User Manual

iMaster.HC10
0.75KW-22KW

Version: 1.1

Table of Contents

1. Safety Precautions

Please read this manual carefully before transportation, installation, operation and maintenance of this product, and follow all safety precautions in this manual in any of the practices; if fail to do so, it may introduce the risk of personal injury (including the potential for death) or equipment damage.

We will not be liable for any injuries and equipment damage caused by your or your customer's negligence and failure to follow our instructions.

1.1. Security information definition

Danger: Failure to comply with relevant requirements may cause serious personal injury and even death.

Warning: Failure to comply with relevant requirements may result in personal injury or equipment damage.

Notice: Steps need to be taken to ensure correct operation.

Trained and qualified professionals: The staff who have passed required professional electrical training and safety education to become familiar with the installation, commission, operation and maintenance of this equipment and the knowledge to avoid all kinds of emergency situations.

1.2. Warning signs

The warnings are used to warn the situations that may cause serious personal injury or equipment damage with suggestions to avoid said risk.

The following warning signs are the ones used in this manual:

Sign	Name	Description
	Danger	Failure to comply with the relevant requirements will cause serious personal injury and even death.
	warning	Failure to comply with relevant requirements may lead to personal injury or equipment damage.
	Static sensitive	Failure to comply with relevant requirements may damage the PCBA board.
	High temperature	The base of the inverter generates high temperature. Do not touch that area.
NOTICE	NOTICE	Steps need to be taken to ensure correct operation.

1.3. Safety guidance

Only trained and qualified personnel are allowed to perform related operations.

Do not perform wiring, inspection, and replacement of components while the power is on.Before wiring and checking, first must ensure that all input power has been disconnected, and then wait at least 10 minutes or check if the DC bus voltage is lower than 36V.

Unauthorized modification of the inverter is strictly prohibited; otherwise it may cause fire, electric shock or injuries.

When the machine is running, the base of the radiator may generate high temperature. Do not touch that area to avoid burns.

The electronic components in the inverter are electrostatic sensitive. Anti-static measures must be taken during operation.

1.3.1. Handling and installation

Do not install the inverter on flammable materials nor adhere to flammable materials. Connect the brake options according to the wiring diagram.

Do not operate the inverter if there is any damage or missing part.

To reduce the risk of electric shock, do not touch the inverter directly or with any wet objects.

NOTICE:

- The tools for transportation and installation shall satisfy all requirements to ensure the normal and safe operation of the inverter and to avoid personal injury, while the installer must take proper mechanical protection such as anti-smashing shoes and working clothes to ensure personal safety,.
- Do not only hold the front cover during transportation or it may be separated accidently.
- Lift and handle the product gently during transportation and installation, otherwise it may be damaged.
- It must be installed in a place that can keep it away from children and public.
- If the installation site is located in a place whose height above sea level is more than 2000m, the inverter cannot satisfy the IEC61800-5-1 requirements for proper low voltage protection.
- Install this product in a suitable environment (see "Installation Environment" chapter for details).
- Prevent screws, cables and any other conductive objects from falling into the inverter.
- When the inverter is running, the leakage current may exceed 3.5mA. Be sure to apply reliable grounding measures, where the ground resistance shall be less than 10Ω and the conductivity (or the cable cross-section area) of the PE grounding conductor and that of the phase conductors are the same.
- The R、S、T/L、N terminals are for the power input, while the U, V, and W are for the output. Please connect the input power cables and the output cables correctly; otherwise the inverter will be damaged.

1.3.2. Commission and operation

Before wiring the inverter terminals, must cut off all connected power and then wait at least 10 minutes.

When the inverter is in operation, it contains and carries high voltage. Any operation or setting not completely rely on keyboard operation is forbidden.

This product is not intended for and cannot be used as an "emergency stop measure". For emergency motor braking purpose, an extra mechanical brake apparatus must be applied.

NOTICE:

- Do not switch the input power of this product ON/OFF in a short interval.
- Before reusing this product after a long period of storage, perform a thorough inspection, capacitor setting, and trial operation.
- Before starting the inverter, must put the front cover back in order to reduce the risk of electric shock.

1.3.3. Inspection, maintenance and component replacement

The maintenance, inspection or component replacement of the inverter must be carried out by trained and qualified professionals.

Before any maintenance, inspection or component replacement, all power supplies connected to the inverter must be cut off and then wait at least 10 minutes.
During any maintenance, maintenance and component replacement, proper measures must be taken to prevent conductive objects such as screws and cables from falling into the inverter along with anti-static measures for protecting the inverter and its internal components.

NOTICE:

- Tighten the screws with proper torque.
- During maintenance, inspection and component replacement, avoid contact with the inverter and its components and do not carry nor wear flammable materials.
- Do not perform insulation withstand voltage test on this product, nor use a megohmmeter to test the control circuit of the inverter.

1.3.4. Disposal

The components in the inverter contain heavy metals. The inverter to be disposed must be treated and handled as industrial waste.

NOTICE:

- The components in the inverter may explode when burned.
- Plastic parts such as panels generate poisonous gas when burned.
- Do not dispose the inverter at will. Its disposal requires special treatment.

2. Product Introduction

2.1. Quick start

2.1.1. Unpack and inspection

After receiving the product, you need to inspect the followings:

- Does the package appear intact with no sign of damp? If not, please contact us.
- Is the model identification printed on the package consistent with your purchase order? If not, please contact us.
- Unpack and check whether there is any abnormality such as water stains inside the packing box and whether there is any sign of damage or crack on the machine shell. If any abnormality or damage found, please contact us.
- Is the nameplate on the product consistent with the model identification printed on the box? If not, please contact us.
- Is there any accessory missing (including the manual and keyboard, etc.)? If so, please contact us.

2.1.2. Usage confirmation

When customers formally start using the inverter, please confirm:

- What is the type of load that the inverter will drive? And will the inverter be overloaded in actual operation?
- Does the inverter need to amplify it power level?
- Is the actual motor current value less than the rated current value of the inverter?
- Is the control accuracy required by the motor can be satisfied by the inverter?
- Is the grid voltage consistent with the rated voltage of the inverter?

2.1.3. Environment confirmation

Before the installation and useage of the inverter, please confirm the followings:

- Does the ambient temperature of the inverter exceed 40°C? If so, derate the capacity at a rate of 1% for every 1°C increase. Furthermore, do not use the inverter in an environment above 50°C.

  NOTICE: For the inverter installed in a cabinet, the ambient temperature above mentioned shall be the air temperature inside the cabinet.

- Is the ambient temperature of the inverter lower than -10°C? If so, please add heating devices.

  NOTICE: For the inverter installed in a cabinet, the ambient temperature above mentioned shall be the air temperature inside the cabinet.

- If the inverter's installation site is located at a place whose altitude is more than1000m and does not exceed 3000m, derate the capacity at a rate of 1% for every 100m increase; If the altitude exceeds 2000m, connect an isolation transformer at the input side of the inverter; If it is more than 3000m and does not exceed 5000m, consult us for technical advice; If more than 5000m,

the inverter is not recommended.

- Does the ambient humidity of the inverter's installation site exceed 90%? Is there any sign of condensation? If so, you need to take some extra measures to protect inverter from humidity.
- Is there any sign of direct sunlight or creature intruder in the inverter's site? If so, you need to take extra measures to protect the inverter from such.
- Is there dust, explosive and flammable gas in the inverter's site? If so, you need to take extra measures to protect the inverter from such.

2.1.4. Installation confirmation

After the inverter is installed, check the installation to confirm following points:

- Do the current capacity of the input power cable and also that of motor cable meet the actual load requirement?
- Are the accessories for the inverter (Including input reactor, input filter, output reactor, output filter, and braking resistor) selected and installed correctly? Do the cables used to connect those accessories meet their current capacity requirements?
- Is the inverter installed on flame-retardant materials? Are the heat-generating accessories (reactors, braking resistors, etc.) of the inverter set away from flammable materials?
- Are all control cables so routed that they are separate from power cables? Does the wiring fully consider the EMC characteristic requirements?
- Are all grounding measures properly grounded in accordance with the requirements of the inverter?
- Is the inverter so installed that there is enough space left around it as instructed in the manual?
- Is the inverter installed in the way instructed in the manual? Try to install it in vertical position if possible.
- Are the external wiring terminals of the inverter fixed tightly with the torque required?
- Is there any screw, cable, or other conductive objects left in the inverter? If so, please remove it.

2.1.5. Basic commission

Before putting the inverter into operation, follow the steps below to complete the basic commission:

- Is the self-learning feature required here? If there is such necessity, please disconnect the motor load to activate the dynamic parameter self-learning; if it is not possible to disconnect the load, choose the static self-learning feature.
- Adjust the acceleration and deceleration intervals according to the actual load conditions.
- Confirm whether the motor rotation direction is consistent with the requirement by inching activating the motor. If it is opposite, it is recommended to change the direction by switching any two of the motor's three phase cables.
- Set all control parameters and put the system into operation to verify their accuracy.

2.2. Specifications

Functional Descriptions	Specifications
AC INPUT	
Input Voltage	AC,1PH,220V(-15%) ~ 240V(+10%) AC,3PH,380V(-15%) ~ 440V(+10%)
Rated Frequency	50/60 Hz
Frequency Range	±5% (47.5 ~ 63Hz)
DC INPUT	
Input Dc voltage dc	450VDC
	800VDC
Recommended VOC voltage range	360～430VDC
	550~750VDC
Recommended MPPT	250～350VDC
	450~600VDC
Voltage range	160～450VDC (parameter adjustable)
	300~800VDC (parameter adjustable)
OUTPUT	
Output Voltage	0- Input Voltage
Maximum Output Frequency	0.1 ~ 500HZ
Output Power	Please refer to Rated Parameter table
Output Current	Please refer to Rated Parameter table
BASIC PARAMETERS	
Highest frequency	Vector control: 0～500Hz
	V/F control：0～500Hz
Carrier frequency	0.8KHz~8KHz(Support up to 16KHz carrier frequency)
	Adjusted automatically according to the load characteristics.
Input frequency resolution	Digital setting: 0.01Hz
	Analog setting: Highest frequency×0.025%
Control mode	Open-loop vector control (SVC) V/F control
Starting torque	0.5Hz/150% (SVC)
Adjustable speed ratio	1：100 (SVC)
Speed control accuracy	±0.5% (SVC)
Overload capability	150% of rated current: 60 seconds 170% of rated current: 12 seconds 190% of rated current: 1.5 seconds
Torque boost	Auto torque boost; Range of manual torque boost 0.1%~30.0%
V/F curve	Three types: Linear, Multi-point, square curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
V/F separation	Full separation, Half separation
Acceleration and deceleration time	Linear and S-curve acceleration and deceleration modes available. The range of acceleration and deceleration time is 0.0~6500.0s.
DC braking	DC braking frequency: 0.00Hz ~ Maximum frequency

	Braking time: 0.0s~36.0s
	Braking current value: 0.0%~100.0%
JOG control	JOG frequency range: 0.00Hz ~ Maximum frequency (5Hz in default).
	JOG acceleration and deceleration time: 0.0s~6500.0s.
Built-in PID	Simplify the establishment of a closed-loop control system
Automatic voltage regulation (AVR)	Keep the output voltage in stable when the grid voltage fluctuates.
Stall prevention from overvoltage and overcurrent	The current and voltage are limited automatically during operation to prevent frequent tripping due to over-current and over-voltage.
Rapid current limit	Reduce the risk of over-current faults to keep inverter operated normally.
Torque limit and control	Limit the torque automatically during operation to prevent frequent tripping due to over-current.
SPECIAL FEATURES	
Deceleration to stop	In case of power loss, the energy from load feedback is used to compensate and decelerate the motor until standstill, to prevent mechanical damage.
Rapid current limit	Reduce the risk of over-current faults to keep inverter operated normally.
Timer control	Setting range: 0.0Min ~ 6500.0Min
Communication	Modbus
MPPT tracking function	Built-in adaptive high-precision photovoltaic array maximum power point tracking
	Suitable for water pump applications with automatic switching between photovoltaic power supply and mains power
INPUT & OUTPUT	
Command source	Operation panel, control terminal and serial communication port.
Frequency source	5 Frequency sources: Digital setting, Analog voltage setting, Analog current setting, Pulse setting and Serial port setting.
Auxiliary frequency source	5 options to provide flexible auxiliary frequency fine-tuning and frequency synthesis.
Input terminals	5 digital input terminals, one of which supports high-speed pulse input up to 50kHz (the lite version only has 4 digital input terminals)
	1 analog input terminal, support 0 ~ 10V voltage input or 0 ~ 20mA current input
	1 rotary potentiometer analog input
Output terminals	1 high-speed pulse output terminal, supporting 50kHz square wave signal output
	1 relay output terminal
	1 analog output terminal, support 0 ~ 20mA current output or 0 ~ 10V voltage output
DISPLAY BUTTONS	
LED display	Display parameters
Key lock and function selection	It allows users to partially or fully lock the keys or define operated range for partial keys to prevent misoperation
Protective function	Power-on motor short circuit detection, output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection,

	overheat protection, overload protection, underload protection, weak light protection, etc.
ENVIRONMENT	
Place Of Use	Indoor, free from direct sunlight, dust, corrosive gas, flammable gas, oil mist, water vapor, dripping water or salt, etc.
Storage temperature	-20°C ~ 60°C
Operation temperature	-10°C ~ 50°C (If temperarture is higher than 40°C, the output capacity will be derated 1% per 1°C increase)
Storage humidity	<95%RH
Operation humidity	<95%RH
Noise Level	50dBA max.
OTHERS	
EMC	Standards:
	NA
Safety	Standards:
	IEC 61800-5-1
INTERACE	
Communication Port	RS-485

2.3. Rated Parameters

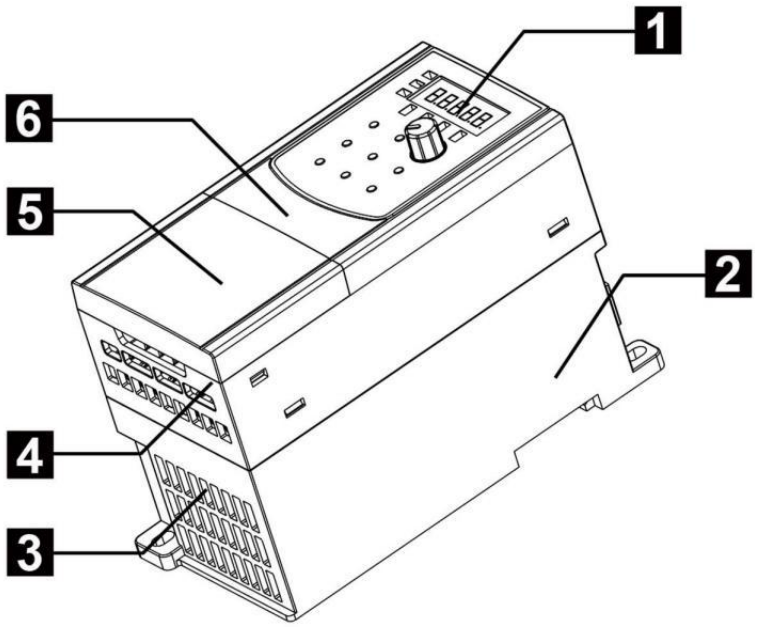
MODEL	Nominal Capacity (KVA)	Input Current (A)	Output Current (A)	Applicable Motor Output (KW)	Applicable Motor Output (HP)
Single Phase 220V 50/60Hz					
iMaster-HC10M-2SR75GC	1.5	8.2	4	0.75	1
iMaster-HC10M-2S1R5GC	3	14	7	1.5	2
iMaster-HC10-2S2R2GC	4	23	9.6	2.2	3
DC Input Specifications					
Maximum input DC voltage DC			450VDC		
Recommended VOC voltage range			360～430VDC		
Recommended MPPT voltage range			250～350VDC		
Starting voltage range			160～450VDC (parameter adjustable)		
Output Specification					
Rated output voltage AC			3PH /1PH 220V		
Output frequency range			0～500.00HZ		
3-Phase 380Vac 50/60Hz					
iMaster-HC10-4TR75GC	1.5	3.4	2.1	0.75	1
iMaster-HC10-4T1R5GC	3	5	3.8	1.5	2
iMaster-HC10-4T2R2GC	4	5.8	5.1	2.2	3
iMaster-HC10-4T3R7GC	6	10.5	9	3.7	5
iMaster-HC10-4T5R5GC	11	13.9	13	5.5	7.5
iMaster-HC10-4T7R5GC	15	18.9	17	7.5	10
iMaster-HC10-4T011GC	30	27.8	25	11	15
iMaster-HC10-4T015GC	37	37.9	32	15	20
iMaster-HC10-4T18.5GC	44	46.7	37	18.5	25

iMaster-HC10-4T022GC	60	55.6	45	22	30
DC Input Specifications					
Maximum input DC voltage DC			800VDC		
Recommended VOC voltage range			550～750VDC		
Recommended MPPT voltage range			450～600VDC		
Starting voltage range			300～800VDC (parameter adjustable)		
Output Specification					
Rated output voltage AC			3PH 380V		
Output frequency range			0～500.00HZ		

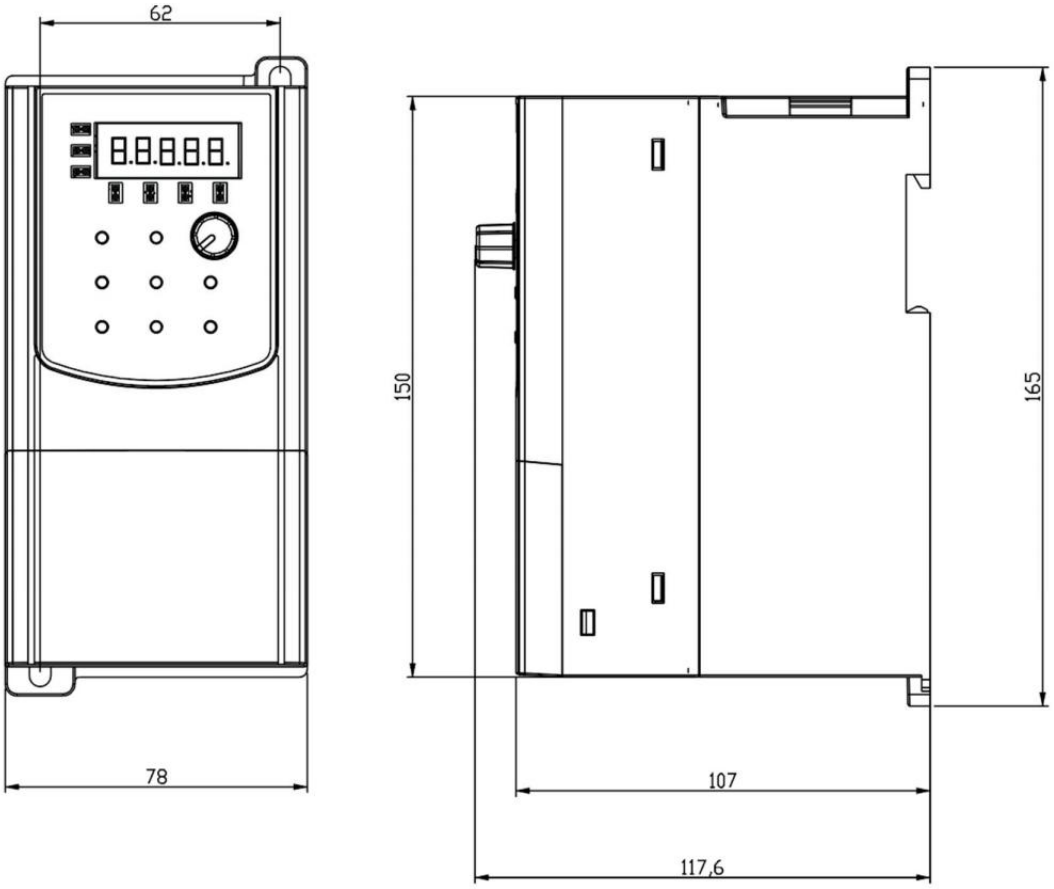
2.4. Recommended battery components and configurations for photovoltaic water pump inverters (only some power segments are listed for reference)

Model	Open circuit voltage level of solar cell modules			
	37±1V		45±1V	
	Battery power ±5WP	Number of batteries per series *Number of series	Battery power ±5WP	Number of batteries per series *Number of series
iMaster-HC10M-2SR75GC	250	11*1	300	9*1
iMaster-HC10M-2S1R5GC	250	11*1	300	9*1
iMaster-HC10-4T2R2GC	250	11*1	300	9*1
iMaster-HC10-4TR75GC	250	18*1	300	15*1
iMaster-HC10-4T1R5GC	250	18*1	300	15*1
iMaster-HC10-4T2R2GC	250	18*1	300	15*1
iMaster-HC10-4T3R7GC	250	20*1	300	16*1
iMaster-HC10-4T5R5GC	250	18*2	300	15*2
iMaster-HC10-4T7R5GC	250	18*2	300	15*2
iMaster-HC10-4T011GC	250	18*3	300	15*3
iMaster-HC10-4T015GC	250	18*4	300	15*4
iMaster-HC10-4T18.5GC	250	18*5	300	15*5
iMaster-HC10-4T022GC	250	18*6	300	15*6

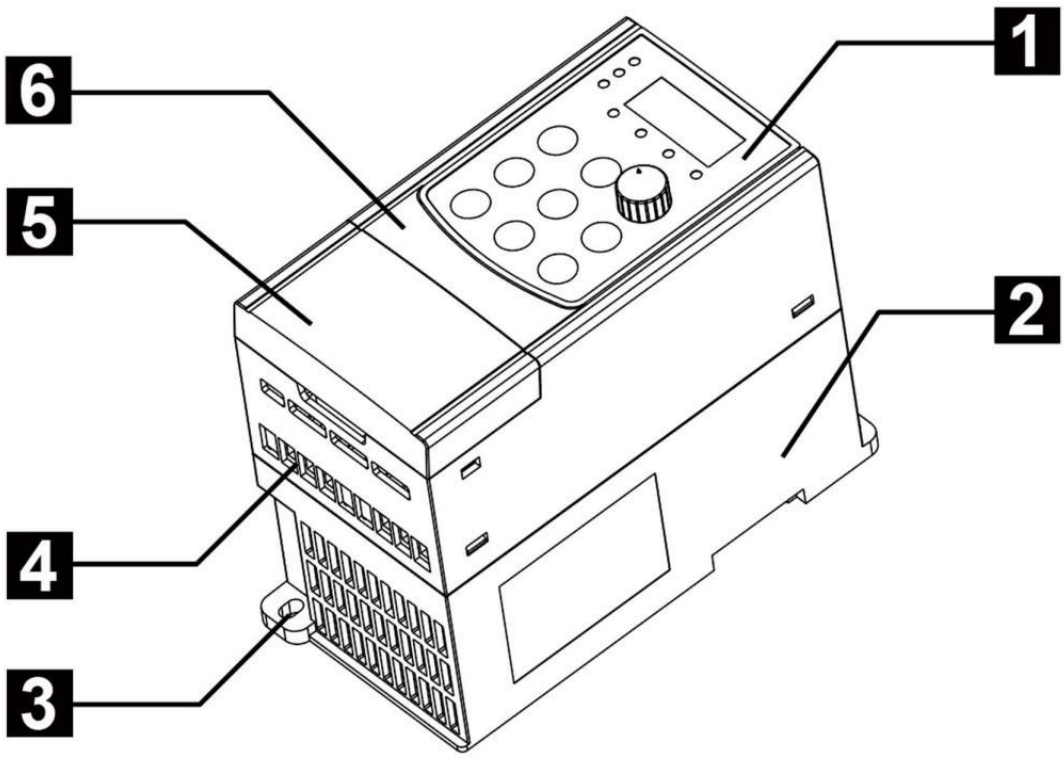
2.5. Schematic diagram



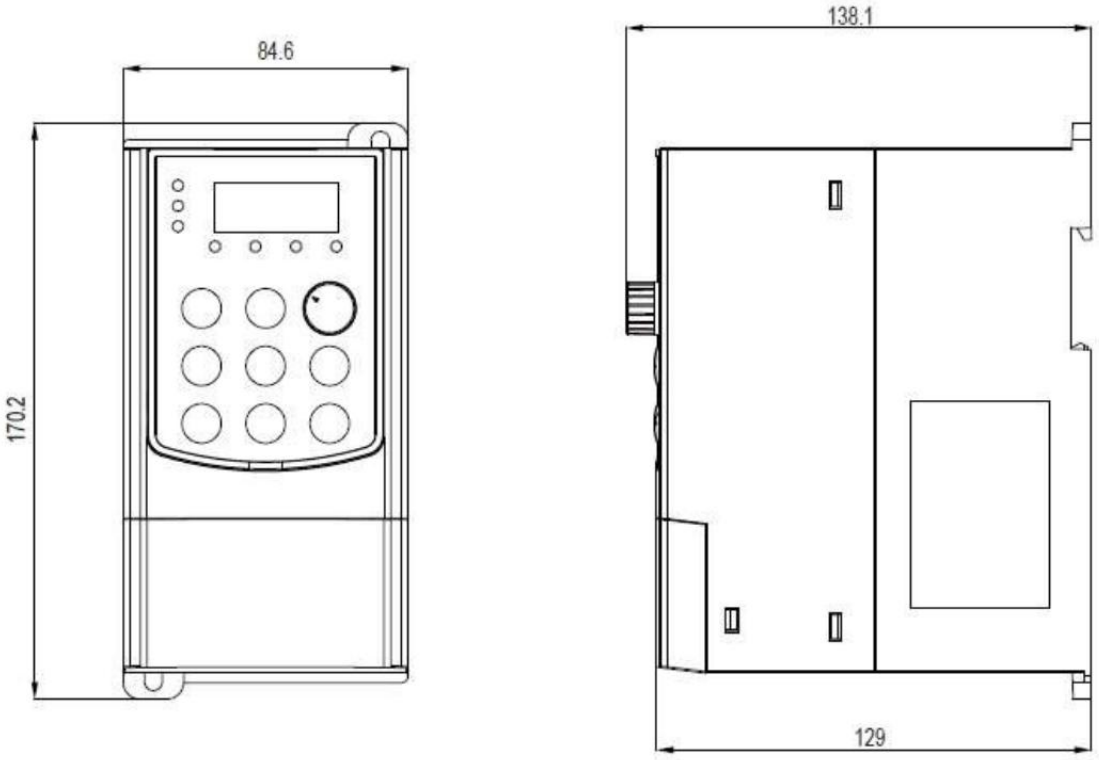
1. Operation keyboard
2. Cabinet
3. Bottom installation hole
4. Input-output hole
5. Flip cover
6. Front cover



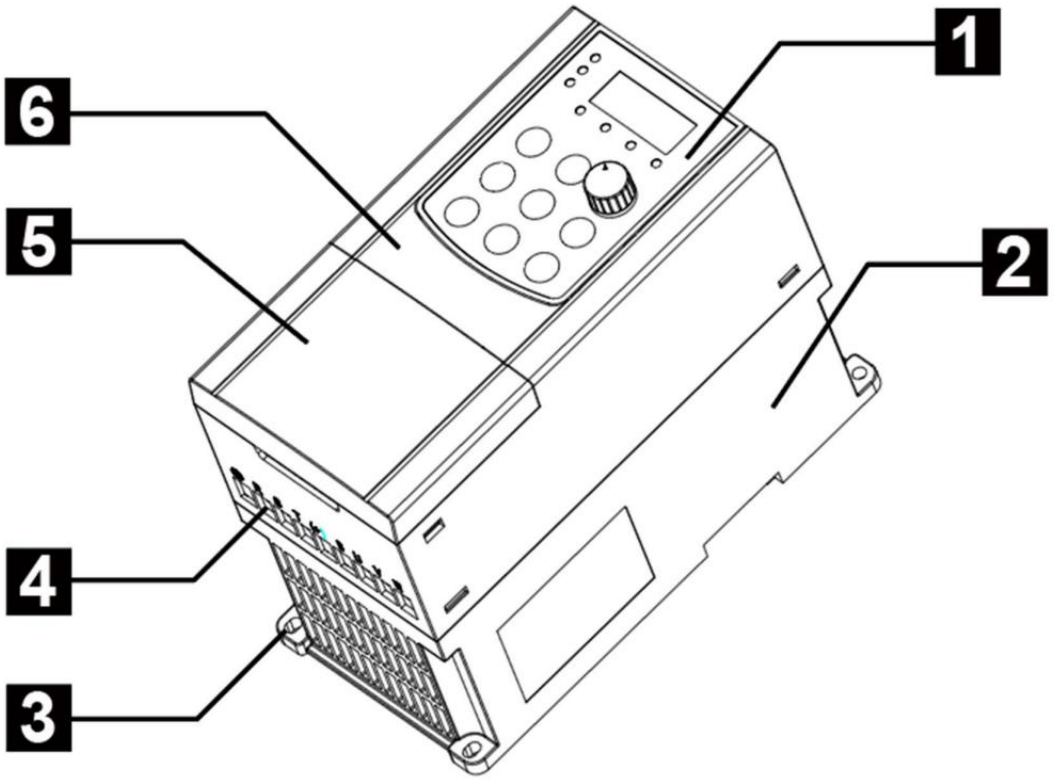
HC10M version 0.75KW-1.5kW schematic diagram & dimensions



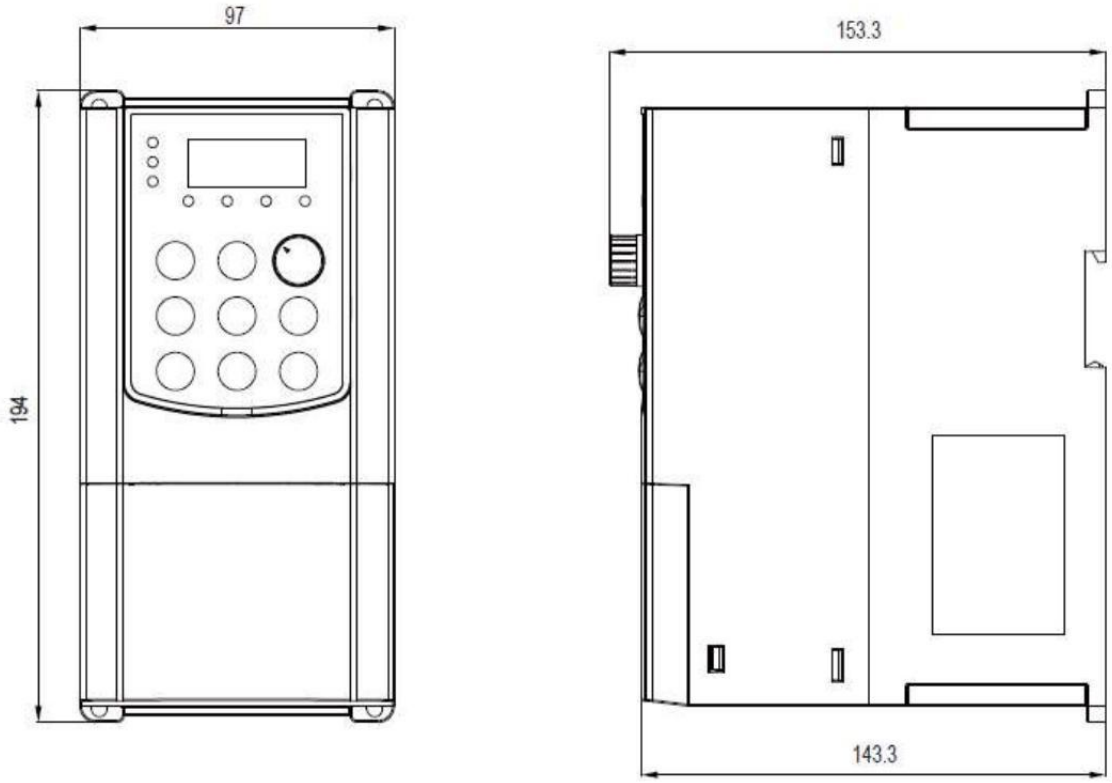
1. Operation keyboard
2. Cabinet
3. Bottom installation hole
4. Input-output hole
5. Flip cover
6. Front cover



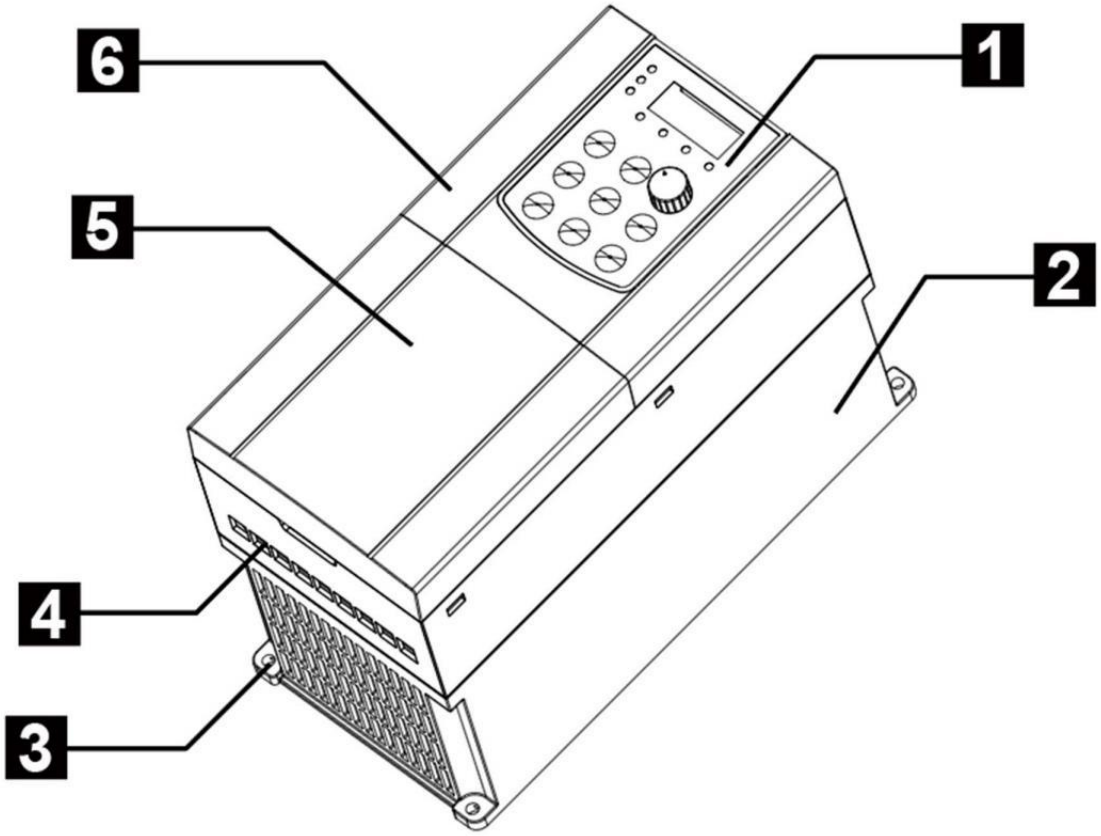
HC10 standard version 0.75KW—2.2KW schematic diagram & dimensions



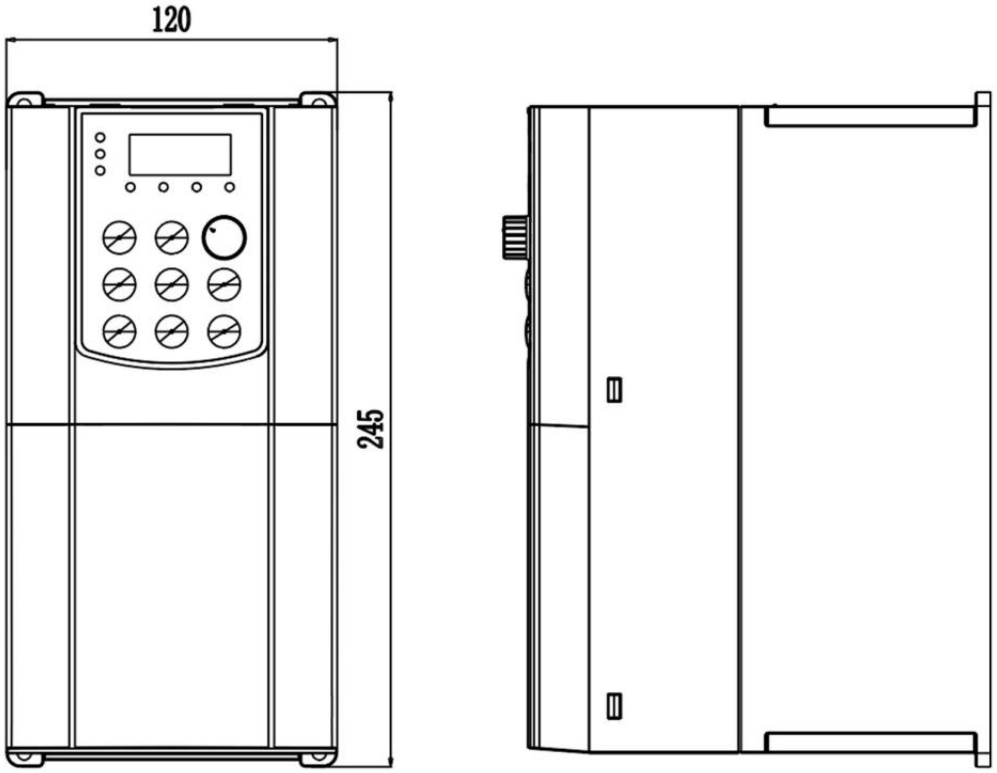
1. Operation keyboard
2. Cabinet
3. Bottom installation hole
4. Input-output hole
5. Flip cover
6. Front cover



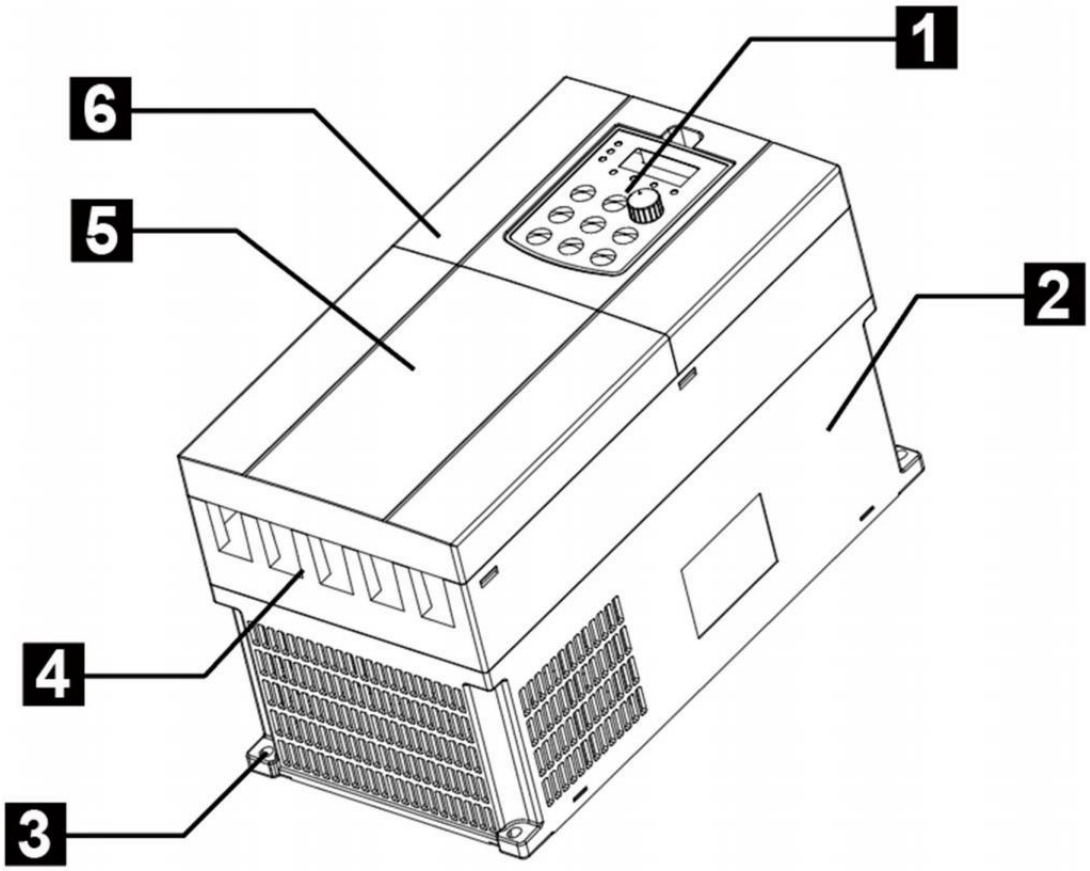
HC10 standard version 3.7kW—5.5kW schematic diagram & dimensions



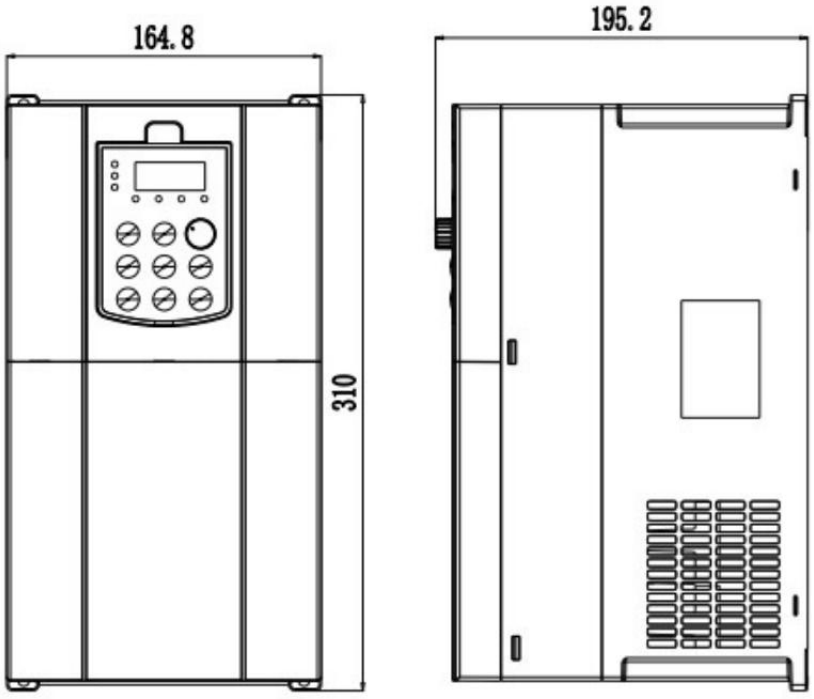
1. Operation keyboard
2. Cabinet
3. Bottom installation hole
4. Input-output hole
5. Flip cover
6. Front cover



HC10 standard version 7.5kW—11kW schematic diagram & dimensions



1. Operation keyboard
2. Cabinet
3. Bottom installation hole
4. Input-output hole
5. Flip cover
6. Front cover



HC10 standard version 15kW—22kW schematic diagram & dimensions

Installation Dimension

MODEL	Instillation Position(mm)		Overall Dimensions(mm)			Instillation Position(mm)	Weight(kg)
	A	B	H	W	D		
iMaster-HC10M-2SR75GC	62	152	165	78	117	5.5	0.7
iMaster-HC10M-1.5G-2S							
iMaster-HC10-4T2.2G-2S	67.3	157.5	170.2	84.6	138.1	5	1
iMaster-HC10-4T0.75GC							
iMaster-HC10-4T1.5GC							
iMaster-HC10-4T2.2GC							
iMaster-HC10-4T3.7GC	85	184	194	97	153.3	4	1.5
iMaster-HC10-4T5.5GC							
iMaster-HC10-4T7.5GC	107	235	245	142	168	5.5	3.5
iMaster-HC10-4T11GC							
iMaster-HC10-4T15GC	147	298	310	164.8	195.2	5.5	5.5
iMaster-HC10-4T18.5GC							
iMaster-HC10-4T22GC							

3. Installation instructions

Only trained and qualified professionals are allowed to perform the tasks described in this chapter. Please follow the instructions stated in "Safety Precautions" for any such tasks. Ignoring any of the safety precautions may lead to personal injury or death or equipment damage.

During the installation process, all power source connected to the inverter shall already be disconnected. If not, disconnect the power sources and wait at least 10 minutes before resuming installation.

The installation plan and design of the inverter must comply with the local relevant laws and regulations. We will not bear any responsibility for any violation regarding the installation hereof. Furthermore, the warranty or quality assurance provided with the inverter will not cover any incident or malfunction due to user's ignorance of the instructions hereof.

3.1. Equipment installation

3.1.1. Installation environment

To expect long term high performance and normal operation from the inverter, a proper installation site selection becomes critical.

Environment	Requirements
Site	Indoors and free from direct sunlight, dust, corrosive gas, flammable gas, oil mist, water vapor, dripping water or salt, etc.
Altitude	Below 1000m
Ambient temperature	−10°C~+40°C (For 40°C~50°C, use with derating) For better reliability, please use the inverter in a place where the temperature does not change rapidly. When installing it in a closed space such as a cabinet, please use a cooling fan or air conditioner for cooling to prevent the internal temperature from exceeding the limit. If expecting the inverter to be restarted after a long period in a low temperature condition, an extra external heating measure will be required for eliminating the ice frozen inside beforehand to prevent the risk of machine damage.
Humidity	Lower than 95%RH with no condense
Vibration	Smaller than 5.9m/s^2 (0.6g)
Storage temperature	−20°C~+60°C
IP rating	IP20
Distribution System	TN,TT

3.1.2. Installation direction

The inverter can be wall-mounted or installed in a cabinet.

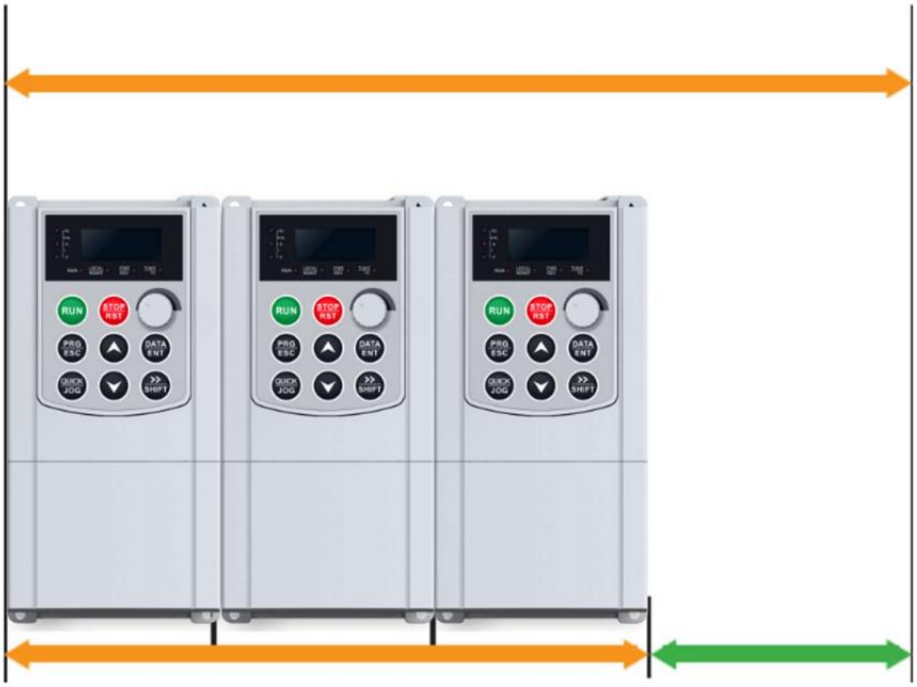
The inverter must be installed in the vertical direction. Please check the installation is in the direction as required in the below:

3.1.3. Installation method

The inverter supports wall-mount installation, and the installation method is as follows:

（1） Wall Mount

（2） DIN Rail (Only for models below 7.5K)



（3） Seamless Installation

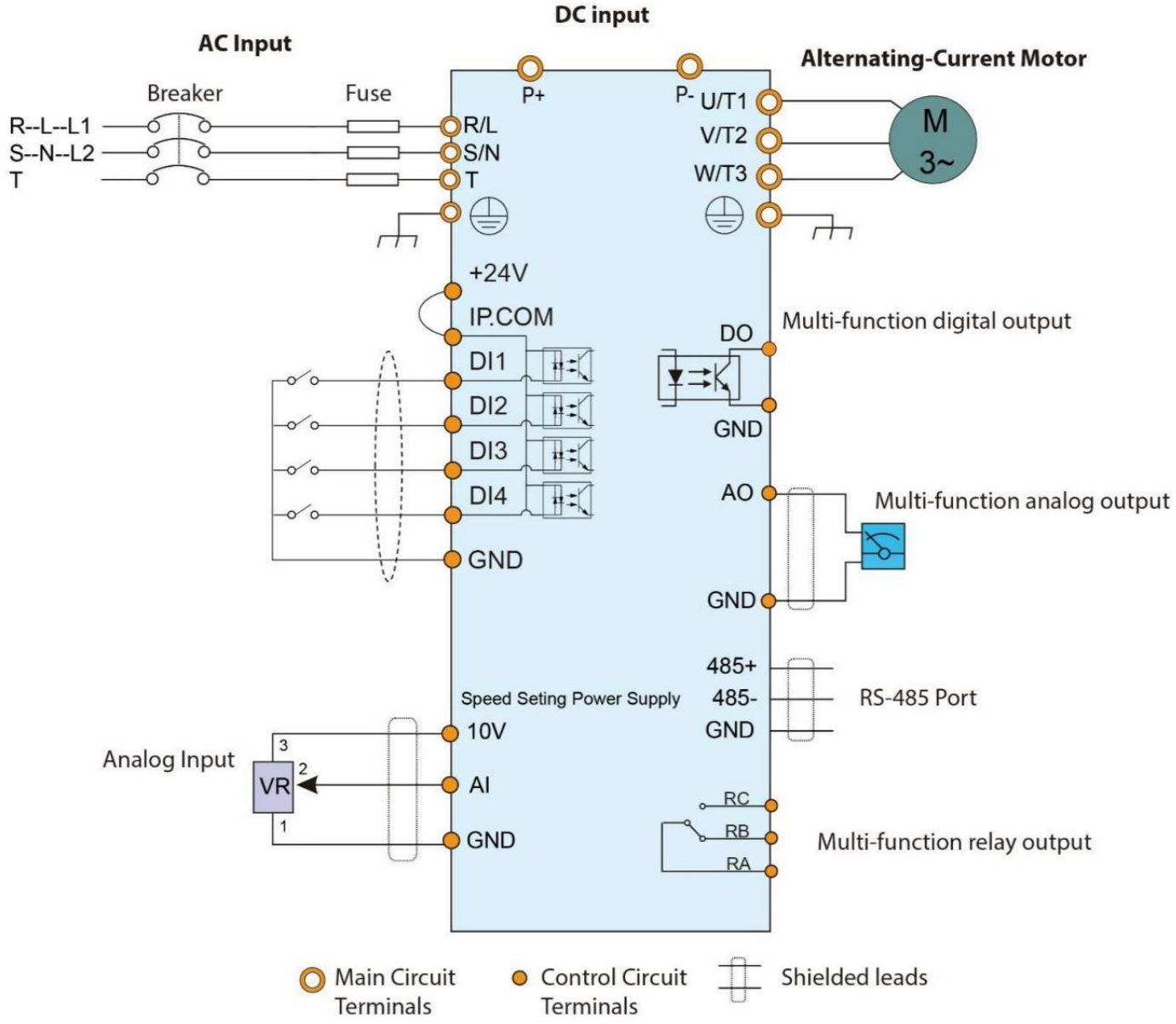
*Please install according to the actual Installation hole positions of different models.

Steps:

1. Mark the location of the mounting hole.
2. Fix the screws or bolts to the marked positions.
3. Lean the inverter against the wall.
4. Fasten the screws to fix the inverter to the wall.

3.2. Standard wiring

3.2.1 HC10M version 0.75KW-1.5KW standard connection and debugging.

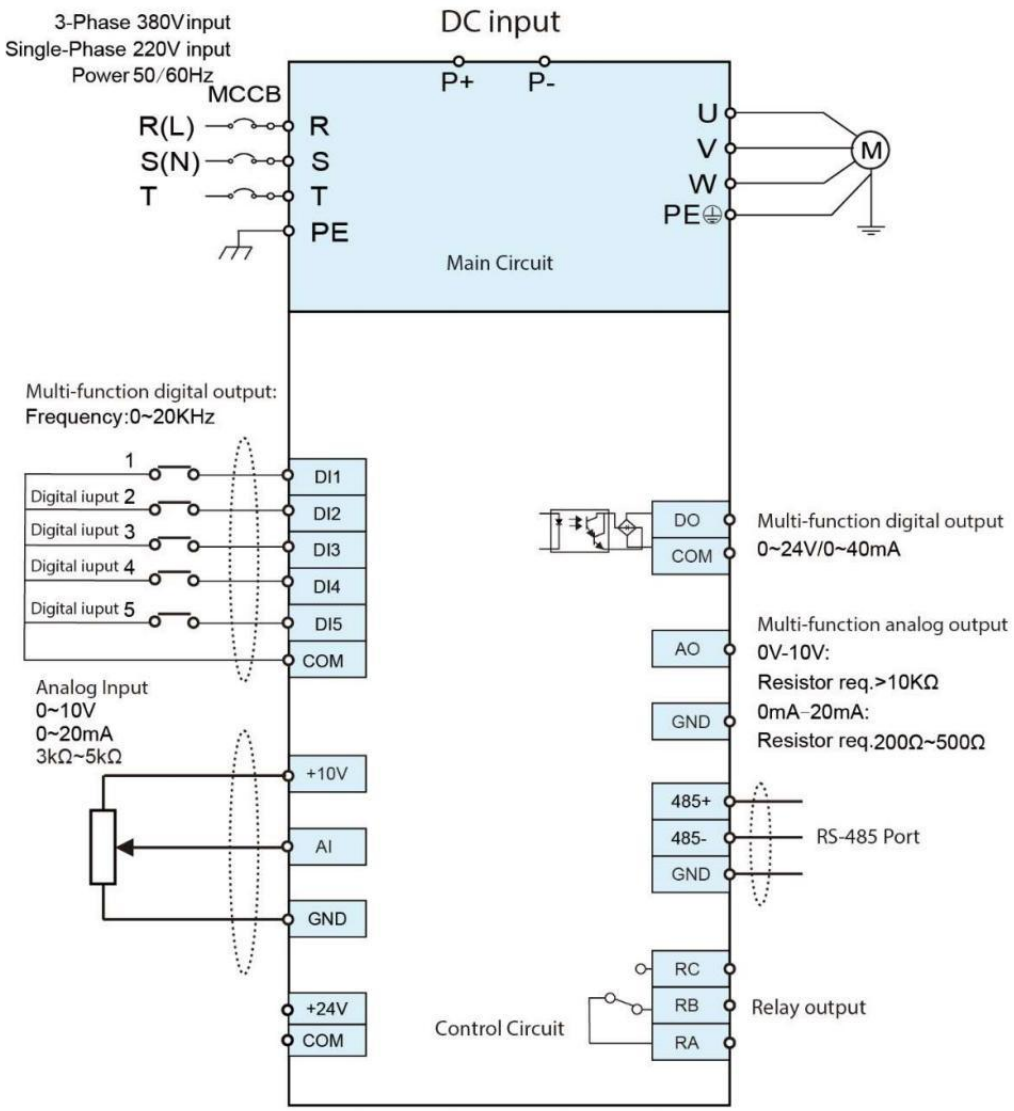


Notice:

1. It is forbidden to use asymmetrical motor cables. If there is a symmetrical ground conductor in the motor cable in addition to the conductive shield, then connect the ground conductor to ground at the drive end and at the motor end.

2. Route the motor cables, input power cables and control cables separately.

3.2.2 HC10 standard version 0.75KW-22KW standard connection and commissioning:

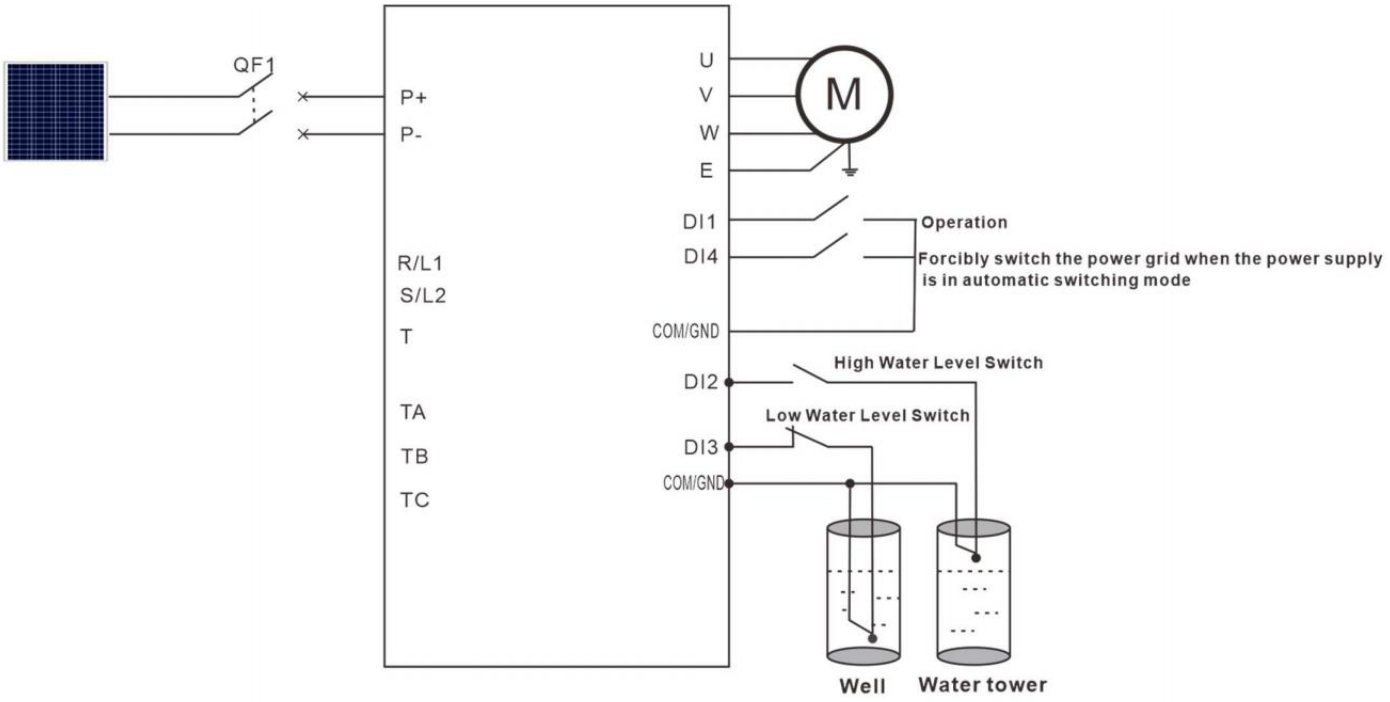


NOTICE: Fuses, braking resistors, input resistances, input filters, output resistances and output filters are all optional accessories. For details, please refer to "Peripheral Options" section.

3.3. Photovoltaic water pump mode wiring and commissioning

3.3.1. Commissioning when photovoltaic panels supply power

When the photovoltaic panel supplies power, the wiring is as follows:



1. The debugging steps are as follows

a. Check the inverter model and wiring, close QF1 and power on after confirming that it is correct;

b. Correctly set the motor parameters, and input F3-00~F3-04 according to the motor nameplate;

c. Set the command source F0-21 according to the requirements, and the frequency converter has power-off memory for the panel commands and communication commands, that is, the command before power-off is memorized, and the command is still maintained after power-on;

d. Run the inverter, under normal light, if the operating frequency is very low or the water output is very small, the wiring of the water pump may be reversed, just exchange the wiring of the two phases of the water pump arbitrarily.

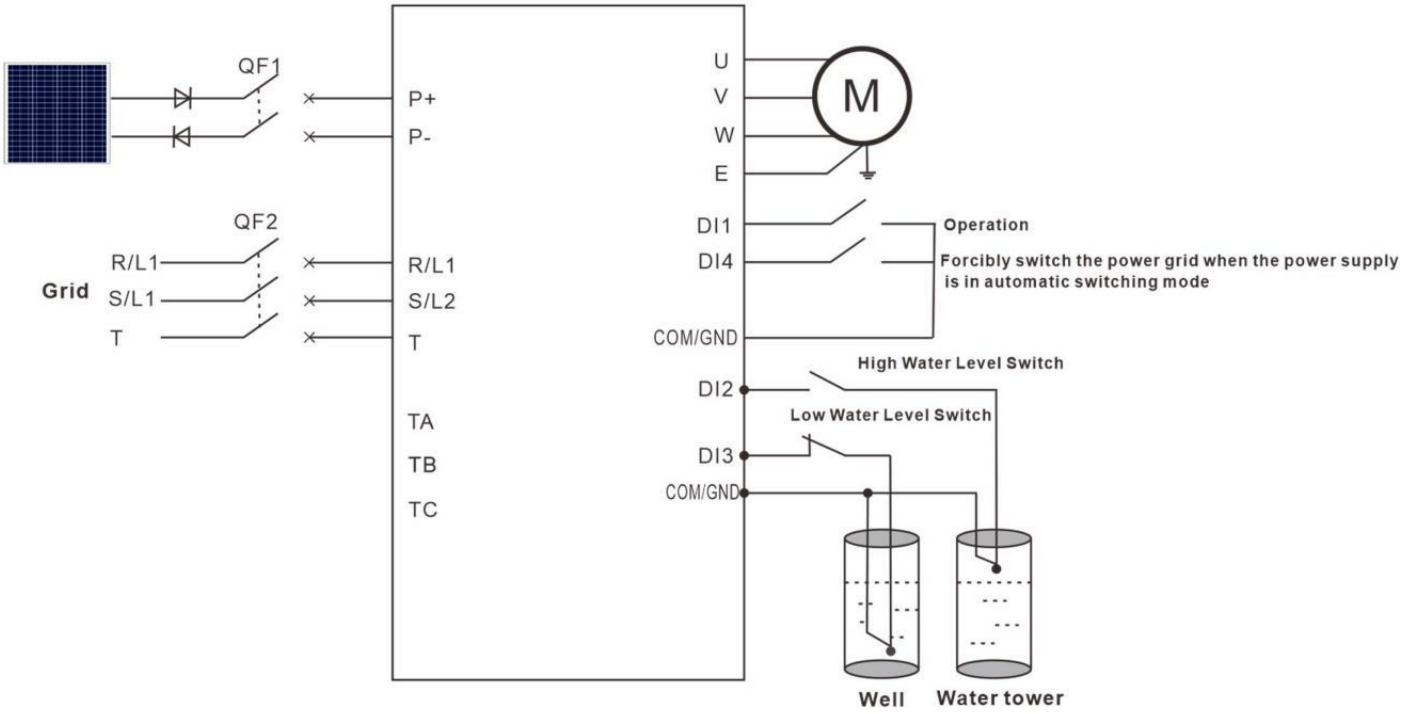
e. According to the needs, the special functions such as weak light warning and abnormal water level warning of P8 group can be set;

Note: 1. DI2, DI3 water level abnormal input terminals, the positive and negative logic polarity of the terminals can be changed through parameter F6-10 to meet the different installation methods of the water level switch.

2. Photovoltaic panels and the grid can be connected to the frequency converter at the same time, and automatic switching and anti-reverse devices need to be added.

3.3.2. Commissioning when powered by photovoltaic panels or grid

When powered by photovoltaic panels or grid, the wiring is as follows:



1. The debugging steps are as follows

a. Check whether the wiring is correct. When there is no diode protection installed at the DC bus input end, it is forbidden to close the photovoltaic panel switch QF1 and the grid input switch QF2 at the same time, otherwise the photovoltaic panel will be damaged;

a. First disconnect the photovoltaic panel switch QF1, and then close the grid switch QF2;

b. Correctly set the motor parameters, input F3-00~F3-04 according to the motor nameplate;

c. Set the command source F0-21 according to the requirement, and the inverter has power-off memory for the panel command and communication command, that is, the command before power-off is memorized, and the command is still maintained after power-on;

d. Set parameter P8-15=2 or close DI4 terminal (switch to grid mode), note: when P8-15 is not equal to 0, close DI4 terminal only participates in internal algorithm calculation, and does not perform automatic switching power supply relay output operation, such as To convert to photovoltaic panel power supply, just set P8-15=1 or disconnect DI4 terminal.

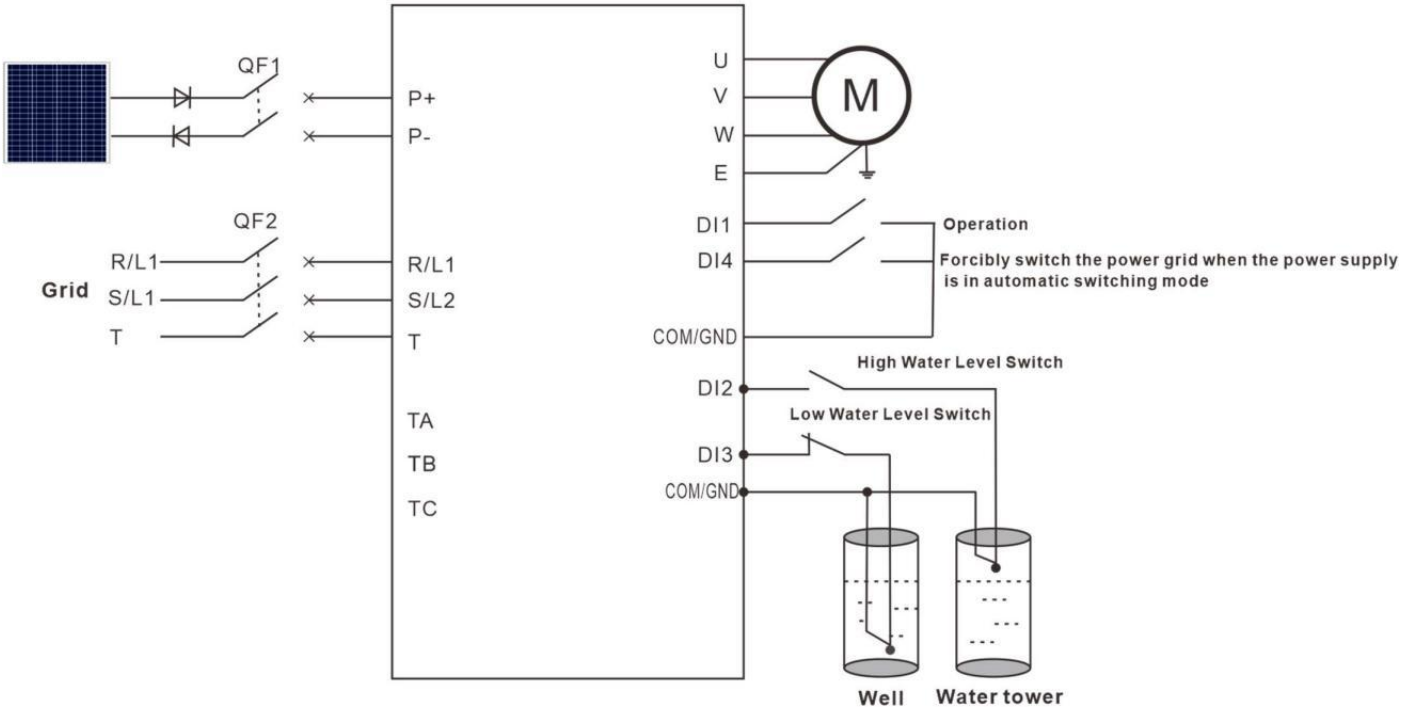
e. According to the needs, the special functions such as weak light warning and abnormal water level warning of P8 group can be set;

f. If the water is normal, it can work normally.

Note: For DI2 and DI3 water level abnormal input terminals, the positive and negative logic polarities of the terminals can be changed through parameter F6-10 to meet the different installation methods of water level switches.

3.3.3. Commissioning when photovoltaic panels and grid power supply are automatically switched

The wiring is as follows when the photovoltaic panel and grid power supply are automatically switched:



1. The debugging steps are as follows

a. Please connect the wires correctly according to the above diagram, and close QF1 and QF2 at the same time after ensuring correctness;

a. Correctly set the motor parameters, and input F3-00~F3-04 according to the motor nameplate;

b. Set the command source F0-21 according to the requirements, the frequency converter has power-off memory for the panel command and communication command, that is, the command before power-off is memorized, and the command is still maintained after power-on;

c. Set P8-15=2=0 (automatically switch the power supply), when the system is powered on, the default is to give priority to the power supply of the photovoltaic panel, TA1\TB1 is activated, the power is switched to the photovoltaic panel, and the bus voltage is stable and meets the conditions, allowing Running, when the light is insufficient, the inverter judges that the light is weak according to its own weak light algorithm, the inverter will stop automatically and TA1\TB1 will act, switch to the grid power supply and run automatically, after the running time reaches P8-16, switch to Photovoltaic panels supply power, and automatically run after P8-17 delay and voltage stabilization, and use this logic cycle to determine switching operation.

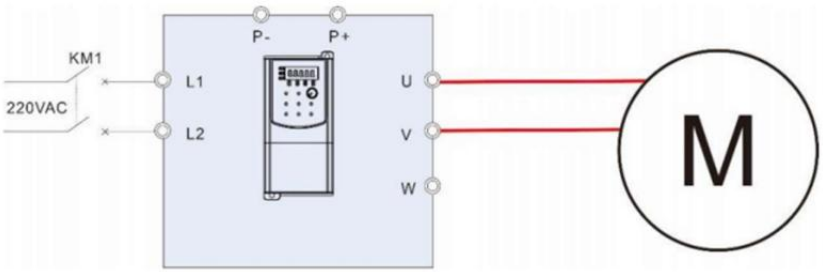
d. According to the needs, the special functions such as weak light warning and abnormal water level warning of P8 group can be set;

Note: For DI2 and DI3 water level abnormal input terminals, the positive and negative logic polarities of the terminals can be changed through parameter F6-10 to meet the different installation methods of water level switches.

⚠	●DC circuit breaker QF1 must be installed as a protection switch for PV DC input. ●When the modules are connected in parallel, a photovoltaic special combiner box should be selected. ●When the distance between the photovoltaic cell module and the frequency converter exceeds 10 meters, the DC input terminal must be equipped with a Type II lightning protection device. ●When the water pump is more than 50 meters away from the inverter, it is recommended to select an output reactor.

3.3.4. Single-phase motor wiring

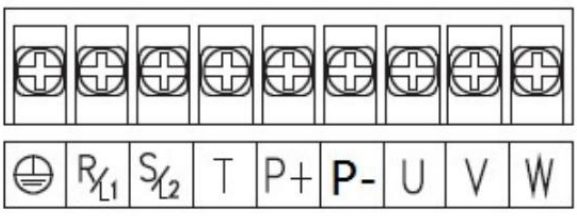
The wiring diagram of the inverter and the single-phase motor is as follows:



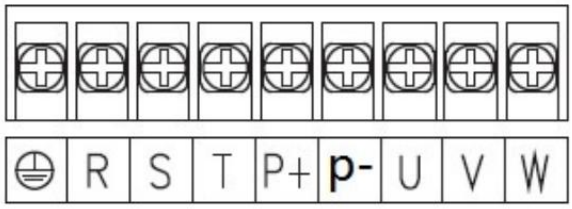
Note: After wiring is completed, set P8-27=1.

3.3.5. Diagram of main circuit terminals

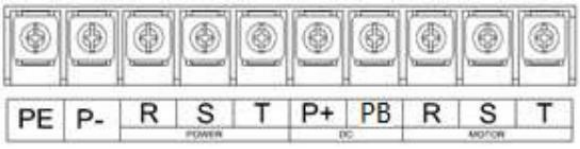
The main terminal diagram is as shown below:



0.75KW-2.2KW main terminal diagram



3.7KW-11KW main terminal diagram



15KW-22KW main terminal diagram

The function for each terminal is as below:

Terminal symbol	Terminal name	Function description
R、S、T	Three-phase AC input terminals	Three-phase AC power connection point
L1、L2	Single-phase AC input terminals	Single-phase AC power connection point
P+、P-	PV input terminal	Connect photovoltaic panels

⏚	Safety ground terminal	Connect to ground
U、V、W	Inverter output terminal	Connect to three-phase motor
U、V		Connect a single-phase motor

NOTICE:

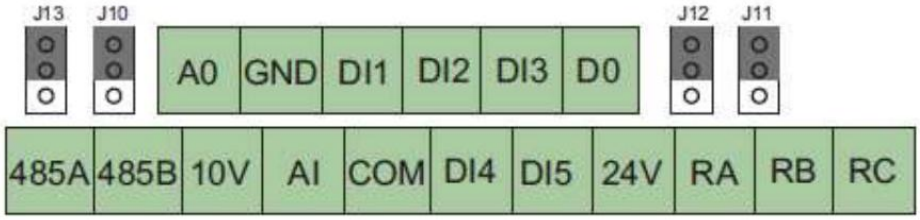
- The use of asymmetrical motor cables is prohibited. If the motor cable comes with a symmetrical grounding conductor along with the conductive shielding layer, please ground the conductor at the inverter end and the motor end.
- Route the motor cables, input power cables and control cables separately.

3.3.6.Steps for main circuit terminal wiring

1. Connect the ground wire of the input power cable directly to the ground (PE) terminal of the inverter, and connect the single-phase (three-phase) input cable to the terminals L1, L2 (R, S, T), and confirm its connection is reliabile.
2. Connect the ground wire of the motor cable to the ground (PE) terminal of the inverter, and connect the three-phase (single-phase motor) cable to the terminals U, V, W, and（U、V）and confirm its connection is reliabile.
3. If conditions permit, mechanically fix all cables outside the inverter.

3.3.7. Control terminal diagram

HC10M version 0.75K-1.5KW - Control circuit terminal arrangement diagram:



HC10M version 0.75K-1.5KW - The function of each control terminals is as stated below:

Category	Terminal Label	Name	Description
Communication	RS485A	RS485 COM port	RS485 differential signal positive terminal
	RS485B		RS485 differential signal negative terminal
Analog input	AI	Analog input terminal	Analog voltage/current input (It can be used as DI digital input, see F6-31 setting for details)
Analog output	AO	Analog output terminal	Analog voltage/current output
Digital input	DI1	Digital input terminal 1	Normal digital input
	DI2	Digital input terminal 2	Normal digital input
	DI3	Digital input terminal 3	Normal digital input
	DI4	Digital input terminal 4	Normal digital input / High frequency pulse input
Digital output	DO	Digital output terminal	Normal digital output/high frequency pulse output
Power supply	10V	+10V power supply	Provide +10V power supply
	GND	+10V power ground	Reference ground for analog signal and +10V power supply
	24V	+24V power supply	Provide +24V power supply
	GND	+24V power ground	
Relay output	RA/RB	Relay output	Normally closed terminal
	RA/RC		Normally open terminal

HC10M version - The jumper functions are as follows:

NO.	Name	Pin number	Function	Factory setting
J13	AI1	1 2 3	1--2: Voltage intput (0～10V) 2--3: Current intput (0～20mA)	0~10V
J10	AO1	1 2 3	1--2: Voltage output (0～10V) 2--3: Current output (0～20mA)	0~10V
J12	PW	1 2 3	1--2: Source type wiring method 2--3: It is a sink type wiring method	Source type
J11	CME	1 2 3	Optocoupler isolation, bipolar open collector output; Output voltage range: 0V～24V; Output current range: 0mA～50mA; Note: The digital output ground CME is internally isolated from the digital input ground COM. By default, it is connected internally through J11. When the DO is driven by an external power supply, J11 must be disconnected.	Short circuit COM

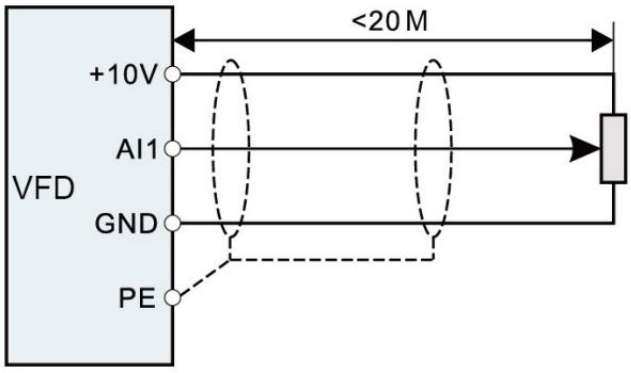
Note:

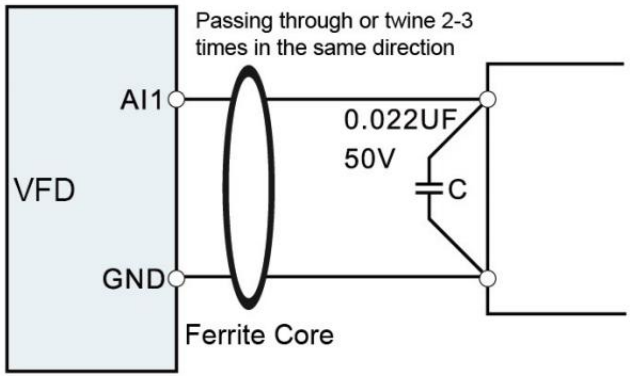
[Note 1] When the ambient temperature exceeds 25°C, the terminal output current needs to be derated for use.

[Note 2] The position of the jumper on the control board and the terminal function assignment, please refer to the actual product when you use it.

HC10M version - Analog input terminal:

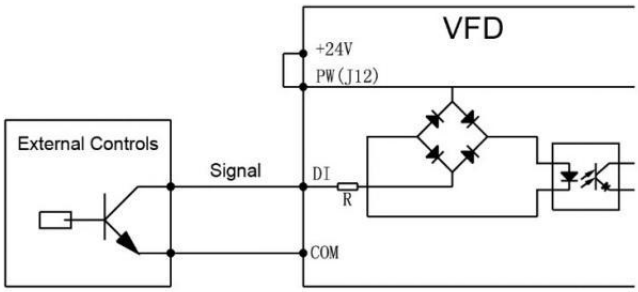
Because the weak analog voltage signal is particularly susceptible to external interference, it is generally necessary to use a shielded cable, and the wiring distance should be as short as possible, not more than 20m. In some situations where the analog signal is severely interfered, a filter capacitor or ferrite core should be added to the analog signal source side.



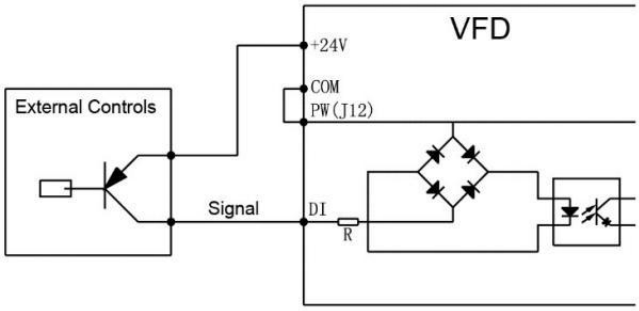


HC10M version -Digital input terminal:

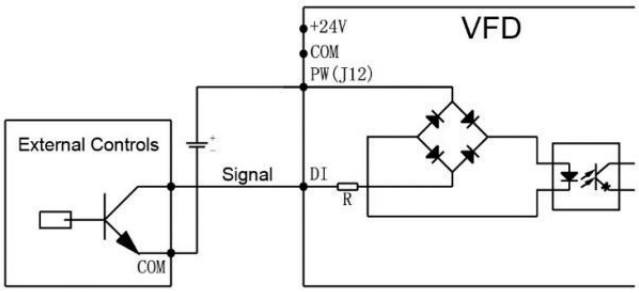
Generally, shielded cables are required, and the wiring distance should be as short as possible, not more than 20m. When using active driving mode, necessary filtering measures should be taken for the crosstalk of the power supply. It is recommended to use the contact control method.



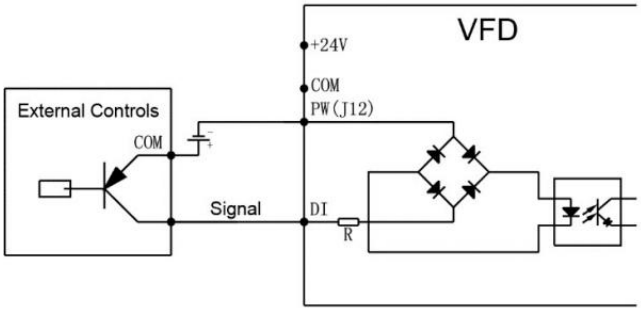
NPN source type connection method using internal 24V power supply



PNP sink type connection method using internal 24V power supply



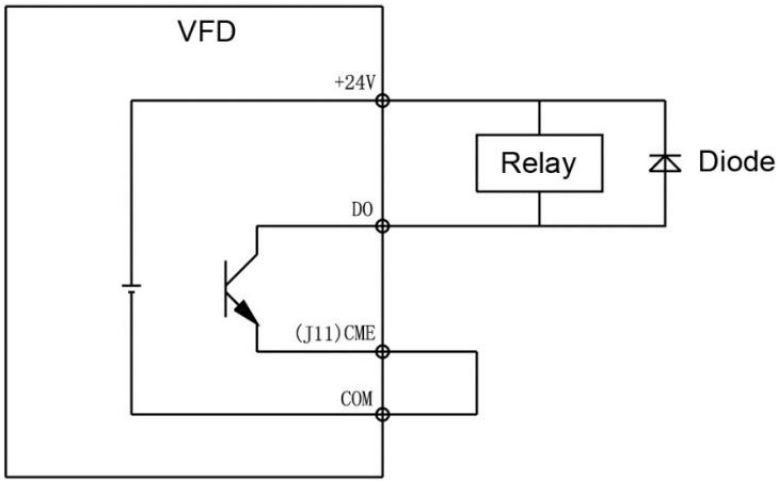
NPN source type connection method using external power supply(Note that J12 removes the jumper between PW and +24V)



PNP sink type connection method using externa power supply(Note that J12 removes the jumper between PW and +24V)

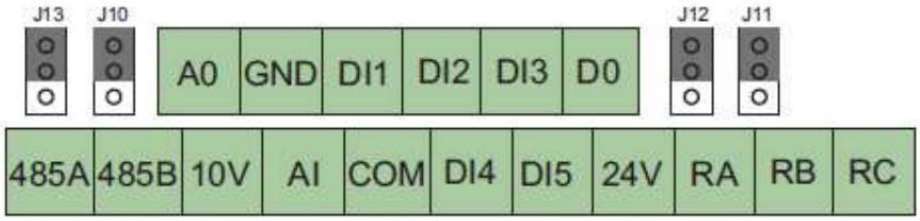
HC10M version -Digital output terminal:

When the digital output terminal needs to drive the relay, absorption diodes should be installed on both sides of the relay coil, otherwise it is easy to cause damage to the DC +24V power supply, and the drive capacity is not more than 50mA.



Digital output terminal wiring diagram

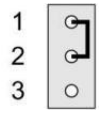
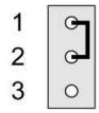
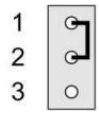
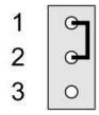
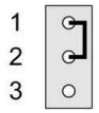
HC10 version 0.75K-22KW - Control circuit terminal arrangement diagram:



HC10 version - The function of each control terminals is as stated below:

Category	Terminal Label	Name	Description
Communication	RS485A	RS485 COM port	RS485 differential signal positive terminal
	RS485B		RS485 differential signal negative terminal
Analog input	AI	Analog input terminal	Analog voltage/current input (It can be used as DI digital input, see F6-31 setting for details)
Analog output	AO	Analog output terminal	Analog voltage/current output
Digital input	DI1	Digital input terminal 1	Normal digital input
	DI2	Digital input terminal 2	Normal digital input
	DI3	Digital input terminal 3	Normal digital input
	DI4	Digital input terminal 4	Normal digital input
	DI5	Digital input terminal 5	Normal digital input / High frequency pulse input
Digital output	DO	Digital output terminal	Normal digital output/high frequency pulse output
Power supply	10V	+10V power supply	Provide +10V power supply
	GND	+10V power ground	
	24V	+24V power supply	Provide +24V power supply
	COM	+24V power ground	
Relay output	RA/RB	Relay output	Normally closed terminal
	RA/RC		Normally open terminal

HC10 version - The jumper functions are as follows:

NO.	Name	Pin number	Function	Factory setting
J13	AI1		1--2: Voltage intput (0～10V) 2--3: Current intput (0～20mA)	0~10V
J10	AO1		1--2: Voltage output (0～10V) 2--3: Current output (0～20mA)	0~10V
J12	PW		1--2: Source type wiring method 2--3: It is a sink type wiring method	Source type
J11	CME		Optocoupler isolation, bipolar open collector output; Output voltage range: 0V～24V; Output current range: 0mA～50mA; Note: The digital output ground CME is internally isolated from the digital input ground COM. By default, it is connected internally through J11. When the DO is driven by an external power supply, J11 must be disconnected.	Connect COM
J16 J17	COM-PE GND-PE		Choose whether PE is connected to COM/GND. In the case of interference, connect PE to COM/GND to improve anti-interference 1--2: COM/GND is disconnected from PE 2--3: COM/GND is connected to PE.	Disconnect

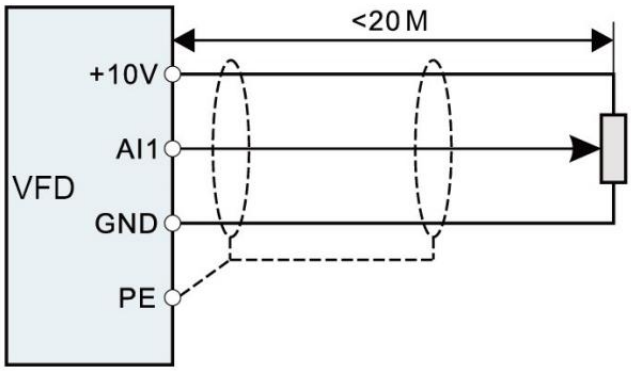
【Note 1】When the ambient temperature exceeds 25°C, the terminal output current needs to be derated.

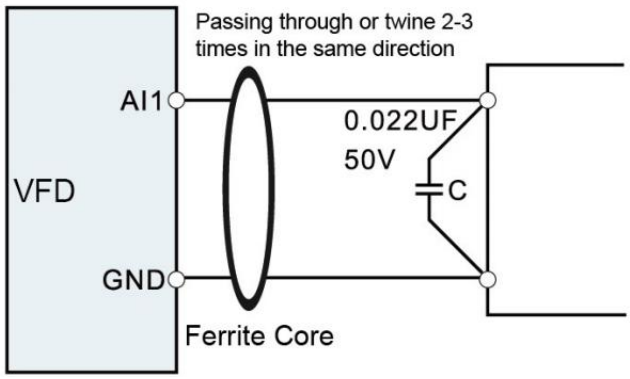
【Note 2】The position of the jumper on the control board and the distribution of terminal functions, please refer to the actual product when using it.

【Note 3】 Compared with HC10 standard version, HC10M version cancels DI5 and COM. If you want to use COM, please connect it to GND.

HC10 version - Analog input terminal:

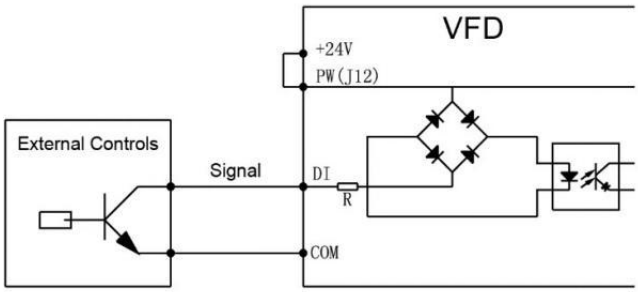
Because the weak analog voltage signal is particularly susceptible to external interference, it is generally necessary to use a shielded cable, and the wiring distance should be as short as possible, not more than 20m. In some situations where the analog signal is severely interfered, a filter capacitor or ferrite core should be added to the analog signal source side.



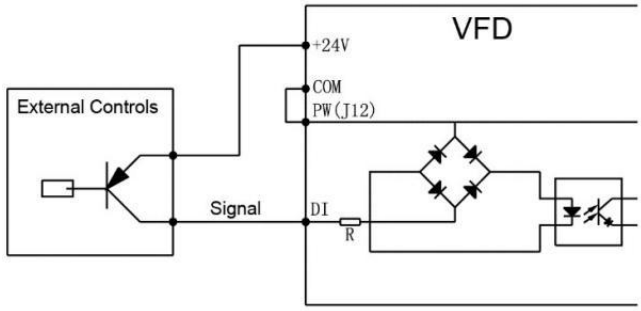


HC10 version -Digital input terminal:

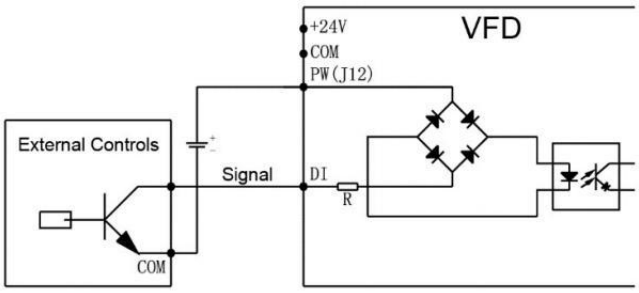
Generally, shielded cables are required, and the wiring distance should be as short as possible, not more than 20m. When using active driving mode, necessary filtering measures should be taken for the crosstalk of the power supply. It is recommended to use the contact control method.



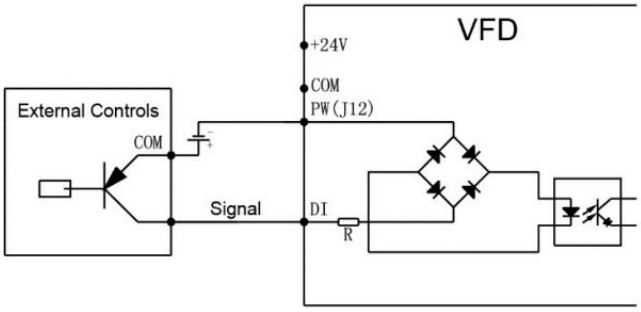
NPN source type connection method using internal 24V power supply



PNP sink type connection method using internal 24V power supply



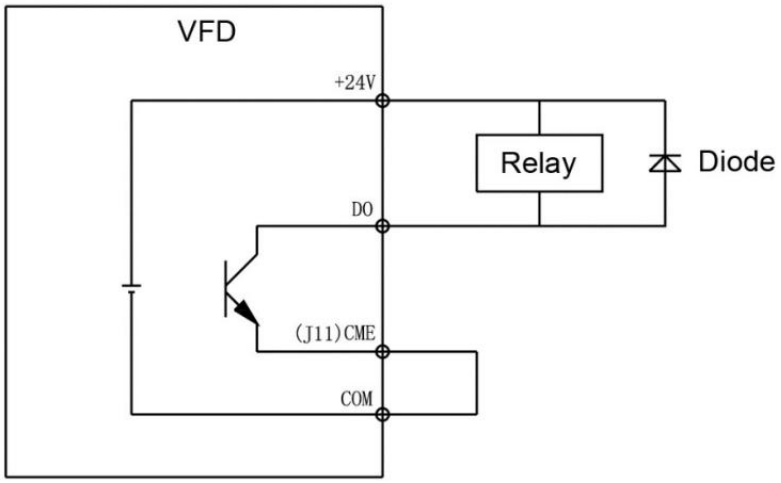
NPN source type connection method using external power supply(Note that J12 removes the jumper between PW and +24V)



PNP sink type connection method using externa power supply(Note that J12 removes the jumper between PW and +24V)

HC10 version -Digital output terminal:

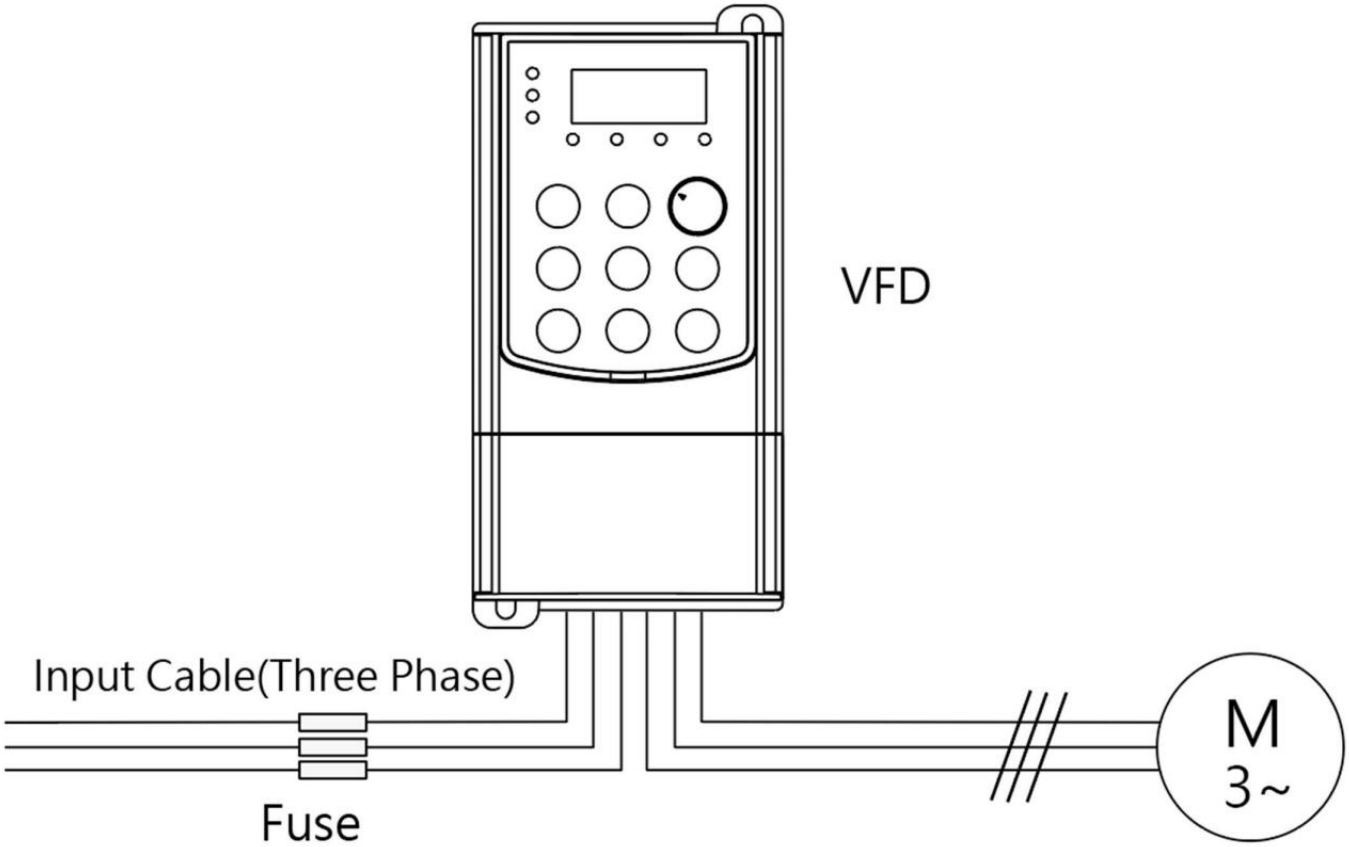
When the digital output terminal needs to drive the relay, absorption diodes should be installed on both sides of the relay coil, otherwise it is easy to cause damage to the DC +24V power supply, and the drive capacity is not more than 50mA.



Digital output terminal wiring diagram

3.4. Wiring protection

3.4.1. Short circuit protection for the inverter and the input power cable



It is necessary to apply protection device (such as fuse) to prevent the inverter and input power cable from overheat due to short-circuit events.

Such protection device shall be deployed according to the following guidelines.

NOTICE: Follow the instructions hereof to select the fuses, which will not only protect the input power cable as well as the inverter against a external short-circuit fault but also will provide proper protection to equipments in the same circuit when an internal short-circuit fault occurs inside the inverter.

3.4.2. Protection for the motor and motor cables

As long as the motor cables are selected according to the rated current of the inverter, the inverter provides short-circuit protection for the motor cable and also the motor. Featuring a motor thermal overload protection, the inverter can protect the motor by directly stopping the output and the current if necessary.

If the inverter is connected to multiple motors, each motor along with its cables needs to be deployed a dedicated thermal overload switch or circuit breaker. There also need fuses to protect them against short-circuit faults.

3.4.3. Bypass connection

For important usages, it usually needs to set up a switching circuit between power grid and the inverter to guarantee that whole system maintains its normal operation even when the inverter fails. For some special practices, such as those where the inverter is dedicated only for soft start, the systems that will switch to power grid after the start also need a corresponding bypass.

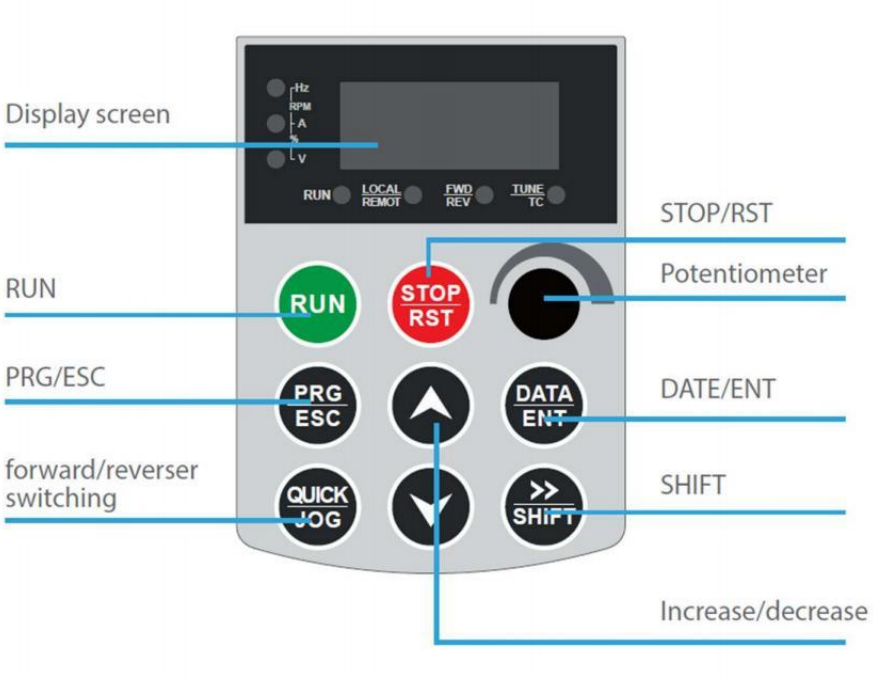
Do not connect the power source to the output terminals U, V and W of the inverter. The voltage carried on the motor cables can cause permanent damage to the inverter.

NOTICE: If there is a need to switch frequently, it is advised to use a switch or contactor with a mechanical interlock to ensure that the motor terminals will not be connected to the input power cables and the inverter outputs at the same time.

4. Keyboard operation

4.1. Keyboard introduction

The keyboard is used to display the inverter status data and to configure the parameters.



Display	Function Description
PRG/ESC	To enter or exit setting mode.
DATE/ENT	To confirm the selection/value in setting mode.
Increase/decrease	To increase/decrease the setting value.
SHIFT	In the shutdown display interface and operation display interface, the parameters to be displayed can be selected circularly; when modifying the parameters, the modification bit of the parameters can be selected.
RUN	In keyboard mode operation, used to run operation
STOP/RST	In the running state, pressing this key can be used to stop the running operation. When the fault alarm state is restricted by the function code P.04, all control modes can be used to reset the operation by this key.
Potentiometer	Adjust rate and frequency

4.1.1.LED Indicator

LED Indicator			Messages
Hz	Red	Solid On	Output frequency value is displayed on the LED screen.
A	Red	Solid On	Output current value is displayed on the LED screen.
V	Red	Solid On	Output voltage value is displayed on the LED screen.
A and V	Red	Solid on	Output power value is displayed on the LED screen.
RUN	Red	Solid on	The inverter is running.

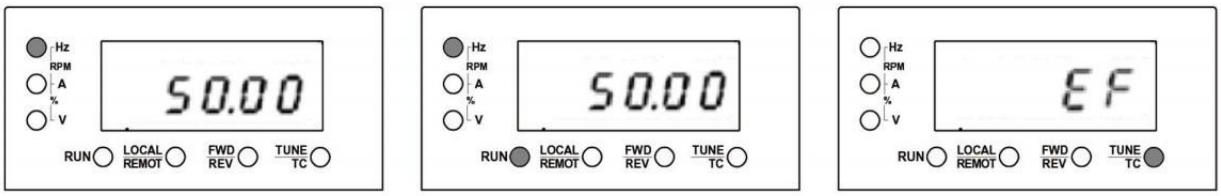
LOCAL/REMOT	Red	Solid on	Terminal start stop control mode
		Solid off	Panel start stop control mode
		Flashing	Communication start stop control mode
FWD/REV	Red	Solid on	The motor is in reverse running state
		Solid off	The motor is in forward running state
TUNE/TC	Red	Solid on	Torque control mode
		Fast flashing	Fault state
		Slow flashing	Parameter self-learning state

4.1.2.Function Buttons

Function Button	Description
PRG/ESC	To enter or exit setting mode.
DATE/ENT	To confirm the selection/value in setting mode.
RUN	In the keyboard operation mode, used for running operation
STOP/RST	• In the running state, press this button to stop the running operation; • In the fault alarm state, it can be used for reset operation. The feature of this key is restricted by the function code FA -01 (STOP/RST key function).
▲	To increase the setting value.
▼	To decrease the setting value.
►► /SHIFT	In the shutdown display interface and operation display interface, the parameters to be displayed can be selected circularly; when modifying the parameters, the modification bit of the parameters can be selected.
QUICK/JOG	• When FF-03 is not equal to 0, different menu modes can be switched according to the values in FF-03. • When FF-03 is equal to 0, specific functions can be selected according to the value in FA-00, such as command source switching, forward / reverse switching, etc
Potentiometer	• Adjust the output frequency; • Adjust the output frequency with the main frequency; • Limit the maximum torque; • Adjust the upper limit of output frequency; • Adjust the output voltage amplitude when V/F is separated.

4.2. Keyboard display

The display allows you to switch between screens showing shutdown status, operation status, function code editing status, and fault alarm status.



4.2.1. Shutdown screen

When the inverter is in shutdown mode, the display shows the shutdown status parameters. In the shutdown state, a variety of state parameters can be displayed. Starting from the screen showing FA-04 (shutdown status), you can select to show those parameters by changing the two-digital fields. For the definition of each digital code, please refer to the description of the FA-04 function codes.

Under the shutdown status, there are 11 parameters available, which are: Frequency settings, Bus voltage, DI input status, DO output status, AI1 voltage, AI2 voltage, Count value, Length value, PLC stage, Load speed, PULSE input pulse frequency. You can select to show those parameters circularly by changing the two-digital fields starting from FA-04 by pressing 》/SHIFT button.

4.2.2. Operation status screen

Once the inverter receives a valid running command and enters the running state, the keyboard displays the operation state parameter, the "RUN" indicator on the keyboard lights on while the "FWD/REV" light is on or off depending on the motor turning direction.

Under this operation status, there are 32 parameters available, which are: Operating frequency, Frequency setting, Bus voltage, Output voltage, Output current, Output power, Output torque, DI input status, DO output status, AI1 voltage, AI2 voltage, Count value, Length value, Load speed, PID setting , PID feedback, PLC stage, PULSE input pulse frequency, Operating frequency 2, Remaining running time, Linear speed, Current power-on time, Current operation time, PULSE input pulse frequency, Communication setting, Main frequency X, Auxiliary frequency Y, Target torque value, Power factor angle, VF separation target voltage, Visual DI input status, and Visual DO input status. Starting from code “FA-02” or “FA-03”, press <DATA> button to activate the two digital selection and press < 》/SHIFT > button to circularly change the parameter code.

4.2.3. Fault status screen

When the inverter detects a fault signal, it enters the fault alarm status, the keyboard displays the fault code, and the "TC" indicator on the keyboard flashes. The fault reset operation can be executed via the "STOP/RST" key, control terminal or a communication command.

As long as the fault persists, the fault code will be displayed.

4.2.4. Function code editing screen

In the shutdown, operation or fault alarm screens, you can press the "PRG/ESC" key to enter the editing screen (if a user password is required here, see the description of FF-00), the editing

screen is a three-level menu, and the levels are: Function code set → Function code label →

Function code parameter. By pressing the "DATA/ENT" key, you can enter into the function code label screen and then the function parameter screen. In the function parameter screen, you can save the parameter by pressing the "DATA/ENT" key. By pressing the "PRG/ESC", you can exit the current menu and back to the previous menu screen.

4.3. Keyboard operation

Various operations of the inverter can be executed via the keyboard. For the description of function codes, please see the function code summary table.

4.3.1. Modification of the inverter function code

The inverter provides a three-level menu, and the three levels are:

1. Function code set number (First level menu);
2. Function code label (Second level menu);
3. Function code value (Third level menu)

NOTICE: When in the third-level menu, a press on the "PRG/ESC" key or the "DATA/ENT" key allows you to return to the second-level menu. The difference between the two keys is:

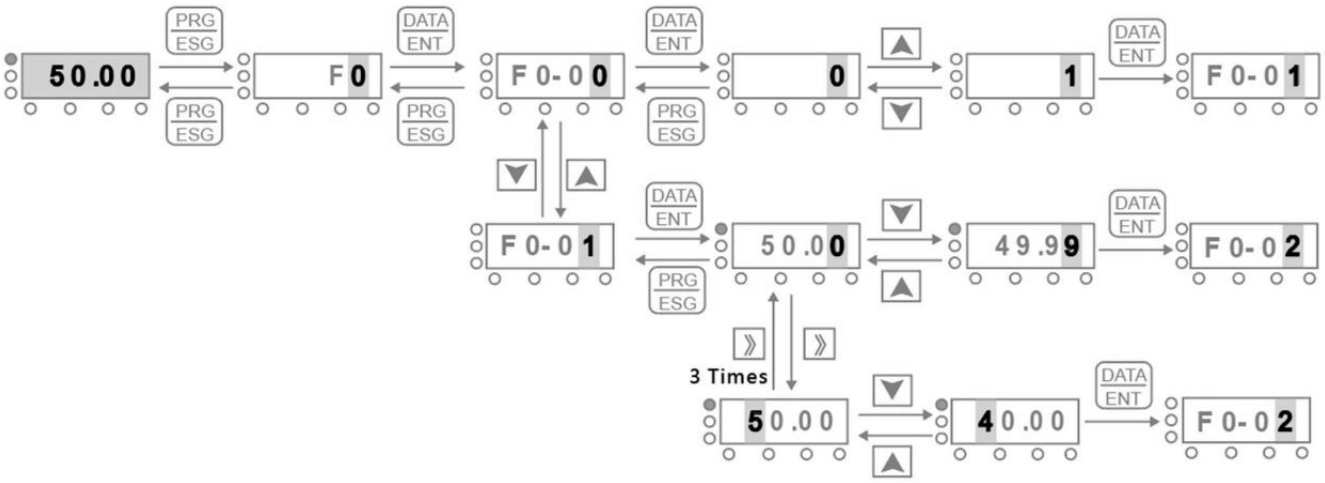
A press on the “DATA/ENT” key will first save the parameter of the current function code and then not only return to the second-level menu but also move to the next function code.

A press on the "PRG/ESC" key will directly return to the second-level menu and at the current function code, without saving the parameter.

In the three-level menu, if none of the parameter digits is flashing, it means that the function code cannot be modified due to one of the reasons below:

- This parameter is one of the unmodifiable parameters such as testing parameters, recorded operating parameters, etc;
- This parameter cannot be modified in the operation state. The modification is allowed only when the inverter is stopped.

Example: Modifying the parameter of the function code code F0-00 from 0 to 1; F0-01 from 50.00 to 50.01 or 40.00.



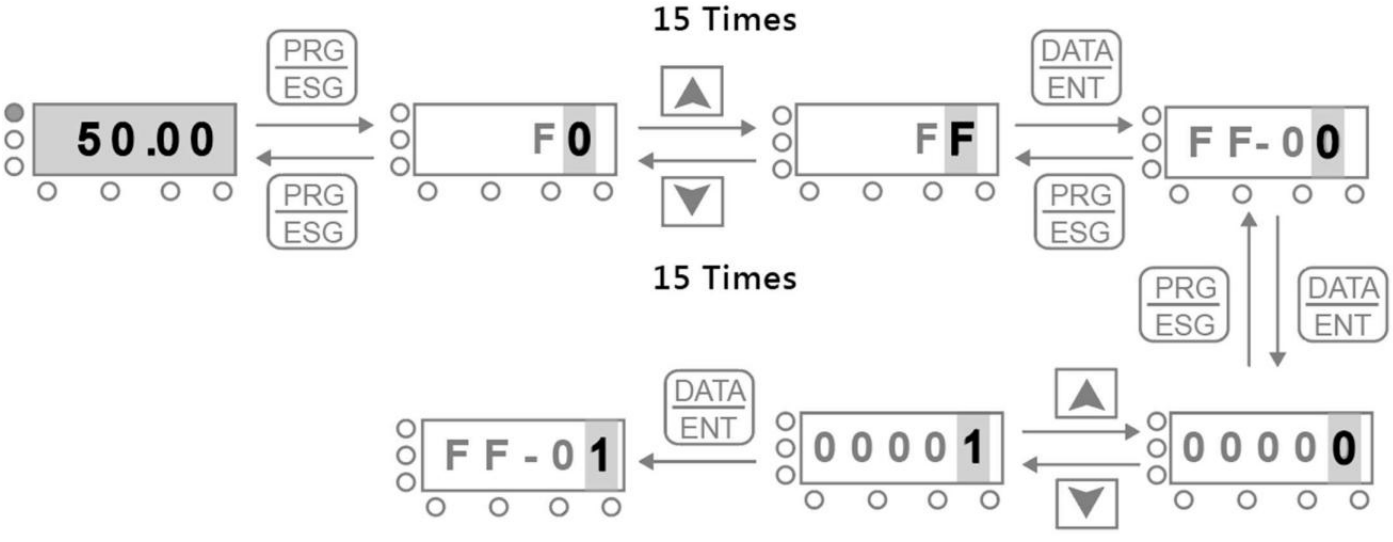
Parameter modification diagram

4.3.2. Password protection

The inverter comes with a user password protection feature. When FF-00 is change to a non-zero value, the value becomes the user password and will be effective after you exit from the function code editing state. Afterward, every time you press the "PRG/ESC" key to try editing the function code, "00000" will be displayed and prompt you to enter the password and only correct password allows you to go further.

If you want to disable the password feature, just set the FF-00 to 0.

The password feature will become effective in one minute after you exit the function code editing state. Afterward, every time you press the "PRG/ESC" key to try editing the function code, "00000" will be displayed and prompt you to enter the password and only correct password allows you to go further.



Password setting diagram

5. Function parameter list

The function parameters of the inverter series inverters are grouped by their functions into 22 sets including F0 ~ F9, FA ~ FF, P0 ~ P4,P8, and U0. Each function set consists of several function codes. A three-level menu is built here to allow you to access and handle the function codes. For example, "F1-06" means the No. 6 function code of the F1 set.

In order to facilitate the setting of function codes via the keyboard, the first-level menu shows the function set number, the second-level menu shows the function code number, and the third-level menu shows the function code parameter.

1. The columns of the function table are as follows:

The first column is "Function code", which is the numbering of the corresponding function parameter sets and parameters;

The second column is "Name", which is the full name of the corresponding function parameter;

The third column is "Range", which describes the details of the corresponding function parameter;

The forth column is "Default", which is the default value of the corresponding function parameter;

The fifth column is "Modification", which is the modification attribute showing the modifiable availability and condition as described below:

"☆": It is modifiable no matter the inverter is in stop or running mode;

"★": It is not modifiable if the inverter is running;

"●": It is non-modifiable because it is a test record.

(The inverter will automatically check and save the attribute of each parameter to prevent the parameters from being accidently changed.)

2. The parameter is expressed in decimal (DEC) format. If it is changed to hexadecimal format, each digit of the parameter value can be edited independently and ranges from 0 to F.

3. "Default" indicates that the corresponding function code parameter has been refreshed and restored to its default value as a result of a restore operation. But the detected and recorded values will not be restored.

4. In order to protect the parameters more effectively, the inverter comes with a password protection feature. Once a user password is set and activated (where the non-0 parameter of FF-00 is the password), every time the user press the PRG/ESC key and try to edit function codes, the system will first prompt for the user password verification by displaying "00000". Unless the user enters the correct user password, the system will not allow further action. For the manufacturer setting parameters, a manufacturer's password must be entered correctly before

editing. (It is advised users not to modify the parameters set by the manufacturer. If the parameters are set incorrectly, the inverter may work abnormally or even be damaged.) When the password protection feature is not activated, the user password can be changed at any time. Only the password set last time will be the one to be used. When the value of FF-00 is set to 0, the user password feature will be disable; if the value is not 0, said value will become the password protecting the parameters from being modified. The user password feature also applies for the modification attempt via a serial communication.

NOTICE: The inverter will automatically check and save the modification attribute of each parameter to prevent the parameters from being accidently changed.

5.1 F0 (Basic function)

Code	Name	Range	Default	Modification
F0-00	First motor control method	0：Speed sensor less vector control (SVC) 1：V/F control	0	*
F0-01	Preset frequency	0.00Hz ~ Max. frequency (F0-09)	50.00Hz	☆
F0-02	Main frequency source X selection	0: Digital setting (preset frequency F0-01, UP/DOWN modifiable, data loss when power off) 1: Digital setting (preset frequency F0-01, UP/DOWN modifiable, Power off memory) 2：AI1 3: AI2 (rotary potentiometer) 4: PULSE pulse setting (simplified version is DI4, standard version is DI5) 5: Multiple instructions 6: Simple PLC 7: PID 8: Communication setting	0	*
F0-03	Auxiliary frequency source Y selection	Same as F0-02 (Main frequency source X selection)	0	*
F0-04	Y range selection of auxiliary frequency source during superposition	0：Relative to the maximum frequency 1：Relative to frequency source X	0	☆
F0-05	Y range of auxiliary frequency source when superposition	0% ~ 150%	0%	☆
F0-06	Frequency source superposition selection	Units digit: Frequency source selection 0: Main frequency source X 1: Result of Main and auxiliary calculation (the algorithm used here is determined by the tenth digit) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between main frequency source X and result of main and auxiliary calculation results 4: Switch between auxiliary frequency source Y and result of main and	00	☆

Code	Name	Range	Default	Modification
		auxiliary calculation Tens digit: Algorithm of main and auxiliary frequency source calculation 0: Main + Auxiliary 1: Main—Auxiliary 2: The bigger one of the two 3: The smaller one of the two		
F0-07	Frequency digital setting memory after shutdown	0:dumped ; 1:saved	0	☆
F0-08	Operation direction selection	0: Default direction (FWD/REV indicator off) 1: Opposite of the default direction (FWD/REV indicator always on)	0	☆
F0-09	Maximum frequency	50.00Hz ~ 500.00Hz	50.00Hz	★
F0-10	Upper limit frequency source	0: F0-11 setting 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication setting	0	★
F0-11	Upper frequency	Lower limit frequency F0-12 ~ Maximum frequency F0-09	50.00Hz	☆
F0-12	Lower limit frequency	0.00Hz ~ Upper limit frequency F0-11	0.00Hz	☆
F0-13	Acceleration time 1	0.00s ~ 650.00s(F0-15=2) 0.0s ~ 6500.0s(F0-15=1) 0s ~ 65000s(F0-15=0)	Model determination	☆
F0-14	Deceleration time 1	0.00s ~ 650.00s(F0-15=2) 0.0s ~ 6500.0s(F0-15=1) 0s ~ 65000s(F0-15=0)	Model determination	☆
F0-15	Acceleration and deceleration time unit	0：1s 1：0.1s 2：0.01s	1	★
F0-16	Base frequency of acceleration and deceleration time	0：Maximum frequency (F0-09) 1：Set frequency (F0-01) 2：100Hz	0	★
F0-18	Carrier frequency	0.8kHz ~ 8.0kHz	Model determination	☆

Code	Name	Range	Default	Modification
F0-19	Temperature based adjustment for carrier frequency	0：Disable 1：Enable (carrier frequency lower limit 1 KHz) 2：Enable (carrier frequency lower limit 2 KHz) 3：Enable (carrier frequency lower limit 3 KHz) 4：Enable (carrier frequency lower limit 4 KHz)	1	☆
F0-20	Command source bundling frequency source	Units digit: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency 2: AI1 3: AI2 (rotary potentiometer) 4: PULSE pulse setting (simplified version is DI4, standard version is DI5) 5: Multi-speed 6: Simple PLC 7: PID 8: Communication setting Tens digit: Terminal command binding frequency source selection（As same as the unit digit） Hundreds digit: Communication command binding frequency source selection（As same as the unit digit）	0	☆
F0-21	Command source selection	0: Operation panel command channel (LED off) 1: Terminal command channel (LED on) 2: Communication command channel (LED flashing)	0	☆
F0-22	GP type display	1: G type (constant torque load) 2: P type (air blower, pump load)	Model determination	●

5.2 F1 set (Start/Stop control parameters)

Code	Name	Range	Default	Modification
F1-00	Start method	0: Direct start-up 1: Speed tracking start-up 2: Asynchronous motor excitation start	0	☆
F1-01	Speed tracking method	0: Start from the stop frequency 1: Start from power frequency 2: Start from the maximum frequency	0	★
F1-02	Start frequency	0.00Hz ~ 10.00Hz	0.00Hz	☆
F1-03	Start frequency hold time	0.0s ~ 100.0s	0.0s	★

Code	Name	Range	Default	Modification
F1-04	Start DC braking current	0 ~ 100%	0%	*
F1-05	Start DC braking time	0.0s ~ 100.0s	0.0s	*
F1-06	Stop method	0: By deceleration control 1: Free stop	0	☆
F1-07	Start frequency of DC braking stop	0.00Hz ~ Maximum frequency	0.00Hz	☆
F1-08	Waiting time of DC braking stop	0.0s ~ 100.0s	0.0s	☆
F1-09	DC braking stop current	0% ~ 100%	0%	☆
F1-10	DC braking stop time	0.0s ~ 100.0s	0.0s	☆
F1-11	Acceleration and deceleration method	0: Linear acceleration and deceleration 1: S curve acceleration and deceleration A 2: S curve acceleration and deceleration B	0	*
F1-12	S curve start time ratio	0.0% ~ (100.0%-F1-13)	30.0%	*
F1-13	S curve end time ratio	0.0% ~ (100.0%-F1-12)	30.0%	*
F1-14	Dynamic braking point	Single-Phase models: 200.0 ~ 410.0V Three-Phase models: 310.0 ~ 800.0V	Model determination	☆
F1-15	Brake usage rate	0 ~ 100%	100%	☆
F1-16	Motor speed tracks tempo	1~ 100	20	☆
F1-17	Motor speed tracks close-loop current KP	0~ 1000	500	☆
F1-18	Motor speed tracks close-loop current KI	0~ 1000	800	☆
F1-19	Motor speed tracks close-loop current value	30~ 200	100	*
F1-20	Motor speed tracks close-loop current limit value	10~ 100	30	*
F1-21	Motor speed tracks voltage rise time	0.5~ 3.0	1.1	*
F1-22	De-magnetizing time	0.00~ 5.00	1.00	*

5.3 F2 set V/F control parameters

Code	Name	Range	Default	Modification
F2-00	Torque boost	0.0%：(Automatic torque boost) 0.1% ~ 30.0%	Model determination	☆
F2-01	Torque boost cut-off frequency	0.00Hz ~ Maximum frequency (F0-09)	10.00Hz	★
F2-02	VF slip compensation gain	0.0% ~ 200.0%	0.0%	☆
F2-03	VF overexcitation gain	0 ~ 200	Model determination	☆
F2-04	VF oscillation suppression gain	0 ~ 100	Model determination	☆
F2-05	VF curve setting	0: Linear V/F 1: Multipoint V/F 2: Square V/F 3: 1.2 power V/F 4: 1.4 power V/F 5: 1.6 power V/F 6: 1.8 power V/F 10: VF full separate mode 11: VF semi-separate mode	0	★
F2-06	Multipoint VF frequency point 1	0.00Hz ~ F2-08	0.00Hz	★
F2-07	Multi-point VF voltage point 1	0.0% ~ 100.0%	0.0%	★
F2-08	Multipoint VF frequency point 2	F2-06 ~ F2-10	0.00Hz	★
F2-09	Multi-point VF voltage point 2	0.0% ~ 100.0%	0.0%	★
F2-10	Multipoint VF frequency point 3	F2-08 ~ Motor rated frequency (F3-03)	0.00Hz	★
F2-11	Multi-point VF voltage point 3	0.0% ~ 100.0%	0.0%	★
F2-12	Oscillation suppression gain mode	0 ~ 4	3	★
F2-13	VF separate voltage source	0: Digital setting (F2-14) 1: AI1 2: AI2 (rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Multi-segment instructions 5: Simple PLC 6: PID 7: Communication setting NOTICE: 100.0% correspond to the	0	☆

Code	Name	Range	Default	Modification
		rated voltage of the motor		
F2-14	VF separate voltage digital setting	0V ~ Rated voltage of motor (F3-01)	0V	☆
F2-15	Voltage acceleration time of VF separation	0.0s ~ 1000.0s NOTICE: The time interval from 0V to the rated voltage of the motor	0.0s	☆
F2-16	Voltage deceleration time of VF separation	0.0s ～ 1000.0s NOTICE: The time interval from 0V to the rated voltage of the motor	0.0s	☆
F2-17	Shutdown mode selection of VF separation	0：Frequency/voltage independently reduced to 0 1: After the voltage is reduced to 0, the frequency is reduced again	0	☆
F2-18	Action current of overcurrent stall	50 ~ 200%	150%	★
F2-19	Overcurrent stall enable	0：Disable 1：Enable	1	★
F2-20	Suppression gain of overcurrent stall	0 ~ 100	20	☆
F2-21	Double speed over current stall action Current compensation coefficient	50 ~ 200%	50%	★
F2-22	Operation voltage of overvoltage stall	Single-Phase models: 160.0 ~ 410.0V Three-Phase models: 200.0 ~ 800.0V	Model determination	★
F2-23	Overvoltage stall enable	0：Disable 1：Enable	1	★
F2-24	Suppress frequency gain of overvoltage stall	0 ~ 100	30	☆
F2-25	Suppress voltage gain of overvoltage stall	0 ~ 100	30	☆
F2-26	Maximum ascent limit frequency of overvoltage stall	0 ~ 50Hz	5Hz	★
F2-27	Time constant of slip compensation	0.1 ~ 10.0	0.5	☆
F2-28	Automatic frequency rise enable	0：Disable 1：Enable	0	★
F2-29	Minimum Electric state torque current	10 ~ 100%	50%	★
F2-30	Maximum generating state torque current	10 ~ 100%	20%	★
F2-31	Automatic frequency rise KP	0 ~ 100	50	☆
F2-32	Automatic frequency rise KI	0 ~ 100	50	☆
F2-33	In-line torque compensation gain	80 ~ 150	100	★

5.4 F3 set (First motor vector control parameters)

Code	Name	Range	Default	Modification
F3-00	Motor rated power	0.1kW ~ 1000.0kW	Model determination	*
F3-01	Motor rated voltage	1V ~ 2000V	Model determination	*
F3-02	Motor rated current	0.01A ~ 655.35A (Inverter power ≤55kW) 0.1A ~ 6553.5A (Inverter power >55kW)	Model determination	*
F3-03	Motor rated frequency	0.01Hz ~ Maximum frequency	Model determination	*
F3-04	Motor rated speed	1rpm ~ 65535rpm	Model determination	*
F3-05	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	*
F3-06	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	*
F3-07	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (Inverter power ≤ 55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Tuning parameters	*
F3-08	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (Inverter power≤55kW) 0.01mH ~ 655.35mH (Inverter power>55kW)	Tuning parameters	*
F3-09	Asynchronous motor no-load current	0.01A ~ F3-02 (Inverter power≤55kW) 0.1A ~ F3-02 (Inverter power>55kW)	Tuning parameters	*
F3-10	Tuning options	0：No operation 1: Asynchronous machine static parameter tuning 2: Asynchronous machine dynamic complete tuning 3: Asynchronous machine static complete tuning	0	*

5.5 F4 set (Vector control parameters)

Code	Name	Range	Default	Modification
F4-00	Speed loop proportional gain 1	1 ~ 100	30	☆
F4-01	Speed loop integral time 1	0.01s ~ 10.00s	0.50s	☆

Code	Name	Range	Default	Modification
F4-02	Switching frequency 1	0.00 ~ F4-05	5.00Hz	☆
F4-03	Speed loop proportional gain 2	1 ~ 100	20	☆
F4-04	Speed loop integral time 2	0.01s ~ 10.00s	1.00s	☆
F4-05	Switching frequency 2	F4-02 ~ Maximum frequency (F0-09)	10.00Hz	☆
F4-06	SVC speed feedback filter time	0.000s ~ 1.000s	0.000s	☆
F4-07	Speed loop integral properties	Units digit: Integral separation 0: Disable 1: Enable	0	☆
F4-08	Vector control slip gain	50% ~ 200%	100%	☆
F4-09	Torque upper limit source for speed control mode	0: Function code F4-10 setting 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication setting The full scale of option 1-4 corresponds to F4-10	0	☆
F4-10	Torque upper limit digital setting for speed control mode	0.0% ~ 200.0%	150.0%	☆
F4-11	Speed control (brake) torque upper limit source	0：Function code F4-12 setting	0	☆
		1：AI1		
		2：AI2 (Rotary potentiometer)		
		3: PULSE pulse setting (simplified version is DI4, standard version is DI5)		
		4：Communication setting		
		1-4: Communication setting The full scale of option 1-4 corresponds to F4-12		
F4-12	Speed control (brake) torque upper limit digital setting	0.0% ～ 200.0%	150.0%	☆
F4-14	Proportional gain of excitation regulation	0 ～ 60000	2000	★
F4-15	Integrating gain of excitation regulation	0 ～ 60000	1300	★

Code	Name	Range	Default	Modification
F4-16	Proportional gain of torque adjustment	0 ～ 60000	2000	*
F4-17	Integrating gain of torque adjustment	0 ～ 60000	1300	*
F4-18	Synchro flux-weakening mode	0~ 2	0	☆
F4-19	Synchro flux-weakening factor	0~ 1	0	☆
F4-20	Maximum output voltage coefficient	100~ 110	Model determination	*
F4-21	Automatic tuning factor of flux-weakening	50~ 200	100	☆
F4-22	Generating state torque enable selection under speed mode	0~ 1	0	*

5.6 F5 set (Torque control parameters)

Code	Name	Range	Default	Modification
F5-00	Speed/torque control mode options	0: Speed control 1: Torque control	0	☆
F5-01	Torque setting source options for torque control mode	0: Digital setting (F5-03) 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication setting	0	☆
F5-03	Torque digital setting for torque control mode	-200.0% ~ 200.0%	150.0%	☆
F5-04	Torque filtering	0 ~ 100.0%	0.0%	☆
F5-05	Maximum frequency of torque forward	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆
F5-06	Torque reverse maximum frequency	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆
F5-07	Torque acceleration time	0.00s ~ 650.00s	0.00s	☆
F5-08	Torque deceleration time	0.00s ~ 650.00s	0.00s	☆

5.7 F6 set (Input terminal parameters)

Code	Name	Range	Default	Modification
F6-00	DI1 terminal function options	0: No function 1: Forward running FWD or running command 2: Reverse running REV or forward and reverse direction command (NOTICE: (Note: When set to 1, 2, it needs to be used in conjunction with F6-13 terminal command mode) 3: Three-line operation control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free stop 9: Fault reset (RESET) 10: Operation pause 11: External fault normally open input 12: Multi-section command terminal 1 13: Multi-segment command terminal 2 14: Multi-stage command terminal 3 15: Multi-section command terminal 4 16: Acceleration/deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keyboard) 20: Control command switching terminal 1 21: Prohibition of acceleration and deceleration 22: PID pause 23: PLC status reset 24: Swing frequency pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Disable torque control 30 PULSE pulse setting (simplified	1	★
F6-01	DI2 terminal function options		48	★
F6-02	DI3 terminal function options		49	★

Code	Name	Range	Default	Modification
		version is DI4, standard version is DI5) 31: Immediate DC braking 32: External fault normally closed input 33: Enable frequency modification 34: Reverse PID action direction 35: External stop terminal 1 36: Control command switching terminal 2 37: Suspend PID integration		
F6-03	DI4 terminal function options	38: Frequency source X and preset frequency switch 39: Frequency source Y and preset frequency switch 40: PID parameter switching 41: User-defined fault 1 42: User-defined fault 2	50	*
F6-04	DI5 terminal function selection (standard model only)	43: Speed control/torque control switch 44: Emergency stop 45: External stop terminal 2 46: Deceleration DC braking 47: Clear the current running time 48: High water level switch 49: Low water level switch 50: Forced mains power	0	*
F6-05	DI filter time	0.000s ~ 1.000s	0.010s	☆
F6-06	DI1 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-07	DI2 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-08	DI3 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-09	DI4 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-10	DI terminal active mode options	0: Active high 1: Active low Units digit: DI1 Tens digit: DI2 Hundreds digit: DI3 Thousands digit: DI4 tens of thousands:DI5	0	*
F6-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	*
F6-12	Terminal UP/DOWN change rate	0.001Hz/s ~ 65.535Hz/s	1.000Hz/s	☆

Code	Name	Range		Default	Modification
F6-13	AI curve 1 minimum input	0.00V ~ F6-15		0.00V	☆
F6-14	AI curve 1 minimum input corresponding setting	-100.0% ~ +100.0%		0.0%	☆
F6-15	AI curve 1 maximum input	F6-13 ~ +10.00V		10.00V	☆
F6-16	AI curve 1 maximum input corresponding setting	-100.0% ~ +100.0%		100.0%	☆
F6-17	AI1 filter time	0.00s ~ 10.00s		0.10s	☆
F6-18	AI curve 2 minimum input	0.00V ~ F6-20		0.00V	☆
F6-19	AI curve 2 minimum input corresponding setting	-100.0% ~ +100.0%		100.0%	☆
F6-20	AI curve 2 maximum input	F6-18 ~ +10.00V		2.8V	☆
F6-21	AI curve 2 maximum input corresponding setting	-100.0% ~ +100.0%		0.0%	☆
F6-22	AI2 filter time	0.00s ~ 10.00s		0.10s	☆
F6-23	AI curve selection	Units digit	AI1 curve selection	H.21	☆
		1	Curve 1 (2 points, see F6-13 ~ F6-16)		
		2	Curve 2 (2 points, see F6-18 ~ F6-21)		
		3	Curve 3（6points, see P3-04～P3-15）		
		Tens digit	AI2 curve selection（As same as the unit digit）		
F6-24	Options for AI lower than minimum input	Units digit	Option for AI1 lower than the minimum input setting	H.00	☆
		0	Minimum input setting		
		1	0.0%		
		Tens digit	AI2 is lower than the minimum input setting selection (same as the unites digit)		
F6-26	PULSE minimum input	0.00kHz ~ F6-28		0.00kHz	☆
F6-27	PULSE minimum input corresponding setting	-100.0% ~ 100.0%		0.0%	☆
F6-28	PULSE maximum input	F6-26 ~ 100.00kHz		50.00kHz	☆

Code	Name	Range	Default	Modification
F6-29	PULSE maximum input corresponding setting	-100.0% ~ 100.0%	100.0%	☆
F6-30	PULSE filter time	0.00s～10.00s	0.10s	☆
F6-31	AI1 terminal function selection	0: AI1 is analog input 1~50: AI1 is used as DI digital input, the function is the same as F6-00	0	★
F6-33	AI1 as a DI valid state selection	0: Active high 1: Active low	0	★

5.8 F7set (Output terminal parameters)

Code	Name	Range	Default	Modification
F7-00	Digital output selection	0: High-speed pulse output 1: Normal digital output	0	☆
F7-01	RELAY1 output function selection	0: No output 1: Inverter-in-operation 2: Fault output (for free stop fault) 3: Frequency level detection FDT1 output 4: Frequency reached 5: Running at zero speed (no output when inverter stops) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle completed 12: Accumulated operation time reached 13: Frequency being limited 14: Torque being limited 15: Operation ready 16: Upper limit frequency reached 17: Lower limit frequency reached (operation related) 18: Undervoltage status output 19: Communication settings 20: Operation at zero speed signal 2 (also output when operation stops) 21: Accumulated power-on time reached 22: Frequency level detection FDT2 23: Frequency 1 reached 24: Frequency 2 reached 25: Current 1 reached 26: Current 2 reached 27: Time out 28: AI1 input overloaded	38	☆

Code	Name	Range	Default	Modification
F7-02	DO output function selection	29: Load dropping 30: Reverse running 31: Zero current state 32: Module temperature reached 33: Output current limit exceeded 34: Lower limit frequency reached (also output when the inverter stops) 35: Alarm (all faults) 36: Operation Times Up 37 : Fault (only for free stop faults and not for undervoltage faults) 38: Power supply mode self-switching terminal	1	☆
F7-03	AO output function selection	0: Operating frequency 1: Set frequency 2: Output current 3: Output torque (absolute value of torque) 4: Output power 5: Output voltage 6: PULSE input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2 (keyboard rotary potentiometer) 9: Length 10: count value 11: Communication settings 12: Motor speed 13: Output current (100.0% corresponds to 1000.0A) 14: Output voltage (100.0% corresponds to 1000.0V) 15: Output torque (actual torque value)	0	☆
F7-04	High-speed pulse output function selection		0	☆
F7-05	Maximum frequency of high-speed pulse output	0.01KHz~100.00KHz	50.00KHz	☆
F7-06	AO bias coefficient	-100.0% ~ +100.0%	0.0%	☆
F7-07	AO gain	-10.00 ~ +10.00	1.00	☆
F7-08	AO output filter time	0.000s ~ 1.000s	0.000s	☆
F7-10	RELAY1 output delay time	0.0s ~ 3600.0s	0.0s	☆
F7-11	DO output delay time	0.0s ~ 3600.0s	0.0s	☆
F7-12	DO output valid state selection	0: Positive logic 1: Inverse logic Units digit: RELAY1 Tens digit: DO1	00	☆

5.9 F8 set (Fault and protection, accelerated overcurrent)

Code	Name	Range	Default	Modification
F8-00	Motor overload protection selection	0: Disable 1: Enable	1	☆
F8-01	Motor overload protection gain	0.20 ~ 10.00	1.00	☆
F8-02	Motor overload warning coefficient	50% ~ 100%	80%	☆
F8-03	Overvoltage stall gain	0 ~ 100	20	☆
F8-04	Overvoltage stall protection voltage	120% ~ 150%	130%	☆
F8-05	Overrun stall gain	0 ~ 100	20	☆
F8-06	Over-current stall protection current	100% ~ 200%	150%	☆
F8-07	Power-on ground short-circuit protection options	0: Disable 1: Enable	1	☆
F8-08	Automatic fault reset times	0 ~ 20	0	☆
F8-09	Fault during automatic reset Relay action selection	0: Operation halt 1: Operation	0	☆
F8-10	Automatic fault reset interval time	0.1s ~ 100.0s	1.0s	☆
F8-12	Output phase loss protection option	0: Disable 1: Enable	1	☆
F8-13	Type of first fault	0: No fault 1: Wave-by-wave current limiting fault 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: Undervoltage	–	●
F8-14	Type of second fault	10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: The module overheated 15: External fault 16: Communication abnormal	~	●

Code	Name	Range	Default	Modification
		17: Contactor abnormal 18: Abnormal current detection 19: Abnormal motor tuning		
F8-15	Type of third (latest) fault	20: Abnormal Parameter reading and writing 21: Inverter hardware abnormal 22: Ground short circuit of motor 23: Running time reached 24: User-defined fault 1 25: User-defined fault 2 26: Power-on time reached 27: Offload 28: PID feedback lost during operation (frequency source) 29: The speed deviation is too large (difference between reference and feedback) (the current 2.2KW VFD has none) 30: Motor overspeed (the current 2.2KW VFD has none) 31: inverter unit protection 32: code disc fault (the current 2.2KW VFD does not have one) 33: Motor overtemperature fault (the current 2.2KW VFD has none) 34: SVC stall failure 35: Magnetic pole position detection failed (the current 2.2KW VFD has none) 36: UVW signal feedback error (the current 2.2KW VFD has no) 37: Point-to-point slave failure (the current 2.2KW VFD has no) 38: Brake resistor short circuit (there is no current 2.2KW VFD) 39: Switch the motor during operation (the current 2.2KW VFD does not have one)	–	●
F8-16	Frequency at the third (latest) fault	–	–	●
F8-17	Current at the third (latest) fault	–	–	●
F8-18	Bus voltage at the third (latest) fault	–	–	●
F8-19	Input status at the third (latest) fault	–	–	●
F8-20	Output status at the third (latest) fault	–	–	●
F8-21	Inverter status at the third (latest) fault	–	–	●
F8-22	Power-on time at the third (latest) fault	–	–	●

Code	Name	Range		Default	Modification
F8-23	Operation time at the third (latest) fault	–		–	●
F8-24	Frequency at the second fault	–		–	●
F8-25	Current at the second fault	–		–	●
F8-26	Bus voltage at the second fault	–		–	●
F8-27	Input status at the second fault	–		–	●
F8-28	Output status at the second fault	–		–	●
F8-29	Inverter status at the second fault	–		–	●
F8-30	Power-on time at the second fault	–		–	●
F8-31	Operation time at the second fault	–		–	●
F8-32	Frequency at the first fault	–		–	●
F8-33	Current at the first fault	–		–	●
F8-34	Bus voltage at the first fault	–		–	●
F8-35	Input status at the first fault	–		–	●
F8-36	Output status at the first fault	–		–	●
F8-37	Inverter status at the first fault	–		–	●
F8-38	Power-on time at the first fault	–		–	●
F8-39	Operation time at the first fault	–		–	●
F8-40	Fault protection action selection 1	Units digit	Motor overload (E11)	00000	☆
		0	Free stop		
		1	Stop by shutdown sequence		
		2	Continue operation		
		Tens digit	Input phase loss(E12)		
		Hundreds digit	Output phase loss (E13) （As same as the unit digit）		
		Thousands digit	External failure (E15) （As same as the unit digit）		
		Ten	Communication abnormal		

Code	Name	Range		Default	Modification
		Thousands digit	(E16)（As same as the unit digit）		
F8-41	Fault protection action selection 2	Units digit	Function code reading and writing abnormal (E20)	00000	☆
		0	Free stop		
		1	Stop by shutdown sequence		
		Tens digit	Operation time reached (E23)（As same as the F8-40 unit digit）		
		Hundreds digit	User-defined fault 1(E24)（As same as the F8-40 unit digit）		
		Thousands digit	User-defined fault 2(E25)（As same as the F8-40 unit digit）		
		Ten Thousands digit	Power-on time reach(E26)（As same as the F8-40 unit digit）		
F8-42	Fault protection action selection 3	Units digit	Offload(E27) （ As same as the F8-40 unit digit ）	00000	☆
		Tens digit	PID feedback lost during operation (E28) (same as F8-40 ones)		
		Hundreds digit	Excessive speed deviation (E29) (same as F8-40 ones) (the current 2.2KW VFD has none)		
		Thousands digit	Motor overspeed (E30) (same as F8-40 units) (currently 2.2KW VFD does not have)		
		Ten Thousands digit	Magnetic pole position detection failure (E35) (same as F8-40 units) (currently 2.2KW VFD does not have)		
F8-43	Fault protection action selection 4	Units digit	Code disc failure (E32) (same as F8-40 units)	00000	☆
		Tens digit	Reserved		
		Hundreds digit	Reserved		
		Thousands digit	Reserved		
		Ten Thousands digit	Reserved		
F8-45	Frequency selection for continuous operation in spite of faults	0: Current operating frequency		0	☆
		1: Set frequency			
		2: Upper limit frequency			
		3: Lower limit frequency			
		4: Abnormal standby frequency			
F8-46	Abnormal backup	0.0% ~ 100.0%		100.0%	

Code	Name	Range	Default	Modification
	frequency	(100.0% corresponding to F0-09)		☆
F8-47	Instantaneous failure tolerance function selection	0: Invalid 1: Decelerate 2: Decelerate to stop	1	★
F8-48	Voltage set for suspending operation in case of instantaneous failure	80.0% ~ 100.0%	85.0%	★
F8-49	Voltage recovery waiting time for continuing operation in case of instantaneous failure	0.00s ~ 100.00s	0.50s	★
F8-50	Voltage set for continuing operation in case of instantaneous failure	60.0% ~ 100.0%(Standard bus voltage)	80.0%	★
F8-51	Offload protection options	0: Disable 1: Enable	0	☆
F8-52	Offload detection level	0.0% ~ 100.0%	10.0%	☆
F8-53	Offload detection time	0.0s ~ 60.0s	1.0s	☆

F8-54	Overspeed detection value	0.0% ~ 50.0%(Maximum frequency)	20.0%	☆
F8-55	Overspeed detection time	0.0s: No detection 0.1 ~ 60.0s	1.0s	☆
F8-56	Excessive speed deviation detection value	0.0% ~ 50.0%(Maximum frequency)	20.0%	☆
F8-57	Excessive speed deviation detection time	0.0s: No detection 0.1 ~ 60.0s	5.0s	☆
F8-58	Deceleration to stop Kp	0~100	30	★
F8-59	Deceleration to stop Ki	0.0~300.0	20.0	★
F8-60	Time setting of Deceleration to stop	0~6500.0s	10.0s	☆

5.10 F9 set(Auxiliary function parameters)

Code	Name	Range	Default	Modification
F9-00	Jog operation frequency	0.00Hz ~ Maximum frequency (F0-09)	5.00Hz	☆
F9-01	Jog acceleration time	0.0s ~ 6500.0s	20.0s	☆
F9-02	Jog deceleration time	0.0s ~ 6500.0s	20.0s	☆
F9-03	Acceleration time 2	0.0s ~ 6500.0s	Model determination	☆
F9-04	Deceleration time 2	0.0s ~ 6500.0s	Model determination	☆
F9-05	Acceleration time 3	0.0s ~ 6500.0s	Model determination	☆
F9-06	Deceleration time 3	0.0s ~ 6500.0s	Model determination	☆
F9-07	Acceleration time 4	0.0s ~ 6500.0s	Model determination	☆
F9-08	Deceleration time 4	0.0s ~ 6500.0s	Model determination	☆
F9-09	Acceleration time 1,2 switching frequency point	0.00Hz ~ Maximum frequency (F0-09)	0.00Hz	☆
F9-10	Deceleration time 1,2 switching frequency point	0.00Hz ~ Maximum frequency (F0-09)	0.00Hz	☆
F9-11	Terminal jog priority	0: Disable 1: Enable	0	☆
F9-12	Forward and reverse dead time	0.0s ~ 3000.0s	0.0s	☆
F9-13	Reverse control	0: Enable 1: Disable	0	☆
F9-14	Action when the set frequency is lower than lower limit frequency	0: Continue operation at lower limit frequency 1: Stop operation 2: Continue operation at zero speed	0	☆
F9-15	Power-on time limit	0h ~ 65000h	0h	☆
F9-16	Operation time limit	0h ~ 65000h	0h	☆
F9-17	Protection feature option	0: Disable 1: Enable	0	☆
F9-18	Frequency detection value (FDT1)	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆

Code	Name	Range	Default	Modification
F9-19	Frequency detection hysteresis value(FDT1)	0.0% ~ 100.0% (FDT1 level)	5.0%	☆
F9-20	Reached frequency detection range	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆
F9-21	Frequency detection value (FDT2)	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-22	Frequency detection hysteresis value (FDT2)	0.0% ~ 100.0% (FDT2 level)	5.0%	☆
F9-23	Arbitrary reached frequency detection value 1	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-24	Arbitrary reached frequency detection width 1	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆
F9-25	Arbitrary reached frequency detection value 2	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-26	Arbitrary reached frequency detection width 2	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆
F9-27	Zero current detection level	0.0% ~ 300.0% 100.0% corresponding to motor rated current	5.0%	☆
F9-28	Zero current detection delay time	0.01s ~ 600.00s	0.10s	☆
F9-29	The output current exceeds the limit	0.0% (No detection) 0.1% ~ 300.0% ((Motor rated current F3-02)	200.0%	☆
F9-30	Output overcurrent detection delay time	0.00s ~ 600.00s	0.00s	☆
F9-31	Arbitrary reached current 1	0.0% ~ 300.0%(Motor rated current F3-02)	100.0%	☆
F9-32	Arbitrary reached current 1 width	0.0% ~ 300.0%(Motor rated current F3-02)	0.0%	☆
F9-33	Arbitrary reached current 2	0.0% ~ 300.0%(Motor rated current F3-02)	100.0%	☆
F9-34	Arbitrary reached current 2 width	0.0% ~ 300.0%(Motor rated current F3-02)	0.0%	☆
F9-35	Timer feature option	0: Disable 1: Enable	0	★
F9-36	Timer operation time selection	0: F9-37 setting 1: AI1 2: AI2 (Rotary potentiometer) Analog input range corresponds to F9-37	0	★
F9-37	Timer counting time selection	0.0Min ~ 6500.0 Min	0.0Min	★
F9-38	Module temperature limit	0°C~ 100°C	75°C	☆

Code	Name	Range	Default	Modification
F9-39	Current operation time limit	0.0 ~ 6500.0 Min	0.0Min	*
F9-40	AI1 input voltage Lower limit of protection value	0.00V ~ F9-41	3.10V	☆
F9-41	AI1 input voltage Upper limit of protection value	F9-40 ~ 10.00V	6.80V	☆
F9-42	Cooling fan control	0: Fan runs during operation 1: Fan keeps running	0	☆
F9-43	Wake up frequency	Sleep frequency (F9-45) ~ Maximum frequency (F0-09)	0.00Hz	☆
F9-44	Wake-up delay time	0.0s ~ 6500.0s	0.0s	☆
F9-45	Sleep frequency	0.00Hz ~ Wake-up frequency (F9-43)	0.00Hz	☆
F9-46	Sleep delay time	0.0s ~ 6500.0s	0.0s	☆
F9-47	Output power factor	0.0~200.0	100.0	☆
F9-48	Skip frequency enable	0: disabled 1: enable	0	☆
F9-49	Hop Frequency 1	0.00Hz ~ maximum frequency (F0-09)	0.00Hz	☆
F9-50	Hop Frequency 2	0.00Hz ~ maximum frequency (F0-09)	0.00Hz	☆
F9-51	Jump range	0.00Hz ~ maximum frequency (F0-09)	0.00Hz	☆

5.11 FA set (Keyboard and display parameters)

Code	Name	Range	Default	Modification
FA-00	QUICK/JOG key function	0：QUICK/JOG disabled 1: Switch between operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward jog 4: Reverse jog	0	*
FA-01	STOP/RST key function	0: Only in keyboard operation mode, the stop function of STOP/RST key is enabled 1: In any operation mode, the stop function of the STOP/RST key is enabled	1	☆
FA-02	LED display parameters 1 for	0000 ~ FFFF Bit00: Operation frequency 1 (Hz)	H.003F	☆

Code	Name	Range	Default	Modification
	operation mode	Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Count value Bit12: Length value Bit13: Load speed display Bit14: PID setting Bit15: PID feedback		
FA-03	LEDLED display parameters 2 for operation mode	0000 ~ FFFF Bit00: PLC stage Bit01: PULSE input pulse frequency (kHz) Bit02: Operation frequency 2 (Hz) Bit03: Remaining operation time Bit04: Linear speed Bit05: Current power-on time (Hour) Bit06: Current running time (Min) Bit07: PULSE input pulse frequency (Hz) Bit08: Communication setting value Bit09: Main frequency X display (Hz) Bit10: Auxiliary frequency Y display (Hz) Bit11: Target torque value Bit12: Power factor angle Bit13: VF separation target voltage (V) Bit14: VF separation output voltage (V) Bit15: Actual feedback speed (Hz)	H.0000	☆
FA-04	LED display parameters for stop mode	0001～FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Count value Bit07: Length value Bit08: PLC stage	H.0033	☆

Code	Name	Range	Default	Modification
		Bit09: Load speed Bit10: PULSE input pulse frequency (kHz)		
FA-05	Load speed display coefficient	0.0001 ~ 6.5000	1.0000	☆
FA-06	Inverter module radiator temperature	-20.0℃ ~ 100.0℃	-	●
FA-07	Cumulative operation time	0h ~ 65535h	-	●
FA-08	Load speed display decimal places	Unit digit: Load speed display U0-13 decimal places 0: 0 decimal digit 1: 1 decimal digit 2: 2 decimal digits 3: 3 decimal digits Tens digit: U0-18/U0-34 display decimal places 1: 1 decimal place 2: 2 decimal place	21	☆
FA-09	Accumulated power-on time	0 ~ 65535h	-	●
FA-10	Accumulated power consumption	0 ~ 65535kw/h	-	●
FA-11	Product code	-	-	●
FA-12	Software version number	-	-	●
FA-13	Modbus protocol version	-	-	●

5.12 FB set (Control optimization parameters)

Code	Name	Range	Default	Modification
FB-00	DPWM switching upper limit frequency	0.00Hz ~ 15.00Hz	12.00Hz	☆
FB-01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	☆
FB-02	Random PWM	0: Random PWM is invalid 1 ~ 10: PWM carrier frequency random depth	0	☆
FB-03	Dead zone compensation mode selection	0：Disable 1：Enable	1	☆
FB-05	Wave-by-wave current limit enable	0：Disable 1：Enable	1	☆
FB-07	Undervoltage point setting	120.0～FB-08 (single phase) 120.0～FB-08 (three-phase)	130.0 (single phase)	★

Code	Name	Range	Default	Modification
			230.0 (three-phase)	
FB-08	Overvoltage point setting	FB-07～450.0V (single phase) FB-07～850.0V (three-phase)	450.0 (single phase) 810.0 (three-phase)	*
FB-09	SVC optimization mode selection	0：Not optimized 1：Optimization mode 1 2：Optimization mode 2	2	*

5.13 FC set (PID function parameters)

Code	Name	Range	Default	Modification
FC-00	PID set-point source	0: FC-01 setting 1: AI1 2: AI2 (Keyboard rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication 5: Multi-step instruction	0	☆
FC-01	PID value set-point	0.0% ~ 100.0%	50.0%	☆
FC-02	PID feedback source	0: AI1 1: PULSE pulse setting (simplified version is DI4, standard version is DI5) 2: Communication setting	0	☆
FC-03	PID action direction	0: Forward 1: Reverse	0	☆
FC-04	PID set-point feedback range	0 ~ 65535	1000	☆
FC-05	Proportional gain Kp1	0.0 ~ 1000.0	20.0	☆
FC-06	Integration time Ti1	0.01s ~ 10.00s	2.00s	☆
FC-07	Differential time Td1	0.000s ~ 10.000s	0.000s	☆
FC-08	PID reverse cutoff frequency	0.00 ~ Maximum frequency (F0-09)	2.00Hz	☆
FC-09	PID deviation limit	0.0% ~ 100.0%	0.0%	☆
FC-10	PID differential limit	0.00% ~ 100.00%	0.10%	☆
FC-11	PID set-point change time	0.00 ~ 650.00s	0.00s	☆
FC-12	PID feedback filter time	0.00 ~ 60.00s	0.00s	☆
FC-13	PID output filter time	0.00 ~ 60.00s	0.00s	☆

Code	Name	Range	Default	Modification
FC-14	Factory reserved	——	——	———
FC-15	Proportional gain Kp2	0.0 ~ 100.0	20.0	☆
FC-16	Integration time Ti2	0.01s ~ 10.00s	2.00s	☆
FC-17	Differential time Td2	0.000s ~ 10.000s	0.000s	☆
FC-18	PID parameter switching conditions	0: Never 1: Switch via DI terminal 2: Automatically switch according to deviation	0	☆
FC-19	PID parameter switching deviation 1	0.0% ~ FC-20	20.0%	☆
FC-20	PID parameter switching deviation 2	FC-19 ~ 100.0%	80.0%	☆
FC-21	PID initial value	0.0% ~ 100.0%	0.0%	☆
FC-22	PID initial value holding time	0.00 ~ 650.00s	0.00s	☆
FC-23	The maximum deviation between two PID outputs	0.00% ~ 100.00%	1.00%	☆
FC-24	The minimum deviation between two PID outputs	0.00% ~ 100.00%	1.00%	☆
FC-25	PID integral properties	Units digit: integral separation 0: invalid 1: Effective Tens digit: Whether to stop integration after output reaches limit 0: Continue 1: Stop	00	☆
FC-26	PID feedback loss detection value	0.0%: No feedback loss detection 0.1% ~ 100.0%	0.0%	☆
FC-27	PID feedback loss detection time	0.0s ~ 20.0s	0.0s	☆
FC-28	PID operation mode	0: No operation when the inverter stops 1: Proceed operation when the inverter stops	0	☆

5.14 FD set (Swing frequency, fixed length and counting parameters)

Code	Name	Range	Default	Modification
FD-00	Swing frequency setting	0: Relative to the center frequency 1: Relative to the maximum frequency	0	☆

Code	Name	Range	Default	Modification
FD-01	Swing frequency amplitude	0.0% ~ 100.0%	0.0%	☆
FD-02	Kick frequency amplitude	0.0% ~ 50.0%	0.0%	☆
FD-03	Swing frequency period	0.1s ~ 3000.0s	10.0s	☆
FD-04	Triangular wave rise time of swing frequency	0.1% ~ 100.0%	50.0%	☆
FD-05	Set length	0m ~ 65535m	1000m	☆
FD-06	Actual length	0m ~ 65535m	0m	☆
FD-07	Number of pulses per meter	0.1 ~ 6553.5	100.0	☆
FD-08	Set count value	1 ~ 65535	1000	☆
FD-09	Designated count value	1 ~ 65535	1000	☆

5.15 FE set (Multi-segment instruction, simple PLC parameters)

Code	Name	Range	Default	Modification
FE-00	Multi-segment command 0	-100.0% ~ 100.0%	0.0%	☆
FE-01	Multi-segment command 1	-100.0% ~ 100.0%	0.0%	☆
FE-02	Multi-segment command 2	-100.0% ~ 100.0%	0.0%	☆
FE-03	Multi-segment command 3	-100.0% ~ 100.0%	0.0%	☆
FE-04	Multi-segment command 4	-100.0% ~ 100.0%	0.0%	☆
FE-05	Multi-segment command 5	-100.0% ~ 100.0%	0.0%	☆
FE-06	Multi-segment command 6	-100.0% ~ 100.0%	0.0%	☆
FE-07	Multi-segment command 7	-100.0% ~ 100.0%	0.0%	☆
FE-08	Multi-segment command 8	-100.0% ~ 100.0%	0.0%	☆
FE-09	Multi-segment command 9	-100.0% ~ 100.0%	0.0%	☆
FE-10	Multi-segment command 10	-100.0% ~ 100.0%	0.0%	☆
FE-11	Multi-segment command 11	-100.0% ~ 100.0%	0.0%	☆
FE-12	Multi-segment command 12	-100.0% ~ 100.0%	0.0%	☆
FE-13	Multi-segment command 13	-100.0% ~ 100.0%	0.0%	☆
FE-14	Multi-segment command 14	-100.0% ~ 100.0%	0.0%	☆
FE-15	Multi-segment command 15	-100.0% ~ 100.0%	0.0%	☆
FE-16	PLC operation mode	0: Stop at the end of a single operation 1: Stop at the end a single operation and keep the end value	0	☆

Code	Name	Range		Default	Modification
		2: Repeat operation			
FE-17	PLC power down memory selection	Units digit	Memory save option for Power-down	00	☆
		0	Don't save		
		1	Save		
		Tens digit	Memory save option for shutdown		
		0	Don't save		
		1	Save		
FE-18	PLC segment 0 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-19	PLC section 0 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-20	PLC segment 1 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-21	PLC section 1 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-22	PLC segment 2 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-23	PLC section 2 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-24	PLC segment 3 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-25	PLC section 3 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-26	PLC segment 4 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-27	PLC section 4 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-28	PLC segment 5 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-29	PLC section 5 acceleration and deceleration time selection	0 ~ 3		0	☆
FE-30	PLC segment 6 execution time selection	0.0s(h) ~ 6553.5s(h)		0.0s(h)	☆
FE-31	PLC section 6 acceleration and deceleration time selection	0 ~ 3		0	☆

Code	Name	Range	Default	Modification
FE-32	PLC segment 7 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-33	PLC section 7 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-34	PLC segment 8 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-35	PLC section 8 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-36	PLC segment 9 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-37	PLC section 9 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-38	PLC segment 10 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-39	PLC section 10 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-40	PLC segment 11 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-41	PLC section 11 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-42	PLC segment 12 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-43	PLC section 12 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-44	PLC segment 13 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-45	PLC section 13 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-46	PLC segment 14 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-47	PLC section 14 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-48	PLC segment 15 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆

Code	Name	Range	Default	Modification
FE-49	PLC section 15 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-50	PLC operation time unit	0: s (second) 1: h (hour)	0	☆
FE-51	Multi-segment command 0 set-point options	0: Function code FE-00 1: AI1 2: AI2 (keyboard rotary potentiometer) 3: PULSE pulse (simplified version is DI4, standard version is DI5) 4: PID 5: Set by preset frequency (F0-01) and adjustable using UP/DOWN keys	0	☆

5.16 FF set (Function code management parameters)

Code	Name	Range	Default	Modification
FF-00	User password	0 ~ 65535	0	☆
FF-01	Parameter initialization	0: No operation 1: Restore parameters to factory values, except motor parameters 2: Clear recorded data 4: Backup user's current parameters 5: Restore to user's backup parameters	0	★
FF-02	Function parameter set display options	Units digit: U set display 0: Disable 1: Enable Tens digit: P set display 0: Disable 1: Enable	11	☆
FF-03	Customized parameter set display selection	Units digit: User-defined parameter set display 0: Disable 1: Enable Tens digit: User-modified parameter set display 0: Disable 1: Enable	00	☆
FF-04	Parameter protection	0: Parameters can be modified 1: Only this parameter can be modified	0	☆

5.17 P0 set (Communication parameters)

Code	Name	Range	Default	Modification
P0-00	Baud rate	0: 300BPS 1: 600BPS 2: 1200BPS	5	★

Code	Name	Range	Default	Modification
		3: 2400BPS		
		4: 4800BPS		
		5: 9600BPS		
		6: 19200BPS		
		7: 38400BPS		
		8: 57600BPS		
		9: 115200BPS		
P0-01	Data Format	0: No parity (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1)	0	☆
P0-02	Local address	0：Broadcast address 1 ~ 247	1	☆
P0-03	Response delay	0 ~ 20ms	2	☆
P0-04	Communication timeout	0.0: Invalid 0.1 ~ 60.0s	0	☆
P0-05	MODBUS communication data format	0: non-standard MODBUS protocol 1: Standard MODBUS protocol	0	☆
P0-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆

5.18 P2 set (AIAO calibration parameters)

Code	Name	Range	Default	Modification
P2-00	AI1 given voltage 1	0.500V～4.000V	Factory calibration	☆
P2-01	AI1 measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-02	AI1 given voltage 2	6.000V～9.999V	Factory calibration	☆
P2-03	AI1 measured voltage 2	6.000V～9.999V	Factory calibration	☆
P2-04	AI2 given voltage 1	0.500V～4.000V	Factory calibration	☆
P2-05	AI2 measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-06	AI2 given voltage 2	6.000V～9.999V	Factory calibration	☆
P2-07	AI2 measured voltage 2	6.000V～9.999V	Factory calibration	☆
P2-08	AO set voltage 1	0.500V～4.000V	Factory calibration	☆
P2-09	AO measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-10	AO set voltage 2	6.000V～9.999V	Factory	☆

Code	Name	Range	Default	Modification
			calibration	
P2-11	AO measured voltage 2	6.000V～9.999V	Factory calibration	☆

5.19 P3 set (AI curve setting parameters)

Code	Name	Range	Default	Modification
P3-00	AI1 jumping point	-100.0% ~ 100.0%	0.0%	☆
P3-01	AI1 jump range	0.0% ~ 100.0%	0.5%	☆
P3-02	AI2 jumping point	-100.0% ~ 100.0%	0.0%	☆
P3-03	AI2 jump range	0.0% ~ 100.0%	0.5%	☆
P3-04	AI curve minimum input 3	0.00V～P3-06	0.00V	☆
P3-05	AI curve minimum input 3 corresponding setting	-100.0%～+100.0%	0.0%	☆
P3-06	AI curve setting of 3 inflection point and 1 input value	P3-04～P3-08	2.00V	☆
P3-07	AI curve setting of 3 inflection point and 1 input value setting	-100.0%～+100.0%	20.0%	☆
P3-08	AI curve setting of 3 inflection point and 2 input value	P3-06～P3-10	4.00V	☆
P3-09	AI curve setting of 3 inflection point and 2 input value setting	-100.0%～+100.0%	40.0%	☆
P3-10	AI curve setting of 3 inflection point and 3 input value	P3-08～P3-12	6.00V	☆
P3-11	AI curve setting of 3 inflection point and 3 input value setting	-100.0%～+100.0%	60.0%	☆
P3-12	AI curve setting of 3 inflection point and 4 input value	P3-10～P3-14	8.00V	☆
P3-13	AI curve setting of 3 inflection point and 4 input value setting	-100.0%～+100.0%	80.0%	☆
P3-14	AI curve maximum input 3	P3-12～+10.00V	10.00V	☆
P3-15	AI curve maximum input 3 corresponding setting	-100.0%～+100.0%	100.0%	☆

5.20 P4 set (User-defined function code parameters)

Code	Name	Range	Default	Modification
P4-00	User-defined function code 0	F0-00 ~ FF-xx P0-00 ~ Px-xx U0-00 ~ U0-xx	F0.10	☆
P4-01	User-defined function code 1		F0.02	☆
P4-02	User-defined function code 2		F0.03	☆
P4-03	User-defined function code 3		F0.07	☆
P4-04	User-defined function code 4		F0.08	☆
P4-05	User-defined function code 5		F0.17	☆
P4-06	User-defined function code 6		F0.18	☆
P4-07	User-defined function code 7		F3.00	☆
P4-08	User-defined function code 8		F3.01	☆
P4-09	User-defined function code 9		F4.00	☆
P4-10	User-defined function code 10		F4.01	☆
P4-11	User-defined function code 11		F4.02	☆
P4-12	User-defined function code 12		F5.04	☆
P4-13	User-defined function code 13		F5.07	☆
P4-14	User-defined function code 14		F6.00	☆
P4-15	User-defined function code 15		F6.01	☆
P4-16	User-defined function code 16		F6.02	☆
P4-17	User-defined function code 17		F6.03	☆
P4-18	User-defined function code 18		F7.00	☆
P4-19	User-defined function code 19		F7.01	☆
P4-20	User-defined function code 20		F7.02	☆
P4-21	User-defined function code 21		F7.03	☆
P4-22	User-defined function code 22		FA.00	☆
P4-23	User-defined function code 23		F0.00	☆
P4-24	User-defined function code 24		F0.00	☆
P4-25	User-defined function code 25		F0.00	☆
P4-26	User-defined function code 26		F0.00	☆
P4-27	User-defined function code 27		F0.00	☆

Code	Name	Range	Default	Modification
P4-28	User-defined function code 28		F0.00	☆
P4-29	User-defined function code 29		F0.00	☆
P4-30	User-defined function code 30		F0.00	☆
P4-31	User-defined function code 31		F0.00	☆

5.21 P8 set (PV parameters)

Code	Name	Range	Default	Modification
P8-00	Photovoltaic water pump dedicated mode	0-Universal Inverter 1-Special inverter for photovoltaic water pump	1	★
P8-01	-	-	-	-
P8-02	MPPT start-up phase target voltage	0-100%	85%	☆
P8-03	MPPT voltage range lower limit	230.0～P8.04 (three-phase model) 150.0～P8.04 (single-phase model)	250.0V 150.0V	☆
P8-04	MPPT voltage range upper limit	P8.03～750.0V (three-phase model) P8.03～450.0V (single-phase model)	650.0V 400.0V	☆
P8-05	MPPT control Kp coefficient	0-100	35	☆
P8-06	MPPT control Ki coefficient	0-100	35	☆
P8-07	Dedicated mode power-on allowable operating voltage	160.0V-600.0V	4T:300.0V 2S:170.0V	☆
P8-08	MPPT upper limit frequency selection (reserved)	0-main frequency given 1-MPPT maximum frequency 2-Minimum of 0 and 1 options	1	☆
P8-09	Operating frequency lower limit setting	0.00-motor rated frequency	10.00Hz	☆
P8-10	Weak light judgment frequency threshold	0.00-motor rated frequency	20.00Hz	☆
P8-11	Low light judgment time	5.0-6553.5s	600.0s	☆
P8-12	Low light wake-up voltage threshold	0-1000.0v	20.0v	☆
P8-13	Low light wake up delay time	0.0-P8-14	200.0s	☆
P8-14	Low light forced wake-up delay time	P8-13-6553.5s	400.0s	☆
P8-15	Power supply selection	0 - self switching 1- Photovoltaic panel power supply 2- grid power supply	1	★
P8-16	Running time of grid power supply under self-	0.0-6553.5min	60.0min	☆

	switching power supply mode			
P8-17	Delay start time after switching to PV power supply under switching power supply mode	2.0-6553.5s	4.0s	☆
P8-18	AI water level detection enable	0 - invalid 1 - valid	0	*
P8-19	Reservoir full level threshold	0.0-100.0%	25.0%	☆
P8-20	Reservoir full water warning sleep delay	0.0-6553.5s	60.0s	☆
P8-21	Reservoir lack of water start delay	0.0-6553.5s	600.0s	☆
P8-22	Hydraulic Probe Damage Monitoring Threshold	0.0-100.0% (When 0.0%, the function is invalid)	0.0%	☆
P8-23	Underload protection enable	0-0 - invalid 1-1 - valid	0	☆
P8-24	Underload detection threshold	0.0-100.0%	25.0%	☆
P8-25	Underload detection time	0.0-1000.0s	60.0s	☆
P8-26	Underload fault reset start time	0.0-1000.0s	120.0s	☆
P8-27	Single-phase water pump mode enable (reserved)	0 - invalid 1 - valid	0	*

5.22 U0 set (Monitoring parameters)

Code	Name	Units	Communication address
U0-00	Operating frequency (Hz)	0.01Hz	7000H
U0-01	Setting frequency (Hz)	0.01Hz	7001H
U0-02	Bus voltage (V)	0.1V	7002H
U0-03	Output voltage (V)	1V	7003H
U0-04	Output current (A)	0.01A	7004H
U0-05	Output power (kW)	0.1kW	7005H
U0-06	Output torque (%)	0.10%	7006H
U0-07	DI input status	1	7007H
U0-08	DO output status	1	7008H
U0-09	AI1 voltage (V)	0.01V	7009H
U0-10	AI2 voltage (V)	0.01V	700AH
U0-11	Count value	1	700BH
U0-12	Length value	1	700CH
U0-13	Load speed display	0.1	700DH
U0-14	PID setting	1	700EH
U0-15	PID feedback	1	700FH

U0-16	PLC stage	1	7010H
U0-17	PULSE input pulse frequency (Hz)	0.01kHz	7011H
U0-18	Feedback speed (Hz)	0.1Hz	7012H
U0-19	Remaining running time	0.1Min	7013H
U0-20	Line speed	1m/Min	7014H
U0-21	Current power-on time	1Min	7015H
U0-22	Current running time	0.1Min	7016H
U0-23	PULSE input pulse frequency	1Hz	7017H
U0-24	Communication settings	0.01%	7018H
U0-25	Inverter running status	0.01Hz	7019H
U0-26	Main frequency X display	0.01Hz	701AH
U0-27	Auxiliary frequency Y display	0.01Hz	701BH
U0-28	Target torque (%)	0.10%	701CH
U0-29	Power factor	0.01	701DH
U0-30	VF separation target voltage	1V	701EH
U0-31	VF separation output voltage	1V	701FH
U0-32	VF oscillation coefficient	——	7020H
U0-33	Temperature	1°C	7021H
U0-34	Actual response speed (Hz)	0.1Hz	7022H
U0-35	Accident details	——	7023H
U0-40	DI input status visual display	——	7028H
U0-41	Visual display of DO output status	——	7029H
U0-42	DI function status visual display 1	——	702AH
U0-43	DI function status visual display 2	——	702BH
…	-	-	-
U0-47	Power supply	0-Grid 1-1-PV	702FH
…	-	-	-
U0-59	-	-	-

6. Detailed function description

6.1 F0 (Basic function)

Code	Name	Range	Default	Modification
F0-00	First motor control method	0：Speed sensor less vector control (SVC) 1：V/F control	0	*

0: SVC open-loop vector control, suitable for high-performance control occasions, one inverter can only drive one motor at the same time, and self-learning must be performed before the first operation. motor parameter settings)

1: V/F control: It is suitable for applications where the control accuracy is not high, or where one inverter drives multiple motors. Self-learning is recommended before the first run.

Code	Name	Range	Default	Modification
F0-01	Preset frequency	0.00Hz ~ Max. frequency (F0-09)	50.00Hz	☆

When the frequency source is "digital setting frequency", the function code value is the initial value of the frequency digital setting of the inverter, and its maximum value cannot exceed the maximum frequency F0-09.

Code	Name	Range	Default	Modification
F0-02	Main frequency source X selection	0: Digital setting (preset frequency F0-01, UP/DOWN modifiable, data loss when power off) 1: Digital setting (preset frequency F0-01, UP/DOWN can be modified, power-off memory) 2：AI1 3: AI2 (rotary potentiometer) 4: PULSE pulse setting (simplified version is DI4, standard version is DI5) 5: Multiple instructions 6: Simple PLC 7: PID 8: Communication setting	0	*

Select the input channel of the main given frequency of the inverter. There are 9 main reference frequency channels:

0: Digital setting (preset frequency F0-01, UP/DOWN can be modified, no memory after power failure)

After power on, set the frequency to the frequency set by F0-01. You can adjust the frequency by pressing the UP or DOWN button. After shutdown or power-off and power-on again, the set frequency will return to the preset frequency of F0-01. (UP/DOWN keys will not modify the value of F0-01)

1: Digital setting (preset frequency F0-01, UP/DOWN can be modified, power-down memory)

After power on, set the frequency to the frequency set by F0-01. You can adjust the frequency by pressing the UP or DOWN button. When the machine is stopped or powered off and powered on again, F0-01 is saved as the modified value.

2: AI1

The frequency is given through the AI1 terminal, the AI maximum value corresponds to the maximum frequency F0-09, and the AI terminal related settings refer to the explanation of the F6 group function code. AI1 terminal

can select voltage type input or current type input through jumper J13, generally 2~10V/4~20mA is the effective range.

3: AI2 (rotary potentiometer)

The frequency is given by the knob on the key board, the AI maximum value corresponds to the maximum frequency F0-09, and the AI terminal related settings refer to the explanation of the F6 group function code. AI2 (the knob on the keyboard) is the largest when it is turned clockwise to the far right, and the smallest when it is turned counterclockwise to the far left.

4: PULSE pulse setting (simplified version is DI4, standard version is DI5)

The frequency is given through the high-speed DI terminal. The high-speed DI terminal is the high-speed pulse input terminal. The voltage range is 10~30Vpeak, and the frequency range is 0KHz~100KHz. The maximum input setting of high-speed pulse F6-29 corresponds to the maximum frequency F0-09. For the related settings of DI terminal, please refer to the explanation of the function code of group F6.

5: Multi-segment instruction

Different state combinations of digital input DI terminals are required to correspond to different set frequency values. It needs to cooperate with the F6 group function code to set the combination state of the DI input terminals. At most 4 DI terminals can be controlled to select a total of 16 corresponding segments from 00 to 15 in the FE group in binary form. The percentage of the setting range in the FE group is the setting value corresponding to the maximum frequency F0-09. When 100%, the frequency is equal to the setting value of F0-09.

6: Simple PLC

The frequency source is the automatic operation of the PLC group function code preset logic, and its operation logic corresponds to the set operating frequency, acceleration and deceleration time and holding time of the FE group 16~50.

7: PID

Select the output of the process PID control as the operating frequency. Generally used for on-site process closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control and other occasions.

According to the PID group settings, the closed-loop feedback automatically controls the running frequency. For detailed settings, please refer to the PID function explanation of the FC group.

8: Communication given

It can be given by MODBUS. For MODBUS related communication settings, please refer to the explanation of the communication parameters of group P0.

Code	Name	Range	Default	Modification
F0-03	Main frequency source X selection	0: Digital setting (preset frequency F0-01, UP/DOWN modifiable, data loss when power off) 1: Digital setting (preset frequency F0-01, UP/DOWN can be modified, power-off memory) 2：AI1 3: AI2 (rotary potentiometer) 4: PULSE pulse setting (simplified version is DI4, standard version is DI5) 5: Multiple instructions 6: Simple PLC 7: PID 8: Communication setting	0	★

When the auxiliary frequency source is used as an independent operation frequency (only used for switching

between frequency source X and Y), the usage method is the same as that of the main frequency source X, and you can refer to the description of F0-02.

When the auxiliary frequency source is used as the superposition operation frequency (the ones digit in F0-06 is not 0):

1. The main frequency source X selection F0-02 and the auxiliary frequency source Y selection F0-03 cannot be set to the same channel (same value) to avoid confusion in the calculation.

2. When the auxiliary frequency source is set to digital setting, the preset frequency F0-01 cannot take effect directly. You can use the UP or DOWN key (DI is set to the corresponding function of the UP or DOWN key) directly on the basis of the set main frequency. adjust up.

Code	Name	Range	Default	Modification
F0-04	Y range selection of auxiliary frequency source during superposition	0：Relative to the maximum frequency 1：Relative to frequency source X	0	☆
F0-05	Y range of auxiliary frequency source when superposition	0% ~ 150%	0%	☆

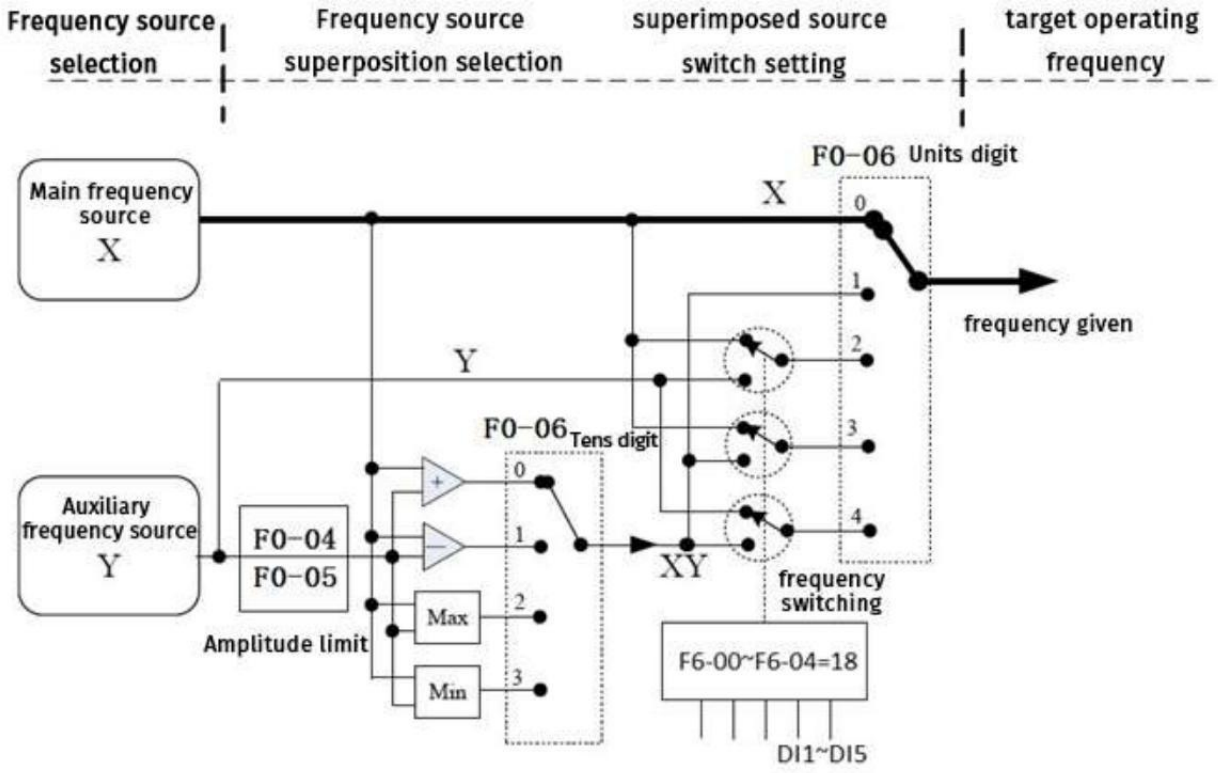
When the frequency source is selected as "frequency superposition", these two parameters are used to determine the adjustment range of the auxiliary frequency source.

F0-05 is used to determine the object corresponding to the auxiliary frequency source range. It can be selected relative to the maximum frequency or relative to the main frequency source X. If it is selected to be relative to the main frequency source, the range of the auxiliary frequency source will follow the main frequency source. changes with the frequency source.

This value is used to limit the frequency upper limit during superposition operation = F0-04 × F0-05

Code	Name	Range	Default	Modification
F0-06	Frequency source superposition selection	Units digit: Frequency source selection 0: Main frequency source X 1: Result of Main and auxiliary calculation (the algorithm used here is determined by the tenth digit) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between main frequency source X and result of main and auxiliary calculation results 4: Switch between auxiliary frequency source Y and result of main and auxiliary calculation Tens digit: Algorithm of main and auxiliary frequency source calculation 0: Main + Auxiliary 1: Main—Auxiliary 2: The bigger one of the two 3: The smaller one of the two	00	☆

Use this parameter to select the frequency given channel. The frequency reference is realized by the combination of the main frequency source X and the auxiliary frequency source Y.



Ones place: B in AB, used to select the setting source of the output target frequency

0: The output target frequency setting value comes from the main frequency source X, F0-02

1: The output frequency setting value is calculated from the calculation method set by the ten digit (A in AB) in this function code.

2: Set one of the DI terminals as "frequency source switching" through the F6 group function code. When this DI terminal is invalid, the output frequency is set as the main frequency source X, and when it is valid, the output frequency is set as the auxiliary frequency Y.

3: Through the F6 group function code, set one of the DI terminals as "frequency source switching". When this DI terminal is invalid, the output frequency is set as the main frequency source X, and when it is valid, the output frequency is set due to the ten digits in this function code (A) in AB is calculated by the calculation method set.

4: Set one of the DI terminals as "frequency source switching" through the F6 group function code. When this DI terminal is invalid, the output frequency is set to auxiliary frequency Y. When it is valid, the output frequency is set due to the ten digit (AB) in this function code. Calculated by the calculation method set in A).

Tens place: A in AB, used to select the calculation method of the superposition operation of the main frequency source and the auxiliary frequency source.

0: Main frequency source X + auxiliary frequency Y, for example X=2, Y=1, the calculation result is 3.

1: Main frequency frequency source X - auxiliary frequency Y, for example X=2, Y=1, the calculation result is 1.

2: The main frequency frequency source X and the auxiliary frequency Y take the larger value, for example, X=2, Y=1, the calculation result is 2.

3: The main frequency source X and the auxiliary frequency Y take the smaller value, for example X=2, Y=1, the calculation result is 1.

Code	Name	Range	Default	Modification
F0-07	Frequency digital setting memory after shutdown	0:dumped ; 1:saved	0	☆

When F0-07 is set to "Do not memorize", the frequency can be adjusted by pressing the UP or DOWN button after

power-on, the inverter cannot memorize the adjusted frequency, and the set frequency will still be the preset frequency of F0-01 at the next power-on.

When F0-07 is set to "Memorize", the inverter can memorize the adjusted frequency, and the set frequency at the next startup is the frequency adjusted by UP/DOWN before power off.

This function is only applicable when the frequency source is digitally set.

Code	Name	Range	Default	Modification
F0-08	Operation direction selection	0: Default direction (FWD/REV indicator off) 1: Opposite of the default direction (FWD/REV indicator always on)	0	☆

By changing this function code, the purpose of changing the direction of the motor can be achieved without changing the wiring of the motor. Its function is equivalent to adjusting any two lines of the motor (U, V, W) to realize the conversion of the rotation direction of the motor.

Tip: After the parameters are initialized, the running direction of the motor will be restored to the original state. It is strictly forbidden to change the direction of the motor after the system is debugged.

Use with caution.

Code	Name	Range	Default	Modification
F0-09	Maximum frequency	50.00Hz ~ 500.00Hz	50.00Hz	★

To avoid equipment failure, the maximum frequency limit needs to be set according to the actual application requirements. When AI, high-speed DI, multi-segment commands and other functions are used as frequency sources, 100% of them correspond to this value.

Code	Name	Range	Default	Modification
F0-10	Upper limit frequency source	0: F0-11 setting 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication setting	0	★

Defines the source of the capped frequency. The upper limit frequency can come from digital setting (F0-11), or from analog input setting, PULSE pulse setting or communication setting. When using analog input setting, PULSE pulse setting or communication setting, please refer to the explanation in F0-02.

For example, when the torque control method is adopted in the control site, in order to avoid the phenomenon of "flying car" caused by material disconnection, the upper limit frequency can be set by analog quantity. When the inverter runs to the upper limit frequency value, the inverter keeps running at the upper limit frequency. .

Code	Name	Range	Default	Modification
F0-11	Upper frequency	Lower limit frequency F0-12 ~ Maximum frequency F0-09	50.00Hz	☆

Set the upper limit frequency limit during running, the minimum value is the lower limit frequency F0-12, and the maximum value is the maximum frequency F0-09.

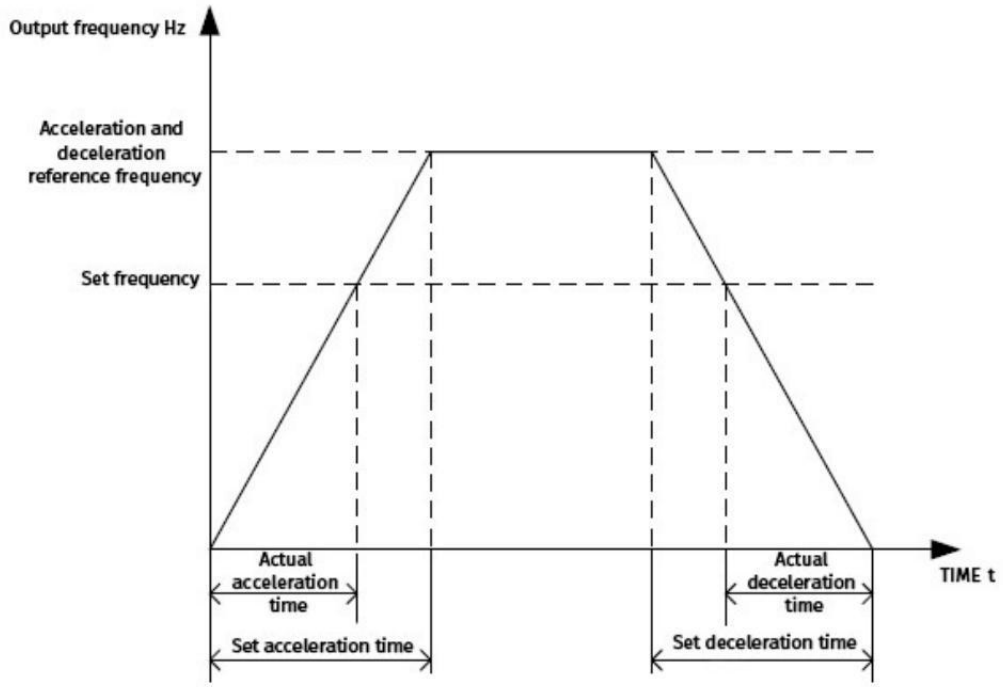
Code	Name	Range	Default	Modification
F0-12	Lower limit frequency	0.00Hz ~ Upper limit frequency F0-11	0.00Hz	☆

Set the lower limit frequency limit during operation, and the maximum value cannot exceed the upper limit frequency F0-11.

Code	Name	Range	Default	Modification
F0-13	Acceleration time 1	0.00s ~ 650.00s(F0-15=2) 0.0s ~ 6500.0s(F0-15=1) 0s ~ 65000s(F0-15=0)	Model determination	☆
F0-14	Deceleration time 1	0.00s ~ 650.00s(F0-15=2) 0.0s ~ 6500.0s(F0-15=1) 0s ~ 65000s(F0-15=0)	Model determination	☆

Acceleration time: the time for the inverter-driven motor to accelerate from 0Hz to the reference frequency of acceleration and deceleration time F0-16. Acceleration and deceleration time precision F0-15 can adjust its corresponding precision.

Deceleration time: the time for the inverter to drive the motor to decelerate from the reference frequency F0-16 of the acceleration and deceleration time to 0Hz. Acceleration and deceleration time precision F0-15 can adjust its corresponding precision. As shown below.



Code	Name	Range	Default	Modification
F0-15	Acceleration and deceleration time unit	0：1s 1：0.1s 2：0.01s	1	★

In order to meet different applications, the unit is divided into 1s, 0.1s, 0.01s. When this setting is modified, the decimal places of the acceleration and deceleration time 1/2/3/4 of F0-13/14 and F9-03~08 will change. , the acceleration and deceleration time will also be changed, it needs to be checked and confirmed, and it needs to be reset if necessary.

Code	Name	Range	Default	Modification
F0-16	Base frequency of acceleration and deceleration time	0：Maximum frequency (F0-09) 1：Set frequency (F0-01) 2：100Hz	0	★

Maximum frequency: Refers to the time required for the acceleration and deceleration time base of the inverter

to change from 0Hz to F0-09 or from F0-09 to 0Hz. The actual deceleration time needs to be proportional to the current running frequency and F0-09.

Set frequency: It refers to the time required for the acceleration and deceleration time base of the inverter to change from: acceleration from 0Hz to F0-01 or deceleration from F0-01 to 0Hz. The actual deceleration time needs to be proportional to the current running frequency and F0-01.

100Hz: Refers to the time required for the acceleration and deceleration time base of the inverter to change from: acceleration from 0Hz to 100Hz or deceleration from 100Hz to 0Hz. The actual deceleration time needs to be proportional to the current operating frequency and 100Hz.

Code	Name	Range	Default	Modification
F0-18	Carrier frequency	0.8kHz ~ 8.0kHz	Model determination	☆

This function adjusts the carrier frequency of the inverter. By adjusting the carrier frequency, the motor noise can be reduced, the resonance point of the mechanical system can be avoided, the leakage current of the line can be reduced, and the interference generated by the inverter can be reduced. When the carrier frequency is low, the higher harmonic components of the output current increase, the loss of the motor increases, and the temperature rise of the motor increases. When the carrier frequency is high, the motor loss decreases and the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases. Adjusting the carrier frequency affects the following performance:

carrier frequency	low → high
Motor noise	big → small
Output current waveform	bad → good
Motor temperature rise	high → low
Inverter temperature rise	low → high
leakage current	small → large
External Radiation Interference	small → large

The factory setting of carrier frequency is different for inverters of different power. Although the user can modify it according to the needs, it should be noted that if the carrier frequency is set higher than the factory value, it will cause the temperature rise of the inverter radiator to increase. At this time, the user needs to derate the inverter, otherwise the inverter will have an overheating alarm. Danger.

Code	Name	Range	Default	Modification
F0-19	Temperature based adjustment for carrier frequency	0：Disable 1：Enable (carrier frequency lower limit 1 KHz) 2：Enable (carrier frequency lower limit 2 KHz) 3：Enable (carrier frequency lower limit 3 KHz) 4：Enable (carrier frequency lower limit 4 KHz)	1	☆

The carrier frequency is adjusted with the temperature, which means that when the inverter detects that the temperature of its own cooling system is high, it intelligently adjusts the carrier frequency to reduce the loss and reduce the temperature, so as to avoid over-temperature causing shutdown or fault alarm. When the temperature of the cooling system drops, the carrier frequency will be adjusted back to the set value of the carrier frequency F0-18.

Code	Name	Range	Default	Modification
F0-20	Command source bundling frequency source	Units digit: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency	0	☆

		2: AI1 3: AI2 (rotary potentiometer) 4: PULSE pulse setting (simplified version is DI4, standard version is DI5) 5: Multi-speed 6: Simple PLC 7: PID 8: Communication setting Tens digit: Terminal command binding frequency source selection（As same as the unit digit） Hundreds digit: Communication command binding frequency source selection（As same as the unit digit）		

Different frequency setting sources can be set for the three command channels (ON/OFF function control source) of operation panel, terminal and communication.

The meaning of the command source is the same as that of F0-02, please refer to the function explanation of F0-02.

Three command sources can be bound to the same frequency source.

When the command source is bundled with the frequency source, and the command source is valid, the setting content of F0-02~06 will be invalid.

Code	Name	Range	Default	Modification
F0-21	Command source selection	0: Operation panel command channel (LED off) 1: Terminal command channel (LED on) 2: Communication command channel (LED flashing)	0	☆

Select the command source to be given by the keypad, and the "LOCAL/REMOT" light is off at this time.

Select the command source as the function terminal, and the "LOCAL/REMOT" light is always on.

Select the command source as communication given, and the "LOCAL/REMOT" light is flashing at this time.

Code	Name	Range	Default	Modification
F0-22	GP type display	1: G type (constant torque load) 2: P type (air blower, warter pump load)	Model determination	●

G-type machine is suitable for machine tools, cranes, centrifuges, injection molding machines, elevators and other equipment. The overload capacity is: 150% rated current 60s, 180% rated current 3s.

P-type machine, suitable for fans, pumps and other equipment, overload capacity: 120% rated current 60s, 150% rated current 3s.

6.2 F1 set (Start/Stop control parameters)

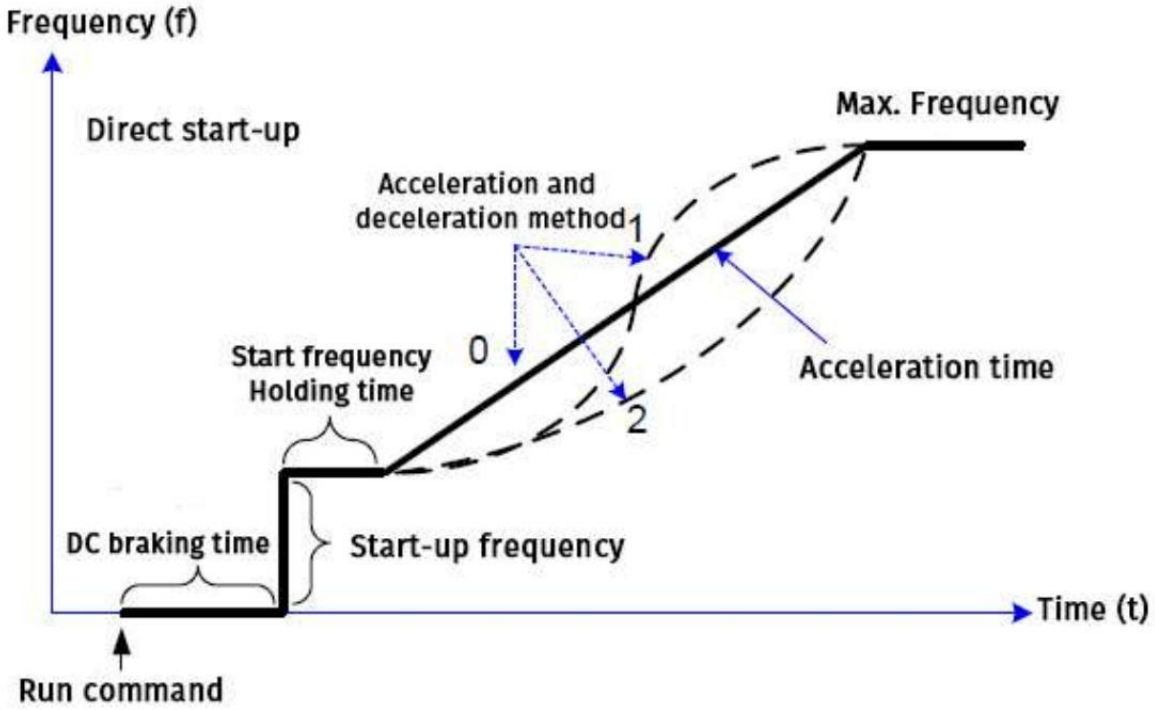
Code	Name	Range	Default	Modification
F1-00	Start method	0: Direct start-up 1: Speed tracking start-up 2: Asynchronous motor excitation start	0	☆

0: direct start

If the starting DC braking current and time F1-04/05 are set to 0, the inverter starts to run from the starting frequency F1-02.

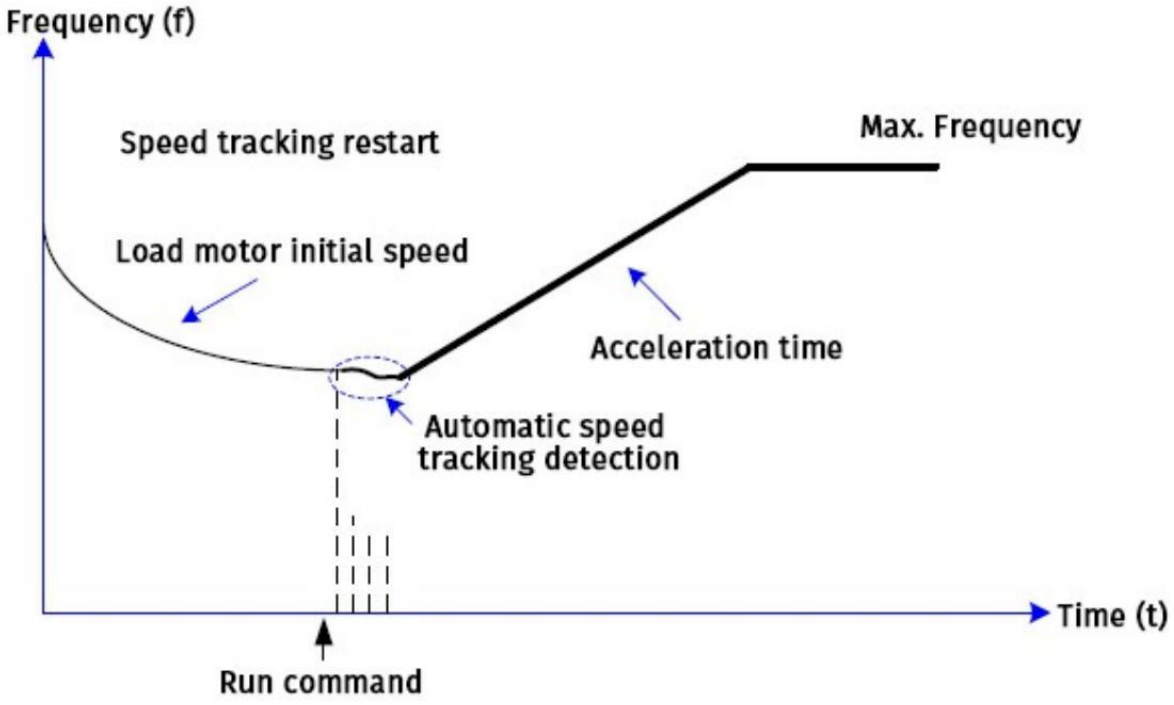
If both the starting DC braking current and time F1-04/05 are not set to 0, it will run at the time of DC braking F1-05 first, and then start running from the starting frequency F1-02.

DC braking and re-run is suitable for occasions where the load inertia is small and the motor may still be rotating when starting. As shown below.



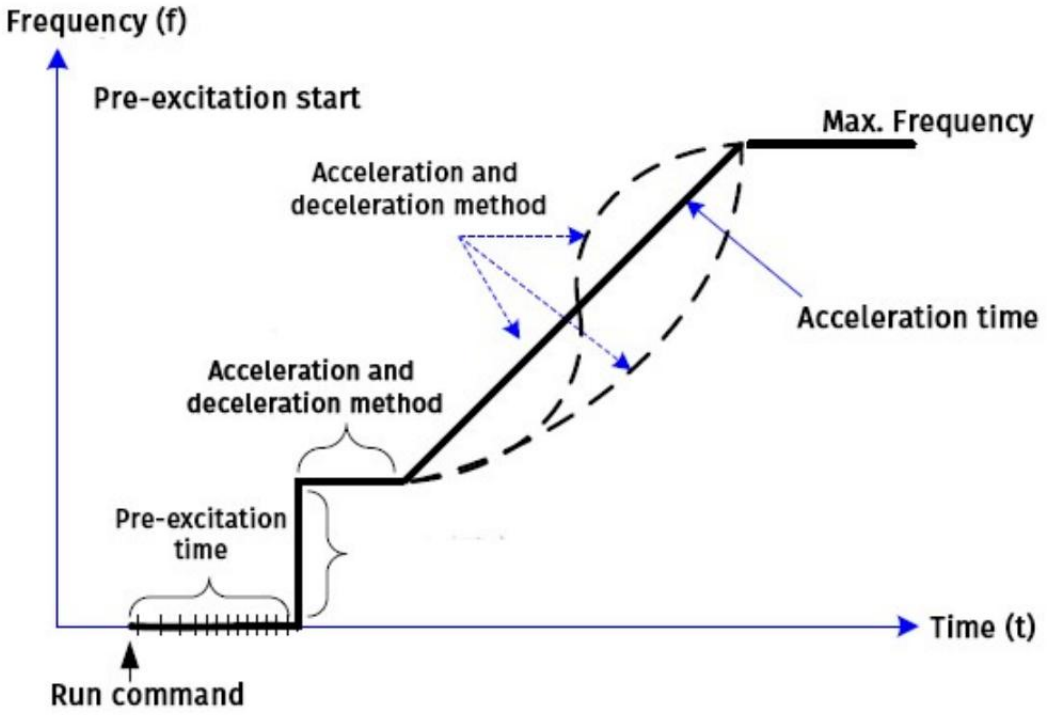
1: Speed tracking restart

Speed tracking restart is suitable for large inertia loads. If the load motor still has inertial rotation when the inverter starts to run, this method is used to start. Shock-free smooth start of the rotating motor. In order to ensure the performance of the speed tracking restart, it needs to be carried out in the vector control mode. As shown below.



2: Asynchronous motor pre-excitation start

For asynchronous motors, establishing a magnetic field before running can improve the dynamic response performance of the motor and reduce the starting current, which needs to be done in the vector control mode. If the pre-excitation current and time F1-04/05 are set to 0, there is no pre-excitation process, and the operation starts from the starting frequency F1-02. If both the pre-excitation current and time F1-04/05 are not set to 0, the excitation will be started first, and the sequence is the same as the start of DC braking. As shown below.



Code	Name	Range	Default	Modification
F1-01	Speed tracking method	0: Start from the stop frequency 1: Start from 1: the power frequency 2: Start from the maximum frequency	0	*

Use the shortest time to complete the speed tracking process, and select the way the inverter tracks the motor speed:

0: The frequency starts to track down from the time of shutdown, usually this method is selected.

1: Track down from the power frequency, which is used in the case of restarting after a long power outage.

2: Track down from the maximum frequency F0-09, and apply to generating loads.

Code	Name	Range	Default	Modification
F1-02	Start frequency	0.00Hz ~ 10.00Hz	0.00Hz	☆
F1-03	Start frequency hold time	0.0s ~ 100.0s	0.0s	*

F1-02: Start frequency

Increase the starting frequency before starting, which can ensure the motor torque when starting, and is suitable for heavy-duty occasions such as lifts and cranes.

The starting frequency is not limited by the lower limit frequency F0-12.

During the forward/reverse switching process, the start frequency holding time will not be executed.

The target frequency cannot be less than the start frequency, otherwise the inverter will not execute the start command and keep the standby state. E.g:

Example 1

F0-02＝0	Frequency source is digital given
F0-01＝2.00Hz	Digital setting frequency is 2.00Hz
F1-02＝5.00Hz	Start frequency is 5.00Hz
F1-03＝2.0s	Start frequency hold time is 2.0s

At this time, the inverter is in standby state, and the output frequency of the inverter is 0.00Hz.

The acceleration time does not include the holding time of the starting frequency, while the simple PLC includes the holding time of the starting frequency. E.g:

Example 2	
F0-02＝0	Frequency source is digital given
F0-01＝10.00Hz	Digital setting frequency is 10.00Hz
F1-02＝5.00Hz	Start frequency is 5.00Hz
F1-03＝2.0s	Start frequency hold time is 2.0s

At this time, the inverter accelerates to 5Hz, continues for 2S, and then accelerates to a given frequency of 10Hz.

F1-03: Start frequency hold time

In order to ensure that there is enough time to build up the magnetic flux during startup, it is necessary to set a reasonable and sufficient startup time.

Code	Name	Range	Default	Modification
F1-04	Start DC braking current	0 ~ 100%	0%	*
F1-05	Start DC braking time	0.0s ~ 100.0s	0.0s	*

F1-04: Start DC braking current/pre-excitation current

Start DC braking, generally used to stop the running motor and then start it. Pre-excitation is used to make the asynchronous motor establish a magnetic field before starting, and improve the response speed. Start DC braking is only valid when the start mode is direct start. At this time, the inverter first performs DC braking according to the set starting DC braking current, and then starts to run after the starting DC braking time. If the DC braking time is set to 0, it will start directly without DC braking. The greater the DC braking current, the greater the braking force.

When this value is set to 0, it will skip the DC braking or pre-excitation stage and start directly. The larger the pre-excitation value, the larger the pre-magnetization current and the larger the torque at startup.

When the rated current of the motor is less than or equal to 80% of the rated current of the inverter, this setting value of 100% corresponds to 100% of the rated current of the motor;

When the rated current of the motor > 80% of the rated current of the inverter, this setting value of 100% corresponds to 80% of the rated current of the inverter;

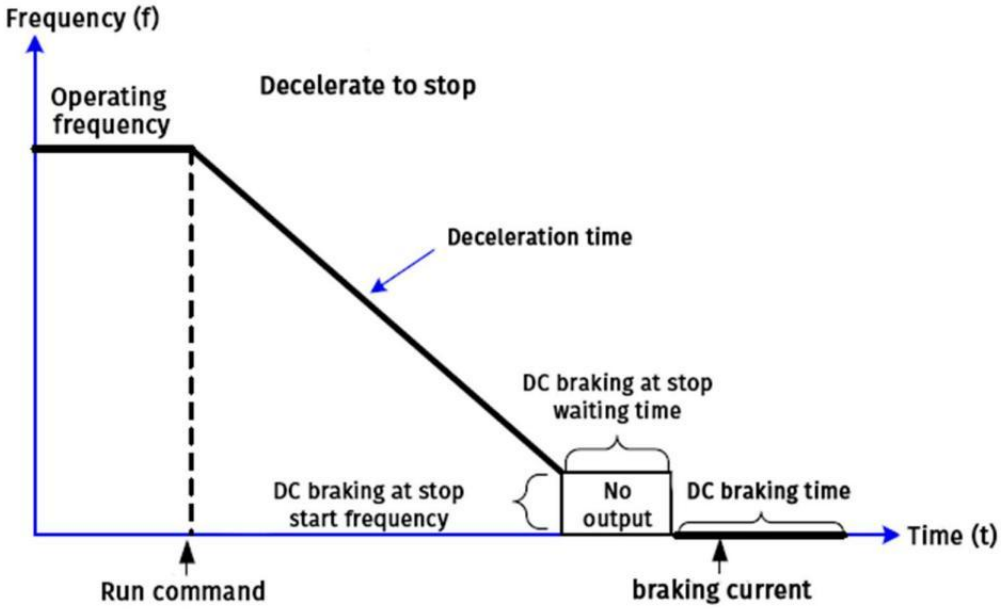
F1-05: Start DC braking time/pre-excitation time

When this value is set to 0, it will skip the DC braking or pre-excitation stage and start directly.

Code	Name	Range	Default	Modification
F1-06	Stop method	0: By deceleration control 1: Free stop	0	☆

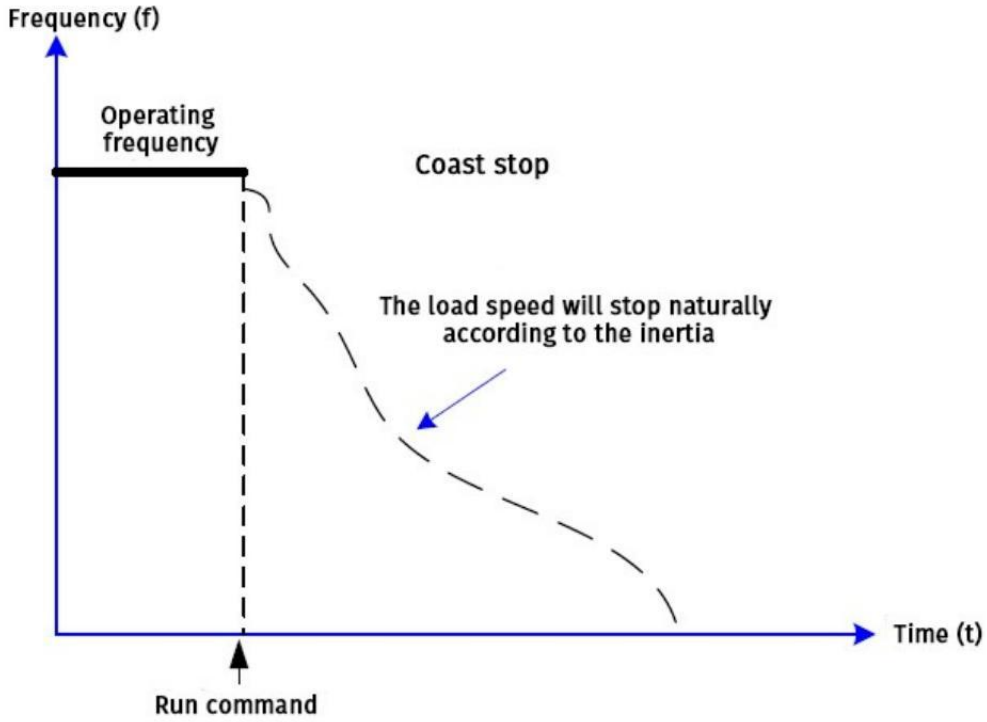
0: Decelerate to stop

When stopping, according to the set deceleration time and curve, reduce the output frequency to 0, then stop the output.



1: Coast stop

When it stops, the output will be stopped immediately, the motor will coast to stop in an uncontrolled state, and the deceleration time is not controlled by the inverter.



Code	Name	Range	Default	Modification
F1-07	Start frequency of DC braking stop	0.00Hz ~ Maximum frequency	0.00Hz	☆
F1-08	Waiting time of DC braking stop	0.0s ~ 100.0s	0.0s	☆
F1-09	DC braking stop current	0% ~ 100%	0%	☆
F1-10	DC braking stop time	0.0s ~ 100.0s	0.0s	☆

F1-07: Start frequency of DC braking at stop

In the process of deceleration and stop, when the frequency decreases to this set value, it starts to enter the DC braking state.

F1-08: DC braking waiting time at stop

After the deceleration frequency reaches the starting frequency of DC braking at stop, the output will be stopped first, and then enter the DC braking state after waiting for the time set by this function code.

F1-09: Stop DC braking current

Its current percentage logic refers to F1-04.

F1-10: DC braking time at stop

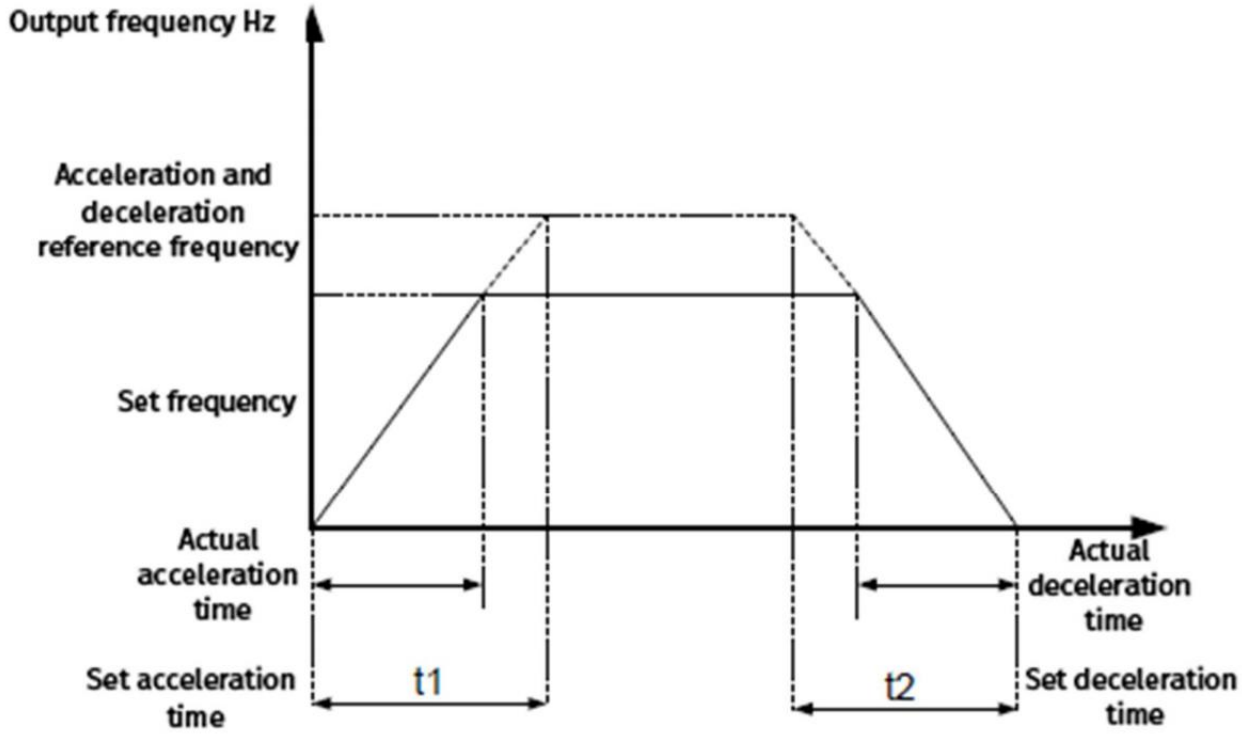
The holding time of DC braking, when this value is set to 0, there is no DC braking stage.

Code	Name	Range	Default	Modification
F1-11	Acceleration and deceleration method	0: Linear acceleration and deceleration 1: S curve acceleration and deceleration A 2: S curve acceleration and deceleration B	0	★

0: Linear acceleration and deceleration

Applicable to most situations, the output frequency increases or decreases linearly according to the set value of acceleration and deceleration time.

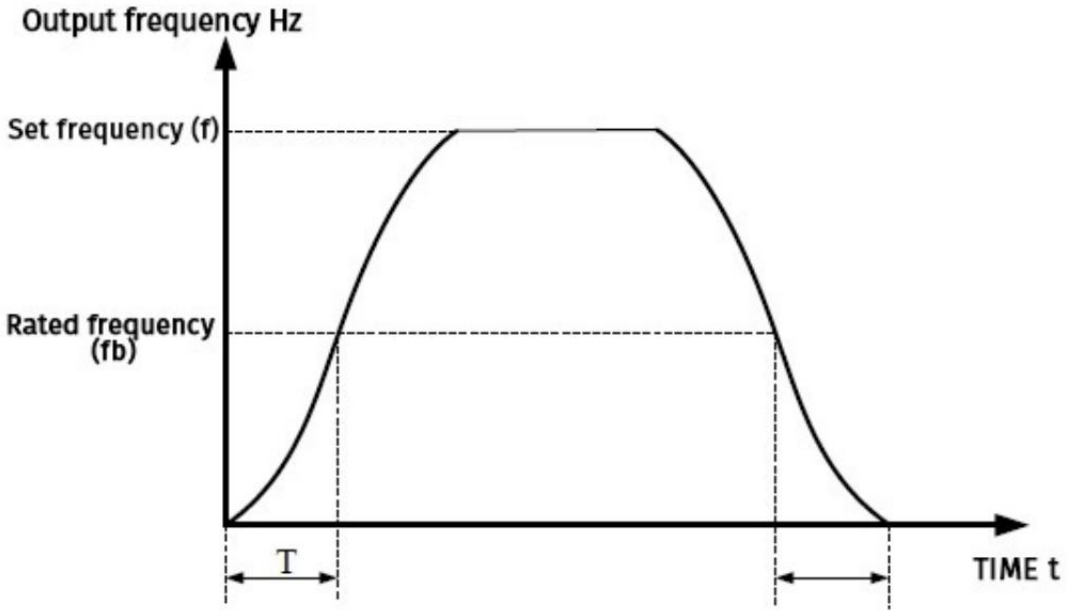
The preset acceleration/deceleration time 1/2/3/4 of F0-13/14 and F9-03~08 can be switched through the DI terminal (see the introduction of F6 group for details).



1: S-curve acceleration and deceleration A

It is suitable for working conditions where the target frequency is fixed and requires smooth start or stop, such as transmission belts, elevators, etc. The output frequency increases or decreases according to the S curve set by F1-12/13.

2: It is suitable for working conditions where the target frequency changes in real time and requires smoothness and dynamic response. S curve B requires that the acceleration and deceleration time is less than 100s and the target frequency is less than 6 times the rated frequency of the motor, otherwise it will automatically switch to linear acceleration.

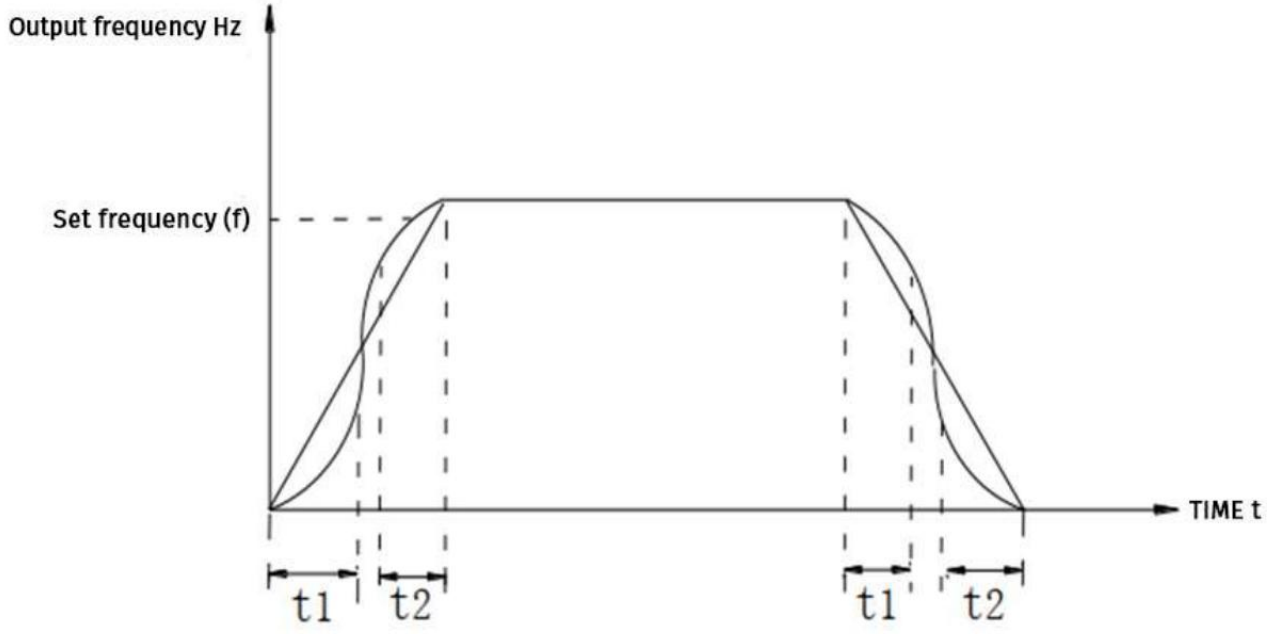


S-curve acceleration and deceleration B schematic diagram

Code	Name	Range	Default	Modification
F1-12	S curve start time ratio	0.0% ~ (100.0%-F1-13)	30.0%	★
F1-13	S curve end time ratio	0.0% ~ (100.0%-F1-12)	30.0%	★

S curve A time setting

The proportion of time t1 at the beginning of the S curve + linear acceleration + the proportion of time t2 at the end of the S curve = the complete acceleration process, reaching the frequency target value. Therefore, the proportion of time at the beginning of the S curve + the proportion of time at the end of the S curve will not be greater than 100%.



S-curve acceleration and deceleration A schematic diagram

Code	Name	Range	Default	Modification
F1-14	Dynamic braking point	Single-Phase models: 200.0 ~ 410.0V Three-Phase models: 310.0 ~ 800.0V	350.0 (Single-Phase) 700.0 (Three-Phase)	☆

Through the cooperation of the braking unit and the braking resistor, the power generated by the motor during the deceleration process can be consumed.

The higher the braking point voltage, the later the braking is involved, and the greater the power consumption of the resistor during braking.

For the recommended configuration of the braking resistor, please refer to the description in the "C.6. Braking Resistor" section in the user manual.

Code	Name	Range	Default	Modification
F1-15	Brake usage rate	0 ~ 100%	100%	☆

It is used to adjust the duty ratio of the conduction of the braking unit. The larger the setting value is, the better the braking effect will be, but the fluctuation of the DC bus voltage will also be larger.

Code	Name	Range	Default	Modification
F1-16	Motor speed tracks tempo	1~ 100	20	☆

Set the speed of software speed tracking. The larger the setting value is, the faster the tracking speed will be, but it may also cause the speed tracking effect to deteriorate. There is no need to adjust this parameter for hardware speed tracking.

Code	Name	Range	Default	Modification
F1-17	Motor speed tracks close-loop current KP	0~ 1000	500	☆

Proportion in PID, when the default speed tracking speed is not enough, adjust this parameter.

Code	Name	Range	Default	Modification
F1-18	Motor speed tracks close-loop current KI	0~ 1000	800	☆

Proportion in PID, when the default speed tracking speed is not enough, adjust this parameter.

Code	Name	Range	Default	Modification
F1-19	Motor speed tracks close-loop current value	30~ 200	100	★

Proportion in PID, when the default speed tracking speed is not enough, adjust this parameter.

Code	Name	Range	Default	Modification
F1-20	Motor speed tracks close-loop current limit value	10~ 100	30	★
F1-21	Motor speed tracks voltage rise time	0.5~ 3.0	1.1	★
F1-22	De-magnetizing time	0.00~ 5.00	1.00	★

F1-20/ F1-21: It is not recommended to modify this parameter.

F1-22: Demagnetization time

This set value is the waiting time for restarting after stopping, and it can only take effect when the speed tracking is turned on.

6.3 F2 set V/F control parameters

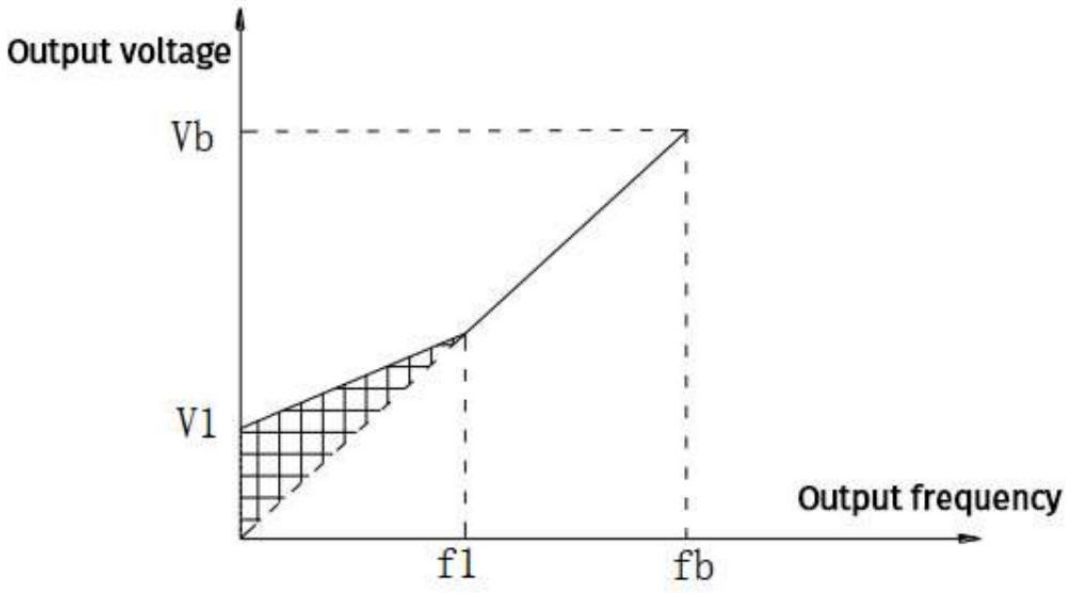
This group of function codes is only valid for V/F control and invalid for vector control. V/F control is suitable for general loads such as fans and water pumps, or where one inverter has multiple motors, or where the power of the inverter and the motor are quite different.

Code	Name	Range	Default	Modification
F2-00	Torque boost	0.0%：(Automatic torque boost) 0.1% ~ 30.0%	Model determination	☆

Torque boost is mainly used to improve low-frequency torque under V/F control.

When the set value is kept at the default value of 0, the inverter will automatically increase the torque. In this case, the inverter will automatically calculate the torque boost according to the set motor parameters.

If the starting torque of the motor is not enough to drag the load, the torque boost value can be manually set according to the actual demand. It should be noted that if the torque boost is too low, the motor will be powerless at low speed; if the torque boost is too high, the motor will run over excitation, the output current of the inverter will be large, and the efficiency will be reduced.



V1: Manual torque boost voltage Vb: Maximum output voltage
f1: Manual torque boost cut-off frequency fb: Rated running frequency

Code	Name	Range	Default	Modification
F2-01	Torque boost cut-off frequency	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	★

This value sets the torque boost stop frequency. When the inverter output frequency is higher than this value, the torque boost stops.

Code	Name	Range	Default	Modification
F2-02	VF slip compensation gain	0.0% ~ 200.0%	0.0%	☆

Compensate for the motor speed deviation generated by the asynchronous motor when the load increases, so that the motor speed can be basically stable when the load changes.

When adjusting the slip compensation, it is generally carried out under the rated load, and the purpose is to adjust the motor speed to be consistent with the target speed.

The V/F slip compensation gain is set to 100.0%, which means that the compensated slip when the motor has rated load is the rated slip of the motor, and the rated slip of the motor is calculated by the inverter through the

rated frequency and the rated speed of the motor in group F3.

When adjusting the V/F slip compensation gain, it is generally based on the principle that the motor speed is basically the same as the target speed under the rated load. When the motor speed is not on target.

Code	Name	Range	Default	Modification
F2-03	VF overexcitation gain	0 ~ 200	Model determination	☆

When the V/F mode decelerates and stops, the bus voltage is suppressed from rising to prevent the inverter from reporting overvoltage. The larger the set value, the stronger the suppression ability, and it is also easy to cause the output current to increase. It is necessary to adjust the settings according to the actual load conditions.

Under the condition of small inertia load or equipped with braking energy absorption device, this setting value is recommended to be set to 0.

Code	Name	Range	Default	Modification
F2-04	VF oscillation suppression gain	0 ~ 100	Model determination	☆

On the premise of effectively suppressing oscillation, it should be set as small as possible, so as not to adversely affect the VF operation.

Please select this gain as 0 when the motor has no oscillation phenomenon. Only when the motor oscillates significantly, it is necessary to increase the gain appropriately. The larger the gain, the more obvious the suppression of oscillation.

When using the oscillation suppression function, the rated current and no-load current parameters of the motor are required to be accurate, otherwise the VF oscillation suppression effect will not be good.

Code	Name	Range	Default	Modification
F2-05	VF curve setting	0: Linear V/F 1: Multipoint V/F 2: Square V/F 3: 1.2 power V/F 4: 1.4 power V/F 5: 1.6 power V/F 6: 1.8 power V/F 10: VF full separate mode 11: VF semi-separate mode	0	★

0: Straight line V/F

V and F change in a fixed proportional relationship and are suitable for ordinary constant torque loads, such as large inertia loads.

1: Multi-point V/F

According to the actual load requirements, multi-point curves can be set through F2-06~11, which are suitable for special loads such as centrifuges and dehydrators.

2-6: The higher the power, the lower the output voltage.

It is suitable for loads such as fans and pumps, and needs to be set according to the actual load:

a. When the load is working in the long-term load area, the output voltage of the inverter should not be too high (the motor power factor should not be too low), otherwise the iron loss of the motor will be too large; the output voltage of the inverter should not be too low (the motor power factor is too high)), otherwise the copper loss of the motor will be too large, and the overload capacity of the motor will become lower.

b. When the load is working in the highest load area, the output current of the inverter cannot exceed the rated current of the inverter and the allowable current of the motor at this speed.

c. When the load is running in all load areas, the temperature rise cannot exceed the rated temperature rise of the motor.

d. The starting current requirement should be met.

10: VF fully separated mode

At this time, the output frequency and output voltage of the inverter are independent of each other, the output frequency is determined by the frequency source, and the output voltage is determined by the voltage source F2-13 separated by VF. Generally used in torque motor control and other occasions.

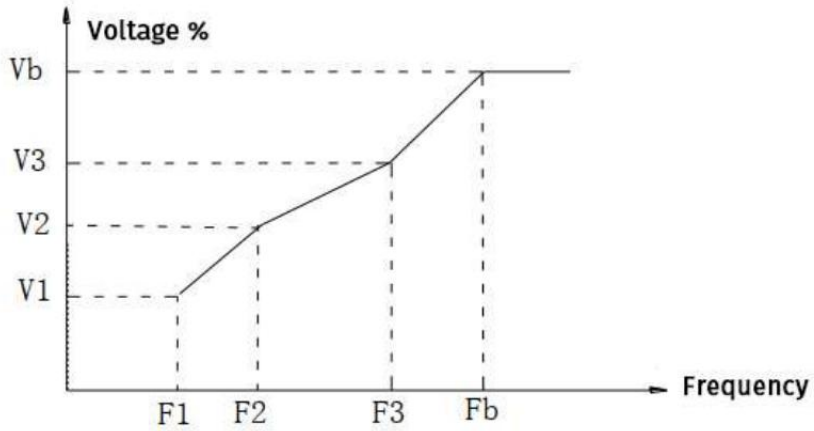
11: VF semi-separate mode

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

Code	Name	Range	Default	Modification
F2-06	Multipoint VF frequency point 1	0.00Hz ~ F2-08	0.00Hz	★
F2-07	Multi-point VF voltage point 1	0.0% ~ 100.0%	0.0%	★
F2-08	Multipoint VF frequency point 2	F2-06 ~ F2-10	0.00Hz	★
F2-09	Multi-point VF voltage point 2	0.0% ~ 100.0%	0.0%	★
F2-10	Multipoint VF frequency point 3	F2-08 ~ Motor rated frequency (F3-03)	0.00Hz	★
F2-11	Multi-point VF voltage point 3	0.0% ~ 100.0%	0.0%	★

The multi-point V/F curve should be set according to the load characteristics of the motor.

Similar to the explanation in the power curve, if the voltage is set too high at low frequency, it may cause the motor to overheat or even burn, and the inverter may be protected by over-stashing or over-current. The following figure is a schematic diagram of the setting of multi-point V/F curve.



V1-V3: The percentage of the voltage of the 1st-3rd stage of the multi-speed V/F
Vb: Motor rated voltage

F1-F3: Frequency 1-3 of multi-speed V/F
Fb: rated operating frequency of the motor

Code	Name	Range	Default	Modification
F2-12	Oscillation suppression gain mode	0 ~ 4	3	★

Used in conjunction with the setting of F2-04, when the motor still oscillates significantly after adjusting the VF oscillation suppression gain alone, you can try to change the settings in this mode.

Code	Name	Range	Default	Modification
F2-13	VF separate voltage source	0: Digital setting (F2-14) 1: AI1 2: AI2 (rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Multi-segment instructions 5: Simple PLC 6: PID 7: Communication setting NOTICE: 100.0% correspond to the rated voltage of the motor	0	☆

V/F separation is generally used in induction heating, inverter power supply and torque motor control and other occasions.

When V/F separation control is selected, the output voltage can be set by function code F2-14, or it can be given by analog quantity, multi-segment instruction, PLC, PID or communication. When non-digital setting is used, 100% of each setting corresponds to the rated voltage of the motor. When the percentage of analog output setting is a negative number, the absolute value of the setting is used as the effective setting value.

Refer to the explanation of the main frequency source X setting.

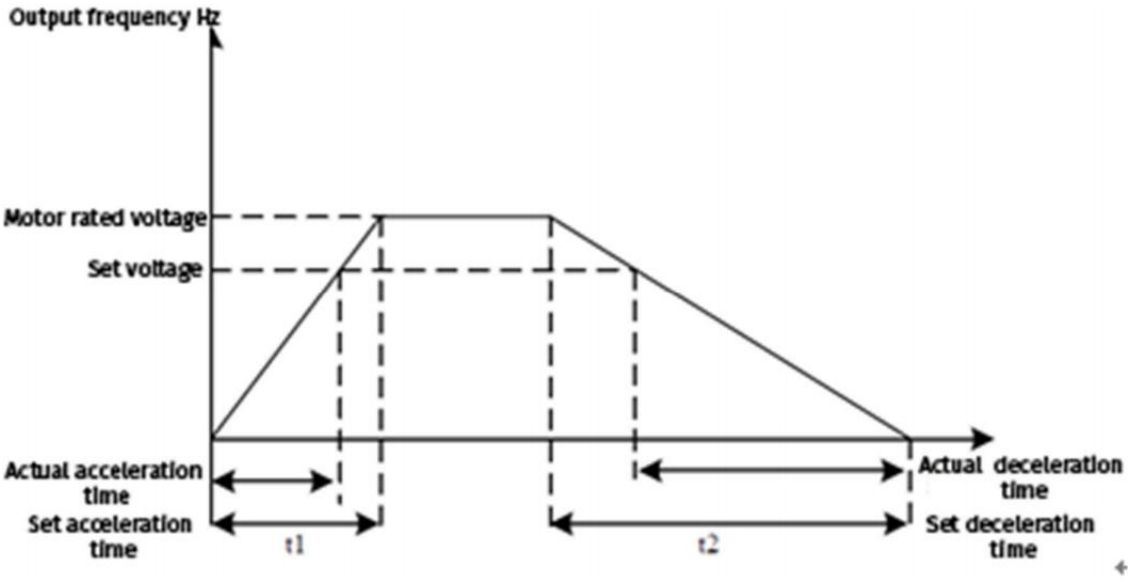
Code	Name	Range	Default	Modification
F2-14	VF separate voltage digital setting	0V ~ Rated voltage of motor (F3-01)	0V	☆

The given value corresponding to the digital setting in F2-13 cannot exceed the rated voltage setting in the motor parameters.

Code	Name	Range	Default	Modification
F2-15	Voltage acceleration time of VF separation	0.0s ~ 1000.0s NOTICE: The time interval from 0V to the rated voltage of the motor	0.0s	☆
F2-16	Voltage deceleration time of VF separation	0.0s ～ 1000.0s NOTICE: The time interval from 0V to the rated voltage of the motor	0.0s	☆

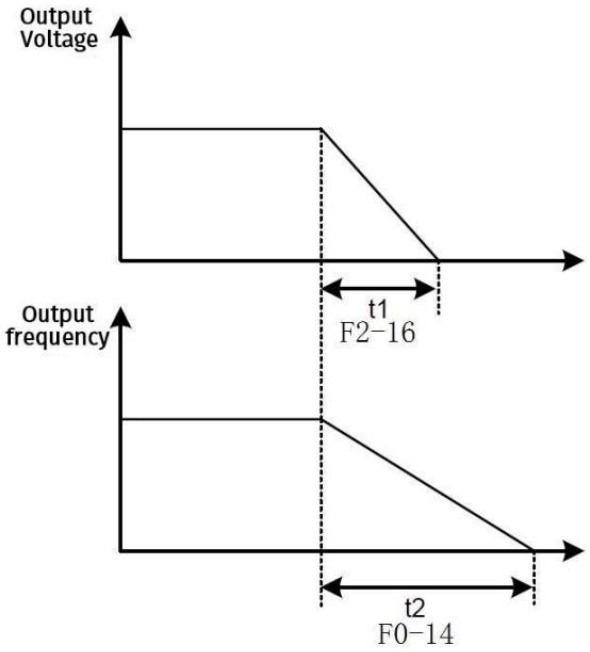
F2-15: Indicates the time t1 required for the voltage to accelerate from 0 to the rated voltage of the motor.

F2-16: Indicates the time t2 required for the voltage to decelerate from the rated voltage of the motor to 0.

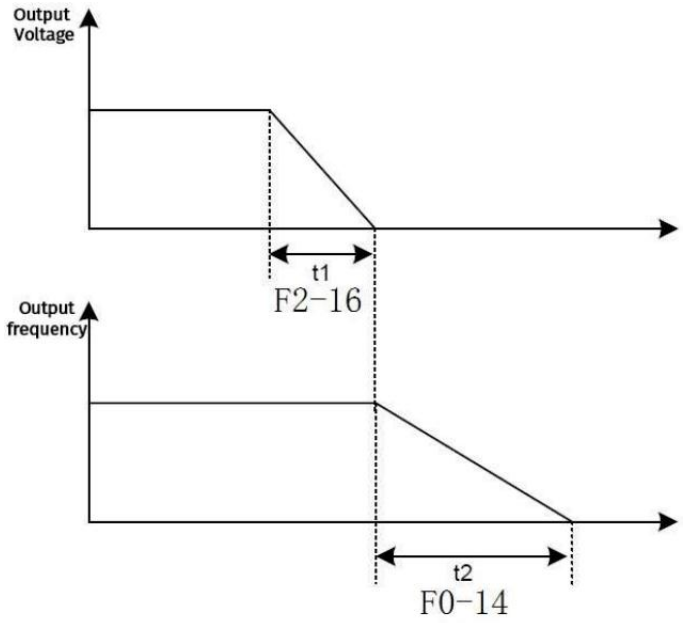


Code	Name	Range	Default	Modification
F2-17	Shutdown mode selection of VF separation	0：Frequency/voltage independently reduced to 0 1: After the voltage is reduced to 0, the frequency is reduced again	0	☆

0: The VF separation output voltage decreases to 0 according to the voltage deceleration time F2-16 (t1), and the output frequency decelerates to 0 according to the deceleration time 1/2/3/4 (t2). As shown below.



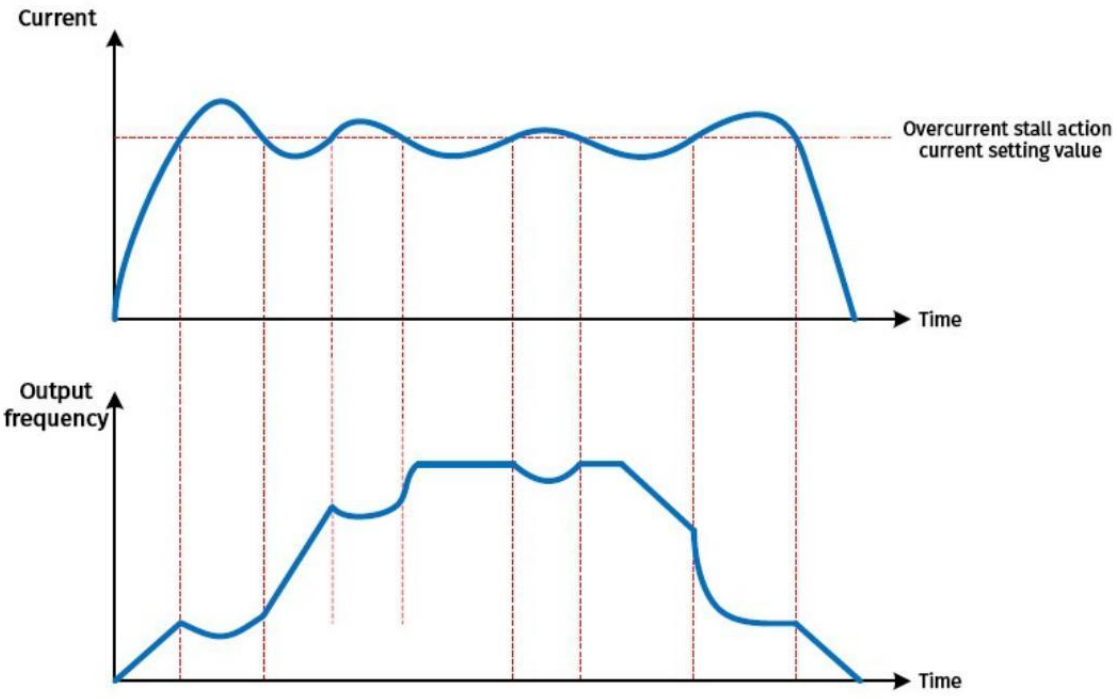
1: The output voltage of the VF separation is reduced to 0 according to the voltage first deceleration time F2-16 (t1), and then the output frequency is decelerated to 0 according to the deceleration time 1/2/3/4 (t2). As shown below.



Code	Name	Range	Default	Modification
F2-18	Action current of overcurrent stall	50 ~ 200%	150%	★

During the operation of the inverter, when the motor is overloaded and the output exceeds the overcurrent stall action current, the inverter will reduce the output frequency and voltage to achieve the purpose of reducing the output current.

If the load increases and the output current exceeds the overcurrent stall setting value, the overcurrent stall action is triggered, and the output frequency begins to decrease until the current decreases below the overcurrent speed setting value, and the output frequency begins to increase again. As shown below.



Code	Name	Range	Default	Modification
F2-19	Overcurrent stall enable	0：Disable 1：Enable	1	★

0: Disable over-current stall action, which may trigger wave-by-wave current limit or overload.

1: Enable over-current stall action, which may lead to longer acceleration time or deceleration at constant speed. When a high-power motor works at a low carrier frequency, the wave-by-wave current limiting may be triggered, resulting in insufficient torque. The rated value of the overcurrent stall action current F2-18 can be lowered to improve the working state.

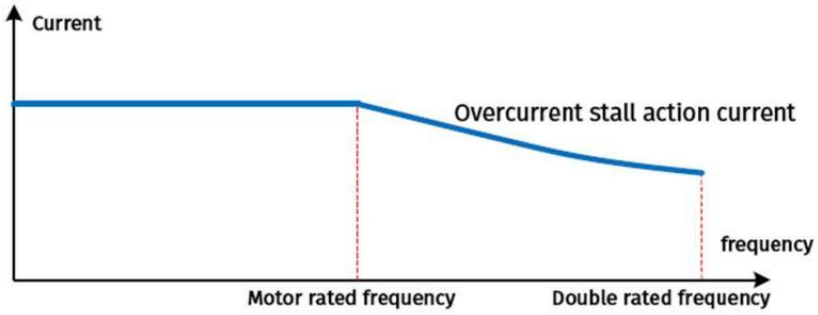
Code	Name	Range	Default	Modification
F2-20	Suppression gain of overcurrent stall	0 ~ 100	20	☆

The larger the gain, the better the limiting ability, but if the set value is too large, it will cause oscillation, and it needs to be set according to the actual working conditions.

Code	Name	Range	Default	Modification
F2-21	Double speed over current stall action Current compensation coefficient	50 ~ 200%	50%	★

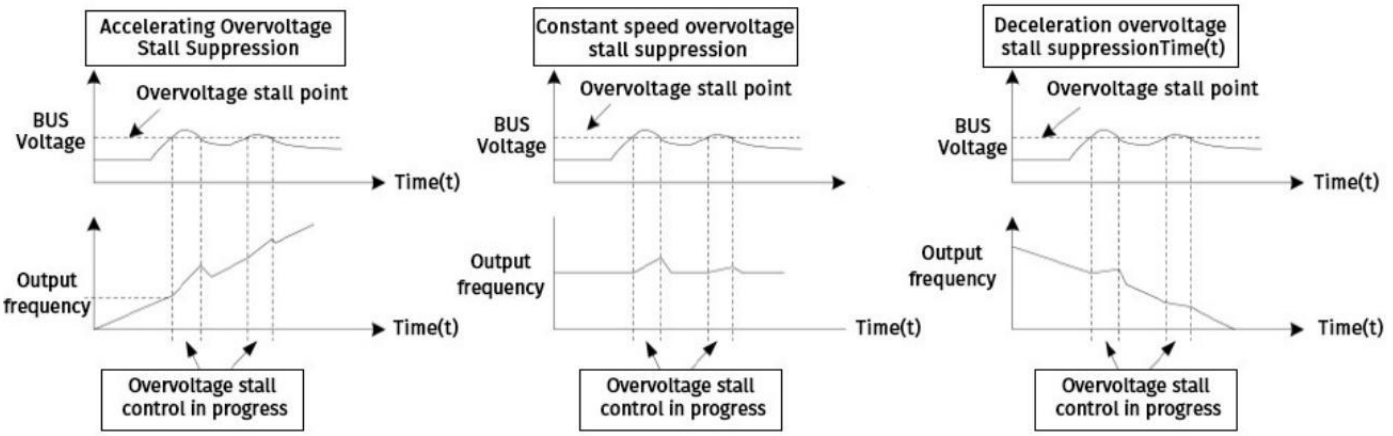
When running in the high frequency region exceeding the rated frequency of the motor, the working current of the motor is relatively small, and the same stall current limit will cause the motor speed to drop significantly. Set the current compensation coefficient for double-speed overcurrent stall action to reduce the stall action current when the frequency is higher than the rated frequency, which can effectively prevent the motor from stalling. Suitable for high operating frequency occasions.

Over-current stall action current exceeding rated frequency = (motor rated frequency/operating frequency) * double-speed over-speed stall action current compensation coefficient * over-current stall action current. The compensation coefficient is set to 50% to close the double-speed overcurrent stall action compensation.



Code	Name	Range	Default	Modification
F2-22	Operation voltage of overvoltage stall	Single-Phase models: 160.0 ~ 410.0V Three-Phase models: 200.0 ~ 800.0V	Model determination	★

During the operation of the inverter, if the bus voltage exceeds the rectified value of the mains input voltage, it means that the motor speed is greater than the output frequency, and the system works in the power generation state. When the bus voltage continues to rise and triggers the overvoltage stall action voltage, the inverter will adjust the output frequency to avoid further rise in bus voltage.



Code	Name	Range	Default	Modification
F2-23	Overvoltage stall enable	0：Disable 1：Enable	1	*

0: Disable overvoltage stall action. If equipped with a braking energy absorption device, it is recommended to set it to disabled.

1: Enable overvoltage stall action. If the load is small inertia, the back-feeding energy is not large, and the braking energy absorption device is not equipped, this function is enabled.

Code	Name	Range	Default	Modification
F2-24	Suppress frequency gain of overvoltage stall	0 ~ 100	30	☆
F2-25	Suppress voltage gain of overvoltage stall	0 ~ 100	30	☆
F2-26	Maximum ascent limit frequency of overvoltage stall	0 ~ 50Hz	5Hz	*
F2-27	Time constant of slip compensation	0.1 ~ 10.0	0.5	☆
F2-33	In-line torque compensation gain	80 ~ 150	100	*

F2-24: Increase the suppression frequency gain, which can strengthen the bus voltage control effect, but will cause the output frequency to fluctuate.

F2-25: Increase the suppression voltage gain to reduce the overshoot of the bus voltage.

F2-26: Up limit frequency = maximum frequency F0-09 + overvoltage stall maximum up limit frequency F2-26.

F2-27: The smaller the setting value, the faster the response speed, but in the large inertia load system, the too small value will easily lead to overvoltage fault.

F2-33: The output torque can be increased, but excessive adjustment may lead to increased motor loss or motor oscillation.

6.4 F3 set (First motor vector control parameters)

Code	Name	Range	Default	Modification
F3-00	Motor rated power	0.1kW ~ 1000.0kW	Model determination	*
F3-01	Motor rated voltage	1V ~ 2000V	Model determination	*

Code	Name	Range	Default	Modification
F3-02	Motor rated current	0.01A ~ 655.35A (Inverter power ≤55kW) 0.1A ~ 6553.5A (Inverter power >55kW)	Model determination	★
F3-03	Motor rated frequency	0.01Hz ~ Maximum frequency	Model determination	★
F3-04	Motor rated speed	1rpm ~ 65535rpm	Model determination	★

The above function codes are the parameters on the motor nameplate. Whether V/F control or vector control is used, the relevant parameters need to be set accurately according to the motor nameplate.

In order to obtain better V/F or vector control performance, motor parameter tuning is required, and the accuracy of the tuning result is closely related to the correct setting of the motor nameplate parameters.

Code	Name	Range	Default	Modification
F3-05	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	★
F3-06	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power≤55kW) 0.0001Ω ~ 6.5535Ω (Inverter power>55kW)	Tuning parameters	★
F3-07	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (Inverter power ≤ 55kW) 0.001mH ~ 65.535mH (Inverter power>55kW)	Tuning parameters	★
F3-08	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (Inverter power≤55kW) 0.01mH ~ 655.35mH (Inverter power>55kW)	Tuning parameters	★
F3-09	Asynchronous motor no-load current	0.01A ~ F3-02 (Inverter power≤55kW) 0.1A ~ F3-02 (Inverter power>55kW)	Tuning parameters	★

F3-05～F3-09 are the parameters of the asynchronous motor, these parameters are generally not on the motor nameplate, and need to be obtained through the automatic tuning of the inverter. Among them, "asynchronous motor static tuning" can only obtain three parameters of F3-05~F3-07, and "asynchronous motor complete tuning" can obtain not only all five parameters, but also encoder phase sequence, current loop PI parameters, etc.

When changing the motor rated power F3-00 or motor rated voltage F3-01, the inverter will automatically modify the parameter values of F3-05~F3-09.

Code	Name	Range	Default	Modification
F3-10	Tuning options	0：No operation 1: Asynchronous machine static parameter tuning 2: Asynchronous machine dynamic complete tuning 3: Asynchronous machine static complete tuning	0	★

The stator resistance, rotor resistance, leakage inductance, mutual inductance and no-load current of the asynchronous motor can be obtained by tuning.

At the same time, the tuning is also divided into on-load tuning and off-load tuning.

The tuning effect is sorted from best to worst: dynamic off-load tuning --> static complete tuning --> static partial tuning --> dynamic on-load tuning.

6.5 F4 set (Vector control parameters)

Code	Name	Range	Default	Modification
F4-00	Speed loop proportional gain 1	1 ~ 100	30	☆
F4-01	Speed loop integral time 1	0.01s ~ 10.00s	0.50s	☆
F4-02	Switching frequency 1	0.00 ~ F4-05	5.00Hz	☆
F4-03	Speed loop proportional gain 2	1 ~ 100	20	☆
F4-04	Speed loop integral time 2	0.01s ~ 10.00s	1.00s	☆
F4-05	Switching frequency 2	F4-02 ~ Maximum frequency (F0-09)	10.00Hz	☆

By setting the proportional coefficient and integral time of the speed regulator, the speed dynamic response characteristics of the vector control can be adjusted.

If the proportional gain is large and the integral time is small, the response will be fast, but if the adjustment is too large, oscillation will occur; otherwise, the response will lag.

If it is necessary to adjust the parameters according to the load, first adjust the proportional gain so that the system will not oscillate; then adjust the integral to reduce overshoot. To meet the needs of fast response and reduce errors.

Code	Name	Range	Default	Modification
F4-06	SVC speed feedback filter time	0.000s ~ 1.000s	0.000s	☆

Increasing the filter time can improve the stability of the motor, but the dynamic response will become weaker; reducing the filter time can strengthen the dynamic response, but if it is too small, it will cause the motor to oscillate.

Code	Name	Range	Default	Modification
F4-07	Speed loop integral properties	Integral separation 0: Disable 1: Enable	0	☆

Turning off the speed loop integration will speed up the response speed, but it may cause the speed overshoot to be too large.

Code	Name	Range	Default	Modification
F4-08	Vector control slip gain	50% ~ 200%	100%	☆

This setting is for vector control and used to adjust slip, same as F2-02 VF slip compensation gain.

In the closed-loop vector system, the speed will not be affected, but the output current will be affected. If the load capacity is weak, this parameter can be appropriately reduced.

Code	Name	Range	Default	Modification
F4-09	Torque upper limit source for speed control mode	0: Function code F4-10 setting 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting 4: Communication setting The full scale of option 1-4 corresponds to F4-10	0	☆

It is used to limit the maximum output torque of the electric state in the speed control mode.

When this function code is set to 0, its digital reference comes from F4-10.

The control mode of each channel of torque upper limit source is similar to that of each channel of main frequency source X, and its 100% value corresponds to the value given by F4-10 torque upper limit number.

Code	Name	Range	Default	Modification
F4-10	Torque upper limit digital setting for speed control mode	0.0% ~ 200.0%	150.0%	☆

Set the digital given value of electric state torque control or the reference value of AI/high-speed DI/communication given and other channels.

Code	Name	Range	Default	Modification
F4-11	Speed control (brake) torque upper limit source	0：Function code F4-12 setting	0	☆
		1：AI1		
		2：AI2 (Rotary potentiometer)		
		3: PULSE pulse setting (simplified version is DI4, standard version is DI5)		
		4：Communication setting		
		1-4: Communication setting The full scale of option 1-4 corresponds to F4-12		

Used to limit the maximum output torque in braking (generating) state in speed control mode. The given source description is the same as F4-09.

Code	Name	Range	Default	Modification
F4-12	Speed control (brake) torque upper limit digital setting	0.0% ～ 200.0%	150.0%	☆

Set the digital given value of torque control in braking (generating) state or the reference value of AI/high-speed DI/communication given and other channels.

Code	Name	Range	Default	Modification
F4-14	Proportional gain of excitation regulation	0 ～ 60000	2000	★
F4-15	Integrating gain of excitation regulation	0 ～ 60000	1300	★
F4-16	Proportional gain of torque adjustment	0 ～ 60000	2000	★
F4-17	Integrating gain of torque adjustment	0 ～ 60000	1300	★

Motor parameter identification is automatically obtained during comprehensive self-learning, and modification is not recommended.

Code	Name	Range	Default	Modification
F4-20	Maximum output voltage coefficient	100~ 110	Model determination	★

The maximum output voltage is limited. Increasing this setting value can improve the load capacity of the field weakening area (over the rated speed), but the ripple will increase and increase the heat generation; otherwise, the ripple will be reduced and the heat generation will be reduced, but it will cause the weak field area. The load capacity is reduced.

Code	Name	Range	Default	Modification
F4-21	Automatic tuning factor of flux-weakening	50~ 200	100	☆

Optimize the torque performance in the field weakening area. Reducing this value can improve the acceleration effect in the field weakening area, but it will reduce the dynamic response capability of the load (the speed drops after loading).

6.6 F5 set (Torque control parameters)

Code	Name	Range	Default	Modification
F5-00	Speed/torque control mode options	0: Speed control 1: Torque control	0	☆

For switching speed/torque control, it should be noted that:

Torque control needs to be performed in vector control mode.

When the DI terminal selects the "43: speed control/torque control switching" function, the DI terminal is effective, and the corresponding set value of this function code is reversed.

When the DI terminal selects the "29: Torque control prohibition" function, the DI terminal will force to enter the speed control mode when the DI terminal is valid.

Code	Name	Range	Default	Modification
F5-01	Torque setting source options for torque control mode	0: Digital setting (F5-03) 1: AI1 2: AI2 (Rotary potentiometer) 3: PULSE pulse setting (simplified version is DI4, standard version is DI5) 4: Communication setting	0	☆

Torque reference source selection.

When this function code is set to 0, its digital reference comes from F5-03.

The control mode of each channel of torque upper limit source is similar to that of each channel of main frequency source X.

Code	Name	Range	Default	Modification
F5-03	Torque digital setting for torque control mode	-200.0% ~ 200.0%	150.0%	☆
F5-04	Torque filtering	0 ~ 100.0%	0.0%	☆
F5-05	Maximum frequency of torque forward	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆
F5-06	Torque reverse maximum frequency	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆
F5-07	Torque acceleration time	0.00s ~ 650.00s	0.00s	☆
F5-08	Torque deceleration time	0.00s ~ 650.00s	0.00s	☆

F5-03: 100% corresponds to the rated torque of the motor.

F5-04: Modification is not recommended.

F5-05/ F5-06: Limit the maximum operating frequency in torque control mode to avoid high speed when the load is less than the motor torque.

F5-07/F5-08: When the torque acceleration and deceleration time is small, the motor speed response is good, but it is easy to cause problems such as vibration and increased noise. It needs to be adjusted according to the actual application site requirements. For example, in master-slave control, if the slave needs to execute the master command quickly, set the torque acceleration and deceleration time to 0.

6.7 F6 set (Input terminal parameters)

H series inverters are equipped with 5 multi-function digital input terminals as standard (DI5 can be used as high-speed pulse input terminal) and 2 analog input terminals.

Code	Name	Default	Modification
F6-00	DI1 terminal function selection	1	★
F6-01	DI2 terminal function selection	48	★
F6-02	DI3 terminal function selection	49	★
F6-03	DI4 terminal function selection	50	★
F6-04	DI5 terminal function selection	0	★

These parameters are used to set the functions of the digital multi-function input terminals. The functions that can be selected are shown in the table below:

Code	Name	Description
0	No function	There is no linkage action. If the terminal is blank and unused, it is recommended to set it to 0 to avoid malfunction.
1	Forward run FWD or run command	When the two-wire type is 1 (F6-11 is set to 0), the DI terminal is valid for forward running. When the two-wire type 2 (F6-11 is set to 1), the DI terminal is valid to run.
2	Reverse running REV or forward and reverse running direction	When the two-wire type is 1 (F6-11 is set to 0), the DI terminal is valid for reverse operation. When the two-wire type 2 (F6-11 is set to 1), the DI terminal is valid for reverse running, and when it is invalid, it is forward running.
3	Three-wire running control	When the two-wire type is 1 (F6-11 is set to 0), the DI terminal is valid for reverse operation. When the two-wire type 2 (F6-11 is set to 1), the DI terminal is valid for reverse running, and when it is invalid, it is forward running.
4	Forward Jog (FJOG)	For jog operation, see F9-00~02 jog operation related setting explanation in F9 group auxiliary functions.
5	Reverse Jog (RJOG)	
6	Terminal UP	The UP/DOWN command is given through the terminal, which is equivalent to UP/DOWN on the keyboard. The trigger state is equivalent to pressing the button all the time, and the invalid state is equivalent to releasing the button.
7	Terminal DOWN	
8	Coast stop	After triggering, it is equal to set F1-06 stop mode to free stop, and then enable stop.
9	Fault reset (RESET)	The fault reset of the inverter is equivalent to the RST function on the keyboard.
10	run pause	After the terminal signal becomes valid, the inverter decelerates to stop and saves the current state, and parameters such as PLC and PID are also retained; after the terminal signal becomes invalid, the inverter returns to the state before the terminal becomes valid.
11	External fault normally open input	Normally open input, when the terminal signal takes effect, the inverter will report E15/A15 fault.
12	Multi-segment command terminal 1	It is composed of 4/3/2/1 and has a total of 4-bit binary control from high to bottom, which is used to control the corresponding value of 00~15 entering the multi-segment instruction FE group. That is, 16 speeds or 16 other commands can be set through the 16 states of these 4 terminals. See Appendix 1 for details.
13	Multi-stage command terminal 2	
14	Multi-stage command terminal 3	
15	Multi-stage command terminal 4	
16	Acceleration and deceleration time	Composed of 2/1, it is controlled by 2-bit binary from high

	selection terminal 1	to low, which is used to select the acceleration and deceleration time 1/2/3/4. See Appendix 2 for details.
17	Acceleration and deceleration time selection terminal 2	
18	Frequency source switching	Cooperate with F0-06 to switch the frequency source.
19	UP/DOWN setting clear (terminal, keyboard)	When the frequency setting is digital setting, after this terminal takes effect, the frequency previously adjusted by the UP/DOWN button or the UP/DOWN function terminal will be restored to the value set by the preset frequency F0-01 immediately.
20	Control command switching terminal 1	When the command source selection F0-21 is set to 1: terminal command channel, when this terminal is valid, the command source can be switched to the key command channel; when the terminal is invalid, it will be switched back to the terminal command channel. When the command source selection F0-21 is set to 2: communication command channel, the terminal can be enabled to switch the command source to the key command channel; when the terminal is invalid, it will be switched back to the communication command channel.
21	Acceleration and deceleration prohibition	After this terminal takes effect, the inverter will not change any output frequency except the stop command.
22	PID pause	After this terminal takes effect, the PID operation is temporarily stopped and the current frequency is maintained.
23	PLC status reset	After this terminal is triggered, the inverter returns to the PLC initial value.
24	Wobble Pause	In wobble frequency control, after this terminal takes effect, the wobble frequency stops and the inverter runs at the center frequency.
25	Counter input	Used in the counting function, if the terminal is valid, it will trigger a count.
26	Counter reset	It is used in the counting function, and the counter is cleared when the terminal is valid.
27	length count input	Used in the length counting function, if the terminal is valid, it will trigger a length record.
28	length reset	It is used in the length counting function. When the terminal is valid, the length is cleared.
29	Torque control prohibited	Used in torque control mode, after this terminal takes effect, it will switch from torque control to speed control. After the terminal is invalid, it will automatically switch back to the torque control mode.
30	PULSE (pulse) frequency input (only valid for DI5)	Set DI5 as high-speed pulse terminal, if DI5 needs to be used as high-speed pulse input, then F6-04 must be set to 30
31	Immediate DC braking	When the terminal becomes effective, it immediately switches to the DC braking state.
32	External fault normally closed	Normally closed input, when the terminal signal takes

	input	effect, the inverter will report E15/A15 fault.
33	Frequency modification enable	If the terminal is valid, it is allowed to modify the frequency by command. If the terminal is invalid, it is forbidden to modify the frequency.
34	PID action direction is reversed	The terminal is valid, and the setting value of FC-03 of the PID action direction is reversed.
35	External parking terminal 1	When the command source selection F0-21 is set to 0: the operation panel command channel, the inverter will stop when this terminal is enabled, which is equivalent to the STOP button on the keyboard.
36	Control command switching terminal 2	When the command source selection F0-21 is set to 1: terminal command channel, the terminal will be switched to the communication command channel when this terminal is valid. When the command source selection F0-21 is set to 2: communication command channel, the terminal will be switched to the terminal command channel when this terminal is valid.
37	PID integral pause	When used for PID operation, the PID integral function is suspended and becomes PD control.
38	Switch between frequency source X and preset frequency	When the terminal is valid, the frequency reference is switched from the main frequency source X to the value of the preset frequency F0-01; when the terminal is invalid, it changes back to the main frequency source X
39	Frequency source Y and preset frequency switch	When the terminal is valid, the frequency reference will be switched from the auxiliary frequency source Y to the value of the preset frequency F0-01; if the terminal is invalid, it will return to the auxiliary frequency source Y.
40	PID parameter switching	It is used when the PID parameter switching condition FC-18 is set to "1: Switching by DI terminal".When the terminal is invalid, use PID parameter 1; when the terminal is valid, use PID parameter 2.
41	User-defined fault 1	When the terminal signal takes effect, the inverter reports E24/A24 fault.
42	User-defined fault 2	When the terminal signal takes effect, the inverter reports E25/A25 fault.
43	Speed control/torque control switching	When F5-00 is set to "0 speed control", the control mode is switched to torque mode when the terminal is valid; it is switched back to the speed mode when the terminal is invalid. When F5-00 is set to "1 Torque control", the control mode is switched to speed mode when the terminal is valid; the torque mode is switched back to when the terminal is invalid.
44	emergency pull over	When the terminal is valid, the system enters the emergency stop state, which will stop the motor as soon as possible. When the terminal is in an active state, it cannot

		be turned on again.
45	External parking terminal 2	When the command source F0-21 is set to any state, the inverter will decelerate to stop, and the deceleration time is given as the deceleration time 4 of F9-08.
46	Deceleration DC braking	After this terminal takes effect, it first decelerates to the stop DC braking initial frequency F1-07, and then executes the stop DC braking logic.
47	The running time is cleared	If the current running time of U0-22 is less than the set value of the current running time (greater than 0) of F9-39, the current running time can be cleared when the terminal is valid, otherwise it cannot be cleared.
48	high water switch	In the special mode of photovoltaic water pump, the terminal is valid, indicating that the water tower is full
49	low water switch	When the photovoltaic water pump is in special mode, the terminal is valid, indicating that the well is short of water
50	Forced Mains	In the special mode of photovoltaic water pump, the terminal is valid, and the mains work mode is forced

Appendix 1 Function Description of Multi-segment Instructions

4 command multi-segment function terminals can be combined into 16 states, these 16 states correspond to 16 command setting values. The specific table is as follows

K4	K3	K2	K1	Instruction settings	Corresponding parameters
OFF	OFF	OFF	OFF	Multi-segment instruction 0	FE-00
OFF	OFF	OFF	ON	Multi-segment instruction 1	FE-01
OFF	OFF	ON	OFF	Multi-segment instruction 2	FE-02
OFF	OFF	ON	ON	Multi-segment instruction 3	FE-03
OFF	ON	OFF	OFF	Multi-segment instruction 4	FE-04
OFF	ON	OFF	ON	Multi-segment instruction 5	FE-05
OFF	ON	ON	OFF	Multi-segment instruction 6	FE-06
OFF	ON	ON	ON	Multi-segment instruction 7	FE-07
ON	OFF	OFF	OFF	Multi-segment instruction 8	FE-08
ON	OFF	OFF	ON	Multi-segment instruction 9	FE-09
ON	OFF	ON	OFF	Multi-segment instruction 10	FE-10
ON	OFF	ON	ON	Multi-segment instruction 11	FE-11
ON	ON	OFF	OFF	Multi-segment instruction 12	FE-12
ON	ON	OFF	ON	Multi-segment instruction 13	FE-13
ON	ON	ON	OFF	Multi-segment instruction 14	FE-14
ON	ON	ON	ON	Multi-segment instruction 15	FE-15

When the frequency source is selected as multi-speed, 100.0% of the function code FE-00～FE-15 corresponds to the maximum frequency F0-09. In addition to the multi-step speed function, the multi-step command can also be used as a given source of PID, or as a voltage source of V/F separation control, etc., to meet the needs of switching between different given values.

Appendix 1 Function description of acceleration/deceleration time selection terminal

Terminal 1	Terminal 1	Acceleration or deceleration time	Corresponding parameters

		selection	
OFF	OFF	Acceleration and deceleration time 1	F0-13、F0-14
OFF	ON	Acceleration and deceleration time 2	F9-03、F9-04
ON	OFF	Acceleration and deceleration time 3	F9-05、F9-06
ON	ON	Acceleration and deceleration time 4	F9-07、F9-08

Code	Name	Range	Default	Modification
F6-05	DI filter time	0.000s ~ 1.000s	0.010s	☆

If the DI terminal is disturbed at the application site, the filter time can be appropriately increased; the longer the filter time, the slower the DI action response time.

Code	Name	Range	Default	Modification
F6-06	DI1 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-07	DI2 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-08	DI3 delay time	0.0s ~ 3600.0s	0.0s	☆
F6-09	DI4 delay time	0.0s ~ 3600.0s	0.0s	☆

After the terminal detects the input signal, it will respond after a delay of this time.

It is used to set the valid state mode of the digital input terminal.

0: When selected as active high level, it is valid when the corresponding DI terminal is short-circuited, and invalid when disconnected.

Code	Name	Range	Default	Modification
F6-10	DI terminal active mode options	0: Active high 1: Active low Units digit: DI1 Tens digit: DI2 Hundreds digit: DI3 Thousands digit: DI4 Ten Thousands digit: DI5	0	★

1: When selected as active low level, the corresponding DI terminal is invalid when short-circuited, and valid when disconnected.

number of digits	Ten Thousands digit	Thousands digit	Hundreds digit	Tens digit	Units digit
Defaults	0	0	0	0	0
Corresponding	DI5	DI4	DI3	DI2	DI1

	terminal					

Code	Name	Range	Default	Modification
F6-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★

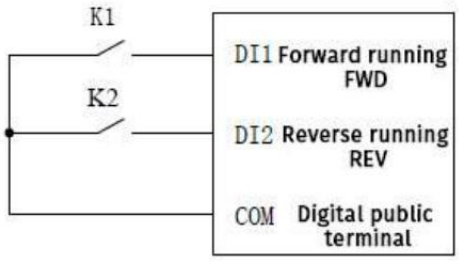
This parameter defines four different ways to control the inverter to run through external terminals.

Note: For the convenience of description, DI1\DI2\DI3 in the DI1-DI5 multi-function input terminals are selected as the external terminals. That is, the function of DI1\DI2\DI3 is selected by setting the value of F6-00~F6-02. For details, please refer to function F6-00~F6-04.

0: Two-wire mode 1: The most commonly used two-wire mode for this bit. The forward and reverse rotation of the motor is determined by DI1/DI2.

Code	Name	Setting value	Function description
F6-11	Terminal command method	0	2-wire mode 1
F6-00	DI1 terminal function selection	1	Forward running FWD
F6-01	DI2 terminal function selection	2	Reverse running REV

K1	K2	Run command
1	0	FWD
0	1	REV
1	1	STOP
0	0	STOP



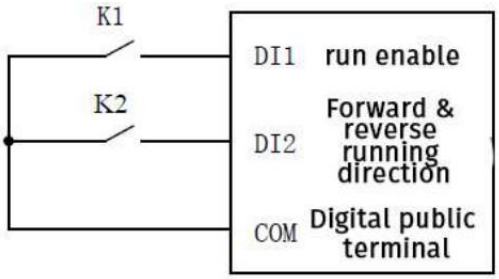
Two-wire mode 1

In this control mode, when K1 is closed, the inverter rotates forward, and when K2 is closed, the inverter rotates reversely. K1/K1 are closed or disconnected at the same time, and the inverter stops running.

0: Two-wire type 2: In this mode, the DI1 terminal is the running enable terminal, and the DI2 function is to confirm the running direction.

Code	Name	Setting value	Function description
F6-11	Terminal command method	1	two-wire 2
F6-00	DI1 terminal function selection	1	run enable
F6-01	DI2 terminal function selection	2	Forward and reverse running direction

K1	K2	Run command
0	0	STOP
0	1	STOP
1	0	FWD
1	1	REV

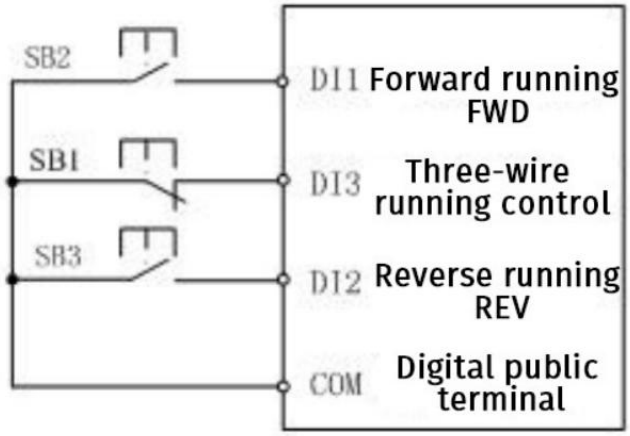


Two-wire mode 2

In this mode, when K1 is closed, K2 disconnects the forward drive of the inverter, and K2 closes the inverter in reverse. K1 is disconnected, and the inverter stops running.

2: Three-wire mode 1, in this mode, the D3 terminal is the enable terminal, and the direction is controlled by DI1/DI2 respectively. The settings are as follows:

Code	Name	Setting value	Function description
F6-11	Terminal command method	2	three-wire 1
F6-00	DI1 terminal function selection	1	Forward running FWD
F6-01	DI2 terminal function selection	2	Run REV in reverse
F6-02	DI3 terminal function selection	3	Three-wire running control



Three-wire mode 1

In this control mode, when the SB1 button is in the closed state, press the SB2 button, the inverter will run forward, and press the SB3 button, the inverter will run reversely.

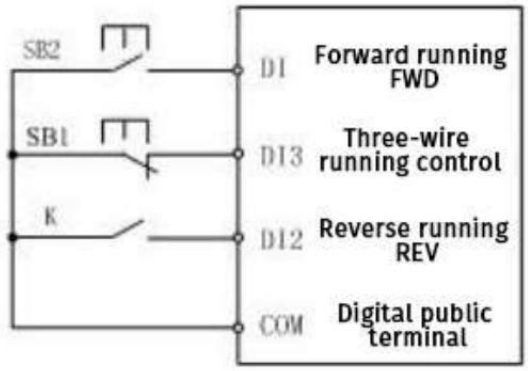
When the SB1 button is disconnected, the inverter stops. During normal start-up and operation, the SB1 button must be kept in the closed state, and the command of the SB2/SB3 button will take effect in the closing action, and the operating state of the inverter is subject to the last status of the three buttons.

3: Three-wire mode 2: In this mode, DI3 is the enable terminal, the running command is given by the DI1 terminal, and the direction is determined by the state of DI2. The settings are as follows:

Code	Name	Setting value	Function description

F6-11	Terminal command method	3	three-wire 1
F6-00	DI1 terminal function selection	1	run enable
F6-01	DI2 terminal function selection	2	Forward and reverse running direction
F6-02	DI3 terminal function selection	3	Three-wire enable operation

K	Running direction
0	Forward running FWD
1	Reverse running REV



As shown in the figure above, in this control mode, when the SB1 button is closed, press the SB2 button to run the inverter, K disconnects the inverter to run forward, K closes the inverter to reverse; the inverter stops when the SB1 button is disconnected. During normal startup and operation, the SB1 button must be kept closed, and the command of the SB2 button will take effect at the edge of the closing action.

Code	Name	Range	Default	Modification
F6-12	Terminal UP/DOWN change rate	0.001Hz/s ~ 65.535Hz/s	1.000Hz/s	☆

It is used to set the change amount of the frequency per second when the UP/DOWN function is long-pressed to adjust the frequency.

Code	Name	Range	Default	Modification
F6-13	AI curve 1 minimum input	0.00V ~ F6-15	0.00V	☆
F6-14	AI1 curve minimum input corresponding setting	-100.0% ~ +100.0%	0.0%	☆
F6-15	AI curve 1 maximum input	F6-13 ~ +10.00V	10.00V	☆
F6-16	AI1 curve maximum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
F6-17	AI1 filter time	0.00s ~ 10.00s	0.10s	☆

When the analog input voltage is less than "AI curve 1 minimum input F6-13", the setting value of F6-23 will be selected according to the AI lower than the minimum input setting, and it will be determined that AI is equal to the "set AI curve 1 minimum input corresponding setting" F6-13, 100% corresponds to 10V, 0% corresponds to 0V" or "0%".

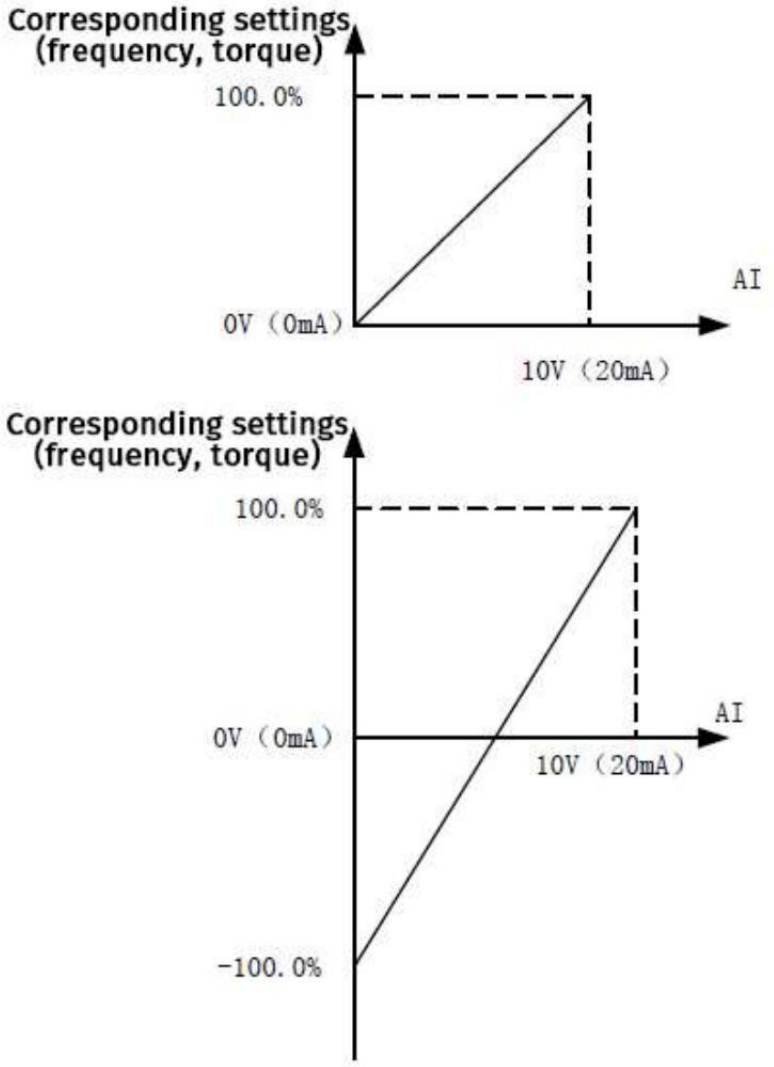
When the analog input voltage is greater than "AI curve 1 maximum input F6-15", it is determined that AI is equal to "set AI curve 1 maximum input corresponding to setting F6-16. When the analog input is current, 1mA

current is equivalent to 0.5V voltage. .

AI1 input filter time is used to set the software filter time of AI1. When the on-site analog quantity is easily disturbed, please increase the filter time so that the detected analog quantity tends to be stable. If you want to slow down, how to set it needs to be considered according to the actual application.

In other applications, the 100.0% of the analog setting corresponds to the nominal value with different meanings, please refer to the description of each application section for details.

The following figure shows two typical settings:



Code	Name	Range	Default	Modification
F6-18	AI2 curve minimum input	0.00V ~ F6-20	0.00V	☆
F6-19	AI2 curve minimum input corresponding setting	-100.0% ~ +100.0%	100.0%	☆
F6-20	AI2 curve maximum input	F6-18 ~ +10.00V	2.80V	☆
F6-21	AI2 curve maximum input corresponding setting	-100.0% ~ +100.0%	0.0%	☆

F6-22	AI2 filter time	0.00s ~ 10.00s	0.10s	☆

同 AI 曲线 1 的讲解。

Code	Name	Range	Default	Modification	Code
F6-23	AI curve selection	Units digit	AI1 curveselection	21	☆
		1	Curve 1 (2 points, see F6-13 ~ F6-16)		
		2	Curve 2 (2 points, see F6-18 ~ F6-21)		
		3	Curve 3（6points, see P3-04～P3-15）		
		Tens digit	AI2 curve selection (same as the unites digit)		

Set the input curve selection of AI1/2. The default 21 corresponds to the following:

Units 1 corresponds to AI1 selection curve 1 (2 points, see F6-13～F6-16)

Tens place 2 corresponds to AI2 selection curve 2 (2 points, see F6-18～F6-21)

Code	Name	Range	Default	Modification	Code
F6-24	Options for AI lower than minimum input	Units digit	Option for AI1 lower than the minimum input setting	00	☆
		0	Minimum input setting		
		1	0.0%		
		Tens digit	AI2 is lower than the minimum input setting selection (same as the unites digit)		

It is set that when AI is less than the minimum value in the curve, it is determined that AI is equal to "corresponding to the minimum input setting" or "0%".

The units/tens from low to high correspond to AI1/AI2 respectively.

Code	Name	Range	Default	Modification
F6-26	PULSE minimum input	0.00kHz ~ F6-28	0.00kHz	☆
F6-27	PULSE minimum input corresponding setting	-100.0% ~ 100.0%	0.0%	☆
F6-28	PULSE maximum input	F6-26 ~ 100.00kHz	50.00kHz	☆
F6-29	PULSE maximum input corresponding setting	-100.0% ~ 100.0%	100.0%	☆
F6-30	PULSE filter time	0.00s ~ 10.00s	0.10s	☆

Same as AI curve and AI filter time.

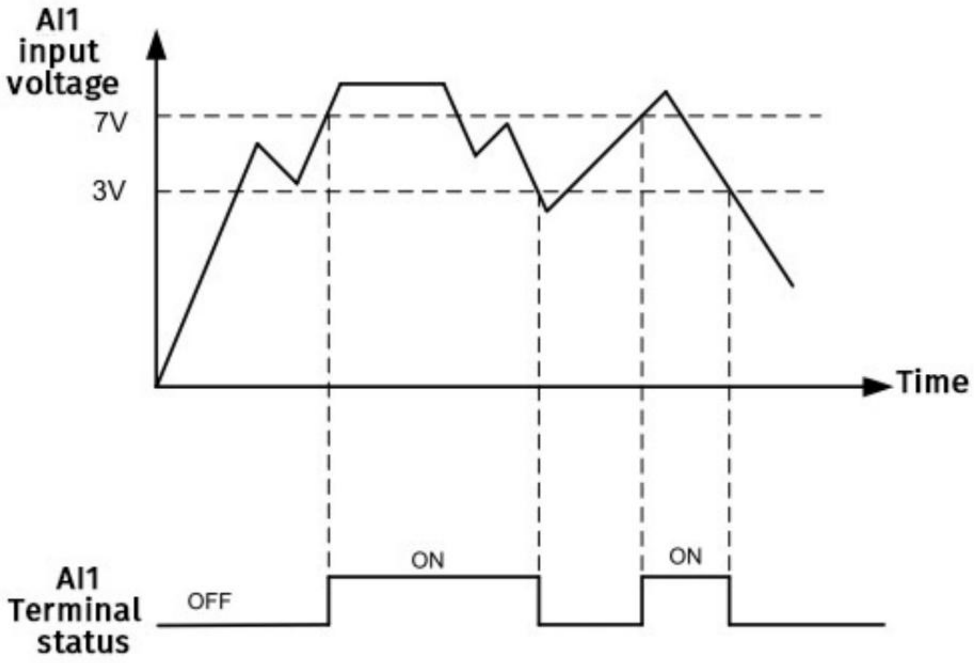
Code	Name	Range	Default	Modification
F6-31	AI1 terminal function selection	0: AI1 is analog input	0	★
		1~47: AI1 is used as DI digital input, the function is the same as F6-00		
F6-33	AI1 as DI valid state selection	0: Active high	0	★
		1: Active low		

Function code F6-31 is used to use AI1 as DI. When AI1 is used as DI, when AI1 input voltage is greater than 7V,

AI1 terminal state is high level, when AI1 input voltage is lower than 3V, AI1 terminal state is low power flat. Hysteresis between 3V~7V

F6-33 is used to determine when AI1 is used as DI, whether AI1 high level is valid state or low level is valid state. As for the function setting of AI1 as DI, it is the same as the normal DI setting, please refer to the description of the relevant DI setting of F6 group.

The following figure takes AI1 input voltage as an example to illustrate the relationship between AI1 input voltage and corresponding DI status:



6.8 F7set (Output terminal parameters)

H series inverters come standard with one multi-function analog output terminal AO, one multi-function digital output terminal DO, and one multi-function relay output terminal.

Code	Name	Range	Default	Modification
F7-00	Digital output selection	0: High-speed pulse output 1: Normal digital output	0	☆

The DO output terminal is a high-speed pulse output terminal or an open-collector terminal multiplexing port. When set to high-speed pulses, the output is high-frequency pulses up to 100kHz.

As an open-collector common digital output, its function is set by F7-02.

When used as high-speed pulse output, its function is set by F7-04.

Code	Name	Default	Modification
F7-01	RELAY1 output function selection	0	☆
F7-02	DO output function selection	1	☆

These multi-function terminals are described as follows:

Code	Name	Function description
0	0: No output	The output terminal has no function.
1	1: Normal digital output	Indicates that the inverter is in the running (RUN) state.

2	2: Fault output (for free stop fault)	Indicates that the inverter has an output fault, and the fault level is free stop (cut off the output).
3	3: Frequency level detection FDT1 output	Indicates that the output frequency reaches or exceeds the set value of F9-18/19.
4	4: Frequency reached	Indicates that the absolute value of the output frequency reaches the set value of F9-20.
5	5: Running at zero speed (no output when inverter stops)	Indicates that the inverter is in RUN state and the output frequency is 0Hz. Although the output frequency is also 0Hz during shutdown, this function terminal will not take effect.
6	6: Motor overload pre-alarm	When the motor overload protection is turned on and the motor load exceeds the set value of the motor overload warning coefficient F8-02, the output is valid.
7	7: Inverter overload pre-alarm	10s before the inverter overload protection action, the output becomes valid.
8	8: Set count value reached	In the counting function, when the count value reaches the set count value FD-08, the output becomes valid.
9	9:Designated count value reached	In the counting function, when the count value reaches the specified count value FD-09, the output becomes valid.
10	10: Length reached	In the fixed length function, when the actual length FD-06 exceeds the set length FD-05, the output becomes valid.
11	11: PLC cycle completed	When the PLC completes a cycle, the output becomes valid, and becomes invalid after 250ms.
12	12: Accumulated operation time reached	When the "accumulated running time FA-07" reaches the value set by "set running time F9-16", the output becomes valid.
13	13: Frequency being limited	When the given frequency exceeds the upper limit frequency or the lower limit frequency, and the actual frequency exceeds the upper limit frequency or the lower limit frequency (that is, in the swing frequency limit), the output is valid.
14	14: Torque being limited	When the inverter runs in the speed control mode, the output is valid when the output torque reaches the upper limit of the speed control torque or the speed deviation exceeds 2Hz.
15	15: Operation ready	When the power supply of the main circuit and control circuit of the inverter has been stabilized, and the inverter has detected any fault information, the inverter is in a running state (that is, there is no fault, no undervoltage), and the output is valid.
16	16: Upper limit frequency reached	When the running frequency is greater than the upper limit frequency F0-11, the output is valid.
17	17: Lower limit frequency reached (operation related)	When the "set frequency is lower than the lower limit frequency running action F9-14" is set to "0: lower limit frequency operation" or "2: zero speed operation", when the running frequency is lower than the lower limit frequency F0-12, the output is valid.
18	18: Undervoltage status output	When the "set frequency is lower than the lower limit frequency running action F9-14" is set to "1: stop", the terminal always keeps the output invalid. When the output frequency is less than the lower limit frequency during acceleration, the output is valid
19	19: Communication settings	When the inverter is in the state of input undervoltage, the output is valid.
20	20: Operation at zero speed signal 2 (also output when operation stops)	The terminal state is given by communication.
21	21: Accumulated power-on time reached	Indicates that the inverter is in the running (RUN) state and the output frequency is 0Hz or there is no output when stopped.
22	22: Frequency level detection FDT2	When the "cumulative power-on time FA-09" reaches the set value of "set power-on arrival time F9-15", the output becomes valid.
23	23: Frequency 1 reached	Indicates that the output frequency of the inverter is within the range of "arbitrary arrival frequency detection value 1 F9-

		23" ± ("maximum frequency F0-09" × "arbitrary arrival frequency detection width 1 F9-24").
24	24: Frequency 2 reached	Indicates that the output frequency of the inverter is within the range of "arbitrary arrival frequency detection value 1 F9-23" ± ("maximum frequency F0-09" × "arbitrary arrival frequency detection width 2 F9-26").
25	25: Current 1 reached	Indicates that the output current of the inverter is within the range of "arbitrary arrival current 1 F9-31" ± ("motor rated current F3-02" × "arbitrary arrival current 1 detection width F9-32").
26	26: Current 2 reached	Indicates that the output current of the inverter is within the range of "arbitrary arrival current 2 F9-33" ± ("motor rated current F3-02" × "arbitrary arrival current 2 detection width F9-34").
27	27: Time out	When the timing function selection F9-35 is set to 1 to be valid, the output is valid when the "current running time F9-39" reaches the given value of "timed running time F9-36".
28	28: AI1 input overloaded	When the AI1 input voltage exceeds the range of "AI1 input voltage protection value lower limit F9-40" ~ "AI1 input voltage protection value upper limit F9-41", the output is valid.
29	29: Load dropping	When the drop-load protection is turned on (F8-51 select 1 is valid), and the load is so small that the drop-load detection is triggered, the output is valid.
30	30: Reverse running	Indicates that the inverter is running in reverse, and the output U/V/W is in reverse order.
31	31: Zero current state	When the output current of the inverter is less than the set value of "zero current detection level F9-27" and the duration exceeds the set value of "zero current detection delay time F9-28", the output is valid.
32	32: Module temperature reached	Indicates that the value of the heat sink temperature FA-06 is greater than the value set by "Module temperature reaches F9-38".
33	33: Output current limit exceeded	When the output current of the inverter is greater than the set value of "output current over-limit F9-29" and the duration exceeds the set value of "output current over-limit detection delay time F9-30", the output is valid.
34	34: Lower limit frequency reached (also output when the inverter stops)	The output is valid when the running frequency value is less than the lower limit frequency F0-12 or when it stops.
35	35: Alarm (all faults)	When the inverter is faulty and the fault level is to continue running, the output is valid.
36	36: Operation Times Up	When the current running time is greater than the "current running arrival time setting"
37	37 : Fault (only for free stop faults and not for undervoltage faults)	Indicates that the inverter has an output fault (excluding input undervoltage fault), and the fault level is free stop (cut off the output).
38	Power supply mode self-switching.	When the power supply mode is set to self-switching, this terminal realizes the switching control of the mains power.

Code	Name	Default	Modification
F7-03	AO output function selection	0	☆
F7-04	High-speed pulse output function selection	0	☆

These multi-function terminals are described as follows:

Code	Name	Function description
0	0: Operating frequency	0Hz ~ maximum frequency F0-09
1	1: Set frequency	0Hz ~ maximum frequency F0-09

2	2: Output current	0 ~ 2 times the rated current of the motor
3	3: Output torque (absolute value of torque)	0 ~ 2 times the rated torque of the motor
4	4: Output power	0 ~ 2 times motor rated power
5	5: Output voltage	0 ~ 1.2 times the rated voltage of the inverter
6	6: PULSE input (100.0% corresponds to 100.0kHz)	0.01kHz ~ 100.00kHz
7	7: AI1	0V ~ 10V (0~20mA)
8	8: AI2 (keyboard rotary potentiometer)	0V ~ 10V
9	9: Length	0 ~ set length FD-05
10	10: count value	0 ~ Set count value FD-08
11	11: Communication settings	0 ~ 100% output value given by communication command
12	12: Motor speed	0 ~ Speed corresponding to the maximum frequency F0-09
13	13: Output current (100.0% corresponds to 1000.0A)	0.0A ~ 1000.0A
14	14: Output voltage (100.0% corresponds to 1000.0V)	0.0V ~ 1000.0V
15	15: Output torque (actual torque value)	-2×motor rated torque ~ 2×motor rated torque

Code	Name	Range	Default	Modification
F7-05	Maximum frequency of high-speed pulse output	0.01KHz~100.00KHz	50.00KHz	☆

When the DO1 terminal is set to high-speed pulse, you can set the corresponding frequency when the high-speed pulse output is 100% through this function code.

Code	Name	Range	Default	Modification
F7-06	AO bias coefficient	-100.0% ~ +100.0%	0.0%	☆
F7-07	AO gain	-10.00 ~ +10.00	1.00	☆

This function code is generally used to correct the zero drift of the analog output and the deviation of the output amplitude. It can also be used to customize the required analog output curve

The calculation relation takes AO1 as an example:

y1 represents the minimum output voltage or current value of AO1; y2 represents the maximum output voltage or current value of AO1

y1 = 10V or 20mA × F7-06 × 100%;

y2 = 10V or 20mA × (F7-06 + F7-07);

The factory default value of F7-06 = 0.0%, F7-07 = 1, so the output 0~10V (or 0~20mA) corresponds to the minimum value of the physical quantity represented by the maximum value of the physical quantity represented.

Example 1:

Change 0～20mA output to 4～20mA

The minimum input current value by the formula: y1 = 20mA × F7-06 × 100%,

4 = 20 × F7-06, calculated according to the formula F7-09 = 20%;

The maximum input current value by the formula: y2=20mA × (F7-06 + F7-07);

20=20 × (20% + F7-07), calculated according to the formula F7-07 = 0.8

Example 2:

Change 0～10V output to 0～5V

The minimum input voltage value by the formula: y1 = 10 × F7-06 × 100%,

0=10 × F7-06, calculated according to the formula F7-06 = 0.0%;

The maximum input voltage value by the formula: y2=10 × (F7-06 + F7-07);

5=10 × (0 + F7-07), calculated according to the formula F7-07 = 0.5

Code	Name	Default	Modification
F7-08	AO output filter time	0.000s～1.000s	☆

If there is a large AO fluctuation and the output needs to be relatively stable, the filter time can be appropriately increased; the longer the filter time, the slower the AO response time.

Code	Name	Range	Default	Modification
F7-10	RELAY1 output delay time	0.0s ~ 3600.0s	0.0s	☆
F7-11	DO output delay time	0.0s ~ 3600.0s	0.0s	☆

Set the action delay time of the output terminal, the time from the trigger state to the actual output becoming valid.

Code	Name	Range	Default	Modification
F7-12	DO output valid state selection	0: Positive logic 1: Inverse logic Units digit: RELAY1 Tens digit: DO1	00	☆

Set the logic state of the output terminal, such as RELAY, the positive logic is normally open, and it is closed when it is valid; the negative logic is normally closed, and it is disconnected when it is valid.

6.9 F8 set (Fault and protection, accelerated overcurrent)

Code	Name	Range	Default	Modification
F8-00	Motor overload protection selection	0: Disable 1: Enable	1	☆
F8-01	Motor overload protection gain	0.20 ~ 10.00	1.00	☆

F8-00 Motor overload protection options:

Select whether to enable the overload protection of the inverter to the motor.

If the motor overload protection is turned off, the motor may be overloaded and damaged. It is recommended to install a thermal relay or other motor overheat protection circuit.

F8-01 Motor overload protection gain:

Motor overload time = typical time of motor overload curve × motor overload protection factor

For example, the 145% overload time of the motor is 300s. If you want to modify it to 180s, then F8-01 needs to be modified as: 180/300 = 0.6.

Typical value of motor overload curve							
Current multiple	1.15	1.25	1.35	1.45	1.55	1.65	1.75
Overload time (sec)	4800	2400	900	300	120	120	120

Code	Name	Range	Default	Modification
F8-02	Motor overload warning coefficient	50% ~ 100%	80%	☆

This coefficient represents that the motor is in the overload state, after the accumulated time of motor overload reaches the percentage of the trigger time of motor overload protection, the motor overload warning state is set, and the function terminal can be used as the warning output.

Code	Name	Range	Default	Modification
F8-07	Power-on ground short-circuit protection options	0: Disable 1: Enable	1	☆

Select whether the inverter detects output short circuit to ground when power on. If it is valid, there will be a voltage output at the output end of the inverter after power-on.

Code	Name	Range	Default	Modification
F8-08	Automatic fault reset times	0 ~ 20	0	☆
F8-09	Fault during automatic fault reset	0: Operation halt	0	☆
	Relay action selection	1: Operation		
F8-10	Automatic fault reset interval time	0.1s ~ 100.0s	1.0s	☆

F8-08 Fault automatic reset times:

When the inverter fails, it can be automatically reset (equivalent to the RST button function). When the number of automatic resets exceeds the set value, the inverter will keep the fault status when it encounters a fault again.

F8-09 Fault relay action selection during automatic fault reset:

After set to action, the function terminal set as fault state output will be set to valid state in case of failure, and will return to invalid state after automatic reset.

After it is set to no action, during the fault and automatic reset process, the function terminal of the fault status output always remains in the invalid state.

F8-10 fault automatic reset interval:

Set the delay time of automatic reset after the fault state occurs. During this period, the inverter remains in the fault state.

Code	Name	Range	Default	Modification
F8-12	Output phase loss protection option	0: Disable 1: Enable	1	☆

Select whether to detect the output phase loss status. If this function is turned off, the inverter will continue to work when the inverter output phase is missing. At this time, the output current may be greater than the displayed current, which is a risk.

If this function is turned on, when the inverter detects that the output phase is missing, the inverter will report the E13/A13 fault, and perform the protection action according to the setting of the fault protection action.

Code	Name	Default	Modification
F8-13	Type of first fault	-	•
F8-14	Type of second fault	-	•
F8-15	Type of third (latest) fault	-	•

Check the fault types as follows:

Fault type	Function	Fault type	Function
0	0: No fault	20	20: Abnormal Parameter reading and writing
1	1: Wave-by-wave current limiting fault	21	21: Inverter hardware abnormal
2	2: Acceleration overcurrent	22	22: Ground short circuit of motor
3	3: Deceleration overcurrent	23	23: Running time reached
4	4: Constant speed overcurrent	24	24: User-defined fault 1
5	5: Acceleration overvoltage	25	25: User-defined fault 2
6	6: Deceleration overvoltage	26	26: Power-on time reached
7	7: Constant speed overvoltage	27	27: Offload
8	8: Buffer resistor overload	28	28: PID feedback lost during operation (frequency source)
F9	9: Undervoltage	29	29: The speed deviation is too large (the deviation between the given and the feedback)
10	10: Inverter overload	30	30: Motor overspeed
11	11: Motor overload	31	31: Inverter unit protection
12	12: Input phase loss	32	32: Code disc failure
13	13: Output phase loss	33	33: Motor over temperature fault
14	14: The module overheated	34	34: SVC stall fault
15	15: External fault	35	35: Magnetic pole position detection failed
16	16: Communication abnormal	36	36: UVW signal feedback error
17	17: Contactor abnormal	37	37: Point-to-point slave failure
18	18: Abnormal current detection	38	38: Braking resistor short circuit
19	19: Abnormal motor tuning	39	39: Switch the motor while running

Code	Name	Default	Modification
F8-16	Frequency at the third (latest) fault	-	●
F8-17	Current at the third (latest) fault	-	●
F8-18	Bus voltage at the third (latest) fault	-	●
F8-19	Input status at the third (latest) fault	-	●
F8-20	Output status at the third (latest) fault	-	●
F8-21	Inverter status at the third (latest) fault	-	●
F8-22	Power-on time at the third (latest) fault	-	●
F8-23	Operation time at the third (latest) fault	-	●
F8-24	Frequency at the second fault	-	●
F8-25	Current at the second fault	-	●
F8-26	Bus voltage at the second fault	-	●
F8-27	Input status at the second fault	-	●
F8-28	Output status at the second fault	-	●
F8-29	Inverter status at the second fault	-	●
F8-30	Power-on time at the second fault	-	●
F8-31	Operation time at the second fault	-	●
F8-32	Frequency at the first fault	-	●
F8-33	Current at the first fault	-	●
F8-34	Bus voltage at the first fault	-	●
F8-35	Input status at the first fault	-	●
F8-36	Output status at the first fault	-	●
F8-37	Inverter status at the first fault	-	●
F8-38	Power-on time at the first fault	-	●
F8-39	Operation time at the first fault	-	●

The above can view various information at the time of failure.

Code	Name	Range	Default	Modification	Code
F8-40	Fault protection action selection 1	Units digit	Motor overload (E11)	00000	☆
		0	Free stop		
		1	Stop by shutdown sequence		
		2	Continue operation		

		Tens digit	Input phase loss (E12)		
		Hundreds digit	Output phase loss (E13)（As same as the unit digit）		
		Thousands digit	External failure (E15)（As same as the unit digit）		
		Ten Thousands digit	Communication abnormal (E16)（As same as the unit digit）		

Code	Name	Range	Default	Modification	Code
F8-41	Fault protection action selection 2	Units digit	Function code reading and writing abnormal (E20)	00000	☆
		0	Free stop		
		1	Stop by shutdown sequence		
		Tens digit	Operation time reached (E23)（As same as the F8-40 unit digit）		
		Hundreds digit	User-defined fault 1(E24)（As same as the F8-40 unit digit）		
		Thousands digit	User-defined fault 2(E25)（As same as the F8-40 unit digit）		
		Ten Thousands digit	Power-on time reach(E26)（As same as the F8-40 unit digit）		

Code	Name	Range	Default	Modification	Code
F8-42	Fault protection action selection 3	Units digit	Offload(E27) （ As same as the F8-40 unit digit ）	00000	☆
		Tens digit	PID feedback lost during operation (E28)（As same as the F8-40 unit digit）		
		Hundreds digit	The speed deviation is too large (E29) (same as F8-40 digit)		
		Thousands digit	Motor overspeed (E30) (same as F8-40 digit)		
		Ten Thousands digit	Magnetic pole position detection failure (E35) (same as F8-40 digit)		

Code	Name	Range	Default	Modification	Code
F8-43	Fault protection action selection 4	Units digit	Code disc fault (E32) (same as F8-40 digit)	00000	☆
		Tens digit	Reserved		
		Hundreds	Reserved		

		digit			
		Thousands digit	Reserved		
		Ten Thousands digit	Reserved		

Coast to stop: The inverter displays fault code E** and stops directly, and the motor coasts to stop.

Stop according to the stop mode: the inverter displays the fault code A**, stops according to the set stop mode, and displays the fault code E** after the stop.

Continue to run: The inverter displays the fault code A** and continues to run. The state of continued running is determined by the setting value of the frequency selection F8-45 when the fault occurs.

Code	Name	Range	Default	Modification
F8-45	Frequency selection for continuous operation in spite of faults	0: Current operating frequency 1: Set frequency 2: Upper limit frequency 3: Lower limit frequency 4: Abnormal standby frequency	0	☆

0: Run at the fault frequency.

1: Run at the frequency given by the frequency source F0-06.

2: Run at the frequency given by the upper limit frequency source F0-10.

3: Run at the frequency given by the lower limit frequency F0-12.

4: Run at the frequency given by the abnormal standby frequency F8-46.

Code	Name	Range	Default	Modification
F8-46	Abnormal backup frequency	0.0% ~ 100.0% (100.0% corresponding to F0-09)	100.0%	☆

100.0% corresponds to the maximum frequency F0-09.

Code	Name	Range	Default	Modification
F8-47	Instantaneous failure tolerance function selection	0: Invalid 1: Decelerate 2: Decelerate to stop	1	★

In the event of an instantaneous power failure or a sudden drop in voltage, the inverter reduces the output speed to compensate the decrease in the DC bus voltage of the inverter with the load feedback energy, so as to keep the inverter running.

There are three state options: 0-invalid; 1-deceleration; 2-deceleration to stop

When the selection of 0 is invalid, the voltage is lower than the undervoltage of the inverter, and the inverter directly reports the undervoltage fault;

When selecting 1 to decelerate, and the voltage is lower than the set value of F8-50, the inverter decelerates to keep the bus voltage constant until it runs at 0Hz;

When selecting 2 to decelerate, the voltage is lower than the set value of F8-50, the inverter decelerates to stop, and the time of deceleration process is given by the setting of instantaneous stop non-stop time F8-60.

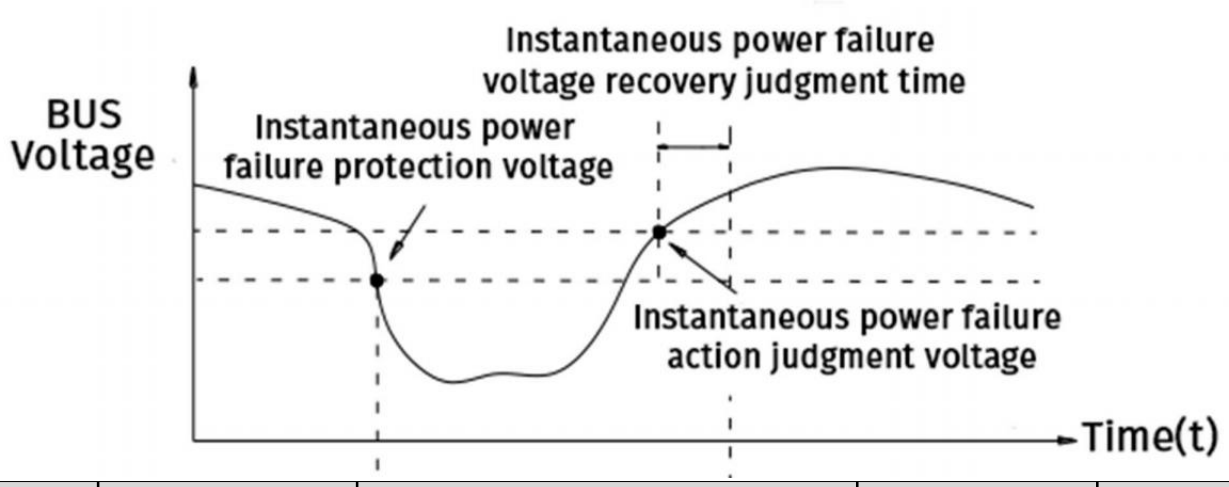
Code	Name	Range	Default	Modification
F8-48	Voltage set for suspending operation in case of instantaneous failure	80.0% ~ 100.0%	85.0%	*
F8-49	Voltage recovery waiting time for continuing operation in case of instantaneous failure	0.00s ~ 100.00s	0.50s	*
F8-50	Voltage set for continuing operation in case of instantaneous failure	60.0% ~ 100.0%(Standard bus voltage)	80.0%	*

The reference voltage of the instantaneous power failure and non-stop pause action voltage and the judgment voltage are the rated bus voltage (single-phase: 311Vdc, three-phase: 540Vdc).

When the busbar voltage drops to the set value of F8-50, the inverter enters the logic of instantaneous stop and non-stop operation.

When the bus voltage rises back to the set value of F8-48, the inverter stops the instantaneous stop and non-stop action (that is, stops frequency reduction), and after delaying the time of F8-49, the inverter exits the instantaneous stop non-stop working logic, and returns to run at a given frequency.

Instantaneous power failure non-stop voltage recovery judgment time F8-49 is to prevent the inverter from repeatedly entering and exiting the instantaneous power failure non-stop logic when the input voltage is unstable, thereby setting a certain hysteresis time.



Code	Name	Range	Default	Modification
F8-51	Offload protection options	0: Disable 1: Enable	0	☆

After this function is turned on, when the output current of the inverter is less than the set value of F8-52 of the load loss detection level, and the duration is longer than the set time of the load loss detection time F8-53, the inverter will report the E27/A27 fault, and the fault will be protected according to the fault. Action setting performs protection action.

Code	Name	Range	Default	Modification
F8-52	Offload detection level	0.0% ~ 100.0%	10.0%	☆

Load loss detection current, when the output current of the inverter is less than this set value, it will determine the load loss, and 100% corresponds to the rated current of the motor.

Code	Name	Range	Default	Modification
F8-53	Offload detection time	0.0s ~ 60.0s	1.0s	☆

During the load loss detection time, if the load returns to above the set value of F8-52, the inverter will automatically return to the given frequency to run.

Code	Name	Range	Default	Modification
F8-54	Overspeed detection value	0.0% ~ 50.0%(Maximum frequency)	20.0%	☆
F8-55	Overspeed detection time	0.0s: No detection 0.1 ~ 60.0s	1.0s	☆

When the inverter detects that the actual speed of the motor exceeds (1 + F8-54) × maximum frequency F0-09, and the duration exceeds the set value of the overspeed detection time F8-55, the inverter will report E30 and act according to the fault protection set to perform protection action.

If F8-55 is set to 0.0s, the over-speed detection function is closed.

Code	Name	Range	Default	Modification
F8-56	Excessive speed deviation detection value	0.0% ~ 50.0%(Maximum frequency)	20.0%	☆
F8-57	Excessive speed deviation detection time	0.0s: No detection 0.1 ~ 60.0s	5.0s	☆

When the inverter detects that the absolute value of the difference between the actual speed of the motor and the given speed exceeds F8-56 × maximum frequency F0-09, and the duration speed deviation is too large to detect the given value of F8-57, the inverter will Report E30, and perform protection action according to the setting of fault protection action.

If F8-57 is set to 0.0s, the detection function of excessive speed deviation is disabled.

Code	Name	Range	Default	Modification
F8-58	Deceleration to stop Kp	0~100	30	★
F8-59	Deceleration to stop Ki	0.0~300.0	20.0	★

If the instantaneous power failure does not stop in the working state of "1: Deceleration", it is easy to trigger undervoltage, and Kp&Ki can be appropriately increased.

Code	Name	Range	Default	Modification
F8-60	Time setting of Deceleration to stop	0~6500.0s	10.0s	☆

Set the deceleration time during which the momentary stop does not stop in the working state of "2: Deceleration to stop".

6.10 F9 set(Auxiliary function parameters)

Code	Name	Range	Default	Modification
F9-00	Jog operation frequency	0.00Hz ~ Maximum frequency (F0-09)	5.00Hz	☆
F9-01	Jog acceleration time	0.0s ~ 6500.0s	20.0s	☆
F9-02	Jog deceleration time	0.0s ~ 6500.0s	20.0s	☆

Define the given frequency and acceleration/deceleration time of the inverter when jogging (this time is the time from 0Hz to accelerate to the maximum frequency F0-09).

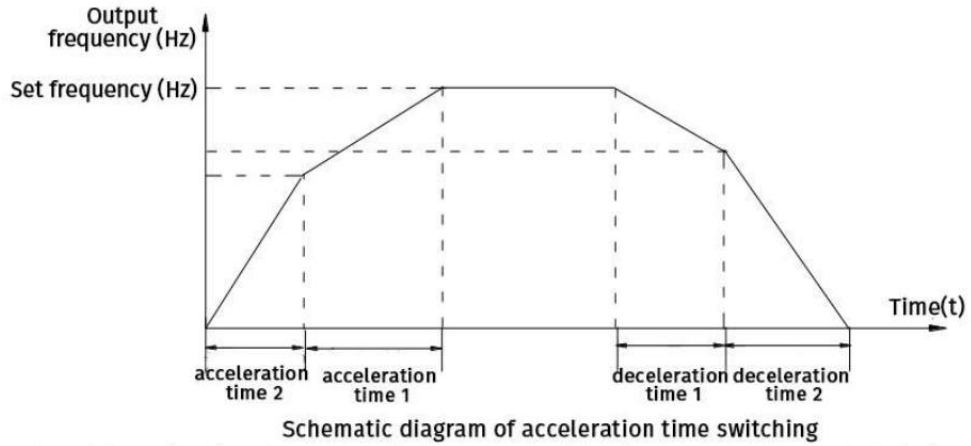
During jogging operation, the starting method is fixed as direct start, and the stop method is fixed as deceleration stop.The jog operation can be performed through the terminals.

Code	Name	Range	Default	Modification
F9-03	Acceleration time 2	0.0s ~ 6500.0s	Model determination	☆
F9-04	Deceleration time 2	0.0s ~ 6500.0s	Model determination	☆
F9-05	Acceleration time 3	0.0s ~ 6500.0s	Model determination	☆
F9-06	Deceleration time 3	0.0s ~ 6500.0s	Model determination	☆
F9-07	Acceleration time 4	0.0s ~ 6500.0s	Model determination	☆
F9-08	Deceleration time 4	0.0s ~ 6500.0s	Model determination	☆

Same as acceleration/deceleration time 1.

Code	Name	Range	Default	Modification
F9-09	Acceleration time 1,2 switching frequency point	0.00Hz ~ Maximum frequency (F0-09)	0.00Hz	☆
F9-10	Deceleration time 1,2 switching frequency point	0.00Hz ~ Maximum frequency (F0-09)	0.00Hz	☆

It is used to select different acceleration and deceleration times according to the operating frequency range instead of through the DI terminal during the acceleration and deceleration process of the inverter. As shown below.



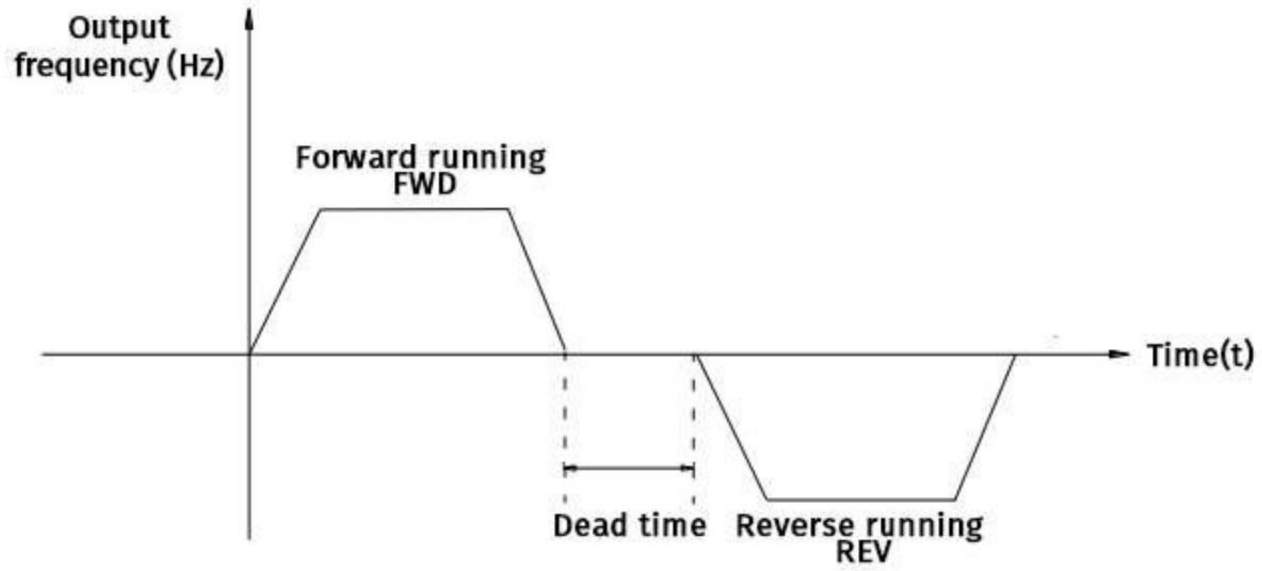
Schematic diagram of acceleration time switching

Code	Name	Range	Default	Modification
F9-11	Terminal jog priority	0: Disable 1: Enable	0	☆

When the jog priority is turned on, if there is a terminal jog command during operation, the inverter will switch to the terminal jog running state.

Code	Name	Range	Default	Modification
F9-12	Forward and reverse dead time	0.0s ~ 3000.0s	0.0s	☆

Set the time to keep the output state at 0Hz during the forward/reverse switching process.



Schematic diagram of forward and reverse dead time

Code	Name	Range	Default	Modification
F9-13	Reverse control	0: Enable 1: Disable	0	☆

Set whether to allow reverse rotation of the inverter. In the state of prohibiting reverse rotation, when the inverter receives a reverse direction running command or a given frequency command of <0Hz, it will change to 0Hz output.

Code	Name	Range	Default	Modification
F9-14	Action when the set frequency is lower than lower limit frequency	0: Continue operation at lower limit frequency 1: Stop operation 2: Continue operation at zero speed	0	☆

It is used to select the frequency that the inverter can output when the given frequency is less than the lower limit frequency F0-12.

Code	Name	Range	Default	Modification
F9-15	Power-on time limit	0h ~ 65000h	0h	☆
F9-16	Operation time limit	0h ~ 65000h	0h	☆

See DO terminal function explanation F7-03.

Code	Name	Range	Default	Modification
F9-17	Protection feature option	0: Disable 1: Enable	0	☆

This parameter relates to the safety protection function of the inverter. If this feature is enabled:

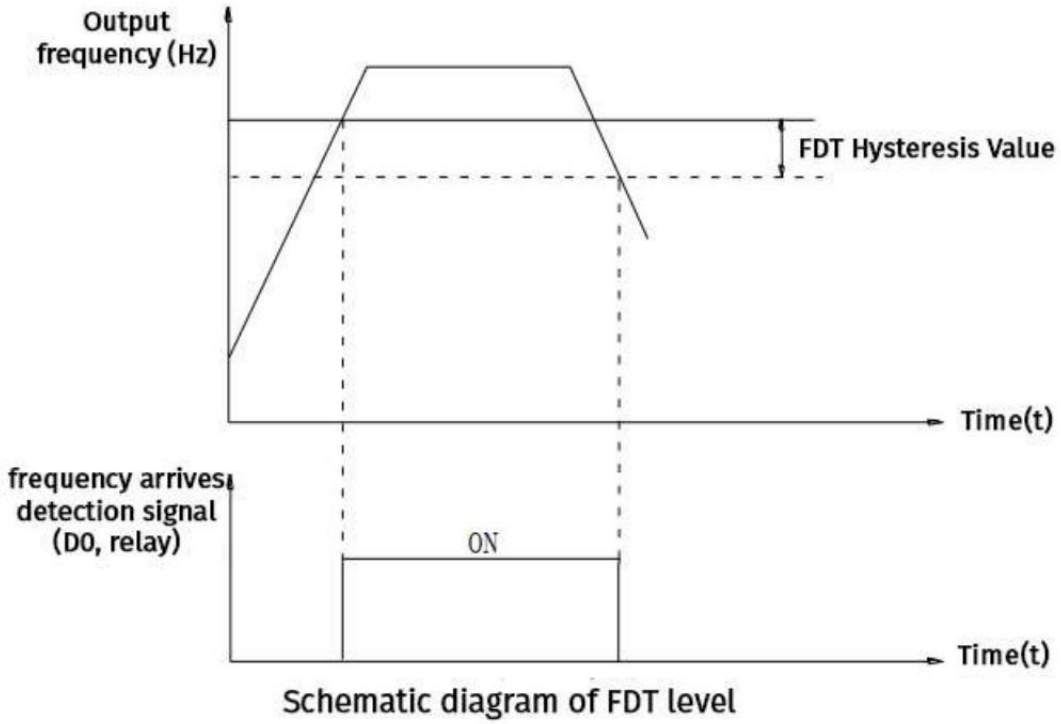
If the running command is valid when the inverter is powered on (for example, the terminal running command is closed before power-on), the inverter will not respond to the running command, and the running command must be removed once, and the inverter will respond after the running command is valid again.

If the running command is valid at the time of inverter fault reset, and the inverter does not respond to the running command, the running command must be removed to eliminate the running protection state.

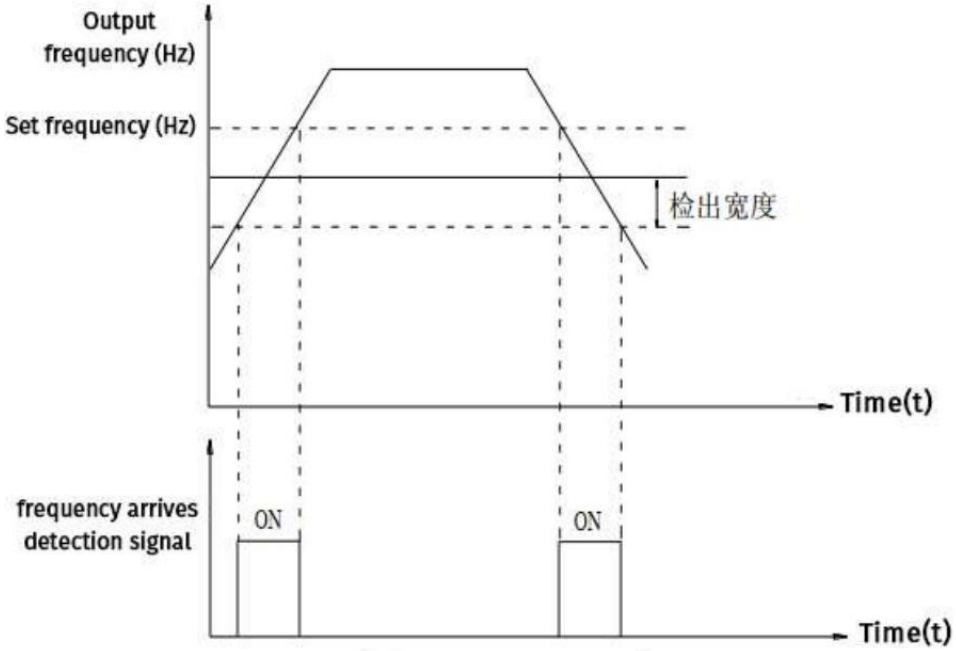
Code	Name	Range	Default	Modification
F9-18	Frequency detection value (FDT1)	0.00Hz ~ Maximum frequency (F0-09)	50.00Hz	☆
F9-19	Frequency detection hysteresis value (FDT1)	0.0% ~ 100.0% (FDT1 level)	5.0%	☆
F9-20	Reached frequency detection range	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆
F9-21	Frequency detection value (FDT2)	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-22	Frequency detection hysteresis value (FDT2)	0.0% ~ 100.0% (FDT2 level)	5.0%	☆

When the running frequency is higher than the frequency detection value, the frequency detection value trigger is valid, and when the frequency is lower than the frequency detection value × (1 - frequency lag value), the frequency detection value trigger is invalid.

When the running frequency reaches the ±(maximum frequency F0-09 × frequency arrival detection amplitude) range of the target frequency, the frequency arrival trigger takes effect. As shown below.



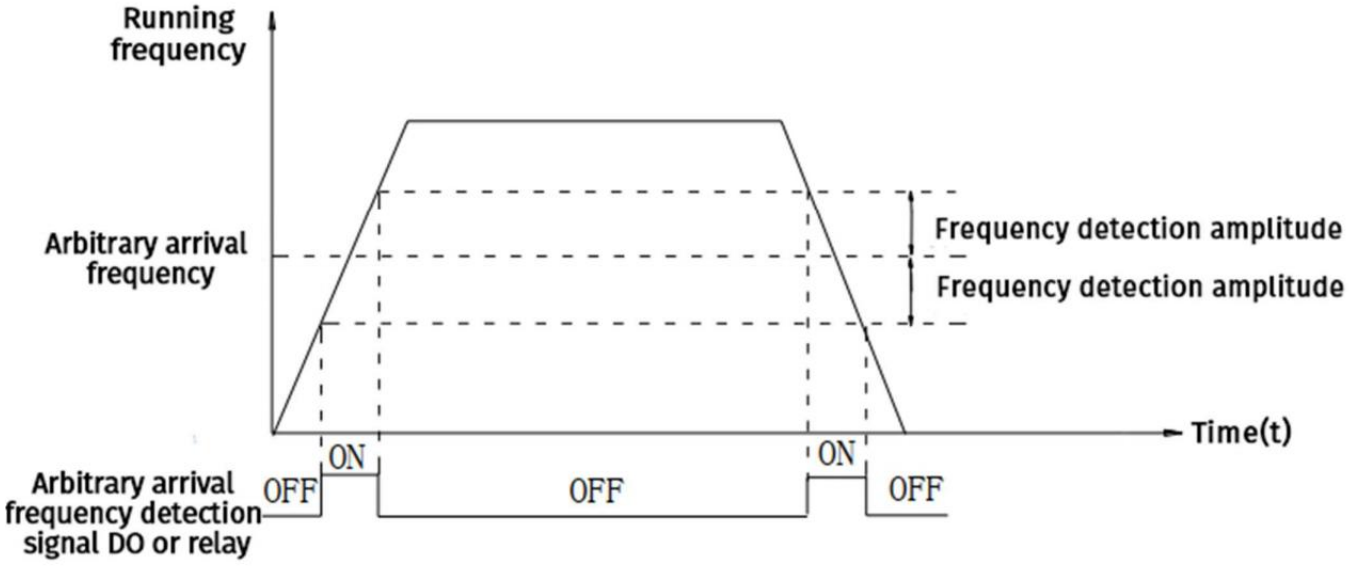
Schematic diagram of FDT level



Schematic diagram of frequency arrival amplitude detection

Code	Name	Range	Default	Modification
F9-23	Arbitrary reached frequency detection value 1	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-24	Arbitrary reached frequency detection width 1	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆
F9-25	Arbitrary reached frequency detection value 2	0.00Hz ~ Maximum frequency	50.00Hz	☆
F9-26	Arbitrary reached frequency detection width 2	0.0% ~ 100.0% (Maximum frequency F0-09)	0.0%	☆

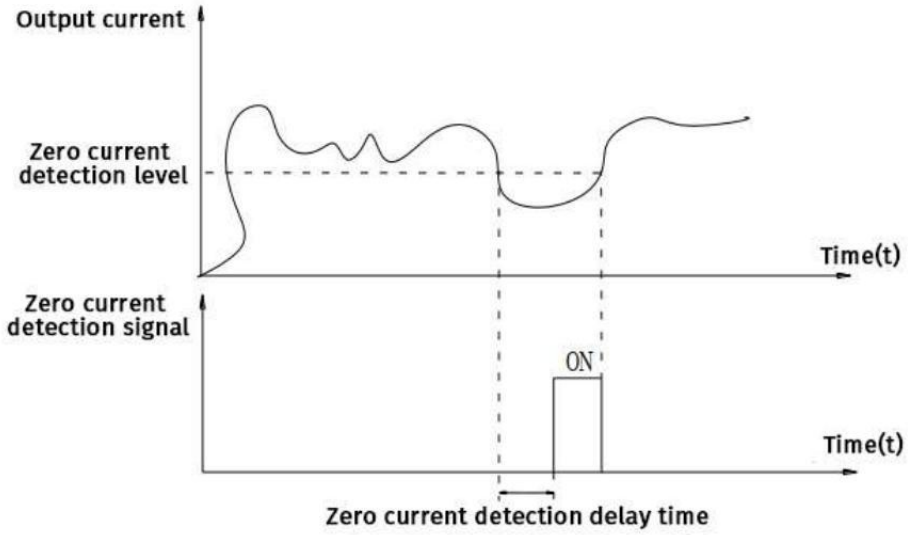
The output frequency is valid within the range of "arbitrary arrival frequency detection value" ± ("maximum frequency F0-09" × "arbitrary arrival frequency detection width").



Schematic diagram of arbitrary arrival frequency detection

Code	Name	Range	Default	Modification
F9-27	Zero current detection level	0.0% ~ 300.0% 100.0% corresponding to motor rated current	5.0%	☆
F9-28	Zero current detection delay time	0.01s ~ 600.00s	0.10s	☆

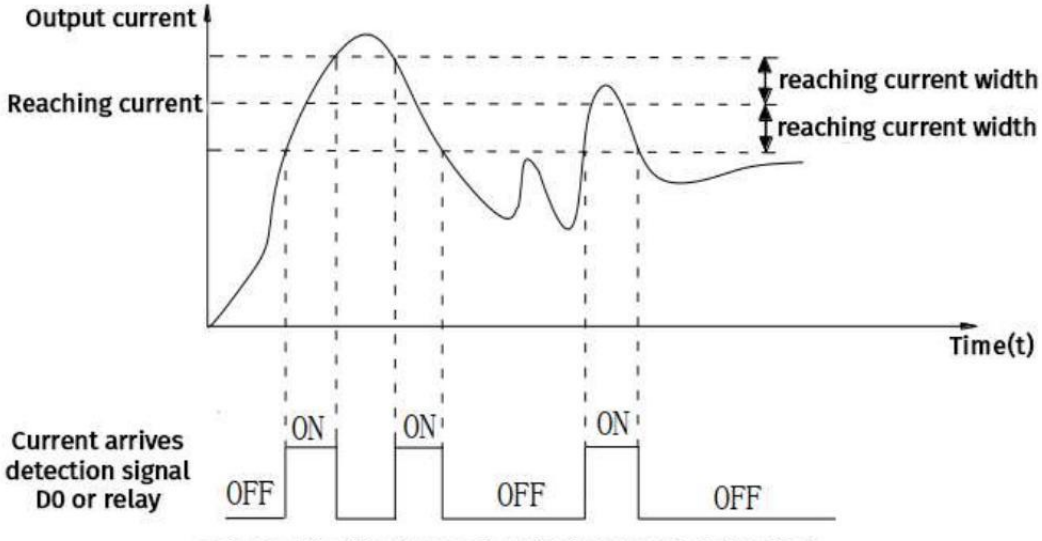
When the output current of the inverter is less than the set value of "zero current detection level F9-27" and the duration exceeds the set value of "zero current detection delay time F9-28", it is valid.



Schematic diagram of zero current detection

Code	Name	Range	Default	Modification
F9-29	The output current exceeds the limit	0.0% (No detection) 0.1% ~ 300.0% ((Motor rated current F3-02)	200.0%	☆
F9-30	Output overcurrent detection delay time	0.00s ~ 600.00s	0.00s	☆

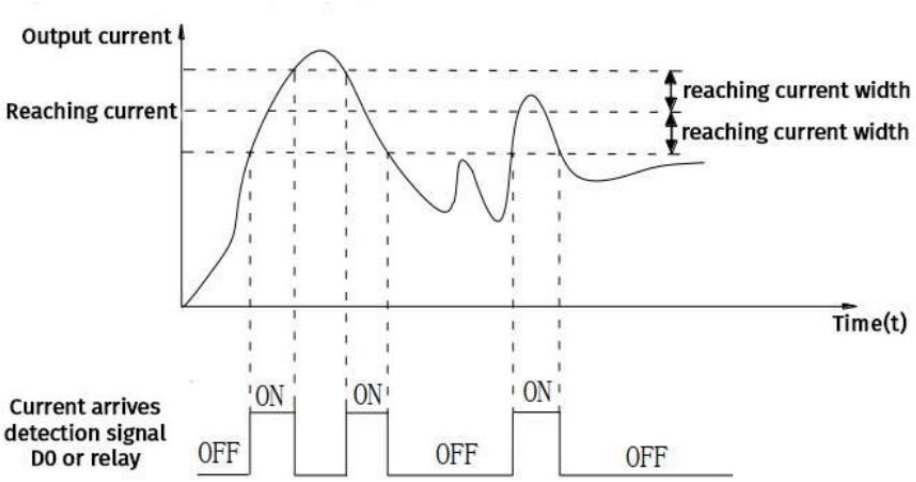
When the output current of the inverter is greater than the set value of "output current over-limit F9-29" and the duration exceeds the set value of "output current over-limit detection delay time F9-30", the output is valid.



Schematic diagram of arrival current detection

Code	Name	Range	Default	Modification
F9-31	Arbitrary reached current 1	0.0% ~ 300.0%(Motor rated current F3-02)	100.0%	☆
F9-32	Arbitrary reached current 1 width	0.0% ~ 300.0%(Motor rated current F3-02)	0.0%	☆
F9-33	Arbitrary reached current 2	0.0% ~ 300.0%(Motor rated current F3-02)	100.0%	☆
F9-34	Arbitrary reached current 2 width	0.0% ~ 300.0%(Motor rated current F3-02)	0.0%	☆

Indicates that the output current of the inverter is within the range of "arbitrary arrival current 1 F9-31" ± ("motor rated current F3-02" × "arbitrary arrival current 1 detection width F9-32").



Schematic diagram of arrival current detection

Code	Name	Range	Default	Modification
F9-35	Timer feature option	0: Disable 1: Enable	0	★

Select whether to enable the timing operation function.

Code	Name	Range	Default	Modification
F9-36	Timer operation time selection	0: F9-37 setting 1: AI1 2: AI2 (Rotary potentiometer) Analog input range corresponds to F9-37	0	★
F9-37	Timing run time	0.0Min ~ 6500.0 Min	0.0Min	★

"Current running time F9-39" reaches the given value of "timed running time F9-36", and the output is valid.

Code	Name	Range	Default	Modification
F9-38	Module temperature limit	0°C~ 100°C	75°C	☆

If the value of the heat sink temperature FA-06 is greater than this set value, the corresponding function terminal is valid.

Code	Name	Range	Default	Modification
F9-39	Current operation time limit	0.0 ~ 6500.0 Min	0.0Min	★

When the running time of the inverter reaches this time, the corresponding function terminals are valid.

Code	Name	Range	Default	Modification
F9-40	AI1 input voltage protection value lower limit	0.00V ~ F9-41	3.10V	☆
F9-41	AI1 input voltage protection value upper limit	F9-40 ~ 10.00V	6.80V	☆

Check whether the AI1 voltage is within the set range. If it is not within the limit, the corresponding function terminal is valid.

Code	Name	Range	Default	Modification
F9-42	Cooling Fan Control	0: Fan runs during operation 1: Fan keeps running	0	★

Fan operation mode selection: 0 means running all the time; 1 means running when running, and the radiator temperature drops below 40°C after shutdown and stops running.

Code	Name	Range	Default	Modification
F9-43	wake up frequency	Sleep frequency (F9-45) ~ Maximum frequency (F0-09)	0.00Hz	☆
F9-44	Wake up delay time	0.0s ~ 6500.0s	0.0s	☆
F9-45	Sleep frequency	0.00Hz ~ Wake-up frequency (F9-43)	0.00Hz	☆
F9-46	sleep delay time	0.0s ~ 6500.0s	0.0s	☆

Sleep and wake up

1. When the given frequency is lower than the sleep frequency, it will enter the sleep state, regardless of whether there is a running command, it will enter the stop state

2. When the given frequency is higher than the wake-up frequency, it will respond to the running command. That is, when there is a running command, enter the running state

3. When there is a running command for the first time, it is higher than the sleep frequency, and it should also respond to the running command.

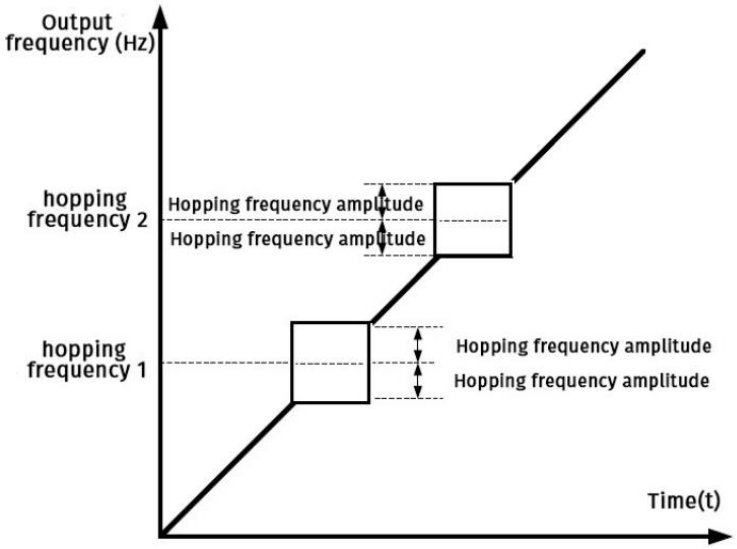
4. The switch between sleep and wake-up has a delay, which is determined by the function code "Wakeup Delay Time" and "Sleep Delay Time".

Code	Name	Range	Default	Modification
F9-47	output power factor	0.0~200.0	100.0	☆

When the displayed value of output power deviates from the actual measured value, this coefficient can be adjusted for correction.

Code	Name	Range	Default	Modification
F9-48	Jump frequency enable	0: Disable 1: enable	0	☆
F9-49	Hop Frequency 1	0.00Hz ～Maximum frequency (F0-09)	0.00Hz	☆
F9-50	Hop Frequency 2	0.00Hz ～Maximum frequency (F0-09)	0.00Hz	☆
F9-51	Jump range	0.00Hz ～Maximum frequency (F0-09)	0.00Hz	☆

The frequency hopping function can skip the set frequency during operation and avoid the mechanical resonance point.



6.11 FA set (Keyboard and display parameters)

Code	Name	Range	Default	Modification
FA-00	QUICK/JOG key function	0：QUICK/JOG disabled 1: Switch between operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward jog 4: Reverse jog	0	*

The QUICK/JOG key is a multi-function key, and the function of the QUICK/JOG key can be set through the function code. It can be controlled by this button during shutdown

0: This button has no function.

1: Switch between keyboard commands and remote operations.

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

Then this key function is invalid.

2: Forward and reverse switching

Use the QUICK/JOG key to switch the direction of the frequency command. This function is only valid when the command source is the operation panel command channel.

3: Forward jog

Forward jog control is realized through the QUICK/JOG key.

4: Reverse jog

The reverse jog control is realized by the QUICK/JOG key.

Code	Name	Range	Default	Modification
FA-01	STOP/RST key function	0: Only in keyboard operation mode, the stop function of STOP/RST key is enabled 1: In any operation mode, the stop function of the STOP/RST key is enabled	1	☆

There are two types of STOP/RESET key function options:

0: Only in the keyboard operation mode, the stop function of this key is valid.

1: In any operation mode, the stop function of this key is valid.

Code	Name	Range	Default	Modification
FA-02	LED display parameters 1 for operation mode	0000 ~ FFFF Bit00: Operation frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Count value Bit12: Length value Bit13: Load speed display Bit14: PID setting Bit15: PID feedback	H.003F	☆

0000～FFFF: If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in this parameter.

Bit00~Bit15: For example, the operating frequency 1(Hz), DI input status, and count value are turned on, and the rest are turned off. Corresponding to BIT00/07/12, the binary value is 0001 0000 1000 0001, and the hexadecimal value is 1081. Set it to 1081.

Code	Name	Range	Default	Modification
FA-03	LEDLED display parameters 2 for operation mode	0000 ~ FFFF Bit00: PLC stage Bit01: PULSE input pulse frequency (kHz) Bit02: Operation frequency 2 (Hz) Bit03: Remaining operation time Bit04: Linear speed Bit05: Current power-on time (Hour) Bit06: Current running time (Min) Bit07: PULSE input pulse frequency (Hz) Bit08: Communication setting value Bit09: Main frequency X display (Hz) Bit10: Auxiliary frequency Y display (Hz) Bit11: Target torque value Bit12: Power factor angle Bit13: VF separation target voltage (V) Bit14: VF separation output voltage (V) Bit15: Actual feedback speed (Hz)	H.0000	☆

0000～FFFF: If you need to display the above parameters during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in this parameter.

Bit00~ Bit15: Display parameter 1 in the same operation.

Code	Name	Range	Default	Modification
FA-04	LED display parameters for stop mode	0001～FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Count value Bit07: Length value Bit08: PLC stage Bit09: Load speed Bit10: PULSE input pulse frequency (kHz)	H.0033	☆

0001～FFFF: If you need to display the above parameters during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in this parameter.

Bit00~ Bit10: Display parameter 1 in the same operation.

Code	Name	Range	Default	Modification
FA-05	Load speed display coefficient	0.0001 ~ 6.5000	1.0000	☆

Through this parameter, adjust the corresponding relationship between the output frequency of the inverter and the load speed. Use with FA-08.

Code	Name	Range	Default	Modification
FA-06	Inverter module radiator temperature	0.0°C ~ 100.0°C	-	●

Displays real-time inverter temperature.

Code	Name	Range	Default	Modification
FA-07	Cumulative operation time	0h ~ 65535h	-	●

Displays the accumulated running time of the inverter.

Code	Name	Range	Default	Modification	Code
FA-08	Load speed display decimal places	Unit digit	Load speed display U0-13 decimal places	21	☆
		0	0 decimal digit		
		1	1 decimal digit		
		2	2 decimal digits		
		3	3 decimal digits		
		Tens digit	U0-18/U0-34 display decimal places		
		1	1 decimal place		
		2	2 decimal place		

Used to set the number of decimal places for display of load speed.

If the load speed display coefficient FA-05 is 3.000, the decimal point of the load speed FA-08 is 0 (0 decimal point), and when the inverter running frequency is 40.00Hz, the load speed is: 40.00*3.000 = 120 (0 decimal point) show).

If the inverter is in the stop state, the load speed will be displayed as the speed corresponding to the set frequency, that is, "set load speed". Taking the set frequency of 50.00Hz as an example, the load speed in the shutdown state is: 50.00*3.000 = 150 (0 decimal point display)

Code	Name	Range	Default	Modification
FA-09	Accumulated power-on time	0 ~ 65535h	-	●
FA-10	Accumulated power consumption	0 ~ 65535kw/h	-	●
FA-11	Product code	-	-	●
FA-12	Software version number	-	-	●
FA-13	Modbus protocol version	-	-	●

6.12 FB set (Control optimization parameters)

Code	Name	Range	Default	Modification
FB-00	DPWM switching upper limit frequency	0.00Hz ~ 15.00Hz	12.00Hz	☆

For VF mode, after running to this set frequency, switch from SVPWM seven-segment continuous modulation to SVPWM five-segment discontinuous debugging.

Code	Name	Range	Default	Modification
FB-01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	☆

For the VF mode, when the carrier frequency divided by the operating frequency is less than 10, it will cause the output current to oscillate or the current harmonics are large. At this time, it can be adjusted to synchronous modulation to reduce the current.

When the output frequency is lower (below 100Hz), synchronous modulation is generally not required, because the ratio of the carrier frequency to the output frequency is relatively high at this time, and the advantages of asynchronous modulation are more obvious.

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

Code	Name	Range	Default	Modification
FB-02	Random PWM	0: Random PWM is invalid 1 ~ 10: PWM carrier frequency random depth	0	☆

Setting random PWM can soften the monotonous and harsh motor sound and help reduce external electromagnetic interference. Adjusting the random PWM with different depths will get different effects.

Code	Name	Range	Default	Modification
FB-03	Dead zone compensation mode selection	0：Disable 1：Enable	1	☆

Modifying this value is not recommended.

Code	Name	Range	Default	Modification

FB-05	Wave-by-wave current limit enable	0：Disable 1：Enable	1	☆

Whether to enable the hardware wave-by-wave current limiting function, the wave-by-wave current limiting can avoid overcurrent faults of the inverter to a certain extent.

Code	Name	Range	Default	Modification
FB-07	Undervoltage point setting	Single-Phase models: 140.0 ~ 400.0V Three-Phase models: 200.0 ~ 2000.0V	Model determination	★
FB-08	Overvoltage point setting	Single-Phase models: 150.0 ~ 410.0V Three-Phase models: 200.0 ~ 2500.0V	Model determination	★

Modifying this value is not recommended.

Code	Name	Range	Default	Modification
FB-09	SVC optimization mode selection	0：Not optimized 1：Optimization mode 1 2：Optimization mode 2	2	★

The selection of optimization mode is controlled under SVC, and modification is not recommended.

6.13 FC set (PID function parameters)

The PID function is a commonly used method for process control. By calculating the difference between the proportional gain Kp, the integral time Ti, the differential time Td and the set target and feedback value, the output frequency of the inverter is controlled at a stable target value. In the PID algorithm, the acceleration and deceleration time is limited by the acceleration and deceleration time 1.

Code	Name	Range	Default	Modification
FC-00	PID set-point source	0: FC-01 setting 1: AI1 2: AI2 (Keyboard rotary potentiometer) 3: PULSE pulse (DI5) 4: Communication 5: Multi-step instruction	0	☆

Used to select the PID target value given channel. 100% corresponds to the set value of the PID given feedback range FC-04.

FC-01	PID value set-point	0.0% ~ 100.0%	50.0%	☆

PID value is given, corresponding to FC-00, select 0. 100% corresponds to the set value of PID given feedback range FC-04.

FC-02	PID feedback source	0: AI1 1: PULSE pulse setting (DI5) 2: Communication setting	0	☆

Used to select the given channel of PID feedback value. 100% corresponds to the set value of the PID given feedback range FC-04.

FC-03	PID action direction	0: Forward 1: Reverse	0	☆

0: Given source > feedback source, the running frequency should rise; given source < feedback source, the running frequency should decrease; given source = feedback source, the running frequency should remain unchanged.

1: Given source>feedback source, the operating frequency should decrease; given source<feedback source, the

operating frequency should increase; given source=feedback source, the operating frequency should remain unchanged.

FC-04	PID set-point feedback range	0 ~ 65535	1000	☆

Given the ranges of the source and feedback source, this value corresponds to 100% of the displayed value.

FC-05	Proportional gain Kp1	0.0 ~ 1000.0	20.0	☆

PID1 parameter: proportional coefficient.

FC-06	Integration time Ti1	0.01s ~ 10.00s	2.00s	☆

PID1 parameter: integral coefficient.

FC-07	Differential time Td1	0.000s ~ 10.000s	0.000s	☆

PID1 parameter: differential coefficient.

FC-08	PID reverse cutoff frequency	0.00 ~ Maximum frequency (F0-09)	2.00Hz	☆

After PID calculation, the output frequency may be a negative value (that is, the inverter reverses rotation). In some cases where reverse rotation is not allowed or the reverse rotation is too fast, this function code can be used to set the upper limit of the reverse rotation frequency to limit.

If the PID inversion cut-off frequency is set to 0 or the inversion is prohibited, the output range is from the upper limit frequency to the lower limit frequency.

If the PID inversion cut-off frequency is not set to 0 or the inversion is not prohibited, the output range is the upper limit frequency ~ the negative inversion cut-off frequency.

FC-09	PID deviation limit	0.0% ~ 100.0%	0.0%	☆

When the deviation between the PID given amount and the feedback amount is less than FC-09, the PID will stop adjusting. Avoid the output frequency fluctuation when the given amount and the feedback amount are close.

FC-10	PID differential limit	0.00% ~ 100.00%	0.10%	☆

Limit the effect of PID differential to avoid system oscillation.

FC-11	PID set-point change time	0.00 ~ 650.00s	0.00s	☆

PID given change time, refers to the time required for PID given value to change from 0.0% to 100.0%. When the PID given changes, the PID given value changes linearly according to the given change time to reduce the adverse effect of the sudden change of the given on the system.

FC-12	PID feedback filter time	0.00 ~ 60.00s	0.00s	☆

Filter the feedback amount to avoid the output adjustment fluctuation caused by the disturbance fluctuation of the feedback amount, the larger the system response speed, the slower.

FC-13	PID output filter time	0.00 ~ 60.00s	0.00s	☆

Filter the output calculated by PID to avoid sudden change of frequency. The larger the value, the slower the system response speed.

FC-15	Proportional gain Kp2	0.0 ~ 100.0	20.0	☆

PID2 parameter: proportional coefficient.

FC-16	Integration time Ti2	0.01s ~ 10.00s	2.00s	☆

PID2 parameter: integral coefficient.

FC-17	Differential time Td2	0.000s ~ 10.000s	0.000s	☆

PID2 parameter: differential coefficient.

FC-18	PID parameter switching conditions	0: Never 1: Switch via DI terminal 2: Automatically switch according to deviation	0	☆

When set as multi-function DI terminal switching, the multi-function terminal function selection is to be set (PID parameter switching terminal, when the terminal is invalid, select parameter group 1, when the terminal is valid, select parameter group 2.

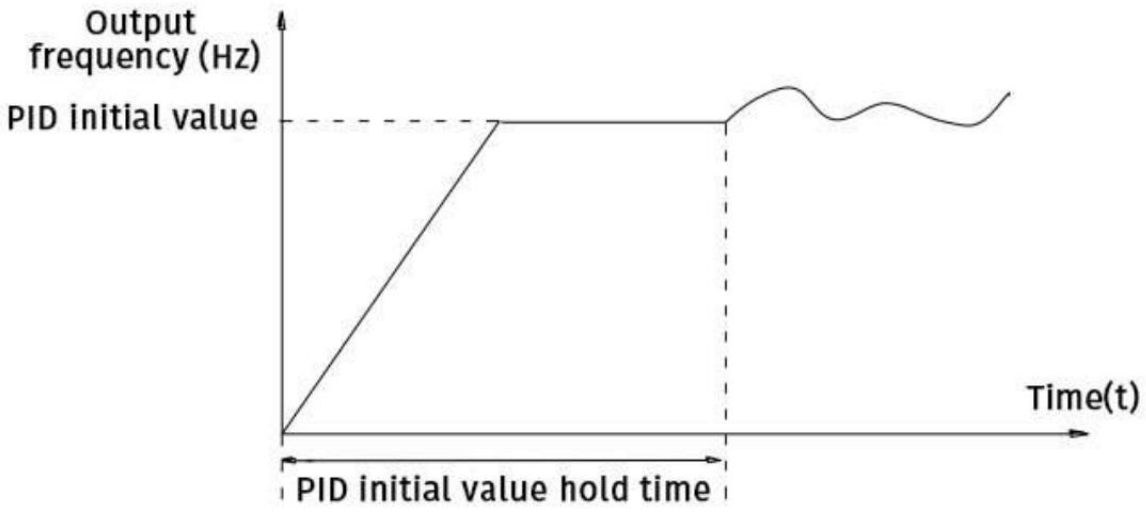
When set to automatic switching, when the absolute value of the deviation between the reference and the feedback is less than the PID parameter switching deviation 1, the PID parameter selects parameter group 1. When the absolute value of the deviation between the reference and the feedback is greater than the PID switching deviation 2, the PID parameter selection selects parameter group 2. When the deviation between reference and feedback is between switching deviation 1 and switching deviation 2, the PID parameters are the linear interpolation values of two sets of PID parameters.

FC-19	PID parameter switching deviation 1	0.0% ~ FC-20	20.0%	☆
FC-20	PID parameter switching deviation 2	FC-19 ~ 100.0%	80.0%	☆

Set to 2 with the PID parameter switching condition: it is used when switching automatically according to the deviation, and 100% corresponds to the maximum deviation between the given and feedback.

FC-21	PID initial value	0.0% ~ 100.0%	0.0%	☆
FC-22	PID initial value holding time	0.00 ~ 650.00s	0.00s	☆

When the inverter starts, the PID output is fixed at the PID initial value, and the PID starts the closed-loop adjustment operation only after the PID initial value holding time.



Schematic diagram of PID initial value function

FC-23	The maximum deviation between two PID outputs	0.00% ~ 100.00%	1.00%	☆
FC-24	The minimum deviation between two PID outputs	0.00% ~ 100.00%	1.00%	☆

To limit the difference between two beats of PID output, it is used to restrain the PID output from changing too fast and make the inverter run more stable.

FC-25	PID integral properties	Units digit	integral separation	00	☆
		0	invalid		
		1	Effective		
		Tens digit	Whether to stop integration after output reaches limit		
		0	Continue		
		1	Stop		

Integral separation: If the integral separation is set to be valid, when the multi-function digital terminal DI integral pause is valid, the PID integral stop operation. At this time, only the proportional and differential actions of the PID are valid. When the integral separation selection is invalid, regardless of whether the multi-function digital terminal DI is valid or not, the integral separation is invalid.

Whether to stop the integration after the output reaches the limit value: After the PID operation output reaches the maximum or minimum value, you can choose whether to stop the integration. If you choose to stop the integration, the PID integration will stop calculating at this time, which may help to reduce the overshoot of the PID.

FC-26	PID feedback loss detection value	0.0%: No feedback loss detection 0.1% ~ 100.0%	0.0%	☆
FC-27	PID feedback loss detection time	0.0s ~ 20.0s	0.0s	☆

This function code is used to judge whether the PID feedback is lost. When the PID feedback amount is less than the feedback loss detection value, and the duration exceeds the PID feedback loss detection time, the inverter will alarm the fault PID loss, and handle it according to the selected fault handling method.

FC-28	PID operation mode	0: No operation when the inverter stops 1: Proceed operation when the inverter stops	0	☆

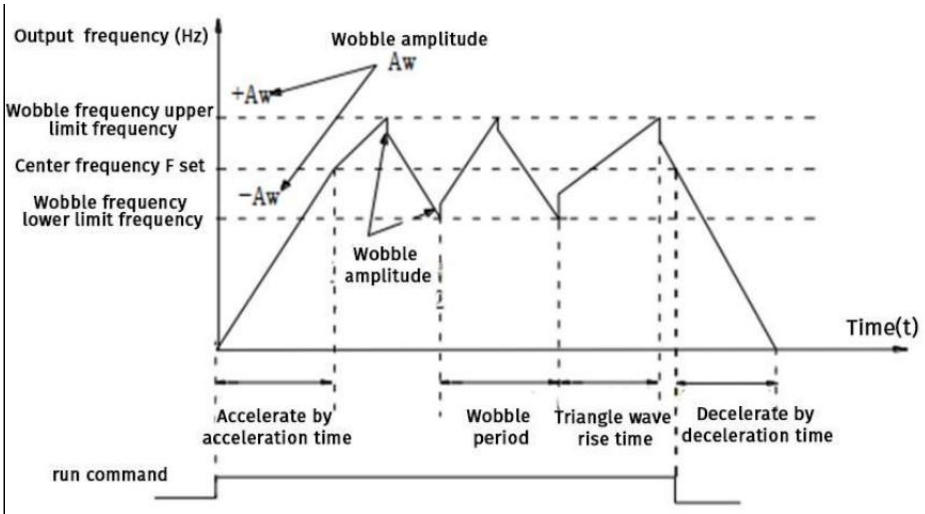
It is used to select whether the PID continues to operate in the PID stop state. In general applications, the PID should stop computing in the stop state.

6.14 FD set (Swing frequency, fixed length and counting parameters)

It is used in textile, chemical fiber and other occasions where traversing and winding functions are required. The output frequency swings up and down at the set center frequency.

Code	Name	Range	Default	Modification
FD-00	Swing frequency setting	0: Relative to the center frequency 1: Relative to the maximum frequency	0	☆

To determine the reference value of the swing frequency, there are two setting methods: 0-relative to the center frequency; 1-relative to the maximum frequency.



Schematic diagram of wobble frequency operation

FD-01	Swing frequency amplitude	0.0% ~ 100.0%	0.0%	☆

When the amplitude is relative to the center frequency, the swing amplitude AW = frequency source F0-06 × swing amplitude FD-01. When setting the swing amplitude relative to the maximum frequency, swing amplitude AW = maximum frequency F0-09 × swing amplitude FD-01. Wobble frequency running frequency range = upper limit frequency ~ lower limit frequency.

FD-02	Kick frequency amplitude	0.0% ~ 50.0%	0.0%	☆

The kick frequency amplitude is the percentage of the kick frequency relative to the swing amplitude when the swing frequency is running, namely: kick frequency = swing amplitude AW × kick frequency amplitude .

If the swing is selected relative to the center frequency, the kick frequency is the change value. If the swing is selected relative to the maximum frequency, the kick frequency is a fixed value. The wobble operating frequency is constrained by the upper limit frequency and the lower limit frequency.

FD-03	Swing frequency period	0.1s ~ 3000.0s	10.0s	☆

Wobble Period: The time value of a complete Wobble period.

FD-04	Triangular wave rise time of swing frequency	0.1% ~ 100.0%	50.0%	☆

The triangular wave time coefficient is the time percentage of the triangular wave rising time relative to the wobble frequency period FD-03.

Triangular wave rise time = wobble frequency period × wobble frequency triangle wave time, in seconds.

Triangular wave falling time = wobble frequency period × (1 - wobble frequency triangle wave time), the unit is second.

FD-05	Set length	0m ~ 65535m	1000m	☆
FD-06	Actual length	0m ~ 65535m	0m	☆
FD-07	Number of pulses per meter	0.1 ~ 6553.5	100.0	☆

Used for fixed length control, used with power terminals.

FD-08	Set count value	1 ~ 65535	1000	☆
FD-09	Designated count value	1 ~ 65535	1000	☆

Used for counting control, used with function terminals.

6.15 FE set (Multi-segment instruction, simple PLC parameters)

Code	Name	Range	Default	Modification
FE-00	Multi-segment command 0	-100.0% ~ 100.0%	0.0%	☆
FE-01	Multi-segment command 1	-100.0% ~ 100.0%	0.0%	☆
FE-02	Multi-segment command 2	-100.0% ~ 100.0%	0.0%	☆
FE-03	Multi-segment command 3	-100.0% ~ 100.0%	0.0%	☆
FE-04	Multi-segment command 4	-100.0% ~ 100.0%	0.0%	☆
FE-05	Multi-segment command 5	-100.0% ~ 100.0%	0.0%	☆
FE-06	Multi-segment command 6	-100.0% ~ 100.0%	0.0%	☆
FE-07	Multi-segment command 7	-100.0% ~ 100.0%	0.0%	☆
FE-08	Multi-segment command 8	-100.0% ~ 100.0%	0.0%	☆
FE-09	Multi-segment command 9	-100.0% ~ 100.0%	0.0%	☆
FE-10	Multi-segment command 10	-100.0% ~ 100.0%	0.0%	☆
FE-11	Multi-segment command 11	-100.0% ~ 100.0%	0.0%	☆
FE-12	Multi-segment command 12	-100.0% ~ 100.0%	0.0%	☆
FE-13	Multi-segment command 13	-100.0% ~ 100.0%	0.0%	☆
FE-14	Multi-segment command 14	-100.0% ~ 100.0%	0.0%	☆
FE-15	Multi-segment command 15	-100.0% ~ 100.0%	0.0%	☆

When the frequency source is multi-speed or LC given, the frequency value of the Nth speed.

FE-16	PLC operation mode	0: Stop at the end of a single operation 1: Stop at the end a single operation and keep the end value 2: Repeat operation	0	☆

0: After PLC cycle once, stop output.

1: After PLC cycle once, keep the last output frequency as output.

2: PLC repeats the cycle.

FE-17	PLC power down memory selection	Units digit	Memory save option for Power-down	00	☆
		0	Don't save		
		1	Save		
		Tens digit	Memory save option for shutdown		
		0	Don't save		
		1	Save		

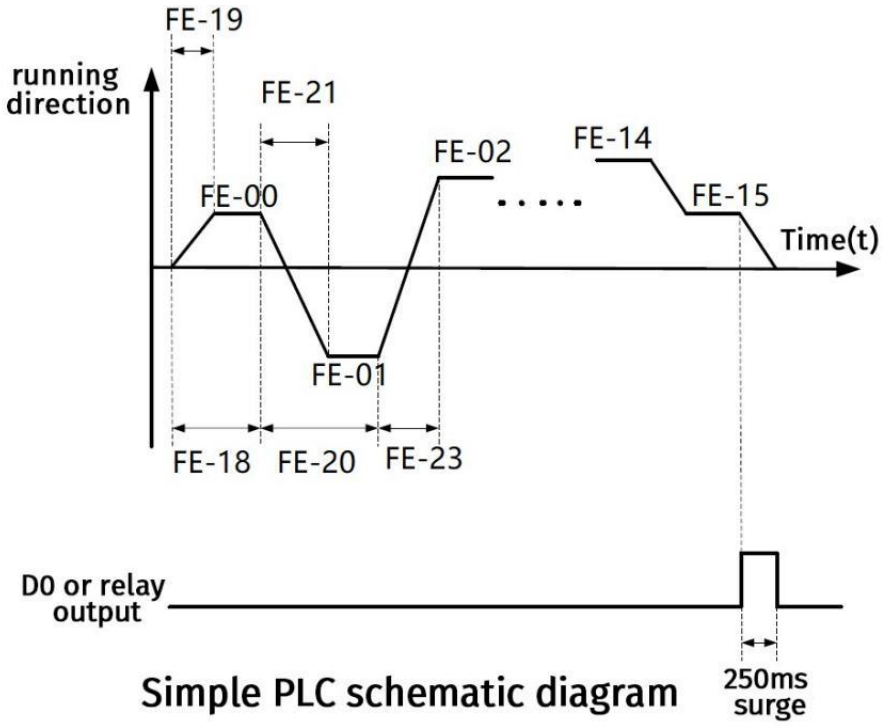
After the inverter is powered off, and then powered on again, whether to memorize the last running segment number.

FE-18	PLC segment 0 execution time	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆

	selection			
FE-19	PLC section 0 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-20	PLC segment 1 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-21	PLC section 1 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-22	PLC segment 2 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-23	PLC section 2 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-24	PLC segment 3 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-25	PLC section 3 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-26	PLC segment 4 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-27	PLC section 4 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-28	PLC segment 5 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-29	PLC section 5 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-30	PLC segment 6 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-31	PLC section 6 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-32	PLC segment 7 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-33	PLC section 7 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-34	PLC segment 8 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-35	PLC section 8 acceleration and deceleration time	0 ~ 3	0	☆

	selection			
FE-36	PLC segment 9 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-37	PLC section 9 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-38	PLC segment 10 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-39	PLC section 10 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-40	PLC segment 11 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-41	PLC section 11 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-42	PLC segment 12 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-43	PLC section 12 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-44	PLC segment 13 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-45	PLC section 13 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-46	PLC segment 14 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-47	PLC section 14 acceleration and deceleration time selection	0 ~ 3	0	☆
FE-48	PLC segment 15 execution time selection	0.0s(h) ~ 6553.5s(h)	0.0s(h)	☆
FE-49	PLC section 15 acceleration and deceleration time selection	0 ~ 3	0	☆

The running time of the Nth stage speed, including the acceleration/deceleration process from the previous stage.The acceleration and deceleration time settings of the Nth terminal running 0~3 correspond to the acceleration and deceleration time 1~4 respectively.



Simple PLC schematic diagram

FE-50	PLC operation time unit	0: s (second) 1: h (hour)	0	☆

The unit selected by the PLC's Nth stage running time.

There are many kinds of given sources for multi-segment instruction 0, which can switch between multi-segment instruction and other given sources.

FE-51	Multi-segment command 0 set-point options	0: Function code FE-00 1: AI1 2: AI2 (keyboard rotary potentiometer) 3: PULSE pulse (simplified version is DI4, standard version is DI5) 4: PID 5: Set by preset frequency (F0-01) and adjustable using UP/DOWN keys	0	☆

6.16 FF set (Function code management parameters)

Code	Name	Range	Default	Modification
FF-00	User password	0 ~ 65535	0	☆

If any non-zero number is set, the password protection function will take effect. The next time you enter the menu, you must enter the correct password, otherwise you cannot view and modify the function parameters, please keep in mind the set user password. Setting FF-00 to 0 will clear the set user password and make the password protection function invalid.

FF-01	Parameter initialization	0: No operation 1: Restore parameters to factory values, except motor parameters 2: Clear recorded data 4: Backup user's current parameters 5: Restore to user's backup parameters	0	★

1: Restore the factory settings, excluding motor parameters: After setting FF-01 to 1, most of the inverter function parameters are restored to the factory default parameters, but the motor parameters, frequency command decimal

point, fault record information, accumulated running time, The cumulative power-on time and cumulative power consumption will not be restored.

2: Clear record information: Clear the inverter fault record information, accumulative running time, accumulative power-on time and accumulative power consumption.

3: Backup current user parameters: Backup the parameters set by the current user. Set the current value of all function parameters.

4: Restore the user parameters backed up before.

FF-02	Function parameter set display options	Units digit: U set display 0: Disable 1: Enable Tens digit: P set display 0: Disable 1: Enable	11	☆

Ones place: hide or show U0. Tens place: hide or display P0~P7.

FF-03	Customized parameter set display selection	Units digit: User-defined parameter set display 0: Disable 1: Enable Tens digit: User-modified parameter set display 0: Disable 1: Enable	00	☆

Units digit: Select whether to display -SCUT after pressing the QUICK/JOG key, and select the function code that can enter the P4 group to set the corresponding function code.

Tens place: Select whether to display -DIFF after pressing the QUICK/JOG key, and select function codes that can enter all non-default values.

FF-04	Parameter protection	0: Parameters can be modified 1: Only this parameter can be modified	0	☆

Select whether user parameters can be modified.

6.17 P0 set (Communication parameters)

Code	Name	Range	Default	Modification
P0-00	Baud rate	0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS	5	★

Set the baud rate of MODBUS communication.

P0-01	Data Format	0: No parity (8-N-2) 1: Even parity (8-E-1)	0	☆

		2: Odd parity (8-O-1) 3: No parity (8-N-1)		

Set the MODBUS communication verification method.

P0-02	Local address	0：Broadcast address 1 ~ 247	1	☆

Set the local address of MODBUS communication.

P0-03	Response delay	0 ~ 20ms	2	☆

The interval time from the end of the inverter data reception to the sending of data to the upper computer, the response time is less than the system processing time, which is subject to the system processing time, the longer the time, the longer the wait.

P0-04	Communication timeout	0.0: Invalid 0.1 ~ 60.0s	0	☆

When 0.0 is set, it is invalid.

Set 0.1~60.s as a valid value. If the interval between one communication and the next communication exceeds the communication timeout time, the system will report a communication failure error.

P0-05	MODBUS communication data format	0: Non Standard MODBUS protocol 1: Standard MODBUS protocol	1	☆

Set whether it is standard modbus protocol.

P0-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆

The decimal place of the read current data, for example: when the actual current is 2.95A,

P0-06=0, the slave receives 01 03 00 02 02 17 CRC check.

P0-06=1, the slave receives 01 03 00 02 00 1D CRC check.

6.18 P2 set (AIAO calibration parameters)

Code	Name	Range	Default	Modification
P2-00	AI1 given voltage 1	0.500V～4.000V	Factory calibration	☆
P2-01	AI1 measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-02	AI1 given voltage 2	6.000V～9.999V	Factory calibration	☆
P2-03	AI1 measured voltage 2	6.000V～9.999V	Factory calibration	☆
P2-04	AI2 given voltage 1	0.500V～4.000V	Factory calibration	☆
P2-05	AI2 measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-06	AI2 given voltage 2	6.000V～9.999V	Factory calibration	☆
P2-07	AI2 measured voltage 2	6.000V～9.999V	Factory calibration	☆

The AI correction function code is used to correct the analog input AI to eliminate the influence of AI input zero offset and gain.

This group of functional parameters has been calibrated before leaving the factory, and when the factory default is restored, it will be restored to the factory calibrated value. Usually in application

The field does not need to be corrected.

The voltage before calibration refers to the actual voltage measured by a multimeter and other measuring instruments, and the voltage after calibration refers to the displayed voltage value sampled by the inverter.

When calibrating, input two voltage values to each AI input port, and compare the value measured by the multimeter and the value read by group U0 respectively.

If the above function codes are entered accurately, the inverter will automatically correct the zero offset and gain of AI.

For the occasion that the user's given voltage does not match the actual sampling voltage of the inverter, the on-site correction method can be used to make the inverter

The sample value is consistent with the expected given value. Taking AI1 as an example, the on-site correction method is as follows:

Given AI1 voltage signal (about 2V)

Actual measurement of AI1 voltage value and store in function parameter P2-00

Check the displayed value of U0-09 and store it in the function parameter P2-01

Given AI1 voltage signal (about 8V)

Actual measurement of AI1 voltage value and store in function parameter P2-02

Check the displayed value of U0-09 and store it in the function parameter P2-03

P2-08	AO set voltage 1	0.500V～4.000V	Factory calibration	☆
P2-09	AO measured voltage 1	0.500V～4.000V	Factory calibration	☆
P2-10	AO set voltage 2	6.000V～9.999V	Factory calibration	☆
P2-11	AO measured voltage 2	6.000V～9.999V	Factory calibration	☆

AO calibration function code, used to calibrate the analog output AO.

This group of functional parameters has been calibrated before leaving the factory, and when the factory default is restored, it will be restored to the factory calibrated value. Usually in application

The field does not need to be corrected.

The voltage before calibration refers to the actual output voltage value measured by a multimeter and other instruments. The corrected voltage refers to the theoretical output voltage value of the inverter.

6.19 P3 set (AI curve setting parameters)

Code	Name	Range	Default	Modification
P3-00	AI1 jumping point	-100.0% ~ 100.0%	0.0%	☆
P3-01	AI1 jump range	0.0% ~ 100.0%	0.5%	☆
P3-02	AI2 jumping point	-100.0% ~ 100.0%	0.0%	☆
P3-03	AI2 jump range	0.0% ~ 100.0%	0.5%	☆
P3-04	AI curve minimum input 3	0.00V～P3-06	0.00V	☆
P3-05	AI curve minimum input 3 corresponding setting	-100.0%～+100.0%	0.0%	☆
P3-06	AI curve setting of 3 inflection point and 1 input value	P3-04～P3-08	2.00V	☆

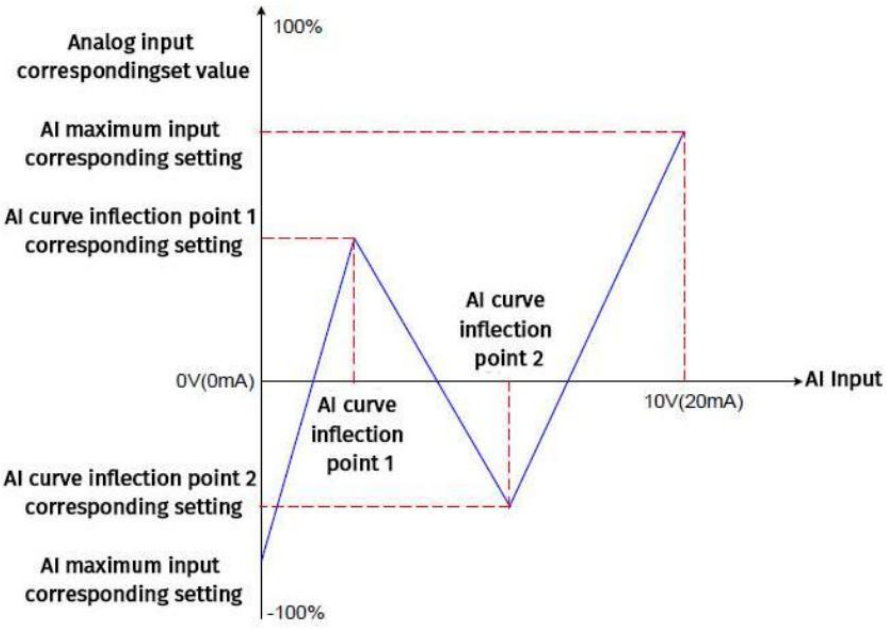
Code	Name	Range	Default	Modification
P3-07	AI curve setting of 3 inflection point and 1 input value setting	-100.0%～+100.0%	20.0%	☆
P3-08	AI curve setting of 3 inflection point and 2 input value	P3-06～P3-10	4.00V	☆
P3-09	AI curve setting of 3 inflection point and 2 input value setting	-100.0%～+100.0%	40.0%	☆
P3-10	AI curve setting of 3 inflection point and 3 input value	P3-08～P3-12	6.00V	☆
P3-11	AI curve setting of 3 inflection point and 3 input value setting	-100.0%～+100.0%	60.0%	☆
P3-12	AI curve setting of 3 inflection point and 4 input value	P3-10～P3-14	8.00V	☆
P3-13	AI curve setting of 3 inflection point and 4 input value setting	-100.0%～+100.0%	80.0%	☆
P3-14	AI curve maximum input 3	P3-12～+10.00V	10.00V	☆
P3-15	AI curve maximum input 3 corresponding setting	-100.0%～+100.0%	100.0%	☆

P3-00~P3-05:

Set the curve of AI setting value. When the AI setting value is AI jumping point ± jumping amplitude, the AI setting value is AI jumping point.

P0-06~P3-15:

Set a 5-point curve, the curve minimum input voltage, inflection point 1, inflection point 2, inflection point 3, and the maximum input need to be increased in turn.



6.20 P4 set (User-defined function code parameters)

Code	Name	Range	Default	Modification
P4-00	User-defined function code 0	F0-00 ~ FF-xx P0-00 ~ Px-xx U0-00 ~ U0-xx	F0.10	☆
P4-01	User-defined function code 1		F0.02	☆
P4-02	User-defined function code 2		F0.03	☆
P4-03	User-defined function code 3		F0.07	☆
P4-04	User-defined function code 4		F0.08	☆
P4-05	User-defined function code 5		F0.17	☆
P4-06	User-defined function code 6		F0.18	☆
P4-07	User-defined function code 7		F3.00	☆
P4-08	User-defined function code 8		F3.01	☆
P4-09	User-defined function code 9		F4.00	☆
P4-10	User-defined function code 10		F4.01	☆
P4-11	User-defined function code 11		F4.02	☆
P4-12	User-defined function code 12		F5.04	☆
P4-13	User-defined function code 13		F5.07	☆
P4-14	User-defined function code 14		F6.00	☆
P4-15	User-defined function code 15		F6.01	☆
P4-16	User-defined function code 16		F6.02	☆

Code	Name	Range	Default	Modification
P4-17	User-defined function code 17		F6.03	☆
P4-18	User-defined function code 18		F7.00	☆
P4-19	User-defined function code 19		F7.01	☆
P4-20	User-defined function code 20		F7.02	☆
P4-21	User-defined function code 21		F7.03	☆
P4-22	User-defined function code 22		FA.00	☆
P4-23	User-defined function code 23		F0.00	☆
P4-24	User-defined function code 24		F0.00	☆
P4-25	User-defined function code 25		F0.00	☆
P4-26	User-defined function code 26		F0.00	☆
P4-27	User-defined function code 27		F0.00	☆
P4-28	User-defined function code 28		F0.00	☆
P4-29	User-defined function code 29		F0.00	☆
P4-30	User-defined function code 30		F0.00	☆
P4-31	User-defined function code 31		F0.00	☆

You can choose whether to enter the user-defined function code display through the QUICK/JOG key through FF-03.

6.21 P8 set (PV parameters)

Code	Name	Range	Default	Modification
P8-00	Photovoltaic water pump dedicated mode	0-Universal Inverter 1-Special inverter for photovoltaic water pump	1	★

0: general frequency converter
for standard model
1: Special inverter for photovoltaic water pump
Enable the special mode of photovoltaic water pump, P8 group takes effect

Code	Name	Range	Default	Modification
P8-01	MPPT enable	0～1 0-disable 1-enable	1	★

0: MPPT disabled and enabled
1: MPPT enable takes effect

Code	Name	Range	Default	Modification
P8-02	MPPT start-up phase target voltage	0-%100	85%	☆

This parameter is the target voltage to be tracked first during the start-up phase of the inverter.

Code	Name	Range	Default	Modification
P8-03	MPPT voltage range lower limit	230.0～P8.04 (three-phase model) 150.0～P8.04 (single-phase model)	250.0V 150.0V	*
P8-04	MPPT voltage range upper limit	P8.03～750.0V (three-phase model) P8.03～450.0V (single-phase model)	650.0V 400.0V	*

The above two parameters define the upper and lower limits of the MPPT tracking target voltage.

Code	Name	Range	Default	Modification
P8-05	MPPT control Kp coefficient	0-100	35	☆
P8-06	MPPT control Ki coefficient	0-100	35	☆

The above two parameters are the frequency response coefficients during MPPT tracking. The larger the value, the faster the response, but the system may be unstable.

Code	Name	Range	Default	Modification
P8-07	Dedicated mode power-on allowable operating voltage	160.0V-600.0V	4T:300.0V 2S:170.0V	☆

In special mode, when power on, the lowest voltage that the inverter is allowed to start running.

Code	Name	Range	Default	Modification
P8-08	MPPT upper limit frequency selection (reserved)	0-main frequency given 1-MPPT maximum frequency Minimum of 2-0 and 1 options	1	☆

0 - main frequency given

The target frequency is determined by the F0 group of frequency sources.

Note: In this mode, it may lead to abnormal water discharge or increased current

1 - maximum frequency

The maximum target frequency is determined by the PV MPPT algorithm

2- Combination settings

The target frequency is set by the combination of the MPPT maximum frequency and the main frequency, and the two take the minimum value.

Code	Name	Range	Default	Modification
P8-09	Operating frequency lower limit setting	0.00-motor rated frequency	10.00Hz	☆

This parameter limits the minimum value of the actual operating frequency

Code	Name	Range	Default	Modification
P8-10	Weak light judgment frequency threshold	0.00-motor rated frequency	20.00Hz	☆
P8-11	Low light judgment time	5.0-6553.5s	600.0s	☆

When the inverter works in the photovoltaic panel mode, and the running frequency is lower than P8-10 and lasts longer than P8-11, the inverter will report weak light warning A01 after the inverter stops. When the inverter is running at the lower limit frequency, the bus voltage is low due to insufficient light When weak light warning A01 is reported at the undervoltage point, the inverter will coast to stop.

Code	Name	Range	Default	Modification
P8-12	Low light wake-up voltage threshold	0-1000.0v	20.0v	☆

P8-13	Low light wake up delay time	0.0-6553.5s	200.0s	☆
P8-14	Low light forced wake-up delay time	0.0-6553.5s	400.0s	☆

After the inverter enters the weak light state, after the delay time P8-13, the detection bus voltage value has risen to the P8-12 voltage when the weak light alarm occurs, and the inverter will automatically start immediately, and the inverter will be forced to start after the time P8-14 Test light intensity.

Code	Name	Range	Default	Modification
P8-15	Power supply selection	0 - self switching 1- Photovoltaic panel power supply 2- grid power supply	1	*

0: auto switch

When the system is powered on, the default is to give priority to the power supply of the photovoltaic panel, RA\RB is activated, the power is switched to the photovoltaic panel, the bus voltage is stable and meets the starting conditions, and the operation is allowed. When the light is insufficient, the inverter judges according to its own weak light algorithm After weak light, the inverter will automatically stop and RA\RB will act, switch to grid power supply and run automatically, after the running time reaches P8-16, it will automatically stop and switch to photovoltaic panel power supply, after the delay of P8-17 and the voltage is stable After that, it will run automatically, and the switching operation is judged by this logic cycle.

1: Photovoltaic panel power supply

Select the photovoltaic panel mode, and the inverter will track the maximum power point with the MPPT algorithm. If the power supply of the inverter is changed from the peripheral circuit to the grid power supply, you can use the default function of switching to the grid in DI5 to switch the grid power supply mode for internal algorithm identification, such as power supply switching Back to the photovoltaic panel for power supply, just disconnect DI5.

2: grid power supply

At this time, the inverter is running in grid power supply mode, and the MPPT algorithm is invalid.

Note: When P8-15 is not 0, the relay output RA\RB does not act, and the DI5 switch grid terminal closure only provides the algorithm basis for the inverter.

Code	Name	Range	Default	Modification
P8-16	Running time of grid power supply under self-switching power supply mode	0.0-6553.5min	60.0min	☆
P8-17	Delay start time after switching to PV power supply under switching power supply mode	2.0-6553.5s	4.0s	☆
P8-18	AI water level detection enable	0 - invalid 1 - valid	0	*

This parameter is used to select the analog channel of the water level feedback. When the analog feedback is not used, ensure that the value of P8-18 is 0, and the switch value DI detection water level function is always valid.

Code	Name	Range	Default	Modification
P8-19	Reservoir full level threshold	0.0-100.0%	25.0%	☆
P8-20	Reservoir full water warning sleep delay	0.0-6553.5s	60.0s	☆
P8-21	Reservoir lack of water start delay	0.0-6553.5s	600.0s	☆

When the hydraulic probe feedback is less than 25.0%, after the P8-20 delay, the inverter stops and enters the full water dormancy state, and A01 is displayed. When the feedback is greater than 25.0%, after the P8-21 time, the inverter exits the full water dormancy state And automatically run according to the command before shutdown.

Note: The judgment time parameters of the abnormal water level detection function of terminals DI2 and DI3 share P8-20-P8-21.

Code	Name	Range	Default	Modification
P8-22	Hydraulic Probe Damage Monitoring Threshold	0.0-100.0% (When 0.0%, the function is invalid)	0.0%	☆

When this parameter is not 0, when the detected water level feedback analog signal is greater than P8-22, it is considered that the hydraulic probe is damaged and E43 fault is reported.

Code	Name	Range	Default	Modification
P8-23	Underload protection enable	0 - invalid 1 - valid	0	☆

Underload protection enable parameter.

Code	Name	Range	Default	Modification
P8-24	Underload detection threshold	0.0-100.0%	25.0%	☆
P8-25	Underload detection time	0.0-1000.0s	60.0s	☆
P8-26	Underload fault reset start time	0.0-1000.0s	120.0s	☆

After the output current of the inverter is lower than the threshold current of P8-24 for the detection time of P8-25, an underload fault E44 will be reported. The fault reset time of underload fault is determined by P8-26.

Note: 100 . 0 % of the underload detection level corresponds to the rated motor current.

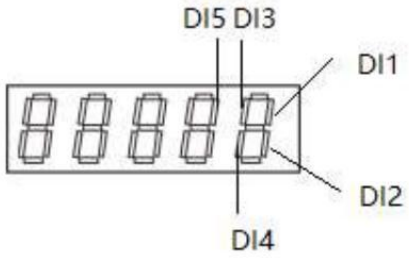
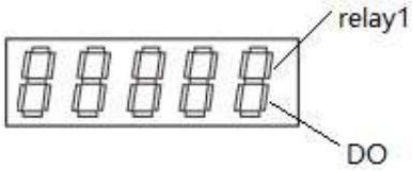
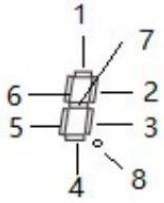
Code	Name	Range	Default	Modification
P8-27	Single-phase water pump mode enable (reserved)	0 - invalid 1 - valid	0	*

When the 2 S frequency converter is equipped with a single-phase water pump, set this parameter to 1.

6.22 U0 set (Monitoring parameters)

Code	Name	Minimum unit	Communication address
U0-00	Operating frequency (Hz)	Displays the theoretical running frequency of the inverter and the absolute value of the set frequency.	7000H
U0-01	Setting frequency (Hz)		7001H
U0-02	Bus voltage (V)	Display the inverter bus voltage value	7002H
U0-03	Output voltage (V)	Display the output voltage value of the inverter during operation	7003H
U0-04	Output current (A)	Display the inverter output current value during running	7004H
U0-05	Output power (kW)	Display the output power value of the inverter during operation	7005H
U0-06	Output torque (%)	Percentage output value of motor rated torque.	7006H
U0-07	DI input status	Displays hexadecimal, and the meaning when the corresponding binary digit is 1 is as follows: BIT0:DI1 is valid	7007H

<table>
<tr><td></td><td></td><td>BIT1:DI2 valid
BIT2:DI3 is valid
BIT3:DI4 is valid
BIT4:DI5 is valid
BIT5: AI1 is valid for DI</td><td></td></tr>
<tr><td>U0-08</td><td>DO output status</td><td>Displays hexadecimal, and the meaning when the corresponding binary digit is 1 is as follows:
BIT0: relay1 is valid
BIT1:DO1 is valid</td><td>7008H</td></tr>
<tr><td>U0-09</td><td>AI1 voltage (V)</td><td rowspan="2">AI sampling data display unit is voltage</td><td>7009H</td></tr>
<tr><td>U0-10</td><td>AI2 voltage (V)</td><td>700AH</td></tr>
<tr><td>U0-11</td><td>Count value</td><td>-</td><td>700BH</td></tr>
<tr><td>U0-12</td><td>Length value</td><td>-</td><td>700CH</td></tr>
<tr><td>U0-13</td><td>Load speed display</td><td>See FA-08 description for details</td><td>700DH</td></tr>
<tr><td>U0-14</td><td>PID setting</td><td>-</td><td>700EH</td></tr>
<tr><td>U0-15</td><td>PID feedback</td><td>-</td><td>700FH</td></tr>
<tr><td>U0-16</td><td>PLC stage</td><td>Displays the current stage of PLC operation</td><td>7010H</td></tr>
<tr><td>U0-17</td><td>PULSE input pulse frequency (Hz)</td><td>Display the DI5 high-speed pulse sampling frequency, the unit is 0.01KHz. It is the same data as U0-23, only the displayed unit is different.</td><td>7011H</td></tr>
<tr><td>U0-18</td><td>Feedback speed (Hz)</td><td>The ten-digit setting value of function code FA-08 indicates the number of decimal points in U0-18/U0-34.</td><td>7012H</td></tr>
<tr><td>U0-19</td><td>Remaining running time</td><td>Display timed running time, remaining running time</td><td>7013H</td></tr>
<tr><td>U0-20</td><td>Line speed</td><td>Display the linear speed of DI5 high-speed pulse sampling, the unit is m/min;</td><td>7014H</td></tr>
<tr><td>U0-21</td><td>Current power-on time</td><td>According to the actual number of sampling pulses per minute and FB-07 (number of pulses per meter), calculate the linear velocity value</td><td>7015H</td></tr>
<tr><td>U0-22</td><td>Current running time</td><td>-</td><td>7016H</td></tr>
<tr><td>U0-23</td><td>PULSE input pulse frequency</td><td>-</td><td>7017H</td></tr>
<tr><td>U0-24</td><td>Communication settings</td><td>Displays the sampling frequency of DI5 high-speed pulse, the unit is 1Hz. It is the same data as U0-17, only the displayed unit is different.</td><td>7018H</td></tr>
<tr><td>U0-25</td><td>Inverter running status</td><td>Display the inverter running status information, the data definition format is as follows
<table><tr><th>Binary bit</th><th>Description</th></tr><tr><td>BIT0</td><td rowspan="2">0: stop 1: run forward
2: Invert</td></tr><tr><td>BIT1</td></tr><tr><td>BIT2</td><td rowspan="2">0: Constant speed
1: Acceleration
2: slow down</td></tr><tr><td>BIT3</td></tr><tr><td>BIT4</td><td>0: Normal 1: Undervoltage</td></tr></table></td><td>7019H</td></tr>
<tr><td>U0-26</td><td>Main frequency X display</td><td>Display main frequency source X frequency setting</td><td>701AH</td></tr>
</table>

U0-27	Auxiliary frequency Y display	Display auxiliary frequency Y frequency setting	701BH
U0-28	Target torque (%)	Display the current torque upper limit set value	701CH
U0-29	Power factor angle	Displays the current operating power factor angle	701DH
U0-30	VF separation target voltage	Displays the target output voltage and the current actual output voltage when operating in the VF separation state	701EH
U0-31	VF separation output voltage	-	701FH
U0-32	VF oscillation coefficient	Display the temperature of the inverter at this time	7020H
U0-33	Temperature	-	7021H
U0-34	Actual response speed (Hz)	Display the current fault code	7022H
U0-35	Accident details	Display main frequency source X frequency setting	7023H
U0-40	DI input status visual display	The status of each functional terminal is indicated by the on-off of the specified segment of the LED digital tube. Its display format is as follows: 	7028H
U0-41	Visual display of DO input status	The status of each functional terminal is indicated by the on-off of the specified segment of the LED digital tube. Its display format is as follows: 	7029H
U0-42	DI function status visual display 1	There are 5 digital tubes on the keyboard, and each digital tube display can represent 8 function options. The display format is as follows: 	702AH
U0-43	DI function status visual display 2		702BH
…			
U0-59			

7. Malfunction

7.1.Prevention

This chapter introduces the preventive maintenance practices that are vital to keep the inverter's normal operation.

7.1.1. Periodic inspection

For the inverters installed in an environment that meets the requirements instructed in this manual, it only requires minimum maintenance. The table below lists the recommended daily maintenance cycle. For more details, please contact us.

Items		Checking content	Method	Requirements
Environment		The ambient temperature, humidity, vibration and presence of dust, gas, oil mist, water droplets, etc.	Visual inspection and instrument measurement	Meet the product requirements.
		Are there any foreign objects such as tools and dangerous items lying around?	Visual inspection	No such items lying around.
Keyboard		Can the display be read clearly?	Visual inspection	The characters are displayed normally.
		Are there any signs of incomplete character displayed?	Visual inspection	Meet the product requirements.
Main circuit	Public	Any bolts loose or missing?	Tighten the bolts	No such abnormality.
		Are the machines and insulators deformed, cracked, broken, or discolored due to overheating or aging?	Visual inspection	No such abnormality.
		Any dirt or dust attached?	Visual inspection	No such abnormality. NOTICE: The discoloration of the copper and aluminum bus does not necessary means a problem with the characteristics.
	Cables and wires	Does the conductor show any signs of discoloration or deformation due to overheating?	Visual inspection	No such abnormality.
		Any cracks or discoloration on the protective layer?	Visual inspection	No such abnormality.
	Terminal block	Any damage?	Visual inspection	No such abnormality.
	Resistance	Any peculiar smell due to overheating?	Smell and visual inspection	No such abnormality.
		Any disconnection?	Multimeter measurement	The resistance values shall be within ±10% of their standard values.

	Transformers, reactors	Any abnormal vibration or odor?	Hearing, smell, visual inspection	No such abnormality.
Cooling system	Cooling fan	Any abnormal noise and vibration?	Hearing, visual inspection, spinning it by hand	Smooth rotation.
		Any bolts or parts loose?	Tighten it.	No such abnormality.
		Any discoloration due to overheating?	Visual inspection and judge the remaining product life based on the maintenance information	No such abnormality.
	Ventilation duct	Any foreign object clogs the cooling fans, air inlets, and exhaust vents blocked?	Visual inspection	No such abnormality.

7.1.2. Cooling fans

The designed product life of the cooling fan for this inverter exceeds 25,000 operating hours, while the actual service life varies according to the actual usage and the ambient temperature. The service time of the inverter can be checked through FA-07 parameter (which is the accumulated service time of this machine).

A noisy bearing often is the sign warning potential fan failures. If this happens to a critical inverter, please replace the fan immediately. The required spare parts of the fans are available from us.

⚠	◇ Read carefully and follow the instructions given in "Safety Precautions" section. Ignoring any of these may cause personal injury or death or equipment damage.

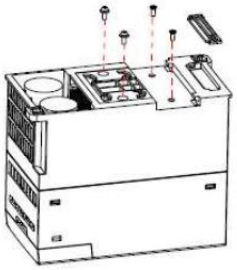
1. Stop the system and cut off the AC power supply, and then wait for a time no less than the time marked on the inverter.

2. Use a screwdriver to pry the fan baffle up from the cabinet.

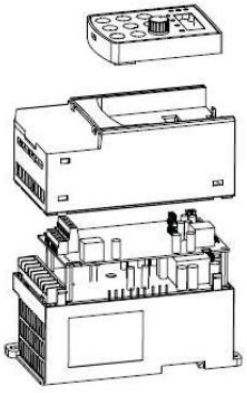
3. Removing the keypad and front cover cover.

4. Take out the fan and pull out the power terminal of the fan.

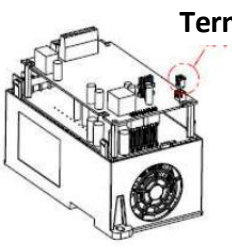
5. Install a new fan into the inverter by repeating the previous steps in the reverse order. NOTICE that the wind direction of the fan shall be consistent with that of the inverter, as shown below:



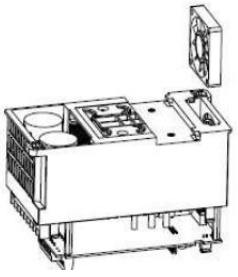
Step 1: Remove screws and the fan baffle.



Step 2: Remove the panel assembly first and then remove the top cove1r5.6



Step 3: Pull out the fan terminal.



Step4: Take out the fan

0.75KW~5.5KW fan maintenance diagram

6. Turn on the power supply.

7.1.3. Capacitance

If the inverter has been left unused more than a reasonable time of period for storage, it is necessary to restore the capacitance of the DC bus before use according to the operation instructions. The storage shall be calculated from the delivery date.

Period	Instructions
Less than 1 year	No need to restore.
1 to 2 years	Before running for the first time, the inverter must be energized for 1 hour.
2 to 3 years	Use an adjustable regulated voltage power supply to charge the inverter: • Apply 25% of rated voltage for 30 minutes; • Apply 50% of rated voltage for 30 minutes; • Apply 75% of rated voltage for 30 minutes; • Finally apply 100% of rated voltage for 30 minutes.
More than 3 years	Use an adjustable regulated voltage power supply to charge the inverter: • Apply 25% of rated voltage for 2 hours; • Apply 50% of rated voltage for 2 hours; • Apply 75% of rated voltage for 2 hours; • Finally apply 100% of rated voltage 2 hours.

The usage of an adjustable voltage power supply to charge the inverter: The choice of adjustable power supply depends on the inverter's power supply specification. For inverters with single-phase/three-phase 220V AC input voltage, a single 220VAC/2A voltage regulator can be the choice. Single-phase or three-phase inverters can be charged with single-phase voltage regulation power supply (L+ connects to R, N connects to S or T). Because all DC bus capacitors connect to a same rectifier, they will be charged at the same time.

When charging a high-voltage inverter, the voltage requirements must be fulfilled (such as 380V). Since capacitor charging requires almost no current, a small-capacity power supply (2A is sufficient) will be enough for the operation.

6.1.3.1. Electrolytic capacitor replacement

	◇ Read carefully and follow the instructions given in "Safety Precautions" section. Ignoring any of these may cause personal injury or death or equipment damage.

When the electrolytic capacitor in the inverter has been used for more than 35,000 operation hours, they need to be replaced with new ones. For specific replacement details, please contact your local distributor or installer.

6.1.4. Power cables

	◇ Read carefully and follow the instructions given in "Safety Precautions" section. Ignoring any of these may cause personal injury or death or equipment damage.

1. Stop the system and cut off the AC power supply, and then wait for a time no less than the time marked on the inverter.

2. Check the tightness of the power cable connection.

3. Power-on.

7.2. Troubleshooting

	◇ The staff who have passed required professional electrical training and safety education to become familiar with the installation, commission, operation and maintenance of this equipment and the knowledge to avoid all kinds of emergency situations. Read carefully and follow the instructions given in "Safety Precautions" section.

7.2.1. Alarm and fault indications

Here the TC indicator is used to indicate fault events (See "Keyboard Operation Process" for details). When the indicator is on, the keyboard display shows an alarm or fault code by which to indicate the type of the abnormal state. Function codes F8-13 ~ F8-15 record the type of the last three faults encountered by the inverter. Function codes F8-16 ~ F8-23, F8-24 ~ F8-31, F8-32 ~ F8-39 record the operation data of the inverter when the last three faults occurred. Using the information given in this chapter, it is possible to find out the causes of most alarms or faults and hence their trouble shooting measures. For those fault events that you cannot determine the causes as instructed, please contact our local office.

7.2.2. Reset from fault

The inverter can be reset by pressing the STOP/RST key on the keyboard, digital input, or turning off the inverter's power supply. After successfully troubleshooting, the motor can be restarted.

7.2.3. Inverter faults and their countermeasures

When a fault happens, follow the steps below to handle the situation:

1. Check if the keyboard displays any abnormal event? If so, please contact us or our local office.

2. If the keyboard shows no sign of abnormality, check the function codes of F8 set for the corresponding fault record parameters to determine the actual state when the current fault occurs.

3. By referring to the table below, check if there is any abnormality description matching with your situation.

4. Try to solve the problem or seek help from qualified technicians.

5. After successfully solve the problem, reset the system and start operation.

Code	Type	Possible causes	Troubleshooting
E01	Wave-by-wave current limiting fault	1. The load is too large or the motor rotation is blocked 2. The selected inverter does not have sufficient capacity for your current usage.	1. Reduce the load or check the motor's mechanical conditions. 2. Replace with a new inverter with higher power rating.
E02	Overcurrent when accelerating	1. The output circuit of the inverter is grounded or short-circuited. 2. Vector control mode is selected but its relative parameters have not been tuned properly. 3. The acceleration time is too short. 4. Improper manual torque boost or V/F curve selection. 5. The output voltage is low 6. Try to start the motor when it is still rotating. 7. Load suddenly increases during	1. Solve peripheral problems. 2. Tune the motor parameters. 3. Increase the acceleration time. 4. Adjust manual torque boost or V/F curve. 5. Adjust the voltage to normal range. 6. Select speed tracking start feature or wait for the motor to stop and then start it. 7. Remove the increased load 8. Replace with a new inverter with

Code	Type	Possible causes	Troubleshooting
		acceleration. 8. The selected inverter does not have sufficient capacity. 9. The grid voltage is low.	higher power rating. 9. Use a voltage-boost device to boost the input voltage.
E03	Overcurrent when decelerating	1. The output circuit of the inverter is grounded or short-circuited. 2. Vector control mode is selected but its relative parameters have not been tuned properly. 3. Deceleration time is too short. 4. Output voltage is too low. 5. Load suddenly increases during deceleration. 6. No braking unit and braking resistor are installed 7. The inverter does not have sufficient capacity. 8. V/F control mode is selected and the overexcitation gain is too large 9. The grid voltage is too low.	1. Solve peripheral problems. 2. Tune the motor parameters. 3. Increase the deceleration time. 4. Adjust the voltage to normal range. 5. Remove the increased load. 6. Install braking unit and braking resistor. 7. Replace with a new inverter with suitable power rating. 8. Decrease the overexcitation gain. 9. Use a voltage-boost device to boost the input voltage.
E04	Overcurrent during constant speed operation	1. Abrupt or abnormal load increase 2. The grid voltage is too low. 3. The inverter does not have sufficient capacity. 4. The output circuit of the inverter is grounded or short-circuited. 5、Vector control mode is selected but its relative parameters have not been tuned properly. 6. Output voltage is too low.	1、Remove the increased load. 2. Use a voltage-boost device to boost the input voltage. 3. Replace with a new inverter with higher power rating. 4. Solve peripheral problems. 5. Tune the motor parameters. 6. Adjust the voltage to normal range.
E05	Overvoltage during acceleration	1. Abnormal input voltage 2. There is an external force that drags the motor during acceleration 3. The acceleration is too short. 4. No braking unit and braking resistor are installed	1. Adjust the voltage to normal range. 2. Remove the external force or install braking resistors. 3. Increase the acceleration time. 4. Install braking units and braking resistors.
E06	Overvoltage during deceleration	1. The input voltage is too high. 2. There is an external force that drags the motor during deceleration. 3. The deceleration time is too short. 4. No braking unit and braking resistor are installed.	1. Adjust the voltage to normal range. 2. Remove the external force or install braking resistors. 3. Increase the deceleration time. 4. Install braking units and braking resistors.
E07	Overvoltage during constant speed operation	1. The input voltage is too high. 2. There is an external force that drags the motor during the operation.	1. Adjust the voltage to normal range. 2. Remove the external force or install braking resistors.
E08	Snubber resistor	1. The input voltage is not within the	1. Adjust the voltage to the range

Code	Type	Possible causes	Troubleshooting
	overload	specified range.	required by the specification.
E09	Undervoltage	1. Instantaneous power failure. 2. The input voltage of the inverter is not within the range required by the specification. 3. Abnormal bus voltage. 4. Abnormal rectifier bridge and buffer resistance 5. Abnormal drive board. 6. Abnormal control board.	1. Reset the system. 2. Adjust the voltage to the normal range. 3. Seek technical support. 4. Seek technical support. 5. Seek technical support. 6. Seek technical support.
E10	Inverter overload	1. Something stalls the motor 2. The load is too large and the capacity of the inverter is too small 3. Accelerate too fast 4. Try to restart the motor while it is still rotating.	1. Check the motor and mechanical condition. 2. Replace with a new inverter with higher power rating. 3. Increase the acceleration time. 4. Select speed tracking start feature or wait for the motor to stop and then restart it.
E11	Motor overload	1. Wrong setting of motor rated current 2. The motor is blocked or the load increases suddenly 3. The grid voltage is too low. 4. Is the motor protection parameter F8-01 properly set?	1. Correct the current value to match the motor's rated current. 2. Reduce the load and check the motor and mechanical conditions. 4. Correct the parameter.
E12	Input phase loss	None (reserved)	——
E13	Output phase loss	1. Wrong wiring between the inverter and the motor. 2. The three-phase output of the inverter is out of balance while the motor is running 3. Abnormal drive board. 4. Abnormal module.	1. Solve peripheral problems. 2. Check the three-phase windings of the motor are normal and solve the problem if any. 3. Seek technical support. 4. Seek technical support.
E14	Module overheating	1. Air duct is blocked/ a fan is damaged 2. The ambient temperature is too high 3. The auxiliary power supply is damaged and the drive voltage is undervoltage 4. Abnormal control board. 5. Module thermistor is damaged 6. The inverter module is damaged	1. Clean the air duct and replace the fan. 2. Lower the ambient temperature. 3. Seek technical support. 4. Seek technical support. 5. Replace the thermistor. 6. Seek technical support.
E15	External fault	1. An external fault signal is received via multi-function terminal DI.	1. Check the abnormal external device, and reset the system after solving the problem.
E16	Abnormal communication	1. An upper stream device is abnormal. 2. Abnormal communication wiring. 3. Communication parameters of P0 set are not set correctly.	1. Check the wiring of the device. 2. Check the communication wiring. 3. Correct the parameter settings.

Code	Type	Possible causes	Troubleshooting
E17	Contactor failure	None (reserved)	——
E18	Abnormal current detected	1. The auxiliary power supply is damaged 2. Abnormal amplifier circuit 3. Current detection chip is damaged	Seek technical support.
E19	Abnormal motor tuning	1. The motor capacity does not match the inverter capacity 2. Motor parameters are not set according to the nameplate 3. Timeout during parameter tuning	1. Choose a suitable inverter according to the motor capacity 2. Set the motor parameters correctly according to the nameplate. 3. Check the wiring between the inverter and the motor.
E20	EEPORM parameter read and write error	1. EEPROM chip is damaged.	1. Replace the main control board.
E21	Factory debugging	——	——
E22	Motor is short to ground	1. The motor is short-circuited to ground	Replace cables or the motor
E23	Operation time is reached	1. The accumulated operation time reaches the set value.	Use the parameter initialization feature to clear the record data.
E24	User-defined fault 1	1. User-defined fault 1 signal is received via multi-function terminal DI.	1. Check the abnormal external device, and reset the system after solving the problem.
E25	User-defined fault 2	1. User-defined fault 2 signal is received via multi-function terminal DI.	1. Check the abnormal external device, and reset the system after solving the problem.
E26	Power-on time is reached	1. The accumulated power-on time reaches the set value	1. Use the parameter initialization feature to clear the record data.
E27	Load loss	1. The inverter running current is less than the value set in F8-52.	1. Check whether the load is disconnected or whether the parameters set in F8-52 and F8-53 are suitable for the actual operation.
E28	PID feedback lost during operation	1. PID feedback disconnection 2. PID feedback source disappears 3. PID feedback is less than the value set in FC-26	Check the PID feedback signal or adjust the value set in FC-26 to an appropriate one.
E29	Speed deviation is too large	1. The motor is blocked. 2. The parameters set in F8-56 and F8-57 are not suitable for the speed deviation detection. 3. Something wrong happens in the wiring between the inverter output terminal UVW and the motor.	1. Check whether the machine is normal and whether the motor parameters are properly set. 2. Correct the parameters set in F8-56 and F8-57. 3. Check whether the wiring between the inverter and the motor is disconnected
E42	Temperature sensor failure	1. The temperature sensor is damaged 2. The ambient temperature is too low	Seek technical support

Code	Type	Possible causes	Troubleshooting
		when starting 3. Poor contact of temperature sensor	

Appendix A. Communication protocol

A.1.Introduction of MODBUS protocol

The MODBUS protocol is a software protocol that has become a universal language for use in electronic controllers. Through this protocol, the controller (device) can communicate with other devices via the network (i.e., signal transmission line, or physical layer, such as RS485). It is now a general industrial standard through which control devices produced by different manufacturers can be connected into an industrial network that can be centralized monitored.

The MODBUS protocol provides two transmission modes: ASCII mode and RTU (Remote Terminal Units) mode. All devices in the same MODBUS network must be set to a same transmission mode. In the same MODBUS network, beside the same transmission mode, the basic parameters such as baud rate, data bits, parity bits, and stop bits must also be same for all devices. This product only supports RTU transmission mode.

The MODBUS network is a single-master and multiple-slave control network; that is, only one device in the same MODBUS network is allowed to act as a master device, while the other devices are all slave ones. The so-called master is a device that has the privilege to take initiative to send information across the MODBUS network to control and query other devices (slave). The so-called slave is a passive device that can only send data messages to the MODBUS network after receiving a control or query message (command) from the master. This action is known as a response. After sending out a command to a slave, the master generally waits a period of time for the controlled or queried slave to respond it. This ensures that only one device sends information to the MODBUS network at the same time to avoid signal conflicts.

Normally, users can set the computer (PC), PLC, IPC, and HMI as a master to achieve centralized control. Setting a device as a master means not that such setting can be enabled by pushing a certain button or switch nor that has its information been given some kind of special format. It means merely a convention. For example, when a host computer is running and its operator click a send-command button, the host computer is allowed to initially send out the commands even when it cannot receive commands from other devices. Then, the host computer is agreed to be the master. Furthermore, for example, when the designer designs the inverter in that way that the inverter is allowed to send information only when it has received a command, the inverter is conventionally treated as a slave device.

A master can communicate with one single slave and can broadcast information to all slaves. For commands that are intended for a specific slave, the slave is required to return a response message. As for broadcasted information from the master, the slave does not need to feedback its response.

A.2.Usage of this inverter

The MODBUS protocol used by this inverter is RTU mode, and the physical layer (network line) is two-wire RS485.

A.2.1. Two-wire RS485

The two-wire RS485 interface works in half-duplex and adopts differential transmission signaling, which is also known as balanced signaling, to handle its signal. It uses a pair of twisted wires, one of which is defined as A (+) and the other is defined as B (-). Normally, the positive level between the sending driver A and B ranging from +2 \to +6V is read as logic "1", and the level ranging from -2V to -6V is read as logic "0".

The “485+” marked on the inverter terminal board is the terminal for A, and 485- is for B.

Communication baud rate (P0-00) refers to the number of binary bits transmitted in one second; hence its unit is bits per second (bps). The higher the baud rate is set, the faster the transmission speed and the worse the interference tolerance. When using 0.56mm (24AWG) twisted pair as the communication cable, depending on the baud rate, the maximum transmission distance is as follows:

Baud rate	Max. distance	Baud rate	Max. distance	Baud rate	Max. distance	Baud rate	Max. distance
2400BPS	1800m	4800BPS	1200m	9600BPS	800m	19200BPS	600m

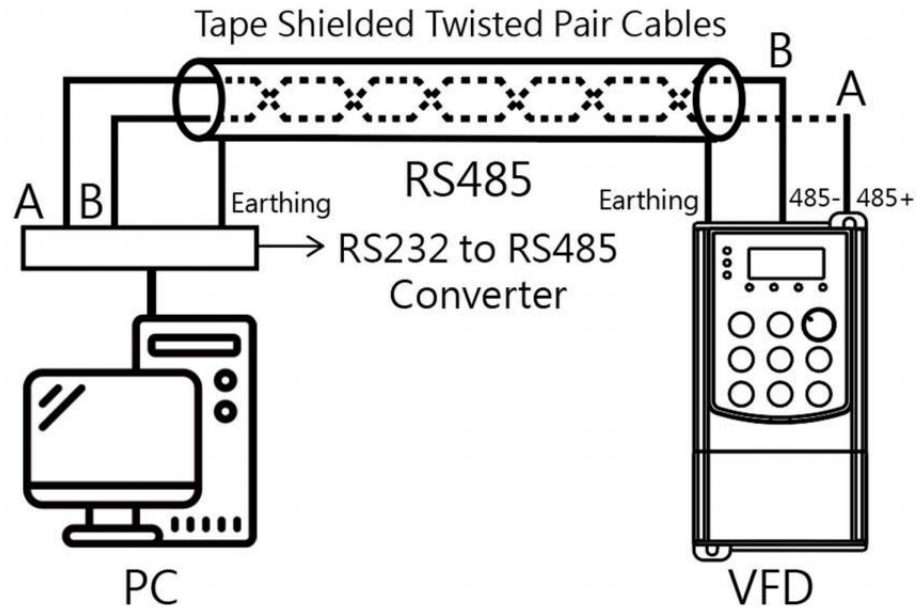
For RS485 long-distance communication, it is recommended to use shielded cables and use the shielding layer as the ground wire.

When devices are few and the distance between them is short, the whole network is expected to work well without a terminal load resistor. However, the performance deteriorates as the distance increases. Therefore, at a longer distance, it is advised to use a 120Ω terminal resistor.

A.2.1.1. Stand-alone application

Figure 7.1 shows a MODBUS field wiring diagram formed by a single inverter and a PC. Because computers generally do not come with RS485 interfaces, the RS232 interface or USB interface of the computer needs to be converted to a RS485 using a converter. Connect the A terminal of RS485 to the 485+ terminal on the inverter terminal board, and connect the RS485 terminal B to the 485- terminal on the inverter terminal board. It is recommended to use shielded twisted pair cables as much as possible. When using a RS232-to-RS485 converter, the RS232 interface on the computer is connected to the RS232 interface of the converter, where the cable length shall be as short as possible and no more than 15m. It is recommended to plug the RS232-to-RS485 converter directly on the computer. Similarly, when using a USB-RS485 converter, the cable shall be also as short as possible.

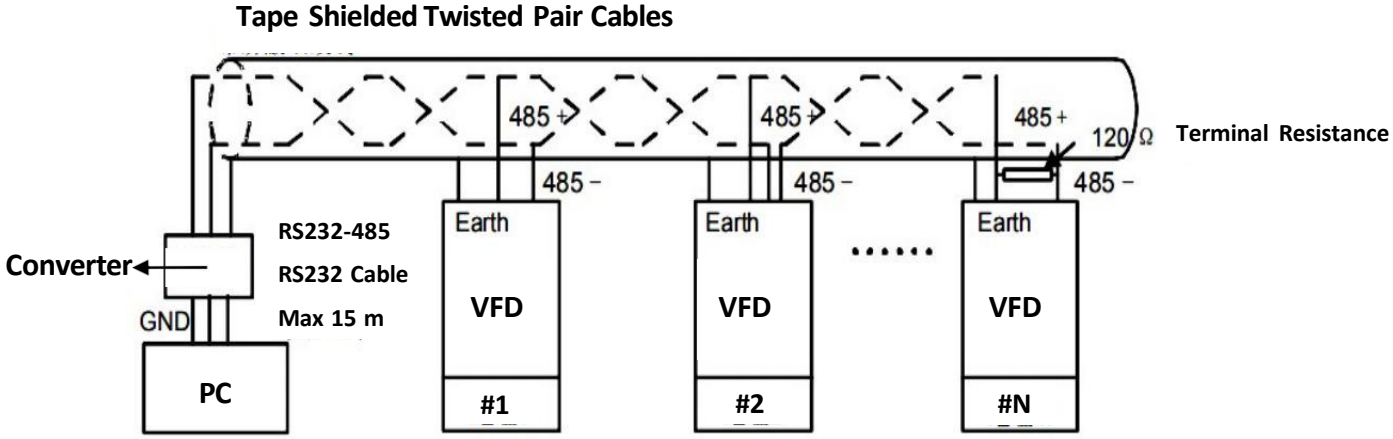
After the wiring is completed, select the correct port (which is the one connected to the RS232-RS485 converter, such as COM1) for the host settings of the computer, and set the basic parameters such as communication baud rate and data bit check to the same of the inverter.



Physical wiring diagram of RS485 for stand-alone application

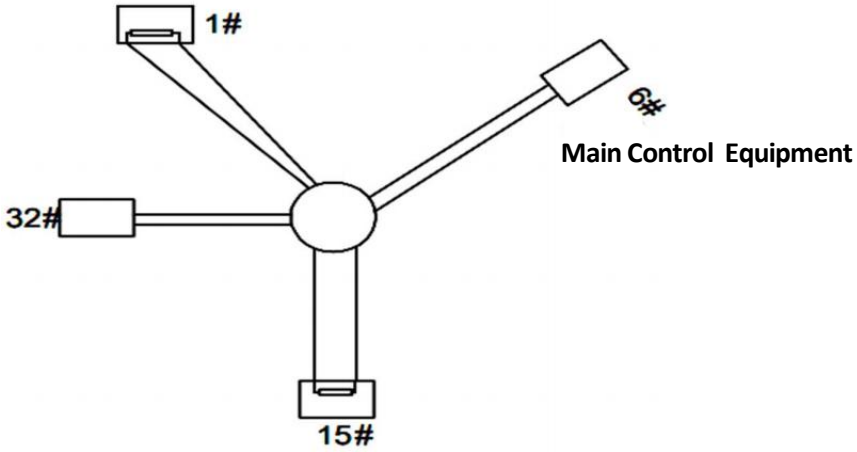
A.2.1.2. Multi-device application

In an actual multi-device application, it is common practice to adopt either daisy connection or star connection. The RS485 industrial bus standard requires the daisy chain connection between devices and 120Ω terminal resistors to be connected at both ends, as shown in Figure 7.2.



Application of daisy connection

The below figure shows a star connection diagram. In this case, terminal resistors are required to be connected to the two devices (1# and 15#) whose connection distances are the longest two among all.



Star connection

Multi-device connection shall use shielded cable as possible as you can. The basic parameters such as baud rate and data bit check of all devices on a RS485 connection must be the same and each device shall be assigned a unique address.

A.2.2.RTU mode

A.2.2.1. RTU communication field structure

When a controller is set to communicate in RTU (Remote Terminal Unit) mode on a MODBUS network, each 8-bit byte of a message contains two 4-bit hexadecimal characters. The main advantage of this approach is that more data can be transmitted than the ASCII approach at the same baud rate.

Coding system

- One start bit.
- 8 data bits, least significant bit sent first. Each 8-bit frame contains two hexadecimal characters (which are 0...9， A...F).
- 1 bit for even-odd parity check (if such check is not required, no such bit)
- 1 stop bit if parity is used, and 2 bits if no parity

Error Check Field

- CRC (Cyclic Redundancy Check)

The description of the data format is as follows:

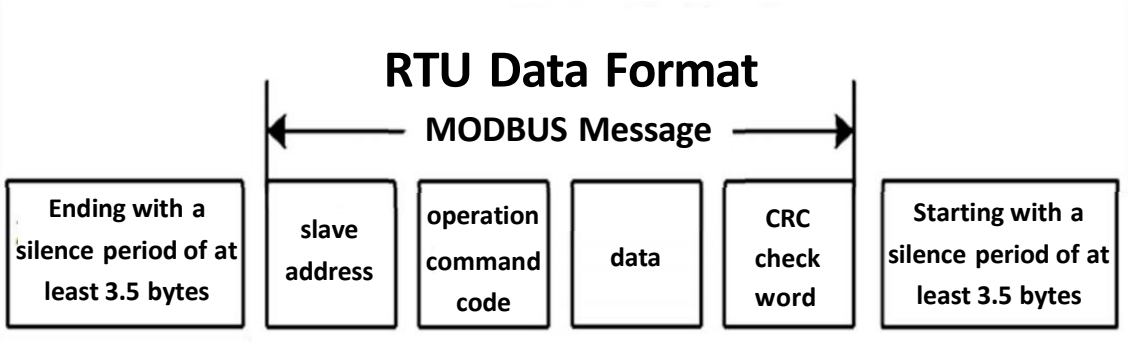
11-bit character frame (BIT1 ~ BIT8 are data bits)

Start bit	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	BIT8	Check bit	Stop bit

In a character frame, the most important ones are the data bits. The start bit, check bit and stop bit are so added that they guarantee the data bits to be transferred to counter devices correctly. In actual communication, the data bits, parity, and stop bits must be kept in same format.

In RTU mode, a new frame transmission always starts with a silence period of at least 3.5 bytes.

On a network where the transmission rate is calculated at the baud rate, the transmission time of 3.5 bytes can be easily identified. The following data fields are sequentially: slave address, operation command code, data and CRC check word. The transmission bytes of each field are hexadecimal (0...9, A...F). Network devices always keep monitoring the activity of the communication bus. When the first field (address information) appears, every network devices will check their address with the byte. With the completion of the transmission of the last byte, there comes a silence period of 3.5 bytes to indicate the end of the frame. After this, a new transmission starts.



A frame of information must be transmitted in a continuous data stream. If a suspended interval of more than 1.5 bytes happens before the end of the entire frame transmission, the receiving device will clear received data because it is incomplete, and mistakenly treat the next incoming byte as the address field of a new frame. Similarly, if the silence period preceding a new frame transmission is less than 3.5 bytes, the receiving device will treat next incoming byte as a part of the previous frame. This will cause frame disorder and incorrect final CRC value is, which lead to communication failure.

Standard Structure of RTU Frame:

Frame header (START)	T1-T2-T3-T4 (Transmission time of 3.5 bytes)
Slave address field (ADDR)	Communication address: 0~247 (decimal) ("0" for the broadcast address)
Function field (CMD)	03H: Read slave parameters; 06H: Write slave parameters;
Data field DATA (N-1) … DATA (0)	Data of 2*N bytes: This part is the main content of communications, and is also the core of the data exchange.
CRCCHK lower bit	Detection value: CRC value (16BIT).
CRCCHK higher bit	
Frame tail (END)	T1-T2-T3-T4 (Transmission time of 3.5 bytes)

A.2.2.2. RTU communication frame error check

In the process of data transmission, sometimes an error occurs to the sent data due to various reasons (such as electromagnetic interference). For example, in a case that a part of the information to be sent is logic "1" and the A-B potential difference on RS485 is expected 6V, when an electromagnetic interference happens and change the potential difference to -6V, other devices will mistake the part as s logic "0". If there is no error check, the devices receiving the data will never know that they received wrong information and respond incorrectly response which may lead to

serious consequences. That is why a verification measure counts.

The idea of verification is that the sender perform calculation on the data to be sent using a fixed algorithm and attaches the result to the back end of the data and sends them together. After receiving the information, the receiver calculates the data based on the same algorithm, and compares its result with the attached result. If the results are the same, it proves that the data is received correctly, otherwise the received content is considered wrong.

The frame error check mainly consists of two parts, namely the single-byte bit check (odd/even check, using the check bit in the character frame) and the entire frame data check (CRC check).

Byte bit check (Parity check)

Users can select different bit check modes according to their needs, where "no parity check" is also an option. Based no the selections, it will affect the check bit setting of each byte.

The approach of even parity: It introduces an even parity bit in prior of data transmission to indicate whether the number of "1" in the transmitted data is odd or even. When it is even, the parity bit is "0"; otherwise it is "1", by which to keep the parity of the data unchanged.

The approach of odd parity: It introduces an odd parity bit in prior of data transmission to indicate whether the number of "1" in the transmitted data is odd or even. When it is odd, the parity bit is "0", otherwise it is "1", by which to keep the parity of the data unchanged.

For example, supposing the data bit that needs to be transmitted is "11001110", the data contains five "1"s. If even parity is used, the even parity bit is "1", and if odd parity is used, the odd parity bit is "0" ". When transmitting data, the parity bit is calculated and placed in the frame's parity bit, and the receiving device must also perform parity check. If the parity of the received data is found to be inconsistent with the preset, a communication error has occurred.

CRC (Cyclical Redundancy Check)

RTU frame format includes a frame error detection field that is calculated using CRC. The CRC field is used to detect the entire content of frame. The CRC field has two bytes, including 16 bits of binary values. It is added to the frame as a result of calculation performed by the transmission device. The receiving device recalculates the CRC of frame, and compares it with the value in the received CRC field. If the two CRC values are not same, it means a transmission error.

CRC is first stored in 0xFFFF, and then a process is called to process six or more consecutive bytes in the frame with the value in the current register. Only the 8-bit data in each character is valid for CRC. The start bit, stop bit and parity check bit are invalid.

During CRC generation, each 8-bit character is independently performed "XOR" operation with the content of the register. The result moves to the least significant bit (LSB) direction, and the most valid bit (MSB) is filled in with 0. LSB is the one to be extracted for detection. If LSB is 1, the register independently conducts "XOR" operation with the preset value; if LSB is 0, there will be no further operation. The entire process will be repeated for eight times. After the completion of the last bit (the 8th bit), the next 8-bit byte will independently be performed "XOR" operation with the current value of the register. The final value of register is the CRC value after the execution of all bytes in the frame.

The CRC calculation method used here is based on the international standard CRC principle. When editing CRC algorithm, users can refer to the standard CRC algorithm and write a CRC calculation program to fully meet their requirements.

A simple function (in C language) for CRC calculation is provided below for reference:

```
unsigned int crc_cal_value(unsigned char* data_value, unsigned char data_length)
{
  int i;
  unsigned int crc_value = 0xffff; while(data_length--)
  {
    crc_value ^ = *data_value ++;
    for(i=0; i<8; i++)
    {
      if(crc_value & 0x0001)crc_value = (crc_value >> 1) ^ 0xa001;
      else crc_value = crc_value >> 1;
    }
  }
  return(crc_value);
}
```

In ladder logic, CKSM calculates the CRC value from the frame content using tale loop-up method, which provides benifits such as simple programming and fast operation speed. However, the process requires large ROM space. Please use this approach cautiously in the cases that there is only limit process space available.

A.3. Command code and communication data

A.3.1. Command Code: 03H (00000011 in binary format), read N words (available for a maximum of consecutive 12 words)

Command code 03H means that the host reads data from the inverter, where the number of data to be read is specified in the "number of data" part of the command and is up to 12 data. The read address must be consecutive. The byte length occupied by each data is 2 bytes, which is also knows as one word. Afterward, the commands mentioned here are all expressed in hexadecimal format (a number followed by an "H" indicates it is a hexadecimal number), and one hexadecimal occupies one byte. This command is used to read the working status of the inverter.For example: From an inverter with the slave address 01H, read two words consecutively starting from data address 0004H (i.e read data from 0004H and 0005H), where the structure of the frames are as follows:

RTU Master Command (sent from the master to the inverter)		RTU Slave Response (sent from the inverter to the master)	
START	T1-T2-T3-T4	START	T1-T2-T3-T4
ADDR	01H	ADDR	01H
CMD	03H	CMD	03H
		Number of bytes	04H
Higher bits of start	00H	Higher bits of data in	13H

address		address 0004H	
Lower bits of start address	04H	Lower bits of data in address 0004H	88H
Higher bits of number of data	00H	Higher bits of data in address 0005H	00H
Lower bits of number of data	02H	Lower bits of data in address 0005H	00H
Lower bits of CRC	85H	Lower bits of CRCCHK	7EH
Higher bits of CRC	CAH	Higher bits of CRCCHK	9DH
END	T1-T2-T3-T4	END	T1-T2-T3-T4

T1-T2-T3-T4 (3.5 bytes of transmission time) in START and END rows is the transmission idle time (whose length is at least 3.5 bytes) reserved for RS485 communication, which guarantees enough time interval to let devices distinguish two pieces of information without confusing them into one piece of information;

ADDR is set to 01H. It means that the command is sent to the inverter with address 01H. The length of ADDR is one byte;

CMD is set to 03H, which means is used to read data from the inverter. The length of CMD is one byte;

"Start address" indicates the start point of the data reading operation. The length of the start address is two bytes with the higher bits in the front of the lower bits.

"Number of data" indicates the number of data to read, the unit is "Word". The start address is set to 0004H and the number of data is to 0002H, which means the operation is to read data from the two addresses 0004H and 0005H.

The CRC check occupies two bytes, where the lower bits form the first byte and the higher bits form the last byte.

Description of the response message:

ADDR is set to 01H. It means that the command is sent to the inverter with address 01H. The length of ADDR is one byte;

CMD is set to 03H, which means the message sent by the inverter is a response to the read command 03H from the master. The length of CMD is one byte;

The "Number of bytes" byte represents the number of bytes from itself (not included) to the CRC byte (not included). Here, 04 means that there are 4 bytes from "Number of byte number" byte to "Lower bits of CRCCHK " bytes, which are "Higher bits of data address 0004H", "Lower bits of data address 0004H, " Higher bits of data address 0005H", and " Lower bits of data address 0005H";

The data amount stored in one piece of data is two bytes, with higher bits in the front and lower bits in the back. It can be seen from the information that the data stored in the data address 0004H is 1388H, and the data in the address 0005H is 0000H.

The CRC check occupies two bytes, where the lower bits consist the first byte and the higher bits consist the later byte.

A.3.2. Command code: 06H (00000110 in binary format), write one word

This command indicates the master's request to writes data into the inverter. One such command can only be used to write one word of data, not multiple words. It is for changing the operation mode of the inverter.

For example, in an write operation trying to write 5000 (1388H) into the address 0008H of the inverter with the slave address 02H, the structure of the frames are as follows

RTU Master Command (sent from the master to the inverter)		RTU Slave Response (sent from the inverter to the master)	
START	T1-T2-T3-T4	START	T1-T2-T3-T4
ADDR	02H	ADDR	02H
CMD	06H	CMD	06H
Higher bits of target memory address	00H	Higher bits of target memory address	00H
Lower bits of target memory address	04H	Lower bits of target memory address	04H
Higher bits of data to be written	13H	Higher bits of data to be written	13H
Lower bits of data to be written	88H	Lower bits of data to be written	88H
LOWER BITS OF CRCCHK	C5H	LOWER BITS OF CRCCHK	C5H
HIGHER BITS OF CRCCHK	6EH	HIGHER BITS OF CRCCHK	6EH
END	T1-T2-T3-T4	END	T1-T2-T3-T4

NOTICE: The command format is mainly introduced in section A.2 and section A.3.

A.4. Definition of data address

This section introduces the definition of communication data address, which is used for controlling the inverter operation mode and obtaining the inverter's status information and related functional parameters.

A.4.1.Functional code parameter expression rule

A parameter address consists of two bytes, where the first byte stores higher bits and the later byte stores lower bits. Both bytes are ranging from 00 ~ ffH. The parameter address can be translated from the code name of its corresponding functional code. The part before "-" in the function code consists the higher byte and the part after "-" consists the lower byte, where the both parts need to be converted to hexadecimal number. Taking function code F5-05 as an example, since "F5" consists the higher byte and "05" consist the lower byte, the parameter address will be F505H after hexadecimal conversion. Taking another example, if the function code is FE-17, the parameter address will be FE11H.

NOTICE:

1. P5 set is the factory parameters and cannot be read or changed by users. Besides, some parameters cannot be changed when the inverter is running; some parameters cannot be changed regardless of the state of the inverter; when changing function code parameters, pay attention to and follow the parameter setting range, unit and related instructions.
2. In addition, it the EEPROM is frequently used by store operation, the service life of the EEPROM may be shorter than expectation. As some users have suspected, some function codes do not need to be stored during a communication process, altering their value in the on-chip RAM brings the same effect. To achieve this, just change the highest bit of the corresponding function code address from F to 0, U to 7, and P to 4. For example, if you find that you don't need to store function code F0-07 into EEPROM and want to change its value in RAM, just change the address to 0007H. However, this kind of address is only valid for writing purpose and will become invalid for any reading operation.

A.4.2. Address of other MODBUS functions

In addition to handling the parameters of the inverter, the master can also control the inverter, such as running, stopping, etc., as well as monitoring the status of the inverter. The following table lists the parameters of other functions:

Function	Address	Data description	R/W feature
Communication control command	2000H	0001H: Forward running	W
		0002H: Reverse running	
		0003H: Forward jogging	
		0004H: Reverse jogging	
		0005H: Free stop	
		0006H: Deceleration stop	
		0007H: Fault reset	
Communication setting address	1000H	Communication frequency ((-100.00%~100.00%) Fmax)	W
	2001H	0001H：Relay closed	
		0002H：DO1 output high	
	2002H	AO output settings (Range: 0~ x7FFF，where 0x7FFF corresponding to 100.0%)	W
Inverter status word	3000H	0001H: In operation	R
Inverter fault code	8000H	See description of fault types	R

The R/W feature indicates the read/write availability of the function. For example, "Communication control command" is a write available feature and accepts a write command (06H) for controlling the inverter. The R available features can only be read but written, and the W available feature can only be written but read.

NOTICE: When using the above table to operate the inverter, some parameters needs be enabled

in advance. For example, if you want to execute a run or stop operation, you need to set the "Operation command channel" (F0-21) to "Communication operation command channel". For another example, when you want to handle "PID set-point", you need to set the "PID set-point source selection" (FC -00) to "Communication set-point".

A.4.3. Fieldbus ratio

In actual usage, communication data is expressed in hexadecimal format, and hexadecimal format cannot express decimal point. For example, 50.12Hz cannot be expressed in hexadecimal. However, we can increase it by a factor of 100 times into an integer (5012), so that 1394H in hexadecimal (that is 5012 in decimal) can be used to represent 50.12.

The factor used here to increase a non-integer into an integer is called the fieldbus ratio.

The fieldbus ratio is determined based on the decimal point of the "setting range" or "default value" listed in the function parameter table. If there are n decimal digits after the decimal point (for example, n=1), the fieldbus ratio m is set to the nth power of 10 (m=10). For details, see the following example:

Function code	Name	Description	Default	Changeable
F0-01	Preset frequency	0.00HZ~maximum frequency (F0-09)	50.00HZ	☆
F0-13	Acceleration time 1	Range: 0.0 ~6500.0s (when F0-15 is set to 1)	Model determination	☆

Since the "setting range" or "factory value" of the preset frequency F0-01 has two decimal digits, the fieldbus ratio value is 100. If the value received by the host computer is 5000, that means "Threshold frequency" of the inverter is 50.00HZ (50.00=5000÷100).

Consider a case of using MODBUS communication to set the acceleration time to 20.0s. First, increase 20.0 by a factor of 10 to an integer 200, which is C8H in hexadecimal. Then send:

01 06 F0 0D 00 C8 2A 9F

Inverter address/ Write command/ Parameter address/ Parameter data/ CRC check

After receiving the instruction, the inverter change 200 to 20.0 using the fieldbus ratio, and then set the acceleration time to 20s.

Furthermore, after sending out the "acceleration time" parameter command, the upper device receive a response message from the inverter:

01 03 02 00 64 B9 AF

Inverter address/ Read command/ Two-byte data/ Parameter data/ CRC check

The parameter data is 0064H and is 100 in decimal. Decrease 100 by the factor of 10 to 10.0, which indicates that the sleep recovery delay time is 10s.

A.4.4.Error message response

While using communication control, it is inevitable to encounter errors. You may accidently send a write command to a parameter that can only be read but written, and the inverter send back an error message response (read error 0x83/write error 0x86). Here, the error message response is sent from the inverter to the master, and their code means as below:

Code	Name	Description
01H	illegal function	Illegal function code
02H	illegal data address	illegal data address
03H	illegal data value	Illegal value: 1: Limit exceeded 2: Password verification or data verification error 3: Write the read-only parameter 3: In running state, parameter write operation is prohibited 4: EEPROM data is being stored
04H	Slave device failure	Misoperation of lock or factory function code

For example, trying to set the "Motor control mode" of the inverter whose address is 01H (F0-00 parameter address is F000H) to 02, the command as below is set:

01 06 F0 00 00 02 3B 0B

Inverter address/ Write command/ Parameter address/ Parameter data/ CRC check

However, the setting range of the "Motor control mode" is 0 ~ 1, which means 2 is a value exceeding the range. At this time, the inverter returns an error message response message which reads as follows:

01 86 03 02 61

Inverter address/ Write error/ Abnormal response code / CRC check

The abnormal response code 86H indicates that the MODBUS communication is abnormal; the error code 03H indicates that the write parameter is illegal and invalid.

A.5.Examples of read and write operations

Refer to chapter A.3 for the format of read and write commands.

A.5.1. Example of read command 03H

Example 1: To read the temperature value of the inverter that is stored in address FA06H, the command sent to the inverter reads:

01 03 FA 06 00 01 54 D3

Inverter address/ Read command/ Parameter address/ Number of data/ CRC check

If the response reads:

01 03 02 00 1B F8 4F

Inverter address/ Read command/ Number of data/ Data content/ CRC check

The data content returned by the inverter is 001BH, which implies the temperature of the inverter is 27°C.

A.5.2.Example of write command 06H

Example 1: To request the inverter with address 03H to run forward. Referring to "Parameter List of Other Functions", the address of "Communication Control Command" parameter is 2000H, and the forward operation value is 0001. See below:

Function	Address	Data description	R/W feature
Communication control command	2000H	0001H: Forward running	W
		0002H: Reverse running	
		0003H: Forward jogging	
		0004H: Reverse jogging	
		0005H: Free stop	
		0006H: Deceleration stop	
		0007H: Fault reset	

The command sent by the master reads:

03 06 20 00 00 01 42 28

Inverter address/ Write command/ Parameter address/ Forward running/ CRC check

If the operation is successfully completed, the response information returned is reads as follows (same as the command sent by the master):

03 06 20 00 00 01 42 28

Inverter address/ Write command/ Parameter address/ Forward running/ CRC check

Example2: To the inverter with address 03H, send a command to set its "Maximum output frequency"to 100Hz.

Code	Name	Parameter description	Default	Changeability
F0-09	Maximum output frequency	Used to set the maximum output frequency of the inverter. It is the basis of frequency settings and the basis of acceleration and deceleration. Please pay attention to set it properly. Setting range: 50.00~500.00Hz	50.00Hz	★

Judging from the number of decimal digits, the fieldbus ratio of "Maximum Output Frequency" (F0-09) is 100. Multiply 100Hz by the ratio and you get 10000, which is 2710H in hexadecimal expression.

The master sends a command that reads:

03 06 F0 09 27 10 71 16

Inverter address/ Write command/ Parameter address/ Data content/ CRC check

If the command is successful completed, the response information will reads as below (same as the command sent by the master):

03 06 F0 09 27 10 71 16

Inverter address/ Write command/ Parameter address/ Data content/ CRC check

A.6. Common communication fault

Common communication faults include: No response and abnormal faults returned from the inverter.

Possible reasons for no response faults are:

1. Wrong serial port selection. For example, the converter uses COM1 while COM2 is selected for communication;

2. The settings of baud rate, data bit, stop bit, check bit and other parameters are inconsistent with those of the inverter;

3. RS485 bus is connected in reverse polarity (+ and -);

Appendix B. Technical Data

B.1. Using derated inverter

B.1.1.Capicity

Determine the inverter specifications based on the rated motor current and power. In order to achieve the rated motor power given in the table, the rated output current of the inverter shall be no less than that of the motor, while the rated power of the inverter also shall be no less than that of the motor.

NOTICE:

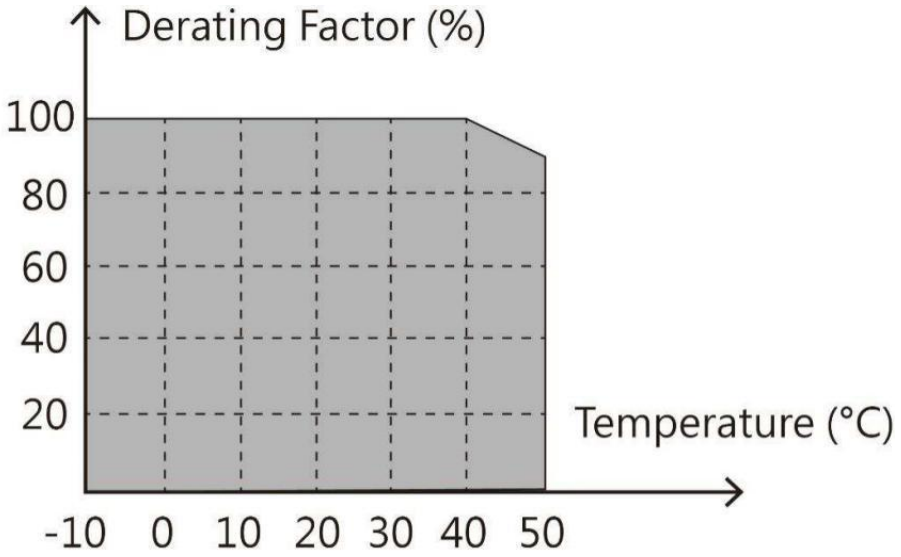
- The maximum acceptable motor shaft power is limited to 1.5 times of the motor rated power. If the limit is exceeded, the inverter will automatically limit the motor's torque and current. This feature can effectively protect the input bridge from overload.
- The rated capacity is the capacity for an environment whose ambient temperature is 40°C.
- Check the public DC system to confirm the total power connected through the public DC system does not exceed the rated power of the motor.

B.1.2.Derating

If the ambient temperature of the installation site exceeds 40°C, the altitude exceeds 1000m, or the switching frequency changes from 4 kHz to 8.12 or 15 kHz, the inverter must be derated.

B.1.2.1. Temperature derating

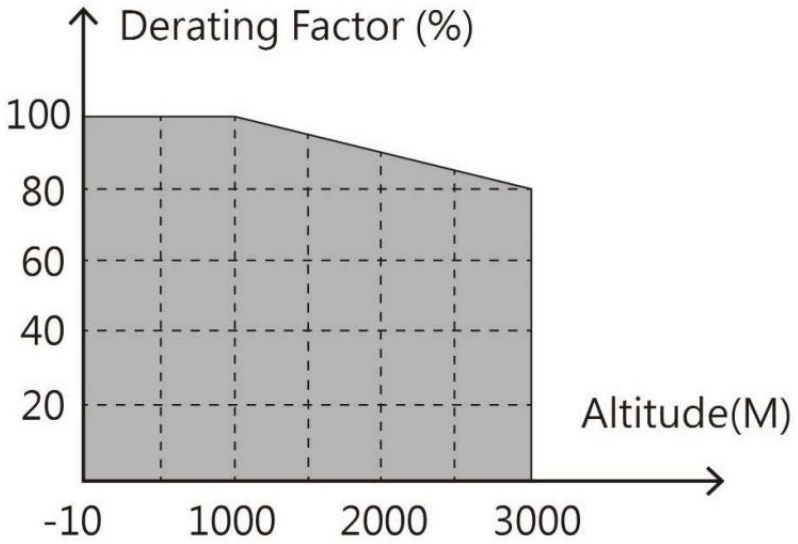
When the temperature ranges from +40°C to +50°C, the rated output current shall decrease by 1% every 1°C increase. Please refer to the figure below for actual derating.



NOTICE: It is not recommended to use the inverter in an environment whose temperature is above 50°C. The customer shall be solely responsible for the consequences arising from ignoring such advice.

B.1.2.2.Altitude derating

The inverter can output rated power when installed below the altitude of 1000m. If the altitude exceeds 1000m and less than 3000m, please derate it at a rate of 1% for every 100m increase. The specific derating rate is shown in the figure below.



When the altitude exceeds 2000m, please configure an isolated inverter at the input end of the inverter.

When the altitude exceeds 3000m and less than 5000m, please consult us for further technical advice. This product is not recommended to be used at an altitude above 5000m.

B.1.2.3. Carrier frequency derating

For an inverter, its carrier frequency setting range varies according to its power level, just like its rated power is defined by its factory carrier frequency. If the actual carrier frequency exceeds the factory value, the power of the inverter needs to be derated at a rate of 10% for every 1 kHz increase in the carrier frequency.

B.2.CE

B.2.1.CE mark

The CE mark on the nameplate indicates that this inverter has passed CE certification and complies with the European Low Voltage Directive (2006/95/EC) and Electromagnetic Compatibility Directive (2004/108/EC).

B.2.2. Compliance with EMC specifications

The European Union stipulates that electrical and electronic equipment sold in Europe must meet the emission limits of electromagnetic disturbances that cannot exceed the relevant standards and have electromagnetic immunity capabilities that can work normally in a certain electromagnetic environment. The EMC product standard (EN61800-3:2004) specifies the electromagnetic

compatibility standards and specific test methods for speed control electric drive system products. Our products must strictly comply with these EMC regulations.

B.3. EMC specifications

The EMC product standard (EN 61800-3:2004) specifies the EMC requirements for inverter products.

Application environment classification:

- First-type environment: Civil environments, including those application environments that are directly connected to the low-voltage power grid that supplies power to civilians without going through an intermediate transformer.
- Second-type environment: all environments except those directly connected to the application environment of the low-voltage power supply grid that supplies power to civilians.

Four categories of inverters:

- C1 type inverter: The rated voltage is lower than 1000V and is used in a first-type environment.
- C2 type inverter: The rated voltage is lower than 1000V, not a plug, socket or mobile device. For usage in a first-type environment, it must be installed and operated by professional personnel.

NOTICE: While no longer restricting the power distribution of an inverter, the EMC standard IEC/EN 61800-3 is still applied to the usage, installation and commissioning. Related professional personnel or organizations are required to possess the necessary skills, including EMC-related knowledge, to install and/or tune electric drive systems.

- C3 type inverter: The rated voltage is lower than 1000V and can be used in a second-type environment but a first-type environment.
- C4 type inverter: The rated voltage is higher than 1000V or the rated current ≧ 400A, and can be used with a complex system in a second-type environment.

B.3.1.C2-type

For conducted interference tolerance, it requires following measures:

1. Select the optional EMC filter by referring to “Appendix C. Peripheral Options" and install it according to the instructions in the EMC filter manual.
2. Follow the instructions in this manual to select the motor and control cables.
3. Install the inverter according to the method described in this manual.

In a domestic environment, this product may general radio interference and require additional prevention measures.

B.3.2.C3-type

The interference tolerance of the inverter meets the requirements of the second-type environment specified in the IEC/EN 61800-3 standard.

For conducted interference tolerance, it requires following measures:

1. Select the optional EMC filter from the “Peripheral options" and install it according to the instructions in the EMC filter manual.
2. Follow the instructions in this manual to select the motor and control cables.
3. Install the inverter according to the method described in this manual.

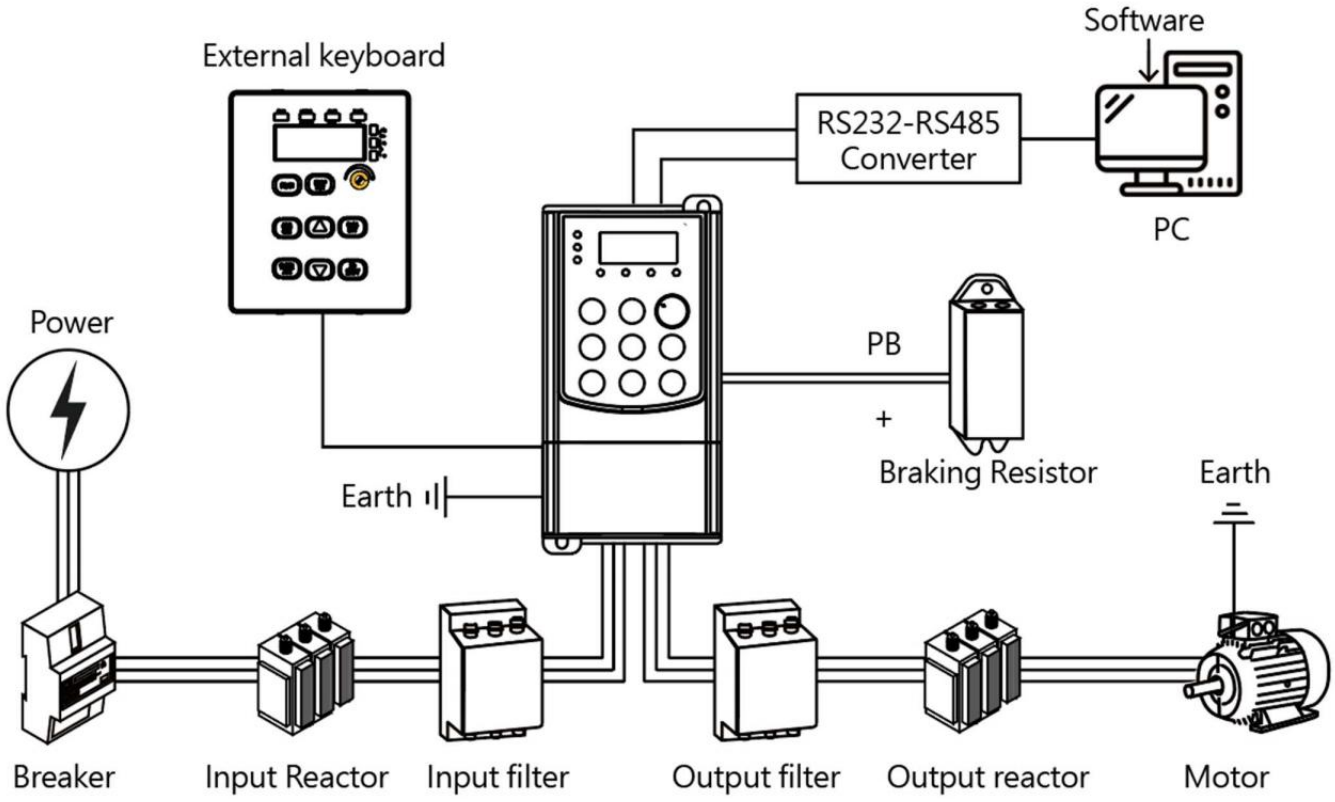
Class C3 inverters cannot be used in a civil low-voltage public power grid. If frequency converters are used in such grids, radio frequency electromagnetic interference will be generated.

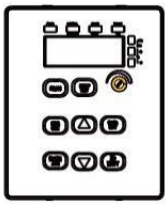
Appendix C. Peripheral Options

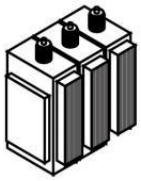
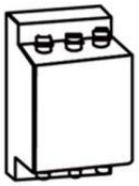
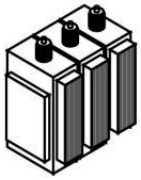
This chapter describes the optional accessories of the inverter.

C.1. Peripheral wiring

The diagram below shows the external wiring of the inverter.



Part	Name	Description
	External keyboard	Including external keyboard with parameter copy feature and external keyboard without the feature. When the external keyboard with parameter copy feature is enabled, the local keyboard will turn itself off; when the external keyboard without parameter copy feature is enabled, the local keyboard and the external keyboard become active at the same time.

	Cable	Used for transmitting electrical signals.
	Breaker	Prevents electric shock accidents and protects against ground short circuits that may cause leakage current fires (please select a leakage circuit breaker that is designed for inverters and has the function of suppressing high-order harmonics. The rated sensitive current of the circuit breaker shall be greater than 30mA for one inverter).
	Input reactor	Suitable for improving the power factor of the input side of the inverter and can suppress high-order harmonic current.
	Input filter	Suppresses the electromagnetic interference transmitted by the inverter to the public grid through the input power line. Please install it during installation and as close to the input terminal side of the inverter as possible.
	Braking resistor	Uses its resistance consuming the regenerative energy of the motor to shorten the deceleration time.
	Output filter	Suppresses the interference generated from the wiring on the output side of the inverter. Please install it as close as possible to the output terminal of the inverter.
	Output reactor	Extends the effective transmission distance of the inverter and effectively suppresses the instant high voltage generated when the IGBT of the inverter is switched on and off.

C.2.Power source

 Ensure that the inverter voltage level is consistent with the grid voltage.

C.3.Cable

C.3.1.Power cable

The specifications of the input power cables and motor cables shall comply with local regulations.

NOTICE: If the electrical conductivity of the motor cable shielding layer fails to meet the requirements, an additional PE conductor shall be used with the cables.

C.3.2.Control Cable

All cables used for analog control or frequency input shall be shielded cables.

The relay cables need to be cables with metal braided shield.

The keyboard needs to be connected with a network cable. If use it in a harsh electromagnetic environment, a shielded network cable is recommended.

NOTICE:

- The analog signal and digital signal are routed separately using designated cables.
- Before connecting the input power cables for the inverter, check the insulation of the input power cables according to local regulations.

Model	Recommended cable size (mm^2)				Set Screws	
	RST / UVW	Screw spec	Screw spec	PB (+)	Screw spec	Torque（Nm）
iMaster-HC10M-2SR75GC	2.5	2.5	2.5	2.5	M3	0.8
iMaster-HC10M-2S1R5GC	2.5	2.5	2.5	2.5	M3	0.8
iMaster-HC10-4T2R2GC	4	4	4	4	M4	1.2 ~ 1.5
iMaster-HC10-4TR75GC	1.5	1.5	1.5	1.5	M4	1.2 ~ 1.5
iMaster-HC10-4T1R5GC	1.5	1.5	1.5	1.5	M4	1.2 ~ 1.5
iMaster-HC10-4T2R2GC	2.5	2.5	2.5	2.5	M4	1.2 ~ 1.5
iMaster-HC10-4T3R7GC	2.5	2.5	2.5	2.5	M4	2 ~ 2.5
iMaster-HC10-4T5R5GC	2.5	2.5	2.5	2.5	M4	1.3~ 1.5
iMaster-HC10-4T7R5GC	4	4	4	4	M4	1.3~ 1.5
iMaster-HC10-4T011GC	6	6	6	6	M4	1.3~ 1.5
iMaster-HC10-4T015GC	10	10	10	10	M5	2.0~ 2.5
iMaster-HC10-4T18.5GC	10	10	10	10	M5	2.0~2.5
iMaster-HC10-4T022GC	10	10	10	10	M5	2.0~2.5

NOTICE:

- The recommended cable specifications for the main circuit are based on the conditions including the ambient temperature below 40 degrees Celsius, the wiring distance below 100 m, and current flow of the rated value.
- Terminal (+) and PB are the terminals for connecting the braking resistor.
- If the control cable and power cable must cross, the angle between the control cable and the power cable must be 90 degrees.
- If the inside of the motor is wet, the insulation resistance will decrease. If any sign of moisture is suspected, dry the motor and then measure it insulation resistance again.

C.4. Circuit breaker and electromagnetic contactor

In order to prevent overload, you need to add a fuse.

A manual control circuit breaker (MCCB) needs to be installed between the AC power source and the inverter. The breaker shall be able to lock in the disconnected position to facilitate installation and maintenance. The capacity of the circuit breaker shall be set between 1.5 and 2 times of the rated current of the inverter.

According to the mechanism of the circuit breaker, if fail to comply with the manufacturer's instructions, thermionic gas may gasp from the circuit breaker case when a short circuit event happens. To ensure safety, special care must be taken when installing and placing the circuit breaker. Follow the manufacturer's instructions to handle it.

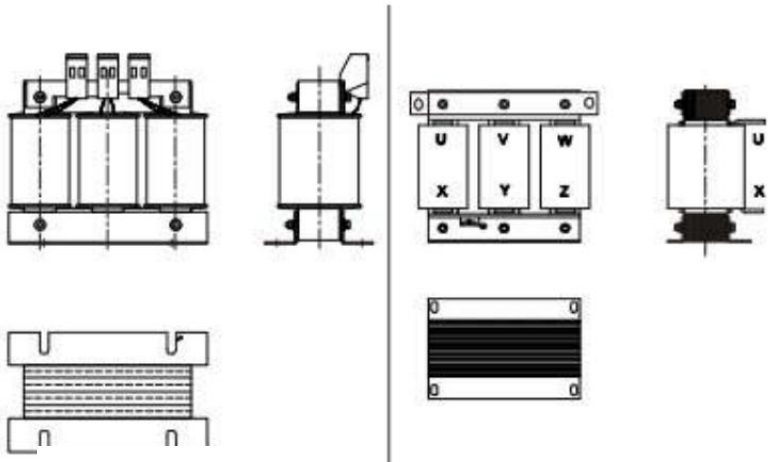
In order to effectively cut off the input power of the inverter when the system fails, it is advised to have an electromagnetic contactor installed on the input side to control the on and off of the main circuit power to ensure safety.

Model	Breaker rated current（A）	Fuse（A）	Recommended contactor rated current（A）
iMaster-HC10M-2SR75GC	16	16	12
iMaster-HC10M-2S1R5GC	25	25	25
iMaster-HC10-4T2R2GC	50	40	32
iMaster-HC10-4TR75GC	6	6	9
iMaster-HC10-4T1R5GC	10	16	12
iMaster-HC10-4T2R2GC	16	16	12
iMaster-HC10-4T3R7GC	16	25	12
iMaster-HC10-4T5R5GC	25	32	25
iMaster-HC10-4T7R5GC	32	40	26
iMaster-HC10-4T011GC	50	60	38
iMaster-HC10-4T015GC	63	70	50
iMaster-HC10-4T18.5GC	63	80	65
iMaster-HC10-4T022GC	80	100	65

C.5.Reactor

In order to prevent the instantaneous large current from flowing into the input power circuit and damaging the rectifier when the power grid provides high-voltage input, an AC reactor needs to be connected to the input side. This measure can also improve the power factor on the input side. When the distance between the inverter and the motor exceeds 50 meters, the leakage current become bigger due to increasing parasitic capacitance effect between the long cable and the ground, which makes the inverter prone to frequent overcurrent protection and may cause damage to the motor insulation. To prevent this, an output reactor is required. When using one inverter to serve multiple motors, it is necessary to add up the cable length of each motor to obtain the total motor cable length. When the total length is more than 50 meters, an output reactor must be added on the output side of the inverter. When the distance between the inverter

and the motor is between 50 and 100 meters, please select the model according to the following table. When it exceeds 100 meters, please directly consult the manufacturer for more technical support.



Output Reactor

Input Reactor

Model	Input Reactor	Output Reactor
iMaster-HC10-4T1R5GC	ACL2-1.5K-4	OCL2-1.5K-4
iMaster-HC10-4T2R2GC	ACL2-2.2K-4	OCL2-2.2K-4
iMaster-HC10-4T3R7GC	ACL2-3.7K-4	OCL2-3.7K-4
iMaster-HC10-4T5R5GC	ACL2-5.5K-4	OCL2-5.5K-4
iMaster-HC10-4T7R5GC	ACL2-7.5K-4	OCL2-7.5K-4
iMaster-HC10-4T011GC	ACL2-11K-4	OCL2-11K-4
iMaster-HC10-4T015GC	ACL2-15K-4	OCL2-15K-4
iMaster-HC10-4T18.5GC	ACL2-18.5K-4	OCL2-18.5K-4
iMaster-HC10-4T022GC	ACL2-22K-4	OCL2-22K-4

NOTICE:

- For input reactors, the design input rated voltage drop is 2%±15%. For output reactors, the design output rated voltage drop is 1%±15%.
- All the above-mentioned optional accessories are not included in the product package. Customers need to place additional order for them if necessary.

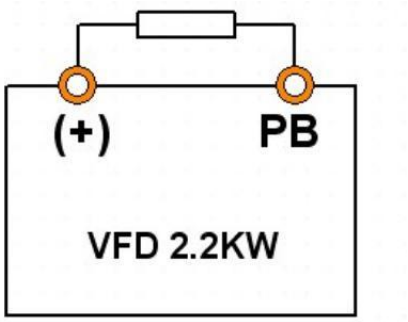
C.5. Install braking resistor

To connect a braking resistor, use shielded cables.

All resistors shall be installed in a well-cooled place.

Material around the braking resistor must be flame-retardant. The surface temperature of the resistor is very high. The temperature of the air flowing from the resistor can be as high as several hundred degrees Celsius. Must prevent any material or object from contacting the resistor.

inverter 2.2KW only needs an external braking resistor. PB and (+) are the wire ends of the braking resistor. The installation of the braking resistor is as follows:



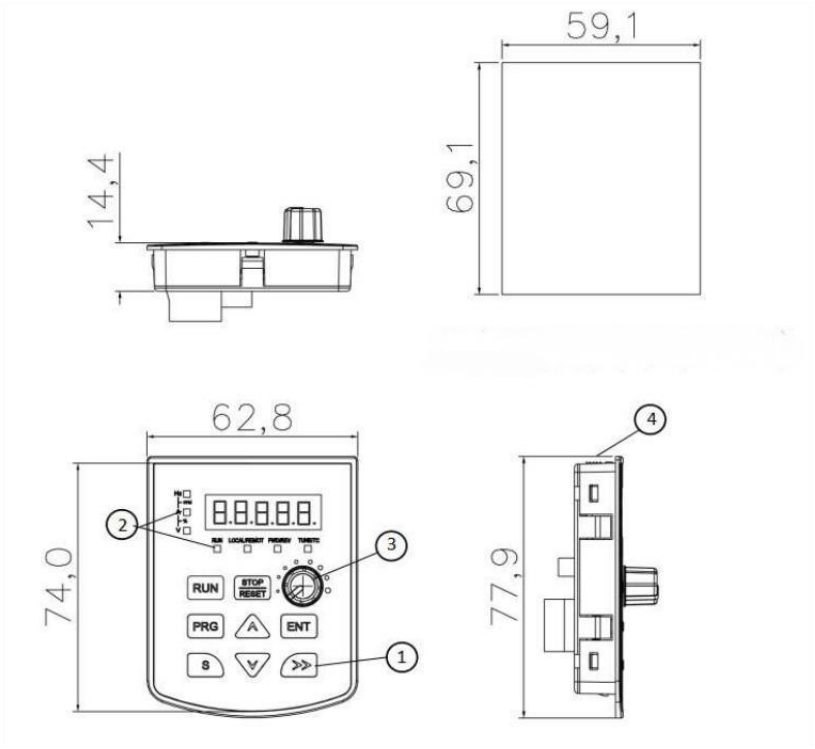
External Brake Resistance

C.6. Dimensions

C.7.1. External keyboard

This chapter describes the dimension drawing of the inverter. The unit of the dimension is millimeters.

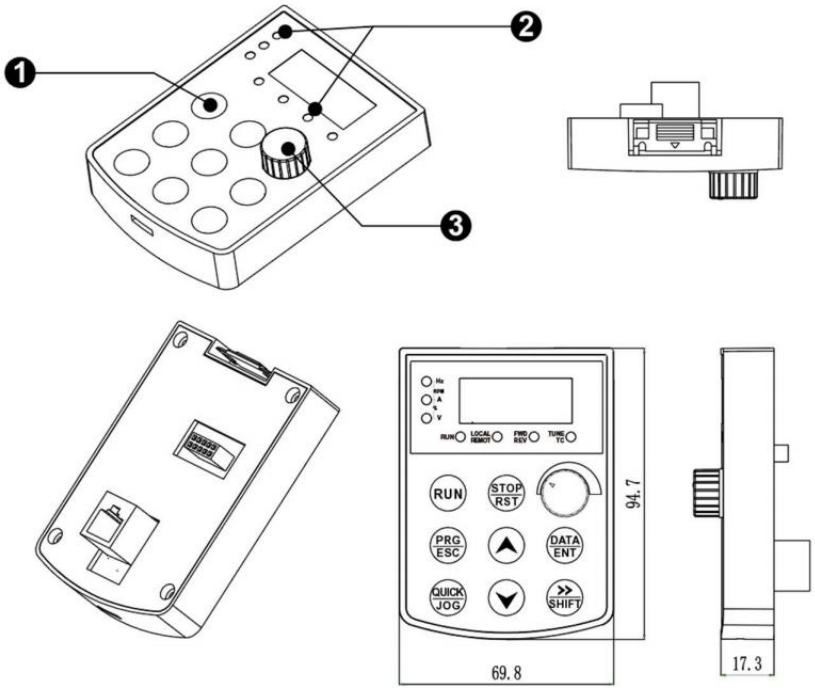
1、HC10M version 0.75K/1.5K external keyboard imension



1. Button
2. LED indicator
3. Knob
4. Panel Opening Dimensions: 69.1*59.1

Note: The standard keyboard can be used externally

2、HC10 version 0.75K- 22K external keyboard imensio



1. Button
2. LED indicator
3. Knob
4. Panel Frame Opening Dimensions: 115*85

Note: The standard keyboard can be used externally