CONTENTS

Preface

Thank you for purchasing FC-3 series Flux Vector Control Inverter.

FC-3 series is a new genreation inverter which can flexibly satisfy customers' individual requirements and industry demand by extension of design on the premise that meet general purpose of the customers, representing the tendency of applying in the future inverter industry. In meeting to the requirements of all kinds of complicated high precision transmission with all functions of built-in universal extended interface, power speed control, torque control ,practical process closed-loop control, simple PLC, flexible I/O terminal, pulse frequency given, frequency given channel and run command channel bundled, main auxiliary given control, swing frequency control , speed track ,encoder break monitoring, interal break unit, 28 species fault monitoring, more than 16 MS speed control,parameters copies etc, at the same time, it provides equipment manufacturer with an all in-one solution of high integration, on reducing system cost and improving system reliability have a great value.

Tab.1 FC-3 Series funtional modules

	FC-3Series : General Magnetic Flux Vector Control lnverter.
Input/Output Interminal	5×DI（4 bidirectional input and 1 high speed），2×AI，1×DO，2×AO，2×Relay (4×DI, 1×Relay when ≤2. 2KW).
Control mode	Open loop vector control; V/F.
Startup torque	Mode HD machine: 0.5Hz/180% (open loop vector control); Mode ND machine: 0.5Hz/120% (open loop vector control).
Communication Function	Modbus (485 communication standard).

This manual provides the user with precaustions and instructions concerning the prototyping, installation,parameter setting, on-site commissioning, fault diagnosis, routine repair and maintenance of inverter. Please read the instruction manual carefully before the proper use of FC-3 Series Inverter, and stay keeping it for the future use. The supporting equipment customers shall distribute this manual together with equipment to the final users.

Unpacking and Inspection

Please confirm carefully when unpacking the box:

1、If the model and inverter rated values on the nameplate are the same as your order. The box contains the equipment certificate of confomity, user manual and warranty card

2、 If the product is damaged during the transportation,please contact our company or the supplier immediately if there is any omission or damage.

Fist time use :

The users who use the product for firt time shall read this manual carefully. For any doubt about certain functions and performances, please contact the technical support personnel of our company for help so as to use the product properly.

The information our company provides are suject to change without additional notice due to the constant improvement of the inverter products .

CE

FC Series inverter is accordance with international standards and has passed CE standards:

IEC/EN61800-5-1: Safety Regulation on Commissionable Electric Drive System;

IEC/EN61800-3: Commissionalbe Electric Drive System;

Third Part :Electromagnetic Compatibility Standard and Specific Testing Method for the Produts.

Chapter1 safety and precautions

Safety definition:

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

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

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

1.1 Safety precautions

1.1.1 Before installation

1. Do not use the damaged inverter or inverter with missing parts. Otherwise, there may be risk of injury.
2. Use the motor with Class B or above insulation. Otherwise, there may be risk of electric shock.

1.1.2 During the Installation

1. Mount the inverter on incombustible surface like metal, and keep away from flammable substances. Otherwise it may cause fire.

2. When more than two inverters are to be installed in one cabinet, due attention shall be paid to the installation locations (refer to Chapter 3 Mechanical and Electrical Installation) to ensure the heat sinking effect.
3. Do not drop the lead wire stub or screw in the inverter. Otherwise it may damage the inverter.

1.1.3 During wiring:

1. Operation shall be performed by the professional engineering technician. Otherwise there will be danger of electric shock!
2. There shall be circuit breaker between the inverter and power supply. Otherwise, there may be free!
3. Make sure the power is disconnected prior to the connection. Otherwise there will be danger of electric shock!
4. The earth terminal shall be earthed reliably. Otherwise there may be danger of electric shock.

5. Make sure input power line is connected is not connected to the output of the U, V, W. Otherwise the damage will be caused to frequency converter!
6. Ensure line to meet safety standards EMC requirements and the region. For wire diameter please refer to 3.3 Electrical Installation. Otherwise an accident may occur!
7. The brake resistance cannot be connected directly connected to the DC bus (+), (-) terminals. Otherwise it may cause fire!

1.1.4 Before Power-on:

1. Please confirm whether the power voltage class is consistent with the rated voltage of the inverter and whether the I/O cable connecting positions are correct, and check whether the external circuit is short circuited and whether the connecting line is firm. Otherwise it may damage the inverter.
2. The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused!

3. Make sure the inverter is free from dielectric test because this test is performed prior to the delivery. Otherwise accident may occur!
4. Check whether all the external fittings are connected correctly in accordance with the circuit provided in this manual. Otherwise accident may occur!

1.1.5 Upon Power-on

1. Do not open the cover of the inverter upon power-on. Otherwise there will be danger of electric shock!
2. Do not touch the inverter and its surrounding circuit with wet hand. Otherwise there will be danger of electric shock!
3. Do not touch the inverter terminals (including control terminal).Otherwise there will be danger of electric shock!
4. At power-on, the inverter will perform the security check of the external heavy-current circuit automatically. Thus, at this time please do not touch the terminals U, V and W or the terminals of motor; otherwise there will be danger of electric shock.

5. If parameter identification is required, due attention shall be paid to the danger of injury arising from the rotating motor. Otherwise accident may occur!
6. Do not change the factory settings at will. Otherwise it may damage the equipment!

1.1.6 During the operation:

1. Do not get close to the machinery and equipment if select restart function. Otherwise, personal injury may be caused!
2. Do not touch the fan or discharge resistor to sense the temperature. Otherwise, you may get burnt!
3. Detection of signals during the operation shall only be conducted by qualified technician. Otherwise, personal injury or equipment damage may be caused!

4. During the operation of the inverter, prevent items from falling into the equipment. Otherwise, it may damage the equipment!
5. Do not start and shut down the inverter by connecting and disconnecting the contactor. Otherwise, it may damage the equipment!

1.1.7 During Repair

1. Do not repair and maintain the equipment with power connection. Otherwise there will be danger of electric shock!
2. Be sure to conduct repair and maintenance after the charge LED indictor of the inverter is OFF. Otherwise the residual charge on the capacitor may cause personal injury!
3. The inverter shall be repaired and maintained only by the qualified person who has received professional training. Otherwise it may cause personal injury or equipment damage!

1.2 Precautions

1.2.1 Motor Insulation Inspection

When the motor is used for the first time, or when the motor is reused after being kept, or when periodical inspection is performed, one shall conduct motor insulation inspection so as to avoid damaging the inverter because of the insulation failure of the motor windings. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V megameter, and the insulating resistance measured shall be at least 5MΩ

1.2.2 Thermal Protection of the Motor

If the ratings of the motor does not match those of the inverter, especially when the rated power of the inverter is higher than the rated power of the motor, the relevant motor protection parameters in the in the inverter shall be adjusted, or thermal relay shall be mounted to protect the motor.

1.2.3 Running with Frequency higher than Standard Frequency

This inverter can provide output frequency of 0Hz to 600Hz. If the user needs to run the inverter with frequency of more than 50Hz, please take the resistant pressure of the mechanical devices into consideration.

1.2.4 Vibration of Mechanical Device

The inverter may encounter the mechanical resonance point at certain output frequencies, which can be avoided by setting the skip frequency parameters in the inverter.

1.2.5 Motor Heat and Noise

Since the output voltage of inverter is PWM wave and contains certain harmonics, the temperature rise, noise and vibration of the motor will be higher than those when it runs at standard frequency.

1.2.6 Voltage-sensitive Device or Capacitor Improving Power Factor at the Output Side

Since the inverter output is PWM wave, if the capacitor for improving the power factor or voltage-sensitive resistor for lightning protection is mounted at the output side, it is easy to cause instantaneous over current in the inverter, which may damage the inverter. It is recommended that such devices not be used.

1.2.7 Switching Devices like Contactors Used at the Input and Output terminal

If a contactor is installed between the power supply and the input terminal of the inverter; it is not allowed to use the contactor to control the startup/stop of the inverter. If use of such contactor is unavoidable, it shall be used with interval of at least one hour. Frequent charge and discharge will reduce the service life of the capacitor inside the inverter. If switching devices like contactor are installed between the output end of the inverter and the motor, ensure that the on/off operation is conducted when the inverter has no output. Otherwise the modules in the inverter may be damaged.

1.2.8 Use under voltage rather than rated voltage

If the FC-3 series inverter is used outside the allowable working voltage range as specified in this manual, it is easy to damage the devices in the inverter. When necessary, use the corresponding step-up or step-down instruments to change the voltage.

1.2.9 Change Three-phase Input to Two-phase Input

It is not allowed to change the FC-3 series three-phase inverter into two-phase one. Otherwise it may cause fault or damage to the inverter.

1.2.10 Lightning Impulse Protection

The series inverter has lightning over current protection device, and has certain self-protection capacity against the lightning. In applications where lightning occurs frequently, the user shall install additional protection devices at the front-end of the inverter.

1.2.11 Altitude and Derating

In areas with altitude of more than 1,000 meters, the heat sinking effect of the inverter may turn poorer due to rare air. Therefore, it needs to derate the inverter for use. Please contact our company for technical consulting in case of such condition.

1.2.12 Certain Special Use

If the user needs to use the inverter with the methods other than the recommended wiring diagram in this manual, such as shared DC bus, please consult our company.

1.2.13 Note of Inverter Disposal

The electrolytic capacitors on the main circuit and the PCB may explode when they are burnt. Emission of toxic gas may be generated when the plastic parts are burnt. Please dispose the inverter as industrial wastes.

1.2.14 Adaptable Motor

1) The standard adaptable motor is four-pole squirrel-cage asynchronous induction motor. If such motor is not available, be sure to select adaptable motors in according to the rated current of the motor. In applications where drive permanent magnetic synchronous motor is required, please consult our company.

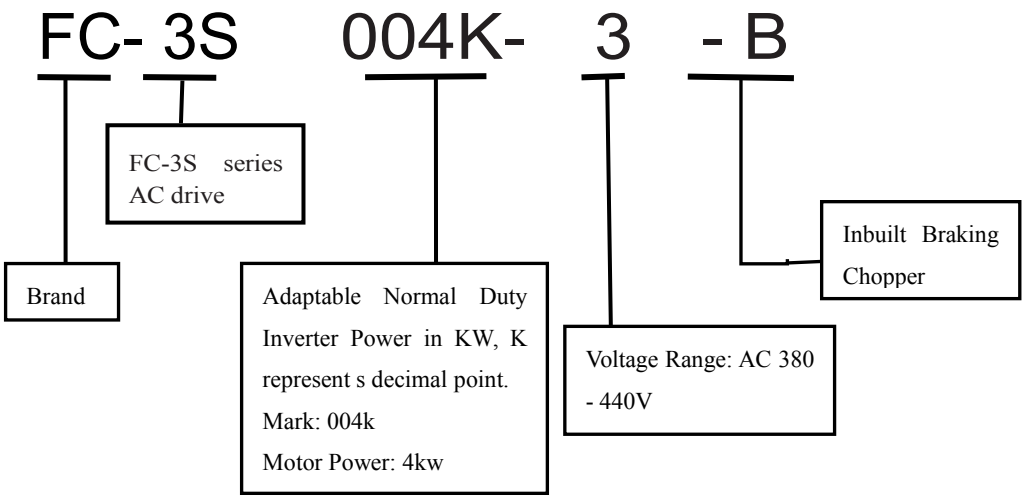
2) The cooling fan and the rotor shaft of the non-variable-frequency motor adopt coaxial connection. When the rotating speed is reduced, the cooling effect will be poorer. Therefore, a powerful exhaust fan shall be installed, or the motor shall be replaced with variable-frequency motor to avoid the over heat of the motor.

3) Since the inverter has built-in standard parameters of the adaptable motors, it is necessary to perform motor parameter identification or modify the default values so as to comply with the actual values as much as possible or it may affect the running effect and protection performance.

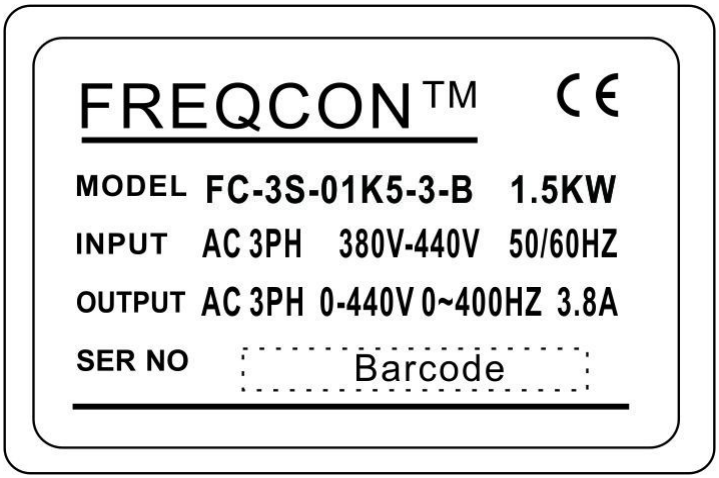
4) The short circuit of the cable or motor may cause alarm or explosion of the inverter. Therefore, please conduct insulation and short circuit test on the newly installed motor and cable. Such test shall also be conducted during routine maintenance. Please note that the inverter and the test part shall be completely disconnected during the test.

Chapter 2 Product Information

2.1 Naming Rules



Nameplate



2.2 FC-3S Inverter series

Tab.2-1 models and technical data of FC-3S Series

Model	Input voltage	Input current （A） ND / HD	Output current （A） ND / HD	Matched motor（kW） ND / HD
FC-3S-0K4-2	Single phase: 220V – 240V Range: -15%～20%	5.4	2.3	0.4
FC-3S-0K75-2		8.2	4.0	0.75
FC-3S-01K5-2		14.0	7.0	1.5
FC-3S-02K2-2 – B		23.0	9.6	2.2
FC-3S-01K5-3 – B	Three phase: 380V–440 V Range：-15%～20%	5.0 / 3.4	3.8 / 2.1	1.5 / 0.75
FC-3S-02K2-3 – B		5.8 / 5.0	5.1 / 3.8	2.2 / 1.5
FC-3S-004K-3 – B		14.6 / 5.8	9.0 /5.1	4.0 / 2.2
FC-3S-05K5-3 – B		14.6 / 10.5	13.0 / 9.0	5.5 / 4.0
FC-3S-07K5-3 – B		20.5 / 14.6	17.0 / 13.0	7.5 / 5.5
FC-3S-009K-3 –B		22.0 / 20.5	20.0 / 17.0	9.0 / 7.5
FC-3S-011K-3 – B		26.0 / 22.0	25.0 / 22.0	11.0 / 9
FC-3S-015K-3 – B		35.0 / 26.0	32.0 / 25.0	15.0 / 9.0
FC-3S-018K5-3 – B		38.5 / 35.0	37.0 /32.0	18.5 / 22.0
FC-3S-022K-3		46.5 / 38.5	45.0 / 37.0	22.0 / 18.5
FC-3S-030K-3		62.0 / 46.5	60.0 / 45.0	30.0 / 22.0
FC-3S-037K-3		76.0 / 62.0	75.0 / 60.0	37.0 / 30.0
FC-3S-015K-3		92.0 / 76.0	90.0 / 75.0	45.0 / 37.0
FC-3S-055K-3		113.0 / 92.0	110.0 / 90.0	55.0 / 45.0
FC-3S-075K-3		157.0 / 113.0	152.0 / 110.0	75.0 / 55.0
FC-3S-093K-3		180.0 / 157.0	176.0 / 152.0	93.0 / 75.0
FC-3S-110K-3		214.0 / 180.0	210.0 / 176.0	110.0 / 93.0
FC-3S-132K-3		256.0 / 214.0	253.0 / 210.0	132.0 / 110.0
FC-3S-160K-3		307.0 / 256.0	304.0 / 253.0	160.0 / 132.0
FC-3S-185K-3		345.0 / 307.0	340.0 / 304.0	185.0 / 160.0
FC-3S-200K-3		385.0 / 345.0	380.0 / 340.0	200.0 / 185.0

Model	Input voltage	Input current （A）ND / HD	Output current （A）ND / HD	Matched motor（kW） ND / HD
FC-3S-220K-3		430.0 / 385.0	426.0 / 380.0	220.0 / 200.0
FC-3S-250K-3		468.0 / 430.0	465.0 / 426.0	250.0 / 220.0
FC-3S-280K-3		525.0 / 468.0	520.0 / 465.0	280.0 / 250.0
FC-3S-315K-3		590.0 / 525.0	585.0 / 520.0	315.0 / 280.0
FC-3S-355K-3		665.0 / 590.0	650.0 / 585.0	355.0 / 315.0
FC-3S-400K-3		785.0 / 665.00	725.0 / 650.0	400.0 / 355.0
FC-3S-450K-3		883.0 / 785.0	820.0 / 725.0	450.0 / 400.0
FC-3S-500K-3		920.0 / 883.0	900.0 / 820.0	500.0 / 450.0
FC-3S-550K-3		1020.0 / 920.0	1000.0 / 900.0	550.0 / 500.0
FC-3S-630K-3		1120.0 / 1020.	1100.0 / 1000.0	630.0 / 550.0
FC-3S-630K-3-HD		1120.0 HD	1100.0 HD	630.0 HD

2.3 Technical Specification

Tab.2-2 FC-3S Inverter Technical Specifications

Item		Specifications
Main control functions	Maximum frequency	Vector control: 0~600Hz. V/F control:0~1200Hz.
	Carrier Frequency	1k ~ 15kHz; the carrier frequency will be automatically adjusted according to the load characteristics.
	Input frequency Resolution	Digital setting: 0.01Hz Analog setting: maximum frequency ×0.1%.
	Control mode	Open loop vector control ; V/F control.
	Startup torque	Mode ND machine: 0.5Hz/180% (Open loop vector control); Mode HD machine: 0.5Hz/120% (Open loop vector control).
	Speed adjustment Range	1：200 (Open loop Vector flux control).
	Stable speed Precision	Open loop vector flux control：≤±0.5% (rated synchronous speed).

Item		Specifications
Main control functions	Stabilization of speed control	Open loop Vector flux control：≤±0.3% (rated synchronous speed).
	Torque response	≤40ms (open magnetic flux vector control).
	Overload capacity	Mode HD machine: 150% rated current 60s; 180% rated current 5s. Mode ND machine: 130% rated current 60s; 150% rated current 5s.
	Torque boost	Automatic torque boost; manual torque boost 0.1% to 30.0%.
	V/F curve	Linear V/F, Multi-point V/F, and Square V/F.
	Speed-up and Speed-down curve	Straight line or S curve speed-up and speed-down mode; four kinds of speed-up and speed-down time; Speed-up and speed-down time ranges from 0.0s to 3000.0s
	DC brake	DC brake frequency: 0.00Hz ~ maximum frequency; Brake time: 0.0s ~ 36.0s; Brake current value: 0.0% to 100.0%.
	Jog control	Jog frequency range:0.00Hz ~ 50.00Hz; Jog speed-up/speed-down time: 0.0s ~ 3000.0s.
	Simple PLC and multi-speed running	It can realize a maximum of 16 segments speed running via the built-in PLC or control terminal.
	Built-in PID	It is easy to realize process-controlled close loop control system.
	（AVR）Automatic voltage regulation	It can keep constant output voltage automatically in case of change of mains voltage.
	Torque limit and control	"Shovel" characteristics, automatic limit on the torque on running time, preventing frequent over-current trip; closed loop vector mode can realize the torque control.
Customized functions	Peripherals self-detection upon power-on	It can conduct safety detections on the peripherals upon power-on, including earth and short circuit detections.
	Shared DC bus function	It can realize the function that multiple inverters share the DC bus.
	JOG key	Programmable key: Select the forward and reverse rotations /jog operation command.

Item		Specifications
Customized functions	Traverse frequency control	Multiple triangular-wave frequency control function.
	Fast current limit function	With fast current limit algorithm built in to reduce the probability of over-current alarm; to improve the anti-jamming capacity of the whole machine.
	Timed control	Timing control function: Setting time range from 0h to 65535h.
	Keypad extension line standardization	Customers can use standard cable to extend the keypad.
Operation function	Running command channel	Three types of channels: operation keypad given, control terminal given and serial communication port given. These channels can be switched in various ways.
	Frequency source	Ten types of frequency sources in total: digital given, analog voltage given, analog current given, pulse given, and serial port given. It can be switched in various ways.
	Auxiliary frequency source	Ten types of auxiliary frequency sources in total. It can implement micro tuning and synthesis of auxiliary frequency.
	Input terminal	Five digital input terminals, and seven terminals in maximum (AI1, AI2 can be used as DI terminals), it has compatibility to PNP or NPN input method. Two analog input terminals, in which AI1 only be used for voltage input, and AI2 can be used as voltage or current input.
	Output terminal	One digital output terminal (bipolar output). Two relay output terminal (one relay output terminal when ≤2.2KW). Two analog output terminals, with optional 0/4mA to 20mA or 0/2V to 10V. It can realize the output of set frequency, output frequency and rotation speed etc.
Display and keypad operate	LED display	Display parameter.
	LCD display	Selective parts, English to suggest the operation content.
	Parameter copy	Use parameter special copy keypad can copy the parameter quickly.
	Key lock and function choose	Lock part of the keypad or the whole keyboard, definite the function range of some keys to avoid.

Item		Specifications
Protection and select accessories.	Protection function	Short circuit detective of power-on motor, input and output open-phase protection, over-current protection, overvoltage protection, under-voltage protection, over-heat protection, over-load protection etc.
	Selective accessories	LCD operation keypad, brake group etc.
Environment	Suitable place	Indoor environment which is against from direct sunlight, dust, corrosive gas, combustible gas, oil mist, vapor, water drop and salt.
	Altitude	Less than 1000m.
	Ambient Temperature	-10℃ ~ +50℃.
	Humidity	Less than 95%RH, no condensing water drops.
	Vibration	Less than 5.9m/ s2 (0.6g).
	Storage temperature	-20℃ ~ +60℃.
	Class of pollution	2
Product standard	Safety standard	IEC61800-5-1:2007
	EMC standard	IEC61800-3:2005

2.4 General Specification

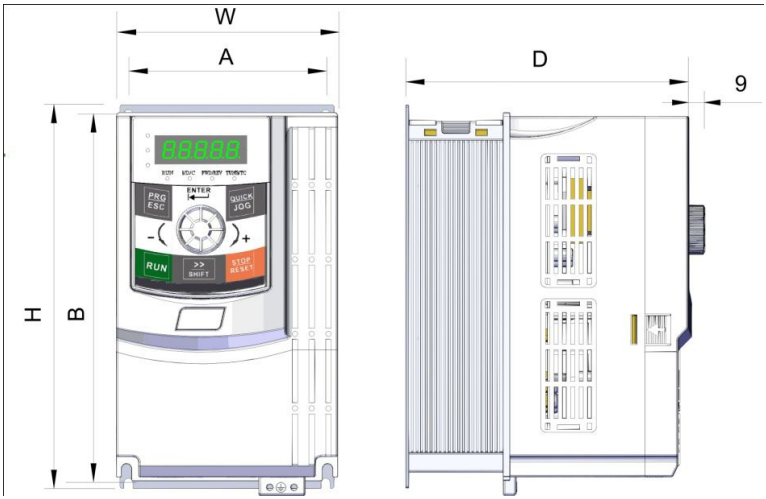


Fig.2-1 Installation dimensions of plastic mode under 11 kW

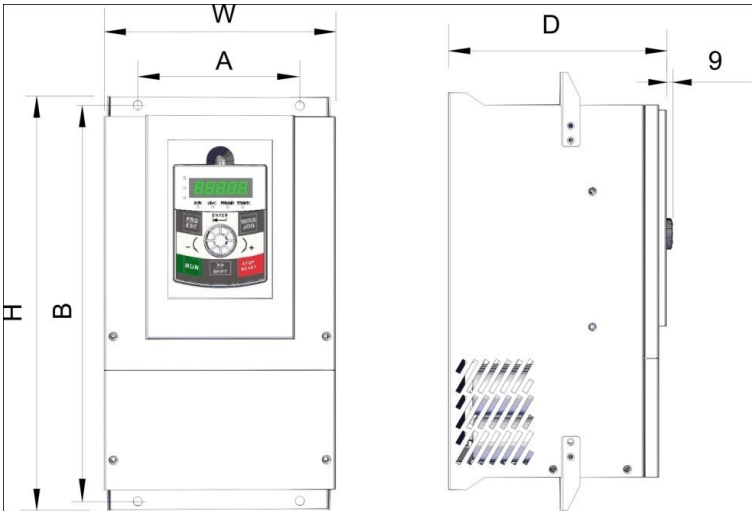


Fig2-2 Installation dimensions of metal mode between 15~30KW

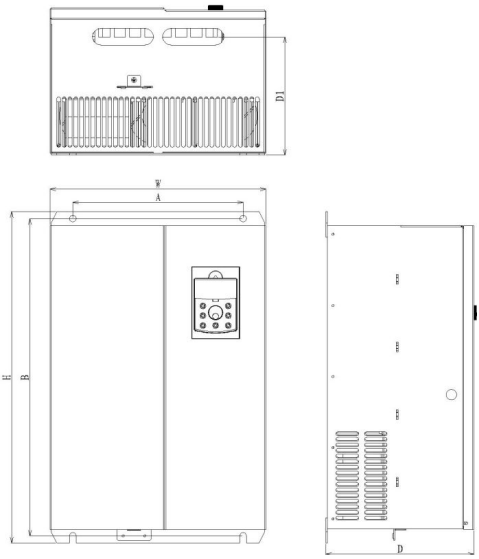
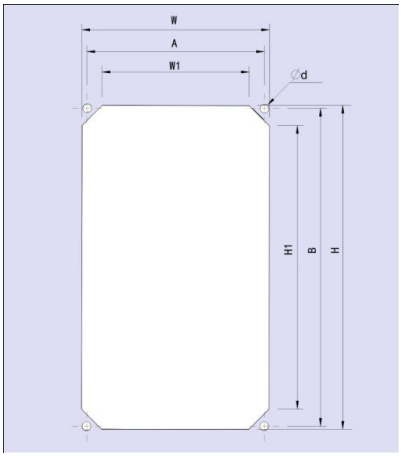


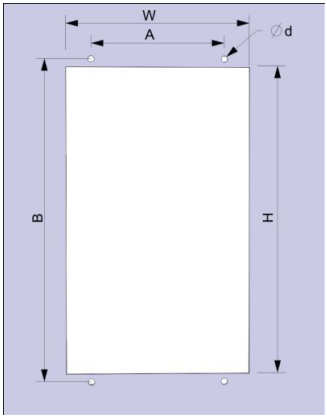
Fig.2-3 Appearance and install dimension of inverter above 37KW

Tab.2-3 Mounting hole dimensions of FC-3 Series

Model	Mounting Hole		Physical Dimension			Diameter of Mounting Hole (mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
FC-3S-0K4-2	78	162	172.5	96	141	φ4.5
FC-3S-0K75-2						
FC-3S-01K5-2						
FC-3S-02K2-2 - B	100	199	210	119	152	φ5
FC-3S-01K5-3 - B	78	162	172.5	96	141	φ4.5
FC-3S-02K2-3 - B						
FC-3S-004K-3 - B	100	199	210	119	152	φ5
FC-3S-05K5-3 - B						
FC-3S-07K5-3 – B	120	259	269	139	155.5	φ6
FC-3S-009K-3 - B						
FC-3S-011K-3 - B	150	314	324	188	183	φ6
FC-3S-015K-3 - B						
FC-3S-018K5-3 - B						

Model	Mounting Hole		Physical Dimension			Diameter of Mounting Hole (mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
FC-3S-022K-3	165	372	383	215	195	φ6
FC-3S-030K-3						
FC-3S-037-3	200	460	485	260	230	φ6
FC-3S-045-3	220	545	565	330	252	φ10
FC-3S-0055K-3						
FC-3S-075K-3	300	563	588	380	266	φ12
FC-3S-093K-3	320	635	660	460	290	φ12
FC-3S-110K-3						
FC-3S-132K-3	340	845	875	475	305	φ12
FC-3S-160K-3						
FC-3S-185K-3 (cabinet type)	380	1066	1100	520	355	φ12
FC-3S-200K-3 (cabinet type)						
FC-3S-185K-3 (hanging type)	370	855	890	520	355	φ12
FC-3S-200K-3 (hanging type)						
FC-3S-220K-3	500	1320	1360	700	380	φ14
FC-3S-225K-3						
FC-3S-280K-3						
FC-3S-315K-3						
FC-3S-355K-3	750	1300	1350	900	455	φ16
FC-3S-400K-3						
FC-3S-450K-3						
FC-3S-500K-3	-	-	1800	1060	500	- （vertical type）
FC-3S-550K-3						
FC-3S-630K-3						
FC-3S-630K-3 HD	-	-	1800	1060	500	- （vertical type）





Tab.2-4 Wall-mounted mode installation dimensions of FC-3 Series under 30KW

Model	Mounting hole		Hole dimension through the wall				Diameter of the hole (mm)
	A (mm)	B (mm)	H (mm)	H1 (mm)	W (mm)	W1 (mm)	
FC-3S-0K4-2	88	157	160	140	93	73	φ4.5
FC-3S-0K75-2							
FC-3S-01K5-2							
FC-3S-02K2-2	108	185	192	168	116	92	φ4.5
FC-3S-01K5-3-B	88	157	160	140	93	73	φ4.5
FC-3S-02K2-3-B							
FC-3S-004K-3-B	108	185	192	168	116	92	φ4.5
FC-3S-05K5-3-B							
FC-3S-07K5-3-B	128	239	245	221	136	112	φ5.5
FC-3S-009K-3-B							
FC-3S-011K-3-B	140	341	311	/	191	/	φ8
FC-3S-015K-3-B							
FC-3S-018K5-3-B							
FC-3S-022K-3	150	392	415	/	219	/	φ8
FC-3S-030K-3							

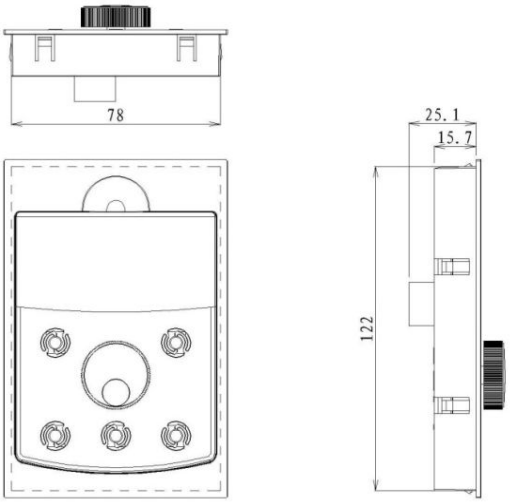


Fig.2-4 Outer keypad with plate installation dimension

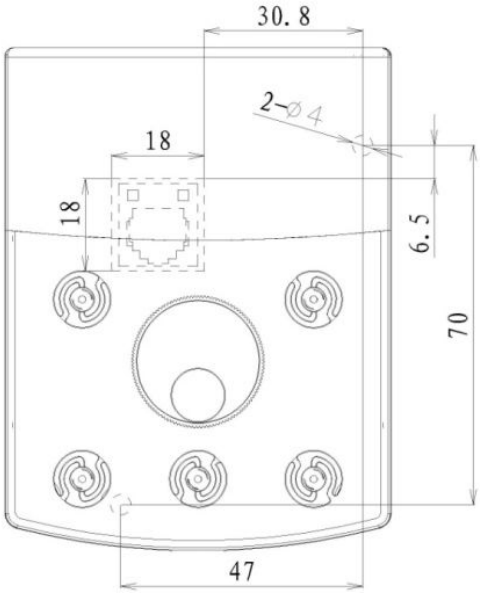


Fig.2-5 Outer keypad without plate installation dimension

2.5 Optional parts

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

Tab.2-5 FC-3 Series 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 keypad	FC-3 Series- LED	External LED display and keyboard	FC-3 series universal The RJ45 interface
External LCD operating keypad	FC-3 Series- LCD	External LCD display and keyboard	The RJ45 interface
Parameter copy keypad	FC-3 Series -LED2	The copy function keypad with parameters	FC-3 series universal RJ45 interface.
Extension cable	FC-3 Series-CAB	Standard 8 core cable, can connect with FC-3 series-LED, FC-3 series-LCD, and FC-3 series-LED2.	Providing 1 meters, 3 meters, 5 meters, 10 meters, totally 4 kinds of specifications
If you need other function module extensions (such as: I/O card, PG card, EPS card and so on), please use the FC-3 series inverter, specifying the order function module card when ordering.			

2.6 Instruction on warranty of inverter

Free warranty only applies to the inverter itself.

1、Our company will provide 12-month warranty (starting from the leave-factory date) for the fault or damage under normal use conditions. If the equipment has been used for over 12 months, reasonable repair expenses will be charged.

2、Reasonable repair expenses will be charged for the following situations within 12 months:

1) The equipment is damaged because the user fails to comply with the requirements of the user's manual;

2) Damage caused by fire, flood and abnormal voltage;

3) Damage caused when the inverter is used for abnormal function.

The service expenses will be calculated according to the standard of the manufacturer. If there is any agreement, the agreement shall prevail.

The service charge is counted according to the standard rules made by the company. The contract takes the priority if there is any agreement previous.

2.7 Guide to select Brake components

What in below Tab.2-6 are the guide data, the user can choose different resistance and power according to the practical situation, (the resistance value must not less than the recommended one; the power value can be more). The brake resistance should be chosen according to the real power of the motor when used in practical system. It is related to system inertia, speed decelerating time and potential energy load etc., the customer should choose it based on the real circumstance. The bigger inertia of the system; the shorter time of speed decelerating; the more frequent of the brake; the bigger power and smaller resistance of the brake resistor need to be with.

2.7.1 How to choose the Resistance

When braking, almost all the recovery energy of the motor is spent on the braking resistance. It follows the formula: U*U/R=Pb

U---the braking voltage of the stable braking system (the value is different in different system. Generally for 380VAC, the value is 700V)

Pb---the braking power

2.7.2 How to choose the Power of the Braking Resistor

The power of the braking resistor is same as the braking power theoretically, but taking into consideration that the derating is 70%. It follows the formula: 0.7*Pr=Pb*D

Pr---the power of the braking resistor

D---the braking ratio (the ratio which the reactivation process divides the whole working process), generally take 10% as its value. You can refer to the details in below chart.

Application industry	Elevator	Winding and unwinding machine	Centrifuge	Accidental braking load
Ratio	20% ～30%	20～30%	50%～60%	5%

Tab.2-6 Selection of FC-3S inverter brake components

Inverter model	Braking torque 150%,5S recommended resistance value, power and brake unit model	Braking torque 100%,15S recommended resistance value, power and brake unit model	Braking torque 50%,15S recommended resistance value, power and brake unit model
FC-3S-0K4-2	≥220Ω，0.4KW Optional brake unit	≥300Ω，0.3KW Optional brake unit	≥300Ω，0.3KW Optional brake unit
FC-3S-0K75-2	≥150Ω，0.6KW Optional brake unit	≥150Ω，0.6KW Optional brake unit	≥300Ω，0.3KW Optional brake unit
FC-3S-01K5-2	≥60Ω，1KW Optional brake unit	≥100Ω，0.8KW Optional brake unit	≥150Ω，0.6KW Optional brake unit
FC-3S-02K2-2-B	≥40Ω，1.2KW build-in brake unit	≥60Ω，1KW build-in brake unit	≥150Ω，0.6KW build-in brake unit
FC-3S-01K5-3-B	≥300Ω，0.3KW build-in brake unit	≥300Ω，0.3KW build-in brake unit	≥300Ω，0.3KW build-in brake unit
FC-3S-02K2-3-B	≥150Ω，0.5KW build-in brake unit	≥220Ω，0.4KW build-in brake unit	≥300Ω，0.3KW build-in brake unit
FC-3S-004K-3-B			
FC-3S-05K5-3-B	≥100Ω，0.8KW build-in brake unit	≥130Ω，0.6KW build-in brake unit	≥150Ω，0.5KW build-in brake unit
FC-3S-07K5-3-B	≥75Ω，1.0KW build-in brake unit	≥100Ω，0.8KW build-in brake unit	≥130Ω，0.6KW build-in brake unit
FC-3S-011K-3-B	≥40Ω，2KW build-in brake unit	≥50Ω，1.5KW build-in brake unit	≥60Ω，1.2KW build-in brake unit
FC-3S-015K-3-B			
FC-3S-018K5-3-B	≥30Ω，4KW build-in brake unit	≥40Ω，2KW build-in brake unit	≥50Ω，1.5KW build-in brake unit
FC-3S-022K-3	≥24Ω，4KW Brake unit built-in as optional	≥30Ω，4KW Brake unit built-in as optional	≥40Ω，2KW Brake unit built-in as optional
FC-3S-030K-3	≥13.6Ω，8KW Brake unit built-in as optional	≥30Ω，4KW Brake unit built-in as optional	≥40Ω，2KW Brake unit built-in as optional
FC-3S-037K-3	≥13.6Ω，8KW Brake unit built-in as optional	≥24Ω，6KW Brake unit built-in as optional	≥30Ω，4KW Brake unit built-in as optional
FC-3S-045K-3	≥10Ω，12KW	≥24Ω，6KW	≥24Ω，6KW
FC-3S-055K-3	≥6.8Ω，12KW	≥10Ω，12KW	≥13.6Ω，8KW
FC-3S-075K-3			
FC-3S-093K-3			

Inverter model	Braking torque 150%,5S recommended resistance value, power and brake unit model	Braking torque 100%,15S recommended resistance value, power and brake unit model	Braking torque 50%,15S recommended resistance value, power and brake unit model
FC-3S-110K-3	≥2*6.8Ω，12KW	≥6.8Ω，12KW	≥6.8Ω，12KW
FC-3S-132K-3			
FC-3S-160K-3			
FC-3S-185K-3	≥3*6.8Ω，12KW	≥2*6.8Ω，12KW	≥2*6.8Ω，12KW
FC-3S-200K-3			
FC-3S-220K-3			
FC-3S-250K-3	≥3*6.8Ω，12KW	≥2*6.8Ω，12KW	≥2*6.8Ω，12KW
FC-3S-280K-3			
FC-3S-315K-3			
FC-3S-355K-3			
FC-3S-400K-3	≥5*6.8Ω，20KW	≥4*6.8Ω，20KW	≥3*6.8Ω，20KW
FC-3S-450K-3			
FC-3S-500K-3			
FC-3S-550K-3	≥6*6.8Ω，20KW	≥5*6.8Ω，20KW	≥4*6.8Ω，20KW
FC-3S-630K-3			

Chapter 3 Wiring

3.1 Typical Wiring

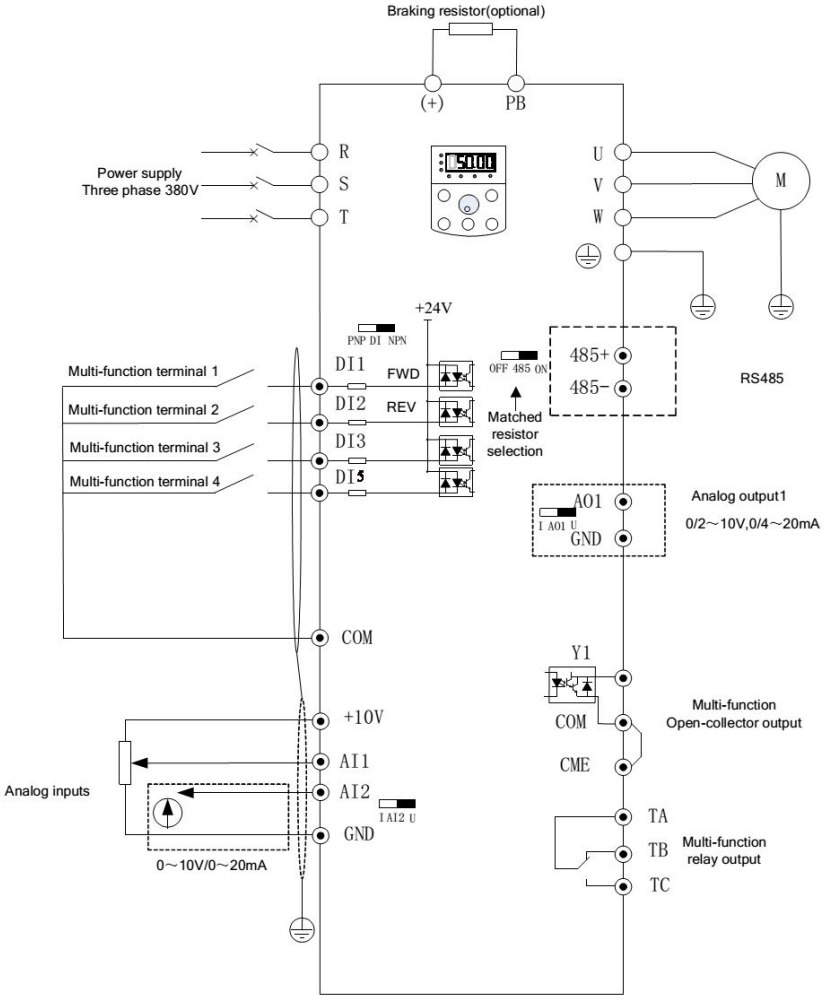


Fig.3-1 Three-phase inverter ≤2. 2KW

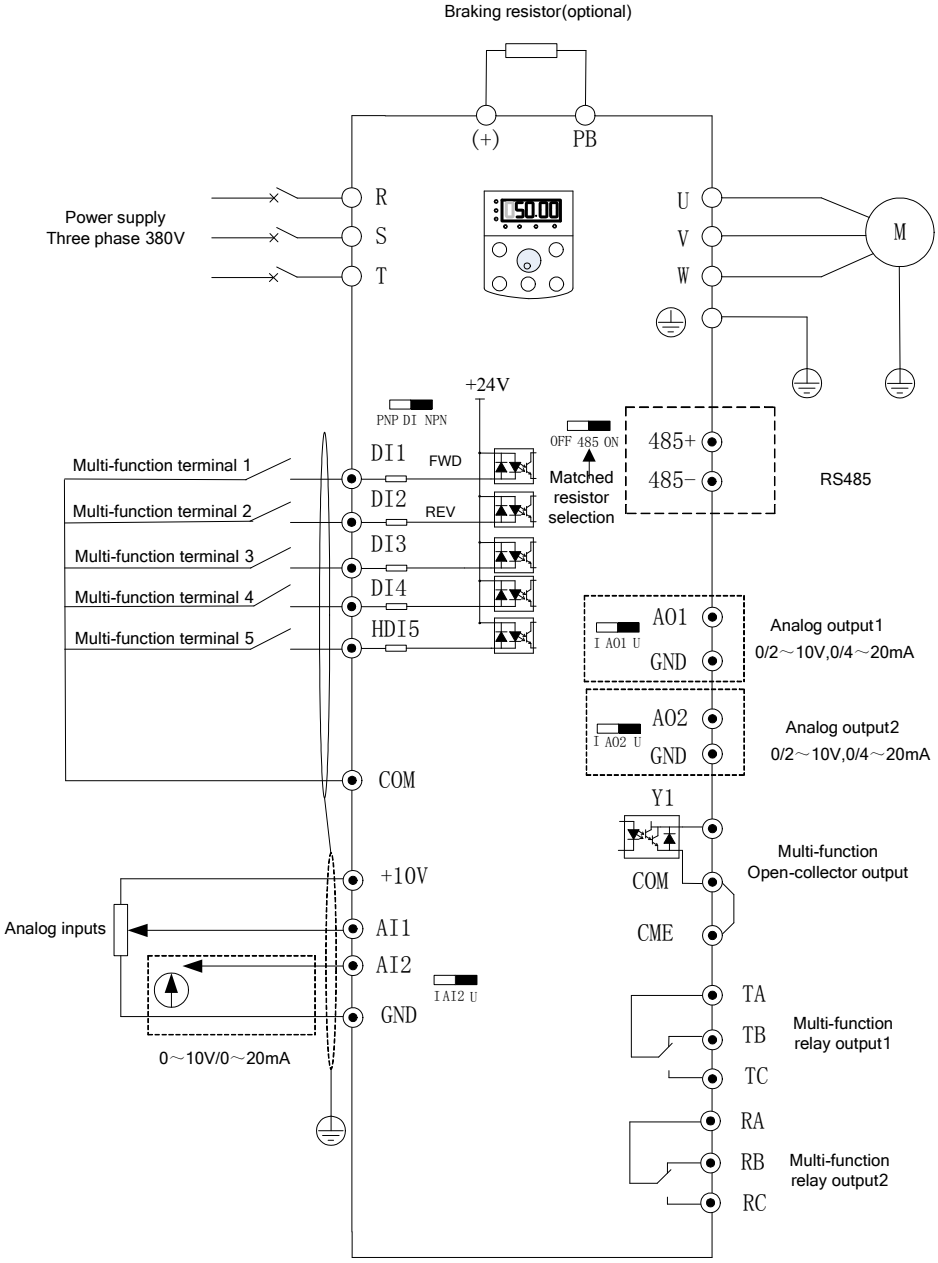


Fig.3-2 Three-phase inverter within 2.2~37KW

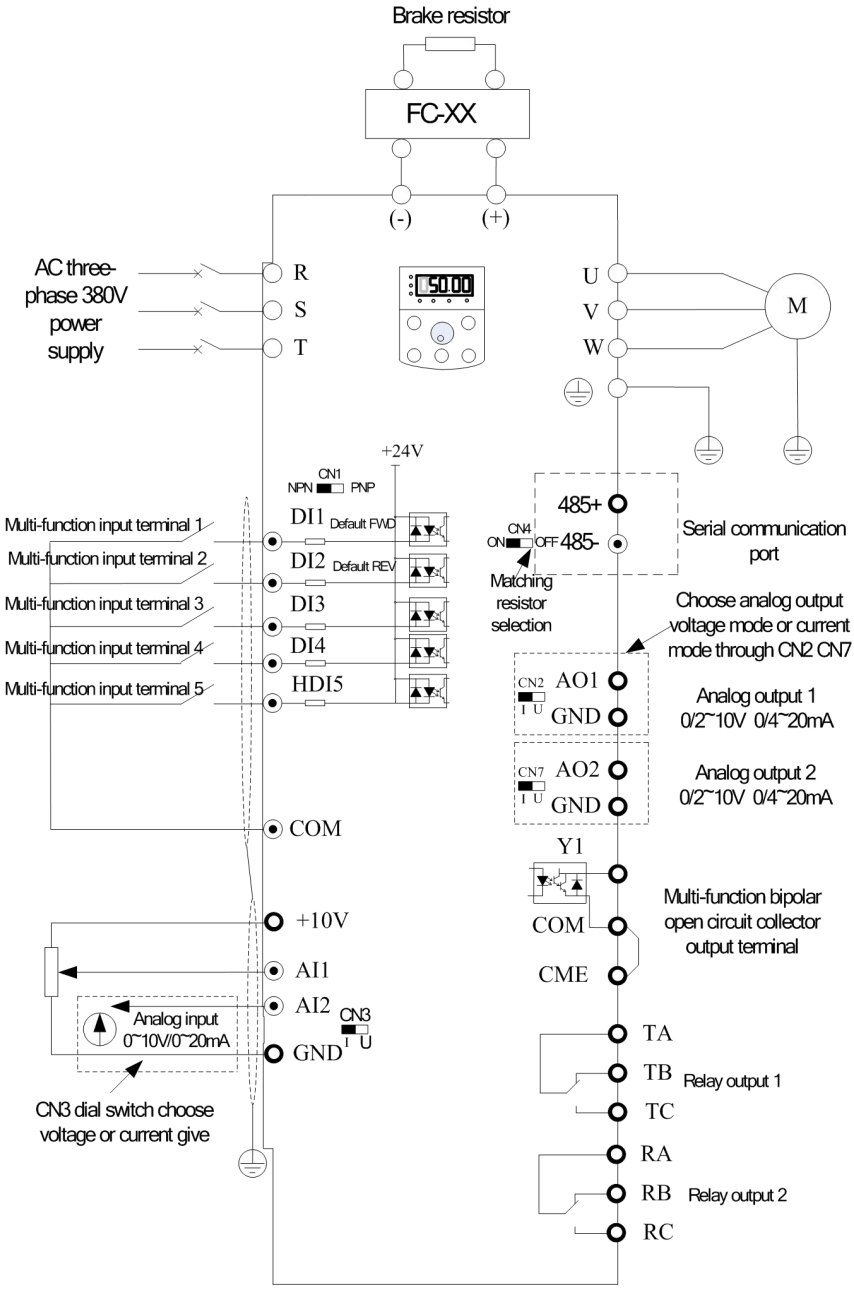


Fig.3-3 three-phase inverter within 45KW~75KW

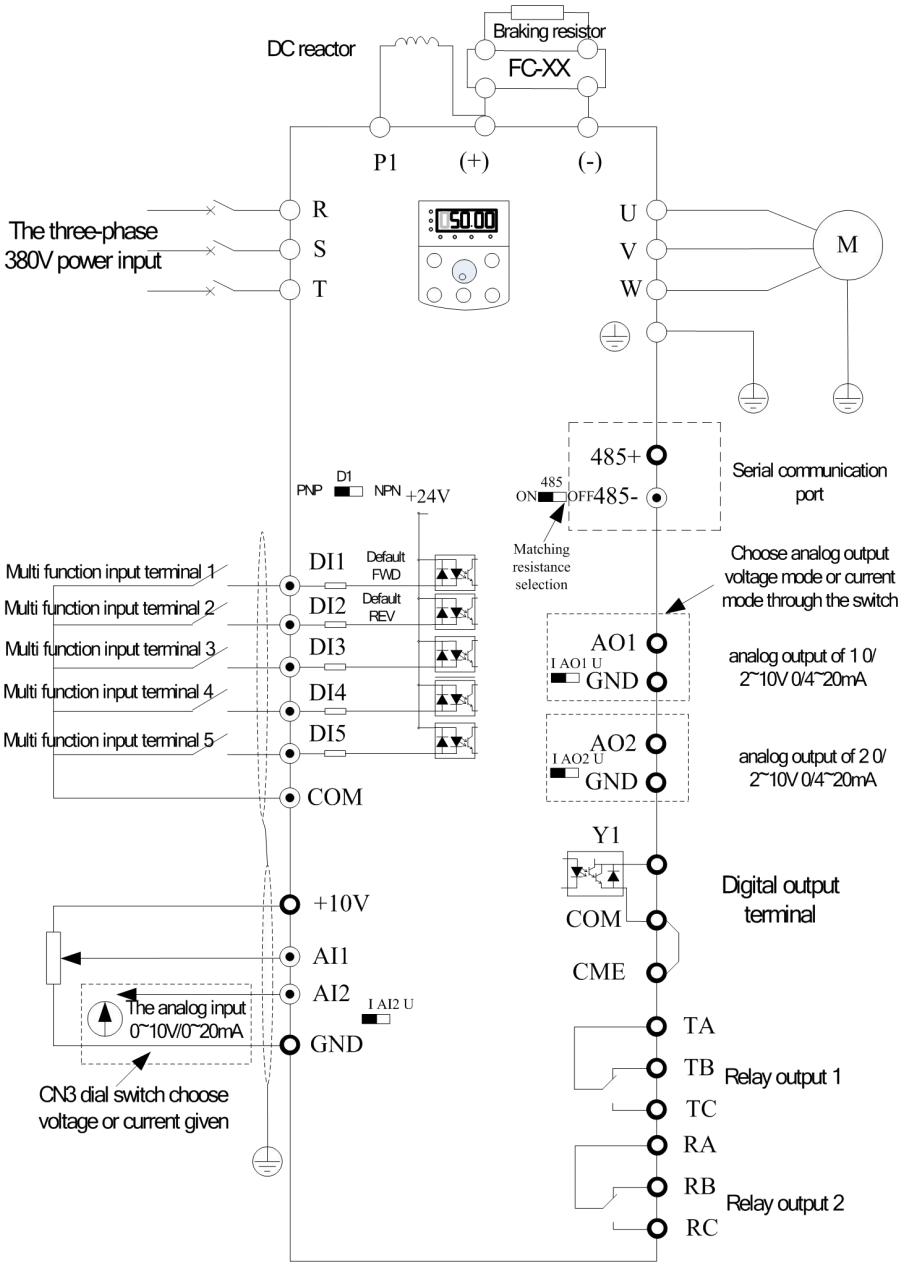


Fig.3-4 three-phase inverter ≥93KW

3.2 Control Terminals and wiring

3.2.1 Main circuit terminals

Table 2-1: Main circuit terminals of three-phase

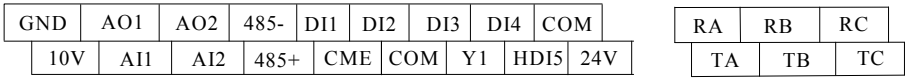
Terminal	Terminal Name	Description
R、S、T	Three-phase power supply input terminals.	Connect to the three-phase AC power supply.
P(+)、(-)	Positive and negative terminals of DC bus.	Common DC bus input point.
P(+)、PB	Connecting terminals of braking resistor.	Connect to the braking resistor for the AC drive of 7.5 kW and below (220 V) and18.5kW and below (other voltage classes).
U、V、W	Output terminals.	Connect to a three-phase motor.
⏚	Grounding terminal.	Must be grounded.

Table 2-2: Main circuit terminals of single-phase

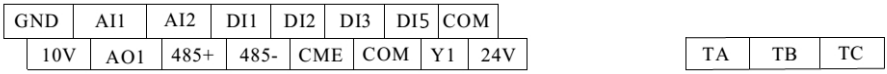
Terminal	Terminal Name	Description
L1、L2	Single-phase power supply input terminals.	Connect to the single-phase 220 VAC power supply.
P(+)、(-)	Positive and negative terminals of DC bus.	Common DC bus input point.
P(+)、PB	Connecting terminals of braking resistor.	Connect to a braking resistor.
U、V、W	Output terminals.	Connect to a three-phase motor.
⏚	Grounding terminal.	Must be grounded.

3.2.2 Control circuit terminals and wiring

The control circuit terminals displayed as below:



Three-phase 380V ≥ 4.0KW



Three-phase 380V ≤2.2KW

☞ **Function instruction of the control terminals**

Tab.3-3 control interface function declaration of FC-3S Series

Category	Terminal	Terminal Name	Function Description
Power source	+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 input	AI1-GND	Analog input 1	1) Input voltage range: 0–10 VDC; 2) Impedance: 100kΩ.
	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 kΩ (voltage input), 500 Ω (current input).
Digital input	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 kΩ. 3) Input voltage range: 9 ~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 4	
Analog output	AO1	Analog	Voltage or current output is decided by dial

	-GND	output 1	switches CN2 and CN7. Output voltage range: 0–10 V Output current range: 0–20 mA.
	AO2 -GND	Analog output 2	
Category	Terminal	Terminal Name	Function Description
Digital output	Y1 -COM	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 FC-3 series of inverter, and use Profibus DP card.
Relay output 1	T/A-T/B	NC terminal	Contact driving capacity: AC 250V, 3 A, COSø = 0.4 DC 30V, 1A
	T/A-T/C	NO terminal	
Relay output 2	R/A-R/B	NC terminal	Contact driving capacity: 250 VAC, 3 A, COSø = 0.4 30 VDC, 1 A
	R/A-R/C	NO terminal	
Keypad extended line interface	CN6	External operation keypad interface	External operation keypad and parameter copy keypad interface, take out the bidirectional crystal head, it can expand the standard network cable.

☞Signal input terminals wiring instruction

1) AI analog input

Since the weak analog voltage signal is easy to suffer external interferences, it needs to employ shielded cable generally and the length shall be no longer than 20 meters, as shown in Fig. 3-5. 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.

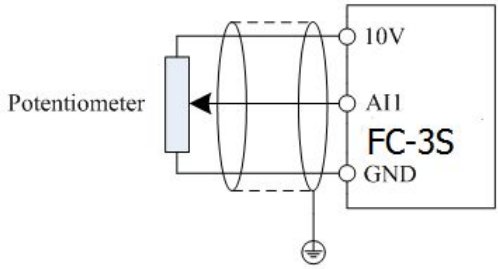


Fig.3-5 Schematic Diagram for Connection of Input Terminal of Analog Signal

2) Digital input terminal:

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.

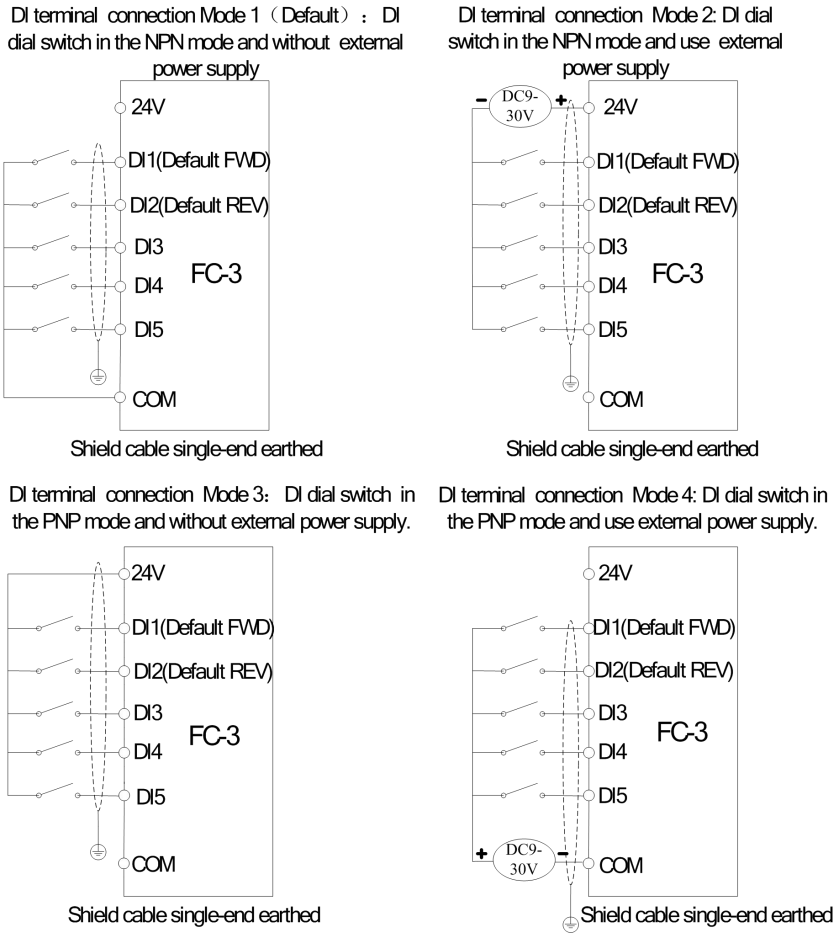


Fig 3-6 Four different wiring diagram

3) Y1 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.3-4, otherwise, when it has output on the digital output terminal, the DC 24V power supply will be damaged immediately.

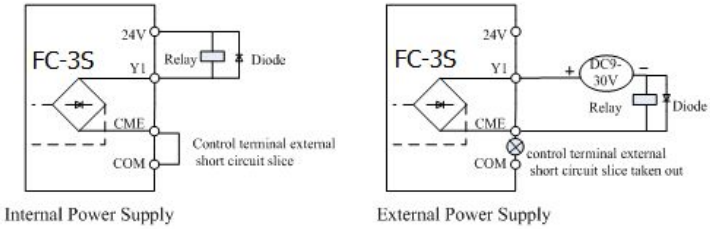


Fig.3-9 Schematic diagram for digital output terminal Y1 wiring

3.3 Electrical installation

3.3.1 Guide to the selection of peripheral electrical parts

Tab.3-4 Guide to the Selection of Peripheral Electrical Parts of FC-3S Inverter

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-3S-0K4-2	10	9	0.75	0.75	0.5	2.5
FC-3S-0K75-2	16	12	0.75	0.75	0.5	2.5
FC-3S-01K5-2	25	18	1.5	1.5	0.5	2.5
FC-3S-02K2-2–B	32	25	2.5	2.5	0.5	2.5
FC-3S-01K5-3–B	6	9	0.75	0.75	0.5	2.5
FC-3S-02K2-3-B	10	9	0.75	0.75	0.5	2.5
FC-3S-004K-3–B	10	12	0.75	0.75	0.5	2.5
FC-3S-05K5-3–B	16	16	2.5	2.5	0.75	2.5
FC-3S-07K5-3–B	20	18	2.5	2.5	0.75	2.5
FC-3S-009K-3–B	32	25	4.0	4.0	1.0	4
FC-3S-0011K-3–B	40	32	4.0	4.0	1.0	6
FC-3S-015K-3–B	40	32	4.0	4.0	1.0	6
FC-3S-018K5-3–B	50	38	6.0	6.0	1.0	6
FC-3S-022K-3	50	40	10	10	1.0	10
FC-3S-030K-3	63	50	10	10	1.0	16

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-3S-037K-3	100	65	16	16	1.0	16
FC-3S-045K-3	100	80	25	25	1.0	25
FC-3S-055K-3	125	95	35	35	1.0	25
FC-3S-075K-3	160	115	50	50	1.0	25
FC-3S-093K-3	225	170	70	70	1.0	25
FC-3S-110K-3	250	205	95	95	1.0	25
FC-3S-132K-3	315	245	120	120	1.0	25
FC-3S-160K-3	350	300	120	120	1.0	25
FC-3S-185K-3	400	300	150	150	1.0	25
FC-3S-200K-3	500	410	185	185	1.0	25
FC-3S-220K-4	500	410	185	185	1.0	25
FC-3S-250K-3	630	475	240	240	1.0	25
FC-3S-280K-3	630	475	2×120	2×120	1.0	25
FC-3S-315K-3	700	620	2×120	2×120	1.0	25
FC-3S-355K-3	800	620	2×150	2×150	1.0	35
FC-3S-400K-3	1000	800	2×185	2×185	1.0	35
FC-3S-450K-3	1250	800	2×240	2×240	1.0	35
FC-3S-500K-3	1250	1000	2×240	2×240	1.0	35
FC-3S-550K-3	1720	1500	3×183	3×183	1.0	35
FC-3S-630K-3	1900	1500	3×240	3×240	1.0	35
FC-3S-630K-3 HD	2200	1650	3×240	3×240	1.0	35

3.3.2 Use instruction of peripheral electric parts

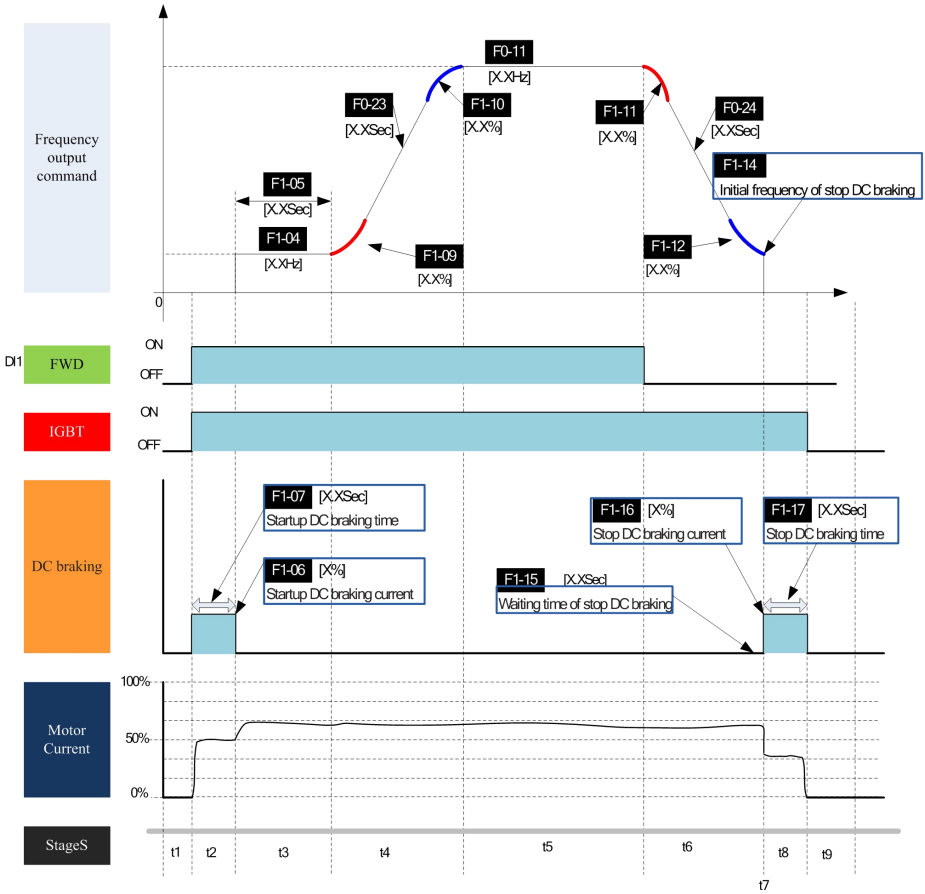
Tab.3-1 Use Instruction of Peripheral Electric Parts of FC-3S Inverter

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.
DC reactor	DC reactor is optional for 110KW~160KW FC series inverter, but standard for the 185KW above.	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.
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.

Chapter 4 Easy Setup

4.1 Logic of Control

☞☞ Complete Timing Diagram

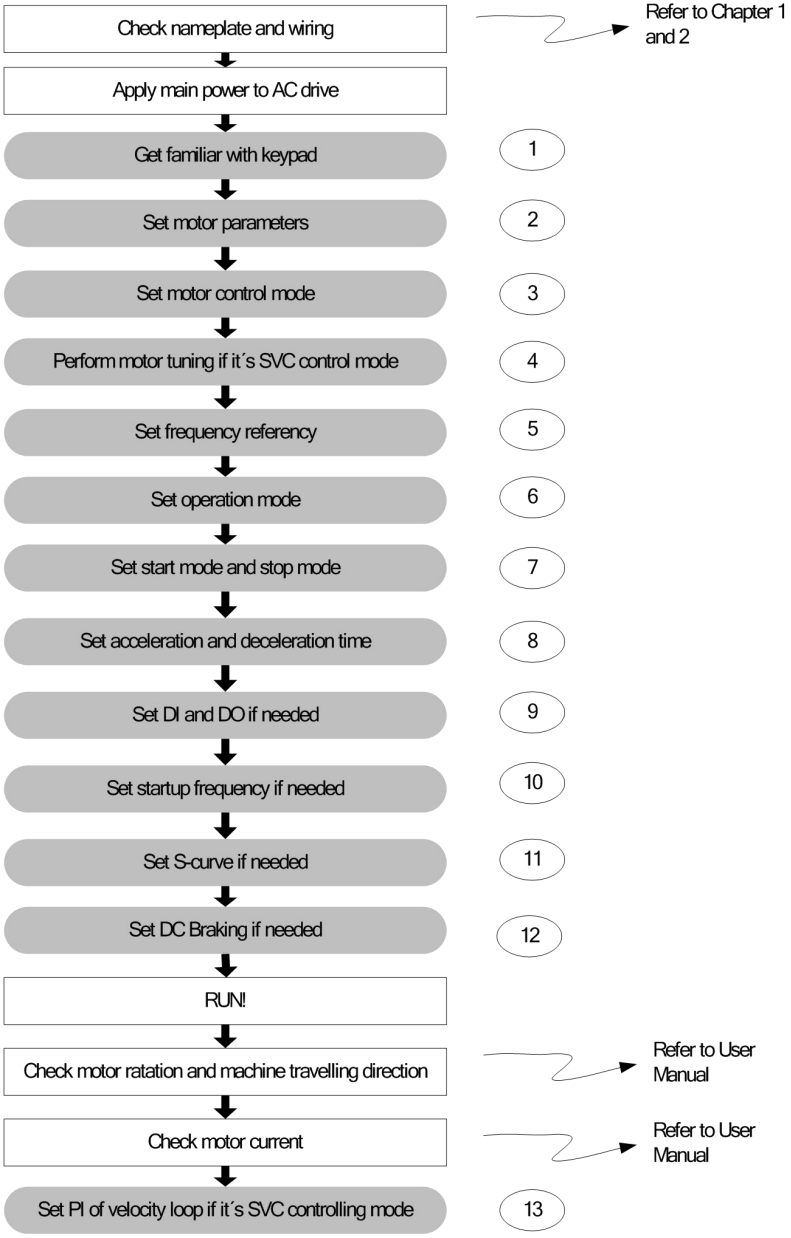


☞☞ Timing Diagram Description

Event	Description	Function code	Status
t1	-The AC drive waits for the RUN signal.	……	Inhabit
t2	-The AC drive receives the Forward RUN command.	……	RUN
	-The IGBT becomes active.	……	
	Startup DC braking is enabled if F1-07 > 0.	F1-06 F1-07	
t3	Startup DC braking is disabled.	……	RUN
	The startup frequency becomes active if F1-05 > 0.	F1-04 F1-05	
t4	-The startup frequency becomes inactive.	……	RUN
	-The motor ramps up to the expected frequency.	F0-23	
	-S-curve active.	F1-09 F1-10	
t5	-Motor runs at expected frequency.	F0-11	RUN
t6	-The Forward RUN command is cancelled.	……	RUN
	-The motor ramps down to zero frequency.	F0-24	
	-S-curve active.	F1-11 F1-12	
t7	-The frequency output command reaches the Stop DC braking frequency threshold.	F1-14	RUN
	-The IGBT shall become inactive if Waiting time of stop DC braking is not zero.	F1-15	RUN (if F6-15 = 0) Inhabit (if F6-15 > 0)
	-After the waiting time set in F1-15 the IGBT becomes active again.	……	
t8	- DC Stop braking is enabled if F1-17 > 0.	F1-16 F1-17	RUN
t9	-DC injection braking 2 is disabled.	……	Inhabit
	-The IGBT turns inactive.	……	

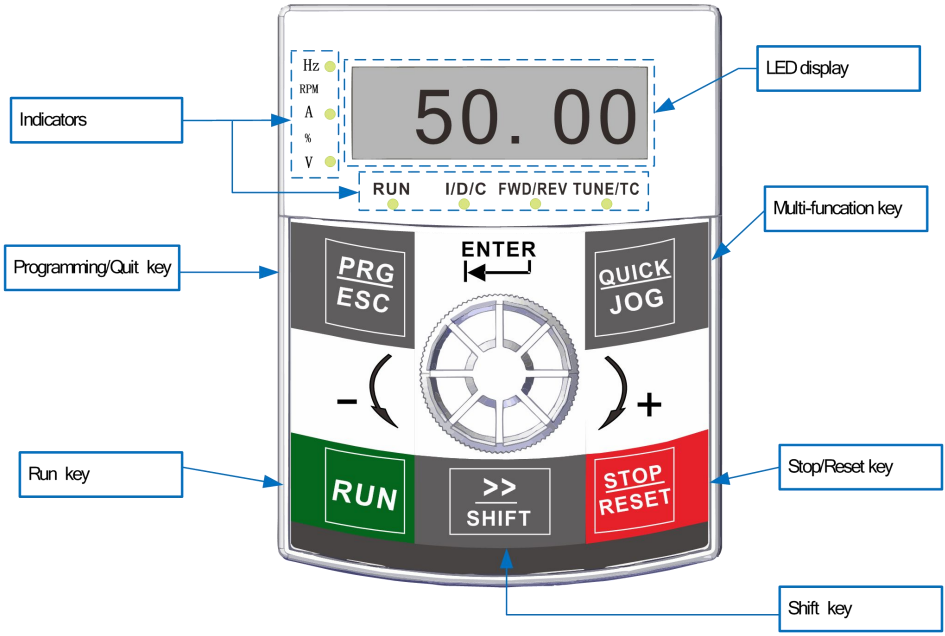
4.2 Step By Step Setup

☞ Setup Flowchart



☞ Step 1: Get Familiar with Keypad

◆ Overview



◆ Indicators

RUN : It indicates the state of the AC drive;
OFF indicates the stop state, ON (green) indicates the running state;

L/D/C : It indicates whether the AC drive is operated by means of keypad, terminals or communication.
OFF indicates keypad control, ON indicates terminal control, and blinking indicates communication control.

FWD/REV : It indicates forward or reverse rotation.
OFF indicates forward rotation and ON indicates reverse rotation.

TUNE/TC : ON indicates torque control mode, blinking slowly indicates auto-tuning state, blinking quickly indicates fault state.

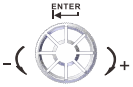
◆ LED display

The 5-digit LED display is able to display the frequency reference, output frequency, monitoring data and fault codes

◆ Hz/RPM/A/%/V

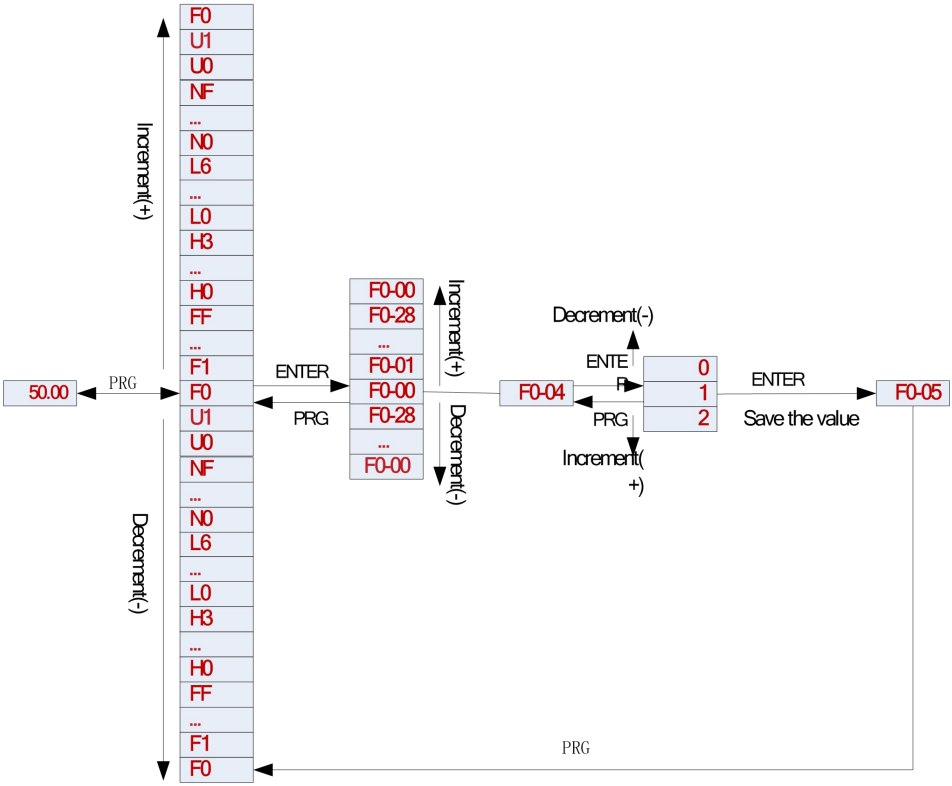
It indicates the unit of function code.

◆ Keys on Keypad

Key	Key Name	Function
	Programming/quit	Enter or exit Level I menu.
	Confirm(ENTER)	Enter the menu interfaces level by level, and confirm the parameter setting.
	Increment(+)	Increase data or function code
	Decrement(-)	Decrease data or function code.
	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
	RUN	Start the AC drive in the keypad operation mode.
	Stop/Reset	Stop the AC drive when it is in the running state and perform the reset operation when it is in the faulty state. The functions of this key are restricted by F7-27.
	Multi-function	Perform function switchover (such as quick switchover of command source or direction) according to the setting of F7-28.

Function Code	Parameter Name	Setting Range	Unit	Default
F7-27	Stop/Reset Function	0: STOP/RESET key enabled only in keypad control. 1: STOP/RESET key enabled in any operation mode.	N/A	1
F7-28	Quick/JOG function selection	0: Forward jog. 1: Switchover between forward rotation and reverse rotation. 2: Reverse jog. 3: Switchover from remote control (terminal or communication) to keypad control.	N/A	0

◆ Keypad Operation



◆ Function Code Arrangement

Function Code Group	Description	Remark
F0 to FF	Standard function code group	Compatible with FC-3S series function parameters.
H0 to H3	Second motor function code group	Parameters, Acceleration and deceleration time and control mode of second motor can be set individual.
L0 to L6	Advanced function code group	System parameters set, user function code select, optimizing control, AI/AO correction, master-slave control, band-type brake control and hibernation control.
N0 to NF	Industry machine function code group	Select different Industry machine.
U0,U1	Monitor function code group	Group U0 is used to display of error information, group U1 is used to display of basic parameters.

☞☞ Step 2: Set Motor Parameters

Function Code	Parameter Name	Setting Range	Unit	Default
F4-01	Rated motor power	0.1 to 1000.0	kw	Model dependent
F4-02	Rated motor voltage	0 to 1500	V	380V
F4-04	Rated motor current	0.1 to 6000.0	A	Model dependent
F4-05	Rated motor frequency	0.00 to F0-14	Hz	50.00Hz
F4-06	Rated motor speed	0 to 60000	rpm	F4-01 dependent

☞ Step 3: Set Motor Control Mode

Function Code	Parameter Name	Setting Range	Unit	Default
F0-03	Control model	1: Sensor-less vector control (SVC). 2: Voltage/Frequency control (V/F).	N/A	2

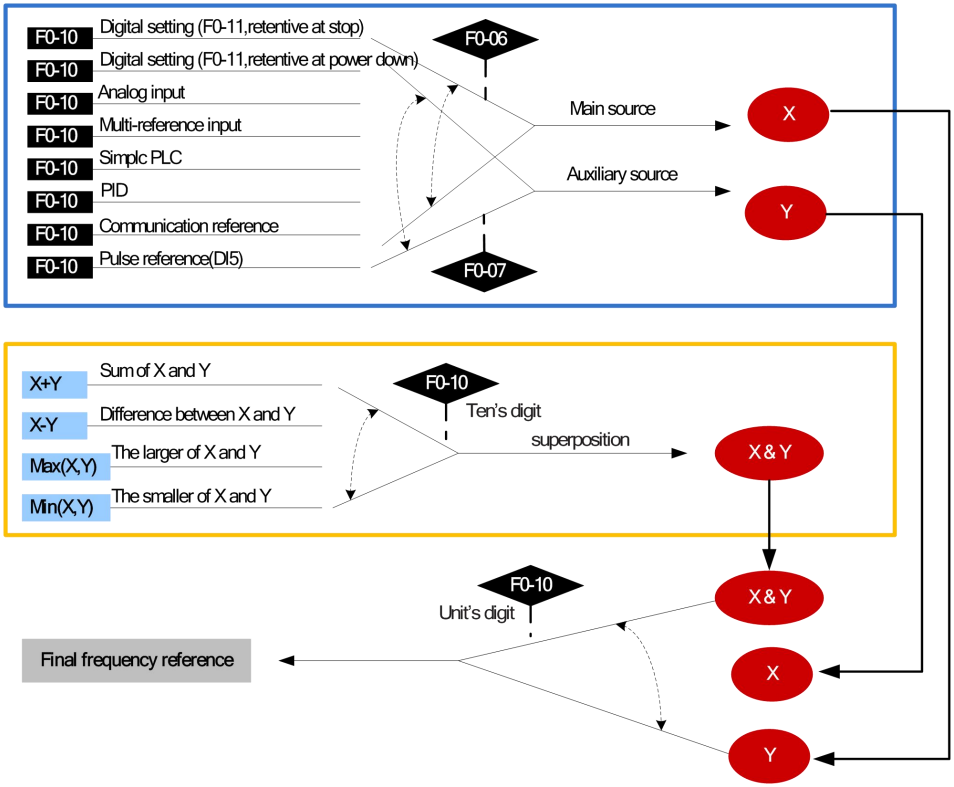
☞☞ Step 4: Perform Motor Tuning if it is SVC Control Mode

Function Code	Parameter Name	Setting Range	Unit	Default
F4-00	Auto-tuning selection	0: No auto-tuning. 1: Static auto-tuning. 2: Complete dynamic auto-tuning.	N/A	0

☞☞ Step 5: Set Frequency Reference

Function Code	Parameter Name	Setting Range	Unit	Default
F0-06	Main frequency source X selection	0: Up/Down digital setting (F0-11, speed rested after stop). 1: Up/Down digital setting (F0-11 retentive after stop). 2: AI1 3: AI2 4: Multi-reference 5: Simple PLC 6: PID 7: Communication reference 8: Pulse reference (DI5)	N/A	1
F0-07	Auxiliary frequency source Y selection	The same as F0-03 (Main frequency source X selection).	N/A	0
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 (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).	N/A	00

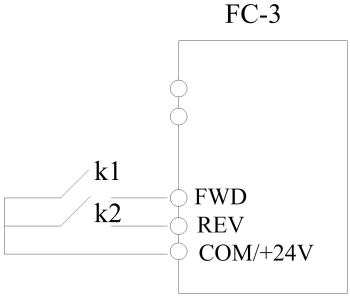
Function Code	Parameter Name	Setting Range	Unit	Default
		Ten's digit() 0: X+Y 1: X-Y 2: Max(X,Y) 3: Min(X,Y)		
F0-11	Preset frequency	0.00 to max F0-14	Hz	50.00



☞☞ Step 6: Select Operation Mode

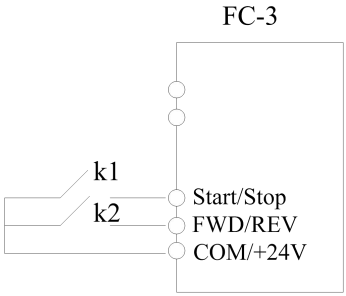
Function Code	Parameter Name	Setting Range	Unit	Default
F0-04	Command source selection	0: Keypad control 1: Terminal control 2: Communication control	N/A	0
F5-11	Terminal command mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	N/A	0

k1	k2	Command
0	0	Stop
1	0	Forward
0	1	Reverse
1	1	Stop



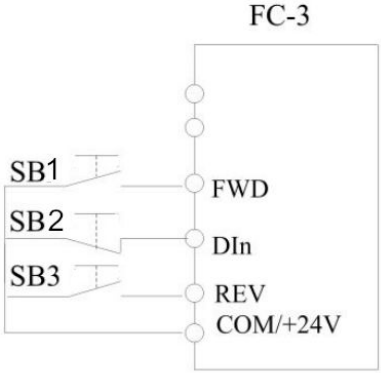
Two wire control mode 1: This mode is the most commonly used two wire mode. Forward running or reverse running is controlled by the command from FWD or REV terminal.

k1	k2	Command
0	0	Stop
0	1	Stop
1	0	Forward
1	1	Reverse



Two wire control mode 2: Start/Stop terminal is the enabled terminal in this mode. The direction depends on the status of FWD/REV terminal.

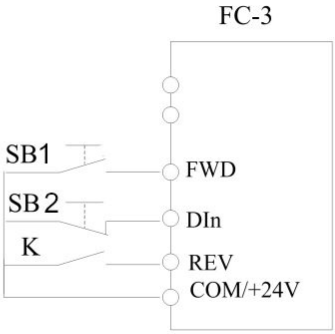
SB1	FWD button
SB2	Stop button
SB3	REV button



Three wire control mode 1: Din is the enabled terminal on this mode. The direction is controlled by FWD or REV terminal. The pulse is effective and the Din terminal signal must be cut off at stop. Din is the multi-function input terminal; the corresponding terminal function should be defined as NO. 3 function “three wire mode running control”.

K	Direction select
0	Forward
1	Reverse

SB1	SB2
Run button	Stop button



Three wire control mode 2: Din is the enabled terminal on this mode. FWD terminal gives the running command and the direction depends on the status of the REV terminal. The Din signal must be cut off at stop. Din is the multi-function input terminal; the corresponding terminal function should be defined as NO. 3 function “three wire mode running control”.

☞☞ Step 7: Set Start Mode and Stop Mode

Function Code	Parameter Name	Setting Range	Unit	Default
F1-00	Start mode	0：Direct start 1：Rotational speed tracking restart	N/A	0

		2：Pre-excited start		
F1-13	Stop mode	0：Decelerate to stop 1：Coast to stop	N/A	0

☞☞ Step 8: Set Acceleration and Deceleration Parameters

Function Code	Parameter Name	Setting Range	Unit	Default
F0-21	Acceleration/ Deceleration time unit	0：1s 1：0.1s 2：0.01s	N/A	1
F0-23	Acceleration time 1	0s～65000s(F0-21=0) 0.0s～6500.0s(F0-21=1) 0.00s～650.00s(F0-21=2)	s	10.0s
F0-24	Deceleration time 1	0s～65000s(F0-21=0) 0.0s～6500.0s(F0-21=1) 0.00s～650.00s(F0-21=2)	s	10.0s
F1-08	Acceleration/ Deceleration mode	0：Linear 1：S-curve	N/A	0

☞☞ Step 9: Set DI and DO If Needed

Function Code	Parameter Name	Setting Range	Unit	Default
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 12：Constant speed 1 13：Constant speed 2 14：Constant speed 3 15：Constant speed 4	N/A	1 FWD
F5-01	DI2 function selection		N/A	2 REV
F5-02	DI3function selection		N/A	9 RESET
F5-03	DI4 function selection		N/A	12 Multi-ref

Function Code	Parameter Name	Setting Range	Unit	Default
		16：Acceleration/Deceleration time selection 1		erence terminal 1
F5-04	DI5 function selection	17：Acceleration/Deceleration time selection 2 18：Frequency source switchover 19：Motor reset to preset speed 20：Command source switchover terminal 1 21：Acceleration/Deceleration prohibited 22：PID pause 23：PLC status reset 24：Swing pause 25：Timer triggers 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 32：Torque control prohibited 33：Pulse input (enabled only for DI5) 34：Frequency modification forbidden 35：PID action direction reverse 36：External STOP terminal 1 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 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	N/A	13 Multi-ref erence terminal 1

Function Code	Parameter Name	Setting Range	Unit	Default
		50：Reverse run prohibited 51：User-defined fault 1 52：User-defined fault 2 53：Dormant input		
F5-10	DI filter time	0.000 to 1.000	s	0.010
F5-13	DI active mode selection 1	00000~11111 0 0 0 0 0 DI5 active mode 0: High level active 1: Low level active DI4 active mode 0: High level active 1: Low level active DI3active mode 0: High level active 1: Low level active DI2active mode 0: High level active 1: Low level active DI1 active mode 0: High level active 1: Low level active	N/A	00000
F5-34	DI1 ON delay	0.0～3600.0	s	0.0
F5-35	DI1 OFF delay	0.0～3600.0	s	0.0
F5-36	DI2 ON delay	0.0～3600.0	s	0.0
F5-37	DI2 OFF delay	0.0～3600.0	s	0.0
F5-38	DI3 ON delay	0.0～3600.0	s	0.0
F5-39	DI3 OFF delay	0.0～3600.0	s	0.0

Note:

"High level active" means that it's **effective** when the corresponding DI terminal connecting to the COM; but it's **ineffective** when disconnecting the terminal.

"Low level active" means that it's **ineffective** when the corresponding DI terminal connecting to the COM, but it's **effective** when disconnecting the terminal.

◆ **DO Setting (Refer to Group FF)**

Function Code	Parameter Name	Setting Range	Unit	Default
F6-00	Relay 1 function	0：No output 1：AC drive running 2：Fault output 3：Frequency-level detection FDT1 output 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 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 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：Timing duration reached output 28：Current running time reached 29：Set count value reached 30：Designated count value reached 31：Indicate motor 1 or motor 2 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 current limit exceeded. 37：Frequency lower limit reached (having output at stop).	N/A	2 Fault output
F6-01	Relay 2 function		N/A	1 AC drive running
F6-02	Y1 unction		N/A	1 AC drive running

Function Code	Parameter Name	Setting Range	Unit	Default
		38：Alarm output 39：Reserved 40：AI1 input limit exceeded 41：Reserved 42：Reserved 43：Frequency 2 reached 44：Current 2 reached 45：Fault output		
F6-26	Relay 1 output delay time	0.0～3600.0	s	0.0
F6-27	Relay 2 output delay time	0.0～3600.0	s	0.0
F6-28	Y 1 output delay time	0.0～3600.0	s	0.0

☞☞ Step 10: Set Startup Frequency If Needed

Function Code	Parameter Name	Setting Range	Unit	Default
F1-04	Startup frequency	0.00～10.00	Hz	0.00
F1-05	Startup frequency active time	0.0～100.0	s	0.0

☞☞ Step 11: Set S-Curve If Needed

Function Code	Parameter Name	Setting Range	Unit	Default
F1-08	Acceleration/ Deceleration mode	0: Linear mode 1: S-curve mode	N/A	0
F1-09	Acceleration time proportion of S-curve start segment	0.0～80.0	%	20.0%
F1-10	Deceleration time proportion of S-curve start segment	0.0～80.0	%	20.0%
F1-11	Acceleration time proportion of S-curve end segment	0.0～80.0	%	20.0%
F1-12	Deceleration time proportion of S-curve end segment	0.0～80.0	%	20.0%

☞☞ Step 12: Set DC Injection Braking If Needed

Function Code	Parameter Name	Setting Range	Unit	Default
F1-06	Startup DC injection braking current	0～100	%	0
F1-07	Startup DC injection braking time	0.0～100.0	s	0.0

☞☞ Step 13: Set PI of Velocity Loop If it is SVC Control Mode

Function Code	Parameter Name	Setting Range	Unit	Default
F3-00	Switchover frequency 1	1.00～F3-02	Hz	5.00
F3-04	Speed loop proportional gain at low frequency	0.1～10.0	N/A	4.0
F3-05	Speed loop integral time at low frequency	0.01～10.00	s	0.50
F3-06	Speed loop proportional gain at high frequency	0.1～10.0	N/A	2.0
F3-07	Speed loop integral time at high frequency	0.01～10.00	s	1.00

Chapter 5 Trouble Shooting

5.1 Faults 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 Anand Associates.
Err04	Overcurrent 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.
Err05	Overcurrent 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.	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-excitation gain.

Display	Fault Name	Possible Causes	Solutions
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.
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. 6. 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.	1: Reduce the load, or check the motor, or check the

Display	Fault Name	Possible Causes	Solutions
		2. The drive is of too small power class.	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 lightening 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 outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4 The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Seek for maintenance.
Err25	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.

Display	Fault Name	Possible Causes	Solutions
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 fault 1	The user-defined fault 1 signal is input via DI.	Reset the fault.
Err31	User-defined fault 2	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 form 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.
Err37	Data storage fault	Communication between DSP and EEPROM fault.	1: Replace the main control board. 2: Contact the agent or Anand Associates.
Err39	Current running time reached	Current running time of AC driver is larger than .F7-38 value.	Reset the fault.

Display	Fault Name	Possible Causes	Solutions
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.
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.

5.2 Common Symptoms and Diagnostics

Fault Name	Possible Causes	Solutions
There is no display at power-on.	1: There is no power supply or the power supply is too low. 2: The switching power supply on the drive board is faulty. 3: The rectifier bridge is damaged. 4: The buffer resistor of the drive is damaged. 5: The control board or the keypad is faulty. 6: The cable between the control board and the drive board or keypad breaks.	1: Check the power supply. 2: Check the bus voltage. 3: Re-connect the keypad and 30-core cables. 4: Contact the agent or Anand Associates for technical support.
"Err20" is displayed at power-on	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC driver is damage.	1: Measure the insulation of the motor and the output cable with a megger. 2: Contact the agent or Anand Associates for technical support.
Err15 (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked.	1: Reduce the carrier frequency (F0-26). 2: Replace the fan and clean the air filter.

Fault Name	Possible Causes	Solutions
	3: Components inside the AC drive are damaged (thermal coupler or others).	3: Contact the agent or Anand Associates for technical support.
The motor does not rotate after the AC drive runs.	1: Check the motor and the motor cables. 2: The AC drive parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the AC drive and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and re-set motor parameters.
The DI terminals are disabled.	1: The parameters are set incorrectly. 2: The external signal is incorrect. 3: Wrong location of the DI dial switch. 4: The control board is faulty.	1:Check and reset the parameters in group F5. 2: Re-connect the external signal cables. 3. Wrong location of the DI dial switch. 4: Contact the agent or Anand Associates for technical support.
The AC drive reports overcurrent and overvoltage frequently	1: The motor parameters are set improperly. 2: The acceleration/ deceleration time is improper. 3: The load fluctuates.	1:Re-set motor parameters or re-perform the motor auto-tuning. 2: Set proper acceleration/ deceleration time. 3: Contact the agent for technical support.

Chapter 6 Function code table

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.

6.1 General Function Codes

Function Code	Parameter Name	Setting Range	Default	Property
Group F0: Standard Function Parameters				
F0-00	Drive model	Drive model: 5 digital display, 2 decimal point	53#.##	●
F0-01	HD/ND type display 0: HD type 1: ND type	0: Heavy duty 1: Normal duty	0	●
F0-02	Rated driver current	0.1A to 3000.0A	Model dependent	●
F0-03	Control mode	1: Sensor-less flux vector control (SFVC). 2: Voltage/Frequency (V/F) control.	2	★
F0-04	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.	0	★
F0-06	Main frequency source X selection	0: UP/ DOWN setting (Speed reset after stop). 1: UP/ DOWN setting	1	★

Function Code	Parameter Name	Setting Range	Default	Property
		(retentive after stop). 2: AI1 3: AI2 4: Multi-speed. 5: Simple PLC. 6: PID 7: Communication setting. 8: Pulse setting.		
F0-07	Auxiliary frequency source Y selection	0: UP/ DOWN setting (Speed reset 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	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 (by DI terminal). 3：Switchover between X and “X and Y superposition” (by DI terminal).	00	☆

Function Code	Parameter Name	Setting Range	Default	Property
		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.	00.00	☆
F0-13	Rotation direction	0: Same direction 1: Reverse direction 2: Reverse forbidden	0	☆
F0-14	Maximum output frequency	0: 0.0–1200.0 Hz(F0-20=1) 1: 0.00–600.00 Hz(F0-20=2)	50.00	★
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)	50.0	☆
F0-17	Frequency upper limit offset	0.00 Hz to maximum frequency (F0-14).	0.00	☆
F0-18	Frequency lower limit	0.00 Hz to frequency upper limits (F0-16).	0.00	☆
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	000	☆

Function Code	Parameter Name	Setting Range	Default	Property
		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.		
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)	10.0	☆
F0-24	Deceleration time 1	0s～30000s (F0-21 = 0) 0.0s～3000.0s (F0-21 = 1) 0.00s～300.00s (F0-21 = 2)	10.0	☆
F0-25	Overmodulation voltage boost	0% to 10%	3	★
F0-26	Carrier frequency	0.5kHz～16.0kHz	Model dependent	☆
F0-27	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
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.	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	★
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	0.00	☆
F1-05	Startup frequency holding time	0.0s～100.0s	0.0	★
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	0.0	★
F1-08	Acceleration/Deceleration mode	0: Linear 1: S-curve	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F1-09	Acceleration time proportion of S-curve start segment	0.00%～80.00%	20.00	★
F1-10	Deceleration time proportion of S-curve start segment	0.00%～80.00%	20.00	★
F1-11	Acceleration time proportion of S-curve end segment	0.00%～80.00%	20.00	★
F1-12	Deceleration time proportion of S-curve end segment	0.00%～80.00%	20.00	★
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)	0.00	☆
F1-15	Waiting time of stop DC braking	0.0s～100.0s	0.0	☆
F1-16	Stop DC braking current	0%～100%	0	☆
F1-17	Stop DC braking time	0.0s～36.0s	0.0	☆
F1-21	Demagnetization time	0.01s～3.00s	0.50	★
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	10.0	★
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	★

Function Code	Parameter Name	Setting Range	Default	Property
F1-27	Detection time of instantaneous stop nonstop recovery voltage	0.0s to 300.0s	0.3	★
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: 1.7-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).	25.00	★
F2-03	Multi-point V/F frequency 1 (F1)	0.00Hz to F2-05	3.00	★
F2-04	Multi-point V/F voltage 1 (V1)	0.0% to 100.0%	8.0	★
F2-05	Multi-point V/F frequency 2 (F2)	F0-05 to F2-07	10.00	★
F2-06	Multi-point V/F voltage 2 (V2)	0.0% to 100.0%	20.0	★
F2-07	Multi-point V/F frequency 3 (F3)	0.00Hz to 50.00Hz	50.00	★

Function Code	Parameter Name	Setting Range	Default	Property
F2-08	Multi-point V/F voltage 3 (V3)	0.0% to 100.0%	100.0	★
F2-09	Slip compensation ratio	0.0% to 200.0%	50.0	☆
F2-10	Over-excitation 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	0.30	☆
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	0	☆
F2-17	Voltage rise time of V/F separation	0.0s to 3000.0s	1.0	☆
F2-18	Voltage decline time of V/F separation	0.0s to 3000.0s	1.0	☆
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	5.00	☆
F3-02	Switchover frequency 2	F3-00 to F0-14	10.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	0.50	☆
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	1.00	☆
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	☆
F3-18	Speed loop feedback filter time	0.000s to 1.000s	0.015	☆
F3-19	Speed loop output filter time	0.000s to 1.000s	0.000	☆
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	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		F3-21)		
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	☆
Group F4: Motor 1 Parameters				
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	★
F4-03	Number of pole pairs of motor 1	2 to 64	Model dependent	○
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	50.00	★
F4-06	Rated motor 1 rotational speed	0rpm to 60000rpm	F4-01 dependent	★
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	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
		power >30kW).		
F4-08	Motor 1 stator resistance	0.001Ωto 65.535Ω	Model dependent	★
F4-09	Motor 1 rotor resistance	0.001Ωto 65.535Ω	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	10.0	☆
F4-13	Deceleration time of complete auto-tuning	1.0s to 6000.0s	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. 12：Constant speed 1 13：Constant speed 2 14：Constant speed 3 15：Constant speed 4 16：Terminal 1 for acceleration/	1	★
F5-01	DI2 function selection		2	★
F5-02	DI3function selection		9	★
F5-03	DI4 function selection		12	★
F5-04	DI5 function selection		13	★

Function Code	Parameter Name	Setting Range	Default	Property
		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 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 32：Torque control prohibited. 33：Pulse input (enabled only for DI5). 34：Frequency modification forbidden. 35：PID action direction reverse. 36：External STOP terminal 1. 37：Command source switchover terminal 2 38：PID integral disabled 39：Switchover between main frequency source X and preset		

Function Code	Parameter Name	Setting Range	Default	Property
		frequency 40：Switchover between auxiliary frequency source Y and preset frequency 41：Switchover between motor 1 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		
F5-10	DI filter time	0.000 to 1.000	0.010	☆
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	1.00	☆
F5-13	DI effective mode selection 1	00000 to 11111	00000	★
F5-15	AI1 minimum input	0.00V to 10.00V	0.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	10.00	☆
F5-18	Corresponding setting of AI1 maximum	-100.0% to 100.00%	100.0	☆
F5-19	AI1 filter time	0.00s to 10.00s	0.10	☆
F5-20	AI2 minimum input	0.00V to 10.00V	0.00	☆
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	10.00	☆
F5-23	Corresponding setting of AI2 maximum	-100.0% to 100.00%	100.0	☆
F5-24	AI2 filter time	0.00s to 10.00s	0.10	☆
F5-30	Pulse minimum input	0.00KHz to 50.00KHz	0.00	☆
F5-31	Corresponding setting of pulse minimum input	-100.0% to 100.00%	0.0	☆
F5-32	Pulse maximum input	0.00KHz to 50.00KHz	50.00	☆
F5-33	Corresponding setting of pulse maximum input	-100.0% to 100.00%	0.0	☆
F5-34	Pulse filter time	0.00s to 10.00s	0.10	☆
F5-35	DI1 On delay time	0.0s to 3600.0s	0.0	☆
F5-36	DI1 Off delay time	0.0s to 3600.0s	0.0	☆
F5-37	DI2 On delay time	0.0s to 3600.0s	0.0	☆
F5-38	DI2 Off delay time	0.0s to 3600.0s	0.0	☆
F5-39	DI3 On delay time	0.0s to 3600.0s	0.0	☆
F5-40	DI3 Off delay time	0.0s to 3600.0s	0.0	☆

Function Code	Parameter Name	Setting Range	Default	Property
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.	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	00	☆
Group F6: Output Terminals				
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	2	☆
F6-01	Relay 2 function		1	☆
F6-02	Y1 function		1	☆

Function Code	Parameter Name	Setting Range	Default	Property
		pre-warning 8：PLC cycle completed 9：Accumulative running time reached 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 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：Clocking 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		

Function Code	Parameter Name	Setting Range	Default	Property
		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 42：Reserved 43：Frequency 2 reached 44：Current 2 reached 45：Fault output		
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	0	☆
F6-10	AO2 output function selection		0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		value: -2 to +2 times of the rated value.		
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	☆
F6-28	Y1 high level output delay	0.0s to 3600.0s	0.0s	☆
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	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
F7-20	Setting accumulative running time.	0h to 65000h	0h	☆
F7-21	JOG preferred	0: Disable 1: Enable	1	☆
F7-22	Frequency detection value	0.00 Hz to maximum frequency	50.00Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
	(FDT1)			
F7-23	Frequency detection hysteresis (FDT hysteresis 1)	0.0% to 100.0%	5.0%	☆
F7-24	Detection range of frequency reached	0.0% to 100.0%	0.0%	☆
F7-25	Reserved			●
F7-26	Cooling fan control	0: Fan working continuously. 1: Fan working during running (Fan working after stopping when temperature is higher than 40℃).	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 function selection	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	H.401f	☆

Function Code	Parameter Name	Setting Range	Default	Property
		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		
F7-30	LED display stop parameters	1 to 0xffff 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.0003 H.0003	☆ ☆
F7-31	Load speed display coefficient	0.001 to 65.500	1.000	☆
F7-32	Temperature of inverter module	12℃ to 100℃	-	●
F7-33	Accumulative power-on time	0h to 65535h	-	●
F7-34	Accumulative running time	0h to 65535h	-	●
F7-36	Current running time function	0: Disable 1: Enable:	0	★

Function Code	Parameter Name	Setting Range	Default	Property
F7-37	Current running time source	0: Digital setting F7-38 1: AI1 2: AI2 (100% of analog input corresponds to F8-44)	0	★
F7-38	Setting of current running time	0.0min to 6500.0min	0.0	☆
F7-39	High level timing	0.0s to 6000.0s	2.0	☆
F7-40	Low level timing	0.0s to 6000.0s	2.0	☆
F7-41	Startup protection	0: No 1: Yes	1	☆
F7-43	Frequency reached detection value 1	0.00Hz to F0-14	50.00	☆
F7-44	Frequency reached detection duration 1	0% to 100%	0	☆
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	☆
F7-51	Setting power-on reached time	0h to 65530h	0	☆
F7-53	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz to maximum frequency(F0-14)	0.00	☆
F7-54	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00Hz to maximum frequency(F0-14)	0.00	☆
F7-55	Frequency detection value	0.00 Hz to maximum frequency	50.00Hz	☆

Function Code	Parameter Name	Setting Range	Default	Property
	(FDT2)			
F7-56	Frequency detect FDT2 hysteresis value	0.0% to 100.0%	5.0%	☆
F7-57	Frequency reached detection value 2	0.00Hz to F0-14	50.00	☆
F7-58	Frequency reached detection duration 2	0% to 100%	0	☆
F7-59	Zero current detection level	0% to 300%	100	☆
F7-60	Zero current detection delay time	0% to 300%	0	☆
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 3	0.0% to 300.0%	0.0	☆
F7-65	LED display running parameters 2	1 to 0xffff 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 speed 0010 Bit05: AC line current 0020 Bit06~Bit15: reserved		
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	☆

Function Code	Parameter Name	Setting Range	Default	Property
F7-69	Module temperature threshold	0℃ to 90℃	70	☆
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	0kWto 65535kW	--	●
F7-73	Performance software version		#.#	●
F7-74	Function software version		#.#	●
Group F8: Communication Parameters				
F8-00	Baud rate	0: 300BPS 1: 600BPS 2: 1200BPS	5	☆
F8-00	Baud rate	3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS	5	☆
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>	0	☆
F8-02	Local address	0 to 247 0: Broadcast address	1	☆
F8-03	Response delay	0ms to 30ms	2	☆
F8-04	Communication timeout	0.0s to 30.0s	0.0	☆
F8-05	Communication data	0: Standard MODBUS-RTU	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
	format selection	protocol 1: Nonstandard MODBUS-RTU protocol		
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	1.00	☆
F9-02	Motor overload warning coefficient.	50% to 100%	80%	☆
F9-03	Overvoltage stall gain	0 to 100	30	☆
F9-04	Overvoltage stall protective voltage	200.0V to 800.0V	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	☆

Function Code	Parameter Name	Setting Range	Default	Property
F9-17	Undervoltage fault auto reset selection	0: Manual reset fault after the undervoltage fault. 1: Auto reset fault according to the bus voltage after the fault.	1	☆
F9-18	Overvoltage inhibition mode selection	0: Ineffective 1: Overvoltage inhibition mode 1 2: Overvoltage inhibition mode 2	1	★
F9-19	Overexcitation 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 overvoltage 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 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	0	☆
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	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		Hundred's digit: Too large speed deviation – Err29 Thousand's digit: User-defined fault 1 – Err30 Ten thousand's digit: User-defined fault 1 – Err31		
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	0	☆
F9-24	Fault protection action selection 3	Unit's place: PID feedback losing on running-Err32 0:free stop 1:stop according to stop mode 2:keep running Ten's place: off load fault Hundreds place: reserved Thousands place: Current running time reached – Err39 Ten thousand's digit: Accumulative running time reached – Err40	0	☆
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	0.0% to 80.0%	20.0	★

Function Code	Parameter Name	Setting Range	Default	Property
	becoming 0			
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	0.0	☆
F9-33	Over-speed detection value	0.0% to 100.0%	20.0	☆
F9-34	Over-speed detection time	0.0s to 100.0s	2.0	☆
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	0.00	☆
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	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	2.00	☆
FA-08	Differential time Td1	0.000s to 10.000s	0.000	☆
FA-09	Cut-off frequency of PID reverse rotation	0.00Hz to maximum frequency(F0-14)	0.00	☆
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	0.00	☆
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	3600.0	☆
FA-18	Proportional gain Kip	0.0 to 100.0	20.0	☆
FA-19	Integral time Ti1	0.01s to 10.00s	2.00	☆
FA-20	Differential time Td1	0.000s to 10.000s	0.000	☆
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	0.00	☆
FA-26	Maximum deviation	0.00% to 100.00%	1.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
	between two PID outputs in forward direction			
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	10.0	☆
Fb-04	Triangular wave rising time coefficient	0.1% to 100.0%	50.0	☆
Fb-05	Set length	0m to 65535m	1000	☆
Fb-06	Actual length	0m to 65535m	0	☆
Fb-07	Number of pulses per meter	0.1 to 6553.5	100.0	☆
Fb-08	Set count value	1 to 65535	1000	☆

Function Code	Parameter Name	Setting Range	Default	Property
Fb-09	Designated count value	1 to 65535	1000	☆
Group FC: Multi-Reference and Simple PLC Function				
FC-00	Reference 0	-100.0% to 100.0%	0.0%	☆
FC-01	Reference 1	-100.0% to 100.0%	0.0%	☆
FC-02	Reference 2	-100.0% to 100.0%	0.0%	☆
FC-03	Reference 3	-100.0% to 100.0%	0.0%	☆
FC-04	Reference 4	-100.0% to 100.0%	0.0%	☆
FC-05	Reference 5	-100.0% to 100.0%	0.0%	☆
FC-06	Reference 6	-100.0% to 100.0%	0.0%	☆
FC-07	Reference 7	-100.0% to 100.0%	0.0%	☆
FC-08	Reference 8	-100.0% to 100.0%	0.0%	☆
FC-09	Reference 9	-100.0% to 100.0%	0.0%	☆
FC-10	Reference 10	-100.0% to 100.0%	0.0%	☆
FC-11	Reference 11	-100.0% to 100.0%	0.0%	☆
FC-12	Reference 12	-100.0% to 100.0%	0.0%	☆
FC-13	Reference 13	-100.0% to 100.0%	0.0%	☆
FC-14	Reference 14	-100.0% to 100.0%	0.0%	☆
FC-15	Reference 15	-100.0% to 100.0%	0.0%	☆
FC-16	Simple PLC running mode	0: Stop after the AC drive runs one cycle	0	☆
FC-16	Simple PLC running mode	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.	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		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 stop.		
FC-18	Running time of simple PLC reference 0	0.0s(h) to 6553.5s(h)	0.0	☆
FC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3	0	☆
FC-20	Running time of simple PLC reference 1	0.0s(h) to 6553.5s(h)	0.0	☆
FC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3	0	☆
FC-22	Running time of simple PLC reference 2	0.0s(h) to 6553.5s(h)	0.0	☆
FC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3	0	☆
FC-24	Running time of simple PLC reference 3	0.0s(h) to 6553.5s(h)	0.0	☆
FC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3	0	☆
FC-26	Running time of simple PLC reference 4	0.0s(h) to 6553.5s(h)	0.0	☆
FC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3	0	☆
FC-28	Running time of simple PLC reference 5	0.0s(h) to 6553.5s(h)	0.0	☆
FC-29	Acceleration/deceleration time of simple PLC	0 to 3	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
	reference 5			
FC-30	Running time of simple PLC reference 6	0.0s(h) to 6553.5s(h)	0.0	☆
FC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3	0	☆
FC-32	Running time of simple PLC reference 7	0.0s(h) to 6553.5s(h)	0.0	☆
FC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3	0	☆
FC-34	Running time of simple PLC reference 8	0.0s(h) to 6553.5s(h)	0.0	☆
FC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3	0	☆
FC-36	Running time of simple PLC reference 9	0.0s(h) to 6553.5s(h)	0.0	☆
FC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3	0	☆
FC-38	Running time of simple PLC reference 10	0.0s(h) to 6553.5s(h)	0.0	☆
FC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3	0	☆
FC-40	Running time of simple PLC reference 11	0.0s(h) to 6553.5s(h)	0.0	☆
FC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3	0	☆
FC-42	Running time of simple PLC reference 12	0.0s(h) to 6553.5s(h)	0.0	☆
FC-43	Acceleration/deceleration time of simple PLC	0 to 3	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
	reference 12			
FC-44	Running time of simple PLC reference 13	0.0s(h) to 6553.5s(h)	0.0	☆
FC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3	0	☆
FC-46	Running time of simple PLC reference 14	0.0s(h) to 6553.5s(h)	0.0	☆
FC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3	0	☆
FC-48	Running time of simple PLC reference 15	0.0s(h) to 6553.5s(h)	0.0	☆
FC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3	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-55	Reference 0 source	0: Keypad 1: AI1 2: AI2 3: Pulse setting 4: PID 5: Set by preset frequency (F0-11, modified via terminal	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		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|)	0	★
Fd-00	Torque setting source in torque control	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)	50.00	☆
Fd-04	Reverse maximum frequency in torque	0.00Hz to maximum frequency(F0-14)	50.00	☆
Fd-06	Torque setting filter time	0.00s to 10.00s	0.00	☆
Fd-07	Acceleration time in torque control	0.0s to 1000.0s	10.0	☆
Fd-08	Deceleration time in torque control	0.0s to 1000.0s	10.0	☆
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	0.00	☆
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	3.00	☆
FE-03	Corresponding setting of AI curve 1 inflexion 1 input	-100.0% to 100.0%	30.0	☆

Function Code	Parameter Name	Setting Range	Default	Property
FE-04	AI curve 1 inflexion 2 input	FE-02to FE-06	6.00	☆
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	10.00	☆
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	0.00	☆
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	3.00	☆
FE-11	Corresponding setting of AI curve 2 inflexion 1 input	-100.0% to 100.0%	30.0	☆
FE-12	AI curve 2 inflexion 2 input	FE-02to FE-06	6.00	☆
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	10.00	☆
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				

Function Code	Parameter Name	Setting Range	Default	Property
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 2 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	0.1kW to 1000.0kW	Model dependent	★
H1-02	Rated motor 3 voltage	0V to 1500V	380	★
H1-03	Number of pole pairs of motor 2	2 to 64	Model dependent	●
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	50.00	★
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 >30kW)	H1-01 dependent	★
H1-08	Motor 2 stator resistance	0.001Ωto 65.535Ω	Model dependent	★
H1-09	Motor 2 rotor resistance	0.001Ωto 65.535Ω	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	10.0	☆
H1-13	Deceleration time of complete auto-tuning	1.0s to 600.0s	10.0	☆
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	5.00	☆
H3-02	Switchover frequency 2	H3-00 to F0-14	10.00	☆
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	0.50	☆
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	1.00	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
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	0.015	☆
H3-19	Speed loop output filter time	0.000s to 1.000s	0.000	☆
H3-20	Source of power-driven torque upper limit	0: H3-21 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: H3-23 1: AI1 2: AI2 3: Communication setting 4: Pulse setting (DI5)	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
		(Analog range corresponds to H3-23)		
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	☆
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	☆

Function Code	Parameter Name	Setting Range	Default	Property
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	☆
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	360.0	☆

Function Code	Parameter Name	Setting Range	Default	Property
			690.0	
L2-05	Under voltage threshold	200.0V to 500.0V	200.0 350.0	☆
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	0	☆
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)	0	☆
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	☆
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 target voltage 2	-9.999V to 10.000V	8.000V	☆

Function Code	Parameter Name	Setting Range	Default	Property
L3-16	AO2 measured voltage 1	-9.999V to 10.000V	3.000V	☆
L3-17	AO2 target voltage 1	-9.999V to 10.000V	3.000V	☆
L3-18	AO2 measured voltage 2	-9.999V to 10.000V	8.000V	☆
L3-19	AO2 target 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	-10.00 to 10.00	1.00	☆
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	0.10	☆
Group L5: Braking Function Parameters				
L5-00	Braking control selection	0: Disable 1: Enable	0	★

Function Code	Parameter Name	Setting Range	Default	Property
L5-01	Braking loosen frequency	0.00Hz to 20.00Hz	2.50	★
L5-02	Braking loosen frequency holding time	0.0s to 20.0s	1.0	★
L5-03	Braking period current threshold	50.0% to 200.0%	120.0	★
L5-04	Braking actuation frequency	0.00Hz to 20.00Hz	1.50	★
L5-05	Braking actuation delay time	0.0s to 20.0s	0.0	★
L5-06	Braking actuation frequency holding time	0.0s to 20.0s	1.0	★
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	☆
L6-02	Sleep delay time	0.0s to 3600.0s	60.0s	☆
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	☆

6.2 Monitoring Parameters

Function Code	Parameter Name		Min. Unit	Property
Group U0: Error Recording Parameters				
U0-00	3rd (latest) fault type	00:No fault 01: Inverter unit protection	1	●
U0-01	2nd fault type		1	●

Function Code	Parameter Name		Min. Unit	Property
U0-02	1st fault type	04: Overcurrent during acceleration 05: Overcurrent during deceleration 06: Over current at constant speed 08: Overvoltage during acceleration 09: Overvoltage during deceleration 10: Overvoltage at constant speed 12: Undervoltage 13: Drive overload 14: Motor overload 15: Drive overheat 17: Current detection fault 20: Short circuit to ground 23: Power input phase loss 24: Power output phase loss 25: EEPROM read-write fault 27: Communication fault 28: External equipment fault 29: Too large speed deviation 30: User-defined fault 1 31: User-defined fault 2 32: PID feedback lost during running 33: Fast current limit fault 34: Load becoming 0	1	●
U0-02	The 1st fault type	35: Control power supply fault	1	●

Function Code	Parameter Name		Min. Unit	Property
		37: Control power supply fault 39: Current running time reached 40: Accumulative running time reached 42: Motor switchover fault during running 46: Master slave control communication disconnection		
U0-03	Frequency upon the 3rd fault		0.01Hz	●
U0-04	Current upon the 3rd fault		0.01A	●
U0-05	Bus voltage upon the 3rd fault		0.1V	●
U0-06	DI status upon the 3rd fault		1	●
U0-07	Output terminal status upon the 3rd fault		1	●
U0-08	AC drive status upon the 3rd fault		1	●
U0-09	Power-on time upon the 3rd fault		1min	●
U0-10	Running time upon the 3rd fault		1min	●
U0-13	Frequency upon the 2nd fault		0.01Hz	●
U0-14	Current upon the 2nd fault		0.01A	●
U0-15	Bus voltage upon the 2nd fault		0.1V	●
U0-16	DI status upon the 2nd fault		1	●
U0-17	Output terminal status upon the 2nd fault		1	●
U0-18	AC drive status upon the 2nd fault		1	●
U0-19	Power-on time upon the 2nd fault		1min	●
U0-20	Running time upon the 2nd fault		1min	●
U0-21	Reserved			●

Function Code	Parameter Name	Min. Unit	Property
U0-22	Reserved		●
U0-23	Frequency upon the 1st fault	0.01Hz	●
U0-24	Current upon the 1st fault	0.01A	●
U0-25	Bus voltage upon the 1st fault	0.1V	●
U0-26	DI status upon the 1st fault	1	●
U0-27	Output terminal status upon the 1st fault	1	●
U0-28	AC drive status upon the 1st fault	1	●
U0-29	Power-on time upon the 1st fault	1min	●
U0-30	Running time upon the 1st 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	●
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	●

Function Code	Parameter Name	Min. Unit	Property
U1-14	Motor speed	1	●
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	HDI5 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		●
U1-37	AO1 target voltage	0.01V	●

Function Code	Parameter Name	Min. Unit	Property
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	●

Chapter 7 FC-3 Series Modbus Communication Protocol

FC-3 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.

7.1 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.

7.2 Application Mode

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

7.3 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.

7.4 Protocol specification

FC-3 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-3 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.

7.5 Communication frame structure

The Modbus protocol data format of FC-3 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:

<table>
<tr><td>Frame Header START</td><td>3.5 characters time</td></tr>
<tr><td>Slave Address ADR</td><td>Contact address:1～247</td></tr>
<tr><td>The command code
CMD</td><td>03：Read the parameter of the slave machine
06：Write the parameters of the slave machine</td></tr>
<tr><td>The content of the data
DATA（N-1）</td><td rowspan="4">The content of the DATA：
The address of function code parameters;
The quantity of function code parameters;
The value of function code parameters;</td></tr>
<tr><td>The content of the data
DATA（N-2）</td></tr>
<tr><td>……...</td></tr>
<tr><td>The content of the data
DATA0</td></tr>
<tr><td>CRC CHK High order</td><td rowspan="2">detection value：CRC16 verified value. High byte is sent previous than low byte.</td></tr>
<tr><td>CRC CHK Low order</td></tr>
<tr><td>END</td><td>3.5-characters time</td></tr>
</table>

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 Header **START**	Slave **Addr**	**CMD**	High address	Low address	High function code number	Low function code number	The high byte of CRC	The low byte of CRC	END
>=3.5 chars	1～247	03	Address_H	Address_L	00	N<=12	*	*	>=3.5 chars

Example: reading continuous 2 parameters from frequency convert F0~03 whose slave machine address is 01.

(The return frames are divided into standard MODBUS format and nonstandard MODBUS format)

The command from the master machine

Frame Header **START**	Slave **Addr**	**CMD**	High address	Low address	High function code number	Low function code number	The high byte of CRC	The low byte of CRC	**END**
>=3.5 chars	0x 01	0x 03	0Xf 0	0x 03	0x 00	0x 02	0x07	0x0B	>=3.5 chars

The replies from the slave machine (standard Modbus)

Frame Header **START**	Slave **Addr**	**C M D**	Read the parameter number	F0-03 High byte value	F0-03 Low byte value	F0-04 High byte value	F0-04 Low byte value	The high byte of CRC	The low byte of CRC	**END**
>=3.5 chars	0x 01	0x 03	0x 04	0x 00	0x 00	0x 00	0x 00	0x FA	0x 33	>=3.5 chars

The replies from the slave machine (nonstandard Modbus)

Frame Header **START**	Slave **Addr**	**C M D**	Read the high byte of the parameter number	Read the low byte of the parameter number	F0-03 High byte value	F0-03 Low byte value	F0-04 High byte value	F0-04 Low byte value	The high byte of CR C	The low byte of CR C	**E N D**
>=3.5 chars	0x 01	0x 03	0x 00	0x 00	0x 04	0x 00	0x 00	0x 00	0x 43	0x 07	>= 3.5 ch ars

If change the control mode from F0-03 to VF (F0-03=1), change the running command source to terminal control (F0-04), the replier data will be: take nonstandard MODBUS as an example, pay attention that it has an extra high byte of parameter quantity than standard BODBUS.

Frame Header **START**	Slave **Addr**	**C M D**	Read the high byte of parameter number	Read the low byte of parameter number	F0-03 High byte value	F0-03 Low byte value	F0-04 High byte value	F0-04 Low byte value	The high byte of CR C	The low byte of CR C	**E N D**
>=3.5 characte rs	0x 01	0x 03	0x 00	0x 04	0x 00	0x 01	0x 00	0x 01	0x D3	0x 07	>= 3.5 ch ars

Command code: 06H, writing in a parameter data.

Frame Head **START**	Slave **Addr**	**C M D**	High addr	Low addr	High byte of the content written in	Low byte of the content written in	High byte of the CRC	Low byte of the CRC	**END**
>=3.5 chars	1 ～ 247	06	Addr _H	Addr _L	Data_H	Data_L	*	*	>=3.5 chars

Example: writing address 01 in the slave machine, function code of the frequency convert control method is vector control mode and F0-03=1.

Command from the master machine

Frame Head **START**	Slave **Addr**	**CMD**	High address	Low address	High byte of the content written in	Low byte of the content written in	High byte of the CRC	Low byte of the CRC	**END**
>=3.5 chars	0X 01	06	0xf0	0x03	0x00	0x01	0x8B	0x0A	>=3.5 chars

Reply from the slave machine

Frame Head **START**	Slave **Addr**	**CMD**	High address	Low address	High byte of the content written in	Low byte of the content written in	High byte of the CRC	Low byte of the CRC	**END**
>=3.5 chars	0X 01	06	0xf0	0x03	0x00	0x01	0x8B	0x0A	>=3.5 chars

Note: if the command written in is not successful, the failed reason will be fed back.

7.6 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）;
}
```

7.7 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、U3	0x70xx、0x71xx、x73xx	

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
1000	*Communication set value(-1000~1000) (decimal) (readable and writable)
1001	Set frequency (minimum unit:0.01Hz)
1002	Running frequency (minimum unit:0.01Hz)
1003	Busbar voltage (minimum unit: 0.01V)
1004	Output voltage (minimum unit: 0.1V)
1005	Output current (minimum unit: 0.1A)
1006	Output power (minimum unit: 0.1kw)
1007	DI input flag (minimum unit: 1)
1008	DO output flag (minimum unit: 1)
1009	PID set (minimum unit: 1)
100A	PID feedback (minimum unit:1)
100B	AI1 voltage (minimum unit: 0.01V)
100C	AI2 voltage (minimum unit: 0.01V)
100D	AO1 output voltage (minimum unit: 0.01V)
100E	PLC step (minimum unit: 1)
100F	Rotate speed (minimum unit: 1rpm)
1010	Count value input (minimum unit: 1)
1011	Pulse frequency input (minimum unit: 0.01kHz)
1012	Feedback speed (minimum unit: 0.1Hz)
1013	The remaining run time (minimum unit: 0.1 min)
1014	Voltage before AI1 revised (minimum unit: 0.001V)
1015	Voltage before AI2 revised (minimum unit: 0.001V)
1016	The actual linear speed (minimum unit: 1m/min)
1017	Load speed (minimum unit: user-defined, refer to F7-31)
1018	present power-on time (minimum unit: 1min)

Parameter address (HEX)	Parameter description
1019	Present run time (minimum unit: 0.1min)
101A	Pulse frequency input (minimum unit: 1Hz)
101B	Main frequency X display (minimum unit: 0.01Hz)
101C	Auxiliary frequency Y display (minimum unit: 0.01Hz)
101D	Target torque (minimum unit: 0.1%), regard motor rated torque as 100%
101E	Output torque (minimum unit: 0.1%), regard motor rated torque as 100%
101F	Output torque (minimum unit: 0.1%), regard inverter rated current as 100%
1020	Upper limit torque (minimum unit: 0.1%), regard inverter rated current as 100%
1021	VF separate target voltage (minimum unit: 1V)
1022	VF separate output voltage (minimum unit: 1V)
1023	Reserved
1024	Motor 1/2 direction (minimum unit: 1)
1025	Length value input (minimum unit: 1)
1026	AO2 output voltage (minimum unit: 0.1%)
1027	Status of the invert (minimum unit: 1)
1028	Present malfunction (minimum unit: 1)

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
2000	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

Read the status of the frequency convert: (read only)

Status word address (HEX)	Status word function
3000	0001: Forward operation
	0002: Reverse operation
	0003: Stop

Digital output terminal control: (write only)

Command address (HEX)	Command content
2001	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
2002	0~7FFF represent 0%~100%

Analog AO2 control: (write only)

Command address (HEX)	Command content
2003	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
8000	0000: Fault free 0001: Reserve 0002: Reserve 0003: Reserve 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

When it has fault on communication, the return address is: reading fault 83XX, writing fault 86XX.

Communication fault address (HEX)	**Description of the fault**
8300 (read) 8600 (write)	0000: Fault free 0001: Wrong password 0002: Wrong command code 0003: Wrong CRC check 0004: Ineffective address 0005: Ineffective parameter 0006: Ineffective parameter change 0007: The system is locked 0008: EEPROM on-stream