# APV PRO series

## Vector type frequency converter instruction manual

V202.xx

The illustrations in this instruction manual are for illustrative purposes only and may differ slightly from the actual product. Due to product upgrades, there may also be slight differences. Please refer to the actual product for accuracy.

Please ensure that this instruction manual is delivered to the end user and kept safe for future inspection and maintenance.

If you have any questions, please contact our company or our agents promptly. We are happy to assist you.

1. Safety Precautions

Read this instruction manual carefully before installing, operating, maintaining, or inspecting.

The safety precautions in the instruction manual are categorized as "Warnings" or "Caution".


It points out potential dangers that, if not avoided, could lead to personal injury or death.

This indicates potential hazards that, if not avoided, could result in minor to moderate personal injury and equipment damage. It can also be used to warn against unsafe practices.


In some cases, even the precautions mentioned **above can lead to serious accidents. Therefore, it is essential to follow these important precautions in all circumstances.**

★ **Note** the steps taken to ensure correct operation.

Warning labels are displayed on the front cover of the drive unit.

Follow these guidelines when using the driver.

Warning mark

| DANGER |
| --- |
| ·Risk of injury and electric shock.<br>·Read the manual and follow the safety instructions before use.<br>·solate from supply and wait 10minutes before removing his cover.<br>·Ensure proper earth connection.<br>·Mount the inverter on a non-combustible surface. |

2. Unpacking and inspection

|  |
| --- |
| • Do not install or run any drives that are damaged or have faulty parts, as this could result in injury. |

After unpacking and removing the drive, please check the following items.

① Confirm that the drive was not damaged during transportation (damage or nicks on the body).

② Confirm that the package contains an instruction manual and warranty card.

③ Check the driver nameplate and confirm that it is the product you ordered.

④ If you ordered optional accessories for the drive, please confirm that the received accessories are what you need.

If you find any damage to the drive or accessories, please call your local dealer immediately.

3. Disassembly and installation precautions

警告

• The design, installation, commissioning, and operation of the equipment must be carried out by trained and qualified professionals; all provisions in the "Warnings" must be followed during the work process, otherwise serious personal injury or major property damage may occur.

• Input power cords are only allowed to be permanently and securely connected, and the equipment must be reliably grounded.

Even when the driver is not in operation, the following terminals may still carry dangerous voltages:

-Power terminals R, S, T

-Connecting the motor terminals U, V, W

• After the power switch is turned off, you must wait at least 10 minutes and allow the driver to discharge completely before you can begin the installation process.

• The minimum cross-sectional area of the grounding conductor must be at least 10 mm², or the maximum value among the two values listed in the table below must be selected as the grounding conductor area:

The cross-sectional area of the power line conductor is S mm² , and the cross-sectional area of the grounding conductor is...

| |
|---|
| S≤6 S |
| 16＜S≤35 16 |
| 35＜S S/2 |

当心

• When lifting the cabinet using the support base, do not grab the panel to lift it while moving the drive unit, otherwise the main unit may fall and cause personal injury.

• The drive unit should be installed on a flame-retardant material such as

metal, away from heat sources and flammable objects to prevent fire.

• When installing two or more drives in a cabinet, a cooling fan must be installed and the air temperature must be controlled below 40°C, otherwise overheating may cause a fire or damage to the equipment.

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# Chapter One Overview

## 1-1 Comprehensive Technical Characteristics of Frequency Converters

| project | | Specification |
|---|---|---|
| Basic | highest frequency | 0 ~ 60 0Hz |
| | carrier frequency | 0.5kHz ~ 16kHz<br>It can automatically adjust the carrier frequency according to the load characteristics. |
| | Input frequency resolution | Digital setting: 0.01Hz<br>Simulation settings: Maximum frequency × 0.025% |
| | Control method | Open-loop vector control ( without PG )<br>V/F control |
| | Starting torque | Model G : 0.5Hz/150% ( without PG ); |
| | Speed range | 1 : 100 ( No PG ) |
| | Speed stability | ±0.5% ( without PG ) |
| | Torque control accuracy | ±5% ( FVC ) |
| | Overload capacity | Type G : 150% rated current for 60 seconds ;<br>180% rated current for 3 seconds . |
| | Torque boost | Automatic torque boost; manual torque boost of 0.1%~30.0%. |
| | V/F curve | Three types: linear; multi-point; Nth power V/F curve<br>( 1.2 , 1.4 , 1.6 , 1.8 , 2 ) |
| | V/F separation | Two methods: full separation and partial separation |
| | Acceleration/deceleration curves | linear or S- curve acceleration/deceleration methods. Four acceleration/deceleration times, ranging from 0.0 to 6500.0 seconds. |
| Function | DC braking | DC braking frequency: 0.00Hz ~ maximum frequency;<br>Braking time: 0.0s ~ 100.0s ;<br>Braking operating current value: 0.0%~100.0% |
| | Jog control | Jogging frequency range: 0.00Hz~50.00Hz .<br>The inching acceleration and deceleration time is 0.0s to 6500.0s . |
| | Simple PLC , multi-speed operation | 16 speed settings can be achieved via built-in PLC or control terminals. |

| | | |
|---|---|---|
| | Built-in PID | It can easily realize a closed-loop control system for process control. |
| | Automatic Voltage Regulator ( AVR ) | It can automatically maintain a constant output voltage when the mains voltage changes. |
| | Overvoltage and overcurrent speed control | Automatic current and voltage limiting during operation to prevent frequent overcurrent and overvoltage tripping. |
| | Fast rate limiting function | Minimize overcurrent faults and protect the inverter for normal operation. |
| | Torque Limiting and Control | " excavator " feature automatically limits torque during operation. Preventing frequent overcurrent tripping |
| | Protection function | Features include: motor short circuit detection, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, and overload protection. |
| Personalization features | Excellent performance | Realizing asynchronous motors using high-performance current vector control technology |
| | Fast rate limiting | To avoid frequent overcurrent faults in the frequency converter |
| | Timed control | Timer control function: Set time range 0.0 Min ~ 6500.0 Min |
| | Communication methods supported | RS-485 , CANopen communication, Profinet communication<br>EtherCAT, Profibus-DP, ModbusTCP |
| run | command source | Operation panel settings, control terminal settings, serial communication port settings. It can be switched in multiple ways |
| | frequency source | Ten frequency sources: digital input, analog voltage input, analog current input, and serial port input. Switching between these sources is possible in multiple ways. |
| | Auxiliary frequency source | Ten auxiliary frequency sources. Allows for flexible auxiliary frequency fine-tuning and frequency synthesis. |
| | Input terminals | 6 digital input terminals,<br>Two analog input terminals support 0-10V voltage input or 4-20mA current input . |
| | Output terminals | 2 relay output terminals<br>Two analog output terminals support 0~20mA current output or 0~10V voltage output. |

| | | |
|---|---|---|
| ring territory | Altitude | Below 1000m ( above 1000m, downshifting is required ) |
| | Ambient temperature | a lower setting if the ambient temperature is between 40℃ and 50℃ ) |
| | humidity | Less than 95% RH, no water droplets condense. |
| | vibration | Less than 5.9 m/ s² (0.6 g) |
| | Storage temperature | -20℃ to +60℃ |
| | Protection level | IP66 |

**1-2 Process Description**

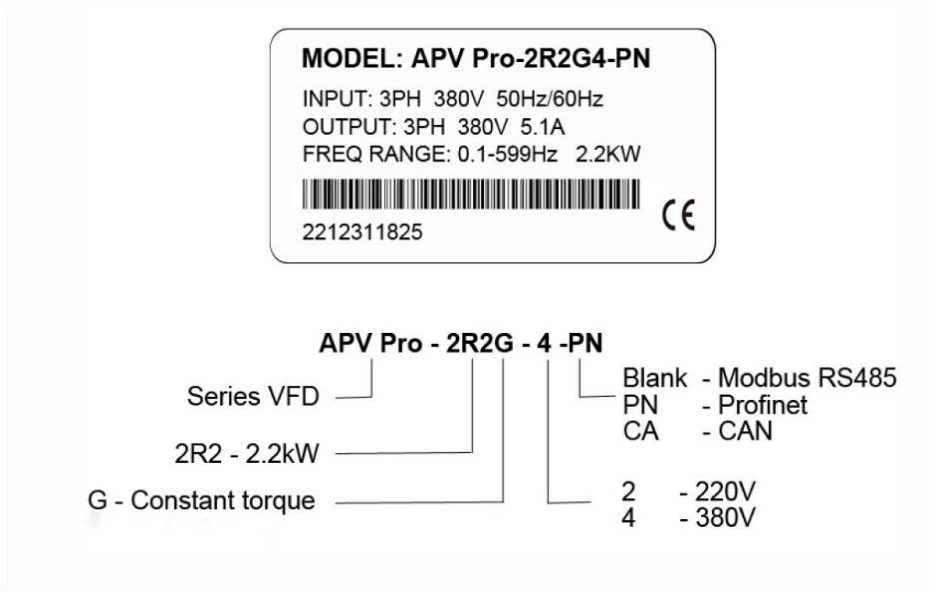
| Function | describe | Show code |
|---|---|---|
| Pump | PA03=0, positive effect:<br>the operating frequency is greater than or equal to the pumping frequency PA.51, and the feedback value is less than the set value and the duration is greater than the pumping time PA.52, then the current pump switches to mains frequency operation and the next variable frequency pump is started .<br>PA03=1, reaction:<br>If the operating frequency is greater than or equal to the pumping frequency PA.51 and the duration is greater than the pumping time PA.52 , then the current pump will switch to mains frequency operation and the next pump will start operating at variable frequency . | |
| Pump reduction | PA03=0, positive effect:<br>If the operating frequency is less than or equal to the pump reduction frequency PA.53, and the feedback is greater than 95% of the set value, and the duration is greater than the pump reduction time PA.54 , then the first pump put into operation should be stopped according to the principle of first-in, first-out.<br>PA03=1, reaction:<br>If the operating frequency is less than or equal to the pump reduction frequency PA.53, and the feedback value is less than 110% of the set value , and the duration is greater than the pump reduction time PA.54 , the first pump put into operation will be stopped according to the principle of first-in, first-out. | |
| Replace pump | If a variable frequency pump is running for a duration that reaches the pump replacement time FA . 55 and | |

| | | |
|---|---|---|
| | there is an idle variable frequency pump , it will be replaced with the next variable frequency pump in operation. | |
| Automatic start upon power-on | Automatic startup of PA.38 upon power-on is invalid if PA.38=0; PA.38's factory default value is 0. | |
| Pressure setting and display | FA.02 Target value setting:<br>0 : PA.04 Set the target pressure; UP and DOWN can be modified . | |
| Terminal to shut off water pump function | Multi-function terminal for shutting off water pump:<br>5.1 : Pump 1 is ineffective .<br>5 2 : Pump 2 is not working.<br>53 : Pump 3 is ineffective.<br>54 : Pump 4 is not working.<br>When the corresponding input terminal is closed<br>1) If the water pump is running at mains frequency, immediately disconnect the motor.<br>2) If the water pump is operating at a variable frequency and there is an idle pump, then immediately proceed with the pump replacement process.<br>3) If the water pump is operating at variable frequency and there is no idle pump, the pump operating at industrial frequency will stop, and after a delay, it will switch to variable frequency operation. | |
| PID sleep function | 1) When pressure is reached, the operating frequency is less than the sleep frequency PA.29, and the duration is greater than the sleep time PA.30. The frequency drops to 0, and the system enters sleep mode, displaying "SLP".<br>2) When the operating frequency is higher than the sleep frequency PA.29, and the frequency is stable, the inverter can intelligently identify this and will enter sleep mode. The relevant parameters are PA.45~PA.48.<br>3) If the frequency is greater than PA.49, do not determine if it is in sleep mode.<br>4) The system will only enter sleep mode when only one variable frequency pump is running. | SLP |
| PID wake-up function | PA03=0, positive effect:<br>When the pressure drops below the set pressure of -PA.31 during sleep mode, the inverter wakes up and the PID controller starts working.<br>PA03=1, reaction:<br>When the feedback value increases during sleep mode and exceeds the set pressure + PA.31, the inverter | |

| | | |
|---|---|---|
| | wakes up and the PID controller starts working. | |
| Antifreeze function | When PA. 41 = 1, during sleep, the duration is greater than PA. 42, and the duration of PA. 43 is at the frequency of PA. 44. | |
| Pressure sensor disconnection detection | If the pressure sensor disconnects, the frequency converter will report a fault and display "PIDE". Refer to parameters PA26 and PA27. | 20 |
| High water pressure alarm | If the pressure exceeds PA.32 during shutdown or operation and the duration exceeds 0.1 seconds, a high pressure fault will be reported and the machine will shut down, with fault code "HP".<br>(After the pressure returns to normal or the set pressure is less than or equal to the set pressure , PA.35 automatically resets the fault after a delay.) | HP |
| Low water pressure alarm | during operation and persists for a period greater than PA.36, a low pressure fault will be reported and the machine will shut down, with fault code "LP".<br>(After pressure > PA.33 *1.1 , PA.35 automatically resets after a delay) | LP |
| Replace the pump if it fails | Connect the pressure sensor to the standby main pump in advance and set PA.58 . Enable FA.65 to replace the main pump and set FA.66 to become the operating source after replacing the main pump. When the main pump fails, it will switch to the standby main pump . | |
| Water shortage alarm | PA03=0, positive effect:<br>"Detection frequency A" = 2Hz lower than the maximum frequency = P0.12 - 2Hz<br>If the inverter's operating frequency is greater than "detection frequency A" and the duration is greater than PA.37, while the pressure is less than PA.34, a water shortage fault will be reported and the unit will shut down, with fault code "LL".<br>PA03=1, reaction<br>The water shortage alarm is no longer being interpreted. | LL |
| Automatic reset function for water shortage fault | In the event of a water shortage fault, the frequency converter will automatically reset the fault and resume operation. The automatic reset interval is PA.39 , and the number of water shortage self-resets is PA.40. This ensures that the unit stops operating when the tap water supply is interrupted and automatically resumes normal water supply once the tap water supply is restored. | |

| | | |
|---|---|---|
| | (In keyboard operation mode, the automatic power-on and automatic operation function needs to be enabled.) | |
| Variable frequency pump tripping fault | Multi-pump communication: Terminal shutdown of frequency converter pump or frequency converter pump failure.<br>If an idle pump is available, switch to idle pump frequency conversion regulation ; if no idle pump is available, check if a mains frequency pump is available. If so, set it as a frequency conversion pump and regulate it with the mains frequency using PID control ; if no mains frequency pump is available, wait for an idle pump to become available before starting operation. | |
| B1~ B4 | Water pump 1~ 4 shut-off function prompt | |
| CO1~ CO4 | Communication disconnection message between the main unit and the slave pumps (pumps 1-4 ) | |

## 1-3 Inverter Nameplate Description

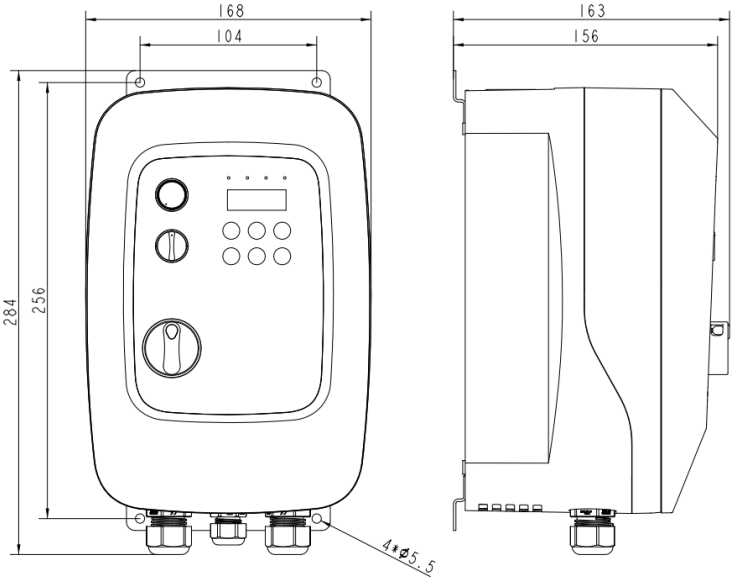


**1-4 series frequency converters**

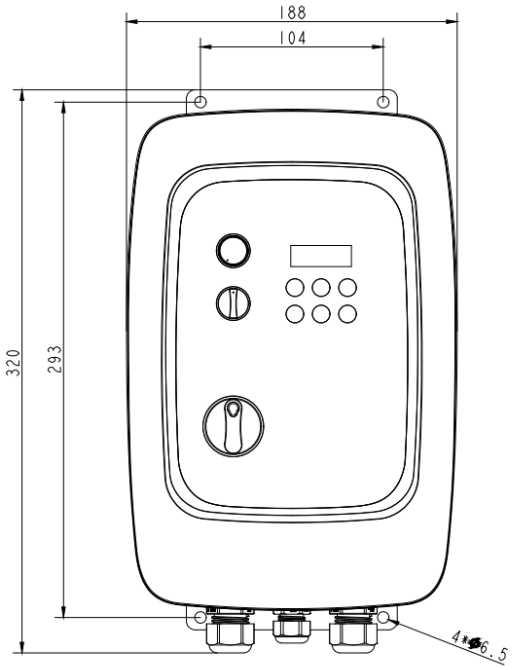
| Inverter Model | Input voltage | Rated output power (KW ) | Rated input current (A ) | Rated output current (A ) | Applicable motor (KW) |
|---|---|---|---|---|---|
| APV PRO-0R75G-4 | 3PH AC 380V ±15% | 0.75 | 3.8 | 2.1 | 0.75 |
| APV PRO-1R5G-4 | | 1.5 | 5.0 | 3.8 | 1.5 |
| APV PRO-2R2G-4 | | 2.2 | 5.8 | 5.1 | 2.2 |
| APV PRO-3R7G-4 | | 3.7 | 10.0 | 9.0 | 3.7 |
| APV PRO-5R5G-4 | | 5.5 | 15.0 | 13.0 | 5.5 |
| APV PRO-7R5G-4 | | 7.5 | 20.0 | 17.0 | 7.5 |
| APV PRO-11G-4 | | 11 | 26.0 | 25.0 | 11 |

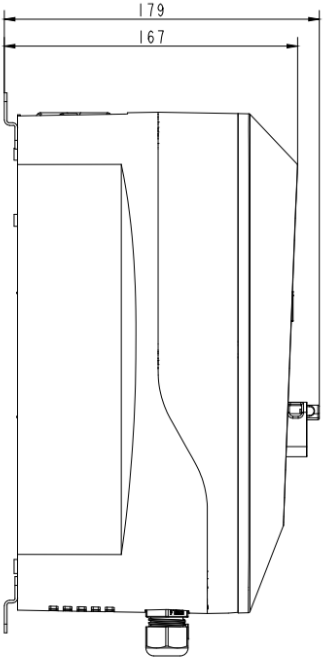
**1-5 Inverter Appearance and Installation Dimensions**

(1) 0.75KW~3.7KW



(2) 5.5KW~11KW

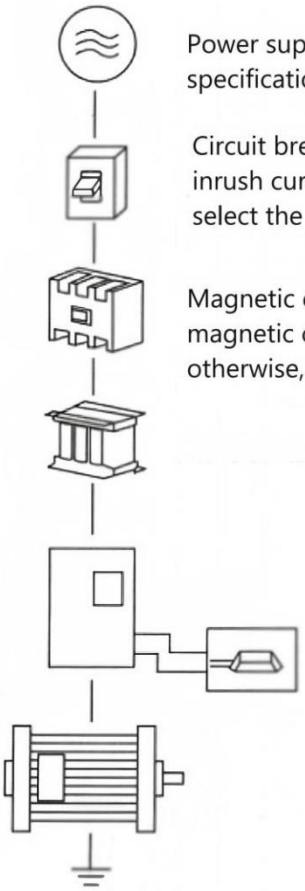


## Chapter Two: Inverter Wiring

The wiring of a frequency converter is divided into the main circuit section and the control section.

### 2-1 Main circuit wiring



Power supply: Use a power supply within the specifications permitted by the inverter.

Circuit breaker:Use an MCCB or RCD. Note that a large inrush current flows into the inverter at power-on; select the breaker accordingly.

Magnetic contactor (MC). Note: Do not use the magnetic contactor to start or stop the inverter; otherwise, its service life will be reduced.

AC reactor (optional): Suppresses high harmonics and improves power factor. Select an appropriate reactor.

The braking resistor： enhances the braking capacity of the inverter 's built-in brake unit.

2-1-1 Peripheral Component Description

(1) AC power supply

Please use the power supply specified in the instruction manual.

(2) Fuseless Circuit Breaker (MCCB)

When the power supply voltage is too low or there is a short circuit on the input side, the circuit breaker can provide protection. When inspecting, maintaining, or not working, the circuit breaker can be disconnected to isolate the frequency converter from the power supply.

(3) Electromagnetic contactor (MC)

It facilitates the control of the inverter's power-on and power-off, ensuring safety.

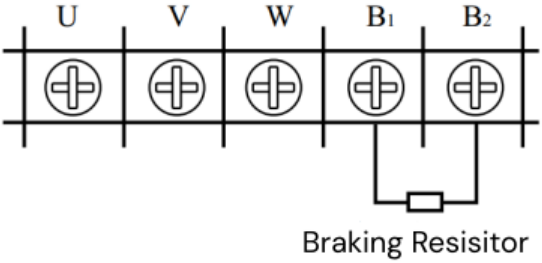
(4) AC reactor ( optional )

a: Suppress high harmonics and protect the frequency converter.

b: Improve power factor

(5) Braking resistor ( selected )

When the motor is braking, to prevent excessive voltage in the inverter's DC circuit and improve the braking capacity of the built-in braking unit, the braking resistor connection method for the T200-BF series inverter is as follows:




2-2-2 Main Circuit Wiring Precautions

(1) Wiring specifications: Please implement wiring in accordance with electrical regulations;

(2) Do not connect AC power to the output terminals (U, V, W) of the frequency converter, otherwise it will damage the frequency converter;

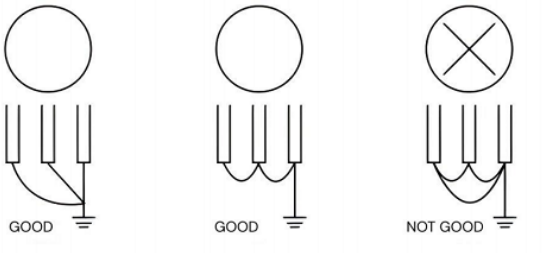
(3) For power wiring, please use isolated wires and conduits as much as possible, and ground both ends of the isolated wires or conduits;

(4) The inverter grounding wire must not be grounded together with the welding machine, high-power motor or high-current load; please ground it separately.

(5) Grounding terminal E: Please ground using the third method, with a grounding impedance of less than 100Ω;

(6) When using the grounding wire, please use it in accordance with the specifications specified in the electrical equipment technical specifications. The shorter the grounding wire, the better.

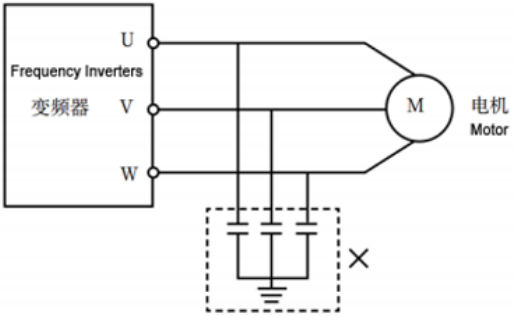
(7) When multiple frequency converters are grounded, please be careful not to create a grounding loop, as shown in the figure below;




(8) The main circuit power line and control line must be wired separately. Parallel wiring should be spaced at least 10cm apart. Cross wiring should be perpendicular to each other. Do not place control line and power line in the same cable tray, otherwise it will cause interference.

(9) Under normal circumstances, the distance between the inverter and the motor should be less than 30 meters. If the distance is too long, the surge current generated by the parasitic capacitance will cause overcurrent protection and may also cause false operation, which may lead to inverter failure or abnormal equipment operation. The maximum distance between the inverter and the motor should not exceed 100 meters. If the distance is long, please select an output side filter and reduce the carrier frequency.

(10) No absorption capacitors or other RC absorption devices shall be installed on the output side (U, V, W) of the frequency converter;



(11) Please ensure that all main circuit terminals are tightened and that the leads are in good contact with the terminals to prevent loosening due to vibration, which could generate sparks and cause a short circuit;

(12) To reduce interference, it is recommended to provide electromagnetic contactors and relays in the circuits surrounding the frequency converter.

The coils of devices such as surge absorbers are connected to surge absorbers.

Recommended specifications for device 2-1-3

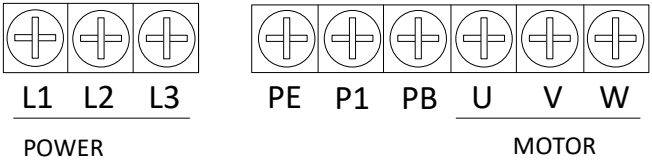
| Inverter Model | Motor used (KW) | Main return line diameter ($mm^2$) | Air circuit breaker (A) | Electromagnetic contactor (A) |
|---|---|---|---|---|
| APV PRO-0R75G-4 | 0.75 | 0.75 | 6 | 9 |
| APV PRO-1R5G-4 | 1.5 | 0.75 | 10 | 9 |
| APV PRO-2R2G-4 | 2.2 | 0.75 | 10 | 9 |
| APV PRO-3R7G-4 | 3.7 | 1.5 | 16 | 12 |
| APV PRO-5R5G-4 | 5.5 | 2.5 | 20 | 18 |
| APV PRO-7R5G-4 | 7.5 | 4 | 32 | 25 |
| APV PRO-11G-4 | 11 | 4 | 40 | 32 |

*The data in the table above is for reference only.

2-1-4 Main Circuit Terminals and Instructions

Users can open the top cover of the frequency converter to see the main circuit terminals.

( 1 ) The main circuit terminals of the T200-BF series frequency converter are arranged as follows:



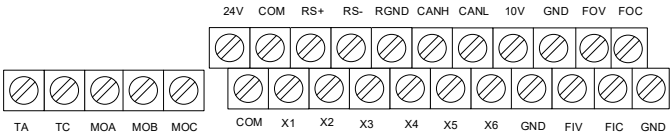

**Note : The illustrations are for illustrative purposes only. If the product you order differs from the actual product, please refer to the physical item .

(2) Main circuit terminal description

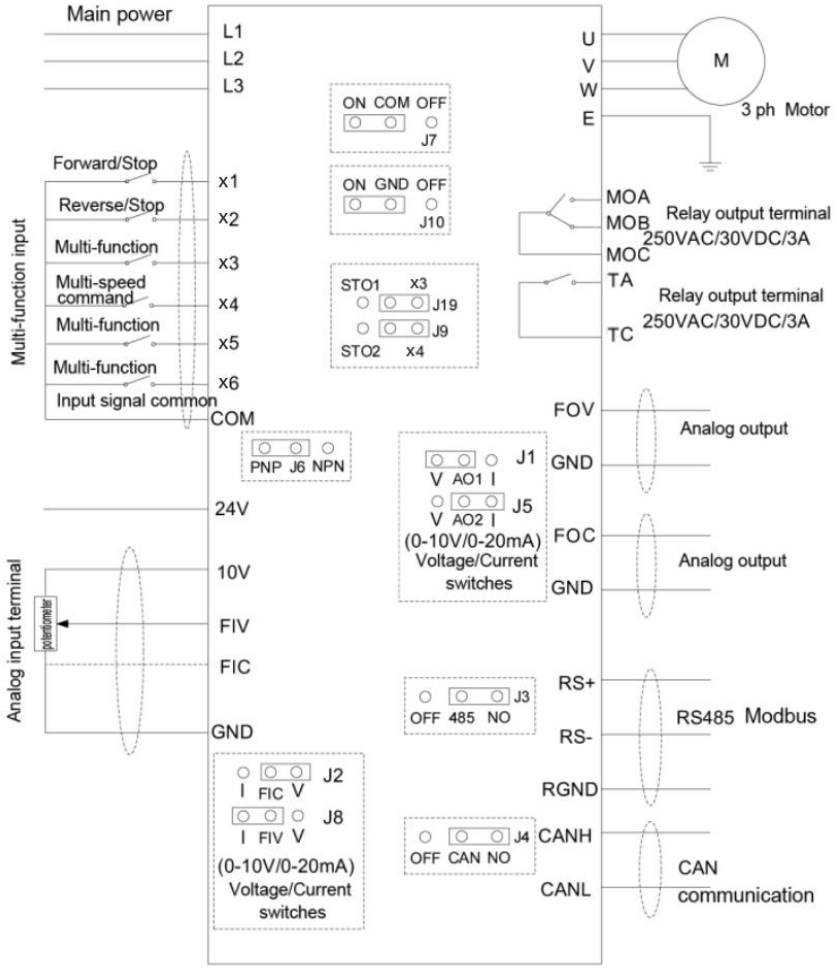
| name | Function Description |
|---|---|
| PE | Grounding terminal |
| T1, T2, T3 | Power input terminal |
| U, V, W | Connect a three-phase AC motor |
| P1, PB | Braking resistor terminals |

## 2-2 Control loop wiring

2-2-1 Control terminal diagram



## 2-2-2 Control Loop Wiring Diagram



2-2-3 Control Terminal Description

| Terminal name | Functional Definition Description | Remark |
|---|---|---|
| X1 | Multi-function input terminal (forward rotation) | Multi-function input terminal Terminals X1 to X6 can be accessed via... Detailed information on pages 4.00 to 4.05 Settings, setting terminals and Valid when COM is closed |
| X2 | Multi-function input terminal (reverse) | |
| X3 | Multi-function input terminal (reset) | |
| X4 | Multi-function input terminal | |
| X5 | Multi-function input terminal | |
| X6 | Multi-function input terminal | |
| COM | Numeric input public terminal | |
| FOV | Analog voltage/current output terminals | 0～10V/0～20mA |
| FOC | Analog voltage/current output terminals | 0～10V/0～20mA |
| 10V | Frequency setting power supply | |
| GND | Common terminal of analog signal terminals | |
| FIV | Analog voltage/current input terminals | 0～10V/0～20mA |
| FIC | Analog voltage/current input terminals | 0～10V/0～20mA |
| 24V | 24V auxiliary power supply | |
| COM | Input signal common terminal | |
| MOA, MOB, MOC | Relay output contacts | AC250V/3A, DC30V/1A |
| TA, TC | Relay output contact (normally open) | AC250V/3A, DC30V/1A |
| RS+, RS- | RS485 communication terminal | |
| RGND | RS485 communication common terminal | |

2-2-4 Control Panel Switch Instructions:

| Switch name | Switch instructions |
|---|---|
| J5 | V: FOC shorted for voltage output; I: FOC shorted for current output. |
| JI | V: FOV shorted for voltage output; I: FOV shorted for current output. |
| J2 | V: FIC shorted for voltage input; I: FIC shorted for current input. |
| J8 | V: FIV shorted for voltage input; I: FIV shorted for current input. |

| | |
|---|---|
| J9/J19 | When switching between STO and terminal functions, the terminal function can be edited when the jumper is in X3/X4. When the jumper is in STO1/STO2, X3/X4 only functions as STO. |
| J6 | NPN/PNP as a low-level and high-level selector switch |
| J3 | For RS485 communication terminating resistor selection switches, the ON side has a 120Ω resistor connected in parallel between RS+ and RS-, while the OFF side has no parallel terminating resistor between RS+ and RS-. |
| J4 | The CAN communication terminating resistor selection switch has a 120Ω resistor connected in parallel on the ON side of the CAN bus, while no parallel terminating resistor is connected on the OFF side of the CAN bus. |
| J7 | COM to ground selection, ON for active, OFF for inactive. |
| J10 | GND is selected for ground; ON indicates active, OFF indicates inactive. |

Precautions for power distribution in control circuits:

(1) Please separate the control signal line from the main return line and other power lines and power supply lines.

) To prevent malfunctions caused by interference, please use twisted shielded wire or double shielded wire, with a recommended specification of 0.3 to 0.5 mm2 ·

(3) Please determine the permissible conditions for each terminal, such as power supply, maximum permissible current, etc.

(4) Grounding terminal E should be properly grounded, and the grounding impedance should be less than 100Ω.

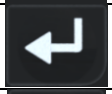
(5) Wiring requirements for each terminal, and correct selection of accessories such as potentiometers, voltmeters, input power supplies, etc.

(6) After completing the wiring, please check it correctly and power it on only after confirming that there are no errors.

# Chapter Three Operations

## 3-1 Instructions for the Main Unit Operation Panel


3-1-1 Button Function Description

| Key symbols | name | Function Description |
|---|---|---|
|  | Programming key | Enter or exit via the primary menu, delete shortcut parameters |
|  | OK button | Enter the menu screen step by step, set parameters and confirm. |
|  | UP increment key | Increment of data or function code |
|  | DOWN decrement key | Decreasing of data or function code |
|  | right shift key | In the shutdown and operation display interfaces, the displayed parameters can be cycled through; when modifying parameters, the modification digits can be selected. |
|  | Run button / Stop button / Reset button | In keyboard operation mode, this key is used to start the operation; while in operation, pressing this key can stop the operation, subject to function code P7.04; in fault alarm mode, this key can be used to reset the fault, not subject to function code P7.04. |

3-1-2 Indicator Light Description

| Symbolic features | Symbol content description |
|---|---|
| Hz | Frequency indicator light |
| A | Current indicator light |
| V | Voltage indicator light |
| F/R | Forward/Reverse Indicator Light: Light off indicates forward rotation; light on indicates reverse rotation. |

**3-2 Operating Procedures**

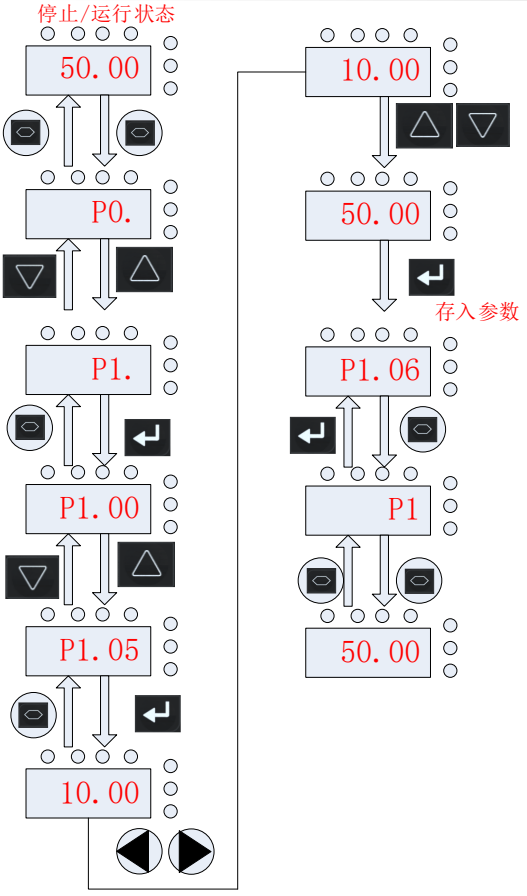
3-2-1 Parameter Settings

The three-level menus are as follows:

1. Function code group number (first-level menu); e.g., "P0"
2. Function code number (second-level menu); e.g., "P0.00"
3. Function code setting value (three-level menu). Example "1"

Note: When operating in the third-level menu, you can press  or  return to the second-level menu. The difference between the two is: pressing  saves the settings to the control panel, then returns to the second-level menu and automatically moves to the next function code; pressing PRG directly returns to the second-level menu, does not save the parameters, and remains on the current function code.

Example: An example of changing function code P1.05 from 10.00Hz to 50.00Hz.




In the third-level menu state, if the parameter does not flash, it means that the function code cannot be modified. Possible reasons include:

1) This function code represents a parameter that cannot be modified, such as actual detection parameters or runtime record parameters.

2) This function code cannot be modified while the system is running; it can only be modified after the system is stopped.

3-2-2 Fault Reset

When a frequency converter malfunctions, it will display relevant fault information. Users can reset the fault using the STOP key on the keypad or the terminal function (P4 group). After a fault reset, the frequency converter will enter standby mode. If the frequency converter is in a faulty state and the user does not reset it, the frequency converter will enter a protection mode and will not be able to operate.

3-2-3 Motor Parameter Self- Learning

1: Dynamic self-learning ( P1.37=2 )

When selecting the PG-free vector control operation mode, the motor's

nameplate parameters must be accurately entered. The inverter will match the standard motor parameters based on these nameplate parameters. To obtain good control performance, it is recommended to perform motor parameter self-learning. The self-learning operation steps are as follows:

First, select the keyboard command channel (P0.02 = 0 ) as the execution command channel.

Then please enter the following parameters according to the actual parameters of the motor:

P1.01: Rated power of the motor;

P1.02: Rated voltage of the motor;

P1.03: Rated current of the motor;

P1.04: Rated frequency of the motor;

P1.05: Rated speed of the motor.

**Note: During the full parameter self-learning process, the motor must be disconnected from the load; otherwise, the motor parameters obtained through self-learning may be incorrect.**

2: Static self-learning ( P1.37=1 )

During the self-learning of motor static parameters, it is not necessary to disconnect the motor from the load. Before the self-learning, the parameters on the motor nameplate (P1.01-P1.05) must be entered correctly. After self-learning, the stator resistance, rotor resistance, and leakage inductance of the motor will be detected. However, the mutual inductance and no-load current of the motor cannot be measured. Users can enter the corresponding values according to the motor nameplate.

## 3-3 Operating Status

### 3-3-1 Power-on Initialization

During the power-on process of the frequency converter, the system first performs initialization, and all indicator lights illuminate. After initialization is complete, the frequency converter enters standby mode.

### 3-3 -2 Standby

In both stop and run states, various status parameters can be displayed. The display of a parameter can be selected by binary bits using function codes P7.03 and P7.04 (running parameters) and P7.05 (stop parameters). The definition of each bit is given in the description of function codes P7.03, P7.04, and P7.05.

### 3-3-3 Motor Parameter Self-Learning

Please refer to the detailed description of function code P1.37 for more information.

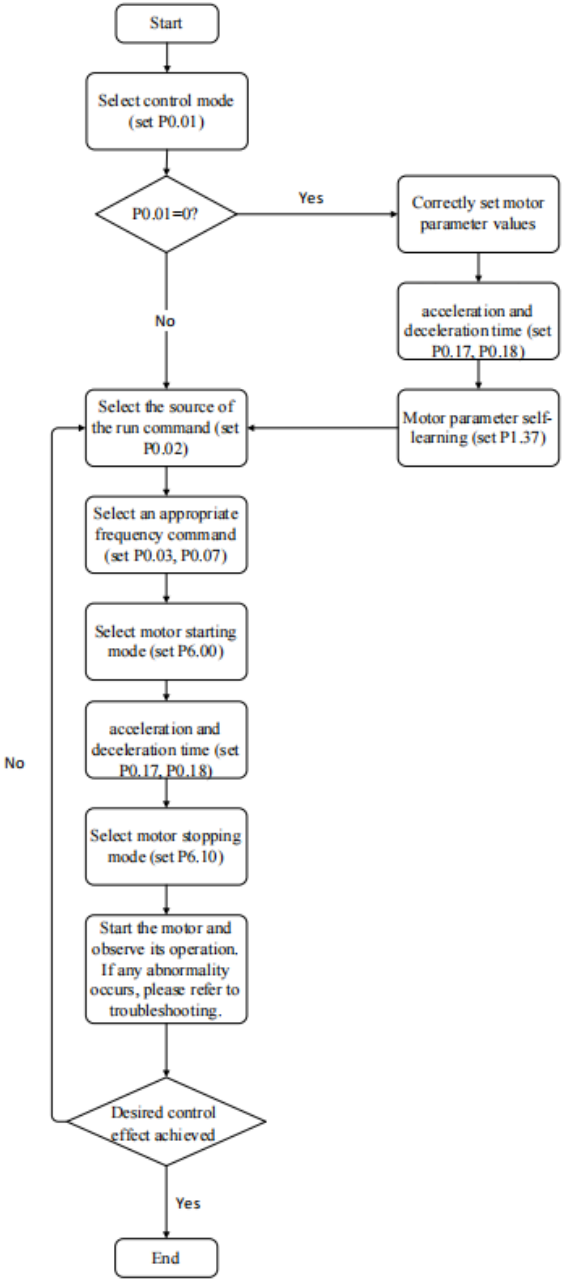
### 3-3 -4 Running

In operation, there are 29 status parameters that can be selected for display, namely: operating frequency, set frequency, bus voltage, output voltage, output current, operating speed, output power, output torque, etc. Whether to display them is selected by function codes P7.03 and P7.04 bit by bit (converted to binary). Press the left and right shift keys to switch the display of the selected parameters in sequence.

**3-3 -5 fault**

The T200-BF series frequency converters provide various fault information. For details, please refer to the T200-BF series frequency converter faults and countermeasures.

## 3-4 Quick Debugging



## Chapter 4 Functional Parameter Summary Table

Setting PP.00 to a non- zero value means a parameter protection password is set. In function parameter mode and user parameter change mode, the parameter menu can only be accessed after entering the correct password. To remove the password, PP.00 must be set to 0. Groups P and C are for basic function parameters, and group D is for monitoring function parameters.

The symbols in the function table are explained as follows:

" ☆ " : This indicates that the setting value of this parameter can be changed whether the frequency converter is in a stopped or running state;

" ★ " : This indicates that the setting of this parameter cannot be changed when the frequency converter is running;

" ● " : This indicates that the value of this parameter is the actual detection record value and cannot be changed;

"*" indicates that the parameter is a " manufacturer parameter " and can only be set by the manufacturer; user operation is prohibited.

Basic Functional Parameter Summary :

| function code | name | Set range | Factory value | Change |
|---|---|---|---|---|
| P0 Basic Function Group | | | | |
| P0.00 | G / P type display | 1: Type G (Constant Torque Load Model) | Model confirmed | ● |
| P0.01 | Control mode selection | 0 : No PG vector control<br>2 : V/F control | 2 | ★ |
| P0.02 | Command source selection | 0: Keyboard command channel<br>1: Terminal command channel<br>2: Communication command channel | 0 | ☆ |
| P0.03 | Main frequency source X selection | 0: Digital setting (preset frequency P0.08 , UP/DOWN can be modified)<br>(Power failure does not retain memory)<br>1: Digital settings (preset frequency P0.08 , UP/DOWN can be modified)<br>(Power-off memory)<br>2: FIV<br>3: FIC<br>4: Keyboard knob<br>5: Retain<br>6: Multi-segment instructions<br>7: Simple PLC<br>8: PID<br>9: Communication given | 0 | ★ |

| | | | | |
|---|---|---|---|---|
| P0.04 | Auxiliary frequency source Y selection | Same as P0.0 3 (Main frequency source X selection) | 0 | ★ |
| P0.05 | Selection of auxiliary frequency source Y range during superposition | 0: relative to the maximum frequency<br>1: Relative to frequency source X | 0 | ☆ |
| P0.06 | The range of auxiliary frequency source Y during superposition | 0%～150% | 100% | ☆ |
| P0.07 | Frequency source superposition selection | Units: Frequency source selection<br>0: Main frequency source X<br>1: Results of primary and secondary operations (The operational relationship is determined by the tens digit)<br>2: Switching between main frequency source X and auxiliary frequency source Y<br>3: Switching between the main frequency source X and the main/auxiliary operation results<br>4: Switching between auxiliary frequency source Y and main/auxiliary operation results<br>Tens: Frequency source master-slave operation relationship<br>0: Primary + Secondary<br>1: Primary-Secondary<br>2: The maximum value of the two<br>3: Minimum of the two | 00 | ☆ |
| P0.08 | Preset frequency | 0.00Hz ~ Maximum frequency (P0.1 0 ) | 50.00Hz | ☆ |
| P0.09 | Direction of movement | 0: Same direction<br>1: Opposite direction | 0 | ☆ |
| P0.1 0 | Maximum frequency | 50.00Hz ～ 600.00Hz | 50.00Hz | ★ |
| P0. 1 1 | Upper limit frequency source | 0: P0.12 setting<br>1: FIV<br>2: FIC<br>3: Retain | 0 | ★ |

| | | | | |
|---|---|---|---|---|
| | | 4: Retain<br>5: Communication given | | |
| P0. 1 2 | Upper limit frequency | Lower frequency limit P0.14 ~ Maximum frequency P0.10 | 50.00Hz | ☆ |
| P0. 1 3 | Upper limit frequency offset | 0.00Hz～Maximum frequency P0.1 0 | 0.00Hz | ☆ |
| P0.1 4 | Lower limit frequency | 0.00Hz ~ Upper limit frequency P0.1 2 | 0.00Hz | ☆ |
| P0.1 5 | carrier frequency | 0.5kHz～16.0kHz | Model confirmed | ☆ |
| P0.1 6 | Carrier frequency varies with temperature Adjustment | 0: No<br>1: Yes | 0 | ☆ |
| P0. 17 | Acceleration time 1 | 0.00s～65000s | Model confirmed | ☆ |
| P0. 18 | Deceleration time 1 | 0.00s～65000s | Model confirmed | ☆ |
| P0. 19 | acceleration/deceleration time unit | 0:1 second<br>1:0.1 seconds<br>2:0.01 seconds | 1 | ★ |
| P0. 21 | Auxiliary frequency source bias frequency during superposition | 0.00Hz～Maximum frequency P0.1 0 | 0.00Hz | ☆ |
| P0. 22 | Frequency command resolution | 2: 0.01Hz | 2 | ★ |
| P0. 23 | Digital setting frequency shutdown memory selection | 0: No memory 1: Memory | 0 | ☆ |
| P0. 2 5 | Acceleration/deceleration time reference frequency | 0: Maximum frequency (P0.1 0 )<br>1: Set frequency<br>2: 100Hz | 0 | ★ |
| P0. 2 6 | Runtime frequency instructions UP/DOWN benchmark | 0: Operating frequency 1: Set frequency | 0 | ★ |
| P0. 2 7 | Command source bundled with frequency source | Units: Operation panel command binding frequency source selection<br>0: No binding | 0000 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 1: Digital frequency setting<br>2: FIV<br>3: FIC<br>4: Retain<br>5: Retain<br>6: Multi-speed<br>7: Simple PLC<br>8: PID<br>9: Communication given<br>Tens: Terminal command binding frequency source selection<br>Hundreds: Communication command binding frequency source selection | | |
| P1 motor parameters | | | | |
| P 1. 00 | Motor type | 0: Ordinary asynchronous motor<br>1: Variable frequency asynchronous motor<br>2: Permanent magnet synchronous motor | Factory settings | ★ |
| P1. 01 | Motor rated power | 0.1kW～1000.0kW | Model confirmed | ★ |
| P1. 02 | Motor rated voltage | 1V～2000V | Model confirmed | ★ |
| P1. 03 | Motor rated current | 0.01A～655.35A<br>(Inverter power <= 55kW) | Model confirmed | ★ |
| P1. 04 | Motor rated frequency | 0.01Hz to maximum frequency | Model confirmed | ★ |
| P1. 05 | Motor rated speed | 1rpm～65535rpm | Model confirmed | ★ |
| P1. 06 | asynchronous motor stator resistance | 0.001Ω～65.535Ω | Learning parameters | ★ |
| P1. 07 | asynchronous motor rotor resistance | 0.001Ω～65.535Ω | Learning parameters | ★ |
| P1. 08 | Leakage inductance of asynchronous motor | 0.01mH～655.35mH | Learning parameters | ★ |
| P1. 09 | asynchronous motor mutual inductance | 0.1mH～6553.5mH | Learning parameters | ★ |

| | | | | |
|---|---|---|---|---|
| P1. 10 | asynchronous motor no-load current | 0.01A～P1.03 | Learning parameters | ★ |
| P1.16 | synchronous motor stator resistance | 0.001Ω～65.535Ω | Learning parameters | ★ |
| P1.17 | Synchronous motor D-axis inductance | 0.01mH~655.35mH | Learning parameters | ★ |
| P1.18 | Synchronous motor Q-axis inductance | 0.01mH~655.35mH | Learning parameters | ★ |
| P1.20 | Synchronous motor back electromotive force | 0.1V~6553.5V | Learning parameters | ★ |
| P1.11 | Motor overload protection selection | 0: Prohibited 1: Allowed | 1 | ☆ |
| P1.12 | Motor overload protection gain | 0.20~10.00 | 1.00 | ☆ |
| P1.13 | Motor overload warning coefficient | 50%~100% | 80% | ☆ |
| P1. 37 | Self-learning selection | 0: No operation<br>1: Static self-learning<br>2: Dynamic self-learning<br>3: Completely static self-learning<br>11: Static self-learning of synchronous motors<br>12: Synchronous Motor Dynamic Self-Learning | 0 | ★ |
| P2 group motor vector control parameters | | | | |
| P2. 00 | Speed loop proportional gain 1 | 1～100 | 20 | ☆ |
| P2. 01 | Velocity loop integral time 1 | 0.01s～10.00s | 0.50s | ☆ |
| P2. 02 | Switching frequency 1 | 0.00 ～ P2.05 | 5.00Hz | ☆ |
| P2. 03 | Speed loop proportional gain 2 | 1～100 | 15 | ☆ |
| P2. 04 | Velocity loop integral time 2 | 0.01s～10.00s | 1.00s | ☆ |
| P2. 05 | Switching frequency 2 | P2.02 ~ Maximum Frequency | 10.00Hz | ☆ |

| | | | | |
|---|---|---|---|---|
| P2. 06 | Vector control slip gain | 50%～200% | 100% | ☆ |
| P2. 07 | Velocity loop filter time constant | 0.000s ～ 1.000s | 0.0 50 s | ☆ |
| P2. 08 | Vector control overexcitation gain | 0～200 | 64 | ☆ |
| P2. 09 | Torque upper limit source under speed control mode | 0: Function code P2.10 setting ( No distinction between electric and generator )<br>1: FIV<br>2: FIC<br>3: Retain<br>4: Retain<br>5: Communication given<br>6: MIN ( FIV , FIC )<br>7: MAX( FIV , FIC )<br>The full-scale range for options 1-7 corresponds to P2.10 . | 0 | ☆ |
| P2. 10 | Torque upper limit digital setting under speed control mode ( electric) | 0.0%～200.0% | 1 50.0% | ☆ |
| P2.11 | Torque upper limit command selection under speed control mode (power generation) | 0: Function code P2.10 setting<br>1: FIV<br>2: FIC<br>3: Retain<br>4: Retain<br>5: Communication given<br>6: MIN ( FIV , FIC )<br>7: MAX( FIV , FIC )<br>8: Function code P2.12 setting<br>The full-scale range for options 1-7 corresponds to P2. 1 2 | 0 | ☆ |
| P2.12 | Torque upper limit digital setting under speed control mode ( power generation) | 0.0%～200.0% | 1 50.0% | ☆ |
| P2. 13 | Excitation regulation proportional gain | 0～60000 | 2000 | ☆ |
| P2. 14 | Excitation regulation integral | 0～60000 | 1300 | ☆ |

| | | | | |
|---|---|---|---|---|
| | gain | | | |
| P2. 15 | Torque regulation proportional gain | 0～60000 | 2000 | ☆ |
| P2. 16 | Torque regulation integral gain | 0～60000 | 1300 | ☆ |
| P2. 17 | Speed ring integral attribute | Units digit: Separation of integrals<br>0: Invalid<br>1: Effective | 0 | ☆ |
| P2. 21 | Maximum torque coefficient in the weak magnetic region | 10 %～ 500 % | 100% | ☆ |
| P2.22 | Power generation limit enable | 0: Invalid 1: Effective throughout | 0 | ☆ |
| P2.23 | upper limit of power generation | 1 %~50% | 5% | ☆ |
| P2.24 | Synchronous machine initial position detection current | 50 %～180% | 120% | |
| P2.25 | Synchronizer initial position angle detection | 0 (Check every time it runs)<br>1 (Not tested)<br>2 (First run test after power-on) | 0 | |
| P2.27 | Synchronous machine saliency rate adjustment gain | 50~500 | 100 | |
| P2.28 | Maximum torque-current ratio control | 0 (Not enabled), 1 (Enabled) | 0 | |
| P2.36 | Synchronous machine low-speed excitation current | 0%～80% | 30% | |
| P2.37 | Start carrier frequency | 0.8kHz ~ P0.15 | 4 | |
| P2.42 | Synchronous machine speed tracking | 0 (Not enabled), 1 (Enabled) | 0 | |
| P2.43 | Zero Servo Enable | 0 (Not enabled), 1 (Enabled) | 0 | |
| P2.44 | Switching frequency | 0.00~P2.02 | 0.30 | |
| P2.45 | Zero servo speed | 1~100 | 10 | |

| | | | | |
|---|---|---|---|---|
| | loop proportional gain | | | |
| P2.46 | Zero servo speed loop integral time | 0.01s ~ 10.00s | 0.50 | |
| P2.47 | Stopping machine and preventing reverse rotation | 0 (Not enabled)<br>1 (On)<br>(To prevent the motor from reversing when decelerating to 0Hz) | 0 | |
| P2.48 | Stop angle | 0.0°~10.0° (This value should be increased appropriately if reversal still occurs under factory conditions) | 0.8° | |
| P2.49 | Tuning-free mode | 0: Not enabled<br>1: Power-on test once<br>2: Always turn on | 0 | |
| P2.50 | Online back EMF calculation | 0: Not calculated<br>1: Calculation | 0 | |
| P3 group V/F control parameters | | | | |
| P3. 00 | VF curve setting | 0: Linear V/F<br>1: Multi-point V/F<br>2: Square V/F<br>3:1.2 V/F<br>4:1.4 V/F<br>6:1.6 V/F<br>8:1.8 V/F<br>9: Retain<br>10: VF Fully Separated Mode<br>11: VF Semi-Separation Mode | 0 | ★ |
| P3.01 | Torque boost | 0.0%: (Automatic torque boost)<br>0.1%～30.0% | Model confirmed | ☆ |
| P3. 02 | Torque boost cutoff frequency | 0.00Hz to maximum frequency | 50.00Hz | ★ |
| P3.03 | Multi-point VF frequency point 1 | 0.00Hz ～ P3.05 | 0.00Hz | ★ |
| P3. 04 | Multi-point VF voltage point 1 | 0.0%～100.0% | 0.0% | ★ |
| P3. 05 | Multi-point VF frequency point 2 | Pages 3.03 to 3.07 | 0.00Hz | ★ |
| P3. 06 | Multi-point VF voltage point 2 | 0.0%～100.0% | 0.0% | ★ |
| P3. 07 | Multi-point VF frequency point 3 | P3.05 ~ Rated frequency of the motor (P1.04) | 0.00Hz | ★ |
| P3. 08 | Multi-point VF | 0.0%～100.0% | 0.0% | ★ |

| | | | | |
|---|---|---|---|---|
| | voltage point 3 | | | |
| P3. 09 | VF slip compensation gain | 0.0%～200.0% | 0.0% | ☆ |
| P3. 10 | VF overexcitation gain | 0～200 | 64 | ☆ |
| P3. 11 | VF oscillation suppression gain | 0～100 | Model confirmed | ☆ |
| P3. 13 | VF-separated voltage source | 0: Numerical setting (P3.14)<br>1: FIV<br>2: FIC<br>3: Retain<br>4: Retain<br>5: Multi-segment instructions<br>6: Simple PLC<br>7: PID<br>8: Communication given<br>Note: 100.0% corresponds to the rated voltage of the motor. | 0 | ☆ |
| P3. 14 | VF-separated voltage digital setting | 0V ~ Motor rated voltage | 0V | ☆ |
| P3. 15 | VF separation voltage acceleration time | 0.0s～1000.0s<br>Note: This indicates the time it takes for the voltage to change from 0V to the motor's rated voltage. | 0.0s | ☆ |
| P3.1 6 | VF deceleration time | 0.0s～1000.0s<br>Note: This indicates the time it takes for the motor's rated voltage to change to 0V. | 0.0s | ☆ |
| P3.17 | VF disconnection shutdown method selection | 0: Frequency/voltage independently reduced to 0<br>1: After the voltage is reduced to 0, the frequency is then reduced. | 0 | ☆ |
| P3.18 | Overcurrent tripping current | 50%~200% | 150% | ★ |
| P3.19 | Overcurrent speed enable | 0: Invalid 1: Valid | 1 | ★ |
| P3.20 | Overflow rate suppression gain | 0~100 | 20 | ☆ |
| P3.21 | Double speed over-speed deceleration | 50%~200% | 50% | ★ |

| | | | | |
|---|---|---|---|---|
| | operating current compensation coefficient | | | |
| P3.22 | Overvoltage stall operating voltage | 650.0V~800.0V | 7 6 0.0V | ★ |
| P3.23 | Overvoltage stall enable | 0: Invalid 1: Valid | 1 | ★ |
| P3.24 | Overvoltage stall suppression frequency gain | 0~100 | 30 | ☆ |
| P3.25 | Overvoltage stall suppression voltage gain | 0~100 | 30 | ☆ |
| P3.26 | Maximum rise frequency limit of overvoltage stall | 0~50Hz | 5Hz | ★ |
| P4 group input terminals | | | | |
| P4. 00 | X 1 terminal function selection | 0: No function<br>1: Forward Rotation (FWD)<br>2: Reverse operation (REV)<br>3: Three-wire operation control<br>4: Forward jogging (JOG F )<br>5: Reverse Jog (JOG R )<br>6: Terminal UP<br>7: Terminal DOWN<br>8: Free Parking<br>9: Fault Reset (RESET)<br>10: Operation paused<br>11: Normally open input for external faults<br>12: Multi-segment instruction terminal 1<br>13: Multi-segment instruction terminal 2<br>14: Multi-segment instruction terminal 3<br>15: Multi-segment instruction terminal 4<br>16: Acceleration/deceleration time selection terminal 1<br>17: Acceleration/deceleration time selection terminal 2<br>18: Frequency source switching<br>19: Reset UP/DOWN settings (Terminals, Keyboard) | 0 | ★ |
| P4. 01 | X 2 terminal function selection | | 0 | ★ |
| P4. 02 | X 3 terminal function selection | | 9 | ★ |
| P4. 03 | X 4 terminal function selection | | 12 | ★ |
| P4. 04 | X 5 terminal function selection | | 13 | ★ |
| P4. 05 | X 6 terminal function selection | | 0 | ★ |
| P4.06 | reserve | | 2 | ★ |
| P4.07 | reserve | | 1 | ★ |

| | | | | |
|---|---|---|---|---|
| | | 20: Run command to switch terminals<br>21: Acceleration and deceleration prohibited<br>22: PID pause<br>23: PLC Status Reset<br>24-28 : Reserved<br>29: Torque control disabled<br>30: Retain<br>31: Retain<br>32: Immediate DC braking<br>33: Normally closed input for external faults<br>34: Frequency Modification Enable<br>35: Reverse the direction of PID control<br>36: External parking terminal 1<br>37: Control command switching terminal 2<br>38: PID Integral Pause<br>39: Switching between frequency source X and preset frequency<br>40: Frequency source Y and preset frequency switching<br>41 ~42 : Retain<br>43: PID Parameter Switching<br>44 ~45 : Retain<br>46: Speed control/torque control switching<br>47: Emergency Stop<br>48: External parking terminal 2<br>49: Deceleration DC Braking<br>50: This run time is reset to zero.<br>5.1 : Pump 1 is ineffective .<br>5.2 : Pump 2 is ineffective .<br>53 : Pump 3 is ineffective.<br>54 : Pump 4 is ineffective.<br>5.5-59 : Reserved<br>62: No water alarm | | |
| P4. 10 | Switching quantity filtering time | 0.000s～1.000s | 0.010s | ☆ |
| P4. 11 | Terminal | 0: Two-line type 1 | 0 | |

| | | | | |
|---|---|---|---|---|
| | command method | 1: Two-line type 2<br>2: Three-line type 1<br>3: Three-line type 2 | | ★ |
| P4. 12 | Terminal UP/DOWN change rate | 0.001Hz/s～65.535Hz/s | 1.00Hz/s | ☆ |
| P4. 13 | FI curve 1 minimum input | 0.00V～ P4. 15 | 0.00V | ☆ |
| P4. 14 | FI curve 1 minimum input corresponding setting | -100.0%～+100.0% | 0.0% | ☆ |
| P4. 15 | FI curve 1 Maximum input | P4. 13～+10.00V | 10.00V | ☆ |
| P4. 16 | FI curve 1 maximum input corresponding setting | -100.0%～+100.0% | 100.0% | ☆ |
| P4. 17 | FI curve 1 filter time | 0.00s～10.00s | 0.10s | ☆ |
| P4. 18 | FI curve 2 minimum input | 0.00V～ P4. 20 | 0.00V | ☆ |
| P4. 19 | FI curve 2 minimum input corresponding settings | -100.0%～+100.0% | 0.0% | ☆ |
| P4. 20 | FI curve 2 maximum input | P4. 18～+10.00V | 10.00V | ☆ |
| P4. 21 | FI curve 2 maximum input corresponding setting | -100.0%～+100.0% | 100.0% | ☆ |
| P4. 22 | FI curve 2 filter time | 0.00s～10.00s | 0.10s | ☆ |
| P4. 23 | FI curve 3 minimum input | -10.00V～ P4. 25 | -10.00V | ☆ |
| P4. 24 | FI curve 3 minimum input corresponding settings | -100.0%～+100.0% | -100.0% | ☆ |
| P4. 25 | FI curve 3 Maximum input | P4. 23～+10.00V | 10.00V | ☆ |
| P4. 26 | FI curve 3 maximum input corresponding | -100.0%～+100.0% | 100.0% | ☆ |

| | | | | |
|---|---|---|---|---|
| | settings | | | |
| P4. 27 | FI curve 3 filtering time | 0.00s～10.00s | 0.10s | ☆ |
| P4. 33 | FI curve selection | Units: FIV curve selection<br>1: Curve 1 (2 points, see pages 4.13 to 4.16)<br>2: Curve 2 (2 points, see pages 4.18 to 4.21)<br>3: Curve 3 (2 points, see pages 4.23-4.26)<br>4: Curve 4 (4 points, see C6.00～C6.07)<br>5: Curve 5 (4 points, see C6.08～C6.15)<br>Tens: FIC curve selection, same as above.<br>Hundreds: Reserved | 321 | ☆ |
| P4. 34 | FI below minimum input setting selection | Units digit: FIV is below the minimum input setting selection.<br>0: Corresponds to the minimum input setting of 1: 0.0%.<br>Tens: FIC is selected below the minimum input setting, same as above. | 000 | ☆ |
| P4. 35 | X 1 delay time | 0.0s～3600.0s | 0.0s | ★ |
| P4. 36 | X 2 delay time | 0.0s～3600.0s | 0.0s | ★ |
| P4. 37 | X 3 delay time | 0.0s～3600.0s | 0.0s | ★ |
| P4. 38 | X- terminal active mode Choose 1 | 0: High level is active<br>1: Active low<br>Units digit: X 1<br>Tens digit: X 2<br>Hundreds digit: X 3<br>Thousands: X 4<br>Tens of thousands place: X 5 | 00000 | ★ |
| P4. 39 | S- Terminal Active Mode Option 2 | 0: High level is active<br>1: Active low<br>Units digit: X6<br>Tens: Reserved<br>Hundreds: Reserved<br>Thousands: Reserved<br>Ten thousandths place: reserved | 00000 | ★ |
| **P5 group output terminals** | | | | |

| | | | | |
|---|---|---|---|---|
| P5.01 | Control board relay function selection ( MOA-MOB-MOC ) | 0: No output<br>1: Inverter in operation<br>2: Fault Output<br>3: Frequency level detection FDT1 output<br>4: Frequency arrives<br>5: Running at zero speed (No output when the machine is stopped)<br>6: Motor overload warning | 0 | ☆ |
| P5.0 2 | Control board relay function selection ( TA -- TC ) | 7: Inverter overload pre-alarm<br>8: Retain<br>9: Retain<br>10: Length reached<br>11: PLC cycle complete<br>12: Cumulative running time reached<br>13: Frequency limited<br>14: Torque Limiting<br>15: Ready to run<br>16: FIV > FIC<br>17: Maximum frequency reached<br>18: Lower limit frequency reached (Related to operation)<br>19: Undervoltage output<br>20: Communication Settings<br>21: (Reserved)<br>22: (Reserved)<br>23: Running at zero speed 2 (Also outputting during shutdown)<br>24: Cumulative power-on time reached<br>25: Frequency Level Detection FDT2 Output<br>26: Frequency 1 reaches output<br>27: Frequency 2 reaches output<br>28: Current 1 reaches the output<br>29: Current 2 reaches the output<br>30: Timed arrival output<br>31: FIV input limit exceeded<br>32: Loading<br>33: Running in reverse | 0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 34: Zero current state<br>35: Module temperature reached<br>36: Output current exceeds limit<br>37: Lower limit frequency reached<br>(Output even when the machine is stopped)<br>38: Alarm Output (Continue Running)<br>39: Motor over-temperature warning<br>40: This run has ended.<br>41: Fault output (no output under low voltage) | | |
| P5. 07 | FOV output function selection | 0: Operating frequency<br>1: Set frequency<br>2: Output current<br>3: Output torque<br>4: Output power<br>5: Output voltage<br>6: Retain<br>7: FIV<br>8: FIC<br>9 ~11 : Reserved<br>12: Communication Settings<br>13: Motor speed<br>14: Output current (100.0% corresponds to 1000.0A)<br>15: Output voltage (100.0% corresponds to 1000.0V)<br>16: Motor output torque (actual value, percentage relative to the motor) | 0 | ☆ |
| P5. 08 | FOC output function selection | | 1 | ☆ |
| P5. 10 | FOV zero bias coefficient | -100.0%～+100.0% | 0.0% | ☆ |
| P5. 11 | FOV gain | -10.00 to +10.00 | 1.00 | ☆ |
| P5. 12 | FOC zero-bias coefficient | -100.0%～+100.0% | 0.0% | ☆ |
| P5. 13 | FOC gain | -10.00 to +10.00 | 1.00 | ☆ |
| P5.15 | FOV output filtering time | 0.00s~10.00s | 0.01s | ☆ |
| P5.16 | FOC output filtering time | 0.00s~10.00s | 0.01s | ☆ |
| P5.17 | MOA-MOB-MOC output delay time | 0.0s～3600.0s | 0.0s | ☆ |

| | | | | |
|---|---|---|---|---|
| P5. 18 | T A- T C output delay time | 0.0s～3600.0s | 0.0s | ☆ |
| P5. 19 | reserve | 0.0s～3600.0s | 0.0s | ☆ |
| P5. 22 | Output terminal valid state selection | 0: Positive logic<br>1: Anti-logic<br>Units digit: MOA-MOB-MOC<br>Tens: TA-TC<br>Hundreds: Reserved | 00000 | ☆ |
| **P6 Start/Stop Parameter Group** | | | | |
| P6. 00 | Startup method | 0: Start directly | 0 | ☆ |
| P6.01 | Speed tracking method | 0: Starting from the downtime frequency<br>1: Start from zero speed<br>2: Start from the highest frequency | 0 | ★ |
| P6. 02 | Speed tracking speed | 1～100 | 20 | ☆ |
| P6. 03 | Startup frequency | 0.00Hz～10.00Hz | 0.00Hz | ☆ |
| P6. 04 | Startup frequency retention time | 0.0s～100.0s | 0.0s | ★ |
| P6. 05 | Starting DC braking current/pre-excitation current | 0%～100% | 0% | ★ |
| P6. 06 | DC braking time/pre-excitation time | 0.0s～100.0s | 0.0s | ★ |
| P6. 07 | Acceleration and deceleration methods | 0: Linear acceleration/deceleration<br>1: S-curve acceleration/deceleration A<br>2: Dynamic S-curve acceleration and deceleration | 0 | ★ |
| P6. 08 | The proportion of the initial period of the S-curve | 0.0%～（100.0%- P6. 09） | 30.0% | ★ |
| P6. 09 | The proportion of the time segment ending the S-curve | 0.0%～(100.0%- P6. 08) | 30.0% | ★ |
| P6. 10 | Shutdown methods | 0: Decelerate and stop; 1: Free stop | 0 | ☆ |
| P6. 11 | DC braking start frequency during shutdown | 0.00Hz to maximum frequency | 0.00Hz | ☆ |

| | | | | |
|---|---|---|---|---|
| P6. 12 | DC braking waiting time during shutdown | 0.0s～100.0s | 0.0s | ☆ |
| P6. 13 | DC braking current during shutdown | 0%～100% | 0% | ☆ |
| P6. 14 | DC braking time during shutdown | 0.0s～100.0s | 0.0s | ☆ |
| P6. 15 | Brake utilization | 0%～100% | 100% | ☆ |
| P6.18 | Rotational speed tracking current magnitude | 30%~200% | Model confirmed | ★ |
| P6.21 | Demagnetization time (SVC is effective) | 0.00~5.00s | Model confirmed | ☆ |
| P7 Keyboard and Display | | | | |
| P7.01 | JOG Functional Parameters | 0: This key has no function.<br>1: Switch between external keyboard commands and remote operation. This refers to switching the command source, i.e., switching between the current command source and keyboard control (local operation). If the current command source is keyboard control, this key function is invalid.<br>2: Switch between forward and reverse directions using the JOG key. This function is only available when the command source is the operation panel command channel.<br>3: Forward jogging is achieved by pulling out the JOG key on the keyboard (JOG-FWD).<br>4: Reverse motion is achieved by pulling out the JOG key on the keyboard (JOG-REV).<br>5: Start/Stop buttons can be selected separately (6 buttons) | 0 | ★ |
| P7.02 | STOP/RESET button function | RESET key stop function is only effective in keyboard operation mode.<br>1. The STOP/RESET button's | 1 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | stop function is effective in any operating mode . | | |
| P7. 03 | LED Operation Display Parameter 1 | 0000～FFFF<br>Bit00: Operating frequency 1 (Hz)<br>Bit01: Set frequency (Hz)<br>Bit02: Bus voltage (V)<br>Bit03: Output Voltage (V)<br>Bit04: Output Current (A)<br>Bit05: Output power (kW)<br>Bit06: Output Torque (%)<br>Bit07: DI Input Status<br>Bit08: DO output status<br>Bit09: FIV Voltage (V)<br>Bit10: FIC voltage (V)<br>Bit11: Reserved<br>Bit12: Reserved<br>Bit13: Reserved<br>Bit14: Load speed display<br>Bit15: PID setting | 1F | ☆ |
| P7.04 | LED Operation Display Parameter 2 | 0000～FFFF<br>Bit00: PID input and feedback<br>Bit01: PLC Stage<br>Bit02: Reserved<br>Bit03: Operating frequency 2 (Hz)<br>Bit04: Remaining runtime<br>Bit05: Voltage before FIV correction (V)<br>Bit06: Voltage before FIC correction (V)<br>Bit07: Reserved<br>Bit08: Motor speed<br>Bit09: Current power-on time (Hour)<br>Bit10: Current running time (Min)<br>Bit11: Reserved<br>Bit12: Communication settings<br>Bit13: Reserved<br>Bit 14: Main frequency X display (Hz)<br>Bit 15: Secondary frequency Y display (Hz) | 0 | ☆ |
| P7.05 | LED stop display parameters | 0000～FFFF<br>Bit00: Set frequency (Hz) | 33 | ☆ |

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|---|---|---|---|---|
| | | Bit01: Bus voltage (V)<br>Bit02: DI Input Status<br>Bit03: DO output status<br>Bit04: FIV voltage (V)<br>Bit05: FIC voltage (V)<br>Bit06: Reserved<br>Bit07: Reserved<br>Bit08: Reserved<br>Bit09: PLC Stage<br>Bit10: Load speed<br>Bit11: PID setting<br>Bit12: Reserved<br>Bit 1 3 : PID Command and Feedback | | |
| P7. 06 | Load speed display coefficient | 0.0001～6.5000 | 1.0000 | ☆ |
| P7. 07 | Inverter module heatsink temperature | 0.0℃～1 2 0.0℃ | - | ● |
| P7.09 | Cumulative running time | 0h~65535h | - | ● |
| P7.11 | Software version | - | - | ● |
| P7.12 | Load speed display decimal places | Units digit: D0.14 Number of decimal points<br>0: 0 decimal places<br>1: 1 decimal place<br>2: 2 decimal places<br>3: 3 decimal places | 1 | ☆ |
| P7.13 | Total power-on time | 0h~65535h | - | ● |
| P7.14 | Cumulative power consumption | 0kW～65535 degrees | - | ● |
| P8 group accessibility functions | | | | |
| P8. 00 | Jog operation frequency | 0.00Hz to maximum frequency | 2.00Hz | ☆ |
| P8. 01 | Inching acceleration time | 0.0s～6500.0s | 20.0s | ☆ |
| P8. 02 | Inching deceleration time | 0.0s～6500.0s | 20.0s | ☆ |
| P8. 03 | Acceleration Time 2 | 0.00 s ～65000s | Model confirmed | ☆ |
| P8. 04 | Deceleration time 2 | 0.0s～65000s | Model confirmed | ☆ |

| | | | | |
|---|---|---|---|---|
| P8. 05 | Acceleration Time 3 | 0.0s～65000s | Model confirmed | ☆ |
| P8. 06 | Deceleration time 3 | 0.0s～65000s | Model confirmed | ☆ |
| P8. 07 | Acceleration Time 4 | 0.0s～65000s | Model confirmed | ☆ |
| P8. 08 | Deceleration time 4 | 0.0s～65000s | Model confirmed | ☆ |
| P8. 09 | Jump frequency 1 | 0.00Hz to maximum frequency | 0.00Hz | ☆ |
| P8. 10 | Jump frequency 2 | 0.00Hz to maximum frequency | 0.00Hz | ☆ |
| P8. 11 | Jump frequency amplitude | 0.00Hz to maximum frequency | 0.01Hz | ☆ |
| P8. 12 | Forward and reverse dead zone time | 0.0s～3000.0s | 0.0s | ☆ |
| P8. 13 | Invert control enable | 0: Allowed 1: Prohibited | 0 | ☆ |
| P8. 14 | Setting the operating frequency to below the lower limit | 0: Operating at the following frequency limit<br>1: Shutdown<br>2: Zero-speed operation | 0 | ☆ |
| P8. 15 | Sagging control | 0.00Hz～10.00Hz | 0.00Hz | ☆ |
| P8. 16 | Set cumulative power-on arrival time | 0h～65000h | 0h | ☆ |
| P8. 17 | Set cumulative running time | 0h～65000h | 0h | ☆ |
| P8. 18 | Start Protection Selection | 0: No protection 1: Protection | 0 | ☆ |
| P8. 19 | Frequency Detection Value (FDT1) | 0.00Hz to maximum frequency | 50.00Hz | ☆ |
| P8. 20 | Frequency Detection Lag (FDT1) | 0.0%～100.0% (FDT1 level) | 5.0% | ☆ |
| P8. 21 | Frequency reaches detection width | 0.0%～100.0% (maximum frequency) | 0.0% | ☆ |
| P8. 22 | Is the jump frequency effective during acceleration and deceleration? | 0: Invalid 1: Valid | 0 | ☆ |
| P8. 25 | Acceleration Time | 0.00Hz to maximum frequency | 0.00Hz | ☆ |

| | | | | |
|---|---|---|---|---|
| | 1 and Acceleration Time 2 switching frequency points | | | |
| P8. 26 | Frequency switching point between deceleration time 1 and deceleration time 2 | 0.00Hz to maximum frequency | 0.00Hz | ☆ |
| P8. 27 | Terminal inching priority | 0: Invalid 1: Valid | 0 | ☆ |
| P8. 28 | Frequency Detection Value (FDT2) | 0.00Hz to maximum frequency | 50.00Hz | ☆ |
| P8. 29 | Frequency Detection Lag (FDT2) | 0.0%～100.0% (FDT2 level) | 5.0% | ☆ |
| P8. 30 | Arbitrary arrival frequency detection value 1 | 0.00Hz to maximum frequency | 50.00Hz | ☆ |
| P8. 31 | Arbitrary arrival frequency detection width 1 | 0.0%～100.0% (maximum frequency) | 0.0% | ☆ |
| P8. 32 | Arbitrary arrival frequency detection value 2 | 0.00Hz to maximum frequency | 50.00Hz | ☆ |
| P8. 33 | Arbitrary arrival frequency detection width 2 | 0.0%～100.0% (maximum frequency) | 0.0% | ☆ |
| P8. 34 | Zero current detection level | 0.0%～300.0%<br>100.0% corresponds to the motor's rated current | 5.0% | ☆ |
| P8. 35 | Zero current detection delay time | 0.01s～600.00s | 0.10s | ☆ |
| P8. 36 | Output current exceeds limit | 0.0% (Not detected)<br>0.1%～300.0% (motor rated current) | 200.0% | ☆ |
| P8. 37 | Output current over-limit detection delay time | 0.00s～600.00s | 0.00s | ☆ |
| P8. 38 | Arbitrary arrival current 1 | 0.0%～300.0% (motor rated current) | 100.0% | ☆ |
| P8. 39 | Arbitrary arrival | 0.0%～300.0% (motor rated | 0.0% | ☆ |

| | | | | |
|---|---|---|---|---|
| | current 1 width | current) | | |
| P8. 40 | Arbitrary arrival current 2 | 0.0%～300.0% (motor rated current) | 100.0% | ☆ |
| P8. 41 | Arbitrary arrival current 2 width | 0.0%～300.0% (motor rated current) | 0.0% | ☆ |
| P8. 42 | Timer function selection | 0: Invalid 1: Effective | 0 | ☆ |
| P8. 43 | Scheduled run time selection | 0: P8.44 settings<br>1: FIV<br>2: FIC<br>3: Retain<br>The analog input range corresponds to page 8.44. | 0 | ☆ |
| P8. 44 | Scheduled run time | 0.0 Min～6500.0 Min | 0.0Min | ☆ |
| P8. 45 | FIV Input Voltage Protection Lower Limit | 0.00V ～ P8.46 | 3.10V | ☆ |
| P8. 46 | FIV Input Voltage Protection Upper Limit | P8. 45～10.00V | 6.80V | ☆ |
| P8. 47 | Module temperature reached | 0℃～100℃ | 75℃ | ☆ |
| P8. 48 | Cooling fan control | 0: Fan operates during operation<br>1: The fan keeps running. | 0 | ☆ |
| P8. 49 | wake-up frequency | Sleep frequency (P8.51) ~ Maximum frequency ( P0.1 0 ) | 0.00Hz | ☆ |
| P8. 50 | Wake-up delay | 0.0s～6500.0s | 0.0s | ☆ |
| P8. 51 | Sleep frequency | 0.00Hz ~ Wake-up frequency (P8.49) | 0.00Hz | ☆ |
| P8. 52 | hibernation delay time | 0.0s～6500.0s | 0.0s | ☆ |
| P8. 53 | Arrival time setting for this run | 0.0 Min～6500.0 Min | 0.0Min | ☆ |
| P8.54 | Output power correction factor | 0~200% | 100% | ☆ |
| P8.55 | Rapid deceleration time | 0~6553.5s | Model confirmed | ☆ |
| P9 Group Faults and Protection | | | | |
| P9. 03 | Overvoltage stall gain | 0～100 | 3 0 | ☆ |
| P9. 04 | Overvoltage stall | 200.0V ~ 2200.0V | 760.0V | ☆ |

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|---|---|---|---|---|
| | protection voltage | | | |
| P9. 07 | Power-on short-circuit protection selection | 0: Invalid 1: Valid | 1 | ☆ |
| P9. 09 | Number of automatic fault resets | 0～20 | 0 | ☆ |
| P9. 10 | Fault YO Action Selection During Automatic Fault Reset | 0: No action<br>1: Actions | 0 | ☆ |
| P9. 11 | Automatic fault reset interval | 0.1s～100.0s | 1.0s | ☆ |
| P9. 12 | Input phase loss /contactor engagement protection selection | Units digit: Input phase loss protection selection<br>Tens: Contactor pull-in protection selection<br>0: Prohibited 1: Allowed | 00 | ☆ |
| P9. 13 | Output phase loss protection selection | 0: Prohibited 1: Allowed<br>Units digit: Output phase loss protection selection<br>Tens digit: Select phase loss protection before operation. | 1 | ☆ |

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| P9. 14 | First type of failure | 0: No fault<br>1: Retain<br>2: Accelerate overcurrent<br>3: Deceleration overcurrent<br>4: Constant speed overcurrent<br>5: Accelerating overvoltage<br>6: Deceleration overvoltage<br>7: Constant speed overvoltage<br>8: Buffer resistor overload<br>9: Undervoltage<br>10: Inverter overload<br>11: Motor overload<br>12: Input phase loss<br>13: Output phase loss<br>14: Module overheating<br>15: External Fault<br>16: Communication error<br>17: Contactor malfunction<br>18: Current detection abnormality<br>19: Motor self-learning abnormality<br>20: Retain<br>21: Parameter read/write exception<br>22: Inverter hardware malfunction<br>23: Motor short circuit to ground<br>24 : Low water pressure alarm<br>25: Retain<br>26: Running time reached<br>27 : High water pressure alarm<br>28 : Water shortage alarm<br>29 : Power-on time has arrived.<br>30: Loadout<br>31: PID feedback lost during runtime<br>40: Fast rate limiting timeout<br>41: Switching motors during operation<br>42 : Speed deviation is too large<br>43: Motor overspeed<br>45: Motor overheating<br>51: Initial position error | | ● |
| P9. 15 | Second type of failure | | - | ● |
| P9. 16 | Third (most recent) fault type | | - | ● |
| P A group PID function | | | | |

| | | | | |
|---|---|---|---|---|
| PA.00 | PID given source | 0: PA.01 settings<br>1: FIV<br>2: FIC<br>3: Retain<br>4: Retain<br>5: Communication given<br>6: Multi-segment instruction setting | 0 | ☆ |
| PA.01 | Set pressure | 0.00 bar ~ PA.04 | 3.0 0 | ☆ |
| PA.02 | PID feedback source | 0: FIV<br>1: FIC<br>2: Retain<br>3: FIV-FIC<br>4: Retain<br>5: Communication given<br>6: FIV+FIC<br>7: MAX(\|FIV\|, \|FIC\|)<br>8: MIN (\|FIV\|, \|FIC\|) | 1 | ☆ |
| PA.03 | PID direction of action | 0: Positive effect<br>1: Reaction | 0 | ☆ |
| PA.04 | Pressure range | 0 ~ 65 0.00 bar | 10.00 | ☆ |
| PA.05 | Proportional gain Kp1 | 0.0 ～ 600.0 | 20 0.0 | ☆ |
| PA.06 | Integration Time Ti1 | 0.01s～10.00s | 2.00s | ☆ |
| PA.07 | Differential time Td1 | 0.000s～10.000s | 0.000s | ☆ |
| PA.08 | PID reverse cutoff frequency | 0.00 ~ Maximum frequency | 0.00Hz | ☆ |
| PA.09 | PID Deviation Limit | 0.0%～100.0% | 0.3 % | ☆ |
| PA.10 | PID derivative limiting | 0.00%～100.00% | 0.10% | ☆ |
| PA.11 | PID given change time | 0.00～650.00s | 0.00s | ☆ |
| PA.12 | PID feedback filter time | 0.00～60.00s | 0.00s | ☆ |
| PA.13 | PID output filtering time | 0.00～60.00s | 0.00s | ☆ |
| PA.14 | reserve | - | - | ☆ |
| PA.15 | Proportional gain | 0.0 ～ 600.0 | 3 00.0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | Kp2 | | | |
| PA.16 | Integration Time Ti2 | 0.01s～10.00s | 0.50s | ☆ |
| PA.17 | Differential time Td2 | 0.000s～10.000s | 0.000s | ☆ |
| PA.18 | PID parameter switching conditions | 0: Do not switch<br>1: Switch via X-terminal<br>2: Automatic switching based on deviation<br>3: Automatic switching based on operating frequency | 2 | ☆ |
| PA.19 | PID parameter switching deviation 1 | 0.0%～PA.20 | 5.0% | ☆ |
| PA.20 | PID parameter switching deviation 2 | PA. 19～100.0% | 10.0% | ☆ |
| PA.21 | PID initial value | 0.0%～100.0% | 0.0% | ☆ |
| PA.22 | PID initial value hold time | 0.00～650.00s | 0.00s | ☆ |
| PA.23 | Maximum positive deviation between two outputs | 0.00%～100.00% | 2.00% | ☆ |
| PA.24 | The maximum value of the opposite deviation between the two outputs | 0.00%～100.00% | 2.00% | ☆ |
| PA.25 | PID integral attribute | Units digit: Separation of integrals<br>0: Invalid 1: Effective<br>Tens digit: Whether to stop integrating after the output reaches the limit.<br>0: Continue accumulating points<br>1: Stop scoring | 00 | ☆ |
| PA.26 | PID feedback loss of detection value | 0.0%: No feedback loss is detected.<br>0.1%～100.0% | 0.0% | ☆ |
| PA.27 | PID feedback loss detection time | 0.0s～20.0s | 1.0s | ☆ |

| | | | | |
|---|---|---|---|---|
| PA.28 | PID Stop Calculation | 0: No operation during shutdown<br>1: Operations during shutdown | 0 | ☆ |
| PA.29 | Sleep frequency | 0.00~Maximum frequency | 25.00HZ | ☆ |
| PA.30 | hibernation time | 0.00~6000 0 S | 10S | ☆ |
| PA.31 | Sleep wake-up value | 0.00~PA.0 1<br>If the pressure is PA.31 lower than the target pressure while the device is in hibernation, it will be awakened. | 0.50 | ☆ |
| PA.32 | Upper limit alarm value for feedback signal (e.g., high pressure). | PA.33~PA.04 | 8.00 | ☆ |
| PA.33 | Feedback signal lower limit alarm value: Setting it to 0 will disable the alarm. | 0.00~PA.32 | 0 | ☆ |
| PA.34 | Water pressure test value | 0.00 ~ PA.01 | 0.25 | ☆ |
| PA.35 | After the pressure returns to normal, the high-pressure or low-pressure fault will be automatically cleared after a delay of PA.35. | 0~9999S | 10S | ☆ |
| PA.36 | Low-voltage alarm detection time | 0~9999S | 10S | ☆ |
| PA.37 | Water shortage alarm detection time | 0~9999S | 100S | ☆ |
| PA.38 | Automatic operation upon power-on | 0~1 (0: does not run automatically upon power-on ) | 0 | ☆ |
| PA.39 | Water shortage self-reset interval | 0~65000S | 60s | ☆ |
| PA.40 | Number of times the water pressure self-reset is insufficient | 0~65000 | 10 | ☆ |
| PA.41 | Antifreeze | 0~1 | 0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | effective: 1 - effective, 0 - ineffective | | | |
| PA.42 | Hibernation, antifreeze waiting time | 0~65 535 s | 900s | ☆ |
| PA.43 | Hibernation, anti-freeze operation time | 0~65 535 s | 30s | ☆ |
| PA.44 | During hibernation, antifreeze operation frequency | 0~50.00Hz | 15.00 HZ | ☆ |
| PA.45 | Sleep mode detection: Sleep mode detection only begins when the frequency change is < PA . 4 5 / s . | 0~10.00Hz | 0.50HZ | ☆ |
| PA.46 | Hibernation Detection: Pressure to reduce frequency throttling | 0.0~10.0% | 0.6% | ☆ |
| PA.47 | Hibernation Detection: Frequency of decrease per second | 0~10.00Hz | 1.00HZ | ☆ |
| PA.48 | Hibernation detection: the number of times the frequency of descent is measured. | 0~1000 | 10 times | ☆ |
| PA.49 | Sleep detection: If the frequency is greater than PA.49, sleep is not detected. | 0~Maximum frequency P0.10 | 42.00HZ | ☆ |
| PA.50 | P ID sampling time | 0~1000 ms | 4ms | ☆ |
| PA.51 | Pump frequency | 0.00~Maximum frequency | 49.00Hz | |

| | | | | |
|---|---|---|---|---|
| PA.52 | Pump testing time | 0.0~6553.5s | 10.0s | |
| PA.53 | Reduce pump frequency | 0.00~Maximum frequency | 25.00Hz | |
| PA.54 | Reduce pump detection time | 0.0~6553.5s | 10.0s | |
| PA.55 | Pump replacement time | 0.0~65535 minutes | 1 20 minutes | |
| PA.56 | Contactor engagement delay time | 0.1~100.0s | 1.0 s | |
| PA.57 | Contactor disconnection delay time | 0.1~100.0s | 1.0 s | |
| PA.58 | Effective selection of each pump | 0: Invalid<br>1: Effective<br>Units digit: Pump No. 1<br>Tens: Pump No. 2<br>Hundreds: Pump No. 3<br>Thousands: Pump No. 4 | 11 | |
| PA.59 | Multi-pump function is effective | 0: Standard machine<br>1: Retain<br>2. Multi-pump communication: One master unit, multiple slave units | 0 | |
| PA.62 | main pump | 1: Main pump, 0: Slave pump | 0 | |
| PA.63 | Replacing the variable frequency pump is effective during startup. | 0: Invalid<br>1: Effective | 0 | |
| PA.64 | Maximum number of operating pumps | Range 1~4 | 4 | |
| PA.65 | Faulty main pump enable | 0: Off 1: On | 0 | |
| PA.66 | Backup main pump operation command source | 0: Keyboard<br>1: terminal<br>2: Communication | 0 | |
| PA.67 | PID display mode | 1: Feedback P XX.X<br>Target H XX.X<br>2: Left target, right feedback | 2 | |
| PA.68 | Vibration feedback selection | 0: FIV 1: FIC | 0 | |
| PA.69 | Vibration alarm percentage | 0.0%~100.0%<br>(4~20mA percentage) | 0 0%<br>(Fault | |

| | | | | |
|---|---|---|---|---|
| | | 0.0% indicates that the vibration alarm function is off. | code SE) | |
| PC group multi-segment instruction, simple PLC | | | | |
| PC. 00 | Multi-segment instruction 0 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 01 | Multi-segment instruction 1 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 02 | Multi-segment instruction 2 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 03 | Multi-segment instruction 3 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 04 | Multi-segment instruction 4 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 05 | Multi-segment instruction 5 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 06 | Multi-segment instruction 6 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 07 | Multi-segment instruction 7 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 08 | Multi-segment instruction 8 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 09 | Multi-segment instruction 9 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 10 | Multi-segment instruction 10 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 11 | Multi-segment instruction 11 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 12 | Multi-segment instruction 12 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 13 | Multi-segment instruction 13 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 14 | Multi-segment instruction 14 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 15 | Multi-segment instruction 15 | -100.0%～100.0% | 0.0% | ☆ |
| PC. 16 | Simplified PLC Operation Mode | 0: Shutdown after a single run<br>1: Retain final value after a single run<br>2: Keep looping | 0 | ☆ |
| PC. 17 | Simple PLC power-off memory selection | Units: Power-off memory selection<br>0: No memory after power failure<br>1: Power-off memory | 00 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | Tens: Stop memory selection<br>0: No memory of shutdown<br>1: Shutdown memory | | |
| PC. 18 | Simple PLC segment 0 running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 19 | Simple PLC Stage 0 Acceleration/Deceleration Time Selection | 0～3 | 0 | ☆ |
| PC. 20 | Simple PLC first stage running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 21 | Simple PLC Stage 1 Acceleration/Deceleration Time Selection | 0～3 | 0 | ☆ |
| PC. 22 | Simplified PLC second stage running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 23 | Simple PLC Second Stage Acceleration/Deceleration Time Selection | 0～3 | 0 | ☆ |
| PC. 24 | Simplified PLC third segment running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 25 | Simple PLC Stage 3 Acceleration/Deceleration Time Selection | 0～3 | 0 | ☆ |
| PC. 26 | Simplified PLC running time, segment 4 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 27 | selection for stage 4 | 0～3 | 0 | ☆ |
| PC. 28 | Simplified PLC running time, segment 5 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 29 | selection (segment 5) | 0～3 | 0 | ☆ |
| PC. 30 | Simplified PLC | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |

| | | | | |
|---|---|---|---|---|
| | running time, segment 6 | | | |
| PC. 31 | selection for segment 6 | 0～3 | 0 | ☆ |
| PC. 32 | Simplified PLC running time segment 7 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 33 | selection (segment 7) | 0～3 | 0 | ☆ |
| PC. 34 | Simplified PLC running time segment 8 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 35 | selection for segment 8 | 0～3 | 0 | ☆ |
| PC. 36 | Simplified PLC running time segment 9 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 37 | Simple PLC 9th Segment Acceleration/Deceleration Time Selection | 0～3 | 0 | ☆ |
| PC. 38 | Simplified PLC running time of segment 10 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 39 | selection for segment 10 | 0～3 | 0 | ☆ |
| PC. 40 | Simple PLC 11th segment running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 41 | selection for segment 11 | 0～3 | 0 | ☆ |
| PC. 42 | Simple PLC 12th segment running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 43 | Simple PLC 12th stage acceleration/deceleration time selection | 0～3 | 0 | ☆ |
| PC. 44 | Simplified PLC running time segment 13 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 45 | selection (segment 13) | 0～3 | 0 | ☆ |

| | | | | |
|---|---|---|---|---|
| PC. 46 | Simplified PLC running time segment 14 | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 47 | selection (segment 14) | 0～3 | 0 | ☆ |
| PC. 48 | Simplified PLC, 15th segment running time | 0.0s(h)～65 00. 0s ( h) | 0.0s (h) | ☆ |
| PC. 49 | selection (segment 15) | 0～3 | 0 | ☆ |
| PC. 50 | Simplified PLC running time unit | 0: s (seconds)<br>1: h (hour) | 0 | ☆ |
| PC. 51 | Multi-segment instruction 0 given mode | 0: Function code PC.00 given<br>1: FIV<br>2: FIC<br>3: Retain<br>4: PULSE pulse<br>5: PID<br>6: The preset frequency ( P0.08 ) is given. UP/DOWN can be modified | 0 | ☆ |
| P d group communication parameters | | | | |
| PD. 00 | baud rate | Units: MODBUS<br>0:300 BPS<br>1:600 BPS<br>2: 1200 BPS<br>3: 2400 BPS<br>4: 4800 BPS<br>5: 9600 BPS<br>6: 19200 BPS<br>7: 38400 BPS<br>8: 57600 BPS<br>9: 115200 BPS<br>Tens: Reserved<br>Hundreds: Reserved<br>Thousands: CAN<br>0:20 KBPS<br>1:50 KBPS<br>2:100 KBPS<br>3:125 KBPS<br>4:250 KBPS<br>5:500 KBPS<br>6:1M BPS | 0 005 | ☆ |
| PD. 01 | Data format | 0: No checksum (8-N-2)<br>1: Even parity (8-E-1) | 3 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 2: Odd parity (8-O-1)<br>3:8-N-1 | | |
| PD. 02 | Local address | 1～247 | 1 | ☆ |
| PD. 03 | Response delay | 0ms～20ms | 2 | ☆ |
| PD. 04 | Communication timeout | 0.0 (invalid), 0.1s～60.0s | 0.0 | ☆ |
| PD. 05 | Data transmission format selection | Units: MODBUS<br>0: Non-standard MODBUS protocol<br>1: Standard MODBUS protocol<br>Tens: Reserved | 1 | ☆ |
| PD. 06 | Communication reading current resolution | 0:0.01A<br>1:0.1A | 1 | ☆ |
| P P Group User function code | | | | |
| PP. 00 | User password | 0～65535 | 0 | ☆ |
| PP. 01 | Parameter initialization | 0: No operation<br>01: Restore factory settings, excluding motor parameters. | 0 | ★ |
| C0 group torque control parameters | | | | |
| L 0.00 | Speed/torque control mode selection | 0: Speed Control<br>1: Torque Control | 0 | ★ |
| L 0.01 | Torque setting source selection under torque control mode | 0: Numeric setting (C0.03)<br>1: FIV<br>2: FIC<br>3: Retain<br>4: Retain<br>5: Communication given<br>6: MIN (FIV, FIC)<br>7: MAX(FIV,FIC)<br>(The full scale of options 1-7 corresponds to the numerical setting C0.03) | 0 | ★ |
| L 0.03 | Torque digital setting under torque control mode | -200.0%～200.0% | 150.0% | ☆ |
| L 0.05 | Torque control positive maximum frequency | 0.00Hz to maximum frequency | 50.00Hz | ☆ |
| L 0.06 | Torque control reverse maximum frequency | 0.00Hz to maximum frequency | 50.00Hz | ☆ |

| | | | | |
|---|---|---|---|---|
| L 0.07 | Torque control acceleration time | 0.00s～65000s | 0.00s | ☆ |
| L 0.08 | Torque control deceleration time | 0.00s～65000s | 0.00s | ☆ |
| C 5 group of control optimization parameters | | | | |
| L 5. 00 | DPWM switching upper limit frequency | 0.00Hz to maximum frequency | 8.00Hz | ☆ |
| L 5. 01 | PWM modulation method | 0: Asynchronous modulation<br>1: Synchronous Modulation | 0 | ☆ |
| L 5. 02 | Dead zone compensation mode selection | 0: No compensation<br>1: Compensation Mode 1 | 1 | ☆ |
| L 5. 03 | Random PWM depth | 0: Random PWM invalid<br>1-10: PWM carrier frequency random depth | 0 | ☆ |
| L 5. 04 | Fast current limiting enable | 0: Disable<br>1: Enable | 1 | ☆ |
| L 5.05 | Voltage overmodulation coefficient | 10 0～1 2 0 | 1 10 | ☆ |
| L 5. 06 | Undervoltage point setting | 20.0 ~ 750.0 | 350.0 | ☆ |
| L 5. 08 | Dead Zone Time Adjustment | 100%～200% | 150% | ☆ |
| L 5.09 | Overpressure point setting | 650.0V ~ 2200.0V | Model confirmed | |

Summary of monitoring parameters :

| function | name | smallest unit |
|---|---|---|
| Group D0 Basic monitoring parameters | | |
| D0.00 | Operating frequency ( Hz ) | 0.01Hz |
| D0. 01 | Set frequency ( Hz ) | 0.01Hz |
| D0.02 | Bus voltage ( V ) | 0.1V |
| D0. 03 | Output voltage ( V ) | 1V |
| D0. 04 | Output current ( A ) | 0.01A |
| D0.05 | Output power ( kW ) | 0.1kW |
| D0. 06 | Output torque ( % ) | 0.1% |
| D0. 07 | DI Input Status | 1 |
| D0. 08 | DO output status | 1 |
| D0. 09 | FIV voltage ( V ) | 0.01V |
| D0. 10 | FIC voltage ( V ) | 0.01V |

| | | |
|---|---|---|
| D0. 14 | Load speed display | 1 |
| D0. 15 | PID setting | 1 |
| D0. 16 | PID feedback | 1 |
| D0. 17 | PLC stage | 1 |
| D0. 20 | Remaining running time | 0.1 Min |
| D0. 21 | FIV voltage before correction | 0.001V |
| D0. 22 | FIC voltage before correction | 0.001V |
| D0. 25 | Current power-on time | 1 Min |
| D0. 26 | Current running time | 0.1 Min |
| D0. 28 | Communication settings | 0.01% |
| D0. 31 | Auxiliary frequency Y display | 0.01Hz |
| D0. 32 | View arbitrary memory address | 1 |
| D0. 34 | Motor temperature value | 1 ℃ |
| D0. 35 | Target torque ( % ) | 0.1% |
| D0. 37 | Power factor perspective | 0.1° |
| D0. 39 | VF separates the target voltage . | 1V |
| D0. 40 | VF separate output voltage | 1V |
| D0. 45 | Fault Information | 0 |
| D0.59 | Set frequency (%) | 0.01% |
| D0.60 | Operating frequency (%) | 0.01% |
| D0.61 | Inverter status | 1 |
| D0.65 | Multi-pump control steps | 0: Shutdown |
| D0.66 | Pressure stabilizing pump operating | |
| D0.6 7 | Pump in state | 0 : Shutdown 1 : Power Frequency 2 : Variable |
| D0.6 8 | Pump in second state | 0 : Shutdown 1 : Power Frequency 2 : Variable |
| D0.69 | Pump three states | 0 : Shutdown 1 : Power Frequency 2 : Variable |
| D0.70 | Pump four states | 0 : Shutdown 1 : Power Frequency 2 : Variable |
| D0.71 | Multi-state observation | Bit0 : Terminal shuts off water pump number one<br>Bit 1 : Terminal shuts off water pump number 2<br>Bit 2 : Terminal shut off water pump number 3<br>Bit 3 : Terminal shuts off water pump number four<br>Bit 4 : Terminal shut off water pump number 5 |
| D0.72 | Current operating pump output | 0.01Hz |

| | | |
|---|---|---|
| D0.73 | Number of successful | 1 |
| D0.74 | Number of successful | 1 |
| D0.75 | Number of successful | 1 |
| D0.76 | Number of successful | 1 |
| D0.77 | Target frequency of host number | 0.01Hz |
| D0.78 | Target frequency of main unit two | 0.01Hz |
| D0.79 | Target frequency of host number | 0.01Hz |
| D0.80 | Target frequency of host number | 0.01Hz |
| D0.81 | Main unit output frequency | 0.01Hz |
| D0.82 | Second host output frequency | 0.01Hz |
| D0.83 | The output frequency of the third | 0.01Hz |
| D0.84 | The output frequency of the fourth | 0.01Hz |
| D0.85 | Output current of main unit No. 1 | 0.01A |
| D0.86 | The No. 2 main unit outputs current. | 0.01A |
| D0.87 | The No. 3 host output current | 0.01A |
| D0.88 | The No. 4 main unit outputs current. | 0.01A |
| D0.89 | Mainframe failure | 1 |
| D0.90 | Mainframe malfunction | 1 |
| D0.91 | Mainframe No. 3 malfunction | 1 |
| D0.92 | The No. 4 main unit malfunctioned. | 1 |
| D0.93 | Output voltage of main unit No. 1 | 1V |
| D0.94 | Output voltage of main unit number | 1V |
| D0.95 | Output voltage of host No. 3 | 1V |
| D0.96 | No. 4 main unit output voltage | 1V |

# Chapter 5 Troubleshooting and Repair

## 5-1 Fault alarms and countermeasures

The T200-BF frequency converter has multiple warning messages and protection functions. Once a fault occurs, the protection functions activate, the frequency converter stops outputting, the frequency converter fault relay contacts actuate, and a fault code is displayed on the frequency converter's display panel. When the user seeks service... Before proceeding, you can first perform a self-check as instructed in this section to analyze the cause of the fault and find a solution. If the cause falls under the category described in the dotted box, Please seek service by contacting the dealer of the inverter you purchased or by contacting our company directly.

In the fault information, OUOC is a hardware overcurrent or overvoltage signal. In most cases, hardware overvoltage faults will cause the OUOC alarm.

| | |
|---|---|
| Fault 1 Name | Inverter unit protection |
| Operation panel display | OC |
| Troubleshooting | 1. Short circuit in the inverter output circuit<br>2. The wiring between the motor and the frequency converter is too long.<br>3. Module overheating<br>4. Loose internal wiring of the frequency converter<br>5. Main control board malfunction<br>6. Driver board malfunction<br>7. Inverter module malfunction |
| Troubleshooting strategies | 1. Troubleshoot external faults<br>2. Install a reactor or output filter<br>3. Check if the air duct is blocked, and if the fan is working properly, and troubleshoot any problems.<br>4. Connect all the connecting cables.<br>5. Seek technical support<br>6. Seek technical support<br>7. Seek technical support |
| Fault 2 Name | Accelerating overcurrent |
| Operation panel display | OC1 |
| Troubleshooting | 1. There is a grounding or short circuit in the inverter output circuit.<br>2. The control method is vector and no parameter identification is performed.<br>3. Acceleration time is too short<br>4. Manual torque boost or inappropriate V/F curve.<br>5. Low voltage |

| | |
|---|---|
| | 6. Start the rotating motor.<br>7. Sudden load increase during acceleration<br>8. The selected frequency converter is too small. |
| Troubleshooting strategies | 1. Troubleshoot external faults<br>2. Identify motor parameters<br>3. Increase acceleration time<br>4. Adjust the manual lifting torque or V/F curve.<br>5. Adjust the voltage to the normal range.<br>6. Select speed tracking start or wait for the motor to stop before starting.<br>7. Cancel sudden load increases<br>8. Select a frequency converter with a higher power rating. |
| Fault 3 Name | Deceleration overcurrent |
| Operation panel display | OC2 |
| Troubleshooting | 1. There is a grounding or short circuit in the inverter output circuit.<br>2. The control method is vector and no parameter identification is performed.<br>3. The deceleration time is too short.<br>4. Low voltage<br>5. Sudden load application during deceleration<br>6. No braking unit or braking resistor was installed. |
| Troubleshooting strategies | 1. Troubleshoot external faults<br>2. Identify motor parameters<br>3. Increase deceleration time<br>4. Adjust the voltage to the normal range.<br>5. Cancel sudden load increases<br>6. Install a braking unit and resistor. |
| Fault 4 Name | Constant speed overcurrent |
| Operation panel display | OC3 |
| Troubleshooting | 1. There is a grounding or short circuit in the inverter output circuit.<br>2. The control method is vector and no parameter identification is performed.<br>3. Low voltage<br>4. Are there any sudden increases in load during operation?<br>5. The selected frequency converter is too small. |
| Troubleshooting strategies | 1. Troubleshoot external faults<br>2. Identify motor parameters<br>3. Adjust the voltage to the normal range.<br>4. Cancel sudden load increases<br>5. Select a frequency converter with a higher power rating. |

| | |
|---|---|
| Fault 5 name | Accelerated overvoltage |
| Operation panel display | OU1 |
| Troubleshooting | 1. Input voltage is too high<br>2. During acceleration, an external force drives the motor.<br>3. Acceleration time is too short<br>4. No braking unit or braking resistor was installed. |
| Troubleshooting strategies | 1. Adjust the voltage to the normal range.<br>2. Eliminate additional power or add a braking resistor.<br>3. Increase acceleration time<br>4. Install a braking unit and resistor. |
| Fault 6 Name | Deceleration overvoltage |
| Operation panel display | OU2 |
| Troubleshooting | 1. Input voltage is too high<br>2. During deceleration, an external force drives the motor.<br>3. Deceleration time is too short<br>4. No braking unit or braking resistor was installed. |
| Troubleshooting strategies | 1. Adjust the voltage to the normal range.<br>2. Eliminate additional power or add a braking resistor.<br>3. Increase deceleration time<br>4. Install a braking unit and resistor. |
| Fault 7 name | Constant speed overvoltage |
| Operation panel display | OU3 |
| Troubleshooting | 1. Input voltage is too high<br>2. The motor is driven by an external force during operation. |
| Troubleshooting strategies | 1. Adjust the voltage to the normal range.<br>2. Eliminate additional power or add a braking resistor. |
| Fault 8 Name | Control power failure |
| Operation panel display | POF |
| Troubleshooting | 1. The input voltage is not within the range specified in the standard. |
| Troubleshooting strategies | 1. Adjust the voltage to the specified range. |
| Fault 9 Name | Undervoltage fault |
| Operation panel display | LU |
| Troubleshooting | 1. Instantaneous power outage<br>2. The voltage at the input terminal of the frequency converter is not within the range required by the specification. |

| | |
|---|---|
| | 3. Abnormal bus voltage<br>4. The rectifier bridge and buffer resistor are not functioning properly.<br>5. Driver board malfunction<br>6. Control panel malfunction |
| Troubleshooting strategies | 1. Reset fault<br>2. Adjust the voltage to the normal range.<br>3. Seek technical support<br>4. Seek technical support<br>5. Seek technical support<br>6. Seek technical support |
| Fault 10 Name | Inverter overload |
| Operation panel display | OL2 |
| Troubleshooting | 1. Is the load too large or is the motor stalled?<br>2. The selected frequency converter is too small. |
| Troubleshooting strategies | 1. Reduce the load and check the condition of the motor and machinery.<br>2. Select a frequency converter with a higher power rating. |
| Fault 11 Name | Motor overload |
| Operation panel display | OL1 |
| Troubleshooting | 1. Is the setting of motor protection parameter P9.01 appropriate ?<br>2. Is the load too large or is the motor stalled?<br>3. The selected frequency converter is too small. |
| Troubleshooting strategies | 1. Set this parameter correctly.<br>2. Reduce the load and check the condition of the motor and machinery.<br>3. Select a frequency converter with a higher power rating. |
| Fault 12 Name | Input phase loss |
| Operation panel display | LI |
| Troubleshooting | 1. The three-phase input power supply is abnormal.<br>2. Driver board malfunction<br>3. Surge protection board malfunction<br>4. Main control board malfunction |
| Troubleshooting strategies | 1. Inspect and eliminate problems in the external wiring.<br>2. Seek technical support<br>3. Seek technical support<br>4. Seek technical support |
| Fault 13 Name | Output phase loss |
| Operation panel display | LO |

| | |
|---|---|
| Troubleshooting | 1. The wiring from the frequency converter to the motor is faulty.<br>2. The inverter's three-phase output is unbalanced when the motor is running.<br>3. Driver board malfunction<br>4. Module error |
| Troubleshooting strategies | 1. Troubleshoot external faults<br>2. Check if the three-phase windings of the motor are normal and troubleshoot any faults.<br>3. Seek technical support<br>4. Seek technical support |
| Fault 14 Name | Module overheating |
| Operation panel display | OH |
| Troubleshooting | 1. The ambient temperature is too high.<br>2. Duct blockage<br>3. Fan malfunction<br>4. Damaged module thermistor<br>5. Inverter module damaged |
| Troubleshooting strategies | 1. Lower the ambient temperature<br>2. Clean the air ducts<br>3. Replace the fan<br>4. Replace the thermistor<br>5. Replace the inverter module |
| Fault 15 Name | External faults |
| Operation panel display | EF |
| Troubleshooting | 1. Input external fault signals via the multi-function terminal. |
| Troubleshooting strategies | 1. Reset Operation |
| Fault 16 Name | Communication failure |
| Operation panel display | CE |
| Troubleshooting | 1. The host computer is not working properly.<br>2. The communication line is faulty.<br>3. Communication parameter P and D group settings are incorrect. |
| Troubleshooting strategies | 1. Check the wiring of the host computer.<br>2. Check the communication connection cable<br>3. Correctly set communication parameters |
| Fault 17 Name | Contactor failure |
| Operation panel display | rAy |

| | |
|---|---|
| Troubleshooting | 1. The driver board and power supply are not functioning properly.<br>2. The contactor is malfunctioning. |
| Troubleshooting strategies | 1. Replace the driver board or power board.<br>2. Replace the contactor |
| Fault 18 Name | Current detection fault |
| Operation panel display | IE |
| Troubleshooting | 1. Check for abnormalities in the Hall effect device.<br>2. Driver board malfunction |
| Troubleshooting strategies | 1. Replace the Hall effect sensor<br>2. Replace the driver board |
| Fault 19 Name | Motor self-learning fault |
| Operation panel display | TE |
| Troubleshooting | 1. Motor parameters are not set according to the nameplate.<br>2. Parameter identification process timed out. |
| Troubleshooting strategies | 1. Set the motor parameters correctly according to the nameplate.<br>2. Check the leads from the frequency converter to the motor. |
| Fault 20 Name | reserve |
| Operation panel display | reserve |
| Troubleshooting | reserve |
| Troubleshooting strategies | reserve |
| Fault 21 Name | EEPROM read/write failure |
| Operation panel display | EEP |
| Troubleshooting | 1. Damaged EEPROM chip |
| Troubleshooting strategies | 1. Replace the main control board |
| Fault 22 Name | Inverter hardware failure |
| Operation panel display | OUOC |
| Troubleshooting | 1. Overvoltage exists<br>2. Overcurrent exists. |
| Troubleshooting strategies | 1. Handle as an overvoltage fault.<br>2. Handle as an overcurrent fault. |
| Fault 23 Name | short circuit to ground fault |
| Operation panel display | GND |

| | |
|---|---|
| Troubleshooting | 1. Motor short circuit to ground |
| Troubleshooting strategies | 1. Replace the cable or motor. |
| Fault 26 Name | Accumulated running time reaches fault |
| Operation panel display | END1 |
| Troubleshooting | 1. The cumulative running time has reached the set value. |
| Troubleshooting strategies | 1. Use the parameter initialization function to clear the recorded information. |
| Fault 29 Name | The cumulative power-on time has reached the fault. |
| Operation panel display | END2 |
| Troubleshooting | 1. The cumulative power-on time has reached the set value. |
| Troubleshooting strategies | 1. Use the parameter initialization function to clear the recorded information. |
| Fault 30 Name | Loading failure |
| Operation panel display | LOAD |
| Troubleshooting | 1. The inverter's operating current is less than P9.64 . |
| Troubleshooting strategies | 1. Confirm whether the load is disconnected or whether the P9.64 and P9.65 parameter settings match the actual operating conditions. |
| Fault 31 Name | Runtime PID feedback loss fault |
| Operation panel display | PIDE |
| Troubleshooting | 1. The PID feedback is less than the PA setpoint . |
| Troubleshooting strategies | 1. Check the PID feedback signal or set PA to a suitable value . |
| Fault 40 name | Wave-by-wave current limiting fault |
| Operation panel display | CBC |
| Troubleshooting | 1. Is the load too large or is the motor stalled?<br>2. The selected frequency converter is too small. |
| Troubleshooting strategies | 1. Reduce the load and check the condition of the motor and machinery.<br>2. Select a frequency converter with a higher power rating. |
| Fault 42 Name | Excessive speed deviation fault |
| Operation panel display | ESP |
| Troubleshooting | 1. No parameter identification was performed.<br>2. Excessive speed deviation indicates that the detection parameters P9.69 and P9.60 are not set appropriately . |
| Troubleshooting | 1. Identify motor parameters |

| | |
|---|---|
| strategies | 2. Set the detection parameters reasonably according to the actual situation. |
| Fault 43 Name | Motor overspeed fault |
| Operation panel display | oSP |
| Troubleshooting | 1. No parameter identification was performed. |
| Troubleshooting strategies | 1. No parameter identification was performed. |
| Fault 51 Name | reserve |
| Operation panel display | reserve |
| Troubleshooting | reserve |
| Troubleshooting strategies | reserve |

| warn  |
|---|
| Maintenance personnel must perform maintenance and upkeep according to the specified methods.<br>Maintenance personnel must be qualified professionals.<br>Before performing maintenance, the power supply to the frequency converter must be disconnected, and maintenance work can only be carried out after 10 minutes.<br>Do not touch the components on the PCB board directly, otherwise static electricity may damage the inverter.<br>• After the repair is completed, make sure all screws are tightened. |

**6-1 Routine Maintenance**

To prevent inverter failures, ensure normal equipment operation, and extend the inverter's service life, routine maintenance is required. The routine maintenance procedures are as follows:

| Inspection items | content |
|---|---|
| Temperature/Humidity | Confirm that the ambient temperature is between 0℃ and 40℃, the humidity is between 20% and 90%, and there is no condensation. |
| oil mist and dust | Confirm that there is no oil mist, dust, or condensation inside the frequency converter. |
| frequency converter | Check the frequency converter for abnormal heating and vibration. |
| fan | Confirm that the fan is operating normally and there are no obstructions or other issues. |
| Input power | Confirm that the voltage and frequency of the input power supply are within the allowable range. |
| motor | Check the motor for abnormal vibration, overheating, abnormal noise, and phase loss. |

**6-2 Regular maintenance**

To prevent inverter malfunctions and ensure its long-term high-performance and stable operation, users must conduct regular inspections (every six months). The inspection items are as follows:

| Inspection items | Inspection content | Elimination methods |
|---|---|---|
| Screws for external terminals | Are the screws loose? | Tighten |
| PCB board | Dust, dirt | Use dry compressed air to thoroughly remove debris. |

| | | |
|---|---|---|
| fan | Whether abnormal noise and vibration, and the cumulative time exceeds 20,000 hours. | 1. Remove debris<br>2. Replace the fan |
| Electrolytic capacitors | Does it change color? Does it have an unusual odor? | Replace electrolytic capacitor |
| heat sink | Dust, dirt | Use dry compressed air to thoroughly remove debris. |
| Power components | Dust, dirt | Use dry compressed air to thoroughly remove debris. |

### 6-3 Replacement of vulnerable parts for frequency converter

The fan and electrolytic capacitors in a frequency converter are easily damaged components. To ensure long-term, safe, and trouble-free operation of the frequency converter, these vulnerable parts must be replaced regularly. The replacement schedule for vulnerable parts is as follows:

◆ Fan: Must be replaced after more than 20,000 hours of use.

◆Electrolytic capacitors: need to be replaced after 30,000 to 40,000 hours of use.

### Warranty of 6-4 frequency converter

Our company provides a 12-month warranty service for the T200-BF series frequency converters from the date of manufacture.

## Appendix 1 One-click parameter setting for multiple pumps via communication

**1) Multi-pump parameter settings:**

| **For the main pump parameters (1 control 1), first set PP01 = 1 , then set the following parameters.** | | | | | |
|---|---|---|---|---|---|
| function code | name | | PP01=30 | | |
| P002 | Run selection | 0~2 | 1 | | |
| P 003 | Frequency source selection | 0~9 | 8 | | |
| PA59 | Multi-pump function is effective | 0~2 | 2 | | |
| P A62 | Main pump selection | 1: Main pump; 0: Slave pump | 1 | | |
| P D 02 | Local address | 1～247 | 1 | | |
| One-to-many control: PA.58 is configured according to the number of control pumps. | | | | | |
| | | | | | |
| **1 for parameters 2-4 of the pump , then set the following parameters.** | | | | | |
| function code | name | content | PP01=31 | PP01=32 | PP01=33 |
| P002 | Run selection | 0~2 | 2 | 2 | 2 |
| P 003 | Frequency source selection | 0~9 | 9 | 9 | 9 |
| PA59 | Multi-pump function is effective | 0~2 | 0 | 0 | 0 |
| P A62 | Main pump selection | 1: Main pump; 0: Slave pump | 0 | 0 | 0 |
| P D 02 | Local address | 1～247 | 2 | 3 | 4 |

**2) Effective selection of each pump , the parameter set on the main pump frequency converter is PA.58 .**

**3 ) When controlling multiple pumps, the RS+ and RS- signals of each frequency converter are connected together.**

Host:

1、PP.01=1 restores factory settings, then PP.01=30 sets host parameters.

2、PA.58 is configured according to the number of control pumps.

3、Start the machine according to the P002 startup method.

Slave:
Set the parameters directly with one click; once set, no modifications are needed. The only difference between each slave device is the PD.02 address.

## Appendix II APV pro Modbus communication protocol

The T200-BF series frequency converters provide an RS485 communication interface and support the Modbus communication protocol. Users can... The computer or PLC can achieve centralized control, and the inverter's operation commands can be set, function code parameters can be modified or read, and the inverter's operating status and fault information can be read through this communication protocol.

I. Agreement Content

This serial communication protocol defines the information content and format used in serial communication. This includes: host polling (or wide-area polling)... (broadcast) format; host encoding method, including: function code requiring action, transmitted data, and error checking, etc. Slave response. It should also use the same structure, including: action confirmation, return data, and error verification. If the slave device receives information... If an error occurs, or if the action required by the host cannot be completed, it will organize a fault message as a response and send it back to the host.

II. Application Methods

The frequency converter is connected to a " single master, multiple slave " PC/PLC control network with an RS485 bus .

III. Bus Structure

( 1 ) Interface method

RS485 hardware interface

( 2 ) Transmission method Asynchronous serial, half-duplex transmission. At any given time, only one of the master and slave devices can send data while the other can only receive data. Data is sent frame by frame in the serial asynchronous communication process.

( 3 ) Topology A single-master, multiple-slave system. Slave addresses can be set from 1 to 247 , with 0 being the broadcast address. Slave addresses in the network must be unique.

IV. Agreement Description

The T200-BF series frequency converter uses an asynchronous serial master-slave Modbus communication protocol, where only one device exists in the network. The master (slave) can establish a protocol (called " query / command " ). Other devices (slaves) can only respond to the master by providing data. The slave device receives a " query / command " from the host , or performs a corresponding action based on the host's " query / command " .

Here, the host refers to a personal computer ( PC ), industrial control equipment, or programmable logic controller ( PLC ), etc., while the slave device refers to the T200-BF frequency inverter. The host can communicate with a single slave device individually, or broadcast information to all slave devices. For individual host " queries / commands " , the slave device must return a message (called a response). For broadcast information sent by the host, the slave device does not need to send a response back to the host.

五、Communication Data Structure

Modbus protocol communication data format of the T200-BF series frequency converters is as follows: When using RTU mode, message sending must begin with a pause interval of at least 3.5 character times.

This is the easiest to implement at various character times under network baud rates. The first field transmitted is the device address.

The usable transmission characters are hexadecimal 0...9, A...F . Network devices continuously monitor the network bus, including during pause intervals. When the first field (address field) is received, each device decodes it to determine if it is destined for itself. After the last transmitted character, a pause of at least 3.5 characters marks the end of the message. A new message can be sent after this pause. start.

The entire message frame must be transmitted as a continuous stream. If there is a pause of more than 1.5 character times before the frame is completed, The receiving device will refresh the incomplete message and assume the next byte is the address field of a new message. Similarly, if a new message... If a message continues from the previous message within a time frame of less than 3.5 characters, the receiving device will interpret it as a continuation of the previous message. This will result in... An error has occurred because the value of the final CRC field cannot be correct.

RTU frame format:

<table>
<tr><td>Frame Header</td><td>3.5 character time</td></tr>
<tr><td>Slave Address</td><td>Mailing address: 1~247</td></tr>
<tr><td>Command code</td><td>03 : Read slave parameters; 06 : Write slave</td></tr>
<tr><td>Data content</td><td rowspan="4">Data contents: function code parameter address, number of function code parameters, function code parameter values, etc.</td></tr>
<tr><td>Data content</td></tr>
<tr><td>...</td></tr>
<tr><td>Data content</td></tr>
<tr><td>CRC CHK high bit</td><td rowspan="2">Detection value: CRC value.</td></tr>
<tr><td>CRC CHK low bits</td></tr>
<tr><td>END</td><td>3.5 character time</td></tr>
</table>

CMD (command instructions) and DATA (data description)

Command code: 03H , read N words (maximum 12 words can be read). For example: frequency converter with slave address 01 . The device's starting address F1 0 5 reads two consecutive values.

Host command information

| | |
|---|---|
| ADR | 01H |
| CMD | 03H |
| High bits of the starting | F 1 H |
| Starting address low bits | 0 5 H |
| Number of registers (high- | 00H |
| Register count (low byte) | 02H |
| CRC CHK high bit | Its CRC CHK value needs to be calculated. |
| CRC CHK low bits | |

Response information from the machine

PD. 05 is set to 0 :

| | |
|---|---|
| ADR | 01H |
| CMD | 03H |
| Byte count (high bit) | 00H |
| Byte count (low byte) | 04H |
| Data F002H at a high level | 00H |
| Data F002H at low levels | 00H |
| Data F003H at a high level | 00H |
| Data F003H at a high level | 01H |
| CRC CHK high bit | Its CRC CHK value needs to be calculated. |
| CRC CHK low bits | |

When PD. 05 is set to 1

| | |
|---|---|
| ADR | 01H |
| CMD | 03H |
| Number of bytes | 04H |
| Data F002H at a high level | 00H |
| Data F002H at low levels | 00H |
| Data F003H at a high level | 00H |
| Data F003H low position | 01H |
| CRC CHK high bit | Its CRC CHK value needs to be calculated. |
| CRC CHK low bits | |

Command code: 06H Write a word ( Word ). For example: Write 3 000 (BB 8H ) to the F00AH address of the slave inverter at address 0 5 H.

Host command information

| | |
|---|---|
| ADR | 0 5 H |
| CMD | 06H |
| Data address high byte | F0H |
| Data address low bits | 0AH |
| High level of data content | 0B H |

| | |
|---|---|
| Data content at a low level | B 8H |
| CRC CHK high bit | CRC CHK value to be calculated |
| CRC CHK low bits | |

Response information from the machine

| | |
|---|---|
| ADR | 0 5 H |
| CMD | 06H |
| Data address high byte | F0H |
| Data address low bits | 0AH |
| High level of data content | 0B H |
| Data content at a low level | B 8H |
| CRC CHK high bit | CRC CHK value to be calculated |
| CRC CHK low bits | |

Verification Method – CRC Verification: CRC ( Cyclical Redundancy Check ) uses the RTU frame format, message... This includes an error detection field based on the CRC method. The CRC field checks the entire message content. The CRC field is two bytes, containing a 16- bit binary value. It is calculated by the transmitting device and added to the message. The receiving device recalculates the CRC of the received message , and... If the two CRC values are not equal, it indicates that there is a transmission error.

The CRC algorithm first stores 0xFFFF , then calls a procedure to compare the value of 8 consecutive bytes from the message with the value in the current register. Line processing. Only the 8 bits of data in each character are valid for CRC ; the start bit, stop bit, and parity bit are invalid.

CRC generation, each 8- bit character is individually XORed with the register contents, and the result is shifted towards the least significant bit. The register is shifted, and the most significant bit is filled with 0. The LSB is extracted and checked; if the LSB is 1 , the register is checked separately and its value differs from the preset value. Alternatively, if the LSB is 0 , no action is taken. The entire process is repeated 8 times. After the last bit (the 8th bit) is completed, the next 8 -bit byte is XORed separately with the current value of the register. The final value in the register is the CRC value after all bytes in the message have been processed .

When adding a CRC to a message, the low byte is added first, followed by the high byte. The simple CRC function is as follows:

```
unsigned int crc_cal_value(unsigned char *data_value,unsigned char
data_length )
{
int i;
unsigned int crc_value=0xffff;
while(data_length-- )
{
```

```
crc_value^=*data_value++;
for(i=0;i<8;i++ )
{
If(crc_value&0x0001 )
crc_value=(crc_value>>1 ) ^0xa001;
else
crc_value=crc_value>>1;
}
}
Return(crc_value);
}
```

Address definition of communication parameters

This section contains the communication information, used to control the operation of the frequency converter, its status, and related parameter settings. Read/write function code parameters (some function codes cannot be changed and are only for manufacturer or monitoring use): Function code parameter address identification rules:

The rule for representing parameter addresses using function code group numbers and labels is as follows:

High-order byte: F0 ~ FF (Group P), A0~ AF ( Group C), 70~7F ( Group D)

Low-order byte: 00~FF

For example: P3.12 , the address is represented as F30C ; Notice: P F group: Parameters cannot be read or modified; Group D: Read-only, parameters cannot be modified.

Some parameters cannot be changed when the frequency converter is running; others cannot be changed regardless of the frequency converter's state. When modifying function code parameters, pay attention to the parameter range, unit, and related instructions.

Furthermore, because EEPROM is frequently stored, its lifespan is reduced . Therefore, some function codes in communication... In this mode, there is no need to store the data; you only need to change the value in RAM .

change the high-order bit F of the function code address to 0 . If the parameter is from group C, to achieve this function, simply change the high-order bit A of the function code address to 4 . The corresponding function code address is represented as follows: High-order byte: 00~0F (Group P), 40~4F (Group C) Low-order byte: 00~FF

For example, function code P3.12 is not stored in EEPROM , and its address is represented as 030C ; Function code C0.05 is not stored in EEPROM ; its address is represented as 4005 . This address indicates that RAM can only be written to , not read from; it is an invalid address when reading from it.

Shutdown / Operation Parameters Section:

| Parameter address | Parameter Description |
|---|---|

| | |
|---|---|
| 1000 ( write only ) | * Communication settings ( -10000~10000 ) |
| 1001 ( Read-only ) | Operating frequency |
| 1002 ( Read-only ) | bus voltage |
| 1003 ( Read-only ) | Output voltage |
| 1004 ( Read-only ) | Output current |
| 1005 ( Read-only ) | Output power |
| 1006 ( Read-only ) | Output torque |
| 1007 ( Read-only ) | running speed |
| 1008 ( Read-only ) | Input terminal markings |
| 1009 ( Read-only ) | Output terminal markings |
| 100A ( Read-only ) | FIV voltage |
| 100B ( Read-only ) | FIC voltage |
| 100C ( Read-only ) | reserve |
| 100D ( Read-only ) | Count value input |
| 100E ( Read-only ) | Length value input |
| 100F ( Read-only ) | Load speed ( motor speed ) |
| 1010 ( Read-only ) | PID settings |
| 1011 ( Read-only ) | PID feedback |
| 1012 ( Read-only ) | PLC steps |
| 1013 ( Read-only ) | PULSE input pulse frequency, in units of |
| 1014 ( Read-only ) | reserve |
| 1015 ( Read-only ) | Remaining running time |
| 1016 ( Read-only ) | FIV voltage before correction |
| 1017 ( Read-only ) | FIC voltage before correction |
| 1018 ( Read-only ) | reserve |
| 1019 ( Read-only ) | linear velocity |
| 101A ( Read-only ) | Current power-on time |
| 101B ( Read-only ) | Current running time |
| 101C ( Read-only ) | PULSE input pulse frequency, in 1Hz |
| 101D ( Read-only ) | Communication settings |
| 101E ( Read-only ) | reserve |
| 101F ( Read-only ) | Main frequency X display |
| 1020 ( Read-only ) | Auxiliary frequency Y display |

**** Notice:**

The communication settings are percentages of relative values; 10000 corresponds to 100.00% , and -10000 corresponds to -100.00% . For data in the dimension of frequency, this percentage is a percentage relative to the

maximum frequency (P0.10 ) ; for data in the dimension of torque, this percentage is P2.10 .

Control commands input to the frequency converter: (write only)

| command address | Command Function |
|---|---|
| 2000 | 0001 : Forward rotation |
| | 0002 : Reverse operation |
| | 0003 : Forward jogging |
| | 0004 : Reverse inching |
| | 0005 : Free Stop |
| | 0006 : Deceleration and Stop |
| | 0007 : Fault Reset |

Read inverter status: (Read-only)

| Status word address | Status word function |
|---|---|
| 3000 | 0001 : Forward rotation |
| | 0002 : Reverse operation |
| | 0003 : Shutdown |

Parameter lock password verification: (If the return value is 8888H , it means the password verification passed)

| Password address | Enter the password content |
|---|---|
| 1F00 | ***** |

Output switch control: (write only)

| command address | Command content |
|---|---|
| 2001 | BIT0 : Reserved<br>BIT1 : Reserved<br>BIT2 : TA-TC output control<br>BIT3 : Reserved<br>BIT4 : MOA-MOB-MOC Output Control |

Analog output FOV control: (Write only)

| command address | Command content |
|---|---|
| 2002 | 0 to 7FFF represents 0 % to 100 %. |

Analog output FOC control: (Write only)

| command address | Command content |
|---|---|
| 2003 | 0 to 7FFF represents 0 % to 100 %. |

Pulse output control: (Write only)

| command address | Command content |
|---|---|
| 2004 | 0 to 7FFF represents 0 % to 100 %. |

Inverter fault description:

| Inverter fault address | Inverter fault information |
|---|---|
| 8000 | 0000: No fault |

| | |
|---|---|
| | 0001: Inverter Unit Protection<br>0002: Accelerating overcurrent<br>0003: Deceleration overcurrent<br>0004: Constant-speed overcurrent<br>0005: Accelerated overvoltage<br>0006: Deceleration overvoltage<br>0007: Constant-rate overvoltage<br>0008: Control power supply failure<br>0009: Undervoltage fault<br>000A: Inverter overload<br>000B: Motor overload<br>000C: Reserved<br>000D: Output phase loss<br>000E: Module overheating<br>000F: External Fault<br>0010: Communication error<br>0011: Contactor malfunction<br>0012: Current detection fault<br>0013: Motor self-learning fault<br>0014: Reserved<br>0015: Parameter read/write error<br>0016: Inverter hardware failure<br>0017: Motor to ground short circuit fault<br>0018: Reserved<br>0019: Reserved<br>001A: Runtime reached<br>001B: Reserved<br>001C: Reserved<br>001D: Power-on time reached<br>001E: Loadout<br>001F: PID feedback lost during runtime<br>0028: Fast rate limiting timeout fault<br>0029: Motor switching failure during operation<br>002A: Speed deviation is too large<br>002B: Motor Overspeed<br>002D: Motor overheating<br>005A: Encoder line count setting error<br>005B: Encoder not connected<br>005C: Initial position error<br>005E: Speed feedback error |

| Communication Fault Address | Fault Function Description |
|---|---|
| 8001 | 0000 : No fault<br>0001 : Incorrect password |

| | |
|---|---|
| | 0002 : Command code error<br>0003 : CRC checksum error<br>0004 : Invalid address<br>0005 : Invalid parameter<br>0006 : Parameter change is invalid<br>0007 : System locked<br>0008 : EEPROM operation in progress |

P D Group Communication Parameter Description

| | | | |
|---|---|---|---|
| PD. 00 | baud rate | Factory value | 0 005 |
| | Set range | Units: MODUBS baud rate<br>0 : 300 BPS<br>1 : 600 BPS<br>2 : 1200 BPS<br>3 : 2400 BPS<br>4 : 4800 BPS<br>5 : 9600 BPS<br>6 : 19200 BPS<br>7 : 38400 BPS<br>8 : 57600 BPS<br>9 : 115200 BPS<br>Thousands: CAN<br>0:20 KBPS<br>1:50 KBPS<br>2:100 KBPS<br>3:125 KBPS<br>4:250 KBPS<br>5:500 KBPS<br>6:1M BPS | |

This parameter sets the data transmission rate between the host computer and the frequency converter. Note that the baud rates set on the host computer and the frequency converter must be identical; otherwise, communication will fail. A higher baud rate results in faster communication.

| | | | |
|---|---|---|---|
| PD. 01 | Data format | Factory value | 3 |
| | Set range | 0 : No validation: Data format <8,N,2><br>1 : Even test: Data format <8,E,1><br>2 : Odd parity: Data format <8,0,1><br>3 : No validation: Data format <8 , N , 1> | |

The data formats set by the host computer and the frequency converter

must be consistent; otherwise, communication will not be possible.

| | | | |
|---|---|---|---|
| PD. 02 | Local address | Factory | 1 |
| | Set range | 1~247 | |

The local address is unique, which is the basis for realizing point-to-point communication between the host computer and the frequency converter.

| | | | |
|---|---|---|---|
| PD. 03 | Response delay | Factory | 2ms |
| | Set range | 0~20ms | |

Response delay: refers to the time interval between the inverter finishing receiving data and sending data to the host computer. If the response delay is small... The response delay is based on the system processing time. If the response delay is longer than the system processing time, the system will wait for a delay after processing the data until the response delay time is up before sending the data to the host computer.

| | | | |
|---|---|---|---|
| PD. 04 | Communication timeout | Factory value | 0.0 s |
| | Set range | 0.0 s (invalid)<br>0.1~60.0s | |

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

When this function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication timeout period, the system... The system will report a communication failure error (CE). Normally, this is set to disabled. However, in a continuous communication system... Setting this parameter allows you to monitor communication status.

| | | | |
|---|---|---|---|
| PD. 05 | Communication protocol selection | Factory value | 1 |
| | Set range | 0 : Non-standard Modbus protocol<br>1 : Standard Modbus protocol | |

PD. 05=1 : Select the standard Modbus protocol.

PD. 05=0 : When reading a command, the slave device returns one more byte than the standard Modbus protocol. See the " Communication Data Structure " section of this protocol for details .

| | | | |
|---|---|---|---|
| PD. 0 6 | Communication reading current resolution | Factory value | 1 |
| | Set range | 0 : 0.01A<br>1 : 0.1A | |

Used to determine the output unit of the current value when reading the output current for communication.