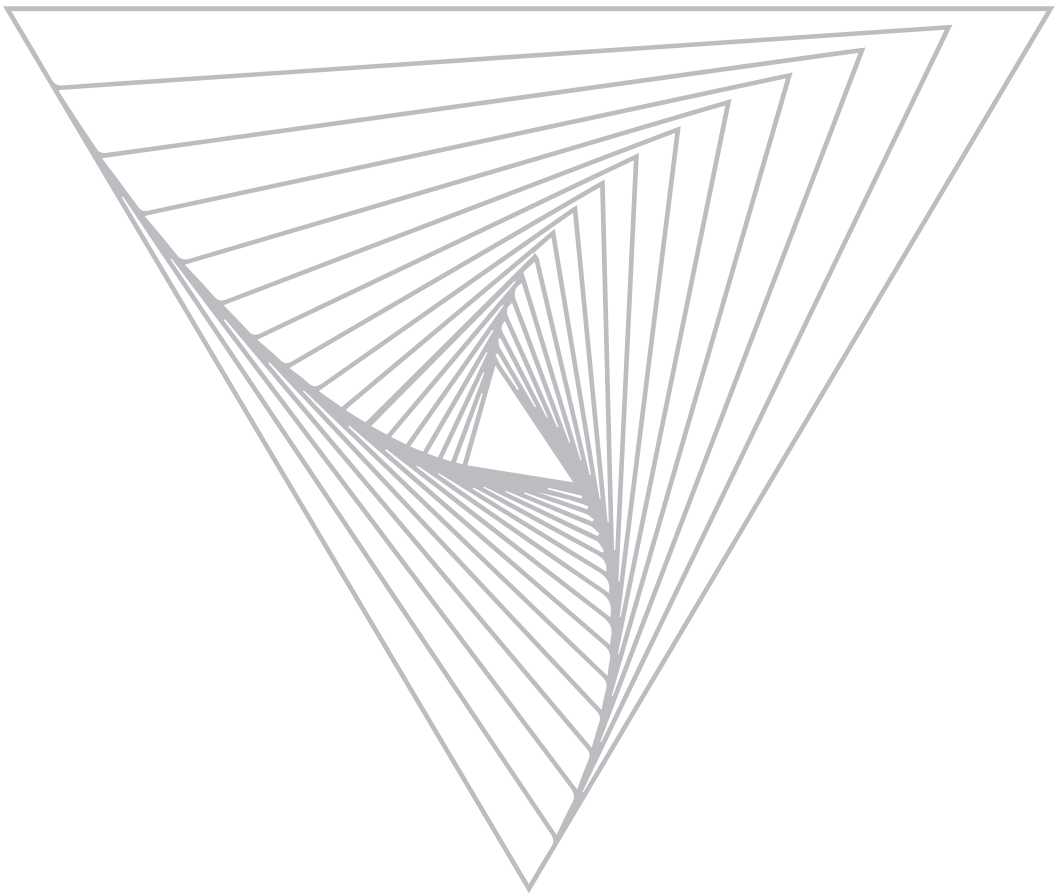
# 980 Series
# User Manual



High protection vector control inverter

# Contents

# Chapter 1 Safety Information and Precautions

## 1.1 Safety Information

Please read this chapter carefully while installing and commissioning the inverter and be sure to follow the safety precautions required in this chapter. We will assume no liability or responsibility for any injury or loss caused by improper operation.

In this manual, safety precautions are classified into the following two categories：

| | | | |
|---|---|---|---|
|  Danger | Indicates there is a risk of electric shock, which may cause equipment damage or personal injury if not avoided. |  Warning | Indicates potential risks, which could result in equipment damage or property loss if not avoided |

| | |
|---|---|
|  Danger | ★Do not install the equipment if you find water seepage, component missing or damage upon unpacking！ |
| | ★Do not use the strip to supply power to the inverter. |
| | ★Do not conduct any high voltage insulation and withstand voltage test. |
| | ★Before touching the inverter, disconnect the power supply; After power off, terminal and internal will exist high pressure for ten minutes, during when don't touch any input/output terminals. |
| | ★Rotating motor may feed electrical energy back to the inverter, before touching it, please ensure that the motor has stopped, or disconnected with the inverter. |
| | ★Before connecting the cable, make sure there is no voltage at the power terminal. |
| | ★Ground the inverter as standard. The ground wire must be able to withstand the maximum fault current limited by the fuse or circuit breaker. |
|  Warning | ▲Handle the equipment with care during transportation. |
| | ▲Keep away from combustibles and electrical conductors. |
| | ▲Inverters are best used indoors, IP20 inverters must be installed in a level 2 pollution environment or in the cabinet of the IP54 and higher level of protection. |
| | ▲Ensure adequate heat dissipation while installing the inverter and do not drill holes near it, for drilling dust and metal debris could fall into |

| | |
|---|---|
| | the inverter, which may lead to danger. |
| | ▲Do not drop wire end or screw into the inverter. |
| | ▲Never connect the power cables to the output terminals (U, V, W) of the inverter. |
| | ▲Never connect the braking resistor between the DC bus terminals DC+ and DC-. |
| | ▲Do not install any automatic control device between the inverter and the motor. |
| | ▲When the control cable is near the power line, keep a minimum spacing of 100 mm and arrange a 90-degree crossover. Make sure all the terminals have been fastened using the appropriate torque. |
| | ▲If the enable input signal is valid, the driven motor may start directly after being powered on. |
| | ▲Ensure that the supply voltage, frequency and phase are in accordance with the inverter rating. |
| | ▲When motor autotune, pay attention that the motor may rotate, which may cause danger. |
| | ▲The inverter can control the motor to run above or below the rated speed. When needing the motor to run overrated speed, you can confirm whether it is feasible with motor manufacturers. |
| | ▲Do not power on or off the inverter frequently, which may be easy to shorten its service life. Please power on again ten minutes after power off. |
| | ▲In the area with an altitude of more than 1000m, derating is required. |
| | ▲Do not try to repair the inverter when errors and faults occur. Contact us for more help. |

## 1.2 General Precautions

**1. Motor Insulation Test**

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the inverter. The motor must be disconnected from the inverter during the insulation test. A 500V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.

**2. Thermal Protection of Motor**

If the rated capacity of the motor selected does not match that of the inverter,

especially when the inverter's rated power is greater than the motor's, adjust the motor protection parameters on the operation panel of the Inverter or install a thermal relay in the motor circuit for protection.

**3. Running at Over 50 Hz**

The inverter provides frequency output of 0 to 500 Hz. If the inverter is required to run at over 50 Hz, consider the capacity of the mechanical devices.

**4. Vibration of Mechanical Device**

The inverter may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

**5.Motor Heat and Noise**

The output of the inverter is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those when the inverter runs at grid power (50 Hz).

**6.Varistor or capacitor on output side of the Inverter**

Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the inverter because the output of the inverter is PWM wave. Otherwise, the inverter may suffer transient over-current or even be damaged.

**7.Contactor at the I/O Terminal of the Inverter**

When a contactor is installed between the input side of the inverter and the power supply, the inverter must not be started or stopped by switching the contactor on or off. If the inverter has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the inverter.

When a contactor is installed between the output side of the inverter and the motor, do not turn off the contactor when the inverter is active. Otherwise, modules inside the inverter may be damaged.

**8.When External Voltage is Out of Rated Voltage Range**

The inverter must not be used outside the allowable voltage range specified in this manual. Otherwise, the inverter's components may be damaged. If required, use a corresponding voltage step-up or step-down device.

**9.Prohibition of Three-phase Input Changed into Two-phase Input**

Do not change the three-phase input of the inverter into two-phase input. Otherwise, a fault will result in, or the inverter will be damaged.

**10.Lightning Shock Protection**

The inverter has a built-in lightning overcurrent protection device, it has certain self-protection ability for inductive lightning. But user should also install lightning

protection device at the front end of the inverters in frequent lightning area.

**11.Temperature and De-rating**

The regular using temperature of this inverter is -10℃- +40℃. De-rating using is required when temperature is more than 40℃. De-rating by 1.5% for every degree increase in ambient temperature. The highest ambient temperature is 50℃.

**12.Altitude and De-rating**

In places where the altitude is above 1000m and the cooling effect reduces due to thin air, it is necessary to de-rate the inverter. When the altitude is above 1000m, de-rating by 1% for 100m increase in altitude. The highest altitude is 3000m.

**13.Some Special Usage**

If the user needs to use a method other than the recommended wiring diagram in this manual, such as shared DC bus, please consult us.

**14.Scrap**

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Please treat them as industrial waste.

**15.About Adaptable Motor**

• The default setting of this inverter is for the 4-pole cage asynchronous induction motors. For other types of motors, select proper parameters in the inverter.

• The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.

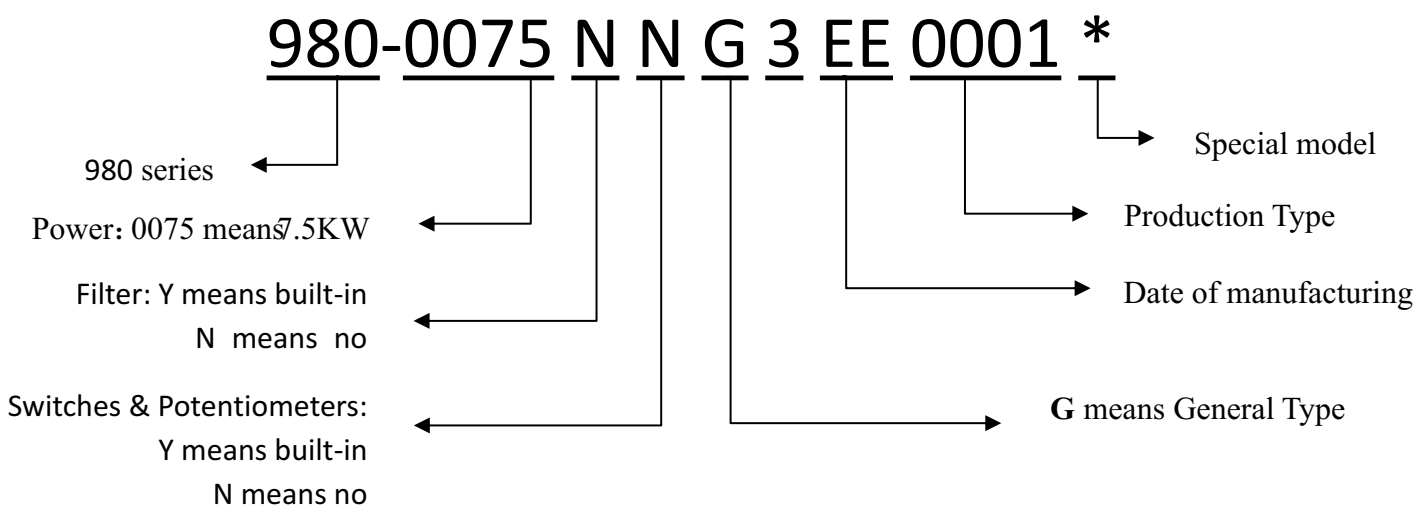
• The standard parameters of the adaptable motor have been configured inside the inverter. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.

• The inverter may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the inverter is disconnected from the tested parts.

# Chapter 2 Product Information

Our inverters have been tested and inspected before leaving our factory. Before unpacking the product, please check product packaging for shipping damage caused by careless transportation and whether the specifications and type of the product complies with the order. If there is any question, please contact the supplier of the products, or directly contact us.

## 2.1 Products Nameplate




## 2.2 Products Model Number

980 General type Inverter Model

| Single Phase Input： 200~240V±10%， 50/60Hz | | | | |
|---|---|---|---|---|
| Inverter Model | Adapted motor | | Rated output current(A) | Frame |
| | KW | HP | | |
| 980-0007G1 | 0.75 | 1 | 4 | A01 |
| 980-0015G1 | 1.5 | 2 | 7 | A01 |
| 980-0022G1 | 2.2 | 3 | 10 | A01 |
| 980-0040G1 | 4.0 | 5 | 18 | A01 |
| **Three Phase Input： 380~480V±10%， 50/60Hz** | | | | |
| Inverter Model | Adapted motor | | Rated output Current(A) | Frame |
| | KW | HP | | |
| 980-0007G3 | 0.75 | 1 | 2.5 | A01 |
| 980-0015G3 | 1.5 | 2 | 3.7 | A01 |

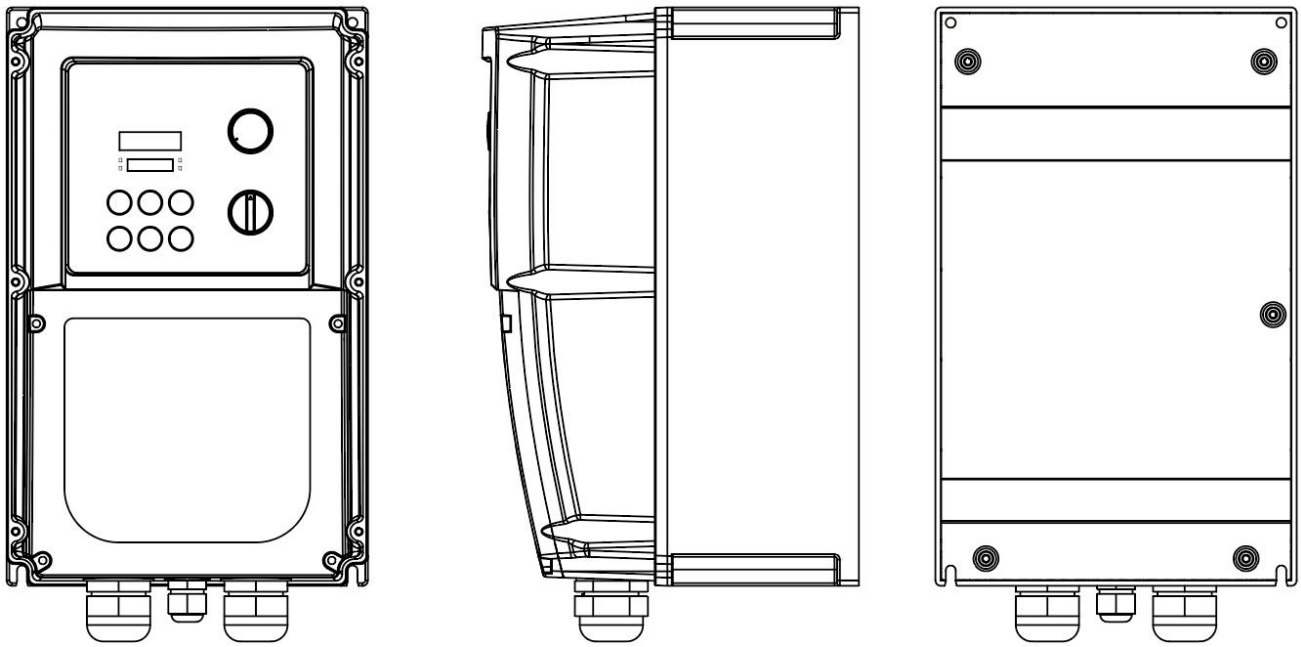
| Single Phase Input：200~240V±10%，50/60Hz | | | | |
|---|---|---|---|---|
| Inverter Model | Adapted motor | | Rated output current(A) | Frame |
| | KW | HP | | |
| 980-0022G3 | 2.2 | 3 | 5.1 | A01 |
| 980-0040G3 | 4 | 5 | 9.0 | A01 |
| 980-0055G3 | 5.5 | 7.5 | 13 | A02 |
| 980-0075G3 | 7.5 | 10 | 16 | A02 |
| 980-0110G3 | 11 | 15 | 25 | A03 |
| 980-0150G3 | 15 | 20 | 32 | A03 |

## 2.3 Products Dimensions

| No. | Power | Dimension(mm) | | | Installation Size(mm) | | Hole Φ |
|---|---|---|---|---|---|---|---|
| | | H | W | D | H1 | W1 | |
| A00 | 0.75~2.2KW/220V<br>0.75~2.2KW/380V | 145.5 | 162 | 71.5 | 128 | 162 | 5mm |
| A01 | 4.0KW/380V<br>4.0KW/220V | 255.1 | 127 | 155.22 | 222 | 113 | 5mm |
| A02 | 5.5~7.5KW | 285.75 | 155 | 174 | 248.8 | 137.8 | 5mm |
| A03 | 11-15KW | 350.80 | 200 | 208.48 | 320 | 183 | 5mm |

*Due to Product upgrade, size update without prior notice, Consult staff for details.

## 2.4 Product Appearance



980 Exterior View

## 2.5 Technical Specifications

| Item | | Specifications |
|---|---|---|
| Basic Functions | Maximum Frequency | Vector Control：0~500.0Hz V/F Control：0~500.0Hz |
| | Carrier Frequency | 0.5kHz~16kHz; the carrier frequency will be automatically adjusted according to the load characteristics. |
| | Input Frequency Resolution | Digital Setting： 0.1Hz<br>Analog Setting： 0.01V corresponding maximum frequency ×0.1% |
| | Control Mode | Open Loop Vector Control(SVC)； V/F Control |
| | Startup Torque | G Type：0.5Hz/150%(SVC)； P Type：0.5Hz/100% |
| Basic Functions | Speed Range and Precision | 1：100(SVC)；±0.5%(SVC) |
| | Overload Capability | G Type：150% rated current 60s ； 180% rated current 3s |
| | Torque Boost | 0.1%~30.0% |

| Item | | Specifications |
|---|---|---|
| | V/F Curve | Line Type、Square Type |
| | Acc. / dec Curve | Straight line or S curve acceleration and deceleration mode<br>Acceleration and deceleration time range between 0.0 to 500.0s. |
| | DC Brake | DC Brake Frequency：0.00Hz to maximum frequency. Brake time： 0.0s to 36.0s |
| | Multi-speed Running | It can realize at maximum of 8 segments speed running via the control terminal. |
| | Built-in PID | It is easy to realize process-controlled closed loop control system. |
| | Over-voltage/current Stall Control | It can limit the running voltage/current automatically and prevent frequent over-voltage/current tripping during the running process. |
| | Motor Over-temperature Protection | Acceptable motor temperature sensor input (PT100, PT1000) |
| | Timing Control | Timing control function：set time range 0.0~6500.0Min |
| | Bus Support | Support Site Bus：Modbus |
| | Protection Function | It can implement power-on motor short-circuit detection, output phase loss protection, over current protection, over voltage protection, under voltage protection, overheating protection and overload protection, which can be turned on or shielded as required. |
| Running | Running Command Source | Operation panel reference, control terminal reference, and communication reference |
| | Target Frequency Source | Digital reference, analog signal reference, multi-segment speed reference, PI control reference, and communication reference |
| | Control Signal Input Terminal | 2 digital input；<br>1 analog input ,support 0~10V、4~20mA、0~20mA signal |
| | Control Signal Output Terminal | 2 relay output<br>1 analog output ,support 0~10V、4~20mA、0~20mAsignal |

| Item | | Specifications |
|---|---|---|
| Environment | Using Place | Indoor, and be free from direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapor, drip or salt. |
| | Altitude | 0~4000m；Derating use when more than 1000m (decrease by 1% per 100 meters) |
| | Ambient Temperature | -10 ℃ to +40 ℃ (Derating use when under ambient temperature of 40 ℃ to 50 ℃) |
| | Humidity | Less than 95%RH, without condensing |
| | Vibration | Less than 5.9m/s (0.6g) |
| | Storge Temperature | －20℃~＋60℃ |
| | Power Distribution System | TN, TT |

# Chapter 3 Mechanical Installation and Electrical Installation

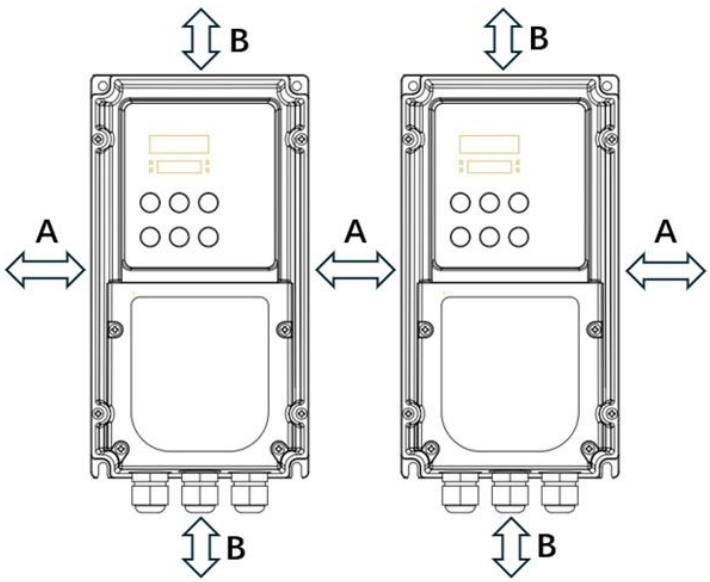
## 3.1 Mechanical Installation

### 3.1.1 Installation Environment Requirements

1) The inverter should be installed vertically and fixed on the mounting support or smooth plane with screws.
2) Ensure that the installation environment meets the environmental requirements in Section 2.5.
3) Keep away from combustibles and areas where water may drench and have enough space around it for heat dissipation.

### 3.1.2 Installation Clearance Requirements

The 980 series inverter has different requirements for surrounding installation space reservation according to the power level, as shown in the following figure:




Installation space requirements for each power level of the 980 series:：

| Power Class | Clearance Requirements(mm) | |
|---|---|---|
| 0.75kW~22kW | A≥10 | B≥200 |
| 30kW~37kW | A≥50 | B≥200 |
| 45kW~110kW | A≥50 | B≥300 |

980 series inverter heat dissipation from the bottom up, when multiple frequency converters work, usually side by side installation. In the case of up-down installation, because the heat of the down-down inverter will cause the temperature of the up-drain equipment to rise and cause the fault, countermeasures such as the installation of heat insulation deflector should be taken.

### 3.1.3 Routine Maintenance

（1） Environmental temperature must be kept within the limits set out in Section 2.5.

（2） The radiator fan must rotate easily and be free from dust.

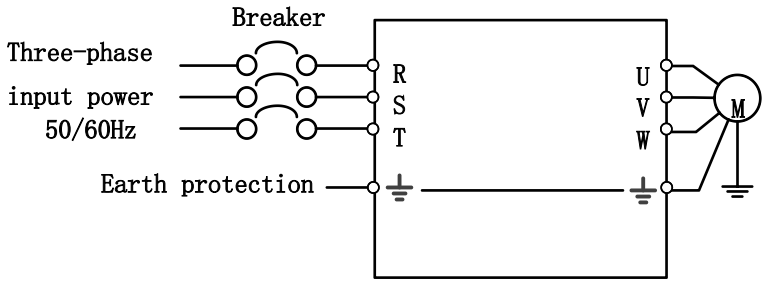
（3） The cabinet in which the inverter is installed should be free of dust and condensation, and the ventilation fan and air filter should work properly to ensure adequate airflow.

## 3.2 Electrical Installation

### 3.2.1 Inverter Main Loop Terminal

| Mark | Terminal Name | Function Description |
|---|---|---|
| R、S、T | Three Phase Power Input Terminal | AC input three-phase power connection point, for single phase inverter, connect R、S terminal. |
| U、V、W | Inverter Output Terminal | Connect three phase motors. |
| ⏚ | Earth Terminal PE | Earth Terminal |

### 3.2.2 Caution of Power Terminal Wiring




All external power wiring needs to be sized and installed in a manner that complies with local codes and relevant IEC standards.

Please refer to the following table for power cable wiring:

| Inverter Model | | Recommended Breaker Specifications | Recommended Contactor Specification | Recommended Input Power Cable (㎡) | Recommended Motor Cable(㎡) | Recommended Control Cable(㎡) |
|---|---|---|---|---|---|---|
| Single Phase 220V | 0.75KW | 16 | 10 | 2.5 | 2.5 | 1.5 |
| | 1.5KW | 20 | 16 | 4 | 2.5 | 1.5 |
| | 2.2KW | 32 | 20 | 6 | 4 | 1.5 |
| Three Phase 380V | 0.75KW | 10 | 10 | 2.5 | 2.5 | 1.5 |
| | 1.5KW | 16 | 10 | 2.5 | 2.5 | 1.5 |
| | 2.2KW | 16 | 10 | 2.5 | 2.5 | 1.5 |
| | 4KW | 25 | 16 | 4 | 4 | 1.5 |
| | 5.5KW | 32 | 25 | 6 | 6 | 1.5 |
| | 7.5KW | 40 | 32 | 6 | 6 | 1.5 |

Caution of terminal wiring:

1. Inverter input side:

▲ Three-phase power supply should be connected to R, S, T terminal, do not have to consider the phase sequence; Single-phase power supply (220V model) should be connected to the R and S terminal.

▲ Proper protection devices installed on input and distribution lines should comply with local safety regulations.

▲ Protection can be provided by installing a suitable fuse at the power supply entry line. Fuses used must comply with local regulations.

▲ Residual high voltage exists at terminals of DC bus DC+ and DC- after power off. Therefore, power off for 10 minutes before wiring.

2. Inverter output side:

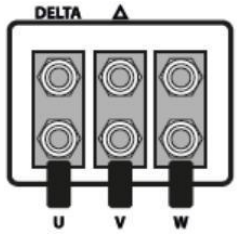
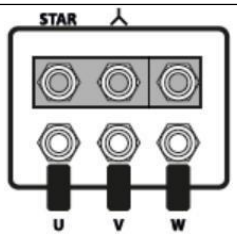
▲ Capacitor or surge absorber cannot be connected to the output side of the inverter, Otherwise, inverter protection or even damage will be caused.

▲ The selection of brake resistance should refer to the recommended value, and the wiring distance should be less than 5m.

▲ When the length of motor cable is more than 100m, AC output reactor should be installed near the inverter.

▲ In order to reduce the interference of inverter output to other equipment, it is recommended to use shielded cable for motor cable.

▲ Motor terminal box connection: Most general-purpose motors can operate at dual voltages, as indicated on the motor nameplate. The operating voltage of the motor is usually selected when the motor is installed, star connection or angle connection. The star connection is usually the one with the highest voltage rating.

| Motor Input Voltage | Motor Nameplate Voltage | Motor Wiring Mode | |
|---|---|---|---|
| 230 VAC | 230/400 VAC | Delta |   |
| 400 VAC | 400/690 VAC | | |
| 400 VAC | 230/400 VAC | Star |   |

### 3.2.3 Description of Control Terminals

Schematic diagram of the 980 series control circuit terminals:

| T1A | T1B | T2A | T2B | T2C | DI3 | DI4 | COM | 24V | AI1 | AO1 | 10V | S+ | S- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

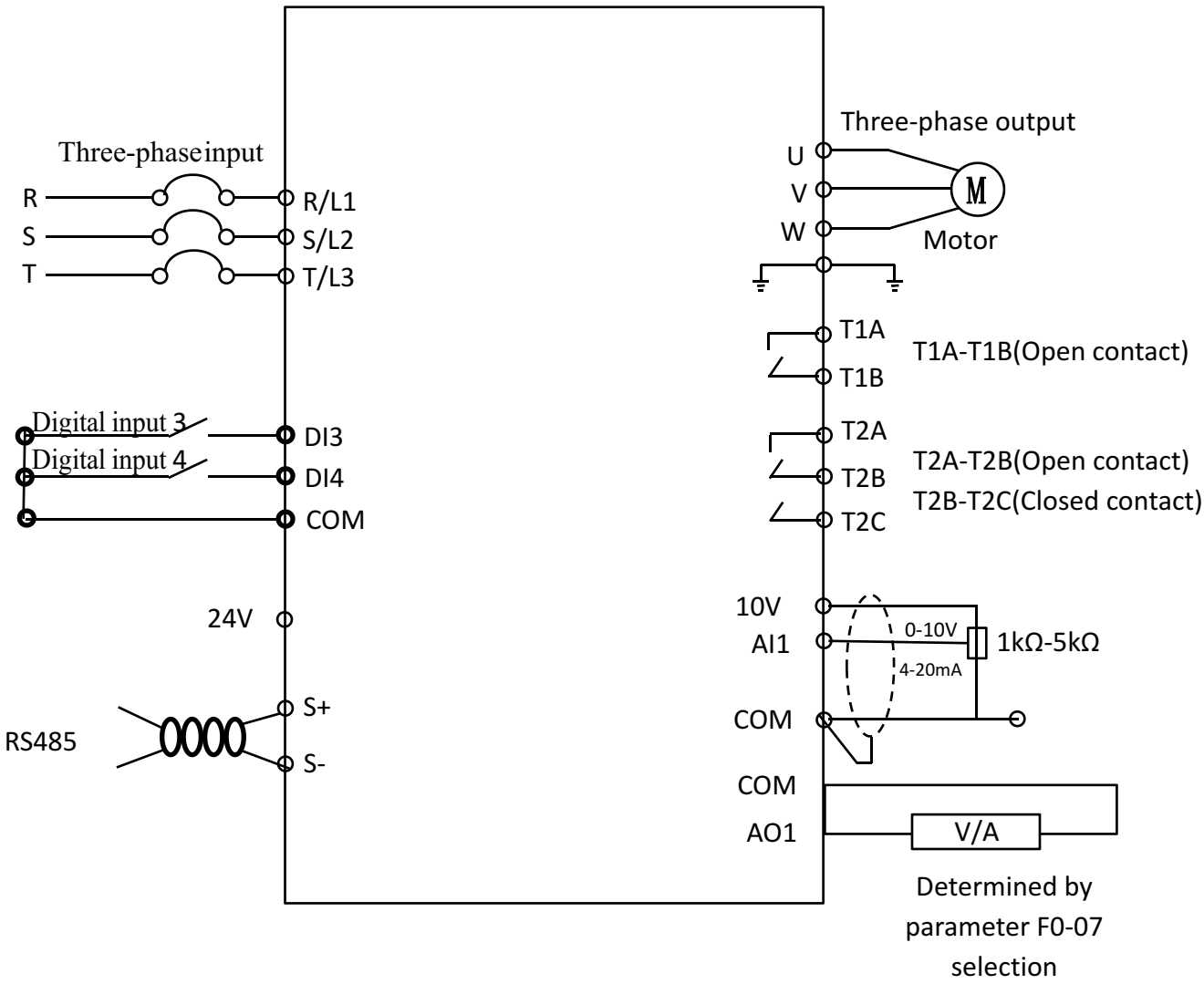
| 5V | 0V | RX | TX |
|---|---|---|---|

Control Terminals Description:

| Type | Terminal | Terminal Name | Function Description |
|---|---|---|---|
| Power Output | +10V-COM | Terminal of 10V power output | Provide +10V power supply for external units, with maximum output current of 10mA.<br>It is generally used as the operating power supply for the external potentiometer.<br>The potentiometer resistance range is 1-5kΩ. |
| Analog Input | AI1-COM | Analog input terminal 1 | F0-07 set voltage and current mode. |
| Digital Input | DI3-COM | Digital Input 3 | Optical coupling isolation， bipolar input. |
| | DI4-COM | Digital Input 4 | |
| Analog Output | AO1-COM | Analog output | F0-07 set voltage and current mode. |
| Relay Output | T1A-T1B | Normally open | Contact driving capacity：250Vac，3A；30Vdc, 1A |
| | T2A-T2B | Normally open | |
| | T2B-T2C | Normally closed | |
| 485 Communication Interface | S+/S- | 485 communication interface | Respectively are the positive end of 485 differential signal and the negative end of 485 differential signal (reference ground: GND). Standard 485 communication interface, please use twisted pair or shielded cable. |
| Copy Keyboard Interface | 5V-0V-RX-TX | Copy Keyboard Interface | For connecting a copy keyboard |

## 3.2.4 Terminal Wiring Diagram

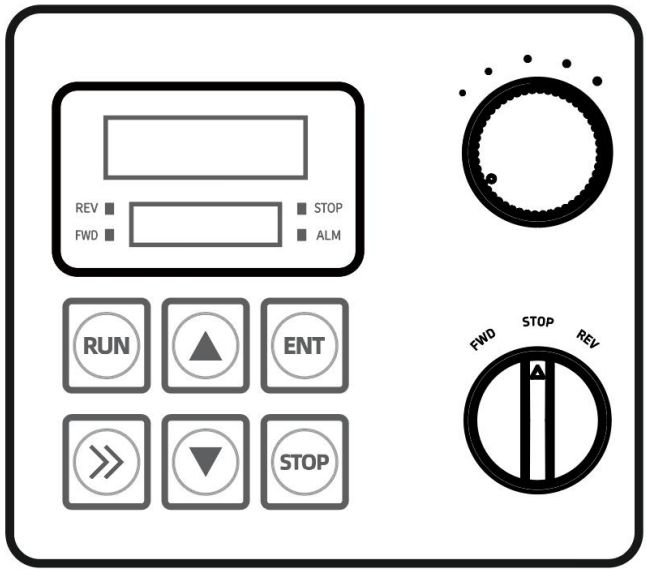
980 Series General Purpose 3-Phase 380V Terminal Wiring DiSgram:



# Chapter 4 Keypad and Display Operation

## 4.1 Introduction to the 980G Keyboard

The operation panel, which can be used to modify the functional parameters of the inverter, monitor the working status of the inverter and control the operation of the inverter (start and stop), is shown in the following figure:




Operation Panel Diagram (General Type)

## 4.2 General Type Keyboard Function Description

| Key Sign | Name | Function Description |
|---|---|---|
| ENT | Program/Enter | Long press for 3 seconds to enter or exit the menu<br>Short press to read or write parameters |
| ▲ | Increase | Increment and decrement of data or function codes<br>Multi-function key function can be set by F0-19 when both keys are pressed at the same time (only available for 6-key panels). |
| ▼ | Decrease | Decrement and increment of data or function codes<br>Multi-function key function can be set by F0-19 when both keys are pressed at the same time (only available for 6-key panels). |

| | | |
|---|---|---|
| >> | Shift | Select the parameter modification and display content. |
| RUN | Run | Panel start. |
| STOP | Stop/Reset | Stop/reset operation. |

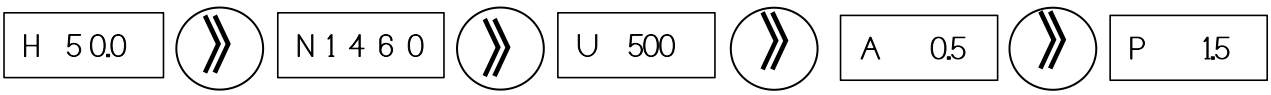
## 4.3 General Type Panel Operation

（1） Running and stopping

The default mode is the panel control mode (parameter F0-00 = 0). The Run key run the inverter and the STOP key controls the inverter to stop. When the inverter is running, the main interface display frequency value; When the inverter stops, the frequency value flashes.

（2） Switching running interface

When the inverter is running, the screen displays the main interface by default. At this time, press the ">>" key, and the screen will switch among various operating interfaces, starting with the output frequency, and then displaying the motor speed, output voltage, output current and output power in turn. Examples are shown in the following figure.

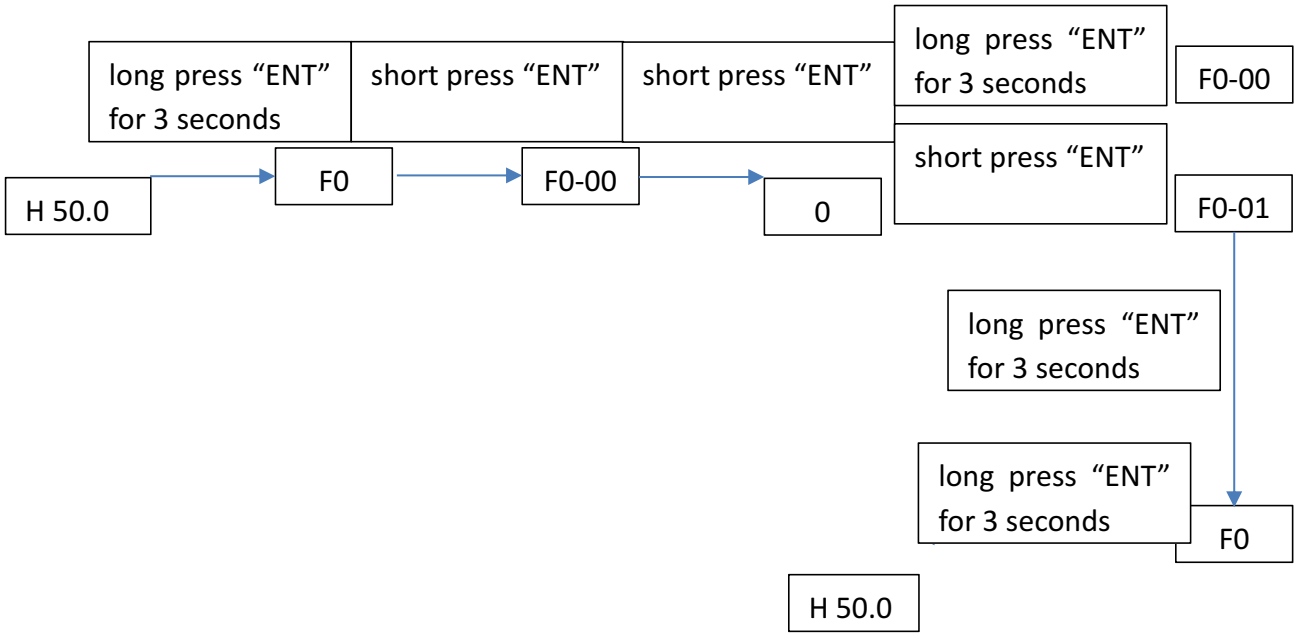



（3） Parameter Interface

When the inverter displays the main interface, long press “ENT” for 3 seconds, it will enter the first level menu interface, after that, you can select the parameter you want to access through “▼/read-only ” in the first level menu interface; short press “ENT”, it will enter the second level menu interface from the first level menu interface, at this time, you can query or modify the value of the parameter.”, it will enter the second level menu interface from the first level menu interface, at this time, you can query or modify the value of the parameter.

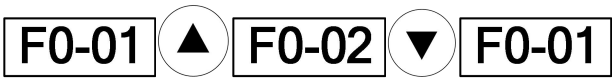
When the inverter displays the secondary menu interface, long press “ENT” for 3 seconds or short press “ENT” can return to the secondary menu interface, but long press “ENT” for 3 seconds will not save the modified parameters, only short press “ENT” will save the parameters. However, long press “ENT” for 3 seconds will not save the modified parameters, only short press “ENT” can save the parameters. When the inverter displays the first level menu interface, long press “ENT” for 3 seconds can

return to the main interface.

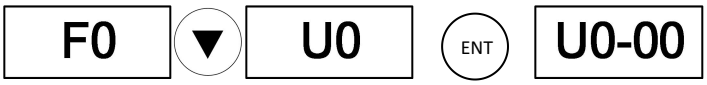



（4） Selection of parameters

When the second-level menu interface is displayed, press "Up" or "Down" to switch the parameters you want to access.




The inverter also has monitoring parameters. The way to view them is to find U0 in the first-level menu interface, and then press "ENTER" to enter the monitoring parameter access interface.




（5） Reset parameters

The parameter F0-24 of 980 series inverter can be used to reset the parameter, the default value of F0-24 is 0, change it to 1 and press “ENT” briefly to reset the parameter to the factory default value.

# Chapter 5 Parameters

## 5.1 Parameters Overview

| Function Code | Name | Function Code | Name |
|---|---|---|---|
| **F0-00** | Command source selection | **F0-13** | Carrier frequency |
| **F0-01** | Main frequency source selection | **F0-14** | Running direction |
| **F0-02** | Auxiliary frequency source selection | **F0-15** | Speed tracking start |
| **F0-03** | Frequency source selection | **F0-16** | Preset frequency |
| **F0-04** | Acceleration time | **F0-17** | Running action frequency below lower limit frequency |
| **F0-05** | Deceleration time | **F0-18** | Command source & frequency source binding |
| **F0-06** | DC output selection | **F0-19** | Reserved |
| **F0-07** | Analog input/output signal format | **F0-20** | STOP key function |
| **F0-08** | Halt mode | **F0-21** | Jog running frequency |
| **F0-09** | Upper limit frequency preset | **F0-22** | Jog acceleration time |
| **F0-10** | Lower limit frequency preset | **F0-23** | Jog deceleration time |
| **F0-11** | Torque boost | **F0-24** | Restore factory parameters |
| **F0-12** | Torque boost cut-off frequency | **F0-25** | Select display menu type |
| **Function Code** | **Name** | **Function Code** | **Name** |
| **F1-00** | DI1 terminal function selection | **F1-16** | Relay output current reaches 1 set value |
| **F1-01** | DI2 terminal function selection | **F1-17** | Relay output current reaches 1 bandwidth |
| **F1-02** | DI3 terminal function selection | **F1-18** | Relay output current reaches 2 set value |
| **F1-03** | DI4 terminal function selection | **F1-19** | Relay output current reaches 2 bandwidth |
| **F1-04** | DI filter time | **F1-20** | Relay1 output delay time |

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|---|---|---|---|
| **F1-05** | DI4~DI1 terminal valid mode selection | **F1-21** | Relay signal off delay time |
| **F1-06** | Terminal command mode | **F1-22** | DI1 terminal signal valid delay time |
| **F1-07** | Relay terminal valid state selection | **F1-23** | DI1 terminal signal invalid delay time |
| **F1-08** | Relay1 function selection | **F1-24** | AI1 gain |
| **F1-09** | Relay2 function selection | **F1-25** | AI1 offset |
| **F1-10** | Reserved | **F1-26** | Reserved |
| **F1-11** | Reserved | **F1-27** | Reserved |
| **F1-12** | Relay output frequency reaches 1 set value | **F1-28** | AO1 output function selection |
| **F1-13** | Relay output frequency reaches 1 bandwidth | **F1-29** | Reserved |
| **F1-14** | Relay output frequency reaches 2 set value | **F1-30** | AO1 gain |
| **F1-15** | Relay output frequency reaches 2 bandwidth | **F1-31** | AO1 offset |
| **Function Code** | **Name** | **Function Code** | **Name** |
| **F2-00** | V/F curve setting | **F2-11** | VF over-current stall action current |
| **F2-01** | Multi-point V/F frequency point 1 | **F2-12** | VF over-current stall enable |
| **F2-02** | Multi-point V/F voltage point 1 | **F2-13** | VF over-current stall inhibition gain |
| **F2-03** | Multi-point V/F frequency point 2 | **F2-14** | VF multiple over-current stall action current compensation coefficient |
| **F2-04** | Multi-point V/F voltage point 2 | **F2-15** | V/F over- magnetizing gain |
| **F2-05** | Multi-point V/F frequency point 3 | **F2-16** | VF over-voltage stall action voltage |
| **F2-06** | Multi-point V/F voltage point 3 | **F2-17** | VF over voltage stall enable |
| **F2-07** | Multi-point V/F frequency point 4 | **F2-18** | VF over-voltage stall suppression frequency gain |
| **F2-08** | Multi-point V/F voltage point 4 | **F2-19** | VF over-voltage stall |

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|---|---|---|---|
| | | | suppression voltage gain |
| **F2-09** | Multi-point V/F frequency point 5 | **F2-20** | Maximum frequency limit of over-voltage stall |
| **F2-10** | Multi-point V/F voltage point 5 | | |
| **Function code** | **Name** | **Function code** | **Name** |
| **F3-00** | Start frequency | **F3-14** | Skip frequency 1 |
| **F3-01** | Start frequency hold time | **F3-15** | Skip frequency bandwidth |
| **F3-02** | Start DC braking current | **F3-16** | Dead time of forward & reverse rotations |
| **F3-03** | Start DC braking time | **F3-17** | Reverse rotation control |
| **F3-04** | DC braking initial frequency at stop | **F3-18** | Brake utilization ratio |
| **F3-05** | DC braking waiting time at stop | **F3-19** | Brake chopper action voltage |
| **F3-06** | DC braking current at stop | **F3-20** | Speed tracking mode |
| **F3-07** | DC braking time at stop | **F3-21** | Speed tracking |
| **F3-08** | Acc./Dec. mode | **F3-22** | Speed tracking current loop Kp |
| **F3-09** | Time proportion of S-curve initial-segment | **F3-23** | Speed tracking current Ki |
| **F3-10** | Time proportion of S-curve end segment | **F3-24** | Speed tracking current value |
| **F3-11** | Acceleration time 2 | **F3-25** | Speed tracking current lower limit |
| **F3-12** | Deceleration time 2 | **F3-26** | Speed tracking voltage increasing time |
| **F3-13** | Acc. time1 & acc. time 2 frequency switching point | **F3-27** | Demagnetizing time |
| **Function code** | **Name** | **Function code** | **Name** |
| **F4-00** | Multi-segment command 0 frequency source | **F4-14** | PLC segment 1 running time |
| **F4-01** | Multi-reference 0 frequency | **F4-15** | PLC segment 1 acc./dec. time selection |
| **F4-02** | Multi-reference 1 frequency | **F4-16** | PLC segment 2 running time |

| | | | |
|---|---|---|---|
| **F4-03** | Multi-reference 2 frequency | **F4-17** | PLC segment 2 acc./dec. time selection |
| **F4-04** | Multi-reference 3 frequency | **F4-18** | PLC segment 3 running time |
| **F4-05** | Multi-reference 4 frequency | **F4-19** | PLC segment 3 acc./dec. time selection |
| **F4-06** | Multi-reference 5 frequency | **F4-20** | PLC segment 4 running time |
| **F4-07** | Multi-reference 6 frequency | **F4-21** | PLC segment 4 acc./dec. time selection |
| **F4-08** | Multi-reference 7 frequency | **F4-22** | PLC segment 5 running time |
| **F4-09** | PLC running mode | **F4-23** | PLC segment 5 acc./dec. time selection |
| **F4-10** | PLC power off save selection | **F4-24** | PLC segment 6 running time |
| **F4-11** | PLC running time unit | **F4-25** | PLC segment 6 acc./dec. time selection |
| **F4-12** | PLC segment 0 running time | **F4-26** | PLC segment 7 running time |
| **F4-13** | PLC segment 0 acc./dec. time selection | **F4-27** | PLC segment 7 acc./dec. time selection |
| **Function code** | **Name** | **Function code** | **Name** |
| **F5-00** | PID reference source | **F5-16** | Dormant dec. judging time |
| **F5-01** | PID reference value | **F5-17** | Wake up pressure |
| **F5-02** | PID feedback source | **F5-18** | Pressure upper limit |
| **F5-03** | PID action direction | **F5-19** | Water shortage detection time |
| **F5-04** | Acc. PID proportional gain Kp | **F5-20** | Water shortage detection frequency |
| **F5-05** | Acc. PID integral time Ki | **F5-21** | Water shortage detection current |
| **F5-06** | Dec. PID proportional gain Kp | **F5-22** | Water shortage detection pressure |
| **F5-07** | Dec. PID integral time Ki | **F5-23** | Water shortage restart time interval |
| **F5-08** | Sensor type | **F5-24** | Water shortage auto restart pressure |
| **F5-09** | Sensor scale | **F5-25** | Antifreezing function enable |
| **F5-10** | Sensor zero deviation | **F5-26** | Antifreezing running |

| | | | |
|---|---|---|---|
| | | | frequency |
| **F5-11** | Sensor full scale deviation | **F5-27** | Antifreezing running time |
| **F5-12** | Dormant frequency | **F5-28** | Antifreezing running period |
| **F5-13** | Dormant delay time | **F5-29** | Auto start enable |
| **F5-14** | Dormant pressure deviation | **F5-30** | Auto start delay time |
| **F5-15** | Dormant dec. frequency step | | |
| **Function code** | **Name** | **Function code** | **Name** |
| **F6-00** | Zero-level menu display data auto switching | **F6-15** | Start protection selection |
| **F6-01** | Parameters modify attribute | **F6-16** | Fault enable selection 1 |
| **F6-02** | LED2 display data selection (dual display reserved parameter) | **F6-17** | Fault enable selection 2 |
| **F6-03** | User password | **F6-18** | Fault auto reset times |
| **F6-04** | Setting accumulative power-on achieving time | **F6-19** | Fault auto reset interval time |
| **F6-05** | Regular running time | **F6-20** | Drop load protection selection |
| **F6-06** | Carrier frequency adjusting with temperature | **F6-21** | Drop load detection level |
| **F6-07** | Carrier frequency adjusting start temperature | **F6-22** | Drop load detection time |
| **F6-08** | Carrier frequency adjusting time | **F6-23** | Voltage sag function selection |
| **F6-09** | DPWM switching upper limit frequency | **F6-24** | Voltage sag judging voltage |
| **F6-10** | Excessive speed deviation detection value | **F6-25** | Voltage sag recovery judging tine |
| **F6-11** | Excessive speed deviation detection time | **F6-26** | Voltage sag action judging voltage |
| **F6-12** | Motor overload protection gain | **F6-27** | Voltage sag gain |
| **F6-13** | External temperature sensor type | **F6-28** | Voltage sag integral coefficient |
| **F6-14** | Overtemperature protection threshold | **F6-29** | Voltage sag action deceleration time |
| **Functio** | **Name** | **Functi** | **Name** |

| n code | | on code | |
|---|---|---|---|
| **F7-00** | Local address | **F7-02** | Data format |
| **F7-01** | Baud rate | **F7-03** | Communication timeout |

| Function code | Name | Function code | Name |
|---|---|---|---|
| **F8-00** | Motor rated power | **F8-10** | Torque set value |
| **F8-01** | Motor rated voltage | **F8-11** | Asynchronous motor stator resistance |
| **F8-02** | Motor rated current | **F8-12** | Asynchronous motor rotor resistance |
| **F8-03** | Motor rated frequency | **F8-13** | Asynchronous motor leakage inductance |
| **F8-04** | Motor rated speed | **F8-14** | Asynchronous motor mutual inductance reactance |
| **F8-05** | Permanent magnet motor back EMF coefficient | **F8-15** | Asynchronous motor no-load current |
| **F8-06** | Motor control mode | **F8-16** | Synchronous motor stator resistance |
| **F8-07** | Motor parameter self-detection | **F8-17** | Synchronous motor D-axis inductance |
| **F8-08** | Speed/torque control selection | **F8-18** | Synchronous motor Q-axis inductance |
| **F8-09** | Torque setting source selection | | |

| Function code | Name | Function code | Name |
|---|---|---|---|
| **F9-00** | High speed area switching frequency | **F9-19** | Flux weakening integral multiple |
| **F9-01** | Speed loop proportional gain at high speed | **F9-20** | Reserved |
| **F9-02** | Speed loop integral time of high-speed segment | **F9-21** | Maximum torque ratio current enable |
| **F9-03** | Low speed segment switching frequency | **F9-22** | Convexity gain coefficient |
| **F9-04** | Speed loop proportional gain at low speed | **F9-23** | Starting carrier frequency |

| | | | |
|---|---|---|---|
| **F9-05** | Speed loop integral time of low-speed segment | **F9-24** | SVC low-speed carrier frequency |
| **F9-06** | Velocity loop filtering time constant | **F9-25** | Low speed carrier frequency switching frequency |
| **F9-07** | Slip compensation coefficient | **F9-26** | Low-speed maximum excitation current |
| **F9-08** | Maximum output voltage coefficient | **F9-27** | Low-speed excitation current switching frequency |
| **F9-09** | Torque control forward maximum frequency | **F9-28** | Low-speed excitation current switching frequency bandwidth |
| **F9-10** | Torque control reverse maximum frequency | **F9-29** | Synchronous motor initial position detection mode |
| **F9-11** | Torque acceleration time | **F9-30** | Synchronous motor initial position identification current initial value |
| **F9-12** | Torque deceleration time | **F9-31** | Synchronous motor initial position compensation angle |
| **F9-13** | M-axis current loop KP | **F9-32** | Synchronous electrical sensing current |
| **F9-14** | M-axis current loop KI | **F9-33** | Synchronous motor back EMF identification initial current |
| **F9-15** | T-axis current loop KP | **F9-34** | Synchronous motor back EMF identification final current |
| **F9-16** | T-axis current loop KI | **F9-35** | Synchronous motor tuning current loop KP |
| **F9-17** | Synchronous motor flux weakening mode | **F9-36** | Synchronous motor tuning current loop Ki |
| **F9-18** | Synchronous motor flux weakening coefficient | | |

## 5.2 Parameters Description

### 5.2.1 F0 Parameter Group – Basic Parameters

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **F0-00** | Command Source Selection | 0 | 0 | 3 | - | Read/Write |
| | 0: Panel control. Press the RUN key of the inverter to run and press the STOP key to stop.<br>1: Terminal control. It is directly controlled by the inverter control terminal. By default, DI1 controls forward rotation and DI2 controls reverse rotation.<br>2. Communication control. It is controlled by Modbus RTU (RS485).<br>3.Reserved (without this parameter) | | | | | |
| **F0-01** | Main Frequency Source Selection | 0 | 1 | 9 | - | Run read-only |
| | 0: function code setting, power-off memory 1: panel potentiometer<br>2： AI1 3: reserved<br>4: Multi-segment command 5: PLC<br>6: Constant pressure water supply 7: General PID<br>8: Communication Settings<br>9: Reserved | | | | | |
| **F0-02** | Auxiliary Frequency Source Selection | 0 | 0 | 8 | - | Run read-only |
| | Same as F0-01 | | | | | |
| | | | | | | |
| **F0-03** | Frequency Source Selection | 00 | 00 | 34 | - | Read/Write |
| | Bit: frequency source selection<br>0: main frequency source<br>1: primary and secondary operation results (the operation relationship is determined by ten digits)<br>2. Switch between the main frequency source and the auxiliary frequency source<br>3. Switch between main frequency source and main and auxiliary operation results.<br>4. The auxiliary frequency source and the main and auxiliary operation results<br>Ten digits: the main and auxiliary operation relationship of frequency source.<br>0: Primary + Secondary<br>1: Primary - secondary<br>2: The maximum value of both<br>3: The minimum value of both | | | | | |
| **F0-04** | Acceleration Time | 0 | Depends | 500.0 | seco | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | on model | | nd | |
| | The acceleration time required for the inverter to accelerate from 0 Hz to the upper limit frequency (F0-09). | | | | | |
| **F0-05** | Deceleration Time | 0 | Depends on model | 500.0 | second | Read/Write |
| | The deceleration time required for the inverter to decelerate from the upper limit frequency (F0-09) to 0 Hz. | | | | | |
| **F0-06** | Control Terminal DC Output Selection | 0 | 2 | 2 | - | Run read-only |
| | 0：5V Output 5V DC voltage<br>1：10V Output voltage of 10V DC<br>2：24V Output DC 24V voltage | | | | | |
| **F0-07** | Analog Input and Output Signal Format | 0000 | 0002 | 1122 | - | Run read-only |
| | 0：0-10V 1：0-20mA 2：4-20mA 3: 20-4mA 4: 20-0mA 5:10-0V<br>Bit: AI1; Hundreds: AO1 | | | | | |
| **F0-08** | Stop Mode | 0 | 0 | 1 | - | Read/Write |
| | 0: Ramp to stop. After the shutdown command is effective, the inverter reduces the output frequency according to the deceleration time and stops after the frequency drops to 0.<br>1: Coast to stop. After the shutdown command is effective, the inverter immediately stops the output, and the motor stops freely according to the mechanical inertia. | | | | | |
| **F0-09** | Frequency Upper limit | F0-10 | 50.0 | 500.0 | Hz | Read/Write |
| | Inverter maximum output frequency | | | | | |
| **F0-10** | Frequency Lower limit | 0.0 | 0.0 | F0-09 | Hz | Read/Write |
| | Inverter minimum output frequency | | | | | |
| **F0-11** | Torque Boost | 0 | Depends on model | 30.0 | % | Read/Write |
| | Under the V/F control mode, the output torque of the motor is relatively low in low frequency operation, which can increase the value of this parameter; However, the torque boost setting is too large, the motor is easy to overheat, and the inverter is easy to overcurrent.<br>When the load is heavy and the starting torque of the motor is insufficient, it is recommended to increase this parameter. When the load is light, the torque can be reduced. | | | | | |
| **F0-12** | Torque Boost Cut-off | 0.0 | 50.0 | F8-03 | Hz | Run |

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|---|---|---|---|---|---|---|
| | Frequency | | | | | read-only |
| | Below this frequency, the torque boost is effective, and beyond this set frequency, the torque boost fails. | | | | | |
| **F0-13** | Switching Frequency | 1.0 | Depends on model | 16.0 | kHz | Read/Write |
| | This function adjusts the switching frequency of the inverter. When the switching frequency is low, the higher harmonic component of the output current increases, the motor loss increases, and the motor temperature rises. When the switching frequency is high, the motor loss decreases, the motor temperature rises, but the frequency is changed.<br>The loss of inverter increases, the temperature rise of inverter increases, and the interference increases. | | | | | |
| **F0-14** | Output Phase Sequence | 0 | 0 | 1 | - | Read/Write |
| | 0：U V W　　1：U W V<br>Changing this parameter can change the motor direction without changing the motor wiring.<br>Note: after the parameter is initialized, the parameter will return to the default value of 0, so be careful on some occasions where it is forbidden to change the motor direction. | | | | | |
| **F0-15** | Speed Tracking Start | 0 | 0 | 1 | - | Read/Write |
| | 0: Disable<br>1: Enable<br>When the inverter starts, there is a short time delay to detect the motor speed and control it from the current motor speed. | | | | | |
| **F0-16** | Preset Frequency | F0-10 | F8-03 | F0-09 | Hz | Read/Write |
| | When the target frequency setting mode is selected as "Digital Setting", this parameter sets the initial value for the target frequency of the inverter.<br>After the target frequency is modified by the "Up/Down" key, this parameter will become invalid temporarily, unless this parameter is modified again. | | | | | |
| **F0-17** | Low Frequency Action | 0 | 0 | 2 | - | Read/Write |
| | 0：Running at lower limit frequency<br>1：Stop<br>2：Zero-speed running<br>When the set frequency is below the lower limit frequency, the running state of the inverter can be selected by this parameter. | | | | | |
| **F0-18** | Command Source & | 0000 | 0000 | 9999 | - | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Source Binding | | | | | |
| | Bit: operation panel command binding frequency source selection<br>0: no binding<br>1: The up and down keys on the panel are given (the terminal UP/DOWN can be modified, and the power-off memory)<br>2: Panel potentiometer<br>3： AI1<br>4： Reserved<br>5: Multi-speed<br>6： PLC<br>7: Constant pressure water supply PID<br>8: General PID<br>9: Communication Settings<br>Ten bits: terminal command binding frequency source selection<br>Hundred bits: communication command binding frequency source selection<br>Define the binding combination between three running command channels and nine channels with given frequencies, which is convenient to realize synchronous switching. | | | | | |
| **F0-19** | Reserved | | | | | |
| **F0-20** | STOP Key Function | 0 | 1 | 1 | - | Read/Write |
| | 0: Only in keyboard operation mode, the stop function of it is effective.<br>1: Under any operation mode, the stop function of it is effective. | | | | | |
| **F0-21** | Jog Running Frequency | 0.0 | 2.0 | F0-09 | Hz | Read/Write |
| **F0-22** | Jog Acceleration Time | 0.0 | 20.0 | 6500.0 | second | Read/Write |
| **F0-23** | Jog Deceleration Time | 0.0 | 20.0 | 6500.0 | second | Read/Write |
| | F0-21-F0-23 defines the given frequency and acceleration and deceleration time of the inverter when jogging. | | | | | |
| **F0-24** | Reset to Factory Parameters | 0 | 0 | 65535 | - | Run read-only |
| | 1: Reset the factory settings. | | | | | |
| **F0-25** | Select the Display Menu Type. | 1 | 1 | 3 | - | Run read-only |
| | 1: Default menu<br>2: Only the parameters changed by the user are displayed.<br>3: Reserved | | | | | |

5.2.2 F1 Parameter Group – Terminal IO Function Selection

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F1-00** | DI1 Terminal Function Selection | 0 | 1 | 35 | - | Run read-only |
| | 0: No function<br>1: Forward running FWD<br>2: Reverse running REV<br>3: Three-wire mode running control<br>4: Two-wire/three-wire switching<br>5: Forward jog<br>6: Reverse jog<br>7: Fault reset<br>8: Multi-segment command terminal 1<br>9: Multi-segment command terminal 2<br>10: Multi-segment command terminal 3<br>11: External stop terminal, which is only valid for panel control.<br>12: Coast stop, that is, blocking PWM output.<br>13: External terminal shutdown (deceleration time 2, which is valid at any time)<br>14: Emergency stop<br>15: DC braking<br>16: Deceleration DC braking<br>17: External fault input (normally open)<br>18: External fault normally closed input<br>19: Running Command switch terminal 1<br>F0-00=1 or 2 is effective.<br>When F0-00=1, this terminal can perform external terminal and keyboard key switching.<br>When F0-00=2, this terminal can perform communication and keyboard key switching.<br>20: Command source switching terminal 2<br>Used for switching between external terminal control and communication command control; If the current state is set to external terminal control, when this terminal is valid, switch to communication command control and vice versa.<br>21: Terminal UP<br>22: Terminal DOWN<br>23: UP/DOWN setting is cleared.<br>24: Frequency source switching | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 25: Switch between the main frequency source and the preset frequency.<br>26: Switch between auxiliary frequency source and preset frequency.<br>27: Effective terminal for frequency setting.<br>28: Acceleration and deceleration are prohibited.<br>29: Acceleration and deceleration time selection terminal 1<br>30: PLC status reset<br>31: Speed control/torque control switching<br>32: Water shortage<br>33: Full of water<br>34: Secondary target pressure setting<br>35: Running pause | | | | | |
| **F1-01** | DI2 Terminal Function Selection | 0 | 2 | 35 | - | Run read-only |
| | Same as DI1. | | | | | |
| **F1-02** | DI3 Terminal Function Selection | 0 | 8 | 35 | - | Run read-only |
| | Same as DI1. | | | | | |
| **F1-03** | DI4 Terminal Function Selection | 0 | 9 | 35 | - | Run read-only |
| | Same as DI1. | | | | | |
| **F1-04** | Reserved | | | | | |
| **F1-05** | DI4-DI1 Terminal Effective Mode Selection | 00000 | 00000 | 11111 | - | Run read-only |
| | 0: The high level is active.<br>1: The low level is active.<br>Each of the five digits can only choose 0 or 1, which respectively correspond to the valid modes of DI1~4. They are:<br>Bit: DI1; Ten: DI2; Hundreds: DI3; Thousands: DI4 | | | | | |
| **F1-06** | Terminal Command Mode | 0 | 0 | 3 | - | Run read-only |
| | **0**: Two-wire mode 1 **1**: Two-wire mode 2 **2**: Three-wire mode 1 **3**: Three-wire mode 2 | | | | | |
| **F1-07** | DO Output Terminal Effective State Selection | 0000 | 0000 | 1111 | - | Read/Write |
| | 0: Positive logic 1. Negative logic Bit: Relay 1 Ten bits: Relay 2<br>Define the output logic of the output terminal. | | | | | |
| **F1-08** | Relay 1 Output | 0 | 1 | 21 | - | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Function Selection | | | | | |
| | The output terminal of each relay can provide 27 kinds of functions, these functions are:<br>**0: No function.**<br>**1. The inverter is running.** The inverter is in the running state, and when there is an output frequency (which can be zero), it outputs the ON signal.<br>**2: Inverter fault.** When the inverter fails and stops, it outputs the ON signal.<br>**3: Ready for running.** When the power supply of the main circuit and control circuit of the inverter is stable, and the inverter does not detect any fault information, and the inverter is in an operational state, the ON signal is output.<br>**4: The upper limit frequency arrives.** When the operating frequency reaches the upper limit frequency, the ON signal is output.<br>**5: The lower limit frequency arrives.** When the operating frequency reaches the lower limit frequency, the ON signal is output. This signal is OFF in the stop state.<br>**6: Torque limit.** In the speed control mode of the inverter, when the output torque reaches the torque limit, the inverter is in the stall protection state and outputs the ON signal at the same time.<br>**7. Communication control.** The relay output is controlled by Modbus RTU (RS485).<br>**8: Motor overload pre-alarm.** Output ON signal before motor overload protection action.<br>**9: Inverter overload pre-alarm.** Output the ON signal 10s before the overload protection of the inverter occurs.<br>**10: Timed time exceeded.** When the running time of the inverter reaches the set timing time (F6-05), it outputs the ON signal.<br>**11: The frequency reaches 1.** When the operating frequency of the inverter reaches the set value of F1-12, it outputs the ON signal.<br>**12: The frequency reaches 2.** When the operating frequency of the inverter reaches the set value of F1-14, it outputs the ON signal.<br>**13: The current reaches 1.** When the running current of the inverter reaches the set value of F1-16, it outputs the ON signal.<br>**14: The current reaches 2.** When the running current of the inverter reaches the set value of F1-18, the ON signal is output.<br>**15: AI1 input exceeds the upper or lower limits.**<br>**16~21: Reserved** | | | | | |
| **F1-09** | Relay 2 Output Function Selection | 0 | 2 | 21 | - | Read/Write |
| | Same as F1-08 | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **F1-10** | Reserved | | | | | |
| **F1-11** | Reserved | | | | | |
| **F1-12** | Relay Output Reaches Frequency Setting Value 1 | 0.0 | 50.0 | F0-09 | Hz | Read/Write |
| | Set value of frequency when relay output function is set to 11. Set the ratio based on the rated value. | | | | | |
| **F1-13** | Relay Output Reaches Frequency Bandwidth 1 | 0.0 | 0.0 | 100.0 | % | Read/Write |
| | When the output frequency of the inverter is within the positive and negative detection width of any set arrival frequency, the relay 1 outputs ON signal. | | | | | |
| **F1-14** | Relay Output Reaches Frequency Setting Value 2 | 0 | 50.0 | F0-09 | Hz | Read/Write |
| | Set value of frequency when relay output function is set to 12. Set the ratio based on the rated value. | | | | | |
| **F1-15** | Relay Output Reaches Frequency Bandwidth 2 | 0.0 | 0.0 | 100.0 | % | Read/Write |
| | When the output frequency of the inverter is within the positive and negative detection width of any set arrival frequency, the relay 2 outputs ON signal. | | | | | |
| **F1-16** | The Relay Output Reaches Current Set Value 1 | 0.0 | 100.0 | 300.0 | % | Read/Write |
| | Set value of frequency or current when relay output function is set to 13. Set the ratio based on the rated value. | | | | | |
| **F1-17** | Relay Output Reaches Current Bandwidth 2 | 0.0 | 0.0 | 300.0 | % | Read/Write |
| | When the output current of the inverter is within the set positive and negative detection width of any arrival current, the relay 1 outputs ON signal. | | | | | |
| **F1-18** | The Relay Output Reaches Current Set Value 2 | 0.0 | 100.0 | 300.0 | % | Read/Write |
| | Set value of frequency or current when relay output function is set to 14. Set the ratio based on the rated value. | | | | | |
| **F1-19** | Relay Output Reaches | 0.0 | 0.0 | 300.0 | % | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Bandwidth 2 | | | | | |
| | When the output current of the inverter is within the set positive and negative detection width of any arrival current, the relay 2 outputs ON signal. | | | | | |
| **F1-20** | Relay 1 Output Delay Time | 0.0 | 0.0 | 3600.0 | second | Read/Write |
| | Delay time of relay 1 from state change to actual output change. | | | | | |
| **F1-21** | Relay signal off delay time | 0.0 | 0.0 | 3600.0 | second | Read/Write |
| | Delay time from relay closure to actual output closure. | | | | | |
| **F1-22** | DI1 terminal signal valid delay time | 0.0 | 0.0 | 3600.0 | second | Read/Write |
| **F1-23** | DI1 terminal signal invalid delay time | 0.0 | 0.0 | 3600.0 | second | Read/Write |
| **F1-24** | AI 1 Gain | 0 | 1.00 | 20.00 | - | Run read-only |
| | Analog input AI1 signal gain multiple, maximum gain up to 20 times. For example, AI1 is used as the target frequency setting, F0-07 is set to "0:0-10V", and this parameter is set to 2.00; Then a 5V input signal can make the Inverter run at the maximum frequency. | | | | | |
| **F1-25** | AI 1 Offset | -10.00 | 0.00 | 10.00 | V | Run read-only |
| | Analog input 1 signal offset value, the maximum offset can be +/-10V. For example, AI1 is set as the target frequency, F0-07 is set to "0:0-10V", and this parameter is set to 2.0; Then the 8V input signal can make the inverter run at the maximum frequency. When F0-07 is set to "1:0-20mA", 10.0V of this parameter indicates an offset of 20mA, and other values also correspond linearly. When F0-07 is set to "2:4-20mA", 10.0V of this parameter indicates the offset of 16mA, and the other values also correspond linearly.<br>Internal calculated value of AI1 = actual input *F1-24+F1-25 | | | | | |
| **F1-26** | Reserved | | | | | |
| **F1-27** | | | | | | |
| **F1-28** | AO1 Output Function Selection | 0 | 0 | 6 | - | Read/Write |
| | 0: Running frequency.<br>1: (Target) Set frequency.<br>2: Output current. 100% AO output signal corresponds to 2 times the rated current. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 3: Output torque. 100% AO output signal corresponds to 2 times the rated torque. This value is the absolute value of torque.<br>4: Output power. 100% AO output signal corresponds to 2 times the rated power.<br>5: Output voltage. 100% AO output signal corresponds to 1.2 times the rated voltage.<br>6. Communication control. The AO output signal is controlled by Modbus RTU (RS485). | | | | | |
| **F1-29** | Reserved | | | | | |
| **F1-30** | AO 1 Gain | 0 | 1.00 | 20.00 | - | Read/Write |
| | Analog output 1 signal gain multiple, maximum gain up to 20 times. | | | | | |
| **F1-31** | AO 1 Offset | -10.00 | 0.00 | 10.00 | V | Read/Write |
| | Analog output 1 signal bias value, the maximum bias can be +/-10V. | | | | | |
| **F1-32** | Reserved | | | | | |
| **F1-33** | | | | | | |

5.2.3 F2 Parameter Group - VF Curve

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F2-00** | VF curve setting | 0 | 0 | 2 | - | Run read-only |
| | 0: straight line v/f.<br>1: multipoint v/f.<br>2: square v/f.<br>Note: F2-00 ~F2-10 is only valid when F8-06 selects "V/F Control". | | | | | |
| **F2-01** | Multi-point VF Frequency Point 1 | 0.0 | 0.0 | F2-03 | Hz | Run read-only |
| **F2-02** | Multi-point VF Voltage Point 1 | 0 | 0 | 100.0 | % | Run read-only |
| **F2-03** | Multi-point VF Frequency Point 2 | F2-01 | 0 | F2-05 | Hz | Run read-only |
| **F2-04** | Multi-point VF Voltage Point 2 | 0 | 0 | 100.0 | % | Run read-only |
| **F2-05** | Multi-point VF Frequency Point 3 | F2-03 | 0 | F2-07 | Hz | Run read-only |
| **F2-06** | Multi-point VF Voltage Point 3 | 0 | 0 | 100.0 | % | Run read-only |

| | | | | | | |
|---|---|---|---|---|---|---|
| **F2-07** | Multi-point VF Frequency Point 4 | F2-05 | 0 | F2-09 | Hz | Run read-only |
| **F2-08** | Multi-point VF Voltage Point 4 | 0 | 0 | 100.0 | % | Run read-only |
| **F2-09** | Multi-point VF Frequency Point 5 | F2-07 | 0 | F0-09 | Hz | Run read-only |
| **F2-10** | Multi-point VF Voltage Point 5 | 0 | 0.0 | 100.0 | % | Run read-only |
| | F2-01~F2-10 parameters define five V/F curves.<br>Voltage relationship: the voltage of each section can be set arbitrarily and can be assigned reasonably according to the load characteristics.<br>Frequency relationship: the multi-point V/F curve of five-segment frequency > four-segment frequency > three-segment frequency > two-segment frequency > one-segment frequency.<br>Multi-point VF should be set according to the load characteristics of the motor.<br>When the low-frequency voltage is set too high, the motor may overheat or even burn out, and the inverter may be over-run or over-current protected. | | | | | |
| **F2-11** | VF Over-current Stall Action Current | 50 | 120 | 200 | % | Run read-only |
| **F2-12** | VF Over-current Stall Enable | 0 | 1 | 1 | - | Run read-only |
| | 0: Disable<br>1: Enable | | | | | |
| **F2-13** | VF Over-current Stall Inhibition Gain | 0 | 20 | 100 | - | Read/Write |
| **F2-14** | VF Multiple Over-current Stall Action Current Compensation Coefficient | 50 | 50 | 200 | - | Run read-only |
| | In high frequency area, the motor drive current is small, relative to the rated frequency, under the same stall current, motor speed drop is large, in order to improve the running characteristics of the motor, can reduce the rated frequency above stall current action, in some centrifuge such as running frequency is higher, need several times flux weakening and load the occasion of moment of inertia is larger, this method has good effect on acceleration. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **F2-15** | VF Overexcitation Gain | 0 | 64 | 200 | - | Read/Write |
| | In the process of inverter deceleration, over magnetizing control can restrain the rise of bus voltage and avoid overvoltage fault. The greater the over magnetizing gain, the stronger the inhibition effect.<br>When the inverter is prone to overvoltage alarm during deceleration, it is necessary to increase the over magnetizing gain. However, the over magnetizing gain is too large, which easily leads to the increase of output current, so it needs to be weighed in application.<br>When the inertia is small, there will be no voltage rise during motor deceleration, so it is recommended to set the over magnetizing gain to 0. To places that have requirements of braking resistor, also suggested that over magnetizing gain is set to 0. | | | | | |
| **F2-16** | VF Overvoltage Stall Action Voltage | 200.0 | Depend on model | 2000.0 | V | Run read-only |
| | VF overvoltage stall running voltage. | | | | | |
| **F2-17** | VF Overvoltage Stall Enable | 0 | 1 | 1 | - | Run read-only |
| | 0: Disable<br>1: Enable | | | | | |
| **F2-18** | VF Overvoltage Stall Inhibition Frequency Gain | 0 | 30 | 100 | - | Read/Write |
| | Increasing F2-18 will improve the control effect of DC bus voltage, but the output frequency will fluctuate. If the output frequency fluctuates greatly, F2-18 can be appropriately reduced. | | | | | |
| **F2-19** | VF Overvoltage Stall Inhibition Voltage Gain | 0 | 30 | 100 | - | Read/Write |
| | Increasing F2-19 can reduce the overshoot of DC bus voltage. | | | | | |
| **F2-20** | Maximum Rising Limiting Frequency of Overpressure Stall | 0 | 5 | 50 | Hz | Run read-only |
| | Limit of maximum rising frequency of overvoltage inhibition. | | | | | |

### 5.2.4 F3 Parameter Group – Start/Stop Process Control

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F3-00** | Start Frequency | 0.0 | 0.0 | 10.0 | Hz | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | To ensure the motor torque at start, please set the appropriate start frequency. | | | | | |
| **F3-01** | Start Frequency Hold Time | 0.0 | 0.0 | 100.0 | second | Run read-only |
| | In order to fully establish the magnetic flux when the motor starts, it is necessary to keep the start frequency for a certain time. | | | | | |
| **F3-02** | Start DC Braking Current | 0 | 0 | 100 | % | Run read-only |
| | The greater the DC braking current, the greater the braking force. When set to 0, the inverter will still perform the braking process for F3-03.<br>Set the time, but there is no braking force at this time. This parameter value corresponds to the rated current percentage. | | | | | |
| **F3-03** | Start DC Braking Time | 0.0 | 0.0 | 100.0 | second | Run read-only |
| | Duration of starting DC braking. | | | | | |
| **F3-04** | DC Braking Initial Frequency at Stop | 0.0 | 0.0 | F0-09 | Hz | Read/Write |
| | In the process of deceleration and stop, when the running frequency decreases to this frequency, the DC braking process begins. | | | | | |
| **F3-05** | DC Braking Waiting Time at Stop | 0.0 | 0.0 | 100.0 | second | Read/Write |
| | After the running frequency is reduced to the starting frequency of stopping DC braking, the inverter stops outputting for a period of time before starting DC.<br>Braking process. It is used to prevent overcurrent and other faults that may be caused when DC braking is started at a higher speed. | | | | | |
| **F3-06** | DC Braking Current at Stop | 0 | 0 | 100 | % | Read/Write |
| | There are two situations of DC braking current relative to the basic value.<br>1. When the rated current of the motor is less than or equal to 80% of the rated current of the inverter, it is the base value of the percentage relative to the rated current of the motor.<br>2. When the rated current of the motor is greater than 80% of the rated current of the inverter, it is percentage relatively 80% inverter rated current to the base value. | | | | | |
| **F3-07** | DC Braking Time | 0.0 | 0.0 | 100.0 | second | Read/Write |
| | The duration of DC braking. When this value is 0, the DC braking process is cancelled. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **F3-08** | Acceleration and Deceleration Mode | 0 | 0 | 1 | - | Run read-only |
| | 0: linear acceleration and deceleration. The output frequency increases or decreases in a straight line.<br>1: S curve acceleration and deceleration. When the target frequency is fixed, the output frequency increases or decreases according to the S curve. | | | | | |
| **F3-09** | S-curve Initial Time Proportion | 0.0 | 30.0 | 70.0 | % | Run read-only |
| | The proportion of time at the beginning of curve acceleration and deceleration, during which the slope of output frequency change gradually increases. It should satisfy with F3-10： F3-09+F3-10<100%。 | | | | | |
| **F3-10** | S-curve End Time Proportion | 0.0 | 30.0 | 70.0 | % | Run read-only |
| | The proportion of the time at the end of the acceleration and deceleration of the S-curve, during which the slope of the output frequency change decreases gradually. In time between the beginning and the end, the inverter output frequency is increased or decreased according to the straight line. | | | | | |
| **F3-11** | Acceleration Time 2 | 0.1 | Depends on model | 6500.0 | second | Read/Write |
| **F3-12** | Deceleration Time 2 | 0.1 | Depends on model | 6500.0 | second | Read/Write |
| **F3-13** | Acceleration & Deceleration Time 1-2 Switching Frequency Point | 0.0 | 0.0 | F0-09 | Hz | Read/Write |
| | It is used to select different acceleration and deceleration time according to the running frequency range, not through DI terminal. | | | | | |
| **F3-14** | Skip Frequency | 0.0 | 0.0 | F0-09 | Hz | Read/Write |
| | When the target frequency is set within the skip frequency range, the final running frequency of the inverter will avoid the range and run stably with the boundary value outside the range. It can be used to avoid the frequency resonance point of mechanical equipment. This parameter is the reference value of skip frequency, and the range is set by F3-15. | | | | | |
| **F3-15** | Skip Frequency | 0.0 | 0.0 | F0-09 | Hz | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Bandwidth | | | | | |
| | Used in combination with F3-14, set specific skip frequency range (F3-14-F3-15) ~ (F3-14+ F3-15). After this range is enabled, the actual operating frequency of the inverter is a hysteresis curve: when the frequency rises from low to within the range, the frequency remains at the low frequency boundary; When the frequency decreases from high to within the range, the frequency remains at the high frequency boundary; | | | | | |
| **F3-16** | Forward/Reverse Dead Time | 0.0 | 0.0 | 3000.0 | second | Read/Write |
| | Set the transition time at the output of 0Hz during the forward and reverse transitions of the inverter. | | | | | |
| **F3-17** | Reverse Control | 0 | 0 | 1 | - | Read/Write |
| | 0: Reverse is allowed.<br>1: Reverse is prohibited. | | | | | |
| **F3-18** | Brake Unit Duty | 0 | 50 | 100 | % | Read/Write |
| | It is used to adjust the duty cycle of the braking unit. If the braking utilization rate is high, the braking unit has a high duty cycle and strong braking effect. However, the bus voltage of the inverter fluctuates greatly in the braking process. When set to 0, brake unit is not enabled. | | | | | |
| **F3-19** | Brake Unit Action Voltage | 200.0 | Depends on model | 1000.0 | V | Read/Write |
| | Built-in starting voltage of braking unit action, after the bus voltage is higher than this voltage, the braking unit will start to act. | | | | | |
| **F3-20** | Speed Tracking Mode | 0 | 1 | 2 | - | Run read-only |
| | 0: Start with the shutdown frequency. Tracking down from the frequency when the power is off.<br>1: Start from the preset frequency. Track upward from the preset frequency and use it when the power is cut off for a long time and then restarted.<br>2: Start with the maximum frequency. Tracking down from the maximum frequency, generally used by generating loads. | | | | | |
| **F3-21** | Speed Tracking | 1 | 50 | 100 | - | Read/Write |
| | When speed tracking starts, set the speed of speed tracking. The larger the parameter is, the faster the tracking speed is. However, if the parameter is too large, the tracking effect may be unreliable. | | | | | |
| **F3-22** | Speed Tracking Current Loop Kp | 0 | Depends on model | 1000 | - | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | F3-22-F3-26 parameters need not be set by users. | | | | | |
| **F3-23** | Speed Tracking Current Loop ki | 0 | Depends on model | 1000 | - | Read/Write |
| **F3-24** | Speed Tracking Current Value | 5 | Depends on model | 200 | % | Read/Write |
| **F3-25** | Speed Tracking Current Lower Limit | 5 | 30 | 100 | % | Run read-only |
| **F3-26** | Speed Tracking Voltage Rising Time | 0.5 | 1.1 | 3.0 | second | Run read-only |
| **F3-27** | Demagnetizing Time | 0.00 | 1.00 | 5.00 | second | Run read-only |
| | The demagnetizing time is the minimum interval between stop and start-up, and this function will take effect only after the speed tracking function is turned on.<br>If the setting value is too small, it is easy to cause overvoltage fault. | | | | | |

5.2.5 F4 Parameter Group – Multi-segment Command

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F4-00** | Multi-segment Command 0 Frequency Source | 0 | 0 | 6 | - | Read/Write |
| | 0: Digital setting (F4-01)<br>1: Preset frequency<br>2: Panel potentiometer<br>3: AI1<br>4: Reserved<br>5: PID<br>6: Reserved | | | | | |
| **F4-01** | Multi-segment Command 0 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-02** | Multi-segment Command 1 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-03** | Multi-segment Command 2 | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency | | | | | |
| **F4-04** | Multi-segment Command 3 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-05** | Multi-segment Command 4 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-06** | Multi-segment Command 5 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-07** | Multi-segment Command 6 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| **F4-08** | Multi-segment Command 7 Frequency | -F0-09 | 0.0 | F0-09 | Hz | Read/Write |
| | Multi-segment command can be used in three occasions: as frequency source, as voltage source of VF separation, and as setting source of process PID.<br>In three applications, the dimension of multi-segment command is relative value, ranging from-100.0% to 100.0%, which is the percentage of relative maximum frequency when used as frequency source; When used as VF separation voltage source, is the percentage relative to the rated voltage of the motor; Since PID setting is originally relative value, multi-segment command as PID setting source does not require dimensional conversion. | | | | | |
| **F4-09** | PLC Running Mode | 0 | 0 | 2 | - | Read/Write |
| | 0：Stop at the end of a single running.<br>1：The final value is maintained at the end of a single running<br>2：Keep circulating | | | | | |
| **F4-10** | PLC Power Off Memory Selection | 00 | 00 | 11 | - | Read/Write |
| | Bit: power-down memory selection<br>0: Don't remember when power is off.<br>1: Power-off memory<br>Ten Bit: Stop memory selection<br>0: Don't remember when power is off.<br>1. Power-off memory | | | | | |
| **F4-11** | PLC Running Time Unit | 0 | 0 | 1 | - | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 0：s(second)<br>1：h(hours) | | | | | |
| **F4-12** | PLC Segment 0 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-13** | PLC Segment 0 Acceleration & Deceleration time selection | 0 | 0 | 1 | - | Read/Write |
| | 0: Acceleration and deceleration time 1<br>1: Acceleration and deceleration time 2 | | | | | |
| **F4-14** | PLC Segment 1 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-15** | PLC Segment 1 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-16** | PLC Segment 2 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-17** | PLC Segment 2 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-18** | PLC Segment 3 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-19** | PLC Segment 3 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-20** | PLC Segment 4 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-21** | PLC Segment 4 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-22** | PLC segment 5 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| **F4-23** | PLC segment 5 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-24** | PLC segment 6 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-25** | PLC segment 6 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |
| **F4-26** | PLC segment 7 Running Time | 0 | 0 | 6500.0 | s(h) | Read/Write |
| **F4-27** | PLC segment 7 Acceleration & Deceleration Time Selection | 0 | 0 | 1 | - | Read/Write |
| | Same as F4-13 | | | | | |

5.2.6 F5 Parameter Group – PID & Constant Pressure Water Supply Parameters

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F5-00** | PID Reference Source | 0 | 0 | 4 | - | Read/Write |
| | This parameter is used to select the target quantity given channel during PID control.<br>**0: F5-01 setting 1：AI1 2：Reserved**<br>**3: Panel potentiometer 4: Communication**<br>No matter which channel, the set target quantity is a relative value, and the set range is 0.0%~100.0%. | | | | | |
| **F5-01** | PID Reference Value (Actual Pressure) | 0.1 | 3.5 | 1000.0 | Bar | Read/Write |
| | Through the value of this parameter, a given amount of PID control is set. | | | | | |
| **F5-02** | PID Feedback Source | 0 | 0 | 4 | - | Read/Write |
| | **0:AI1 1. Reserved 2. Communication**<br>**3: DC bus voltage 4: Temperature**<br>This parameter is used to select the feedback quantity in PID control. For a given channel, the feedback quantity is relative as the given quantity. | | | | | |
| **F5-03** | PID Direction | 0 | 0 | 1 | - | Read/Write |
| | 0: Positive effect. When the feedback signal of PID is less than a given amount, the output frequency of the inverter increases. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 1: Negative effect. When the feedback signal of PID is less than a given amount, the output frequency of inverter decreases.<br>The function of PID control is to make the given quantity and the feedback quantity the same. Through this parameter, you can set the running trend of the inverter when there is a difference between the given quantity and the feedback quantity. | | | | | |
| **F5-04** | Acceleration PID Proportional Gain Kp | 0.0 | 20.0 | 6500.0 | - | Read/Write |
| | The proportional gain of PID controller determines the adjustment strength of the whole PID controller. The greater Kp, the greater the adjustment strength. If the value is high, even if the difference between the given and the feedback is small, the transducer can respond quickly, and the output frequency can vary greatly. But too high a value can cause instability. | | | | | |
| **F5-05** | Acceleration PID Integral Time Ki | 0.01 | 0.80 | 10.00 | second | Read/Write |
| | The integral time of PID controller determines the integral adjustment intensity of PID controller. The shorter the integral time, the greater the adjustment intensity. If this parameter is set too small, the system may shock easily. | | | | | |
| **F5-06** | Deceleration PID Proportional Gain Kp | 0.0 | 200.0 | 6500.0 | - | Read/Write |
| | Same as F5-04 | | | | | |
| **F5-07** | Deceleration PID Integral Time Ki | 0.01 | 0.01 | 10.00 | second | Read/Write |
| | Same as F5-05 | | | | | |
| **F5-08** | Sensor Type | 0 | 0 | 3 | - | Read/Write |
| | 0：0~10V<br>1：4~20mA<br>2：0~5V<br>3：0.5V~4.5V | | | | | |
| **F5-09** | Sensor Range | 0.0 | 16.0 | 25.0 | Bar | Read/Write |
| | The maximum pressure measuring range of the sensor, the sensor nameplate or dial are marked. | | | | | |
| **F5-10** | Sensor Zero Correction | -10.0 | 0.0 | 10.0 | Bar | Read/Write |
| | This parameter is set when there is no pressure in the pipeline and pressure is fed back by the inverter. | | | | | |
| **F5-11** | Sensor Full-scale Correction | -10.0 | 0.0 | 10.0 | Bar | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | This parameter is set when the pressure displayed on the pressure gauge is inconsistent with the feedback pressure after the pipeline is pressurized. | | | | | |
| **F5-12** | Sleep Frequency | 0 | 20.0 | F0-09 | Hz | Read/Write |
| | When the inverter detects that the feedback pressure reaches the target value, the frequency will be reduced to this parameter value, and the inverter will sleep and stop. | | | | | |
| **F5-13** | Sleep Delay Time | 0.0 | 0.0 | 1200.0 | second | Read/Write |
| | During the running of the inverter, when the set frequency is less than f5-12 sleep frequency, after the F5-13 sleep delay time, the inverter enters the sleep state and automatically stops. | | | | | |
| **F5-14** | Sleep Pressure Offset | 0 | 8 | 100 | % | Read/Write |
| | Percentage relative to target pressure. | | | | | |
| **F5-15** | Frequency Step of Sleep Deceleration | 0.0 | 3.0 | F0-09 | Hz | Read/Write |
| | Effective at constant or critical pressure. | | | | | |
| **F5-16** | Sleep Deceleration Time Delay | 60.0 | 60.0 | 600.0 | second | Read/Write |
| | Note: f5-14 ~ f5-16 is effective when the pressure fluctuation is small. | | | | | |
| **F5-17** | Wake Up Pressure | 0 | 80 | 100 | % | Read/Write |
| | Wake up pressure value, relative to feedback pressure; For example, set it to 80%, the feedback pressure is 10 bar, and the pressure wake-up is 8 bar. | | | | | |
| **F5-18** | Pressure Upper Limit | 0 | 150 | 300 | % | Read/Write |
| | The percentage of the target pressure, exceeding this pressure, an overpressure fault err53 is reported. | | | | | |
| **F5-19** | Water Shortage Detection Time | 0.0 | 120.0 | 1200.0 | second | Read/Write |
| | It takes time from water pump water shortage to alarm detection. | | | | | |
| **F5-20** | Water Shortage Detection Frequency | 0 | 45.0 | F0-09 | Hz | Read/Write |
| | When the frequency reaches the set value, the current is lower than the set value of F5-21 or the pressure is lower than the set value of F5-22, Err52 water shortage fault is reported. | | | | | |
| **F5-21** | Water Shortage Detection Current | 0 | 40 | 200 | % | Read/Write |
| | Percentage of motor rated current. When the current is lower than this value, it is reported that err52 is short of water. | | | | | |
| **F5-22** | Water Shortage | 0 | 20 | 100 | % | Read/Write |

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| | Detection Pressure | | | | | |
| | Percentage of target pressure. When the pressure is lower than this, it is reported that err52 is short of water. | | | | | |
| **F5-23** | Water Shortage Restart Time | 1 | 20 | 2000 | Min | Read/Write |
| | The inverter will restart automatically after this time. | | | | | |
| **F5-24** | Water Shortage Auto Restart Pressure | 0 | 50 | 100 | % | Read/Write |
| | Percentage of target pressure. | | | | | |
| **F5-25** | Antifreeze Function | 0 | 0 | 1 | - | Read/Write |
| | 0: Disable<br>1：enable | | | | | |
| **F5-26** | Antifreeze Running Frequency | 2.0 | 10.0 | F0-09 | Hz | Read/Write |
| | When f5-25 is set to 1, the antifreeze function takes effect, and the inverter runs at this frequency. | | | | | |
| **F5-27** | Antifreeze Running Time | 60.0 | 60.0 | 3600.0 | second | Read/Write |
| | The time of single running when the inverter is enabled with anti-freezing function. | | | | | |
| **F5-28** | Anti-freezing running period | 0 | 30 | 1440 | Min | Read/Write |
| | Running period of inverter when antifreeze function is enabled. | | | | | |
| **F5-29** | Auto start enable | 0 | 0 | 1 | - | Read/Write |
| | 0：Forbidden<br>1：Enabled | | | | | |
| **F5-30** | Auto start delay time(only Water supply mode) | 0 | 10 | 120 | | Read/Write |
| **F5-31 ~F5-42** | Reserved | | | | | |

5.2.7 F6 Parameter Group – Extend Parameter

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F6-00** | Main Menu Display Auto Switching | 0 | 1 | 1 | - | Read/Write |
| | 0: Switching is prohibited. When the display is switched from the frequency interface to other interfaces, it is forbidden to automatically switch back to the frequency interface.<br>1: Automatic switching. When the display is switched from the frequency | | | | | |

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| | interface to other interfaces, it will automatically switch back to the frequency interface after 10 seconds. | | | | | |
| **F6-01** | Parameter Modification Attribute | 0 | 0 | 1 | - | Read/Write |
| | 0: Allow modification.<br>1. No modification is allowed.<br>When this parameter is set to 1, the inverter is forbidden to modify the parameter, and it must be set to 0 before it can be changed. | | | | | |
| **F6-02** | LED2 Display Data Selection(Double Display Reserved Parameters) | 0 | 2 | 7 | - | Read/Write |
| | 0:Running Frequency<br>1:Running Speed<br>2:Output Current<br>3:DC Bus Voltage<br>4:Output Voltage<br>5:Output Power<br>6:PID Feedback<br>7:Power frequency pump current | | | | | |
| **F6-03** | User Password | 0 | 0 | 65535 | - | Run read-only |
| | The inverter provides the user password protection function. When F6-03 is SET to non-zero, it is the user password. The password protection will take effect after exiting the function code editing state. Press the SET key again, "-------" will be displayed. You must input the user password correctly to enter the parameter interface. | | | | | |
| **F6-04** | Set Inverter Power on Time | 0 | 0 | 17520 | hour | Read/Write |
| | After the accumulated power-on time of the inverter exceeds this value, the inverter reports a fault Err20. The function of this parameter is invalid when it is set to 0. | | | | | |
| **F6-05** | Set Inverter Running Time | 0.0 | 0.0 | 6500.0 | min | Read/Write |
| | When the frequency converter starts, it will start timing. When the running time reaches this value, the frequency converter will stop automatically. This parameter is invalid when the value is set to 0. | | | | | |
| **F6-06** | Switching Frequency Adjusting with Temperature | 0 | 1 | 1 | - | Read/Write |
| | When the inverter detects that the radiator temperature is high, it | | | | | |

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| | automatically reduces the switching frequency to reduce the temperature rise of the inverter. When the radiator temperature is low, the switching frequency gradually returns to the set value. This parameter is disabled when the value is set to 0. | | | | | |
| **F6-07** | Switching Frequency Adjusting Start Temperature | 0 | 55 | 150 | ℃ | Read/Write |
| | When the inverter detects that the radiator temperature exceeds the set value of this parameter, F6-06 function is effective, and the switching frequency is adjusted with the temperature. | | | | | |
| **F6-08** | Switching Frequency Adjusting Time | 0.1 | 20.0 | 50.0 | s | Read/Write |
| | When the inverter detects that the heat sink temperature exceeds the set value of F6-07, the switching frequency starts to adjust after the set time of F6-08. | | | | | |
| **F6-09** | DPWM Switching Frequency | 5.0 | F8-03 | F0-09 | Hz | Read/Write |
| | This parameter is valid only for VF control.<br>When the asynchronous VF is running, the wave sending mode is 7-segment continuous modulation mode below this value, and on the contrary, it is 5-segment intermittent modulation mode.<br>For 7-segment continuous modulation, the switch loss of an inverter is large, but the current ripple is small; The switching loss is small, and the current ripple is large in the 5 - segment discontinuous modulation mode. However, it may lead to instability of motor operation at high frequency, and generally does not need to be modified. | | | | | |
| **F6-10** | Excessive Speed Deviation Detection Value | 0.0 | 30.0 | 100.0 | % | Read/Write |
| **F6-11** | Excessive Speed Deviation Detection Time | 0.0 | 0.00 | 60.0 | s | Read/Write |
| | This function is only valid when there is vector control of speed sensor. When this parameter is 0.0s, the detection of excessive speed deviation will be cancelled. | | | | | |
| **F6-12** | Motor Overload Protection Gain | 0.20 | 1.00 | 10.00 | - | Read/Write |
| | Used to adjust the gain multiple of the set value of overload current in the inverter.<br>Note: Increasing this parameter means increasing the overload current, so improper setting may burn out the motor. | | | | | |

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|---|---|---|---|---|---|---|
| **F6-13** | External Temperature Sensor Type | 0 | 0 | 3 | - | Read/Write |
| | 0: Disable. 1: PT100<br>2: PT1000 3: 5k NTC resistance | | | | | |
| | | | | | | |
| **F6-14** | Overtemperature Protection Threshold | 0 | 200 | 200 | ℃ | Read/Write |
| | When the temperature of the external sensor exceeds the protection threshold, the inverter will give an alarm. | | | | | |
| **F6-15** | Start Protection Selection | 0 | 0 | 1 | - | Read/Write |
| | If the parameter is set to 1, the inverter will not respond to the running command if the running command is valid when the inverter is powered on or after a fault is reset. The running command must be removed once before the inverter responds to the running command. | | | | | |
| **F6-16** | Fault Enable Selection 1 | 00000 | 01111 | 11111 | - | Read/Write |
| | 0: Protection is prohibited. 1: Enable protection<br>Bit: Relay closing fault<br>Ten bits: Output open-phase protection.<br>Hundred bits: Input open-phase protection.<br>Thousand bit: Power-on short-circuit protection to ground.<br>Ten thousand bits: output detection before operation (including grounding and phase loss) | | | | | |
| **F6-17** | Fault Enable Selection 2 | 00000 | 00001 | 11111 | - | Read/Write |
| | 0: Protection is Prohibited. 1: Enable protection<br>Bit: Motor overload protection selection<br>Ten bits: AI input lower limit protection selection<br>Hundred bits: Reserved<br>Thousand bits: Reserved<br>Ten thousand bits: Reserved | | | | | |
| **F6-18** | Fault Auto Reset Times | 0 | 0 | 20 | time | Read/Write |
| | Inverter can automatically reset after fault alarm. After this number is exceeded, the inverter will remain in a fault state.<br>When set to 0, the automatic reset function is not enabled. | | | | | |
| **F6-19** | Fault Auto Reset Interval Time | 0.1 | 1.0 | 100.0 | second | Read/Write |
| | The waiting time from the inverter fault alarm to the automatic fault | | | | | |

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| | reset. | | | | | |
| **F6-20** | Drop load protection selection | 0 | 0 | 1 | - | Read/Write |
| | 0：Invalid<br>1：Valid<br>When the parameter is set to 1, the output current of the inverter is less than F6-21 and the duration is greater than F6-22, and the output frequency is automatically reduced to 7% of the rated frequency. If the load recovers, the system continues to run at the preset frequency. | | | | | |
| **F6-21** | Drop load detection level | 0.0 | 10.0 | 100.0 | % | Read/Write |
| **F6-22** | Drop load detection time | 0.0 | 1.0 | 60.0 | s | Read/Write |
| **F6-23** | Voltage sag function selection | 0 | 0 | 2 | - | Run read-only |
| | 0：Invalid<br>1： Deceleration. When the voltage of the inverter decreases suddenly (including but not limited to instantaneous power failure), the inverter decelerates. When the line voltage returns to normal and the duration exceeds F6-25, the inverter accelerates to the original set frequency normally.<br>2： Ramp to stop. When the voltage of the inverter decreases suddenly (including but not limited to instantaneous power failure), the inverter ramps to stop.<br>When the voltage of the inverter decreases suddenly (including but not limited to instantaneous power failure), and when the busbar voltage drops below F6-26, the inverter reduces the output frequency, so that the motor is in the state of generating power. This function can make the electric energy that feeds back to the busbar voltage maintain the busbar voltage at about F6-26, so that the system can normally decelerate to 0Hz. When the bus voltage returns to F6-24 and the duration exceeds F6-25, the inverter accelerates to the original setting frequency normally. | | | | | |
| **F6-24** | Voltage sag judging voltage | 80 | 85 | 100 | % | Run read-only |
| **F6-25** | Voltage sag recovery judging time | 0.0 | 0.5 | 100.0 | s | Run read-only |
| **F6-26** | Voltage sag action judging voltage | 60 | 80 | 100 | % | Read/Write |
| **F6-27** | Voltage sag gain Kp | 0 | 40 | 100 | - | Read/Write |
| **F6-28** | Voltage sag integral | 0 | 30 | 100 | - | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | coefficient Ki | | | | | |
| **F6-29** | Voltage sag action deceleration time | 0.0 | 20.0 | 300.0 | s | Run read-only |

5.2.8 F7 Parameter Group – Communication Parameters

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F7-00** | Inverter Address | 1 | 1 | 249 | - | Read/Write |
| | The local address when using the communication function of the inverter. When this value is set to 0, it is the broadcast address, which realizes the broadcast function of the upper computer. | | | | | |
| **F7-01** | Baud Rate | 0 | 0 | 4 | - | Read/Write |
| | 0：9600bps 1：19200bps 2：38400bps<br>3：57600bps 4：115200bps | | | | | |
| **F7-02** | Data Format | 0 | 3 | 3 | - | Read/Write |
| | 0: No check -2 stop bits (8-N-2)<br>1: Even check -1 stop bit (8-E-1)<br>2: Odd check -1 stop bit (8-O-1)<br>3: No check -1 stop bit (8-N-1) | | | | | |
| **F7-03** | Communication Timeout | 0.0 | 0.0 | 60.0 | second | Read/Write |
| | When this parameter is set to 0.0 second, no communication timeout detection is performed.<br>When this parameter is set to more than 0.1 second, if the interval between one communication and the next communication exceeds the communication timeout, the inverter will report a communication failure (Err16). | | | | | |

5.2.9 F8 Parameter Group – Motor Control Mode

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F8-00** | Motor Rated Power | 0.1 | Depends on model | 1000.0 | Kw | Run read-only |
| | This parameter is set to the rated power of the motor (nameplate). | | | | | |
| **F8-01** | Motor Rated Voltage | 1 | Depends on model | 500 | V | Run read-only |
| | This parameter is set to the rated voltage of the motor (nameplate). | | | | | |

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|---|---|---|---|---|---|---|
| **F8-02** | Motor Rated Current | 0.01 | Depends on model | 655.35 | A | Run read-only |
| | This parameter is set to the rated current of the motor (nameplate). | | | | | |
| **F8-03** | Motor Rated Frequency | 0 | 50.0 | 500.0 | Hz | Run read-only |
| | This parameter is set to the rated frequency of the motor (nameplate). | | | | | |
| **F8-04** | Motor Rated Speed | 1 | 1460 | 65535 | Rpm | Run read-only |
| | This parameter is set to the rated speed of the motor (nameplate). | | | | | |
| **F8-05** | Back EMF Coefficient for PM Motor | 0 | Depends on model | 6553.5 | V | Run read-only |
| | This parameter is set as the back EMF coefficient of synchronous machine. | | | | | |
| **F8-06** | Motor Control Mode | 0 | 0 | 2 | - | Run read-only |
| | 0: V/F control.<br>1: Vector speed control (IMSVC) of asynchronous motor. F8-07 parameter identification is required after SVC control is selected.<br>2: Vector speed control (FMSVC) of synchronous motor. F8-07 parameter identification is required after SVC control is selected. | | | | | |
| **F8-07** | Motor Parameter Autotune | 0 | 0 | 3 | - | Run read-only |
| | 0: No operation.<br>1: Static parameter identification. If the motor can't be completely separated from the load and can't rotate freely, please choose static parameter identification.<br>2: Dynamic parameter identification. If the motor is completely disconnected from the load and can rotate freely, please choose dynamic parameter identification.<br>Note: After restoring the factory setting value, changing the model or setting the motor power and voltage level, it is necessary to identify the parameters again so that the vector control can run best. | | | | | |
| **F8-08** | Speed/Torque Control Selection | 0 | 0 | 1 | - | Run read-only |
| | 0: Speed control<br>1. Torque control<br>It is used to select the inverter control mode: speed control or torque control, and the torque control only works in vector mode. | | | | | |

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| **F8-09** | Torque Setting Source Selection | 0 | 0 | 7 | - | Run read-only |
| | 0: Parameter setting (F8-10) 1: Panel potentiometer setting 2：AI1<br>3: Reserved 4: Communication<br>5: Reserved 6: Reserved<br>7: Reserved<br>Choose the torque setting source. There are seven torque setting methods. | | | | | |
| **F8-10** | Torque Setting Value | -200.0 | 150.0 | +200.0 | % | Read/Write |
| | Torque value when F8-09 torque setting source is selected as 0. | | | | | |
| **F8-11** | Asynchronous Motor Stator Resistance | 0.001 | Depends on model | 65.535 | Ω | Run read-only |
| **F8-12** | Asynchronous Motor Rotor Resistance | 0.001 | Depends on model | 65.535 | KW | Run read-only |
| **F8-13** | Asynchronous Motor Leakage Inductance | 0.01 | Depends on model | 655.35 | mH | Run read-only |
| **F8-14** | Asynchronous Motor Mutual Inductance | 0.1 | Depends on model | 6553.5 | mH | Run read-only |
| **F8-15** | Asynchronous Motor Magnetizing Current | 0.01 | Depends on model | F8-02 | A | Run read-only |
| | F8-11~F8-15 are asynchronous motor parameters, these parameters are generally not on the motor nameplate, need to be obtained by motor parameter identification F8-07. If the induction motor cannot be tuned on site, you can input the above parameters according to the parameters provided by the motor manufacturer. | | | | | |
| **F8-16** | Synchronous Motor Stator Resistance | 0.001 | Depends on model | 65.535 | Ω | Run read-only |
| **F8-17** | Synchronous Motor D-axis Inductance | 0.01 | Depends on model | 655.35 | mH | Run read-only |
| **F8-18** | Synchronous Motor Q-axis Inductance | 0.01 | Depends on model | 655.35 | mH | Run read-only |
| | F8-16~F8-18 are synchronous motor parameters. Some synchronous | | | | | |

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| | motor nameplates will provide some parameters, but most of the motor nameplates do not provide the above parameters. These parameters must be obtained through parameter identification and must be identified in synchronous motor vector control mode. |

5.2.10 F9 Parameter Group – Motor Control Advanced Parameter

| Parameter | Description | Minimum Value | Default Value | Maximum Value | Unit | Change Permission |
|---|---|---|---|---|---|---|
| **F9-00** | High Speed Area Switching Frequency | F9-03 | 10.0 | F8-03 | Hz | Read/Write |
| | When the running frequency is greater than this value, the speed loop PID parameter is selected as the speed loop parameter in the high-speed segment. Running frequency between high speed and low speed, the speed loop PID parameter linear transformation of two sets of PID parameters. | | | | | |
| **F9-01** | High Speed Area Proportional Gain | 1 | 20 | 100 | - | Read/Write |
| | Setting the proportional coefficient of the speed regulator can adjust the speed dynamic response characteristics of vector control. Increasing the proportional gain can speed up the dynamic response of the speed loop, but excessive proportional gain may make the system oscillate.<br>Note: The parameters of high-speed area and low-speed area are only valid when F8-06 selects vector control. | | | | | |
| **F9-02** | High Speed Area Integral Time Constant | 0.01 | 1.00 | 10.00 | second | Read/Write |
| | The speed dynamic response characteristic of vector control can be adjusted by setting the integral time of the speed regulator. Shortening the integral time can accelerate the dynamic response of the speed loop, but too short integral time may make the system oscillate. | | | | | |
| **F9-03** | Low Speed Area Switching Frequency | 0.0 | 5.0 | F9-00 | Hz | Read/Write |
| | When the operating frequency is less than this value, F9-04 and F9-05 are selected as PID parameters of speed loop. | | | | | |
| **F9-04** | Low Speed Area Proportional Gain | 1 | 30 | 100 | - | Read/Write |
| | The inverter runs at different frequencies and can select different speed loop PID parameters. When the running frequency is less than the switching | | | | | |

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| | frequency of the low-speed segment F9-03, the proportional gain of the speed loop is used. | | | | | |
| **F9-05** | Low Speed Area Integral Time Constant | 0.01 | 0.50 | 10.00 | second | Read/Write |
| | When the operating frequency is less than the switching frequency F9-03 in the low-speed section, the value of this parameter is used for the speed loop integral time. | | | | | |
| **F9-06** | Speed Loop Filter Time Constant | 0.000 | 0.200 | 1.000 | second | Read/Write |
| | This parameter generally does not need to be adjusted, and the filtering time can be appropriately increased when the speed fluctuation is large. If the motor oscillates, the parameter should be appropriately reduced. The speed loop filter time constant is small, and the output torque of a inverter may fluctuate greatly， but the response speed is fast. | | | | | |
| **F9-07** | Slip Compensation Coefficient | 50 | 100 | 200 | % | Read/Write |
| | For speed sensorless vector control, this parameter is used to adjust the steady speed accuracy of the motor: when the motor has a low speed, increase this parameter, and vice versa.<br>With vector control of speed sensor, this parameter can adjust the output current of down-converter with the same load. | | | | | |
| **F9-08** | Maximum Output Voltage Coefficient | 100 | 105 | 110 | % | Run read-only |
| | The maximum output voltage of inverter can be increased. Increasing F9-08 can improve the maximum load capacity of fan weak magnetic area, but the increase of motor current ripple will aggravate the motor heat. On the contrary, the maximum load capacity of motor weak magnetic area will decrease, but the ripple of motor current will reduce the motor heat. Generally, no adjustment is required. | | | | | |
| **F9-09** | Torque Control Forward Maximum Frequency | 0.0 | 50.0 | F0-09 | Hz | Read/Write |
| **F9-10** | Torque Control Reverse Maximum Frequency | 0.0 | 50.0 | F0-09 | Hz | Read/Write |
| | Used to set the forward or reverse maximum operating frequency of inverter under torque control mode.<br>When the inverter in torque control mode, if the load torque is less than the output torque of the motor, the motor speed will keep rising. In order to prevent accidents such as coasting in the mechanical system, the maximum motor speed during torque control must be limited.<br>If it is necessary to change the maximum torque control frequency dynamically, the upper limit frequency can be controlled. | | | | | |

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| **F9-11** | Torque Acceleration Time | 0.0 | 0.0 | 6500.0 | second | Read/Write |
| **F9-12** | Torque Deceleration Time | 0.0 | 0.0 | 6500.0 | second | Read/Write |
| | Under the torque control mode, the difference between the output torque of the motor and the load torque determines the speed change rate of the motor and the load. Therefore, the motor speed may change rapidly, resulting in noise or excessive mechanical stress. By setting the torque control acceleration and deceleration time, the motor speed can be changed smoothly.<br>In the torque control of small torque start, it is not recommended to set the torque acceleration and deceleration time; If the torque acceleration and deceleration time is set, it is suggested to increase the speed filter coefficient appropriately.<br>When the torque needs to respond quickly, set the torque control acceleration and deceleration time to 0.00s. | | | | | |
| **F9-13** | M-axis Current Loop Kp | 0 | 2000 | 30000 | - | Read/Write |
| **F9-14** | M-axis Current Loop Ki | 0 | 1000 | 30000 | - | Read/Write |
| **F9-15** | T-axis Current Loop Kp | 0 | 2000 | 30000 | - | Read/Write |
| **F9-16** | T-axis Current Loop Ki | 0 | 1000 | 30000 | - | Read/Write |
| | F9-13-F9-16 is the current loop PID adjustment parameter, which will be automatically obtained after tuning, and generally does not need to be modified. | | | | | |
| **F9-17** | Synchronous Motor Flux Weakening Mode | 0 | 1 | 2 | - | Read/Write |
| | 0: Disable. The motor is not subject to flux-weakening control. At this time, the maximum speed of the motor is related to the bus voltage of the inverter. There is no flux-weakening current, and the output current is small, but the running frequency may not reach the set frequency. If you want to achieve a higher speed, you need to turn on the flux-weakening function.<br>1: Automatic adjustment. It is automatically adjusted by the inverter, and the higher the speed after entering the field weakening area, the greater the field weakening current.<br>2: Calculation + Automatic Adjustment. Combined with automatic adjustment, the speed of flux weakening current adjustment is faster, and this mode can be set when automatic adjustment can't meet the demand, but this mode depends on the accuracy of motor parameters. | | | | | |
| **F9-18** | Synchronous Motor Flux Weakening Coefficient | 0 | 05 | 50 | - | Read/Write |
| | In the direct calculation mode, the required demagnetizing current can be calculated according to the target speed, and the size of demagnetizing | | | | | |

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| | current can be manually adjusted through F9-18. The smaller the demagnetizing current is, the smaller the total output current will be, but the desired flux weakening effect may not be achieved. | | | | | |
| **F9-19** | Flux Weakening Integral Multiple | 02 | 02 | 10 | - | Read/Write |
| | Changing this parameter can change the adjustment speed of the flux weakening current. However, faster adjustment of the flux weakening current may lead to instability. Therefore, you do not need to manually change this parameter. | | | | | |
| **F9-20** | Reserved | | | | | |
| **F9-21** | Maximum Torque Ratio Current Enable | 0 | 0 | 1 | - | Read/Write |
| | 0: Disable 1: Enabled | | | | | |
| **F9-22** | Salient Rate Gain Coefficient | 50 | 100 | 500 | - | Read/Write |
| | Related to the structure of synchronous motor, according to the different characteristics of the motor to set different salient pole rate gain coefficient, generally no need to set. | | | | | |
| **F9-23** | Starting Switching Frequency | 1.0 | 3.0 | F0-13 | KHz | Read/Write |
| | The size of the carrier frequency at startup. | | | | | |
| **F9-24** | SVC Low Speed Switching Frequency | 0.08 | 4.0 | F0-13 | KHz | Read/Write |
| | In SVC mode, the switching frequency of synchronous motor running at low speed. | | | | | |
| **F9-25** | Low Speed Switching Frequency Switch Frequency | 5.0 | 20.0 | F8-03 | Hz | Read/Write |
| | At low speed, the switching frequency is the set value of F9-23. After running the set value of this parameter, the switching frequency changes to the set value of F0-13. | | | | | |
| **F9-26** | Low Speed Maximum Magnetizing Current | 0 | 20 | 80 | % | Read/Write |
| | Set the maximum excitation current of synchronous motor at low speed. | | | | | |
| **F9-27** | Low Speed Magnetizing Current Switching Frequency | 0 | 20.0 | F8-03 | Hz | Read/Write |

| | | | | | | |
|---|---|---|---|---|---|---|
| | The maximum magnetizing current of synchronous motor at low speed is set at F9-26. After reaching this frequency, it will switch to normal current size. The default value of this parameter will change with the upper frequency (F0-09) and the rated frequency of the motor (F8-03). | | | | | |
| **F9-28** | Low Speed Magnetizing Current Switching Frequency Bandwidth | 0.0 | 5.0 | F8-03 | Hz | Read/Write |
| | When the synchronous motor runs at low speed, when the frequency reaches the set value of F9-27, if the current changes within the set range of F9-28, the low-speed magnetizing current is switched only once. | | | | | |
| **F9-29** | Synchronous Motor Initial Position Detection Mode | 0 | 1 | 1 | - | Read/Write |
| | 0: Check before each run. 1: No detection | | | | | |
| **F9-30** | Synchronous Motor Initial Position Identification Current Initial Value | 5 | 120 | 180 | % | Run read-only |
| **F9-31** | Synchronous Motor Initial Position Compensation Angle | 0.0 | 0.0 | 359.9 | ° | Read/Write |
| **F9-32** | Synchronous Motor Inductance Detection Current | 30 | 80 | 120 | % | Read/Write |
| **F9-33** | Synchronous Motor Back EMF Identification Initial Current | 0 | 50 | 180 | % | Run read-only |
| **F9-34** | Synchronous Motor Back EMF Identification Final Current | 30 | 80 | 180 | % | Run read-only |
| **F9-35** | Synchronous Motor Tuning Current Loop Kp Adjustment Coefficient | 1 | 6 | 100 | - | Read/Write |
| **F9-36** | Synchronous Motor Tuning Current Loop Ki Adjustment Coefficient | 1 | 6 | 100 | - | Read/Write |
| **F9-37 - F9-70** | Reserved | | | | | |

## 5.3 Monitoring Parameter

The monitoring parameters of the inverter can only be read and cannot be modified.

| Parameter | Description | Unit | Communication Address | Parameter Attribute |
|---|---|---|---|---|
| U0-00 | Inverter Running State 1: forward 2: reverse 3: stop | - | 1000H | read-only |
| U0-01 | Fault Code | - | 1001H | read-only |
| U0-02 | Set Frequency | 0.1Hz | 1002H | read-only |
| U0-03 | Running Frequency | 0.1Hz | 1003H | read-only |
| U0-04 | Running Speed | Rpm | 1004H | read-only |
| U0-05 | Output Voltage | V | 1005H | read-only |
| U0-06 | Output Current | 0.1A | 1006H | read-only |
| U0-07 | Output Power | 0.1KW | 1007H | read-only |
| U0-08 | DC Bus Voltage | V | 1008H | read-only |
| U0-09 | Output Torque | 0.1Nm | 1009H | read-only |
| U0-10 | Power Factor Angle | - | 100AH | read-only |
| U0-11 | DI input state, default display -----. DI1-DI4 effective will display ----1 ----2 ---3- ---4 - | - | 100BH | read-only |
| U0-12 | Relay state, default display -----. Relay 1 effective will display ----1 | - | 100CH | read-only |
| U0-13 | AI1 Voltage Before Correction | 0.01V | 100DH | read-only |
| U0-14 | Reserved | 0.01V | 100EH | read-only |
| U0-15 | AI1 Voltage | 0.01V | 100FH | read-only |
| U0-16 | Reserved | 0.01V | 1010H | read-only |
| U0-17 | PID Setting | - | 1011H | read-only |
| U0-18 | PID Feedback | - | 1012H | read-only |
| U0-19 | Remaining Running Time | 0.1Min | 1013H | read-only |
| U0-20 | Current Power-on Time | Min | 1014H | read-only |
| U0-21 | Current Running Time | 0.1Min | 1015H | read-only |
| U0-22 | Cumulative Running Time | Hour | 1016H | read-only |
| U0-23 | Accumulated Power-on Time | Hour | 1017H | read-only |
| U0-24 | Cumulative Power Consumption | Kwh | 1018H | read-only |
| U0-25 | Motor Temperature Value | ℃ | 1019H | read-only |

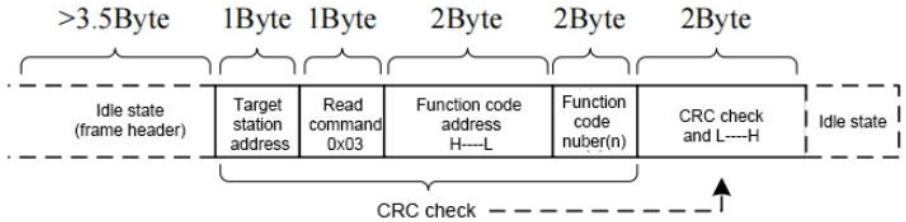
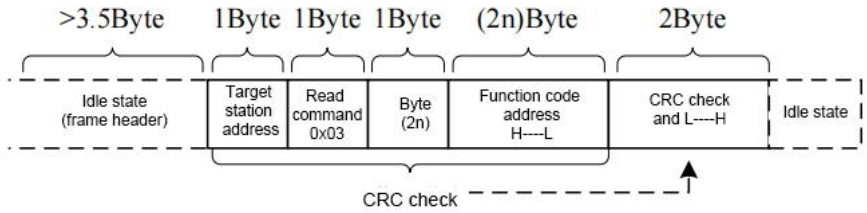
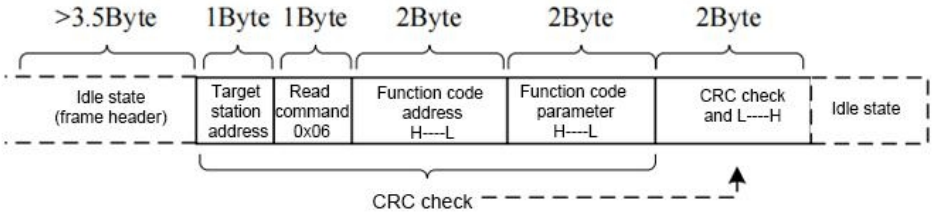
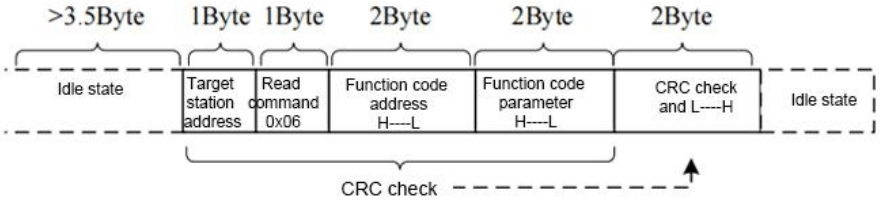
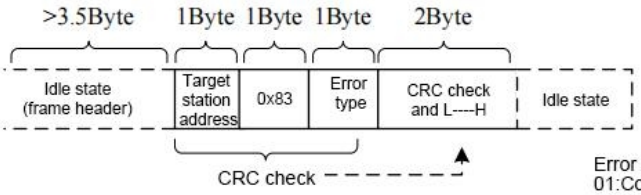
| | | | | |
|---|---|---|---|---|
| **U0-26** | IGBT Temperature Value | ℃ | 101AH | read-only |
| **U0-27** | Actual Switching Frequency | 0.1KHz | 101BH | read-only |
| **U0-28** | M-axis Current Actual Value | 0.1A | 101CH | read-only |
| **U0-29** | T-axis Current Actual Value | 0.1A | 101DH | read-only |
| **U0-30** | Feedback Speed Actual Value | 0.1Hz | 101EH | read-only |
| **U0-31** | Reserved | - | 101FH | read-only |
| **U0-32** | Cascading running status of water pumps | - | 1020H | read-only |
| **U0-33** | Water supply pump state | - | 1021H | read-only |
| **U0-34** | Master and slave output torque | 0.1% | 1022H | read-only |
| **U0-35** | On-line identification of back EMF | 0.1V | 1023H | read-only |
| **U0-36** | Timing pump switching remain time display | h | 1024H | read-only |
| **U0-37** | Reserved | - | 1025H | read-only |
| **U0-38** | Reserved | - | 1026H | read-only |
| **U0-39** | Reserved | - | 1027H | read-only |
| **U0-40** | Reserved | - | 1028H | read-only |
| **U0-41** | Reserved | - | 1029H | read-only |
| **U0-42** | Product Serial Number Lower 16 Digits | - | 102AH | read-only |
| **U0-43** | Product Serial Number Higher 16 Digits | - | 102BH | read-only |
| **U0-44** | Motor Boot Version | - | 102CH | read-only |
| **U0-45** | CPU Type | - | 102DH | read-only |
| **U0-46** | Power Board Hardware Version | - | 102EH | read-only |
| **U0-47** | Power Board Software Version | - | 102FH | read-only |
| **U0-48** | Control Board Software Version | - | 1030H | read-only |
| **U0-49** | Product Number | - | 1031H | read-only |
| **U0-50** | Manufacturer Code | - | 1032H | read-only |
| **U0-51** | Third (most recent) Fault Code | - | 1033H | read-only |
| **U0-52** | Second Fault Code | - | 1034H | read-only |
| **U0-53** | First Fault Code | - | 1035H | read-only |
| **U0-54** | Third Fault Frequency | 0.1Hz | 1036H | read-only |
| **U0-55** | Third Fault Current | 0.1A | 1037H | read-only |
| **U0-56** | Third Fault DC Bus Voltage | 0.1V | 1038H | read-only |
| **U0-57** | Third Fault Heatsink Temperature | ℃ | 1039H | read-only |
| **U0-58** | Third Fault Time(from power-on time) | Min | 103AH | read-only |
| **U0-59** | Third Fault Time(from running time) | 0.1Hour | 103BH | read-only |
| **U0-60** | Second Fault Frequency | 0.1Hz | 103CH | read-only |
| **U0-61** | Second Fault Current | 0.1A | 103DH | read-only |
| **U0-62** | Second Fault DC Bus Voltage | 0.1V | 103EH | read-only |
| **U0-63** | Second Fault Heatsink Temperature | ℃ | 103FH | read-only |

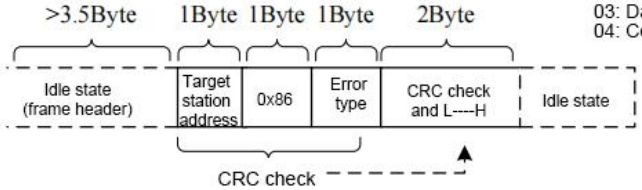
| | | | | |
|---|---|---|---|---|
| **U0-64** | Second Fault Time(from power-on time) | Min | 1040H | read-only |
| **U0-65** | Second Fault Time(from running time) | 0.1Hour | 1041H | read-only |
| **U0-66** | First Fault Frequency | 0.1Hz | 1042H | read-only |
| **U0-67** | First Fault Current | 0.1A | 1043H | read-only |
| **U0-68** | First Fault DC Bus Voltage | 0.1V | 1044H | read-only |
| **U0-69** | First Fault Heatsink Temperature | ℃ | 1045H | read-only |
| **U0-70** | First Fault Time(from power-on time) | Min | 1046H | read-only |
| **U0-71** | First Fault Time(from running time) | 0.1Hour | 1047H | read-only |

# Chapter 6 Communication

## 6.1 Modbus-RTU Communication Protocol

The controller can read consecutive addresses at one time, with a maximum of 12 addresses, but it should be noted that it cannot exceed the last address, otherwise it will make an error. The read operation command is 0x03; The write command is 0x06, which does not support reading and writing of bytes or bits.

<table>
<tr><th>Operation</th><th>command frame</th></tr>
<tr><td rowspan="2">Read</td><td>Read command frame of master station<br> 
</td></tr>
<tr><td>Read response frame of slave station<br> 
</td></tr>
<tr><td rowspan="2">Write</td><td>Write command framd of master station<br> 
</td></tr>
<tr><td>Write response framd of master station<br> 
</td></tr>
<tr><td>Fault</td><td>Read response errot framd of slave station<br> 

<br>Error type:<br>01:Command code error<br>02: Address error<br>03: Data error<br>04: Command cannot handle<br>Read response errot framd of slave station<br> 
</td></tr>
</table>

## 6.2 Modbus Register Definition

| Register Number | Function Code Parameter | Function Code | Function | Range | Description |
|---|---|---|---|---|---|
| 0x01 | - | 06 | Set communication frequency | -10000~10000 | 10000 refers to 100% corresponding to the maximum frequency, 0 refers to 0% corresponding to the minimum frequency, when set to negative direction. |
| 0x02 | - | 06 | Control command | 1~7 | 1：forward running<br>2：reverse running<br>3：forward jogging<br>4：reverse jogging<br>5：free stop<br>6：ramp to stop<br>7：fault reset |
| 0x03 | - | 06 | Relay control | 0x00~0x0F | BIT0：relay 1 control；<br>BIT1：relay 2 control |
| 0x04 | - | 06 | AO1 output control | 0～7FFF | 0 corresponding output 0%，<br>7FFF corresponding output 100% |
| 0x05 | - | 06 | AO2 output control | 0～7FFF | 0 corresponding output 0%，<br>7FFF corresponding output 100% |
| 0xF000 | F0-00 | 03 | Command source | 0~2 | Refer to F0-00 |
| …… | | | | | |
| 0xF924 | F9-36 | 03 | Synchronous motor tuning time current loop Ki adjustment coefficient | Depend on inverter model | Refer to F9-36 |
| 0x1000 | U0-00 | 03 | Refer to U0-00 | | |

| | | | |
|---|---|---|---|
| …… | | | |
| 0x1047 | U0-71 | 03 | Refer to U0-71 |

All user-configurable parameters can be read or written from the hold register by the appropriate Modbus command. The register numbers of parameters F0-00 to F9-36 are defined as 0xF001 to 0xF924. The register numbers of parameters U0-00 to U0-71 are defined as 0x1000 to 0x1047.

## 6.3 Modbus Application Cases

### 6.3.1 Setting Communication Parameters

During MODBUS communication, you need to set relevant parameters first, and they can be set in F7 parameter group.

| Parameter | Name | Description |
|---|---|---|
| F7-00 | Inverter address | The local address of the inverter when it uses the communication function. If the value is set to 0, the broadcast address is used to implement the broadcast function of the upper computer. |
| F7-01 | Baud Rate | 0：9600BPS 1：19200BPS2：38400BPS3：57600BPS<br>4：115200BPS |
| F7-02 | Data Format | 0: No verification (8-N-2) 1: even check (8-E-1)<br>2: Odd check (8-O-1)3: No verification (8-N-1) |
| F7-03 | Communication Timeout | When this parameter is set to 0.0 second, no communication timeout detection is performed.<br>When this parameter is set to more than 0.1 second, if the interval between one communication and the next communication exceeds the communication timeout, the inverter will report a communication failure (Err16). |

### 6.3.2 Enable Communication Function

| Parameter | Set Value | Function |
|---|---|---|
| F0-00：Command Mode | 2 | The start-stop control mode of an inverter is set as communication control. The controller writes the number "1~5" to register no.2 to control the start-stop command executed by the inverter. See Section 6.2 for the specific command. |
| F0-01：Target Frequency Setting | 8 | The target frequency setting mode of an inverter is communication setting. The controller can control the |

| | | |
|---|---|---|
| Mode | | target frequency of an inverter by writing the number "-10000~10000" to register No. 1. For specific command, see Section 6.2. |
| F1-08：Relay Output Selection | 7 | The inverter relay is set for communication control, and the controller writes the number "0 or 1" into the No.3 register, which can control the closing and opening of the relay. |
| F1-28：AO1/AO2 Output Selection | 6 | The analog output terminal of the inverter is set as communication control, and the controller writes numbers "0~7FFF" to register no. 4, where 0 corresponds to 0% output and 7FFF to 100% output. |
| F5-00: PID Setting Source<br>F5-02: PID Feedback Source | 4/2 | The Modbus register No.1 of the inverter is enabled at this time, and its value is used as the given value or feedback value of PID. |

# Chapter7 Maintenance and Troubleshooting

## 7.1 Routine Maintenance

### 7.1.1 Regular Inspection

Due to the influence of environmental temperature, humidity, dust and vibration, the internal devices of the inverter will be aged, resulting in potential failures of the inverter or reducing the service life of the inverter. Therefore, it is necessary to carry out daily and regular maintenance of the inverter.

| Daily Inspection Items | Regular Inspection Items |
|---|---|
| ▲ Whether the sound of the motor changes abnormally or vibrates during running. | ▲ Check whether the air channel is clean |
| ▲ Does the installation environment of inverter change. | ▲ Check whether the screws are loose. |
| ▲ Whether the cooling fan of the inverter works normally and whether there are stains. | ▲ Check whether the inverter is corroded. |
| ▲ Is the inverter overheated. | ▲ Check the wiring terminals for traces of arcing pulling. |
| ▲ Is the inverter kept clean. | |

### 7.1.2 Long-time Storage

If the inverter has been stored for a period of time before installation or has not been powered by the main power supply for a long time, it is necessary to age and energize the DC capacitor in the inverter according to the following instructions before operation, and the inverter can run normally after the aging is completed.

| Storage Time | Input Voltage 1 | Duration 1 | Input Voltage 2 | Duration 2 | Input Voltage 3 | Duration 3 | Input Voltage 4 | Duration 4 |
|---|---|---|---|---|---|---|---|---|
| Less than 1 year | 100% | Without treatment | | | | | | |
| 1-2 years | 100% | 1 hour | Normal running | | | | | |
| 2~3 years | 25% | 0.5 hour | 50% | 0.5 hour | 75% | 0.5 hour | 100% | 0.5 hour |
| More than 3 years | 25% | 2 hours | 50% | 2 hours | 75% | 2 hours | 100% | 2 hours |

## 7.2 Faults and Solutions

When a fault occurs during the operation of the 980 series inverter system, the inverter immediately stops the output so as to protect the motor, and at the same time the inverter fault relay operates. The inverter panel will display the fault code, the fault code corresponds to the type of fault and common solutions are detailed in the following table.

**The list in the table is for reference only. Do not repair or modify it without authorization. If you can't troubleshoot, please ask the supplier for technical support.**

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| Inverter Unit Protection | Err01 | 1. The output circuit is grounded or short circuited<br>2. The connecting cable of the motor is too long<br>3. The module overheats<br>4. The internal connections become loose<br>5. The main control board is faulty<br>6. The drive board is faulty<br>7. The inverter module is faulty | 1. Eliminate external faults<br>2. Install a reactor or an output filter<br>3. Check the air filter and the cooling fan<br>4. Connect all cables properly<br>5. Contact for technical support<br>6. Contact for technical support<br>7. Contact for technical support |
| Overcurrent During Acceleration | Err02 | 1. The output circuit is grounded or short circuited<br>2. The control method is vector and no parameter identification<br>3. The acceleration time is too short<br>4. Manual torque boost or V/F curve is not appropriate<br>5. The voltage is too low | 1. Eliminate external faults<br>2. Perform the motor auto-tuning<br>3. Increase the acceleration time<br>4. Adjust the manual torque boost or V/F curve<br>5. Adjust the voltage to normal range<br>6. Select rotational speed tracking restart or start the motor after it stops<br>7. Remove the added load. |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| | | 6. The startup operation is performed on the rotating motor.<br>7. A sudden load is added during acceleration<br>8. The inverter model is of too small power class | 8. Select higher power rating inverter |
| Overcurrent During Deceleration | Err03 | 1. The output circuit is grounded or short circuited<br>2. The control method is vector and no parameter identification<br>3. The deceleration time is too short<br>4. The voltage is too low<br>5. A sudden load is added during deceleration<br>6. The braking unit and braking resistor are not installed | 1. Eliminate external faults<br>2. Perform the motor auto-tuning<br>3. Increase the deceleration time<br>4. Adjust the voltage to normal range<br>5. Remove the added load.<br>6. Install the braking unit and braking resistor |
| Overcurrent at Constant Speed | Err04 | 1. The output circuit is grounded or short circuited<br>2. The control method is vector and no parameter identification<br>3. The voltage is too low<br>4. A sudden load is added during deceleration<br>5. The inverter model is of too small power class | 1. Eliminate external faults<br>2. Perform the motor auto-tuning<br>3. Adjust the voltage to normal range<br>4. Remove the added load.<br>5. Select higher power rating inverter |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| Overvoltage During Acceleration | Err05 | 1. The input voltage is too high<br>2. An external force drives the motor during acceleration<br>3. The acceleration time is too short<br>4. The braking unit and braking resistor are not installed | 1. Adjust the voltage to normal range<br>2. Cancel the external force or install a braking resistor<br>3. Increase the acceleration time<br>4. Install the braking unit and braking resistor |
| Overvoltage During Deceleration | Err06 | 1. The input voltage is too high<br>2. An external force drives the motor during deceleration<br>3. The deceleration time is too short<br>4. The braking unit and braking resistor are not installed | 1. Adjust the voltage to normal range<br>2. Cancel the external force or install a braking resistor<br>3. Increase the deceleration time<br>4. Install the braking unit and braking resistor |
| Overvoltage at Constant Speed | Err07 | 1. The input voltage is too high<br>2. An external force drives the motor during running | 1. Adjust the voltage to normal range<br>2. Cancel the external force or install a braking resistor |
| Control Power Supply Fault | Err08 | 1. The input voltage is not within the allowable range | 1. Adjust the voltage to normal range |
| Undervoltage | Err09 | 1. Instantaneous power failure<br>2. The inverter’s input voltage is not within the allowable range<br>3. The DC bus voltage is abnormal<br>4. The rectifier bridge and buffer resistor are faulty<br>5. The drive board is | 1. Reset the fault<br>2. Adjust the voltage to normal range<br>3. Contact for Technical support<br>4. Contact for Technical support<br>5. Contact for Technical support<br>6. Contact for Technical support |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| | | faulty<br>6. The main control board is faulty | |
| Inverter Overload | Err10 | 1. The load is too heavy or locked rotor occurs on the motor<br>2. The inverter model is of too small power class | 1. Reduce the load and check the motor and mechanical condition<br>2. Select an inverter of higher power class |
| Motor Overload | Err11 | 1. P9-01 is set improperly<br>2. The load is too heavy or locked rotor occurs on the motor<br>3. The inverter model is of too small power class | 1. Set P9-01 correctly<br>2. Reduce the load and check the motor and mechanical condition<br>3. Select higher power rating inverter |
| Power Input Phase Loss | Err12 | 1. The three-phase power input is abnormal<br>2. The drive board is faulty<br>3. The lightening board is faulty<br>4. The main control board is faulty | 1. Eliminate external faults<br>2. Contact for Technical support<br>3. Contact for Technical support<br>4. Contact for Technical support |
| Power Output Phase Loss | Err13 | 1. The cable connecting the inverter and the motor is faulty<br>2. The inverter's three-phase outputs are unbalanced when the motor is running<br>3. The drive board is faulty<br>4. The module is faulty | 1. Eliminate external faults<br>2. Check whether the motor three-phase winding is normal<br>3. Contact for Technical support<br>4. Contact for Technical support |
| Module Overheat | Err14 | 1. The ambient temperature is too high<br>2. The air filter is blocked | 1. Lower the ambient temperature<br>2. Clean the air filter<br>3. Replace the damaged |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| | | 3. The fan is damaged<br>4. The thermally sensitive resistor of the module is damaged<br>5. The inverter module is damaged | fan<br>4. Replace the damaged thermally sensitive resistor<br>5. Replace the inverter module |
| External Equipment Fault | Err15 | 1. External fault signal is input via DI<br>2. External fault signal is input via virtual I/O | 1. Reset the operation<br>2. Reset the operation |
| Communication Fault | Err16 | 1. The controller is in abnormal state<br>2. The communication cable is faulty<br>4. The communication parameters are set improperly | 1. Check the cabling of host computer<br>2. Check the communication cabling<br>4. Set the communication parameters properly |
| Contactor Fault | Err17 | 1. The drive board and power supply are faulty<br>2. The contactors is faulty | 1. Replace the faulty drive board or power supply board<br>2. Replace the faulty contactor |
| Current Detection Fault | Err18 | 1. The HALL device is faulty<br>2. The drive board is faulty | 1. Replace the faulty HALL device<br>2. Replace the faulty drive board |
| Motor Auto-tuning Fault | Err19 | 1. The motor parameters are not set according to the nameplate<br>2. The motor auto-tunning times out | 1. Set the motor parameters according to the nameplate properly<br>2. Check the cable connecting the inverter and the motor |
| EEPROM Write Fault | Err21 | 1. The EEPROM chip is damaged | 1. Replace the main control board |
| Inverter Hardware Fault | Err22 | 1、Overvoltage<br>2、Overcurrent | 1. Solve as overvoltage fault<br>2. Solve as overcurrent fault |
| Short Circuit to | Err23 | 1. The motor is short | 1. Replace the cable or |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| Ground | | circuited to the ground | motor |
| Accumulative Running Time Reached | Err26 | 1. The accumulative running time reaches the setting value | 1. Clear the record through the parameter initialization function |
| Accumulative Power-on Time Reached | Err29 | 1. The accumulative power-on time reaches the setting value | 1. Clear the record through the parameter initialization function |
| Pulse-by-pulse Current Limit Fault | Err40 | 1. The load is too heavy or locked rotor occurs on the motor<br>2. The inverter model is of too small power class | 1. Reduce the load and check the motor and mechanical condition<br>2. Select an inverter of higher power class |
| Motor Switchover Fault During Running | Err41 | 1. Change the selection of the motor via terminal during running of the inverter | 1. Perform motor switchover after the inverter stops |
| Excessive Speed Deviation Fault | Err42 | 1. Excessive Speed deviation Inspection parameter P6-10, P6-11 Setting is not correct<br>2. No parameter identification | 1. Correctly Setting Parameter P6-10, P6-11.<br>2. Executive parameter identification |
| Water Shortage alarm | A52 | 1. Pressure sensor is damaged<br>2. Check whether the parameters of the inverter are incorrectly set<br>3. Whether the pipe network and motor are correct | 1. Check pressure sensor<br>2. Check inverter parameter setting<br>3. Check motor and pipe |
| Overpressure Fault | Err53 | 1. Pressure sensor is damaged<br>2. Check whether the parameters of the inverter are incorrectly set | 1. check the pressure sensor<br>2. Test whether the inverter F5-18 is correctly set |
| Knitting Machine DI | Err56 | 1.DI terminal function setting is not correct | 1. Check the DI terminal settings. |

| Fault Name | Display | Possible Causes | Solutions |
|---|---|---|---|
| Fault | | 2. DI terminal is constantly high or low during the signal judgment cycle. | 2. Check the status of the corresponding DI terminal. |
| Internal Communications Fault | Err64 | 1.Inverter internal communication failure | 1.Contact for Technical support |
| Power board Communication Fault | Err65 | 1. Power board abnormality | 1.Contact for Technical support |

## 7.3 Common Faults and Solutions

The following faults may be encountered during the use of the inverter. Refer to the following table for simple fault analysis：

| SN | Fault | Possible Causes | Solutions |
|---|---|---|---|
| 1 | There is no display at power-on | 1. There is no power supply to the inverter or the power input to the inverter is too low<br>2. The power supply of the switch on the drive board of the inverter is faulty<br>3. The rectifier bridge is damaged<br>4. The buffer resistor is faulty<br>5. The control board or the operation panel is faulty<br>6. The cable connecting the control board and the drive board, and the operation panel breaks | 1. Check the power supply<br>2. Check the DC bus voltage<br>3. Re-connect the 10-core cables<br>4~6. Contact us for technical support |
| 2 | ”Err23” is displayed at power-on | 1. The motor or the motor output cable is short circuited to the ground<br>2. The inverter is damaged | 1. Measure the insulation of the motor and the output cable with a megger<br>2. Contact us for technical support |

| SN | Fault | Possible Causes | Solutions |
|---|---|---|---|
| 3 | Err14 (Module overheat) fault alarm frequently | 1. The setting of switching frequency is too high<br>2. The cooling fan is damaged, or the air filter is blocked<br>3. Components inside the inverter are damaged (thermocouple or other) | 1. Reduce the switching frequency (P0-13)<br>2. Replace the fan and clean the air filter<br>3. Contact us for technical support |
| 4 | The motor does not rotate after the inverter runs | 1. Check the motor and the motor cables<br>2. The inverter parameters are set improperly (Motor parameters)<br>3. The cable between the drive board and the control board is in poor contact<br>4. The drive board is faulty | 1. Ensure the cable between the inverter and the motor is normal<br>2. Replace the motor or clear mechanical faults<br>3. Check the re-set motor parameters<br>4. Contact us for technical support |
| 5 | The DI terminals are disabled | 1. The parameters are set incorrectly<br>2. The external signal is incorrect<br>3. The control board is faulty | 1. Check and reset the parameters in group P4<br>2. Re-connect the external signal cables<br>3. Contact us for technical support |
| 6 | The inverter overcurrent and overvoltage frequently | 1. The motor parameters are set improperly<br>2. The acceleration/deceleration time is improper<br>3. The load fluctuates | 1. Re-set motor parameters or re-perform the motor auto-tunning<br>2. Set proper acceleration/deceleration time<br>3. Contact us for technical support |
| 7 | Err17 alarm when power-on or running | The soft startup contactor is not picked up | 1. Check whether the contactor cable is loose<br>2. Check whether the contactor is faulty<br>3. Check whether 24V power supply of the contactor is faulty<br>4. Contact us for technical support |

## 7.4 Warranty Agreement

(1) Free warranty only refers to the inverter itself.

(2) In case of failure or damage within the warranty terms, our company is responsible for 12 months warranty (from the date of delivery, the bar code on the fuselage shall prevail, and if there is a contract agreement, it shall be implemented according to the agreement). For more than 12 months, we will charge a reasonable maintenance fee;

(3) During the warranty period, our company will charge a certain maintenance fee if:

a) Machine damage caused by the user's failure to comply with the regulations in the user manual;

b) Machine damage caused by mistakes in use and unauthorized maintenance and modification;

c) Damage caused by fire, flood, abnormal voltage, etc.;

d) Damage caused by using the inverter for abnormal functions;

e) Damage caused by man-made falling and transportation after purchase;

f) Failure and damage caused by obstacles outside the machine (such as external equipment factors);

(4) The service fee is calculated according to the uniform standard of the manufacturer. If there is a contract, the contract will take precedence.

(5) If there is any problem in the service process, please contact the supplier in time.

(6) The final interpretation right of warranty instructions belongs to our company.

# Warranty Card

| | | |
|---|---|---|
| Customer Information | Address: | |
| | Name: | Contact: |
| | Postal code: | Tel: |
| Product Information | Product model: | |
| | Fuselage Bar code (posted here): | |
| | Agent name: | |
| Fault Information | | |

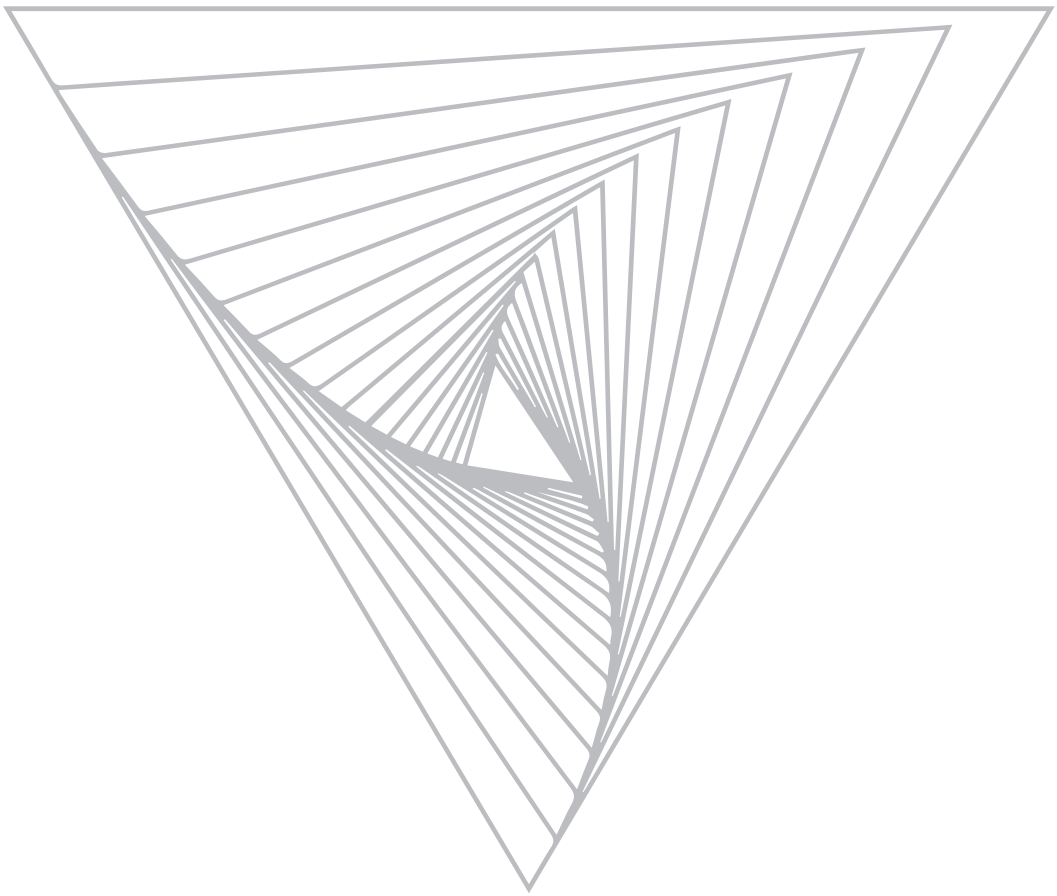
Certificate

This product has gone through rigorous quality control tests at factory.

| | |
|---|---|
| Inspector | |
| Approval Mark | |

V980.25.03.01.E

# 980 Series
# User Manual



High protection vector control inverter