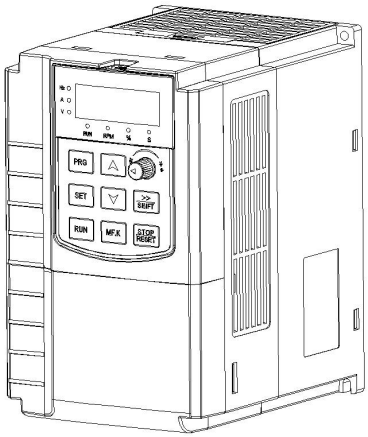
# Preface

First of all, thank you for purchasing the KV500 series vector control inverter designed and manufactured by Shenzhen K-easy Electric Technology Co., Ltd.

This manual introduces the functional characteristics and use methods of KV500 series inverters, including product selection, parameter setting, operation debugging, maintenance inspection, etc. Before using the product (installation, wiring, operation, maintenance, inspection, etc.), please be careful Read this manual.



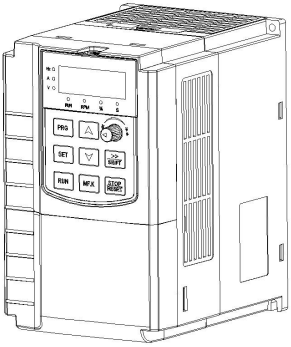

**Precautions**

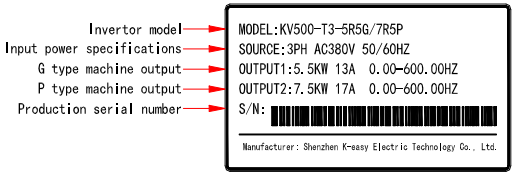
- In order to explain the details of the product, the illustrations in this manual are sometimes in the state of removing the cover or safety cover. When using this product, be sure to install the cover or cover in accordance with the regulations, and follow the instructions in the manual.
- The illustrations in this manual are for illustration only and may be different from the products you ordered.
- The company is committed to the continuous improvement of the product, and the product functions will be continuously upgraded. The information provided is subject to change without notice.
- If you have any problems during use, please contact our regional agents or directly contact our customer service center.

Customer Service Phone:

# Chapter 1 Inverter Introduction

## 1.1 Product naming and nameplate identification






KV500 - T 3 - 5R5 G / 7R5 P

(1) (2) (3) (4) (5)

1

| Inverter series | |
|---|---|
| KV500 | Universal |

2

| Code | Voltage level |
|---|---|
| T | Three phase |
| S | Single phase |

3

| Code | Voltage |
|---|---|
| 2 | 220V |
| 3 | 380V |
| 6 | 660V |
| 11 | 1140V |

4

| Code | Adapted motor power |
|---|---|
| 1R5 | 1.5KW |
| 2R2 | 2.2KW |
| 5R5 | 5.5KW |
| 7R5 | 7.5KW |
| 011 | 11KW |
| 015 | 15KW |

5

| Code | Inverter type |
|---|---|
| G | Universal |
| P | Fan water pump type |

## 1.2 Specifications and ratings

| Three-phase power: 380V, 50/60Hz | | | | | |
|---|---|---|---|---|---|
| **Inverter model** | **Current (A)** | **Inverter model** | **Current (A)** | **Inverter model** | **Current (A)** |
| KV500-T3-R75G/1R5P | 2.1/3. | KV500-T3-045G/055P | 90/112 | KV500-T3-315G/355P | 585/650 |
| KV500-T3-1R5G/2R2P | 3.8/5. | KV500-T3-055G/075P | 112/150 | KV500-T3-355G/400P | 650/725 |
| KV500-T3-2R2G/3R7P | 5.1/9 | KV500-T3-075G/090P | 150/176 | KV500-T3-400G/450P | 725/820 |
| KV500-T3-3R7G/5R5P | 9/13 | KV500-T3-090G/110P | 176/210 | KV500-T3-450G/500P | 820/880 |
| KV500-T3-5R5G/7R5P | 13/17 | KV500-T3-110G/132P | 210/253 | KV500-T3-500G/560P | 880/990 |
| KV500-T3-7R5G/011P | 17/25 | KV500-T3-132G/160P | 253/304 | KV500-T3-560G/630P | 990/1100 |
| KV500-T3-011G/015P | 25/32 | KV500-T3-160G/185P | 304/340 | **Single-phase** | |
| KV500-T3-015G/018P | 32/37 | KV500-T3-185G/200P | 340/377 | KV500-S2-R75G | 4 |
| KV500-T3-018G/022P | 37/45 | KV500-T3-200G/220P | 377/426 | KV500-S2-1R5G | 7 |
| KV500-T3-022G/030P | 45/60 | KV500-T3-220G/250P | 426/465 | KV500-S2-2R2G | 10 |
| KV500-T3-030G/037P | 60/75 | KV500-T3-250G/280P | 465/520 | KV500-S2-3R7G | 16 |
| KV500-T3-037G/045P | 75/90 | KV500-T3-280G/315P | 520/585 | KV500-S2-5R5G | 20 |

## 1.3 Product technical specifications

| Item | | Specification |
|---|---|---|
| power input | Voltage, frenqucy | Single-phase 220V, 50 / 60Hz Three-phase 380V, 50 / 60Hz |
| | Allow fluctuations | Voltage imbalance rate: <3%, frequency: ± 5% Distortion rate meets the requirements of IEC61800-2 |
| | Power factor | ≥0.94(With DC reactor) |
| | Inverter efficiency | ≥96% |
| Output | Output voltage | Output under rated conditions: 3 phases, 0 ～ input voltage, error less than 5% |
| | Speed range | G type: 0～600Hz |
| | Speed stabilization | ± 0.5% of the maximum frequency value |
| | Overload capacity | Type G: 150% rated current for 1 minute, 180% rated current for 10 seconds, 200% rated current for 0.5 seconds |
| Main control perform ance | Motor control mode | Without PG V / F control, without PG vector control, with PG V / F control, with PG vector control |
| | Speed control range | Vector control without PG, rated load 1: 100; Vector control with PG, rated load 1: 1000 |
| | Steady speed accuracy | Vector control without PG: ≤2% rated synchronous speed; with PG vector control: ≤0.05% rated synchronous speed |
| | Starting torque | Vector control without PG: 150% of rated torque at 0.5Hz; Vector control with PG: 200% of rated torque at 0Hz |
| | Torque response | Vector control without PG: <20ms; Vector control with PG: <10ms |

| | | |
|---|---|---|
| | Frequency accuracy | Digital setting: maximum frequency × ± 0.01%; analog setting: maximum frequency × ± 0.2% |
| | Frequency resolution | Digital setting: 0.01Hz; analog setting: maximum frequency × 0.05% |
| Product basic functions | DC braking capacity | Starting frequency: 0.00 ～ 50.00Hz; Braking time: 0.0 ～ 60.0s; Braking current: 0.0 ～ 150.0% of rated current |
| | Torque boost | Automatic torque boost 0.0% ～ 100.0%; manual torque boost 0.0% ～ 30.0% |
| | V / F curve | Four methods: linear curve, multi-point V / F curve, torque reduction curve (1.1 ~ 2.0 power), square V / F curve |
| | Acceleration / deceleration curve | Two methods: linear acceleration and deceleration, S curve acceleration and deceleration; four sets of acceleration and deceleration time, time unit 0.01s, maximum 650.00s |
| | Rated output voltage | The rated voltage of the motor is 100%, which can be set within the range of 50 to 100% (the output does not exceed the input voltage) |
| | Automatic voltage adjustment | When the grid voltage fluctuates, it can automatically keep the output voltage constant |
| | Automatic energy-saving | Under V / F control mode, the output voltage is automatically optimized according to the load to achieve energy-saving operation |
| | Standard function | PID control, speed tracking and restart after power failure, skip frequency, frequency upper and lower limit control, program operation, multi-stage speed, RS485, analog output, frequency pulse output |
| | Frequency setting channel | Keyboard digital setting, keyboard potentiometer, analog terminals AI1, AI2, communication reference and multi-function terminal selection, main and auxiliary channel combination, expansion card, can be switched in various ways |
| | Feedback input channel | Voltage / current terminal AI, communication reference, pulse input HDI |
| | Run command channel | Operation panel setting, external terminal setting, communication setting, expansion card setting |
| | Input command signal | Start, stop, forward and reverse, jog, multi-speed, reset, acceleration / deceleration time selection, frequency setting channel selection, external fault alarm |
| Protective function | | Over-voltage, under-voltage, current limit, over-current, overload, electronic thermal relay, over-temperature, over-voltage stall, data protection, rapid protection, input and output phase loss protection |
| Surroundings | Installation site | Altitude is less than 1000 meters, derating for use above 1000 meters, derating 1% for every 100 meters; no condensation, icing, rain, snow, hail, etc., solar radiation is less than 700W / m2, air pressure is 70 ～ 106kPa |
| | Temperature, humidity | -10 ～ + 50 ℃, derating above 40 ℃, maximum temperature 60 ℃ (no-load operation); 5% ～ 95% RH (non-condensing) |
| | Vibration | When 9～200Hz, 5.9m/s2(0.6g) |
| | Storage | -30 ～+60℃ |
| | Protection class | IP20 |
| | Cooling method | Forced air cooling |

# Chapter 2 Mechanical Installation and Wiring

## 2.1 Product safety precautions

This section describes various precautions that must be followed to ensure the safe use of the product by the user, maximize the performance of the inverter, and ensure reliable operation of the inverter.

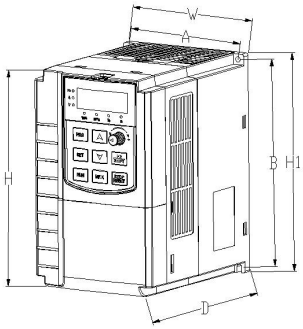
**●Precautions for using the inverter**

| | |
|---|---|
| Warning | ● When installing the inverter inside a closed cabinet, please install a cooling fan or cooling air conditioner to fully cool the inverter to ensure that the temperature of the inverter's air inlet is below 40 ° C to ensure that the inverter can operate safely and reliably. |
| Important | ● When installing, please cover the upper part of the inverter with cloth or paper to prevent metal debris, oil, water and other debris from entering the inverter during the drilling operation. Carefully remove these obstructions after the operation is completed.<br>● When operating the inverter, please observe the measures and methods specified by ESD prevention measures, otherwise the inverter may be damaged.<br>● If multiple inverters are installed in the cabinet, sufficient space must be reserved in the upper part of the inverter to facilitate the replacement of the cooling fan.<br>● Do not use the inverter beyond its rated range, otherwise the inverter may be damaged.<br>● When transporting the inverter, please be sure to hold the stable case. If only the front cover is grasped, the main body of the inverter may fall, which may cause personal injury or damage the inverter. |

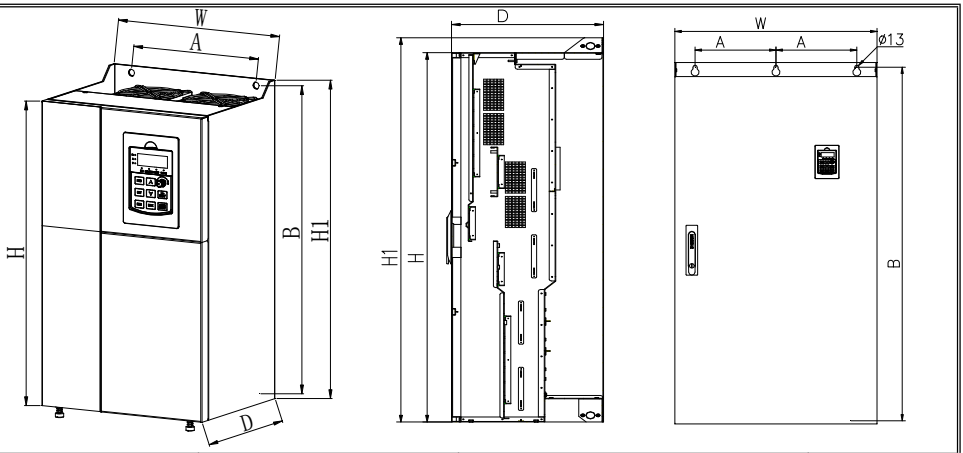
**●Motor use precautions**

| | |
|---|---|
| Important | ● The maximum allowable running speed of different motors is different. Do not use the motor beyond the maximum allowable operating speed of the motor.<br>● When the inverter is running at low speed, the self-cooling effect of the motor is seriously reduced. If the motor is at low speed for a long time, it will be damaged by overheating;<br>● Resonance may occur during variable-speed operation of a machine running at a constant speed. Install anti-vibration rubber under the motor bracket or use the skip frequency control function to avoid it.<br>● The torque characteristics are different when the motor is driven by a variable frequency drive and a commercial power supply. Please confirm the torque characteristics of the mechanical equipment to be connected.<br>● The rated current of the submersible motor is greater than the standard motor. Please pay attention to confirm the rated current of the motor and select an appropriate inverter.<br>● When the distance between the motor and the inverter is large, the maximum torque of the motor will be reduced due to the voltage drop. Therefore, when connecting over long distances, use a sufficiently thick cable for connection. |

## 2.2 Inverter dimensions




| Inverter model | Installation hole position（mm） | | Dimensions（mm） | | | | Installation aperture |
|---|---|---|---|---|---|---|---|
| | A | B | H | H1 | W | D | |
| KV500-T3-R75G/1R5P | 106.6 | 175 | 185 | | 118 | 157 | Ø4.5 |
| KV500-T3-1R5G/2R2P | | | | | | | |
| KV500-T3-2R2G/3R7P | | | | | | | |
| KV500-T3-3R7G/5R5P | 148 | 235 | 247 | | 160 | 178 | Ø5.5 |
| KV500-T3-5R5G/7R5P | | | | | | | |
| KV500-T3-7R5G/011P | | | | | | | |
| KV500-T3-011G/015P | 205 | 305 | 320 | | 220 | 198 | Ø6 |
| KV500-T3-015G/018P | | | | | | | |
| KV500-T3-018G/022P | | | | | | | |
| KV500-T3-022G | | | | | | | |

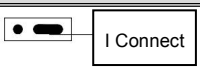
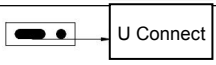


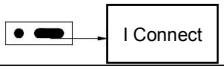
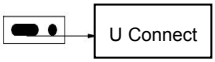
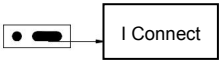
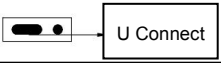
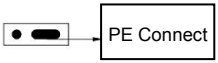

| Inverter model | Installation hole position（mm） | | Dimensions（mm） | | | | Installation aperture |
|---|---|---|---|---|---|---|---|
| | A | B | H | H1 | W | D | |
| KV500-T3-030P | 205 | 445 | 440 | 460 | 265 | 215 | Ø10 |
| KV500-T3-030G/037P | | | | | | | |
| KV500-T3-037G/045P | | | | | | | |
| KV500-T3-045G/055P | 230 | 560 | 560 | 585 | 320 | 280 | Ø11 |
| KV500-T3-055G/075P | | | | | | | |
| KV500-T3-075G/090P | 240 | 610 | 610 | 635 | 380 | 310 | Ø11 |
| KV500-T3-090G/110P | | | | | | | |
| KV500-T3-110G/132P | | | | | | | |
| KV500-T3-132G/160P | 300 | 775 | 760 | 800 | 440 | 325 | Ø11 |
| KV500-T3-160G/185P | 400 | 1075 | 1060 | 1100 | 500 | 325 | Ø11 |
| KV500-T3-185G/200P | | | | | | | |
| KV500-T3-200G/220P | | | | | | | |
| KV500-T3-220G/250P | 500 | 1135 | 1115 | 1160 | 625 | 350 | Ø13 |
| KV500-T3-250G/280P | | | | | | | |
| KV500-T3-280G/315P | | | | | | | |
| KV500-T3-315G/355P | 600 | 1225 | 1200 | 1250 | 750 | 360 | Ø13 |
| KV500-T3-355G/400P | | | | | | | |
| KV500-T3-400G/450P | | | | | | | |
| KV500-T3-450G/500P | 650 | 545 | 1700 | 1800 | 800 | 600 | Ø18 |
| KV500-T3-500G/560P | | | | | | | |
| KV500-T3-560G/630P | | | | | | | |

## 2.3 Product terminal configuration

### 2.3.1 Function description of connection of conversion terminal

| category | Terminal symbol | Terminal name | Terminal function definition |
|---|---|---|---|
| Power | +10V-GND | + 10V external power supply | 10V auxiliary power output, maximum output 10VDC / 50mA |
| | +24V-COM | External + 24V power supply | Provide + 24V power to the outside, the maximum output is 100mA |
| Analog input | AI1-GND | Analog terminal 1 | 1. Input range: DC 0V-10V / 4mA-20mA, determined by AI-1 jumper selection on the control board. 2. Input impedance: 100KΩ for voltage input and 500Ω for current input. |
| | AI2-GND | Analog terminal 2 | 1. Input range: DC 0V-10V / 4mA-20mA, determined by the AI-2 jumper selection on the control board. 2. Input impedance: 100KΩ for voltage input, 500Ω for current input |
| Digital input | (X1-X4)-COM | Digital input 1-4 | The inside is a photoelectric converter, which can be programmed to operate. Input conditions: max. DC30V/ 8mA. |
| | X5-COM | High-speed pulse terminal | With X1-X4 function and high-speed pulse input function, the maximum input frequency: 100KHz. |
| Analog output | AO1-GND | Analog output 1 | The voltage or current output is determined by the AO-1 jumper selection on the control board. |
| | AO2-GND | Analog output 2 | The AO-2 jumper selection on the control board determines the voltage, current and frequency output. |
| Relay output | TB1-TC1 | Normally closed terminal | Programmable action objects, maximum contact capacity: 3A / 240VAC<br>5A / 30VDC |
| | TA1-TC1 | Normally open terminal | |
| Communication | A+ | Communication terminal A+ | RS485 communication interface |
| | B- | Communication terminal B- | |

| Conversion terminal | Location | legend | Function Description |
|---|---|---|---|
|  (AO-1) | I |  | (AO1)0～20mA/4～20mA current output |
| | U |  | (AO1)0～10V voltage output |
|  (AO-2) | I |  | (AO2)0～20mA/4～20mA current output |
| | U |  | (AO2)0～10V voltage output |

| | | | |
|---|---|---|---|
| | AO2-F |  | (AO2)FM frequency output |
|  (AI-1) | I |  | (AI1) 0～20mA/4～20mA current input |
| | U |  | (AI1)0～10V voltage input |
|  (AI-2) | I |  | (AI2) 0～20mA/4～20mA current input |
| | U |  | (AI2)0～10V voltage input |
| GND-PE<br>COM-PE | PE |  | Connect COM / GND to PE |

### 2.3.2 Inverter electrical circuit wiring

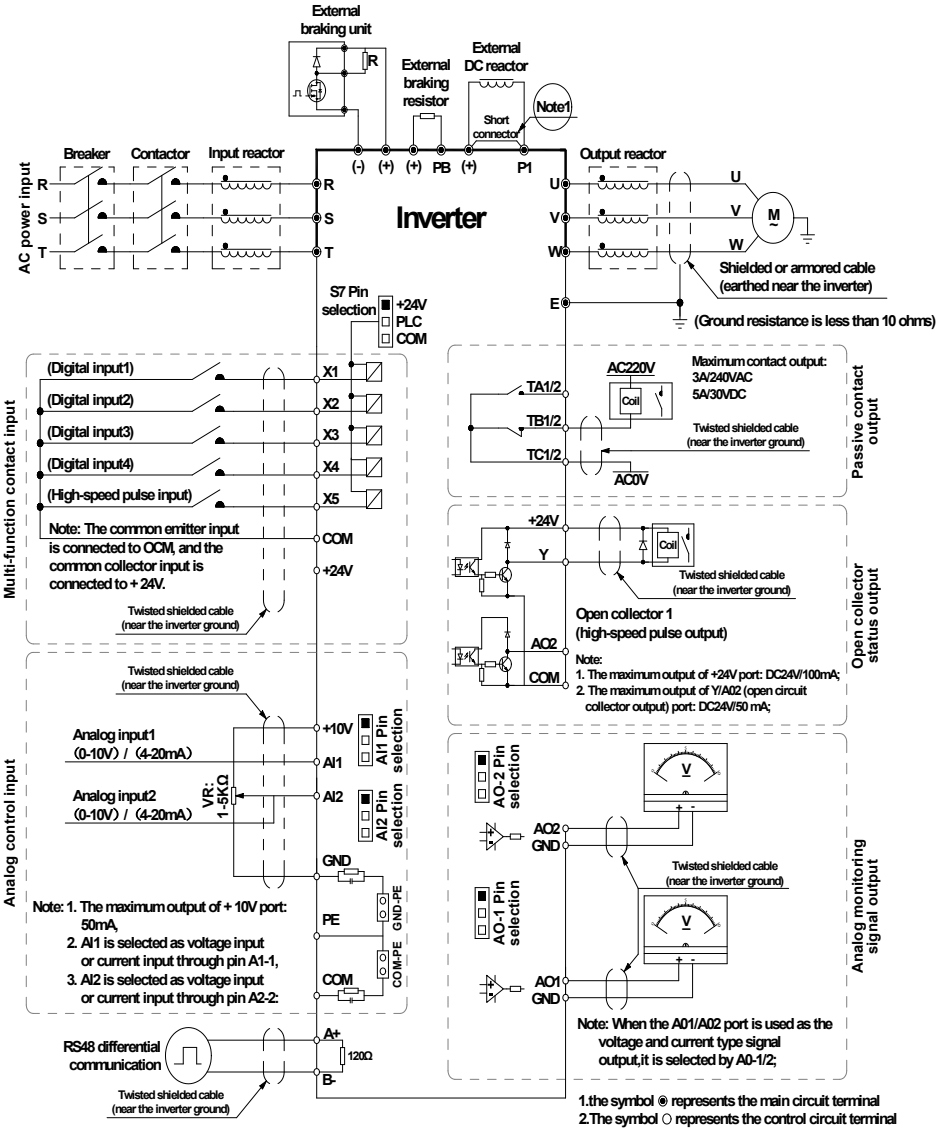
The wiring method of the inverter control circuit is shown in the figure on the following page:

Note: 1) When installing the DC reactor, be sure to remove the shorting piece between the P1, (+) terminals;

2) The multi-function input terminals (X1-X5) can select NPN or PNP transistor signals as input, and the bias voltage can be selected from the inverter's internal power supply (+ 24V terminal) or external power supply (24V).

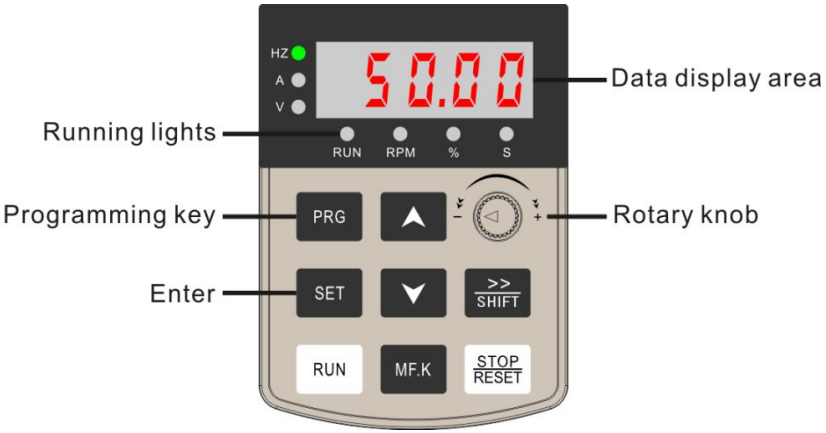
3) The analog monitoring output is a dedicated output for the ammeter, voltmeter and other indicator tables, and cannot be used for control operations such as feedback control.

4) The default 24V open collector input, without external 24V. HDI supports open collector signal> 18V, pulse signal> 9V input, the highest pulse HDI can receive is 100KHz.


External braking unit
R
External braking resistor
External DC reactor
Note1
Short connector
Breaker
Contactor
Input reactor
Output reactor
AC power input
R
S
T
(-) (+) (+) PB (+) P1
Inverter
U
V
W
M
Shielded or armored cable (earthed near the inverter)
(Ground resistance is less than 10 ohms)
E
S7 Pin selection
+24V
PLC
COM
Multi-function contact input
(Digital input1)
(Digital input2)
(Digital input3)
(Digital input4)
(High-speed pulse input)
X1
X2
X3
X4
X5
Note: The common emitter input is connected to OCM, and the common collector input is connected to + 24V.
COM
+24V
Twisted shielded cable (near the inverter ground)
Passive contact output
AC220V
Coil
Maximum contact output:
3A/240VAC
5A/30VDC
TA1/2
TB1/2
TC1/2
AC0V
Twisted shielded cable (near the inverter ground)
Open collector status output
+24V
Y
Coil
Twisted shielded cable (near the inverter ground)
Open collector 1 (high-speed pulse output)
AO2
COM
Note:
1. The maximum output of +24V port: DC24V/100mA;
2. The maximum output of Y/A02 (open circuit collector output) port: DC24V/50 mA;
Analog control input
Twisted shielded cable (near the inverter ground)
Analog input1 (0-10V) / (4-20mA)
Analog input2 (0-10V) / (4-20mA)
VR: 1-5KΩ
+10V
AI1
AI2
GND
PE
COM
AI1 Pin selection
AI2 Pin selection
GND-PE
COM-PE
Note: 1. The maximum output of + 10V port: 50mA,
2. AI1 is selected as voltage input or current input through pin A1-1,
3. AI2 is selected as voltage input or current input through pin A2-2;
RS48 differential communication
A+
B-
120Ω
Twisted shielded cable (near the inverter ground)
Analog monitoring signal output
AO-2 Pin selection
AO-1 Pin selection
AO2
GND
AO1
GND
V
Twisted shielded cable (near the inverter ground)
Note: When the A01/A02 port is used as the voltage and current type signal output,it is selected by A0-1/2;
1.the symbol ◉ represents the main circuit terminal
2.The symbol ○ represents the control circuit terminal

# Chapter 3 Operation Display and Description

● Keyboard Operator Appearance




● Key Function

| Key symbol | Key name | Functional description |
|---|---|---|
| PRG | Menu | Enter or exit the first-level menu. |
| SET | Confirm/Modify key | Enter the menu screen step by step and confirm the setting parameters. |
| ▲ | Increment key | Increase of data or function code. |
| ▼ | Decrement key | Decrease of data or function code. |
| RUN | Run key | In the keyboard operation mode, it is used to run the operation. |
| MF.K | Multi-function selection key | According to the F4-07 parameter for function switching selection, the command source or running direction can be defined to switch quickly. |
| STOP RESET | Stop / Reset button | In the running state, press this key to stop the running operation; when the fault alarm is used for resetting operation, the characteristics of this key are restricted by F4-08 parameters. |
| >> SHIFT | Shift key | Under the display interface, select the display parameters cyclically; when modifying the parameters, it is used to switch the modification bits. |
| ◁ | Keyboard potentiometer | It can be used to set input value for given frequency, given torque, PID given, PID feedback, etc. |

● Indicator meaning

| Name | | Status | Meaning |
|---|---|---|---|
| Unit indicator | Hz | Flashing / bright | Indicates the frequency unit. |
| | A | Bright | Indicates the current unit. |

| | | | |
|---|---|---|---|
| | V | Flashing / bright | Indicates the voltage unit. |
| | S | Bright | Indicates the time unit. |
| | RPM | Bright | Indicates the speed unit. |
| | % | Flashing / bright | Indicates a percentage unit. |
| Status indicator | RUN | Bright | Inverter is running forward. |
| | RUN | Flashing | Inverter is running in reverse. |
| | RUN | OFF | The inverter stops. |

# Chapter 4 Detailed description of function parameters

## 4.1 Basic parameters

| | | | |
|---|---|---|---|
| F0-00 | G / P model display | Setting range: 0 ～ 1 | Default: 0 |

**0：G type machine** Suitable for constant torque loads
**1：P type machine** Suitable for variable torque loads (fan, pump type loads)

| | | | |
|---|---|---|---|
| F0-01 | Control operating mode | Setting range: 0～3 | Default: 0 |

**0：VF control:** According to the voltage / frequency ratio, it can automatically compensate the stator resistance voltage loss and automatically compensate the slip frequency. It has higher low-frequency torque and speed accuracy than control mode 1, and can be used for encoderless speed feedback with higher requirements for low-frequency torque control;

**1：High-performance vector control without PG:** That is, the speed sensorless vector control operation mode is used for all speed control. Set this mode when high-precision speed control is required.

In this mode control, even if the feedback signal of the motor is not used, the torque can respond quickly, and a large torque can be obtained when the low-speed motor is running.

**2：High-performance vector control with PG**: That is, there is a speed sensor vector control operation mode. This control mode is used for all variable speed control with fast torque response and high performance torque control. High-precision speed control up to zero speed is possible. In order to receive the speed feedback signal of the motor, you need to use the PG optional card.

It is mainly used in places with strict control performance such as high-precision speed control, torque control, and simple servo control.

**3：Voltage and frequency separation output:** That is, the output voltage and output frequency can be set and adjusted independently, and are generally used in industries such as EPS power supply, torque motor control, and high-frequency heating;

**Notes： 1. PG refers to a speed-measuring encoder. It is used for vector control with PG. Generally, there is a photoelectric encoder or resolver. You need to select the corresponding PG card according to the PG type and parameters. For details, see the function code [F5-30];**

**2. When selecting the vector control mode, before the first run, the motor parameters must be input correctly and the motor parameters are automatically tuned to obtain the correct motor parameters. For details, please refer to the detailed description of the "F5" motor parameter group.**

**3. The parameters of the vector control parameter group must be set correctly to ensure good steady-state and dynamic control performance. For the parameter setting and adjustment of the vector control parameter group, please refer to the detailed description of the "F6" parameter group.**

**4. When selecting the vector control mode, it should be noted that the inverter can only drive one motor at the same time; and the level of the inverter capacity and the motor capacity must not be too large, the inverter can be two or one level higher than the motor power level Otherwise, the control performance may be reduced, or the drive system may not operate normally.**

| | | | |
|---|---|---|---|
| F0-02 | Operation instruction selection | Setting range: 0～2 | Default: 0 |

It is used to select the channel where the inverter accepts running and stopping commands and running direction. Torque control is only used for start and stop control.

**0：Keyboard control** The operation and stop of the inverter are controlled by the forward running key **RUN**, reverse running or jog key **MF.K** and stop key **STOP / RESET** on the keyboard. The **MF.K** key is defined as reverse rotation or jog selection through **[F4-07]**, set "0" as reverse rotation, and set "1" as jog.

**1： Terminal control** The running command control is performed by the multi-function input terminals forward, reverse, forward jog, reverse jog, etc., see **[F2-00 ～ F2-04]** for details. See **[F2-20]** for terminal operation control mode, and **[F2-21]** for terminal start protection.

**2：Communication control** The running command is given by the host computer through Modbus RS485 communication. For communication parameter settings, please refer to Fd Communication Control Parameter Group. When point-to-point broadcast communication, the slave selects the running command transmitted by the host as the running command, please refer to **[Fd-09]** description.

The running command is set and modified through the address 0x3001 / 0x2001. For details, see Appendix 1: Modbus Communication Protocol.

**Note: 1. When the fault is reset, the keyboard STOP / RESET key, control terminal reset command, and RS485 communication port are all valid reset commands.**

**Tip: The function of the STOP / RESET key on the keyboard can be selected. In external terminal control or communication control, it can be defined as the stop button and other functions, please refer to the parameter [F4-08]; when the external terminal is running control, if the keyboard STOP If the / RESET key is stopped, the inverter stops and the external terminal running command is blocked at the same time. At this time, the external terminal stop command needs to be input to release the lock, and the external terminal running command is valid again. The communication control is the same.**

| | | | |
|---|---|---|---|
| F0-03 | Main frequency given source | Setting range: 0～9 | Default: 0 |
| F0-04 | Auxiliary frequency reference source | Setting range: 0～9 | Default: 1 |

In **[F0-03]** and **[F0-04]**, select the given source of the set frequency of the inverter; **[F0-06]** set the relationship between the main and auxiliary channels.

**0：Keyboard number given frequency** The setting frequency is given by the parameter **[F0-08]** keyboard digital setting frequency; the current setting value of the parameter **[F0-08]** can be quickly modified by the **[F4-09]** LED unit digit to select the keyboard up / down keys; Please refer to parameter **[F4-09]** for details of power-off storage and selection of action limit of up / down keys.

**1：Keyboard potentiometer given** The set frequency is given by the potentiometer on the keyboard. The input voltage is linearized through the keyboard potentiometer, and the calibration 100% corresponds to the maximum frequency. For details, see the parameters **[F4-10 ～ F4-13]**.

**2: Analog AI1 given**

**3: Analog AI2 given**

The set frequency is given and modified by the input analogs AI1 and AI2. By linearizing the input analog value, the calibration is 100% corresponding to the maximum frequency. For details, see "F3" parameter group analog processing

**4：Terminal pulse HDI given** The set frequency is given and modified by the input terminal pulse signal of the control terminal (**HDI**); through the linearization processing of the input pulse signal, the scaling 100% corresponds to the maximum frequency, see the parameters **[F2-22 ～ F2-27]** for details

**5： RS485 communication given** The set frequency is given by the communication method. For the communication parameter settings, please refer to the Fd communication control parameter group.

When point-to-point broadcast communication, the slave selects the host to send the given frequency or output frequency as the set frequency, please refer to **[Fd-09]** description. The set frequency can be set and modified by address 0x3000 / 0x2000, see appendix: Modbus communication protocol.

**6： Terminal UP / DW control** The set frequency is controlled by the control terminal to increase and decrease. The multi-function terminals (**X1 ～ X5**) set the "frequency increase (UP)" terminal and "frequency decrease (DW)" terminal and (**COM**) on and off to control. For details, please refer to the parameter **[F2-00 ～ F2-04**] terminal function description.

**7：PID control given** When **[F0-03]** or **[F0-04]** selects this channel, the inverter operation mode is process PID control, the set frequency is the output after PID action, PID control given amount, feedback amount and other control parameters, see details Process PID control parameter group "Fb".

The current setting value of parameter **[Fb-01]** can be quickly modified by **[F4-09]** LED single digit selection keyboard up / down key, the parameter value is stored after power off and the selection of action limit of up / down key is shown in parameter **[F4-09 ]**.

The status and characteristics of PID control can be changed through the multi-function input terminals. For details, please refer to the parameter **[F2-00 ～ F2-04]**.

**8：Program control (PLC) given** The set frequency and the running direction of the inverter are controlled by the simple PLC process inside the inverter, and the process can control up to 15 stages of speed; see the parameter "FC" multi-stage speed, PLC function and swing frequency parameter group for details;

If the running time of a certain speed is set to "0", the speed will be skipped when the program is running, so that the speed of the program can be easily set. When the parameter **[F0-16]** LED hundred place is set to "0", the frequency control direction is invalid or **[F0-16]** LED ten place is set to "1", when reverse rotation is prohibited, if any direction of speed run command direction is set To reverse, the inverter will run at 0.00Hz at this speed.

Both program operation and multi-speed operation are to realize the variable-speed operation of the inverter according to certain rules. In multi-speed operation, the switching of multi-speed and the change of running direction are realized by different combinations of "multi-speed control terminal" and (COM) defined in "multi-function input terminal". The program operation function can not only define the multi-band frequency of a cycle in the function parameters, but also define the time, direction, acceleration and deceleration time and cycle mode of the multi-band frequency operation in the function parameters. The multi-speed control terminals can be defined by any multi-function terminals. For details, please refer to the parameters **[F2-00 ～ F2-04]**.

**9： Multi-speed given** The set frequency is selected by the "multi-speed terminal". If the frequency main and auxiliary channels are not selected for multi-speed, the multi-speed terminal has a higher priority to switch the frequency to the multi-speed. If multi-step speed reference is selected, it will be carried out according to the setting combination of the frequency source. When the multi-step speed terminals are

invalid, the multi-step speed reference will be zero. Refer to parameter **[F2-00 ～ F2-04]** for selection of "multi-speed terminal".

| F0-05 | Auxiliary frequency reference source | Setting range: 0～1 | Default: 0 |
|---|---|---|---|

The auxiliary frequency reference source is selected by this parameter. The reference source of the main frequency reference source is the maximum frequency **[F0-09]**.

0: Use the maximum frequency as the reference source

1: Take the main frequency as the reference source

Auxiliary channel setting frequency = Auxiliary channel frequency reference source × Absolute value of main frequency channel setting frequency / maximum frequency

| F0-06 | Frequency command overlay selection | Setting range: 0～5 | Default: 0 |
|---|---|---|---|

It is used to select the combination mode of inverter setting frequency channel A and channel B.

0: Main frequency Only the main frequency channel [F0-03] is valid, the auxiliary frequency channel [F0-04] is invalid.

1: Auxiliary frequency Only the auxiliary frequency channel [F0-04] is valid, the main frequency channel [F0-03] is invalid.

2: Main + auxiliary The main frequency channel [F0-03] sets the frequency plus the auxiliary frequency channel [F0-04] sets the frequency, and the sum of the two sets the frequency for the inverter.

3: The main-auxiliary channel [F0-03] set the frequency minus the channel [F0-04] set the frequency, the difference between the two is the frequency set by the inverter, this way may produce a negative frequency, when negative Whether the output is valid at value frequency is determined by [F0-16] setting.

4: Maximum value of both channels [F0-03] set frequency and channel [F0-04] set frequency take the maximum value, whichever is the inverter set frequency.

5: Minimum value of both channels [F0-03] set frequency and channel [F0-04] set frequency take the minimum value, whichever is the set frequency of the inverter.

**Note:**

1. **When the jog running command is valid, the jog setting frequency is used as the inverter setting frequency.**
2. **The main and auxiliary channels have not selected the multi-step speed reference. If the multi-step speed terminal selection is valid, the corresponding frequency selected by the multi-step speed terminal will be used as the inverter set frequency.**
3. **When the given source selected by the main and auxiliary channels is the same, no superposition calculation is performed, and the given source frequency of the main channel is used as the set frequency of the inverter.**
4. **Priority of frequency reference source: from high to low, it is jog running frequency setting, multi-speed setting (selected from non-channel), run command binding given frequency, frequency given source channel.**
5. **If the rotation direction selection [F0-16] is set to reverse prohibition, no matter what value the frequency control direction selection is set to, when the frequency calculation result is negative, the inverter will output 0.00Hz frequency.**

**Tip: The given frequency after the synthesis of the main and auxiliary channels is still limited by the upper limit frequency and the lower limit frequency.**

| | | | |
|---|---|---|---|
| F0-07 | Run command bundle | Setting range: 0000～AAAA | Default: 0000 |

When this parameter is valid, it is used to set the frequency source channel for each running command channel. When the command source has a bundled frequency source, the set frequency obtained by **[F0-03 ～ F0-06]** will no longer be valid during the period when the command source is valid, but **[F0-16]** LED hundred-digit frequency direction control is still valid .

0: No bundling Press **[F0-03 ～ F0-06]** setting to determine the frequency reference.

1: Keyboard number setting 2: Potentiometer setting

3: AI1 given 4: AI2 given

5: HDI given 6: RS485 given

7: Terminal UP / DW 8: PID given

9: PLC given A: Multi-stage speed given

The above 1 ～ 10 settings are consistent with the description of the main frequency reference channel selection **[F0-03]**.

| | | | |
|---|---|---|---|
| F0-08 | Keyboard digital setting frequency | Setting range: 0.00～Upper limit frequency | Default: 50.00Hz |

This parameter is valid only when the frequency reference channel **[F0-03, F0-04]** is set to "0: keyboard number setting", and is used to set and modify the keyboard number setting frequency.

| | | | |
|---|---|---|---|
| F0-09 | Maximum frequency | Setting range: Upper limit frequency～600.00Hz | Default: 50.00Hz |
| F0-10 | Upper frequency source selection | Setting range: 0～7 | Default: 0 |
| F0-11 | Digital setting of upper limit frequency | Setting range: Lower limit frequency ～ maximum frequency | Default: 50.00Hz |
| F0-12 | Lower limit frequency | Setting range: 0.00～Upper limit frequency | Default: 0.00Hz |
| F0-13 | Lower frequency operation mode | Setting range: 0～1 | Default: 1 |

**Maximum frequency:** when the analog input, pulse input (HDI), multi-speed, etc. are used as frequency sources in the inverter, 100% of each is scaled relative to the maximum frequency; when the **[F1-16]** LED unit digit is set to "0" , The maximum frequency is used as the reference frequency for acceleration / deceleration time.

**Upper frequency source selection:** select the given source of inverter upper frequency. The upper limit frequency is the upper limit of the given frequency, which limits the given frequency.

0: Upper limit frequency digital setting is set by parameter **[F0-11]**.

1: keyboard potentiometer given

2: Analog quantity AI1 given

3: Analog quantity AI2 given

4: Terminal pulse HDI setting

5: RS485 communication setting Set by address 0x3004 / 0x2004, please refer to the appendix: Modbus communication protocol

When using keyboard potential, analog (AI1, AI2), terminal pulse (HDI), it is similar to the main frequency given channel, please refer to [F0-03] introduction.

**Upper limit frequency digital setting:** when **[F0-10]** is set to "0", the upper limit frequency given channel.

**Lower limit frequency:** when the set frequency is lower than the lower limit frequency, the inverter can run at zero frequency or lower limit frequency. Which operating mode to use is set by **[F0-13]** to set the lower limit frequency operating mode.

**Lower frequency operation mode:**

0: Stop output, enter into suspended operation state Maintain the running state, no voltage output.

1: Running at the lower limit frequency When the actual set frequency is lower than the lower limit frequency, the inverter runs at the lower limit frequency.

**Note: The maximum frequency, upper limit frequency and lower limit frequency should be set carefully according to the requirements of operating conditions. In addition to the upper limit frequency and the lower limit frequency, the output frequency of the inverter during operation is also limited by the setting values of parameters such as start frequency, stop detection frequency, stop DC braking start frequency, jump frequency and other parameters. The relationship between maximum frequency, upper limit frequency and lower limit frequency is shown in the figure below.**

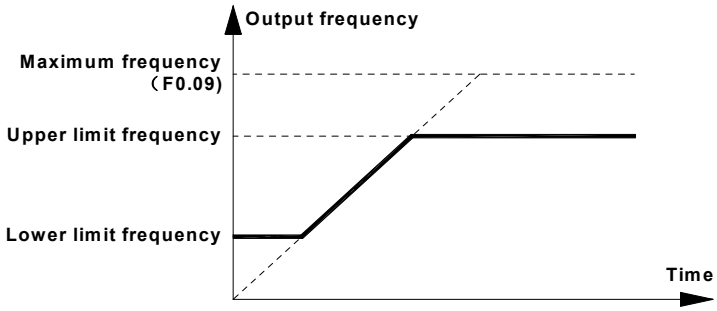



**Diagram of the relationship between the upper/lower and maximum frequency**

| | | | |
|---|---|---|---|
| F0-14 | Acceleration time 0 | Setting range: 0.00～650.00s | Default: Model settings |
| F0-15 | Deceleration time 0 | Setting range: 0.00～650.00s | Default: Model settings |

The acceleration time refers to the time required for the output frequency to accelerate from 0.00 Hz to the time reference frequency, and the deceleration time refers to the time required for the output frequency to decelerate from the time reference frequency to 0.00 Hz. The maximum frequency, the fixed frequency of 50 Hz, and the given frequency can be selected as the time reference frequency through the parameter **[F1-16]** LED unit digits. For details, see parameter **[F1-16]**.

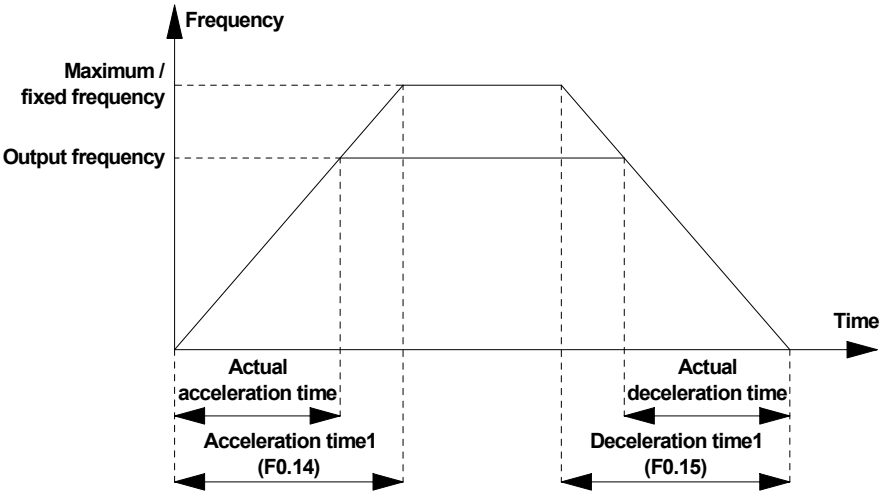



**Diagram of acceleration and deceleration time**

Normal frequency acceleration and deceleration can choose 4 groups of acceleration and deceleration time. The acceleration / deceleration time 1 is set by **[F0-14 ～ F2-15]**, and the acceleration / deceleration time 2, acceleration / deceleration time 3, and acceleration / deceleration time 4 are set by **[F1-21 ～ F2-26]**. Acceleration and deceleration time 1 is the default acceleration and deceleration time group. If you want to select other acceleration and deceleration time groups, you can select it through the control terminal.

When the program is running, one of the 4 groups of acceleration and deceleration time can be selected for each program operation segment, regardless of the terminal selection. For details, see **[FC-31 ～ FC-45]**.

Jog acceleration and deceleration time are set by **[F1-39, F1-40]**.

The emergency stop deceleration time is set by **[F1-27]**

| | | | |
|---|---|---|---|
| F0-16 | Choice of running direction | Setting range: 0000～0121 | Default: 0000 |

**Units of LED: Reverse running direction** Used to select the adjustment of motor running control direction.

0: unchanged direction The actual steering of the motor is the same as the required steering, and the current motor direction is not adjusted;

1: Reverse the direction The actual steering of the motor is opposite to the required steering, adjust the current direction of the motor;

**Tens of LED: Prohibition of running direction** It is used to select the validity of motor running control direction.

0: Allow forward and reverse commands. The inverter accepts forward and reverse commands to control the motor operation;

1: Only forward command is allowed. The inverter only accepts the forward control command to control the motor. If the reverse command is given, the inverter will not run.

2: Only allow reverse command. The inverter only accepts the reverse control command to control the motor operation; if the forward command is given, the inverter will not run.

**Hundreds of LEDs: Frequency control direction selection** Used to select whether to allow negative

frequency to change the current inverter running direction when the frequency setting value is negative.

0: The frequency control direction is invalid. If the calculation result is negative, the inverter outputs a frequency of 0.00 Hz.

1: Frequency control direction is valid. If the calculation result is negative, the inverter changes the current running direction and outputs the corresponding frequency.

**Notes:**

**When restoring the factory value, the setting value of this parameter will not be changed. When this parameter is set to a certain value, all commands of the running command channel (operation keyboard, external terminals, RS485 communication) are affected by the selected value.**

| F0-17 | PWM carrier frequency | Setting range: 0.7～16.0kHz | Default: Model settings |
|---|---|---|---|

Used to set the switching frequency of the inverter IGBT. Please set this parameter when adjusting electromagnetic noise and reducing leakage current. This function is mainly used to improve the noise and vibration that may occur during the operation of the inverter. The current waveform is ideal when the carrier frequency is high, and the motor noise is small. It is very suitable in places where silence is required. But at this time, the switching loss of the main components is larger, the whole machine generates more heat, the efficiency is reduced, and the output is reduced. At the same time, the radio interference is relatively large. Another problem when operating at high carrier frequencies is that the capacitive leakage current increases. When a leakage protector is installed, it may cause malfunction or overcurrent. When running at a low carrier frequency, it is contrary to the above phenomenon.

Different motors respond differently to the carrier frequency. The best carrier frequency also needs to be adjusted according to the actual situation. But as the motor capacity increases, the carrier frequency should be selected smaller.

The company reserves the right to limit the maximum carrier frequency.

| Carrier frequency | Motor noise | Electrical interference | Radiator temperature |
|---|---|---|---|
| Low<br>↓<br>High | Loud<br>↓<br>Low | Low<br>↓<br>Large | Low<br>↓<br>High |

**Tip: In order to obtain better control characteristics, the ratio of carrier frequency to the maximum operating frequency of the inverter is recommended not to be lower than 36. If the inverter is working in a low frequency band for a long time, it is recommended to reduce the carrier frequency to reduce the impact of dead time.**

**Note: When the carrier frequency is higher than the factory-set value, the rated power of the inverter should be reduced by 5% for each additional 1kHz carrier frequency.**

| F0-18 | PWM control mode | Setting range: 0000～1111 | Default: 1111 |
|---|---|---|---|

**Units of LED: Carrier is related to temperature**

0: independent of temperature

1: related to temperature

When the temperature of the inverter is too high, the inverter will automatically reduce the carrier frequency; using this function can reduce the switching loss of the power device and prevent frequent alarms of the inverter overheating fault.

**Tens of LED: Carrier is related to output frequency**

0: Independent of output frequency

1: related to output frequency

When the correlation between the carrier and the output frequency is valid, the inverter can automatically adjust the carrier frequency according to the output frequency. This function can improve the inverter's low-frequency performance and high-frequency mute effect.

**Hundreds of LEDs: Random PWM enable**

0: Prohibited The motor noise frequency is fixed.

1: Enable This method can make the harmonic spectrum of the output voltage of the inverter be evenly distributed in a wide frequency range, which can effectively suppress motor noise and mechanical vibration.

**Thousands of LEDs: PWM modulation mode Select the PWM mode of the inverter**

0: Only use three-phase modulation

1: Two-phase three-phase modulation automatic switching

| | | | |
|---|---|---|---|
| F0-19 | Parameter initialization | Setting range: 0～3 | Default: 0 |

0: No operation

1: Restore the factory value (do not restore the motor parameters) After the parameters are restored to the factory values, the function parameters are restored to the factory defaults, excluding the motor parameter group.

2: Restore the factory value (restore the motor parameters) After the parameters are restored to the factory values, the function parameters are restored to the factory default values, and restored together with the motor parameter group.

3: Clear fault record Clear all the historical fault information recorded by **[FA-40 ～ FA-59]**.

## 4.2 Operation control parameters

| | | | |
|---|---|---|---|
| F1-00 | Start method | Setting range: 0～2 | Default: 0 |
| F1-01 | Start pre-excitation time | Setting range: 0.00～60.00s | Default: model setting |
| F1-02 | Start frequency | Setting range: 0.00～60.00Hz | Default: 0.50Hz |
| F1-03 | Start frequency hold time | Setting range: 0.0～50.0s | Default: 0.0s |
| F1-04 | DC injection current | Setting range: 0.0～150.0% | Default: 60.0% |
| F1-05 | DC injection time | Setting range: 0.0～60.0s | Default: 0.0s |

**Start operation mode:**

0: Start the inverter from the start frequency, and start the inverter with the start frequency set by [F1-02] and the start frequency duration set by [F1-03]; it is suitable for occasions with large static friction torque and small load inertia , Or when the user cooperates with external mechanical braking equipment. That is, where the motor shaft can remain stationary after the motor is stopped and then restarted.

1: DC braking first and then start from the starting frequency First apply DC injection current [F1-04] and DC injection time [F1-05] to the load motor to apply a certain DC braking energy (ie electromagnetic brake), and then start again Frequency start; suitable for small inertial loads with forward or reverse rotation in the stop state.

2: Start after speed tracking and direction judgment The inverter first detects the speed and direction of the

motor, and then starts to run to the given frequency according to the acceleration / deceleration time at the detected speed.

**Start pre-excitation time:** This parameter is used to set the time for pre-excitation of asynchronous motor at startup. This parameter can establish the magnetic field before the motor starts, which can effectively improve the starting performance of the motor and reduce the starting current and starting time.

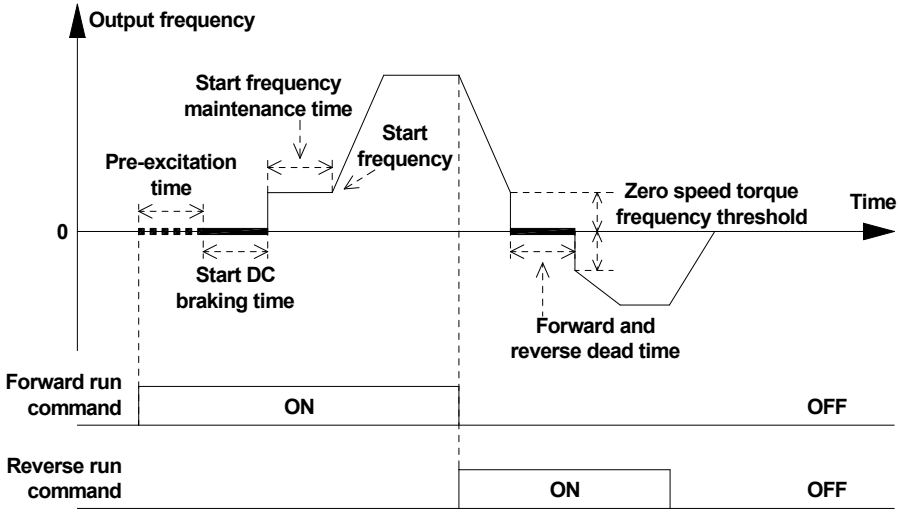
**Start frequency:** refers to the initial output frequency of the inverter when it starts. Setting a suitable starting frequency can have a higher starting torque, and for some loads with a large static friction force in a static state, some impulse can be obtained at the moment of starting. However, if the set value is too large, E.oC1 and other faults may sometimes occur.

**Starting frequency duration:** refers to the time the inverter maintains at the starting frequency. After the maintaining time, it starts to enter normal acceleration and deceleration.

**DC injection current:** refers to the magnitude of the braking current sent by the inverter to the motor during DC braking. This value is based on the rated output current of the inverter. Only when **[F1-00]** is selected as "1" will there be DC braking function at startup. This parameter is set to 0 to start DC braking is invalid.

**DC injection time:** refers to the duration of the DC braking current at the start; only when **[F1-00]** is selected as "1" will there be a DC braking function at the start; when the braking time is 0.0 seconds, no DC braking process .

**Note: The starting frequency is not limited by the lower limit frequency [F0-12] and the zero speed torque frequency threshold [F1-29].**



| | | | |
|---|---|---|---|
| F1-06 | Speed tracking | Setting range: 0.00～60.00s | Default: 0.50s |
| F1-07 | Speed tracking shutdown delay | Setting range: 0.00～60.00s | Default: 1.00s |

**Speed tracking speed:** refers to the time it takes for the output voltage to be added to the normal voltage at the current speed during the speed tracking start of the inverter. The shorter the time, the faster the tracking process, but the greater the current impact generated by the tracking process. When it is zero, the tracking speed is automatically controlled by the inverter.

**Speed tracking stop delay:** It means that after the output of the inverter is cut off, a certain delay is required to output the voltage to start the motor again, so that the inrush current at the start is as small as possible. When the time is zero, the delay is automatically controlled by the inverter.

| | | | |
|---|---|---|---|
| F1-08～F1-09 | | Reserved | |
| F1-10 | Stop mode | Setting range: 0～1 | Default: 0 |

**0: Deceleration stop** According to the set deceleration time and deceleration mode, the inverter stops output after decelerating to 0.00Hz frequency.
In the process of decelerating and stopping, when the output frequency is less than the stop DC braking start frequency **[F1-11]**, the output frequency of the inverter jumps to zero, DC braking is performed and the work is stopped after the execution is completed; otherwise the inverter will decelerate Stop working after the minimum output frequency.
In the process of decelerating and stopping, for the machine with built-in braking unit (KV500-T3-018G and below), external braking resistor (optional) can be connected. When the DC bus voltage exceeds **[F4-26]**, the energy consumption braking action At the voltage value, the inverter starts to perform energy-consuming braking action.
Machines without built-in braking unit (KV500-T3-022G and above) can be equipped with external braking unit and braking resistor. This mode is mainly used in situations where quick braking is required during shutdown.

**1: Free stop** The inverter immediately blocks the output after receiving the stop command, and the motor runs freely to stop. When this method is selected, the external mechanical brake is generally used to achieve rapid stop.

| | | | |
|---|---|---|---|
| F1-11 | Starting frequency of DC braking at stop | Setting range: 0.00～50.00Hz | Default: 1.00Hz |
| F1-12 | DC braking current at shutdown | Setting range: 0.0～150.0% | Default: 60.0% |
| F1-13 | DC brake holding time at stop | Setting range: 0.0～60.0s | Default: 0.0s |
| F1-14 | Minimum output frequency during shutdown | Setting range: 0.00～50.00Hz | Default: 0.50Hz |

**Starting frequency of DC braking at stop:** It means that when the inverter decelerates to this frequency, it will stop the output and start the DC braking function; when stopping, the DC braking function will be started when the output frequency is less than the starting frequency of DC braking at stop.

During deceleration and stop, when the given frequency is less than the stop DC braking start frequency, DC braking starts and the output frequency of the inverter jumps to zero. If the operating conditions do not have strict requirements for stopping and braking, the starting frequency of DC braking should be set as low as

possible when stopping.

**DC braking current at stop:** refers to the magnitude of the braking current sent by the inverter to the motor during DC braking. This value 100.0% corresponds to the rated output current of the inverter.

DC braking function can provide zero speed torque. It is usually used to improve the stopping accuracy and achieve a quick stop, but it cannot be used for deceleration braking during normal operation; that is, once DC braking starts, the inverter will stop output. If the DC braking current is set too large, an overcurrent fault is likely to occur when the inverter is stopped. If this parameter is set to 0, the shutdown DC braking is invalid.

**DC brake holding time at stop:** refers to the duration of DC braking current when stopped. When the braking time is 0.0 seconds, there is no DC braking process, that is, the DC braking function is invalid. If this parameter is set to 0, the shutdown DC braking is invalid.

| | | | |
|---|---|---|---|
| F1-15 | Reserved | | |
| F1-16 | Acceleration and deceleration | Setting range: 0000～0012 | Default: 0010 |
| F1-17 | Acceleration start S curve time | Setting range: 0.00～10.00s | Default: 0.10s |
| F1-18 | Acceleration end S curve time | Setting range: 0.00～10.00s | Default: 0.10s |
| F1-19 | Deceleration start S curve time | Setting range: 0.00～10.00s | Default: 0.10s |
| F1-20 | Deceleration end S curve time | Setting range: 0.00～10.00s | Default: 0.10s |

**Acceleration and deceleration options**

**Units of LED: Base frequency of acceleration and deceleration time**

This parameter is used to select the basis for acceleration / deceleration time.

0: Maximum frequency The reference for acceleration and deceleration time is the maximum frequency **[F0-09].**

1: Fixed frequency The reference for acceleration and deceleration time is a fixed frequency of 50.00 Hz.

2: Set frequency The reference of acceleration and deceleration time is set frequency. If the set frequency changes frequently, the acceleration of the motor will change, so please pay attention when applying.

**Tens of LEDs: acceleration and deceleration**

This series of inverters provides 2 kinds of acceleration and deceleration methods; in normal start, stop, forward and reverse, acceleration and deceleration, both acceleration and deceleration methods are effective.

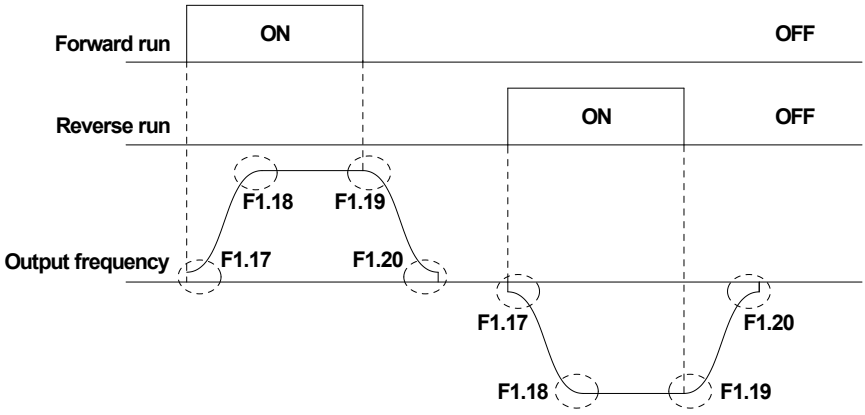
0: Straight line Generally applicable to general-purpose loads.

1: S curve S-type acceleration and deceleration curves are mainly provided for loads that need to slow down noise and vibration during acceleration and deceleration, reduce start-stop impact or low frequency, need to decrease torque, and high frequency require short-term acceleration.

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

The characteristics of the S curve during forward rotation and reverse rotation are shown in the figure




below:

After setting the S curve, the acceleration and deceleration time will be extended as follows:
Acceleration time = selected acceleration time + (**[F1-17]** + **[F1-18]**) / 2
Deceleration time = selected deceleration time + (**[F1-19]** + **[F1-20]**) / 2

| | | | |
|---|---|---|---|
| F1-21 | Acceleration time 1 | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-22 | Deceleration time 1 | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-23 | Acceleration time 2 | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-24 | Deceleration time 2 | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-25 | Acceleration time 3 | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-26 | Deceleration time 3 | Setting range: 0.01～650.00s | Default: 10.00s |

**Acceleration time 2/3/4:** When parameter **[F1-16]** LED unit is set to "0", it means the time required for the output frequency to accelerate from 0.00Hz to the maximum frequency **[F0-09]**; 16] When the LED unit digit is set to "1", it refers to the time required for the output frequency to accelerate from 0.00Hz to 50.00Hz; see the parameter **[F1-16]** for details.

**Deceleration time 1/2/3:** when the parameter **[F1-16]** LED unit is set to "0", it refers to the time required for the output frequency to decelerate from the maximum frequency **[F0-09]** to 0.00Hz; when the parameter **[F1- 16]** When the LED unit digit is set to "1", it refers to the time required for the output frequency to decelerate from 50.00Hz to 0.00Hz; see parameter **[F1-16]** for details.

The acceleration / deceleration time 1/2/3 can only switch the current acceleration / deceleration time group (PLC program) through the on-off combination of the multi-function terminals "Acceleration / deceleration time selection terminal 1" and "Acceleration / deceleration time selection terminal 2" and (**COM**) Except for operation);

If the acceleration / deceleration time selection terminal is not set, the factory default is that acceleration / deceleration time 1 is valid, and the inverter performs acceleration / deceleration according to acceleration / deceleration time 1.

For the definition of acceleration and deceleration time for PLC program operation, please refer to parameter **[FC-31 ～ FC-45]** for details.

The jog acceleration and deceleration time is not within this range, and the jog acceleration and deceleration time are individually set by **[F1-39, F1-40]**.

Comparison table of acceleration and deceleration time selection:

| Terminal 2 | Terminal 1 | Acceleration and deceleration time selection |
|---|---|---|
| OFF | OFF | Acceleration time 0 / Deceleration time 0 |
| OFF | ON | Acceleration time 1 / Deceleration time 1 |
| ON | OFF | Acceleration time 2 / Deceleration time 2 |
| ON | ON | Acceleration time 3 / Deceleration time 3 |

If you have doubts about the above table, please refer to the “FC” parameter group's multi-speed sequence diagram for multi-speed.

| | | | |
|---|---|---|---|
| F1-27 | Emergency stop deceleration time | Setting range: 0.01～650.00s | Default: 1.00s |

Used to set the deceleration time during emergency stop. The definition of emergency stop time is the same as acceleration and deceleration time.

During the emergency stop function, if the multi-function output terminal has been set to emergency stop, the multi-function output terminal will always output a valid signal during the emergency stop process. See the parameters **[F2-45 ～ F2-47]** for details.

| | | | |
|---|---|---|---|
| F1-28 | Forward and reverse dead time | Setting range: 0.0～120.0s | Default: 0.0s |

**Forward and reverse dead time:** This function is defined as the transition time that the inverter waits at 0.0 Hz during forward to reverse rotation, or from reverse to forward rotation. It is set for equipment with mechanical dead zone when changing the load.

| | | | |
|---|---|---|---|
| F1-29 | Zero speed torque frequency threshold | Setting range: 0.00～10.00Hz | Default: 0.50Hz |
| F1-30 | Zero speed torque retention coefficient | Setting range: 0.0～150.0% | Default: 60.0% |
| F1-31 | Zero speed torque holding time | Setting range: 0.0～6000.0s | Default: 0.0s |

**Judging the entry condition of the zero-speed torque function:**

**1. During the speed-up process of the inverter, when the given frequency is less than the start frequency, the inverter output is zero, but the zero-speed torque function is not entered.**

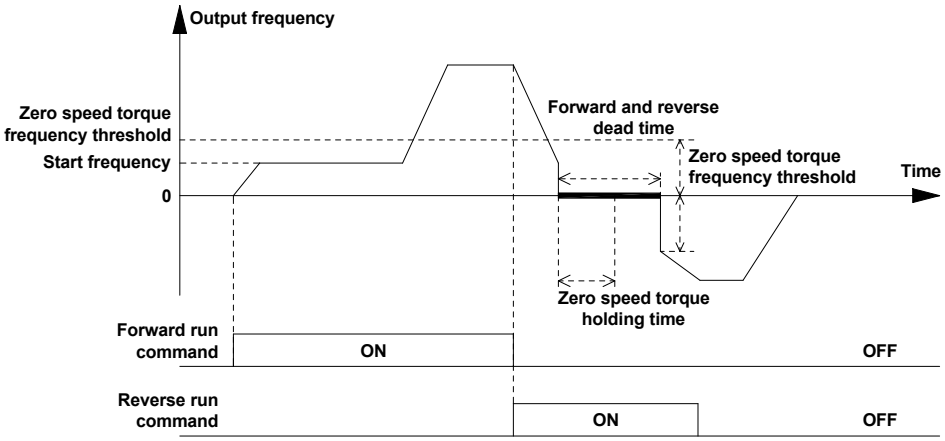
**2. During the speed-up process of the inverter, when the given frequency is less than or equal to the zero-speed torque frequency threshold, the output frequency is 0 Hz, and the zero-speed torque function is entered. When the given frequency is greater than the zero-speed torque frequency threshold, the zero-speed torque holding function will not be entered.**

**3. During the forward / reverse switching process of the inverter during normal operation, when the output frequency is less than [F1-29], the zero frequency is output and the zero-speed torque function is entered. When the zero-speed torque holding time [F1-31] is greater than the**

**positive and negative When turning the dead time [F1-28], the hold time is determined by the forward and reverse dead time [F1-28].**

**4. During the normal operation of the inverter, change the frequency setting value during the speed-up and speed-down operation. When the speed is reduced, it will output zero frequency after [F1-29] and enter the zero-speed torque function. Speed torque function.**

**5. During the inverter's stop and deceleration process, when the output frequency is less than the zero-speed torque frequency threshold [F1-29], the inverter's output will be zero-stop and will not enter the zero-speed torque function. If the stop DC braking start frequency is greater than [F1-29], when the output frequency is less than the stop DC braking start frequency, it will enter the stop DC braking state.**




**Zero-speed torque retention coefficient: e**ffective under open-loop V / F or open-loop vector, set the output torque of the inverter when running at zero speed, 100% corresponds to the rated current of the motor. In closed-loop control mode, the magnitude of zero-speed torque is determined by the motor load. If the torque setting is large or the duration is long during use, attention should be paid to the heat dissipation of the motor.

**Zero-speed torque holding time:** Set the inverter to enter the zero-speed torque holding time. The timing starts when the running frequency is 0 Hz, and the inverter stops output after the time reaches the set

zero-speed holding torque time. Among them, the effective timing value is 0 ～ 5999.9s. The parameter is set within the effective timing value. The inverter counts at the set time. After the time expires, the inverter terminates the zero-speed torque maintenance.

If the parameter setting is equal to 6000.0s, the frequency converter does not perform timing and the default is long-term effective. Only after the stop command is given or a non-zero operating frequency is given, the zero speed torque retention is terminated.

**Note: If the zero-speed holding torque is set too large or the zero-speed holding torque time is set too long, pay attention to the temperature rise of the motor. If the temperature rise of the motor is large, it is necessary to improve the heat dissipation of the motor and add the heat dissipation equipment.**

| | | | |
|---|---|---|---|
| F1-32～F1-34 | | Reserved | |
| F1-35 | Action selection after power failure | Setting range: 0～1 | Default: 0 |
| F1-36 | Waiting time after power failure | Setting range: 0.00～60.00s | Default: 0.50s |

**Action selection after power failure:**

0: Invalid The inverter must run after receiving the running command after power off.

During keyboard operation control, RS485 communication control or optional card operation, if the inverter loses power, the operation command is automatically cleared.

1: Valid If the inverter is in the running state before the power is cut off, after the power is restored, after the waiting time set by **[F1-36]**, the inverter will automatically start the speed tracking. During the waiting time after power failure and restart, the inverter does not accept the running command, but if the stop command is input during this period, the inverter will be released from the restart state. The setting principle of the waiting time for power failure and restart **[F1-36]** is based on factors such as the work recovery preparation time of other equipment related to the inverter after power is restored.

**Note: The function of restart after power failure can enable the inverter to start running automatically after power is restored. Therefore, it is very accidental, so please adopt it with caution for personal and equipment safety.**

| | | | |
|---|---|---|---|
| F1-37 | | Reserved | |
| F1-38 | Jog running frequency setting | Setting range: 0.00～Maximum frequency | Default: 5.00Hz |
| F1-39 | Jog acceleration time | Setting range: 0.01～650.00s | Default: 10.00s |
| F1-40 | Jog deceleration time | Setting range: 0.01～650.00s | Default: 10.00s |

**Jog running frequency setting:** Set the output frequency of the inverter when jogging.

**Jog acceleration time:** when the parameter **[F1-16]** LED unit is set to "0", it means the time required for the output frequency to accelerate from 0.00Hz to the maximum frequency **[F0-09]**; when the parameter **[F1-16]** LED When the ones place is set to "1", it refers to the time required for the output frequency to accelerate from 0.00Hz to 50.00Hz; see parameter **[F1-16]** for details.

**Jog deceleration time:** when the parameter **[F1-16]** LED unit is set to "0", it means the time required for the output frequency to decelerate from the maximum frequency **[F0-09]** to 0.00Hz; when the parameter **[F1-16]** LED When the ones place is set to "1", it refers to the time required for the output frequency to decelerate from 50.00Hz to 0.00Hz; see parameter **[F1-16]** for details.

The jog frequency has the highest priority command right (terminal jog). That is, in any state, once the jog command is valid, it immediately runs from the current running frequency to the jog frequency with the jog acceleration / deceleration time. Jog acceleration / deceleration time is defined the same as acceleration / deceleration time. The inverter can be controlled by the keyboard, control terminals, communication

commands or the jog operation command of the optional card.

**Note: The setting value of the jog operating frequency is only limited by the maximum frequency of [F0-09]. When the set jog frequency is greater than the upper limit frequency of [F0-11], the actual jog output frequency of the inverter during jog operation Limited by the upper limit frequency. Only the terminal jog running priority is not limited by the run command channel, other jog commands only have priority when they are the same as the run command channel. For example, the jog operation of the keyboard is only valid when the keyboard control is running.**

## 4.3 Switching terminal parameters

| | | | |
|---|---|---|---|
| F2-00 | Multi-function input terminal 1(X1) | Setting range: 0～63 | Default: 1 |
| F2-01 | Multi-function input terminal 2(X2) | | Default: 2 |
| F2-02 | Multi-function input terminal 3(X3) | | Default: 4 |
| F2-03 | Multi-function input terminal 4(X4) | | Default: 5 |
| F2-04 | Multi-function input terminal 5(X5) | | Default: 6 |

This machine has 5 multi-function input terminals, and the functions of multi-function input terminals (X1-X5) can be defined by parameters **[F2-00 ～ F2-04]**. The characteristics and detection delay of the multi-function input terminals can be set through the parameters **[F2-08 ～ F2-19]**. For details, see the parameters **[F2-08 ～ F2-19]**. Among them, X5 and high-speed pulse input HDI share an external input terminal X5 / HDI. When there is a function code to select HDI, the external terminal is used as HDI input, otherwise it is used as X5 input. For example, when **[F2-04] =** 0, the terminal X5 / HDI will be valid as the HDI input, and at this time, the digital signal X5 input will not be accepted.

The multi-function input terminals are rich in functions and can be easily set and selected according to needs. The set values and functions are shown in the table below:

| Set value | Set value | Set value | Set value |
|---|---|---|---|
| 0 | No function | 27 | PID feedback switching 1 |
| 1 | Forward run | 28 | PID feedback switching 2 |
| 2 | Reverse run | 29 | PID feedback switching 3 |
| 3 | Three-wire operation control (Xi) | 30 | Program operation (PLC) pause |
| 4 | Jog forward | 31 | Program operation (PLC) restart |
| 5 | Reverse jog | 32 | Acceleration and deceleration time selection terminal 1 |
| 6 | Free parking | 33 | Acceleration and deceleration time selection terminal 2 |
| 7 | Emergency stop | 34 | Acceleration and deceleration pause |
| 8 | Fault reset | 35 | Swing frequency input |
| 9 | External fault input | 36 | Swing frequency pause |
| 10 | Increasing frequency (UP) | 37 | Swing frequency reset |
| 11 | Decreasing frequency (DW) | 40 | Timer trigger terminal |
| 12 | Frequency increasing and decreasing clearing (UP / DW clearing) | 41 | Timer clear terminal |
| 13 | Channel A switches to channel B | 42 | Counter clock input terminal |
| 14 | Switch the frequency channel combination to A | 43 | Counter clear terminal |
| 15 | Switch the frequency channel combination to B | 44 | DC braking command |
| 16 | Multi-speed terminal 1 | 45 | Pre-excitation command terminal |
| 17 | Multi-speed terminal 2 | 46 | Motor selection terminal |

| | | | |
|---|---|---|---|
| 18 | Multi-speed terminal 3 | 47 | Run pause |
| 19 | Multi-speed terminal 4 | 48 | Command channel switch to keyboard |
| 20 | PID control canceled | 49 | Command channel switch to terminal |
| 21 | PID control pause | 50 | Command channel switch to communication |
| 22 | PID characteristic switching | 51 | Command channel switch to expansion card |
| 23 | PID gain switching | 52 | Operation prohibited |
| 24 | PID given switch 1 | 53 | Forward prohibition |
| 25 | PID given switch 2 | 54 | Reverse prohibition |
| 26 | PID given switch 3 | 55 | Reserved |

**0: No function** means the terminal is invalid. If the terminal function is idle, it is recommended to set to "0" to prevent misoperation.

**1: Forward running** When the running command is given by the terminal, if **[F2-20]** is set to two-wire system 1, and the terminal is valid, the inverter will run forward. For other control modes, please refer to parameter **[F2-20]** .

**2: Reverse running** When the running command is given by the terminal, if **[F2-20]** is set to two-wire system 1, and the terminal is valid, the inverter will run in reverse. For other control modes, please refer to parameter **[F2-20]** .

**3: Three-wire operation control (Xi)** When the operation command is given by the terminal, if **[F2-20]** is set to three-wire system 1/2, this terminal is the three-wire operation control terminal (Xi). For specific functions, see the parameter **[F2 -20]**.

**4: Forward jog**

**5: reverse jog**

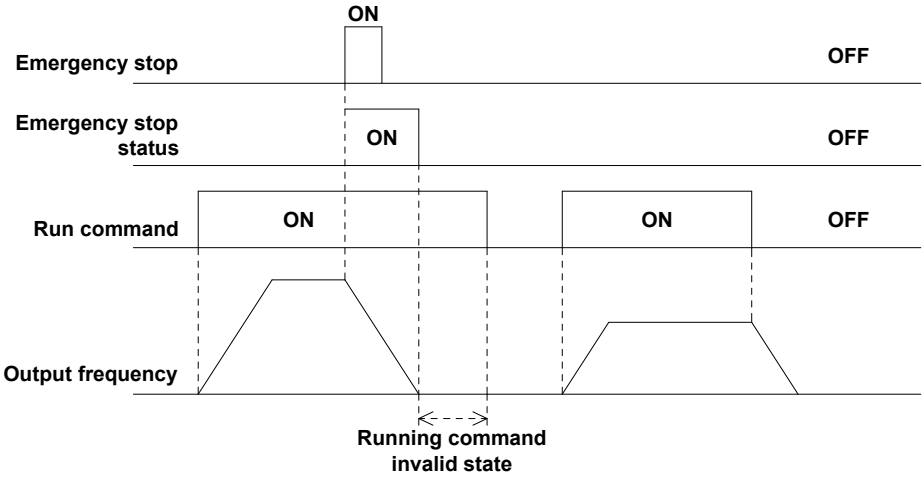
Forward and reverse jog command input port. When this terminal is valid, the inverter jogs. The terminal jog command has the highest priority. For detailed setting of jog parameters, please refer to **[F1-38 ～ F1-40]**.

**6: Free stop** Free stop command input port. When this terminal is valid, the inverter immediately blocks the output, and the motor is in free running state.

When the free stop terminal is always valid, the inverter will not accept any start command and will remain stopped. When the terminal two-wire control operation, after the free stop terminal command is released, whether to restore the original operation command, refer to the parameter setting of parameter **[F2-21]**. When the keyboard, RS485, optional card and terminal three-wire system control operation, after the free stop terminal command is released, the original operation command will not be restored. If you need to start the inverter, you need to re-enter the operation command.

**7: Emergency stop** If an emergency stop command is input during the operation of the inverter, the inverter will decelerate to stop with the deceleration time set by **[F1-27]**. For details, please refer to **[F1-27]** Emergency stop deceleration time. After the emergency stop command is entered, it cannot be restarted until the inverter is completely stopped. If the stop mode **[F1-10]** is set to free stop, the inverter still performs emergency stop deceleration according to the emergency stop time. When the emergency stop terminal is always valid, the inverter will not accept any start command and keep the stop command state. When the two-wire control operation of the terminal, after the emergency stop terminal command is released, whether to restore the original operation command, refer to the parameter setting of **[F2-27]**.

When the keyboard, communication, optional card and terminal three-wire system control operation, after the emergency stop terminal command is released, the original operation command will not be restored. If you need to start the inverter, you need to re-enter the operation command.




**Note: Sudden deceleration may cause the inverter to produce overvoltage faults. When an overvoltage fault occurs, the output of the inverter will be cut off and the motor will be in a free running state, which will cause the motor to be uncontrollable. Therefore, when using the emergency stop function, please set an appropriate deceleration time in [F1-27], or use it in conjunction with the energy consumption braking function.**

**8: Fault reset** When the inverter generates a fault alarm, the terminal can be used to reset the fault. When the terminal two-wire control is running, after the fault is reset, whether to restore the original operation command, please refer to the parameter setting of **[F2-27].**

**9: External fault input** Through this terminal, you can input the fault signal of the external device, which is convenient for the inverter to monitor and protect the external device. After the inverter receives the external fault input signal, it immediately blocks the output, the motor is in a free running state, and displays the fault message E. EF.

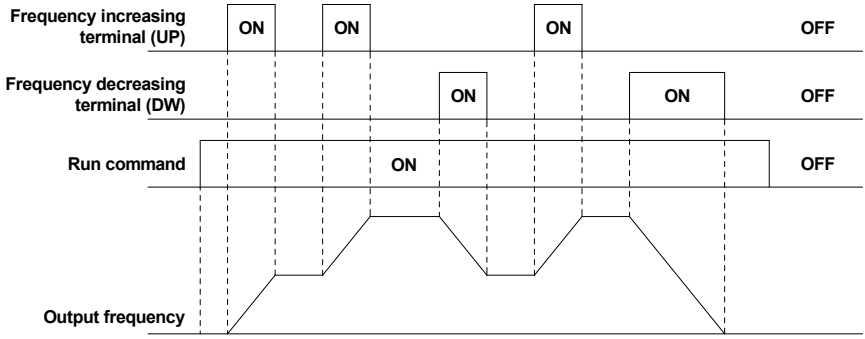
**10: Increasing frequency (UP)**

**11: Decreasing frequency (DW)**

**12: frequency increasing and decreasing clearing (UP / DW clearing)**

The increase and decrease (UP) and decrease (DW) of the given frequency are realized through the control terminal. It is only valid when parameter **[F0-03]** is set to "7" terminal UP / DW control. The memory and clearing method after adjusting frequency by UP and DW can be set through **[F2-36]**, see parameter **[F2-36]** for details; the acceleration / deceleration rate of the given frequency controlled by terminal UP / DW control is set by **[F2-37]** .

The frequency can be adjusted by UP and DW at any time by the "frequency increasing and decreasingclearing (UP / DW clearing)" terminal to clear its given frequency.




**13: Switch channel A to channel B**

**14: Frequency channel combination is switched to channel A**

**15: Switch the frequency channel combination to B**

Switch the frequency given channel combination through the terminal.

**16: Multi-speed terminal 1**

**17: Multi-speed terminal 2**

**18: Multi-speed terminal 3**

**19: Multi-speed terminal 4**

The input port of the multi-segment speed command, the code combination realizes 15-segment speed; the multi-segment speed command has the priority right next to the jog command. For details, please refer to the detailed description of parameter multi-speed and PLC function parameter "FC" group parameters.

**20: PID control canceled** When the frequency reference main channel selection **[F0-03]** is set to "8" PID control reference timing, if this terminal is valid, the PID function can be invalidated, the frequency reference main channel reference frequency becomes 0.00 Hz. When this terminal is invalid, PID restarts to calculate the frequency given by the frequency given main channel.

**21: PID control pause** When the frequency given channel selects the PID control given time, if this terminal is valid, the PID adjustment can be temporarily disabled, and the PID adjustment frequency immediately before the terminal becomes effective remains unchanged. When this terminal is invalid, PID restarts to calculate the given frequency.

**22: PID characteristic switching** When the frequency setting main channel selection **[F0-03]** is set to "8" PID control setting, if this terminal is valid, the characteristic of the LED unit setting of parameter [Fb-07] will change After the terminal is invalid, the PID output characteristic will change to the one set by the LED unit digit of **[Fb-07].**

**23: PID gain switching**

This terminal selection is only valid when the gain switching condition **[Fb-22]** is set to "1". When this function is invalid, the PID adjustment proportional, integral, and derivative parameters are **[Fb-11 ～ Fb-13],** and when valid, it is **[Fb -14 ~ Fb-16].**

**24: PID reference switching 1**

**25: PID given switch 2**

**26: PID reference switching 3**

When the given signal source of PID controller [Fb-00] is set to “7” terminal selection, the channel of the given signal source of PID controller is switched through this group of terminals. For details, please refer to parameter **[Fb-00].**

**27: PID feedback switching 1**

**28: PID feedback switching 2**

**29: PID feedback switching 3**

When the PID controller feedback signal source **[Fb-03]** is set to "7" terminal selection, the channel of the PID controller feedback signal source is switched through this group of terminals. For details, see parameter **[Fb-03].**

**30: Program operation (PLC) pause** When the frequency setting main channel selection **[F0-03]** is set to "8" Program control (PLC) reference, during the process of program operation, this signal is effective to make the program operation pause, frequency conversion The device runs at the current frequency. After the signal disappears, it continues to run as before the pause. For detailed parameters of the program control (PLC), please refer to the "FC" group parameters of the multi-speed and PLC functions.

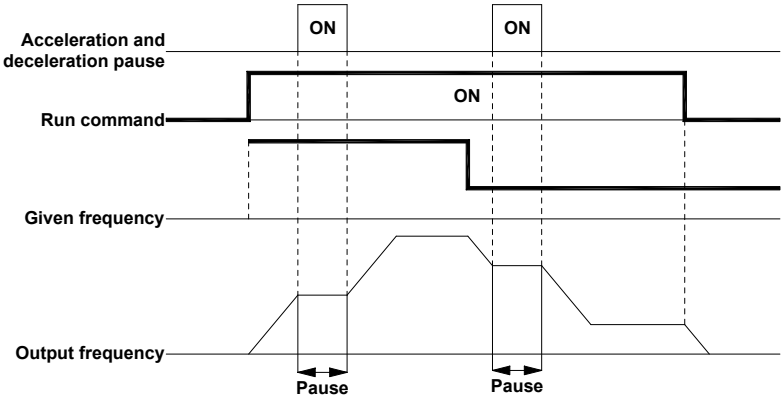
**31: Program running (PLC) restart** When the frequency setting main channel selection **[F0-03]** is set to "8" Program control (PLC) setting, this signal is effective to make the program run during the stop state and the process of program running Restart and start operation from the first stage. For detailed parameters of the program control (PLC), please refer to the "FC" group parameters of the multi-speed and PLC functions.

**32: Acceleration and deceleration time selection terminal 1**

**33: Acceleration and deceleration time selection terminal 2**

Acceleration and deceleration time selection command input port, code combination to achieve 4 stages of acceleration and deceleration selection. When the parameter is not set and the terminal is invalid, the default selection is that acceleration and deceleration time 0 is valid. For details, please refer to the detailed description of parameters **[F1-21 ～ F1-26].**

**34: Acceleration and deceleration pause** In the running state of the inverter, when this terminal is valid, the inverter stops acceleration and deceleration and keeps the current speed unchanged.



**35: Swing frequency input** When swing frequency control is set to manual input, when this terminal is valid, the swing frequency function is valid and the inverter starts swing frequency operation. See the parameter **[FC-49 ～ FC-55]** for details.

**36: Suspension of wobble frequency** During wobble frequency control, when this terminal is valid, the inverter keeps the current output frequency unchanged. After the terminal command is cancelled, the swing frequency operation is resumed. See the parameter **[FC-49 ～ FC-55]** for details.

**37: Swing frequency reset** During swing frequency control, when this terminal is valid, the inverter returns to the center frequency and runs. After the terminal command is cancelled, the swing frequency operation is resumed. See the parameter **[FC-49 ～ FC-55]** for details.

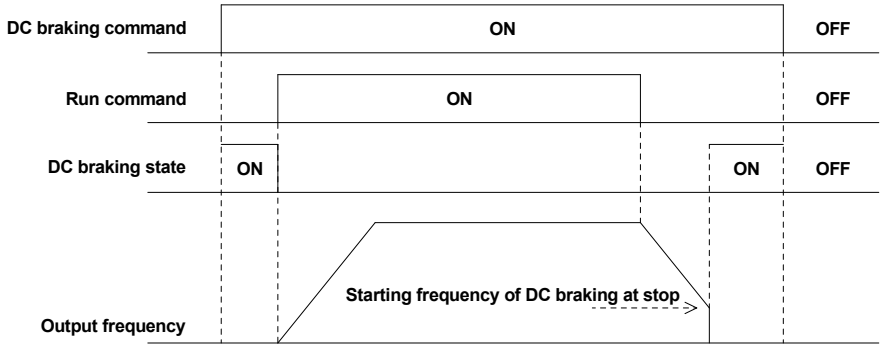
**40: Timer trigger terminal** The port that starts the timer to start the timekeeping action, and the closure is valid. See the parameters **[F2-39 ～ F2-40]** for details.

**41: Timer clear terminal** The timer record of the timer is cleared, and the instantaneous closing is effective. See the parameters **[F2-39 ～ F2-40]** for details.

**42: Counter clock input terminal** For the clock input terminal of the counter function, please refer to parameter **[F2-41 ～ F2-42]** for details.

**43: Counter reset terminal** The counter record of the counter is cleared, and the instantaneous closing is effective. For details, please refer to the parameter **[F2-41 ～ F2-42]**.

**44: DC braking command** When the inverter is stopped, the DC braking function of the inverter can be started. For the current during DC braking, please refer to parameter **[F1-12]** the setting value of DC braking current at shutdown. If a run or jog command is input, the DC brake will be released.



**45: Pre-excitation command terminal** This function is only valid when the asynchronous machine is vector controlled. When the inverter is stopped, the pre-excitation function of the inverter can be started. If a run or jog command is input, the pre-excitation will be released.

**47: Operation pause**

**48: Command channel switch to keyboard**

**49: Command channel switch to terminal**

**50: Command channel switch to communication**

**51: Command channel switch to expansion card**

Command channel switching terminal, can switch to 4 kinds of command given, the effective priority of the terminal is from high to low in order of keyboard, terminal, communication, expansion card.

**52: Operation prohibited**

**53: forward transfer prohibited**

**54: Reverse prohibition**

When the operation prohibition terminal selection is valid, the operation command is invalid in the stop state, and the free stop in the operation state;

When the forward prohibition terminal selection is valid, the forward run command is invalid in the stop state, and the free stop is stopped in the forward run state;

When the reverse prohibition terminal selection is valid, the reverse run command is invalid in the stop state, and free stop in the reverse run state;

**Note: Uninterpreted codes in the middle are reserved options.**

| | | | |
|---|---|---|---|
| F2-05 ～ F2-07 | | Reserved | |
| F2-08 | X1 ～ X4 terminal characteristic selection | Setting range: 0000～1111 | Default: 0000 |

**X1 ~ X4 terminal characteristics selection:** set the characteristics of multi-function input terminals X1, X2, X3, X4 respectively.

**LED unit: X1 terminal**

0: closing is effective

1: Disconnect is effective

**Tens of LED: X2 terminal**

0: closing is effective

1: Disconnect is effective

**Hundreds of LEDs: X3 terminal**

0: closing is effective

1: Disconnect is effective

**Thousands of LEDs: X4 terminal**

0: closing is effective

1: Disconnect is effective

| | | | |
|---|---|---|---|
| F2-09 | X5 terminal feature selection | Setting range: 0000～1111 | Default: 0000 |

The selection of terminal characteristics is the same as above.

| | | | |
|---|---|---|---|
| F2-10 | X1 effective detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-11 | X1 invalid detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-12 | X2 effective detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-13 | X2 invalid detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-14 | X3 effective detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-15 | X3 invalid detection delay | Setting range: 0.000～6.000s | Default: 0.010 |

| | | | |
|---|---|---|---|
| F2-16 | X4 effective detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-17 | X4 invalid detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-18 | X5 effective detection delay | Setting range: 0.000～6.000s | Default: 0.010 |
| F2-19 | X5 invalid detection delay | Setting range: 0.000～6.000s | Default: 0.010 |

**Effective detection delay:** The delay time corresponding to the transition of the input terminals X1 ～ X5 from the invalid state to the valid state.

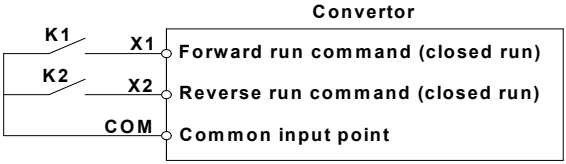
**Invalid detection delay:** the delay time corresponding to the transition of the input terminals X1 ～ X5 from the valid state to the invalid state.

| | | | |
|---|---|---|---|
| F2-20 | Terminal control operation mode | Setting range: 0～3 | Default: 0 |

This parameter defines four different ways to control the operation of the inverter through external terminals.

**0: Two-wire control 1:** Operation and direction are unified. This mode is the most commonly used two-wire mode. The factory default is to determine the forward and reverse running of the motor by the X1 (forward running) and X2 (reverse running) terminal commands. As shown below:

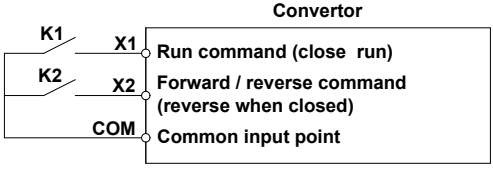
| K1 | K2 | Run command |
|---|---|---|
| 0 | 0 | Stop |
| 1 | 0 | Forward |
| 0 | 1 | Reverse |
| 1 | 1 | Stop |




**Schematic diagram of two-wire control 1**

**1: Two-wire control 2:** Separation of operation and direction. The forward run terminal X1 (forward run) defined when using this mode is the run enable terminal. The definition of the direction is determined by the state of the reverse run terminal X2 (reverse run). As shown below:

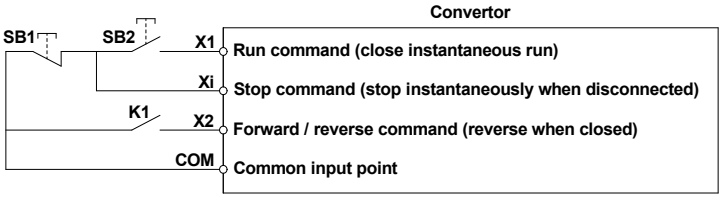
| K1 | K2 | Run command |
|---|---|---|
| 0 | 0 | Stop |
| 1 | 0 | Forward |
| 1 | 1 | Reverse |
| 0 | 1 | Stop |




**Schematic diagram of two-wire control 2**

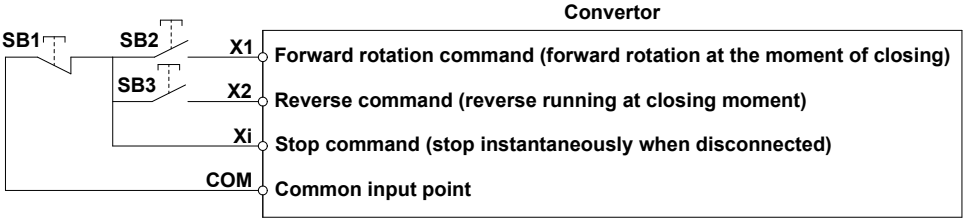
**2: Three-wire control 1:** In this mode, the three-wire operation control terminal (Xi) is a stop operation terminal. The operation command is generated by the forward rotation operation terminal X1 (forward rotation operation), and the direction is controlled by the reverse rotation operation terminal X2 (reverse rotation operation). The three-wire operation control terminal (Xi) is a valid input.

| K1 | Direction control |
|---|---|
| 0 | Forward |
| 1 | Reverse |




**Schematic diagram of three-wire control 1**

**3: Three-wire control 2:** In this mode, the three-wire operation control terminal (Xi) is a stop operation terminal. The operation command is generated by the forward rotation operation terminal X1 (forward rotation operation) or the reverse rotation operation terminal X2 (reverse operation), and both control the operation direction at the same time.




**Schematic diagram of three-wire control 2**

**Tips: SB1: stop button; SB2: forward running button; SB3: reverse running button; "Xi" is the multi-function input terminal set to "3" [three-wire operation control (Xi)].**

| | | | |
|---|---|---|---|
| F2-21 | Terminal start protection | Setting range: 0000～0111 | Default: 0111 |

The following states are only valid when the terminal control operation [F0-02] is set to "1" and the two-wire control mode, that is, [F2-26] is set to "0" or "1". In the three-wire control mode, the operation command must be re-entered.

**LED unit place: terminal start protection when exiting abnormal**

0: close

1: open

**Tens of LEDs: Start protection of the jog terminal when exiting abnormal**

0: close

1: open

**Hundreds of LEDs: start protection when the command channel is switched to the terminal**

0: close

1: open

**Thousands of LEDs: reserved**

**Note: When the start-stop command channel is a terminal and the control mode is a two-wire type, when the terminal running command is in a valid state, the inverter will stop due to an abnormality. After the abnormality disappears, if the protection is turned off, the inverter immediately starts the motor to enter the running state; if the protection is turned on, the previous operation command must be cancelled before the motor can be started in response to the new operation command.**

| | | | |
|---|---|---|---|
| F2-22 | HDI input minimum frequency | Setting range: 0.00～50.00kHz | Default: 0.00kHz |
| F2-23 | HDI minimum frequency corresponding setting | Setting range: 0.00～100.00% | Default: 0.00% |
| F2-24 | HDI input maximum frequency | Setting range: 0.00～50.00kHz | Default: 50.00kHz |
| F2-25 | HDI maximum frequency corresponding setting | Setting range: 0.00～100.00% | Default: 100.00% |
| F2-26 | HDI filter time | Setting range: 0.00～9.00s | Default: 0.10s |
| F2-27 | HDI cutoff frequency | Setting range: 0.000 ～ 1.000kHz | Default: 0.010kHz |

**HDI input minimum frequency:** This function defines the minimum frequency accepted by the pulse input terminal (HDI). Frequency signals lower than this value will be processed by the input minimum frequency.

**HDI minimum frequency corresponding setting:** used to set the percentage of the setting value corresponding to the minimum input frequency of HDI.

**HDI input maximum frequency:** This function defines the maximum frequency accepted by the pulse input terminal (HDI). Frequency signals higher than this value will be processed by the inverter at the input maximum frequency.

**HDI maximum frequency corresponding setting:** used to set the percentage of the setting value corresponding to the HDI maximum input frequency.

**HDI filter time:** This parameter is defined as the size of the input pulse signal to filter, used to eliminate interference signals. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.

**HDI cut-off frequency:** This parameter defines the minimum recognition pulse frequency of the HDI port. If the pulse frequency is lower than this parameter, the inverter will no longer recognize it, and it will be processed according to the "0Hz" frequency value. The smaller the value is set, the lower the pulse frequency that the HDI port can receive, but when the pulse frequency of the HDI port disappears, the longer the inverter judges that the pulse input is "0Hz".

| | | | |
|---|---|---|---|
| F2-28 | Terminal UP / DW control mode | Setting range: 0～2 | Default: 0 |
| F2-29 | Terminal UP / DW control frequency increase and decrease rate | Setting range: 0.01～50.00Hz/s | Default: 0.50Hz/s |

**Terminal UP / DW frequency adjustment selection**

0: Power-off shutdown storage When the terminal UP / DW is adjusted, the machine keeps the frequency record after power failure or stop. During power-on operation, the inverter performs UP / DW adjustment operation from the frequency at the last stop.

1: No storage after power off, storage during shutdown When the terminal UP / DW is adjusted, the frequency record is kept after the machine stops. In the next operation, the inverter performs UP / DW adjustment operation from the frequency of the last stop. No record is saved after a power failure, and operation starts from 0.00 Hz.

2: The operation is valid and the shutdown is cleared when the terminal is adjusted by UP / DW. The frequency record is not maintained after the machine stops or is powered off. In the next operation, the inverter performs UP / DW adjustment operation from 0.00Hz.

**Terminal UP / DW frequency increase / decrease speed:** This function defines the change rate of the given frequency when the terminal UP / DW is adjusted.

| | | | |
|---|---|---|---|
| F2-30 | | Reserved | |
| F2-31 | Timer time unit | Setting range: 0～2 | Default: 0 |
| F2-32 | Timer setting | Setting range: 0～65000 | Default: 0 |

**Timer time unit:** This function is used to set the timer time unit of the inverter timer.

0: second The time unit of timer timer is second.

1: minute The time unit for timer timing is minutes.

2: hour The time unit of timer timer is hour.

**Timer setting value:**

This parameter is used to set the timing time of the inverter. The start of the timer is completed by the external timer trigger terminal of the timer (the trigger terminal is selected by **[F2-00 ～ F2-04]**), and the time is counted from the reception of the external trigger signal. (The output terminal is selected by **[F2-39 ～ F2-41]**) The pulse signal with a width of 1 second is output.

When the trigger terminal is invalid, the timer keeps the current timing value, and continues to count time after the trigger terminal is valid.

| | | | |
|---|---|---|---|
| F2-33 | | Reserved | |
| F2-34 | Counter input frequency division | Setting range: 0 ～ 6000 | Default: 0 |
| F2-35 | Counter maximum | Setting range: 0～65000 | Default: 1000 |
| F2-36 | Counter set value | Setting range: 0～65000 | Default: 500 |

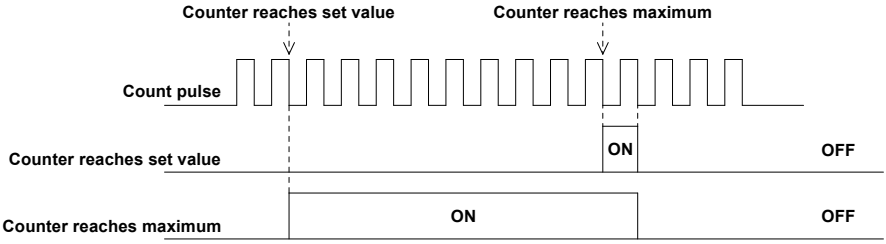
This parameter specifies the counting operation of the internal counter. The counting clock input terminal of the counter is selected by the parameter **[F2-00 ～ F2-04]**.

**Maximum value of the counter:** When the count value of the counter to the external clock reaches the value specified by the parameter **[F2-35],** a width is output at the corresponding output terminal (the output terminal is selected by **[F2-39 ～ F2-41]**) equal to the external clock period Valid signal. That is, when the next count signal is input, the output terminal stops outputting the valid signal.

**Counter setting value:** When the count value of the counter to the external clock reaches the value specified by parameter **[F2-36]**. Output valid signal at the corresponding output terminal (the output terminal is

selected by **[F2-39 ～ F2-41]**), continue to count to the value specified by parameter **[F2-35]**, and cause the output valid signal to cancel when the counter is cleared.

At any time, the count value of the counter can be cleared through the counter clear terminal set by the multi-function input terminals **[F2-00 ～ F2-04].**




**Tip: The counter can work alone without being limited by the running state of the inverter. When some working conditions require counting, the counter in the inverter can be used, and the count value can be displayed in [C-21].**

| | | | |
|---|---|---|---|
| F2-37 | | Reserved | |
| F2-38 | Output terminal polarity selection | Setting range: 0000～0111 | Default: 0000 |

**LED unit: Y terminal**

0: positive polarity

1: negative polarity

**Tens of LED: Relay output terminal 1**

0: positive polarity

1: negative polarity

**Hundreds of LEDs: Relay output terminal 2**

0: positive polarity

1: negative polarity

**Thousands of LEDs: reserved**

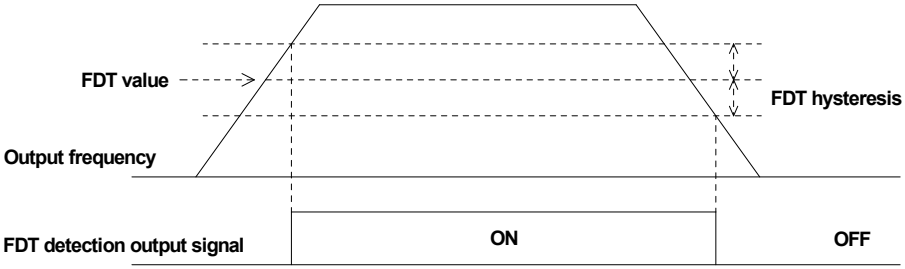
| | | | |
|---|---|---|---|
| F2-39 | Output terminal 1 | Setting range: see attached table 4.4 | Default: 1 |
| F2-40 | Relay output 1 | | Default: 4 |
| F2-41 | Relay output 2 | | Default: 11 |
| F2-42 | Y1 output delay time | Setting range: 0.000～6.000s | Default: 0.010s |
| F2-43 | Relay 1 output delay | Setting range: 0.000～6.000s | Default: 0.010s |
| F2-44 | Relay 2 output delay | Setting range: 0.000～6.000s | Default: 0.010s |

When the internal logic operation of the inverter wants to change the Y terminal state, the actual state of the Y terminal is output after the set delay time. The precautions for the delay time are the same as the input terminal, and the relay output terminal is the same.

| | | | |
|---|---|---|---|
| F2-45 | Output frequency level 1 (FDT1) | Setting range: 0.00～maximum frequency | Default: 30.00Hz |

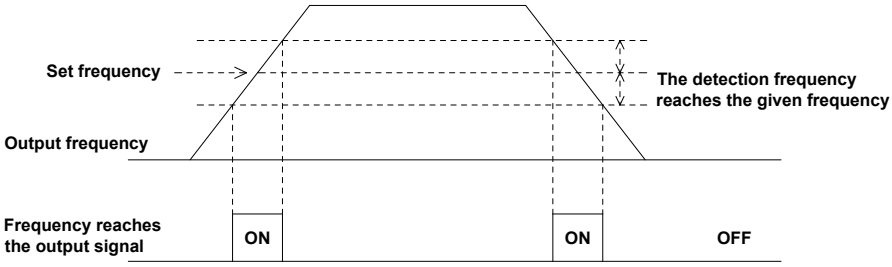
| | | | |
|---|---|---|---|
| F2-46 | FDT1 lag | Setting range: 0.00～maximum frequency | Default: 1.00Hz |
| F2-47 | Output frequency level 2 (FDT2) | Setting range: 0.00～maximum frequency | Default: 50.00Hz |
| F2-48 | FDT2 lag | Setting range: 0.00～maximum frequency | Default: 1.00Hz |

During acceleration, when the output frequency of the inverter exceeds the frequency detection level [F2-45] / [F2-47] setting value, after the lag frequency set by [F2-46] / [F2-48], the output Effective signal; when decelerating, when the output frequency of the inverter is lower than the frequency detection level, after the same lag frequency, the invalid signal is output. The output frequency detection is shown below:




| | | | |
|---|---|---|---|
| F2-49 | The detection frequency reaches the given frequency | Setting range: 0.00～50.00Hz | Default: 2.00Hz |

When the output frequency of the inverter reaches or is close to the given frequency value, the output terminal (Y / TA1-TB1-TC1, TA2-TB2-TC2) is selected to output a valid signal when "the given frequency arrives"; this function can be adjusted for the detection amplitude of the up and down deviation. The frequency arrival output is shown below:



## 4.4 Analog terminal parameters

| | | | |
|---|---|---|---|
| F3-00 | AI1 lower limit | Setting range: 0.00～10.00V | Default: 0.00V |
| F3-01 | AI1 lower limit corresponding setting | Setting range: -100.00～100.00% | Default: 0.00% |
| F3-02 | AI1 upper limit | Setting range: 0.00～10.00V | Default: 10.00V |
| F3-03 | AI1 upper limit corresponding setting | Setting range: -100.00～100.00% | Default: 100.00% |
| F3-04 | AI1 filter time | Setting range: 0.00～6.00s | Default: 0.10s |
| F3-05 | AI1 voltage / current selection | Setting range: 0: voltage 1: current | Default: 0 |

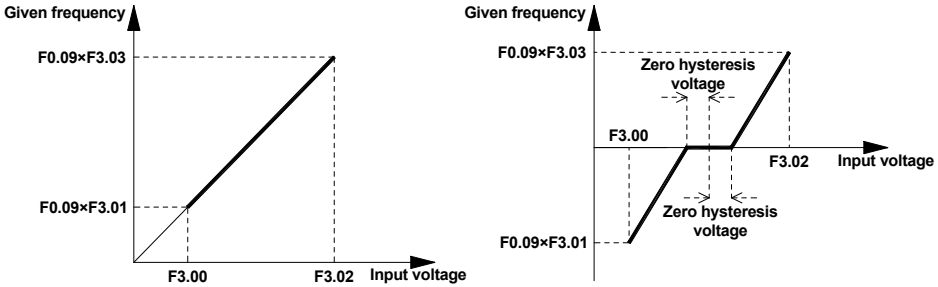
**AI1 lower limit value:** This function defines the signal received by the analog input terminal **(AI1).** The voltage signal lower than this value will be processed according to the **AI1** lower limit value.

**AI1 lower limit corresponding setting:** used to set the percentage of the set value corresponding to the **AI1** lower limit input analog quantity.

**AI1 upper limit value:** This function defines the signal received by the analog input terminal **(AI1).** If the voltage signal exceeds this value, the inverter will process it according to the AI1 upper limit value.

AI1 upper limit corresponding setting: used to set the percentage of AI1 upper limit input analog corresponding to the set value.

**AI1 filter time:** This parameter is defined as the size of the **(AI1)** input analog signal that is used to eliminate interference signals. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.




**Schematic diagram of analog given frequency**

**Tips: Set the frequency source to select AI1 as the timing, set the frequency to be adjusted to a negative value, and cooperate with [F0-16] hundred-digit selection frequency control direction for bipolar adjustment.**

| | | | |
|---|---|---|---|
| F3-06 | AI2 lower limit | Setting range: 0.00～10.00V | Default: 0.00V |
| F3-07 | AI2 lower limit corresponding setting | Setting range: 0.00～100.00% | Default: 0.00% |
| F3-08 | AI2 upper limit | Setting range: 0.00～10.00V | Default: 10.00V |
| F3-09 | AI2 upper limit corresponding setting | Setting range: 0.00～100.00% | Default: 100.00% |
| F3-10 | AI2 filter time | Setting range: 0.00～10.00s | Default: 0.010s |
| F3-11 | AI2 voltage / current selection | Setting range: 0: voltage 1: current | Default: 0 |
| F3-12 | AI1 terminal function selection | See X terminal function | Default: 0 |

| | | | |
|---|---|---|---|
| F3-13 | AI1 high level setting | 0.00～100.00% | Default: 70.00% |
| F3-14 | AI1 low level setting | 0.00～100.00% | Default: 30.00% |
| F3-15 | AI2 terminal function selection | See X terminal function | Default: 0 |
| F3-16 | AI2 high level setting | 0.00～100.00% | Default: 70.00% |
| F3-17 | AI2 low level setting | 0.00～100.00% | Default: 30.00% |

| | | | |
|---|---|---|---|
| F3-18 | Analog quantity to set the terminal effective state | Setting range: 0000～0111 | Default: 0000 |

**LED unit: AI1**

0: low level

1: high level

**Tens of LEDs: AI2**

0: low level

1: high level

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| F3-19 | Analog input curve selection | Setting range: 0000～0222 | Default: 0000 |

**LED unit: AI1**

**Tens of LEDs: AI2**

**LED hundreds / thousands reserved**

0: Straight line By default, the normal two-point straight line can be referred to the above "Simulation of Analog Reference Frequency".

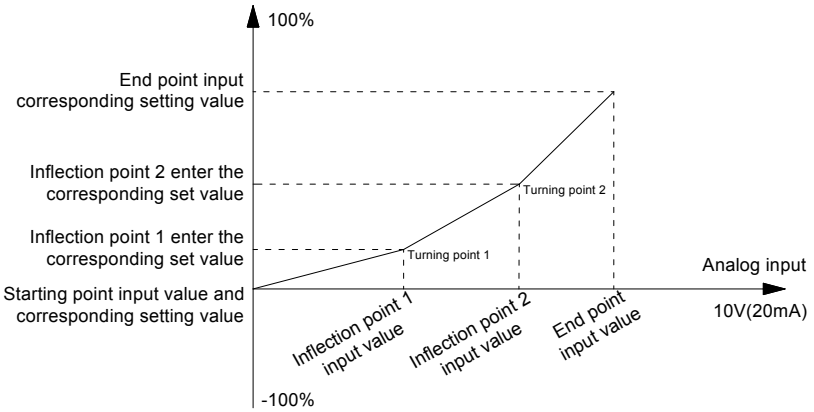
1: Curve 1 multi-point disconnection, please see the description of function code **[F3-21 ～ F3-28]**.

2: Curve 2 multi-point disconnection, please see the description of function code **[F3-29 ～ F3-36]**.

| | | | |
|---|---|---|---|
| F3-20 | | Reserved | |
| F3-21 | Curve 1 lower limit | Setting range: 0.00～10.00V | Default: 0.00V |
| F3-22 | Curve 1 lower limit corresponding setting | Setting range: 0.00～100.00% | Default: 0.0% |
| F3-23 | Curve 1 Inflection point 1 Input voltage | Setting range: 0.00～10.00V | Default: 3.00V |
| F3-24 | Curve 1 turning point 1 corresponding setting | Setting range: 0.00～100.00% | Default: 30.0% |
| F3-25 | Curve 1 Inflection point 2 Input voltage | Setting range: 0.00～10.00V | Default: 6.00V |
| F3-26 | Curve 1 turning point 2 corresponding setting | Setting range: 0.00～100.00% | Default: 60.0% |
| F3-27 | Curve 1 upper limit | Setting range: 0.00～10.00V | Default: 10.00V |
| F3-28 | Curve 1 upper limit corresponding setting | Setting range: 0.00～100.00% | Default: 100.0%z |
| F3-29 | Curve 2 lower limit | Setting range: 0.00～10.00V | Default: 0.00V |
| F3-30 | Curve 2 lower limit corresponding setting | Setting range: 0.00～100.00% | Default: 0.0% |
| F3-31 | Curve 2 Inflection point 1 Input voltage | Setting range: 0.00～10.00V | Default: 3.00V |
| F3-32 | Curve 2 inflection point 1 corresponding setting | Setting range: 0.00～100.00% | Default: 30.0% |
| F3-33 | Curve 2 Inflection point 2 Input voltage | Setting range: 0.00～10.00V | Default: 6.00V |
| F3-34 | Curve 2 Inflection point 2 corresponding setting | Setting range: 0.00～100.00% | Default: 60.0% |
| F3-35 | Curve 2 upper limit | Setting range: 0.00～10.00V | Default: 10.00V |
| F3-36 | Curve 2 upper limit corresponding setting | Setting range: 0.00～100.00% | Default: 100.0%z |

Curve 1 and curve 2 can be set with two inflection points, which are divided into three straight lines, and the slope of each section can be different, which can achieve a more flexible correspondence, as shown in the

following figure:




Schematic diagram of multi-point curve

If the curve 1 or curve 2 is selected by AS or AI (AS), the current must be converted into a voltage to set the current and voltage is doubled, 4mA corresponds to 2V, 20mA corresponds to 10V.

**Note: [F3-21, F3-23, F3-25, F3-27] and [F3-29, F3-31, F3-33, F3-35] The voltage input value must be set in increments.**

| F3-37 | AO output signal type | Setting range: 0000～0032 | Default: 0000 |
|---|---|---|---|

**Units: AO1**

0: 0 ～ 10V
1: 4.00 ～ 20.00mA
2: 0.00 ～ 20.00mA

**Ten: AO2**

0: 0 ～ 10V
1: 4.00 ～ 20.00mA
2: 0.00 ～ 20.00mA
3: FM frequency pulse output

Specify the output signal types of AO1 and AO2 terminals respectively, and choose voltage output and current output; AO2 can also be used as pulse output.

**Reminder: After selecting the output mode of the parameter, you also need to select the on-off mode of the control board switch J1, J2, J3.**

**1. When the frequency pulse output is selected, set the switch to J1;**

**2. When selecting 0.00 ～ 20.00mA or 4.00 ～ 20.00mA output, set the switch to J2;**

**3. When the 0 ～ 10V output is selected, set the switch to J3;**

**When the inverter leaves the factory, the software and hardware default to 0 ～ 10V output. If you need to change it, please change the hardware and software at the same time according to the actual output signal.**

| Transfer switch | Choose location | Legend | Function Description |
|---|---|---|---|

| | | | |
|---|---|---|---|
|  | J1 |  | 0 ～ 50kHz frequency output |
| | J2 |  | 0 ～ 20mA current output<br>4 ～ 20mA current output |
| | J3 |  | 0 ～ 10V voltage output |

| | | | |
|---|---|---|---|
| F3-38 | AO1 output selection | Setting range: 0～18 | Default: 0 |
| F3-39 | A02 output selection | | Default: 1 |

It is used to set the inverter monitoring quantity corresponding to the output signals of the multi-function output terminals **(AO1)** and **(AO2)**.

**(AO1)** The output signal is set by **[F3-53]** single digit.

**(AO2)** The output signal is set by **[F3-53]** tens place.

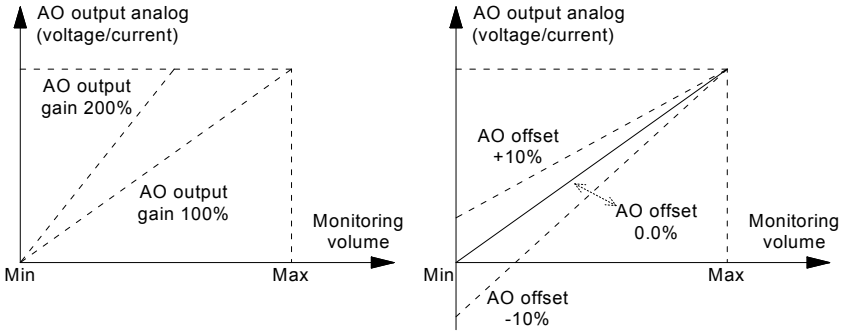
| Set value | Monitoring volume | Function Description | AO minimum output | AO maximum output |
|---|---|---|---|---|
| 0 | Given frequency | Corresponds to the given frequency of the current | The minimum output corresponds to 0.00Hz | Maximum output corresponds to maximum frequency |
| 1 | Output frequency | Corresponds to the output frequency of the current inverter | The minimum output corresponds to 0.00Hz | Maximum output corresponds to maximum frequency |
| 2 | Output current | Corresponds to the output current of the current inverter | The minimum output corresponds to 0.00A | The maximum output corresponds to twice the rated current of the inverter |
| 3 | Input voltage | Corresponds to the input voltage of the current inverter | The minimum output corresponds to 0V | The maximum output corresponds to twice the rated voltage of the inverter |
| 4 | Output voltage | Corresponds to the current inverter output voltage | The minimum output corresponds to 0V | The maximum output corresponds to the rated voltage of the inverter |
| 5 | Mechanical speed | Corresponds to the mechanical speed corresponding to the output frequency of the current | The minimum output corresponds to 0 speed | Maximum output corresponds to the speed corresponding to the maximum frequency |
| 6 | Given torque | Corresponds to the output torque of the current inverter | The minimum output corresponds to 0.00% torque | Maximum output corresponds to 200% torque |
| 7 | Output torque | Corresponds to the output torque of the current inverter | The minimum output corresponds to 0.00% torque | Maximum output corresponds to 200% torque |
| 8 | PID given amount | Corresponds to the PID given amount of the current inverter | The minimum output corresponds to 0.00% PID reference | Maximum output corresponds to 100% of PID given amount |

| | | | | |
|---|---|---|---|---|
| 9 | PID feedback | Corresponds to the PID feedback of the current inverter | The minimum output corresponds to 0.00% PID feedback | Maximum output corresponds to 100% PID feedback |
| 10 | Output Power | Corresponds to the output power of the current inverter | The minimum output corresponds to 0 power | Maximum output corresponds to rated output power |
| 11 | Bus voltage | Corresponds to the input voltage of the current inverter | The minimum output corresponds to 0V | The maximum output corresponds to twice the rated DC voltage of the inverter |
| 12 | AI1 input value | Corresponds to the current inverter's AI1 input value | The minimum output corresponds to the AI1 input lower limit | The maximum output corresponds to the upper limit of AI1 input |
| 13 | AI2 input value | Corresponds to the current inverter AI input value | The minimum output corresponds to the AI input lower limit | The maximum output corresponds to the upper limit of AI input |
| 14 | HDI input value | Corresponds to the current inverter's HDI input value | The minimum output corresponds to the HDI input lower limit | The maximum output corresponds to the upper limit of HDI input |
| 15 | Module temperature 1 | Corresponds to the current inverter module temperature 1 | The minimum output corresponds to the module temperature 1 is 0 degrees Celsius | Maximum output corresponding to module temperature 1 is 100 degrees Celsius |
| 16 | Module temperature 2 | Corresponds to the current inverter module temperature 2 | The minimum output corresponds to the module temperature 2 is 0 degrees Celsius | Maximum output corresponding to module temperature 2 is 100 degrees Celsius |
| 17 | RS485 given | AO1 address 0x3021 / 0x2021<br>AO2 address 0x3022 / 0x2022 | The minimum output corresponds to 0 | Maximum output corresponds to 1000 |

| | | | |
|---|---|---|---|
| F3-40 | AO1 output gain | Setting range: 25.0～200.0% | Default: 100.0% |
| F3-41 | A01 output signal offset | Setting range: -10.0～10.0% | Default: 0.0% |
| F3-42 | A01 output filter | Setting range: 0.000～6.000s | Default: 0.010s |

**AO1 output gain:** used to adjust (AO1) terminal output analog value.

**AO1 output signal offset:** used to adjust the zero point of (AO1) terminal output signal.



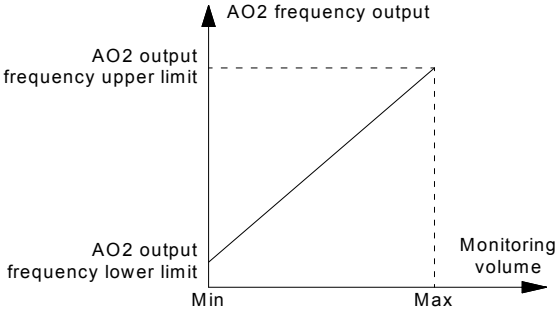
**A01 output filter:** This parameter is defined as the size of the AO1 output analog signal, which is used to eliminate interference signals. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.

| | | | |
|---|---|---|---|
| F3-43 | AO2 output gain | Setting range: 25.0～200.0% | Default: 100.0% |
| F3-44 | A02 Analog output signal offset | Setting range: -10.0～10.0% | Default: 0.0% |
| F3-45 | A02 output filter | Setting range: 0.000～6.000s | Default: 0.010s |

Please refer to the relevant parameter description of AO1.

| | | | |
|---|---|---|---|
| F3-46 | AO2FM frequency output lower limit | Setting range: 0.00～100.00kHz | Default: 0.20kHz |
| F3-47 | AO2FM frequency output upper limit | Setting range: 0.00～100.00kHz | Default: 50.00kHz |

Set the lower limit and upper limit frequency value of the output signal of AO2 when FM frequency pulse is output.




## 4.5 Keyboard and display parameters

| | | | |
|---|---|---|---|
| F4-00 | Parameter and key lock selection | Setting range: 0～3 | Default: 0 |

**0: not locked**

The parameters and key lock function are invalid.

**1: Function parameter lock**

It is forbidden to modify the setting value of all function parameters (except F0-08, the value can be modified by up and down keys). The keyboard cannot enter the parameter modification interface, and the monitoring amount can be selected by shifting the keyboard. The functions of all keys on the keyboard are not locked.

**2: Function parameters and key lock (except RUN / STOP / MF.K).**

Lock the setting values of all function parameters. The keyboard cannot enter the parameter modification interface, and the keyboard monitoring amount cannot be selected. It is forbidden to modify the parameters. At the same time, lock all keys on the keyboard except RUN / STOP / MF.K.

**3: The function parameters and keys are all locked**

Lock the setting values of all function parameters, prohibit the modification of parameters; at the same time lock all keys on the keyboard except PRG.

**Tips: 1: Unlock method of the dual-row digital tube keyboard: After pressing the "PRG" menu key, the**

**dual-row digital tube keyboard displays "CodE" on the first line of the digital tube. You can directly enter the user password (F4-01—user password) in the second line through the up and down keys and then press the "SET" key to unlock.**

**2: Unlock method of single-line digital tube keyboard: After pressing "PRG" menu key, the single-line digital tube keyboard displays "CodE". Then press the "SET" key to display the flashing input cursor, enter the user password (F4-01-user password) through the up and down keys, then press the "SET" key again to confirm, you can unlock.**

**3: The user password is a protective parameter set by the customer to protect the inverter parameters for random tampering. After the password is set, the password should be properly kept to prevent any inconvenience when the parameters need to be modified later.**

| | | | |
|---|---|---|---|
| F4-01 | User password | Setting range: 0～9999 | Default: 0 |

Used to set user password. When the parameter and key lock selection **[F4-00]** is locked (not "0"), the password must be entered before the lock can be released. The factory default password is 0, please keep the set password properly.

| | | | |
|---|---|---|---|
| F4-02～F4-06 | | Reserved | |
| F4-07 | Keyboard MF.K selection | Setting range: 0～1 | Default: 0 |

Set optional function of MF.K button

**0: reverse**

**1: Jog**

| | | | |
|---|---|---|---|
| F4-08 | Keyboard STOP key setting | Setting range: 0～2 | Default: 1 |

0: The non-keyboard control mode is invalid. The keyboard stop key STOP cannot be used as the stop key to stop when the non-keyboard control running signal.

1: Non-keyboard control mode stops according to the stop mode. The keyboard stop key STOP can be used as the stop key to stop when the non-keyboard control running signal.

2: Non-keyboard control mode stops in free mode The keyboard stop key STOP can be used as a stop key to freely stop when the non-keyboard control running signal.

**Note: If the terminal control or communication control mode is selected to be effective, then during terminal control or RS485 control, after pressing the keyboard stop key to stop, the inverter is in the stop locked state. At this time, if you want to make the inverter run again, you must first send the stop command through the selected run command channel, and then you can make the inverter run again after the locked state is released.**

| | | | |
|---|---|---|---|
| F4-09 | Keyboard up and down key selection | Setting range: 0000～0212 | Default: 0011 |

**LED unit position: keyboard up and down key modification selection**

0: Invalid The keyboard up and down key shortcut modification parameter function is invalid.

1: Used to adjust the frequency given by keyboard F0-08 The up and down keys on the keyboard can quickly modify the setting value of parameter **[F0-08].**

2: It is used to adjust the PID keyboard reference Fb-01. The up and down keys on the keyboard can quickly modify the setting value of parameter **[Fb-01].**

**Tens of LEDs: Power-off storage**

0: frequency is not stored when power off

1: Frequency power-off storage

Select whether the inverter saves the modified value to the corresponding parameter when the power is cut off after the parameter is quickly modified through the keyboard up and down keys.

**Hundreds of LEDs: action limit**

0: Adjustable running stop

1: Adjustable only during operation, keep at shutdown

2: Adjustable during operation, cleared at shutdown

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| F4-10 | Keyboard potentiometer lower limit | Setting range: 0.00～5.00V | Default: 0.50V |
| F4-11 | Corresponding to the lower limit of keyboard potentiometer | Setting range: 0.00～100.00% | Default: 0.00% |
| F4-12 | Upper limit value of keyboard potentiometer | Setting range: 0.00～5.00V | Default:.50V |
| F4-13 | Corresponding to the upper limit of keyboard potentiometer | Setting range: 0.00～100.00% | Default: 100.00% |

**Keyboard potentiometer lower limit value:** This function defines the signal lower limit value given by the keyboard potentiometer. If the voltage signal exceeds this value, the inverter will process the keyboard potentiometer lower limit value.

**Keyboard potentiometer lower limit corresponding setting:** used to set the percentage of the setting value corresponding to the keyboard potentiometer analog lower limit.

**Upper limit value of keyboard potentiometer:** This function defines the upper limit value of the signal given by the keyboard potentiometer. If the voltage signal exceeds this value, the inverter will process the upper limit value of the keyboard potentiometer.

**Keyboard potentiometer upper limit corresponding setting:** used to set the percentage of the setting value corresponding to the upper limit value of the analog value of the keyboard potentiometer.

| | | | |
|---|---|---|---|
| F4-14 | The content displayed in the running state of the first line of the keyboard | Setting range: 0000～6969 | Default: 1101 |
| F4-15 | The content displayed in the running state of the first line of the keyboard | Setting range: 0000～6969 | Default: 0402 |
| F4-16 | The content displayed in the first line of the keyboard when it is stopped | Setting range: 0000～6969 | Default: 1100 |
| F4-17 | The content displayed in the first line of the keyboard when it is stopped | Setting range: 0000～6969 | Default: 0402 |

**The display content of the first line of the keyboard in the running state:** set the content of the first line that can be cyclically monitored when the keyboard is in the running state. In the running state, the monitored content can be modified by the keyboard "SET" key. Each key press will jump one item. The cyclic monitoring parameter does not have the power-off memory function after being changed, and the value set by the LED digits is displayed by default after power-on.

**The display content of the first line of the keyboard in the stop state:** set the content of the first line that can be cyclically monitored when the keyboard is in the stop state. In the stop state, the monitored content can be modified by the keyboard "SET" key. Each key presses one item. The cyclic monitoring parameter does not have the power-off memory function after being changed. After power-on, the value set by the tenth digit of the LED is displayed by default. The setting content of the LED thousands and thousands digits is consistent with the C monitoring serial number.

| | | | |
|---|---|---|---|
| F4-18 | The content displayed on the second line of the keyboard | Setting range: 0000～6969 | Default: 0402 |
| F4-19 | The content displayed on the second line of the keyboard | Setting range: 0000～6969 | Default: 1210 |

| | | | |
|---|---|---|---|
| F4-20 | The second line of the keyboard displays the content in the stop state | Setting range: 0000～6969 | Default: 0402 |
| F4-21 | The second line of the keyboard displays the content in the stop state | Setting range: 0000～6969 | Default: 1210 |

It is valid only for the dual-line keyboard. For details, please refer to parameter **[F4-14 ～ F4-17]**.

| | | | |
|---|---|---|---|
| F4-22 | Keyboard display item settings | Setting range: 0000～1111 | Default: 0000 |

**LED unit: output frequency display selection**

0: Target frequency Shows the target frequency of the currently controlled motor.

1: Synchronous frequency Shows the output frequency of the inverter after calculation.

**Tens of LEDs: reserved**

**Hundreds of LEDs:** power display dimension Used to correct the output power of the inverter displayed by C-10, the unit of display power can be selected:

0: Power display percentage (%) shows that the output power is 100%, and 100.0% is the rated motor power

1: Power display kilowatt (KW) shows the actual value of output power

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| F4-23 | | Reserved | |
| F4-24 | Speed display coefficient | Setting range: 0.0～500.0% | Default: 100.0% |

This parameter sets the display coefficient of the keyboard monitoring item "mechanical speed". 100.0% corresponds to the rated motor speed.

| | | | |
|---|---|---|---|
| F4-25 | Power display coefficient | Setting range: 0.0～500.0% | Default: 100.0% |

## 4.6 Motor parameters

| | | | |
|---|---|---|---|
| F5-00 | Motor type | Setting range: 0: asynchronous motor (AM) | Default: 0 |

**Motor type:** read-only parameter indicating the current motor type. It is determined according to **[F0-00]** motor control method.

**0: asynchronous motor (AM)**

| | | | |
|---|---|---|---|
| F5-01 | Number of motor poles | Setting range: 2～48 | Default: 4 |

Set the number of motor poles, and set this parameter according to the value stated on the motor nameplate.

| | | | |
|---|---|---|---|
| F5-02 | Motor rated power | Setting range: 0.4～1000.0kW | Default: model setting |

Set the rated motor power in 0.1kW units. Each time the motor power setting value changes, the inverter automatically calls the corresponding default value parameter as the default value of **[F5-03 ~ F5-11]**. If parameter self-learning is performed, the parameter values of **[F5-07 ～ F5-11]** will be automatically changed according to the result of self-learning. When high-precision motor control is required, be sure to set the motor parameters correctly **[F5-01 ～ F5- 06]** After that, perform motor parameter self-learning.

| | | | |
|---|---|---|---|
| F5-03 | Motor rated frequency | Setting range: 0.01～Maximum frequency | Default: model setting |

Set the rated frequency of the motor, and set this parameter according to the rated frequency value recorded on the motor nameplate.

| | | | |
|---|---|---|---|
| F5-04 | Motor rated speed | Setting range: 0～65000rpm | Default: model setting |

Set the rated speed of the motor, and set this parameter according to the rated speed value recorded on the motor nameplate.

| | | | |
|---|---|---|---|
| F5-05 | Motor rated voltage | Setting range: 0～1500V | Default: model setting |

Set the motor rated voltage, and set this parameter according to the rated voltage value stated on the motor nameplate.

| | | | |
|---|---|---|---|
| F5-06 | Motor rated current | Setting range: 0.1～2000.0A | Default: model setting |

Set the rated current of the motor, and set this parameter according to the rated current value stated on the nameplate of the motor.

| | | | |
|---|---|---|---|
| F5-07 | Asynchronous motor no-load current | Setting range: 0.01～650.00A | Default: model setting |
| F5-08 | Asynchronous motor stator resistance | Setting range: 0.01～50.00% | Default: model setting |
| F5-09 | Rotor resistance of asynchronous motor | Setting range: 0.01～50.00% | Default: model setting |
| F5-10 | Asynchronous motor stator leakage inductance | Setting range: 0.01～50.00% | Default: model setting |
| F5-11 | Asynchronous motor stator inductance | Setting range: 0.1～2000.0% | Default: model setting |

For asynchronous motor model parameters, when **[F5-20]** is set for auto-tuning, the contents of **[F5-07 ～ F5-11]** will be changed automatically. If you know the exact motor model parameters, you can also enter the motor model parameters manually for debugging without performing parameter auto-tuning.

| | | | |
|---|---|---|---|
| F5-12～F5-19 | | Reserved | |
| F5-20 | Motor parameter identification | Setting range: 0～2 | Default: 0 |

**0: No operation** No self-learning of motor parameters, motor parameters are set according to default values.

**1: Rotation identification** Before auto-tuning, be sure to enter the value of the nameplate parameter [F5-01 ～ F5-06] of the controlled asynchronous motor correctly. During the rotation timing, the asynchronous motor is in a static state. At this time, the stator resistance, rotor resistance of the asynchronous motor and the fixed rotor inductance of the motor are automatically measured. The corresponding parameters are automatically written into the function code, and are automatically refreshed after the rotation tuning is completed. After the parameters are set, press the keyboard run key to start the rotary self-learning. At this time, the keyboard displays "t-01". After the parameter auto-tuning is completed, the motor automatically stops and the inverter returns to the standby state.

**2: Static identification** Before auto-tuning, be sure to enter the value of the nameplate parameter [F5-01 ～ F5-06] of the controlled asynchronous motor correctly. The motor is in a static state during static adjustment. At this time, the stator resistance, rotor resistance and stator rotor inductance of the asynchronous motor are automatically measured, and the measured parameters are automatically written into the function code accordingly. After the parameters are set, press the keyboard run key to start the static self-learning. At this time, the keyboard displays "t-02". After the parameter auto-tuning is complete, the running indicator goes out and the inverter returns to the standby state.

**Note: After the parameter auto-tuning is finished, the setting value of [F5-20] will be automatically set to "0".**

**Attention: 1. Before setting [F5-20] to "1" for rotary type self-learning, the motor shaft should be disconnected from the load, and the motor is prohibited to carry out rotation parameter self-learning with load.**

**2. In some occasions (such as when the motor cannot be separated from the load), it is not convenient to perform rotary self-learning or the user does not have high requirements for motor control performance. If you do not perform self-learning, be sure to enter the motor nameplate parameters [F5-01 ～ F5-06] correctly.**

**3. If the user already knows the accurate motor parameters, he can directly input the motor**

**parameters to [F5-01 ～ F5-11].**

**4. Before starting self-learning, make sure that the motor is in a stopped state, otherwise self-learning cannot be performed normally.**

**5. When [F5-20] is set to "1", if overvoltage or overcurrent faults occur during self-learning, the acceleration / deceleration time [F0-14, F0-15] can be extended appropriately.**

**6. If the inverter's static self-learning is unsuccessful, report E.tE1 fault; if the inverter's rotary self-learning is unsuccessful, report E.tE2 fault.**

| | | | |
|---|---|---|---|
| F5-21～F5-29 | | Reserved | |
| F5-30 | Speed feedback or encoder type | Setting range: 0000～1111 | Default: 0000 |

**Units of LED: Encoder type** Set the encoder type according to the actual encoder settings.

0: ordinary ABZ encoder

1: resolver

**Tens of LED: Encoder direction** When it is found that the motor speed and the encoder speed measurement direction are inconsistent, exchange the direction by setting this parameter.

0: consistent direction;

1: The direction is opposite

**Hundreds of LEDs: wire break detection** After the wire break detection is turned on, the inverter will report an encoder failure and stop when it detects that the encoder is broken.

0: close

1: open

**Thousands of LEDs: Z pulse correction enabled**

0: close

1: open

| | | | |
|---|---|---|---|
| F5-31 | ABZ encoder line number | Setting range: 0～60000 | Default: 1024 |

**ABZ encoder line number:** used to set the number of pulses output by the speed feedback sensor per week, please set accurately according to the sensor specifications.

| | | | |
|---|---|---|---|
| F5-32 | Disconnection detection time | Setting range: 0.100～60.000s | Default: 2.000s |

**Disconnection detection time:** It is used to set the delay time to confirm the sensor disconnection when the sensor disconnection detection is valid. Set 0sec to disable the disconnection detection function;

| | | | |
|---|---|---|---|
| F5-33 | Resolver pole number | Setting range: 2～128 | Default: 2 |

**Resolver pole number:** The number of poles is set according to the resolver actually selected, which is generally a 2-pole resolver.

| | | | |
|---|---|---|---|
| F5-34 ～ F5-35 | | Reserved | |
| F5-36 | Encoder speed filter | Setting range: 0.0～100.0ms | Default: 1.0ms |

If the feedback interference of the motor encoder is large, the filtering time of the speed measurement can be appropriately increased, but the increase of the filtering time will reduce the response performance of the system. In some occasions with higher requirements for response performance, too large filtering time will cause system oscillation.

## 4.7 Vector control parameters

| | | | |
|---|---|---|---|
| F6-00 | Speed loop proportional gain 1 | Setting range: 0.01～100.00 | Default: 10.00 |
| F6-01 | Speed loop integration time 1 | Setting range: 0.000～6.000 | Default: 0.500 |
| F6-02 | Speed loop filter time 1 | Setting range: 0.0～100.0ms | Default: 0.0ms |
| F6-03 | Speed loop switching frequency 1 | Setting range: 0.00～50.00Hz | Default: 5.00Hz |
| F6-04 | Speed loop proportional gain 2 | Setting range: 0.01～100.00 | Default: 10.00 |
| F6-05 | Speed loop integration time 2 | Setting range: 0.000～6.000s | Default: 0.500s |
| F6-06 | Speed loop filter time 2 | Setting range: 0.0～100.0ms | Default: 0.0ms |
| F6-07 | Speed loop switching frequency 2 | Setting range: 0.00～50.00Hz | Default: 5.00Hz |

**Speed loop proportional gain and integration time setting:** Increasing the proportional gain can speed up the dynamic response of the system; but the proportional gain is too large, the system is prone to oscillation. Reducing the integration time can speed up the dynamic response of the system; but if the integration time is too small, the system overshoot is large and it is easy to produce oscillations. Generally, adjust the proportional gain first to ensure that the system does not oscillate as much as possible; then adjust the integration time so that the system has both fast response characteristics and little overshoot.

**Note: If the proportional gain is too large and the integration time is too small, the system may generate an overvoltage fault (if there is no external braking resistor or braking unit) after it is quickly started to high speed. This is due to the decrease process after speed overshoot. The system regenerative braking state energy feedback. It can be avoided by reducing the proportional gain and increasing the integration time parameter.**

ASR (speed loop) adjustment of proportional gain and integration time parameters in high and low speed operation: if the system has fast response requirements for high and low speed on-load operation, ASR switching frequency can be set [F6-03] and **[F6 -07]**.

Generally, when the system is running at low frequency, to improve the dynamic response characteristics, the proportional gain can be relatively increased and the integration time can be reduced. Generally adjust the speed regulator parameters in the following order: select the appropriate switching frequency **[F6-03]** and **[F6-07]**. When the output frequency is below the switching frequency 1 **[F6-04]**, the first group of ASR (speed loop) parameters are valid; when the output frequency is above the switching frequency 2 **[F6-07]**, the second group of ASR (speed loop) parameters are valid; When the output frequency is between switching frequency 1 [F6-03] and switching frequency 2 **[F6-07]**, the parameters are linearly and proportionally transitioned from the first set of ASR (speed loop) parameters to the second set of ASR (speed loop) parameters. Adjust ASR (speed loop) proportional gain 1 **[F6-00]** and ASR (speed loop) integration time 1 **[F6-01]** at low speed to ensure that there is no oscillation at low frequency and good dynamic response characteristics. Adjust the ASR (speed loop) proportional gain 2 [F6-04] and ASR (speed loop) integration time 2 **[F6-05]** at high speed to ensure that the system does not oscillate and the dynamic response characteristics are good.

| | | | |
|---|---|---|---|
| F6-08 | Electric torque limit | Setting range: 0.0～250.0% | Default: 180.0% |
| F6-09 | Generation torque limit | Setting range: 0.0～250.0% | Default: 180.0% |

Set the PI parameters of the current loop during vector control of asynchronous and synchronous machines. During vector control, if speed, current oscillation or instability occurs, the gains can be appropriately reduced to achieve stability; at the same time, increasing the gains can help improve the dynamic response of the motor.

| | | | |
|---|---|---|---|
| F6-10 | Current loop straight axis proportional gain | Setting range: 0.001～4.000 | Default: 1.000 |
| F6-11 | Current loop integral gain | Setting range: 0.001～4.000 | Default: 1.000 |
| F6-12 | Current loop cross axis proportional gain | Setting range: 0.001～4.000 | Default: 1.000 |
| F6-13 | Current loop cross axis integral gain | Setting range: 0.001～4.000 | Default: 1.000 |

Set the PI parameters of the current loop during vector control of asynchronous and synchronous machines. During vector control, if there are speed, current oscillation, and instability, each gain can be appropriately reduced to achieve stability; at the same time, increasing each gain helps to improve the dynamic response of the motor.

| | | | |
|---|---|---|---|
| F6-15 | Vector electric slip compensation | Setting range: 0.0～250.0% | Default: 100.0% |
| F6-16～F6-21 | | Reserved | |

The asynchronous motor vector control is effective. When the loop vector is open, the slip compensation coefficient is used to adjust the motor speed accuracy. When the motor speed is lower than the set value after loading, the value needs to be increased, and vice versa.

When the closed-loop vector is used, this value is used to adjust the linearity of the motor output torque and output current. When the motor has a rated load and the motor current deviates more than the rated value marked on the nameplate, the larger the value is, the smaller Increase the value.

| | | | |
|---|---|---|---|
| F6-22 | Over-excitation braking gain | Setting range: 0.0～500.0% | Default: 100.0% |
| F6-23 | Over-excitation braking limit | Setting range: 0.0～250.0% | Default: 100.0% |

The asynchronous motor closed-loop vector control is effective. The over-excitation function can achieve faster deceleration control without overvoltage. The greater the over-excitation gain, the faster the control response. The braking limit is relative to the rated excitation of the motor. The better the dynamic effect. However, an excessively large limit will increase the temperature rise of the motor during deceleration, and the value can only be increased appropriately when the motor has good heat dissipation.

| | | | |
|---|---|---|---|
| F6-24 | Vector control energy saving function | Setting range: 0～1 | Default: 0 |
| F6-25 | Energy-saving control gain | Setting range: 0.0～80.0% | Default: 50.0% |
| F6-26 | Energy-saving control low-pass filtering | Setting range: 0.000～6.000s | Default: 0.010s |

The asynchronous machine vector control is effective. During energy-saving operation, the output current is automatically reduced by analyzing the torque output to reduce the motor's heat loss to achieve the energy-saving effect.

| | | | |
|---|---|---|---|
| F6-27 | Motor power limit in constant power zone | Setting range: 0.0～250.0% | Default: 150.0% |

Under vector control, the motor output power is controlled. When the motor is running at low and medium speeds, it is in the constant torque zone. At this time, the motor torque output is limited by electric / generator torque **[F6-08 ～ F6-09]**, and the rated speed is above During operation, it is in the constant power zone. At this time, the output power is limited to **[F6-27]**, and the motor torque output decreases in inverse proportion to the speed.

## 4.8 Torque control parameters

| | | | |
|---|---|---|---|
| F7-00 | Torque / speed control | Setting range: 0 ～ 1 | Default: 0 |

**0: speed control**
**1: Torque control** This option is only effective under vector control.

| F7-01 | Torque reference channel selection | Setting range: 0 ～ 5 | Default: 0 |
|---|---|---|---|

The torque setting adopts a relative value, and 100.0% corresponds to the rated torque of the motor. The setting range is 0% to 200.0%, indicating that the maximum torque of the inverter is 2 times the rated torque of the inverter.

**0: keyboard number given** It is given by the function code **[F7-02]**.

**1: keyboard potentiometer given** Set by analog value of keyboard potentiometer.

**2: AI1** Set by AI1 terminal voltage analog input.

**3: AI2** It is set by the AI2 terminal voltage or current analog input. The voltage or current input can be selected by the switch on the control board.

**4: HDI** High-speed pulse input by HDI terminal.

**5: RS485 communication given** Set by RS485 serial communication, the communication address is 0x3005 / 0x2005.

| F7-02 | Torque keyboard digital setting | Setting range: 0 ～ 100.0% | Default: 0.0% |
|---|---|---|---|

When the function code **[F7-01] = 0**, the torque setting value is given by the function code **[F7-02]**.

| F7-03 | Torque input lower limit | Setting range: 0.00～100.00% | Default: 0.00% |
|---|---|---|---|
| F7-04 | Lower limit corresponding setting | Setting range: -200.00～200.00% | Default: 0.00% |
| F7-05 | Torque input upper limit | Setting range: 0.00～100.00% | Default: 100.00% |
| F7-06 | Upper limit corresponding setting | Setting range: -200.00～200.00% | Default: 100.00% |
| F7-07 | Reference torque filter time | Setting range: 0.000～6.000s | Default: 0.100s |

Use **[F7-03 ～ F7-06]** to linearize the torque reference channel to obtain the torque reference value.
**Given first-order filter time:** Filter the torque given value to make the given torque change smoothly.

| F7-08 | Output torque upper limit | Setting range: 0 ～ 200.0% | Default: 150.0% |
|---|---|---|---|
| F7-09 | Output torque lower limit | Setting range: 0 ～ 200.0% | Default: 0% |

**Output torque upper limit:** used to set the output torque upper limit during torque control;
**Output torque lower limit:** used to set the output torque lower limit during torque control;

| F7-10 | Torque control forward speed limit selection | Setting range: 0 ～ 5 | Default: 0 |
|---|---|---|---|

It is used to set the maximum running frequency limit of the inverter in torque control mode.
When the inverter torque control, if the load torque is less than the output torque of the motor, the motor speed will continue to rise, in order to prevent accidents such as speeding of the mechanical system, the maximum motor speed during torque control must be limited.

**0: keyboard number given** It is given by function code **[F7-12]**.

**1: Keyboard potentiometer setting × F7-12** Set by analog value of keyboard potentiometer.

**2: AI1 × F7-12** Set by AI1 terminal voltage analog input.

**3: AI2 ×F7-12** It is set by the AI2 terminal voltage or current analog input. The voltage or current input can be selected by the switch on the control board.

**4: HDI × F7-12** High-speed pulse input by HDI terminal.

**5: RS485 communication setting × F7-12** Set by RS485 serial communication, the communication

address is 0x3006 / 0x2006.

**Note: setting 100% corresponds to the maximum output frequency**

| F7-11 | Torque control reverse speed limit selection | Setting range: 0 ～ 5 | Default: 0 |
|---|---|---|---|

**0: keyboard number given** It is given by function code **[F7-13]**.

**1: Keyboard potentiometer setting × F7-13** Set by analog value of keyboard potentiometer.

**2：AI1 × F7-13** Set by AI1 terminal voltage analog input.

**3：AI2 ×F7-13** It is set by the AI2 terminal voltage or current analog input. The voltage or current input can be selected by the switch on the control board.

**4: HDI × F7-13** High-speed pulse input by HDI terminal.

**5: RS485 communication setting × F7-13** Set by RS485 serial communication, the communication address is 0x3007 / 0x2007.

**Note: setting 100% corresponds to the maximum output frequency**

| F7-12 | Torque control forward rotation maximum speed digital limit | Setting range: 0.0 ～ 100.0% | Default: 100.0% |
|---|---|---|---|
| F7-13 | Torque control reverse maximum speed digital limit | Setting range: 0.0 ～ 100.0% | Default: 100.0% |

When the function codes **[F7-10]** and **[F7-11]** are set to 0, the maximum speed limit will be set by **[F7-12]** and **[F7-13]**. In order to prevent the initial commissioning of the torque function, a default speed setting of 100.0% appears to be less, enabling protection

## 4.9 V / F control parameters

| F8-00 | Linear V / F curve selection | Setting range:：0～11 | Default: 0 |
|---|---|---|---|

**V / F curve selection** It is used to select the type of V / F curve to meet the requirements of different load characteristics.

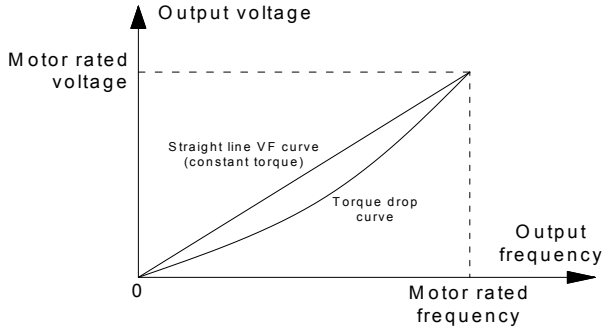
0: straight line VF curve;

1-9: 1.1 to 1.9 power VF decreasing torque curves, as shown in the figure below;

10: square VF curve;

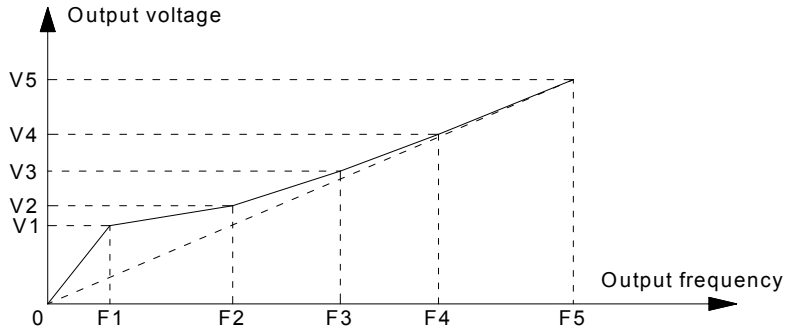
11: Multi-point VF curve; refer to **[F8-01 ～ F8-10]**;

The default straight VF curve is suitable for most general occasions; the multiple power curve and the square VF curve are generally used for fans or pumps, which can reduce high-frequency current and achieve energy-saving effects.



| | | | |
|---|---|---|---|
| F8-01 | V / F voltage V1 | Setting range: 0.0～100.0% | Default: 3.0% |
| F8-02 | V / F frequency F1 | Setting range: 0.00～Maximum frequency | Default: 1.00Hz |
| F8-03 | V / F voltage V2 | Setting range: 0.0～100.0% | Default: 28.0% |
| F8-04 | V / F frequency F2 | Setting range: 0.00～Maximum frequency | Default: 10.00Hz |
| F8-05 | V / F voltage V3 | Setting range: 0.0～100.0% | Default: 55.0% |
| F8-06 | V / F frequency F3 | Setting range: 0.00～Maximum frequency | Default: 25.00Hz |
| F8-07 | V / F voltage V4 | Setting range: 0.0～100.0% | Default: 78.0% |
| F8-08 | V / F frequency F4 | Setting range: 0.00～Maximum frequency | Default: 37.50Hz |
| F8-09 | V / F voltage V5 | Setting range: 0.0～100.0% | Default: 100.0% |
| F8-10 | V / F frequency F5 | Setting range: 0.00～Maximum frequency | Default: 50.00Hz |

**Self-setting V / F curve:**




The user sets the first / second / three / fourth / fifth voltage percentages of the V / F curve based on the inverter 's rated output voltage of 100.0%, corresponding to the frequency points of F1 / F2 / F3 / F4 / F5; The user sets the first, second, third, fourth, and fifth frequency values of the V / F curve, which correspond to V1 / V2 / V3 / V4 / V5, respectively. This group of parameter settings must meet the following conditions:
0≤F1≤F2≤F3≤F4≤F5≤maximum frequency; 0≤V1≤V2≤V3≤V4≤V5≤100.0%
V1, V2, V3, V4, V5 are based on the rated motor voltage.

| | | | |
|---|---|---|---|
| F8-11 | Output voltage percentage | Setting range: 25～120% | Default: 100% |

The output voltage adjustment factor of the inverter. This function is used to adjust the output voltage of the inverter to meet the needs of different V / F characteristics.

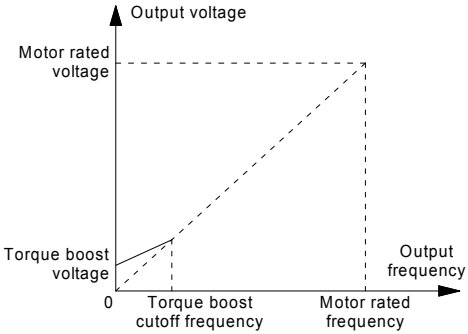
| | | | |
|---|---|---|---|
| F8-12 | torque boos | Setting range: 0.0～30.0% | Default: 0.0% |
| F8-13 | Torque boost cutoff frequency | Setting range: 0.0～100.0% | Default: 100.0% |

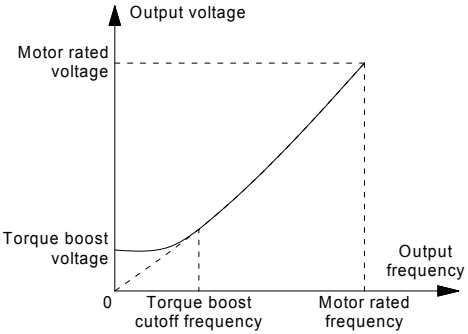
**Torque boost:** [F8-12] is set to 0.0 for automatic torque boost, and the output voltage is automatically compensated according to the size of the load; [F8-12] is set to other values for fixed torque boost, and the output voltage is compensated according to the output frequency To improve the low-frequency torque characteristics of the inverter. Please select the torque boost value according to the size of the load. During low-frequency operation, the torque boost value is too high, the motor may be overexcited,

and it is easy to overheat for a long time. In severe cases, the inverter may have overcurrent fault protection, or the inverter may not start .

**Note: When the parameter [F8-00] is set to "1" to customize the V / F curve, the torque boost value set by the parameter [F8-12] is invalid, and the inverter runs according to the customized V / F curve.**

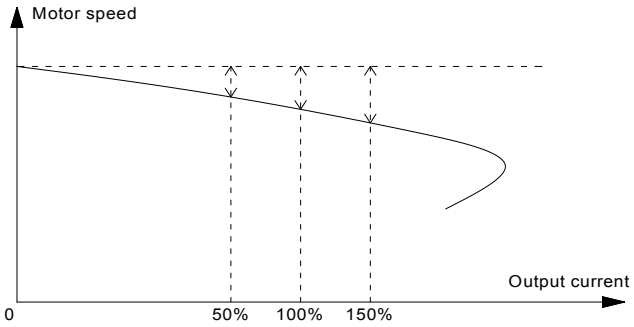
**Torque boost cutoff frequency:** Set the effective range of the torque boost function. When the output frequency exceeds this value, the torque boost function is cut off. 100.0% corresponds to the rated frequency of the motor.




| | | | |
|---|---|---|---|
| F8-14 | V / F slip compensation gain | Setting range: 0.0～200.0% | Default: 100.0% |
| F8-15 | V / F slip compensation limit | Setting range: 0.0～300.0% | Default: 100.0% |
| F8-16 | V / F slip compensation filter | Setting range: 0.000～6.000s | Default: 0.200s |

This function enables the output frequency of the inverter to be automatically adjusted within the set range with the change of the motor load; to dynamically compensate the slip frequency of the motor, so that the motor basically maintains a constant speed, effectively reducing the impact of load changes on the motor speed.




If it is used together with the automatic torque boost function, the low-frequency torque characteristics of the inverter can be significantly improved. 100.0% of the slip frequency compensation amount corresponds to the rated slip of the motor. Setting the compensation value too large may cause the motor speed to exceed the set value, so **[F8-15]** is required to set the limit. The slip compensation filtering time is the size of the slip compensation filtering, which is used to eliminate interference signals. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.

| | | | |
|---|---|---|---|
| F8-17 | Oscillation suppression gain | Setting range: 0.0～900.0% | Default: 100.0% |

When the motor control mode F0-00 = 0 or 1, medium and high power occasions are prone to motor current instability and motor speed oscillation. This is a low-frequency resonance caused by the combination of electrical and mechanical effects. By adjusting **[F8-17]**, low-frequency resonance can be suppressed, but excessive suppression gain may cause additional stability problems.

| | | | |
|---|---|---|---|
| F8-18 | | Resereved | |
| F8-19 | V / F automatic energy-saving control | Setting range: 0～1 | Default: 0 |
| F8-20 | Lower frequency limit of energy-saving buck frequency | Setting range: 0.0～50.00Hz | Default: 15.00Hz |
| F8-21 | Lower limit of energy-saving buck voltage | Setting range: 0.0～100.0% | Default: 50.0% |
| F8-22 | Energy-saving buck voltage regulation rate | Setting range: 0～0.200V/MS | Default: 0.010V/MS |
| F8-23 | Energy saving buck voltage recovery rate | Setting range: 0～2.000V/MS | Default: 0.200V/MS |

**Automatic energy-saving control:** when the motor is under light load, the inverter automatically adjusts the output voltage after entering the constant speed, improving the efficiency of the motor to achieve the purpose of energy saving.

0: close

1: open

**Energy saving step-down frequency lower limit:** When the output frequency of the inverter is lower than this value, the automatic energy saving control will be invalid.

**Energy saving step-down voltage lower limit:** the lower limit of output voltage that can be reduced during automatic energy-saving operation. 100.0% is the output voltage corresponding to the current output frequency without energy-saving control.

**Energy-saving buck voltage regulation rate:** The rate of voltage regulation during the energy-saving buck process.

**Energy saving buck voltage recovery rate:** the rate at which the voltage rises back to normal voltage when the energy saving buck process is exited.

**Note: The automatic energy saving is entered only at a constant speed, so this function is not suitable for the occasion where the given frequency changes frequently.**

| | | | |
|---|---|---|---|
| F8-24～F8-29 | | Resereved | |
| F8-30 | Voltage-frequency separated output voltage source | Setting range: 0～6 | Default: 0 |

When **[F0-01]** = 3 (voltage-frequency separation output mode), the function code sets the source of the output voltage command; in voltage-frequency separation output mode, the output voltage command 100.0% corresponds to the rated motor voltage **[F5-05]**, output The frequency command is still specified by the channel A and B frequency sources, see **[F0-03], [F0-04], [F0-06]**.

**0: Function code F8-31 setting**

**1: keyboard potentiometer given** Given by keyboard potentiometer

**2: Voltage analog AI1 is given** Set by AI1 terminal voltage analog input.

**3: Voltage / current analog AI2 given** It is set by the AI2 terminal voltage or current analog input. The voltage or current input can be selected by the switch on the control board.

**4: Terminal pulse HDI setting** The high-speed pulse input by the HDI terminal is set, and the corresponding range is from 1K to 50K, and the corresponding voltage is 0 to the rated voltage of the inverter.

**5: PID output given** Set by PID output

**6: RS485 communication given** Set by RS485 serial communication, the communication address is 0x300A / 0x200A.

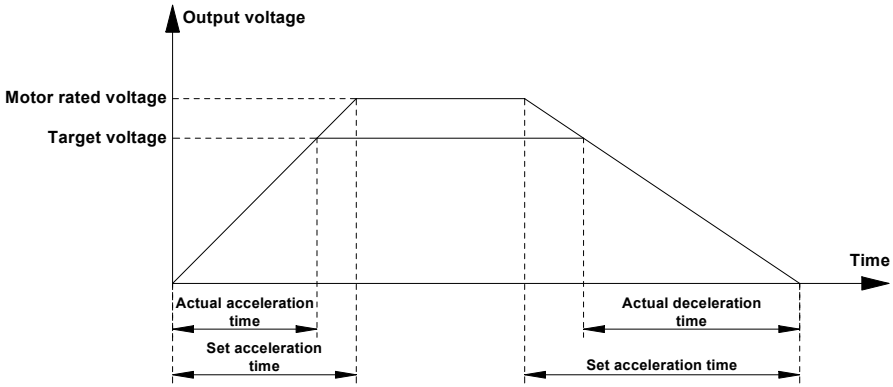
| | | | |
|---|---|---|---|
| F8-31 | Digital setting of voltage-frequency separation output voltage | Setting range: 0.0%～100.0% | Default: 0 |

**Digital setting of voltage-frequency separation voltage:** When **[F8-30]** = 0, this parameter determines the reference of the voltage source, and 100% corresponds to the rated voltage of the motor.

| | | | |
|---|---|---|---|
| F8-32 | Voltage-frequency separation voltage acceleration time | Setting range: 0.00～100.00s | Default: 10.00 |
| F8-33 | Voltage-frequency separation voltage deceleration time | Setting range: 0.00～100.00s | Default: 10.00 |

**Voltage-frequency separation voltage acceleration time:** refers to the time required for the output voltage to accelerate from 0 to the rated voltage of the motor.

**Voltage-frequency separation voltage deceleration time:** refers to the time required for the output voltage to decelerate from the rated voltage to 0.




**Schematic diagram of voltage-frequency separation**

| F8-34 | Voltage-frequency separation stop mode | Setting range: 0～1 | Default: 0 |
|---|---|---|---|

The function code sets the stop mode of the voltage-frequency separation mode:

**0: The output voltage and output frequency acceleration and deceleration do not affect each other**

**1: After the output voltage drops to 0V, the output frequency drops again.**

**Note: 1. When switching between forward and reverse rotation, [F8-34] selection control is invalid, the output voltage decelerates to zero first, then the output frequency decelerates to zero, and then the direction is switched.**

**2. When [F8-34] = 0, the frequency and voltage are decelerated at the same time, but the shutdown is based on the frequency setting time. When the voltage deceleration time is greater than the frequency, the greater time is invalid.**

## 4.10 Enhanced function parameter group

| F9-00 | Jump frequency 1 | 0.00～Maximum frequency | Default: 0.00Hz |
|---|---|---|---|
| F9-01 | Jump frequency amplitude 1 | 0.00～Maximum frequency | Default: 0.00Hz |
| F9-02 | Jump frequency 2 | 0.00～Maximum frequency | Default: 0.00Hz |
| F9-03 | Jump frequency amplitude 2 | 0.00～Maximum frequency | Default: 0.00Hz |
| F9-04～F9-07 | | Reserved | |

| F9-08 | Swing frequency control | Setting range: 0～1 | Default: 0 |
|---|---|---|---|
| F9-09 | Swing frequency amplitude control | Setting range: 0～1 | Default: 0 |
| F9-10 | Reserved | | |
| F9-11 | Swing frequency amplitude | Setting range: 0.0～100.0% | Default: 10.0% |
| F9-12 | Jump frequency amplitude | Setting range: 0.0～50.0% | Default: 10.0% |
| F9-13 | Swing frequency rise time | Setting range: 0.00～650.00s | Default: 5.00s |
| F9-14 | Wobble frequency fall time | Setting range: 0.00～650.00s | Default: 5.00s |

During wobble frequency operation, the inverter periodically changes the output frequency with the preset acceleration and deceleration time. This function is especially suitable for the textile industry and other

systems that allow the speed to change according to the different diameters of the bobbin.

The center frequency of the wobble frequency comes from the frequency set by the main and auxiliary channels given by the frequency, multi-stage speed or program control (PLC); the wobble frequency is automatically canceled during jog and closed-loop operation. When the PLC and the wobble frequency are running at the same time, the wobble frequency function is invalid when switching between the PLC frequency segments. After the PLC stage acceleration and deceleration settings transition to the PLC set frequency, the wobble frequency starts.

When using the swing frequency function ([F9-08] is valid), the inverter first accelerates to the center frequency of the swing frequency according to the acceleration time, and then presses the set swing frequency amplitude [F9-11], jump frequency [F9- 12]. Wobble frequency rise time [F9-13] and wobble frequency fall time [F9-14] The wobble frequency runs cyclically until it is decelerated and stopped according to the deceleration time after a stop command.

**Swing frequency control**

This parameter defines whether to use the wobble frequency function.

0: Swing frequency control is invalid

1: Swing frequency control is effective

**Swing control**

0: The swing amplitude changes relative to the center frequency. The swing amplitude AW changes with the center frequency. For the change rate, see **[F9-11]**.

1: Relative maximum frequency The swing amplitude is fixed. The swing amplitude AW is determined by the maximum frequency and **[F9-11]**.

**Swing frequency amplitude:** This parameter defines the amplitude of the frequency swing during swing frequency control.

**Variable swing: AW = center frequency × [F9-11]**

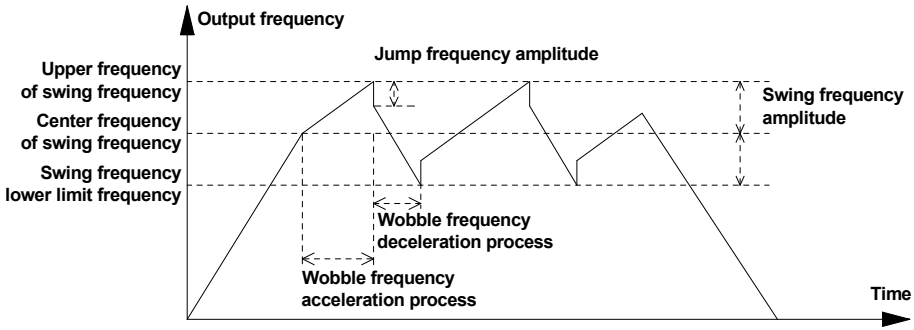
**Fixed swing: AW = maximum operating frequency [F0-09] × [F9-11]**

**Jump frequency amplitude:** used to set the jump frequency during wobble frequency operation.

**Sudden jump frequency = swing amplitude AW × [F9-12]**

**Swing frequency rise time:** used to set the acceleration time of swing frequency.

**Swing frequency falling time:** used to set the deceleration time of swing frequency.



| | | | |
|---|---|---|---|
| F9-15 | Fan control | 0 ～2 | Default: 1 |

**0: The fan runs after the inverter is powered on**

**1: Shutdown is related to temperature, running is running**

**2: The stop fan stops, the operation is related to the temperature**

| | | | |
|---|---|---|---|
| F9-16 | Energy consumption braking enable | 0 ～1 | Default: 0 |
| F9-17 | Energy consumption braking action voltage | 115.0%～150.0% | Default: 135.0% |
| F9-18 | Energy consumption braking utilization rate | 0.0～100.0% | Default: 10.0 % |
| F9-19～F9-20 | | Reserved | |

## 4.11 Fault and protection parameters

| | | | |
|---|---|---|---|
| FA-00 | Overcurrent suppression function | Setting range: 0 ～ 1 | Default: 0 |
| FA-01 | Overcurrent suppression point | Setting range: 0.0 ～ 300.0% | Default: 160.0% |
| FA-02 | Overcurrent suppression gain | Setting range: 0.0 ～ 500.0% | Default: 100.0% |

**Overcurrent suppression function** The over-current suppression function is to limit the over-current suppression point automatically during real-time monitoring of the load current during operation to prevent fault trip caused by excessive current. This function is especially suitable.

**0: suppression is always effective;**

**1: Acceleration and deceleration are valid, constant speed is invalid;**

**Overcurrent suppression point** The set current limit level (the inverter controls the output current by stopping acceleration, decelerating or decreasing, and increasing the output frequency).

**Overcurrent suppression gain** This parameter can be used to adjust the response speed of overcurrent suppression.

**Note:** The use of this function may prolong the acceleration and deceleration time. When the inverter starts and stops, if the output frequency cannot run to the given frequency under the expected acceleration and deceleration time under the condition of large current, it indicates that the current limiting function is activated. Please reduce the load or adjust the relevant parameters.

| | | | |
|---|---|---|---|
| FA-03 | Current hardware protection settings | Setting range: 0000～0201 | Default: 0001 |

**Units of LED: Wave-by-wave current limiting** The wave-by-wave current limiting is protected by hardware, which can limit the rise of current to a certain extent, so that the current does not exceed the protection value of the inverter, and avoid stopping due to skipped current faults.

0: close

1: open

**Tens of LEDs: reserved**

**Hundreds of LEDs:** SC protection interference suppression When this function is valid, the inverter will

intelligently judge the E. SC alarm, eliminate interference, and only alarm the real fault signal. This function may delay the alarm time, please use it with caution.

0: close

1: First-level interference suppression

2: Secondary interference suppression

| | | | |
|---|---|---|---|
| FA-04～FA-05 | | Reserved | |
| FA-06 | Busbar overvoltage suppression function | Setting range: 0000～0012 | Default: 0012 |

**ED one bit: Overvoltage suppression control**

0: prohibited

1: Only enabled during deceleration

2: Enable both under acceleration and deceleration

**Select whether the voltage suppression function is effective when the inverter decelerates.** If this function is valid, when the bus voltage of the inverter reaches or exceeds the value set by **[FA-07]** during deceleration, the inverter will slow down or stop deceleration, so as to ensure that the inverter does not skip the voltage due to the high bus voltage protection.

**Select whether the voltage suppression function is effective when the inverter accelerates.** When the accelerating bus voltage of the inverter reaches or exceeds the value set by **[FA-07],** the inverter will automatically adjust the operating frequency to suppress the rise of the bus voltage, so as to ensure that the inverter does not cause overvoltage protection due to excessive bus voltage. This function is especially effective for eccentric loads.

**Tens of LEDs: Excitation control**

0: close

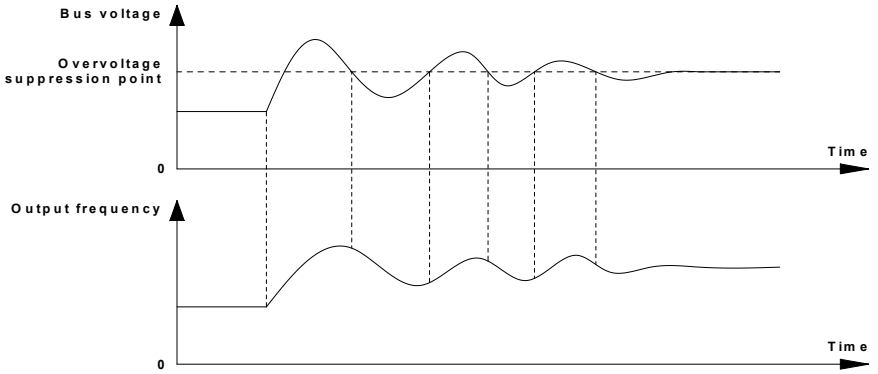
1: open

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| FA-07 | Bus overvoltage suppression point | Setting range: 110.0 ～ 150.0% | Default: 130.0% |
| FA-08 | Bus overvoltage suppression gain | Setting range: 0.0 ～ 500.0% | Default: 100.0% |

When the bus voltage reaches or exceeds the bus overvoltage suppression point **[FA-07]** during the operation of the inverter, the inverter will automatically adjust the operating frequency to suppress the bus voltage rise, so as to ensure that the inverter does not cause overvoltage protection due to the high bus voltage. Adjusting **[FA-08]** can improve the overvoltage suppression effect. Setting [FA-08] to 0 is equivalent to turning off the overvoltage suppression function. Overvoltage suppression is effective for any motor control method.




| | | | |
|---|---|---|---|
| FA-09 | Bus undervoltage suppression function | Setting range: 0～1 | Default: 0 |
| FA-10 | Bus undervoltage suppression point | Setting range: 60.0%～90.0% | Default: 80.0% |
| FA-11 | Bus undervoltage suppression gain | Setting range: 0.0 ～ 500.0% | Default: 100.0% |

When the bus voltage reaches or falls below the bus undervoltage suppression point **[FA-10]** during the operation of the inverter, the inverter will automatically adjust the operating frequency to suppress the reduction of the bus voltage, thus ensuring that the inverter does not cause undervoltage protection due to the low bus voltage. Adjusting **[FA-11]** can improve the undervoltage suppression effect. Setting **[FA-09]** to 0 is equivalent to turning off the overvoltage suppression function. Undervoltage suppression is effective for any motor control method.

| | | | |
|---|---|---|---|
| FA-12 | Bus undervoltage protection point | Setting range: 60.0%～90.0% | Default: 60.0% |

**Bus undervoltage protection point** This parameter stipulates the allowable lower limit voltage of the bus voltage when the inverter is working normally. For some occasions where the power grid is low, the undervoltage protection level can be appropriately reduced to ensure the normal operation of the inverter.

**Note: When the grid voltage is too low, the output torque of the motor will decrease. For constant power loads and constant torque loads, too low a grid voltage will increase the input and output current of the inverter, thereby reducing the reliability of the inverter operation.**

| | | | |
|---|---|---|---|
| FA-13 | | Reserved | |
| FA-14 | Short circuit detection after power on | Setting range: 0～1 | Default: 0 |

Power-on-to-ground short-circuit detection is to detect the insulation of the motor when the inverter is powered on. If the motor insulation is damaged and a short circuit to ground occurs, the inverter will detect and report a short circuit fault to ground.

**0: close**

**1: open**

**Note: When this function is turned on, there is voltage output on the output terminals U, V and W of the inverter when power is turned on. Please pay attention to safety.**

| FA-15 | Phase loss protection | Setting range: 0000～0021 | Default: 0011 |
|---|---|---|---|

**Units of LED: output phase loss protection** When the motor connected to the inverter loses phase, the output phase loss E.OLF will be reported.

0: close

1: open

**Tens of LEDs: Input phase loss protection** When the power grid phase loss occurs, the inverter will report an input phase loss fault.

0: close

1: Turn on the alarm A.ILF

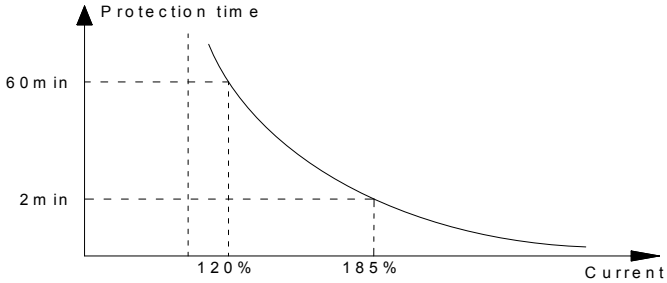
2: Turn on the fault E.ILF

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| FA-16 | Motor overload protection factor | Setting range: 0.0～250.0% | Default: 100.0% |
|---|---|---|---|

If the motor is overloaded for a long time, it will seriously heat up. **[FA-16]** sets the coefficient of overload protection or thermal protection of the inverter on the load motor. The motor overload protection and motor current have an inverse time limit characteristic curve, and the protection when FA-16 = 100.0% The curve is as follows.




The current into the protection curve = (actual current of the motor / motor overload protection factor) × 100%, so increasing **[FA-16]** can improve the overload capacity of the motor; [FA-16] sets the motor overload warning coefficient when the motor overload reaches [FA-16] When the coefficient is set, the inverter warns via terminal output. For details, please refer to the Y terminal function.

**Note: When one inverter is running in parallel with multiple motors, the thermal relay protection function of the inverter will be ineffective. In order to effectively protect the motor, please install a thermal protection relay on the input end of each motor.**

| FA-17 | Load warning detection setting | Setting range: 0000～1414 | Default: 0000 |
|---|---|---|---|

**LED unit: detection selection (protection 1)**

0: no detection

1: Detect excessive load

2: Only detect excessive load at constant speed

3: Detect insufficient load

4: Only detect insufficient load at constant speed

**Tens of LEDs: Alarm selection**

0: alarm, continue to run

1: Fault protection action and free stop

**Hundreds of LEDs: detection selection (protection 2)**

0: no detection

1: Detect excessive load

2: Only detect excessive load at constant speed

3: Detect insufficient load

4: Only detect insufficient load at constant speed

**Thousands of LEDs: alarm selection**

0: alarm, continue to run

1: Fault protection action and free stop

| | | | |
|---|---|---|---|
| FA-18 | Load warning detection level 1 | Setting range: 0.0～200.0% | Default: 130.0% |
| FA-19 | Load warning detection time 1 | Setting range: 0.0～60.0s | Default: 5.0s |
| FA-20 | Load warning detection level 2 | Setting range: 0.0～200.0% | Default: 30.0% |
| FA-21 | Load warning detection time 2 | Setting range: 0.0～60.0s | Default: 5.0s |

In VF control mode, the motor output current is used as the load warning judgment value, 100.0% corresponds to the motor rated current; in vector control mode, the motor output torque is used as the load warning judgment value, 100.0% corresponds to the motor rated output torque, and the load warning judgment value The detection time FA-19 / FA-21 is compared with the detection threshold FA-18 / FA-20, and the corresponding action is made according to FA-17. The terminal output can be used for early warning.

| | | | |
|---|---|---|---|
| FA-22 | | Reserved | |
| FA-23 | Protective action of excessive speed deviation | Setting range: 0000～0012 | Default: 0000 |

**LED unit position: detection selection**

0: no detection

1: Only detect at constant speed

2: Always check

**Tens of LEDs: Alarm selection**

0: Free stop and report fault E.DEF

1: Alarm A.DEF and continue to run

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| FA-24 | Excessive speed deviation detection threshold | Setting range: 0.0～60.0% | Default: 10.0% |

| | | | |
|---|---|---|---|
| FA-25 | Detection time for excessive speed deviation | Setting range: 0.0～60.0s | Default: 2.0s |

Under vector control, when the deviation between the speed feedback value and the speed set value is greater than the detection threshold FA-24 within the detection time FA-25, the inverter considers that the detected deviation is too large and abnormal, and takes corresponding action according to FA-23 . The speed deviation detection threshold 100% corresponds to the maximum frequency.

| | | | |
|---|---|---|---|
| FA-26 | Fast protection action | Setting range: 0000～0012 | Default: 0000 |

**LED unit position: detection selection**

0: no detection

1: Only detect at constant speed

2: Always check

**Tens of LEDs: Alarm selection**

0: Free stop and report fault E.SPD

1: Alarm A.SPD and continue to run

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| FA-27 | Fast detection threshold | Setting range: 0.0～150.0% | Default: 110.0% |
| FA-28 | Fast detection time | Setting range: 0.000～2.000s | Default: 0.010s |

Under vector control, when the speed feedback value is greater than the detection threshold FA-27 within the detection time FA-28, the inverter considers that the motor speed is abnormally fast and makes corresponding actions according to FA-26. The detection threshold of the speed is 100% Corresponds to the maximum frequency.

| | | | |
|---|---|---|---|
| FA-29～F2-36 | | Reserved | |
| FA-37 | Fault self-recovery times | Setting range: 0～5 | Default: 0 |
| FA-38 | Fault self-recovery interval time | Setting range: 0.1～100.0s | Default: 1.0s |

**Failure recovery times:**

0: Off No automatic reset function, only manual reset.

1 ～ 5: Turn on the function, 1 ～ 5 is the number of self-recovery after failure (defined as the maximum number of self-recovery after each failure)

Due to load fluctuations, grid voltage fluctuations and other accidental factors during the operation of the inverter, the inverter may stop due to faults. At this time, in order to ensure the continuity of the system work, the inverter is allowed to automatically reset the fault types such as overload, overcurrent, system abnormality, overvoltage, and undervoltage during operation, and resume operation. In the process of self-recovery, the inverter resumes operation by speed tracking and restarting. If the inverter fails to resume operation within the set number of times, the fault is protected, the output is stopped, and the number of fault recovery counts is automatically cleared. Since multiple continuous fault restarts may cause damage to the inverter, it is recommended to set the number of fault self-recovery times to 1.

During fault self-recovery, the fault output terminal can be selected to operate or not to operate. For details, please refer to **[F2-45 ～ F2-47].**

**Fault self-recovery interval time:** This parameter is defined as the waiting time after the inverter fails and before each reset.

**Note: 1. This function is only effective for faults such as overload, overcurrent, system abnormality, overvoltage, and undervoltage during operation, and is invalid for other faults;**

**2. When the fault is not removed, the inverter cannot be reset.**

**Tip: The starting characteristics of the mechanical equipment must be carefully considered in use. For occasions where it is impossible to start with load or when the inverter has no output when the inverter must output an alarm, please use this function carefully.**

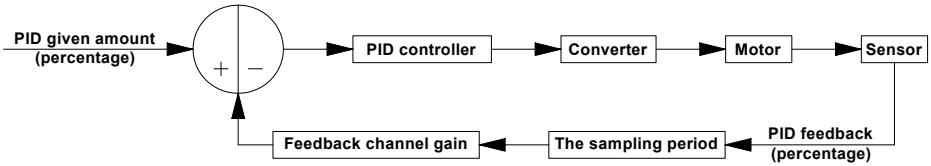
| | | | |
|---|---|---|---|
| FA-39 | Fault diagnosis information | See the fault information code table for details | |
| FA-40 | Fault type | See the fault information code table for details | -- |
| FA-41 | Fault operating frequency | 0.00～Maximum frequency | -- |
| FA-42 | Fault output voltage | 0～1500V | -- |
| FA-43 | Fault output current | 0.1～2000.0A | -- |
| FA-44 | Fault bus voltage | 0～3000V | -- |
| FA-45 | Faulty module temperature | 0～100℃ | -- |
| FA-46 | Faulty inverter status | LED unit position: running direction<br>0: forward<br>1: reverse<br>Tens of LEDs: running status<br>0: stop<br>1: Speed up<br>2: slow down<br>3: constant speed<br>Hundreds of LEDs: reserved<br>Thousands of LEDs: reserved | -- |
| FA-47 | Fault input terminal status | See input terminal status diagram | -- |
| FA-48 | Fault output terminal status | See output terminal status diagram | -- |
| FA-49 | Previous failure type | See the fault information code table for details | -- |
| FA-50 | Operating frequency of previous fault | 0.00～Maximum frequency | -- |
| FA-51 | Previous fault output voltage | 0～1500V | -- |
| FA-52 | Previous fault output current | 0.1～2000.0A | -- |
| FA-53 | Bus voltage of previous fault | 0～3000V | -- |
| FA-54 | Module temperature of the previous failure | 0～100℃ | -- |
| FA-55 | Inverter status of previous failure | LED unit position: running direction<br>0: forward<br>1: reverse<br>Tens of LEDs: running status<br>0: stop<br>1: Speed up<br>2: slow down<br>3: constant speed<br>Hundreds of LEDs: reserved<br>Thousands of LEDs: reserved | -- |
| FA-56 | The state of the input terminal of the previous fault | See input terminal status diagram | -- |
| FA-57 | Output terminal status of previous fault | See output terminal status diagram | -- |
| FA-58 | The first two failure types | See the fault information code table for details | -- |
| FA-59 | The first three failure types | See the fault information code table for details | -- |

**Tip: To record the detailed fault information of the inverter, the fault record can be cleared by**

**parameter [F0-19], see parameter [F0-19] for details.**

## 4.12 Process PID control parameters

PID control is a commonly used method for process control. Adjust the output frequency of the inverter by performing a series operation of proportional, integral, and derivative on the difference between the feedback amount of the controlled object and the PID given amount of the inverter to form a negative feedback PID adjustment, so as to stabilize the controlled object at the PID Quantitative purpose.




**Schematic diagram of PID control**

| | | | |
|---|---|---|---|
| Fb-00 | PID controller given signal source | Setting range: 0～7 | Default: 0 |

Set the input channel of PID controller given signal.

0: Keyboard digital PID setting PID setting value is determined by the setting value of **[Fb-01]**.

1: Keyboard potentiometer setting PID setting value is given by keyboard potentiometer.

2: Analog AI1 given PID setpoint is given by voltage analog AI1.

3: Analog quantity AI2 setting PID setting value is given by voltage analog quantity AI2.

4: Terminal pulse HDI setting PID setting value is given by terminal pulse HDI.

5: RS485 communication given PID given value is given by RS485 communication, the communication address is 0x3008 / 0x2008.

6: The optional value of the optional card PID is given by the optional card. For details, please refer to the optional card manual.

7: Terminal selection The PID given value is selected by the combination of multi-function input terminals, and the multi-function input terminals are set by **[F2-00 ～ F2-04]**.

**Terminal switching selection diagram:**

| Terminal 3 | Terminal 2 | Terminal 1 | PID given switching terminal selection |
|---|---|---|---|
| OFF | OFF | OFF | Keyboard number PID given |
| OFF | OFF | ON | Keyboard potentiometer given |
| OFF | ON | OFF | Voltage analog AI1 given |
| OFF | ON | ON | Voltage analog AI setting |
| ON | OFF | OFF | Current analog AS is given |
| ON | OFF | ON | Terminal pulse HDI given |
| ON | ON | OFF | RS485 communication given |
| ON | ON | ON | Optional card |

If you have doubts about the above table, please refer to the “FC” parameter group's multi-speed sequence diagram for multi-speed.

| | | | |
|---|---|---|---|
| Fb-01 | Keyboard digital PID given / feedback | Setting range: 0.00～100.0% | Default: 50.0% |

This parameter is valid only when **[Fb-00] / [Fb-03]** is set to the keyboard digital PID reference / feedback; the maximum range of the feedback signal [Fb-06] is used as the reference; PID reference value will be

modified automatically and synchronously.

If the parameter **[F4-09]** LED unit digit is set to "3", you can quickly modify the value of this parameter through the keyboard up and down keys. After quickly modifying this parameter, whether the inverter saves the modified value during power outage 09] The setting value of the ten-digit LED is determined.

| Fb-02 | PID given acceleration and deceleration time | Setting range: 0.00～60.00 | Default: 1.00s |
|---|---|---|---|

**PID given acceleration time** Refers to the time required for the PID setting percentage to accelerate from 0% to the setting value of **[Fb-01]**;

**PID given deceleration time** Refers to the time required for the PID setting percentage to decelerate from **[Fb-01]** setting value to 0%;

| Fb-03 | PID controller feedback signal source | Setting range: 0～7 | Default: 2 |
|---|---|---|---|

Set the input channel of PID controller feedback signal.

0: Keyboard digital PID feedback The PID feedback channel is determined by the set value of **[Fb-01]**.

1: Keyboard potentiometer feedback PID feedback channel is keyboard potentiometer.

2: Analog AI1 feedback PID feedback channel is voltage analog AI1.

3: Analog AI2 feedback PID feedback channel is voltage analog AI2.

4: Terminal pulse HDI feedback PID feedback channel is terminal pulse HDI.

5: RS485 communication feedback The PID feedback channel is RS485 communication, and the communication address is 0x3009 / 0x2009.

6: Optional card PID feedback channel is optional card, please refer to the optional card manual.

7: Terminal selection The PID feedback channel is selected by the combination of multi-function input terminals, and the multi-function input terminals are set by **[F2-00 ～ F2-04]**.

**Terminal switching selection diagram:**

| Terminal 3 | Terminal 2 | Terminal 1 | PID given switching terminal selection |
|---|---|---|---|
| OFF | OFF | OFF | Keyboard digital PID feedback |
| OFF | OFF | ON | Keyboard potentiometer feedback |
| OFF | ON | OFF | Voltage analog AI1 feedback |
| OFF | ON | ON | Voltage / current analog AI feedback |
| ON | OFF | OFF | Current analog AS feedback |
| ON | OFF | ON | Terminal pulse HDI feedback |
| ON | ON | OFF | RS485 communication feedback |
| ON | ON | ON | Optional card |

If you have doubts about the above table, please refer to the “FC” parameter group's multi-speed sequence diagram for multi-speed.

**Note: The given signal source of the PID controller and the feedback signal source of the PID controller cannot be set to the same channel, otherwise the PID cannot work normally.**

| Fb-04 | Feedback signal low-pass filter time | Setting range: 0.000～6.000s | Default: 0.010s |
|---|---|---|---|

**Feedback signal low-pass filter time constant** This parameter is defined as the size of filtering the feedback signal, which is used to eliminate the interference signal. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.

| Fb-05 | Feedback signal gain | Setting range: 0.00～10.00 | Default: 1.00 |
|---|---|---|---|

This function is used to amplify or reduce the input signal of the feedback channel.

| Fb-06 | Maximum range of feedback signal | Setting range: 0～100.0 | Default: 100.0 |
|---|---|---|---|

This function is used to correct the display data of PID given amount and PID feedback amount.

$$\text{Actual digital tube display value}=\frac{\text{The given (feedback) signal value}-\text{the input lower limit of this channel}}{\text{The upper limit of the channel input}-\text{the lower limit of the channel input}}\times\text{Maximum sensor range}$$

For example, when pressure control is set to the maximum pressure of the sensor, the displayed value is the actual pressure value.

Assuming that the external voltage terminal **(AI1)** is used as the feedback signal input channel, when the **(AI1)** upper limit voltage is set to 9V and the lower limit voltage is 0.5V; the current feedback voltage value is 4.5V, and the maximum sensor range is 20mpa.

**Digital tube display value = (4.5-0.5) × 20 / (9-0.5) = 9.4mpa**

| Fb-07 | PID control selection | Setting range: 0000～1111 | Default: 0100 |
|---|---|---|---|

**LED unit: feedback characteristic selection**

0: Positive characteristic Applicable to the occasions where the output frequency of the inverter is required to maintain PID balance when the PID feedback amount is greater than the PID given amount; such as constant pressure water supply, air supply, and tension control for winding.

1: Negative characteristics Applicable to the occasions where the output frequency of the inverter is required to maintain PID balance when the PID feedback amount is greater than the PID given amount; such as central air conditioning constant temperature control and unwinding tension control.

**Tens of LEDs:** Closed-loop bypass keeps output

0: output is cleared when closed loop bypass

1: Output hold when closed loop bypass

**Hundreds of LEDs: alignment selection**

When the PID setting value is not at the 50% center point, the difference between the PID setting value and the PID feedback value, that is, the error range, is in an asymmetric state. This parameter selects whether to correct the asymmetric error range to return it to a symmetrical state.

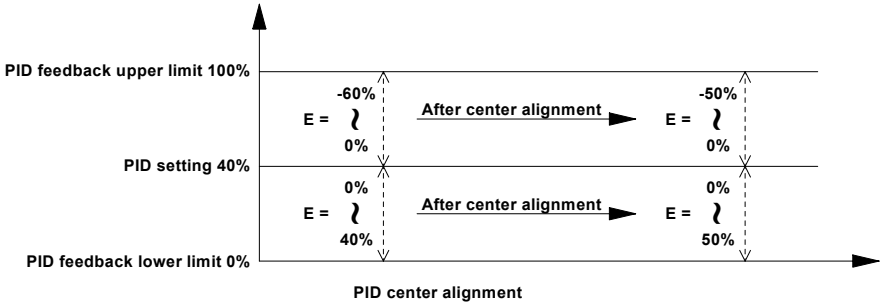
0: Non-center alignment error is not corrected.

1: The center alignment error is corrected.

**Thousands of LEDs: Differential adjustment properties**

0: Differentiate the deviation

1: Differentiate the feedback



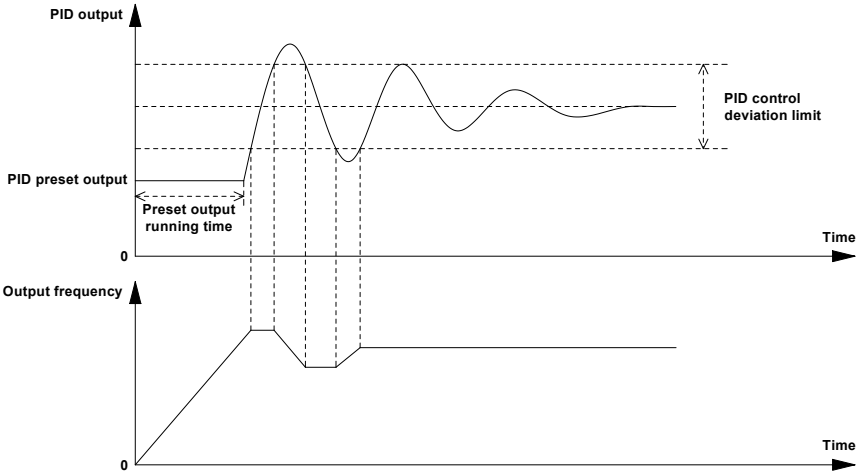
| | | | |
|---|---|---|---|
| Fb-08 | PID preset output | Setting range: 0.00～100.0% | Default: 100.0% |
| Fb-09 | PID preset output running time | Setting range: 0.0～6500.0s | Default: 0.0s |

This function is defined as that after the PID operation is started, the output is first output according to the PID preset [Fb-08], and continues to run on the output value for the time set by the PID preset output operation time [Fb-09], and then according to PID closed-loop characteristic operation.

**Tip: When PID is used for frequency source setting [F0-03 = 8] preset output 100.0% corresponds to the maximum frequency output; when PID is used for voltage-frequency separation output voltage source [F8-30 = 5] preset output 100.0% Corresponds to the rated voltage of the motor.**

| | | | |
|---|---|---|---|
| Fb-10 | PID control deviation limit | Setting range: 0.00～100.0% | Default: 0.0% |

The maximum allowable deviation of PID feedback for a given amount of PID; when the feedback is within this range, PID adjustment stops and the output remains unchanged; the rational use of this function helps coordinate the accuracy and stability of the system output contradiction.




| | | | |
|---|---|---|---|
| Fb-11 | Proportional gain P1 | Setting range: 0.000～8.000 | Default: 0.100 |
| Fb-12 | Integration time I1 | Setting range: 0.0～600.0s | Default: 1.0s |
| Fb-13 | Differential gain D1 | Setting range: 0.000～6.000s | Default: 0.000s |

The adjustment parameters of PID control should be set according to the actual system characteristics.

**Proportional gain P:** It is the parameter that determines the degree of response of P action to deviation. When the gain is large, the response is fast, but excessively large will produce oscillation; if the gain is small, the response is late.

**Integration time I:** Determine the size of the I action effect. When the integration time is large, the response is slow, and the ability to control external disturbances becomes poor. When the integration time is small, the response speed is fast. If it is too small, oscillation will occur.

**Differential gain D:** When the deviation between the PID feedback amount and the PID given amount changes, the output is adjusted in proportion to the deviation change rate. The adjustment amount is only related to the direction and magnitude of the deviation change, but not to the direction and magnitude of

the deviation itself. The function of differential regulation is to adjust the trend of the feedback signal when the feedback signal changes, thereby suppressing the change of the feedback signal. Use the differential regulator with caution, because the differential regulator is easy to amplify the interference of the system, especially the interference with higher change frequency.

| | | | |
|---|---|---|---|
| Fb-14 | Proportional gain P2 | Setting range: 0.000～8.000 | Default: 0.100 |
| Fb-15 | Integration time I2 | Setting range: 0.0～600.0s | Default: 1.0s |
| Fb-16 | Differential gain D2 | Setting range: 0.000～6.000s | Default: 0.000s |

Refer to **[Fb-11 ～ F2-13]** for this group of functions

| | | | |
|---|---|---|---|
| Fb-17 | PID parameter switching conditions | Setting range: 0～2 | Default: 0 |

0: No switching, only use gain 1 parameter
1: Use X terminal to switch
2: Switch according to deviation

| | | | |
|---|---|---|---|
| Fb-18 | Low switching deviation | Setting range: 0.0～100.0% | Default: 20.0% |

**Low switching deviation** When the PID deviation is less than this value, use the gain 1 parameter

| | | | |
|---|---|---|---|
| Fb-19 | High switching deviation | Setting range: 0.0～100.0% | Default: 80.0% |

**High switching deviation** When the PID deviation is greater than this value, the gain 2 parameter is used

| | | | |
|---|---|---|---|
| Fb-20 | | Reserved | |
| Fb-21 | Differential limiting | Setting range: 0.0～100.0% | Default: 5.0% |
| Fb-22 | PID output upper limit | Setting range: 0.0～100.0% | Default: 100.0% |
| Fb-23 | PID output lower limit | Setting range: 0.0～Fb-22 | Default: 0.0% |
| Fb-24 | PID output filter time | Setting range: 0.000～6.000s | Default: 0.0s |

**PID output filter time** This parameter is defined as the size of filtering the feedback signal, which is used to eliminate the interference signal. The longer the filtering time, the stronger the anti-interference ability, but the response speed becomes slower; the shorter the filtering time, the anti-interference ability becomes weaker, but the response speed becomes faster.

| | | | |
|---|---|---|---|
| Fb-25 | Feedback disconnection detection time | Setting range: 0.0～120.0s | Default: 1.0s |
| Fb-26 | Feedback disconnection action selection | Setting range: 0～3 | Default: 0 |
| Fb-27 | Upper limit of wire break alarm | Setting range: 0.0～100.0% | Default: 100.0% |
| Fb-28 | Lower limit of wire break alarm | Setting range: 0.0～100.0% | Default: 0.0% |

The feedback disconnection detection function is defined as when the frequency setting mode of the inverter is selected as the PID setting. When the inverter is running, when the feedback signal is detected to be greater than the set value of [Fb-27] or less than **[Fb-28]** set value and maintaining the delay time of **[Fb-25]**, the sensor is considered to be disconnected.

**Feedback disconnection action selection:**

**0: Continue PID operation without reporting failure** This function is invalid, and the inverter does not perform wire break detection.

**1: Stop and report fault** When the inverter detects that the sensor is disconnected, it immediately blocks the output, the motor stops freely, and reports the fault E.PID.

**2: Continue PID operation and output an alarm signal** When the inverter detects that the sensor is disconnected, it still operates according to PID adjustment, but the keyboard displays fault A.PID and flashes.

3: Run at the current frequency and output an alarm signal When the inverter detects that the sensor is disconnected, the output frequency before the fault remains unchanged, but the keyboard displays the

fault A.PID and flashes.

**Wire break alarm upper limit:** Set the upper limit of PID sensor wire break detection. After the feedback signal exceeds the wire break alarm upper limit and continues for [Fb-25] delay time, the sensor is considered to be broken.

**Lower limit of wire break alarm:** Set the lower limit of PID sensor wire break detection. After the feedback signal is less than the lower limit of wire break alarm and continues for [Fb-25] delay time, the sensor is considered to be broken.

| | | | |
|---|---|---|---|
| Fb-29 | Sleep selection | Setting range: 0 ～1 | Default: 0 |
| Fb-30 | Sleep frequency | Setting range: 0.00～50.00Hz | Default: 30.00Hz |
| Fb-31 | Sleep delay | Setting range: 0.0～3600.0S | Default: 3.0S |
| Fb-32 | Wake deviation | Setting range: 0.0～50.0% | Default: 5.0% |
| Fb-33 | Wakeup delay | Setting range: 0.0～60.0S | Default: 0.0S |

## 4.13 Multi-speed, PLC function and swing frequency parameters

| | | | |
|---|---|---|---|
| FC-00 | Multi-band frequency 1 | Setting range: 0.00～maximum frequency | Default: 10.00 Hz |
| FC-01 | Multi-band frequency 2 | Setting range: 0.00～maximum frequency | Default: 20.00 Hz |
| FC-02 | Multi-band frequency 3 | Setting range: 0.00～maximum frequency | Default: 30.00 Hz |
| FC-03 | Multi-band frequency 4 | Setting range: 0.00～maximum frequency | Default: 40.00 Hz |
| FC-04 | Multi-band frequency 5 | Setting range: 0.00～maximum frequency | Default: 50.00 Hz |
| FC-05 | Multi-band frequency 6 | Setting range: 0.00～maximum frequency | Default: 40.00 Hz |
| FC-06 | Multi-band frequency 7 | Setting range: 0.00～maximum frequency | Default: 30.00 Hz |
| FC-07 | Multi-band frequency 8 | Setting range: 0.00～maximum frequency | Default: 20.00 Hz |
| FC-08 | Multi-band frequency 9 | Setting range: 0.00～maximum frequency | Default: 10.00 Hz |
| FC-09 | Multi-band frequency 10 | Setting range: 0.00～maximum frequency | Default: 20.00 Hz |
| FC-10 | Multi-band frequency 11 | Setting range: 0.00～maximum frequency | Default: 30.00 Hz |
| FC-11 | Multi-band frequency 12 | Setting range: 0.00～maximum frequency | Default: 40.00 Hz |
| FC-12 | Multi-band frequency 13 | Setting range: 0.00～maximum frequency | Default: 50.00 Hz |
| FC-13 | Multi-band frequency 14 | Setting range: 0.00～maximum frequency | Default: 40.00 Hz |
| FC-14 | Multi-band frequency 15 | Setting range: 0.00～maximum frequency | Default: 30.00 Hz |

This group of parameters is used to set the running frequency of the fifteen-stage speed in program operation and multi-stage speed control.

Multi-step speed control has the priority after jog. When the user selects multi-speed operation, 4 multi-function input terminals need to be set as multi-speed control terminals. For the specific setting method, please refer to the detailed description of **[F2-00 ～ F2-04]**.

These four multi-speed control terminals are combined with the **(COM)** ON / OFF state to control which speed the inverter runs at. Its operation and direction are controlled by the operation signal and direction given by the operation command channel **[F0-02]**. The acceleration and deceleration time defaults to acceleration and deceleration time 1 **[F0-14]**, **[F0-15]**, and can also be selected through the acceleration and deceleration time selection terminals set by the multi-function input terminals **[F2-00 ～ F2-04]** Select acceleration and deceleration time.

| Multi-speed terminal 4 | Multi-speed terminal 3 | Multi-speed terminal 2 | Multi-speed terminal 1 | Terminal / Period of speed |
|---|---|---|---|---|
| OFF | OFF | OFF | ON | 1X［**FC-00**］ |
| OFF | OFF | ON | OFF | 2X［**FC-01**］ |

| | | | | |
|---|---|---|---|---|
| OFF | OFF | ON | ON | 3X **[FC-02]** |
| OFF | ON | OFF | OFF | 4X **[FC-03]** |
| OFF | ON | OFF | ON | 5X **[FC-04]** |
| OFF | ON | ON | OFF | 6X **[FC-05]** |
| OFF | ON | ON | ON | 7X **[FC-06]** |
| ON | OFF | OFF | OFF | 8X **[FC-07]** |
| ON | OFF | OFF | ON | 9X **[FC-08]** |
| ON | OFF | ON | OFF | 10X **[FC-09]** |
| ON | OFF | ON | ON | 11X **[FC-10]** |
| ON | ON | OFF | OFF | 12X **[FC-11]** |
| ON | ON | OFF | ON | 13X **[FC-12]** |
| ON | ON | ON | OFF | 14X **[FC-13]** |
| ON | ON | ON | ON | 15X **[FC-14]** |

| | | | |
|---|---|---|---|
| FC-15 | Multi-frequency operation mode selection | Setting range: 0000～2122 | Default: 0000 |

It is used to select the PLC operation mode for program control given timing.

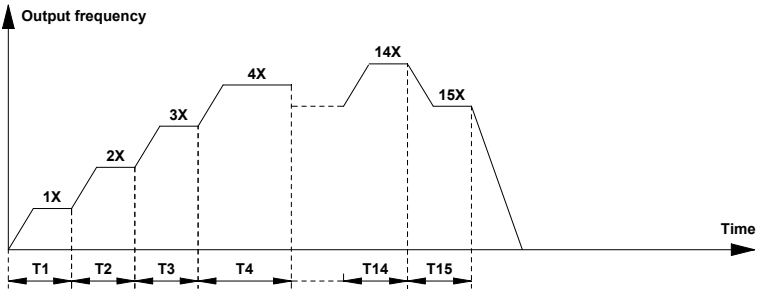
**LED unit position: circulation mode**

0: Stop after a single cycle After accepting the running command, the inverter starts to run from the first speed, the time unit is set by the LED ten digits of **[FC-15]**; the running time is set by the parameters **[FC-16 ～ FC-30]**; the running direction and plus The deceleration time is selected by the parameter **[FC-31 ～ FC-45]**; when the running time is up, it will switch to the next stage of speed operation, and the time, direction, acceleration and deceleration time of each stage of speed operation can be set separately; The frequency converter outputs "0" frequency. If the running time of a certain stage is zero, the stage is skipped during operation.

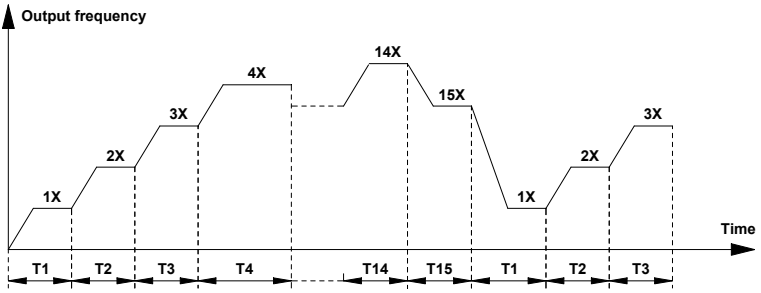
1: Continuous cycle After the inverter runs the 15th stage speed, it returns to the 1st stage speed and restarts the operation, the cycle continues. The time unit is set by the ten-digit LED of [FC-15]; the running time is set by the parameter **[FC-16 ~ FC-30]**; the running direction and acceleration / deceleration time are selected by the parameter **[FC-31 ~ FC-45].**

2: Keep the final value after a single cycle The inverter does not stop after running a single cycle, and continues to run at the speed of the last stage where the running time is not zero. The time unit is set by the ten-digit LED of **[FC-15]**; the running time is set by the parameter **[FC-16 ~ FC-30]**; the running direction and acceleration / deceleration time are selected by the parameter **[FC-31 ~ FC-45].**

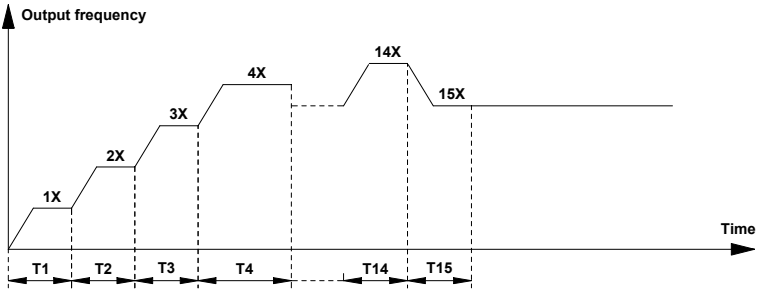
**Note: The acceleration and deceleration time when the PLC is executed is specified by the ten digits of [FC-31 to FC-45] LED, and is not affected by the terminal selection.**




Schematic diagram of single cycle of program operation




Schematic diagram of continuous cycle of program operation




Schematic diagram of program running in a single cycle

**Tens of LEDs: Timing unit** Used to set the time unit for timing when the program is running.

0: seconds

1: point

2: hours

**Hundreds of LEDs: Power-off storage method**

0: do not store

1: storage

This parameter is defined as whether to store the current state of program operation (number of running stages, remaining time in this stage, acceleration and deceleration, running direction, etc.) when the inverter is selected to run when the program is running. If the power-off storage is selected, the LED thousands parameter of [FC-15] can be used to define the recovery method of the program operation after the next power-on. If you want to ensure that the inverter can continue the state before the power failure after the instantaneous power failure is restored, you should set this parameter to "1".

**Thousands of LEDs: startup mode**

0: restart from the first stage

1: Re-run from the stage of shutdown

**2: Continue to run with the remaining time at shutdown**

This parameter defines the operation mode when the program is restarted after being interrupted due to various reasons (stop, failure, power failure, etc.) during the running of the program.

Select "0" mode, the inverter will restart at the first speed.

Select "1" mode, the inverter will re-time running in the momentary interruption phase.

Select "2" mode, the inverter will run at the moment of interruption, and run according to the remaining time of the moment of interruption.

**Tip: The output frequency when the program is running is limited by the upper and lower frequency limits. When the given frequency is less than the lower limit frequency, run according to [F0-13] lower limit frequency operation mode.**

| | | | |
|---|---|---|---|
| FC-16 | Multi-segment frequency 1 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-17 | Multi-segment frequency 2 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-18 | Multi-segment frequency 3 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-19 | Multi-segment frequency 4 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-20 | Multi-segment frequency 5 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-21 | Multi-segment frequency 6 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-22 | Multi-segment frequency 7 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-23 | Multi-segment frequency 8 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-24 | Multi-segment frequency 9 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-25 | Multi-segment frequency 10 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-26 | Multi-segment frequency 11 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-27 | Multi-segment frequency 12 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-28 | Multi-segment frequency 13 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-29 | Multi-segment frequency 14 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |
| FC-30 | Multi-segment frequency 15 segment running time | Setting range: 0.0～6500.0(s/m/h) | Default: 10.0 |

Set the running time of the 15-segment speed respectively, the time unit is determined by the setting value of

the LED ten digits of **[FC-15]**.

| | | | |
|---|---|---|---|
| FC-31 | Multi-section frequency 1-15 direction and acceleration / deceleration time | Setting range: 0000～0031 | Default: 0000 |
| FC-32 | | | Default: 0000 |
| FC-33 | | | Default: 0000 |
| FC-34 | | | Default: 0000 |
| FC-35 | | | Default: 0000 |
| FC-36 | | | Default: 0000 |
| FC-37 | | | Default: 0000 |
| FC-38 | | | Default: 0000 |
| FC-39 | | | Default: 0000 |
| FC-40 | | | Default: 0000 |
| FC-41 | | | Default: 0000 |
| FC-42 | | | Default: 0000 |
| FC-43 | | | Default: 0000 |
| FC-44 | | | Default: 0000 |
| FC-45 | | | Default: 0000 |

When the program is running, set the running direction and acceleration / deceleration time of 15 speeds respectively.

**LED unit position: running direction of this segment**

0: forward

1: reverse

When the parameter [F0-16] LED tens is set to "1" and only forward command is allowed, if the segment speed is set to reverse, it will run at 0.00Hz.

**Tens place of LED: acceleration and deceleration time of this segment**

0: acceleration and deceleration time 0

1: Acceleration and deceleration time 1

2: Acceleration and deceleration time 2

3: Acceleration and deceleration time 3

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

## 4.14 Communication control function parameters

| | | | |
|---|---|---|---|
| Fd-00 | Master-slave choice | Setting range: 0 ～1 | Default: 0 |

Select the inverter as the master or slave when doing Modbus communication or CAN communication. For a detailed introduction of Modbus communication, please refer to Appendix 2 (Modbus Communication Protocol).

**LED unit: Modbus communication master-slave selection**

0: Slave The inverter acts as a slave, and the communication address is set by parameter **[Fd-01]**. At this time, the inverter accepts the command from the host on the communication network, and selects whether to reply data during the write operation according to the parameter **[Fd-08]**. The delay time of the reply command is set by the parameter **[Fd-05]**.

1: Master As the master, the inverter sends data of the master to the communication network through broadcast commands, and all slaves accept master commands. The data sent by the host is set by the parameter **[Fd-09].**

**Tens of LEDs: reserved**

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

**Note: When the inverter is used as a host for networking, all network slaves must also be K-easy's inverters for proper networking. The host sends broadcast data through a custom free protocol.**

| | | | |
|---|---|---|---|
| Fd-01 | 485 communication address | Setting range: 1～247 | Default: 1 |

This parameter defines the communication address of the machine as a Modbus communication slave. If the machine is used as the host, this parameter is meaningless. 0 is the broadcast address.

| | | | |
|---|---|---|---|
| Fd-02 | Communication baud rate selection | Setting range: 0 ～5 | Default: 3 |

**LED unit: Modbus communication baud rate** Set the baud rate during Modbus communication.

0：1200 bps

1：2400 bps

2：4800 bps

3：9600 bps

4：19200 bps

5：38400 bps

**Tens of LEDs: reserved**

**Hundreds of LEDs: reserved**

**Thousands of LEDs: reserved**

| | | | |
|---|---|---|---|
| Fd-03 | Modbus data format | Setting range: 0～5 | Default: 0 |

Set the data format during Modbus communication. If the data format is set differently, communication will not be possible.

0: (N, 8, 1) No parity, data bit: 8, stop bit: 1
1: (E, 8, 1) Even parity, data bit: 8, stop bit: 1
2: (O, 8, 1) odd parity, data bit: 8, stop bit: 1
3: (N, 8, 2) No parity, data bit: 8, stop bit: 2
4: (E, 8, 2) Even parity, data bit: 8, stop bit: 2
5: (O, 8, 2) odd parity, data bit: 8, stop bit: 2

| | | | |
|---|---|---|---|
| Fd-04 | Communication ratio setting | Setting range: 0.00～5.00 | Default: 1.00 |

The communication command sent by the host computer is multiplied by this parameter, and used as the communication given value or feedback value of this machine. The communication commands of the host computer can be modified in proportion.

| | | | |
|---|---|---|---|
| Fd-05 | Communication response delay | Setting range: 0～500ms | Default: 0ms |

This parameter defines the intermediate interval time when the frequency converter is used as Modbus communication slave station, and the response data is sent to the upper computer after the data reception is completed. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is longer than the system processing time, the system will wait for the data after processing the data. Send data.

| | | | |
|---|---|---|---|
| Fd-06 | Communication timeout failure time | Setting range: 0.1～100.0s | Default: 1.0s |
| Fd-07 | Communication fault action selection | Setting range: 0～3 | Default: 0 |

**Modbus communication timeout fault time:** If the interval time between one communication and the next communication exceeds the communication timeout time, it is considered that the communication has a disconnection fault, and **[Fd-07]** determines the fault disconnection action mode.

**Modbus communication fault action mode selection:**

**0: Do not detect timeout fault** The inverter does not perform fault detection and always runs according to the last communication command.

**1: Alarm and stop freely** When the communication given command set by the inverter exceeds the time set by **[Fd-06]**, it still does not receive the next frame command or any other communication command, the inverter reports fault E. CE and stops.

**2: Warning and continue to run** When the running command mode of the inverter is given by the communication mode, after setting the communication given command over the time set by **[Fd-06]**, still no new communication command is received, the inverter reports warning **A.074** and presses The last communication command runs.

**3: Forced shutdown** After the communication given command set by the inverter exceeds the time set by **[Fd-06]**, it still does not receive the next frame command or any other communication command, and the inverter stops.

| Fd-08 | Transmission response processing | Setting range: 0～1 | Default: 0 |
|---|---|---|---|

This parameter selects whether the inverter responds when the host computer sends a write command to the inverter. If the host computer needs the inverter to reply information, the inverter will occupy the communication bus in time-sharing. When doing communication control, the host computer needs to reserve enough time to reply the inverter information. If the host computer does not need the inverter to reply information, and only sends instructions to the inverter, you can choose to write without response to improve the utilization efficiency of the communication bus. This parameter is only valid for write operations and has no effect on read operations.

**0: There is a response to the write operation**

**1: No response to write operation**

| Fd-09 | Host sending selection | Setting range: 0000～AAAA | Default: 0031 |
|---|---|---|---|

The data sent to the slave when the inverter is set as the Modbus communication master. At this time, the master inverter sends a broadcast command, and all slaves will receive the master to send the command.

The host can send up to 4 frames of data in polling mode, which correspond to the setting values of LED unit digit, tens digit, hundreds digit and thousands digit respectively. When set to invalid, no data is sent.

**LED single digit: the first group to send frame selection**

0: invalid

1: Run the command

2: given frequency

3: output frequency

4: upper limit frequency

5: given torque

6: output torque

7: reserved

8: reserved

9: PID given

A: PID feedback

**Tens of LEDs: Selection of the second group of transmitted frames**

**Hundreds of LEDs: The third group sends frame selection**

**Thousands of LEDs: The fourth group sends frame selection**

Same as above.

| | |
|---|---|
| Host broadcast data | Slave receiving corresponding address and application |
| 1: Run command given | 0x3001, can be used as the given source of running command |
| 2: Host given frequency | 0x3000, can be used as the given frequency of communication |
| 3: Host output frequency | 0x3000, can be used as the given frequency of communication |
| 4: Host upper limit frequency | 0x3004, can be used as the upper limit frequency for communication |
| 5: Host given torque | 0x3005, can be used as a given torque for communication |
| 6: Host output torque | 0x3005, can be used as a given torque for communication |
| 7: Torque control forward speed limit | 0x3006, can be used as the communication given torque control forward speed limit |
| 8: torque control reverse speed limit | 0x3007, it can be used as the communication given torque control reverse speed limit |
| 9: Host given PID | 0x3008, can be given as PID communication |
| A: Host feedback PID | 0x3009, can be given as PID communication |

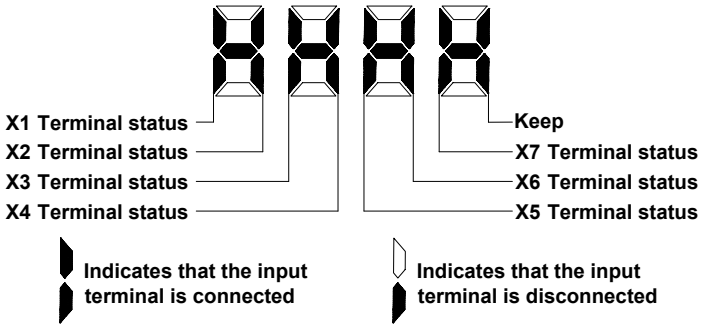
| | | | |
|---|---|---|---|
| Fd-10 | RS485 communication port configuration | Setting range: 0～1 | Default: 0 |

**RS485 communication port configuration**

**0: Configure for ModBus communication** General ModBus usage.

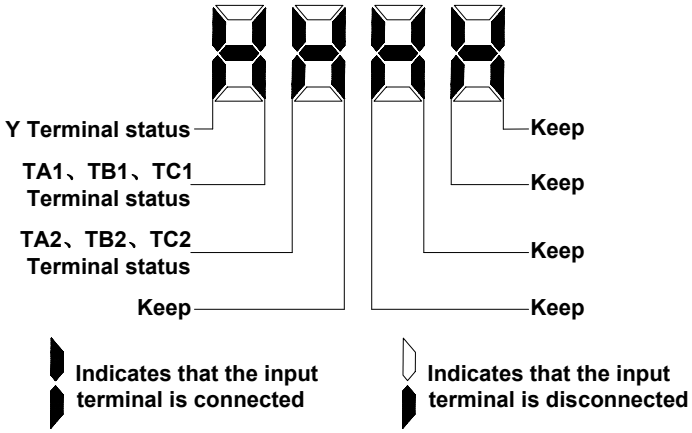
**1: Other agreements**

## 4.15 Schematic diagram of the input terminal disconnected and connected state:




**Schematic diagram of the input terminal on / off state**

**Schematic diagram of the output terminal disconnected and connected state:**




**Schematic diagram of the output terminal on / off state**

# Chapter 5 Function Parameter Table

## 5.1 Explanation of each meaning in the function code parameter summary table

| Profile field | Explanation |
|---|---|
| Function code number | Code representing the function code, such as: F0-00 |
| Function code name | Name of the function code, explaining the function of the function code |
| Factory default | The setting value after the function code is restored to the factory value (F0-19) |
| Attributes | ●: The parameter operation can be changed; ○: The parameter operation cannot be changed; ×: The parameter can only be read; ※: The parameter is related to the inverter model; |
| Mailing address | Communication address when using communication (such as RS485) to read and write function code values |

## 5.2 Basic parameter group

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F0-00 | G / P model display | Model settings | 0: G type machine 1: P type machine | ○ | 0x000 |
| F0-01 | Control operating mode | 0 | 0: VF control<br>1: Vector control without PG<br>2: With PG vector control<br>3: Voltage-frequency separation control | ○ | 0x001 |
| F0-02 | Operation instruction | 0 | 0: keyboard 1: terminal 2: RS485 communication | ○ | 0x002 |
| F0-03 | Main frequency given source | 0 | 0: keyboard digital given frequency<br>1: keyboard potentiometer given<br>2: Analog quantity AI1 given<br>3: Analog quantity AI2 given<br>4: Terminal pulse HDI setting<br>5: RS485 communication given<br>6: Terminal UP / DW control<br>7: PID control given<br>8: Program control (PLC) given<br>9: Multi-stage speed reference | ● | 0x003 |
| F0-04 | Auxiliary frequency reference source | 1 | | ● | 0x004 |
| F0-05 | Auxiliary frequency reference source | 0 | 0: take maximum output frequency as reference source<br>1: Take the main frequency as the reference source | ● | 0x005 |

| | | | | | |
|---|---|---|---|---|---|
| F0-06 | Frequency command overlay selection | 0 | 0: main frequency<br>1: auxiliary frequency<br>2: main + auxiliary<br>3: main-auxiliary<br>4: The maximum of both<br>5: The minimum of the two | ● | 0x006 |
| F0-07 | Run command bundle | 0000 | Units: keyboard command binding<br>Tens: terminal command binding<br>Hundreds: communication command bundle<br>1: Keyboard number setting 2: Potentiometer setting<br>3: AI1 given 4: AI2 given<br>5: HDI given 6: RS485 given<br>7: Terminal UP / DW 8: PID given<br>9: PLC given A: Multi-stage speed given<br>0: No binding | ● | 0x007 |
| F0-08 | Keyboard digital setting frequency | 50.00Hz | 0.00～upper limit frequency | ● | 0x008 |
| F0-09 | Maximum frequency | 50.00Hz | Upper limit frequency～600.00Hz | ○ | 0x009 |
| F0-10 | Upper frequency source selection | 0 | 0: upper limit frequency digital setting<br>1: keyboard potentiometer given<br>2: Analog quantity AI1 given<br>3: Analog quantity AI2 given<br>4: Terminal pulse HDI setting<br>5: RS485 communication given | ● | 0x00A |
| F0-11 | Digital setting of upper limit frequency | 50.00Hz | Lower limit frequency～Maximum frequency | ● | 0x00B |
| F0-12 | Lower limit frequency | 0.00Hz | 0.00～upper limit frequency | ● | 0x00C |
| F0-13 | Lower frequency | 1 | 0: stop output 1: run at the lower limit frequency | ○ | 0x00D |
| F0-14 | Acceleration time 0 | Model settings | 0.01～650.00s | ※ | 0x00E |
| F0-15 | Deceleration time 0 | Model settings | | ※ | 0x00F |
| F0-16 | Choice of running direction | 0000 | Units: reverse running direction<br>0: direction unchanged 1: direction reversed<br>Tens: prohibition of running direction<br>0: invalid 1: reverse rotation prohibited<br>2: forward rotation prohibited<br>Hundreds: frequency control direction command<br>0: invalid 1: valid | ○ | 0x010 |

| | | | | | |
|---|---|---|---|---|---|
| F0-17 | PWM carrier frequency | Model settings | 0.7～16.0kHz | ※ | |
| F0-18 | PWM control mode | 1111 | Units: carrier and temperature correlation<br>0: Irrelevant 1: Related<br>Tens: Carrier is related to output frequency<br>0: Irrelevant 1: Related<br>Hundreds: random PWM enable<br>0: Disable 1: Enable<br>Thousands: PWM modulation<br>0: three-phase modulation 1: automatic switching | ● | |
| F0-19 | Parameter initialization | 0 | 0: No operation<br>1: Restore factory value (do not restore motor parameters)<br>2: Restore factory defaults (restore motor parameters)<br>3: Clear fault record | ○ | 0x013 |

**Start and stop control parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attribute | Mailing address |
|---|---|---|---|---|---|
| F1-00 | Start method | 0 | 0: start directly<br>1: Start after DC injection<br>2: Start after speed tracking | ○ | 0x0100 |
| F1-01 | Start pre-excitation time | 0.00s | 0.00～60.00s | ○ | 0x0101 |
| F1-02 | Start frequency | 0.50Hz | 0.00～60.00Hz | ○ | 0x0102 |
| F1-03 | Start frequency hold | 0.0s | 0.0～50.0s | ○ | 0x0103 |
| F1-04 | DC injection current | 60.0% | 0.0～150.0% | ○ | 0x0104 |
| F1-05 | DC injection time | 0.0s | 0.0～60.0s | ○ | 0x0105 |
| F1-06 | Speed tracking | 0.50s | 0.00～60.00s | ○ | 0x0106 |
| F1-07 | Speed tracking shutdown delay | 1.00s | 0.00～60.00s | ○ | 0x0107 |
| F1-08～F1-09 | | Reserved | | | |
| F1-10 | Stop mode | 0 | 0: Deceleration stop 1: Free stop | ● | 0x010A |
| F1-11 | Starting frequency of DC braking at stop | 1.00Hz | 0.00～50.00Hz | ○ | 0x010B |
| F1-12 | DC braking current at shutdown | 60.0% | 0.0～150.0% | ○ | 0x010C |
| F1-13 | DC brake holding time at stop | 0.0s | 0.0～60.0s | ○ | 0x010D |
| F1-14 | Minimum output frequency during shutdown | 0.50Hz | 0.00～50.00Hz | ● | 0x010E |
| F1-15 | Reserved | | | | 0x010F |
| F1-16 | Acceleration and deceleration | 0010 | Units: time base selection<br>0: Maximum frequency 1: Fixed frequency 50Hz<br>2: Set frequency<br>Tens: S acceleration and deceleration options<br>0: linear acceleration and deceleration 1: S curve acceleration and deceleration<br>Hundreds, Thousands: reserved | ○ | 0x0110 |
| F1-17 | Acceleration start S curve time | 0.10s | 0.00～10.00 | ○ | 0x0111 |

| | | | | | |
|---|---|---|---|---|---|
| F1-18 | S curve time at the end of acceleration | 0.10s | 0.00～10.00 | ○ | 0x0112 |
| F1-19 | Deceleration start S curve time | 0.10s | 0.00～10.00 | ○ | 0x0113 |
| F1-20 | S curve time at the end of deceleration | 0.10s | 0.00～10.00 | ○ | 0x0114 |
| F1-21 | Acceleration time 1 | 10.00s | 0.01～650.00s | ● | 0x0115 |
| F1-22 | Deceleration time 1 | 10.00s | 0.01～650.00s | ● | 0x0116 |
| F1-23 | Acceleration time 2 | 10.00s | 0.01～650.00s | ● | 0x0117 |
| F1-24 | Deceleration time 2 | 10.00s | 0.01～650.00s | ● | 0x0118 |
| F1-25 | Acceleration time 3 | 10.00s | 0.01～650.00s | ● | 0x0119 |
| F1-26 | Deceleration time 3 | 10.00s | 0.01～650.00s | ● | 0x011A |
| F1-27 | Emergency stop deceleration time | 1.00s | 0.01～650.00s | ● | 0x011B |
| F1-28 | Forward and reverse dead time | 0.0s | 0.0～120.0s | ○ | 0x011C |
| F1-29 | Zero speed torque frequency threshold | 0.50Hz | 0.00～10.00Hz | ● | 0x011D |
| F1-30 | Zero speed torque retention coefficient | 60.0% | 0.0～150.0% | ● | 0x011E |
| F1-31 | Zero speed torque holding time | 0 | 0.0～6000.0s<br>When set to 6000.0s, keep | ● | 0x011F |
| F1-32～F1-34 | | Reserved | | | |
| F1-35 | Action selection after power failure | 0 | 0: invalid 1: valid | ○ | 0x0123 |
| F1-36 | Waiting time after power failure | 0.50s | 0.00～60.00s | ○ | 0x0124 |
| F1-37 | Reserved | | | | 0x0125 |
| F1-38 | Jog running frequency setting | 5.00Hz | 0.00～maximum frequency | ● | 0x0126 |
| F1-39 | Jog acceleration time | 10.00s | 0.01～650.00s | ● | 0x0127 |
| F1-40 | Jog deceleration time | 10.00s | 0.01～650.00s | ● | 0x0128 |

**Multi-function terminal parameter group**

| Function | Function code name | Factory default | Set value range and definition | Attrib | Mailing address |
|---|---|---|---|---|---|
| F2-00 | X1 terminal input function selection | 1 | See Schedule | ○ | 0x200 |

| | | | | | |
|---|---|---|---|---|---|
| F2-01 | X2 terminal input function selection | 2 | See Schedule | ○ | 0x201 |
| F2-02 | X3 terminal input function selection | 4 | See Schedule | ○ | 0x202 |
| F2-03 | X4 terminal input function selection | 5 | See Schedule | ○ | 0x203 |
| F2-04 | X5 terminal input function selection | 6 | See Schedule | ○ | 0x204 |
| F2-05～F2-07 | | Reserved | | | |
| F2-08 | X1 ～ X4 terminal characteristic selection | 0000 | 0: closed effective 1: open effective<br>Units: X1 Tens: X2<br>Hundreds: X3 Thousands: X4 | ● | 0x208 |
| F2-09 | X5 terminal feature selection | 0000 | 0: closed effective 1: open effective<br>Units: X5 Tens: reserved<br>Hundreds: reserved Thousands: reserved | ● | 0x209 |
| F2-10 | X1 effective detection delay | 0.010 | 0.000～6.000s | ● | 0x20A |
| F2-11 | X1 invalid detection delay | 0.010 | 0.000～6.000s | ● | 0x20B |
| F2-12 | X2 effective detection delay | 0.010 | 0.000～6.000s | ● | 0x20C |
| F2-13 | X2 invalid detection delay | 0.010 | 0.000～6.000s | ● | 0x20D |
| F2-14 | X3 effective detection delay | 0.010 | 0.000～6.000s | ● | 0x20E |
| F2-15 | X3 invalid detection delay | 0.010 | 0.000～6.000s | ● | 0x20F |
| F2-16 | X4 effective detection delay | 0.010 | 0.000～6.000s | ● | 0x210 |
| F2-17 | X4 invalid detection delay | 0.010 | 0.000～6.000s | ● | 0x211 |
| F2-18 | X5 effective detection delay | 0.010 | 0.000～6.000s | ● | 0x212 |
| F2-19 | X5 invalid detection delay | 0.010 | 0.000～6.000s | ● | 0x213 |
| F2-20 | Terminal control operation mode | 0 | 0: Two-wire system 1 1: Two-wire system 2<br>2: Three-wire system 1 3: Three-wire system 2 | ○ | 0x21A |
| F2-21 | Terminal start protection | 0111 | 0: off 1: on<br>Units: terminal start protection when exiting abnormal<br>Ten digits: Start protection of the jog terminal when exiting abnormally<br>Hundreds: start protection when the command channel is switched to the terminal | ○ | 0x21B |

| | | | | | |
|---|---|---|---|---|---|
| | | | Thousands: reserved | | |
| F2-22 | HDI input minimum frequency | 0.00kHz | 0.00～50.00kHz | ● | 0x21E |
| F2-23 | HDI minimum frequency corresponding setting | 0.00% | 0.00～100.00% | ● | 0x21F |
| F2-24 | HDI input maximum frequency | 50.00kHz | 0.00～50.00kHz | ● | 0x220 |
| F2-25 | HDI maximum frequency corresponding setting | 100.00% | 0.00～100.00% | ● | 0x221 |
| F2-26 | HDI filter time | 0.100s | 0.000～9.000s | ● | 0x222 |
| F2-27 | HDI cutoff frequency | 0.010kHz | 0.000～1.000kHz | ● | 0x223 |
| F2-28 | Terminal UP / DW control selection | 0 | 0: frequency power-off storage<br>1: Frequency is not stored when power is off<br>2: Adjustable during operation, cleared at shutdown | ○ | 0x224 |
| F2-29 | Terminal UP / DW control frequency rate | 0.50Hz/s | 0.01～50.00Hz/s | ● | 0x225 |
| F2-30 | Reserved | | | | 0x226 |
| F2-31 | Timer time unit | 0 | 0: second 1: minute 2: hour | ● | 0x227 |
| F2-32 | Timer setting | 0 | 0～65000 | ● | 0x228 |
| F2-33 | Reserved | | | | 0x229 |
| F2-34 | Counter input frequency division | 0 | 0～6000 | ● | 0x22A |
| F2-35 | Counter maximum | 1000 | 0～65000 | ● | 0x22B |
| F2-36 | Counter set value | 500 | 0～65000 | ● | 0x22C |
| F2-37 | Reserved | | | | 0x22D |
| F2-38 | Output terminal polarity selection | 0000 | 0: positive polarity 1: negative polarity<br>Units: Y terminal Tens: Relay 1<br>Hundreds: relay 2 Thousands: reserved | ● | 0x22E |
| F2-39 | Output terminal 1 | 1 | See attached table | ● | 0x22F |
| F2-40 | Relay output 1 | 4 | See attached table | ● | 0x230 |
| F2-41 | Relay output 2 | 11 | See attached table | ● | 0x231 |

| | | | | | |
|---|---|---|---|---|---|
| F2-42 | Y1 output delay time | 0.010s | 0.000～6.000s | ● | 0x232 |
| F2-43 | Relay 1 output delay | 0.010s | 0.000～6.000s | ● | 0x233 |
| F2-44 | Relay 2 output delay | 0.010s | 0.000～6.000s | ● | 0x234 |
| F2-45 | Output frequency level 1 (FDT1) | 30.00Hz | 0.00～maximum frequency | ● | 0x235 |
| F2-46 | FDT1 lag | 1.00Hz | 0.00～maximum frequency | ● | 0x236 |
| F2-47 | Output frequency level 2 (FDT2) | 50.00Hz | 0.00～maximum frequency | ● | 0x237 |
| F2-48 | FDT2 lag | 1.00Hz | 0.00～maximum frequency | ● | 0x238 |
| F2-49 | The given frequency reaches the detection value | 2.00Hz | 0.00～50.00Hz | ● | 0x239 |

**Analog terminal parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F3-00 | AI1lower limit | 0.00V | 0.00～10.00V | ● | 0x300 |
| F3-01 | AI1 lower limit corresponding setting | 0.00% | -100.00～100.00% | ● | 0x301 |
| F3-02 | AI1 upper limit | 10.00V | 0.00～10.00V | ● | 0x302 |
| F3-03 | AI1 upper limit corresponding setting | 100.00% | -100.00～100.00% | ● | 0x303 |
| F3-04 | AI1 filter time | 0.010s | 0.000～6.000s | ● | 0x304 |
| F3-05 | AI1 voltage / current selection | 0 | 0: voltage 1: current | ● | 0x305 |
| F3-06 | AI2 lower limit | 0.00V | 0.00～10.00V | ● | 0x306 |
| F3-07 | AI2 lower limit corresponding setting | 0.00% | 0.00～100.00% | ● | 0x307 |
| F3-08 | AI2 upper limit | 10.00V | 0.00～10.00V | ● | 0x308 |
| F3-09 | AI2 upper limit corresponding setting | 100.00% | 0.00～100.00% | ● | 0x309 |
| F3-10 | AI2 filter time | 0.010s | 0.000～6.000s | ● | 0x30A |
| F3-11 | AI2 voltage / current | 0 | 0: voltage 1: current | ● | 0x30B |
| F3-12 | AI1 terminal function selection | 0 | See X terminal function | ○ | 0x30C |
| F3-13 | AI1 high level setting | 70.00% | 0.00～100.00% | ● | 0x30D |
| F3-14 | AI1 low level setting | 30.00% | 0.00～100.00% | ● | 0x30E |

| | | | | | |
|---|---|---|---|---|---|
| F3-15 | AI2 terminal function selection | 0 | See X terminal function | ○ | 0x30F |
| F3-16 | AI2 high level setting | 70.00% | 0.00～100.00% | ● | 0x310 |
| F3-17 | AI2 low level setting | 30.00% | 0.00～100.00% | ● | 0x311 |
| F3-18 | Analog quantity to set the terminal effective state | 0000 | 0: low level 1: high level<br>Units: AI1 Tens: AI2<br>Hundreds: reserved Thousands: reserved | ● | 0x312 |
| F3-19 | Analog input curve selection | 0000 | Units: AI1<br>0: straight line 1: curve 1 2: curve 2<br>Tens: AI2 Hundreds, Thousands: reserved | ● | 0x313 |
| F3-20 | Reserved | | | | 0x314 |
| F3-21 | Curve 1 lower limit | 0.00V | 0.00～10.00V | ● | 0x315 |
| F3-22 | Curve 1 lower limit corresponding setting | 0.0% | 0.00～100.00% | ● | 0x316 |
| F3-23 | Curve 1 Inflection point 1 Input voltage | 3.00V | 0.00～10.00V | ● | 0x317 |
| F3-24 | Curve 1 turning point 1 corresponding setting | 30.00% | 0.00～100.00% | ● | 0x318 |
| F3-25 | Curve 1 Inflection point 2 Input voltage | 6.00V | 0.00～10.00V | ● | 0x319 |
| F3-26 | Curve 1 turning point 2 corresponding setting | 60.00% | 0.00～100.00% | ● | 0x31A |
| F3-27 | Curve 1 upper limit | 10.0V | 0.00～10.00V | ● | 0x31B |
| F3-28 | Curve 1 upper limit corresponding setting | 100.00% | 0.00～100.00% | ● | 0x31C |
| F3-29 | Curve 2 lower limit | 0.00V | 0.00～10.00V | ● | 0x31D |
| F3-30 | Curve 2 lower limit corresponding setting | 0.00% | 0.00～100.00% | ● | 0x31E |
| F3-31 | Curve 2 Inflection point 1 Input voltage | 3.00V | 0.00～10.00V | ● | 0x31F |
| F3-32 | Curve 2 inflection point 1 corresponding setting | 30.00% | 0.00～100.00% | ● | 0x320 |
| F3-33 | Curve 2 Inflection point 2 Input voltage | 6.00V | 0.00～10.00V | ● | 0x321 |
| F3-34 | Curve 2 Inflection point 2 corresponding setting | 60.00% | 0.00～100.00% | ● | 0x322 |

| | | | | | |
|---|---|---|---|---|---|
| F3-35 | Curve 2 upper limit | 10.00V | 0.00～10.00V | ● | 0x323 |
| F3-36 | Curve 2 upper limit corresponding setting | 100.00% | 0.00～100.00% | ● | 0x324 |
| F3-37 | AO output signal selection | 0000 | Units: AO1<br>0: 0 ～ 10V 1: 4.00 ～ 20.00mA<br>2: 0.00 ～ 20.00mA<br>Ten: AO2<br>0: 0 ～ 10V 1: 4.00 ～ 20.00mA<br>2: 0.00 ～ 20.00mA<br>3: FM frequency pulse output<br>Hundreds, Thousands: reserved | ● | 0x325 |
| F3-38 | AO1 output selection | 0 | 0: given frequency 1: output frequency<br>2: output current 3: input voltage<br>4: Output voltage 5: Mechanical speed<br>6: given torque 7: output torque<br>8: PID given amount 9: PID feedback amount<br>10: output power 11: bus voltage<br>12: AI1 input value 13: AI2 input value<br>14: HDI input value 15: module temperature 1<br>16: Module temperature 2 17: Communication given | ● | 0x326 |
| F3-39 | A02 output selection | 1 | | ● | 0x327 |
| F3-40 | AO1 output gain | 100.0% | 25.0～200.0% | ● | 0x328 |
| F3-41 | A01 output signal offset | 0.0% | -10.0～10.0% | ● | 0x329 |
| F3-42 | A01 output filter | 0.010s | 0.000～6.000s | ● | 0x32A |
| F3-43 | AO2 output gain | 100.0% | 25.0～200.0% | ● | 0x32B |
| F3-44 | A02 Analog output signal offset | 0.0% | -10.0%～10.0% | ● | 0x32C |
| F3-45 | A02 output filter | 0.010s | 0.000～6.000s | ● | 0x32D |
| F3-46 | A02FM frequency output lower limit | 0.20kHz | 0.00～100.00kHz | ● | 0x32E |
| F3-47 | A02FM frequency output upper limit | 50.00kHz | 0.00～100.00kHz | ● | 0x32F |

**Keyboard parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F4-00 | Parameter and key lock selection | 0 | 0: Not locked 1: Function parameter locked<br>2: Function parameters and key lock (except RUN / STOP / MF.K)<br>3: The function parameters and keys are all locked | ● | 0x400 |
| F4-01 | User password | 0 | 0～9999 | ● | 0x401 |
| F4-02～F4-06 | | | | | 0x402 |
| F4-07 | Keyboard MF.K selection | 0 | 0: reverse 1: jog | ○ | 0x407 |
| F4-08 | Keyboard STOP key setting | 1 | 0: Non-keyboard control mode is invalid<br>1: Non-keyboard control mode stops according to the stop mode<br>2: Non-keyboard control mode stops in free mode | ○ | 0x408 |
| F4-09 | Keyboard up and down key selection | 0011 | Units: keyboard up and down keys to modify selection<br>0: invalid<br>1: Used to adjust the frequency given by keyboard F0-08<br>2: Used to adjust PID keyboard given Fb-01<br>Ten digits: Power-off storage<br>0: frequency is not stored when power off<br>1: Frequency power-off storage<br>Hundreds place: action limit<br>0: Adjustable running stop<br>1: Adjustable only during operation, keep at shutdown<br>2: Adjustable during operation, cleared at shutdown<br>Thousands: reserved | ○ | 0x409 |
| F4-10 | Keyboard potentiometer lower limit | 0.50V | 0.00～5.00V | ● | 0x40A |

| | | | | | |
|---|---|---|---|---|---|
| F4-11 | Corresponding to the lower limit of keyboard potentiometer | 0.00 | 0.00～100.00% | ● | 0x40B |
| F4-12 | Upper limit value of keyboard potentiometer | 4.50V | 0.00～5.00V | ● | 0x40C |
| F4-13 | Corresponding to the upper limit of keyboard | 100.00 | 0.00～100.00% | ● | 0x40D |
| F4-14 | Run display on the first line of the keyboard | 1101 | Tens of one's place: the first group displays 00 ～ 63<br>Hundreds and thousandss: the second group displays 00 ～ 63 | ● | 0x40E |
| F4-15 | Run display on the first line of the keyboard | 0402 | As defined in F4-14 | ● | 0x40F |
| F4-16 | Stop display on the first line of the keyboard | 1100 | As defined in F4-14 | ● | 0x410 |
| F4-17 | Stop display on the first line of the keyboard | 0402 | As defined in F4-14 | ● | 0x411 |
| F4-18 | Run display on the second line of the keyboard | 0402 | As defined in F4-14 | ● | 0x412 |
| F4-19 | Run display on the second line of the keyboard | 1210 | As defined in F4-14 | ● | 0x413 |
| F4-20 | Stop display on the second line of the keyboard | 0402 | As defined in F4-14 | ● | 0x414 |
| F4-21 | Stop display on the second line of the keyboard | 1210 | As defined in F4-14 | ● | 0x415 |
| F4-22 | Keyboard display item settings | 0000 | Units: output frequency display selection<br>0: target frequency 1: running frequency<br>Hundreds: power display dimension<br>0: percentage (%) 1: kilowatt (KW) | ● | 0x416 |
| F4-23 | Reserved | | | | |
| F4-24 | Speed display coefficient | 100.0% | 0.0～500.0% | ● | 0x418 |
| F4-25 | Power display coefficient | 100.0% | 0.0～500.0% | ● | 0x419 |
| F4-26～F4-27 | | | | | |

**Motor parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F5-00 | Motor type | 0 | 0: asynchronous motor (AM) | × | 0x500 |
| F5-01 | Number of motor poles | 4 | 2～98 | ○ | 0x501 |
| F5-02 | Motor rated power | Model settings | 0.1～1000.0kW | ※ | 0x502 |
| F5-03 | Motor rated frequency | Model settings | 0.01～maximum frequency | ※ | 0x503 |
| F5-04 | Motor rated speed | Model settings | 1～65000rpm | ※ | 0x504 |
| F5-05 | Motor rated voltage | Model settings | 0～1500V | ※ | 0x505 |
| F5-06 | Motor rated current | Model settings | 0.1～2000.0A | ※ | 0x506 |
| F5-07 | Asynchronous motor no-load current | Model settings | 0.1～650.0A | ※ | 0x507 |
| F5-08 | Asynchronous motor stator resistance | Model settings | 0.01～50.00% | ※ | 0x508 |
| F5-09 | Rotor resistance of asynchronous motor | Model settings | 0.01～50.00% | ※ | 0x509 |
| F5-10 | Asynchronous motor stator leakage inductance | Model settings | 0.01～50.00% | ※ | 0x50A |
| F5-11 | Asynchronous motor stator inductance | Model settings | 0.1～2000.0% | ※ | 0x50B |
| F5-12～F5-19 | | Reserved | | | |
| F5-20 | Motor parameter identification | 0 | 0: no operation 1: rotation identification<br>2: static identification 3: reserved | ○ | 0x514 |
| F5-21～F5-29 | | | | | |
| F5-30 | Speed feedback or encoder type | 0000 | Units: encoder type<br>0: ABZ 1: Rotation<br>Tens: encoder direction<br>0: consistent direction 1: opposite direction<br>Hundreds: disconnection detection<br>0: off 1: on<br>Thousands: Z pulse correction is enabled<br>0: off 1: on | ○ | 0x51E |

| | | | | | |
|---|---|---|---|---|---|
| F5-31 | ABZ encoder line number | 1024 | 1 | ○ | 0x51F |
| F5-32 | Disconnection detection time | 2.000s | 0.100～60.000s | ● | 0x520 |
| F5-33 | Resolver pole number | 2 | 2～128 | ○ | 0x521 |
| F5-34～F5-35 | | Reserved | | | |
| F5-36 | Encoder speed filter | 1.0ms | 0.0～100.0ms | ● | 0x524 |

**Vector control parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F6-00 | Speed loop proportional gain 1 | 10.00 | 0.01～100.00 | ● | 0x600 |
| F6-01 | Speed loop integration time 1 | 0.500s | 0.000～6.000s | ● | 0x601 |
| F6-02 | Speed loop filter time 1 | 0.0ms | 0.0～100.0ms | ● | 0x602 |
| F6-03 | Speed loop switching frequency 1 | 5.00Hz | [F6-07] ～Upper limit | ● | 0x603 |
| F6-04 | Speed loop proportional gain 2 | 10.00 | 0.01～100.00 | ● | 0x604 |
| F6-05 | Speed loop integration time 2 | 0.500s | 0.000～6.000s | ● | 0x605 |
| F6-06 | Speed loop filter time 2 | 0.0ms | 0.0～100.0ms | ● | 0x606 |
| F6-07 | Speed loop switching frequency 2 | 5.00Hz | 0.00～[F6-03] | ● | 0x607 |
| F6-08 | Electric torque limit | 180.0% | 0.0～250.0% | ● | 0x608 |
| F6-09 | Generation torque limit | 180.0% | 0.0～250.0% | ● | 0x609 |
| F6-10 | Current loop straight axis proportional gain | 1.000 | 0.001～4.000 | ● | 0x60A |
| F6-11 | Current loop integral gain | 1.000 | 0.001～4.000 | ● | 0x60B |
| F6-12 | Current loop cross axis proportional gain | 1.000 | 0.001～4.000 | ● | 0x60C |
| F6-13 | Current loop cross axis integral gain | 1.000 | 0.001～4.000 | ● | 0x60D |
| F6-14 | Reserved | | | | 0x60E |
| F6-15 | Vector electric slip compensation | 100.0% | 0.0～250.0% | ● | 0x60F |
| F6-16～F6-21 | | | | | |
| F6-22 | Over-excitation braking gain | 100.0% | 0.0～500.0% | ○ | 0x616 |
| F6-23 | Over-excitation braking limit | 100.0% | 0.0～250.0% | ○ | 0x617 |
| F6-24 | Vector control energy saving function | 0 | 0: off 1: on | ○ | 0x618 |
| F6-25 | Energy-saving control gain | 50.0% | 0.0～80.0% | ● | 0x619 |

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|---|---|---|---|---|---|
| F6-26 | Energy-saving control low-pass filtering | 0.010s | 0.000～6.000s | ● | 0x61A |
| F6-27 | Motor power limit in constant power zone | 150.0% | 0.0～250.0% | ● | 0x61B |
| F6-28～F6-69 | | Reserved | | | |

**Torque control parameter group**

| Function code number | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F7-00 | Torque / speed control | 0 | 0: speed control 1: torque control | ● | 0x700 |
| F7-01 | Torque reference channel selection | 0 | 0: keyboard number given<br>1: keyboard potentiometer given<br>2: AI1 3: AI2<br>4: HDI 5: RS485 communication given | ● | 0x701 |
| F7-02 | Torque keyboard digital setting | 0.0% | 0～100.0% | ● | 0x702 |
| F7-03 | Torque input lower limit | 0.00% | 0.00～100.00% | ● | 0x703 |
| F7-04 | Lower limit corresponding setting | 0.00% | -200.00～200.00% | ● | 0x704 |
| F7-05 | Torque input upper limit | 100.00% | 0.00～100.00% | ● | 0x705 |
| F7-06 | Upper limit corresponding setting | 100.00% | -200.00～200.00% | ● | 0x706 |
| F7-07 | Reference torque filter time | 0.100s | 0.000～6.000s | ● | 0x707 |
| F7-08 | Output torque upper limit | 150.0% | 0～200.0% | ● | 0x708 |
| F7-09 | Output torque lower limit | 0% | 0～200.0% | ● | 0x709 |
| F7-10 | Torque control forward speed limit selection | 0 | 0: Function code F7-12 setting;<br>1: keyboard potentiometer × F7-12;<br>2: AI1 × F7-12;<br>3: AI2 × F7-12;<br>4: HDI × F7-12;<br>5: RS485 communication given × F7-12 | ● | 0x70A |

| | | | | | |
|---|---|---|---|---|---|
| F7-11 | Torque control reverse speed limit selection | 0 | 0: Function code F7-13 setting;<br>1: keyboard potentiometer × F7-13;<br>2: AI1 × F7-13;<br>3: AI2 × F7-13;<br>4: HDI × F7-13;<br>5: RS485 communication given × F7-13 | ● | 0x70B |
| F7-12 | Torque control forward maximum speed limit | 100.0% | 0.0～100.0% | ● | 0x70C |
| F7-13 | Torque control reverse maximum speed limit | 100.0% | 0.0 ～ 100.0% | ● | 0x70D |
| F7-14 | Reserved | | | | 0x70E |

**V / F control parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F8-00 | Linear V / F curve selection | 0 | 0: straight line V / F;<br>1-9: 1.1-1.9 power V / F;<br>10: square V / F;<br>11: Multi-point V / F (F8-01 ～ F8-10); | ○ | 0x0800 |
| F8-01 | V / F voltage V1 | 3.0% | 0.0～100.0% | ○ | 0x0801 |
| F8-02 | V / F frequency F1 | 1.00Hz | 0.00～maximum frequency | ○ | 0x0802 |
| F8-03 | V / F voltage V2 | 28.0% | 0.0～100.0% | ○ | 0x0803 |
| F8-04 | V / F frequency F2 | 10.00Hz | 0.00～maximum frequency | ○ | 0x0804 |
| F8-05 | V / F voltage V3 | 55.0% | 0.0～100.0% | ○ | 0x0805 |
| F8-06 | V / F frequency F3 | 25.00Hz | 0.00～maximum frequency | ○ | 0x0806 |
| F8-07 | V / F voltage V4 | 78.0% | 0.0～100.0% | ○ | 0x0807 |
| F8-08 | V / F frequency F4 | 37.50Hz | 0.00～maximum frequency | ○ | 0x0808 |
| F8-09 | V / F voltage V5 | 100.0% | 0.0～100.0% | ○ | 0x0809 |
| F8-10 | V / F frequency F5 | 50.00Hz | 0.00～maximum frequency | ○ | 0x080A |
| F8-11 | Output voltage percentage | 100.0% | 25.0～120.0% | ○ | 0x080B |
| F8-12 | Torque boost | 1.0% | 0.0～30.0%(0.0% automatic torque boost) | ● | 0x080C |
| F8-13 | Torque boost cutoff frequency | 100.0% | 0.0～100.0% | ● | 0x080D |
| F8-14 | V / F slip compensation gain | 100.0% | 0.0～200.0% | ● | 0x080E |

| | | | | | |
|---|---|---|---|---|---|
| F8-15 | V / F slip compensation limit | 100.0% | 0.0～300.0% | ● | 0x080F |
| F8-16 | V / F slip compensation filter | 0.200s | 0.000～6.000s | ● | 0x0810 |
| F8-17 | Oscillation suppression gain | 100.0% | 0.0～900.0% | ● | 0x0811 |
| F8-18 | Reserved | | | | 0x0812 |
| F8-19 | V / F automatic energy-saving control | 0 | 0: off 1: on | ○ | 0x0813 |
| F8-20 | Lower frequency limit of energy-saving buck frequency | 15.00Hz | 0.0～50.00Hz | ○ | 0x0814 |
| F8-21 | Lower limit of energy-saving buck voltage | 50.0% | 20.0～100.0% | ○ | 0x0815 |
| F8-22 | Energy-saving buck voltage regulation rate | 0.010V/MS | 0.000～0.200V/MS | ● | 0x0816 |
| F8-23 | Energy saving buck voltage recovery rate | 0.200V/MS | 0.000～2.000V/MS | ● | 0x0817 |
| F8-24～F8-29 | | | | | |
| F8-30 | Voltage-frequency separated output voltage source | 0 | 0: Function code F8-31 setting<br>1: keyboard potentiometer given<br>2: Analog quantity AI1 given<br>3: Analog quantity AI2 given<br>4: Pulse HDI given<br>5: PID output given<br>6: RS485 communication given | ● | 0x081E |
| F8-31 | Digital setting of voltage-frequency separation output voltage | 0.0% | 0.0%～100.0% | ● | 0x081F |
| F8-32 | Voltage-frequency separation voltage acceleration time | 10.00s | 0.0～100.00s | ● | 0x0820 |
| F8-33 | Voltage-frequency separation voltage deceleration time | 10.00s | 0.0～100.00s | ● | 0x0821 |
| F8-34 | Voltage-frequency separation stop mode | 0 | 0: The output voltage and output frequency acceleration and deceleration do not affect each other | ● | 0x0822 |

| | | | | | |
|---|---|---|---|---|---|
| | | | 1: After the output voltage drops to 0V, the output frequency drops again. | | |
| F8-35～F8-38 | | Reserved | | | |

**Enhanced function parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| F9-00 | Jump frequency 1 | 0.00Hz | 0.00～maximum frequency | ● | 0x0900 |
| F9-01 | Jump frequency amplitude | 0.00Hz | 0.00～maximum frequency | ● | 0x0901 |
| F9-02 | Jump frequency 2 | 0.00Hz | 0.00～maximum frequency | ● | 0x0902 |
| F9-03 | Jump frequency range 2 | 0.00Hz | 0.00～maximum frequency | ● | 0x0903 |
| F9-04～F9-07 | | Reserved | | | |
| F9-08 | Swing frequency control | 0 | 0: The swing frequency is invalid<br>1: The swing frequency is valid | ● | 0x0908 |
| F9-09 | Swing frequency amplitude control | 0 | 0: relative center frequency 1: relative maximum frequency | ● | 0x0909 |
| F9-10 | Reserved | | | | |
| F9-11 | Swing frequency amplitude | 10.0% | 0.0～100.0% | ● | 0x090B |
| F9-12 | Jump frequency amplitude | 10.0% | 0.0～50.0% | ● | 0x090C |
| F9-13 | Swing frequency rise time | 5.00s | 0.00～650.00s | ● | 0x090D |
| F9-14 | Wobble frequency fall time | 5.00s | 0.00～650.00s | ● | 0x090E |
| F9-15 | Fan control | 1 | 0: The fan runs after the inverter is powered on<br>1: Shutdown is related to temperature, running is running<br>2: The stop fan stops, the operation is related to the temperature | ● | 0x090F |
| F9-16 | Energy consumption | 0 | 0: off 1: on | ● | 0x0910 |
| F9-17 | Energy consumption braking action voltage | 135.0% | 115.0%～150.0% | ● | 0x0911 |
| F9-18 | Energy consumption braking utilization rate | 10.0% | 0.0～100.0% | ● | 0x0912 |
| F9-19～F9-20 | | Reserved | | | |

**Protection and fault parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| FA-00 | Overcurrent suppression function | 0 | 0: suppression is always effective<br>1: Acceleration and deceleration are valid, constant speed is invalid | ○ | 0xA00 |
| FA-01 | Overcurrent suppression point | 160.0% | 0.0 ～ 300.0% | ● | 0xA01 |
| FA-02 | Overcurrent suppression gain | 100.0% | 0.0 ～ 500.0% | ● | 0xA02 |
| FA-03 | Current hardware protection settings | 0001 | Units: wave-by-wave current limiting (CBC)<br>0: off 1: on<br>Tens: reserved<br>Hundreds: SC protection interference suppression<br>0: close<br>1: First-level interference suppression<br>2: Secondary interference suppression<br>Thousands: reserved | ○ | 0xA03 |
| FA-04～FA-05 | | Reserved | | | |
| FA-06 | Bus overvoltage suppression function | 0012 | Units: Overvoltage suppression control<br>0: Disable 1: Deceleration is effective<br>2: Both enabled during acceleration and deceleration<br>Tens: over-excitation control<br>0: off 1: on<br>Hundreds and thousandss: reserved | ○ | 0xA06 |
| FA-07 | Bus overvoltage suppression point | 130.0% | 110.0 ～ 150.0% | ※ | 0xA07 |
| FA-08 | Bus overvoltage suppression gain | 100.0% | 0.0 ～ 500.0% | ● | 0xA08 |
| FA-09 | Bus undervoltage suppression function | 0 | 0: Disable 1: Enable | ○ | 0xA09 |

| | | | | | |
|---|---|---|---|---|---|
| FA-10 | Bus undervoltage suppression point | 80.0% | 60.0 ～ 90.0% | ※ | 0xA0A |
| FA-11 | Bus undervoltage suppression gain | 100.0% | 0.0 ～ 500.0% | • | 0xA0B |
| FA-12 | Bus undervoltage protection point | 60.0% | 60.0 ～ 90.0% | ※ | 0xA0C |
| FA-13 | Reserved | | | | 0xA0D |
| FA-14 | Short circuit detection after power on | 0 | 0: off 1: on | ○ | 0xA0E |
| FA-15 | Phase loss protection | 0011 | Units: output phase loss protection<br>0: off 1: on<br>Ten digits: input phase loss protection<br>0: close 1: open alarm<br>2: Open failure<br>Hundreds, Thousands: reserved | ○ | 0xA0F |
| FA-16 | Motor overload protection factor | 100.0% | 0.0～250.0% | ○ | 0xA10 |
| FA-17 | Load warning detection setting | 0000 | Units: detection selection (protection 1)<br>0: not detect 1: detect excessive load<br>2: Only detect excessive load at constant speed<br>3: Detect insufficient load<br>4: Only detect insufficient load at constant speed<br>Tens: alarm selection<br>0: alarm, continue to run<br>1: Fault protection action and free stop<br>Hundreds: detection selection (protection 2)<br>0: not detect 1: detect excessive load<br>2: Only detect excessive load at constant speed<br>3: Detect insufficient load<br>4: Only detect insufficient load at constant speed | ○ | 0xA11 |

| | | | | | |
|---|---|---|---|---|---|
| | | | Thousands: alarm selection<br>0: alarm, continue to run<br>1: Fault protection action and free stop | | |
| FA-18 | Load warning detection level 1 | 130.0% | 0.0～200.0% | ○ | 0xA12 |
| FA-19 | Load warning detection time 1 | 5.0s | 0.0～60.0s | ○ | 0xA13 |
| FA-20 | Load warning detection level 2 | 30.0% | 0.0～200.0% | ○ | 0xA14 |
| FA-21 | Load warning detection time 2 | 5.0s | 0.0～60.0s | ○ | 0xA15 |
| FA-22 | Reserved | | | | 0xA16 |
| FA-23 | Protective action of excessive speed deviation | 0000 | Units: detection selection<br>0: not detect 1: detect only at constant speed<br>2: Always check<br>Tens: alarm selection<br>0: Free stop and report fault<br>1: Alarm and continue to run<br>Hundreds, Thousands: reserved | ○ | 0xA17 |
| FA-24 | Excessive speed deviation detection threshold | 10.0% | 0.0～60.0% | ○ | 0xA18 |
| FA-25 | Detection time for excessive speed deviation | 2.0s | 0.0～60.0s | ○ | 0xA19 |

| | | | | | |
|---|---|---|---|---|---|
| FA-26 | Fast protection action | 0000 | Units: detection selection<br>0: not detect 1: detect only at constant speed<br>2: Always check<br>Tens: alarm selection<br>0: Free stop and report fault<br>1: Alarm and continue to run<br>Hundreds, Thousands: reserved | ○ | 0xA1A |
| FA-27 | Fast detection threshold | 110.0% | 0.0～150.0% | ○ | 0xA1B |
| FA-28 | Fast detection time | 0.010s | 0.000～2.000s | ○ | 0xA1C |
| FA-29～FA-36 | | Reserved | | | |
| FA-37 | Fault self-recovery times | 0 | 0～5 | ○ | 0xA25 |
| FA-38 | Fault self-recovery interval time | 1.0s | 0.1～100.0s | ○ | 0xA26 |
| FA-39 | Fault diagnosis information | -- | See the fault information code table for details | × | 0xA27 |
| FA-40 | Fault type | -- | See the fault information code table for details | × | 0xA28 |
| FA-41 | Fault operating frequency | -- | 0.00～maximum frequency | × | 0xA29 |
| FA-42 | Fault output voltage | -- | 0～1500V | × | 0xA2A |
| FA-43 | Fault output current | -- | 0.1～2000.0A | × | 0xA2B |
| FA-44 | Fault bus voltage | -- | 0～3000V | × | 0xA2C |
| FA-45 | Faulty module temperature | -- | 0～100℃ | × | 0xA2D |
| FA-46 | Faulty inverter status | -- | Units: running direction<br>0: forward rotation 1: reverse rotation<br>Ten digits: running status<br>0: stop 1: accelerate<br>2: Deceleration 3: Constant speed<br>Hundreds, Thousands: reserved | × | 0xA2E |
| FA-47 | Fault input terminal status | -- | See input terminal status diagram | × | 0xA2F |
| FA-48 | Fault output terminal status | -- | See output terminal status diagram | × | 0xA30 |
| FA-49 | Previous failure type | -- | See the fault information code table for details | × | 0xA31 |

| | | | | | |
|---|---|---|---|---|---|
| FA-50 | Operating frequency of previous fault | -- | 0.00～maximum frequency | × | 0xA32 |
| FA-51 | Previout fault output voltage | -- | 0～1500V | × | 0xA33 |
| FA-52 | Previous fault output current | -- | 0.1～2000.0A | × | 0xA34 |
| FA-53 | Bus voltage of previous fault | -- | 0～3000V | × | 0xA35 |
| FA-54 | Module temperature of the previous failure | -- | 0～100℃ | × | 0xA36 |
| FA-55 | Inverter status of previous failure | -- | Units: running direction<br>0: forward rotation 1: reverse rotation<br>Ten digits: running status<br>0: stop 1: accelerate<br>2: Deceleration 3: Constant speed<br>Hundreds, Thousands: reserved | × | 0xA37 |
| FA-56 | Output terminal status of previous fault | -- | See input terminal status diagram | × | 0xA38 |
| FA-57 | Output terminal status of previous fault | -- | See output terminal status diagram | × | 0xA39 |
| FA-58 | The first two failure types | -- | See the fault information code table for details | × | 0xA3A |
| FA-59 | The first three failure types | -- | See the fault information code table for details | × | 0xA3B |

**PID control parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| Fb-00 | PID controller given signal source | 0 | 0: keyboard number PID given<br>1: keyboard potentiometer given<br>2: Analog quantity AI1 given<br>3: Analog quantity AI2 given<br>4: Pulse HDI given<br>5: RS485 communication given<br>6: optional card<br>7: terminal selection | ● | 0xB00 |
| Fb-01 | Keyboard digital PID given / feedback | 50.0% | 0.00～100.0% | ● | 0xB01 |

| | | | | | |
|---|---|---|---|---|---|
| Fb-02 | PID given acceleration and deceleration time | 1.00s | 0.00～60.00s | ● | 0xB02 |
| Fb-03 | PID controller feedback signal source | 2 | 0: keyboard number PID given<br>1: keyboard potentiometer given<br>2: Analog quantity AI1 given<br>3: Analog quantity AI2 given<br>4: Terminal pulse HDI setting<br>5: RS485 communication given<br>6: optional card<br>7: terminal selection | ● | 0xB03 |
| Fb-04 | Feedback signal low-pass filter time | 0.010s | 0.000～6.000s | ● | 0xB04 |
| Fb-05 | Feedback signal gain | 1.00 | 0.00～10.00 | ● | 0xB05 |
| Fb-06 | Maximum range of feedback signal | 100.0 | 0～100.0 | ● | 0xB06 |
| Fb-07 | PID control selection | 0100 | Unit: feedback feature selection<br>0: positive characteristic 1: negative characteristic<br>Tens: closed loop bypass keeps output<br>0: output is cleared when closed loop bypass<br>1: Output hold when closed loop bypass<br>Hundreds place: alignment selection<br>0: Non-center alignment 1: Center alignment<br>Thousands: Differential adjustment properties<br>0: Differentiate the deviation<br>1: Differentiate the feedback | ○ | 0xB07 |
| Fb-08 | PID preset output | 100.0% | 0.0～100.0% | ● | 0xB08 |
| Fb-09 | PID preset output running | 0.0s | 0.0～6500.0s | ● | 0xB09 |
| Fb-10 | PID control deviation limit | 0.0% | 0.0～100.0% | ● | 0xB0A |
| Fb-11 | Proportional gain P1 | 0.100 | 0.000～8.000 | ● | 0xB0B |
| Fb-12 | Integration time I1 | 1.0s | 0.0～600.0s | ● | 0xB0C |
| Fb-13 | Differential gain D1 | 0.000s | 0.000～6.000s | ● | 0xB0D |
| Fb-14 | Proportional gain P2 | 0.100 | 0.000～8.000 | ● | 0xB0E |
| Fb-15 | Integration time I2 | 1.0s | 0.0～600.0s | ● | 0xB0F |

| | | | | | |
|---|---|---|---|---|---|
| Fb-16 | Differential gain D2 | 0.000s | 0.000～6.000s | ● | 0xB10 |
| Fb-17 | PID parameter switching conditions | 0 | 0: No switching 1: X terminal switching<br>2: Switch according to deviation | ● | 0xB11 |
| Fb-18 | Low switching deviation | 20.0% | 0.0～100.0% | ● | 0xB12 |
| Fb-19 | High switching deviation | 80.0% | 0.0～100.0% | ● | 0xB13 |
| Fb-20 | Reserved | | | | 0xB14 |
| Fb-21 | Differential limiting | 5.0% | 0.0～100.0% | ● | 0xB15 |
| Fb-22 | PID output upper limit | 100.0% | 0.0～100.0% | ● | 0xB16 |
| Fb-23 | PID output lower limit | 0.0% | 0.0～[Fb-22] | ● | 0xB17 |
| Fb-24 | PID output filter time | 0.0s | 0.000～6.000s | ● | 0xB18 |
| Fb-25 | Feedback disconnection | 1.0s | 0.0～120.0s | ● | 0xB19 |
| Fb-26 | Feedback disconnection action selection | 0 | 0: continue to run without failure<br>1: Stop and report fault<br>2: Continue to run, output alarm<br>3: Run at current frequency and alarm | ● | 0xB1A |
| Fb-27 | Upper limit of wire break alarm | 100.0% | 0.0～100.0% | ● | 0xB1B |
| Fb-28 | Lower limit of wire break alarm | 0.0% | 0.0～100.0% | ● | 0xB1C |
| Fb-29 | Sleep selection | 0 | 0: off 1: on | ● | 0xB1D |
| Fb-30 | Sleep frequency | 30.00Hz | 0.00～50.00Hz | ● | 0xB1E |
| Fb-31 | Sleep delay | 3.0S | 0.0～3600.0S | ● | 0xB1F |
| Fb-32 | Wake deviation | 5.0% | 0.0～50.0% | ● | 0xB20 |
| Fb-33 | Wakeup delay | 0.0S | 0.0～60.0S | ● | 0xB21 |

**Multi-stage speed, PLC function parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| FC-00 | Multi-band frequency 1 | 10.00Hz | 0.00～maximum frequency | ● | 0xC00 |
| FC-01 | Multi-band frequency 2 | 20.00Hz | 0.00～maximum frequency | ● | 0xC01 |
| FC-02 | Multi-band frequency 3 | 30.00Hz | 0.00～maximum frequency | ● | 0xC02 |
| FC-03 | Multi-band frequency 4 | 40.00Hz | 0.00～maximum frequency | ● | 0xC03 |
| FC-04 | Multi-band frequency 5 | 50.00Hz | 0.00～maximum frequency | ● | 0xC04 |
| FC-05 | Multi-band frequency 6 | 40.00Hz | 0.00～maximum frequency | ● | 0xC05 |
| FC-06 | Multi-band frequency 7 | 30.00Hz | 0.00～maximum frequency | ● | 0xC06 |
| FC-07 | Multi-band frequency 8 | 20.00Hz | 0.00～maximum frequency | ● | 0xC07 |

| | | | | | |
|---|---|---|---|---|---|
| FC-08 | Multi-band frequency 9 | 10.00Hz | 0.00～maximum frequency | ● | 0xC08 |
| FC-09 | Multi-band frequency 10 | 20.00Hz | 0.00～maximum frequency | ● | 0xC09 |
| FC-10 | Multi-band frequency 11 | 30.00Hz | 0.00～maximum frequency | ● | 0xC0A |
| FC-11 | Multi-band frequency 12 | 40.00Hz | 0.00～maximum frequency | ● | 0xC0B |
| FC-12 | Multi-band frequency 13 | 50.00Hz | 0.00～maximum frequency | ● | 0xC0C |
| FC-13 | Multi-band frequency 14 | 40.00Hz | 0.00～maximum frequency | ● | 0xC0D |
| FC-14 | Multi-band frequency 15 | 30.00Hz | 0.00～maximum frequency | ● | 0xC0E |
| FC-15 | Multi-frequency operation mode selection | 0000 | Units: circular mode<br>0: single cycle 1: continuous cycle<br>2: Keep the final value after a single cycle<br>Ten digits: timing unit<br>0: second 1: minute 2: hour<br>Hundreds: power-down storage<br>0: Do not store 1: Store<br>Thousands: start mode<br>0: restart from the first stage<br>1: Re-run from the stage of shutdown<br>2: Continue to run with the remaining time of the shutdown phase | ● | 0xC0F |
| FC-16 | Multi-frequency 1 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC10 |
| FC-17 | Multi-frequency 2 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC11 |
| FC-18 | Multi-frequency 3 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC12 |
| FC-19 | Multi-frequency 4 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC13 |
| FC-20 | Multi-frequency 5 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC14 |
| FC-21 | Multi-frequency 6 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC15 |
| FC-22 | Multi-frequency 7 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC16 |
| FC-23 | Multi-frequency 8 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC17 |

| | | | | | |
|---|---|---|---|---|---|
| FC-24 | Multi-frequency 9 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC18 |
| FC-25 | Multi-frequency 10 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC19 |
| FC-26 | Multi-frequency 11 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC1A |
| FC-27 | Multi-frequency 12 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC1B |
| FC-28 | Multi-frequency 13 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC1C |
| FC-29 | Multi-frequency 14 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC1D |
| FC-30 | Multi-frequency 15 running time | 10.0 | 0.0～6500.0(s/m/h) | ● | 0xC1E |

| | | | | | |
|---|---|---|---|---|---|
| FC-31 | Multi-section frequency 1-15 direction and acceleration / deceleration time | 0000 | Units: running direction of this segment<br>0: forward 1: reverse<br>Tens: the acceleration and deceleration time<br>0: acceleration and deceleration time 0<br>1: Acceleration and deceleration time 1<br>2: Acceleration and deceleration time 2<br>3: Acceleration and deceleration time 3<br>Hundreds, Thousands: reserved | ● | 0xC1F |
| FC-32 | | 0000 | | ● | 0xC20 |
| FC-33 | | 0000 | | ● | 0xC21 |
| FC-34 | | 0000 | | ● | 0xC22 |
| FC-35 | | 0000 | | ● | 0xC23 |
| FC-36 | | 0000 | | ● | 0xC24 |
| FC-37 | | 0000 | | ● | 0xC25 |
| FC-38 | | 0000 | | ● | 0xC26 |
| FC-39 | | 0000 | | ● | 0xC27 |
| FC-40 | | 0000 | | ● | 0xC28 |
| FC-41 | | 0000 | | ● | 0xC29 |
| FC-42 | | 0000 | | ● | 0xC2A |
| FC-43 | | 0000 | | ● | 0xC2B |
| FC-44 | | 0000 | | ● | 0xC2C |
| FC-45 | | 0000 | | ● | 0xC2D |
| FC-46～FC-48 | | Reserved | | | |

**Communication control function parameter group**

| Function code | Function code name | Factory default | Set value range and definition | Attributes | Mailing address |
|---|---|---|---|---|---|
| Fd-00 | Master-slave choice | 0 | 0: Slave 1: Master | ○ | 0xD00 |
| Fd-01 | Mailing address | 1 | 1～247 | ○ | 0xD01 |

| | | | | | |
|---|---|---|---|---|---|
| Fd-02 | Communication baud rate selection | 3 | 0：1200 bps 1：2400 bps<br>2：4800 bps 3：9600 bps<br>4：19200 bps 5：38400 bps | ○ | 0xD02 |
| Fd-03 | Modbus data format | 0 | 0：(N，8，1) 1：(E，8，1)<br>2：(O，8，1) 3：(N，8，2)<br>4：(E，8，2) 5：(O，8，2) | ○ | 0xD03 |
| Fd-04 | Communication ratio setting | 1.00 | 0.00～5.00 | ● | 0xD04 |
| Fd-05 | Communication response delay | 0ms | 0～500ms | ● | 0xD05 |
| Fd-06 | Communication timeout failure time | 1.0s | 0.1～100.0s | ● | 0xD06 |
| Fd-07 | Communication fault action selection | 0 | 0: No detection 1: Alarm and free stop<br>2: Warning to continue running 3: Forced shutdown | ● | 0xD07 |
| Fd-08 | Transmission response processing | 0 | 0: There is a response 1: No response | ● | 0xD08 |
| Fd-09 | Host sending selection | 0031 | Units: the first group to send frame selection<br>0: invalid 1: run command<br>2: given frequency 3: output frequency<br>4: upper limit frequency 5: given torque<br>6: output torque 7, 8: reserved<br>9: PID given A: PID feedback<br>Ten digits: the second group sends the same frame as above<br>Hundreds place: the third group sends the frame to choose as above<br>Thousands: the fourth group sends the same frame as above | ● | 0xD09 |
| Fd-10 | RS485 communication port configuration | 0 | 0: Modbus communication;<br>1: Other protocols | ● | 0xD0A |

## 5.3 Terminal input function selection

| | | | |
|---|---|---|---|
| 0: No function | 1: forward running | 2: Reverse operation | 3: Three-wire operation control (Xi) |
| 4: Forward jog | 5: reverse jog | 6: Free parking | 7: Emergency stop |
| 8: Fault reset | 9: external fault input | 10: Increasing frequency (UP) | 11: Decreasing frequency (DW) |
| 12: Clear UP / DW | 13: Switch channel A to channel B | 14: Switch frequency channel to A | 15: Switch frequency channel |
| 16: Multi-speed terminal 1 | 17: Multi-speed terminal 2 | 18: Multi-speed terminal 3 | 19: Multi-speed terminal 4 |
| 20: PID control canceled | 21: PID control suspended | 22: PID feature switching | 23: PID gain switching |
| 24: PID reference switching 1 | 25: PID given switch 2 | 26: PID reference switching 3 | 27: PID feedback switching 1 |
| 28: PID feedback switching 2 | 29: PID feedback switching 3 | 30: Program running (PLC) pause | 31: Program operation (PLC) |
| 32: acceleration and deceleration time terminal 1 | 33: acceleration and deceleration time terminal 2 | 34: Acceleration and deceleration pause | 35: Swing frequency input |
| 36: Swing frequency pause | 37: Swing frequency reset | 40: Timer trigger terminal | 41: Timer clear terminal |
| 42: Counter clock input | 43: Counter reset terminal | 44: DC braking command | 45: Pre-excitation command terminal |
| 46: Motor selection terminal | 47: Operation pause | 48: Command channel switch to keyboard | 49: Command channel switch to terminal |
| 50: Command channel switch to communication | 52: Operation prohibited | 53: forward transfer prohibited | 54: Reverse prohibition |

## 5.4 Terminal output function selection

| | | | |
|---|---|---|---|
| 0: No output | 1: Inverter is running | 2: The inverter is running in reverse | 3: The inverter is running forward |

| | | | |
|---|---|---|---|
| 4: Fault trip alarm 1 (alarm during fault self-recovery) | 5: Fault trip alarm 2 (no alarm during fault self-recovery) | 6: external fault shutdown | 7: inverter undervoltage |
| 8: The inverter is ready for operation | 9: Output frequency level detection 1 (FDT1) | 10: Output frequency level detection 2 (FDT2) | 11: arrival at a given frequency |
| 12: Running at zero speed | 13: Upper frequency reached | 14: Lower limit frequency reached | 15: Completion of the program running cycle |
| 16: Running completed in the program running phase | 17: PID feedback exceeds the upper limit | 18: PID feedback is lower than the lower limit | 19: PID feedback sensor is disconnected |
| 21: The timer is up | 22: The counter reaches the maximum value | 23: Counter reaches the set value | 24: Energy consumption braking |
| 25: PG feedback disconnected | 26: Emergency stop | 27: Load pre-alarm output 1 | 28: Load pre-alarm output 2 |
| 29: Motor overload pre-alarm | 30: RS485 given | Interpretation code is not reserved in the middle | |

## 5.5 Monitoring code

By pressing the PRG key for more than 2 seconds, you enter the "C" parameter group. Check the current status of the inverter.

| Function code number | Function code name | Factory default | Set value range and definition |
|---|---|---|---|
| C-00 | Given frequency | 0.01Hz | 2100H |
| C-01 | Output frequency | 0.01Hz | 2101H |
| C-02 | Output current | 0.1A | 2102H |
| C-03 | Bus voltage | 0.1V | 2103H |
| C-04 | Output voltage | 0.1V | 2104H |
| C-05 | Mechanical speed | 1RPM | 2105H |
| C-06 | Input voltage | 0.1V | 2106H |
| C-07 | Output Power | 0.1% | 2107H |
| C-08 | Given torque | 0.1% | 2108H |
| C-09 | Output torque | 0.1% | 2109H |
| C-10 | PID given amount | 0.1% | 210CH |
| C-11 | PID feedback | 0.1% | 210DH |
| C-12 | Module temperature 1 | 0.1℃ | 210EH |

| | | | |
|---|---|---|---|
| C-13 | Module temperature 2 | 0.1℃ | 210FH |
| C-14 | Input terminal X is on | See input terminal status diagram | 2110H |
| C-15 | Output terminal Y is on | See output terminal status diagram | 2111H |
| C-16 | Analog AI1 input value | 0.001V | 2112H |
| C-17 | Analog AI2 input value | 0.001V/0.001mA | 2113H |
| C-18 | Pulse signal HDI input value | 0.001kHz | 2114H |
| C-19 | Analog output AO1 | 0.01V | 2115H |
| C-20 | Analog output AO2 | 0.01V/0.01mA/0.01kHz | 2116H |
| C-21 | Counter count value | | 2117H |
| C-22 | Running time of this power-on | 0.1 hour | 2118H |
| C-23 | Cumulative running time of this machine | hour | 2119H |
| C-24 | Power factor angle | 1° | 211AH |
| C-25 | Inverter power level | kW | 211BH |
| C-26 | Inverter rated voltage | V | 211CH |
| C-27 | Inverter rated current | A | 211DH |
| C-28 | Software version | | 211EH |
| C-29 | PG feedback frequency | 0.01Hz | 211FH |

## 5.6 Common faults and their treatment

| Communication code | Fault display | Fault name | Troubleshoot | Solution |
|---|---|---|---|---|
| 1 | E. SC | System abnormality | ● The acceleration time is set too short;<br>● The output of the inverter is short-circuited between phases or to ground;<br>● The module is damaged;<br>● Electromagnetic interference<br>● Abrupt load current exceeds rated value | ● Properly extend the acceleration time;<br>● Check the peripheral equipment, and restart after troubleshooting;<br>● Seek technical support from manufacturers;<br>● Check the wiring, grounding, shielding, etc.<br>● Check the load or adjust the inverter parameters |
| | A.LIF | Input power failure warning | ● Input power phase loss | ● Troubleshoot the lack of input power |
| 4 | E.oC1 | Overflow during acceleration | ● The acceleration time is set too short;<br>● Start the rotating motor;<br>● The capacity of the inverter is too small. | ● Properly extend the acceleration time;<br>● The motor stops or starts after speed tracking;<br>● Select the inverter with matching capacity grade |
| 5 | E.oC2 | Overcurrent during deceleration | ● The deceleration time is set too short;<br>● Large potential energy load or load inertia;<br>● The capacity of the inverter is too small. | ● Properly extend the deceleration time;<br>● External braking resistor or braking unit;<br>● Use inverters with matching capacity levels. |
| 6 | E.oC3 | Overcurrent at constant speed | ● Abrupt load;<br>● The grid voltage is low. | ● Check the load change and eliminate it;<br>● Check the input power and eliminate the fault. |

| | | | | |
|---|---|---|---|---|
| **7** | E.oU1 | Overpressure during acceleration | ● The power supply voltage fluctuation exceeds the limit;<br>● Start the rotating motor. | ● Detect grid voltage and eliminate faults;<br>● The motor stops or starts after speed tracking; |
| **8** | E.oU2 | Overpressure during deceleration | ● The deceleration time is set too short;<br>● The load potential energy or inertia is too large;<br>● The power supply voltage fluctuation exceeds the limit. | ● Properly extend the deceleration time;<br>● Increase the capacity of the inverter or add a braking unit;<br>● Check the input power and eliminate the fault. |
| **9** | E.oU3 | Constant speed overvoltage | ● The power supply voltage fluctuation exceeds the limit. | ● Check the input power and eliminate the fault; |
| **10** | E.LU2 | Bus undervoltage | ● The power supply voltage is too low;<br>● There is a large inrush current in the power grid;<br>● The internal DC main contactor is not closed. | ● Check the input power and eliminate the fault;<br>● Improve the power supply system;<br>● Seek technical support from manufacturers. |
| **11** | E.oL1 | Motor overload | ● The grid voltage is low;<br>● Improper setting of motor overload protection coefficient;<br>● The motor is blocked or the load is too heavy;<br>● The general-purpose motor runs at low speed for a long time. | ● Check the input power;<br>● Use inverters with matching capacity levels;<br>● For long-term low-speed operation, select a dedicated motor.<br>● Speed regulation overload coefficient |
| **12** | E.oL2 | Inverter overload | ● The load is too heavy<br>● The acceleration time is set too short;<br>● Start the rotating motor; | ● Use inverters with matching capacity levels;<br>● Properly extend the acceleration time;<br>● The motor stops or starts after speed tracking; |
| **13** | E.ILF | Input phase loss | ● Abnormal input power;<br>● Abnormal internal circuit; | ● Check the input power;<br>● Seek technical support from manufacturers. |
| **14** | E.oLF | Output phase loss | ● The three-phase output of the inverter is out of phase. | ● Check the output voltage, current and motor wiring; |

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| **15** | E.oH2 | Rectifier overheating | ● The ambient temperature is too high;<br>● The air duct is blocked or the fan is abnormal;<br>● The temperature detection circuit is faulty. | ● Make the operating environment of the inverter meet the specifications;<br>● Drain the air duct or replace the fan of the same model;<br>● Seek technical support from manufacturers. |
| **16** | E.oH1 | Inverter overheating | ● The ambient temperature is too high;<br>● The air duct is blocked or the fan is abnormal;<br>● The temperature detection circuit is faulty. | ● Make the operating environment of the inverter meet the specifications;<br>● Drain the air duct or replace the fan of the same model;<br>● Seek technical support from manufacturers. |
| **17** | E. EF | External fault | ● External equipment failure protection action. | ● Check external equipment. |
| **18** | E.SE1 | Communication failure | ● Improper setting of baud rate;<br>● Broken communication connection;<br>● The communication format does not match the host computer. | ● Set the matching baud rate;<br>● Check the communication connection;<br>● Set the matching communication format. |
| **19** | E.HAL | Current detection fault | ● Detect circuit failure;<br>● The motor phases are unbalanced. | ● Seek technical support;<br>● Check the motor and wiring. |
| **20** | E.AT1 | Motor static self-learning | ● Motor detection time out;<br>● Start static detection during motor rotation;<br>● The capacity difference between the motor and the inverter is too large;<br>● The motor parameters are set incorrectly. | ● Check the motor connection;<br>● Test after the motor is stopped;<br>● Replace the inverter model;<br>● Set again according to the motor nameplate. |
| **21** | E.EEP | EEPROM failure | ● Electromagnetic interference during storage;<br>● The EEPROM is damaged. | ● Re-enter and store;<br>● Seek technical support from manufacturers. |
| **25** | E.AT2 | Motor dynamic self-learning | ● Start detection during motor rotation;<br>● Motor with load detection;<br>● Motor detection time out;<br>● The capacity difference between the motor and the | ● Test after the motor is stopped;<br>● Disconnect the motor load and re-check;<br>● Check the motor connection;<br>● Replace the inverter model;<br>● Set again according to the motor |

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| | | | inverter is too large;<br>● The motor parameters are set incorrectly. | nameplate. |
| **27** | E. PG | Expansion card connection is abnormal | ● Connection failure between PG card and inverter | ● Check connection |
| **28** | E.OU4 | Overpressure during shutdown | ●The power supply voltage fluctuation exceeds the limit. | ● Check the input power and eliminate the fault;<br>● Seek technical support from manufacturers. |
| **29** | E.PID | PID disconnection fault | ● PID feedback disconnection alarm upper limit<br>● Lower limit of PID feedback disconnection alarm<br>● Feedback sensor failure or poor wiring | ● Confirm sensor status<br>● Correct wiring<br>● Confirm the setting value of Fb-27 and Fb-28 |
| **30** | E.RSV | Reserved | | |

# Chapter VI Regular Inspection and Maintenance

## 6.1 Inspection

The frequency converter is composed of semiconductor devices, electronic devices, and motion devices, and these devices have a service life. Due to the influence of environmental temperature, humidity, dust and vibration, it will cause the aging of the internal components of the inverter, resulting in the potential failure of the inverter or reducing the service life of the inverter. Therefore, it is necessary to carry out daily and regular maintenance and maintenance on the inverter.

● Daily inspection: In order to avoid damage to the inverter and shorten the service life, please confirm the following items daily.

| Check item | c | Judgement standard |
|---|---|---|
| Input and output voltage | Check whether the power supply voltage meets the requirements and whether there is missing phase power supply phenomenon. | Refer to the nameplate requirements. |
| Operating environment | Whether the installation environment meets the requirements. | Confirm the source and solve it properly |
| Cooling system | The working condition of the inverter's cooling fan. | No dirt or debris blocking the air duct |
| Motor | The motor works abnormally | Whether there are abnormal conditions of heat generation, abnormal noise and vibration. |
| Load condition | Whether the output current of the inverter is higher than the rated value of the motor or the inverter for a certain period of time. | Confirm whether there is an overload situation and confirm whether the inverter selection is correct. |

● Periodic inspection: According to the use environment and working conditions, the frequency inverter shall be inspected regularly every 3 to 6 months.

| Check item | Check item | Preventive solution |
|---|---|---|
| Motor | ● Insulation resistance check;<br>● Whether the motor has abnormal vibration and abnormal noise. | ● Tighten mechanical and electrical connections and lubricate the motor shaft. |
| Electrical connections | ● Whether the wires and connecting parts are discolored, whether the insulation layer is damaged, cracked, discolored or aging;<br>● Whether the connection terminal is worn, | ● Replace damaged wires;<br>● Fasten loose terminals and replace damaged terminals;<br>● Measure the grounding resistance and |

| | | |
|---|---|---|
| | damaged or loose; | tighten the corresponding grounding terminal. |
| Mechanical connection | ● Whether there is abnormal vibration and noise, and whether it is loose or not. | ● Tighten, lubricate, and replace defective parts. |
| Semiconductor or device | ● Whether it is contaminated with garbage and dust, and whether the appearance has changed significantly. | ● Clean the operating environment and replace damaged parts. |
| Electrolytic capacitor | ● Whether there is leakage, discoloration, cracking, whether the safety valve is exposed, swollen, cracked or leaking. | ● Replace damaged parts. |
| A printed circuit board | ● Whether there is odor, discoloration, severe rust, and whether the connector is reliable. | ● Fasten the connection;<br>● Clean the printed circuit board or replace the damaged printed circuit board; |
| Cooling system | ● Whether the cooling fan is damaged, dirty or blocked;<br>● Whether the air intake and exhaust are blocked or contaminated with foreign objects. | ● Clean operating environment;<br>● Replace damaged parts. |
| Keyboard | ● Whether the keyboard is damaged or displayed incompletely. | ● Replace damaged parts. |

Warning: Do not perform related work while the power is on. When performing related work, please cut off the power and confirm that the DC voltage of the main circuit has dropped to a safe level, and wait for 5 minutes before performing related work.

● Component replacement: Different types of components have different service life. The service life of parts is closely related to the environment and maintenance conditions used. Cooling fans and electrolytic capacitors are vulnerable parts. Perform daily inspection according to the following table. If there are any abnormalities, please replace them in time.

| Part Name | Life cycle | Cause of damage | Part Name | Life cycle | Cause of damage |
|---|---|---|---|---|---|
| Fan | 2~3 years | Bearing wear, blade aging | Electrolytic capacitor | 4~5 years | The ambient temperature is high and the electrolyte evaporates |

The replacement of other devices has very strict requirements on maintenance technology and product familiarity, and after replacement, it must be strictly tested before it can be put into use, so it is not recommended that users replace other internal devices. If you really need to replace it, please contact the agent where you purchased the product or our sales department.

## 6.2 Inverter storage

After purchasing the inverter, users must pay attention to temporary storage and long-term storage:

- When storing, try to put it into the company's packing box according to the original packaging.
- Long-term storage will cause the deterioration of the electrolytic capacitor. It must be ensured that it is energized once within 2 years, and the energization time is at least 5 hours. The input voltage must be slowly increased to the rated value with a voltage regulator.

# Appendix: Modbus communication protocol

KV500 series inverters are equipped with RS485 communication interface as standard, and adopt the international standard Modbus communication protocol for master-slave communication. Users can implement centralized control (setting inverter control commands, operating frequency, related function code parameter modification, working status and fault information monitoring, etc.) through PC / PLC, host computer, etc. to adapt to specific application requirements.

● **Communication frame structure**

The communication data format is as follows: the composition of the byte: including the start bit, 8 data bits, parity bit and stop bit.

| Start bit | Bit1 | Bit2 | Bit3 | Bit4 | Bit5 | Bit6 | Bit7 | Bit8 | Check Digit | Stop bit |
|---|---|---|---|---|---|---|---|---|---|---|

The information of one frame must be transmitted in a continuous data stream. If the interval of more than 1.5 bytes before the end of the entire frame transmission, the receiving device will clear these incomplete information and mistakenly believe that the next byte is a new one. The address field part of the frame. Similarly, if the interval between the start of a new frame and the previous frame is less than 3.5 bytes, the receiving device will consider it to be the continuation of the previous frame. Due to the disorder of the frame, the final CRC check value is incorrect, resulting in communication error.

● **Communication control parameter group address description:**

<table>
<tr><td>Function Description</td><td>Address definition</td><td colspan="3">Explanation of data meaning</td><td>R/W 特性</td></tr>
<tr><td>Communication given frequency</td><td>0x3000 or 0x2000</td><td colspan="3">0 ～ 32000 corresponds to 0.00Hz ～ 320.00Hz</td><td>W/R</td></tr>
<tr><td>Communication command setting</td><td>0x3001 or 0x2001</td><td colspan="2">0000H: no command<br>0001H: forward running<br>0002H: Reverse operation<br>0003H: forward jog<br>0004H: reverse jog</td><td>0005H: Decelerate to stop<br>0006H: Free stop<br>0007H: Fault reset<br>0008H: Run prohibit command<br>0009H: Run allow command</td><td>W/R</td></tr>
<tr><td rowspan="5">Inverter status</td><td rowspan="5">0x3002 or 0x2002</td><td>Bit0</td><td>0: stop state</td><td>1: Running state</td><td rowspan="5">R</td></tr>
<tr><td>Bit1</td><td>0: non-accelerated state</td><td>1: accelerated state</td></tr>
<tr><td>Bit2</td><td>0: Non-deceleration state</td><td>1: Deceleration state</td></tr>
<tr><td>Bit3</td><td>0: forward</td><td>1: reverse</td></tr>
<tr><td>Bit4</td><td>0: No fault</td><td>1: Inverter failure</td></tr>
<tr><td>Inverter fault</td><td>0x3003 or 0x2003</td><td colspan="3">Inverter current fault code (see fault code table)</td><td>R</td></tr>
</table>

| | | | |
|---|---|---|---|
| code | | | |
| Communication given upper limit frequency | 0x3004 or 0x2004 | 0 ～ 32000 corresponds to 0.00Hz ～ 320.00Hz | W/R |
| Communication torque setting | 0x3005 or 0x2005 | 0～1000 corresponds to 0.0～100.0% | W/R |
| Torque control forward maximum frequency limit | 0x3006 or 0x2006 | 0～1000 corresponds to 0.0～100.0% | W/R |
| Torque control reverse maximum frequency limit | 0x3007 or 0x2007 | 0～1000 corresponds to 0.0～100.0% | W/R |
| Communication given PID setting value | 0x3008 or 0x2008 | 0～1000 corresponds to 0.0～100.0% | W/R |
| Communication given PID feedback value | 0x3009 or 0x2009 | 0～1000 corresponds to 0.0～100.0% | W/R |
| Voltage-frequency separation voltage value setting | 0x300A or 0x200A | 0～1000 corresponds to 0.0～100.0% | W/R |
| AO1 output | 0x3021 or 0x2021 | 0-10000 corresponding output 0-10V, 0-20mA | R |
| AO2 output | 0x3022 or 0x2022 | 0-10000 corresponding output 0-10V, 0-20mA, 0-50kHz | R |

**Note: For other function code addresses, please refer to the "Communication Address" column in the function parameter table. When using the write command (06H), if the most significant bit of the function code parameter address is 0, it will only be written into the inverter RAM, and it will not be stored when the power is off. Power-off storage. Such as F0-00 parameters: address 0x0000 is written to RAM, and address 0x1000 is written to EEPROM.**

**●The meaning of the error code of the slave responding to abnormal information:**

| Error code | Explanation | Error code | Explanation |
|---|---|---|---|
| 1 | Command code error | 7 | Reserved |
| 3 | CRC check error | 8 | Inverter is busy (EEPROM is being |

| | | | |
|---|---|---|---|
| | | | stored) |
| 4 | Illegal address | 9 | Parameter value exceeded |
| 5 | Illegal data | 10 | Reserved parameters cannot be changed |
| 6 | Parameters cannot be changed during operation | 11 | Error reading parameter bytes |

**Attachment:** Double-line display operation keyboard size