

CONTENTS

CHAPTER 1 SAFETY AND PRECAUTIONS	2
1.1 Safety Precautions	2
CHAPTER 2 PRODUCT INFORMATION.....	4
2.1 Naming Rules	4
2.2 Nameplate.....	Error! Bookmark not defined.
2.3 FC-5S Inverter Series	5
2.4 Physical Appearance and Dimensions of Mounting Hole.....	5
2.5 Optional Parts	8
CHAPTER 3 ELECTRICAL INSTALLATION AND WIRING	10
3.1 Electrical Installation.....	10
3.2 Typical wiring.....	12
CHAPTER 4 OPERATION AND DISPLAY	20
4.1 Operation and Display Interface Introduction.....	20
4.2 Instruction of Function Code Viewing and Modification Methods	22
CHAPTER 5 SVC DEBUGGING INSTRUCTIONS.....	24
CHAPTER 6 COMMISSIONING.....	25
CHAPTER 7 TROUBLE SHOOTING	32
CHAPTER 8 MODBUS COMMUNICATION PROTOCOL.....	37
APPENDIX A FUNCTION PARAMETER TABLE	47
APPENDIX B VERSION CHANGE RECORD.....	85

Chapter 1 Safety and Precautions

Safety definition:

In this manual, safety precautions are divided into two types below:



Danger

Danger arising due to improper operations may cause severe hurt or even death.



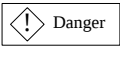
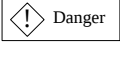
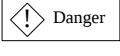
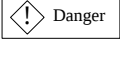
Caution

Danger arising due to improper operations may cause moderate hurt or light hurt or equipment damage.

Please read the manual carefully before install, debug or maintain the system; following the safety rules that indicated in the detail. If any injury caused by rule-breaking operations, our company has no responsibility for it.

1.1 Safety Precautions

Status	Safety class	Items
Before installing	Danger	Do not install it if the control system is moistened, parts missing or components damaged. Do not install if the real objects are different from the packing list.
	Caution	It should be handled with care during moving, otherwise there is risk of damage the device. Don't use the damaged drive or inverter with missing parts or there is danger of hurt. Don't use your hand to touch the components of the control system or there is risk of static damage.
During installing	Danger	Install the inverter on incombustible surface like metal; stay away from combustible materials. Otherwise it may cause fire. Don't turn the screws without purpose, especially the bolts with red mark.
	Caution	Do not drop the lead wire stub or screw in the inverter. Otherwise it may damage the inverter. Install the inverter in the environment with less vibration and no direct sunlight. When more than two inverters are to be installed in one cabinet, pay attention to the installation location to ensure the heat dissipation effect.
During wiring	Danger	The device must be installed by professional electric operator, or it will have unexpected danger. There must be breaker between the inverter and the power source, or it may have fire risk. Please make sure the power supply is off before wiring, or it has the risk of electric shock. Please earth the inverter in normative way, or it has the risk of electric shock.

	 Caution	Don't connect the input power supply to the output terminals (U,V,W) of the inverter. Pay attention to the marks of the wiring terminals so as to avoid the wire misconnect. Or it will cause damage to the inverter. The brake resistance cannot be directly connected between the DC bus (+),(-) terminals. Otherwise it may cause fire! Please refer to the manual to choose right wire diameter, or it may have accident.
Before power-on	 Caution	Please confirm whether the power voltage class is consistent with the rated voltage of the inverter; whether the wiring position of the input terminals (R, S, T) and the output terminals (U, V, W) are correct; Check carefully whether the external circuit is short circuited and whether the connecting line is firm. Otherwise it may damage the inverter. There is no need to do withstand voltage test on any part of the inverter, because it has been tested before the delivery, otherwise it may cause accident.
	 Danger	It must have the cover plate ready on the machine before connect to the power, or it will cause electric shock. All the wiring of the peripheral device must follow the instruction of the manual which has provided the circuit illustration of the wiring way. Otherwise it may cause accident.
During power-on	 Danger	Don't open the cover plate after connection to the power resource. Or it has danger of electric shock. Don't touch any terminals regardless of input or output side, or it has danger of electric shock.
	 Caution	If you need to record the running parameter, pay attention that the running motor may have the risk to hurt people. Or it may cause accident.
During the operation	 Danger	Detection of signals during the operation shall only be conducted by qualified technician. Otherwise, personal injury or equipment damage may be caused. Do not touch the fan or discharge resistor to sense the temperature, or you may get burnt.
	 Caution	During the operation of the inverter, keep items from falling into the equipment, or it may damage the equipment. Do not start and shut down the inverter by connecting and disconnecting the contactor, or it may damage the equipment.
Maintenance	 Danger	The inverter shall be repaired and maintained only by the qualified person who has been trained professionally, or it may cause personal injury or equipment damage. Do not repair and maintain the equipment with power-on, or there will be danger of electric shock. Only more than 10 minutes after you shut down the power supply on the input side can you start to repair or maintain the inverter, otherwise, the residual charge on the capacitor may cause personal injury.

Chapter 2 Product Information

2.1 Naming Rules

Fig.2-1 Naming Rules

FC-5S	-0004K-	-3	-B
INVERTER	ADAPTABLE	VOLTAGE CLASS	BRAKE CHOPPER
DRIVE SERIES	POWER RANGE	-1 1PHASE 220 V	
		2- 3 PHASE 220V	
		-3 3PHASE 380 V	

2.3 FC-5S Inverter Series

Tab.2-1 models and technical data of FC-5S

Model	Input current(A)	Output current (A)	Matched motor (kW)
Input voltage: Single phase:220V Range:-15%~20%			
FC-5S-0K4-1	5.4	2.3	0.4
FC-5S-0K75-1	8.2	4.0	0.75
FC-5S-01K5-1	14.0	8.0	1.5
FC-5S-02K2-1	23.0	9.6	2.2
FC-5S-004K-1	32.0	18.0	4.0
Input voltage: Three phase:380V Range: -15%~20%			
FC-5S-0K75-3-B	3.4	2.1	0.75
FC-5S-01K5-3-B	5.0	3.8	1.5
FC-5S-02K2-3-B	5.8	5.1	2.2
FC-5S-004K-3-B	10.5	9.0	4.0
FC-5S-05K5-3-B	14.6	13.0	5.5
FC-5S-07K5-3-B	20.5	18.0	8.5
FC-5S-009K-3-B	22.0	20.0	9.0
FC-5S-011K-3-B	28.0	25.0	11.0
FC-5S-015K-3-B	35.0	32.0	15.0
FC-5S-018K5-3-B	38.5	38.0	18.5
FC-5S-022K-3-B	46.5	45.0	22.0
FC-5S-030K-3-B	69.8	60	30.0
FC-5S--037K-3	85.7	75	37.0
FC-5S-045K-3-	102.7	90	45.0
FC-5S-055K-3	125.2	110	55.0
FC-5S-075K-3	170.0	152	75.0

2.4 Physical Appearance and Dimensions of Mounting Hole

2.4.1 Product Appearance and dimensions of Mounting Hole

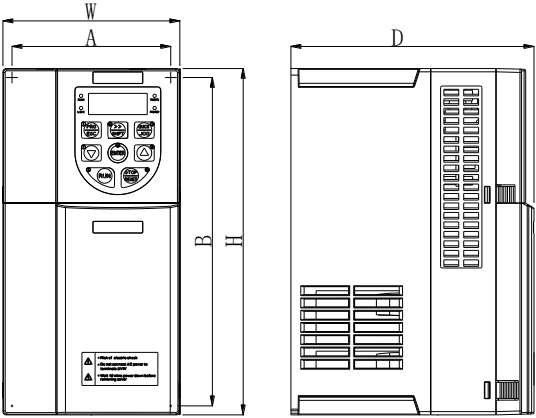


Fig.2-3 Physical appearance of plastic structure below 22 Kw

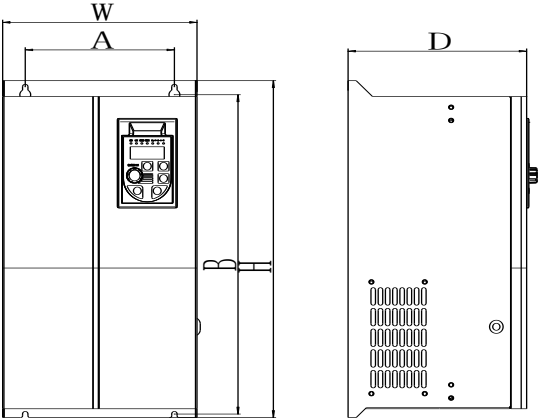


图 2-4. 30~75kW Physical appearance of plastic structure

Tab.2-2 Physical appearance and installation mounting hole dimensions of FC-5S

Model	Mounting hole		Physical dimension			Dimension of mounting hole(mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
FC-5S-0K4-2	65	158	167	75	121	Φ 4.5
FC-5S-0K75-2-B						
FC-5S-01K5-2-B						
FC-5S-02K2-2-B	82	168	178	93	143	Φ 5
FC-5S-004K-3-B	96	201	212	107	147	Φ 6
FC-5S--0K75-3-B	65	158	167	75	121	Φ 4.5
FC-5S-01K5-3-B						
FC-5S-02K2-3-B						
FC-5S-004K-3-B	82	168	178	93	143	Φ 5
FC-5S-05K5-3-B	96	201	212	107	147	Φ 6
FC-5S-07K5-B						
FC-5S-009K-B						
FC-5S-011K-3-B	130	261	270	150	183	Φ 6
FC-5S-015K-3-B						
FC-5S-018K-3-B	168	313	324	189	191	Φ 7
FC-5S-022K-3-B						
FC-5S-030K-3-B	165	363	383	215	197.5	Φ 6
FC-5S-037K-3-(B)	200	426	449	260	207	Φ 7
FC-5S-045K-3-(B)						
FC-5S-055K-3-(B)	245	517	550	310	260	Φ10
FC-5S-075K-3-(B)						

2.4.2 Installation dimension of outer keyboard(mm)

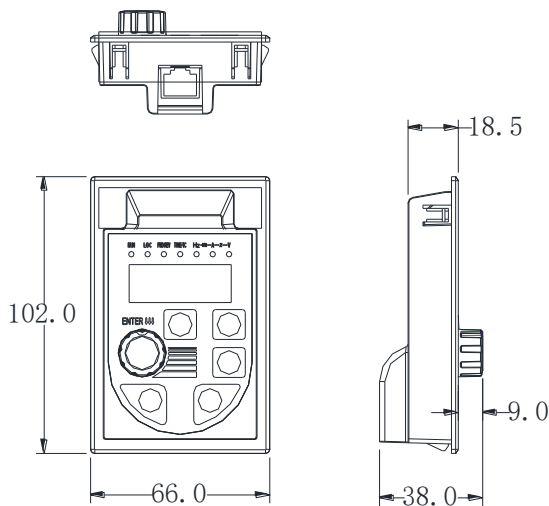


Fig.2-5 Installation dimension of outer keyboard with tray

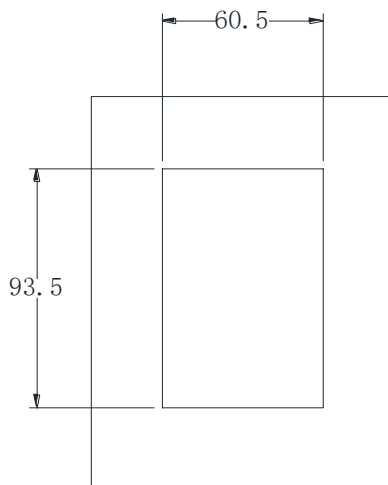


Fig.2-6 Mounting hole dimension of outer keyboard with tray

2.5 Optional Parts

If the user needs such optional parts, please specify when placing the order.

Tab.2-3 FC-5S Inverters Optional Parts

Name	Model	Function	Remarks
Built-in brake unit	The letter “B” attached behind the product model	Braking	Built-in as standard
External LED operating panel	FC-5S-OP	External LED display and keyboard	CM series universal The RJ45 interface
Keyboard tray	FC-5S-JP	with FC-5S series keyboard configuration	Optional
If you need other function module extensions (such as: I/O card, PG card, EPS card and so on), please use the CM580 series inverter, specifying the order function module card when ordering.			

Chapter 3 Electrical Installation and Wiring

3.1 Electrical Installation

3.1.1 Guide to choose peripheral electrical components

Tab.3-1 guide to choose peripheral electrical components

Inverter Model	Circuit Breaker (MCCB) (A)	Contactor (A)	Input Side Main Circuit Wire (mm ²)	Output Side Main Circuit Wire (mm ²)	Control Circuit Wire (mm ²)	Earth Wire (mm ²)
FC-5S-0K4-2-B	10	9	2.5	2.5	1.5	2.5
FC-5S-0K75-2-B	16	12	2.5	2.5	1.5	2.5
FC-5S-01K5-2-B	25	18	2.5	2.5	1.5	2.5
FC-5S-02K2-2-B	32	25	2.5	2.5	1.5	2.5
FC-5S-0K4-2-B	50	40	4	4	1.5	4
FC-5S-0K75-3-B	6	9	2.5	2.5	1.5	2.5
FC-5S-01K5-3-B	10	9	2.5	2.5	1.5	2.5
FC-5S-02K-2-3-B	10	12	2.5	2.5	1.5	2.5
FC-5S-004K-3-B	16	16	2.5	2.5	1.5	2.5
FC-5S-05K5-3-B	20	18	2.5	2.5	1.5	2.5
FC-5S-07K5-3-B	32	25	4.0	4.0	1.5	4
FC-5S-009K-3-B	40	32	4.0	4.0	1.5	6
FC-5S-011K-3-B	40	32	4.0	4.0	1.5	6
FC-5S-015K-3-B	50	40	8.0	8.0	1.5	6
FC-5S-018K-3-B	63	40	10	10	1.5	10
FC-5S-022K-3-B	80	50	10	10	1.5	16
FC-5S-030K-3-B	100	65	16	16	1.5	16
FC-5S-037K-3-K(B)	100	80	25	25	1.5	25
FC-5S-045K-3-K(B)	125	115	35	35	1.5	25
FC-5S-055K-3-(B)	160	150	50	50	1.5	25
FC-5S-075K-3-(B)	225	170	70	70	1.5	25

3.2.2 Using instruction of peripheral electrical components

Tab.3-2 Using instruction of the peripheral electrical components

Part Name	Installation Location	Function Description
Circuit breaker	The front-end of the input circuit	Disconnect the power supply in case of downstream equipment is over current.
Contactor	Between the circuit breaker and the inverter input side	Power-on and power-off operation of the inverter. Frequent power-on/power-off operation (more than 2 times per minute) on the inverter or direct start shall be avoided.
AC input reactor	Input side of the inverter	1) Improve the power factor of the input side. 2) Eliminate the high order harmonics of the input side effectively, and prevent other equipment from damaging due to voltage waveform deformation. 3) Eliminate the input current unbalance due to the unbalance among the phase of input.
EMC input filter	Input side of the inverter	1) Reduce the external conduction and radiation interference of the inverter; 2) Reduce the conduction interference flowing from the power end to the inverter, thus improving the anti-interference capacity of the inverter.
AC output reactor	Between the inverter output side and the motor, close to the inverter	The inverter output side generally has higher harmonic. When the motor is far from the inverter, since there are many capacitors in the circuit, certain harmonics will cause resonance in the circuit and bring in the following results: 1) Degrade the motor insulation performance and damage the motor for the long run. 2) Generate large leakage current and cause frequent inverter protection action. 3) In general, if the distance between the inverter and the motor exceeds 100 meters, output AC reactor shall be installed.

3.2 Typical wiring

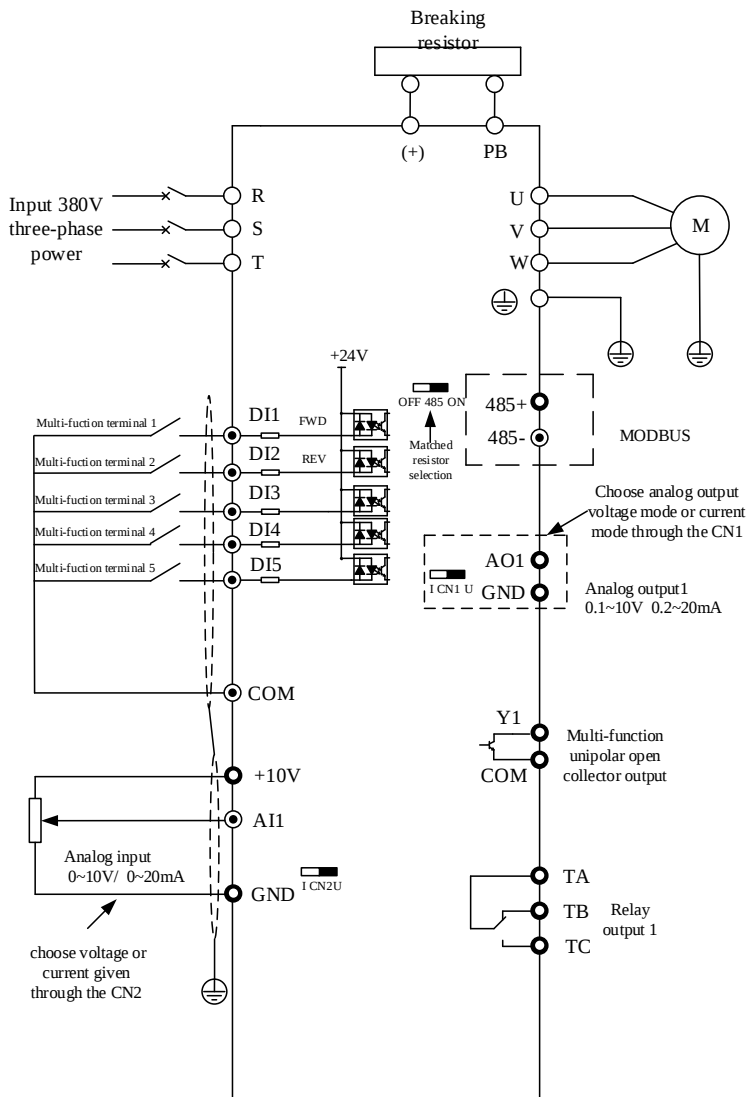


Fig.3-1 Three-phase inverter under 9.0kW (380V)

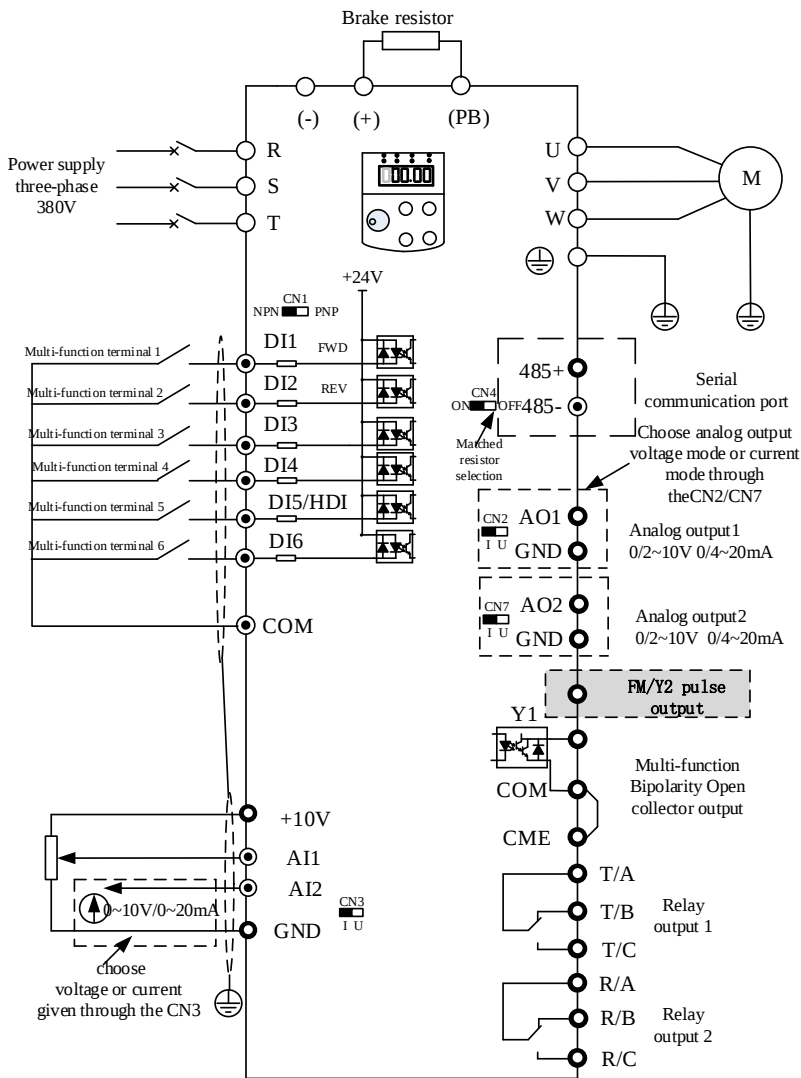


Fig.3-2 Three-phase inverter above 11.0kW (380V)

3.2.1 Main circuit terminals and wiring

Main circuit terminals

Terminal	Terminal Name	Description
R, S, T	Three-phase power supply input terminals	Connect to the three-phase AC power supply.
L, N	Single-phase power supply input terminals	Connect to the single-phase 220 VAC power supply
P(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point.
P(+), PB	Connecting terminals of braking resistor	Connect to the braking resistor for the AC drive of 4.0kW and below (220 V) and 22kW and below (other voltage classes).
U, V, W	Output terminals	Connect to a three-phase motor.
	Grounding terminal	Must be grounded.

Wiring precautions:

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

No phase sequence requirement in the input side wiring of the inverter.

DC bus P(+), (-) :

Pay attention that there is remaining voltage on DC bus P(+), (-) just after a power failure, only wait until the power indicate LED is off and 10 minutes after the power off, can we start the wiring operation, or there is risk of electric shock.

The wire length of the brake unit should be no more than 10m, and we should use the twisted pair and tight wire for wiring.

Don't connect the brake resistor to the DC bus directly, or it may damages the inverter and cause fire.

Connection terminals of brake resistor P(+), PB

How to choose the brake resistor refer to the recommended value and the wiring distance should be less than 5m, or it may damage the inverter.

Output side of the inverter U、V、W

The capacitor or surge absorber can't be connected to the output side of the inverter, or it may damage the inverter.

If the motor cable is too long, for the influence of the distribute capacitance, it's easily to have electrical resonance, causing the damage of the insulation or large leakage current which make the inverter over-current protection. If the length of motor cable is more than 100m, a AC output reactor should be installed near the inverter.

3.2.2 Control circuit terminals and wiring

3.2.2.1 The control circuit terminals of 0.75kW~9.0kW displayed as below:

485-	GND	AI1	Y1	DI1	DI3	DI5			
485+	+10V	AO1	+24V	DI2	DI4	COM	TA	TB	TC

Three-phase 380V under 9.0kW

Function instruction of the control terminals

Tab.3-3 control interface function declaration

Category	Terminal	Terminal Name	Function Description
Power supplies	+10V-GND	External +10 V power supply	Provide +10 V power supply to external unit, maximum output current: 10 mA Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ.
	+24V-COM	External +24 V power supply	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA
Analog inputs	AI1-GND	Analog input 1	1) Input voltage range: 0–10 VDC; 2) Impedance: 100kΩ
Digital inputs	DI1-COM	Digital input 1	1) Optical coupling isolation, set NPN mode. 2) Impedance: 3.3 kΩ.
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5	
Analog output	AO1-GND	Analog output 1	Voltage or current output is decided by CN2. Output voltage range: 0.1–10 V Output current range: 0.2–20 mA
Digital output	Y1-COME	Digital output 1	Optical coupling isolation, dual polarity open collector output Output voltage range: 0–24 V Output current range: 0–50 mA Note that CME and COM are internally isolated, but they are short circuit externally when leaving factory (In this case Y1 is driven by +24 V by default). If you want to drive Y1 by external power supply, the external short circuit of CME and COM must be switched off.
Communication interface	485+,485-	Modbus Communication terminal	Modbus communication interface, it can choose the communication matched resistance through dial switch CN4. If Profibus communication function is needed, please choose CM580 series of inverter, and use profibus DP card.

Category	Terminal	Terminal Name	Function Description
Relay output 1	T/A-T/B	NC terminal	Contact driving capacity: AC 250V, 3 A, $\cos\phi = 0.4$ DC 30V, 1A
	T/A-T/C	NO terminal	
Relay output 2	R/A-R/C	NO terminal	Contact driving capacity: 250 VAC, 3 A, $\cos\phi = 0.4$ 30 VDC, 1 A
Keyboard extended line interface	J4	External operation panel interface	External operation panel and parameter copy panel interface, it can expand the standard network cable.

3.2.2.1 The control circuit terminals above 11.0kW displayed as below:

GND	AO1	AO2	485-	DI1	DI2	DI3	DI4	HDI5	COM		RA	RB	RC
+10V	AI1	AI2	485+	CME	COM	Y1	DI6	$\frac{Y2}{EM}$	+24V		TA	TB	TC

Three-phase 380V above 11.0kW

Function instruction of the control terminals

Tab.3-4 control interface function declaration

Category	Terminal	Terminal Name	Function Description
Power supplies	+10V-GND	External +10 V power supply	Provide +10 V power supply to external unit, maximum output current: 10 mA Generally, it provides power supply to external potentiometer with resistance range of 1–5 k Ω .
	+24V-COM	External +24 V power supply	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA
Analog inputs	AI1-GND	Analog input 1	1) Input voltage range: 0–10 VDC; 2) Impedance: 100k Ω
	AI2-GND	Analog input 2	1) Input range: 0–10 VDC/4–20 mA, decided by CN3 dial switches on the control board 2) Impedance: 100 k Ω (voltage input), 500 Ω (current input)
Digital inputs	DI1-COM	Digital input 1	1) Optical coupling isolation, compatible with dual-polarity input. Switch over through DI dial switch, factory set PNP mode. 2) Impedance: 3.3 k Ω . 3) Input voltage range: 11 ~30V 4) HDI5 can be used as high-speed input port.
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	HDI5-COM	Digital input 5	
	DI6-COM	Digital input 6	

Category	Terminal	Terminal Name	Function Description
Analog output	AO1-GND	Analog output 1	Voltage or current output is decided by dial switches CN2 and CN8. Output voltage range: 0–10 V Output current range: 0–20 mA
	AO2-GND	Analog output 2	
Digital output	Y1-COME	Digital output 1	Optical coupling isolation, dual polarity open collector output Output voltage range: 0–24 V Output current range: 0–50 mA Note that CME and COM are internally isolated, but they are short circuit externally when leaving factory (In this case Y1 is driven by +24 V by default). If you want to drive Y1 by external power supply, the external short circuit of CME and COM must be switched off.
	FM-COM(Y2 terminal is also available)	High-speed pulse output terminals	With the restraint of Functional code F6–04 “FM post output way choice”; when regard for high speed pulse output, maximum frequency to 100KHz.
Communication interface	485+,485-	Modbus Communication terminal	Modbus communication interface, it can choose the communication matched resistance through dial switch CN4. If Profibus communication function is needed, please choose CM580 series of inverter, and use profibus DP card.
Relay output 1	T/A-T/B	NC terminal	Contact driving capacity: AC 250V, 3 A, $\cos\phi = 0.4$ DC 30V, 1A
	T/A-T/C	NO terminal	
Relay output 2	R/A-R/C	NO terminal	Contact driving capacity: 250 VAC, 3 A, $\cos\phi = 0.4$ 30 VDC, 1 A
Keyboard extended line interface	CN6	External operation panel interface	External operation panel and parameter copy panel interface, it can expand the standard network cable.

Signal input terminals wiring instruction

A. AI analog input

Since the weak analog voltage signal is easy to suffer external interference, it needs to employ shielded cable generally and the length shall be no longer than 20 meters, as shown in Fig. 3-3. In case the analog signal is subject to severe interference, and analog signal source side shall be installed with filter capacitor or ferrite magnetic core.

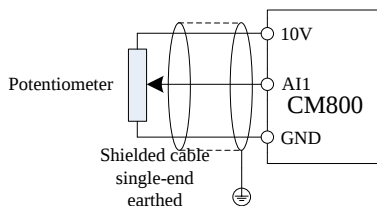
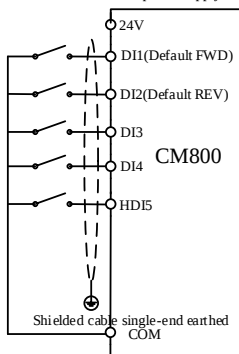


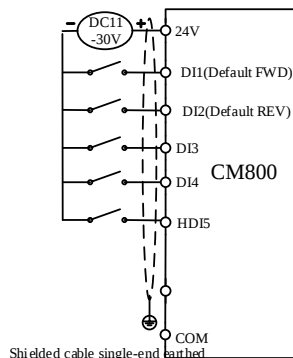
Fig.3-3 Schematic Diagram for Connection of Input Terminal of Analog Signal

B. Digital input terminal:

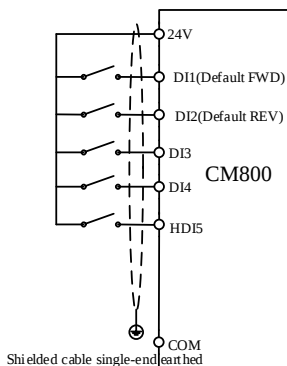
DI terminal connection Mode 1 (Default) : DI dial switch in NPN mode and without external power supply



DI terminal connection Mode 2: DI dial switch in NPN mode and with external power supply



DI terminal connection Mode 3: DI dial switch in PNP mode and without external power supply



DI terminal connection Mode 4: DI dial switch in PNP mode and with external power supply

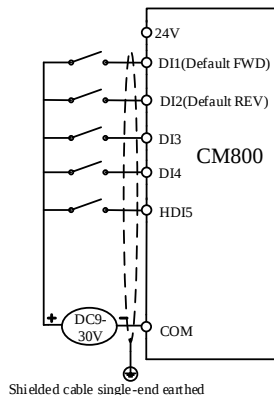


Fig 3-4 Four different wiring diagram

It needs to employ shielded cable generally, with cable length of no more than 20 meters. 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.

C. High-speed pulse terminal

D. Digital output terminal:

When the digital output terminal needs the drive relay, absorption diode shall be installed at the two sides of the relay coil and the drive capacity should be no more than 50mA. Otherwise it may easily damage DC 24 power supply.

Caution: The absorption diode shall be installed with correct polarity, as shown in Fig.3-5, otherwise, when it has output on the digital output terminal, the DC 24V power supply will be damaged immediately.

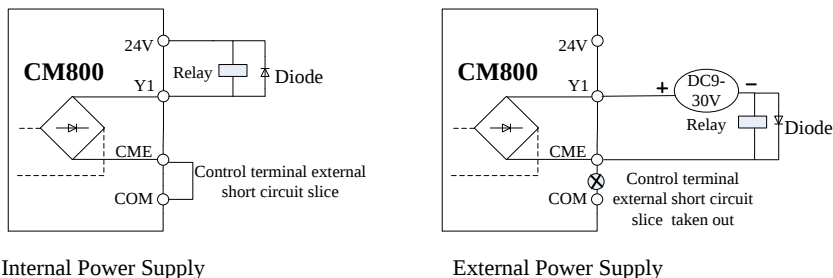
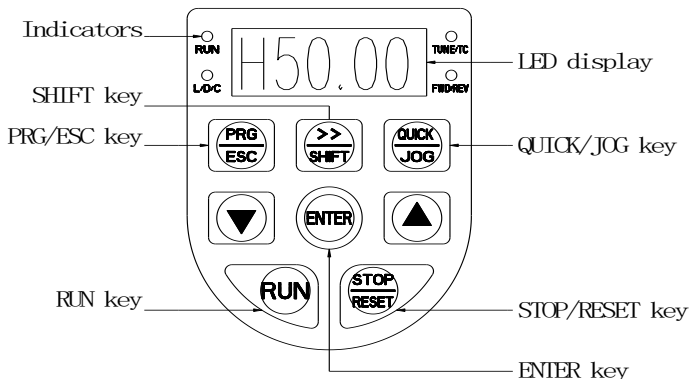


Fig.3-5 Schematic diagram for digital output terminal Y1 wiring

Chapter 4 Operation and Display

4.1 Operation and Display Interface Introduction

We can change the function parameter, monitor the working status and control (start up/stop) the running inverter through the operation panel. The appearance and function are like below:



LED keypad (Standard configuration below 11kw)

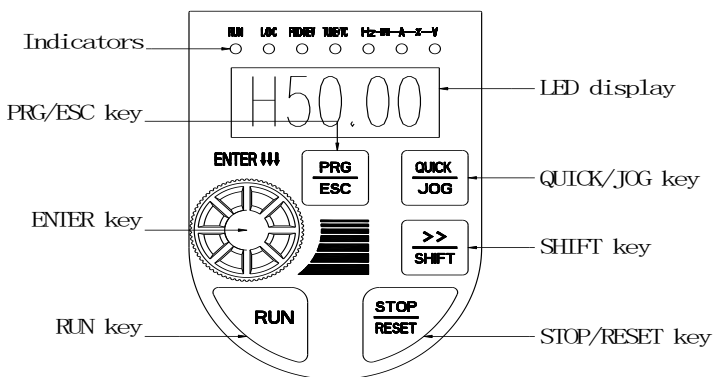


Fig.4-1 LED main keyboard (Standard configuration above 11 kw)

4.1.1 Description of Function LED Indicator

LED Symbol	Unit	Implication	Color
Unit LED	Hz	Freq. Unit LED on— current parameter is frequency value	Green
	A	Current Unit LED on— current parameter is current value	Green
	V	Voltage Unit LED on— current parameter is voltage value	Green
	RPM (Hz+A)	Speed Unit LED on —current parameter is rotation speed value	Green
	% (Hz+V)	Percentage LED on—current parameter is percentage value	Green
Function LED (above 11kw)	RUN	running status LED LED on—in the status of running Light off—in the status of stop LED flash—in the status of sleep	Green
	L/D/C	control mode LED LED off—in the status of keyboard control mode LED on—in the status of terminal control mode LED flash—in the status of remote communication control mode	Red
	FWD/REV	running direction LED LED off—in the status of forward rotation LED on—in the status of reverse rotation LED flash—the target frequency is opposite to the actual frequency or in the status of reverse-run prohibition	Red
	TUNE/TC	tuning/torque /fault LED LED on—in the status of torque control LED flash—tuning/fault	Red
Monitoring Interface (below 9.0KW)	F	Moving frequency F18.50 The current running frequency is 18.50Hz in the figure	
	H	Setting frequency H45.00 The current running frequency is 45.00Hz in the figure	
	n	Rotation speed n0900 The current running frequency is 900rpm in the figure	

LED Symbol		Unit	Implication	Color
	A	Electric current	 The current running frequency is 2.10A in the figure	
	V	Voltage	 The current running frequency is 420.5V in the figure	

4.1.2. Keyboard instruction

Tab.4-2 keyboard function table

Key	Name	Function
PRG/ESC	Program/ Exit	entry or exit ,return to primary menu
» /SHIFT	shift key	Select the displayed parameters in turn on the stop display interface and running display interface, the specific content please refer to F7-29 and F7-30; when modifying parameters, select the modification digit of parameters
QUICK/JOG	direction/jog run	When F7-28 is set as 0, it's used as jog run key. When F7-28 is set as 1, it's used as direction key, press this key now, the direction will be reversed.
ENTER/ 	ENTER	Entry into the menu interface ,confirm the setup parameters
	increase (+)	Increase in the data or function code
	decrease (-)	Decrease in the data or function code
RUN	Run key	used in running operation under keyboard control mode
STOP/RESET	STOP/RESET	In the status of running, pressing it can stop the running operation; in fault alarm status, it can be used as reset. The characteristic of this key is limited by function code F7-27

4.2 Instruction of Function Code Viewing and Modification Methods

Function code parameter of FC-5S inverter adopts three-level menu, it can view and monitor the parameter by operation panel. The three-level menu includes function parameter set (level 1 menu) →Function code (level 2 menu) →Function code setup value (level 3 menu). Refer to Fig.4-2 for the operation procedure. In the state parameter interface, it can check the different status parameter by the “» ” key.

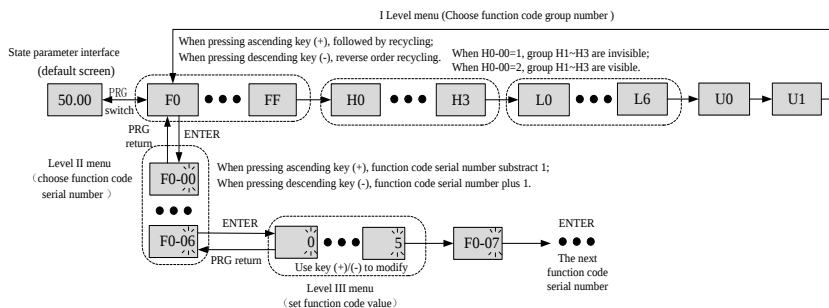


Fig.4-2 three-level menu operation flow chart

Tips: When operating with the three-level menu, you can press **PRG** or **ENTER** to return to the 2nd level menu. But it will save the present parameter data and move to the next function code if press **ENTER**, while it will give up the present parameter revising if press **PRG**.

For example: make function code F1-04 change from 0.00Hz to 5.00Hz.

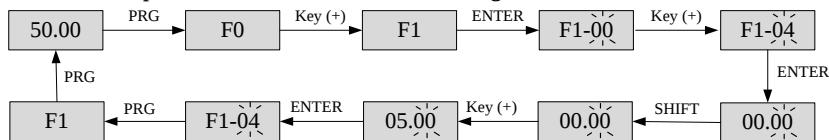


Fig.4-3 parameter setting operation flowchart

In the status of the 3rd menu, the value can't be modified if the parameter doesn't have the flashing digit. You can check the function code property description for the specific reasons.

Chapter 5 SVC Debugging Instructions

1. The Setting of the Synchronization Type, Control model and Motor parameters

The motor type be set to synchronous and control model of SVC: F0-03 = 11.

Remark: ten's digit is motor type selection and Unit's digit is control mode for F0-03

Unit's digit: 1: SVC 2: VF 3: close-loop vector (Reserve)

Ten's digit: 1: synchronous motor 0: asynchronous motor

Note: Only synchronous motors can be selected above 11KW inverter.

According to the actual motor parameters to set F4-01~F4-06

2. Parameter Identification

Powered-on the motor, setting the F4-00 for 1 when it loads; Conversely, setting the F4-00 for 2 and the Digital tube will show TUNE. To ensure the control effect, you'd better set the F4-00 for 2 in the mode of non-load.

Press the RUN key to identify parameters and it will finish when the TUNE disappear.

Identification lasts about 1-min. and you can press the STOP to exit. The motor will produce current during the process of identification. Keep the motor in 60% rated frequency and observe if it is steady. Slow down to switch off when it is steady for a while or press the STOP to exit directly.

To check whether the F4-17 ~ F4-20 parameters is normal after finishing parameters Identification

3. The non-load commissioning

Set the speed within smaller range, such as F0-11 = 20 HZ.

Press the RUN key to check whether motor can accelerate to the given frequency. The Inverter is in normal if motor can accelerate to the given frequency with a small current. Similarly, set the frequency for rated frequency and check whether the motor can accelerate to it.

4. Quick-start commissioning when required set; otherwise, skip this operation

Press the RUN key and check to see if the motor can accelerate quickly to given frequency when decrease the motor acceleration time (e.g., set to 1s) and change the speed loop, current loop PI parameter.

5. Loading operation

Motor will be run normally in non-load after finishing above five steps.

Remark: Adjust the parameters of F3-04 and F3-06 if the motor can't reach the desired effect when change the rotational inertia of the system. If change another type, please set the motor in a rated frequency and current before identify the parameter.

Chapter 6 commissioning

6.1 Procedures before running

The flowchart in this chapter has tell us the basic procedures before start the inverter, please choose the corresponding flowchart according to the accrual application. We only introduce the basic settings in this section.

Flow chart	Sub flowchart	Content	page
A	-	Basic steps from installation, wiring to running	25
-	A-1	Running under open-loop vector (speed sensor less vector) control	26
-	A-2	Running under V/F control	27

Flowchart A (connecting to the motor by the least setting change)

Flowchart A explains the connection to the motor by the least setting. The setting will have some differences for the different use. Please use the initial set parameter of the inverter in the application which doesn't need precise control.

Sub flowchart A-1 (motor running with open-loop vector control mode)

Sub flowchart A-1 explains the startup steps in open-loop vector control mode. It's more effective for vector control when high starting torque, torque limitation etc are needed.

Sub flowchart A-2 (simple motor running with V/F control mode)

When running with V/F control mode, please set the parameter according to below flowchart. It is more effective of V/F control in fan or pump application.

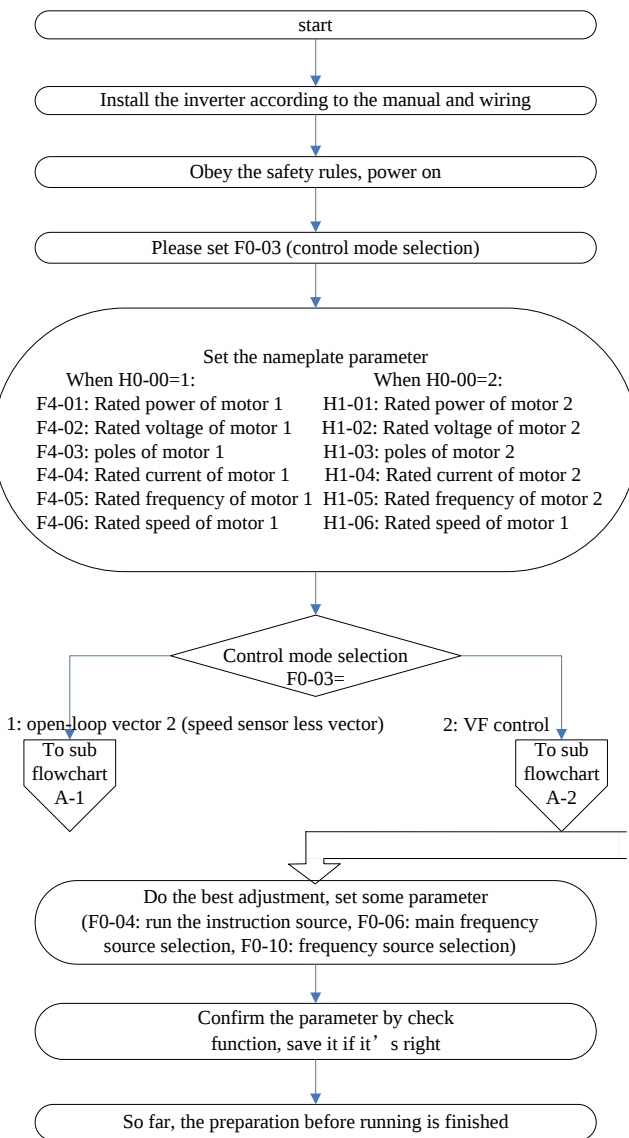


Fig. 6-1 basic steps before running

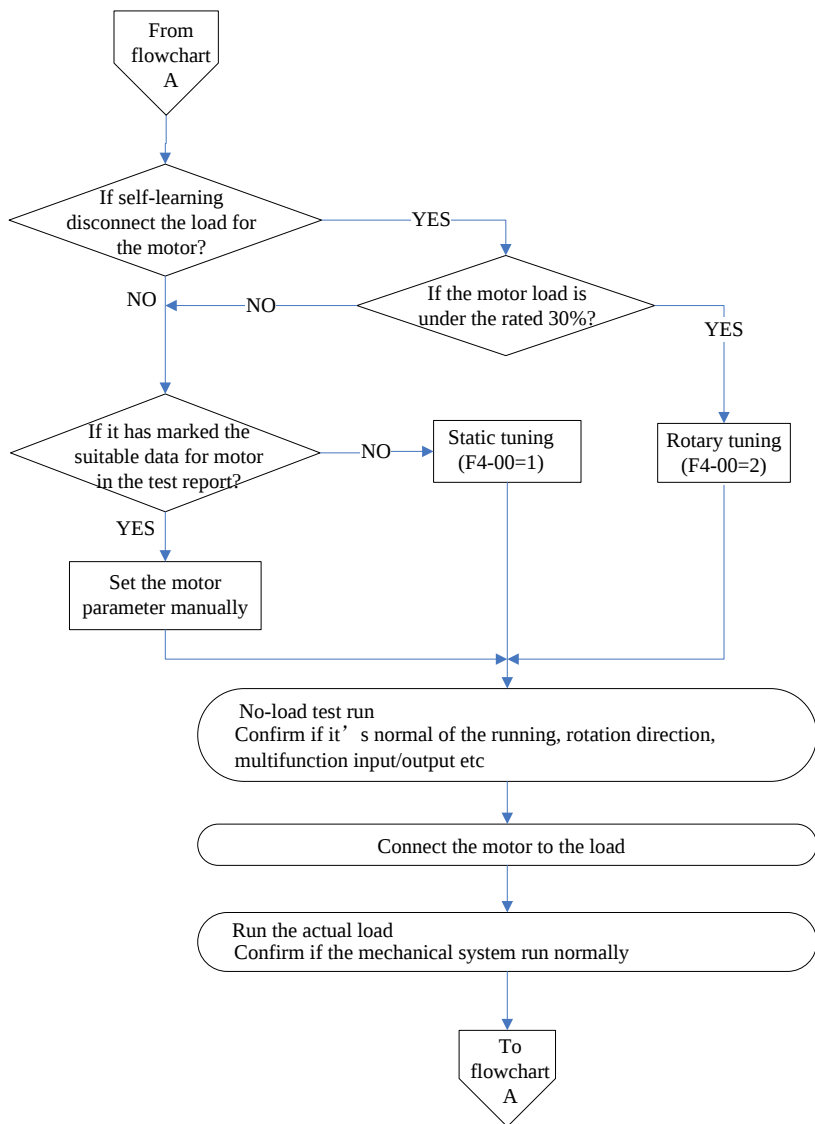


Fig.6-2 open-loop vector control running steps

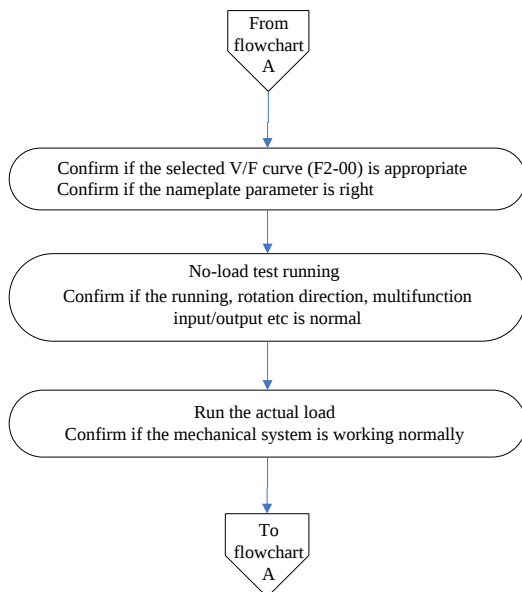


Fig.6-3 V/F control mode running steps

6.1.1 State parameter check

It can display various of state parameter through the key “ $\gg$ ” either the machine is stopped or running. It’s function code F7-29 (running parameter) and F7-30 (stop parameter) choose the parameter display when it’s stop or running according to the binary bit. It has totally sixteen run/stop state parameter for choosing to display, more details please refer to the F7-29 and F7-30 description in chapter five.

6.2 Start-stop Control of the Inverter

6.2.1 Source selection of the start-stop signal

There are three source of the start-stop control command of the inverter, respectively are operate panel control, terminal control and communication control, you can choose it by function code F0-04.

F0-04	Set running command source		Default value	explanation
	Setting range	0	Operate panel command channel (LED off)	Press RUN, STOP to start-stop
		1	Terminal command channel (LED on)	Define DI as the start-stop command terminal
		1	Communication command channel (LED flicker)	Use MODBUS-RTU protocol

6.2.1.1 Operate panel start-stop control

When operate the panel to make the function code F0-4=0, it's panel star-stop control mode. Press the "Run" button then the inverter starts to run (LED on); press "STOP" button on the run status, then the inverter stops (LED off).

6.2.1.2 Terminal start-stop control

FC-5S series of inverter provides several of terminal control ways, it can use function code F5-11 to confirm what control way does the terminal uses. Function code F5-00~F5-04 determine the input port of the start-stop control signal. For the specific setting ways, please refer to the detail explanation of function code F5-11, F5-00~F5-04 etc.

Example 1: It's require to use toggle switch as the start-stop switch of the inverter, connect the forward running switch signal to DI2 port, connect the reverse running switch signal to DI4 port. The way how to use and set is as follows:

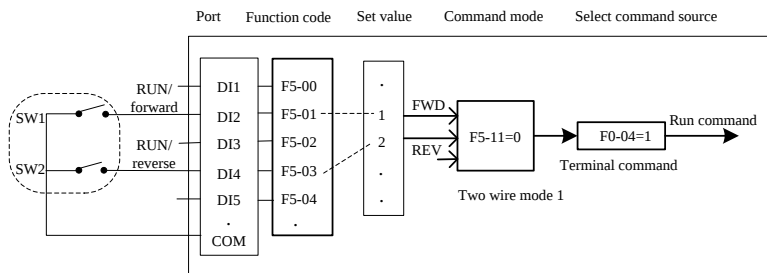


Fig.6-4 Illustration of terminal control start-stop mode

The control mode showed in the picture above: when SW1 is closed, the inverter runs in forward; when SW1 is open, the inverter is stopped. Similarly, when SW2 is closed, the inverter runs in reverse; when SW2 is open, the inverter is stopped. Whatever both SW1 and AW2 are closed or open, the inverter will be stopped.

Example 2: It's requiring to use electromagnetic pushbutton switch as the start-stop switch of the inverter, connect the start signal to DI2 port, connect the stop signal to DI4 port. The way how to use and set is as follows:

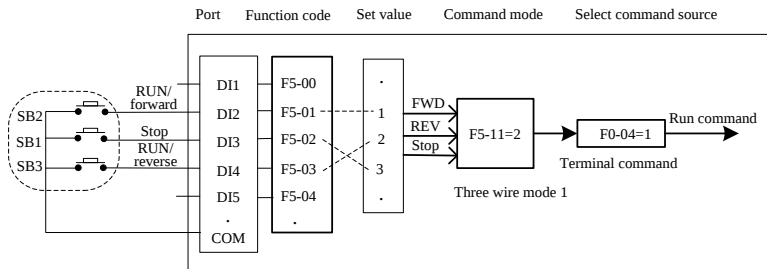


Fig.6-5 Illustration of terminal control start-stop mode

The control mode showed in the picture above: SB1 must keep closed on the normal running, otherwise the inverter will be stopped. The commands of SB2 and SB3 are effective when the buttons are pressed down. The running status of the

inverter is determined by the final actions of these 3 buttons.

6.2.1.3 Communication start-stop control

The upper computer uses RS485 communication mode to control the inverter application. Choosing communication mode (F0-04=2) as control command source, then the start-stop of the inverter can be controlled by communication mode. The setting of the related function code is as follows:

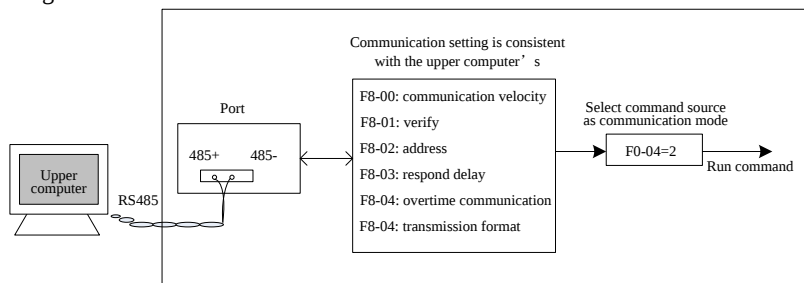


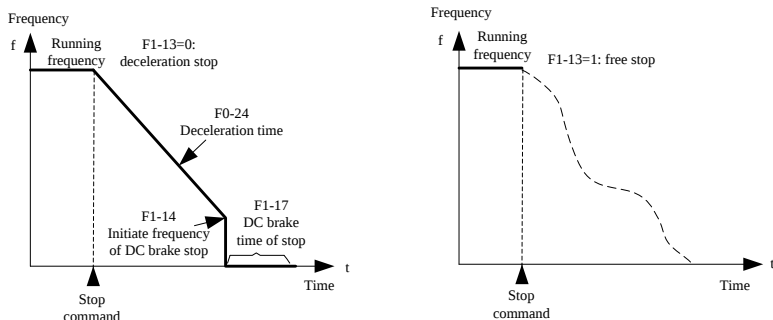
Fig.6-6 Illustration of communication control start-stop mode

In the above picture, if set communication overtime (F8-04) function code as nonzero value, the automotive stop function of the inverter overtime fault is active. It can avoid the inverter run out of control because of the communication fault or upper computer fault. This function can be use in some certain application.

The protocol which built in the communication port is MODBUS-RTU slave protocol, the upper machine must use MODBUS-RTU master protocol to communicate with it. For the related specific content of the communication protocol, please refer to the manual appendix A: Modbus communication protocol.

6.2.2 Start mode

There is 3 modes of the inverter, respectively are direct start, fast track start and asynchronous machine pre-excited magnetic start, it can be selected by function parameter F1-00.



6.2.3 Stop mode

There are 2 kinds of stop mode of inverter, respectively are deceleration stop and free stop. It can be selected by function code F1-13.

6.2.4 Jog running

In many occasions, the inverter need to run in slow speed so as to test the equipment or other function, so it's convenient to run in jog. For the relevant parameters of Jog t running, please refer to F7-00~F7-02

Chapter 7 Trouble Shooting

If faults happened on the running process, the inverter will stop to output immediately to protect the motor, and the corresponding fault relay of the inverter has contact action at the same time so the panel will display the fault code. The fault types and regular solutions that corresponding to the fault code are listed below in the table. Details in below form is only for reference, so please don't fix or change it by yourself. If you can't clear out the fault please contact us or the local agent for technical support.

Tab.7-1 Fault warning and solutions

Display	Fault Name	Possible Causes	Solutions
Err01	Inverter unit protection	1: The output circuit is grounded or short circuited. 2: The module overheats. 3: The internal connections become loose. 4: The main control board is faulty, drive board or module is faulty.	1: Eliminate external faults. 2: Check the air filter and the cooling fan. 3: Connect all cables properly. 4: Contact the agent or the manufacturer for help.
Err04	Over current during acceleration	1: The output circuit is grounded or short circuited. 2: Motor parameter is not right. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.

Display	Fault Name	Possible Causes	Solutions
Err05	Over current during deceleration	1: The output circuit is grounded or short circuited. 2: Motor parameter is not right. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed. 7: Magnetic flux brake gain too much	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor. 7: Decrease the over- magnetic flux brake gain.
Err06	Over current at constant speed	1: The output circuit is grounded or short circuited. 2: Motor parameter is not right. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Err08	Overvoltage during acceleration	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed. 5: Motor parameter is wrong.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor. 5: Perform the motor auto-tuning.
Err09	Overvoltage during deceleration	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
Err10	Overvoltage at constant speed	1: The input voltage is too high. 2: An external force drives the motor during acceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor.

Display	Fault Name	Possible Causes	Solutions
Err12	Undervoltage	1. Instantaneous power failure occurs. 2. The input voltage exceeds the allowed range. 3. The DC bus voltage is too low. 4. The rectifier bridge and Buffer resistor are faulty. 5. The drive board is faulty. 8. The control board is faulty.	1. Reset the fault. 2. Adjust the input voltage to within the allowed range. 3. Seek for maintenance.
Err13	Drive overload	1. The load is too heavy or the rotor is locked. 2. The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
Err14	Motor overload	1: F9-01 is too small. 2: The load is too heavy or the rotor is locked. 3: The drive is of too small power class.	1: Set F9-01 correctly. 2: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 3: Select a drive of higher power class.
Err15	Drive overheat	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The cooling fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
Err17	Current detection fault	1: The internal connections become loose. 2: The HALL device is faulty. 3: The control or drive board is faulty.	1: Connect all cables properly. 2: Seek for maintenance.
Err20	Short circuit to ground	The motor is short circuited to the ground.	Replace the cable or motor.
Err23	Power input phase loss	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightning board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Seek for maintenance.
Err24	Power output phase loss	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal.

Display	Fault Name	Possible Causes	Solutions
		outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4 The module is faulty.	3: Seek for maintenance.
Err25	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
Err27	Communication fault	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: The communication parameters in group F8 are set improperly.	1: Check cabling of the host computer. 2: Check the communication cabling. 3: Set the communication parameters properly.
Err28	External equipment fault	External fault normally closed or normally open signal is input via DI.	Reset the fault.
Err29	Too large speed deviation	1: The load is too heavy and the acceleration time is too short. 2:F9-31 and F9-32 are set incorrectly.	1: Increase the acceleration and deceleration time. 2:Set F9-31 and F9-32 correctly based on the actual situation.
Err30	User-defined fault1	The user-defined fault 1 signal is input via DI.	Reset the fault.
Err31	User-defined fault2	The user-defined fault 2 signal is input via DI.	Reset the fault.
Err32	PID feedback lost during running	The PID feedback is lower than the setting of FA-13.	Check the PID feedback signal or set FA-26 to a proper value.
Err33	Fast current limit fault	1: The load is too heavy or the rotor is locked. 2: The acceleration time is too short.	1: Reduce the load, or change the inverter with larger power. 2: Increase the acceleration time.
Err34	Load becoming 0	The detection is reached. Get more details from F9-28 to F9-30.	Reset the fault or reset F9-28 to F9-30 value
Err35	Control power supply fault	1: The input voltage is not within the allowable range. 2:The power on and off is too frequently.	1: Adjust the input voltage to the allowable range. 2:Extension of power on cycle.
Err36	Function board communication failure	1:Function board is in poor contact or abnormal 2:Hardware communication is faulty	1. Contact dealers 2. Contact the technical support of the manufacturer

Display	Fault Name	Possible Causes	Solutions
Err37	Data storage fault	Communication between DSP and EEPROM fault.	1: Replace the main control board. 2: Contact the agent or the manufacturer for help.
Err39	Current running time reached	Current running time of AC driver is larger than .F7-38 value.	Reset the fault.
Err40	Accumulative running time reached	The accumulative running time reaches the setting value of F7-20.	Clear the record through the parameter initialization function or set F7-20 to a new value.
Err42	Motor switchover fault during running	Change the selection of the motor via terminal during running of the AC drive.	Perform motor switchover after the AC drive stops.
Err44	DSP board communication is faulty	1:The DSP board is in poor contact or abnormal 2:Hardware communication is faulty	1. Contact dealers 2. Contact the technical support of the manufacturer
Err46	Master slave control communication disconnection	1:There is no set host but set the slave machine 2:The communication cable is faulty or communication parameter setting not correct.	1: Set host and reset the fault. 2: Check the communication cabling and communication parameters F8.

Chapter 8 Modbus Communication Protocol

FC-5S series of frequency converters can provide RS232/RS485 communication interface, and use MODBUS communication protocol. The user can realize the central control through computer or PLC. Also it can set the running commands, modify or read the function code parameter, read the working status and fault information of the frequency converter according to the protocol.

1. Communication Protocol Content

This serial communication protocol has defined the content and the working format in serial communication, including master machine polling format (or broadcast) and master machine encoding method. The content includes the function code of the requested action, data transmission, error checking, etc. Same structure is used on the slave machine response, which includes action confirmation, data returning, error checking, etc. If the slave machine has an error in receiving information or cannot complete the requirements from the master machine, it will send a fault signal back as a response to the master machine.

2. Application Mode

The frequency converter connect PC/PLC network with RS232/RS485 bus and single master but multiple slave machines.

3. Bus Structure

(1) Interface mode

RS232/RS485 hardware interface

(2) Transmission mode

It's asynchronous serial and half-duplex transmission mode. For master machine and slave machine, only one can send data and another one receive it at the same time. In the process of serial asynchronous communication, the data is transmitted frame by frame in the form of message.

(3) Topological structure

In single master machine and multiple slave machines system, the setup range of slave address is "1~247", and "0" is the broadcast communication address. The address of the slave machine in net work must be unique.

4. Protocol specification

FC-5S series frequency converter communication protocol is a asynchronous serial and master-slave Modbus communication protocol, only one facility (master machine) in network can set up protocol (called "query/command"), other facilities (slave machines) can only response to the "query/command" of master machine according to the data provided, or make relevant action by "query/command" from the master machine. The master machine here means personal computer (PC), industrial controlled facility or programmable logic controller (PLC), etc., the slave

machine means FC-5S frequency converter. The master machine can not only communicate with one slave machine separately, but also broadcast information to all the slave machines. For the separate access to “query/command” of master machine, the slave machine will return information (called response). For the broadcast information from the master machine, the slave machines need not to response to the master machine.

5. Communication frame structure

The Modbus protocol data format of FC-5S series of frequency convert is as follows:

If use RTU mode, the message must be sent with a pause of at least 3.5 characters time. Different character time is very easy to get under the circumstance of varieties of network baud rates. The first domain of the message transmission is the equipment address, the usable transmissive characters are hexadecimal 0~9, A~F. Network equipment continuously detect the network trunk line, including the pause time. Once the first domain (address domain) is received, all the facilities will decode to make out if it's sent to their own. After the last characters sent, a pause with at least 3.5 character time buckets indicates the end the message. A new message can be started after the pause.

The entire message frames must be sent as a continuous flow. If there was a pause over 1.5-character time before the frame completed, the receiving equipment will update the incomplete message and assume the next byte as address domain of a new message. Likewise, if a new message was sent following with the previous one during less than 3.5-character time, the receiving equipment will regard it as the extension of the previous message. This will lead to an error, because the result is impossible to be right with the value of CRC domain at last.

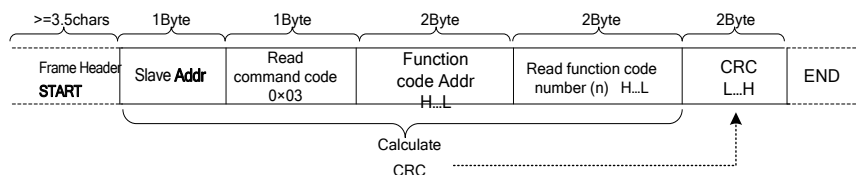
RTU frame format:

Frame Header START	3.5 characters time
Slave Address ADR	Contact address:1~247(Set by F8-02)
The command code CMD	03: Read the parameter of the slave machine 06: Write the parameters of the slave machine
The content of the data DATA (N-1)	The content of the DATA: The address of function code parameters; The quantity of function code parameters; The value of function code parameters;
The content of the data DATA (N-2)	
.....	
The content of the data DATA0	
CRC CHK Low order	detection value: CRC16 verified value. low byte is sent previous than High byte.
CRC CHK High order	
END	3.5-characters time

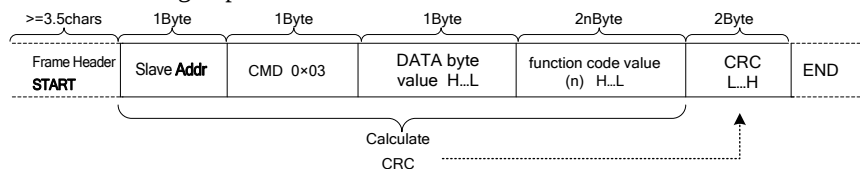
Command instruction (CMD) and data description (DATA)

Command code: 03H, read N words (Word), it can read at most 12 words and N = 1 ~ 12 words. Specific format is as below:

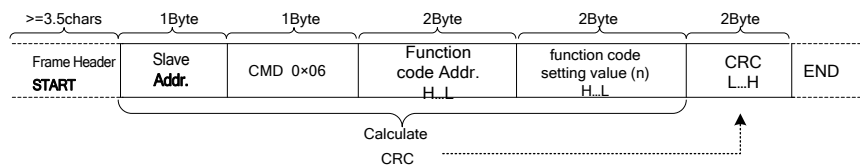
Frame of reading command from the master:



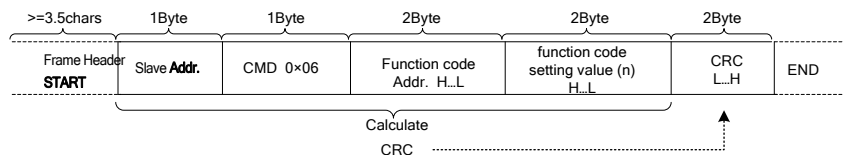
Frame of reading response command from the slave:



Frame of writing command from the master:

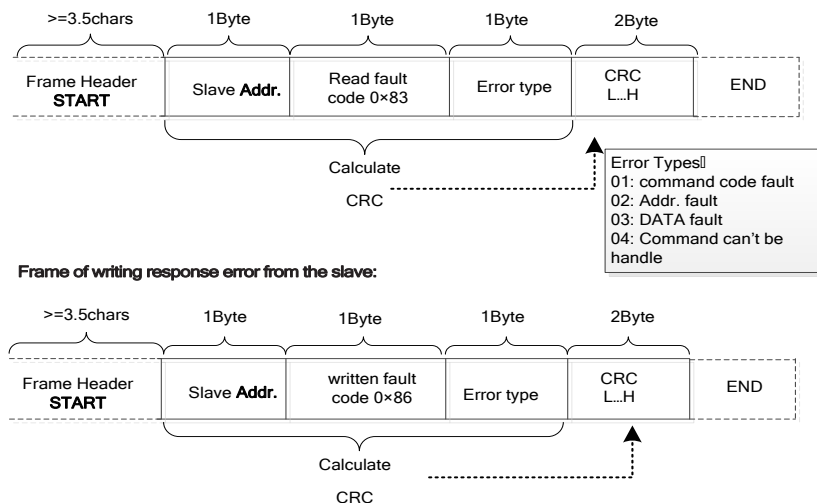


Frame of writing response command from the slave:



Note: If the slave detects a communication frame error or reading/writing failure is caused by other reasons, an error frame will be returned as follows:

Frame of reading response error from the slave:



Example: reading continuous 2 parameters from frequency convert F0~03 whose slave machine address F8-02= 01.

Command from the master machine:

Frame Header	Slave Addr.	Read function	Function code	Read function	CRC	END
>=3.5chars	0x01	code 0x03	0xF0 0x03	0x00 0x02	0x07 0x0B	

Reply from the slave machine:

Frame Header	Slave Addr.	Read function	DATA byte	F0_03 parameter	F0_04 parameter	CRC	END
>=3.5chars	0x01	code 0x03	value 0x04	value 0x00 0x00	value 0x00 0x00	0xFA 0x33	

6. Verification mode (CRC verification mode)

CRC (Cyclical Redundancy Check) use RTU frame format, the message includes error checking domain based on CRC method. CRC domain checked the content of the entire message. CRC domain is 2 bytes, containing a 16-bit binary value. It's added to the message after calculated by transmission equipment. The receiving device recalculates the CRC message after the information received, and compare with the value in the received CRC. If the two CRC values are not equal, it indicates that errors happened on transmission.

CRC saves 0xFFFF firstly, and then call a process to deal continuous 8-bit bytes in the message with the value in current register. Only 8 bit data in each character is effective to CRC, start bit, stop bit and the parity bit are ineffective.

During the process of CRC, each 8-bit character individually exclusive or the content in the register (XOR), the result shifts to the least significant bit while the

most significant bit is filled with a “0”. The LSB is picked out to test, if the LSB is 1, the register exclusive or the preset value, if the LSB is 0, no action taken. The whole process will be repeated 8 times. When the last bit (the 8th bit) is done, the next 8-bit character separately exclusive or the current value in the register again. The final value in the register is the CRC value after all the bytes in the message have been dealt with.

When adding CRC to message, the lower bytes are add previous than the higher bytes. The simple CRC function is as follow:

```
unsigned int crc_chk_value (unsigned char *data_value, unsigned char length)
{
    unsigned int crc_value=0xFFFF;
    int i;
    while (length--)
    {
        crc_value^=*data_value++;
        for (i=0;i<8;i++)
        {
            if (crc_value&0x0001)
            {
                crc_value= (crc_value>>1) ^0xa001;
            }
            else
            {
                crc_value=crc_value>>1;
            }
        }
    }
    return (crc_value) ;
}
```

7. The definition of communication parameter address

This part is the content about communication, which used for controlling the running and working status of the frequency convert, and set relevant parameter.

Parameter of read and write function code (some function code can't be changed, only for supplier and monitor usage):

Labeling rule of function code address:

Use the group number and mark number of the function code as parameter

address rule:

The high bytes: F0~FF (group F)、H0~HF (group H)、L0~LF (group L)、n0~nF (group N)、70~7F (group U) the low byte: 00~FF

For example: F0-11, the address indicated as F00B;

Attention:

Group FF: The parameter can neither be read nor be altered.

Group U: The parameter can only be read, but not be altered.

Some parameter can't be changed when the frequency convert is on running status; some parameter can't be changed regardless of any status of the frequency convert; please pay attention to the range, unit and relevant instruction when changing the function code parameter.

Group number of function code	Access address of communication	Function code address of communication revise the RAM
Group F0~FE	0xF000~0xFEFE	0x0000~0x0EFF
Group H0~HF	0xA000~0xAFFF	0x4000~0x4FFF
Group L0~LF	0xB000~0xBFFF	0x5000~0x5FFF
Group n0~nF	0xC000~0xCFFF	0x6000~0x6FFF
Group U0、U1	0x70xx、0x71xx	

Pay attention that if the EEPROM is stored continuously, the service life will be reduced. So there is no need to store some function code on the communication mode, just need to change the value in RAM.

If it's group F of the parameter to realize this function, just need to change high byte from F to 0 on the function code address.

If it's group A of the parameter to realize this function, just need to change high byte from A to 4 on the function code address.

The relevant function code address indicated as below:

High byte: 00~0F (group F)、40~4F (group A) the low byte: 00~FF

For example; function code F0-11 doesn't store in EEPROM, the address indicated as 000B; this address means that it only can write RAM, but can't use the read action, if it's being read, the address is ineffective.

Stop / Run Parameter

Parameter Address (HEX)	Parameter Description
0x1000/9000	1000:*Communication set value(-1000~1000) (decimal) (readable and writable) (minimum unit:0.01%),Read/Write
	9000: range(0Hz~F0-14) (minimum unit:0.01Hz), Read/Write
0x1001	Set frequency (minimum unit:0.01Hz), Read-only
0x1002	Running frequency (minimum unit:0.01Hz), Read-only
0x1003	Busbar voltage (minimum unit: 0.01V), Read-only
0x1004	Output voltage (minimum unit: 0.1V), Read-only
0x1005	Output current (minimum unit: 0.1A), Read-only
0x1006	Output power (minimum unit: 0.1kw), Read-only
0x1007	DI input flag (minimum unit: 1), Read-only
0x1008	DO output flag (minimum unit: 1), Read-only
0x1009	PID set (minimum unit: 1), Read-only
0x100A	PID feedback (minimum unit:1), Read-only
0x100B	AI1 voltage (minimum unit: 0.01V), Read-only
0x100C	AI2 voltage (minimum unit: 0.01V), Read-only
0x100D	AO1 output voltage (minimum unit: 0.01V), Read-only
0x100E	PLC step (minimum unit: 1), Read-only
0x100F	Rotate speed (minimum unit: 1rpm), Read-only
0x1010	Count value input (minimum unit: 1), Read-only
0x1011	Pulse frequency input (minimum unit: 0.01kHz), Read-only
0x1012	Feedback speed (minimum unit: 0.1Hz), Read-only
0x1013	The remaining run time (minimum unit: 0.1 min), Read-only
0x1014	Voltage before AI1 revised (minimum unit: 0.001V), Read-only
0x1015	Voltage before AI2 revised (minimum unit: 0.001V), Read-only
0x1016	The actual linear speed (minimum unit: 1m/min), Read-only
0x1017	Load speed (minimum unit: user-defined, refer to F7-31), Read-only

0x1018	present power-on time (minimum unit: 1min) , Read-only
0x1019	Present run time (minimum unit: 0.1min) , Read-only
0x101A	Pulse frequency input (minimum unit: 1Hz) , Read-only
0x101B	Main frequency X display (minimum unit: 0.01Hz) , Read-only
0x101C	Auxiliary frequency Y display (minimum unit: 0.01Hz) , Read-only
0x101D	Target torque (minimum unit: 0.1%), regard motor rated torque as 100%, Read-only
0x101E	Output torque (minimum unit: 0.1%), regard motor rated torque as 100%, Read-only
0x101F	Output torque (minimum unit: 0.1%), regard inverter rated current as 100%, Read-only
0x1020	Upper limit torque (minimum unit: 0.1%), regard inverter rated current as 100%, Read-only
0x1021	VF separate target voltage (minimum unit: 1V) , Read-only
0x1022	VF separate output voltage (minimum unit: 1V) , Read-only
0x1023	Reserved, Read-only
0x1024	Motor 1/2 direction (minimum unit: 1) , Read-only
0x1025	Length value input (minimum unit: 1) , Read-only
0x1026	AO2 output voltage (minimum unit: 0.1V) , Read-only
0x1027	Status of the invert (minimum unit: 1) , Read-only
0x1028	Present malfunction (minimum unit: 1) , Read-only

Example 1: read the run frequency of the first machine: 0x01 0x03 0x10 0x02 0x00 0x01 0x21 0x0A 0x10 0x02 (1002) run frequency address, 0x00 0x01 (0001) one data 0x21 0x0A (210A) CRC verified value.

Example 2: read the busbar voltage, output voltage, output current of the first machine at the same time: 0x01 0x03 0x10 0x03 0x00 0x03 CRC verified value, the meaning of the data is similar to example 1.

Attention: Communication set value is a relative percentage value, 10000 correspond to 100.00% and -10000 correspond to -100.00%
For the data of frequency dimension, this percentage is the percentage of the relative maximum frequency (F0-14); for the data of torque, this percentage is F3-21, F3-23, H3-21, H3-23.

Control command input to the frequency convert: (Write only)

Command word address (HEX)	Command word function
0x2000	0001: Forward operation
	0002: Reverse operation
	0003: Forward jog
	0004: Reverse jog
	0005: Free stop
	0006: Slow-down stop
	0007: Fault reset

Example 3: give command forward rotating to the second machine: 0x02 0x06 0x20 0x00 0x00 0x01 CRC verified value

Status word address (HEX)	Status word function
0x3000	0001: Forward operation
	0002: Reverse operation
	0003: Stop

Read the status of the frequency convert: (read only)**Digital output terminal control: (write only)**

Command address (HEX)	Command content
0x2001	BIT0: RELAY1 output control BIT1: RELAY2 output control BIT2: DO1 output control

Attention: D0 output terminal need to choose 16 (communication control) function.

Analog AO1 control: (write only)

Command address (HEX)	Command content
0x2002	0~7FFF represent 0%~100%

Analog AO2 control: (write only)

Command address (HEX)	Command content
0x2003	0~7FFF represent 0%~100%

Attention: AO output need to choose 7 (communication control output) function.

Fault descriptions of the frequency convert:

The fault address (HEX)	The fault detail information
0x8000	0000: Fault free 0001: Reserve 0002: Reserve 0003: Reserve

0x8000	0004: Accelerated over current 0005: Decelerated over current 0006: Constant over current 0007: Over current on stop 0008: Accelerated over voltage 0009: Decelerated over voltage 000A: Constant over voltage 000B: Over voltage on stop 000C: Undervoltage fault 000D: Frequency convert overload 000E: Motor overloading 000F: Module over heat 0010: Reserve 0011: Current detection fault 0012: Reserve 0013: Reserve 0014: Earth short circuit of the motor 0015: Tuning fault of the motor 0016: Reserve 0017: Shortage- phase on input 0018: Shortage- phase on output 0019: Abnormal read and write on EEPROM 001A: Enter the password more than the limit times 001B: Abnormal communication 001C: External fault 001D: Over speed deviation 001E: Fault 1 that user defined 001F: Fault 2 that user defined 0020: Lost the PID feedback on running 0021: Limit current fault of the hardware 0022: Off load 0023: Overload on the buffer resistance 0024: Abnormal contactor 0025: The agent running time is up 0026: Over temperature of the motor 0027: Present running time is up 0028: Accumulated running time is up 0029: Power-on time is up 002A: Fault on switching the motor 002B: Over speed of the motor 002C: Reserve 002D: Reserve 002E: Reserve 002F: Fault on point- to- point communication of slave machine
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When it has fault on communication, the return address is: reading fault 83XX, writing fault 86XX.

Appendix A Function Parameter Table

Function code group	Function description	Explanation
F0~FF	Basic function parameter group	Compatible with CM series of function code
H0~H3	2 nd motor parameter group	2 nd motor parameter, acceleration and deceleration time, control method, all can be set independently.
L0~L6	Enhancement function parameter group	System parameter set, custom-made user function code, optimization control, AI/AO revising, master-slave control, mechanical brake function and sleep function.
N0~NF	Professional inverter function selection group	Choose to use different professional inverter function
U0~U1	Monitoring parameter group	U0 is the fault record parameter group; U1 is the user monitoring parameter group, for the convenience to check the relevant output status.

The symbols in the function code table are described as follows:

"☆":The parameter can be modified when the AC drive is in either stop or running state.

"★":The parameter cannot be modified when the AC drive is in the running state.

"○":The parameter is the actually measured value and cannot be modified.

"●":The parameter is factory parameter and can be set only by the manufacturer

Enhancement code: group H0~group H3, group L0~group L3, are started by function code parameter F7-75.

The shaded part in the function parameter list is the special parameter of synchronous motor.

Function Code	Parameter Name	Setting Range	Default	Property
Group F0: Standard Function Parameters				
F0-00	Product model	Product model: 7 digital display, 2 decimal point	80#.##	●
F0-01	G/P type display	0: Heavy duty(G type) 1: Normal duty(P type)	0	●
F0-02	Rated driver current	0.1A to 3000.0A	Model dependent	●
F0-03	Control mode	Unit's digit: Motor Control mode 1: Sensor-less vector	2	★

Function Code	Parameter Name	Setting Range	Default	Property
		control(SFVC) 2: Voltage/Frequency(V/F) 3: vector control(FVC) Ten's digit: Motor type Selecting (Only synchronous motors can be selected above 11KW) 0: Induction Motor 1: PMSM		
F0-04	Running command source selection	0: Operation keypad control (LED off). 1: Terminal control (LED on). 2: Communication control (LED blinking).	0	★
F0-05	Base frequency for modification during running	0: Running frequency. 1: Set frequency.	1	★
F0-06	Main frequency source X selection	0: UP/ DOWN setting (non-recorded after stop). 1: UP/ DOWN setting (retentive after stop). 2: AI1 3: AI2 4: Multi-speed. 5: Simple PLC. 6: PID 7: Communication setting. 8: Pulse setting.	1	★
F0-07	Auxiliary frequency source Y selection	0: UP/ DOWN setting (non-recorded after stop). 1: UP/ DOWN setting (Retentive after stop). 2: AI1 3: AI2 4: Multi-reference. 5: Simple PLC. 6: PID 7: Communication setting. 8: Pulse setting.	0	★
F0-08	Range of auxiliary frequency Y selection	0: Relative to maximum frequency. 1: Relative to main frequency X.	0	☆
F0-09	Range of auxiliary frequency Y	0%~100%	100%	☆
F0-10	Frequency source selection	Unit's digit (Frequency source selection). 0: Main frequency source X. 1: X and Y operation result. 2: Switchover between X and Y	00	☆

Function Code	Parameter Name	Setting Range	Default	Property
		(by DI terminal). 3: Switchover between X and “X and Y superposition” (by DI terminal). 4: Switchover between Y and “X and Y superposition” (by DI terminal). Ten’s digit() 0: X+Y 1: X-Y 2: Max(X,Y) 3: Min(X,Y)		
F0-11	Preset frequency	0.00 to maximum frequency F0-14.	50.00Hz	☆
F0-13	Rotation direction	0: Same direction 1: Reverse direction 2: Reverse forbidden	0	☆
F0-14	Maximum output frequency	50.0Hz–1200.0 Hz(F0-20=1) 50.0Hz–600.00 Hz(F0-20=2)	50.00Hz	★
F0-15	Frequency source upper limit	0: Set by F0-16 1: AI1 2: AI2 3: Communication setting 4: Pulse setting	0	★
F0-16	Frequency upper limit	Frequency lower limit(F0-18)to maximum frequency (F0-14)	50.0Hz	☆
F0-17	Frequency upper limit offset	0.00 Hz to maximum frequency (F0-14).	0.00Hz	☆
F0-18	Frequency lower limit	0.00 Hz to frequency upper limits (F0-16).	0.00Hz	☆
F0-19	Command source binding select	Unit’s digit: Binding operation keypad command to frequency source. 0: No Binding 1: Digital setting 2: AI1 3: AI2 4: Multi-speed 5: Simple PLC 6: PID 7: Communication setting. 8: Pulse setting (HDI5). Ten’s digit: Binding operation terminal command to frequency source. Hundred’s digit: Binding operation communication command to frequency source. Thousand’s digit: Reserved.	000	☆

Function Code	Parameter Name	Setting Range	Default	Property
F0-20	Frequency fractional selection	1: 0.1Hz 2: 0.01Hz	2	★
F0-21	Acceleration/Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
F0-22	Acceleration/Deceleration time base frequency	0: Maximum frequency (F0-14) 1: Set frequency 2: Rated motor frequency	0	★
F0-23	Acceleration time 1	0s~30000s (F0-21 = 0) 0.0s~3000.0s (F0-21 = 1) 0.00s~300.00s (F0-21 = 2)	10.0s	☆
F0-24	Deceleration time 1	0s~30000s (F0-21 = 0) 0.0s~3000.0s (F0-21 = 1) 0.00s~300.00s (F0-21 = 2)	10.0s	☆
F0-25	Over modulation voltage boost	0% to 10%	3%	★
F0-26	Carrier frequency	0.5kHz~18.0kHz	Model dependent	☆
F0-27	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
F0-28	Initialization parameters	0:No operation. 1:Restore factory parameters, except motor parameters, record information and F0-20. 2:Clear the record information. 3:Backup the current user parameters. 4:User parameter backup recovery. 5:Restore factory parameters, including motor parameters.	0	★
F0-29	LCD upload or download parameter selection	0:no function 1:Download parameter to LCD 2:only upload F4 function parameters 3: Upload parameters except the F4 group 4: Upload all the parameters	0	☆
Group F1: Start/ Stop Control				
F1-00	Start mode	0: Direct start. 1: Rotational speed tracking restart. 2: Pre-excited start(asynchronous motor).	0	☆
F1-01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed 2: From maximum frequency	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F1-02	Max current of rotational speed tracking	30%~150%	100%	★
F1-03	Rotational speed tracking speed	1~100	20	☆
F1-04	Startup frequency	0.00Hz~10.00Hz	0.50Hz	☆
F1-05	Startup frequency holding time	0.0s~100.0s	0.0s	★
F1-06	Startup DC braking current/ Pre-excited current	0%~100%	0%	★
F1-07	Startup DC braking time/ Pre-excited time	0.0s~100.0s	0.0s	★
F1-08	Acceleration/Deceleration mode	0:Linear Acceleration/Deceleration mode 1:S-curve Acceleration/Deceleration mode A 2:S-curve Acceleration/Deceleration mode B	0	★
F1-09	Acceleration time proportion of S-curve start segment	0.0%~100.0%	20.0%	★
F1-10	Deceleration time proportion of S-curve start segment	0.0%~100.0%	20.0%	★
F1-11	Acceleration time proportion of S-curve end segment	0.0%~100.0%	20.0%	★
F1-12	Deceleration time proportion of S-curve end segment	0.0%~100.0%	20.0%	★
F1-13	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
F1-14	Initial frequency of stop DC braking	0.00HZ ~ maximum frequency (F0-14)	0.00Hz	☆
F1-15	Waiting time of stop DC braking	0.0s~100.0s	0.0s	☆
F1-16	Stop DC braking current	0%~100%	0%	☆
F1-17	Stop DC braking time	0.0s~38.0s	0.0s	☆
F1-21	Demagnetization time	0.01s~3.00s	0.50s	★
F1-23	Nonstop at instantaneous stop (when power fail) mode selection	0: Ineffective 1: Automatic start at power fluctuation 2: Decelerate to stop.	0	★
F1-24	Deceleration time of nonstop at instantaneous stop	0.0s to 100.0s	10.0s	★

Function Code	Parameter Name	Setting Range	Default	Property
F1-25	Effective voltage of nonstop at instantaneous stop	60% to 85%	80%	★
F1-26	Recovery voltage of nonstop at instantaneous stop	85% to 100%	90%	★
F1-27	Detection time of instantaneous stop nonstop recovery voltage	0.0s to 300.0s	0.3s	★
F1-28	Auto-regulation gain of nonstop at instantaneous stop	0 to 100	40	☆
F1-29	Auto-regulation integral time of nonstop at instantaneous stop	1 to 100	20	☆
Group F2: V/F Control Parameters				
F2-00	V/F curve setting	0: Linear V/F. 1: Multi-point V/F. 2: Square V/F. 3: 1.8-power V/F. 4: 1.5-power V/F. 5: 1.3-power V/F. 6: Voltage and frequency complete separation. 7: Voltage and frequency half separation.	0	★
F2-01	Torque boost	0.0%~30.0%	0.0%	☆
F2-02	Cut-off frequency of torque boost	0.00 Hz to maximum output frequency (F0-14).	25.00Hz	★
F2-03	Multi-point V/F frequency 1 (F1)	0.00Hz to F2-05	1.30Hz	★
F2-04	Multi-point V/F voltage 1 (V1)	0.0% to 100.0%	5.2%	★
F2-05	Multi-point V/F frequency 2 (F2)	F0-05 to F2-07	2.50Hz	★
F2-06	Multi-point V/F voltage 2 (V2)	0.0% to 100.0%	8.8%	★
F2-07	Multi-point V/F frequency 3 (F3)	0.00Hz to 50.00Hz	15.00Hz	★
F2-08	Multi-point V/F voltage 3 (V3)	0.0% to 100.0%	35.0%	★
F2-09	Slip compensation ratio	0.0% to 200.0%	50.0%	☆
F2-10	V/F Magnetic flux brake Gain	0 to 200	100	☆
F2-11	Oscillation suppression gain	0 to 100	Model dependent	☆
F2-13	Slip compensation time	0.02s to 1.00s	0.30s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F2-15	Output voltage source for voltage and frequency separation	0: Digital setting (F2-16). 1: AI1 2: AI2 3: Multi-reference 4: Simple PLC 5: PID 6: Communication setting. 7: Pulse setting (DI5). 100.0% corresponds to the rated.	0	☆
F2-16	Voltage digital setting for V/F separation	0 V to rated motor voltage	0V	☆
F2-17	Voltage rise time of V/F separation	0.0s to 3000.0s	1.0s	☆
F2-18	Voltage decline time of V/F separation	0.0s to 3000.0s	1.0s	☆
F2-19	Stop mode selection upon V/F separation	0: Frequency and voltage declining independently. 1: Frequency declining after voltage declines to 0.	0	☆
Group F3: Vector Control Parameters				
F3-00	Switchover frequency 1	1.00Hz to F3-02	5.00Hz	☆
F3-02	Switchover frequency 2	F3-00 to F0-14	10.00Hz	☆
F3-04	Speed loop proportional gain at low frequency	1.0 to 10.0	4.0	☆
F3-05	Speed loop integral time at low frequency	0.01s to 10.00s	0.50s	☆
F3-06	Speed loop proportional gain at high frequency	1.0 to 10.0	2.0	☆
F3-07	Speed loop integral time at high frequency	0.01s to 10.00s	1.00s	☆
F3-08	Speed loop integral property	0: Integral take effect 1: Integral separation	0	★
F3-11	Torque adjustment proportional gain Kp	0 to 30000	2200	☆
F3-12	Torque adjustment integral gain Ki	0 to 30000	1500	☆
F3-13	Excitation adjustment proportional gain Kp	0 to 30000	2200	☆
F3-14	Excitation adjustment integral gain Ki	0 to 30000	1500	☆
F3-15	Flux braking gain	0 to 200	0	☆
F3-16	Field weakening torque correction ratio	50% to 200%	100%	☆
F3-17	Slip compensation gain	50% to 200%	100%	☆

Function Code	Parameter Name	Setting Range	Default	Property
F3-18	Speed loop feedback filter time	0.000s to 1.000s	0.015s	☆
F3-19	Speed loop output filter time	0.000s to 1.000s	0.000s	☆
F3-20	Source of power-driven torque upper limit	0: F3-21 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5) (Analog range corresponds to F3-21)	0	☆
F3-21	Power-driven torque upper limit	0.0% to 200.0%	150.0%	☆
F3-22	Upper limit source of braking torque	0: F3-23 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5) (Analog range corresponds to F3-23)	0	☆
F3-23	Braking torque upper limit	0.0% to 200.0%	150.0%	☆
F3-24	PMSM magnetic current at low speed	0.0%~80.0%	25.0%	★
F3-25	PMSM magnetic current cutoff frequency	0%~100%	10%	★
F3-26	Time of Pre-excitation	0.00s~5.00s	0.00s	★
F3-27	PMSM initial position identification selecting	0: Disable 1: The first Identify ways 2: The second Identify way	1	★
Group F4: Motor 1Parameters				
F4-00	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning 2: Complete auto-tuning	0	★
F4-01	Rated motor 1 power	0.1kW to 1000.0kW	Model dependent	★
F4-02	Rated motor 1 voltage	0V to 1500V	380	★
F4-04	Rated motor 1 current	0.01A to 600.00 A (motor rated power ≤30 kW). 0.1A to 6000.0 A (motor rated power >30kW).	F4-01 dependent	★
F4-05	Rated motor frequency	0.01Hz to F0-14	50.00Hz	★
F4-06	Rated motor 1 rotational speed	0rpm to 60000rpm	F4-01 dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
F4-07	Motor 1 no-load current	0.01A to F4-04 A (motor rated power ≤ 30 kW). 0.1A to F4-04 A (motor rated power > 30 kW).	Model dependent	★
F4-08	Motor 1 stator resistance	0.001 Ω to 65.535 Ω	Model dependent	★
F4-09	Motor 1 rotor resistance	0.001 Ω to 65.535 Ω	Model dependent	★
F4-10	Motor 1 mutual inductive	0.1mH to 6553.5mH	Model dependent	★
F4-11	Motor 1 leakage inductive	0.01mH to 655.35mH	Model dependent	★
F4-12	Acceleration time of complete auto-tuning	1.0s to 6000.0s	10.0s	☆
F4-13	Deceleration time of complete auto-tuning	1.0s to 6000.0s	10.0s	☆
F4-17	PMSM stator resistance	0.001 Ω ~ 65.535 Ω	Model dependent	★
F4-18	PMSM d-axis inductance	0.01mH ~ 655.35mH	Model dependent	★
F4-19	PMSM q-axis inductance	0.01mH ~ 655.35mH	Model dependent	★
F4-20	PMSM BEMF	1V ~ 65535V	Model dependent	★
F4-21	PMSM no-load current	0.0% ~ 50.0%	10.0%	★
Group F5: Input Terminals				
F5-00	DI1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three-wire control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Speed increase 7: Speed Decrease 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: External fault normally open (NO) input.	1	★
F5-01	DI2 function selection		2	★

Function Code	Parameter Name	Setting Range	Default	Property
F5-02	DI3function selection	12:Constant speed 1 13:Constant speed 2 14:Constant speed 3 15:Constant speed 4 16:Terminal 1 for acceleration/ deceleration time selection 17:DI for acceleration/ deceleration time selection 18:Frequency source switchover 19:MOTPOT setting clear (terminal, keypad) 20:Command source switchover terminal 1	9	★
F5-03	DI4 function selection	21:Acceleration/Deceleration prohibited 22:PID pause 23:PLC status reset 24:Swing pause 25:Timer trigger input 26:Immediate DC injection braking 27:External fault normally closed (NC) input 28:Counter input 29:Counter reset 30:Length count input 31:Length reset	12	★
F5-04	DI5 function selection	32:Torque control prohibited. 33:Pulse input (enabled only for DI5). 34:Frequency modification forbidden. 35:PID action direction reverses. 36:ExternalSTOPterminal1. 37:Command source switchover terminal 2 38:PID integral disabled 39:Switchover between main frequency source X and preset frequency 40:Switchover between auxiliary frequency source Y and preset frequency 41:Switchover between motor 1	13	★

Function Code	Parameter Name	Setting Range	Default	Property
F5-05	DI6 function selection	and motor 2 42:Reserved 43:PID parameter switchover 44:Speed control/Torque control switchover 45:Emergency stop 46:External STOP terminal 2 47:Deceleration DC injection braking 48:Clear the current running time 49:Switchover between two-line mode and three-line mode 50:Reverse run prohibited 51>User- defined fault 1 52>User-defined fault 2 53:Dormant input	0	★
F5-10	DI filter time	0.000 to 1.000s	0.010s	☆
F5-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
F5-12	Terminal UP/DOWN rate	0.01Hz/s to 100.00Hz/s	1.00Hz/s	☆
F5-13	Terminal effective mode 1	0: High level 1: Low level Unit's:DI1; Ten's:DI2; Hundred's:DI3; Kilobit:DI4; Myriabit:DI5	00000	★
F5-14	Terminal effective mode 2	0: High level 1: Low level Unit's:DI6	00000	★
F5-15	AI1 minimum input	0.00V to 10.00V	0.00V	☆
F5-16	Corresponding setting of AI1 minimum input	-100.0% to 100.00%	0.0%	☆
F5-17	AI1 maximum input	0.00V to 10.00V	10.00V	☆
F5-18	Corresponding setting of AI1 maximum	-100.0% to 100.00%	100.0%	☆
F5-19	AI1 filter time	0.00s to 10.00s	0.10s	☆
F5-20	AI2 minimum input	0.00V to 10.00V	0.00V	☆
F5-21	Corresponding setting of AI2 minimum input	-100.0% to 100.00%	0.0%	☆
F5-22	AI2 maximum input	0.00V to 10.00V	10.00V	☆
F5-23	Corresponding setting of AI2 maximum	-100.0% to 100.00%	100.0%	☆
F5-24	AI2 filter time	0.00s to 10.00s	0.10s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F5-30	Pulse minimum input	0.00KHz to 100.00KHz	0.00KHz	☆
F5-31	Corresponding setting of pulse minimum input	-100.0% to 100.00%	0.0%	☆
F5-32	Pulse maximum input	0.00KHz to 100.00KHz	50.00KHz	☆
F5-33	Corresponding setting of pulse maximum input	-100.0% to 100.00%	100.0%	☆
F5-34	Pulse filter time	0.00s to 10.00s	0.10s	☆
F5-35	DI1 On delay time	0.0s to 3600.0s	0.0s	☆
F5-36	DI1 Off delay time	0.0s to 3600.0s	0.0s	☆
F5-37	DI2 On delay time	0.0s to 3600.0s	0.0s	☆
F5-38	DI2 Off delay time	0.0s to 3600.0s	0.0s	☆
F5-41	AI1 function selection as DI terminal	0 to 53 as DI terminal function.	0	★
F5-42	AI2 function selection as DI terminal	0 to 53 as DI terminal function.	0	★
F5-44	AI effective mode selection as DI terminal	Unit's digit(AI1). 0: High level effective. 1: Low level effective. Ten's digit(AI2). 0: High level effective. 1: Low level effective. Hundred's digit::reserved	0×00	☆
F5-45	AI curve selection	Unit's digit (AI1 curve selection) 0: 2 points curve. 1: Multi-point curve 1. 2: Multi-point curve 2. Ten's digit (AI2 curve selection). 0: 2 points curve 1: Multi-point curve 1 2: Multi-point curve 2 Hundred's digit: reserved	0×00	☆
Group F6: Output Terminals				

Function Code	Parameter Name	Setting Range	Default	Property
F6-00	Relay 1 function	0:No output 1:AC drive running 2:Fault output 3:Frequency-level detection FDT1 reached 4:Frequency reached 5:Zero-speed running (no output at stop) 6:Motor overload pre-warning 7:AC drive overload pre-warning 8:PLC cycle completed 9:Accumulative running time reached	2	☆
F6-01	Relay 2 function	10:Frequency limited 11:Ready for RUN 12:AI1>AI2 13:Frequency upper limit reached 14:Frequency lower limit reached 15:Undervoltage state output 16:Communication setting 17:Timer output 18:Reverse running 19:Reserved	1	☆
F6-02	Y1 function	20:Length reached 21:Torque limited 22:Current 1 reached 23:Frequency 1 reached 24:Module temperature reached 25:Load lost 26:Accumulative power-on time reached 27:Clacking reached output 28:Current running time reached 29:Set count value reached 30:Designated count value reached 31: Motor 1 and motor 2 indication 32: Brake control output 33:Zero-speed running 2 (having output at stop) 34:Frequency level detection FDT2 output 35:Zero current state 36:Software over current 37:Frequency lower limit reached (having output at stop) 38:Alarm output 39:Reserved 40:AI1 input overrun 41:Reserved	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
		42:Reserved 43:Frequency 2 reached 44:Current 2 reached 45:Fault output		
F6-04	FM terminal output selection	0: pulse output (FMP) 1: open loop collector switch value output (FMR)	0	☆
F6-05	FMR output selection	Same as Y1 output selection	0	☆
F6-09	AO1 output function selection	0: Running frequency 1: Set frequency 2: Output current 3: Output power 4: Output voltage 5: Analog AI1 input 6: Analog AI2 input 7: Communication setting 8: Output torque 9: Length 10: Count value 11: Motor rotational speed 12: Output bus voltage(0 to 3 times of driver rated) 13: Pulse input 14: Output current 15: Output voltage(100.0% corresponds to 1000.0V) 16: Output torque (Actual value: -2 to +2 times of the rated value)	0	☆
F6-10	AO2 output function selection		0	☆
F6-11	FMP output function selection		0	☆
F6-12	FMP max-frequency output		50.00	☆
F6-13	AO1 minimum output	-100.0% to F6-15	0.0%	☆
F6-14	Minimum corresponds to AO1 output	0.00V to 10.00V	0.00v	☆
F6-15	AO1 maximum output	F6-13 to 100.0%	100.0%	☆
F6-16	Maximum corresponds to AO1 output	0.00V to 10.00V	10.00V	☆
F6-17	AO2 minimum output	-100.0% to F6-19	0.0%	☆
F6-18	Minimum corresponds to AO2 output	0.00V to 10.00V	0.00v	☆
F6-19	AO2 maximum output	F6-17 to 100.0%	100.0%	☆
F6-20	Maximum corresponds to AO2 output	0.00V to 10.00V	10.00V	☆
F6-26	Relay 1 output delay	0.0s to 3600.0s	0.0s	☆
F6-27	Relay 2 output delay	0.0s to 3600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F6-28	Y1 high level output delay	0.0s to 3600.0s	0.0s	☆
F6-29	FMR/Y2 high level output delay	0.0~3600.0s	0.0s	☆
F6-31	AO signal output type selection	Unit's digit: AO1 Ten's digit: AO2 0: Voltage type 1: Current type	00	☆
Group F7: Auxiliary Functions and Keypad Display				
F7-00	JOG running frequency	0.00 Hz to maximum frequency	6.00Hz	☆
F7-01	JOG acceleration time	0.0s to 3000.0s	10.0s	☆
F7-02	JOG deceleration time	0.0s to 3000.0s	10.0s	☆
F7-03	Acceleration time 2	0.0s to 3000.0s	10.0s	☆
F7-04	Deceleration time 2	0.0s to 3000.0s	10.0s	☆
F7-05	Acceleration time 3	0.0s to 3000.0s	10.0s	☆
F7-06	Deceleration time 3	0.0s to 3000.0s	10.0s	☆
F7-07	Acceleration time 4	0.0s to 3000.0s	10.0s	☆
F7-08	Deceleration time 4	0.0s to 3000.0s	10.0s	☆
F7-09	Jump frequency 1	0.00 Hz to maximum frequency	0.00Hz	☆
F7-10	Jump frequency 1 amplitude.	0.00 Hz to maximum frequency	0.00Hz	☆
F7-11	Jump frequency 2	0.00 Hz to maximum frequency	0.00Hz	☆
F7-12	Jump frequency 2 amplitude.	0.00 Hz to maximum frequency	0.00Hz	☆
F7-15	Forward/Reverse rotation dead-zone time.	0.0s to 3000.0s	0.0s	☆
F7-16	Keypad knob accuracy	0: Default mode 1: 0.1Hz 2: 0.5Hz 3: 1Hz 4: 2Hz 5: 4Hz 6: 5Hz 7: 8Hz 8: 10Hz	0	☆
F7-17	Running mode when set frequency lower than frequency lower limit.	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆
F7-18	Droop ration	0.0% to 100.0%	0.0%	☆
F7-19	Delay time of stopping mode when set frequency lower than frequency lower limit.	0.0s to 600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-20	Setting accumulative running time.	0h to 65000h	0h	☆
F7-21	JOG preferred Mode	0: invalid 1: JOG preferred Mode 1 2: JOG preferred Mode 2	1	☆
F7-22	Frequency detection value (FDT1)	0.00 Hz to maximum frequency	50.00Hz	☆
F7-23	Frequency detection hysteresis (FDT hysteresis 1)	0.0% to 100.0%	1.0%	☆
F7-24	Detection range of frequency reached	0.0% to 100.0%	1.0%	☆
F7-25	Reserved		0	●
F7-26	Cooling fan control	0: Fan working during running 1: Fan working continuously. (Fan working after stopping when temperature is higher than 40 °C).	0	★
F7-27	STOP/RESET key function	0: STOP/RESET key enabled only in operation keypad control. 1: STOP/RESET key enabled in any operation mode.	1	☆
F7-28	Quick/JOG selection function	0: Forward JOG. 1: Switchover between forward rotation and reverse rotation. 2: Reverse JOG. 3: Switchover between operation keypad control and remote command control.	0	★
F7-29	LED display running parameters	0000 to 0xffff Bit00: Running frequency 0001 Bit01: Set frequency 0002 Bit02: Bus voltage (V) 0004 Bit03: Output voltage 0008 Bit04: Output current 0010 Bit05: Output power (kW) 0020 Bit06: DI input status 0040 Bit07: DO output status 0080 Bit08: AI1 voltage (V) 0100 Bit09: AI2 voltage (V) 0200 Bit10: PID setting 0400 Bit11: PID feedback 0800 Bit12: Count value 1000 Bit13: Length value 2000 Bit14: load speed display 4000 Bit15: PLC stage 8000	H.441F	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-30	LED display stop parameters	1 to 0x1fff Bit00: Set frequency 0001 Bit01: Bus voltage (V) 0002 Bit02: DI input status 0004 Bit03: DO output status 0008 Bit04: AI1 voltage (V) 0010 Bit05: AI2 voltage (V) 0020 Bit06: PID setting 0040 Bit07: PID feedback 0080 Bit08: Count value 0100 Bit09: Length value 0200 Bit10: Load speed display 0400 Bit11: PLC stage 0800 Bit12: Pulse input frequency 1000 Bit13~Bit15: Reserved	H.0043	☆
F7-31	Load speed display coefficient	0.001 to 65.500	1.000	☆
F7-32	Temperature of inverter module	12℃ to 100℃	Measured value	●
F7-33	Accumulative power-on time	0h to 65535h	Measured value	●
F7-34	Accumulative running time	0h to 65535h	Measured value	●
F7-36	Current running time function	0: Disable 1: Enable	0	★
F7-37	Current running time source	0: Digital setting F7-38 1: AI1 2: AI2 (100% of analog input corresponds to F7-44)	0	★
F7-38	Setting of current running time	0.0min to 6500.0min	0.0min	☆
F7-39	High level timing	0.0s to 6000.0s	2.0s	☆
F7-40	Low level timing	0.0s to 6000.0s	2.0s	☆
F7-41	Startup protection	0: No 1: Yes	1	☆
F7-43	Frequency reached detection value 1	0.00Hz to F0-14	50.00Hz	☆
F7-44	Frequency reached detection duration 1	0% to 100%	1%	☆
F7-45	Current detection level 1	0% to 300%	100%	☆
F7-46	Current reached detection duration 1	0% to 300%	0%	☆
F7-49	User code	0 to 65535	0	☆
F7-50	Jump frequency during acceleration and deceleration	0: Disable 1: Enable	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-51	Setting power-on reached time	0h to 65530h	0h	☆
F7-53	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz to maximum frequency(F0-14)	0.00Hz	☆
F7-54	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00Hz to maximum frequency(F0-14)	0.00Hz	☆
F7-55	Frequency detection value (FDT2)	0.00 Hz to maximum frequency	50.00Hz	☆
F7-56	Frequency detect FDT2 hysteresis value	0.0% to 100.0%	1.0%	☆
F7-57	Frequency reached detection value 2	0.00Hz to F0-14	50.00Hz	☆
F7-58	Frequency reached detection duration 2	0% to 100%	1%	☆
F7-59	Zero current detection level	0% to 300%	10.0%	☆
F7-60	Zero current detection delay time	0% to 300%	1.0s	☆
F7-61	Current output detection amplitude	20.0% to 400.0%	200.0%	☆
F7-62	Current output detection amplitude delay time	0.00s to 300.00s	0.00s	☆
F7-63	Current detection level 2	20% to 300%	100%	☆
F7-64	Current reached detection duration 2	0.0% to 300.0%	0.0%	☆
F7-65	LED display running parameters 2	0x0~0x1FF Bit00: target torque 0001 Bit01: output torque 0002 Bit02: pulse input frequency (KHz) 0004 Bit03: HDI input liner speed(m/min) 0008 Bit04: motor rotation speed0010 Bit05: AC line current 0020 Bit06: Accumulative running time(h) Bit07: The current running time(min) Bit08: Accumulative power consumption (KW/h) Bit09~Bit15: reserved	H. 010	☆
F7-67	AI1 input voltage lower limit	0.00V to F7-68	2.00V	☆
F7-68	AI1 input voltage upper limit	F7-67 to 11.00V	8.00V	☆
F7-69	Module temperature threshold	0℃ to 90℃	70℃	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-70	Output power correction coefficient	0.001 to 3.000	1.000	☆
F7-71	Linear speed display coefficient	Linear speed = F-71 * HDI1 pulse number per second /Fb-07	1.000	☆
F7-72	Accumulative power consumption	0kW to 65535kW	Measured value	●
F7-73	Performance software version		#. #	●
F7-74	Function software version		#. #	●
F7-75	Improve function parameter display selecting	0: Hide improvement function parameter: H0~H3, L0~L5 1: Display improvement function parameter: H0~H3, L0~L5	0	☆
F7-76	Motor rotational display correction coefficient	0.0010~3.0000	1.0000	☆
Group F8: Communication Parameters				
F8-00	Baud rate	0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS	2	☆
F8-01	Data format	0: No check <8,N,2> 1: Even parity check 2 <8,E,1> 2: Odd Parity check <8,O,1> 3: No check1 <8,N,1>	3	☆
F8-02	Local address	0 to 247 (0 is Broadcast address)	1	☆
F8-03	Response delay	0ms to 30ms	2ms	☆
F8-04	Communication timeout	0.0s to 30.0s	0.0s	☆
F8-05	Communication data format selection	0: Standard MODBUS-RTU protocol 1: Nonstandard MODBUS-RTU protocol	0	☆
F8-06	Background software monitoring function	0: Prohibit, the default 485 communication function 1: open the Background software monitoring function, the 485 communication function be used at this time	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group F9: Fault and Protection				
F9-00	Motor overload protection selection.	0: Disable 1: Enable	1	☆
F9-01	Motor overload protection gain.	0.02 to 10.00	0.20	☆
F9-02	Motor overload warning coefficient.	50% to 100%	80%	☆
F9-03	Overvoltage stall gain	0 to 100	0	☆
F9-04	Overvoltage stall protective voltage	200.0V to 850.0V	760.0V	★
F9-05	V/F overcurrent stall gain	0 to 100	20	☆
F9-06	V/F overcurrent stall protective current	100% to 200%	150%	★
F9-07	VF weak magnetic current stall protection coefficient.	50% to 200%	100%	★
F9-08	Overvoltage stalling allowed to rise limit value	0% to 100%	10%	☆
F9-11	Fault auto reset times	0 to 20	0	☆
F9-12	Fault relay action selection during fault auto reset	0: Not act 1: Act	0	☆
F9-13	Time interval of fault auto reset	0.1s to 100.0s	1.0s	☆
F9-14	Input phase loss protection selection	0: Disable 1: Enable	1	☆
F9-15	Output phase loss protection selection	0: Disable 1: Enable	1	☆
F9-16	Short-circuit to ground upon power-on	0: Disable 1: Enable	1	☆
F9-17	Undervoltage fault auto reset selection	0: Manual reset fault after the under voltage fault. 1: Auto reset fault according to the bus voltage after the fault.	0	☆
F9-18	Overvoltage inhibition mode selection	0: Ineffective 1: Overvoltage inhibition mode 1 2: Overvoltage inhibition mode 2	1	★
F9-19	Over excitation force state selection	0: Ineffective 1: Effective during running at constant speed or deceleration 2: Effective during running at deceleration	2	★
F9-20	Threshold of over-voltage inhibition mode 2	1.0% to 150.0%	100.0%	★
F9-22	Fault protection action selection 1	0 to 22202 Unit's digit: Motor over load – Err14	00000	☆

Function Code	Parameter Name	Setting Range	Default	Property
		0: Coast to stop 1: Stop according to stop mode 2: Continue to run Ten's digit: Reserved Hundred's digit: Input phase loss - Err23 Thousand's digit: Output phase loss - Err24 Ten thousand's digit: Parameter read-write fault - Err25		
F9-23	Fault protection action selection 2	0 to 22222 Unit's digit: Communication fault - Err27 0: Coast to stop 1: Stop according to stop mode 2: Continue to run Ten's digit: External equipment fault - Err28 Hundred's digit: Too large speed deviation - Err29 Thousand's digit: User-defined fault1 - Err30 Ten thousand's digit: User-defined fault1 - Err31	00000	☆
F9-24	Fault protection action selection 3	0 to 22022 Unit's digit: PID feedback lost during running - Err32 0: Coast to stop 1: Stop according to stop mode 2: Continue to run Ten's digit: Load becoming 0 - Err34 Hundreds place: reserved Thousands place: Current running time reached - Err39 Ten thousand's digit: Accumulative running time reached - Err40	00000	☆
F9-26	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency(F9-27)	1	☆
F9-27	Backup frequency upon abnormality	0.0% to 100.0%	100.0%	☆
F9-28	Protection upon load becoming 0	0: Disable 1: Enable	0	☆
F9-29	Detection level of load becoming 0	0.0% to 80.0%	20.0%	★

Function Code	Parameter Name	Setting Range	Default	Property
F9-30	Detection time of load becoming 0	0.0s to 100.0s	5.0%	☆
F9-31	Detection value of too large speed deviation	0.0% to 100.0%	20.0%	☆
F9-32	Detection time of too large speed deviation	0.0s to 100.0s	0.0s	☆
F9-33	Over-speed detection value	0.0% to 100.0%	20.0%	☆
F9-34	Over-speed detection time	0.0s to 100.0s	2.0s	☆
F9-35	Motor overload protection current coefficient	100% to 200%	100%	☆
Group FA: PID Function				
FA-00	PID setting source	0: Keypad 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5) 5: Multi-reference	0	☆
FA-01	PID digital setting	0.0% to 100.0%	50.0%	☆
FA-02	PID setting change time	Response time:0.00s to 650.00s	0.00s	☆
FA-03	PID feedback source	0: AI1 1: AI2 2: AI1 - AI2 3: Communication setting 4: Pulse setting (DI5) 5: AI1 + AI2 6: MAX(AI1 , AI2) 7: MIN(AI1 , AI2)	0	☆
FA-04	PID action direction	0: Forward action 1: Reverse action	0	☆
FA-05	PID feedback range setting	0 to 65535	1000	☆
FA-06	Proportional gain Kp	0.0 to 100.0	20.0	☆
FA-07	Integral time Ti1	0.01s to 10.00s	2.00s	☆
FA-08	Differential time Td1	0.000s to 10.000s	0.000s	☆
FA-09	Cut-off frequency of PID reverse rotation	0.00Hz to maximum frequency(F0-14)	0.00Hz	☆
FA-10	Deviation limit	0.0% to 100.0%	0.0%	☆
FA-11	Differential limit	0.00% to 100.00%	0.10%	☆
FA-12	PID feedback filter time	0.00s to 60.00s	0.00s	☆
FA-13	Detection value of PID feedback loss	0.0% to 100.0%	0.0%	☆
FA-14	Detection time of PID feedback loss	0.0s to 3600.0s	3600.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
FA-18	Proportional gain Kip2	0.0 to 100.0	20.0	☆
FA-19	Integral time Ti2	0.01s to 10.00s	2.00s	☆
FA-20	Differential time Td2	0.000s to 10.000s	0.000s	☆
FA-21	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Automatic switchover based on deviation	0	☆
FA-22	PID parameter switchover deviation 1	0.0% to FA-23	20.0%	☆
FA-23	PID parameter switchover deviation 2	FA-22 to 100.0%	80.0%	☆
FA-24	PID initial value	0.0% to 100.0%	0.0%	☆
FA-25	PID initial value holding time	0.00s to 650.00s	0.00s	☆
FA-26	Maximum deviation between two PID outputs in forward direction	0.00% to 100.00%	1.00%	☆
FA-27	Maximum deviation between two PID outputs in reverse direction	0.00% to 100.00%	1.00%	☆
FA-28	PID integral property	Unit's digit: Integral separated 0: Effective 1: Ineffective Ten's digit: integral selection when output reached limit 0:Continue 1:Stop	00	☆
FA-29	PID operation at stop	0:No PID operation at stop 1: PID operation at stop	0	☆
Group Fb: Swing Frequency, Fixed Length and Count				
Fb-00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆
Fb-01	Swing frequency amplitude	0.0% to 100.0%	0.0%	☆
Fb-02	Jump frequency amplitude	0.0% to 50.0%	0.0%	☆
Fb-03	Swing frequency cycle	0.1s to 3000.0s	10.0s	☆
Fb-04	Triangular wave rising time coefficient	0.1% to 100.0%	50.0%	☆
Fb-05	Set length	0m to 65535m	1000m	☆
Fb-06	Actual length	0m to 65535m	0m	☆
Fb-07	Number of pulses per meter	0.1 to 6553.5	100.0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Fb-08	Set count value	1 to 65535	1000	☆
Fb-09	Designated count value	1 to 65535	1000	☆
Group FC: Multi-Reference and Simple PLC Function				
FC-00	Multi-segment frequency 0	-100.0% to 100.0%	0.0%	☆
FC-01	Multi-segment frequency 1	-100.0% to 100.0%	0.0%	☆
FC-02	Multi-segment frequency 2	-100.0% to 100.0%	0.0%	☆
FC-03	Multi-segment frequency 3	-100.0% to 100.0%	0.0%	☆
FC-04	Multi-segment frequency 4	-100.0% to 100.0%	0.0%	☆
FC-05	Multi-segment frequency 5	-100.0% to 100.0%	0.0%	☆
FC-06	Multi-segment frequency 6	-100.0% to 100.0%	0.0%	☆
FC-07	Multi-segment frequency 7	-100.0% to 100.0%	0.0%	☆
FC-08	Multi-segment frequency 8	-100.0% to 100.0%	0.0%	☆
FC-09	Multi-segment frequency 9	-100.0% to 100.0%	0.0%	☆
FC-10	Multi-segment frequency 10	-100.0% to 100.0%	0.0%	☆
FC-11	Multi-segment frequency 11	-100.0% to 100.0%	0.0%	☆
FC-12	Multi-segment frequency 12	-100.0% to 100.0%	0.0%	☆
FC-13	Multi-segment frequency 13	-100.0% to 100.0%	0.0%	☆
FC-14	Multi-segment frequency 14	-100.0% to 100.0%	0.0%	☆
FC-15	Multi-segment frequency 15	-100.0% to 100.0%	0.0%	☆
FC-16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆
FC-17	Simple PLC retentive selection	0: Non-retentive neither at power off nor after stop. 1: Retentive at power off but non-retentive after stop. 2: Non-retentive at power off but retentive after stop. 3: Retentive at power off and after	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		stop.		
FC-18	Running time of simple PLC reference 0	0.0~6500.0	0.0	☆
FC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-20	Running time of simple PLC reference 1	0.0~6500.0	0.0	☆
FC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-22	Running time of simple PLC reference 2	0.0~6500.0	0.0	☆
FC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-24	Running time of simple PLC reference 3	0.0~6500.0	0.0	☆
FC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-26	Running time of simple PLC reference 4	0.0~6500.0	0.0	☆
FC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-28	Running time of simple PLC reference 5	0.0~6500.0	0.0	☆
FC-29	Acceleration/deceleration time of simple PLC reference 5	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-30	Running time of simple PLC reference 6	0.0~6500.0	0.0	☆
FC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-32	Running time of simple PLC reference 7	0.0~6500.0	0.0	☆
FC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-34	Running time of simple PLC reference 8	0.0~6500.0	0.0	☆
FC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-36	Running time of simple PLC reference 9	0.0~6500.0	0.0	☆

Function Code	Parameter Name	Setting Range	Default	Property
FC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-38	Running time of simple PLC reference 10	0.0~6500.0	0.0	☆
FC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-40	Running time of simple PLC reference 11	0.0~6500.0	0.0	☆
FC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-42	Running time of simple PLC reference 12	0.0~6500.0	0.0	☆
FC-43	Acceleration/deceleration time of simple PLC reference 12	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-44	Running time of simple PLC reference 13	0.0~6500.0	0.0	☆
FC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-46	Running time of simple PLC reference 14	0.0~6500.0	0.0	☆
FC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-48	Running time of simple PLC reference 15	0.0~6500.0	0.0	☆
FC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3 (Means acceleration/deceleration time 1 to 4 respectively)	0	☆
FC-50	Time unit of simple PLC	0:s 1:h	0	☆
FC-51	Multi-Reference priority selection	0: No 1: Yes	1	☆
FC-52	Acceleration/deceleration time of multi-Reference	0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4	0	☆
FC-53	FC - 00 - FC - 15 units selection of multi-segment speed	0:% 1:Hz	0	☆
FC-55	Reference 0 source	0: Keypad 1: AI1 2: AI2 3: Pulse setting 4: PID	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		5: Set by preset frequency (F0-11, modified via terminal UP/ DOWN)		
Group Fd : Torque Control				
Fd-00	Torque setting source in torque control	0: Keypad 1: AI1 2: AI2 3: Pulse setting 4: Communication setting 5: MAX(AI1 , AI2) 6: MIN(AI1 , AI2) (Full range of 1 to 6 corresponds to Fd-01)	0	★
Fd-01	Torque digital setting	-200.0% to 200.0%	150.0%	☆
Fd-03	Forward maximum frequency in torque	0.00Hz to maximum frequency(F0-14)	50.00Hz	☆
Fd-04	Reverse maximum frequency in torque	0.00Hz to maximum frequency(F0-14)	50.00Hz	☆
Fd-06	Torque setting filter time	0.00s to 10.00s	0.00s	☆
Fd-07	Acceleration time in torque control	0.0s to 1000.0s	10.0s	☆
Fd-08	Deceleration time in torque control	0.0s to 1000.0s	10.0s	☆
Fd-10	Speed/Torque control	0: Speed control 1: Torque control	0	★
Group FE: AI Curve Setting				
FE-00	AI curve 1 minimum input	-10.00V to FE-02	0.00V	☆
FE-01	Corresponding setting of AI curve 1 minimum input	-100.0% to 100.0%	0.0%	☆
FE-02	AI curve 1 inflexion 1 input	FE-00 to FE-04	3.00V	☆
FE-03	Corresponding setting of AI curve 1 inflexion 1 input	-100.0% to 100.0%	30.0%	☆
FE-04	AI curve 1 inflexion 2 input	FE-02to FE-06	6.00V	☆
FE-05	Corresponding setting of AI curve 1 inflexion 2 input	-100.0% to 100.0%	60.0%	☆
FE-06	AI curve 1 maximum input	FE-06 to 10.00V	10.00V	☆
FE-07	Corresponding setting of AI curve 1 maximum input	-100.0% to 100.0%	100.0%	☆
FE-08	AI curve 2 minimum input	-10.00V to FE-02	0.00V	☆
FE-09	Corresponding setting of AI curve 2 minimum input	-100.0% to 100.0%	0.0%	☆
FE-10	AI curve 2 inflexion 1 input	FE-00 to FE-04	3.00V	☆
FE-11	Corresponding setting of AI curve 2 inflexion 1 input	-100.0% to 100.0%	30.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
FE-12	AI curve 2 inflexion 2 input	FE-02to FE-06	6.00V	☆
FE-13	Corresponding setting of AI curve 2 inflexion 2 input	-100.0% to 100.0%	60.0%	☆
FE-14	AI curve 2 maximum input	FE-06 to 10.00V	10.00V	☆
FE-15	Corresponding setting of AI curve 2 maximum input	-100.0% to 100.0%	100.0%	☆
FE-24	Jump point of AI1 input corresponding setting	-100.0% to 100.0%	0.0%	☆
FE-25	Jump amplitude of AI1 input corresponding setting	0.0% to 100.0%	0.5%	☆
FE-26	Jump point of AI2 input corresponding setting	-100.0% to 100.0%	0.0%	☆
FE-27	Jump amplitude of AI2 input corresponding setting	0.0% to 100.0%	0.5%	☆
Group FF: Factory Parameters				
FF-00	User code	0 to 65535	*****	☆
Group H0: Motor 2 Parameters Setting				
H0-00	Motor selection	1: Motor 1 2: Motor 2	1	★
H0-01	Motor 2 control mode	1: Open loop flux vector control (Speed-sensorless vector control) 2: Voltage/Frequency (V/F) control	2	★
H0-02	Motor acceleration/deceleration time	0: Same as motor 1 1: Acceleration/deceleration time 1 2: Acceleration/deceleration time 2 3: Acceleration/deceleration time 3 4: Acceleration/deceleration time 4	0	☆
Group H1: Motor 2 Parameters				
H1-00	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning 2: Complete auto-tuning	0	★
H1-01	Rated motor 2 power	0.4kW to 1000.0kW	Model dependent	★
H1-02	Rated motor 3 voltage	0V to 1500V	380V	★
H1-04	Rated motor 2 current	0.01A to 600.00 A (motor rated power ≤30 kW) 0.1A to 6000.0 A (motor rated power >30kW)	H1-01 dependent	★
H1-05	Rated motor 2 frequency	0.00Hz to F0-14	50.00Hz	★
H1-06	Rated motor 2 rotational speed	0rpm to 30000rpm	H1-01 dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
H1-07	Motor 2 no-load current	0.01A to H1-04 A (motor rated power ≤ 30 kW) 0.1A to H1-04 A (motor rated power > 30 kW)	H1-01 dependent	★
H1-08	Motor 2 stator resistance	0.001 Ω to 65.535 Ω	Model dependent	★
H1-09	Motor 2 rotor resistance	0.001 Ω to 65.535 Ω	Model dependent	★
H1-10	Motor 2 mutual inductive	0.1mH to 6553.5mH	Model dependent	★
H1-11	Motor 2 leakage inductive	0.01mH to 655.35mH	Model dependent	★
H1-12	Acceleration time of complete auto-tuning	1.0s to 600.0s	10.0s	☆
H1-13	Deceleration time of complete auto-tuning	1.0s to 600.0s	10.0s	☆
Group H2: Motor 2 V/F Control Parameters				
H2-00	Torque boost	0.0%~30.0%	0.0%	☆
H2-02	Oscillation suppression gain	0 to 100	Model dependent	☆
Group H3: Motor 2 Vector Control Parameters				
H3-00	Switchover frequency 1	1.00Hz to H3-02	5.00Hz	☆
H3-02	Switchover frequency 2	H3-00 to F0-14	10.00Hz	☆
H3-04	Speed loop proportional gain at low frequency	1.0 to 10.0	4.0	☆
H3-05	Speed loop integral time at low frequency	0.01s to 10.00s	0.50s	☆
H3-06	Speed loop proportional gain at high frequency	1.0 to 10.0	2.0	☆
H3-07	Speed loop integral time at high frequency	0.01s to 10.00s	1.00s	☆
H3-08	Speed loop integral property	0: integral effect 1: integral separation	0	★
H3-11	Torque adjustment proportional gain Kp	0 to 30000	2000	☆
H3-12	Torque adjustment integral gain Ki	0 to 30000	1300	☆
H3-13	Excitation adjustment proportional gain Kp	0 to 30000	2000	☆

Function Code	Parameter Name	Setting Range	Default	Property
H3-14	Excitation adjustment integral gain Ki	0 to 30000	1300	☆
H3-15	Flux braking gain	100 to 200	110	☆
H3-16	Field weakening torque correction ratio	50% to 200%	100%	☆
H3-17	Slip compensation gain	50% to 200%	100%	☆
H3-18	Speed loop feedback filter time	0.000s to 1.000s	0.015s	☆
H3-19	Speed loop output filter time	0.000s to 1.000s	0.000s	☆
H3-20	Source of power-driven torque upper limit	0: F3-21 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5) (Analog range corresponds to H3-21)	0	☆
H3-21	Power-driven torque upper limit	0.0% to 200.0%	150.0%	☆
H3-22	Source of braking torque upper limit	0: F3-23 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5) (Analog range corresponds to H3-23)	0	☆
H3-23	Braking torque upper limit	0.0% to 200.0%	150.0%	☆
Group L0: System Parameters				
L0-00	Parameters only for reading	0: Disable 1: Enable	1	☆
L0-01	LCD top menu setting	0x000~0xBBBB Unit's digit: the first line Ten's digit: the second line Hundred's digit: the third line 0: Setting frequency 1: Running frequency 2: Bus voltage 3: output voltage 4: output current 5: output power 6: PID giving 7: PID feedback 8: load speed 9: PLC stage A: output torque	0x134	☆

Function Code	Parameter Name	Setting Range	Default	Property
		B: motor rotation speed		
L0-02	LCD language selection	0: Chinese 1: English	0	☆
L0-03	LED menu switching selection	0: prohibition 1: enable	0	☆
L0-04	Vector running frequency display selection	0: Real-time frequency 1: setting frequency	0	☆
L0-05	UP/Down regulation display selection	0: Display the setting value 1: Display the current variable value	0	☆
Group L1: User - defined Parameters				
L1-00	Clear user-defined parameters	0: Disable 1: Enable	0	☆
L1-01	User-defined parameters 1	uF0-00 to uU1-xx	uF0-03	☆
L1-02	User-defined parameters 2	uF0-00 to uU1-xx	uF0-04	☆
L1-03	User-defined parameters 3	uF0-00 to uU1-xx	uF0-06	☆
L1-04	User-defined parameters 4	uF0-00 to uU1-xx	uF0-23	☆
L1-05	User-defined parameters 5	uF0-00 to uU1-xx	uF0-24	☆
L1-06	User-defined parameters 6	uF0-00 to uU1-xx	uF4-00	☆
L1-07	User-defined parameters 7	uF0-00 to uU1-xx	uF4-01	☆
L1-08	User-defined parameters 8	uF0-00 to uU1-xx	uF4-02	☆
L1-09	User-defined parameters 9	uF0-00 to uU1-xx	uF4-04	☆
L1-10	User-defined parameters 10	uF0-00 to uU1-xx	uF4-05	☆
L1-11	User-defined parameters 11	uF0-00 to uU1-xx	uF4-06	☆
L1-12	User-defined parameters 12	uF0-00 to uU1-xx	uF4-12	☆
L1-13	User-defined parameters 13	uF0-00 to uU1-xx	uF4-13	☆
L1-14	User-defined parameters 14	uF0-00 to uU1-xx	uF5-00	☆
L1-15	User-defined parameters 15	uF0-00 to uU1-xx	uF5-01	☆
L1-16	User-defined parameters 16	uF0-00 to uU1-xx	uF5-02	☆
L1-17	User-defined parameters 17	uF0-00 to uU1-xx	uF6-00	☆
L1-18	User-defined parameters 18	uF0-00 to uU1-xx	uF6-01	☆
L1-19	User-defined parameters 19	uF0-00 to uU1-xx	uF0-00	☆
L1-20	User-defined parameters 20	uF0-00 to uU1-xx	uF0-00	☆
L1-21	User-defined parameters 21	uF0-00 to uU1-xx	uF0-00	☆

Function Code	Parameter Name	Setting Range	Default	Property
L1-22	User-defined parameters 22	uF0-00 to uU1-xx	uF0-00	☆
L1-23	User-defined parameters 23	uF0-00 to uU1-xx	uF0-00	☆
L1-24	User-defined parameters 24	uF0-00 to uU1-xx	uF0-00	☆
L1-25	User-defined parameters 25	uF0-00 to uU1-xx	uF0-00	☆
L1-26	User-defined parameters 26	uF0-00 to uU1-xx	uF0-00	☆
L1-27	User-defined parameters 27	uF0-00 to uU1-xx	uF0-00	☆
L1-28	User-defined parameters 28	uF0-00 to uU1-xx	uF0-00	☆
L1-29	User-defined parameters 29	uF0-00 to uU1-xx	uF0-00	☆
L1-30	User-defined parameters 30	uF0-00 to uU1-xx	uF0-00	☆
L1-31	User-defined parameters 31	uF0-00 to uU1-xx	uF0-00	☆
Group L2: Optimization Parameters				
L2-00	Dead zone compensation selection	0: No compensation 1: Compensation	1	☆
L2-01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
L2-02	PWM seven phase/five phase selection	0: Seven phase in whole course 1: Seven phase/five phase auto switchover	0	☆
L2-03	CBC current limit	0: Disable 1: Enable	1	☆
L2-04	Braking threshold	350.0V to 780.0V	360.0V	☆
			690.0V	
L2-05	Under voltage threshold	200.0V to 500.0V	200.0V	☆
			350.0V	
L2-06	Random PWM depth	0 to 6	0	☆
L2-07	0Hz running way	0: No current output 1: Normal operation 2: Output with DC braking current F1-16	0Hz	☆
L2-08	Limitation of low frequency carrier	0: Limitation mode 0 1: Limitation mode 1 2: Unlimited (the carrier waves are in accordance in every frequency ranges)	1	☆
Group L3: AI/AO Correction				
L3-00	AI1 displayed voltage 1	-9.999V to 10.000V	3.000V	☆
L3-01	AI1 measured voltage 1	-9.999V to 10.000V	3.000V	☆

Function Code	Parameter Name	Setting Range	Default	Property
L3-02	AI1 displayed voltage 2	-9.999V to 10.000V	8.000V	☆
L3-03	AI1 measured voltage 2	-9.999V to 10.000V	8.000V	☆
L3-04	AI2 displayed voltage 1	-9.999V to 10.000V	3.000V	☆
L3-05	AI2 measured voltage 1	-9.999V to 10.000V	3.000V	☆
L3-06	AI2 displayed voltage 2	-9.999V to 10.000V	8.000V	☆
L3-07	AI2 measured voltage 2	-9.999V to 10.000V	8.000V	☆
L3-12	AO1 target voltage 1	-9.999V to 10.000V	3.000V	☆
L3-13	AO1 measured voltage 1	-9.999V to 10.000V	3.000V	☆
L3-14	AO1 target voltage 2	-9.999V to 10.000V	8.000V	☆
L3-15	AO1 measured voltage 2	-9.999V to 10.000V	8.000V	☆
L3-16	AO2 target voltage 1	-9.999V to 10.000V	3.000V	☆
L3-17	AO2 measured voltage 1	-9.999V to 10.000V	3.000V	☆
L3-18	AO2 target voltage 2	-9.999V to 10.000V	8.000V	☆
L3-19	AO2 measured voltage 2	-9.999V to 10.000V	8.000V	☆
Group L4: Master-slave Control Parameters				
L4-00	Master-slave control selection	0: Disable 1: Enable	0	★
L4-01	Master-slave selection	0: Master 1: Slave	0	★
L4-02	Master sending frequency selection	0: Running frequency 1: Target frequency	0	★
L4-03	Command source selection of slave followed the master	0: Non-follow 1: Follow	0	★
L4-04	Slave received frequency coefficient	0.00%~600.00%	100.00%<1>	☆
L4-05	Slave received torque coefficient	-10.00 to 10.00	1.00	☆
L4-06	Slave received torque offset	-50.00% to 50.00%	0.00%	☆
L4-07	Frequency offset threshold	0.20% to 10.00%	0.50%	☆
L4-08	Master-slave communication offline detection time	0.00s to 10.00s	0.10S	☆
Group L5: Braking Function Parameters				
L5-00	Braking control selection	0: Disable 1: Enable	0	★
L5-01	Braking loosen frequency	0.00Hz to 20.00Hz	2.50Hz	★

Function Code	Parameter Name	Setting Range	Default	Property
L5-02	Braking loosen frequency holding time	0.0s to 20.0s	1.0s	★
L5-03	Braking period current threshold	50.0% to 200.0%	120.0%	★
L5-04	Braking actuation frequency	0.00Hz to 20.00Hz	1.50Hz	★
L5-05	Braking actuation delay time	0.0s to 20.0s	0.0s	★
L5-06	Braking actuation frequency holding time	0.0s to 20.0s	1.0s	★
Group L6: Sleep Wake-up Function Parameters				
L6-00	Sleep selection	0: Sleep function ineffective 1: DI terminal control 2: PID setting and feedback control 3: Running frequency control	0	☆
L6-01	Sleep frequency	0.00Hz to 50.00Hz	0.00Hz<1>	☆
L6-02	Sleep delay time	0.0s to 3600.0s	20.0s	☆
L6-03	Wake-up deviation	0.0% to 100.0%	10.0%	☆
L6-04	Wake-up delay time	0.0s to 3600.0s	0.5s	☆
L6-05	Dormant delay time output Frequency selection	0: PID auto-adjustment 1: Dormant frequency L6-01	0	☆

Function Code	Parameter Name	Min. Unit	Property
Group U0: Error Recording Parameters			

Function Code	Parameter Name		Min. Unit	Property
U0-00	3 rd (latest) fault type	00:No fault Err01: Inverter unit protection Err04: Overcurrent during acceleration Err05: Overcurrent during deceleration Err06: Over current at constant speed Err08: Overvoltage during acceleration Err09: Overvoltage during deceleration Err10: Overvoltage at constant speed Err12: Under voltage Err13: Drive overload Err14: Motor overload Err15: Drive overheat Err17: Current detection fault Err20: Short circuit to ground Err23: Power input phase loss Err24: Power output phase loss Err25: EEPROM read-write fault Err27: Communication fault Err28: External equipment fault Err29: Too large speed deviation Err30: User-definedfault1 Err31: User-definedfault2 Err32: PID feedback lost during running	1	●
U0-01	2 nd (latest) fault type	Err33: Fast current limit fault Err34: Load becoming 0 Err35: Control power supply fault Err36:Function board communication failure Err37: Control power supply fault Err39: Current running time reached Err40: Accumulative running time reached Err42: Motor switchover fault during running Err44:DSP board communication failure Err46: Master slave control communication disconnection	1	●
U0-02	1 st fault type	Err46: Master slave control communication disconnection	1	●
U0-03	Frequency upon the 3 rd fault		0.01Hz	●
U0-04	Current upon the 3 rd fault		0.01A	●

Function Code	Parameter Name	Min. Unit	Property
U0-05	Bus voltage upon the 3 rd fault	0.1V	●
U0-06	DI status upon the 3 rd fault	1	●
U0-07	Output terminal status upon the 3 rd fault	1	●
U0-08	AC drive status upon the 3 rd fault	1	●
U0-09	Power-on time upon the 3 rd fault	1min	●
U0-10	Running time upon the 3 rd fault	1min	●
U0-13	Frequency upon the 2 nd fault	0.01Hz	●
U0-14	Current upon the 2 nd fault	0.01A	●
U0-15	Bus voltage upon the 2 nd fault	0.1V	●
U0-16	DI status upon the 2 nd fault	1	●
U0-17	Output terminal status upon the 2 nd fault	1	●
U0-18	AC drive status upon the 2 nd fault	1	●
U0-19	Power-on time upon the 2 nd fault	1min	●
U0-20	Running time upon the 2 nd fault	1min	●
U0-23	Frequency upon the 1 st fault	0.01Hz	●
U0-24	Current upon the 1 st fault	0.01A	●
U0-25	Bus voltage upon the 1 st fault	0.1V	●
U0-26	DI status upon the 1 st fault	1	●
U0-27	Output terminal status upon the 1 st fault	1	●
U0-28	AC drive status upon the 1 st fault	1	●
U0-29	Power-on time upon the 1 st fault	1min	●
U0-30	Running time upon the 1 st fault	1min	●
Group U1: Application Monitoring Parameters			
U1-00	Running frequency	0.01Hz	●
U1-01	Setting frequency	0.01Hz	●
U1-02	Bus voltage	0.1V	●
U1-03	Output voltage	1v	●
U1-04	Output current	0.1A	●
U1-05	Output power	0.1kW	●
U1-06	DI input status, hexadecimal	1	●

Function Code	Parameter Name	Min. Unit	Property
U1-07	DO output status, hexadecimal	1	●
U1-08	AI1 voltage after correction	0.01V	●
U1-09	AI2 voltage after correction	0.01V	●
U1-10	PID setting, PID setting (percentage)×FA-05	1	●
U1-11	PID feedback, PID feedback (percentage)×FA-05	1	●
U1-12	Count value	1	●
U1-13	Length value	1	●
U1-14	Motor speed	1rpm	●
U1-15	PLC stage	1	●
U1-16	Input pulse frequency	0.01kHz	●
U1-17	Feedback speed	0.1Hz	●
U1-18	Remaining running time of F7-38 setting	0.1min	●
U1-19	AI1 voltage before correction	0.001v	●
U1-20	AI2 voltage before correction	0.001v	●
U1-21	HD15 high speed pulse sampling linear speed	1m/min	●
U1-22	Load speed display	1rpm	●
U1-23	Current power-on time	1min	●
U1-24	Current running time	0.1min	●
U1-25	Pulse input frequency	1Hz	●
U1-26	Communication setting value	0.01%	●
U1-27	Main frequency X	0.01Hz	●
U1-28	Auxiliary frequency Y	0.01Hz	●
U1-29	Target torque	0.1%	●
U1-30	Output torque	0.1%	●
U1-31	Output torque	0.1%	●
U1-32	Torque upper limit	0.1%	●
U1-33	Target voltage upon V/F separation	1V	●
U1-34	Output voltage upon V/F separation	1V	●
U1-35	Reserved		●
U1-36	Current motor number	1	●

Function Code	Parameter Name	Min. Unit	Property
U1-37	AO1 target voltage	0.01V	●
U1-38	AO2 target voltage	0.01V	●
U1-39	AC drive running status: 0: Stop 1: Forward 2: Reverse 3: Fault	1	●
U1-40	AC drive current fault	1	●
U1-41	Agent remaining limited time	1h	●
U1-42	AC input current	0.1A	●
U1-43	PLC current stage remaining time	0.1	●
U1-47	Accumulative running time 1 (Accumulative running time=U1-47+U1-48)	1h	●
U1-48	Accumulative running time 2 (Accumulative running time=U1-47+U1-48)	1min	●

Appendix B Version Change Record

Date	New Version	Changed Contents
2020.10	V1.0	This is the first edition
2020.12	V1.1	1) Added "Modbus Communication Protocol"; 2) Optimization of wiring diagram and control terminal diagram; 3) Corrected the size of 22KW 4) Added the version Change History
2021.12	V1.2	1) Added Function board communication failure-Err36 and DSP board communication failure -Err44 . 2) Added special parameters of synchronous motor:F3-24~F3-28,F4-17~F4-21