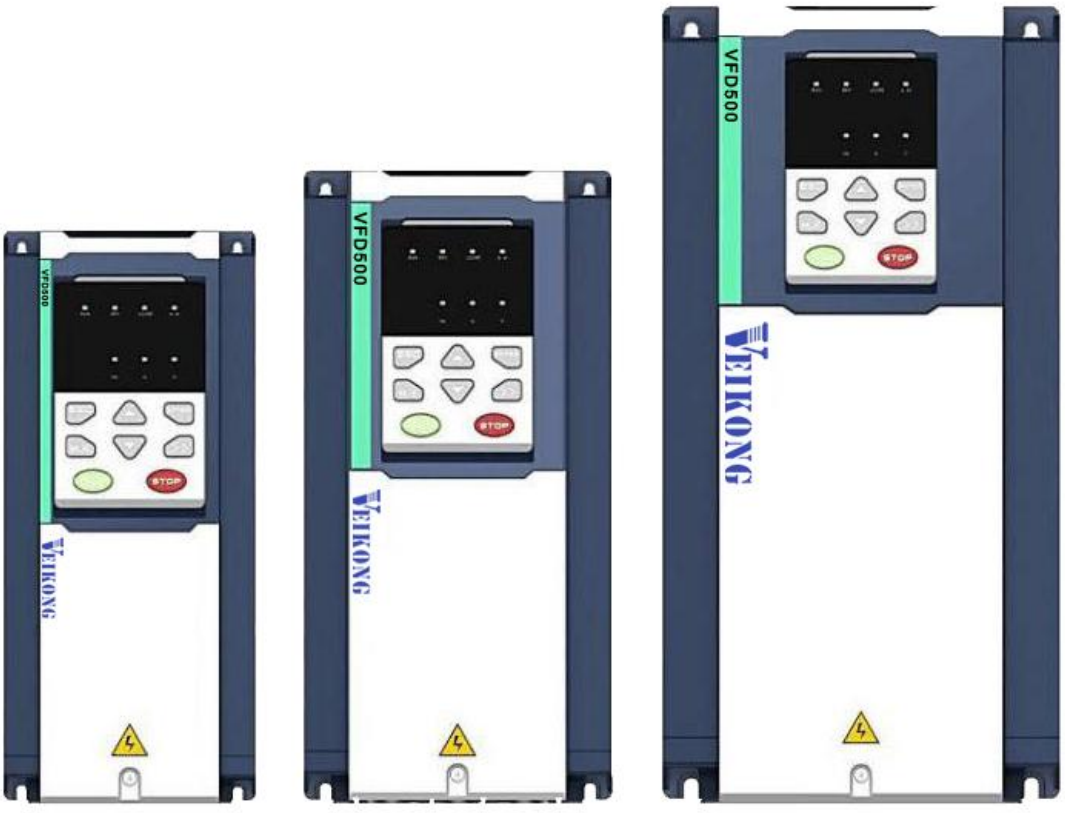
VEIKONG

# Operation manual

## VFD500 Series AC DRIVE

## High Performance vector and torque



# Preface

Thank you for purchasing the VFD500 series high performance vector and torque control frequency inverter

VFD500 series with advanced functions, such as high performance vector control of induction motor, user-programmable function and backstage monitoring software, variable communication and supporting multiple PG cards etc. It is applicable to textile, papermaking, tension control, wire drawing fans and pumps, machine tools, packaging, food and all kinds of automatic production equipment.Its excellent performance is equivalent and competitive to most of international brand AC drives

This manual introduces functional characteristics and usage of VFD500 series inverter, includes product model selection, parameter settings, running and debugging, maintenance, checking, and so on. Please be sure to read this manual carefully before operation. For equipment matching manufacturers, please send this manual to your end user together with your devices, in order to facilitate the usage.

**PRECAUTIONS**

- To describe the product details, the illustrations in the manual sometimes are under the state of removing the outer housing or security covering. While using the product, please be sure to mount the housing or covering as required, and operate in accordance with the contents of manual.
- The illustrations in this manual is only for explanation, may be different from the products you ordered.
- Committed to constantly improving the products and features will continue to upgrade, the information provided is subject to change without notice.
- Please contact with the regional agent or client service center directly of factory if there is any questions during usage.

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# Contents

# Chapter 1 Safety Information and Precautions

**Safety Definitions: In this manual, safety precautions are divided into the following two categories:**

 indicates that failure to comply with the notice will result in serous injury or even death

 indicates that failure to comply with the notice will result in moderate or minor injury andequipment damage

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. will assume no liability or responsibility for any injury or loss caused by improper operation.

## 1.1 Safety Precautions

| Use stage | Security Level | Precautions |
|---|---|---|
| Before Installation |  DANGER | ➢ packing water, parts missing or damaged parts, please do not install!<br>➢ Packaging logo and physical name does not match, please do not install! |
| |  WARNING | ➢ Handling should be light lift, otherwise there is the danger of damage to equipment!<br>➢ Do not use damaged drive or missing drive. Risk of injury!<br>➢ Do not touch the control system components by hand, or there is the danger of electrostatic damage! |
| During Installation |  DANGER | ➢ Please install the flame retardant objects such as metal, away from combustibles, or may cause a fire! |
| |  WARNING | ➢ Do not allow lead wires or screws to fall into the drive, otherwise the drive may be damaged!<br>➢ Install the drive in a place where there is less vibration and direct sunlight.<br>➢ Drive placed in airtight cabinet or confined space, please note the installation of space to ensure the cooling effect. |
| Wiring |  DANGER | ➢ You must follow the guidance of this manual and be used by qualified electrical engineers. Otherwise, unexpected danger may occur!<br>➢ There must be a circuit breaker between the drive and the power supply, otherwise a fire may occur!<br>➢ Make sure the power supply is in zero-energy state before wiring, otherwise there is danger of electric shock!<br>➢ Please follow the standard to the drive properly grounded, otherwise there is the risk of electric shock! |
| |  WARNING | ➢ Never connect input power to the drive's output terminals (U, V, W). Note that the terminal markings, do not take the wrong line! Otherwise it will cause damage to the drive!<br>➢ Never connect the braking resistor directly to the DC bus +, - terminals. Otherwise it will cause a fire!<br>➢ Refer to the manual's recommendations for the wire diameter used. Otherwise it may happen accident!<br>➢ Do not disassemble the connecting cable inside the driver. Otherwise, the internal of the servo driver may be damaged. |
| Before Power-on |  DANGER | ➢ Make sure the voltage level of the input power is the same as the rated voltage of the driver. Check if the wiring position of the power input terminals (R, S, T) and output terminals (U, V, W) is correct; Of |

| Use stage | Security Level | Precautions |
|---|---|---|
| | | the external circuit is short-circuited, the connection is tightened, or cause damage to the drive!<br>➢ No part of the drive need to withstand voltage test, the product has been made before the test. Otherwise it may cause accident! |
| |  <br>WARNING | ➢ The driver must be covered before the cover can be powered, otherwise it may cause electric shock!<br>➢ All peripheral accessories must be wired according to the instructions in this manual, and be properly wired in accordance with this manual. Otherwise it may cause accident! |
| After Power-on |  <br>DANGER | ➢ Do not open the cover after power on, otherwise there is danger of electric shock!<br>➢ If the indicator light does not light after power on, the keyboard does not display the situation, immediately disconnect the power switch, do not touch any input and output terminals of the drive, otherwise there is the risk of electric shock! |
| |  <br>WARNING | ➢ If parameter identification is required, preclude the possibility of injury when rotating the motor!<br>➢ Do not arbitrarily change the drive manufacturer parameters, or it may cause damage to the device! |
| During Operation |  <br>DANGER | ➢ Do not touch the cooling fan, radiator and discharge resistance to test the temperature, otherwise it may cause burns!<br>➢ Non-professional technicians Do not detect the signal during operation, otherwise it may cause personal injury or equipment damage! |
| |  <br>WARNING | ➢ Drive operation, should avoid something falling into the device, otherwise it will cause damage to the device!<br>➢ Do not use the contactor on-off method to control the start and stop the drive, otherwise it will cause damage to the equipment! |
| Maintenance |  <br>DANGER | ➢ Do not live on the equipment repair and maintenance, or there is a risk of electric shock!<br>➢ Turn off the input power for 10 minutes before performing maintenance and repair on the drive, otherwise the residual charge on the capacitor will cause harm to people!<br>➢ Do not carry out maintenance and repair on the drive without personnel who have been professionally trained, otherwise personal injury or equipment damage will occur!<br>➢ All pluggable plug-ins must be unplugged in the case of power failure!<br>➢ The parameters must be set and checked after replacing the drive. |
| |  <br>WARNING | ➢ Before performing maintenance work on the drive, make sure that the motor is disconnected from the drive to prevent the motor from feeding back power to the drive due to accidental rotation. |

## 1.2 Precaution

- **Contactor using**

If the contactor is installed on the power input side of the inverter, do not make the contactor frequent on-off operation. The interval between ON and OFF of the contactor should not be less than one hour. Frequent charging and discharging will reduce the use of capacitors in the inverter life.
If a contactor is installed between the inverter output terminals (U, V, W) and the motor, make sure that the inverter is turned on and off when there is no output. Otherwise, the inverter may be damaged.

- **Lightning impulse protection**

Although this series of inverters are equipped with lightning over-current protection device, there is a certain degree of self-protection for inductive lightning, but for lightning frequent place, customers should also install lightning protection device in the front of the inverter.

- **Altitude and derating use**
  In areas above 1000m above sea level, it is necessary to derate the inverter due to poor air quality due to poor air quality. In this case, please consult our company.

- **Power input**
  The inverter power input should not exceed the operating voltage range specified in this manual. If necessary, use a step-up or step-down device to change the power supply to the specified voltage range.
  Do not change the three-phase inverter to two-phase input, otherwise it will cause malfunction or inverter damage.

- **Output filtering**
  When the cable length between the inverter and the motor exceeds 100 meters, it is suggested to use the output AC reactor to avoid inverter over-current caused by excessive distributed capacitance. Output filter according to the needs of the field matching.
  Inverter output is PWM wave, please do not install the capacitor on the output side to improve the power factor or lightning varistor, etc., otherwise it may easily lead to inverter instantaneous overcurrent or even damage the inverter.

- **About motor heat and noise**
  Because the inverter output voltage is PWM wave, contains a certain degree of harmonics, so the motor temperature rise, noise and vibration compared with the same frequency operation will be slightly increased.

- **Disposal**
  Electrolytic capacitors on the main circuit and electrolytic capacitors on the printed circuit board may explode when incinerated, and poisonous gases are generated when plastic parts are burned. Please dispose as industrial waste.

- **The scope of application**

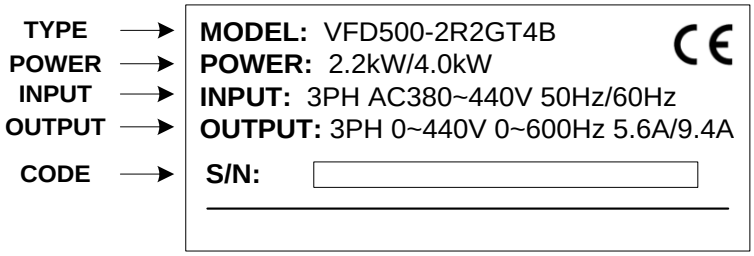
This product is not designed and manufactured for use on equipment where life is at stake. To use this product on a mobile, medical, aerospace, nuclear or other special purpose device, please contact our company For more information.

This product is manufactured under strict quality control and should be equipped with a safety device if it is used in a device that may cause a serious accident or damage due to inverter failure.

# Chapter 2 Product Information

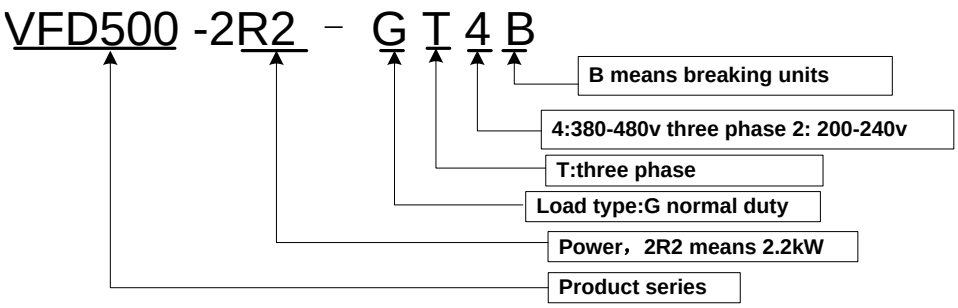
## 2.1 Designation Rules

**Name plate：**




2-1 Name Plate

**Model instruction：**




2-2Model instruction

## 2.2Product series instruction

**Table 2-1VFD500 inverter models and technical data**

| Model | Power capacity (KVA) | Input current (A) | Output current(A) | | Adaptable Motor (KW) | SIZE | Brake Unit |
|---|---|---|---|---|---|---|---|
| | | | Heavy load | Light load | | | |
| Three phase: 380-480V，50/60Hz | | | | | | | |
| VFD500-R75GT4B | 1.5 | 3.4 | 2.5 | 4.2 | 0.75 | SIZE A | Internal |
| VFD500-1R5GT4B | 3 | 5 | 4.2 | 5.6 | 1.5 | | |
| VFD500-2R2GT4B | 4 | 5.8 | 5.6 | 9.4 | 2.2 | | |
| VFD500-4R0G/5R5PT4B | 5.9 | 10.5 | 9.4 | 13.0 | 3.7 | | |
| VFD500-5R5G/7R5PT4B | 8.9 | 14.6 | 13.0 | 17.0 | 5.5 | SIZE B | |
| VFD500-7R5G/011PT4B | 11 | 20.5 | 17.0 | 23.0 | 7.5 | | |
| VFD500-011G/015PT4B | 17 | 26.0 | 25.0 | 31.0 | 11 | SIZE C | Internal |
| VFD500-015G/018PT4B | 21 | 35.0 | 32.0 | 37.0 | 15 | | |
| VFD500-018G/022PT4B | 24 | 38.5 | 37.0 | 45.0 | 18.5 | SIZE D | |
| VFD500-022G/030PT4B | 30 | 46.5 | 45.0 | 57.0 | 22 | | |
| VFD500-030G/037PT4 | 40 | 62.0 | 60.0 | 75.0 | 30 | SIZE E | option |
| VFD500-037G/045PT4 | 50 | 76.0 | 75.0 | 87.0 | 37 | | |
| VFD500-045G/055PT4 | 60 | 92.0 | 90.0 | 110.0 | 45 | SIZE F | |
| VFD500-055G/075PT4 | 75 | 113.0 | 110.0 | 135.0 | 55 | | |
| VFD500-075G/090PT4 | 104 | 157.0 | 152.0 | 165.0 | 75 | SIZE G | |
| VFD500-090G/110PT4 | 112 | 170.0 | 176.0 | 210.0 | 90 | | External |
| VFD500-110G/132PT4 | 145 | 220.0 | 210.0 | 253.0 | 110 | SIZE H | |
| VFD500-132G/160PT4 | 170 | 258.0 | 253.0 | 304.0 | 132 | SIZE I | |
| VFD500-160G/185PT4 | 210 | 320.0 | 304.0 | 360.0 | 160 | | |
| VFD500-185G/200PT4 | 245 | 372.0 | 360.0 | 380.0 | 185 | SIZE J | |
| VFD500-200G/220PT4 | 250 | 380.0 | 380.0 | 426.0 | 200 | | |
| VFD500-220G/250PT4 | 280 | 425.0 | 426.0 | 465.0 | 220 | SIZE K | |
| VFD500-250G/280PT4 | 315 | 479.0 | 465.0 | 520.0 | 250 | | |
| VFD500-280G/315PT4 | 350 | 532.0 | 520.0 | 585.0 | 280 | SIZE L | |
| VFD500-315G/355PT4 | 385 | 585.0 | 585.0 | 650.0 | 315 | | |
| VFD500-355G/400PT4 | 420 | 638.0 | 650.0 | 725.0 | 355 | SIZE M | |
| VFD500-400G/450PT4 | 470 | 714.0 | 725.0 | 820.0 | 400 | | |
| VFD500-450G/500PT4 | 530 | 800.0 | 820.0 | / | 450 | SIZE N | |
| VFD500-500G/560PT4 | 580 | 880.0 | 900.0 | / | 500 | | |
| VFD500-560G/630PT4 | 630 | 950.0 | 980.0 | / | 560 | SIZE O | |
| VFD500-630GT4 | 710 | 1080 | 1120. | / | 630 | SIZE O | |
| VFD500-710GT4 | 790 | 1200 | 1260 | / | 710 | SIZE O | |

| Single phase :220V ,50/60HZ | | | | | | | |
|---|---|---|---|---|---|---|---|
| VFD500-R40GS2 | 1.3 | 6.0 | **3.2** | 5.6 | 0.4 | SIZE A | Inbuilt |
| VFD500-R75GS2 | 2.4 | 11.0 | **5.6** | 8.0 | 0.75 | SIZE A | |
| VFD500-1R5GS2 | 3.5 | 15.0 | **8.0** | 10.6 | 1.5 | SIZE A | |
| VFD500-2R2GS2 | 5.5 | 25.0 | **10.6** | 14.0 | 2.2 | SIZE A | |
| VFD500-4R0GS2 | 7.7 | 35.0 | **17.0** | 23.0 | 4.0 | SIZE B | |
| VFD500-5R5GS2 | 8.9 | 53.0 | **25.0** | 31.0 | 5.5 | SIZE C | |
| VFD500-7R5GS2 | 11 | 67.0 | **32.0** | 37.0 | 7.5 | SIZE C | |
| Three phase 220V ,50/60HZ | | | | | | | |
| VFD500-R40GT2B | 4 | 6.0 | **3.2** | 5.6 | 0.4 | SIZE A | Inbuilt |
| VFD500-R75GT2B | 4 | 11.0 | **5.6** | 8.0 | 0.75 | SIZE A | |
| VFD500-1R5GT2B | 3.5 | 15.0 | **8.0** | 10.6 | 1.5 | SIZE A | |
| VFD500-2R2GT2B | 5.5 | 25.0 | **10.6** | 14.0 | 2.2 | SIZE A | |
| VFD500-4R0GT2B | 11 | 35.0 | **17.0** | 23.0 | 4.0 | SIZE B | |
| VFD500-5R5GT2B | 17 | 53.0 | **25.0** | 31.0 | 5.5 | SIZE C | |
| VFD500-7R5GT2B | 21 | 67.0 | **32.0** | 37.0 | 7.5 | SIZE C | |
| VFD500-011GT2B | 30 | 46.5 | **45.0** | / | 11 | SIZE D | Inbuilt |
| VFD500-015GT2 | 40 | 62.0 | **60.0** | / | 15 | SIZE E | External |
| VFD500-018GT2 | 50 | 76.0 | **75.0** | / | 18.5 | SIZE E | External |
| VFD500-022GT2 | 60 | 92.0 | **90.0** | / | 22 | SIZE F | External |
| VFD500-030GT2 | 75 | 113.0 | **110.0** | / | 30 | SIZE F | External |
| VFD500-037GT2 | 104 | 157.0 | **152.0** | / | 37 | SIZE G | External |
| VFD500-045GT2 | 112 | 170.0 | **176.0** | / | 45 | SIZE G | External |
| VFD500-055GT2 | 145 | 220.0 | **210.0** | / | 55 | SIZE H | External |
| VFD500-075GT2 | 145 | 320.0 | **304.0** | / | 75 | SIZE I | External |

Description:

* The built-in brake unit of this model is optional. Take 30kW as an example. The model without brake unit is VFD500-030G/037PT4, and the model with brake unit is VFD500-030G/037PT4B

## 2.3Technical Specifications

**Table 2-2 VFD500 Technical Specifications**

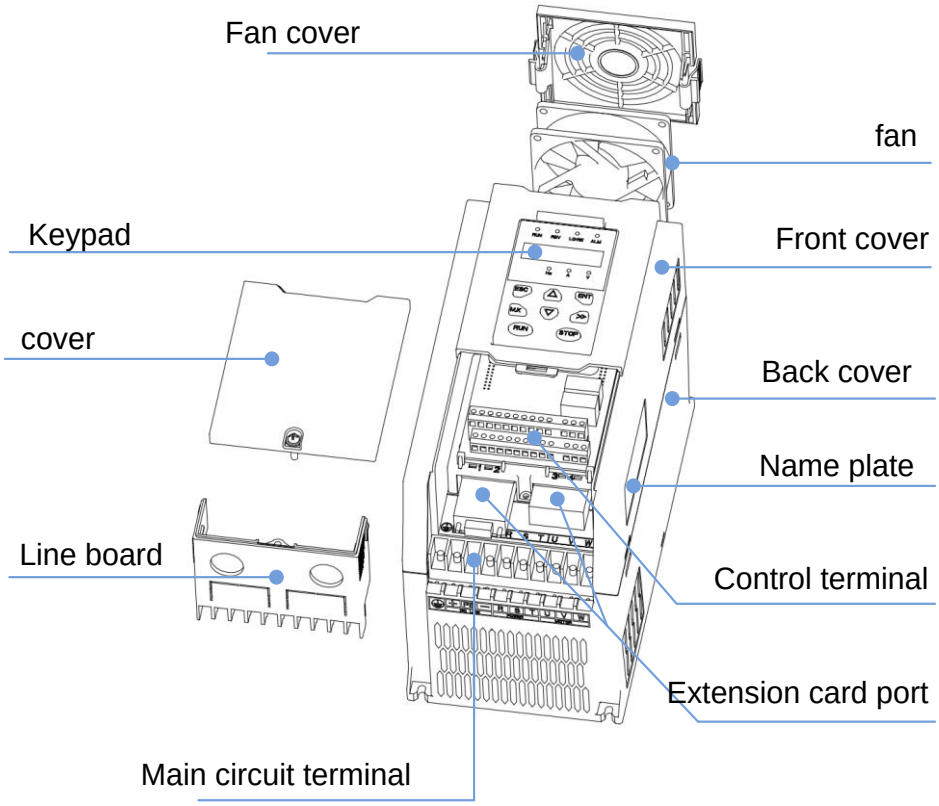
| Item | | Specifiation |
|---|---|---|
| Input | Inuput Voltage | 1phase/3phase 220V：200V～240V<br>3 phase 380V-480V：380V～480V |
| | Allowed Voltage fluctuation range | -15%～10% |
| | Input frequency | 50Hz / 60Hz，fluctuation less than 5% |
| Output | Output Voltage | 3phase：0～input voltage |
| | Overload capacity | General purpose application：60S for 150% of the rated current<br>Light load application：60S for 120% of the rated current |
| Control | Control mode | **V/f control**<br>**Sensorless flux vector control without PG card（SVC）**<br>**Sensor speed flux vector control with PG card (VC)** |
| | Operating mode | Speed control、Torque control（SVC and VC） |
| | **Speed range** | **1:100 (V/f)**<br>**1:200( SVC)**<br>**1:1000 (VC)** |
| | **Speed control accuracy** | **±0.5% (V/f)**<br>**±0.2% (SVC)**<br>**±0.02% (VC)** |
| | Speed response | 5Hz(V/f)<br>20Hz(SVC)<br>50Hz(VC) |
| | frequency range | **0.00～600.00Hz(V/f)**<br>**0.00～200.00Hz(SVC)**<br>**0.00～400.00Hz(VC)** |
| | Input frequency resolution | Digital setting: 0.01 Hz<br>Analog setting: maximum frequency x 0.1% |
| | Startup torque | **150%/0.5Hz(V/f)**<br>**180%/0.25Hz(SVC)**<br>**200%/0Hz(VC)** |
| | Torque control accuracy | SVC：within 5Hz10%，above 5Hz5%<br>VC:3.0% |
| | V/f curve | V / f curve type: straight line, multipoint, power function, V / f separation;<br>Torque boost support: Automatic torque boost (factory setting), manual torque boost |
| | Frequency giving ramp | Support linear and S curve acceleration and deceleration;<br>4 groups of acceleration and deceleration time, setting range 0.00s ~ 60000s |
| | DC bus voltage control | Overvoltage stall control: limit the power generation of the motor by adjusting the output frequency to avoid skipping the voltage fault;<br><br>Undervoltage stall control: control the power consumption of the motor by adjusting the output frequency to avoid yaw failure<br><br>VdcMax Control: Limit the amount of power generated by the motor by adjusting the output frequency to avoid over-voltage trip;<br>VdcMin control: Control the power consumption of the motor by adjusting the output frequency, to avoid jump undervoltage fault |
| | Carrier frequency | 1kHz～12kHz(Varies depending on the type) |

| | | |
|---|---|---|
| | Startup method | Direct start (can be superimposed DC brake); speed tracking start |
| | Stop method | Deceleration stop (can be superimposed DC braking); free to stop |
| | Maincontrol function | Jog control, droop control, up to 16-speed operation, dangerous speed avoidance, swing frequency operation, acceleration and deceleration time switching, VF separation, over excitation braking, process PID control, sleep and wake-up function, built-in simple PLC logic, virtual Input and output terminals, built-in delay unit, built-in comparison unit and logic unit, parameter backup and recovery, perfect fault record,fault reset, two groups of motor parametersfreeswitching, software swap output wiring, terminals UP / DOWN |
| Function | Keypad | LED Digital keyboard and LCD keypad(option) |
| | Communication | Standard:<br>MODBUS communication<br>CAN OPEN AND PROFINET( IN DEVELOPMENT) |
| | **PG card** | **Incremental Encoder Interface Card (Differential Output and Open Collector), Rotary Card ,frequency division signal pg card** |
| | Input terminal | Standard:<br>5 digital input terminals, one of which supports high-speed pulse input up to 50kHz;<br>2 analog input terminals, support 0 ~ 10V voltage input or 0 ~ 20mA current input;<br>Option card:<br>4 digital input terminals<br>2 analog input terminals.support-10V-+10V voltage input |
| | Output terminal | standard:<br>1 digital output terminal;<br>1 high-speed pulse output terminal (open collector type), support 0 ~ 50kHz square wave signal output;<br>1 relay output terminal(second relay is an option )<br>2 analog output terminals, support 0 ~ 20mA current output or 0 ~ 10V voltage output;<br>Option card: 4 digital output terminals |
| Protection | Refer to Chapter 6 "Troubleshooting and Countermeasures" for the protection function | |
| Environment | Installation location | Indoor, no direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapor, drip or salt. |
| | Altitude | 0-3000m.inverter will be derated if altitude higher than1000m and rated output current will reduce by 1% if altitude increase by 100m |
| | Ambient temperature | -10°C~ +40°C,maximum 50°C (derated if the ambient temperature is between 40°C and 50°C)Rated output current decrease by 1.5% if temperature increase by 1°C |
| | Humidity | Less than 95%RH, without condensing |
| | Vibration | Less than 5.9 $m/s^2$ (0.6 g) |
| | Storage temperature | -20°C ~ +60°C |
| Others | Installation | Wall-mounted, floor-controlled cabinet, transmural |
| | Protection level | IP20 |
| | cooling method | Forced air cooling |
| EMC | CE ROHS | Internal EMC filter<br>Complies with EN61800-3<br>Category C3<br>3rd Environment |

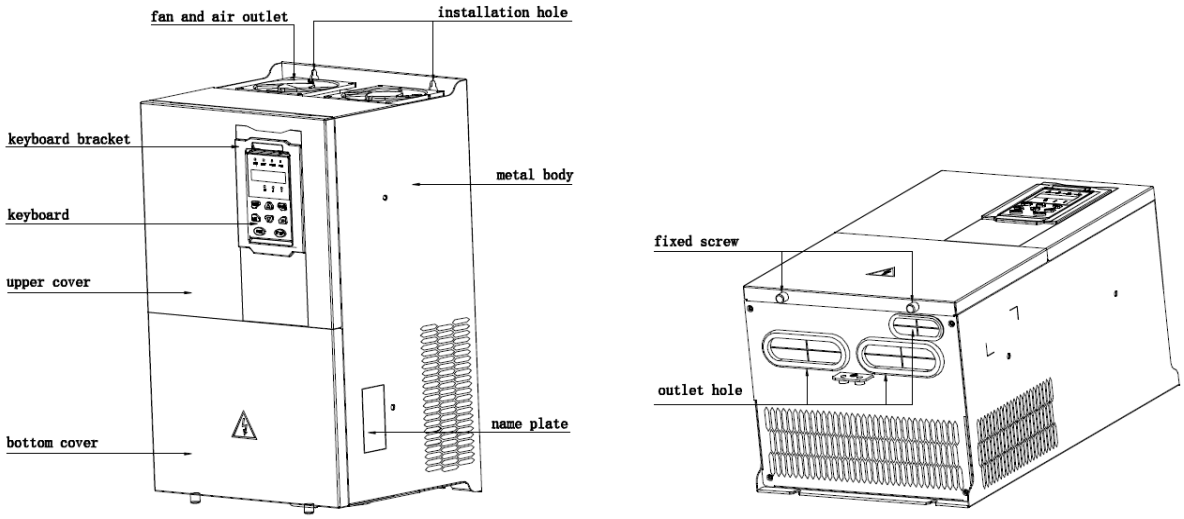
# Chapter 3 Product appearance and Installation Dimension

## 3.1 Product appearance and installation

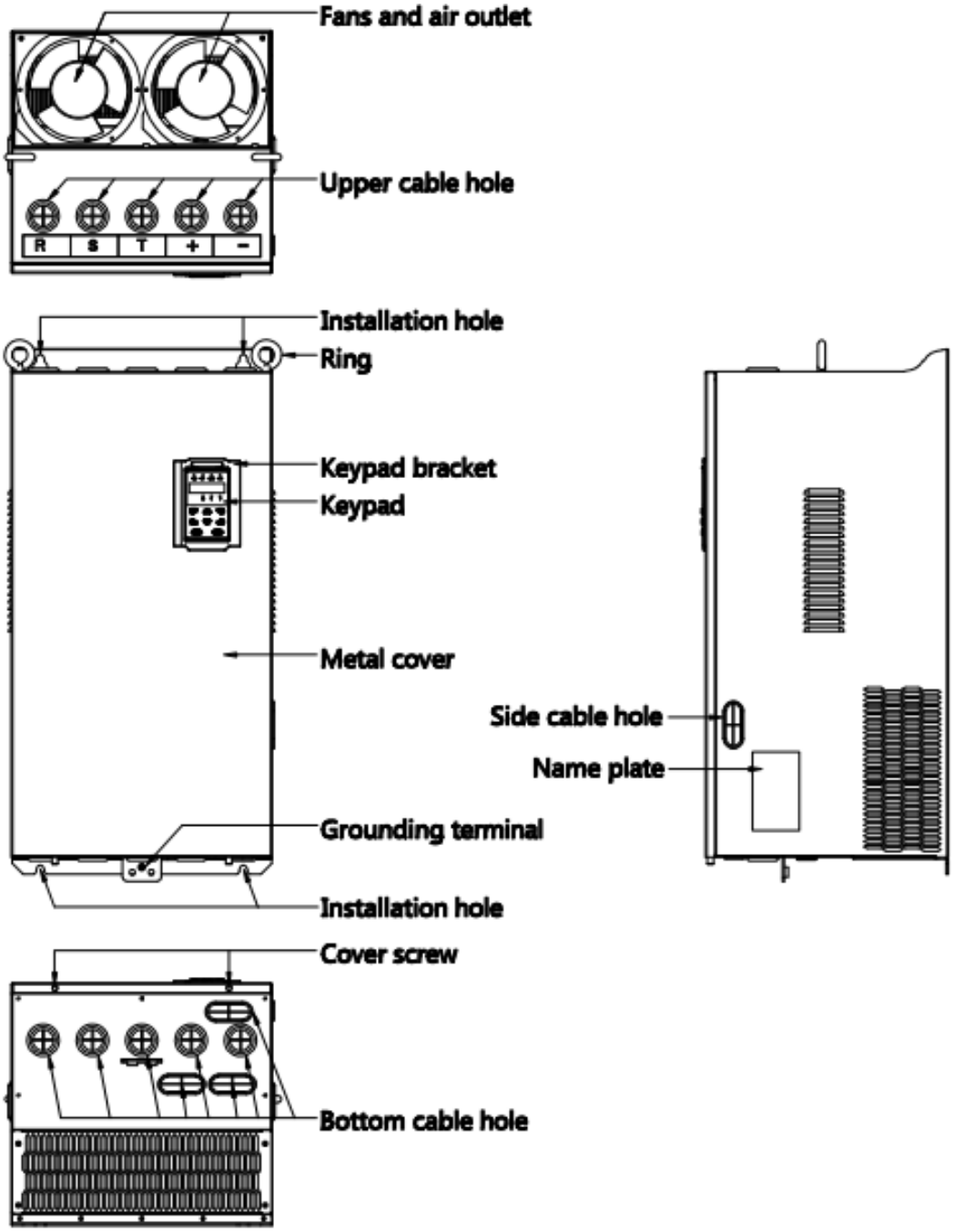
### 3.1.1Product appearance



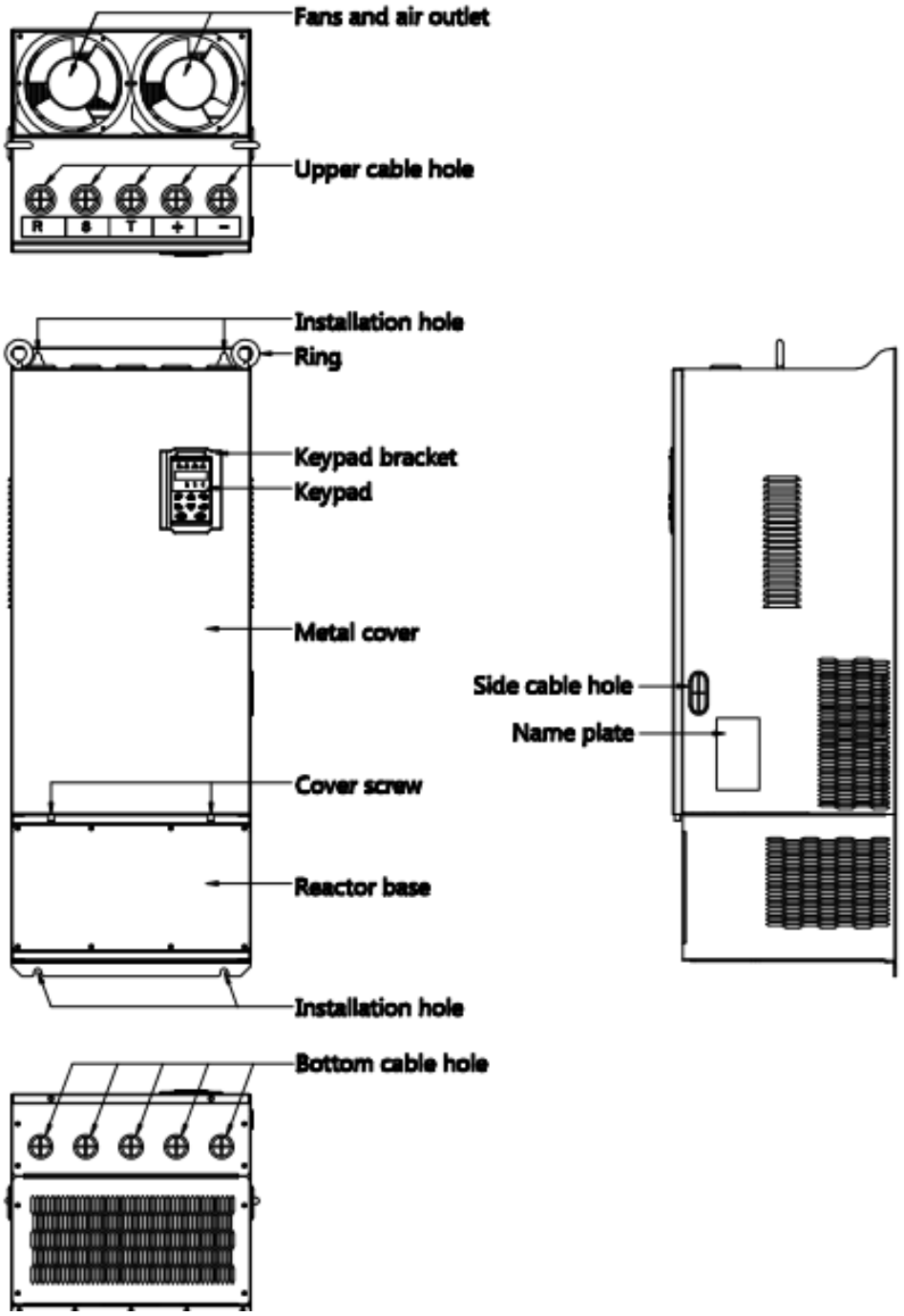

3-1-1 0.75kw-15kw



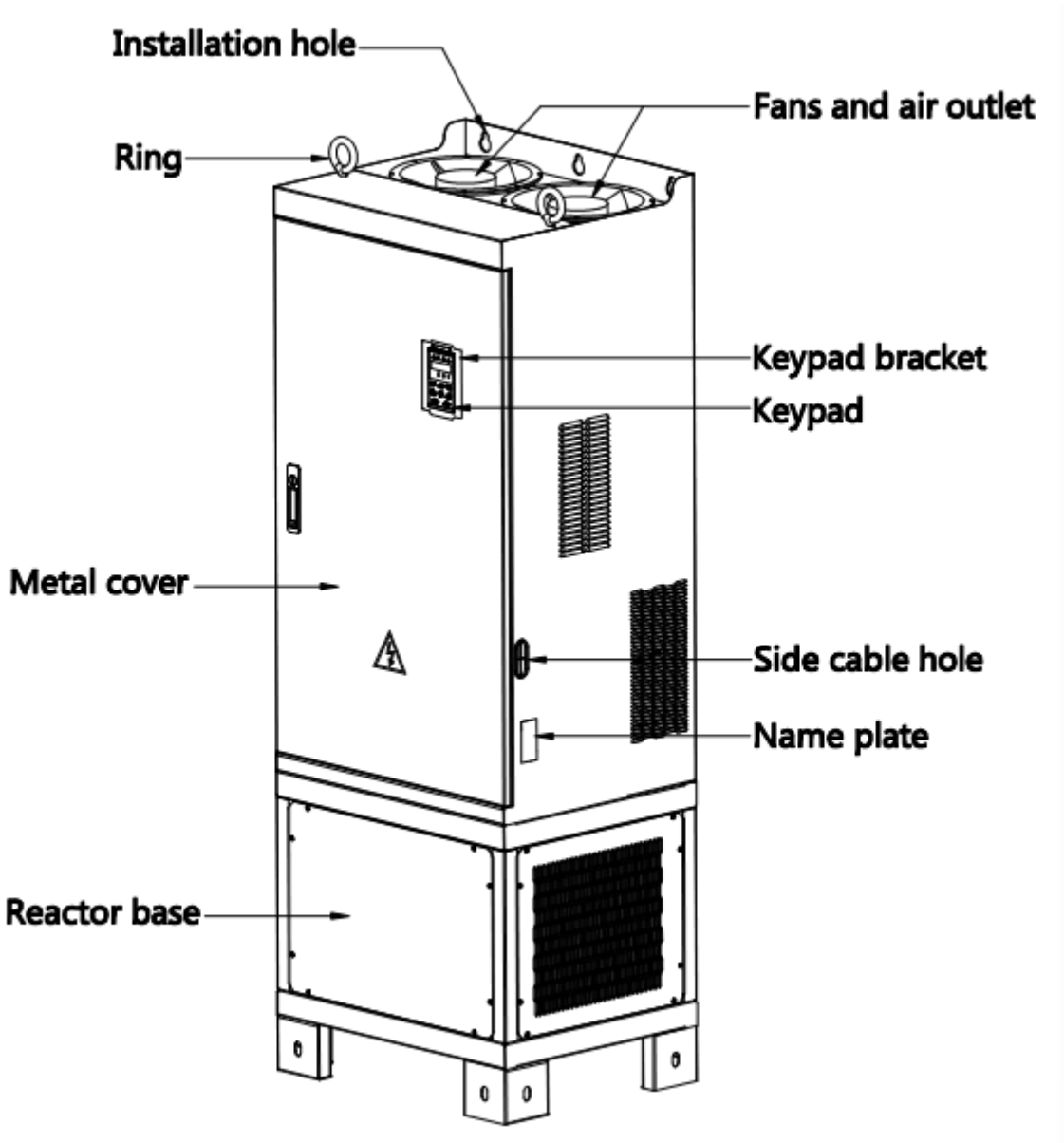

3-1-2 18.5kw-90kw




3-1-3 110kw-250kw




3-1-4 110KW-250KW (With bottom base)




3-1-5 280KW-400KW

### 3.1.2Appearance and Mounting Hole Dimension

**◆Keypay and keypad support size**

The dimensions of the VFD500 series keypad are shown in Figure 3-1. When installing the keypad on the outside of the control cabinet, use the two screws on the back of the keypad to fix it (right side of Figure 3-1).

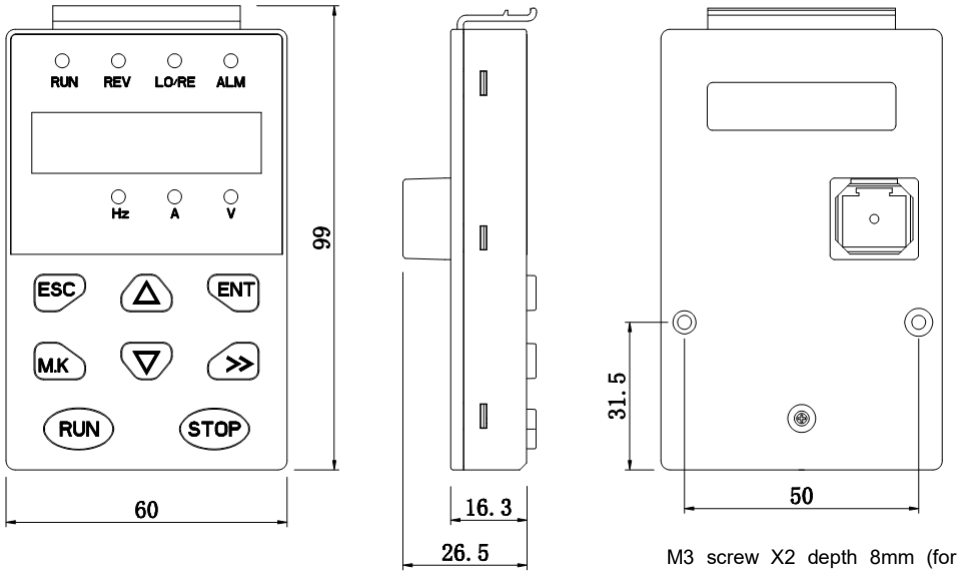



**Diagram 3-2 Keypad dimension**

If you want to mount keyboard on control cabinet (to prevent the keypad from protruding toward the outside of the control cabinet), use a keypad Bracket. The dimensions of the keypadbracket are shown in Figure 3-2. The dimensions of the mounting diagram and control cabinet are shown in Figure 3-3.

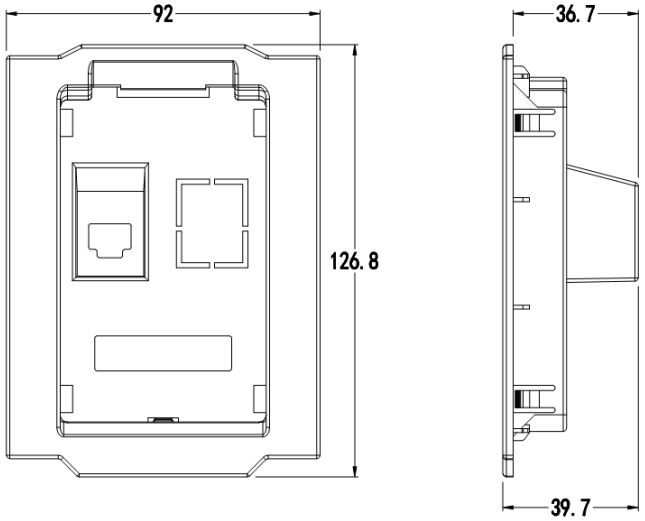



Figure 3-3 Keypad Holder Size (Unit: mm)

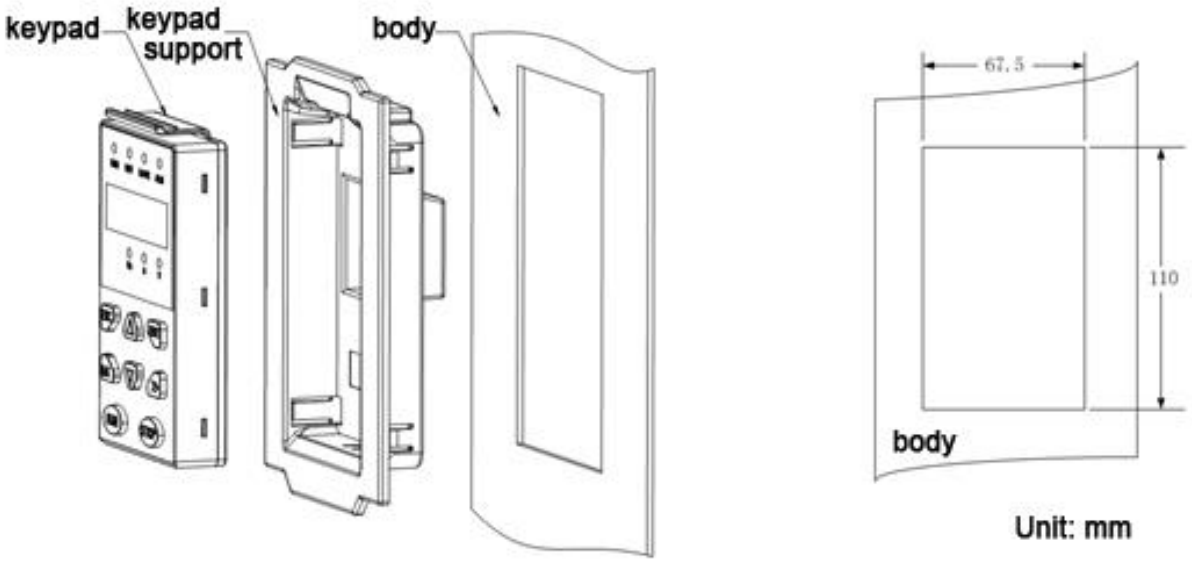



Figure 3-4 Keypad support installation diagram and control cabinet processing dimensions

**◆Inverter dimensions and installation dimensions**

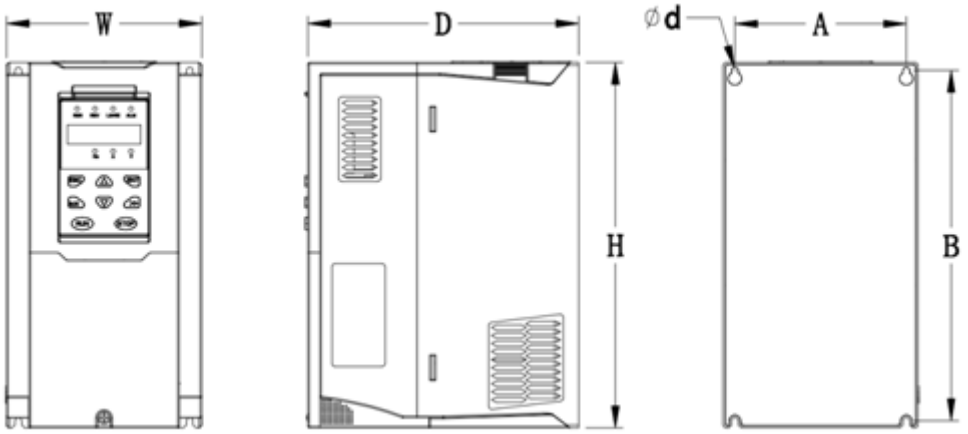



Figure 3-5 SIZE A to SIZE C(0.75KW-15KW) Dimension

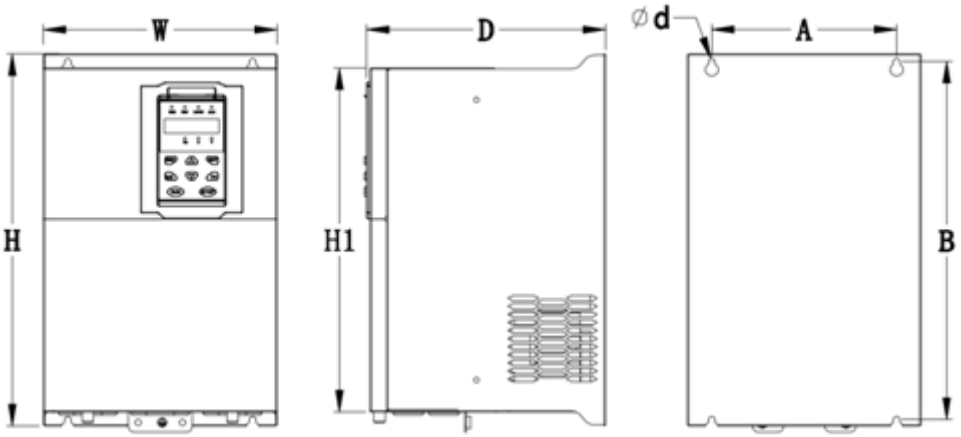



Figure 3-6 SIZE D~G(18.5KW-90KW) Dimension

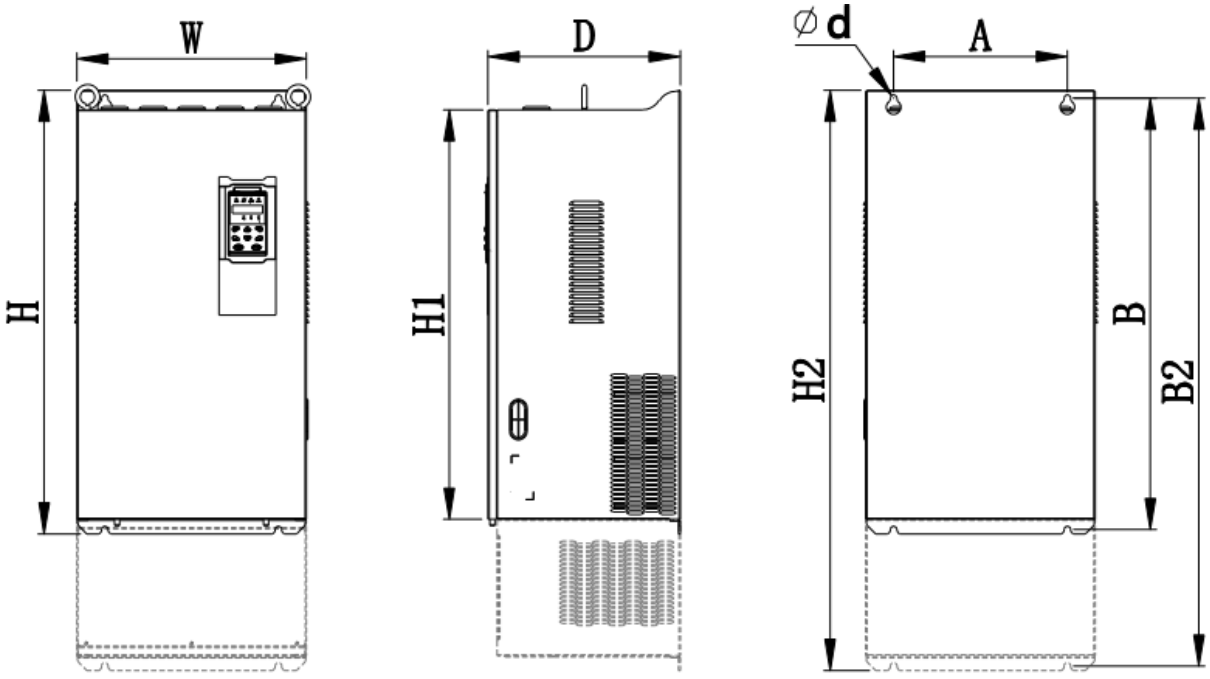



Figure 3-7 SIZE H~J(110KW-250KW) Dimension

Note: SIZE H~SIZE J (110kw-200kw) standard model without reactor and bottom base

Reactor and bottom base for option

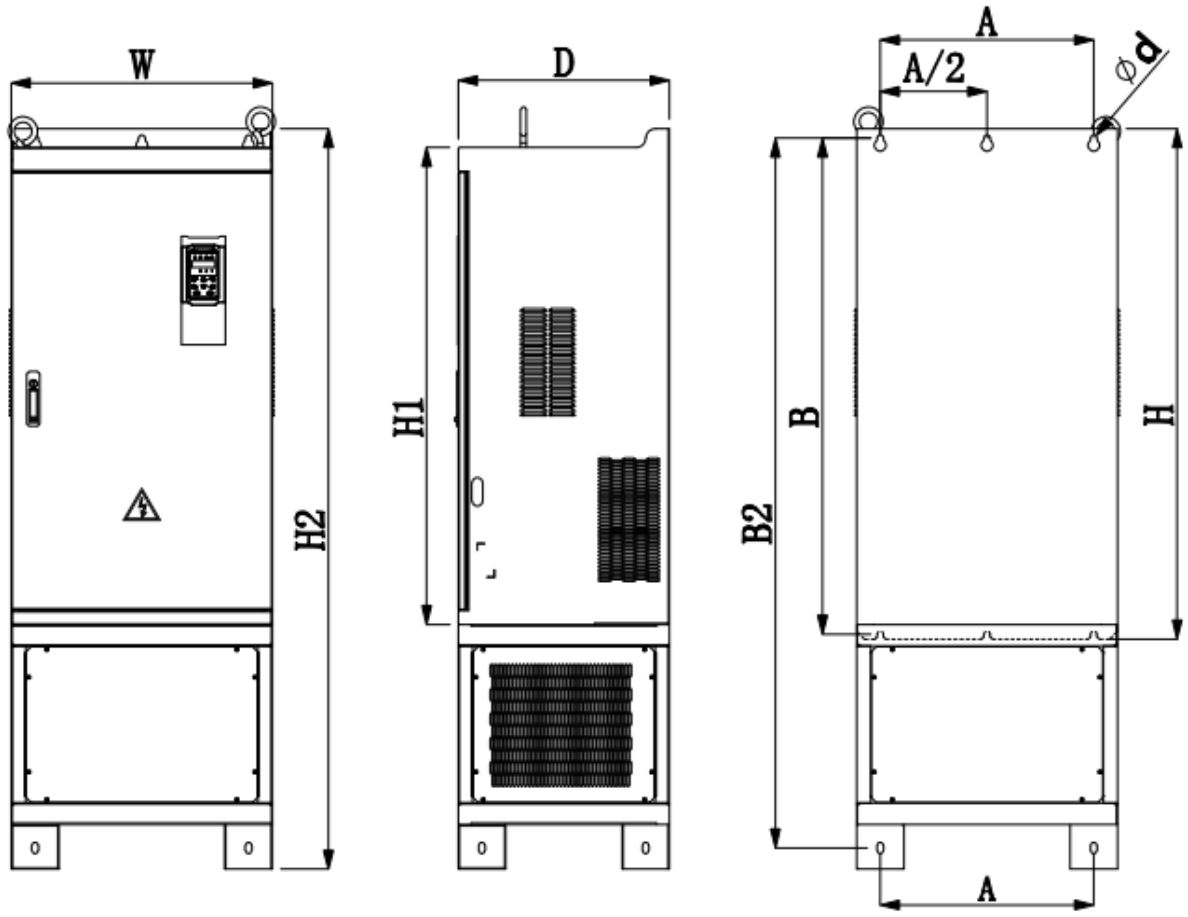



Figure 3-8 SIZE K~J(280KW-315KW) Dimension

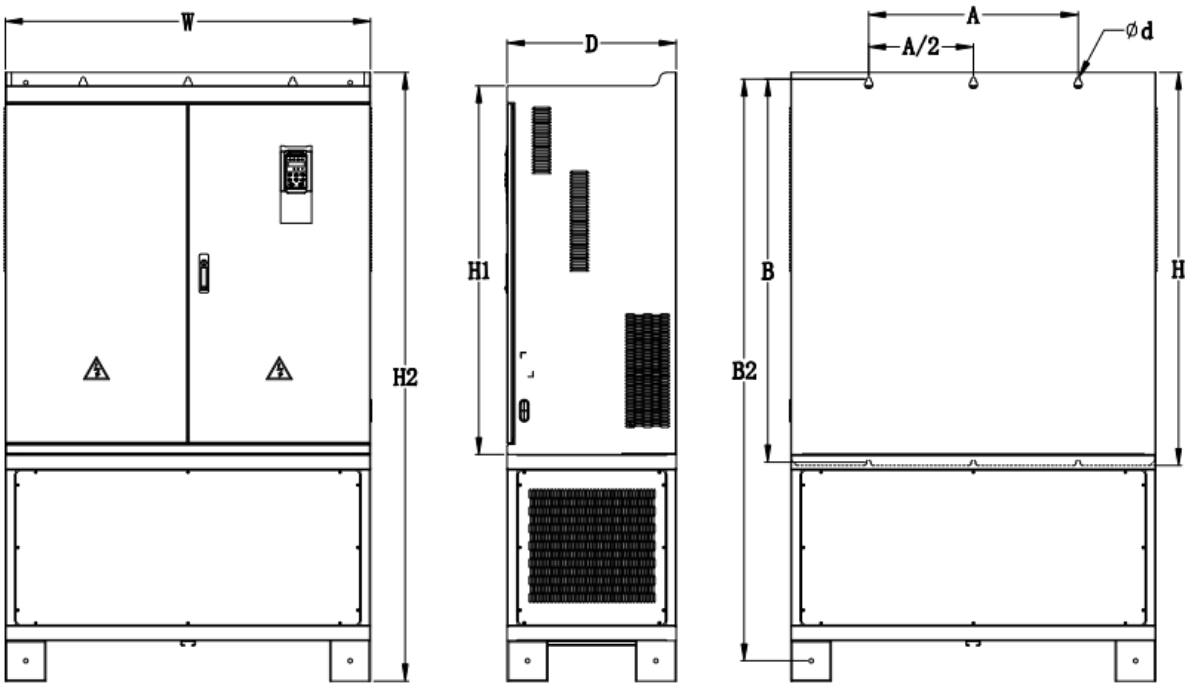



Figure 3-9 SIZE K~O(315KW-710KW) Dimensions

Table 3-1 VFD500 series appearance and installation dimension

| SIZE | | | Appearance and installation dimension（mm） | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | B2 | H | H1 | H2 | W | D | Φd | Mounting screws |
| 0.75KW-4KW | 87 | 206.5 | / | 215 | / | / | 100 | 170 | ø5.0 | M4X16 |
| 5.5KW-7.5KW | 113 | 239.5 | / | 250 | / | / | 130 | 180 | ø5.0 | M4X16 |
| 11KW-15KW | 153 | 299 | / | 310 | / | / | 170 | 193 | Ø6.0 | M5X16 |
| 18.5KW-22KW | 165 | 350 | / | 370 | 335 | / | 210 | 205 | Ø6.0 | M5X16 |
| 30KW-37KW | 218 | 438 | / | 452.5 | 424 | / | 260 | 230 | Ø7.0 | M6X16 |
| 45KW-55KW | 250 | 535 | / | 555 | 520 | / | 320 | 275 | Ø10.0 | M8X20 |
| 75KW-90KW | 280 | 620 | / | 640 | 605 | / | 350 | 290 | Ø10.0 | M8X20 |
| 110KW | 280 | 695 | 915 | 715 | 660 | 935 | 370 | 313 | Ø11.0 | M8X25 |
| 132KW-160KW | 280 | 705 | 925 | 725 | 670 | 945 | 360 | 338 | Ø11.0 | M8X25 |
| 185KW-200KW | 360 | 795 | 1145 | 816 | 762 | 1166 | 490 | 358 | Ø11.0 | M10X25 |
| 220KW-250KW | 360 | 795 | 1145 | 816 | 762 | 1166 | 490 | 358 | Ø11.0 | M10X25 |
| 280KW-315KW | 450 | 1045 | 1495 | 1075 | 1005 | 1560 | 550 | 450 | Ø13.0 | M12X30 |
| 355KW-400KW | 630 | 1013 | 1425 | 1045 | 970 | 1495 | 730 | 450 | Ø13 | M12×30 |
| 450KW-500KW | 660 | 1065 | / | 1575 | 1095 | / | 785 | 450 | Ø13 | M12×30 |
| 560KW-710KW | 620 | 1130 | / | 1800 | 1170 | / | 1080 | 500 | Ø13 | M12×30 |

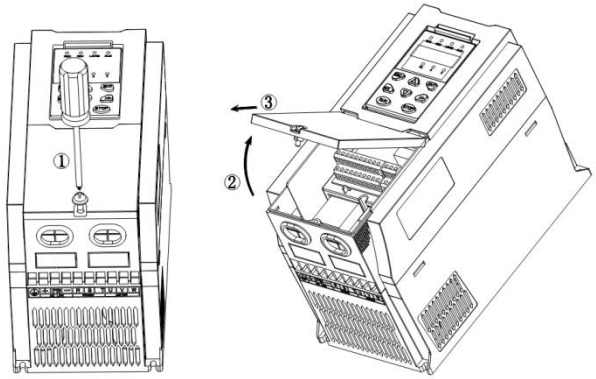
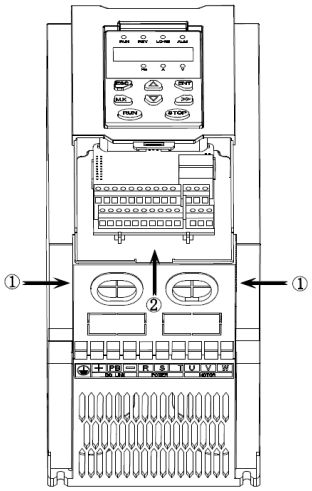
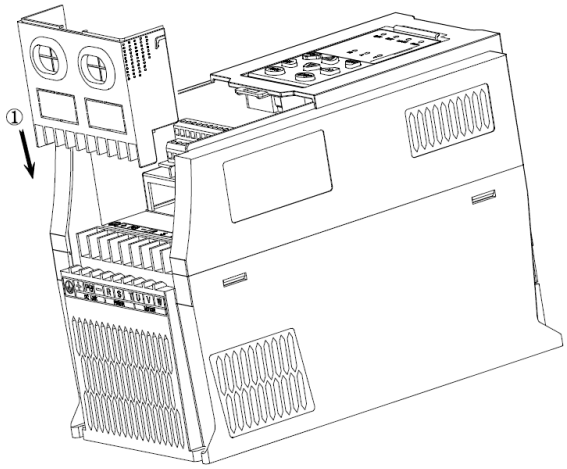
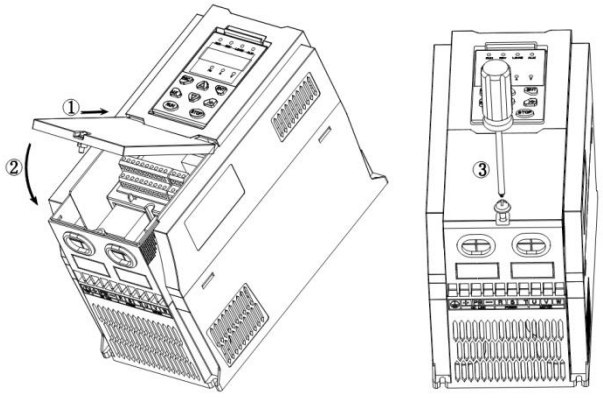
**Remarks:**

**(1) B2 and H2 are the installation dimensions when the reactor base is included.**

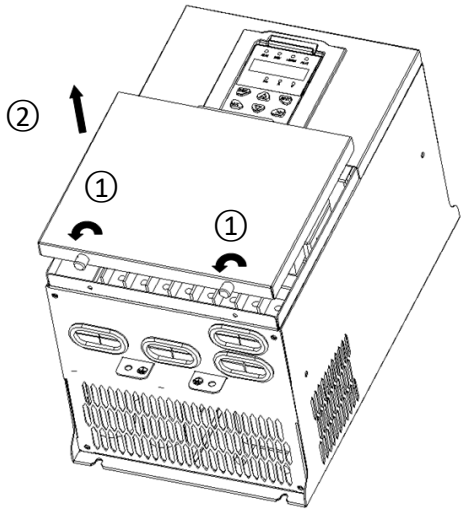
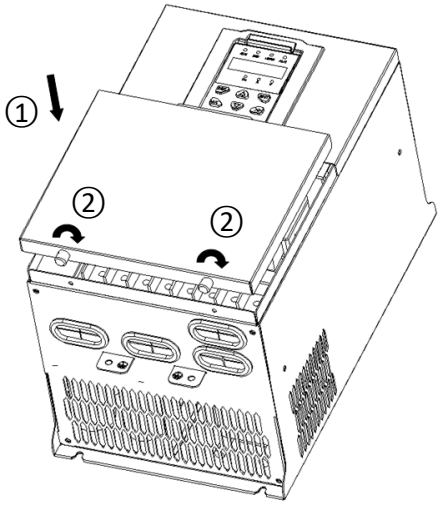
**(2) Φd is the diameter of the installation screw hole of the whole machine.**

### 3.1.3Removal and installation of cover and inlet plate

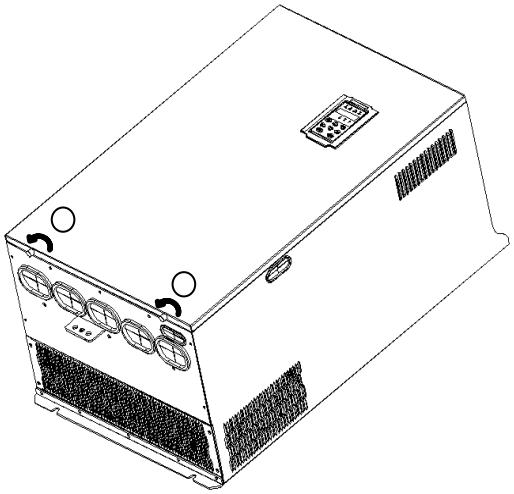
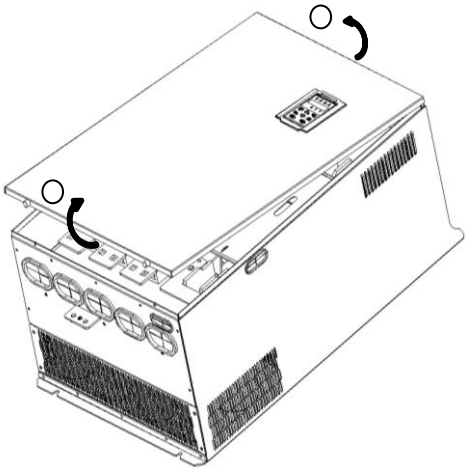
◆ SIZEA～SIZE C( 0.75KW-15KW) Removal and installation of cover and inlet plate：

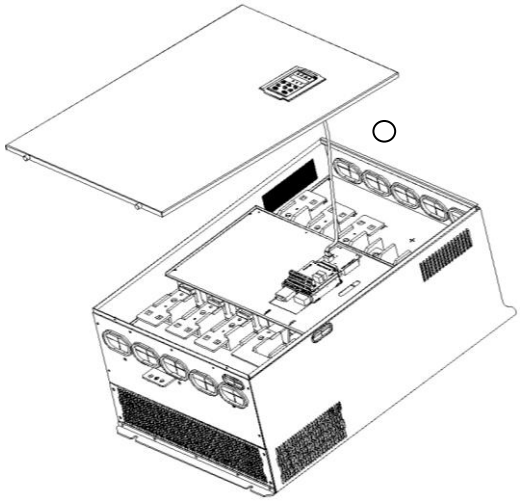
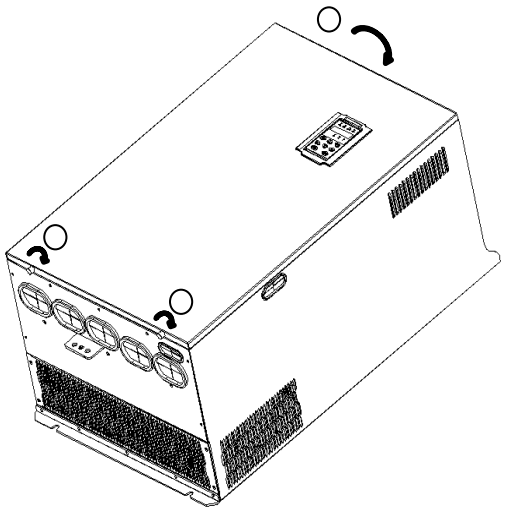
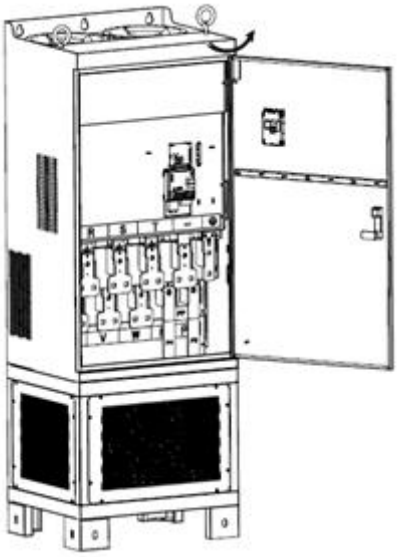
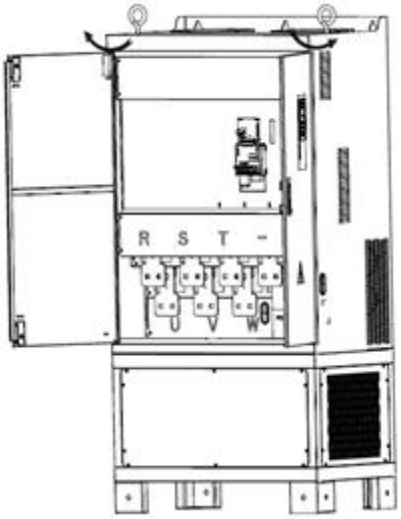
<table>
<tr><th colspan="2">Removal steps</th></tr>
<tr><td>  <br>Step 1: Open the top cover<br>① Unscrew the screw on the cover<br>② Lift up the cover<br>③ Remove the cover from the front</td><td>  <br>Step 2: Take out the inlet board<br>① Hold down the sides of the inlet plate with your thumb and middle finger<br>② Press to disengage the buckle and pull it out of the board</td></tr>
<tr><th colspan="2">Installation steps</th></tr>
<tr><td>  <br>① Step 1: Install the inlet board<br>② Put the inlet board from the top down into the mounting position to ensure that the card buckles</td><td>  <br>Step 2: Install the upper cover<br>① Slant the front cover diagonally from the front to the docking station<br>② Lower the cover plate toward the inlet board<br>③ Tighten the screws on the cover</td></tr>
</table>

◆ SIZE D-G(18.5KW-90KW) Removal and installation of cover：

| Removal steps | Installation steps |
|---|---|
|  |  |
| ① Unscrew the two screws at the bottom of the bottom cover<br>② Remove the cover vertically | ① Close the cover vertically<br>② Tighten the two screws on the bottom of the cover |

◆SIZEH～SIZE I( 110KW-160KW) Removal and installation of cover

| | |
|---|---|
|  |  |
| ①Unscrew the two screws at the bottom of the cover | ②Hold both sides of the cover with both hands and lift the lower part of the cover<br>③Push up and lift the entire cover (becareful or you will snap the keyboard cable ) |
| Installation steps | |

<table>
<tr>
<td>  <br>①Plug in the keyboard line</td>
<td>  <br>② buckle the top of the cover<br>③Tighten the screws at the bottom of the cover</td>
</tr>
<tr>
<td>  </td>
<td> 
</td>
</tr>
<tr>
<td colspan="2">110kw and above are door-open style</td>
</tr>
</table>

## 3.2Wiring

### 3.2.1 Standard wiring diagram

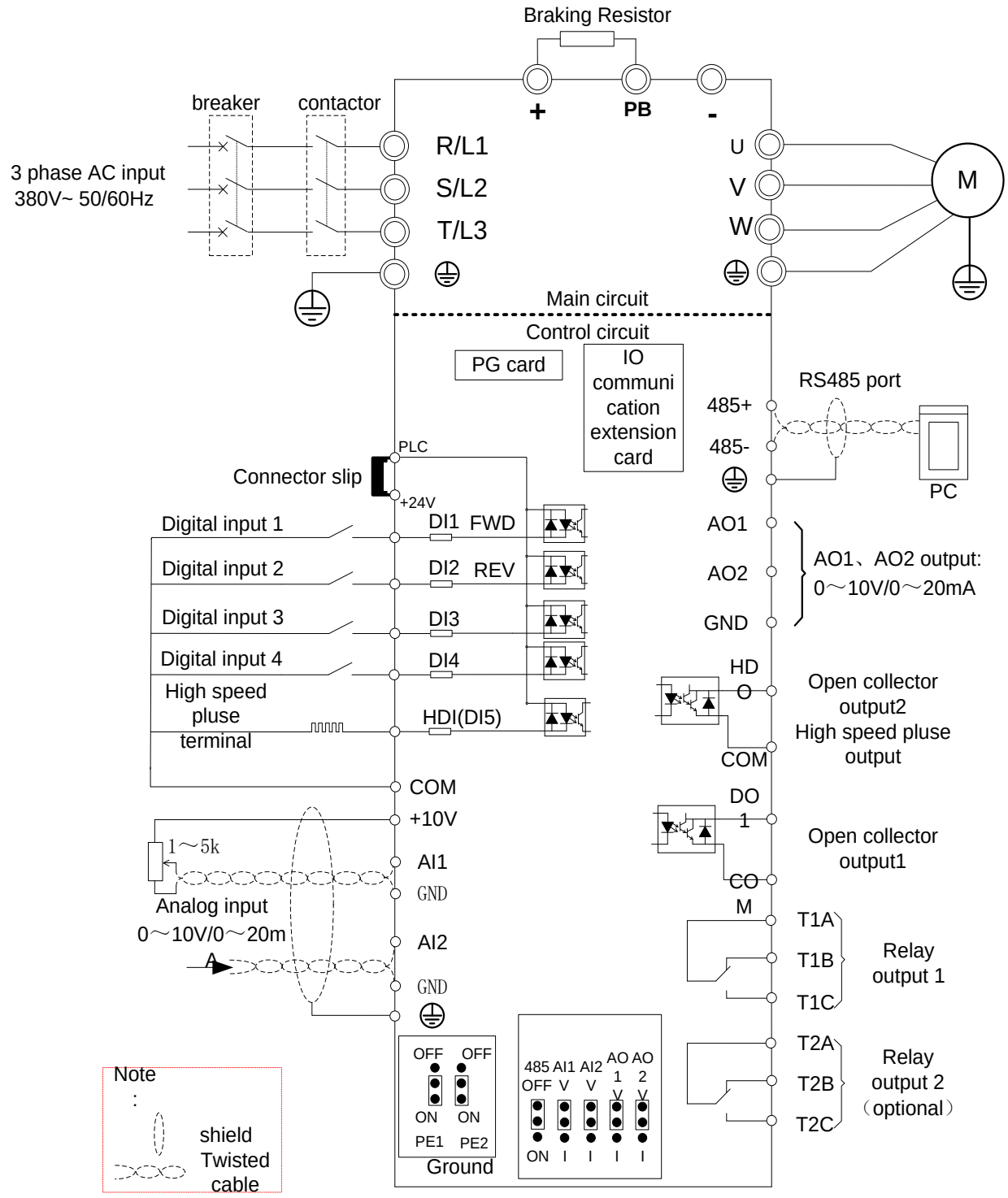



Diagram 3-10standard wiring

### 3.2.2Main Circuit Terminals

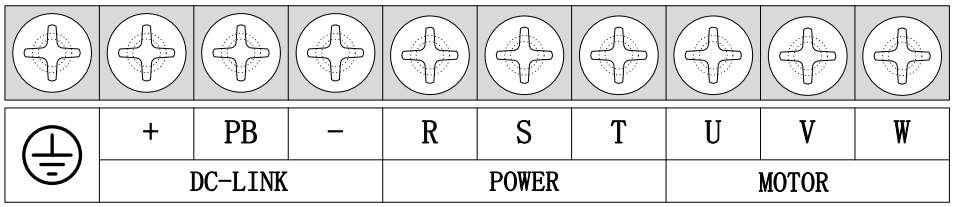



Figure 3-11 SIZE A~SIZE C(0.75kw-15kw) Main Circuit Terminal

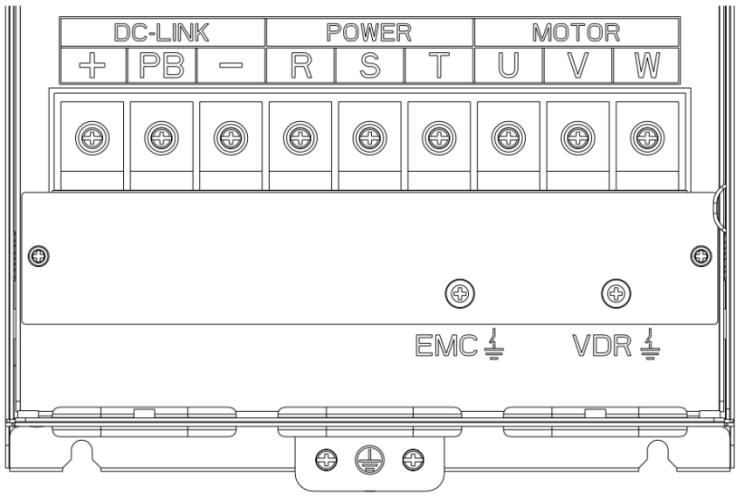



Figure 3-12 SIZE D 18.5kw-22kw main circuit terminal block diagram

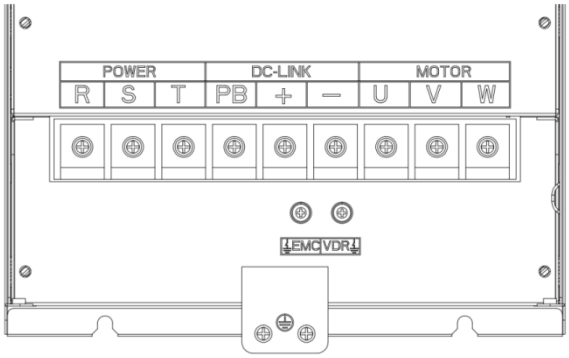



Figure 3-13 SIZE E 30kw-37kw(LEFT)

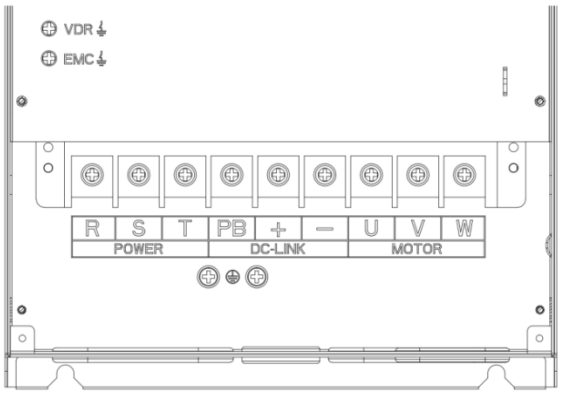



Figure 3-14 SIZE F~G45kw-90kw(RIGHT)

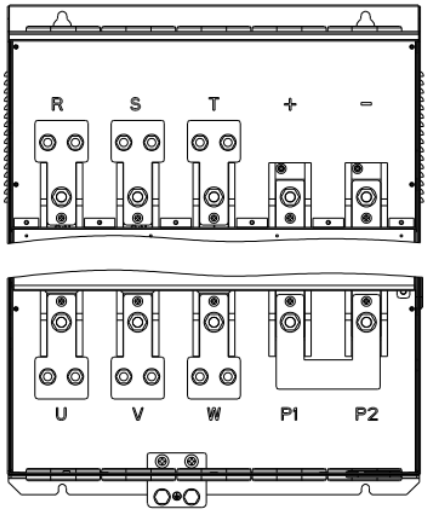



Figure 3-15 110kw-250kw Main Circuit Terminal Blocks

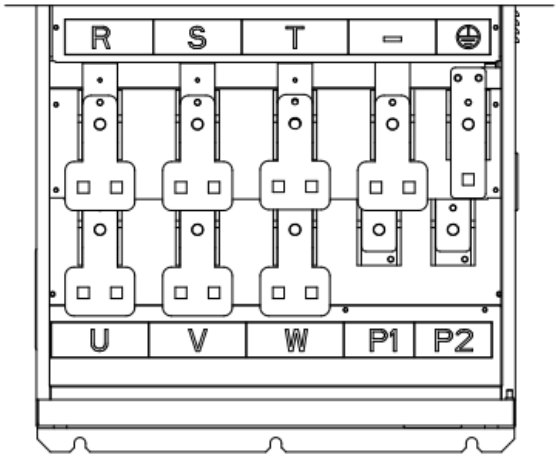



Figure 3-16 280kw-400kw Main Circuit Terminal Blocks

Table 3-17 Function description of the main circuit terminal of the inverter

| Terminal | Function instruction |
|---|---|
| **R、S、T** | AC power input terminal, connect three-phase AC power |
| **U、V、W** | Inverter AC output terminal, connect three-phase AC motor |
| **+、-** | The positive and negative terminals of the internal DC bus are connected to the external brake unit or For common DC bus |
| **P1、P2** | P1 and P2 are terminal to Connect DC reactor, short P1 to P2 when DC reactor is not used (P2 is equivalent to "+" of DC bus) |
| **+、PB** | Braking resistor connection terminal when built-in brake unit |
| ⏚ | Ground terminal, ground |
| EMC、VDR | Safety capacitor and varistor grounding selection screw (SIZE A~SIZE C EMC screw on the left side of the fuselage) |

### 3.2.3 Terminal screws and wiring specifications

Table 3-18 Main circuit cable and screw specifications

| Model number | Power terminal | | | Ground terminal | | |
|---|---|---|---|---|---|---|
| | Screw | Tightening torque（N·m） | Cable diameter（$mm^2$） | screw | Tightening torque（N·m） | Cable diameter（$mm^2$） |
| VFD500-R75GT4B | M3 | 1.5 | 2.5 | M3 | 1.5 | 2.5 |
| VFD500-1R5GT4B | M3 | 1.5 | 2.5 | M3 | 1.5 | 2.5 |
| VFD500-2R2GT4B | M3 | 1.5 | 2.5 | M3 | 1.5 | 2.5 |
| VFD500-4R0G/5R5PT4B | M3 | 1.5 | 4 | M3 | 1.5 | 4 |
| VFD500-5R5G/7R5PT4B | M4 | 2 | 6 | M4 | 2 | 6 |
| VFD500-7R5G/011PT4B | M4 | 2 | 6 | M4 | 2 | 6 |
| VFD500-011G/015PT4B | M5 | 4 | 10 | M5 | 4 | 10 |
| VFD500-015G/018PT4B | M5 | 4 | 10 | M5 | 4 | 10 |
| VFD500-018G/022PT4B | M6 | 4 | 10 | M6 | 4 | 10 |
| VFD500-022G/030PT4B | M6 | 4 | 16 | M6 | 4 | 16 |
| VFD500-030G/037PT4 | M8 | 10 | 16 | M6 | 5 | 10 |
| VFD500-037G/045PT4 | M8 | 10 | 16 | M6 | 5 | 10 |
| VFD500-045G/055PT4 | M8 | 10 | 25 | M6 | 5 | 16 |
| VFD500-055G/075PT4 | M8 | 10 | 35 | M6 | 5 | 16 |
| VFD500-075G/090PT4 | M10 | 20 | 50 | M8 | 8 | 25 |
| VFD500-090G/110PT4 | M10 | 20 | 70 | M8 | 8 | 35 |
| VFD500-110G/132PT4 | M10 | 20 | 120 | M8 | 10 | 70 |
| VFD500-132G/160PT4 | M12 | 35 | 150 | M8 | 10 | 70 |
| VFD500-160G/185PT4 | M12 | 35 | 185 | M8 | 10 | 70 |
| VFD500-185G/200PT4 | M12 | 35 | 95*2 | M10 | 15 | 95 |
| VFD500-200G/220PT4 | M12 | 35 | 95*2 | M10 | 15 | 95 |
| VFD500-220G/250PT4 | M12 | 35 | 120*2 | M10 | 15 | 120 |
| VFD500-250G/280PT4 | M12 | 35 | 120*2 | M10 | 15 | 120 |
| VFD500-280G/315PT4 | M12 | 35 | 150×2 | M12 | 15 | 120 |
| VFD500-315G/355PT4 | M12 | 35 | 150×2 | M12 | 15 | 150 |
| VFD500-355G/400PT4 | M12 | 35 | 150×2 | M12 | 15 | 150 |
| VFD500-400G/450PT4 | M12 | 35 | 185×2 | M12 | 15 | 185 |
| VFD500-450G/500PT4 | M12 | 35 | 240×2 | M12 | 15 | 240 |
| VFD500-500G/560PT4 | M12 | 35 | 240×2 | M12 | 15 | 240 |
| VFD500-560G/630PT4 | M12 | 35 | 185×3 | M12 | 15 | 185 |
| VFD500-630GT4 | M12 | 35 | 240×3 | M12 | 15 | 240 |
| VFD500-710GT4 | M12 | 35 | 240×3 | M12 | 15 | 240 |

### 3.2.4 Cautions for Main Circuit Wiring

#### （1）Power Supply Wiring

◆ It is forbidden to connect the power cable to the output terminal of the inverter. Otherwise, the internal components of the inverter will be damaged.

◆ In order to provide input side overcurrent protection and power outage overhaul convenience, the inverter should be connected to the power supply through circuit breakers and contactors.

◆ Please confirm the power phase, the voltage is consistent with the product nameplate, do not match may result in damage to the inverter.

（2）DC wiring

◆ Do not connect the braking resistor directly to +, -, which may cause the inverter to be damaged or even fire.

◆ When using the external brake unit, pay attention to +, - can not be reversed, otherwise it will cause damage to the inverter and brake unit or even cause a fire.

#### （3）Motor Wiring

◆It is forbidden to short circuit or ground the inverter output terminal, otherwise the internal components of the inverter will be damaged.

◆Avoid short circuit the output cables or with the inverter enclosure, otherwise there exists the danger of electric shock.

◆It is forbidden to connect the output terminal of the inverter to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the inverter may be damaged.

◆When contactor is installed between the inverter and the motor, it is forbidden to switch on/off the contactor during the running of the inverter, otherwise, there will be large current flowing into the inverter, triggering the inverter protection action.

◆Length of cable between the inverter and motor

If the cable between the inverter and the motor is too long, the higher harmonic leakage current of the output end will produce by adverse impact on the inverter and the peripheral devices. It is suggested that when the motor cable is longer than 100m, output AC reactor be installed. Refer to the following table for the carrier frequency setting.

### 3.2.4Control Circuit Terminal

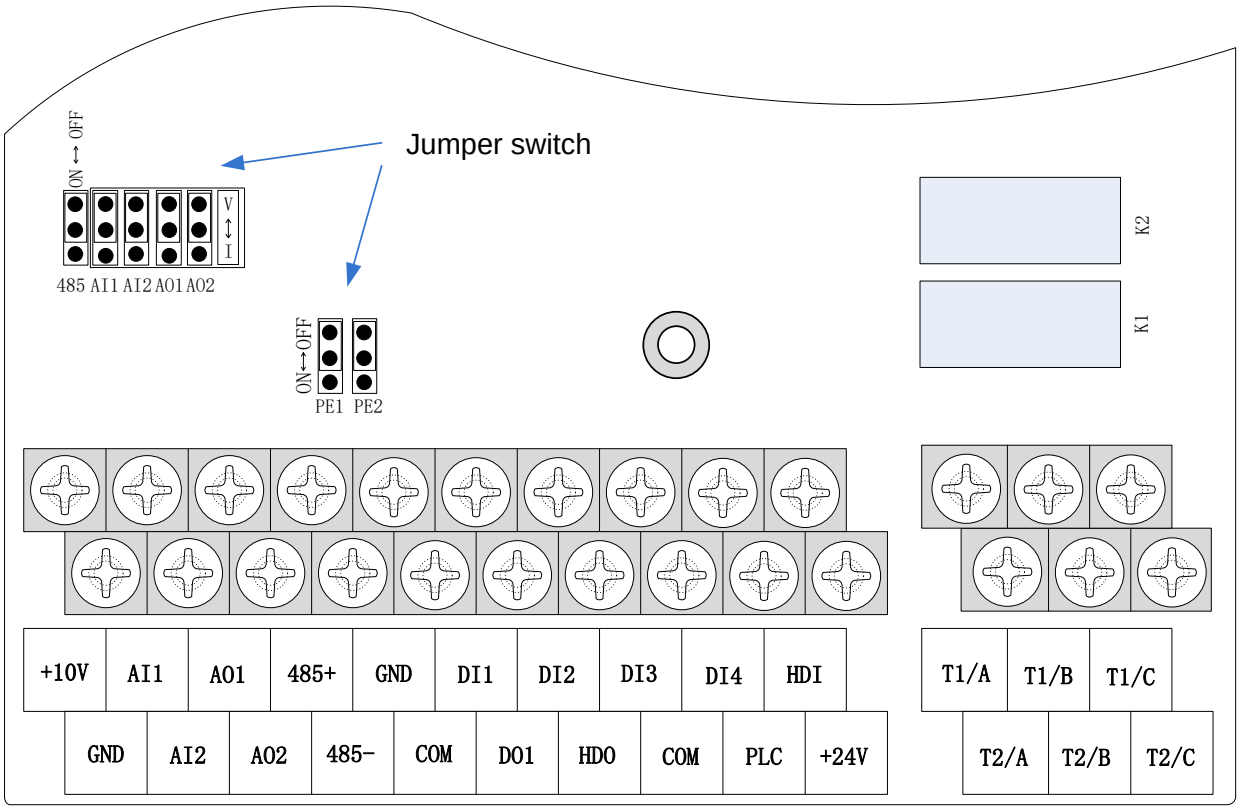



Diagram 3-19 VFD500 control circuit terminal

**Table 3-20 VFD500 control circuit terminal instruction**

| Type | Terminal Symbol | Terminal Name | Terminal function description |
|---|---|---|---|
| Analog input voltage | +10V | Input voltage | 10.10V±1% |
| | | | Maximum output current:10mA，it provides power supply to external potentiometer with resistance range of：1KΩ~51KΩ |
| | GND | Ananog ground | Internal isolation from COM |
| | AI1 | Analog input1 | Input voltage:0~10V：Impedance 22KΩ，Maximum input voltage |
| | | | Input current:0~20mA：Impedance 500Ω，Maximum input current |
| | | | Through the jumper switch AI1 0 ~ 10V and 0 ~ 20mA analog input switch, the factory default voltage input. |
| | AI2 | Analog input 2 | Input voltage:0~10V：Impedance 22KΩ，Maximum input voltage |
| | | | Input current:0~20mA：Impedance 500Ω，Maximum input current |
| | | | Through the jumper switch AI1 0 ~ 10V and 0 ~ 20mA analog input switch, the factory default voltage input. |
| Analog input | AO1 | Analog output 1 | Output voltage:0~10V：Impedance ≥10KΩ |
| | | | Output current:0~20mA：Impedance 200Ω~500Ω |
| | | | Through the jumper switch AO1 0 ~ 10V and 0 ~ 20mA analog output switching, the factory default voltage output. |
| | AO2 | Analog output 2 | Output voltage:0~10V：Impedance ≥10KΩ |
| | | | Output current:0~20mA：Impedance 200Ω~500Ω |
| | | | Through the jumper switch AO1 0 ~ 10V and 0 ~ 20mA analog output switching, the factory default voltage output. |
| | GND | Ananog ground | Internal isolation from COM |
| Switch input | +24V | +24V current | 24V±10%，Internal isolation from GND |
| | | | Maximum output current：200mA |
| | | | To provide 24V power supply, generally used as a digital input and output terminal power supply and external sensor power |
| | PLC | Digital input terminal common | The factory default setting is connected PLC with +24V<br>Terminal for on-off input high and low level switch |
| | | | When using the external signal to drive DI1~DI5, it will disconnect the connector slip of PLC with the +24V |
| | COM | +24V ground | Internal isolation from GND |
| | DI1~DI4 | Digital input terminal 1~4 | Optocoupler isolation, compatible with bipolar input |
| | | | Frequency range：0~200Hz |
| | | | Voltage range：10V~30V |
| | HDI | Digital input | Digital input terminal：same as DI1~DI4 |

| Type | Terminal Symbol | Terminal Name | Terminal function description |
|---|---|---|---|
| | | terminal /High-speed pulse input | Pulse input frequency input：0~50KHz |
| | | | Voltage range：10V~30V |
| Switch output | DO1 | Open collector output | Optocoupler isolation |
| | | | Voltage range：0V~24V |
| | | | Current range：0mA ~50mA |
| | HDO | Open collector output /High-speed pulse output | Open collector output：same as DO1 |
| | | | High-speed pulse output：0~50KHz |
| Relay output 1 | T1A/T1B/T1C | Relay output | T1A-T1B：nomal close |
| | | | T1A-T1C：nomal open |
| | | | Contact rating：AC 250V，3A；DC 30V，1A |
| **Relay output2 (optional)** | **T2A/T2BT2C** | **Relay output** | **T2A-T2B：nomal close** |
| | | | **T2A-T2C：nomal open** |
| | | | **Contact rating：AC 250V，3A；DC 30V，1A** |
| 485 port | 485+ | 485 Positive differential signal | Baud rate：1200/2400/4800/9600/19200/38400/57600/115200bps |
| | 485- | 485 Negative differential signal | |

Table 3-21 Functional Description of VFD500 Jumper Switch

| Name | Function | Defaults |
|---|---|---|
| 485 | 485 Termination resistor selection: ON has 100 ohm terminating resistor, OFF is no terminating resistor | OFF |
| AI1 | AI1 analog type selection: V is the voltage input (0 ~ 10V), I is the current input (0 ~ 20mA) | V |
| AI2 | AI2 analog type selection: V is the voltage input (0 ~ 10V), I is the current input (0 ~ 20mA) | V |
| AO1 | AO1 analog type selection: V is the voltage output (0 ~ 10V), I is the current output (0 ~ 20mA) | V |
| AO2 | AO2 analog type selection: V is the voltage output (0 ~ 10V), I is the current output (0 ~ 20mA) | V |
| PE1 | GND ground selection: ON is grounded through the safety capacitor, OFF is not connected | OFF |
| PE2 | COM ground selection: ON is grounded through the safety capacitor, OFF is not connected | OFF |

**◆ Analog input terminal instructions**

The AI1 and AI2 terminals can accept both analog voltage input and analog current input. They can be switched by jumpers “AI1” and “AI2” on the IO board. The connection method and jumper

switch configuration are shown in the following figure:

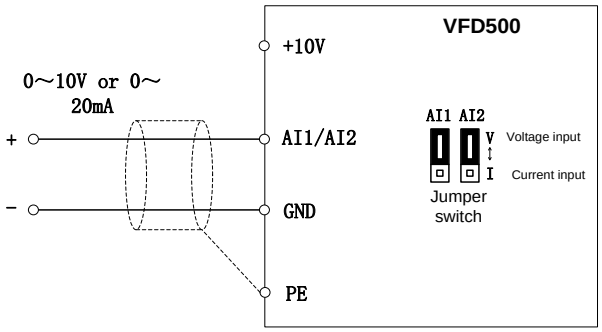



**Figure 3-22 Analog input terminal wiring diagram**

The AO1 and AO2 terminals support the voltage output (0~10V) and the current output (0~20mA). They are selected by jumpers “AO1” and “AO2” on the IO board. The connection method is as shown in the figure below:

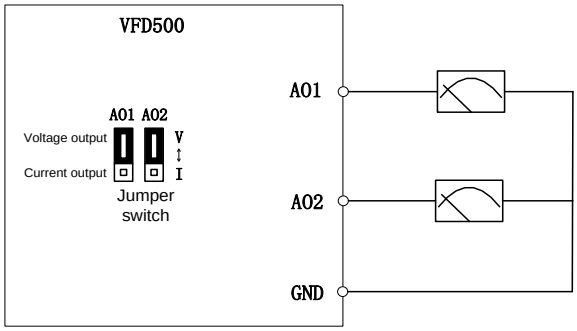
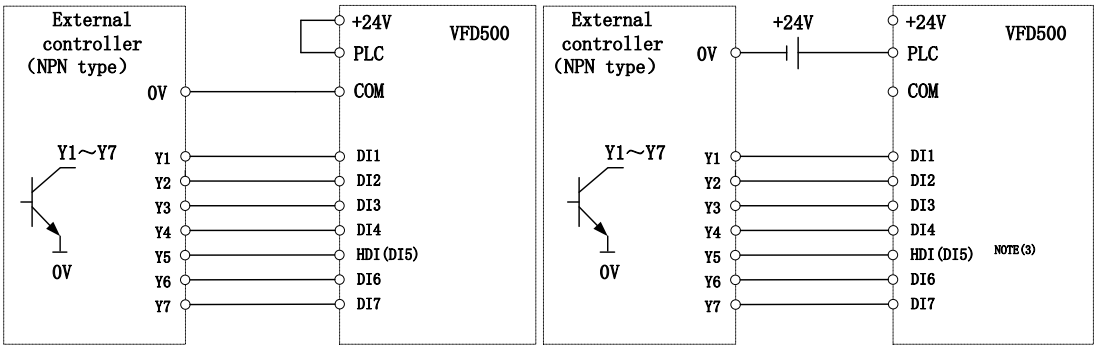
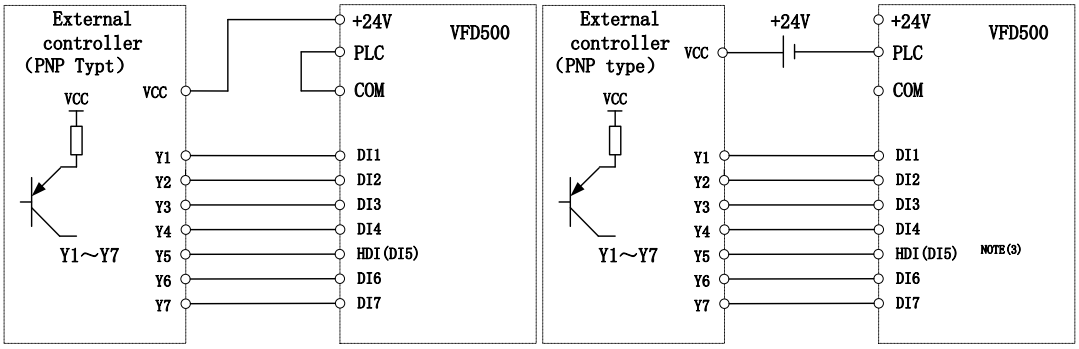



**Figure 3-23 Analog output terminal wiring diagram**

### ◆Digital input terminal instructions




**A：By internal 24V with NPN mode** **B：By internal 24V with PNP mode**




C：NPN mode uses external +24V power supply D：PNP mode uses external +24V power supply

**3-24 Switching Digital input terminal wiring diagram**

## Note：

**1. If the output of the external controller is a relay contact, it can be regarded as an NPN or PNP type. The "0V" or "VCC" of the external controller in the above figure can be regarded as the common terminal of the relay.**

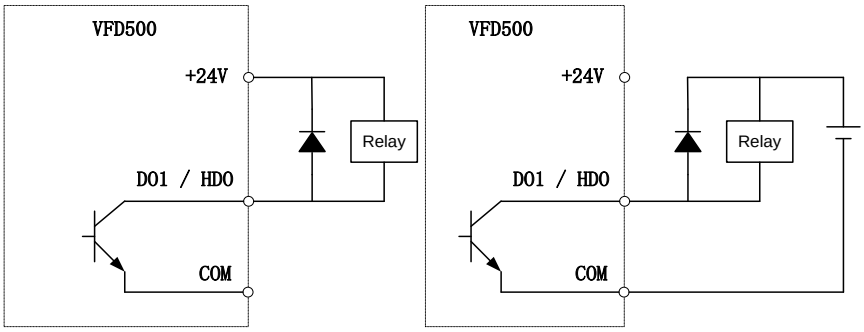
**2. When using an external power supply, the shorting link between +24V and PLC must be removed, otherwise the product will be damaged!**

**3. When using an external power supply, when using HDI, connect the negative pole of the external power supply to COM, otherwise HDI will be invalid!**

**4. The voltage range of VCC is 10V~30V.**

## ◆Switch output terminal instructions

The multi-function output terminals DO1 and HDO can be powered by the internal +24V power supply of the inverter or an external power supply. The wiring diagram is as follows:




A、Use internal power supply B、Use external power supply

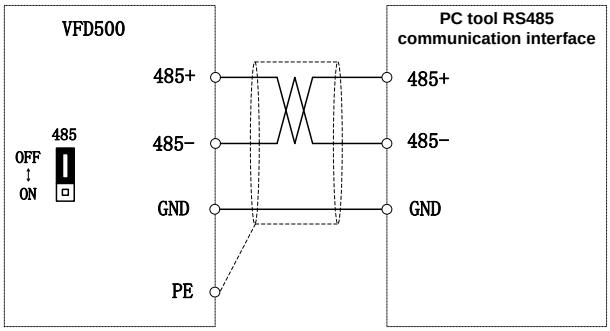
**3-25 Switching digital output terminal wiring diagram**

## Note：

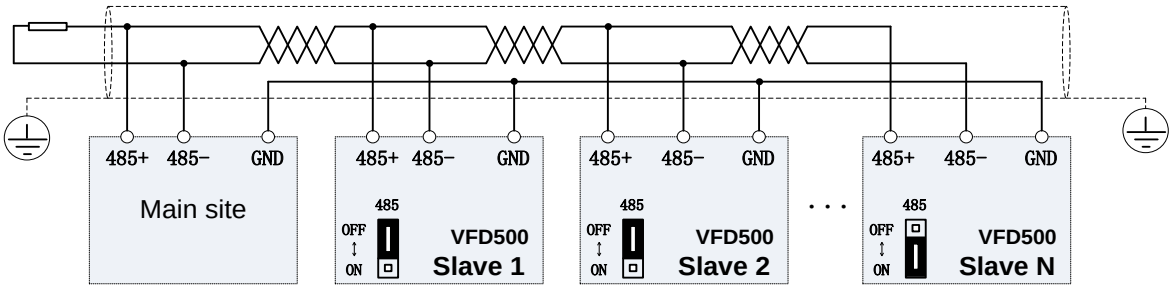
The multi-function terminal output is an open collector output with a maximum allowable current of 50mA. When using the internal power supply, if the inductive load is driven, an absorption circuit such as an RC snubber circuit or a freewheeling diode should be installed. When adding a freewheeling diode, be sure to confirm the polarity of the diode, otherwise the product will be damaged. For external power supply, connect the negative terminal of the

external power supply to the COM terminal.

### ◆485Communication terminal instructions




**3-26 Single inverter RS485 directly communicates with the host computer**




**3-16Multiple inverter RS485 is connected to the host computer for communication**

## 3.3 EMCquestion and solution

The working principle of the inverter determines that it will certainly produce electromagnetic interference, affecting and interfering with other equipment. In the meantime, the frequency converter usually works under the industrial environment with very strong noise,its internal weak signal is also easily disturbed. For safe and trouble-free operation of the frequency converter, as well as the normal and orderly operation of other equipment, install the equipment according to the following rules.。

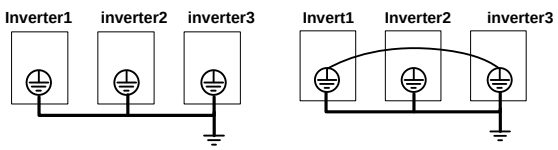
- Install the input noise filter,the filter to the inverter input power supply side of the wiring should be as short as possible.
- Filter shell and the installation of the cabinet should be a large area of reliable connection, in order to reduce the noise current loop impedance.
- The wiring distance between inverter and motor should be as short as possible. The motor cable adopts 4-core cable. One end of the ground wire is grounded at the inverter side and the other end is connected with the motor case. The motor cable is sheathed into the metal pipe.
- Input power line and output motor line should be far away from each other.
- Easily affected equipment and signal lines should be installed away from the inverter.
- The key signal cable should use shielded cable. It is suggested that the shielded cable layer should be grounded by 360 degree grounding method and set in the metal pipe. As far as possible from the inverter input power cable and output motor cable, if the signal cable must cross the input power cable or output motor cable, the two should be orthogonal.
- When using the analog voltage and current signals for remote frequency setting, double-stranded, shielded and shielded cables should be used, and the shield should be connected to the grounding terminal PE of the inverter. The longest signal cable should not exceed 50 meters.
- The control circuit terminals T1A / T1B / T1C, T2A / T2B / T2C and other control circuit terminals should be separated wiring.
- It is forbidden to short-circuit the shield with other signal lines and equipment.
- When connecting the inductive load device (magnetic contactor, relay, solenoid valve, etc.) to the inverter, be sure to use the surge suppressor on the load device coil.
- Correct and reliable grounding is safe and reliable operation of the foundation:

(1) Inverter will generate leakage current, the greater the carrier frequency, the greater the leakage current. Inverter leakage current greater than 3.5mA, the size of the leakage current by the conditions of use, in order to ensure safety, inverter and motor must be grounded;

(2) Grounding resistance should be less than 10 ohms. Grounding cable diameter requirement, refer to the same type of input and output cables half of the cross-sectional area selection;

(3) Do not share the ground wire with welding machines and other power equipment;

(4) When using more than two inverters, do not make the ground wire loop.。




Correct incorrect

3-27-1 Ground wire connection diagram

- Frequency converter to motor cable length and carrier frequency to maintain the appropriate relationship

When the cable between the inverter and the motor is long, due to the influence of distributed capacitance, it is easy to produce electrical resonance, thus generating a large current so that the inverter over-current protection. It

is recommended to install the AC output reactor when the motor cable length exceeds 100 meters. Refer to the following table for carrier frequency setting

## Inverter output cable length and carrier frequency table

3-27-2 diagram

| Cable length between drive and motor | 20m below | 50m below | 100m below | 100m above |
|---|---|---|---|---|
| Carrier frequency （P22.00） | 15kHz below | 8kHz below | 4kHz below | 2kHzbelow |

# Chapter 4 Operation and display

## 4.1 LED Instruction of operation and display

LED keyboard consists of 5 digital tubes, 7 lights, 8 keys and a potentiometer; can be used to set the parameters, status monitoring and operation control, LED keyboard shape as shown in Figure 4-1：


Figure 4-1 Operating panel

**Description of indicator**

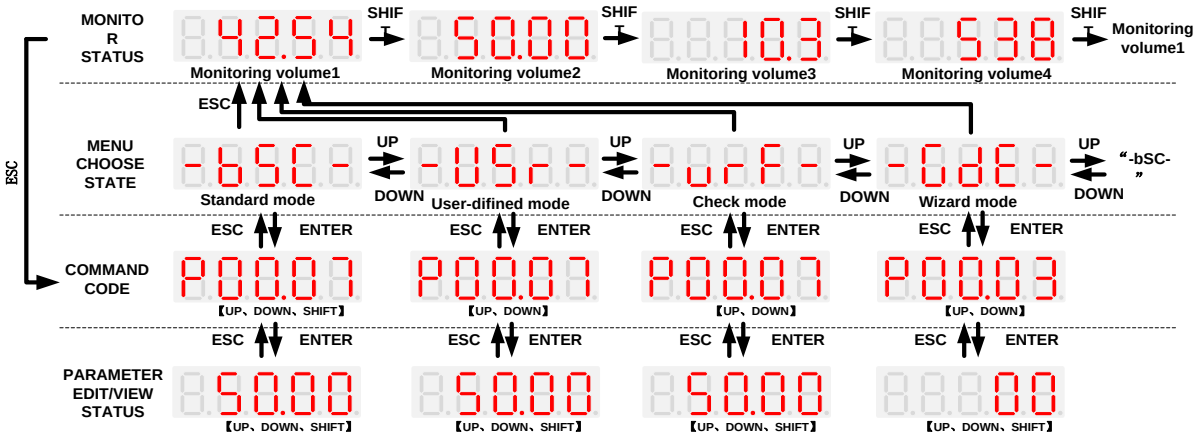
Table 4-1 The name and function of each part of the keyboard

| No. | Part | Name | Function |
|---|---|---|---|
| 1 | ESC | Exit | • exit menu level |
| 2 | ENT | Confirmation | • Enter the menu interfaces level by level,<br>• confirm the parameter setting and save to EEPROM |
| 3 | △ | **Increment/Up** | • The number indicated by the cursor increases by one.<br>• Next function code.<br>• Used to switch the left and right screens while in monitor mode |
| 4 | ▽ | **Decrement/Down** | ·The number indicated by the cursor minus one.<br>• The previous function code. |
| 5 | M.K | Multi-function | ·Perform function switchover according to the setting of 21.02 |
| 6 | >> | Shift | • Cursor shift.<br>• Monitor Status Displays the next monitor volume.<br>• Switch left and right screens. |
| 7 | RUN | Run | Start the frequency inverter in the operation panel control mode |
| 8 | STOP | Stop/Reset | • During operation, press to stop the operation (restricted by parameter 21.03).<br>• In fault status, press this key to reset the fault. |

| | | | |
|---|---|---|---|
| 9 | Hz | Indicator light:Hz | ·Indicate the digital display unit, all three lights off menas other units |
| 10 | A | Indicator light:A | |
| 11 | V | Indicator light:V | |
| 12 | rpm Hz A | Indicator light:HZ+A(rpm/minute) | When Hz" and "A" are lit at the same time, the unit of the currently displayed parameter is "RPM PER MINUTE |
| 13 | % A V | Indicator light:A+V(%) | When "A" and "V" are lit at the same time, the unit of the currently displayed parameter is "percent". |
| 14 | RUN | Running lights | • Off: indicates a stop condition.<br>• On: indicates inverter is running.·<br>Blinking: Deceleration stopped. |
| 15 | REV | Direction indicator | • Used to indicate the sign of the variable when the LED is displaying one of the variables listed in 27.02;<br>• In other cases the sign of the output frequency is indicated. |
| 16 | LO/RE | Command source indicator | • Off: The command source is the keyboard.<br>• On: The command source is terminal.<br>• Blinking: The command source is communication. |
| 17 | ALM | Fault indicator | • When it is on, the drive is faulty. |

## 4.2 Display hierarchy and menu mode

VFD500 digital keyboard display is divided into four layers, from top to bottom are: monitoring status, menu mode selection status, function code selection status, parameter editing / viewing status, as shown in Figure 4-2. In the menu mode selection status, press 【UP】 or 【DOWN】 key to select menu mode, press 【ENTER】 to enter the selected menu mode, the following describes several menu modes:




4-2Keyboard operation diagram

### ◆ Standard mode（-bSC-）

If visiting access (r00.01) is standard, all the function codes mentioned in this manual are accessible.

If visiting access (r00.01) is the end user (in the state of user password lock), then only some function code can be accessed.

### ◆ User-difined mode（-USr-）

In this menu mode, only 20 user-defined parameters defined are displayed.

### ◆ Verify mode（-vrF-）

In this menu mode, only parameters that differ from the factory settings are displayed。

### ◆ Guide mode（-GdE-）

When users first use the inverter, can guide the user to complete a simple trial run。

## 4.3 Digital tube display

### Display of decimal data

### 16 digits:

The range of unsigned numbers is 0 ~ 65535 (without decimal point). The displayed range of signed numbers is -9999 ~ 32767 (excluding decimal point). The negative numbers less than -9999 will be displayed as -9999.

### 32 digits:

The left and right screen display, combined with the following figure to illustrate:


Dot1 is used to distinguish between the left and right screens. On indicates the left panel (upper 5 digits) and turns off the right screen (lower 5 digits). When the left screen is displayed, Dot5 is used to indicate the sign digit. On indicates that the value is negative, off indicates the value is Positive.

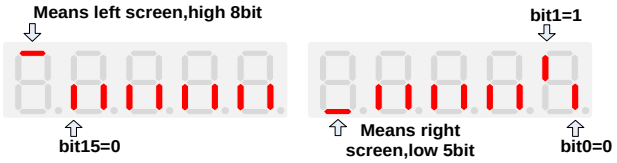
The display range of 32-bit unsigned numbers is 0 to 4294967295 (excluding decimal point), and the displayed range of signed numbers is -2147483648 to 2147483647 (excluding the decimal point).

### ◆ Binary data display

Binary number currently only supports 16 digits, points left and right screen display.

The leftmost digital tube is used to distinguish the left and right screens: the top digit segment lights up for the left panel and the bottom segment segment lights for the right panel.

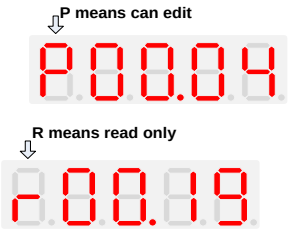
Remove the leftmost digital tube, from right to left, followed by Bit0 ~ Bit15. The upper segment is lit to indicate 1, the lower segment to light to indicate 0.



### ◆ Parameter attribute identification

Editable parameters The leftmost LED displays "P"; the leftmost LED of the read-only parameter displays "r", as shown below.

◆



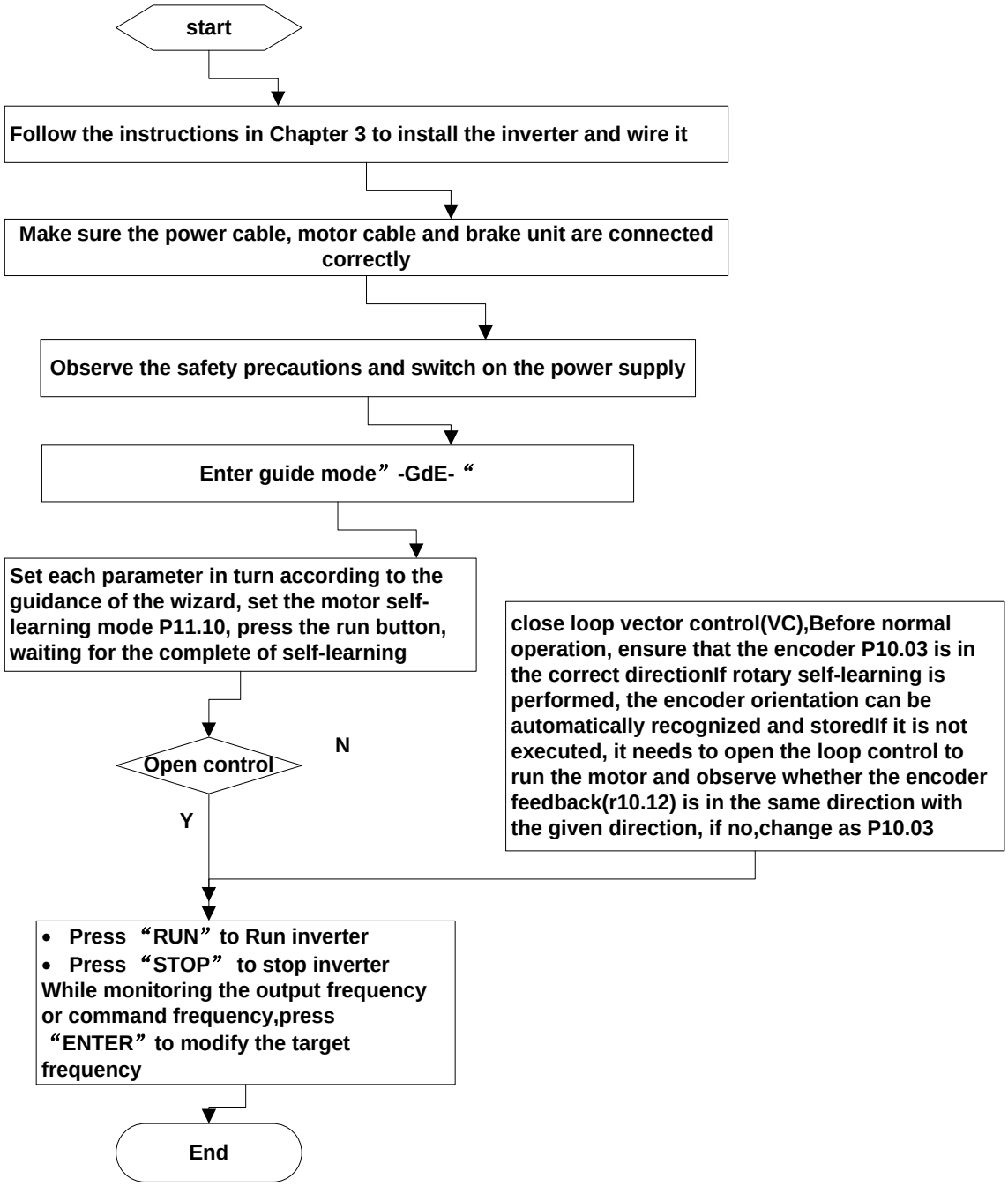

### ◆ Specific symbol

In some cases, the digital tube will display a specific symbol. The meaning of specific symbols is shown in the following table:Table4-2 Digital tube display symbol and meaning

| Symbol | Meaning |
|---|---|
| tUnE | Motor parameter self-learning |
| bUSY | Processing parameter read and write requests |
| End | • Indicates that the parameters have been changed and saved to the EEPROM<br>• The mission has been completed |
| Er.xxx | • Fault code, "XXX" is the fault type, see Chapter 6 for details |

## 4.4 Test run

**Please follow the procedure below to commission the first time power-on。**




**4-3Trial run flow chart**

# Chapter 5 Function Code Table

The following is the VFD500 parameter distribution list：



**Term Description:**

The parameter is also called function code; the operation panel is also called the keyboard.

Due to usage habits, different terms may be used in different places in this manual, but all refer to the same content.

**Symbol Description:**

"☆" means that the setting value of this parameter can be changed when the inverter is stopped or running.

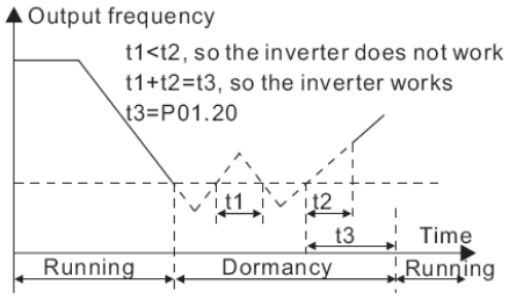
"★" means that the setting value of this parameter can not be changed when the inverter is running.

"●" indicates that the value of this parameter is the actual test record value, which can not be changed

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| **00Group Basic Function** | | | | |
| P00.00 | User password | 0 ~ 65535<br>➢ No user password status after power-on (P00.01=1):<br>The way to set a user password to lock is that Entering the same non-zero value two tmes in succession<br>➢ Locked staus<br>Enter the password to unlock<br>➢ Unlocked status<br>Enter the original password to lock inverter; enter the same value twice in a row to change the password (password will be cleared if you enter 0 two times in a row). | 0 | ☆ |
| P00.01 | Access authority | 0：END USER<br>Some parameter are not authorized to check when user password in locked state<br>1：Standard<br>ALL Parameter can be checked | 1 | • |
| P00.02 | Parameter copy and backup | 0：No action<br>11：save all parameter to EEPROM backup space<br>12：Restore all parameter from EEPROM backup space | 0 | ★ |
| P00.03 | **RESET** | 0：NO ACTION<br>11：Restore default parameter except for motor parameter and auto-tune related parameter and factory parameter<br>12:Restore default to factory parameter<br>13：Clear tripping record | 0 | ★ |
| P00.04 | **Motor Control mode** | 0：VF<br>1：SVC(sensorless vector control)<br>➢ Open loop vector without encoder feedback and the feedback speed is internally estimated and supports torque control mode.<br>2：VC Vector control with sensor<br>➢ Close loop vec tor and torque control supporting encoder feedback in high precision or torque control application.The inverter must be equipped with a PG card that matches the encoder. For the relevant parameters of the PG card, please refer to P10 group | 0 | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| **P00.05** | **Running mode** | 0：Speed mode<br>1：Torque mode<br>➢ If use with DI function,19:Switch between torque and speed Control and 20: torque control diabled. Actuall effective running mode is related with DI status | 0 | ★ |
| **P00.06** | **Source of the Operation Command** | 0：keypad<br>1：terminal<br>2：communication<br>➢ Command source: run、stop、forward、reverse、jog、fast brake stop.etc<br>➢ If use with DI function, 12：Switching run command to Keypad and 13：Switching run command to Communication,Actuall effective command source is related with DI status | 0 | ★ |
| **P00.07** | **Numeric frequency setting** | 00.00Hz～maximum frequency(Set P21.17=1 to change the unit to 1Rpm) | 50.00Hz | ☆ |
| **P00.08** | **Rotation direction** | 0：Forward<br>1：Reverse<br>➢ It is only for keypad control to change running direction by giving frequency symbol to be reverse)If command by keypad/terminal /communication,and not want to achieve reverse running by giving frequency symbol to be reverse,need to change P22.13 in stop mode(see parameter P22.13) | 0 | ☆ |
| **P00.09** | **Reverse control** | 0：enable<br>1：disbale | 0 | ★ |
| **P00.10** | **Motor option** | 0：motor 1<br>1：motor 2<br>If use with DI function,16:Switch between motor 1 and motor 2,Actuall effective command source is related with DI status | 0 | ★ |
| P00.11 | Special industry | 0：standard drive<br>1：Reserved | 0 | ★ |
| **r00.18** | **Power board software version** | - | - | • |
| **r00.19** | **Control board software version** | - | - | • |
| **r00.21** | SN 1 | - | - | • |
| **r00.22** | SN 2 | - | - | • |

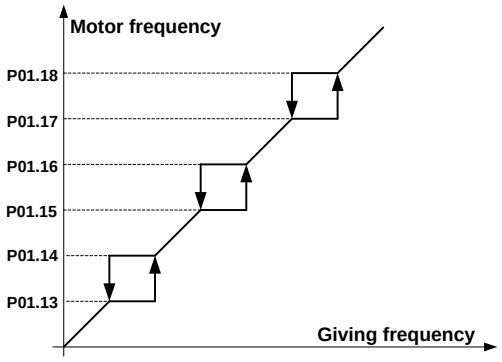
| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| **01Group frequency source selction** | | | | |
| **P01.00** | **Main frequency source selection (A)** | 0：Digital setting<br>**1：AI1**<br>2：AI2<br>3：AI3(IO externsion card)<br>4：AI4(IO externsion card)<br>5：HDI<br>6：multi-step speed<br>7：communication<br>8：PID<br>9：Internal PLC<br>Notice:DI terminal function code 26-32 superior than this function code | 0 | ★ |
| **P01.01** | **Auxiliary frequency source selection (B)** | **Same as P01.00**<br>Notice:DI terminal function code 33 superior than this function code | 0 | ★ |
| P01.02 | Reference option for auxiliary frequency source | 0：Relative to Maximum frequency<br>1：Relative to main frequency | 0 | ★ |
| P01.03 | Auxiliary frequency gains | 0.0～300.0 | 100.0% | ☆ |
| P01.04 | Frequency source selection | 0：main frequency sourceA<br>1：auxiliary frequency sourceB<br>2：Main and auxiliary arithmetic results<br>3：Switchover between main and auxiliary frequency<br>4：switchover between main frequency source A and A+B Arithmetic results<br>5：Switchover between B and (A+B)<br>（*）DI function code 25 effective to corresponding terminal ,frequency will adopt the latter | 0 | ★ |
| P01.05 | Main and Auxiliary arithmetic | 0：A+B<br>1：A-B<br>2：The bigger of main A and Auxliary B<br>3：The smaller of Main A and Auxiliary B<br>4：A*B<br>A*B have better frequency adjustment ,wiely used for winding industry, fine sand machine, and leather, paper industry... | 0 | ★ |
| **P01.06** | **Maximum frequency** | 10.00～600.00Hz | 50.00Hz | ★ |
| P01.07 | Upper limit frequency control | 0：digital setting (set through P01.08)<br>1：AI1<br>2：AI2<br>3：Reserved | 0 | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | 4：Reserved<br>5：Pulse setting HDI<br>6：Reserved<br>7：Communication setting | | |
| **P01.08** | **Upper limit frequency** | Lower limit frequency(P01.09)～maximum frequency (P01.06) | 50.00Hz | ☆ |
| P01.09 | Lower limit frequency | 0.00Hz～upper limit frequency | 0.00Hz | ☆ |
| P01.10 | Action when set frequency lower than lower limit frequency | 0：Run at low limit frequency<br>1：Stop after delaying P01.11<br>2：Run at zero speed<br>The inverter will coast to stop when the set frequency is lower than the lower-limit one.if the set frequency is above the lower limit one again and it lasts for the time set byP01.11, the inverter will come back to the running state automatically. | 0 | ★ |
| P01.11 | Delay time when set frequency lower than lower limit frequency | 0.000s～30.000s<br>This function code determines the hibernation delay time. When the running frequency of the inverter is lower than the lower limit one, the inverter will stop to stand by.<br>When the set frequency is above the lower limit one again and it lasts for the time set by P01.11, the inverter will run automatically.<br>  | 0.000s | ★ |
| P01.12 | Jump frequency start up protection | Unit/ten/hundred'digit：three jump frequency 1/2/3<br>0：Disable<br>1：Enable (avoid risk speed) | 000 | ☆ |
| P01.13 | Jump frequency 1 lower limit | 0.00Hz～(P01.14) | 0.00Hz | ☆ |
| P01.14 | Jump frequency upper limit | P01.13- (P01.06)Maximum frequency | 0.00Hz | ☆ |
| P01.15 | Jump frequency 2 lower limit | 0.00Hz～(P01.16) | 0.00Hz | ☆ |
| P01.16 | Jump frequency 2 upper limit | P01.15～maximum frequency(P01.06) | 0.00Hz | ☆ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| P01.17 | Jump frequency 3 lower limit | 0.00Hz～(P01.18) | 0.00Hz | ☆ |
| P01.18 | Jump frequency 3 upper limit | P01.17～maximum frequency(P01.06) | 0.00Hz | ☆ |

Risk speed or Jump frequency start up protection is used to some situation which need avoid motor speed and speed range,for example,due to mechanical resonance ,P01.12 will be enabled to avoide risk speed in forward or reverse mode

。




| | | | | |
|---|---|---|---|---|
| P01.19 | Multi-step speed reference source | Unit'digit：0 phase reference source set by<br>0-multi-step speed(P01.21)<br>1-preset frequency (P00.07)<br>2:AI1<br>3:AI2<br>4:AI3(IO expansion board)<br>5:AI4(IO expansion board)<br>6:HDI pulse<br>7:Communication<br>8:PID<br>Ten's digit：Combination of multiple speed<br>0：Combination method<br>1：Priority method | 00 | ★ |

**Combination method Description:**

| Multispeed terminal 4 | Multispeed terminal 3 | Multispeed terminal 2 | Multispeed terminal 1 | Combination method Speed reference |
|---|---|---|---|---|
| Ineffective | Ineffective | Ineffective | Ineffective | Multispeed 0 |
| Ineffective | Ineffective | Ineffective | **effective** | Multispeed 1 |
| Ineffective | Ineffective | **effective** | Ineffective | Multispeed 2 |
| Ineffective | Ineffective | **effective** | **effective** | Multispeed 3 |
| Ineffective | **effective** | Ineffective | Ineffective | Multispeed 4 |
| Ineffective | **effective** | Ineffective | **effective** | Multispeed 5 |
| Ineffective | **effective** | **effective** | Ineffective | Multispeed 6 |
| Ineffective | **effective** | **effective** | **effective** | Multispeed 7 |
| **effective** | Ineffective | Ineffective | Ineffective | Multispeed 8 |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **effective** | Ineffective | Ineffective | **effective** | Multispeed 9 |
| **effective** | Ineffective | **effective** | Ineffective | Multispeed 10 |
| **effective** | Ineffective | **effective** | **effective** | Multispeed 11 |
| **effective** | **effective** | Ineffective | Ineffective | Multispeed 12 |
| **effective** | **effective** | Ineffective | **effective** | Multispeed 13 |
| **effective** | **effective** | **effective** | Ineffective | Multispeed 14 |
| **effective** | **effective** | **effective** | **effective** | Multispeed 15 |

**Priority method Description:**

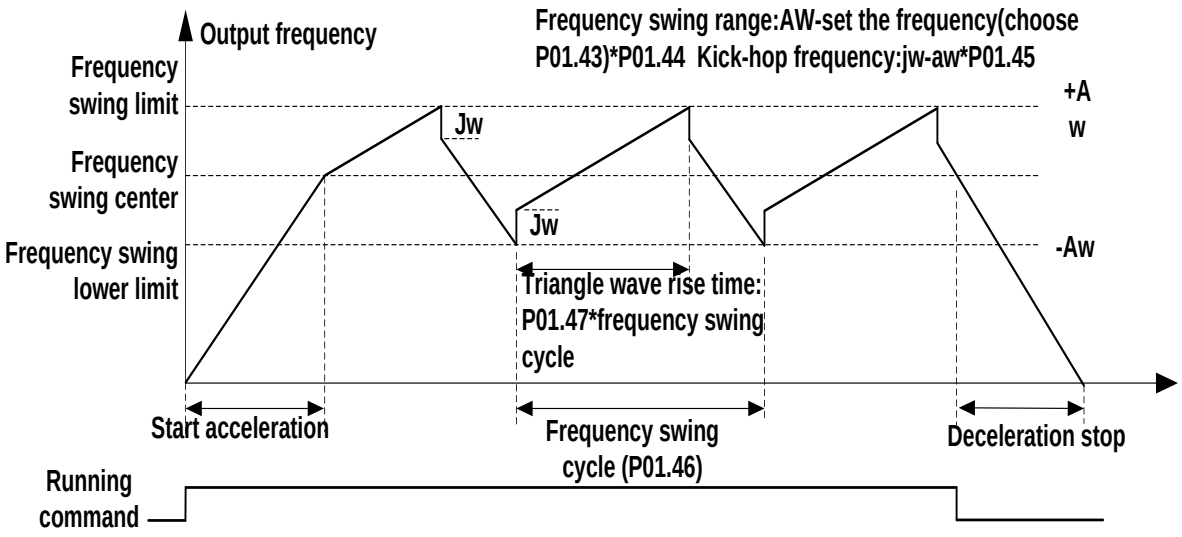
| Multispeed terminal 4 | Multispeed terminal 3 | Multispeed terminal 2 | Multispeed terminal 1 | Priority method Speed reference |
|---|---|---|---|---|
| Ineffective | Ineffective | Ineffective | Ineffective | Multispeed 0 |
| Ineffective | Ineffective | Ineffective | **effective** | Multispeed 1 |
| Ineffective | Ineffective | **effective** | random | Multispeed 2 |
| Ineffective | **effective** | random | random | Multispeed 3 |
| **effective** | random | random | random | Multispeed 4 |

| | | | | |
|---|---|---|---|---|
| P01.20 | Multiple step speed Rotation direction | Bit0 ～ 15 corresponding to 0 ～ 15 phase direction<br>0:forward direction 1:reverse direction | 0 | ☆ |
| P01.21 | Multiple step speed 0/in-built plc 1 | Lower limit frequency (P01.09) ～ maximum frequency(P01.06)**Note: When the unit's digit of P01.19 is set to non-zero, this setting is invalid.** | 0.00Hz | ☆ |
| P01.22 | Multiple step speed 1/in-built plc 2 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.23 | Multiplestep speed 2/in-built plc 3 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.24 | Multiple step speed 3/in-built plc 4 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.25 | Multiple step speed 4/in-built plc 5 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.26 | Multiple-step speed 5/in-built plc 6 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.27 | Multiple step speed 6/in-built plc 7 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.28 | Multiple step speed 7/in-built plc 8 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.29 | Multiple step speed 8/in-built plc 9 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.30 | Multiple step speed 9/in-built plc 10 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | | | |
| P01.31 | Multiple step speed 10/in-built plc 11 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.32 | Multiple step speed 11/in-built plc 12 | Lower limit frequency(P01.09) ～ maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.33 | Multiple step speed 12/in-built plc 13 | Lower limit frequency(P01.09)～maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.34 | Multiple step speed 13/in-built plc 14 | Lower limit frequency(P01.09)～maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.35 | Multiple step speed 14/in-built plc 15 | Lower limit frequency(P01.09)～maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.36 | Multiple step speed 15/in-built plc 16 | Lower limit frequency(P01.09)～maximum frequency(P01.06) | 0.00Hz | ☆ |
| P01.37 | Jog frequency | 0.00Hz～maximum frequency(P01.06) | 5.00Hz | ☆ |
| P01.38 | Jog command when running | 0：not responsive<br>1：responsive | 0 | ★ |
| P01.39 | UP/DOWN rates | 0.00(auto rates)～600.00Hz/s | 1.00Hz/s | ☆ |
| P01.40 | TERMINAL UP AND DOWN CONTROL | Unit'digit：<br>0：Zero clearing in non-running<br>1：Zero clearning when UP/DOWN command not effective<br>2：Not zero cleaning (decide by remembering digit when power failure<br>Ten's digit：<br>0：Non-zero cleaning at power failure<br>1:Save at power failure UP/DOWN offset<br>Hundred's digit: UP/DOWN near to zero<br>0: Forbidden<br>1:Enable<br>Thousand's digit up and down action mode<br>0:Superposition<br>1:Gain effect | 0002 | ★ |
| P01.41 | Droop control gains | 0.00～1.00<br>Rotation speed drop value based on Rated load（relative to maximum frequency）<br>Frequency drop volume:Max frequency*P01.41*Current load/rated load | 0.00 | ☆ |
| P01.42 | Droop control filtering time | 0.000s～10.000s | 0.050s | ☆ |
| When several motors drive the same load, each motor's load is different because of the difference of motor's rated speed. The load of different motors can be balanced through droop control function which makes the speed droop along with load increase.<br>When the motor outputs rated torque, actual frequency drop is equal to P1.41. User can adjust this parameter from small to big gradually during commissioning. | | | | |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | | | |
| P01.43 | Textile frequency setting | 0: relative to center of textile frequency<br>1: relative to maximum frequency | 0 | ☆ |
| P01.44 | **Textile frequency** | 0.0%～100% relative to center of textile frequency P01.43 = 0Textile frequency Aw = P01.44 * center frequency<br>P01.43 = 1: Textile frequency Aw = P01.44 * max frequency | 0.0% | ☆ |
| P01.45 | **Jump frequency** | 0.0%～50.0% relative to textile frequency | 0.0% | ☆ |
| P01.46 | Textile period | 0.1s～3000.0s | 10.0s | ☆ |
| P01.47 | Triangle wave rising time coeffcient | 0.1%～100.0% relative to textile period | 50.0% | ☆ |

This function is mostly used in textile and chemical industry and some application such as traversing and winding so it is used for balancing the workload allocation when multiple motors are used to drive the same load. The output frequency of the frequency inverters decreases as the load increases. You can reduce the workload of the motor under load by decreasing the output frequency for this motor, implementing workload balancing among multiple motors.**P01.44 or P01.46=0,This function disable**




| | | | | |
|---|---|---|---|---|
| P01.48 | Auxiliary frequency effective threshold | When the main frequency ≥ this setting, the auxiliary frequency will be effective | 0.00Hz | ☆ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| **02 Group Start and stop Control** | | | | |
| **P02.00** | **Starting mode** | **0：Direct start**<br>Inverter will start from P02.01,After P02.02,It will go to setting frequency as per S curve<br>**1：Speed tracking/Searching**<br>Inverter will do search for motor speed and recognize and accelerate and decelerate to setting frequency.See Parameter P02.16-P02.19<br>The direction and speed will be tracked automatically for the smoothing starting of rotating motors. It suits the application with reverse rotation when big load starting. | 0 | ★ |
| P02.01 | Startup frequency | 0.00Hz～10.00Hz | 0.00Hz | ★ |
| P02.02 | Startup frequency holding time | 0.000s～10.000s<br>Set a proper starting frequency to increase the torque of the inverter during starting. During the retention time of the starting frequency, the output frequency of the inverter is the starting frequency. And then, the inverter will run from the starting frequency to the set frequency. If the set frequency<br>is lower than the starting frequency, the inverter will stop running and keep in the stand-by state. The starting frequency is not limited in the lower limit frequency. | 0.000s | ★ |
| **P02.03** | **Quick-response excitation** | 0：Disable<br>1：Enable<br>Set 1= enable it will automatically calculate pre-exciation current P02.04 and pre-excitaton time ,after finishing calculation,this parameter will reset to 0 | 0 | ★ |
| **P02.04** | **Pre-excitation current** | 0%～200% motor rated current | Depend | ★ |
| **P02.05** | **Pre-excitation time** | 0.00s～10.00s<br>Pre-excitation enable Asynchronous motor for magnetic field for higher starting torque | Depend | ★ |
| P02.06 | DC brake current at start-up | 0～100% motor rated current | 100% | ☆ |
| P02.07 | DC brake time at start-up | 0.000s～30.000s<br>No start DC brake when set to 0s | 0.000s | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | | | |
| DC braking is used to make the running motor stop & restart. Pre-excitation is used to establish asynchronous motor magnetic field, then start, improve the response speed.<br>DC braking is only valid when start directly, the inverter performs DC braking according to P02-06 firstly, and runs after P02-07. If DC braking time is 0, the inverter starts directly. The bigger the DC braking current is, the greater the braking force<br>If the start mode is pre-excitation start, then the inverter establishes magnetic field according to the set pre-excitation current firstly, runs after the set pre-excitation time. If the pre-excitation time is 0, the inverter starts directly.<br>DC braking current before start/pre-excitation current refers to the percentage of the inverter rated current. | | | | |
| **P02.08** | **Stop method** | 0：ramp to stop<br>after the stop command becomes valid, the inverter decelerates to reduce the outputfrequency during the set time. When the frequency decreases to 0Hz, the inverter stops.<br>1：free coast to stop<br>after the stop command becomes valid, the inverter ceases the output immediately. And the load coasts to stop at the mechanical inertia. | 0 | ☆ |
| P02.09 | Startup frequency of DC brake at stop | 0.00Hz～50.00Hz<br>start the DC braking when running frequency reaches starting frequency determined by P02.09. | 1.00Hz | ★ |
| **P02.10** | **DC braking current at stop** | 0～200% motor rated current(Maximum value not higher than drive rated current)<br>the value of P02.10 is the percentage of rated current of inverter. The bigger the DC braking current is, the greater the braking torque isDC braking time: the retention time of DC braking. If the time is 0, the DC braking is invalid. The inverter will stop at the set deceleration time. | 100% | ☆ |
| **P02.11** | **DC brake time at stop** | 0.000s～30.000s<br>Inverters blocks the output before starting the DC braking. After this waiting time, the DC braking will be started so as to prevent over-current | 0.000s | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | fault caused by DC braking at high speed. | | |
| P02.12 | Magnetic flux brake gain | 1.00～1.50<br>Over excitation braking convert some kinetic energy to motor heating by increasing motor excitation.value 1 means ineffective: value higher,better performance but output current bigger<br>This inverter can slow down the motor by increasing the magnetic flux. The energy generated by the motor during braking can be transformed into heat energy by increasing the magnetic flux. The inverter monitors the state of the motor continuously even during the magnetic flux period. So the magnetic flux can be used in the motor stop, as well as to change the rotation speed of the motor. Its other advantages are:<br>Brake immediately after the stop command. It does not need to wait the magnetic flux weaken.<br>The cooling is better. The current of the stator other than the rotor increases during magnetic flux braking, while the cooling of the stator is more effective than the rotor. | 1.00 | ★ |
| **P02.13** | **Delaying frequency at stop** | 0.00Hz～20.00Hz | 0.50Hz | ★ |
| **P02.14** | **Delaying time at stop** | 0.000s～60.000s<br>0.000s:no function for delaying time at stop<br>>0.000s:it is effective,when output frequency decrease lower than delaying frequency at stop (P02.13),inverter will block pulse output after delaying time at stop (P02.14).if run command comes during delaying time,inverter will restart.it is useful to some application with jog function | 0.000s | ★ |
| P02.15 | The minimum blocking time after free stop | 0.010s～30.000s | Depend | ★ |
| **P02.16** | **Speed tracking mode** | Unit's digit：tracking mode<br>0 ： Speed tracking for maximum output frequency | 00 | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | 1：Speed tracking for frequency at stop<br>2：Speed tracking for grid frequency<br>Ten's digit：direction choosing<br>0：only search at given frequency direction<br>1：search on the other direction when failed for given frequency tracking | | |
| P02.17 | Deceleration time for speed search | 0.1s～20.0s | 2.0s | ★ |
| P02.18 | Current for speed search | 10%～150% motor rated current | 40% | ★ |
| P02.19 | Speed search compensation factor | 0.00～10.00 | 1.00 | ★ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| **03 Group Ramp and S curve** | | | | |
| **P03.00** | **Acceleration and deceleration curve selection** | 0：linear<br>1：S curve A<br>2：S curve B | 0 | ★ |

Acceleration and deceleration curve, also known as "Ramp Frequency Generator (RFG)", is used to smooth the frequency command. VFD500 supports the following acceleration and deceleration curve:

0: linear acceleration / deceleration

The output changes at a constant acceleration or deceleration. Acceleration time refers to the time from when the inverter accelerates from zero to the reference frequency (selected by P03.15); deceleration time refers to the time required to decelerate from the reference frequency to zero.

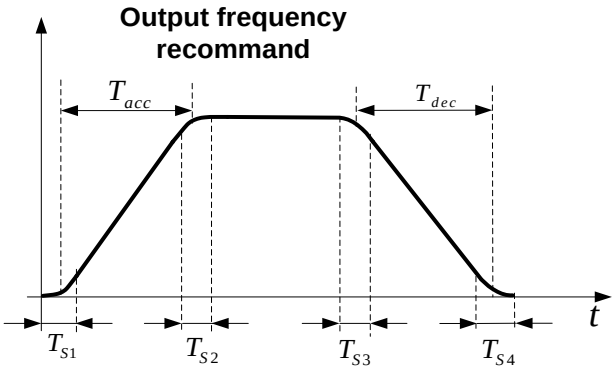
1: S curve method

This acceleration and deceleration curve acceleration "a" changes in a ramp, start and stop relatively flat. Acceleration and deceleration process as shown below, Tacc and Tdec for the set acceleration and deceleration time.

The acceleration and deceleration curve of the equivalent acceleration and deceleration time:

Acceleration time = Tacc + (Ts1 + Ts2) / 2

Deceleration time = Tdec + (Ts3 + Ts4) / 2




2: S curve method B

The time of this S-curve is defined as in the method A except that in the acceleration / deceleration process, if the target frequency suddenly approaches or the acceleration / deceleration time changes, the S-curve is re-planned. In addition, when the target frequency changes, the S Curves avoid "overshoot" as much as possible.

| | | | | |
|---|---|---|---|---|
| **P03.01** | **Acceleration time 1** | Setting value depend on P03.16<br>P03.16 = 2, 0.00～600.00s;<br>P03.16 = 1, 0.0s～6000.0s;<br>P03.16 = 0, 0s～60000s | Depend on model | ☆ |
| **P03.02** | **Deceleration time 1** | Setting value depend on P03.16<br>P03.16 = 2, 0.00～600.00s;<br>P03.16 = 1, 0.0s～6000.0s;<br>P03.16 = 0, 0s～60000s | Depend on model | ☆ |
| P03.03 | Accelerationtime2 | 0.01～60000s same as P03.01 | Depend on model | ☆ |
| P03.04 | Deceleration time2 | 0.01～60000s same as P03.02 | Depend on model | ☆ |
| P03.05 | Acceleration time3 | 0.01～60000s same as P03.01 | Depend on model | ☆ |

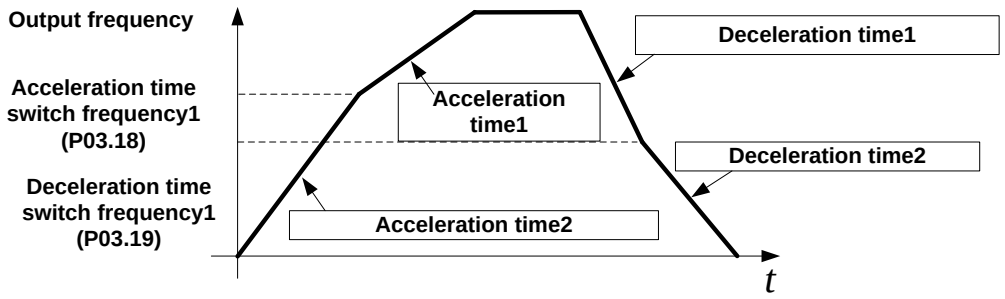
| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| P03.06 | Deceleration time3 | 0.01～60000s same as P03.02 | Depend on model | ☆ |
| P03.07 | Acceleration time4 | 0.01～60000s same as P03.01 | Depend on model | ☆ |
| P03.08 | Deceleration time4 | 0.01～60000s same as P03.02 | Depend on model | ☆ |

The VFD500 provides four groups of acceleration and deceleration time. The actual acceleration / deceleration time can be selected by different methods such as DI terminal, output frequency and PLC running segments. Several methods can not be used at the same time. Factory default is to use acceleration / deceleration time

1.DI terminal select acceleration and deceleration time of the mapping table is as follows:：

| Acceleration and deceleration time DI terminal 2 | Acceleration and deceleration time DI terminal 1 | Acceleration and deceleration time |
|---|---|---|
| Ineffective | Ineffective | Acceleration and deceleration time terminal 1（P03.01,P03.02） |
| Ineffective | Effective | Acceleration and deceleration time terminal 2（P03.03,P03.04） |
| Effective | Ineffective | Acceleration and deceleration time terminal 3（P03.05,P03.06） |
| Effective | Effective | Acceleration and deceleration time terminal 4（P03.07,P03.08） |

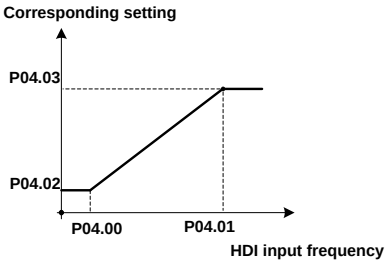
The schematic diagram of selecting acceleration / deceleration time according to the output frequency is as follows：



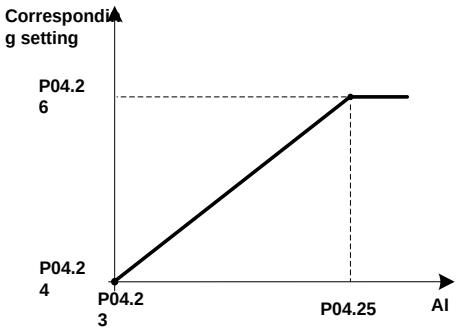

Other ways to select acceleration / deceleration time can be found in the description of relevant parameters。

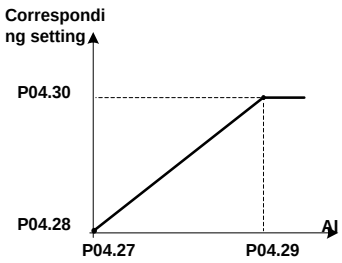
| | | | | |
|---|---|---|---|---|
| **P03.09** | **Jog Acceleration time** | Time Setting same as P03.01 | 6.00s | ☆ |
| **P03.10** | **Jog Deceleration time** | Time Setting same as P03.02 | 10.00s | ☆ |
| P03.11 | S-curve Acceleration begin time | Setting value depend on P03.16<br>P03.16 = 2, 0.01～30.00s;<br>P03.16 = 1, 0.1s～300.0s;<br>P03.16 = 0, 1s～3000s | 0.50s | ☆ |
| P03.12 | S-curve Acceleration arrival time | **SAME AS P03.11** | 0.50s | ☆ |
| P03.13 | S-curve Deceleration | **SAME AS P03.11** | 0.50s | ☆ |

| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | begin time | | | |
| P03.14 | S-curve Deceleration Arrival time | **SAME AS P03.11** | 0.50s | ☆ |
| P03.15 | Accel and Deceltime frequency benchmark | 0：Maximum frequency<br>1：Motor rated frequency | 0 | ★ |
| P03.16 | Accel and Decel time unit selection | 0：1s<br>1：0.1s<br>2：0.01s | 2 | ★ |
| P03.17 | Quickstop deceleration time | 0.01～65000s | 5.00s | ☆ |
| P03.18 | Switchingfrequency 1 in acceleration time | 0.00Hz～maximum frequency(P01.06) | 0.00Hz | ☆ |
| P03.19 | Switchingfrequency 1 in deceleration time | 0.00Hz～maximum frequency(P01.06) | 0.00Hz | ☆ |
| **P03.20** | **Forward/reverse Dead band time** | 0.00s～30.00s Waiting time for zero speed during forward and reverse switchover | 0.00s | ★ |
| **04 Group Analog and Pulse input** | | | | |
| P04.00 | Minimum input pulse frequency | 0.00kHz～50.00kHz | 1.00kHz | ☆ |
| P04.01 | Maximum input pulse frequency | 0.00kHz～50.00kHz | 30.00kHz | ☆ |
| P04.02 | Setting Corresponding to Minimum input | -100.0%～100.0% | 0.0% | ☆ |
| P04.03 | Setting Corresponding to maximum input | -100.0%～100.0% | 100.0% | ☆ |
| P04.04 | Pulse input filter time | 0.000s～10.000s | 0.050s | ☆ |
| r04.05 | Pluse input frequency | 0.00kHz～50.00kHz(it is used to check HDI pulse input frequency) | - | ● |
| r04.06 | HDI equivalent value | -100.0%～100.0%(it is used to View the output of the HDI mapping curve) | - | ● |
| P04.07 | AI 1 Curve setting | Unit's：AI curve selection<br>0：curve A<br>1：curve B<br>2：Curve C | 00 | ★ |

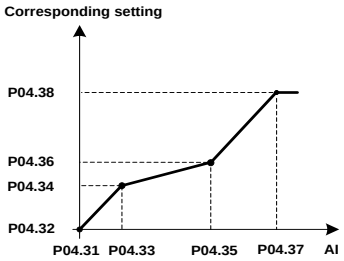


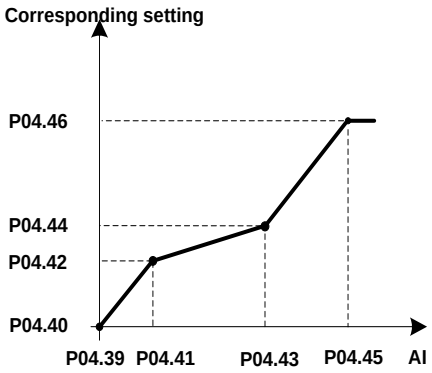
| Function code | Parameter name | Description | Default | Property |
|---|---|---|---|---|
| | | 3：Curve D<br>Ten'unit：when input signal lower than minimum input<br>0：equal to minimum input<br>1：equal to 0.0% | | |
| P04.08 | AI1 filter time | 0.000s～10.000s | 0.100s | ☆ |
| r04.09 | AI 1 actual value | 0.00V～10.00V ( it is used to view the port voltage of AI1. When AI1 is a current type (0~20mA) input, multiplying this value by 2 is the input current (mA) of the AI1 port.) | - | ● |
| r04.10 | AI 1 Conversion value | -100.0%～100.0%(It is used to view the output of the AI1 mapped curve) | - | ● |
| P04.11 | AI 2 Curve setting | Unit's：AI curve selection<br>0：curve A<br>1：curve B<br>2：Curve C<br>3：Curve D<br>Ten'unit：when input signal lower than minimum input<br>0：equal to minimum input<br>1：equal to 0.0% | 01 | ★ |
| P04.12 | AI2 filter time | 0.000s～10.000s | 0.100s | ☆ |
| r04.13 | AI 2 actual value | 0.00V～10.00V ( it is used to view the port voltage of AI2. When AI2 is a current type (0~20mA) input, multiplying this value by 2 is the input current (mA) of the AI2 port.) | - | ● |
| r04.14 | AI 2 Conversion value | -100.0%～100.0%(It is used to view the output of the AI2 mapped curve) | - | ● |
| P04.15 | AI 3(option card) Curve setting | Unit's：AI curve selection<br>0：curve A<br>1：curve B<br>2：Curve C<br>3：Curve D<br>Ten'unit：when input signal lower than minimum input<br>0：equal to minimum input<br>1：equal to 0.0% | 02 | ★ |
| P04.16 | AI3 (option card) filter time | 0.000s～10.000s | 0.100s | ☆ |
| r04.17 | AI3(option card) actual value | 0.00V～10.00V ( it is used to view the port voltage of AI3. When AI3 is a current type (0~20mA) input, multiplying this value by 2 is the input current (mA) of the AI3 port.) | - | ● |
| r04.18 | AI3(option card) Conversion value | -100.0%～100.0%(It is used to view the output of the AI3 mapped curve) | - | ● |
| P04.19 | AI 4(option card) Curve setting | Unit's：AI curve selection<br>0：curve A<br>1：curve B<br>2：Curve C<br>3：Curve D | 03 | ★ |

<table>
<tr><th>Function code</th><th>Parameter name</th><th colspan="2">Description</th><th>Default</th><th>Property</th></tr>
<tr><td></td><td></td><td colspan="2">Ten’unit：when input signal lower than minimum input<br>0：equal to minimum input<br>1：equal to 0.0%</td><td></td><td></td></tr>
<tr><td>P04.20</td><td>AI4(option card) filter time</td><td colspan="2">0.000s～10.000s</td><td>0.100s</td><td>☆</td></tr>
<tr><td>r04.21</td><td>AI4(option card) actual value</td><td colspan="2">0.00V～10.00V ( it is used to view the port voltage of AI4. When AI4 is a current type (0~20mA) input, multiplying this value by 2 is the input current (mA) of the AI4 port.)</td><td>-</td><td>●</td></tr>
<tr><td>r04.22</td><td>AI4(option card) Conversion value</td><td colspan="2">-100.0%～100.0%(It is used to view the output of the AI4 mapped curve)</td><td>-</td><td>●</td></tr>
<tr><td>P04.23</td><td>Curve A horizontal axis 1</td><td>0.00V～P04.25</td><td rowspan="4"> 

Note:input less than P04.23,output decided by curve ten’s digit</td><td>0.00V</td><td>☆</td></tr>
<tr><td>P04.24</td><td>Curve Avertical axis 1</td><td>-100.0%～100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>P04.25</td><td>Curve A horizontal axis 2</td><td>P04.23～10.00V</td><td>10.00V</td><td>☆</td></tr>
<tr><td>P04.26</td><td>Curve A vertical axis 2</td><td>-100.0%～100.0%</td><td>100.0%</td><td>☆</td></tr>
<tr><td colspan="6">Setting method mode for AI1 4~20mA form<br>1. Switch the corresponding AI1 jumper on the IO board to current;<br>2. Set the function code: P04.07 Unit’s place=0 (default), P04.23=2.00.</td></tr>
<tr><td>P04.27</td><td>Curve B horizontal axis 1</td><td>0.00V～P04.29</td><td rowspan="4"> 

if you want to use 4-20MA,Set 04.27=2.00V<br>Note:input less than P04.27,output decide by curve ten’s digit</td><td>0.00V</td><td>☆</td></tr>
<tr><td>P04.28</td><td>Curve B vertical axis 1</td><td>-100.0%～100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>P04.29</td><td>Curve B horizontal axis 2</td><td>P04.27～10.00V</td><td>10.00V</td><td>☆</td></tr>
<tr><td>P04.30</td><td>Curve B vertical axis 2</td><td>-100.0%～100.0%</td><td>100.0%</td><td>☆</td></tr>
<tr><td colspan="6">Setting method mode for AI2 4~20mA form<br>1. Switch the corresponding AI1 jumper on the IO board to current;<br>2. Set the function code: P04.11 one place=1 (default), P04.27=2.00</td></tr>
<tr><td>P04.31</td><td>Curve C horizontal axis 1</td><td>0.00V～P04.33</td><td></td><td>0.00V</td><td>☆</td></tr>
</table>

<table>
<tr><th>Function code</th><th>Parameter name</th><th colspan="2">Description</th><th>Default</th><th>Property</th></tr>
<tr><td>P04.32</td><td>Curve C vertical axis 1</td><td>-100.0%～100.0%</td><td rowspan="7"> 

Note:input less than P04.31,output decided by curve ten’s digit</td><td>0.0%</td><td>☆</td></tr>
<tr><td>P04.33</td><td>Curve C horizontal axis 2</td><td>P04.31～P04.35</td><td>3.00V</td><td>☆</td></tr>
<tr><td>P04.34</td><td>Curve C vertical axis 2</td><td>-100.0%～100.0%</td><td>30.0%</td><td>☆</td></tr>
<tr><td>P04.35</td><td>Curve C horizontal axis 3</td><td>P04.33～P04.37</td><td>6.00V</td><td>☆</td></tr>
<tr><td>P04.36</td><td>Curve C vertical axis 3</td><td>-100.0%～100.0%</td><td>60.0%</td><td>☆</td></tr>
<tr><td>P04.37</td><td>Curve C horizontal axis 4</td><td>P04.35～10.00V</td><td>10.00V</td><td>☆</td></tr>
<tr><td>P04.38</td><td>Curve C vertical axis 4</td><td>-100.0%～100.0%</td><td>100.0%</td><td>☆</td></tr>
<tr><td>P04.39</td><td>Curve D horizontal axis 1</td><td>0.00V～P04.41</td><td rowspan="7"> 

Note:input less than P04.39,output decided by curve ten’s digit</td><td>0.00V</td><td>☆</td></tr>
<tr><td>P04.40</td><td>Curve D vertical axis 1</td><td>-100.0%～100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>P04.41</td><td>Curve D horizontal axis 2</td><td>P04.39～P04.43</td><td>3.00V</td><td>☆</td></tr>
<tr><td>P04.42</td><td>Curve D vertical axis 2</td><td>-100.0%～100.0%</td><td>30.0%</td><td>☆</td></tr>
<tr><td>P04.43</td><td>Curve D horizontal axis 3</td><td>P04.41～P04.45</td><td>6.00V</td><td>☆</td></tr>
<tr><td>P04.44</td><td>Curve D vertical axis 3</td><td>-100.0%～100.0%</td><td>60.0%</td><td>☆</td></tr>
<tr><td>P04.45</td><td>Curve D horizontal axis 4</td><td>P04.43～10.00V</td><td>10.00V</td><td>☆</td></tr>
<tr><td>P04.46</td><td>Curve D vertical axis 4</td><td>-100.0%～100.0%</td><td>100.0%</td><td>☆</td></tr>
<tr><td colspan="6">Description: The range of HDI, AI1 ~ AI4 mapping curve:<br>➢ For frequency setting, 100% corresponds to the maximum frequency P01.06.<br>➢ For torque setting, 100% corresponds to the maximum torque P14.02.<br>➢ For other uses, see the description of the relevant function.</td></tr>
</table>

| 05 Group Analog and Pulse output | | | | |
|---|---|---|---|---|
| r05.00 | Actual output Pulse frequency | 0.00kHz～50.00kHz | - | ● |
| P05.01 | HDO Pulse Output type | 0：Common numeric output (DO2 P07.02)<br>1：high frequency pulse output (Hdo) | 0 | ☆ |
| P05.02 | HDO output source selection | 0：Running frequency（0～max frequency）<br>1：Set frequency（0～max frequency）<br>2：output current（0～2times motor rated current）<br>3：output torque(0～3times motor rated torque)<br>4：set torque(0～3times motor rated torque)<br>5：output voltage（0～2times motor rated voltage）<br>6: DC bus voltage（0～2times drives standard DC bus voltage）<br>7: output power（0～2times motor rated power）<br>8:encoder rotating speed(0-maximum frequency rotating speed)<br>9: AI1（0.00～10.00V）<br>10: AI2（0.00～10.00V）<br>11: AI3（0.00～10.00V）<br>12: AI4（0.00～10.00V） | 0 | ☆ |
| P05.03 | HDO Minimum output pulse frequency | 0.00kHz～50.00kHz<br>HDO terminal output pulse frequencywhen Output signal source=0 | 1.00kHz | ☆ |
| P05.04 | HDO Max output pulse frequency | 0.00kHz～50.00kHz<br>HDO terminal output pulse frequencywhen Output signal source=maximum value | 30.00kHz | ☆ |
| r05.05 | AO1 actual value | 0.0%～100.0% | - | ● |
| P05.06 | AO1 output function signal selection | **Same as P05.02 function description** | 0 | ☆ |
| P05.07 | AO1 output offset | -100.0%～100.0% | 0.0% | ☆ |
| P05.08 | AO1 output gain | -10.00～10.00 | 1.00 | ☆ |
| The output error of AO1 can be corrected by P05.07 and P05.08, or the mapping relationship between signal source and actual output can be changed. The formula is:<br>AO.c = P05.07 + P05.08 × AO.pAO.c: the actual output of AO1;<br>AO.p: AO1 Value before correction and **AO.c, AO.p, 100.0% of P05.07 corresponds to 10V or 20mA.**<br>**Example: AO1 is set to 4~20mA output:**<br>**1. Switch the corresponding AO1 jumper on the IO board to current**<br>**2. Set the function code: P05.07=20.0%, P05.08=0.80** | | | | |
| r05.09 | AO2 actual value | 0.0%～100.0% | - | ● |
| P05.10 | AO2 output function signal selection | **Same as P05.02 function description** | 0 | ☆ |
| P05.11 | AO2 output offset | -100.0%～100.0% | 0.0% | ☆ |
| P05.12 | AO2 gain | -10.00～10.00 | 1.00 | ☆ |

The output error of AO2 can be corrected by P05.11 and P05.12, or the mapping relationship between signal source and actual output can be changed. The formula is:

AO.c = P05.11 + P05.12 × AO.pAO.c: the actual output of AO2;

AO.p: AO2 value before correction and **AO.c, AO.p, 100.0% of P05.11 corresponds to 10V or 20mA.**

**Example: Such as: AO2 is set to 4~20mA output:**

**1. Switch the corresponding AO2 jumper on the IO board to current**

**2. Set the function code: P05.11=20.0%, P05.12=0.80**

| 06 Group Multi-function Digital input | | | | |
|---|---|---|---|---|
| r06.00 | DI port status | Bit0～Bit8 Correspond to DI1～DI8<br>Bit12～Bit15 Correspond to VDI1～VDI4 | - | ● |
| P06.01 | DI1 Numeric input function | 0：No function<br>1：FORWARD<br>2：Reverse/Forward and reverse switchover<br>3：Three wire control<br>4：Forward jog command<br>5：Reverse jog command<br>6：Terminal UP<br>7：Terminal DOWN<br>8：Clear up UP/DOWN offset<br>9：Coast to stop/free stop<br>10：Fault reset<br>11：Reverse forbidden<br>12：Switching run command to Keypad<br>13：Switching run command to Communication<br>14：fast stop<br>15：external stop<br>16：Switch between motor 1 and motor 2<br>17：Pause operatoin<br>18：DC braking<br>19：Switch between torque and speed Control<br>20：Torque control diabled<br>21：Multi-step speed terminal 1<br>22：Multi-step speed terminal2<br>23：Multi-step speedterminal3<br>24：Multi-step speed terminal4<br>25：Frequency source switchover<br>26：Switch main frequency source to Numeric frequency setting<br>27：Switch main frequency source to AI1<br>28：Switch main frequency source to AI2<br>29：Switch main frequency source to AI3<br>30：Switch main frequency source to AI4<br>31：Switch main frequency source to high- | 1 | ★ |
| P06.02 | DI2 Numeric input function | | 2 | ★ |
| P06.03 | DI3 Numeric input function | | 4 | ★ |
| P06.04 | DI4 Numeric input function | | 10 | ★ |
| P06.05 | DI5(HDI) Numeric input function | | 0 | ★ |
| P06.06 | DI6 Numeric input function（option card） | | 0 | ★ |

| | | | | |
|---|---|---|---|---|
| P06.07 | DI7 Numeric input function（option card） | frequency pulse input<br>32：Switch main frequency source to communication setting<br>33：Switch auxiliary frequency source to numeric frequency setting<br>34：Accel and Decel time terminal 1<br>35：Accel and Decel time termina2<br>36：Accel and Decel Stop<br>37：User-defined fault 1<br>38：User-defined fault 2<br>39：PID pause<br>40：PID integral pause<br>41：PID parameter Switchover<br>42：PID Positive/negative reaction switch<br>43：Preset PID terminal 1<br>44：Preset PID terminal 2<br>45：PID Main and Auxaliary command switch<br>46：PID Main and Auxaliary feedback switch<br>47：Simple PLC status reset<br>48：Simple PLC time stop<br>49：Swing frequency stop<br>50：Counter 1 input<br>51：Counter 1 reset/clear<br>52：Counter 2 input<br>53：Counter 1 reset/clear<br>54：Clear/reset timed running time<br>55：Motor 2 Accel and Decel time selection | 0 | ★ |
| P06.08 | DI8 Numeric input function（option card） | | 0 | ★ |
| P06.09 | DI9 Numeric input function（option card） | | 0 | ★ |
| P06.13 | VDI1 Numeric input function（Virtual DI） | | 0 | ★ |
| P06.14 | VDI2 Numeric input function（Virtual DI） | | 0 | ★ |
| P06.15 | VDI3 Numeric input function（Virtual DI） | | 0 | ★ |
| P06.16 | VDI4 Numeric input function（Virtual DI） | | 0 | ★ |
| P06.17 | Virtual input source | Unit’digit: VDI1 input source<br>0~F: P06.33 specifies the bit0~bit15 of the parameter<br>Ten’s digit: VDI2 input source<br>0~F: P06.34 specifies the bit0~bit15 of the parameter.<br>Hundred’s digit: VDI3 input source<br>0~F: P06.35 specifies the bit0~bit15 of the parameter<br>Thousand’s digit: VDI4 input source<br>0~F: P06.36 specifies the bit0~bit15 of the parameter | 0003 | ★ |
| P06.18 | DI Forcing function | Define as per bit **:Disable;1:Enable**<br>Bit0-bit11:DI1-DI12<br>Bit12-bit15:VDI1-VDI4 | H0000000<br>0<br>L00000000 | ★ |

| | | | | |
|---|---|---|---|---|
| | | When the bit is enabled, the state of the DI or VDI is set by the corresponding bit of P06.19. | | |
| P06.19 | DI Forcing data | Define as per bit 0:effective;1:ineffective<br>Bit0-bit11:DI1-DI12<br>Bit12-bit15:VDI1-VDI4 | 0 | ☆ |
| P06.20 | Effective logic of Numericinput terminal | Define as per bit 0:positive logic;1:negative logic<br>Bit0-bit11:DI1-DI12<br>Bit12-bit15:VDI1-VDI4<br>In the reverse logic, the inactive level of the DI terminal becomes the active level. | 0 | ★ |
| P06.21 | DI1 Effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.22 | DI1 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.23 | DI2 Effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.24 | DI2 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.25 | DI3 Effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.26 | DI3 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.27 | DI4 Effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.28 | DI4 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P06.29 | Two wire/3wire operation control | 0：2-wire mode (FWD+REV)1<br>1：2-wire mode RUN+DIRECTION)2<br>2：3-wire 1(FWD+REV+ENABLE)<br>3：3-wire 2 RUN +FWD/REV+ENABLE | 0 | ★ |

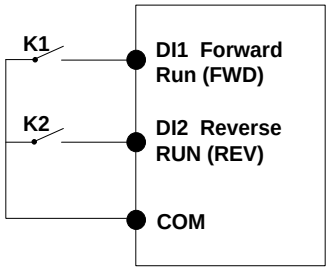



Figure1：Two-line mode 1

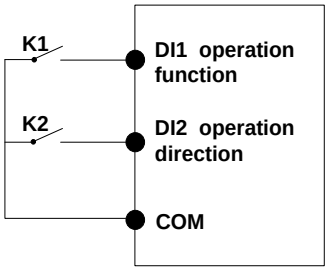



Figure 2：Two-line mode2

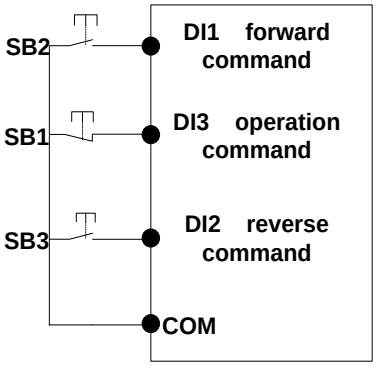



Figure 3：Three-line mode1

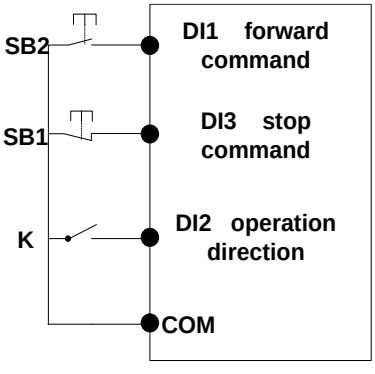



Figure 4：Three-line mode2

**Two-line mode 1:**

K1 is closed, the drive is running forward, K2 closed reverse operation, K1, K2 at the same time closed or disconnected, the inverter stops running.

**Two-line mode 2:**

In K1 closed state, K2 disconnect the inverter forward, K2 closed inverter reverse; K1 off the inverter to stop

running.

**Three-line mode 1:**

DI3 is set to three-wire control function. When the SB1 button is closed, press the SB2 button. The inverter is forward running. Press the SB3 button to invert the inverter. When the SB1 button is off, the inverter will stop. During normal start-up and running, it is necessary to keep the SB1 button closed, and the commands of SB2 and SB3 buttons take effect during the closing operation. The running status of the inverter takes the last key action of the three buttons as the standard.

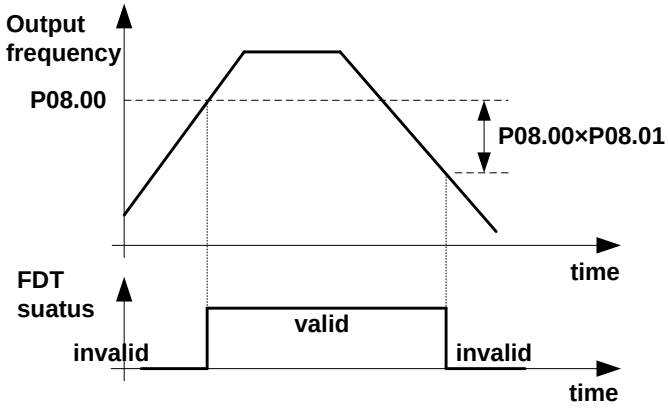
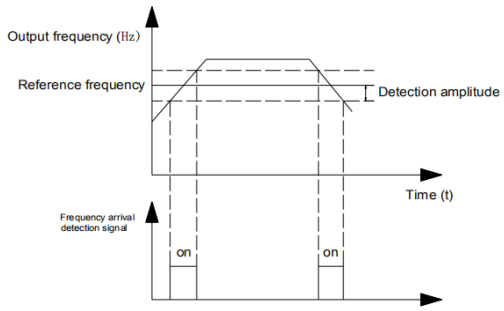
**Three-line mode 2:**

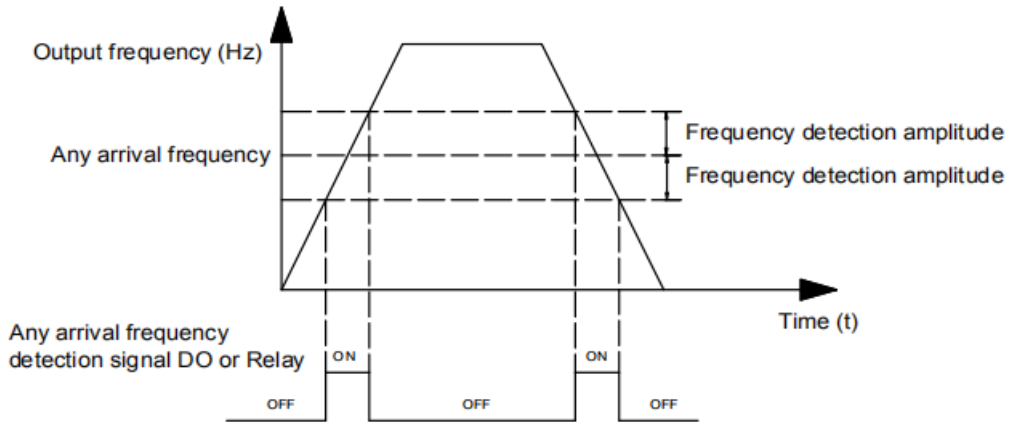
DI3 is set to three-wire control function. When the SB1 button is closed, press the SB2 button to run the inverter, K to switch the inverter forward, K to close the inverter and SB1 to turn off the inverter. During normal start-up and operation, it is necessary to keep the SB1 button closed and the command of the SB2 button effective during the closing operation.

| | | | | |
|---|---|---|---|---|
| P06.30 | Digital input termimal filtering time | 0.000～0.100s<br>Set the sample filter time of DI1~DI4 and HDI terminals. If the interference is strong, increase the parameter to avoid wrong operation. | 0.010s | ☆ |
| **P06.31** | **Terminal protection function** | 0：no protection<br>When command is terminal ,power on and terminal effective,inverter will run<br>1：protection<br>When command is terminal ,power on and terminal effective, inverter will not run ,so need terminal ineffective then effective,then inverter will run | 0 | ★ |
| P06.32 | DI terminal on/ready time | 0.000s～30.000s | 1.000s | ★ |
| P06.33 | VDI1 source | To Select the source of VDI1, Please select the input signal of VDI1 together with the Unit's digit of P06.17. | 06.00 | ★ |
| P06.34 | VDI 2 source | To Select the source of VDI2, Please select the input signal of VDI1 together with the Ten's digit of P06.17. | 06.00 | ★ |
| P06.35 | VDI 3 source | To Select the source of VDI3, Please select the input signal of VDI1 together with the Hundred's digit of P06.17. | 07.00 | ★ |
| P06.36 | VDI 4 source | To Select the source of VDI4, Please select the input signal of VDI1 together with the Thousand's digit of P06.17. | 44.00 | ★ |
| **07 Group Multi-function Digital output** | | | | |
| r07.00 | DO output port status | Define as per bit,<br>0:ineffective 1:effective<br>Bit0:DO1 Bit1:D02 Bit2:relay1, Bit 3:relay 2(option) Bit4: DO3;Bit5: DO4 Bit6: DO5; Bit7: DO6Bit8: VDO1;Bit9: VDO2 | - | ● |

| | | | | |
|---|---|---|---|---|
| P07.01 | DO1 Output terminal function group | 0:No function<br>1:READY<br>2:RUN<br>3:Error1（All fault）<br>4:Error2（Stop fault）<br>5:Error 3 t(fault but It still keeps running)<br>6:Swing frequency limit<br>7:Torque limit<br>8:Reverse running<br>9: Upper limit frequency arrival<br>10:Lower limit frequency arrival 1(not detect when stop)<br>11: Lower limit frequency arrival2(detect when stop)<br>12:FDT1 output frequency detection range<br>13:FDT2 output frequency detection range<br>14:Setting frequency arrival<br>15:Desired frequency attained 1 P08.05<br>16:Desired frequency attained 2P08.07<br>17:Zero speed （stop without output）<br>18: Zero speed （stop with output）<br>19:Zero current status<br>20:Output current exceed limit<br>21:Counter 1 setting value arrival<br>22:Counter 1 setting value arrival<br>23:Simple PLC cycle finish<br>24:Reserved<br>25:Drive overload pre-warning<br>26: Motor overload pre-warning<br>27: Motor overheat pre-warning<br>28:Off loading<br>29:Reserved<br>30:Reserved<br>31: Reserved<br>32:Variable selector unit 1 output<br>33:Variable selector unit 2 output<br>34:Variable selector unit 3 output<br>35:Variable selector unit 4 output<br>36:Logic unit 1 output<br>37:Logic unit 2 output<br>38:Logic unit 3 output<br>39:Logic unit 4 output<br>40:Delaying unit 1 output<br>41:Delaying unit 2 output<br>42: Delaying unit 3 output | 0 | ☆ |
| P07.02 | DO2(HDO) Output terminal function group | | 0 | ☆ |
| P07.03 | Relay 1 Output terminal function group(T1A T1B T1C) | | 3 | ☆ |
| P07.04 | **Relay 2 Output terminal function group(T2A T2B T2C)(Optional)** | | 0 | ☆ |
| P07.05 | DO3 Output terminal function group(IO card) | | 0 | ☆ |
| P07.06 | DO4 Output terminal function group(IO card) | | 0 | ☆ |
| P07.07 | DO5 Output terminal function group(IO card) | | 0 | ☆ |

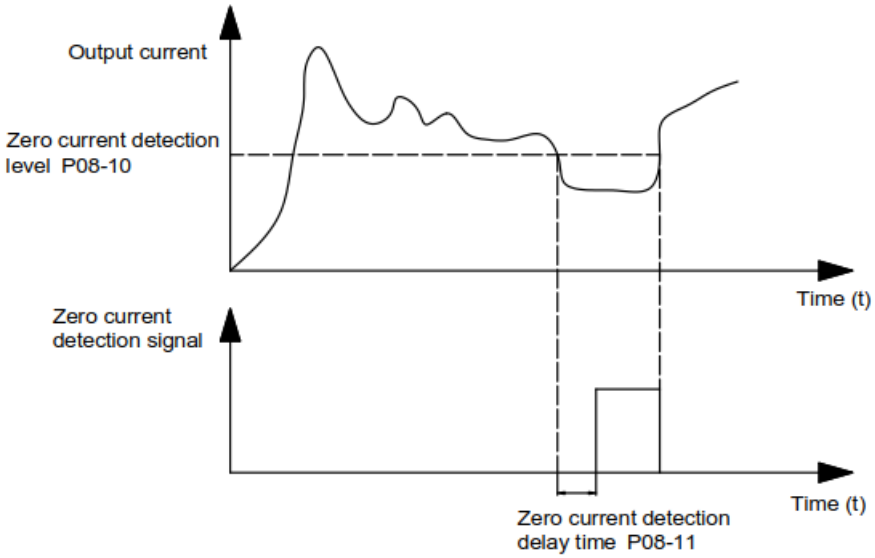
| | | | | |
|---|---|---|---|---|
| P07.08 | DO6 Output terminal function group(IO card) | 43: Delaying unit 4 output<br>44: Reserved<br>45: Reserved | 0 | ☆ |
| P07.09 | VDO1(virtual DO1) output Terminal function | | 0 | ☆ |
| P07.10 | VDO2(virtual DO2) output Terminal function | | 0 | ☆ |
| P07.11 | Output logic negative | Define as per bit O:off;1:on(negative)<br>Bit0:DO1<br>Bit1:DO2<br>Bit2:Relay 1<br>Bit3: Relay 2(option)<br>Bit4: DO3;Bit5: DO4 Bit6: DO5; Bit7: DO6<br>Bit8: VDO1;Bit9: VDO2<br>Notice:posive logic equivalent to Normal open point<br>And negative logic equivalent to Normal close point | 0 | ☆ |
| P07.12 | DO1 effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.13 | DO1 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.14 | DO2 effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.15 | DO2 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.16 | Relay 1 effective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.17 | Relay 1 ineffective delay time | 0.000s～30.000s | 0.000s | ☆ |
| P07.18 | Relay 2 effective delay time | 0.000s～30.000s relay 2 as option | 0.000s | ☆ |
| P07.19 | Relay 2 ineffective delay time | 0.000s～30.000s relay 2 as option | 0.000s | ☆ |

| 08 Group Digital output setting | | | | |
|---|---|---|---|---|
| P08.00 | Frequency detection value (FDT1) | 0.00Hz～maximum frequency(P01.06) | 50.00Hz | ☆ |
| P08.01 | Frequency detection hysteresis 1 | 0.0%～100.0% FDT1 | 5.0% | ☆ |
| P08.02 | Frequency detection value 2(FDT2) | 0.00Hz～maximum frequency(P01.06) | 50.00Hz | ☆ |
| P08.03 | Frequency detection hysteresis 2 | 0.0%～100.0% FDT2(P08.02) | 5.0% | ☆ |
| FDT is used to check inverter output frequency,when output frequency is greater than frequency detection value,FDT effective,when output frequency is less than frequency detection value*(1- Frequency detection hysteresis),FDT ineffective;whenoutput frequency is between the above two,FDT output keep no change,following is FDT chart<br>  <br> | | | | |
| P08.04 | Detection range of frequency arrival | 0.0%～100.0% maximum frequency (P01.06)<br>When output frequency is between command frequency ±P08.04*P01.06,corresponding DO output effective signal<br>  <br> | 3.0% | ☆ |
| P08.05 | Desired frequency attained 1 | 0.00Hz～maximum frequency (P01.06) | 50.00Hz | ☆ |
| P08.06 | Any frequency reaching detection amplitude 1 | 0.0%～100.0% maximum frequency (P01.06) | 3.0% | ☆ |
| P08.07 | Desired frequency attained2 | 0.00Hz～maximum frequency(P01.06) | 50.00Hz | ☆ |
| P08.08 | Any frequency reaching detection amplitude 2 | 0.0%～100.0% maximum frequency (P01.06) | 3.0% | ☆ |
| When the output frequency reaches positive or negative detection amplitude of frequency detection value, DO outputs ON signal. VFD500 series inverter provides two parameters of any arrival frequency detection value, used to set frequency value and frequency detection range. | | | | |



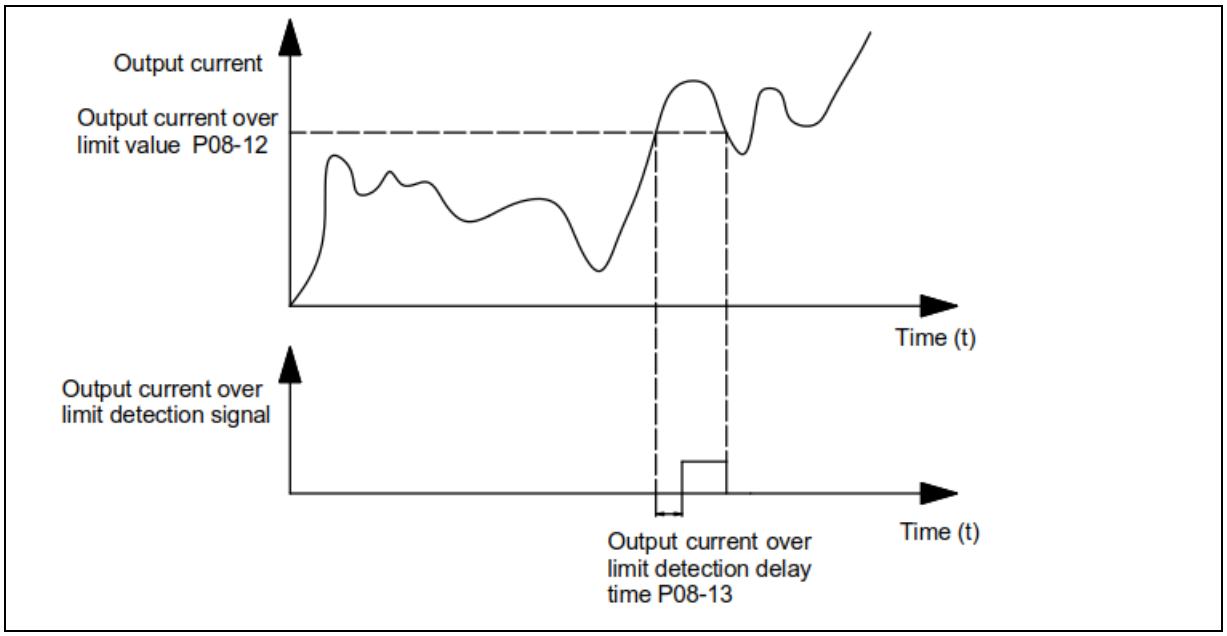

| | | | | |
|---|---|---|---|---|
| P08.09 | Zero speed detection amplitude | 0.00H～5.00Hz | 0.25Hz | ☆ |
| P08.10 | Zero current detection level | 0.0%～100.0% rated motor current | 5.0% | ☆ |
| P08.11 | Zero current detection delay time | 0.000～30.000s<br>0.000～30.000s<br>Notice：When output current≤P08.10 and endure P08.11 time,corresponding DO output effective signal | 0.100s | ☆ |

When the output current ≤ zero current detection level, lasts for longer than zero current detection delay time, DO terminal outputs ON signal.




| | | | | |
|---|---|---|---|---|
| P08.12 | Output overcurrent threshold | 0.0%～300.0%<br>motor rated time | 200.0% | ☆ |
| P08.13 | Overcurrent detection delay time | 0.000～30.000sNotice：When output current≥P08.12 and endure P08.13 time,corresponding DO output effective signal | 0.100s | ☆ |

When the output current is bigger than or over-limit detection point, lasts for longer than software over current point detection delay time, DO terminal outputs ON signal.


Output current
Output current over limit value P08-12
Time (t)
Output current over limit detection signal
Time (t)
Output current over limit detection delay time P08-13

| 10 Group encoder type | | | | |
|---|---|---|---|---|
| P10.01 | Encoder type | 0: ABZ<br>1: ABZUVW<br>2: Rotary/resolver<br>3: sin/cos encoder<br>➢ Consult factory when need PG card | 0 | ★ |
| P10.02 | Encoder line number | 1～65535<br>Rotary pulse number: 1024× rotary pair of poles | 1024 | ★ |
| P10.03 | AB pulse direction | 0: forward， 1: reverse<br>➢ If control mode is VC (with PG card)we can get this value by auto tuning for motor<br>➢ We can run motor with open loop,and observe r10.12 and r27.00 if they are in the same direction,if not,then change this value | 0 | ★ |
| P10.07 | Rotating ratio molecule between motor and encoder | 1～65535 | 1000 | ★ |
| P10.08 | Rotating ratio demonimator between motor and encoder | 1～65535 | 1000 | ★ |
| When encoder is not installed on the motor rotor axis,asynchronous motor vector control with encoder is effective by setting motor and encoder rotating speed ratio (P10.07 and P10.08)<br><br>$\text{motor rotating speed} = \frac{P10.07}{P10.08} \times \text{encoder speed}$<br><br>For example：if motor rotating speed is 1500RPM and encoder speed 1000RPM，set P10.07=1500，P10.08=1000。 | | | | |
| P10.09 | Encoder offline detection time | 0.0(not detecting)～10.0s | 2.0 | ★ |
| P10.11 | Encoder rotation filter time | 0～32 speed loop control cycle | 1 | ★ |
| r10.12 | encoder feedback rotating speed | Current rotating speed by measuing, unit: 0.01Hz/1Rpm<br>➢ unit set by P21.17。<br>➢ no symbolic number，Function code r27.02:Bit5 for direction；keypad indicator 【REV】indicate direction | - | ● |
| r10.13 | Encoder current position | 0 ～ 4*encoder pulse number -1<br>encoder current position refer Z pulse as zero point,motor forward running and one cyle to Z pulse ,then postion to zero | - | ● |
| r10.14 | Z pulse marking value | 0 ～ 4*encoder pulse number-1<br>(it is used to monitor encoder slipping and AB being disturbed ) | - | ● |

| 11 Group Motor 1 Parameter | | | | |
|---|---|---|---|---|
| r11.00 | Motor type | 0：AC asynchronous motor<br>1：Synchronous motor(Special software)<br>See appendix parameter | 0 | ● |
| **P11.02** | **Motor rated power** | 0.1kW～800.0kW<br>➢ when power is less than 1kw ,0.75kw set to 0.8 as per round up principle ,0.55kw motor set 0.6<br>➢ when change motor rated power,AC drive will automatically set other parameter of motor name plate and motor model parameter **be careful to use** | Depend | ★ |
| **P11.03** | **Motor rated voltage** | 10V～2000V | Depend | ★ |
| **P11.04** | **Motor rated current** | P11.02<30kW：0.01A<br>P11.02>=30kW：0.1A | Depend | ★ |
| **P11.05** | **Motor rated frequency** | 1.00Hz～600.00Hz | 50.00Hz | ★ |
| **P11.06** | **Motor rated RPM** | 1～60000rpm | Depend | ★ |
| P11.07 | Motor rated power factor | 0.500～1.000 | Depend | ★ |
| r11.08 | Motor rated torque | Read only,0.1Nm(P11.02<30KW);<br>1Nm(P11.02>30KW) | - | ● |
| r11.09 | Number of motor 1 pairs of pole | Read only,It will auto calculate as per motor rated frequency and rated rotating speed | - | ● |
| **P11.10** | **Auto-tune/self-learning** | 0：no auto tuning<br>1：Stationary auto tuning of Asynchronous motor<br>It is suitable in the cases when the motor can not de-couple form the load. The auto tuning for the motor parameter will impact the control accuracy.<br><br>2：dynamic or Rotational auto tuning of Asynchronous motor<br>Comprehensive motor parameter autotune<br>It is recommended to use rotation auto tuning when high control accuracy is needed. | 0 | ★ |

1: Stationary auto tuning of Asynchronous motor

When do auto tuning ,motor stationary ,it can get parameter P11.11 ～P11.13。

Static self-learning can not learn all the motor parameters, so the control performance is difficult to achieve the best; if the motor nameplate information is incomplete, or the motor is not a 4-pole 50Hz GB motor, it is recommended to perform "rotation self-learning".

In the case of limited rotation, such as limited travel, limited load (crane), limited running direction, etc., static self-learning is used.

2: Rotatoinal auto tuning of Asynchronous motor

When do auto tuning ,motor first stationary and rotary, ,it can get parameter P11.11～P11.18，as to close loop contro,it can get P10.03 encoder directioin

| | | | | |
|---|---|---|---|---|
| When rotating self-learning, the motor will rotate forward and the speed can reach 50%~100% of the rated speed. The lighter the load during self-learning, the better the learning effect.<br>note:<br>Notice: **it can do motor auto tune when command source is keypad**<br>**Please self-learn when the motor is cold. Make sure the motor is at rest before learning!**<br>Please confirm that the motor nameplate parameters have been set before self-learning. For closed-loop control, you should also set the encoder parameters!<br>After setting this parameter, press the **"RUN"** button on the keyboard, the self-learning will start, and the inverter will stop itself after the self-learning is completed. | | | | |
| P11.11 | Stator resistor of Asynchronous motor | Unit:0.001Ω(P11.02<30kW)<br>Unit:0.01mΩ(P11.02>=30kW) | Depend | ★ |
| P11.12 | Rotor resistor of Asychronous motor | Unit:0.001Ω(P11.02<30kW)<br>Unit:0.01mΩ(P11.02>=30kW) | Depend | ★ |
| P11.13 | Leakage inductance of Asychronous motor | Unit:0.01mH(P11.02<30kW)<br>Unit:0.001mH(P11.02>=30kW) | Depend | ★ |
| P11.14 | Mutual inductance of Asynchronous motor | Unit:0.1mH(P11.02<30kW)<br>Unit:0.01mH(P11.02>=30kW) | Depend | ★ |
| P11.15 | No-load excitation current of Asynchronous motor | Unit:0.01AP11.02(<30kW)<br>Unit:0.1A(P11.02>=30kW) | Depend | ★ |
| P11.16 | Excitation saturation factor 1 | At non rated-excitation status | 1.100 | ★ |
| P11.17 | Excitation saturation factor 2 | At non rated-excitation status | 0.900 | ★ |
| P11.18 | Excitation saturation factor3 | At non rated-excitation status | 0.800 | ★ |

| 12 Group Motor 1 VF control parameter | | | | |
|---|---|---|---|---|
| P12.00 | VF curve | 0：linear VF<br>1：Multi-point VF<br>2：VF to the 1.3<br>3：1.7 power<br>4：2.0 power<br>5：VF complete separation<br>6：VF Half separation | 0 | ★ |

- When the VF curve is straight line and power curve, the frequency-voltage curve is as follows:

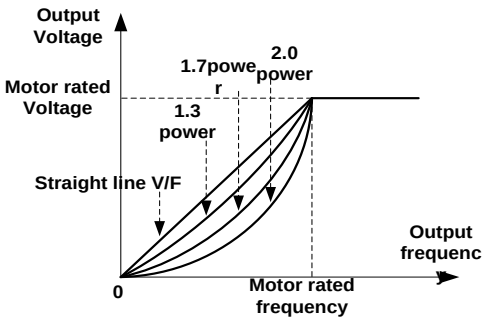



Figure 1：Straight line VF and 1.3、1.7、2.0 power VF

- Multi-stage line type VF curve：

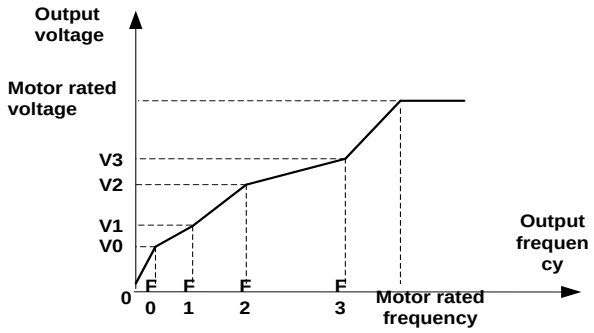



Figure 2： multi-stage line type VF curve

- VF full separation

The output voltage and output frequency are completely independent. The output frequency is determined by the frequency source. The output voltage is determined by P12.20. Suitable for applications such as variable frequency power or torque motors.

- VF semi-isolated

At this point the ratio of output voltage and output frequency given by the voltage source, the formula is as follows:：

$$\text{output voltage}=2 \times \text{Voltage source given} \times \text{output frequency} \times \frac{\text{motor rated voltage}}{\text{motor rated frequency}}$$

| | | | | |
|---|---|---|---|---|
| P12.01 | Multi-point VF Frequency 1(F0) | 0.00Hz～multi-point VF curve F1(P12.03) | 0.00Hz | ☆ |
| P12.02 | Multi-point VF Voltage 0(V0) | 0.0%～100.0% | 0.0% | ☆ |
| P12.03 | Multi-point VF Frequency 1(F1) | multi-point VF curve F0(P12.01)～multi-point VF curve F2(P12.05) | 50.00Hz | ☆ |
| P12.04 | Multi-point VF Voltage 1(V1) | 0.0%～100.0% | 100.0% | ☆ |

| | | | | |
|---|---|---|---|---|
| P12.05 | Multi-point VF Frequency 1(F2) | multi-point VF curve F1(P12.03)～multi-point VF curve F3(P12.08) | 50.00Hz | ☆ |
| P12.06 | Multi-point VF Voltage 2(V2) | 0.0%～100.0% | 100.0% | ☆ |
| P12.07 | Multi-point VF Frequency 3(F3) | multi-point VF curveF2(P12.05)～600.00Hz | 50.00Hz | ☆ |
| P12.08 | Multi-point VFVoltage 3(V3) | 0.0%～100.0% | 100.0% | ☆ |
| **P12.09** | **Torque boost** | 0%～200% 0% is automatic torque boost | 0% | ☆ |

- Automatic torque boost

When P12.09=0=Automatic torque boost,inverter will automatically compensate output voltage to improve torque in low frequency as per actual load ,it is useful for linear VF curve

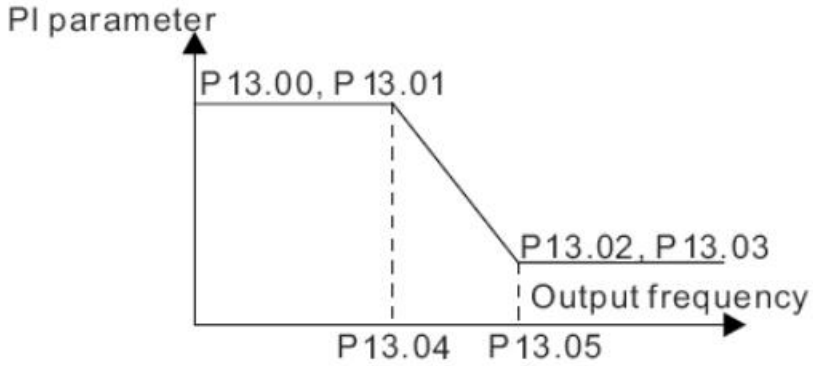
- Manual torque boost
- When P12.09 not 0,it means manual torque output.Output frequency 0 torque increasing value=p12.09*motor stator resistance *rated excitation current,,increasing value will be gradully decreased as frequency increase ,if higher than 50% of motor rated frequency,increasing value will be zero
- Notice:manual torque boost is useful to linear and power curve

| | | | | |
|---|---|---|---|---|
| P12.11 | Slip compensation gain | 0～200%<br>It is used to compensate the speed drop of the asynchronous motor VF control with load, and improve the speed control accuracy. Please adjust according to the following principles:<br>● Increase the setting when the motor speed is lower than the target value with loading.<br>● Reduce this setting when the motor speed is higher than the target value with loading, | 100% | ☆ |
| P12.12 | Slip compensation filter time | 0.01s～10.00s<br>It is used to adjust the speed and stability of the VF control response to the load.<br>● Decrease this setting when the load response is slow.<br>● Increase this setting when the speed is unstable | 1.00s | ☆ |
| P12.13 | Oscillation suppression gains | 0～2000<br>In the SVPWM control mode, current fluctuation may occur to the motor on some frequency, especially the motor with big power. The motor can not run stably or overcurrent may occur. These phenomena can be canceled by adjusting thisparameter. | 300 | ☆ |
| P12.14 | Oscillation suppression effective frequency range | Oscillation suppression effective range :100%～1200%<br>Set the range of the oscillation suppression function, 100% corresponds to the rated | 110% | ☆ |

| | | | | |
|---|---|---|---|---|
| | | frequency of the motor | | |
| **P12.15** | **Current limit function selection** | 0：ineffective<br>1：only adjust output voltage(Current limiting for general VF separation)<br>2：adjust output frequency | 2 | ★ |
| **P12.16** | **Current limit level** | 20%～180% drive rated current | 150% | ☆ |
| P12.17 | Weak magnetic zone current limit factor | optimize dynamic performance of Weak magnetic zone,10%～100% | 0.60 | ☆ |
| P12.20 | Voltage source for VF separation | 0：digital setting<br>1：AI1<br>2：AI2<br>3：AI3(IO expansion board)<br>4：AI4(IO expansion board)<br>5：HDI<br>6：Reserved<br>7：communication<br>8：PID | 0 | ★ |
| P12.21 | Digital setting for VF separation voltage | 0.0%～100.0% | 0.0% | ☆ |
| P12.22 | VF separation voltage Accel and Decel time | 0.00s～60.00s | 1.00s | ☆ |
| P12.23 | VF Separation voltage rates as per time | VF Separation Voltage variation every hour range:-100.00%～100.00% | 0.0% | ☆ |

| 13 Group Motor 1 vector control | | | | |
|---|---|---|---|---|
| P13.00 | Speed Proportional Gain ASR_P1 | 0.1～100.0 | 12.0 | ☆ |
| P13.01 | Speed Integral Time constant ASR_T1 | 0.001s～30.000s | 0.200s | ☆ |
| P13.02 | Speed Proportional Gain ASR_P2 | 0.1～100.0 | 10.0 | ☆ |
| P13.03 | Speed Integral Time constant ASR_T1 | 0.001s～30.000s | 0.500s | ☆ |
| P13.04 | ASR parameter Switching frequency 1 | 0.00Hz～ ASR switching frequency 2(P13.05) | 5.00Hz | ☆ |
| P13.05 | ASR parameter Switching frequency 2 | ASR switching frequency 1～600.00Hz(P13.04) | 10.00Hz | ☆ |

By setting the speed factor and integration time of the speed regulator, you can adjust
Section vector controlled speed loop dynamic response characteristics. Increase the proportional gain and reduce
The integration time can speed up the dynamic response of the speed loop, but the proportional gain is too large
Or the integration time is too small, it is easy to cause the system to oscillate, and the overshoot is too large.
Proportion increase
Too small is also likely to cause steady-state oscillations of the system, and there may be a speed difference.




PI has a close relationship with the inertia of the system. Adjust on the base of PI according to different loads to meet various demands.

P13.00 and P13.01 are Speed adjuster parameter for low-speed use,scope of action from zero to P13.04
P13.02 and P13.03 are Speed adjuster parameter for high-speed use,scope of action from P13.05 to maximum frequency
P13.04-P13.05 Two sets of parameter for linear tansitions

| | | | | |
|---|---|---|---|---|
| P13.06 | Speed control torque limit source selection | Unit's digit：Electric torque limit source<br>0:Digital setting<br>1:Ai1<br>2:Ai2<br>3:AI3((IO expansion board)<br>4:AI4(IO expansion board)<br>5: HDI<br>6:Communication | 00 | ★ |

| | | | | |
|---|---|---|---|---|
| | | Ten'unit：Electric torque limit source<br>Same as unit'digit | | |
| P13.07 | Electric torque limit | 0.0%～300.0% | 160.0% | ☆ |
| P13.08 | Upper limit of brake torque | 0.0%～300.0% | 160.0% | ☆ |
| P13.12 | Torque current directives filter time | Unit：current loop adjust cycle ,0～100 | 2 | ☆ |
| P13.13 | ACR Proportional Gain1 | 0.01～1000 | 300 | ☆ |
| P13.14 | ACR Integral Time1 | 0.01～300.00ms | 10.00ms | ☆ |
| P13.15 | ACR Proportional Gain2 | 0.01～1000 | 300 | ☆ |
| P13.16 | ACR Integral Time2 | 0.01～300.00ms | 10.00ms | ☆ |
| ACR：Automatic current regulator.<br>ACR parameters adjust the PI adjustment parameter of the current loop which affects the dynamic response speed and control accuracy directly. Generally, users do not need to change the default value;<br>Only apply to the vector control mode without PG card (P00.04=0). | | | | |
| P13.17 | Voltage feedforward Gain | 0～100improve the dynamic response of vector control, | 0 | ★ |
| P13.19 | Voltage margin | 0.0%～50.0%improve the dynamic response of weak magnetic curvature. | 3% | ☆ |
| P13.20 | Flux weakening adjuster integral time | 0.001s-5.000s | 0.010s | ☆ |
| P13.21 | Proportional gain of field weakening regulator | 0.000~2.000 | 0.100 | ☆ |
| P13.22 | Slip compensation | 50%-200%<br>For sensorless vector control, this parameter is used to adjust the speed stabilizing precision of the motor.<br>When the speed is too low due to heavy load of motor, this parameter needs to be enlarged, vice versa. | 100% | ☆ |
| P13.23 | SVC zero speed directives | 0:No action 1:Output DC current | 0 | ★ |

| 14 Group Torque control | | | | |
|---|---|---|---|---|
| **P14.00** | **Torque control input source** | 0：Digital setting(P14.01)<br>1：AI1<br>2：AI2<br>3：AI3(IO expansion board)<br>4：AI4(IO expansion board)<br>5：HDI<br>6：Communication | 0 | ★ |
| **P14.01** | **Torque digital setting** | -200.0～200.0%<br>The torque reference greater than 0 indicates that the direction of the torque is the same as the forward direction of the motor; less than 0 indicates that the direction of the torque is the same as the reverse direction of the motor. | 0 | ☆ |
| P14.02 | Maximum torque | Benchmark 10.0%～300.0%<br>Notice:It is torque benchmarks as torque reference for analog inputs and high frequency pulse input also it is the ultimate output torque during torque control. | 200.0% | ★ |
| P14.03 | Torque Acceleration time | 0.000s～60.000s<br>Notice:Torque reference time from zero to motor rated torque | 0.100s | ☆ |
| P14.04 | Torque control Deceleration time | 0.000s～60.000s<br>Notice:Torque given time from motor rated torque to zero | 0.100s | ☆ |
| P14.05 | Speed limit source | Units: speed limit source selection<br>0: Digital setting (P14.06)<br>1: AI1<br>2: AI2<br>3: AI3 (expansion card)<br>4: AI4 (expansion card)<br>5: HDI<br>6: Communication<br>Ten's place: speed limit source symbol<br>0: unsigned<br>1: Signed | 0 | ★ |
| P14.06 | Digital setting of forward speed limit value | Relative to the maximum frequency: 0.00%～100.00% | 100.0% | ☆ |
| P14.07 | Digital setting of reverse speed limit value | Relative to maximum frequency：0.0%～100.0% | 100.0% | ☆ |
| P14.08 | Torque setting over limit speed | 0: Symmetrical torque command<br>After the motor speed exceeds the speed limit value, the torque input source sets the absolute value of the torque reference, and the direction of the torque is always the braking force.<br>1: Enter speed mode<br>After the motor speed exceeds the speed limit | 0 | ★ |

| | | | | |
|---|---|---|---|---|
| | | value, enter the speed mode, and the inverter will limit the speed to within the speed limit value as much as possible. | | |
| P14.10 | Static friction torque | 0.0%～50.0% | 10.0% | ☆ |
| P14.11 | Static friction torque compensation | 0.00Hz～50.00Hz<br>It is used to overcome the static friction force at the start, and the speed is higher than P14.11 and the static friction torque compensation is cancelled. | 1.00Hz | ★ |
| P14.12 | Dynamic friction factor | 0.0%～50.0%<br>Dynamic friction at rated speed<br>Notice: motor sliding friction torque at rated rotating speed | 0.0% | ☆ |
| P14.13 | Dynamic friction starting value | 0.0%～50.0% | 0.0% | ☆ |
| P14.15 | Torque control upper limit frequency acceleration time | 0.00~655.35 | 0.00 | ☆ |
| P14.16 | Torque control upper limit frequency deceleration time | 0.00~655.35 | 0.00 | ☆ |

| **16 Group Energy saving control** | | | | |
|---|---|---|---|---|
| r16.00 | Electricity meter count (32BIT) | Unit:KW/H | - | ● |
| r16.02 | Output power | Unit:0.1kw,output power will be negative in regen state | - | ● |
| r16.03 | Power factor | -1.000～1.000 | - | ● |
| P16.04 | Electricity meter zero clearing | 0:no function；1111：clear to zero | 0 | ☆ |
| **P16.05** | **Energy saving control** | 0：disable<br>1：enable | 0 | ★ |
| **P16.06** | **Energy saving voltage limit** | 0%～50%(0% means **Energy saving control** disable and more than 0% means **Energy saving control** enable | 0% | ☆ |
| P16.07 | Energy saving filter time | 0.0～10.0s | 2.0s | ☆ |
| Notice:P16.05 is invisible(it is useful in vf control) and When energy saving enabled, the output current can be reduced and thepower loss can be reduced when the load is light.For example, the fan and pump is light loaded, most of the inverters do not have this function, so we are more energy efficient. Energy savings can be achieved when it is light loads or load changes so slow | | | | |

| 20 Group User-defined function code menu | | | | |
|---|---|---|---|---|
| P20.00 | User-defined function code 0 | **The value is the function code number, ranging from 00.00 to 63.99.**<br><br>**Example: If you want to display P03.01 and P13.00 in the user-defined menu mode (-USr-), set P20.00=03.01, P20.01=13.00** | 00.00 | ☆ |
| P20.01 | User-defined function code 1 | | 00.00 | ☆ |
| P20.02 | User-defined function code 2 | | 00.00 | ☆ |
| P20.03 | User-defined function code 3 | | 00.00 | ☆ |
| P20.04 | User-defined function code 4 | | 00.00 | ☆ |
| P20.05 | User-defined function code 5 | | 00.00 | ☆ |
| P20.06 | User-defined function code 6 | | 00.00 | ☆ |
| P20.07 | User-defined function code 7 | | 00.00 | ☆ |
| P20.08 | User-defined function code 8 | | 00.00 | ☆ |
| P20.09 | User-defined function code 9 | | 00.00 | ☆ |
| P20.10 | User-defined function code 10 | | 00.00 | ☆ |
| P20.11 | User-defined function code 11 | | 00.00 | ☆ |
| P20.12 | User-defined function code 12 | | 00.00 | ☆ |
| P20.13 | User-defined function code 13 | | 00.00 | ☆ |
| P20.14 | User-defined function code 14 | | 00.00 | ☆ |
| P20.15 | User-defined function code 15 | | 00.00 | ☆ |
| P20.16 | User-defined function code 16 | | 00.00 | ☆ |
| P20.17 | User-defined function code 17 | | 00.00 | ☆ |
| P20.18 | User-defined function code 18 | | 00.00 | ☆ |
| P20.19 | User-defined function code 19 | | 00.00 | ☆ |
| P20.20 | User-defined function code 20 | | 00.00 | ☆ |
| P20.21 | User-defined function code 21 | | 00.00 | ☆ |

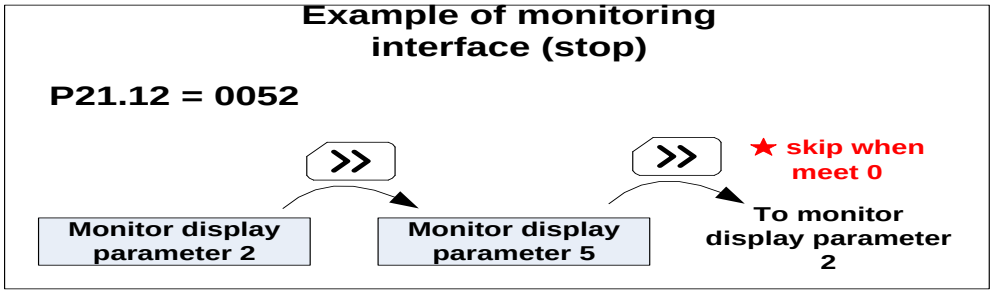
| | | | | |
|---|---|---|---|---|
| P20.22 | User-defined function code 22 | **The value is the function code number, ranging from 00.00 to 63.99.**<br><br>**Example: If you want to display P03.01 and P13.00 in the user-defined menu mode (-USr-), set P20.00=03.01, P20.01=13.00** | 00.00 | ☆ |
| P20.23 | User-defined function code 23 | | 00.00 | ☆ |
| P20.24 | User-defined function code 24 | | 00.00 | ☆ |
| P20.25 | User-defined function code 25 | | 00.00 | ☆ |
| P20.26 | User-defined function code 26 | | 00.00 | ☆ |
| P20.27 | User-defined function code 27 | | 00.00 | ☆ |
| P20.28 | User-defined function code 28 | | 00.00 | ☆ |
| P20.29 | User-defined function code 29 | | 00.00 | ☆ |
| P20.30 | User-defined function code 30 | | 00.00 | ☆ |
| P20.31 | User-defined function code 31 | | 00.00 | ☆ |
| P20.32 | User-defined function code 32 | | 00.00 | ☆ |
| P20.33 | User-defined function code 33 | | 00.00 | ☆ |
| P20.34 | User-defined function code 34 | | 00.00 | ☆ |
| P20.35 | User-defined function code 35 | | 00.00 | ☆ |
| P20.36 | User-defined function code 36 | | 00.00 | ☆ |
| P20.37 | User-defined function code 37 | | 00.00 | ☆ |
| P20.38 | User-defined function code 38 | | 00.00 | ☆ |
| P20.38 | User-defined function code 39 | | 00.00 | ☆ |
| P20.39 | User-defined function code 39 | | 00.00 | ☆ |

| 21 Group Keypad and Display Group | | | | |
|---|---|---|---|---|
| P21.00 | **Keyboard UP/DOWN function** | Units: UP/DOWN enable selection 0: Disable 1: Enable<br>Ten'unit: clear selection 0: Cleared in non-operational state 1: Not cleared<br>Hundred's unit: Power-down memory selection 0: no memory 1: memory<br>Thousand's unit: rate selection 0: automatic rate 1: P01.39 rate | 0111 | ★ |
| **P21.02** | **MK function option** | 0：no function; 1：Forward Jog<br>2：Reverse Jog; 3：Forward/reverse Switch<br>4：Quick stop; 5：coast to stop<br>**6：Curse left shift(LCD keypad )** | 1 | ★ |
| **P21.03** | **STOP function** | 0:Valid only at Keypad Control<br>1:valid at all command Channels | 1 | ☆ |
| P21.04 | Monitoring display1 | 00.00～99.99 | 27.00 | ☆ |
| P21.05 | Monitoring display2 | 00.00～99.99 | 27.01 | ☆ |
| P21.06 | Monitoring display3 | 00.00～99.99 | 27.06 | ☆ |
| P21.07 | Monitoring display4 | 00.00～99.99 | 27.05 | ☆ |
| P21.08 | Monitoring display5 | 00.00～99.99 | 27.03 | ☆ |
| P21.09 | Monitoring display6 | 00.00～99.99 | 27.08 | ☆ |
| P21.10 | Monitoring display7 | 00.00～99.99 | 06.00 | ☆ |
| P21.11 | Running status Monitoring display parameter option | Unit'digit to Thousand'digit set 1-4 monitor parameter<br>0 means no display，1～7 corresponds to monitor parameter 1～7<br>Unit'digit：choose first monitoring data，0～7<br>Ten's digit：choose second monitoring data，0～7<br>Hundred's digit：choose third monitoring data，0～7<br>Thousand's digit：choose fourth monitoring display，0～7 | 5321 | ☆ |
| P21.22 | Stop status Monitoring display parameter option | Same as P21.11 | 0052 | ☆ |

VFD500 digital keyboard monitoring interface supports up to 4 monitoring volume. Monitoring variables in running status and monitoring variables in stop status are set by P21.11 and P21.12, respectively. Press 【SHIFT】 key on the keyboard to switch the monitoring volume from low to high of P21.11 or P21.12, Encountered "0" then skip, cycle monitoring.

Take the shutdown monitoring interface for example, P21.12 = 0052, there are 2 monitoring variables, which are r27.01 (monitor display parameter 2, P21.05 = 27.01) and r27.03 (monitor display parameter 5, P21.08 =

27.03), press the 【SHIFT】 key on the keyboard to switch between the two monitors, as shown below.




The rules for running the monitoring interface are the same as the shutdown monitoring interface, and will not be repeated

| | | | | |
|---|---|---|---|---|
| P21.13 | Digital keypad personalized setting | **Unit's digit: quick editing function selection**<br>**0: invalid**<br>1：Numeric frequency setting<br>2：Numeric torque setting<br>3：PID digital setting 0<br>Note: The quick editing function means that if the current monitoring value is the output frequency or command frequency under the monitoring status, press the [ENTER] key to enter the parameter editing interface directly. The edited parameters are set by the ones digit of this function code.<br>**Ten's digit: monitor pointer reset selection**<br>0: When the display status is in the monitoring status from other status, or when the running monitoring status and stop monitoring status are switched, the previously recorded monitoring pointer position will be restored.<br>1: When the display status is in the monitoring status by other status, or when the monitoring status of running status and stop status are switched, the monitor pointer will be reset to the ones of P21.11 or P21.12.<br>**Note: when power-on, the shutdown monitoring pointer points to the P21.12 bits, the operation monitoring pointer points to P21.11 bits** | 01 | ★ |
| P21.14 | Load speed display factor | 0.001～65.000 | 30.000 | ☆ |
| P21.15 | Load speed decimal point digit | 0～3 | 0 | ☆ |
| r21.16 | Load speed display | Load speed =P27.00*P21.10<br>Decimal point digit defined by P21.11 | - | ● |
| P21.17 | Speed display unit | 0：0.01Hz；1: 1Rpm<br>➢ Display unit for selecting P00.07, r27.00, r27.01, r10.12 | 0 | ★ |

| 22 Group AC drive data and configuration | | | | |
|---|---|---|---|---|
| **P22.00** | **Carrier/swithcing frequency** | Depend on drives power<br>≤7.5kW: 1kHz～12.0kHz<br>11kW～45kW: 1kHz～8kHz<br>≥55kw: 1kHz～4kHz<br>The carrier frequency can be reduced when it came like following phenomenon:<br>1 The leakage current generated by the inverter is large<br>2 The interference generated by the inverter has an impact on peripheral devices<br>3 Long wiring distance between inverter and motor<br>The carrier frequency can be increased whenwhen it came like following phenomenon:<br>1 The electromagnetic noise generated by the motor is large | Depend | ☆ |
| Carrier frequency will affect the noise of motor and the EMI of inverter.<br>If the carrier frequency is increased, it will cause better current wave, less harmonic current and lower noise of motor.<br>Notice:<br>The factory default is optimal in most cases. Modification of this parameter is not recommended.<br>If the carrier frequency exceeds the factory default, the inverter must be derated because the higher carrier frequency will cause more switching loss, higher temperature rise of inverter and stronger electromagnetic interference.<br>If the carrier frequency is lower than the factory default, it is possible to cause less output torque of motor and more harmonic current. | | | | |
| P22.01 | Carrier frequency adjustment | Unit'digit：adjustment as per Rotation<br>0:No；1:Yes<br>Ten'digit：adjustment as per Temperature<br>0 no；1：yes<br>The inverter can automatically adjust the carrier frequency according to its temperature. This function can reduce the possibility of overheat alarm of the inverter. | 00 | ★ |
| P22.02 | Low speed carrier frequency | 1.0kHz～15.0kHz | Depend | ☆ |
| P22.03 | High speed carrier frequency | 1.0kHz～15.0kHz | Depend | ☆ |
| P22.04 | Carrier frequency switching point 1 | 0.00Hz～600.00HzWhen the carrier frequency is adjusted according to the output frequency, the carrier frequency set by P22.02 is used when the output frequency is lower than this set value. | 10.00Hz | ☆ |

| | | | | |
|---|---|---|---|---|
| P22.05 | Carrier frequency switching point2 | 0.00Hz～600.00Hz When the carrier frequency is adjusted according to the output frequency, the carrier frequency set by P22.03 is used when the output frequency is higher than this set value. | 50.00Hz | ☆ |
| P22.06 | PWM modulation method | 0：SVPWM<br>It is normally used<br>1：SVPWM+DPWM<br>Using this modulation method can reduce the switching loss of the inverter and reduce the probability of overheating alarm of the inverter; however, the electromagnetic noise of the motor in the medium speed section will be too large.<br>2：PWM at random<br>The electromagnetic noise generated by the motor is white noise, not a sharp squeak.<br>3：SPWM<br>It is only used in special situation | 0 | ★ |
| P22.07 | DPWM switching point | 10%～100%(modulation percentage)<br>When P22.06 is set to 1, increasing this setting vaule can reduce the electromagnetic noise in the middle speed section. | 30% | ★ |
| P22.08 | Modulating limit | 100%-110%<br>It is used to define the duty cycle of the inverter side IGBT. Overmodulation is allowed when it is set to 100% or more, and the allowable overmodulation is deepened when the set value is increased from 101 to 110. | 105% | ★ |
| **P22.10** | **AVR function** | 0:diabled<br>1:enabled<br>When the AVR function is enabled, the effect of the DC bus voltage change on the output voltage can be eliminated. | 1 | ★ |
| P22.11 | Energy braking voltage funtion | 0-Disabled<br>1-Enabled<br>2-only enable when ramp to stop<br>This parameter is only used to control the built-in brake unit. For models without a built-in brake unit, this setting can be ignored. | 1 | ☆ |
| P22.12 | Energy braking voltage | 320V～400V(220V level )<br>600V～800V(380V level )<br>690V～900V(480V level )<br>950V～1250V(690V level) | Depend | ☆ |
| P22.13 | Output phase switch | 0:No Operation<br>1:Output phase switch<br>(equal to change Phase between V and | 0 | ★ |

| | | | | |
|---|---|---|---|---|
| | | W,For closed loop control, you need to re-rotate the self-learning to confirm the encoder direction) | | |
| **P22.14** | **Cooling method (fan control)** | 0:Effective when running<br>1:Forced control( effective when power on)<br>2:Adjustable as per drive temperature | 0 | ☆ |
| **P22.15** | **G/P drive type** | 0-G type;1-P type<br>➢ G means normal duty (constant torque load)<br>➢ P means light duty such as fan and pump | 0 | ★ |
| r22.16 | Drive rated power | Read only Unit:0.1kw | - | ● |
| r22.17 | Drive rated Voltage | Read only Unit:V | - | ● |
| r22.18 | Drive rated current | Read only Unit:0.1A | - | ● |
| P22.20 | Trial time setting | After this time, the inverter will stop and report Er.TTA fault; if set to 0, it will be cancelled. Note: This parameter needs agency authority to be able to see | 0 | ☆ |

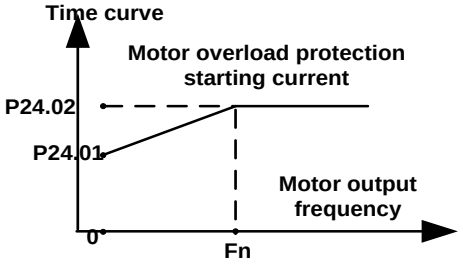
| 23 Group Drive protection function setting | | | | |
|---|---|---|---|---|
| P23.00 | **DC Bus voltage control option** | ➢ Unit'digit :Overvoltage stall control<br>0:overvoltage stall disabled<br>**1:overvoltage stall enabled**<br>2:overvoltage stall enabled self-adjustable<br>➢ The over-voltage stall function limits the amount of power generated by the motor by extending the deceleration time or even increasing the speed, avoiding over-voltage on the DC side and reporting over-voltage faults<br>Ten'unit:Undervoltage stall control<br>0:undervoltage stall disabled<br>**1:Undervoltage stall(decelerate to zero speed and be in standby mode,after power restoring ,it will run again automatically)**<br>2: Undervoltage stall deceleration(decelerate to zero and stop)<br>➢ **The undervoltage stall function reduces the motor power consumption or reduces the power consumption of the motor or turns it into a power generation operation to avoid the undervoltage fault on the DC side.**<br>➢ The undervoltage stall function is used when the input power supply quality is poor (the power supply voltage fluctuates downward or the sporadic short power is suspended), and it is necessary to keep the inverter running as much as possible. | 01 | ★ |
| P23.01 | **Overvoltage stall threshold** | 220V Level: 320V～400V<br>380V Level: 540V～800V<br>480V Level：650V～950V | Depend | ★ |
| P23.02 | **Undervoltage threshold** | 220V level: 160V～300V<br>380V level: 350V～520V<br>480V level: 400V～650V | Depend | ★ |
| P23.03 | Overvoltage stall ratio | 0～10.0 | 1.0 | ☆ |
| P23.04 | Undervoltage stall ratio | 0～20.0 | 4.0 | ☆ |
| P23.05 | **Undervoltage trip threshold** | 220V Level:160V～300V<br>380V Level:350V～520V<br>480V Level:400V～650V | Depend | ★ |
| P23.06 | Undervoltage fault detecting time | 0.0s～30.0s | 1.0s | ☆ |
| **P23.07** | **Hardware protection configuration** | Unit's digit: Wave-by-wave current limit enable<br>0: invalid; 1: valid<br>Ten's digit short to ground enable bit<br>0: invalid; 1: valid | 11 | ★ |
| P23.10 | Over-speed detection | 0.0%～120.0% maximum frequency | 120.0% | ☆ |

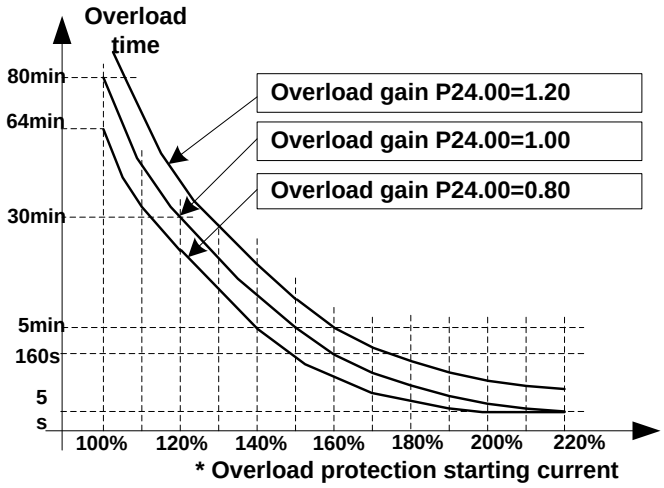
| | | | | |
|---|---|---|---|---|
| | value | | | |
| P23.11 | Over-speed detection time | 0.0s～30.0s0.：shielding | 1.0s | ☆ |
| P23.12 | Detection value of too large speed deviation | 0.0%～100.0%(motor rated frequency) | 20.0% | ☆ |
| P23.13 | Detection value of too large speed deviation | 0.0s～30.0s<br>0.0：shielding | 0.0s | ☆ |
| **P23.14** | **Input phase loss detection time** | 0.0s～30.0s<br>0.0：forbidden | 8.0s | ☆ |
| P23.15 | Output phase loss inbalance detecting | 0%～100% | 30% | ☆ |
| P23.18 | Fault protection action selection 1 | Unit's digit : input phase loss<br>0: coast to stop<br>1: Emergent stop<br>2: Stop as per stop mode<br>3: Continue to Run<br>Ten'unit: user self-defined fault 1<br>same as Unit's digit<br>Hundred'unit: user self-defined fault 2<br>same as Unit'digit<br>Thousand's unit: communication fault<br>same as unit's digit | 0000 | ☆ |
| P23.19 | Fault protection action selection 2 | Unit's digit: motor overload<br>0: Coast to stop<br>1: Emergent stop<br>2: Stop as per stop mode<br>3: Continue to run<br>Ten'unit: motor overheat<br>same as unit'digit<br>Hundred'unit: too large speed deviation<br>same as unit'digit<br>Thousand's unit: motor over speed<br>same as Unit'digit | 0000 | ☆ |
| P23.20 | Fault protection action selection 3 | Unit's digit: PID feedback lost during running<br>0: Coast to stop<br>1: Fast stop<br>2: Stop as per stop mode<br>3: Continue to run<br>Ten'unit: Reserved<br>same as unit'digit<br>Hundred'unit: reserved<br>same as unit'digit<br>thousand'unit: reserved<br>same as unit'digit | 0000 | ☆ |
| P23.21 | Fault protection action selection 4 | Unit's digit: output phase loss<br>0: Coast to stop<br>1: Fast stop | 0000 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 2: Stop as per stop mode<br>Ten'unit: EEPROM fault<br>0: Coast to stop<br>1: Fast stop<br>2: Stop as per stop mode<br>3: Continue to run<br>Hundred's unit: PG card fault(reserved)<br>0: Coast to stop<br>1: Fast stop<br>2: Stop as per stop mode<br>3: Continue to run<br>Thousand's unit: off load fault<br>0: Coast to stop<br>1: Fast stop<br>2: Stop as per stop mode<br>3: Continue to run | | |
| P23.24 | Fault reset | Define as per bit:<br>bit0-undervoltage;bit1- inverter overload<br>bit2-inverter overheat ;bit3-motor overload<br>bit4-motor overheat;bit5-user'fault 1<br>bit6- user'fault 2; bit7～15 reserved | 0 | ☆ |
| P23.25 | Fault source for auto reset | Define as per bit:<br>bit0-overcurrent during acceleration;bit1-overcurrent during deceleration<br>bit2-overcurrent during constant speed;bit3-over voltage during acceleration<br>bit4-overvoltage during deceleratoin;bit5-overvoltage during<br>bit6-inverter undervoltage;bit7-input phase loss<br>bit8-inverter overload;bit9-inverter overheat<br>bit10-motor overload;bit11-motor overheat<br>bit12-user'fault 1;bit13-user'fault 2<br>bit14-Reserved;bit15-Reserved | 0 | ☆ |
| P23.26 | Fault auto Reset times | 0～99 | 0 | ☆ |
| P23.27 | Numberic output Action at fault reset | 0:Disabled<br>1:Enabled | 0 | ☆ |
| P23.28 | Interval time of fault auto reset | 0.1s～300.0s | 0.5s | ☆ |
| P23.29 | Fault auto reset times clearing time | 0.1s～3600.0s | 10.0s | ☆ |
| P23.30 | Continuing Running frequency selection when trip | 0: Run at the set frequency<br>1: Run at abnormal standby frequency | 0 | ☆ |
| P23.31 | Abnormal back-up frequency | 0.00Hz～maximum frequency | 2.0HZ | ☆ |

| 24 Group motor Protection parameter | | | | |
|---|---|---|---|---|
| P24.00 | Motor overload protection gain | 0.20～10.00<br>The larger the value, the longer the allowable overload operation, and the higher the risk of motor overheating damage. | 1.00 | ☆ |
| P24.01 | Motor overload starting current at zero speed | 50.0%～150.0% | 100.0% | ☆ |
| P24.02 | Motor overload starting current at Rated speed | 50.0%～150.0% | 115.0% | ☆ |

**Motor in self cooling mode, heat dissipation is poor when in low frequency but good in condition of high frequency . P24.01 adn P24.02 is used to set the starting point of zero and rated speed overload current in order to obtain a more reasonable under different speed overload protection Time curve**




Left: Motor overload protection starting current

Right: Motor Overload Protection Curve with Different Overload Protection Gains

Motor overload only protects the motor from overload when P24.04 is enabled.P24.00 is used to adjust the overload inverse time curve time, as shown in the right figure above, the minimum motor overload time is 5.0s.

Note: Users need to correctly set the three parameters of P24.00, P24.01 and P24.02 according to the actual overload capacity of the motor. If set unreasonable, prone to motor overheating damage and the inverter is not timely warning of the danger of protection.

| | | | | |
|---|---|---|---|---|
| **P24.03** | **Motor overload warning factor** | 50%~100%,<br>When the overload accumulation degree is greater than this value, the P07 group DO terminal output function code"26"(Motor overload warning) is selected and output valid signal | 80% | ☆ |
| **P24.04** | **Motor protection option** | Unit'digit:Motor 1 protection selection<br>0:Turn off software overload protection<br>1:Enable software overload protection<br>Ten's digit:Motor 2 protection selection<br>0:Turn off software overload protection<br>1:Enable software overload protection | 11 | ☆ |

Default inverter is —no motor temperature protection. To enable this protection, please confirm that present motor has a temperature sensor. (PTC means motor sensor,PTC1000 and PTC100 is different motor sensor type.if your motor have temperature sensor,you need to use our special card to connect PTC1000 or PTC100) and set temperature sensor type (P24.08) to start motor overheating protection.User can view present motor temperature through function code R27.07; if motor temperature is greater than motor overheating alarming threshold (P24.10), numeric output terminal —25: Motor Overload alarmingis enabled and this signal is used for instruction; if motor temperature is greater than motor overheating protection threshold (P24.09), inverter will give an alarm about motor overheating fault (Er. oH3) and start corresponding protection action.

★ Motor overheating fault (Er. oH3) can not be reset immediately until motor temperature drops to a value far below the protection threshold

| | | | | |
|---|---|---|---|---|
| **P24.08** | **Motor temperature sensor type** | 0:no<br>1:PT100<br>2:PT1000<br>3: KTY84-130 | 0 | ☆ |
| P24.09 | Motor overheat fault threshold | 0.0℃～200.0℃ | 120.0℃ | ☆ |
| P24.10 | Motor overheat warning threshold | 0.0° C～200.0° C<br>When the motor temperature detected by the temperature sensor is greater than this value, the DO terminal output function of function "27: Motor over temperature warning" is selected. | 90.0℃ | ☆ |
| r24.11 | Motor temperature read data | Unit 0.1℃<br>Display the motor temperature detected by the temperature sensor | - | ● |
| P24.12 | Off load protection | 0:effective 1:ineffective | 0 | ☆ |
| P24.13 | Off load detection level | 0.0%-100% | 10.0% | ☆ |
| P24.14 | Off load detection time | 0.000s-60.000s | 1.000s | ☆ |

Off load=unload

If output current is lower than offload detection level (P24.13) and this status continues for offload detection time (P24.14) when offload detection protection is enabled (P24.12=1)
and inverter is in running mode and not in DC brake, then inverter gives an offload protection fault (Er. LL) report and stops as the offload protection setting (P24.12)

| 25 Group Fault tracking parameter | | | | |
|---|---|---|---|---|
| r25.00 | Current fault type | - see detail chapter 6 fault diagnosis and solution | - | ● |
| r25.01 | Output frequency at fault | Unit:0.01Hz | - | ● |
| r25.02 | Output current at fault | Unit:0.1A | - | ● |
| r25.03 | Bus voltage at fault | Unit:V | - | ● |
| r25.04 | Running mode status 1at fault | - see Parameter r27.10 in detail | - | ● |
| r25.05 | Input terminal status at fault | Bit0～Bit6 corresponds to DI1～DI7<br>Bit12～Bit15 corresponds to VDI1～VDI4 | - | ● |
| r25.06 | Working time at fault | Unit:0.01S | - | ● |
| r25.07 | Accumulated working time at fault | Unit:hour | - | ● |
| r25.08 | Frequency source at fault | Unit:0.01hz | - | ● |
| r25.09 | Torque source at fault | Unit:0.1% compared to motor rated torque | - | ● |
| r25.10 | Encoder speed at fault | Unit:RPM | - | ● |
| r25.11 | Electrical angle at fault | Unit: 0.1° | | ● |
| r25.12 | Running mode status 2 1at fault | See Parameter r27.11 in detail | - | ● |
| r25.13 | Input terminal status at fault | Define as per unit，0:ineffective，1:effective<br>Bit0: DO1; Bit1: DO2<br>Bit2: relay; Bit3 (relay 2 as option)<br>Bit4: DO3; Bit5: DO4<br>Bit6: DO5; Bit7: DO6<br>Bit8: VDO1; Bit9: VDO2 | - | ● |
| r25.14 | Heat sink temperature at fault | Unit: 0.1° C | - | ● |
| r25.15 | Low-level fault | For the fault type, see theChapter6Fault Diagnosis and Solution | - | ● |
| r25.16 | Warning type | For the fault type, see theChapter6Fault Diagnosis and Solution | - | ● |
| **26 Group Fault recording parameter** | | | | |
| r26.00 | Last fault 1trip type | SEE DETAILS IN CHAPTER 6 | - | ● |
| r26.01 | Output | Unit:0.01Hz | - | ● |

| | | | | |
|---|---|---|---|---|
| | frequency at fault | | | |
| r26.02 | Output current at fault | Unit:0.1A | - | ● |
| r26.03 | Bus voltage at fault | Unit:V | - | ● |
| r26.04 | Running mode status 1at fault | See Parameter r27.10 | - | ● |
| r26.05 | Input terminal status at fault | Bit0～Bit6 corresponds to DI1～DI7<br>Bit12～Bit15 corresponds to VDI1～VDI4 | - | ● |
| r26.06 | working time at fault | Unit:0.01S | - | ● |
| r26.07 | Accumulated working time atfault | Unit:hour | - | ● |
| r26.08 | Last fault 2 trip type | Same as last fault description<br>-<br>-<br>-<br>-<br>-<br>- | - | ● |
| r26.09 | Output frequency at fault | | - | ● |
| r26.10 | Output current at fault | | - | ● |
| r26.11 | Bus voltage at fault | | - | ● |
| r26.12 | Running mode status 1at fault | | - | ● |
| r26.13 | Input terminal status at fault | | - | ● |
| r26.14 | Working time at fault | | - | ● |
| r26.15 | Accumulated working time at fault | | - | ● |
| r26.16 | Last fault 3 trip type | Same as last fault description<br>-<br>-<br>-<br>- | - | ● |
| r26.17 | Output frequency at fault | | - | ● |
| r26.18 | Output current at faul | | - | ● |
| r26.19 | Bus voltage at fault | | - | ● |
| r26.20 | Running mode status 1at fault | | - | ● |
| r26.21 | Input terminal status at fault | | - | ● |

| | | | | |
|---|---|---|---|---|
| r26.22 | Working time at fault | | - | ● |
| r26.23 | Accumulated working time atfault | | - | ● |
| **27 Group Monitoring parameter** | | | | |
| r27.00 | Running frequency | It can set unit as per Parameter P21.07 | - | ● |
| r27.01 | Set frequency | It can set unit as per Parameter P21.07 | - | ● |
| r27.02 | Direction indicator | Bit0: direction of the running frequency (0-positive direction; 1-negative direction, the same below)<br>Bit1: Set the direction of the frequency<br>Bit2: direction of the main frequency<br>Bit3: direction of the secondary frequency<br>Bit4: Direction of the UpDown offset<br>Bit5: Direction of the encoder feedback frequency<br>Reserved above Bit6 | - | ● |
| r27.03 | Bus voltage | Unit：1V | - | ● |
| r27.04 | VF separation setting | unit：0.1% | - | ● |
| r27.05 | Output voltage | unit：0.1V | - | ● |
| r27.06 | Output current | unit：0.1A | - | ● |
| r27.07 | Output current percentage | unit：0.1%(100% of motor rated current) | - | ● |
| r27.08 | Output torque | 0.1% | - | ● |
| r27.09 | Torque setting | 0.1% | - | ● |
| r27.10 | Drives running mode status 1 | Bit0:Running status 0-Stop;1-Run<br>Bit1:Motor direction0-Forward;1-Reverse<br>Bit2:Ready signal:0-not ready;1-ready<br>Bit3:fault status 0-no fault;1-fault<br>Bit4～5:fault type:0-free stop;1-fast stop;2-stop as per stop mode；3：continue to run<br>Bit6:jog status:0-no jog;1-jog status<br>Bit7:Auto tune :0-no;1-yes<br>Bit8:DC braking:0-Non DC braking;1-DC braking<br>Bit9:Reserved<br>Bit10～11:Acceleration and Deceleration: 0:stop/zero output;1:speed up;2:slow down;3:constant speed<br>Bit12:Warning status: 0:no warning; 1:warning<br>Bit13:current limit status:0-no;1-yes | - | ● |

| | | | | |
|---|---|---|---|---|
| | | Bit14:overvoltage stalladjustment:0-no ;1-yes<br>Bit15:undervoltage stall adjustment :0-no;1-yes | | |
| r27.11 | Drives running mode2 | Bit0～1:current command source:0-keypad;1-terminal ;2-communicatoin<br>Bit2～3:motor option:0-motor 1;1-motor 2<br>Bit4～5:current motor control:0-VF;1-SVC;2-VC<br>Bit6～7:current running mode:0-speed;1-torque;2-position | - | ● |
| r27.12 | Drives running mode status 3 | Reserved | - | ● |
| r27.13 | Drives running mode status 4 | Reserved | - | ● |
| r27.14 | Accumulated power on time | Unit:hour | - | ● |
| r27.15 | Accumulated running time | Unit:hour | - | ● |
| r27.16 | Power-on time | Unit:min | | |
| r27.18 | Heat sink temperature | Unit:0.1 ℃ | - | ● |
| r27.19 | Main frequency | Unit:0.01Hz | - | ● |
| r27.20 | Auxiliary frequency | unit:0.01Hz | - | ● |
| r27.21 | UpDown offset frequency | unit:0.01Hz | - | ● |
| **30 Group Modbus communication parameter** | | | | |
| P30.00 | Communication type | 0:Modbus;<br>1:Canopen | 0 | ★ |
| P30.01 | Drive Address | 1～247<br>Different slaves on the same network should set different local addresses;<br>0 is the broadcast address, all slave inverters can be identified | 1 | ★ |
| P30.02 | Modbus baud rate | 0:1200 bps; 1:2400 bps<br>2:4800 bps; 3:9600 bps<br>4:19200 bps; 5:38400 bps<br>6:57600 bps; 7:115200 bps | 3 | ★ |
| P30.03 | Modbus data format | 0: 1-8-N-1<br>(1 start bit +8 data bits +1 stop bits )<br>1: 1-8-E-1<br>(1start bit +8 data bits +1 even parity +1 stop bit)<br>2: 1-8-0-1<br>(1 star bit+8 data bits +1odd parity+1 stop bits) | 0 | ★ |

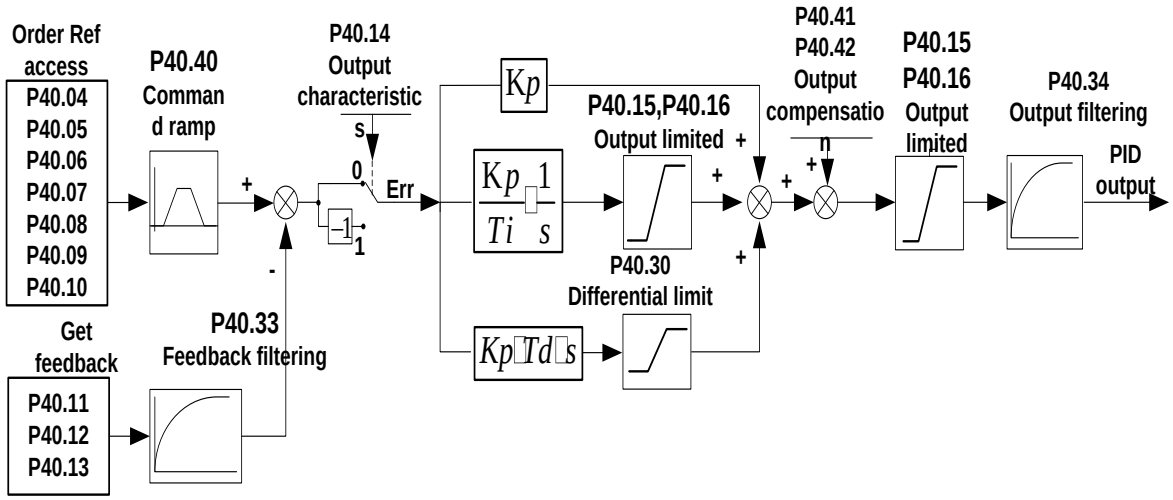
| | | | | |
|---|---|---|---|---|
| | | 3: 1-8-N-2<br>(1 star bit+8 data bits+2 stop bits)<br>4: 1-8-E-2<br>(1 star bits+8 data bit+1 even parity+2 stop bits)<br>5: 1-8-0-2<br>(1 start bit +8 data bits+1 odd parity+2 stop bits) | | |
| P30.04 | Modbus response delay | 1～20msThe delay time of the local to answer the master | 2ms | ★ |
| P30.05 | Modbus overtime | 0.0s(disabled)～60.0s(works for master-slave system) When this function code effective,if slave do not receive data from master overtime,it will trip as Er.485 | 0.0s | ★ |
| r30.06 | Number of frames received by Modbus | Each time a frame is received, this value is incremented by 1,0 to 65535 cycles. | - | ● |
| r30.07 | Number of frames that Modbus has sent | Each time a frame is sent, this value is incremented by 1,0 to 65,536 cycles. | - | ● |
| r30.08 | Number of error frames received by Modbus | Each time an CRC error frame is received, this value is incremented by 1,0 to 65535 cycles; it can be used to judge the degree of communication interference. | - | ● |
| P30.09 | Modbus master-slave option | 0: Slave<br>1: Master(sent by broadcast ) | 0 | ★ |
| P30.10 | Slave memory when inverter as master | 1～9 corresponds to 0x7001～0x7009 | 1 | ☆ |
| P30.11 | Data sent by Master | 0:output frequency<br>1:set frequency<br>2:output torque<br>3:set torque<br>4:PID setting<br>5:PID feedback<br>6:output current | 0 | ☆ |
| P30.12 | Sending interval of Master | 0.010～10.000sAs a master, after sending one frame of data, the next frame of data is sent after this delay. | 0.1s | ☆ |
| P30.13 | Receiving proportaionality factor of slave | -10.000～10.000The values of slave registers 0x7001 and 0x7002 take effect after passing through this scaling factor | 1.00 | ☆ |
| P30.14 | Communication special register | 0: 0.01%<br>1: 0.01Hz | 0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | speed unit | 2: 1Rpm<br>Some units of specific communication registers can be set by this parameter. See Appendix A for details. | | |
| P30.15 | Modbus response characteristics | When the format of the received frame is a write register, this parameter can be set to reply to the host.<br>0: Reply to the host (standard Modbus protocol)<br>1: Do not reply to the host (non-standard Modbus protocol) | 0 | ☆ |
| **31 Group Canopen communication parameter** | | | | |
| P31.00 | CANopen communication address | 1 ~ 127 | 1 | ☆ |
| P31.01 | CANopen Baud rate | 0：100k<br>1：125k<br>2：250k<br>3：500k<br>4：1M | 3 | ☆ |
| P31.02 | CANopen overtime | 1ms ~ 20ms | 4ms | ☆ |
| r31.07 | CANopen version number | Display the version number of the CANopen card | - | ● |
| r31.08 | CANopen Working status | 0: Initialisation status<br>1: Disconnected<br>2: Connecting/Preparing-<br>3: Stopped<br>4: Operational status<br>5: Pre_operational | - | ● |
| r31.10 | CANopen receive error count | The number of error frames received by CANopen is not saved after power off | - | ● |
| r31.11 | CANopen send error count | The number of error frames sent by CANopen is not saved after power off | - | ● |
| r31.12 | CANopen receive frame number | The number of frames received by CANopen is not saved after power off | - | ● |
| r31.14 | CANopen send frame number | The number of frames sent by CANopen is not saved after power off | - | ● |

| 40 Group PID function | | | | |
|---|---|---|---|---|
| r40.00 | PID final output value | Read only unit:0.1% | - | ● |
| r40.01 | PID final set value | Read only | - | ● |
| r40.02 | PID final feedback value | Read only | - | ● |
| r40.03 | PID deviation value | Read only unit:0.01% | - | ● |

PID through the target signal (command) and the controlled amount of the difference between the feedback signal proportional (P), integral (I) and differential (D) operation, adjust the inverter output frequency, etc., to achieve closed-loop system, the controlled amount Stable at the target value.

VFD500 built-in process PID structure as shown below, suitable for flow control, pressure control, temperature control and tension control applications.




| | | | | |
|---|---|---|---|---|
| **P40.04** | **PID reference source** | Unit's digit:**PID main reference source(ref1)**<br>0：Digtital setting<br>1：AI1<br>2：AI2<br>3：AI3(IO expansion board)<br>4：AI4(IO expansion board)<br>5：HDI high frequency pulse<br>6：Communication<br>Ten's digit:**PID Auxilary reference source(ref2)Same as Unit's digit** | 00 | ☆ |
| P40.05 | PID given range | 0.01～655.35 | 100.00 | ☆ |
| P40.06 | PID digital setting 0 | 0.0～P40.05 | 0.0% | ☆ |
| P40.07 | PID digital setting 1 | 0.0～P40.05 | 0.0% | ☆ |
| P40.08 | PID digital setting 2 | 0.0～P40.05 | 0.0% | ☆ |
| P40.09 | PID digital | 0.0～P40.05 | 0.0% | ☆ |

<table>
<tr><td></td><td>setting 3</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">When PID reference source is digital setting, PID digital setting 0~3 depends on DI terminal function 43 (preset PID terminal I ) and 44 ( preset PID terminal 2):
<table>
<tr><th>preset PID terminal1</th><th>preset PID terminal 2</th><th>PID Digital setting value(0.1%)</th></tr>
<tr><td>ineffective</td><td>ineffective</td><td>P40.06 * 100.0% / P40.05</td></tr>
<tr><td>ineffective</td><td>effective</td><td>P40.07 * 100.0% / P40.05</td></tr>
<tr><td>effective</td><td>ineffective</td><td>P40.08 * 100.0% / P40.05</td></tr>
<tr><td>effective</td><td>effective</td><td>P40.09 * 100.0% / P40.05</td></tr>
</table>
For example: When AI1 is used as PID feedback, if the full range corresponds to 16.0kg pressure and require PID control to be 8.0kg; then set P40.05 PID feedback range to 16.00, PID digital reference terminal select to P40.06, Set P40.06 (PID preset setting 0) to be 8.00</td></tr>
<tr><td>P40.10</td><td>PID reference source selection</td><td>0:ref1<br>1:ref1+ref2<br>2:ref1-ref2<br>3:ref1*ref2<br>4:ref1/ref2<br>5:Min(ref1,ref2)<br>6:Max(ref1,ref2)<br>7(ref1+ref2)/2<br>8: fdb1and fdb2 switchover</td><td>0</td><td>☆</td></tr>
<tr><td>P40.11</td><td>PID feedback source1</td><td>Unit’s digit 0：PID feedback source1(fdb1)<br>0:AI1<br>1:AI2<br>2:AI3(option card)<br>3:AI4(option card)<br>4: PLUSE(HDI)<br>5: Communication<br>6: Motor rated output current<br>7: Motor rated output frequency<br>8: Motor rated output torque<br>9: Motor rated output frequency<br>Ten’s digit : PID feedback source2 (fdb2)<br>Same as Unit’s digit</td><td>00</td><td>☆</td></tr>
<tr><td>P40.12</td><td>PID Feedback range</td><td>0.01～655.35</td><td>100.00</td><td>☆</td></tr>
<tr><td>P40.13</td><td>PID feedback function selection</td><td>0:fdb1<br>1:fdb1+fdb2<br>2:fdb1-fdb2<br>3:fdb1*fdb2<br>4:fdb1/fdb2<br>5:Min(fdb1,fdb2)Take fdb1.fdb2 smaller value<br>6:Max(fdb1,fdb2) Take fdb1.fdb2 bigger value<br>7: (ref1+ref2)/2</td><td>0</td><td>☆</td></tr>
</table>

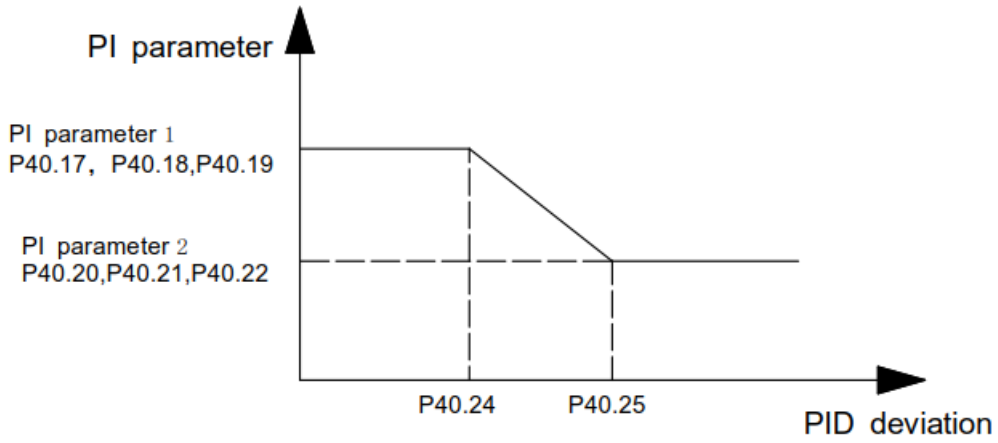
| | | | | |
|---|---|---|---|---|
| | | 8: fdb1and fdb2 switchover | | |
| P40.14 | PID output feature | 0: PID output is positive: when the feedback signal exceeds the PID reference value, the output frequency of the inverter will decrease to balance the PID. For example, the strain PID control during wrapup<br>1: PID output is negative: When the feedback signal is stronger than the PID reference value, the output frequency of the inverter will increase to balance the PID. For example, the strain PID control during wrapdown | 0 | ☆ |
| **The PID output characteristic is determined by P40.14 and Di terminal 42 function PID positive/negative switching**:<br>P40.14 = 0 and "42: PID positive/negative switching" terminal is invalid: : PID output characteristic is positive<br>P40.14 = 0 and "42: PID positive/negative switching" terminal is valid: : PID output characteristic is negative<br>P40.14 = 1 and "42: PID positive/negative switching" terminal is invalid: : PID output characteristic is negative<br>P40.14 = 1 and "42: PID positive/negative switching" terminal is valid: : PID output characteristic is positive | | | | |
| P40.15 | Upper limit of PID output | -100.0%～100.0% | 100.0% | ☆ |
| P40.16 | lower limit of PID output | -100.0%～100.0% | 0.0% | ☆ |
| P40.17 | Proportaional gain KP1 | 0.00～200.0%<br>The function is applied to the proportional gain P of PID input.<br>P determines the strength of the whole PID adjuster. The parameter of 100 means that when the offset of PID feedback and given value is 100%, the adjusting range of PID adjust is the Max. frequency (ignoring integral function and differential function). | 5.0% | ☆ |
| P40.18 | Integral time TI1 | 0.01s～20.00s<br>This parameter determines the speed of PID adjustor to carry out integral adjustment on the deviation of PID feedback and reference.<br>When the deviation of PID feedback and reference is 100%, the integral adjustor works continuously after the time (ignoring the proportional effect and differential effect) to achieve the Max. Frequency (P01.06) or the Max. Voltage (P12.21). Shorter the integral time, stronger is the | 1.00s | ☆ |

| | | | | |
|---|---|---|---|---|
| | | adjustment | | |
| P40.19 | Differential time TD1 | 0.000s～0.100s<br>This parameter determines the strength of the change ratio when PID adjustor carries out integral adjustment on the deviation of PID feedback and reference.<br>If the PID feedback changes 100% during the time, the adjustment of integral adjustor (ignoring the proportional effect and differential effect) is the Max. Frequency (P01.06) or the Max. Voltage (P12.21). Longer the integral time, stronger is the adjusting. | 0.000s | ☆ |
| P40.20 | Proportaional gain KP2 | 0.00～200.0%. | 5.0% | ☆ |
| P40.21 | Integral time TI2 | 0.00s<br>(no any integral effect )～20.00s | 1.00s | ☆ |
| P40.22 | Differential time TD2 | 0.000s～0.100s | 0.000s | ☆ |
| P40.23 | PID parameter switchover condition | 0：no switchover<br>Do not switch, use KP1, TI1, TD1<br>1：switchover via DI<br>Switch by DI terminal<br>KP1, TI1, TD1 are used when DI terminal No. 41 function is invalid; KP2, TI2, TD2 are used when valid<br>2：automatic switchover based on deviation<br>The absolute value of PID command and feedback deviation is less than P40.24, using KP1, TI1, TD1; the absolute value of deviation is greater than P40.25, using KP2, TI2, TD2 parameters; the absolute value of deviation is between P40.24~P40.25, The two sets of parameters are linearly transitioned. | 0 | ☆ |
| P40.24 | PID parameter switchover devation 1 | 0.0%～P40-25 | 20.0% | ☆ |
| P40.25 | PID parameter switchover devation 2 | P40-24～100.0% | 80.0% | ☆ |
| In some applications, one group PID parameter is not enough, different PID parameters would be adopted according to the situation. | | | | |

The function codes are used to switch two groups PID parameter. The setting mode of the regulator parameters P40.20~P40.22 is similar as P40.17~P40.19's.

Two groups PID parameter can be switched via DI terminal, or switched according to PID deviation automatically.

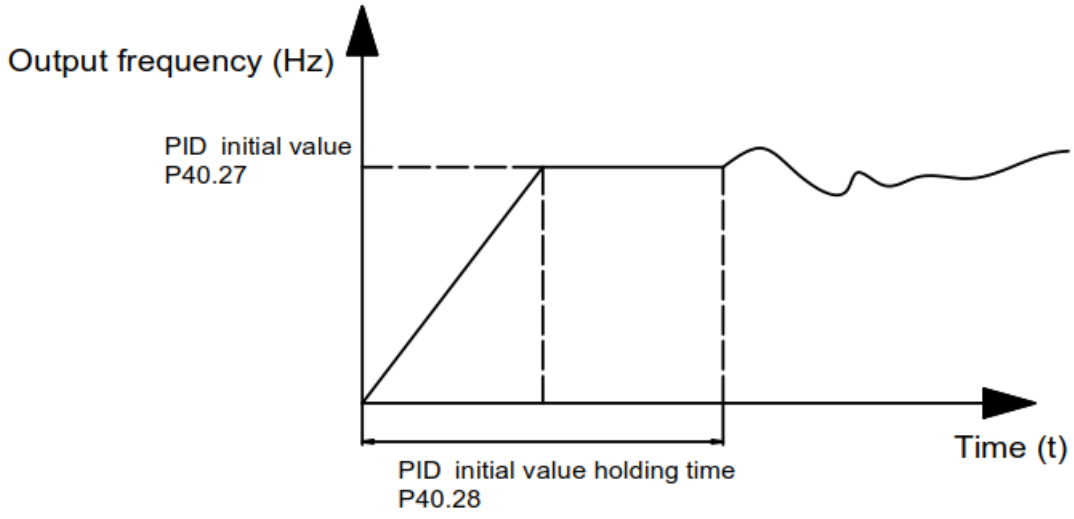
When selection is automatic switching: when the deviation absolute value between given and feedback is smaller than P40.24 (PID parameter switching deviation 1), PID parameter selection is group 1. When the deviation absolute value between given and feedback is bigger than P40.25 (PID parameter switching deviation 2), PID parameter selection is group 2. When the deviation absolute value between given and feedback is between P40.24 and P40.25, PID parameter is the linear interpolation of two groups PID parameter, showed as below

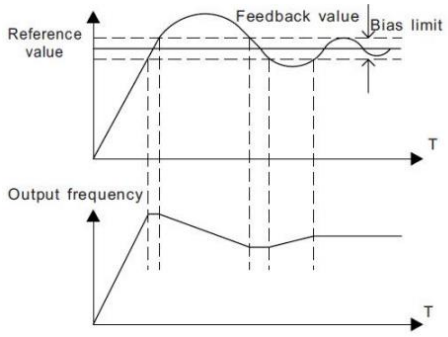



parameter switching diagram

| | | | | |
|---|---|---|---|---|
| P40.26 | PID integral separation threshold | 0.0%～100.0% | 100.0% | ☆ |
| P40.27 | PID initial value | 0.0%～100.0% | 0.0% | ☆ |
| P40.28 | PID intial value holding time | 0.00～650.00s | 0.00s | ☆ |

This function is only valid when P40.39 = 0 which is not calculated. The PID output is reset after the inverter stops. If P40.28 ≠ 0, when the inverter runs, the PID output is equal to the initial value of PID and keeps the time of P40.28.



| | | | | |
|---|---|---|---|---|
| PID initial value function diagram | | | | |
| P40.29 | PID deviation limit | 0.0%～100.0%<br>The output of PID system is relative to the maximum<br>deviation of the close loop reference. As shown in the<br>diagram below, PID adjustor stops to work during the<br>deviation limit. Set the function properly to adjust the<br>accuracy and stability of the system.<br>  <br> | 0.0% | ☆ |
| P40.30 | PID differential limit | 0.00%～100.00% | 1.00% | ☆ |
| P40.33 | PID feedback filter time | 0.000～30.000s | 0.010s | ☆ |
| P40.34 | PID output filter time | 0.000～30.000s | 0.010s | ☆ |
| P40.35 | Detection value of PID feedback loss ( lower limit) | 0.0%(no detection )～100.0% | 0.0% | ☆ |
| P40.36 | Detection time of PID feedback loss | 0.000s～30.000s | 0.000s | ☆ |
| P40.37 | Detection value of PID feedback loss( upper limit) | 0.0%～100.0%(no detection) | 100.0% | ☆ |
| P40.38 | Upper Detection time of PID feedback loss | 0.000s～30.000s | 0.000s | ☆ |
| P40.39 | PID operation at stop | 0-No PID operation at stop<br>1-PID operation at stop | 0 | ☆ |
| P40.40 | PID command for accel and decel time | 0.0s～6000.0s | 0.0s | ☆ |

| | | | | |
|---|---|---|---|---|
| P40.41 | PID offset selection | 0-digital setting<br>1-AI1<br>2-AI2<br>3-AI3(option card) | 0 | ☆ |
| P40.42 | PID offset digital setting | -100.0%～100.0% | 0.0% | ☆ |
| **41 Group Sleeping function** | | | | |
| P41.00 | Sleep mode and wake up selection | Unit's digit: **sleep mode selection**<br>0:no sleep function<br>1:sleep by frequency<br>2:AI1 sleep (AI1 as pressure feedback)<br>3:AI2 sleep(AI2 as pressure feedback)<br>4:AI3 sleep (AI3 as pressure feedback)<br>3:AI4 sleep(AI4 as pressure feedback)<br>Ten's digit :**wake up mode selection**<br>0:wake up by frequency<br>1:AI1 wake up (AI1 as pressure feedback)<br>2:AI2 wake up (AI2 as pressure feedback)<br>3:AI3 wake up (AI3 as pressure feedback)<br>4:AI4 wake up (AI4 as pressure feedback)<br>Hundred's digit:**Sleep wake direction selection**<br>**0: positive direction**<br>Sleep source (AI1 ~ AI4) > P41.03, inverter will sleep<br>Wake-up source (AI1 ~ AI4) < P41.04, the inverter will wake up<br>**1: reverse direction**<br>Sleep source (AI1 ~ AI4) < P41.03, inverter sleep<br>Wake-up source (AI1 ~ AI4) > P41.04, the inverter wakes up.<br>➢ When the sleep source and wakeup source are the same, please pay attention to the size relationship of P41.03 and P41.04. If the parameter setting is unreasonable, when the wake- | 010 | ☆ |

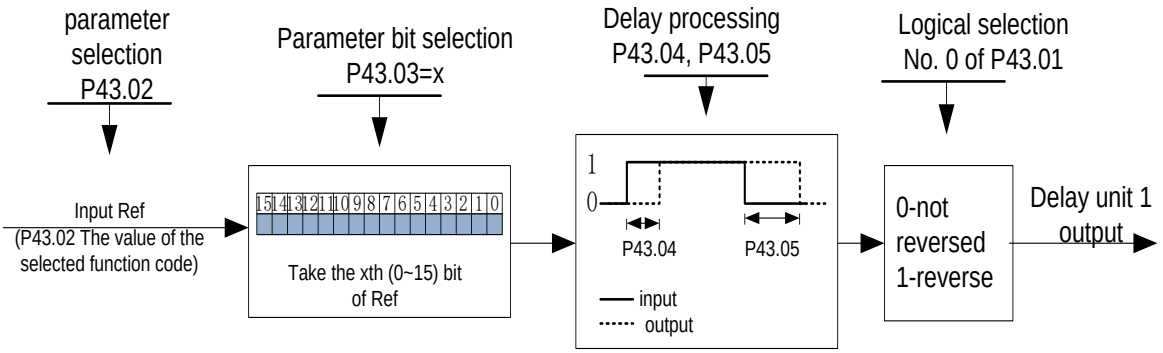
| | | | | |
|---|---|---|---|---|
| | | up condition is selected, even if the sleep condition is established, the sleep state cannot be entered, and special attention is required when using. | | |
| P41.01 | Sleep setting value by frequency | 0.00Hz～600HZ,It will sleep if value is less than this value | 0.00Hz | ☆ |
| P41.02 | Wake up threshold by frequency | 0.00hz～600.00hz, ,It will wake up if value is bigger than this value | 0.00Hz | ☆ |
| When selecting frequency sleep and frequency wake-up, it must be set by P41.01 < P41.02. When the frequency source is PID setting, and the frequency wake-up must be set to PID shutdown operation: P40.39 = 1. | | | | |
| P41.03 | Sleep setting value by pressure | 0～100.0% | 0.0% | ☆ |
| P41.04 | Wake up threshold by pressure | 0.～100.0% | 0.0% | ☆ |
| P41.05 | Sleep delay time | 0.0s～6000.0s | 0.0s | ☆ |
| P41.06 | Wake up delay up | 0.0s～6000.0s | 0.0s | ☆ |
| P41.07 | Sleep decelerating time | Setting value decide by P03.16<br>P03.16 = 2, 0.00～600.00s;<br>P03.16 = 1, 0.0s～6000.0s;<br>P03.16 = 0, 0s～60000s<br>P41.07 set to 0,sleeping stop mode to free coast。 | 0.00s | ☆ |
| **42 Group Simple PLC** | | | | |
| r42.00 | PLC current running mode | Read only | - | ● |
| r42.01 | PLC current running remaining time | Read only | - | ● |
| r42.02 | PLC times of cycles | Read only | - | ● |
| **P42.03** | **Simple PLC running mode** | Unit'digit:<br>0: single cycle then stop<br>1: single cycle then keep last speed<br>2: recycle<br>3: Plc reset when single cycle stop<br>Ten's digit:<br>0:power off without saving<br>1:power off with saving<br>Hundred'digit: | 003 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 0:stop without saving<br>1:stop with saving<br>**0**: Restart from the first stage; stop during running (cause by the stop command, fault or power loss), run from the first stage after restart. **1:** Continue to run from the stop frequency; stop during running(cause by stop command and fault), the inverter willrecord the running time automatically, enter into the stage after restart and keep the remaining running at the setting frequency. | | |
| P42.04 | PLC running times | 1～60000 | 1 | ☆ |
| P42.05 | PLC step 1 running time | 0.0～6553.5 unit depend on P42.21<br>Notice:Running time do not conclude acceleration and deceleration time,same as following | 0.0 | ☆ |
| P42.06 | PLC step 2 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.07 | PLC step 3 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.08 | PLC step 4 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.09 | PLC step 5 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.10 | PLC step 6 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.11 | PLC step 7 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.12 | PLC step 8 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.13 | PLC step 9 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.14 | PLC step 10 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.15 | PLC step 11 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.16 | PLC step 12 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.17 | PLC step 13 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.18 | PLC step 14 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.19 | PLC step 15 running time | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |
| P42.20 | PLC step 16 | 0.0～6553.5 unit depend on P42.21 | 0.0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | running time | | | |
| P42.21 | PLC running time unit | 0:S;1:minute;2:hour | 0 | ☆ |
| P42.22 | PLC step 1-4 ACCEL/DECEL time selector | Unit'digit:step 1 ACCEL/DECEL time selector<br>ten'digit: step 2 ACCEL/DECEL time selector<br>Hundred's: step 3 ACCEL/DECEL time selector<br>Thousand'unit:step 4 ACCEL/DECEL time selector<br>0- ACCEL/DECEL time 1<br>1- ACCEL/DECEL time 2<br>2- ACCEL/DECEL time 3<br>3- ACCEL/DECEL time 4 | 0000 | ☆ |
| P42.23 | PLC step 5-8 ACCEL/DECEL time selector | Unit'digit: ACCEL/DECEL time 5<br>Ten'digit: ACCEL/DECEL time 6<br>Hundred'digit: ACCEL/DECEL time 7<br>Thousand'digit: ACCEL/DECEL time 8<br>0- ACCEL/DECEL time 1<br>1- ACCEL/DECEL time 2<br>2- ACCEL/DECEL time 3<br>3- ACCEL/DECEL time 4 | 0000 | ☆ |
| P42.24 | PLC step 9-12 ACCEL/DECEL time selector | Unit'digit: ACCEL/DECEL time 9<br>ten'digit: ACCEL/DECEL time 10<br>Hundred'digit: ACCEL/DECEL time 11<br>Thousand'digit: ACCEL/DECEL time 12<br>0- ACCEL/DECEL time 1<br>1- ACCEL/DECEL time 2<br>2- ACCEL/DECEL time 3<br>3- ACCEL/DECEL time 4 | 0000 | ☆ |
| P42.25 | PLC step 13-16 ACCEL/DECEL time selector | Unit's Digit: ACCEL/DECEL time 13<br>Ten'Digit: ACCEL/DECEL time 14<br>Hundred'digit: ACCEL/DECEL time 15<br>Thousand's digit: ACCEL/DECEL tim 16<br>0- ACCEL/DECEL time 1<br>1- ACCEL/DECEL time 2<br>2- ACCEL/DECEL time 3<br>3- ACCEL/DECEL time 4 | 0000 | ☆ |
| P42.26 | PLC stop decelerating time | 0.01～60000s<br>Setting value decide by P03.16<br>P03.16 = 2, 0.00～600.00s;<br>P03.16 = 1, 0.0s～6000.0s;<br>P03.16 = 0, 0s～60000s | 20.00s | ☆ |
| **43 Group Programming delay-unit** | | | | |

| | | | | |
|---|---|---|---|---|
| r43.00 | Delay unit output status | It is used to view the current output status of the delay unit.<br>Bit definition is used, Bit0~Bit3 respectively indicate the output status of delay units 1~4, 0 means invalid, 1 means valid. | - | ● |

VFD500 inverter built-in 4 delay unit. The delay unit can collect the status of 0 ~ 15 bits of all parameters that can be viewed in the function code table, and finally output the delay unit status after delay processing and logic selection. Can be used for DI / DO, comparator / logic unit output delay and other functions, but also as a virtual relay.

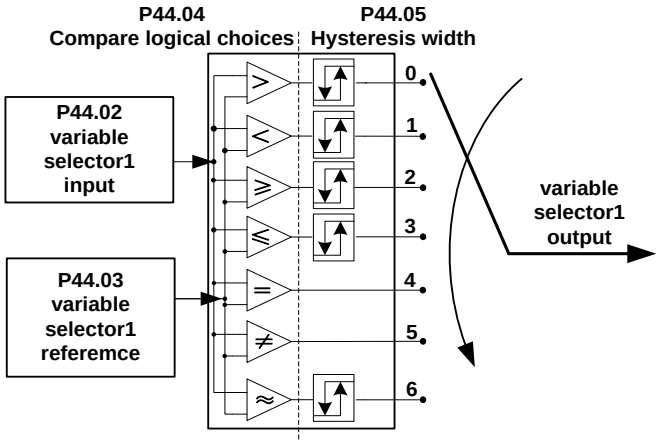



Delay unit 1 block diagram

The picture shows the delay unit 1 block diagram, delay unit 2 to 4 and so on. Delay unitsDelay can be used for DI/DO delay processing also can be combined with comparator units and logic units for more complex applications.

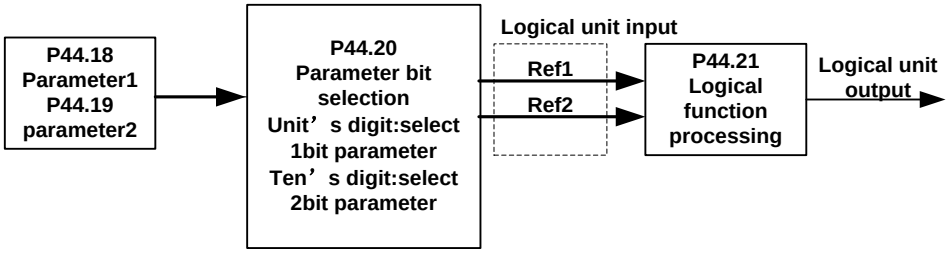
| | | | | |
|---|---|---|---|---|
| P43.01 | Delay unit 1-4 logicl | 0000B～1111B<br>Bit0~Bit3 corresponds to delay units 1~4, which are used to specify whether the output of the delay unit is inverted. | 0 | ☆ |
| P43.02 | **Delay unit 1** input parameter selection | 00.00-98.99(function code index) | 00.00 | ☆ |
| P43.03 | Delay unit 1 input bit selection | 0-15 | 0 | ☆ |
| P43.04 | Delay unit 1 rising edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.05 | Delay unit 1 descending edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.06 | **Delay unit 2** input parameter selection | 00.00-98.99(function code index) | 00.00 | ☆ |
| P43.07 | Delay unit 2 input bit selection | 0-15 | 0 | ☆ |
| P43.08 | Delay unit2 rising edge delay time | 0.0s～3000.0s | 0.0s | ☆ |

| | | | | |
|---|---|---|---|---|
| P43.09 | Delay unit2descending edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.10 | **Delay unit 3** input parameter selection | 00.00-98.99(function code index) | 00.00 | ☆ |
| P43.11 | Delay unit 3 input bit selection | 0-15 | 0 | ☆ |
| P43.12 | Delay unit3 rising edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.13 | Delay unit3descending edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.14 | **Delay unit 4** input parameter selection | 00.00-98.99(function code index) | 00.00 | ☆ |
| P43.15 | Delay unit 4 input bit selection | 0-15 | 0 | ☆ |
| P43.16 | Delay unit4 rising edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| P43.17 | Delay unit4descending edge delay time | 0.0s～3000.0s | 0.0s | ☆ |
| **44 Group Variable selector and logic block** | | | | |
| r44.00 | Variable selector 1～4 output | bit0～3 indicate the output of variable selector 1-4 | - | ● |
| r44.01 | Logic block 1～4 output | bit0～3 indicate the output of logic block 1～4 | - | ● |
| P44.02 | Variable selector 1 input parameter | 00.00～98.99(Function code index) | 00.00 | ☆ |
| P44.03 | Variableselector 1 threshold | 00.00～98.99(Function code index) | 00.00 | ☆ |
| P44.04 | Variable selector 1 logic mode | 0:>; 1:<; 2:≥;3:≤;4:=; 5:≠; 6:≈ | 0 | ☆ |
| P44.05 | Variableselector 1 hysteresis width | 0～65535 | 0 | ☆ |
| VFD500 inbuilt 4 group variable selector,this function can be used for any two function code parameters,by selecting the comparison relationship, and output will be 1 if it meet conditions or it will be 0.Variable selector output can act as DI,VDI,virtual relay input and DO,relay.etc output.Users can easily and flexibily get logic function ,variable selector 1 frame as follows | | | | |




**Left:variable selector graph Right: hysteresis width graph**

| | | | | |
|---|---|---|---|---|
| P44.06 | Variable selector 2 input parameter | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.07 | Variable selector 2 threshold | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.08 | Variable selector 2 logic mode | 0:>; 1:<; 2:≥;3:≤;4:=; 5:≠; 6:≈ | 0 | ☆ |
| P44.09 | Variable selector 2 hysteresis width | 0～65535 | 0 | ☆ |
| P44.10 | Variable selector 3 input parameter | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.11 | Variable selector 3 threshold | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.12 | Variable selector 3 logic mode | 0:>; 1:<; 2:≥;3:≤;4:=; 5:≠; 6:≈ | 0 | ☆ |
| P44.13 | Variable selector 3 hysteresis width | 0～65535 | 0 | ☆ |
| P44.14 | Variable selector 4 input parameter | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.15 | Variable selector 4 threshold | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.16 | Variable selector 4 logic mode | 0:>; 1:<; 2:≥;3:≤;4:=; 5:≠; 6:≈ | 0 | ☆ |
| P44.17 | Variable selector 4 hysteresis width | 0～65535 | 0 | ☆ |
| P44.18 | Logic block 1 threshold | 00.00-98.99(function code index) | 00.00 | ☆ |

| | | | | |
|---|---|---|---|---|
| | parameter 1 | | | |
| P44.19 | Logic block 1 threshold parameter2 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.20 | Logic block 1 input source | Unit'digit：parameter 1 bit selection<br>0-F (Represent 0-15),P44.18 corresponds to 0-15 bit<br>Ten'digit:parameter 2 bit selection<br>0-F (Represent 0-15),P44.19 corresponds to 0-15 bit | 0 | |
| P44.21 | Logic bock 1 function | 0:no function;1:and;<br>2:or;<br>3:not and;<br>4:not or;<br>5: exclusive OR<br>6:Ref=1 effective;Ref2=1 ineffective<br>7:Ref1 up effective,Ref2 up ineffective<br>8:Ref1 up and signal reverse<br>9:Ref1 up and output 200ms pulse width | 0 | ☆ |
| VFD500 built-in 4 logical units. The logic unit can perform any one of 0-15 bits of any parameter 1 and any one of 0-15 bits of any parameter 2 for logic processing. The condition is true output 1, otherwise 0 is output. Logic unit output can be used as DI, VDI, delay unit and other inputs, DO, relays and other output, the user can more flexible access to the required logic. The schematic block diagram of the logic unit 1 is as follows.<br>  <br> | | | | |
| P44.22 | Logic block 2 threshold parameter 1 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.23 | Logic block 2 threshold parameter2 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.24 | Logic block 2 input source | Unit'digit：parameter 1 bit selection<br>0-F (Represent 0-15),P44.22 corresponds to 0-15 bit<br>Ten'digit:parameter 2 bit selection<br>0-F (Represent 0-15),P44.23 corresponds to 0-15 bit | 0 | ☆ |
| P44.25 | Logic bock 2 function | 0:no function;<br>1:and; | 0 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | 2:or;<br>3:not and;<br>4:not or;<br>5: exclusive OR<br>6:Ref=1 effective;Ref2=1 ineffective<br>7:Ref1 up effective,Ref2 up ineffective<br>8:Ref1 up and signal reverse<br>9:Ref1 up and output 200ms pulse width | | |
| P44.26 | Logic block 3 threshold parameter 1 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.27 | Logic block 3 threshold parameter2 | 00.00-98.99(function code index) | 0 | ☆ |
| P44.28 | Logic block 3 input source | Unit'digit：parameter 1 bit selection<br>0-F (Represent 0-15),P44.26 corresponds to 0-15 bit<br>Ten'digit:parameter 2 bit selection<br>0-F (Represent 0-15),P44.27 corresponds to 0-15 bit | 0 | ☆ |
| P44.29 | Logic bock 3 function | 0:no function;<br>1:and;<br>2:or;<br>3:not and;<br>4:not or;<br>5: exclusive OR<br>6:Ref=1 effective;Ref2=1 ineffective<br>7:Ref1 up effective,Ref2 up ineffective<br>8:Ref1 up and signal reverse<br>9:Ref1 up and output 200ms pulse width | 0 | ☆ |
| P44.30 | Logic block 4 threshold parameter 1 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.31 | Logic block 4 threshold parameter2 | 00.00-98.99(function code index) | 00.00 | ☆ |
| P44.32 | Logic block 4 input source | Unit'digit：parameter 1 bit selection<br>0-F (Represent 0-15),P44.30 corresponds to 0-15 bit<br>Ten'digit:parameter 2 bit selection<br>0-F (Represent 0-15),P44.31 corresponds to 0-15 bit | 0 | ☆ |
| P44.33 | Logic bock 4 function | 0:no function;<br>1:and;<br>2:or;<br>3:not and;<br>4:not or; | 0 | ☆ |

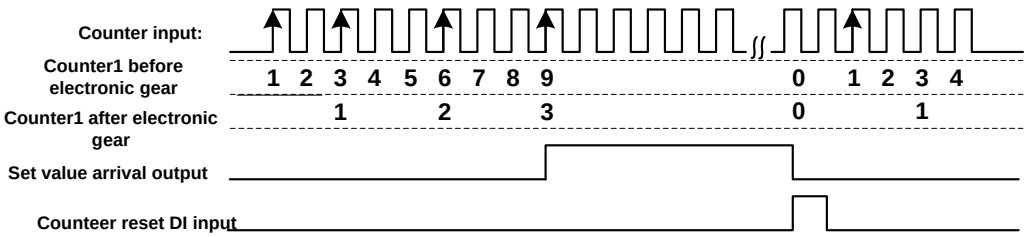
| | | | | |
|---|---|---|---|---|
| | | 5: exclusive OR<br>6:Ref=1 effective;Ref2=1 ineffective<br>7:Ref1 up effective,Ref2 up ineffective<br>8:Ref1 up and signal reverse<br>9:Ref1 up and output 200ms pulse width | | |
| P44.34 | Constant setting 1 | 0～65535 | 0 | ☆ |
| P44.35 | Constant setting 2 | 0～65535 | 0 | ☆ |
| P44.36 | Constant setting 3 | 0～65535 | 0 | ☆ |
| P44.37 | Constant setting 4 | -9999～9999 | 0 | ☆ |
| P44.38 | Constant setting 1 as per bit definition | 0～65535(define as bit) | 0 | ☆ |
| P44.39 | Constant setting 2 as per bit definition | 0～65535(define as bit) | 0 | ☆ |
| P44.40 | Constant setting 3 as per bit definition | 0～65535(define as bit) | 0 | ☆ |
| P44.41 | Constant setting 4 as per bit definition | 0～65535(define as bit) | 0 | ☆ |
| **Constant setting for reference of variable selector or logic block input** | | | | |
| **45 Group Multi-functional counter** | | | | |
| r45.00 | Counter 1 input value | The count value before the electronic gear, that is, the number of pulses received by the counter 1 hardware, 32-bit read-only data | - | ● |
| r45.02 | Counter 1 count value | Count value after electronic gear, 32-bit read-only data | - | ● |
| P45.04 | Counter 1 set value | 1 to 4294967295, when the counter 1 count value (after the electronic gear) reaches this setting, the DO function "Counter 1 set value reached" is valid. | 1000 | ☆ |
| P45.06 | Counter 1 maximum value | 1 to 4294967295, set the maximum value of counter 1 (after electronic gear) | 4294967295 | ☆ |
| P45.08 | Counter 1 Electronic gear numerator | 1～65535<br>Counter 1 count value = counter 1 input value ×( electronic gear numerator / electronic gear denominator ) | 1 | ☆ |
| P45.09 | Counter 1 Electronic gear denominator | 1～65535 | 1 | ☆ |

VFD500 has two inbuilt counters:Counter 1 is a 32-bit multifunction counter with electronic gears; counter 2 is a 16-bit normal counter with no electronic gear function. Now take the counter 1 as an example to briefly explain its function and use, and the counter 2 will not be specified.

The counter 1 receives the pulse signal through the terminal corresponding to the DI function "Counter 1 input", and the pulse signal is used for the counter 1 counting after passing through the electronic gear. When the count value reaches the set value (P45.04), the DO function "Counter 1 set value reached" is valid; when the count value reaches the maximum value (P45.06), select whether to stop counting or reset the count according to P45.13. value.

The counter can also be reset by the DI terminal. When the DI Terminal is the "Counter 1 reset" function and the terminal is valid, the counter 1 is reset.

For example: P45.04=3, P45.08=3, P45.09=1, the function of counter 1 is as shown below.

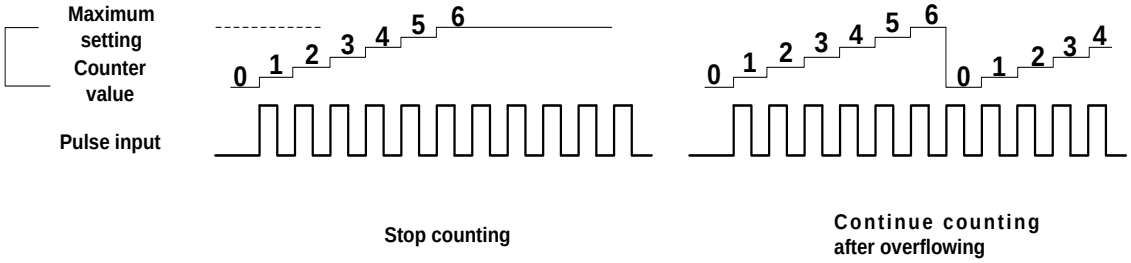



By setting a reasonable electronic gear, the counter 1 can realize functions such as fixed length in addition to the counting function, and the user can flexibly use it in specific applications.

| | | | | |
|---|---|---|---|---|
| r45.10 | Counter 2 actual value | Read only | - | ● |
| P45.11 | Counter 2 set value | When the counter 2 count value (after the electronic gear) reaches this setting, the DO function "Counter 2 set value reached" is valid.setting range: 1～65535 | 1000 | ☆ |
| P45.12 | Counter 2 maximum value | 1 to 65535, set the maximum value of counter 2.<br>Setting range: 1~65535 | 65535 | ☆ |
| P45.13 | Counter 1 control | Unit'digit: counting method<br>0: Stop counting after counting the maximum value<br>1: Reset after counting the maximum value, recount from 0<br>Ten'sdigit: the action after the counter reaches the set value<br>0: continue to run<br>1: Free stop<br>2: Ramp to stop<br>3: Emergency stop<br>Hundred's digit : Power-down save option<br>0: Do not save the count value when power is off<br>1: save the count value when power is off | 001 | ☆ |
| P45.14 | Counter 2 control | Unit'digit: counting method<br>0: Stop counting after counting the maximum value<br>1: Reset after counting the maximum value, | 100 | ☆ |

| | | | | |
|---|---|---|---|---|
| | | recount from 0<br>Ten'sdigit: the action after the counter reaches the set value<br>0: continue to run<br>1: Free stop<br>2: Ramp to stop<br>3: Emergency stop<br>Hundred's digit : Power-down save option<br>0: Do not save the count value when power is off<br>1: save the count value when power is off | | |

Count 1/2 overflow action:when counter higher than maximum value as following chart




| 60 Group Motor 2 basic parameter | | | | |
|---|---|---|---|---|
| P60.00 | Control mode | Same as P00.04 | 0 | ★ |
| P60.01 | Upper limit frequency | Same as P01.07 | 0 | ★ |
| P60.02 | Upper limit frequency digital setting | Lower limit (P01.09) ～ maximum frequency(P01.06) | 50.00Hz | ☆ |
| P60.04 | Accel and Decel time option | 0：same as motor 1<br>1：Accel and Decel time 3<br>When choose 1,Motor 2 can convert betweens accel and decal time 3 and 4 by DI terminal function code 55 or switch by output frequency comparing with P60.05 P60.06） | 0 | ★ |
| P60.05 | Accel time frequency switchover 2 | 0.00Hz～maximum frequency (P01.06) | 0.00Hz | ☆ |
| P60.06 | Decel time frequency switchover 2 | 0.00Hz～maxinumm frequency(P01.06) | 0.00Hz | ☆ |
| **61 Group Motor2 parameter** | | | | |
| 61.xx same as motor 1 parameter P11.xx | | | | |
| **62 Group Motor 2 VF control parameter** | | | | |
| 62.xx same as motor 1 VF control P12.xx | | | | |
| **63 Group Motor 2 Vector control parameter** | | | | |
| 63.xx same as motor 2 Vector control P13.xx | | | | |

# Chapter 6 Fault Diagnosis and Solution

## 6.1 Failure and diagnosis

The VFD500 inverter has perfect protection. If a fault occurs, the inverter will act according to the fault attribute. For more serious faults, the inverter will directly block the output; for general faults, it can be configured to stop or continue to operate according to the scheduled stop mode. After the inverter fails, the fault relay contacts act and the fault code is displayed on the display panel. Before seeking service, users can perform self-checking according to the tips in this section, analyze the cause of the fault, and find a solution.

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| Inverter unit protection | 1 | Er. SC | 1: Motor insulation aging<br>2: The cable is damaged and contact, short circuit<br>3:The distance between motor and inverter are too long.<br>4: Output transistor breakdown<br>5: The internal wiring of the inverter is loose, or the hardware is bad.<br>6:Brake transistor short circuit | 1. Confirm the insulation resistance of the motor. If it is turned on, replace the motor.<br>2. Check the power cable of the motor<br>3. Install reactor or output filter<br>4, seeking technical support<br>5, seeking technical support<br>6. Check if the braking resistor is damaged and the wiring is correct. |
| Over current during acceleration | 2 | Er.OC1 | 1: The output circuit is grounded or short circuited.<br>2: Motor auto-tuning is not performed.<br>3: The acceleration time is too short.<br>4: Manual torque boost or V/F curve is not appropriate.<br>5: The voltage is too low.<br>6: The startup operation is performed on the rotating motor.<br>7: A sudden load is added during acceleration.<br>8: The frequency inverter model is of too small power class. | 1: Eliminate external faults.<br>2: Perform the motor auto-Tuning in cold state<br>3: Increase the acceleration time.<br>4: Adjust the manual torque boost or V/F curve.<br>5: Adjust the voltage to normal range.<br>6: Select rotational speed tracking restart or start the motor after it stops.<br>7: Remove the added load.<br>8: Select a frequency inverter Of higher power class. |
| Over current during deceleration | 3 | Er.OC2 | 1: The output circuit is grounded or short circuited.<br>2: Motor auto-tuning is not performed.<br>3: The deceleration time is too short.<br>4: The voltage is too low.<br>5: A sudden load is added during deceleration.<br>6: The braking unit and braking resistor are not installed | 1: Eliminate external faults.<br>2: Perform the motor auto-tuning.<br>3: Increase the deceleration time.<br>4: Adjust the voltage to normal range.<br>5: Remove the added load.<br>6: Install the braking unit And braking resistor. |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| Over current at constant speed | 4 | Er.OC3 | 1: The output circuit is grounded or short circuited.<br>2: Motor auto-tuning is notperformed.<br>3: The voltage is too low.<br>4: A sudden load is added during operation.<br>5: The frequency inverter model is of too small power class. | 1:Eliminate external faults.<br>2: Perform the motor auto-tuning.<br>3:Adjust The voltage to normal range.<br>4: Remove the addedload.<br>5: Select a frequency Inverter of higher power class. |
| Overvoltage during acceleration | 5 | Er.OU1 | 1:The input voltage is too high<br>2:The surge voltage is mixed in the input power supply.<br>3: There is an external force to drive the motor to run, or the brake type load is too heavy<br>4:The acceleration time is too short<br>5:The motor is shorted to ground | 1:The power supply voltage is reduced to the normal range<br>2:Install DC reactor<br>3:Cancel the external force of the draggable motor or install the brake unit<br>4: Increase the acceleration time<br>5:Eliminate the part of the ground short circuit |
| Overvoltage during deceleration | 6 | Er.OU2 | 1:The input voltage is too high<br>2:The surge voltage is mixed in the input power supply.<br>3: there is an external force to drive the motor to run, or the brake type load is too heavy<br>4:the decceleration time is too short<br>5:the motor is shorted to ground | 1:the power supply voltage is reduced to the normal range<br>2:install DC reactor<br>3:Cancel the external force of the draggable motor or install the brake unit<br>4: increase the decceleration time<br>5:eliminate the part of the ground |
| Overvoltage at constant speed | 7 | Er.OU3 | 1:The input voltage is too high<br>2:The surge voltage is mixed in the input power supply.<br>3: There is an external force to drive the motor to run, or the brake type load is too heavy<br>4:The acceleration or decceleration time is too short<br>5:The motor is shorted to ground | 1:the power supply voltage is reduced to the normal range<br>2:install DC reactor<br>3:Cancel the external force of the draggable motor or install the brake unit<br>4: increase the acceleration or decceleration time<br>5:eliminate the part of the ground |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| Low voltage | 8 | Er.Lv1  | 1: Instantaneous power failure occurs on the input power supply or input phase loss<br>2: The frequency inverter's input voltage is not within the allowable range.<br>3: Cut off the power during operation<br>4:the internal wiring of the inverter is loose, or the hardware is bad. | 1:Check if the input power supply is abnormal, whether the input power terminal is loose, whether the input contactor or the air switch is abnormal.<br>2:adjust the voltage to the normal range<br>3:Power off after the inverter stops<br>4:seeking technical support<br>5: For the unstable power supply, if the performance requirements are low, try to enable the undervoltage stall function (P23.00). |
| Contactor open | 9 | Er.Lv2  | 1: Instantaneous power failure occurs on the input power supply<br>2: The frequency inverter's input voltage is not within the allowable range.<br>3: Cut off the power during operation<br>4:the internal wiring of the inverter is loose, or the hardware is bad. | 1:Check if the input power supply is abnormal, whether the input power terminal is loose, whether the input contactor or the air switch is abnormal.<br>2:adjust the voltage to the normal range<br>3:Power off after the inverter stops<br>4:seeking technical support<br>5: For the unstable power supply, if the performance requirements are low, try to enable the undervoltage stall function (P23.00). |
| Frequency inverter overload | 10 | Er. OL  | 1:The load is too large or the motor is blocked.<br>2:The large inertia load acceleration and deceleration time is too short<br>3: When the VF is controlled, the torque boost or V/F curve is not suitable.<br>4:The frequency converter selection is too small<br>5:Overload at low speed operation | 1. Reduce the load and check the motor and mechanical conditions.<br>2, increase the acceleration and deceleration time<br>3. Adjust the torque boost or V/F curve<br>4, select the inverter with a larger power level<br>5. Perform motor self-learning in cold state and reduce carrier frequency at low speed |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| Motor overload | 11 | Er.oL1 | 1:The load is too large or the motor is blocked.<br>2:The large inertia load acceleration and deceleration time is too short<br>3:When the VF is controlled, the torque boost or V/F curve is not suitable.<br>4:The motor selection is too small<br>5:overload at low speed operation<br>6:Improper setting of motor parameters and motor protection parameters | 1. Reduce the load and check the motor and mechanical conditions. Correctly set the motor parameters and motor protection parameters.<br>2, increase the acceleration and deceleration time<br>3. Adjust the torque boost or V/F curve<br>4, select a motor with a higher power level<br>5. Perform motor self-learning in cold state and reduce carrier frequency at low speed<br>6, check the settings of related parameters |
| Power input phase loss | 12 | Er.iLP | 1: The three-phase power input is abnormal.<br>2: The drive board is faulty.<br>3: Thelightning proof board is faulty.<br>4: The main control board is faulty. | 1:Eliminate external faults.<br>2: Ask for technical support.<br>3: Ask for technical support.<br>4: Ask for technical support. |
| Power output phase loss | 13 | Er.oLP | 1: The cable connecting the frequency inverter and the motor is faulty.<br>2: The frequency inverter's three-phase outputs are unbalanced when the motor is running.<br>3: The drive board is faulty.<br>4: The IGBT module is faulty. | 1:Eliminate external faults.<br>2: Check whether the Motor three phase winding is normal.<br>3: Ask for technical support.<br>4: Ask for technical support. |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| IGBT Module overheat | 14 | Er. oH | 1: The ambient temperature is too high.<br>2: The air filter is blocked.<br>3: The fan is damaged.<br>4: The thermally sensitive resistor of the IGBT module is damaged.<br>5: The inverter IGBT module is damaged | 1:Lower the ambient temperature.<br>2: Clean the air filter.<br>3: Replace thedamaged fan.<br>4:Replace the damaged thermally<br>sensitive resistor.<br>5: Replace the inverter module. |
| Motor overheat | 16 | Er. oH3 | 1:The temperature sensor wiring is loose<br>2:The motor temperature is too high<br>3:Themotor temperature sensor detects that the temperature is greater than the set threshold. | 1:check the temperature sensor wiring<br>2:Improve the carrier frequency, strengthen the heat dissipation of the motor, reduce the load, and select a motor with higher power.<br>3:Check if the set threshold is reasonable. |
| By wave current limitingfault | 17 | Er.CbC | 1: The load is too heavy or locked-rotor occurs on the motor.<br>2: The frequency inverter model is of too small power class | 1: Reduce the load and check the motor and mechanical condition.<br>2: Select a frequency inverter of<br>higher power class. |
| Ground short circuit | 18 | Er.GF | 1. Motor burnout or insulation aging<br>2, The cable is damaged and contact, short circuit<br>3. The distributed capacitance of the ⏚ terminal and motor cable is larger motor cable<br>4, Hardware is damaged | 1. Confirm the insulation resistance of the motor. If it is turned on, replace the motor.<br>2. Check the power cable of the motor to eliminate the fault point.<br>3, reduce the carrier frequency, install the output reactor<br>4, seeking technical support |
| module temperature detection fault | 20 | Er.tCK | 1, Temperature detection line broken<br>2, Drive board is faulty<br>3. Main control board is faulty<br>4, The environmental temperature is too low | 1. Check the thermistor wiring<br>2. Ask for technical support<br>3. Ask for technical support<br>4, manual intervention to drive the temperature rise |
| Current detection fault | 21 | Er.Cur | 1: The HALL device is faulty.<br>2: The drive board is faulty.<br>3: The control board is faulty | 1: Replace the faulty HALL device.<br>2: Replace the faulty drive board.<br>3: Ask for technical support. |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| Encoder offline | 22 | Er.PGL | 1. Motor locked<br>2. Encoder pulse setting wrong<br>3. Encoder offline | 1 check motor and mechanical condition<br>2 set correct parameter for encoder<br>3 check encoder connecting line |
| Motor over-speed | 25 | Er. oS | 1: The encoder parameters are setincorrectly.<br>2: The motor auto-tuning is notperformed.<br>3: The over-speed detectionparameters are set incorrectly | 1: Set the encoder parametersproperly.<br>2: Perform the motor auto-tuning.<br>3: Set the over-speed detection parameter correctly based on the actual situation. |
| Too large speed deviation | 26 | Er.DEV | 1: The encoder parameters are setincorrectly.<br>2: The motor auto-tuning is notperformed.<br>3: The detection parameters of toolarge speed deviation are setincorrectly. | 1: Set the encoder parameters properly.<br>2: Perform the motor auto-tuning.<br>3: Set the detection parameters correctly based on the actualsituation. |
| Motor auto-tuning fault 1 | 27 | Er.tU1 | 1: The motor parameters are not set according to the nameplate.<br>2: The motor auto-tuning times out. | 1: Set the motor parameters according to the nameplateproperly.<br>2: Check the cable connecting between the Frequency inverter and themotor. |
| Motor auto-tuning fault 3 | 28 | Er.tU3 | 1: The motor parameters are not set according to the nameplate.<br>2: The motor auto-tuning times out. | 1: Set the motor parametersaccording to the nameplateproperly.<br>2: Check the cable connecting between the Frequency |
| Off load | 31 | Er. LL | 1、The frequency inverter running currentis lower than the setting value. | 1、Confirm whether the load is off<br>2、Check that the load is disconnected or the parameter setting is correct |
| EEPROM read- write fault | 32 | Er.EEP | 1、 Eeprom Operate too frequent<br>2、 The EEPROM chip is damaged. | 1、 Operate Eeprom suitable<br>2、 Replace the main control board |
| Running time arrival | 33 | Er.TTA | Inverter trial time arrival | 1:Contact agent or distributor |
| 485Communication fault | 34 | Er.485 | 1, The work of the host computer is not normal<br>2, The communication line is not normal<br>3, The communication parameter set is incorrect | 1. Check the connection of upper computer<br>2. Check the communication connection line<br>3. Set communication parameters correctly |

| Fault Name | Fault code | Display | Possible Causes | Solutions |
|---|---|---|---|---|
| PID feedback lost during running | 36 | Er.FbL | 1、 PID feedback<P40.35 setting value and P40.36 not zero,PID feedback>P40.37 setting value and P40.38 not zero | 1、 Check PID feedback signal<br>2、 P40.35 and P40.37 set correct parameter |
| User-defined fault 1 | 37 | Er.Ud1 | 1: The signal of user-defined fault 1 is input via DI.<br>2:The signal of user-defined fault 1 is input via virtual I/O. | 1: Reset the operation.<br>2: Reset the operation |
| User-defined fault 2 | 38 | Er.Ud2 | 1: The signal of user-defined fault 2 is input via DI.<br>2:The signal of user-defined fault 2 is input via virtual I/O. | 1: Reset the operation.<br>2: Reset the operation |

The fault code is used for the communication read fault type: when the communication reads the registers r25.00, r26.00, r26.08, r26.16, the register contents of the reply are fault coded.

## 6.2 Warning type

The warning is used to remind and inform the user of the current state of the inverter. When the warning occurs, the keypad will display a warning message, and the warning will automatically reset when the warning is cleared. Some warnings require the user to check the cause before running the drive, and some do not care. Warning As an instant reminder, the drive does not store the corresponding information. Bit 12 of r27.10 indicates whether there is a warning message currently.

| Warning name | War ning code | Display | Reason | Measure |
|---|---|---|---|---|
| Insufficient power | 1 | PoFF | 1: The DC link voltage is insufficient and cannot be started normally. | 1:Check if the inverter power supply is normal. |
| Wrong parameter | 2 | A.PARA | 1: The parameter settings are wrong, such as:<br>The torque mode is set in the VF control mode. | 1:Modify and check the parameter compatibility problem |
| Sleeping status | 5 | SLEEP | 1. The system is in a sleep state, and the system will automatically start when hibernation is over. | 1:Generally no need to pay attention to it |

The warning code is used for the communication read warning type: when the communication reads register r25.16, the contents of the returned register are the warning code.

# Chapter 7 Selection Guide of inverter Accessory

## 7.1 Selection Guide of braking component

The braking resistor is used to consume the energy fed back by the motor to the inverter during braking or generating operation, so as to achieve quick braking or prevent the inverter from reporting the main circuit overvoltage fault. Braking resistor selection has two parameters: resistance and power, under normal circumstances, the greater the system inertia, the need for deceleration time is shorter, the more frequent braking, the braking resistor selection should be greater power , The smaller the resistance.

1、Selection of braking units

When braking, almost all the renewable energy of motor is consumed on the braking resistor.

$$R = \frac{U^2}{P_B}$$

Formula：

U --- The braking voltage when the system brakes stably (Different models have different values. Models with built-in braking unit can be set by P22.12)

R - Braking resistor

Pb – Braking Power

2 、**Selection power of braking resistor**

Braking resistor power can be calculated according to the following formula：

$$P_R = P_B \times D$$

Formula，

$P_R$----Braking resistor power

D ---- Braking frequency (braking process accounts for the proportion of the entire process), by the load conditions to determine the characteristics of common occasions typical values are shown in the table below：

Table 7-1 Braking frequency of common applications

| applications | D value |
|---|---|
| elevator | 20%～40% |
| Unwinding and winding | 40%～60% |
| Centrifuge | 40%～60% |
| Hoist and crane | 40%～60% |
| General application | 10% |

3 、braking components selection table

Table 7-2 VFD500 braking components selection table

| Three phase 380V | | | |
|---|---|---|---|
| Model | Recommend power of braking resistor （10%braking | Recommend resistance value of braking resistor | Braking unit |
| VFD500-R75GT4B | 100W | ≥ 200Ω | Built-in as standard |
| VFD500-1R5GT4B | 150W | ≥ 180Ω | |
| VFD500-2R2GT4B | 300W | ≥ 180Ω | |
| VFD500-4R0G/5R5PT4B | 500W | ≥ 90Ω | |

| | | | |
|---|---|---|---|
| VFD500-5R5G/7R5PT4B | 800W | ≥ 60Ω | Built-in as option |
| VFD500-7R5G/011PT4B | 1000W | ≥ 60Ω | |
| VFD500-011G/015PT4B | 1.2KW | ≥ 25Ω | |
| VFD500-015G/018PT4B | 1.5KW | ≥ 25Ω | |
| VFD500-018G/022PT4B | 2.0KW | ≥ 18Ω | |
| VFD500-022G/030PT4B | 2.5KW | ≥ 18Ω | |
| VFD500-030G/037PT4 | 3.0KW | ≥ 12Ω | |
| VFD500-037G/045PT4 | 3.7 KW | ≥ 15Ω | |
| VFD500-045G/055PT4 | 4.5 KW | ≥ 8Ω | |
| VFD500-055G/075PT4 | 5.5 KW | ≥ 6Ω | |
| VFD500-075G/090PT4 | 7.5 KW | ≥ 6Ω | |
| VFD500-090G/110PT4～ VFD500-710GT4 | As per actual load and braking power | | external |

## 7.2 PG card type

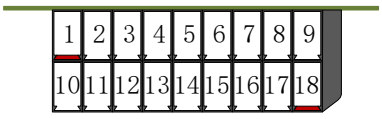
The optional PG card and supported encoders for the VFD500 are shown in the table below.

Chart 7-3 PG type view chart

| Model | name | USAGE |
|---|---|---|
| MT500-PG-INC1 | INCREMENTAL PG | open collector type, push-pull output type, differential output type encoder. |
| MT500-PG-INC2 | Incremental encoder PG card with Frequency division | open collector type, push-pull output type, differential output type encoder.<br>Frequency division range: 0~63 |
| MT500-PG-RT1 | RESOLVER PG | Rotary transformer encoder |

### （1）INCREMENTAL PG

**Chart 7-4 Incremental encoder PG card (VFD500-PG-INC1) port definition**

| Pin number diagram | Pin number | Name | Usage |
|---|---|---|---|
|  | 1，10 | PE | Shield terminal |
| | 2，11 | VCC | Power output for powering the encoder<br>5V ± 2%, maximum 200mA<br>12V±5%, maximum 200mA |
| | 3，12 | GND | Power supply common terminal and signal |
| | 4 | Z- | Encoder Z-signal |
| | 5 | Z+ | Encoder Z+signal |
| | 6 | B- | Encoder B-signal |
| | 7 | B+ | Encoder B+signal |
| | 8 | A- | Encoder A-signal |

| | | | | |
|---|---|---|---|---|
| | 9 | A+ | Encoder A+signal | |
| | 13 | W- | Encoder W-signal | Note:UVW is used to the synchronous motor incremental encoder, no need wiring when it is not used. |
| | 14 | W+ | Encoder W+signal | |
| | 15 | V- | Encoder V-signal | |
| | 16 | V+ | Encoder V+signal | |
| | 17 | U- | Encoder U-signal | |
| | 18 | U+ | Encoder U+signal | |

◆ **Open collector type, push-pull output type encoder wiring:**

Select the encoder power supply through SW3 on the PG card, SW1 and SW2 to the OC side, as shown below:：

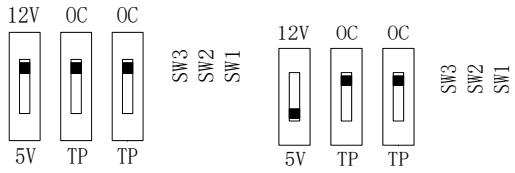



**Chart 7-5 Collector open type, push-pull output type encoder DIP switch selection**

When wiring, the A-、B-、Z- terminals of the PG card are not wired, and the signal output of the encoder is connected to the A+、B+、Z+ terminals of the PG card, as shown in the figure below.：

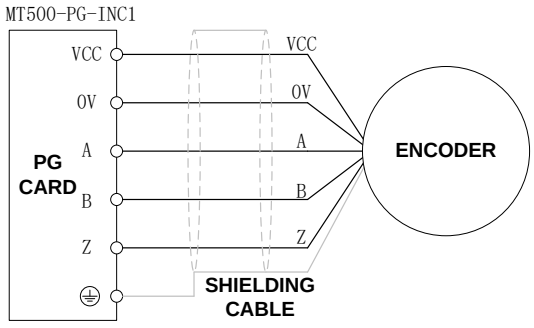



**Chart 7-6 Collector open type, push-pull output type encoder wiring diagram**

◆ **Differential output encoder wiring：**

Select the encoder power supply through SW3 on the PG card, SW1 and SW2 to the TP side, as shown below：

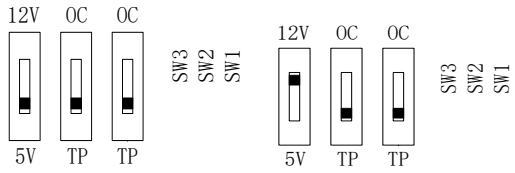


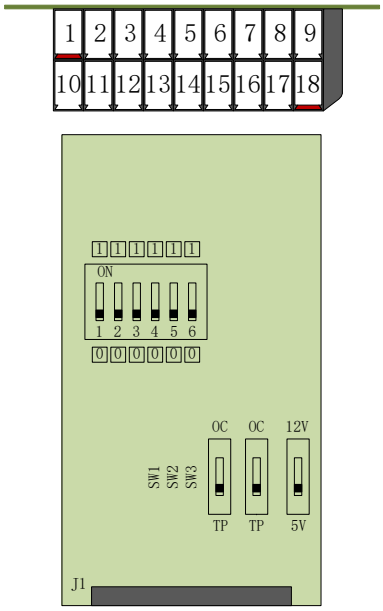

**Chart 7-7 Differential output type encoder DIP switch selection**

The wiring of the PG card and the encoder are connected one by one according to the silkscreen.

### （2）Incremental encoder PG card with Frequency division

**The input signal of the MT500-PG-INC2 crossover PG card can be differential or open collector type, selected by the DIP switch; there are two sets of output signals, open collector type and differential output type; The card's port definition is shown in the table below.**

**Chart 7-8 Incremental encoder PG card with frequency division (MT500-PG-INC2) port definition**

| Pin number diagram | Pin number | Name | Usage |
|---|---|---|---|
|  | 1 | PE | Shield terminal |
| | 2 | VCC | Power output for powering the encoder<br>5V ± 2%, maximum 200mA<br>12V±5%, maximum 200mA |
| | 3 | GND | Power supply common terminal and signal |
| | 4 | Z- | Encoder Z-signal |
| | 5 | Z+ | Encoder Z+signal |
| | 6 | B- | Encoder B-signal |
| | 7 | B+ | Encoder B+signal |
| | 8 | A- | Encoder A-signal |
| | 9 | A+ | Encoder A+signal |
| | 10 | OZ | Z signal crossover output (NPN open collector type) |
| | 11 | OB | B-phase pulse frequency dividing output (NPN open collector type) |
| | 12 | OA | Phase A pulse divider output (NPN open collector type) |
| | 13 | OZ- | Z signal crossover output Z- (differential output type) |
| | 14 | OZ+ | Z signal crossover output Z+ (differential output type) |
| | 15 | OB- | B-phase pulse divider output B- (differential output type) |
| | 16 | OB+ | B-phase pulse divider output B+ (differential output type) |
| | 17 | OA- | Phase A pulse divider output A- (differential output type) |

| | | | |
|---|---|---|---|
| | 18 | OA+ | Phase A pulse divider output A+ (differential output type) |

**In the schematic diagram of the crossover card in Table 7-5, the dial switch indicates bit 0~bit5 of the frequency division number from right to left, the frequency division range is 0~63, and the frequency division number is set to 0 and 1 when there is no frequency division.**

**Frequency division corresponding to a single DIP switch**

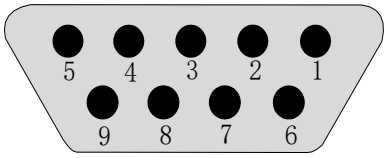
| DIP switch | Number of frequency division |
|---|---|
| 1 | 32 |
| 2 | 16 |
| 3 | 8 |
| 4 | 4 |
| 5 | 2 |
| 6 | 1 |

**For example 35 frequency divsion： 35 = 32+2+1**

**Just turn the dial switches corresponding to the subscripts 1, 5, and 6 to "ON".Please refer to the description of MT500-PG-INC1 for encoder wiring of MT500-PG-INC2.**

### （3）Resolver PG card

**Chart 7-9 Resolver PG Card (MT500-PG-RT1) Interface Definition**

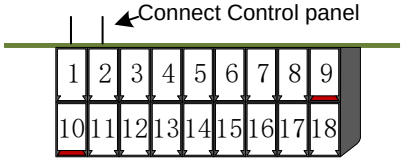
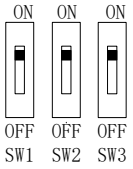
| Pin number diagram | Pin number | Name | Usage |
|---|---|---|---|
|  （PORT TYPE：DB9） | 1 | EXCLO | Resolver excitation negative |
| | 2 | EXC | Resolver excitation positive |
| | 3 | SIN | Resolver feedback SIN positive |
| | 4 | SINLO | Resolver feedback SIN negative |
| | 5 | COS | Resolver feedback COS positive |
| | 9 | COSLO | Resolver feedback COS negative |
| | 6，7，8 | NC | Hanging in air |

## 7.3 IO Extension card

- **MT500-IOEX1 Extension card**

- The MT500-IOEX1 expansion card is a multi-function IO expansion card for VFD530 series inverters. It can expand 4 channels of DI, 2 channels of AI, and 4 channels of DO. Among them, , AI4 can be used as an ordinary voltage input analog quantity, and can also be used as a temperature detection input of PT100/PT1000/KTY84-130 (temperature detection is connected to PT and COM).

- **The terminal definitions of the MT500-IOEX1 expansion card are shown in Table 7-10**

<table>
<tr><th>Terminal distribution</th><th>SN</th><th>Terminal name</th><th>Terminal function description</th></tr>
<tr><td rowspan="15"> 
</td><td>1、10</td><td>GND</td><td>Analog ground, internally isolated from COM</td></tr>
<tr><td>2</td><td>AI4</td><td>Analog input 4<br>Input 0~10V: input impedance 22KΩ</td></tr>
<tr><td>3、6、16</td><td>COM</td><td>+24V, PT, PLC and digital input and output public terminal</td></tr>
<tr><td>4</td><td>24V</td><td>Provides +24V power supply to the outside, generally used as digital input and output terminal working power supply and external sensor power supply</td></tr>
<tr><td rowspan="4">5</td><td rowspan="4">PLC</td><td>Digital input power terminal</td></tr>
<tr><td>It is used for switching between high and low level of switch input. It is short-circuited with +24V at the factory, that is, DI is active at low level.</td></tr>
<tr><td>When the external power is input, disconnect the PLC from the +24V.</td></tr>
<tr><td>It is a separate network from the PLC on the IO board and is used separately.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">PT</td><td>Support PT100/PT1000/KTY84-130<br>AI4 is inactive when using the temperature sensor direct connection function (temperature detection connection PT and COM)</td><td> 
</td></tr>
<tr><td>DIP switch switching mode:
<table>
<tr><th>DIP switch</th><th>SW 1</th><th>SW 2</th><th>SW 3</th></tr>
<tr><td>AI4</td><td>ON</td><td>ON</td><td>ON</td></tr>
<tr><td>PT100</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>PT1000</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>KTY84-130</td><td>OFF</td><td>ON</td><td>ON</td></tr>
</table></td><td></td></tr>
<tr><td>8</td><td>DI9</td><td>Digital input 9</td><td rowspan="2">Input frequency: 0~200Hz<br>Voltage range: 0~30V</td></tr>
<tr><td>9</td><td>DI7</td><td>Digital input 7</td></tr>
<tr><td>11</td><td>AI3</td><td colspan="2">Analog input 3 input 0~10V</td></tr>
<tr><td>12</td><td>DO6</td><td>Open collector output 6</td><td rowspan="2">Voltage range: 0~24V</td></tr>
<tr><td>13</td><td>DO4</td><td>Open collector output 4</td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | 14 | DO5 | Open collector output 5 | |
| | 15 | DO3 | Open collector output 3 | |
| | 17 | DI8 | Digital input 8 | Input frequency: 0~200Hz Voltage range: 0~30V |
| | 18 | DI6 | Digital input 6 | |

### 7.4 CANopen exentsion card

The MT500-CAN1 communication card is a CANopen slave communication card for connecting VFD500 series inverters to the CANopen network. Please note that CANopen communication cannot be used simultaneously with Modbus communication.

Product Features:

Support Node Guard protocol, the master station can use this function to query device status;

Support the Heartbeat protocol, and the slave station periodically reports the current status to the primary station;

Support NMT network management protocol;

SDO only supports the accelerated transfer mechanism, which can transfer up to 4 bytes and can be used to read and write the inverter parameters.

Support 4 groups of PDO

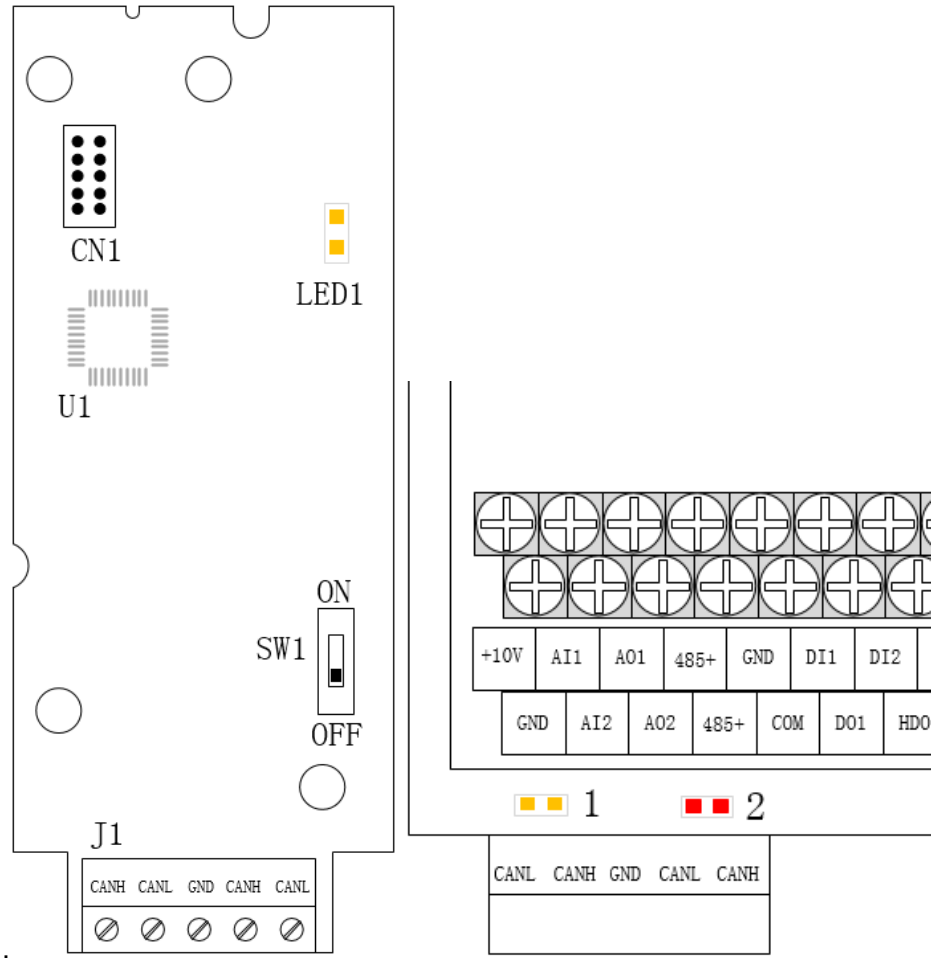



Figure 7-11 CANopen communication card and installation DiagramTable 7-12 CANopen communication card hardware description

| Graphic name | Description name | Function description |
|---|---|---|
| J1 | Terminals | CANopen bus terminal block, see description of Table 7-9 |
| LED1 | Power Indicator | Lights up to indicate normal power supply |
| Indicator light:<br>Yellow light (1)<br>Red light (2) | Status Indicator | Working status and fault indication:<br>Yellow light (1) on: indicates normal operation<br>Yellow light (1) flash: indicates communication initialization<br>Red light (2) on: indicates internal communication failure<br>Red light (2) flash: indicates CANopen communication failure or bus off |
| SW1 | DIP switch | Terminating resistor for setting the CANopen bus |

Table 7-9 Function description of J1 terminal block

| Graphic name | Description name | Function description |
|---|---|---|
| 1，4 | CANH | Signal line positive |
| 2，5 | CANL | Signal line negative |
| 3 | GND | Signal ground |

# Chapter 8 Daily maintenance of frequency inverters

## 8.1 Daily maintenance

Due to the influence of temperature, humidity, dust and vibration, it will lead to poor heat dissipation and component aging of frequency inverter, and results in potential failure or reducing the service life of frequency inverter. Therefore, it is necessary to do daily and regular maintenance of the frequency inverter.

### 8.1.1 Daily maintenance

Due to the influence of temperature, humidity, dust and vibration, it will lead to poor heat dissipation and component aging of frequency inverter, and results in potential failure or reducing the service life of frequency inverter. Therefore, it is necessary to do daily and regular maintenance of the frequency inverter.
Daily check items:
1) Check if the sound is normal during the running of the motor;
2) Check if there is a vibration during the running of the motor;
3) check whether the installation environment of frequency inverter has changed;
4) Check if the cooling fan of frequency inverter is working correctly, the cooling air duct is clear;
5) Check if the frequency inverter is overheating;
6) Make sure that the frequency inverter should always be kept in a clean state;
7) Clear up effectively the dust on the surface of frequency inverter, prevent the dust from entering into the inside of frequency inverter, especially for the metal dust;
8) Clear up effectively the oil and dust on the cooling fan of frequency inverter.

### 8.1.2 Regular inspection

Please regularly check the frequency inverter, especially for the difficult checking place of running.
Regular inspection items:
1) Check the air duct and clear up regularly;
2) Check if there are any loose screws;
3) Check if the inverter has been corroded;
4) Check whether the wiring terminals show signs of arcing;
5) Main circuit insulation test.

Note: When using the megger(please use the DC 500V meg ohm meter) to measure the insulation resistance, you shall disconnect the main circuit with the frequency inverter. Do not use the insulation resistance meter to test the control circuit. It don’t have to do the high voltage test (It has been done when the frequency inverter produced in factory.)

## 8.2 Wearing parts replacement

The vulnerable parts of the inverter mainly include cooling fans, electrolytic capacitors, relays, etc. The life of the inverter is closely related to the environment and maintenance conditions used. Table 8-3 lists the replacement time and causes of damage to the main components for reference. In addition, if abnormality is found during maintenance, please replace it in time.

Table 8-3 Spared parts replacement time

| Spared parts | Replacing time | Damaged reasons | How to check |
|---|---|---|---|
| fans | 30000 ～ 60000h | Bearing wear, blade aging | 1, the blade has cracks<br>2 abnormal vibration, excessive noise |
| Electrolytic capacitor | 40000 ～ 50000h | Poor input power quality, high ambient temperature, low air pressure, frequent load changes, electrolyte aging | 1, there is liquid leakage<br>2, the safety valve protrudes<br>3, the capacitance value is beyond the allowable range<br>4, insulation resistance is abnormal<br>5, DC bus voltage fluctuations are too large |
| Relay | 50000 ～ 100000 times | Corrosion, dust affect contact contact effect, contact action is too frequent | Contact ineffective |

The user can refer to the accumulated power-on time and accumulated running time recorded by the inverter, and combine the actual operating conditions and the external environment to determine the replacement period.

1) Possible reasons for the damage of cooling fan: bearing wear and vane aging. Distinguish standard: Any cracks in the fan vanes, any abnormal vibration sound during the starting of frequency inverter.
2) Possible reasons for the damage of filter electrolytic capacitor: poor quality of the input power supply, the environment temperature is high, the load change frequently and the electrolyte aging. Distinguish standard: Any leakage of its liquid, if the safety valve is protruding, electrostatic capacitance and insulation resistance measurement.

## 8.3Warranty Items

1) Warranty only refers to frequency inverter.
2) Under normal use, if there is any failure or damage, our company is responsible for the warranty within 18 months. (Leave factory date is subjected to the S/N on the frequency inverter nameplate or according to the contract). When over 18 months, reasonable fee will be charged for maintenance;
3) During the period of 18 months, if the following situation happens, certain maintenance fee will be charged;

a. The users don't follow the rules in the manual lead to the frequency inverter damaged;
b. The damage caused by fire, flood and abnormal voltage;
c. The damage caused by using the frequency inverter for abnormal functions;
d. The relevant service fee is calculated according to the manufacturer's standard, if there is an contract, then it is subject to the contract items.

 For detailed warranty instructions, please refer to the Product Warranty Card.

# Appendix A Modbus communication protocol

VFD500 series of inverter provides RS485 communication on interface, and adopts MODBUS communication protocol. User can carry out centralized monitoring through PC/PLC to get operating

requirements and user can set the running command, modify or read the function codes, the workingstate or fault information of frequency inverter by Modbus communication protocol.In addition VFD 500can also be used as a host to broadcast with other VFD500 communication.

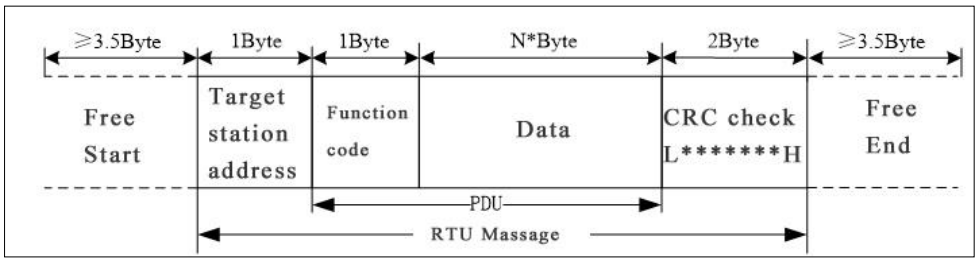
## A.1 Protocl fomat

RS485 asynchronous half-duplex.

RS485 terminal default data format: 1-8-N-1 (1 start bit, 8 data bits, no parity, 1 stop bit), the default baud rate: 9600bps. See parameter group set 30.

## A.2 Message format

The VFD500 series inverter Modbus message includes the start sign, the RTU message, and the end sign。




The RTU message includes the address code, the PDU (Protocol Data Uint, the protocol data unit), and the CRC check. PDU includes the function code and the data section.

RTU frame format：

| | | |
|---|---|---|
| Frame start (START) | More than the 3.5 byte transmission time | |
| Target station address (ADR) | Communication address:1 to 247(0: broadcastaddress) | |
| Command code (CMD) | Command code | Description |
| | 0x03 | Read multiple registers of the AC drive |
| | 0x06 | Write a single register to the AC drive. |
| | 0x10 | Write Multiple registers to the AC drive. |
| | 0x08 | Diagnostic command code |
| Number of function code | Including the register address (2Byte), the number of registers n(2Byte) and the register content (2nByte), etc.see A3 in detail | |
| CRC CHK low level | It indicates the replying data or the data waiting to write-in. CRC 16 check value,During the transmission, high bit is put in frontand low bit is at the back.see detail in A.5 Chapter | |
| CRC CHK high level | | |
| FRAME END | More than 3.5 byte transmission time | |

## A.3 Command code instruction

### A.3.1 Command code 0x03Read multiple registers or status words

- **Request PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x03 |
| initial address | 2byte | 0x0000～0xFFFF(high 8 bit in front) |
| Number of registers | 2byte | 0x0001-0x0010 (1～16,high 8 bit in front) |

- **Response PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x03 |
| Initial address | 1byte | 2n（n means Number of registers） |
| Number of registers | 2* nbyte | Register value high 8 bit in front,first send initial address'register value |

- **Wrong PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x83 |
| Abnormal code | 1byte | See A.4Abnormal response information |

Currently Modbus protocol 0x03 command code does not support cross-group read multiple function codes, it will be wrongif more than the current group of function code number

### A.3.2 Command code 0x06 write single registers or status word command codes

**Request PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x06 |
| Initial address | 2byte | 0x0000～0xFFFF(high 8 bit in front) |
| Register value | 2byte | 0x0000～0xFFFF(register value high 8 bit in front) |

- **Respond PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x06 |
| Register address | 2byte | 0x0000～0xFFFF |
| Register value | 2byte | 0x0000～0xFFFF |

- **Wrong PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x86 |
| Abnormal code | 1byte | See A4 Abnormal response information |

### A.3.3 Command 0x10write multiple registers or status word command codes

- **Request PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x10 |
| Initial address | 2byte | 0x0000～0xFFFF(high 8 bit in front) |
| Number of Register | 2byte | 0x0001～0x0010(1～16, high 8 bit in front) |
| Number of Byte | 1byte | 2n (n is number of Register) |

| | | |
|---|---|---|
| Register Value | 2* nbyte | Register value high 8 bit in front,first send initial address'register value |

- **Respond PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x10 |
| Initial address | 2byte | 0x0000～0xFFFF( high 8 bit in front) |
| Number of register | 2byte | 1～16(1～16, high 8 bit in front) |

- **Wrong PDU**

| | | |
|---|---|---|
| Command code | 1byte | 0x90 |
| Abnomal Code | 1byte | See Abnormal response information |

**A.3.4 Commad code 0x08Diagnostic function**

- Modbus Command Code 0x08 Providea series of tests to check the communication system between the client (master) device and the server (slave) or various internal error conditions in the server.
- This function uses the sub-command code of 2 bytes inquery to define the type of test to be performed. The server copies the command and subcommand codes in the normal response. Some diagnostics cause the remote device to return the data through the normally responding data fields.
- Diagnostic functions to remote devices generally do not affect the user program running in the device. The main diagnostic function of this product is not line diagnosis (0000), used to test the host from the machine is normal communication.
- Request PDU

| | | |
|---|---|---|
| Command code | 1byte | 0x08 |
| Subcommand code | 2byte | 0x0000～0xFFFF |
| Data | 2byte | 0x0000～0xFFFF |

Respond PDU

| | | |
|---|---|---|
| Command code | 1byte | 0x08 |
| Subcommand code | 2byte | 0x0000 |
| Data | 2byte | Same as request of PDU |

Wrong PDU

| | | |
|---|---|---|
| Command code | 1byte | 0x88 |
| Abnomal code | 1byte | See Abnormal response information |

**A.4 Abnormal response information**

When the master device sends a request to the slave device, the master expects a normal response. The master's query may result in one of four events:

(1) If the slave device receives a request for a communication error and the query can be processed normally, the slave device will return a normal response.

(2) If the slave device does not receive the request due to a communication error, no information can be returned and the slave device times out.

(3) If the slave device receives a request and detects a communication error (parity, address, framing error, etc.), no response is returned and the slave device times out.

(4) If the slave device receives no communication error request, but can not handle the request (such as the register address does not exist, etc.), the slave station will return an abnormal response to inform the master of the actual situation.

**Abnormal response command code = normal response command code + 0x80, Abnormal code value and meaning as shown in the following table**

| Error code | Name | Description |
|---|---|---|
| 0x01 | Invalid command code/error function code | The function code received by the slave is outside the configured range |
| 0x02 | Error data address/Illegal register address | Slave station receives the data address is not allowed address<br>the number of registers being Read and write is out of range<br>When writing multiple registers, the number of bytes in the PDU is not equal to the number of registers |
| 0x03 | wrong frame format | Length of frame is not correct<br>CRC verifying not passed |
| 0x04 | Data is out of range | The data received by the slave exceeds the corresponding register minimum to maximum range |
| 0x05 | Reading request refuse | Operate to read-only register wirte<br>Operate to read-only register write in running status |

### A.5 CRC check

CRC（Cyclical Redundancy Check）use RTU frame，The message includes an error detection field based on the CRC method. The CRC field examines the contents of the entire message. The CRC field is two bytes containing a binary value of 16 bits. It is calculated by the transmission equipment and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field,If the two CRC values are not equal, there is an error in the transmission.There is a lot of information on the Internet about CRC checking it is not elaborated hereabout CRC check code generation algorithm,

### A.6 Register address distribution

The register address of VFD500 is 16-bit data, the upper 8 bits represent the function code group number, the lower 8 bits represent the group number, the upper 8 bits are sent before. The 32-bit register occupies two adjacent addresses, the even address stores the lower 16 bits, and the next address (odd address) of the even address stores the upper 16 bits.

In the register write operation, in order to avoid frequent damage caused by memory EEPROM write, using the highest bit of the register address indicates whether it save as EEPROM, the highest bit to be 1 indicates to save in EEPROM, 0 means save only in RAM. In other words, if you want to write the register value which is saved after power-off, you should add 0x8000 to the original register address.

VFD500 register address as follows：

| Adress space | Descriptoin |
|---|---|
| 0x0000 ~ 0x6363 (Function code address space) | Rule: The upper 8 digits of the hexadecimal number indicate the group number (0 to 99), and the lower 8 digits indicate the serial number within the group (0 to 99). |

<table>
<tr><td colspan="2"></td><td>Example 1: Function code 27.10 (drive status word 1), which<br>The hexadecimal address is: 0x1B0A (0x1B = 27, 0x0A = 10),<br>Decimal address: 27 × 256 + 10 = 6922.<br><br>Example 2: Function code 14.01 (digital setting of torque reference), when no EEPROM is stored, its<br>The hexadecimal address is: 0x0E01 (0x0E = 14, 0x01 = 1),<br>The decimal address is: 14 × 256 + 1 = 3585.<br><br>If you want to save the content written in communication to EEPROM after power off, then<br>The hexadecimal address is 0x8E01 (0x0E01 plus 0x8000),<br>The decimal address is 36353 (3585 plus 32768).<br>Note: The addresses calculated in hexadecimal or decimal are the same, and users can choose a familiar calculation method.</td></tr>
<tr><td rowspan="12">Communicatoin special address</td><td>0x7000</td><td>Communication command.The values and functions are as follows：<br>0x0000：disable command ；<br>0x0001：forward running；<br>0x0002：reverse running；<br>0x0003：forward jog；<br>0x0004：reverse jog；<br>0x0005：free stop；<br>0x0006：decelerating stop；<br>0x0007：immediate stop；<br>0x0008：fault reset；</td></tr>
<tr><td>0x7001</td><td>Communication speed given. The unit of this register can be set by P30.14。<br>0.01%（-100.00% ~ 100.00%）<br>0.01Hz（0 ~ 600.00Hz）<br>1Rpm（0 ~ 65535Rpm）</td></tr>
<tr><td>0x7002</td><td>CommunicationTorque given.0.01%（-300.00% ~ 300.00%）</td></tr>
<tr><td>0x7003</td><td>Communication upper frequency given. The unit of this register can be set by P30.14.<br>Different units range same as 0x7001.</td></tr>
<tr><td>0x7004</td><td>Torque mode speed limit. The unit of this register can be set by P30.14.<br>Different units range same as 0x7001.</td></tr>
<tr><td>0x7005</td><td>Electric torque limit 0.1%（0~300.0%）</td></tr>
<tr><td>0x7006</td><td>Power generation torque limit 0.1%（0~300.0%）</td></tr>
<tr><td>0x7007</td><td>PID setting source.0.01%（-100.00% ~ 100.00%）</td></tr>
<tr><td>0x7008</td><td>PID feedback source 0.01%（-100.00% ~ 100.00%）</td></tr>
<tr><td>0x7009</td><td>VF separation voltage given.0.1%（0~ 100.0%）</td></tr>
<tr><td>0x700A</td><td>External fault setting</td></tr>
<tr><td></td><td>0x700B</td><td>DO status setting. When the DO function (please refer to P07.01 ~ P07.10) is set to 0 (no function), its status comes from the setting of the communication dedicated register, and the corresponding bit of 1 means it is valid. The bits of this register are defined as follows:
<table>
<tr><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
</table>
</td></tr>
</table>

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | RL2 | RL1 | DO2 | DO1 |
| | | Bit15 | Bit14 | Bit13 | Bit12 | Bit11 | Bit10 | Bit9 | Bit8 |
| | | | | | | | | VDO2 | VDO1 |

**2）Inverter status: Read the inverter status, see 27 groups of function codes.**

**3）Inverter fault description: read the inverter fault see 25.00 function code (0x1900)**

| VFD Fault address | VFD trip information | |
|---|---|---|
| 0x1900（25.00 function code） | 0000：no fault<br>0001：SC protection<br>0002：overcurrent during acceleration<br>0003：overcurrent during deceleration<br>0004：overcurrent at constant speed<br>0005：overvoltage during acceleration<br>0006：overvoltage during deceleration<br>0007：overvoltage at constant speed<br>0008：low voltage fault<br>0009：contactor open<br>000A：VFD overload<br>000B：motor overload<br>000C：power input phase loss<br>000D：power output phase loss<br>000E：IGBT module overheat<br>000F：Reserved<br>0010：motor overheat<br>0011：fast overcurrent time out fault<br>0012：Ground fault<br>0013：motor auto tuning fault reserved<br>0014：drives temperarure detection fault | 0015：current detection fault<br>0016：PG card feedback fault<br>0017：Encoder zero detection fault<br>0018：Reserved<br>0019：overspeed<br>001A：too large speed deviation<br>001B: motor auto tuning fault 1<br>001C: motor auto tuning fault 2<br>001D: motor auto tuning fault 3<br>001E：motor auto tuning fault 4<br>001F：off load<br>0020：Eeprom read and write fault<br>0021：Reserved<br>0022：Communication time out fault<br>0023：extension card fault<br>0024：PID feedback lost during running<br>0025：User-defined fault 1<br>0026：User-defined fault 2 |

### A.7 Register data type

There are several types of register data, and each type of communication setting method is shown in the following table:

| Types of register data | Communication setting method |
|---|---|
| 16-bit unsigned number | 0~65535 corresponds to 0xFFFF; the decimal point does not need to be processed.Example: Set P00.07 to 40.00Hz: Write 0x0FA0 to the 0x0007 address. |
| 16-bit signed number | -32768~32767 corresponds to 0x8000~0x7FFFF.<br>Example: Set P14.01 to -50.0%:<br>Write 0xFE0C to the 0x0E01 address. |
| Binary number | Represents a value of 16 bits.<br>For example, the content of the 0x0600 address is 0x0012, which means:Bit1 of r06.00=1, bit4=1; that is, DI1 and DI5 (HDI) are valid.。 |
| "One hundred thousand" type | "Units" ~ "Thousands" correspond to 0~3bit, 4~7bit, 8~11bit, 12~15bit respectively. |

| | |
|---|---|
| | Example: Set the “Unit’digit” of P40.04 to AI1 and “ten’s digit” to AI2:<br>Write 0x0021 to the 0x2804 address. |
| 32-bit unsigned number | The contents of the two registers need to be combined into 32-bit numbers.<br>For example, read the meter r16.00:<br>Step 1: Read 2 registers from the starting address 0x1000<br>Step 2: Watt-hour meter reading = ((Uint32)0x1001 value<<16) + 0x1000 value |
| 32-bit signed number | Similar to 32-bit unsigned numbers. The value of the even address is still the lower 16 bits, and the value of the next address (odd number) of the even address indicates the upper 16 bits. |

### A.8 The inverter acts as a Modbus master

VFD500 can be used as a Modbus master station, it currently only supports broadcast network. When P30.09 is set as 1, master mode can be enabled. The sending frame as master station is as follows:

| 0x00 | 0x06 | 0x70 | N | ValH | ValL | CRCL | CRCH |
|---|---|---|---|---|---|---|---|

Instruction：

1. N indicates the slave register of the operation which is set by P30.10.
2. Val means the data sent, Val = (ValH << 8) + ValL, the function code P30.11 is to select the contents of the data sent.
3. The idle time between frame and frame is set by function code P30.12.

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