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HD200 Drive User Manual

MAXAUTO

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User manual

HD200 AC Drive

Preface

Thank you for purchasing the HD200 series AC drive developed by Our company.For the users who use this product for the first time, read the manual carefully.

Contents

Warranty Agreement

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

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

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

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

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

The damage caused by the improper operation.

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

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

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

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

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

7. The company reserves the right to interpret this agreement

Chapter 1 Safety and Cautions

Safety and Cautions Definition

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

Danger

Indicates that failure to comply with the notice will result in severe personal injury or even death.

Note

Indicates that failure to comply with the notice will result in personal injury or property damage.

1.1 Safety Cautions

Use Stage	Safety Grade	Precautions
Before Installation	Danger	♦Do not install the equipment if you find water seepage, component missing or damage upon unpacking. ♦Do not install the equipment if the packing list does not conform to the product you received.
	Danger	♦ Handle the equipment with care during transportation to prevent damage to the equipment. ♦ Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury. ♦ Do not touch the components with your hands. Failure to comply will result in static electricity damage.

Use Stage	Safety Grade	Precautions
During Installation	Danger	♦ Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failures to comply may result in a fire. ♦ Do not loosen the fixed screws of the components, especially the screws withe red marks.
	Note	♦ Do not drop wire end or screw into the AC drive. Failure it will result in damage to the AC drive. ♦ Install the AC drive in places free of vibration and direct sunlight. ♦ When two AC drives are laid in the same cabinet , ♦ arrange the installation positions properly to ensure the cooling effect.
At wiring	Danger	♦ A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result a fire. ♦ Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. ♦ Never connect the power cables to the output terminals(U,V,W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply may result in damage to the AC drive. ♦ Ensure that the main cable line comply with the standard, the line meets the EMC requirements and the area safety standard. Failure to comply may result in risk or accident. ♦ Never connect the power cables the braking resistor between the DC bus terminals P+, P-. Failure to comply may result in a fire.

Use Stage	Safety Grade	Precautions
Before Power-on	Danger	♦ Please confirm the peripheral equipment and cable converter is configured in this manual of the recommended model, all the configuration line in accordance with the connection method of the manual provides the correct wiring. Failure to comply will result in accidents. ♦ Check that the voltage class of the power supply is consistent with the rated voltage class of the AC drive.
After Power-on	Danger	♦ Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock. ♦ Do not touch the operation of AC drive during the hands is wet. Failure to comply will result in accident. ♦ Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock. ♦ Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive. ♦ Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accident.
During Operation	Danger	♦ Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive. ♦ Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt.
	Danger	♦ Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive. ♦ Do not start or stop the AC drive by turning the contactor ON/OFF. Failure to comply will result in damage to the AC drive.

Use Stage	Safety Grade	Precautions
During Maint-enance	Danger	♦ Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock. ♦ Ensure that the AC drive is disconnected from all power suppliers before staring repair or maintenance on the AC drive.
During Maint-enance	Danger	♦ Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive. ♦ Set and check the parameters again after the AC drive is replaced.

1.2 Cautions

1.2.1 Motor Insulation Test

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

1.2.2 Thermal Protection of Motor

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

1.2.3 Running Below and Above Rated Frequency

The AC drive provides frequency output of 0 to 600.00Hz. When the users use the frequency converter for a long time, please pay attention to the motor cooling or use of variable frequency motor. If the AC drive is required to run at over 50Hz, consider the capacity of the machine.

1.2.4 Motor heat and noise

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

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

Do not install the capacitor for improving power factor or lightning protection voltage sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.

1.2.6 Contactor at the I/O terminal of the AC drive

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

When a contactor is installed between the output side of the AC drive and the motor,do not turn off the contactor when the AC drive is active. Otherwise, modules inside theAC drive may be damaged.

1.2.7 When External Voltage is Out of Rated Voltage Range

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

1.2.8 The Derating of the AC Drive

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

1.2.9 Prohibition of Three-Phase Input Change into Two-Phase Input

Do not change the three-phase input of the AC drive into two-phase input. Otherwise, a fault will result or the AC drive will be damaged.

1.2.10 Surge Suppressor

The AC drive has a built-in over-voltage, over-current device for suppressing the surge voltage generated when the inductive loads around the AC drive are switched on or off. If the inductive loads generate a very high surge voltage, use a surge suppressor for the inductive load to prolong the service life of the AC drive.

1.2.11 Ambient Temperature and De-rating

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

1.2.12 Altitude and De-rating

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

1.2.13 Disposal

The electrolytic capacitors, plastic parts and other devices may explode when they are burnt. Poisonous gas is generated when they are burnt. Treat them as ordinary industrial waste according to relevant national laws and regulations.

1.2.14 Adaptable Motor

- The standard adaptable motor is adaptable four-polo squirrel-cage AC asynchronous induction motor or PMSM. For other types of motor, select a proper AC drive according to the rated motor current.
- The cooling fan and rotor shaft of general motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor runs at low frequency for a long time.
- The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running effect and protection performance will be affected.
- The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.

Chapter 2 Product Information

2.1 Naming Rules

Model code contains product information. Users can find the code on the model designation label attached to the AC drive or the simple nameplate.

HD200 –2S 0.7 G C

❶ ❷ ❸ ❹ ❺

Name	Mark	Description	Detail
AC drive series	❶	Ac drive series	HD200
Voltage level	❷	Voltage level	2S: Single-phase 220V Range:-15%~20% 4T: Three-phase 380V Range:-15%~20%
Adaptable power	❸	Adaptable motor power(KW)	0.4KW~4.0KW
Load type	❹	Load type	G: General type
Braking unit mark	❺	Braking unit	Null: None C: With a brake unit

Fig. 2-1 Name Designation Rules

2.2 Nameplate

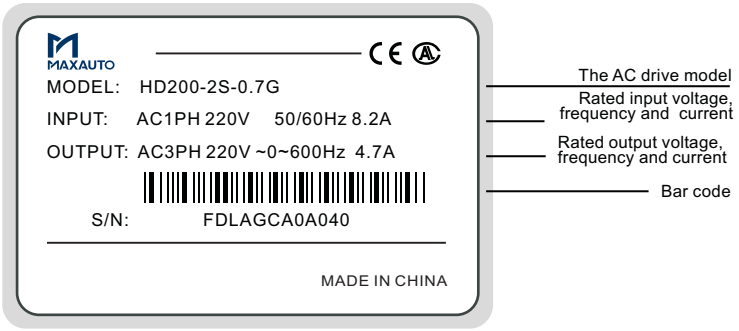


Fig. 2-2 Product nameplate

2.3 HD200 Series AC Drive

AC Drive Model	Power Capacity (KVA)	Rated Input Current (A)	Rated Output Current (A)	Adaptable Motor (KW)
Input voltage: single-phase 220V Range：-15%~20%				
HD200-2S-0.7G	1.5	8.2	4.7	0.75
HD200-2S-1.5G	3.0	14.0	7.5	1.5
HD200-2S-2.2G	4.0	23.0	10.0	2.2
Input voltage: three-phase 380V Range: -15%~20%				
HD200-4T-0.7G	1.5	3.4	2.3	0.75
HD200-4T-1.5G	3.0	5.0	3.7	1.5
HD200-4T-2.2G	4.0	5.8	5.1	2.2
HD200-4T-4.0G	5.9	10.5	8.5	4.0

2.4 Technical Specifications

Item		Specifications		
Basic specifications	Maximum frequency	0~600Hz		
	Carrier frequency	2.0kHz~10.0kHz The carrier frequency is automatically adjusted based on the load features.		
	Input frequency resolution	Digital setting: 0.01Hz	Analog setting: Max frequency×0.025%	
	Control mode	0: V/F control; 1: Vector mode 0 control		
	Startup torque	1.0Hz/150%		
	Speed range	1:50 (Vector mode 0)		
	Overload capability	15 overload capability 60m for 120%; 60s for 150% f rated current; 4s for 180% of rated current		
	Torque boost	Auto torque boost	Manual torque boost 0.1% to 20%	
	V/F curve	Line	Multi-point	Square V/F curve
	Acc/Dec curve	Linear Acc/Dec mode; Four kinds of Acc/Dec time; Range of Acc/Dec Time: 0.0 ~ 3600.0s		
	DC braking	DC braking frequency: 0.00Hz~Maximum frequency Braking time: 0.0 ~ 100.0s Braking action current value: 0.0~150%		
	Jog control	Jog frequency range: 0.00Hz~Maximum frequency		

Item		Specifications
Basic specifications	Onboard PID	It realizes process-controlled closed loop PID control system easily
	Simple PLC, Multi-stage	16-speed operating through built-in PLC or control terminal
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Overvoltage/ Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to overvoltage/overcurrent.
Individualized	High performance	High-performance current vector control technology to achieve a three-phase ACinduction motor control.
	Instantaneous non-stop	Load feedback energy compensates the voltage reduction so that the AC drive cancontinue to run in a short time in case of power interruption.
	Rapid current limit	Rapid software and hardware current limiting technology helps to avoid frequent over-current fault.
Running	Bus support	In accordance with international standard MODBUS communication
	Command source	Given the control panel, control terminal, serial communi-cation port given. Itcan be switched by a variety of ways.
	Frequency source	8 frequency sources : digital setting, analog voltage setting, analog current setting, pulse setting, PLC given, multi-speed setting485 communication setting, etc. It can be switched by a variety of ways
	Auxiliary frequency source	8 auxiliary frequency source. Flexible implementation of auxiliary frequencytuning, frequency synthesis.
	Input terminal	Five digital input terminals (S1~S5). One analog input terminal (AI1) that supports 0~10V voltage input or 0~20mA current input. One high-speed pulse (HDI) that receives max 50kHz frequency high-speed input.
	Output terminal	One digital output terminal. One relay output terminal. One analog output terminal AO that supports 0~20mA current output or 0~10V voltage output
	Key Locking and function selection	Achieve some or all of the keys locked and define the scope of partialkeys to prevent misuse.
	Protection function	Powered motor short circuit test; Input/output phase failure protection; Over current protection; voltage protection; Under voltage protection; Over heat protection ; Overload protection; braking resistor fault protection.

2.5 Product Outline, Installation Hole Size

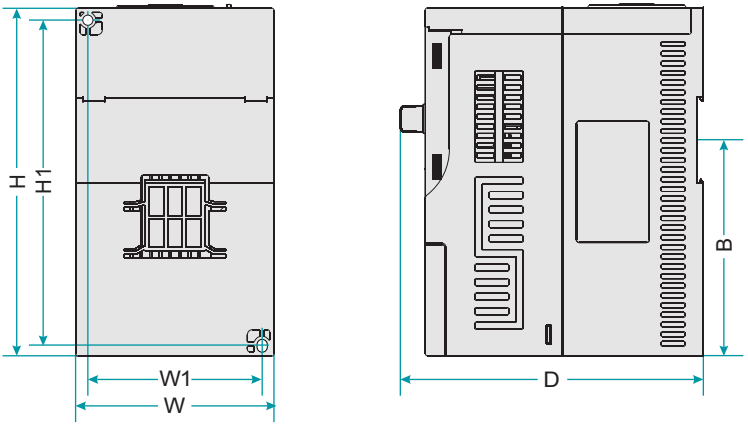


Fig. 2-4 Outline dimension and installation size

Model	H(mm)	W(mm)	D(mm)	H1(mm)	W1(mm)	B(mm)	Diameter (mm)	GW(kg)
Single-phase 220V series								
HD200-2S-0.7G	145	82	115	135	72	89	Ø4	0.90
HD200-2S-1.5G								
HD200-2S-2.2G	190	110	152	178	98	*	Ø5	1.95
Three-phase 380V series								
HD200-4T-0.7G	145	82	115	135	72	89	Ø4	0.90
HD200-4T-1.5G								
HD200-4T-2.2G								
HD200-4T-4.0G	190	110	152	178	98	*	Ø5	1.95

2.6 External Keyboard Dimension

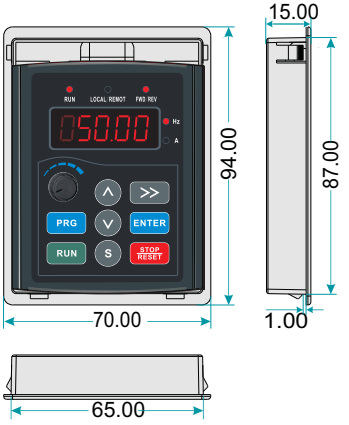


Fig. 2-5 External Keyboard dimension

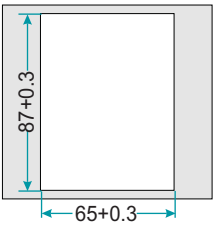


Fig. 2-6 Opening dimension diagram for keypad with base

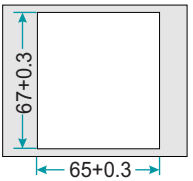
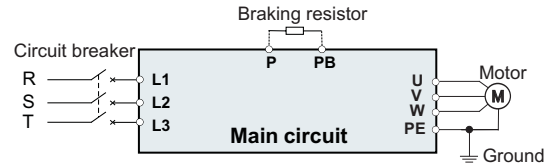
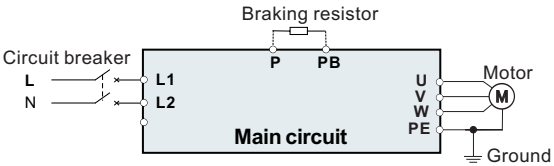


Fig. 2-7 Opening dimension diagram for keypad without base

2.7 Main Circuit Wiring Diagram



3-phase input power supply



Single-phase input power supply

Precautions on the wiring:

1. DC bus have residual voltage after the AC drive is switched off. Ensure voltage is less than 36V before touching the equipment Otherwise, you may get electric shock.

2. Braking resistor connecting terminals: The cable length of the braking resistor shall be less than 5m. Otherwise, it may damage the AC drive.

3. The AC drive output terminals: U, V, W: If the motor cable is too long, this will damage the motor insulation or generate higher leakage current, causing the AC drive to trip in overcurrent protection. If the motor cable is greater than 30m, need to reduce the carrier to decrease the leakage current; if it is greater than 50 m long, an AC output reactor must be installed close to the AC drive.

4. Protective grounding terminal PE: Must be reliably connected to the main grounding conductor. Grounding wire diameter should be greater than 10mm² and the resistance must be less than 5Ω. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive.Do not connect the grounding terminal to the neutral conductor of power supply.

2.8 Control Circuit Wiring Diagram

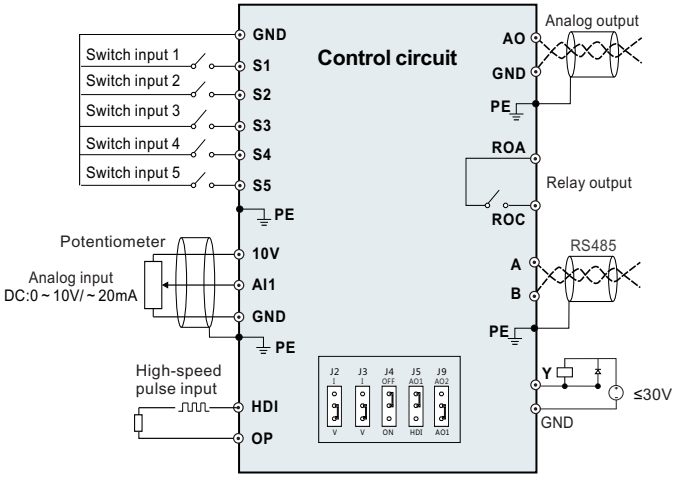


Figure 2-8 Wiring diagram of Control Circuit

2. 9 Control circuit terminals and function

Type	Terminal	Name	Function Description
Analog input	10V	Analog input Reference voltage	10.5V(±3%)
			Max output current: 25mA, external potentiometer resistance range is more than 4kΩ
	AI1	Analog input	0~20mA: input impedance 500Ω, maximum input current is 25mA
			0~10V: input impedance 100Ω, max input voltage 12.5V
			Input range: 0–10 V /0–20 mA, switched by jumper J3 on the control board and factory defaulted as voltage input.
Analog output	AO	Analog output	0~20mA: impedance 200Ω~500Ω
			0~10V: impedance: > 10kΩ
			Output range: 0–10 V /4–20 mA, switched by jumper J2 on the control board and factory defaulted as voltage output.
Digital input	GND	Analog ground	The public ground of digital input terminals (S1-S5)
	S1-S5	Digital Input S1 ~ S5	The specific function of multi-functional input terminals is set by F04.01~F04.05 It's valid when terminals and the GND are closed.
Digital output	Y	Open collector output	Voltage range: 0~24V
			Current range: 0~50mA
Relay output	ROA, ROC	Relay output	Normally open contact
			Contact capacity: 250VAC/3A, 30VDC/3A
High speed pulse	HDI, OP	High-speed pulse input	Pulse input: maximum frequency 50kHz
			Voltage range:10V~30V
RS485	A	Rs485 signal +	Speed rate:1200/2400/4800/9600/19200/38400
	B	Rs485 signal -	Using twisted pair or shielded cable. The longest distance is 300 meters.
	GND	Rs485 grounding	

2.10 Dial Code Switch Function Description

Name	Jumpers Figure	Function	Factory default
485 (J4)		Rs485 communicational terminal resistance selection ON: 120Ω terminal connection is valid OFF: without terminal connection	OFF
Ai1 (J3)		I is for current input (0~20mA) V is for voltage input (0~10V)	0~10V
AO (J2)		I is for current output (0~20mA) V is for voltage output (0~10V)	0~10V

AO, HDI Function Description and Terminal Setting

AO (analog output), HDI (high frequency pulse input) function and terminal cannot be effective at the same time. Through the combination setting of jumper J5 and jumper J9 and the setting of F04.00, users can select the function of AO and HDI respectively.

Jumper Terminal J5	Jumper Terminal J9	F04.00 Setting	Description
		F04.00 = 1	Ao function (Terminal) is valid
	Invalid	F04.00 = 0	HDI function (Terminal) is valid

Chapter 3 Operation And Display

3.1 Introduction of the keypad

The keypad is used to control inverters, read the state data and adjust parameters.

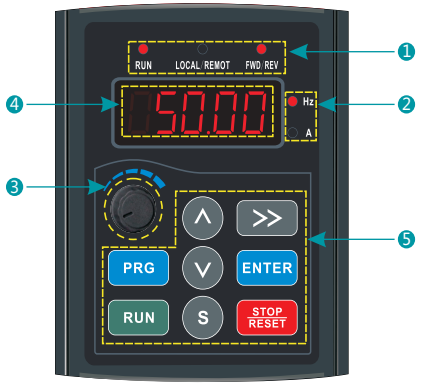


Fig 3-1 Keypad

No	Name	Instructions		
❶	Status indicator	RUN	LED off means that the AC drive is in the stop state; LED on means the AC drive is in the running state.	
		LOCAL/REMOT	It indicates whether the AC drive is operated by means of operation panel, terminals or communication.	
			○ LOCAL/REMOT: OFF	Operation panel control
			● LOCAL/REMOT: ON	Terminals control
			◑ LOCAL/REMOT: Blinking	Communication control
		FWD/REV	ON means the AC drive is in the reverse rotation state; OFF means the AC drive is in the forward rotation state.	
❷	Unit indicator	It represents the current display of the keypad		
		Hz	Frequency unit	
		A	Current unit	

No	Name	Instructions		
❸	Poten-tiometer	When the frequency source A or B is set to 1, the setting of the frequency source is determined by analog potentiometer input voltage.		
❹	Code display zone	Five-figure LED display displays various monitoring date and alarm code such as set frequency and output frequency.		
❺	Keypad buttons zone	PRG	Program key	Enter or exit Level I menu.
		ENTER	Confirm key	Enter the menu interfaces level by level, and confirm the parameter setting
		∧	Increment	Increase data or function code progressively
		∨	Decrement	Decrease data or function code progressively
		>>	Shift key	Move right to select the displaying parameter circularly in stopping and running mode. Select the parameter modifying digit during the parameter modification.
		RUN	Run key	The key used to operate the AC drive in keypad operation mode.
		STOP RESET	Stop/Reset key	This key is used to stop in running status and it's limited by function code F06.03. This key used to reset all control modes in the fault alarm state.
		S	S key	The function of this key is confirmed by function code F06.01

3.2 Viewing and Modifying Function Codes

The operation panel of inverters adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.Figure 4-2 Operation procedure on the operation panel.

Operation procedure on the operation panel:

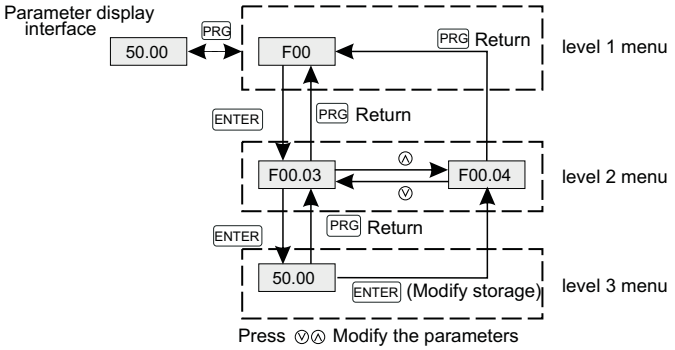


Fig.3-2 Operation Procedure of three-level Menu

Remarks:

You can return to Level II menu from Level III menu by pressing PRG or ENTER. After you press ENTER , the system saves the parameter setting first, and then goes back to Level II menu and shifts to the next function code.After you press PRG , the system does not save the parameter setting, but directly returns to Level II menu and remains at the current function code.

Here is an example of changing the value of F03.03 to 15.00 Hz:

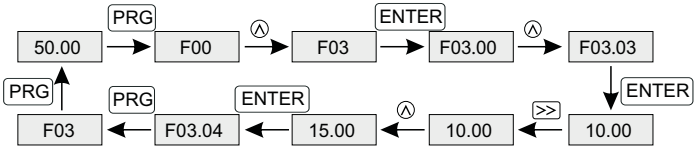


Fig. 3-3Example of changing the parameter value

In Level III menu, if the parameter has no blinking digit, it means that the parameter cannotbe modified. This may be because:

1. Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter.

2. Such a function code cannot be modified in the running state and can only be changed at stop.

Chapter 4 Function Parameters Table

Function Parameters Table

The function parameters of the series AC drive have been divided into 14 groups (F00 ~ F0D) according to the function.

For the convenience of function codes setting, the function group number corresponds to the first level menu,the function code corresponds to the level 2 menu and the function code corresponds to the level 3 menu.

1. Below is the instruction of the function lists:

The first line"Function code":codes of function parameter group and parameters;

The second line"Name":full name of function parameters;

The third line"Setting range":effective setting value of the function parameters;

The fourth line"Default value":the original factory values of the function parameter;

The fifth line"Modify":the modifying character of function codes(the parameters can be modified or not and the modifying conditions), below is the instruction:

"○" : means the set value of the parameter can be modified on stop and running state;

"◎" : means the set value of the parameter can not be modified on the running state;

"●" : means the value of the parameter is the real detection value which can not be modified.

2. "Parameter radix" is decimal(DEC), if the parameter is expressed by hex, then the parameter is separated from each other when editing. The setting range of the certain bits are0-F(hex).

3. "Default" means the function code parameters will restore to the default value during default parameters restoring. But the actually detected parameter value or record value won't be restored.

Function Code	Name	Setting Range	Default	Property
		Group F00 Basic Function		
F00.00	Speed control mode	0: V/F control 1: Vector mode 0 control	1	◎
F00.01	Run command channel	0: Keypad running command channel (LED OFF) 1: Terminal running command channel (LED ON) 2: MODBUS communication running command channel (LED FLASH)	0	○
F00.02	Reserve	0	0	●
F00.03	Maximum output frequency	F00.04~600.00 Hz	50 Hz	◎
F00.04	Upper limit of the running frequency	F00.05~F00.03 (Max. frequency)	50 Hz	◎
F00.05	Lower limit of the running frequency	0.00Hz~F00.04 (Upper limit)	0.0 Hz	◎
F00.06	A frequency command selection	0: Keypad digital setting 1: Panel potentiometer setting 2: Analog AI1 setting 3: Reserve 4: High-pulse setting(HDI) 5: Simple PLC program setting 6: Multi-stage speed running setting 7: PID control setting 8: MODBUS communication setting	1	○
F00.07	B frequency command selection	0: Keypad digital setting 1: Panel potentiometer setting 2: Analog AI1 setting 3: Reserve 4: High-pulse setting(HDI) 5: Simple PLC program setting 6: Multi-stage running setting 7: PID control setting 8: MODBUS communication setting	5	○
F00.08	B frequency command reference	0: Max output frequency 1: A frequency command	0	◎
F00.09	B frequency source gain coefficient	0.0~100.0%	100.0%	○

Function Code	Name	Setting Range	Default	Property
F00.10	Combination mode of the setting	0: A 1: B 2: (A+B) 3: (A-B) 4: Max. (A, B) 5: Min. (A, B)	0	○
F00.11	Keypad set frequency	0.00 Hz~F00.03 (max. frequency)	50.00Hz	○
F00.12	Acceleration time 1	0.0~3600.0s	Model dependent	○
F00.13	Deceleration time 1	0.0~3600.0s	Model dependent	○
F00.14	Running direction	0: Default direction 1: Reverse direction 2: Prohibit reverse running	0	○
F00.15	High frequency carrier setting	2.0kHz~10.0kHz	Model dependent	○
F00.16	Low frequency carrier setting	2.0kHz~F00.15	Model dependent	○
F00.17	Motor parameter auto-tuning	0: None 1: Stator resistance + No-load current auto-tuning 2: No-load current auto-tuning	0	◎
F00.18	Function restore parameter	0: No operation 1: Restore default value 2: Cancel the fault record	0	◎
Group F01 Start-up and Stop Control				
F01.00	Start running mode	0: Start-up directly 1: Start-up after DC braking	0	◎
F01.01	Starting frequency of direct start	0.00~50.00Hz	0.50Hz	◎
F01.02	Retention time of the starting frequency	0.0~100.0s	0.0s	◎
F01.03	Braking current before starting	0.0~150.0%	0.0%	◎
F01.04	Braking time before starting	0.0~100.0s	0.0s	◎

Function Code	Name	Setting Range	Default	Property
F01.05	ACC and DEC mode selection	0: Line 1: Reserve	0	◎
F01.06	Stop mode selection	0: Decelerate to stop 1: Coast to stop	0	○
F01.07	Startingfrequency of stop braking	0.00~F00.03 (Max. frequency)	0.00Hz	○
F01.08	Waiting time of stop braking	0.0~50.0s	0.0s	○
F01.09	Stop DC braking current	0.0~150.0%	0.0%	○
F01.10	Stop DC braking time	0.0~50.0s	0.0s	○
F01.11	Dead time of FWD/REV rotation	0.0~3600.0s	0.0s	○
F01.12	Shift mode of FWD/REV rotation	0: Shift after zero frequency 1: Shift after starting frequency 2: Shift after stopping speed and delay time (delay time is set by F01.22)	0	◎
F01.13	Stopping frequency	0.00~50.00Hz	1.00Hz	◎
F01.14	Detection time of stop frequency	0.0~100.0s	0.5s	◎
F01.15	Reserve	0	0	●
F01.16	Terminal running protection selection when powering on	0: The terminal running command is invalid when powering on 1: The terminal running command is valid when powering on	0	○
F01.17	Action if running frequency < frequency lower limit (Valid: > 0)	0: Run at lower limit frequency 1: Stop 2: Zero speed operation	0	◎
F01.18	Hibernation restore delay Time	0.0~3600.0s (F01.17 = 2 is valid)	0.0s	○
F01.19	Restart after power off	0: Disable 1: Enable	0	○
F01.20	Waiting time of restart after power off	0.0~3600.0s (F01.19=1 is valid)	1.0s	○

Function Code	Name	Setting Range	Default	Property
F01.21	Start delay time	0.0 ~ 60.0s	0.0s	○
F01.22	Delay time of the stop speed	0.0~100.0s	0.0s	○
		Group F02 Motor Parameters		
F02.00	Reserve	0	0	●
F02.01	Motor type	0: General asynchronous motor (With low frequency compensation) 1: AC drive asynchronous motor (without low frequency compensation)	0	◎
F02.02	Motor rated power	0.1~100.0kW	Model dependent	◎
F02.03	Motor rated voltage	0~1200V	Model dependent	◎
F02.04	Motor rated current	0.8~1000.0A	Model dependent	◎
F02.05	Motor rated frequency	0.01Hz~F00.03 (max frequency)	50.00Hz	◎
F02.06	Motor rated rotational speed	1~36000rpm	Model dependent	◎
F02.07	Motor stator resistance	0.001~65.535Ω	Model dependent	○
F02.08	Motor no-load current	0.2~30.0A	Model dependent	○
F02.09	Overload protection selection	0: No protection 1: General Motor protection 2:Variable frequency motor protection	1	◎
F02.10	Overload protection coefficient	20.0%~120.0%	100.0%	○
		Group F03 V/F Control		
F03.00	V/F curve setting	0: Linear V/F curve 1: Multiple-point V/F curve 2: 1.3th power low torque V/F curve 3: 1.7th power low torque V/F curve 4: 2.0th power low torque V/F curve	0	◎
F03.01	Torque boost	0.0% (Automatic); 0.1%~20.0%	0.0%	○
F03.02	Torque boost close	0.0~50.0% (Relative to motor rated frequency)	20.0%	○
F03.03	V/F frequency point 1	0.00Hz~F03.05	00.00Hz	○

Function Code	Name	Setting Range	Default	Property
F03.04	V/F voltage point1	0.0~100.0% (Motor rated voltage)	00.0%	○
F03.05	V/F frequency point 2	F03.03~F03.07	00.00Hz	○
F03.06	V/F voltage point 2	0.0~100.0% (Motor rated voltage)	00.0%	○
F03.07	V/F frequency point 3	F03.05~F02.05 (Motor rated frequency)	00.00Hz	○
F03.08	V/F voltage point 3	0.0~100.0% (Motor rated voltage)	00.0%	○
F03.09	V / F slip compensation gain	0.0~200.0%	100.0%	○
F03.10	V / F slip compensation close frequency	0.00HZ~F00.03 (max frequency)	50.00Hz	○
F03.11	Low frequency suppression oscillation factor	0~30	2	○
F03.12	High frequency suppression oscillation factor	0~30	2	○
F03.13	Motor suppression oscillation demarcation point	0.00Hz~F00.03 (Max frequency)	30.00Hz	○
F03.14	Reserved	------	–	—
F03.15	Reserved	------	–	—
F03.16	Reserved	------	–	—
F03.17	Reserved	------	–	—
F03.18	Reserved	------	–	—
F03.19	Reserved	------	–	—
F03.20	AVR function selection	0: Invalid 1: Valid	1	○

Function Code	Name	Setting Range	Default	Property
		Group F04 Input Terminals		
F04.00	HDI input/AO output function selection	0: HDI input enabled (See F04.23~F04.28) 1: AO output enabled (See F04.21) Note: This function parameter setting affects the function of the effectiveness of the control board HDI terminal and AO terminals. Users also need to control board J5, J9 jumper to configure options.	0	◎
F04.01	S1 terminal function selection	0: No function 1: Forward rotation operation 2: Reverse rotation operation 3: 3-line running control 4: Forward jogging 5: Reverse jogging 6: Coast to stop 7: Fault reset 8: Operation pause 9: External fault input 10: Increasing frequency setting (UP) 11: Decreasing frequency setting (DOWN) 12: Frequency increase or decrease setting clear 13: Shift between A setting and B setting 14: Shift between combination setting and A setting 15: Shift between combination setting and B setting 16: Multi-stage speed terminal 1 17: Multi-stage speed terminal 2 18: Multi-stage speed terminal 3 19: Multi-stage speed terminal 4 20: Multi-stage speed pause 21: ACC/DEC time selection 1 22: ACC/DEC time selection 2 23: Reserve 24: Reserve 25: PID control pause (Continued)	1	◎
F04.02	S2 terminal function selection		4	◎
F04.03	S3 terminal function selection		7	◎
F04.04	S4 terminal function selection		0	◎

Function Code	Name	Setting Range	Default	Property
F04.05	S5 terminal function selection	26: Reserve 27: Reserve 28: Counter reset 29: Reserve 30: ACC/DEC prohibited 31: Reserve 32: Reserve 33:Frequency setting clear 34: DC braking 35: Reserve 36: Shift the command to the keypad 37: Shift the command to the terminal 38: Shift the command to the communication 39:PID parameter switchover	0	◎
F04.06	Reserve		0	●
F04.07	Polarity selection of input terminals Bit4 Bit3 Bit2 Bit1 Bit0 S5 S4 S3 S2 S1	0x00~0x1F	0x00	○
F04.08	ON-OFF filter time	0.000~1.000s	0.010s	○
F04.09	Virtual terminal setting	0: Virtual terminal is invalid 1: MODBUS communication virtual terminal is valid	0	◎
F04.10	Terminals control running modes	0: Two-line control 1 1: Two-line control 2 2: Three-line control 1 3: Three-line control 2	0	◎
F04.11	Switch-on delay of S1 terminal	0.000~50.000s	0.000s	○
F04.12	Switch-off delay of S1 terminal	0.000~50.000s	0.000s	○
F04.13	Switch-on delay of S2 terminal	0.000~50.000s	0.000s	○
F04.14	Switch-off delay of S2 terminal	0.000~50.000s	0.000s	○
F04.15	Switch-on delay of S3 terminal	0.000~50.000s	0.000s	○

Function Code	Name	Setting Range	Default	Property
F04.16	Switch-off delay of S3 terminal	0.000~50.000s	0.000s	○
F04.17	Switch-on delay of S4 terminal	0.000~50.000s	0.000s	○
F04.18	Switch-off delay of S4 terminal	0.000~50.000s	0.000s	○
F04.19	Switch-on delay of S5 terminal	0.000~50.000s	0.000s	○
F04.20	Switch-off delay of S5 terminal	0.000~50.000s	0.000s	○
F04.21	Reserve	0	0	●
F04.22	Reserve	0	0	●
F04.23	HDI high-speed pulse input function selection	0: Frequency setting input 1: Counter input (reserve) 2: length count value input	0	◎
F04.24	Lower limit frequency of HDI	0.00kHz~F04.26	0.00kHz	○
F04.25	Corresponding setting of lower limit frequency of HDI	-100.0~100.0%	0.0%	○
F04.26	Upper limit frequency of HDI	F04.24 ~50.00kHz	50.00kHz	○
F04.27	Corresponding setting of upper limit frequency of HDI	-100.0~100.0%	100.0%	○
F04.28	HDI frequency input filter time	0.000~10.000s	0.100s	○
F04.29	Lower limit value of AI1	0.00V~F04.31	0.00V	○
F04.30	Corresponding setting of lower limit of AI1	-100.0~100.0%	0.0%	○
F04.31	AI1 upper limit value	F04.29~10.00V	10.00V	○
F04.32	Corresponding setting of upper limit of Ai1	-100.0~100.0%	100.0%	○

Function Code	Name	Setting Range	Default	Property
F04.33	AI1 input filter time	0.000~10.000s	0.100s	○
F04.34	Keypad analog filter time	0.000~10.000s	0.050s	○
Group F05 Output Terminals				
F05.00	Reserve	0	0	●
F05.01	Y output selection	0: Invalid 1: Running 2: Forward running 3: Reverse running 4: Jog running 5: AC drive fault 6: Frequency level detection FDT1 7: Frequency level detection FDT2 8: Frequency reached 9: Zero-speed running 10: Upper limit frequency reached 11: Lower limit frequency reached 12: Ready for running 13: Reserve 14: Reserve 15: Reserve 16: Completion of simple PLC stage 17: Completion of simple PLC cycle 18:Setup count value arrival 19: Designated count value reached 20: External fault is valid 21: Length reached 22: Running time reached 23: MODBUS communication virtual terminal output 24: Torque arrival	1	○
F05.02	Reserve		0	●
F05.03	Relay RO output selection		1	○
F05.04	Reserve		0	●
F05.05	Polarity of output terminals Bit3 Bit2 Bit1 Bit0 0 0 R0 Y	0x0~0x3	0x0	○
F05.06	Y switch-on delay time	0.000~50.000s	0.000s	○
F05.07	Y switch-off delay time	0.000~50.000s	0.000s	○
F05.08	Relay RO switch-on delay time	0.000~50.000s	0.000s	○

Function Code	Name	Setting Range	Default	Property
F05.09	Relay RO switch-off delay time	0.000~50.000s	0.000s	○
F05.10	AO output selection	0: Running frequency 1: Set frequency 2: Ramp reference frequency 3: Running speed 4: Output current (relative to AC drive rated current) 5: Output current (relative to motor rated current) 6: Output voltage 7: Output power 8: Reserve 9: Output torque 10: Analog AI1 input value 11: Reserve 12: Reserve 13: High-speed pulse HDI input value 14: MODBUS communication setting value	0	○
F05.11	Lower output limit of AO	0.0%~F05.13	0.0%	○
F05.12	Corresponding AO output of lower limit	0.00~10.00V	0.00V	○
F05.13	Upper output limit of AO	F05.11~100.0%	100.0%	○
F05.14	Corresponding AO output of upper limit	0.00~10.00V	10.00V	○
F05.15	Ao output filter time	0.000~10.000s	0.000s	○
		Group F06 HMI Group		
F06.00	User's password	0~65535	0	○
F06.01	S key function selection	0: No function 1: Jog running 2: Shift the display state by the shifting key 3: Shift between forward rotations and reverse 4: Clear UP/DOWN settings 5: Coast to stop 6: Command source switch	1	◎

Function Code	Name	Setting Range	Default	Property
F06.02	Reserved	------	–	-
F06.03	STOP/RESET stop function selection	0: Only valid for keypad control 1: Both valid for keypad and terminal control 2: Both valid for keypad and communication control 3: Valid for all control modes	0	○
F06.04	Parameters state 1	0x0000~0xFFFF Bit0: Running frequency (Hz ON) Bit1: Set frequency (Hz blinking) Bit2: Bus voltage Bit3: Output voltage Bit4: Output current (A ON) Bit5: Running speed Bit6: Output power Bit7: Output torque Bit8: PID reference value Bit9: PID feedback value Bit10: Input terminal state Bit11: Output terminal state Bit12: Pulse count value Bit13: Length value Bit14: The current stage in Multi-stage speed Bit15: Analog AI1 value	0x03FF	○
F06.05	Parameters state 2	0x00~0x1F Bit0: High-spped pulse HDI frequency Bit1: Motor overload percentage Bit2: AC drive overload percentage Bit3: Ramp frequency setting value (Hz is ON) Bit4: Linear speed Bit5~15: Reserve	0x00	○

Function Code	Name	Setting Range	Default	Property
F06.06	Parameters for stopping state	0x000~0x7FF Bit0: Set frequency (Hz is flicking slowly) Bit1: Bus voltage Bit2: Input terminal state Bit3: Output terminal state Bit4: PID reference value Bit5: PID feedback value Bit6: Analog AI1 value Bit7: High-spped pulse HDI frequency Bit8: The current stage in Multi-stage speed Bit9: Pulse count value Bit10: Length value Bit11~Bit15: Reserve	0x0FF	○
F06.07	Frequency display coefficient	0.01~20.00 Displayed frequency = running frequency× F06.07	1.00	○
F06.08	Rotation speed display coefficient	0.1~999.9% Mechanical rotation speed = 60 * running frequency * F06.08 / Motor pole pairs	100.0%	○
F06.09	Linear speed display coefficient	0.1~999.9% Linear speed = Mechanical rotation speed *F06.09	1.0%	○
F06.10	Reserve	0	0	●
F06.11	Converter module temperature	-20.0~120.0℃	–	●
F06.12	Control board software version	1.00~655.35	–	●
F06.13	Cumulative running time of the unit	0-65535h	0	○
F06.14	Reserve	0	0	●
F06.15	AC drive rated power	0.4~100.0kW	–	●
F06.16	AC drive rated voltage	50~1000V	–	●
F06.17	AC drive rated current	0.1~1000.0A	–	●

Function Code	Name	Setting Range	Default	Property
F06.18	Current fault type	See Chapter 5 Common Faults and Solutions	–	●
F06.19	Previous 1 fault type		–	●
F06.20	Previous 2 fault type		–	●
F06.21	Running frequency at current fault	——	0.00Hz	●
F06.22	Ramp reference frequency at current fault	——	0.00Hz	●
F06.23	Output voltage at current fault	——	0V	●
F06.24	Output current at current fault	——	0.0A	●
F06.25	Bus voltage at current fault	——	0.0V	●
F06.26	The Max. temperature at current fault	——	0.0℃	●
F06.27	Input terminals state at current fault	——	0	●
F06.28	Output terminals state at current fault	——	0	●
F06.29	Running frequency at previous fault	——	0.00Hz	●
F06.30	Ramp reference frequency at previous fault	——	0.00Hz	●
F06.31	Output voltage at previous fault	——	0V	●
F06.32	Output current at previous fault	——	0.0A	●
F06.33	Bus voltage at previous fault	——	0.0V	●
F06.34	The Max. temperature at previous fault	——	0.0℃	●

Function Code	Name	Setting Range	Default	Property
F06.35	Input terminals state at previous fault	——	0	●
F06.36	Output terminals state at previous fault	——	0	●
Group F07 Enhanced Group				
F07.00	Acceleration time 2	0.0~3600.0s	Model dependent	○
F07.01	Deceleration time 2	0.0~3600.0s	Model dependent	○
F07.02	Acceleration time 3	0.0~3600.0s	Model dependent	○
F07.03	Acceleration time 3	0.0~3600.0s	Model dependent	○
F07.04	Deceleration time 4	0.0~3600.0s	Model dependent	○
F07.05	Acceleration time 4	0.0~3600.0s	Model dependent	○
F07.06	Jogging frequency	0.00~F00.03 (Max. frequency)	5.00Hz	○
F07.07	Jogging ACC time	0.0~3600.0s	Model dependent	○
F07.08	Jogging DEC time	0.0~3600.0s	Model dependent	○
F07.09	Fault auto reset times	0~10	0	○
F07.10	Interval time of fault auto reset	0.1~3600.0s	1.0s	○
F07.11	Reserve	0	0	●
F07.12	Reserve	0	0	●
F07.13	FDT1 electrical level detection value	0.00~F00.03 (Max. frequency)	50.00Hz	○
F07.14	FDT1 retention detection value	0.0~100.0% (FDT1 level)	5.0%	○
F07.15	FDT2 electrical level detection value	0.00~F00.03 (Max. frequency)	50.00Hz	○
F07.16	FDT2 retention detection value	0.0~100.0% (FDT2 level)	5.0%	○

Function Code	Name	Setting Range	Default	Property
F07.17	Frequency arrival detection value	0.0~F00.03 (Max. frequency)	0.00Hz	○
F07.18	Energy braking enable	0: Energy braking disable 1: Energy braking enable	1	○
F07.19	Threshold voltage of energy braking	200.0~1000.0V	220V level: 380.0V 380V level: 700.0V	○
F07.20	Reserve	0	0	●
F07.21	Over commission selection	0: Over commission is invalid 1: Over commission is valid	0	◎
F07.22	Keypad digital control setting	0x000~0x1221 LED ones: frequency control selection 0: ∧/∨ key adjustment is invalid 1: ∧/∨ key adjustment is valid LED tens: frequency control 0: Only valid for F00.06=0 or F00.07=0 setting 1: Valid for all frequency modes 2: Invalid for MS when MS is priority LED hundreds: stop action selection 0: Setting is valid 1: Valid during running, cleared after stopping 2: Valid during running, cleared after receiving the stop command LED thousands: ∧/∨ key integral function 0: Integral function is valid 1: Integral function is invalid	0x0001	○
F07.23	Integral ratio of the keypad ∧/∨	0.01~10.00s	0.10s	○
F07.24	UP/DOWN terminal control setting	0x000~0x221 LED ones: frequency control 0: UP/DOWN terminal setting valid 1: UP/DOWN terminal setting invalid LED tens: frequency control 0: Only valid for F00.06=0 or F00.07=0 setting 1: Valid for all frequency modes 2: Invalid for multi-sted when multi-sted is priority LED hundreds: Action selection when stop 0: Setting is valid	0x000	○

Function Code	Name	Setting Range	Default	Property
F07.24	UP/DOWN terminal control setting	1: Valid in running, clear after stop 2: Valid in running, clear after receiving the stop commands	0x000	○
F07.25	Up terminal frequency changing ratio	0.01~50.00s	0.50s	○
F07.26	DOWN terminal frequency changing ratio	0.01~50.00s	0.50s	○
F07.27	Frequency setting at power loss	0x00~0x011 LED ones: Action selection when power off 0: Save when power off 1: Clear when power off LED tens: Action selection when MODBUS set frequency power off 0: Save when power off 1: Clear when power off	0x00	○
F07.28	Magnetic flux braking	0: invalid 1~100: The bigger the coefficient, the stronger the braking is.	0	○
F07.29	PWM modulation mode	0: 3-phase modulation 1: 2/3 -phase modulation switchover	1	◎
		Group F08 PID Control		
F08.00	PID reference source selection	0: Keypad digital reference(F08.01) 1: Analog channel AI1 reference 2: Reserve 3: High-speed pulse HDI setting 4: MS reference 5: MODBUS communication setting	0	○
F08.01	Keypad preset PID reference	-100.0~100.0%	50.0%	○
F08.02	PID feedback source selection	0: Analog channel AI1 feedback 1: Reserve 2: High-speed pulse HDI feedback 3: MODBUS communication feedback	0	○
F08.03	PID output feature selection	0: PID output is positive 1: PID output is negative	0	○
F08.04	Proportional gain (Kp 1)	0.00~100.00	0.50	○

Function Code	Name	Setting Range	Default	Property
F08.05	Integral time1 (Ti 1)	0.00~10.00s	0.20s	○
F08.06	Differential time 1 (Td 1)	0.00~10.00s	0.00s	○
F08.07	Sampling cycle (T)	0.01~100.00s	0.10s	○
F08.08	PID control deviation limit	0.0~100.0%	0.0%	○
F08.09	Output upper limit of PID	F08.10~100.0% (Max. frequency)	100.0%	○
F08.10	Output lower limit of PID	-100.0%~F08.09 (Max. frequency)	0.0%	○
F08.11	Detection value of feedback offline	0.0~100.0%	0.0%	○
F08.12	Detection time of feedback offline	0.0~3600.0s	1.0s	○
F08.13	PID adjustment selection	0x00~0x11 LED ones 0: Keep on integral adjustment when the frequency achieves the upper and lower limit. 1: Stop integral adjustment when the frequency achieves the upper and lower limit LED tens 0: The same with the setting direction 1: Opposite to the setting direction	0x00	○
F08.14	Proportional gain 2 (Kp2)	0.00~100.00	0.50	○
F08.15	Integral time 2 (Ti2)	0.00~10.00s	0.20s	○
F08.16	Differential time 2 (Td2)	0.00~10.00s	0.00s	○
F08.17	Switchover selection of PID	0: Without switchover 1: Switch according to the input deviation 2: Switch according to terminal.	0	◎

Function Code	Name	Setting Range	Default	Property
F08.18	Input deviation threshold when PID switching	0.0~100.00%	20%	○
F08.19	PID initial value	-100.0%~100.0%	0.0%	○
F08.20	PID initial holding time	0.0~600.0s	0.0s	○
Group F09 Fixed-length,Count and Fixed Time Parameters				
F09.00	Reserve	0	0	●
F09.01	Reserve	0	0	●
F09.02	Reserve	0	0	●
F09.03	Reserve	0	0	●
F09.04	Set length	0~65535m	0m	○
F09.05	Actual length	0~65535m	0m	●
F09.06	Pulse per rotation	1~10000	1	○
F09.07	Alxe perimeter	0.01~100.00cm	10.00cm	○
F09.08	Length ratio	0.001~10.000	1.000	○
F09.09	Length correcting coefficient	0.001~1.000	1.000	○
F09.10	Set count value	F09.11~65535	0	○
F09.11	Designated count value	0~F09.10	0	○
F09.12	Running time setting	0~65535min	0	○
F09.13	Exact stop mode	0: Stop invalid 1: Setting length reached 2: Setting counter value reached	0	○
F09.14	Torque arrive setting value	0.0 ~ 250.0%	100.0%	○
Group F0A Simple PLC and Multi- step Speed Control				
F0A.00	Simple PLC mode	0: Stop after running once 1: Run at the final value after running once 2: Cycle running	0	○
F0A.01	Simple PLC retentive selection	0: No retentive upon power failure 1: Retentive upon power failure	0	○
F0A.02	Multi-stage speed 0	-100.0~100.0%	0.0%	○

Function Code	Name	Setting Range	Default	Property
F0A.03	The running time of step 0	0.0~6553.5s(min)	0.0s	○
F0A.04	Multi-stage speed 1	-100.0~100.0%	0.0%	○
F0A.05	The running time of step 1	0.0~6553.5s(min)	0.0s	○
F0A.06	Multi-stage speed 2	-100.0~100.0%	0.0%	○
F0A.07	The running time of step 2	0.0~6553.5s(min)	0.0s	○
F0A.08	Multi-stage speed 3	-100.0~100.0%	0.0%	○
F0A.09	The running time of step 3	0.0~6553.5s(min)	0.0s	○
F0A.10	Multi-stage speed 4	-100.0~100.0%	0.0%	○
F0A.11	The running time of step 4	0.0~6553.5s(min)	0.0s	○
F0A.12	Multi-stage speed 5	-100.0~100.0%	0.0%	○
F0A.13	The running time of step 5	0.0~6553.5s(min)	0.0s	○
F0A.14	Multi-stage speed 6	-100.0~100.0%	0.0%	○
F0A.15	The running time of step 6	0.0~6553.5s(min)	0.0s	○
F0A.16	Multi-stage speed 7	-100.0~100.0%	0.0%	○
F0A.17	The running time of step 7	0.0~6553.5s(min)	0.0s	○
F0A.18	Multi-stage speed 8	-100.0~100.0%	0.0%	○
F0A.19	The running time of step 8	0.0~6553.5s(min)	0.0s	○
F0A.20	Multi-stage speed 9	-100.0~100.0%	0.0%	○
F0A.21	The running time of step 9	0.0~6553.5s(min)	0.0s	○
F0A.22	Multi-stage speed10	-100.0~100.0%	0.0%	○
F0A.23	The running time of step 10	0.0~6553.5s(min)	0.0s	○

Function Code	Name	Setting Range	Default	Property
F0A.24	Multi-stage speed11	-100.0~100.0%	0.0%	○
F0A.25	The running time of step 11	0.0~6553.5s(min)	0.0s	○
F0A.26	Multi-stage speed12	-100.0~100.0%	0.0%	○
F0A.27	The running time of step 12	0.0~6553.5s(min)	0.0s	○
F0A.28	Multi-stage speed13	-100.0~100.0%	0.0%	○
F0A.29	The running time of step 13	0.0~6553.5s(min)	0.0s	○
F0A.30	Multi-stage speed14	-100.0~100.0%	0.0%	○
F0A.31	The running time of step 14	0.0~6553.5s(min)	0.0s	○
F0A.32	Multi-stage speed15	-100.0~100.0%	0.0%	○
F0A.33	The running time of step 15	0.0~6553.5s(min)	0.0s	○
F0A.34	Simple PLC 0~7 step ACC/DEC time	0x000~0xFFFF	0x0000	○
F0A.35	Simple PLC 8~15 step ACC/DEC time	0x000~0xFFFF	0x0000	○
F0A.36	PLC restart mode selection	0: Restart from the first step. 1: Continue to run from the stop frequency.	0	◎
F0A.37	Multi-stage time unit	0: seconds 1: minutes	0	◎
Group F0B Protective Parameters				
F0B.00	Output phase loss protection	0: Invalid 1: Valid	1	◎
F0B.01	Frequency decreasing at sudden power loss	0: Invalid 1: Valid	0	◎
F0B.02	Frequency decreasing ratio at sudden power loss	0.00Hz/s~F00.03/ (Max. frequency)	10.00Hz/s	◎
F0B.03	Over-voltage stall protection	0: Invalid 1: Valid	1	◎

Function Code	Name	Setting Range	Default	Property
F0B.04	Voltage protection of over-voltage stall	120~150% (Standard bus voltage 220V)	120%	○
		120~150% (Standard bus voltage 380V)	125%	
F0B.05	Current limit action selection	0: Current-limiting is invalid 1: Current-limiting is valid	1	◎
F0B.06	Automatic current limit	50.0~200.0%	Model dependent	◎
F0B.07	Frequency-decreasing ratio during current limit	0.00~50.00Hz/s	10.00Hz/s	◎
F0B.08	Reserve	0	0	●
F0B.09	Reserve	0	0	●
F0B.10	Reserve	0	0	●
F0B.11	Output terminal action during fault	LED ones 0: Action under fault undervoltage 1: No action under fault undervoltage LED tens 0: Action during the automatic reset 1: No action during the automatic reset	0x00	○
Group F0C Serial Communication Function				
F0C.00	Local communication address	0~247 (0 is the broadcast address)	1	○
F0C.01	Communication baud ratio setting	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	4	○
F0C.02	Digital bit checkout setting	0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	○
F0C.03	Answer delay	0~200ms	5ms	○

Function Code	Name	Setting Range	Default	Property
F0C.04	Fault time of communication overtime	0.0 (invalid), 0.1~60.0s	0.0s	○
F0C.05	Transmission fault processing	0: Alarm and stop freely 1: No alarm and continue to run 2: No alarm and stop according to the stop mode (Only under the communication control) 3: No alarm and stop according to the mode (Under all control modes)	0	○
F0C.06	Communication processing action selection	0: Write with response. 1: Write without response.	0	○
F0C.07	Host broadcast interval time	10ms-5000ms	200ms	○
F0C.08	MODBUS communication mode selection	0: Standard RTU mode 1: Master slave mode 1 (Slave only accepts frequency) 2: Master slave mode 2 (Slave accepts frequency and start-stop command)	0	◎
Group F0D Monitoring Function				
F0D.00	Setting frequency	0.00Hz~F00.03	0.00Hz	●
F0D.01	Output frequency	0.00Hz~F00.03	0.00Hz	●
F0D.02	Ramp reference frequency	0.00Hz~F00.03	0.00Hz	●
F0D.03	Output voltage	0~1200V	0V	●
F0D.04	Output current	0.0~5000.0A	0.0A	●
F0D.05	Motor rotational speed	0~65535rpm	0 rpm	●
F0D.06	Reserve	0	0	●
F0D.07	Reserve	0	0	●
F0D.08	Motor power	-300.0~300.0% (relative to motor rated power)	0.0%	●
F0D.09	Output torque	-250.0~250.0% (relative to motor rated torque)	0.0%	●
F0D.10	Evaluated motor frequency	0.00Hz~F00.03	0.00Hz	●

Function Code	Name	Setting Range	Default	Property
F0D.11	DC bus voltage	0.0~2000.0V	0V	●
F0D.12	Digital input terminals state	0x00~0x1F	0	●
F0D.13	Digital output terminals state	0~3	0	●
F0D.14	Digital adjustment	0.00Hz~F00.03	0.00Hz	●
F0D.15	Reserve	0	0	●
F0D.16	Linear speed	0~65535	0	●
F0D.17	Length value	0~65535	0	●
F0D.18	Counting	0~65535	0	●
F0D.19	AI1 input voltage	0.00~10.00V	0.00V	●
F0D.20	Reserve	0	0	●
F0D.21	Reserve	0	0	●
F0D.22	HDI input frequency	0.00~50.00kHz	0.00kHz	●
F0D.23	PID reference value	-100.0~100.0%	0.0%	●
F0D.24	PID feedback value	-100.0~100.0%	0.0%	●
F0D.25	Power factor of the motor	-1.00~1.00	0.0	●
F0D.26	The running time	0-65535min	–	○
F0D.27	The current step of Multi-stage speed and PLC	0~15	0	●

Danger

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

5.1 Fault Code List

No	Fault Code	Fault Type	Possible Causes	Solutions
1	E.oU1	Accelerating overvoltage	◆ Input voltage is abnormal; ◆ There is large energy feedback.	◆ Check the input power; ◆ Check if the DEC time of the load is too short, or the AC drive starts during the rotation of the motor or it needs to increase the energy consumption components.
2	E.oU2	Decelerating overvoltage		
3	E.oU3	Constant overvoltage		
4	E.oc1	Accelerating overcurrent	◆ The acceleration and deceleration is too fast; ◆ The voltage of grid is too low; ◆ The power of AC drive is too low; ◆ The load transients or is abnormal; ◆ The grounding is short circuited and the output is phase loss; ◆ There is a strong external interference	◆ Increase the ACC and DEC time; ◆ Check the input power; ◆ Select the AC drive with a larger power; ◆ Check if the load is short circuited (the grounding short circuited or the wire short circuited) or the rotation is not smooth; ◆ Check the output configuration; ◆ Check if there is strong interference.
5	E.oc2	Decelerating overcurrent		
6	E.oc3	Constant overcurrent		
7	E.LU	Bus undervoltage fault	◆ The voltage of power supply is too low.	◆ Check the input power of the supply line
8	E.oL1	Motor overload	◆ The voltage of power supply is too low; ◆ The motor setting rated current is incorrect; ◆ The motor stall or load transients is too strong.	◆ Check voltage of power supply ◆ Reset the rated current of the motor; ◆ Check the load and adjust torque boost.

No	Fault Code	Fault Type	Possible Causes	Solutions
9	E.oL2	The AC drive overload	◆ The acceleration is too short; ◆ Reset the rotating motor; ◆ The voltage of power supply is too low; ◆ The load is too heavy; ◆ Close loop vector control, reverse direction of the code panel and long low-speed operation.	◆ Increase the acceleration time; ◆ Avoid restart after stopping; ◆ Check the power of the supply line; ◆ Select a AC drive with bigger power; ◆ Select a proper motor.
10	E.SPo	Output phase loss	◆ U, V, W phase loss output (Or serious asymmetrical three-phase of the load).	◆ Check input power of supply line.
11	E.oH1	IGBT module overheat	◆ Ambient temperature is too high; ◆ The time of overload running is too long.	◆ Lower ambient temperature
12	E.EF	External fault	◆ Sn external fault input terminals action	◆ Check input power of supply line
13	E.CE	485 communication fault	◆ The baud rate setting is incorrect; ◆ Communication wire failure; ◆ The communication address is wrong; ◆ There is strong interference to the communication.	◆ Set proper baud rate; ◆ Check the communication interface wiring; ◆ Set the correct communication address ◆ Replace or change the wiring, improve anti-interference capability.
14	E.IcE	Current detecting fault	◆ The connection of control board is not good; ◆ Hoare components are broken; ◆ The modifying circuit is abnormal.	◆ Check the connector and repatch; ◆ Replace Hoare current sensor; ◆ Replace the main control board.
15	E.EEP	EEPROM operation fault	◆ There is an error in read-write control parameter; ◆ EEPROM is damaged.	◆ Press STOP/RST to reset; ◆ Replace the main control board
16	E.IdE	PID feedback disconnection fault	◆ PID feedback offline; ◆ PID feedback source disappear.	◆ Check the PID feedback signal; ◆ Check the PID feedback source.

No	Fault Code	Fault Type	Possible Causes	Solutions
17	E.BrE	Braking unit fault	◆ Braking circuit fault or damage to the brake pipes; ◆ External braking resistor is not sufficient.	◆ Check the braking unit and replace the braking pipe; ◆ Increase the braking resistor.
18	E.End	Running time reached	◆ The actual running time is longer than the internal setting running time.	◆Ask for the supplier and adjust the setting running time.

5.2 Common Faults and Solutions

You may come across the following faults during the use of the AC drive. Refer to the following table for simple fault analysis.

No	Fault	Possible Causes	Solutions
1	No display at power-on	◆ There is no power supply to the AC drive or the power Input to the AC drive is too low; ◆ The power supply of the switch on the AC drive board is faulty; ◆ The rectifier bridge is damaged; ◆ Buffer resistance of the drive is damaged; ◆ Control board and keypad are faulty; ◆ The cable connecting the control board and the drive board and the operation panel breaks.	◆ Check the input supply; ◆ Check the bus voltage; ◆ Reconnect the driver board and the control board 26-core cable; ◆ Contact the agent for technical support.
2	is displayed at power-on	◆ The cable between the driver board and the control board is not good; ◆ Related components on the board are damaged.	◆ Re-connect the driver board and the control board 26-core cable; ◆ Contact the agent for technical support.

No	Fault	Possible Causes	Solutions
3	Power ON AC Drive displaynormal, after runningshow P.oFF and quickly extinguishOff, a few seconds later display show normal	◆ The cooling fan is damaged or locked-rotor occurs; ◆ The peripheral control terminal cable is short circuited.	◆ Replace the damaged fan; ◆ Eliminate external short circuited fault.
4	E.oH1 (module overheat) fault is reported frequently	◆ The setting of carrier frequency is too high; ◆ The cooling fan is damaged, or the air filter is blocked; ◆ Components inside the AC drive are damaged (thermal coupler or others).	◆ Reduce the carrier frequency (F00.15); ◆ Replace the fan and clean the air filter; ◆ Contact the agent or our company for technical support
5	The motor does not rotate after the AC drive runs	◆ Motor and motor cable are faulty; ◆ Motor nameplate parameters are set improperly; ◆ The cable between the drive board and the control board is in poor contact; ◆ The drive board is faulty.	◆ Ensure the cable between the AC drive and the motor is normal; ◆ Replace the motor or clear mechanical faults; ◆ Check and re-set the motor nameplate parameters; ◆ Check the cable between drive board and control panel; ◆ Contact the agent or our company for technical support.
6	Input Sn terminals are invalid	◆ The parameters are set incorrectly; ◆ The external signal is incorrect; ◆ The control board is faulty.	◆ Reset the parameters in group F04; ◆ Re-connect the external signal cables; ◆ Contact the agent or our companyfor technical support.
7	The AC drive reports over-current and over-voltage frequently	◆ The motor nameplate parameters are set improperly; ◆ The acceleration/deceleration time is improper; ◆ The load fluctuates.	◆Re-set the motor nameplate parameters; ◆Set proper acceleration / deceleration time; ◆Contact the agent or our company for technical support.

Chapter 6 Rs485 Communication Protocol

6.1 Function Protocol

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

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

Read data: Slave responding frame

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

2. Write a single data (0x06)

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

Write data response :

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

3. Host broadcast frequency and start-stop command(0X20)

Slave ADDR	xx
CMD	0x20
High bit of start-stop command	xx
Low bit of start-stop command	xx
High bit of setting frequency value	xx
Low bit of setting frequency value	xx
Low bit of CRC check	xx
High bit of CRC check	xx

Slave no response.

4 Error message response

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

Slave Add	xx
CMD	0x83 or 0x86
Error code	xx
Low bit of CRC check	xx
High bit of CRC check	xx

Error codes are defined as follows:

Error Code	Error Name	Detailed Explanation of the Error
0x01	Illegal CMD	Slave received command code is illegal or not exist.
0x02	Illegal Add.	Slave receives operation address is cross-border or illegal.
0x03	Illegal Data	It is illegal that the salve receives data is not within the set range or the range is limited by other function.
0x04	Operation failed	Invalid for the function setting during the writing operation of the parameter, such as the function of the input terminals cannot be defined repeatedly.
0x05	Password Error	Written password is different from password set by the user.
0x06	Data frame error	Slave received data frame length is incorrect or CRC checksum can not be pass.
0x07	Parameters only for read	Slave received the function parameters of the write operation is a read-only parameter.
0x08	Parameters can not be modified during running	Slave receives the function parameter of write operation can not be modified during running.
0x09	Password protection	Slave has set a user password, but there is no password verification

6.2 Communication Parameter Address

MODBUS communication includes read and write operations of function parameters and some special register's read and write operations. Special register includes control register, set registers, state registers, and factory information.

(1) The Definition of Communication Parameter Address The function code number and parameter label is the representation rule of the parameter address.

High byte: F00-F0D Low byte:：00-FF

For example, to access F04.13, the access address of the parameter is 0xF40D；

Function code group	Absolute address	Function code group	Absolute address
Group F00	0x00	Group F01	0x01
Group F02	0x02	Group F03	0x03
Group F04	0x04	Group F05	0x05
Group F06	0x06	Group F07	0x07
Group F08	0x08	Group F09	0x09
Group F0A	0x0A	Group F0B	0x0B
Group F0C	0x0C	Group F0D	0x0D

Note: Due to EEPROM is stored frequently , it will reduce the life of the EEPROM, so some parameters don't need to store in the communication mode, as long as change the RAM value, the absolute address in the table corresponding to the parameter RAM address high post. To achieve this function, as long as the absolute address regard address high post

For example：

The parameter F04.13 is stored in EEPROM , and the address is represented as 0xF40D；

The parameter F04.13 is not stored in the EEPROM, and the address is represented as 0x040D；

Read of both EEPROM address and RAM address are valid.

When read the function code parameters, user can only read the maximum of 16 consecutive address parameters.more than 16, the AC drive will return the illegal data.

When writing function parameter, each can only write a parameter. Users should pay attention to the setting value that cannot exceed the set range of function parameters.

Function parameters set permissions and function code attributes related parameters, such as read-only parameter is not writable, the operation cannot be changed in the running also cannot be written.

The password is set by the user, in the case without decryption, all of the parameters cannot write. User password and parameter autotune cannot via communication to write. Otherwise, the AC drive will return the fault information.

6.3 Special register address definitions

Register	Function	Add	Setup description	R/W
Control Register	Control Word register	2000H	0001H: Forward running 0002H: Reverse running 0003H: Forward jog 0004H: Reverse jog 0005H: Deceleration stop 0006H: Free stop (Emergency Stop) 0007H: Fault reset 0008H: Jog stop 0009H: Pre-excitation	W

Register	Function	Add	Setup description	R/W
Control Register	Control Bit register	2001H	Bit0:=0 invalid; =1 Forward running Bit1:=0 invalid; =1 Reverse running bit2:=0 invalid; =1 Forward jog Bit3:=0 invalid; =1 Reverse jog Bit4:=0 invalid; =1 Deceleration stop Bit5:=0 invalid; =1 Free stop Bit6:=0 invalid; =1 Fault reset Bit7:=0 invalid; =1 Jog stop Bit8=0 Pre-excitation	W
Setting Register	Setting frequency	3000H	0~Fmax(unit：0.01Hz)	W
	PID reference	3001H	0~1000(1000 correspondence to100.0%)	W
	PID feedback	3002H	0~1000(1000 correspondence to100.0%)	W
	Virtual input terminal	3009H	0x0000~0x00FF (BIT0~BIT4 correspondence to S1~S5)	W
	Virtual output terminal	300AH	0x0000~0x000F	W
	Analog output set	300CH	-1000~1000 (1000 correspondence to100.0%)	W
Status Register	Status register 1	6000H	0001H: Forward running 0002H: Reverse running 0003H: Inverter in stopping 0004H: Inverter in fault 0005H: Inverter in OF0F	R
	Status register 2	6001H	Bit0: =0 isn't ready to run; =1 ready to run Bi1~2: =00 motor1; =01 motor2 Bit3: =0 Asynchronous motor =1 Synchronous motor Bit4: =0: No overload pre-warning =1:overload pre-warning Bit5~Bit6: =00 keyboard control =01 terminal control =10 Communication control	R
	Fault Code	6002H	See Fault Type Description	R

Note: R is only for read, write is invalid and will report fault; W is only for write, read is invalid and will report fault