SPIN2 Solar Pump Drivers

Solar Pump Drivers (2.2kW – 37kW)

Contents

Notes for Safe Operation

■Before Installation

WARNING
Do not install or operate the controller which is damaged or has missing parts. Otherwise, it may result in equipment damage or life harm.

■ Installation

CAUTION
◎ Hold the bottom of the controller when installing or moving the controller, you must not just hold the shell， in order to prevent the injury or breaking of controller. ◎ Install the controller on nonflammable material like metal. Otherwise it may cause a fire. ◎ When the controller is mounted in a protective cabinet, the cabinet needs to set vents to ensure ambient temperature is below 40℃,Otherwise it may be damaged because of high temperature. ◎ When installing the controller, you should avoid direct sunlight, the controller can be installed under the PV arrays.

WARNING
◎Ensure only qualified personnel can install and operate the controller. Otherwise it can cause an electrical shock or damage of the controller. ◎ Make sure the controller is isolated from power supply by the circuit breaker. Otherwise it may cause a fire. ◎ Make sure that the ground terminal ⏚ is grounded correctly. ◎ Do not touch the power input terminals or the pump's terminals . Otherwise it may cause an electrical shock.

■ Operation

CAUTION
◎ Do not open or remove the front cover during operation. Otherwise it may cause an electrical shock. ◎ Before testing the pump must be installed; you cannot make the pump dry-run for a long time. In order to test the pump, the maximum dry-run time is not more than 15s ◎ If the pump turning is reversed, it can change any two cables of the pump's three power cables. ◎ When the water pump is stopped due to the light shadow, it will restart the operation after 300s. ◎ If a water level probe is installed in the well, when the water level is below the level of water shortage, the water pump will stop. If there is no water level probe, it will need to be short connection of controller's related terminals. If a water level probe is not used, the controller's terminals must be short connected

■ Maintenance and check

WARNING
◎ Only qualified or authorized professional personnel can maintain, replace and inspect the controller. Otherwise it may cause damage and injury. ◎ Wait at least 10 minutes after the power failure, or make sure that is no residual voltage before carry out maintenance and inspection, otherwise it may cause damage.

■ Others

WARNING
◎ Failing to follow these instructions, which result in damage to the machine, cannot enjoy the warranty service.

Chapter 1 How It Works

1.1 System Description

The SPIN2 solar pumping system serves to provide water in remote applications where electrical grid power is either unreliable or unavailable. The controller can convert DC power from the PV array to AC power，and drive variable kinds of pumps. In sunny days, the SPIN2 solar pumping system can continuously pump water. The system is without batteries and other energy storage devices, it is recommended to take water to a reservoir for later use and water sources are those natural or special such as river, lake, well or waterway, etc. A float switch can be installed in the water tower to control the pump operation. And install a low-level probe in well to detect the well water so that when the water shortage pump is stopped. Figure 1 shows a typical diagram of a SPIN2 solar pumping system. The major parts and components in the system are listed after the diagram.

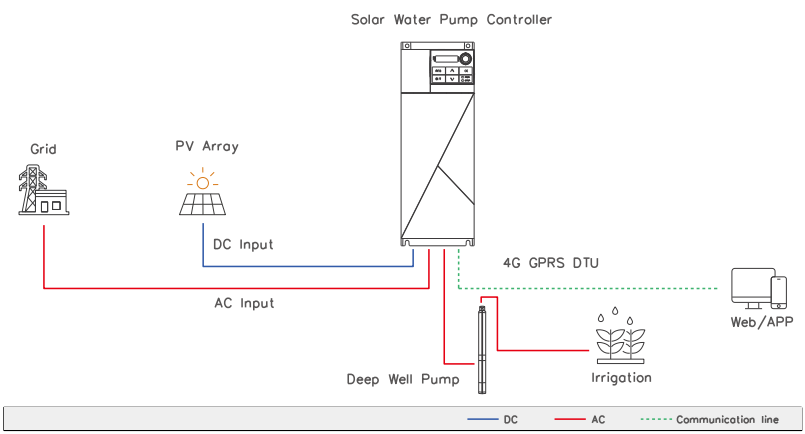


Figure 1-1-1 SPIN2 solar pumping system

Chapter 2 General Information

The SPIN2 solar pump controller is a variable speed motor drive designed to run any IEC three-phase asynchronous motors. The SPIN2 solar pumping system provides water to remote locations by converting high voltage, direct current from a solar array into alternating current to run a standard three-phase asynchronous motor.When solar energy is not enough AC input power can work as a backup power supply.The controller provides fault detection, motor soft start, and speed control. The SPIN2 solar pump controller is designed to provide these features with the plug and play ease of installation.

The SPIN2 solar pump controller is designed with the high standard of reliability expected of products.In conditions of weak sunshine,the controller can also drive the pump to lift water,AC input power can work as a backup power supply,to prevent the system panels from failure,and controller only stops in extreme conditions.Full operation is restored automatically whenever abnormal conditions subside.

2.1 Inspection

Before starting ， inspect the SPIN2 solar pump controller unit. Verify that the part number is correct and that no damage has occurred during transit.

NOTE: SPIN2 solar pump controller is one component of a SPIN2 solar pumping system which has other two optional components, solar array and AC pump with motor.

2.2 Descriptions and Features

The SPIN2 solar pump controller is based on a standard SPIN2 platform controlling a standard three-phase asynchronous motor driving a pump powered by a solar array or an optional AC generator backup.

The SPIN2 solar pump controller continuously monitors system performance and

incorporates a number of features for pumping system protection. In the event of a fault, the SPIN2 solar pump controller will indicate the type of fault through the LED display mounted on the front cover of controller.

The SPIN2 solar pumping system is optimized for pumping under adverse input power conditions unique to solar arrays：

• Internal diagnostics will tolerate a lower input voltage.

• Whenever possible, the controller attempts to drive the pump load by maximizing power output from the solar array.

An easy to use interface is provided to enhance configurability and enable remote system monitoring.

• A LED display provides a detailed indication of system status.

• A small keypad offers flexibility for selection of user options.

2.3 Protection Features

Electronic monitoring gives the controller the capability to monitor the system and automatically shut down in the event of:

• Dry well conditions – with low level switch
• Bound Pump – with auto-reversing torque.
• High Voltage Surge
• Low Input Voltage
• Open Motor Circuit
• Short circuit
• Overheat

NOTE: This controller provides motor overload protection by preventing motor current from exceeding rating current and by limiting the duty cycle in the event of low water level. This controller does not provide over temperature sensing of the motor.

2.4 SPIN2 Technical Specification

General Parameters			
Protection			
Surge Protection	Integrated	Overvoltage Protection	Integrated
Under voltage Protection	Integrated	Locked pump Protection	Integrated
Open circuit Protection	Integrated	Short circuit Protection	Integrated
Overheated Protection	Integrated	Dry Run Protection	Integrated
Communication			
MODBUS Communication Card	Optional RS-485		
Others			
Ambient Temperature Range	-20°C～60°C;>45°C, Derating as Required		
Cooling Method	Fan Cooling		
Ambient Humidity	≤ 95%RH		
Certificates	IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN61800-3:2004,CE		
Input Voltage	Single Phase: 150-450VDC /1PH 220-240VAC 50/60Hz Three Phase: 220-900VDC /3PH 380-480VAC 50/60Hz		

Sheet 2-5-1 SPIN2 Technical Specification

2.6 SPIN2 Model Selection

Controller Model	SPIN2-00220S	SPIN2-00220H	SPIN2-00400H	SPIN2-00550H
Input Data				
Max Input Voltage(Voc)	DC 450V	DC 900V		
Starting voltage [V]	DC 180V	DC 350V		
Optimum input voltage [V]	DC 330V	DC 560V		
Recommended Voltage, at MPP	DC 275-380V	DC 500-750V		
Recommended PV Array Power [kW]	2.7 ~ 3.5	2.7 ~ 3.5	4.8 ~ 6.4	6.6 ~ 8.8
Alternate AC Generator				
Input Voltage	1P 220-240V	3P 380-480V		
Max Amps(RMS)[A]	23	5.8	10.5	14.6
Power and VA Capability[kVA]	4	4	5.9	8.9
Output Data				
Output Voltage, Rated	3P 0-220/240V	3P 0-380/480V		
Max Amps(RMS)[A]	9.6	5.1	9	13
Output Power, Rated[kW]	2.2	2.2	4	5.5
Output Frequency	0～50Hz/60Hz			

Sheet 2-6-1 SPIN2 2.2 kW—5.5kW Selection Sheet

Controller Model	SPIN2-00750H	SPIN2-01100H	SPIN2-01500H	SPIN2-01850H
Input Data				
Max Input Voltage(Voc)	DC 900V			
Starting voltage [V]	DC 350V			
Optimum input voltage [V]	DC 560V			
Recommended Voltage, at MPP	DC 500-750V			
Recommended PV Array Power［kW］	9 ~ 12	13.2 ~ 17.6	18 ~ 24	22.2 ~ 29.6
Alternate AC Generator				
Input Voltage	3P 380-480V			
Max Amps(RMS)[A]	20.5	26	35	38.5
Power and VA Capability[kVA]	11	17	21	24
Output Data				
Output Voltage, Rated	3P 0-380/480V			
Max Amps(RMS)[A]	17	25	32	37
Output Power, Rated[kW]	7.5	11	15	18.5
Output Frequency	0 ~ 50Hz/60Hz			

Sheet 2-6-2 SPIN2 7.5 kW—18.5 kW Selection Sheet

Controller Model	SPIN2-02200H	SPIN2-03000H	SPIN2-03700H
Input Data			
Max Input Voltage(Voc)	DC 900V		
Starting voltage [V]	DC 350V		
Optimum input voltage [V]	DC 560V		
Recommended Voltage, at MPP	DC 500-750V		
Recommended PV Array Power［kW］	26.4 ~ 35.2	36 ~ 48	44 ~ 59.2
Alternate AC Generator			
Input Voltage	3P 380-480V		
Max Amps(RMS)[A]	46.5	62	76
Power and VA Capability[kVA]	30	40	57
Output Data			
Output Voltage, Rated	3P 0-380/480V		
Max Amps(RMS)[A]	45	60	75
Output Power, Rated[kW]	22	30	37
Output Frequency	0 ~ 50Hz/60Hz		

Sheet 2-6-3 SPIN2 22 kW—37 kW Selection Sheet

Chapter 3 Mechanical and Electrical Installation

3.1 Outline & Installation Dimensions Diagram(Unit: mm)

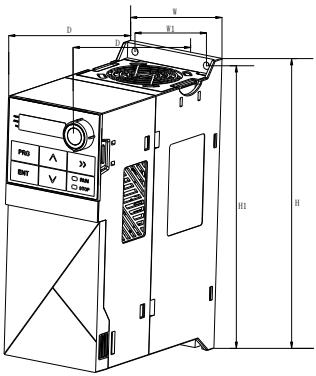


Figure 4-1-1 Dimensions V1 parameters

Model	External dimension				Installation dimension		Hole size
	H	W	D	D1	H1	W1	d
SPIN2-00220S	190	72	146	138	180	56	5
SPIN2-00220H							
SPIN2-00400H							

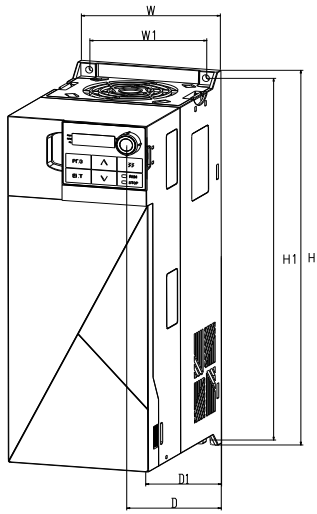


Figure 4-2-2 Dimensions V2 parameters

Model	External dimension				Installation dimension		Hole size
	H	W	D	D1	H1	W1	d
SPIN2-00550H	250	95	153.6	145	240	80	5
SPIN2-00750H							

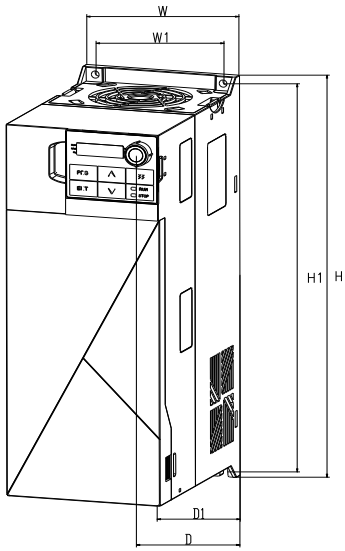


Figure 4-2-3 Dimensions V3 parameters

Model	External dimension				Installation dimension		Hole size
	H	W	D	D1	H1	W1	d
SPIN2-01100H	334	120	188.6	180	322	100	6
SPIN2-01500H							

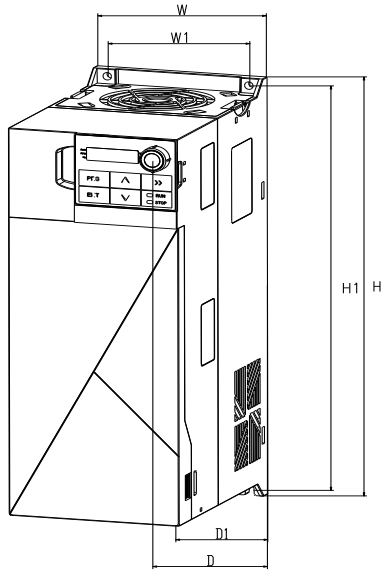


Figure 4-2-4 Dimensions V4 parameters

Model	External dimension				Installation dimension		Hole size
	H	W	D	D1	H1	W1	d
SPIN2-01850H	388	145	195.1	182.7	374	116	6
SPIN2-02200H							

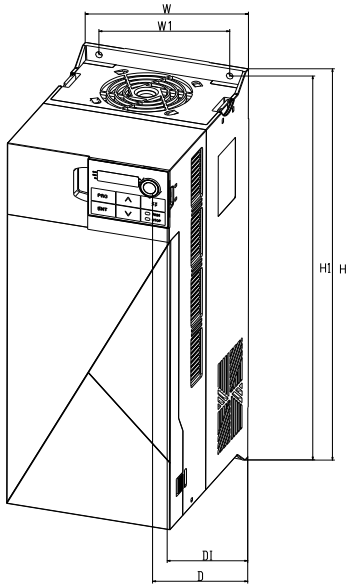
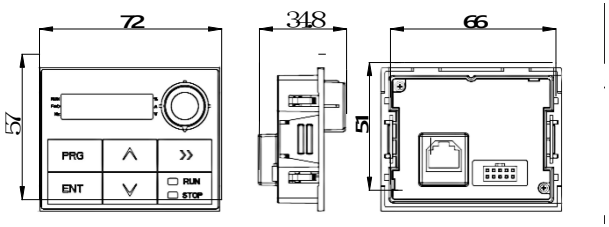


Figure 4-2-5 Dimensions V5 parameters

Model	External dimension				Installation dimension		Hole size
	H	W	D	D1	H1	W1	d
SPIN2-03000H	450	180	204	195	430	144	7
SPIN2-03700H							

3.2 Keypad Dimensions Diagram

■Keypad Dimensions

Specification	Single-phase 220V :2.2kW Three-phase 380V :2.2kW-37kW
Keyboard	
Size	
Configuration	Standard configuration

3.3 Mechanical Installation

3.3.1 Overheat protection

Install the SPIN2 solar pump controller in a control box with control terminals and power wiring. Install the control box out of direct sunlight to prevent overheating and reduced performance. The optimum location is on the mounting pole for the solar array underneath the array for protection from the sun, heat, and weather elements. Placing the control box in direct sunlight or high ambient temperatures will result in reduced performance due to temperature fold back protection of the SPIN2 solar pump controller. For optimum performance, maximize the shading of the control box.

It is recommended that use a wire tube to protect the electric wire from the destruction of wildlife and natural weathering, and bury the wire tube into the ground to strengthen protection. If you do not use a wire tube, you can use a higher quality outdoor cable.

3.3.2 Location Selection

The SPIN2 solar pump controller is intended for operation in ambient temperatures up to 60℃, but in order to avoid overheating caused by the failure, it is recommended to install the controller in the shadow position.

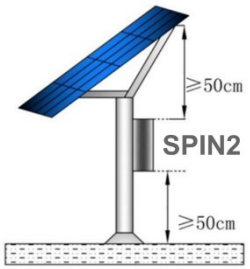


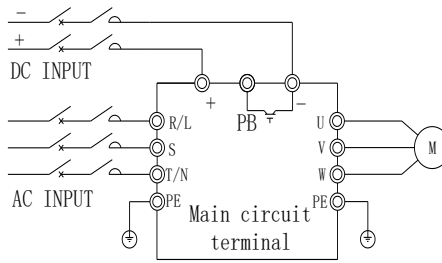
Figure 3-3-1 Control Box Location

3.4 Electrical Installation

3.4.1 Terminals

The following are typical figures of terminal blocks.

Note: Terminals are different in shapes and combinations, depending on different sizes of SPIN2 Solar Controllers.



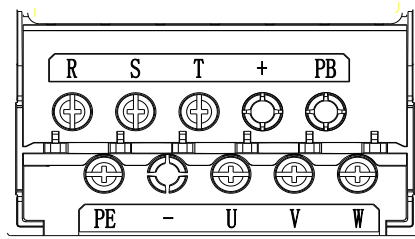


Figure 3-4-1 Main terminals (The sequence may be different from actual product)

Terminal mark	Name	Describe
R、S、T	Three-phase power input terminal	The three-phase AC power input is connected to the terminal
(+)、(-)	DC bus positive and negative terminals	Solar DC input terminal
U、V、W	Inverter output terminal	Connected three-phase motor
⏚	Ground terminal	Touch the ground

Figure 3-4-2 Control terminals (The sequence may be different from actual product)

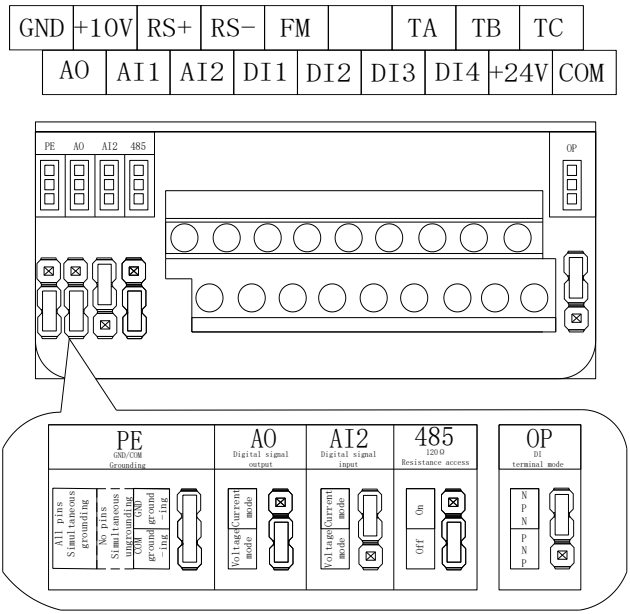


Figure 3-4-3 Jumper terminal function diagram 1

The jumper terminal is functional in icon state 1		
Transfer jumper	Chosen position	Function description
PE	Connect the upper two feet	GND Grounding
	Connect the lower two feet	COM Ungrounding
	All three pins (Default)	GND/COM Simultaneous grounding
	All three pins are not connected	GND/COM Simultaneous ungrounding
AO	Connect the upper two feet	AO Current output 0~20mA
	Lower pin connection (Default)	AO Voltage output 0~10V
Al2	Upper pin connection (Default)	AI Current input 4~20mA Range can be modified by parameter
	Connect the lower two feet	AI Voltage input 0~10V
485	Connect the upper two feet	RS485 Communication Connects to the

		120Ω terminal resistor
	Lower pin connection (Default)	RS485 Communication disconnect 120Ω terminal resistor
OP	Upper pin connection (Default)	NPN
	Lower pin connection	PNP

Category	Symbol	Name	Function
Power supply	+10V-GND	+ 10V	To provide extend +10V power supply ,the maximum output current is 20mA.Generally used as an external potentiometer working power supply.
	+24V-COM	+ 24V	Provide external +24V power supply, maximum output current: 150mA. Generally used as digital input and output terminals working power supply and external sensor power supply.
Analog input	AI1-GND	Analog input terminal 1	1、 The range of input voltage：DC 0V ~ 10V 2、 input impedance：100kΩ
	AI2-GND	Analog input terminal 2	1、The range of input：DC 0V ~ 10V/0mA ~ 20mA，It is determined by the AI2 jumper selection on the control board. 2、Input impedance :Voltage input 100kΩ, current input 500Ω
Digital input	DI1	Digital input1	1、Optocoupler isolation 2、 input impedance: 4kΩ 3、level input voltage range: 9V ~ 30V
	DI2	Digital input2	
	DI3	Digital input3	
	DI4	Digital input4	
Analog output	AO1-GND	Analog output1	AO1 determines the voltage or current output by selecting the AO jumper on the control board. The output voltage range is 0V ~ 10V Output current range: 0mA ~ 20mA AO2 can only be a voltage output.
	AO2-GND	Analog output2	
Digital output	FM-COM		Optocoupler isolation, bipolar open collector output Output voltage range: 0V ~ 24V Output current range: 0mA ~ 50mA Subject to function code F6.00 FM Terminal Output Mode Selection
Relay output	TA-TB	NC	Contact drive capability:

Category	Symbol	Name	Function
	TA- TC	NO	AC 250V，3A，COSø=0.4； DC 30V，1A
RS485 communication	RS+	communication terminal positive	RS485Differential signal positive end
	RS-	Communication terminal negative	Differential signal negative end

Table 3-4-4 Control terminals and functions

3.4.2 DC Input Wiring

For solar pumping systems, a two-pole DC breaker switch must be installed between the solar array and the SPIN2solar pump controller.

Connect the cables which comes from the two-pole DC breaker switch downstream terminals marked with “+” and “-” (positive and negative poles of Solar panel output), to SPIN2 solar pump controller’s terminals block labeled as “+”, “-”.

3.4.3 Junction box connection

If there are a large number of solar modules, it is necessary to use a junction box to converge the bus to the solar array. The junction box need to install fuses, lightning protection device and DC switch. The fuse and the DC switch can prevent the short circuit protection; the lightning protection device can play the direct current side the lightning protection function. The junction box must be sealed, and water can not enter

3.4.4 Ground Wiring

Ground terminal (GND) is labeled as this icon  Please refer to the instruction to this icon, or other equivalent icon or sign by local electrical codes or international standard. Correct grounding helps to prevent shock hazard if there is a fault in the motor.

3.4.5 Motor Wiring

Connect the cable with four wires from the Motor to the controller terminal block to terminals U, V, W, and GND .Check motor lead color to ensure correct installation.

3.4.6 Low water level probe wiring (optional)

In order to avoid dry pumping lead to pump damage can be connected a wells probe to the terminals of the SPIN2 solar pump controller, so as to detect the water level in wells and the wire maximum length can not more than 50m. If there is no water level probe for the detection of the water level, please keep the two terminals of the controller short. The controller can also detect water through the built-in software water detection function.

3.4.7 Water tank level float switch wiring (optional)

Use a floating ball switch to prevent reservoir overflow is recommended. When the reservoir is full, the pump will stop; when the water level is lower than the low level, the pump will be restarted. It can prevent the overflow, limit the unnecessary pump wear. The SPIN2 controller allows the use of small signal line to connect to remote float switch, even if the position of the reservoir is far away.

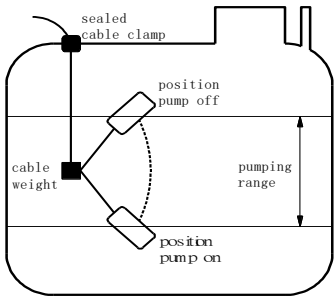


Figure 3-4-3 Floating Ball Diagram

Float switch request:

1. The minimum requirements for 1 mm² line diameter, the distance up to 50m
2. I f the application is in a long distance transmission, the need to use the shielded wire. The end of the shielding layer close to the controller needs to be grounded, the end close to the floating ball switch; the end close to the float switch is not required to be grounded.

Chapter 4 Display and Operation

4.1 Display interface introduction

The buttons on the operation panel can modify the function parameters of the frequency converter, monitor the working status of the frequency converter, and control the operation of the frequency converter (start, stop), etc. Its appearance and function area are shown as follows:

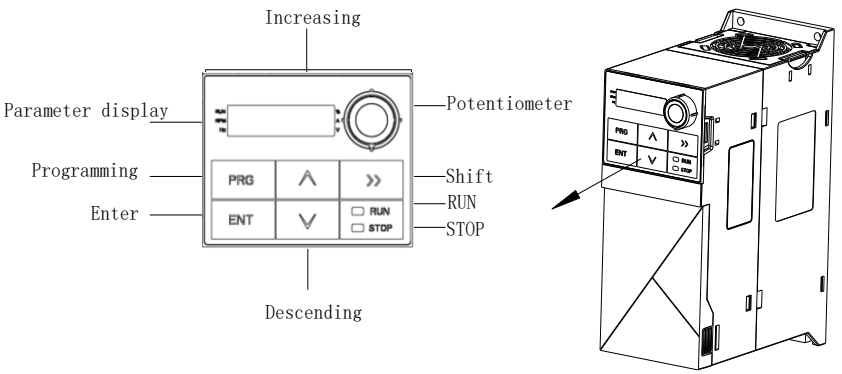


Figure 2-1-1 Schematic diagram of the operation panel

4.2 Quick on-board debugging operation

Press ENT to enter F0 and display F0.00, press up and down to select parameters, press ENT to enter the selected parameters for setting, press ENT to save the Settings, press PRG to return to F0, and then press PRG to return to 50.00 interface.

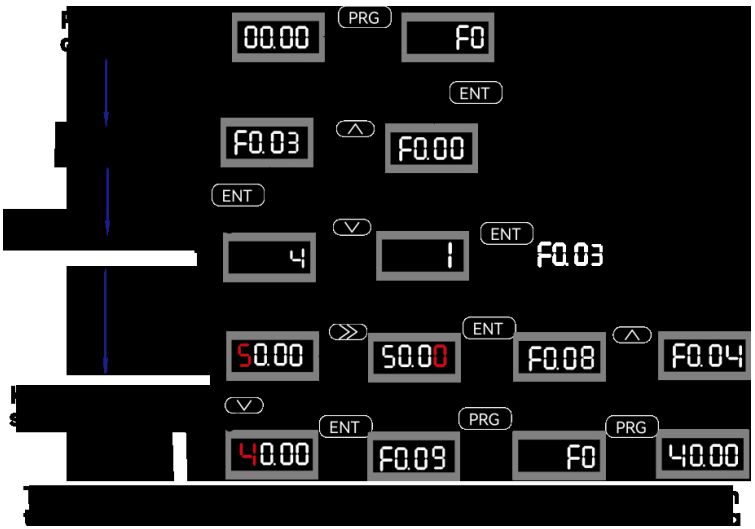


Figure 2-2-1 Rapid debugging process

4.3 Indicator and button function

Item	Name	Function
Indicator light	Indicator light	Hz: Frequency unit A : Current unit V : Voltage unit % : Percentage RUN:Operation FWD: Forward rotation
Button	PRG (Programming key)	Level 1 menu Enter or exit
	ENT(Confirm key/Forward &reverse switch)	Enter the menu screen step by step and confirm setting parameters (parameter setting state) Fast forward and reverse rotation of the load motor (in non-parameter setting state)
	△ (Increasing key)	Increment of data or function code
	▽ (Decrement key)	Decrement of data or function code
	>> (Shift key)	The display parameters can be selected in the stop display interface and the run display interface; When modifying a parameter, you can select the modification bit of the parameter.
	RUN (Run key)	In keyboard mode, it is used to run operations.
	STOP (Stop key)	In the running state, press this key to stop the running operation. When the fault alarm is in the state, it can be used for double-bit operation, and the characteristics of the key are restricted by the function code F7.02

Rotary knob	potentiometer	Can be used as a frequency given source. When the frequency converter is set with this knob as the frequency source, clockwise rotation increases the given value and counterclockwise decreases the given value.

Table 2-2-1 Indicator and button description

Chapter 5 Parameters List

5.1 Basic parameters

○ : The parameters can be modified at stop or running status.

● : The parameters cannot be modified at running status.

◎ : The parameters which are actual-detecting record value and cannot be modified.

Function code	Name	Setting range	Default	Attribute	Correspondence address
F0 Basic function parameter group					
F0.00	Motor control mode	**0：**SVC **1：**V/F **2：**-	1	●	0x0000
F0.01	Command source selection	**0：**Operation panel command channel **1：**Terminal command channel **2：**Serial port communication command channel	0	●	0x0001
F0.02	Run time UP/DOWN benchmark	**0：**Operating frequency **1：**Set frequency	1	●	0x0002
F0.03	Primary frequency source X selection	**0：**Digital setting F0.08 (adjustable terminal UP/DOWN, no memory after power failure) **1：**Digit setF0.08（terminal UP/DOWN Adjustable, power down memory） **2：**AI1given **3：**AI2given **4：**Keyboard potentiometer set **5：**The terminal PULSE pulse is set **6：**Multispeed instruction **7：**Simple PLC **8：**PID **9：**Communication setting **10:**AI3 given(expand)	4	●	0x0003

Function code	Name	Setting range	Default	Attribute	Correspondence address
F0.04	Auxiliary frequency source Y selection	Same as F0.03	0	●	0x0004
F0.05	The auxiliary frequency source Y range is selected during superposition	**0:** relative to the maximum frequency F0.10 **1:** relative to the frequency source X	0	○	0x0005
F0.06	Auxiliary frequency source Y range in superposition	0% ~ 150%	100%	○	0x0006
F0.07	Frequency source operation selection	**LED ones：Frequency source selection** **0:** indicates the primary frequency source **1:** indicates the result of primary and secondary operations **2:** Switch between primary frequency source and secondary frequency source **3:** Switch between the primary frequency source and the primary and secondary operation results **4:** Switch between auxiliary frequency source and primary and secondary operation results **LED ten: frequency source main and auxiliary operation relationship** **0:** primary + secondary **1:** Primary - secondary **2:** indicates the maximum value of both **3:** indicates the minimum value of both **4:** Main * auxiliary	0	○	0x0007
F0.08	Keyboard setting frequency	0.00Hz ~ Maximum frequency F0.10	50.00Hz	○	0x0008
F0.09	Running direction selection	**0:** indicates the same direction	0	○	0x0009

Function code	Name	Setting range	Default	Attribute	Correspondence address
		1: The direction is reversed **2:** Reverse prohibition			
F0.10	Maximum output frequency	0.00Hz ~ 320.00Hz	50.00Hz	●	0x000A
F0.11	Upper limit frequency source selection	**0:** The number is given F0.12 **1:** AI1 **2:** AI2 **3:** AI3 **4:** Set the terminal PULSE **5:** Communication given **6:** Reservations **7:** keyboard potentiometer set	0	●	0x000B
F0.12	upper limiting frequency	F0.14 ~ F0.10	50.00Hz	○	0x000C
F0.13	Upper frequency bias	0.00Hz ~ F0.10	0.00Hz	○	0x000D
F0.14	Lower frequency	0.00Hz ~ F0.12	0.00Hz	○	0x000E
F0.15	Lower frequency Operating mode	**0：**Run at lower frequency **1：**STOP **2：**Zero speed operation	0	○	0x000F
F0.16	Carrier frequency	0.5kHz ~ 16.0kHz	Model determination	○	0x0010
F0.17	Carrier PWM characteristic selection	**Bits: Select PWM mode** **0:** automatic switching; **1:**7 wave; **2:**5 wave; **3:** SPWM; **LED ten: carrier is associated with the output frequency** **0：**Independent of output frequency **1：**It depends on the output frequency **LED hundred: random PWM depth** **0：** OFF **1-8：**Open, adjust depth	1010	●	0x0011

Function code	Name	Setting range	Default	Attribute	Correspondence address
		LED kilobit: Over modulation option **0：**OFF **1：**ON			
F0.18	Acceleration time 1	0.0s ~ 6500.0s	Model determination	○	0x0012
F0.19	Deceleration time1	0.0s ~ 6500.0s	Model determination	○	0x0013
F0.20	Parameter initialization	**0:** no action is taken **1:** Restore factory value (do not restore motor parameters) **2:** clears the record information **3:** Restore factory value (restore motor parameters)	0	●	0x0014
F0.23	Unit of acceleration and deceleration time	**0:** 1 second **1:** 0.1 seconds **2:** 01 seconds	1	●	0x0017
F0.24	Acceleration and deceleration time reference frequency	**0:** Maximum frequency (F0.10) **1:** Set the frequency **2:** 100 Hz	0	●	0x0018
F0.25	Fan control	**Bits: start/stop control** **0:** The fan runs after the inverter is powered on **1:** Shutdown is related to temperature, and operation is running **2:** Stop The fan stops, and the operation is related to temperature Tens place: Enables the speed adjustment function **0:** Off **1:** Enable	01	○	0x0019
F0.26	Frequency command decimal	**1:**1 decimal places	2	●	0x001A

Function code	Name	Setting range	Default	Attribute	Correspondence address
	point	**2:**2 decimal places			
F0.27	Modulation ratio coefficient	10.0 ~ 150.0%	97.0%	○	0x001B
F1 Start stop control parameter group					
F1.00	Start-up operation mode	**LED bits: Boot mode** **0:** starts directly from the start frequency **1:** Start after speed tracking and direction judgment **2:** The asynchronous machine starts with pre-excitation	00	●	0x0100
F1.01	Speed tracking mode	**LED ten: speed tracking direction** **0:** Consistent with shutdown direction **1:** Consistent with starting direction **2:** Automatic search	0	●	0x0101
F1.02	Speed tracking time	0.01 ~ 60.00s	1.00s	○	0x0102
F1.03	Speed tracking current loop gain	0.00 ~ 100.00	10.00	○	0x0103
F1.04	RPM tracking speed gain	0.01 ~ 10.00	2.00	○	0x0104
F1.05	Speed tracking current	50 ~ 200%	150%	○	0x0105
F1.06	Starting frequency	0.00 ~ 60.00Hz	0.00Hz	○	0x0106
F1.07	Startup frequency duration	0.0 ~ 50.0s	0.0s	●	0x0107
F1.08	Braking current before starting	0.0 ~ 150.0%	80.0%	●	0x0108
F1.09	Braking time before starting	0.0 ~ 60.0s	0.0s	●	0x0109
F1.10	Stop method	**0:** Slow down and stop **1:** Free shutdown	0	○	0x010A
F1.11	Stop DC braking start frequency	0.00Hz ~F0.10	0.00Hz	○	0x010B
F1.12	Stop DC braking wait time	0.0s ~ 100.0s	0.0s	○	0x010C
F1.13	Stop DC braking current	0.0% ~ 150.0%	80.0%	○	0x010D
F1.14	Stop DC braking duration	0.0s ~ 100.0s	0.0s	○	0x010E

Function code	Name	Setting range	Default	Attribute	Correspondence address
F1.16	Energy consumption brake action voltage	115.0% ~ 140.0%	130%	●	0x0110
F1.17	Magnetic flux braking gain	10 ~ 150%	80%	○	0x0111
F1.18	Magnetic flux braking operating voltage	110% ~ 500%	120%	○	0x0112
F1.19	Flux brake limiting	0 ~ 200%	20%	○	0x0113
F1.20	Acceleration and deceleration selection	0: straight line 1: S curve	0	●	0x0114
F1.21	S-curve initial acceleration rate	20.0% ~ 100.0%	50.0%	●	0x0115
F1.22	S-curve initial deceleration rate	20.0% ~ 100.0%	50.0%	●	0x0116
F1.23	Zero speed holding torque	0.0 ~ 150.0%	0	●	0x0117
F1.24	Zero speed holding torque time	0.0 to 6000.0sec. If the value is set to 6000.0s, the value remains unchanged without time limitation	Model determination	●	0x0118
F1.25	Start pre-excitation time	0.00 ~ 60.00s	0.20	○	0x0119
F1.26	Shutdown frequency	0.00 ~ 60.00Hz	0.00Hz	○	0x011A
F1.27	Power failure restart action selection	**0:** invalid **1:** Valid	0	○	0x011B
F1.28	Power failure restart waiting time	0.00 ~ 120.00s	0.50s	○	0x011C

Function code	Name	Setting range	Default	Attribute	Correspondence address
F1.29	Select the terminal running protection	**LED bits: Select the terminal run command when powering on** **0:** The terminal running command is invalid during power-on **1:** Terminal running commands are valid during power-on **LED ten: Run command given channel switch terminal run command selection** **0:** The terminal running command is invalid **1:** The terminal command is valid when the terminal is cut in	11	○	0x011D
F2 Motor parameter group					
F2.00	Motor type	**0：**Asynchronous machine（AM） **1：**Permanent magnet synchronous motor（PM） **2：**Single-phase induction motor (VF control only)	0	●	0x0200
F2.01	Rated power of motor	0.1kW ~ 400.0kW	Model determination	●	0x0201
F2.02	Rated voltage of motor	1V ~ 440V		●	0x0202
F2.03	Rated current of motor	0.1 ~ 2000.0A		●	0x0203
F2.04	Rated frequency of motor	0.01Hz ~ F0.10		●	0x0204
F2.05	Rated motor speed	1rpm ~ 65000rpm		●	0x0205
F2.06	Motor stator resistance	0.001 ~ 65.000		●	0x0206
F2.07	Motor rotor resistance	0.001 ~ 65.000		●	0x0207
F2.08	Motor fixed rotor inductance	0.1 ~ 6500.0mH		●	0x0208
F2.09	Mutual inductance of motor fixed rotor	0.1 ~ 6500.0mH		●	0x0209

Function code	Name	Setting range	Default	Attribute	Correspondence address
F2.10	Motor no-load current	0.1 ~ 650.0A		●	0x020A
F2.11	Tuning selection	**0:** no operation is performed **1:** static tuning 1 **2:** Full tuning **3:** Static tuning 2(AM calculated Lm)	0	●	0x020B
F2.12	G/P model	Change parameters can only be used to query factory models and cannot be modified **0:** Type G machine **1:** P-type machine	Model determination	□	0x020C
F2.13	Single-phase motor turns ratio	10 -200%	100%	●	0x020D
F2.14	Current calibration coefficient of single-phase motor	50 -200%	120%	●	0x020E
F2.15	Number of motor poles	2-48	4	●	0x020F
F2.22	Stator resistance of synchro	0.001 ~ 65.000（0.0010hm）	Model determination	●	0x0216
F2.23	Synchro d-axis inductance	0.01mH ~ 655.35mH		●	0x0217
F2.24	Synchro Q-axis inductance	0.01mH ~ 655.35mH		●	0x0218
F2.25	Synchro back electromotive force	0.1V ~ 1000.0V		○	0x0219
F2.29	Back potential identification current	0.1% - 100.0%	50.0%	●	0x021D
F2.31	Asynchronous no-load current per unit value	0.1%	Model determi	●	0x021F
F2.32	Per unit asynchronous stator resistance	0.01%		●	0x0220
F2.33	Asynchronous rotor resistance per unit value	0.01%		●	0x0221
F2.34	Asynchronous mutual inductance per unit value	0.1%		●	0x0222
F2.35	Asynchronous leakage sensing per unit value	0.01%		●	0x0223

Function code	Name	Setting range	Default	Attribute	Correspondence address
F2.36	Per unit value of asynchronous leakage sensing coefficient	0.01%	nation	●	0x0224
F2.37	Synchronous stator resistance per unit value	0.01%		●	0x0225
F2.38	Per unit value of synchronous D-axis inductance	0.01%		●	0x0226
F2.39	Synchronous Q-axis inductance per unit value	0.01%		●	0x0227
F2.40	Back electromotive force of synchronous motor	0.1V	300.0V	●	0x0228
F3 Vector control parameter group					
F3.00	ASR(Speed loop) proportional gain 1	0.00 ~ 100.00%	20%	○	0x0300
F3.01	ASR(Velocity ring) integration time 1	0.01s ~ 10.00s	0.30	○	0x0301
F3.02	Loss of velocity protection value	0 ~ 5000ms (0 Turn off stall protection)	0ms	○	0x0302
F3.03	ASR filtering time 1	0.000 ~ 0.100s	0.000s	○	0x0303
F3.04	ASR switching frequency 1	0.00 ~ 50.00Hz	5.00Hz	○	0x0304
F3.05	ASR(Speed loop) proportional gain 2	0.00 ~ 100.00%	20%	○	0x0305
F3.06	ASR(Velocity loop) integration time 2	0.01s ~ 10.00s	0.30	○	0x0306
F3.07	retain		0	-	0x0307
F3.08	ASR filtering time 2	0.000 ~ 0.100s	0.000s	○	0x0308
F3.09	ASR switching frequency 2	0.00 ~ 50.00Hz	10.00Hz	●	0x0309
F3.10	Slip compensation coefficient	0 ~ 250%	100%	●	0x030A
F3.11	Maximum electric torque	0.0 ~ 250.0%	160.0%	○	0x030B
F3.12	Maximum electric torque	0.0 ~ 250.0%	160.0%	○	0x030C
F3.16	Current loop D axis proportional	0.1 ~ 10.0	1.0	●	0x0310

Function code	Name	Setting range	Default	Attribute	Correspondence address
	gain				
F3.17	Current loop D axis integral gain	0.1 ~ 10.0	1.0	○	0x0311
F3.18	Current loop Q axis proportional gain	0.1 ~ 10.0	1.0	○	0x0312
F3.19	Current loop Q axis integral gain	0.1 ~ 10.0	1.0	○	0x0313
F3.20	D-axis feedforward gain	0.0 ~ 200.0%	50.0%	○	0x0314
F3.21	Q-axis feedforward gain	0.0 ~ 200.0%	50.0%	○	0x0315
F3.22	Optimize the current loop bandwidth	0.0 ~ 99.99ms	2.00ms	○	0x0316
F3.23	Current loop control word		0	○	0x0317
F3.24	Weak magnetic control current upper limit	0 - 200%	50%	●	0x0318
F3.25	Weak magnetic control feed forward gain	0 - 500%	0%	●	0x0319
F3.26	Weak magnetic control proportional gain	0 - 9999	500	○	0x031A
F3.27	Weak magnetic control integral gain	0 - 9999	1000	○	0x031B
F3.28	MTPA gain	0.0 - 500.0%	0.0%	○	0x031C
F3.29	MTPA filtering time	0.0 - 999.9ms	100.0ms	○	0x031D
F3.30	Magnetic flux compensation coefficient	0 ~ 500%	100%	○	0x031E
F3.31	Open-loop vector observer gain	0 - 9999	1024	○	0x031F
F3.32	Open loop vector observation filtering time	1 ~ 100ms	20ms	○	0x0320
F3.33	The open-loop vector compensates the starting frequency	0 ~ 100.0%	1.0%	○	0x0321
F3.34	Open loop vector control word		8	○	0x0322
F3.35	Synchronous open loop start	**0:** direct startup.	0	○	0x0323

Function code	Name	Setting range	Default	Attribute	Correspondence address
	mode	**1:** Start at an Angle			
F3.36	Dc pull in time	1ms - 9999ms	500ms	○	0x0324
F3.37	Synchronous open loop vector low frequency boost	0 ~ 100.0%	20.0%	○	0x0325
F3.38	Synchronous open loop vector high frequency boost	0.0 ~ 100.0%	0.0%	○	0x0326
F3.39	Low frequency boost to maintain frequency	0.0 ~ 100.0%	10.0%	○	0x0327
F3.40	Low frequency increases cutoff frequency	0.0 ~ 100.0%	20.0%	○	0x0328
F3.46	Speed/torque control mode	**0:** Speed control **1:** Torque control	0	●	0x032E
F3.47	Torque given channel selection	**0:** F3.48 is set **1:** AI1□F3.48 **2:** AI2□F3.48 **3:** AI3□F3.48 **4:** PUL□F3.48 **5:** Keyboard potentiometer given □F7.01 **6:** RS485 communication given □F3.48	0	●	0x032F
F3.48	Torque keyboard numeric setting	0 ~ 200.0%	100.0%	○	0x0330
F3.49	Torque direction selection	**Units: torque direction setting** **0:** The torque direction is positive **1:** The torque direction is negative **Tens place: torque reversing setting** **0:** Torque reversal is allowed **1:** Torque reversal is prohibited	00	○	0x0331
F3.50	Upper limit of output torque	F3.51 ~ 200.0%	150.0%	○	0x0332
F3.51	Lower limit of output torque	0 ~ F3.50	0%	○	0x0333
F3.52	Torque control forward speed limit selection	0: F3.54 is set 1: AI1□F3.54	0sec	○	0x0334

Function code	Name	Setting range	Default	Attribute	Correspondence address
		2: AI2□F3.54 3: AI3□F3.54 4: PUL□F3.54 5: Keyboard potentiometer given □F3.54 6: RS485 communication given □F3.54			
F3.53	Torque control reversal speed limit selection	0: F3.55 is set 1: AI1□F3.55 2: AI2□F3.55 3: AI3□F3.55 4: PUL□F3.55 5: Keyboard potentiometer given □F3.55 6: RS485 communication given □F3.55 7: Purchase card	0	○	0x0335
F3.54	Torque control positive maximum speed limit	0.00 ~ upper limiting frequency	50.00Hz	○	0x0336
F3.55	Torque control reversal maximum speed limit	0.00 ~ upper limiting frequency	50.00Hz	○	0x0337
F3.56	Speed/torque switching delay	0.00 ~ 10.00s	0.01s	○	0x0338
F3.57	Torque acceleration time	0.00 ~ 10.00s	0.01s	○	0x0339
F3.58	Torque deceleration time	0.00 ~ 10.00s	0.01s	○	0x033A
F3.59	Forward and reverse torque dead zone time	0.00 ~ 650.00s	0.00s	○	0x033B
F4 V/F control parameter group					
F4.00	Linear VF curve selection	0: linear V/F curve; 1: Multi-point V/F curve 2: Square V/F curve 3-11:1.1-1.9 power VF curves, respectively; 12: V/F fully separated mode	0	●	0x0400
F4.01	Manual torque lift	0.1 ~ 30.0% , 0 Automatic torque	Model	○	0x0401

Function code	Name	Setting range	Default	Attribute	Correspondence address
		boost	determination		
F4.02	Torque boost cutoff frequency	0.00Hz ~ F0.10	50.00Hz	●	0x0402
F4.03	Self-set frequency F1	0.00Hz ~ F4.05	3.00Hz	●	0x0403
F4.04	Self-set voltage V1	0.0% ~ 100.0%	10.0%	●	0x0404
F4.05	Self-set frequency F2	F4.03 ~ F4.07	5.00Hz	●	0x0405
F4.06	Self-set voltage V2	0.0% ~ 100.0%	15.0%	●	0x0406
F4.07	Self-set frequency F3	F4.05~F4.09	8.00Hz	●	0x0407
F4.08	Self-set voltage V3	0.0% ~ 100.0%	22.0%	●	0x0408
F4.09	Self-set frequency F4	F4.07~Rated frequency of motor F2.04	12.00Hz	●	0x0409
F4.10	Self-set voltage V4	0.0% ~ 100.0%	31.0%	●	0x040A
F4.11	Oscillation suppression gain	0.0 ~ 10.0	Model determination	○	0x040B
F4.12	Oscillation suppression filtering time	1 - 1000ms	50ms	○	0x040C
F4.14	Percentage of output voltage	25 ~ 100%	100%	●	0x040E
F4.16	AVR Function	**0:** invalid **1:** Only slowing down is not effective **2:** Only constant speed is effective **3:** Effective	3	●	0x0410
F4.17	EVF torque boost gain	0 - 500.0%	50.0%	○	0x0411
F4.18	EVF Torque boost filtering time	1 - 1000ms	20ms	○	0x0412
F4.19	EVF Slip compensation gain	0 - 500.0%	0.0%	○	0x0413
F4.20	EVF Slip compensation filtering time	1 - 1000ms	100ms	○	0x0414
F4.21	Automatic energy saving selection	Units bit: 0 is off, 1 is on Tens: Frequency change exit depth	50	○	0x0415

Function code	Name	Setting range	Default	Attribute	Correspondence address
		Hundreds place: / Thousands: /			
F4.22	Lower limit frequency of energy saving operation	0.0 ~ 100.0%	25.0%	○	0x0416
F4.23	Energy saving and pressure reduction time	0.1 ~ 5000.0s	10.0s	○	0x0417
F4.24	Lower limit of energy saving and pressure reduction	20.0 ~ 100.0%	30.0%	○	0x0418
F4.25	Energy saving and pressure reduction rate	1 - 1000V/sec	50V/sec	○	0x0419
F4.26	Voltage regulated proportional gain	0 - 100	20	○	0x041A
F4.27	Voltage regulation integral gain	0 - 100	20	○	0x041B
F4.30	Stabilizer proportional gain	0.1% - 100.0%	10.0%	○	0x041E
F4.31	Stabilizer filtering time	1ms - 1000ms	50ms	○	0x041F
F4.32	Low frequency current lift	0.0% - 200.0%	100.0%	○	0x0420
F4.33	Low frequency boost maintenance frequency	0 ~ 100.0%	10.0%	○	0x0421
F4.34	Low frequency current boosts the cutoff frequency	0 ~ 100.0%	30.0%	○	0x0422
F4.35	D-axis current gain	0.0 - 100.0	2.0	○	0x0423
F4.36	Q-axis current gain	0.0 - 100.0	2.0	○	0x0424
F4.37	Magnetic flux set strength	0 - 500%	30%	○	0x0425
F4.38	Magnetic flux control proportional gain	0 - 9999	500	○	0x0426
F4.39	Magnetic flux controls the integral gain	0 - 9999	500	○	0x0427
F4.40	Dc pull in time	1ms - 9999ms	1000ms	○	0x0428
F4.41	Starting frequency	0.00Hz ~ 99.00Hz	3.00Hz	○	0x0429
F4.42	Starting frequency time	0.0sec ~ 999.0sec	3.0sec	○	0x042A

Function code	Name	Setting range	Default	Attribute	Correspondence address
F4.43	V/F Separate the output voltage source	0: function code F0.27 set 1: AI1 is set 2: AI2 is set 3: Reservations 4: Set the terminal PULSE 5: Multi-speed 6: Simple PLC 7: PID 8: Communication is given 100% corresponding to the rated voltage of the motor	0	○	0x042B
F4.44	V/F separation output voltage digital setting	0.0% - 100.0%	0	○	0x042C
F4.45	V/F separation voltage rise time	0.0-1000.0sec	1.0	○	0x042D
F4.46	V/F separation voltage drop time	0.0-1000.0sec	1.0	○	0x042E
F4.47	V/F separate stop mode	**0:** The voltage/frequency is simultaneously reduced to 0; **1:** The frequency decreases after the voltage drops to 0	0	○	0x042F
F5 Enter the terminal parameter group					
F5.00	DI1 Terminal function selection	**0：**Non-function **1：**FWD **2：**REV **3：**Three-wire operation control **4：**FJOG **5：**RJOG **6：**Terminal UP **7：**terminal DOWN **8：**Free break **9：**RESET **10：**Running pause **11：**External fault input(NO) **12：**Multispeed instruction terminal 1 **13：**Multispeed instruction terminal 2	1	●	0x0500
F5.01	DI2 Terminal function selection		2	●	0x0501
F5.02	DI3 Terminal function selection		53	●	0x0502
F5.03	DI4 Terminal function selection		54	●	0x0503
F5.08	AI1 Indicates the DI terminal function		0	●	0x0508
F5.09	AI2 Indicates the DI terminal function		0	●	0x0509

Function code	Name	Setting range	Default	Attribute	Correspondence address
		14：Multispeed instruction terminal 3 **15：**Multispeed instruction terminal 4 **16：**Acceleration and deceleration time select terminal 1 **17：**Acceleration and deceleration time select terminal 2 **18：**Frequency source switching (terminal, keyboard) **19：**The UP/DOWN setting clears zero **20：**Run the command to switch terminals **21：**Acceleration and deceleration prohibition **22：**PID pause **23：**PLC State reset **24：**Swing pause **25：**Counter input **26：**Counter reset **27：**Length count input **28：**Length reset **29：**Torque control prohibited **30：**PULSE impulse input（only DI4） **31：**Retain **32：**Immediate DC braking **33：**The external fault is normally closed **34：**Retain **35：**The direction of PID action is reversed **36：**External parking terminal 1 **37：**Control command switching terminal **38：**PID integration pause terminal			

Function code	Name	Setting range	Default	Attribute	Correspondence address
		39：Main frequency source and preset frequency switching terminal **40：**Auxiliary frequency source and preset frequency switching terminal **41：**Retain **42：**Retain **43：**PID parameter switching terminal **44：**User-defined fault 1 **45：**User-defined fault 2 **46：**Speed control/torque control switch **47：**Emergency stop **48：**External parking terminal 2 **49：**Decelerate DC braking **50：**The running time is cleared **51：**Timing enable **52：**Timing reset **54：Full water protection** **55：AC access**			
F5.10	AI1 Input selection	0：0-10V 3：0-5V 4：0.5-4.5V	0	●	0x050A
F5.11	AI2 Input selection	0：0-10V 1：4-20mA 2: 0-20mA 3：0-5V 4：0.5-4.5V	1	●	0x050B
F5.12	VDI1 terminal function selection	**0：**Non-function **1：**FWD **2：**REV **3：**Three-wire operation control **4：**FJOG **5：**RJOG **6：**Terminal UP	0	●	0x050C
F5.13	VDI2 terminal function selection		0	●	0x050D
F5.14	VDI3 terminal function selection		0	●	0x050E

Function code	Name	Setting range	Default	Attribute	Correspondence address
		7：terminal DOWN **8：**Free break **9：**RESET **10：**Running pause **11：**External fault input(NO) **12：**Multispeed instruction terminal 1 **13：**Multispeed instruction terminal 2 **14：**Multispeed instruction terminal 3 **15：**Multispeed instruction terminal 4 **16：**Acceleration and deceleration time select terminal 1 **17：**Acceleration and deceleration time select terminal 2 **18：**Frequency source switching (terminal, keyboard) **19：**The UP/DOWN setting clears zero **20：**Run the command to switch terminals **21：**Acceleration and deceleration prohibition **22：**PID pause **23：**PLC State reset **24：**Swing pause **25：**Counter input **26：**Counter reset **27：**Length count input **28：**Length reset **29：**Torque control prohibited **30：**PULSE impulse input（only DI4） **31：**Retain **32：**Immediate DC braking			

Function code	Name	Setting range	Default	Attribute	Correspondence address
		33：The external fault is normally closed **34：**Retain **35：**The direction of PID action is reversed **36：**External parking terminal 1 **37：**Control command switching terminal **38：**PID integration pause terminal **39：**Main frequency source and preset frequency switching terminal **40：**Auxiliary frequency source and preset frequency switching terminal **41：**Retain **42：**Retain **43：**PID parameter switching terminal **44：**User-defined fault 1 **45：**User-defined fault 2 **46：**Speed control/torque control switch **47：**Emergency stop **48：**External parking terminal 2 **49：**Decelerate DC braking **50：**The running time is cleared **51：**Timing enable **52：**Timing reset			
F5.15	DI filtering time	0.000s ~ 1.000s	0.010s	○	0x050F
F5.16	Terminal command mode	0：Two-wire type 1 1：Two-wire type 2 2：Three-wire type 1 3：Three-wire type 2	0	●	0x0510
F5.17	UP/DOWN change rate	0.01Hz ~ 655.35Hz	0.50Hz	○	0x0511
F5.18	AI1 minimum input	0.00V ~ F5.20	0.00V	○	0x0512

Function code	Name	Setting range	Default	Attribute	Correspondence address
F5.19	AI1 minimum input setting	-100.0% ~ +100.0%	0%	○	0x0513
F5.20	AI1 maximum input	F5.18 ~ +10.00V	10.00V	○	0x0514
F5.21	AI1 maximum input setting	-100.0% ~ +100.0%	100.0%	○	0x0515
F5.22	AI1 filtering time	0.00s ~ 10.00s	0.10s	○	0x0516
F5.23	AI2 minimum input	-10.00V ~ F5.25	2.00V	○	0x0517
F5.24	AI2 minimum input setting	-100.0% ~ +100.0%	0%	○	0x0518
F5.25	AI2 maximum input	F5.23 ~ +10.00V	10.00V	○	0x0519
F5.26	AI2 maximum input setting	-100.0% ~ +100.0%	100.0%	○	0x051A
F5.27	AI2 filtering time	0.00s ~ 10.00s	0.10s	○	0x051B
F5.28	PULSE	0.00 ~ F5.30	0.00kHz	○	0x051C
F5.29	PULSE Input minimum frequency setting	0.00 ~ 100.00%	0%	○	0x051D
F5.30	PULSE Input maximum frequency	F5.28 ~ 50.00kHz	20.00kHz	○	0x051E
F5.31	PULSE maximum frequency setting	0.00 ~ 100.00%	100.0%	○	0x051F
F5.32	PULSE filtering time	0.00 ~ 10.00s	0.10s	○	0x0520
F5.33	DI1 Enable delay time	0.0s ~ 360.0s	0.0s	○	0x0521
F5.34	DI2 Enable delay time	0.0s ~ 360.0s	0.0s	○	0x0522
F5.35	DI1 Forbidden delay time	0.0s ~ 360.0s	0.0s	○	0x0523
F5.36	DI2 Forbidden delay time	0.0s ~ 360.0s	0.0s	○	0x0524
F5.37	Enter terminal valid status setting 1	**0：**Active low **1：**Active high **LED bits：**D1 terminal **LED tens：**D2 terminal **LED hundreds：**D3 terminal **LED thousands：**D4 terminal	0	●	0x0525
F5.38	Enter terminal valid status setting 2	**0：**Active low **1：**Active high **LED bits：**D5 terminal(expend)	0	●	0x0526

Function code	Name	Setting range	Default	Attribute	Correspondence address
		LED tens：D6 terminal(expend)			
F5.39	Enter terminal valid status setting 3	**0：**Active low **1：**Active high **LED bits：**AI1 **LED tens：**AI2 **LED hundreds：**AI3（expend）	0	●	0x0527
F5.40	Analog input curve selection	**Bits：**AI1 **Tens：**AI2 **Hundreds：**AI3（expend） **0：**Straight line (default) **1：**Curve 1 **2：**Curve 2	0	●	0x0528
F5.41	Lower limit of curve 1	0.00 ~ F5.43	0.00V	○	0x0529
F5.42	The lower limit of curve 1 is set accordingly	0.00 ~ 100.00%	0.0%	○	0x052A
F5.43	Curve 1 Inflection point 1 Input voltage	F5.41 ~ F5.45	3.00V	○	0x052B
F5.44	Curve 1 inflection point 1 corresponds to the setting	0.00 ~ 100.00%	30.0%	○	0x052C
F5.45	Curve 1 Inflection point 2 Input voltage	F5.43 ~ F5.47	6.00V	○	0x052D
F5.46	Curve 1 inflection point 2 corresponds to the setting	0.00 ~ 100.00%	60.0%	○	0x052E
F5.47	Upper limit of curve 1	F5.45 ~ 10.00V	10.0V	○	0x052F
F5.48	The upper limit of curve 1 is set accordingly	0.00 ~ 100.00%	100.0%	○	0x0530
F5.49	Lower limit of curve 2	0.00 ~ F5.51	0.00V	○	0x0531
F5.50	The lower limit of curve 2 is set accordingly	0.00 ~ 100.00%	0.0%	○	0x0532
F5.51	Curve 2 Inflection point 1 Input voltage	F5.49 ~ F5.53	3.00V	○	0x0533
F5.52	Curve 2 inflection point 1	0.00 ~ 100.00%	30.0%	○	0x0534

Function code	Name	Setting range	Default	Attribute	Correspondence address
	corresponds to the setting				
F5.53	Curve 2 Inflection point 2 Input voltage	F5.51 ~ F5.55	6.00V	○	0x0535
F5.54	Curve 2 inflection point 2 corresponds to the setting	0.00 ~ 100.00%	60.0%	○	0x0536
F5.55	Upper limit of curve 2	F5.53 ~ 10.00V	10.00V	○	0x0537
F5.56	The upper limit of curve 2 is set accordingly	0.00 ~ 100.00%	100.0%	○	0x0538
F6 Output terminal parameter group					
F6.00	FM terminal output selection	**0:** pulse output **1:** Open Collector Output (FMR)	1	○	0x0600
F6.01	FMR open collector output selection	**0:** No output **1:** The inverter is in operation **2:** Fault output (fault shutdown) **3:** Frequency level detection FDT1 output **4:** Frequency reaches **5:** Zero speed running 1 **6:** motor overload forecast alarm **7:** inverter overload forecast alarm **8:** Set meter value reached **9:** The specified count value is reached **10:** Length reached **11:** The PLC cycle is complete **12:** The accumulated running time reaches **13:** Reservations **14:** Torque limit **15:** Ready to run **16:** AI1 > AI2 **17:** The upper frequency reaches **18:** The lower limit frequency reaches 1 **19:** Output in undervoltage state	0	○	0x0601
F6.02	Relay 1 output selection		2	○	0x0602
F6.03	Relay 2 Output selection (extended)		0	○	0x0603
F6.06	VDO1 Output selection		0	●	0x0606
F6.07	VDO2 Output selection		0	●	0x0607
F6.08	VDO3 Output selection		0	●	0x0608
F6.09	Reserve			-	0x0609

Function code	Name	Setting range	Default	Attribute	Correspondence address
		20: Communication control **21:** Positioning completed (reserved) **22:** Positioning close (reserved) **23:** Zero speed running 2 **24:** The cumulative power-on time reaches **25:** Frequency level detection FDT2 output **26:** Frequency reaches 1 output **27:** Frequency reaches 2 output **28:** Current reaches 1 output **29:** Current reaches 2 output **30:** timed to reach output **31:** Reservations **32:** Reserved **33:** Running direction **34:** Reservations **35:** The module temperature reaches **36:** Reserved **37:** The lower limit frequency reaches 2 **38:** Fault output 2 **39:** Reserved **40:** The running time arrives **41:** User-defined output 1 **42:** User-defined output 2 **43:** timer output **44:** Running forward **45:** Reverse running			
F6.10	AO Output signal selection	**Bits：**AO1 **0：**0～10V **1：**4.00～20.00mA **2：**0.00～20.00mA **Tens：**AO2(expend) **0：**0～10V **1：**4.00～20.00mA	00	-	0x060A

Function code	Name	Setting range	Default	Attribute	Correspondence address
		2：0.00～20.00mA			
F6.11	FMP (Pulse output terminal) output selection	0：Run frequency 1：Setting frequency 2：Output current 3：Output torque 4：Output power 5：Output voltage 6：Reserve 7：AI1 8：AI2 9：AI3 10：PULSE Input Value 11：Reserve 12：Communication setting 13：Motor speed 14: Output current(0-1000A，corresponding to 0-10V) 15：Output voltage(0-1000V，corresponding to 0-10V) 16：Bus voltage(0-1000V，corresponding to0-10V)	0	○	0x060B
F6.12	AO1 Output selection		0	○	0x060C
F6.13	AO2 Output（expend）		0	○	0x060D
F6.14	FM frequency output upper limit	0.00~50.00kHz	20.00kHz	○	0x060E
F6.15	AO1 Minimum input	0.00V ～ F6.17	0.00V	○	0x060F
F6.16	AO1 Minimum input corresponds to setting	0.0% ～ +100.0%	0.0%	○	0x0610
F6.17	AO1 Maximum output	F6.15～ +10.00V	10.00V	○	0x0611
F6.18	AO1 The maximum output corresponds to the setting	0.0% ～ +100.0%	100.0%	○	0x0612
F6.19	AO2 Minimum output（expend）	0.00V ～ F6.21	0.00V	○	0x0613
F6.20	AO2 Minimum Output correspondence Settings (expend)	0.0% ～ +100.0%	0.0%	○	0x0614
F6.21	AO2 Maximum output	F6.19～ +10.00V	10.00V	○	0x0615

Function code	Name	Setting range	Default	Attribute	Correspondence address
	（expend）				
F6.22	AO2 Maximum Output correspondence Settings (expend)	0.0% ~ +100.0%	100.0%	○	0x0616
F6.23	FMR Turn-on delay time	0.0s ~ 3600.0s	0.0s	○	0x0617
F6.24	Relay 1 Turn-on delay time	0.0 ~ 3600.0s	0.0s	○	0x0618
F6.25	Relay 2 Turn-on delay time （expend）	0.0s ~ 3600.0s	0.0s	○	0x0619
F6.26	VDO Turn-on delay time	0.0 ~ 3600.0s	0.0s	○	0x061A
F6.27	FMR disconnect delay time	0.0s ~ 3600.0s	0.0s	○	0x061B
F6.28	Relay 1 Disconnect delay time	0.0 ~ 3600.0s	0.0s	○	0x061C
F6.29	Relay 2 Disconnect delay time(expend)	0.0s ~ 3600.0s	0.0s	○	0x061D
F6.30	VDO1 Disconnect delay	0.0 ~ 3600.0s	0.0s	○	0x061E
F6.31	Output terminal valid status Select 1	**0:** positive logic **1:** Reverse logic **Units place: FDOR** **Tens place: RL1** **Hundred place: RL2 (extended)** **Thousands: -**	000	○	0x061F
F6.32	Virtual output terminal valid status Select 2	**0:** positive logic **1:** Reverse logic **Units bit: VDO1** **Tens place: VDO2** **Hundred digit: VDO3** **Thousands: -**	000	○	0x0620
F6.33	User-defined Output Selection (EX) 1	**0:** indicates the running frequency **1:** Set the frequency **2:** Bus voltage **3:** Output voltage **4:** Output current **5:** Output power **6:** Output torque	0	○	0x0621

Function code	Name	Setting range	Default	Attribute	Correspondence address
		7-8: Reserved **9:** AI1 input quantity **10:** AI2 input quantity **11:** AI3 input quantity			
F6.34	The comparison method chosen by the user 1	**Units: Compare test methods** **0:** equal to (EX == X1) **1:** The value is greater than or equal to **2:** less than or equal to **3:** interval comparison (X1 ≤ EX ≤ X2) **4:** bit test (EX & X1=X2) **Tens: output mode** **0:** false value output **1:** truth output	0	○	0x0622
F6.35	User-defined dead zone 1	0 ~ 65535	0	○	0x0623
F6.36	User-defined 1 Output comparison value 1	0 ~ 65535	0	○	0x0624
F6.37	User defined 1 Output comparison value 2	0 ~ 65535	0	○	0x0625
F6.38	User-defined Output Selection (EX) 2	**0:** indicates the running frequency **1:** Set the frequency **2:** Bus voltage **3:** Output voltage **4:** Output current **5:** Output power **6:** Output torque **7-8:** Reserved **9:** AI1 input quantity **10:** AI2 input quantity **11:** AI3 input quantity	0	○	0x0626
F6.39	The comparison method chosen by the user 2	**Units: Compare test methods** **0:** equal to (EX == X1) **1:** The value is greater than or equal to **2:** less than or equal to	0	○	0x0627

Function code	Name	Setting range	Default	Attribute	Correspondence address
		3: interval comparison (X1 ≤ EX ≤ X2) **4:** bit test (EX & X1=X2) **Tens: output mode** **0:** false value output **1:** truth output			
F6.40	User -defined dead area 2	0 ~ 65535	0	○	0x0628
F6.41	User custom 2 output comparison value 1	0 ~ 65535	0	○	0x0629
F6.42	User custom 2 output comparison value 2	0 ~ 65535	0	○	0x062A
F6.43	Timer time unit	**0：**second **1：**min **2：**hour	0	○	0x062B
F6.44	Timer maximum	0～65000（No reset when the set value is 65000）	0	○	0x062C
F6.45	Timer set value	0～65000	0	○	0x062D
F6.46	Counter maximum	0～65000	0	○	0x062E
F6.47	Counter set value	0～65000	0	○	0x062F
F7 Keyboard and display parameter group					
F7.00	LCD Keyboard parameter copy	0: No operation 1: The device's function parameters are uploaded to the LCD keypad (hold down the ENT and up keys simultaneously to start the upload process) 2: The LCD keypad's function parameters are downloaded to the device (hold down the ENT and down keys simultaneously to start the process of loading the parameters onto the device)	0	○	0x0700

Function code	Name	Setting range	Default	Attribute	Correspondence address
F7.01	ENT Select the key function	**0:** ENT is invalid **1:** Switch between the command channel of the operation panel and the remote command channel (the remote command channel includes communication and terminal control) **2:** reverse switch **3:** turn forward **4:** Reverse the dots **5:** Menu mode switching **6:** Reverse operation	0	●	0x0701
F7.02	Keyboard STOP key range	**LED bits: Terminal control selection** **0:** The terminal command is invalid **1:** valid for the terminal command **LED ten: communication control selection** **0:** The communication command is invalid **1:** valid for communication commands **LED hundred: reserved** **LED thousand: reserved**	0011	○	0x0702
F7.03	Keyboard run displays parameter 1	**LED units: First group display** **0:** output frequency **1:** Given frequency **2:** Bus voltage **3:** Output voltage **4:** Output current **5:** Output power **6:** Output torque **7:** DI input status **8:** DO output status **9:** AI1 voltage **A:** AI2 voltage **B:** AI3 voltage	3420	○	0x0703

Function code	Name	Setting range	Default	Attribute	Correspondence address
		C: Reservation **D:** Reservation **E:** Motor speed **F:** PID setting **LED ten: second group display** **LED hundred: Third group display** **LED thousand: Fourth group display**			
F7.04	Keyboard run displays parameter 2	**LED units: First group display** **0:** not displayed **1:** PID feedback **2:** PLC stage **3:** Reservations **4:** Feedback speed **5:** Reservations **6:** Reservations **7:** Reservations **8:** Reserve **9:** indicates the current power-on time **A:** Current running time **B:** Reserved **C:** Communication setting **D:** Reservation **E:** Main frequency X is displayed **F:** Auxiliary frequency Y is displayed **LED ten: second group display** **LED hundred: Third group display** **LED thousand: Fourth group display**	0000	○	0x0704

Function code	Name	Setting range	Default	Attribute	Correspondence address
F7.05	Keyboard stop displays parameters	**LED units: First group display** **0:** output frequency **1:** Given frequency **2:** Bus voltage **3:** Output voltage **4:** Output current **5:** Output power **6:** Output torque **7:** DI input status **8:** DO output status **9:** AI1 voltage **A:** AI2 voltage **B:** AI3 voltage **C:** Motor speed **D:** PID setting **E:** PID feedback **F:** PLC stage **LED ten: second group display** **LED hundred: Third group display** **LED thousand: Fourth group display**	3421	○	0x0705
F7.06	Load speed display factor	0.001 ~ 65.000	1.000	○	0x0706
F7.07	Temperature of the radiator of the inverter module	0℃ ~ 100℃		□	0x0707
F7.08	Rectifier bridge radiator temperature	0℃ ~ 100℃		□	0x0708
F7.09	Cumulative running time	0h ~ 65535h		□	0x0709
F7.10	Product number	-		□	0x070A
F7.11	Software version	-		□	0x070B
F7.12	Retain			□	0x070C
F7.13	Total power-on time	0 ~ 65535h		□	0x070D
F7.14	High cumulative power consumption	Power Consumption =F7.14*65535+F7.15		□	0x070E

Function code	Name	Setting range	Default	Attribute	Correspondence address
F7.15	Low cumulative power consumption	Units：kWh		□	0x070F
F7.16	Output power correction factor	0 - 100.0%	100.0%	○	0x0710
F7.17	Power display dimension selection	0 - Power display percentage (%) 1 - Power display kilowatts (KW)	1	○	0x0711
F8 Auxiliary function parameter group					
F8.00	Click operation frequency setting	0.00Hz ~ Maximum frequency F0.10	2.00Hz	○	0x0800
F8.01	Point acceleration time	0.01s ~ 6500.0s	20.0s	○	0x0801
F8.02	Point deceleration time	0.01s ~ 6500.0s	20.0s	○	0x0802
F8.03	Acceleration time 2	0.01s ~ 6500.0s	Model determination	○	0x0803
F8.04	Deceleration time 2	0.01s ~ 6500.0s		○	0x0804
F8.05	Acceleration time 3	0.01s ~ 6500.0s		○	0x0805
F8.06	Deceleration time 3	0.01s ~ 6500.0s		○	0x0806
F8.07	Acceleration time 4	0.01s ~ 6500.0s		○	0x0807
F8.08	Deceleration time 4	0.01s ~ 6500.0s		○	0x0808
F8.09	Emergency stop deceleration time	0.01s ~ 6500.0s		○	0x0809
F8.10	Jump frequency 1	0.00Hz ~ Maximum frequency	0.00Hz	○	0x080A
F8.11	Jump frequency 2	0.00Hz ~ Maximum frequency	0.00Hz	○	0x080B
F8.12	Jump frequency amplitude	0.00Hz ~ Maximum frequency	0.00Hz	○	0x080C
F8.13	Reversible dead zone time	0.0 ~ 120.0s	0.0s	○	0x080D
F8.14	The carrier frequency is adjusted with temperature	**0：** Temperature independent **1：** Temperature dependent	1	○	0x080E
F8.15	Terminal action is preferred	**0：** invalid **1：** valid	1	○	0x080F
F8.16	Set the cumulative power-on arrival time	0h ~ 65000h	0h	○	0x0810
F8.17	Set the cumulative run arrival time	0h ~ 65000h	65000h	○	0x0811
F8.18	Set the cumulative power-on time	**0：** continue to run	0	●	0x0812

Function code	Name	Setting range	Default	Attribute	Correspondence address
	arrival action	**1：**Fault warning			
F8.19	Set the cumulative run time arrival action	**0：**continue to run **1：**Fault warning	0	●	0x0813
F8.20	Arrival time of this run	0～65000min	0	○	0x0814
F8.21	The running time reaches the action selection	0：Continue to run 1：Fault prompt	0	●	0x0815
F8.22	Frequency detection value(FDT1)	0.00～Maximum frequency	50.00Hz	○	0x0816
F8.23	Frequency detection lag value(FDT1)	0.00～Maximum frequency	0.00Hz	○	0x0817
F8.24	Frequency detection value(FDT2)	0.00～Maximum frequency	50.00Hz	○	0x0818
F8.25	Frequency detection lag value(FDT2)	0.00～Maximum frequency	0.00Hz	○	0x0819
F8.26	Frequency reaches to detect width	0.0% ～ 100.0%（Maximum frequency）	0.0%	○	0x081A
F8.27	Arbitrarily arrive at the evaluation rate detection value 1	0.00Hz～Maximum frequency	50.00Hz	○	0x081B
F8.28	Arbitrarily reached the frequency detection amplitude1	0.0% ～ 100.0%（Maximum frequency）	0.0%	○	0x081C
F8.29	Arbitrarily arrive at the evaluation rate detection value 2	0.00Hz～Maximum frequency	50.00Hz	○	0x081D
F8.30	Arbitrarily reached the frequency detection amplitude 2	0.0% ～ 100.0%（Maximum frequency）	0.0%	○	0x081E
F8.31	Arbitrarily reach current1	0.0% ～ 300.0%(Motor rated current)	100.0%	○	0x081F
F8.32	Arbitrarily reach current 1 width	0.0% ～ 300.0%(Motor rated current)	0.0%	○	0x0820
F8.33	Arbitrarily reach current2	0.0% ～ 300.0%(Motor rated current)	100.0%	○	0x0821
F8.34	Arbitrarily reach current 2 width	0.0% ～ 300.0%(Motor rated current)	0.0%	○	0x0822

Function code	Name	Setting range	Default	Attribute	Correspondence address
F9 Functional parameter array					
F9.00	PID given source	0：Keyboard number PID given F9.01 1：AI1 2：AI2 3：Reserve 4：Terminal pulse given 5：Communication given 6：Multi -stage speed given 7：Keyboard potentiometer given	0	○	0x0900
F9.01	PID Numerical given	0.0% ~ 100.0%	50.0%	○	0x0901
F9.02	PID Feedback source	0：AI1 1：AI2 2：Reserve 3：AI1-AI2 4：Terminal pulse given 5：Communication given 6：AI1+AI2 7: MAX(|AI1|, |AI2|) 8: MIN(|AI1|, |AI2|) 9:Keyboard potentiometer given	0	○	0x0902
F9.03	PID Control characteristics	LED units :Feedback characteristic selection 0：Positive action 1：Reaction LED tens：PID Adjustment direction selection 0：Reverse prohibition 1：Reverse permit LED Hundreds：Alignment selection 0：Off-center alignment 1：Center alignment LED kilobit：Reserve	0100	○	0x0903
F9.04	PID Given feedback range	0 ~ 100.0	100.0	○	0x0904
F9.05	Proportional gain P1	0 ~ 1000.0	20.00	○	0x0905

Function code	Name	Setting range	Default	Attribute	Correspondence address
F9.06	Integration time I1	0.00s ~ 10.00s	2.00s	○	0x0906
F9.07	Differential time D1	0.00s ~ 10.00s	0.00s	○	0x0907
F9.08	PID Reverse cutoff frequency	0.00 ~ Maximum frequency F0.10	0.00Hz	○	0x0908
F9.09	PID Deviation limit	0.0% ~ 100.0%	0.0%	○	0x0909
F9.10	PID Differential limiting	0.00% ~ 100.00%	0.10%	○	0x090A
F9.11	PID Given change time	0.00 ~ 100.00s	0s	○	0x090B
F9.12	PID Feedback filtering time	0.00 ~ 60.00s	0.00s	○	0x090C
F9.13	PID Output filtering time	0.00 ~ 60.00s	0.00s	○	0x090D
F9.14	Proportional gain P2	0.0 ~ 1000.0	20.00	○	0x090E
F9.15	Integration time I2	0.00s ~ 10.00s	2.00s	○	0x090F
F9.16	Differential time D2	0.00s ~ 10.00s	0.00s	○	0x0910
F9.17	PID Parameter switching condition	0：Do not switch 1：Terminal switching 2：Automatic switching based on deviation	0	○	0x0911
F9.18	PID Parameter switching deviation 1	0.0% ~ F9.19	20.0%	○	0x0912
F9.19	PID Parameter switching deviation 2	F9.18 ~ 100.0%	80.0%	○	0x0913
F9.20	PID Initial frequency value	0.0% ~ 100.0%	0%	○	0x0914
F9.21	PID Frequency initial holding time	0.0 ~ 6500.0s	0.0s	○	0x0915
F9.23	Feedback wire break action selection	0：The PID continues to run and no fault is reported 1：Stop and report fault (manual reset) 2：Continue PID operation, output alarm signal 3：Run at the current frequency, output alarm signal 4：Stop and report fault	0	○	0x0917

Function code	Name	Setting range	Default	Attribute	Correspondence address
		(automatic reset)			
F9.24	Wire break alarm upper limit	F9.25 ~ 100.0%	100.0%	○	0x0918
F9.25	Line break alarm lower limit	0 ~ F9.24	0.0%	○	0x0919
F9.26	Feedback break detection time	0.0s ~ 120.0s	0.0s	○	0x091A
F9.27	PID Stop operation	0：No operation is performed 1：Operation during shutdown	0	○	0x091B
F9.28	PID Function selection	0：Normal PID 1：Dormant PID	0	○	0x091C
F9.29	PID Hibernation threshold	0.0% ~ 100.0%	60.0%	○	0x091D
F9.30	PID Sleep delay	0.0 ~ 3600.0s	3.0s	○	0x091E
F9.31	PID Wake-up threshold	0.0% ~ 100.0%	20.0%	○	0x091F
F9.32	PID Wake up delay	0.0 ~ 3600.0s	3.0s	○	0x0920
F9.33	Dormancy detection frequency	0 ~ Upper limit frequency F0.12	25.00Hz	○	0x0921
F9.34	Minimum output	0：F0.14(Lower frequency) 1:0Hz		●	0x0922
F9.35	Double output deviation reverse minimum	0.00 ~ 100.00%	1.00%	○	0x0923
F9.36	Double output deviation reverse maximum	0.00 ~ 100.00%	1.00%	○	0x0924
F9.37	PID Integral attribute	Units place: integral separation 0: invalid 1: Valid Tens: output to the limit, whether to stop integrating 0: continue integrating 1: Stop collecting points	0	○	0x0925
F9.38	PID Preset Switchover condition selection	0：Time 1：Switch according to AI1 feedback value	0	○	0x0926

Function code	Name	Setting range	Default	Attribute	Correspondence address
F9.39	PID Minimum value of AI feedback switching	0.0 ~ F9.40	45.0%	○	0x0927
F9.40	PID AI feedback maximum switching value	F9.39 ~ 100.0%	55.0%	○	0x0928
FA Fault and protection parameter group					
FA.00	Motor overload protection selection	0：Off 1：On	1	○	0x0A00
FA.01	Motor overload protection factor	0.0 ~ 250.0%	100.0%	○	0x0A01
FA.02	Motor overload warning coefficient	20.0 ~ 250.0%	80.0%	○	0x0A02
FA.03	Over voltage stall/over loss rate control options	0：Off 1：On Unit：Excessive suppression enable Tens：Over current suppression enable Hundreds：Judge the input of brakes Thousands：Excessive suppression of fast rising frequency	1111	○	0x0A03
FA.04	Over voltage protection voltage	110% - 150%	Model settings	○	0x0A04
FA.05	Overvoltage voltage increase increase	0.00 - 50.00	2.00	○	0x0A05
FA.06	Over -pressure stall current loop gain	0.00 - 50.00	2.00	○	0x0A06
FA.07	Over -loss speed protection current	50% - 200%	150%	○	0x0A07
FA.08	Over -loss speed gain	0.00 - 50.00	2.00	○	0x0A08
FA.09	Over -loss speed points	0.00 - 50.00	4.00	○	0x0A09
FA.10	Short -circuit detection	0: invalid 1: Effectively	1	○	0x0A0A

Function code	Name	Setting range	Default	Attribute	Correspondence address
FA.11	Enter lack of protection protection	0: Close 1: Open	1	○	0x0A0B
FA.12	Output lacking protection	0: Close 1: Open	1	○	0x0A0C
FA.13	Input phase loss protection software detection level	0.0 ~ 999.9%	15.0%	○	0x0A0D
FA.14	PWM Parameter setting	Units: Turn on voltage prediction compensation Tens: Indicates the PWM update mode 0: Single sample update 1: Double sample and double update Hundred bits: random carrier mode 0: random carrier 1: Random 0 vector	0010		0x0A0E
FA.15	Hardware current and voltage protection	Units: Hardware Current Limiting (CBC) 0: off 1: on Ten places: - Hundred digit: SC filtering time 1 - F Kilobit: OC filtering time 1 - F	0001	○	0x0A0F
FA.16	CBC Protection point	100 ~ 220%	200%	○	0x0A10
FA.17	CBC Overload protection time	1 ~ 5000ms	500ms	○	0x0A11
FA.18	River pressure point settings	40.0% ~ 100.0%	100.0%	○	0x0A12
FA.19	Reserve	-	Model determination	□	0x0A13
FA.20	Number of failure recovery	0~5	0	○	0x0A14
FA.21	Interval for fault self-recovery	0.1 ~ 100.0s	1.0s	○	0x0A15
FA.22	Instant stop non-stop function	Units bit:	0000	○	0x0A16

Function code	Name	Setting range	Default	Attribute	Correspondence address
	selection	0: off 1: enabled Tens place: 0: intermittent operation 1: stop			
FA.23	Instantaneous stop non-stop entry voltage	40% - 150%	75%	○	0x0A17
FA.24	Instantaneous stop non-stop stable voltage	60% - 150%	95%	○	0x0A18
FC Communication parameter group					
FC.00	Address of this machine	1 ~ 247，0 is Broadcast address	1	○	0x0C00
FC.01	Communication Potter rate selection	0：300 bps 1：600 bps 2：1200 bps 3：2400 bps 4：4800 bps 5：9600 bps 6：19200 bps 7：38400 bps 8：57600 bps 9：115200 bps	5	○	0x0C01
FC.02	Modbus Data format	0: (8.N.2) 8 bits, no verification, 2 stop stops 1: (8.E.1) 8 bits, puppets, 1 stop position 2: (8.O.1) 8 digits, strange verification, 1 stop stop 3: (8.N.1) 8 bits, no verification, 1 stop stop	3	○	0x0C02
FC.03	Modbus Communication response delay	0ms ~ 20ms	2ms	○	0x0C03
FC.04	Modbus Communication timeout failure time	0.0（Invalid），0.1s~60.0s	0	○	0x0C04
FD Multi -speed instructions and simple PLC parameter arrays					

Function code	Name	Setting range	Default	Attribute	Correspondence address
FD.00	Multi -speed instruction 0	-100.0% ~ 100.0% (100.0% 对应 Maximum frequencyF0.10)	0	○	0x0D00
FD.01	Multi -speed instruction 1	-100.0% ~ 100.0%	0	○	0x0D01
FD.02	Multi -speed instruction 2	-100.0% ~ 100.0%	0	○	0x0D02
FD.03	Multi -speed instruction 3	-100.0% ~ 100.0%	0	○	0x0D03
FD.04	Multi -speed instruction 4	-100.0% ~ 100.0%	0	○	0x0D04
FD.05	Multi -speed instruction 5	-100.0% ~ 100.0%	0	○	0x0D05
FD.06	Multi -speed instruction 6	-100.0% ~ 100.0%	0	○	0x0D06
FD.07	Multi -speed instruction 7	-100.0% ~ 100.0%	0	○	0x0D07
FD.08	Multi -speed instruction 8	-100.0% ~ 100.0%	0	○	0x0D08
FD.09	Multi -speed instruction 9	-100.0% ~ 100.0%	0	○	0x0D09
FD.10	Multi -speed instruction10	-100.0% ~ 100.0%	0	○	0x0D0A
FD.11	Multi -speed instruction11	-100.0% ~ 100.0%	0	○	0x0D0B
FD.12	Multi -speed instruction12	-100.0% ~ 100.0%	0	○	0x0D0C
FD.13	Multi -speed instruction13	-100.0% ~ 100.0%	0	○	0x0D0D
FD.14	Multi -speed instruction14	-100.0% ~ 100.0%	0	○	0x0D0E
FD.15	Multi -speed instruction15	-100.0% ~ 100.0%	0	○	0x0D0F
FD.16	PLC Mode of operation	0: Stops after a single run 1: Maintain the final value at the end of a single run 2: Keep cycling	0	○	0x0D10
FD.17	PLCPower down memory selection	Ones Slot: 0: Power failure does not memory 1: Power failure memory Ten places: 0: stops and does not remember 1: Shutdown memory	0	○	0x0D11
FD.18	PLC Segment 0 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D12

Function code	Name	Setting range	Default	Attribute	Correspondence address
FD.19	PLC Select the acceleration and deceleration time of section 0	0 ~ 3	0	○	0x0D13
FD.20	PLC Segment 1 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D14
FD.21	PLC Select the acceleration and deceleration time of section 1	0 ~ 3	0	○	0x0D15
FD.22	PLC Segment 2 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D16
FD.23	PLC Select the acceleration and deceleration time of section 2	0 ~ 3	0	○	0x0D17
FD.24	PLC Segment 3 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D18
FD.25	PLC Select the acceleration and deceleration time of section 3	0 ~ 3	0	○	0x0D19
FD.26	PLC Segment 4 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D1A
FD.27	PLC Select the acceleration and deceleration time of section 4	0 ~ 3	0	○	0x0D1B
FD.28	PLC Segment 5 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D1C
FD.29	PLC Select the acceleration and deceleration time of section 5	0 ~ 3	0	○	0x0D1D
FD.30	PLC Segment 6 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D1E
FD.31	PLC Select the acceleration and deceleration time of section 6	0 ~ 3	0	○	0x0D1F
FD.32	PLC Segment 7 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D20
FD.33	PLC Select the acceleration and deceleration time of section 7	0 ~ 3	0	○	0x0D21
FD.34	PLC Segment 8 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D22
FD.35	PLC Select the acceleration and deceleration time of section 8	0 ~ 3	0	○	0x0D23
FD.36	PLC Segment 9 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D24
FD.37	PLC Select the acceleration and deceleration time of section 9	0 ~ 3	0	○	0x0D25
FD.38	PLC Segment 10 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D26

Function code	Name	Setting range	Default	Attribute	Correspondence address
FD.39	PLC Select the acceleration and deceleration time of section 10	0 ~ 3	0	○	0x0D27
FD.40	PLC Segment 11 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D28
FD.41	PLC Select the acceleration and deceleration time of section 11	0 ~ 3	0	○	0x0D29
FD.42	PLC Segment 12 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D2A
FD.43	PLC Select the acceleration and deceleration time of section 12	0 ~ 3	0	○	0x0D2B
FD.44	PLC Segment 13 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D2C
FD.45	PLC Select the acceleration and deceleration time of section 13	0 ~ 3	0	○	0x0D2D
FD.46	PLC Segment 14 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D2E
FD.47	PLC Select the acceleration and deceleration time of section 14	0 ~ 3	0	○	0x0D2F
FD.48	PLC Segment 15 run time	0.0 ~ 6553.5(s/m/h)	0.0s(h)	○	0x0D30
FD.49	PLC Select the acceleration and deceleration time of section 15	0 ~ 3	0	○	0x0D31
FD.50	PLC Run-time unit	LED units: timing unit 0: s(seconds) 1: h(hours) 2: min(minutes)	0	○	0x0D32
FD.51	Multi-segment speed instruction 0 given mode	0: Function code FD.00 is set 1: AI1 given 2: AI2 given 3: AI2 given 4: Set the terminal PULSE 5: PID 6: Preset frequency (F0.08) given, UP/DOWN can be modified 7: keyboard potentiometer set	0	○	0x0D33
FD.52	Multiple speed is preferred	0: invalid 1: Valid	1	○	0x0D34

Function code	Name	Setting range	Default	Attribute	Correspondence address
FE User parameter group					
FE.00	User password	0~65535	0	○	0x0E00
FE.01	Number of times to display fault records	0~8	4	○	0x0E01
FE.02	Parameter and key lock selection	0: not locked 1: The function parameter is locked 2: Function parameters and key lock (except RUN/STOP/JOG) 3: All function parameters and keys are locked	0	○	0x0E02

5.2 Fault record parameter group

Function code	Name	Setting range and description	Change	communication address
E0 Fault parameter set				
E0.00	Fault type	For details, see the fault Information Code table	□	0xE000
E0.01	Failure operating frequency	0.0 ~ Maximum frequency	□	0xE001
E0.02	Fault output current	0.1 ~ 2000.0A	□	0xE002
E0.03	Fault bus voltage	0 ~ 810.0V	□	0xE003
E0.04	Fault input terminal status	See input terminal status diagram	□	0xE004
E0.05	Fault output terminal status	See output terminal status diagram	□	0xE005
E0.06	Fault module temperature	0 ~ 100℃	□	0xE006
E0.07	Fault frequency converter condition	LED bits: Running direction 0: forward 1: reverse LED ten: running status 0: Stop 1: Steady speed 2: Speed up 3: Slow down	□	0xE007

Function code	Name	Setting range and description	Change	communication address
E0.08	Down time (Count from this power-on)	0 ~ 65535min	□	0xE008
E0.09	Down time (From total running time)	0 ~ 65535H	□	0xE009
E0.10	Fault output voltage	0 ~ 1500V	□	0xE00A
E0.11	Fault diagnosis information	See (Chapter 8 - Fault Code Details)	□	0xE00B
E0.12	Number of faulty CBC	10Sec Clear zero if no CBC exists		

5.3 Display parameter group

Function code	Name	Minimum unit	Change	Communication address
D0 Display parameter group				
D0.00	Running frequency(Hz)	0.01Hz	□	0xD000
D0.01	Setting frequency(Hz)	0.01Hz	□	0xD001
D0.02	Bus voltage(V)	0.1V	□	0xD002
D0.03	Output voltage(V)	1V	□	0xD003
D0.04	Output current(A)	0.1A	□	0xD004
D0.05	Output power(kW)	0.1kW	□	0xD005
D0.06	Output torque(%)	0.1%	□	0xD006
D0.07	DI Input state		□	0xD007
D0.08	DO Output state		□	0xD008
D0.09	AI1 Voltage (V)	0.01V	□	0xD009
D0.10	AI2 Voltage(V)	0.01V	□	0xD00A
D0.11	AO1 Voltage（V）	0.01V	□	0xD00B
D0.12	Count value		□	0xD00C
D0.13	Axis frequency		□	0xD00D
D0.14	Load speed display	1rpm	□	0xD00E
D0.15	PID setting		□	0xD00F
D0.16	PID feedback		□	0xD010

Function code	Name	Minimum unit	Change	Communication address
D0 Display parameter group				
D0.17	PLC phase		□	0xD011
D0.18	PULSE input pulse frequency		□	0xD012
D0.19	Feedback speed(Unit0.1Hz)		□	0xD013
D0.20	Remaining running time		□	0xD014
D0.21	AI1Pre-correction voltage		□	0xD015
D0.22	AI2Pre-correction voltage		□	0xD016
D0.23	Reserve		□	0xD017
D0.24	Linear velocity		□	0xD018
D0.25	Current power-on time	1min	□	0xD019
D0.26	Current running time	0.1min	□	0xD01A
D0.27	CPU temperature		□	0xD01B
D0.28	Communication setting		□	0xD01C
D0.29	Radiator temperature		□	0xD01D
D0.30	Main frequency X display	0.01Hz	□	0xD01E
D0.31	Auxiliary frequency Y display	0.01Hz	□	0xD01F
D0.34	Reserve		□	0xD022
D0.35	Analog grounding		□	0xD023
D0.36	3.3VA		□	0xD024
D0.37	Control board plate number		□	0xD025
D0.38	Plate number of the power board		□	0xD026
D0.39	Power factor Angle		□	0xD027
D0.40	Virtual VDI state		□	0xD100
D0.41	Virtual VDO state		□	0xD101
D0.42	Expand DI input status		□	0xD102
D0.43	Expand DO input status		□	0xD103
D0.44	Expansion board version		□	0xD104

Function code	Name	Minimum unit	Change	Communication address
D0 Display parameter group				
D0.45	AI3（Expand）voltage（V）	0.01V	□	0xD105
D0.46	AI4（Expand）voltage（V）	0.01V	□	0xD106
D0.49	AO2 Voltage（V）	0.01V	□	0xD109
D0.53	Communication status of the main control board		□	0xD10D
D0.54	Extended communication status		□	0xD10E

5.4 A1 Special parameters for solar water pumps

Function code	Name	Minimum unit	Default	Change	Communication address
A1 Display parameter group					
A1.00	Photovoltaic water pump mode	0: Variable frequency speed regulation mode 1: CVT mode 2: MPPT mode	2	□	0xA100
A1.01	CVT target voltage	20.0% - 200.0%	81.0%	□	0xA101
A1.02	MPPT voltage upper limit	20.0% - 200.0%	100.0%	□	0xA102
A1.03	Lower limit of MPPT voltage	20.0% - 200.0%	50.0%	□	0xA103
A1.04	Frequency adjustment Kp	10.0% - 500.0%	0.20	□	0xA104
A1.05	Frequency adjustment Ki	0.001s - 9.999sec	0.20	□	0xA105
A1.06	Frequency adjustment Kd		0.20	□	0xA106
A1.07	Frequency adjustment filtering time	0.001s - 9.999sec	0.002sec	□	0xA107
A1.08	MPPT search interval	0.1 - 60.0	1.0sec	□	0xA108
A1.09	MPPT gain	0-100	50	□	0xA109
A1.10	Hibernation voltage threshold	0 ～ 1000V	0V	□	0xA10A
A1.11	Sleep recovery voltage	0 ～ 1000V	400V	□	0xA10B

Function code	Name	Minimum unit	Default	Change	Communication address
A1 Display parameter group					
A1.12	Dormant recovery waiting time	0.0sec～3000.0sec	10.0sec	□	0xA10C
A1.13	Low-frequency protection detection frequency	0 - 100%	20%、50%	□	0xA10D
A1.14	Low-frequency protection detection time	0.0sec～3000.0sec	30.0sec	□	0xA10E
A1.15	Low-frequency protection automatic recovery time	0.0sec～3000.0sec	120.0sec	□	0xA10F
A1.16	Dry protection detects current	0 - 200%	40%，50%	□	0xA010
A1.17	Dry protection detection frequency	0 - 100%	80%	□	0xA111
A1.18	Dry protection detection time	0.0sec～3000.0sec	60.0sec	□	0xA112
A1.19	Automatic recovery time for dry protection	0.0sec～3000.0sec	900.0sec	□	0xA113
A1.20	Overcurrent protection detects current	0 - 200%	0%	□	0xA114
A1.21	Overcurrent protection detection time	0.0sec～3000.0sec	30.0sec	□	0xA115
A1.22	Overcurrent protection automatic recovery time	0.0sec～3000.0sec	900.0sec	□	0xA116
A1.23	Minimum power protection value	0.00kw - 650.00kw	0.00kw	□	0xA117
A1.24	Minimum power protection detection time	0.0sec～3000.0sec	10.0sec	□	0xA118
A1.25	Minimum power protection automatic recovery time	0.0sec～3000.0sec	10.0sec	□	0xA119
A1.26	Alarm recovery mode	0: Automatic recovery Manual recovery LED0: Low-frequency protection LED1: Dry protection	0000H	□	0xA11A

Function code	Name	Minimum unit	Default	Change	Communication address
A1 Display parameter group					
		LED2: Overcurrent and overload protection LED3: Minimum Power protection			
A1.27	Water full protection detection time	0.0sec～3000.0sec	10.0sec	□	0xA11B
A1.28	Water full protection exit time	0.0sec～3000.0sec	10.0sec	□	0xA11C
A1.29	Auxiliary function	0: Invalid, 1: Valid LED0:0: The upper limit is limited by the given frequency, 1: The upper limit frequency is limited by the rated frequency of the motor LED1:0: The minimum upper limit is 0; 1: The minimum upper limit frequency is 1/4 of the motor LED2: Save after power failure LED3: Under-voltage fault not saved	0110H	□	0xA11D
A1.30	Selection of photovoltaic water pump functions	0: Invalid, 1: Valid LED0: Constant torque frequency limit selection LED1: Retain LED2: A sudden increase in voltage updates the Voc voltage LED3: Fast frequency reduction function	1100H	□	0xA11E

Function code	Name	Minimum unit	Default	Change	Communication address
A1 Display parameter group					
A1.31	Rapid frequency reduction gain	0-20	2	□	0xA11F
A1.32	Rapid frequency reduction threshold	3.0%-15.0%	5.0%	□	0xA122
A1.33	The voltage suddenly increases the threshold	0.0%-20.0%	5.0%	□	0xA123
A1.34	Constant torque frequency limit	80.0%-150.0%	150.0%	□	0xA124
A1.35	Automatic power switching	0: Not allowed 1: Not allowed		□	0xA125
A1.36	Automatically switch to photovoltaic time	1～600Min	60Min	□	0xA126
A1.37	Automatic switching delay	0.1～3000.0s	5.0s	□	0xA127
A1.38	DC/AC minimum frequency	0.00-300.00Hz	20.00Hz	◎	0xA128
A1.39	Minimum duration of DC/AC frequency	1～500Min	5Min	◎	0xA129
A1.40	AC/DC detection cycle	1～500Min	30Min	◎	0xA12A
A1.41	AC/DC detection frequency	1.00-300.00Hz	30.00Hz	◎	0xA12B
A1.42	AC/DC cycle detection duration	1～500Sec	10Sec	◎	0xA12C
A1.43	AC type	LED1: 0 - Not mandatory, 1 - Mandatory DC, 2 - Mandatory AC LED2: Under-voltage activates MPPT LED3: Retained	0000H	◎	0xA12D
A1.44	Mains power detection frequency	50-500Hz	300	◎	0xA12E
A1.45	Main power supply voltage detection	0.00-1000.0V	5.0V	◎	0xA12F
A1.46	Power generator voltage filtering time	1.0ms-1000.0ms	10.0ms	◎	0xA130
A1.47	Generator detected voltage	0.00-1000.0V	1.5V	◎	0xA132
A1.48	Number of generators detected	0-10000	20	◎	0xA133

Function code	Name	Minimum unit	Default	Change	Communication address
A1 Display parameter group					
A1.49	Power status detection function	LED0: Initial detection power (0-A) LED1: Stop detection power (0-A) LED2: Determine power type in AC state LED3: Determine power type in DC state	0163H	◎	0xA134
A1.50	Pass the temperature reduction frequency point	0: Disable over-temperature frequency reduction 1 - 100: Over-temperature frequency reduction threshold	0	◎	0xA135
A1.51	Reduction ratio	0~100%	5	◎	0xA136

5.5 A4 Special parameters for constant pressure water supply

Function code	Name	Minimum unit	Default	Change	Communication address
A4 Display parameter group					
A4.00	Selection of water supply function	0: Invalid 1: Effective	0	□	0xA400
A4.01	Set pressure	1.0~A4.19	3.0bar	□	0xA401
A4.02	Start-up deviation pressure	0.0~A4.01	0.3bar	□	0xA402
A4.03	Sensor range	1.0~200.0bar	16.0bar	□	0xA403
A4.04	Sensor feedback type	0:4~20mA(AI2) 1:0~10V(AI1)	0	□	0xA404
A4.05	Pressure calibration coefficient	0.750~1.250	1.000	□	0xA405
A4.06	Proportional gain P	0.0~100.0	50.0	□	0xA406
A4.07	Integration time I	0.00s~10.00s	0.50	□	0xA407

Function code	Name	Minimum unit	Default	Change	Communication address
A4 Display parameter group					
A4.08	Differential time D	0.000s~10.000s	0.000	□	0xA408
A4.09	Hibernation selection	0: Close 1: Sleep Mode 1 2: Sleep Mode 2	1	□	0xA409
A4.10	Hibernation delay	0.0s~100.0s	5.0s	□	0xA40A
A4.11	Wake-up delay	0.0s~100.0s	3.0s	□	0xA40B
A4.12	Low-frequency holding frequency	0.0 - hibernation frequency A4.14	20.00Hz	□	0xA40C
A4.13	Low-frequency holding frequency running time	0.0s~100.0s	5.0s	□	0xA40D
A4.14	Dormancy frequency	A4.12~上限频率 F0.12	25.00Hz	□	0xA40E
A4.15	Dormancy detection cycle	0.0s~600.0s	30.0s	□	0xA40F
A4.16	Leakage coefficient	0.1s~100.0s	2.5s	□	0xA410
A4.17	Dormancy detection coefficient	1~10	4	□	0xA411
A4.18	Dormancy deviation pressure	0.0bar~1.0bar	0.1bar	□	0xA412
A4.19	High-voltage alarm setting value	A4.00~A4.03	15.0bar	□	0xA413
A4.20	Low-voltage alarm setting value	0.0~A4.01	0.0bar	□	0xA414
A4.21	Delay time of water pressure alarm	0.0~100.0	3.0s	□	0xA415
A4.22	Sensor disconnection detection value	0.00~10.00V	0.20	□	0xA416
A4.23	Sensor disconnection detection time	0.0s~100.0s	30.0s	□	0xA417
A4.24	Water shortage protection function	0: Close 1: Judged based on frequency and current 2: Judged based on frequency and pressure	2	□	0xA418
A4.25	Water shortage fault detection threshold	0.0~A4.01	0.5bar	□	0xA419

Function code	Name	Minimum unit	Default	Change	Communication address
A4 Display parameter group					
A4.26	Frequency of water shortage protection detection	0~ Upper limit frequency F0.12	48.00Hz	□	0xA41A
A4.27	Water shortage protection detection current percentage	0.0~100.0%	40.0%	□	0xA41B
A4.28	Water shortage protection detection time	0.0~200.0s	60.0s	□	0xA41C
A4.29	Automatic reset delay for water shortage protection	0~1000	15	□	0xA41D
A4.30	The number of times of automatic reset for water shortage protection	0~100	10	□	0xA41E
A4.31	Pressure rise control function	0: Invalid 1: Effective	0	□	0xA41F
A4.32	Retain			□	0xA422
A4.33	Retain			□	0xA423
A4.34	Retain			□	0xA424
A4.35	Constant-frequency water shortage function selection	The units digit: Disable the protection function 0: Off 1: On Ten: Detected current 0: Total current \ n1: Torque current One hundred: Thousand:	0010	□	0xA425
A4.36	Constant-frequency water shortage protection current	0% - 150%	40%	□	0xA426
A4.37	Constant frequency water shortage protection frequency	0% - 100%	50%	□	0xA427
A4.38	Constant frequency water shortage protection detection time	1～1000s	30s		0xA428
A4.39	Constant-frequency water shortage protection recovery time	1～10000s	600s		0xA429

Function code	Name	Minimum unit	Default	Change	Communication address
A4 Display parameter group					
A4.40	Constant-frequency water shortage protection recovery times	0~100	5		0xA430

Chapter 6 Communication protocol

SPIN2 Drive Standard equipment RS485 Communication interface，located in the signal terminal area.It has 2 independent terminal,and the keyboard outgoing interface of the SPIN2 is RJ45 tiein with Modbus communication protocol.

The user can set the start and stop of the inverter through the function, modify or read the function code parameters, and read the working status and fault information of the inverter.

6.1 Register address

■ Shutdown/operation parameters (1000H read-write, 1001H-1020H read-only) :

Parameter address	Parameter Description	Unit
1000H	Communication Settings（-10000～10000）	0.01%
1001H	Operating frequency	0.01Hz
1002H	Bus voltage	0.1V
1003H	Output voltage	1V
1004H	Output current	0.01A
1005H	Output power	0.1kW
1006H	Output torque	0.1%
1007H	Running speed	0.01Hz
1008H	DI Input mark	1
1009H	DO Output mark	1
100AH	AI1 Voltage	0.01V
100BH	AI2 Voltage	0.01V
100CH	Reserve	-
100DH	Count input	1 time
100EH	Length value input	1 time
100FH	Load speed	1rpm
1010H	PID given	0.10%

1011H	PID feedback	0.10%
1012H	PLC step	1（Range 0～15）
1013H	PULSE Input pulse frequency Unit 0.01KHz	0.01Hz
1014H	Reserve	-
1015H	Remaining running time	1min
1016H	AI1 Pre-correction voltage	0.001V
1017H	AI2 Pre-correction voltage	0.001V
1018H	Reserve	-
1019H	Linear velocity	1m/min
101AH	Current power-on time	1 min
101BH	Current running time	0.1 min
101CH	Reserve	-
101DH	Comunication setting value	（-10000～10000）
101EH	Reserve	-
101FH	Main frequency X display	0.01Hz
1020H	Auxiliary frequency Y display	0.01Hz

Table 6-6-1 Stop/Running Parameter address table

Notice：The communication set point is a percentage of the relative value, 10000 corresponding to 100.00% , -10000 corresponding to -100.00%.Data on the frequency dimension. The percentage is the percentage relative to the maximum frequency (F0-10); For torque dimension data, the percentage is F2-10 (torque upper limit number set).

■ Control command input to inverter: (write only)

Command word address	Command function
2000H	0001：Forward running
	0002：Inverted running
	0003：Forward point
	0004：Inverted point
	0005：Free stop
	0006：Slow down stop
	0007：Fault reset

Table 6-6-2 Command function parameter list

■ Read inverter status: (Read only)

Command word address	Command function
3000H	0001：Forward running
	0002：Inverted running
	0003：AC drive standby
	0004：AC drive fault
	0005：AC drive undervoltage
	0006：Slow down stop

Table 6-6-3 Read the inverter status information table

■ Parameter lock password verification

（If 8888H is returned, the password verification succeeds ）

Passward address	Enter the contents of the password
1F00H	*****

Table 6-6-4 Password verification address and format

■ Digital output terminal control:(Write only)

Command word address	Command function
2001H	BIT0~BIT1：Reserve
	BIT2：RELAY1 Output control
	BIT3：RELAY2 Output control
	BIT4：FMR Output control
	BIT5：VDO
	BIT6~BIT9：Reserve

Table 6-6-5 Digital output control

■ Analog output AO1 control:(Write only)

Command word address	Command function
2002H	0 ~ 7FFF representation 0% ~ 100%

Table 6-6-6 Analog output A01 control

■ Analog output AO2 control：（Write only）

Command word address	Command function
2003H	0 ~ 7FFF representation 0% ~ 100%

Table 6-6-7 Analog output A02 control

■ PULSE Output control：（Write only）

Command word address	Command function
2004H	0 ~ 7FFF representation 0% ~ 100%

Table 6-6-8 PULSE Output control

■ AC drive fault description：

AC drive fault address	AC drive fault information
8000H	0000：No fault 0001：Reserved 0002：Accelerates over current 0003：Decelerating over current 0004：Constant over current 0005：Acceleration over voltage 0006：Decelerating over voltage 0007：Constant over voltage 0008：Buffer resistance overload fault 0009：Under voltage fault 000A：AC drive overloaded 000B：Motor overloaded 000C：Input open phase 000D：Output open phase 000E：The module overheats 000F：External fault 0010：The communication is abnormal 0011：Reserved 0012：Current detection fault 0013：Motor tuning failure 0015：Parameter read and write exception 0016：The EEPROM verification is faulty 0017：Motor short circuit to ground fault 001A：The running time is up 001B: User-defined fault 1 001C: User-defined fault 2 001D: The power-on time arrives 001E：Reserved 001F：PID feedback is lost during running 0028：The fast current limiting times out 0029：Reserved

■ Communication fault information description data (fault code):

Communication fault address	Fault function description
8001H	0000：No fault 0001：The password is incorrect 0002：The command code is incorrect 0003：CRC check error 0004：Invalid address 0005：Invalid parameter 0006：The parameter change is invalid 0007：The system is locked 0008：Operating in EEPROM

Table 6-6-10 Communication fault information description data table

■ Parameters for FC group communication

FC.00	Local address	Factory default	1
	Set range	00~31	

When the local address is set to 0, it is the broadcast address, and the host computer broadcast function is realized. The local address is unique (except broadcast place Off-site), which is the basis for point-to-point communication between the host computer and the inverter.

FC.01	Baud rate	Factory default	5
	Set range	0：300 bps 1：600 bps 2：1200 bps 3：2400 bps 4：4800 bps 5：9600 bps 6：19200 bps 7：38400 bps	

This parameter used to setting the data transmission rate between the host computer and the AC drive.Note that the baud rate set by the upper computer and AC drive must be consistent.Otherwise,the communication can’t be carried out.The higher the baud rate,the faster the communication speed is.

FC.02	Data bits and check Settings	Factory default	3

	Setting range	0：(8.N.2) 8 -Bit，No check，2 stop bit 1：(8.E.1) 8-Bit，Even check，1 stop bit 2：(8.O.1) 8-Bit,Odd check，1 stop bit 3：(8.N.1) 8-Bit，No check，1 stop bit

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

FC.03	Response time	Factory default	2ms
	Setting range	0~20ms	

Response delay: refers to the intermediate interval between the end of the frequency converter data acceptance and the sending of data to the upper machine. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is longer than the system processing time, the system will wait until the response delay time reaches the upper computer before sending the data.

FC.04	Communication timeout	Factory default	0.0 s
	Setting range	0.0 s（Invalid），0.1~60.0s	

When the function code is set to 0.0s, the communication timeout parameter is invalid.

When this function code is set to valid value, if the interval between one communication and the next communication exceeds the communication timeout period, the system reports a communication fault error (Err16).Usually, this is set to invalid. If you set the next parameter in a continuous communication system, you can monitor the communication status.

FC.05	Communication read current resolution	Factory default	0
	Setting range	0：0.01A 1：0.1A	

The output unit used to determine the current value when the communication reads the output current.

Chapter 7 Diagnoses and Troubleshooting

The SPIN2 solar pump controller will attempt to drive the pump to deliver water even under adverse conditions. To ensure years of reliable service, it must also protect the system components from conditions that might result in equipment damage. When adverse conditions arise, the controller will continue to deliver as much water as possible at reduced output if necessary, and will shut down only in extreme cases. Full operation will resume automatically whenever abnormal conditions subside.

If the controller has stopped to indicate a fault code on the display, the associated time-out delay will vary depending on the nature of the fault. The number following the “Err” symbol corresponds to the error code for the offending condition.

7.1 Error Codes

Code	Description	Possible Causes	Suggestions
Err02	Overcurrent During Acceleration	Output grounded or shorted	Check output cables and motor insulation
		Too fast acceleration	Increase acceleration time
		Lower-rating controller	Replace with higher-rating controller
Err03	Overcurrent During Deceleration	Output grounded or shorted	Check output cables and motor insulation
		Too fast deceleration	Increase deceleration time
Err04	Overcurrent at Constant Speed	Output grounded or shorted	Check output cables and motor insulation
		Lower-rating controller	Replace with higher-rating controller
Err05	Overvoltage During Acceleration	Input voltage too high	Adjust input voltage to normal value
		Too fast acceleration	Increase acceleration time
		Lack of brake unit & brake resistor	Add brake unit & brake resistor
Err06		Input voltage too high	Adjust input voltage to normal value

Code	Description	Possible Causes	Suggestions
	Overvoltage During Deceleration	Too fast deceleration	Increase deceleration time
		Lack of brake unit & brake resistor	Add brake unit & brake resistor
Err07	Overvoltage at Constant Speed	Input voltage too high	Adjust input voltage to normal value
Err08	Buffer Resistor Overload	Input voltage not in proper range	Adjust input voltage to proper range
Err09	Bus Voltage Too Low	Input voltage not in proper range	Adjust input voltage to proper range
		Failure of bus voltage detection/buffer resistor/control board/power board	Seek for technical support
Err10	VFD Overload	Load too large or motor stuck	Decrease the load and check the motor
		Lower-rating controller	Replace with higher-rating controller
Err11	Motor Overload	Improper settings of FA.01 & FA.02	Correctly set them
		Load too large or motor stuck	Decrease the load and check the motor
Err12	Input Phase Loss	Abnormal input power source	Check input power source and wirings
		Failure of control board/power board	Seek for technical support
Err13	Output Phase Loss	Motor Inner Failure	Check the coil winding
		Abnormal Output Cables	Check the wirings
		Imbalance of 3-phase Output	Check the motor coil winding and output circuit
		Failure of control board/power board	Seek for technical support
Err14	IGBT	Ambient Temperature Too	Lower the ambient temperature if

Code	Description	Possible Causes	Suggestions
	Overheat	High	possible
		Air Duct Blocked	Clear air duct
		Fan Failure	Replace the fan
		Failure of inner thermistor/IGBT	Seek for technical support
Err15	External Error through DI Terminal	External Error Signal through DI Terminals	Check external signal
Err16	Communication Failure	Failure of Upper Device	Check upper device
		Abnormal RS485 Wirings	Check the wirings
		Incorrect settings of FC Group Parameters	Correctly setting them
Err17	Main Circuit Contactor Failure	Main Circuit Contactor Fails to Close	Replace the contactor or seek for technical support
Err18	Current Detection Failure	Detecting Circuit Failure	Seek for technical support
		Control Board Failure	Seek for technical support
Err19	Motor Tuning Failure	Incorrect settings of F2 Group Parameters	Correctly setting them according to motor nameplate
Err21	Parameter Reading & Writing Failure	Control Board Failure	Seek for technical support
Err22	EEPROM Failure	EEPROM Chip Failure	Seek for technical support
Err23	Motor Shorted to Ground	Motor/Output Cables Shorted to Ground	Check the insulation of them
		Control Board Failure	Seek for technical support
Err24	Software	Water Shortage	Check the water source

Code	Description	Possible Causes	Suggestions
	Dry Run Error	FD.12 Set Too Large(When FD.10 is set above 0)	Decrease set value of FD.12
Err26	Accumulated Running Time Reached	Accumulated running time has reached set value	Clear the time record
Err29	Accumulated Powered-on Time Reached	Accumulated powered-on time has reached set value	Clear the time record
Err31	PID Feedback Offline	PID Feedback Signal Loss	Check the feedback signal source
		PID Feedback Below Minimum Detection Value	Correctly set F9.25 & F9.26
Err40	CBC Overcurrent	Load too large or motor stuck	Decrease the load and check the motor
		Lower-rating controller	Replace with higher-rating controller
E098/ E099	Inner Communication Failure	Poor connection between keypad and control board	Re-connect the keypad and control board
		Keypad Failure	Seek for technical support
Lou	Low Level of Water Inlet	Float switch/level sensor outputs close signal at inlet	Check whether the water level is too low at inlet
FULL	High Level of Water Outlet	Float switch/level sensor outputs close signal at outlet	Check whether the water level is too high at outlet

7.2 Common Faults and Remedies

Order	Fault phenomenon	Possible cause	Remedy
1	No display on keypad	Abnormal input voltage	Check whether input voltage is in normal range
		Poor contact between keyboard and control board	Check connect cable
		Inner instrument failure	Look for technical support
2	Pump cannot run	Lack of input power（light）	Increase panel power or restart at enough light
		Motor failed or stuck	Replace the motor or check mechanical fault
		Incorrect wiring of motor	Confirm whether wiring is correct
3	DI terminal failure	Incorrect setting of parameters	Check and reset F5 group parameters
		External fault	Reconnect signal wire，and clear external faults
		Control board failure	Look for technical support
4	Controller interference	Abnormal carrier frequency	Reduce carrier frequency properly
		Incorrect ground method	The controller and pump shall both be grounded （not together with other external devices）
		Cable too long between controller and motor	Install output reactor or reduce length of cable
5	Big noise of motor	Motor failed or stuck	Replace the motor or check mechanical fault
		Abnormal carrier frequency	Increase carrier frequency properly
6	Switch trip	Installed leakage switch or air switch overload	Replace the air switch (without leakage) or replace the air switch with a larger capacity
		Abnormal input power	Check input power and eliminate short circuit
		Internal instrument failure	Look for technical support