VH3 series vector VFD

(PA parameter auto-study） Fast manual

Wuxi XINJE Electric Co., Ltd.

Data No.: INV C 12 20170328 204

This manual contained basic notes of body safety and product connection. These notes are listed with triangle mark, others please comply with basic electrical operation rules.

Installation notes

please abide by the points for attention, if not, the control system may work abnormal and cause property damaging.

Correct using

This equipment only can be used to the applications listed in this manual, and connected the devices recommended by XINJE.

The product can work fine by correct transmission, maintainance, configuration and installation, and please operate as the manual notes.

Responsibility statement

We have checked the contents of this manual to match the hardware and software descriptions, as the mistakes are inevitable, we cannot ensure the complete consistency. The manual is subject to change without prior notice.

Aug. 2016

Catalog

Safety Precautions

Upon unpacking, please confirm that: Check whether the model and the rated values on the nameplate of the inverter are in accordance with your order. Check if there is any damage occurred during transportation; pleases contact us or the distributor if you find any missing or damage of the products.

In order to use this product correctly, the user who uses the product for the first time must read this manual carefully and pay close attention to the safety precautions.

Please keep this manual properly, hand it to the terminal user and lay it on the place where the operators can read it easily.

◎ Safty Precautions ◎

Confirmations Upon Delivery

Notice 
1. Never install an inverter that is damaged or missing components. Doing so can result in injury.

- **Installation**

Notice 
1. Always hold the bottom of the inverter when carrying it. If the inverter is held by the front cover, the main body of the inverter may fall, possible resulting in injury. 2. Attach the inverter to metal or other noncombustible materials. Fire can result if the inverter is attached to a combustible material. 3. Install a cooling fan or other cooling device when installing more than one inverter in the same enclosure so that the temperature of the air entering the inverters is below 45℃. Overheating can result in fires or other accidents.

- **Wiring**

Danger 
1. Always turn off the input power supply before wiring. Otherwise, an electric shock or fire may occur. 2. Wiring must be operated by an authorized person qualified in electrical work. Otherwise, an electric shock or fire may occur. 3. Make sure to ground the ground terminals. Otherwise, an electric shock or fire may occur. 4. Always check the operation of any emergency stop circuits after they are wired. Otherwise, possibly result in injury (user responsibility for the wiring). 5. Never touch the output terminal directly by your hands or let the output terminals to come into contact with the inverter case. Never short the output terminals. Otherwise, an electric short or ground short may occur. 6. Never touch the internal circuit or the zero-component until power off and the charge indicator is off as there may still be high voltage inside the AC motor dirver.
Notice 
1. Confirm that the voltage of the main AC power supply satisfies the rated voltage of the Inverter. Injury and fire may occur if the voltage is not right. 2. Do not perform voltage withstand tests on the Inverter. Otherwise, semiconductor elements and other devices can be damaged. 3. Connect braking resistors, Braking Resistor Units, and Braking Units as shown in the I/O wiring examples. Otherwise, a fire may occur. 4. Tighten all terminal screws to the specified tightening torque. Otherwise, a fire may occur. 5. Do not connect AC power to output terminals U, V, and W. The interior parts of the Inverter will be damaged if voltage is applied to the output terminals. 6. Do not connect phase-advancing capacitors or LC/RC noise filters to the

output circuits.The Inverter may be damaged or internal parts burnt if these devices are connected.

7. Do not connect electromagnetism switch, electromagnetism contactor to output circuit. When the inverter is running with load, the electromagnetism switch and electromagnetism contactor will generate inrush current which will cause inverter's over current protection.
8. Do not disassemble the whole front cover as disassembling the top front while wiring is ok. Otherwise, inverter internal parts may be damaged.

- **Maintenance and Inspection**

Danger 

1. Do not touch the inverter terminals, as they may carry high voltage.
   Otherwise, an electric short may occur.
2. Make sure to have protective cover .Always have the protective cover in place when power is being supplied to the Inverter. When attaching the cover, please with the power turns off.
   Otherwise, an electric short may occur.
3. Maintenance, inspection, must be performed only by authorized personnel.
   Otherwise, an electric short may occur.

Notice 

1. A CMOS IC is used in the control board. Handle the control board and CMOS IC carefully. The CMOS IC can be destroyed by static electricity if touched directly.
2. Do not change the wiring, or remove connectors or the Digital Operator, during operation.
   Otherwise, The devices may be damaged.

◎ Usage Precautions ◎

- **Constant torque low speed running**

When the inverter outputs to a common motor at low speed for a long term, the output rated torque should be derated due to the worsening radiating effect. If low speed constant torque long term running is required, then a special variable frequency motor is needed.

- **Motor insulation**

When using the V5/F5 series inverter, make sure to confirm the insulation of the motor which will be used to avoid device damage. Besides, do the periodic check for the insulation condition of the motor located in the bad environment to guarantee the system can operate safely.

- **Negative torque load**

If in the case of improving load, negative torque may occur. Braking units should be connected with the inverter, or over current and over voltage fault may happen.

- **Mechanical resonance point of load**

The inverter may encounter the mechanical resonance point of load within certain output frequency range. Jump frequencies have to be set to avoid it.

- **Capacitor and resistor**

Because the inverter output pulse wave, capacitor and resistors shouldn't be connected with the output terminals of the inverter, or the inverter may trip or components may be damaged; Besides, don’t connect switch components such as air switch and contactor with the output terminals is recommended, as shown in Fig.1-1(If switch components need to be connected with the output terminals, make sure output current of the inverter is zero when switch is acting).

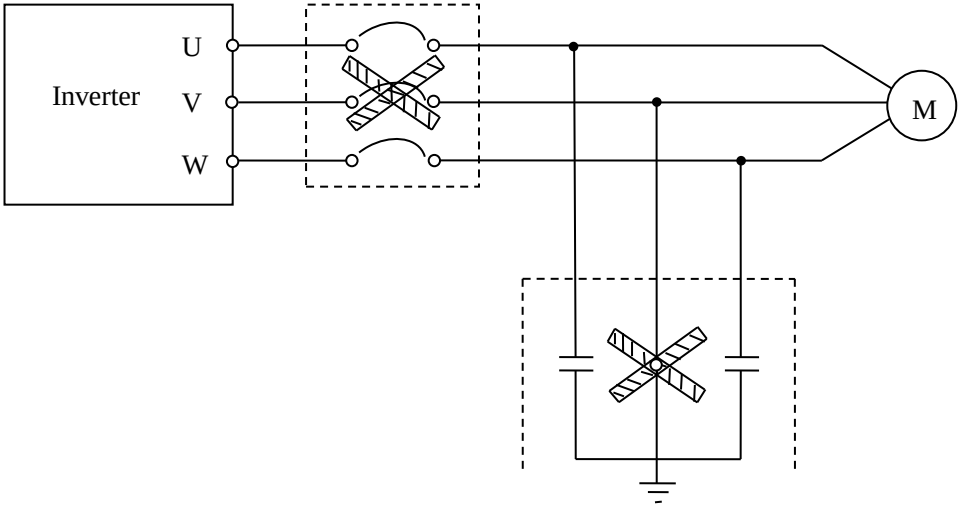


Fig.1-1 Capacitor is prohibited to be connected with output terminals of inverter

- **Derate according to basic frequency setting**

When the basic frequency is lower than the reference frequency, please consider duration for the motor so as to avoid motor's damage caused by overheating.

- **Running at frequency above 50Hz**

If running at frequency above 50Hz, besides the increment of vibration and noise, the ranges of running speed of motor shaft and mechanical device have to be guaranteed. Be sure to make an enquiry first.

- **The electro-thermal protective value of motor**

If the applicable motor is selected as per requirements, the inverter can perform the thermal protection to the motor. If the ratings of applied motor are not in compliance with the inverter, be sure to adjust the protective value or adopt other protective measures to guarantee the safe running of motor.

- **Altitude and derate**

When the altitude is higher than 1000m, the cooling effect of inverter is deteriorated because of the rareness of air, deration must be considered, shown in Fig.1-2 which indicates the relationship between the altitude and rated current of

frequency inverter.

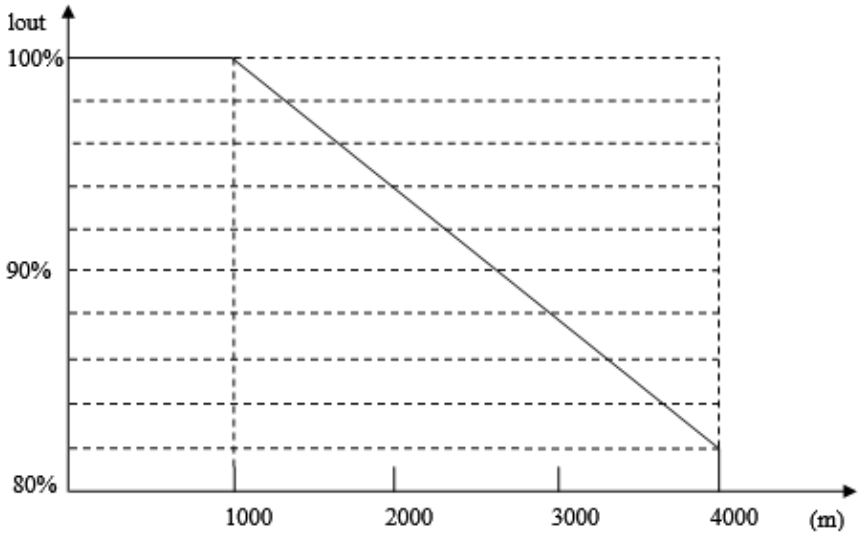


Fig. 1-2 The relationship between the altitude and rated current of frequency inverter

- **About protection classes**

The protection class of VH3 series inverter IP20 is reached in the case of status display unit or keyboard.

◎ Note For Scrap ◎

When you scrap the inverter, please pay attention to:

Explosion risk of capacitor: The capacitors in the main circuits may explode when they are burned.

Waste gas when plastic parts are burned: Poisonous gas may be generated when front panel is burned.

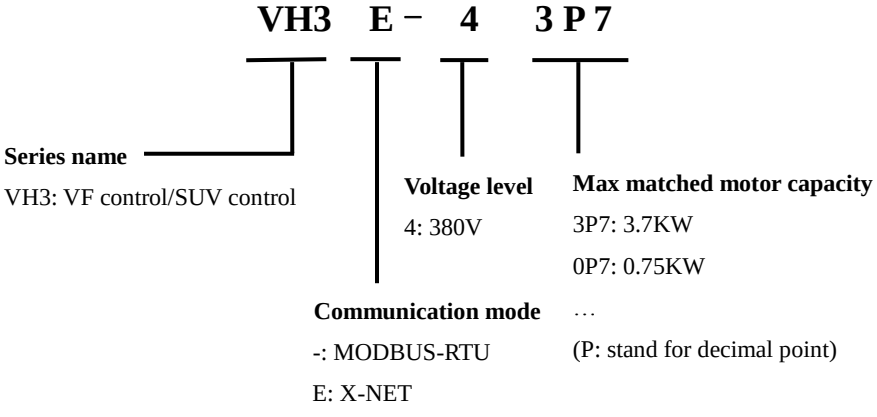
Dispose method: Please dispose as industrial rubbish.

1 Product introduction

1-1. Summarization

VH3 series inverter is produced by Xinje with high performance, easy operating and low noise. It is a innovative product with a series advanced and practical running and control functions such as practical PI, flexible input and output terminals, parameter modification online, fixed length control, traverse operation, RS485 control, fieldbus control. It provides OEM customers with high integrated, reliable, cost-effective solution.

Naming rules



VH3 series include vairous type of models. The model and function table:

Type	X-NET fieldbus	RS 485	Multi-speed	X6 high speed pulse input	DO relay output	DO high speed pulse output	Analog current input	Analog current voltage output	Error relay output
VH3-40P7	×	√	√	√	√	√	√	√	√
VH3-41P5	×	√	√	√	√	√	√	√	√
VH3-	×	√	√	√	√	√	√	√	√

42P2									
VH3-43P7	×	√	√	√	√	√	√	√	√
VH3-45P5	×	√	√	√	√	√	√	√	√
VH3-47P5	×	√	√	√	√	√	√	√	√
VH3-4011	×	√	√	√	√	√	√	√	√
VH3-4015	×	√	√	√	√	√	√	√	√
VH3E-40P7	√	×	√	√	√	√	√	√	√
VH3E-41P5	√	×	√	√	√	√	√	√	√
VH3E-42P2	√	×	√	√	√	√	√	√	√
VH3E-43P7	√	×	√	√	√	√	√	√	√
VH3E-45P5	√	×	√	√	√	√	√	√	√
VH3E-47P5	√	×	√	√	√	√	√	√	√
VH3E-40	√	×	√	√	√	√	√	√	√

11									
VH3 E-40 15	√	×	√	√	√	√	√	√	√

Notes: × not support √ support

VH3/VH3E models:

Voltage level	Model	Input power supply capacity (KVA)	Input current (A)	Output current (A)	Suitable motor (KW)
Three phase 380V	VH3-40P7	1.5	3.4	2.1	0.75
	VH3-41P5	3.0	5.0	3.8	1.5
	VH3-42P2	4.0	5.8	5.1	2.2
	VH3-43P7	5.9	10.5	9.0	3.7
	VH3-45P5	8.9	14.6	13.0	5.5
	VH3-47P5	11.0	20.5	17.0	7.5
	VH3-4011	17.0	26.0	25.0	11.0
	VH3-4015	21.0	35.0	32.0	15.0
	VH3E-40P7	1.5	3.4	2.1	0.75
	VH3E-41P5	3.0	5.0	3.8	1.5
	VH3E-42P2	2.2	5.8	5.1	2.2
	VH3E-43P7	5.9	10.5	9.0	3.7
	VH3E-45P5	8.9	14.6	13.0	5.5
	VH3E-47P5	11.0	20.5	17.0	7.5
	VH3E-4011	17.0	26.0	25.0	11.0
	VH3E-4015	21.0	35.0	32.0	15.0

1-2. Specification

Technical sepcification

VH3-4_ _ _		0P7	1P5	2P2	3P7
Output	Matched motor (KW)	0.75	1.5	2.2	3.7
	Rated current (A)	2.1	3.8	5.1	9.0
	Rated voltage (V)	AC 380			
	Frequency range (Hz)	0~500			
	Frequency resolution (Hz)	0.01			
Input	Rated voltage/frequency	Three phase 380V; 50Hz/60Hz			
	Voltage permissible fluctuation	Voltage: -15% ~ +15% voltage unblanced rate: <3%			
	Permissible frequency fluctuation	Frequency: ±5%			

VH3-4_ _ _		5P5	7P5	011	015
Output	Matched motor (KW)	5.5	7.5	11.0	15.0
	Rated current (A)	13.0	17.0	25.0	32.0
	Rated voltage (V)	AC 380			
	Frequency range (Hz)	0~500			
	Frequency resolution (Hz)	0.01			
Input	Rated voltage/frequency	Three phase 380V; 50Hz/60Hz			
	Voltage permissible fluctuation	Voltage: -15% ~ +15% voltage unblanced rate: <3%			
	Permissible frequency fluctuation	Frequency: ±5%			

Common specification

Environment	Application environment	In-door, free from direct sunlight, dust, corrosive gas, oil mist, steam, water drop etc
	Altitude	Lower than 1000m (The inverter should be derated when the elevation is higher than 1000m)
	Ambient Temperature	-10℃ ~ +40℃
	Humidity	Less than 90% RH, No condensation
	Vibration	Less than 5.9 m/s^2 (0.6M)
	Storage Temperature	-20℃ ~ +60℃
Structure	Protect Configuration	IP20 (In the state of state display units or keyboard)
	Cooling Manner	Fan cooling
Installation		Wall mounted or install inside cabinet

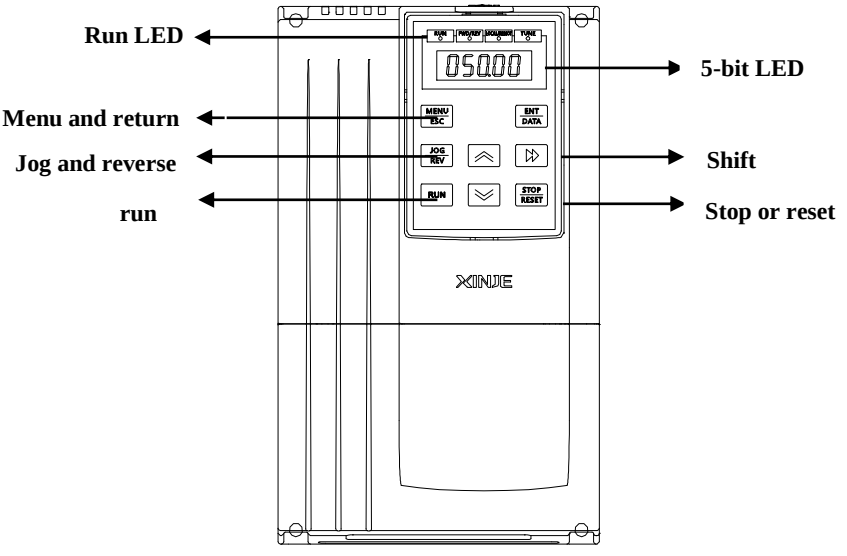
General specification

Basic functions	Max frequency	Vector control: 0~500Hz V/F control: 0~500Hz
	Carrier frequency	0.5KHz~16KHz Auto-adjust the carrier frequency as the load features
	Frequency resolution	Digital setting: 0.01Hz Analog setting: max frequency × 0.025%
	Control mode	Open loop vector control (SVC) V/F control
	Startup torque	G type: 0.5HZ/150% (SVC) P type: 0.5HZ/100%
	Stable speed precision	±0.5% (SVC)

	Overload ability	G type: 150% rated current 60s; 180% rated current 3s P type: 120% rated current 60s; 150% rated current 3s
	Torque boost	Auto torque boost; manual torque boost 0.1%~30.0%
	V/F curve	line type, multi-point type, N power type, V/F curve (1.2^{nd} power, 1.4^{th} power, 1.6^{th} power, 1.8^{th} power, 2^{nd} power)
	V/F separation	Two ways: complete-separation, half-separation
	Acceleration deceleration curve	Line or S curve mode. Four acceleration/deceleration time, range is 0.0~6500.0s
	DC brake	DC brake frequency: 0.00HZ ~ max frequency Brake time: 0.0s~36.0s Brake action current: 0.0%~100.0%
	Jog control	Jog frequency: 0.00Hz~50.00Hz。 Jog acceleration/deceleration time 0.0s~6500.0s
	Simple PLC, multi-speed running	Built-in PLC or control terminal can make max 16 different kinds of speed running
	Built-in PID	Easy to make process control close loop control system
	Auto-voltage regulation (AVR)	When the power system voltage changed, make the output voltage stable
	Overvoltage overcurrent speed loss control	Auto-limit the voltage and current when running, prevent from tripping caused by frequently overvoltage overcurrent
	Fast current limit function	Minimize the overcurrent fault, protect the VFD
	Torque limit and control	Excavator feature, auto-limit the torque when running, prevent from tripping caused by frequently overcurrent; close loop vector control mode can make torque control
Special functions	Outstanding performance	Control the asynchronous motor through current vector control technology
	Not stop running for momentary power failure	It will compensate the voltage loss by the load energy feedback when instantaneous power failure to make the VFD running for short time

	Fast current limit	Avoid frequently overcurrent fault of frequency inverter
	Timing control	Set the time range: 0.0Min ~ 6500.0Min
	Multi-motor switching	Two groups of motor parameters can switch two different motors
	Multithreading bus control	Two kinds of fieldbus: Modbus, X-NET
Running functions	Command source	Set through operate panel, terminals, serial port Multi-mode can be switched
	Frequency source	Set through digital, analog current, analog voltage, pulse, serial port. The modes can be switched
	Auxiliary frequency source	10 kinds of auxiliary frequency source. It can make auxiliary frequency fine-tuning and frequency synthesis
	Input terminal	2 terminals of digital input, one of them support max 100KHz high speed pulse input 2 terminals of analog input, one of them only support 0~10V voltage input 1 terminal of 0~10V voltage input
	Output terminal	1 terminal of high speed pulse output (open collector optional), support 0~100KHz square wave output 1 terminal of digital output 1 terminal of relay output 1 terminal of analog output, support 0~20mA or 0~10V
Run		Protection for overcurrent, overvoltage, overheat, overload, undervoltage
Accessories		Brake components, VH3 base, extension cable of operate panel

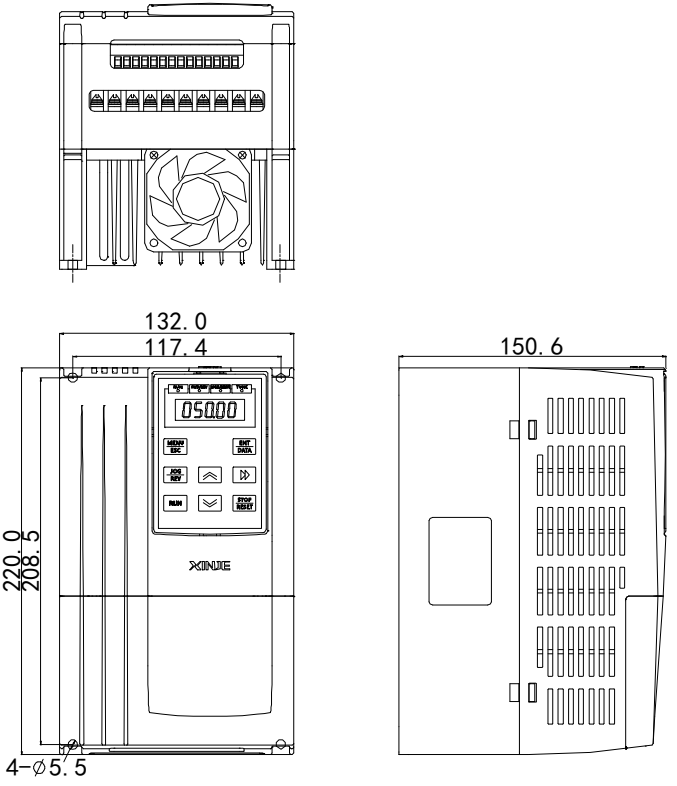
1-3. Part description



1-4. Dimension

- **VH3 series three phase 2.2~3.7KW**

Unit: mm



2 Installation and wiring

2-1. Installation environment

2-1-1. Environment requirments

- Ambient tempeature: -10ºC~40ºC. The inverter should be derated when the temperature over 40ºC, at the same time ventilation and heat dissipation should be enhanced.
- Far away from the location with direct sunlight, dust, floating fiber or metal powder.
- Mount in the location free of corrosive gas and combustible gas.
- Mount in the location free of condensation, and the humidity should less then 95%RH.
- Mount in the location where vibration less than 5.9m/s²(0.6G)
- Far away from electramagnetism interfere source and other electric instruments sensitive with electramagnetism interfere.

2-1-2. Installation direction and space

- Mount the inverter vertically under general condition.
- The mounting space and distance are shown in Fig. 2-1.
- When several inverters are mounted up and down, air diversion plate should be fixed in the middle as shown in Fig. 2-2.

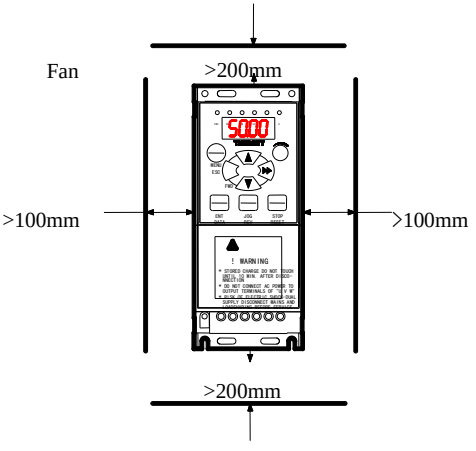


Fig 2-1. Installation space

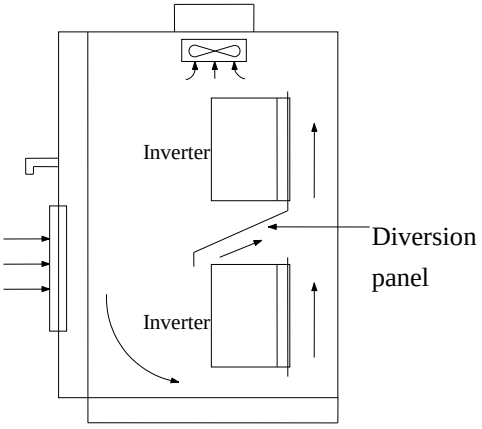


Fig 2-2. Installation of multi-inverter

2-1-3. installation and remove of operate panel

- Removing: Remove the four screws on the cover with phillips screwdriver.
- Mounting: Allign the mounting holes and then fix the screws.

2-2. Wiring notes

Caution

- Wiring after power off for at least 10 minutes, otherwise, an electronic short may occur.
- Do not connect AC power to output terminals U, V and W.
- Both the inverter and the motor should be safety grounded as there is leakage current inside the inverter.The diameter of grounding copper cable must be more than 3.5mm², grounding resistor must be less than 10ohm.
- Withstand voltage test of the inverter has been done in the factory, users would better not do it again.
- Do not install electromagnetic contactor, absorption capacitor or other resistance-capacitance absorption devices, as shown in Fig2-3.
- In order to make the input over-current protection and power off maintenance easily, the inverters should connect power supply via braker.
- The connection cable of relay I/O circuit (X1~X4, X6, FWD, REV, OC, DO) should select the twisted-pair or shield cable with diameter over 0.75 mm². One terminal of the shield layer should be hung in the air and the other

terminal should be connected with the inverter's grounding terminal PE, the cable length should be less than 50m.

Danger

- Before layout operation, make sure the power supply of inverter is cut off, all the LED on the operate panel is black out and delay for more than 10 minutes.
- Wiring work can be performed after the voltage between internal electrolesis capacity "+" and "–" is below DC36V.
- Wiring work can only be done by trained and professional personnel.
- Before power on, please check if the power supply voltage is consistent with the inverter voltage level, otherwise device damage, human injuries and deaths may occur.

2-3. Main circuit wiring

2-3-1. Wiring diagram

The brake resistor wiring is different for models, the main circuit wiring diagram is shown as below:

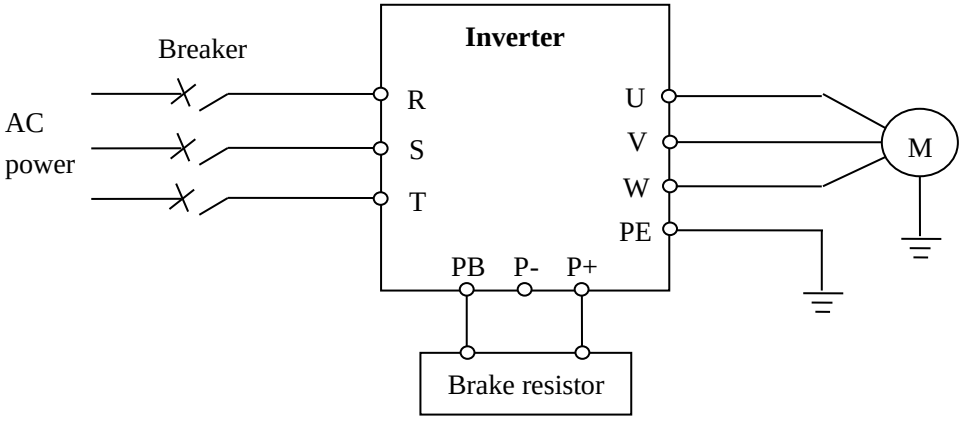
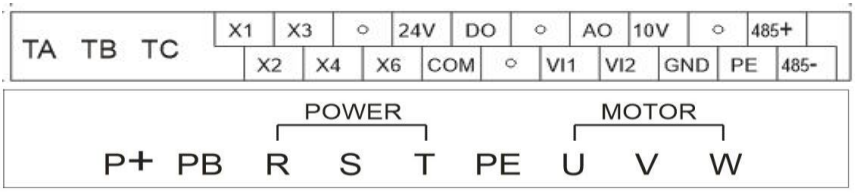


Fig 2-3. Main circuit simple wiring diagram

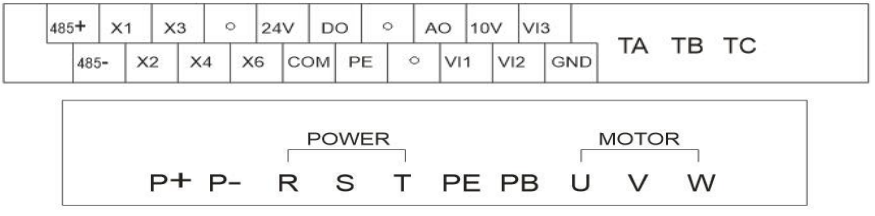
2-3-2. Terminal arrangement

VH3-40P7/ VH3-41P5 terminal arrangement



Terminals	Function
R, S, T	Power suply three phase 380V
U, V, W	motor cable UVW (pay attention to the motor wiring method)
PE	Ground
P+, PB	Connect to brake resistor
TA , TB, TC	Fault relay
X1, X2, X3, X4, X6, COM	X1, X2, X3, X4: multi-function terminal, X6: high speed pulse input
24V, COM	For relay, power supply of limit switch
DO, COM	Relay output or high speed pulse output
AO, GND	Analog voltage or current output
VI1, GND	Analog voltage or current input
VI2, GND	Analog voltage or current input
485+, 485-	RS485 interface

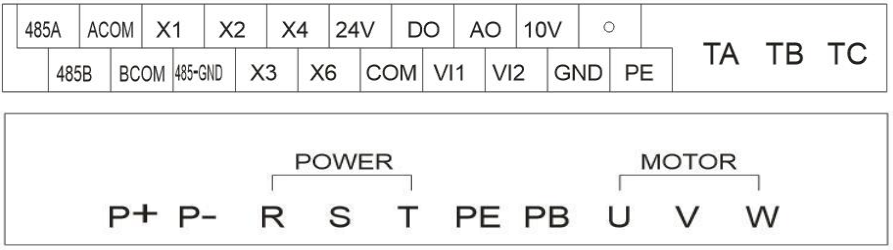
VH3-42P2/ VH3-43P7 terminal arrangement



Terminals	Function
R, S, T	Power suply three phase 380V

U, V, W	motor cable UVW (pay attention to the motor wiring method)
PE	Ground
P+, PB	Connect to brake resistor
TA , TB, TC	Fault relay
X1, X2, X3, X4, X6, COM	X1, X2, X3, X4: multi-function terminal, X6: high speed pulse input
24V, COM	For relay, power supply of limit switch
DO, COM	Relay output or high speed pulse output
AO, GND	Analog voltage or current output
VI1, GND	Analog voltage or current input
VI2, GND	Analog voltage or current input
485+, 485-	RS485 interface

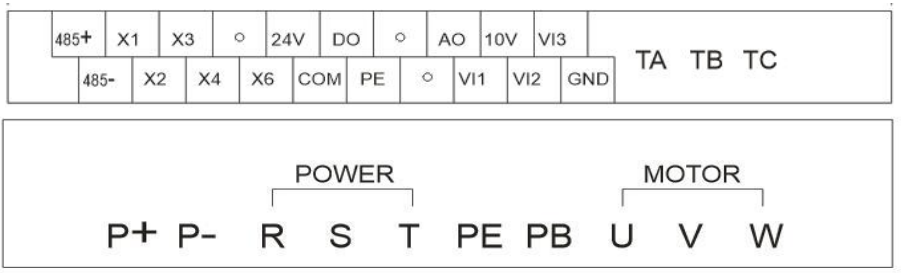
VH3-45P5/ VH3-47P5 terminal arrangement



Terminal	Function
R, S, T	Power suply three phase 380V
U, V, W	motor cable UVW (pay attention to the motor wiring method)
PE	Ground
P+, PB	Connect to brake resistor
TA , TB, TC	Fault relay
X1, X2, X3, X4, X6, COM	X1, X2, X3, X4: multi-function terminal,

	X6: high speed pulse input
24V, COM	For relay, power supply of limit switch
DO, COM	Relay output or high speed pulse output
AO, GND	Analog voltage or current output
VI1, GND	Analog voltage or current input
VI2, GND	Analog voltage or current input
485A, 485B, 485-GND	485A is differential signal +, 485B is differential signal-
ACOM, BCOM	

VH3-4011/ VH3-4015 terminal arrangement



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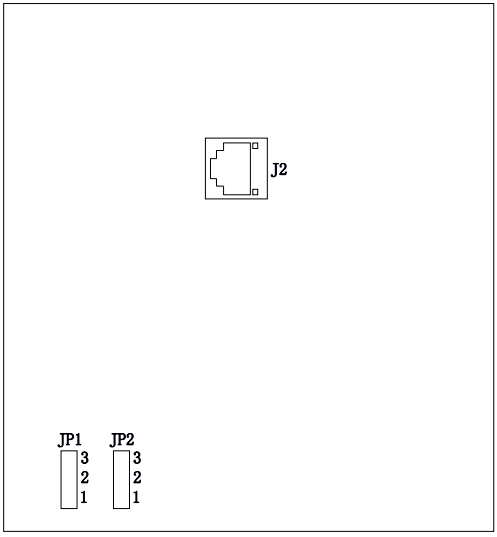
VI1, GND	Analog voltage or current input
VI2, GND	Analog voltage or current input

485+, 485-	RS485 interface

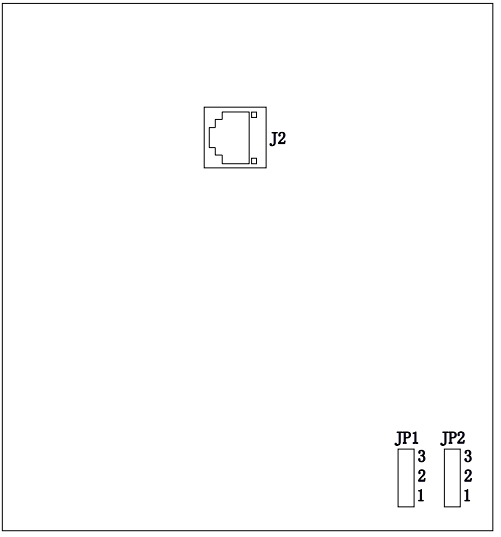
2-4. Control circuit wiring

2-4-1. Control board and jumper

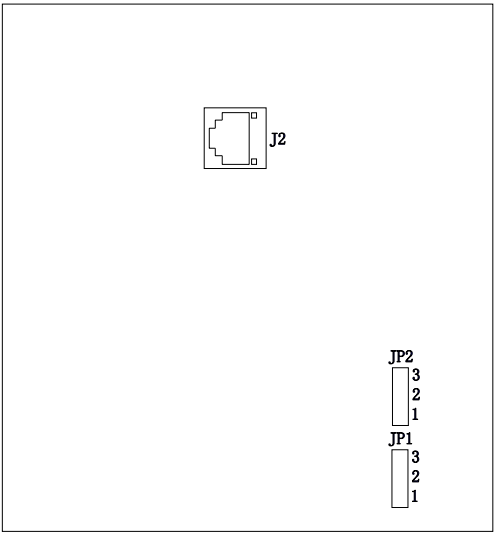
VH3-40P7/ VH3-41P5 series three phase VFD jumper



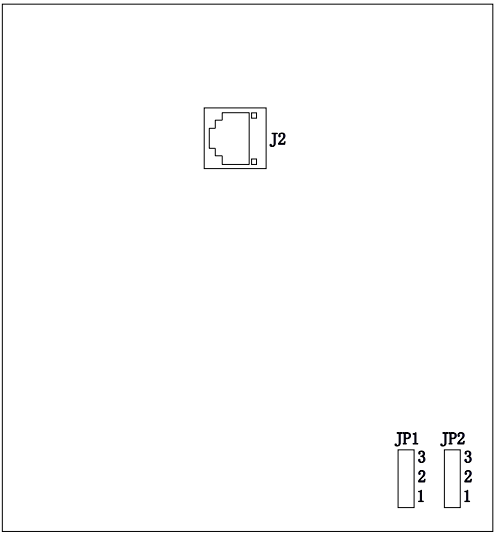
VH3-42P2/ VH3-43P7 series three phase VFD jumper



VH3-45P5/ VH3-47P5 series three phase VFD jumper



VH3-4011/ VH3-4015 series three phase VFD jumper



The jumper position on the control board is shown as above diagram, please set the jumper and wiring the terminal before using the VFD. The wire above 1mm² is recommended for terminal wiring. J1 is the interface between operate panel and CPU board. J2 is the interface between operate panel and CPU board RJ45 port, the RJ-45 cable should not be larger than 3 meters.

Table 2-2 jumper function

Jumper	Function	Setting	Default setting
JP1	CI current/voltage input options	1－2 V side: 0~10V voltage signal 2－3 I side: 4~20mA current signal	4~20mA(not support for now)
JP2	Analog output terminal AO	1－2: 0~10V, AO terminal voltage output 2－3: 4~20mA, AO terminal current output	0~10V

2-4-2. Analog I/O wiring

VI terminal received the analog signal, jumper setting is voltage input 0~10V and current input 4~20mA(not support for now). The wiring diagram is shown as

fig2-6.

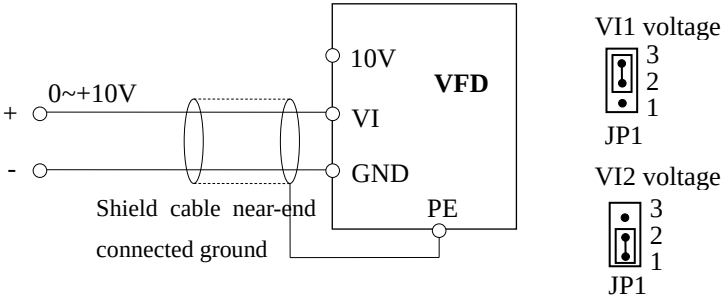


Fig 2-6 VI terminal wiring

Analog output terminal AO wiring

Analog output terminal AO can display various physical quantities. The output voltage is 0~10V, output current is 4~20mA.

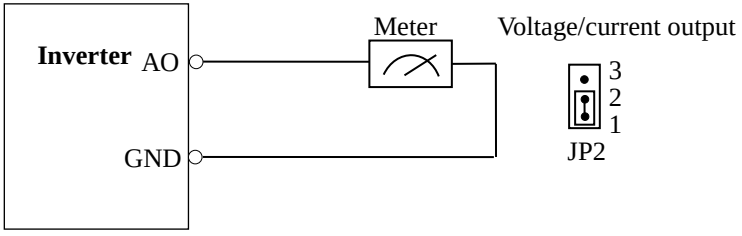


Fig. 2-7 Analog output wiring

Note:

(1) When using analog input, please install filter capacitor or common mode inductance between VI and GND.

(2) Because analog input signal is easily interfered by outside, the shield cable is required, the cable length must be short and the shield layer must be grounded well.

(3) The resistor connecting between control terminal 10V and GND is 5~10K.

2-4-3. Communication terminal wiring

The communication port of this inverter is standard RS485 port.

With the following wiring methods, it can build up control system of one-master-one-slave or one-master-multi-slaves. Also, the superior device (PC or PLC) can make the functions such as real time monitoring, remote control, highly automated motion control.

- The connection between VFD RS485 inteface and upper device

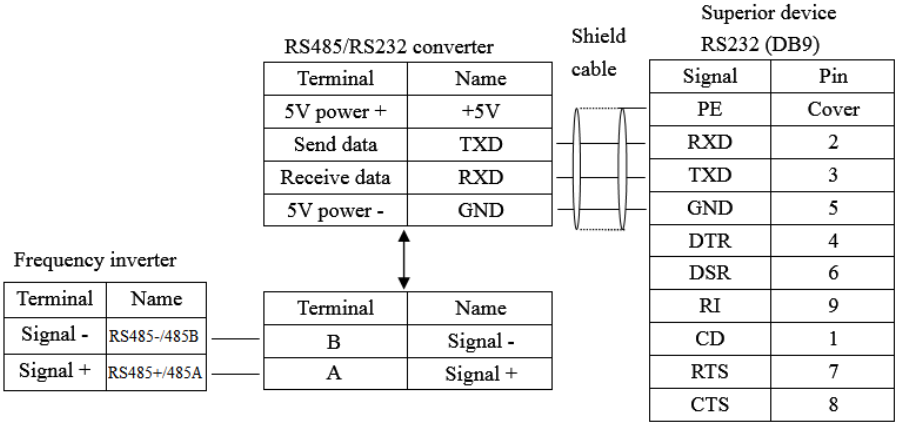


Fig 2-8 RS485－(RS485/232)－RS232 communication wiring

- Many inverters can be connected together through RS485, the PLC(or PC) is the master device, as shown in Fig.2-9; Also, you can select one inveter as master and the other inverters are slaves, as shown in Fig.2-10.The more inverters are connected, the communication system will be interfered seriously, the following wiring is recommended.

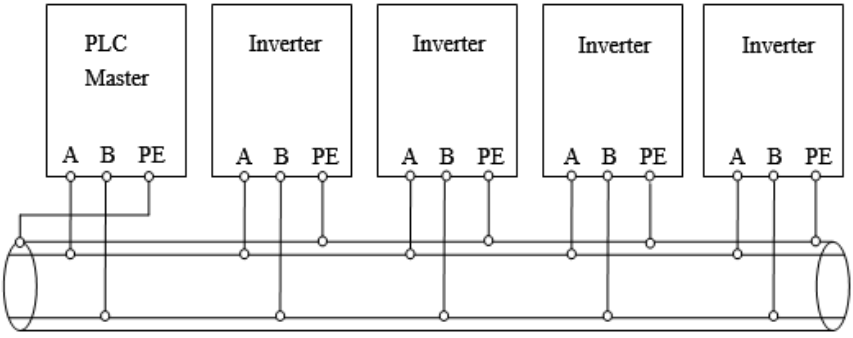


Fig. 2-9 Connection of PLC and inverters

(Inverters and motors are all grounded well)

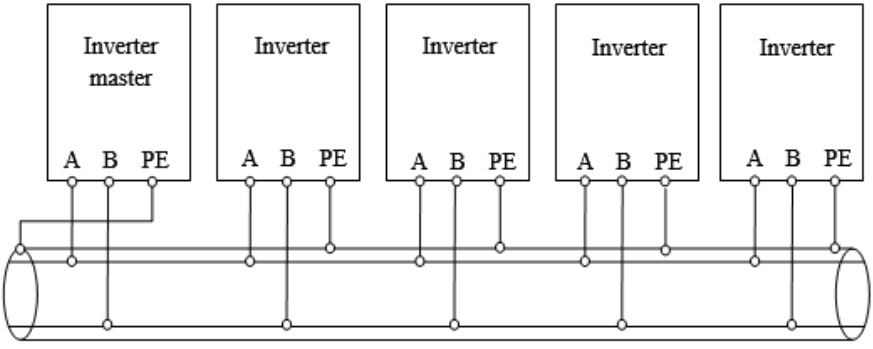


Fig. 2-10 Connection of several inverters

(Inverters and motors are all grounded well)

If the communication is still failed with the above connection methods, you can adopt the following methods:

(1) Use separate power supply for PLC or isolate its power supply.

(2) Use magnetism ring for the cable and reduce the inverter's carrier frequency.

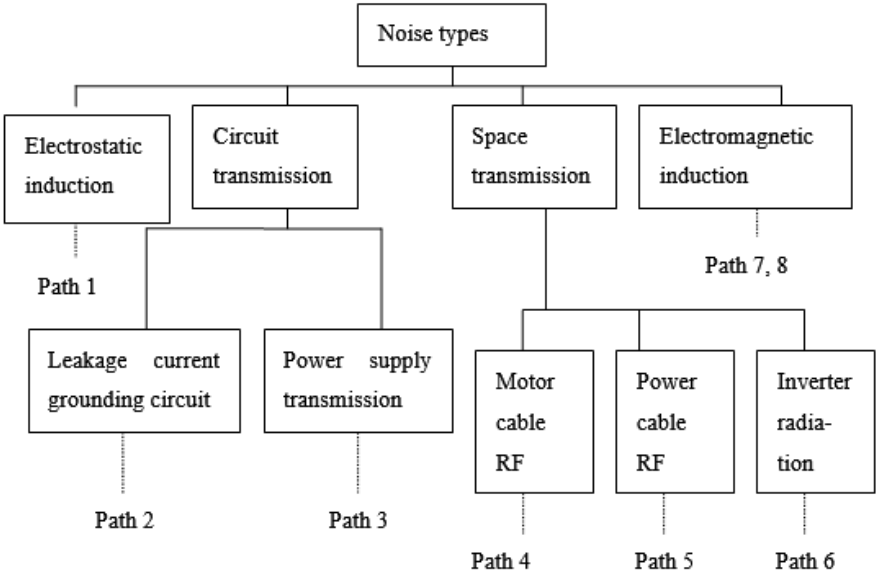
2-5. Installation instructions according with EMC

As the inverter output wave is PWM, electromagnetic noise will generate while it is working. To reduce the inverter interference for other devices, this chapter introduces the EMC mounting method in the following aspects: control the noise, local wiring, grounding, leak current, power supply filter.

2-5-1. Noise suppression

1. Noise type

The noise made by inverter may affect the neaby equipments and the effection is related to inveter's control system, antinoise and anti-jamming ability of the devices, wiring environment, safety distance, grounding method and other factors.The noise contains the following types: electrostatic induction, circuit transmit, space transmit, electro magnetic induction and so on.



2. The way to suppress the noise

Table 2-5 solutions for noise

Noise transferring path	Solutions

②	When the ground cable of external equipment forms a loop with the inverter, the equipment may operate incorrectly caused by leakage current of inverter grounding cable. The problem can be solved if the equipment is not grounded.
③	If the external equipment shares the same AC supply with the inverter, the inverter's noise may be transmitted along its input power supply cables, which may cause interference to other external equipments. Take the following actions to solve this problem: Install noise filter at the input side of the inverter, and use an isolation transformer or power filter to prevent the noise from disturbing the external equipment.
④⑤⑥	(1)The equipment and the signal cables should be far away from the inverter. The signal cables should be shielded and the shielding layer should be grounded. The signal cables should be located far away from the input/output cables of the inverter. If the signal cables must cross over the power cables, they should be placed at right angle to one another. (2) Install high-frequency noise filter (ferrite common-mode choke) at the input and output of the inverter to prevent the RF interfere of power lines. (3) Motor cables should be placed in a tube thicker than 2mm or buried in a cement slot. Power cables should be placed inside a metal tube and be grounded by shielding layer (Motor cable should use 4-core cable, one of the cores should be grounded near the inverter and another point should be connected to the motor's cover).
①⑦⑧	Don't put the strong and weak electricity cables in parallel or bundle these cables together. Other devices should also be away from the inverter.The devices wire should be away from the I/O of the inverter. The signal cables and power cables should be shielded cables. Devices with strong electric field and magnetic field should be away and orthogonal from the inverter.

2-5-2. Local wiring and grounding

(1) The cable connected inverter and motor (cables from U, V, W points) should not parallel with power supply calbe (R, S, T or L, N terminal input wire). The distance should be more than 30cm.

(2) Inverter's output cables from U, V, W terminals is recommend to put in metal

tube or slot.

(3) Control signal cables should be shield and the shield layer should be connected with inveter's PE terminal, then ground the point near the inverter.

(4) The grounding cable of inverter's PE terminal should be connected to ground directly.It can't connect to other devices' grounding cables.

(5) Don't put the signal cables in parallel with the power cables (R, S, T or L, N with U, V, W) or bundle these cables together, at least 20~60 cm distance shoule be kept (related with power current), If the signal cables and power cables needed to be intersected, they should be vertical to each other, as shown in Fig 2-11.

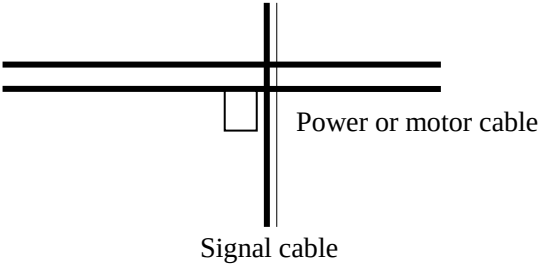


Fig. 2-11 Wiring requirement of system

(6) The weak electricity grounding cable such as control signal and sensors should be separated with strong electricity grounding cable.

(7) Do not connect other devices to inverter's power input terminals (R, S, T or L, N).

3 VFD running and operation

3-1. VFD running

3-1-1. Command channel of VFD running

We can control the inverter's START, STOP, JOG and other running actions by three command channels.

1. Operation panel

Control by 

and 

keys on the operation panel (default setting)

2. Control terminals

FWD, REV, COM can form 2-wire control; one terminal of X1~X4, X6 and FWD, REV can form 3-wire control.

3. Running channel choice

Control the start, stop of VFD through upper device or other devices communicating with VFD.

Parameter P0.03 can choose the command channel.

Warning: The user must debug the system after changing the command channel to make sure it can meet the system requirement, otherwise device damage and physical injury will happen.

3-1-2. VFD frequency setting channel

In common operating mode, there are 8 channels to set the frequency:

0: analog potentiometer

1:  and  keys on the operate panel

2: Function code on the operate panel

3: Terminals UP/DOWN

4: Serial port

5: Analog VI

6: Analog CI

7: Pulse terminal (PULSE)

3-1-3. VFD working state

There are two running state: stop and running.

Stop state: After the inverter powered on and initialized, if no operating command is input, the inverter will enter standby state.

Running state: The inverter enters running state after it receives running command.

3-1-4. VFD running mode

VH3 VFD has five kinds of running mode.

0: Jog running

When the inverter is in the standby state, it will running according to jog frequency after receiving jog running command

(e.g after pressing 

key)

1: Close loop

Set the close loop parameter P0.01=8, VFD will enter close loop mode. It will do PID regulation for setting value and feedback value. PID regulator output is the basic instruction of VFD output frequency. The close loop mode will be switched to other mode through multi-function terminal.

2: PLC running

Set the PLC function parameter P0.01=9, VFD will enter PLC running mode. VFD will run as the preset running mode.

3：Multi-segment speed running

VFD will run with multi-speed through the nonzero combination of multi-function terminal.

3-2. Keyboard

3-2-1. Keyboard layout

Start, speed regulation, stop, brake, running parameter setting and control of the peripheral can be controlled by VFD operate panel and control terminals. Operate panel is shown in Fig.3-2.

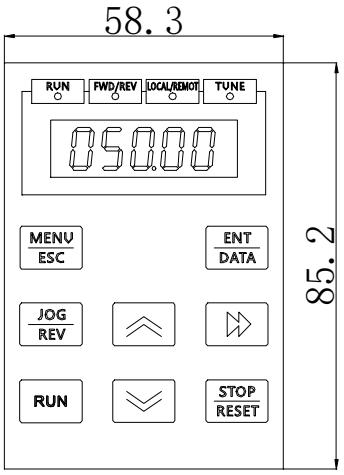


Fig 3-2 operate panel

3-2-2. Keyboard function

There are 8 buttons on the operate panel.

Button	Name	Function
RUN	Forward running	In operate panel control mode, press this key to run forward
STOP RESET	Stop/Reset	In operate panel control mode, press this key to stop running. In error mode, press it to return to normal state.
MENU ESC	Program/Exit	Enter or exit programming state
JOG REV	Jog/Reverse run	P3.04=0, invalid P3.04=1, valid
	Increase	Increase data or function code, frequency pause when running
	Decrease	decrease data or function code, frequency pause when running
	Shift/monitor	Choose the data setting bit in editing state, switch the display state and monitoring parameter in other state

ENT DATA	Save/switch	Enter next menu or save the parameter in programming state

3-2-3. LED and indicator

The operate panel has 5-bit 8-segment LED and 4 state indicators.

3 state indicators are above the LED on the operate panel. From left to right: forward indicator FWD, reverse indicator REV, alarm indicator ALM. The functions of these indicators are shown in Table3-1

Table 3-1 state indicators

<table>
<tr><th colspan="3">Item</th><th colspan="2">Function</th></tr>
<tr><td rowspan="4">Display function</td><td colspan="2">LED</td><td colspan="2">Display VFD present status parameters and setting parameters</td></tr>
<tr><td rowspan="3">State indicator</td><td>FWD</td><td>Forward running indicator, inverter outputs positive phase, the motor will run forward after connecting to the inverter</td><td rowspan="2">If FWD and REV indicators all light, it means that the inverter are in DC braking mode</td></tr>
<tr><td>REV</td><td>Reverse running indicator, inverter outputs negative phase.The motor will run reverse after connecting to the inverter</td></tr>
<tr><td>ALM</td><td colspan="2">This indicator will light when the inverter is alarming.</td></tr>
</table>

3-2-4. Operation method of the panel

Various operations can be done through the operate panel.

1. Status parameter display

Press [▷▷] key to display parameter group b. First display the parameter No, then display parameter value after one second.

(1) it only displayed status parameter when VFD was out of factory, if user needs to check other parameters, please set the parameter P3.41, P3.42.

(2) When you are checking status monitor parameter, press [ENT DATA] to enter default monitor parameter display status.The default parameter is setting frequency in stopping state and is output frequency in running state.

2. Parameter setting

Take the following as an example: change function parameter P3.06 from 5.00Hz

to 8.50Hz.

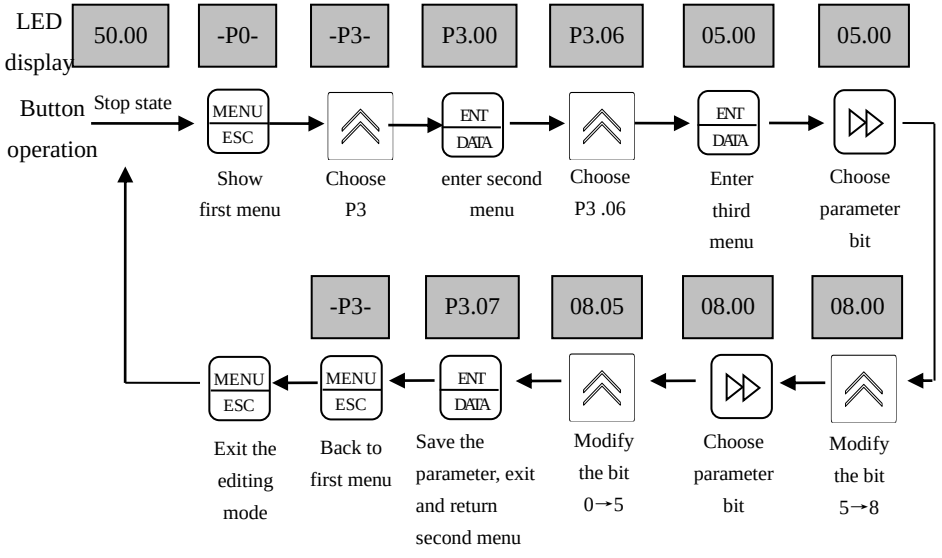


Fig 3-3 parameter editing example

In the third menu, the parameter can't be changed if no bit is flashing, the possible reasons are:

(1) The setting of this parameter can not be changed, such as the actural detected parameters or recorded parameters.

(2) This parameters can only be changed in stop state and can not be changed in running state.

(3) Parameters have been protected. If the lowest bit of P3.01 is set to 1 or 2, all the parameters can not be changed. If you really want to change the setting, please set P3.01 to 0 in advance.

3. Jog running

If the running command channel is operate panel, machine is standby, jog frequency is 5Hz:

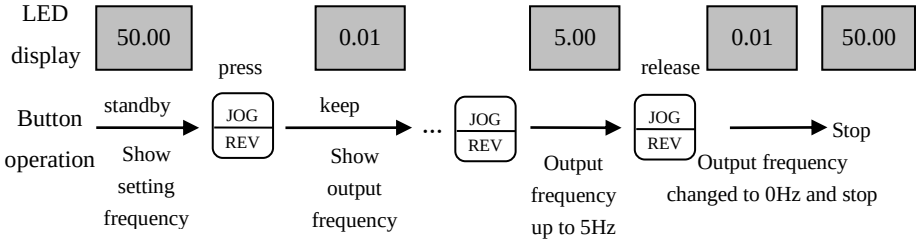


Fig 3-4 Jog running example

4. Set user password

If the user password PF.01 is set to 2345. The bold number will flash in fig3-10.

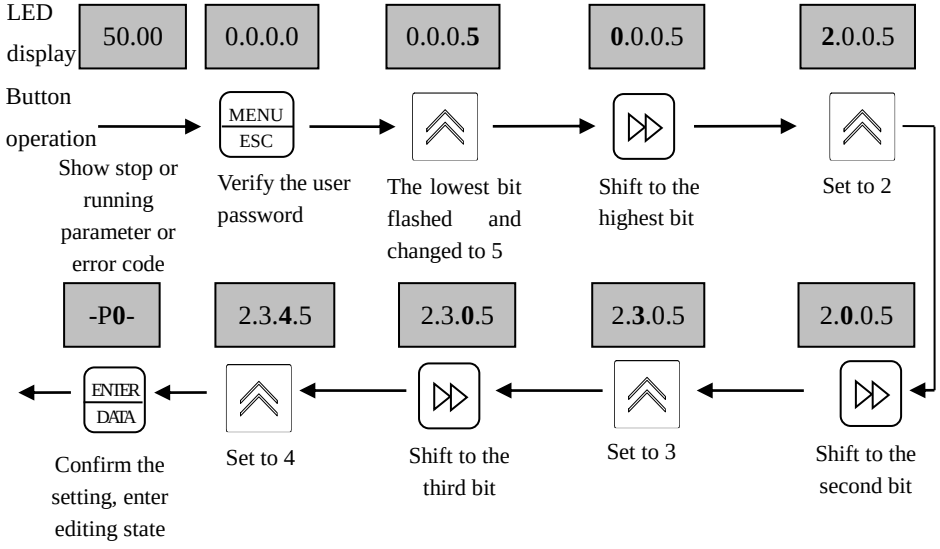


Fig 3-5 input the password

5. Check error parameter

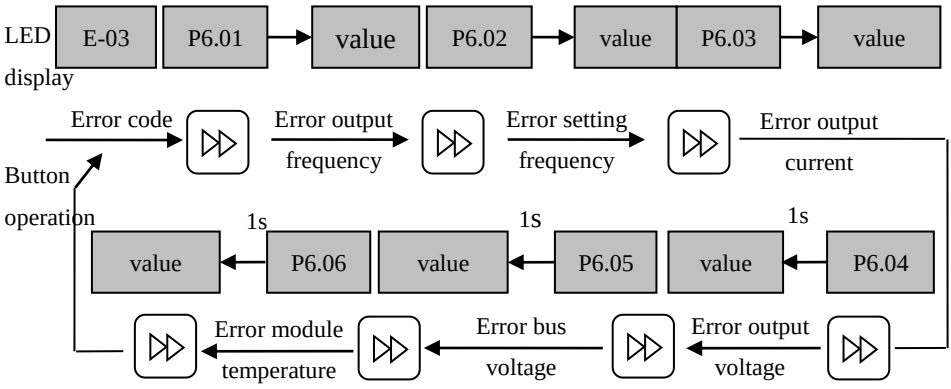


Fig 3-6 error state

Note:

(1) Press [▷▷] key to check parameter P6 in error code display mode, the range is P6.01~P6.06, press [▷▷] key, parameter No. will firstly displayed and the parameter value will be displayed after 1s.

(2) While checking, press [MENU ESC] key to back to error code display.

6. Set frequency via [∧] and [∨]

If it is in stopping parameter display mode, P0.01=1, the operation mode is shown below:

(1) Frequency regulation is integral mode;

(2) When always pressing [∧], the digital increases from lowest bit of LED, then ten bit starts to increase, so does hundred bit and thousand bit. If you release and press it again, it increases from the lowest bit again.

(3) When always pressing [∨], the digital decreases from lowest bit of LED, then ten bit starts to decrease, so does hundred bit and thousand bit. If you release and press it again, it decreases from the lowest bit again.

3-3. VFD power on

3-3-1. checking after power on

Please make the wire of inverter according to “Wiring”in this manual.

3-3-2. First time power on

After checking the wiring and AC power, switch on the AC power supply to electrify the inverter.The inverter operation panel will display dynamic screen and then the contactor closes. When the LED displays preset frequency, the inverter initialization is completed.The procedure is shown as in Fig 3-7.

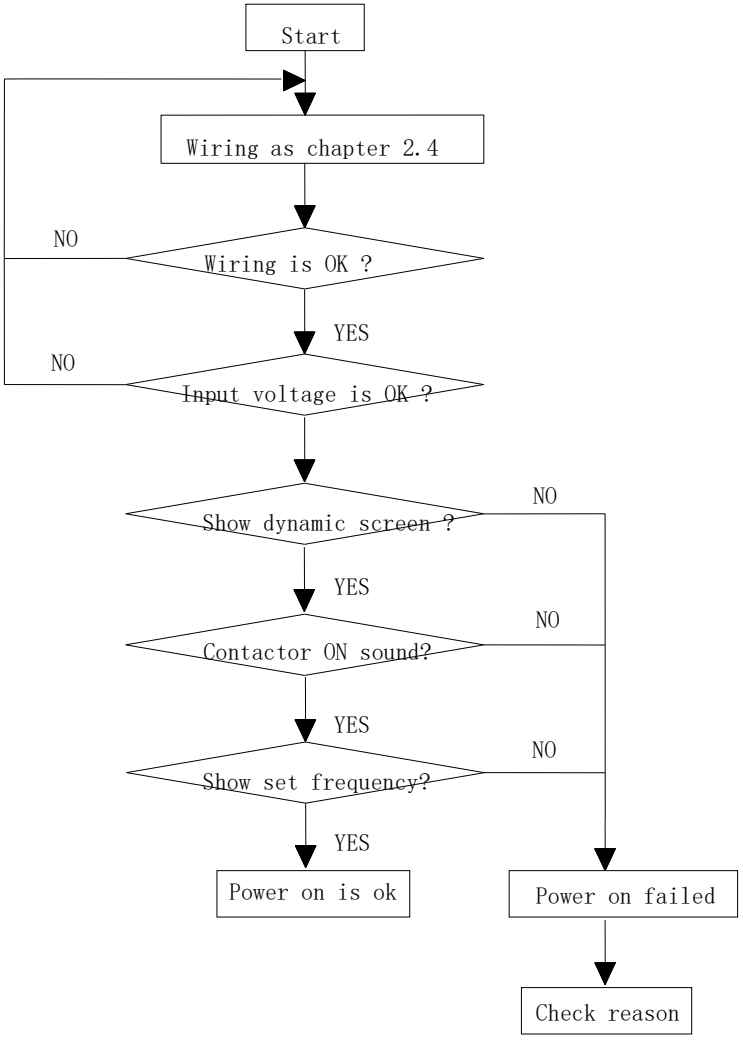


Fig 3-7 VFD first time power on operation procedure

4 Function parameter

4-1. Function code

○: Parameters can be changed while running
×: Parameters can not be changed while running
—: Parameters can only be read, can not be changed

Group P0: Basic running parameters				
parameter	**Name**	**Setting range**	**Default value**	**change**
P0-00	Control mode	0: V/F control 1: no speed sensor and vector control	0	○
P0-01	Frequency setting channel	0: digital set (no power-off retentive) 1: digital set (power-off retentive) 2: VI1 (voltage) 3: VI2 (voltage) 5: terminal X6 pulse 6: MODBUS-RTU communication 7: multi-speed command 8: PID 9: simple PLC running	0	○
P0-02	Digital set the running frequency	0.00Hz~P0-06(max output frequency)	50.00Hz	○
P0-03	Running command channel	0: operation panel 1: Teminal 2: serial port	0	○
P0-04	Reverse run	0: reverse run enable 1: reverse run disable	0	○
P0-05	Run forward/reverse dead zone time	0.0s~3000.0s	0.0s	○
P0-06	Highest ouput frequency	50.00Hz~500.00Hz	50.00Hz	○
P0-07	Auxiliary frequency	0: digital set (no power-off retentive)	0	○

	setting channel	1: digital set (power-off retentive) 2: VI1 (voltage) 3: VI2 (voltage) 5: terminal X6 pulse 6: MODBUS-RTU communication 7: multi-speed command 8: PID 9: simple PLC running		
P0-08	Superposition of frequency source	The unit: frequency source selection 0: main frequency source A 1: operation result of main frequency A and auxiliary frequency source B 2: frequency source A and B switching Decade: operational formulas of A and B 0: A+B 1: A-B 2: max(A,B) 3: min (A,B)	00	○
P0-09	Torque boost	0.0% (automatical torque boost) 0.1%~30.0%	0.1%	○
P0-10	Cut-off frequency for torque boost	0.00Hz~max output frequency P0-06	50.00Hz	○
P0-12	Carrier frequency	0.5K~16.0K	6.0KHZ	○
P0-13	Acc/Dec mode selection	0: linear Acc/Dec 1: static S curve Acc/Dec 2: dynamic S curve Acc/Dec	0	○
P0-14	S curve starting part proportion	0.0%~(100.0%-P0-15)	30.0%	○
P0-15	S curve end part proportion	0.0%~(100.0%-P0-14)	30.0%	○
P0-16	Acc/dec time unit	0: 1s 1: 0.1s	1	○

		2: 0.01s		
P0-17	Accerlate time 1	0.00s~650.00s(P0-16=2) 0.0s~6500.0s(P0-16=1) 0s~65000s(P0-16=0)	Model setting	○
P0-18	Decerlate time 1	0.00s~650.00s(P0-16=2) 0.0s~6500.0s(P0-16=1) 0s~65000s(P0-16=0)	Model setting	○
P0-19	Upper limit frequency	P0-20~P0-06	50.00Hz	○
P0-20	Low limit frequency	0.00Hz~P0-19	0.00Hz	○
P0-21	Running mode under low limit frequency	0: run at low limit frequency 1: stop 2: zero speed run	0	○
P0-22	V/F curve setting	0: line V/F 1: multi-point V/F 2: square V/F 3: 1.2nd power V/F 4: 1.4th power V/F 6: 1.6th power V/F 8: 1.8th power V/F 9: reserved 10: V/F complete separation mode 11: V/F semidetached mode	0	○
P0-23	Multi-point V/F frequency point F1	0.00Hz~P0-25	0.00Hz	○
P0-24	Multi-point V/F voltage point V1	0.0~100.0%	0.0%	○
P0-25	Multi-point V/F frequency point F2	P0-23~P0-27	0.00Hz	○
P0-27	Multi-point V/F frequency point F3	P0-25~PA-03(motor rated frequency)	0.00Hz	○

P0-28	Multi-point V/F voltage point V3	0.0~100.0%	0.0%	○
P0-32	Carrier frequency regulation as temperature	0: no 1: yes	1	○
P0-33	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	0	○
P0-35	Frequency command decimal point	2: 0.01Hz	2	○
P0-38	Auxiliary frequency source offset digital setting when superposition	0.00Hz~max output frequency (P0-06)	0.00Hz	○
P0-39	Digital setting frequency memory selection	0: no memory 1: memory	0	○
P0-40	Running direction	0: default direction 1: reserve direction of default direction	0	○
P0-42	Upper frequency offset	0.00Hz~max output frequency (P0-06)	0.00Hz	○
P0-43	V/F oscillation suppression gain	0~100	Model setting	○
P0-44	V/F separation voltage rising time	0.0s~1000.0s Note: the time changed from 0V to rated motor voltage	0.0s	○

P0-45	V/F separation voltage source	0: digital setting (P0-46) 1: VI1 2: VI2 3: PULSE setting (X6) 4: multi-segment command 5: simple PLC 6: PID 7: communication setting	0	×
P0-50	Speed loop proportion gain 1	1~100	30	○
P0-51	Speed loop integral time 1	0.01s~10.00s	0.50s	○
P0-52	Switching frequency 1	0.00~P0-55	5.00Hz	○
P0-53	Speed loop proportion gain 2	1~100	20	○
P0-54	Speed loop integral time 2	0.01s~10.00s	1.00s	○
P0-55	Switching frequency 2	P0-52~max output frequency P0-06	10.00Hz	○
P0-56	Speed control (drive) torque upper limit source	0: parameter P0-57 setting 1: VI1 2: VI2 3: VI3 4: PULSE setting 5: communication setting 6: MIN(VI1, VI2) 7: MAX(VI1, VI2) 1~7 full scale corresponding to P0-57	0	○
P0-57	Speed control (drive) torque upper limit digital setting	0.0%~200.0%	150.0%	○

P0-58	Slip compensation	50%~200%	100%	○
P0-59	Speed loop filter time constant	0.000s~1.000s	0.050s	○
P0-64	Speed loop integral feature	The unit: integral separation 0: invalid 1: valid	0	○
P0-70	Slip compensation	0.0%~200.0%	0.0%	○
P0-71	VF overexcitation gain	0~200	64	○

Group P1: frequency parameters				
Parameter	**Name**	**Range**	**Default value**	**Change**
P1-01	VI1 filter time constant	0.00s~10.00s	0.10s	○
P1-02	VI curve 1 min setting	0.00V~P1-04	0.00V	○
P1-03	VI curve 1 frequency percentage of min setting	-100.0%~+100.0%	0.0%	○
P1-04	VI curve 1 max setting	P1-02~+10.00V	10.00V	○
P1-05	VI curve 1 frequency percentage of max setting	-100.0%~+100.0%	100.0%	○
P1-06	VI2 filter time constant	0.00s~10.00s	0.10s	○
P1-07	VI curve 2 min setting	0.00V~P1-09	0.00V	○
P1-08	VI curve 2 frequency percentage of min setting	-100.0%~+100.0%	0.0%	○
P1-09	VI curve 2 max setting	P1-07~+10.00V	10.00V	○
P1-10	VI curve 2 frequency percentage of max setting	-100.0%~+100.0%	100.0%	○
P1-11	VI3 filter time constant	0.00s~10.00s	0.10s	○

P1-12	VI curve 3 min setting	-10.00V~P1-14	-10.00V	○
P1-13	VI curve 3 frequency percentage of min setting	-100.0%~+100.0%	-100.0%	○
P1-14	VI curve 3 max setting	P1-12~+10.00V	10.00V	○
P1-15	VI curve 3 frequency percentage of max setting	-100.0%~+100.0%	100.0%	○
P1-18	PULSE min setting	0.00kHz~P1-20	0.00kHz	○
P1-19	PULSE frequency percentage of min setting	-100.0%~+100.0%	0.0%	○
P1-20	PULSE max setting	P1-18~100.0kHz	50.00kHz	○
P1-21	PULSE frequency percentage of max setting	-100.0%~+100.0%	100.0%	○
P1-22	PULSE filter time constant	0.00s~10.00s	0.10s	○
P1-23	VI curve selection	The unit: VI1 curve selection 1: curve 1 (2 points, refer to P1-02~P1-05) 2: curve 2 (2 points, refer to P1-07~P1-10) 3: curve 3 (2 points, refer to P1-12~P1-15) 4: curve 4 (4 points, refer to P1-25~P1-32) 5: curve 5 (4 points, refer to P1-33~P1-40) Decade: VI2 curve selection, ditto Hundreds place: VI3 curve	321	○

		selection, ditto		
P1-24	VI under min input setting selection	The unit: VI1 under min input setting selection 0: min input setting 1: 0.0% Decade: VI2 under min input setting selection, ditto Hundreds place: VI3 under min input setting selection, ditto	000	○
P1-25	VI curve 4 min input	-10.00V~P1-27	0.00V	○
P1-26	VI curve 4 min input corresponding setting	-100.0%~+100.0%	0.0%	○
P1-27	VI curve 4 inflection point 1 input	P1-25~P1-29	3.00V	○
P1-28	VI curve 4 inflection point input related setting 1	-100.0%~+100.0%	30.0%	○
P1-29	VI curve 4 inflection point 2 input	P1-27~P1-31	6.00V	○
P1-30	VI curve 4 inflection point 2 input related setting	-100.0%~+100.0%	60.0%	○
P1-31	VI curve 4 max input	P1-29~+10.00V	10.00V	○
P1-32	VI curve 4 max input related setting	-100.0%~+100.0%	100.0%	○
P1-33	VI curve 5 min input	-10.00V~P1-35	-10.00V	○
P1-34	VI curve 5 min input related setting	-100.0%~+100.0%	-100.0%	○
P1-35	VI curve 5 inflection point 1 input	P1-33~P1-37	-3.00V	○
P1-36	VI curve 5 inflection	-100.0%~+100.0%	-30.0%	○

	point 1 input related setting			
P1-37	VI curve 5 inflection point 2 input	P1-35~P1-39	3.00V	○
P1-38	VI curve 5 inflection point 2 input related setting	-100.0%~+100.0%	30.0%	○
P1-39	VI curve 5 max input	P1-37~+10.00V	10.00V	○
P1-40	VI curve 5 max input related setting	-100.0%~+100.0%	100.0%	○
P1-41	VI1 setting jump point	-100.0%~+100.0%	0.0%	○
P1-42	VI1 setting jump amplitude	0.0%~100.0%	0.5%	○
P1-43	VI2 setting jump point	-100.0%~+100.0%	0.0%	○
P1-44	VI2 setting jump amplitude	0.0%~100.0%	0.5%	○
P1-45	VI3 setting jump point	-100.0%~+100.0%	0.0%	○
P1-46	VI3 setting jump amplitude	0.0%~100.0%	0.5%	○

Group P2: start and brake parameters				
Parameter	**Name**	**Setting range**	**Default value**	**change**
P2-00	Start mode	0: start directly 1: speed tracking then start 2: preexcitation start (AC asynchronous motor)	0	○
P2-01	Start frequency	0.00Hz~10.00Hz	0.00Hz	○
P2-02	The duration of start frequency	0.0s~100.0s	0.0s	○
P2-03	Start DC brake current /preexcitation current	0%~100%	0%	○

	percentage			
P2-04	Start DC brake time/preexcitation time	0.0s~100.0s	0.0s	○
P2-05	Stop mode	0: deceleration stop 1: free stop	0	○
P2-06	DC brake start frequency when stop	0.00Hz~max output frequency P0-06	0.00Hz	○
P2-07	DC brake time when stop	0.0s~100.0s	0.0s	○
P2-08	DC brake current percentage when stop	0%~100%	0%	○
P2-09	DC brake waiting time when stop	0.0s~100.0s	0.0s	○
P2-10	Speed tracking mode	0: from stop frequency 1: from working frequency 2: from max output frequency	0	○
P2-11	Speed tracking speed	1~100	20	○
P2-12	Brake using rate	0%~100%	100%	○

Group P3: auxiliary running parameters				
Parameter	**Name**	**Setting range**	**Default value**	**change**
P3-00	Wake up frequency	Dormancy frequency F3-01~max output frequency P0-06	0.00Hz	○
P3-01	Dormancy frequency	0.00Hz~wake up frequency P3-00	0.00Hz	○
P3-02	Wake up delay time	0.0s~6500.0s	0.0s	○
P3-03	Dormancy delay time	0.0s~6500.0s	0.0s	○
P3-04	Terminal jog first	0: invalid 1: valid	0	○
P3-05	Module temperature	0℃~100℃	75℃	○

	reached			
P3-06	Jog run frequency	0.00Hz~max output frequency P0-06	2.00Hz	○
P3-07	Jog acceleration time	0.0s~6500.0s	20.0s	○
P3-08	Jog deceleration time	0.0s~6500.0s	20.0s	○
P3-10	Power on arrival time	0h~65000h	0h	○
P3-11	Running arrival time	0h~65000h	0h	○
P3-12	Start the protection	0: not protect 1: protect	0	○
P3-13	Fan	0: fan works when running 1: fan always work	0	○
P3-14	Acceleration time 2	0.0s~6500.0s	Model setting	○
P3-15	Deceleration time 2	0.0s~6500.0s	Model setting	○
P3-16	Acceleration time 3	0.0s~6500.0s	Model setting	○
P3-17	Deceleration time 3	0.0s~6500.0s	Model setting	○
P3-18	Acceleration time 4	0.0s~6500.0s	Model setting	○
P3-19	Deceleration time 4	0.0s~6500.0s	Model setting	○
P3-20	Multi-segment frequency 0	-100.0%~+100.0%	0.0%	○
P3-21	Multi-segment frequency 1	-100.0%~+100.0%	0.0%	○
P3-22	Multi-segment frequency 2	-100.0%~+100.0%	0.0%	○
P3-23	Multi-segment frequency 3	-100.0%~+100.0%	0.0%	○
P3-24	Multi-segment frequency	-100.0%~+100.0%	0.0%	○

	4			
P3-25	Multi-segment frequency 5	-100.0%~+100.0%	0.0%	○
P3-26	Multi-segment frequency 6	-100.0%~+100.0%	0.0%	○
P3-27	Multi-segment frequency 7	-100.0%~+100.0%	0.0%	○
P3-28	Multi-segment frequency 8	-100.0%~+100.0%	0.0%	○
P3-29	Multi-segment frequency 9	-100.0%~+100.0%	0.0%	○
P3-30	Multi-segment frequency 10	-100.0%~+100.0%	0.0%	○
P3-31	Multi-segment frequency 11	-100.0%~+100.0%	0.0%	○
P3-32	Multi-segment frequency 12	-100.0%~+100.0%	0.0%	○
P3-33	Multi-segment frequency 13	-100.0%~+100.0%	0.0%	○
P3-34	Multi-segment frequency 14	-100.0%~+100.0%	0.0%	○
P3-35	Multi-segment frequency 15	-100.0%~+100.0%	0.0%	○
P3-37	Jump frequency 1	0.00Hz~max output frequency	0.00Hz	○
P3-38	Jump frequency 2	0.00Hz~max output frequency	0.00Hz	○
P3-39	Jump frequency amplitude	0.00Hz~max output frequency	0.01Hz	○
P3-40	Jump frequency is effective in acc/dec process	0: not effective 1: effective (in vector condition)	0	○
P3-41	Frequency detection value (FDT1 level)	0.00Hz~max output frequency	50.00Hz	○

P3-42	Frequency detection lag value (FDT1 level)	0.0%~100.0%	5.0%	○
P3-43	Frequency arrival detection amplitude	0.0%~100.0%(max output frequency)	0.0%	○
P3-44	Frequency detection value (FDT2 level)	0.00Hz~max output frequency	50.00Hz	○
P3-45	Frequency detection lag value (FDT2 level)	0.0%~100.0%	5.0%	○
P3-46	Frequency arrival detection value 1	0.00Hz~max output frequency	50.00Hz	○
P3-47	Frequency arrival detection 1 amplitude	0.0%~100.0%(max output frequency)	0.0%	○
P3-48	Frequency arrival detection value 2	0.00Hz~max output frequency	50.00Hz	○
P3-49	Frequency arrival detection 2 amplitude	0.0%~100.0%(max output frequency)	0.0%	○
P3-50	Acceleration time ½ switching frequency point	0.00Hz~max output frequency	0.00Hz	○
P3-51	deceleration time ½ switching frequency point	0.00Hz~max output frequency	0.00Hz	○
P3-52	Current arrival detection value 1	0.0%~300.0%(motor rated current)	100.0%	○
P3-53	Current arrival detection 1 amplitude	0.0%~300.0%(motor rated current)	0.0%	○
P3-54	Current arrival detection value 2	0.0%~300.0%(motor rated current)	100.0%	○
P3-55	Current arrival detection 2 amplitude	0.0%~300.0%(motor rated current)	0.0%	○
P3-56	Zero current detection value	0.0%~300.0%(motor rated current)	5.0%	○
P3-57	Zero current detection delay time	0.01s~600.00s	0.10s	○

P3-58	Software overcurrent point	0: 0.0%(not detection) 1: 0.1%~300.0%(motor rated current)	200.0%	○
P3-59	Software overcurrent detection delay time	0.00s~600.00s	0.00s	○
P3-60	VI1 input voltage low limit	0.00V~P3-61	3.10V	○
P3-61	VI1 input voltage upper limit	P3-60~11.00V	6.80V	○
P3-62	Timing function selection	0: invalid 1: valid	0	○
P3-63	Timing time setting	0: P3-64 setting	0	○
P3-64	Setting run time	0.0Min~6500.0Min	0.0Min	○
P3-65	Present run arrival time	0.0Min~6500.0Min	0.0Min	○

Group P4: terminal function parameters				
Parameter	**Name**	**Range**	**Default value**	**change**
P4-00	Input terminal X1 function	0: no function 1: forward run FWD or run command 2: reverse run REV or run direction (note: set to 1, 2, should use together with P4-11) 3: three wires mode run control 4: forward jog(FJOG) 5: reverse jog(RJOG) 6: free stop 7: fault reset(RESET) 8: external fault normally open input 9: terminal UP 10: terminal DOWN	1	○
P4-01			4	○
P4-02	Input terminal X2 function		9	○

P4-03	Input terminal X3 function	11: UP/DOWN setting reset(terminal, keyboard) 12: running pause 13: acc/dec time selection terminal 1 14: acc/dec time selection terminal 2 15: PID pause 16: multi-segment command terminal 1 17: multi-segment command terminal 2 18: multi-segment command terminal 3 19: multi-segment command terminal 4 20: swing frequency pause 21: acc/dec prohibition 22: torque control prohibition 23: length count input 24: length reset 25: counter input 26: counter reset 27: PULSE frequency input (only X6 is valid) 28: PLC state reset 29: frequency source switching(main and auxiliary frequency source switching) 32: external fault normally close input 33: frequency modification enable 34: PID integral pause 35: PID functional direction reverse 36: PID parameter switching 37: external stop terminal 1 38: external stop terminal 2 39: urgent stop(for vector mode) 40: decelerate DC brake 41: user-defined fault 1 42: user-defined falult 2 43: run time reset 44: motor selection terminal 1 45: motor selection terminal 2	12	○
P4-04	Input terminal X4 function		13	○
P4-06	Input terminal X6 function		0	○

P4-10	Terminal UP/DOWN speed	0.001Hz/s~65.535Hz/s	1.00Hz/s	○
P4-11	Terminal command method	0: two-wire mode 1 1: two-wire mode 2 2: three-wire mode 1 3: three-wire mode 2	0	○
P4-12	X terminal filter time	0.000s~1.000s	0.010s	○
P4-13	X terminal effective state selection 1	0: high level valid 1: low level valid The unit: X1 Decade: X2 Hundreds place: X3 Kilobit: X4 Myriabit: X6	00000	○
P4-15	X1 delay time	0.0s~3600.0s	0.0s	○
P4-16	X2 delay time	0.0s~3600.0s	0.0s	○
P4-17	X3 delay time	0.0s~3600.0s	0.0s	○
P4-18	DO output mode	0: high speed pulse output 1: DO output	0	○
P4-19	DO output selection	0: no output 1: VFD is running 2: fault output(free stop fault) 3: frequency level detection FDT1 output 4: frequency level detection FDT2 output 5: frequency arrival 6: zero speed run (not output when stop) 7: zero speed run 2(output when stop) 8: upper limit frequency arrival 9: low limit frequency arrival (related to running) 10: motor overload warning 11: VFD overload warning 12: communication setting	0	○

		13: torque limit 14: frequency limit(only low limit frequency is valid, upper limit frequency already limited) 15: frequency 1 arrival output 16: frequency 2 arrival output 17: current 1 arrival output 18: current 2 arrival output 19: setting counter value arrival 20: appointed counter value arrival 21: run ready 22: VI1>VI2 23: VI1 input overlimit 24: output when under voltage 25: accumulated power on time arrival 26: time arrival output 27: length arrival 28: simple PLC cycle finished 29: accumulated run time arrival 30: positioning completed(reserved) 31: positioning close(reserved) 32: low limit frequency arrival (output when stop) 33: fault output(not output for free stop fault and under voltage) 34: module temperature arrival 35: alarm output(all fault) 36: motor overheat warning(no motor temperature sensor by now) 37: reverse running 38: off load 39: output current overlimit 40: zero current state 41: this time run time arrival		
P4-20	TATBTC output selection	ditto		

P4-25	AO output selection	0: run frequency 1: setting frequency 2: motor speed 3: output current 4: output voltage 5: output power 6: motor output torque(absolute value, percentage relative to the motor) 7: VI1 8: VI2 10: PULSE input(100.0% is corresponding to 100.0kHz) 11: communication setting 12: counter value 13: length 14: motor output torque(actual value, percentage relative to the motor) 15: output current(100.0% is corresponding to 1000.0A) 16: output voltage(100.0% is corresponding to 1000.0V)	0	○
P4-27	AO zero bias coefficient	-100.0%~+100.0%	0.0%	○
P4-28	AO gain	-10.00~+10.00	1.00	○
P4-32	FMR output delay time	0.0s~3600.0s	0.0s	○
P4-33	RELAY1 output delay time	0.0s~3600.0s	0.0s	○
P4-37	DO effective state selection	0: positive logic 1: reverse logic The unit: FMR Decade: RELAY1	00000	○

Group P5: protection function parameters				
Parameter	**Name**	**Range**	**Default value**	**Change**
P5-00	Motor overload protection mode	0: prohibition 1: permission	1	○
P5-01	Motor overload protection gain	0.20~10.00	1.00	○
P5-02	Overvoltage speed loss gain	Reversed	-	-
P5-03	Overvoltage speed loss protection voltage	Reversed	-	-
P5-04	Input open-phase protection	The unit: input open-phase protection Decade: contactor close protection 0: prohibition 1: permission	11	○
P5-05	Output open-phase protection	0: prohibition 1: permission	1	○
P5-06	Overcurrent speed loss gain	Reserved	-	-
P5-07	Overcurrent speed loss protection current	Reserved	-	-
P5-08	Power on protection for short circuit relative to ground	0: prohibition 1: permission	1	○
P5-09	Fault auto-reset times	0~20	0	○
P5-10	Fault auto-reset space time	0.1s~100.0s	1.0s	○
P5-11	Fault relay action when fault auto-reset	0: no action 1: action	0	○
P5-12	Motor overload warning coefficient	50%~100%	80%	○
P5-13	Protection action 1 when fault	The unit: motor overload(Err 9)	00000	○

		0: free stop 1: stop as stop mode 2: continue running Decade: input open-phase(Err10) Hundreds place: output open-phase(Err11) Kilobit: external fault(Err15) Myriabit: user-defined fault 1(Err16)		
P5-14	Protection action 2 when fault	The unit: user-defined fault 2(Err17) 0: free stop Decade: communication error(Err22) 0: free stop 1: stop as the stop mode Hundreds place: eeprom read write error(Err23) Kilobit: load off(Err24) Myriabit: run time arrival (Err25)	00000	○
P5-15	Protection action 3 when fault	The unit: power on time arrival(Err27) 0: free stop 1: stop as stop mode 2: continue running Decade: PID feedback lost when running(Err28) 0: free stop 1: stop as stop mode	00000	○

		2: continue running		
P5-18	Continue running frequency when fault	0: run at present frequency 1: run at setting frequency 2: run at upper limit frequency 3: run at low limit frequency 4: run at error backup frequency	0	○
P5-19	Not stop when instant power off	0~2	0	○
P5-20	Instant stop pause judgement voltage	80.0%~100.0%	85.0%	○
P5-21	Not stop when Instant power off voltage rising judgement time	0.0s~100.0s	0.5s	○
P5-22	Not stop when instant power off judgement voltage	60.0%~100.0%(standard bus voltage)	80.0%	○
P5-23	Motor temperature sensor type	0: no temperature sensor 1: PT100 2: PT1000	0	○
P5-24	Motor overheat protection threshold value	0℃~200℃	110℃	○
P5-25	Motor overheat warning threshold value	0℃~200℃	90℃	○
P5-28	Off load protection	0: invalid 1: valid	0	○
P5-29	Off load detection level	0.0~100.0%	10.0%	○
P5-30	Off load detection time	0.0s~60.0s	1.0s	○
P5-33	Error backup frequency setting	0.0%~100.0% (100.0% corresponding to	100.0%	○

		the max frequency P0-06)		

Group P6: fault records parameters				
Parameter	**Name**	**Range**	**Default setting**	**Change**
P6-00	The third time (latest)fault type	0: no fault 1: accelertion overcurrent 2: deceleration overcurrent 3: constant speed overcurrent 4: acceleration overvoltage 5: deceleration overvoltage 6: constant speed overvoltage 7: undervoltage fault 8: VFD overload 9: motor overload 10: input open-phase 11: output open-phase 12: the radiator overheat 13: buffer resistor overload fault 14: contactor fault 15: external fault 16: user-defined fault 1 17: user-defined fault 2	-	×
P6-01	The second time fault type		-	×
P6-02	The first time fault type		-	×

		18: current detection fault 19: motor short circuit to ground fault 20: current limiting fault 21: motor tuning fault 22: communication (overtime) fault 23：EEPORM read write fault 24: off load 25: run time arrival 26: switch motor when running 27: power on time arrival 28: PID feedback lost when running		
P6-03	The third time (latest) fault frequency	-	-	×
P6-04	The third time (latest) fault current	-	-	×
P6-05	The third time (latest) fault bus voltage	-	-	×
P6-06	The third time (latest) fault input terminal state	-	-	×
P6-07	The third time (latest) fault output terminal state	-	-	×
P6-08	The third time (latest) fault VFD state	-	-	×
P6-09	The third time (latest) fault	-	-	×

	power on time			
P6-10	The third time (latest) fault run time	-	-	×
P6-11	The second time fault frequency	-	-	×
P6-12	The second time fault current	-	-	×
P6-13	The second time fault bus voltage	-	-	×
P6-14	The second time fault input terminal state	-	-	×
P6-15	The second time fault output terminal state	-	-	×
P6-16	The second time fault VFD state	-	-	×
P6-17	The second time fault power on time	-	-	×
P6-18	The second time fault run time	-	-	×
P6-19	The first time fault frequency	-	-	×
P6-20	The first time fault current	-	-	×
P6-21	The first time fault bus voltage	-	-	×
P6-22	The first time fault input terminal state	-	-	×
P6-23	The first time fault output terminal state	-	-	×
P6-24	The first time fault VFD state	-	-	×
P6-25	The first time fault power on time	-	-	×
P6-26	The first time fault run time	-	-	×

Group P7: process control close-loop parameters				
Parameter	**Name**	**Range**	**Default value**	**change**
P7-01	Setting channel selection	0: FA-01 setting 1: VI1	0	○

		2: VI2 4: PULSE setting(X6) 5: communication setting 6: multi-segment instruction setting		
P7-02	Feedback channel selection	0: VI1 1: VI2 2: reserved 3: VI1-VI2 4: VI1+VI2 5: PULSE setting (X6) 6: communication setting	0	○
P7-03	PID feedback filter time	0.00s~60.00s	0.00s	○
P7-04	PID output filter time	0.00s~60.00s	0.00s	○
P7-05	Operate panel setting	0.0%~100.0%	50.0%	○
P7-06	PID setting change time	0.00s~650.00s	0.00s	○
P7-07	PID reverse run cut-off frequency	0.00Hz~max output frequency	0.00Hz	○
P7-08	PID deviation limit	0.0%~100.0%	0.0%	○
P7-09	PID differential limit	0.00%~100.00%	0.10%	○
P7-10	Proportion gain P	0.0~100.0	20.0	○
P7-11	Integral time I	0.01s~10.00s	2.00s	○
P7-12	Differential time D	0.000s~10.000s	0.000s	○
P7-13	PID parameter switching condition	0: not switch 1: switch by terminal 2: auto-switch as the deviation	0	○
P7-14	PID parameter switching deviation 1	0.0%~P7-15	20.0%	○
P7-15	PID parameter switching deviation 2	P7-14~100.0%	80.0%	○
P7-16	PID proportion gain P2	0.0~100.0	20.0	○

P7-17	PID integral time I2	0.01s~10.00s	2.00s	○
P7-18	PID differential time D2	0.000s~10.000s	0.000s	○
P7-19	PID function direction	0: positive function 1: negative function	0	○
P7-20	PID setting feedback range	0~65535	1000	○
P7-21	PID max deviation between two times of output	0.00%~100.00%	1.00%	○
P7-22	PID min deviation between two times of deviation	0.00%~100.00%	1.00%	○
P7-23	PID initial value	0.0%~100.0%	0.0%	○
P7-24	PID intial value hold time	0.00s~650.00s	0.00s	○
P7-25	PID operation mode (operation when stop)	0: not operation when stop 1: operation when stop	0	○
P7-26	PID integral feature	The unit: integral separation 0: invalid 1: valid Decade: stop integral when output reached the limit value 0: not stop integral 1: stop integral	00	○
P7-27	PID feedback missing detection value	0.0%: not judge the feedback missing 0.1%~100.0%	0.0%	○
P7-28	PID feedback missing detection time	0.0s~20.0s	0.0s	○
P7-29	PID sampling period	Reversed		

Group P8: simple PLC running parameters				
Parameter	**Name**	**Range**	**Default value**	**Change**
P8-00	Simple PLC running mode	0: single time running end stop 1: single time running end keep the final value 2: keep cycling	0	○
P8-01	Simple PLC segment 0 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-02	Simple PLC segment 0 acceleration/deceleration time	0~3	0	○
P8-03	Simple PLC segment 1 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-04	Simple PLC segment 1 acceleration/deceleration time	0~3	0	○
P8-05	Simple PLC segment 2 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-06	Simple PLC segment 2 acceleration/deceleration time	0~3	0	○
P8-07	Simple PLC segment 3 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-08	Simple PLC segment 3 acceleration/deceleration time	0~3	0	○
P8-09	Simple PLC segment 4 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-10	Simple PLC segment 4 acceleration/deceleration time	0~3	0	○
P8-11	Simple PLC segment 5 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-12	Simple PLC segment 5 acceleration/deceleration time	0~3	0	○
P8-13	Simple PLC segment 6 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-14	Simple PLC segment 6 acceleration/deceleration time	0~3	0	○
P8-15	Simple PLC segment 7 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-16	Simple PLC segment 7	0~3	0	○

	acceleration/deceleration time			
P8-17	Simple PLC segment 8 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-18	Simple PLC segment 8 acceleration/deceleration time	0~3	0	○
P8-19	Simple PLC segment 9 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-20	Simple PLC segment 9 acceleration/deceleration time	0~3	0	○
P8-21	Simple PLC segment 10 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-22	Simple PLC segment 10 acceleration/deceleration time	0~3	0	○
P8-23	Simple PLC segment 11 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-24	Simple PLC segment 11 acceleration/deceleration time	0~3	0	○
P8-25	Simple PLC segment 12 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-26	Simple PLC segment 12 acceleration/deceleration time	0~3	0	○
P8-27	Simple PLC segment 13 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-28	Simple PLC segment 13 acceleration/deceleration time	0~3	0	○
P8-29	Simple PLC segment 14 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-30	Simple PLC segment 14 acceleration/deceleration time	0~3	0	○
P8-31	Simple PLC segment 15 run time	0.0~6500.0s(h)	0.0s(h)	○
P8-32	Simple PLC segment 15 acceleration/deceleration time	0~3	0	○
P8-33	Simple PLC power-off retentive	The unit: power-off	00	○

		retentive 0: no memory 1: memory Decade: stop memory 0: no memory 1: memory		
P8-34	Simple PLC run time unit	0: second 1: hour	0	○

Group PA: motor basic parameters				
parameter	**Name**	**Range**	**Default value**	**Change**
PA-00	Motor rated power	0.1kW~1000.0kW	Model setting	○
PA-01	Motor rated voltage	1V~2000V	Model setting	○
PA-02	Motor rated current	0.01A~655.35A (VFD power ≤55kW) 0.1A~6553.5A (VFD power >55kW)	Model setting	○
PA-03	Motor rated frequency	0.01Hz~max output frequency	Model setting	○
PA-04	Motor rated speed	1rpm~65535rpm	Model setting	○
PA-05	Motor type	0: normal asynchronous motor 1: various frequency asynchronous motor	0	○
PA-06	Asynchronous motor no-load current	0.01A~PA-02 (VFD power ≤55kW) 0.1A~PA-02 (VFD power >55kW)	Tuning parameter	○
PA-07	Asynchronous	0.001Ω~65.535Ω	Tuning	○

	motor stator resistor	(VFD power ≤55kW) 0.0001Ω~6.5535Ω(VFD power >55kW)	parameter	
PA-08	Asynchronous motor rotor resistor	0.001Ω~65.535Ω (VFD power ≤55kW) 0.0001Ω~6.5535Ω (VFD power >55kW)	Tuning parameter	○
PA-09	Asynchronous motor leakage inductance	0.01mH~655.35mH (VFD power ≤55kW) 0.001mH~65.535mH (VFD power >55kW)	Tuning parameter	○
PA-10	Asynchronous motor mutual inductance	0.1mH~6553.5mH (VFD power ≤55kW) 0.01mH~655.35mH (VFD power >55kW)	Tuning parameter	○
PA-17	Tuning selection	0: no operation 1: asynchronous motor static tuning 1 2: asynchronous motor dynamic tuning 3: asynchronous motor static tuning 2	0	○

Group PB: special application parameters				
Parameter	**Name**	**Range**	**Default value**	**change**
PB-00	JOG function	0: JOG invalid 1: forward and reverse run switching 2: forward jog 3: reverse jog	0	○
PB-01	STOP function	0: STOP/RES is valid in	1	○

		keyboard mode 1: STOP/RES is valid in any mode		
PB-02	VFD model display	1: G type (constant torque load model) 2: P type (fan, water pump load model)	Model setting	○
PB-03	Inverter module radiator temperature	0.0℃~100.0℃	-	×
PB-04	Rectifier bridge radiator temperature	Product number	-	
PB-05	Accumulated run time	0h~65535h	-	×
PB-06	Product number	-	-	×
PB-07	Software version	-	-	×
PB-08	Load speed display coefficient	0.0001~6.5000	1.0000	○
PB-09	Load speed display decimal position	The unit: U0-22 decimal number 0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places Decade: U0-17/U0-18 decimal number 1: 1 decimal place 2: 2 decimal places	21	○
PB-13	Accumulated power on time	0h~65535h	-	×
PB-14	Accumulated	0~65535 degree	-	×

	power consumption			
PB-15	Pulse number per meter	0.1~6553.5	100.0	○
PB-16	Setting count value	1~65535	1000	○
PB-17	Appointed count value	1~65535	1000	○
PB-18	Setting length	0m~65535m	1000 m	○
PB-19	Actual length	0m~65535m	0m	○
PB-20	Swing frequency setting method	0: relative to the center frequency 1: relative to the max frequency	0	○
PB-21	Swing frequency range	0.0%~100.0%	0.0%	○
PB-22	Swing frequency period	0.1s~3000.0s	10.0s	○
PB-23	Jump frequency range	0.0%~50.0%	0.0%	○
PB-24	Swing frequency triangle wave rising time	0.1%~100.0%	50.0%	○
PB-25	User password	0~65535	0	○
PB-26	Parameter initialization	0: no operation 01: reset to facotry setting, no include motor parameters 02: clear away the records	0	○
PB-27	Read only user password(can be modified)	0: can be modified 1: cannot be modified	0	○
PB-30	Torque control	0: speed control 1: torque control	0	○
PB-31	Driving torque	0: digital setting 1 (A0-03)	0	○

	upper limit source	1: VI1 2: VI2 4: PULSE 5: communication setting 6: MIN(VI1,VI2) 7: MAX(VI1,VI2) (option 1-7 full scale relative to PB-32 digital setting)		
PB-32	Drive torque upper limit	-200.0%~200.0%	150.0%	○
PB-33	Torque acceleration time	0.00s~650.00s	0.00s	○
PB-34	Torque deceleration time	0.00s~650.00s	0.00s	○
PB-35	Torque control forward max frequency	0.00Hz~max output frequency	50.00Hz	○
PB-36	Torque control reverse max frequency	0.00Hz~max output frequency	50.00Hz	○
PB-37	Wave-to-wave current limit enable	0: disable 1: enable	1	○
PB-38	Under voltage point setting	200.00V~2000.0V	Model setting 380V 350V	○
PB-39	Over voltage point setting	200.0V~2200.0V	Model setting	○
PB-40	Dead area time adjustment special for -1140V	100%~200%	150%	○
PB-41	SVC optimal	1: optimal mode 1	2	○

	selection	2: optimal mode 2		
PB-42	Current detection compensation	0~100	5	○
PB-43	Dead area compensation mode	0: not compensate 1: compensation mode 1	1	○
PB-44	Modulation mode	0: asynchronous modulation 1: synchronous modulation	0	○
PB-45	DPWM switching upper limit frequency	5.00Hz~max output frequency	8.00Hz	○
PB-46	Random PWM	0: random PWM invalid 1~10: PWM carrier frequency random depth	0	○

Group PC: communication parameter				
Parameter	**Name**	**Range**	**Default value**	**Change**
PC-00	Serial port communication protocol	0: MODBUS-RTU protocol	0	×
PC-01	Device address	0: broadcast address 1~247 (MODBUS,Profibus-DP,CANlink)	1	○
PC-02	Baud rate	The unit: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS	6005	○

		7: 38400BPS		
PC-03	MODBUS data format	0: no parity (8-N-2) 1: even parity (8-E-1) 2: odd parity (8-O-1) 3: no parity (8-N-1) (MODBUS is effective)	0	○
PC-04	MODBUS answer delay	0 ~ 20ms (MODBUS is effective)	2	○
PC-06	Communication overtime	0.0: invalid 0.1 ~ 60.0s	0.0	○
PC-07	Read current resolution through communication	0: 0.01A 1: 0.1A	0	○

Group A0: second motor parameters				
Parameter	**Name**	**Range**	**Default value**	**Change**
A0-00	Motor rated power	0.1kW~1000.0kW	Model setting	○
A0-01	Motor rated voltage	1V~2000V	Model setting	○
A0-02	Motor rated current	0.01A~655.35A (VFD power ≤ 55kW) 0.1A~6553.5A (VFD power > 55kW)	Model setting	○
A0-03	Motor rated frequency	0.01Hz~max output frequency	Model setting	○
A0-04	Motor rated speed	1rpm~65535rpm	Model setting	○
A0-05	Motor type	0: normal asynchronous motor 1: variable frequency asynchronous motor	0	○
A0-06	Asynchronous	0.01A~A2-03	Model	○

	motor no-load current	(VFD power ≤ 55kW) 0.1A~A2-03 (VFD power > 55kW)	setting	
A0-07	Asynchronous motor stator resistor	0.001Ω~65.535Ω (VFD power ≤ 55kW) 0.0001Ω~6.5535Ω (VFD power > 55kW)	Model setting	○
A0-08	Asynchronous motor rotor resistor	0.001Ω~65.535Ω (VFD power ≤ 55kW) 0.0001Ω~6.5535Ω (VFD power > 55kW)	Model setting	○
A0-09	Asynchronous motor leakage inductance	0.01mH~655.35mH (VFD power ≤ 55kW) 0.001mH~65.535mH (VFD power > 55kW)	Model setting	○
A0-10	Asynchronous motor mutual inductance	0.1mH~6553.5mH (VFD power ≤ 55kW) 0.01mH~655.35mH (VFD power > 55kW)	Model setting	○
A0-17	Tuning selection	0: no tuning 1: asynchronous motor static tuning 1 2: asynchronous motor dynamic tuning 3: asynchronous motor static tuning 2	0	○
A0-31	Speed loop ratio gain 1	1~100	30	○
A0-32	Speed loop integral time 1	0.01s~10.00s	0.50s	○
A0-33	Switching frequency 1	0.00Hz~A0-36	5.00Hz	○
A0-34	Speed loop ratio gain 2	1~100	20	○

A0-35	Speed loop integral time 2	0.01s~10.00s	1.00s	○
A0-36	Switching frequency 2	A0-33~max output frequency	10.00Hz	○
A0-37	Speed control (drive) torque upper limit source	0: A0-38 setting 1: VI1 2: VI2 4: PULSE 5: communication setting 6: MIN(VI1,VI2) 7: MAX(VI1,VI2) Option 1 to 7 full scale corresponding to A0-38 digital setting	0	○
A0-38	Speed control(drive) torque upper limit digital setting	0.0%~200.0%	150.0%	○
A0-40	Speed loop filter time constant	1~31	28	○
A0-41	M axis current loop Kp	0~20000	2000	○
A0-42	M axis current loop Ki	0~20000	1300	○
A0-43	T axis current loop Kp	0~20000	2000	○
A0-44	T axis current loop Ki	0~20000	1300	○
A0-45	Speed loop integral features	The unit: integral separation 0: invalid 1: valid	0	○
A0-51	Motor acceleration deceleration time	0: same to first motor 1: acc/dec time 1	0	○

		2: acc/dec time 2 3: acc/dec time 3 4: acc/dec time 4		
A0-52	Torque boost	0.0%: automatic torque boost 0.1%~30.0%	Model setting	○
A0-53	Oscillation suppression gain	0~100	Model setting	○
A0-54	Motor control mode	0: no speed sensor vector control (SVC) 2: V/F control	0	○

Group AD: VIAO calibration				
Parameter	**Name**	**Range**	**Default value**	**Change**
AD-00	VI1 measured voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-01	VI1 display voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-02	VI1 measured voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-03	VI1 display voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-04	VI2 measured voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-05	VI2 display voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-06	VI2 measured voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-07	VI2 display voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-12	AO1 target voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-13	AO1 measured voltage	0.500V~4.000V	Out of factory	○

	1		calibration	
AD-14	AO1 target voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-15	AO1 measured voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-16	AO2 target voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-17	AO2 measured voltage 1	0.500V~4.000V	Out of factory calibration	○
AD-18	AO2 target voltage 2	6.000V~9.999V	Out of factory calibration	○
AD-19	AO2 measured voltage 2	6.000V~9.999V	Out of factory calibration	○

Group U0: monitoring parameters		
Parameter	**Name**	**Min unit**
U0-00	Running frequency (Hz)	0.01Hz
U0-01	Setting frequency (Hz)	0.01Hz
U0-02	Output voltage (V)	1V
U0-03	Output current (A)	0.01A
U0-04	But voltage (V)	0.1V
U0-05	Output power (kW)	0.1kW
U0-06	Output torque (%) percentage of motor rated torque	0.1%
U0-07	PID setting	1
U0-08	PID feedback	1
U0-09	VI1 voltage (V)	0.01V
U0-10	VI2 voltage (V)/current (mA)	0.01V/0.01mA
U0-12	VI1 voltage before calibration	0.001V
U0-13	VI2 voltage (V)/current (mA) before calibration	0.001V/0.01mA
U0-15	PULSE input pulse frequency	1Hz
U0-16	PULSE input pulse frequency (Hz)	0.01kHz
U0-17	Feedback speed (Hz)	0.01Hz

U0-18	Line speed	1m/Min
U0-19	X input state	1
U0-20	DO output state	1
U0-21	Load speed display (display setting frequency×coefficient when stop, display running frequency×coefficient when running)	1
U0-22	Present power on time	1Min
U0-23	Present running time	0.1Min
U0-24	PLC stage	1
U0-25	Count value	1
U0-26	Length value	1
U0-27	Communication setting value	0.01%
U0-28	Main frequency A display	0.01Hz
U0-29	Auxiliary frequency B display	0.01Hz
U0-30	Setting frequency (%)	0.01%
U0-31	Running frequency (%)	0.01%
U0-32	VFD state	1
U0-33	Target torque (%)	0.1%
U0-34	Power factor angle	0.1°
U0-35	Fault message	1
U0-36	VF separation target voltage	1V
U0-37	VF separation output voltage	1V
U0-38	Remaining running time	0.1Min
U0-39	X terminal input state display	1
U0-40	DO terminal input state display	1

5 Fault diagnosis and solution

5-1. fault and solution

When fault occurs, the error code will show in LED digital tube, the inverter stops outputting and the fault relay contactor is activated. If the motor is running when the fault occurs, motor will free stop. Table 5-1 is the fault list. Please check the fault according to the table or contact us for service.

Table 5-1 fault and solution

Error code	Name	Fault	Solution
Err01	Over-current when accelerating	1. the VFD output circuit has short circuit or ground connection 2. control mode is vector and has not done the parameter tuning 3. acceleration time too short 4. manual torque boost or V/F curve not suitable 5. voltage too low 6. startup the rotating motor 7. add load when accelerating 8. VFD power is too small	1. check outside fault 2. do the motor parameter tuning 3. increase acceleration time 4. adjust the manual torque boost or V/F curve 5. adjust the voltage to normal range 6. choose speed tracking startup or startup after motor stop 7. move away the additional load 8. choose larger power VFD
Err02	Over-current when decelerating	1. the VFD output circuit has short circuit or ground connection 2. control mode is vector and has not done the parameter tuning 3. deceleration time too short	1. check outside fault 2. do the motor parameter tuning 3. increase deceleration time 4. adjust the voltage to

		4. voltage too low 5. add load when decelerating 6. has no brake unit and brake resistor	normal range 5. move away the additional load 6. install brake unit and brake resistor
Err03	Constant speed over-current	1. the VFD output circuit has short circuit or ground connection 2. control mode is vector and has not done the parameter tuning 3. voltage too low 4. add load when running 5. VFD power is too small	1. check outside fault 2. do the motor parameter tuning 3. adjust the voltage to normal range 4. move away the additional load 5. choose larger power VFD
Err04	Accelerating over-voltage	1. input voltage too high 2. external force drive the motor to run in accelerating process 3. acceleration time too short 4. no brake unit and brake resistor	1. adjust the voltage to normal range 2. cancel the external force or install brake resistor 3. increase acceleration time 4. install brake unit and brake resistor
Err05	Decelerating over-voltage	1. input voltage too high 2. external force drive the motor to run in decelerating process 3. deceleration time too short 4. no brake unit and brake resistor	1. adjust the voltage to normal range 2. cancel the external force or install brake resistor 3. increase deceleration time 4. install brake unit and brake resistor
Err06	Constant	1. input voltage too high	1. adjust the voltage to

	over-voltage	2. external force drive the motor to run when running	normal range 2. cancel the external force or install brake resistor
Err07	Under voltage	1. momentary power failure 2. VFD input voltage is out of the range 3. bus voltage is abnormal 4. rectifier bridge and buffer resistor abnormal 5. drive circuit board error 6. control circuit board error	1. reset the fault 2. adjust the voltage to normal range 3-6. ask for technical support
Err08	VFD over-load	1. load is too large and motor blocked 2. VFD power is too small	1. decrease the load and check the motor and mechanical condition 2. choose larger power VFD
Err09	Motor over-load	1. check motor protection parameters 2. load is too large or motor blocked 3. VFD power is too small	1. set the suitable motor protection parameter 2. decrease the load and check the motor and mechanical condition 3. choose larger power VFD
Err10	Input lack of phase	1. 3-phase input power supply is abnormal 2. drive circuit board error 3. anti-thunder circuit board error 4. main control circuit board error	1. check the outside circuit 2-4. ask for technical support
Err11	Output lack of phase	1. the wire from VFD to motor has problem	1. check the outside fault 2.check the motor 3-phase

		2. VFD 3-phase output is unbalanced when motor running 3. Drive circuit board error 4. module error	resistor 3-4. ask for technical support
Err12	heatsink/module overheat	1. environment temperature is too high 2. air flue blockage 3. fan damaged 4. thermistor damaged 5. the inverter module damaged	1. decrease the environment temperature 2. clear the air flue 3. change new fan 4. change new thermistor 5. change new inverter module
Err13	Buffer resistor overload		
Err14	Contactor fault	1. drive circuit board and power supply error 2. contactor error	1. change new drive circuit board or power supply circuit board 2. change contactor
Err15	External fault	1、input external fault signal from X terminal 2. input external fault signal from virtual DO function	1. reset run 2. reset run
Err16	User-defined fault 1	1. input user-defined fault 1 signal from X terminal 2. input user-defined fault 1 signal via virtual IO function	1. reset run 2. reset run
Err17	User-defined fault 2	1. input user-defined fault 2 signal from X terminal 2. input user-defined fault 2 signal via virtual IO function	1. reset run 2. reset run
Err18	Current detection fault	1. HALL component error 2. drive circuit board error	1. change new HALL 2. change new drive circuit board
Err19	Motor short circuit	Motor short circuit to ground	Change cable or motor

	to ground		
Err20	Wave-to-wave current limit failure	1. load too large or motor blocked 2. VFD power too small	1. decrease the load and check the mechanical condition 2. choose larger power VFD
Err21	Motor tuning fault	1. motor parameter not set as label 2. parameter tuning overtime	1. set correct motor paramter as the label 2. check the cable from VFD to motor
Err22	Communication (overtime) fault	1. upper device work abnormal 2. communication cable error 3. parameter group PC setting is not correct	1. check the upper device wiring 2. check the communication wiring 4. set correct communication parameter
Err23	EEPORM read write error	EEPROM chip damaged	Change new main control circuit board
Err24	Off load	VFD run current less than P5-29	If the load is off or set correct parameters of P5-29, P5-30
Err25	Run time arrival	cumulative run time arrived setting value	Clear the records through parameter initialization function
Err26	Switch motor when running	Change the motor selection via terminal when VFD is running	Please switch the motor after VFD stop
Err27	Power on time arrival	Cumulative power on time arrived setting value	Clear the records through parameter initialization function
Err28	PID feedback missing when running	PID feedback less than P7-27	Check PID feedback signal or set suitable parameter of P7-27

5-2. Check the fault records

The inverter records the last 6 times fault code and the running parameter of last fault. Checking these information can help to solve the problem. The fault records are stored in P6.

5-3. Fault reset

Once the fault occurs, select one of the following operations to restart the inverter:

(1) When fault code displayed in the operation panel, press STOP/RESET key after you confirm the inverter can be reset.

(2) After setting one terminal among X1~X6 as external RESET input (P4.00~P4.04=7), connect it with COM terminal and then disconnect.

(3) Cut off the power supply

Note:

(1) Please make sure you know the reason of the fault and get rid of it before resetting, otherwise the inverter may be damaged permanently.

(2) If the inverter can not be reset or fault reoccurred after resetting, please check the reason as the inverter may be damaged by resetting continuously.

(3) Delay 5 minutes to reset when overload and overheat protection are enabled.

6 Maintenance

6-1. Maintenance

Environment effections such as ambient temperature, humidity, fog, internal component aging and other factors will give rise to the occurrence of potential faults. Therefore, it is necessary to daily check and routine maintain the inverters.

6-1-1. Routine maintenance

Please confirm the following items when start the inverter.

(1) If there is abnormal noise and vibration with the motor.

(2) If the inverter and motor heat unusually.

(3) If the environment temperature is too high.

(4) If the value of load amperometer is as usual.

(5) If the fan of inverter can operate normally.

6-2. Periodical care and maintenance

6-2-1.Periodical care

Before checking and maintaining the inverter, please make sure that the inverter is power off, monitor has no display content and the indication lamp of main circuit power is off.The checking contents are shown in Tabel 6-1.

Table 6-1 periodical maintenance

Items	Contents	Countermeasures
The screw of main circuit terminals, control circuit terminals	If the screws are loose	Tighten the screws with screw drivers
Heatsink	If there is dust	Use dry compressed air with 4~6kgcm^2 pressure
PCB board	If there is dust	Use dry compressed air with 4~6kgcm^2 pressure
Cooling fan	There is abnormal noise, vibration, or if it has run for more than 20 000 hours.	Change cooling fan

Power component	If there is dust	Use dry compressed air with 4~6kgcm^2 pressure
Aluminium electrolytic capacitor	If it has changed color, particular smell or bubble	Change aluminium electrolytic capacitor

6-2-2. Periodical maintenance

To make the inverter work normally for long time, periodical care and maintenance for inverter's internal electronic component should be done. The electronic component's lifetime depends on their application environment and preservation. The reference lifetime are shown in table 6-2:

Table 6-2 Lifetime of inverter components

Component	Life
Cooling fan	2~3 year
Electrolytic capacitors	4~5 year
Print circuit board	5~8 year
Fuse	10 year

The usage conditions of the above components are shown below:

(1) Environmental temperature: 30℃in average.

(2) Load coefficient: less than 80%.

(3) Running time : less than 12 hours per day.

6-3. Warranty of the inverter

Xinje Company will offer warranty service in the case of the following situations:

(1) The warranty range only points to the inverter;

(2) We will take the responsibility of 15 months defects liability period for any faults or damages under the normal operation conditions. After15 months, maintenance will be charged;

(3) Even within 15 months, maintenance would be charged under the following conditions:

Inverter is damaged due to incorrect operation, which are not in compliance with "User Manual";

Inverter is damaged due to fire, flood, and abnormal voltage and so on;
Inverter is damaged due to wiring fault.
Inverter is damaged due to the improper use of drive functions;
(4) Service fee will be charged according to the actual costs. If there are any maintenance contracts, the contract has priority.

7 Communication protocol

7-1. Overview of communication protocol

The inverters have RS485 communication port and adopt MODBUS communication protocol. Therefore, the inverter can be set as a slave to communicate with the marter (such as PLC and PC) which has the same communicatin port and protocol; also, user can use a inverter as the master to communicate with several inverters produced by our company via RS485 port to make multi-machine linkage. Besides, you can connect the RS485 port to remote keyboard.

This inverter support MODBUS-RTU, the following is the particular instruction for the inverter's communication protocol.

7-2. Communication protocol

7-2-1. Communication networking mode

Inverter as a slave

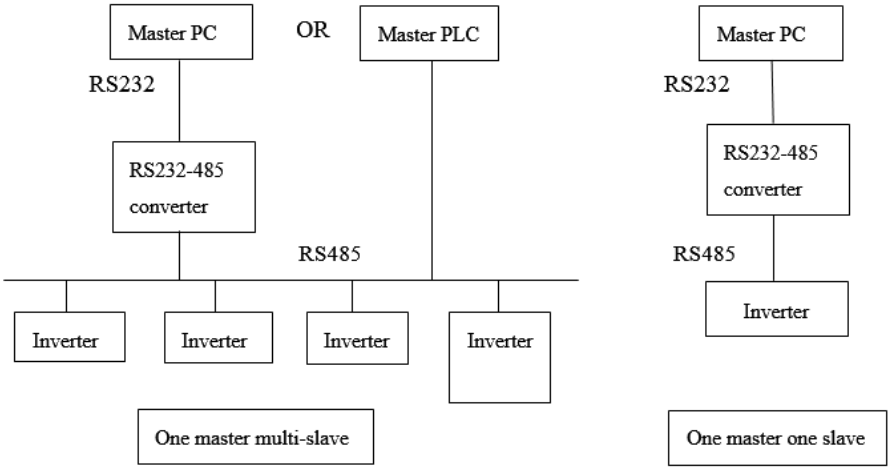


Fig.7-1 Networking diagram of inverter

Multi-device network

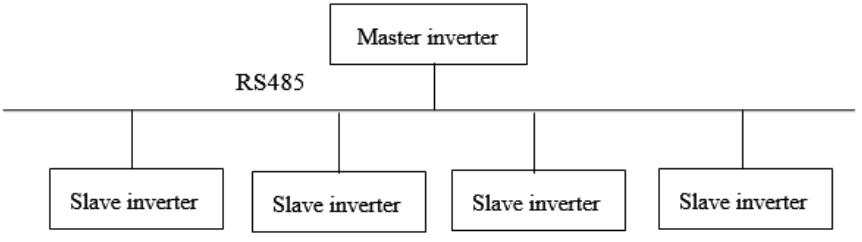


Fig 7-2 Networking diagram of multi-device

7-2-2. Communication protocol modes

The inverter can be master and slave in RS485 network. If it is master, it can control other inverters made by our company to realize multi-machine linkage.If it is slave, PC or PLC (master) can control it. The concrete communication modes are shown below:

(1) The inverter is slave, master-slave point-to-point mode. The slave devices will not response when master sends requires by broadcast address.

(2) The inverter is master. The slave devices will not response when master sends requires by broadcast address.
(3) Users can set the inverter address, baud rate and data format via the keypad or serial port.
(4) The slave reports the current fault information in the latest response frame.

7-2-3. Communication port

RS485 port is asynchronous serial, half-duplex transmission. Default data format: 1 start bit, 8 data bits, 1 stop bit.
Default baud rate 19200bps, the communication parameters please refer to P3.09~P3.12.

7-3.Modbus-RTU communication protocol

7-3-1. Character structure

(1－8－2 format，None)

Start bit	0	1	2	3	4	5	6	7	Stop bit	Stop bit

(1－8－1 format ， Odd)

Start bit	0	1	2	3	4	5	6	7	Odd	Stop bit

(1－8－1 format，Even)

Start bit	0	1	2	3	4	5	6	7	Even	Stop bit

(1－8－1 format，None)

Start bit	0	1	2	3	4	5	6	7	Stop bit

7-3-2. Communication structure

Read: 0x03

Write: 0x06

Write RAM: 0x07 (note: not write in eeprom to save its using life)

Circuit test: 0x08, to test whether one station is connected to the RS485 bus. Send back the data receiving from main station.

Address:

Function code:

High 8-bits is group no., low 8-bits is function code

Read:

P0 ~ PF: 0x00xx ~ 0x0Fxx

A0 ~ AF: 0xA0xx ~ 0xAFxx

B0 ~ BF: 0xB0xx ~ 0xBFxx

C0 ~ CF: 0xC0xx ~ 0xCFxx

U0 ~ UF: 0x80xx ~ 0x8Fxx

Write:

P0 ~ PF: 0x00 ~ 0x0F

A0 ~ AF: 0xA0 ~ 0xAF

B0 ~ BF: 0xB0 ~ 0xBF

C0 ~ CF: 0xC0 ~ 0xCF

U0 not support write

Write ram:

P0 ~ PF: 0x00 ~ 0x0F

A0 ~ AF: 0xA0 ~ 0xAF

B0 ~ BF: 0xB0 ~ 0xBF

C0 ~ CF: 0xC0 ~ 0xCF

U0 not support write

Non-function code:

Write only:

Communication setting value:

1000H:

Control command:

2000H:

1: forward run

2: reverse run

3: forward jog

4: reverse jog

5: decelerating stop

6: free stop

7: fault reset

Digital output terminal control:

2001H:

BIT0: DO output control

BIT1: RELAY1 output control

Analog value AO1 output:

2002H:

0~7FFF means 0%~100%

Read only:

Read state:

3000H:

1: forward run

2: reverse run

3: stop

Read VFD fault:

9000H:

Fault information:

0000H: no

0001H: accelerating over-current

0002H: decelerating over-current

0003H: constant speed over-current

0004H: accelerating over-voltage

0005H: decelerating over-voltage

0006H: constant speed over-voltage

0007H: under-voltage fault
0008H: VFD over-load
0009H: motor over-load
000AH: input lack of phase
000BH: output lack of phase
000CH: heat sink
000DH: buffer resistor overload
000EH: contactor fault
000FH: external fault
0010H: user-defined fault 1
0011H: user-defined fault 2
0012H: current detection fault
0013H: motor short circuit to ground fault
0014H: wave-to-wave current limit fault
0015H: motor tuning fault
0016H: communication(overtime) fault
0017H: EEPORM read write fault
0018H: EEPORM read write fault
0019H: run time arrival
001AH: switch motor when running
001BH: power on time arrival
001CH: PID feedback missing when running

If there is user password:

It needs to read the password in 30 seconds after writing in the correct password, otherwise it needs to write in the correct password again.

Appendix A Accessories

Appendix A-1. brake resistor

0.75~15KW VFD has internal brake unit. Please choose brake unit and resistor as table 1-1. 18.5KW and up VFD needs to connect brake unit. The brake resistor connection diagram please refer to fig1-1.

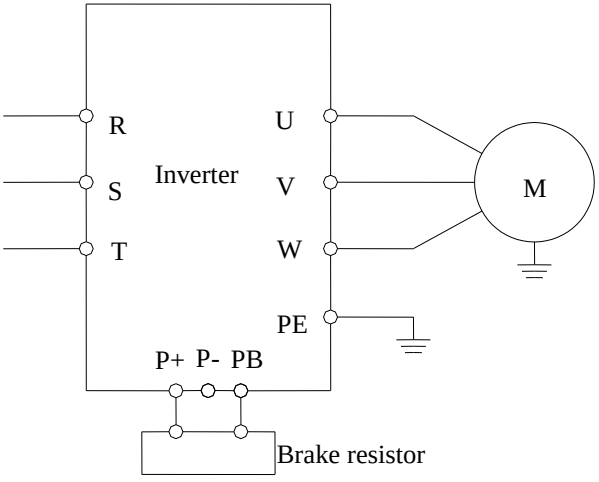


Fig 1-1 wiring diagram of VFD and brake unit

Brake unit wiring diagram:

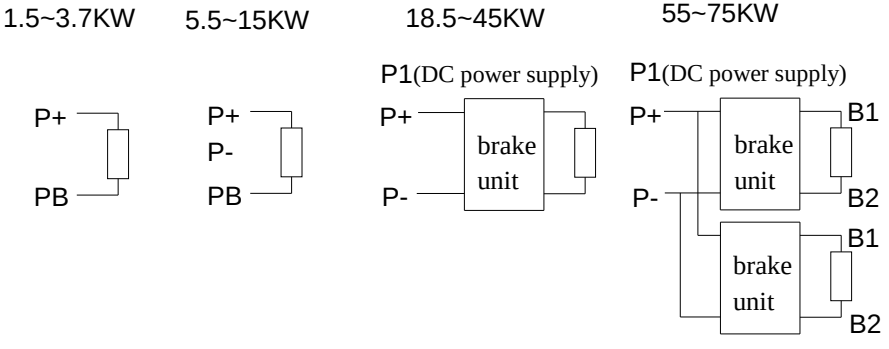


Table 1-1 brake resistor

Power(KW)	Brake unit		Brake resistor	
	Specification	Quantity	Equivalent brake resistance (Ω)	Equivalent brake power (W)
0.75	Built-in	1	≥300	150
1.5	Built-in	1	≥220	150
2.2	Built-in	1	≥200	250
3.7	Built-in	1	≥130	300
5.5	Built-in	1	≥90	400
7.5	Built-in	1	≥65	500
11.0	Built-in	1	≥43	800
15.0	Built-in	1	≥32	1000

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