

# Frequency Inverter User Manual



1AC220V 0.4-1.5kW

3AC380V 0.75-2.2kW

# Preface

Thank you for choosing JT100 Series Micro AC Motor Drives. This user manual presents a detailed description of JT100 series with respect to product features, structural characteristics, functions, installation, parameter setting, troubleshooting, commissioning and daily maintenance, etc. Be sure to carefully read through the safety precautions before use, and use this product on the premise that personnel and equipment safety is ensured.

## IMPORTANT NOTES

- Please assure the intactness of product enclosure and all safety covers before installation. Operation must conform to the requirements of this manual and local industrial safety regulations and/or electrical codes.
- Contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual.
- In the event of damage or loss of user manual, users may ask local distributors, offices or our Technical Service Department for a new one.
- If any item as stated in this manual is not clear, please contact our Technical Service Department.
- If any anomaly occurs after power up or during the operation, it is essential to stop the machine and identify the fault or seek technical services as soon as possible.

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# Chapter 1 Safety and Precautions

## Safety definition:

In this manual, safety precautions are classified as follows:



**Danger:** Operations which are not performed according to requirements may cause serious equipment loss or personnel injury.



**Caution:** Operations which are not performed according to requirements may cause medium hurt or light hurt or material loss.

During the installation, commissioning and maintenance of the system, please make sure to follow the safety and precautions of this chapter. In case of a result of illegal operations, caused any harm and losses is nothing to do with the company.

## 1.1 Safety Precautions

### 1.1.1 Before Installation

|                                                                                                |                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger  | <ul style="list-style-type: none"><li>● Do not use the water-logged inverter, damaged inverter or inverter with missing parts. Otherwise, there may be risk of injury.</li><li>● Use the motor with Class B or above insulation. Otherwise, there may be risk of electric shock.</li></ul> |
| <br>Caution | <ul style="list-style-type: none"><li>● Carefully handled when loading, otherwise it may damage the inverter.</li><li>● Please don't use the damaged driver or inverter with</li></ul>                                                                                                     |

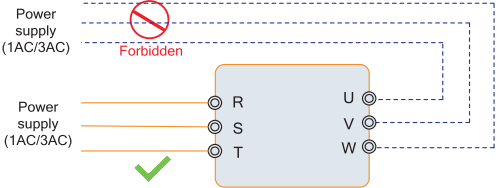
|  |                                                                                                                                                                                                    |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>missing parts, there may be risk of injury.</p> <ul style="list-style-type: none"><li>● Do not touch the electronic parts and components; otherwise it will cause static electricity.</li></ul> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 1.1.2 During Installation

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger  | <ul style="list-style-type: none"><li>● Install the inverter on incombustible surface such as metal, and keep away from flammable substances. Otherwise it may cause fire.</li><li>● Do not loose the set screw of the equipment, especially the screws marked in RED.</li></ul>                                                                                                                                                                                                            |
| <br>Caution | <ul style="list-style-type: none"><li>● Do not drop the cable residual or screw in the inverter. Otherwise it may damage the inverter.</li><li>● Please install the driver in the place where there is no direct sunlight or less vibratory.</li><li>● When more than two inverters are to be installed in one cabinet, due attention should be paid to the installation locations (refer to Chapter 3 Mechanical and Electrical Installation) to ensure the heat sinking effect.</li></ul> |

### 1.1.3 During Wiring

|                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger | <ul style="list-style-type: none"><li>● Operation should be performed by the professional engineering technician. Otherwise there will be danger of electric shock!</li><li>● There should be circuit breaker between the inverter and power supply. Otherwise, there may cause fire!</li><li>● Make sure the power is disconnected prior to the connection. Otherwise there will be danger of electric shock!</li><li>● The ground terminal should be earthed reliably. Otherwise there may be danger of electric shock.</li></ul> |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>Caution</b> | <ul style="list-style-type: none"> <li>● Never connect AC power to output U, V, W terminals. Please note the remark of the wiring terminals, connect them correctly. Otherwise it will cause inverter be damaged.</li> </ul>  <ul style="list-style-type: none"> <li>● Ensure the wiring circuit can meet the requirement of EMC and the area safety standard. Please follow the instructions in the manual before wiring. Otherwise may cause injury or electric shock.</li> <li>● Never connect the braking resistor between DC bus (+), (-) terminals. Otherwise may cause fire.</li> <li>● Encoder must be used together with shielded wire, and ensure the single terminal of the shielded lay is connected with ground well.</li> </ul> |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 1.1.4 Before Power-on

|                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>Danger</b> | <ul style="list-style-type: none"> <li>● Please confirm whether the power voltage class is consistent with the rated voltage of the inverter and whether the I/O cable connecting positions are correct, and check whether the external circuit is short circuited and whether the connecting line is firm. Otherwise it may damage the inverter. The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused.</li> </ul> |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                              |                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                              | <ul style="list-style-type: none"><li>● The inverter is free from dielectric test because this test is performed prior to the delivery. Otherwise accident may occur.</li></ul>                                                                                                                                   |
| <br>Caution | <ul style="list-style-type: none"><li>● The cover must be well closed prior to the inverter power-on. Otherwise electric shock may be caused!</li><li>● Whether all the external fittings are connected correctly in accordance with the circuit provided in this manual. Otherwise accident may occur!</li></ul> |

### 1.1.5 After Power-on

|                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger    | <ul style="list-style-type: none"><li>● Do not open the cover of the inverter upon power-on. Otherwise there will be danger of electric shock!</li><li>● Do not touch the inverter and its surrounding circuit with wet hand. Otherwise there will be danger of electric shock!</li><li>● Do not touch the inverter terminals (including control terminal). Otherwise there will be danger of electric shock!</li><li>● At power-on, the inverter will perform the security check of the external heavy-current circuit automatically. Thus, at the moment please do not touch the terminals U, V and W, or the terminals of motor, otherwise there will be danger of electric shock.</li></ul> |
| <br>Caution | <ul style="list-style-type: none"><li>● If parameter identification is required, due attention should be paid to the danger of injury arising from the rotating motor. Otherwise accident may occur!</li><li>● Do not change the factory settings at will. Otherwise it may damage the equipment!</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |

### 1.1.6 During Operation

|                                                                                              |                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger  | <ul style="list-style-type: none"><li>● Do not touch the fan or discharge resistor to sense the temperature. Otherwise, you may get burnt!</li><li>● Detection of signals during the operation should only be conducted by qualified technician. Otherwise, personal injury or equipment damage may be caused!</li></ul> |
| <br>Caution | <ul style="list-style-type: none"><li>● During the operation of the inverter, keep items from falling into the equipment. Otherwise, it may damage the equipment!</li><li>● Do not start and shut down the inverter by connecting and disconnecting the contactor. Otherwise, it may damage the equipment!</li></ul>     |

### 1.1.7 During Maintain

|                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Danger | <ul style="list-style-type: none"><li>● Do not repair and maintain the equipment with power connection. Otherwise there will be danger of electric shock!</li><li>● Be sure to conduct repair and maintenance after the charge LED indicator of the inverter is OFF. Otherwise, the residual charge on the capacitor may cause personal injury!</li><li>● The inverter should be repaired and maintained only by the qualified person who has received professional training. Otherwise, it may cause personal injury or equipment damage!</li><li>● Carry out parameter setting after replacing the inverter, all the plug-ins must be plug and play when power outage.</li></ul> |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Chapter 2 Product Information

### 2.1 Product Inspection

Checking the following items when receiving the inverter

**Table 2-1 Confirmation information**

| Confirmation Items                                             | Method                                                                                                                |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Confirm if the inverter is what you ordered                    | Check name plate                                                                                                      |
| Damaged or not                                                 | Inspect the entire exterior of the inverter to see if there are any scratches or other damage resulting from shipping |
| Confirm if the fastening parts (screws, etc.) are loose or not | Check with a screw driver if necessary                                                                                |
| User's manual, certification and other spares                  | User's manual and the relative spares                                                                                 |

Please contact the local agent or our company directly if there is any damage on the inverter.

## 2.2 Selection Guide

Table 2-2 Product model and technical data

| Inverter Model    | Motor |     | Rated Input Current (A) | Rated Output Current (A) |
|-------------------|-------|-----|-------------------------|--------------------------|
|                   | kW    | HP  |                         |                          |
| 1AC 220~240V ±15% |       |     |                         |                          |
| GK150-2T0.4       | 0.4   | 0.5 | 5.4                     | 2.3                      |
| GK150-2T0.75      | 0.75  | 1   | 8.2                     | 4                        |
| GK150-2T1.5       | 1.5   | 2   | 14                      | 7                        |
| 3AC 380~415V ±15% |       |     |                         |                          |
| GK150-4T0.75      | 0.75  | 1   | 3.4                     | 2.1                      |
| GK150-4T1.5       | 1.5   | 2   | 5.0                     | 3.8                      |
| GK150-4T2.2B      | 2.2   | 3   | 5.8                     | 5.1                      |

## 2.3 Technical Specifications

Table 2-3 Technical features of GK150

| Item    | Technical Index  | Specification                                    |
|---------|------------------|--------------------------------------------------|
| Input   | Input voltage    | 1AC/3AC 220V $\pm 15\%$ ,<br>3AC 380V $\pm 15\%$ |
|         | Input frequency  | 50/60Hz $\pm 5\%$                                |
| Output  | Output voltage   | 0~rated input voltage                            |
|         | Output frequency | 0~600Hz                                          |
| Control | Control mode     | V/f control                                      |

|                  |                                         |                                                                                                                                     |
|------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Features         | Operation command mode                  | Keypad control<br>Terminal control<br>Serial communication control (Modbus)                                                         |
|                  | Overload capacity                       | 150% / 60s,<br>180% / 10s,<br>200% / 1s.                                                                                            |
|                  | Torque boost                            | manually torque boost: 0.1%~30.0%                                                                                                   |
|                  | V/f curve                               | Three types: linear, multiple point and square type (1.2 power, 1.4 power, 1.6 power, 1.8 power, square)                            |
|                  | DC braking                              | DC braking when starting and stopping<br>DC braking frequency:<br>0.0Hz~maximum frequency, braking time: 0.0s~25.0s                 |
|                  | Jog operation                           | Jog operation frequency:<br>0.0Hz~maximum frequency<br>Jog acceleration/deceleration time:<br>0.1s~3600.0s                          |
|                  | Simple PLC & multi-step speed operation | It can realize a maximum of 16 multi-step speeds running via the built-in PLC or control terminals.                                 |
|                  | Built-in PID                            | Built-in PID control to easily realize the close loop control of the process parameters (such as pressure, temperature, flow, etc.) |
| Control Function | Wobble frequency control                | Multiple triangular-wave frequency control, special for textile                                                                     |
|                  | Timing/length/counting control          | Timing/length/counting control function                                                                                             |

|                        |                                           |                                                                                                                         |
|------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                        | Over-voltage & over-current stall control | Limit current & voltage automatically during the running process, prevent frequent over-current & over-voltage tripping |
| Input/output terminals | Input terminals                           | Programmable digital input: 4 multifunctional inputs<br>1 programmable analog input:<br>VI: 0~10V / 4~20Ma              |
|                        | Output terminals                          | 1 normal open relay output                                                                                              |
|                        | Communication terminals                   | Offer RS485 communication interface, support MODBUS-RTU communication protocol                                          |
| Environment            | Ambient temperature                       | -10°C~40°C, without direct sunshine.                                                                                    |
|                        | Humidity                                  | 90%RH or less (non-condensing)                                                                                          |
|                        | Altitude                                  | ≤1000M: output rated power, > 1000M: output derated                                                                     |
|                        | Storage temperature                       | -20°C~60°C                                                                                                              |

## 2.4 External dimensions

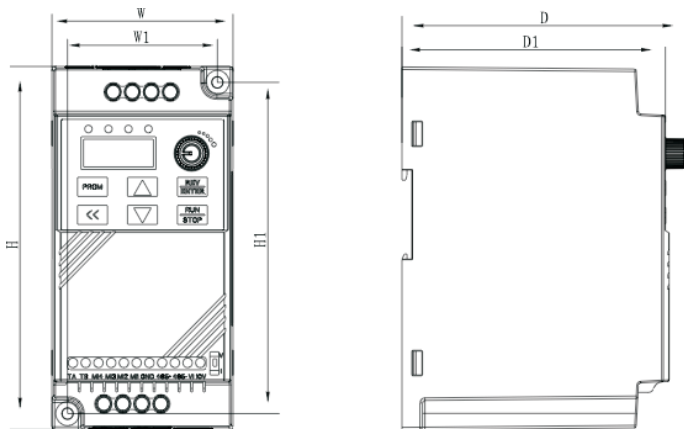


Table 2-4 External dimensions (mm)

| W    | H     | D     | W1 | H1  | D1  | Aperture |
|------|-------|-------|----|-----|-----|----------|
| 72.5 | 142.5 | 113.8 | 60 | 130 | 107 | Ø4.5     |

## Chapter 3 Installation and Wiring

### 3.1 Wiring diagram

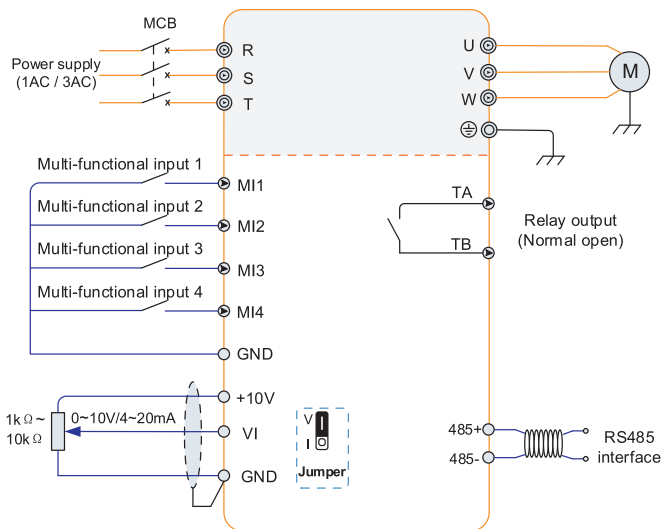


Fig. 3-1 Wiring Diagram

**Note:**

Terminal © refers to the main circuit terminal, terminal O refers to the control circuit terminal.

## 3.2 Main circuit terminals and connections



### Danger

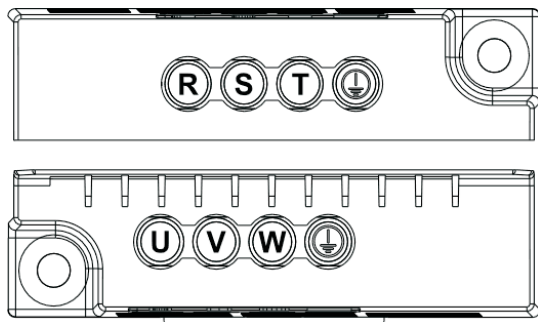
- Make sure that the power switch is at OFF status prior to perform wiring connection. Otherwise there may be danger of electric shock!
- Only the qualified and trained personnel can perform wiring connection. Otherwise it may cause equipment and human injuries!
- It should be earthed reliably. Otherwise there may be danger of electric shock or fire!



### Caution

- Make sure that the rated value of the input power supply is consistent with that of the inverter. Otherwise it may damage the inverter!
- Make sure that the motor matches the inverter. Otherwise it may damage the motor or generate inverter protection!
- Do not connect the power supply to the terminals of U, V and W. Otherwise it may damage the inverter!

### 3.2.1 Layout of main circuit terminals



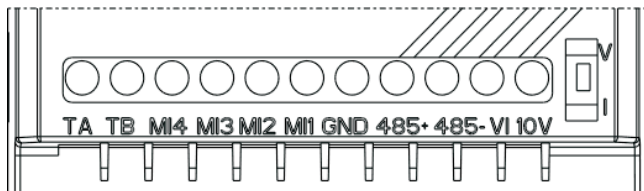
### 3.2.2 Instructions of main circuit terminals

Tab 3-1 Instructions of main circuit terminals

| Terminal                                                                            | Description                      |
|-------------------------------------------------------------------------------------|----------------------------------|
| R, T                                                                                | Connect to single phase AC power |
| R, S, T                                                                             | Connect to three-phase AC power  |
| U, V, W                                                                             | Connect to three phase motor     |
|  | Ground connection terminal       |

### 3.3 Control terminals and connections

#### 3.3.1 Layout of the control circuit terminals



#### 3.3.2 Description of jumpers on control board

Tab 3-2 Description of jumper

| Jumper                         | position | Description   |
|--------------------------------|----------|---------------|
| VI input signal type selection | V        | 0~10V signal  |
|                                | i        | 4~20Ma signal |

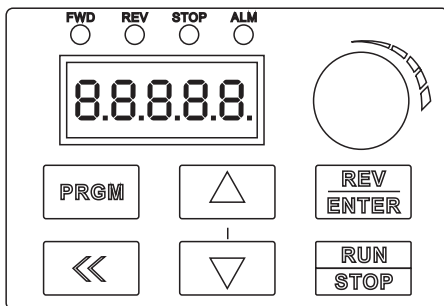
### 3.3.3 Description of Control Terminal Function

**Tab 3-3 Description of Control Terminal Function**

| Type          | Terminal Symbol | Terminal Name         | Function Description                                                                                                                                                                                                                          |
|---------------|-----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply  | +10V~GND        | External +10V power   | Provide +10V power supply for external units, and the maximum output current is 50Ma.<br>It is generally used as the operating power supply for the external potentiometer. The potentiometer resistance range is 1K $\omega$ ~10K $\omega$ . |
| Analog Input  | VI~GND          | Analog input terminal | 1. Input range: 0~10V, input impedance: 6.8K $\omega$ .<br>2. Input range: 0/4~20Ma, input impedance: 500 $\Omega$ .                                                                                                                          |
| Digital Input | MI1             | Digital input 1       | 1. Optical coupling isolation.<br>2. Input impedance: 10K $\omega$<br>3. Voltage range for level input: 9V~30V                                                                                                                                |
|               | MI2             | Digital input 2       |                                                                                                                                                                                                                                               |
|               | MI3             | Digital input 3       |                                                                                                                                                                                                                                               |
|               | MI4             | Digital input 4       |                                                                                                                                                                                                                                               |
| Relay Output  | TA-TB           | Normally open         | Driving capacity:<br>AC 250V/3A,<br>DC 30V/1A                                                                                                                                                                                                 |
| RS485         | 485+            | RS485+                | Communication interface of Modbus, it is suggested to use twisted-pair cable or shielded cable.                                                                                                                                               |
|               | 485-            | RS485-                |                                                                                                                                                                                                                                               |

## Chapter 4 Operation and Display

### 4.1 Keypad Description



Tab 4-1 Function keys description

| Functional indicator | Description                            |
|----------------------|----------------------------------------|
| <b>FWD</b>           | Indication of inverter forward running |
| <b>REV</b>           | Indication of inverter reverse running |
| <b>STOP</b>          | Inverter is stopping                   |
| <b>ALM</b>           | Inverter with fault                    |

**Tab 4-2 Keypad push-button description**

| Button        | Name                         | Function                                                                                                                                                                |
|---------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PRGM          | Programming key              | Entry and exit of primary menu                                                                                                                                          |
| REV/<br>ENTER | Reverse/<br>Confirmation key | Under monitoring status, it is use the change the running direction (set by F7-01)<br><br>Under parameter setting status, it is used to confirm the parameters setting. |
| ▲             | Increment key                | Progressively increase of data or function codes                                                                                                                        |
| ▼             | Decrement key                | Progressively decrease of data or function codes                                                                                                                        |
| >>            | Shift key                    | Select the modification bit of parameters when modifying parameters.                                                                                                    |
| RUN/<br>STOP  | Running key                  | 1, Start the inverter at stop mode;<br>2, Stop the inverter at running mode;<br>3, Reset the inverter at fault status.                                                  |

## 4.2 Fault Protection

In fault status, inverter will display fault code & record output current, output voltage, etc. For details, please refer to FA (fault and protection) parameter group. Fault can be reset via RUN/STOP key or external terminals.

## 4.3 Password Setting

The inverter provides user password protection function. When F7-00 is set to non-zero value, it indicates the user password, and the password protection turns valid after 1 minute of setting the password. When pressing **PRGM** key again, "00000" will be displayed, and common menu cannot be entered until

user password is input correctly.

To cancel the password protection function, enter with password and set F7-00 to "0".

## 4.4 Display setting for F7-03

If F7-03 parameters need to be displayed when running, **set the corresponding position to 1, and combine every four bits of binary numbers into one hexadecimal number, and then enter the four hexadecimal numbers into F7-03.**

Running status display 1:

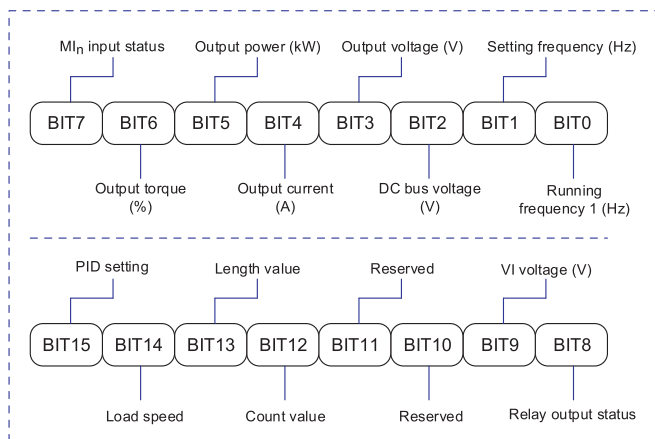


Fig. 4-1 Running status display 1

For example, if user wants to display output voltage, DC bus voltage, setting frequency, running frequency, output current, output torque, VI voltage, output terminal status, the value of each bit is as the following table:

Tab 4-3

|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| BIT7 | BIT6 | BIT5 | BIT4 | BIT3 | BIT2 | BIT1 | BIT0 |
| 0    | 0    | 1    | 1    | 1    | 1    | 1    | 1    |
| 3    |      |      |      | F    |      |      |      |
| BIT1 | BIT1 | BIT1 | BIT1 | BIT1 | BIT1 | BIT1 | BIT1 |
| 5    | 4    | 3    | 2    | 1    | 0    | 9    | 8    |
| 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    |
| 0    |      |      |      | 3    |      |      |      |

The value of F7-03 is **033F**.

※The setting of F7-04 and F7-05 are similar as F7-03.

## Chapter 5 Examples of Operation

### 5.1 Keypad start, stop, speed adjust by up, down button

**Parameters setting:** F0-02=0, F0-03=0, F0-23=1 (Digital setting frequency storage when stop);

**Start, stop:** press “RUN/STOP” button to make inverter run forward, press “REV/ENTER” to make inverter run reverse, press “RUN/STOP” to stop the inverter

**Speed adjusts:** press  button to increase the frequency, press  button to decrease the frequency.

### 5.2 Keypad start, stop, speed adjust by keypad potentiometer

**Parameters setting:** factory default;

**Start, stop:** press “RUN/START” button to make inverter run forward, press “REV/ENTER” to make inverter run reverse, press “RUN/STOP” to stop the inverter

**Speed adjusts:** turn the keypad potentiometer

### 5.3 Inverter start/stop by external signal, speed adjust by external potentiometer

**Parameters setting:** F0-02=1, F0-03=2, F5-01=02

**Start, stop:** “MI1–GND” close, inverter runs forward; “MI2–GND” close, inverter runs reverse, MI1, MI2 disconnect with GND, inverter stops.

**Speed adjusts:** turn the external potentiometer (10V, VI, GND, jumper at V

side)

## **5.4 Inverter start/stop by external signal, speed adjust by external 0~10V signal**

**Parameters setting:** F0-02=1, F0-03=2, F5-01=02

**Start, stop:** “MI1–GND” close, inverter run forward; “MI2–GND” close, inverter run reverse, MI1, MI2 disconnect with GND, inverter stop.

**Speed adjusts:** by changing the value of external voltage signal (VI, GND, jumper at V side)

## **5.5 Inverter start/stop by external signal, speed adjust by external 4~20Ma signal**

**Parameters setting:** F0-02=1, F0-03=3, F5-01=02, F5-13=2V (means 4Ma)

**Start, stop:** “MI1–GND” close, inverter run forward; “MI2–GND” close, inverter run reverse, MI1, MI2 disconnect with GND, inverter stop.

**Speed adjusts:** by changing the value of external current signal (VI, GND, jumper at I side)

## **5.6 Increase or decrease the frequency by external digital input**

(1) start/stop by keypad

**Parameters setting:** F0-02=0, F0-03=0, F5-00=06, F5-01=07

**Start, stop:** press “RUN/STOP” button to make inverter run forward, press “REV/ENTER” to make inverter run reverse, press “RUN/STOP” to stop inverter.

**Speed adjusts:** “MI1–GND” close, frequency increase; “MI2–GND” close, frequency decrease.

(2) start/stop by external digital signal

**Parameters setting:** F0-02=1, F0-03=0, F5-00=06, F5-01=07, F5-02=01, F5-03=02

**Start, stop:** “MI3–GND” close, inverter run forward; “MI4–GND” close, inverter run reverse.

**Speed adjusts:** “MI1–GND” close, frequency increase; “MI2–GND” close, frequency decrease.

**Note:**

If the changed frequency needs to be stored after power off, please set F0-23=1.

## 5.7 Multi-step speed function

(1) start/stop by keypad

**Parameters setting:** F0-02=0, F0-03=6, F5-00=12, F5-01=13, F5-02=14 (FD-00~FD-15, 16 steps speed can be set)

**Start, stop:** press “RUN/STOP” button to make inverter run forward, press “REV/ENTER” to make inverter run reverse, press “RUN/STOP” to stop inverter.

**Speed adjusts:** by different combinations of MI input (shown as below list).

**Parameters setting:** F5-00=12, F5-01=13, F5-02=14, F5-03=15 (FD-00~FD-15, 16 steps speed can be set)

※ **Different combination means different speeds:**

| MI4 | MI3 | MI2 | MI1 | Command setting      | Corresponding parameter |
|-----|-----|-----|-----|----------------------|-------------------------|
| OFF | OFF | OFF | OFF | Multi-step command 0 | FD-00                   |
| OFF | OFF | OFF | ON  | Multi-step command 1 | FD-01                   |

|     |     |     |     |                       |       |
|-----|-----|-----|-----|-----------------------|-------|
| OFF | OFF | ON  | OFF | Multi-step command 2  | FD-02 |
| OFF | OFF | ON  | ON  | Multi-step command 3  | FD-03 |
| OFF | ON  | OFF | OFF | Multi-step command 4  | FD-04 |
| OFF | ON  | OFF | ON  | Multi-step command 5  | FD-05 |
| OFF | ON  | ON  | OFF | Multi-step command 6  | FD-06 |
| OFF | ON  | ON  | ON  | Multi-step command 7  | FD-07 |
| ON  | OFF | OFF | OFF | Multi-step command 8  | FD-08 |
| ON  | OFF | OFF | ON  | Multi-step command 9  | FD-09 |
| ON  | OFF | ON  | OFF | Multi-step command 10 | FD-10 |
| ON  | OFF | ON  | ON  | Multi-step command 11 | FD-11 |
| ON  | ON  | OFF | OFF | Multi-step command 12 | FD-12 |
| ON  | ON  | OFF | ON  | Multi-step command 13 | FD-13 |
| ON  | ON  | ON  | OFF | Multi-step command 14 | FD-14 |
| ON  | ON  | ON  | ON  | Multi-step command 15 | FD-15 |

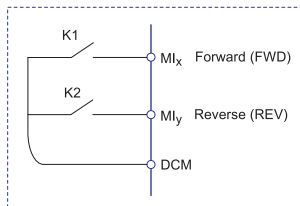
## 5.8 Terminal command mode

### F5-11=0: Two-line running mode 1:

This is the most common mode. The forward/reverse rotation of the motor is decided by the commands of FWD and REV terminals.

| Terminal        | Setting value | Description           |
|-----------------|---------------|-----------------------|
| MI <sub>x</sub> | 1             | Forward running (FWD) |
| MI <sub>y</sub> | 2             | Reverse running (REV) |

| K1  | K2  | Run command |
|-----|-----|-------------|
| OFF | OFF | Stop        |
| OFF | ON  | Reverse     |
| ON  | OFF | Forward     |
| ON  | ON  | Stop        |

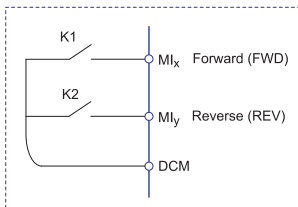


#### F5-11=1: Two-line running mode 2:

When this mode is adopted, REV is enabled terminal. The direction is determined by the status of FWD.

| Terminal        | Terminal | Description                   |
|-----------------|----------|-------------------------------|
| MI <sub>x</sub> | 1        | Run enable                    |
| MI <sub>y</sub> | 2        | Forward / Reverse run control |

| K1  | K2  | Run command |
|-----|-----|-------------|
| OFF | OFF | Stop        |
| OFF | ON  | Stop        |
| ON  | OFF | Forward     |
| ON  | ON  | Reverse     |



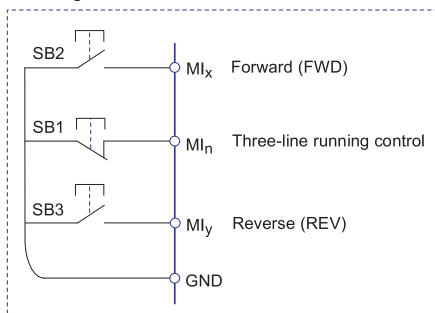
**F5-11=2: Three-line running mode 1:**

In this mode,  $MI_n$  is enabled terminal, and the direction is controlled by FWD and REV respectively. However, the pulse is enabled through disconnecting the signal of  $MI_n$  terminal when the inverter stops.

| Terminal | Setting value | Description                |
|----------|---------------|----------------------------|
| $MI_x$   | 1             | Forward running (FWD)      |
| $MI_y$   | 2             | Reverse running (REV)      |
| $MI_n$   | 3             | Three-line running control |

To make the inverter run, users must close  $MI_n$  terminal firstly. It can achieve the motor forward or reverse control via pulse rising of  $MI_x$  or  $MI_y$ .

It can achieve the inverter stop via cutting off  $MI_n$  terminal signal.  $MI_x$ ,  $MI_y$ ,  $MI_n$  are  $MI1 \sim MI4$ , the valid input of  $MI_x$  ( $MI_y$ ) is pulses signal, and the valid input of  $MI_n$  is level signal.



SB1: Stop button

SB2: Forward rotation button

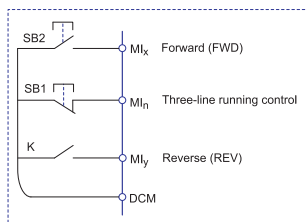
SB3: Reverse rotation button

**F5-11=3: Three-line running mode 2:**

In this mode,  $MI_N$  is enabled terminal, and the running command is given by FWD, while the direction is determined by the status of REV. Stop command is performed through disconnecting the  $MI_N$  signal.

| Terminal | Setting value | Description                   |
|----------|---------------|-------------------------------|
| $MI_x$   | 1             | Run enable                    |
| $MI_y$   | 2             | Forward / Reverse run control |
| $MI_n$   | 3             | Three-line running control    |

| K   | Running direction |
|-----|-------------------|
| OFF | Forward           |
| ON  | Reverse           |



## Chapter 6 Function Parameter List

The detailed functional parameters are listed in below table.

The instruction of the symbols in function parameter list is as following:

“○” Means the parameter can be modified at stop and running status.

“◎” Means the parameter cannot be modified at the running status.

“●” Means the parameter is the real detection value which cannot be modified.

### 6.1 Basic Function Parameters List

| Code                            | Name                                 | Detailed instruction                                                                               | Default | Modify |
|---------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------|---------|--------|
| <b>F0 Group: Basic Function</b> |                                      |                                                                                                    |         |        |
| F0-00                           | Inverter model                       | 1: G model (constant torque load model)<br>2: P model (fan and pump load model)                    | 1       | ●      |
| F0-01                           | Control mode                         | 2: V/f control                                                                                     | 2       | ◎      |
| F0-02                           | Running command source               | 0: Keypad<br>1: Terminal<br>2: Communication                                                       | 0       | ◎      |
| F0-03                           | Main frequency source<br>A selection | 0: Keypad (F0-08, UP and DOWN Adjustable, non-recorded after power off)<br>1: Keypad potentiometer | 1       | ◎      |

| Code  | Name                                   | Detailed instruction                                                                                                                                                                                                                                      | Default | Modify |
|-------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|       |                                        | 2: VI (0~10V)<br>3~5: Reserved<br>6: Multi-step speed<br>7: Simple PLC<br>8: PID<br>9: Communication (Modbus)                                                                                                                                             |         |        |
| F0-04 | Auxiliary frequency source B selection | Same as F0-03                                                                                                                                                                                                                                             | 0       | ⊙      |
| F0-05 | Reference of Frequency source B        | 0: Relative to maximum frequency<br>1: Relative to frequency source A                                                                                                                                                                                     | 0       | ○      |
| F0-06 | Range of Auxiliary Frequency source B  | 0%~150%                                                                                                                                                                                                                                                   | 100%    | ○      |
| F0-07 | Frequency source selection             | Units place: frequency source selection<br>0: Main frequency source A<br>1: Calculation result of frequency A and B (determined by tens place)<br>2: Switching between A and B<br>3: Switching between A and calculation result<br>4: Switching between B | 00      | ○      |

| Code  | Name                                  | Detailed instruction                                                                                                                                     | Default         | Modify |
|-------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|
|       |                                       | and calculation result<br>Tens place: calculation<br>relationship between<br>frequency A and B<br>0: A + B<br>1: A – B<br>2: Max (A, B)<br>3: Min (A, B) |                 |        |
| F0-08 | Keypad<br>reference<br>frequency      | 0.00Hz ~ maximum<br>frequency (F0-10)                                                                                                                    | 50.00H<br>z     | ○      |
| F0-09 | Running<br>direction<br>selection     | 0: Same direction<br>1: Reverse direction                                                                                                                | 0               | ○      |
| F0-10 | Maximum<br>frequency                  | 50.00Hz ~ 600.00Hz                                                                                                                                       | 50.00H<br>z     | ◎      |
| F0-11 | Frequency<br>source<br>of upper limit | 0: Set by F0-12<br>1: VI<br>5: Communication                                                                                                             | 0               | ◎      |
| F0-12 | Frequency<br>upper limit              | F0-14 (frequency lower<br>limit) ~<br>F0-10 (max. frequency)                                                                                             | 50.00H<br>z     | ○      |
| F0-13 | Frequency<br>upper limit<br>offset    | 0.00Hz ~ F0-10 (max.<br>frequency)                                                                                                                       | 0.00<br>Hz      | ○      |
| F0-14 | Frequency<br>lower limit              | 0.00Hz ~ F0-12<br>(frequency upper limit)                                                                                                                | 0.00<br>Hz      | ○      |
| F0-15 | Carrier<br>frequency                  | 0.5kHz ~ 16.0kHz                                                                                                                                         | Model<br>depend | ○      |
| F0-16 | Carrier<br>frequency                  | 0: No<br>1: Yes                                                                                                                                          | 1               | ○      |

| Code  | Name                                                         | Detailed instruction                                          | Default      | Modify |
|-------|--------------------------------------------------------------|---------------------------------------------------------------|--------------|--------|
|       | adjusting according to temperature                           |                                                               |              |        |
| F0-17 | Acceleration time 1                                          | 0.00s ~ 65000s                                                | Model depend | ○      |
| F0-18 | Deceleration time 1                                          | 0.00s ~ 65000s                                                | Model depend | ○      |
| F0-19 | ACC/DEC time unit                                            | 0: 1s<br>1: 0.1s<br>2: 0.01s                                  | 1            | ◎      |
| F0-20 | Reserved                                                     |                                                               |              |        |
| F0-21 | Auxiliary frequency source offset frequency when combination | 0.00Hz ~ F0-10 (max. frequency)                               | 0.00 Hz      | ○      |
| F0-22 | Frequency command resolution                                 | 1: 0.1Hz<br>2: 0.01Hz                                         | 2            | ◎      |
| F0-23 | Digital setting frequency storage selection when stop        | 0: Not store<br>1: store                                      | 1            | ○      |
| F0-24 | ACC/DEC time reference frequency                             | 0: F0-10 (max. frequency)<br>1: Setting frequency<br>2: 100Hz | 0            | ◎      |
| F0-25 | Running frequency command                                    | 0: Running frequency<br>1: Setting frequency                  | 0            | ◎      |

| Code                                    | Name                                             | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Default | Modify |
|-----------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|                                         | UP/DOWN reference                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |        |
| F0-26                                   | Command source combination with frequency source | <p><b>Units place:</b> Operation keypad command combine with frequency source<br/>           0: No combination<br/>           1: Keypad Potentiometer<br/>           2: VI<br/>           6: Multi-step speed<br/>           7: Simple PLC<br/>           8: PID<br/>           9: Communication</p> <p><b>Tens place:</b> Terminal command combine with frequency source</p> <p><b>Hundreds place:</b> Communication command combine with frequency source</p> <p><b>Thousands place:</b> Auto running combine with frequency source</p> | 0000    | ○      |
| F0-27                                   | Parameters initialization                        | 0: No action<br>1: Initialize basic parameters (F0 and F1 groups)<br>2: Clear the record<br>3: Initialized completely                                                                                                                                                                                                                                                                                                                                                                                                                     | 0       | ◎      |
| <b>F1 Group: Start and Stop control</b> |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |        |

| Code  | Name                                                                | Detailed instruction                                                                                                                                                                                                                                                                       | Default    | Modify |
|-------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------|
| F1-00 | Start mode                                                          | 0: Direct start<br>2: Pre-excitation start                                                                                                                                                                                                                                                 | 0          | ○      |
| F1-01 | Reserved                                                            |                                                                                                                                                                                                                                                                                            |            |        |
| F1-02 | Reserved                                                            |                                                                                                                                                                                                                                                                                            |            |        |
| F1-03 | Start frequency                                                     | 0.00Hz ~ 10.00Hz                                                                                                                                                                                                                                                                           | 0.00<br>Hz | ○      |
| F1-04 | Start frequency<br>holding time                                     | 0.0s ~ 100.0s                                                                                                                                                                                                                                                                              | 0.0s       | ◎      |
| F1-05 | DC braking<br>current before<br>start/pre-<br>excitation<br>current | 0% ~ 100%                                                                                                                                                                                                                                                                                  | 0%         | ◎      |
| F1-06 | DC braking<br>time before<br>start/pre-<br>excitation time          | 0.0s ~ 100.0s                                                                                                                                                                                                                                                                              | 0.0s       | ◎      |
| F1-07 | ACC/DEC<br>mode                                                     | 0: Linear ACC/DEC<br>1: S-curve ACC/DEC A<br>(Applications which<br>require start & stop<br>smoothly, such as<br>elevator and conveyor<br>belt.)<br>2: S-curve ACC/DEC B<br>(Suitable for the<br>applications that the<br>high speed area above<br>rated frequency needs<br>fast ACC/DEC.) | 0          | ◎      |

| Code                              | Name                                      | Detailed instruction                        | Default      | Modify |
|-----------------------------------|-------------------------------------------|---------------------------------------------|--------------|--------|
| F1-08                             | Time of S curve's start part              | 0.0% ~ (100.0% ~ F1-09)                     | 30.0%        | ⊙      |
| F1-09                             | Time of S curve's end part                | 0.0% ~ (100.0% ~ F1-08)                     | 30.0%        | ⊙      |
| F1-10                             | Stop mode                                 | 0: Deceleration to stop<br>1: Coast to stop | 0            | ○      |
| F1-11                             | DC braking start frequency while stopping | 0.00Hz ~ F0-10 (max. frequency)             | 0.00 Hz      | ○      |
| F1-12                             | DC braking delay time while stopping      | 0.0s ~ 100.0s                               | 0.0s         | ○      |
| F1-13                             | DC braking current while stopping         | 0% ~ 100%                                   | 0%           | ○      |
| F1-14                             | DC braking time while stopping            | 0.0s ~ 100.0s                               | 0.0s         | ○      |
| F1-15                             | Braking usage ratio                       | 0% ~ 100%                                   | 100%         | ○      |
| <b>F2 Group: Motor Parameters</b> |                                           |                                             |              |        |
| F2-00                             | Motor type                                | 0: Common asynchronous motor                | 0            | ⊙      |
| F2-01                             | Motor rated power                         | 0.1Kw ~ 1000.0Kw                            | Model depend | ⊙      |
| F2-02                             | Motor rated voltage                       | 1V ~ 2000V                                  | Model depend | ⊙      |
| F2-03                             | Motor rated current                       | 0.01A ~ 655.35A                             | Model depend | ⊙      |

| Code                             | Name                          | Detailed instruction                                                                                                                                                                             | Default      | Modify |
|----------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|
| F2-04                            | Motor rated frequency         | 0.00Hz ~ F0-10 (max. frequency)                                                                                                                                                                  | Model depend | ⊙      |
| F2-05                            | Motor rated speed             | 1 ~ 65535RPM                                                                                                                                                                                     | Model depend | ⊙      |
| F2-06 ~ F2-11                    | Reserved                      |                                                                                                                                                                                                  |              |        |
| F4 Group: V/f Control Parameters |                               |                                                                                                                                                                                                  |              |        |
| F4-00                            | V/f curve setting             | 0: Linear<br>1: Multiple-points<br>2: Square<br>3: 1.2th power<br>4: 1.4th power<br>6: 1.6th power<br>8: 1.8th power<br>9: Reserved<br>10: V/f separate completely<br>11: V/f separate partially | 0            | ⊙      |
| F4-01                            | Torque boost                  | 0.1% ~ 30.0%                                                                                                                                                                                     | Model depend | ○      |
| F4-02                            | Torque boost cutoff frequency | 0.00Hz ~ F0-10 (max. frequency)                                                                                                                                                                  | 50.00Hz      | ⊙      |
| F4-03                            | V/f frequency point 1         | 0.00Hz ~ F4-05                                                                                                                                                                                   | 0.00 Hz      | ⊙      |
| F4-04                            | V/f voltage point 1           | 0.0% ~ 100.0%                                                                                                                                                                                    | 0.0%         | ⊙      |
| F4-05                            | V/f frequency point 2         | F4-03 ~ F4-07                                                                                                                                                                                    | 0.00 Hz      | ⊙      |
| F4-06                            | V/f voltage                   | 0.0% ~ 100.0%                                                                                                                                                                                    | 0.0%         | ⊙      |

| Code                             | Name                                   | Detailed instruction                                                                                                                                       | Default      | Modify |
|----------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|
|                                  | point 2                                |                                                                                                                                                            |              |        |
| F4-07                            | V/f frequency point 3                  | F4-05 ~ F2-04 (motor rated frequency)                                                                                                                      | 0.00 Hz      | ⊙      |
| F4-08                            | V/f voltage point 3                    | 0.0% ~ 100.0%                                                                                                                                              | 0.0%         | ⊙      |
| F4-09                            | V/f slip compensation gain             | 0.0% ~ 200.0%                                                                                                                                              | 0.0%         | ○      |
| F4-10                            | V/f over excitation gain               | 0 ~ 200                                                                                                                                                    | 64           | ○      |
| F4-11                            | V/f oscillation suppression gain       | 0 ~ 100                                                                                                                                                    | Model depend | ○      |
| F4-12                            | Reserved                               |                                                                                                                                                            |              |        |
| F4-13                            | Voltage source of V/f separation       | 0: Digital setting (F4-14)<br>1: V/<br>5: Multi-step speed<br>6: Simple PLC<br>7: PID<br>8: Communication<br>Note: 100% corresponds to motor rated voltage | 0            | ○      |
| F4-14                            | Digital setting of V/f separation      | 0V~F2-02 (Motor rated voltage)                                                                                                                             | 0V           | ○      |
| F4-15                            | Voltage rise up time of V/f separation | 0.0s~1000.0s<br>Note: means voltage rise up time from 0 to motor rated voltage                                                                             | 0.0s         | ○      |
| <b>F5 Group: Input Terminals</b> |                                        |                                                                                                                                                            |              |        |

| Code  | Name                  | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                 | Default | Modify |
|-------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| F5-00 | MI1 terminal function | 0: No function                                                                                                                                                                                                                                                                                                                                                                                       | 1       | ⊙      |
| F5-01 | MI2 terminal function | 1: Forward (FWD)<br>2: Reverse (REV)<br>3: Three-line running control                                                                                                                                                                                                                                                                                                                                | 2       | ⊙      |
| F5-02 | MI3 terminal function | 4: Forward Jog (FJOG)<br>5: Reverse Jog (RJOG)<br>6: Terminal UP<br>7: Terminal DOWN<br>8: Coast to stop<br>9: Fault reset (RESET)                                                                                                                                                                                                                                                                   | 0       | ⊙      |
| F5-03 | MI4 terminal function | 10: Pause running<br>11: External fault (normal open) input<br>12: Multi-step speed terminal 1<br>13: Multi-step speed terminal 2<br>14: Multi-step speed terminal 3<br>15: Multi-step speed terminal 4<br>16: ACC/DEC selection terminal 1<br>17: ACC/DEC selection terminal 2<br>18: Main frequency source switching<br>19: UP and DOWN setting clear (terminal and keypad)<br>20: Running command | 0       | ⊙      |

| Code | Name | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Default | Modify |
|------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|      |      | switching terminal<br>21: ACC/DEC invalid<br>22: PID Pause<br>23: PLC status reset<br>24: Wobble frequency<br>pause<br>25: Counter input<br>26: Counter reset<br>27: Length count input<br>28: Length reset<br>29: Torque control invalid<br>30~31: Reserved<br>32: DC braking<br>command<br>33: External fault (normal<br>closed) input<br>34: Frequency<br>modification enabled<br>35: PID action direction<br>reverse<br>36: External stop<br>terminal 1<br>37: Control command<br>switching terminal 2<br>38: PID integration stop<br>39: Switch frequency<br>source A to preset<br>frequency<br>40: Switch frequency<br>source B to preset<br>frequency<br>41~42: Reserved |         |        |

| Code                | Name                                   | Detailed instruction                                                                                                                                                                                              | Default   | Modify |
|---------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|
|                     |                                        | 43: PID parameter switching<br>44~45: Reserved<br>46: Speed control / torque control switching<br>47: Emergency stop<br>48: External stop terminal 2<br>49: Deceleration DC braking<br>50: The running time reset |           |        |
| F5-04<br>~<br>F5-09 | Reserved                               |                                                                                                                                                                                                                   |           |        |
| F5-10               | MI terminals filter time               | 0.000s ~ 1.000s                                                                                                                                                                                                   | 0.010s    | ○      |
| F5-11               | Terminal command mode                  | 0: Two-line mode 1<br>1: Two-line mode 2<br>2: Three-line mode 1<br>3: Three-line mode 2                                                                                                                          | 0         | ◎      |
| F5-12               | UP/DOWN change rate                    | 0.001Hz/s ~ 65.535Hz/s                                                                                                                                                                                            | 1.00 Hz/s | ○      |
| F5-13               | VI minimum input                       | 0.00V ~ 10.00V                                                                                                                                                                                                    | 0.00V     | ○      |
| F5-14               | VI minimum input corresponding setting | -100.0% ~ +100.0%                                                                                                                                                                                                 | 0.0%      | ○      |
| F5-15               | VI maximum input                       | 0.00 ~ 10.00V                                                                                                                                                                                                     | 10.00V    | ○      |

| Code                             | Name                                   | Detailed instruction                                                                                                                                                             | Default | Modify |
|----------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| F5-16                            | VI maximum input corresponding setting | -100.0% ~ +100.0%                                                                                                                                                                | 100.0 % | ○      |
| F5-17                            | VI input filter time                   | 0.00s ~ 10.00s                                                                                                                                                                   | 0.10s   | ○      |
| F5-18 ~ F5-56                    | Reserved                               |                                                                                                                                                                                  |         |        |
| F5-57                            | MI1 delay time                         | 0.0s ~ 3600.0s                                                                                                                                                                   | 0.0s    | ◎      |
| F5-58                            | MI2 delay time                         | 0.0s ~ 3600.0s                                                                                                                                                                   | 0.0s    | ◎      |
| F5-59                            | MI3 delay time                         | 0.0s ~ 3600.0s                                                                                                                                                                   | 0.0s    | ◎      |
| F5-60                            | MI terminals valid mode selection      | 0: Active-high level signal<br>1: Active-low level signal<br>Units place: MI1<br>Tens place: MI2<br>Hundreds place: MI3<br>Thousands place: MI4<br>Ten thousands place: Reserved | 00000   | ◎      |
| F5-61                            | Reserved                               |                                                                                                                                                                                  |         |        |
| <b>F6 Group: Output Terminal</b> |                                        |                                                                                                                                                                                  |         |        |
| F6-00~ F6-01                     | Reserved                               |                                                                                                                                                                                  |         |        |
| F6-02                            | Relay output function                  | 0: No output<br>1: Inverter is running                                                                                                                                           | 0       | ○      |

| Code | Name                  | Detailed instruction                        | Default | Modify |
|------|-----------------------|---------------------------------------------|---------|--------|
|      | selection<br>(TA, TB) | 2: Fault output (fault stop)                | 2       | ○      |
|      |                       | 3: FDT1 output                              |         |        |
|      |                       | 4: Frequency arrival                        |         |        |
|      |                       | 5: Zero-speed running (no output when stop) |         |        |
|      |                       | 6: Motor overload pre-alarm                 | 0       |        |
|      |                       | 7: Inverter overload pre-alarm              |         |        |
|      |                       | 8: Setting count value arrival              | 0       |        |
|      |                       | 9: Designated count value arrival           |         |        |
|      |                       | 10: Length arrival                          |         |        |
|      |                       | 11: Simple PLC circulate running completed  |         |        |
|      |                       | 12: Accumulated running time arrival        |         |        |
|      |                       | 13: Frequency limiting                      |         |        |
|      |                       | 14: Torque limiting                         |         |        |
|      |                       | 15: Ready for running                       |         |        |
|      |                       | 16: Reserved                                |         |        |
|      |                       | 17: Frequency upper limit arrival           | 0       |        |
|      |                       | 18: Frequency lower limit arrival           |         |        |
|      |                       | 19: Under voltage status output             |         |        |
|      |                       | 20: Communication setting                   |         |        |
|      |                       | 21: Position fixed                          |         |        |

| Code | Name | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Default | Modify |
|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|      |      | (reserved)<br>22: Position approach<br>(reserved)<br>23: Zero-speed running 2<br>(output when stop)<br>24: Accumulated power-<br>on time arrival<br>25: FDT2 output<br>26: Frequency 1 arrival<br>output<br>27: Frequency 2 arrival<br>output<br>28: Current 1 arrival<br>output<br>29: Current 2 arrival<br>output<br>30: Timing arrival output<br>31: VI input over limit<br>32: Off load<br>33: Reverse running<br>34: Zero-current status<br>35: Module temperature<br>arrival<br>36: Output current over<br>limit<br>37: Lower limit frequency<br>arrival (output when stop)<br>38: Warning output (keep<br>running)<br>39: Motor over<br>temperature pre-alarm<br>40: This running time |         |        |

| Code                | Name                       | Detailed instruction                                     | Default | Modify |
|---------------------|----------------------------|----------------------------------------------------------|---------|--------|
|                     |                            | arrival                                                  |         |        |
|                     |                            | 0: Running frequency                                     |         |        |
|                     |                            | 1: Setting frequency                                     |         |        |
|                     |                            | 2: Output current                                        | 0       | ○      |
|                     |                            | 3: Output torque                                         | 1       |        |
|                     |                            | 4: Output power                                          |         |        |
|                     |                            | 5: Output voltage                                        |         |        |
|                     |                            | 6: Reserved                                              |         |        |
|                     |                            | 7: VI                                                    |         |        |
|                     |                            | 8: Reserved                                              |         |        |
|                     |                            | 9: Reserved                                              |         |        |
|                     |                            | 10: Length                                               |         |        |
|                     |                            | 11: Count value                                          |         |        |
|                     |                            | 12: Communication                                        |         |        |
|                     |                            | 13: Motor speed                                          |         |        |
|                     |                            | 14: Output current<br>(100.0% corresponds to<br>1000.0A) |         |        |
|                     |                            | 15: Output voltage<br>(100.0% corresponds to<br>1000.0V) |         |        |
|                     |                            | 16: Reserved                                             |         |        |
| F6-03<br>~<br>F6-17 | Reserved                   |                                                          |         |        |
| F6-18               | Relay output<br>delay time | 0.0s ~ 3600.0s                                           | 0.0s    | ○      |
| F6-19<br>~<br>F6-20 | Reserved                   |                                                          |         |        |

| Code                                | Name                                | Detailed instruction                                                                                                                                                                                                                                     | Default | Modify |
|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| F6-22                               | Relay output valid status selection | 0: Positive logic<br>1: Negative logic<br>Units place: Reserved<br>Tens place: Relay                                                                                                                                                                     | 00      | ○      |
| <b>F7 Group: Keypad and Display</b> |                                     |                                                                                                                                                                                                                                                          |         |        |
| F7-00                               | User password                       | 0 ~ 65535                                                                                                                                                                                                                                                | 0       | ○      |
| F7-01                               | REV/JOG function selection          | 0: Reverse run<br>1: Switching between keypad command and remote command (terminal command or communication command)<br>2: FDW/REV Switching<br>3: Forward Jog<br>4: Reverse Jog                                                                         | 0       | ◎      |
| F7-02                               | STOP/RESET function selection       | 0: Valid when keypad control<br>1: Always valid                                                                                                                                                                                                          | 1       | ○      |
| F7-03                               | Running status display 1            | 0000 ~ FFFF<br>Bit00: Running frequency 1 (Hz)<br>Bit01: Setting frequency (Hz)<br>Bit02: DC Bus voltage (V)<br>Bit03: Output voltage (V)<br>Bit04: Output current (A)<br>Bit05: Output power (kW)<br>Bit06: Output torque (%)<br>Bit07: MI input status | 401F    | ○      |

| Code  | Name                     | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default | Modify |
|-------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|       |                          | Bit08: MO output status<br>Bit09: VI voltage (V)<br>Bit10: Reserved<br>Bit11: Reserved<br>Bit12: Count value<br>Bit13: Length value<br>Bit14: Load speed display<br>Bit15: PID setting                                                                                                                                                                                                                                                                                                                |         |        |
| F7-04 | Running status display 2 | 0000 ~ FFFF<br>Bit00: PID feedback<br>Bit01: PLC step<br>Bit02: Reserved<br>Bit03: Running frequency<br>2 (Hz)<br>Bit04: Remain running<br>time<br>Bit05: VI voltage before<br>calibration (V)<br>Bit06: Reserved<br>Bit07: Reserved<br>Bit08: Linear speed<br>Bit09: Current power-on<br>time (Hour)<br>Bit10: Current running<br>time (Min)<br>Bit11: Reserved<br>Bit12: Communication<br>setting value<br>Bit13: Reserved<br>Bit14: Main frequency A<br>display (Hz)<br>Bit15: Auxiliary frequency | 0000    | ○      |

| Code  | Name                           | Detailed instruction                                                                                                                                                                                                                                                                                                       | Default | Modify |
|-------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|       |                                | B display (Hz)                                                                                                                                                                                                                                                                                                             |         |        |
| F7-05 | Stop status display            | 0000 ~ FFFF<br>Bit00: Setting frequency (Hz)<br>Bit01: DC Bus voltage (V)<br>Bit02: MI input status<br>Bit03: MO output status<br>Bit04: VI voltage(V)<br>Bit05: Reserved<br>Bit06: Reserved<br>Bit07: Count value<br>Bit08: Length value<br>Bit09: PLC step<br>Bit10: Load speed<br>Bit11: PID setting<br>Bit12: Reserved | 0003    | ○      |
| F7-06 | Load speed display coefficient | 0.0001 ~ 6.5000<br><b>Example:</b> if load speed display factor (F7-06) is 2.000, load speed decimal place (F7-12) is 2 (2 decimal places), when the running frequency is 40.00Hz, load speed is:<br>$40.00 \times 2.000 = 80.00$                                                                                          | 3.0000  | ○      |
| F7-07 | IGBT module temperature        | 0.0°C ~ 100.0°C                                                                                                                                                                                                                                                                                                            | -       | ●      |
| F7-08 | Reserved                       |                                                                                                                                                                                                                                                                                                                            |         |        |
| F7-09 | Accumulated running time       | 0h ~ 65535h                                                                                                                                                                                                                                                                                                                | -       | ●      |

| Code                                | Name                                  | Detailed instruction                                                                   | Default      | Modify |
|-------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------|--------------|--------|
| F7-10                               | Model No.                             | -                                                                                      | -            | ●      |
| F7-11                               | Software version No.                  | -                                                                                      | -            | ●      |
| F7-12                               | Load speed display decimal place      | 0: 0 decimal place<br>1: 1 decimal place<br>2: 2 decimal places<br>3: 3 decimal places | 1            | ○      |
| F7-13                               | Accumulated Power-on time             | 0h ~ 65535h                                                                            | -            | ●      |
| F7-14                               | Accumulated power consumption         | 0kWh ~ 65535kWh                                                                        | -            | ●      |
| F7-15                               | Function codes modification authority | 0: Enable<br>1: Disable                                                                | 0            | ○      |
| <b>F8 Group: Enhanced Functions</b> |                                       |                                                                                        |              |        |
| F8-00                               | Jog running frequency                 | 0.00Hz ~ F0-10 (max. frequency)                                                        | 2.00 Hz      | ○      |
| F8-01                               | Jog acceleration time                 | 0.0s ~ 6500.0s                                                                         | 20.0s        | ○      |
| F8-02                               | Jog deceleration time                 | 0.0s ~ 6500.0s                                                                         | 20.0s        | ○      |
| F8-03                               | Acceleration time 2                   | 0.0s ~ 6500.0s                                                                         | Model depend | ○      |
| F8-04                               | Deceleration time 2                   | 0.0s ~ 6500.0s                                                                         | Model depend | ○      |
| F8-05                               | Acceleration time 3                   | 0.0s ~ 6500.0s                                                                         | Model depend | ○      |

| Code  | Name                                                           | Detailed instruction                                                            | Default      | Modify |
|-------|----------------------------------------------------------------|---------------------------------------------------------------------------------|--------------|--------|
| F8-06 | Deceleration time 3                                            | 0.0s ~ 6500.0s                                                                  | Model depend | ○      |
| F8-07 | Acceleration time 4                                            | 0.0s ~ 6500.0s                                                                  | Model depend | ○      |
| F8-08 | Deceleration time 4                                            | 0.0s ~ 6500.0s                                                                  | Model depend | ○      |
| F8-09 | Jump frequency 1                                               | 0.00Hz ~ F0-10<br>(maximum frequency)                                           | 0.00 Hz      | ○      |
| F8-10 | Jump frequency 2                                               | 0.00Hz ~ F0-10<br>(maximum frequency)                                           | 0.00 Hz      | ○      |
| F8-11 | Jump frequency amplitude                                       | 0.00Hz ~ F0-10<br>(maximum frequency)                                           | 0.01 Hz      | ○      |
| F8-12 | FWD/REV dead time                                              | 0.0s ~ 3000.0s                                                                  | 0.0s         | ○      |
| F8-13 | Reverse control                                                | 0: Enable<br>1: Disable                                                         | 0            | ○      |
| F8-14 | Action when setting frequency lower than frequency lower limit | 0: Running at frequency lower limit (F0-14)<br>1: Stop<br>2: Zero-speed running | 0            | ○      |
| F8-15 | Droop control                                                  | 0.00Hz ~ 10.00Hz                                                                | 0.00 Hz      | ○      |
| F8-16 | Accumulated power-on arrival time                              | 0h ~ 65000h                                                                     | 0h           | ○      |
| F8-17 | Accumulated running arrival time                               | 0h ~ 65000h                                                                     | 0h           | ○      |

| Code  | Name                                                                  | Detailed instruction                                                                                    | Default | Modify |
|-------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------|--------|
| F8-18 | Auto restart selection after power recovering                         | 0: Auto restart<br>1: No action<br>※ This function is only valid under terminal control mode (F0-02=1). | 0       | ○      |
| F8-19 | Frequency detection value (FDT1)                                      | 0.00Hz ~ F0-10 (maximum frequency)                                                                      | 50.00Hz | ○      |
| F8-20 | Frequency detection lagging value (FDT1)                              | 0.0% ~ 100.0% (F8-19)                                                                                   | 5.0%    | ○      |
| F8-21 | Frequency arrival detection amplitude                                 | 0.0% ~ 100.0% (maximum frequency)                                                                       | 0.0%    | ○      |
| F8-22 | Jump frequency control during ACC/DEC                                 | 0: Invalid<br>1: Valid                                                                                  | 0       | ○      |
| F8-25 | Acceleration time 1 and acceleration time 2 switching frequency point | 0.00Hz ~ F0-10 (maximum frequency)                                                                      | 0.00 Hz | ○      |
| F8-26 | Deceleration time 1 and deceleration time 2                           | 0.00Hz ~ F0-10 (maximum frequency)                                                                      | 0.00 Hz | ○      |

| Code  | Name                                                 | Detailed instruction                                          | Default     | Modify |
|-------|------------------------------------------------------|---------------------------------------------------------------|-------------|--------|
|       | switching<br>frequency point                         |                                                               |             |        |
| F8-27 | Terminal jog<br>priority                             | 0: Invalid<br>1: Valid                                        | 0           | ○      |
| F8-28 | Frequency<br>detection value<br>(FDT2)               | 0.00Hz ~ F0-10<br>(maximum frequency)                         | 50.00H<br>z | ○      |
| F8-29 | Frequency<br>detection<br>lagging value<br>(FDT2)    | 0.0% ~ 100.0% (F8-28)                                         | 5.0%        | ○      |
| F8-30 | Any arrival<br>frequency<br>detection value<br>1     | 0.00Hz ~ F0-10<br>(maximum frequency)                         | 50.00H<br>z | ○      |
| F8-31 | Any arrival<br>frequency<br>detection<br>amplitude 1 | 0.0% ~ 100.0%<br>(maximum frequency)                          | 0.0%        | ○      |
| F8-32 | Any arrival<br>frequency<br>detection value<br>2     | 0.00Hz ~ F0-10<br>(maximum frequency)                         | 50.00H<br>z | ○      |
| F8-33 | Any arrival<br>frequency<br>detection<br>amplitude 2 | 0.0% ~ 100.0%<br>(maximum frequency)                          | 0.0%        | ○      |
| F8-34 | Zero-current<br>detection level                      | 0.0% ~ 300.0%<br>100.0% corresponds to<br>motor rated current | 5.0%        | ○      |
| F8-35 | Zero-current                                         | 0.01s ~ 600.00s                                               | 0.10s       | ○      |

| Code  | Name                                           | Detailed instruction                                         | Default | Modify |
|-------|------------------------------------------------|--------------------------------------------------------------|---------|--------|
|       | detection delay time                           |                                                              |         |        |
| F8-36 | Output current over limit value                | 0.0% (No detection)<br>0.1% ~ 300.0% (motor rated current)   | 200.0 % | ○      |
| F8-37 | Output current over limit detection delay time | 0.00s ~ 600.00s                                              | 0.00s   | ○      |
| F8-38 | Any arrival current 1                          | 0.0% ~ 300.0% (motor rated current)                          | 100.0 % | ○      |
| F8-39 | Any arrival current 1 amplitude                | 0.0% ~ 300.0% (motor rated current)                          | 0.0%    | ○      |
| F8-40 | Any arrival current 2                          | 0.0% ~ 300.0% (motor rated current)                          | 100.0 % | ○      |
| F8-41 | Any arrival current 2 amplitude                | 0.0% ~ 300.0% (motor rated current)                          | 0.0%    | ○      |
| F8-42 | Timing function selection                      | 0: Invalid<br>1: Valid                                       | 0       | ○      |
| F8-43 | Timing running duration source selection       | 0: F8-44<br>1: VI<br>Analog input scale corresponds to F8-44 | 0       | ○      |
| F8-44 | Timing running duration                        | 0.0Min ~ 6500.0Min                                           | 0.0Min  | ○      |
| F8-45 | VI input voltage protection lower limit        | 0.00V ~ F8-46                                                | 3.10V   | ○      |
| F8-46 | VI input voltage                               | F8-45 ~ 10.00V                                               | 6.80V   | ○      |

| Code                          | Name                         | Detailed instruction                                                                                                     | Default | Modify |
|-------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------|--------|
|                               | protection upper limit       |                                                                                                                          |         |        |
| F8-47                         | Module temperature arrival   | 0°C ~ 100°C                                                                                                              | 75°C    | ○      |
| F8-48                         | Cooling fan control          | 0: Start the cooling fan while start the frequency inverter<br>1: Start the cooling fan while switch on the power supply | 0       | ○      |
| F8-49                         | Wake up frequency            | F8-51 (Dormancy frequency) ~ F0-10 (max. frequency)                                                                      | 0.00 Hz | ○      |
| F8-50                         | Wake up delay time           | 0.0s ~ 6500.0s                                                                                                           | 0.0s    | ○      |
| F8-51                         | Dormancy frequency           | 0.00Hz ~ F8-49 (Wake up frequency)                                                                                       | 0.00 Hz | ○      |
| F8-52                         | Dormancy delay time          | 0.0s ~ 6500.0s                                                                                                           | 0.0s    | ○      |
| F8-53                         | Running arrival time setting | 0.0Min ~ 6500.0Min                                                                                                       | 0.0Min  | ○      |
| <b>F9 Group: PID Function</b> |                              |                                                                                                                          |         |        |
| F9-00                         | PID given source             | 0: F9-01<br>1: VI<br>2: Reserved<br>3: Reserved<br>4: Reserved<br>5: Communication<br>6: Multi-step command              | 0       | ○      |

| Code  | Name                            | Detailed instruction                                        | Default | Modify                |
|-------|---------------------------------|-------------------------------------------------------------|---------|-----------------------|
| F9-01 | PID given through keypad        | 0.0%~100%<br>(percentage of sensor measure range)           | 50.0%   | <input type="radio"/> |
| F9-02 | PID feedback source             | 0: VI<br>1~4: Reserved<br>5: Communication<br>6~8: Reserved | 0       | <input type="radio"/> |
| F9-03 | PID action direction            | 0: Positive<br>1: Negative                                  | 0       | <input type="radio"/> |
| F9-04 | PID given feedback range        | 0~65535                                                     | 1000    | <input type="radio"/> |
| F9-05 | Proportional gain Kp1           | 0.0 ~ 100.0                                                 | 20.0    | <input type="radio"/> |
| F9-06 | Integration time Ti1            | 0.01s ~ 10.00s                                              | 2.00s   | <input type="radio"/> |
| F9-07 | Differential time Td1           | 0.000s ~ 10.000s                                            | 0.000s  | <input type="radio"/> |
| F9-08 | Cutoff frequency of PID reverse | 0.00 ~ F0-10 (maximum frequency)                            | 0.00 Hz | <input type="radio"/> |
| F9-09 | PID deviation limit             | 0.0% ~ 100.0%                                               | 0.0%    | <input type="radio"/> |
| F9-10 | PID differential amplitude      | 0.00% ~ 100.00%                                             | 0.10%   | <input type="radio"/> |
| F9-11 | PID given filter time           | 0.00 ~ 650.00s                                              | 0.00s   | <input type="radio"/> |
| F9-12 | PID feedback filter time        | 0.00 ~ 60.00s                                               | 0.00s   | <input type="radio"/> |
| F9-13 | PID output filter time          | 0.00 ~ 60.00s                                               | 0.00s   | <input type="radio"/> |
| F9-14 | Reserved                        |                                                             |         |                       |

| Code  | Name                                               | Detailed instruction                                                                                   | Default | Modify |
|-------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------|--------|
| F9-15 | Proportional gain Kp2                              | 0.0 ~ 100.0                                                                                            | 20.0    | ○      |
| F9-16 | Integration time Ti2                               | 0.01s ~ 10.00s                                                                                         | 2.00s   | ○      |
| F9-17 | Differential time Td2                              | 0.000s ~ 10.000s                                                                                       | 0.000s  | ○      |
| F9-18 | PID parameter switching condition                  | 0: No switching<br>1: Switching via MIn terminals<br>2: Automatic switching according to the deviation | 0       | ○      |
| F9-19 | PID parameter switching deviation 1                | 0.0% ~ F9-20                                                                                           | 20.0%   | ○      |
| F9-20 | PID parameter switching deviation 2                | F9-19 ~ 100.0%                                                                                         | 80.0%   | ○      |
| F9-21 | PID initial value                                  | 0.0% ~ 100.0%                                                                                          | 0.0%    | ○      |
| F9-22 | PID initial value holding time                     | 0.00 ~ 650.00s                                                                                         | 0.00s   | ○      |
| F9-23 | Forward maximum value between two output deviation | 0.00% ~ 100.00%                                                                                        | 1.00%   | ○      |
| F9-24 | Reverse maximum value between two output deviation | 0.00% ~ 100.00%                                                                                        | 1.00%   | ○      |

| Code                                  | Name                                 | Detailed instruction                                                                                                                                                                    | Default | Modify                |
|---------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------|
| F9-25                                 | PID integration attribute            | <b>Units place:</b> Integration separate<br>0: Invalid<br>1: Valid<br><b>Tens place:</b> Stop integrating or not after output reach limit<br>0: Keep integrating<br>1: Stop integrating | 00      | <input type="radio"/> |
| F9-26                                 | PID feedback lost detection value    | 0.0%: No judgment for feedback lost<br>0.1% ~ 100.0%                                                                                                                                    | 0.0%    | <input type="radio"/> |
| F9-27                                 | PID feedback lost detection time     | 0.0s ~ 20.0s                                                                                                                                                                            | 0.0s    | <input type="radio"/> |
| F9-28                                 | PID stop calculation                 | 0: No calculation when stop<br>1: Calculation when stop                                                                                                                                 | 0       | <input type="radio"/> |
| <b>FA Group: Fault and Protection</b> |                                      |                                                                                                                                                                                         |         |                       |
| FA-00                                 | Motor overload protection selection  | 0: Disable<br>1: Enable                                                                                                                                                                 | 1       | <input type="radio"/> |
| FA-01                                 | Motor overload protection gain       | 0.20 ~ 10.00                                                                                                                                                                            | 1.00    | <input type="radio"/> |
| FA-02                                 | Motor overload pre-alarm coefficient | 50% ~ 100%                                                                                                                                                                              | 80%     | <input type="radio"/> |
| FA-03                                 | Stall over-voltage gain              | 0 ~ 100                                                                                                                                                                                 | 20      | <input type="radio"/> |
| FA-04                                 | Stall over-voltage point /           | 120% ~ 150%                                                                                                                                                                             | 135%    | <input type="radio"/> |

| Code  | Name                                                       | Detailed instruction                       | Default | Modify |
|-------|------------------------------------------------------------|--------------------------------------------|---------|--------|
|       | Braking threshold                                          |                                            |         |        |
| FA-05 | Stall over current gain                                    | 0 ~ 100                                    | 20      | ○      |
| FA-06 | Stall over-current point                                   | 100% ~ 200%                                | 170%    | ○      |
| FA-07 | Short-circuit to ground protection selection when power-on | 0: Invalid<br>1: Valid                     | 1       | ○      |
| FA-08 | Over current restrain function                             | 0: Disable<br>1: Enable                    | 0       | ○      |
| FA-09 | Fault auto-reset times                                     | 0 ~ 20                                     | 0       | ○      |
| FA-10 | Relay output selection during fault auto-reset             | 0: No action<br>1: Action                  | 0       | ○      |
| FA-11 | Fault auto-reset interval                                  | 0.1s ~ 100.0s                              | 1.0s    | ○      |
| FA-12 | Reserved                                                   |                                            |         |        |
| FA-13 | Output phase failure protection selection                  | 0: Disable<br>1: Enable                    | 1       | ○      |
| FA-14 | The first fault type                                       | 0: No fault<br>1: Reserved                 | —       | ●      |
| FA-15 | The second fault type                                      | 2: Acc over current<br>3: Dec over current | —       | ●      |

| Code  | Name                          | Detailed instruction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default | Modify |
|-------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| FA-16 | The third (latest) fault type | 4: Over current in constant speed<br>5: Over voltage in Acc process<br>6: Over voltage in Dec process<br>7: Over voltage in constant speed<br>8: Buffer resistor overload<br>9: Under voltage<br>10: Inverter overload<br>11: Motor overload<br>12: Input side phase failure<br>13: Output side phase failure<br>14: IGBT Module overheat<br>15: External fault<br>16: Communication fault<br>17: Contactor fault<br>18: Current detection fault<br>19: Reserved<br>20: Reserved<br>21: Parameter R/W fault<br>22: Inverter hardware fault<br>23: Motor short circuit to ground fault<br>24: Reserved | —       | ●      |

| Code  | Name                                                 | Detailed instruction                                                                                                                                                                                                                                                    | Default | Modify |
|-------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|
|       |                                                      | 25: Reserved<br>26: Running time arrival<br>27: Reserved<br>28: Reserved<br>29: Power-on time arrival<br>30: Off load<br>31: PID feedback lost<br>when running<br>40: Fast current limiting<br>over time<br>41: Switch the motor<br>during running<br>42 ~ 51: Reserved |         |        |
| FA-17 | Frequency at the third (latest) fault                | —                                                                                                                                                                                                                                                                       | —       | ●      |
| FA-18 | Current at the third (latest) fault                  | —                                                                                                                                                                                                                                                                       | —       | ●      |
| FA-19 | Bus voltage at the third (latest) fault              | —                                                                                                                                                                                                                                                                       | —       | ●      |
| FA-20 | Input terminal's status at the third (latest) fault  | —                                                                                                                                                                                                                                                                       | —       | ●      |
| FA-21 | Output terminal's status at the third (latest) fault | —                                                                                                                                                                                                                                                                       | —       | ●      |

| Code                 | Name                                         | Detailed instruction | Default | Modify |
|----------------------|----------------------------------------------|----------------------|---------|--------|
| FA-22                | Inverter status at the third (latest) fault  | —                    | —       | ●      |
| FA-23                | Power-on time at the third (latest) fault    | —                    | —       | ●      |
| FA-24                | Running time at the third (latest) fault     | —                    | —       | ●      |
| FA -25<br>~<br>FA-26 | Reserved                                     |                      |         |        |
| FA-27                | Frequency at the second fault                | —                    | —       | ●      |
| FA-28                | Current at the second fault                  | —                    | —       | ●      |
| FA-29                | Bus voltage at the second fault              | —                    | —       | ●      |
| FA-30                | Input terminal's status at the second fault  | —                    | —       | ●      |
| FA-31                | Output terminal's status at the second fault | —                    | —       | ●      |
| FA-32                | Inverter status at the second fault          | —                    | —       | ●      |
| FA-33                | Power-on time                                | —                    | —       | ●      |

| Code                | Name                                        | Detailed instruction | Default | Modify |
|---------------------|---------------------------------------------|----------------------|---------|--------|
|                     | at the second fault                         |                      |         |        |
| FA-34               | Running time at the second fault            | —                    | —       | ●      |
| FA-35<br>~<br>FA-36 | Reserved                                    |                      |         |        |
| FA-37               | Frequency at the first fault                | —                    | —       | ●      |
| FA-38               | Current at the first fault                  | —                    | —       | ●      |
| FA-39               | DC bus voltage at the first fault           | —                    | —       | ●      |
| FA-40               | Input terminal's status at the first fault  | —                    | —       | ●      |
| FA-41               | Output terminal's status at the first fault | —                    | —       | ●      |
| FA-42               | Inverter status at the first fault          | —                    | —       | ●      |
| FA-43               | Power-on time at the first fault            | —                    | —       | ●      |
| FA-44               | Running time at the first fault             | —                    | —       | ●      |
| FA-45<br>~<br>FA-70 | Reserved                                    |                      |         |        |

| FB Group: Wobble Frequency, Fixed Length, Counting |                                       |                                                                     |       |   |
|----------------------------------------------------|---------------------------------------|---------------------------------------------------------------------|-------|---|
| FB-00                                              | Wobble frequency setting mode         | 0: Relative to center frequency<br>1: Relative to maximum frequency | 0     | ○ |
| FB-01                                              | Wobble frequency amplitude            | 0.0% ~ 100.0%                                                       | 0.0%  | ○ |
| FB-02                                              | Sudden Jump frequency amplitude       | 0.0% ~ 50.0%                                                        | 0.0%  | ○ |
| FB-03                                              | Wobble frequency cycle                | 0.1s ~ 3000.0s                                                      | 10.0s | ○ |
| FB-04                                              | Triangular wave rise time coefficient | 0.1% ~ 100.0%                                                       | 50.0% | ○ |
| FB-05                                              | Setting length                        | 0m ~ 65535m                                                         | 1000m | ○ |
| FB-06                                              | Actual length                         | 0m ~ 65535m                                                         | 0m    | ○ |
| FB-07                                              | Number of pulses per meter            | 0.0 ~ 6553.5                                                        | 100.0 | ○ |
| FB-08                                              | Setting count value                   | 1 ~ 65535                                                           | 1000  | ○ |
| FB-09                                              | Designated count value                | 1 ~ 65535                                                           | 1000  | ○ |
| FC Group: Communication Parameters                 |                                       |                                                                     |       |   |
| FC-00                                              | Baud rate                             | 0: 300BPS<br>1: 600BPS<br>2: 1200BPS                                | 5     | ○ |

|                                                    |                                       |                                                                                                                         |      |   |
|----------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|---|
|                                                    |                                       | 3: 2400BPS<br>4: 4800BPS<br>5: 9600BPS<br>6: 19200BPS<br>7: 38400BPS<br>8: 57600BPS<br>9: 115200BPS                     |      |   |
| FC-01                                              | Data format                           | 0: No parity check (8-N-2)<br>1: Even parity check (8-E-1)<br>2: Odd parity check (8-O-1)<br>3: No parity check (8-N-1) | 0    | ○ |
| FC-02                                              | Inverter address                      | 1 ~ 249, 0 is broadcast address                                                                                         | 1    | ○ |
| FC-03                                              | Communication delay time              | 0ms ~ 20ms                                                                                                              | 2ms  | ○ |
| FC-04                                              | Communication timeout time            | 0.0 (invalid)<br>0.1s ~ 60.0s                                                                                           | 0.0  | ○ |
| FC-05                                              | Communication protocol selection      | <b>Modbus</b><br>0: Non-standard MODBUS protocol<br>1: Standard MODBUS protocol                                         | 1    | ○ |
| FC-06                                              | Communication read current resolution | 0: 0.01A<br>1: 0.1A                                                                                                     | 0    | ○ |
| <b>FD Group: Multi-step Command and Simple PLC</b> |                                       |                                                                                                                         |      |   |
| FD-00                                              | Multi-step speed 0                    | -100.0% ~ 100.0%                                                                                                        | 0.0% | ○ |

|       |                         |                                                                                          |      |   |
|-------|-------------------------|------------------------------------------------------------------------------------------|------|---|
| FD-01 | Multi-step speed 1      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-02 | Multi-step speed 2      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-03 | Multi-step speed 3      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-04 | Multi-step speed 4      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-05 | Multi-step speed 5      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-06 | Multi-step speed 6      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-07 | Multi-step speed 7      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-08 | Multi-step speed 8      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-09 | Multi-step speed 9      | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-10 | Multi-step speed 10     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-11 | Multi-step speed 11     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-12 | Multi-step speed 12     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-13 | Multi-step speed 13     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-14 | Multi-step speed 14     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-15 | Multi-step speed 15     | -100.0% ~ 100.0%                                                                         | 0.0% | ○ |
| FD-16 | Simple PLC running mode | 0: Stop after one cycle<br>1: Keep last frequency after one cycle<br>2: Circular running | 0    | ○ |

|       |                                             |                                                                                                                                                                        |              |   |
|-------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|
| FD-17 | Simple PLC status memory selection          | <b>Units place:</b><br>Memory selection when power-off<br>0: Not memory<br>1: Memory<br><b>Tens place:</b><br>Memory selection when stop<br>0: Not memory<br>1: Memory | 00           | ○ |
| FD-18 | 0 <sup>th</sup> step running time           | 0.0s (h) ~ 6500.0s (h)                                                                                                                                                 | 0.0<br>s (h) | ○ |
| FD-19 | 0 <sup>th</sup> step ACC/DEC time selection | 0 ~ 3                                                                                                                                                                  | 0            | ○ |
| FD-20 | 1 <sup>st</sup> step running time           | 0.0s (h) ~ 6500.0s (h)                                                                                                                                                 | 0.0<br>s (h) | ○ |
| FD-21 | 1 <sup>st</sup> step ACC/DEC time selection | 0 ~ 3                                                                                                                                                                  | 0            | ○ |
| FD-22 | 2 <sup>nd</sup> step running time           | 0.0s (h) ~ 6500.0s (h)                                                                                                                                                 | 0.0<br>s (h) | ○ |
| FD-23 | 2 <sup>nd</sup> step ACC/DEC time selection | 0 ~ 3                                                                                                                                                                  | 0            | ○ |
| FD-24 | 3 <sup>rd</sup> step running time           | 0.0s (h) ~ 6500.0s (h)                                                                                                                                                 | 0.0<br>s (h) | ○ |
| FD-25 | 3 <sup>rd</sup> step ACC/DEC time selection | 0 ~ 3                                                                                                                                                                  | 0            | ○ |
| FD-26 | 4 <sup>th</sup> step running time           | 0.0s (h) ~ 6500.0s (h)                                                                                                                                                 | 0.0<br>s (h) | ○ |
| FD-27 | 4 <sup>th</sup> step ACC/DEC                | 0 ~ 3                                                                                                                                                                  | 0            | ○ |

## Chapter 6 Function Parameter List

|       |                                                    |                        |              |   |
|-------|----------------------------------------------------|------------------------|--------------|---|
|       | time selection                                     |                        |              |   |
| FD-28 | 5 <sup>th</sup> step<br>running time               | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-29 | 5 <sup>th</sup> step<br>ACC/DEC<br>time selection  | 0 ~ 3                  | 0            | ○ |
| FD-30 | 6 <sup>th</sup> step<br>running time               | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-31 | 6 <sup>th</sup> step<br>ACC/DEC<br>time selection  | 0 ~ 3                  | 0            | ○ |
| FD-32 | 7 <sup>th</sup> step<br>running time               | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-33 | 7 <sup>th</sup> step<br>ACC/DEC<br>time selection  | 0 ~ 3                  | 0            | ○ |
| FD-34 | 8 <sup>th</sup> step<br>running time               | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-35 | 8 <sup>th</sup> step<br>ACC/DEC<br>time selection  | 0 ~ 3                  | 0            | ○ |
| FD-36 | 9 <sup>th</sup> step<br>running time               | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-37 | 9 <sup>th</sup> step<br>ACC/DEC<br>time selection  | 0 ~ 3                  | 0            | ○ |
| FD-38 | 10 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |
| FD-39 | 10 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                  | 0            | ○ |
| FD-40 | 11 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h) | 0.0<br>s (h) | ○ |

|       |                                                    |                                                                                                                                             |              |   |
|-------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|
| FD-41 | 11 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                                                                                                                                       | 0            | ○ |
| FD-42 | 12 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h)                                                                                                                      | 0.0<br>s (h) | ○ |
| FD-43 | 12 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                                                                                                                                       | 0            | ○ |
| FD-44 | 13 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h)                                                                                                                      | 0.0<br>s (h) | ○ |
| FD-45 | 13 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                                                                                                                                       | 0            | ○ |
| FD-46 | 14 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h)                                                                                                                      | 0.0<br>s (h) | ○ |
| FD-47 | 14 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                                                                                                                                       | 0            | ○ |
| FD-48 | 15 <sup>th</sup> step<br>running time              | 0.0s (h) ~ 6500.0s (h)                                                                                                                      | 0.0<br>s (h) | ○ |
| FD-49 | 15 <sup>th</sup> step<br>ACC/DEC<br>time selection | 0 ~ 3                                                                                                                                       | 0            | ○ |
| FD-50 | Timing unit<br>(Simple PLC<br>mode)                | 0: s (second)<br>1: h (hour)                                                                                                                | 0            | ○ |
| FD-51 | Multi-step<br>speed 0 given<br>channel             | 0: FD-00<br>1: VI<br>2: Reserved<br>3: Keypad potentiometer<br>4: Reserved<br>5: PID control<br>6: Keypad setting<br>frequency (F0-08), can | 0            | ○ |

|       |                                   |                                                                                                                                                                |   |   |
|-------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
|       |                                   | be modified via UP/DN                                                                                                                                          |   |   |
| FD-52 | Multi-step speed 3 given channel  | 0: FD-00<br>1: VI<br>2: Reserved<br>3: Keypad potentiometer<br>4: Reserved<br>5: PID control<br>6: Keypad setting frequency (F0-08), can be modified via UP/DN | 0 | ○ |
| FD-53 | Multi-step speed 6 given channel  | 0: FD-00<br>1: VI<br>2: Reserved<br>3: Keypad potentiometer<br>4: Reserved<br>5: PID control<br>6: Keypad setting frequency (F0-08), can be modified via UP/DN | 0 | ○ |
| FD-54 | Multi-step speed 9 given channel  | 0: FD-00<br>1: VI<br>2: Reserved<br>3: Keypad potentiometer<br>4: Reserved<br>5: PID control<br>6: Keypad setting frequency (F0-08), can be modified via UP/DN | 0 | ○ |
| FD-55 | Multi-step speed 12 given channel | 0: FD-00<br>1: VI<br>2: Reserved<br>3: Keypad potentiometer<br>4: Reserved<br>5: PID control                                                                   | 0 | ○ |

|                                                            |                                       |                                                                        |          |   |
|------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------|----------|---|
|                                                            |                                       | 6: Keypad setting frequency (F0-08), can be modified via UP/DN         |          |   |
| <b>FE Group: Torque Control &amp; Optimized Parameters</b> |                                       |                                                                        |          |   |
| FE-00~<br>FE-14                                            | Reserved                              |                                                                        |          |   |
| FE-15                                                      | DPWM switching upper limit frequency  | 0.00Hz ~ 15.00Hz                                                       | 12.00 Hz | ○ |
| FE-16                                                      | PWM regulation mode                   | 0: Asynchronous mode<br>1: Synchronous mode                            | 0        | ○ |
| FE-17                                                      | Dead zone compensation mode selection | 0: no compensation<br>1: compensation mode 1<br>2: compensation mode 2 | 1        | ○ |
| FE-18                                                      | Depth of random PWM                   | 0: Random PWM invalid<br>1~10: depth of random PWM                     | 0        | ○ |
| FE-19                                                      | Fast current limitation enable        | 0: Disable<br>1: Enable                                                | 1        | ○ |
| FE-20                                                      | Current detection compensation        | 0~100                                                                  | 5        | ○ |
| FE-21                                                      | Reserved                              |                                                                        |          |   |
| FE-22                                                      | Under voltage level setting           | 60% ~ 140%                                                             | 80%      | ○ |

## 6.2 Monitoring Parameter Table (U0 group)

| Function code | Name                          | Minimum unit |
|---------------|-------------------------------|--------------|
| U0-00         | Running frequency (Hz)        | 0.01Hz       |
| U0-01         | Setting frequency (Hz)        | 0.01Hz       |
| U0-02         | DC bus voltage (V)            | 0.1V         |
| U0-03         | Output voltage (V)            | 1V           |
| U0-04         | Output current (A)            | 0.01A        |
| U0-05         | Output power (kW)             | 0.1kW        |
| U0-06         | Output torque (%)             | 0.10%        |
| U0-07         | MI input status               | 1            |
| U0-08         | Relay output status           | 1            |
| U0-09         | VI voltage (V)                | 0.01V        |
| U0-10~ U0-11  | Reserved                      |              |
| U0-12         | Count value                   | 1            |
| U0-13         | Length value                  | 1            |
| U0-14         | Load speed                    | 1            |
| U0-15         | PID setting                   | 1            |
| U0-16         | PID feedback                  | 1            |
| U0-17         | PLC step                      | 1            |
| U0-18~ U0-19  | Reserved                      |              |
| U0-20         | Remain running time           | 0.1Min       |
| U0-21         | VI voltage before calibration | 0.001V       |
| U0-22~U0-24   | Reserved                      |              |

---

| Function code | Name                          | Minimum unit |
|---------------|-------------------------------|--------------|
| U0-25         | Current power-on time         | 1Min         |
| U0-26         | Current running time          | 0.1Min       |
| U0-27         | Reserved                      |              |
| U0-28         | Communication setting value   | 0.01%        |
| U0-29         | Reserved                      |              |
| U0-30         | Main frequency A display      | 0.01Hz       |
| U0-31         | Auxiliary frequency B display | 0.01Hz       |

## Chapter 7 Trouble Shooting

### 7.1 Fault and Trouble Shooting

|            |                                                                                                                                                                                                                                                                                                                                                                                  |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Converter short circuit protection                                                                                                                                                                                                                                                                                                                                               |
| Fault Code | <b>Err01</b>                                                                                                                                                                                                                                                                                                                                                                     |
| Reason     | <ol style="list-style-type: none"><li>1. Short-circuit or ground fault occurred at inverter output side</li><li>2. The cable connecting the motor with the inverter is too long</li><li>3. The module is over-heat</li><li>4. The cable connections inside the inverter are loosen</li><li>5. The control board is abnormal</li><li>6. The power board is abnormal</li></ol>     |
| Solution   | <ol style="list-style-type: none"><li>1. Inspect whether motor damaged, insulation worn or cable damaged</li><li>2. Install a reactor or output filter</li><li>3. Check if the air duct is blocked and if the fan is in normal status, and resolve the existing problems</li><li>4. Make sure the cables are connected well</li><li>5, 6, 7. Ask for technical support</li></ol> |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over current when acceleration                                                                                                                                                                                                                                                                                                                                                                                              |
| Fault Code | <b>Err02</b>                                                                                                                                                                                                                                                                                                                                                                                                                |
| Reason     | <ol style="list-style-type: none"><li>1. Short-circuit or ground fault occurred at inverter output side</li><li>2. The acceleration time is too short</li><li>3. The manual torque boost or V/f curve is not proper</li><li>4. The voltage is too low</li><li>5. Start the running motor</li><li>6. Load is added suddenly during the acceleration</li><li>7. Power selection of inverter is too small</li></ol>            |
| Solution   | <ol style="list-style-type: none"><li>1. Inspect whether motor damaged, insulation worn or cable damaged</li><li>2. Increase the acceleration time</li><li>3. Adjust the manual torque boost or V/F curve</li><li>4. Make the voltage in the normal range</li><li>5. Select speed tracking start or start the motor till it stops</li><li>6. Cancel the sudden added load</li><li>7. Select bigger power inverter</li></ol> |

|            |                                                                                                                                                                                                                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over-current when deceleration                                                                                                                                                                                                                                                                                                    |
| Fault Code | <b>Err03</b>                                                                                                                                                                                                                                                                                                                      |
| Reason     | <ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output side</li> <li>2. The deceleration time is too short</li> <li>3. The voltage is too low</li> <li>4. Load is added suddenly during the deceleration</li> <li>5. Have not installed braking unit and braking resistor</li> </ol> |
| Solution   | <ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Increase the deceleration time</li> <li>3. Make the voltage in the normal range</li> <li>4. Cancel the sudden added load</li> <li>5. Install braking unit and braking resistor</li> </ol>                   |

|            |                                                                                                                                                                                                                                                          |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over-current when constant speed running                                                                                                                                                                                                                 |
| Fault Code | <b>Err04</b>                                                                                                                                                                                                                                             |
| Reason     | <ol style="list-style-type: none"> <li>1. Short-circuit or ground fault occurred at inverter output</li> <li>2. The voltage is too low</li> <li>3. Load is added suddenly during running</li> <li>4. Power selection of inverter is too small</li> </ol> |
| Solution   | <ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Make the voltage in the normal range</li> <li>3. Cancel the sudden added load</li> <li>4. Select bigger power inverter</li> </ol>  |

|            |                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over-voltage when acceleration                                                                                                                                                                                                                                                 |
| Fault Code | <b>Err05</b>                                                                                                                                                                                                                                                                   |
| Reason     | <ol style="list-style-type: none"><li>1. The input voltage is too high</li><li>2. There is external force driving the motor to run during acceleration</li><li>3. The acceleration time is too short</li><li>4. Have not installed braking unit and braking resistor</li></ol> |
| Solution   | <ol style="list-style-type: none"><li>1. Make the voltage in the normal range</li><li>2. Cancel the external force</li><li>3. Increase the acceleration time</li><li>4. Install braking unit and braking resistor</li></ol>                                                    |

|            |                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over-voltage when deceleration                                                                                                                                                                                                                                                 |
| Fault Code | <b>Err06</b>                                                                                                                                                                                                                                                                   |
| Reason     | <ol style="list-style-type: none"><li>1. The input voltage is too high</li><li>2. There is external force driving the motor to run during deceleration</li><li>3. The deceleration time is too short</li><li>4. Have not installed braking unit and braking resistor</li></ol> |
| Solution   | <ol style="list-style-type: none"><li>1. Make the voltage in the normal range</li><li>2. Cancel the external force</li><li>3. Increase the deceleration time</li><li>4. Install braking unit and braking resistor</li></ol>                                                    |

|            |                                                                                                                     |
|------------|---------------------------------------------------------------------------------------------------------------------|
| Fault Name | Over-voltage when constant speed running                                                                            |
| Fault Code | <b>Err07</b>                                                                                                        |
| Reason     | 1. The input voltage is too high<br>2. There is external force driving the motor to run during the inverter running |
| Solution   | 1. Make the voltage in the normal range<br>2. Cancel the external force or install braking resistor                 |

|            |                                         |
|------------|-----------------------------------------|
| Fault Name | Power-supply fault                      |
| Fault Code | <b>Err08</b>                            |
| Reason     | 1. The input voltage is out of range    |
| Solution   | 1. Make the voltage in the normal range |

|            |                                                                                                                                                                                                                                       |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Under-voltage                                                                                                                                                                                                                         |
| Fault Code | <b>Err09</b>                                                                                                                                                                                                                          |
| Reason     | 1. Instantaneous power-off<br>2. The input voltage is out of range<br>3. DC Bus voltage is abnormal<br>4. The rectifier bridge and buffer resistor are abnormal<br>5. The power board is abnormal<br>6. The control board is abnormal |
| Solution   | 1. Fault Reset<br>2, 3. Make the voltage in the normal range<br>4, 5, 6. ask for technical support                                                                                                                                    |

|            |                                                                                                  |
|------------|--------------------------------------------------------------------------------------------------|
| Fault Name | Inverter over load                                                                               |
| Fault Code | <b>Err10</b>                                                                                     |
| Reason     | 1. The load is too heavy or motor blockage occurs<br>2. Power selection of inverter is too small |
| Solution   | 1. Reduce the load, check the status of motor & machinery<br>2. Select bigger power inverter     |

|            |                                                                                                                                          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Motor over load                                                                                                                          |
| Fault Code | <b>Err11</b>                                                                                                                             |
| Reason     | 1. FA-00 and PA-01 is set improperly<br>2. The load is too heavy or motor blockage occurs<br>3. Power selection of inverter is too small |
| Solution   | 1. Set FA-00 and PA-01 properly<br>2. Reduce the load, check the status of motor & machinery<br>3. Select bigger power inverter          |

|            |                                                                                                                                                                                                                                                          |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | Output phase failure                                                                                                                                                                                                                                     |
| Fault Code | <b>Err13</b>                                                                                                                                                                                                                                             |
| Reason     | <ol style="list-style-type: none"> <li>1. The connection between inverter and motor is abnormal</li> <li>2. Output voltage unbalance during the motor running</li> <li>3. The power board is abnormal</li> <li>4. The IGBT module is abnormal</li> </ol> |
| Solution   | <ol style="list-style-type: none"> <li>1. Inspect whether motor damaged, insulation worn or cable damaged</li> <li>2. Make sure the motor three phase winding is normal</li> <li>3, 4. Ask for technical support</li> </ol>                              |

|            |                                                                                                                                                                                                                                                                     |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | IGBT module over-heat                                                                                                                                                                                                                                               |
| Fault Code | <b>Err14</b>                                                                                                                                                                                                                                                        |
| Reason     | <ol style="list-style-type: none"> <li>1. Ambient temperature is too high</li> <li>2. Air duct is blocked</li> <li>3. Cooling fans are broken</li> <li>4. Thermal resistor(temperature sensor) of the module is broken</li> <li>5. IGBT module is broken</li> </ol> |
| Solution   | <ol style="list-style-type: none"> <li>1. Reduce the ambient temperature</li> <li>2. Clear the air duct</li> <li>3. Replace cooling fans</li> <li>4, 5. Ask for technical support</li> </ol>                                                                        |

|            |                                                                              |
|------------|------------------------------------------------------------------------------|
| Fault Name | External device fault                                                        |
| Fault Code | <b>Err15</b>                                                                 |
| Reason     | MI terminal receives an external fault signal generated by peripheral device |

|            |                                                                                                                                                                                          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solution   | Find out the fault source, solve it and reset the inverter                                                                                                                               |
| Fault Name | Communication fault                                                                                                                                                                      |
| Fault Code | <b>Err16</b>                                                                                                                                                                             |
| Reason     | <ol style="list-style-type: none"> <li>1. Master computer works abnormal</li> <li>2. Communication cable is abnormal</li> <li>3. FC group parameters are set improperly</li> </ol>       |
| Solution   | <ol style="list-style-type: none"> <li>1. Check the connection of master computer</li> <li>2. Check the communication connection</li> <li>3. Set FC group parameters properly</li> </ol> |

|            |                                                                                                                                          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Fault Name | DC contactor fault                                                                                                                       |
| Fault Code | <b>Err17</b>                                                                                                                             |
| Reason     | <ol style="list-style-type: none"> <li>1. Power board or power supply board are abnormal</li> <li>2. DC contactor is abnormal</li> </ol> |
| Solution   | <ol style="list-style-type: none"> <li>1. Replace power board or power supply board</li> <li>2. Replace DC contactor</li> </ol>          |

|            |                                                                   |
|------------|-------------------------------------------------------------------|
| Fault Name | Current detection fault                                           |
| Fault Code | <b>Err18</b>                                                      |
| Reason     | 1. Hall sensor is abnormal<br>2. The power board is abnormal      |
| Solution   | 1. Check hall sensor and connection<br>2. Replace the power board |

|            |                              |
|------------|------------------------------|
| Fault Name | EEPROM read/write fault      |
| Fault Code | <b>Err21</b>                 |
| Reason     | 1. EEPROM chip is broken     |
| Solution   | 1. Replace the control board |

|            |                                                                    |
|------------|--------------------------------------------------------------------|
| Fault Name | Inverter hardware fault                                            |
| Fault Code | <b>Err22</b>                                                       |
| Reason     | 1. Over voltage<br>2. Over current                                 |
| Solution   | 1. Handle as over voltage fault<br>2. Handle as over current fault |

|            |                                         |
|------------|-----------------------------------------|
| Fault Name | Motor short-circuit to ground           |
| Fault Code | <b>Err23</b>                            |
| Reason     | 1. The motor is short-circuit to ground |
| Solution   | 1. Replace cables or motor              |

|            |                                                                       |
|------------|-----------------------------------------------------------------------|
| Fault Name | Accumulated running time arrival                                      |
| Fault Code | <b>Err26</b>                                                          |
| Reason     | 1. The accumulated running time reaches the setting value             |
| Solution   | 1. Clear the record information via parameter initialization function |

|            |                                                                       |
|------------|-----------------------------------------------------------------------|
| Fault Name | Accumulated power-on time arrival                                     |
| Fault Code | <b>Err29</b>                                                          |
| Reason     | 1. The accumulated power-on time reaches the setting value            |
| Solution   | 1. Clear the record information via parameter initialization function |

|            |                                                                       |
|------------|-----------------------------------------------------------------------|
| Fault Name | Off-load fault                                                        |
| Fault Code | <b>Err30</b>                                                          |
| Reason     | 1. The inverter running current is smaller than FA-64                 |
| Solution   | 1. Confirm if the load breaks away and FA-64 & FA-65 are set properly |

|            |                                                    |
|------------|----------------------------------------------------|
| Fault Name | PID feedback lost when running                     |
| Fault Code | <b>Err31</b>                                       |
| Reason     | 1. PID feedback is smaller than F9-26              |
| Solution   | 1. Check PID feedback signal or set F9-26 properly |

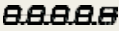
|            |                                                                                                      |
|------------|------------------------------------------------------------------------------------------------------|
| Fault Name | Current-limiting fault                                                                               |
| Fault Code | <b>Err40</b>                                                                                         |
| Reason     | 1. Whether the load is heavy or the motor is blocked<br>2. Power selection of inverter is too small. |
| Solution   | 1. Reduce the load and detect the motor & machinery condition<br>2. Select bigger power inverter     |

## 7.2 Common Faults and Solutions

| Fault                              | Reason                                                                                                                                                                                                                                                   | Solution                                                                                                                   |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>No display</b><br>when power-on | 1, The input voltage is 0 or too low.<br>2, The switching power supply on the drive board is broken.<br>3, Rectifier bridge is broken.<br>4, Buffer resistors are broken.<br>5, The control board or keypad is broken.<br>6, Cables are loose connection | 1, Check the input power-supply.<br>2, Check the DC bus voltage<br>3, Reconnect the cables<br>4, Ask for technical support |
| <b>Display HC</b><br>when power-on | 1, Loose connection of the control board and power board.<br>2, Control board is broken.<br>3, Motor or motor cables short-circuited with ground.<br>4, Hall sensor is broken.<br>5, Input voltage is too low                                            | 1, Check the mentioned reasons one by one.<br>2, Ask for technical support                                                 |

|                                                                              |                                                                                                                                                                                                                              |                                                                                                                                                                                |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display <b>HC</b> when starting the inverter, and inverter stops immediately | <ol style="list-style-type: none"> <li>1, Fans are broken or air duct is blocked.</li> <li>2, The control cables are short-circuited.</li> </ol>                                                                             | <ol style="list-style-type: none"> <li>1, Measure the insulation of control cables with magneto-ohmmeter.</li> <li>2, Ask for technical support</li> </ol>                     |
| <b>Err23</b> is displayed when power-on                                      | <ol style="list-style-type: none"> <li>1, The motor or the output line is short-circuited to the ground.</li> <li>2, The inverter is damaged.</li> </ol>                                                                     | <ol style="list-style-type: none"> <li>1, Measure the insulation of the motor and output line with magneto-ohmmeter.</li> <li>2, Ask for technical support</li> </ol>          |
| <b>Err14</b> happens frequently                                              | <ol style="list-style-type: none"> <li>1, Carrier frequency setting is too high.</li> <li>2, Fans are broken or air duct is blocked.</li> <li>3, The inverter inside components is broken (such as thermocouple).</li> </ol> | <ol style="list-style-type: none"> <li>1, Reduce the carrier frequency (F0-15).</li> <li>2, Replace fans, clear the air duct.</li> <li>3, Ask for technical support</li> </ol> |

|                                                        |                                                                                                                                                                                                                                      |                                                                                                                                                                                                         |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor does not run after starting the inverter         | 1, Motor and motor cables are abnormal.<br>2, The inverter parameters are set improperly (motor parameters).<br>3, The connection of the cables of the driver board and control board are not good.<br>4, The driver board is broken | 1, Make sure the connection of the inverter and motor is very well.<br>2, Replace the motor or clear the mechanical failure.<br>3, Check & reset the motor parameters.<br>4, Ask for technical support. |
| Digital input (MIX) terminal is invalid                | 1, The parameter is set improperly.<br>2, The external signal is wrong.<br>3, The control board is broken.                                                                                                                           | 1, Check & reset F5 group parameters.<br>2, Reconnect the external signal cable.<br>3, Ask for technical support.                                                                                       |
| Over voltage and over current fault happens frequently | 1, Motor parameters are set improperly.<br>2, The ACC/DEC time is improper.<br>3, The load has big fluctuation.                                                                                                                      | 1, Reset motor parameters.<br>2, Set proper ACC/DEC time.<br>3, check the load condition.                                                                                                               |

|                                                                                                       |                                                                                          |                                                                                               |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Power on display<br> | 1, The control board is broken.<br>2, Loose connection of control board and power board. | 1, Replace the control board.<br>2, Reconnect the cable between control board and power board |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|

## Chapter 8 MODBUS

GK150 series inverter provides RS485 communication interface, and adopts MODBUS communication protocol. User can realize centralized monitoring through PC/PLC, host computer, and also can set inverter's operating commands, modify or read function parameters, read operating status and fault information, etc.

### 8.1 About Protocol

This serial communication protocol defines the transmission information and use format in the series communication. It includes the formats of master-polling, broadcast and slave response frame, and master coding method with the content including slave address (or broadcast address), command, transmitting data and error checking. The response of slave adopts the same structure, including action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving the information or cannot finish the action demanded by master, it will send one fault signal to master as a response.

### 8.2 Application Method

The inverter could be connected into a "Single-master & Multi-slaves" PC/PLC control network with RS485 bus.

### 8.3 Bus Structure

(1) Interface mode

RS485

### (2) Transmission mode

There provide asynchronous series and half-duplex transmission mode. At the same time, just one can send the data and the other only receives the data between master and slave. In the series asynchronous communication, the data is sent out frame by frame in the form of message.

### (3) Topological structure

In Single-master Multi-slave system, the setup range of slave address is 0 to 247. 0 refers to broadcast communication address. The address of slave must be exclusive in the network. That is basic condition of MODBUS communication.

## 8.4 Protocol Description

GK150 series inverter communication protocol is a kind of asynchronous serial master-slave communication protocol. In the network, only one equipment (master) can build a protocol (Named as "Inquiry/Command"). Other equipment (slave) response "Inquiry/Command" of master only by providing the data, or doing the action according to the master's "Inquiry/Command". Here, master is Personnel Computer, Industrial control equipment or Programmable logical controller, and the slave is inverter or other communication equipment with the same communication protocol. Master not only can visit some slave separately for communication, but also sends the broadcast information to all the slaves. For the single "Inquiry/Command" of master, all of slaves will return a signal that is a response; for the broadcast information provided by master, slave needs not feedback a response to master.

## 8.5 Communication Data Structure

MODBUS protocol communication data format of GK150 series inverters are shown as below:

In RTU mode, the Modbus minimum idle time between frames should be no less than 3.5 bytes. The checksum adopts CRC-16 method. All data except checksum itself sent will be counted into the calculation. Please refer to section: CRC Check for more information. Note that at least 3.5 bytes of Modbus idle time should be kept and the start and end idle time need not be summed up to it.

The entire message frame must be transmitted as a continuous data stream. If a idle time is more than 1.5 bytes before completion of the frame, the receiving device flushes the incomplete message and assumes that the next byte will be the address field of a new message. Similarly, if a new message begins earlier than 3.5 bytes interval following a previous message, the receiving device will consider it as a continuation of the previous message. Because of the frame's confusion, at last the CRC value is incorrect and communication fault will occur.

RTU frame format:

|               |                                                           |
|---------------|-----------------------------------------------------------|
| START         | Transmission time of 3.5 bytes                            |
| Slave Address | Communication address : 0 to 249                          |
| Command Code  | 03H: Read slave parameters<br>06H: Write slave parameters |
| DATA (N-1)    | Data:                                                     |

|               |                                                                                                       |
|---------------|-------------------------------------------------------------------------------------------------------|
| DATA (N-2)    | Function code parameter address, the number of function code parameter, Function code parameter, etc. |
| .....         |                                                                                                       |
| DATA 0        |                                                                                                       |
| CRC Low byte  | Detection Value: CRC value                                                                            |
| CRC High byte |                                                                                                       |
| END           | Transmission time of 3.5 bytes                                                                        |

## 8.6 Command Code and Communication Data Description

### 8.6.1 Command code: 03H, reads N words. (There are 12 characters can be read at the most.)

For example: The inverter start address F002 of the slave 01 continuously reads two consecutive values.

Master command information

|                           |     |
|---------------------------|-----|
| Address                   | 01H |
| Command Code              | 03H |
| Start Address High byte   | F0H |
| Start Address Low byte    | 02H |
| Register Number High byte | 00H |
| Register Number Low byte  | 02H |
| CRC Low byte              | 56H |
| CRC High byte             | CBH |

## Slave responding information

|                      |     |
|----------------------|-----|
| Address              | 01H |
| Command Code         | 03H |
| Byte Number          | 04H |
| Data F002H High byte | 00H |
| Data F002H Low byte  | 00H |
| Data F003H High byte | 00H |
| Data F003H Low byte  | 01H |
| CRC Low byte         | 3BH |
| CRC High byte        | F3H |

**8.6.2 Command code: 06H, write a word**

For example: Write 5000(1388H) into address F00AH, slave address 02H.

## Master command information

|                        |     |
|------------------------|-----|
| Address                | 02H |
| Command Code           | 06H |
| Data Address High byte | F0H |
| Data Address Low byte  | 0AH |
| Data Content High byte | 13H |
| Data Content Low byte  | 88H |
| CRC Low byte           | 97H |

|                              |     |
|------------------------------|-----|
| CRC High byte                | ADH |
| Slave responding information |     |
| Address                      | 02H |
| Command Code                 | 06H |
| Data Address High byte       | F0H |
| Data Address Low byte        | 0AH |
| Data Content High byte       | 13H |
| Data Content Low byte        | 88H |
| CRC Low byte                 | 97H |
| CRC High byte                | ADH |

### 8.6.3 CRC checking

In RTU mode, messages include an error-checking field that is based on a CRC method. The CRC field checks the contents of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value received in the CRC field. If the two values are not equal, an error results.

The CRC is started by 0xFFFF. Then a process begins of applying successive eight-bit bytes of the message to the current contents of the register. Only the eight bits of data in each character are used for generating the CRC. Start and

stop bits, and the parity bit, do not apply to the CRC.

During generation of the CRC, each eight-bit character is exclusive ORed with the register contents. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register is then exclusive ORed with a preset, fixed value. If the LSB was a 0, no exclusive OR takes place. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is exclusive ORed with the register's current value, and the process repeats for eight more shifts as described above. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

When the CRC is appended to the message, the low byte is appended first, followed by the high byte. The following are C language source code for CRC-16.

```
unsigned int crc_cal_value(unsigned char *data_value, unsigned char
data_length)
{
    int i;
    unsigned int crc_value = 0xffff;
    while(data_length--)
    {
        crc_value ^= *data_value++;
        for(i=0;i<8;i++)
        {
            if(crc_value&0x0001)
                crc_value = (crc_value>>1)^0xa001;
```

```
        else
            crc_value = crc_value>>1;
        }
    }
    return(crc_value);
}
```

### 8.6.4 Address definition of communication parameter

Here is about address definition of communication parameter. It's used to control the inverter operation, status and related parameter setting.

The mark rules of function code parameters address:

The group number and mark of function code is the parameter address for indicating the rules.

(1) F0~FF group parameter address:

High byte: F0 ~ FF(F group),

Low byte: 00 to FF

(2) U0 group parameter address:

High byte: 70H,

Low byte: 00 to FF

#### For example:

F3-12, address indicates to 0xF30C

FC-05, address indicates to 0xFC05

U0-03, address indicates to 0x7003

**Note:**

1. Group FF: Either the parameter cannot be read, nor be changed.
2. Group U0: Only for reading parameter, cannot be changed parameters.
3. Some parameters cannot be changed during operation; some parameters regardless of what kind of status the inverter in, the parameters cannot be changed. Change the function code parameters, pay attention to the scope of the parameters, units, and relative instructions.

Besides, due to EEPROM be frequently stored, it will reduce the lifetime of EEPROM. So in the communication mode, some function codes needn't be stored, only change the RAM value.

For F group parameters, to achieve this function, just change high bit F of the function code into 0..

Corresponding function code addresses are indicated below:

(1) F0~FF group parameter address:

High byte: 00 to FF,

Low byte: 00 to FF

(2) U0 group parameter address:

High byte: 70H,

Low byte: 00 to FF

For example:

F3-12, address indicates to 030C

FC-05, address indicates to 0C05

These addresses can only act writing RAM, it cannot act reading. When act reading, it is an invalid address.

### (2) Stop/start parameter address

| Parameter Address | Parameter Description                                     |
|-------------------|-----------------------------------------------------------|
| 1000H             | * Communication setting value (-10000 to 10000) (Decimal) |
| 1001H             | Running frequency                                         |
| 1002H             | Bus voltage                                               |
| 1003H             | Output voltage                                            |
| 1004H             | Output current                                            |
| 1005H             | Output power                                              |
| 1006H             | Output torque                                             |
| 1007H             | Running speed                                             |
| 1008H             | MI input status                                           |
| 1009H             | FM, AM output status                                      |
| 100AH             | VI voltage                                                |
| 100BH             | Reserved                                                  |
| 100CH             | Reserved                                                  |
| 100DH             | Counting value input                                      |
| 100EH             | Length value input                                        |
| 100FH             | Load speed                                                |

| Parameter Address | Parameter Description         |
|-------------------|-------------------------------|
| 1010H             | PID setting                   |
| 1011H             | PID feedback                  |
| 1012H             | Simple PLC running step       |
| 1013H             | Reserved                      |
| 1014H             | Feedback speed, unit is 0.1Hz |
| 1015H             | Remain running time           |
| 1016H             | VI voltage before calibration |
| 1017H             | Reserved                      |
| 1018H             | Reserved                      |
| 1019H             | Linear speed                  |
| 101AH             | Current power on time         |
| 101BH             | Current running time          |
| 101CH             | Reserved                      |
| 101DH             | Communication setting value   |
| 101EH             | Actual feedback speed         |
| 101FH             | Main frequency A display      |
| 1020H             | Auxiliary frequency B display |

**Note:**

Communication setting value is the percentage of relative value, and 10,000

corresponds to 100.00%, -10000 corresponds to -100.00%.

To the data of frequency, the percentage is the percentage of relative maximum frequency (F0-10).

To the data of torque, the percentage is F2-10 (torque upper limit).

### (3) Control command input to inverter (write only)

| Command Word Address | Command Function           |
|----------------------|----------------------------|
| 2000H                | 0001: Forward running      |
|                      | 0002: Reverse running      |
|                      | 0003: Forward jog          |
|                      | 0004: Reverse jog          |
|                      | 0005: Coast to stop        |
|                      | 0006: Deceleration to stop |
|                      | 0007: Fault reset          |

### (4) Read inverter status: (read only)

| Status Word Address | Status Word Function  |
|---------------------|-----------------------|
| 3000H               | 0001: Forward running |
|                     | 0002: Reverse running |
|                     | 0003: Stop            |

(5) Parameters locking password check: (If the return is 8888H, it means the password check passes.)

| Password Address | Content of Input password |
|------------------|---------------------------|
| 1F00H            | *****                     |

(6) Digital output terminal control: (write only)

| Command Address | Command Content             |
|-----------------|-----------------------------|
| 2001H           | BIT0: MO1 output control    |
|                 | BIT1: MO2 output control    |
|                 | BIT2: RELAY1 output control |
|                 | BIT3: RELAY2 output control |
|                 | BIT4 ~ BIT9: Reserved       |

(7) Analog output AM control: (write only)

| Command Address | Command Content          |
|-----------------|--------------------------|
| 2002H           | 0~7FFF refers to 0%~100% |

(8) Analog output FM control: (write only)

| Command Address | Command Content          |
|-----------------|--------------------------|
| 2003H           | 0~7FFF refers to 0%~100% |

(9) Pulse output control: (write only)

| Command Address | Command Content           |
|-----------------|---------------------------|
| 2004H           | 0~7FFF refers to 0% ~100% |

(10) Inverter fault code description:

| Inverter Fault Address | Inverter Fault Information                     |
|------------------------|------------------------------------------------|
| 8000H                  | 0000: No fault                                 |
|                        | 0001: Reserved                                 |
|                        | 0002: Over current when acceleration           |
|                        | 0003: Over current when deceleration           |
|                        | 0004: Over current when constant speed running |
|                        | 0005: Over voltage when acceleration           |
|                        | 0006: Over voltage when deceleration           |
|                        | 0007: Over voltage when constant speed running |
|                        | 0008: Buffer resistor overload                 |
|                        | 0009: Under voltage fault                      |
|                        | 000A: Inverter overload                        |
|                        | 000B: Motor overload                           |
|                        | 000C: Reserved                                 |
|                        | 000D: Output phase failure                     |
|                        | 000E: Module overheat                          |
|                        | 000F: External fault                           |
|                        | 0010: Communication fault                      |
|                        | 0011: Contactor fault                          |

---

|  |                                             |
|--|---------------------------------------------|
|  | 0012: Current detection fault               |
|  | 0013: Reserved                              |
|  | 0014: Reserved                              |
|  | 0015: Parameter R/W fault                   |
|  | 0016: Inverter hardware fault               |
|  | 0017: Motor short circuit to ground         |
|  | 0018: Reserved                              |
|  | 0019: Reserved                              |
|  | 001A: Running time arrival                  |
|  | 001B: Customized fault 1                    |
|  | 001C: Customized fault 2                    |
|  | 001D: Power on time arrival                 |
|  | 001E: Off load                              |
|  | 001F: PID feedback lost when running        |
|  | 0028: Fast current limiting over time fault |
|  | 0029: Reserved                              |
|  | 002A: Speed deviation oversize              |
|  | 002B: Motor over speed                      |

---

## 8.7 FC Group Communication Parameter Description

| FC-00 | Baud Rate     | Factory Setting                                                                                                                             | 5 |
|-------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------|---|
|       | Setting range | 0: 300BPS<br>1: 600BPS<br>2: 1200BPS<br>3: 2400BPS<br>4: 4800BPS<br>5: 9600BPS<br>6: 19200BPS<br>7: 38400BPS<br>8: 57600BPS<br>9: 115200BPS |   |

This parameter is used to set the data transmission rate between host computer and the inverter. Please note that baud rate of the host computer and inverter must be the same. Otherwise, the communication is impossible. The bigger baud rate is, the faster communication is.

| FC-01 | Data Format   | Factory Setting                                                                                                                                                | 0 |
|-------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|       | Setting range | 0: No check: Data format <8-N-2><br>1: Even parity Check :data format <8-E-1><br>2: Odd Parity Check : data format <8-O-1><br>3: No check: Data format <8-N-1> |   |

The setting data format of host computer and inverter must be the same; otherwise, the communication is impossible.

|       |               |                               |   |
|-------|---------------|-------------------------------|---|
| FC-02 | Local Address | Factory Setting               | 1 |
|       | Setting range | 1~249, 0 is broadcast address |   |

When the local address is set to be 0, that is broadcast address, it can realize the broadcast function of host computer.

Local address must be unique (except broadcast address). This is the base of point-to-point communication between host computer and inverter.

|       |                |                 |     |
|-------|----------------|-----------------|-----|
| FC-03 | Response Delay | Factory Setting | 2ms |
|       | Setting range  | 0~20ms          |     |

Response delay: It refers to the interval time from the inverter finishes receiving data to sending data to the host computer. If the response delay is less than system processing time, then the response delay is based on the system processing time. If the response delay is more than system processing time, after the system processing the data, it should be delayed to wait until the response delay time arrives, then sending data to host computer.

|       |                       |                             |      |
|-------|-----------------------|-----------------------------|------|
| FC-04 | Communication Timeout | Factory Setting             | 0.0s |
|       | Setting range         | 0.0s (invalid)<br>0.1~60.0s |      |

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

When the function code set to be valid value, if the interval time between the communication and the next communication is beyond the communication timeout, the system will report communication failure error (Err16). At normal circumstances, it is set to be invalid. If in the continuous communication system, set the parameter, you can monitor the communication status.

|       |                                  |                                                                         |   |
|-------|----------------------------------|-------------------------------------------------------------------------|---|
| FC-05 | Communication Protocol selection | Factory Setting                                                         | 1 |
|       | Setting range                    | Modbus<br>0: Nonstandard Modbus protocol<br>1: Standard Modbus protocol |   |

FC-05=1: Select standard MODBUS protocol

FC-05=0: When reading the command, the slave return is one byte than the standard MODBUS protocol's, for details refer to communications Data Structure of this protocol.

|       |                                       |                     |   |
|-------|---------------------------------------|---------------------|---|
| FC-06 | Communication Read Current Resolution | Factory Setting     | 0 |
|       | Setting range                         | 0: 0.01A<br>1: 0.1A |   |

It is used to confirm the output current unit when communication reads output current.

