



# **SC10 Solar Pump Controller**

## **User Manual**

# Preface

Thank you for using SC10 series products. This manual provides you with relevant operation instructions and detailed description of parameters. Please read this manual carefully before installation, running, maintenance or inspection.

Please make sure the wiring and the pump's rotation direction is correct before using.

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# 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



- ◎ 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



- ◎ 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



- ◎ 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 SC10 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 SC10 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 SC10 solar pumping system. The major parts and components in the system are listed after the diagram.

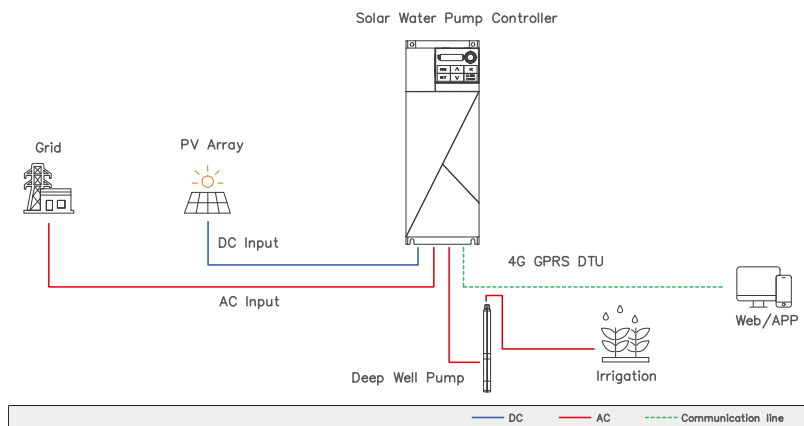


Figure 1-1-1 SC10 solar pumping system

## 1.2 System Consist

The SC10 solar pump controller runs at variable speed while matching the changing power provided by the solar array. Variable speed operation means there is no in-rush or surge of energy during the pump/motor start-up, helping to eliminate wear on the motor and pumping system.

### ■ Pump Check Valve Requirements

**Notice:** In order to ensure maximum system reliability and water delivery, check valves must be installed in the drop pipe. The first check valve must be installed at the pump and additional check valves should be installed every 30m (100 ft) of vertical pipe after the pump.

## 1.3 System Functions

### ■ System Diagnostics

The SC10 solar pump controller continuously monitors system performance and detects a variety of abnormal conditions. In many cases, the controller will compensate as needed to maintain continuous system operation; however, if there is high risk of equipment damage, the controller will protect the system and display the fault condition. If possible, the controller will try to restart itself when the fault condition subsides. See Diagnostics and Troubleshooting section for a list of Fault Codes and corrective actions.

### ■ Motor Soft-Start

Normally, when there is a demand for water and power is available, the SC10 solar pump controller will be operating. Whenever the SC10 solar pump controller detects a need for water, the controller always “ramps up” the motor speed while gradually increasing motor voltage, resulting in a cooler motor and lower start-up current compared to conventional water systems. Due to the controller’s soft-start feature this will not harm the motor.

### ■ Overheat Monitoring

The SC10 solar pump controller can be operated at full power when the ambient temperature reaches 45 °C. At temperatures above 45 °C, the controller reduces the carrier frequency and maintains operation as much as possible.

### ■Water Level Control

The SC10 solar pump controller can access two water level switch detects remotely control the pump automatically. Level switch for SC10 solar pump controller is optional, not mandatory.

### ■Hybrid Input of DC & AC Power Supply

SC10 Solar Pump Controller supports both DC and AC power input. When they are connected at a same time, the system will start the water pump with DC input power if it is available, and AC input power works as backup, ensuring the continuous power supply.

Note: According to different models, the power supply can be both single phase 220V, and also 3 phase 380V, please seek the details from manufacturer or certificated agents.

## Chapter 2 General Information

The SC10 solar pump controller is a variable speed motor drive designed to run any IEC three-phase asynchronous motors. The SC10 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 SC10 solar pump controller is designed to provide these features with the plug and play ease of installation.

The SC10 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 SC10 solar pump controller unit. Verify that the part number is correct and that no damage has occurred during transit.

**NOTE:** SC10 solar pump controller is one component of a SC10 solar pumping system which has other two optional components, solar array and AC pump with motor.

### 2.2 Descriptions and Features

The SC10 solar pump controller is based on a standard SC10 platform controlling a standard three-phase asynchronous motor driving a pump powered by a solar array or an optional AC generator backup.

The SC10 solar pump controller continuously monitors system performance and incorporates a number of features for pumping system protection. In the event of a

fault, the SC10 solar pump controller will indicate the type of fault through the LED display mounted on the front cover of controller.

The SC10 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 SC10 Solar Pump Controller Model Description

### SC10 - 4 T 5R5 - EH

① ② ③ ④ ⑤ ⑥

| Segment                                                                                                                                                                                                                                                          | Description          | Options                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------|
| ①                                                                                                                                                                                                                                                                | SC series            | Solar Pump Controller                                                                            |
| ②                                                                                                                                                                                                                                                                | Series ID            | 10:General platform series products                                                              |
| ③                                                                                                                                                                                                                                                                | Rated Output Voltage | 2: 220V three phase; 4: 380V three phase                                                         |
| ④                                                                                                                                                                                                                                                                | Input Voltage        | S: 150-450VDC /1PH 220-240VAC 50/60Hz (Note 1)<br>T: 220-900VDC /3PH 380-480VAC 50/60Hz (Note 2) |
| ⑤                                                                                                                                                                                                                                                                | Motor Power Rating   | 5R5:5.5kW; R: decimal point                                                                      |
| ⑥                                                                                                                                                                                                                                                                | English series       | H:High-voltage electrical version                                                                |
| <b>Note 1:</b> Supporting Alternating Current input, with voltage rating of AC 220V single phase connected to terminal R&T.<br><b>Note 2:</b> Supporting Alternating Current input, with voltage rating of AC 380V three phase connected to terminal R, S and T. |                      |                                                                                                  |

Sheet 2-4-1 SC10 Model Description

## 2.5 SC10 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℃～60℃;>45℃, Derating as Required                        |                          |            |
| Cooling Method            | Fan Cooling                                                |                          |            |
| Ambient Humidity          | ≤ 95%RH                                                    |                          |            |
| Standard Warranty(month ) | 18                                                         |                          |            |
| Certificates              | IEC/EN 61800-5-1,IEC/EN 61800-2:2004,IEC/EN61800-3:2004,CE |                          |            |

Sheet 2-5-1 SC10 Technical Specification

## 2.6 SC10 Model Selection

| Controller Model                | SC10-2S2R2-EH | SC10-4T2R2-EH | SC10-4T004-EH | SC10-4T5R5-EH |
|---------------------------------|---------------|---------------|---------------|---------------|
| <b>Input Data</b>               |               |               |               |               |
| 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       |
| <b>Alternate AC Generator</b>   |               |               |               |               |
| 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           |
| <b>Output Data</b>              |               |               |               |               |
| 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 SC10 2.2 kW—5.5kW Selection Sheet

| Controller Model                | SC10-4T7R5-EH | SC10-4T011-EH | SC10-4T015-EH | SC10-4T018R5-EH |
|---------------------------------|---------------|---------------|---------------|-----------------|
| <b>Input Data</b>               |               |               |               |                 |
| 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       |
| <b>Alternate AC Generator</b>   |               |               |               |                 |
| Input Voltage                   | 3P 380-480V   |               |               |                 |
| Max Amps(RMS)[A]                | 20.5          | 26            | 35            | 38.5            |
| Power and VA Capability[kVA]    | 11            | 17            | 21            | 24              |
| <b>Output Data</b>              |               |               |               |                 |
| 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 SC10 7.5 kW—18.5 kW Selection Sheet

| Controller Model               | SC10-4T022-EH | SC10-4T030-EH | SC10-4T037-EH |
|--------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>              |               |               |               |
| 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       |
| <b>Alternate AC Generator</b>  |               |               |               |
| Input Voltage                  | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]               | 46.5          | 62            | 76            |
| Power and VA Capability[kVA]   | 30            | 40            | 57            |
| <b>Output Data</b>             |               |               |               |
| 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 SC10 22 kW—37 kW Selection Sheet

| Controller Model               | SC10-4T045-EH | SC10-4T055-EH | SC10-4T075-EH |
|--------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>              |               |               |               |
| 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] | 54~72         | 66~88         | 90~120        |
| <b>Alternate AC Generator</b>  |               |               |               |
| Input Voltage                  | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]               | 92            | 113           | 157           |
| Power and VA Capability[kVA]   | 69            | 85            | 114           |
| <b>Output Data</b>             |               |               |               |
| Output Voltage, Rated          | 3P 0-380/480V |               |               |
| Max Amps(RMS)[A]               | 91            | 112           | 150           |
| Output Power, Rated[kW]        | 45            | 75            | 93            |
| Output Frequency               | 0~50Hz/60Hz   |               |               |

Sheet 2-6-4 SC10 45kW—75kW Selection Sheet

| Controller Model               | SC10-4T093-EH | SC10-4T110-EH | SC10-4T132-EH |
|--------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>              |               |               |               |
| 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] | 112~149       | 132~176       | 158~211       |
| <b>Alternate AC Generator</b>  |               |               |               |
| Input Voltage                  | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]               | 180           | 214           | 256           |
| Power and VA Capability[kVA]   | 134           | 160           | 192           |
| <b>Output Data</b>             |               |               |               |
| Output Voltage, Rated          | 3P 0-380/480V |               |               |
| Max Amps(RMS)[A]               | 176           | 210           | 253           |
| Output Power, Rated[kW]        | 93            | 110           | 132           |
| Output Frequency               | 0~50Hz/60Hz   |               |               |

Sheet 2-6-5 SC10 93 kW—132kW Selection Sheet

| Controller Model               | SC10-4T160-EH | SC10-4T185-EH | SC10-4T200-EH |
|--------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>              |               |               |               |
| 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] | 307~231       | 222~296       | 240~320       |
| <b>Alternate AC Generator</b>  |               |               |               |
| Input Voltage                  | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]               | 307           | 345           | 385           |
| Power and VA Capability[kVA]   | 231           | 245           | 260           |
| <b>Output Data</b>             |               |               |               |
| Output Voltage, Rated          | 3P 0-380/480V |               |               |
| Max Amps(RMS)[A]               | 304           | 340           | 377           |
| Output Power, Rated[kW]        | 160           | 185           | 200           |
| Output Frequency               | 0~50Hz/60Hz   |               |               |

Sheet 2-6-6 SC10 160 kW—200kW Selection Sheet

| Controller Model                | SC10-4T220-EH | SC10-4T250-EH | SC10-4T280-EH |
|---------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>               |               |               |               |
| 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] | 264~352       | 300~400       | 378~504       |
| <b>Alternate AC Generator</b>   |               |               |               |
| Input Voltage                   | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]                | 430           | 468           | 525           |
| Power and VA Capability[kVA]    | 280           | 355           | 396           |
| <b>Output Data</b>              |               |               |               |
| Output Voltage, Rated           | 3P 0-380/480V |               |               |
| Max Amps(RMS)[A]                | 426           | 465           | 520           |
| Output Power, Rated[kW]         | 220           | 250           | 280           |
| Output Frequency                | 0~50Hz/60Hz   |               |               |

Sheet 2-6-7 SC10 220 kW—280kW Selection Sheet

| Controller Model                | SC10-4T315-EH | SC10-4T355-EH | SC10-4T400-EH |
|---------------------------------|---------------|---------------|---------------|
| <b>Input Data</b>               |               |               |               |
| 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] | 378~504       | 426~568       | 480~640       |
| <b>Alternate AC Generator</b>   |               |               |               |
| Input Voltage                   | 3P 380-480V   |               |               |
| Max Amps(RMS)[A]                | 590           | 665           | 785           |
| Power and VA Capability[kVA]    | 445           | 500           | 565           |
| <b>Output Data</b>              |               |               |               |
| Output Voltage, Rated           | 3P 0-380/480V |               |               |
| Max Amps(RMS)[A]                | 585           | 650           | 725           |
| Output Power, Rated[kW]         | 315           | 355           | 400           |
| Output Frequency                | 0~50Hz/60Hz   |               |               |

Sheet 2-6-8 SC10 315 kW—400kW Selection Sheet

| Controller Model               | SC10-4T450-EH | SC10-4T500-EH | SC10-4T560-EH | SC10-4T630-EH |
|--------------------------------|---------------|---------------|---------------|---------------|
| <b>Input Data</b>              |               |               |               |               |
| 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] | 540~720       | 600~800       | 670~840       | 750~950       |
| <b>Alternate AC Generator</b>  |               |               |               |               |
| Input Voltage                  | 3P 380-480V   |               |               |               |
| Max Amps(RMS)[A]               |               |               |               |               |
| Power and VA Capability[kVA]   |               |               |               |               |
| <b>Output Data</b>             |               |               |               |               |
| Output Voltage, Rated          | 3P 0-380/480V |               |               |               |
| Max Amps(RMS)[A]               | 800           | 860           |               |               |
| Output Power, Rated[kW]        | 450           | 500           | 560           | 630           |
| Output Frequency               | 0~50Hz/60Hz   |               |               |               |

Sheet 2-6-9 SC10 450 kW—630kW Selection Sheet

Note: according to different regions, the recommended PV array power is 1.2 ~ 1.6 times the power of the controller.

## Chapter 3 Mechanical and Electrical Installation

### 3.1 Outline & Installation Dimensions Diagram(Unit: mm)

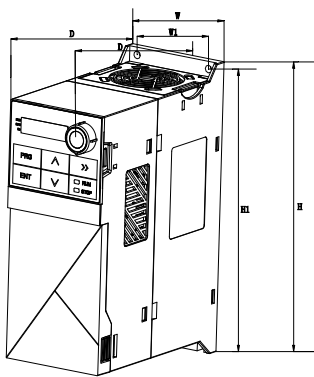


Figure 3-1-1 Dimensions V1 parameters

| Model         | External dimension |    |     |     | Installation dimension |    | Hole size |
|---------------|--------------------|----|-----|-----|------------------------|----|-----------|
|               | H                  | W  | D   | D1  | H1                     | W1 | d         |
| SC10-2S2R2-EH | 190                | 72 | 146 | 138 | 180                    | 56 | 5         |
| SC10-4T2R2-EH |                    |    |     |     |                        |    |           |
| SC10-4T004-EH |                    |    |     |     |                        |    |           |

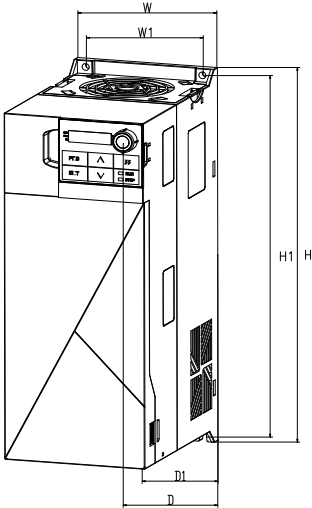


Figure 3-1-2 Dimensions V2 parameters

| Model         | External dimension |    |       |     | Installation dimension |    | Hole size |
|---------------|--------------------|----|-------|-----|------------------------|----|-----------|
|               | H                  | W  | D     | D1  | H1                     | W1 | d         |
| SC10-4T5R5-EH | 250                | 95 | 153.6 | 145 | 240                    | 80 | 5         |
| SC10-4T7R5-EH |                    |    |       |     |                        |    |           |

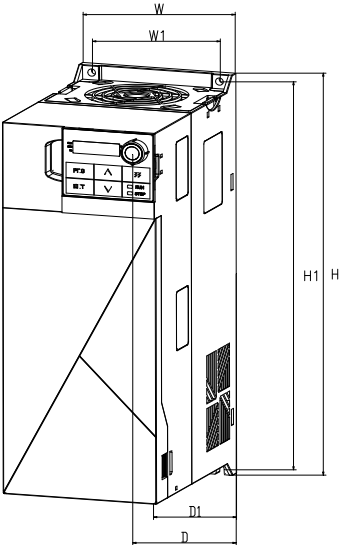


Figure 3-2-3 Dimensions V3 parameters

| Model         | External dimension |     |       |     | Installation dimension |     | Hole size |
|---------------|--------------------|-----|-------|-----|------------------------|-----|-----------|
|               | H                  | W   | D     | D1  | H1                     | W1  | d         |
| SC10-4T011-EH | 334                | 120 | 188.6 | 180 | 322                    | 100 | 6         |
| SC10-4T015-EH |                    |     |       |     |                        |     |           |

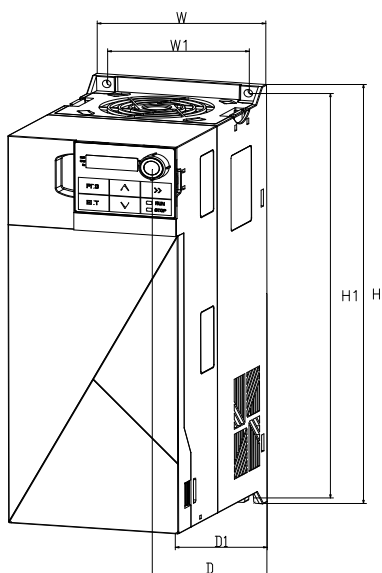


Figure 3-2-4 Dimensions V4 parameters

| Model           | External dimension |     |       |       | Installation dimension |     | Hole size |
|-----------------|--------------------|-----|-------|-------|------------------------|-----|-----------|
|                 | H                  | W   | D     | D1    | H1                     | W1  | d         |
| SC10-4T018R5-EH | 388                | 145 | 195.1 | 182.7 | 374                    | 116 | 6         |
| SC10-4T022-EH   |                    |     |       |       |                        |     |           |

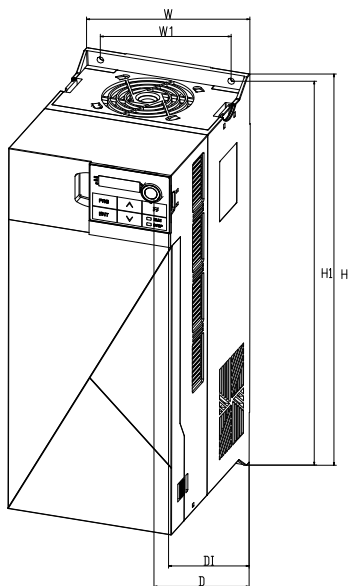


Figure 3-2-5 Dimensions V5 parameters

| Model         | External dimension |     |     |     | Installation dimension |     | Hole size |
|---------------|--------------------|-----|-----|-----|------------------------|-----|-----------|
|               | H                  | W   | D   | D1  | H1                     | W1  | d         |
| SC10-4T030-EH | 450                | 180 | 204 | 195 | 430                    | 144 | 7         |
| SC10-4T037-EH |                    |     |     |     |                        |     |           |

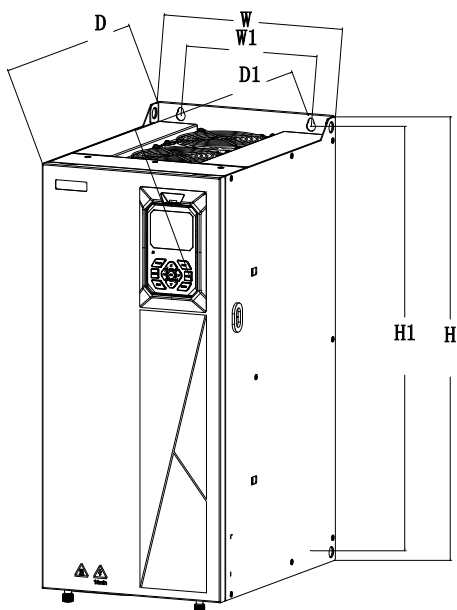


Figure 3-2-6 Dimensions V6 parameters

| Model         | External dimension |     |     |     | Installation dimension |     | Hole size |
|---------------|--------------------|-----|-----|-----|------------------------|-----|-----------|
|               | H                  | W   | D   | D1  | H1                     | W1  | d         |
| SC10-4T045-EH | 500                | 230 | 323 | 330 | 481.5                  | 160 | 8         |
| SC10-4T055-EH |                    |     |     |     |                        |     |           |

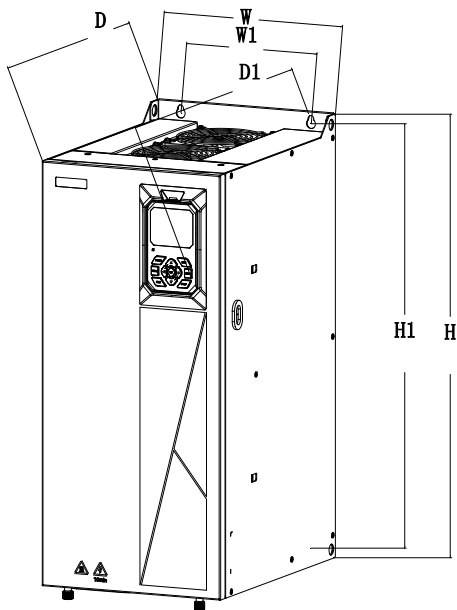


Figure 3-2-7 Dimensions V7 parameters

| Model         | External dimension |     |     |     | Installation dimension |     | Hole size |
|---------------|--------------------|-----|-----|-----|------------------------|-----|-----------|
|               | H                  | W   | D   | D1  | H1                     | W1  | d         |
| SC10-4T075-EH | 595                | 260 | 360 | 367 | 569.5                  | 190 | 8         |
| SC10-4T093-EH |                    |     |     |     |                        |     |           |
| SC10-4T110-EH |                    |     |     |     |                        |     |           |

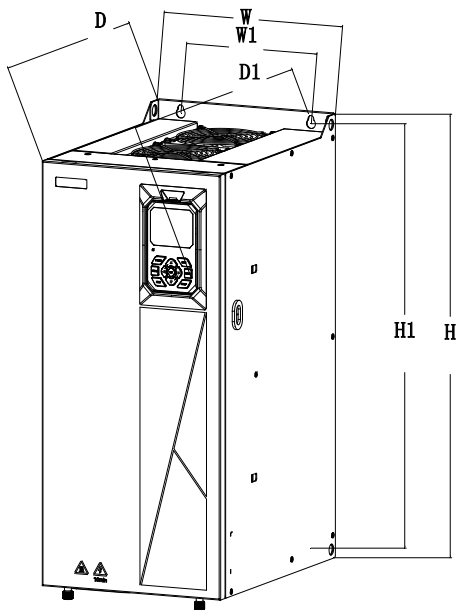


Figure 3-2-8 Dimensions V8 parameters

| Model         | External dimension |     |     |     | Installation dimension |     | Hole size |
|---------------|--------------------|-----|-----|-----|------------------------|-----|-----------|
|               | H                  | W   | D   | D1  | H1                     | W1  | d         |
| SC10-4T132-EH | 660                | 330 | 422 | 429 | 640                    | 200 | 10        |
| SC10-4T160-EH |                    |     |     |     |                        |     |           |

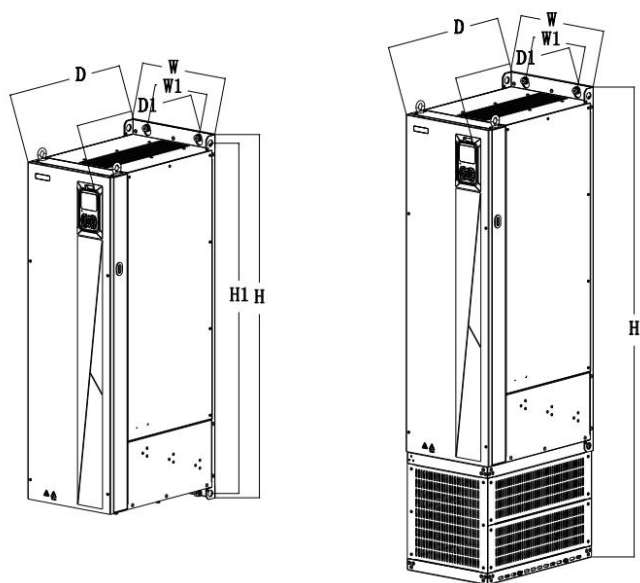


Figure 3-2-9 Dimensions V9 parameters

| Model                     | External dimension |     |       |     | Installation dimension |     | Hole size |
|---------------------------|--------------------|-----|-------|-----|------------------------|-----|-----------|
|                           | H                  | W   | D     | D1  | H1                     | W1  |           |
| SC10-4T185-EH             | 1105               | 320 | 486.5 | 487 | 106.5                  | 200 | 20        |
| SC10-4T200-EH             |                    |     |       |     |                        |     |           |
| SC10-4T220-EH             |                    |     |       |     |                        |     |           |
| SC10-4T185-EH (with base) | 1430               | 320 | 486.5 | 487 | /                      | 200 | 20        |
| SC10-4T200-EH (with base) |                    |     |       |     |                        |     |           |
| SC10-4T220-EH (with base) |                    |     |       |     |                        |     |           |

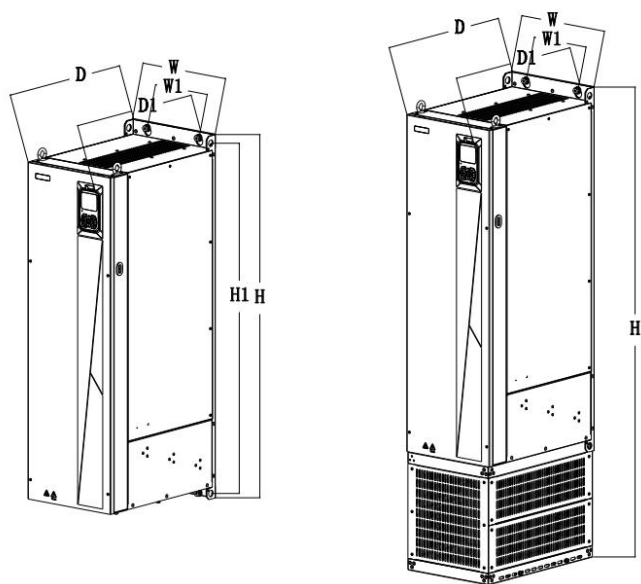


Figure 3-2-10 Dimensions V10 parameters

| Model                    | External dimension |     |       |     | Installation dimension |     | Hole size |
|--------------------------|--------------------|-----|-------|-----|------------------------|-----|-----------|
|                          | H                  | W   | D     | D1  | H1                     | W1  | d         |
| SC10-4T250-EH            | 1255               | 320 | 511.5 | 512 | 1215                   | 200 | 20        |
| SC10-4T280-EH            |                    |     |       |     |                        |     |           |
| SC10-4T250-EH(with base) | 1580               | 320 | 511.5 | 512 | /                      | 200 | 20        |
| SC10-4T280-EH(with base) |                    |     |       |     |                        |     |           |

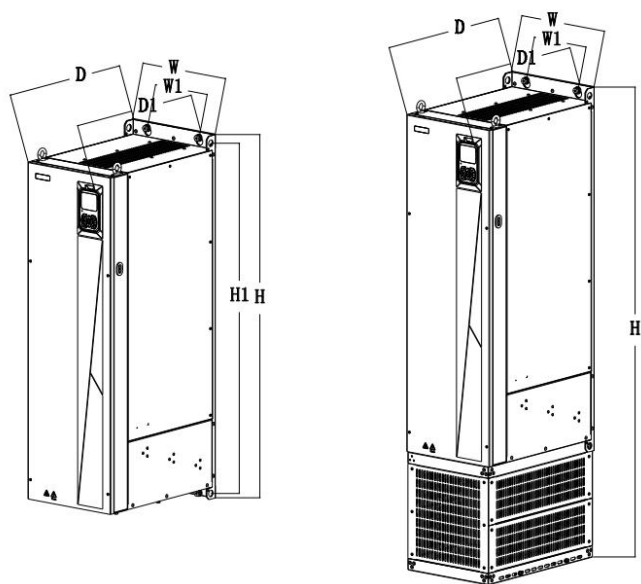


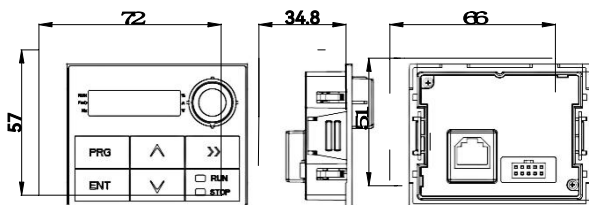
Figure 3-2-11 Dimensions V11 parameters

| Model                    | External dimension |     |       |     | Installation dimension |     | Hole size |
|--------------------------|--------------------|-----|-------|-----|------------------------|-----|-----------|
|                          | H                  | W   | D     | D1  | H1                     | W1  | d         |
| SC10-4T315-EH            | 1383               | 370 | 611.5 | 618 | 1340.5                 | 200 | 20        |
| SC10-4T355-EH            |                    |     |       |     |                        |     |           |
| SC10-4T400-EH            |                    |     |       |     |                        |     |           |
| SC10-4T315-EH(with base) | 1775               | 370 | 511.5 | 618 | /                      | 200 | 20        |
| SC10-4T355-EH(with base) |                    |     |       |     |                        |     |           |
| SC10-4T400-EH(with base) |                    |     |       |     |                        |     |           |

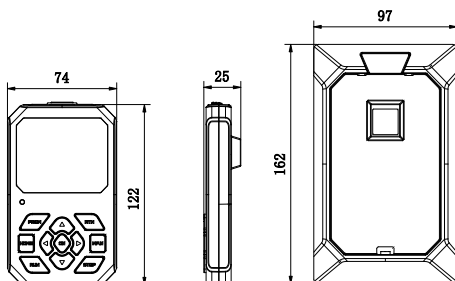
## 3.2 Keypad Dimensions Diagram

### ■Keypad Dimensions

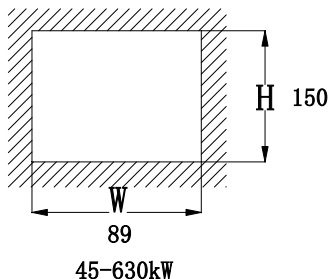
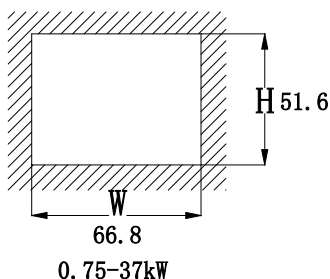
Keyboard size for 2.2 - 37kW



Keyboard size for 45 - 630kW



Keyboard opening dimensions



### 3.3 Mechanical Installation

#### 3.3.1 Overheat protection

Install the SC10 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 foldback protection of the SC10 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 SC10 solar pump controller is intended for operation in ambient temperatures up to 60 °C , but in order to avoid overheating caused by the failure, it is recommended to install the controller in the shadow position.

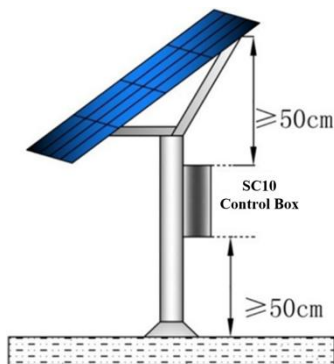


Figure 3-3-1 Control Box Location

## 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 SC10 Solar Controllers.

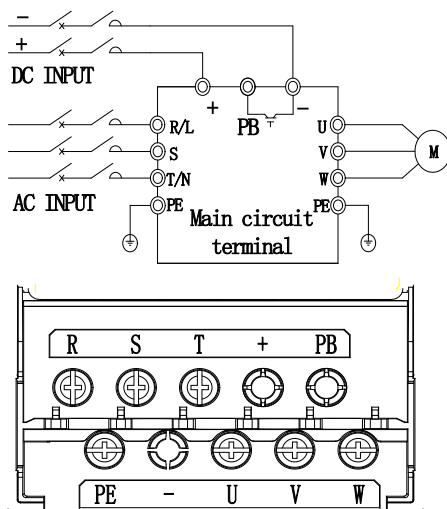


Figure 3-4-1 Main terminals (The sequence may be different from actual product)

| 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                                            |

|     |      |     |     |     |     |     |      |     |
|-----|------|-----|-----|-----|-----|-----|------|-----|
| GND | +10V | RS+ | RS- | FM  |     | TA  | TB   | TC  |
| AO  | AI1  | AI2 | DI1 | DI2 | DI3 | DI4 | +24V | COM |

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

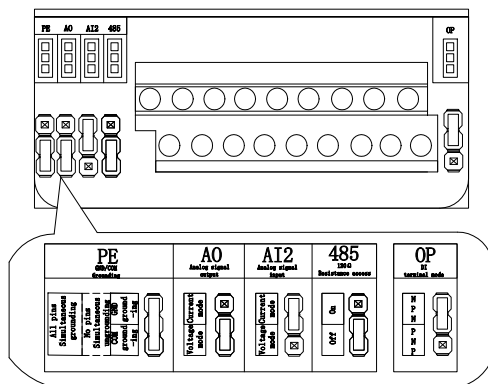


Figure 3-4-3 Jumper terminal function diagram 1

| 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                                    |
| AI2                                               | 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<br>2、 input impedance: 100k $\Omega$                                                                                                                             |
|                | 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.<br>2、 Input impedance : Voltage input 100k $\Omega$ , current input 500 $\Omega$         |
| Digital input  | DI1      | Digital input1          | 1、 Optocoupler isolation<br>2、 input impedance: 4k $\Omega$<br>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<br>Output current range: 0mA ~ 20mA<br>AO2 can only be a voltage output. |
|                | AO2-GND  | Analog output2          |                                                                                                                                                                                                             |
| Digital output | FM-COM   | Digital input1          | Optocoupler isolation, bipolar open collector output<br>Output voltage range: 0V ~ 24V<br>Output current range: 0mA ~ 50mA<br>Subject to function code F6.00 FM Terminal Output Mode Selection              |
| Relay output   | TA-TB    | NC                      | Contact drive capability:<br>AC 250V, 3A, COS $\phi$ =0.4;<br>DC 30V, 1A                                                                                                                                    |
|                | TA- TC   | NO                      |                                                                                                                                                                                                             |

| Category               | Symbol | Name                               | Function                              |
|------------------------|--------|------------------------------------|---------------------------------------|
| RS485<br>communication | RS+    | communication<br>terminal positive | RS485Differential signal positive end |
|                        | RS-    | Communication<br>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 SC10solar 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 SC10 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.

**Note: To reverse direction of motor rotation, reverse any two wires**

|               |             |             |              |              |
|---------------|-------------|-------------|--------------|--------------|
| US            | Black (BLK) | Red (RED)   | Yellow (YEL) | Ground (GND) |
| International | Gray (GRY)  | Black (BLK) | Brown (BRN)  | Ground (GND) |

### 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 SC10 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 SC10 controller allows the use of small signal line to connect to remote float switch, even if the position of the reservoir is far away.

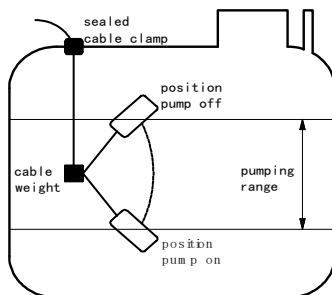


Figure 3-4-5 Floating Ball Diagram

**Float switch request:**

1. The minimum requirements for 1 mm<sup>2</sup> line diameter, the distance up to 50m
2. If 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:

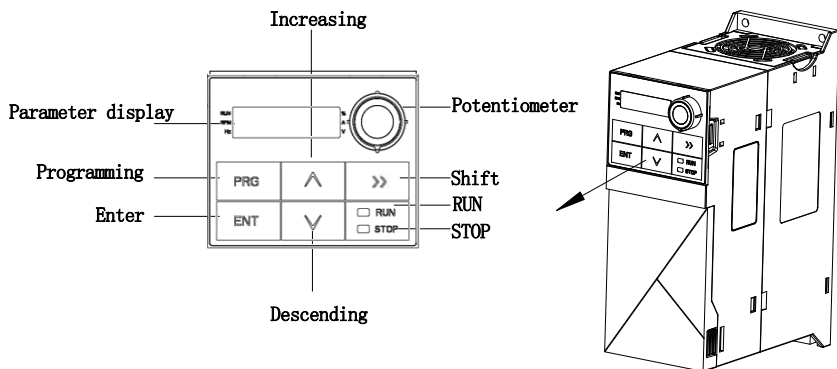


Figure 4-1-1 Schematic diagram of the operation panel

## 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.

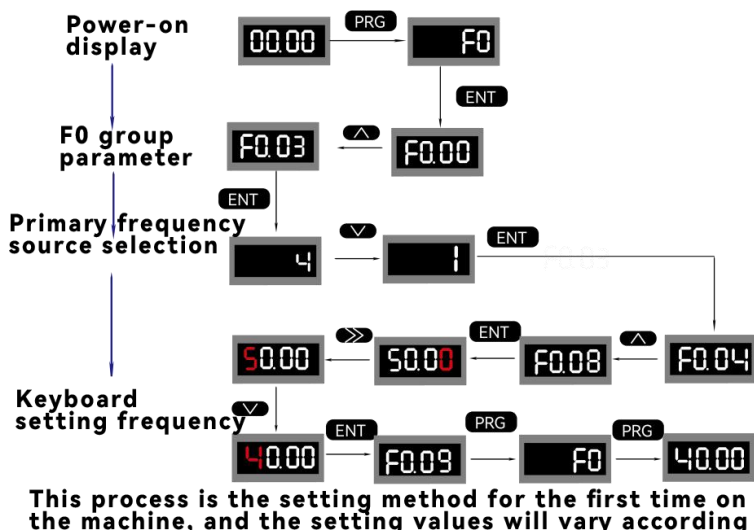


Figure 4-2-1 Rapid debugging process

## 4.3 Indicator and button function

| Item            | Name                                      | Function                                                                                                                                                                                                                        |
|-----------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator light | Indicator light                           | Hz: Frequency unit;<br>A: Current unit;<br>V: Voltage unit;<br>%: Percentage;<br>RUN: Operation;<br>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)<br>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.                                                                                                                                                                                 |
| Rotary          | 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 |
|                 | potentiometer                             | Can be used as a frequency given source.                                                                                                                                                                                        |

|      |  |                                                                                                                                                                          |
|------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| knob |  | 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. |
|------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Sheet 4-3-1 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 | Address |
|------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>F0 Basic function parameter group</b> |                                   |                                                                                                                                                                                                                                                                                                                                                                                               |         |           |         |
| F0.00                                    | Motor control mode                | <b>0:</b> SVC<br><b>1:</b> V/F<br><b>2:</b> FVC<br><b>3:</b> -                                                                                                                                                                                                                                                                                                                                | 1       | ●         | 0x0000  |
| F0.01                                    | Command source selection          | <b>0:</b> Operation panel command channel<br><b>1:</b> Terminal command channel<br><b>2:</b> Serial port communication command channel                                                                                                                                                                                                                                                        | 0       | ●         | 0x0001  |
| F0.02                                    | Running UP/DOWN benchmark         | <b>0:</b> Operating frequency<br><b>1:</b> Set frequency                                                                                                                                                                                                                                                                                                                                      | 1       | ●         | 0x0002  |
| F0.03                                    | Main frequency source X selection | <b>0:</b> Digital setting F0.08 (adjustable terminal UP/DOWN, no power-off memory)<br><b>1:</b> Digital setting F0.08 (adjustable terminal UP/DOWN, with power-off memory)<br><b>2:</b> AI1<br><b>3:</b> AI2<br><b>4:</b> Keyboard potentiometer<br><b>5:</b> PULSE terminal<br><b>6:</b> Multi-speed instruction<br><b>7:</b> Simple PLC<br><b>8:</b> PID<br><b>9:</b> Communication setting | 1       | ●         | 0x0003  |

| Function code | Name                                                        | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Default | Attribute | Address |
|---------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F0.04         | Auxiliary frequency source Y selection                      | Same as F0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4       | ●         | 0x0004  |
| F0.05         | Auxiliary frequency Y range selection in superposition mode | <b>0:</b> Relative to the maximum frequency F0.10<br><b>1:</b> Relative to the frequency source X                                                                                                                                                                                                                                                                                                                                                                                                                        | 0       | ○         | 0x0005  |
| F0.06         | Auxiliary frequency Y range in superposition mode           | 0% ~ 150%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 100%    | ○         | 0x0006  |
| F0.07         | Frequency source operation selection                        | <b>Ones: Frequency source selection</b><br><b>0:</b> Main frequency source<br><b>1:</b> Main and auxiliary calculation result<br><b>2:</b> Main and auxiliary calculation switch<br><b>3:</b> Switch of main frequency and calculation result<br><b>4:</b> Switch of auxiliary frequency and calculation result<br><b>tens:combination way selection</b><br><b>0:</b> Main + auxiliary<br><b>1:</b> Main - auxiliary<br><b>2:</b> Maximum value of both<br><b>3:</b> Minimum value of both<br><b>4:</b> Main * auxiliary | 00      | ○         | 0x0007  |
| F0.08         | Keyboard setting frequency                                  | 0.00Hz ~ maximum frequency F0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.00Hz | ○         | 0x0008  |
| F0.09         | Running direction selection                                 | <b>0:</b> Same direction<br><b>1:</b> Reverse direction<br><b>2:</b> Reverse prohibition                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0       | ○         | 0x0009  |
| F0.10         | Maximum output frequency                                    | 0.00Hz ~ 320.00Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.00Hz | ●         | 0x000A  |
| F0.11         | Upper limit frequency source selection                      | <b>0:</b> F0.12<br><b>1:</b> AI1<br><b>2:</b> AI2<br><b>3:</b> AI3<br><b>4:</b> Terminal PULSE<br><b>5:</b> Communication                                                                                                                                                                                                                                                                                                                                                                                                | 0       | ●         | 0x000B  |

| Function code | Name                                 | Setting range                                                                                                                                                                                                                                                                                                                              | Default             | Attribute | Address |
|---------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---------|
|               |                                      | 6: Reserve<br>7: Keyboard potentiometer                                                                                                                                                                                                                                                                                                    |                     |           |         |
| F0.12         | Upper limit frequency                | F0.14 ~ F0.10                                                                                                                                                                                                                                                                                                                              | 50.00Hz             | ○         | 0x000C  |
| F0.13         | Upper frequency offset               | 0.00Hz ~ F0.10                                                                                                                                                                                                                                                                                                                             | 0.00Hz              | ○         | 0x000D  |
| F0.14         | Lower limit frequency                | 0.00Hz ~ F0.12                                                                                                                                                                                                                                                                                                                             | 0.00Hz              | ○         | 0x000E  |
| F0.15         | Lower limit frequency running mode   | 0: Run at lower limit frequency<br>1: Stop<br>2: Zero-speed operation                                                                                                                                                                                                                                                                      | 0                   | ○         | 0x000F  |
| F0.16         | Carrier frequency                    | 0.5kHz ~ 16.0kHz                                                                                                                                                                                                                                                                                                                           | Model determination | ○         | 0x0010  |
| F0.17         | Carrier PWM characteristic selection | Ones: PWM mode selection<br>0: Automatic switch;<br>1: CPWM;<br>2: DPWM;<br>3: SPWM;<br>Tens: relevance between carrier and output frequency<br>0: Output frequency independent<br>1: Output frequency dependent<br>Hundreds: random PWM depth<br>0: Off<br>1-8: On (adjust depth)<br>Thousands: over modulation option<br>0: Off<br>1: On | 1010                | ●         | 0x0011  |
| F0.18         | Acceleration time 1                  | 0.0s ~ 6500.0s                                                                                                                                                                                                                                                                                                                             | Model determination | ○         | 0x0012  |
| F0.19         | Deceleration time1                   | 0.0s ~ 6500.0s                                                                                                                                                                                                                                                                                                                             | Model determination | ○         | 0x0013  |

| Function code                                | Name                                                   | Setting range                                                                                                                                                                                                                                                                                                | Default | Attribute | Address |
|----------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F0.20                                        | Parameter initialization                               | <b>0:</b> No action<br><b>1:</b> Restore factory default (do not restore motor parameters)<br><b>2:</b> Clear the record information<br><b>3:</b> Restore factory default (restore motor parameters)                                                                                                         | 0       | ●         | 0x0014  |
| F0.23                                        | Unit of acceleration and deceleration time             | <b>0:</b> 1 second<br><b>1:</b> 0.1 second<br><b>2:</b> 0.01 second                                                                                                                                                                                                                                          | 1       | ●         | 0x0017  |
| F0.24                                        | Acceleration and deceleration time benchmark frequency | <b>0:</b> Maximum frequency (F0.10)<br><b>1:</b> Setting frequency<br><b>2:</b> 100 Hz                                                                                                                                                                                                                       | 0       | ●         | 0x0018  |
| F0.25                                        | Fan control                                            | <b>Ones: start/stop control</b><br><b>0:</b> Fan runs after powered on<br><b>1:</b> Stop is related to temperature, operation equals running.<br><b>2:</b> Stop The fan stops, and the operation is related to temperature<br><b>Tens: enable speed adjustment function</b><br><b>0:</b> Off<br><b>1:</b> On | 01      | ○         | 0x0019  |
| F0.26                                        | Frequency command decimal point                        | <b>1:</b> 1 decimal place<br><b>2:</b> 2 decimal places                                                                                                                                                                                                                                                      | 2       | ●         | 0x001A  |
| F0.27                                        | Modulation ratio coefficient                           | 10.0 ~ 150.0%                                                                                                                                                                                                                                                                                                | 100.0%  | ○         | 0x001B  |
| F0.29                                        | Motor frequency selection                              | <b>Ones: motor frequency selection</b><br><b>0:</b> 50Hz/380V, 50Hz/220V<br><b>1:</b> 60Hz                                                                                                                                                                                                                   | 0000    | ●         | 0x001B  |
| <b>F1 Start stop control parameter group</b> |                                                        |                                                                                                                                                                                                                                                                                                              |         |           |         |
| F1.00                                        | Start-up operation mode                                | <b>Ones: start mode</b><br><b>0:</b> Start directly via start frequency<br><b>1:</b> Start after speed tracking and direction judgment<br><b>2:</b> Asynchronous machine pre-excitation start-up                                                                                                             | 0       | ●         | 0x0100  |

| Function code | Name                                    | Setting range                                                                                                                                                                                                                                                                         | Default | Attribute | Address |
|---------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F1.01         | Speed tracking mode                     | <b>Ones: fault reset startup method;</b><br><b>0:</b> Start directly<br><b>1:</b> Start directly after speed tracking<br><b>Tens: speed tracking direction</b><br><b>0:</b> Consistent with stop direction<br><b>1:</b> Consistent with start direction<br><b>2:</b> Automatic search | 00      | ●         | 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         | Start frequency                         | 0.00 ~ 60.00Hz                                                                                                                                                                                                                                                                        | 0.50Hz  | ○         | 0x0106  |
| F1.07         | Start 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                             | <b>0:</b> Deceleration stop<br><b>1:</b> Free stop                                                                                                                                                                                                                                    | 0       | ○         | 0x010A  |
| F1.11         | Stop DC braking start frequency         | 0.00Hz ~ F0.10                                                                                                                                                                                                                                                                        | 0.00Hz  | ○         | 0x010B  |
| F1.12         | Stop DC braking waiting 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  |
| F1.15         | Braking duty cycle                      | 0%~100%                                                                                                                                                                                                                                                                               | 100%    | ○         | 0x010F  |
| F1.16         | Energy consumption brake action voltage | 115.0% ~ 150.0%                                                                                                                                                                                                                                                                       | 130%    | ●         | 0x0110  |
| F1.17         | Magnetic flux braking gain              | 10 ~ 150%                                                                                                                                                                                                                                                                             | 80%     | ○         | 0x0111  |
| F1.18         | Magnetic flux braking action voltage    | 110% ~ 500%                                                                                                                                                                                                                                                                           | 125%    | ○         | 0x0112  |
| F1.19         | Flux brake limit amplitude              | 0 ~ 200%                                                                                                                                                                                                                                                                              | 20%     | ○         | 0x0113  |

| Function code | Name                                    | Setting range                                                                                                                                                  | Default             | Attribute | Address |
|---------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---------|
| F1.20         | Acceleration and deceleration selection | 0: Straight line<br>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%                                                                                                                                                   | 50.0%               | ●         | 0x0117  |
| F1.24         | Zero speed holding torque time          | 0.0 ~ 6000.0sec.<br>(When the value is set to 6000.0s, the value maintains without time limitation)                                                            | Model determination | ●         | 0x0118  |
| F1.25         | Start pre-excitation time               | 0.00 ~ 60.00s                                                                                                                                                  | 0.10                | ○         | 0x0119  |
| F1.26         | Stop frequency                          | 0.00 ~ 60.00Hz                                                                                                                                                 | 0.00Hz              | ○         | 0x011A  |
| F1.27         | Power failure restart action selection  | <b>0nes:</b> Power failure restart<br><b>0:</b> Invalid<br><b>1:</b> Valid<br><b>Tens:</b> Force power failure restart<br><b>0:</b> invalid<br><b>1:</b> Valid | 01                  | ○         | 0x011B  |
| F1.28         | Power failure restart waiting time      | 0.00 ~ 120.00s                                                                                                                                                 | 10.00s              | ○         | 0x011C  |

| Function code                   | Name                                  | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                             | Default             | Attribute | Address |
|---------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---------|
| F1.29                           | Terminal running protection selection | <b>Ones:terminal running command selection during power-on</b><br><b>0:</b> The terminal running command is invalid during power-on<br><b>1:</b> Terminal running command is valid during power-on<br><b>Tens:terminal running command selection when running command input terminal switches</b><br><b>0:</b> The terminal running command is invalid when the terminal is cut in<br><b>1:</b> The terminal command is valid when the terminal is cut in | 11                  | ○         | 0x011D  |
| <b>F2 Motor parameter group</b> |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |           |         |
| F2.00                           | Motor type                            | <b>0:</b> Asynchronous machine (AM)<br><b>1:</b> Permanent magnet synchronous motor (PM)<br><b>2:</b> Single-phase induction motor (without capacitor)<br><b>3:</b> Single-phase induction motor (With capacitor)                                                                                                                                                                                                                                         | 0                   | ●         | 0x0200  |
| F2.01                           | Motor rated power                     | 0.1kW ~ 630.0kW                                                                                                                                                                                                                                                                                                                                                                                                                                           | Model determination | ●         | 0x0201  |
| F2.02                           | Motor rated voltage                   | 1V ~ 480V                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     | ●         | 0x0202  |
| F2.03                           | Motor rated current                   | 0.1 ~ 2000.0A                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | ●         | 0x0203  |
| F2.04                           | Motor rated frequency                 | 0.01 ~ F0.10                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     | ●         | 0x0204  |
| F2.05                           | Motor rated 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 stator and rotor inductance     | 0.1 ~ 6500.0mH                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | ●         | 0x0208  |
| F2.09                           | Motor mutual inductancerotor          | 0.1 ~ 6500.0mH                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | ●         | 0x0209  |

| Function code | Name                                               | Setting range                                                                                                                | Default             | Attribute | Address |
|---------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---------|
| F2.10         | Motor no-load current                              | 0.1 ~ 650.0A                                                                                                                 |                     | ●         | 0x020A  |
| F2.11         | Tuning selection                                   | <b>0:</b> no operation<br><b>1:</b> static tuning<br><b>2:</b> dynamic tuning<br><b>3:</b> Static tuning 2(AM calculates Lm) | 0                   | ●         | 0x020B  |
| F2.12         | G/P type                                           | <b>0:</b> G-type machine<br><b>1:</b> P-type machine                                                                         | Model determination | ◎         | 0x020C  |
| F2.13         | Single-phase motor turns ratio                     | 10 -200%                                                                                                                     | 100%                | ●         | 0x020D  |
| F2.14         | Single-phase motor current calibration coefficient | 50 -200%                                                                                                                     | 100%                | ●         | 0x020E  |
| F2.15         | Motor poles                                        | 2-48                                                                                                                         | 4                   | ●         | 0x020F  |
| F2.22         | Stator resistance of synchro                       | 0.001 ~ 65.000 (0.0010hm)                                                                                                    | Model determination | ●         | 0x0216  |
| F2.23         | D-axis inductance of synchro                       | 0.01mH ~ 655.35mH                                                                                                            |                     | ●         | 0x0217  |
| F2.24         | Q-axis inductance of synchro                       | 0.01mH ~ 655.35mH                                                                                                            |                     | ●         | 0x0218  |
| F2.25         | Back EMF of SM synchro                             | 0.1V ~ 1000.0V                                                                                                               |                     | ○         | 0x0219  |
| F2.29         | Back EMF recognize current                         | 0.1% - 100.0%                                                                                                                | 50.0%               | ●         | 0x021D  |
| F2.31         | Asynchronous no-load current per unit value        | 0.1%                                                                                                                         | Model determination | ●         | 0x021F  |
| F2.32         | Asynchronous stator resistance per unit value      | 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 | Address |
|------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F2.36                                    | Asynchronous leakage sensing coefficient per unit value | 0.01%                                                                                                                                                                                  | ation   | ●         | 0x0224  |
| F2.37                                    | Synchronous stator resistance per unit value            | 0.01%                                                                                                                                                                                  |         | ●         | 0x0225  |
| F2.38                                    | Synchronous D-axis inductance per unit value            | 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                                                                                                                                                                                   | 340.0V  | ●         | 0x0228  |
| <b>F3 Vector control parameter group</b> |                                                         |                                                                                                                                                                                        |         |           |         |
| F3.00                                    | ASR(velocity loop) proportional gain 1                  | 0.00 ~ 1.00                                                                                                                                                                            | 0.20    | ○         | 0x0300  |
| F3.01                                    | ASR(velocity ring) integral time 1                      | 0.01s ~ 10.00s                                                                                                                                                                         | 0.50    | ○         | 0x0301  |
| F3.02                                    | Velocity loss protection value                          | 0 ~ 5000ms<br>(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 ~ 1.00                                                                                                                                                                            | 0.20    | ○         | 0x0305  |
| F3.06                                    | ASR(Velocity loop) integral time 2                      | 0.01s ~ 10.00s                                                                                                                                                                         | 0.30    | ○         | 0x0306  |
| F3.07                                    | Stall protection level                                  | <b>Ones:</b> stall frequency detection value*10%,0 means off<br><b>Tens:</b> stall detection initial frequency*10%<br><b>Hundreds:</b> Stall detection time(sec)<br><b>Thousands:-</b> | 0x0251  | -         | 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                                       | 0 ~ 250%                                                                                                                                                                               | 100%    | ●         | 0x030A  |

| Function code | Name                                      | Setting range | Default | Attribute | Address |
|---------------|-------------------------------------------|---------------|---------|-----------|---------|
|               | coefficient                               |               |         |           |         |
| F3.11         | Maximum electric torque                   | 0.0 ~ 250.0%  | 160.0%  | ○         | 0x030B  |
| F3.12         | Maximum generation torque                 | 0.0 ~ 250.0%  | 160.0%  | ○         | 0x030C  |
| F3.16         | Current loop D axis proportional gain     | 0.1 ~ 10.0    | 1.0     | ●         | 0x0310  |
| 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 current loop bandwidth           | 0.0 ~ 99.99ms | 2.00ms  | ○         | 0x0316  |
| F3.23         | Current loop control word                 | 0 - 65535     | 20      | ○         | 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%  | 50.0%   | ○         | 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                          | 1 ~ 100ms     | 20ms    | ○         | 0x0320  |

| Function code | Name                                                 | Setting range                                                                                                                                                                                                                                      | Default | Attribute | Address |
|---------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               | observation filtering time                           |                                                                                                                                                                                                                                                    |         |           |         |
| F3.33         | The open-loop vector compensation starting frequency | 0 ~ 100.0%                                                                                                                                                                                                                                         | 1.0%    | ○         | 0x0321  |
| F3.34         | Open loop vector control word                        | 0 - 65535                                                                                                                                                                                                                                          | 0       | ○         | 0x0322  |
| F3.35         | Synchronous open loop start mode                     | <b>0:</b> Start directly<br><b>1:</b> Initial angle detection                                                                                                                                                                                      | 0       | ○         | 0x0323  |
| F3.36         | DC pull in time                                      | 1ms - 9999ms                                                                                                                                                                                                                                       | 500ms   | ○         | 0x0324  |
| F3.37         | Synchronous open loop vector low frequency boost     | -100% ~ 100.0%                                                                                                                                                                                                                                     | 10.0%   | ○         | 0x0325  |
| F3.38         | Synchronous open loop vector high frequency boost    | -100% ~ 100.0%                                                                                                                                                                                                                                     | 0.0%    | ○         | 0x0326  |
| F3.39         | Low frequency boost holding frequency                | 0.0 ~ 100.0%                                                                                                                                                                                                                                       | 10.0%   | ○         | 0x0327  |
| F3.40         | Low frequency boost cut-off frequency                | 0.0 ~ 100.0%                                                                                                                                                                                                                                       | 20.0%   | ○         | 0x0328  |
| F3.46         | Speed/torque control mode                            | <b>0:</b> Speed control<br><b>1:</b> Torque control                                                                                                                                                                                                | 0       | ●         | 0x032E  |
| F3.47         | Torque reference channel selection                   | <b>0:</b> F3.48<br><b>1:</b> AI1×F3.48<br><b>2:</b> AI2×F3.48<br><b>3:</b> AI3×F3.48<br><b>4:</b> PUL×F3.48<br><b>5:</b> Keyboard potentiometer ×F7.01<br><b>6:</b> RS485 communication ×F3.48<br><b>7:</b> Purchase card<br><b>8:</b> VS3(expand) | 0       | ●         | 0x032F  |
| F3.48         | Torque keyboard numeric setting                      | 0 ~ 200.0%                                                                                                                                                                                                                                         | 100.0%  | ○         | 0x0330  |
| F3.49         | Torque direction selection                           | <b>Ones: torque direction setting</b><br><b>0:</b> Positive torque direction<br><b>1:</b> Negative torque direction<br><b>Tens: torque reversing setting</b>                                                                                       | 00      | ○         | 0x0331  |

| Function code | Name                                         | Setting range                                                                                                                                                         | Default | Attribute | Address |
|---------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               |                                              | <b>0:</b> Torque reversal is allowed<br><b>1:</b> Torque reversal is prohibited                                                                                       |         |           |         |
| F3.50         | Upper limit output torque                    | F3.51 ~ 200.0%                                                                                                                                                        | 150.0%  | ○         | 0x0332  |
| F3.51         | Lower limit output torque                    | 0 ~ F3.50                                                                                                                                                             | 0%      | ○         | 0x0333  |
| F3.52         | Torque control forward speed limit selection | 0: F3.54<br>1: AI1×F3.54<br>2: AI2×F3.54<br>3: AI3×F3.54<br>4: PUL×F3.54<br>5: Keyboard potentiometer<br>×F3.54<br>6: RS485 communication<br>×F3.54                   | 0sec    | ○         | 0x0334  |
| F3.53         | Torque control reverse speed limit selection | 0: F3.55<br>1: AI1×F3.55<br>2: AI2×F3.55<br>3: AI3×F3.55<br>4: PUL×F3.55<br>5: Keyboard potentiometer×F3.55<br>6: RS485 communication n<br>×F3.55<br>7: Purchase card | 0       | ○         | 0x0335  |
| F3.54         | Torque control forward maximum speed limit   | 0.00 ~ upper limiting frequency                                                                                                                                       | 50.00Hz | ○         | 0x0336  |
| F3.55         | Torque control reverse 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 time         | 0.00 ~ 650.00s                                                                                                                                                        | 0.00s   | ○         | 0x033B  |
| F3.60         | Torque compensation amplitude                | 0.0%~50.0%                                                                                                                                                            | 10.0%   | ○         | 0x033C  |
| F3.61         | Torque compensation cutoff                   | 0.0%~100.0%                                                                                                                                                           | 30.0%   | ○         | 0x033D  |

| Function code                         | Name                                   | Setting range                                                                                                                                              | Default             | Attribute | Address |
|---------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---------|
|                                       | torque                                 |                                                                                                                                                            |                     |           |         |
| F3.62                                 | Torque compensation cutoff frequency   | 0~50.00Hz                                                                                                                                                  | 2.00Hz              | ○         | 0x033E  |
| <b>F4 V/F control parameter group</b> |                                        |                                                                                                                                                            |                     |           |         |
| F4.00                                 | Linear V/F curve selection             | 0: linear V/F curve;<br>1: Multi-point V/F curve<br>2: Square V/F curve<br>3-11: 1.1-1.9 power of V/F curves respectively;<br>12: V/F fully separated mode | 0                   | ●         | 0x0400  |
| F4.01                                 | Manual torque lift                     | 0.1 ~ 30.0%, 0 automatic torque boost                                                                                                                      | Model determination | ○         | 0x0401  |
| F4.02                                 | Torque boost cut-off 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<br>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 ~ 20.0                                                                                                                                                 | 5.0                 | ○         | 0x040B  |
| F4.12                                 | Oscillation suppression filtering time | 1 - 1000ms                                                                                                                                                 | 50ms                | ○         | 0x040C  |

| Function code | Name                                         | Setting range                                                                                                                                                                                                                               | Default | Attribute | Address |
|---------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F4.14         | VF function selection                        | <b>Ones:</b> torque boost selection<br><b>0:</b> Manual torque boost<br><b>1:</b> Auto torque boost<br><b>Tens:</b> torque compensation selection<br><b>0:</b> Off<br><b>1:</b> On<br><b>Hundreds:</b> Reserve<br><b>Thousands:</b> Reserve | 0000    | ○         | 0x040D  |
| F4.14         | Percentage of output voltage                 | 25 ~ 100%                                                                                                                                                                                                                                   | 100%    | ●         | 0x040E  |
| F4.16         | AVR function                                 | <b>0:</b> Invalid<br><b>1:</b> Only deceleration is invalid<br><b>2:</b> Only constant speed is valid<br><b>3:</b> Valid                                                                                                                    | 3       | ●         | 0x0410  |
| F4.17         | EVF torque boost gain                        | 0 - 500.0%                                                                                                                                                                                                                                  | 100.0%  | ○         | 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            | <b>Ones:</b> 0 is off, 1 is on<br><b>Tens:</b> Frequency change exit depth<br><b>Hundreds:</b> /<br><b>Thousands:</b> /                                                                                                                     | 50      | ○         | 0x0415  |
| F4.22         | Energy saving lower limit frequency          | 0.0 ~ 100.0%                                                                                                                                                                                                                                | 25.0%   | ○         | 0x0416  |
| F4.23         | Energy saving pressure reduction time        | 0.1 ~ 5000.0s                                                                                                                                                                                                                               | 10.0s   | ○         | 0x0417  |
| F4.24         | Energy saving lower limit pressure reduction | 20.0 ~ 100.0%                                                                                                                                                                                                                               | 30.0%   | ○         | 0x0418  |
| F4.25         | Energy saving pressure reduction rate        | 1 - 1000V/sec                                                                                                                                                                                                                               | 50V/sec | ○         | 0x0419  |
| F4.26         | Voltage regulated proportional gain          | 0 - 100                                                                                                                                                                                                                                     | 20      | ○         | 0x041A  |

| Function code | Name                                          | Setting range                                                                                                                                                                          | Default | Attribute | Address |
|---------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| 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 lifting amplitude       | 0.0% - 200.0%                                                                                                                                                                          | 50.0%   | ○         | 0x0420  |
| F4.33         | Low frequency boost holding frequency         | 0 ~ 100.0%                                                                                                                                                                             | 20.0%   | ○         | 0x0421  |
| F4.34         | Low frequency current boost cutoff frequency  | 0 ~ 100.0%                                                                                                                                                                             | 50.0%   | ○         | 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 setting intensity               | 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         | Start frequency                               | 0.00Hz ~ 99.00Hz                                                                                                                                                                       | 3.00Hz  | ○         | 0x0429  |
| F4.42         | Start frequency time                          | 0.0sec ~ 999.0sec                                                                                                                                                                      | 3.0sec  | ○         | 0x042A  |
| F4.43         | V/F separation output voltage source          | 0: F0.27<br>1: AI1<br>2: AI2<br>3: Reserve<br>4: PULSE terminal<br>5: Multi-speed<br>6: Simple PLC<br>7: PID<br>8: Communication, 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  |

| Function code                            | Name                                   | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Default | Attribute | Address |
|------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F4.45                                    | V/F separation voltage boost 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 separation stop mode               | <b>0:</b> Voltage and frequency reduce to 0 simultaneously<br><b>1:</b> Frequency decreases after the voltage drops to 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0       | ○         | 0x042F  |
| <b>F5 Input terminal parameter group</b> |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |           |         |
| F5.00                                    | DI1 terminal function selection        | <b>0:</b> Non-function<br><b>1:</b> FWD<br><b>2:</b> REV<br><b>3:</b> Three-wire operation control<br><b>4:</b> FJOG<br><b>5:</b> RJOG<br><b>6:</b> Terminal UP<br><b>7:</b> Terminal DOWN<br><b>8:</b> Free break<br><b>9:</b> Reset<br><b>10:</b> Running pause<br><b>11:</b> External fault input(NO)<br><b>12:</b> Multispeed instruction terminal 1<br><b>13:</b> Multispeed instruction terminal 2<br><b>14:</b> Multispeed instruction terminal 3<br><b>15:</b> Multispeed instruction terminal 4<br><b>16:</b> Acceleration and deceleration time select terminal 1<br><b>17:</b> Acceleration and deceleration time select terminal 2<br><b>18:</b> Frequency source switching (terminal, keyboard)<br><b>19:</b> The UP/DOWN setting clears zero<br><b>20:</b> Run the command to switch | 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 | Address |
|---------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               |      | terminals<br><b>21:</b> Acceleration and deceleration prohibition<br><b>22:</b> PID pause<br><b>23:</b> PLC State reset<br><b>24:</b> Swing pause<br><b>25:</b> Counter input<br><b>26:</b> Counter reset<br><b>27:</b> Length count input<br><b>28:</b> Length reset<br><b>29:</b> Torque control prohibited<br><b>30:</b> PULSE impulse input (only DI4)<br><b>31:</b> Reserve<br><b>32:</b> Immediate DC braking<br><b>33:</b> The external fault is normally closed<br><b>34:</b> Reserve<br><b>35:</b> The direction of PID action is reversed<br><b>36:</b> External parking terminal 1<br><b>37:</b> Control command switching terminal<br><b>38:</b> PID integration pause terminal<br><b>39:</b> Main frequency source and preset frequency switching terminal<br><b>40:</b> Auxiliary frequency source and preset frequency switching terminal<br><b>41:</b> Reserve<br><b>42:</b> Reserve<br><b>43:</b> PID parameter switching terminal<br><b>44:</b> User-defined fault 1<br><b>45:</b> User-defined fault 2<br><b>46:</b> Speed control/torque control switch<br><b>47:</b> Emergency stop<br><b>48:</b> External parking terminal 2 |         |           |         |

| Function code | Name                             | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default | Attribute | Address |
|---------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               |                                  | <b>49:</b> Decelerate DC braking<br><b>50:</b> The running time is cleared<br><b>51:</b> Timing enable<br><b>52:</b> Timing reset<br><b>54:</b> Full water protection<br><b>55:</b> AC access                                                                                                                                                                                                                                                                                                                                                 |         |           |         |
| F5.10         | AI1 input selection              | 0: 0-10V<br>3: 0-5V<br>4: 0.5-4.5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0       | ●         | 0x050A  |
| F5.11         | AI2 input selection              | 0: 0-10V<br>1: 4-20mA<br>2: 0-20mA<br>3: 0-5V<br>4: 0.5-4.5V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1       | ●         | 0x050B  |
| F5.12         | VDI1 terminal function selection | <b>0:</b> Non-function<br><b>1:</b> FWD<br><b>2:</b> REV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0       | ●         | 0x050C  |
| F5.13         | VDI2 terminal function selection | <b>3:</b> Three-wire operation control<br><b>4:</b> FJOG<br><b>5:</b> RJOG                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0       | ●         | 0x050D  |
| F5.14         | VDI3 terminal function selection | <b>6:</b> Terminal UP<br><b>7:</b> Terminal DOWN<br><b>8:</b> Free break<br><b>9:</b> Reset<br><b>10:</b> Running pause<br><b>11:</b> External fault input(NO)<br><b>12:</b> Multispeed instruction terminal 1<br><b>13:</b> Multispeed instruction terminal 2<br><b>14:</b> Multispeed instruction terminal 3<br><b>15:</b> Multispeed instruction terminal 4<br><b>16:</b> Acceleration and deceleration time select terminal 1<br><b>17:</b> Acceleration and deceleration time select terminal 2<br><b>18:</b> Frequency source switching | 0       | ●         | 0x050E  |

| Function code | Name | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default | Attribute | Address |
|---------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               |      | (terminal, keyboard)<br><b>19:</b> The UP/DOWN setting clears zero<br><b>20:</b> Run the command to switch terminals<br><b>21:</b> Acceleration and deceleration prohibition<br><b>22:</b> PID pause<br><b>23:</b> PLC State reset<br><b>24:</b> Swing pause<br><b>25:</b> Counter input<br><b>26:</b> Counter reset<br><b>27:</b> Length count input<br><b>28:</b> Length reset<br><b>29:</b> Torque control prohibited<br><b>30:</b> PULSE impulse input (only DI4)<br><b>31:</b> Reserve<br><b>32:</b> Immediate DC braking<br><b>33:</b> The external fault is normally closed<br><b>34:</b> Reserve<br><b>35:</b> The direction of PID action is reversed<br><b>36:</b> External parking terminal 1<br><b>37:</b> Control command switching terminal<br><b>38:</b> PID integration pause terminal<br><b>39:</b> Main frequency source and preset frequency switching terminal<br><b>40:</b> Auxiliary frequency source and preset frequency switching terminal<br><b>41:</b> Reserve<br><b>42:</b> Reserve<br><b>43:</b> PID parameter switching terminal<br><b>44:</b> User-defined fault 1<br><b>45:</b> User-defined fault 2 |         |           |         |

| Function code | Name                                  | Setting range                                                                                                                                                                                                                                              | Default  | Attribute | Address |
|---------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|
|               |                                       | <b>46:</b> Speed control/torque control switch<br><b>47:</b> Emergency stop<br><b>48:</b> External parking terminal 2<br><b>49:</b> Decelerate DC braking<br><b>50:</b> The running time is cleared<br><b>51:</b> Timing enable<br><b>52:</b> Timing reset |          |           |         |
| F5.15         | DI filtering time                     | 0.000s ~ 1.000s                                                                                                                                                                                                                                            | 0.010s   | ○         | 0x050F  |
| F5.16         | Terminal command mode                 | 0: Two-wire type 1<br>1: Two-wire type 2<br>2: Three-wire type 1<br>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  |
| 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 input minimum frequency         | 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 ~ 20.00kHz                                                                                                                                                                                                                                           | 20.00kHz | ○         | 0x051E  |
| F5.31         | PULSE maximum frequency setting       | 0.00 ~ 100.00%                                                                                                                                                                                                                                             | 100.0%   | ○         | 0x051F  |

| Function code | Name                                        | Setting range                                                                                                                                                                          | Default | Attribute | Address |
|---------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| 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         | Input terminal valid status setting 1       | <b>0:</b> Active low<br><b>1:</b> Active high<br><b>LED ones:</b> D1 terminal<br><b>LED tens:</b> D2 terminal<br><b>LED hundreds:</b> D3 terminal<br><b>LED thousands:</b> D4 terminal | 0000    | ●         | 0x0525  |
| F5.38         | Input terminal valid status setting 2       | <b>0:</b> Active low<br><b>1:</b> Active high<br><b>Ones:</b> D5 terminal(expend)<br><b>Tens:</b> D6 terminal(expend)<br><b>Hundreds:</b> D7 terminal<br><b>Thousands:</b> D8 terminal | 0000    | ●         | 0x0526  |
| F5.39         | Input terminal valid status setting 3       | <b>0:</b> Active low<br><b>1:</b> Active high<br><b>Ones:</b> AI1<br><b>Tens:</b> AI2<br><b>Hundreds:</b> AI3 (expend)<br><b>Thousands:</b> Reserve                                    | 0000    | ●         | 0x0527  |
| F5.40         | Analog input curve selection                | <b>Ones:</b> AI1<br><b>Tens:</b> AI2<br><b>Hundreds:</b> AI3 (expend)<br><b>0:</b> Straight line (default)<br><b>1:</b> Curve 1<br><b>2:</b> Curve 2                                   | 0       | ●         | 0x0528  |
| F5.41         | Lower limit of curve 1                      | 0.00 ~ 10.00V                                                                                                                                                                          | 0.00V   | ○         | 0x0529  |
| F5.42         | Lower limit of curve 1 set                  | 0.00 ~ 100.00%                                                                                                                                                                         | 0.0%    | ○         | 0x052A  |
| F5.43         | Inflection point 1 of curve 1 input voltage | F5.41 ~ 10.00V                                                                                                                                                                         | 3.00V   | ○         | 0x052B  |
| F5.44         | Inflection point 1 of curve 1               | 0.00 ~ 100.00%                                                                                                                                                                         | 30.0%   | ○         | 0x052C  |

| Function code                             | Name                                        | Setting range                                                                                                                                                                                                                                                           | Default | Attribute | Address |
|-------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|                                           | set                                         |                                                                                                                                                                                                                                                                         |         |           |         |
| F5.45                                     | Inflection point 2 of curve 1 input voltage | F5.43 ~ 10.00V                                                                                                                                                                                                                                                          | 6.00V   | ○         | 0x052D  |
| F5.46                                     | Inflection point 2 of curve 1 set           | 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 set              | 0.00 ~ 100.00%                                                                                                                                                                                                                                                          | 100.0%  | ○         | 0x0530  |
| F5.49                                     | Lower limit of curve 2                      | 0.00 ~ 10.00V                                                                                                                                                                                                                                                           | 0.00V   | ○         | 0x0531  |
| F5.50                                     | The lower limit of curve 2 set              | 0.00 ~ 100.00%                                                                                                                                                                                                                                                          | 0.0%    | ○         | 0x0532  |
| F5.51                                     | Inflection point 1 of curve 2 input voltage | F5.49 ~ 10.00V                                                                                                                                                                                                                                                          | 3.00V   | ○         | 0x0533  |
| F5.52                                     | Inflection point 1 of curve 2 set           | 0.00 ~ 100.00%                                                                                                                                                                                                                                                          | 30.0%   | ○         | 0x0534  |
| F5.53                                     | Curve 2 Inflection point 2 input voltage    | F5.51 ~ F5.55                                                                                                                                                                                                                                                           | 6.00V   | ○         | 0x0535  |
| F5.54                                     | Inflection point 2 of curve 1 set           | 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 set              | 0.00 ~ 100.00%                                                                                                                                                                                                                                                          | 100.0%  | ○         | 0x0538  |
| <b>F6 Output terminal parameter group</b> |                                             |                                                                                                                                                                                                                                                                         |         |           |         |
| F6.00                                     | FM terminal output selection                | <b>0:</b> Pulse output<br><b>1:</b> Open Collector Output (FMR)                                                                                                                                                                                                         | 1       | ○         | 0x0600  |
| F6.01                                     | FMR open collector output selection         | <b>0:</b> No output<br><b>1:</b> The inverter is in operation<br><b>2:</b> Fault output (fault shutdown)<br><b>3:</b> Frequency level detection FDT1 output<br><b>4:</b> Frequency reaches<br><b>5:</b> Zero speed running 1<br><b>6:</b> Motor overload forecast alarm | 0       | ○         | 0x0601  |
| F6.02                                     | Relay 1 output selection                    |                                                                                                                                                                                                                                                                         | 21      | ○         | 0x0602  |
| F6.03                                     | Relay 2 output selection (expend)           |                                                                                                                                                                                                                                                                         | 1       | ○         | 0x0603  |
| F6.06                                     | VDO1 output selection                       |                                                                                                                                                                                                                                                                         | 0       | ●         | 0x0606  |
| F6.07                                     | VDO2 output selection                       |                                                                                                                                                                                                                                                                         | 0       | ●         | 0x0607  |

| Function code | Name                  | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Default | Attribute | Address |
|---------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F6.08         | VDO3 output selection | 7: Inverter overload forecast alarm<br>8: Set meter value reached<br>9: The specified count value is reached<br>10: Length reached<br>11: The PLC cycle is complete<br>12: The accumulated running time reaches<br>13: Reserve<br>14: Torque limit<br>15: Ready to run<br>16: AI1 > AI2<br>17: The upper frequency reaches<br>18: The lower limit frequency reaches 1<br>19: Output in undervoltage state<br>20: Communication control<br>21: Positioning completed (reserved)<br>22: Positioning close (reserved)<br>23: Zero speed running 2<br>24: The cumulative power-on time reaches<br>25: Frequency level detection<br>FDT2 output<br>26: Frequency reaches 1 output<br>27: Frequency reaches 2 output<br>28: Current reaches 1 output<br>29: Current reaches 2 output<br>30: Timed to reach output<br>31: Reserve<br>32: Reserve<br>33: Running direction<br>34: Reserve<br>35: The module temperature reaches<br>36: Reserve<br>37: The lower limit frequency reaches 2<br>38: Fault output 2 | 0       | ●         | 0x0608  |
| F6.09         | Reserve               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         | -         | 0x0609  |

| Function code | Name                                         | Setting range                                                                                                                                                                                                                                                           | Default  | Attribute | Address |
|---------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|
|               |                                              | <b>39:</b> Reserve<br><b>40:</b> The running time arrives<br><b>41:</b> User-defined output 1<br><b>42:</b> User-defined output 2<br><b>43:</b> Timer output<br><b>44:</b> Running forward<br><b>45:</b> Reverse running                                                |          |           |         |
| F6.10         | AO output signal selection                   | <b>Ones:</b> AO1<br><b>0:</b> 0 ~ 10V<br><b>1:</b> 4.00 ~ 20.00mA<br><b>2:</b> 0.00 ~ 20.00mA<br><b>Tens:</b> AO2(expend)<br><b>0:</b> 0 ~ 10V<br><b>1:</b> 4.00 ~ 20.00mA<br><b>2:</b> 0.00 ~ 20.00mA                                                                  | 00       | -         | 0x060A  |
| F6.11         | FMP (pulse output terminal) output selection | <b>0:</b> Run frequency<br><b>1:</b> Setting frequency                                                                                                                                                                                                                  | 0        | ○         | 0x060B  |
| F6.12         | AO1 Output selection                         | <b>2:</b> Output current<br><b>3:</b> Output torque<br><b>4:</b> Output power<br><b>5:</b> Output voltage<br><b>6:</b> Reserve<br><b>7:</b> AI1<br><b>8:</b> AI2<br><b>9:</b> AI3<br><b>10:</b> PULSE Input Value                                                       | 0        | ○         | 0x060C  |
| F6.13         | AO2 output selection (expend)                | <b>11:</b> Reserve<br><b>12:</b> Communication setting<br><b>13:</b> Motor speed<br><b>14:</b> Output current(0-1000A, corresponding to 0-10V)<br><b>15:</b> Output voltage(0-1000V, corresponding to 0-10V)<br><b>16:</b> Bus voltage(0-1000V, corresponding to 0-10V) | 0        | ○         | 0x060D  |
| F6.14         | Upper limit FM frequency output              | 0.00~50.00kHz                                                                                                                                                                                                                                                           | 20.00kHz | ○         | 0x060E  |

| Function code | Name                                     | Setting range   | Default | Attribute | Address |
|---------------|------------------------------------------|-----------------|---------|-----------|---------|
| F6.15         | AO1 minimum input                        | 0.00V ~ F6.17   | 0.00V   | ○         | 0x060F  |
| F6.16         | AO1 minimum input setting                | 0.0% ~ +100.0%  | 0.0%    | ○         | 0x0610  |
| F6.17         | AO1 maximum output                       | F6.15 ~ +10.00V | 10.00V  | ○         | 0x0611  |
| F6.18         | AO1 maximum output 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 setting(expend)       | 0.0% ~ +100.0%  | 0.0%    | ○         | 0x0614  |
| F6.21         | AO2 maximum output (expend)              | F6.19 ~ +10.00V | 10.00V  | ○         | 0x0615  |
| F6.22         | AO2 maximum output setting (expend)      | 0.0% ~ +100.0%  | 100.0%  | ○         | 0x0616  |
| F6.23         | FMR connection delay time                | 0.0s ~ 3600.0s  | 0.0s    | ○         | 0x0617  |
| F6.24         | Relay 1 connection delay time            | 0.0 ~ 3600.0s   | 0.0s    | ○         | 0x0618  |
| F6.25         | Relay 2 connection delay time (expend)   | 0.0s ~ 3600.0s  | 0.0s    | ○         | 0x0619  |
| F6.26         | VDO connection delay time                | 0.0 ~ 3600.0s   | 0.0s    | ○         | 0x061A  |
| F6.27         | FMR disconnection delay time             | 0.0s ~ 3600.0s  | 0.0s    | ○         | 0x061B  |
| F6.28         | Relay 1 disconnection delay time         | 0.0 ~ 3600.0s   | 0.0s    | ○         | 0x061C  |
| F6.29         | Relay 2 disconnection delay time(expend) | 0.0s ~ 3600.0s  | 0.0s    | ○         | 0x061D  |
| F6.30         | VDO1 disconnect delay                    | 0.0 ~ 3600.0s   | 0.0s    | ○         | 0x061E  |

| Function code | Name                                             | Setting range                                                                                                                                                                                                                                                                                                                      | Default | Attribute | Address |
|---------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F6.31         | Output terminal valid status selection 1         | <b>0:</b> positive logic<br><b>1:</b> reverse logic<br><b>Ones: FDOR</b><br><b>Tens: RL1</b><br><b>Hundreds: RL2 (expend)</b><br><b>Thousands: -</b>                                                                                                                                                                               | 000     | ○         | 0x061F  |
| F6.32         | Virtual output terminal valid status selection 2 | <b>0:</b> positive logic<br><b>1:</b> reverse logic<br><b>Ones: VDO1</b><br><b>Tens: VDO2</b><br><b>Hundreds: VDO3</b><br><b>Thousands: -</b>                                                                                                                                                                                      | 000     | ○         | 0x0620  |
| F6.33         | User-defined output selection (EX) 1             | <b>0:</b> Running frequency<br><b>1:</b> Setting frequency<br><b>2:</b> Bus voltage<br><b>3:</b> Output voltage<br><b>4:</b> Output current<br><b>5:</b> Output power<br><b>6:</b> Output torque<br><b>7-8:</b> Reserve<br><b>9:</b> AI1 input quantity<br><b>10:</b> AI2 input quantity                                           | 0       | ○         | 0x0621  |
| F6.34         | Comparison method chosen by the user 1           | <b>Ones: Compare test method</b><br><b>0:</b> Equal to ( $EX == X1$ )<br><b>1:</b> Greater than or equal to<br><b>2:</b> Less than or equal to<br><b>3:</b> Interval comparison ( $X1 \leq EX \leq X2$ )<br><b>4:</b> Bit test ( $EX \& X1=X2$ )<br><b>Tens: output method</b><br><b>0:</b> False output<br><b>1:</b> 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  |

| Function code | Name                                                      | Setting range                                                                                                                                                                                                                                                                                                                      | Default  | Attribute | Address |
|---------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|
| F6.38         | User-defined output selection (EX) 2                      | <b>0:</b> Running frequency<br><b>1:</b> Setting frequency<br><b>2:</b> Bus voltage<br><b>3:</b> Output voltage<br><b>4:</b> Output current<br><b>5:</b> Output power<br><b>6:</b> Output torque<br><b>7-8:</b> Reserve<br><b>9:</b> AI1 input quantity<br><b>10:</b> AI2 input quantity                                           | 0        | ○         | 0x0626  |
| F6.39         | Comparison method chosen by the user 2                    | <b>Ones: Compare test method</b><br><b>0:</b> Equal to ( $EX == X1$ )<br><b>1:</b> Greater than or equal to<br><b>2:</b> Less than or equal to<br><b>3:</b> Interval comparison ( $X1 \leq EX \leq X2$ )<br><b>4:</b> Bit test ( $EX \& X1=X2$ )<br><b>Tens: output method</b><br><b>0:</b> False output<br><b>1:</b> Truth output | 0        | ○         | 0x0627  |
| F6.40         | User -defined dead area 2                                 | 0 ~ 65535                                                                                                                                                                                                                                                                                                                          | 0        | ○         | 0x0628  |
| F6.41         | Comparison between user self-define 2 with output value 1 | 0 ~ 65535                                                                                                                                                                                                                                                                                                                          | 0        | ○         | 0x0629  |
| F6.42         | Comparison between user self-define 2 with output value 2 | 0 ~ 65535                                                                                                                                                                                                                                                                                                                          | 0        | ○         | 0x062A  |
| F6.43         | Lower limit FM output frequency                           | 0.00 ~ 20.00kHz                                                                                                                                                                                                                                                                                                                    | 0.10kHz  | ○         | 0x062B  |
| F6.44         | Upper limit FM output frequency                           | 0.00 ~ 20.00kHz                                                                                                                                                                                                                                                                                                                    | 10.00kHz | ○         | 0x062C  |
| F6.45         | Timer time unit                                           | <b>0:</b> second<br><b>1:</b> min<br><b>2:</b> hour                                                                                                                                                                                                                                                                                | 0        | ○         | 0x062D  |
| F6.46         | Timer maximum                                             | 0 ~ 65000 (No reset when the set value is 65000)                                                                                                                                                                                                                                                                                   | 0        | ○         | 0x062E  |

| Function code                                  | Name                                | Setting range                                                                                                                                                                                                                                                                                                                                                        | Default | Attribute | Address |
|------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F6.47                                          | Timer setting value                 | 0 ~ 65000                                                                                                                                                                                                                                                                                                                                                            | 0       | ○         | 0x062F  |
| F6.48                                          | Lower limit of FM                   | 0 ~ 65000                                                                                                                                                                                                                                                                                                                                                            | 0       | ○         | 0x0630  |
| F6.49                                          | Counter setting value               | 0 ~ 65000                                                                                                                                                                                                                                                                                                                                                            | 0       | ○         | 0x0631  |
| F6.50                                          | AO1 setting value                   |                                                                                                                                                                                                                                                                                                                                                                      |         |           | 0x0632  |
| <b>F7 Keyboard and display parameter group</b> |                                     |                                                                                                                                                                                                                                                                                                                                                                      |         |           |         |
| F7.00                                          | LCD keyboard parameter copy         | <b>0:</b> No operation is performed<br><b>1:</b> The function parameters of the machine are uploaded to the LCD keyboard<br><b>2:</b> LCD keyboard function parameters download to the machine                                                                                                                                                                       | 0       | ○         | 0x0700  |
| F7.01                                          | ENT button function selection       | <b>0:</b> ENT is invalid<br><b>1:</b> Switch between the command channel of the operation panel and the remote command channel (the remote command channel includes communication and terminal control)<br><b>2:</b> Forward/reverse switch<br><b>3:</b> Forward jog<br><b>4:</b> Reverse jog<br><b>5:</b> -<br><b>6:</b> Reverse operation<br><b>7:</b> MPPT switch | 0       | ●         | 0x0701  |
| F7.02                                          | Keyboard STOP button function range | <b>Ones: terminal control selection</b><br><b>0:</b> Invalid for terminal commands<br><b>1:</b> Valid for the terminal command<br><b>Tens: communication control selection</b><br><b>0:</b> Invalid for communication commands<br><b>1:</b> Valid for communication commands<br><b>Hundreds:</b> reserve<br><b>Thousands:</b> reserve                                | 0011    | ○         | 0x0702  |
| F7.03                                          | Keyboard operation display          | <b>Ones first group display</b>                                                                                                                                                                                                                                                                                                                                      | E420/F2 | ○         | 0x0703  |

| Function code | Name                                   | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Default | Attribute | Address |
|---------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               | parameter 1                            | <b>0:</b> Output frequency<br><b>1:</b> Given frequency<br><b>2:</b> Bus voltage<br><b>3:</b> Output voltage<br><b>4:</b> Output current<br><b>5:</b> Output power<br><b>6:</b> Output torque<br><b>7:</b> DI input status<br><b>8:</b> DO output status<br><b>9:</b> AI1 voltage<br><b>A:</b> AI2 voltage<br><b>B:</b> Reserve<br><b>C:</b> Reserve<br><b>D:</b> Reserve<br><b>E:</b> Motor speed<br><b>F:</b> PID setting<br><b>Tens: second group display</b><br><b>Hundreds: third group display</b><br><b>Thousands: fourth group display</b>                                      | 04      |           |         |
| F7.04         | Keyboard operation display parameter 2 | <b>Ones: first group display</b><br><b>0:</b> Not display<br><b>1:</b> PID feedback<br><b>2:</b> PLC stage<br><b>3:</b> Reserve<br><b>4:</b> Feedback speed<br><b>5:</b> Reserve<br><b>6:</b> Reserve<br><b>7:</b> Reserve<br><b>8:</b> Reserve<br><b>9:</b> Indicates the current power-on time<br><b>A:</b> Current running time<br><b>B:</b> Reserve<br><b>C:</b> Communication setting<br><b>D:</b> Reserve<br><b>E:</b> Main frequency X is displayed<br><b>F:</b> Auxiliary frequency Y is displayed<br><b>Tens: second group display</b><br><b>Hundreds: third group display</b> | 0000/1  | ○         | 0x0704  |

| Function code | Name                                  | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Default   | Attribute | Address |
|---------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|---------|
|               |                                       | <b>Thousands:fourth group display</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |           |         |
| F7.05         | Keyboard stop display parameters      | <b>Ones: first group display</b><br><b>0:</b> Output frequency<br><b>1:</b> Given frequency<br><b>2:</b> Bus voltage<br><b>3:</b> Output voltage<br><b>4:</b> Output current<br><b>5:</b> Output power<br><b>6:</b> Output torque<br><b>7:</b> DI input status<br><b>8:</b> DO output status<br><b>9:</b> AI1 voltage<br><b>A:</b> AI2 voltage<br><b>B:</b> Reserve<br><b>C:</b> Motor speed<br><b>D:</b> PID setting<br><b>E:</b> PID feedback<br><b>F:</b> PLC stage<br><b>Tens: second group display</b><br><b>Hundreds:third group display</b><br><b>Thousands:fourth group display</b> | 5421/12ed | ○         | 0x0705  |
| F7.06         | Load speed display factor             | 0.001 ~ 65.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.000     | ○         | 0x0706  |
| F7.07         | Inverter module heatsink temperature  | 0°C ~ 100°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | ⊙         | 0x0707  |
| F7.08         | Rectifier bridge heatsink temperature | 0°C ~ 100°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | ⊙         | 0x0708  |
| F7.09         | Total running time                    | 0h ~ 65535h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | ⊙         | 0x0709  |
| F7.10         | Product number                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | ⊙         | 0x070A  |
| F7.11         | Software version                      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | ⊙         | 0x070B  |
| F7.12         | Reserve                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | ⊙         | 0x070C  |
| F7.13         | Total power-on time                   | 0 ~ 65535h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           | ⊙         | 0x070D  |
| F7.14         | Total power consumption high word     | Power Consumption<br>=F7.14*65535+F7.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           | ⊙         | 0x070E  |
| F7.15         | Total power consumption               | Units: kWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           | ⊙         | 0x070F  |

| Function code                                | Name                              | Setting range                                                                                                                                                                                                                                                                                                                                   | Default                    | Attribute | Address |
|----------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|---------|
|                                              | low word                          |                                                                                                                                                                                                                                                                                                                                                 |                            |           |         |
| F7.16                                        | Output power calibration factor   | 0 - 500.0%                                                                                                                                                                                                                                                                                                                                      | 100.0%                     | ○         | 0x0710  |
| F7.17                                        | Power display dimension selection | 0 - Power display percentage (%)<br>1 - Power display kilowatts (KW)                                                                                                                                                                                                                                                                            | 0                          | ○         | 0x0711  |
| F7.18                                        | Keyboard display option selection | <b>Ones:LCD keypad display language:</b><br>0:Chinese<br>1:English<br><b>Tens:output frequency display:</b><br>0:Target frequency<br>1:Sync frequency<br>2:Integrator frequency<br><b>Hundreds:machine speed display:</b><br>0:Target speed<br>1:Actual speed<br><b>Thousands:fault code display</b><br>0:Hex code display<br>1:Digital display | 1100                       | ○         | 0x0712  |
| <b>F8 Auxiliary function parameter group</b> |                                   |                                                                                                                                                                                                                                                                                                                                                 |                            |           |         |
| F8.00                                        | Jog operation frequency setting   | 0.00Hz ~ maximum frequency<br>F0.10                                                                                                                                                                                                                                                                                                             | 2.00Hz                     | ○         | 0x0800  |
| F8.01                                        | Jog acceleration time             | 0.01s ~ 6500.0s                                                                                                                                                                                                                                                                                                                                 | 20.0s                      | ○         | 0x0801  |
| F8.02                                        | Jog deceleration time             | 0.01s ~ 6500.0s                                                                                                                                                                                                                                                                                                                                 | 20.0s                      | ○         | 0x0802  |
| F8.03                                        | Acceleration time 2               | 0.01s ~ 6500.0s                                                                                                                                                                                                                                                                                                                                 | 0.2                        | ○         | 0x0803  |
| F8.04                                        | Deceleration time 2               | 0.01s ~ 6500.0s                                                                                                                                                                                                                                                                                                                                 | 0.2                        | ○         | 0x0804  |
| F8.05                                        | Acceleration time 3               | 0.01s ~ 6500.0s                                                                                                                                                                                                                                                                                                                                 | Model<br>determin<br>ation | ○         | 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  |

| Function code | Name                                                   | Setting range                                                                   | Default | Attribute | Address |
|---------------|--------------------------------------------------------|---------------------------------------------------------------------------------|---------|-----------|---------|
| F8.11         | Jump frequency 2                                       | 0.00Hz ~ Maximum frequency                                                      | 0.00Hz  | ○         | 0x080B  |
| F8.12         | Jump frequency amplitude                               | 0.00Hz ~ Maximum frequency                                                      | 0.01Hz  | ○         | 0x080C  |
| F8.13         | Forward/reverse dead zone time                         | 0.0 ~ 120.0s                                                                    | 0.0s    | ○         | 0x080D  |
| F8.14         | Relationship between carrier frequency and temperature | <b>0:</b> Temperature independent<br><b>1:</b> Temperature dependent >75.1.0Khz | 1       | ○         | 0x080E  |
| F8.15         | Jog terminal priority                                  | <b>0:</b> Invalid<br><b>1:</b> Valid                                            | 1       | ○         | 0x080F  |
| F8.16         | Total power-on arrival time set                        | 0h ~ 65000h                                                                     | 0h      | ○         | 0x0810  |
| F8.17         | Total run arrival time set                             | 0h ~ 65000h                                                                     | 65000h  | ○         | 0x0811  |
| F8.18         | Total power-on arrival time action setting             | <b>0:</b> Continue to run<br><b>1:</b> Fault warning                            | 0       | ●         | 0x0812  |
| F8.19         | Total run arrival time action setting                  | <b>0:</b> Continue to run<br><b>1:</b> Fault warning                            | 0       | ●         | 0x0813  |
| F8.20         | Current run time                                       | 0 ~ 65000min                                                                    | 0       | ○         | 0x0814  |
| F8.21         | Current run time arrival action selection              | <b>0:</b> Continue to run<br><b>1:</b> Fault warning                            | 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 arrival detection width                      | 0.0% ~ 100.0% (maximum frequency)                                               | 0.0%    | ○         | 0x081A  |
| F8.27         | Arbitrary frequency arrival detection value l          | 0.00Hz ~ maximum frequency                                                      | 50.00Hz | ○         | 0x081B  |

| Function code                            | Name                                               | Setting range                                                                                                                                                                    | Default | Attribute | Address |
|------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F8.28                                    | Arbitrarily arrival frequency detection amplitude1 | 0.0% ~ 100.0% ( maximum frequency)                                                                                                                                               | 0.0%    | ○         | 0x081C  |
| F8.29                                    | Arbitrary frequency arrival detection value 2      | 0.00Hz ~ maximum frequency                                                                                                                                                       | 50.00Hz | ○         | 0x081D  |
| F8.30                                    | Arbitrarily arrival frequency detection amplitude2 | 0.0% ~ 100.0% (maximum frequency)                                                                                                                                                | 0.0%    | ○         | 0x081E  |
| F8.31                                    | Arbitrarily arrival current1                       | 0.0% ~ 300.0%(motor rated current)                                                                                                                                               | 100.0%  | ○         | 0x081F  |
| F8.32                                    | Arbitrarily arrival current 1 width                | 0.0% ~ 300.0%(motor rated current)                                                                                                                                               | 0.0%    | ○         | 0x0820  |
| F8.33                                    | Arbitrarily arrival current2                       | 0.0% ~ 300.0%(motor rated current)                                                                                                                                               | 100.0%  | ○         | 0x0821  |
| F8.34                                    | Arbitrarily arrival current 2 width                | 0.0% ~ 300.0%(motor rated current)                                                                                                                                               | 0.0%    | ○         | 0x0822  |
| <b>F9 PID functional parameter array</b> |                                                    |                                                                                                                                                                                  |         |           |         |
| F9.00                                    | PID source                                         | 0: Keyboard number PID input to F9.01<br>1: AI1<br>2: AI2<br>3: Reserve<br>4: Terminal pulse<br>5: Communication<br>6: Multi-speed<br>7: Keyboard potentiometer                  | 0       | ○         | 0x0900  |
| F9.01                                    | PID Numerical                                      | 0.0% ~ 100.0%                                                                                                                                                                    | 50.0%   | ○         | 0x0901  |
| F9.02                                    | PID Feedback source                                | 0: AI1<br>1: AI2<br>2: Reserve<br>3: AI1-AI2<br>4: Terminal pulse<br>5: Communication<br>6: AI1+AI2<br>7: MAX( AI1 ,  AI2 )<br>8: MIN( AI1 ,  AI2 )<br>9: Keyboard potentiometer | 0       | ○         | 0x0902  |

| Function code | Name                                | Setting range                                                                                                                                                                                                                                                                                                 | Default | Attribute | Address |
|---------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| F9.03         | PID Control characteristics         | <b>Ones</b> : feedback characteristic selection<br>0: positive<br>1: negative<br><b>Tens</b> : PID adjustment direction selection<br>0: reverse prohibition<br>1: reverse permission<br><b>Hundreds</b> : Alignment selection<br>0: Off-center alignment<br>1: Center alignment<br><b>Thousands</b> : Reserve | 0110    | ○         | 0x0903  |
| F9.04         | PID feedback range                  | 0 ~ 100.0                                                                                                                                                                                                                                                                                                     | 100.0   | ○         | 0x0904  |
| F9.05         | Proportional gain P1                | 0.00 ~ 100.00/5.00                                                                                                                                                                                                                                                                                            | 20.00   | ○         | 0x0905  |
| F9.06         | Integral time I1                    | 0.00s ~ 10.00s /1.00                                                                                                                                                                                                                                                                                          | 1.00s   | ○         | 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 limit amplitude    | 0.00% ~ 100.00%                                                                                                                                                                                                                                                                                               | 0.10%   | ○         | 0x090A  |
| F9.11         | PID 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 ~ 100.00/20.00                                                                                                                                                                                                                                                                                            | 20.00   | ○         | 0x090E  |
| F9.15         | Integral time I2                    | 0.00s ~ 10.00s /5.00                                                                                                                                                                                                                                                                                          | 1.00s   | ○         | 0x090F  |
| F9.16         | Differential time D2                | 0.00s ~ 10.00s                                                                                                                                                                                                                                                                                                | 0.00s   | ○         | 0x0910  |
| F9.17         | PID Parameter switching condition   | 0: Do not switch<br>1: Terminal switching<br>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             | F9.18 ~ 100.0%                                                                                                                                                                                                                                                                                                | 80.0%   | ○         | 0x0913  |

| Function code | Name                                                | Setting range                                                                                                                                                                                                               | Default | Attribute | Address |
|---------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               | deviation 2                                         |                                                                                                                                                                                                                             |         |           |         |
| 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: Continues PID operation without fault<br>1: Stop with fault (manual reset)<br>2: Continue PID operation with output alarm<br>3: Run at the current frequency with output alarm signal<br>4: Stop with fault (auto reset) | 0       | ○         | 0x0917  |
| F9.24         | Wire break alarm upper limit                        | 0.00 ~ 100.0%                                                                                                                                                                                                               | 100.0%  | ○         | 0x0918  |
| F9.25         | Wire break alarm lower limit                        | 0.00 ~ 100.0%                                                                                                                                                                                                               | 0.0%    | ○         | 0x0919  |
| F9.26         | Feedback wire break detection time                  | 0.0s ~ 120.0s                                                                                                                                                                                                               | 0.0s    | ○         | 0x091A  |
| F9.27         | PID stop operation                                  | 0: No operation during stop<br>1: Operation during stop                                                                                                                                                                     | 0       | ○         | 0x091B  |
| F9.28         | PID function selection                              | 0: Normal PID<br>1: Sleep PID                                                                                                                                                                                               | 0       | ○         | 0x091C  |
| F9.29         | PID sleep 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         | Sleep detection frequency                           | 0 ~ Upper limit frequency F0.12                                                                                                                                                                                             | 25.00Hz | ○         | 0x0921  |
| F9.34         | Minimum output                                      | 0: F0.14(Lower frequency)<br>1:0Hz                                                                                                                                                                                          | 0       | ●         | 0x0922  |
| F9.35         | Maximum positive output deviation between two cycle | 0.00 ~ 100.00%                                                                                                                                                                                                              | 1.00%   | ○         | 0x0923  |
| F9.36         | Maximum negative output deviation between two cycle | 0.00 ~ 100.00%                                                                                                                                                                                                              | 1.00%   | ○         | 0x0924  |
| F9.37         | PID integral attribute                              | <b>Ones:</b> integral separation                                                                                                                                                                                            | 0       | ○         | 0x0925  |

| Function code                                  | Name                                      | Setting range                                                                                                                                                                                                                        | Default        | Attribute | Address |
|------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|---------|
|                                                |                                           | 0: Invalid<br>1: Valid<br><b>Tens:</b> output to the limit, whether to stop integrating<br>0: Integrate continue<br>1: Stop integrating                                                                                              |                |           |         |
| F9.38                                          | PID preset switchover condition selection | 0: Time<br>1: Switch according to AI1 feedback value                                                                                                                                                                                 | 0              | ○         | 0x0926  |
| F9.39                                          | PID AI feedback switching minimum value   | 0.0 ~ F8.18                                                                                                                                                                                                                          | 45.0%          | ○         | 0x0927  |
| F9.40                                          | PID AI feedback switching maximum value   | F8.17 ~ 100.0%                                                                                                                                                                                                                       | 55.0%          | ○         | 0x0928  |
| <b>FA Fault and protection parameter group</b> |                                           |                                                                                                                                                                                                                                      |                |           |         |
| FA.00                                          | Motor overload protection selection       | 0: Off<br>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/over current control options | 0: Off 1: On<br><b>Ones:</b> over voltage suppression enable<br><b>Tens:</b> over-current suppression enable<br><b>Hundreds:</b> input breaks resistance judgement<br><b>Thousands:</b> over-current suppression fast frequency rise | 1110           | ○         | 0xA03   |
| FA.04                                          | Over voltage suppression point            | 110% - 150%                                                                                                                                                                                                                          | Model settings | ○         | 0x0A00  |
| FA.05                                          | Udc control voltage loop gain             | 0.00 - 50.00                                                                                                                                                                                                                         | 2.00           | ○         | 0x0A01  |
| FA.06                                          | Udc control current loop gain             | 0.00 - 50.00                                                                                                                                                                                                                         | 4.00           | ○         | 0x0A02  |

| Function code | Name                                                 | Setting range                                                                                                                                                                     | Default | Attribute | Address |
|---------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| FA.07         | Over current suppression point                       | 50% - 200%                                                                                                                                                                        | 150%    | ○         | 0x412   |
| FA.08         | Over current suppression gain                        | 0.00 - 50.00                                                                                                                                                                      | 2.00    | ○         | 0x413   |
| FA.09         | Over current suppression integration                 | 0.00 - 50.00                                                                                                                                                                      | 4.00    | ○         | 0x414   |
| FA.10         | Short -circuit to ground detection                   | 0: Invalid<br>1: Valid                                                                                                                                                            | 1       | ○         | 0x0A0A  |
| FA.11         | Input phase loss protection                          | 0: Off<br>1: On                                                                                                                                                                   | 1       | ○         | 0x0A0B  |
| FA.12         | Output phase loss protection                         | 0: Off<br>1: On                                                                                                                                                                   | 1       | ○         | 0x0A0C  |
| FA.13         | Input phase loss protection software detection level | 0.0 ~ 999.9%                                                                                                                                                                      | 15.0%   | ○         | 0x0A0D  |
| FA.14         | PWM parameter setting                                | <b>Ones:</b> turn on the voltage prediction compensation<br><b>Tens:</b><br>0: SSSU<br>1: SDDU<br><b>hundreds:</b> random carrier mode<br>0: random carrier<br>1: random 0 vector | 010     |           | 0x0A0E  |
| FA.15         | Hardware current and voltage protection              | <b>Ones:</b> hardware Current Limiting (CBC)<br>0: off 1: on<br><b>Tens:</b> -<br><b>Hundreds:</b> SC filtering time<br>1 - F<br><b>Thousands:</b> OC filtering time<br>1 - F,    | 1111    | ○         | 0x0A0F  |
| FA.16         | CBC protection point                                 | 100 ~ 220%                                                                                                                                                                        | 190%    | ○         | 0x0A10  |
| FA.17         | CBC overload protection time                         | 1 ~ 5000ms                                                                                                                                                                        | 300ms   | ○         | 0x0A11  |
| FA.18         | Voltage loss point settings                          | 40.0% ~ 150.0%                                                                                                                                                                    | 100.0%  | ○         | 0x0A12  |
| FA.19         | Over-voltage point setting                           | -                                                                                                                                                                                 | Model   | ©         | 0x0A13  |

| Function code                           | Name                              | Setting range                                                                                                                                                                                      | Default       | Attribute | Address |
|-----------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|---------|
|                                         |                                   |                                                                                                                                                                                                    | determination |           |         |
| FA.20                                   | Fault auto-reset attempts         | 0~5                                                                                                                                                                                                | 0             | ○         | 0x0A14  |
| FA.21                                   | Fault auto-reset interval         | 0.1 ~ 100.0s                                                                                                                                                                                       | 1.0s          | ○         | 0x0A15  |
| FA.22                                   | Ride-through function selection   | <b>Ones:</b><br>0: off<br>1: enabled<br><b>Tens:</b><br>0: intermittent operation<br>1: stop                                                                                                       | 0000          | ○         | 0x0A16  |
| FA.23                                   | Ride-through entry voltage        | 40% - 150%                                                                                                                                                                                         | 75%           | ○         | 0x0A17  |
| FA.24                                   | Ride-through holding voltage      | 60% - 150%                                                                                                                                                                                         | 95%           | ○         | 0x0A18  |
| <b>FC Communication parameter group</b> |                                   |                                                                                                                                                                                                    |               |           |         |
| FC.00                                   | Local address                     | 1 ~ 247<br>(0 : broadcast address)                                                                                                                                                                 | 1             | ○         | 0x0C00  |
| FC.01                                   | Communication baud rate selection | 0: 300 bps<br>1: 600 bps<br>2: 1200 bps<br>3: 2400 bps<br>4: 4800 bps<br>5: 9600 bps<br>6: 19200 bps<br>7: 38400 bps<br>8: 57600 bps<br>9: 115200 bps                                              | 5             | ○         | 0x0C01  |
| FC.02                                   | Modbus data format                | 0:(8.N.2) 8 data bits, no parity, 2 stop bits<br>1: (8.E.1) 8 data bits,even parity, 1 stop bit<br>2: (8.O.1) 8 data bits, odd parity, 1 stop bit<br>3: (8.N.1) 8 data bits, no parity, 1 stop bit | 3             | ○         | 0x0C02  |
| FC.03                                   | Modbus communication              | 0ms ~ 20ms                                                                                                                                                                                         | 2ms           | ○         | 0x0C03  |

| Function code | Name                                             | Setting range                                                                                                                                                                                                                        | Default | Attribute | Address |
|---------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|               | response delay                                   |                                                                                                                                                                                                                                      |         |           |         |
| FC.04         | Modbus communication timeout failure time        | 0.0 (invalid) , 0.1s~60.0s                                                                                                                                                                                                           | 0       | ○         | 0x0C04  |
| FC.05         | Communication function selection                 | Ones:current resolution<br>0:0.01A<br>1:0.1A<br>Tens:write frequency commands<br>0:percentage(10000--upper limit frequency)<br>1:Hz(real-time frequency)<br>Hundreds:reserve<br>Thousands:reserve                                    |         |           | 0x0C05  |
| FC.06         | Reserve                                          |                                                                                                                                                                                                                                      |         |           | 0x0C06  |
| FC.07         | Master/slave selection (modbus/CAN)              | <b>Ones:</b> Modbus communication master/slave selection<br><b>Tens:</b><br>0:slave<br>1:master                                                                                                                                      |         |           | 0x0C07  |
| FC.08         | Communication proportional setting               | 0.00-5.00                                                                                                                                                                                                                            |         |           | 0x0C08  |
| FC.09         | Modbus communication fault action mode selection | 0:free stop with alarm<br>1:continue running without alarm<br>2:stop without alarm<br>(operation command given by communication)<br>3:stop without alarm<br>(operation given by all terminals)                                       |         |           | 0x0C09  |
| FC.10         | Master send selection                            | <b>Ones:</b> Tx frame group 1 selection<br><b>Tens:</b> Tx frame group 2 selection<br><b>Hundreds:</b> Tx frame group 3 selection<br><b>Thousands:</b> Tx frame group 4 selection<br>-----<br>0:Invalid<br>1:Operation command input |         |           | 0x0C1A  |

| Function code                                                       | Name                             | Setting range                                                                                                                                                                                       | Default | Attribute | Address |
|---------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
|                                                                     |                                  | 2:Master set frequency<br>3:Master output frequency<br>4:Master upper limit frequency<br>5:Reserve<br>6:Master output torque<br>7:Reserve<br>8:Reserve<br>9:Master set PID<br>A:Master feedback PID |         |           |         |
| FC.11                                                               | RS485 communication port setting | 0:Modbus communication<br>1:Series communication<br>2:UART_OSC                                                                                                                                      |         |           | 0x0C1B  |
| <b>FD Multi -speed instructions and simple PLC parameter arrays</b> |                                  |                                                                                                                                                                                                     |         |           |         |
| FD.00                                                               | Multi -speed instruction 0       | -100.0% ~ 100.0% (100.0% correspond with 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  |

| Function code | Name                                               | Setting range                                                                                                              | Default | Attribute | Address |
|---------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| FD.16         | PLC operation mode                                 | 0: Stop at the end of a single running<br>1: Hold final value at the end of a single run<br>2: Keep cycling                | 0       | ○         | 0x0D10  |
| FD.17         | PLC power-off memory selection                     | <b>Ones:</b><br>0: No power-off memory<br>1: Power-off memory on<br><b>Tens:</b><br>0: No stop memory<br>1: Stop memory on | 0       | ○         | 0x0D11  |
| FD.18         | PLC segment 0 run time                             | 0.0 ~ 6553.5(s/m/h)                                                                                                        | 0.0s(h) | ○         | 0x0D12  |
| FD.19         | PLC segment 0 acceleration/ deceleration selection | 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 segment 1 acceleration/ deceleration selection | 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 segment 2 acceleration/ deceleration selection | 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 segment 3 acceleration/ deceleration selection | 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 segment 4 acceleration/ deceleration selection | 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 segment 5 acceleration/ deceleration           | 0 ~ 3                                                                                                                      | 0       | ○         | 0x0D1D  |

| Function code | Name                                                      | Setting range       | Default | Attribute | Address |
|---------------|-----------------------------------------------------------|---------------------|---------|-----------|---------|
|               | selection                                                 |                     |         |           |         |
| FD.30         | PLC segment 6 run time                                    | 0.0 ~ 6553.5(s/m/h) | 0.0s(h) | ○         | 0x0D1E  |
| FD.31         | PLC segment 6<br>acceleration/ deceleration<br>selection  | 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 segment 7<br>acceleration/ deceleration<br>selection  | 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 segment 8<br>acceleration/ deceleration<br>selection  | 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 segment 9<br>acceleration/ deceleration<br>selection  | 0 ~ 3               | 0       | ○         | 0x0D25  |
| FD.38         | PLC segment 10 run time                                   | 0.0 ~ 6553.5(s/m/h) | 0.0s(h) | ○         | 0x0D26  |
| FD.39         | PLC segment 10<br>acceleration/ deceleration<br>selection | 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 segment 11<br>acceleration/ deceleration<br>selection | 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 segment 12<br>acceleration/ deceleration<br>selection | 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 segment 13<br>acceleration/ deceleration<br>selection | 0 ~ 3               | 0       | ○         | 0x0D2D  |

| Function code                  | Name                                                | Setting range                                                                                                                                                                | Default | Attribute | Address |
|--------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| FD.46                          | PLC segment 14 run time                             | 0.0 ~ 6553.5(s/m/h)                                                                                                                                                          | 0.0s(h) | ○         | 0x0D2E  |
| FD.47                          | PLC segment 14 acceleration/ deceleration selection | 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 segment 16 acceleration/ deceleration selection | 0 ~ 3                                                                                                                                                                        | 0       | ○         | 0x0D31  |
| FD.50                          | PLC run-time unit                                   | LED ones: timing unit<br>0: s(second)<br>1: h(hour)<br>2: min(minute)                                                                                                        | 0       | ○         | 0x0D32  |
| FD.51                          | Multi-speed instruction 0 set mode                  | 0: Function code FD.00 set<br>1: AI1<br>2: AI2<br>3: AI2<br>4: terminal PULSE<br>5: PID<br>6: Preset frequency (F0.08) set, UP/DOWN is modified<br>7: keyboard potentiometer | 0       | ○         | 0x0D33  |
| FD.52                          | Multi-speed priority                                | 0: Invalid<br>1: Valid                                                                                                                                                       | 1       | ○         | 0x0D34  |
| <b>FE User parameter group</b> |                                                     |                                                                                                                                                                              |         |           |         |
| FE.00                          | User password                                       | 0~65535                                                                                                                                                                      | 0       | ○         | 0x0E00  |
| FE.01                          | Fault record display count                          | 0~8                                                                                                                                                                          | 4       | ○         | 0x0E01  |
| FE.02                          | Parameter/keypad button locked selection            | 0: Not locked<br>1: Function parameter locked<br>2: Function parameters and key locked (except RUN/STOP/JOG)<br>3: Function parameters and keys all locked                   | 0       | ○         | 0x0E02  |

## 5.2 Fault record parameter group

| Function code                 | Name                                        | Setting range                                                                                                                                                                                                       | Attribute | Address |
|-------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|
| <b>E0 Fault parameter set</b> |                                             |                                                                                                                                                                                                                     |           |         |
| E0.00                         | Fault type                                  | see fault information code table in details                                                                                                                                                                         | ⊙         | 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 ~ 1000.0V                                                                                                                                                                                                         | ⊙         | 0xE003  |
| E0.04                         | Fault input terminal status                 | Refer to input terminal status diagram                                                                                                                                                                              | ⊙         | 0xE004  |
| E0.05                         | Fault output terminal status                | Refer to output terminal status diagram                                                                                                                                                                             | ⊙         | 0xE005  |
| E0.06                         | Fault module temperature                    | 0 ~ 100°C                                                                                                                                                                                                           | ⊙         | 0xE006  |
| E0.07                         | Fault VFD condition                         | <b>Ones:</b> Running direction<br>0: forward 1: reverse<br><b>Tens:</b> running status<br>0: Stop<br>1: Steady speed<br>2: Acceleration<br>3: Deceleration<br><b>Hundreds:</b> Reserve<br><b>Thousands:</b> Reserve | ⊙         | 0xE007  |
| E0.08                         | Fault run time<br>(from this power-on)      | 0 ~ 65535min                                                                                                                                                                                                        | ⊙         | 0xE008  |
| E0.09                         | Fault run time<br>(from total running time) | 0 ~ 65535H                                                                                                                                                                                                          | ⊙         | 0xE009  |
| E0.10                         | Fault output voltage                        | 0 ~ 1500V                                                                                                                                                                                                           | ⊙         | 0xE00A  |
| E0.11                         | Fault diagnosis information                 | Refer to (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       | Attribute | Address |
|-----------------------------------|-----------------------------|--------------------|-----------|---------|
| <b>D0 Display parameter group</b> |                             |                    |           |         |
| 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)            | 0.01kW             | ⊙         | 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  |
| D0.17                             | PLC phase                   |                    | ⊙         | 0xD011  |
| D0.18                             | PULSE input pulse frequency |                    | ⊙         | 0xD012  |
| D0.19                             | FM output frequency         |                    | ⊙         | 0xD013  |
| D0.20                             | CPU remaining running time  |                    | ⊙         | 0xD014  |
| D0.21                             | PV state                    |                    | ⊙         | 0xD015  |
| D0.22                             | PV Voc                      |                    | ⊙         | 0xD016  |
| D0.23                             | Reserve                     |                    | ⊙         | 0xD017  |
| D0.24                             | Reserve                     |                    | ⊙         | 0xD018  |
| D0.25                             | Current power-on time       | 1min,start counter | ⊙         | 0xD019  |

| Function code                     | Name                          | Minimum unit                       | Attribute | Address |
|-----------------------------------|-------------------------------|------------------------------------|-----------|---------|
| <b>D0 Display parameter group</b> |                               |                                    |           |         |
|                                   |                               | after this power on                |           |         |
| D0.26                             | Current running time          | 0.1min,start counter after running | ⊙         | 0xD01A  |
| D0.27                             | CPU temperature               |                                    | ⊙         | 0xD01B  |
| D0.28                             | Communication setting         |                                    | ⊙         | 0xD01C  |
| D0.29                             | IGBT 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                             | Reserve                       |                                    | ⊙         | 0xD023  |
| D0.36                             | 3.3VA                         |                                    | ⊙         | 0xD024  |
| D0.37                             | Control board version         |                                    | ⊙         | 0xD025  |
| D0.38                             | Power board version           |                                    | ⊙         | 0xD026  |
| D0.39                             | Reserve                       |                                    | ⊙         | 0xD027  |
| D0.40                             | Reserve                       |                                    | ⊙         | 0xD028  |
| D0.41                             | Reserve                       |                                    | ⊙         |         |
| D0.42                             | Reserve                       |                                    | ⊙         |         |
| D0.43                             | Reserve                       |                                    | ⊙         |         |
| D0.44                             | Reserve                       |                                    | ⊙         |         |
| D0.45                             | Reserve                       |                                    | ⊙         |         |
| D0.46                             | Reserve                       |                                    | ⊙         |         |
| D0.49                             | Reserve                       |                                    | ⊙         |         |

## 5.4 A1 Special parameters for solar water pumps

| Function code                     | Name                         | Setting Range                               | Default | Attribute | Address |
|-----------------------------------|------------------------------|---------------------------------------------|---------|-----------|---------|
| <b>A1 Display parameter group</b> |                              |                                             |         |           |         |
| A1.00                             | Photovoltaic water pump mode | 0: Variable frequency speed regulation mode | 2       | ⊙         | 0xA100  |

| Function code                     | Name                                             | Setting Range               | Default  | Attribute | Address |
|-----------------------------------|--------------------------------------------------|-----------------------------|----------|-----------|---------|
| <b>A1 Display parameter group</b> |                                                  |                             |          |           |         |
|                                   |                                                  | 1: CVT mode<br>2: MPPT mode |          |           |         |
| 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                             | MPPT voltage lower limit                         | 20.0% - 200.0%              | 50.0%    | ⊙         | 0xA103  |
| A1.04                             | Frequency adjustment Kp                          | 0.0 - 999.9                 | 2.0      | ⊙         | 0xA104  |
| A1.05                             | Frequency adjustment Ki                          | 0.0 - 999.9                 | 2.0      | ⊙         | 0xA105  |
| A1.06                             | Frequency adjustment Kd                          | 0.0 - 999.9                 | 2.0      | ⊙         | 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                             | Sleep voltage threshold                          | 0 ~ 1000V                   | 0V       | ⊙         | 0xA10A  |
| A1.11                             | Sleep recovery voltage                           | 0 ~ 1000V                   | 400V     | ⊙         | 0xA10B  |
| A1.12                             | Sleep recovery waiting time                      | 0.0sec~3000.0sec            | 10.0sec  | ⊙         | 0xA10C  |
| A1.13                             | Low-frequency protection detection frequency     | 0 - 100%                    | 20%      | ⊙         | 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-out protection detection current             | 0 - 200%                    | 40%      | ⊙         | 0xA010  |
| A1.17                             | Dry-out protection detection frequency           | 0 - 100%                    | 80%      | ⊙         | 0xA111  |
| A1.18                             | Dry-out protection detection time                | 0.0sec~3000.0sec            | 60.0sec  | ⊙         | 0xA112  |
| A1.19                             | Dry-out protection auto recovery time            | 0.0sec~3000.0sec            | 900.0sec | ⊙         | 0xA113  |
| A1.20                             | Over-current protection detection current        | 0 - 200%                    | 0%       | ⊙         | 0xA114  |
| A1.21                             | Over-current protection detection time           | 0.0sec~3000.0sec            | 30.0sec  | ⊙         | 0xA115  |

| Function code                     | Name                                             | Setting Range                                                                                                                                                                                                                                                                                                                                     | Default  | Attribute | Address |
|-----------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|
| <b>A1 Display parameter group</b> |                                                  |                                                                                                                                                                                                                                                                                                                                                   |          |           |         |
| A1.22                             | Over-current 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                                                                                                                                                                                                                                                                                                                                  | 900.0sec | ⊙         | 0xA119  |
| A1.26                             | Alarm recovery mode                              | 0: Automatic recovery<br>1: Manual recovery<br>LED0: Low-frequency protection<br>LED1: Minimum Power protection<br>LED2: Dry protection<br>LED3: Over-current and overload protection                                                                                                                                                             | 0000H    | ⊙         | 0xA11A  |
| 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<br><b>LED0:</b><br>0: Upper limit is limited by the given frequency<br>1: Upper limit frequency is limited by the rated frequency of the motor<br><b>LED1:</b><br>0: Minimum upper limit is 0;<br>1: Minimum upper limit frequency is 1/4 of the motor<br><b>LED2:</b> Fault power-off reserve<br><b>LED3:</b> Under-voltage | 1110H    | ⊙         | 0xA11D  |

| Function code                     | Name                                       | Setting Range                                                                                                                                                                                                                                                      | Default | Attribute | Address |
|-----------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>A1 Display parameter group</b> |                                            |                                                                                                                                                                                                                                                                    |         |           |         |
|                                   |                                            | fault not reserve                                                                                                                                                                                                                                                  |         |           |         |
| A1.30                             | Photovoltaic water pump function selection | 0: Invalid, 1: Valid<br>LED0: Constant torque frequency limit selection<br>LED1: Reserve<br>LED2: Update Voc voltage on voltage surge<br>LED3: Fast frequency reduction function                                                                                   | 1100H   | ⊙         | 0xA11E  |
| A1.31                             | Rapid frequency reduction gain             | 0-20                                                                                                                                                                                                                                                               | 2       | ⊙         | 0xA11F  |
| A1.32                             | Rapid frequency reduction threshold        | 3.0%-15.0%                                                                                                                                                                                                                                                         | 5.0%    | ⊙         | 0xA120  |
| A1.33                             | Voltage surge threshold                    | 0.0%-20.0%                                                                                                                                                                                                                                                         | 5.0%    | ⊙         | 0xA121  |
| A1.34                             | Constant torque frequency limit            | 80.0%-150.0%                                                                                                                                                                                                                                                       | 150.0%  | ⊙         | 0xA122  |
| A1.35                             | Automatic power switching                  | <b>LED 0:</b> AC/DC switching function<br>0:Off<br>1:On<br><b>LED1:</b> AC/DC switching way<br>0:judge by time<br>1:intelligent judgement<br><b>LED 2:</b> relay action way<br>0:NC<br>1:edge trigger<br>2:NO<br><b>LED 3:</b> intelligently start AC rapid switch | 0100H   | ⊙         | 0xA123  |
| A1.36                             | Automatic switch to PV time                | 1~500min                                                                                                                                                                                                                                                           | 30min   | ⊙         | 0xA124  |
| A1.37                             | Automatic switching delay                  | 0.1~3000.0s                                                                                                                                                                                                                                                        | 5.0s    | ⊙         | 0xA125  |
| A1.38                             | DC/AC minimum frequency                    | 0.00-300.00Hz                                                                                                                                                                                                                                                      | 20.00Hz | ⊙         | 0xA126  |
| A1.39                             | DC/AC minimum frequency duration           | 1~500Min                                                                                                                                                                                                                                                           | 5min    | ⊙         | 0xA127  |

| Function code                     | Name                                | Setting Range                                                                                                                                                                                         | Default | Attribute | Address |
|-----------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>A1 Display parameter group</b> |                                     |                                                                                                                                                                                                       |         |           |         |
| A1.40                             | AC/DC detection cycle               | 1~500Min                                                                                                                                                                                              | 30min   | ⊙         | 0xA128  |
| A1.41                             | AC/DC detection frequency           | 1.00-300.00Hz                                                                                                                                                                                         | 30.00hz | ⊙         | 0xA129  |
| A1.42                             | AC/DC cycle detection duration      | 1~500Sec                                                                                                                                                                                              | 10sec   | ⊙         | 0xA12A  |
| A1.43                             | AC type                             | <b>LED0:</b><br>0:Generation<br>1:Grid<br><b>LED1:</b><br>0:Not forced<br>1:DC forced<br>2:AC forced<br><b>LED2:</b> MPPT enable<br>on under-voltage<br><b>LED3:</b> AC input<br>phase-loss detection | 0000H   | ⊙         | 0xA12B  |
| A1.44                             | Grid detection frequency            | 50-500Hz                                                                                                                                                                                              | 300     | ⊙         | 0xA12C  |
| A1.45                             | Grid supply voltage detection       | 0.00-1000.0V                                                                                                                                                                                          | 5.0V    | ⊙         | 0xA12D  |
| A1.46                             | Generator voltage filtering time    | 1.0ms-1000.0ms                                                                                                                                                                                        | 10.0ms  | ⊙         | 0xA12E  |
| A1.47                             | Generator detected voltage          | 0.00-1000.0V                                                                                                                                                                                          | 1.5V    | ⊙         | 0xA12F  |
| A1.48                             | Generator detection count           | 0-10000                                                                                                                                                                                               | 20      | ⊙         | 0xA130  |
| A1.49                             | Power status detection function     | <b>LED0:</b> Initial detection<br>power (0-A)<br><b>LED1:</b> Stop detection<br>power (0-A)<br><b>LED2:</b> Determine<br>power type in AC state<br><b>LED3:</b> Determine<br>power type in DC state   | 0163H   | ⊙         | 0xA131  |
| A1.50                             | Over-temp frequency reduction point | 0: Disable the<br>thermal throttling<br>threshold<br>1 - 100: Exceed the<br>thermal throttling<br>threshold                                                                                           | 0       | ⊙         | 0xA132  |
| A1.51                             | Frequency reduction ratio           | 0~100%                                                                                                                                                                                                | 5       | ⊙         | 0xA133  |

| Function code                     | Name                            | Setting Range                                                                                                                                                                                                                      | Default | Attribute | Address |
|-----------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>A1 Display parameter group</b> |                                 |                                                                                                                                                                                                                                    |         |           |         |
| A1.52                             | Clean action selection          | <b>LED0:Cleaning enabled</b><br>0:Prohibit<br>1:Enable<br><b>LED1:Cleaning start selection</b><br>0:On first power-on<br>1:Before every start<br><b>LED2:Cleaning finish action</b><br>0:Stop<br>1:Continue<br><b>LED3:Reserve</b> | 0x0110  | ⊙         | 0xA134  |
| A1.53                             | Cleaning frequency              | F0.14-F0.12                                                                                                                                                                                                                        | 25.00Hz | ⊙         | 0xA135  |
| A1.54                             | Cleaning forward operation time | 0-3000.0min                                                                                                                                                                                                                        | 0.5min  | ⊙         | 0xA136  |
| A1.55                             | Cleaning reverse operation time | 0-3000.0min                                                                                                                                                                                                                        | 0.5min  | ⊙         | 0xA137  |
| A1.56                             | Cleaning cycle count            | 1~60                                                                                                                                                                                                                               | 5       | ⊙         | 0xA138  |

## 5.5 A4 Special parameters for constant pressure water supply

| Function code                     | Name                             | Setting Range                 | Default | Attribute | Address |
|-----------------------------------|----------------------------------|-------------------------------|---------|-----------|---------|
| <b>A4 Display parameter group</b> |                                  |                               |         |           |         |
| A4.00                             | Water supply function selection  | 0: Invalid<br>1: Effective    | 0       | ⊙         | 0xA400  |
| A4.01                             | Set pressure                     | 1.0~A4.19                     | 3.0bar  | ⊙         | 0xA401  |
| A4.02                             | Start 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)<br>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                                          | Setting Range                                                                                | Default | Attribute | Address |
|-----------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>A4 Display parameter group</b> |                                               |                                                                                              |         |           |         |
| A4.08                             | Differential time D                           | 0.000s~10.000s                                                                               | 0.000   | ⊙         | 0xA408  |
| A4.09                             | Sleep selection                               | 0: Off<br>1: Sleep Mode 1<br>2: Sleep Mode 2                                                 | 1       | ⊙         | 0xA409  |
| A4.10                             | Sleep 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 - sleep frequency<br>A4.14                                                               | 20.00Hz | ⊙         | 0xA40C  |
| A4.13                             | Low-frequency holding frequency running time  | 0.0s~100.0s                                                                                  | 5.0s    | ⊙         | 0xA40D  |
| A4.14                             | Sleep frequency                               | A4.12~Upper<br>frequency limitedF0.12                                                        | 25.00Hz | ⊙         | 0xA40E  |
| A4.15                             | Sleep detection cycle                         | 0.0s~600.0s                                                                                  | 30.0s   | ⊙         | 0xA40F  |
| A4.16                             | Leakage coefficient                           | 0.1s~100.0s                                                                                  | 2.5s    | ⊙         | 0xA410  |
| A4.17                             | Sleep detection coefficient                   | 1~10                                                                                         | 4       | ⊙         | 0xA411  |
| A4.18                             | Sleep deviation pressure                      | 0.0bar~1.0bar                                                                                | 0.1bar  | ⊙         | 0xA412  |
| A4.19                             | High-pressure alarm setting value             | A4.00~A4.03                                                                                  | 15.0bar | ⊙         | 0xA413  |
| A4.20                             | Low-pressure 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: Off<br>1: Judge based on<br>frequency/current<br>2: Judge based on<br>frequency/ pressure | 2       | ⊙         | 0xA418  |
| A4.25                             | Water shortage fault detection threshold      | 0.0~A4.01                                                                                    | 0.5bar  | ⊙         | 0xA419  |
| A4.26                             | water shortage protection detection frequency | 0~ Upper limit<br>frequency F0.12                                                            | 48.00Hz | ⊙         | 0xA41A  |

| Function code                     | Name                                                        | Setting Range                                                                                                                                                                     | Default | Attribute | Address |
|-----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|
| <b>A4 Display parameter group</b> |                                                             |                                                                                                                                                                                   |         |           |         |
| 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                             | Water shortage protection auto reset delay                  | 0~1000                                                                                                                                                                            | 15      | ⊙         | 0xA41D  |
| A4.30                             | Water shortage protection Auto reset count                  | 0~100                                                                                                                                                                             | 10      | ⊙         | 0xA41E  |
| A4.31                             | Pressure boosting control function                          | 0: Invalid<br>1: Valid                                                                                                                                                            | 0       | ⊙         | 0xA41F  |
| A4.32                             | Reserve                                                     |                                                                                                                                                                                   |         | ⊙         | 0xA420  |
| A4.33                             | Reserve                                                     |                                                                                                                                                                                   |         | ⊙         | 0xA421  |
| A4.34                             | Reserve                                                     |                                                                                                                                                                                   |         | ⊙         | 0xA422  |
| A4.35                             | Constant-frequency water shortage function selection        | <b>Ones: open the protection function</b><br>0: Off 1: On<br><b>Tens: detect current</b><br><b>0: Total current</b><br>1: Torque current<br><b>Hundreds:</b><br><b>Thousands:</b> | 0010    | ⊙         | 0xA423  |
| A4.36                             | Constant-frequency water shortage protection current        | 0% - 150%                                                                                                                                                                         | 40%     | ⊙         | 0xA424  |
| A4.37                             | Constant frequency water shortage protection frequency      | 0% - 100%                                                                                                                                                                         | 50%     | ⊙         | 0xA425  |
| A4.38                             | Constant frequency water shortage protection detection time | 1~1000s                                                                                                                                                                           | 30s     |           | 0xA426  |
| A4.39                             | Constant-frequency water shortage protection recovery time  | 1~10000s                                                                                                                                                                          | 600s    |           | 0xA427  |
| A4.40                             | Constant-frequency water shortage protection recovery times | 0~100                                                                                                                                                                             | 5       |           | 0xA428  |

## Chapter 6 Communication protocol

SC30 inverter is equipped standard RS485 communication interface, located in the signal terminal area. The interface includes 2 independent terminals. The SC30 keypad communication port uses an RJ45 connector and is compatible with the Modbus protocol.

The user allows the user to start and stop the inverter, read or modify parameters settings, and monitor real-time operating status and fault information.

### 6.1 Agreement content

The serial communication protocol defines the content and format of information transmitted in serial communication. It includes: Host polling (or broadcast) format; The coding method of the host, including the function code of the required action, the transmission data and the error check. The slave's response also adopts the same structure, including action confirmation, return data and error checking. If the slave machine makes an error while receiving the information, or fails to perform the action required by the host, it will organize a fault message as a response to the host.

### 6.2 Application mode

The inverter is connected to the "single master multi-slave" PC/PLC control network with RS485 bus.

### 6.3 Bus structure

1. Interface: RS485 hardware interface

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

3. Topological structure: In a single-master multi-slave system, the address range of the slave is 1~31, 0 Indicates the broadcast communication address. The slave address in the network must be unique.

### 6.4 Protocol specification

The SC10 series frequency converter communication protocol is an asynchronous serial master-slave Modbus communication protocol in which only one device (the host) in the network can establish the protocol (called "query/command"). Other devices (slave) can only respond to the query/command of the host by providing data, or perform corresponding actions according to the query/command of the host. The host here refers to a personal

computer (PC), industrial control equipment or programmable logic controller (PLC), etc., and the slave refers to the SC10 inverter. The host can communicate with one slave individually, and broadcast information to all the lower slaves. For individually accessed host "queries/commands", the slave returns a message (called a response), and for broadcast messages sent by the host, the slave does not need to respond back to the host.

## 6.5 Communication frame specification

- With RTU mode, message delivery starts with a pause interval of at least 3.5 character times. With a variety of character times at network baud rates, this is easiest to achieve. The first domain to be transmitted is the device address. The transmission character that can be used is hexadecimal 0... 9,A... F. Network devices constantly detect the network bus, including during pause intervals. When the first domain (address domain) receives it, each device decodes it to determine whether to send it to its own. After the last transmitted character, a pause of at least 3.5 character time marks the end of the message. A new message can start after this pause. The entire message frame must be transmitted as a continuous flow. If there is a pause time of more than 1.5 character times before frame completion, the receiving device will refresh the incomplete message and assume that the next byte is the address field of a new message. Similarly, if a new message starts after the previous message in less than 3.5 characters, the receiving device will consider it a continuation of the previous message. This will result in an error because the value in the last CRC field cannot be correct.
- RTU The frame format is as follows:

|                         |                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Frame header START      | 3.5 characters                                                                                                          |
| Slave address ADR       | Communication address: 1~247                                                                                            |
| Command code MD         | 03: Read slave parameters;<br>06: Write slave parameters                                                                |
| Data content (DATA N-1) | Information Content:<br>Function code parameter address, function<br>code parameter number, function code<br>value, etc |
| Data content (DATA N-2) |                                                                                                                         |
| .....                   |                                                                                                                         |
| Data content DATA0      |                                                                                                                         |
| CRCCHK high-order       | Detection value: CRC value                                                                                              |
| CRCCHK low-order        | Detection value: CRC value                                                                                              |
| END                     | 3.5 characters                                                                                                          |

Table 6-5-1 RTU Frame format

- Reads the slave register data
- Example 1: Read two consecutive values continuously from the start address F002 of the frequency converter whose address is 01.

### Host command information:

|                          |     |
|--------------------------|-----|
| ADR                      | 01H |
| CMD                      | 03H |
| Start address high-order | F0H |
| Start address low-order  | 02H |

|                           |                                         |
|---------------------------|-----------------------------------------|
| Register count high-order | 00H                                     |
| Register count low-order  | 02H                                     |
| CRCCHK low-order          | The CRCCHK value needs to be calculated |
| CRCCHK high-order         |                                         |

Table 6-5-2 The host reads the command frame format

**Slave responds to message:**

|                       |                                         |
|-----------------------|-----------------------------------------|
| ADR                   | 01H                                     |
| CMD                   | 03H                                     |
| Byte count            | 04H                                     |
| Date F002H high-order | 00H                                     |
| Date F002H low-order  | 00H                                     |
| Date F003H high-order | 00H                                     |
| Date F003H low-order  | 01H                                     |
| CRCCHK low-order      | The CRCCHK value needs to be calculated |
| CRCCHK high-order     |                                         |

Table 6-5-3 Read the response message frame format from the slave machine

**■ Writes slave register data**

Example2: Write 5000 (1388H) to the F00AH address of the inverter at slave address 02H.

**Host command information:**

|                         |                                         |
|-------------------------|-----------------------------------------|
| ADR                     | 02H                                     |
| CMD                     | 06H                                     |
| Data address high-order | F0H                                     |
| Data address low-order  | 0AH                                     |
| Data content high-order | 13H                                     |
| Data content low-order  | 88H                                     |
| CRCCHK low-order        | The CRCCHK value needs to be calculated |
| CRCCHK high-order       |                                         |

Table 6-5-4 The host writes the command frame format

**Slave responds to message:**

|                         |                                         |
|-------------------------|-----------------------------------------|
| ADR                     | 02H                                     |
| CMD                     | 06H                                     |
| Data address high-order | F0H                                     |
| Data address high-order | 0AH                                     |
| Data address low-order  | 13H                                     |
| Data content high-order | 88H                                     |
| CRCCHK low-order        | The CRCCHK value needs to be calculated |
| CRCCHK high-order       |                                         |

Table 6-5-5 Slave response message frame format

■ Check mode—CRC Check mode:

Using the RTU frame format, the message includes an error-detection field based on CRC methods. The CRC domain detects the contents of the entire message. The CRC field is a two-byte, 16-bit binary value. It is calculated by the transmitting device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, there is a transmission error. The CRC first stores 0xFFFF and then invokes a procedure to process the consecutive 8-bit bytes in the message with the value in the current register. Only 8 bits of data per character are valid for CRC, and the start and stop bits and parity bits are not valid. During CRC generation, each 8-bit character is individually distinct from the register content or (XOR), and the result moves in the direction of the least significant bit and the most significant bit is filled with 0. The LSB is extracted for detection, if the LSB is 1, the register alone is different from the preset value or if the LSB is 0, it is not performed. The whole process is repeated eight times. After the last bit (the 8th bit) is completed, the next 8-bit byte separately differs from the current value of the register. The value in the final register is the CRC value after all bytes in the message have been executed. When CRC is added to a message, low bytes are added first, then high bytes.

CRC When added to a message, low bytes are added first, then high bytes. The CRC simple function is as follows:

The address definition of communication parameters: This part is the content of communication, which is used to control the operation of the frequency converter, the status of the frequency converter and the related parameter Settings (some function codes cannot be changed, only for manufacturers to use).

**Notice :** FF parameter group: Parameters can neither be read nor changed; Some parameters cannot be changed when the inverter is in operation; Some parameters can not be changed no matter what state the inverter is in; Change the function code parameters, but also pay attention to the range of parameters, units, and related descriptions. Because EEPROM is stored frequently, the service life of EEPROM will be reduced, so the communication design or configuration of the upper computer should pay attention to avoid frequent writing operation.

## 6.6 Register address

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

| Parameter address | Parameter Description                                      | Unit   |
|-------------------|------------------------------------------------------------|--------|
| 1000H             | Communication Settings<br>(-10000 ~ 10000)<br>(decimalism) | 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 | Runnning 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,<br>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 | Communication 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: Deceleration 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: Deceleration stop     |

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

■ Parameter lock password verification

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

| Password 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 AO1 control

■ Analog output AO2 control: (Write only)

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

Table 6-6-7 Analog output AO2 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<br>0009: Under voltage fault<br>000A: AC drive overloaded<br>000B: Motor overloaded<br>000C: Input open phase<br>000D: Output open phase<br>000E: The module overheats<br>000F: External fault<br>0010: The communication is abnormal<br>0011: Reserved<br>0012: Current detection fault<br>0013: Motor tuning failure<br>0015: Parameter read and write exception<br>0016: The EEPROM verification is faulty<br>0017: Motor short circuit to ground fault<br>001A: The running time is up<br>001B: User-defined fault 1<br>001C: User-defined fault 2<br>001D: The power-on time arrives<br>001E: Reserved<br>001F: PID feedback is lost during running<br>0028: The fast current limiting times out<br>0029: Reserved |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

■ Communication fault information description data (fault code):

| Communication fault address | Fault function description                                                                                                                                                                                                                                                |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8001H                       | 0000: No fault<br>0001: The password is incorrect<br>0002: The command code is incorrect<br>0003: CRC check error<br>0004: Invalid address<br>0005: Invalid parameter<br>0006: The parameter change is invalid<br>0007: The system is locked<br>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<br>1: 600 bps<br>2: 1200 bps<br>3: 2400 bps<br>4: 4800 bps<br>5: 9600 bps<br>6: 19200 bps<br>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<br>1: (8.E.1) 8 -Bit, Even check, 1 stop bit<br>2: (8.O.1) 8 -Bit, Odd check, 1 stop bit<br>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<br>1: 0.1A |   |

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

## 6.7 EEPROM Address Specification

The communication address listed in the function code table is the write RAM address, and the data will not be saved after the RAM storage is powered off. In the communication mode, for the write command "06H", if the parameter needs to be powered off, the way should be written to EEPROM, and the highest bit "0" of the original RAM address should be changed to "F" to convert the corresponding EEPROM address, such as: Change "0XXX" to "FXXX"

※Address translation example:

The maximum output frequency is F010, the communication address of the write RAM is: 000A, and the corresponding EEPROM address is: F00A.

The acceleration time is F018, the communication address of the write RAM is 0012, and the corresponding EEPROM address is F012.

Other parameters, and so on...

It should be noted that the erasing life of EEPROM is about 1 million times, more than the erasing times, will affect the reliability of data storage, if not necessary, it is recommended to use the way of writing RAM communication.

## Chapter 7 Diagnoses and Troubleshooting

The SC10 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<br>During<br>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<br>During<br>Deceleration | Output grounded or shorted          | Check output cables and motor insulation |
|       |                                       | Too fast deceleration               | Increase deceleration time               |
| Err04 | Overcurrent<br>at Constant<br>Speed   | Output grounded or shorted          | Check output cables and motor insulation |
|       |                                       | Lower-rating controller             | Replace with higher-rating controller    |
| Err05 | Overvoltage<br>During<br>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          |

| Code  | Description                           | Possible Causes                                                            | Suggestions                                     |
|-------|---------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------|
| Err06 | Overvoltage<br>During<br>Deceleration | Input voltage too high                                                     | Adjust input voltage to normal value            |
|       |                                       | Too fast deceleration                                                      | Increase deceleration time                      |
|       |                                       | Lack of brake unit & brake resistor                                        | Add brake unit & brake resistor                 |
| Err07 | Overvoltage<br>at Constant<br>Speed   | Input voltage too high                                                     | Adjust input voltage to normal value            |
| Err08 | Buffer<br>Resistor<br>Overload        | Input voltage not in proper range                                          | Adjust input voltage to proper range            |
| Err09 | Bus Voltage<br>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<br>Overload                       | Load too large or motor stuck                                              | Decrease the load and check the motor           |
|       |                                       | Lower-rating controller                                                    | Replace with higher-rating controller           |
| Err11 | Motor<br>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<br>Loss                   | Abnormal input power source                                                | Check input power source and wirings            |
|       |                                       | Failure of control board/power board                                       | Seek for technical support                      |
| Err13 | Output Phase<br>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                      |

| Code  | Description                         | Possible Causes                            | Suggestions                                         |
|-------|-------------------------------------|--------------------------------------------|-----------------------------------------------------|
| Err14 | IGBT Overheat                       | Ambient Temperature Too High               | Lower the ambient temperature if 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                          |

| Code          | Description                         | Possible Causes                                          | Suggestions                                         |
|---------------|-------------------------------------|----------------------------------------------------------|-----------------------------------------------------|
| Err24         | Software Dry Run Error              | Water Shortage                                           | Check the water source                              |
|               |                                     | A1.16 Set Too Large(When A1.18 is set above 0)           | Decrease set value of A1.16                         |
| 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/<br>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 |

| Order | Fault phenomenon        | Possible cause                                  | Remedy                                                                                    |
|-------|-------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------|
| 2     | Pump cannot run         | Poor contact between keyboard and control board | Check connect cable                                                                       |
|       |                         | Inner instrument failure                        | Look for technical support                                                                |
|       |                         | Lack of input power (light)                     | Increase panel power or restart at enough light                                           |
| 3     | DI terminal failure     | Motor failed or stuck                           | Replace the motor or check mechanical fault                                               |
|       |                         | Incorrect wiring of motor                       | Confirm whether wiring is correct                                                         |
|       |                         | Incorrect setting of parameters                 | Check and reset F5 group parameters                                                       |
| 4     | Controller interference | External fault                                  | Reconnect signal wire, and clear external faults                                          |
|       |                         | Control board failure                           | Look for technical support                                                                |
|       |                         | Abnormal carrier frequency                      | Reduce carrier frequency properly                                                         |
| 5     | Big noise of motor      | 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                                          |
|       |                         | Motor failed or stuck                           | Replace the motor or check mechanical fault                                               |
| 6     | Switch trip             | Abnormal carrier frequency                      | Increase carrier frequency properly                                                       |
|       |                         | 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                                                                |

## System Report

| System and Components              |             |        |         |          |
|------------------------------------|-------------|--------|---------|----------|
| Date of Purchase                   |             |        |         |          |
| Distributor<br>(Contact details)   |             |        |         |          |
|                                    |             |        |         |          |
| System                             |             |        |         |          |
| Controller<br>Serial Number        |             |        |         |          |
| Motor Serial<br>Number or<br>Power |             |        |         |          |
| Pump Type                          | Submersible |        | Surface |          |
|                                    |             |        |         |          |
| Solar Power                        |             |        |         |          |
| Solar Module                       |             |        |         |          |
| Manufacturers                      |             |        |         |          |
| Type                               |             |        |         |          |
| Peak<br>Voltage (Vmp)              |             |        |         |          |
| Open Circuit<br>Voltage(Voc)       |             |        |         |          |
| Quantity                           |             |        |         |          |
| Connection                         |             | Series |         | Parallel |

| Installation                                        |  |                          |                                            |  |                          |
|-----------------------------------------------------|--|--------------------------|--------------------------------------------|--|--------------------------|
| Installation Date                                   |  |                          |                                            |  |                          |
| Installer<br>(contact details)                      |  |                          |                                            |  |                          |
| Submersible Pump                                    |  |                          | Surface Pump                               |  |                          |
| Well Depth                                          |  | m/ft                     | Head<br>(self suction)                     |  | m/ft                     |
| Pump Depth                                          |  | m/ft                     |                                            |  |                          |
| Vertical Height (well<br>mouth to the tower<br>top) |  | m/ft                     | Suction lift                               |  | m/ft                     |
|                                                     |  |                          | MAX. Suction<br>lift                       |  | m/ft                     |
| Static Water Level                                  |  | m/ft                     |                                            |  |                          |
| Dynamic Water Level                                 |  | m/ft                     |                                            |  |                          |
| Vertical Pipe in Well(pump)                         |  |                          | Suction Pipe                               |  |                          |
| Diameter                                            |  | mm/inch                  | Diameter                                   |  | mm/inch                  |
| Type                                                |  |                          | Type                                       |  |                          |
| Length                                              |  | m/ft                     | Length                                     |  | m/ft                     |
| Additional Pipe (to water tower)                    |  |                          | Vertical Pipe                              |  |                          |
| Diameter                                            |  | mm/inch                  | Diameter                                   |  | mm/inch                  |
| Type                                                |  |                          | Type                                       |  |                          |
| Length                                              |  | m/ft                     | Length                                     |  | m/ft                     |
| Cable of Submersible Pump                           |  |                          | Cable of Surface Pump                      |  |                          |
| Wire Diameter                                       |  | mm <sup>2</sup> /<br>AWG | Wire Diameter                              |  | mm <sup>2</sup> /<br>AWG |
| Length (from the<br>controller to pump)             |  | m/ft                     | Length (from<br>the controller to<br>pump) |  | m/ft                     |

## Chapter 8 Warranty Policy

### **Standard Warranty Period:**

The pump controller manufacturer grants a standard warranty period of 18 months (1.5 years) for the pump controllers, starting from the date of shipment from manufacturer factory or 12 months (1 year) starting from the date of purchased invoice marked (whichever is longer).

### **Warranty Conditions:**

If your pump controller gets fault and requires troubleshooting, please contact your distributor or dealer directly. Alternatively, feedback briefly to manufacture service hotline for logging and send your warranty card to our service department by fax/email to process the warranty claim.

During the warranty period, the pump controller manufacturer covers all costs for replacing any product or parts of the product proved to be defective in design or manufacture. To claim the warranty under the warranty policy of pump controller manufacturer, you need to supply us with the following information and documentation regarding the faulty pump controller:

1. Product model No.(e.g. SC10-4T5R5) and serial No. (e.g.C121661B280H000292YA).
2. Copy of the invoice and warranty certificate of the controller.
3. Copy of the installation report and installation date.
4. Error message on LED screen ( if available ) or any information which would be helpful to

determine the defect

5. Detailed information about the entire system (modules, circuits, etc.).
6. Documentation of previous claims/exchanges (if applicable).

After receiving above information, The pump controller manufacturer will decide how to proceed the service:

- ☐ Repaired by manufacture factory, or
- ☐ Repaired on-site by manufacture service center, or
- ☐ Offer a replacement device of equivalent value according to model and age.

In the case of an exchange, the remaining portion of the original warranty period will be transferred to the replacement device. You will not receive a new certificate, as your entitlement is documented at pump controller manufacturer.

If the pump controller needs to be replaced following assessment, manufacture will send a replacement unit immediately. The defective pump controller should be sent back to the closest manufacture service center by packing in its original package if possible.



