COTRUST 合信

CTF220 Series

User Manual

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深圳市合信自动化技术有限公司
COTRUST TECHNOLOGIES CO., LTD.

Contents

Safety Precautions

*Please do follow

1   introduction

First of all, thank you for purchasing our CTF220 series inverter!

This manual describes how to use CTF220 series frequency converter correctly. Please read this manual carefully before use (installation, operation, maintenance, inspection, etc.). In addition, please understand the safety precautions of the product before using the product.

Disclaimer: COTRUST is not responsible for the device damage or personal injury which caused by the operations against the requirements.

In order to prevent harm to people and damage to property, the following instructions must be observed. Please refer to the relevant symbol description for the possible harm and damage degree caused by the wrong use of this product.

Safety precautions

● In order to illustrate the details of the product, the legend in this manual sometimes shows the state of removal of the cover or safety cover.

● When using this product, be sure to install the shell or cover as prescribed, and follow the instructions.

● The legends in this manual are for illustration only and may differ from the products you ordered.

● Due to product upgrades or specification changes, and to improve the convenience and accuracy of the instruction manual, the contents of this instruction manual are subject to change without notice.

● If you need to order the instruction manual due to damage or loss, please contact our regional agents or directly contact our customer service center.

● If you still have some problems, please contact our customer service center.

2

Safety Information and Precautions

*Please do follow

2　Safety Information and Precautions

In order to ensure the safety of your personal and equipment, please read this chapter carefully before using the frequency converter.

Safety Precautions

This symbol describes the matters needing attention in operation and the possibility

of physical injury or equipment damage if not operated as required.

This symbol indicates that if not operated as required, it may lead to death, serious

injury or serious property loss.

(1) It is strictly forbidden to connect AC power lines to the U, V and W output terminals of the converter, otherwise the converter will be completely damaged.

(2) Do not short (-) to (+), otherwise it will lead to the damage of converter and short circuit of power supply.

(3) Frequency converters are forbidden to be installed on inflammable materials, otherwise there is a risk of fire.

(4) Do not install in the environment containing explosive gases, otherwise there is a risk of explosion.

(5) After the main circuit is connected, the exposed terminals should be insulated, otherwise there is a risk of electric shock.

(6) In case of electrification, do not operate the frequency converter by wet hand, otherwise there is a danger of electric shock.

(7) The ground terminal of the frequency converter must be well grounded.

(8) In the course of power-on, do not open the cover and do wiring work. Wiring or inspection can be carried out only after 10 minutes of power off.

(9) Persons with professional qualifications must conduct wiring operations. It is strictly forbidden to leave any conductive substances in the machine, otherwise there is a risk of electric shock or damage to the frequency converter。

(10) Frequency converter with storage time of more than 2 years should be gradually boosted by a voltage regulator when power is turned on, otherwise they will be in danger of electric shock and explosion.

(11) It is strictly forbidden to connect terminals other than TA, TB, TC, PA, PB　　and PC in control terminals with 220V AC signals, otherwise there is a risk of damage to

property

(12) If the transducer is damaged or parts are incomplete, please do not install and operate, otherwise there is a risk of fire or injury to personnel.

(13) Installation should be carried out in a place that can bear the weight of the transducer, otherwise there will be danger of injury or damage to property when it falls.

⚡ **Danger**	Indicates operation against requirements may result in severe personal injuries or even death.
⚠️ **Caution**	Indicates operation against requirements may result in personal injuries or device damage.
🔔 **Notice**	Indicates necessary supplements or explanations.

3

CTF220 series Specifications

*Products Information

3   CTF220 series Specifications

3.1   Naming Rules

CTF220 – 4   T   11G / 15P

Code	Name
CTF220	Series

Code	2	4	5	7
Input voltage	220V	380V	480V	690V

Code	Phase
S	Single
T	Three

Code	1.5P	......	1000P
Fans and pumps (KW)	1.5	......	1000

Code	0.7 G	......	900G
Constant torque (KW)	0.75	......	900
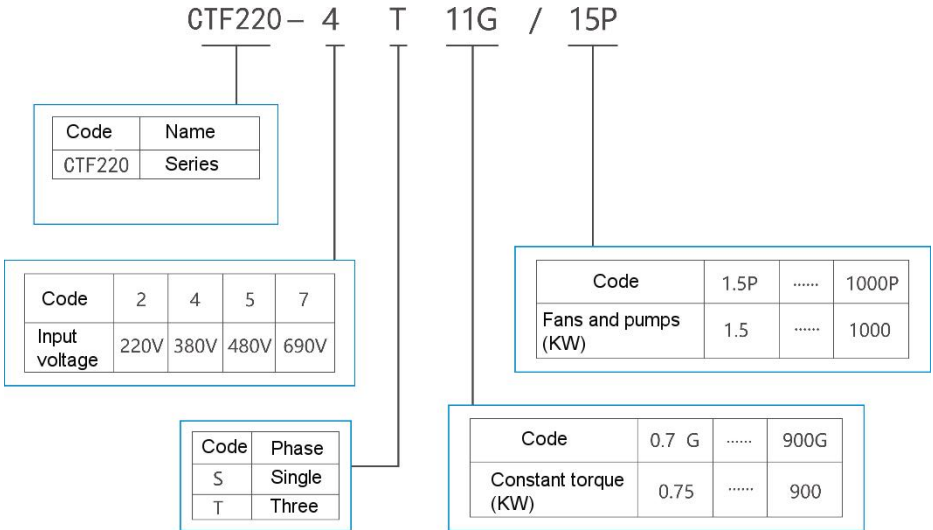
3.2   Nameplate

MODEL :   CTF220 -4T11G/15P

POWER :   11/15KW

INPUT   :   AC3PH 380V~480V

          50/60HZ 26A/35A

OUTPUT: AC3PH 0~480V

          0~3200HZ 25A/32A

3.3   CTF220 Series Frequency Converters

Table 2-1 CTF220 Series Model and Technical Data

Type	Rated Capacity (KVA)	Rated Input Current (A)	Rated Output Current(A)	Adapter Motor(KW)
Single-phase power supply		**200~240V**	**50/60Hz**	
CTF220-2T0.7	1.5	8.2	4	0.75
CTF220-2T1.5	3	14	7	1.5
CTF220-2T2.2	4	23	9.6	2.2
Three-phase power supply		**380~480V**	**50/60Hz**	
CTF220-4T0.7G/1.5P	1.5/3	3.4/5	2.1/3.8	0.75/1.5
CTF220-4T1.5G/2.2P	3/4	5/5.8	3.8/5.1	1.5/2.2
CTF220-4T2.2G/3.0P	4/4.9	5.8/8.0	5.1/6.8	2.2/3.0
CTF220-4T3.0G/4.0P	4.9/5.9	8.0/10.5	6.8/9.0	3.0/4.0
CTF220-4T4.0G/5.5P	5.9/8.9	10.5/14.6	9/13	4.0/5.5
CTF220-4T5.5G/7.5P	8.9/11	14.6/20.5	13/17	5.5/7.5
CTF220-4T7.5G/11P	11/17	20.5/26	17/25	7.5/11
CTF220-4T11G/15P	17/21	26/35	25/32	11/15
CTF220-4T15G/18.5P	21/24	35/38.5	32/37	15/18.5
CTF220-4T18.5G/22P	24/30	38.5/46.5	37/45	18.5/22
CTF220-4T22G/30P	30/40	46.5/62	45/60	22/30
CTF220-4T30G/37P	40/57	62/76	60/75	30/37
CTF220-4T37G/45P	57/69	76/92	75/91	37/45
CTF220-4T45G/55P	69/85	92/113	91/112	45/55
CTF220-4T55G/75P	85/114	113/157	112/150	55/75
CTF220-4T75G/90P	114/134	157/180	150/176	75/90
CTF220-4T90G/110P	134/160	180/214	176/210	90/110
CTF220-4T110G/132P	160/192	214/256	210/253	110/132

3.4 Frequency Converters Appearance and Location Name Descriptions

3.4.1 **Product Profile**
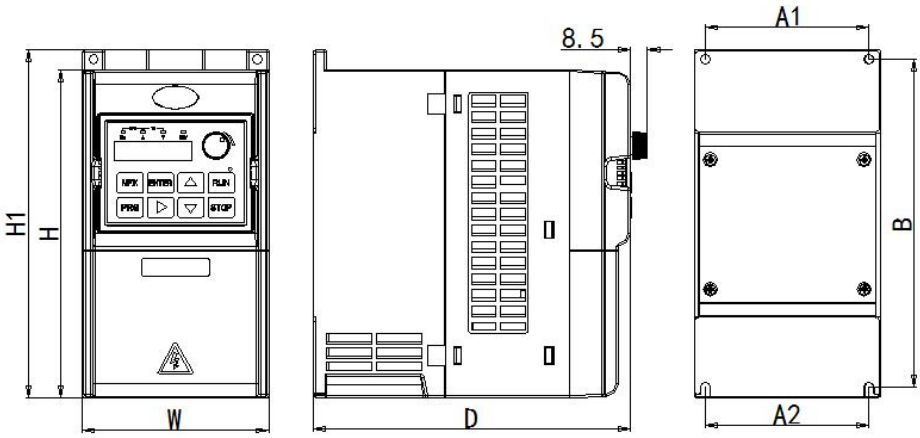
Figure 3-1 0.75kW～22kW Outline Size and Installation Size
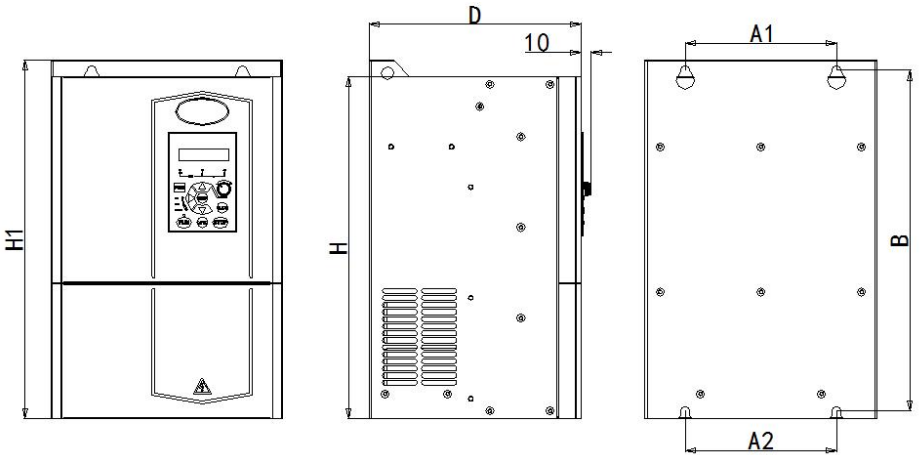
Figure 3-2 30kW～110kW Outline Size and Installation Size

3.4.2   Profile and Installation Hole Size

Profile and Installation Hole Size

Shell code	Model	Installation Hole Position (mm)		Dimension (mm)				Installation Diameter (mm)	Weight (kg)
		A1/A2	B	H	H1	W	D		
Z2	CTF220-2T0.7	81/81	162	162	172	92	152	∅ 4.5	1.4
	CTF220-2T1.5								
	CTF220-2T2.2								
	CTF220-4T0.7G/1.5P								
	CTF220-4T1.5G/2.2P								
	CTF220-4T2.2G/3.0P								
	CTF220-4T3.0G/4.0P								
	CTF220-4T4.0G/5.5P								
Z3	CTF220-4T5.5G/7.5P	98/98	208	207	219	109	172.5	∅ 5.5	2.1
	CTF220-4T7.5G/11P								
Z4	CTF220-4T11G/15P	119/119	250	250	261	130	182	∅ 5.5	3.4
	CTF220-4T15G/18.5P								
Z5N	CTF220-4T18.5G/22P	167/177	282	280	293	190	199	∅ 5.5	5.7
	CTF220-4T22G/30P								5.9
Z6N	CTF220-4T30G/37P	210/200	410	390	426	250	210	∅ 9	13.5
	CTF220-4T37G/45P								
Z7N	CTF220-4T45G/55P	266/266	473	450	492	300	236	∅ 9	18.35
	CTF220-4T55G/75P								18.85
EN	CTF220-4T75G/90P	230/230	536	500	555	320	230	∅ 10	24.8
FN	CTF220-4T90G/110P	320/320	611	568	634	410	240	∅ 12	35.5
	CTF220-4T110G/132P								36.2

3.4.3   External Keyboard Size :

Only Z2, Z3, Z4 ,Z5Nshell standard with CTF-KB 220 keyboard, other shells are standard with CTF-KB 221 native keyboard.

1、CTF-KB220 External Keyboard Size（Opening Size 72*53.5mm）
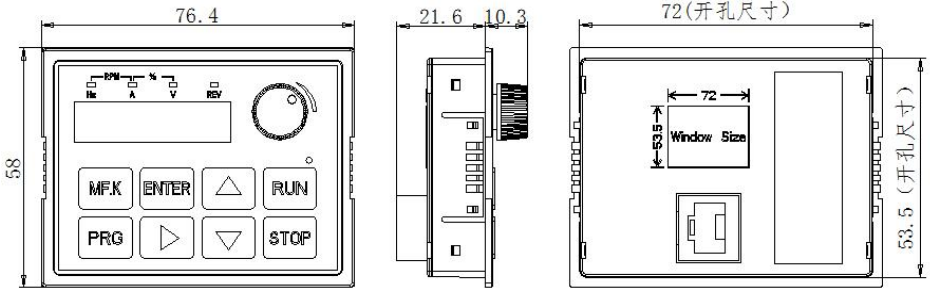
2、CTF-KB220A Keyboard shell Size（Opening Size 80.5*65.5mm）
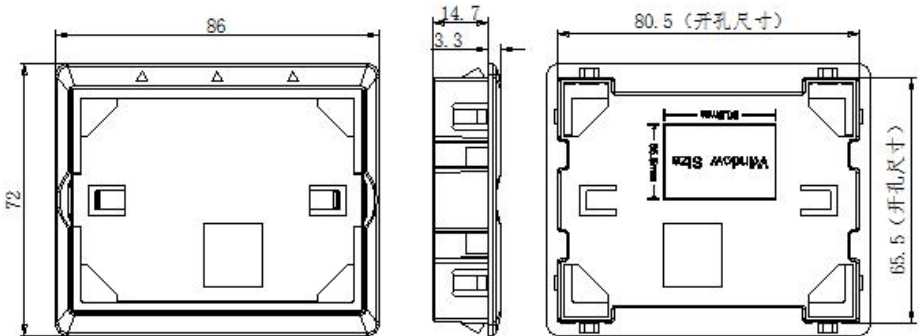
3、CTF-KB221 External Keyboard Size（Opening Size63.5*95.5mm）
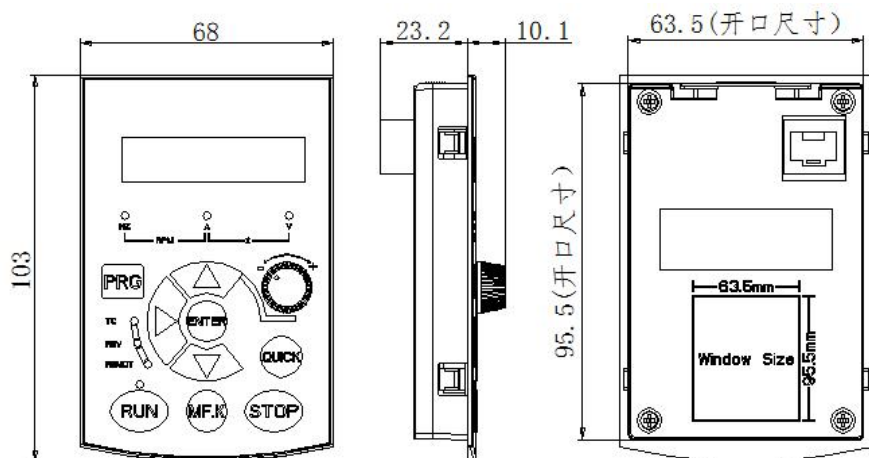
4、CTF-KB221ACTF-KB220A Keyboard shell Size（Opening Size 77.5*123mm）
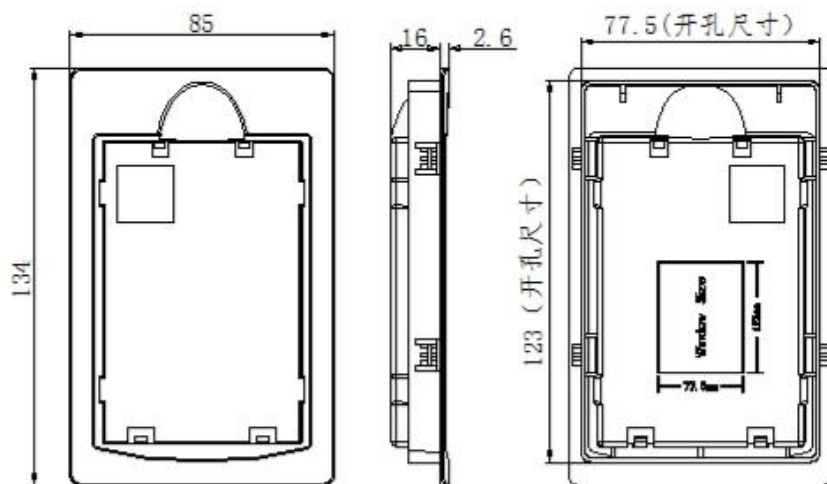
4

CTF220 Installation and Wiring

*Installation and Wiring

4   CTF220 Series Installation and Wiring

4.1   Mechanical Installation

Installation Environment :

1) Ambient temperature : Ambient temperature has a great impact on the life of the converter, and the operating ambient temperature of the converter is not allowed to exceed the allowable

temperature range（-10℃~50℃).

2) Install the frequency converter on the surface of the flame-retardant object, and there should be enough space around it to dissipate heat. Frequency converter is easy to generate

a lot of heat when working. The screw is mounted vertically on the mounting support.

3) Please install it in a place where vibration is not easy. Vibration should not exceed

0.6G. Pay special attention to keeping away from punch press and other equipment.

4) Avoid installing in direct sunlight, places of damp and water drops.

5) Avoid installing corrosive, flammable and explosive gases in the air.

6) Avoid installing in places with greasy, dusty and polymetallic dust. When CTF220 series converters radiate heat from bottom to top, when many converters work, they are usually installed side by side. When the installation of the upper and lower rows is needed, because the heat of the lower row frequency converter will cause the temperature rise of the upper row equipment to cause failure, measures such as installing the heat insulation guide plate

should be taken. When the temperature is greater than 22kW, A should be greater than 50mm.

Power Level	Installation Dimensions	
	B	A
≤15kW	≥100mm	No requirement can be made
18.5kW—30kW	≥200mm	≥50mm
≥37kW	≥300mm	≥50mm
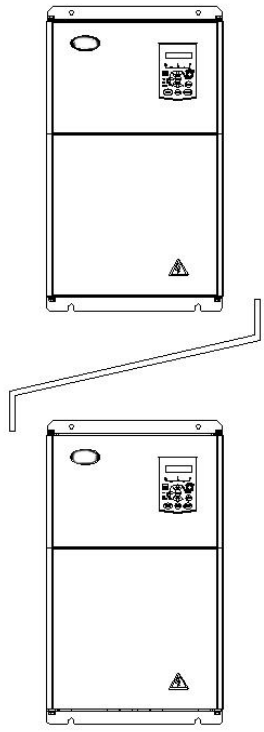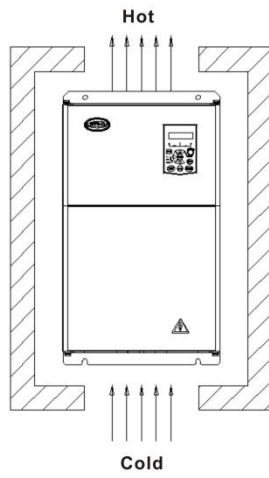
Heat Insulation Guide Plate Installation Diagram

4.2 **Frequency Converter Wiring**

4.2.1 **Typical Wiring Diagram**
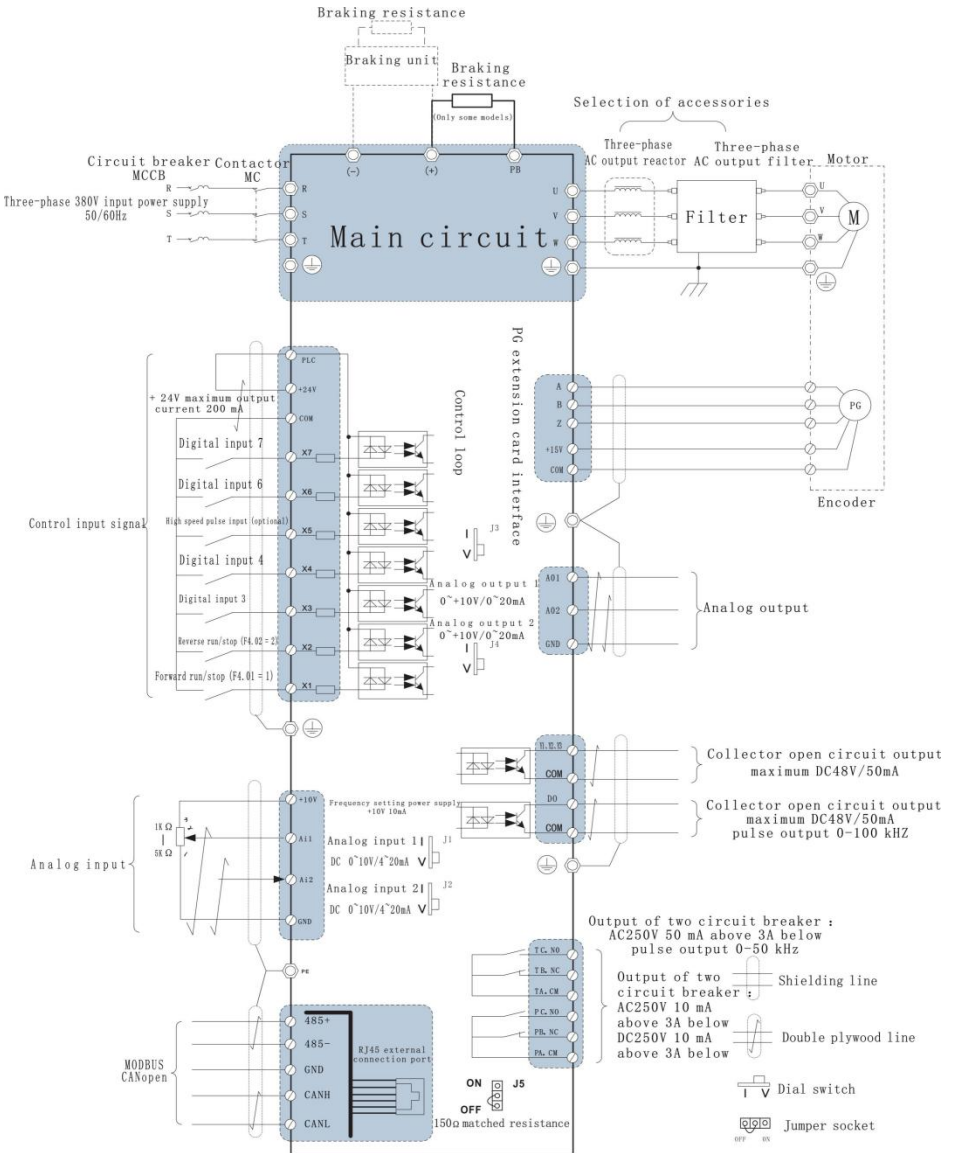
4.2.2　Main Circuit Terminals and Connections

1) Single-phase frequency converter main circuit terminal descriptions :

Terminal Label	Name	Descriptions
L、N 或 R、S	Single-phase power supply	Single-phase 220V AC power supply
（+）、（-）	DC bus positive and negative	Common DC bus input point
PB、(+)	Energy consumption brake	Connect braking resistance
U、V、W	Frequency converter output	Connect three-phase motor
⏚	Grounding terminal	Frequency converter safe grounding

2)Main circuit terminal of three-phase converter descriptions :

Terminal Label	Name	Descriptions
R、S、T	Three-phase power supply input terminal	AC input three-phase power connection point
(+)、（-）	DC bus positive and negative terminal	Common DC bus terminal, 18.5 kw above external braking unit connection
PB、(+)	Energy consumption braking terminal	Connect braking resistance
P、(+)	External reactor connection terminal	External reactor connection point
U、V、W	Converter output terminal	Connect three-phase motor
⏚	Grounding terminal	Converter safe grounding

4.2.3　Control Terminals and Wiring:

1）0.75KW～22KW The terminal layout of the control circuit is as follows :

485+	10V	AI1	X1	X2	X3	X4	COM	TA	TB	TC
485-	AI2	GND	AO1	X6/AO2	X5	24V	PLC	DO	PA	PC

AI1 analog input terminal 1,the control boarddial switch J1 chooses DC 0V-10V/4mA-20mAfactory value as voltage input.

AI2 analog input terminal2,the control boarddial switch J2 chooses DC 0V-10V/4mA-20mA,factory value as voltage input.

A01 analog output1,control board dial switch J3chooses DC 0V-10V/4mA-20mA, output value asvoltage output.

A02 analog output2,the control board dial switchJ4 chooses DC 0v-10v/4mA-20mA output value asvoltage output.

J9 is a switch between AO2 and X6, jumping to the upper end is X6, jumping to the lower end is AO2, the default AO2

30KW and above The terminal layout of the control circuit is as follows :

485+	485-	10V	AI1	GND	X1	X2	X3	X4	X5	COM	DO	TA	TB	TC
GND	AI2	AO1	AO2	COM	X6	X7	24V	PLC	Y1	Y2	Y3	PA	PB	PC

Ai1 analog input terminal 1,the control board dial switch J1 chooses DC 0V-10V/4mA-20mA factory value as voltage input.
AI2 analog input terminal2,the control board dial switch J2 chooses DC 0V-10V/4mA-20mA,factory value as voltage input.
AO1 analog output1,control board dial switch J3 chooses DC 0V-10V/4mA-20mA,output value as voltage output.
AO2 analog output2,the control board dial switch J4 chooses DC 0v-10v/4mA-20mA output value as voltage output.

PG card interface

CAN bus and profibus-DP card interface

Standard RS-485 interface,please use twisted pair or shield wire, J5 is terminal resistance matching jumper,factory value without jumper cap is OFF state.

2） Control Terminal Function Descriptions：

Table 4-1 CTF220 Transducer Control Terminal Function Descriptions

Item	Terminal Label	Terminal Name	Function Descriptions
Power supply	+10V-GND	External connection + 10V power supply	External supply + 10V power supply, maximum output current : 10mA It is generally used as power supply for external potentiometer. The resistance range of potentiometer is 1 kΩ~5 K Ω
	+24V-COM	External connection + 24V Power Supply	External supply+ 24V power supply , generally used as a digital input and output terminal working power supply and external sensor power supply maximum output current : 200 mA.
	PLC	External power input terminal	The default connection with + 24V is that when X1-X7 is driven by external signal, the PLC should be connected with external power supply and disconnected from + 24V power supply terminal.
Analog input	AI1-GND	Analog input terminal 1	1.Input range : DC 0V ～ 10V (F5.00=0)/4mA ～20mA (F5.00=1), which is decided by J1 dialing switch on the control board. J1 dials to the upper end for current and to the lower end for voltage. 2. Input impedance : 22KΩ at voltage input and 250Ω at current input.
	AI2-GND	Analog input terminal 2	1. Input range : DC 0V-10V (F5.06=0)/4mA ～ 20mA (F5.06=1), which is decided by J2 dialing switch on the control board. J2 dials to the upper end for current and to the lower end for voltage. 2. Input impedance : 22KΩ at voltage input and 250Ω at current input.
Digital input	X1-COM	Digital input 1	1. Optical root isolation, compatible with bipolar input 2. Input impedance : 3.3kΩ 3. Voltage range at level input : 9V ～30V
	X2-COM	Digital input 2	
	X3-COM	Digital input 3	
	X4-COM	Digital input 4	
	X5-COM	High speed pulse input terminal	In addition to the characteristics of X1～X4, it can also be used as a high-speed pulse input channel. Maximum input frequency: 100kHz
	X6-COM	Digital input 6	1.Optical root isolation, compatible with bipolar input 2.Input impedance : 3.3kΩ 3.Voltage range at level input : 9V～ 30V
	X7-COM	Digital input 7	
Analog output	AO1-GND	Analog output 1	The J3 dial switch on the control board chooses to determine the voltage or current output. The J3 dials to the upper end for the current and to the lower end for the voltage. Output voltage range : 0V-10V (F5.29=0)

			Output current range : 4mA-20mA (F5.29=1)
	AO2-GND	Analog output 2	The J4 dial switch on the control board chooses to decide the voltage or current output. The J4 dials to the upper end for the current and to the lower end for the voltage. Output voltage range : 0V ～10V (F5.34=0) Output current range : 4mA～ 20mA (F5.34=1)
Digital input	Y1-COM	Digital input 1	Optical lotus root isolation, bipolar open-circuit collector output Output voltage range : 0V ～24V Output current range : 0 mA～ 50 mA
	Y2-COM	Digital input 2	
	Y3-COM	Digital input 3	
	DO-COM	High speed pulse output	Select "constraint" (F5.24) by the output mode; When used as a high-speed pulse output (F5.24=0), the highest frequency is up to 100 kHz; When used as collector open output (F5.24=1), as Y1 specification.
Communica tion serial port	485+	485 differential signal positive end	Standard RS-485 interface, please use twisted pair or shield wire, J5 is terminal resistance matching jumper, factory value without jumper cap is OFF state.
	485-	485 differential signal negative end	
Relay outpu	TA-TB	Normally closed terminals	Contact driving capability: AC250V，3A，COSø=0.4。 DC30V1A
	TA-TC	Normally open terminals	
	PA-PB	Normally closed terminals	
	PA-PC	Normally open terminals	
Auxiliary interface Jumper	J9	PG card interface	24 core terminals, interface with various PG cards
	J10	Keyboard interface	Local keyboard
	J13	External keyboard interface	External keyboard 485 ports
Jumper	J6、J7	COM, GND and geodetic E connection selection jumper	J6 is COM and geodetic E jumper, J7 is GND and geodetic E jumper, factory value jumps to the bottom of ON state.

5

∗ **Operation and Display**

5   Operation and Display

5.1   Operation and Display Interface Introduction

With the operation panel, the function parameters of the converter can be modified, the working state of the converter can be monitored and the operation control of the converter (start and stop) can be carried out. The shape and function area of the converter are shown

in the following figure :
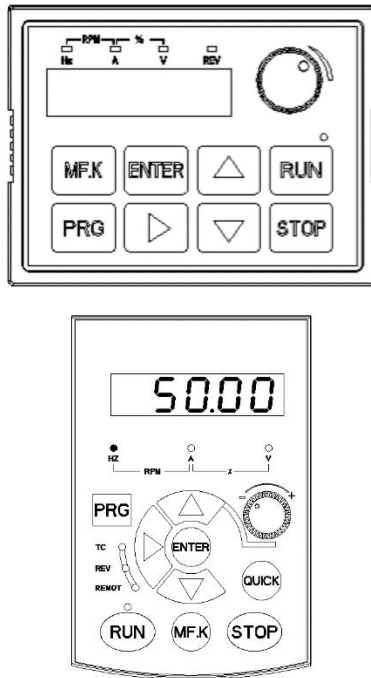
Figure 5-1 Operating Keyboard Layout

1)Functional indicator descriptions :

RUN: When the lamp is off, it means that the frequency converter is down, and when the lamp

is on, it means that the frequency converter is running.

REMOT: Keyboard operation, terminal operation and remote operation (communication control) indicator lamp. The light out indicates the keyboard operation control state, the light on indicates the terminal operation control state, and the light flashing indicates the

remote operation control state.

REV: Reverse and forward indicator light. The light indicates that it is in reverse state.

TUNE/TC: Self-learning indicator for motor parameters, light indicates self-learning status.

2）Unit indicator:

Hz : Frequency unit   A: Current unit   V: Voltage unit

RPM (Hz + A) : Speed unit

(A + V) : Percentage

3）Digital display area :

5-bit LED display, can display the set frequency, output frequency, various monitoring data

and warning code.

4）Keyboard button instruction sheet

Table 5-1 Keyboard Function Table

Key	Name	Name
PRG	Programming/Exit	Entry or exit shortcut parameter deletion
▶	Shift/Monitor	Under the downtime display interface and the running display interface, the display parameters can be selected circularly, and the modification bit of the parameters can be selected when modifying the parameters.
ENTER	Function/Data	Enter menu screen step by step and confirm setting parameters
MF.K	Multi-function selection key	Detailed operation method is described in F0.40 (MF.K key function selection)
RUN	Forward Run	Press this key to turn the frequency converter forward under the mode of operation panel
STOP RESET	Stop/Reset	Pressing this key can be used to stop operation when running, and reset operation when fault alarm occurs. The characteristics of this key are restricted by function code F0.05 (STOP/RES key function).
▲	Increment	Incremental increment of data or function code (increasing incremental speed when pressed continuously)
▼	Decrement	Decreasing of data or function code (increasing deceleration when pressed continuously)
QUICK	Menu mode selection	Shift to different menu modes (default is a menu mode) according to the median value of F0.35 (personality parameter group display selection)

5.2 **Motor parameters self-learning**

To select the operation mode of vector control, the nameplate parameters of the motor must be input accurately before the frequency converter runs, and   T600 frequency converter   matches the standard motor parameters according to the nameplate parameters. The vector control mode is highly dependent on the motor parameters, and in order to obtain good control

performance, the accurate parameters of the controlled motor must be obtained. The

self-learning steps of motor parameters are as follows :

First, the command source (F0.01) is selected as the command channel of the operation panel.

Then please input the following parameters according to the actual parameters of the motor:

F1.02: Motor rated power   F1.03: Motor rated voltage

F1.04: Motor rated current   F1.05: Motor rated frequency

F1.06: Motor rated speed

If the motor can be completely disconnected from the load, then F1.38 please choose 2

(complete self-learning), and then press the RUN key on the keyboard panel, the frequency converter will automatically calculate the following parameters of the motor:

F1.07: Stator resistance

F1.08: Rotor resistance

F1.09: Leakage inductanc

No-load current   : $I_o = I \cdot \sqrt{1-\eta^2}$

Mutual inductance calculation   : $L_m = \dfrac{U}{2\sqrt{3}\, f \cdot I_o} - L\alpha$

Among them, Lo is no-load current and Lm is mutual inductance and leakage inductance.

F1.10 Interaction inductive reactance

F1.11: Motor parameters no-load excitation current completes self-learning.

If the motor can not be completely separated from the load, then F1.38 please select 1 (static self-learning), and then press the RUN key on the panel. Inverter measures three parameters of stator resistance, rotor resistance and leakage inductance in turn. Without measuring mutual inductance and no-load current of motor, users can calculate these two parameters by themselves according to motor nameplate. The nameplate parameters used in calculation are rated voltage U, rated current I, rated frequency twin

and power factor η :

The calculation methods of no-load current and mutual inductance of motor are described in the following formulas, in which L o is leakage inductance of motor.

6

Functional Parameter Table

*Descriptions of Parameters

6　Functional Parameter Table

Descriptions of Parameters

F0.36 is set to non-zero value, that is, parameter protection password is set. In functional parameter mode and user change parameter mode, the parameter menu must enter the password correctly before entering. To cancel the password, F0.36 should be set to "0".

The parameter menu in user customized parameter mode is not protected by password.

Group F and group A are basic function parameters, while group L is monitoring function parameters. The symbols in the function table are as follows :

"☆"：It means that the setting value of the parameter can be changed when the frequency converter is down and running.

"★"：Indicates that the setting value of this parameter cannot be changed when the frequency converter is in operation.

"•"：The value of this parameter is the actual detection record value, which can not be

changed ;

"*"：Indicates that the parameter is "Manufacturer Parameter", which is limited to

manufacturer settings and prohibits users from operating.

6.1　Basic Functional Parameters Summary

6.1.1　Group F0 Basic Function Group

Function Code	Name	Setting Range	Default	Property
F0.00	G/P models setting	1:Model G (constant torque load) 2:Model P (variable torque load e.g.fan, pump)	1	★
F0.01	Command source selection	0: Operating panel control(REMOT LED off) 1: Terminal control (REMOT LED on) 2: Communication control (REMOT blinking)	0	☆
F0.02		0: Digital setting (preset frequency F0.09, UP/DOWN can be modified, non-retentive at power failure) 1: Digital setting (preset frequency F0.09, UP/DOWN can be modified, retentive at power failure) 2:AI1	4	★

Function Code	Name	Setting Range	Default	Property
	Main frequency instruction selection	3:AI2 4:Panel potentiometer 5:PULSE pulse setting (X5) 6: Multi-reference 7: Simple PLC 8:PID 9:Communication given Note : When the function of F4.01-F4.07 is set to 56,57,58, the multi-band frequency has the highest priority when the terminal is valid. See F8.01-F8.07 for the multi-band frequency setting.		
F0.03	Auxiliary frequency instruction selection	Same as F0.03 (main frequency instruction selection)	0	★
F0.04	Frequency instruction overlay mode selection	Unit 's digit : Frequency instruction selection 0: Main frequency instruction 1: Result of main and auxiliary operations (Operation relationship is determined by ten 's digit) 2: Switching between main frequency instruction and auxiliary frequency instruction 3: Switching between main frequency instruction and main and auxiliary operation results 4: Switching between auxiliary frequency instruction and primary and auxiliary operations Ten 's digit : Principal and auxiliary operational relations of frequency instructions 0: Master + auxiliary 1: Main-auxiliary 2: Maximum of both 3: Minimum of both	00	☆
F0.05	Selection of auxiliary Frequency instruction range in overlay	0: Relative to maximum frequency 1: Relative to the main frequency instruction	0	☆
F0.06	Range of auxiliary Frequency instruction in overlay	0%～150%	100%	☆
F0.07	Reserved		--	--
F0.08	Offset frequency of auxiliary frequency source in superposition	0.00Hz ～ maximum frequency (F0.13)	0.00Hz	☆

Function Code	Name	Setting Range	Default	Property
F0.09	Preset frequency	0.00Hz ～ maximum frequency (F0.13)	50.00Hz	☆
F0.10	Digital setting frequency downtime memory selection	0: Not retentive 1: Retentive	1	☆
F0.11	Frequency instruction resolution	1: 0.1Hz (maximum frequency can be adjusted to 320Hz) 2: 0.01 Hz (maximum frequency can be adjusted to 3200 Hz)	2	★
F0.12	Runtime frequency instruction UP/DOWN benchmark	0: Running frequency 1: Setting frequency	0	★
F0.13	Maximum frequency	50.00Hz～320Hz	50.00Hz	★
F0.14	Upper limit frequency	Lower limit frequency F0.17～maximum frequency F0.13	50.00Hz	☆
F0.15	Upper limit frequency instruction	0: F0.14 setting 1:AI1 2:AI2 3: Panel potentiometer 4: Pulse setting 5: Communication given	0	★
F0.16	Upper limit frequency bias	0.00Hz ～ maximum frequency F0.13	0.00Hz	☆
F0.17	Lower limit frequency	0.00Hz ～upper limit frequency F0.14	0.00Hz	☆
F0.18	Setting frequency below lower limit frequency operation mode	0: Operating at the lower frequency limit 1:Stopping 2: Zero speed operation (V/F mode, no output below 0.20Hz)	0	☆
F0.19	Carrier frequency	0.5kHz ～ 16.0kHz	Model dependent	☆
F0.20	Carrier frequency adjustment with temperature	0:No 1:Yes	1	☆
F0.21	Acceleration Time 1	0.00s～650.00s(F0.23=2) 0.0s～6500.0s(F0.23=1) 0s～65000s(F0.23=0)	Model dependent	☆
F0.22	Deceleration Time 1	0.00s～650.00s(F0.23=2) 0.0s～6500.0s(F0.23=1) 0s～65000s(F0.23=0)	Model dependent	☆

Function Code	Name	Setting Range	Default	Property
F0.23	Acceleration and deceleration time unit	0:1 seconds 1:0.1 seconds 2:0.01 seconds	1	★
F0.24	Acceleration and deceleration time Reference frequency	0: Maximum frequency (F0.13) 1: Set frequency 2:100Hz	0	★
F0.25	Acceleration and deceleration mode	0:Linear acceleration and deceleration 1:S Curve acceleration and deceleration A 2:S Curve acceleration and deceleration B	0	★
F0.26	Proportion of S curve starting time	0.0%～（100.0%～ F0.27）	30.0%	★
F0.27	S curve end time ratio	0.0%～（100.0% ～F0.26）	30.0%	★
F0.28	Point motion frequency	0.00Hz ～ maximum frequency	6.00Hz	☆
F0.29	Point acceleration time	0.0s～6500.0s	20.0s	☆
F0.30	Point motion deceleration time	0.0s～6500.0s	20.0s	☆
F0.31	Terminal point priority	0: Invalid 1: Valid	1	☆
F0.32	Running direction	0: Consistent with the set direction 1:Contrary to the set direction	0	☆
F0.33	Anti-inversion control	0: Permit motor inversion 1: No motor inversion	0	☆
F0.34	Selection of functional parameter group display	Unit 's digit :Group L display selection 0: No display 1: Display Ten 's digit : Group A display selection 0: No display 1: Display	01	☆
F0.35	Display selection of personality parameter group	Unit 's digit : User customized parametric group display selection 0: No display 1: Display Ten 's digit : User change parametric group display selection 0: No display 1: Display	00	☆
F0.36	User Password	0～65535	0	☆
F0.37	Function code modification	0: Modifiable 1: Not modifiable (except F0.36 and F0.37 can	0	☆

Function Code	Name	Setting Range	Default	Property
	properties	modify other parameters can not be modified)		
F0.38	Selection of terminal protection for power-on starter	0: No protection. When power on, the converter runs directly when the terminal is closed. 1: Protection. When the power is on, the operation terminal is closed, the frequency converter does not run, and the operation terminal needs to be disconnected and closed before it can run.	0	☆
F0.39	Undervoltage point setting	75.0% ～140.0%	Model dependent	☆
F0.40	Functional selection of MF.K	0:MF.K is invalid 1: Operating panel command channel and remote command channel (end) Subcommand channel or (communication command channel) Switching 2: Forward and reverse switching 3: Positive turning point 4: Reverse point move 5: Reverse operation	3	★
F0.41	STOP/RESET	0: STOP/RES key downtime is effective only in keyboard mode 1: The STOP/RES key downtime function is effective in any mode of operation.	1	☆
F0.42	Sellection of motor parameter set	0: First motor parameter 1: Second motor parameters (group A0)	0	★
F0.49	Application macro instructions	0: Invalid 2000: Constant pressure water supply (no sleep) 2010: Constant pressure water supply (with sleep, if the frequency converter is in　sleep, the LED digital tube will display SLP) 2668: Special for engraving machine	0	★
F0.50	Parameter initialization	0: No operation 01: Restore factory parameters, excluding motor parameters, F0.11 02: Clear record information 03: Restore all factory parameters, including motor parameters 06: Backup user's current parameters 888: Restore user backup parameters	0	★

6.1.2 Group F1 First Motor Parameters

Function Code	Name	Setting Range	Default	Property
F1.00	No.1 motor control mode	0: Sensorless vector control (SVC) 1: Closed- loop vector control (FVC) 2:V/F control	2	★
F1.01	Motor selection	0: Common asynchronous motor 1: Frequency conversion asynchronous motor	0	★
F1.02	Rated power of motor	0.1 kw ～ 1000.0 kw	Model dependent	★
F1.03	Rated voltage of motor	1V ～ 2000V	Model dependent	★
F1.04	Rated current of motor	0.01A ～ 655.35A (converter power=55kw) 0.1 A～ 6553.5A (converter power > 55kw)	Model dependent	★
F1.05	Rated frequency of motor	0.01Hz ～ maximum frequency	Model dependent	★
F1.06	Rated speed of motor	1rpm～65535rpm	Model dependent	★
F1.07	Stator resistance of asynchronous motor	0.001 -65.535 (converter power= 55kw) 0.0001 - 6.555 (converter power > 55kw)	Self-learning parameters	★
F1.08	Rotor resistance of asynchronous motor	0.001 ～ 65.535 (converter power= 55kw) 0.0001～ 6.555 (converter power > 55kw)	Self-learning parameters	★
F1.09	Leakage inductance of asynchronous motor	0.01m ～ H655.35m (converter power= 55kw) 0.001mH～65.535mH(converter power>55kw)	Self-learning parameters	★
F1.10	Mutual inductance reactance of Asynchronous motor	0.1mH ～ 6553.5mH (converter power= 55kw) 0.01mH～655.35 mH (converter power>55kw)	Self-learning parameters	★
F1.11	No-load current of asynchronous motor	0.01A～F1.04 (converter power= 55kw) 0.1A～ F1.04 (converter power > 55kw)	Self-learning parameters	★
F1.28	Line number of encoder	1-65535	2500	★
F1.29	Type of encoder	0:ABZ incremental encoder 1:UVW incremental encoder 2: Revolver 3: Sine-cosine encoder	0	★
F1.31	ABZ incremental encoder AB phase	0: Forward 1: Reverse	0	★

Function Code	Name	Setting Range	Default	Property
	sequence			
F1.38	Self-learning selection of motor parameters	0: No operation 1: Asynchronous static self-learning 2: Complete self-learning of asynchronous machine	0	★

6.1.3 Group F2 First Motor Vector Control Parameters

Function Code	Name	Setting Range	Default	Property
F2.00	Speed loop proportional gain 1	1～100	30	☆
F2.01	Speed loop integral time 1	0.01s～10.00s	0.50s	☆
F2.02	Switching frequency 1	0.00～F2.05	5.00Hz	☆
F2.03	Speed loop proportional gain 2	1～100	20	☆
F2.04	Speed loop integral time 2	0.01s～10.00s	1.00s	☆
F2.05	Switching frequency 2	F2.02～maximum frequency	10.00Hz	☆
F2.06	Vector control slip gain	50%～200%	100%	☆
F2.07	Speed loop filtering time constant	0.000s～0.100s	0.000s	☆
F2.08	Vector control Overexcitation gain	0～200	64	☆
F2.09	Speed control torque upper limit source	0: Function code F2.10 setting 1:AI1 2:AI2 3: Panel potentiometer 4:PULSE pulse setting 5: Communication given 6: MIN (AI1, AI2) 7:MAX (AI1, AI2) full range of 1～7 options corresponds to F2.10	0	☆
F2.10	Digital setting of torque upper	0.0%～200.0%	150.0%	☆

Function Code	Name	Setting Range	Default	Property
	limit in speed control mode			
F2.11	Speed control torque upper limit source（generation electricity）	0: Function code F2.12 setting 1:AI1 2:AI2 3: Panel potentiometer 4:PULSE pulse setting 5: Communication given 6: MIN (AI1, AI2) 7:MAX (AI1, AI2) full range of 1～7 options corresponds to F2.12	2000	☆
F2.12	Digital setting of torque upper limit in speed control mode（generation electricity）	0.0%～200.0%	1300	☆
F2.13	Excitation regulation proportional gain	0～60000	2000	☆
F2.14	Excitation regulation integral gain	0～60000	1300	☆
F2.15	Torque regulation proportional gain	0～60000	0	☆
F2.16	Torque regulation integral gain	0～60000	0	☆
F2.17	Integral property of speed loop	Unit 's digit : integral separation 　0: Invalid　　1: Valid	0	☆
F2.21	Maximum torque coefficient in the weak magnetic region	50%～200%	100%	☆
F2.22	Power generation power limiting enabling	0: Invalid　　1: Valid	0	☆
F2.23	Power cap	0.0～200.0%	Model dependent	☆
F2.24	Selection of torque setting	0: Number Set 1 (F2.26) 1:AI1 2:AI2 3: Panel potentiometer 4:PULSE pulse 5: Communication given 6: MIN (AI1, AI2) 7：MAX (AI1, AI2) (full range of 1～7 options, corresponding to F2.26 digital settings)	0	★

Function Code	Name	Setting Range	Default	Property
F2.26	Torque digital setting in torque control mode	-200.0%～200.0%	150.0%	☆
F2.28	Torque control forward maximum frequency	0.00Hz～maximum frequency	50.00Hz	☆
F2.29	Torque control reverse maximum frequency	0.00Hz～maximum frequency	50.00Hz	☆
F2.30	Torque control acceleration time	0.00s～650.00s	0.00s	☆
F2.31	Torque control deceleration time	0.00s～650.00s	0.00s	☆
F2.32	Selection of speed/torque control mode	0:Speed control 1:Torque control	0	★

6.1.4 Group F3 V/F Control Parameters

Function Code	Name	Setting Range	Default	Property
F3.00	V/F curve setting	0: Linear V/F 1: Multipoint V/F	0	★
F3.01	Torque lifting	0.0% : (automatic torque lifting) 0.1%~ 30.0%	Model dependent	☆
F3.02	Torque lifting cut-off frequency	0.00Hz～maximum frequency	50.00Hz	★
F3.03	Multipoint V/F frequency point 3	Rated frequency of motor (F1.05)	40.00Hz	★
F3.04	Multipoint V/F voltage point 3	0.0%1～00.0%	80.0%	★
F3.05	Multipoint V/F frequency point 2	F3.07～F3.03	25.00Hz	★
F3.06	Multipoint V/F voltage point 2	0.0%～100.0%	50.0%	★
F3.07	Multipoint V/F frequency point 1	0.00Hz～F3.05	10.00Hz	★
F3.08	Multipoint V/F voltage point 1	0.0%～100.0%	20.0%	★
F3.09	V/F slip compensation gain	0.0%～200.0%	0.0%	☆
F3.10	V/F overexcitation gain	0～600	0	☆

Function Code	Name	Setting Range	Default	Property
F3.11	V/F oscillation suppression gain	0～100	Model dependent	☆
F3.18	Over-drain speed action current	50～200%	150%	★
F3.19	Excessive loss speed enabling	0: Invalid 1: Valid	1	★
F3.20	Overloss speed suppression gain	0～100	20	☆
F3.21	The compensation coefficient of overdrain action current	50～200%	50%	★
F3.22	Over-voltage stall action voltage	650.0V～800.0V	770.0V	★
F3.23	Over-voltage stall enabling	0: Invalid 1: Valid	1	★
F3.24	Over-voltage stall suppression frequency gain	0～100	30	☆
F3.25	Over-voltage stall-suppressed voltage gain	0～100	30	☆
F3.26	Over-voltage stall is the largest Increase frequency limit	0～50Hz	5Hz	★

In the process of acceleration, constant speed and deceleration, if the current exceeds the over-loss quick acting current (the factory value is 150%, which means 1.5 times the rated current of the inverter), the over-loss speed will work, and the output frequency will begin to reduce until the current returns to the over-loss speed point below, the frequency will begin to

Up to the target frequency, the actual acceleration time is automatically extended, if the actual acceleration time can not meet the requirements, you can appropriately increase the "F3.18 over-loss quick acting current".

How to improve the VF running performance:

1) How to improve the actual acceleration time under the VF control mode

phenomenon	measure

If the actual acceleration time of the motor is found during the acceleration process, which is far greater than the set acceleration time, the following measures can be taken	The target frequency is less than 2 times the rated frequency. When the actual acceleration time is found in the acceleration process cannot meet the requirements, the F3.18 "excessive loss speed action current" can be increased, adjusted by 10% each time, and the set value exceeds 170%, which is easy to cause "frequency converter overload fault E010"
	If the target frequency is 3 times or 4 times the rated frequency, in the process of rapid acceleration, is likely to appear motor stall phenomenon (inverter output frequency has reached the target frequency, but the motor speed has been in a speed, or acceleration time is too long), now can adjust F3.21 "loss current compensation coefficient" set value of 100%

2）How to shorten the actual deceleration time under VF control

phenomenon	measure
During the deceleration process, if the actual deceleration time of the motor is found to be much greater than the set deceleration time, the following measures can be taken	If no brake resistance or feedback unit is installed, please increase the F3.10 "V/F overexcitation gain" setting value, each adjustment amount is "±20", after increasing the adjustment amount, if the motor shock overvoltage fault is caused, please reduce F3.25 "overvoltage stalling suppression voltage gain".
	If the frequency converter is equipped with brake resistance or feedback brake unit, and the input voltage level of the frequency converter is 360V~420V, adjust the Fb.42 "Energy Consumption Brake start voltage" set value to 690V, and adjust the F3.10 "overexcitation gain" to 0
	Recommended setting value: F6.08 (starting frequency of stopping DC braking) 0.50Hz; F6.10 (shutdown DC braking current) 50%; F6.11 (stop DC braking time) 1s

How to control the output current under VF control mode, and how to prevent overcurrent failure under extreme shock load

phenomenon	measure
In order to better protect the motor and control the upper limit of the motor current, the following measures can be taken to adjust the upper limit of the inverter output current	"Inverter output current upper limit" can be controlled by adjusting F3.18 (over-loss quick acting current), "inverter output current upper limit" = rated current of the inverter x F3.18 (factory value 150%). It is recommended that the minimum output current limit of the inverter should not be less than the rated current of the motor, and the recommended value is 1.5 times the rated current of the motor.
	Rapid acceleration, rapid deceleration, or impact load types may cause "overcurrent fault", please increase the F3.20 (over-loss rate suppression gain) setting value, each adjustment amount of "±10", too much adjustment may cause current oscillation

How to limit the bus voltage under VF control mode to prevent overvoltage failure?

phenomenon	measure
In some constant speed power generation loads (such as typical oilfield pumping units), impact sudden loading, sudden unloading loads (such as typical high-power punches), the operation process is very easy to cause overvoltage failure, in order to avoid causing overvoltage failure, if the factory parameters will still appear overvoltage failure, you can take the following measures	Constant speed intermittent power generation load: Please reduce F3.22 (overvoltage stalling operation voltage) setting value (factory value 770V), without special requirements to limit the bus voltage upper limit, it is recommended to adjust to "720V" or so, if the overvoltage fault still occurs, Please adjust F3.24 (maximum rise frequency limit of overvoltage stall) setting to 10Hz or 20Hz (such as oil field pumping units with long periodic generation time loads)
	When an overvoltage fault occurs on a sudden impact loading and unloading load, lower the F3.22 (overvoltage stalling operating voltage) setting, and adjust it to about 720V
	Large inertia fast deceleration load: If the inverter is equipped with brake resistance, and the input voltage level of the inverter is 360V~420V, please adjust the Fb.42 "Energy consumption brake start voltage" set value to 690V, and adjust the F3.10 "overexcitation gain" to 0. If it is still overvoltage, please lower the F3.22 (overvoltage stalling operating voltage) setting value, it is recommended to adjust to "740V"

6.1.5 Group F4 Digital Input and Output Terminals Function

Function Code	Name	Setting Range	Default	Property
F4.00	Terminal command mode	0: Two-line 1 1: Two-line 2 2: Trilinear 1 3: Three-line 2 4: Electronic cam two-line 3	0	★
F4.01	Functional selection of X1 terminal	0: No function 1: Forward operation (FWD)	1	★
F4.02	Functional selection of X2 terminal	2: Reverse operation (REV) 3: Three-line operation control	2	★
F4.03	Functional selection of X3 terminal	4: FJOG	41	★
F4.04	Functional selection of X4 terminal	5: Reverse point move (RJOG) 6: Terminal UP	9	★
F4.05	Functional selection of X5 terminal	7: Terminal DOWN 8: Coast to stop	56	★
F4.06	Functional selection of X6 terminal	9: Fault reset (RESET) 10: Operation pause	6	★
F4.07	Functional selection of X7 terminal	11: External fault normal open input 12: Multi reference terminal 1	7	★
F4.08	Functional selection	13: Multi reference terminal 2 14: Multi reference terminal 3	0	★

Function Code	Name	Setting Range	Default	Property
	of X8 terminal	15: Multi reference terminal 4		
F4.09	Functional selection of X9 terminal	16:Acceleration/deceleration time selection terminal 1	0	★
F4.10	Functional selection of X10 terminal	17:Acceleration/deceleration time selection terminal 2 18: Frequency instruction switching 19:UP/DOWN setting zero (terminal, keyboard) 20: Run command switching terminal 1 21: Acceleration/deceleration ban 22:PID pause 23:PLC state reset 24: Swing pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reduction 29: Torque control ban 30:PULSE (Pulse) frequency input(only for X5) 31: Reserved 32: Direct current brake immediately 33: Normally closed input for external faults 34: Frequency modification enablement 35:The direction of action of PID is reversed 36: External stop terminal 1 37: Run command switching terminal 2 38:PID integral suspension 39: Primary frequency instruction and preset frequency switching 40: Auxiliary frequency instruction and preset frequency switching 41: Forward turn point move 1, point move priority 42: Reverse point move 1, point move priority 43:PID parameter switching 44: User-defined fault 1 45: User-defined fault 2 46: Speed/torque control switching 47: Emergency stop 48: External stop terminal 2 49: Decelerated DC braking 50:The running time cleared.	0	★

Function Code	Name	Setting Range	Default	Property
		51: Two-line/three-line switching 52: Reserved 53: Multistage closed-loop terminal 1 (corresponding to FA.00-FA.07) 54: Multistage closed-loop terminal 2 (corresponding to FA.00-FA.07) 55: Multistage closed-loop terminal 3 (corresponding to FA.00-FA.07) 56: Multistage frequency terminal 1 (corresponding to F8.01-F8.07) 57: Multistage frequency terminal 2 (corresponding to F8.01-F8.07) 58: Multistage frequency terminal 3 (corresponding to F8.01-F8.07) 60: Motor selection terminal		
F4.11	X filtering time	0.000s～1.000s	0.010s	☆
F4.12	Change rate of terminal UP/DOWN	0.001Hz/s～65.535Hz/s	1.00Hz/s	☆
F4.13	X1 delay Time	0.0s～3600.0s	0.0s	★
F4.14	X2 delay Time	0.0s～3600.0s	0.0s	★
F4.15	X3 delay Time	0.0s～3600.0s	0.0s	★
F4.16	Effective mode selection of X terminal 1	0:High level effective 1: Low level effective Unit 's digit : X1 Ten 's digit : X2 Hundred 's digit : X3 Thousand 's digit : X4 Ten thousand 's digit : X5	00000	★
F4.17	Effective mode selection of X terminal 1	0:High level effective 1: Low level effective Unit 's digit : X6 Ten 's digit : X7 Hundred 's digit : X8 Thousand 's digit : X9 Ten thousand 's digit : X10	00000	★
F4.18	Functional selection of AI1 terminal as X	0～60	0	★
F4.19	Functional	0～60	0	★

Function Code	Name	Setting Range	Default	Proper ty
	selection of AI2 terminal as X			
F4.20	Functional selection of panel potentiometer terminal as X	0～60	0	★
F4.21	Effective mode selection of AI terminal as X.	0:High level effective 1: Low level effective Unit 's digit : AI1 Ten 's digit : AI2 Thousand 's digit : Panel potentiometer	000	★
F4.29	DOR output function selection	0: No output 1: Frequency converter in operation 2: Fault output (fault shutdown)	3	☆
F4.30	Function selection of control board relay (TA-TB-TC)	3: Frequency level detection FDT1 output 4: Frequency arrives 5: Zero speed operation (no output when shutdown)	2	☆
F4.31	Relay output function selection (PA-PB-PC)	6: Motor overload forecasting alarm 7: Frequency converter overload warning 8: Set the numeric arrives 9: Designated numeric arrives	1	☆
F4.32	Y1 output function selection	10:Length arrives 11:PLC cycle completion 12: Accumulated runtime arrives	1	
F4.33	Y2 output function selection	13: Frequency limit 14: Torque limit 15: Ready for operation	1	☆
F4.34	Y3 output function selection	16:AI1>AI2 17: Upper limit frequency arrives 18: Lower limit frequency arrives (operation related) 19: Under-voltage state output 20: Communication setting 21:FDT2 non-standard output 22: Reserved 23: Zero speed operation 2 (output when shutdown) 24:Cumulative power-on time arrives 25:Frequency level detection FDT2 output 26:Frequency 1 arrives at output	1	☆

Function Code	Name	Setting Range	Default	Property
		27:Frequency 2 arrives output 28: Current 1 arrives output 29: Current 2 arrives output 30:Timing arrives output 31:AI1 input overrun 32: Downloading 33: In reverse operation 34:Zero current state 35: Module temperature arrives 36: Output current overrun 37: Lower limit frequency arrives (outage also) 38: Alarm output (continue running) 39: Motor overtemperature forecast warning 40:Runtime arrives 41: Fault output (coast to stop fault, and undervoltage not output)		
F4.35	DOR output delay time	0.0s～3600.0s	0.0s	☆
F4.36	Relay1 (TA/B/C) output delay time	0.0s～3600.0s	0.0s	☆
F4.37	Relay2 (FA/B/C) output delay time	0.0s～3600.0s	0.0s	☆
F4.38	Y1 output delay time	0.0s～3600.0s	0.0s	☆
F4.39	Y2 output delay time	0.0s～3600.0s	0.0s	☆
F4.40	Y3 output delay time	0.0s～3600.0s	0.0s	☆
F4.41	Y output effective state selection 1	0: Positive logic 1: Negative logic Unit 's digit : DOR Ten 's digit : RELAY1 (TA/B/C) Hundred 's digit : RELAY2 (PA/B/C) Thousand 's digit : Y1 Ten thousand 's digit : Y2	00000	☆
F4.42	Y output effective state selection 2	0: Positive logic 1: Negative logic Unit 's digit : Y3	00000	☆
F4.54	Frequency detection value (FDT1)	0.00Hz～maximum frequency	50.00Hz	☆

Function Code	Name	Setting Range	Default	Proper ty
F4.55	Frequency detection delay value (FDT1)	0.0%～100.0%(FDT1 level)	5.0%	☆
F4.56	Frequency detection width	0.0%～ 100.0% (maximum frequency)	0.0%	☆
F4.57	Frequency detection value (FDT 2)	0.00Hz～ maximum frequency	50.00Hz	☆
F4.58	Frequency detection delay value (FDT2)	0.0% ～100.0%(FDT2 level)	0.0%	☆
F4.59	Arbitrary arrival frequency detection value	0.00Hz ～maximum frequency	50.00Hz	☆
F4.60	Arbitrary arrival frequency detection width 1	0.0%～ 100.0% (maximum frequency)	0.0%	☆
F4.61	Arbitrary arrival frequency detection value 2	00.00Hz～ maximum frequency	50.00Hz	☆
F4.62	Arbitrary arrival frequency detection width 2	0.0% ～ 100.0% (maximum frequency)	0.0%	☆
F4.63	Zero current detection level	0.0%～ 300.0% 100.0% corresponds to motor rated current	5.0%	☆
F4.64	Zero current detection delay time	0.01s～ 600.00s	0.10s	☆
F4.65	Output current over-limit	0.0% (not tested) 0.1%～ 300.0%(motor rated current)	200.0%	☆
F4.66	Delay time of over-limit detection of output current	0.00s～ 600.00s	0.00s	☆
F4.67	Arbitrary arrival current 1	0.1%～ 300.0%(motor rated current)	100.0%	☆
F4.68	Arbitrary arrival current width 1	0.1%～ 300.0%(motor rated current)	0.0%	☆
F4.69	Arbitrary arrival current 2	0.1%～ 300.0%(motor rated current)	100.0%	☆

Function Code	Name	Setting Range	Default	Property
F4.70	Arbitrary arrival current width 2	0.0% ～300.0%(motor rated current)	0.0%	☆
F4.71	AI1 lower limit of input voltage protection value	0.00V～ F4.72	3.10V	☆
F4.72	AI1 upper limit of input voltage protection value	F4.71 ～10.00V	6.80V	☆
F4.73	Module temperature arrival	0℃～ 100℃	75℃	☆

6.1.6 Group F5 Input and Output Function Terminal

Function Code	Name	Setting Range	Default	Property
F5.00	AI1 selection of input voltage/current signal	0: 0～ 10V voltage or 0-20mA 1: 4～20mA 1: 4 ～20mA	0	☆
F5.01	AI curve 1 minimum input	0.00V ～F5.03	0.00V	☆
F5.02	AI curve 1 minimum Input corresponding setting	-100.0%～ +100.0%	0.0%	☆
F5.03	AI curve 1 maximum input	F5.01 ～ +10.00V	10.00V	☆
F5.04	AI curve 1 maximum Input corresponding setting	-100.0%～ +100.0%	100.0%	☆
F5.05	AI1 filtering time	0.00s～ 10.00s	0.10s	☆
F5.06	AI2 selection of input voltage/current signal	0: 0～ 10V voltage or 0 ～20mA 1: 4～20mA 1: 4 ～20mA	0	☆
F5.07	AI curve 2 minimum input	0.00V～ F5.09	0.00V	☆
F5.08	AI curve 2 minimum Input corresponding setting	-100.0% ～ +100.0%	0.0%	☆

Function Code	Name	Setting Range	Default	Property
F5.09	AI curve 2 maximum input	F5.07～ +10.00V	10.00V	☆
F5.10	AI curve 2 maximum Input corresponding setting	-100.0%～ +100.0%	100.0%	☆
F5.11	AI2 filtering time	0.00s～ 10.00s	0.10s	☆
F5.12	AI curve 3 minimum input	-10.00V～ F5.14	-9.50V	☆
F5.13	AI curve 3 minimum input corresponding setting	0.0%～ +100.0%	-100.0%	☆
F5.14	Maximum input of panel potentiometer	F5.12～ +10.00V	9.50V	☆
F5.15	Panel potentiometer maximum input corresponding setting	-100.0%～+100.0%	100.0%	☆
F5.16	Panel potentiometer filtering time	0.00s～10.00s	0.10s	☆
F5.17	PULSE minimum input	0.00kHz～F5.19	0.00	☆
F5.18	PULSE minimum input correspondence settings	-100.0%～100.0%	0.0%	☆
F5.19	PULSE maximum input	F5.17～100.00kHz	50.00kHz	☆
F5.20	PULSE maximum input setting	-100.0%～ 100.0%	100.0%	☆
F5.21	PULSE filtering time	0.00s ～ 10.00s	0.10s	☆
F5.22	AI curve selection	Unit 's digit : AI1 curve selection 1: Curve 1 (2 points, see F5.01-F5.04) 2: Curve 2 (2 points, see F5.07-F5.10) 3: Curve 3 (2 points, see F5.12-F5.15) 4: Curve 4 (4 points, see A6.00-A6.07) 5: Curve 5 (4 points, see A6.08-A6.15)	321	☆

Function Code	Name	Setting Range	Default	Property
		Ten 's digit : AI2 curve selection, ibid. Hundred 's digit : Panel potentiometer curve selection, ibid.		
F5.23	AI lower than minimum input setting	Unit 's digit : AI1 lower than minimum input setting selection 0: Corresponding minimum input setting 1:0.0% Ten 's digit : AI2 below the minimum input setting option,ibid. Hundred 's digit : Panel potentiometer below minimum input setting option, ibid.	000	☆
F5.24	DO terminal output mode selection	0: Pulse output (DOP) 1: Switch output (DOR)	1	☆
F5.25	DOP output maximum frequency	0.01kHz～ 100.00kHz	50.00kHz	☆
F5.26	DOP output function selection	0: Operating frequency 1: Setting frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: PULSE input (100.0% corresponds to 100.0kHz) 7:AI1 8:AI2 9: Panel potentiometer	0	☆
F5.27	AO1 output function selection	10:Length 11: Numbering 12: Communication setting	0	☆
F5.28	AO2 output function selection	13: Motor speed 14: Output current (100.0% corresponds to 1000.0 A) 15: Output voltage (100.0% corresponds to 1000.0 V) 16: Reserved	1	☆
F5.29	AO1 selection of output voltage/current signal	0: 0 ～10V or 0～20mA 1: 4 ～20mA	0	☆
F5.30	AO1 zero bias coefficient	-100.0% ～ +100.0%	0.0%	☆

Function Code	Name	Setting Range	Default	Property
F5.31	AO1 gain	-10.00 ～ +10.00	1.00	☆
F5.32	AO2 zero bias coefficient	-100.0% ～ +100.0%	0.0%	☆
F5.33	AO2 gain	-10.00 ～ +10.00	1.00	☆
F5.34	AO2 selection of output voltage/current	0: 0 ～10V OR 0 ～20mA 1: 4 ～20mA	0	☆

6.1.7 **Group F6   Start/stop Control**

Function Code	Name	Setting Range	Default	Property
F6.00	Startup mode	0: Direct start 1: Speed tracking restart 2: Preexcitation startup (AC asynchronous motor)	0	☆
F6.01	Speed tracking mode	0: Start with downtime frequency 1: Start at zero speed 2: Start with the maximum frequency	0	★
F6.02	Speed tracking speed	1～ 100	20	☆
F6.03	Start frequency	0.00Hz～ 10.00Hz	0.00Hz	☆
F6.04	Start frequency holding time	0.0s～ 100.0s	0.0s	★
F6.05	Start DC braking current/preexcitation current	0%～ 100%	0%	★
F6.06	Start DC braking time/preexcitation time	0.0s ～100.0s	0.0s	★
F6.07	Shutdown mode	0: Deceleration to stop 1:Coast to stop	0	☆
F6.08	Shutdown DC braking start frequency	0.00Hz～ maximum frequency	0.00Hz	☆
F6.09	DC brake waiting time	0.0s～ 100.0s	0.0s	☆
F6.10	Shutdown DC braking current	0%～ 100%	0%	☆
F6.11	Shutdown DC braking current	0.0s～ 100.0s	0.0s	☆
F6.12	Braking usage rate	0% ～100%	100%	☆

6.1.8 **Group F7 Keyboard and Display Function**

Function Code	Name	Setting Range	Default	Property
F7.02	LED operation monitoring parameter display selection 1	0000 ～1111 Unit 's digit : L0.00- operating frequency1 (Hz) Ten 's digit : L0.01 - set frequency (Hz) Hundred 's digit : L0.02 - bus voltage Thousand 's digit : L0.03 - output voltage 0:No display 1:Display	0101	☆
F7.03	LED operation monitoring parameter display selection 2	0000-1111 Unit 's digit : L0.04 - output current (A) Ten 's digit : L0.05 - output power (kw) Hundred 's digit : L0.06 - output torque (%) Thousand 's digit : L0.07-X input state 0:No display 1:Display	0001	☆
F7.04	LED operation monitoring parameter display selection 3	0000-1111 Unit 's digit : L0.08-Y output state Ten 's digit : L0.09-AI1 voltage (V) Hundred 's digit : L0.10-AI2 voltage (V) Thousand 's digit : L0.11 - panel potentiometer voltage (V) 0:No display 1:Display	0000	☆
F7.05	LED operation monitoring parameter display selection 4	0000 ～ 1111 Unit 's digit : L0.12 - count value Ten 's digit : L0.13 - length value Hundred 's digit : L0.14 - load speed display Thousand 's digit : L0.15-PID setting 0:No display 1:Display	0100	☆
F7.06	LED operation monitoring parameter display selection 5	0000 ～ 1111 Unit 's digit : L0.16-PID feedback Ten 's digit : L0.17-PLC stage Hundred 's digit : Reserved Thousand 's digit : L0.19- operating frequency 2 (Hz) 0:No display 1:Display	0000	☆
F7.07	LED operation Monitoring Parameter display selection 6	0000 ～ 1111 Unit 's digit : L0.20 - remaining runtime Ten 's digit ::L0.21-AI1precorrection voltage (V)	0000	☆

Function Code	Name	Setting Range	Default	Property
		Hundred 's digit :L0.22-AI2precorrection voltage (V) Thousand 's digit : L0.23-panelp potentiometer precorrection voltage (V) 0:No display 1:Display		
F7.08	LED operation monitoring parameter display selection 7	0000 ～ 1111 Unit 's digit :L0.24 - linear speed Ten 's digit : L0.25 - current power-on time (hour) Hundred 's digit : L0.26 - current runtime (min) Thousand 's digit : Reserved 0:No Display 1:Display	0000	☆
F7.09	LED operation monitoring parameter display selection 8	0000～ 1111 Unit 's digit : L0.28 - communication settings Ten 's digit : Reserved Hundred 's digit : L0.30 - main frequency X display (Hz) Thousand 's digit : L0.31 - auxiliary frequency Y display (Hz) 0: No display 1:Display	0000	☆
F7.12	LED downtime parameter display selection 1	0000 ～1111 Unit 's digit : L0.01 - set frequency (Hz) Ten 's digit : L0.02 - bus voltage (V) Hundred 's digit : L0.07-X input state Thousand 's digit : L0.08-Y output state 0: No display 1:Display	0011	☆
F7.13	LED downtime parameter display selection 2	0000 ～ 1111 Unit 's digit : L0.09-AI1 voltage (V) Ten 's digit : L0.10-AI2 voltage (V) Hundred 's digit : L0.11 - panel potentiometer voltage (V) Thousand 's digit : L0.12 - count value 0:No display 1:Display	0000	☆
F7.14		0000～ 1111	0000	☆

Function Code	Name	Setting Range	Default	Property
	LED downtime Parameter display selection 3	Unit 's digit : L0.13 - length value Ten 's digit : L0.17 - PLC stage Hundred 's digit : L0.14 - load speed Thousand 's digit : L0.15 - PID setting 0: No display 1:Display		
F7.15	LED downtime parameter display selection 4	0000 ～ 1111 Unit 's digit : Reserved Ten 's digit : L0.16 - PID feedback Hundred 's digit : Reserved Thousand 's digit : Reserved 0: No display 1:Display	0000	☆
F7.17	Second digital tube operation display initial monitoring parameters	0～ 62, of which 0 corresponds to L0.00. 62 62 corresponds to L0.62, and so on.	4	☆
F7.18	Second digital tube down displays initial monitoring parameters	0～62, of which 0 corresponds to L0.00. 62 62 corresponds to L0.62, and so on.	2	☆
F7.22	Load speed display coefficient	0.01～ 200.00	100.00%	☆
F7.23	Load speed display decimal points	0:0 decimal digit 1:1 decimal digit 2:2 decimal digit 3:3 decimal digit	0	☆
F7.24	Inverter module radiator temperature	0.0℃～ 100.0℃	-	●
F7.25	Rectifier module radiator temperature	0.0℃～ 100.0℃	-	●
F7.26	Reserved	-	-	●
F7.27	Cumulative running time	0h ～65535 hours	-	●
F7.28	Cumulative power-on time	0h～ 65535 hours	-	●

Function Code	Name	Setting Range	Default	Property
F7.29	Product ID	-	-	●
F7.30	Functional software version number	-	-	●
F7.31	Cumulative power consumption	0～65535 degrees	-	●
F7.32	Output power Correction coefficient	0.00%～200.00%	100.00%	☆

6.1.9 Group F8 Auxiliary Functional Terminal

Function Code	Name	Setting Range	Default	Property
F8.00	Forward and reverse dead zone time	0.0s～3000.0s	0.0s	☆
F8.01	Multistage frequency 1	0.00Hz ～maximum frequency	10.00Hz	☆
F8.02	Multistage frequency 2	0.00Hz～ maximum frequency	15.00Hz	☆
F8.03	Multistage frequency3	0.00Hz～ maximum frequency	20.00Hz	☆
F8.04	Multistage frequency4	0.00Hz ～maximum frequency	25.00Hz	☆
F8.05	Multistage frequency5	0.00Hz～ maximum frequency	30.00Hz	☆
F8.06	Multistage frequency 6	0.00Hz～ maximum frequency	35.00Hz	☆
F8.07	Multistage frequency 7	0.00Hz～ maximum frequency	40.00Hz	☆
F8.16	Acceleration time 2	0.0s～ 6500.0s	机型确定	☆
F8.17	Deceleration time 2	0.0s ～6500.0s	机型确定	☆
F8.18	Acceleration time 3	0.0s～ 6500.0s	机型确定	☆
F8.19	Deceleration time 3	0.0s～ 6500.0s	机型确定	☆
F8.20	Acceleration Time 4	0.0s～ 6500.0s	机型确定	☆
F8.21	Deceleration time 4	0.0s～ 6500.0s	机型确定	☆
F8.23	Jump frequency 2	0.00Hz～ maximum frequency	0.00Hz	☆
F8.24	Jump frequency amplitude	0.00Hz ～maximum frequency	0.01Hz	☆
F8.25	Droop control	0.00Hz ～10.00Hz	0.00Hz	☆

Function Code	Name	Setting Range	Default	Property
F8.26	Cooling fan control	0:Running fan 1: The fan is running all the time.	0	☆
F8.27	Set cumulative power-on arrival time	0h ～65000h	0h	☆
F8.28	Set accumulated running arrival time	0h～ 65000h	0h	☆
F8.29	Acceleration and deceleration process jump frequency valid or not	0: Invalid 1: Valid	0	☆
F8.30	Acceleration time 1 and acceleration time 2 switch frequency points	0.00Hz～ maximum frequency	0.00Hz	☆
F8.31	Deceleration time 1 and deceleration time 2 switch frequency points	0.00Hz～ maximum frequency	0.00Hz	☆
F8.32	Timing function selection	0: Invalid 1: Valid	0	☆
F8.33	Timing runtime selection	0:F8.34 setting 1:AI1 2:AI2 3: Analog input range of panel potentiometer corresponds to F8.34	0	☆
F8.34	Timing running time	0.0 Min ～6500.0 Min	0.0Min	☆
F8.35	Set the arrival time of this run	0.0Min～6500.0Min	0.0Min	☆
F8.36	Command source bundle frequency command	Individual bit: operation panel command binding frequency command selection 0: No binding 1: Number setting frequency 2：AI1 3：AI2 4: The panel potentiometer 5: PULSE Pulse setting (X5) 6: Multi-section speed	0000	☆

Function Code	Name	Setting Range	Default	Property
		7: Simple PLC 8：PID 9: Communication given Ten 's digit : terminal command binding frequency command selection Hundred's digit : communication command binding frequency command selection Thousand's digit : automatically run the binding frequency instruction selection		
F8.38	DPWM Switch upper limit frequency	0.00Hz～320.00Hz	12.00Hz	☆
F8.39	PWM modulation mode	0：Asynchronous modulation 1：synchronous modulation	0	☆
F8.40	Selection of dead zone compensation mode	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
F8.41	Random PWM depth	0: Random PWM is invalid 1~10: PWM carrier frequency random depth	0	☆
F8.42	Fast flow limiting enabling	0: Disable 1: Enable	1	☆
F8.43	Current detection compensation	0～100	5	☆
F8.44	SVC Optimize mode selection	0: Unoptimized 1: Optimization mode 1 2: Optimization mode 2	1	☆
F8.45	Time adjustment of dead zone	100%～200%	150%	☆
F8.46	Overvoltage point setting	200.0-2500.0V	Model dependent	★

6.1.10　Group F9 Closed-loop PID and Constant Pressure Water Supply Special Parameter

Function Code	Name	Setting Range	Default	Property
F9.00		0:F9.01 setting 1:AI1 2:AI2	0	☆

Function Code	Name	Setting Range	Default	Property
	PID given source	3: Panel potentiometer 4:PULSE pulse setting (X5) 5: Communication given 6: Given multistage instructions		
F9.01	PID value given	0.000～F9.04 (Mpa)	0.200	☆
F9.02	Feedback source	0:AI1 1:AI2 2: Panel potentiometer 3:AI1-AI2 4:PULSE pulse setting (X5) 5: Communication given 6:AI1+AI2 7: MAX (| AI1 |, | AI2 |) 8: MIN (| AI1 |, | AI2 |)	0	☆
F9.03	PID action direction	0: Positive effect 1: Reaction	0	☆
F9.04	PID given feedback (distance pressure gauge range for water supply)	0.00 ～655.35 (water supply for Mpa)	1.00	☆
F9.05	Proportional gain KP1	0.0 ～100.0	20.0	☆
F9.06	Integral time Ti1	0.01s ～ 10.00s	2.00s	☆
F9.07	Differential time Td1	0.000s ～ 10.000s	0.000s	☆
F9.08	Reverse cut-off frequency	0.00Hz ～ maximum frequency	0.00Hz	☆
F9.09	PID deviation limit	0.0% ～100.0%	0.0%	☆
F9.10	PID differential limitation	0.00% ～100.00%	0.10%	☆
F9.11	PID given change time	0.00 ～650.00s	0.00s	☆
F9.12	PID feedback filtering time	0.00～ 60.00s	0.00s	☆
F9.13	PID output filtering time	0.00～ 60.00s	0.00s	☆
F9.14	PID downtime given initial value	0: Actual PID setting 1: Equivalent to F9.21, used in conjunction with F9.11	0	☆

Function Code	Name	Setting Range	Default	Property
F9.15	Proportional gain KP2	0.0-100.0	20.0	☆
F9.16	Integral time Ti2	0.01s ～10.00s	2.00s	☆
F9.17	Differential time Td2	0.000s ～10.000s	0.000s	☆
F9.18	PID parameter switching conditions	0: No switching 1: Switching through X-terminal 2: Automatic switching according to deviation	0	☆
F9.19	PID parameter switching deviation 1	0.0% ～ F9.20	20.0%	☆
F9.20	PID parameter switching deviation 2	F9.19 ～ 100.0%	80.0%	☆
F9.21	PID initial value	0.0% ～ 100.0%	0.0%	☆
F9.22	PID initial holding time	0.00 ～ 650.00s	0.00s	☆
F9.23	Twice output deviation positive maximum	0.00% ～ 100.00%	1.00%	☆
F9.24	Two output deviations reverse maximum	0.00% ～ 100.00%	1.00%	☆
F9.25	PID integral attribute	Unit 's digit : Integral separation 0: Invalid 1: Valid Ten 's digit : Whether to stop integral after output to limit value 0: Continue to integrate 1: Stop integral	00	☆
F9.26	PID feedback loss detection value	0.0% : Loss of feedback without judgment 0.1% ～ 100.0%	0.0%	☆
F9.27	PID feedback loss detection value	0.0s ～ 20.0s	0.0s	☆
F9.28	PID shutdown operation	0: Stop without operation 1: Downtime operation	0	☆
F9.36	Recovery coefficient	0.0% ～ 100.0% (relative to the target force percentage) pressure recovery calculated by multiplying F9.36 by F9.0	75.0%	☆
F9.37	Delayed recovery	0.0s ～ 6500.0s	0.0s	☆

Function Code	Name	Setting Range	Default	Property
	time			
F9.38	Sleep frequency	0.00Hz to maximum frequency (Converter belongs to sleep state, LED digital tube will display SLP)	38.00Hz	☆
F9.39	Sleep delay time	0.0s ～ 6500.0s	0.0s	☆
F9.40	Water supply sleep tolerance	0.0% ～ 100.0%, which is the corresponding percentage of the given pressure. See chapter VI, F9.38, F9.39 for details.	20.0%	☆
F9.41	Closed-loop PID monitoring mode function selection of keyboard UP/DOWN	In the closed-loop PID mode, this function is effective. In the non-closed-loop PID mode, this function code is invalid. 0: Keyboard frequency is set to adjust 1:PID digital setting adjustment	1	☆
F9.42	Constant pressure water supply model selection	0:One drag multi-constant-pressure water supply mode is invalid 1: Choose Y1 and Y3 as one-drag-two water supply mode (one-use-one-equipment) 2: Choose Y1, Y2, Y3, DO one drag two-cycle constant pressure water supply mode to be effective (one with one supplement, Y1 controls the first pump frequency conversion, Y2 controls first pump frequency conversion, Y3 controls the second pump frequency conversion, DO controls second pump frequency conversion)	0	★
F9.43	Timing rotation interval	0 ～ 65535 minutes , 0 indicates invalid timing rotation	0	☆
F9.44	Pump addition judgment time	0.0 ～ 6553.5s	5.0s	☆
F9.45	Pump reduction judgment time	0.0 ～ 6553.5s	3.0s	☆
F9.46	Electromagnetic switch delay time	0.1 ～ 10.0s	0.5s	
F9.47	Converter pump input delay time	0.1 ～ 20.0s	1.0s	
F9.49	Low pressure achieves monitoring point	0.0 ～ 100.0%	0.0%	

Function Code	Name	Setting Range	Default	Property
F9.50	Water shortage delay detection	0.1 ~ 999.9s	0.0s	
F9.51	Water shortage detection current	0.0 ~ 100.0% (relative to motor rated current)	0.0%	
F9.52	Water supply card mode Y1 output function	0: Water supply mode is invalid, Y1 can be used as other general frequency converter functions. 1: Water supply mode is effective, one drag two water supply, one uses Y1 as first pump frequency conversion control, and one uses Y1 as first pump frequency conversion control.	0	☆
F9.53	Water supply card mode Y2 output function	0: Water supply mode is invalid, Y2 can be used as other general frequency converter functions. 1: Water supply mode is effective, one drag two water supply, one supplement Y2 as first pump power frequency control.	0	☆
F9.54	Water supply card mode Y3 output function	0: Water supply mode is invalid, Y3 can be used as other general frequency converter functions. 1: Water supply mode is effective, one drag two water supply, one uses Y3 as first pump frequency conversion control, and one uses Y3 as first pump frequency conversion control.	0	☆
F9.55	Water supply card mode DO output function	0: Water supply mode is invalid, DO can be used as other general purpose frequency converter functions. 1: The water supply mode is effective, one drag two water supply, one supplement DO as first pump power frequency control.	0	☆
F9.56	Water shortage protection function	0: Close 1: Open, judge by frequency (F9.58), pressure (outlet pressure), current (actual current of motor). When the output frequency is greater than or equal to F9.58, feedback pressure is less than F9.57, and the percentage of output current is less than F9.59. After meeting the above three conditions, delay F9.62,report E069 (water shortage fault). 2: Open and judge by outlet pressure. When feedback pressure is less than F9.57, delay F9.62 and report E069 (Watershortage fault)	0	☆
F9.57	Water shortage fault detection threshold	0.00 Mpa ~ F9.04 when the feedback pressure is less than this set value, the water shortage judgment is made.	0.05Mpa	☆

Function Code	Name	Setting Range	Default	Property
F9.58	Water shortage protection detection frequency	0.00 ～ upper limit frequency F9.56 = 1 is valid to determine the comparative frequency of water shortage	50.00Hz	☆
F9.59	Water shortage protection percentage of detection current	0.0 ～ 100.0% F9.56 = 1 valid, the percentage of rated current of motor	40.0%	☆
F9.60	Water shortage protection automatic restart delay	0 ～ 9999 minutes	15 minutes	☆
F9.61	Water shortage protection automatic reset number	After the water shortage fault is reported from 0 to 50, after F9.60 time, the frequency converter automatically resets and operates. The reset times are limited by F9.61. When the reset times are reached, the water shortage fault can not be automatically cleared, and the fault should be reset manually according to reset. If F9.61 is set to 9999, the water shortage fault can be reset indefinitely	10	☆
F9.62	Water shortage alarm detection time	0.0 ～ 120.0s	15.0s	☆

6.1.11 Group FA Multi-reference, Simple PLC, Swing Frequency, Fixed Length and Counting

Function Code	Name	Setting Range	Default	Property
FA.00	Reference 0	-100.0%～100.0%	0.0%	☆
FA.01	Reference 1	-100.0%～100.0%	0.0%	☆
FA.02	Reference 2	-100.0%～100.0%	0.0%	☆
FA.03	Reference 3	-100.0%～100.0%	0.0%	☆
FA.04	Reference 4	-100.0%～100.0%	0.0%	☆
FA.05	Reference 5	-100.0%～100.0%	0.0%	☆
FA.06	Reference 6	-100.0%～100.0%	0.0%	☆
FA.07	Reference 7	-100.0%～100.0%	0.0%	☆
FA.08	Reference 8	-100.0%～100.0%	0.0%	☆

Function Code	Name	Setting Range	Default	Property
FA.09	Reference 9	-100.0%～100.0%	0.0%	☆
FA.10	Reference 10	-100.0%～100.0%	0.0%	☆
FA.11	Reference 11	-100.0%～100.0%	0.0%	☆
FA.12	Reference 12	-100.0%～100.0%	0.0%	☆
FA.13	Reference 13	-100.0%～100.0%	0.0%	☆
FA.14	Reference 14	-100.0%～100.0%	0.0%	☆
FA.15	Reference 15	-100.0%～100.0%	0.0%	☆
FA.16	Reference 0 given mode	0: Function code FA.00 given 1:AI1 2:AI2 3: Panel potentiometer 4:PULSE pulse 5:PID 6: Given the preset frequency (F0.09), UP/DOWN can be modified.	0	☆
FA.17	Simple PLC running mode	0: Stop at the end of single operation 1: Keep the final value at the end of a single run 2: Continuous cycle	0	☆
FA.18	Simple PLC power-off memory selection	Unit 's digit : Power-off memory selection 0: No power failure, no memory 1: Power-off memory Ten 's digit : Downtime memory selection 0: No memory of downtime 1: Downtime memory	00	☆
FA.19	Simple PLC section 0 running time	0.0s（h）～ 6553.5s（h）	0.0s（h）	☆
FA.20	Simple PLC selection of acceleration and deceleration time in section 0	0～ 3	0	☆
FA.21	Simple PLC section 1 running time	0.0s（h）～ 6553.5s（h）	0.0s（h）	☆
FA.22	Simple PLC selection of acceleration and deceleration time in section 1	0～3	0	☆
FA.23	Simple PLC	0.0s（h）～6553.5s（h）	0.0s（h）	☆

Function Code	Name	Setting Range	Default	Property
	section 2 running time			
FA.24	Simple PLC selection of acceleration and deceleration time in section 2	0～3	0	☆
FA.25	Simple PLC section 3 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.26	Simple PLC selection of acceleration and deceleration time in section 3	0～3	0	☆
FA.27	Simple PLC section 4 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.28	Simple PLC selection of acceleration and deceleration time in section 4	0～3	0	☆
FA.29	Simple PLC section 5 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.30	Simple PLC selection of acceleration and deceleration time in section 5	0～3	0	☆
FA.31	Simple PLC section 6 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.32	Simple PLC selection of acceleration and deceleration time in section 6	0～3	0	☆
FA.33	Simple PLC section 7 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.34	Simple PLC selection of acceleration and deceleration time in section 7	0～3	0	☆

Function Code	Name	Setting Range	Default	Property
FA.35	Simple PLC section 8 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.36	Simple PLC selection of acceleration and deceleration time in section 8	0～3	0	☆
FA.37	Simple PLC section 9 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.38	Simple PLC selection of acceleration and deceleration time in section 9	0～3	0	☆
FA.39	Simple PLC section 10 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.40	Simple PLC selection of acceleration and deceleration time in section 10	0～3	0	☆
FA.41	Simple PLC section 11 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.42	Simple PLC selection of acceleration and deceleration time in section 11	0～3	0	☆
FA.43	Simple PLC section 12 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.44	Simple PLC selection of acceleration and deceleration time in section 12	0～3	0	☆
FA.45	Simple PLC section 13 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.46	Simple PLC selection of acceleration and deceleration time	0～3	0	☆

Function Code	Name	Setting Range	Default	Property
	in section 13			
FA.47	Simple PLC section 14 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.48	Simple PLC selection of acceleration and deceleration time in section 14	0～3	0	☆
FA.49	Simple PLC section 15 running time	0.0s（h）～6553.5s（h）	0.0s（h）	☆
FA.50	Simple PLC selection of acceleration and deceleration time in section 15	0～3	0	☆
FA.51	Simple PLC running time unit	0：s 1：h	0	☆
FA.52	Swing frequency setting mode	0: Relative to center frequency 1: Relative to maximum frequency	0	☆
FA.53	Swing frequency amplitude	0.0%～100.0%	0.0%	☆
FA.54	Jump frequency amplitude	0.0%～50.0%	0.0%	☆
FA.55	Swing frequency cycle	0.1s～3000.0s	10.0s	☆
FA.56	Swing frequency triangular wave rising time	0.1%～100.0%	50.0%	☆
FA.57	Set length	0m～65535m	1000m	☆
FA.58	Actual length	0m～65535m	0m	☆
FA.59	Pulse number per meter	0.1～6553.5	100.0	☆
FA.60	Setting count value	1～65535	1000	☆
FA.61	Specified count value	1～65535	1000	☆

6.1.12　Group Fb Fault and Protection

Function Code	Name	Setting Range	Default	Property
Fb.00	Motor overload protection selection	0: Prohibition 1: Permission	1	☆
Fb.01	Motor overload protection gain	0.20～10.00	1.00	☆
Fb.02	Motor overload warning coefficient	50%～100%	80%	☆
Fb.03	Overvoltage stall gain	0～100	0	☆
Fb.04	Overvoltage stall protection voltage/energy consumption braking initial voltage	120%～150%	760.0V	☆
Fb.05	Overflow stall gain	0～100	20	☆
Fb.06	Overflow Stall protection current	100%～200%	150%	☆
Fb.07	Power-on short circuit protection to ground selection	0: Invalid　　　1: Valid	1	☆
Fb.08	Fault automatic reset number	0～20	0	☆
Fb.09	During fault automatic reset, Y action selection	0: No action 1:Action	0	☆
Fb.10	Fault automatic reset interval	0.1s～100.0s	1.0s	☆
Fb.11	Input phase shortage and input line fault protection selection	Unit 's digit : Selection of input phase shortage protection Ten 's digit : Selection of input line fault protection 0: Prohibition 1: Permission	11	☆
Fb.12	Selection of output shortage protection	0: Prohibition 1: Permission	1	☆
Fb.13	Fault protection action selection 1	Unit 's digit : Motor overload (11) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running Ten 's digit : Input phase shortage(12)　Hundred 's digit : Output phase shortage (13) Thousand 's digit : External fault (15) Ten thousand 's digit : Abnormal communication (16)	00000	☆
Fb.14		Unit 's digit : Coder/PG card abnormality (20) 0: Coast to stop Ten 's digit : Functional code reading and writing abnormalities (21)	00000	☆

Function Code	Name	Setting Range	Default	Property
	Fault protection action selection 2	0: Coast to stop 1: Shut Down by shutdown mode Hundred 's digit : Reserved Thousand 's digit : Motor overheating (25) Ten thousand 's digit : Reserved		
Fb.15	Fault protection action selection 3	Unit 's digit : User-defined fault 1 (27) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running Ten 's digit : User-defined fault 2 (28) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running Hundred 's digit : Power-on time arrives(29) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running Thousand 's : Download (30) 0: Coast to stop 1: Slow down and stop 2: Slow down to 7% of the rated frequency of the motor and continue to run. Automatically restore to set frequency operation without download Ten thousand 's digit :PID loss feedback at running time (31) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running	00000	☆
Fb.16	Fault protection action selection 4	Unit 's digit : Excessive speed deviation (42) 0: Coast to stop 1: Shut down by shutdown mode 2: Continue running Ten 's digit : Motor overspeed (43) Hundred 's digit : Initial position error(51) Thousand 's : Speed feedback error (52)	00000	☆
Fb.20	Fault continue operation frequency selection	0: Running at current operating frequency 1: Running at set frequency 2: Running at the upper limit frequency 3: Running at the lower frequency limit 4: Running at abnormal reserved frequency	0	☆
Fb.21	Abnormal reserved frequency	0.0% ～ 100.0% (100.0% corresponds to the maximum frequency)	100.0%	☆
Fb.26	Selection of instantaneous power outage action	0: invalid 1: deceleration 2: deceleration stop	0	☆
Fb.27	Transient action pauses Judgment voltage	80.0%～100.0%	90.0%	☆
Fb.28	Instantaneous outage voltage rising as judgment time	0.00s～100.00s	0.50s	☆
Fb.29	Instantaneous power-off as judgment voltage	60.0%～100.0%(standard bus voltage)	80.0%	☆

Function Code	Name	Setting Range	Default	Property
Fb.30	Download protection selection	0: Prohibition 1: Permission	0	☆
Fb.31	Download detection level	0.0～100.0%	10.0%	☆
Fb.32	Download detection time	0.0～60.0s	1.0s	☆
Fb.33	Overspeed detection value	0.0%～50.0% (Maximum frequency)	20.0%	☆
Fb.34	Overspeed detection time	0.0s : No detection 0.0s～60.0s	1.0s	☆
Fb.35	Speed deviation excessive detection value	0.0% ～50.0% (maximum frequency)	20.0%	☆
Fb.36	Speed deviation excessive detection time	0.0s : No detection 0.0s～60.0s	5.0s	☆
Fb.42	Energy consumption brake start voltage	350.0V～999.9V	Model dependent	☆

6.1.13　Group FC Fault Recording Group

Function Code	Name	Setting Range	Default	Property
FC.00	Previous (the latest) fault type	0: No fault 1: Reserved 2: Accelerated overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Accelerated overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Control power supply overvoltage (Constant speed medium overvoltage)	－	●
FC.01	The first and second faults type	9:Undervoltage 10: Converter overload 11: Motor overload 12: Input phase shortage 13: Output phase shortage 14: Module overheating 15: External Fault 16: Communication fault	－	●
FC.02	The first three faults type	17: Abnormal input line 18: Current detection fault 19: Motor self-learning fault 20: Encoder/PG card fault 21: Parametric read-write exception 22: Frequency converter hardware fault 23: Short circuit between motor and ground 24: Reserved 25: Reserved	－	●

Function Code	Name	Setting Range	Default	Property
FC.03	The first four fault type	26: Reserved 27: User-defined fault 1 28: User-defined fault 2 29:Power-on time arrives 30:Download 31: Loss of PID feedback at running time 40: Fast current limiting and overtime	—	●
FC.04	The first five fault type	41: Switching motor at running time 42: Excessive speed deviation 43:Motor Overspeed 45:Motor Overtemperature 51: Initial position error	—	●
FC.05	The first six fault type		—	●
FC.06	Previous (the latest) fault frequency	—	—	●
FC.07	Previous (the latest) fault current	—	—	●
FC.08	Previous (the latest) fault bus voltage	—	—	●
FC.09	Previous (the latest) fault input terminal status	—	—	●
FC.10	Previous (the latest) fault output terminal status	—	—	●
FC.11	Previous (the latest) fault converter status	—	—	●
FC.12	Previous (the latest) fault power-on time	—	—	●
FC.13	Previous (the latest) fault running time	—	—	●
FC.14	Previous (the latest) fault Radiator temperature of converter module	—	—	●
FC.15	Previous (the latest) fault set frequency	—	—	●
FC.16	The first two times fault frequency	—	—	●
FC.17	The first two times fault current	—	—	●
FC.18	The first two times fault bus voltage	—	—	●
FC.19	The first two times fault input terminal	—	—	●

Function Code	Name	Setting Range	Default	Property
	status			
FC.20	The first two times fault output terminal status	—	—	●
FC.21	The first two times fault converter status	—	—	●
FC.22	The first two times fault power-on time	—	—	●
FC.23	The first two times fault running time	—	—	●
FC.24	The first two times fault converter radiator temperature	—	—	●
FC.25	The first two times fault set frequency	—	—	●
FC.26	The first three fault frequency	—	—	●
FC.27	The first three fault current	—	—	●
FC.28	The first three fault bus voltage	—	—	●
FC.29	The first three faults input terminal status	—	—	●
FC.30	The first three fault output terminal status	—	—	●
FC.31	The first three fault converter status	—	—	●
FC.32	The first three fault power-on time	—	—	●
FC.33	The first three fault running time	—	—	●
FC.34	The first three fault converter radiator temperature	—	—	●
FC.35	The first three fault set frequency	—	—	●

6.1.14   Group Fd Communication Parameters

Function Code	Name	Setting Range	Default	Property
Fd.00	Communication baud rate	Unit 's digit：Modbus 0：300bps 1：600bps 2：1200bps 3：2400bps 4：4800bps 5：9600bps 6：19200bps 7：38400bps 8：57600bps 9：115200bps	6005	☆
Fd.01	MODBUS data format	0: No check (8-N-2) 1: Dual check (8-E-1) 2: Odd check (8-O-1) 3: No check (8-N-1) (MODBUS valid)	0	☆
Fd.02	Local address	0: Broadcast address 1～247 (MODBUS valid)	1	☆
Fd.03	MODBUS response delay	0ms～20ms (MODBUS valid)	2	☆
Fd.04	Serial Communication Overtime	0.0 (Invalid), 0.1s～60.0s (MODBUS valid)	0.0	☆
Fd.05	MODBUS, profibus-D communications S data format	Unit 's digit : MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Ten 's digit : Profibus-DP 0:PPO 1 format 1:PPO 2 format 2:PPO 3 format 3:PPO 5 format	31	☆
Fd.06	Communication read current resolution	0：0.01A 1：0.1A	0	☆
Fd.07	Principal and subordinate selection	0: Host 1: Slave	0	☆
Fd.15	Serial communication protocol selection	0:Modbus protocol 1:Profibus-DP bridge 2:CANopen bridge	0	☆

6.2 Summary of Monitoring Parameters

Function Code	Name	Minimum Unit	Communication Address
L0.00	Running frequency (Hz)	0.01Hz	7000H
L0.01	Set frequency (Hz)	0.01Hz	7001H
L0.02	Bus voltage (V)	0.1V	7002H
L0.03	Output voltage (V)	1V	7003H
L0.04	Output current (A)	0.01A	7004H
L0.05	Output power (kW)	0.1kW	7005H
L0.06	Output torque (%)	0.1%	7006H
L0.07	X input status	1	7007H
L0.08	Y output status	1	7008H
L0.09	AI1 voltage (V)	0.01V	7009H
L0.10	AI2 voltage (V)/current (mA)	0.01V/0.01mA	700AH
L0.11	Panel potentiometer voltage (V)	0.01V	700BH
L0.12	Counting value	1	700CH
L0.13	Length value	1	700DH
L0.14	Load speed display	1	700EH
L0.15	PID set	0.01	700FH
L0.16	PID feedback	0.01	7010H
L0.17	PLC stage	1	7011H
L0.18	PULSE input pulse frequency (Hz)	0.01kHz	7012H
L0.19	Feedback speed (unit 0.1Hz)	0.1Hz	7013H
L0.20	Remaining running time	0.1Min	7014H
L0.21	AI1 pre-correction voltage	0.001V	7015H
L0.22	AI2 pre-correction voltage/current (mA)	0.01V/0.01mA	7016H
L0.23	Panel potentiometer pre-correction voltage	0.001V	7017H
L0.24	Linear speed	1m/Min	7018H

Function Code	Name	Minimum Unit	Communication Address
L0.25	Current power-on time	1Min	7019H
L0.26	Current running time	0.1Min	701AH
L0.27	PULSE input pulse frequency	1Hz	701BH
L0.28	Communication set	0.01%	701CH
L0.29	Encoder feedback speed	0.01Hz	701DH
L0.30	Main frequency X display	0.01Hz	701EH
L0.31	Auxiliary frequency Y display	0.01Hz	701FH
L0.32	View arbitrary memory address value	1	7020H
L0.33	Synchronize rotor position	0.1°	7021H
L0.34	Motor temperature value	1℃	7022H
L0.35	Target torque (%)	0.1%	7023H
L0.36	Rotation position	1	7024H
L0.37	Power factor angle	0.1°	7025H
L0.38	ABZ position	1	7026H
L0.39	V/F separation target voltage	1V	7027H
L0.40	V/F separated output voltage	1V	7028H
L0.41	X input state visual display	1	7029H
L0.42	Y input state visual display	1	702AH
L0.43	X functional state visual display 1 (function 01-40)	1	702BH
L0.44	X functional state visual display 2 (function 41-80)	1	702CH
L0.45	Fault information	1	702DH
L0.58	Z signal counter	1	703AH
L0.59	Setting frequency (%)	0.01%	703BH
L0.60	Running frequency (%)	0.01%	703CH
L0.61	Converter status	1	703DH
L0.62	Current fault code	1	703EH
L0.65	Cycle upper limit	0.1%	7041H
L0.74	Actual motor output torque	-100～100%	704AH

7

Maintenance and Troubleshooting

*Routine Repair and Maintenance

7　Routine Repair and Maintenance

Fault Name	Display	Possible Causes	Solutions
Acceleration overcurrent	E002	1. Grounded or short circuit of converter output circuit. 2. The control mode is vector without parameter identification. 3. Acceleration time is too short. 4. Inappropriate manual torque lifting or V/F curve. 5. Low voltage. 6. Start the rotating motor. 7. Sudden load during acceleration. 8. Converter selection is too small.	1. Eliminating peripheral fault. 2. Identification of motor parameters. 3. Increase the acceleration time. 4. Adjusting manual lifting torque or V/F curve. 5. Adjust the voltage to normal range 6. Select speed tracking start or restart after the machine stops. 7. Cancel sudden load. 8. Choosing converter with higher power level.
Deceleration overcurrent	E003	1. Grounded or short circuit of converter output circuit. 2. The control mode is vector without parameter identification. 3. The deceleration time is too short. 4. Low voltage. 5. Sudden load during deceleration. 6. No brake unit and brake resistance.	1. Eliminating peripheral fault. 2. Identification of motor parameters. 3. Increase deceleration time. 4. Adjust voltage to normal range. 5. Cancel sudden load. 6. Installation of brake unit and resistor.
Constant speed overcurrent	E004	1. Grounded or short circuit of converter output circuit. 2. The control mode is vector without parameter identification. 3. Low voltage. 4. Whether there is sudden load in operation. 5. Converter selection is too small.	1. Eliminating peripheral fault. 2. Identification of motor parameters. 3. Adjust the voltage to normal range. 4. Cancel sudden load. 5. Choosing converter with higher power level.
Acceleration overvoltage	E005	1. High input voltage. 2. Existing external force driving motor operation in acceleration process. 3. Acceleration time is too short.	1. Adjust the voltage to normal range. 2. Cancel additional power or install brake resistance. 3. Increase the acceleration

Fault Name	Display	Possible Causes	Solutions
		4. No brake unit and brake resistance.	time. 4. Installing brake unit and resistor.
Deceleration overvoltage	E006	1. High input voltage. 2. Existing external force driving motor operation in deceleration process. 3. Too short deceleration time. 4. Brake unit and brake resistance.	1. Adjust the voltage to normal range. 2. Cancel additional power or install brake resistance. 3. Increase deceleration time. 4. Installing brake unit and resistor.
Constant speed overvoltage	E007	1. High input voltage. 2. Existing external force driving motor run in running process.	1. Adjust the voltage to normal range. 2. Cancel additional power or install brake resistance.
Control source fault	E008	1. The input voltage is not within the range specified in the code.	1. Adjust the voltage to the specification requirements.
Undervoltage fault	E009	1. Instantaneous blackout. 2. Converter input voltage is not within the scope of specifications. 3. Abnormal bus voltage 4. Abnormal rectifier bridge and buffer resistance. 5. Abnormal driving plate. 6. Abnormal control board	1. Reset fault. 2. Adjust voltage to normal range. 3. Seeking technical support.
Converter overload	E010	1. Whether the load is too large or the motor is blocked . 2. Converter selection is too small.	1. Load reduction and inspection of motor and machinery. 2. Choosing a frequency converter with higher power level.
Motor overload	E011	1. Whether the setting of motor protection parameter Fb.01 appropriate or not . 2. Whether the load is too large or the motor is blocked. 3. Converter selection is too small.	1. Setting this parameter correctly. 2. Load reduction and inspection of motor and machinery. 3.Choosing converter with higher power level.
Input phase shortage	E012	1. Abnormal three-phase input power supply. 2. Drive board abnormality. 3. Abnormal lightning protection plate.	1. Check and eliminate problems in peripheral cable. 2. Seeking technical support.

Fault Name	Display	Possible Causes	Solutions
		4. Abnormal main control board	
Output phase shortage	E013	1. The lead from the frequency converter to the motor is abnormal. 2. Three-phase output unbalance of frequency converter during motor operation. 3. Drive board abnormality. 4. Module exception.	1. Eliminating peripheral fault 2. Check whether the three-phase winding of the motor normal or not and troubleshooting. 3. Seeking technical support.
Module overheating	E014	1. Excessive ambient temperature. 2. Air duct blockage. 3. Fan damage. 4. Module thermistor damage. 5.Converter module damage.	1. Reducing ambient temperature. 2. Clean up the air duct. 3. Replacement of fans. 4. Replacement of thermistor. 5. Replacement of converter module.
External equipment fault	E015	1. Input signal of multi-function terminal X external fault. 2. Input signal of virtual IO function external fault.	1. Reset operation.
Communication fault	E016	1. The upper computer is not working properly. 2. Abnormal communication cable 3. Correct setting of communication parameters group Fd .	1. Check PC cable. 2. Check the communication connection. 3. Correct setting of communication parameters.
Input line fault	E017	1. L, N or R, S, T input line problem. 2. Electric shock in power grid.	1. Check the input power line. 2. Put Fb.11 = 00.
Current detection fault	E018	1. Check hall device abnormality. 2. Drive board abnormality.	1. Replacement of hall devices. 2. Replacement of drive plate.
Motor self-learning fault	E019	1. Motor parameters are not set according to nameplate. 2. Time-out of parameter identification process.	1. Setting motor parameters correctly according to nameplate. 2. Check the frequency converter to the motor lead.
Code disk fault	E020	1.Encoder type mismatch. 2. Encoder connection error. 3. Encoder damage. 4. Abnormal PG card.	1. Setting the encoder type correctly according to practice. 2. Troubleshooting of line fault. 3. Replacement of encoder. 4.

Fault Name	Display	Possible Causes	Solutions
			Replacement of PG card.
EEPROM reading and writing fault	E021	1、EEPRO chip damage.	1. Replacement of master control board.
Frequency converter hardware fault	E022	1. Existence of overpressure.	1. Dealing with overvoltage fault.
Grounded short circuit fault	E023	Short circuit of motor to ground.	1. Replacement of cable or motor.
User-defined fault 1	E027	1. Input user-defined fault 1 signal through multi-function terminal X. 2. Input user-defined fault 1 signal through the virtual IO function.	1. Reset operation.
User-defined fault 2	E028	1. Input user-defined fault 2 signal through multi-function terminal X. 2. Input user-defined fault 2 signal through virtual IO function.	1. Reset Operation.
Accumulated power-on time to fault	E029	1. Accumulated power-on time to the setting value.	1. Clearing record information with parameter initialization function.
Download fault	E030	1. The operating current of the converter is less than Fb.31.	1. Verify whether the load is detached or whether the parameters of Fb.31 and Fb.32 meet the actual operating conditions.
Runtime PID feedback loss fault	E031	1. PID feedback is less than F9.26.	1. Check the PID feedback signal or set F9.26 as a suitable value.
Pulse by pulse current limiting fault	E040	1. Whether the load is too large or the motor is blocked. 2. Converter selection is too small.	1. Load reduction and inspection of motor and machinery. 2. Choose a frequency converter with higher power level.
Runtime switching motor fault	E041	1. Change the current motor selection through terminals during the operation of frequency converter.	1. Motor switching operation after frequency converter shutdown.
		1. Incorrect setting of encoder	1. Correct setting of encoder

Fault Name	Display	Possible Causes	Solutions
Excessive speed deviation fault	E042	parameters. 2. No parameter identification. 3. The unreasonable setting of detection parameters with too large speed deviation.	parameters. 2. Identification of motor parameters. 3. Reasonable setting of detection parameters according to actual conditions.
Motor overspeed fault	E043	1. Incorrect setting of encoder parameters. 2. No parameter identification. 3. Unreasonable setting of motor overspeed detection parameters.	1. Correct setting of encoder parameters. 2. Identification of motor parameters. 3. Reasonable setting of detection parameters according to actual conditions.
Motor overtemperature fault	E045	1. Loose wiring of temperature sensor. 2. Motor temperature is too high.	1. Detecting temperature sensor wiring and troubleshooting. 2. Reduce the carrier frequency or take other measures to heat radiation the motor.
Initial position error	E051	1. The deviation between motor parameters and practice is too large.	1. Revalidate the correctness of motor parameters, focusing on whether the rated current is set on a small side.
Constant pressure water supply water shortage fault	E069	1.Water sources shortage.	1. Check up water sources.
In sleeping	SLP	1. Constant pressure water supply sleep state.	1. Normal phenomena, If not, please set sleeping-related parameters.
Password protection	-----	Converter is set with user password.	1. Enter the correct user password or contact the agent.

Among the 60 warning messages, E022 is the signal of hardware over-current or over-voltage. In most cases, hardware over-voltage fault causes E022 alarm.

8

CTF220 communication protocol

*RS485communicat i on

8 CTF220 Serial communication protocol

CTF220 Series frequency converter provides the RS485 communication interface, and adopts the standard MODBUS communication protocol. Users can realize centralized control through PC / PLC (set the inverter operation command, function code parameters, read the working status and fault information of the inverter) to meet the specific use requirements.

1. Content of the agreement

The serial communication protocol defines the information content and usage format transmitted in the serial communication. This includes: host polling (or broadcast) format; host coding method, including: required action function code, transmission data and error check. The response of the slave also adopts the same structure, including: action confirmation, return data and error verification, etc. If the slave has an error while receiving the information, or cannot complete the action required by the host, it will organize a failure information and feed it back to the host in response.

2. apply styles

The inverter is connected to the "single-master and multi-slave" PC / PLC control network with RS485 bus. Multi-machine application: In practical application, the chrysanthemum connection method and the star connection method are generally adopted. RS485 industrial bus standard requires that each equipment should be connected by chrysanthemum chain, and both ends must be connected with 120 Ω terminal resistance, as shown in Figure 8-1. Figure 8-2 shows the simplified wiring diagram. Figure 8-3 is the practical application diagram.
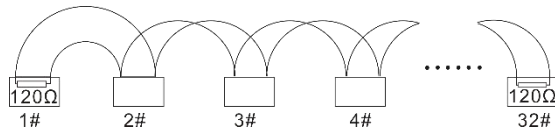

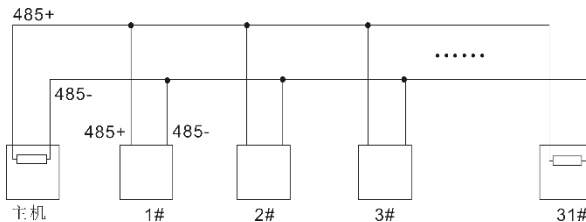Fig. 8-1 Field wiring diagram of chrysanthemum connection method

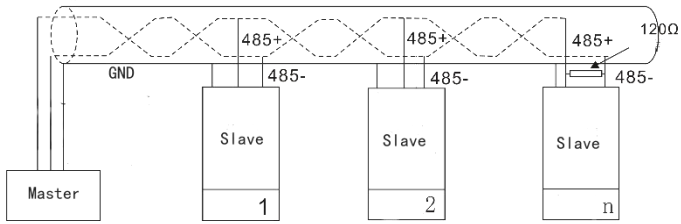Fig. 8-2 Chrysanthemum simplified wiring diagram

Fig. 8-3 Chrysanthemum grafting operation diagram

Figure 8-4 shows the pattern of the star connection. At this time, the terminal resistance (1 # and 15 # equipment) must be connected to the two devices with the longest line distance.
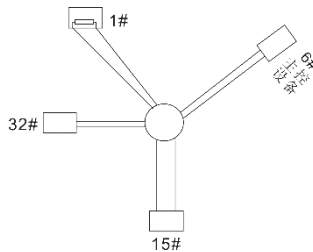

Fig. 8-4 star connection

The shielding line should be used as far as possible. Basic parameters such as baud rate and data bit calibration for all devices on the RS485 line must be consistent, and the address must not be repeated.

3.Bus structure

(1)Interface mode

RS485 hardware interface

(2)transmission mode

Aynchronous serial, semi-duplex transmission mode. At the same time the host and slave can only have one send data and the other can only receive data. In the process of serial asynchronous communication, the data is sent in the form of packets, frame by frame.

(3)topology structure.

Single-host multi-slave system. The setting range of the slave address is 1~247, and 0 is the broadcast communication address. The slave address in the network must be unique.

3. protocol specification

CTF220 Series inverter communication protocol is an asynchronous serial master and slave ModBus communication protocol, and only one device (host) in the network can establish the protocol (called "query / command"). Other devices (slave) can only respond to the host by providing data to the "query / command" of the host, or according to the "Query / command" of the host. Host in here refers to the personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., the slave refers to the CTF220 frequency converter. The host can communicate with a single alone and publish broadcast information to all lower planes. For the individually accessed host "query / command", the slave will return a message (called a response), for the host broadcast information, the slave need no feedback response to the host.

4. Communication data structure

The Modbus protocol communication data format of CTF220 series inverter is as follows:

In RTU mode, message sending starts at a minimum of 3.5 characters. Diversified character times under the network baud rate, which is the easiest to achieve. The first domain to transport is the device address. The transfer character that can be used is the 0...9,A...F in hex. The network device constantly detects the network bus, including during the pause interval. When the first domain (address domain) receives, each device decodes to determine whether it is sent to it. After the last transfer character, a pause of at least 3.5 character time calibrates the end of the message. A new message can start after this pause. The entire message frame must be transferred as a continuous stream. If there is a pause time of more than 1.5 characters before the frame completes, the receiving device will refresh the incomplete message and assume that the next byte is the address domain of a new message. Similarly, if a new message starts in less than 3.5 characters, the receiving device will regard it as a continuation of the previous message. This would lead to an error because the value in the last CRC domain could not be correct.

Table 8-1 RTU frame format:

Frame head START	3.5 Character time
Slave ADR	1~247
CMD	03：Read ；06：Write
DATA（N-1）	Data content: functional code parameter address, number of functional code parameters, functional code parameter value, etc.
DATA（N-2）	
……	
DATA0	
CRCCHK	Detection value：CRC
CRCCHK	
END	3.5 Character time

✧   CMD and DATA

command code：03H，read N（Word）(Up to 12 words can be read)

For example, read the function code parameters F0.08 and F0.09, read the starting address F008H of the inverter with 01, and read two consecutive values

Table 8-2 Host command information

ADR	01H
CMD	03H
Start address high	F0H
Start address low	08H
Register count high	00H
Register count low	02H
CRCCHK low	76H
CRCCHK high	C9H

Table 8-3 The slave station responds to information

ADR	01H
CMD	03H
Byte count	04H
F002H high	13H
F002H low	88H
F003H high	00H
F003H low	00H
CRCCHK low	7EH
CRCCHK high	9DH

Command code: 06H, write one word (Word)

For example, set F0.10 to 300.00Hz, and write 30000 (7530H) to the F 00 AH address of the slave address 06H frequency converter.Table 8-4 Host command information

ADR	08H
CMD	06H
Parameter address high	F0H
Parameter address low	0AH

Parameter value high	75H
Parameter value low	30H
CRCCHK low	BCH
CRCCHK high	D5H

Table 8-4 The slave station responds to information

ADR	08H
CMD	06H
Parameter address high	F0H
Parameter address low	0AH
Parameter value high	75H
Parameter value low	30H
CRCCHK low	BCH
CRCCHK high	D5H

✧   verification mode —CRC(CyclicalRedundancyCheck)

Using the RTU frame format, the message includes an error detection domain based on the CRC method. The CRC domain detects the content of the entire message. The CRC domain is two bytes containing a binary value of 16 bits. It is calculated by the transmission device and then added to the message. The receiving device recalculates the CRC that has received the message and compares the value in the received CRC domain, and if the two CRC values are not equal, the transmission error occurs。

CRC is done by first saving 0xFFFF and then calling a process to process the continuous 8-bit bytes in the message with the value in the current register. Only 8 Bit data in each character is valid for CRC, and both start and stop bits and parity bits are invalid.

During CRC generation, each 8-bit character is different from the register content or (XOR) separately, and the result is moved towards the lowest effective bit, and the highest effective bit is filled with 0. The LSB was extracted for detection, not performed if LSB was 1, register alone and preset values were different, or if LSB was 0. The entire procedure was repeated 8 times. After the last digit (8th digit) is completed, the next 8-bit byte is separately different from the current value of the register. The value in the final register is the CRC value after all bytes in the message.

When CRC is added to the message, low bytes join first, then high bytes. The CRC simple functions are as follows:

unsignedintcrc_chk_value(unsignedcF0r*data_value,unsignedcF0rlength)

{unsignedintcrc_value=0xFFFF;inti;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);}
```

✧　Address definition of the communication parameter

This part is the content of communication, used to control the operation of the frequency converter, the frequency converter status and related parameter setting.

Read and write function code parameters (some function codes cannot be changed, only for manufacturers):

Address marking rules with function code group number and label number:

High bytes: F0~FF (Group F), A0~AF (Group A), 70~7F (Group L)

Low Bytes: 00 to FF

For example, for the range function code F3.12, the access address of the function code is expressed as 0 F30C;

pay attention to:

FF group: can neither read nor change parameters; L group: can read only, do not change parameters.

Some parameters cannot be changed when the frequency converter is in operation; some parameters cannot be changed; change the function code parameters, note the parameter range, units, and relevant instructions.

Function code group number	Communication access address	Communication fies the function code address in RAM
F0～FE group	0×F000～0×FEFF	0×0000～0×0EFF
A0～AC group	0×A000～0×ACFF	0×4000～0×4CFF
L0　group	0×7000～0×70FF	

Note: Since EEPROM is frequently stored, it will reduce the service life of EEPROM, so some function codes are not stored in communication mode, just change the value in RAM.

If it is an F group parameter, to achieve this function, as long as the high F of the function code address into 0.

If it is A group parameter, to achieve this function, as long as the high A of the function code address into 4. The corresponding function code address is indicated as follows:

High bytes: 00~0F (Group P), 40~4F (Group A)

Low Bytes: 00 to FF

for example：

Function code F3.12 is not stored in EEPROM, and the address is 030C;

Function code A0.05 is not stored in EEPROM, and the address is 4005;

This address means that can only write RAM, can not read the action, read, invalid address.

For all the parameters, this function can also be implemented using the command code 07H.

The F1 group: only parameters can be read without changing parameters; some parameters cannot be changed when the inverter is in operation; some parameters cannot be changed regardless of the state of the inverter; change the function code parameters, pay attention to the parameter range, units, and relevant instructions.

Table 8-5   Stop / run parameters section

Parameter address	parametric description	Parameter address	parametric description
1000H	*Communication Setpoint (decimal) -10000～10000	1010H	PID Settings
1001H	running frequency	1011H	PID feedback
1002H	busbar voltage	1012H	PLC step
1003H	output voltage	1013H	PULSE Input pulse frequency，unit 0.01kHz
1004H	output(current)	1014H	Feedback speed，unit 0.1Hz
1005H	output power	1015H	remaining running time
1006H	output torque	1016H	AI1 Corrected the pre-voltage
1007H	running speed	1017H	AI2 Corrected the pre-voltage
1008H	X input flag	1018H	Panel potentiometer Corrected the pre-voltage
1009H	Y Output flag	1019H	linear speed
100AH	AVI voltage	101AH	Current power time
100BH	ACI voltage	101BH	Current run time
100CH	Panel potentiometer voltage	101CH	PULS EInput pulse frequency，unit 1Hz
100DH	Count input	101DH	Communication set value
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	The primary frequency X is shown
-	-	1020H	The auxiliary frequency Y is shown

pay attention to:

The communication set point is the percentage of the relative value, 10000 corresponds to 100.00% and-10000 corresponds to-100.00%. For the data of frequency dimension, the percentage is the percentage of the relative maximum frequency;

for the data of torque dimension, the percentage is F2.10, A0.48 (the torque upper limit number is set, corresponding to the first and second motors respectively).

Example 1: The starting address 1002 of the inverter with 01(Fd.02=001) continuously reads two values (that is, read bus voltage and output voltage).

Table 8-6 Host command information

ADR	01H
CMD	03H
Parameter address high	10H
Parameter address low	02H
Parameter value high	00H
Parameter value low	02H
CRCCHK low	61H
CRCCHK high	0BH

Table 8-7 The slave station responds to information

ADR	01H
CMD	03H
Byte count	04H
F002H high	11H
F002H low	B2H
F003H high	00H
F003H low	00H
CRCCHK low	5FH
CRCCHK high	28H

Example 2: The inverter starting address 1000 with the slave address 01(Fd.02=001) writes a value 10000 (i. e., setting the given frequency of communication as the maximum output frequency).

Table 8-8 Host command information

ADR	01H
CMD	06H
Parameter address high	10H
Parameter address low	00H
Parameter value high	27H
Parameter value low	10H
CRCCHK low	97H
CRCCHK high	36H

Table 8-9 The slave station responds to information

ADR	01H
CMD	06H
Parameter address high	10H
Parameter address low	00H
Parameter value high	27H
Parameter value low	10H
CRCCHK low	97H
CRCCHK high	36H

Table 8-10 Control command input to the frequency converter (write only)

Command word address	Command function
2000	0001：Forward operation
	0002：Reverse operation
	0003：Forward JOG
	0004：Reverse JOG
	0005：Coast to stop
	0006：deceleration stop
	0007：Fault reset

For example: frequency converter with slave address 01 (running command channel is given for communication)

Table 8-11 Host command information

ADR	01H
CMD	06H
Parameter address high	20H
Parameter address low	00H
Parameter value high	00H
Parameter value low	01H
CRCCHK low	43H
CRCCHK high	CAH

Table 8-12 The slave station responds to information

ADR	01H
CMD	06H
Parameter address high	20H
Parameter address low	00H
Parameter value high	00H
Parameter value low	01H
CRCCHK low	43H
CRCCHK high	CAH

Table 8-13Read the frequency converter status (read-only)

status word address	State word function
3000	0001：Forward operation
	0002：Reverse operation
	0003：machine halt

Password address	Enter the contents of the password
F024	****

Parameter lock password check: (if 8888H, the password check passed)

Table 8-14 Digital output terminal control (write only)

command address	Command function
2001H	BIT0：Y1 output
	BIT1：Y2 output

	BIT2：RELAY1 output BIT3：RELAY2 output BIT4：DOR output BIT5：Y3 BIT6：reserve

Table 8-15 Analog output AO1 control (write only)

command address	Lock the password command content
2002H	0～7FFF express 0％～100％

Table 8-16 Analog output AO2 control (write only)

command address	Lock the password command content
2003H	0～7FFF express 0％～100％

Table 8-16 High Speed Pulse (DO) Output Control (write only)

command address	Lock the password command content
2004H	0～7FFF express 0％～100％

Table 8-17 Description of the frequency converter fault

Address of Frequency converter fault	Inverter fault information	
8000H	0000：No fault 0001：Reserved 0002：Accelerated overcurrent 0003：Deceleration overcurrent 0004：Constant speed overcurrent 0005：Accelerated overvoltage 0006：Deceleration overvoltage 0007：Constant speed overvoltage 0008：Buffer resistance overload fault 0009：Undervoltage 000A：Converter overload 000B：Motor overload 000C：Input phase shortage 000D：Output phase shortage 000E：Module overheating 000F：External Fault	0015：Parametric read-write exception 0016：Frequency converter hardware fault 0017：Short circuit between motor and ground 0018：Reserved 0019：Reserved 001A：Reserved 001B：User-defined fault 1 001C：User-defined fault 2 001D：Power-on time arrives 001E：Download 001F：Loss of PID feedback at running time 0028：Fast current limiting and overtime 0029：Switching motor at running time 002A：Excessive speed deviation 002B：Motor superspeed 002D：Motor overtemperature

0010： Communication fault	005A：Encoder line number set error
0011：Abnormal input line	005B：Unconnected encoder
0012：Current detection fault	005C：Initial location error
0013：Motor self-learning fault	005E：Speed feedback error
0014：Encoder/PG card fault	

Table 8-18 Communication fault information description data (fault code)

Communication fault address	Fault function description
8001	0000：No fault 0001：wrong password 0002：Command code error 0003：CRC check error 0004：invalid address 0005：Invalid parameters 0006：The parameter change is invalid 0007：The system is locked

Table 8-19 Description of the Fd group communication parameters

	Default	6005	
Fd.00 baud rate	Set range	the unit ：MODUBS baud rate	
		0：300BPS	5：9600BPS
		1：600BPS	6：19200BPS
		2：1200BPS	7：38400BPS
		3：2400BPS	8：57600BPS
		4：4800BPS	9：115200BPS

This parameter is used to set the data transmission rate between the upper computer computer and the frequency converter. Note that the baud rate set by the upper computer and the inverter must be consistent, otherwise, the communication cannot be carried out. The larger the port rate, the faster the communication speed.

	Default	0
Fd.01 data format	Set range	0：No check：data format <8，N，2> 1：even check ：data format<8，E，1> 2：odd check：data format<8，O，1> 3：No check：data format<8-N-1>

The data format set by the upper computer and the inverter must be consistent, otherwise, the communication cannot be carried out.

	Default	1
Fd.02 local address	Set range	1～247，0 is broadcast address

When the local address is set to 0, it is the broadcast address, realizing the broadcasting function of the upper computer.

The local address is unique (except the broadcast address), which is the basis of realizing the point-to-point communication between the upper computer and the frequency converter.

Fd.03	Default	2ms
Response delay	Set range	0～20ms

Response delay: refers to the intermediate interval between the end of the inverter data acceptance and the data sent by the upward computer. If the response delay is less than the system processing time, the response delay shall be subject to the system processing time; if the response delay is longer than the system processing time, the system processing After the data, to delay the wait, until the answer delay time, to send the data to the upper machine.

Fd.04	Default	0.0s
Communication timeout time	Set range	0.0s（invalid）；0.1～60.0s

The communication timeout time parameter is invalid when the function code is set to 0.0s.

When the function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication time-out time, the system will report the communication fault error (E016). Usually, it is set to be invalid. If in a continuous communication system, you set the secondary parameters, you can monitor the communication status.

Fd.05	Default	1
Communication protocol selection	Set range	0：Non-standard Modbus protocol； 1：The standard Modbus protocol

Fd.05=1：Select the standard Modbus protocol.。

Fd.05=0：When reading the command, the slave return bytes is one byte more than the standard Modbus protocol, please see the "5 Communication Data Structure" section of this protocol.

Fd.06	Default	0
Communication to read the current resolution	Set range	0：0.01A；1：0.1A

Used to determine the output unit of the current value when the communication reads the output current.

9

Warranty

*Guarantee clauses and maintenance list

9 Warranty

Guarantee clauses and maintenance list

For consumers being assured and satisfied to use the products, we will strictly in accordance with the relevant laws and regulations issued by country to make reasonable after-sales service system.

9.1 Warranty Period

COTRUST provides warranty service in certain time (calculated from the date of first delivery) for products, please use as followed by regulations. Any non-human fault during the warranty period is free to be maintained.

Equipment damaged due to one of the following reasons during the warranty period, it will be charged for maintenance

1) Failure and damage caused by human factors and abnormal working environment, or not using according to the user manual provided by our company;

2) Users disassemble, repair or modify products without the consent of COTRUST.

3) Failure or damage due to falling or poor transportation after purchasing the product.

4) Failure or damage due to natural causes (such as flood, lightning, earthquake, abnormal voltage, other secondary disasters)

5) Failure or damage due to external device.

6) Abrasion or fracture by normally use.

7) No valid shopping credentials or the fuselage serial number was damaged

9.2 Warranty Information

◆ In case of product failure or damage, please fill in the " maintenance list" correctly and send it to us (see the mailing address on the next page).

◆ The charge of maintenance fee is subject to the price list of COTRUST.

◆ If your problem is not properly solved, please call or email our customer service department (see the contact information on the back cover), we will help you solve the problem in the shortest time.

◆ COTRUST reserves the right to interpret these clauses.

9.3 Maintenance List

Company that sends product to repair:

Company address:

Name: _____Tel: _____Fax: _____

No.	Type	Serial No.	Fault	Note
1				Repair (√) Detect ( ) Upgrade ( )
2				Repair (√) Detect ( ) Upgrade ( )
3				Repair (√) Detect ( ) Upgrade ( )
4				Repair (√) Detect ( ) Upgrade ( )
5				Repair (√) Detect ( ) Upgrade ( )
6				Repair (√) Detect ( ) Upgrade ( )
7				Repair (√) Detect ( ) Upgrade ( )
8				Repair (√) Detect ( ) Upgrade ( )
9				Repair (√) Detect ( ) Upgrade ( )
10				Repair (√) Detect ( ) Upgrade ( )
11				Repair (√) Detect ( ) Upgrade ( )
12				Repair (√) Detect ( ) Upgrade ( )
13				Repair (√) Detect ( ) Upgrade ( )
14				Repair (√) Detect ( ) Upgrade ( )
15				Repair (√) Detect ( ) Upgrade ( )

Agent seal:

(Seal to be valid)

✉ Delivery info
Address: 268 New road, Yangyong village, Dalang town, Dongguan, CHINA
Addressee: Maintenance department
Tel: 0796-82220668
Postcode: 523770

Service Hotline

+86 400-700-4858

Address: 9/F, block a, building 6, international innovation Valley, Nanshan District, Shenzhen

Tel: 0755-86226822

Fax:0755-86226922

E-mail: sales@co-trust.com
Website: http://www.co-trust.com

Version:V2.02
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