

## **Mini Size Vector AC Drive, Model : SET640**



External Keyboard



User manual

## Preface

Thanks for purchasing our inverters.

This manual describes how to use this AC Drive properly. Please read it carefully before installation, operation, maintenance and inspection. Besides, please use the product after understanding the safety precautions.



| Precautions   |
|---|
| <ul style="list-style-type: none"><li>● In order to describe the product's details, the drawings presented in this instruction are sometimes shown without covers or protective guards. When using the product, please make sure to install the cover or protective guard as specified firstly, and operate the products in accordance with the instructions.</li><li>● Since the drawings in this manual are represented examples, some are subject to differ from delivered products.</li><li>● This manual may be modified when necessary, because of improvement of the product, modification or changes in specifications. Such modifications are denoted by a revised manual No.</li><li>● If you want to order the manual due to loss or damage, please contact our company agents in each region or our company customer service center directly.</li><li>● If there is still any problem during using the products, please contact our company customer service center directly.</li></ul> |

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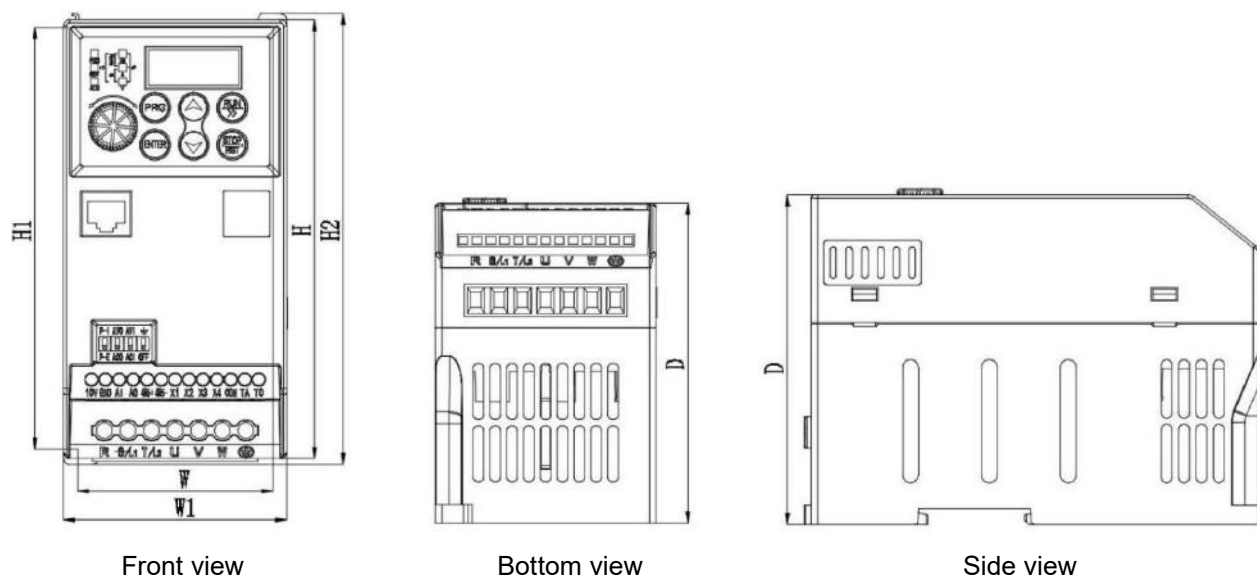
## Chapter 1 Installation and wiring of AC Drive

### 1.1 Installation precautions

|   |   |
|---|---|
| <br>Danger   | <ul style="list-style-type: none"> <li>● Please make sure that the input power has been cut off before wiring. Otherwise there maybe danger of electric shock and fire!</li> <li>● Only The qualified and trained personnel can perform wiring connection. Otherwise, it may cause equipment and human injuries!</li> <li>● It should be earthed reliably. Otherwise, there may be danger of electric shock or fire!</li> <li>● Pls check whether the emergency stop terminal's performance is effective after connected. Otherwise, it may cause risk of Injury! (The user shall be responsible if injury caused without checking.)</li> <li>● Do not touch the output terminals directly. The output terminal of the AC Drive is directly connected to the motor. Do not short circuit between output terminals. Otherwise, there maybe risk of electric shock and circuit short.</li> <li>● Be sure to install the cover outside the terminal before powering on. When removing the cover, be sure to disconnect the power supply first. Otherwise, there will be risk of electric shock.</li> <li>● Please wait for 5 to 8 minutes to discharge the residual power before inspecting and maintaining the motor after cutting off the power supply, otherwise there maybe risk of residual voltage on the electrolytic capacitor.</li> <li>● Non-professional technicians are not allowed to carry out inspection and maintenance. Otherwise, there will be risk of electric shock.</li> </ul> |
| <br>Danger | <ul style="list-style-type: none"> <li>● Please make sure that the rated voltage value of the input power is consistent with that of the inverter. Otherwise, it may cause danger of injury and fire.</li> <li>● Please connect the braking resistor or braking unit according to the wiring diagram. Otherwise, there will be risk of fire!</li> <li>● It is better to use a screwdriver and wrench with specified torque to fasten the terminal. Otherwise, there will be risk of fire.</li> <li>● Do not connect the input power supply to the terminals of U.V.W. Otherwise, the voltage input will cause internal damage of the Inverter.</li> <li>● Do not remove the cover of the front panel. Only remove the cover of the terminal when wiring. Otherwise, It may cause internal damage to the inverter.</li> </ul>  |

## 1.2 Outlook Drawing

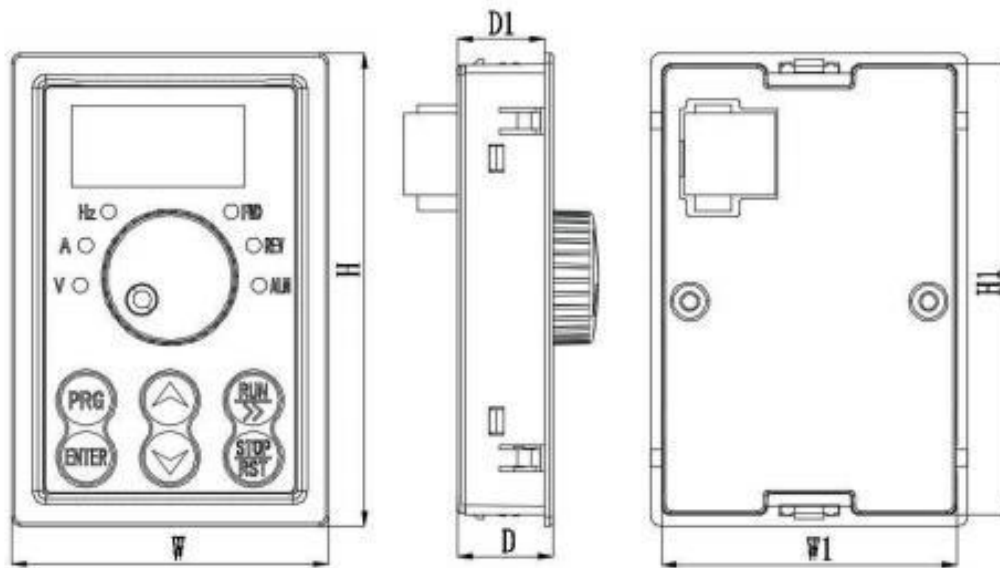
### A.outline dimension



### Inverter outlook dimensions

| Model      | W<br>(mm)               | W1<br>(mm) | H<br>(mm) | H1<br>(mm)         | H2<br>(mm) | D<br>(mm) | Installation<br>hole<br>(mm) |
|------------|-------------------------|------------|-----------|--------------------|------------|-----------|------------------------------|
|            | Installation dimensions |            |           | Overall dimensions |            |           |                              |
| 0.75~2.2KW | 63                      | 72         | 142       | 136.5              | 146        | 104.5     | 4                            |
| 4-5.5KW    | 78                      | 87         | 181.5     | 172.5              | 181.5      | 127.5     | 4                            |

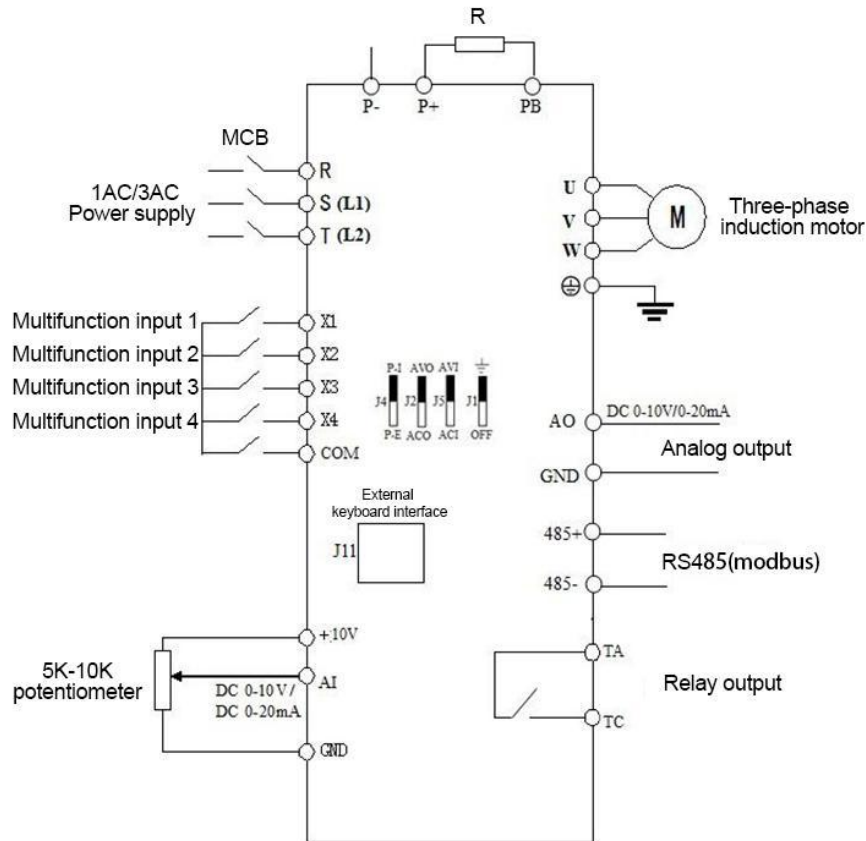
## B. Dimensions of external keyboard base



| Keyboard base hole size |        |      |        | Keyboard thickness |        |
|-------------------------|--------|------|--------|--------------------|--------|
| W                       | W1     | H    | H1     | D                  | D1     |
| 53mm                    | 49.4mm | 79mm | 75.4mm | 15.9mm             | 14.5mm |

## 1.3 Basic Wiring Diagram

The wiring of AC Drive is divided into main circuit and control circuit. The user can lift the cover of the output/input terminal, and then the main circuit terminal and control circuit terminal can be seen. The user must correctly connect the wiring circuit according to the following diagram.



#### 1.4 Control circuit terminals

|     |     |    |    |      |      |    |    |    |    |     |    |    |
|-----|-----|----|----|------|------|----|----|----|----|-----|----|----|
| 10V | GND | AI | AO | 485+ | 485- | X1 | X2 | X3 | X4 | COM | TA | TC |
|-----|-----|----|----|------|------|----|----|----|----|-----|----|----|


#### 1.5 0.75KW-2.2KW Main circuit terminals

|   |      |      |   |   |   |   |
|---|------|------|---|---|---|---|
| R | S/L1 | T/L2 | U | V | W | ⏏ |
|---|------|------|---|---|---|---|

#### 4KW-5.5KW Main circuit terminals

|   |   |   |    |    |   |   |   |   |
|---|---|---|----|----|---|---|---|---|
| R | S | T | P+ | PB | U | V | W | ⏏ |
|---|---|---|----|----|---|---|---|---|

#### 1.6 Description of jumpers on control board

| J1  |  |                        |
|---|--|------------------------|
|  | Main control board grounding                     |                        |
| OFF   | Main control board grounding is disconnected     |                        |
| J2  |  |                        |
| AVO   | Analog AO output                                 | voltage signal: 0-10V  |
| ACO   | Analog AO output                                 | current signal: 0-20mA |
| J4  |  |                        |
| P-I   | The selection of built-in keyboard potentiometer |                        |

|     |  |
|-----|--|
| P-E | The selection of external keyboard potentiometer |
| J5  |  |
| AVI | Analog AI input voltage signal: 0-10V            |
| ACI | Analog AI input current signal: 0-20mA           |

## 1.7 Wiring precautions

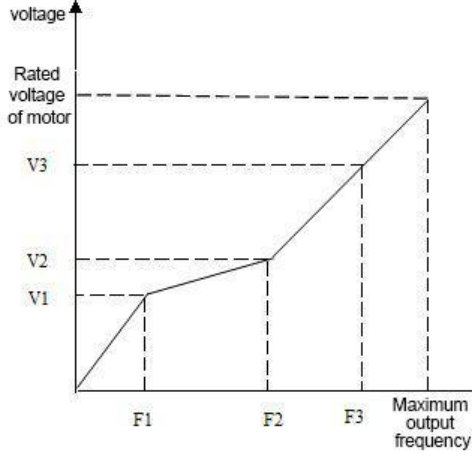
- (1) When replacing the motor, the input power of the AC Drive must be cut off.
- (2) The motor or the power supply of the power frequency only can be switched when the inverter stops output.
- (3) In order to minimize the impact of electromagnetic interference, when the electromagnetic contactor and electric relay used are close to the AC Drive, the surge absorption device should be installed.
- (4) Do not connect the AC input power to the inverter output terminals U, V, W.
- (5) The external control line of AC Drive shall be equipped with isolation device or shielded wire.
- (6) In addition to shielding, the input command signal wiring should also be routed separately, preferably away from the main circuit wiring.
- (7) When the carrier frequency is less than 4KHz, the maximum distance between the AC Drive and the motor should be within 50 meters. When the carrier frequency is greater than 4KHz, the distance should be appropriately reduced. The wiring should preferably be laid in a metal tube.
- (8) When the AC Drive is equipped with peripheral equipment (filter, reactor, etc.), the insulation resistance to the ground shall be measured with a 1000V megohmmeter first to ensure that it is not lower than 4 megohm.
- (9) It is not allowed to install phase capacitance or resistance capacitance absorption device at the U, V and W output terminals of the converter
- (10) If the AC Drive needs to be started frequently, do not turn off the power supply. You must use the COM/RUN of the control terminal for start and stop operation to avoid damaging the rectifier bridge.
- (11) In order to prevent accidents, the grounding terminal G must be reliably grounded (the grounding impedance should be below 100  $\Omega$ ), otherwise there will be electricity leakage.
- (12) When wiring the main circuit, please select the wire diameter and specification according to the relevant provisions of the national electrical regulations.



## Chapter 2 Product Information

| ○—Parameters that can be modified in any state<br>×—Parameters that cannot be modified in operation<br>◆—Actual detection parameters cannot be modified<br>◇—Manufacturer parameters are only modified by the manufacturer. Users are not allowed to modify |                               |  |               |         |        |
|---|-------------------------------|--|---------------|---------|--------|
| F0 group - Basic operating parameters   |                               |  |               |         |        |
| Function code   | Name                          | Description  | Set range     | Default | Change |
| F0.00   | Function macro definition     | 0: Common mode<br>1: Single pump constant pressure water supply<br>2~3: Reserved<br>4: Engraving machine mode<br>5~10: Reserved  | 0~10          | 0       | ×      |
| F0.01   | Motor control mode            | 0: VF control<br>1: Advanced VF control<br>2: Simple vector control<br>3: Advanced Vector Control<br>4: Torque control   | 0~4           | 0       | ×      |
| F0.02   | Run command channel selection | 0: Panel operation command channel<br>1: Terminal operation command channel<br>2: Communication operation command channel  | 0~2           | 0       | ○      |
| F0.03   | Frequency setting selection   | 0: Panel potentiometer<br>1: Digital setting 1, operation panel ▲, ▼ key adjustment<br>2: Digital setting 2, terminal UP/DOWN adjustment<br>3: AI analog setting (0 ~ 10V/0 ~ 20mA)<br>4: Combined given<br>5: Reserved<br>6: Communication given<br>7: Reserved<br>Note: Select the combination setting time, and the combination setting method is selected in F1.15 | 0~7           | 0       | ○      |
| F0.04   | Maximum output frequency      | The maximum output frequency is the maximum frequency allowed by the   | F0.05~999.9Hz | 50.0Hz  | ×      |

|       |   |  |   |               |   |
|-------|---|--|---|---------------|---|
|       |   | AC Drive, and is the benchmark for acceleration and deceleration setting.  |   |               |   |
| F0.05 | Upper limit frequency                           | The operating frequency cannot exceed this frequency   | F0.06~<br>F0.04                         | 50.0Hz        | × |
| F0.06 | Lower frequency                                 | The operating frequency cannot be lower than this frequency  | 0.0~<br>Upper limit frequency           | 0.0Hz         | × |
| F0.07 | Lower frequency arrival processing              | 0: Zero speed operation<br>1: Run at lower frequency<br>2: halt  | 0~2                                     | 0             | × |
| F0.08 | Digital setting of shutdown operation frequency | The set value is the given initial value of frequency number   | 0.0~<br>Upper limit frequency           | 10.0Hz        | ○ |
| F0.09 | Digital frequency control                       | Unit bit: Power-down storage<br>0: Store<br>1: Do not store<br>Tens bit: shutdown hold<br>0: Reserved<br>1: Do not Reserved<br>Hundreds bit: UP/DOWN negative frequency regulation<br>0: of no avail<br>1: effective<br>Thousand bit: PID, PLC frequency superposition selection<br>0: of no avail<br>1: F0.03+PID<br>2: F0.03+PLC | 0000 ~<br>2111                          | 0000          | ○ |
| F0.10 | Acceleration time                               | Time required for converter to accelerate from zero frequency to maximum output frequency  | 0.1~<br>999.9S<br>0.4~                  | Model setting | ○ |
| F0.11 | Deceleration time                               | Time required for converter to decelerate from maximum output frequency to zero frequency  | 4.0KW<br>7.5S<br>5.5~<br>7.5KW<br>15.0S |               |   |
| F0.12 | Running direction setting                       | 0: Forward<br>1: Reverse<br>2: Reverse prohibited  | 0~2                                     | 0             | ○ |
| F0.13 | V/F Curve setting                               | 0: Linear curve<br>1: Square curve<br>2: Multi-point VF curve  | 0~2                                     | 0             | × |

| F0.14  | Torque increase                        | Manual torque increase, which is a percentage of the rated voltage of the motor  | 0.0~30.0%   | Model setting | ○      |
|--|--|--|---|---------------|--------|
| F0.15  | Torque lifting cut-off frequency       | This setting is the lifting cut-off frequency point for manual torque lifting  | 0.0~50.0Hz  | 15.0Hz        | ×      |
| F0.16  | Carrier frequency setting              | For the occasions requiring silent operation, the carrier frequency can be appropriately increased to meet the requirements, but increasing the carrier frequency will increase the heat output of the converter.  | 2.0~16.0KHz<br>0.4~3.0KW<br>4.0KHz<br>4.0~7.5KW<br>3.0KHz | Model setting | ×      |
| F0.17  | F1                                     |    | 0.1~F2  | 12.5Hz        | ×      |
| F0.18  | V1                                     |  | 0.0~V2  | 25.0%         | ×      |
| F0.19  | F2                                     |  | F1 ~ F3   | 25.0Hz        | ×      |
| F0.20  | V2                                     |  | V1 ~ V3   | 50.0%         | ×      |
| F0.21  | F3                                     |  | F2~rated frequency of motor [F4.03]                       | 37.5Hz        | ×      |
| F0.22  | V3                                     |  | V2~100.0% * (motor rated voltage [F4.00])                 | 75.0%         | ×      |
| F0.23  | User Password                          | To set any non-zero number, it takes 3 minutes or power off to take effect.  | 0~9999  | 0             | ○      |
| F0.24  | Frequency display resolution selection | 0: 0.1Hz<br>1: 1Hz<br>Note: When setting this parameter, you must check the maximum output frequency (F0.04), upper frequency limit (F0.05), motor rated frequency (F4.03) and other frequency-related parameters. | 0~1   | 0             | ○      |
| <b>F1 group - Auxiliary operation parameters</b> |  |  |   |               |        |
| Function code                                    | Name                                   | Description  | Set range   | Default       | Change |

|       |  |   |  |        |   |
|-------|--|---|--|--------|---|
| F1.00 | Starting mode                                    | <p>LED Single digit: Starting mode</p> <p>0: Start from starting frequency</p> <p>1: DC braking first and then starting from starting frequency</p> <p>2: Reserved</p> <p>LED Tens digit: Power failure or abnormal restart mode</p> <p>0: Of no avail</p> <p>1: Start from starting frequency</p> <p>LED hundreds digit: Reserved</p> <p>LED thousands digit: Reserved</p> | 0000 ~ 0012                            | 00     | × |
| F1.01 | Starting frequency                               |   | 0.0 ~ 50.0Hz                           | 1.0Hz  | ○ |
| F1.02 | Starting DC braking voltage                      |   | 0.0 ~ 50.0%<br>×Rated voltage of motor | 0.0%   | ○ |
| F1.03 | Start DC braking time                            |   | 0.0 ~ 30.0s                            | 0.0s   | ○ |
| F1.04 | Shutdown mode                                    | <p>0: Deceleration shutdown</p> <p>1: Free stop</p>   | 0 ~ 1                                  | 0      | × |
| F1.05 | Starting frequency of DC braking during shutdown |   | 0.0 ~ Upper limit frequency            | 0.0Hz  | ○ |
| F1.06 | Shutdown DC brake voltage                        |   | 0.0 ~ 50.0% × Rated voltage of motor   | 0.0%   | ○ |
| F1.07 | Shutdown DC braking time                         |   | 0.0 ~ 30.0s                            | 0.0s   | × |
| F1.08 | DC braking waiting time of shutdown              |   | 0.00 ~ 99.99s                          | 0.00s  | × |
| F1.09 | Forward jog frequency setting                    | Set point dynamic positive and negative frequency   | 0.0 ~ 50.0Hz                           | 10.0Hz | ○ |

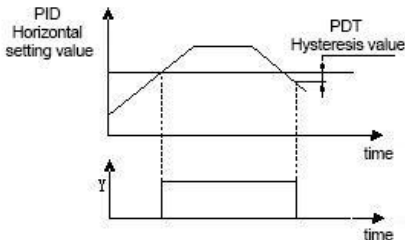
|       |   |  |  |               |   |
|-------|---|--|--|---------------|---|
| F1.10 | Reverse jog frequency setting                         | Set point dynamic positive and negative frequency  | 0.0 ~ 50.0Hz   | 10.0Hz        | ○ |
| F1.11 | Jog acceleration time                                 | Set inching acceleration and deceleration time   | 0.1~999.9S<br>0.4~4.0KW<br>10.0S<br>5.5~7.5KW<br>15.0S | Model setting | ○ |
| F1.12 | Jog deceleration time                                 |  |  |               |   |
| F1.13 | Skip frequency  | By setting the skip frequency and range, the AC Drive can avoid the mechanical resonance point of the load.  | 0.0 ~ Upper limit frequency                            | 0.0Hz         | ○ |
| F1.14 | Jump range  |  | 0.0 ~ 10.0Hz   | 0.0Hz         | ○ |
| F1.15 | Frequency combination setting mode                    | 0: Potentiometer+digital frequency 1<br>1: Potentiometer+digital frequency 2<br>2: Potentiometer+AI<br>3: Digital frequency 1+AI<br>4: Digital frequency 2+AI<br>5: Digital frequency 1+multi-speed<br>6: Digital frequency 2+multi-speed<br>7: Potentiometer+multi-step speed<br>8: AI+PLC (stacking in the same direction)<br>9: Reserved  | 0~9  | 0             | × |
| F1.16 | Programmable operation control (simple PLC operation) | LED single digit: PLC enable control<br>0: Of no avail<br>1: Effective<br>LED Tens digit: Operation mode selection<br>0: Single cycle<br>1: Continuous cycle<br>2: Maintain final value after single cycle<br>LED hundreds digit: Starting mode<br>0: Restart from the first section<br>1: Start from the stage at the time of shutdown (fault)<br>2: Start from the stage and frequency at the time of shutdown (fault)<br>LED thousands digit: Power down storage selection<br>0: Do not store<br>1: Store | 0000 ~ 1221  | 0000          | × |
| F1.17 | Multi-step speed frequency 1                          | Set step 1 frequency   | -Upper limit frequency~upper limit frequency           | 5.0Hz         | ○ |
| F1.18 | Multi-step speed frequency 2                          | Set step 2 frequency.  | -Upper limit frequency~upper limit frequency           | 10.0Hz        | ○ |
| F1.19 | Multi-step speed frequency 3                          | Set step 3 frequency   | -Upper limit frequency~upper limit frequency           | 15.0Hz        | ○ |

|       |   |   |  |        |   |
|-------|---|---|--|--------|---|
| F1.20 | Multi-step speed frequency 4                              | Set step 4 frequency  | -Upper limit frequency~<br>upper limit frequency | 20.0Hz | ○ |
| F1.21 | Multi-step speed frequency 5                              | Set step 5 frequency  | -Upper limit frequency~<br>upper limit frequency | 25.0Hz | ○ |
| F1.22 | Multi-step speed frequency 6                              | Set step 6 frequency  | -Upper limit frequency~<br>upper limit frequency | 37.5Hz | ○ |
| F1.23 | Multi-step speed frequency 7                              | Set step 7 frequency  | -Upper limit frequency~<br>upper limit frequency | 50.0Hz | ○ |
| F1.24 | Step 1 run time   | Set the running time of segment speed 1 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.25 | Step 2 run time   | Set the running time of segment speed 2 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.26 | Step 3 run time   | Set the running time of segment speed 3 (the unit is selected by [F1.35], and the default is seconds))  | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.27 | Step 4 run time   | Set the running time of segment speed 4 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.28 | Step 5 run time   | Set the running time of segment speed 5 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.29 | Step 6 run time   | Set the running time of segment speed 6 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.30 | Step 7 run time   | Set the running time of segment speed 7 (the unit is selected by [F1.35], and the default is seconds)   | 0.0 ~<br>999.9s                                  | 10.0s  | ○ |
| F1.31 | Multi-step acceleration and deceleration time selection 1 | Unit bit: Acceleration and deceleration time of phase 1<br>0~1<br>Tens bit: Acceleration and deceleration time of stage 2<br>0~1<br>Hundreds bit: Acceleration and deceleration time of stage 3<br>0~1<br>Thousands bit: Acceleration and deceleration time of stage 4<br>0~1 | 0000 ~<br>1111                                   | 0000   | ○ |
| F1.32 | Multi-step acceleration and deceleration time selection 2 | Unit bit: Acceleration and deceleration time of stage 5<br>0~1<br>Tens bit: Acceleration and deceleration time of stage 6<br>0~1<br>Hundreds bit: Acceleration and deceleration   | 000~111  | 000    | ○ |

|  |   | time of stage 6<br>0~1<br>thousands bit: Reserved   |  |         |        |
|--|---|---|--|---------|--------|
| F1.33  | Acceleration time 2                         | Set acceleration and deceleration time 2  | 0.1~999.9s<br>0.4~4.0KW<br>10.0s<br>5.5~7.5KW<br>15.0s | 10.0s   | ○      |
| F1.34  | Deceleration time 2                         |   |  |         |        |
| F1.35  | Time unit selection                         | LED Single digit: Process PID time unit<br>LED Tens digit: Simple PLC time unit<br>LED hundreds digit : Conventional acceleration and deceleration time unit<br>LED thousands digit: Reserved<br>0: Unit: 1 second<br>1: Unit: 1 point<br>2: Unit: 0.1 second | 000~211  | 000     | ×      |
| F1.36  | Dead time of positive and negative rotation | The transition time waiting at the output zero frequency during the transition of the converter from forward operation to reverse operation or from reverse operation to forward operation.   | 0.0~999.9s   | 0.0     | ○      |
| <b>F2 group - Analog and digital input and output parameters</b> |   |   |  |         |        |
| Function code  | Name  | Description   | Set range  | Default | Change |
| F2.00  | AI input lower limit voltage                | Set AI upper and lower voltage  | 0.00~F2.01   | 0.00V   | ○      |
| F2.01  | AI input upper limit voltage                |   | F2.01~10.00V   | 10.00V  | ○      |
| F2.02  | AI lower limit corresponding setting        | Set the AI upper and lower limit corresponding setting, which corresponds to the percentage of the upper limit frequency [F0.05].   | -100.0%~100.0%   | 0.0%    | ○      |
| F2.03  | Corresponding setting of AI upper limit     |   |  | 100.0%  | ○      |
| F2.04~F2.07  | Reserved                                    | -   | -  | 0       | ◆      |
| F2.08  | Analog input signal filtering time constant | This parameter is used for filtering the input signal of AI and panel potentiometer to eliminate the influence of interference  | 0.1~5.0s   | 0.1s    | ○      |
| F2.09  | Analog input anti-shaking deviation limit   | When the analog input signal fluctuates frequently near the given value, the frequency fluctuation caused by this fluctuation can be suppressed by setting F2.09.   | 0.00 ~ 0.10V   | 0.00V   | ○      |

|       |  |  |                                  |        |   |
|-------|--|--|----------------------------------|--------|---|
| F2.10 | AO analog output terminal function selection | 0: output frequency<br>1: Output current<br>2: motor speed<br>3: output voltage<br>4: AI<br>5: Reserved  | 0~5                              | 0      | ○ |
| F2.11 | AO output lower limit                        | Set AO output upper and lower limits   | 0.00 ~ 10.00V/<br>0.00 ~ 20.00mA | 0.00V  | ○ |
| F2.12 | AO Output upper limit                        |  |                                  | 10.00V | ○ |
| F2.13 | Input terminal X1 function                   | 0: Control terminal idle<br>1: Forward inching control<br>2: Reverse jog control<br>3: Forward control (FWD)<br>4: Reverse control (REV)<br>5: Three-wire operation control<br>6: Free stop control<br>7: External stop signal input (STOP)<br>8: External reset signal input (RST)                    | 0~30                             | 3      | × |
| F2.14 | Input terminal X2 function                   | 9: External fault normally open input<br>10: Frequency increase command (UP)<br>11: Frequency decrement instruction (DOWN)<br>13: Multi-stage speed selection S1<br>14: Multi-stage speed selection S2<br>15: Multi-stage speed selection S3<br>16: Operation command channel is forced to be terminal | 0~30                             | 4      | × |
| F2.15 | Input terminal X3 function                   | 17: The running command channel is forced to communicate<br>18: Stop DC braking command<br>19: Frequency switch to AI  | 0~30                             | 0      | × |
| F2.16 | Input terminal X4 function                   | 20: Frequency switch to digital frequency 1<br>21: Frequency switch to digital frequency 2<br>22: Reserved<br>23: Counter clear signal<br>24: Counter trigger signal<br>25: Timer reset signal   | 0~30                             | 0      | × |
| F2.17 | Reserved                                     | 26: Timer trigger signal<br>27: Acceleration and deceleration time selection<br>28: Swing frequency pause (stop at the current frequency)<br>29: Swing frequency reset (return to center frequency)<br>30: External stop/reset signal input (STOP/RST)<br>40: Run Pause                                | -                                | 0      | × |
| F2.18 | FWD/REV terminal control mode                | 0: Two-wire control mode 1<br>1: Two-wire control mode 2<br>2: Three-wire control mode 1<br>3: Three-wire control mode 2<br>4: Three-wire control mode 3<br>5: Reserved  | 0~5                              | 0      | × |



|       |   |   |                              |         |   |
|-------|---|---|------------------------------|---------|---|
| F2.19 | Terminal function detection selection during power-on | 0: Terminal operation command is invalid when power-on<br>1: Terminal operation command is valid when power-on  | 0~1                          | 0       | × |
| F2.20 | R Output setting                                      | 0: leave unused<br>1: AC Drive is ready for operation 2: Converter in operation<br>3: The AC Drive is running at zero speed<br>4: External fault shutdown<br>5: Inverter fault<br>6: Frequency/speed arrival signal(FAR) 7: Frequency/speed level detection signal(FDT)   | 0~17                         | 5       | ○ |
| F2.21 | Reserved  | 8: Output frequency reaches the upper limit<br>9: Output frequency reaches the lower limit<br>10: AC Drive overload pre-alarm 11: Timer overflow signal<br>12: Counter detection signal<br>13: Counter reset signal<br>14: Auxiliary motor<br>15: Forward<br>16: Reverse<br>17: Output indication signal when output frequency drops to speed detection level | -                            | 0       | ○ |
| F2.22 | R Closing delay                                       | Delay from relay R state change to output change  | 0.0 ~ 255.0s                 | 0.0s    | × |
| F2.23 | R Disconnection delay                                 |   |                              |         |   |
| F2.24 | Frequency reaches FAR detection amplitude             | The output frequency is within the positive and negative detection width of the set frequency, and the terminal outputs effective signal (low level)  | 0.0Hz~15.0Hz                 | 5.0Hz   | ○ |
| F2.25 | FDT Horizontal setting value                          |    | 0.0Hz~ Upper limit frequency | 10.0Hz  | ○ |
| F2.26 | FDT Hysteresis value                                  |   | 0.0~30.0Hz                   | 1.0Hz   | ○ |
| F2.27 | UP/DOWN Terminal modification rate                    | This function code is used to set the frequency modification rate when the UP/DOWN terminal sets the frequency, that  | 0.1Hz ~ 99.9Hz/s             | 1.0Hz/s | ○ |

|       |  |  |              |   |   |
|-------|--|--|--------------|---|---|
|       |  | is, the amount of frequency change when the UP/DOWN terminal is shorted to the COM terminal for one second.  |              |   |   |
| F2.28 | Input terminal pulse trigger mode setting(X1~X4) | 0: Indicates the level triggering mode<br>1: Indicates pulse triggering mode<br>Note: X1 ~ X4 correspond to 1H, 2H, 4H and 8H in hexadecimal order.  | 0~FH         | 0 | ○ |
| F2.29 | Valid logic setting of input terminal(X1~X4)     | 0 : Indicates positive logic, that is, the connection between Xi terminal and common terminal is valid, and the disconnection is invalid<br>1: Indicates anti-logic, that is, the connection between Xi terminal and common terminal is invalid, and the disconnection is valid<br>Note: X1 ~ X4 correspond to 1H, 2H, 4H and 8H in hexadecimal order. | 0~FH         | 0 | ○ |
| F2.30 | X1 Filter coefficient                            | Used to set the sensitivity of the input terminal. If the digital input terminal is vulnerable to interference and causes mis-operation, increase this parameter, and the anti-interference ability will be enhanced, but if the setting is too large, the sensitivity of the input terminal will be reduced.<br>1: Represents 2MS scanning time unit  | 0~9999       | 5 | ○ |
| F2.31 | X2 Filter coefficient                            |  | 0~9999       | 5 | ○ |
| F2.32 | X3 Filter coefficient                            |  | 0~9999       | 5 | ○ |
| F2.33 | X4 Filter coefficient                            |  | 0~9999       | 5 | ○ |
| F2.34 | Reserved   |  | -            | 0 | ○ |
| F2.35 | X1 Access delay time                             | Used to set input terminal access delay time   | 0.00~655.00s |   | ○ |
| F2.36 | X2 Access delay time                             |  | 0.00~655.00s |   | ○ |
| F2.37 | X3 Access delay time                             |  | 0.00~655.00s |   | ○ |
| F2.38 | X4 Access delay time                             |  | 0.00~655.00s |   | ○ |
| F2.39 | Reserved   |  | -            |   | ○ |
| F2.40 | X1 Disconnect delay time                         | Used to set the input terminal disconnection delay time  | 0.00~655.00s | 5 | ○ |
| F2.41 | X2 Disconnect delay time                         |  | 0.00~655.00s | 5 | ○ |
| F2.42 | X3 Disconnect delay time                         |  | 0.00~655.00s | 5 | ○ |
| F2.43 | X4 Disconnect delay time                         |  | 0.00~655.00s | 5 | ○ |
| F2.44 | Reserved   |  | -            | 0 | ○ |

| F3 group - PID parameter |                      |  |             |         |        |
|--------------------------|----------------------|--|-------------|---------|--------|
| Function code            | Name                 | Description  | Set range   | Default | Change |
| F3.00                    | PID function setting | <p>LED Single digit: PID Regulation characteristics</p> <p>0: of no avail</p> <p>1: Positive action</p> <p>When the feedback signal is greater than the given quantity of PID, the output frequency of AC Drive is required to decrease (that is, reduce the feedback signal)</p> <p>2: Negative effect</p> <p>When the feedback signal is greater than the given quantity of PID, the output frequency of AC Drive is required to rise (that is, reduce the feedback signal).</p> <p>LED Tens digit: PID Quantitative input channel</p> <p>0: Keyboard potentiometer</p> <p>PID dosing is given by potentiometer on the operation panel</p> <p>1: Number given</p> <p>PID dosing is given by numbers and set by function code F3.01.</p> <p>2: Pressure setting (Mpa, Kg)</p> <p>Set the pressure given by F3.01 and F3.18</p> <p>LED hundreds digit: PID feedback input channel</p> <p>0: AI</p> <p>1: Reserved</p> <p>LED thousands digit: PID sleep selection</p> <p>0: of no avail</p> <p>1: Normal sleep</p> <p>This method needs to set specific parameters such as F3.10~F3.13</p> <p>2: Disturbance dormancy</p> <p>It is the same as the parameter setting when the sleep mode is 0. If the PID feedback value is within the range of F3.14 setting value, the disturbance sleep will be entered after the sleep delay time is maintained. When the feedback value is less</p> | 0000 ~ 2122 | 1010    | ×      |

|       |                                |   |                            |       |   |
|-------|--------------------------------|---|----------------------------|-------|---|
|       |                                | than the awakening threshold (PID polarity is positive), it will wake up immediately.   |                            |       |   |
| F3.01 | Setting of quantitative number | Use the operation keyboard to set the given quantity of PID control. This function is effective only when the PID given channel is selected as a digital given channel (F3.00 ten digits are 1 or 2). If the tenth digit of F3.00 is 2, it is used as a pressure setting, and this parameter is consistent with the unit of F3.18.  | 0.0 ~ 100.0%               | 0.0%  | ○ |
| F3.02 | Feedback channel gain          | When the feedback channel is inconsistent with the set channel level, this function can be used to adjust the gain of the feedback channel signal.  | 0.01 ~ 10.00               | 1.00  | ○ |
| F3.03 | Proportional gain P            | The speed of PID regulation is set by the two parameters of proportional gain and integration time. It is required to increase the proportional gain and reduce the integration time when the regulation speed is fast, and to decrease the proportional gain and increase the integration time when the regulation speed is slow. Generally, the differential time is not set. | 0.01~5.00                  | 2.00  | ○ |
| F3.04 | Integral time Ti               |   | 0.1~50.0s                  | 1.0s  | ○ |
| F3.05 | Differential time Td           |   | 0.1~10.0s                  | 0.0s  | ○ |
| F3.06 | Sampling period T              | The larger the sampling period is, the slower the response is, but the better the suppression effect of interference signal is. Generally, it is not necessary to set.  | 0.1~10.0s                  | 0.0s  | ○ |
| F3.07 | Deviation limit                | The deviation limit is the ratio of the absolute value of the deviation between the system feedback quantity and the given quantity to the given quantity. When the feedback quantity is within the deviation limit, the PID regulation will not act.   | 0.0 ~ 20.0%                | 0.0%  | ○ |
| F3.08 | Close-loop preset frequency    | Frequency and operation time of AC Drive before PID is put into operation   | 0.0~ Upper limit frequency | 0.0Hz | ○ |
| F3.09 | Preset                         |   | 0.0 ~                      | 0.0s  | × |

|       |   |  |              |        |   |
|-------|---|--|--------------|--------|---|
|       | frequency holding time  |  | 999.9s       |        |   |
| F3.10 | Wake-up threshold coefficient                                   | If the actual feedback value is greater than the set value, and the frequency output by the AC Drive reaches the lower limit frequency, the AC Drive will enter the sleep state after the delay waiting time defined in F3.12 (i.e., running at zero speed); This value is a percentage of the PID setpoint.                 | 0.0 ~ 150.0% | 100.0% | ○ |
| F3.11 | Awakening threshold coefficient                                 | If the actual feedback value is less than the set value, the converter will leave the sleep state and start working after the delay waiting time defined in F3.13; This value is a percentage of the PID setpoint.   | 0.0 ~ 150.0% | 90.0%  | ○ |
| F3.12 | Sleep delay time  | Set sleep delay time   | 0.0 ~ 999.9s | 100.0s | ○ |
| F3.13 | Wake up delay time  | Set awakening delay time   | 0.0 ~ 999.9s | 1.0s   | ○ |
| F3.14 | Deviation between feedback and set pressure when entering sleep | This function parameter is only valid for disturbance sleep mode   | 0.0 ~ 10.0%  | 0.5%   | ○ |
| F3.15 | Tube burst detection delay time                                 | Set the delay time of tube burst detection   | 0.0 ~ 130.0s | 0.0s   | ○ |
| F3.16 | High pressure detection threshold                               | When the feedback pressure is greater than or equal to this set value, the tube burst fault "EPA0" will be reported after the tube burst delay of F3.15. When the feedback pressure is less than this set value, the tube burst fault "EPA0" will automatically reset; This threshold is a percentage of the given pressure. | 0.0 ~ 200.0% | 150.0% | ○ |
| F3.17 | Low pressure detection threshold                                | When the feedback pressure is less than this set value, the tube burst fault "EPA0" will be reported after the tube burst delay of F3.15. When the feedback pressure is greater than or equal to this set value, the tube burst fault "EPA0" will automatically reset; This threshold is a percentage of the given           | 0.0 ~ 200.0% | 50.0%  | ○ |

|  |  | pressure.   |                                    |              |        |
|--|--|---|------------------------------------|--------------|--------|
| F3.18  | Sensor range                                   | Set the maximum range of the sensor   | 0.00 ~<br>99.99<br>(MPa, Kg)       | 10.00MPa     | ○      |
| <b>F4 group - Advanced function parameters</b> |  |   |                                    |              |        |
| Function code                                  | Name   | Description   | Set range                          | Default      | Change |
| F4.00  | Rated power of motor                           | Motor parameter setting   | 0.0~2000.0 KW                      | Model depend | ×      |
| F4.01  | Rated voltage of motor                         |   | 0~500V:<br>380V<br>0~250V:<br>220V | Model depend | ×      |
| F4.02  | Rated current of motor                         |   | 0.1~<br>999.9A                     | Model depend | ×      |
| F4.03  | Rated frequency of motor                       |   | 1.0~<br>999.9Hz                    | 50.0Hz       | ×      |
| F4.04  | Rated speed of motor                           |   | 0~9999RPM                          | Model depend | ×      |
| F4.05  | No-load Cur                                    | Set motor no-load current   | 0.1~F4.01                          | Model depend | ×      |
| F4.06  | AVR function                                   | 0: of no avail<br>1: Effective throughout<br>2: Invalid only when decelerating  | 0~2                                | 0            | ×      |
| F4.07  | Cooling fan control                            | 0: Automatic control mode<br>1: Keep running during power-on  | 0~1                                | 0            | ○      |
| F4.08  | Number of fault automatic reset                | When the number of reset times is set to 0, there is no automatic reset function, and only manual reset is allowed. 10 means that the number of times is unlimited, that is, countless times.   | 0~10                               | 0            | ×      |
| F4.09  | Fault automatic reset interval                 | Set the automatic reset interval of fault   | 0.5~25.0s                          | 3.0s         | ×      |
| F4.10  | Starting voltage of energy consumption braking | If the internal DC side voltage of the converter is higher than the starting voltage of energy consumption braking, the built-in braking unit acts. If a braking resistor is connected at this time, the rising voltage energy in the converter will be released through the braking resistor, so that the DC voltage will fall back. | 330 ~<br>380/660 ~<br>800V         | 350/780V     | ○      |
| F4.11  | Energy consumption braking action ratio        |   | 10~100%                            | 100%         | ○      |
| F4.12  | Overmodulation function selection              | 0: of no avail<br>1: effective  | 0~1                                | 0            | ×      |
| F4.13  | PWM model                                      | 0: Full frequency seven-band<br>1: Full frequency five-band<br>2: Seven sections to five sections   | 0~2                                | 0            | ×      |
| F4.14  | Slip compensation coefficient                  | The speed of the asynchronous motor will drop after it is loaded. The slip compensation can make the motor speed close to its synchronous speed, thus making the motor  | 0~200%                             | 100%         | ×      |

|       |  |   |               |              |   |
|-------|--|---|---------------|--------------|---|
|       |  | speed control accuracy higher. This coefficient is only valid for ordinary V/F and simple vectors.  |               |              |   |
| F4.15 | Slip compensation mode                   | 0: of no avail<br>1: Low frequency compensation<br>Note: This parameter is only valid for advanced V/F  | 0~1           | 0            | × |
| F4.16 | Motor parameter self-learning            | 0: of no avail<br>1: Static self-learning (Start to display STAR immediately, and end to display END for 1s)  | 0~1           | 0            | × |
| F4.17 | Rated power of motor                     | After changing the rated power of the motor F4.17, F4.01, F4.02, F4.04, F4.05, F4.18~F4.20 are automatically updated to the default parameters of the corresponding power of the motor.                             | 0.0~2000.0KW  | Model depend | ○ |
| F4.18 | Motor rotor resistance                   |   | 0.00~200.00Ω  | Model depend | ○ |
| F4.19 | Motor stator and rotor inductance        |   | 0.00~200.00mH | Model depend | ○ |
| F4.20 | Motor stator and rotor mutual inductance |   | 0.00~200.00mH | Model depend | ○ |
| F4.21 | Speed loop (ASR1) proportional gain      | Function codes F4.21~F4.26 are valid in vector control mode.<br><br>The speed response characteristic of vector control is changed by setting the proportional gain P and the integral time I.                      | 1~100         | 30           | × |
| F4.22 | Speed loop (ASR1) integration time       |   | 0.01~10.00s   | 0.50         | ○ |
| F4.23 | Switching low frequency                  |   | 0.0~10.0Hz    | 5.0          | × |
| F4.24 | Speed loop (ASR2) proportional gain      |   | 1~100         | 20           | ○ |
| F4.25 | Speed loop (ASR2) integration time       |   | 0.01~10.00s   | 1.00         | ○ |
| F4.26 | Switch high frequency                    |   | F4.23~320.0Hz | 10.0         | × |
| F4.27 | Vector slip compensation                 | In the vector control mode, this parameter is used to adjust the speed stability accuracy of the motor. When the motor is overloaded and the speed is low, increase this parameter, otherwise reduce this parameter | 50%~200%      | 100          | ○ |
| F4.28 | Speed loop filtering time constant       | Set the speed loop filtering time constant  | 0.000~1.000S  | 0.010        | ○ |
| F4.29 | Reserved                                 | -   | -             | 0            | ◆ |

|   |  |   |                                     |          |        |
|---|--|---|-------------------------------------|----------|--------|
| F4.30                                     | Speed loop torque limit                  | This setting is a percentage of the rated current of the motor  | 0.0%~200.0%                         | 150.0    | ○      |
| F4.31                                     | Torque command selection                 | 0: Keyboard number setting<br>1: AI<br>2: Reserved  | 0~2                                 | 0        | ×      |
| F4.32                                     | Torque digital setting                   | This setting is a percentage of the rated current of the motor  | 0.0%~200.0%*<br>Motor rated current | 150.0    | ○      |
| F4.33                                     | Torque control forward maximum frequency | It is used to set the maximum forward or reverse operating frequency of the converter under the torque control mode.  | 0.0~3200.0Hz                        | 50.0     | ○      |
| F4.34                                     | Torque control reverse maximum frequency |   | 0.0~3200.0Hz                        | 50.0     | ○      |
| F4.35                                     | Torque rise time                         | The torque rise/fall time defines the time when the torque rises from 0 to the maximum value or decreases from the maximum value to 0.  | 0.00~1.00s                          | 0.00     | ○      |
| F4.36                                     | Torque drop time                         |   | 0.00~1.00s                          | 0.00     | ○      |
| F5 group - Protection function parameters |  |   |                                     |          |        |
| Function code                             | Name                                     | Description   | Set range                           | Default  | Change |
| F5.00                                     | Protection settings                      | LED Single digit: Motor overload protection selection<br>0: of no avail<br>1: effective<br>LED Tens digit: PID Feedback disconnection protection<br>0: of no avail<br>1: Protection action and free shutdown<br>LED hundreds digit: 485 communication failure handling<br>0: Protection action and free shutdown<br>1: Alarm but maintain current operation<br>2: Alarm and shut down according to the set mode<br>LED thousands digit: Shock suppression selection<br>0: of no avail<br>1: effective | 0000 ~ 1211                         | 0001     | ×      |
| F5.01                                     | Motor overload protection factor         | The motor overload protection factor is the percentage of the rated current of the motor to the rated output current of the AC Drive.   | 30% ~ 110%                          | 100%     | ×      |
| F5.02                                     | Undervoltage protection level            | This function code specifies the allowable lower limit voltage of DC bus when the AC Drive works normally   | 50 ~ 280/50 ~ 480V                  | 180/360V | ×      |



|       |  |  |                      |          |   |
|-------|--|--|----------------------|----------|---|
| F5.03 | Deceleration voltage limit factor                | This parameter is used to adjust the ability of the inverter to suppress overvoltage during deceleration.  | 0: close, 1~255      | 1        | × |
| F5.04 | Overvoltage limit level                          | The overvoltage limit level defines the action voltage during overvoltage stall protection   | 350 ~ 400/660 ~ 850V | 375/700V | × |
| F5.05 | Acceleration current limiting factor             | This parameter is used to adjust the ability of the converter to suppress overcurrent during acceleration  | 0: close, 1~99       | 10       | × |
| F5.06 | Constant speed current limiting factor           | This parameter is used to adjust the ability of the converter to suppress overcurrent during the constant speed process  | 0: close, 1~10       | 0        | × |
| F5.07 | Current limiting level                           | The current limiting level defines the current threshold of the automatic current limiting action, and its setting value is the percentage of the rated current of the AC Drive  | 50% ~ 200%           | 160%     | × |
| F5.08 | Feedback disconnection detection value           | This value is the percentage of PID given quantity. When the feedback value of PID is continuously less than the feedback disconnection detection value, the AC Drive will make corresponding protection actions according to the setting of F5.00. When F5.08=0%, it is invalid.  | 0.0 ~ 100.0%         | 0.0%     | × |
| F5.09 | Feedback disconnection detection time            | The delay time before the protection action after the feedback disconnection occurs.   | 0.1 ~ 999.9S         | 10.0s    | × |
| F5.10 | Frequency converter overload pre-alarm level     | The set value of the current threshold of the overload pre-alarm action of the AC Drive is the percentage of the rated current of the AC Drive.  | 0~150%               | 120%     | ○ |
| F5.11 | AC Drive overload pre-alarm delay                | The delay time between the output current of the converter from continuously greater than the amplitude of the overload pre-alarm level (F5.10) to the output of the overload pre-alarm signal.  | 0.0~15.0s            | 5.0s     | × |
| F5.12 | Jog priority enable                              | 0: of no avail<br>1: When the AC Drive is running, inching priority is the highest   | 0~1                  | 0        | × |
| F5.13 | Oscillation suppression coefficient              | In case of motor vibration, set F5.00 thousand bits to be effective, turn on the vibration suppression function, and then adjust it by setting the vibration suppression coefficient. Generally, the vibration amplitude is large, and increase the vibration suppression coefficient F5.13, F5.14~F5.16 do not need to be set; In case of special occasions, F5.13~F5.16 should be used together. | 0~200                | 30       | ○ |
| F5.14 | Amplitude suppression factor                     |  | 0~12                 | 5        | ○ |
| F5.15 | Lower limit frequency of oscillation suppression |  | 0.0~F5.16            | 5.0Hz    | ○ |
| F5.16 | Upper limit frequency of oscillation suppression |  | F5.15~F0.05          | 45.0Hz   | ○ |

| F5.17                                      | Wave-by-wave current limiting selection                 | LED Single digit: Select in acceleration<br>0: of no avail<br>1: effective<br>LED Tens digit: Select in deceleration<br>0: of no avail<br>1: effective<br>LED hundreds digit: Select at constant speed<br>0: of no avail<br>1: effective<br>LED thousands digit: Reserved  | 000~111   | 011           | ×      |
|--|---|--|---|---------------|--------|
| F5.18                                      | Detection coefficient of output phase loss protection   | When the ratio of the maximum value to the minimum value of the three-phase output current is greater than this factor and the duration exceeds 6 seconds, the converter reports the output current unbalance fault EPLI; When F5.18=0.00, the output phase loss protection is invalid   | 0.00~20.00  | 2.00          | ○      |
| F5.19                                      | Instantaneous power-off frequency reduction coefficient | Set the instantaneous power-off frequency reduction factor   | 0: Instantaneous stop function is invalid<br>1~9999 | 0             | ○      |
| F5.20                                      | Instantaneous power-off frequency reduction point       | Set the frequency reduction point of instant power failure   | 220V:180~330V<br>250V<br>380V:300~550V<br>450V      | Model setting | ×      |
| <b>F6 group - Communication parameters</b> |   |  |   |               |        |
| Function code                              | Name  | Description  | Set range   | Default       | Change |
| F6.00                                      | Local address   | Set the local address, 0 is the broadcast address  | 0~247   | 1             | ×      |
| F6.01                                      | MODBUS communication configuration                      | Unit bit: Baud rate selection<br>0: 9600BPS<br>1: 19200BPS<br>2: 38400BPS<br>Tens bit: data format<br>0: No verification<br>1: even parity check<br>2: Odd check<br>Hundreds bit: Communication response mode<br>0: Normal response<br>1: Only respond to slave address<br>2: No response<br>3: The slave does not respond to the free stop command of the host in broadcast mode<br>Thousands bit: Reserved | 0000~0322   | 0000          | ×      |

| F6.02   | Communication timeout detection time | If the machine does not receive the correct data signal within the time interval defined by this function code, the machine thinks that the communication has failed, and the AC Drive will determine whether to protect or maintain the current operation according to the setting of the communication failure action mode; When this value is set to 0.0, RS485 communication timeout detection is not performed.                                       | 0.1~100.0s | 0.0s    | ×      |
|---|--------------------------------------|--|------------|---------|--------|
| F6.03   | Local response delay                 | This function code defines the intermediate time interval between receiving the converter data frame and sending the response data frame to the upper computer. If the response time is less than the system processing time, the system processing time shall prevail.  | 0~200ms    | 5ms     | ×      |
| F6.04   | Proportional linkage coefficient     | This function code is used to set the weight coefficient of the frequency command received by the slave through the RS485 interface. The actual operating frequency of the slave is equal to the value of this function code multiplied by the value of the frequency setting command received through the RS485 interface. In the linkage control, this function code can set the proportion of operating frequency of multiple inverters.                | 0.01~10.00 | 1.00    | ○      |
| F6.05   | Reserved                             | -  | -          | 0       | ×      |
| <b>F7 group - Supplementary function parameters</b> |                                      |  |            |         |        |
| Function code                                       | Name                                 | Description  | Set range  | Default | Change |
| F7.00   | Counting and timing mode             | LED Single digit: Count arrival processing<br>0: One-week counting, stop output<br>1: One-week count, continue to output<br>2: Cycle count, stop output<br>3: Cycle count, continue output<br>LED Tens digit: Reserved<br>LED hundreds digit: Timed arrival processing<br>0: One-cycle timing, stop output<br>1: One-cycle timing, continue to output<br>2: Cycle timing, stop output<br>3: Cycle timing, continue output<br>LED thousands digit: Reserved | 000~303    | 103     | ×      |
| F7.01   | Counter reset value setting          | Set counter reset value  | F7.02~9999 | 1       | ○      |
| F7.02   | Counter detection value setting      | Set counter detection value  | 0~F7.01    | 1       | ○      |
| F7.03   | Timing time setting                  | Set timing time  | 0~9999s    | 0s      | ○      |

|  |  |   |                 |         |        |
|--|--|---|-----------------|---------|--------|
| F7.04～<br>F7.07                          | Reserved   | -   | -               | 0       | ○      |
| F7.08                                    | Swing control  | 0: forbid<br>1: effective   | 0～1             | 0       | ×      |
| F7.09                                    | Swing control  | 0: Fixed amplitude<br>The reference value of swing is the maximum<br>output frequency (F0.04)<br>1: Variable amplitude<br>The swing reference value is the given<br>channel frequency   | 0～1             | 0       | ×      |
| F7.10                                    | Swing frequency<br>shutdown and<br>start mode<br>selection | 0: Start according to the state memorized<br>before shutdown<br>1: Restart  | 0～1             | 0       | ×      |
| F7.11                                    | Swing amplitude  | The swing amplitude is a percentage<br>corresponding to the maximum output<br>frequency (F0.04).  | 0.0～<br>100.0%  | 0.0%    | ○      |
| F7.12                                    | Jump frequency   | This function code refers to the amplitude of<br>rapid decline after the frequency reaches the<br>upper limit of the frequency during the<br>frequency swing, and also refers to the<br>amplitude of rapid rise after the frequency<br>reaches the lower limit of the frequency<br>swing. This value is the percentage relative to<br>the amplitude of swing frequency (F7.11). If it<br>is set to 0.0%, there will be no sudden jump<br>frequency. | 0.0～50.0%       | 0.0%    | ○      |
| F7.13                                    | Swing rise time  | The running time from the lower frequency of<br>swing to the upper frequency of swing.  | 0.1～<br>3600.0s | 5.0     | ○      |
| F7.14                                    | Swing down<br>time   | The running time from the upper limit<br>frequency to the lower limit frequency.  | 0.1～<br>3600.0s | 5.0     | ○      |
| F7.15                                    | Upper limit of<br>swing frequency<br>delay                 | Set the upper and lower frequency delay of<br>swing frequency.  | 0.1～<br>3600.0s | 5.0     | ○      |
| F7.16                                    | Lower limit<br>frequency delay<br>of swing<br>frequency    |   | 0.1～<br>3600.0s | 5.0     | ○      |
| F8 Group - Manage and display parameters |  |   |                 |         |        |
| Function<br>code                         | Name   | Description   | Set range       | Default | Change |

| F8.00                                  | Selection of main parameters of Operation Monitoring    | For example, F8.00=2, that is, select the output voltage (d-02), then the default display item of the main monitoring interface is the current output voltage value   | 0~31       | 0       | ○      |
|--|---|---|------------|---------|--------|
| F8.01                                  | Selection of main parameters for Shutdown monitoring    | For example, F8.01=3, that is, select the bus voltage (d-03), then the default display item of the main monitoring interface is the current bus voltage value.  | 0~31       | 1       | ○      |
| F8.02                                  | Run auxiliary display (only valid for dual display)     | For example, F8.02=4, that is, select the output current (d-02), then the default display item of the main monitoring interface is the current output voltage value.  | 0~31       | 4       | ○      |
| F8.03                                  | Shutdown Auxiliary Display(only valid for dual display) | For example, F8.03=3, that is, select the bus voltage (d-03), then the default display item of the main monitoring interface is the current bus voltage value.  | 0~31       | 3       | ○      |
| F8.04                                  | Motor speed display coefficient                         | It is used to correct the speed scale display error and has no effect on the actual speed.  | 0.01~99.99 | 1.00    | ○      |
| F8.05                                  | Parameter Initialization                                | <p>0: No action<br/>The AC Drive is in normal parameter reading and writing state. Function code setting value. Whether it can be changed depends on the setting state of the user password and the current working state of the converter.</p> <p>1: Restore factory settings<br/>All user parameters are restored to the factory settings according to the model.</p> <p>2: Clear the fault record<br/>Clear the contents of fault records (d-19~d-24). After the operation is completed, this function code will be cleared automatically.</p> | 0~2        | 0       | ×      |
| F8.06                                  | Reserved  | -   | 0          | 0       | ×      |
| <b>F9 Group - Factory Parameters</b>   |   |   |            |         |        |
| Function code                          | Name  | Description   | Set range  | Default | Change |
| F9.00                                  | Factory password  | 1~9999  | 1          | ****    | ◇      |
| <b>D Group - Monitoring parameters</b> |   |   |            |         |        |
| Function code                          | Name  | Description   | Set range  | Default | Change |
| d-00                                   | Output Frequency (Hz)                                   | 0.0~999.9Hz   | 0.1Hz      | 0.0Hz   | ◆      |

|      |   |                                  |                 |                  |   |
|------|---|----------------------------------|-----------------|------------------|---|
| d-01 | Frequency set (Hz)                            | 0.0~999.9Hz                      | 0.1Hz           | 0.0Hz            | ◆ |
| d-02 | Output Voltage(V)                             | 0~999V                           | 1V              | 0V               | ◆ |
| d-03 | Bus voltage(V)                                | 0~999V                           | 1V              | 0V               | ◆ |
| d-04 | Output Current(A)                             | 0.0~999.9A                       | 0.1A            | 0.0A             | ◆ |
| d-05 | Motor Speed(rpm)                              | 0~60000rpm                       | 1rpm            | Model setting    | ◆ |
| d-06 | Analog Input AI(V/mA)                         | 0.00~10.00V/0.00~20.00mA         | 0.01V/0.01mA    | 0.00V/mA         | ◆ |
| d-07 | Reserve                                       | -                                | 0               | 0                | ◆ |
| d-08 | Analog Output AO(V/mA)                        | 0.00~10.00V/0.00~20.00mA         | 0.01V/0.01mA    | 0.00V/mA         | ◆ |
| d-09 | Reserved                                      | -                                | -               | 0                | ◆ |
| d-10 | PID Pressure setpoint                         | 0.00~10.00V/0.00~99.99 (MPa, Kg) | 0.01V/(MPa, Kg) | 0.00V (MPa, Kg)  | ◆ |
| d-11 | PID Pressure feedback value                   | 0.00~10.00V/0.00~99.99 (MPa, Kg) | 0.01V/(MPa, Kg) | 0.00V/ (MPa, Kg) | ◆ |
| d-12 | Current count value                           | 0~9999s                          | 1s              | 0s               | ◆ |
| d-13 | Current timing value(s)                       | 0~9999s                          | 1s              | 0s               | ◆ |
| d-14 | Input terminals status(X1-X4)                 | 0~FH                             | 1H              | 0H               | ◆ |
| d-15 | Output status(R)                              | 0~1H                             | 1H              | 0H               | ◆ |
| d-16 | Module temperature(°C)                        | 0.0~132.3°C                      | 0.1°C           | 0.0              | ◆ |
| d-17 | Software upgrade date(year)                   | 2010~2026                        | 1               | 2023             | ◆ |
| d-18 | Software upgrade date (Month, day)            | 0~1231                           | 1               | 0109             | ◆ |
| d-19 | Second fault code                             | 0~19                             | 1               | 0                | ◆ |
| d-20 | Last fault code                               | 0~19                             | 1               | 0                | ◆ |
| d-21 | Output frequency at the last fault (Hz)       | 0.0~999.9Hz                      | 0.1Hz           | 0.0Hz            | ◆ |
| d-22 | Output current at the last fault(A)           | 0.0~999.9A                       | 0.1A            | 0.0V             | ◆ |
| d-23 | Bus voltage at the last fault(V)              | 0~999V                           | 1V              | 0V               | ◆ |
| d-24 | Module temperature at the last fault(°C)      | 0.0~132.3°C                      | 0.1°C           | 0.0°C            | ◆ |
| d-25 | Accumulated operation time of the AC Drive(h) | 0~9999h                          | 1h              | 0h               | ◆ |

|                    |   |   |  |               |   |
|--------------------|---|---|--|---------------|---|
| d-26               | Inverter status                                 | 0~FFFFH<br>BIT0: operation/shutdown<br>BIT1: reverse/forward rotation<br>BIT2: Jog<br>BIT3: DC braking<br>BIT4: Reserved<br>BIT5: overvoltage limit<br>BIT6: Constant speed frequency reduction<br>BIT7: overcurrent limit<br>BIT8~9:00 - zero speed/01 - acceleration/10 - deceleration/11 - constant speed<br>BIT10: overload pre-alarm<br>BIT11: Reserved<br>BIT12~13 running command channel:<br>00-panel/01-terminal/10-reserved<br>BIT14~15 bus voltage status: 00 - normal/01 - low voltage protection/10 - overvoltage protection | 1H   | 0H            | ◆ |
| d-27               | Software version                                | 1.00~99.99  | 0.01   | 2.00          | ◆ |
| d-28               | Power model                                     | 0.10~99.9KW   | 0.01KW   | Model setting | ◆ |
| d-29               | Estimated frequency of motor                    | 0.0~maximum output frequency [F0.04] Note: motor operating frequency converted from estimated motor speed   | 0.1Hz  | 0.0Hz         | ◆ |
| d-30               | Output torque                                   | -200~+200%  | 1%   | 0%            | ◆ |
| d-31               | Input voltage(V)                                | 0~999V  | 1V   | 0V            | ◆ |
| E group-Error code |   |   |  |               |   |
| Error Code         | Description                                     | Possible causes of failure  | Trouble shooting                                   |               |   |
| E0C1               | Overcurrent during accelerated operation        | The acceleration time is too short  | Expand the acceleration time                       |               | 1 |
|                    |   | Low power of inverter   | Choose higher power grade inverter                 |               |   |
|                    |   | Improper setting of the V/F curve or torque rise  | Adjust the V/F curve or torque increase            |               |   |
| E0C2               | Overcurrent during the decelerated operation    | The deceleration time is too short  | Expand the deceleration time                       |               | 2 |
|                    |   | Lower Power of inverter   | Choose higher power grade inverter                 |               |   |
| E0C3               | Overcurrent during the constant speed operation | Low grid voltage  | Check input power                                  |               | 3 |
|                    |   | Sudden or abnormal load   | Check the load or reduce the sudden change of load |               |   |
|                    |   | Low power of inverter   | Choose higher grade power inverter                 |               |   |
| EHU1               | Overvoltage during accelerated operation        | Abnormal input voltage  | Check input power supply                           |               | 4 |
|                    |   | Restart the rotating motor  | Set to start after DC braking                      |               |   |
| EHU2               | Overvoltage                                     | The deceleration time is too short  | Extend the deceleration time                       |               | 5 |

|      |  |   |   |    |
|------|--|---|---|----|
|      | during deceleration operation                | Abnormal input voltage  | Check input power supply  |    |
| EHU3 | Over voltage during constant speed operation | Abnormal input voltage  | Check input power supply  | 6  |
| EHU4 | Over voltage during shutdown                 | Abnormal input voltage  | Check input power supply  | 7  |
| ELU0 | Under voltage during operation               | The input voltage is abnormal or the relay is not closed                | Check the voltage of power supply voltage or ask service from the manufacturer  | 8  |
| ESC1 | Power Module Fault                           | Inverter's output short circuit or grounding                            | Check motor wiring  | 9  |
|      |  | Converter instantaneous overcurrent                                     | Refer to overcurrent countermeasures  |    |
|      |  | Abnormal control board or serious interference                          | Ask the manufacturer for service  |    |
|      |  | Power device damage   | Ask the manufacturer for service  |    |
| E-OH | Heatsink over temperature                    | Ambient temperature is too high   | Lower the ambient temperature   | 10 |
|      |  | Fan damage  | Change the fan  |    |
|      |  | Air duct blocked  | Dredge air duct   |    |
| EOL1 | Inverter overload                            | Improper setting of V/F curve or torque rise                            | Adjust the V/F curve and torque rise  | 11 |
|      |  | The grid voltage is too low   | Check the grid voltage  |    |
|      |  | The acceleration time is too short                                      | Extend the Acceleration time  |    |
|      |  | Motor Overload  | Select higher power converter   |    |
| EOL2 | Motor Overload                               | Improper setting of V/F curve or torque rise                            | Adjust the V/F curve and torque increase  | 12 |
|      |  | Grid voltage is too low   | Check the grid voltage  |    |
|      |  | The motor is locked or too large sudden change of the load              | Check load  |    |
|      |  | Improper setting of the overload protection factor                      | Correctly set the motor overload protection factor  |    |
| E-EF | External equipment failure                   | External equipment fault input terminal closed                          | Disconnect the fault input terminal of external equipment and clear the fault (pay more attention to check the cause)                                       | 13 |
| EPOF | Double CPU communication failure             | CPU communication failure   | Ask the manufacturer for service  | 14 |
| EPID | PID feedback disconnection                   | PID feedback line is loose  | Check feedback wiring   | 15 |
|      |  | The feedback quantity is less than the detection value of disconnection | Adjust the detection input threshold  |    |
| E485 | RS485 communication failure                  | Not match the baud rate of the upper computer                           | Adjust the baud rate  | 16 |
|      |  | RS485 Channel interference  | Check whether the communication wiring is shielded and whether the wiring is reasonable. If necessary, consider connecting the filter capacitor in parallel |    |
|      |  | Communication timeout   | retry   |    |



|      |                              |  |  |    |
|------|------------------------------|--|--|----|
| ETUN | Motor Tuning fault           | Motor parameter setting error  | Rest the motor parameters  | 17 |
| ECCF | Current detection fault      | Current sampling circuit fault   | Ask the manufacturer for service                                       | 18 |
|      |                              | Auxiliary power failure  |  |    |
| EEEP | EEPROM read and write error  | EEPROM fault   | Ask the manufacturer for service                                       | 19 |
| EPLI | Output phase loss protection | Output U, V, W have phase loss   | Check output wiring  | 20 |
| EPAO | Tube failure                 | Voltage feedback is less than low voltage detection threshold or greater than or equal to high voltage detection threshold | Check the feedback wiring or adjust the high and low voltage threshold | 22 |

## Chapter 3 Communication protocol

### 1. RTU mode and format

When the controller communicates on the Modbus bus in RTU mode, every 8-bit byte in the message is divided into two 4-bit hexadecimal characters. The main advantage of this mode is that the density of the characters transmitted is higher than ASCII mode at the same baud rate, and each message must be transmitted continuously.

#### (1)Format of each byte in RTU mode

Program system: 8-bit binary, hexadecimal 0-9, A-F

Data bit: 1-bit start bit, 8-bit data (low bit sent first), stop bit occupies 1 bit, parity bit can be selected.

(Refer to RTU data frame as sequence diagram)

Error check area: cyclic redundancy check (CRC).

#### (2)RTU Data frame sequence diagram

With Parity Check

|       |   |   |   |   |   |   |   |   |     |      |
|-------|---|---|---|---|---|---|---|---|-----|------|
| Start | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Par | Stop |
|-------|---|---|---|---|---|---|---|---|-----|------|

No Parity Check

|       |   |   |   |   |   |   |   |   |      |
|-------|---|---|---|---|---|---|---|---|------|
| Start | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Stop |
|-------|---|---|---|---|---|---|---|---|------|

### 2. Description of reading and writing

| Function Code | Function Description |
|---------------|----------------------|
| 03            | Read Register        |
| 06            | Write Register       |

### 3. Address of the Register

| Function of the register                | Address     |
|---|-------------|
| Control Command Input                   | 2000H       |
| Monitoring parameter reading(d-00~d-31) | 1000H~001FH |
| Communication frequency setting         | 2001H       |
| User parameter setting(F0.00~F8.06)     | 0000H~0806H |
| Factory parameter setting(F9.00~F9.10)  | 0900H~090AH |

**4. Address description of communication protocol Parameter:**

| Function description                          | Address definition | Description of data significance  | R/W |
|---|--------------------|---|-----|
| Communication control command                 | 2000H              | 0001H: halt   | W   |
|   |                    | 0012H: normal operation   |     |
|   |                    | 0013H: Normal jog operation   |     |
|   |                    | 0022H: Reverse operation  |     |
|   |                    | 0023H: reverse jog operation  |     |
| Communication setting frequency address       | 2001H              | The communication setting frequency range is - 10000~10000.<br>Note: The communication set frequency is a percentage of the maximum frequency, and its range is - 100.00%~100.00%). | W   |
| Communication control command                 | 2002H              | 0001H: External fault input   | W   |
| Read operation/shutdown parameter description | 2102H              | Set frequency (two decimal places)  | R   |
|   | 2103H              | Output frequency (two decimal places)   | R   |
|   | 2104H              | Output current (one decimal place)  | R   |
|   | 2105H              | Bus voltage (one decimal place)   | R   |
|   | 2106H              | Output voltage (one decimal place)  | R   |
|   | 2107H              | Analog input AI(two decimal places)   | R   |
|   | 2108H              | Reserved  | R   |
|   | 2109H              | Current Count Value   | R   |
|   | 210AH              | Motor Speed   | R   |
|   | 210BH              | Analog Output AO (two decimal places)   | R   |
|   | 210CH              | Reserved  | R   |
|   | 210DH              | Temperature of the Inverter(one decimal place)  | R   |
|   | 210EH              | PID feedback value(two decimal places)  | R   |
|   | 210FH              | PID set point ( two decimal places)   | R   |
|   | 2110H              | Reserved  | R   |
|   | 2111H              | pulse input frequency   | R   |
|   | 2112H              | Current fault   | R   |
|   | 2113H              | Current timing value  | R   |
|   | 2114H              | Input terminal status   | R   |
|   | 2115H              | Output terminal status  | R   |

|                             |       |  |   |
|-----------------------------|-------|--|---|
|                             | 2116H | BIT0: operation/shutdown<br>BIT1: forward/reverse<br>BIT2: Jog<br>BIT3: DC braking<br>BIT4: Reserved<br>BIT5: overvoltage limit<br>BIT6: Constant speed frequency reduction<br>BIT7: overcurrent limit<br>BIT8~9:00 - zero speed/01 - acceleration/10 - deceleration/11 - constant speed<br>BIT10: overload pre-alarm<br>BIT11: Reserved<br>BIT12~13 operation command channel:<br>00-panel/01-terminal/10-communication<br>BIT14~15 bus voltage status: 00 - normal/01 - low voltage protection/10 - overvoltage protection | R |
|                             | 2101H | Bit0: running<br>Bit1: shutdown<br>Bit2: Jog<br>Bit3: forward rotation<br>Bit4: Reverse<br>Bit5 ~ Bit7: reserved<br>Bit8: Communication given<br>Bit9: analog signal input<br>Bit10: communication operation command channel<br>Bit11: parameter locking<br>Bit12: running<br>Bit13: jog command<br>Bit14 ~ Bit15: R reserved  | R |
| Read fault code description | 2100H | 00: No abnormality<br>01: Module fault<br>02: Overvoltage<br>03: Temperature fault<br>04: Inverter overload<br>05: Motor overload<br>06: External fault<br>07~09: Reserved<br>10: Overcurrent during acceleration<br>11: Overcurrent during deceleration<br>12: Overcurrent at constant speed<br>13: Reserved<br>14: Under voltage<br>15: Reserved<br>16: RS485 communication failure<br>17: Tube explosion fault<br>18: Reserved<br>19: Dual CPU communication failure<br>20: Reserved<br>21: Reserved                      | R |

|  |  |  |  |
|--|--|--|--|
|  |  | 22: Current detection fault<br>23: Reserved<br>24: Reserved<br>25: Output phase loss |  |
|--|--|--|--|

### 5. 03 Reading function mode:

Inquiry information frame format:

|                       |     |
|-----------------------|-----|
| Address               | 01H |
| Function              | 03H |
| Starting data address | 21H |
|                       | 02H |
| Data(2Byte)           | 00H |
|                       | 02H |
| CRC CHK Low           | 6FH |
| CRC CHK High          | F7H |

Data Analysis:

01H address of the inverter  
03H reading function code  
2102H starting address  
0002H numbers of the reading address, and 2102H & 2103H  
F76FH 16bit CRC check code

Response information frame format:

|              |     |
|--------------|-----|
| Address      | 01H |
| Function     | 03H |
| DataNum*2    | 04H |
| Data1[2Byte] | 17H |
|              | 70H |
| Data2[2Byte] | 00H |
|              | 00H |
| CRC CHK Low  | FEH |
| CRC CHK High | 5CH |

Data Analysis:

01H address of the inverter  
03H Read Function Code  
04H Product of Read Items x2  
1770H Data of reading 2102H(set frequency)  
0000H Data of reading 2103H (output frequency)  
5CFEH 16-bit CRC check code

**6. 06H Writing Function Mode:**

Inquiry information frame format:

|                       |     |
|-----------------------|-----|
| Address               | 01H |
| Function              | 06H |
| Starting data address | 20H |
|                       | 00H |
| Data(2Byte)           | 00H |
|                       | 01H |
| CRC CHK Low           | 43H |
| CRC CHK High          | CAH |

Data Analysis:

01H address of the inverter  
 06H writing function code  
 2000H address of control order  
 0001H stop command  
 43CAH 16-bit CRC check code

Response information frame format

|                       |     |
|-----------------------|-----|
| Address               | 01H |
| Function              | 06H |
| Starting data address | 20H |
|                       | 00H |
| Number of Data(Byte)  | 00H |
|                       | 01H |
| CRC CHK Low           | 43H |
| CRC CHK High          | CAH |

**Data Analysis:** If the setting is correct, the same input data is returned.