K-DRIVE

Feedback Unit

CL100 Series

User Manual

CE ISO 9001 CA

Preface

Thank you for purchasing the CL100 series energy return stand alone developed by our company.

The CL100 energy feedback unit adopts advanced control algorithms, which have the characteristics of high efficiency, high power factor, and low harmonic interference. Applied in situations where electric energy regeneration and high requirements for harmonic and energy conservation and emission reduction are required during variable frequency speed regulation. The feedback unit ensures effective bra-king of variable frequency speed regulation while returning more than 97% of renewable energy to the power grid, achieving the goal of energy conservation and emission reduction..

We provide information of model selection, installation, parameter setting, field debugging, fault diagnosis and daily maintenance for users in this manual.

First-time Use

For the users who use this product for the first time, read the manual carefully. If in doubt concerning some functions or performances, contact the technical support personnel of Our company to ensure correct use.

ATTENTIONS
➤ Please power off when wiring.
➤ Electronic components inside AC drive are especially sensitive to static electricity, do not put anything into internal of AC drive.And do not touch main circuit board.
➤ After power cut, if indicator is still lamp, it still have high voltage in AC drive. It is very dangerous, please do not touch internal circuit and components.
➤ Please ensure the grounding terminals of AC drive is grounded correctly.
➤ Never connect input power supply with output terminal U,V,W of AC drive.

Contents

Chapter **1**

Safety and Attentions

Please read this chapter carefully when installing, debugging, and repairing this system, and be sure to follow the safety precautions required in this chapter. Any injury or loss caused by violation of regulations is not related to our company.

Safety signs in this manual	
⚡ **DANGER**	Dangers caused by operations beyond requirements may lead to serious injury,and even death.
⚠ **CAUTION**	angers caused by operations beyond requirements may lead to moderate damages or minor injuries, as well equ-ipment damages.

1.1 Installation and wiring precautions

⚡ **DANGER**
Wiring operations must be carried out by qualified professionals, otherwise there is a risk of electric shock.
When installing and wiring, the feedback device and other devices connected to it, such as the frequency converter, must be powered off, and wait for 5-10 minutes to confirm that the stored electricity on the internal capacitors of each related device has been discharged before proceeding with the operation to ensure safety.
The grounding terminal of the feedback device must be reliably grounded, otherwise there is a risk of electric shock.

⚠ **CAUTION**
The positive and negative terminals of the DC bus of the feedback device cannot be reversed, otherwise it will not work or even cause damage to the feedback device itself and related equipment, and there is a risk of fire.
The feedback device should be installed in a well ventilated environment, otherwise it may cause the equipment to malfunction or even be damaged.

1.2 Precautions for use

⚡ DANGER
After being powered on, various components inside the feedback device carry dangerous high voltage, which can be extremely dangerous and even life-threatening if directly touched by the human body.
⚠ CAUTION
Avoid dropping metal items such as screws and washers into the feedback device, as there is a risk of equipment damage. During use, ensure that the chassis cover is properly closed.

1.3 Other

⚡ DANGER
Machine scrapping should be treated as industrial waste and incineration is strictly prohibited, otherwise there may be a risk of explosion.

Product Brief Introduction

2.1 Position and content of nameplate

MODEL: CL100-4T-90KW
SOURCE: PH AC380V 50/60HZ
OUTPUT: 93KW 176A 0-600HZ

BDDG3DFDG1241245

2.2 Nameplate model description and rated parameters

$$\underline{\text{CL100}} - \underline{\text{A}} - \underline{\text{4T}} - \underline{\text{55KW}}$$
$$\quad ① \qquad ② \quad ③ \qquad ④$$

Serial number	Description	Meaning
①	CL100 series	Feedback Unit
②	Version	First generation vacant, upgraded to A, B, C
③	Voltage level	3S: Single-phase 220V 4T: Three-phase 380V 7T: Three-phase 690V
④	Adaptable motor power(KW)	11KW~315KW

2.3 Specifications and models

2.3.1 CL100 Energy Feedback Single Machine Series

Model (50% DTC)	50% DTC rated current (A)	Peak current (A)	Adaptive asynchronous motor (kW)	Adapted synchronous motor (kW)
CL100-4T-11KW	20A	27A	11kW	7.5kW
CL100-4T-22KW	28A	37A	22kW	11kW
CL100-4T-30KW	34A	45A	30kW	22kW
CL100-4T-37KW	42A	54A	37kW	30kW
CL100-4T-45KW	57A	74A	45kW	37kW
CL100-4T-55KW	70A	91A	55kW	45kW
CL100-4T-75KW	85A	111A	75kW	55kW
CL100-4T-90KW	104A	136A	90kW	75kW
CL100-4T-110KW	137A	185A	110kW	90kW
CL100-4T-132KW	165A	223A	132kW	110kW
CL100-4T-160KW	209A	273A	160kW	132kW
CL100-4T-185KW	221A	326A	185kW	160kW
CL100-4T-220KW	250A	417A	220kW	185kW
CL100-4T-250KW	284A	475A	250kW	220kW
CL100-4T-280KW	319A	531A	280kW	250kW
CL100-4T-315KW	358A	600A	315kW	280kW

Chapter 2

Product selection instructions:

➢ Light load type: braking torque of 110%, braking time of 1/4 working system (within 1 minute cycle, continuous operation for 15 seconds, stop for 45 seconds, feedback current is rated current), feedback unit selection power is reduced by one gear on the basis of motor power. Suitable for: kowtow machine, pumping machine, packaging machine, centrifuge, lathe, textile machine, gantry planer, printing machine, spindle, sugar mill honey separator, industrial dewatering machine, rewinder, paper machine.

> Standard type: braking torque of 150%, braking time of 1/2 working system (within 1 minute cycle, continuous operation for 30 seconds, stop for 30 seconds, feedback current is rated current), and the selected power of the feedback unit is equal to the motor power. Suitable for: cranes, hoists, elevators, tower cranes, winches, cable cars, port gantry cranes, coal mining machines, down conveyor belts, winches, steel mills, coilers, uncoilers, cranes, uncoilers and coilers, wire drawing machines, wire drawing machines, monkey carts, stackers, unloaders, ship locks, etc.

> Continuous type: braking torque of 220%, continuous working system, suitable for continuous and uninterrupted feedback situations, commonly used for dynamometer and generator grid connected feedback. The selection of feedback unit power increases by two levels on the basis of motor power.

The above selection should be applied to asynchronous motors. When applied to synchronous motors, the power selection of the feedback unit needs to be further amplified by one level.

### 2.3.2 CL100A AFE front-end rectifier unit series

Model (50% DTC)	Rated current (A)	Adaptive asynchronous motor (kW)	Adapted synchronous motor (kW)
CL100-4T-22KW	34A	22kW	11kW
CL100-4T-30KW	46A	30kW	22kW
CL100-4T-37KW	56A	37kW	30kW
CL100-4T-45KW	68A	45kW	37kW
CL100-4T-55KW	84A	55kW	45kW
CL100-4T-75KW	114A	75kW	55kW

2.4 Technical Features

| Project		Content
Source	Grid voltage	Three phase -380V
	Grid frequency	45Hz 65Hz
Control	Current control mode	Direct current control method
	Working mode	Rectification feedback/feedback
	Feedback starting voltage	620V
	Fan control	Parameter selection
	Overheat protection	90 ℃
Display	Status indication	Power indication, fault indication, feedback status indication, etc
Environment	Installation site	Indoor, altitude not exceeding 1000m, no direct sunlight, no conductive dust or corrosive gases
	ambient temperature	-10~40 ℃, well ventilated
	Environmental humidity	Below 90% RH (without condensation)
	Vibration degree	Below 0.5g

Chapter 2

2.5 Appearance and installation dimensions

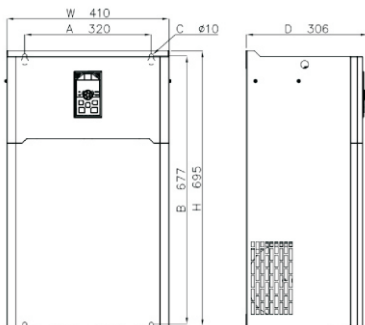### 2.5.1 CL100 series exterior and installation hole size

11KW-45KW

55KW-75KW
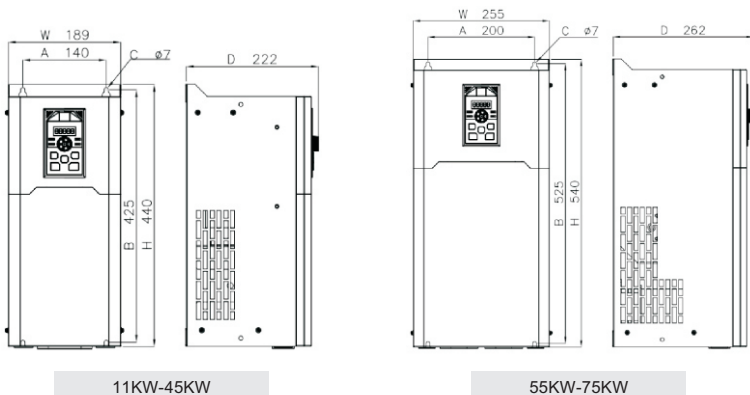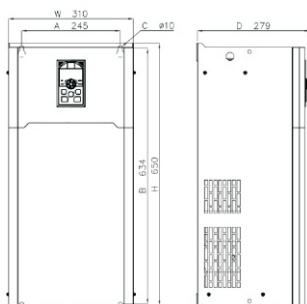
90KW-110KW
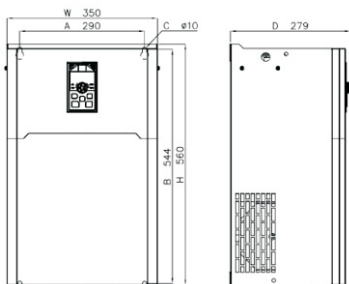
132KW-185KW

220KW-315KW

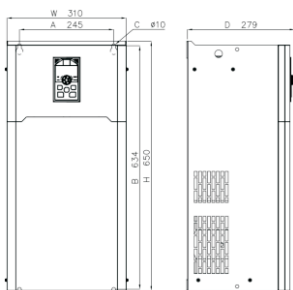| AC Drive Model	Installation size (mm)		Dimensions (mm)			Aperture	Reactor
	A	B	H	W	D	d	
CL100-4T-11KW	140	425	440	189	222	Φ7	Built-in
CL100-4T-22KW							
CL100-4T-30KW							
CL100-4T-37KW							
CL100-4T-45KW	200	525	540	255	262	Φ7	Built-in
CL100-4T-55KW							
CL100-4T-75KW							
CL100-4T90KW	245	634	650	310	279	Φ10	Built-in
CL100-4T-110KW							
CL100-4T-132KW	290	544	560	350	279	Φ10	External L1
CL100-4T-160KW							
CL100-4T-185KW							
CL100-4T-220KW	320	677	695	410	306	Φ10	External L1
CL100-4T-250KW							
CL100-4T-280KW							External L2
CL100-4T-315KW							

Chapter 2

2.5.2 CL100A series exterior and installation hole size
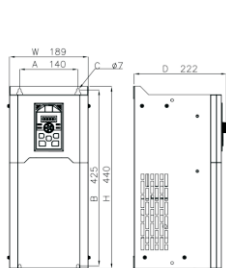
22KW-30KW
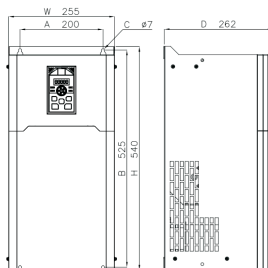
37KW-45KW

55KW
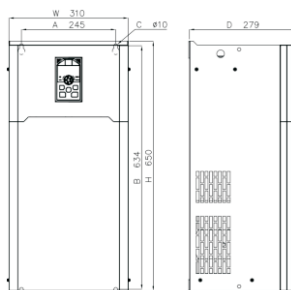
75KW

AC Drive Model	Installation size (mm)		Dimensions (mm)			Aperture	Reactor
	A	B	H	W	D	d	
CL100-4T-22KW	140	425	440	189	222	Φ7	Built-in
CL100-4T-30KW							
CL100-4T-37KW	200	525	540	255	262	Φ7	Built-in
CL100-4T-45KW							
CL100-4T-55KW	245	634	650	310	279	Φ10	Built-in
CL100-4T-75KW	290	544	560	350	279	Φ10	Built-in

2.5.3 Dimensional diagram of reactor
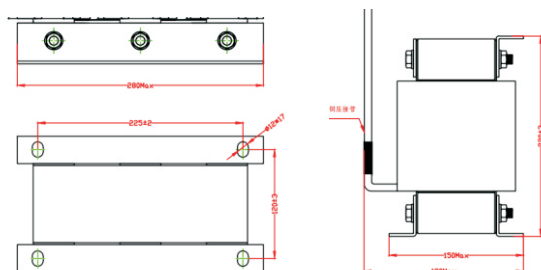
CL100-4T-132-160KW/CL100A-4T-75KW Reactor
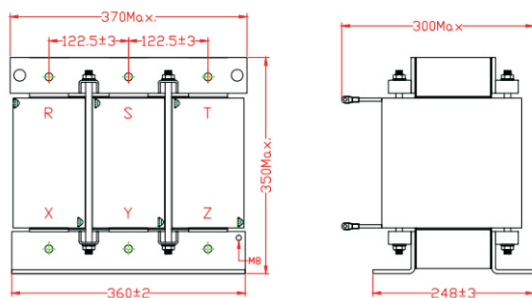
CL100-4T-185~220KW Reactor

CL100-4T-250KW Reactor
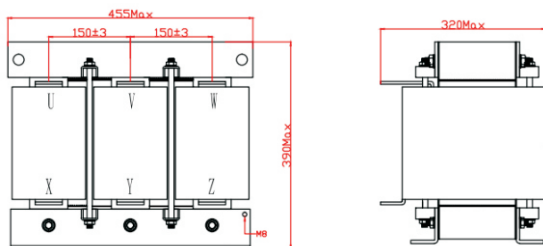
CL100-4T-280~315KW Reactor

Chapter 3

Installation

3.1 Mechanical Installation

3.1.1 Installation Environment

➢ Environment temperature: Surrounding environment temperature has a great impact on lifetime of AC drive, and the operation environment temperature of AC drive shall not exceed allowable temperature range (- 10℃ ~ 40℃).
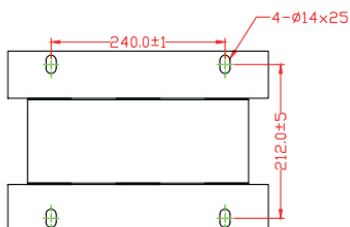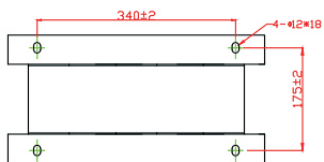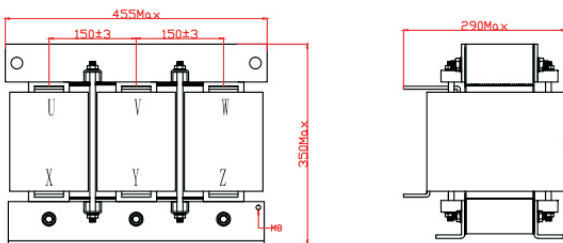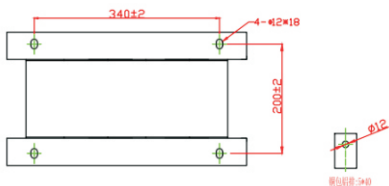
➢ While AC drive is installed on the surface of inflaming retardants, and enough space around is necessary for heat dissipation. When AC drive works, it will produce plenty of heats. And make vertical installation onto supporting holder with screw.

➢ Please install it in some places that are not easy to vibrate. And the vibration shall not be larger than 0. 6G. Especially pay attention to keep away from punching machine and other equipments.

➢ Avoid to be installed where there are direct sunlights, moist surroundings and water drops.

➢ Avoid to be installed where there are corrosivity, inflammability and explosive gas.

➢ Avoid to be installed where there are oil contamination, dirts and metal dusts.
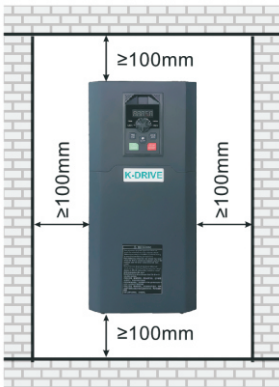
Figure 3-1 Individual installation diagram
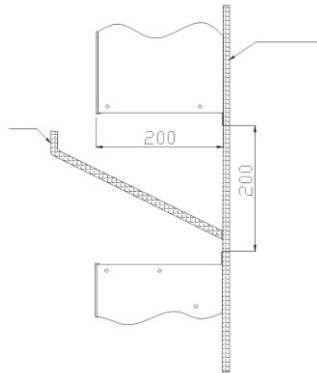
Figure 3-2 Installation diagram of two feedback units up and down

Explanation:
When installing the frequency converter up and down, please follow the insulation guide plate shown in the installation diagram.

3.1.2 The installation of the model needs to pay attention to the problem of heat dissipation. So please note the following:

➢ Please install the inverter vertically so that the heat can be dissipated upwards. But not upside down. If there are many inverters in the cabinet, it is better to install them side by side. In the occasions that need to be installed up and down, please refer to Figure 3-1 to install the heat insulation deflector.

➢ The installation space is as shown in Figure 3-1 to ensure the cooling space of the inverter. However, please consider the heat dissipation of other components in the cabinet when arranging.

➢ The mounting bracket must be made of flame retardant material.

➢ For applications with metal dust, it is recommended to install the radiator outside the cabinet. At this time, the space in the fully sealed cabinet should be as large as possible.

3.2 Basic wiring diagram
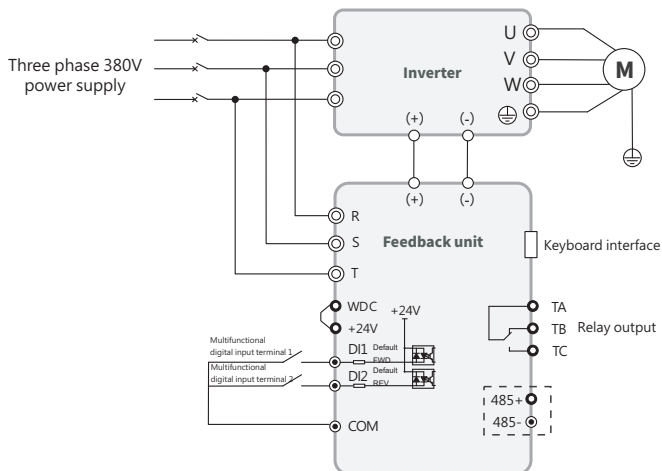
Figure 3-3 11~110KW Feedback Unit Wiring Diagram
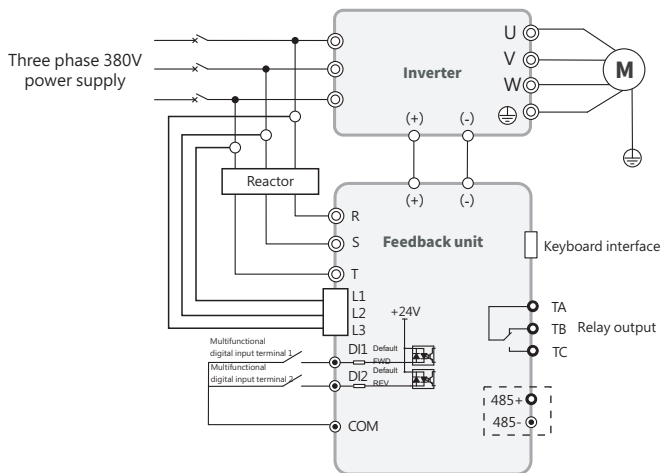
Figure 3-4 132~315KW Feedback Unit Wiring Diagram

3.2.1 Main circuit terminals and wiring

Terminal	Name	Function description
R、S、T	Three-phase power input terminal	AC input three-phase power connection point
(+)、(-)	DC bus positive and negative terminals	Common DC bus input point
⏚	Ground terminal	Ground terminal

⚠ CAUTION

When wiring, attention should be paid to the polarity of the DC input terminals "DC (+)" and "DC (-)" of the feedback device. If the polarity is reversed, it may cause equipment damage and even pose a risk of fire.

To prevent electric leakage from causing harm to the human body, the grounding terminal "PE" of the feedback device should be reliably grounded.

3.2.2 Wiring when connecting to the frequency converter

Some brands of frequency converters do not have clear DC bus terminals. In this case, when connecting to the feedback device, the DC input terminals "DC (+)" and "DC (-)" of the feedback device should be directly connected to both ends of its internal frequency converter energy storage capacitor. Due to the fact that the energy storage capacitors in the DC circuit of a frequency converter operating at a voltage of 380V usually require two sets of series connections to meet the voltage resistance requirements, the wiring should be led out from the corresponding poles of the two capacitors.

3.2.3 Control terminals and wiring

GND	485+	485-	DI4	DI1	DI2
COM	DI3	+24V	TA	TB	TC

Function Description of Control Terminals:

Sort	Terminal	Name	Function Description
Output	24V-COM	External+24V power supply	Provide a+24V power supply to the outside, usually used as a working power supply for digital input and output terminals and an external sensor power supply. Maximum output current: 200mA
Digital input	DI1-COM	Digital input 1	1. Optical lotus root isolation, factory in NPN mode
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	2. Input impedance: 3.3k Ω
	DI4-COM	Digital input 4	3. Voltage range during level input: 9-30V
Communi cation Interface	485+ , 485-	Modbus communicatio n interface	Modbus communication interface

Operation and Display

4.1 Keypad description

4.1.1 Keypad explanation and function

Using the operation panel, you can modify the function parameters of the inverter, monitor the working status of the inverter, and control the operation of the inverter (start, stop). Its appearance and functions are shown in the following figure.

Explanation: Figure 4-1 shows the standard LED keyboard configuration, and Figure 4-2 shows the LCD keyboard. If you need to select this keyboard, please specify it when placing an order.

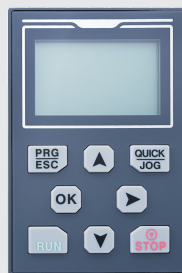Figure 4-1. Schematic diagram of the operation panel 1

Figure 4-4. Schematic diagram of the operation panel 2

LED display area

Confirm key/ Increase key/ Decrease key

Shift key

Jog run key/ Direction key

Program key

Run key

Stop/Reset key
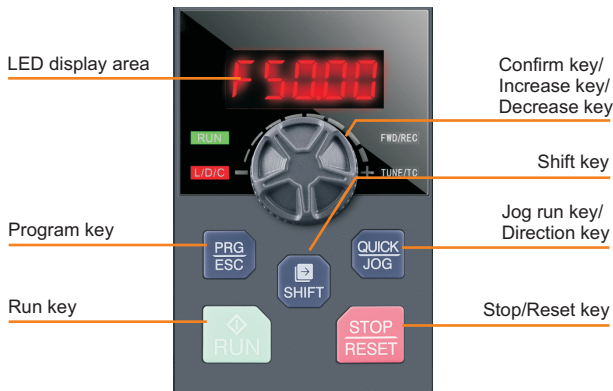
Figure 4-1 Operation panel diagram 1
(standard configuration LED keyboard 1)

Chapter 4

4.1.2 Function indicator description

Indicator sign	Name	meaning	Color
RUN	Operating status indicator	On - the inverter is running Off - Inverter is in stop state Flashing - the inverter is in sleep state	Green
L/D/C	Control mode indicator	Off - Inverter is in keypad control mode On - the inverter is in terminal control mode Flashing-Inverter is in remote communication control mode	Red
FWD/REV	Running direction indication	Off - Forward state On - inversion state Flashing - the target frequency is opposite to the actual frequency or is in the reverse running prohibited state	Red
TUNE/TC	Tuning/Torque Control/Fault Indicator	On - torque control Flashing - Tuning\Fault status	Red

4.1.3 Description of keyboard buttons

Button	Name	Function Description
PRG ESC	Program / Escape key	Enter or exit the first-level menu, return to the upper-level menu
	Enter	Enter the menu screen step by step, set parameters to confirm
	Increment key (+)	Increment of data or function code
	Decrement key (-)	Decrement of data or function code
SHIFT	Shift key	In the stop display interface and the running display interface, the display parameters can be selected cyclically. For the specific display meaning, please refer to P7-29 and P7-30; when modifying the parameters, you can select the modification bit of the parameter
RUN	Run key	In keyboard operation mode, used to run operation
STOP RESET	Stop/Reset key	In the running state, pressing this key can be used to stop the running operation; in the fault alarm state, it can be used to reset the operation. The characteristics of this key are restricted by the function code P7-27.

Chapter 4

Button	Name	Function Description
QUICK JOG	Jog run/Direction keys	When P7-28 is set to 0, it is the jog running button, and when P7-28 is set to 1, it is the direction button. Press this button to reverse the direction.

4.2 Instructions for viewing and modifying function codes

The function code parameters of the feedback unit adopt a three-level menu structure, which can be viewed and modified through the operation panel. The three menus are: Function parameter group (Level I menu) → Function code (Level II menu) → Function code Settings (Level III menu). Figure 4-2 shows the operation process. On the status parameters screen, you can press to view different status parameters.
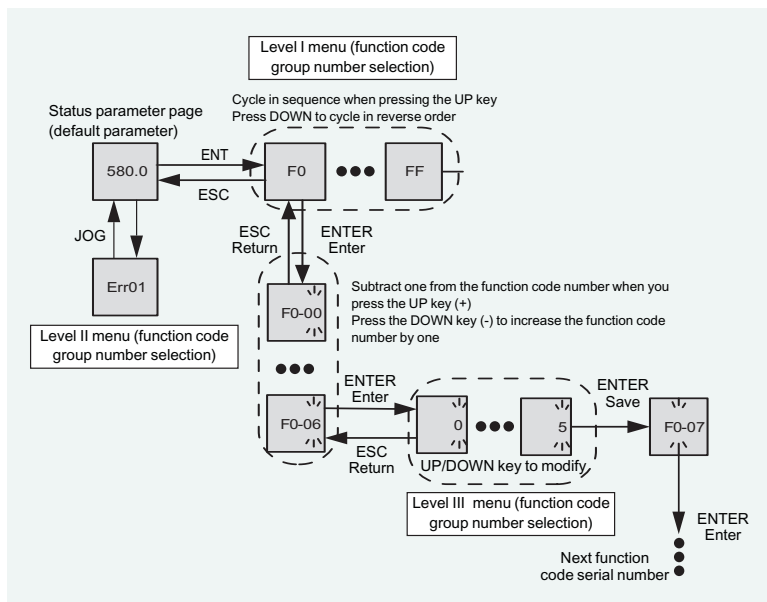
Figure 4-2 Three-level menu operation flow chart

illustrate

When operating in the third level menu, you can press the ESC or Enter keys to return to the second level menu. But pressing the Enter key will save the current parameter modification values and transfer them to the next function code; Pressing the ESC key is to abandon the current parameter modification.

Example

Change the function code F2-04 from 0.00 to 5.00.
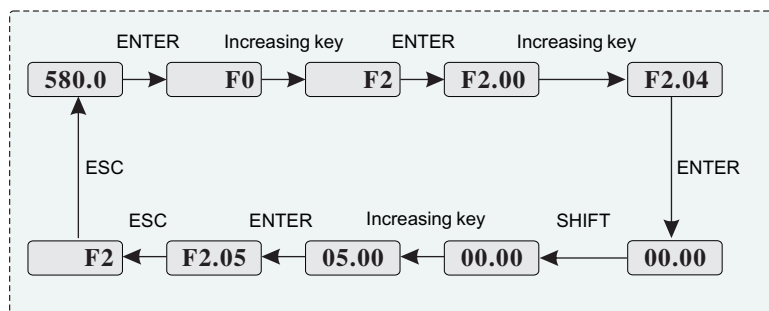
Figure 4-3 Parameter setting operation flowchart

In the third level menu state, if the parameter does not have a flashing bit, it means that the value of the function code parameter cannot be modified. The specific reason can be found in the function code attribute description.

Chapter 5

Troubleshooting and Countermeasures

If a fault occurs during the system operation, the inverter will immediately protect the motor to stop the output, and the corresponding inverter fault relay contact will act. The inverter panel displays the fault code. The fault type and common solution corresponding to the fault code are shown in the following table. The list in the table is for reference only, please do not repair or modify it without authorization. If the fault cannot be eliminated, please seek technical support from our company or the product agent.

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Feedback section			
Module malfunction	Err01	◆ Whether there is a phase to phase or ground short circuit at the grid connection terminals R, S, and T ◆ Is the module overheated ◆ Is the internal wiring of the rectification unit loose ◆ Is the main control board, driver board, or module functioning properly	◆ Contact short circuit ◆ Are the fans and air ducts normal? ◆ Connect all loose wires ◆ Seek technical support
Loss of lock fault in phase-locked loop	Err02	◆ The power grid is severely unstable ◆ Is there any looseness in the connection terminals R, S, and T of the power grid ◆ Is the internal wiring of the rectification unit loose ◆ Is the main control board or driver board functioning properly	◆ Check the power grid situation ◆ Connect all loose wires properly ◆ Seeking technical support
External phase loss fault	Err03	◆ The power grid is severely unstable ◆ Is there any looseness in the connection terminals R, S, and T of the power grid ◆ Is the internal wiring of the rectification unit loose ◆ Is the main control board or driver board functioning properly	◆ Check the power grid situation ◆ Connect all loose wires properly ◆ Seeking technical support

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Overcurrent fault	Err04	◆ There is grounding or short circuit in the rectification circuit ◆ PI parameter setting error ◆ Bus voltage rise rate set too high ◆ The speed of sudden loading or unloading of the load is too fast ◆ Is the main control board, driver board, or module functioning properly	◆ Check for short circuits ◆ Check parameter settings ◆ Reduce load acceleration and deceleration rate ◆ Seeking technical support
Bus overvoltage fault	Err07	◆ Input voltage too high ◆ The sudden acceleration speed of the load is too fast ◆ The selection of rectification units is too small ◆ The operating power of the frequency converter is too high ◆ Is the rectification feedback voltage set too high	◆ Troubleshooting peripheral faults ◆ Reduce the rate of sudden load increase ◆ Choose a higher power rectifier unit ◆ Adjust the voltage to the normal range ◆ Seeking technical support
Bus undervoltage fault	Err09	◆ Input voltage too low ◆ Is the main control board, driver board, or module functioning properly	◆ Troubleshooting peripheral faults ◆ Seeking technical support
Overload fault	Err10	◆ The selection of rectification unit is too small ◆ The operating power of the frequency converter is too high	◆ Choose a higher power rectifier unit ◆ Reduce the operating power of the frequency converter
Low grid frequency	Err11	◆ Low input voltage frequency ◆ Is the main control board, driver board, or module functioning properly	◆ Troubleshooting peripheral faults ◆ Seeking technical support
Low grid voltage	Err12	◆ Low input voltage ◆ Is the main control board, driver board, or module functioning properly	◆ Troubleshooting peripheral faults ◆ Seeking technical support

Chapter 5

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
High grid frequency	Err13	◆ Input voltage frequency is too high ◆ Is the main control board, driver board, or module functioning properly	◆ Troubleshooting peripheral faults ◆ Seeking technical support
High grid voltage	Err14	◆ Input voltage is too high ◆ Is the main control board, driver board, or module functioning properly	◆ Troubleshooting peripheral faults ◆ Seeking technical support
Severe imbalance of the power grid	Err15	◆ The power grid is severely unstable ◆ Is there any looseness in the connection terminals R, S, and T of the power grid ◆ Is the internal wiring of the rectifier element loose ◆ Is the main control board or driver board functioning properly	◆ Check the power grid situation ◆ Connect all loose wires properly ◆ Seeking technical support
Module overheating	Err16	◆ The selection of rectification unit is too small ◆ The operating power of the frequency converter is too high	◆ Choose a higher power rectifier unit ◆ Reduce the operating power of the frequency converter
Current sampling fault	Err18	◆ Is the main control board or driver board functioning properly	◆ Seeking technical support
Data overflow protection	Err21	◆ Parameter setting error	◆ Parameter reset ◆ Seeking technical support

Chapter 6

Modbus protocol

The CL100 series feedback unit provides RS232/RS485 communication interface and supports Modbus communication protocol. Users can achieve centralized control through computers or PLC, set feedback device operation commands through this communication protocol, modify or read function code parameters, and read the working status and fault information of the feedback device.

6.1 Communication frame structure

The Modbus RTU protocol communication data format for the CL100 series feedback unit is as follows.

Frame header START	3.5 character time
Slave address ADR	Communication address: 1 ~ 247 (set by F8-02)
Command code CMD	03: Read slave parameters; 06: Write slave parameters
Data content DATA (N-1)	Data content: Function code parameter address, function code parameter number, function code parameter value, etc.
Data content DATA (N-2)	
...	
Data content DATA0	
CRC CHK low order	Detection value: CRC16 check value. When transmitting, the low byte comes first and the high byte follows. For the calculation method, please refer to the description of CRC check in this section.
CRC CHK high bits	
END	3.5 character time

Command command (CMD) and data description (DATA)

Command code: 0X30H, read N words (Word), can read up to 12 words and N=1~ 12. The specific format is as follows:

Host read command frame

Calculate CRC check

Slave read response frame

≥3.5 Character	1 Byte	1 Byte	1 Byte	2 Byte	2 Byte	
Frame header	Slave address	Read command code 0×03	Number of data bytes (2n)	Function code parameters H...L	CRC check L...H	Finish

Calculate CRC check
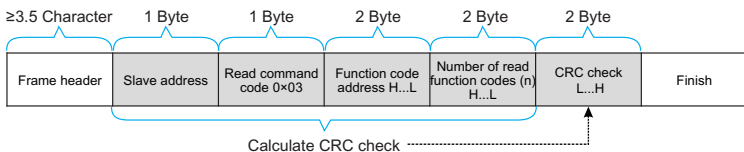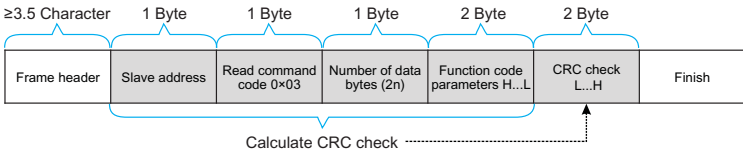
Host write command frame

≥3.5 Character	1 Byte	1 Byte	2 Byte	2 Byte	2 Byte	
Frame header	Slave address	Write command code 0×06	Function code parameters H...L	Function code setting value H...L	CRC check L...H	Finish

Calculate CRC check

Slave write response frame

≥3.5 Character	1 Byte	1 Byte	2 Byte	2 Byte	2 Byte	
Frame header	Slave address	Write command code 0×06	Function code parameters H...L	Function code setting value H...L	CRC check L...H	Finish

Calculate CRC check
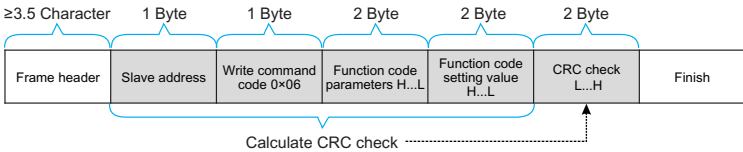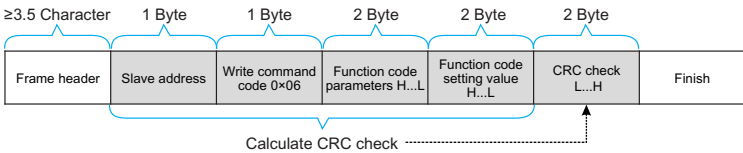
If the slave detects a communication frame error, or fails to read and write due to other reasons, it will reply with an error frame. Slave read response error frame:

≥3.5 Character	1 Byte	1 Byte	1 Byte	2 Byte	
Frame header	Slave address	Read trouble codes 0×83	Error type	CRC check L...H	Finish

Calculate CRC check
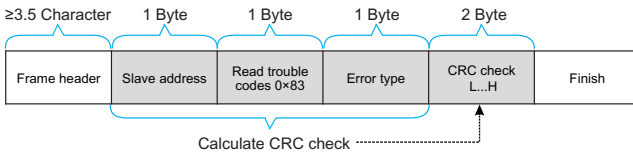
Slave write response error frame

≥3.5 Character	1 Byte	1 Byte	1 Byte	2 Byte	
Frame header	Slave address	Write fault code 0×86	Error type	CRC check L...H	Finish

Calculate CRC check
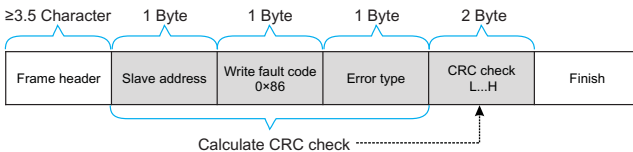
Example: read the contents of two consecutive parameters starting from P0-03 of the inverter whose slave address P8-02 is 01.

The frame sent by the host is shown in the figure:

Frame header ≥3.5 Character	Slave address 0×01	Read command code 0×03	Function code address 0×F0 0×03	Number of read function codes 0×00 0×02	CRC check 0×07 0×0B	Finish

The slave reply frame is as shown in the figure:

Frame header ≥3.5 Character	Slave address 0×01	Read command code 0×03	Data bytes 0×04	P0.03 parameter value 0×00 0×00	P0.04 parameter value 0×00 0×00	CRC check 0×FA 0×33	Finish

Note: If the write command is unsuccessful, the failure reason will be returned.

6.2 Communication parameter address definition

This part is the content of communication, which is used to control the operation of the inverter, the status of the inverter and the setting of related parameters.

Read and write function code parameters (some function codes cannot be changed, and are only used by manufacturers or monitored):

Function code parameter address marking rules:

The rules are represented by the function code group number and label as the parameter address:

High byte: F0-FF (Group F), H0-HF (Group H), L0-LF (Group L), n0-nF (Group N), P0-PF (Group P), 70-7F (Group U) Low byte: 00-FF.

Such as: P0-11, the address is expressed as F00B;

Notice:

FF group: parameters can neither be read nor changed;

Group U: can only be read, parameters cannot be changed.

Some parameters cannot be changed when the inverter is running; some parameters cannot be changed no matter what state the inverter is in; when changing the function code parameters, pay attention to the range, unit, and related descriptions of the parameters.

Function code group	Communication visit address	Function code address of communication change RAM
F0 ~ FE	0xF000 ~ 0xFEFF	0x0000 ~ 0x0EFF
H0 ~ HF	0xA000 ~ 0xAFFF	0x4000 ~ 0x4FFF

Function code group	Communication visit address	Function code address of communication change RAM
L0 ~ LF	0xB000 ~ 0xBFFF	0x5000 ~ 0x5FFF
n0 ~ nF	0xC000 ~ 0xCFFF	0x6000 ~ 0x6FFF
U0、U1	0x70xx、0x71xx	

In addition, because EEPROM is frequently stored, it will reduce the service life of EEPROM, so some function codes do not need to be stored in the mode of communication, as long as the value in RAM can be changed.

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

If it is A group H parameter, to achieve this function, as long as the high level A of the function code address becomes 4 can be achieved.

Function code addresses are as follows: High byte: 00 to 0F (group F), 40 to 4F (group A) Low byte: 00 to FF

For example, the function code F0-11 is not stored in EEPROM, and the address is represented as 000B. This address indicates that the RAM can only be written, but cannot be read. The read address is invalid.

(1) System Status Table (Read only)

Type	Command address	Command content
Running state	0x3000	0000: Shutdown 0001: Running 0002: Fault
Grid frequency	0x3001	0~Maximum set frequency
Output voltage (grid voltage)	0x3002	0-800V
Bus voltage	0x3003	0-800V
Feedback total power increased by 8 bits	0x3004	0-65535
Feedback total power is 8 bits low	0x3005	0-65535
DI status	0x3006	BIT0: DI1 status BIT1: DI2 status
DO status	0x3007	BIT0: RELAY1 output control BIT1: Reserved
Fault number address	0x3008	Reserved

(2) System Status Table (Only write)

Type	Command address	Command content
Control command input	0x2000	0001: Stop enabling 0002: Run Enable 0003: Fault reset
DO state control	0x2001	BIT0: RELAY1 output control BIT1: Reserved

Chapter **7**

Function & Parameter Table

7.1 Function code description

Icons	Content
☆	Indicates that the inverter parameters can be modified during stop and running (0)
★	Indicates that the inverter is in a running state and cannot be modified (1)
○	Indicates that this parameter is a manufacturer's parameter and cannot be changed by the user (3)
●	Indicates the actual detection value of the inverter or the manufacturer's fixed value, which cannot be changed (2)

7.2 Feedback section function code

⌶ The L/D/C light is a fault light;

⌶ The FWD/REV light is a fault interface light;

⌶ TUNE/TC is the power mode light.

Function code	Name	Description (setting range)	Factory Default	Change
Group F0: Basic function group				
F0-00	Run Command Channel	0: Keyboard control 1: Terminal control	0	★
F0-01	Keyboard control mode	0: Feedback mode 1: Rectification mode	0	★
F0-02	Grid or power frequency selection	0: 50Hz 1: 60Hz	0	★
F0-03	Power mode selection	0: Rated emergency power supply 1: VF power mode (not open)	0	★
F0-04	Modulation mode	0: Bipolarity 1: Unipolarity	1	★
Group F2: Control group				
F2-00	Terminal settings	0: No terminal control required 1: DI1 control fault reset, DI2 operation enable	0	☆
F2-01	Bus voltage set value	400.0V~800.0V	620.0V	☆
F2-02	Voltage rise slope	10V/s~120V/s	40V/s	☆
F2-03	Voltage drop slope	10V/s~120V/s	40V/s	☆

Function code	Name	Description (setting range)	Factory Default	Change
F2-04	Voltage hysteresis range	1.0V~50.0V	0V	☆
F2-05	Reactive power given polarity	0: capacitive reactive power 1: Sensory reactive power	0	☆
F2-06	Slope of reactive current rise	0.0A/s~100.0A/s	5.0A/s	☆
F2-07	Slope of reactive current decrease	0.0A/s~100.0A/s	5.0A/s	☆
F2-08	Reactive power allocation	0-100.0%	0.0%	☆
F2-09	Maximum reactive voltage limit	0-20.0%	100.0%	☆
F2-10	Voltage loop feedback current limiting	90% to 180% (rated current of feedback unit)	160%	☆
F2-11	Phase locked loop ratio	10-100	10	☆
F2-12	Phase-locked loop integral	10-100	10	☆
Group F4: Functional parameter group				
F4-00	Minimum soft charging duration	500ms~3000ms	1000ms	★
F4-01	Input overvoltage Protection	120%~150%	130%	☆
F4-02	Input undervoltage protection	50%~80%	60%	☆
F4-03	Overload protection starting point	65%~105%	95%	☆
F4-04	50Hz overfrequency	55.00 Hz~65.00 Hz	65.00Hz	★
F4-05	50Hz underfrequency	35.00 Hz~45.00 Hz	35.00 Hz	★
F4-06	60Hz overfrequency	65.00 Hz~75.00 Hz	75.00Hz	★
F4-07	Delay start time of emergency power supply function	45.00 Hz~55.00 Hz	45.00Hz	★
F4-08	Emergency power supply rise time	0.0s~1200.0s	2.0s	☆
F4-09	Rated output of emergency power supply	500ms~5000ms	2000ms	☆
F4-10	VF maximum frequency (not open)	0.0%~150.0%	1000%	☆
F4-11	VF rated output (not open)	0.01Hz~200.00Hz	50.00Hz	★
F4-12	VF adjustment time (not open)	1%~100%	100%	★

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Function code	Name	Description (setting range)	Factory Default	Change
F4-13	VF frequency setting (not open)	0.01Hz/s~10.00Hz/s	5.00Hz/s	★
F4-14	Current loop proportional adjustment (in automatic calculation mode)	0~F4.11	50.00Hz	★
F4-15	Current loop proportional adjustment (in automatic calculation mode)	1~50	12	●
F4-16	Current loop integral adjustment (in automatic calculation mode)	1~10	5	●
F4-17	Voltage loop proportional adjustment (in automatic calculation mode)	1~20	2	●
F4-18	Voltage loop integral regulation (in automatic calculation mode)	1~20	10	●
Group F5: Data Display Group (Read Only)				
F5-00	Feedback Total Active Power Low Double Word Low Word	0-65535	--	●
F5-01	Feedback Total Active Power Low Double Word High Word	0-65535	–	●
F5-02	Feedback always has merit, high is the lowest of the two characters	0-65535	–	●
F5-03	Module malfunction	1: Module malfunction	–	●
F5-04	Loss of lock fault in phase-locked loop	1: Loss of lock fault in phase-locked loop	–	●
F5-05	External faults	1: External faults	–	●
F5-06	Overcurrent fault	1: Overcurrent fault	–	●
F5-07	Bus overvoltage fault	1: Bus overvoltage fault	–	●
F5-08	Bus undervoltage fault	1: Bus undervoltage fault	–	●
F5-09	Overload fault	1: Overload fault	–	●
F5-10	Low grid frequency fault	1: Low grid frequency fault	–	●
F5-11	Low voltage fault in the power grid	1: Low voltage fault in the power grid	–	●

Function code	Name	Description (setting range)	Factory Default	Change
F5-12	High frequency faults in the power grid	1: High frequency faults in the power grid	–	●
F5-13	High voltage fault in the power grid	1: High voltage fault in the power grid	–	●
F5-14	Severe unbalanced faults in the power grid	1: Severe unbalanced faults in the power grid	–	●
F5-15	Over temperature fault	1: Over temperature fault	–	●
F5-16	Current sampling fault	1: Current sampling fault	–	●
F5-17	Modbus communication failure	1: Modbus communication failure	–	●
F5-18	ROM data overflow fault	1: ROM data overflow fault	–	●
F5-19	Zero drift value of A-phase current	0-4095	–	●
F5-20	Zero drift value of phase B current	0-4095	–	●
F5-21	Zero drift value of C-phase current	0-4095	–	●
F5-22	Temperature AD value	0-4095	–	●
F5-23	Temperature AD right shift value	0-65535	–	●
F5-24	EPPROM error data	0-199	–	●
F5-25	Voltage loop proportional gain	0~65535 (actual value is 1000 * F5.25)	–	●
F5-26	Voltage loop integral gain	0-65535	–	●
F5-27	Current loop proportional gain	0-65535	–	●
F5-28	Current loop integral gain	0-65535	–	●
F5-29	Proportional gain of phase-locked loop	0-65535	–	●
F5-30	Phase locked loop integral gain	0-65535	–	●
F5-31	Calculation result of phase-locked loop 1	0-65535	–	●
F5-32	Calculation result of phase-locked loop 2	0-65535	–	●

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Function code	Name	Description (setting range)	Factory Default	Change
Group F6: Fan Function Group				
F6-00	Fan control	0: Run immediately upon power on 1: Controlled by temperature (starting at 55 ℃) 2: Start the fan during runtime	2	☆
Group F8: Protection setting group				
F8-00	Overload minimum running time	8.0s~1200.0s	8.0s	☆
F8-02	Number of automatic fault resets	0 ~ 65535	50000	☆
F8-04	Number of automatic fault resets	2s ~ 100.0s	2.0s	☆
Group FB: Serial communication group				
FB-00	Local communication address	0:1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	1	☆
FB-01	Communication baud rate setting	0: No verification RTU 1: Even check RTU 2: Odd check RTU	3	☆
FB-02	Data format	0-200ms	1	☆
FB-03	Communication response delay	0.0 (invalid)~100.0 seconds	5ms	☆
FB-04	Communication timeout failure time	0: Alarm and free parking	0.0s	☆
FB-05	Communication transmission error handling	1: Do not alarm and continue running	0	☆
Group FD: Human machine interface group				
FD-00	User password	1000~9999	100	☆
FD-01	Functional parameter recovery	0: No operation 1: Restore default values 2: Clear fault file	0	★

Function code	Name	Description (setting range)	Factory Default	Change
FD-02	Battery display mode	0: General display 1: Scientific notation	0	☆
Group FE: Status Display Group (Read Only)				
FE-00	The first two types of faults	0: No fault 1: Module malfunction (ERR01) 2: Phase lock failure (ERR02) 3: External fault (ERR03) 4: Overcurrent fault (ERR04) 7: Bus overvoltage fault (ERR07) 9: Bus undervoltage fault (ERR09) 10: Overload fault (ERR10) 11: Low grid frequency fault (ERR11) 12: Low grid voltage fault (ERR12) 13: High grid frequency fault (ERR13) 14: High grid voltage fault (ERR14) 15: Severe unbalanced fault of the power grid (ERR15) 16: Module overheating fault (ERR16) 18: Current sampling fault (ERR18) 21: Storage Data Overflow Fault (ERR21)	0	●
FE-01	Previous fault type	0-21	0	●
FE-02	Current fault type	0-21	0	●
FE-04	Feedback current during fault	0.1A ~ 2000.0A	0.0A	●
FE-05	Bus voltage during fault	0.0V ~ 2000.0V	0.0V	●
FE-06	Input terminal during fault	00 ~ 11	00	●
FE-08	Module temperature	0℃ ~ 120℃	–	●
FE-09	Grid frequency	0.00 Hz ~ 655.36Hz	–	●
FE-10	Grid voltage	0.0V ~ 700.0V	–	●
FE-11	Bus voltage	0.0V ~ 2000.0V	–	●

Function code	Name	Description (setting range)	Factory Default	Change
Group FE: Status Display Group (Read Only)				
FE-12	output voltage	0.0V ~ 2000.0V	–	●
FE-13	Feedback current	0.0A ~ 2000.0A	–	●
FE-18	Previous fault feedback current	0.1A ~ 2000.0A	0.0A	●
FE-19	Previous fault bus voltage	0.0V ~ 2000.0V	0.0V	●
FE-20	Last fault input terminal	00 ~ 11	00	●
FE-21	Feedback current for the first two faults	0.1A ~ 2000.0A	0.0A	●
FE-22	The voltage of the first two faulty busbars	0.0V ~ 2000.0V	0.0V	●
FE-23	The first two fault input terminals	00 ~ 11	00	●
FE-24	Feedback active power	0.0kW ~ 2000.0KW	–	●
FE-25	Feedback reactive power	0.0kVar ~ 2000.0KVar	–	●
FE-26	Accumulated feedback energy	0.0kWh ~ 6553.5KWh	–	●
FE-27	Accumulated feedback energy	0.0kWh ~ 6553.5KWh	–	●
Group FF:Unit nameplate (read-only)				
FF-00	Rated power of feedback unit	0.4kW~1000.0kW	–	●
FF-01	Rated voltage of feedback unit	100.0V~2000.0V	–	●
FF-02	Rated current of feedback unit	1.0A~2000.0A	–	●
FF-03	Eliminating narrow pulse time	3.2 us~12.0 us	Model settings	★
FF-04	Machine model	0~65535	–	●
FF-05	Software version	0~65535	–	●
FF-06	Current loop Kp coefficient	0~65535	Model settings	★
FF-07	Voltage loop Kp coefficient	0~65535	Model settings	★
FF-08	Unit password	After successful input, you can enter super user mode	–	☆
FF-09	Clear Records	0: No operation 1: Clear Records	–	☆

Function code	Name	Description (setting range)	Factory Default	Change
FF-10	Frequency converter model (select hardware ratio for voltage and current sampling)	0: Invalid 1-1200: View the corresponding table of machine models	–	☆
FF-11	Rated power of frequency converter	0.4kW~1200.0kW	–	●
FF-12	Rated voltage of frequency converter	100.0V~1000.0V	–	●
FF-13	Rated current of frequency converter	1.0A~2000.0A	Model settings	●
FF-14	Standard overcurrent value	1.0A~6000.0A	–	●
FF-15	Current echo correction (1000)	50.0%~150.0%	–	☆
FF-16	Dead Time	3.2 us~12.0 us	Model settings	★
FF-17	Bus undervoltage point	50% ~ 90%	60%	☆
FF-18	Bus overvoltage point	150% ~ 180%	150%	☆
FF-19	Zero battery	0-1	0	☆
FF-20	Over temperature point	25 ℃~120 ℃	90℃	☆
FF-21	Temperature curve	0: Temperature curve of all-in-one machine 4: Energy feedback module NTC	4	☆
FF-22	Control model	0: Phase loss operation mode (positive and negative sequence control) 1: Non phase loss operation mode (conventional control)	0	☆
FF-23	Save the current F0~FD groups as user default values	0: No operation 1: Save current value as user default 2: Initialize epprom	0	☆
FF-24	Feedback unit carrier frequency	1.0kHz~16.0kHz	Model settings	☆

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Function code	Name	Description (setting range)	Factory Default	Change
FF-25	Period of positive and negative order decomposition operation (can be deleted)	1ms~20ms	1ms	★
FF-26	Current loop kp	100-30000	3000	★
FF-27	Current loop ki	1-1000	20	★
FF-28	Voltage loop kp	1~1000 (actually 1000 * FF.28)	10	★
FF-29	Voltage loop ki	1-1000	1	★
FF-30	Current direction selection	0: Forward 1: Reverse	0	★
FF-31	Current imbalance protection trigger value (belongs to redundant protection, can be left or not)	45%~60%	45%	☆
FF-32	Loss of lock detection of phase-locked loop	300~600	600	★
FF-33	Maximum operating peak current of feedback unit	1.0A~2000.0A	Model settings	●
FF-34	AC inductance		Model settings	☆
FF-35	DC capacitor		Model settings	☆
FF-36	PI mode selection	0: Automatically calculate PI 1: Manually calculating PI	1	☆
FF-37	PI mode selection	0-65535	65535	●

WARRANTY

❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).

❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:

- ¤ Return, replacement and repair within 30 days of delivery:
- ¤ Replacement and repair within 90 days of delivery:
- ¤ Repair within 18 months of delivery:
- ¤ Except when exporting abroad.

❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.

❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:

- ¤ Failure caused by the user's use and operation in accordance with the requirements of the «Instruction Manual»:
- ¤ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
- ¤ Failure caused by abnormal aging of the product due to poor user environment:
- ¤ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
- ¤ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)

❺ Under the following conditions, manufacturers have the right not to provide warranty services:

- ¤ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
- ¤ When the user fails to pay the purchase price in accordance with the signed contract:
- ¤ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used

❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

User information			
User name			
User address			
Postal code		Contact person	
Tel		Fax	
Machine type		Machine code	
Agent / Reseller Information			
Supplier			
Contact			
Tel		Delivery date	

CERTIFICATE OF QUALITY

QC test：_____

This product has been tested by our company's quality department, and its performance meets the standards, passes the inspection, and is approved to leave the factory.

Energy efficient , beautiful environment

SHENZHEN K-EASY AUTOMATION CO.,LIMITED

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