SLANVERT

SBHQ Series High Voltage Drive

USER'S MANUAL

Hope SenLan Science & Technology Holding Corp., Ltd

Contents

Foreword

Thank you for purchasing Slanvert SBHQ series high voltage inverter.

The Slanvert SBHQ series high voltage inverter is a new generation of high-performance, multi-function series high voltage inverter independently developed by Hope Senlan Science and Technology Holding Corp., Ltd., with high power factor, high reliability, high efficiency, low harmonic content, low loss, easy maintenance, less land and other characteristics, it is a high-pressure direct input and inverter high-voltage direct output of "high-high" type high-voltage frequency converter, suitable for ordinary three-phase high-voltage induction asynchronous motor, and it can be widely used in the fields of metallurgy, electric power, machinery, paper making, building material, chemical, petroleum, pharmaceutical, mining, etc.

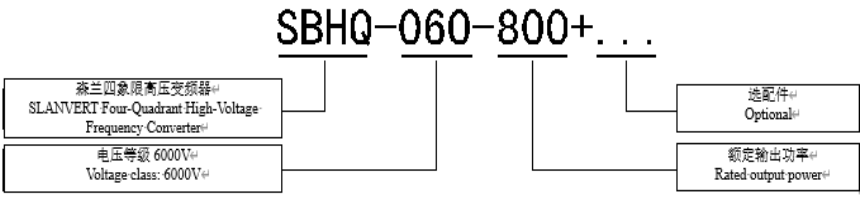
This Manual provides users with installation wiring, parameter setting, daily maintenance, fault diagnosis and troubleshooting, etc. Before installing, setting up, running and maintaining the inverter, please be sure to read all the contents of the User Manual of this product in detail, memorize the relevant knowledge and safety precautions of the inverter, and ensure the correct use and give full play to its superior performance. Technical specification of this product may change without prior notice. The Manual of this product shall be properly kept until the inverter is scrapped.

Precautions for Unpacking Inspection

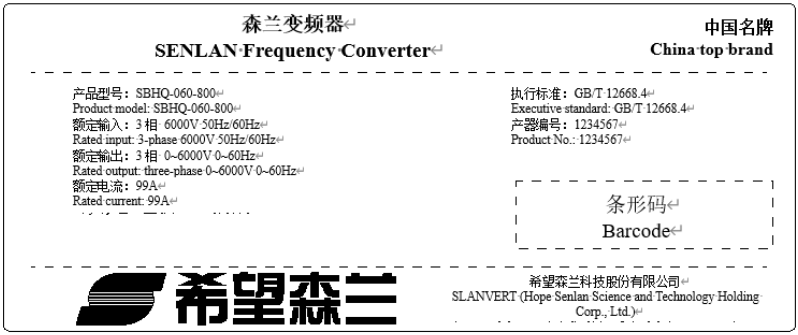
When unpacking, please confirm the following items carefully. In case of any problem, please contact us or the Supplier directly.

Verification Items	Verification Methods
Is it in line with your order?	Confirm whether the nameplate of inverter is consistent with your order.
Is there any damage to the product?	Check the overall appearance of the product to confirm whether it is damaged during transportation.

Model description of the inverter



Description on inverter nameplate (taking SBHQ-060-1120 as an example)



Definition of Safety Signs

For safety-related contents in this manual, please use the following signs, and the contents with safety signs must be followed.

 Danger **: wrong use or operation not according to the requirements may cause damage to the inverter or casualties.**

 Attention : operation not according to the requirements may result in abnormal operation of the system. In serious cases, it may cause inverter or mechanical damage.

The comparison table of some terms and abbreviations is as follows:

Name	Meaning and Description
AI	Analog Input, see page 105.
AO	Analog Output, see page 106.
AVR	Automatic Voltage Regulation, see page 78.
EMC	Electric Magnetic Compatibility
EMI	Electric Magnetic Interference
LED	Light Emitting Diode
PID	Proportional-Integral-Derivative, see page 108.
PG	Pulse Generator
PWM	Pulse Width Modulate
Digital input n	It refers to internal switching signal of the nth item in the digital input function definition table on page 96. Available for X terminal, FWD, REV terminal selection
Digital output n	It refers to internal switching signal of the nth item in the digital output function definition table on page 101. Available for Y terminal, relay selection output

1. Safety and Precautions

1.1 Safety Precautions

I. Installation

■ Read and understand the installation section below before installing the high-voltage inverter.

■ Do not install the inverter at the place with or near combustible materials, or there will be a fire risk.

■ Do not install it in an environment containing combustible gas, or it may pose an explosion risk.

II. Wiring

■ The wiring shall be operated by personnel with professional qualification to prevent electric shock danger.

■ Make sure the indicator light of the high-voltage live indicator is completely off, otherwise it may cause electric shock.

■ Make sure the input power supply is completely disconnected, and hang obvious operation signs before wiring operation, otherwise it may cause electric shock.

■ Comply with standard and local safety rules when installing external wiring. Protective isolation sections must be provided between high and low voltage cables and any other cables specified in CE safety standards.

■ High-voltage circuit breaker for circuit protection shall be provided at the power side of high-voltage inverter.

■ The grounding terminal (PE) of the inverter must be reliably and correctly grounded (ground resistance: ≤0.5Ω), otherwise it may cause electric shock.

■ The output terminals (U, V, W) must never be directly connected to the AC power supply.

III. Inspection before Power On

■ The inverter door must be closed before power on, otherwise it may cause electric shock and explosion.

■ The inverter can control the motor to run at high speed. To run above the rated frequency of the motor, it must first confirm whether the motor and mechanical device can withstand high speed operation.

IV. Power on and Operation Precautions

■ The frequency conversion speed regulation system is the high-voltage dangerous equipment, and any operator must strictly observe the operation rules when operating.

■ Untrained on-duty personnel shall not perform any operation on the touch screen.

■ The voltage of the input power terminal shall not exceed the rated voltage range, otherwise the inverter will be damaged.

■ Check whether the parameter setting is correct before test run.

■ The cabinet door cannot be opened when the input power is connected, there is high voltage inside and it may cause electric shock.

■ Do not use wet hands to operate the inverter, otherwise it may cause electric shock.

■ Do not turn on or off the input power to control the inverter operation and stop.

■ When parameter initialization is performed, the parameters shall be reset.

■ When selecting the restart function (such as fault self-reset or instantaneous power failure restart), do not get close to the motor and mechanical load while the inverter is waiting for starting.

■ Even after the high-voltage circuit breaker is disconnected and the control power switch is turned off, there may still be hazardous voltages in the inverter cabinet (e.g., energy storage within the unit).

■ There may still be dangerous voltage in the inverter cabinet when the circuit breaker is turned on (off) and the power is turned off.

■ Guardrails (marked with high-voltage hazard signs) shall be installed on the necessary position, and they shall not be removed during operation.

V. Transportation and Packing Precautions

■ Do not place heavy objects on the inverter.

■ Do not exert any force on the human machine interface and the cover plate in the course of handling, otherwise it may cause personal injury or property loss.

■ The equipment in the cabinet must be protected against wind and rain. If it must be stored outdoors temporarily, heater must be used in the cabinet to prevent condensation. Protective covers such as plastic or canvas shall be placed thereon. These measures are especially important if the equipment is placed for a long time.

VI. Scrapping

■ It shall be scrapped as industrial wastes.

■ The electrolytic capacitor inside the inverter may explode when burned.

■ The plastic parts of the inverter will produce toxic gas when burned.

1.2 Precautions

I. About Motor and Mechanical Load

■ Constant-torque and low-speed operation

When the inverter drives the common motor to run at low speed for a long time, the temperature of the motor will rise due to the poor heat dissipation effect of the motor. If running at low speed constant torque for a long time is needed, it must use frequency conversion motor or forced air cooling.

■ Motor overload protection

When the adaptive motor is selected, the inverter can protect the motor from overload. If the motor does not match the rated capacity of the inverter, the protection value must be adjusted or other protective measures must be taken to ensure the safe operation of the motor.

■ Operation above the frequency of 50Hz

In case of operation exceeding 50Hz, in addition to considering the increase of vibration and noise of the motor, it must also confirm whether the use speed range of the motor bearing and mechanical device is allowed.

■ Lubrication for mechanical device

When the gearbox, gear and other mechanical devices needing to be lubricated are operated at low speed for a long time, they may be damaged due to poor lubrication effect, so they must be confirmed in advance.

■ Regenerative torque load

For the occasion of lifting load, there is often a regenerative torque, the inverter often stops due to overvoltage protection, at this time the appropriate specification of the brake components shall be considered.

■ Mechanical resonance point of load device

The inverter may encounter the mechanical resonance point of the load device within a certain output frequency range, which can be avoided by setting anti-vibration rubber under the base plate of the motor or by setting the frequency avoidance of the inverter.

■ Insulation inspection of motor before being connected with the inverter

When the motor is used for the first time and re-used after long time placement, insulation inspection for motor shall be carried out prevent the inverter from damage due to insulation failure of the motor winding. Please use 2500V voltage megohmmeter for test, and it shall guarantee that the measured insulation resistance is not less than 5MΩ.

II. About the Inverter

■ Capacitance or pressure sensitive devices improving the power factor

As the inverter outputs PWM voltage, if the output side is installed with capacitance or lightning protection voltage-sensitive resistor for improving power factor, it will cause the inverter fault trip or device damage, please be sure to remove it.

■ Contactors and other switching devices installed at the output end of the inverter

If switches such as contactors need to be installed between the inverter output and the motor, please be sure to switch on and off when the inverter has no output, otherwise the inverter may be damaged.

■ Occasion for frequent start and stop

It is advisable to carry out start/stop control for the inverter through the stop and start command. It is strictly prohibited to use contactors and other switching devices on the input side of the inverter for direct and frequent start and stop, or it will cause equipment damage.

■ Use beyond rated voltage

SBHQ series high-voltage inverter is not suitable for use outside the allowable input voltage range. If necessary, please contact the manufacturer.

■ Lightning impulse protection

The inverter is equipped with lightning overvoltage protection device, which has a certain self-protection ability for inductive lightning.

■ Derating of inverter

1) If the ambient temperature exceeds 40°C, the converter shall be derated by 5% per 1°C, and external forced heat dissipation must be added;

2) In areas with an altitude of more than 1000m, the thin air will cause the heat dissipation effect of the inverter to deteriorate, and it is necessary to derate for use. For every 100m, the derating is 1%.

2. Product Specification

2.1 General Technical Specification of SBHQ Series Four-Quadrant High-Voltage Frequency Converter

Items		Item Description
Input	Rated voltage, frequency	Three phases: 3kV/3.3kV/6kV/6.6kV/10kV/11kV，50Hz/60Hz
	Allowable range	Voltage fluctuation range: －20%~＋15%, available for instantaneous -30%; frequency: ± 5%
Output	Output voltage	Three-phase, 0V~input voltage, error<5%
	Output frequency range	0.00~60.00Hz
Basic specifications	Motor control mode	Without PGV/F control, with PGV/F control, without PG vector control, with PG vector control
	Overload capacity	150% rated current (1min); protect immediately for 200% rated current
	Frequency resolution	Digital setting: 0.01Hz; simulation setting: 0.1% of the maximum frequency
	Run command channel	Human machine interface setting, control terminal setting, communication setting, switchable via terminal
	Frequency setting channel	Human machine interface, communication setting, UP/DOWN regulating valve, AI1, AI2, AI3, PFI
	Auxiliary frequency setting	For flexible auxiliary frequency trim and setting frequency synthesis
	Torque boost	Automatic torque boost, manual torque boost
	V/F curve	Users can define V/F curve, linear V/F curve and 5 reduction torque characteristic curves
	Acceleration & deceleration methods	Linear acceleration & deceleration, S curve acceleration & deceleration
	Jog	Jog frequency range: 0.10~50.00HZ; jog acceleration & deceleration time: 0.1~600.0s
	Automatic energy-saving operation	Automatically optimize V/F curve according to load condition for automatic energy-saving operation
	Automatic voltage regulation (AVR)	When grid voltage changes within a certain range, automatically maintain a constant output voltage
	Instantaneous stop processing	When powering down instantaneously, the equipment can continue operating
	PFI	Maximum input frequency: 50kHz
	PFO	Output of 0~50kHz collector open ended pulse square signal is programmable.
	Analog input	Input of 3-path analog signals can select voltage mode or current mode frequency inverter via positive or negative input.
	Analog output	4-path analog signal output can respectively select 0/4~20mA or 0/2~10V, programmable
	Digital input	8-path optional multifunctional digital input
	Digital output	2-path multifunctional digital output, and 3-path multifunctional relay output
	Communication	Internal RS485 communication interface supports Modbus protocol and Profibus-DP (optional).
Features	Process PID	Two groups of PID parameters, various modification modes;
	Multistage speed method	Encoding selection, direct selection, overlap selection and number selection method
Protection		Over-current, over-voltage, under-voltage, input/output phase loss, output short circuit, output grounding, overheat, motor overload, external failure, lost connection of analog input, stall prevention, motor PTC or Pt100 overheat protection, etc.
Optional		One-for-one manual bypass cabinet, one-for-two manual bypass cabinet, one-for-one automatic bypass cabinet, one-for-two automatic bypass cabinet, communication module, SHE-PU01 human machine interface, Profibus-DP

Items		Item Description
Environment	Application site	With elevation below 1,000m, indoor, without direction sunshine, dust, corrosive gas, combustible gas, oil mist, water vapor, water drop, and salt mist, etc.
	Operating ambient temperature/humidity	-10~＋40℃/20~90%RH, without condensation water drop
	Vibration	<5.9m/s² (0.6g)
Structure	Degree of protection	Above IP30
	Cooling mode	Forced cooling, with control fan

2.2 Product Series Specification

See the following table for rated value of SBHQ series four-quadrant high-voltage frequency converter:

6kV:

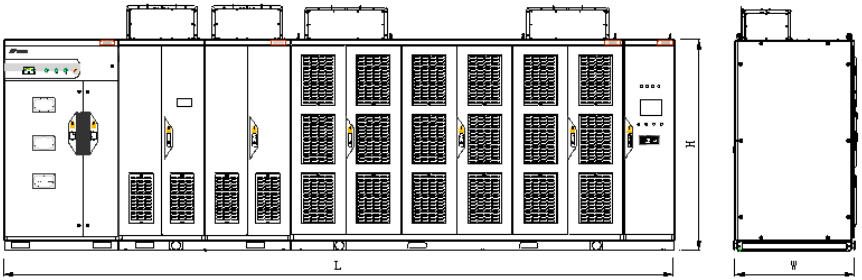
Frequency converter model	Rated capacity （kVA）	Rated output Current (A)	Adaptive motor （kW）	Frequency converter model	Rated capacity （kVA）	Rated output Current (A)	Adaptive motor （kW）
SBHQ-060-160	200	20	160	SBHQ-060-710	900	88	710
SBHQ-060-200	250	25	200	SBHQ-060-800	1000	99	800
SBHQ-060-220	275	28	220	SBHQ-060-900	1125	111	900
SBHQ-060-250	315	31	250	SBHQ-060-1000	1250	123	1000
SBHQ-060-280	350	35	280	SBHQ-060-1120	1400	138	1120
SBHQ-060-315	400	39	315	SBHQ-060-1250	1600	154	1250
SBHQ-060-355	450	44	355	SBHQ-060-1400	1750	173	1400
SBHQ-060-400	500	50	400	SBHQ-060-1600	2000	198	1600
SBHQ-060-450	560	56	450	SBHQ-060-1800	2250	222	1800
SBHQ-060-500	630	62	500	SBHQ-060-2000	2500	247	2000
SBHQ-060-560	700	69	560	SBHQ-060-2240	2800	277	2240
SBHQ-060-630	800	78	630	SBHQ-060-2500	3150	309	2500

10kV:

Frequency converter model	Rated capacity （kVA）	Rated output Current (A)	Adaptive motor （kW）	Frequency converter model	Rated capacity （kVA）	Rated output Current (A)	Adaptive motor （kW）
SBHQ-100-200	250	15	200	SBHQ-100-1000	1250	75	1000
SBHQ-100-250	315	19	250	SBHQ-100-1120	1400	84	1120
SBHQ-100-280	350	21	280	SBHQ-100-1250	1600	94	1250
SBHQ-100-315	400	24	315	SBHQ-100-1400	1750	105	1400
SBHQ-100-355	450	27	355	SBHQ-100-1600	2000	115	1600
SBHQ-100-400	500	30	400	SBHQ-100-1800	2250	130	1800
SBHQ-100-450	560	34	450	SBHQ-100-2000	2500	144	2000
SBHQ-100-500	630	38	500	SBHQ-100-2240	2800	162	2240
SBHQ-100-560	700	42	560	SBHQ-100-2500	3150	182	2500

SBHQ-100-630	800	47	630	SBHQ-100-2800	3500	205	2800
SBHQ-100-710	900	53	710	SBHQ-100-3150	4000	230	3150
SBHQ-100-800	1000	60	800	SBHQ-100-3550	4500	260	3550
SBHQ-100-900	1125	68	900	SBHQ-100-4000	5000	290	4000

The outline drawing of SBHQ series frequency converter is as shown below:



The boundary dimension and weight of SBH series inverter are as shown in the Table below: (the size and weight of the all-in-one machine are shown below)

6kV:

Frequency converter model	L	W	H	Weight (kg)	Frequency converter model	L	W	H	Weight (kg)
SBHQ-060-160	5025	1250	2200	2800	SBHQ-060-710	5175	1250	2200	4000
SBHQ-060-200	5025	1250	2200	2900	SBHQ-060-800	5175	1250	2200	4200
SBHQ-060-220	5025	1250	2200	3000	SBHQ-060-900	5175	1250	2200	4450
SBHQ-060-250	5025	1250	2200	3150	SBHQ-060-1000	5175	1250	2200	4600
SBHQ-060-280	5025	1250	2200	3250	SBHQ-060-1120	5175	1250	2200	4850
SBHQ-060-315	5025	1250	2200	3350	SBHQ-060-1250	5175	1250	2200	5100
SBHQ-060-355	5025	1250	2200	3400	SBHQ-060-1400	5960	1550	2300	5500
SBHQ-060-400	5025	1250	2200	3500	SBHQ-060-1600	5960	1550	2300	6000
SBHQ-060-450	5025	1250	2200	3550	SBHQ-060-1800	5960	1550	2300	6500
SBHQ-060-500	5025	1250	2200	3650	SBHQ-060-2000	5960	1550	2300	7000
SBHQ-060-560	5175	1250	2200	3750	SBHQ-060-2240	5960	1550	2300	7200
SBHQ-060-630	5175	1250	2200	3900	SBHQ-060-2500	5960	1550	2300	7600

10kV:

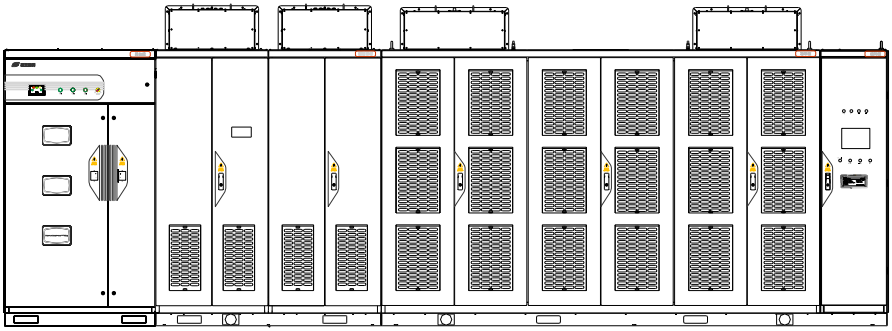
Frequency converter model	L	W	H	Weight (kg)	Frequency converter model	L	W	H	Weight (kg)
SBHQ-100-200	5860	1250	2200	3000	SBHQ-100-1000	5860	1250	2200	4950
SBHQ-100-250	5860	1250	2200	3150	SBHQ-100-1120	6110	1250	2200	5100

Frequency converter model	L	W	H	Weight (kg)	Frequency converter model	L	W	H	Weight (kg)
SBHQ-100-280	5860	1250	2200	3250	SBHQ-100-1250	6110	1250	2200	5500
SBHQ-100-315	5860	1250	2200	3350	SBHQ-100-1400	6410	1250	2200	6000
SBHQ-100-355	5860	1250	2200	3450	SBHQ-100-1600	6410	1250	2200	6500
SBHQ-100-400	5860	1250	2200	3500	SBHQ-100-1800	6410	1250	2200	6900
SBHQ-100-450	5860	1250	2200	3600	SBHQ-100-2000	6410	1250	2200	7200
SBHQ-100-500	5860	1250	2200	3650	SBHQ-100-2240	7090	1550	2300	7500
SBHQ-100-560	5860	1250	2200	3750	SBHQ-100-2500	7090	1550	2300	8000
SBHQ-100-630	5860	1250	2200	4000	SBHQ-100-2800	7090	1550	2300	8500
SBHQ-100-710	5860	1250	2200	4200	SBHQ-100-3150	7090	1550	2300	9000
SBHQ-100-800	5860	1250	2200	4400	SBHQ-100-3550	7090	1550	2300	9500
SBHQ-100-900	5860	1250	2200	4500	SBHQ-100-4000	7090	1550	2300	10800

Note: The above size is the standard size, which shall be subject to the project for different products.

2.3 Composition and Working Principle of System

2.3.1 Frequency Converter Component



◆ Switch cabinet

The voltage at grid side is introduced into the inverter, and the output of the inverter is sent to the motor through the high-voltage vacuum switch or the isolation switch. It is equipped with a variety of specifications of power frequency bypass cabinets for users to choose from. The standard configuration is a manual bypass cabinet, and users can perform power frequency bypass operations.

◆ Transformer cabinet

Dry phase-shifting transformer is installed to provide low voltage power supply to the power unit. Meanwhile, through the phase-shifting technology, the harmonic THD at the input side of the power grid is kept below 3% when over 70% of the load is loaded.

◆ Power cabinet

It is the core power part of the inverter, with multiple H-bridge power units built in. The output of each phase of the inverter is obtained by multiple power units in series. The three-phase output of variable frequency and variable voltage can be obtained by coordinating and controlling the PWM waveform sent by each power unit.

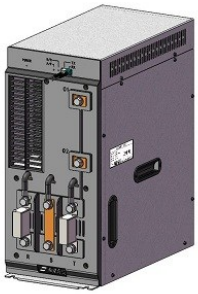
◆ Control cabinet

As the core control part of the inverter, it is responsible for the coordination and control of the whole electrical system, the control and monitoring of the power unit through optical fiber, and the communication between various components. Besides, it has the remote monitoring function. It is equipped with the operation button and LCD human machine interface.

◆ Power unit

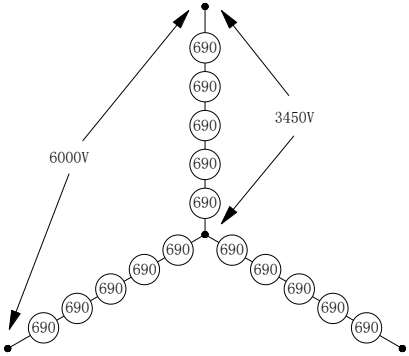
The power unit is equivalent to a single-phase frequency converter, and its electrical schematic diagram is shown below, mainly including input filter capacitor, input filter reactor, three-phase synchronous rectifier circuit, capacitor bank and IGBT (or IPM) frequency converter circuit, as well as control circuit responsible for optical fiber communication, PWM control, fault detection and protection. The synchronous rectifier control circuit continuously monitors the amplitude and phase of the input voltage of the power unit. By controlling the switching of the rectifier-side IGBT in coordination with the input reactor, it generates a sinusoidal current waveform that is in phase with the input voltage, thereby eliminating harmonics generated by the diode rectifier bridge. The power factor reaches over 98%. Harmonic pollution to the grid is eliminated.

It is the core component of the inverter, with three-phase AC 690V input and single-phase PWM inverter output. The unit itself is equipped with such functions as fault detection, protection and status report. The appearance of power unit is as shown in the figure below.



2.3.2 Series Connection Principle of Unit

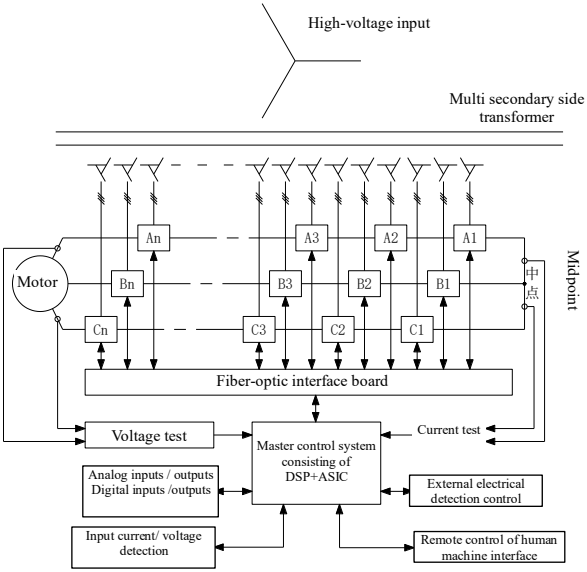
The output of each phase of the SBHQ series high-voltage inverter (6kV) is obtained by series connection of 5 units. The voltage superposition principle is shown below.



Schematic Diagram of Voltage Superposition

Each unit is three-phase input and single-phase inverter output. When the system is operated at 50Hz, the effective output voltage of each unit is 690V, and the phase voltage of 5 units is 3450V through overlying, and the circuit voltage of three-phase output is 6000V.

The figure below shows the schematic diagram of circuit principle of high-voltage inverter in series connection of units.

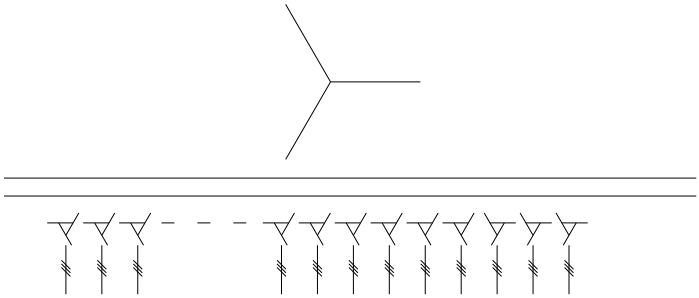


Schematic Diagram of Circuit Principle of Medium-voltage Inverter in Series Connection of Units

Multiple sets of secondary side output are provided for the power grid input via multi secondary side phase-shifting transformer to respectively supply the power units with power. The three-phase output is composed of one-phase output consisting of several power units in series. The main control system controls the frequency and amplitude of output voltage of the inverter by controlling the PWM output of each power unit, so as to control the motor speed. Main control system and unit communicate through optical fiber, which ensures reliable signal transmission and insulated isolation between main control and high voltage parts.

2.3.3 Phase-shifting Transformer

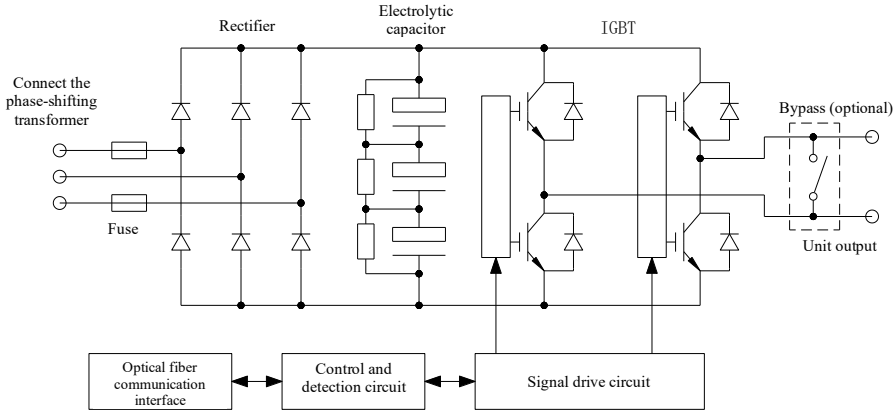
The input isolation transformer in the SBHQ series high-voltage inverter is dry shift transformer with multiple secondary sides, and its electrical principle is shown in the following figure:



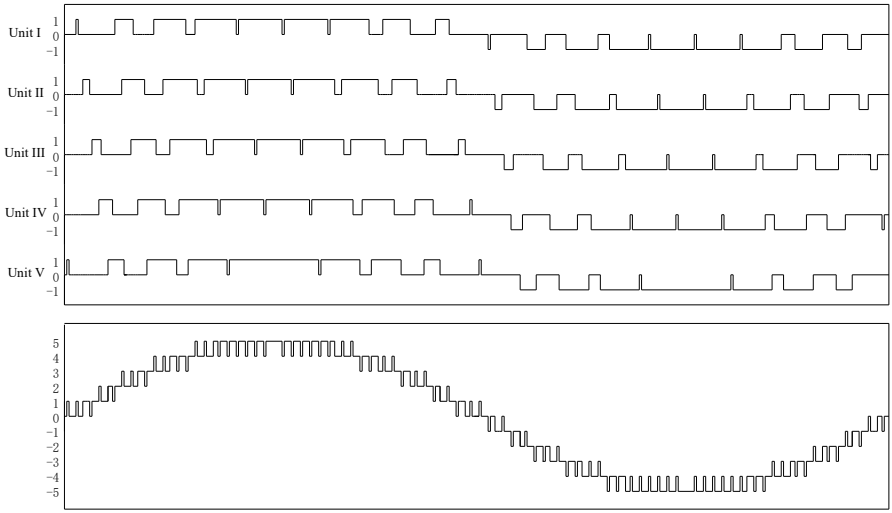
The rated input voltage of the transformer can be arbitrary, and the output voltage at the secondary side is 690V. The secondary side has 15 sets of winding in total (6kV system), and each set of winding realizes a certain phase shift through the extension triangle connection, $\text{Phase-shift angle} = \frac{60°}{\text{Number of units in each phase}}$. The phase-shifting transformer can reduce the voltage and supply power to the power unit, thus the phase-shifting multiplexing of the rectifier input current can be realized, and the leakage reactance of the transformer can be added to eliminate the input current harmonic at the network side. The input current THD can be controlled below 3% by using the phase-shifting transformer with multiple secondary sides.

2.3.4 Electrical Principle of Power Unit

The power unit is equivalent to a single-phase inverter, and its electrical schematic diagram is shown below, mainly including three-phase bridge rectifier circuit, capacitor bank and IGBT (or IPM) inverter circuit, as well as control circuit responsible for optical fiber communication, PWM control, fault detection and protection.

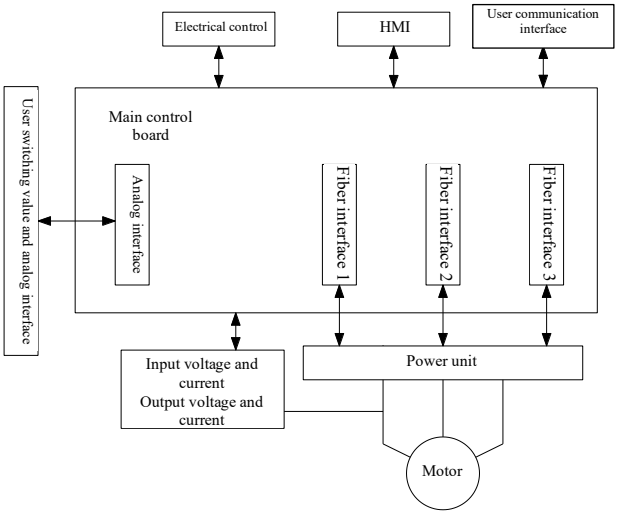


The power unit adopts a modular design, with each unit equipped with an independent CPLD processor and voltage/current sampling circuits, enabling independent energy feedback control under the coordination of the main control system. Each unit of SBHQ series four-quadrant high-voltage frequency converter can be mutually replaced, and each phase is connected by multiple units in series to obtain multiple phase voltage output. The following figure shows the phase voltage output waveform obtained by 6 units in series.



The phase voltage can produce a total of 2×5+1=11 steps, and the output voltage harmonics can be suppressed below 5%.

2.3.5 Main Control System



Block Diagram of Main Control System

The block diagram of the main control system is shown above and the main control system consists of main control panel, external interface and some detection circuits. The electric control interface is used for controlling the electrical switch and receiving the user operational orders. The main control panel consists of main control circuit, monitoring circuit, communication interface of LCD human-computer interface, voltage and current detection circuits and optical fiber communication circuit. Main control circuit is used for computing the PWM pulse and sending it to the power units

through optical fiber communication circuit. LCD human-computer interface is used for parameter setting and status display.

Core components of SBHQ high-voltage inverter's master main control system are dedicated chips for DSP and FPGA, with high reliability and computing speed. Compared with the master control system consisting of single chip as the core component, it has obvious advantages.

2.3.6 Bypass Function

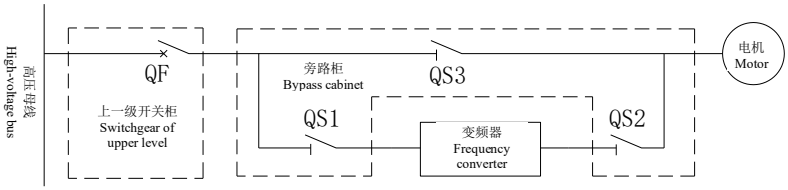
QF uses a high-voltage circuit breaker with comprehensive relay protection.

If QS1, QS2, and QS3 are manual isolation switches, the motor can achieve manual bypass.

When QS1 is closed, QS2 is closed, and QS3 is open, the motor can be speed-controlled by the frequency converter.

When QS1 is open, QS2 is open, and QS3 is closed, the motor can be directly started/stopped and protected by QF, completely isolating the frequency converter from the grid for easier maintenance and inspection.

If QS1, QS2, and QS3 are all electrical switches, automatic motor bypass or soft-start functionality can be achieved.



Note: Direct power-frequency starting/stopping causes significant mechanical load impact, please use with caution.

3. Handling, Installation and Wiring

3.1 Handling and Installation of Inverter

Danger	**1. All inspection work of the frequency converter can only be carried out by trained professionals.** **2. Do not install or use the frequency converter if it is damaged or its components are incomplete; otherwise it may result in fire and personal injury.** **3. The inverter shall be installed where it can withstand the weight of the inverter, otherwise there is a risk of injury or damage to property when falling.**

Each electric cabinet of SBHQ series four-quadrant high-voltage frequency converter is under the condition of the whole assembly, testing, packaging factory, so the cabinet must be transported as a whole in the transportation process. In order to improve the reliability of the VVVF system and avoid the damage of the high-voltage VVF system during transportation, the basic requirements for transportation and storage are determined in this chapter. The environmental requirements for transportation and storage detailed in this chapter must be strictly followed. Violation of the relevant requirements in this chapter will affect the service life of the high-voltage variable frequency speed regulation system.

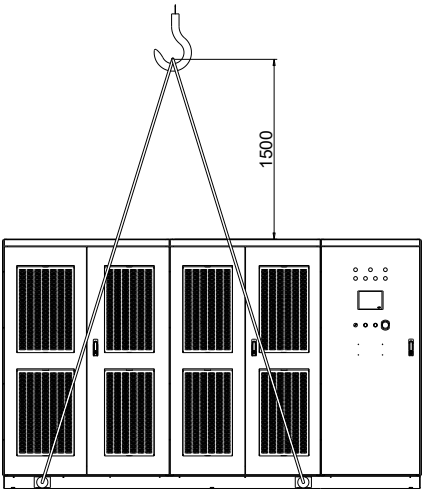
3.1.1 Transportation of High-voltage Inverter

The external packing of SBHQ series four-quadrant high-voltage frequency converter can withstand the external impact of sea, land or air transportation, but appropriate protective measures must be taken to prevent water immersion and dust contamination. In addition, it shall also prevent the impact of external mechanical damage and rough handling in the sea, land and air transportation process. For proper handling, disassembly and storage, please pay attention to all relevant notes and instruction labels marked on the packing cases. It is suggested to entrust a reputable logistics company to undertake the hoisting and transportation of high-voltage variable frequency speed regulating system.

Transportation: SBHQ series four-quadrant high-voltage variable frequency speed regulation system can be transported by car, train, plane, ship and any other means of transportation. Products must be handled with care during transportation, no rain, sun exposure, and there shall be no violent vibration, impact or reverse.

Handling: power unit cabinet, control cabinet and switching cabinet can be directly handled by lifting ring; during transportation, the frequency converter shall be protected from impact and vibration. All cabinets shall not be upside down and the inclination angle shall not exceed 30°. Because phase-shifting transformer is too heavy, before hoisting, transformer and transformer cabinet have been fixed into one unit, rings on the cabinet body shall not be adopted, and hoisting holes on the transformer shall be used directly. To prevent the deformation of the cabinet, the angle between the sling and the cabinet shall not be less than 60 °, see the figure above. Take special care during lifting, to prevent damaging or scratching the cabinet. The converter shall be placed vertically when handling.

Schematic Diagram for Overall Hoisting



Attention : Since the fan cover will interfere the lifting, remove the fan cover before lifting. Install the fan cover after lifting.

In addition, all cabinets are provided with forklifts for easy handling by forklift.

3.1.2 Storage and Installation Conditions of High-voltage Inverter

Improper storage of power electronics can affect the life of the equipment and even cause the equipment to fail to function properly.

Storage environment: free from direct sunlight, no dust, no corrosive gases, no flammable gases, no oil mist, no steam and no dripping;

Relative humidity 5 ~ 95%, storage temperature -40 ~ +70 ° C, do not place where there is a sudden change in temperature causing condensation and freezing.

Do not place it directly on the ground, it shall be placed on a suitable support;

If there is moisture, appropriate amount of desiccant shall be provided.

Period, and pay special attention to mechanical damage; effects caused by humidity, temperature or fire. If the package is damaged or you find that the equipment has been damaged, immediately check the damage of the device, repair the damaged device and store the variable frequency speed control system according to the above requirements.

The converter shall be installed in an indoor place with good ventilation. When selecting the installation environment, pay attention to the following conditions:

1. The ambient temperature is required to be in the range of -10 ~ 40 °C. The life of the converter is greatly affected by the ambient temperature. Make sure that the temperature of the surrounding environment does not exceed the allowable range. If the ambient temperature exceeds 40°C, the converter shall be derated by 5% per 1°C, and external forced heat dissipation must be added;

2. In areas with an altitude of more than 1000m, the thin air will cause the heat dissipation effect of the converter to deteriorate, and it is necessary to derate for use. For every 100m, the derating is 1%;

3. The humidity must be lower than 90% RH, without water condensation;

4. Be installed in a place where the vibration is less than 5.9m/s^2 (0.6g);

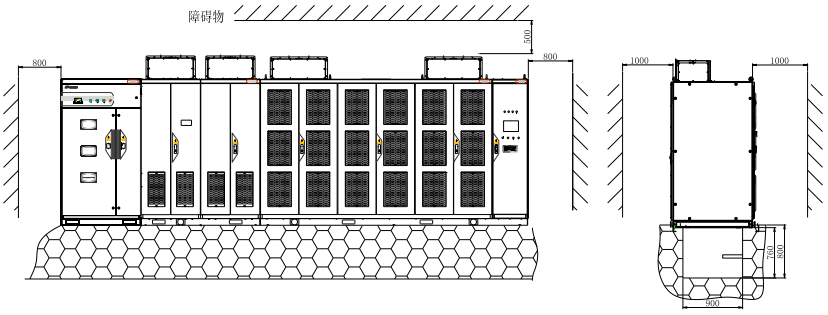
5. Avoid to be installed in places exposed to direct sunlight;

The place of installation shall be free from dust and metal powder;

7. It is strictly forbidden to be installed in places with corrosive and flammable gases;

8. The efficiency of the high-voltage inverter is above 96%, and the loss becomes heat energy. In order to reduce the ambient temperature, the user can install a centralized ventilation duct, and then the hot air is directly led through the air duct to the outdoor. It is recommended that the exhaust air volume per 100kW inverter capacity be >1800m^3/h. When using air conditioning for cooling, the air conditioning configuration per 100kW converter capacity is >2p.

9. Inverter installation interval and distance requirements are shown in the figure below:



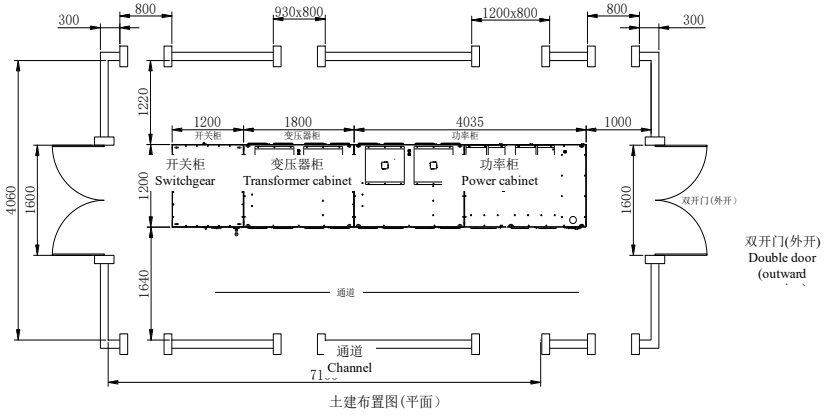
Air Duct Schematic Diagram

Air inlet

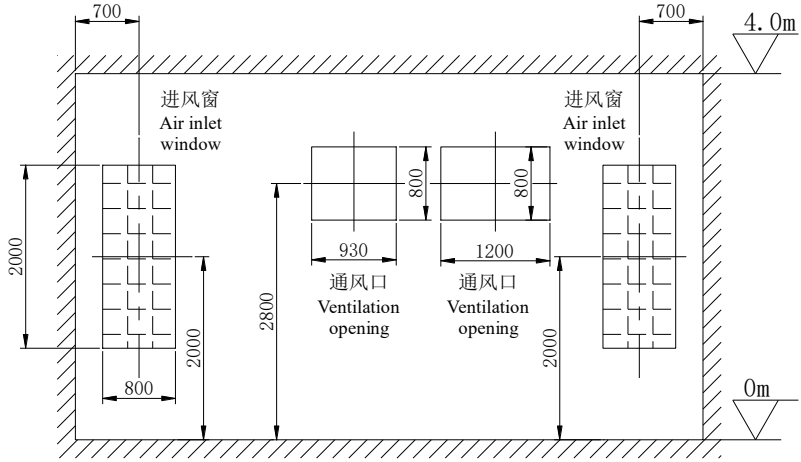
10. Civil Works and Cabinet Installation:

Cabinet of high voltage variable frequency speed control system must be placed vertically on the concrete-grouted flat channel steel foundation frame with overall surface roughness of less than 5 mm. The foundation must be made of non-combustible materials with smooth and abrasion-free surfaces. The foundation It must be moisture-proof and able to withstand the weight of the variable frequency speed control system. Cable pipelines must be made of non-combustible materials with smooth and abrasion-free surfaces. It must be moisture-proof and dust-proof and able to keep animals outside. All cabinets shall be firmly welded on the base and reliably connected with the ground of the plant. The grounding resistance shall not be greater than 0.5Ω. The antirust treatment shall be conducted for welding parts.

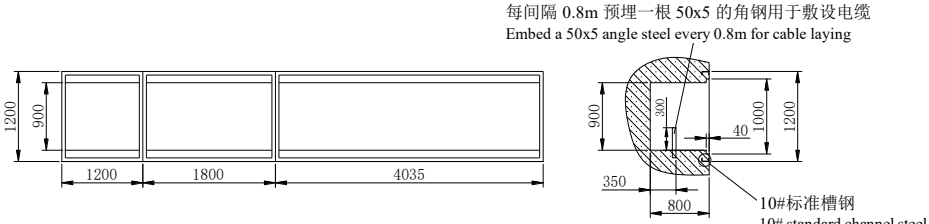
Civil Layout for Equipment Installation (taking SBHQ-060-1120 as an example):



土建布置图(平面)
Civil Layout (Plan)



土建布置图(立面视图)
Civil Layout (Elevation View)



电缆沟道及槽钢基础图
Cable Duct and Channel Steel Foundation

When commencing the plant construction, remain the wall on one side unbuilt until converter is in place.

Note: ■ For different projects, there may be differences, which shall be subject to the actual project drawings, and the above is for reference only.

■ For the selection of installation location, do not choose the area with water pipes or liquid fluid pipelines around, so as to prevent water pipe or liquid pipe explosion, which may cause fatal impact on the equipment.

3.2 Wiring of the Inverter

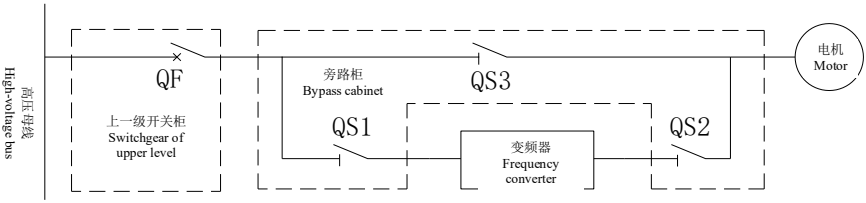
Dange
1. Inverter wiring can only be carried out by trained personnel. **2. The inverter must be grounded reliably, otherwise an electric shock or fire may occur.** **3. It is not allowed to connect the power cable to U, V, W. Otherwise, the inverter will explode.** **4. Before powering on, it shall be carefully verified that the rated input voltage of the inverter is consistent with the voltage level of the AC power supply. Otherwise, it may cause personal injury and equipment damage.** **5. The main circuit terminal and the wire cold press terminal must be firmly connected.** **6. Input R, S, T and output U, V, W terminals must be wired in strict accordance with the phase order.** **7. It is forbidden to connect a surge-absorbing capacitor to the output of the inverter.**

3.2.1 Main Circuit Terminal Wiring and Configuration

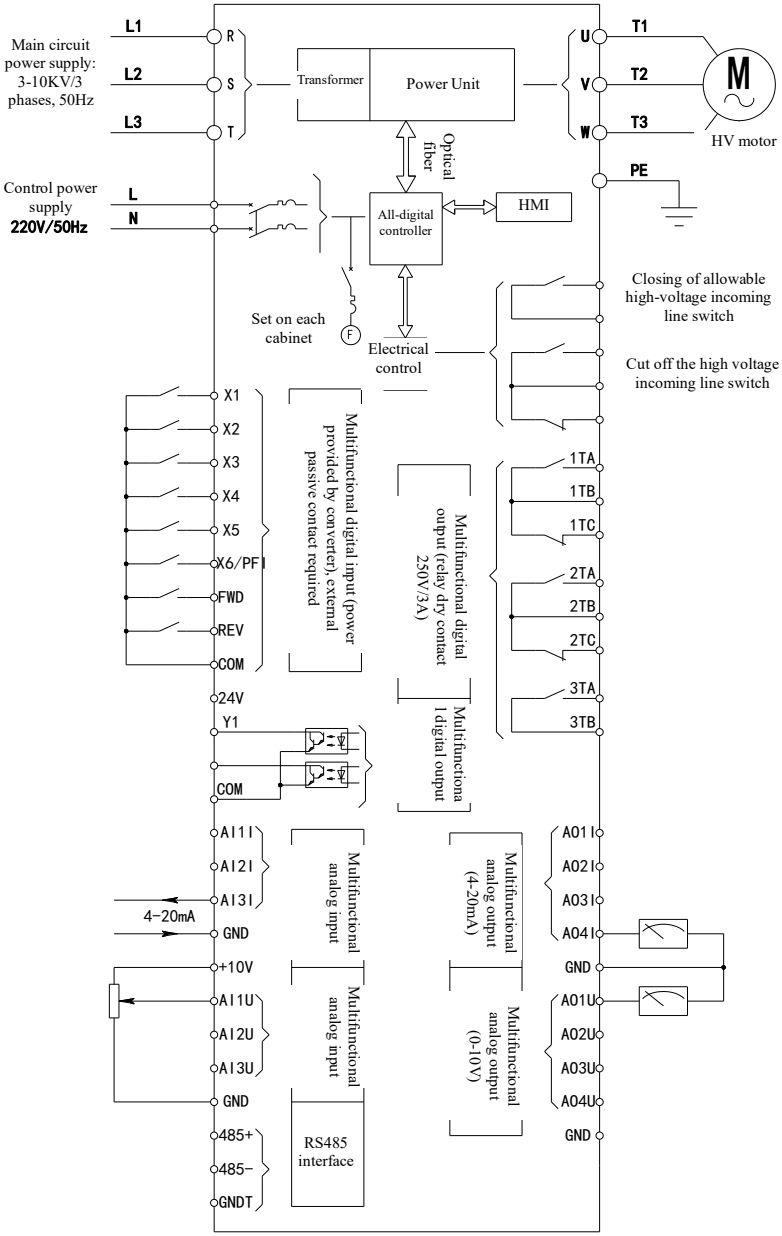
The high-voltage power supply needs to be connected to the high-voltage frequency converter through the main circuit breaker, and the main circuit breaker is allowed to be closed only after receiving the high-voltage closing permission signal sent by the converter.

The main circuit breaker can be a vacuum or gas insulated circuit breaker. It must be featured with overcurrent and short circuit protection functions, and also be able to withstand transformer closing surge current (about 7 to 8 times the rated current of the converter).

Typical main circuit drawing:


高压母线
High-voltage bus
QF
上一级开关柜
Switchgear of
upper level
旁路柜
Bypass cabinet
QS3
QS1
QS2
变频器
Frequency
converter
电机
Motor

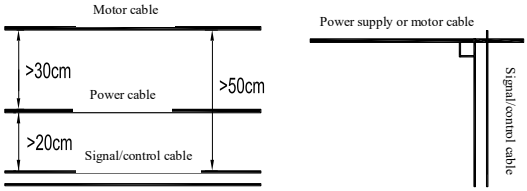
The basic operation wiring connection is as follows:



Description on main circuit terminal function:

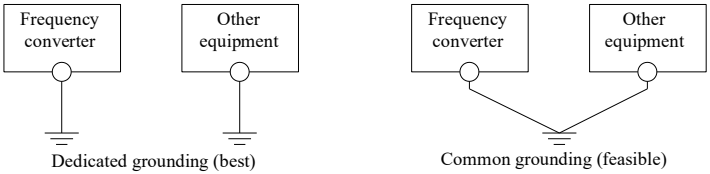
Terminal symbol	Terminal name	Explanation
R, S, T	Input power terminal	Connect to three-phase power supply
U, V, W	Inverter output terminal	Connect with three-phase motor
PE	Grounding terminal	Grounding terminal on inverter case shall be grounded

Control cable, power cable and motor cable shall be applied separately to avoid interference due to intercoupling, and enough far distance shall be maintained between them, especially, when cables are installed in a parallel manner and with long extension distance. If signal cable has to cross power cable, the vertical crossing method shall be applied, shown as follows:

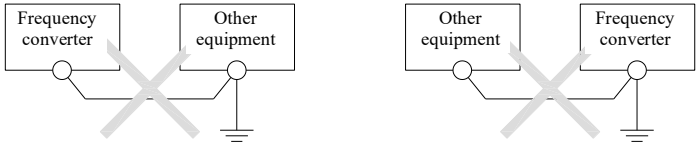


Direct earth capacitance becomes larger and intercoupling interference becomes stronger if motor cable is longer or cross sectional area of motor cable is bigger, therefore, cable with specified cross sectional area shall be applied, and its length shall be as short as possible.

See following figure for recommended earthing method when wiring:



The following earthing methods are not allowed:



3.2.2 Control Terminals and Wiring

The SBHQ series high-voltage inverter user terminal functions are as follows:

Terminal Symbol	Terminal Name	Terminal Function & Description	Technical Specifications
485＋	Positive terminal of 485 differential signal	RS485 communication interface	Can connect 1~32 RS485 sites Input impedance: >10kΩ
485－	Negative terminal of 485 differential signal		

Terminal Symbol	Terminal Name	Terminal Function & Description	Technical Specifications
GNDT	485 differential signal grounding terminal	Communication interface grounding terminal	GNDT is internally isolated from GND and COM
GND	Ground	Analog input/output, grounding terminal for +10V power supply	GND is internally isolated from COM and GNDT
＋10V	+10V reference power supply	+10V power supply to the user	+10V maximum output current 100mA, voltage accuracy better than 2%
AO1I	Multifunctional analog output 1	Function selection: See the description of parameters F6-21, F6-25, F6-29, F6-33 for details.	Current type: 0 ~ 20mA, load ≤ 500Ω
AO2I	Multifunctional analog output 2		
AO3I	Multi-function analog output 3		
AO4I	Multi-function analog output 4		
AO1U	Multifunctional analog output 1		Voltage type: 0~10V, output ≤10mA
AO2U	Multifunctional analog output 2		
AO3U	Multi-function analog output 3		
AO4U	Multi-function analog output 4		
AI1I	Analog input 1	Input type selection: See the description of parameters F6-00, F6-07, F6-14 for details. Note: I and U of the same analog input shall not be used at the same time.	Input current range: -20 ~ +20mA Input impedance: current input: 250Ω
AI2I	Analog input 2		
AI3I	Analog input 3		
AI1U	Analog input 1		Input voltage range: -10 ~ +10V Input impedance: voltage input: 110kΩ
AI2U	Analog input 2		
AI3U	Analog input 3		
24V	24V power terminal	Provide users with 24V voltage	Maximum output current 100mA
X1	X1 digital input terminal	See F4 menus for function selection and settings.	Opto-isolator One-way input Input impedance: >3k Ω Input voltage range: <30V Sampling period: 1ms High level: voltage difference with COM >10V Low level: voltage difference with COM <3V
X2	X2 digital input terminal		
X3	X3 digital input terminal		
X4	X4 digital input terminal		
X5	X5 digital input terminal		
X6	X6 digital input terminal		
REV	REV digital input terminal		
FWD	FWD digital input terminal		
COM	Digital quantity common terminal	Common end of X1~X6, FWD, REV, Y1, Y2, 24V power terminals	Internally isolated from GND, GNDT

Terminal Symbol	Terminal Name	Terminal Function & Description	Technical Specifications
Y1	Y1 digital output terminal	See F5 menus for function selection and configurations.	Optocoupler isolated OC output Specification: 24VDC/50mA
Y2	Y2 digital output terminal		
1TA	Output terminal of relay 1	See F5 menus for function selection and configurations.	TA-TB: normally open TB-TC: normally closed Contact specifications: 250V AC/3A 24V DC/5A
1TB			
1TC			
2TA	Output terminal of relay 2		
2TB			
2TC			
3TA	Output terminal of relay 3		
3TB			

Note: All terminals must not be used beyond the scope. **The above signal points are for reference only, and the actual project drawings and materials are subject to specific projects.**

1) Analog input terminal wiring

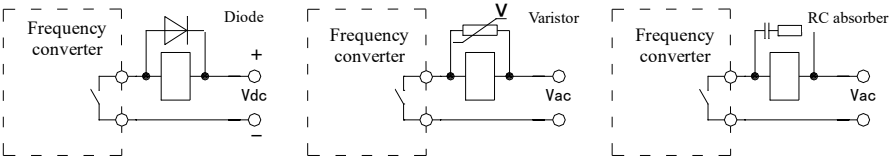
When using voltage analog signals for remote operation, the length of the control line between the operator and the inverter shall be less than 30m. Since the analog signal is susceptible to interference, the analog control line shall be separated from the high-voltage circuit, relay, contactor and other circuits. The wiring shall be as short as possible and the connecting wire shall be shield twisted pair. One end of the shield wire shall be connected to the GND terminal of the inverter.

2) Wiring of multi-function input terminals X1~X6, FWD and REV terminals and multi-function output terminals Y1 and Y2

The multi-function input and output terminal wiring shall be separated from the analog input and output terminal wiring and the power supply line as much as possible. If a shield wire is used, of which, the shield layer shall be grounded reliably. If necessary, the signal wire can also be used to connect the metal pipe to the equipment, and the metal pipe must be grounded, which can reduce some interference. The wiring length of the multi-function input and output terminals shall not exceed 50m. For Y1 and Y2, if driving an inductive load, a freewheeling diode shall be added.

3) Wiring of relay output terminals TA, TB, TC

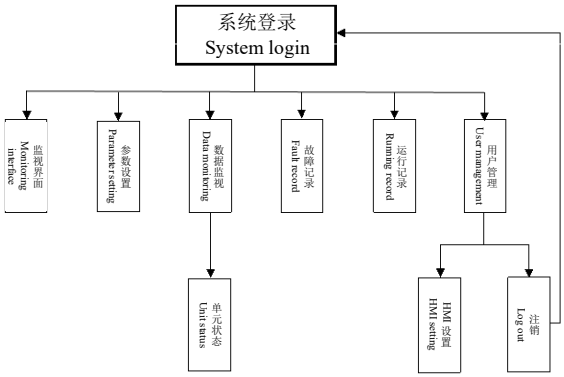
For driving inductive loads (such as electromagnetic relays, contactors, electromagnetic brakes), surge voltage absorbing circuits, varistor or freewheeling diodes (for DC electromagnetic circuits, must pay attention to polarity when installing) shall be installed. The components of the snubber circuit shall be installed close to the coils of the relay or contactor as shown below:



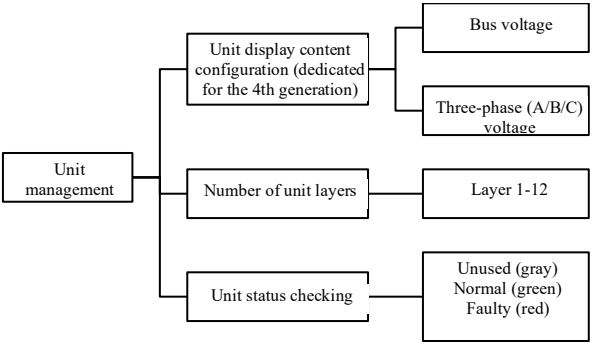
4. Operation of Inverter

4.1 Human & Machine Interface Operation

Functional Block Diagram of SLANVERT Frequency Conversion High Voltage Control System:



Unit management expansion diagram:



System login window:

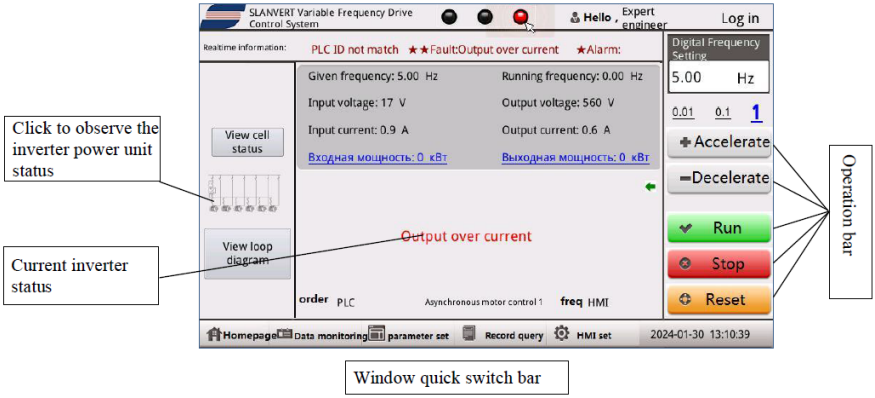
User level: Touch screen is divided into four user levels, i.e., application engineer level, product manager level and expert engineer level. The default passwords for application engineer level and product manager level: any number and 6666 respectively;

Application engineer level can perform simple operations, but cannot modify the function parameters of the inverter;

The product manager level can modify the function parameters of the inverter except the manufacturer's parameters.

The expert engineer level can modify the functional parameters and manufacturer's parameters of the inverter, and can change/retrieve the password of the product manager level.

Homepage window:



Acceleration and deceleration button: When the frequency of the inverter is given to the human machine interface, the set frequency of the inverter is modified in combination with the currently selected acceleration/deceleration step value. It is also feasible to directly click the number under "digital frequency set" and manually enter the required set frequency in the pop-up window.

Start button: Start the converter.

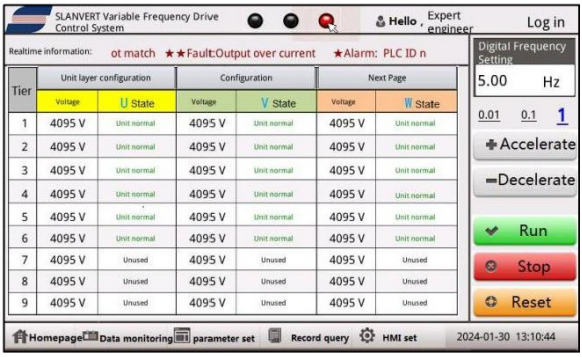
Stop button: Stop the running converter.

Reset button: Reset a fault.

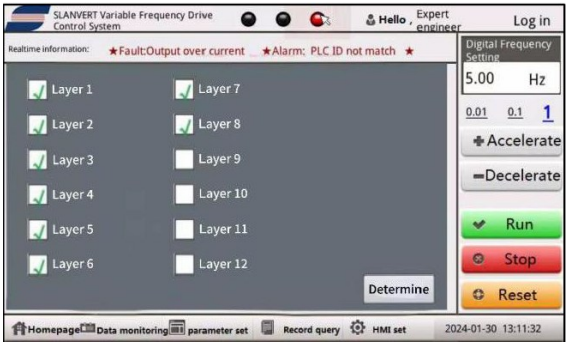
Underlined button in the center of the homepage: re-select the required monitoring parameters.

Note: The "Parameter Settings", "HMI Settings" and "Time" in the Quick Switch bar of the window can only be modified by users higher than the "Application Engineer Level".

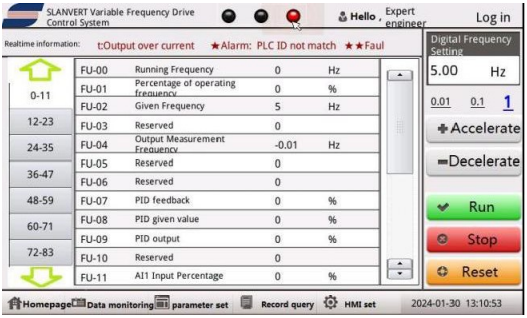
Unit status window: Through this window, it is feasible to observe the real-time unit status, click the previous page and the next page to look up to the status of each layer of units.



In the unit status window, press the "Unit Layer Configuration" button to switch to the unit layer configuration interface.

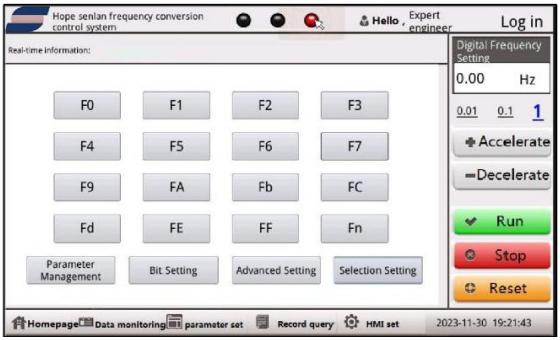


Data monitoring window: Different monitoring data can be switched via the left tab.

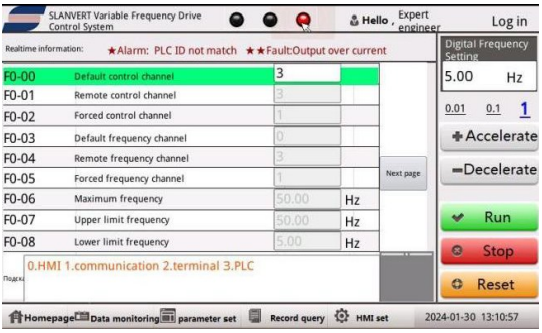


Setting of the parameters:

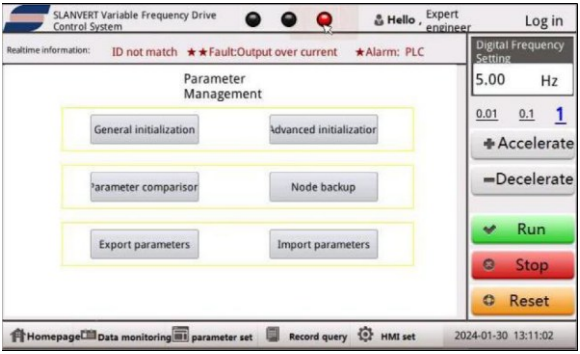
Entering "Parameter Settings" requires the level to be higher than "Application Engineer Level". After entering, the parameters can be changed.



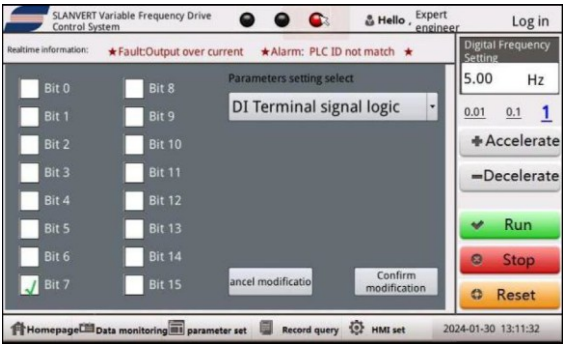
Click the parameter group name to enter the parameter setting interface, such as group F1:



Parameter management function is feasible for parameter initialization, parameter comparison, and so on. Application engineer level can only perform common initialization operations:

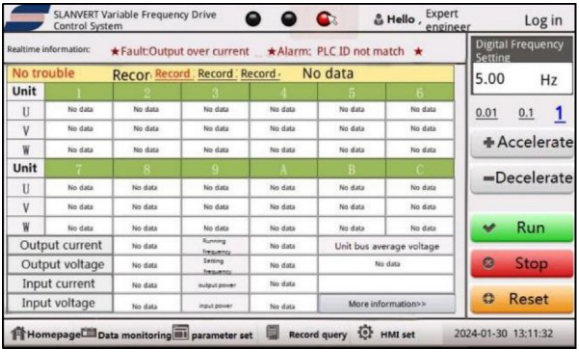


Based on bit setting, it is feasible to set the signal logic of DI and DO terminals more intuitively:



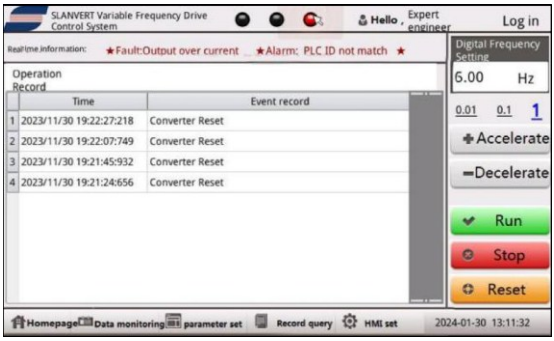
Records query:

Fault record: Record the time when the fault occurred from the last time to the fourth time, the status of the unit at the time of the fault, output current, output voltage, output power, input current, input voltage, and fault description.



Clearing records requires a user level higher than the application engineer level.

Operation records: Detailedly recorded the time when the inverter fails, operates, and stops. Clearing records requires a user level higher than the application engineer level.



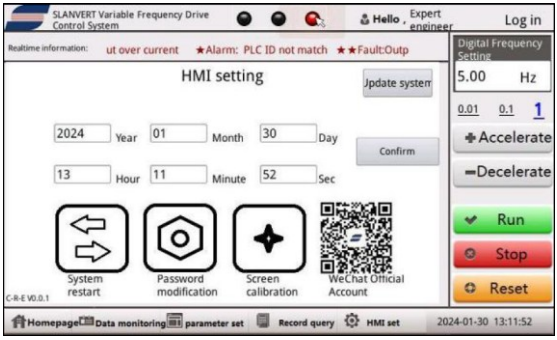
HMI settings:

After entering the HMI settings interface, you can make the following settings:

Date, time: modify the touch screen system time;

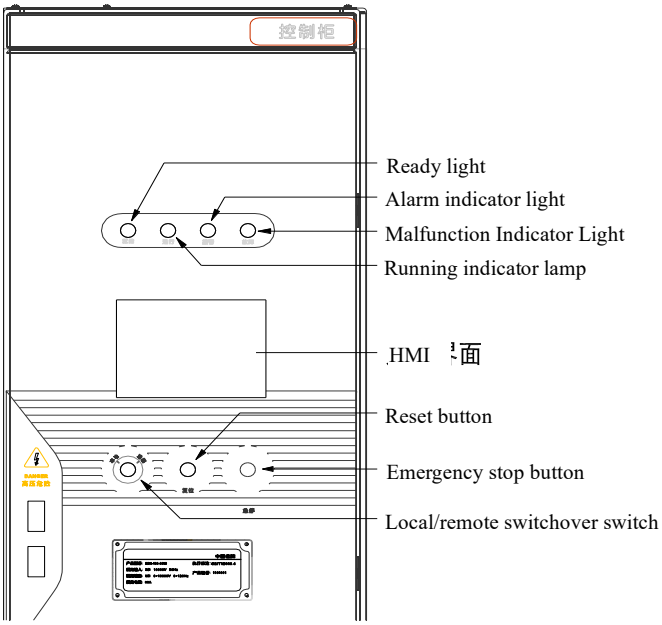
System restart: Restart the touch screen;

Screen calibration: Calibrate touch screen;



Password modification: On the password modification screen, you can change the password of the current user, retrieve product manager password, and enter the password to switch the current user level; If the password is incorrect, the system changes the user level to application engineer level by default.

4.2 Control Cabinet Introduction



Fault indicator: This indicator indicates whether the variable frequency speed control system is in a fault state. If a fault occurs, the indicator will be on with a beep.

Alarm indicator: This indicator indicates whether the variable frequency speed control system is in an alarm state. If it is in an alarm state, the indicator will be on.

Operation indicator: This indicator indicates whether the frequency conversion speed control system is operating. If it is in the operation state, the indicator will be on.

Ready indicator: Indicating whether the frequency conversion speed control system is in standby & ready or normal operation. If a fault is detected, the light will be off.

Man-machine interface: The man-machine interface can set and view parameters, run control, display fault information, and so on.

Reset button: When the converter detects the fault signal, it enters the fault state and the fault alarm light is on. The fault can be reset by entering a reset command (man-machine interface, control terminal, control cabinet reset button or communication command). If the fault persists, the fault will continue to be displayed.

Emergency stop button: If this button is pressed during operation of the converter, the output will be blocked immediately, and the motor will coast to stop.

Local/remote switch: Run a command to switch to the HMI or terminal.

5. List of Functional Parameters

Note: Change: "○" means that both standby and operation state can be changed, "×" means that only the operation state cannot be changed, and "△" means read-only.

Security level: '0' indicates application engineer level, '1' indicates technical engineer level, '2' indicates product manager level, and '3' indicates expert engineer level.

F0 Basic Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F0-00	Default control channel	0: HMI1: Communication 2: Terminal 3: PLC	0	×	1	72
F0-01	Remote control channel		2	×	1	72
F0-02	Forced control channel		1	×	1	72
F0-03	Default frequency channel	0: HMI1: Communication 2: AI1 3: AI2 4: AI3 5: Reserved	0	×	1	72
F0-04	Remote frequency channel		3	×	1	72
F0-05	Forced frequency channel		1	×	1	72
F0-06	Maximum frequency	0.01 ~ 320.00Hz (frequency value corresponding to 100% analog signal)	50.00Hz	○	1	72
F0-07	Upper limit frequency	0.01 ~ 320.00Hz (maximum limit of set frequency)	50.00Hz	○	1	72
F0-08	Lower limit frequency	0.01 ~ 320.00Hz (minimum limit of set frequency)	5.00Hz	○	1	72
F0-09	Motor steering lock	0: Unlocked 1: Forward hold 2: Backward hold (valid at a set frequency)	0	×	1	72
F0-12	Control mode selection	0: V/F control 1: Vector control 2: Permanent-magnet synchronous motor 3: Power output	0	×	1	73

F1 Acceleration & Deceleration, Starting, Stopping and Jogging Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F1-00	Acceleration time 1	0.1s~3600.0s Acceleration time: The time required for frequency from "0Hz" to "maximum frequency". The default acceleration time 1; Deceleration time: The time required for frequency to change from "maximum frequency" to "0Hz". The default deceleration time 1.	120.0s	○	0	73
F1-01	Deceleration time 1		120.0s	○	0	73
F1-02	Acceleration time 2		120.0s	○	0	73
F1-03	Deceleration time 2		120.0s	○	0	73
F1-04	Acceleration time 3		120.0s	○	0	73
F1-05	Deceleration time 3		120.0s	○	0	73
F1-06	Acceleration time 4		120.0s	○	0	73
F1-07	Deceleration time 4		120.0s	○	0	73
F1-09	Fast stop time	0.1s~3600.0s (the time required for frequency to change from "maximum frequency" to "0Hz")	50.0s	○	0	73
F1-10	Starting method	0: Start from the starting frequency 1: First DC braking and then starting from the	0	×	1	74

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
		starting frequency 2: Speed tracking start mode 1 3: Speed tracking start mode 2				
F1-11	Starting frequency	0.01~60.00Hz (set the start frequency output value, valid only when starting at the start frequency)	0.50Hz	○	1	74
F1-12	Starting frequency retention time	0.0s~60.0s (starting frequency maintenance time, valid only when starting at the start frequency)	0.0s	○	1	74
F1-13	Start delay time	0.0s~1000.0s (starting delay time after receiving the start signal)	0.0s	○	1	74
F1-14	Voltage soft start enabling	0: invalid 1: valid (the voltage starts from 0 at the time of soft start, it is valid only when starting at the start frequency)	0	×	1	74
F1-15	Starting DC braking time	0.0~60.0s	0.0s	○	1	74
F1-16	Starting DC braking current	0.0~100.0%, the rated current of the motor is 100%	0.0%	○	1	74
F1-17	Stop mode selection	0: Deceleration stop, 1: Free stop, 2. Deceleration + DC braking	0	○	1	75
F1-18	Shutdown frequency	0.01~320.00Hz (When the output frequency is lower than this frequency when stopping, the output is directly stopped. Only deceleration shutdown is valid)	0.50Hz	○	1	75
F1-19	Shutdown DC braking waiting time	0.00~10.0s	0.0s	○	1	75
F1-20	Shutdown DC braking time	0.0~60.0s	0.0s	○	1	75
F1-21	Shutdown DC braking current	0.0~100.0%, the rated current of the motor is 100%	0.0%	○	1	75
F1-28	Motor commutation dead time	0.1s~600.0s (zero-speed hold time when motor output direction changes)	1.0s	○	1	76
F1-29	Inching frequency	0.01~60.00Hz (set frequency when using the inching control)	5.00Hz	○	1	76
F1-32	Acceleration and deceleration switch point 1	0.00~320.00Hz (the acceleration/deceleration switch is enabled if the value is not 0)	0.00Hz	○	1	76
F1-33	Acceleration and deceleration switch point 2		0.00Hz	○	1	76
F1-34	Acceleration and deceleration switch point 3		0.00Hz	○	1	76

F2 V/F Control Parameters, Synchro Control, Redundancy Control and Overlapping Frequency Control Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F2-00	V/F curve settings	0: Reserved 1: Linear (1.0 power) 2: Reduced torque V/F curve 1 (1.2 power) 3: Reduced torque V/F curve 2 (1.5 power) 4: Reduced torque V/F curve 3 (1.7 power) 5: Reduced torque V/F curve 4 (2.0 power) 6: Reduced torque V/F curve 5 (3.0 power)	1	×	1	77
F2-02	Manual torque boost amplitude	0~10.0% (boost voltage = set value * rated output voltage)	0.0%	○	1	77
F2-03	Torque boost cutoff point	0~100.0% (frequency point to end torque boost, corresponding to "maximum voltage frequency")	10.0%	○	1	77
F2-09	Anti-vibration damping coefficient	0~500 (used to reduce the output current oscillation phenomenon when the motor is lightly loaded. 0 means off. If the value is larger, the effect is stronger)	5	○	1	78
F2-10	Automatic voltage regulation function	0: Disabled 1: Enabled 2: Enabled, but disabled when decelerating	0	○	1	78
F2-11	Automatic energy saving operation selection	0: Invalid, 1: Valid	0	○	1	78
F2-12	Maximum frequency voltage	0~20000V (voltage value corresponding to the maximum frequency in the VF curve)	10000V	○	1	79
F2-13	Maximum voltage frequency	0.01~320.00Hz (frequency corresponding to the maximum voltage in VF curve)	50.00Hz	○	1	79
F2-21	Synchronous soft start enabling	0: Disabled 1: Enabled (synchronizing to grid output after starting to grid frequency)	0	○	1	79
F2-22	Sync rate setting	0.0~60.0 (the synchronization time is longer if the value is larger)	10.0	○	1	79
F2-23	Synchronous phase compensation	-20.0°~+20.0° (compensates for synchronous angle errors)	2.5°	×	1	79
F2-24	Voltage ramp time	0.0s~60.0s (times from 0 to maximum voltage)	5.0s	○	1	79
F2-30	Motor type selection	0: Asynchronous motor control 1: Synchronous motor VF control 2: Synchronous motor IF control 1 3: Synchronous motor IF control 2	0	○	1	79
F2-31	Initial excitation of synchronizer	0~100.00% (maximum excitation current: 100.00%)	5.00%	○	1	80
F2-32	Synchronizing excitation	0~100.00% (maximum excitation current: 100.00%)	50.00%	○	1	80
F2-33	Synchronizing current	0~100.00% (rated output current: 100.00%)	50.00%	○	1	80
F2-34	Synchronizing time	0.0~60.0s	3.0s	○	1	80
F2-35	Synchronizer stabilization time	0.0~60.0s	3.0s	○	1	80
F2-36	Excitation control proportional factor	0.001~10.000	0.020	○	1	80
F2-37	Excitation control integral factor	0.001~10.000	0.002	○	1	80
F2-38	Synchronizer galloping	0: Off 1: Allowed	0	○	1	80

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	start					
F2-40	Control algorithm selection	0: General algorithm 1: Continuous heavy load 2: Starting heavy load only	0	○	1	80
F2-41	Starting excitation time	0.0 ~ 360.0s	0.5s	○	1	80
F2-42	Starting excitation current	20.0% ~ 150.0%	100.0%	○	1	80
F2-43	Starting switching frequency 1	5.00Hz~F2-44 “starting switching frequency 2”	10.00Hz	○	1	80
F2-44	Starting switching frequency 2	F2-43 “starting switching frequency 1”~30.00Hz	20.00Hz	○	1	80
F2-45	Running switching frequency 1	F2-46 “running switching frequency 2”~20.00Hz	15.00Hz	○	1	81
F2-46	Running switching frequency 2	0.01Hz~F2-45 “running switching frequency 1”	14.00Hz	○	1	81
F2-47	Voltage boost ratio	0.1 ~ 30.0%	20.0%	○	1	81
F2-48	Current set slope	1 ~ 10000ms	500ms	○	1	81
F2-49	Value Kp of current regulator	0.001 ~ 10.000	0.100	○	1	81
F2-50	Value Ki of current regulator	0.0001 ~ 1.0000	0.0200	○	1	81
F2-55	Parallel/redundant control	0: Stand-alone 1: Redundant host 2: Redundant slave 3: Parallel host 4: Parallel slave	0	○	1	81
F2-56	Redundant switching voltage limit	50.0% ~ 90.0%	80.0%	○	1	81
F2-57	Failover settings	0: All faults are switched 1: Only output fault is not switched	0	○	1	81
F2-60	Overlapping frequency value	0.01~320.00Hz	43.00Hz	○	1	81
F2-61	Overlapping voltage value	0~20000V	0V	○	1	81
F2-62	Overlapping starting point	0.01~320.00Hz (starting overlapping frequency when operating frequency absolute value > set value)	50.00Hz	○	1	81
F2-63	Overlapping ramp time	0~600s (time required for voltage from 0 to the rated value)	30S	○	1	81
F2-65	Initial excitation settings	0~100.00% (maximum excitation current: 100.00%)	20.00%	○	1	82
F2-66	Intermediate excitation settings		40.00%	○	1	82
F2-67	End excitation settings		60.00%	○	1	82
F2-68	Initial excitation frequency	0.50Hz~50.00Hz	3.00Hz	○	1	82
F2-69	Intermediate switching frequency		10.00Hz	○	1	82
F2-70	End switching frequency		20.00Hz	○	1	82

F3 Vector Control Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F3-00	Motor control mode	0: Without PG vector control 2: With PG vector control 2 1: Without PG vector control 1 3: With PG vector control 3	0	×	1	83
F3-01	Torque boost selection	0: None, 1: Manual boost 2: Automatic boost 3: manual boost + automatic boost	1	×	1	83
F3-02	Manual torque boost amplitude	0.0%~ maximum value determined by model, the minimum unit is 0.1%	Model determination	○	1	83
F3-03	Manual torque boost end point	0.0~100.0%, take F3-08 as 100％	10.0%	○	1	84
F3-04	Automatic torque boost degree	0.0~100.0％	80.0%	○	1	84
F3-05	Slip compensation filtering time	0.1~25.0s	1.0s	○	1	84
F3-06	Automatic torque filtering frequency R	0.1~25.0rad/s	1.0 rad/s	○	1	84
F3-07	Automatic torque filter frequency L	0.1~25.0rad/s	10.0rad/s	○	1	84
F3-08	Basic frequency	0.01~320.00Hz (Frequency corresponding to the maximum voltage in VF curve)	50.00Hz	×	1	84
F3-09	Maximum output voltage	0~20000V (Voltage value corresponding to the maximum frequency in the VF curve)	10000V	×	1	85
F3-10	Output voltage recovery time	1~50	5s	○	1	85
F3-11	Anti-vibration damping method	0:torq 1:id 2:iq	0	○	1	85
F3-12	Anti-vibration damping	0~200	Model determination	○	1	85
F3-13	Anti-vibration damped filter frequency	0.1~25.0 rad/s	2.0 rad/s	○	1	85
F3-14	High-speed ASR proportional gain	0.00~200.00	5.00	○	1	85
F3-15	High-speed ASR integration time	0.010~30.000s	1.000s	○	1	85
F3-16	Low-speed ASR proportional gain	0.00~200.00	10	○	1	85
F3-17	Low-speed ASR integration time	0.010~30.000s	0.500s	○	1	85
F3-18	ASR parameter switching point	0.00~650.00Hz	5.00Hz	○	1	85
F3-19	ASR filtering time	0.000~2.000s	0.010s	○	1	86
F3-20	Acceleration compensation differential time	0.000~20.000s	0.000s	○	1	86

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F3-21	Low-speed steady-state strong PI fluctuation frequency	0~65535	50	○	1	86
F3-22	PI linear switching	0~65535	500	○	1	86
F3-23	Low-speed strong PI valid frequency threshold	0~65535	200	○	1	86
F3-24	Low-speed steady-state strong PI_KP	0~65535	1300	○	1	86
F3-25	Low-speed steady-state strong PI_KI	0~65535	30	○	1	86
F3-26	Low-speed steady-state strong PI intervention time	0~65535	50	○	1	86
F3-27	ASR strong PI intervention velocity deviation threshold	0~65535	5000	○	1	86
F3-28	ASR strong PI intervention P increment	0~65535	10	○	1	86
F3-29	ASR strong PI intervention I coefficient	0~65535	5	○	1	86
F3-30	ASR strong PI intervention P maximum value	0~65535	1000	○	1	86
F3-31	Electric power limit	0.0~250.0%, take rated power of inverter as 100%	120.0%	○	1	86
F3-32	Regenerative power limit	0.0~250.0%, take rated power of inverter as 100%	120.0%	○	1	87
F3-33	Electric torque limitation	0.0~250.0%, take rated torque of motor as 100% (note: for vector control only)	180.0%	○	1	87
F3-34	Regenerative torque limitation	0.0~250.0%, take rated torque of motor as 100% (note: for vector control only)	180.0%	○	1	87
F3-35	Pre-excitation time	0.01~5.00s	Model determination	×	1	88
F3-36	Pre-excitation intensity	50.0~150.0%	94.0%	×	1	88
F3-37	Flux linkage set GEN	0~2000	110.0%	○	1	88
F3-38	Flux linkage set MOT	0~2000	88.0%	○	1	88
F3-39	Low-speed flux lifting	0~50%	0	○	1	88
F3-40	Weak magnetic regulator integration time	0.100~3.000s	0.150s	○	1	88
F3-41	Flux linkage closed-loop current moment filtering time	0~65535	5	○	1	88

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F3-42	Flux linkage closed light load torque threshold	0~1000 0~200	100	○	1	88
F3-43	Generator-motor current threshold 0%-100%		35	○	1	88
F3-44	Flux linkage closed-loop switch	0~1	1	○	1	88
F3-45	Generator-motor torque return difference	0~1000	50	○	1	88
F3-46	Excitation braking flux strength	50.0~150.0%	0	○	1	88
F3-47	Rotor flux filter cutoff angular frequency coefficient	10	10	○	1	89
F3-48	Flux limiting value	0~65535	16384	○	1	89
F3-49	Limiting value of rotor flux filter cutoff angular frequency filter coefficient	0~65535	32760	○	1	89
F3-50	Minimum filter value coefficient of rotor flux filter cutoff angular frequency	0~65535	5240	○	1	89
F3-51	Filter coefficient of rotor flux filter cutoff angular frequency	0~65535	2	○	1	89
F3-52	Rotor flux filter system 1 (0-3Hz power generating)	0~65535	10	○	1	89
F3-53	Rotor flux filter coefficient 2 (3Hz-4Hz)	0~65535	10	○	1	89
F3-54	Rotor flux filter coefficient 3 (4Hz-10Hz)	0~65535	10	○	1	89
F3-55	Rotor flux filter coefficient 4 (0-3Hz electric)	0~65535	30	○	1	89
F3-56	Rotor flux filter coefficient 5 (10Hz-50Hz)	0~65535	10	○	1	89
F3-57	Minimum filter value coefficient of torque-control rotor flux filter cutoff angular frequency	0~65535	8200	○	1	89
F3-58	Torque filtering coefficient	0~65535	100	○	1	89

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F3-59	Generation slip compensation coefficient	0~65535	0	○	1	90
F3-60	Electric slip compensation coefficient	0~65535	10	○	1	90
F3-61	Vector control synchronization frequency filtering cut-off frequency	1~250 rad/s	200 rad/s	○	1	90
F3-62	Flux control gain	1.0~3.0	1.0	○	1	90
F3-63	Decoupling compensation allowed	0: Forbidden, 1: Allowed	1	×	1	90
F3-64	Decoupling compensation of PI2	0: Method I 1: Method II	1	×	1	90
F3-65	Cut-off frequency of current loop	100~6000 rad/s	3666 rad/s	○	1	90
F3-66	Decoupling compensation coefficient	0.000~1.000	1.000	○	1	90
F3-67	Speed estimation filter cut-off frequency	40~160Hz	160	○	1	90
F3-68	Feed-forward switch	0: Disabled 1: Enabled	0	○	1	90
F3-69	Feed-forward value	0.0~100.0%, take rated torque of motor as 100%	0	○	1	90
F3-70	Feed-forward attenuation coefficient	0~100.0%	99.9%	○	1	90
F3-71	Feed-forward torque direction	0: Positive 1: Negative	0	○	1	90
F3-72	PG pulse number per revolution	1~8192	1024	×	1	91
F3-73	PG type	0: Quadrature encoder, 1: Single channel encoder	0	×	1	91
F3-74	PG direction selection	0: Positive 1: Negative	0	○	1	91
F3-75	PG disconnection action	0: No action, 1: Alarm, 2: Fault and free stop	2	○	1	91
F3-76	PG disconnection detection time	0.1~10.0s	1.0s	○	1	91
F3-77	PG gear ratio denominator setting	1~1000	1	×	1	91
F3-78	PG gear ratio molecular setting	1→1000	1	×	1	91
F3-79	PG speed measurement filtering time	0.000→2.000s	0.005s	○	1	91
F3-80	Control voltage selection	0: Measurement 1: Set	1	○	1	92
F3-81	Closing enabling	0: Disabled 1: Enabled	0	○	1	92

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	switch					
F3-82	Forward opening frequency	0.01→20.00Hz	3.00Hz	○	1	92
F3-83	Forward closing frequency	0.01→20.00Hz	5.00Hz	○	1	92
F3-84	Reversal opening frequency	0.01→20.00Hz	3.00Hz	○	1	92
F3-85	Reversal closing frequency	0.01→20.00Hz	5.00Hz	○	1	92
F3-86	Forward opening current threshold	0→100.0%	10.0%	○	1	92
F3-87	Reversal opening current threshold	0→100.0%	3.0%	○	1	92
F3-88	Opening maintenance frequency	0.01→20.00Hz	4.00Hz	○	1	92
F3-89	Opening maintenance time	0→10000ms	220ms	○	1	92
F3-90	Anti-slip frequency	0.01→20.00Hz	4.00Hz	○	1	92
F3-91	Anti-slip action time	0→10000ms	220ms	○	1	93
F3-92	Forward opening torque threshold	0→100.0%	6.0%	○	1	93
F3-93	Reversal opening torque threshold	0→100.0%	0%	○	1	93
F3-94	Closing state switching time	0→10000ms	1000ms	○	1	93
F3-95	Running frequency filter time	0→1000ms	150ms	○	1	93
F3-96	Bus voltage filtering time	0→1000ms	100ms	○	1	93
F3-97	Residual voltage filtering time	0→1000ms	2ms	○	1	93
F3-98	Follow current	10~100%	50%	○	1	93
F3-99	DC exciting current	0~150%	150%	○	1	93
F3-100	DC exciting time	Rotor time constant multiplier	5	○	1	93
F3-101	Overvoltage suppression	0: Closing 1: Opening	0	○	1	93
F3-102	Lower limit of acquisition frequency action	0.01→50.00Hz	4.00Hz	○	1	93
F3-103	Current tracking strategy	0: Method 1 1: Method 2 2: Braking	0	○	1	94

F4 Digital Input Terminal and Multi-speed

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F4-00	Terminal X1 connection	0: Not connected to the 14: External alarm	15	○	1	96

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	settings	following signals signal 1: Multi-stage speed selection 1 2: Multi-stage speed selection 2 3: Multi-stage speed selection 3 4: Multi-stage speed selection 4 5: Multi-stage speed selection 5 6: Multi-stage speed selection 6 7: Multi-stage speed selection 7 8: Time-stage speed selection 1 9: Time-stage speed selection 2 10: Time-stage speed selection 3 11: Time-stage speed selection 4 12: Emergency stop fault 13: External fault signal 15: Fault resetting 16: Forward jogging 17: Reverse jogging 18: Fast stop 19: Free stop 20: Start prohibited 21: Operation interruption 22: Forced frequency channel switching 23: Forced control channel switching 24: Remote frequency channel switching 25: Remote control channel switching 26: Grid connection completion signal 27: Reserved				
F4-01	Terminal X2 connection settings		0	○	1	96
F4-02	Terminal X3 connection settings		0	○	1	96
F4-03	Terminal X4 connection settings		0	○	1	96
F4-04	Terminal X5 connection settings		0	○	1	96
F4-05	Terminal X6 connection settings		0	○	1	96
F4-06	Terminal FWD connection settings		0	○	1	96
F4-07	Terminal REV connection settings		0	○	1	96
F4-08	Terminal control mode	0: Single-line mode (start/stop) 1: Two-line mode 1 (forward, reverse) 2: Two-line mode 2 (start/stop, direction) 3: Two-line mode 3 (start/stop) 4: Three-line mode 1 (forward, reverse, stop) 5: Three-line mode 2 (running, direction, stop) 6: Double pulse control (start/stop)	3	×	1	97
F4-09	Terminal DI signal logic	Bit0-Bit7 corresponds to DI1-DI8 (0: Positive logic 1: Negative logic)	128	○	1	98
F4-10	Digital input filtering time	0~10000ms	50ms	○	1	98
F4-16	Multi-speed selection	0: Code selection, 1: Direct selection 2: Superposition mode, 3: Quantity selection	0	×	1	98
F4-17	Multi-stage speed 1 set frequency	0.01~320.00Hz	10.00Hz	○	0	98
F4-18	Multi-stage speed 2 set frequency		15.00Hz	○	0	98
F4-19	Multi-stage speed 3 set frequency		20.00Hz	○	0	99
F4-20	Multi-stage speed 4 set frequency		25.00Hz	○	0	99
F4-21	Multi-stage speed 5 set frequency		30.00Hz	○	0	99
F4-22	Multi-stage speed 6 set frequency		35.00Hz	○	0	99
F4-23	Multi-stage speed 7 set frequency		40.00Hz	○	0	99
F4-50	Terminal FWD selection	0~7: DI1~DI8	6	×	1	100

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F4-51	Terminal REV selection		7	×	1	100
F4-52	Terminal STOP selection		3	×	1	100

F5 Digital Output and Relay Output Settings

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F5-00	Terminal Y1 connection settings	0: Forced to be 0 1: Forced to be 1 2: Ready instruction 3: Operation indication 4: Failure indication 5: Alarm indication 6: Forward running 7: Reverse running 8: External fault 9: Synchronization sign 10: Reset signal 11: Specified alarm detection 12: Excitation start-stop switch 13: Redundant host output switch 14: Redundant slave output switch 15: Redundant host communication failure 16: Redundant slave communication failure 17: Redundant host ready sign 18: Redundant slave ready sign 19: Set frequency standard sign 20: Frequency detection level 1 21: Frequency detection level 2	0	○	1	101
F5-01	Terminal Y2 connection settings		0	○	1	101
F5-02	Terminal T1 connection settings		0	○	1	101
F5-03	Terminal T2 connection settings		0	○	1	101
F5-04	Terminal T3 connection settings		0	○	1	101
F5-05	Terminal DO output logics	0: Positive logic 1: Negative logic	0	○	1	102
F5-06	Frequency reaches detection width	0.00~60.00Hz	2.50Hz	○	1	102
F5-07	Frequency level detection value 1	0.00~320.00Hz	50.00Hz	○	1	102
F5-08	Frequency level detection hysteresis value 1	0.00~320.00Hz	1.00Hz	○	1	102
F5-09	Frequency level detection value 2	0.00~320.00Hz	50.00Hz	○	1	102
F5-10	Frequency level detection hysteresis value 2	0.00~320.00Hz	1.00Hz	○	1	102
F5-11	Y1 terminal closing delay	0.00~650.00s	0.00s	○	1	103
F5-12	Y1 terminal opening delay	0.00~650.00s	0.00s	○	1	103
F5-13	Y2 terminal closing delay	0.00~650.00s	0.00s	○	1	103
F5-14	Y2 terminal opening delay	0.00~650.00s	0.00s	○	1	103
F5-15	T1 terminal closing delay	0.00~650.00s	0.00s	○	1	103

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F5-16	T1 terminal opening delay	0.00~650.00s	0.00s	○	1	103
F5-17	T2 terminal closing delay	0.00~650.00s	0.00s	○	1	103
F5-18	T2 terminal opening delay	0.00~650.00s	0.00s	○	1	103
F5-19	T3 terminal closing delay	0.00~650.00s	0.00s	○	1	103
F5-20	T3 terminal opening delay	0.00~650.00s	0.00s	○	1	103
F5-21	Alarm output selection 1	0~65535	0	○	1	104
F5-22	Alarm output selection 2	0~65535	0	○	1	104

F6 Analog and Pulse Frequency Terminal Settings

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F6-00	AI1 type	0: 0~10V or 0~20mA, corresponding to 0~100% 1: 2~10V or 4~20mA, corresponding to 0~100% 2: centered on 5V or 10mA Corresponding to -100%~100%	1	○	1	105
F6-01	AI1 gain	0.00~200.00%	100.00%	○	1	105
F6-02	AI1 bias	－50.00~50.00%	0.00%	○	1	105
F6-03	AI1 filtering time	0~10000ms	1000ms	○	1	105
F6-07	AI2 type	0: 0~10V or 0~20mA, corresponding to 0~100% 1: 2~10V or 4~20mA, corresponding to 0~100% 2: centered on 5V or 10mA Corresponding to -100%~100%	1	○	1	105
F6-08	AI2 gain	0.00`200.00%	100.00%	○	1	105
F6-09	AI2 bias	－50.00~50.00%	0.00%	○	1	105
F6-10	AI2 filtering time	0~10000ms	1000ms	○	1	105
F6-14	AI3 type	0: 0~10V or 0~20mA, corresponding to 0~100% 1: 2~10V or 4~20mA, corresponding to 0~100% 2: centered on 5V or 10mA Corresponding to -100%~100%	1	○	1	105
F6-15	AI3 gain	0.00~200.00%	100.00%	○	1	105
F6-16	AI3 bias	－50.00~50.00%	0.00%	○	1	105
F6-17	AI3 filtering time	0~10000ms	1000ms	○	1	105
F6-21	AO1 output signal	0~39 (corresponding to FU-450~FU-489)	0	○	1	106
F6-22	AO1 type	0: 0~10V 1: 2~10V 2: centered on 5V	1	○	1	106
F6-23	AO1 gain	0.00% ~ 200.00%	100.00%	○	1	106

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F6-24	AO1 bias	－50.00% ~ 50.00%	0.00%	○	1	106
F6-25	AO2 output signal	0~39 (corresponding to FU-450~FU-489)	0	○	1	106
F6-26	AO2 type	0: 0~10V 1: 2~10V 2: Centered on 5V	1	○	1	106
F6-27	AO2 gain	0.00% ~ 200.00%	100.00%	○	1	106
F6-28	AO2 bias	－50.00% ~ 50.00%	0.00%	○	1	106
F6-29	AO3 output signal	0~39 (corresponding to FU-450~FU-489)	4	○	1	107
F6-30	AO3 type	0: 0~10V 1: 2~10V 2: centered on 5V	1	○	1	107
F6-31	AO3 gain	0.00% ~ 200.00%	100.00%	○	1	107
F6-32	AO3 bias	－50.00% ~ 50.00%	0.00%	○	1	107
F6-33	AO4 output signal	0~39 (corresponding to FU-450~FU-489)	4	○	1	107
F6-34	AO4 type	0: 0~10V 1: 2~10V 2: centered on 5V	1	○	1	107
F6-35	AO4 gain	0.00% ~ 200.00%	100.00%	○	1	107
F6-36	AO4 bias	－50.00% ~ 50.00%	0.00%	○	1	107
F6-46	Analog signal setting	0.00%~100.00%	0.00%	○	0	107

F7 Process PID Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F7-00	PID control function selection	0: Non-selection process PID control 1: Selection process PID control 2: Select PID to correct the set frequency before the acceleration and deceleration ramp 3: Select PID to correct the set frequency after the acceleration and deceleration ramp	0	×	1	108
F7-01	PID set channel selection	0: F7-04 1: AI1 2: AI2 3: AI3 4: Host computer analog quantity 1, 5: Host computer analog quantity 2	0	×	1	108
F7-02	PID feedback channel selection	0: AI1 1: AI2 2: AI3 3: Host computer analog 1 4: Host computer analog 2, 5: Output current ratio 6: Output power ratio	0	×	1	108
F7-04	PID analog signal setting	－100.00% ~ 100.00%	0.00%	○	0	109
F7-05	PID Proportional Gain	0.000 ~ 10.000	0.020	○	1	109
F7-06	PID integral time	0.00 ~ 100.00s	20.00s	○	1	109
F7-07	PID differential setting	0.00 ~ 10.00	0.00	○	1	109
F7-12	PID sampling period	1 ~ 10000ms	10ms	○	0	109
F7-13	PID regulation limit	0: Active, 1: Counteractive	0	○	1	109
F7-14	PID set slope time	0.00 ~ 20.00s (time required by set value to be from 0 to 100%)	0.50s	○	0	109
F7-17	Maximum PID output	－100.00% ~ 100.00%	100.00%	○	1	109

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	limit					
F7-18	Minimum PID output limit	－100.00% ~ 100.00%	-100.00%	○	1	109
F7-20	Preset PID value	－100.00% ~ 100.00%	0.00%	○	1	110

F9 Customization Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
F9-00	Customization parameter 0	0~65535 (special parameters for PLC)	0	○	1	110
F9-01	Customization parameter 1	0~65535 (special parameters for PLC)	0	○	1	110
F9-02	Customization parameter 2	0~65535 (special parameters for PLC)	0	○	1	110
F9-03	Customization parameter 3	0~65535 (special parameters for PLC)	0	○	1	110
F9-04	Customization parameter 4	0~65535 (special parameters for PLC)	0	○	1	110
F9-05	Customization parameter 5	0~65535 (special parameters for PLC)	0	○	1	110
F9-06	Customization parameter 6	0~65535 (special parameters for PLC)	0	○	1	110
F9-07	Customization parameter 7	0~65535 (special parameters for PLC)	0	○	1	110
F9-08	Customization parameter 8	0~65535 (special parameters for PLC)	0	○	1	110
F9-09	Customization parameter 9	0~65535 (special parameters for PLC)	0	○	1	110
F9-10	Customization parameter 10	0~65535 (special parameters for PLC)	0	○	1	110
F9-11	Customization parameter 11	0~65535 (special parameters for PLC)	0	○	1	110
F9-12	Customization parameter 12	0~65535 (special parameters for PLC)	0	○	1	110
F9-13	Customization parameter 13	0~65535 (special parameters for PLC)	0	○	1	110
F9-14	Customization parameter 14	0~65535 (special parameters for PLC)	0	○	1	110
F9-15	Customization parameter 15	0~65535 (special parameters for PLC)	0	○	1	110
F9-16	Customization parameter 16	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-17	Customization parameter 17	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-18	Customization parameter 18	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-19	Customization	-32768~32767 (special parameters for PLC)	0	○	1	110

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	parameter 19					
F9-20	Customization parameter 20	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-21	Customization parameter 21	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-22	Customization parameter 22	-32768~32767 (special parameters for PLC)	0	○	1	110
F9-23	Customization parameter 23	-32768~32767 (special parameters for PLC)	0	○	1	110

FA Motor Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FA-00	Motor parameter setting	11: Static self-tuning 22: No-load rotation self-tuning	00	○	1	110
FA-01	Rated motor power	110~50000kW	Model determination	○	1	110
FA-02	Number of motor poles	2~256 (it must be an even number)	4	○	1	110
FA-03	Rated motor current	0.5~1200.0A	Model determination	○	1	110
FA-04	Rated motor frequency	1.00~320.00Hz	50.00Hz	○	1	110
FA-05	Rated motor speed	125~40000r/min	Model determination	○	1	110
FA-06	Rated motor voltage	100~20000V	Model determination	×	1	110
FA-07	Motor no-load current	0.1A→FA-03 "motor rated current"	0	○	1	111
FA-08	Motor stator resistance	0.00→50.00%	0	○	1	111
FA-09	Motor leakage inductive reactance	0.00→50.00%	0	○	1	111
FA-10	Motor rotor resistance	0.00→50.00%	0	○	1	111
FA-11	Motor mutual inductive reactance	0.0→2000.0%	0	○	1	112
FA-12	Motor core saturation coefficient 1	1.000→1.500	1	○	1	112
FA-13	Motor core saturation coefficient 2	1.000→FA-12 "motor core saturation coefficient 1"	1	○	1	112
FA-14	Motor core saturation coefficient 3	FA-15 "motor core saturation coefficient 4"→1.000	0.5	○	1	112
FA-15	Motor core saturation coefficient 4	0.500→1.000	0.5	○	1	112

Fb Protection Function and Inverter Advanced Settings

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
Fb-00	Carrier frequency	500~5000Hz (carrier frequency output by power unit)	800Hz	○	2	113
Fb-03	Power grid fail and restarting	0. Restart prohibited 1. Time-limited restart (when the start signal continues)	0	○	2	113
Fb-04	Self-reset times	0~10 times	0	○	2	113
Fb-05	Self-reset interval	1.0 ~ 30.0s	5.0s	○	2	113
Fb-06	Fault output during self-reset	0. No-output fault 1. Output fault	0	○	2	113
Fb-07	Grid voltage undervoltage point	10.0% ~ 70.0% (corresponding to “rated input voltage”)	55.0%	○	2	114
Fb-08	Power grid voltage overvoltage point	80.0% ~ 130.0% (corresponding to “rated input voltage”)	120.0%	○	2	114
Fb-09	Grid voltage sag trigger point	10.0% ~ 90.0% (corresponding to “rated input voltage”)	70.0%	○	2	114
Fb-10	Grid voltage sag enabling	0: Disabled 1: enabling (VF control is valid only)	1	○	2	114
Fb-11	Maximum grid voltage sag time	0 ~ 3000ms	600ms	○	2	114
Fb-13	Motor overload detection	0. Always detecting 1. Constant speed detection only	1	○	2	114
Fb-14	Motor overload alarm level	50.0% ~ 150.0%	110.0%	○	2	114
Fb-15	Motor overload fault level	50.0% ~ 150.0%	130.0%	○	2	114
Fb-16	Motor overload fault time	0.1s ~ 30.0s	2.0s	○	2	114
Fb-17	Motor overspeed protection	0. Disable 1. Alarm only 2. Failure shutdown	1	○	2	115
Fb-18	Motor overspeed detection level	50.0% ~ 150.0%	110.0%	○	2	115
Fb-19	Motor overspeed detection time	0.1S ~ 30.0S	5.0S	○	2	115
Fb-20	Acceleration overcurrent and stall protection	0. Disabled 1.Valid	1	○	2	115
Fb-21	Acceleration overcurrent and stall level	50.0% ~ 150.0%	130.0%	○	2	115
Fb-22	Power-off restart timeout period	1.0 ~ 120.0s	10.0s	○	2	115
Fb-24	Loss power protection	0. Disable 1. Alarm only 2. Failure shutdown	2	○	2	115
Fb-25	Loss power limit	5.0% ~ 50.0% (rated power)	25.0%	○	2	116
Fb-26	Cabinet door opening protection	0. Disable 1. Alarm only 2. Failure shutdown	2	○	2	116

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
Fb-27	Temperature controller fault protection	0. Disable 1. Alarm only 2. 30min protection after failure	1	○	2	116
Fb-28	Communication offline time	1.0S ~ 600.0s (time between communication offline and fault detection)	3.0s	○	2	116
Fb-29	HMI off-line protection	0. Disable 1. Alarm only 2. Failure shutdown	1	○	2	116
Fb-30	USER off-line protection	0. Disable 1. Alarm only 2. Failure shutdown	1	○	2	116
Fb-31	Output phase loss protection	0. Disable 1. Alarm only 2. Failure shutdown	2	○	2	116
Fb-32	AI1 off-line action	0. Disable 1. Alarm only 2. Failure shutdown 3. Hold the value before 3s and alarm (only 2-10V/4-20mA off-line protection is valid)	0	○	2	116
Fb-33	AI2 off-line action		0	○	2	116
Fb-34	AI3 off-line action		0	○	2	116
Fb-35	AI offline threshold	0.0% ~ 20.0% (only 2-10V/4-20mA offline protection is valid. It will be considered off line once lower than this value)	0.0%	○	2	117
Fb-36	Fan life expectancy	0 ~ 65500h	30000h	○	2	117
Fb-37	Fan shutdown delay	0 ~ 60min (When setting > 60min, indicating that the fan is running all the time)	3min	○	2	117
Fb-38	Fan failure delay	0 ~ 120min	30min	○	2	117
Fb-39	Starting point of fan under cabinet	30.0% ~ 150.0% (100% corresponding to rated input current)	100.0%	○	2	117

FC Wave Recording Function Settings

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FC-00	Record waveform 1 selection	0: Vr 1: Vs 2: Vt 3: Vu 4: Vv 5: Vw 6: Ir 7: Is 8: It 9: Iu 10: Iv 11: Iw 12: Vi 13: Vo14: Ii 15: Io 16: Fo 17: Pi 18: Po 19: VdcU 20: VdcV 21: VdcW 22: AI1 23: AI2 24: AI3	0	○	1	117
FC-01	Record waveform 2 selection		0	○	1	117
FC-02	Record waveform 3 selection		0	○	1	117
FC-03	Record waveform 4 selection		0	○	1	117
FC-04	Record waveform period	0.1~100.0ms	0.1ms	○	1	118
FC-05	Record trigger condition 1	Failure trigger (0: invalid; 65535: All faults are triggered; Others: triggered only when consistent with the fault code)	0	○	1	118
FC-06	Record trigger condition 2	Running time trigger (Trigger when reaching setting time, 0: invalid; Unit: 1s)	0s	○	1	118
FC-07	Record trigger condition 3	Run-frequency trigger (Trigger when reaching setting frequency,	0.00Hz	○	1	118

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
		0.00: invalid; Unit: 0.01Hz)				
FC-08	Record trigger condition 4	Event occurrence trigger (0: invalid 1: Trigger by voltage sag 2: Restore after voltage sag 3: Blocking command 4: Start command 5: Stop command)	0	○	1	118

Fd Shore Power Supply, Electromagnetic Soft Start and Reactive Power Compensation Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
Fd-00	Power output mode	0. power supply (shore power supply) 1. Tracking grid 2. Constant power generation 3. Reactive compensation	1	×	2	119
Fd-01	Output frequency setting	0~320.00Hz	50.00Hz	○	0	119
Fd-02	Output voltage setting	0~20000V	0V	○	0	119
Fd-03	Voltage soft start time	0~600s (the time of output voltage from 0 to rated voltage)	10s	○	1	119
Fd-04	Advanced grid angle	0~45.0° (tracking grid mode is valid)	2.5°	○	0	119
Fd-05	Tracking voltage increment	0.00~20.00% rated voltage (tracking grid mode is valid)	0.50%	○	0	119
Fd-06	Current regulator KP	0.000~65.535 (constant power generation and reactive power compensation modes are effective)	0.100	○	2	119
Fd-07	Current regulator KI	0.000~6.5535 (constant power generation and reactive power compensation modes are effective)	0.001	○	2	119
Fd-08	Output power setting	0~20000kW (select 'constant power generation' to set the output power value)	1kW	○	0	119
Fd-09	Power regulator KP	0.000~65.535 (select 'constant power generation', power PI controller ratio)	1.000	○	2	119
Fd-10	Power regulator KI	0.000~6.5535 (select "constant power generation", power PI regulator integral value)	0.001	○	2	120
Fd-11	Generation phase regulation	0.00~1.000	0.065	○	2	120
Fd-12	Filter inductance value (uH)	0~65535 uH (filter inductance value that is output and sent to the grid, unit: uH)	50uH	○	2	120
Fd-20	Power supply frequency selection	0: 50Hz 1: 60Hz 2: Custom frequency	0	○	0	120
Fd-21	Custom frequency	0.00~80.00Hz	50.00	○		120
Fd-22	Supply frequency deviation	－3.00~3.00Hz	0.00Hz	○	0	120
Fd-23	Supply voltage	0~:3: supply voltage 1~4	0	○	0	120

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	selection					
Fd-24	Supply voltage 1	0~20000V	3000V	○	0	120
Fd-25	Supply voltage 2	0~20000V	6000V	○	0	120
Fd-26	Supply voltage 3	0~20000V	10000V	○	0	120
Fd-27	Supply voltage 4	0~20000V	11000V	○	0	120
Fd-28	Supply voltage deviation	－500~500V	0V	○	0	120
Fd-29	Automatic upper voltage regulation limit	0: Disabled 10.0%→30.0%	1	○	0	120
Fd-30	Voltage rise slope	10~10000V/s	0	○	0	120
Fd-31	Power supply phase sequence selection	0: Positive phase sequence 1: Negative-phase sequence	0	×	0	121
Fd-32	Automatic current limiting	0: Off 1: On	0	○	0	121
Fd-33	Reverse power limiting function	0: Disabled 1: Enabled (valid only for the first grid connection)	0	×	0	121
Fd-34	Overcurrent restart time	1.0~6553.5ms	500ms	○	1	121
Fd-35	Initial overcurrent restart value	0~100.0%	20.0%	○	1	121
Fd-36	Overcurrent restart threshold	10.0~250.0%	120.0%	○	1	121

FE Permanent-magnet Synchronous Motor Control Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FE-00	Tuning command	0: Untuned 1: Static tuning: Identifying resistance and quadrature axis inductance 2: dynamic tuning: Identifying resistance, quadrature axis inductance, counter electromotive force	0	×	2	122
FE-01	FVC Installation Angle/Direction Identification and Selection	0: Identifying motor parameters only 1: Identify motor parameters, identify encoder information with load 2: Identify motor parameters, and identify encoder information with no load	4	×	2	122
FE-02	High-speed segment speed loop integral parameter	0~6000	50	○	1	123
FE-03	High-speed segment speed loop proportional parameter	0~6000	150	○	1	123
FE-04	Low-speed segment speed loop integral parameter	0~60000	50	○	1	123
FE-05	Low-speed segment	0~60000	150	○	1	123

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	speed loop proportional parameter					
FE-06	Speed loop PI switching point 2	0.00Hz~320.00Hz (using low-speed PI parameters for speed loop above the frequency point)	2.00Hz	○	1	123
FE-07	Speed loop PI switching point 1	0.00Hz~320.00Hz (using low-speed PI parameters for speed loop below the frequency point)	1.00Hz	○	1	123
FE-08	High-speed filtering coefficient	4~512 (steady-state performance will be better and dynamic response will be slower if the coefficient is larger)	86	○	1	123
FE-09	Low-speed segment speed filter coefficient	4~512 (steady-state performance will be better and dynamic response will be slower if the coefficient is larger)	26	○	1	123
FE-10	control mode selection	1: SVC 2: Torque control 3: IF+MRAS control 4: FVC	1	×	2	123
FE-11	Flux weakening mode	0: Direct calculation 1: Automatic regulation 2: Non-flux weakening	1	×	2	124
FE-12	Weak magnetic current regulation coefficient	0~120	80	○	1	124
FE-13	Weak magnetic regulation coefficient	0~40	4	○	1	124
FE-14	Weak magnetic output voltage regulation coefficient	0~12 (the inverter output voltage will be larger and the weak magnetic current will be lower if the coefficient is larger)	0	○	1	124
FE-15	Maximum torque current ratio control enabling	0: Disabled 1: Enabled	0	×	2	124
FE-18	Maximum frequency limiting mode	0: Demagnetizing 1: Non-demagnetizing	0	×	2	124
FE-19	Set the torque current percentage	0~100%, taking rated current of motor as 100% (this parameter limits the D-axis current)	150%	○	2	125
FE-20	Preset starting current	0 ~ 200%, taking the rated current of the motor as 100%, affecting the initial value of the speed loop PI.	0%	×	1	125
FE-21	Identify the counter electromotive force current/low speed minimum current	0~100%, taking the rated current of the motor as 100%	30%	×	2	125
FE-22	Starting DC braking current	0~100%, taking the rated current of the motor as 100%	0%	×	1	125
FE-23	Shutdown DC braking current	0~100%, taking the rated current of the motor as 100%	0%	×	1	125
FE-24	Starting DC braking time	0.1s~36.0s (larger value results in a longer braking duration)	0.0s	○	1	125
FE-25	Shutdown DC braking time	0.1s~36.0s (larger value results in a longer braking duration)	0.0s	○	1	125
FE-26	Shutdown DC braking waiting time	0.1s~36.0s (larger value results in a longer waiting time)	0.0s	○	1	125

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FE-27	Shutdown/DC braking frequency	0.00Hz~320.00Hz (the frequency of entering DC braking from braking phase)	0.00Hz	○	1	125
FE-28	Resistance estimation coefficient	0~9999	0	×	3	126
FE-29	Velocity estimation coefficient 1	0~1000	20	×	2	126
FE-30	Velocity estimation coefficient 2	0~1000	30	×	2	126
FE-31	Counter electromotive force compensation coefficient	0~1000	1000	×	2	126
FE-32	Initial position detection method	0: No detection 1: Detection method 1 2: Detection method 2 3: Detection method 3	1	×	1	126
FE-33	Polarity identification duration	10~200	25	×	2	126
FE-34	Initial position/polarity identification detection current	50%~200%	100%	×	2	126
FE-35	FVC initial position detection scheme	0: Detection per start 1: First start detection after startup	1	×	1	126
FE-36	Initial position for parameter identification	0~359.9°	330.0°	×	1	127
FE-37	High injection frequency	0~1000Hz, use the default 4-time rated frequency if it is set to be 0	0	○	0	127
FE-38	Online rotor position compensation enabling	1: Enabled 2: Disabled	0	○	0	127
FE-44	D-axis inductance	0~60000 (after parameter identification and manual modification, the current loop PI parameter will change)	7000	×	1	127
FE-45	Q-axis inductance	0~60000 (after parameter identification and manual modification, the current loop PI parameter will change)	7000	×	1	127
FE-46	Stator resistance	0~60000 (after parameter identification and manual modification, the current loop PI parameter will change)	2700	×	1	127
FE-47	Inductance/resistance unit	Inductance (ones) 0: uH 1: 10uh 2: 100uH Resistance (tens) 0: mO 1: 10mO Counter electromotive force (hundreds): 0: ×0 1: ×10 2: ×100	0	×	1	127
FE-48	Counter electromotive force coefficient	0~60000, dynamic identification required, and 130* counter electromotive force/frequency estimation can be adopted	500	×	1	127
FE-49	Integral parameter of the D-axis current loop	0~60000 (parameter identification and automatic calculation)	200	×	1	127
FE-50	Proportional parameter of D-axis current loop	0~60000 (parameter identification and automatic calculation)	300	×	1	127
FE-51	Integral parameter of the Q-axis current loop	0~60000 (parameter identification and automatic calculation)	200	×	1	127

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FE-52	Proportional parameter of Q-axis current loop	0~60000 (parameter identification and automatic calculation)	300	×	1	127
FE-53	DC brake stator resistance	0~60000	1	×	2	127
FE-54	Display speed filtering coefficient	0~10, with larger value, the filter depth will be larger, and the display will be more stable, but the delay will be increased	5	○	1	128
FE-55	Display frequency filtering coefficient	0~10, with larger value, the filter depth will be larger, and the display will be more stable, but the delay will be increased	5	○	1	128
FE-56	Display torque current filtering coefficient	0~10, with larger value, the filter depth will be larger, and the display will be more stable, but the delay will be increased	5	○	1	128
FE-57	Number of encoder wires	1~8192	1024	×	0	128
FE-58	Encoder type	0: Quadrature encoder	0	×	0	128
FE-59	AB phase sequence of ABZ incremental encoder	0: Positive 1: Negative	0	○	0	128
FE-60	UVW phase sequence of UVW encoder	0: Positive 1: Negative	0	○	0	128
FE-61	Number of pole-pairs of rotary transformer	1~10000	1	×	0	128
FE-62	PG variable speed percentage denominator	0~1000	1	×	0	128
FE-63	PG variable speed percentage member	0~1000	0	×	0	128
FE-64	PG speed measurement filtering time	0.000s~2.000s	0.005s	○	0	128
FE-65	PG mounting angle	0~359.9°	0.0°	○	0	129
FE-66	PG offline action	0: No action, 1: Alarm, 2: Fault and free stop	2	○	1	129
FE-67	PG offline detection time	0.1s~10.0s	1.0s	○	1	129
FE-68	Signal Z enabling	0: Encoder signal Z is not used 1: Encoder signal Z is used	1	×	1	129
FE-69	Speed measurement under the mode without PG enabled	0: Disabled 1: Enabled	0	○	1	129
FE-70	PG mounting angle re-identification	0: Disabled 1: Enabled	0	○	0	129
FE-74	Overspeed frequency multiple	0~200% is used to determine the overspeed alarm, in percentage of maximum frequency	120%	○	0	130
FE-75	Overspeed detection time	0.001s~0.600s	0.005s	○	0	130
FE-76	Speed offset detection value	0%~50%	10%	○	0	130
FE-77	Speed offset detection time	0.0s~60.0s	5.0s	○	0	130

FF Communication Parameters

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FF-00	Communication compatibility selection	0: None 1: Compatible with three generations of devices	0	○	1	131
FF-01	USER communication format	0: 8/N/1 1: 8/E/1 2: 8/O/1 3: 8/N/2	2	○	1	131
FF-02	USER communication baud rate	0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps	4	○	1	131
FF-03	USER correspondence address	0~247	1	○	1	131
FF-10	Communication process character 1 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-11	Communication process character 2 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-12	Communication process character 3 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-13	Communication process character 4 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-14	Communication process character 5 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-15	Communication process character 6 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-16	Communication process character 7 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-17	Communication process character 8 selection	Corresponding monitoring parameter 0~100	0	○	1	131
FF-20	Local address for CAN communicate	1~63	1	×	1	131
FF-21	CAN communication baud rate	0: 1M 1: 500K 2: 250K 3: 125K 4: 100K 5: 50K	1	×	1	132

FM Touch Screen Settings

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
FM-00	User login	Input login password.	0	○	1	134
FM-01	User operation	0: None 1: Initialize operator parameters 2: Initialize the administrator parameters and the parameters below	0	○	1	134
FM-02	Parameter protection level	0→3 (0: invalid, other corresponding security levels)	0	○	1	134
FM-03	Administrator previous password	0→65535	0	○	1	134
FM-04	Administrator new password	0→65535	0	○	1	134
FM-05	Administrator new password	0→65535	0	○	1	134
FM-11	Software registration	Enter the software registration code	0	○	1	134

Parameters	Name	Setting Range and Description	Factory Default Value	Change	Security Level	Page No.
	code					
FM-12	Software permissible time	1→65535h	21600	○	1	134

FU Data Monitoring

Correspondence Address	Parameters	Name	Explanation
1200	FU-00	Operating frequency	Unit: 0.01Hz
1201	FU-01	Operation frequency percentage	Unit: 0.01%
1202	FU-02	Set frequency	Unit: 0.01Hz
1203	FU-03	Reserved	
1204	FU-04	Output measurement frequency	Unit: 0.01Hz
1205	FU-05	Reserved	
1206	FU-06	Reserved	
1207	FU-07	PID feedback value	Unit: 0.01%
1208	FU-08	PID set value	Unit: 0.01%
1209	FU-09	PID output value	Unit: 0.01%
120A	FU-10	Reserved	
120B	FU-11	AI1 input percentage	Unit: 0.01%
120C	FU-12	AI2 input percentage	Unit: 0.01%
120D	FU-13	AI3 input percentage	Unit: 0.01%
120E	FU-14	Reserved	
120F	FU-15	Reserved	
1210	FU-16	Reserved	
1211	FU-17	Reserved	
1212	FU-18	Output current	Unit: 0.1A
1213	FU-19	Output current percentage	Unit: 0.01%
1214	FU-20	Input current	Unit: 0.1A
1215	FU-21	Phase-R input current	
1216	FU-22	Phase-S input current	
1217	FU-23	Phase-T input current	
1218	FU-24	Phase-U output current	
1219	FU-25	Phase-V output current	
121A	FU-26	Phase-W output current	
121B	FU-27	Reserved	
121C	FU-28	Reserved	
121D	FU-29	Reserved	

Correspondence Address	Parameters	Name	Explanation
121E	FU-30	Reserved	
121F	FU-31	Output voltage	Unit: 1V
1220	FU-32	Reserved	
1221	FU-33	Reserved	
1222	FU-34	Reserved	
1223	FU-35	Output power	Unit: 1KW
1224	FU-36	Reserved	
1225	FU-37	Reserved	
1226	FU-38	Input voltage	Unit: 1V
1227	FU-39	Input power	Unit: 1KW
1228	FU-40	Voltage of input RS line	
1229	FU-41	Voltage of input ST line	
122A	FU-42	Voltage of input TR line	
122B	FU-43	Voltage of input UV line	
122C	FU-44	Voltage of input VW line	
122D	FU-45	Voltage of input WU line	
122E	FU-46	Communication polling cycle	
122F	FU-47	Times of communication error	
1230	FU-48	Reserved	
1231	FU-49	Accumulated running time of fan	
1232	FU-50	Digital input/output terminal status	
1233	FU-51	Reserved	
1234	FU-52	Unit U1-4 status information	
1235	FU-53	Unit U2-8 status information	
1236	FU-54	Unit V1-4 status information	
1237	FU-55	Unit V2-8 status information	
1238	FU-56	Unit W1-4 status information	
1239	FU-57	Unit W2-8 status information	
123A	FU-58	Unit U9V9W9 status information	
123B	FU-59	System fault code	
123C	FU-60	Reserved	
123D	FU-61	Reserved	
123E	FU-62	Reserved	
123F	FU-63	Reserved	
1240	FU-64	Reserved	
1241	FU-65	Reserved	
1242	FU-66	Reserved	

Correspondence Address	Parameters	Name	Explanation
1243	FU-67	Reserved	
1244	FU-68	Reserved	
1245	FU-69	Reserved	
1246	FU-70	Reserved	
1247	FU-71	Reserved	
1248	FU-72	Reserved	
1249	FU-73	Reserved	
124A	FU-74	Rated power of inverter	The min. unit: 1kW
124B	FU-75	DSP software version No.	
124C	FU-76	Reserved	
124D	FU-77	Reserved	
124E	FU-78	Reserved	
124F	FU-79	Reserved	
1250	FU-80	Reserved	
1251	FU-81	Reserved	
1252	FU-82	Reserved	
1253	FU-83	Reserved	
1254	FU-84	Reserved	
1255	FU-85	Reserved	
1256	FU-86	Reserved	
1257	FU-87	Reserved	
1258	FU-88	Reserved	
1259	FU-89	Reserved	
125A	FU-90	Reserved	
125B	FU-91	Reserved	
125C	FU-92	Reserved	
125D	FU-93	Reserved	
125E	FU-94	Reserved	
125F	FU-95	Reserved	
1260	FU-96	AO1 output percentage	Unit: 0.01%
1261	FU-97	AO2 output percentage	Unit: 0.01%
1262	FU-98	AO3 output percentage	Unit: 0.01%
1263	FU-99	AO4 output percentage	Unit: 0.01%
1264	FU-100	Manufacturer information	Identify the manufacturer
1265	FU-101	Equipment ID	Identify product type
1266	FU-102	Software ID	Identify software version
1267	FU-103	Dynamic verification code	Used for applying for dynamic passwords

Correspondence Address	Parameters	Name	Explanation
1268	FU-104	System clock (low-order 16 bits)	Taking the year of 1970 as the base number, unit: s
1269	FU-105	System clock (high-order 16 bits)	
126A	FU-106	System status (low-order 16 bits)	See the description below
126B	FU-107	System status (high-order 16 bits)	
126C	FU-108	Switch status (low-order 16 bits)	Corresponding to the primary circuit switch
126D	FU-109	Switch status (high-order 16 bits)	
126E	FU-110	Input watt-hour meter (low-order 16 bits)	Input electricity measurement
126F	FU-111	Input watt-hour meter (high-order 16 bits)	
1270	FU-112	Output watt-hour meter (low-order 16 bits)	Output electricity measurement
1271	FU-113	Output watt-hour meter (high-order 16 bits)	
1272	FU-114	Rated power	Unit: 1KW
1273	FU-115	Rated input voltage	Unit: 1V
1274	FU-116	Rated input current	Unit: 0.1A
1275	FU-117	Rated output voltage	Unit: 1V
1276	FU-118	Output current rating	Unit: 0.1A
1277	FU-119	Service time of equipment	Units: Hours
1278	FU-120	Single operation time of the device	Units: Hours
1279	FU-121	Accumulated running time of fan	Units: Hours
127A	FU-122	Fault code	
127B	FU-123	Alarm information (low-order 16 bits)	
127C	FU-124	Alarm information (high-order 16 bits)	
127D	FU-125	Login user level	0: Operation 1: Maintenance 2: Administration 3: Manufacturer
127E	FU-126	Current frequency channel source	
127F	FU-127	Current start/stop channel source	
1280	FU-128	DI terminal status	
1281	FU-129	DO terminal status	
1282	FU-130		
1283	FU-131	Automatic restart remaining time	Valid during automatic reset
1284	FU-132	Automatic restart remaining times	Valid during automatic reset
1285	FU-133	Delay shutdown countdown (s)	Alarm of delayed fault shutdown
1286	FU-134	Current control mode	0: Not loaded 1: Asynchronous motor VF 2: Asynchronous motor vector 3: Synchronous motor VF 4: Synchronous motor vector 5: Permanent magnet synchronous 6: Power supply 7: Power generation supply 8: SVG control

Correspondence Address	Parameters	Name	Explanation
1287	FU-135	Reserved	
1288	FU-136	Reserved	
1289	FU-137	Reserved	
128A	FU-138	Reserved	
128B	FU-139	Reserved	
128C	FU-140	Reserved	
128D	FU-141	Reserved	
128E	FU-142	Reserved	
128F	FU-143	Reserved	
1290	FU-144	Reserved	
1291	FU-145	Reserved	
1292	FU-146	Reserved	
1293	FU-147	Reserved	
1294	FU-148	Reserved	
1295	FU-149	Switch cabinet ID	Model determination
1296	FU-150	Number of unit bypass layers	Bit display, see the description below
1297	FU-151	Unit bus voltage sum of phase U	Unit: 1V
1298	FU-152	Unit bus voltage sum of phase V	Unit: 1V
1299	FU-153	Unit bus voltage sum of phase W	Unit: 1V
129A	FU-154	Unit U1 status information	Bit0-11: busbar voltage Bit12-15: state
129B	FU-155	Unit U2 status information	Bit0-11: busbar voltage Bit12-15: state
129C	FU-156	Unit U3 status information	Bit0-11: busbar voltage Bit12-15: state
129D	FU-157	Unit U4 status information	Bit0-11: busbar voltage Bit12-15: state
129E	FU-158	Unit U5 status information	Bit0-11: busbar voltage Bit12-15: state
129F	FU-159	Unit U6 status information	Bit0-11: busbar voltage Bit12-15: state
12A0	FU-160	Unit U7 status information	Bit0-11: busbar voltage Bit12-15: state
12A1	FU-161	Unit U8 status information	Bit0-11: busbar voltage Bit12-15: state
12A2	FU-162	Unit U9 status information	Bit0-11: busbar voltage Bit12-15: state
12A3	FU-163	Reserved	
12A4	FU-164	Reserved	
12A5	FU-165	Reserved	
12A6	FU-166	Unit V1 status information	Bit0-11: busbar voltage Bit12-15: state
12A7	FU-167	Unit V2 status information	Bit0-11: busbar voltage Bit12-15: state
12A8	FU-168	Unit V3 status information	Bit0-11: busbar voltage Bit12-15: state
12A9	FU-169	Unit V4 status information	Bit0-11: busbar voltage Bit12-15: state
12AA	FU-170	Unit V5 status information	Bit0-11: busbar voltage Bit12-15: state
12AB	FU-171	Unit V6 status information	Bit0-11: busbar voltage Bit12-15: state
12AC	FU-172	Unit V7 status information	Bit0-11: busbar voltage Bit12-15: state
12AD	FU-173	Unit V8 status information	Bit0-11: busbar voltage Bit12-15: state

Correspondence Address	Parameters	Name	Explanation
12AE	FU-174	Unit V9 status information	Bit0-11: busbar voltage Bit12-15: state
12AF	FU-175	Reserved	
12B0	FU-176	Reserved	
12B1	FU-177	Reserved	
12B2	FU-178	Unit W1 status information	Bit0-11: busbar voltage Bit12-15: state
12B3	FU-179	Unit W2 status information	Bit0-11: busbar voltage Bit12-15: state
12B4	FU-180	Unit W3 status information	Bit0-11: busbar voltage Bit12-15: state
12B5	FU-181	Unit W4 status information	Bit0-11: busbar voltage Bit12-15: state
12B6	FU-182	Unit W5 status information	Bit0-11: busbar voltage Bit12-15: state
12B7	FU-183	Unit W6 status information	Bit0-11: busbar voltage Bit12-15: state
12B8	FU-184	Unit W7 status information	Bit0-11: busbar voltage Bit12-15: state
12B9	FU-185	Unit W8 status information	Bit0-11: busbar voltage Bit12-15: state
12BA	FU-186	Unit W9 status information	Bit0-11: busbar voltage Bit12-15: state
12BB	FU-187	Reserved	
12BC	FU-188	Reserved	
12BD	FU-189	Reserved	
12BE	FU-190	Temperature of unit U1 detection point 1 ℃	
12BF	FU-191	Temperature of unit U2 detection point 1 ℃	
12C0	FU-192	Temperature of unit U3 detection point 1 ℃	
12C1	FU-193	Temperature of unit U4 detection point 1 ℃	
12C2	FU-194	Temperature of unit U5 detection point 1 ℃	
12C3	FU-195	Temperature of unit U6 detection point 1 ℃	
12C4	FU-196	Temperature of unit U7 detection point 1 ℃	
12C5	FU-197	Temperature of unit U8 detection point 1 ℃	
12C6	FU-198	Temperature of unit U9 detection point 1 ℃	
12C7	FU-199	Reserved	
12C8	FU-200	Reserved	
12C9	FU-201	Reserved	
12CA	FU-202	Temperature of unit V1 detection point 1 ℃	
12CB	FU-203	Temperature of unit V2 detection point 1 ℃	
12CC	FU-204	Temperature of unit V3 detection point 1 ℃	
12CD	FU-205	Temperature of unit V4 detection	

Correspondence Address	Parameters	Name	Explanation
		point 1 ℃	
12CE	FU-206	Temperature of unit V5 detection point 1 ℃	
12CF	FU-207	Temperature of unit V6 detection point 1 ℃	
12D0	FU-208	Temperature of unit V7 detection point 1 ℃	
12D1	FU-209	Temperature of unit V8 detection point 1 ℃	
12D2	FU-210	Temperature of unit V9 detection point 1 ℃	
12D3	FU-211	Reserved	
12D4	FU-212	Reserved	
12D5	FU-213	Reserved	
12D6	FU-214	Temperature of unit W1 detection point 1 ℃	
12D7	FU-215	Temperature of unit W2 detection point 1 ℃	
12D8	FU-216	Temperature of unit W3 detection point 1 ℃	
12D9	FU-217	Temperature of unit W4 detection point 1 ℃	
12DA	FU-218	Temperature of unit W5 detection point 1 ℃	
12DB	FU-219	Temperature of unit W6 detection point 1 ℃	
12DC	FU-220	Temperature of unit W7 detection point 1 ℃	
12DD	FU-221	Temperature of unit W8 detection point 1 ℃	
12DE	FU-222	Temperature of unit W9 detection point 1 ℃	
12DF	FU-223	Reserved	
12E0	FU-224	Reserved	
12E1	FU-225	Reserved	
12E2	FU-226	Temperature of unit U1 detection point 2 ℃	
12E3	FU-227	Temperature of unit U2 detection point 2 ℃	
12E4	FU-228	Temperature of unit U3 detection point 2 ℃	
12E5	FU-229	Temperature of unit U4 detection point 2 ℃	
12E6	FU-230	Temperature of unit U5 detection point 2 ℃	
12E7	FU-231	Temperature of unit U6 detection point 2 ℃	

Correspondence Address	Parameters	Name	Explanation
12E8	FU-232	Temperature of unit U7 detection point 2 ℃	
12E9	FU-233	Temperature of unit U8 detection point 2 ℃	
12EA	FU-234	Temperature of unit U9 detection point 2 ℃	
12EB	FU-235	Reserved	
12EC	FU-236	Reserved	
12ED	FU-237	Reserved	
12EE	FU-238	Temperature of unit V1 detection point 2 ℃	
12EF	FU-239	Temperature of unit V2 detection point 2 ℃	
12F0	FU-240	Temperature of unit V3 detection point 2 ℃	
12F1	FU-241	Temperature of unit V4 detection point 2 ℃	
12F2	FU-242	Temperature of unit V5 detection point 2 ℃	
12F3	FU-243	Temperature of unit V6 detection point 2 ℃	
12F4	FU-244	Temperature of unit V7 detection point 2 ℃	
12F5	FU-245	Temperature of unit V8 detection point 2 ℃	
12F6	FU-246	Temperature of unit V9 detection point 2 ℃	
12F7	FU-247	Reserved	
12F8	FU-248	Reserved	
12F9	FU-249	Reserved	
12FA	FU-250	Temperature of unit W1 detection point 2 ℃	
12FB	FU-251	Temperature of unit W2 detection point 2 ℃	
12FC	FU-252	Temperature of unit W3 detection point 2 ℃	
12FD	FU-253	Temperature of unit W4 detection point 2 ℃	
12FE	FU-254	Temperature of unit W5 detection point 2 ℃	
12FF	FU-255	Temperature of unit W6 detection point 2 ℃	
1300	FU-256	Temperature of unit W7 detection point 2 ℃	
1301	FU-257	Temperature of unit W8 detection point 2 ℃	
1302	FU-258	Temperature of unit W9 detection point 2 ℃	

Correspondence Address	Parameters	Name	Explanation
1303	FU-259	Reserved	
1304	FU-260	Reserved	
1305	FU-261	Reserved	
1306	FU-262	Temperature of unit U1 detection point 3 ℃	
1307	FU-263	Temperature of unit U2 detection point 3 ℃	
1308	FU-264	Temperature of unit U3 detection point 3 ℃	
1309	FU-265	Temperature of unit U4 detection point 3 ℃	
130A	FU-266	Temperature of unit U5 detection point 3 ℃	
130B	FU-267	Temperature of unit U6 detection point 3 ℃	
130C	FU-268	Temperature of unit U7 detection point 3 ℃	
130D	FU-269	Temperature of unit U8 detection point 3 ℃	
130E	FU-270	Temperature of unit U9 detection point 3 ℃	
130F	FU-271	Reserved	
1310	FU-272	Reserved	
1311	FU-273	Reserved	
1312	FU-274	Temperature of unit V1 detection point 3 ℃	
1313	FU-275	Temperature of unit V2 detection point 3 ℃	
1314	FU-276	Temperature of unit V3 detection point 3 ℃	
1315	FU-277	Temperature of unit V4 detection point 3 ℃	
1316	FU-278	Temperature of unit V5 detection point 3 ℃	
1317	FU-279	Temperature of unit V6 detection point 3 ℃	
1318	FU-280	Temperature of unit V7 detection point 3 ℃	
1319	FU-281	Temperature of unit V8 detection point 3 ℃	
131A	FU-282	Temperature of unit V9 detection point 3 ℃	
131B	FU-283	Reserved	
131C	FU-284	Reserved	
131D	FU-285	Reserved	
131E	FU-286	Temperature of unit W1 detection point 3 ℃	

Correspondence Address	Parameters	Name	Explanation
131F	FU-287	Temperature of unit W2 detection point 3 ℃	
1320	FU-288	Temperature of unit W3 detection point 3 ℃	
1321	FU-289	Temperature of unit W4 detection point 3 ℃	
1322	FU-290	Temperature of unit W5 detection point 3 ℃	
1323	FU-291	Temperature of unit W6 detection point 3 ℃	
1324	FU-292	Temperature of unit W7 detection point 3 ℃	
1325	FU-293	Temperature of unit W8 detection point 3 ℃	
1326	FU-294	Temperature of unit W9 detection point 3 ℃	
1327	FU-295	Reserved	
1328	FU-296	Reserved	
1329	FU-297	Reserved	
132A	FU-298	Unit U1 rectifier status	
132B	FU-299	Unit U2 rectifier status	
132C	FU-300	Unit U3 rectifier status	
132D	FU-301	Unit U4 rectifier status	
132E	FU-302	Unit U5 rectifier status	
132F	FU-303	Unit U6 rectifier status	
1330	FU-304	Unit U7 rectifier status	
1331	FU-305	Unit U8 rectifier status	
1332	FU-306	Unit U9 rectifier status	
1333	FU-307	Reserved	
1334	FU-308	Reserved	
1335	FU-309	Reserved	
1336	FU-310	Unit V1 rectifier status	
1337	FU-311	Unit V2 rectifier status	
1338	FU-312	Unit V3 rectifier status	
1339	FU-313	Unit V4 rectifier status	
133A	FU-314	Unit V5 rectifier status	
133B	FU-315	Unit V6 rectifier status	
133C	FU-316	Unit V7 rectifier status	
133D	FU-317	Unit V8 rectifier status	
133E	FU-318	Unit V9 rectifier status	
133F	FU-319	Reserved	

Correspondence Address	Parameters	Name	Explanation
1340	FU-320	Reserved	
1341	FU-321	Reserved	
1342	FU-322	Unit W1 rectifier status	
1343	FU-323	Unit W2 rectifier status	
1344	FU-324	Unit W3 rectifier status	
1345	FU-325	Unit W4 rectifier status	
1346	FU-326	Unit W5 rectifier status	
1347	FU-327	Unit W6 rectifier status	
1348	FU-328	Unit W7 rectifier status	
1349	FU-329	Unit W8 rectifier status	
134A	FU-330	Unit W9 rectifier status	
134B	FU-331	Reserved	
134C	FU-332	Reserved	
134D	FU-333	Reserved	
134E	FU-334	Unit U1 capacitance discharge time	
134F	FU-335	Unit U2 capacitance discharge time	
1350	FU-336	Unit U3 capacitance discharge time	
1351	FU-337	Unit U4 capacitance discharge time	
1352	FU-338	Unit U5 capacitance discharge time	
1353	FU-339	Unit U6 capacitance discharge time	
1354	FU-340	Unit U7 capacitance discharge time	
1355	FU-341	Unit U8 capacitance discharge time	
1356	FU-342	Unit U9 capacitance discharge time	
1357	FU-343	Reserved	
1358	FU-344	Reserved	
1359	FU-345	Reserved	
135A	FU-346	Unit V1 capacitance discharge time	
135B	FU-347	Unit V2 capacitance discharge time	
135C	FU-348	Unit V3 capacitance discharge time	
135D	FU-349	Unit V4 capacitance discharge time	
135E	FU-350	Unit V5 capacitance discharge time	
135F	FU-351	Unit V6 capacitance discharge time	
1360	FU-352	Unit V7 capacitance discharge time	
1361	FU-353	Unit V8 capacitance discharge time	
1362	FU-354	Unit V9 capacitance discharge time	
1363	FU-355	Reserved	
1364	FU-356	Reserved	

Correspondence Address	Parameters	Name	Explanation
1365	FU-357	Reserved	
1366	FU-358	Unit W1 capacitance discharge time	
1367	FU-359	Unit W2 capacitance discharge time	
1368	FU-360	Unit W3 capacitance discharge time	
1369	FU-361	Unit W4 capacitance discharge time	
136A	FU-362	Unit W5 capacitance discharge time	
136B	FU-363	Unit W6 capacitance discharge time	
136C	FU-364	Unit W7 capacitance discharge time	
136D	FU-365	Unit W8 capacitance discharge time	
136E	FU-366	Unit W9 capacitance discharge time	
136F	FU-367	Reserved	
1370	FU-368	Reserved	
1371	FU-369	Reserved	
1372	FU-370	Reserved	
1373	FU-371	Reserved	
1374	FU-372	Reserved	
1375	FU-373	Reserved	
1376	FU-374	Reserved	
1377	FU-375	Reserved	
1378	FU-376	Reserved	
1379	FU-377	Reserved	
137A	FU-378	Reserved	
137B	FU-379	Reserved	
137C	FU-380	Reserved	
137D	FU-381	Reserved	
137E	FU-382	Reserved	
137F	FU-383	Reserved	
1380	FU-384	Reserved	
1381	FU-385	Reserved	
1382	FU-386	Reserved	
1383	FU-387	Reserved	
1384	FU-388	Reserved	
1385	FU-389	Reserved	
1386	FU-390	Reserved	
1387	FU-391	Reserved	
1388	FU-392	Reserved	
1389	FU-393	Reserved	

Correspondence Address	Parameters	Name	Explanation
138A	FU-394	Reserved	
138B	FU-395	Reserved	
138C	FU-396	Reserved	
138D	FU-397	Reserved	
138E	FU-398	Reserved	
138F	FU-399	Reserved	
1390	FU-400	Reserved	
1391	FU-401	Reserved	
1392	FU-402	Reserved	
1393	FU-403	Reserved	
1394	FU-404	Reserved	
1395	FU-405	Reserved	
1396	FU-406	Reserved	
1397	FU-407	Reserved	
1398	FU-408	Reserved	
1399	FU-409	Reserved	
139A	FU-410	Reserved	
139B	FU-411	Reserved	
139C	FU-412	Reserved	
139D	FU-413	Reserved	
139E	FU-414	Reserved	
139F	FU-415	Reserved	
13A0	FU-416	Reserved	
13A1	FU-417	Reserved	
13A2	FU-418	Reserved	
13A3	FU-419	Reserved	
13A4	FU-420	Set frequency	Unit: 0.01Hz
13A5	FU-421	Operating frequency	Unit: 0.01Hz
13A6	FU-422	Output measurement frequency	Unit: 0.01Hz
13A7	FU-423	Output voltage	Unit: 1V
13A8	FU-424	Output current	Unit: 0.1A
13A9	FU-425	Output power	Unit: 1KW
13AA	FU-426	Input voltage	Unit: 1V
13AB	FU-427	Input current	Unit: 0.1A
13AC	FU-428	Input power	Unit: 1KW
13AD	FU-429	Motor rotation frequency	Unit: 0.01Hz
13AE	FU-430	Grid measurement frequency	Unit: 0.01Hz
13AF	FU-431	Power supply setting frequency	Unit: 0.01Hz

Correspondence Address	Parameters	Name	Explanation
13B0	FU-432	Power supply setting voltage	Unit: 1V
13B1	FU-433	Effective voltage value pf phase R	
13B2	FU-434	Effective voltage value pf phase S	
13B3	FU-435	Effective voltage value pf phase T	
13B4	FU-436	Effective current value pf phase R	
13B5	FU-437	Effective current value pf phase S	
13B6	FU-438	Effective current value pf phase T	
13B7	FU-439	Reserved	
13B8	FU-440	Reserved	
13B9	FU-441	Reserved	
13BA	FU-442	Reserved	
13BB	FU-443	Reserved	
13BC	FU-444	Reserved	
13BD	FU-445	Reserved	
13BE	FU-446	Reserved	
13BF	FU-447	Reserved	
13C0	FU-448	Reserved	
13C1	FU-449	Reserved	
13C2	FU-450	Operation frequency percentage	Take basic frequency as 100%
13C3	FU-451	Set frequency percentage	Take basic frequency as 100%
13C4	FU-452	Grid frequency percentage	Take basic frequency as 100%
13C5	FU-453	Output voltage percentage	Take 1.5 times the rated output voltage as 100%
13C6	FU-454	Output current percentage	Take 2 times the rated output current as 100%
13C7	FU-455	Output Power Percentage	Take 1.5 times the rated output power as 100%
13C8	FU-456	Input voltage percentage	Take 1.5 times the rated input voltage as 100%
13C9	FU-457	Input current percentage	Take 2 times the rated input current as 100%
13CA	FU-458	Input power percentage	Take 1.5 times the rated input power as 100%
13CB	FU-459	AI1 input percentage	
13CC	FU-460	AI2 input percentage	
13CD	FU-461	AI3 input percentage	
13CE	FU-462	Simulated set percentage	
13CF	FU-463	Excitation current percentage	Take the maximum output current of the excitation cabinet as 100%
13D0	FU-464	Reserved	
13D1	FU-465	Reserved	

Correspondence Address	Parameters	Name	Explanation
13D2	FU-466	Reserved	
13D3	FU-467	Reserved	
13D4	FU-468	Reserved	
13D5	FU-469	Reserved	
13D6	FU-470	Reserved	
13D7	FU-471	Reserved	
13D8	FU-472	Reserved	
13D9	FU-473	Reserved	
13DA	FU-474	Reserved	
13DB	FU-475	Reserved	
13DC	FU-476	Reserved	
13DD	FU-477	Reserved	
13DE	FU-478	Reserved	
13DF	FU-479	Reserved	
13E0	FU-480	Permanent magnet control indication	
13E1	FU-481	Reserved	
13E2	FU-482	Reserved	
13E3	FU-483	Reserved	
13E4	FU-484	Reserved	
13E5	FU-485	Reserved	
13E6	FU-486	Reserved	
13E7	FU-487	Reserved	
13E8	FU-488	Reserved	
13E9	FU-489	Reserved	
13EA	FU-490	System readiness test	
13EB	FU-491	Unit ready sign	
13EC	FU-492	Redundant host control output	
13ED	FU-493	Redundant host switching ready	
13EE	FU-494	Redundant host communication is normal	
13EF	FU-495	Redundant slave control output	
13F0	FU-496	Redundant slave switching ready	
13F1	FU-497	Redundant slave communication is normal	
13F2	FU-498	Redundant host/slave settings for the machine	
13F3	FU-499	Reserved	
13F4	FU-500	Reserved	
13F5	FU-501	Reserved	

Correspondence Address	Parameters	Name	Explanation
13F6	FU-502	Reserved	
13F7	FU-503	Reserved	
13F8	FU-504	Reserved	
13F9	FU-505	Voltage sag counter	
13FA	FU-506	CAN error counter	
13FB	FU-507	Communication error counter	
13FC	FU-508	PLC sending data 1	
13FD	FU-509	PLC sending data 2	
13FE	FU-510	PLC receiving data 1	
13FF	FU-511	PLC receiving data 2	

Power unit state description:

Status	Content	Status	Content	Status	Content	Status	Content
0	Bypass failure	4	Unit over-temperature	8	Uplink communication failure	12	Unit power-losing
1	Abnormal bypass	5	Bus undervoltage	9	rectifier fault	13	Unit shutdown
2	Module fault	6	AC phase loss	10	Reserved	14	Unit bypass
3	Bus overvoltage	7	Downlink communication failure	11	Temperature measurement is offline	15	Normal

6. Detailed Explanation of Functional Parameters

6.1 F0 Basic Parameters

F0-00	**Default control channel**	Factory Default Value	0	Security Level	1	Change	×
F0-01	**Remote control channel**	Factory Default Value	2	Security Level	1	Change	×
F0-02	**Forced control channel**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: HMI 1: Communication 2: Terminal 3: PLC						

🕮 Digital input 23 "forced control channel switching" and digital input 25 "remote control channel switching" can force switch control channel, see page 96.

F0-03	**Default frequency channel**	Factory Default Value	0	Security Level	1	Change	×
F0-04	**Remote frequency channel**	Factory Default Value	3	Security Level	1	Change	×
F0-05	**Forced frequency channel**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: HMI 1: Communication 2: AI1 3: AI2 4: AI3						

🕮 Digital input 22 "forced frequency channel switching" and digital input 24 "remote frequency channel switching" can force switch frequency channel, see page 96.

F0-06	**Maximum frequency**	Factory Default Value	50.00Hz	Security Level	1	Change	○
Setting range	F0-07 “upper limiting frequency”~320.00Hz						
F0-07	**Upper limit frequency**	Factory Default Value	50.00Hz	Security Level	1	Change	○
Setting range	F0-08 "lower limit frequency" ~ F0-06 "maximum frequency"						
F0-08	**Lower limit frequency**	Factory Default Value	5.00Hz	Security Level	1	Change	○
Setting range	0.01Hz~F0-07 “upper limiting frequency”						

🕮 F0-06 'maximum frequency': The frequency when the frequency is set at 100% is used for analog input or PFI to set the frequency.

🕮 F0-07 'upper limiting frequency', F0-08 'lower limit frequency': limit the final set frequency.

F0-09	**Motor steering lock**	Factory Default Value	0	Security Level	1	Change	×

Setting range	0: Unlocked 1: Forward direction locked 2: Reverse direction locked (valid at set frequency)

🕮 Adjust the rotation direction of the motor.

F0-12	Control mode selection	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: V/F control 1: Vector control 2: Permanent magnet synchronous motor 3: Power supply mode						

🕮 Control mode:

F0-12＝0 'V/F control': The speed open-loop, voltage and frequency coordinated control mode can improve the torque output capacity by lifting torque and can improve the mechanical characteristics and speed control accuracy through slip compensation.

F0-12＝1 'vector control': Enter the F3 function group "Vector Control Parameters" to set relevant parameters.

F0-12＝2 'permanent magnet synchronous motor': Control the permanent magnet synchronous motor.

F0-12＝3 'power supply mode': The power supply mode can output three-phase voltage and frequency (50/60Hz) and fixed/adjustable AC power supply. Enter the Fd function group to set the relevant parameters.

6.2 F1 Acceleration & Deceleration, Starting, Stopping and Jogging Parameters

F1-00	Acceleration time 1	Factory Default Value	120.0s	Security Level	0	Change	○
F1-01	Deceleration time 1	Factory Default Value	120.0s	Security Level	0	Change	○
F1-02	Acceleration time 2	Factory Default Value	120.0s	Security Level	0	Change	○
F1-03	Deceleration time 2	Factory Default Value	120.0s	Security Level	0	Change	○
F1-04	Acceleration time 3	Factory Default Value	120.0s	Security Level	0	Change	○
F1-05	Deceleration time 3	Factory Default Value	120.0s	Security Level	0	Change	○
F1-06	Acceleration time 4	Factory Default Value	120.0s	Security Level	0	Change	○
F1-07	Deceleration time 4	Factory Default Value	120.0s	Security Level	0	Change	○
Setting range	0.1~3600.0s						

🕮 Acceleration time: the time required to increase the running frequency to 50Hz; Deceleration time: the time required to decrease the running frequency to 0Hz.

🕮 F1-00~F1-07 provides 4 acceleration & deceleration times. It can be selected according to digital input 8, 9, 10 and 11. See page 96 for details.

F1-09	Fast stop time	Factory Default Value	50.0s	Security Level	0	Change	○
Setting range	0.1~3600.0s						

🕮 F1-09 'fast deceleration time': When the digital input 18 'fast stop" or the communication gives fast stop command, the inverter will stop according to the 'fast stop deceleration time'.

F1-10	Starting mode	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: Start from the starting frequency 1: First DC braking and then starting from the starting frequency 2: Speed tracking start mode 1 3: Speed tracking start mode 2						
F1-11	Starting frequency	Factory Default Value	0.50Hz	Security Level	1	Change	○
Setting range	0.01~60.00Hz						
F1-12	Starting frequency retention time	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.0s~60.0s						
F1-13	Starting delay time	Factory Default Value	0.0s	Security Level	1	Change	×
Setting range	0.0s~1000.0s						
F1-14	Voltage soft start enabling	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: invalid 1: valid (the voltage starts from 0 at the time of soft start, it is valid only when starting at the start frequency)						
F1-15	Starting DC braking time	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.0s~60.0s						
F1-16	Starting DC braking current	Factory Default Value	0.0%	Security Level	1	Change	○
Setting range	0.0~100.0%, the rated current of the motor is 100%						

🕮 Inverter starting mode:

F1-10＝0 'start from starting frequency': when starting, the inverter runs at F1-11 'starting frequency', it will accelerate after the time set in F1-12 'starting frequency holding time', which can reduce the current shock when starting.

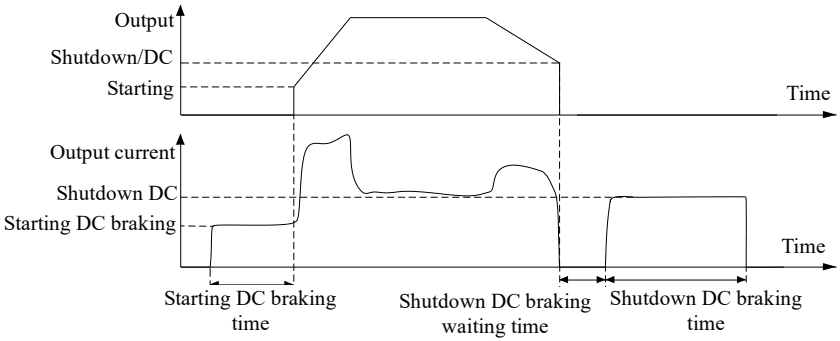
F1-10＝1 'DC braking before starting from the starting frequency': Sometimes the motor is in a rotating state before starting (such as the fan may be reversed due to headwind before starting), so DC braking before starting can be adopted to stop the motor and start it again to prevent starting impact overcurrent. Relevant parameters can be set according to F1-15 'starting DC braking time' and F1-16 'start DC braking current'.

F1-10＝2 'speed tracking starting mode 1': Automatically identify the speed and direction of the motor before starting, and then start smoothly without impact from the corresponding frequency. For the rotating motor, it is unnecessary to stop it completely for restart, which can shorten the starting time and reduce the starting impact.

F1-10＝3 'speed tracking starting mode 2': Automatically identify the speed and direction of the motor before starting, and then start smoothly without impact from the corresponding frequency. For the rotating motor, it is unnecessary to stop it completely for restart, which can shorten the starting time and reduce the starting impact.

🕮 In case of transient stop, self-reset and restart after operation interruption , the starting mode is speed tracking starting mode 1 or speed tracking starting mode 2.

🕮 Starting and stopping DC braking are shown below:



⚠ Attention : Tracking starting mode is recommended for high-speed or large-inertia load starting, rather than long-time DC braking before starting.

⚠ Attention : Starting from the starting frequency immediately after the free stop will lead to overcurrent due to the remanence counter electromotive force in the motor. Therefore, if the motor does not stop rotating after the free stop, it is recommended to adopt tracking starting mode to start it if it is required to be started immediately.

🕮 F1-14 'voltage soft starting enabling': when selecting 'starting from the starting frequency' as the starting mode and F1-12 'starting frequency hold time' is not 0, the output voltage gradually transitions from 0 to the voltage corresponding to the starting frequency within the starting frequency holding time if F1-14＝1, so as to reduce the starting impact when starting and avoid the non-directional rotation of the motor caused by suddenly increased voltage. It is only valid for V/F control.

F1-17	**Shutdown method**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Deceleration stop, 1: Free stop, 2. Deceleration + DC braking						
F1-18	**Shutdown frequency**	Factory Default Value	0.50Hz	Security Level	1	Change	○
Setting range	0.01~320.00Hz						
F1-19	**Shutdown DC braking waiting time**	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.00~10.0s						
F1-20	**Shutdown DC braking time**	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.0s~60.0s						
F1-21	**Shutdown DC braking current**	Factory Default Value	0.0%	Security Level	1	Change	○
Setting range	0.0~100.0%, the rated current of the motor is 100%						

🕮 Inverter stop mode:

F1-17＝0 'deceleration stop': The inverter reduces its operation frequency and enters the standby state at F1-18 "stop frequency".

F1-17＝1 'free stop': Inverter locks the output, and the motor slide freely; But during the jogging operation or emergency stop, the stop is still the deceleration stop. For the stop of water pump, free stop shall not be adopted generally, because the water pump stop time is short, sudden stop will occur water hammer effect.

F1-17＝2 'deceleration +DC braking': The inverter decelerates after receiving the stop instruction and locks the output when it reaches F1-18 "stop frequency". After the F1-19 "stop DC braking waiting time", there will be DC current as set in F1-20 "Stop DC brake current" in motor, then it will stop after reaching the F1-20 "Stop DC braking time". See page 74 for start and stop DC braking diagram.

⚠ Attention : DC braking mode is recommended under low speed (below 10Hz generally) or for small motor.

⚠ Attention DC braking will consume the load mechanical energy in the rotor of the motor, so long-time or frequent DC braking is easy to cause the motor overheating.

F1-28	Factory Default Value	1.0s	Security Level	1	Change	○
Setting range						

🕮 Waiting time for alternation of forward and reversed rotation of motor, which aims to minimize the impact of forward and reversed rotation on machinery.

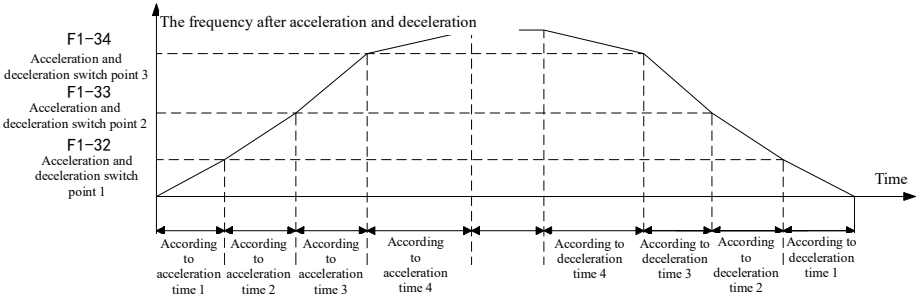
F1-29	Inching frequency	Factory Default Value	5.00Hz	Security Level	1	Change	○
Setting range	0.01~60.00Hz						

🕮 The start and stop mode of jogging operation is set to be starting from starting frequency and stop by means of deceleration stop.

🕮 Acceleration and deceleration time of inching operation: F1-06 'acceleration time 4' and F1-07 'deceleration time 4'.

F1-32	Acceleration and deceleration switch point 1	Factory Default Value	0Hz	Security Level	0	Change	○
F1-33	Acceleration and deceleration switch point 2	Factory Default Value	0Hz	Security Level	0	Change	○
F1-34	Acceleration and deceleration switch point 3	Factory Default Value	0Hz	Security Level	0	Change	○
Setting range	0.00~320.00Hz						

🕮 Functions of 'switch point of acceleration and deceleration time' are shown below. If automatic segmental acceleration and deceleration functions are not required, this parameter can be set to zero. Automatic switch function of acceleration and deceleration time is invalid in jogging operation, emergency stop and stall prevention.



🕮 The acceleration and deceleration switching point 1 is invalid when it is greater than the acceleration and deceleration switching points 2 and 3, and the acceleration and deceleration switching point 2 is invalid when it is greater than the acceleration and deceleration switching point 3.

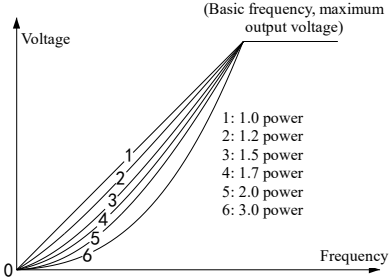
6.3 F2 V/F Control Parameters, Synchro Control, Redundancy Control and Overlapping Frequency Control Parameters

F2-00	V/F curve settings	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: Reserved 2: Reduced torque V/F curve 1 (1.2 power) 4: Reduced torque V/F curve 3 (1.7 power) 6: Reduced torque V/F curve 5 (3.0 power)		1: Linear V/F curve (1.0 power) 3: Reduced torque V/F curve 2 (1.5 power) 5: Reduced torque V/F curve 4 (2.0 power)				

🕮 V/F curves can be set to linear and various reduced torque forms.

🕮 The V/F curve of reduced torque can improve the motor efficiency of reduced torque load of fan pump under light load.

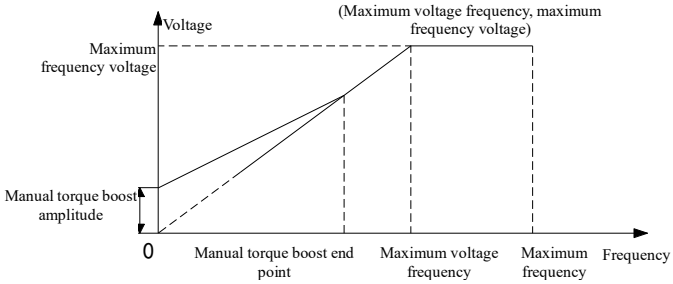
🕮 Reduced torque form V/F curve can reduce noise. Linear and reduced torque V/F curves are as follows:



F2-02	Manual torque boost amplitude	Factory Default Value	0.0%	Security Level	1	Change	○
Setting range	0.0~10.0%						
F2-03	**Torque boost cutoff point**	Factory Default Value	10.0%	Security Level	1	Change	○
Setting range	0.0~100.0%						

🕮 Manual torque lift can improve the low speed torque and starting torque of the motor. Adjust F2-02 "manual torque lifting amplitude" from small to large until meeting the starting requirements. Do not set it too high, otherwise the motor will overheat or overcurrent.

🕮 The relation curve between output voltage V and frequency F is composed of the set V/F curve and manual torque lift 1. The relationship between F2-02 'manual torque lift amplitude', F2-03 'torque lift cutoff point', F2-05 'maximum voltage frequency' and F2-12 'maximum frequency voltage' is shown below:



F2-09	Anti-vibration damping coefficient	Factory Default Value	5	Security Level	1	Change	○
Setting range	0~500						

🕮 By adjusting the anti-vibration damping, the vibration of the motor can be suppressed under no load or light load, and the vibration can be eliminated by adjusting from small to large level.

F2-10	Automatic voltage regulation function	Factory Default Value	1	Security Level	1	Change	○
Setting range	0: Invalid, 1: Always valid, 2: Invalid only when decelerating						

🕮 Automatic voltage regulation function: When the input voltage or DC bus voltage changes, this function can remain that output voltage is free from influence, making production process and product quality stable.

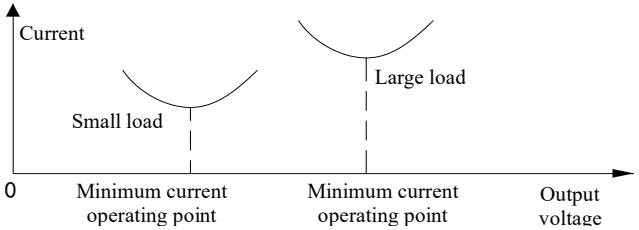
🕮 When the input voltage is higher than the rated value, the automatic voltage regulation function shall be turned on to prevent the motor from running under excessive voltage.

🕮 The automatic voltage regulation function allows faster deceleration under the mode of 'invalid only when decelerating' by comparing with the mode of 'always valid', but the deceleration current is slightly larger. This is because deceleration increases the DC bus voltage, and if automatic voltage regulation function is invalid, the output voltage will also increase, which increases the motor loss and reduces the mechanical energy feedback of the motor, so that the deceleration time can be set shorter.

⚠ Attention: If the load rotary inertia is large, the automatic voltage regulation function shall be set as "always valid" to prevent excessive voltage when decelerating and causing motor heating.

F2-11	Automatic energy saving operation selection	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Invalid, 1: Valid						

🕮 Automatic energy-saving operation: automatically adjust the output voltage to minimize the load current at the same motor speed and motor loss. This function is particularly effective for fan and pump loads with torque reduction, as shown in the figure below:



The automatic energy saving operation requires both automatic torque lifting and slip compensation functions.

F2-12	Maximum frequency voltage	Factory Default Value	10000V	Security Level	1	Change	○
Setting range	0~20000V						
F2-13	**Maximum voltage frequency**	Factory Default Value	50.00Hz	Security Level	1	Change	○
Setting range	0.01~320.00Hz						

🕮 F2-12 “maximum frequency voltage” and F2-13 “maximum voltage frequency” are valid for V/F control only.

F2-21	Synchronous soft start enabling	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Disabled 1: Enabled (synchronizing to grid output after starting to grid frequency)						
F2-22	**Sync rate setting**	Factory Default Value	10.0s	Security Level	1	Change	○
Setting range	0.0~60.0s						
F2-23	**Synchronous phase compensation**	Factory Default Value	2.5°	Security Level	1	Change	○
Setting range	-20.0°~+20.0°						

🕮 F2-21 'synchronous soft start enabling': After the inverter is started, it reaches the actually reached set frequency (the same as the power grid frequency), then the inverter begins to track the frequency, voltage and phase of the power grid. When the output of the inverter is synchronized with the frequency, voltage and phase of the power grid, the inverter sends a signal to allow switching. When the high-voltage bypass switch is closed, the inverter stops output when it receives the "grid connection completion signal", and at the same time, the output switch is disconnected, the inverter stops and the synchronous soft start process is completed.

F2-24	Voltage ramp time	Factory Default Value	5.0s	Security Level	1	Change	○
Setting range	0.0s~60.0s (times from 0 to maximum voltage)						

🕮 When the starting mode is speed tracking start mode 1 or speed tracking start mode 2, the speed tracking start completion time is F2-24 "voltage ramp time".

F2-30	Motor type selection	Factory Default Value	0	Security Level	1	Change	○

Setting range	0: Asynchronous motor control 1: Synchronous motor VF control 2: Synchronous motor IF control 1 3: Synchronous motor IF control 2						
F2-31	**Initial excitation of synchronizer**	Factory Default Value	5%	Security Level	1	Change	○
Setting range	0~100.00%						
F2-32	**Synchronizing excitation**	Factory Default Value	50%	Security Level	1	Change	○
Setting range	0~100.00%						
F2-33	**Synchronizing current**	Factory Default Value	50%	Security Level	1	Change	○
Setting range	0~100.00%						
F2-34	**Synchronizing time**	Factory Default Value	3.0s	Security Level	1	Change	○
Setting range	0.0~60.0s						
F2-35	**Synchronizer stabilization time**	Factory Default Value	3.0s	Security Level	1	Change	○
Setting range	0.0~60.0s						
F2-36	**Excitation control proportional factor**	Factory Default Value	0.02	Security Level	1	Change	○
Setting range	0.001~10.000						
F2-37	**Excitation control integral factor**	Factory Default Value	0.002	Security Level	1	Change	○
Setting range	0.001~10.000						
F2-38	**Synchronizer galloping start**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Off 1: Allowed						
F2-40	**Control algorithm selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: General algorithm 1: Continuous heavy load 2: Starting heavy load only						
F2-41	**Starting excitation time**	Factory Default Value	0.5s	Security Level	1	Change	○
Setting range	0.0 ~ 360.0s						
F2-42	**Starting excitation current**	Factory Default Value	100.0%	Security Level	1	Change	○
Setting range	20.0% ~ 150.0%						
F2-43	**Starting switching frequency 1**	Factory Default Value	10.00Hz	Security Level	1	Change	○
Setting range	5.00Hz~"F2-44"						
F2-44	**Starting switching frequency 2**	Factory Default	20.00Hz	Security Level	1	Change	○

		Value					
Setting range	"F2-43"~30.00Hz						
F2-45	**Shutdown switching frequency 1**	Factory Default Value	15.00Hz	Security Level	1	Change	○
Setting range	"F2-46"~20.00Hz						
F2-46	**Shutdown switching frequency 2**	Factory Default Value	14.00Hz	Security Level	1	Change	○
Setting range	0.01Hz~"F2-45"						
F2-47	**Voltage boost ratio**	Factory Default Value	20.0%	Security Level	1	Change	○
Setting range	0.1 ~ 30.0%						
F2-48	**Current set slope**	Factory Default Value	500ms	Security Level	1	Change	○
Setting range	1 ~ 10000ms						
F2-49	**Value Kp of current regulator**	Factory Default Value	0.100	Security Level	1	Change	○
Setting range	0.001 ~ 10.000						
F2-50	**Value Ki of current regulator**	Factory Default Value	0.0200	Security Level	1	Change	○
Setting range	0.0001 ~ 1.0000						
F2-55	**Parallel/redundant control**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Stand-alone 1: Redundant host 2: Redundant slave 3: Parallel host 4: Parallel slave						
F2-56	**Redundant switching voltage limit**	Factory Default Value	80.0%	Security Level	1	Change	○
Setting range	50.0% ~ 90.0%						
F2-57	**Failover settings**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: All faults are switched 1: Only output fault is not switched						
F2-60	**Overlapping frequency value**	Factory Default Value	43.00Hz	Security Level	1	Change	○
Setting range	0.01~320.00Hz						
F2-61	**Overlapping voltage value**	Factory Default Value	0V	Security Level	1	Change	○
Setting range	0~20000V						
F2-62	**Overlapping starting point**	Factory Default Value	50.00Hz	Security Level	1	Change	○
Setting range	0.01~320.00Hz (starting overlapping frequency when operating frequency absolute value > set value)						
F2-63	**Overlapping ramp time**	Factory	30s	Security	1	Change	○

		Default Value		Level			
Setting range	0~600s (time required for voltage from 0 to the rated value)						
F2-65	**Initial excitation settings**	Factory Default Value	20.00%	Security Level	1	Change	○
F2-66	**Intermediate excitation settings**	Factory Default Value	40.00%	Security Level	1	Change	○
F2-67	**End excitation settings**	Factory Default Value	60.00%	Security Level	1	Change	○
Setting range	0~100.00% (maximum excitation current: 100.00%)						
F2-68	**Initial excitation frequency**	Factory Default Value	3.00Hz	Security Level	1	Change	○
F2-69	**Intermediate switching frequency**	Factory Default Value	10.00Hz	Security Level	1	Change	○
F2-70	**End switching frequency**	Factory Default Value	20.00Hz	Security Level	1	Change	○
Setting range	0.50Hz~50.00Hz						

🕮 The inverter parameters shall be adjusted according to the relevant parameters of the field synchronous motor, redundant control or overlapping frequency control.

🕮 F2-65~ F2-70 are used for IF control 1 parameters and IF control 2 parameters of synchronous motor.

6.4 F3 Vector Control Parameters

F3-00	Motor control mode	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: No PG vector control 1: PG vector control 1 2: PG vector control 2 3: PG vector control 3						

🕮 Under F0-09 = 1 vector control, the parameter shall be set.

🕮 'No PG vector control': i.e., speed sensorless vector control. It performs decoupling control for flux linkage and torque through rotor magnetic field orientation and achieves closed-loop speed control according to identified speed, so it has good mechanical characteristics. It can be used for the places that have high drive performance requirements and are inconvenient to install encoder. Torque can be controlled in this control mode.

🕮 'With PG vector control': i.e., with speed sensor vector control. It performs decoupling control for flux linkage and torque through rotor magnetic field orientation and achieves closed-loop speed control according to detected speed, so it has good dynamic performance and steady-state accuracy. It is mainly used for high-precision speed control, simple servo control and other high-performance control occasions. Torque can be controlled under this control mode and the torque control accuracy is high in low speed and power generation state.

🕮 For vector control, it shall be noted that:

1. It is generally used for the occasion of one inverter controlling one motor. Vector control can also be applied to multiple coaxial motors with the same model and parameters, but the parameter self-tuning shall be carried out when multiple motors are connected together, or the equivalent parameters after multiple motors are connected in parallel shall be manually input;

2. Motor parameters need to be self-tuned or accurately input for internal motor dynamic model and magnetic field orientation algorithm;

3. The power level of the motor and the inverter shall match. If the rated current of the motor is too small, the control performance will decline. The rated current of the motor shall not be less than 1/4 of the rated current of the inverter;

4. The parameters of ASR shall be set correctly to ensure steady and dynamic performance of speed control;

5. The number of poles of the motor shall not exceed 8 and vector control shall not be adopted for double-cage motor, deep-slot motor and torque motor;

6. Set F3-08 "basic frequency" to be the same as the rated frequency of the motor, which is convenient for high-speed field-weakening control.

🕮 V/F control is required in the following situations:

1. A single inverter drives multiple motors at the same time: the load of each motor is not output in a balanced way, or the motor parameter capacity is different;

2. The load current is less than 1/4 of the rated current of the inverter;

3. The inverter is not loaded (when testing);

4. The output of the inverter is connected to the transformer.

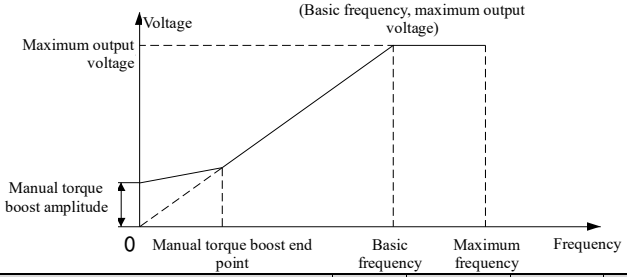
⚠ Danger : For PG control mode, it is required to set PG parameters correctly (see encoder parameter description on Page 128). Improper setting may result in personal injury and property loss. After the motor cable is reconnected, the direction settings of the encoder must be checked again.

F3-01	Torque boost selection	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: None 1: Manual lift 2: Automatic lift 3: Manual lift+automatic lift						
F3-02	Manual torque boost amplitude	Factory Default Value	Model determination	Security Level	1	Change	○

Setting range	0.0%~ maximum value determined by model, the minimum unit is 0.1%						
F3-03	**Torque boost cutoff point**	Factory Default Value	10.0%	Security Level	1	Change	○
Setting range	0~100.0%, take F3-08 as 100%						
F3-04	**Automatic torque boost degree**	Factory Default Value	80.0%	Security Level	1	Change	○
Setting range	0~100.0%						

🕮 Manual torque lift can improve the low speed torque and starting torque of the motor. Adjust F3-02 "manual torque lifting amplitude" from small to large until meeting the starting requirements. Do not set it too high, otherwise the motor will overheat or overcurrent.

🕮 The relation curve between output voltage V and frequency F is composed of the set V/F curve and manual torque lift 1. The relationship between F3-02 'manual torque lift amplitude', F3-03 'manual torque lift cutoff point', F3-08 'basic frequency' and F3-09 'maximum output voltage' is shown below:



F3-05	**Slip compensation filtering time**	Factory Default Value	1.0s	Security Level	1	Change	○
Setting range	0.1~25.0s						
F3-06	**Automatic torque filtering frequency R**	Factory Default Value	1.0 rad/s	Security Level	1	Change	○
Setting range	0.1~25.0rad/s						
F3-07	**Automatic torque filter frequency L**	Factory Default Value	10.0rad/s	Security Level	1	Change	○
Setting range	0.1~25.0rad/s						

🕮 Slip compensation function: If the output frequency remains unchanged, load changes will cause slip change, and the speed will reduce. Slip compensation function can adjust the output frequency of the inverter online according to the load torque, reduce the change of speed with the load and improve the speed control accuracy.

🕮 Slip compensation is effective when automatic torque lift is turned on (F3-01＝2 or 3).

🕮 The calculation formula of rated slip frequency is: rated slip frequency = rated frequency - (rated speed × number of poles ÷120)

🕮 If the motor oscillates during slip compensation, F3-05 'slip compensation filtering time' can be considered to be increased.

F3-08	**Basic frequency**	Factory Default Value	50.00Hz	Security Level	1	Change	×

Setting range	0.01~320.00Hz (frequency corresponding to the maximum voltage in VF curve)						
F3-09	**Maximum output voltage**	Factory Default Value	10000V	Security Level	1	Change	×
Setting range	0~20000V (voltage value corresponding to the maximum frequency in the VF curve)						
F3-10	**Output voltage recovery time**	Factory Default Value	5s	Security Level	1	Change	○
Setting range	1~50						

🕮 F3-08 “basic frequency“ shall be set to be the same as FA-04 “rated frequency of motor“ when vector control is adopted.

🕮 When F3-09 "maximum output voltage" is under vector control, the maximum output voltage shall be set to the same as the FA-06 "motor rated voltage".

⚠ Attention：**Before vector self-learning, it is required to confirm whether the F3-08 "basic frequency" and F3-09 "maximum output voltage" are correct.**

F3-11	**Anti-vibration damping method**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0:torq 1:id 2:iq						
F3-12	**Anti-vibration damping**	Factory Default Value	Model determination	Security Level	1	Change	○
Setting range	0~200						
F3-13	**Anti-vibration damped filter frequency**	Factory Default Value	2.0 rad/s	Security Level	1	Change	○
Setting range	0.1~25.0 rad/s						

🕮 By adjusting the anti-vibration damping, the vibration of the motor can be suppressed under no load or light load, and the vibration can be eliminated by adjusting from small to large level.

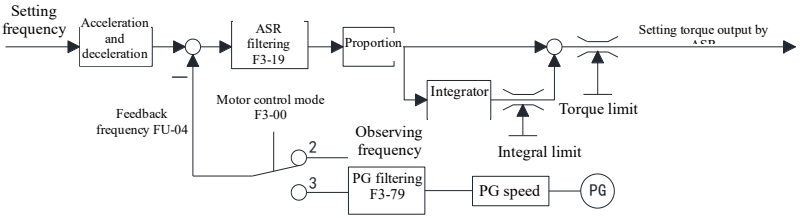
F3-14	**High-speed ASR proportional gain**	Factory Default Value	5.00	Security Level	1	Change	○
Setting range	0.00~200.00						
F3-15	**High-speed ASR integration time**	Factory Default Value	1.000s	Security Level	1	Change	○
Setting range	0.010~30.000s						
F3-16	**Low-speed ASR proportional gain**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0.00~200.00						
F3-17	**Low-speed ASR integration time**	Factory Default Value	0.500s	Security Level	1	Change	○
Setting range	0.010~30.000s						
F3-18	**ASR parameter switching point**	Factory Default Value	5.00Hz	Security Level	1	Change	○

Setting range	0.00~650.00Hz						
F3-19	**ASR filtering time**	Factory Default Value	0.010s	Security Level	1	Change	○
Setting range	0.000~2.000s						
F3-20	**Acceleration compensation differential time**	Factory Default Value	0.000s	Security Level	1	Change	○
Setting range	0.000~20.000s						
F3-21	**Low-speed steady-state strong PI fluctuation frequency**	Factory Default Value	50	Security Level	1	Change	○
Setting range	0~65535						
F3-22	**PI linear switching**	Factory Default Value	500	Security Level	1	Change	○
Setting range	0~65535						
F3-23	**Low-speed strong PI valid frequency threshold**	Factory Default Value	200	Security Level	1	Change	○
Setting range	0~65535						
F3-24	**Low-speed steady-state strong PI_KP**	Factory Default Value	1300	Security Level	1	Change	○
Setting range	0~65535						
F3-25	**Low-speed steady-state strong PI_KI**	Factory Default Value	30	Security Level	1	Change	○
Setting range	0~65535						
F3-26	**Low-speed steady-state strong PI intervention time**	Factory Default Value	50	Security Level	1	Change	○
Setting range	0~65535						
F3-27	**ASR strong PI intervention velocity deviation threshold**	Factory Default Value	5000	Security Level	1	Change	○
Setting range	0~65535						
F3-28	**ASR strong PI intervention P increment**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						
F3-29	**ASR strong PI intervention I coefficient**	Factory Default Value	5	Security Level	1	Change	○
Setting range	0~65535						
F3-30	**ASR strong PI intervention P maximum value**	Factory Default Value	1000	Security Level	1	Change	○
Setting range	0~65535						
F3-31	**Electric power limit**	Factory Default Value	120.0%	Security Level	1	Change	○

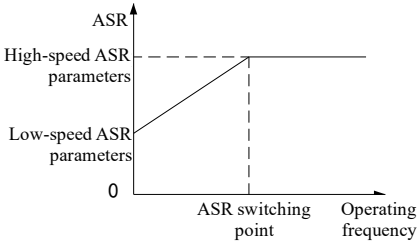
Setting range	0.0~250.0%, take rated power of inverter as 100%						
F3-32	**Regenerative power limit**	Factory Default Value	120.0%	Security Level	1	Change	○
Setting range	0.0~250.0%, take rated power of inverter as 100%						
F3-33	**Electric torque limitation**	Factory Default Value	180.0%	Security Level	1	Change	○
Setting range	0.0~250.0%, take rated torque of motor as 100% (note: for vector control only)						
F3-34	**Regenerative torque limitation**	Factory Default Value	180.0%	Security Level	1	Change	○
Setting range	0.0~250.0%, take rated torque of motor as 100% (note: for vector control only)						

🕮 ASR: Automatic speed regulator. In vector control, ASR outputs the set torque, which is limited by F3-33 ~ F3-34.

🕮 ASR structure diagram for vector control is shown below:



🕮 F3-18 “ASR parameter switching point“: ASR parameter switching can be used if different ASR parameters are required for high-speed and low-speed operation. Low-speed parameter F3-16 and F3-17 can be adopted when zero speed is adopted, and high-speed parameters F3-14 and F3-15 can be adopted when operating frequency is above the ASR parameter switching point. Besides, there shall be a smooth transition of high and low speed parameters between zero speed and ASR parameter switching point , as shown in the figure below. If only one set of ASR parameters is required, F3-18 "ASR parameter switching point" can be set to 0, that is, only high-speed ASR parameters are used.



🕮 F3-20 “ASR acceleration compensation differential time“: The parameter differentiates the set frequency processed by acceleration and deceleration time to obtain a feedforward torque setting, which is added to the set torque to better track the set operating frequency in the process of acceleration and deceleration and reduce overshoot.

🕮 ASR regulation method: Firstly, the proportional gain shall be increased as far as possible under the premise of ensuring the system does not oscillate, then adjust the integration time to make the system respond quickly with a small overshoot.

🕮 When the speed overshoot is too large due to improper ASR parameters, the overpressure may be caused by energy feedback during the deceleration process of speed recovery.

F3-35	Pre-excitation time	Factory Default Value	Model determination	Security Level	1	Change	×
Setting range	0.01~5.00s						
F3-36	Pre-excitation intensity	Factory Default Value	94.0%	Security Level	1	Change	×
Setting range	50.0~150.0%						

🕮 F3-35 "pre-excitation time": Before starting the motor, ensure that the motor is fully excited so that there is enough starting torque, this process generally takes 0.1-2.0s. The larger the motor capacity is, the longer the pre-excitation time will be.

🕮 F3-36 "pre-excitation intensity": Too high or too low flux level below the flux weakening point will lead to the decline of torque output capacity and efficiency.

F3-37	Flux linkage set GEN	Factory Default Value	110.0%	Security Level	1	Change	○
Setting range	0~2000						
F3-38	Flux linkage set MOT	Factory Default Value	88.0%	Security Level	1	Change	○
Setting range	0~2000						
F3-39	Low-speed flux lifting	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~50%						
F3-40	Weak magnetic regulator integration time	Factory Default Value	0.150s	Security Level	1	Change	○
Setting range	0.100~3.000s						
F3-41	Flux linkage closed-loop current moment filtering time	Factory Default Value	5	Security Level	1	Change	○
Setting range	0~65535						
F3-42	Flux linkage closed light load torque threshold	Factory Default Value	100	Security Level	1	Change	○
Setting range	0~1000						
F3-43	Generator-motor current threshold 0%-100%	Factory Default Value	35	Security Level	1	Change	○
Setting range	0~200						
F3-44	Flux linkage closed-loop switch	Factory Default Value	1	Security Level	1	Change	○
Setting range	0~1						
F3-45	Generator-motor torque return difference	Factory Default Value	50	Security Level	1	Change	○
Setting range	0~1000						
F3-46	Excitation braking flux strength	Factory	0	Security	1	Change	○

		Default Value		Level			
Setting range	50.0~150.0%						
F3-47	**Rotor flux filter cutoff angular frequency coefficient**	Factory Default Value	10	Security Level	1	Change	○
Setting range	10						
F3-48	**Flux limiting value**	Factory Default Value	16384	Security Level	1	Change	○
Setting range	0~65535						
F3-49	**Limiting value of rotor flux filter cutoff angular frequency filter coefficient**	Factory Default Value	32760	Security Level	1	Change	○
Setting range	0~65535						
F3-50	**Minimum filter value coefficient of rotor flux filter cutoff angular frequency**	Factory Default Value	5240	Security Level	1	Change	○
Setting range	0~65535						
F3-51	**Filter coefficient of rotor flux filter cutoff angular frequency**	Factory Default Value	2	Security Level	1	Change	○
Setting range	0~65535						
F3-52	**Rotor flux filter coefficient 1 (0-3Hz power generating)**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						
F3-53	**Rotor flux filter coefficient 2 (3Hz-4Hz)**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						
F3-54	**Rotor flux filter coefficient 3 (4Hz-10Hz)**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						

F3-55	**Rotor flux filter coefficient 4 (0-3Hz electric)**	Factory Default Value	30	Security Level	1	Change	○
Setting range	0~65535						
F3-56	**Rotor flux filter coefficient 5 (10Hz-50Hz)**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						
F3-57	**Minimum filter value coefficient of torque-control rotor flux filter cutoff angular frequency**	Factory Default Value	8200	Security Level	1	Change	○
Setting range	0~65535						
F3-58	**Torque filtering coefficient**	Factory Default	100	Security Level	1	Change	○

		Value					
Setting range	0~65535						
F3-59	**Generation slip compensation coefficient**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~65535						
F3-60	**Electric slip compensation coefficient**	Factory Default Value	10	Security Level	1	Change	○
Setting range	0~65535						
F3-61	**Vector control synchronization frequency filtering cut-off frequency**	Factory Default Value	200 rad/s	Security Level	1	Change	○
Setting range	1~250 rad/s						
F3-62	**Flux control gain**	Factory Default Value	1.0	Security Level	1	Change	○
Setting range	1.0~3.0						
F3-63	**Decoupling compensation allowed**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: Forbidden, 1: Allowed						
F3-64	**Decoupling compensation of PI2**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: Method I 1: Method II						
F3-65	**Cut-off frequency of current loop**	Factory Default Value	3666rad/s	Security Level	1	Change	○
Setting range	100~6000 rad/s						
F3-66	**Decoupling compensation coefficient**	Factory Default Value	1.000	Security Level	1	Change	○
Setting range	0.000~1.000						
F3-67	**Speed estimation filter cut-off frequency**	Factory Default Value	160	Security Level	1	Change	○
Setting range	40~160Hz						
F3-68	**Feed-forward switch**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Disabled 1: Enabled						
F3-69	**Feed-forward value**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0.0~100.0%, take rated torque of motor as 100%						
F3-70	**Feed-forward attenuation coefficient**	Factory Default Value	99.9%	Security Level	1	Change	○
Setting range	0~100.0%						
F3-71	**Feed-forward torque direction**	Factory	0	Security	1	Change	○

		Default Value		Level			
Setting range	0: Positive 1: Negative						
F3-72	**PG pulse number per revolution**	Factory Default Value	1024	Security Level	1	Change	×
Setting range	1~8192						
F3-73	**PG type**	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: Quadrature encoder, 1: Single channel encoder						
F3-74	**PG direction selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Positive 1: Negative						
F3-75	**PG disconnection action**	Factory Default Value	2	Security Level	1	Change	○
Setting range	0: No action, 1: Alarm, 2: Fault and free stop						
F3-76	**PG disconnection detection time**	Factory Default Value	1.0s	Security Level	1	Change	○
Setting range	0.1~10.0s						
F3-77	**PG gear ratio denominator setting**	Factory Default Value	1	Security Level	1	Change	×
Setting range	1~1000						
F3-78	**PG gear ratio molecular setting**	Factory Default Value	1	Security Level	1	Change	×
Setting range	1~1000						
F3-79	**PG speed measurement filtering time**	Factory Default Value	0.005s	Security Level	1	Change	○
Setting range	0.000~2.000s						

🕮 Encoder interface board, such as SL-PG-3, is required for the use of encoder. See the section of encoder interface board for the wiring method.

🕮 F3-73 'PG type': When selecting a single-channel encoder, the signal must enter through channel A. Single-channel encoder is not suitable for low speed and forward and reversal operations.

🕮 F3-74 'PG direction selection': If selecting forward direction for single-channel encoder, the speed value of the encoder (query record - control information -PG detection frequency) is always positive. Otherwise, it is always negative.

🕮 PG disconnection detection and processing: If the speed regulator's set frequency is greater than 0.5Hz and the encoder has no pulse generated within F3-76 "PG disconnection detection time", it will be deemed to be PG disconnection, and the disconnection action will be processed according to the settings of F3-75 "PG disconnection action". PG disconnection detection is only available for these with PG V/F control and PG vector control.

🕮 When the encoder is connected to the motor shaft through gears and other speed shifting devices, it is necessary to set F3-77 and F3-78 correctly, and the relationship between the encoder speed and the motor speed is as follows: motor speed = encoder speed ×F3-78 "PG gear ratio member setting" ÷F3-77 "PG gear ratio denominator setting'.

🕮 F3-79 'PG speed measuring and filtering time': Encoder speed measuring requires F3-79 filtering, so F3-79

cannot be set too large when dynamic performance is required to be high.

🕮 Relevant monitoring parameters: query record - control information -PG detection frequency.

🕮 **Encoder setting verification method**: Adopt non-PG V/F control mode to run in the direction and frequency allowed by the load, and observe whether the direction of FU-38 "PG detection frequency" is consistent with the direction displayed on the operation panel and whether the value is close to the set frequency.

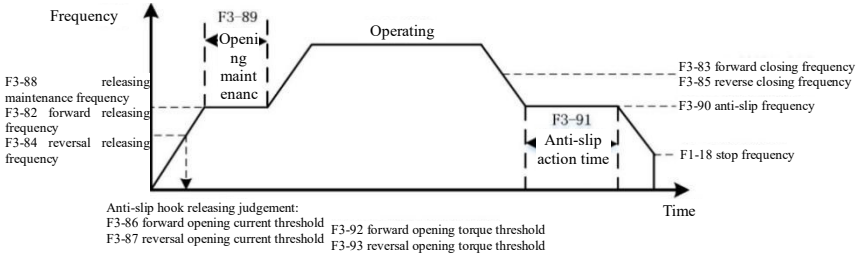
Danger **: For PG control mode, it is required to set PG parameters correctly. Improper setting may result in personal injury and property loss. After the motor cable is reconnected, the direction settings of the encoder must be checked again.**

F3-80	**Control voltage selection**	Factory Default Value	1	Security Level	1	Change	○
Setting range	0: Measurement 1: Set						
F3-81	**Closing enabling switch**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Disabled 1: Enabled						
F3-82	**Forward opening frequency**	Factory Default Value	3.00Hz	Security Level	1	Change	○
Setting range	0.01~20.00Hz						
F3-83	**Forward closing frequency**	Factory Default Value	5.00Hz	Security Level	1	Change	○
Setting range	0.01~20.00Hz						
F3-84	**Reversal opening frequency**	Factory Default Value	3.00Hz	Security Level	1	Change	○
Setting range	0.01~20.00Hz						
F3-85	**Reversal closing frequency**	Factory Default Value	5.00Hz	Security Level	1	Change	○
Setting range	0.01~20.00Hz						
F3-86	**Forward opening current threshold**	Factory Default Value	10.0%	Security Level	1	Change	○
Setting range	0~100.0%						
F3-87	**Reversal opening current threshold**	Factory Default Value	3.0%	Security Level	1	Change	○
Setting range	0~100.0%						
F3-88	**Opening maintenance frequency**	Factory Default Value	4.00Hz	Security Level	1	Change	○
Setting range	0.01~20.00Hz						
F3-89	**Opening maintenance time**	Factory Default Value	220ms	Security Level	1	Change	○
Setting range	0~10000ms						
F3-90	**Anti-slip frequency**	Factory	4.00Hz	Security	1	Change	○

		Default Value		Level			
Setting range	0.01~20.00Hz						
F3-91	**Anti-slip action time**	Factory Default Value	220ms	Security Level	1	Change	○
Setting range	0~10000ms						
F3-92	**Forward opening torque threshold**	Factory Default Value	6.0%	Security Level	1	Change	○
Setting range	0~100.0%						
F3-93	**Reversal opening torque threshold**	Factory Default Value	0%	Security Level	1	Change	○
Setting range	0~100.0%						
F3-94	**Closing state switching time**	Factory Default Value	1000ms	Security Level	1	Change	○
Setting range	0~10000ms						
F3-95	**Running frequency filter time**	Factory Default Value	150ms	Security Level	1	Change	○
Setting range	0~1000ms						
F3-96	**Bus voltage filtering time**	Factory Default Value	100ms	Security Level	1	Change	○
Setting range	0~1000ms						
F3-97	**Residual voltage filtering time**	Factory Default Value	2ms	Security Level	1	Change	○
Setting range	0~1000ms						
F3-98	**Follow current**	Factory Default Value	50%	Security Level	1	Change	○
Setting range	10~100%						
F3-99	**DC exciting current**	Factory Default Value	150%	Security Level	1	Change	○
Setting range	0~150%						
F3-100	**DC exciting time**	Factory Default Value	5	Security Level	1	Change	○
Setting range	Rotor time constant multiplier						
F3-101	**Overvoltage suppression**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Closing 1: Opening						
F3-102	**Lower limit of acquisition frequency action**	Factory Default Value	4.00Hz	Security Level	1	Change	○
Setting range	0.01~50.00Hz						

F3-103	Current tracking strategy	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Method 1 1: Method 2 2: Braking						

🕮 Control closing logic diagram is as follows:



⚠ Attention : Closing control must ensure that the terminal controls the FWD to go up and REV to go down.

🕮 Function code settings:

🕮 1. Method to enable closing logic functions

(1) Set F3-81 to 1 to enable the closing logic functions;

(2) Select 22 for the solenoid gate control relay T1 output function.

🕮 2. Releasing:

🕮 2.1 Following forward releasing conditions must be met at the same time:

(1) Current operating frequency is greater than F3-82 (forward releasing frequency, unit: Hz);

(2) Current output torque is greater than F3-92 (forward releasing torque threshold, set value: 100.0, corresponding to 100% rated torque);

(3) Current output current is greater than F3-86 (forward releasing current threshold, set value: 100.0, corresponding to 100% rated current).

🕮 2.2 Following reverse releasing conditions must be met at the same time:

(1) Current operating frequency is greater than F3-84 (reverse releasing frequency, unit: Hz);

(2) Current output torque is greater than F3-93 (reverse releasing torque threshold, set value: 100.0, corresponding to 100% rated torque);

(3) Current output current is greater than F3-87 (reverse releasing current threshold, set value: 100.0, corresponding to 100% rated current).

⚠ Attention: **The set releasing frequency must be lower than or equal to current running frequency. Otherwise, it is impossible to release the brake. In case of sliding when releasing, the releasing torque and the set current value can be appropriately increased.**

🕮 3. Closing setting:

🕮 3.1 Following forward closing conditions must be met at the same time:

(1) Stop instruction received;

(2) The current operating frequency is less than or equal to F3-83 (forward closing frequency, unit: Hz);

(3) Free stop by directly closing.

🕮 3.2 Following reverse closing conditions must be met at the same time:

(1) Stop instruction received;

(2) The current operating frequency is less than or equal to F3-85 (reverse closing frequency, unit: Hz);

(3) Free stop by directly closing.

⚠ Attention : **The set closing frequency shall be lower than or equal to the minimum frequency at which the system operates.**

🕮 4. Troubleshooting for Hook Slipping:

🕮 4.1 Troubleshooting for Hook Slipping during Shutdown and Closing:

(1) When the frequency is the same as that in F3-90 (anti-slip frequency), the inverter maintains the output and waits for the closing, and the maintenance time can be set according to F3-91 "anti-slip action time". In case of slip, the F3-91 set value shall be increased, and the value shall be decreased in case of towing hook (with abnormal noise caused by friction).

⚠ Attention : **The set anti-slip frequency shall be less than or equal to the closing frequency (the minimum value of forward closing and reverse closing), and the set F1-18 (stop frequency) shall be less than the anti-slip frequency.**

🕮 4.2 Troubleshooting for Hook Slipping when Releasing:

(1) Appropriately increase the releasing current threshold (F3-86/F3-87) and releasing torque threshold (F3-92/F3-93) corresponding to the operating direction.

6.5 F4 Digital Input Terminal and Multistage Speed

F4-00	**X1 digital input terminal function**	Factory Default Value	15	Security Level	1	Change	○
F4-01	**X2 digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-02	**X3 digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-03	**X4 digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-04	**X5 digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-05	**X6 digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-06	**FWD digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
F4-07	**REV digital input terminal function**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~26, see the digital input function definition table below.						

🕮 Digital input function definition table:

0: Not connected to the following signals 1: Multi-stage speed selection 1 2: Multi-stage speed selection 2 3: Multi-stage speed selection 3 4: Multi-stage speed selection 4 5: Multi-stage speed selection 5 6: Multi-stage speed selection 6	7: Multi-stage speed selection 7 8: Acceleration / deceleration time selection 1 9: Acceleration / deceleration time selection 2 10: Acceleration and deceleration time selection 3 11: Acceleration and deceleration time selection 4 12: Emergency stop fault 13: External fault signal	14: External alarm signal 15: Fault resetting 16: Forward jogging 17: Reverse jogging 18: Fast stop 19: Free stop 20: Start prohibited	21: Operation interruption 22: Forced frequency channel switching 23: Forced control channel switching 24: Remote frequency channel switching 25: Remote control channel switching 26: Grid connection completion signal 27: Reserved

🕮 Relevant monitoring parameters: FU-128 “digital input terminal state”.

🕮 The digital input function is detailed as follows:

1~7: Multi-stage speed selection. See F4-16 “multi-stage speed selection mode“ on page 98 for details.

8~11: Acceleration and deceleration time selection. When the acceleration and deceleration time is directly selected from 1 to 4 and multiple signals are effective at the same time, the priority of the small number is higher.

12: Emergency stop fault. When the signal is effective, the inverter stops immediately and reports the emergency stop fault, which cannot be automatically reset and must be manually reset. If normally closed input is required, it can be realized by inverting the digital input terminal of F4-09.

13: External fault signal. The abnormal or fault information of the peripheral equipment of the inverter is input to the inverter through this signal, so that the inverter stops with external fault reported. The fault cannot be reset automatically and must be manually reset. If normally closed input is required, it can be realized by inverting the digital input terminal of F4-09. External failure can be indicated by digital output 8 "external failure".

14: External alarm signal. Through this signal, the alarm information of the peripheral equipment of the inverter is input to the inverter, and the inverter triggers the external alarm. The alarm automatically resets when the external alarm is removed.

15: Fault resetting. The rising edge of the signal resets the fault.

16~17: Forward and reverse jogging operation. See the description of jogging function on page 76.

18: Fast stop. If the signal is valid, the inverter will stop according to F1-29 "fast stop time".

19: Free stop. If the signal is valid in the operation of the inverter, the output will be blocked immediately, and the motor will stop by inertia sliding.

20: Start prohibited. When the signal is effective, it will prohibit the operation of the inverter, and the inverter will stop freely if in operation.

21: Operation interruption. When the inverter is in operation, the inverter will block the output when the signal is valid. When the operation is interrupted and command is lifted, the inverter will start in the way of speed tracking start.

22: Forced frequency channel switching. When the signal is effective, the normal operating frequency setting channel will be forcibly switched to the frequency channel set by F0-05. Once it is invalid, the frequency setting channel restores.

23: Forced control channel switching. When the signal is valid, the normal operation control channel will be forcibly switched to the control channel set by F0-02. Once it is invalid, the control channel restores.

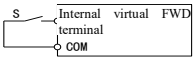
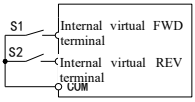
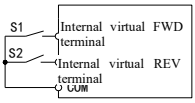
24: Remote frequency channel switching. When the signal is effective, the normal operating frequency setting channel will be forcibly switched to the frequency channel set by F0-04. Once it is invalid, the frequency setting channel restores.

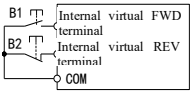
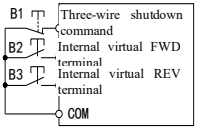
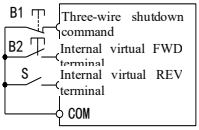
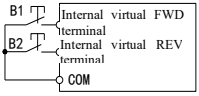
25: Forced control channel switching. When the signal is valid, the normal operation control channel will be forcibly switched to the control channel set by F0-01. Once it is invalid, the control channel restores.

26: Grid connection completion signal. High level is valid.

F4-08	Terminal control mode	Factory Default Value	3	Security Level	1	Change	○
Setting range	0: Single line mode (start-stop) 1: Two-line mode 1 (forward, reverse) 2: Two-line mode 2 (start-stop, direction) 3: Two-line mode 3 (start/stop)		4: Three-line mode 1 (forward, reverse, stop) 5: Three-line mode 2 (running, direction, stop) 6: Double-pulse control (start-stop/stop)				

🕮 The table below lists the logic and diagrams of various operating modes. In the table, S stands for valid level. B is valid edge:

F4-08	Mode name	Running logics			Illustration
0	Single-line type (start/stop)	S: Running switch, run when valid Note: The direction is determined by the direction of the set frequency			
1	Two-line mode 1 (Forward, reversal)	**S2 (reversal)**	**S1 (forward)**	**Implications**	
		Invalid	Invalid	Stop	
		Invalid	Valid	Forward	
		Valid	Invalid	Reverse rotation	
		Valid	Valid	Stop	
2	Two-line mode 2 (Start/stop, direction)	**S2 (direction)**	**S1 (start/stop)**	**Implications**	
		Invalid	Invalid	Stop	
		Invalid	Valid	Forward	
		Valid	Invalid	Stop	
		Valid	Valid	Reverse rotation	

F4-08	Mode name	Running logics	Illustration
3	Two-line mode 3 (Start, stop)	B1: Run button (normally on) B2: stop button (normally off) Note: The direction is determined by the direction of the set frequency	
4	Three-line mode 1 (Forward, reversal, stop) Digital input 37 'three-wire stop command' is required to be attached	B1: Stop button (normally off) B2: Forward running button (normally on) B3: reversal button (normally on)	
5	Three-line mode 2 (Operation, direction, stop) Digital input 37 'three-wire stop command' is required to be attached	B1: Stop button (normally off) B2: Operation button (normally on) S: Direction switch, reverse when effective	
6	Two-line mode 4 (Start/stop)	B1: Forward run/stop button (normally on) B2: Reverse run/stop button (normally on)	

🕮 In terminal control mode, although single-line or two-line operation mode 1 and 2 are of level valid, it is necessary to restart by giving the stop signal before operation signal when inverter stops due to the stop command generated by other sources.

🕮 For two-line 3 and three-line operation mode, the running button is invalid when the normally-off stop button is turned off.

🕮 Two-line mode 4: press the forward running button of inverter to run forward in the standby state, and then press again to stop the inverter; The same goes for reverse running.

🕮 Even if the running mode determines the operation direction, it is still limited by the direction locking.

🕮 If the terminal command has no direction information, the operation direction shall be determined by the state (positive and negative) of set frequency channels.

F4-09	Terminal DI signal logic	Factory Default Value	128	Security Level	1	Change	○
Setting range	Bit0-Bit7 corresponding to DI1-DI8 (0: Positive logic 1: Negative logic)						
F4-10	Digital input filtering time	Factory Default Value	50ms	Security Level	1	Change	○
Setting range	0~10000ms						

🕮 Terminal X signal filtering time: define the shake elimination time of digital input terminal, the signal with duration shorter than the filtering time will be neglected.

F4-16	Multi-speed selection	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: Code selection 1: Direct selection 2: Overlapping mode 3: Number selection						
F4-17	Multi-stage speed 1 set frequency	Factory Default Value	10.00Hz	Security Level	1	Change	○
F4-18	Multi-stage speed 2 set frequency	Factory Default	15.00Hz	Security Level	1	Change	○

		Value					
F4-19	**Multi-stage speed 3 set frequency**	Factory Default Value	20.00Hz	Security Level	1	Change	○
F4-20	**Multi-stage speed 4 set frequency**	Factory Default Value	25.00Hz	Security Level	1	Change	○
F4-21	**Multi-stage speed 5 set frequency**	Factory Default Value	30.00Hz	Security Level	1	Change	○
F4-22	**Multi-stage speed 6 set frequency**	Factory Default Value	35.00Hz	Security Level	1	Change	○
F4-23	**Multi-stage speed 7 set frequency**	Factory Default Value	40.00Hz	Security Level	1	Change	○
Setting range	0.01~320.00Hz						

🕮 **F4-16＝0 'Code Selection'**: Select 1 ~ 3 binary code with multi-stage frequency and select multi-stage speed 1 ~ 7 to set frequency. For example: X1~X3 are respectively set to be 'multi-stage speed selection 1~3', then the corresponding coding selection relation is shown below. In the table, '0' refers to invalid case, and '1' refers to valid case:

X3	X2	X1	Select Results	X3	X2	X1	Select Results
0	0	0	Multi-stage speed is invalid	1	0	0	F1-14 (multi-stage speed 4 set frequency)
0	0	1	F1-11 (multi-stage speed 1 set frequency)	1	0	1	F1-15 (multi-stage speed 5 set frequency)
0	1	0	F1-12 (multi-stage speed 2 set frequency)	1	1	0	F1-16 (multi-stage speed 6 set frequency)
0	1	1	F1-13 (multi-stage speed 3 set frequency)	1	1	1	F1-17 (multi-stage speed 7 set frequency)

🕮 **F4-16＝1 'direct selection'**: 'Multi-stage speed selection 1'~'multi-stage speed selection 7' directly correspond to the set frequency of 'multi-stage speed 1'~'multi-stage speed 7'. When multiple selection signals are valid, the selection signal with the smaller number is valid. For example: X1~FWD are respectively set to be 'multi-stage speed 1 set frequency'~'multi-stage speed 7 set frequency', then the corresponding relationship is shown below. In the table, '0' refers to invalid case, '1' refers to valid case and '-' refers to any state:

FWD	X6	X5	X4	X3	X2	X1	Select Results
0	0	0	0	0	0	0	Multi-stage speed is invalid
—	—	—	—	—	—	1	F1-11 (multi-stage speed 1 set frequency)
—	—	—	—	—	1	0	F1-12 (multi-stage speed 2 set frequency)
—	—	—	—	1	0	0	F1-13 (multi-stage speed 3 set frequency)
—	—	—	1	0	0	0	F1-14 (multi-stage speed 4 set frequency)
—	—	1	0	0	0	0	F1-15 (multi-stage speed 5 set frequency)
—	1	0	0	0	0	0	F1-16 (multi-stage speed 6 set frequency)
1	0	0	0	0	0	0	F1-17 (multi-stage speed 7 set frequency)

🕮 **F4-16＝2 'Overlapping method':** The set frequency is the sum of all selected multi-stage speeds (limited by upper and lower frequencies).

🕮 For example, only 'multi-stage speed selection 1', 'multi-stage speed selection 3' and 'multi-stage speed selection 4' are valid, then: set frequency = multi-stage speed 1 set frequency + multi-stage speed 3 set frequency + multi-stage speed 4 set frequency.

🕮 **F4-16＝3 'Number selection'**: The number of effective signals among 'multi-stage speed selection 1'~'multi-stage speed selection 7' determines that multi-stage frequency is selected for setting value. For example: if any 3 of them are valid, then set frequency = multi-stage speed 3 set frequency.

F4-50	**Terminal FWD selection**	Factory Default Value	6	Security Level	1	Change	○
Setting range	0~7: DI1~DI8						

🕮 Select the source of the forward running command of terminal.

F4-51	**Terminal REV selection**	Factory Default Value	7	Security Level	1	Change	○
Setting range	0~7: DI1~DI8						

🕮 Select the source of the reverse running command of terminal.

F4-52	**Terminal STOP selection**	Factory Default Value	3	Security Level	1	Change	○
Setting range	0~7: DI1~DI8						

🕮 Select the source of the stop command of terminal.

6.6 F5 Digital Output and Relay Output Settings

F5-00	**Terminal Y1 connection settings**	Factory Default Value	0	Security Level	1	Change	○
F5-01	**Terminal Y2 connection settings**	Factory Default Value	0	Security Level	1	Change	○
F5-02	**Terminal T1 connection settings**	Factory Default Value	0	Security Level	1	Change	○
F5-03	**Terminal T2 connection settings**	Factory Default Value	0	Security Level	1	Change	○
F5-04	**Terminal T3 connection settings**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~21, see the digital output function definition table below.						

🕮 Digital output function definition table:

0: Forced to be 0	6: Forward running	12: Excitation start-stop switch	18: Redundant slave ready sign
1: Forced to be 1	7: Reverse running	13: Redundant host output switch	19: Set frequency standard sign
2: Ready instruction	8: External fault	14: Redundant slave output switch	20: Frequency detection level 1
3: Operation indication	9: Synchronization sign	15: Redundant host communication failure	21: Frequency detection level 2
4: Failure indication	10: Reset signal	16: Redundant slave communication failure	
5: Alarm indication	11: Specified alarm detection	17: Redundant host ready sign	

🕮 The digital output function is detailed as follows:

0: Forced to be 0. Forced to output disconnection signal.

1: Forced to be 1. Forcely output a connected signal.

2: Ready instruction. Trouble-free state after applying high voltage.

3: Running instruction. When the inverter is running.

4: Failure instruction. If the inverter is in the fault state, there will be effective signal output.

5: Alarm instruction. This signal is effective when the inverter alarms.

6. Forward running. This signal is effective when the inverter is running in forward direction.

7: Reverse running. This signal is effective when the inverter is running in reverse.

8: External fault. The signal is valid in case of shutdown due to external fault. The signal is invalid once the external fault is reset.

9: Synchronization sign. The signal is effective when the output voltage of the inverter is synchronized with the frequency, voltage and phase of the grid.

10: Reset signal. This signal is valid when resetting the inverter.

11: Specified alarm detection. The signal is effective when the alarm position selected by F5-21 and F5-22 has an alarm.

12: Excitation start-stop switch. The signal is effective when the excitation start-stop switch is active.

13: Redundant host output switch. If the output switch of the redundant host is closed, a valid signal is output

14: Redundant slave output switch. If the redundant slave output switch is closed, a valid signal is output.

15: Redundant host communication failure. If the redundant host is in the communication failure state, a valid signal is output.

16: Redundant slave communication failure. If the redundant slave is in a communication failure state, a valid signal is output.

17: Redundant host ready sign. The redundant host is in the trouble-free state after it is powered on.

18: Redundant slave ready sign. The redundant slave is in the trouble-free state after it is powered on.

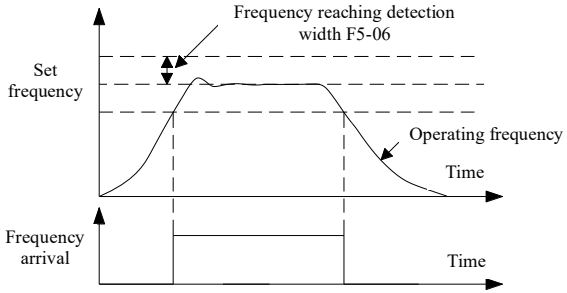
19: Set frequency standard sign. The signal is effective when the inverter operating frequency reaches the set frequency.

20: Frequency detection level 1. The signal is effective when the running frequency of the inverter reaches the detection level 1.

21: Frequency detection level 2. The signal is effective when the running frequency of the inverter reaches the detection level 2.

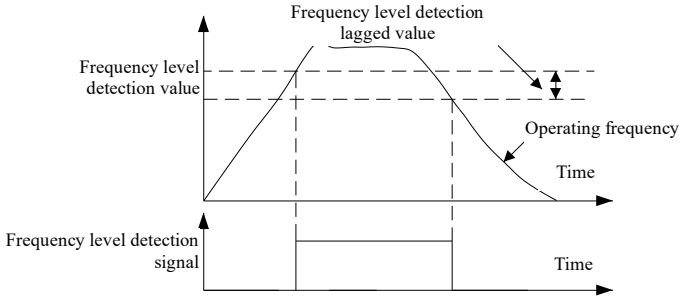
F5-06	**Frequency reaches detection width**	Factory Default Value	2.50Hz	Security Level	1	Change	○
Setting range	0.00~60.00Hz						

🕮 When the operation frequency of the inverter is within the positive and negative detection width near the set frequency , the frequency arrival signal is sent, as shown in the figure below:



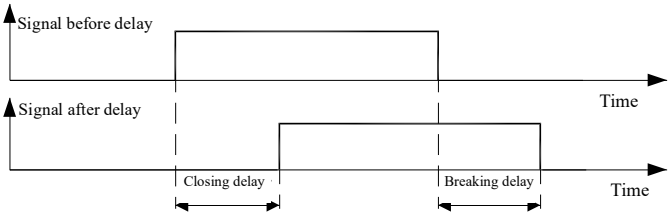
F5-07	**Frequency level detection value 1**	Factory Default Value	50.00Hz	Security Level	1	Change	○
F5-08	**Frequency level detection hysteresis value 1**	Factory Default Value	1.00Hz	Security Level	1	Change	○
F5-09	**Frequency level detection value 2**	Factory Default Value	25.00Hz	Security Level	1	Change	○
F5-10	**Frequency level detection hysteresis value 2**	Factory Default Value	1.00Hz	Security Level	1	Change	○
Setting range	0.00~320.00Hz						

🕮 When the operating frequency is greater than the "frequency level detection value", the value output "frequency level detection signal" is effective until the operating frequency is less than the "frequency level detection value - frequency level detection lagged value", as shown in the following figure:



F5-11	**Y1 terminal closing delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-12	**Y1 terminal opening delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-13	**Y2 terminal closing delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-14	**Y2 terminal opening delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-15	**T1 terminal closing delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-16	**T1 terminal opening delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-17	**T2 terminal closing delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-18	**T2 terminal opening delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-19	**T3 terminal closing delay**	Factory Default Value	0.00s	Security Level	1	Change	○
F5-20	**T3 terminal opening delay**	Factory Default Value	0.00s	Security Level	1	Change	○
Setting range	0.00~650.00s						

🕮 Digital output delay is shown below:



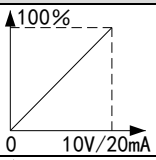
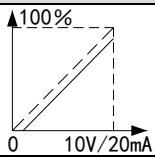
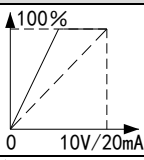
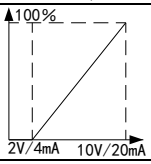
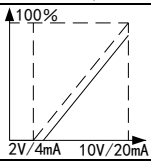
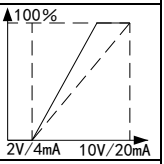
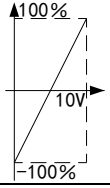
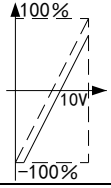
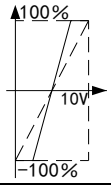
F5-21	**Alarm output selection 1**	Factory Default Value	0	Security Level	1	Change	○
F5-22	**Alarm output selection 2**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~65535						

🕮 It is used to select the alarm information that needs to be monitored, and the corresponding bit (in binary) is 1, indicating that the alarm information is allowed to be output through the digital output terminal, otherwise the alarm will be ignored.

6.7 F6 Analog and Pulse Frequency Terminal Settings

F6-00	**AI1 type**	Factory Default Value	1	Security Level	1	Change	○
Setting range	0: 0~10V or 0~20mA, corresponding to 0~100% 1:2~10V or 4~20mA, corresponding to 0~100% 2: centered on 5V or 10mA, corresponding to -100%~100%						
F6-01	**AI1 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
Setting range	0.00%~200.00%						
F6-02	**AI1 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
Setting range	－50.00%~50.00%						
F6-03	**AI1 filtering time**	Factory Default Value	10000ms	Security Level	1	Change	○
Setting range	0~10000ms						
F6-07	**AI2 type**	Factory Default Value	1	Security Level	1	Change	○
F6-08	**AI2 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
F6-09	**AI2 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
F6-10	**AI2 filtering time**	Factory Default Value	1000ms	Security Level	1	Change	○
F6-14	**AI3 type**	Factory Default Value	1	Security Level	1	Change	○
F6-15	**AI3 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
F6-16	**AI3 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
F6-17	**AI3 filtering time**	Factory Default Value	1000ms	Security Level	1	Change	○
Setting range	All settings for AI2 and AI3 are the same as that of AI1						

🕮 The table below shows the calculation formula, characteristic curve and adjustment diagram of the simulation input (the dashed line shows the factory setting characteristic, the solid line is the adjusted characteristic):

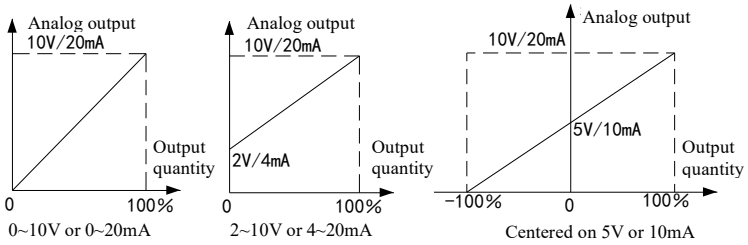
Mode	Output Formula	Basic Curve	Bias＝10.00%	Gain＝200.0%
0~10V or 0~20mA, corresponding to 0~100% instructions	Output = gain x (input-bias) (Result limited to -100~100%)			
2~10V or 4~20mA, corresponding to 0~100% instructions	Output＝gain ×[5/4×(input－bias) －25%] (Result limited to 0~100%)			
Centered on 5V or 10mA, corresponding to -100~100% instructions	Output＝gain×2×[(input - bias) -50%] (Result limited to -100~100%)			

🕮 'Filtering time': Increase it to slow down the response but enhance the anti-interference ability; reduce it to make the response faster, but the anti-interference becomes worse.

F6-21	**AO1 output signal**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~39 (corresponding to FU-450~FU-489)						
F6-22	**AO1 type**	Factory Default Value	1	Security Level	1	Change	○
Setting range	0: 0~10V or 0~20mA 1: 2~10V or 4~20mA 2: centered on 5V or 10mA						
F6-23	**AO1 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
Setting range	0.00%~200.00%						
F6-24	**AO1 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
Setting range	－50.00%~50.00%						
F6-25	**AO2 output signal**	Factory Default Value	0	Security Level	1	Change	○
F6-26	**AO2 type**	Factory Default Value	1	Security Level	1	Change	○
F6-27	**AO2 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
F6-28	**AO2 bias**	Factory	0.00%	Security	1	Change	○

		Default Value		Level			
F6-29	**AO3 output signal**	Factory Default Value	4	Security Level	1	Change	○
F6-30	**AO3 type**	Factory Default Value	1	Security Level	1	Change	○
F6-31	**AO3 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
F6-32	**AO3 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
F6-33	**AO4 output signal**	Factory Default Value	4	Security Level	1	Change	○
F6-34	**AO4 type**	Factory Default Value	1	Security Level	1	Change	○
F6-35	**AO4 gain**	Factory Default Value	100.00%	Security Level	1	Change	○
F6-36	**AO4 bias**	Factory Default Value	0.00%	Security Level	1	Change	○
Setting range	All settings for AO2, AO3 and AO4 are the same as that of AO1.						

🕮 Three types of analog output are shown below:



🕮 Range can be changed and zero point can be corrected by adjusting gain and bias.

Calculation formula: 0~10V output $\left(\left|\frac{\text{Output}}{\text{Maximum value of the selected signal}}\right| \times \text{Gain} + \text{Bias}\right) \times 10\text{V}$.

2~10V output $\left(\left|\frac{\text{Output}}{\text{Maximum value of the selected signal}}\right| \text{Gain} \times \frac{4}{5} + \frac{1}{5} \quad \text{Bias}\right) \times 10\text{V}$。

Output centered on 5A $\left(-\left(\frac{\text{Output quantity}}{\text{Maximum value of the selected signal}}\right) \quad \text{Gain} \times \frac{1}{2} + \frac{1}{2} + \text{Bias}\right) \times 10\text{V}$.

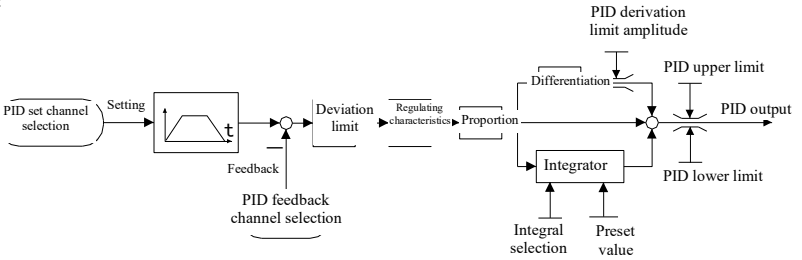
F6-46	**Analog signal setting**	Factory Default Value	0.00%	Security Level	1	Change	○

Setting range	0.00%~100.00%

6.8 F7 Process PID Parameters

F7-00	PID control function selection	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: Non-selection process PID control 1: Select process PID control (maximum PID output frequency is 100%) 2: Select PID to correct set frequency before acceleration and deceleration ramp (maximum PID output frequency is 100%). 3: Select PID to correct set frequency after acceleration and deceleration ramp (maximum PID output frequency is 100%)						

🕮 Process PID can be used to control tension, pressure, flow, liquid level, temperature and other process variables. The proportional link produces control effects proportional to the deviation to minimize the deviation and the integral link mainly aims to eliminate static difference. The longer the integral time is, the weaker the integral effect is, and the shorter the integral time is, the stronger the integral effect will be. The differential link predicts the change of the deviation signal through the variation trend of the deviation, and produces the control signal to suppress the deviation before the deviation becomes larger, so as to accelerate the response speed of the control. Structure of process PID is as follows:



🕮 There are also two correction working modes of process PID: Set frequency correction before acceleration and deceleration ramp, set frequency correction after acceleration and deceleration ramp. **Set frequency correction before acceleration and deceleration ramp**: PID output is overlaid on the set frequency before acceleration and deceleration ramp for correction.

Set frequency correction after acceleration and deceleration ramp: PID output is overlaid on the set frequency after acceleration and deceleration ramp, which can also achieve correction effect in acceleration and deceleration process by comparing with 'Set frequency correction before acceleration and deceleration ramp'.

F7-01	PID set channel selection	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: F7-04 1: AI1 2: AI2 3: AI3 4: Host computer analog 1 5: Host computer analog 2						
F7-02	**PID feedback channel selection**	Factory Default Value	0	Security Level	1	Change	×
Setting range	0: AI1 1: AI2 2: AI3 3: Host computer analog 1 4: Host computer analog 2 5: Output current ratio 6: Output power ratio						

🕮 The process PID adopts normalized input and output: the input and output ranges are ±100%, and the calibration of the input is related to the selection of feedback channel, sensor characteristics and analog input settings and the output is calibrated at a maximum frequency of 100% during frequency control.

🕮 There are filtering links in the set channel and feedback channel. For example, the filtering time of AI1 is F6-26.

These filtering links will affect the control performance and can be set according to actual needs.

F7-04	PID analog signal setting	Factory Default Value	0.00%	Security Level	1	Change	○
Setting range	－100.00~100.00%						
F7-05	**PID Proportional Gain**	Factory Default Value	0.020	Security Level	1	Change	○
Setting range	0.000~10.000						
F7-06	**PID integral time**	Factory Default Value	20.00s	Security Level	1	Change	○
Setting range	0.00~100.00s						
F7-07	**PID differential setting**	Factory Default Value	0.00	Security Level	1	Change	○
Setting range	0.00~10.00						

🕮 PID parameter regulation principles: The proportional gain shall be firstly increased from a smaller value (e.g. 0.20) until the feedback signal starts to oscillate, and then reduced by 40-60% to stabilize the feedback signal. The integral time shall be reduced from a larger value (e.g. 20.00s) until the feedback signal starts to oscillate, and then increased it by 10-50% to stabilize the feedback signal. If the demand of system for overshoot and dynamic error is high, differential action can be added.

F7-12	PID sampling period	Factory Default Value	10ms	Security Level	1	Change	○
Setting range	1~10000ms						

🕮 PID sampling cycle: general settings shall be 5 to 10 times smaller than the response time of the controlled object.

F7-13	PID regulation polarity	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Positive reaction 1: Negative reaction						

PID regulation polarity: Positive action refers to the increase in speed required for quantitative increase under stable operating conditions, while negative action indicates that reduction in speed is required when a quantitative increase is set under stable operating conditions.

F7-14	PID set slope time	Factory Default Value	0.00s	Security Level	0	Change	○
Setting range	0.00 ~ 20.00s (time required by set value to be from 0 to 100%)						

PID set slope time: it can make the increase or decrease time for set quantity smooth to reduce the impact caused at the beginning of PID input.

F7-17	Maximum PID output limit	Factory Default Value	100.00%	Security Level	1	Change	○
Setting range	－100.00%~100.00%						
F7-18	**Minimum PID output limit**	Factory Default Value	－100.00%	Security Level	1	Change	○

Setting range	－100.00%~100.00%

🕮 Users can limit the PID amplitude as needed. Appropriate amplitude limit can reduce overshoot and avoid excessive control quantity.

F7-20	Preset PID value	Factory Default Value	0.00%	Security Level	1	Change	○
Setting range	－100.00%~100.00%						

🕮 PID control is carried out with the preset value as the initial value of the integrator, which is equivalent to the preload of PID and can improve the response speed when starting.

6.9 F9 Customization Parameters

F9-00 ~ F9-15	Customization parameter 0~customization parameter 15	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~65535 (special parameters for PLC)						
F9-16 ~ F9-23	Customization parameter 16~customization parameter 23	Factory Default Value	0	Security Level	1	Change	○
Setting range	-32768~32767 (special parameters for PLC)						

🕮 PLC customization parameter operation function: Achieve the automation of the production process according to the set operating parameters.

6.10 FA Motor Parameters

FA-00	Motor parameter setting	Factory Default Value	00	Security Level	1	Change	○
Setting range	11: Static self-tuning 22: No-load rotation self-tuning						
FA-01	Rated motor power	Factory Default Value	Model determination	Security Level	1	Change	○
Setting range	110~50000kW						
FA-02	Number of motor poles	Factory Default Value	4	Security Level	1	Change	○
Setting range	2~256 (it must be an even number)						
FA-03	Rated motor current	Factory Default Value	Model determination	Security Level	1	Change	○
Setting range	0.5~1200.0A						
FA-04	Rated motor frequency	Factory Default Value	50.00Hz	Security Level	1	Change	○
Setting range	1.00~320.00Hz						
FA-05	Rated motor speed	Factory Default Value	Model determination	Security Level	1	Change	○
Setting range	125~40000r/min						
FA-06	Rated motor voltage	Factory	Model	Security	1	Change	×

		Default Value	determination	Level			
Setting range	100~20000V						

🕮 Be sure to input the motor nameplate parameters FA-01~FA-06 before running the inverter.

🕮 FA-00＝11 "Stationary self-tuning": measure the stator resistance, leakage inductance and rotor resistance of the motor. It is recommended to input no-load current before operation.

🕮 FA-00=22 "No-load complete self-tuning": in addition to the parameters measured by static self-tuning, it also measures mutual inductance, no-load current, and iron core saturation coefficient. The start of the no-load complete self-tuning process includes a stationary self-tuning process. During a complete self-tuning, the motor will rotate.

🕮 Notes on self-tuning:

1. The nameplate parameters of the motor must be set before self-tuning, otherwise the motor may be damaged;

2. The power levels of the motor and the inverter should match, and the rated current of the motor shall not be less than 1/4 of the rated current of the inverter;

3. When changing the rated power of the motor, the motor parameter value determined by the model will be restored to the factory value;

4. When replacing the motor or output cable, be sure to redo the parameter self-tuning;

5. Motor parameter self-tuning needs to set the running command channel to operation panel control;

6. Before performing no-load complete self-tuning, confirm that: the motor and the mechanical load are disengaged; there is no problem in accelerating the motor to 80% of the basic frequency; the mechanical brake device should be released; in the case of a lift, please remove the mechanical load connected to the motor to Prevents slippage during self-tuning.

🕮 Parameter self-tuning operation:

1. Input the nameplate parameters FA-01~FA-06 of the motor, especially when the vector control is used, the input parameters must be correct, otherwise the control performance of the inverter will be affected;

2. Before the no-load complete self-tuning, set F2-12 "basic frequency" and F2-13 "maximum output voltage", and select the appropriate acceleration and deceleration time to ensure that there is no overcurrent or overvoltage during acceleration and deceleration;

3. Confirm that the motor is in a static state, set FA-00 "motor parameter self-tuning" to the corresponding value, and then click start;

4. After the measurement is completed, it will automatically stop, the measurement results will be automatically recorded in the motor parameters, and FA-00 will automatically become 00.

🕮 The motor may rotate slightly during the execution of the motor stationary self-tuning.

FA-07	**Motor no-load current**	Factory Default Value	Model determination	Security Level	1	Change	○
Setting range	0.1A→FA-03 "motor rated current"						
FA-08	**Motor stator resistance**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0.00→50.00%						
FA-09	**Motor leakage inductive reactance**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0.00→50.00%						
FA-10	**Motor rotor resistance**	Factory	0	Security	1	Change	○

		Default Value		Level			
Setting range	0.00→50.00%						
FA-11	**Motor mutual inductive reactance**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0.00→2000.0%						
FA-12	**Motor core saturation coefficient 1**	Factory Default Value	1	Security Level	1	Change	○
Setting range	1.000→1.500						
FA-13	**Motor core saturation coefficient 2**	Factory Default Value	1	Security Level	1	Change	○
Setting range	1.000→FA-12 "motor core saturation coefficient 1"						
FA-14	**Motor core saturation coefficient 3**	Factory Default Value	0.5	Security Level	1	Change	○
Setting range	FA-15 "motor core saturation coefficient 4"→1.000						
FA-15	**Motor core saturation coefficient 4**	Factory Default Value	0.5	Security Level	1	Change	○
Setting range	0.500→1.000						

🕮 If the parameter self-tuning cannot be performed, or if you know the exact parameters of the motor , you can manually calculate and input the motor parameters. The formula for calculating the percentage value of motor parameters is as follows:

$$\text{Resistance or reactance percentage (\%)} = \frac{\text{Resistance or reactance } (\Omega)}{\text{Rated Voltage (V)} \,/\, \left(\sqrt{3} \times \text{ Rated Current (A)}\right)} \times 100\%$$

Note: The inductive reactance is the inductive reactance at the rated frequency of the motor. The calculation formula of the inductive reactance is: Inductive reactance=2π×frequency×inductance.

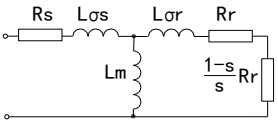
🕮 The inverter adopts the parameters of the T-I type equivalent circuit (as shown in the figure below) of the induction motor. The conversion relationship between the conventional T type equivalent circuit (as shown in the figure below) to the T-I type equivalent circuit parameters is as follows:

Type T-I circuit stator resistance $R_s = R_s$

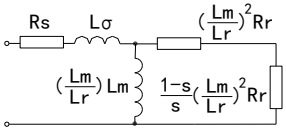
Type T-I circuit rotor resistance $R_r = \left(L_m / L_r\right)^2 R_r$

Type T-I circuit leakage inductance $L_\sigma = \left(L_m / L_r\right)^2 L_\sigma$

Type T-I circuit mutual inductance $L_m = L_m^2 / L_r$



Type T equivalent circuit



Type T-I equivalent circuit

6.11 Fb Protection Function and Advanced Settings of the Inverter

Fb-00	Carrier frequency	Factory Default Value	800Hz	Security Level	2	Change	○
Setting range	500~5000Hz (carrier frequency output by power unit)						

🕮 Fb-00 'carrier frequency': If the carrier frequency is high, the motor operation noise is low and the harmonic current of the motor is small, so the heating is reduced, but the common-mode current becomes larger, the interference is large and the heat productivity of the inverter is large. It will be opposite if the carrier frequency is low. The carrier frequency can be appropriately raised in case of mute operation is required. When the set carrier frequency is above the factory default, the inverter needs to be derated by 5% for every increase of 1kHz.

Fb-03	Power grid fail and restarting	Factory Default Value	0	Security Level	2	Change	○
Setting range	0. Restart prohibited	1. Time-limited restart (when the start signal continues)					

🕮 The following processing methods are available when the input voltage is too low:

Fb-03＝0: Power failure is taken as a fault, triggering free shutdown with undervoltage fault reported. Power failure can be determined if the power grid voltage is below the undervoltage point.

Fb-03＝1: The output is blocked, so that the voltage drop of the DC bus of the unit slows down. If the voltage recovers within 10s, it shall be restarted (speed tracking start), and there will be fault reported in case of undervoltage timeout.

🕮 Handling method for Fb-03＝1 can avoid undervoltage shutdown caused by instantaneous power outage for fan, centrifuge and other large-inertia load.

🕮 In case of undervoltage in operation, free stop will be triggered with undervoltage fault reported. There will only be alarm in case of undervoltage in standby mode.

Fb-04	Self-reset times	Factory Default Value	0	Security Level	2	Change	○
Setting range	0~10 times						
Fb-05	**Self-reset interval**	Factory Default Value	5.0s	Security Level	2	Change	○
Setting range	1.0~30.0s						
Fb-06	**Fault output during self-reset**	Factory Default Value	0	Security Level	2	Change	○
Setting range	0: No-output fault	1: Output fault					

🕮 Automatic fault reset function: For faults occurring during operation, press Fb-05 "automatic reset interval" and Fb-04 "automatic reset times" for automatic reset and restart. It can avoid tripping caused by misoperation, instantaneous overvoltage of power supply or external non-repetitive impact.

🕮 Automatic reset process: In case of fault during operation, the fault will be automatically reset after the automatic reset interval. If the fault disappears, start again according to the speed tracking start mode. If the fault still exists and the reset times have not exceeded that in Fb-04, continue to try automatic reset, otherwise fault will be reported and the machine will stop.

🕮 Reset conditions for the number of times of fault reset: after the inverter fault self-reset, there is no fault for 10 consecutive minutes; Once fault is detected, fault shall be manually reset, and then power shall be connected again after power outage.

🕮 Fb-06 'automatic reset during failure output': Select digital output 4 "fault instructions" to check whether it is valid during automatic reset.

🕮 Automatic reset is invalid for power device protection, external fault and emergency stop fault.

⚠ Danger **: Use the automatic reset function with caution. Otherwise, personal injury or property loss may occur.**

Fb-07	**Grid voltage undervoltage point**	Factory Default Value	55.0%	Security Level	2	Change	○
Setting range	10.0 ~ 70.0% (corresponding to “rated input voltage”)						
Fb-08	**Power grid voltage overvoltage point**	Factory Default Value	120.0%	Security Level	2	Change	○
Setting range	80.0 ~ 130.0% (corresponding to “rated input voltage”)						
Fb-09	**Grid voltage sag trigger point**	Factory Default Value	70.0%	Security Level	2	Change	○
Setting range	10.0 ~ 90.0% (corresponding to “rated input voltage”)						
Fb-10	**Grid voltage sag enabling**	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: Enabling (VF control is valid only)						
Fb-11	**Maximum grid voltage sag time**	Factory Default Value	600ms	Security Level	2	Change	○
Setting range	0~3000ms						

🕮 When the power grid voltage is lower than Fb-09 "grid voltage sag trigger point" and the time is less than Fb-11 "maximum grid voltage sag time", it is regarded as voltage sag. In case of voltage sag, if Fb-10 = 1, the inverter blocks the output, so that the voltage drop of the DC bus of the unit slows down. If the voltage recovers within the Fb-11 "maximum grid voltage sag time", it shall be restarted (speed tracking start), and there will be fault reported in case of timeout.

Fb-13	**Motor overload detection**	Factory Default Value	1	Security Level	2	Change	○
Setting range	0. Always detecting 1. Constant speed detection only						
Fb-14	**Motor overload alarm level**	Factory Default Value	110.0%	Security Level	2	Change	○
Setting range	50.0%~150.0%						
Fb-15	**Motor overload fault level**	Factory Default Value	130.0%	Security Level	2	Change	○
Setting range	50.0%~150.0%						
Fb-16	**Motor overload fault detection time**	Factory Default Value	2.0s	Security Level	2	Change	○
Setting range	0.1s~30.0s						

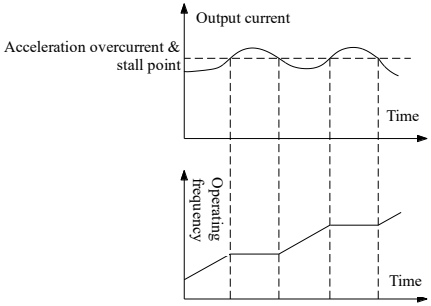
🕮 Motor overload: When the motor current exceeds Fb-15 and the duration exceeds the time set in Fb-16, and the inverter reports "motor overload failure" and stops. This function can be used to detect whether the mechanical load is abnormal and the current is too large.

Fb-17	Motor overspeed protection	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						
Fb-18	**Motor overspeed detection level**	Factory Default Value	110.0%	Security Level	2	Change	○
Setting range	50.0%~150.0%						
Fb-19	**Motor overspeed detection time**	Factory Default Value	5.0s	Security Level	2	Change	○
Setting range	0.1s~30.0s						

🕮 Motor overspeed: When the inverter detects that the motor speed exceeds that in Fb-18 and the duration exceeds the time set in Fb-19, the inverter reports "motor overspeed failure" and stops.

Fb-20	Acceleration overcurrent and stall protection	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: valid						
Fb-21	**Acceleration overcurrent and stall level**	Factory Default Value	130.0%	Security Level	2	Change	○
Setting range	50.0%~150.0%						

🕮 During the acceleration process, when the Fb-20 "acceleration overcurrent and stall protection" is valid and the output current is greater than the Fb-21 "acceleration overcurrent and stall level", the acceleration is temporarily stopped, and the acceleration continues after the current decreases, as shown in the figure below:



Fb-22	Power-off restart timeout period	Factory Default Value	10.0s	Security Level	2	Change	○
Setting range	1.0~120.0s						

🕮 When the system power-off restart time exceeds the Fb-22 'power-off restart timeout period', the inverter will stop.

Fb-24	Loss power protection	Factory Default Value	2	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						

Fb-25	Loss power limit	Factory Default Value	25.0%	Security Level	2	Change	○
Setting range	5.0% ~ 50.0% (rated power)						

🕮 When the difference between the input power and the output power of the inverter exceeds the Fb-25 "loss power limit", the inverter will act according to the Fb-24 "loss power protection".

Fb-26	Cabinet door opening protection	Factory Default Value	2	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						
Fb-27	Temperature controller fault protection	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: 30min protection after failure						

🕮 In order to protect the life safety of users and prevent electric shock caused by opening the cabinet door or not closing the cabinet door properly when the inverter is connected to the high voltage power supply, and the mode of operation of the inverter when the cabinet door is accidentally opened or not closed properly can be set according to Fb-26.

Fb-28	Communication offline time	Factory Default Value	10.0s	Security Level	2	Change	○
Setting range	1.0 ~ 600.0s (time between communication offline and fault detection)						
Fb-29	HMI off-line protection	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						
Fb-30	USER off-line protection	Factory Default Value	1	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						
Fb-31	Output phase loss protection	Factory Default Value	2	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown						

🕮 Inverter output phase loss protection: In case of inverter output phase loss, the motor operates with single phase and current and torque ripple become larger, so output phase loss protection can avoid damage to motor and mechanical load.

🕮 When the output frequency or current is very low, the output phase loss protection is invalid.

Fb-32	AI1 off-line action	Factory Default Value	0	Security Level	2	Change	○
Fb-33	AI2 off-line action	Factory Default Value	0	Security Level	2	Change	○
Fb-34	AI3 off-line action	Factory Default Value	0	Security Level	2	Change	○
Setting range	0: Disabled 1: Alarm 2: Failure shutdown 3: Hold the value before 3s and alarm (only 2~10V/4~20mA off-line protection is valid)						

Fb-35	AI offline threshold	Factory Default Value	0.0%	Security Level	2	Change	○
Setting range	0.0~20.0%						

🕮 AI off-line: When the inverter detects that the analog input signal is less than the off-line threshold, it can be considered to be off-line.

Fb-36	Fan life expectancy	Factory Default Value	30000h	Security Level	2	Change	○
Setting range	0~65500h						

🕮 When the accumulated operation time reaches the fan life expectancy setting, the digital output terminal function 11 'fan life expectancy is reached' will be effective. It is suggested to replace a fan with same model. After replacing the fan, monitoring parameter FU-49 'accumulated running time of fan' is automatically cleared, and digital output terminal function 11 'fan life expectancy is reached' is invalid.

🕮 Relevant parameters: Digital output terminal function 11 "specified alarm detection";

Monitoring parameters: FU-49 “fan accumulated operation time”.

Fb-37	Fan shutdown delay	Factory Default Value	3min	Security Level	2	Change	○
Setting range	0~60min (when setting> 60min, it indicates that the fan keeps running all the time)						
Fb-38	Fan failure delay	Factory Default Value	30min	Security Level	2	Change	○
Setting range	0~120min						
Fb-39	Starting point of fan under cabinet	Factory Default Value	100.0%	Security Level	2	Change	○
Setting range	30.0% ~ 150.0% (100% corresponding to rated input current)						

🕮 Fan shutdown delay: In occasions with frequent starts and stops, it should be set to "always running" to avoid frequent start and stop of the fan.

6.12 FC Wave Recording Function Settings

FC-00	Record waveform 1 selection	Factory Default Value	0	Security Level	1	Change	○
FC-01	Record waveform 2 selection	Factory Default Value	0	Security Level	1	Change	○
FC-02	Record waveform 3 selection	Factory Default Value	0	Security Level	1	Change	○
FC-03	Record waveform 4 selection	Factory Default Value	0	Security Level	1	Change	○

Setting range	0: Vr 1: Vs 2: Vt 3: Vu 4: Vv 5: Vw 6: Ir 7: Is 8: It 9: Iu 10: Iv 11: Iw 12: Vi 13: Vo 14: Ii 15: Io 16: Fo 17: Pi 18: Po 19: VdcU 20: VdcV 21: VdcW 22: AI1 23: AI2 24: AI3						
FC-04	**Record waveform period**	Factory Default Value	0.1ms	Security Level	1	Change	○
Setting range	0.1~100.0ms						
FC-05	**Record trigger condition 1**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Fault triggered (0: invalid; 65535: All faults are triggered, others: triggered only when consistent with the fault code)						
FC-06	**Record trigger condition 2**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Running time trigger (triggered when reaching the set time, 0: invalid; Unit: 1s)						
FC-07	**Record trigger condition 3**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Running frequency trigger (triggered when reaching the set frequency, 0: invalid, unit: 0.01Hz)						
FC-08	**Record trigger condition 4**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Event occurrence trigger (0: invalid 1: voltage sag triggered 2: voltage sag recovery 3: block command 4: start command 5: stop command)						

🕮 It is feasible to query the waveform recorded in FC-01 'record waveform 1 selection' - FC-03 'record waveform 4 selection' from the waveform capture record under the condition of FC-05 'record trigger condition 1'-FC-08 'record trigger condition 4' and within the time set in FC-04 'record waveform period', or the waveforms that need to be analyzed can also be saved and restored via software.

6.13 Fd Shore Power Supply, Electromagnetic Soft Start and Reactive Power Compensation Parameters

Fd-00	**Power output mode**	Factory Default Value	0	Security Level	2	Change	×
Setting range	0: Power supply (shore power supply) 1: Tracking grid 2: Constant power generation 3: Reactive compensation						

🕮 Under F0-09＝3 'power supply mode', the parameter shall be set.

🕮 Fd-00 = 0 'power supply (shore power supply): output fixed/adjustable AC power supply of three-phase voltage and frequency (50/60Hz) .

🕮 Fd-00＝1 'tracking grid' or 2 'constant power generation': The parameters are used in the factory only and are forbidden to be used by users.

🕮 Fd-00＝3 'reactive compensation': The high voltage inverter is used as a reactive power compensation cabinet to improve the power factor of the grid side.

Fd-01	**Output frequency setting**	Factory Default Value	50.00Hz	Security Level	0	Change	○
Setting range	0.00~320.00Hz (select 'power supply', output frequency value)						
Fd-02	**Output voltage setting**	Factory Default Value	0V	Security Level	0	Change	○
Setting range	0~20000V (select 'power supply', output voltage value)						
Fd-03	**Voltage soft start time**	Factory Default Value	10s	Security Level	1	Change	○
Setting range	1~600s (select 'power supply', the time of output voltage from 0 to rated voltage)						
Fd-04	**Advanced grid angle**	Factory Default Value	0°	Security Level	2	Change	○
Setting range	0~45.0° (tracking grid mode is valid)						
Fd-05	**Tracking voltage increment**	Factory Default Value	0%	Security Level	2	Change	○
Setting range	0.00~35.00% rated voltage (tracking grid mode is valid)						
Fd-06	**Current regulator KP**	Factory Default Value	0.100	Security Level	2	Change	○
Setting range	0.000~65.535 (constant power generation and reactive power compensation modes are effective)						
Fd-07	**Current regulator KI**	Factory Default Value	0.0010	Security Level	2	Change	○
Setting range	0.0000~6.5535 (constant power generation and reactive power compensation modes are effective)						
Fd-08	**Output power setting**	Factory Default Value	1kW	Security Level	0	Change	○
Setting range	0~20000kW (select 'constant power generation' to set the output power value)						
Fd-09	**Power regulator KP**	Factory Default Value	0.020	Security Level	2	Change	○

Setting range	0.000~65.535 (select 'constant power generation', power PI controller ratio)						
Fd-10	**Power regulator KI**	Factory Default Value	0.0010	Security Level	2	Change	○
Setting range	0.0000~6.5535 (select "constant power generation", power PI regulator integral value)						
Fd-11	**Generation phase regulation**	Factory Default Value	0.065	Security Level	2	Change	○
Setting range	0.000~1.000						
Fd-12	**Filter inductance value (uH)**	Factory Default Value	50 uH	Security Level	2	Change	○
Setting range	0~65535 uH (filter inductance value that is output and sent to the grid, unit: uH)						
Fd-20	**Power supply frequency selection**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0: 50Hz 1: 60Hz 2: Custom frequency						
Fd-21	**Custom frequency**	Factory Default Value	50.00Hz	Security Level	0	Change	○
Setting range	0.00~80.00Hz						
Fd-22	**Supply frequency deviation**	Factory Default Value	0.00Hz	Security Level	0	Change	○
Setting range	—3.00~3.00Hz						
Fd-23	**Supply voltage selection**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0: Power supply voltage 1 1: Power supply voltage 2 2: Power supply voltage 3 3: Power supply voltage 4						
Fd-24	**Supply voltage 1**	Factory Default Value	3000V	Security Level	0	Change	○
Fd-25	**Supply voltage 2**	Factory Default Value	6000V	Security Level	0	Change	○
Fd-26	**Supply voltage 3**	Factory Default Value	10000V	Security Level	0	Change	○
Fd-27	**Supply voltage 4**	Factory Default Value	11000V	Security Level	0	Change	○
Setting range	0~20000V						
Fd-28	**Supply voltage deviation**	Factory Default Value	0V	Security Level	0	Change	○
Setting range	—500~500V						
Fd-29	**Automatic upper voltage regulation limit**	Factory Default Value	1	Security Level	0	Change	○
Setting range	0: Disabled 1: 0.0~30.0%						
Fd-30	**Voltage rise slope**	Factory	0V/s	Security	0	Change	○

		Default Value		Level			
Setting range	10~10000V/s						
Fd-31	**Power supply phase sequence selection**	Factory Default Value	0	Security Level	0	Change	×
Setting range	0: Positive phase sequence 1: Negative-phase sequence						
Fd-32	**Automatic current limiting**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0: Off 1: On						
Fd-33	**Reverse power limiting function**	Factory Default Value	0	Security Level	0	Change	×
Setting range	0: Disabled 1: Enabled ((valid only for the first grid connection)						
Fd-34	**Overcurrent restart time**	Factory Default Value	500.0ms	Security Level	1	Change	○
Setting range	1.0~6553.5ms						
Fd-35	**Initial overcurrent restart value**	Factory Default Value	20.0%	Security Level	1	Change	○
Setting range	0~100.0%						
Fd-36	**Overcurrent restart threshold**	Factory Default Value	120.0%	Security Level	1	Change	○
Setting range	10.0~250.0%						

🕮 Adjust the power parameters according to the use conditions of the power mode on site.

6.14 FE Permanent-magnet Synchronous Motor Control Parameters

FE-00	Tuning command	Factory Default Value	0	Security Level	2	Change	×
Setting range	0: Untuned 1: Static tuning: Identifying resistance and quadrature axis inductance 2: dynamic tuning: Identifying resistance, quadrature axis inductance, counter electromotive force						

🕮 In the FVC control mode, the tuning process will also select the PG direction and identify the encoder installation angle. During the identification, the motor will rotate at a low speed. This process can be enabled or disabled by "FE-01 FVC installation angle/direction identification enabling" option.

🕮 In the mode without PG, in the process of motor identification, the motor rotor may have a slight movement, which is normal;

🕮 When carrying out "no-load complete self-tuning", if the motor jitters during the starting process, the parameter FE-21 "low speed minimum current" can be appropriately increased;

🕮 In case of "self-tuning fault", please cut off the power supply for inspection and then carry out the operation again. If the problem still remains, please contact the manufacturer;

🕮 After the setting, the parameter automatically returns to zero.

FE-01	FVC Installation Angle/Direction Identification and Selection	Factory Default Value	4	Security Level	2	Change	×
Setting range	0: Identifying motor parameters only 1: Identify motor parameters, identify encoder information with load 2: Identify motor parameters, and identify encoder information with no load						

🕮 In FVC mode, it is necessary to ensure before parameter identification that the motor parameters (FA parameter group), the number of encoder lines (FE-57) and the encoder type (FE-58) are set correctly.

🕮 During FVC tuning,

FE-01=0 'Identifying motor parameters only': In the FVC control mode, only the motor parameters are identified, and the encoder installation angle/encoder direction is not identified;

FE-01=1 'Identifying motor parameters, identifying encoder information with load': The encoder installation angle and the encoder direction will be identified. During the identification, the motor will rotate at a low speed. This mode allows the motor to be identified with load;

FE-01=2 'Identifying motor parameters, and identifying encoder information with no load': During the identification, the motor will rotate at a low speed, and it is allowed to identify the encoder direction and installation angle in the no-load state when the motor is under a no-load state, and if the load is lighter, the identification results will be more accurate.

🕮 In the FVC control mode, if the motor encoder installation direction has been determined, it is feasible to set "FE-70 encoder installation angle re-identification" as 1 after motor parameter identification, and it is allowed to directly start and run the motor encoder to automatically complete the identification of the encoder installation angle.

FE-02	**High-speed segment speed loop integral parameter**	Factory Default Value	50	Security Level	1	Change	○
FE-03	**High-speed segment speed loop proportional parameter**	Factory Default Value	150	Security Level	1	Change	○
Setting range	0~6000						
FE-04	**Low-speed segment speed loop integral parameter**	Factory Default Value	50	Security Level	1	Change	○
FE-05	**Low-speed segment speed loop proportional parameter**	Factory Default Value	150	Security Level	1	Change	○
Setting range	0~60000						

🕮 Too large proportion coefficient will cause high frequency oscillation of speed, and mechanical oscillation or electromagnetic noise will increase significantly. Too small proportion coefficient or too large moment of inertia will cause low frequency oscillation of the speed and obvious speed overshoot, which may cause overvoltage if no discharge measures are taken.

🕮 If the integral coefficient is too small, the response will be slow and there will be static difference in speed control. If the integral coefficient is too large, low frequency oscillation of speed and the speed overshoot will be caused. In general, the greater the moment of inertia is, the greater the integral coefficient and proportional coefficient will be, which may increase the speed filter coefficient. To decrease the integral coefficient, the proportional coefficient can be appropriately increased.

FE-06	**Speed loop PI switching point 2**	Factory Default Value	2.00Hz	Security Level	1	Change	○
Setting range	0.00~320.00Hz (using high-speed PI parameters for speed loop above the frequency point)						
FE-07	**Speed loop PI switching point 1**	Factory Default Value	1.00Hz	Security Level	1	Change	○
Setting range	0.00~320.00Hz (using low-speed PI parameters for speed loop below the frequency point)						

🕮 Note: When the speed is higher than FE-06, high-speed ASR parameters can be used for adjustment, and when the speed is lower than FE-07, the low-speed ASR parameters can be adopted, and the two sets of parameters can be used for smooth the transition between two switching points.

FE-08	**High-speed filtering coefficient**	Factory Default Value	86	Security Level	1	Change	○
FE-09	**Low-speed segment speed filter coefficient**	Factory Default Value	26	Security Level	1	Change	○
Setting range	4~512 (steady-state performance will be better and dynamic response will be slower if the coefficient is larger)						

🕮 Too large value may result in instability.

FE-10	**control mode selection**	Factory Default Value	1	Security Level	2	Change	×

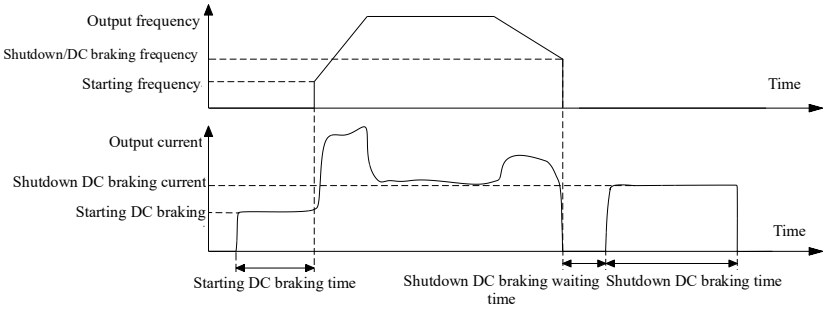
Setting range	1: SVC 2: Torque control 3: IF+MRAS control 4: FVC

- FE-10＝1 '**no PG vector control**': i.e., speed sensorless vector control.
- FE-10＝2 '**torque control**': i.e., speed sensorless vector control.
- FE-10＝3 '**IF+SVC control**': i.e., IF+speed sensorless vector control.
- FE-10＝4 "**PG flux vector control (FVC)**": Encoder parameter shall be set for PG flux vector control

FE-11	**Flux weakening mode**	Factory Default Value	1	Security Level	2	Change	×
Setting range	0: Direct calculation 1: Automatic regulation 2: Non-flux weakening						
FE-12	**Weak magnetic current regulation coefficient**	Factory Default Value	80	Security Level	1	Change	○
Setting range	0~120						
FE-13	**Weak magnetic regulation coefficient**	Factory Default Value	4	Security Level	1	Change	○
Setting range	0~40						
FE-14	**Weak magnetic output voltage regulation coefficient**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0~12 (the inverter output voltage will be larger and the weak magnetic current will be lower if the coefficient is larger)						
FE-15	**Maximum torque current ratio control enabling**	Factory Default Value	0	Security Level	2	Change	×
Setting range	0: Disabled 1: Enabled						

FE-18	**Maximum frequency limiting mode**	Factory Default Value	0	Security Level	2	Change	×
Setting range	0: Demagnetizing 1: Non-demagnetizing						
FE-19	**Set the torque current percentage**	Factory Default Value	150%	Security Level	2	Change	○
Setting range	0~100%, taking rated current of motor as 100% (this parameter limits the D-axis current)						
FE-20	**Preset starting current**	Factory Default Value	0%	Security Level	1	Change	×
Setting range	0 ~ 200%, taking the rated current of the motor as 100%, affecting the initial value of the speed loop PI.						
FE-21	**Identify the counter electromotive force current/low speed minimum current**	Factory Default Value	30%	Security Level	2	Change	×
Setting range	0~100%, taking the rated current of the motor as 100%						
FE-22	**Starting DC braking current**	Factory Default Value	0%	Security Level	1	Change	×
Setting range	0~100%, taking the rated current of the motor as 100%						
FE-23	**Shutdown DC braking current**	Factory Default Value	0%	Security Level	1	Change	×
Setting range	0~100%, taking the rated current of the motor as 100%						
FE-24	**Starting DC braking time**	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.1s~36.0s (larger value results in a longer braking duration)						
FE-25	**Shutdown DC braking time**	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.1s~36.0s (larger value results in a longer braking duration)						
FE-26	**Shutdown DC braking waiting time**	Factory Default Value	0.0s	Security Level	1	Change	○
Setting range	0.1s~36.0s (larger value results in a longer waiting time)						
FE-27	**Shutdown/DC braking frequency**	Factory Default Value	0.00Hz	Security Level	1	Change	○
Setting range	0.00Hz~320.00Hz (the frequency of entering DC braking from braking phase)						

🕮 Starting and stopping DC braking are shown below:



FE-28	Resistance estimation coefficient	Factory Default Value	0	Security Level	3	Change	×
Setting range	0~9999						
FE-29	**Velocity estimation coefficient 1**	Factory Default Value	20	Security Level	2	Change	×
Setting range	0~1000						
FE-30	**Velocity estimation coefficient 2**	Factory Default Value	30	Security Level	2	Change	×
Setting range	0~1000						
FE-31	**Counter electromotive force compensation coefficient**	Factory Default Value	1000	Security Level	2	Change	×
Setting range	0~1000						

FE-32	Initial position detection method	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: No detection 1: Detection mode 1 2: Detection mode 2						

🕮 Detection mode 1 is 180° different from detection mode 2, and very few motors use detection mode 2; During position detection, the motor will be injected with voltage pulse, and the injection of pulse will make the motor produce abnormal sound. The greater the motor power is, the greater the abnormal sound will be.

FE-33	Polarity identification duration	Factory Default Value	25	Security Level	2	Change	×
Setting range	10ms~200ms						
FE-34	**Initial position/polarity identification detection current**	Factory Default Value	100%	Security Level	2	Change	×
Setting range	50%~200%						
FE-35	**FVC initial position detection scheme**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: Detection per start 1: First startup detection;						

FE-36	**Initial position for parameter identification**	Factory Default Value	330.0°	Security Level	1	Change	×
Setting range	0~359.9°						
FE-37	**High injection frequency**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0~1000Hz, use the default 4-time rated frequency of motor if it is set to be 0						
FE-38	**Online rotor position compensation enabling**	Factory Default Value	0	Security Level	0	Change	○
Setting range	1: Enabled 2: Disabled						
FE-44	**D-axis inductance**	Factory Default Value	7000	Security Level	1	Change	×
FE-45	**Q-axis inductance**	Factory Default Value	7000	Security Level	1	Change	×
FE-46	**Stator resistance**	Factory Default Value	2700	Security Level	1	Change	×
Setting range	0~60000 (after parameter identification and manual modification, the current loop PI parameter will change)						
FE-47	**Inductance/resistance unit**	Factory Default Value	0	Security Level	1	Change	×
Setting range	Ones: inductance 0: uH 1: 10uH 2: 100uH Tens: Resistance 0: mΩ 1: 10mΩ Hundreds: Counter electromotive force coefficient 0: ×1 1: ×10 2: ×100						
FE-48	**Counter electromotive force coefficient**	Factory Default Value	500	Security Level	1	Change	×
Setting range	0~60000, dynamic identification required, and 130* counter electromotive force/frequency estimation can be adopted						
FE-49	**Integral parameter of the D-axis current loop**	Factory Default Value	200	Security Level	1	Change	×
FE-50	**Proportional parameter of D-axis current loop**	Factory Default Value	300	Security Level	1	Change	×
FE-51	**Integral parameter of the Q-axis current loop**	Factory Default Value	200	Security Level	1	Change	×
FE-52	**Proportional parameter of Q-axis current loop**	Factory Default Value	300	Security Level	1	Change	×
Setting range	0~60000 (parameter identification and automatic calculation)						
FE-53	**DC brake stator resistance**	Factory Default Value	1	Security Level	2	Change	×
Setting range	0~60000						

FE-54	**Display speed filtering coefficient**	Factory Default Value	5	Security Level	1	Change	○
FE-55	**Display frequency filtering coefficient**	Factory Default Value	5	Security Level	1	Change	○
FE-56	**Display torque current filtering coefficient**	Factory Default Value	5	Security Level	1	Change	○
Setting range	0~10, with larger value, the filter depth will be larger, and the display will be more stable, but the delay will be increased						

FE-57	**Number of encoder wires**	Factory Default Value	1024	Security Level	0	Change	×
Setting range	1~8192						
FE-58	**Encoder type**	Factory Default Value	0	Security Level	0	Change	×
Setting range	0: ABZ incremental encoder						
FE-59	**AB phase sequence of ABZ incremental encoder**	Factory Default Value	0	Security Level	0	Change	○
FE-60	**UVW phase sequence of UVW encoder**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0: Positive 1: Negative						
FE-61	**Number of pole-pairs of rotary transformer**	Factory Default Value	1	Security Level	0	Change	×
Setting range	1~10000						
FE-62	**PG gear ratio denominator setting**	Factory Default Value	1	Security Level	0	Change	×
FE-63	**PG gear ratio molecular setting**	Factory Default Value	1	Security Level	0	Change	×
Setting range	0~1000						

🕮 Encoder interface board, such as SL-PG-3, is required for the use of encoder. See the section of encoder interface board for the wiring method.

🕮 When the encoder is connected to the motor shaft through gears and other speed shifting devices, it is necessary to set FE-62 “PG gear ratio denominator setting”, FE-63 “PG gear ratio molecular setting” correctly, and the relationship between the encoder speed and the motor speed is as follows:

Motor speed = encoder speed × FE-63 "PG gear ratio numerator setting" ÷ FE-62 "PG gear ratio denominator setting"

⚠ Attention : When setting the encoder gear ratio , the number of pole-pairs of motor shall be an integral multiple of "PG gear ratio denominator setting"/" PG gear ratio molecular setting".

FE-64	**PG speed measurement filtering time**	Factory Default	0.005s	Security Level	0	Change	○

		Value					
Setting range	0.000s ~ 2.000s						

🕮 FE-64 'PG speed measuring and filtering time': Encoder speed measuring requires FE-64 filtering, so FE-64 cannot be set too large when dynamic performance is required to be high.

FE-65	**PG mounting angle**	Factory Default Value	0.0°	Security Level	0	Change	○
Setting range	0~359.9°						

🕮 FE-65 "encoder installation angle": This function code is valid for all types of encoders and is used to set the angle of the encoder mounting origin relative to the magnetic pole. The encoder installation angle can be obtained regardless of no-load tuning or on-load tuning, and the installation angle needs to be re-identified after the encoder is reinstalled or replaced.

FE-66	**PG offline action**	Factory Default Value	2	Security Level	1	Change	○
Setting range	0: No action, 1: Alarm, 2: Fault and free stop						
FE-67	**PG offline detection time**	Factory Default Value	1.0s	Security Level	1	Change	○
Setting range	0.1s ~ 10.0s						

🕮 PG disconnection action: If the speed regulator's set frequency is greater than 0.5Hz and the encoder has no pulse generated within FE-67 "PG disconnection detection time", it will be deemed to be PG disconnection, and the disconnection action will be processed according to the settings of FE-66 "PG disconnection action". PG disconnection detection is only available for these with PG V/F control and PG vector control.

FE-68	**Signal Z enabling**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: Encoder signal Z is not used 1: Encoder signal Z is used						

🕮 FE-68 'Signal Z enabling': This function code is only meaningful if the encoder is an incremental encoder, and Z-signal correction is enabled by default to eliminate accumulated position deviation. In some cases, if the interference to the encoder signal Z is relatively large, it will cause galloping or motor output deterioration, and in serious cases, it may even report the encoder related fault, at this time, the FE-68 can be set to 0 to cancel the signal Z correction. After canceling the signal Z correction, although no encoder-related faults will be reported, if the signal AB has accumulated errors due to external interference (generally speaking, the signal Z is more susceptible to interference) or other reasons, it may eventually result in galloping. The best solution is to reduce the interference to the encoder signal by separating the encoder line from the power line, removing the interference source and adding the encoder magnetic ring.

FE-69	**Speed measurement under the mode without PG enabled**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: Disabled 1: Enabled						

🕮 FE-69 'speed measurement under the mode without PG enabled': This function enables the rotational speed measurement function in non-PG mode. The rotational speed measurement result can be viewed in FU-04 (unit: 0.1Hz).

FE-70	**PG mounting angle re-identification**	Factory Default Value	0	Security Level	0	Change	○
Setting range	0: Disabled 1: Enabled						

🕮 FE-70 'encoder installation angle re-identification': in FVC control mode, after the encoder is re-installed or the

position is adjusted, this position can be set to 1. After direct start, the installation angle will be automatically identified and the position will be 0.

⚠ Attention : It is required to ensure that the encoder is oriented correctly when using this function.

FE-74	**Overspeed frequency multiple**	Factory Default Value	120%	Security Level	0	Change	○
Setting range	0~200% is used to determine the overspeed alarm, in percentage of maximum frequency						
FE-75	**Overspeed detection time**	Factory Default Value	0.005s	Security Level	0	Change	○
Setting range	0.001s~0.600s						
FE-76	**Speed offset detection value**	Factory Default Value	10%	Security Level	0	Change	○
Setting range	0%~50%						
FE-77	**Speed offset detection time**	Factory Default Value	5.0s	Security Level	0	Change	○
Setting range	0.0s~60.0s						

6.15 FF Communication Parameters

FF-00	**Communication compatibility selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: None 1: Compatible with three generations of devices						
FF-01	**USER communication format**	Factory Default Value	2	Security Level	1	Change	○
Setting range	0: 8/N/1 1: 8/E/1 2: 8/O/1 3: 8/N/2						
FF-02	**USER communication baud rate**	Factory Default Value	4	Security Level	1	Change	○
Setting range	0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps						
FF-03	**USER correspondence address**	Factory Default Value	1	Security Level	1	Change	○
Setting range	0~247						
FF-10	**Communication process character 1 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-11	**Communication process character 2 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-12	**Communication process character 3 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-13	**Communication process character 4 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-14	**Communication process character 5 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-15	**Communication process character 6 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-16	**Communication process character 7 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-17	**Communication process character 8 selection**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Corresponding monitoring parameter 0~100						
FF-20	**Local address for CAN communicate**	Factory Default	1	Security Level	1	Change	×

		Value					
Setting range	1~63						
FF-21	**CAN communication baud rate**	Factory Default Value	1	Security Level	1	Change	×
Setting range	0: 1M 1: 500K 2: 250K 3: 125K 4: 100K 5: 50K						

🕮 The RS485 Modbus RTU protocol of SLANVERT high-voltage inverter consists of three layers: physical layer, data link layer, and application layer. The physical layer and data link layer adopt Modbus protocol based on RS485, and the application layer controls inverter operation, stop, parameter reading and writing and other operations.

🕮 The Modbus-RTU protocol is a master-slave protocol. The communication between the host and the slave has two types, i.e., the host requests, the slave replies, or hole is broadcasting, and slave is not answering. Only one device can transmit on the bus at any time, and the host polls the slave. The slave cannot send messages without receiving the command from the host. The host can send the command repeatedly if the communication is not correct. If no response is received within a given period of time, the polled slave is considered lost. If the slave cannot execute a certain message, it sends an exception message to the host.

🕮 Inverter parameter addressing method: the high 8 bits of 16-bit Modbus parameter address are the group number of parameters, and the lower 8 bits are the number in the group of the parameter, all of them are addressed in hexadecimal way. For example, the address of parameter F4-17 is 0411H. For communication variables (control words, status words, etc.), the parameter group number is 50 (32H). Note: Communication variables include inverter parameters that can be accessed by communication, special instruction variables for communication and special state variables for communication. Corresponding communication parameter group number of menu code is shown in the table below:

Menu code	Parameter group number	Menu code	Parameter group number	Menu code	Parameter group number	Menu code	Parameter group number
F0	0(00H)	F5	5(05H)	FA	10(0AH)	FF	15(0FH)
F1	1(01H)	F6	6(06H)	Fb	11(0BH)	Fn	16(10H)
F2	2(02H)	F7	7(07H)	Fc	12(0CH)	FP	17(11H)
—	—	—	—	Fd	13(0DH)	FU	64(40H)
F4	4(04H)	F9	9(09H)	—	—	—	—

🕮 Data type in communication: The data transmitted in communication is a 16-bit integer. The smallest unit can be seen from the decimal point position of the parameter in the parameter list. For example, for F0-06 'maximum frequency', the minimum unit is 0.01Hz, so for Modubus-RTU protocol, communication transmission 5000 represents 50.00Hz.

🕮 Communication command variable:

Name	Modbus address	Change	Explanation
Main control word	3200H	○	Bit 0: Running command, valid when writing in 1 Bit 1: Stop command, valid when writing in 1 Bit 2: Free stop command, valid when writing in 1 Bit 3: Fast stop command, valid when writing in 1 Bit 4: Fault reset command, valid when writing in 1 Bit 5: Not used Bit 6: Not used Bit 7: Not used Bit 8: Forward jogging, valid when it is 1 Bit 9: Reversed jogging, valid when it is 1 Bit 10: Not used Bit 11: Not used Bit 12: Not used Bit 13: Not used Bit 14: Host access permission Bit 15: Slave access permission
Communication set frequency	3201H	○	－320.00~320.00Hz
Host computer analog 1	3202H	○	Range: -100.00%~100.00%

Name	Modbus address	Change	Explanation
Host computer analog 2	3203H	○	

🕮 Communication state variables:

Name	Modbus address	Change	Explanation
Main status word	3210H	△	Bit 0: System ready sign Bit 1: System alarm sign Bit 2: System fault sign Bit 3: System operating sign Bit 4: Delay waiting and running sign Bit 5~7: Reserved Bit 8: High voltage hazard indication Bit 9: High voltage normal indication Bit 10: Forward running indication Bit 11: Reverse running indication Bit 12~14: Reserved Bit 15: Token-holding status
Fault code	3211H	△	
Process character 1 selection output	3212H	△	Corresponding to the content selected in FF-10
Process character 2 selection output	3213H	△	Corresponding to the content selected in FF-11
Process character 3 selection output	3214H	△	Corresponding to the content selected in FF-12
Process character 4 selection output	3215H	△	Corresponding to the content selected in FF-13
Process character 5 selection output	3216H	△	Corresponding to the content selected in FF-14
Process character 6 selection output	3217H	△	Corresponding to the content selected in FF-15
Process character 7 selection output	3218H	△	Corresponding to the content selected in FF-16
Process character 8 selection output	3219H	△	Corresponding to the content selected in FF-17
Alarm character (low-order 16 bits)	321AH	△	Detected via Fb-01, See page 148 for faults and solutions

🕮 The SBHQ high-voltage inverter supports Modbus protocol in RTU (remote terminal unit) mode. The supported functions are: function 3 (read multiple parameters, the maximum number of words is 50), function 16 (write multiple parameters, maximum number of words is 10), and function 8 (loop test). Among them, function 16 supports broadcasting (the address of the broadcast message is 0). The start and end of an RTU frame are marked by at least 3.5 character intervals (Baud rate of 19200bit/s and 38400bit/s: 2ms).

🕮 The format of RTU frames is as follows:

Slave address (1 byte)	Modbus function number (1 byte)	Data (multiple bytes)	CRC16 (2 bytes)

🕮 Function 3: multi-reading The range of the word to be read is 1-50.

🕮 Function 16: multi-writing The number of words written ranges from 1 to 10.

🕮 Function 8: Loop test, the test function number is 0000H, and the frame is required to be returned as it is.

🕮 Abnormal response: When the slave station cannot complete the request sent by the master station, it returns an abnormal response message.

6.16 FM Touch Screen Settings

Fault record: (address is in HEX format)

FM-00	**User login**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Input login password.						
FM-01	**User operation**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0: None 1: Initialize operator parameters 2: Initialize the administrator parameters and the parameters below						
FM-02	**Parameter protection level**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0→3 (0: invalid, other corresponding security levels)						
FM-03	**Administrator previous password**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0→65535						
FM-04	**Administrator new password**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0→65535						
FM-05	**Administrator new password**	Factory Default Value	0	Security Level	1	Change	○
Setting range	0→65535						
FM-11	**Software registration code**	Factory Default Value	0	Security Level	1	Change	○
Setting range	Enter the software registration code						
FM-12	**Software permissible time**	Factory Default Value	21600	Security Level	1	Change	○
Setting range	1→65535h						

6.17 Fault Recording

Fault record: (address is in HEX format)

Fault recording 1		Fault recording 2		Fault recording 3		Fault recording 4	
Address	Name	Address	Name	Address	Name	Address	Name
5000	Fault name	5020	Fault name	5040	Fault name	5060	Fault name
5001	Timestamp (high byte)	5021	Timestamp (high byte)	5041	Timestamp (high byte)	5061	Timestamp (high byte)
5002	Timestamp (low byte)	5022	Timestamp (low byte)	5042	Timestamp (low byte)	5062	Timestamp (low byte)
5003	Output current	5023	Output current	5043	Output current	5063	Output current
5004	Output voltage	5024	Output voltage	5044	Output voltage	5064	Output voltage
5005	Input current	5025	Input current	5045	Input current	5065	Input current
5006	Input voltage	5026	Input voltage	5046	Input voltage	5066	Input voltage
5007	Instantaneous output current value	5027	Instantaneous output current value	5047	Instantaneous output current value	5067	Instantaneous output current value
5008	Instantaneous output voltage value	5028	Instantaneous output voltage value	5048	Instantaneous output voltage value	5068	Instantaneous output voltage value
5009	Instantaneous input current value	5029	Instantaneous input current value	5049	Instantaneous input current value	5069	Instantaneous input current value
500A	Instantaneous input voltage	502A	Instantaneous input voltage	504A	Instantaneous input voltage	506A	Instantaneous input voltage
500B	Output current value before 2ms	502B	Output current value before 2ms	504B	Output current value before 2ms	506B	Output current value before 2ms
500C	Output voltage value before 2ms	502C	Output voltage value before 2ms	504C	Output voltage value before 2ms	506C	Output voltage value before 2ms
500D	Input current value before 2ms	502D	Input current value before 2ms	504D	Input current value before 2ms	506D	Input current value before 2ms
500E	Input voltage value before 2ms	502E	Input voltage value before 2ms	504E	Input voltage value before 2ms	506E	Input voltage value before 2ms
500F	Operating frequency	502F	Operating frequency	504F	Operating frequency	506F	Operating frequency
5010	Set frequency	5030	Set frequency	5050	Set frequency	5070	Set frequency
5011	Operating frequency before 2ms	5031	Operating frequency before 2ms	5051	Operating frequency before 2ms	5071	Operating frequency before 2ms
5012	Set frequency before 2ms	5032	Set frequency before 2ms	5052	Set frequency before 2ms	5072	Set frequency before 2ms
5013	Output power	5033	Output power	5053	Output power	5073	Output power
5014	Input power	5034	Input power	5054	Input power	5074	Input power
5015	System status information	5035	System status information	5055	System status information	5075	System status information
5016	Phase U unit 1~4 status	5036	Phase U unit 1~4 status	5056	Phase U unit 1~4 status	5076	Phase U unit 1~4 status
5017	Phase U unit 5~8 status	5037	Phase U unit 5~8 status	5057	Phase U unit 5~8 status	5077	Phase U unit 5~8 status
5018	Phase U unit 9~C status	5038	Phase U unit 9~C status	5058	Phase U unit 9~C status	5078	Phase U unit 9~C status
5019	Phase V unit 1~4 status	5039	Phase V unit 1~4 status	5059	Phase V unit 1~4 status	5079	Phase V unit 1~4 status
501A	Phase V unit 5~8 status	503A	Phase V unit 5~8 status	505A	Phase V unit 5~8 status	507A	Phase V unit 5~8 status
501B	Phase V unit 9~C status	503B	Phase V unit 9~C status	505B	Phase V unit 9~C status	507B	Phase V unit 9~C status
501C	Phase W unit 1~4	503C	Phase W unit 1~4	505C	Phase W unit 1~4	507C	Phase W unit 1~4

Fault recording 1		Fault recording 2		Fault recording 3		Fault recording 4	
	status		status		status		status
501D	Phase W unit 5~8 status	503D	Phase W unit 5~8 status	505D	Phase W unit 5~8 status	507D	Phase W unit 5~8 status
501E	Phase W unit 9~C status	503E	Phase W unit 9~C status	505E	Phase W unit 9~C status	507E	Phase W unit 9~C status
501F	Average voltage of the unit bus	503F	Average voltage of the unit bus	505F	Average voltage of the unit bus	507F	Average voltage of the unit bus

🕮 Inverter fault code and name are as follows:

0: No fault
1: HMI communication offline
2: User communication offline
3: PLC communication offline
4: Fan faulted
5: External fault
6: Abnormal stall protection
7: Power undervoltage
8: Power supply phase sequence error
9: Reserved
10: Output phase loss
11: Unit light fault
12: Motor heavy load
13: Reserved
14: Motor overspeed
15: Inverter overload
16: Analog signal AI1 offline
17: Analog signal AI2 offline
18: Analog signal AI3 offline
19: Temperature controller faulted
20: Abnormal power detected
21: Motor tuning fault
22~29: Reserved
30: Output overcurrent
31: Power supply overvoltage
32: Door-opening protection
33: Unit repeated failure
34: Abnormal main circuit
35: Transformer overtemperature
36: Locked-rotor fault
37: Inverter hardware failure
38~39: Reserved
40: Output phase error
41: Input overload protection
42: Motor underload protection
43~44: Reserved
45: Parallel chain fault
46~49: Reserved
50: Emergency stop fault

6.18 FU Data Monitoring

1200	**FU-00**	**Operating frequency**	Minimum unit	0.01Hz	Change	△
1201	**FU-01**	**Operation frequency percentage**	Minimum unit	0.01%	Change	△
1202	**FU-02**	**Set frequency**	Minimum unit	0.01Hz	Change	△
1204	**FU-04**	**Output measurement frequency**	Minimum unit	0.01Hz	Change	△
1207	**FU-07**	**PID feedback value**	Minimum unit	0.01%	Change	△
1208	**FU-08**	**PID set value**	Minimum unit	0.01%	Change	△
1209	**FU-09**	**PID output value**	Minimum unit	0.01%	Change	△
120B	**FU-11**	**AI1 input percentage**	Minimum unit	0.01%	Change	△
120C	**FU-12**	**AI2 input percentage**	Minimum unit	0.01%	Change	△
120D	**FU-13**	**AI3 input percentage**	Minimum unit	0.01%	Change	△
1212	**FU-18**	**Output current**	Minimum unit	0.1A	Change	△
1213	**FU-19**	**Output current percentage**	Minimum unit	0.01%	Change	△
1214	**FU-20**	**Input current**	Minimum unit	0.1A	Change	△
1215	**FU-21**	**Phase-R input current**	Minimum unit	1	Change	△
1216	**FU-22**	**Phase-S input current**	Minimum unit	1	Change	△
1217	**FU-23**	**Phase-T input current**	Minimum unit	1	Change	△
1218	**FU-24**	**Phase-U output current**	Minimum unit	1	Change	△
1219	**FU-25**	**Phase-V output current**	Minimum unit	1	Change	△
121A	**FU-26**	**Phase-W output current**	Minimum unit	1	Change	△
121F	**FU-31**	**Output voltage**	Minimum unit	1V	Change	△
1223	**FU-35**	**Output power**	Minimum unit	1KW	Change	△
1226	**FU-38**	**Input voltage**	Minimum unit	1V	Change	△
1227	**FU-39**	**Input power**	Minimum unit	1KW	Change	△

1228	**FU-40**	**Voltage of input RS line**	Minimum unit	1	Change	△
1229	**FU-41**	**Voltage of input ST line**	Minimum unit	1	Change	△
122A	**FU-42**	**Voltage of input TR line**	Minimum unit	1	Change	△
122B	**FU-43**	**Voltage of input UV line**	Minimum unit	1	Change	△
122C	**FU-44**	**Voltage of input VW line**	Minimum unit	1	Change	△
122D	**FU-45**	**Voltage of input WU line**	Minimum unit	1	Change	△
122E	**FU-46**	**Communication polling cycle**	Minimum unit	1	Change	△
122F	**FU-47**	**Times of communication error**	Minimum unit	1	Change	△
1231	**FU-49**	**Accumulated running time of fan**	Minimum unit	1	Change	△
1232	**FU-50**	**Digital input/output terminal status**	Minimum unit	1	Change	△
1234	**FU-52**	**Unit U1-4 status information**	Minimum unit	1	Change	△
1235	**FU-53**	**Unit U2-8 status information**	Minimum unit	1	Change	△
1236	**FU-54**	**Unit V1-4 status information**	Minimum unit	1	Change	△
1237	**FU-55**	**Unit V2-8 status information**	Minimum unit	1	Change	△
1238	**FU-56**	**Unit W1-4 status information**	Minimum unit	1	Change	△
1239	**FU-57**	**Unit W2-8 status information**	Minimum unit	1	Change	△
123A	**FU-58**	**Unit U9V9W9 status information**	Minimum unit	1	Change	△
123B	**FU-59**	**System fault code**	Minimum unit	1	Change	△
124A	**FU-74**	**Rated power of inverter**	Minimum unit	1KW	Change	△
124B	**FU-75**	**DSP software version No.**	Minimum unit	1	Change	△
1260	**FU-96**	**AO1 output percentage**	Minimum unit	0.01%	Change	△
1261	**FU-97**	**AO2 output percentage**	Minimum unit	0.01%	Change	△
1262	**FU-98**	**AO3 output percentage**	Minimum unit	0.01%	Change	△
1263	**FU-99**	**AO4 output percentage**	Minimum unit	0.01%	Change	△
1264	**FU-100**	**Manufacturer information**	Minimum unit	1	Change	△
Content description		Identify the manufacturer				
1265	**FU-101**	**Equipment ID**	Minimum unit	1	Change	△
Content description		Identify product type				
1266	**FU-102**	**Software ID**	Minimum unit	1	Change	△
Content description		Identify software version				
1267	**FU-103**	**Dynamic verification code**	Minimum unit	1	Change	△
Content description		Used for applying for dynamic passwords				
1268	**FU-104**	**System clock (low-order 16 bits)**	Minimum unit	1	Change	△
1269	**FU-105**	**System clock (high-order 16 bits)**	Minimum unit	1	Change	△
Content description		Taking the year of 1970 as the base number				
126A	**FU-106**	**System status (low-order 16 bits)**	Minimum unit	1	Change	△
126B	**FU-107**	**System status (high-order 16 bits)**	Minimum unit	1	Change	△
126C	**FU-108**	**Switch status (low-order 16 bits)**	Minimum unit	1	Change	△
126D	**FU-109**	**Switch status (high-order 16 bits)**	Minimum unit	1	Change	△
Content description		Corresponding to the primary circuit switch				
126E	**FU-110**	**Input watt-hour meter (low-order 16 bits)**	Minimum unit	1	Change	△
126F	**FU-111**	**Input watt-hour meter (high-order 16 bits)**	Minimum unit	1	Change	△

Content description		Input electricity measurement				
1270	**FU-112**	**Output watt-hour meter (low-order 16 bits)**	Minimum unit	1	Change	△
1271	**FU-113**	**Output watt-hour meter (high-order 16 bits)**	Minimum unit	1	Change	△
Content description		Output electricity measurement				
1272	**FU-114**	**Rated power**	Minimum unit	1KW	Change	△
1273	**FU-115**	**Rated input voltage**	Minimum unit	1V	Change	△
1274	**FU-116**	**Rated input current**	Minimum unit	1A	Change	△
1275	**FU-117**	**Rated output voltage**	Minimum unit	1V	Change	△
1276	**FU-118**	**Output current rating**	Minimum unit	1A	Change	△
1277	**FU-119**	**Service time of equipment**	Minimum unit	1h	Change	△
1278	**FU-120**	**Single operation time of the device**	Minimum unit	1h	Change	△
1279	**FU-121**	**Accumulated running time of fan**	Minimum unit	1h	Change	△
127A	**FU-122**	**Fault code**	Minimum unit	1	Change	△
127B	**FU-123**	**Alarm information (low-order 16 bits)**	Minimum unit	1	Change	△
127C	**FU-124**	**Alarm information (high-order 16 bits)**	Minimum unit	1	Change	△
127D	**FU-125**	**Login user level**	Minimum unit	1	Change	△
Content description		0: Application engineer 1: Technical engineer 2: Product manager 3: Specialist engineer				
127E	**FU-126**	**Current frequency channel source**	Minimum unit	1	Change	△
Content description		0: HMI 1: Communication 2: AI1 3: AI2 4: AI3 5: Reserved				
127F	**FU-127**	**Current start/stop channel source**	Minimum unit	1	Change	△
Content description		0: HMI 1: Communication 2: AI1 3: AI2 4: AI3 5: Reserved				
1280	**FU-128**	**DI terminal status**	Minimum unit	1	Change	△
1281	**FU-129**	**DO terminal status**	Minimum unit	1	Change	△
1283	**FU-131**	**Automatic restart remaining time**	Minimum unit	1	Change	△
Content description		Valid during automatic reset				
1284	**FU-132**	**Automatic restart remaining times**	Minimum unit	1	Change	△
Content description		Valid during automatic reset				
1285	**FU-133**	**Delay shutdown countdown (s)**	Minimum unit	1	Change	△
Content description		Alarm of delayed fault shutdown				
1286	**FU-134**	**Current control mode**	Minimum unit	1	Change	△
Content description		0: Not loaded 1: Asynchronous motor VF 2: Asynchronous motor vector 3: Synchronous motor VF 4: Synchronous motor vector 5: Permanent magnet synchronous 6: Power supply 7: Power generation supply 8: SVG control				
1295	**FU-149**	**Switch cabinet ID**	Minimum unit	1	Change	△
1296	**FU-150**	**Number of unit bypass layers**	Minimum unit	1	Change	△
1297	**FU-151**	**Unit bus voltage sum of phase U**	Minimum unit	1V	Change	△
1298	**FU-152**	**Unit bus voltage sum of phase V**	Minimum unit	1V	Change	△
1299	**FU-153**	**Unit bus voltage sum of phase W**	Minimum unit	1V	Change	△
129A	**FU-154**	**Unit U1 status information**	Minimum unit	1	Change	△
129B	**FU-155**	**Unit U2 status information**	Minimum unit	1	Change	△
129C	**FU-156**	**Unit U3 status information**	Minimum unit	1	Change	△

129D	**FU-157**	**Unit U4 status information**	Minimum unit	1	Change	△
129E	**FU-158**	**Unit U5 status information**	Minimum unit	1	Change	△
129F	**FU-159**	**Unit U6 status information**	Minimum unit	1	Change	△
12A0	**FU-160**	**Unit U7 status information**	Minimum unit	1	Change	△
12A1	**FU-161**	**Unit U8 status information**	Minimum unit	1	Change	△
12A2	**FU-162**	**Unit U9 status information**	Minimum unit	1	Change	△
Content description		Bit0-11: busbar voltage Bit12-15: state				
12A6	**FU-166**	**Unit V1 status information**	Minimum unit	1	Change	△
12A7	**FU-167**	**Unit V2 status information**	Minimum unit	1	Change	△
12A8	**FU-168**	**Unit V3 status information**	Minimum unit	1	Change	△
12A9	**FU-169**	**Unit V4 status information**	Minimum unit	1	Change	△
12AA	**FU-170**	**Unit V5 status information**	Minimum unit	1	Change	△
12AB	**FU-171**	**Unit V6 status information**	Minimum unit	1	Change	△
12AC	**FU-172**	**Unit V7 status information**	Minimum unit	1	Change	△
12AD	**FU-173**	**Unit V8 status information**	Minimum unit	1	Change	△
12AE	**FU-174**	**Unit V9 status information**	Minimum unit	1	Change	△
Content description		Bit0-11: busbar voltage Bit12-15: state				
12B2	**FU-178**	**Unit W1 status information**	Minimum unit	1	Change	△
12B3	**FU-179**	**Unit W2 status information**	Minimum unit	1	Change	△
12B4	**FU-180**	**Unit W3 status information**	Minimum unit	1	Change	△
12B5	**FU-181**	**Unit W4 status information**	Minimum unit	1	Change	△
12B6	**FU-182**	**Unit W5 status information**	Minimum unit	1	Change	△
12B7	**FU-183**	**Unit W6 status information**	Minimum unit	1	Change	△
12B8	**FU-184**	**Unit W7 status information**	Minimum unit	1	Change	△
12B9	**FU-185**	**Unit W8 status information**	Minimum unit	1	Change	△
12BA	**FU-186**	**Unit W9 status information**	Minimum unit	1	Change	△
Content description		Bit0-11: busbar voltage Bit12-15: state				
12BE	**FU-190**	**Temperature of unit U1 detection point 1 ℃**	Minimum unit	1	Change	△
12BF	**FU-191**	**Temperature of unit U2 detection point 1 ℃**	Minimum unit	1	Change	△
12C0	**FU-192**	**Temperature of unit U3 detection point 1 ℃**	Minimum unit	1	Change	△
12C1	**FU-193**	**Temperature of unit U4 detection point 1 ℃**	Minimum unit	1	Change	△
12C2	**FU-194**	**Temperature of unit U5 detection point 1 ℃**	Minimum unit	1	Change	△
12C3	**FU-195**	**Temperature of unit U6 detection point 1 ℃**	Minimum unit	1	Change	△
12C4	**FU-196**	**Temperature of unit U7 detection point 1 ℃**	Minimum unit	1	Change	△
12C5	**FU-197**	**Temperature of unit U8 detection point 1 ℃**	Minimum unit	1	Change	△
12C6	**FU-198**	**Temperature of unit U9 detection point 1 ℃**	Minimum unit	1	Change	△

12CA	**FU-202**	**Temperature of unit V1 detection point 1 ℃**	Minimum unit	1	Change	△
12CB	**FU-203**	**Temperature of unit V2 detection point 1 ℃**	Minimum unit	1	Change	△
12CC	**FU-204**	**Temperature of unit V3 detection point 1 ℃**	Minimum unit	1	Change	△
12CD	**FU-205**	**Temperature of unit V4 detection point 1 ℃**	Minimum unit	1	Change	△
12CE	**FU-206**	**Temperature of unit V5 detection point 1 ℃**	Minimum unit	1	Change	△
12CF	**FU-207**	**Temperature of unit V6 detection point 1 ℃**	Minimum unit	1	Change	△
12D0	**FU-208**	**Temperature of unit V7 detection point 1 ℃**	Minimum unit	1	Change	△
12D1	**FU-209**	**Temperature of unit V8 detection point 1 ℃**	Minimum unit	1	Change	△
12D2	**FU-210**	**Temperature of unit V9 detection point 1 ℃**	Minimum unit	1	Change	△
12D6	**FU-214**	**Temperature of unit W1 detection point 1 ℃**	Minimum unit	1	Change	△
12D7	**FU-215**	**Temperature of unit W2 detection point 1 ℃**	Minimum unit	1	Change	△
12D8	**FU-216**	**Temperature of unit W3 detection point 1 ℃**	Minimum unit	1	Change	△
12D9	**FU-217**	**Temperature of unit W4 detection point 1 ℃**	Minimum unit	1	Change	△
12DA	**FU-218**	**Temperature of unit W5 detection point 1 ℃**	Minimum unit	1	Change	△
12DB	**FU-219**	**Temperature of unit W6 detection point 1 ℃**	Minimum unit	1	Change	△
12DC	**FU-220**	**Temperature of unit W7 detection point 1 ℃**	Minimum unit	1	Change	△
12DD	**FU-221**	**Temperature of unit W8 detection point 1 ℃**	Minimum unit	1	Change	△
12DE	**FU-222**	**Temperature of unit W9 detection point 1 ℃**	Minimum unit	1	Change	△
12E2	**FU-226**	**Temperature of unit U1 detection point 2 ℃**	Minimum unit	1	Change	△
12E3	**FU-227**	**Temperature of unit U2 detection point 2 ℃**	Minimum unit	1	Change	△
12E4	**FU-228**	**Temperature of unit U3 detection point 2 ℃**	Minimum unit	1	Change	△
12E5	**FU-229**	**Temperature of unit U4 detection point 2 ℃**	Minimum unit	1	Change	△
12E6	**FU-230**	**Temperature of unit U5 detection point 2 ℃**	Minimum unit	1	Change	△
12E7	**FU-231**	**Temperature of unit U6 detection point 2 ℃**	Minimum unit	1	Change	△
12E8	**FU-232**	**Temperature of unit U7 detection point 2 ℃**	Minimum unit	1	Change	△
12E9	**FU-233**	**Temperature of unit U8 detection point 2 ℃**	Minimum unit	1	Change	△

12EA	**FU-234**	**Temperature of unit U9 detection point 2 ℃**	Minimum unit	1	Change	△
12EE	**FU-238**	**Temperature of unit V1 detection point 2 ℃**	Minimum unit	1	Change	△
12EF	**FU-239**	**Temperature of unit V2 detection point 2 ℃**	Minimum unit	1	Change	△
12F0	**FU-240**	**Temperature of unit V3 detection point 2 ℃**	Minimum unit	1	Change	△
12F1	**FU-241**	**Temperature of unit V4 detection point 2 ℃**	Minimum unit	1	Change	△
12F2	**FU-242**	**Temperature of unit V5 detection point 2 ℃**	Minimum unit	1	Change	△
12F3	**FU-243**	**Temperature of unit V6 detection point 2 ℃**	Minimum unit	1	Change	△
12F4	**FU-244**	**Temperature of unit V7 detection point 2 ℃**	Minimum unit	1	Change	△
12F5	**FU-245**	**Temperature of unit V8 detection point 2 ℃**	Minimum unit	1	Change	△
12F6	**FU-246**	**Temperature of unit V9 detection point 2 ℃**	Minimum unit	1	Change	△
12FA	**FU-250**	**Temperature of unit W1 detection point 2 ℃**	Minimum unit	1	Change	△
12FB	**FU-251**	**Temperature of unit W2 detection point 2 ℃**	Minimum unit	1	Change	△
12FC	**FU-252**	**Temperature of unit W3 detection point 2 ℃**	Minimum unit	1	Change	△
12FD	**FU-253**	**Temperature of unit W4 detection point 2 ℃**	Minimum unit	1	Change	△
12FE	**FU-254**	**Temperature of unit W5 detection point 2 ℃**	Minimum unit	1	Change	△
12FF	**FU-255**	**Temperature of unit W6 detection point 2 ℃**	Minimum unit	1	Change	△
1300	**FU-256**	**Temperature of unit W7 detection point 2 ℃**	Minimum unit	1	Change	△
1301	**FU-257**	**Temperature of unit W8 detection point 2 ℃**	Minimum unit	1	Change	△
1302	**FU-258**	**Temperature of unit W9 detection point 2 ℃**	Minimum unit	1	Change	△
1306	**FU-262**	**Temperature of unit U1 detection point 3 ℃**	Minimum unit	1	Change	△
1307	**FU-263**	**Temperature of unit U2 detection point 3 ℃**	Minimum unit	1	Change	△
1308	**FU-264**	**Temperature of unit U3 detection point 3 ℃**	Minimum unit	1	Change	△
1309	**FU-265**	**Temperature of unit U4 detection point 3 ℃**	Minimum unit	1	Change	△
130A	**FU-266**	**Temperature of unit U5 detection point 3 ℃**	Minimum unit	1	Change	△
130B	**FU-267**	**Temperature of unit U6 detection point 3 ℃**	Minimum unit	1	Change	△
130C	**FU-268**	**Temperature of unit U7 detection point 3 ℃**	Minimum unit	1	Change	△

130D	**FU-269**	**Temperature of unit U8 detection point 3 ℃**	Minimum unit	1	Change	△
130E	**FU-270**	**Temperature of unit U9 detection point 3 ℃**	Minimum unit	1	Change	△
1312	**FU-274**	**Temperature of unit V1 detection point 3 ℃**	Minimum unit	1	Change	△
1313	**FU-275**	**Temperature of unit V2 detection point 3 ℃**	Minimum unit	1	Change	△
1314	**FU-276**	**Temperature of unit V3 detection point 3 ℃**	Minimum unit	1	Change	△
1315	**FU-277**	**Temperature of unit V4 detection point 3 ℃**	Minimum unit	1	Change	△
1316	**FU-278**	**Temperature of unit V5 detection point 3 ℃**	Minimum unit	1	Change	△
1317	**FU-279**	**Temperature of unit V6 detection point 3 ℃**	Minimum unit	1	Change	△
1318	**FU-280**	**Temperature of unit V7 detection point 3 ℃**	Minimum unit	1	Change	△
1319	**FU-281**	**Temperature of unit V8 detection point 3 ℃**	Minimum unit	1	Change	△
131A	**FU-282**	**Temperature of unit V9 detection point 3 ℃**	Minimum unit	1	Change	△
131E	**FU-286**	**Temperature of unit W1 detection point 3 ℃**	Minimum unit	1	Change	△
131F	**FU-287**	**Temperature of unit W2 detection point 3 ℃**	Minimum unit	1	Change	△
1320	**FU-288**	**Temperature of unit W3 detection point 3 ℃**	Minimum unit	1	Change	△
1321	**FU-289**	**Temperature of unit W4 detection point 3 ℃**	Minimum unit	1	Change	△
1322	**FU-290**	**Temperature of unit W5 detection point 3 ℃**	Minimum unit	1	Change	△
1323	**FU-291**	**Temperature of unit W6 detection point 3 ℃**	Minimum unit	1	Change	△
1324	**FU-292**	**Temperature of unit W7 detection point 3 ℃**	Minimum unit	1	Change	△
1325	**FU-293**	**Temperature of unit W8 detection point 3 ℃**	Minimum unit	1	Change	△
1326	**FU-294**	**Temperature of unit W9 detection point 3 ℃**	Minimum unit	1	Change	△
132A	**FU-298**	**Unit U1 rectifier status**	Minimum unit	1	Change	△
132B	**FU-299**	**Unit U2 rectifier status**	Minimum unit	1	Change	△
132C	**FU-300**	**Unit U3 rectifier status**	Minimum unit	1	Change	△
132D	**FU-301**	**Unit U4 rectifier status**	Minimum unit	1	Change	△
132E	**FU-302**	**Unit U5 rectifier status**	Minimum unit	1	Change	△
132F	**FU-303**	**Unit U6 rectifier status**	Minimum unit	1	Change	△
1330	**FU-304**	**Unit U7 rectifier status**	Minimum unit	1	Change	△
1331	**FU-305**	**Unit U8 rectifier status**	Minimum unit	1	Change	△
1332	**FU-306**	**Unit U9 rectifier status**	Minimum unit	1	Change	△

1336	**FU-310**	**Unit V1 rectifier status**	Minimum unit	1	Change	△
1337	**FU-311**	**Unit V2 rectifier status**	Minimum unit	1	Change	△
1338	**FU-312**	**Unit V3 rectifier status**	Minimum unit	1	Change	△
1339	**FU-313**	**Unit V4 rectifier status**	Minimum unit	1	Change	△
133A	**FU-314**	**Unit V5 rectifier status**	Minimum unit	1	Change	△
133B	**FU-315**	**Unit V6 rectifier status**	Minimum unit	1	Change	△
133C	**FU-316**	**Unit V7 rectifier status**	Minimum unit	1	Change	△
133D	**FU-317**	**Unit V8 rectifier status**	Minimum unit	1	Change	△
133E	**FU-318**	**Unit V9 rectifier status**	Minimum unit	1	Change	△
1342	**FU-322**	**Unit W1 rectifier status**	Minimum unit	1	Change	△
1343	**FU-323**	**Unit W2 rectifier status**	Minimum unit	1	Change	△
1344	**FU-324**	**Unit W3 rectifier status**	Minimum unit	1	Change	△
1345	**FU-325**	**Unit W4 rectifier status**	Minimum unit	1	Change	△
1346	**FU-326**	**Unit W5 rectifier status**	Minimum unit	1	Change	△
1347	**FU-327**	**Unit W6 rectifier status**	Minimum unit	1	Change	△
1348	**FU-328**	**Unit W7 rectifier status**	Minimum unit	1	Change	△
1349	**FU-329**	**Unit W8 rectifier status**	Minimum unit	1	Change	△
134A	**FU-330**	**Unit W9 rectifier status**	Minimum unit	1	Change	△
134E	**FU-334**	**Unit U1 capacitance discharge time**	Minimum unit	1	Change	△
134F	**FU-335**	**Unit U2 capacitance discharge time**	Minimum unit	1	Change	△
1350	**FU-336**	**Unit U3 capacitance discharge time**	Minimum unit	1	Change	△
1351	**FU-337**	**Unit U4 capacitance discharge time**	Minimum unit	1	Change	△
1352	**FU-338**	**Unit U5 capacitance discharge time**	Minimum unit	1	Change	△
1353	**FU-339**	**Unit U6 capacitance discharge time**	Minimum unit	1	Change	△
1354	**FU-340**	**Unit U7 capacitance discharge time**	Minimum unit	1	Change	△
1355	**FU-341**	**Unit U8 capacitance discharge time**	Minimum unit	1	Change	△
1356	**FU-342**	**Unit U9 capacitance discharge time**	Minimum unit	1	Change	△
135A	**FU-346**	**Unit V1 capacitance discharge time**	Minimum unit	1	Change	△
135B	**FU-347**	**Unit V2 capacitance discharge time**	Minimum unit	1	Change	△
135C	**FU-348**	**Unit V3 capacitance discharge time**	Minimum unit	1	Change	△
135D	**FU-349**	**Unit V4 capacitance discharge time**	Minimum unit	1	Change	△
135E	**FU-350**	**Unit V5 capacitance discharge time**	Minimum unit	1	Change	△
135F	**FU-351**	**Unit V6 capacitance discharge time**	Minimum unit	1	Change	△
1360	**FU-352**	**Unit V7 capacitance discharge time**	Minimum unit	1	Change	△
1361	**FU-353**	**Unit V8 capacitance discharge time**	Minimum unit	1	Change	△
1362	**FU-354**	**Unit V9 capacitance discharge time**	Minimum unit	1	Change	△
1366	**FU-358**	**Unit W1 capacitance discharge time**	Minimum unit	1	Change	△
1367	**FU-359**	**Unit W2 capacitance discharge time**	Minimum unit	1	Change	△
1368	**FU-360**	**Unit W3 capacitance discharge time**	Minimum unit	1	Change	△
1369	**FU-361**	**Unit W4 capacitance discharge time**	Minimum unit	1	Change	△
136A	**FU-362**	**Unit W5 capacitance discharge time**	Minimum unit	1	Change	△
136B	**FU-363**	**Unit W6 capacitance discharge time**	Minimum unit	1	Change	△

136C	**FU-364**	**Unit W7 capacitance discharge time**	Minimum unit	1	Change	△
136D	**FU-365**	**Unit W8 capacitance discharge time**	Minimum unit	1	Change	△
136E	**FU-366**	**Unit W9 capacitance discharge time**	Minimum unit	1	Change	△
13A4	**FU-420**	**Set frequency**	Minimum unit	0.01Hz	Change	△
13A5	**FU-421**	**Operating frequency**	Minimum unit	0.01Hz	Change	△
13A6	**FU-422**	**Output measurement frequency**	Minimum unit	0.01Hz	Change	△
13A7	**FU-423**	**Output voltage**	Minimum unit	1V	Change	△
13A8	**FU-424**	**Output current**	Minimum unit	0.1A	Change	△
13A9	**FU-425**	**Output power**	Minimum unit	1kw	Change	△
13AA	**FU-426**	**Input voltage**	Minimum unit	1V	Change	△
13AB	**FU-427**	**Input current**	Minimum unit	0.1A	Change	△
13AC	**FU-428**	**Input power**	Minimum unit	1KW	Change	△
13AD	**FU-429**	**Motor rotation frequency**	Minimum unit	0.01Hz	Change	△
13AE	**FU-430**	**Grid measurement frequency**	Minimum unit	0.01Hz	Change	△
13AF	**FU-431**	**Power supply setting frequency**	Minimum unit	0.01Hz	Change	△
13B0	**FU-432**	**Power supply setting voltage**	Minimum unit	1V	Change	△
13B1	**FU-433**	**Effective voltage value pf phase R**	Minimum unit	1	Change	△
13B2	**FU-434**	**Effective voltage value pf phase S**	Minimum unit	1	Change	△
13B3	**FU-435**	**Effective voltage value pf phase T**	Minimum unit	1	Change	△
13B4	**FU-436**	**Effective current value pf phase R**	Minimum unit	1	Change	△
13B5	**FU-437**	**Effective current value pf phase S**	Minimum unit	1	Change	△
13B6	**FU-438**	**Effective current value pf phase T**	Minimum unit	1	Change	△
13C2	**FU-450**	**Operation frequency percentage**	Minimum unit	1%	Change	△
13C3	**FU-451**	**Set frequency percentage**	Minimum unit	1%	Change	△
13C4	**FU-452**	**Grid frequency percentage**	Minimum unit	1%	Change	△
13C5	**FU-453**	**Output voltage percentage**	Minimum unit	1%	Change	△
13C6	**FU-454**	**Output current percentage**	Minimum unit	1%	Change	△
13C7	**FU-455**	**Output Power Percentage**	Minimum unit	1%	Change	△
13C8	**FU-456**	**Input voltage percentage**	Minimum unit	1%	Change	△
13C9	**FU-457**	**Input current percentage**	Minimum unit	1%	Change	△
13CA	**FU-458**	**Input power percentage**	Minimum unit	1%	Change	△
13CB	**FU-459**	**AI1 input percentage**	Minimum unit	1%	Change	△
13CC	**FU-460**	**AI2 input percentage**	Minimum unit	1%	Change	△
13CD	**FU-461**	**AI3 input percentage**	Minimum unit	1%	Change	△
13CE	**FU-462**	**Simulated set percentage**	Minimum unit	1%	Change	△
13CF	**FU-463**	**Excitation current percentage**	Minimum unit	1%	Change	△
13E0	**FU-480**	**Permanent magnet control indication**	Minimum unit	1	Change	△
13EA	**FU-490**	**System readiness test**	Minimum unit	1	Change	△
13EB	**FU-491**	**Unit ready sign**	Minimum unit	1	Change	△
13EC	**FU-492**	**Redundant host control output**	Minimum unit	1	Change	△
13ED	**FU-493**	**Redundant host switching ready**	Minimum unit	1	Change	△
13EE	**FU-494**	**Redundant host communication is normal**	Minimum unit	1	Change	△

13EF	**FU-495**	**Redundant slave control output**	Minimum unit	1	Change	△
13F0	**FU-496**	**Redundant slave switching ready**	Minimum unit	1	Change	△
13F1	**FU-497**	**Redundant slave communication is normal**	Minimum unit	1	Change	△
13F2	**FU-498**	**Redundant host/slave settings for the machine**	Minimum unit	1	Change	△
13F9	**FU-505**	**Voltage sag counter**	Minimum unit	1	Change	△
13FA	**FU-506**	**CAN error counter**	Minimum unit	1	Change	△
13FB	**FU-507**	**Communication error counter**	Minimum unit	1	Change	△
13FC	**FU-508**	**PLC sending data 1**	Minimum unit	1	Change	△
13FD	**FU-509**	**PLC sending data 2**	Minimum unit	1	Change	△
13FE	**FU-510**	**PLC receiving data 1**	Minimum unit	1	Change	△
13FF	**FU-511**	**PLC receiving data 2**	Minimum unit	1	Change	△

7. Troubleshooting and Exception Handling

7.1 Faults of Inverter and Solutions

Table for faults and solutions:

Fault code	Fault Type	Possible fault causes	Troubleshooting Methods
1	HMI communication fault	The communication line is disconnected or parameters are wrong	Check the communication line or seek for service
2	User communication offline	Communication parameters are not properly set	Check the FF menu setting
		There is severe communication interference	Check the wiring and grounding of communication loop
		Upper computer is not working	Check the upper computer and wiring
3	PLC communication offline	The communication line is disconnected or parameters are wrong	Check the communication line or seek for service
4	Fan failure	Contactor damage or circuit fault of control fan	Replace the contactor or check the control circuit
5	External fault	External fault terminal is closed	Solve the external fault
6	Abnormal stall protection	The stall condition lasts for 1 minute	Set the operating parameters correctly
		PG is connected reversely which causes overspeed	Check PG wiring
7	Power supply undervoltage	Input voltage is abnormal or power fails during operation	Inspect the input power supply and wiring
		There is heavy load impact	Check the load
		Input phase loss	Inspect the input power supply and wiring
8	Power phase sequence error		Replace the input phase sequence
10	Output phase loss	Output phases U, V and W are lost	Check the output wiring; check the motor and cable
11	Unit light fault		
12	Motor heavy load	Motor current exceeds the overload detection level and is beyond the detection time	Check the load Check the overload protection setting
14	Motor overspeed		
15	Overload of inverter	Excessive load	Check the load or select large-power inverter
		Temperature of inverter is too high	Check fans, air ducts and ambient temperature
		Acceleration time is too short	Extended acceleration time.
		Carrier frequency is too high	Reduce the carries frequency or select the inverter with larger capacity
		V/F curve is improper	Adjust the V/F curve and the torque boost
		Restart the rotating motor	Set to the speed track starting or restart after the motor is completely stopped
		Input voltage too low	Check input voltage
16	Analog signal AI1 offline	The connection is lost or external equipment is damaged	Check the external connection and equipment

Fault code	Fault Type	Possible fault causes	Troubleshooting Methods
17	Analog signal AI2 offline		
		The threshold of connection loss is not properly set	Check the settings of the Fb-35
18	Analog signal AI3 offline		
19	Fault of temperature controller		
20	Abnormal power detected		
21	Motor tuning fault		
30	Output overcurrent	There is phase fault or short circuit to ground inside the motor or wiring	Check the motor and wiring
		The starting voltage is too high	Check the torque boost setting
		Acceleration time is too short	Extended acceleration time.
		V/F curve is improper	Adjust the V/F curve or the torque boost setting
		Restart the rotating motor	Set to the speed track starting; restart after the motor is completely stopped
		Power grid voltage is low	Inspect input power
		Deceleration time is too short	Extend deceleration time
		There is potential energy load or the inertia torque is too large	Equip proper dynamic braking assembly outside
		Abnormal load	Inspect the load
		The power of inverter is too small	Use the inverter with large power class
31	Power supply overvoltage	Input voltage is abnormal	Inspect input power
		Restart the rotating motor	Set to the speed track starting; restart after the motor is completely stopped
		There is potential energy load or the load inertia is too large	Select proper dynamic braking assembly outside
		The motor runs abnormally and has vibration	Adjust the F2-03 parameter to reduce vibration
		The time of acceleration and deceleration is too short	Extend the time of acceleration and deceleration properly
		Load inertia is too large	Adopt the dynamic braking assembly
		Voltage detection circuit is in failure	Seek for service
32	Door-opening protection	The cabinet door is not closed or travel switch is damaged	Check the closing state of cabinet door and check the travel switch and its connection point
33	Unit repeated failure		
34	Abnormal main circuit		
35	Phase-shifting transformer overtemperature	Ambient temperature too high	Decrease the ambient temperature
		Air ducts are blocked or fans are damaged	Clean the air ducts or replace the fans
		Excessive load	Check the load or select large-power inverter
36	Locked-rotor fault		
37	Inverter hardware failure		

Fault code	Fault Type	Possible fault causes	Troubleshooting Methods
40	Output phase error		
41	Input overload protection		
42	Motor underload protection		
45	Parallel chain fault		
50	Emergency stop fault	There is external fault input	Check peripheral equipment

7.2 Alarms of Inverter and Solutions

Table for alarms and solutions:

Alarm Name	Content and Description	Solutions	Corresponding Bits of Alarm Characters
External alarm	External alarm signal is valid		Bit0
communication offline	Communication timeout	Refer to solutions to corresponding faults	Bit2
Touch screen offline	Communication disconnection or wrong parameters	Refer to solutions to corresponding faults	Bit3
PLC communication offline	Communication disconnection or wrong parameters	Refer to solutions to corresponding faults	Bit4
Unit bypass	Power unit occurs faults and operates with low voltage due to by-pass of inverter	Record the fault information and handle it after the inverter is shut down.	Bit5
ID of PLC is not matched		Check whether the ID of PLC is matched	Bit6
Cabinet door opening	Cabinet door is not closed and detection switch is broken	Refer to solutions to corresponding faults	Bit7
One abnormal circuit of control power	One circuit of control power has no output or is in fault as detected	Check the wiring of control power	Bit8
Abnormal alarm of fan			Bit9
Fan life alarm			Bit10
Alarm for overspeed of motor			Bit11
Output phase loss	Output phase loss	Refer to solutions to corresponding faults	Bit12
AI1 is offline	Analog input signal is lower than the connection loss threshold	Refer to solutions to corresponding faults	Bit13
AI2 is offline	Analog input signal is lower than the connection loss threshold	Refer to solutions to corresponding faults	Bit14
AI3 is offline	Analog input signal is lower than the connection loss threshold	Refer to solutions to corresponding faults	Bit15

Transformer over-temperature alarm	Air intake of transformer cabinet is blocked; cooling fan of transformer cabinet is broken; output overload	Refer to solutions to corresponding faults	Bit16
Fault of temperature controller			Bit17
Motor overload alarm	Motor current exceeds the overload detection level and is beyond the detection time	Refer to solutions to corresponding faults	Bit18
Synchronous optical fiber is offline			Bit19
Inverter overload alarm	Output current of inverter is larger than the overload protection level and beyond the detection time	Refer to solutions to corresponding faults	Bit20

7.3 Abnormal Operation of the Inverter and Solutions

Table for abnormal operation and solutions:

Phenomenon	Conditions	Possible Causes	Solutions
The HMI does not respond	Some keys or all keys have no response	Connecting line of human-computer interface has poor contact	Check the connecting line and seek for service from our company
		No operating authorization	
		Human-computer interface is damaged	Change the human-computer interface
Parameters cannot be modified	Partial parameters cannot be modified	Insufficient security level	Enter the password corresponding to the level
		Attributes of parameters are changed to read only	Users cannot modify parameters that can only be read
	No modification under operating state	Attributes of parameters are changed to no modification under operating state	Modify them under standby mode
Inverter stops accidentally in operation	inverter stops automatically without shutdown order	Faulty	Find out fault causes and reset faults
		PLC cycle completed	Check PLC parameter setting
		Operation command channel switch	Check operation and state of operation command channel
	Motor stops automatically without shutdown order	It's in the fault automatic reset period	Check the setting of fault automatic reset and fault causes
		It's in PLC suspended state	Check PLC function setting
		Operation interruption	Check the interruption setting
		Set frequency is 0, under zero frequency operation	Check the set frequency
		PID direct action, feedback＞set PID reverse action, feedback＜set	Check the feedback and set PID
The inverter	inverter	Digital input 19 "free stop" is valid	Check the free shutdown terminal

cannot start	cannot be started under the command	Digital input 20 "start prohibited" is valid	Check the operation prohibition terminal of inverter
		Shutdown button is not closed under the control mode of three-wire 1 and 2 or two-wire 3	Check the shutdown button and connection
		Wrong operation command channel	Modify the operation command channel
		Inverter is in fault	Troubleshooting
		The logic of input terminal is set improperly	Check F4-09 settings

8. Maintenance and After-sales Service

Danger

1. Only professionally trained personnel can disassemble components, perform maintenance and replace components;
2. Before inspection and maintenance, please make sure that the converter has been disconnected from the power supply, the high-voltage indicator lights are off and wait a few minutes for full discharge inside the converter, otherwise there will be electric shock danger;
3. Do not leave screw, washer and other metal parts in the machine, otherwise equipment may be damaged and there will be fire risks;
4. After replacing the control board, relevant parameters must be set before operation, otherwise equipment may be damaged.

8.1 Daily Care and Maintenance

It is necessary to periodically check the inverter and its operating environment because faults may be caused by dust, humidity, vibration and other factors in the environment, as well as aging and failure of devices. Maintaining a good operating environment, recording daily operation data, and finding out abnormal phenomena early are good ways to prolong the service life of the inverter. Following aspects shall be inspected in the daily maintenance of inverter:

1. Whether the operating environment of inverter is in conformity with requirements;

2. Whether operating parameters of inverter are within the specified range;

3. Whether there is abnormal vibration or sound;

4. Whether there is abnormal smell;

5. Whether the fan rotates normally;

6. Whether the input voltage is within the specified range and voltage of each phase is in balance.

8.2 Regular Maintenance

Users can inspect the inverter regularly once every three/six months as per the using environment. Inspection contents are as follows generally:

1. Whether screws of control terminals are loosened;

2. Whether terminals of main loop are in poor contact, and whether the copper bar joints are overheated;

3. Whether power cables and control cables are damaged, especially the surface contacting with metal surface, whether there are scratches;

4. Whether the insulation binder of cold-pressed terminal of power cable has fallen off;

5. The dust in circuit board and air duct shall be cleaned thoroughly, and the dust collector shall be used for the best;

6. Inverters stored for a long time must go through one power-on test within two years, which shall last for nearly five hours; a voltage regulator shall be used to increase the voltage to rated value slowly without load.

Danger **: If the insulation test of the motor is carried out, the connection between the motor and the inverter must be disconnected, otherwise the inverter will be damaged.**

Danger : **The control circuit shall not go through the withstand voltage test and insulation test, or circuit components will be damaged.**

8.3 Replacement for Vulnerable Parts of Inverter

Vulnerable parts of the inverter mainly include filtering electrolytic capacitors and cooling fans, with service life closely related to the operating environment and maintenance status. Users can determine whether the vulnerable parts need to be replaced according to the operating time.

◆ Cooling fan

Possible damage causes: Bearing wear and blade aging (the service life of fan is generally 30,000-40,000 hours).

Determination criteria: whether there are cracks on fan blades and abnormal vibration sound when starting the machine.

Replacement precautions:

1. Replace the fan with the model specified by the manufacturer (rated voltage, current, speed, and air volume must be the same);

2. The direction marked on the fan must be consistent with the supply air direction of the fan;

3. Ensure to install the protective cover.

◆ Filter electrolytic capacitor

Possible cause of damage: High ambient temperature, frequent load jump, resulting in increased pulsating current, electrolyte aging.

Determination criteria: whether there is liquid leakage, whether the safety valve has bulged, the determination of electrostatic capacitance and insulation resistance.

It is recommended to replace the busbar electrolytic capacitor every 4 to 5 years.

8.4 Storage of the Inverter

After the user purchases the inverter, the following aspects must be paid attention to for temporary storage and long-term storage:

◆ Avoid storage in places with high temperature, high humidity, and dust and metal dust;

◆ Long-time storage will lead to deterioration of electrolytic capacitor, it must be guaranteed to be powered at least once for 5h every time within 2 years, the input voltage must be increased slowly to the rated value with the voltage regulator.

8.5 After-sale Service

The warranty period of the product is 12 months from the date of purchase, but repair is paid even within the warranty period in the following cases.

1. Damage caused by failure to operate and use according to user's manual;

2. Man-made damage caused by self-modification;

3. Damage caused by use beyond the requirements of standard specifications;

4. Damage caused by falling down after purchase or damage caused in transport;

5. Damage caused by fire, flood, abnormal voltage, strong lightning strike, etc.

In case of abnormal working conditions of the inverter, check and adjust according to the Manual. Inn case of fault, please contact the Company in time. Within the warranty period, the Company will provide free repair service for any fault due to the product manufacturing and design defects, and any defect beyond the warranty period will be repaired by the Company after being paid according to customer requirements.

9. Options

The optional accessories listed below, if necessary, please place orders from us.

9.1 Encoder Interface Board (SL-PG-3)

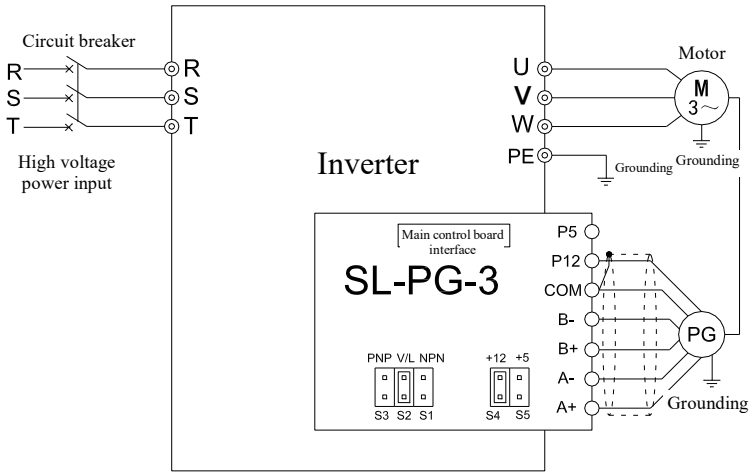
The encoder interface board functions to receive the encoder signal so that the inverter can perform PG V/F control or PG vector control.

Installation method: (1) Confirm that the power supply of the inverter is cut off; (2) Insert the large end of plastic column attached to the interface board into the main control board; (3) Align the socket on the interface board with the pin (J12) on the interface of the main control board, align the two mounting holes on the interface board with the placed plastic column, and press down.

The encoder interface board can be adapted to almost all encoders of output forms: open collector (NPN, PNP), voltage type, complementary push-pull type and differential output type. The encoder interface board provides 12V and 5V isolated power supply.

⚠ Attention: The interface type and power supply of the encoder must be correctly selected through the jumper. The factory jumper: 12V, NPN encoder.

Basic wiring is as follows (take the 12V differential output encoder as an example):

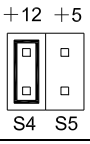
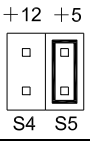


The functions and specifications of the encoder interface board terminals are as follows:

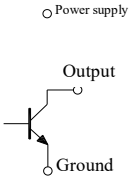
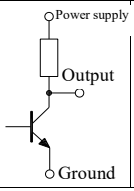
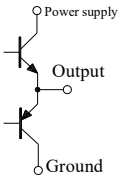
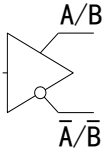
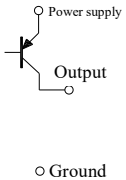
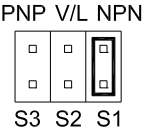
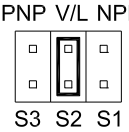
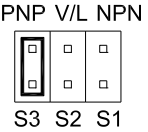
Terminal Symbol	Terminal Name	Terminal Function & Description	Technical Specifications.
Z+	Encoder terminal Z+ input	Encoder Z same-phase signal input	Maximum input frequency: 390kHz; The single-channel encoder is only connected to the A channel; Non-differential input type must be connected from A+ or B+ and A- and B- shall be overhead.
Z−	Encoder terminal Z- input	Encoder Z phase signal input	
A+	Encoder terminal A+ input	Encoder A same-phase signal input	
A−	Encoder terminal A- input	Encoder A phase signal input	
B+	Encoder B+ input	Encoder B same-phase signal input	

Terminal Symbol	Terminal Name	Terminal Function & Description	Technical Specifications.
	terminal		
B—	Encoder B- input terminal	Encoder B phase signal input	
COM	Power ground	P12 and P5 power supplies and input signal ground are isolated from the main control board GND	—
P12	12V power terminal	12V power supply for users	Maximum output current 80mA
P5	5V power terminal	5V power supply for user	Maximum output current 200mA

The instructions for using the power jumper of the encoder interface board are as follows:

Power supply	12V	5V
Jumper position		

The instructions for using the output type jumper of the encoder are as follows:

Type	NPN type	Voltage type	Complementary push-pull type	Differential output type	PNP type
Output structure					
Jumper position					

⚠ Attention	1. Check whether the coaxiality of the connection between the mechanical shaft and the encoder meets the requirements. If not, torque fluctuation and mechanical vibration will occur. 2. It is recommended to use a shielded twisted pair to connect the encoder and the encoder interface board. The shielding layer of the shielded line close to the inverter end must be connected to the COM of the encoder interface board. 3. The encoder signal line and power line must be separated, otherwise electric magnetic interference will affect the output signal of the encoder. 4. The grounding of the encoder shell can reduce interference.

The contents of this manual are subject to change without notice

Hope Senlan Science And Technology Holding Corp., Ltd.
Email: info@dlhope.com
Site: www.slanvert.com
Tel: +86 028 8565 3587
Address: No. 1599, Konggang 2 road, Xi HangGang Economic Development Zone, Chengdu, Sichuan Province, China.