# **XINJE** VH1 series general frequency converter

#### Hardware fast manual

Thank you for using this product. This fast manual provides relevant information abo ut VH1 series variable frequency drives. Please read this manual carefully before use to en sure the correctness of installation and use. More detailed information about VH1 series fre quency converter (parameters, alarms, etc.) can be found in the VH1 frequency inverter ma

#### Safety precautions

Please read this manual carefully before using the products, and after fully understanding the use of the product, safety, precautions and other contents of the operation. Please connect the product correctly under the premise of paying great attention to safety

The problems that may be caused during the use of the product are basically included in the safety precautions, and all are indicated by the two levels of attention and danger, and other unfinished matters, please comply with the basic electrical operating procedures.

When used incorrectly, there may be hazards, situations that may Attention cause moderate or minor injury, and situations that may cause property damage and machine damage. When used incorrectly, it can be dangerous, resulting in serious A Dangerous

injury or even death, and may cause serious property damage, fire, and other situations

#### Safety precautions

During unpacking acceptance

## Attention

1. Before unpacking, please check whether the outer package of the product is in good condition and whether there is damage, moisture, deformation, etc.

- 2. Before unpacking, please check whether the model identification on the outside of the
- packing box is consistent with the ordered model.
- 3. Before unpacking, please check the surface of the product for damage and corrosion. 4. After unpacking, please check whether the product nameplate label is consistent with
- the external model identification. 5. After unpacking, check whether the internal accessories are complete, including
- instructions, operation panel and expansion card. ✓ During installing

#### Attention

. When carrying, please hold the bottom of the machine body

- If you only hold the panel, there is a risk that the main body will fall and hit your feet.
- 2. Please install it on metal and other non combustible material plates.
- Installed on flammable materials, there is a risk of fire.
- 3. When more than two frequency converters are installed in the same control cabinet, please set cooling fans and keep the air temperature at the air inlet below 40°C.

Overheating may cause fire and other accidents. ✓ Wiring

### Attention

1. Please confirm whether the AC main circuit power supply is consistent with the rated voltage of the frequency converter

- Danger of injury and fire.
- 2. Don't conduct voltage withstand test on the frequency converter.
- It will cause damage to semiconductor components
- 3. Please connect the braking resistor or braking unit according to the wiring diagram. There is a risk of fire.
- 4. Please fasten the terminal with a screwdriver with the specified torque
- There is a risk of fire.

5. Don't connect the input power cable to the output U, V and W terminals.

If the voltage is applied to the output terminal, it will cause internal damage to the

frequency converter. 6. Don't connect the phase-shifting capacitor and LC / RC noise filter to the output circuit.

It will cause internal damage to the frequency converter.

- 7 Don't connect the electromagnetic switch and electromagnetic contactor to the output circuit
- When the frequency converter operates with load, the surge current generated by the action of electromagnetic switch and electromagnetic contactor will cause the overcurrent
- protection of the frequency converter. 3. Don't remove the front panel cover. Only remove the terminal cover during wiring.

It may cause internal damage to the frequency converter.

### A Danger

1. Before wiring, please confirm that the input power supply has been cut off. Danger of electric shock and fire.

- 2. Ask electrical engineering professionals to conduct wiring operation. Danger of electric shock and fire.

3. The grounding terminal must be reliably grounded.

Danger of electric shock and fire.

- 4. After the emergency stop terminal is connected, be sure to check whether its action is
- effective.

Danger of injury. (The responsibility for wiring shall be borne by the user)

- 5. Don't directly touch the output terminal. The output terminal of the frequency converter shall not be connected with the cover, and the output terminals shall not be short circuited. Electric shock and risk of short circuit.
- 6. After cutting off the AC power supply and before the indicator light of the digital operator of the AC motor driver goes out, it indicates that there is still high voltage inside the AC motor driver.

Very dangerous, do not touch the internal circuit and components.

<ul> <li>Maintenance and inspection</li> </ul>
Attention
1. CMOS integrated circuits are installed on the keyboard board, control circuit board and
drive circuit board.
Please pay special attention when using.
If you touch the circuit board directly with your fingers, electrostatic induction may
damage the integrated chip on the circuit board.
2. Don't change the wiring and remove the terminal wiring during power on. Don't check
the signal during operation. Damage to equipment.
Danger
1. Don't touch the wiring terminal of the frequency converter. There is high voltage on the
terminal.
Danger of electric shock.
2. Before power on, be sure to install the terminal housing. When removing the housing,
be sure to disconnect the power supply.
Danger of electric shock.

3. Non professional technicians are not allowed to carry out maintenance and inspection.

 $\frac{\text{VH}}{1}\frac{1}{2} - \frac{4}{3}\frac{1\text{P5}}{4} - \frac{B}{5}$ 

Description

VH: general frequency

B: built-in braking unit

Vacant: no

#### Specification Item Frequency Low frequency operation mode: 0.01Hz accuracy High frequency operation mode: 0.1Hz Low frequency operation mode: Digital setting: 0.01Hz, Analog setting: max frequency×0.1% Frequency High frequency operation mode: Digital setting: resolution 0.1Hz, Analog setting: max frequency×0.1% Up to 5 channels digital input X, X1-X5 supports Digital input Control NPN and PNP inputs channel terminal Up to 2 channel analog input AI, AI1 support Analog input input 0~10V/0~20mA and AI2 support 0~10V channel Digital output Control Up to 2 channel digital output channel terminal Up to 1 channel analog output AO, only support Analog output output 0-10V voltage output channel Startup command Communication setting (Modbus), operate panel setting, terminal setting setting Communication setting (Modbus), operate panel Frequency setting setting, terminal setting, analog AI setting, multi-speed setting, simple PLC setting, PID mode setting, main and auxiliary seting Frequency main and auxiliary operation, reverse inhibition, torque boost, nine kinds of V/F curve settings, five segments of AI curve settings, acceleration and deceleration curve settings, terminal delay and filtering, terminal multi-function input and output, DC braking. Typical function energy consumption braking, inching operation, 16 segments of speed, built-in two channels of PID, speed tracking restart, carrier modulation, fault recording, fault self reset, pre-excitation start, 30 groups of user defined parameters Product Carrier modulation, torque control, motor function auto-tuning, current limiting control, over-voltage control, under voltage control, speed tracking, Importan droop control, vibration suppression, over-voltage function and over-current stall control, automatic voltage regulation (AVR), automatic energy-saving operation, etc Power on motor short-circuit detection, input and output phase loss protection, over-current protection, over-voltage protection, under voltage Protection protection, overheat protection, overload function protection, under load protection, over-current and voltage stall protection, relay closing protection, terminal protection, instantaneous power failure non stop, etc Energy VFD installation and size description built-in braking unit as standard, can connect consumption external brake resistor Installation site braking ✓ Please install it in a cabinet free from sun and rain. LCD display, parameter setting, status monitoring, LCD panel parameter copy, fault analysis and location, and combustibles program download, mass storage of parameters sensitive to electromagnetic interference Non stop when In case of instantaneous power failure, the load

U	i foddet identification	converter
2	Product series	1: open-loop vector frequency converter
3	Input voltage level	4: AC 380V 2: AC220V
4	Power grade	0P4: 0.4KW 0P7: 0.75KW 1P5: 1.5KW

Product identification

#### **Technical specification**

Braking unit

Danger of electric shock

**Product information** 

Naming rule

Code

1

(5)

Model VH1B	20P4	20P7	40P4	40P7	41P5
Adaptive motor (KW)	0.4	0.75	0.4	0.75	1.5
Input rated current (A)	1.3	9.8	1.8	2.3	4.4
Power supply capacity (KVA)	1	1.5	1	1.5	3.0
Output rated current (A)	2.5	4.0	1.5	2.1	3.8

#### General specification

Item		Specification		
Power range		0.4kW~55kW		
	Rated voltage,	380V: three phase 380V, 50Hz/60Hz		
Input	frequency	220V: single phase 220V, 50Hz/60Hz		
	Allowable			
	voltage	Three phase $380V$ : $320 \sim 460V$ Single phase $220V$ : $187 \sim 253V$		
	fluctuation range	Single phase 2207. 167 - 255 V		
0.4.4	Voltage	0~input voltage		
Output	Frequency	0~600Hz		
	Control motor			
	type	Asynchronous motor, Synchronous motor		
	Control			
	performance	V/F control(VVF), Vector control (SVC)		
	Speed accuracy	$\pm 1\%$		
Control	Speed fluctuation	±0.5%		
erformance	Speed range	1: 50		
	Startup torque	1.0Hz: 150%		
	Torque accuracy	//		
	Torque response	//		
	Overload ability	G model 150% rated current 60s		
	Gventoau ability	P model 120% rated current 60s		

Item		Specification		
	instantaneous	feedback energy compensates for the decrease of		
	power failure	voltage and keeps the inverter running for a short		
		time		
		Timing control function: the time range is		
	I iming control	0.1Min~6500.0Min		
	Multi-motor	Two sets of motor parameters can realize the		
	switching	switching control of two motors		
	Flexible and diversified terminal functions	Multi function terminal, with logic function selection, meet the general inverter control function requirements		
	Communication customization	It is convenient for users to read and write the		
	parameters	inverter parameters continuously		
	Software	Rich background monitoring function, convenient		
	Software	for field data collection and debugging		
		It can display the set frequency, output frequency,		
	Keyboard display	output voltage, output current, input and output		
		status and other parameters		
	Button locking	Realize the partial or total locking of keys to		
Display and	Dutton locking	prevent false triggering		
keyboard		Standard LED single display numeric keyboard,		
	Parameter copy	optional LCD English display keyboard		
		(parameter download)		
	Optional accessories	LCD keyboard, LED Knob keyboard and External cable		
		Indoor, free from direct sunlight, dust, corrosive		
	Using place	gas, combustible gas, oil mist, water vapor,		
		dripping or salt, etc		
		Below 1000 meters. (derating is required when the		
	Altitude	height is higher than 1000m, and the output		
		current will be reduced by about 10% of the rated		
		current when the height is increased every		
		1000m.)		
Environment	Ambient	-10°C~+40°C (When the ambient temperature is		
Environment	temperature	between 40°C and 50°C, please reduce the rating		
	temperature	or enhance the heat dissipation)		
	Ambient	Less than 95%RH. no condensation		
	humidity	,,,		
	Vibration	Less than 5.9 m/s <sup>2</sup> (0.6G)		
	Storage	-40°C~+70°C		
	temperature			
	Protection level	IP20		
	Cooling mode	Forced air cooling		
Installa	ation mode	Wall mounted and embedded		

- $\checkmark$  Please don't use this product near corrosive and flammable gas environments such as hydrogen sulfide, chlorine gas, ammonia, sulfur, chlorinated gases, acids, alkalis, salts,
- ✓ Please don't install in high temperature, humidity, dust, metal dust environment.
- ✓ Keep away from electromagnetic interference sources and other electronic instruments

#### Environmental condition

Item	Description
Using environment temperature	-10°C~40°C(nonfreezing)
Using environment humidity	Less than 95% RH(non-condensation)
Storage temperature	-40°C~70°C
Storage humidity	Less than 95% RH(non-condensation)
Vibration	Less than 5.9m/s <sup>2</sup>

#### Installation space and direction

✓ Generally, it should be installed vertically.

- ✓ Minimum requirements for installation spacing and distance.
- ✓ When multiple frequency converters are installed up and down, the middle part shall be equipped with guide plate.

### ■ Single installation



Note: the distance of A and B is more than 50 mm, and the distance of C is more than 100 mm.

#### Multiple installation



Note: the distance of A and B is more than 50mm, and the distance of C and D is more than 100mm.

#### Vertical installation



#### **Mounting dimension**(Unit : mm)

• VH1-20P4/20P7/40P4/40P7/41P5-B





#### Note: The installation screw is M4.

### VFD system terminal wiring

Main circuit wiring



- **Definition of main circuit terminals**
- . VH1-20P4/40P4/20P7/40P7/41P5-B



#### Instructions of main circuit terminals

Terminal	Name	Description		
L1,L2,L3	Three phase power supply input	AC three phase power supply input		
L1,L3	Single phase power supply input	AC single phase power supply input		
U,V,W	VFD output terminal	Connect to the three phase motor		
PE	Grounding terminal	Connect to the ground		
P+,PB	Brake resistor terminal	Connect to the brake resistor		

#### 1. Input power supply L1, L2, L3/L1,L3

1) There is no phase sequence requirement for input side wiring of frequency converter.

2) Circuit breaker, contactor, AC reactor, fuse, brake resistor and output reactor are

optional parts. Please refer to chapter 6 for details.

#### 2. P+, PB

Note:

Refer to the recommended value for brake resistance selection, and the wiring

distance is less than 5m, otherwise the inverter may be damaged.

#### 3. Output U, V, W

1) Please refer to chapter 6 for output cable.

2) No capacitor or surge absorber can be connected to the output side of the inverter, otherwise the inverter will be damaged.

3) When the length of motor cable is more than 100m, it is easy to produce electrical resonance due to the influence of distributed capacitance, so it is necessary to install AC output reactor near the frequency converter.

#### 4. Grounding terminal PE

1) The terminal must be reliably grounded, and the grounding resistance must be less than  $10\Omega$ . Otherwise, the equipment will work abnormally or even be damaged.

2) It is not allowed to share the grounding terminal PE and the power zero cable N terminal.

3) The impedance of protective grounding conductor must meet the requirement of withstanding large short-circuit current in case of fault.

4) The size of protective grounding conductor shall be selected according to the table below.

Sectional area of single	Minimum sectional area of
phase cable (S)	protective conductor (S <sub>p</sub> )
S≤16mm <sup>2</sup>	S
$16 \text{mm}^2 \le S \le 35 \text{mm}^2$	16mm <sup>2</sup>
35mm <sup>2</sup> < S	S/2

#### 5) Yellow and green cable must be used for protective grounding.

#### Distribution diagram of control loop



### Definition of control loop terminals

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X1 X2 X3 24V COM 0V 10V B A

#### Instructions of control loop terminals

		-	
Terminal sort	Name	Implication	Remark
1	А	485 communication terminal	Without isolation
2	В	485 communication comman	without isolation
3	24V		
4	COM		24v and COM are short
5	X1	X1-X5 Bidirectional input,	circuited to form NPN
6	X2	only support normal input,	OV and COM are short
7	X3	not support high-speed pulse input	circuited to form PNP
8	X4		input
9	X5		mput
10	0V	Only support open collector output,	
11	Y1	not support high-speed pulse	
12	TA	Relay output, Contactor capacity: AC 250V, 3A, DC	1 normally on an agint
13	TB	30V, 1A	I normally open point
14	10V		AI1 support 0-10V and
15	AI1		0-20mA, switch by
16	AI2		jumper cap(The top two
17	GND	10V-GND External output +10V voltage	rows of pins are current
		AI1,AI2-GND Input 0-10V to the inverter	mode, and the bottom
		AO1-GND Inverter external output 0-10V	two rows of pins are
18	AO		voltage mode), AI2
			doesn't support current,
			only support voltage

Note: When installing vertically, the wind shield must be added, otherwise it will cause mutual influence between multiple inverters, resulting in poor heat dissipation





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