KAMAN

KM20 Series Inverter

USER MANUAL

Preface

Thank you for purchasing the series invertor developed by Our company.

For the users who use this product for the first time, read the manual carefully.

Contents

Warranty Agreement

1. The warranty period of the product is 18 months (refer to the bar code on the equipment body). During the warranty period , if the product fails or damaged under the condition of normal use by following the instruction, we will be responsible for free maintenance.

2. Within the warranty period , maintenance will be charged for the damages caused by the following reasons :

    The damage caused by improper use or repair/modification without prior permission.

    The damage caused by fire , flood , abnormal voltage , other natural disasters and second disaster.

    The hardware damage caused by artificial falling or transportation after purchase.

    The damage caused by the improper operation.

    The damage or failure caused by the trouble out of the equipment (e.g. : External device)

3. If there is any failure or damage to the product, please fill in the information of the Product Warranty Card in details correctly.

4. The maintenance fee is charged according to the newly adjusted Maintenance Price List of our company .

5. In general , the warranty card will not be re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance .

6. If there is any problem during the service , please contact the agent of our company or our company directly .

7. The company reserves the right to interpret this agreement

Chapter 1 Safety and Cautions

1.1 Safety and Cautions Definition

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. Our company will assume no ability and responsibility for any injury or loss caused by improper operation.

⚡ Danger

Operations which are not performed comply with the requirements may cause severe hurt or even death.

⚠ Note

Operations which are not performed comply with requirements may cause personal injury or property damage.

1.2 Safety Cautions

Use Stage	Safety Grade	Precautions
Before Installation	⚡ Danger	✦ Do not install the equipment if you find water seepage, component missing or damage upon unpacking. ✦ Do not install the equipment if the packing list does not conform to the product you received.
	⚡ Danger	✦ Handle the equipment with care during transportation to prevent damage to the equipment. ✦ Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury. ✦ Do not touch the components with your hands. Failure to comply will result in static electricity damage.
During Installation	⚡ Danger	✦ Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failures to comply may result in a fire. ✦ Do not loosen the fixed screws of the components, especially the screws withe red marks.
	⚠ Note	✦ Do not drop wire end or screw into the AC drive. Failure it will result in damage to the AC drive. ✦ Install the AC drive in places free of vibration and direct sunlight. ✦ When two AC drives are laid in the same cabinet ,arrange the installation positions properly to ensure the cooling effect.

Use Stage	Safety Grade	Precautions
At wiring	⚠ **Danger**	✦ A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result a fire. ✦ Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. ✦ Never connect the power cables to the output terminals(U,V,W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply may result in damage to the AC drive. ✦ Ensure that the main cable line comply with the standard, the line meets the EMC requirements and the area safety standard. Failure to comply may result in risk or accident. ✦ Never connect the power cables the braking resistor between the DC bus terminals P+, P-. Failure to comply may result in a fire.
At wiring	⚠ **Danger**	✦ Use a shielded cable for the encoder, and ensure that the shielding layer is reliably grounded.
Before Power-on	⚠ **Danger**	✦ Please confirm the peripheral equipment and cable converter is configured in this manual of the recommended model, all the configuration line in accordance with the connection method of the manual provides the correct wiring. Failure to comply will result in accidents. ✦ Check that the voltage class of the power supply is consistent with the rated voltage class of the AC drive.
After Power-on	⚠ **Danger**	✦ Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock. ✦ Do not touch the operation of AC drive during the hands is wet. Failure to comply will result in accident. ✦ Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock. ✦ Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive. ✦ Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accident.
During Operation	⚠ **Danger**	✦ Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive. ✦ Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt.

Use Stage	Safety Grade	Precautions
During Operation	⚡ **Danger**	✦ Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive. ✦ Do not start or stop the AC drive by turning the contactor ON/OFF. Failure to comply will result in damage to the AC drive.
After Power-on	⚡ **Danger**	✦ Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock. ✦ Ensure that the AC drive is disconnected from all power suppliers before staring repair or maintenance on the AC drive. ✦ Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive.
After Power-on	⚡ **Danger**	✦ Set and check the parameters again after the AC drive is replaced.

1.3 Cautions

1.3.1 Requirement on Residual Current Device(RCD)

The AC drive generates high leakage current during running, which flows earthing (PE) conductor. Thus install a type-B RCD at the transient and steady-state leakage current to ground that may be generated at startup and during running of the AC drive. You can select a specialized RCD with the function of suppressing high harmonics or general-purpose RCD with relatively large residual current.

1.3.2 Motor Insulation Test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the AC drive during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.
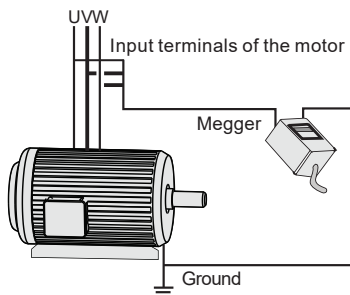
1.3.8 Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the power supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive.

When a contactor is installed between the output side of the AC drive and the motor,do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.
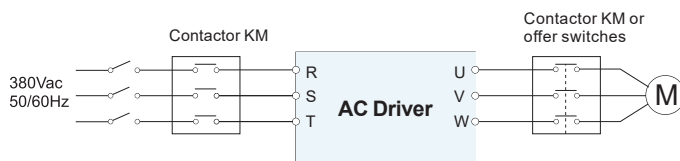
Do not start/stop the AC drive by switching the contactor on/off. If the AC drive has to be operated by the contactor, ensure that the tiome interval is at least one hour.

Turn on /off the contactor when the AC drive has no output. Otherwise,modifies inside the AC drive may be damaged.

1.3.9 The Use Occasion of the External Voltage Out of Rated Voltage Rage

The AC drive must not be used outside the allowable voltage range specified in this manual. Otherwise, the AC drive's components may be damaged. If required, use a corresponding voltage step[-up or step-down device.

1.3.10 The Above Derating of the Default

Different power grade frequency converter has its default carrier frequency, when to run at a higher carrier frequency, the AC Drive must to reduce the amount when running.

1.3.11 Change Three Phase Input into Two Phase Input

It is not allowed to change the three phase AC drive into two phase one . Otherwise , it may cause it may cause fault or damage the AC drive.

1.3.12 The Protection of the Lighting Impulse

Although the AC drive has equipped with lightning overvoltage, overcurrent device, which has a certain protection function for the induction lightning. For the lightning prone areas, the user is necessary to install lightning protection device at the front of the AC drive, which will benefit to the service life of the transducer.

1.3.13 Ambient Temperature and De-rating

The normal use of the frequency converter ambient temperature is -10℃~40℃. Temperature exceeds 40℃, the equipment need to reduce the amount of use. The ambient temperature of each increase is reduced by 1.5%, the maximum use of the ambient temperature is 50℃.

1.3.14 Altitude and Derating

In places where the altitude is above 1000m and the cooling effect reduces due to thin airit is necessary to de-rate the AC drive. Contact Our company for technical support.

1.3.15 Some Special Usages

If writing that is not described in this manual, such as common DC bus is applied, contact the agent or Our company for technical support.

1.3.16 The Cautious of the AC drive Disposal

The electrolytic capacitors on the main circuits and PCB may explore when they are burnt. Poisonous gas is generated when the plastic parts are burn. Treat them as ordinary industrial refer to relevant national laws and regulations.

1.3.17 Adaptable Motor

1. The standard parameters of the adaptable motor is adaptable four-squirrel-cage asynchronous induction motor or PMSM. For other types of motor, select a proper AC drive according to the rated motor current.

2. The cooling fan and rotor shaft of general AC Drive are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace.

3. The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.

4. The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.

1.3.3 Thermal Protection of Motor

If the selected AC drive does not match the rated capacity of the motor , especially when the rated power of the AC drive is higher than that of the motor, adjust the parameters for motor protection in the AC drive or to install thermal relay to protect the motor .

1.3.4 Running Below and Above Rated Frequency

The AC drive provides frequency output of 0 to 500.00Hz. When the users use the frequency converter for a long time, please pay attention to the motor cooling or use of variable frequency motor. If the AC drive is required to run at over 50Hz, consider the capacity of the machine.

1.3.5 Vibration of mechanical device

The AC drive may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency. If the operating frequency of the customer coincide with the resonant frequency please modify the operating frequency or change the inherent resonance frequency of the mechanical system.

1.3.6 Motor heat and noise

The output of the AC drive is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those when the AC drive runs at power frequency (50 Hz).

1.3.7 Voltage-sensitive device or capacitor on output side of the AC drive

Do not install the capacitor for improving power factor or lightning protection voltage sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even bedamaged.
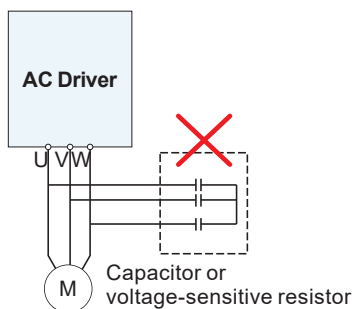
⚡ **DANGER**
◆ Only trained and qualified professionals should perform the work that described in this chapter. Please follow the instructions in "Safety Precautions", ignoring these safety precautions may result in personal injury or damage to equipment.   ◆ During the installation process, it must be ensured that the power supply of the inverter has been disconnected. If the inverter has been powered on, after the power is turned off, and the waiting time is not shorter than the time marked on the inverter, and confirm that the CHARGE light is off, it is recommended that the user directly use a multimeter to monitor that the DC bus voltage of the inverter below 36V.   ◆ The installation design of the inverter must comply with the relevant laws and regulations of the installation site. If the installation of the inverter violates the requirements of local laws and regulations, our company does not assume any responsibility. In addition, if the user does not follow these recommendations, the VFD may experience some failures that are not covered by the warranty or quality assurance.

2.1 Naming Rules

$$\underset{\textbf{1}}{\underline{KM20}} - \underset{\textbf{2}}{\underline{4T}} - \underset{\textbf{3}}{\underline{2.2}} \underset{\textbf{4}}{G} \underset{\textbf{5}}{C}$$

Field	Mark	Explanation	Content
Ac drive series	❶	Ac drive series	KM20 series
Voltage Level	❷	Voltage Level	2S:single-phase 220V 4T:Three-phase 380V
Adaptive Power	❸	Adaptive Power	0.7kW~5.5kW
Function Type	❹	Function Type	G:General P:Fan pump
Braking Unit	❺	Braking Unit	Null:None C:with braking unit

Figure 2-1 Name Designation Rules

2.2 Nameplate

MODEL ： KM20-4T-2.2GC — Model of the AC drive

INPUT ： AC3PH 380V 50/60Hz 13.9A — Rated input voltage, frequency and current

OUTPUT ： AC3PH 380V 0~500Hz 13A — Rated output voltage, frequency and current

— Bar code

S/N： FDLAGCA0A055
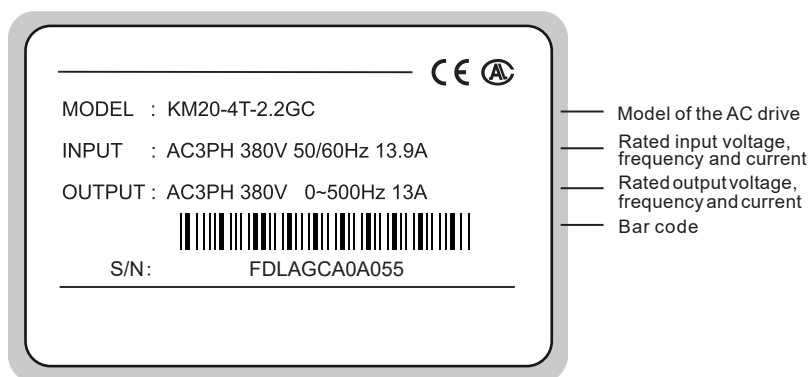
Figure 2-2 Name Designation Rules

2.3 Basic Technical Specifications

	Item	Specification	
Power Input	Input Voltage	AC,1PH,220V(-15%) ~ 240V(+10%)	
		AC,3PH,380V(-15%) ~ 440V(+10%)	
	Rated Frequencya	50Hz	
	Frequency Range	±5% (47.5 ~ 63Hz)	
Power Output	Output Voltage	0 ~ input voltage	
	Output Frequency	0.1Hz ~ 500.0Hz	
	Output Power	Please refer to "rated value"	
	Output Current	Please refer to "rated value"	
Basic Function	Max. Frequency	0 ~ 500Hz	
	Carrier Frequency	0.8kHz ~ 8.0kHz；the carrier frequency can be automatically adjusted according to the load characteristics	
	Input Frequency Resolution	Digital setting：0.01Hz	Analog setting: max, frequency × 0.025%
	Control Mode	V/F open loop speed control	Open Loop Vector Control (SVC)
	Starting Torque	0.5Hz/150%(SVC)	
	Speed Range	1: 100(SVC)	
	Steady Speed Accuracy	±0.5%(SVC)	
	Overload Capacity	150% rated current 60s; 170% rated current 12s; 190% rated current 1.5s.	
	Torque	Automatic torque boost	Manual torque increase 0.1%~30. 0%
	V/F Curve	Linear type	Multipoint type	N th-power V/F	V/F separation
	Acce. and Dec. Curve	Linear or S-curve acceleration and deceleration methods. Four groups of switchable acceleration and deceleration time, acceleration and deceleration time range: 0.0 ~ 6500.0s	
	DC Braking	DC braking frequency: 0.00Hz~max. frequency Braking time：0. 0~1000. 0s Braking action current value：0. 0~100. 0%	
	Jog Control	Jog frequency range: 0.00Hz~Max. frequency: Jog frequency acc. and dec. time: 0.0~6500.0s	
	Simple PLC, multi-speed	Through the built-in PLC or control terminals to achieve up to 16-speed operation	
	Buit-in PID	It can easily realize the closed-loop PID control of the process control system	
	Automatic voltage adjustment（AVR）	When the grid voltage changes, it can automatically keep the output voltage constant	
	Overvoltage and overcurrent Stall Control	Automatically limit the output current and bus voltage of the AC Drive during operation to prevent frequent overcurrent and overvoltage tripping	
	Fast Current Limiting	Mini. overcurrent faults and protect the normal operation of the AC Drive	
	Torque Limiting and Control	During operation, the torque is automatically limited to prevent frequent overcurrent; the vector control mode can realize torque control.	
	Brake Unit	0.75~5.5KW standard built-in braking unit	
Special Function	Non stop function	Load feedback energy compensates the voltage reduction so that the AC drive can continue to run in a short time in case of power interruption.	
	Rapid current limit	Rapid software and hardware current limiting technology helps to avoid frequent over-current fault.	
	Bus Support	One Modbus communication,	

	Item	Specification
Running	Command Source	Given the control panel, control terminal, serial communication port given. It can be switched by a variety of ways.
	Frequency Source	Given the control panel, control terminal, serial communication port given. It can be switched by a variety of ways.
	Auxiliary Frequency source	8 auxiliary frequency source. Flexible implementation of auxiliary frequency tuning, frequency synthesis.
	Input Terminal	Standard: . 4 digital input terminals, one of which support to 100kHz high-speed pulse input . 1 analog input terminals, which supports 0V~10V voltage input or 0 ~ 20mAcurrent input
	Output Terminal	Standard: . 1 high-speed pulse output terminal (optional open collector type), support of 0 ~ 60kHz square wave signal output . 1 digital output terminal . 1 analog output terminals, support 0~20mA current output or 0~10V voltage output
Display and Operation	LED Display	Display each parameter of function code group
	The Key Lock and Function Selection	Achieve some or all of the keys locked and define the scope of partial keys to prevent misuse.
	Protection Function	Powered motor short circuit test; Input/output phase failure protection; Over current protection; Over voltage protection; Under voltage protection; Over heat protection ; Overload protection;
Environment	Application environment	In-door, free from direct sunlight, dust, corrosive gas, combustible ga , oil mist, steam , water drop and salt .
	Altitude	Lower than 1000m (1000m-3000m for derated use)
	Ambient temperature	-10°C ~ $+40^{\circ}$C(derated use in the ambient temperature of 40°C to 50°C)
	Humidity	Less than 95%RH, without condensation
	Vibration	Less than 5.9m/s(0.6g)
	Storage temperature	-20°C ~ $+60^{\circ}$C

2.4 Series of AC drive

Model	Power Capacity (KVA)	Input Current (A)	Output Current (A)	Adaptable Motor (KW)	Recommended input side main circuit wire (mm^2)	Recommended output side main circuit wire (mm^2)
Single-phase 220V Range:-15%~20%						
KM20-2S-0.7GC	1.5	8.2	4.0	0.7	2.5	2.5
KM20-2S-1.5GC	3.0	14.0	7.0	1.5	4.0	2.5
KM20-2S-2.2GC	4.0	23.0	9.6	2.2	6.0	4.0
Three-phase 380V Range:-15%~20%						
KM20-4T-0.7GC	1.5	3.4	2.1	0.7	2.5	2.5
KM20-4T-1.5GC	3.0	5.0	3.8	1.5	2.5	2.5
KM20-4T-2.2GC	4.0	5.8	5.1	2.2	2.5	2.5
KM20-4T-4.0GC	5.9	10.5	9.0	4.0	4.0	4.0
KM20-4T-5.5GC	11	13.9	13	5.5	4.0	4.0

2.5 Selection of Reference

When the AC drive is driven by the control device requiring rapid braking, the braking unit needs to release the power of the motor braking feedback to the DC bus. 400V voltage level 0.75~5.5KW is equipped with built-in braking unit, if you need to rapid stop, please refer to the appropriate braking to select the unit and braking resistance, AC drive capacity, if need to stop, it can be directly connected to the braking resistance.

AC Drive Capacity(KW)	Braking Unit		Braking Resistor		
	Specification	Quantity(pcs)	Resistance	Power	Quantity(pcs)
0.7	Built-in as standard	1	300Ω	150W	1
1.5		1	220Ω	150W	1
2.2		1	200Ω	250W	1
4.5		1	130Ω	300W	1
5.5		1	90Ω	400W	1

2.6 Product Outline, Installation Hole Size
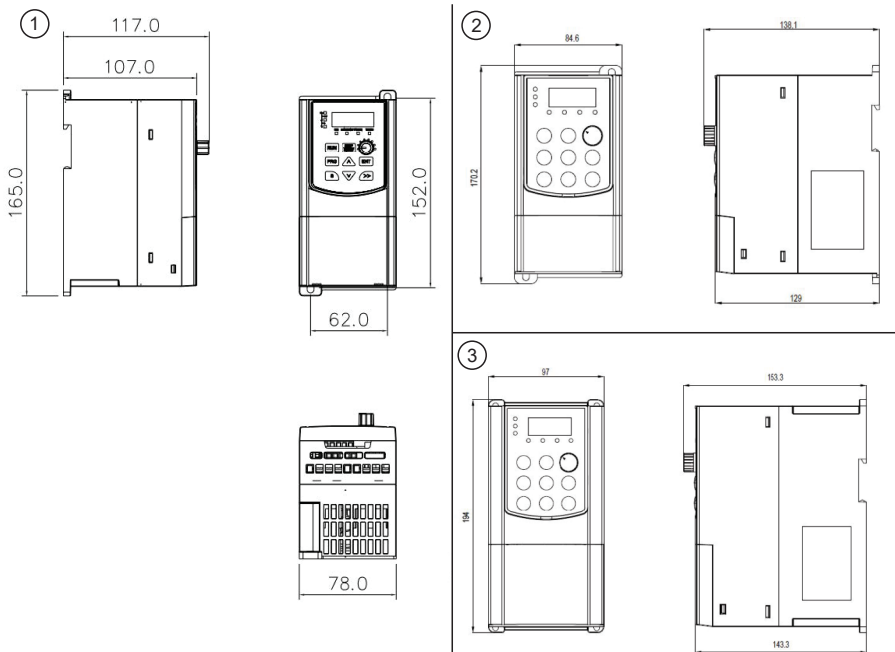
① KM20-2S-0.7G/2S-1.5G structure diagram and dimension

② KM20-2S-2.2G/4T-0.7/1.5/2.2G structure diagram and dimension

③ KM20-4T-4.0G/5.5G structure diagram and dimension

Model	Inverter			Installation			GW(kg)
	H(mm)	W(mm)	D(mm)	H1(mm)	W1(mm)	Diameter (mm)	
KM20-2S-0.7GC	165	78	117	152	62	Ø5.5	0.7
KM20-2S-1.5GC							
KM20-2S-2.2GC	170.2	84.6	138.1	157.5	67.3	Ø5	1
KM20-4T-0.7GC							
KM20-4T-1.5GC							
KM20-4T-2.2GC							
KM20-4T-4.0GC	194	97	153. 3	184	85	Ø4	1. 5
KM20-4T-5.5GC							

2.7 Dimensions of the keypad outline

This section gives the dimension drawing of the
inverter keyboard, the unit of dimension drawing is mm
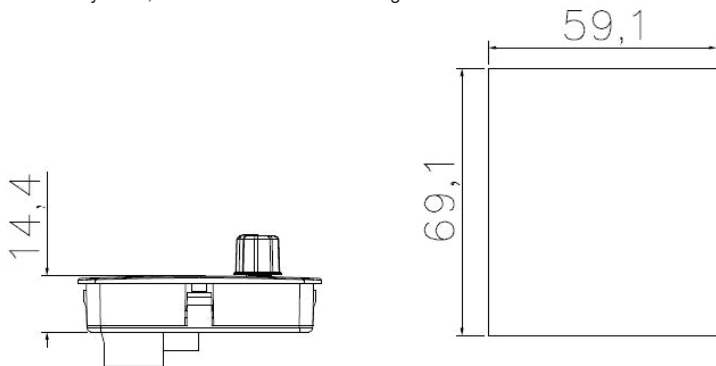
Dimensions of cabinet holes $(T=1.2)$
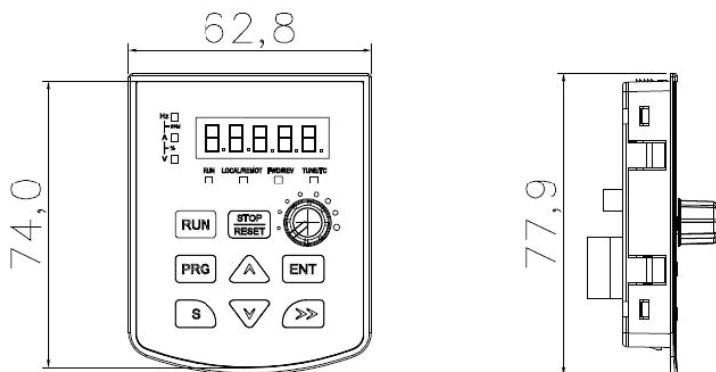
KM20-2S-0.7G/2S-1.5G
Dimensional drawing of keypad structure

1. Button   2. LED indicator

3. Knob   4. Install the clip

2.7.1 Dimensions of the keypad outline

This section gives the dimension drawing of the
inverter keyboard, the unit of dimension drawing is mm
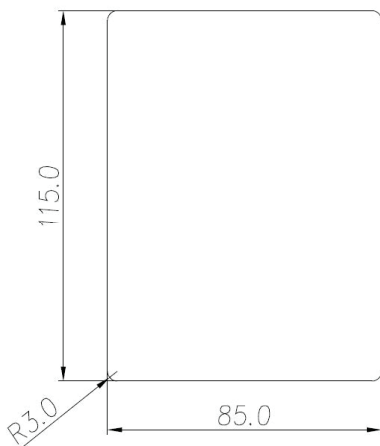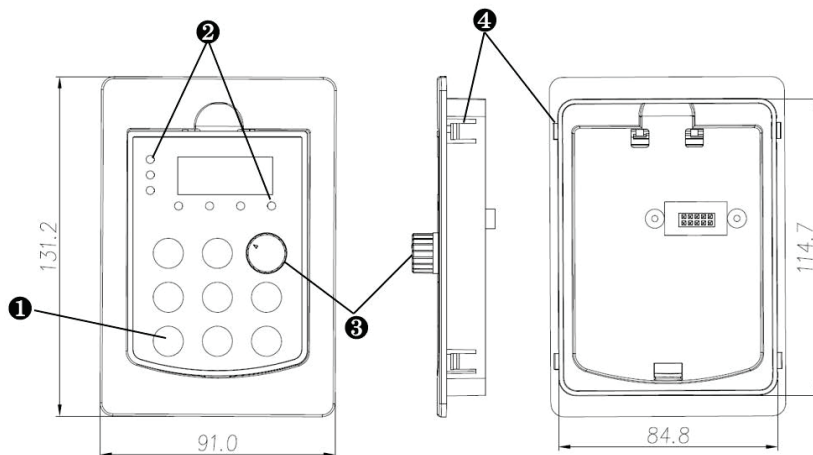
1. Button   2. LED indicator

3. Knob   4. Install the clip

KM20-2S-2.2G/4T-0.7/1.5/2.2G/4.0G/5.5G Dimensional of keypad structure

2.8 Control Circuit Wiring Diagram

KM20-2S-0.7G/2S-1.5G

Braking resistor (self-configured)

3 phase 380V input
1 phase 220V input
The power 50/60 Hz

MCCB

(+)   PB

R/L1/L   R
S/L2/N   S
T/L3   T
           PE

Main Circuit

U
V
W
PE⏚

M

Digital input:
Frequence:0~20kHz

Control circuit

Digital input 1   DI1
Digital input 2   DI2
Digital input 3   DI3
Digital input 4   DI4

GND

DO   Digital output
GND   0~24V/0~40mA

Analog input：
0~10V
0~20mA
3kΩ~5kΩ

AO1   Function analog output
            0V-10V:
            Resistance >
GND   10KΩ 0mA-20mA:
            Resistance
            200Ω~500Ω

+10V

485+
485-   485
GND   COMMUNICATION
            INTERFACE

AI1

GND

RC
RB   Relay output
RA

24V power supply   +24V
                    GND

2.8.1 Control Circuit Wiring Diagram

KM20-2S-2.2G/4T-0.7/1.5/2.2G/4.0G/5.5G
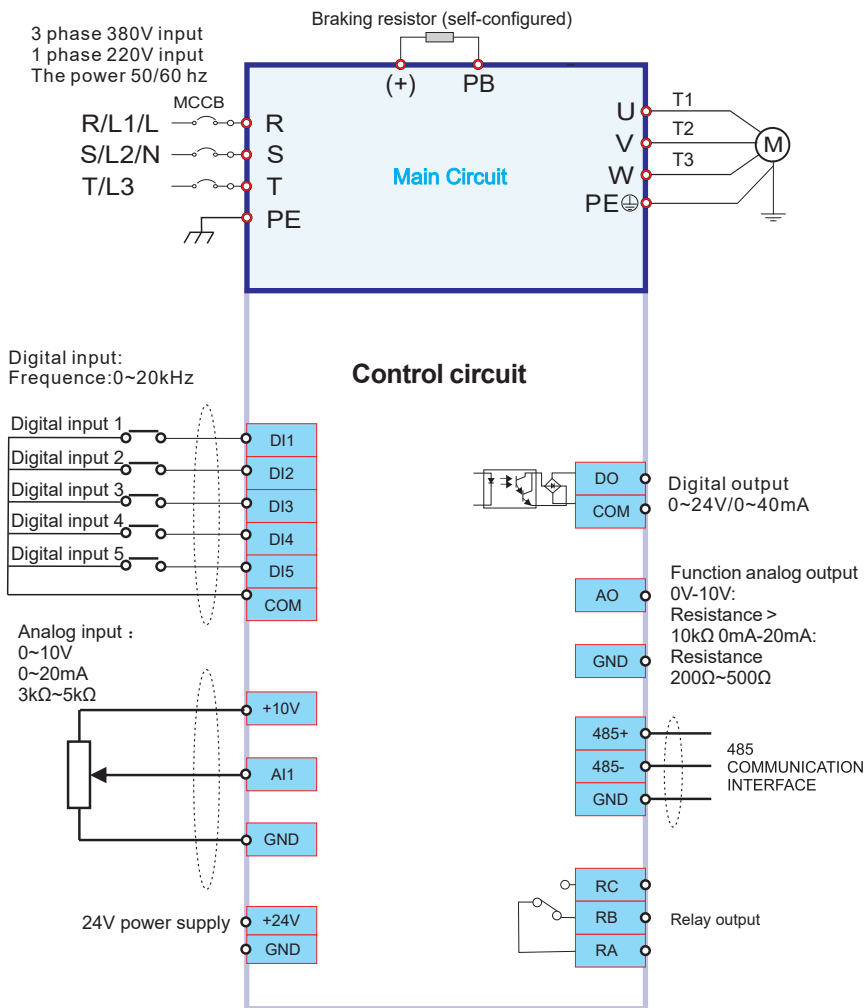
Note:

1. DC reactor, braking unit and braking resistor are optional accessories".

2. P1 and(+) are short circuited in factory, if need to connect with the DC reactor, please remove the contact tag between P1 and (+).

3. Do not install capacitor or surge suppressor on the output side of the AC drive. Otherwise, it may cause faults to the AC drive or damage to the capacitor and surge suppressor;

4. Input/output (main circuit) of the AC drive include harmonic components, which may interfere with the AC drive attachment communications equipment. Therefore, install an anti-aliasing filter to minimize the interference;

2.9 Control Panel Terminal Instructions

KM20-2S-0.7G/2S-1.5G   KM20-2S-2.2G/4T-0.7/1.5/2.2G/4.0G/5.5G
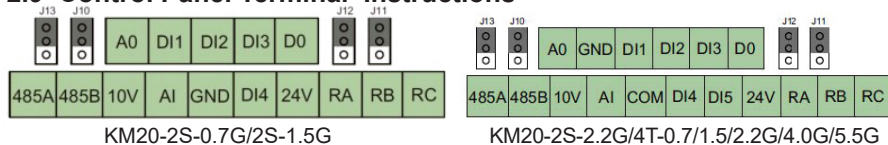
Control circuit terminal

Type	Terminal	Terminal Name	Specification
RS485	485A	485 differential signal +	Baudrate1200/2400/4800/9600/19200/38400
	485B	485 differential signal -	Use twisted pair or shielded wire, the longest distance is 300 meters
Analog input	AI1	Analog Input 1	0~20mA: Input resistance 500Ω, max input current is 25mA 0~10V: Input resistance 100KΩ, max input voltage 12.5V The switch between 0~20mA and 0~10V analog is realized through the J13 jumper, and the factory default is voltage input.
Analog output	AO1	Analog Input 1	0~20mA:Input resistance 200Ω~500Ω 0~10V: Input resistance >10KΩ The switch between 0~20mA and 0~10V analog output is realized through the J10 jumper, and the factory default voltage output.
Digital input	DI1	Digital input terminal 1	Ordinary digital input
	DI2	Digital input terminal 2	Ordinary digital input
	DI3	Digital input terminal 3	Ordinary digital input
	DI4	Digital input terminal 4	Ordinary digital input/High frequency pulse input (2S-0.7/2S-1.5)
	DI4	Digital input terminal 4	Ordinary digital input(Except 2S-0.7/2S-1.5)
	DI5	Digital input terminal 5	Ordinary digital input/High frequency pulse input (Except 2S-0.7/2S-1.5)
Digital output	DO	Digital output terminal 1	Open collector output：High-speed pulse output （0.0~20.0kHz）
Power Supply	10V	□10V power supply	Provide 10V power supply, can be used as the reference voltage of AI
	GND	□10V power supply ground	10V power supply ground
	+24V	power supply	Provide +24V power supply externally Maximum output current: 200mA
	COM	Digital input common end	The interior is isolated from GND(Except 2S-0.7/2S-1.5)
Relay output	RA/RB	Relay output	often OFF terminal
	RA/RC		often ON terminal

Switching Dial Code Switch Function Description

Terminals	Name	Jumpers Figure	Function	Factory Setting
J13	AI1		1--2: voltage output (0 10V) 2--3: current output (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 pattern wiring method 2-3：leakage pattern wiring method	Source pattern
J11	CME		Photocoupler 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 GND. By default, it is internally connected through J11. When DO wants to be driven by an external power supply, J11 must be disconnected.	Connect GND

2.9.1 Analog input terminal：

Weak analog voltage signals are easy to suffer external interference, and therefore the shielded cable must be used and the cable length must be less than 20 m, as shown in following figure2-1.In applications where the analog signal suffers severe interference, install filter capacitor or ferrite magnetic core at the analog signal source, as shown in the following figure 2-2
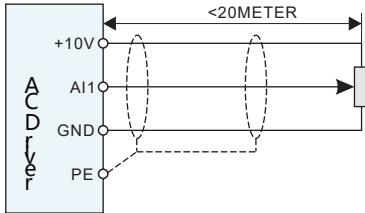
Figure2-1 Analog input and output terminal wiring diagram
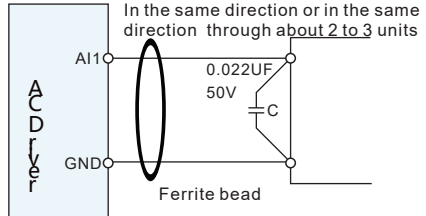
Figure2-2 Analog input terminal process wiring diagram

2.9.2 Digital Input Terminals：

Generally, select shielded cable no longer than 20 m. When active driving is adopted,necessary filtering measures shall be taken to prevent the interference to the power supply. It is recommended to use the contact control mode
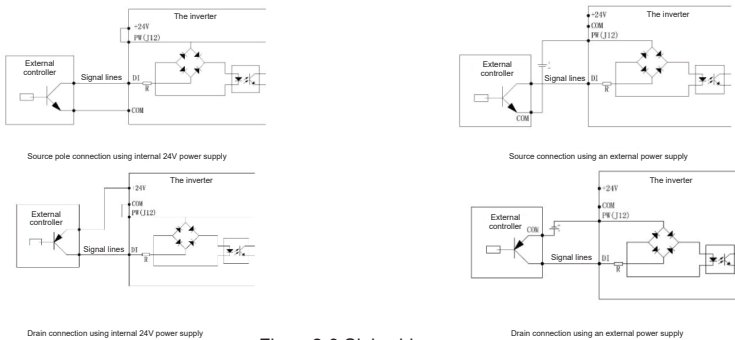
Figure2-3 Sink wiring

2.9.3 Digital Output Terminals：

When the digital output terminal needs to drive the relay, an absorption diode shall be installed between two sides of the relay coil. Otherwise, it may cause damage to the 24 VDC power supply. The driving capacity is not more than 50 mA.
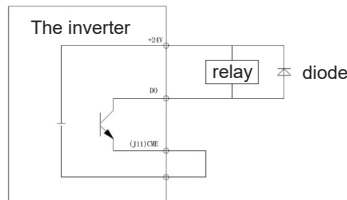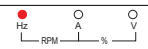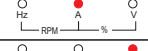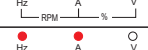
Figure 2-4 DO Terminal Wiring diagram

Chapter 3   Operation And Display

3.1 Introduction of the keypad

The keypad is used to control the AC drive, read the state data and adjust parameters.
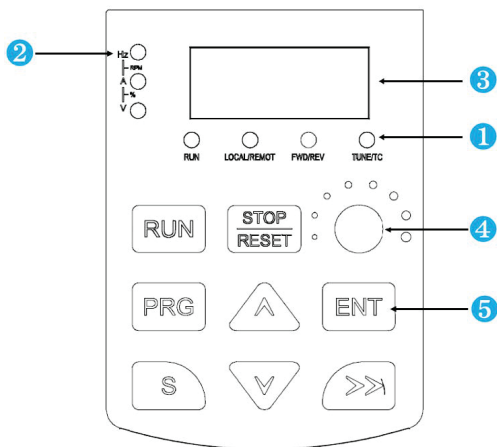
No.	Name	Instructions		
❶	Status indicator	RUN/TUNE	OFF	The AC drive is in the stopping state;
			ON	The AC drive is in the running state.
		FWD/REV	OFF	The AC drive is in the forward rotation state
			ON	The AC drive is in the reverse rotation state.
		LOCAL/REMOTE	OFF	The AC drive is running from reverse to forward
			ON	Terminals control
			Flash	Communication control
		TUNE/TC	ON	Torque control mode
			Flash quickly	The AC drive is in the fault state
			Flash slowly	The AC drive is in the parameter autotuning state;
❷	Unit indicator	It represents the current display of the Keypad		
			Hz	Frequency unit
			A	Current unit
			V	Voltage unit
			RPM	Speed unit
			%	Percentage

No.	Name	Instructions
③	Code Display Zone	5-figure LED display displays various monitoring data and alarm code such as set frequency and output frequency <table><tr><th>Display letter</th><th>Correspo-nding letter</th><th>Display letter</th><th>Correspo-nding letter</th><th>Display letter</th><th>Correspo-nding letter</th></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>2</td><td>2</td></tr><tr><td>3</td><td>3</td><td>4</td><td>4</td><td>5</td><td>5</td></tr><tr><td>6</td><td>6</td><td>7</td><td>7</td><td>8</td><td>8</td></tr><tr><td>9</td><td>9</td><td>A</td><td>A</td><td>b</td><td>b</td></tr><tr><td>C</td><td>C</td><td>d</td><td>d</td><td>E</td><td>E</td></tr><tr><td>F</td><td>F</td><td>H</td><td>H</td><td>I</td><td>I</td></tr><tr><td>L</td><td>L</td><td>N</td><td>N</td><td>n</td><td>n</td></tr><tr><td>o</td><td>o</td><td>P</td><td>P</td><td>r</td><td>r</td></tr><tr><td>S</td><td>S</td><td>t</td><td>t</td><td>U</td><td>U</td></tr><tr><td>v</td><td>v</td><td>.</td><td>.</td><td>-</td><td>—</td></tr></table>
④	Digital potent iomete	When the frequency source X or Y is set to 1, the setting of the frequency source is determined by the analog potentiometer input voltage . The maximum output voltage corresponding to the maximum frequency, minimum voltage corresponding to 0 Hz
⑤	Keypad button zone	**PRG** — Program key — Enter or escape from the first level menu and remove the parameter quickly **ENTER** — Entry key — Enter the menu step-by-step confirm parameters **∧** — Up key — Increase data or function code progressively **∨** — Down key — Decrease data or function code progressively **>>** — Right-Shift key — Move right to select the displaying parameter circularly in stopping and running mode. Select the parameter modifying digit during the para meter modification **RUN** — Run key — The key is used to operate on the AC drive in key operation mode **STOP RESET** — Stop/Reset — This key is used to stop in running state; This key is used to reset all control modes in the fault alarm state.. **S** — S Key — Corresponding to F10.00

3.2 Display of Keypad

Operate the AC drive via operations panel. See the detailed structure description of function code in the brief diagram of function codes.
The AC drive has three-level menus, they are:

1.Group number of function code(first-level menu))

2.Tab of function code(second-level menu)

3.Set value of function code(third-level menu)

Operation procedure on the operation panel:
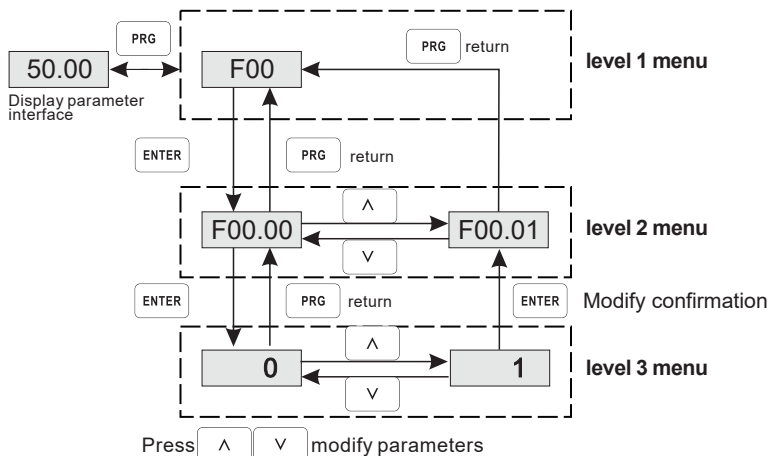
Note:
Press both the "PRG" and the "ENT" key to return to level2 menu from the level3 menu. The difference is: pressing "ENT" will save the set parameters into the control panel, and then return to the level2 menu with shifting to the next function code automatically; while pressing "PRG" will directly return to the level 2 menu without saving the parameters, and keep staying at the current function code.

In Level 3 menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:
a. Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter;
b. Such a function code cannot be modified in the running state and can only be changed to stop.
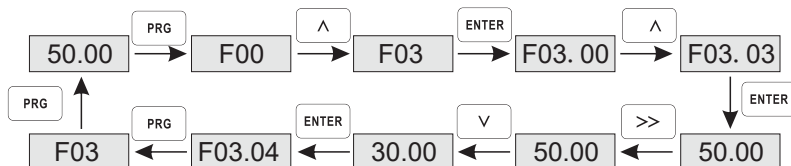
The function parameters of the AC drive have been divided according to the function.
Each function group contains certain function codes applying3-level menus.
1. Below is the instruction of the function lists:
The first line "Function code":codes of function parameter group and parameters;
The second line "Name":full name of function parameters;
The third line "Setting range":effective setting value of the function parameters;
The fourth line "Default value":the original factory values of the function parameter;
The fifth line"Modify":the modifying character of function codes(the parameters can be modified or not and the modifying conditions), below is the instruction:

"○": means the set value of the parameter can be modified on stop and running state;
"X": means the set value of the parameter can not be modified on the running state;
"*": means the value of the parameter is the real detection value which can not be modified.
The sixth line "Address": The address of the function parameter in the communication.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
Group F00 : System Function Group					
F00.00	Motor selection	0: Motor 1. Reserve	0	X	0x000
F00.01	Motor control technique	Ones: motor 1control parameter 0: V/F control 1: SVC control 2. Reserve Tens: reserved	00	X	0x001
F00.02	Type of drive	0: Type G (applicable to constant-torque load) 1: Type P (applicable to light-duty load)	0	X	0x002
F00.03	Reserved	-	-	*	-
F00.04	Reserved	-	-	*	-
F00.05	Reserved	-	-	*	-
F00.06	Parameters protection	0: All parameter programming allowed 1: Only this parameter programming allowed	0	○	0x006
F00.07	Software version	XXXXX	Model de-pendent	*	0x007
F00.08	User's password	0: No password Other: Password protection	0	○	0x008
F00.09	Supplier's password	XXXXX	0	○	0x009
F00.10	Parameter restoration	0: No operation 1: Restore all parameters to factory default (excluding motor parameters) 2: Clear fault record 3: Restore all parameters to factory default (including motor parameters)	0	X	0x00A

Function code	Name	Setup range	Default Value	Modification	Add.
Group F01 : Basic Function Group					
F01.00	X frequency command	0: Keypad digital setting 1: Keypad potentiometer setting 2: Analog AI1 setting 3: Reserve 4: Reserve 5: High-speed pulse DI5 setting 6: Multi-step Freq running setting 7: Simple PLC setting 8: PID control setting 9: Communication setting	1	X	0x100
F01.01	Y frequency command		3	X	0x101
F01.02	Y frequency command reference	0: MAX. output frequency(F01.07) 1: X frequency command	0	○	0x102
F01.03	Y frequency range	0.0~100.0%	100.0%	○	0x103
F01.04	Combination of the setting codes	Ones: Frequency reference selection 0: X 1: X and Y calculation (based on tens position) 2: Switchover between X and Y 3: Switchover between X and "X&Y calculation" 4: Switchover between Y and "X&Y calculation" Tens: X and Y calculation formula 0: X + Y 1: X - Y 2: Max. (X, Y) 3: Min. (X, Y)	00	○	0x104
F01.05	Digital setting UP, DOWN preset frequency	0.00Hz to Max frequency	50.00Hz	○	0x105
F01.06	Retentive of digital setting frequency	Ones: Retentive selection of digital setting frequency upon stop 0: Not retentive 1: Retentive Tens: Retentive selection of digital setting frequency upon power-off 0: Not retentive 1: Retentive	11	○	0x106

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.07	Max. output frequency	50.00Hz~500.00Hz	50.00Hz	×	0x107
F01.08	Upper limit frequency source selection	0: F01.09 1: Ai1 2: Reserve 3: Reserve 4: Pluse	0	○	0x108
F01.09	Lower limit frequency~Max. frequency	F01.10~F01.07(Max. frequency)	50.00Hz	○	0x109
F01.10	0.00Hz~upper limit frequency	0.00Hz~F01.09 (Upper limit frequency)	0.05Hz	○	0x10A
F01.11	0.00Hz~Max. frequency	0.00Hz~F01.07(Max. frequency)	5.00Hz	○	0x10B
F01.12	Jog selection in running state	0:allowed 1:prohibited	0	○	0x10C
F01.13	Action if running frequency<lower limit frequency	0: Operating frequency lower limit 1: Zero speed operation 2: Stop	0	○	0x10D
F01.14	Reserved				
F01. 15	Hopping frequency1	0.00Hz-Maximum frequency	0.00Hz	○	0x10F
F01. 16	Jump frequency 1 range	0.00Hz-Maximum frequency	0.00Hz	○	0x110
F01. 17	Hopping frequency2	0.00Hz-Maximum frequency	0.00Hz	○	0x111
F01. 18	Jump frequency 2 range	0.00Hz-Maximum frequency	0.00Hz	○	0x112

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
		Group F02 : Startup and stop control			

F02.00	Run command channel	0: Keypad run command channel
		1: Terminal command channel
		   (Keypad STOP disabled)
		2: Terminal command channel
		   (Keypad STOP enable)
		3:Communication command
		   (Keypad STOP disabled)
		4:Communication command
		   (Keypad STOP enabled)
			0	○	0x200

F02.01	Binding command source to frequency source	Ones: Binding keyboard command to frequency source 0: No function 1: Keypad digital setting 2: Keypad potentiometer setting 3: Analog AI1 setting 4: Reserve 5: Reserve 6: High-speed pulse DI5 setting 7: Multi-speed running setting 8: Simple PLC program setting 9: PID control setting A: Communication setting Tens: Binding terminal command to frequency source 0–9, same as Ones Hundreds: Binding communication command to frequency source 0–9, same as Ones	000	○	0x201
F02-02	Rotation direction	0: Same direction 1: Reverse direction	0	○	0x202
F02.03	Start-up mode	0: Start-up directly 1: Start-up after Speed tracking 2: Start-up after DC braking/Pre excitation	0	○	0x203
F02.04	Starting frequency of direct start	0.00~10.00Hz	0.00Hz	×	0x204
F02.05	Retention time of the starting frequency	0.0~100.0s	0.0s	×	0x205

Function code	Name	Setup range	Default Value	Modification	Add.
F02.06	DC injection braking level/ Pre excitation level	0.0~100.0%	50.0%	×	0x206
F02.07	DC injection braking active time/ Pre-excitation active time	0.0~1000.0s	0.0s	×	0x207
F02.08	Reserved			*	—
F02.09	Stop Mode	0: Decelerate to stop 1: Coast to stop	0	○	0x209
F02.10	Starting frequency of DC braking	0.00~F01.07(Max. frequency)	0.00Hz	○	0x20A
F02.11	Waiting time of DC braking	0.0~1000.0s	0.0s	○	0x20B
F02.12	Stopping DC braking current	0.0~100.0%	50.0%	○	0x20C
F02.13	Stopping DC braking time	0.0~1000.0s	0.0s	○	0x20D
F02.14	Reverse disabled	0: Reverse enabled 1: Reverse disabled	0	○	0x20E
F02.15	Dead time of FWD/REV rotation	0.0~3000.0s	0.0s	○	0x20F
F02.16	The protection of the electric terminals	0: Invalid operation command on terminal 1: valid operation command on terminal	0	○	0x210
F02.17~ F02.18	Reserved				—
F02.19	Energy braking seclection	0: Disable 1: Enable	1	○	0x213
F02.20	Energy braking threshold voltage	single phase: 200.0V ~410.0V three phase: 600.0V~800.0V	Model dependent	○	0x214
F02.21	Brake use ratio	0.0%~100.0%	100.0%	○	0x215
F02.22	The coefficient of Magnetic flux braking	0~200	0.0%	○	0x216

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
		Group F03 : Acc/Dec Parameters			
F03.00	Acc-time 1	0.0~6500.0s	Model de-pendent	○	0x300
F03.01	Dec-time 1	0.0~6500.0s	Model de-pendent	○	0x301
F03.02	ACC time2	0.0~6500.0s	Model de-pendent	○	0x302
F03.03	DEC time2	0.0~6500.0s	Model de-pendent	○	0x303
F03.04	ACC time3	0.0~6500.0s	Model de-pendent	○	0x304
F03.05	DEC time3	0.0~6500.0s	Model de-pendent	○	0x305
F03.06	ACC time4	0.0~6500.0s	Model de-pendent	○	0x306
F03.07	DEC time4	0.0~6500.0s	Model de-pendent	○	0x307
F03.08	Jogging ACC time	0.0~6500.0s	20.0s	○	0x308
F03.09	Jogging DEC time	0.0~6500.0s	20.0s	○	0x309
F03.10	Switching frequency of ACC time 1, 2	0.00~F01.07(Max. frequency)	0.00Hz	○	0x30A
F03.11	Switching frequency of DEC time 1, 2	0.00~F01.07(Max. frequency)	0.00Hz	○	0x30B
F03.12	ACC/DEC selection	0: Linear type 1: S-curve type	0	×	0x30C
F03.13	S curve start ratio	0.0~(100.0~F03.14)%	30.0%	×	0x30D
F03.14	S curve end ratio	0.0~(100.0~F03.13)%	30.0%	×	0x30E

Function code	Name	Setup range	Default Value	Modification	Modification
Group F04 : V / F Control Group					
F04.00	Motor 1V / F curve setting	0: Straight line V/F curve 1: Multi-dots V/F curve 2: 2.0en power V/F curve 3: V/F separation	0	X	0x400
F04.01	V/F frequency 1 of motor 1	0.00Hz~F04.03	0.00Hz	X	0x401
F04.02	V/F Voltage 1 of motor 1	0.0%~100.0%(motor1 rated voltage)	0.0%	X	0x402
F04.03	V/F frequency 2 of motor 1	F04.01~F04.05	25.00Hz	X	0x403
F04.04	V/F Voltage 2 of motor 1	0.0%~100.0%(motor1 rated voltage)	50.0%	X	0x404
F04.05	V/F frequency 3 of motor 1	F04.03~F02.02 (motor1 rated frequency)	50.00Hz	X	0x405
F04.06	V/F Voltage 3 of motor 1	0.0%~100.0%(motor1 rated voltage)	100.0%	X	0x406
F04.07	Torque boost of motor 1	0.0%(automatic torque boost) 0.1%~30.0%(Manual torque boost)	Model dependent	○	0x407
F04.08	Frequency limit of torque boost of motor1	0.00~F01.07(Max. frequency)	10.00Hz	X	0x408
F04.09	V/F oscillation suppression gain of motor 1	0~100	Model dependent	○	0x409
F04.10~ F04.21	Reserved				—

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.22	Voltage setting on V/F separated pattern	0: Keypad digital setting(F04.23) 1: Keypad potentiometer setting 2: Analog AI1 setting 3: Reserve 4: Reserve 5: High-speed pulse DI5 setting 6: Multi-step Freq running setting 7: Simple PLC program setting 8: PID control setting 9: Communication setting	0	○	0x416
F04.23	Keypad setting voltage	0.0~Motor rated voltage	0.0v	○	0x417
F04.24	Voltage ACC time	0.0~1000.0s	0.0s	○	0x418
F04.25	Voltage DEC time	0.0~1000.0s	0.0s	○	0x419
F04.26	Automatic current limit action selection	0: Disable 1: Enable	1	X	0x41A
F04.27	Automatic current limit	50.0~200.0%	150%	X	0x41B
F04.28	Reserved				—
F04.29	Reserved				—
F04.30	Over-voltage stall protection	0: Invalid 1: Stall protection mode 1 2: Reserved	1	X	0x41E
F04.31	Voltage protection of over-voltage stall	Single phase vfd:160.0V~410.0V 3 phase vfd:200.0V~800.0V	Model de-pendent	X	0x41F

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
		Group F05 : Motor 1 Parameter Group			

F05.00	Motor 1 type	0: Ordinary asynchronous motor
		     (with low frequency compensation)
		1: AC drive motor
		     (without low frequency compensation)
			0	×	0x500

F05.01	Rated power of motor 1	0.1~1000.0kW	Model de-pendent	×	0x501
F05.02	Rated voltage of motor 1	0~1200V	Model de-pendent	×	0x502
F05.03	Rated current of motor 1	0.1~6000.0A	Model de-pendent	×	0x503
F05.04	Rated frequency of motor 1	0.01~F01.07(Max. frequency)	50.00Hz	×	0x504
F05.05	Rated speed of motor1	1~36000rpm	Model de-pendent	×	0x505
F05.06	Stator resistance of motor 1	0.001~65.535Ω	Model de-pendent	×	0x506
F05.07	rotor resistance of motor 1	0.001~65.535Ω	Model de-pendent	×	0x507
F05.08	leakage inductance of motor 1	0.01~655.35mH	Model de-pendent	×	0x508
F05.09	Mutual inductance of motor 1	0.01~655.35mH	Model de-pendent	×	0x509
F05.10	Non-load current of motor 1	0.1A~F05.03	Model de-pendent	×	0x50A
F05.16~ F05.25	Reserved				
F05.26	Motor 1 parameter autotuning	0: No operation 1: Rotation autotuning 2: Static autotuning	0	×	0x51A

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
Group F06: Motor 1 Vector Control Parameters					
F06.00	Speed loop proportional gain 1	1~100	30	○	0x600
F06.01	Speed loop integral time 1	0.01~10.000s	0.50s	○	0x601
F06.02	Low switching frequency	0.00Hz~F06.05	5.00Hz	○	0x602
F06.03	Speed loop proportional gain 2	1~100	20	○	0x603
F06.04	Speed loop integral time 2	0.01~10.00s	1.0s	○	0x604
F06.05	High switching frequency	F06.02~F01.07（Max. frequency）	10.00Hz	○	0x605
F06.06	ASR feedback input filtering time	0.000~0.100s	0.015s	○	0x606
F06.07	Current loop percentage coefficient KP1	0~60000	Model de-pendent	○	0x607
F06.08	Current loop integral coefficient KI1	0~60000	Model de-pendent	○	0x608
F06.09	Current loop percentage coefficient KP2	0~60000	Model de-pendent	○	0x609
F06.10	Current loop integral coefficient KI2	0~60000	Model de-pendent	○	0x60A
F06.11	Electric torque upper limit setting source selection	0: Keypad digital setting(F06.13) 1: Keypad potentiometer setting 2: Analog AI1 setting 3: Reserve 4: Reserve 5: High-speed pulse DI5 setting 6: Communication setting Note: Full range of values 1~6 corresponds to the digital setting of F06.13.	Model de-pendent	○	0x60B
F06.12	Braking torque upper limit setting source selection	0: Keypad digital setting(F06.14) 1: Keypad potentiometer setting 2: Analog AI1 setting 3: Reserve 4: Reserve 5: High-speed pulse DI5 setting 6: Communication setting Note: Full range of values 1~6 corresponds to the digital setting of F06.14.	Model de-pendent	○	0x60C

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.13	Keypad digital setting of electric torque	0.0~200.0%（Motor rated current）	150.0%	○	0x60D
F06.14	Keypad digital setting of braking torque	0.0~200.0%（Motor rated current）	150.0%	○	0x60E
F06.15	Torque limit coefficient influx weakening	50~200	100	○	0x60F
F06.16	Compensation coefficient of slip	50%~200%	100%	○	0x610

Function code	Name	Setup range	Default Value	Modification	Add.
		Group **F09**: Torque Control Parameters			
F09.00	Speed/Torque control selection	0: Speed control 1: Torque control	0	X	0x900
F09.01	Torque setting source in torque control	0: Keypad digital setting(F09.02) 1: Keypad potentiometer setting 2: Analog AI1 setting 3: Reserve 4: Reserve 5: High-speed pulse DI5 setting 6: Communication setting	0	○	0x901
F09.02	Torque digital setting in torque control	-200.0%~200.0%	150.0%	○	0x902
F09.03	ACC time in torque control	0.00~650.00s	0.00s	○	0x903
F09.04	DEC time in torque control	0.00~650.00s	0.00s	○	0x904
F09.05	Reserved				
F09.06	Torque control forward rotation upper limit frequency keyboard limit value	0.00Hz~Max. frequency	50.0Hz	○	0x906
F09.07	Reserved				
F09.08	Torque control reverse upper limit frequency keyboard limit value	0.00Hz~Max. frequency	50.0Hz	○	0x908
F09.09~ F09.11	Reserved				

Function code	Name	Setup range		Default Value	Modifi-cation	Add.
		Group F10: Keypad Operation and LED Display				
F10.00	The key of S function selection	0: No function 1: Forward jog 2: Reverse jog 3: Forward/reverse switchover 4: Run command sources shifted 5: Clear the date of exact stop		1	×	0x0A00
F10.01	Display parameter setting 1 on run status	0~65535 BIT0: Running frequency(Hz ON) BIT1: Setting frequency(Hz flash) BIT2: Bus voltage(V ON) BIT3: Output voltage(V ON) BIT4: Output current(A ON) BIT5: Motor speed(rpm ON) BIT6: Output power(% ON) BIT7: Output torque(% ON) BIT8: PID reference (% ON) BIT9: PID feedback(% ON) BIT10: Input terminal state BIT11: Output terminal state BIT12: AI1(V on) BIT13: Reserve BIT14: Reserve BIT15: Linear speed Note: If you want to display the above parameters, add the corresponding decimal to enter this parameter	$2^0=1$ $2^1=2$ $2^2=4$ $2^3=8$ $2^4=16$ $2^5=32$ $2^6=64$ $2^7=128$ $2^8=256$ $2^9=512$ $2^{10}=1024$ $2^{11}=2048$ $2^{12}=4096$ $2^{13}=8192$ $2^{14}=16384$ $2^{15}=32768$	53	○	0x0A01
F10.02	Display parameter setting 2 on run status	0~65535 BIT0: PLC current stage BIT1: Pulse count value BIT2: Length value BIT3: Torque setting value(﹪ ON) BIT4: Pulse Di5 frequency BIT5: Load speed BIT6: IGBT temperature BIT7: AC input voltage BIT8: Encoder feedback speed BIT9~BIT15: Reserve Note: If you want to display the above parameters, add the corresponding decimal to enter this parameter	$2^0=1$ $2^1=2$ $2^2=4$ $2^3=8$ $2^4=16$ $2^5=32$ $2^6=64$ $2^7=128$ $2^8=256$	0	○	0x0A02
F10.03	Reserved					—

Function code	Name	Setup range		Default Value	Modification	Add.
F10.04	Display parameter setting on stop status	0~65535 BIT0: Setting frequency(Hz ON) BIT1: Motor speed(rpm ON) BIT2: Bus voltage(V ON) BIT3: AC input voltage BIT4: Input terminal state BIT5: Output terminal state BIT6: PID reference (% ON) BIT7: PID feedback(% ON) BIT8: AI1(V on) BIT9: Reserve BIT10: Reserve BIT11: Length value BIT12: Pulse count value BIT13: PLC current stage BIT14: Load speed BIT15: Pulse Di5 frequency Note: If you want to display the above parameters, add the corresponding decimal to enter this parameter	$2^0=1$ $2^1=2$ $2^2=4$ $2^3=8$ $2^4=16$ $2^5=32$ $2^6=64$ $2^7=128$ $2^8=256$ $2^9=512$ $2^{10}=1024$ $2^{11}=2048$ $2^{12}=4096$ $2^{13}=8192$ $2^{14}=16384$ $2^{15}=32768$	7	○	0x0A04
F10.05	Reserved					0x0A05
F10.06	Reserved				○	0x0A06
F10.07	Reserved					—
F10.08	Reserved					—
F10.09	Load speed display coefficient	0.0001 ~ 6.5000		1.000	○	0x0A09
F10.10	Number of decimal places for loadspeed display	0.Zero decimal point 1.One decimal point 2.Two decimal points 3.Three decimal points		0	○	0x0A0A

Function code	Name	Setup range	Default Value	Modification	Modification
		Group F11: Digital Input Terminal Group			
F11.00	DI1 terminals function selection	0: No function 1: Forward 2: Reverse 3: Three-wire control operation	1	×	0x0B00
F11.01	DI2 terminals function selection	4: Forward Jogging 5: Reverse Jogging 6: Coast to stop 7: External STOP terminal 1 8: External STOP terminal 2(DEC time4)	2	×	0x0B01
F11.02	DI3 terminals function selection	9: Immediate DC injection braking 10: DEC DC injection braking 11: Run Pause 12: Fault reset 13: Shift the command 1	4	×	0x0B02
F11.03	DI4 terminals function selection	14: Shift the command 2 15: Shift frequency command 16: Terminal UP 17: Terminal DOWN 18: Clear UP/DOWN (including∧/∨ key) adjustment	12	×	0x0B03
F11.04	DI5 terminals function selection (Except 2S-0.7/2S-1.5)	19: Multi-step speed terminal K1 20: Multi-step speed terminal K2 21: Multi-step speed terminal K3 22: Multi-step speed terminal K4			
F11.05	Reserved	23: PLC status reset 24: PID parameters switching 25: Reserve 26: PID action direction reverse			
F11.06	Reserved	27: PID pause 28: Pulse input (valid only for DI5) 29: Swing pause 30: Counter input 31: Counter reset			
F11.07	Reserved	32: Length count input 33: Length reset 34: Clear the current running time 35: Reverse prohibited			
F11.08	Reserved	36: DEC/ACC time 1 37: DEC/ACC time 2 38: DEC/ACC disabling 39: External fault input 1 40: External fault input 2			
F11.09	Reserved	41: Reserve 42: Speed control/Torque control switchover 43: Torque control prohibited			

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F11.10	Filtering time of digital input terminal	0.000~1.000s	0.010s	○	0x0B0A
F11.11	DI active mode selection 1	0:Positive logic 1:Negative logic Units position: DI1 active mode Tens position: DI2 active mode Hundreds position: DI3 active mode Thousand position: DI4 active mode Ten thousands position: reserved	00000	X	0x0B0B
F11.12	Reserved				
F11.13	Terminals control running mode	0: 2-wire control 1 1: 2-wire control 2 2: 3-wire control 1 3: 3-wire control 2	0	X	0x0B0D
F11.14	Terminal UP/DOWN rate	0.001Hz/s ~ 65.000Hz/s	1.000Hz	○	0x0B0E
F11.15	Switch-on delay of DI1 terminal	0.0~3600.0s	0.0s	X	0x0B0F
F11.16	Switch-off delay of DI1 terminal	0.0~3600.0s	0.0s	X	0x0B10
F11.17	Switch-on delay of DI2 terminal	0.0~3600.0s	0.0s	X	0x0B11
F11.18	Switch-off delay of DI2 terminal	0.0~3600.0s	0.0s	X	0x0B12
F11.19	Switch-on delay of DI3 terminal	0.0~3600.0s	0.0s	X	0x0B13
F11.20	Switch-off delay of DI3 terminal	0.0~3600.0s	0.0s	X	0x0B14

Function code	Name	Setup range	Default Value	Modification	Add.
Group F12: Digital Output Terminal Group					
F12.00	HDO output	0: Open collector pole high speed pulse output(See F15.02 for detailed information of the related function) 1: Open collector pole output (See F12.02 for detailed information of the related function)	0	○	0x0C00
F12.01	DO1 output	0: Invalid 1: AC drive running 2: Forward running 3: Reverse running 4: Jogging running 5: Zero-speed running 6: Ready for operation	0	○	0x0C01
F12.02	Reserved	7: AC drive fault 8: AC drive overload pre-alarming 9: Motor overload pre-alarming 10: AC drive under load pre-alarming 11: Frequency arrival 12: Upper limit Freq attained 13: Lower limit Freq attained			
F12.03	Relay T1 output	14: Frequency detection FDT1 15: Frequency detection FDT2 16: Frequency 1 reached 17: Frequency 2 reached 18: Reserved 19: Completion of PLC stage 20: Completion of PLC Circle	1	○	0x0C03
F12.04	Reserved	21: PID sleeping 22: Current 1 reached 23: Current 2 reached 24: Reserve 25: Setting count value attained 26: Designated count value attained 27: Setting length attained 28: Designated length attained 29: Setting running time reached			
F12.05	Reserved	30: Communication setting 31: Output DI1 32: Output Di2 33: Limit the output Di1 34: AI1 input limit exceeded 35: Reserve 36: PID feedback offline 37: Motor overheat warning			
F12.06	Polarity of output terminals	0:Positive logic 1:Negative logic Units position: D01 active mode Tens position: HDO active mode Hundreds position: T1 active mode Thousand position: Reserved Ten thousands position: Reserved	0	○	0xC06

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.07	DO1 switch-on delay time	0.0~3600.0s	0.0s	○	0x0C07
F12.08	DO1 switch-off delay time	0.0~3600.0s	0.0s	○	0x0C08
F12.09	Reserved				
F12.10	Reserved				
F12.11	T1 switch-on delay time	0.0~3600.0s	0.0s	○	0x0C0B
F12.12	T1 switch-off delay time	0.0~3600.0s	0.0s	○	0x0C0C
F12.13	Reserved				
F12.14	Reserved				
F12.15	Reserved				—
F12.16	Reserved				—
F12.17	Frequency arrival detection value	0.0%~100.0%	0.0%	○	0x0C11
F12.18	FDT1 frequency detection value	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C12
F12.19	FDT1 frequency detection hysteresis	0.0%~100.0%	5.0%	○	0x0C13
F12.20	FDT2 frequency detection value	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C14
F12.21	FDT2 frequency detection hysteresis	0.0%~100.0%	5.0%	○	0x0C15
F12.22	Detection of any frequency 1	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C16
F12.23	Detection width of any frequency 1	0.0%~100.0%(Max. frequency)	0	○	0x0C17
F12.24	Detection of any frequency 2	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C18
F12.25	Detection width of any frequency 2	0.0%~100.0%(Max. frequency)	0	×	0x0C19

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.26	Reserved				
F12.27	Reserved				
F12.28	Any current reaching 1 value	0.0%~300.0%(Motor rated current)	100.0%	○	0x0C1C
F12.29	Any current reaching 1 amplitude	0.0%~300.0%(Motor rated current)	0.0%	○	0x0C1D
F12.30	Any current reaching 2 value	0.0%~300.0%(Motor rated current)	100.0%	○	0x0C1E
F12.31	Any current reaching 2 amplitude	0.0%~300.0%(Motor rated current)	0.0%	○	0x0C1F
F12.32	AI1 input voltage lower limit	0.0V~F12.33	3. 0V	○	0x0C20
F12.33	AI1 input upper limit voltage	F12.32~10.00V	7.0V	○	0x0C21
F12.34~ F12.40	Reserved				

Function code	Name	Setup range	Default Value	Modification	Add.
Group F14: Analog Curve And Pulse Input Setting Function Group					
F14.00	Lower limit of AI1	0.00V~ F14.02	0.00V	○	0x0E00
F14.01	Corresponding setting of the lower limit of AI1	-100.0%~100.0%	0.0%	○	0x0E01
F14.02	Ai1 inflexion 1 input	F14.00~F14.04	10.00V	○	0x0E02
F14.03	Corresponding percentage of AI1 inflexion 1 input	-100.0%~100.0%	100.0%	○	0x0E03
F14.04	Ai1 inflexion 2 input	F14.02~F14.06	10.00V	○	0x0E04
F14.05	Corresponding percentage of AI1 inflexion 2 input	-100.0%~100.0%	100.0%	○	0x0E05
F14.06	Upper limit of AI1	F14.04~10.00V	10.00V	○	0x0E06
F14.07	Corresponding setting of the upper limit of AI1	-100.0%~100.0%	100.0%	○	0x0E07
F14.08	AI1 input filter time	0.00s~10.00s	0.100s	○	0x0E08
F14.09~ F14.26	AI2 min. input	0.00V~F14.11	0.00V	○	0x0E09

Function code	Name	Setup range	Default Value	Modification	Add.
F14.27	AI lower than Min. input setting selection	Ones: AI1 lower than minimum input setting selection 0: Corresponding percentage of min. input 1：0.0% Tens:Reserved Hundreds: Reserved	0x000	○	0x0E1B
F14. 28	Lower limit frequency of pulse DI5	0.00kHz~F14.30	0.00 kHz	○	0x0E1C
F14. 29	Corresponding setting of lower limit frequency of pulse DI5	-100.0%~100.0%	0.0%	○	0x0E1D
F14. 30	Upper limit frequency of pulse DI5	F14.28~100.00kHz	50.00 kHz	○	0x0E1E
F14. 31	Corresponding setting of upper limit frequency of pulse DI5	-100.0%~100.0%	100.0%	○	0x0E1F
F14. 32	Input filter time of pulse DI5	0.00s~10.00s	0.10s	○	0x0E20

Group F15: Analog Curve And Pulse Output Setting Function Group

Function code	Name	Setup range	Default Value	Modification	Add.
F15.00	AO1 output	0: Running frequency 1: Setting frequency 2: Output current (relative to twice rated current of the motor) 3: Output voltage	0	○	0x0F00
F15.01	Reserved	4: High speed pulse DI5 input value 5: Analog AI1 input value 6: Reserve 7: Reserve 8: Length 9: Count value			
F15.02	DO output selection	10: Running time 11: Output torque 12: Output power 13: Communication setting 14: Keypad potentiometer setting	0	○	0x0F02
F15.03	Ao1 output lower limit	0.0%~F15-05	0.0%	○	0x0F03
F15.04	AO1 output lower limit corresponding output	0.00V~10.00V	0.00V	○	0x0F0
F15.05	Ao1 output upper limit	F15.03~100.0%	100.0%	○	0x0F0
F15.06	AO1 output upper limit corresponding output	0.00V~10.00V	10.00V	○	0x0F0
F15.07~ F15.10	Reserve				
F15.11	HDO output lower limit	0.0%~F15.13	0.0%	○	0x0F0B
F15.12	The lower limit corresponds to the HDO output	0.00kHz~60.00kHz	0.00kHz	○	0x0F0C
F15.13	HDO output upper limit	F15.11~100.0%	100.0%	○	0x0F0D
F15.14	The upper limit corresponds to the HDO output	0.00kHz~60.00kHz	10.00kHz	○	0x0F0

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
		Group F16: AI/AO Correction Group			
F16.00	Reserved		Correction before delivery		
F16.01	AI1 measured voltage1	0.000V~10.000V		○	0x1001
F16.02	AI1 display voltage1	0.000V~10.000V		○	0x1002
F16.03	AI1 measured voltage2	0.000V~10.000V		○	0x1003
F16.04	AI1 display voltage 2	0.000V~10.000V		○	0x1004
F16.05~ F16.12	Reserved				
F16.13	AO1 measured voltage 1	0.000V~10.000V		○	0x100D
F16.14	AO1 display voltage 1	0.000V~10.000V		○	0x100E
F16.15	AO1 measured voltage 2	0.000V~10.000V		○	0x100F
F16.16	AO1 display voltage 2	0.000V~10.000V		○	0x1010
F16.17~ F16.20	Reserved				

Function code	Name	Setup range	Default Value	Modification	Modification
		Group F18: Serial Communication Function Group			
F18.00	Local communication address	0~247 0: Reserve 1-247: slave address	1	○	0x1200
F18.01	Communication baud rate	Units position : Modbus Communication baud rate 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Tens position :Reserved	45	○	0x1201
F18.02	Data format symbol	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check, data format (8-N-1) （MODBUS communication setting)	0	○	0x1202
F18.03	Answer delay	0~20ms	2ms	○	0x1203
F18.04	Fault time of com-munication overtime	0.0s (Invalid); 0.1~60.0s	0.0s	○	0x1204
F18.05	Reserved				
F18.06	Current resolution readby communication	0: 0.01A 1: 0.1A	0	○	0x1206
F18.07~ F18.31	Reserved	—	—	*	—

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
Group F19: PID Control Group
F19.00	PID reference source	Units position: PID reference source 0: Keypad potentiometer setting 1: PID digital setting(F19.02) 2: AI1 3: Reserve 4: Reserve 5: Pulse DI5 6: Communication setting Tens position: PID feedback source 0: AI1 1: Reserve 2: Reserve 3: Reserve 4: Reserve 5: Reserve 6: Reserve 7: Pulse DI5 8: Communication setting	01	○	0x1300
F19.01	PID range	0~65535	1000	○	0x1301
F19.02	PID digital 1 setting	0~F19.01	500	○	0x1302
F19.03	Reserved				
F19.04	PID operation direction	0: PID output is positive 1: PID output is negative	0	○	0x1304
F19.05	Proportional gain(P1)	0.0~1000.0	20.0	○	0x1305
F19.06	Intergal time(I1)	0.01s~10.00s	2.00s	○	0x1306
F19.07	Differential time(D1)	0.000s~10.000s	0.000s	○	0x1307
F19.08	PID offse limit	0.00~50.0%	0.0%	○	0x1308
F19.09	PID differential limit	0.0%~100.0%	1.0%	○	0x1309
F19.10	PID reference change time	0.00~650.00s	0.00s	○	0x130A
F19.11	PID feedback filter time	0.00~60.00s	0.00s	○	0x130B
F19.12	PID output filter time	0.00~60.00s	0.00s	○	0x130C
F19.13	Proportional gain(P2)	0.0~1000.0	20.0	○	0x130D
F19.14	Intergal time(I2)	0.01s~10.00s	2.00s	○	0x130E
F19.15	Differential time(D2)	0.000s~10.000s	0.000s	○	0x130F

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.16	Upper limit Freq when opposite to rotary set direction	0.00Hz~F01.07(max. frequency)	0.00Hz	○	0x1310
F19.17	PID Preset Value	0.0%~100.0%	0.0%	○	0x1311
F19.18	PID Preset Value Keeping time	0.0~650.0s	0.00s	○	0x1312
F19.19	PID Hibernate Frequency	0.00Hz~F19.21	0.00Hz	○	0x1313
F19.20	PID Hibernate Delay Time	0.0~6500.0s	0.0s	○	0x1314
F19.21	PID Awaken Value	0.0~100.0%	0.0%	○	0x1315
F19.22	PID Awaken Value delay time	0.0~6500.0s	0.5S	○	0x1316
F19.23~ F19.26	Reserved				
F19.27	Detection value of feedback offline	0.0~100.0%	0.0%	○	0x131B
F19.28	Detection time of feedback offline	0.0~6500.0s	0.0s	○	0x131C
F19.29	PID feedback offline processing	0: Alarm and stop freely 1: Alarm and stop according to the stop mode 2: No alarm and continue to run	0	○	0x131D
F19.30	Reserved				

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
		Group F20: Swing Frequency, Fixed Length, Count and Timing			
F20.00	Swing Frequency setting mode	0: Relative to center frequency 1: Relative to Max. frequency	0	○	0x1400
F20.01	Swing frequency amplitude	0.0~100.0%	0.0%	○	0x1401
F20.02	Kick frequency amplitude	0.0~50.0%	0.0%	○	0x1402
F20.03	Cycle of swing frequency	0.1s~3000.0s	10.0s	○	0x1403
F20.04	Triangular wave ramp-up time coefficient	0.1%~100.0%	50.0%	○	0x1404
F20.05	Setup length	0~65535m	1000m	○	0x1405
F20.06	Reserved				
F20.07	The number of pulses of each meter	0.1~6553.5	100.0	○	0x1407
F20.08	Reserved		1000	○	0x1408
F20.09	Designated count value	1~65535	1	○	0x1409
F20.10	Running time setting	0.0~65535min	0.0Min	○	0x140A
F20.11	Reserved				

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
Group F21: Simple PLC and Multi-step Freq Control Group					
F21.00	Multi-step Freq 0	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1500
F21.01	Multi-step Freq 1	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1501
F21.02	Multi-step Freq 2	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1502
F21.03	Multi-step Freq 3	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1503
F21.04	Multi-step Freq 4	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1504
F21.05	Multi-step Freq 5	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1505
F21.06	Multi-step Freq 6	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1506
F21.07	Multi-step Freq 7	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1507
F21.08	Multi-step Freq 8	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1508
F21.09	Multi-step Freq 9	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1509
F21.10	Multi-step Freq 10	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150A
F21.11	Multi-step Freq 11	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150B
F21.12	Multi-step Freq 12	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150C
F21.13	Multi-step Freq 13	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150D
F21.14	Multi-step Freq 14	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150E
F21.15	Multi-step Freq 15	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150F
F21.16	Simple PLC running method	Ones : PLC runmode 0: Stop after running once 1: Run at the final value after running once 2: Cycle running Tens : Unit of simple PLC runtime 0: Second (s) 1: Minute (min)	00	○	0x1510
F21.17	Simple PLC memory selection when in power loss	Ones： Power loss memory 0:No memory on power loss 1: Memorized on power loss Tens: Stop memory 0:No memory on stop 1: Memorized on stop	00	○	0x1511
F21.18	The running time of step 0	0.0~6553.5s(min)	0.00s (Min)	○	0x1512

Function code	Name	Setup range	Default Value	Modification	Modification
F21.19	Setting of multi-step 0	Ones :Run direction 0: Forward 1: Reverse Tens: Accel/Decel time 0: Accel/Decel time 1 1: Accel/Decel time 2 2: Accel/Decel time 3 3: Accel/Decel time 4 Hundreds : Freq setting 0: Multi-step Freq 0 (F21.00) 1: Keypad digital setting 2: Keypad potentiometer setting 3: AI1 setting 4: Reserve 5: Reserve 6: DI5 pulse input 7: Process PID output 8: Communication setting	000	○	0x1513
F21.20	The running time of step 1	0.0~6553.5s(min)	0.0s	○	0x1514
F21.21	Setting of multi-step 1	Same as F21-19	000	○	0x1515
F21.22	The running time of step 2	0.0~6553.5s(min)	0.0s	○	0x1516
F21.23	Setting of multi-step 2	Same as F21-19	000	○	0x1517
F21.24	The running time of step 3	0.0~6553.5s(min)	0.0s	○	0x1518
F21.25	Setting of multi-step 3	Same as F21-19	000	○	0x1519
F21.26	The running time of step 4	0.0~6553.5s(min)	0.0s	○	0x151A
F21.27	Setting of multi-step 4	Same as F21-19	000	○	0x151B
F21.28	The running time of step 5	0.0~6553.5s(min)	0.0s	○	0x151C
F21.29	Setting of multi-step 5	Same as F21-19	000	○	0x151D
F21.30	The running time of step 6	0.0~6553.5s(min)	0.0s	○	0x151E
F21.31	Setting of multi-step 6	Same as F21-19	000	○	0x151F

Function code	Name	Setup range	Default Value	Modifi-cation	Modifi-cation
F21.32	The running time of step 7	0.0~6553.5s(min)	0.0s	○	0x1520
F21.33	Setting of multi-step 7	Same as F21-19	000	○	0x1521
F21.34	The running time of step 8	0.0~6553.5s(min)	0.0s	○	0x1522
F21.35	Setting of multi-step 8	Same as F21-19	000	○	0x1523
F21.36	The running time of step 9	0.0~6553.5s(min)	0.0s	○	0x1524
F21.37	Setting of multi-step 9	Same as F21-19	000	○	0x1525
F21.38	The running time of step 10	0.0~6553.5s(min)	0.0s	○	0x1526
F21.39	Setting of multi-step 10	Same as F21-19	000	○	0x1527
F21.40	The running time of step 11	0.0~6553.5s(min)	0.0s	○	0x1528
F21.41	Setting of multi-step 11	Same as F21-19	000	○	0x1529
F21.42	The running time of step 12	0.0~6553.5s(min)	0.0s	○	0x152A
F21.43	Setting of multi-step 12	Same as F21-19	000	○	0x152B
F21.44	The running time of step 13	0.0~6553.5s(min)	0.0s	○	0x152C
F21.45	Setting of multi-step 13	Same as F21-19	000	○	0x152D
F21.46	The running time of step 14	0.0~6553.5s(min)	0.0s	○	0x152E
F21.47	Setting of multi-step 14	Same as F21-19	000	○	0x152F
F21.48	The running time of step 15	0.0~6553.5s(min)	0.0s	○	0x1530
F21.49	Setting of multi-step 15	Same as F21-19	000	○	0x1531
F21.50	Reserved				

Function code	Name	Setup range	Default Value	Modifi-cation	Modifi-cation
Group F28: Strengthen Function Groups					
F28.00	Carrier frequency setting	0.8~8.0K	Model de-pendent	○	0x1C00
F28.01	Carrier frequency adjusted with temperature	0: Invalid 1: Valid	1	○	0x1C01
F28.02	PWM mode	0: Three-phase modulation 1: Three-phase and two-phase modulation switching	0	×	0x1C02
F28.03	Random PWM	0: Fixed PWM 1~10: Random PWM coefficient	0	×	0x1C03
F28.04	Voltage over modulation coefficient	100~110	105	×	0x1C04
F28.05	Cooling FanQ Control	0: Fan runs when running 1: The fan keeps running	0	×	0x1C05

Function code	Name	Setup range	Default Value	Modification	Add.
Group F29: Protection Parameters Group					
F29.00	Input/Output Phase loss protection	0x00~0x11 Ones: Input phase loss protection 0: Disable 1: Enable Tens: Output phase loss protection 0: Disable 1: Enable	0x11	×	0x1D00
F29.01	Detection of short-circuit to ground	0x00~0x11 Ones: Detection of short-circuit to ground upon power-on 0: Disable 1: Enable Tens: Reserve	0x01	×	0x1D01
F29.02	Motor overload protection	0: Invalid 1: Valid	1	×	0x1D02
F29.03	Motor overload protection gain	50~300	100	×	0x1D03
F29.04	Reserved				
F29.05	Overload pre-alarm detection	50.0%~200%	150%	○	0x1D05
F29.06	Reserved				
F29.07	Motor underload protection	0: Invalid 1: Valid	0	×	0x1D07
F29.08	Underload pre-alarm detection	0.0%~100%	25%	○	0x1D08
F29.09	Underload pre-alarm detection time	0.1s~60.0s	1.0s	○	0x1D09
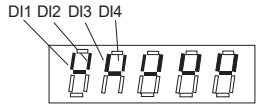
Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.10	Reserved				
F29.11	Fault reset times	0~20	0	○	0x1D0B
F29.12	Selection of DO action during auto reset	0: Not act 1: Act	0	○	0x1D0C
F29.13	Delay time of auto reset	0.0s~100.0s	1.0s	○	0x1D0D
F29.14	Detection level of speed error	0.0%~50.0%	20.0%	○	0x1D0E
F29.15	Detection time of speed error	0.0:Don't detection 0.1s~60.0s	5.0s	○	0x1D0F
F29.16	Overspeed detection level	0.0%~50.0%	20.0%	○	0x1D10
F29.17	Overspeed detection time	0.0:Don't detection 0.1s~60.0s	1.0s	○	0x1D11
F29.18	Power dip ride-through function selection	0: Disabled 1: Bus voltage constant control 2: Decelerate to stop	0	×	0x1D12
F29.19	Threshold of power dip ride-through function disabled	80.0%~100.0%	85.0%	×	0x1D13
F29.20	Judging time of bus voltage recovering from power dip	0.0s~100.0s	0.5s	×	0x1D14
F29.21	Threshold of power dip ride-through function enabled	60.0%~100.0%	80.0%	×	0x1D15
F29.22~F29.24	Reserved				
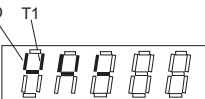
Function code	Name	Setup range	Default Value	Modification	Add.
Group F30: User-Defined Parameters Group
F30.00	User-Defined Parameter 0	F00.00~F99.XX	F00.01	○	0x1E00
F30.01	User-Defined Parameter 1	F00.00~F99.XX	F02.00	○	0x1E01
F30.02	User-Defined Parameter 2	F00.00~F99.XX	F01.00	○	0x1E02
F30.03	User-Defined Parameter 3	F00.00~F99.XX	F01.04	○	0x1E03
F30.04	User-Defined Parameter 4	F00.00~F99.XX	F01.05	○	0x1E04
F30.05	User-Defined Parameter 5	F00.00~F99.XX	F03.00	○	0x1E05
F30.06	User-Defined Parameter 6	F00.00~F99.XX	F03.01	○	0x1E06
F30.07	User-Defined Parameter 7	F00.00~F99.XX	F04.00	○	0x1E07
F30.08	User-Defined Parameter 8	F00.00~F99.XX	F04.07	○	0x1E08
F30.09	User-Defined Parameter 9	F00.00~F99.XX	F11.00	○	0x1E09
F30.10	User-Defined Parameter 10	F00.00~F99.XX	F11.01	○	0x1E0A
F30.11	User-Defined Parameter 11	F00.00~F99.XX	F11.02	○	0x1E0B
F30.12	User-Defined Parameter 12	F00.00~F99.XX	F12.03	○	0x1E0C
F30.13	User-Defined Parameter 13	F00.00~F99.XX	F15.00	○	0x1E0D
F30.14	User-Defined Parameter 14	F00.00~F99.XX	F02.03	○	0x1E0E
F30.15	User-Defined Parameter 15	F00.00~F99.XX	F02.09	○	0x1E0F
F30.16	User-Defined Parameter 16	F00.00~F99.XX	F28.00	○	0x1E10
F30.17	User-Defined Parameter 17	F00.00~F99.XX	F00.00	○	0x1E11
F30.18	User-Defined Parameter 18	F00.00~F99.XX	F00.00	○	0x1E12
F30.19	User-Defined Parameter 19	F00.00~F99.XX	F00.00	○	0x1E13
F30.20	User-Defined Parameter 20	F00.00~F99.XX	F00.00	○	0x1E14
F30.21	User-Defined Parameter 21	F00.00~F99.XX	F00.00	○	0x1E15
F30.22	User-Defined Parameter 22	F00.00~F99.XX	F00.00	○	0x1E16
F30.23	User-Defined Parameter 23	F00.00~F99.XX	F00.00	○	0x1E17
F30.24	User-Defined Parameter 24	F00.00~F99.XX	F00.00	○	0x1E18
F30.25	User-Defined Parameter 25	F00.00~F99.XX	F00.00	○	0x1E19
F30.26	User-Defined Parameter 26	F00.00~F99.XX	F00.00	○	0x1E1A
F30.27	User-Defined Parameter 27	F00.00~F99.XX	F00.00	○	0x1E1B
F30.28	User-Defined Parameter 28	F00.00~F99.XX	F00.00	○	0x1E1C
F30.29	User-Defined Parameter 29	F00.00~F99.XX	F00.00	○	0x1E1D
F30.30	User-Defined Parameter 30	F00.00~F99.XX	F00.00	○	0x1E1E
F30.31	User-Defined Parameter 31	F00.00~F99.XX	F00.00	○	0x1E1F

Function code	Name	Setup range	Default Value	Modifi-cation	Modifi-cation
		Group F98: History Fault			
F98.00	Current fault type	0: No fault 1: Inverter module protection(E.OUT) 2: Current detection fault(E.ICE) 3: Short circuit to ground(E.ERH) 4: Input phase loss(E.SPI) 5: Output phase loss(E.SPO) 6: Overcurrent during acceleration(E.OC1) 7: Overcurrent during deceleration(E.OC2) 8: Overcurrent at constant speed(E.OC3) 9: Overvoltage during acceleration(E.OU1) 10: Overvoltage during deceleration(E.OU2) 11: Overvoltage at constant speed(E.OU3)	-	*	0x2200
F98.01	Previous fault type	12: Undervoltage(E.LU) 13: AC drive overload(E.OL1) 14: Motor overload(E.OL2) 15: Motor overload prealarm(E.OL3) 16: Motor underload(E.LL) 17: AC drive overheated(E.OH) 18: Motor auto-tuning fault(E.TUNE) 19: EEPROM read-write fault(E.EEP) 20: External fault 1(E.EF1) 21: External fault 2(E.EF2) 22: Port communication fault(E.CE)	-	*	0x2201
F98.02	Previous 2 fault type	23: PID feedback loss(E.PID) 24: Speed feedback fault(E.EDU) 25: Imbalance fault(E.STO) 26: Encoder fault(E.ECD) 27: Motor overheated fault(E.PTC) 28: Reserve 29: Magnetic pole initial position detection falut(E.PLR) 30: Motor switchover fault during running(E.CH) 31: RESERVE	-	*	0x2202
F98.03	Running frequency at current fault	----	----	*	0x2203
F98.04	Output current at current fault	----	----	*	0x2204
F98.05	Output voltage at current fault	----	----	*	0x2205
F98.06	Bus voltage at current fault	----	----	*	0x2206
F98.07	IGBT temperature at current fault	----	----	*	0x2207
F98.08	Input terminals state at current fault	----	----	*	0x2208
F98.09	Output terminals state at current fault	----	----	*	0x2209

Function code	Name	Setup range	Default Value	Modifi-cation	Modifi-cation
F98.10	AC drive state at current fault	----	----	*	0x220A
F98.11	Power-on time at current fault	----	----	*	0x220B
F98.12	Running time at current fault	----	----	*	0x220C
F98.13	Running frequency at previous fault	----	----	*	0x220D
F98.14	Output current at previous fault	----	----	*	0x220E
F98.15	Output voltage at previous fault	----	----	*	0x220F
F98.16	Bus voltage at previous fault	----	----	*	0x2210
F98.17	IGBT temperature at previous fault	----	----	*	0x2211
F98.18	Input terminals state at previous fault	----	----	*	0x2212
F98.19	Output terminals state at previous fault	----	----	*	0x2213
F98.20	AC drive state at previous fault	----	----	*	0x2214
F98.21	Power-on time at previous fault	----	----	*	0x2215
F98.22	Running time at previous fault	----	----	*	0x2216
F98.23	Running frequency at previous 2 fault	----	----	*	0x2217
F98.24	Output current at previous 2 fault	----	----	*	0x2218
F98.25	Output voltage at previous 2 fault	----	----	*	0x2219
F98.26	Bus voltage at previous 2 fault	----	----	*	0x221A
F98.27	IGBT temperature at previous 2 fault	----	----	*	0x221B
F98.28	Input terminals state at previous 2 fault	----	----	*	0x221C
F98.29	Output terminals state at previous 2 fault	----	----	*	0x221D
F98.30	AC drive state at previous 2 fault	----	----	*	0x221E
F98.31	Power-on time at previous 2 fault	----	----	*	0x221F
F98.32	Running time at previous 2 fault	----	----	*	0x2220

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
		Group F99: Monitoring Function Group			
F99.00	Output frequency	0.00Hz~F01.08(Upper limit Freq)	----	*	0x2100
F99.01	Setting frequency	0.00Hz~F01.08(Upper limit Freq)	----	*	0x2101
F99.02	Output current	0.01~5000.0A	----	*	0x2102
F99.03	Motor speed	0~65535rpm	----	*	0x2103
F99.04	Load speed display	0~65535	----	*	0x2104
F99.05	Output power	0.1~6553.5KW	----	*	0x2105
F99.06	Output torque	-300.0%~300.0%	----	*	0x2106
F99.07	Output voltage	0~1000V	----	*	0x2107
F99.08	DC bus voltage	0.0~2000.0V	----	*	0x2108
F99.09	AC input voltage	0.0~2000.0V	----	*	0x2109
F99.10	AC drive status	1: Forward 2: Reverse 3: Forward Jogging 4: Reverse Jogging 5: AC drive Fault 6: Under-voltage 7: AC drive stop	----	*	0x210A
F99.11	Fault information	0~33(Corresponding to F98.00)	----	*	0x210B
F99.12	AI1 input voltage	0.00~10.00V	----	*	0x210C
F99.13~F99.16	Reserved				
F99.17	DI state	0x00~0xFFF	----	*	0x2111
F99.18	DI state display	The state of each function end is indicated by the on-off of the specified section of the LED digital tube. The on-off of the digital tube segment means that the corresponding terminal state is valid, while the off-off means that the corresponding terminal state is invalid. DI1 DI2 DI3 DI4	----	*	0x2112

Function code	Name	Setup range	Default Value	Modification	Modification
F99.19	DO state	0x00~0xFFF	----	*	0x2113
F99.20	DO state display	Same as F99. 18.	----	*	0x2114
F99.21	Pulse Input Frequency	0.01kHz~100.00kHz	----	*	0x2115
F99.22	Reserved				
F99.23	PID reference	0~65000	----	*	0x2117
F99.24	PID feedback	0~65000	----	*	0x2118
F99.25	Counting value	0~65535	----	*	0x2119
F99.26	Length value	0~65535	----	*	0x211A
F99.27	Linear speed	0~65535	----	*	0x211B
F99.28	Target torque	-300.0%~300.0%	----	*	0x211C
F99.29	Remaining running time	0.1Min~6553.5Min	----	*	0x211D
F99.30	PLC step	0~15	----	*	0x211E
F99.31	Feedback frequency	0.01Hz~F01.07(MAX. Freq)	----	*	0x211F
F99.32	Feedback speed of encode	0.01Hz~F01.07(MAX. Freq)	----	*	0x2120
F99.33	Reserved				
F99.34	AC drive temperature	-30~200℃	----	*	0x2122
F99.35	Current Power-on time	1Min~65535Min	----	*	0x2123
F99.36	Current Running time	0.1Min~6553.5Min	----	*	0x2124
F99.37	G/P type	0: G type 1: P type	----	*	0x2125
F99.38	AC drive power	0.7~500.0KW	----	*	0x2126
F99.39	Motor seletion	1: Motor 1 2: Motor 2	----	*	0x2127
F99.40	Accumulative power-on time	1Min~65535Min	----	*	0x2128
F99.41	Accumulative running time	0.1Min~6553.5Min	----	*	0x2129

Group F00
System Function Group

The Content of This Chapter

This chapter lists the function code table, and give a brief description of the function code table.

Function code	Name	Setup range	Default Value	Modification	Add.
F00.00	Motor selection	0~1	0	X	0x000

0: Motor 1

Select motor 1 for current load.Please set the parameters of motor 1 in F05 function codes.

1: Reserved

Function code	Name	Setup range	Default Value	Modification	Add.
F00.01	Motor control technique	00~11	00	X	0x001

 Ones: motor 1 control technique

0: V/f control

Constant Volt/Hertz ratio control: Applicable to such cases in which the performance requirement to the drive is not rigorous, or using one drive to drive several motors, or it is difficult to identify motor parameters correctly, etc. When motor 1 under V/f control is selected, need to set related parameters group F04 well;

1: Sensor-less vector control

This helps achieve high-performance control without encoder.Sensor-less vector control is precise vector control and it requires motor rotary tune.Before the first operation, the motor parameters should be self-learned to obtain the correct motor parameters;

Function code	Name	Setup range	Default Value	Modification	Add.
F00.02	Type of drive	0~1	0	X	0x002

0: G type(Constant torque /heavyload type load)

1: P type(Variable torque / lightload type load)

Function code	Name	Setup range	Default Value	Modification	Add.
F00.03	Reserved	0~2	0	○	0x003

Function code	Name	Setup range	Default Value	Modification	Add.
F00.05	Reserved	0~4	0	○	0x005

Function code	Name	Setup range	Default Value	Modification	Add.
F00.06	Parameters protection	0~1	0	○	0x006

0: All parameter programming allowed

1: Only this parameter programming allowed

Function code	Name	Setup range	Default Value	Modification	Add.
F00.07	Software version	XXXXX		∗	0x007

This parameter shows the version of the software

Function code	Name	Setup range	Default Value	Modification	Add.
F00.08	User's password	0: No password Other: Password protection	0	○	0x008

The AC drive provides a security protection function that requires a user-defined password.

Function parameter F00.08 controls this function.

When F00.08 has the default value zero, it is not necessary to enter a password to program the AC drive.

Note: Restoring the factory default value(F00.10) will clear the user password, please use with caution.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F00.09	Supplier's password	XXXXX	Model de-pendent	○	0x009

Non-user parameters

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F00.10	Parameter restoration	0~3	0	X	0x00A

0: No operation
1: Restore all parameters to factory default (excluding motor parameters)
2: Clear fault record
3: Restore all parameters to factory default (including motor parameters)

Note: The function code will automatically revert to 0 after the operation is completed;The initialization operation can clear the user password. Please use this function with caution.

Group F01
Basic Function Group

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.00	X frequency command	0~9	1	X	0x100
F01.01	Y frequency command		3	X	0x101

1: Digital setting

When the drive is powered up, the value of F01.05 is taken as the master frequency reference.

The user can modify the set value through UP and DOWN of the keyboard and terminal. no matter the drive is running or in stop.

Frequency adjustment on control panel and Frequency adjustment via terminal UP and DOWN can be cleared through terminal "Clear UP/DOWN adjustment". Refer to F11.00~FF11.09 tor details.

1: Panel potentiometer

The setting frequency is set by the potentiometer knob on the keyboard. The user can adjust the frequency setting value by operating the potentiometer knob.

Note: This frequency source only supports LED keyboard. LCD keyboard has no keyboard potentiometer.

2:AI1

3:Reserved

4:Reserved

The set frequency is determined by the analog input terminal. The analog input of AC drive is composed of 2 road signs and analog input terminals AI1, AI2 and one way extended analog input terminals AI3. The three analog input channels are all optional voltage/current input (0~10V/0~20mA), and the voltage or current input can be selected through the skip line.

Refer to specification of F14.00~F14.27 for corresponding relation between analog input and output frequency.

See parameter Group F16 for automatic correction of analog input.

5: High-speed pulse DI5 input

If this parameter value selected, frequency reference will be determined by pulse frequency input via terminal DI5 only. In such a case, F11.04 should be set to 28. Corresponding relation between pulse frequency and frequency reference is specified in F14.28~F14.32.The 100.0% set for high-speed pulse input corresponds to the maximum forward output frequency (F01.07), and the -100.0% corresponds to the maximum reverse output frequency (F01.07).

6: Multi-step Freq running

To select multi-speed operation mode, F11 sets of multi-function input terminals are required to define multi-speed terminals and F21 sets of multi-speed parameters to determine the correspondence between the given signal and the set frequency.

7: Simple PLC

To select a simple PLC operation mode, it is necessary to set F21 multi-stage speed and PLC parameters to determine the set frequency, running direction and running time.

8: PID control

When choosing PID control, it is necessary to set Group F19 PID function parameters, and the operating frequency of the converter is the frequency value after PID action.The meaning of PID given source, quantitative, feedback source, etc., please refer to the introduction of Group F19 PID function.

9: Communication

The host computer/device is the master frequency reference source of the drive through

standard RS485 communication interface on the drive.

Refer to Group F18 and appendix on this manual for further information about communication

protocol, and programming, etc

Function code	Name	Setup range	Default Value	Modification	Add.
F01.02	Y frequency command reference	0~1	0	○	0x102

0: Maximum output frequency,

100% of Y frequency setting corresponds to the maximum output frequency F01.07.

1: X frequency command,

100% of Y frequency setting corresponds to the X frequency.

Function code	Name	Setup range	Default Value	Modification	Add.
F01.03	Y frequency range	0.0~100.0%	100.0%	○	0x103

This parameter is the gain coefficient of the source Y frequency running results.Y frequency source = Y frequency source command (percentage) × Y frequency command reference object×Y frequency source gain coefficient when the user selects Y frequency source as the auxiliary frequency source, it can set the auxiliary frequency source affects to set frequency by this parameter setting.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.04	Combination of the setting codes	00~34	00	○	0x104

Ones: Frequency reference selection
0: X
1: X and Y calculation (based on tens position)
2: Switchover between X and Y
3: Switchover between X and "X&Y calculation"
4: Switchover between Y and "X&Y calculation"

Tens: X and Y calculation formula
0: X + Y
1: X - Y
2: Max. (X, Y)
3: Min. (X, Y)

The switching function of frequency source is realized by Group F11 input function "frequency source switching" terminal.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.05	Keypad digital setting frequency	0.00Hz~F01.07(Max. Freq)	50.00Hz	○	0x105

 When X and Y frequency commands are selected as "keypad Digital settings", the value of the function code is the original setting one of the frequency data of the AC drive .

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.06	Retentive of digital setting frequency	00~11		8	0x106

Ones: Retentive selection of digital setting frequency upon stop.

After set F01.05, it determines whether to save frequency reference selection by the up/down function of keypad or terminal when the AC drive stops.
0: Not retentive
1: Retentive

Tens：
Retentive selection of digital setting frequency upon power-off.

After set F01.05,it determines whether to save frequency reference selection by the up/down function of keypad or terminal when the AC drive power-off.

0: Not retentive
1: Retentive

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F01.07	Max. output frequency	50.00Hz~500.00Hz	50.00Hz	×	0x107

This parameter is used to set the maximum output frequency of the AC drive. User should pay attention to this parameter because it is the foundation of the frequency setting and the speed of acceleration and deceleration.

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F01.08	Upper limit frequency source selection	0~4	0	○	0x108

The parameter defines the source of the upper bound frequency.The upper frequency may come from a digital setting (F01.09), an analog input channel, or a given pulse.When timing with analog quantities or pulses, the maximum frequency set to 100% corresponds to F01.07.

0: F01.09
1: AI1
2: Reserved
3: Reserved
4: Pluse DI5

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F01.09	Upper limit frequency	F01.10~F01.07(Max. frequency)	50.00Hz	○	0x109

When F01.08 is set to 0, the parameter determines the upper limit frequency.

The upper limit of the running frequency is the upper limit of the output frequency of the AC drive which is lower than or equal to the maximum frequency.

The AC drive runs at the upper limit frequency if the set frequency is higher than the upper limit one

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F01.10	Lower limit frequency	0.00Hz~F01.09 (Upper limit frequency)	0.00Hz	○	0x10A

The lower limit of the running is that of the ouput frequency of the AC drive.

when setting frequency is lower than the lower limit frequency, which is decided by F01.13

Note:Max. output frequency≥Upper limit frequency≥Lower limit frequency.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.11	Jog frequency	0.00Hz~F01.07(Max. frequency)	5.00Hz	○	0x10B

The set frequency of jog

The acceleration time of inching is set by F03.08,

The deceleration time of inching is set by F03.09.

The jog command can be controlled by operating panel S key, control terminal or communication.Multifunction S key can be set as forward jog or reverse jog key through parameter F10.00.Jog can be realized using "forward jog terminal" and "reverse jog terminal" of DI, as well as via communication input. See drive communication protocol for further information.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.12	Jog selection in running state	0:allowed 1:prohibited	0	○	0x10C

This parameter determines whether the JOG command is valid in the operating state of the AC drive

0:allowed
1:prohibited

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.13	Action if running frequency<lower limit frequency	0~2	0	○	0x10D
F01.14	Reserved		0.0s	○	0x10E

0: Run at lower limit frequency

the run should be at lower limit frequency.

1: Run at 0Hz

the run should be at 0Hz.

2: Stop

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F01.15	Jump frequency 1	0.00Hz~F01.07(Max. frequency)	0.00Hz	○	0x10F
F01.16	Jump frequency 1 width	0.00Hz~F01.07(Max. frequency)	0.00Hz	○	0x110
F01.17	Jump frequency 2	0.00Hz~F01.07(Max. frequency)	0.00Hz	○	0x111
F01.18	Jump frequency 2 width	0.00Hz~F01.07(Max. frequency)	0.00Hz	○	0x112

Skip frequency is a function designed to prevent the drive run at resonance zone of mechanical system. At most 2 skip zones can be defined. See Fig.
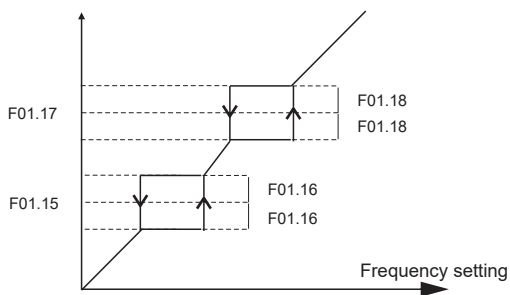
Once parameters of skip zones are set, the output frequency of the drive would automatically get out of these skip zones even if the frequency reference is within these zones.

 NOTE:

Output frequency of drive can normally pass through skip zones during Accel and Decel.

Group F02
Startup and Stop Control

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.00	Run command channel	0~4	0	○	0x200

Select the run control command of the AC drive channel. The control command of the AC drive includes: Start-up, stop, forward, reverse, jogging and fault reset.

0: Keypad running command channel("LOCAL/REMOT" light off)

Control run command through RUN, STOP/RESET and MF keys on control panel (set

multifunction key s to JOG by F10.00). Refer to Chapter 4 about the operation of control keypad

1: Terminal running command channel("LOCAL/REMOT" LED is ON)

 Control run command via DI terminals. Perform FORWARD and REVERSE by DI terminals.The Keypad STOP invalid.

2: Terminal running command channel("LOCAL/REMOT" LED is ON)

Control run command via DI terminals. Perform FORWARD and REVERSE by DI

terminals. The Keypad STOP valid.

3: Communication run command channel("LOCAL/REMOT" LED is FLASH)

 Master device is able to control run command through built-in RS485 serial communication interface of drive.The Keypad STOP invalid.

4: Communication running command channel("LOCAL/REMOT" LED is FLASH)

Master device is able to control run command through built-in RS485 serial communication interface of drive.The Keypad STOP valid.

Run command from control panel, terminals and communication can be switched by terminals"run command switched to control panel control", "run command switched to terminal control" and "run command switched to communication control".

Multifunction key S can be set to "run command sources shifted" key through parameter F10.00. When S key is pressed under this setting, run command will be shifted during control panel control, terminal control and communication control circularly.

Function code	Name	Setup range	Default Value	Modifi– cation	Add.
F02.01	Binding command source to frequency source	000~AAA	000	○	0x201

This parameter defines the bundled combination of three run command sources and frequency reference sources with the purpose of facilitating simultaneous switching.

Refer to parameter F01.00 for details regarding above-mentioned sources of frequency reference.

Different run command sources can be bundled with the same frequency reference source.

The priority of frequency reference sources bundled with run command overrides F01.00~F01.05.

Ones:Binding keyboard command to frequency source
0: No function
1: Keypad digital setting
2: Keypad potentiometer setting
3: Analog AI1 setting
4: Analog AI2 setting
5: Analog AI3 setting
6: High-speed pulse DI5 setting
7: Multi-speed running setting
8: Simple PLC program setting
9: PID control setting
A: Communication setting

Tens: Binding terminal command to frequency source

0–9, same as Ones

Hundreds:Binding communication command to frequency source

0–9, same as Ones

Function code	Name	Setup range	Default Value	Modifi– cation	Add.
F02-02	Rotation direction	0~1	0	○	0x202

0: Runs at the default direction, the AC drive runs in the forward , FWD / REV LED is OFF.

1: Runs at the reverse direction. the AC runs in the reverse , FWD / REV LED is ON

Modify the function code to shift the rotation direction of the motor. This effect equals to the shifting the rotation direction by adjusting either two of the motor lines (U, V, W).

Note: When the function parameter come back to the default value, the motor's running direction will come back to the default state, too. In some cases it should be used with caution after commissioning if the change of rotation direction is disabled.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.03	Start-up mode	0~2	0	○	0x203

This parameter takes effect during the process of transition from stop status to run status.

0: From start frequency

When drive starts to run from stop status, it starts from start frequency F02.04 and keeps this frequency for a period of time set by F02.05, and then accelerated to frequency reference in accordance with the Accel method and time.

1: Start-up after speed tracing :

The AC drive automatically track the speed and direction of the motor for rotating the motor in smooth start.Apply to certain high inertia loads with rotation of the occasion when the starter motor rotor, like rotating fan, etc.

1: DC braking/Pre excitation start

To make the motor stop completely, the drive will perform DC braking with a certain period of time, as specified by F02.06,F02.07, then start from start frequency F02.04, keeping a period of time as specified by F02.05, and then accelerate to frequency reference.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.04	Starting frequency of direct start	0.00~10.00Hz	0.00Hz	×	0x204
F02.05	Retention time of the starting frequency	0.0~100.0s	0.0s	×	0x205

Start frequency is initial output frequency of drive start from stop status. Start frequency holding time is the continuous run time with start frequency. After this holding time, the drive will accelerate to set frequency. Usually appropriate start frequency and holding time assure the starting torque of heavy-duty load.

Provided that set frequency is lower than start frequency, drive output frequency is 0 Hz. Start frequency and start frequency holding time take effect at the moment of motor start, as well as the transfer between forward and reverse. Accel time excludes the holding time of start frequency.
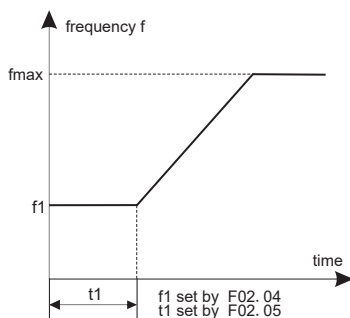
frequency f

fmax

f1

time

t1

f1 set by F02. 04
t1 set by F02. 05

Function code	Name	Setup range	Default Value	Modification	Add.
F02.06	DC injection braking level/ Pre excitation level	0.0~100.0%	50.0%	×	0x206
F02.07	DC injection braking active time/ Pre-excitation active time	0.0~1000.0s	0.0s	×	0x207

The AC drive will carry out DC injection braking level/Pre excitation level set before starting and it will speed up after the DC injection braking active time/Pre-excitation active time. If the time is set to 0, the DC injection braking/Pre excitation is invalid.

The stronger the braking current, the bigger of the braking power. The DC injection braking level/Pre excitation level before starting means the percentage of the rated current of the AC drive.

Function code	Name	Setup range	Default Value	Modification	Add.
F02.09	Stop Mode	0: Decelerate to stop 1: Coast to stop	0	○	0x209

0: Decelerate to stop: after the stop command because valid, the AC drive decelerates to decrease the output frequency, during the set time. When the frequency decrease to 0Hz , the AC drive stop.

1: Coast to stop: after the stop command becomes invalid, the AC drive ceases the output immediately. And the load coasts to stop at the mechanical inertia.

Function code	Name	Setup range	Default Value	Modification	Add.
F02.10	Starting frequency of DC braking	0.00~F01.07(Max. frequency)	0.00Hz	○	0x20A
F02.11	Waiting time of DC braking	0.0~1000.0s	0.0s	○	0x20B
F02.12	Stopping DC braking current	0.0~100.0%	50.0%	○	0x20C
F02.13	Stopping DC braking time	0.0~1000.0s	0.0s	○	0x20D

The starting frequency of stop braking: the AC drive will carry on stop DC braking when the frequency is arrived during the procedure of decelerating to stop.

The waiting time of stop braking: before the stop DC braking, the AC drive will close output and begin to carry on the DC braking after the waiting time. This function is used to avoid the overcurrent fault caused by DC braking when the speed is too high.

Stop DC braking current: the DC brake added. The stronger the current, the bigger the DC braking effect.

The braking time of stop braking: the retention time of DC brake. If the time is 0, the DC brake is invalid. The AC drive will stop at the set deceleration time.

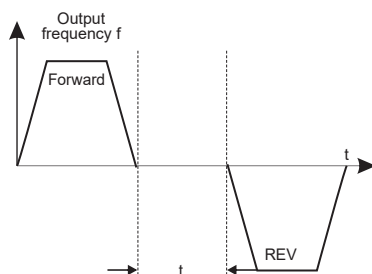| Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.14	Reverse disabled	0~1	0	○	0x20E

0: Reverse enabled

1: Reverse disabled

In some applications, reverse is likely to result in equipment damage. This parameter is used to prevent reverse running.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.15	Dead time of FWD/REV rotation	0.0~3000.0s	0.0s	○	0x20F

The dead time with 0Hz output during the transition from forward to reverse, or from reverse to forward is indicated by letter "t" in Fig

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F02.16	The protection of the terminals command	0~1	0	○	0x210

When the running commands are controlled by the terminal, the system will detect the state of the running terminal during powering on.

0: The terminal running is invalid when powering on. Even the running command is detected to be valid during/powering on, the AC drive won't run and the system keeps in the protection state until the running command is canceled and enabled again.

1: The terminal running command is valid when powering on. If the running command is detected to be valid during powering, the system will start the AC drive automatically after the initialization.

Note: This function should be selected with cautions, or serious result may follow.

Function code	Name	Setup range	Default Value	Modification	Add.
F02.17	Reserved			○	0x211

Function code	Name	Setup range	Default Value	Modification	Add.
F02.19	Energy braking seclection	0~1	1	○	0x213

0: Disabled

1: Enabled

When dynamic brake is enabled, the electric energy generated during Decel shall be converted into heat energy consumed by braking resistor, so as to attain rapid Decel. This brake method applies to brake of high-inertia load or the situations that require quick stop. In such a case, it is necessary to select appropriate dynamic braking resistor and brake chopper. The drives equal and below 30kW are provided with a standard inbuilt brake chopper. Inbuilt brake chopper is optional for drives 37kW~75kW.

Function code	Name	Setup range	Default Value	Modification	Add.
F02.20	Energy braking threshold voltage	600.0~800.0V	700V	○	0x214
F02.21	Brake use ratio	0.0%~100.0%	100.0%	○	0x215

 Two parameters takes effect only to the drives with inbuilt brake chopper. If F02.19 is set to 1, when bus voltage of drive attains the value of F02.20, Energy brake shall perform. The energy shall be rapidly consumed through braking resistor. This value is used to regulate the brake effect of brake chopper.

F02.21 is used to adjust the duty ratio of the dynamic braking unit. The higher the value is, the higher the duty ratio of the braking unit is and the stronger the braking effect is. However, the voltage of the inverter bus during the braking process fluctuates greatly.

Function code	Name	Setup range	Default Value	Modification	Add.
F02.22	The coefficient of Magnetic flux braking	0~200	64	○	0x216

When overexcitation brake is enabled in case of stop by Decel, the motor shall transform the electric energy generated during Decel into heat energy by increasing magnetic flux so as to attain rapid stop. If this parameter is enabled, the Decel time will be shortened. If over excitation brake is disabled, the Decel current of motor will decrease and the Decel time will be lengthened.

Note: the current version of the flux brake is only valid for VF control.

Group F03
Acc/Dec Parameters

Function code	Name	Setup range	Default Value	Modification	Add.
F03.00	Acc-time 1	0.0~6500.0s	Model dependent	○	0x300
F03.01	Dec-time 1	0.0~6500.0s	Model dependent	○	0x301
F03.02	ACC time2	0.0~6500.0s	Model dependent	○	0x302
F03.03	DEC time2	0.0~6500.0s	Model dependent	○	0x303
F03.04	ACC time3	0.0~6500.0s	Model dependent	○	0x304
F03.05	DEC time3	0.0~6500.0s	Model dependent	○	0x305
F03.06	ACC time4	0.0~6500.0s	Model dependent	○	0x306
F03.07	DEC time4	0.0~6500.0s	Model dependent	○	0x307

Accel time means required time for drive to Accelerate to maximum frequency F01.07 from 0HZ frequency;

Dccel time means required time for drive to Decelerate to 0HZ frequency from maximum frequency F01.07 ;

These four types of Accel/Decel time can be selected through the ON/OFF combination of DI terminals "Accel/Decel time determinant 1" and "Accel/Decel time determinant 2". See Table.

Terminal 2	Terminal 1	Dec/Acc time selection	Correspondence parameters
OFF	OFF	Dec and Acc time 1	F03.00/F03.01
OFF	ON	Dec and Acc time 2	F03.02/F03.03
ON	OFF	Dec and Acc time 3	F03.04/F03.05
ON	ON	Dec and Acc time 4	F03.06/F03.07

NOTE:

When the drive is running under simple PLC, the Accel time and Decel time are determined by simple PLC related parameters, not by the DI terminals. See Group F21 for details.

When Accel/Decel of broken-line style is selected, Accel/Decel time is automatically switched to Accel/Decel time 1 and 2 according to switching frequency (F03.10,F03.11). Under this circumstance, Accel/Decel time selection terminals are disabled.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F03.08	Jogging ACC time	0.0~6500.0s	20.0s	○	0x308
F03.09	Jogging DEC time	0.0~6500.0s	20.0s	○	0x309

Accel time means required time for drive to Accelerate to maximum frequency F01.07 from 0Hz frequency;

Dccel time means required time for drive to Decelerate to 0Hz frequency from maximum frequency F01.07 ;

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F03.10	Switching frequency of ACC time 1, 2	0.00~F01.07(Max. frequency)	0.00Hz	○	0x30A
F03.11	Switching frequency of DEC time 1, 2	0.00~F01.07(Max. frequency)	0.00Hz	○	0x30B

This function selects acceleration/deceleration time according to running frequency range during drive running. This function is active only when motor 1 is selected and acceleration/deceleration time is not switched over via external DI terminal.

During acceleration, if the running frequency is below F3.10, acceleration time 2 is selected. If it is above F3.10, acceleration time 1 is selected.

During deceleration, if the running frequency is above F3.11, deceleration time 1 is selected. If it is below F3.11, deceleration time 2 is selected
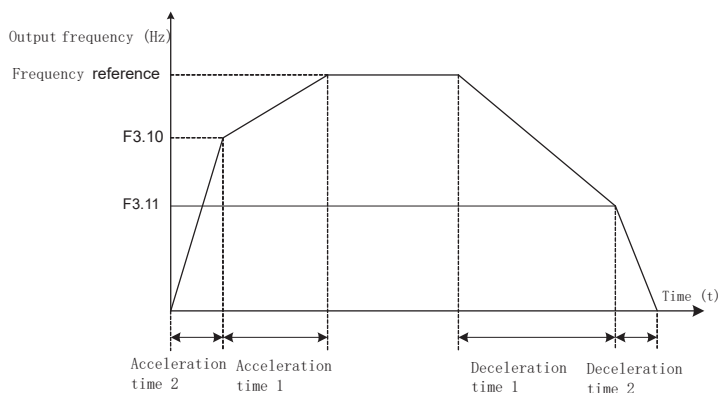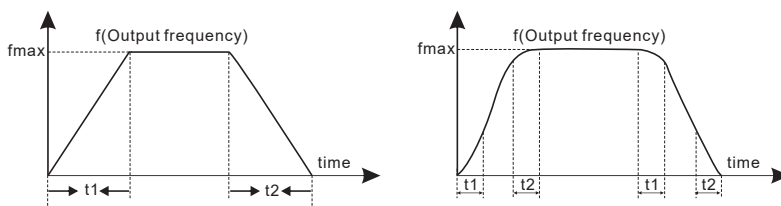
Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F03.12	ACC/DEC selection	0~1	0	×	0x30C
F03.13	S curve start ratio	0.0~(100.0~F03.14)%	30.0%	×	0x30D
F03.14	S curve end ratio	0.0~(100.0~F03.13)%	30.0%	×	0x30E

F3.12 set starting and running frequency mode selection .

0:   line type; the output frequency by line increment or decrement.

1:   S curve type; output frequency by increases or decreases according of S curve.

S curve is generally used to relatively flat occasion for the start and stop the process , such as elevators, conveyor belt.

Instruction: t1is the start segment ratio of the S curve,
t2 is the end segment ratio of the S curve.

Group F04
V/F Control Group

Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F04.00	Motor 1V / F curve setting	0~3	0	X	0x400
F04.01	V/F frequency 1 of motor 1	0.00Hz~F04.03	0.00Hz	X	0x401
F04.02	V/F Voltage 1 of motor 1	0.0%~100.0%(motor1 rated voltage)	0.0%	X	0x402
F04.03	V/F frequency 2 of motor 1	F04.01~F04.05	25.00Hz	X	0x403
F04.04	V/F Voltage 2 of motor 1	0.0%~100.0%(motor1 rated voltage)	50.0%	X	0x404
F04.05	V/F frequency 3 of motor 1	F04.03~F02.02 (motor1 rated frequency)	50.00Hz	X	0x405
F04.06	V/F Voltage 3 of motor 1	0.0%~100.0%(motor1 rated voltage)	100.0%	X	0x406

Set the relation between output voltage and output frequency of the drive when motor 1 is under V/f control.

0: Straight line V/F curve

Applies to general constant-torque load. When drive output frequency is 0, output voltage will be 0, while when output frequency is rated frequency of motor, the output voltage would be rated voltage of motor.

1: Multi-dots V/F curve (determined by F04.01~F04.06)

Applies to spin drier, centrifuge, industrial washing machine and other special loads. When drive output frequency is 0, output voltage will be 0, while when output frequency is rated frequency of motor, the output voltage would be rated voltage of motor. What is different is this pattern can set 4 inflection points by F04.01~F04.06. See below Fig.

2: parabol power V/F curve

it apply to torque-dropped loads such as fans and water pumps. See Fig.

3: V/F separation

Output frequency and output voltage can be set separately. Frequency is set by the method as stated In Group F01. Output voltage Is set by F04.22. See F04.22 for details. This mode applies to variable-frequency power supply or torque motor control etc.

Note:V1<V2<V3, f1<f2<f3.Too high low frequency voltage will heat the motor excessively or cause damage. The AC drive may install when overcurrent of overcurrent protection.
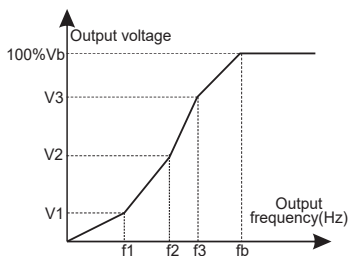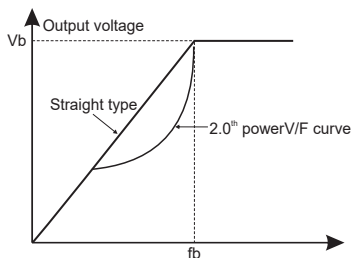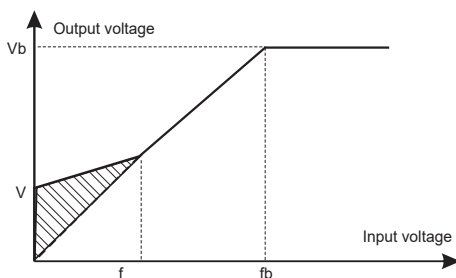
Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.07	Torque boost of motor 1	0.0%(automatic torque boost) 0.1%~30.0%(Manual torque boost)	Model de-pendent	○	0x407
F04.08	Frequency limit of torque boost of motor1	0.00~F01.07(Max. frequency)	50.00Hz	X	0x408

Torque boost to the output voltage for the features of low frequency torque. F04.07 is for the percentage of the rated motor voltage Vb. In practical application, torque boost should be selected according to the load. The bigger the load is, the bigger the boost is. Too bigger torque is inappropriate because the motor will run with over-magnetic,and the current of the AC drive will increase to raise the temperature of the AC drive and decrease the efficiency.

When the torque boost is set to 0.0%, the AC drive is automatic torque boost, and AC drive interior will according to the motor stator resistance value and the actual running current to make compensation for stator resistance voltage.

F04.08 define a manual cut-off frequency of torque boost is relative to percentage of the motor rated frequency fb. Torque boost threshold: under the threshold, the torque boost is valid, but over the threshold, the torque boost is invalid.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.09	V/F oscillation suppres-sion gain of motor 1	0~100	Model de-pendent	○	0x409

Under V/f control, speed and current oscillation is likely to occur due to load vibration, and may lead to system failure even over current protection. This is particularly obvious during no-load or light-load applications. The appropriate setting of parameter values of F04.09 would effectively suppress speed and current oscillation. In many case it is not necessary to modify the default setting. Please make progressive change around default setting, since excessive setting will influence V/f control performance.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.22	Voltage setting on V/F separated pattern	0~9	0	○	0x416
F04.23	Keypad setting voltage	0.0~Motor rated voltage	0.0v	○	0x417
F04.24	Voltage ACC time	0.0~1000.0s	0.0s	○	0x418
F04.25	Voltage DEC time	0.0~1000.0s	0.0s	○	0x419

This parameter is valid when F4.00 is set to 3

0: Keypad digital setting(F04.23)
1: Keypad potentiometer setting
2: Analog AI1 setting
3: Reserved
4: Reserved
5: High-speed pulse DI5 setting
6: Multi-step Freq running setting
7: Simple PLC program setting
8: PID control setting
9: Communication setting

Voltage ACC time of V/F separation indicates time required by voltage to rise from 0 to rated motor voltage.

Voltage DEC time of V/F separation indicates time required by voltage to decline from rated motor voltage to 0.

Note:

F04.22 100.0% of the set value corresponds to the rated voltage of the motor;

Please refer to the frequency source setting for details.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.26	Automatic current limit action selection	0: Disable 1: Enable	1	X	0x41A
F04.27	Automatic current limit	50.0~200.0%	150	X	0x41B

During the AC drive in the accelerate operation, the load too large lead to international motor speed is lower than the increase rate of the output frequency. If without take measures, it will result in accelerated over-current fault and caused the drive trip.

Comparison the limit protection during the operation of the AC drive by detecting the output current and the current limit level F04.27, when the level exceeds the limit as well as in the acceleration running, the AC drive running steadily. If it constant speed operation, the AC drive drop-run. If it sustained over current limit level, the output frequency will continue to fall until to the lower limit frequency. When detected again the output current is below the current limit level, the continue to accelerate running.

F04. 26~F04. 27
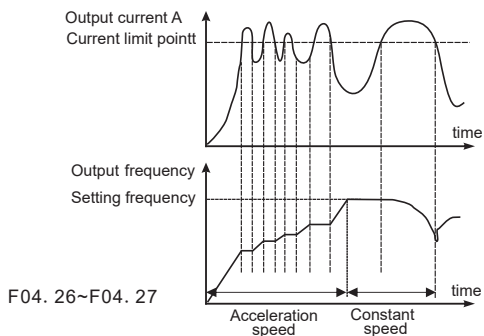
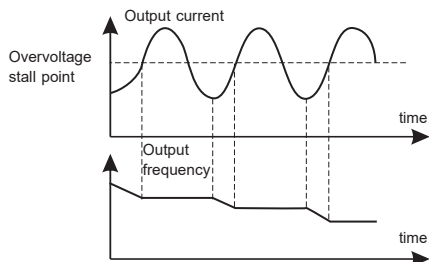| Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F04.30	Over-voltage stall protection	0: Invalid 1: Stall protection mode 1	1	X	0x41E
F04.31	Voltage protection of over-voltage stall	650.0V~800.0V	720.0V	X	0x41F

F04.30 Set Over-voltage stall protection mode

0: Invalid
1: Stall protection mode 1

During the deceleration process of the AC drive, when the DC bus voltage exceeds the over-voltage stall protection voltage, the AC drive will gradually slow down the frequency drop with the voltage until the frequency drop stops and remains at the current operating frequency. After the bus voltage drops, the converter will continue to slow down.

Set overpressure stall protection point on F04.31

Group F05
Motor 1 Parameter Group

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F05.00	Motor 1 type	0~1	0	×	0x500

0: Ordinary asynchronous motor
1: AC drive motor

The major difference between ordinary motor and variable frequency motor lies in the handling of motor overload protection. Under low speed run, ordinary motor has poor heat dissipation,so motor overload protection shall be derated at low speed. Since fan-based heat dissipation of variable frequency motor is not affected by motor speed, low-speed overload protection is not necessarily derated.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F05.01	Rated power of motor 1	0.1~1000.0kW	Model de-pendent	×	0x501
F05.02	Rated voltage of motor 1	0~1200V	Model de-pendent	×	0x502
F05.03	Rated current of motor 1	0.1~6000.0A	Model de-pendent	×	0x503
F05.04	Rated frequency of motor 1	0.01~F01.07(Max. frequency)	50.00Hz	×	0x504
F05.05	Rated speed of motor1	1~36000rpm	Model de-pendent	×	0x505

The function parameter is used to set the asynchronous motor nameplate parameters. Regardless use the V/F control or vector control, in order to ensure the performance of control, it must be in accordance with the asynchronous motor nameplate parameter and set to the correct F05.01~F05.05 value. In addition, please be noted that, if the power of motor and AC drive standard fitness machine, the distribution power gap is too large (over two files of the power), that the control performance of the AC drive will significantly decreased as well. AC drive provides parameter auto-tuning function. Accurate parameter auto-tuning depends on proper setting of the motor nameplate parameters.

Note:Reset the motor rated power (F05.01), you can initialize F05. 02~F05. 10 motor parameters.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F05.06	Stator resistance of motor 1	0.001~65.535Ω	Model de-pendent	×	0x506
F05.07	rotor resistance of motor 1	0.001~65.535Ω	Model de-pendent	×	0x507
F05.08	leakage inductance of motor 1	0.01~655.35mH	Model de-pendent	×	0x508
F05.09	Mutual inductance of motor 1	0.01~655.35mH	Model de-pendent	×	0x509
F05.10	Non-load current of motor 1	0.1A~F05.03	Model de-pendent	×	0x50A

F05.06 ~ F05.10 is asynchronous motor 1 identification parameters, these parameters are not showed in general motor nameplate, they need to obtain from AC drive's auto-tuning on motor parameters. Dynamic auto-tuning can acquire F05.06~F05.10 all the parameters, static auto-tuning only get 3 parameters of F05.06~F05.08 ,the other parameters remain the factory default value.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F05.26	Motor 1 parameter autotuning	0~2	0	×	0x51A

0: No operation

1: Rotation autotuning: Comprehensive motor parameter autotune. It is recommended to use rotation autotuning when high control accuracy is needed.

2: Static autotuning: It is suitable in the cases when the motor can not de-couple from the load. The antotuning for the motor parameter will impact the control accuracy.

# Group F06:
Motor 1 Vector Control Parameters

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.00	Speed loop proportional gain 1	1~100	30	○	0x600
F06.01	Speed loop integral time 1	0.01~10.000s	0.50s	○	0x601
F06.02	Low switching frequency	0.00Hz~F06.05	5.00Hz	○	0x602
F06.03	Speed loop proportional gain 2	1~100	20	○	0x603
F06.04	Speed loop integral time 2	0.01~10.00s	1.0s	○	0x604
F06.05	High switching frequency	F06.02~F01.07（Max. frequency）	10.00Hz	○	0x605

F06.00 to F06.05 are speed loop PI parameters.

If running frequency ≤ F06.02(Switchover frequency 1), PI parameters are F06.00 and F06.01.

If running frequency ≥ F06.05(Switchover frequency 2), PI parameters are F06.03 and F06.04.

If running frequency is between F06.02 and F06.05, PI parameters are obtained from linear switchover between two groups of PI parameters, as shown in Figure.
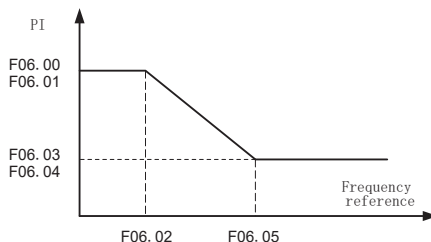
To improve the system response, increase the proportional gain or reduce the integral time. Remember to increase proportional gain first to ensure that the system does not oscillate, and then reduce integral time to ensure that the system has quick response and small overshoot.

NOTE:

Incorrect PI setting may cause large speed overshoots and a fast falling speed drop may cause an overvoltage on the DC bus.

Function code	Name	Setup range	Default Value	Modification	Add.
F06.06	ASR feedback input filtering time	0.000~0.100s	0.015s	○	0x606

This parameter takes effect only when Motor control technique is FVC. You can improve motor stability by increasing F06.07. Be aware that this may slow dynamic response. Decreasing it will obtain quick system response but may lead to motor oscillation. Adjustment of this parameter is not required normally

Function code	Name	Setup range	Default Value	Modification	Add.
F06.07	Current loop percentage coefficient KP1	0~60000	Model dependent	○	0x607
F06.08	Current loop integral coefficient KI1	0~60000	Model dependent	○	0x608
F06.09	Current loop percentage coefficient KP2	0~60000	Model dependent	○	0x609
F06.10	Current loop integral coefficient KI2	0~60000	Model dependent	○	0x60A

 These function parameters are vector control current loop PI parameters. They are obtained frommotor auto-tuning. Adjustment of these parameter is not required normally.

The dimension of current loop integral regulator is integral gain rather than integral time. Very large current loop PI gain may lead to control loop oscillation. When current oscillation or torque fluctuation is great, decrease the proportional gain or integral gain.

Function code	Name	Setup range	Default Value	Modification	Add.
F06.11	Electric torque upper limit setting source selection	0~6	Model dependent	○	0x60B

In the speed control mode, there are 6 ways to set the upper limit source of electric torque, which can be selected by F06.11.

0: Keypad digital setting(F06.13)
1: Keypad potentiometer setting
2: Analog AI1 setting
3:Reserved
4:Reserved
5: High-speed pulse DI5 setting
6: Communication setting

Note: Full range of values 1~6 corresponds to the digital setting of F06.13.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.12	Braking torque upper limit setting source selection	0~6	Model de-pendent	○	0x60C

In the speed control mode, there are 6 ways to set the upper limit source of braking torque, which can be selected by F06.12.

0: Keypad digital setting(F06.14)
1: Keypad potentiometer setting
2: Analog AI1 setting
3: Reserved
4: Reserved
5: High-speed pulse DI5 setting
6: Communication setting
Note: Full range of values 1~6 corresponds to the digital setting of F06.14.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.13	Keypad digital setting of electric torque	0.0~200.0%（Motor rated current）	150.0%	○	0x60D
F06.14	Keypad digital setting of braking torque	0.0~200.0%（Motor rated current）	150.0%	○	0x60E

F06.11 is set as 0: when the upper torque limit is set digitally, the upper torque full range of the electric state is set as F06.13.

F06.12 is set as 0: when the upper limit of torque is set numerically, the upper full range of torque in power generation state is set as F06.14.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.15	Torque limit coefficient influx weakening	50~200	100	○	0x60F

Under the pattern of SVC or FVC speed control, and when the drive is running at frequency higher than rated frequency (flux weakening zone), appropriate torque limit coefficient can effectively improve the performance of output torque and Accel/Decel characteristics.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F06.16	Compensation coefficient of slip	50%~200%	100%	○	0x610

This function improves control performance in SVC/FVC .

For FVC , it can adjust output current of the AC drive. Decrease this parameter

gradually when a large rating AC drive is controlling a lightly loaded motor. Adjustment of this

parameter is not required normally.

Group F09:
Torque Control Parameters

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F09.00	Speed/Torque control selection	0~1	0	X	0x900

This function parameter determines whether the AC drive is in speed control or torque control.

0: Speed control

1: Torque control

The AC drive has two digital input functions related to torque control, function 42 "Speed control/Torque control" and function 43 "Torque control prohibited" . The two functions must be used together with parameter F09.00 to implement switchover between speed control and torque control.

When function 42 is enabled, the control mode is determined by setting of F09.00.

When function 42 is disabled, the control mode is reverse to setting of F09.00.

When function 43 is enabled, the AC drive always run in speed control no matter whether function 42 is enabled or disabled.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F09.01	Torque setting source in torque control	0~6	0	○	0x901
F09.02	Torque digital setting in torque control	-200.0%~200.0%	150.0%	○	0x902

These two function parameters select channel of setting torque reference in torque control.

0: Keypad digital setting(F09.02)

1: Keypad potentiometer setting

2: Analog AI1 setting

3: Reserved

4: Reserved

5: High-speed pulse DI5 setting

6: Communication setting

Torque reference is a relative value. 100.0% corresponds to rated AC drive torque (can be viewed in F99.06). When torque reference is a positive value, the AC drive runs in forward direction. When torque reference is a negative value, the AC drive runs in reverse direction.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F09.03	ACC time in torque control	0.00~650.00s	0.00s	○	0x903
F09.04	DEC time in torque control	0.00~650.00s	0.00s	○	0x904

These function parameters set acceleration/deceleration time in torque control to implement smooth change of motor speed. This helps to prevent problems such as big noise or too large mechanical stress caused by quick change of motor speed.

But in applications where rapid torque response is required, for example, two motors are used to drive the same load, you need to set these two parameters to 0.00s.

For example, two motors drive the same load. To balance the load level of the two motors, set one drive as master in speed control and set the other as slave in torque control.

The slave will follow output torque of the master as its torque reference, which requires quick response to the master output torque. In this case, set acceleration/deceleration time of the slave in torque control to 0.00s.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F09.05	Reserved	0~6	0	○	0x905
F09.06	Torque control forward rotation upper limit frequency keyboard limit value	0.00Hz~F01.07（Max. frequency）	50.0Hz	○	0x906

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F09.07	Reserved	0~6	0	○	0x907
F09.08	Torque control reverse rotation upper limit frequency keyboard limit value	0.00Hz~F01.07（Max. frequency）	50.0Hz	○	0x908

Group F10:
Keypad Operation and LED Display

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F10.00	The key of S function selection	0~6	1	×	0x0A00

0: No function

1: Forward jog, Press S key to begin the jogging FWD running.

2: Reverse jog, Press S key to begin the jogging REV running.

3: Forward/reverse switchover, Press S to shift the displayed function code from right to left.

4: Run command sources shifted,

 when F02.00 set as 0, S key command source switch is invalid.

 when F00.01 set as 1 or 2(terminal), S key can achieve the switch between terminals and operation panels

 When F00.01 set as 3 or 4(communication), S key can achieve the switch between communication and operation panels.

5: Clear the date of exact stop

Note:

When S key is used for forward/reverse switching (F10.00=3), the inverter will not remember the state after switching after power off.

When switching command channels using the S key (F10.00=4), if F02.00 is set to 0, the S key command source switch is invalid.When F02.00 is set to 1 or 2 (terminal), switch between terminal and operation panel can be achieved by S key.When F02.00 sets bit 3 or 4 (communication), the switch between communication and operation panel can be realized through S key.

When S key is used to clear the data during the accurate stop process (F10.00=5), it means that after pressing S key, the current count value, current length and current running time are all cleared 0.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F10.01	Display parameter setting 1 on run status	0~65535	53	○	0x0A01

The F10.01 Parameter Setting Function Table

Parameters	DEC	Parameters	DEC
Running frequency（Hz ON）	2^0=1	Setting frequency（Hz flickering）	2^1=2
Bus voltage（V ON）	2^2=4	Output voltage（V ON）	2^3=8
Output current（A ON）	2^4=16	Motor speed(rpm ON)	2^5=32
Output power（% ON）	2^6=64	Output torque（% ON）	2^7=128
PID reference（% ON）	2^8=256	PID feedback（% ON）	2^9=512
DI terminal state	2^{10}=1024	DO terminal state	2^{11}=2048
AI1(V on)	2^{12}=4096	Reserved	2^{13}=8192
Reserved	2^{14}=16384	Linear speed	2^{15}=32768

When the converter is running, the specified parameters in F10.01 need to be displayed. It is only necessary to add the decimal corresponding to all display parameters and fill in F10.01

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F10.02	Display parameter setting 2 on run status	0~65535	0	○	0x0A02

The F10.02 Parameter Setting Function Table

Parameters	DEC	Parameters	DEC
PLC current segment number	2^0=1	Pulse count value	2^1=2
Length value	2^2=4	Torque setting value（% ON）	2^3=8
Pulse DI5 frequency	2^4=16	Load speed	2^5=32
IGBT temperature	2^6=64	AC input voltage	2^7=128
Encoder feedback speed	2^8=256	Reserve	

When the converter is running, the specified parameters in F10.02 need to be displayed. It is only necessary to add the decimal corresponding to all display parameters and fill in F10.02

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F10.04	Display parameter setting on stop status	0~65535	7	○	0x0A04

The F10.04 Parameter Setting Function Table

Parameters	DEC	Parameters	DEC
Setting frequency（Hz flickering）	2^0=1	Motor speed(rpm ON)	2^1=2
Bus voltage（V ON）	2^2=4	AC input voltage（V ON）	2^3=8
DI terminal state	2^4=16	DO terminal state	2^5=32
PID reference （% ON）	2^6=64	PID feedback（% ON）	2^7=128
AI1(V on)	2^8=256	Reserved	2^9=512
Reserved	2^{10}=1024	Length value	2^{11}=2048
Pulse count value	2^{12}=4096	PLC current segment number	2^{13}=8192
Load speed	2^{14}=16384	Pulse Di5 frequency	2^{15}=32768

When the converter is running, the specified parameters in F10.04 need to be displayed. It is only necessary to add the decimal corresponding to all display parameters and fill in F10.04

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F10.09	Load speed display coefficient	0.001~ 65. 000	1.000	○	0x0A09
F10.10	Number of decimal places for loadspeed display	0.Zero decimal point 1.One decimal point 2.Two decimal points 3.Three decimal points	0	○	0x0A0A

When the display of load speed is needed, the corresponding relationship between the output frequency of the AC drive and the load speed can be adjusted by F10.09, and the decimal number displayed in the load speed can be set by F10.10. With these two parameters, the user can match the display value of the load speed of the decimal point corresponding to the output frequency.

Group F11
Digital Input Terminal Group

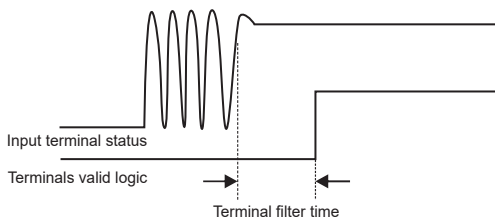| Function code	Name	Setup range	Default Value	Modifi- cation	Add.
F11.00	DI1 terminals function selection	0: No function 1: Forward 2: Reverse	1	×	0x0B00
F11.01	DI2 terminals function selection	3: Three-wire control operation 4: Forward Jogging 5: Reverse Jogging 6: Coast to stop	2	×	0x0B01
F11.02	DI3 terminals function selection	7: External STOP terminal 1 8: External STOP terminal 2(DEC time4) 9: Immediate DC injection braking 10: DEC DC injection braking	4	×	0x0B02
F11.03	DI4 terminals function selection	11: Run Pause 12: Fault reset 13: Shift the command 1 14: Shift the command 2	12	×	0x0B03
F11.04	DI5 terminals function selection	15: Shift frequency command 16: Terminal UP 17: Terminal DOWN 18: Clear UP/DOWN (including ∧/∨	0	×	0x0B04
F11.05	DI6 terminals function selection	key) adjustment 19: Multi-step speed terminal 1 20: Multi-step speed terminal 2	0	×	0x0B05
F11.06	DI7 terminals function selection (extension card function)	21: Multi-step speed terminal 3 22: Multi-step speed terminal 4 23: PLC status reset 24: PID parameters switching	0	×	0x0B06
F11.07	DI8 terminals function selection (extension card function)	25: Reserved 26: PID action direction reverse 27: PID pause 28: Pulse input (valid only for DI5)	0	×	0x0B07
F11.08	DI9 terminals function selection (extension card function)	29: Swing pause 30: Counter input 31: Counter reset 32: Length count input	0	×	0x0B08
F11.09	DI10 terminals function selection (extension card function)	33: Length reset 34: Clear the current running time 35: Reverse prohibited 36: DEC/ACC time 1 37: DEC/ACC time 2 38: DEC/ACC disabling 39: External fault input 1 40: External fault input 2 41: Reserved 42: Speed control/Torque control switchover 43: Torque control prohibited	0	×	0x0B09

Terminal Function Explained in Details

Setting Value	Function	Instruction
0	No function	Even if there is a signal input, the AC drive remain the same. Unused terminal was set to NO Function to prevent the wrong action.
1	Forward rotation operation	Through the external terminal to control the AC drive forward and reverse running.
2	Reverse rotation operation	
3	3-wire control operation	There are two-wire control and three-wire control about Forward (FWD) and reverse (REV).In case of three-wire control is enabled, "three-wire control" terminal is activated. For details, refer to F11.13 (FWD/REV terminal control mode).
4	Forward jogging	Jogging frequency, jogging acceleration and deceleration time, please refer to F01.11、F03.08、F03.09
5	Reverse jogging	
6	Coast to stop	AC drive without output, the motor is not controlled by the AC drive. For the large inertia load and no requirements for the stopping time
7	External STOP terminal 1	In operation panel control, the terminal set for this function can be used to stop the AC drive, equivalent to function of the STOP key on the operation panel.
8	External STOP terminal 2	This function enables the AC drive to decelerate to stop in any control mode (operation panel, terminal or communication). In this case, the deceleration time is deceleration time 4(F03.07).
9	Immediate DC injection braking	Once the terminal set for this function becomes on, the AC drive directly switches over to DC injection braking state.
10	DEC DC injection braking	When terminal set for this function becomes on, the AC drive decelerates to DC injection braking frequency(F02.10) threshold and then switches over to DC injection braking state.
11	Operation Pause	The AC drive deceleration stop, but all the operating parameters are memory state. Such as, PLC parameters, the frequency of the swing parameters and PID parameters. This signal disappears, the AC drive resume to the previous state before the stop.
12	Fault reset	Same function with the Keypad on the STOP/RESET reset and used to achieve remote fault reset.
13	Shift the command 1	If command source is terminal control (F02.00 = 1,2), this terminal is used to perform switchover between terminal control and operation panel control. If command source is communication control (F02.00 =3,4), this terminal is used to perform switchover between communication control and operation panel control.

Setting Value	Function	Instruction
14	Shift the command 2	Terminal set for this function is used to perform switchover between terminal control and communication control. If command source is terminal control, the AC drive switches over to communication control after the terminal becomes ON.
15	Shift frequency command	The terminal set for this function is used to perform switchover between two frequency reference setting channels according to setting in F01.04.
16	Terminal UP	The terminals selecting these two functions are used for increment and decrement when frequency reference is input via external DI terminal, or when frequency source is digital setting.
17	Terminal DOWN	
18	Clear UP/DOWN (including ∧/∨ key) adjustment	If the frequency source is digital setting, the terminal set for this function is used to clear the modification by using the UP/DOWN function or the increment/decrement key on the operation panel, restoring the frequency reference to the value of F01.04.
19	Multi-step speed terminal 1	Through the combination of the four terminals digital state can achieve 16 speed settings.
20	Multi-step speed terminal 2	Note: Multi segment speed terminal 1 is low-order, multi segment speed terminal 4 is high-order.
21	Multi-step speed terminal 3	
22	Multi-step speed terminal 4	

MS terminal 4	MS terminal 3	MS terminal 2	MS terminal 1
BIT3	BIT2	BIT1	BIT0

Setting Value	Function	Instruction
23	PLC status reset	Restart the simple PLC process, clear the previous PLC state memory information.
24	PID parameters switching	PID parameters are F19.05~F19.07 when terminal set for this function becomes off; PID parameters are F19.13~F19.15 when terminal set for this function becomes on.
25	Reserved	Reserved
26	PID action direction reverse	When terminal set for this function becomes on, PID operation direction is reversed to direction set in F19.04.
27	PID control pause	PID temporary failure, the AC drive maintain the current frequency output.
28	Pulse input (valid only for DI5)	DI5 is used for pulse input as frequency reference.
29	Swing pause	When terminal set for this function becomes on, the wobble function becomes disabled and the drive outputs center frequency.
30	Counter input	Terminal set for this function is used to count pulses.
31	Counter reset	Terminal set for this function is used to clear counter.
32	Length count input	Terminal set for this function is used to count pulses of the length signal.
33	Length reset	The terminal set for this function is used to clear length

Setting Value	Function	Instruction
34	Clear the current running time	Clear the running time this time.
35	Reverse prohibited	When terminal set for this function becomes on, reverse running of the AC drive is prohibited. It is the same as function of F02.14
36	Dec /Acc time 1	Through the combination of these two terminals to select 4 groups of acceleration and deceleration time:
37	Dec/ Acc time2	*(see table below)*

Terminal 2	Terminal 1	Dec/Acc time selection	Correspondence parameters
OFF	OFF	Dec and Acc time 1	F03.00/F03.01
OFF	ON	Dec and Acc time 2	F03.02/F03.03
ON	OFF	Dec and Acc time 3	F03.04/F03.05
ON	ON	Dec and Acc time 4	F03.06/F03.07

Setting Value	Function	Instruction
38	Dec/Acc disabling	To ensure that the AC drive is not affected by external signals (except for the shutdown command), to maintain the current output frequency.
39	External fault input 1	When the external fault signal sent to the AC drive, the AC drive display fault and shut down.
40	External fault input 2	
41	Reserved	Reserved
42	Speed control/ Torque control switchover	This function enables the AC drive to switch over between speed control and torque control. When terminal set for this function becomes off, the AC drive runs in the mode set in F09.00. When terminal set for this function becomes on, the AC drive switches over to the other control mode.
43	Torque control prohibited	When the terminal set for this function becomes on, torque control is disabled and the AC drive enters speed control.

Function code	Name	Setup range	Default Value	Modification	Add.
F11.10	Filtering time of digital input terminal	0.000~1.000s	0.010s	○	0x0B0A

Setting DI1~DI10 terminal sampling filter time. In the large disturbance conditions, this parameter should be increased to prevent misuse.

Input terminal status

Terminals valid logic

Terminal filter time

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F11.11	DI active mode selection 1	00000~11111	00000	X	0x0B0B
F11.12	Reserved			X	0x0B0C

These two function parameters set active mode of DI terminals.

0: High level active

If a high level voltage is applied to DI terminal, the DI signal will be seen as active. That is, the DI terminal becomes active when being connected with COM, and inactive when being disconnected from COM.

1: Low level active

If a low level voltage is applied to DI terminal, the DI signal will be seen as active. That is, the DI terminal becomes active when being disconnected from COM, and inactive when being connected with COM.

| F11.11 sets the polarity selection for DI1~DI5		F11.12 sets the polarity selection for DI5~DI10	
Ones:DI1	0:Positive logic 1:Negative logic	Ones:DI6	0:Positive logic 1:Negative logic
Tens:DI2	0:Positive logic 1:Negative logic	Tens:DI7	0:Positive logic 1:Negative logic
Hundreds:DI3	0:Positive logic 1:Negative logic	Hundreds:DI8	0:Positive logic 1:Negative logic
Thousand:DI4	0:Positive logic 1:Negative logic	Thousand:DI9	0:Positive logic 1:Negative logic
Ten thousand:DI5	0:Positive logic 1:Negative logic	Ten thousand:DI10	0:Positive logic 1:Negative logic

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F11.13	Terminals control running mode	0~3	0	X	0x0B0D

This parameter defines four different modes of controlling the operation of the inverter via the external terminal.

0: Two-line running mode
This mode is the most commonly used one . The forward/reverse rotation of the motor is decided by the commands of FWD and REV terminals .

K1	K2	Running Command
0	0	Stop
1	0	Forward Rotation
0	1	Reverse Rotation
1	1	Stop
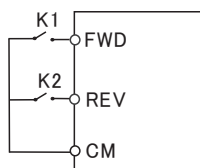
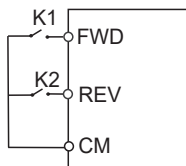Two-line Running 1

1:Two-line running mode

When this mode is adopted , REV is enabled terminal . The direction is determined by the status of FWD .

K1	K2	Running Command
0	0	Stop
1	0	Forward Rotation
1	1	Reverse Rotation
0	1	Stop

Two-line Running 2

2: Three-line running mode

In this mode , DIn is enabled terminal , and the direction is controlled by FWD and REV respectively .However , the pulse is enabled by disconnecting the signal of DIn terminal when the inverter stops .
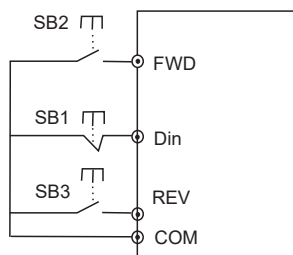
SB1: Stop button

SB2:Forward rotation button

SB3:Reverse rotation button

Three-line Running Mode 1

3: Three-line running mode

In this mode,DIn is enabled terminal , and the running command is given by FWD(pulse enabled), while the direction is determined by the status of REV .Stop command is performed by disconnecting the DIn signal .

K	Running Direction Selection
0	Forward Rotation
1	Reverse Rotation

SB1: Stop button
SB2: Running button
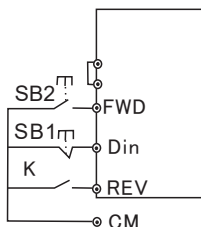
Three-line Running Mode 2

Function code	Name	Setup range	Default Value	Modification	Add.
F11.14	Terminal UP/DOWN rate	0.001Hz~65.000Hz	1.000Hz	○	0x0B0E

This parameter is used to set the step size of frequency adjustment UP/DOWN. The step size is defined as frequency change per second.

Function code	Name	Setup range	Default Value	Modification	Add.
F11.15	Switch-on delay of DI1 terminal	0.0~3600.0s	0.0s	X	0x0B0F
F11.16	Switch-off delay of DI1 terminal	0.0~3600.0s	0.0s	X	0x0B10
F11.17	Switch-on delay of DI2 terminal	0.0~3600.0s	0.0s	X	0x0B11
F11.18	Switch-off delay of DI2 terminal	0.0~3600.0s	0.0s	X	0x0B12
F11.19	Switch-on delay of DI3 terminal	0.0~3600.0s	0.0s	X	0x0B13
F11.20	Switch-off delay of DI3 terminal	0.0~3600.0s	0.0s	X	0x0B14

Function Code defines the programmable input terminal's corresponding delay time during the level changing from the starting period to disconnected.

Group F12
Digital Output Terminal Group

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.00	HDO output	0~1	0	○	0x0C00

0: Open collector pole high speed pulse output

(See F15.02 for detailed information of the related function)

1: Open collector pole output

(See F12.02 for detailed information of the related function)

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.01	DO1 output		0	○	0x0C01
F12.02	Reserved		0	○	0x0C02
F12.03	Relay T1 output	0~37	1	○	0x0C03
F12.04	Reserved		7	○	0x0C04
F12.05	Reserved		0	○	0x0C05

Output Terminal Detail Introduction

Setting Value	Function	Instruction
0	Invalid	Output terminal without any function
1	In operation	When the AC drive in operation, there is frequency output, output ON signal.
2	Forward rotation operation	When the AC drive in forward operation, there is frequency output, output ON signal.
3	Reverse rotation operation	When the AC drive in reverse operation, there is frequency output, output ON signal.
4	Jogging operation	When the AC drive in jogging operation, there is frequency output, output ON signal.
5	Zero-speed running	When the AC drive output frequency and the given frequency are zero, output ON signal.
6	Ready for operation	The main circuit and control circuit power supply is set, AC drive protection function does not work, when AC drive is in operation state, output ON signal.
7	AC drive fault	When the AC drive failure, output ON signal.

Setting Value	Function	Instruction
8	AC drive overload pre-alarming	Terminal set for this function becomes on 10s before the AC drive performs overload protection.
9	Motor overload pre-alarming	The AC drive judges motor overload pre-warning according to pre warning threshold before performing overload protection. If this threshold is exceeded, terminal set for this function becomes on. For motor overload parameters, see descriptions of F29.02~F29.06
10	Underload per-alarming	When the AC drive load in the lower warning point, and warning time is over, output ON signal. Refer to the function code F29.07 ~F29.11 for details.
11	Frequency arrival	The operating frequency of the AC drive is within a certain range of the target frequency and outputs ON signal. Reference function code F12.17 detailed instructions.
12	Upper limit frequency arrival	When the operating frequency reaches the upper limit frequency, output ON signal.
13	Lower limit frequency arrival	When running frequency reaches frequency lower limit, terminal set for this function becomes on. When the AC drive is in stop status, terminal set for this function becomes off.
14	Frequency detection FDT1	Reference function code F12.18~F12.19 detailed instructions.
15	Frequency detection FDT2	Reference function code F12.20~F12.21 detailed instructions.
16	Any frequency 1 arrival	Please refer to function code F12.22~F12.23 for details.
17	Any frequency 2 arrival	Please refer to function code F12.24~F12.25 for details.
18	Reserved	
19	Completion of Simple PLC stage	When the current phase of the simple PLC complete operation, output signal.
20	Completion of Simple PLC Circle	When the simple PLC complete a cycle, output signal.
21	PID sleeping	When the AC drive enters PID sleep state, output ON signal
22	Any Current 1 arrival	Please refer to function code F12.28~F12.29 for details.
23	Any Current 2 arrival	Please refer to function code F12.30~F12.312 for details.
24	Reserved	Reserved
25	Setting count value arrival	When the value of the test over F20.08 set value, output ON signal.
26	Defined count value arrival	When the value of the test over F20.09 set value, output ON signal.

Setting Value	Function	Instruction
27	Setting length attained	When the actual length of the test is over the length of the F20.05 set, output ON signal.
28	Reserved	Reserved
29	Setting Running time arrival	When the total running time of the AC drive over F20.10 set time , output ON signal.
30	MODBUS communications virtual terminal output	Output signal is set according to the setting value of MODBUS, 1 for ON signal, 0 for OFF signal.
31	Output DI1	Output DI1 state
32	Output DI2	Output DI2 state
33	Limit the output Di1	When the DI1 terminal is effective, the output terminal will be effective immediately. After the corresponding disconnect delay time of the set terminal, the output terminal will be invalid.
34	Ai1 input limit exceeded	Terminal set for this function becomes on when AI1 input is larger than value set in F12.33 (AI1 input voltage upper limit) or smaller than value set in F12.32 (AI1 input voltage lower limit).
35	Reserved	Reserved
36	PID feedback offline	Reference function code F19.27~F19.29 detailed instructions.
37	Motor overheat warning	Terminal set for this function becomes on when motor temperature reaches value set in F29.24 (Motor overheat pending threshold). You can view motor temperature by using F99.33.

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.06	Polarity of output terminals	00000~11111	00000	○	0xC06

This function parameter sets active mode of terminals DO1,HDO, T1, T2, and T3.

0: Positive logic

Digital output terminal becomes active when being connected with COM, and inactive when being disconnected from COM.

1: Negative logic

Digital output terminal becomes active when being disconnected from COM, and inactive when being connected with COM.

| F12.06 sets the polarity selection for Output		
Ones:DO1	0:Positive logic	1:Negative logic
Tens:Reserved	0:Positive logic	1:Negative logic
Hundreds:T1	0:Positive logic	1:Negative logic
Thousand:Reserved	0:Positive logic	1:Negative logic
Ten thousand:Reserved	0:Positive logic	1:Negative logic

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.07	DO1 switch-on delay time	0.0~3600.0s	0.0s	○	0x0C07
F12.08	DO1 switch-off delay time	0.0~3600.0s	0.0s	○	0x0C08
F12.09	Reserved	0.0~3600.0s	0.0s	○	0x0C09
F12.10	Reserved	0.0~3600.0s	0.0s	○	0x0C0A
F12.11	T1 switch-on delay time	0.0~3600.0s	0.0s	○	0x0C0B
F12.12	T1 switch-off delay time	0.0~3600.0s	0.0s	○	0x0C0C
F12.13	Reserved	0.0~3600.0s	0.0s	○	0x0C0D
F12.14	Reserved	0.0~3600.0s	0.0s	○	0x0C0E

Function Code defines the programmable input terminal's corresponding delay time during the level changing from the starting period to disconnected.
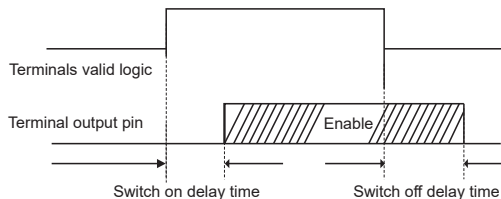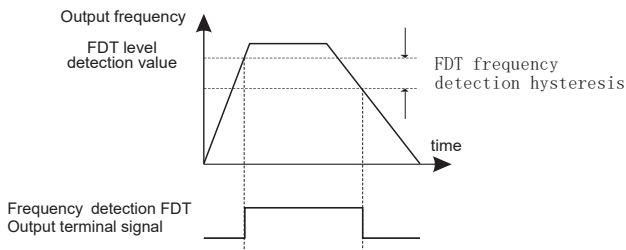

Function code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.17	Frequency arrival detection value	0.0%~100.0%	0.0%	○	0x0C11

When the output frequency is among the positive or negative detection range of the set frequency, the multi-function digital output terminal will output the signal of "frequency arrival", see the diagram below for detailed information:
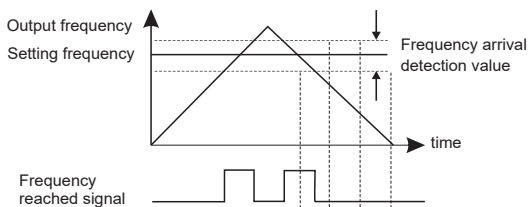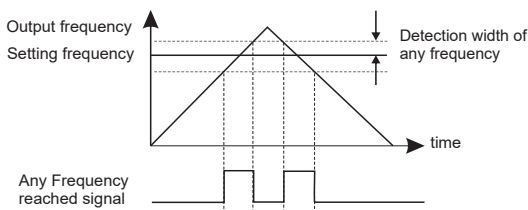
Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.18	FDT1 frequency detection value	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C12
F12.19	FDT1 frequency detection hysteresis	0.0%~100.0%	5.0%	○	0x0C13
F12.20	FDT2 frequency detection value	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C14
F12.21	FDT2 frequency detection hysteresis	0.0%~100.0%	5.0%	○	0x0C15

When the output frequency exceeeds the corresponding frequency of FDT frequency detection value , the multi-function digital output terminals will output the signal of "frequency detect FDT" until the output frequency decreases to a value lower than(FDTfrequency detection hysteresis)the corresponding frequency, the signal is invalid. Below is the ware form diagram:

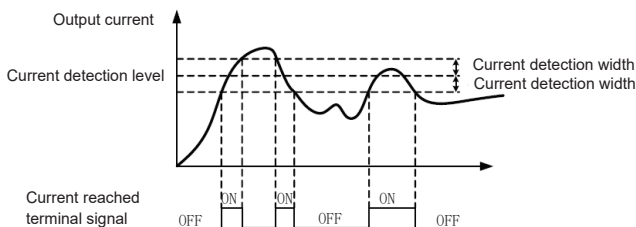| Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.22	Detection of any frequency 1	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C16
F12.23	Detection width of any frequency 1	0.0%~100.0%(Max. frequency)	0	○	0x0C17
F12.24	Detection of any frequency 2	0.00Hz~F01.07(Max. frequency)	50.00Hz	○	0x0C18
F12.25	Detection width of any frequency 2	0.0%~100.0%(Max. frequency)	0	×	0x0C19

The drive provides two groups of frequency detection parameters for the digital output functions 16 and 17. When the output frequency is in the range of the detection width, the digital output terminal set for function 16 or 17 becomes on.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.28	Any current reaching 1 value	0.0%~300.0%(Motor rated current)	100.0%	○	0x0C1C
F12.29	Any current reaching 1 amplitude	0.0%~300.0%(Motor rated current)	0.0%	○	0x0C1D
F12.30	Any current reaching 2 value	0.0%~300.0%(Motor rated current)	100.0%	○	0x0C1E
F12.31	Any current reaching 2 amplitude	0.0%~300.0%(Motor rated current)	0.0%	○	0x0C1F

The drive provides two groups of current detection level and width.

If output current of the AC drive reaches the width, digital output terminals set for functions 22 and 23 become on.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F12.32	AI1 input voltage lower limit	0.0V~F12.33	3. 0V	○	0x0C20
F12.33	AI1 input upper limit voltage	F12.32~10.00V	7.0V	○	0x0C21

These two functiomn parameters indicate whether AI1 input voltage is in the setting range. If AI1 input is larger than F12.33 or smaller than F12.32, digital output terminal set for function 34 becomes on.

Group F14
Analog Curve And Pulse Input Setting Function Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F14.00	Lower limit of AI1	0.00V~ F14.02	0.00V	○	0x0E00
F14.01	Corresponding setting of the lower limit of AI1	-100.0%~100.0%	0.0%	○	0x0E01
F14.02	Ai1 inflexion 1 input	F14.00~F14.04	3.00V	○	0x0E02
F14.03	Corresponding percentage of AI1 inflexion 1 input	-100.0%~100.0%	30.0%	○	0x0E03
F14.04	Ai1 inflexion 2 input	F14.02~F14.06	6.00V	○	0x0E04
F14.05	Corresponding percentage of AI1 inflexion 2 input	-100.0%~100.0%	60.0%	○	0x0E05
F14.06	Upper limit of AI1	F14.04~10.00V	10.00V	○	0x0E06
F14.07	Corresponding setting of the upper limit of AI1	-100.0%~100.0%	100.0%	○	0x0E07
F14.08	Ai1 input filter time	0.00s~10.00s	0.100s	○	0x0E08

Description of input value of Ai1:

With regard to AI1, -100% corresponds to 0V or 0mA, while 100% corresponds to 10V or 20mA.(Switch by jumper)

Ai1 curve is a broken line with two inflection points. Diagram of AI curve is shown as below:

F14.08 define the filtering time of analog input terminals AI1. Long filtering time results in strong immunity from interference but slow response, while short filtering time brings rapid response but weak immunity from interference.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F14.27	AI lower than Min. input setting selection	000~111	000	○	0x0E1B

 When analog input voltage is below the value of F14.00,F14.09,F14.18, the AC drive uses the minimum value or 0.0%, determined by the setting of F14.27.

F14.27 SETS THE AI LOWER	
Ones:AI1	0: Corresponding percentage of min. input; 1:0.0%
Tens:Reserved	0: Corresponding percentage of min. input; 1:0.0%
Hundreds:Reserved	0: Corresponding percentage of min. input; 1:0.0%

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F14. 28	Lower limit frequency of pulse DI5	0.00KHz~F14.30	0.00 KHz	○	0x0E1C
F14. 29	Corresponding setting of lower limit frequency of pulse DI5	-100.0%~100.0%	0.0%	○	0x0E1D
F14. 30	Upper limit frequency of pulse DI5	F14.28~100.00KHz	50.00 KHz	○	0x0E1E
F14. 31	Corresponding setting of upper limit frequency of pulse DI5	-100.0%~100.0%	100.0%	○	0x0E1F
F14. 32	Input filter time of pulse DI5	0.00s~10.00s	0.10s	○	0x0E20

 When digital input terminal DI5 receives pulse signal as frequency reference, the relation between input pulse signal and set frequency is defined by curves set by F14.28~F14.32.

F14.28 and F14.30 represent the range of DI input pulse frequency, 100kHz at maximum.

F14.29 and F14.31 are the set values of frequency that corresponds to DI input pulse frequency:100% corresponds to positive maximum frequency while -100% corresponds to negative maximum frequency.
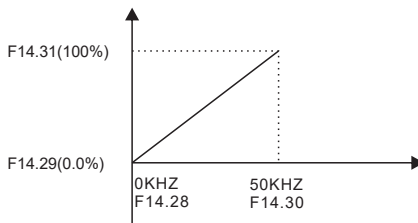
default curve

Group F15
Analog Curve And Pulse Output Setting Function Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F15.00	AO1 output	0~14	0	○	0x0F00
F15.01	Reserved		1	○	0x0F01
F15.02	DO output		0	○	0x0F02

These parameters select the function of the pulse output terminal and the two analog output terminals.The pulse output frequency range of the DO terminal is 0.01 kHz to F15.14 (Max. DO output frequency). F15.14 must be set in the range of 0.01 to 100.00 kHz.

The output range of AO1 is 0 to 10 V or 0 to 20 mA.

The functions of the three terminals are listed in the following table.

The Output Range Description of Analog Quantity or High Speed Pulse

| Setting Value	Function	Instruction
0	Running frequency	0~Maximum output frequency(Corresponding to 0~100%)
1	Set frequency	0~Maximum output frequency(Corresponding to 0~100%)
2	Output current	The motor rated current 0~2 times (corresponding to 0~100%)
3	Output voltage	The AC drive rated voltage 0~1.5 (corresponding to 0~100%)
4	High speed pulse Di5 input value	0.00~100.00kHz(corresponding to 0~100%)
5	Analog AI1 input value	0~10V/0~20mA(corresponding to 0~100%)
6	Reserved	
7	Reserved	
8	Length	0 to max. set length(corresponding to 0~100%)
9	Count value	0 to max. count value (corresponding to 0~100%)
10	Running time	0 to max. Running time(corresponding to 0~100%)
11	Output torque	The rated torque 0~2 times(corresponding to 0~100%)
12	Output power	The rated power 0~2 times(corresponding to 0~100%)
13	communications reference	0.0%~100.0%(corresponding to 0~100%)
14	Keypad potentiometer setting	0~10V (corresponding to 0~100%)

Funtion code	Name	Setup range	Default Value	Modifi- cation	Add.
F15.03	Lower output limit of AO1	0.0%~F15.05	0.0%	○	0x0F03
F15.04	Corresponding AO1 output of lower limit	0.00V~10.00V	0.00V	○	0x0F04
F15.05	Upper output limit of AO1	F15.03~100.0%	100.0%	○	0x0F05
F15.06	The corresponding AO1 output of upper limit	0.00V~10.00V	10.00V	○	0x0F06
F15.07	Reserved			○	0x0F07
F15.08	Reserved			○	0x0F08
F15.09	Reserved			○	0x0F09
F15.10	Reserved			○	0x0F0A
F15.11	Lower output limit of DO	0.0%~F15.13	0.0%	○	0x0F0B
F15.12	Corresponding DO output of lower limit	0.00~100.00kHz	0.00Hz	○	0x0F0C
F15.13	Upper output limit of DO	F15.11~100.0%	100.0%	○	0x0F0D
F15.14	Corresponding DO output of upper limit	0.00~100.00kHz	100.00 kHz	○	0x0F0E

The above function codes define the corresponding relationship between the output value and the analog output, when the output value over the external of the setting maximum output or minimum output rang, calculate by the upper limit output or lower output.

The current output is analog output, 1mA is equivalent to 0.5V voltage.

In different applications the 100% of the output value is different from the corresponding analog output, please refer to the above analog or high speed pulse output range table.
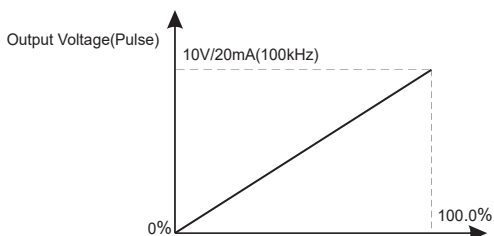
Group F16   AI/AO Correction Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F16.00	Reserved			○	0x1000
F16.01	AI1 measured voltage1	0.000V~10.000V		○	0x1001
F16.02	AI1 display voltage1	0.000V~10.000V		○	0x1002
F16.03	AI1 measured voltage2	0.000V~10.000V		○	0x1003
F16.04	AI1 display voltage 2	0.000V~10.000V		○	0x1004
F16.05	AI2 measured voltage1	0.000V~10.000V		○	0x1005
F16.06	Reserved			○	0x1006
F16.07	Reserved			○	0x1007
F16.08	Reserved		Correction before delivery	○	0x1008
F16.09	Reserved			○	0x1009
F16.10	Reserved			○	0x100A
F16.11	Reserved			○	0x100B
F16.12	Reserved			○	0x100C
F16.13	AO1 measured voltage 1	0.000V~10.000V		○	0x100D
F16.14	AO1 display voltage 1	0.000V~10.000V		○	0x100E
F16.15	AO1 measured voltage 2	0.000V~10.000V		○	0x100F
F16.16	AO1 display voltage 2	0.000V~10.000V		○	0x1010
F16.17	Reserved			○	0x1011
F16.18	Reserved			○	0x1012
F16.19	Reserved			○	0x1013
F16.20	Reserved			○	0x1014

Take the correction of AI1 as an example:

1)First set F16.00 to 1 to correct the AI1 channel. After setting 1, the parameter is automatically cleared.

2)Observe the voltage value of the AI1 input through F99.12, record the displayed value and the measured value of the two points that need to be collected in turn, and then subparameter input into parameters F16.01~F16.04, the correction of AI1 can be completed.
3)The AO correction method is the same as the enumerated AI1 method.

Group F18
Serial Communication Function Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F18.00	Local communication address	0~247	1	○	0x1200

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F18.01	Communication baud rate		45	○	0x1201

This parameter is used to set transmission speed between host computer and AC drive.

Note that baud rate of host computer must be the same as that of AC drive. Otherwise, communication shall fail. The higher baud rate is, the faster communication will be.

Ones :
Modbus Communication baud rate
0: 300 BPS
1: 600 BPS
2: 1200 BPS
3: 2400 BPS
4: 4800 BPS
5: 9600 BPS
6: 19200 BPS
7: 38400 BPS
8: 57600 BPS

9: 115200 BPS

Funtion code	Name	Setup range	Default Value	Modification	Add.
F18.02	Data format symbol	0~3	0	○	0x1202

0: No check (8-N-2)

1: Even parity check (8-E-1)

2: Odd parity check (8-O-1)

3: No check, data format (8-N-1)

Note:

PC with the data format converter setting must be consistent, otherwise, communication is impossible.

Funtion code	Name	Setup range	Default Value	Modification	Add.
F18.03	Answer delay	0~20ms	2ms	○	0x1203

This parameter sets interval between AC drive completing receiving data and AC drive sending data to host computer. If response delay is shorter than system processing time, system processing time shall prevail. If response delay is longer than system processing time, system sends data to host computer only after response delay is up.

Funtion code	Name	Setup range	Default Value	Modification	Add.
F18.04	Fault time of communication overtime	0.0s ~60.0s	0.0s	○	0x1204

When the function code is set to 0.0, the communication timeout parameter is invalid.

When the function code is set to a non-zero value, if a communication with the next communication interval exceeds communication overtime time, the system will report "Communcation Fault" (E.CE).

Typically, it will be set to inactive. If continuous communication system, setting this parameter can monitor the communication status.

Funtion code	Name	Setup range	Default Value	Modification	Add.
F18.06	Current resolution readby communication	0: 0.01A 1: 0.1A	0	○	0x1206

This parameter is used to set unit of output current read by communication.

Group F19 PID Control Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.00	PID reference source	00~86	01	○	0x1300

Ones:
PID reference source.
0: Keypad potentiometer setting
1: PID digital setting(F19.02)
2: AI1
3:Reserved
4:Reserved
5: Pulse DI5
6: Communication setting

Tens:
PID feedback source.
0: AI1
1: Reserved
2: Reserved
3: Reserved
4: Reserved
5: Reserved
6: Reserved
7: Pulse DI5
8: Communication setting

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.01	PID range	0~65535	1000	○	0x1301

The PID range is a dimensionless unit used to display a given AND feedback PID.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.02	PID digital 1 setting	0~F19.01	500	○	0x1302
F19.03	Reserved			○	0x1303

Set this parameter when F19.00's ones is set to 1.PID setting is determined through this parameter, and the range is 0 ~ PID range (F19.01).

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.04	PID operation direction	0~1	0	○	0x1304

0: PID output is positive: When the feedback signal exceeds the PID given value, the output frequency of the AC drive will decrease to balance the PID. For example, the strain PID control during warpup.

1: PID output is negative: When the feedback signal is stronger than the PID given value, the output frequency of the AC drive will increase to balance the PID. For example, the strain PID control during warpdown.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.05	Proportional gain(P1)	0.00~100.0%	20.0%	○	0x1305
F19.06	Intergal time(I1)	0.00~100.00s	2.00s	○	0x1306
F19.07	Differential time(D1)	0.000~10.000s	0.000s	○	0x1307

Process PID is provided with two groups of proportion, integral and derivative parameters set

by F19.05~F9.07 are the first group of parameters.F19.13~F19.15 are the second group of parameters.They are toggled through the function code DI terminal function 24 "PID parameter switch"

Proportional gain P1: dynamic response of the system can be quickened by increasing proportional gain P1. However, excessive P1 value would bring about system oscillation. Only proportional gain control cannot eliminate steady state error.

Integration time I1: dynamic response of the system can be quickened by reducing integration time I1. However, excessively small I1 value would result in serious system overshooting and may easily bring about oscillation. Integral control can be used to eliminate steady state error but is unable to control sharp changes.

Derivative time D1: it can predict the change trend of offset and thus can rapidly respond to the change, improving dynamic performance. However, this is vulnerable to interference. Please use derivative control with caution.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.08	PID offse limit	0.00~50.0%	0.0%	○	0x1308

The output of PID system is the maximum deviation relative to close loop reference. As shown in the diagram below, PID adjustor stops to work during the deviation limit. Set the function properly to adjust the accuracy and stability of the system.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.09	PID differential limit	0.0%~100.0%	1.0%	○	0x1309

F19.09 applies a limit to PID differential output as a large output can cause excessive system oscillation.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.10	PID reference change time	0.00~650.00s	0.00s	○	0x130A
F19.11	PID feedback filter time	0.00~60.00s	0.00s	○	0x130B
F19.12	PID output filter time	0.00~60.00s	0.00s	○	0x130C

F19.10 sets time it takes PID reference to change from 0.0% to 100.0%. PID reference changes linearly based on the time set in this parameter, reducing negative impact of sudden PID reference change.

F19.11 filters the PID feedback, which helps to lower interference on PID feedback but slows system response performance.

F19.12 filters the PID output frequency, which helps to drop off mutation of the AC drive output frequency but slows system response performance.

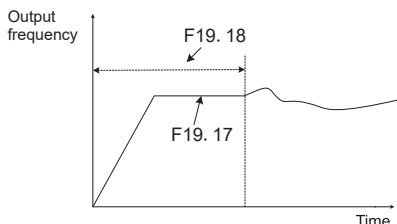| Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.13	Proportional gain(P2)	0.00~100.0%	20.0%	○	0x130D
F19.14	Intergal time(I2)	0.00~100.00s	2.00s	○	0x130E
F19.15	Differential time(D2)	0.000~10.000s	0.000s	○	0x130F

 Process PID is provided with two groups of proportion, integral and derivative parameters set

by F19.05~F9.07 are the first group of parameters.F19.13~F19.15 are the second group of parameters.They are toggled through the function code DI terminal function 24 "PID parameter switch"

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.16	Upper limit Freq when opposite to rotary set direction	0.00Hz~F01.07(max. frequency)	0.00Hz	○	0x1310

In some cases, only when the PID output frequency is negative (REV), the PID can control the quantitative and feedback to the same state, but too high reversal frequency is not allowed in some cases, F19.16 is used to determine the upper limit of the reversal frequency.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.17	PID Preset Value	0.0%~100.0%	0.0%	○	0x1311
F19.18	PID Preset Value Keeping time	0.0~650.0s	0.00s	○	0x1312

PID does not make adjustment when the drive starts its running, but outputs the value set by F19.17 and maintains the holding time set by F19.18, then starts PID adjustment. When F19.18 is set to 0, PID initial value is disabled. This function makes PID adjustment get into stable status fast.

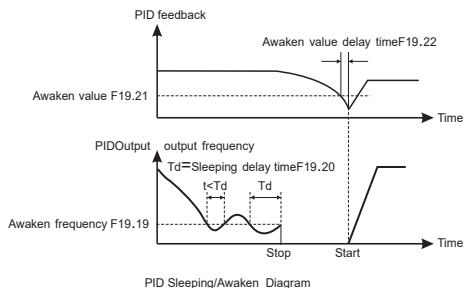| Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.19	PID Hibernate Frequency	0.00Hz~F01.07(max. frequency)	0.0	○	0x1313
F19.20	PID Hibernate Delay Time	0.0~6500.0s	30.0s	○	0x1314

When the PID output frequency is less than the PID Hibernate frequency setted by F19.19, after the PID hibernate delay time setted by F19.20, AC drive will enter into the hibernate status and stop by the way of coasting to stop

Select 21 as the output teminal function(AC drive was in hibernation status), AC drive will come into the hiberation status, Output terminals can be used to output.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.21	PID Awaken Value	0.0~100.0%	0.0%	○	0x1315
F19.22	PID Awaken Value delay time	0.0~6500.0s	0.5S	○	0x1316

When AC drive is in sleeping state, PID feedback value ≤ (PID given valueXF19.21), with the delay time of PID Awaken Values which is set by F19.22, the AC drive will be awakened and restart.

PID Sleeping/Awaken Diagram

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F19.27	Detection value of feedback offline	0.0~100.0%	0.0%	○	0x131B
F19.28	Detection time of feedback offline	0.0~6500.0s	0.0s	○	0x131C
F19.29	PID feedback offline processing	0~2	0	○	0x131D

When PID feedback is lower than F19.27 and last F19.28 setting detection time, The ac drive enters dormancy state. The next action of the AC drive is set by parameter F19.29

0: Alarm E.PID and stop freely

1: Alarm E.PID and stop according to the stop mode(F02.09)

2: No alarm and continue to run

Note: The inverter can set the output terminal function 36 "PID disconnected signal output" to output feedback disconnected signal.

Group F20
Swing Frequency, Fixed Length, Count and Timing

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F20.00	Swing Frequency setting mode	0~1	0	○	0x1400
F20.01	Swing frequency amplitude	0.0~100.0%	0.0%	○	0x1401
F20.02	Kick frequency amplitude	0.0~50.0%	0.0%	○	0x1402
F20.03	Cycle of swing frequency	0.1s~3000.0s	10.0s	○	0x1403
F20.04	Triangular wave ramp-up time coefficient	0.1%~100.0%	50.0%	○	0x1404

The swing frequency function is applicable to the textile and chemical fiber fields and the applications where traversing and winding functions are required .

The swing frequency function means that the output frequency of the inverter swings up and down with the setup frequency (frequency command is selected by F01.04) as the center . The trace of running frequency at the time axis is shown as the figure below , in which the swing amplitude is set by F20.01 and F20.02 .
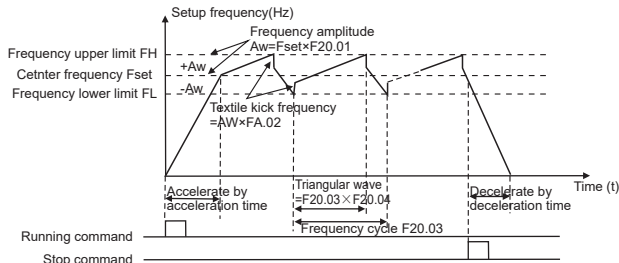
The parameter is used to determine the swing amplitude benchmark .

0: Relative to the central frequency , and it is a variable swing amplitude system . The swing amplitude varies with the central frequency (setup frequency) .

1:Relative to the maximum frequency (F01.07) , and it is fixed swing amplitude system . The swing amplitude is fixed .

F20.01,F20.02 are used to determine the values of swing amplitude and kick frequency .

Swing amplitude AW (variable swing amplitude) = frequency source F01.04 x swing amplitude F20.01
Swing amplitude AW (fixed swing amplitude) = upper frequency F01.07x swing amplitude F20.01

Kick frequency = swing amplitude AW x kick frequency amplitude F20.02

NOTE:

The swing frequency is limited by the frequency upper limit and frequency lower limit .If the setting is inappropriate , it works abnormally .

If the swing amplitude relative to the central frequency is selected , the kick frequency is a variable value .

If the swing amplitude relative to the upper limit frequency is selected , the kick frequency is a fixed value .

F20.03,F20.04

Swing frequency : I t refers to the time of a complete cycle of swing frequency .
F20.04 Time constant of triangular wave boost is relative to
F20.03 swing frequency cycle .
Triangular wave boost time = FA.03xFA.04(unit : s)
Triangular wave falling time = FA.03 x(1- FA.04)(unit : s)

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F20.05	Setup length	0~65535m	1000m	○	0x1405
F20.06	Reserved	0~65535m	1m	○	0x1406
F20.07	The number of pulses of each meter	0.1~6553.5	100.0	○	0x1407

The above function code is used for fixed-length control.

The length information needs to be collected through the multi-function digital input terminal. The number of pulses sampled by the terminal is divided by the number of pulses per meter F20.07, and the actual length can be calculated.When the actual length is greater than the set length F20.05, the multi-function digital DO outputs the "set length arrives" ON signal.

During the fixed-length control process, the length reset operation can be carried out through the multi-function DI terminal (DI function is 33), please refer to group F11 for details.

In the application, the corresponding input terminal function should be set as "length count input" (function 32). When the pulse frequency is high, the DI5 port must be used.

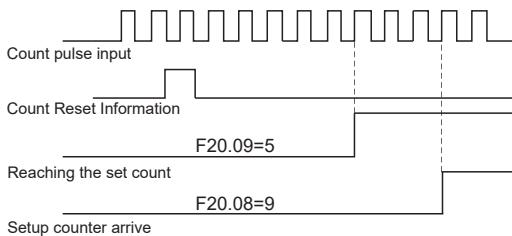| Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F20.08	Set count value	1~65535	1000	○	0x1408
F20.09	Designated count value	1~65535	1	○	0x1409

 The drive has the counting function. The sampling DI terminal must be set for function 30 "Counter input ". For high pulse frequency, use terminal DI5.

 When the counting value reaches the level set in F20.05, digital output terminal set for function 25 "Setup count value reached" becomes on.

When the counting value reaches the level set in F20.06, digital output terminal set for function 26 "Designated count value reached" becomes on.

Counter reset can be implemented via DI terminal set for function 31 "Counter reset".

F20.09 designated counting value is not greater than the set count value F20.08.

Count pulse input

Count Reset Information

F20.09=5

Reaching the set count

F20.08=9

Setup counter arrive

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F20.10	Running time setting	0.0~65535min	0.0Min	○	0x140A

Pre-seting AC drive running time. When the accumulated running time reaches the setting running time, the multi-function digital output terminal 29"Setting Running time arrival" signal.

The terminal input function 34 "timer reset" can be used to reset the running time.

Group F21
Simple PLC and Multi-step Freq Control Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F21.00	Multi-step Freq 0	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1500
F21.01	Multi-step Freq 1	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1501
F21.02	Multi-step Freq 2	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1502
F21.03	Multi-step Freq 3	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1503
F21.04	Multi-step Freq 4	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1504
F21.05	Multi-step Freq 5	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1505
F21.06	Multi-step Freq 6	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1506
F21.07	Multi-step Freq 7	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1507
F21.08	Multi-step Freq 8	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1508
F21.09	Multi-step Freq 9	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x1509
F21.10	Multi-step Freq 10	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150A
F21.11	Multi-step Freq 11	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150B
F21.12	Multi-step Freq 12	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150C
F21.13	Multi-step Freq 13	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150D
F21.14	Multi-step Freq 14	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150E
F21.15	Multi-step Freq 15	0.0Hz~F01.07(Max.Freq)	0.00Hz	○	0x150F

In multi-reference mode, combinations of different DI(19 ~ 22 DI function) terminal states correspond to different frequency references. The AC drive supports a maximum of 16 references implemented by 16 state combinations of four DI terminals.

If a DI terminal is used for the multi-reference function, you need to set related parameters in group F11.

K4	K3	K2	K1	Reference Setting	Corresponding Pr.
OFF	OFF	OFF	OFF	Reference 0	F21.00
OFF	OFF	OFF	ON	Reference 1	F21.01
OFF	OFF	ON	OFF	Reference 2	F21.02
OFF	OFF	ON	ON	Reference 3	F21.03
OFF	ON	OFF	OFF	Reference 4	F21.04
OFF	ON	OFF	ON	Reference 5	F21.05
OFF	ON	ON	OFF	Reference 6	F21.06
OFF	ON	ON	ON	Reference 7	F21.07

K4	K3	K2	K1	Reference Setting	Corresponding Pr.
ON	OFF	OFF	OFF	Reference 8	F21.08
ON	OFF	OFF	ON	Reference 9	F21.09
ON	OFF	ON	OFF	Reference 10	F21.10
ON	OFF	ON	ON	Reference 11	F21.11
ON	ON	OFF	OFF	Reference 12	F21.12
ON	ON	OFF	ON	Reference 13	F21.13
ON	ON	ON	OFF	Reference 14	F21.14
ON	ON	ON	ON	Reference 15	F21.15

Funtion code	Name	Setup range	Default Value	Modification	Add.
F21.16	Simple PLC running method	00~11	00	○	0x1510

Ones : PLC runmode

0：Stopping after a running cycle. The AC drive automatically shut down after complete a single cycle, it need to give a run command again to start.

1 Keeping final value operation after a running cycle. The AC drive automatically maintain the operating frequency and direction of the last paragraph after complete a single cycle.

2 Cycle running. The AC drive automatically starts the next cycle until appear stop command and the system stop after complete a single cycle.

Tens :   Unit of simple PLC runtime

0: Second (s)

1: Minute (min)

Funtion code	Name	Setup range	Default Value	Modification	Add.
F21.17	Simple PLC memory selection when in power loss		00	○	0x1511

 F21.17 determines whether the running data is retentive at power down or at stop.

If retentive, the running data is memorized at power down or at stop and the AC drive will continue to run from the memorized data at next power-on.

If not retentive, the AC drive runs from the first simple PLC reference at next power-on.

Ones: Power loss memory
0:No memory on power loss
1: Memorized on power loss
Tens: Stop memory
0:No memory on stop
1: Memorized on stop

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F21.18	The running time of step 0	0.0~6553.5s(min)	0.00s (Min)	○	0x1512
F21.19	Setting of multi-step 0	000~831	000	○	0x1513

F21.18 sets the run time for step 0 of simple PLC and the time unit is set by tens place of F21.16.

F21.19 Set the working state of step 0

Ones :Run direction,

Sets the run direction for step 0 of simple PLC.
0: Forward
1: Reverse

Tens: Accel/Decel time,

Sets the Accel/Decel time step 0.The Accel/Decel time of simple PLC running is set here, not determined by digital input terminal "Accel/Decel time determinant 1-2". In addition, Accel/Decel time unit is set through tens place of F21.16
0: Accel/Decel time 1
1: Accel/Decel time 2
2: Accel/Decel time 3
3: Accel/Decel time 4
Hundreds : Freq setting

Sets the frequency reference of step 0 of simple PLC.

0: Multi-step Freq 0 (F21.00)
1: Keypad digital setting
2: Keypad potentiometer setting
3: AI1 setting
4: Reserved
5: Reserved
6: DI5 pulse input
7: Process PID output
8: Communication setting

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F21.20	The running time of step 1	0.0~6553.5s(min)	0.0s	○	0x1514
F21.21	Setting of multi-step 1	Same as F21-19	000	○	0x1515
F21.22	The running time of step 2	0.0~6553.5s(min)	0.0s	○	0x1516
F21.23	Setting of multi-step 2	Same as F21-19	000	○	0x1517

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F21.24	The running time of step 3	0.0~6553.5s(min)	0.0s	○	0x1518
F21.25	Setting of multi-step 3	Same as F21-19	000	○	0x1519
F21.26	The running time of step 4	0.0~6553.5s(min)	0.0s	○	0x151A
F21.27	Setting of multi-step 4	Same as F21-19	000	○	0x151B
F21.28	The running time of step 5	0.0~6553.5s(min)	0.0s	○	0x151C
F21.29	Setting of multi-step 5	Same as F21-19	000	○	0x151D
F21.30	The running time of step 6	0.0~6553.5s(min)	0.0s	○	0x151E
F21.31	Setting of multi-step 6	Same as F21-19	000	○	0x151F
F21.32	The running time of step 7	0.0~6553.5s(min)	0.0s	○	0x1520
F21.33	Setting of multi-step 7	Same as F21-19	000	○	0x1521
F21.34	The running time of step 8	0.0~6553.5s(min)	0.0s	○	0x1522
F21.35	Setting of multi-step 8	Same as F21-19	000	○	0x1523
F21.36	The running time of step 9	0.0~6553.5s(min)	0.0s	○	0x1524
F21.37	Setting of multi-step 9	Same as F21-19	000	○	0x1525
F21.38	The running time of step 10	0.0~6553.5s(min)	0.0s	○	0x1526
F21.39	Setting of multi-step 10	Same as F21-19	000	○	0x1527
F21.40	The running time of step 11	0.0~6553.5s(min)	0.0s	○	0x1528
F21.41	Setting of multi-step 11	Same as F21-19	000	○	0x1529
F21.42	The running time of step 12	0.0~6553.5s(min)	0.0s	○	0x152A
F21.43	Setting of multi-step 12	Same as F21-19	000	○	0x152B

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F21.44	The running time of step 13	0.0~6553.5s(min)	0.0s	○	0x152C
F21.45	Setting of multi-step 13	Same as F21-19	000	○	0x152D
F21.46	The running time of step 14	0.0~6553.5s(min)	0.0s	○	0x152E
F21.47	Setting of multi-step 14	Same as F21-19	000	○	0x152F
F21.48	The running time of step 15	0.0~6553.5s(min)	0.0s	○	0x1530
F21.49	Setting of multi-step 15	Same as F21-19	000	○	0x1531

For other step parameters, please refer to step 0.

Group F28
Strengthen Function Groups

Funtion code	Name	Setup range	Default Value	Modification	Add.
F28.00	Carrier frequency setting	1.0~16.0	Model dependent	○	0x1C00

The advantages of high carrier frequency: ideal current waveform, little current harmonic wave and motor noise.

The disadvantages of high carrier frequency: increasing the switch loss, increasing AC drive temperature and the impact to the output capacity. The AC drive needs to derate on high carrier frequency. At the same time, the leakage and electrical magnetic interference will increase. Apply low carrier frequency will cause unstable running, torque decreasing and surge.

The the manufacturers has set a reasonal carrier frequency when the AC drive is in factory. In general, users do not need to changethe parameters.

When users use over the default carrier frequency, it need to derating , each additional 1k carrier frequency, it need to derate 10% .

Carrier frequency	Electromagnetic noise	Leakage Current	Cooling Degree
0.5kHz	↑ big	↑ big	↑ big
5kHz			
16kHz	↓ small	↓ small	↓ small

The relationship table of the motor type and carrier frequency

Model	Carrier frequency Default
0.7~11KW	6KHz
15~45KW	4KHz
55KW	3KHz
More than 75KW	2KHz

Tips for PWM switching frequency setting:

1) When the motor line is too long, reduce switching frequency.

2) When torque at low speed is unstable, reduce switching frequency.

3) If the drive produces severe interference to surrounding equipment, reduce switching frequency.

4) Leakage current of the drive is big, reduce switching frequency.

5) Drive temperature rise is relatively high, reduce switching frequency.

6) Motor temperature rise is relatively high, increase switching frequency.

7) Motor noise is relatively big, increase switching frequency.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F28.01	Carrier frequency adjusted with temperature	0~1	1	○	0x1C01

0: Invalid
1: Valid

When self-adaption of PWM switching frequency is selected, the drive will automatically reduce switching frequency with the temperature rise, protecting itself against overheat. Set to 0 where PWM switching frequency change is not allowed.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F28.02	PWM mode	0~1	0	×	0x1C02

0: Three-phase modulation

1: Three-phase and two-phase modulation switching

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F28.03	Random PWM	0~10	0	×	0x1C03

This parameter helps to lower motor audible noise and reduce electromagnetic interference.

0: Fixed PWM

1~10: Random PWM coefficient

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F28.04	Voltage over modulation coefficient	100~110	105	×	0x1C04

This parameter indicates boost capacity of maximum voltage of the AC drive. Increasing F28.04 will improve max. loading capacity in motor field weakening area. Be aware that this may lead toan increase in motor current ripple and an increase in motor heating.

Decreasing it will reduce motor current ripple and motor heating. Be aware that this will lower max. loading capacity in motor field weakening area. Adjustment of this parameter is not required normally

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F28.05	Cooling fan working mode	0~1	0	×	0x1C05

 This function parameter sets working mode of cooling fan.

0: Working during drive running

The fan works during drive running. When the drive stops, the fan works if heatsink

temperature is above 40°C and stops if heatsink temperature is below 40°C.

1: Working continuously

 The fan keeps working after power-on

Group F29
Protection Parameters Group

Funtion code	Name	Setup range	Default Value	Modification	Add.
F29.00	Phase loss protection	00~11	11	×	0x1D00

Ones: Input phase loss protection

0: Disable

1: Enable. If input phase loss,The AC drive alarm E.SPI

Tens: Output phase loss protection

0: Disable

1: Enable.If output phase loss,The AC drive alarm E.SPO

Funtion code	Name	Setup range	Default Value	Modification	Add.
F29.01	Detection of short-circuit to ground	00~11	0x01	×	0x1D01

Ones: Detection of short-circuit to ground upon power-on

0: Disable

1: Enable

Tens: Reserved

Funtion code	Name	Setup range	Default Value	Modification	Add.
F29.02	Motor overload protection		1	×	0x1D02
F29.03	Motor overload protection gain	50~300	100	×	0x1D03

F19.02 Select whether to turn on motor overload protection

0: Invalid

The motor overload protection is disabled. In this case, install a thermal relay between the AC drive output (U, V, W) and the motor.

1: Valid

The motor overload protection function has an inverse load-time characteristics.

If the motor overload current level and overload protection time need be adjusted, modify setting of F29.03.

When motor running current reaches 225% of rated motor current and motor runs at this level for 30 seconds, E.OL2 (motor overload) is detected.

When motor running current reaches 175% of rated motor current and motor runs at this level for 2 minutes, E.OL2 (motor overload) is detected.

When motor running current reaches 115% of rated motor current and motor runs at this level for 80 minutes, E.OL2 is detected.
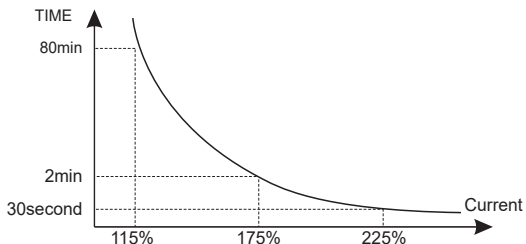
Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.04	Reserved			○	0x1D04
F29.05	Overload pre-alarm detection	50.0%~200%	150%	○	0x1D05
F29.06	Reserved			○	0x1D06

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.07	Motor underload protection	0~1	0	×	0x1D07

0: Invalid

1: Valid

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.08	Underload pre-alarm detection	0.0%~100%	25%	○	0x1D08
F29.09	Underload pre-alarm detection time	0.1s~60.0s	1.0s	○	0x1D09

AC drive or motor output current is less than underload pre-alarm detection level (F29.08), and the duration exceeds the overload warning delay time (F29.09), output underload warning signal(Output terminal function 10).

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.11	Fault reset times	0~20	0	○	0x1D0B

F19.11 sets permissible times of auto fault reset. If reset times exceed the value set in this parameter, the AC drive will keep fault status.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.12	Selection of DO action during auto reset	0~1	0	○	0x1D0C
F29.13	Delay time of auto reset	0.0s~100.0s	1.0s	○	0x1D0D

F29.12 decides whether digital output terminal set for fault output acts during the fault reset.

0: Not act
1: Act

F29.13 sets the delay of auto reset after the AC drive detects a fault.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.14	Detection level of speed error	0.0%~50.0%	20.0%	○	0x1D0E
F29.15	Detection time of speed error	0.0:Don't detection 0.1s~60.0s	5.0s	○	0x1D0F

This function is effective only for vector control with speed sensor.

When detected motor speed is different from frequency reference and the difference is larger than the value of F29.14 for longer than the time set in F29.15, the AC drive detects E.EDU.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.16	Overspeed detection level	0.0%~50.0%	20.0%	○	0x1D10
F29.17	Overspeed detection time	0.0:Don't detection 0.1s~60.0s	1.0s	○	0x1D11

These function parameters define motor overspeed detection that is effective only for vector control with speed sensor.

When detected motor speed exceeds setting frequency and the excess is larger than the value of F29.16 for longer than time set in F29.17, the AC drive detects E.STO .

If F29.17 is set to 0, motor overspeed detection is disabled.

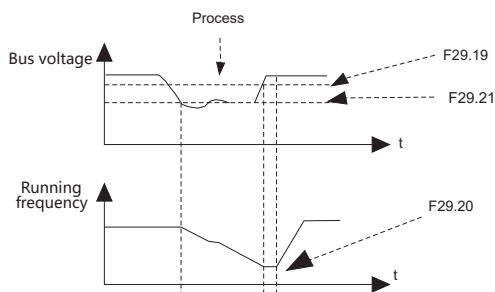| Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F29.18	Power dip ride-through function selection	0: Disabled 1: Bus voltage constant control 2: Decelerate to stop	0	×	0x1D12
F29.19	Threshold of power dip ride-through function disabled	80.0%~100.0%	85.0%	×	0x1D13
F29.20	Judging time of bus voltage recovering from power dip	0.0s~100.0s	0.5s	×	0x1D14
F29.21	Threshold of power dip ride-through function enabled	60.0%~100.0%	80.0%	×	0x1D15

Upon instantaneous power failure or sudden voltage dip, the DC bus voltage of the AC drive reduces. This function enables the AC drive to compensate the DC bus voltage reduction with the load feedback energy by reducing the output frequency so as to keep the AC drive running continuously.

If P9-59 = 0, Invalid

If P9-59 = 1, upon instantaneous power failure or sudden voltage dip, the AC drive

decelerates. Once the bus voltage resumes to normal, the AC drive accelerates to the set frequency. If the bus voltage remains normal for the time exceeding the value set in P9-61, it is considered that the bus voltage resumes to normal.

If P9-59 = 2, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates to stop.

Figure .AC drive action diagram upon instantaneous power failure

Group F30
User-Defined Parameters Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add
F30. 00	User-Defined Parameter 0	F00. 00~F99.XX	F00.01	O	0x1E00
F30. 01	User-Defined Parameter 1	F00. 00~F99.XX	F02.00	O	0x1E01
F30. 02	User-Defined Parameter 2	F00. 00~F99.XX	F01.00	O	0x1E02
F30. 03	User-Defined Parameter 3	F00. 00~F99.XX	F01.04	O	0x1E03
F30. 04	User-Defined Parameter 4	F00. 00~F99.XX	F01.05	O	0x1E04
F30. 05	User-Defined Parameter 5	F00. 00~F99.XX	F03.00	O	0x1E05
F30. 06	User-Defined Parameter 6	F00. 00~F99.XX	F03.01	O	0x1E06
F30. 07	User-Defined Parameter 7	F00. 00~F99.XX	F04.00	O	0x1E07
F30. 08	User-Defined Parameter 8	F00. 00~F99.XX	F04.07	O	0x1E08
F30. 09	User-Defined Parameter 9	F00. 00~F99.XX	F11.00	O	0x1E09
F30. 10	User-Defined Parameter 10	F00. 00~F99.XX	F11.01	O	0x1E0A
F30. 11	User-Defined Parameter 11	F00. 00~F99.XX	F11.02	O	0x1E0B
F30. 12	User-Defined Parameter 12	F00. 00~F99.XX	F12.03	O	0x1E0C
F30. 13	User-Defined Parameter 13	F00. 00~F99.XX	F15.00	O	0x1E0D
F30. 14	User-Defined Parameter 14	F00. 00~F99.XX	F02.03	O	0x1E0E
F30. 15	User-Defined Parameter 15	F00. 00~F99.XX	F02.09	O	0x1E0F
F30. 16	User-Defined Parameter 16	F00. 00~F99.XX	F28.00	O	0x1E10
F30. 17	User-Defined Parameter 17	F00. 00~F99.XX	F00.00	O	0x1E11
F30. 18	User-Defined Parameter 18	F00. 00~F99.XX	F00.00	O	0x1E12
F30. 19	User-Defined Parameter 19	F00. 00~F99.XX	F00.00	O	0x1E13
F30. 20	User-Defined Parameter 20	F00. 00~F99.XX	F00.00	O	0x1E14
F30. 21	User-Defined Parameter 21	F00. 00~F99.XX	F00.00	O	0x1E15
F30. 22	User-Defined Parameter 22	F00. 00~F99.XX	F00.00	O	0x1E16
F30. 23	User-Defined Parameter 23	F00. 00~F99.XX	F00.00	O	0x1E17
F30. 24	User-Defined Parameter 24	F00. 00~F99.XX	F00.00	O	0x1E18
F30. 25	User-Defined Parameter 25	F00. 00~F99.XX	F00.00	O	0x1E19
F30. 26	User-Defined Parameter 26	F00. 00~F99.XX	F00.00	O	0x1E1A
F30. 27	User-Defined Parameter 27	F00. 00~F99.XX	F00.00	O	0x1E1B

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F30. 28	User-Defined Parameter 28	F00. 00~F99.XX	F00.00	○	0x1E1C
F30. 29	User-Defined Parameter 29	F00. 00~F99.XX	F00.00	○	0x1E1D
F30. 30	User-Defined Parameter 30	F00. 00~F99.XX	F00.00	○	0x1E1E
F30. 31	User-Defined Parameter 31	F00. 00~F99.XX	F00.00	○	0x1E1F

F30.00~F30.31: This set of parameters is a user customized parameter set. Among all the parameters, the user can select the required parameters to be summarized into the F30 group as user customized parameters for easy viewing and change operations.

Long press the PRG key in the operation panel to enter the user custom parameter mode, the display parameters are defined by F30.00~F30.31. The order is the same as that of the F30 group.

Group F98
History Fault

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F98.00	Current fault type	0: No fault 1: Inverter module protection(E.OUT) 2: Current detection fault(E.ICE) 3: Short circuit to ground(E.ERH) 4: Input phase loss(E.SPI) 5: Output phase loss(E.SPO) 6: Overcurrent during acceleration(E.OC1) 7: Overcurrent during deceleration(E.OC2) 8: Overcurrent at constant speed(E.OC3) 9: Overvoltage during acceleration(E.OU1) 10: Overvoltage during deceleration(E.OU2) 11: Overvoltage at constant speed(E.OU3)	-	*	0x2200
F98.01	Previous fault type	12: Undervoltage(E.LU) 13: AC drive overload(E.OL1) 14: Motor overload(E.OL2) 15: Motor overload prealarm(E.OL3) 16: Motor underload(E.LL) 17: AC drive overheated(E.OH) 18: Motor auto-tuning fault(E.TUNE) 19: EEPROM read-write fault(E.EEP) 20: External fault 1(E.EF1) 21: External fault 2(E.EF2) 22: Port communication fault(E.CE)	-	*	0x2201
F98.02	Previous 2 fault type	23: PID feedback loss(E.PID) 24: Speed feedback fault(E.EDU) 25: Imbalance fault(E.STO) 26: Encoder fault(E.ECD) 27: Motor overheated fault(E.PTC) 28: Reserve 29: Magnetic pole initial position detection falut(E.PLR) 30: Motor switchover fault during running(E.CH) 31: RESERVE	-	*	0x2202

F98.00~F98.02 record the AC drive's fault code for the last three times

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F98.03	Running frequency at current fault	----	----	*	0x2203
F98.04	Output current at current fault	----	----	*	0x2204
F98.05	Output voltage at current fault	----	----	*	0x2205

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F98.06	Bus voltage at current fault	----	----	*	0x2206
F98.07	IGBT temperature at current fault	----	----	*	0x2207
F98.08	Input terminals state at current fault	----	----	*	0x2208
F98.09	Output terminals state at current fault	----	----	*	0x2209
F98.10	AC drive state at current fault	----	----	*	0x220A
F98.11	Power-on time at current fault	----	----	*	0x220B
F98.12	Running time at current fault	----	----	*	0x220C

The above parameters record the AC drive internal variable records when current fault occurs, please refer tothe function code of each specific display.

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F98.13	Running frequency at previous fault	----	----	*	0x220D
F98.14	Output current at previous fault	----	----	*	0x220E
F98.15	Output voltage at previous fault	----	----	*	0x220F
F98.16	Bus voltage at previous fault	----	----	*	0x2210
F98.17	IGBT temperature at previous fault	----	----	*	0x2211
F98.18	Input terminals state at previous fault	----	----	*	0x2212
F98.19	Output terminals state at previous fault	----	----	*	0x2213
F98.20	AC drive state at previous fault	----	----	*	0x2214
F98.21	Power-on time at previous fault	----	----	*	0x2215
F98.22	Running time at previous fault	----	----	*	0x2216

These parameters record the AC drive internal variables at previous, the record of the input and output variables, referring to the function code specific display.
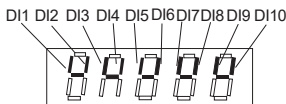
Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F98.23	Running frequency at previous 2 fault	----	----	*	0x2217
F98.24	Output current at previous 2 fault	----	----	*	0x2218
F98.25	Output voltage at previous 2 fault	----	----	*	0x2219
F98.26	Bus voltage at previous 2 fault	----	----	*	0x221A
F98.27	IGBT temperature at previous 2 fault	----	----	*	0x221B
F98.28	Input terminals state at previous 2 fault	----	----	*	0x221C
F98.29	Output terminals state at previous 2 fault	----	----	*	0x221D
F98.30	AC drive state at previous 2 fault	----	----	*	0x221E
F98.31	Power-on time at previous 2 fault	----	----	*	0x221F
F98.32	Running time at previous 2 fault	----	----	*	0x2220

The above parameters record internal input and output variables when the 2 times faults occurred, see function code specific display.
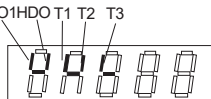
Group F99
Monitoring Function Group

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F99.00	Output frequency	0.00Hz~F01.08(Upper limit Freq)	----	*	0x2100
F99.01	Setting frequency	0.00Hz~F01.08(Upper limit Freq)	----	*	0x2101
F99.02	Output current	0.01~5000.0A	----	*	0x2102
F99.03	Motor speed	0~65535rpm	----	*	0x2103
F99.04	Load speed display	0~65535	----	*	0x2104
F99.05	Output power	0.1~6553.5KW	----	*	0x2105
F99.06	Output torque	-300.0%~300.0%	----	*	0x2106
F99.07	Output voltage	0~1000V	----	*	0x2107
F99.08	DC bus voltage	0.0~2000.0V	----	*	0x2108
F99.09	AC input voltage	0.0~2000.0V	----	*	0x2109
F99.10	AC drive status	1: Forward 2: Reverse 3: Forward Jogging 4: Reverse Jogging 5: AC drive Fault 6: Under-voltage 7: AC drive stop	----	*	0x210A
F99.11	Fault information	0~33(Corresponding to F98.00)	----	*	0x210B
F99.12	AI1 input voltage	0.00~10.00V	----	*	0x210C
F99.13	Reserved		----	*	0x210D
F99.14	Reserved		----	*	0x210E
F99.15	Reserved		----	*	0x210F
F99.16	Reserved		----	*	0x2110
F99.17	DI state	0x00~0xFFF	----	*	0x2111
F99.18	DI state display	The state of each function end is indicated by the on-off of the specified section of the LED digital tube. The on-off of the digital tube segment means that the corresponding terminal state is valid, while the off-off means that the corresponding terminal state is invalid. DI1 DI2 DI3 DI4 DI5 DI6 DI7 DI8 DI9 DI10	----	*	0x2112

Funtion code	Name	Setup range	Default Value	Modifi-cation	Add.
F99.19	DO state	0x00~0xFFF	----	*	0x2113
F99.20	DO state display	Same as F99. 18. DO1HDO T1 T2 T3	----	*	0x2114
F99.21	Di5 pulse frequency	0.01~100.00kHz	----	*	0x2115
F99.22	Reserved	0.01~100.00kHz	----	*	0x2116
F99.23	PID reference	0~65000	----	*	0x2117
F99.24	PID feedback	0~65000	----	*	0x2118
F99.25	Counting value	0~65535	----	*	0x2119
F99.26	Length value	0~65535	----	*	0x211A
F99.27	Linear speed	0~65535	----	*	0x211B
F99.28	Target torque	-300.0%~300.0%	----	*	0x211C
F99.29	Remaining running time	0.1Min~6553.5Min	----	*	0x211D
F99.30	PLC step	0~15	----	*	0x211E
F99.31	Feedback frequency	0. 01Hz~F01. 07(MAX. Freq)	----	*	0x211F
F99.32	Feedback speed of encode	0. 01Hz~F01. 07(MAX. Freq)	----	*	0x2120
F99.33	Reserved	1~200℃	----	*	0x2121
F99.34	AC drive temperature	-30~200℃	----	*	0x2122
F99.35	Current Power-on time	1Min~65535Min	----	*	0x2123
F99.36	Current Running time	0.1Min~6553.5Min	----	*	0x2124
F99.37	G/P type	0: G type 1: P type	----	*	0x2125
F99.38	AC drive power	0.7~500.0KW	----	*	0x2126
F99.39	Motor seletion	1: Motor 1 2: Motor 2	----	*	0x2127
F99.40	Accumulative power-on time	1Min~65535Min	----	*	0x2128
F99.41	Accumulative running time	0.1Min~6553.5Min	----	*	0x2129

Chapter 6 Troubleshooting

⚡ **Danger**
✦ Only qualified electricians are allowed to maintain the AC drive. Read the safety instruction in chapter safety precaution before working on the AC drive.

No.	Code	Fault	Cause	Solution
1	E.OUT	IGBT protection	♦ The acceleration is too fast . ♦ There is damage to the intern-al to IGBT of the phase. ♦ The connection of the driving wires and the grounding is not good.	♦ Increase Acc time. ♦ Change the power unit. ♦ Check the driving wires. ♦ Check if there is strong interference to the external equipment
2	EICE	Current-detecting fault	♦ The connection of the control board is not good. ♦ Hoare components is broken ♦ The modifying circuit is abnormal.	♦ Check the connector and repatch. ♦ Change the hoare. ♦ Change the main panel.
3	E.ERH	Grounding shortcut fault	♦ The output of the AC drive is short circuited with the ground. ♦ There is fault in the current detection circuit.	♦ The output of the AC drive is short circuited with the ground. ♦ There is fault in the current detection circuit.
4	E.SPI	Input phase loss	♦ Phase loss or fluctuation of input R,S,T.	♦ Check input power
5	E.SPO	Output phase loss	♦ U,V,W phase loss input (or serious asymmetrical three phase of the load)	♦ Check input power
6	E.OC 1	Accelerating overcurrent	♦ The acceleration or deceleration is too fast. ♦ The voltage of the grid is too low.	♦ Increase the Acc time. ♦ Check the input power. ♦ Select the AC drive with a large power.
7	E.OC 2	Decelerating overcurrent	♦ The power of the AC drive is too low. ♦ The load transient or abnormal. ♦ The grounding is short circuited or the output is phase loss. ♦ There is strong external interference.	♦ Check if the load is short circuited(the grounding short circuited) or the rotation is not smooth. ♦ Check the output configuration. ♦ Check if there is strong interference.
8	E.OC 3	Constant overcurrent		
9	E.OU 1	Accelerating overvoltage		♦ Check the input power. ♦ Check if the DEC time of the load is too short or the AC drive starts during the rotation of the motor or it needs to increase the energy consumption components.
10	E.OU 2	Decelerating overvoltage	♦ The input voltage is abnormal. ♦ There is large energy feedback.	
11	E.OU 3	Constant overvoltage		

No.	Code	Fault	Cause	Solution
12	E.LU	Under-voltage fault	♦ The voltage of the power supply is too low.	♦ Check the input power of the supply line.
13	E.OL1	AC drive overload	♦ The acceleration is too fast. ♦ Reset the rotating motor. ♦The voltage of the power supply is too low. ♦ The load is too heavy.	♦ Increase the Acc time. ♦ Avoid the restarting after stopping. ♦ Check the power of the supply line, ♦ Select an AC drive with bigger power, ♦ Select a proper motor.
14	E.OL2	Motor overload	♦ The voltage of the power supply is too low.	♦ Check the input power of the supply line.
15	E.oL3	Motor overload prealarm	♦ The AC drive will report the over-load pre-alarm according to the set value.	♦ Check the load and the overload pre-alarm point.
16	E.LL	Motor underload fault	♦ The AC drive will report the unde-rload pre-alarm according to the set value.	♦ Check the load and the underload pre-alarm point.
17	E.OH	AC drive overheated	♦ Air duct jam or fan damage. ♦ Ambient temperature is too high. ♦ The time of overload running is too long	♦ Lower the ambient temperature. ♦ Clean the ventilation. ♦ Replace the cooling fan. ♦ Replace the damaged thermally sensitive resistor. ♦ Replace the AC Drive IGBT.
18	E.TUE	Motor-autotuning fault	♦ The motor capacity does not com-ply with the AC drive capability. ♦ The rated parameter of the motor does not set correctly. ♦ The offset between the paramet-ers from autotune and the stand-ard parameter is huge. ♦ Autotune overtime.	♦ Check the connector and repatch. ♦ Change the hoare. ♦ Change the main panel.
19	E.EEP	EEPROM operation fault	♦ Error of controlling the write and read of the parameters. ♦ Damage to EEPROM.	♦ Press STOP/RESET to reset. ♦ Change the main control panel.
20	E.EF1	User-defined fault 1	User-defined fault 1 is input via DI.	Reset the operation.
21	E.EF2	User-defined fault 2	User-defined fault 2 is input via DI.	Reset the operation.
22	E.CE	Communication fault	♦ The baud rate setting is incorrect. ♦ Fault occurs to the communica-tion wiring. ♦ The communication address is wrong. ♦ There is strong interference to the communication.	♦ Set proper baud rate. ♦ Check the communication connection distribution. ♦ Set proper communication address. ♦ Change or replace the connection distribution or improve the anti-interfere-nce capability.

No.	Code	Fault	Cause	Solution
23	E.PID	PID feedback outline fault	♦ PID feedback offline. ♦ PID feedback source disappear.	♦ Check the PID feedback signal. ♦ Check the PID feedback source.
24	E.EDU	Speed deviation fault	♦ Encoder parameters are set improperly. ♦ Motor auto-tuning is not performed. ♦ F29. 14 (detection level of speed error) and F29. 15 (detection time of speed error) are setincorrectly.	♦ Set encoder parameters properly. ♦ Perform motor auto-tuning. ♦ Set F9-69 and F9-70 correctly based on actual condition.
25	E.STO	Maladjustment fault	♦The control parameters of the synchronous motors not set properly. ♦ The autoturn parameter is not right. ♦ The AC drive is not connected to the motor.	♦ Check the load and ensure it is normal. ♦ Check whether the control parameter is set properly or not. ♦ Increase the maladjustment detection time.
26	E.ECD	Encoder fault	♦ Encoder is not matched. ♦ Encoder wiring is incorrect. ♦ Encoder is damaged. ♦ PG card is abnormal.	♦ Set the type of encoder correctly. ♦ Check the PG card power supply and phase sequence. ♦ Replace encoder. ♦ Replace PG card.
27	E.PTC	Motor overheat	♦ Cable connection of temperature sensorbecomes loose ♦ The motor temperature is too high.	♦ Check cable connection of temperature sensor. ♦ Check cable connection of temperature sensor.
28	RESERVE			
29	E.PLR	Motor overheat		
30	E.CH	Motor switchover fault	Motor switchover by DI during drive running of the AC drive	Perform motor switchover after the AC drive stops

Chapter 7 MODBUS Communication Protocol

The AC Drive provides RS485 communication interface and adopts the international standard ModBus communication protocol for master-slave communication. Users can realize centralized control through PC/PLC, control host computer, etc. (setting inverter control commands, operating frequency, modification of relevant function code parameters, monitoring of inverter working status and fault information, etc.) to meet specific application requirements .

7.1 Function Protocol

1.Read a single or multiple data（0x03）

Read data command frame:

ADDR	xx
CMD	0x03
High bit of the start	xx
Low bit of the start	xx
High bit of data number	xx
Low bit of data number	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

Read data: Slave responding frame

ADDR	xx
CMD	0x03
Byte number N*2	N*2
High bit of data 1	xx
Low bit of data 1	xx
□□	xx
High bit of data N	xx
Low bit of data N	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

2.Write a single data（0x06）

ADDR	xx
CMD	0x06
High bit of register Add.	xx
Low bit of the start	xx
High bit of data number	xx
Low bit of data number	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

ADDR	xx
CMD	0x06
High bit of register Add.	xx
Low bit of the start	xx
High bit of data number	xx
Low bit of data number	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

ADDR	xx
CMD	0x08
High bit of start/ stop command	xx
Low bit of start/ stop command	xx
High bit of Setting frequency value	xx
Low bit of Setting frequency value	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

Slave no response

3.The error message response

Sometimes, errors occurs during the process of the communication. For example, reading or writing data to an illegal address, etc., then the slave will not work as a normal read-write response to reply the host, but send a wrong message frame. Error message frame format is as follows, where the command code is the result of the operation between highest-bit (Bit 7) of host operation and 1 (read error is 0x83 / write error is 0x86).

ADDR	xx
CMD	0x83 or 0x86
Error code	xx
Check low bit of CRC	xx
Check high bit of CRC	xx

The error code define as follows:

Error Code	Descriptions
01H	Illegal function code
02H	Illegal Data Add
03H	Illegal Data Value Reasons： 1: Limit exceeded 2: Write operation to read-only parameters 3: In running state, parameter write operation is prohibited 4: The slave is busy, mainly when storing data to the EEPROM

7.2 Communication Parameters Address

MODBUS communication includes read and write functions of the parameters of the operation of some special registers read and write operations, which include the control register, set register, state register and factory information.
1. The Definition of Function Parameter Add.
The group number of the AC Drive function code is mapped to the high byte of the register address, and the parameter number in the group is mapped to the low byte of the register address. For example, to access F01.12, the access address of the parameter is 0x010C.

Function code group	Absolute Add.	Function code group	Absolute Add.
F00 Group	0x00	F01Group	0x01
F02 Group	0x02	F03Group	0x03
F04 Group	0x04	F05Group	0x05
F06 Group	0x06	F07Group	0x07
F08 Group	0x08	F09Group	0x09
F10 Group	0x0A	F11Group	0x0B
F12 Group	0x0C	F13Group	0x0D
F14 Group	0x0E	F15Group	0x0F
F16 Group	0x10	F18Group	0x12
F19 Group	0x13	F20Group	0x14
F21 Group	0x15	F28Group	0x1C
F29 Group	0x1D	F30Group	0x1E
F98 Group	0x22	F99Group	0x21

Note:
    Because EEPROM is frequently stored, it will reduce the life of EEPROM. Therefore, some parameters in the mode of communication don't need to store as long as change the value of RAM. Absolute address in the table corresponds to the high byte of RAM address, to achieve this function, simply add 0X40 to all high bytes in the table.
For example:
        The parameter F01.12 is stored in EEPROM , and the address is represented as 0x010C;
        The parameter F01.12 is not stored in the EEPROM, and the address is represented as 0x410C;
        Read of both EEPROM address and RAM address are valid.

    When read the function code parameters, user can only read the maximum of 16 consecutive address parameters.more than 16, the AC drive will return the illegal data.
When writing function parameter, each can only write a parameter. Users should pay attention to the setting value that cannot exceed the set range of function parameters.
Function parameters set permissions and function code attributes related parameters, such as read-only parameter is not writable, the operation cannot be changed in the running also cannot be written.
        The password is set by the user, in the case without decryption, all of the parameters cannot write.

User password and parameter autotune cannot via communication to write. Otherwise, the AC drive will return the fault information.

2.The Definition of the Status Parameters

Add.	Number	Setting instruction	R/W
2100H	F99.00	Output frequency	R
2101H	F99.01	Setting frequency (R/W,Write command will change the communication set frequency value)	W/R
2102H	F99.02	Output current	R
			R
210AH	F99.10	AC drive status 1: Forward running 2: Reverse running 3: Forward jogging 4: Reverse jogging 5: AC drive fault 6: Under-voltage status 7: AC drive stop	R
210BH	F99.11	AC Drive Current Fault 0: No fault 18: Motor self-learning fault 1: IGBT protection 19: Parameter reading and 2: Current detecting fault writing fault 3: Grounding shortcut fault 20: External fault 1 4: Input phase loss 21: External fault 2 5: Output phase loss 22: Communication error 6: Accelerating over-current 23: PID feedback disconnection 7: Decelerating over-current 24: Speed deviation fault 8: Constant over-current 25: Offset fault 9: Accelerating over-voltage 26: Encoder fault 10: Decelerating over-voltage 27: Motor over temperature fault 11: Constant over-voltage 28: Output signal feedback error 12: Under-voltage fault 29: Magnetic pole initial position 13: AC drive overload detection failed 14: Motor overload 30: Switch the motor while running 15: Motor overload prealarm 31: Reserved 16: Motor underload fault 32: Power-on time arrives 17: AC drive overheating 33: Running time arrives	R
□□	□□	□□	R
2117H	F99.23	PID reference (R/W,Write command will change the communication PID setting value)	W/R
2118H	F99.24	PID feedback (R/W,Write command will change the communication PID feedback value)	W/R
□□	□□	□□	R

3.The Definition of the Special Register Address

Register	Function instruction	Add	Setting instruction	R/W
Control Register	Control register	2000H	0001H: Forward running 0002H: Reverse running 0003H: Forward jogging 0004H: Reverse jogging 0005H: Dcclerate stop 0006H: Coast to stop(emergency stop) 0007H: Fault reset	W
Setting Register	Torque setting value	2001H	~10000~10000（Corresponding to~200.0％~200.0％）	W
	Forward upper limit frequency	2002H	0 ~ 10000 (Corresponding to 0~Fmax）	W
	Reverse upper limit frequency	2003H	0 ~ 10000 (Corresponding to 0~Fmax）	W
	Electric torque upper limit value	2004H	0 ~ 10000	W
	Brake torque upper limit value	2005H	0 ~ 10000	W
	Voltage setting on VF separated pattern	2006H	0 ~ 1000 (Corresponding to 0~Motor rated voltage）	W
	Docontrol	2007H	0 ~ 0x000F	W
	Ao1control	2008H	0 ~ 0x7FFF	W
	Ao2control	2009H	0 ~ 0x7FFF	W
	HDOcontrol	200AH	0 ~ 0x7FFF	W

Note:

1. R is read-only, invalid write and error reporting address;

2. W for write only, invalid read and error reporting address.

Product Warranty Card

Customer information	Add. of corporation：	
	Name of corporation：	Contact person：
	P.C.：	Tel.：
Product information	Product model：	
	Body bar code：	
	Name of agent：	
Failure information	(maintenance time and content)：	
	Maintenance personnel：	