VZ2000 Series

User Manual

Thank you very much for choosing VZ2000 Series Inverter.
Before installing, operating, maintaining or checking the driver, please read this manual carefully to ensure proper usage. Keep this manual easily accessible so that it can be referred anytime as necessary.

1 Safety Precautions

Please read this operation manual carefully before installation, operation, maintenance or inspection. In this manual, the safety precautions were sorted "WARNING" or "CAUTION".

indicates a potentially dangerous situation which, if can not avoid will result in death or serious injury.

indicates a potentially dangerous situation which, if can not avoid will cause minor or moderate injury and damage the device. This symbol is also used for warning any unsafe operation.

In some cases, even the contents of “WARNING” still can cause serious accident. Please follow these important precautions in any situation.

In some cases, even the contents of "CAUTION"still can cause serious accident. Please follow these important precautions in any situation.

★ **NOTE** indicates the necessary operation to ensure the device run properly.
Warning Marks are placed on the front cover of the inverter. Please follow these indications when using the inverter.

⚠ **WARNING**
• May cause injury or electric shock. • Please follow the instructions in the manual before installation or operation. • Disconnect all power line before opening front cover of unit. Wait at least 10 minutes until DC Bus capacitors discharge. • Use proper grounding techniques. • Never connect AC power to output UVW terminals.

VZ2000 Series User Manual

Chapter 1 Introductions

1.1 Technology Features

Items		VZ2000
Standard functions	Control mode	Sensorless flux vector control (SFVC) Voltage/Frequency (V/F) control
	Maximum frequency	Vector control: 0-320 Hz V/F control: 0-3200Hz
	Carrier frequency	1-16 kHz The carrier frequency is automatically adjusted based on the load features
	Input frequency resolution	Dgital setting: 0.01 Hz Analog setting: maximum frequency x 0.025%
	Startup torque	G type: 0.5 Hz/150% (SFVC) P type: 0.5 Hz/100%
	Speed range	1: 100 (SFVC)
	Speed stability accuracy	±0.5% (SFVC)
	Overload capacity	G type: 60s for 150%of the rated current, 3s for 180%of the rated current P type: 60s for 120%of the rated current, 3s for 150%of the rated current
	Torque boost	Fixed boost Customized boost 0.1%-30.0%
	V/F curve	Straight-line V/F curve Multi-point V/F curve N-power V/F curve (1.2-power, 1.4-power, 1.6-power, 1.8-power, square)
	V/F separation	Two types: complete separation; half separation
	Ramp mode	Straight-line ramp S-curve ramp Four groups of acceleration/deceleration time with the range of 0.0-6500.0s
	DC braking	DC braking frequency: 0.00 Hz to maximum frequency Braking time: 0.0-100.0s Braking action current value: 0.0%-100.0%
	JOG control	JOG frequency range: 0.00-50.00 Hz JOG acceleration/deceleration time: 0.0-6500.0s
Standard functions	Onboard multiple preset speeds	It implements up to 16 speeds via the simple PLC function or combination of X terminal states
	Onboard PID	It realizes process-controlled closed loop control system easily
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes
	Overvoltage/ Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to overvoltage/over current.
	Torque limit and control	It can limit the torque automatically and prevent frequent over current tripping during the running process
	Instantaneous stop doesn't stop	The load feedback energy compensates the voltage eduction so that the AC drive can continue to run for a short time
	Rapid current limit	It helps to avoid frequent over current faults of the AC drive.
	High performance	Control of asynchronous motor is implemented through the high-performance current vector control technology.

	Timing control	Time range:0.0-6500.0 minutes
	Communication methods	RS485
	Running command channel	Given by the panel, control terminals Serial communication port, can be switched by many ways
	Frequency source	10 kinds of frequency source, given by Digital analog voltage, analog current, pulse, serial port. Which can be switched by many ways
	Auxiliary frequency source	10 kinds of Frequency source, which can easily realize Micro adjustment, frequency Synthesizer
Input and output	Input terminals	6 digital input terminals, one of which supports up to 100 kHz high-speed pulse input (optional) 2 analog input terminals, one of which only supports 0-10 V voltage input and the other supports 0-10 V voltage input or 4-20 mA current input
	Output termina	1 digital output terminal 1 relay output terminal 1 analog output terminal: that supports 0-20 mA current output or 0-10 V voltage output

Operations on the operation panel	LED display	It displays the parameters
	Key locking and function selection	It can lock the keys partially or completely and define the function range of some keys so as to prevent mis-function
	Protection mode	Motor short-circuit detection at power-on, output phase loss protection, over-current protection, over-voltage protection, under voltage protection overheat protection and overload protection
Environment	Installation location	Indoor, avoid direct sunlight, dust, corrosive gas combustible gas, oil smoke, vapour, drip or salt.
	Altitude	Lower than 1000m (Lower the grades when using higher then 1000m)
	Ambient temperature	-10℃-40℃ (Lower the grades if the ambient temperature is between 40°C and 50℃)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s² (0.6 g
	Storage temperature	-20℃-60℃

1.2 Description of Name Plate

VT ① - 2 ② - 400 ③ – 3R7/5R5 ④ G/P ⑤ – □ ⑥

No.	Identification	Description
①	VT	Series name
②	9	Classification
③	200/400	200: 1PH AC220V 400: 3PH AC380V
④	3R7/5R5	3R7: 3.7kW 5R5: 5.5kW
⑤	G/P	G: Constant torque P: Variable torque
⑥	□	Specific symbol (Blank for normal product)

1.3 Selection Guide

1.3PHAC380V±15%/1PHAC220V±15%

Model	Rated Output Power (KW)	Rated Input current (A)	Rated Output Current (A)	Motor Power (kW)
1PH/3PH AC 220V-15%-15%				
VZ2200-0R4G	0.4	5.4	2.4	0.4
VZ2200-0R75G	0.75	7.2	4.5	0.75
VZ2200-1R5G	1.5	10	7.0	1.5
VZ2200-2R2G	2.2	16	10.0	2.2
VZ2200-3R7G	3.7	23	16.0	3.7
3PH AC380V±15%				
VZ2400-0R75G	0.75	3.8	2.5	0.75
VZ2400-1R5G	1.5	5	3.7	1.5
VZ2400-2R2G	2.2	5.8	5.0	2.2
VZ2400-3R7G/5R5P	3.7/5.5	10.0/15.0	9.0/13.0	3.7/5.5
VZ2400-5R5G	5.5	15.0	13.0	5.5
VZ2400-7R5P	7.5	14	17.5	7.5
VZ2400-7R5G/11P	7.5/11	20.0/26.0	17.0/25.0	7.5/11
VZ2400-11G/15P	11/15	26.0/35.0	25.0/32.0	11/15
VZ2400-15G/18.5P	15/18.5	35.0/38.0	32.0/37.0	15/18.5
VZ2400-18.5G/22P	18.5/22	38.0/46.0	37.0/45.0	18.5/22
VZ2400-22G/30P	22/30	46.0/62.0	45.0/60.0	22/30
VZ2400-30G/37P	30/37	62.0/76.0	60.0/75.0	30/37
VZ2400-37G/45P	37/45	76.0/90.0	75.0/90.0	37/45
VZ2400-45G/55P	45/55	90.0/105.0	90.0/110.0	45/55
VZ2400-55G	55	105.0	110.0	55
VZ2400-75P	75	140.0	150.0	75
VZ2400-75G/90P	75/90	140.0/160.0	150.0/176.0	75/90
VZ2400-90G/110P	90/110	160.0/210.0	176.0/210.0	90/110
VZ2400-110G/132P	110/132	210.0/240.0	210.0/253.0	110/132
VZ2400-132G/160P	132/160	240.0/290.0	253.0/300.0	132/160
VZ2400-160G/185P	160/185	290.0/330.0	300.0/340.0	160/185
VZ2400-185G/200P	185/200	330.0/370.0	340.0/380.0	185/200
VZ2400-200G/220P	200/220	370.0/410.0	380.0/420.0	200/220
VZ2400-220G/250P	220/250	410.0/460.0	420.0/470.0	220/250

Chapter 2 Installation and wiring

2.1 Environment and installation requirements

Inverter's installation environment on the service life of inverter, and has direct influence on the normal function. Inverter can't satisfy the specifications of environment, protection or fault could lead to the Inverter.

VZ2000 series inverter of wall hung inverter, please use the vertical installation so that the air convection and the heat dissipation effect can be better.

Inverter's installation environment, please make sure must comply with

(01) -10°C to+40°C ambient temperature

(02) Environment humidity 0-95% and no condensation

(03) Avoid direct sunlight

(04) Environment does not contain corrosive gas and liquid

(05) Environment without dust, floating fiber, cotton and metal particles

(06) Away from the radioactive material and fuel

(07) Away from electromagnetic interference source (such as electric welding machine, big power machine)

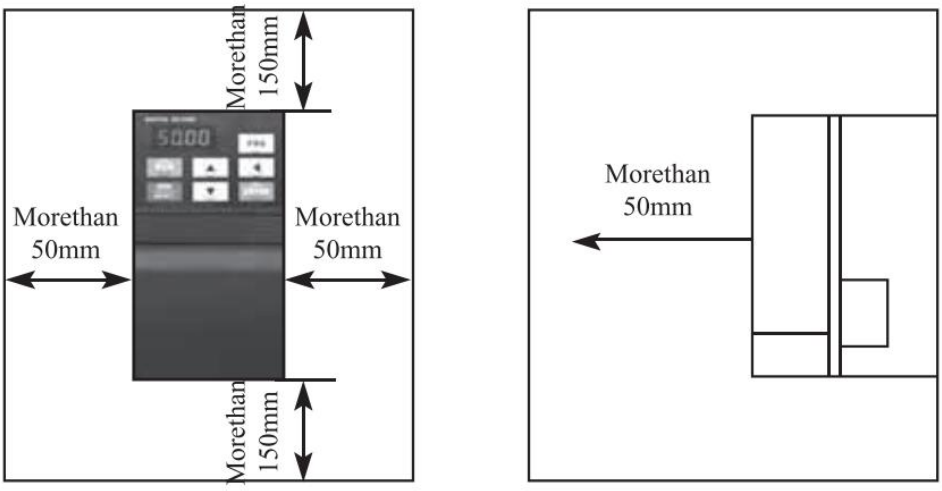
(08) Installed planar solid, no vibration, if it cannot avoid vibration, please add anti-vibration pads to reduce the vibration

(09) Please install the inverter in the well-ventilated place, easy to check and maintain, and install on the solid non-combustible material, away from the heating element (such as braking resistance, etc.)

(10) Inverter installation please reserve enough space, especially many inverters' installation, please pay attention to the placement of the frequency Inverter, and configure cooling fans, make the environment temperature lower than 45℃.

(11) Inverter can output the rated power when installed with altitude of lower than 1000m. It will be derated when the altitude is higher than 1000m.

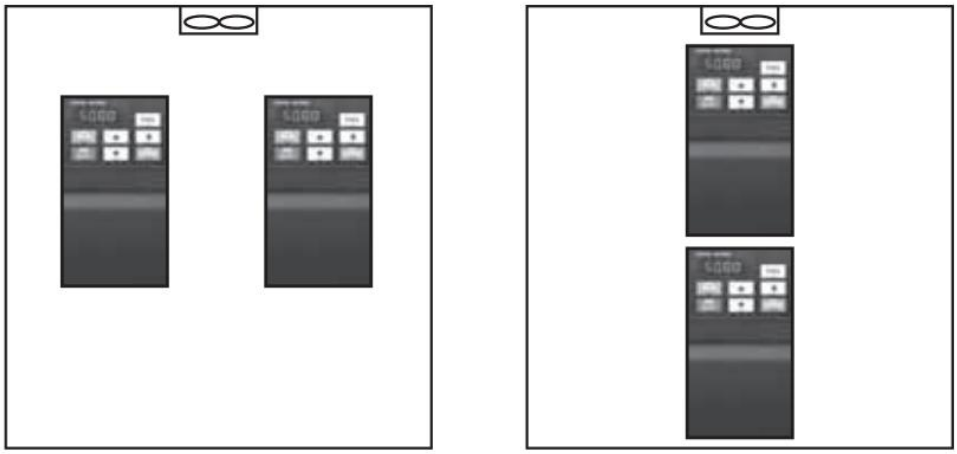
(1) Single inverter installation



(2) Multiple inverters installed in one control cabinet.

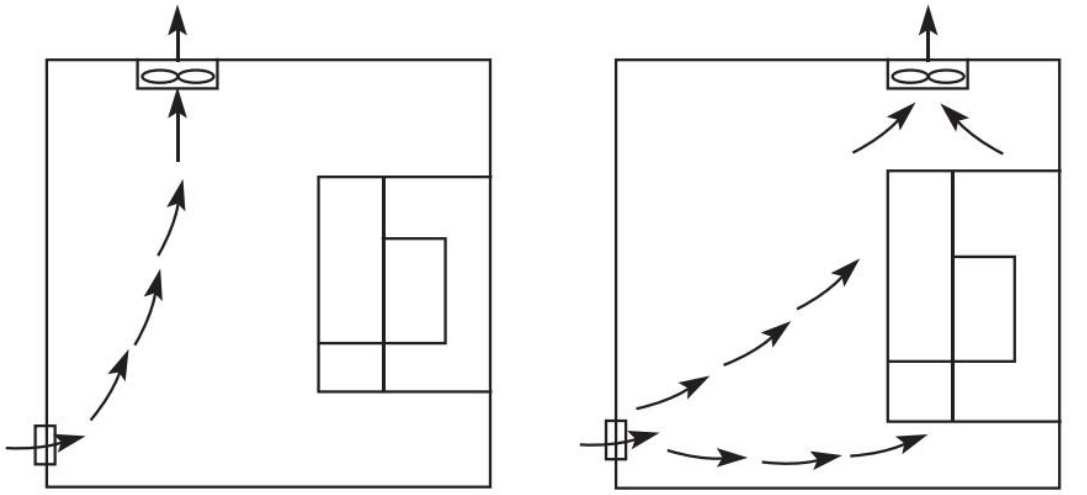
Please pay attetion:

①When encasing the multiple inverters, install them in paralled as a cooling measure.



Favorable placing　　Unfavorable placing

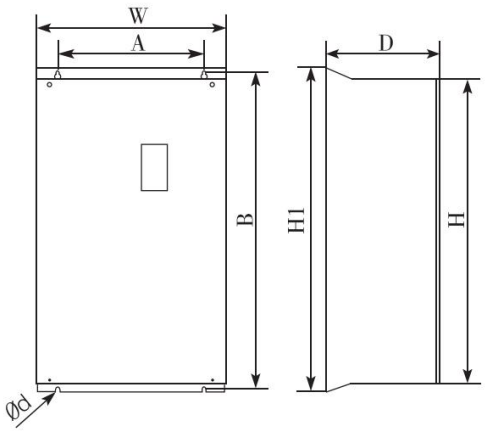
②If multiple inverters are installed in one control cabinet, please leave enough clearances and take cooling measure.



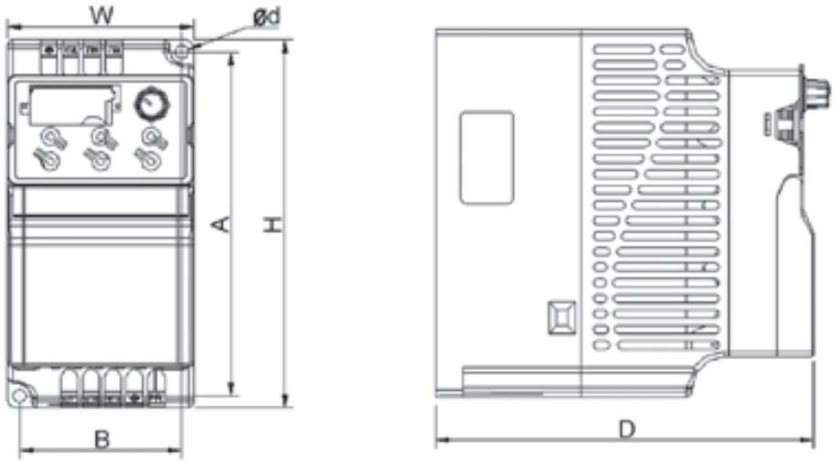
Incorrect installation position of the fan　　Correct installation position of the fan

The inverter's outside shape and the installation dimensions.

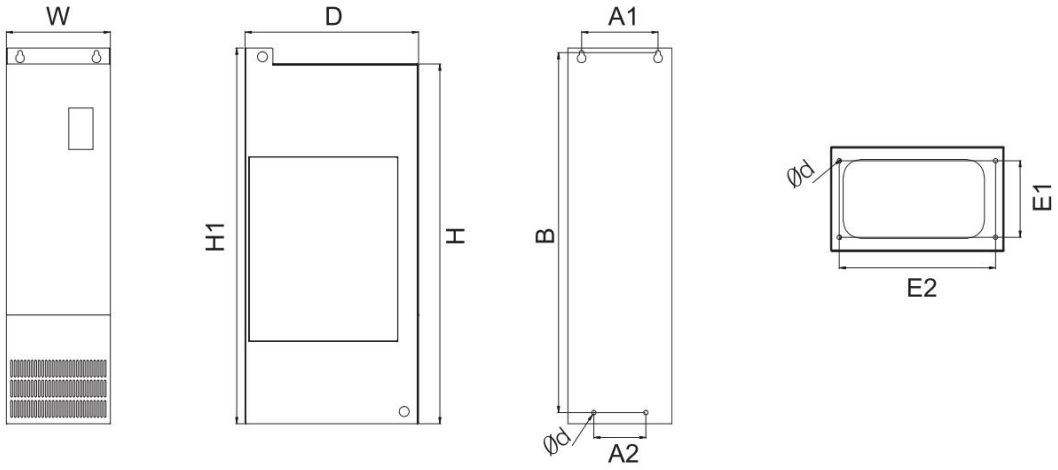
(1) 0.4-22kW



(2) 30--160kW



(3) 185--220kW



Model	Outline dimension (mm)				Installation size (mm)		
	W	H	H1	D	A	B	ød
VZ2200-0R4G VZ2200-1R5G	72	142	-	152	62.7	132.7	5
VZ2200-2R2G VZ2200-3R7G	100	183	-	143	90	173	5
VZ2200-5R5G VZ2200-7R5G	130	260	-	184	120	250	5
VZ2400-0R4G VZ2400-2R2G	72	142	-	152	62.7	132.7	5
VZ2400-3R7G/5R5P VZ2400-5R5G	100	183	-	143	90	173	5
VZ2400-7R5P VZ2400-11G/15P	130	260	-	184	120	250	5
VZ2400-15G/18.5P VZ2400-22G/30P	195	280	-	179	182.5	266	7
VZ2400-30G/37P VZ2400-37G/45P	245	390	425	193	180	410	7
VZ2400-45G/55P VZ2400-55G/75P	300	500	540	252	200	522	9
VZ2400-75G/90P	338	546	576	256.5	270	560	9

VZ2400-90G/110P VZ2400-110P/132P	338	550	580	300	270	564	9
VZ2400-132G/160P VZ2400-160G/185P	400	675	715	310	320	695	11
VZ2400-132G/160PZ VZ2400-160G/185PZ	400	871.5	915	310	320	895	11
VZ2400-185G/200PVZ2400-220G/250P	300	1035	1080	500	A1: 220 A2: 150 E1: 220 E2: 450 ød: 13		

2.2 The opening size of the keyboard

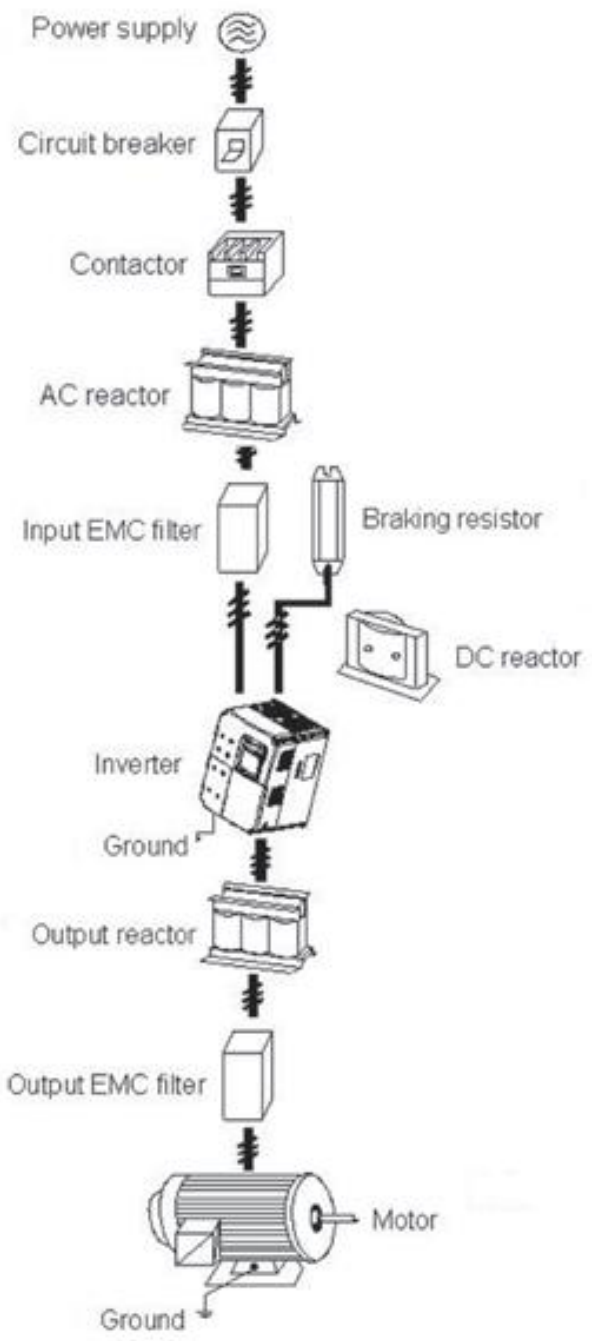
(1) 0.4--22kW 68.5mm*39mm

(2) 30kW or above 70mm*119mm

2.3 The Inverter Wiring

The inverter wiring of the main part and the control part.

2.3.1 The inverter wiring of the main part



2.3.2 the descriptions of peripheral devices

(1) AC power supply

Use with the permissible power suppy in specifications of the inverter.

(2) Moulded case circuit breaker: (MCCB)

When the power supply voltage is low or the input terminal short circuit occurs, the breaker can provide protection, during inspection, maintenance or the inverter is not running.you can cut off the breaker to separate the inverter from the power supply.

(3) Magnetic contractor (MC)

The contractor can turn on and turn off the power of the inverter to ensure safety.

(4) AC current reactor

A suppress high harmonic to protect the inverter to ensure safety.

(5) Brake resistor

When the motor is braking, the resistor can avoid DC bus high voltage of the inverter, and improve the braking ability of the internal brake unit.

2.3.3 Precautions main circuit wiring

(1) Circuit wiring, refer to requirements of electrical codes.

(2) Application of supply power to output terminals (U, V, W) of the invert will damage it, so never perform such wiring.

(3) Power supply's wiring, please use isolated wire and wire pipe if possible, and make isolated wire and wire pipe link to the earth.

(4) The inverter and welding device, high-power motor, high-power load can't use a earth cable.

(5) The ground terminal E, ground impedance is lower than 100Q (6) Use the shortest earth cable possible.

(7) Many inverters are earthed, pay attention not to cause ground loops.

(8) The power cables and the control cables must be separated in the main circuit. Keep the power cables more than 10 cm away from the parallelled control cables, when the power cables and the control cables are crossed, make them vertical. Don't make the power cables and the control cables together, or the interference will cause.

(9) Under normal circumstances, the diatance between the inverters and the motors is less than 30m, the current produced by the parasitic capacitance may cause over-current protection, mis- action, inverter's fault and equipment operating faults. The maximum distance is 100m, when the distance is long, please select the output side filter, and reduce the carrier frequency.

(10) Don't install an absorbing capacitor or other capacitance- resistance absorbing devices.

(11) Ensure the terminals are all locked tightly, the cables are connected well with the terminals, present the looseness due to an action of shaking, causesparks and the short circuit.

To minimize the interference, it is recommended that the contactor and relay should be connected to the surge absorber.

- Noise filter installed at the input side of inverter;
- Install noise isolation for other equipment by means of isolation transformer or power filter.

2.3.4 Device recommended specifications

Applicable Inverter Type	Input voltage	Motor Output (kW)	Main Circuit Cable Type (mm^2)	Breaker Selection (A)	Input Side Magnetic contractor (A)
VZ2200-0R4G	1PH 220V 50/60Hz	0.4	0.75	10	9
VZ2200-0R75G		0.75	0.75	16	12
VZ2200-1R5G		1.5	1.5	25	18
VZ2200-2R2G		2.2	2.5	32	25
VZ2200-3R7G		3.7	2.5	40	32
VZ2400-0R4G	3PH 380V 50/60Hz	0.4	0.75	6	9
VZ2400-0R75G		0.75	0.75	6	9
VZ2400-1R5G		1.5	0.75	10	9
VZ2400-2R2G		2.2	0.75	10	9

VZ2400-3R7G/5R5P		3.7/5.5	1.5	16	12
VZ2400-5R5G		5.5	2.5	20	18
VZ2400-7R5P		7.5	4	32	25
VZ2400-7R5G/11P		7.5/11	4	32	25
VZ2400-11G/15P		11/15	4	40	32
VZ2400-15G/18.5P		15/18.5	6	50	38
VZ2400-18.5G/22P		18.5/22	10	50	40
VZ2400-22G/30P		22/30	10	63	50
VZ2400-30G/37P		30/37	16	100	65
VZ2400-37G/45P		37/45	25	100	80
VZ2400-45G/55P		45/55	45/55	45/55	45/55
VZ2400-55G/75P		55/75	55/75	55/75	55/75
VZ2400-75G/90P		75/90	75/90	75/90	75/90
VZ2400-90G/110P		90/110	90/110	90/110	90/110
VZ2400-110G/132P		110/132	110/132	110/132	110/132
VZ2400-132G/160P		132/160	132/160	132/160	132/160
VZ2400-160G/185P		160/185	160/185	160/185	160/185
VZ2400-185G/200P		185/200	185/200	185/200	185/200
VZ2400-200G/220P		200/220	200/220	200/220	200/220
VZ2400-220G/250P		220/250	220/250	220/250	220/250

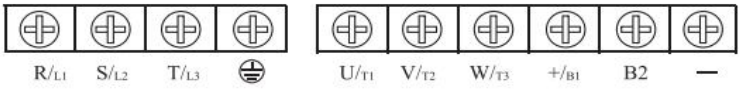
***The above data are for reference only.**

2.3.5 Main circuit terminals and description

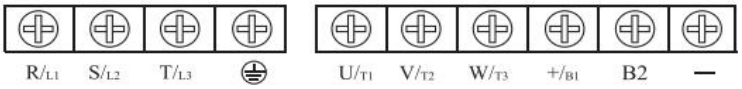
1.Main circuit terminal arrangement VZ2000 series inverter is as follows:

Type a:3ph380v0.2-2.2kW&1ph220v0.4-1.5kW

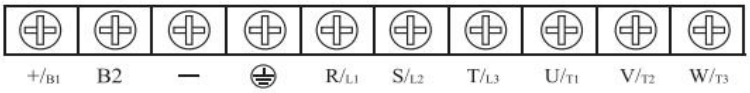
Type b:3ph380v3.7-5.5kW&1ph220v2.2-3.7kW



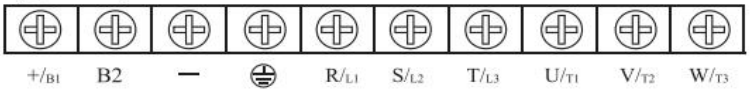
Type c:3ph380v7.5-11kW&1ph 220v 5.5--7.5kW



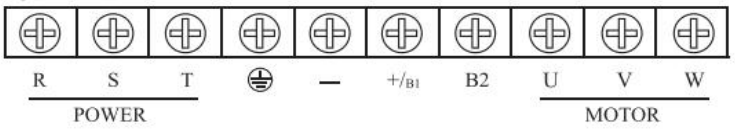
Type d:3ph 380v15--22kW



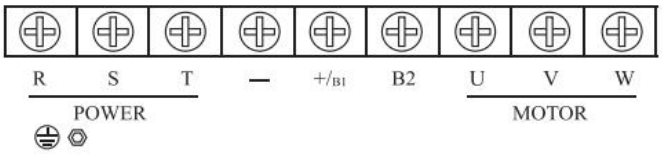
Type e:3ph 380v 30-37kW



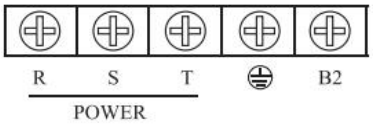
Type f:3ph 380v 45-75kW

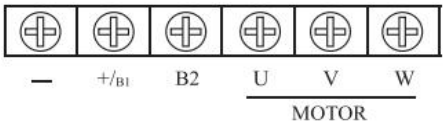


Type g:3ph 380v 90-110kW



Type h:3ph 380v 132-160kW

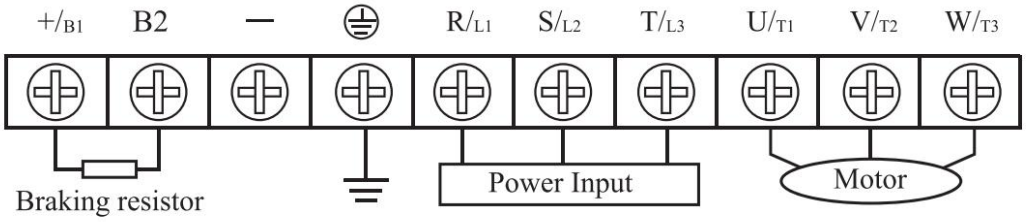




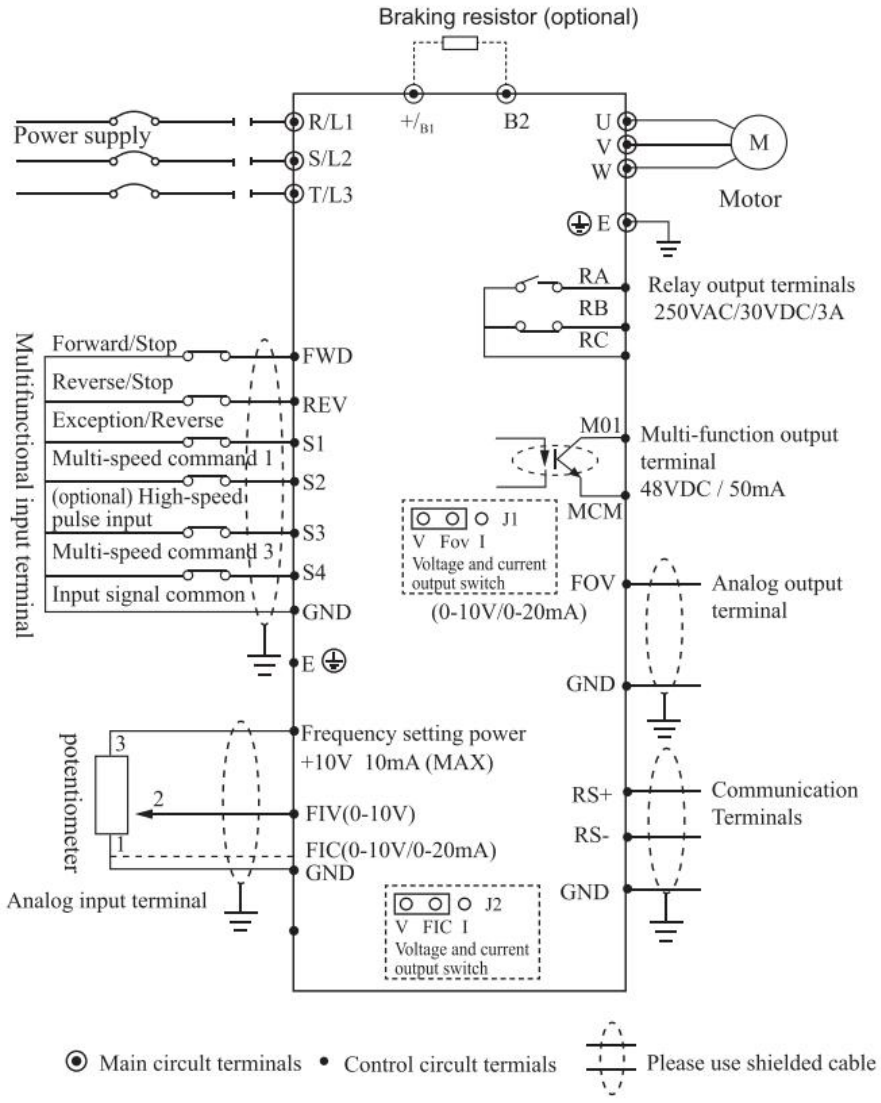
2.Description of main circuit terminals

Terminal Name	Description
R/L1, S/L2, T/L3	Connect to the commercial power supply
U/T1, U/T2, U/T3	nverter output terminals, connect a three-phase motor
+/B1, -	Positive and negative DC inverter, brake unit can be connected.
+/B1, B2	Connect brake resistor.
+, PR	
⏚	Earth (ground)

3.Wiring Example

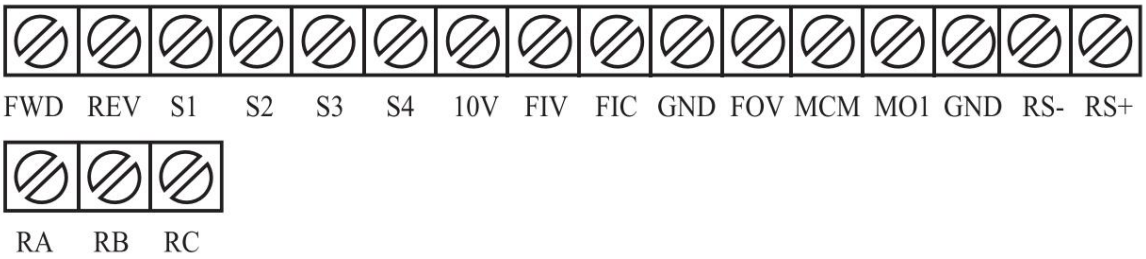


4.The basic wiring diagram



2.4 Control Terminals

Control terminal arrangement



2.4.1 Control Terminal Description

(1) Input signals

Terminal Name	Function Description	Remarks
FWD	Forward command input (multi-function input terminals)	Multi-function input terminals S1-S4, FWD, REV terminals by reference number of specific settings set the terminal and GND closed effective
REV	Reverse command input (multi-function input terminals)	
S1	Multi-function input terminals	
S2	Multi-function input terminals	
S3	High-speed pulse input terminal (optional)	
S4	Multi-function input terminals	
FOV	Analog output terminal	0-10V/0-20mA
10V	Frequency setting power	
FIV	Analog voltage input terminal	0-10V
FIC	Analog input terminal	0-20mA/0-10V
GND	Input signal common	
MCM	Optically coupled output common	
M01	Multifunctional optical coupling output contacts	
RS+	RS485 positive	RS485 communication
RS-	RS485 negative	
RA	Relay output contacts (normally open)	
RB	Relay output contacts (normally closed)	
RC	Relay output contacts RA, RB common	

Control panel switch Description:

Switch name	Switch Description
J2	Voltage (0-10V) /current (0-20mA) input switch V, FIC short for voltage input; I, FIC short for current input
J1	Voltage (0-10V) /current (0-20mA) output switch V and FOV shorted to voltage output; I and FOV shorting current output

Control loop distribution NOTES:

(1) Please let the control signal lines and the main lines, and other power lines, power lines separate traces.

(2) In order to prevent interference caused by malfunction, use stranded or double-stranded shielded shielded wire line, specifications for 0.5-2mm²

(3) Make sure that each using terminal to allow conditions, such as: power supply, the maximum current.

(4) Correct ground terminal E, grounding resistance is less than 100Ω.

(5) Each terminal's wiring requirements, the correct selection of accessories such as potentiometers, voltmeter, input power supplies

(6) After completing the wiring correctly and check to make sure it is correct and then the power can be on.

Chapter 3 Operation

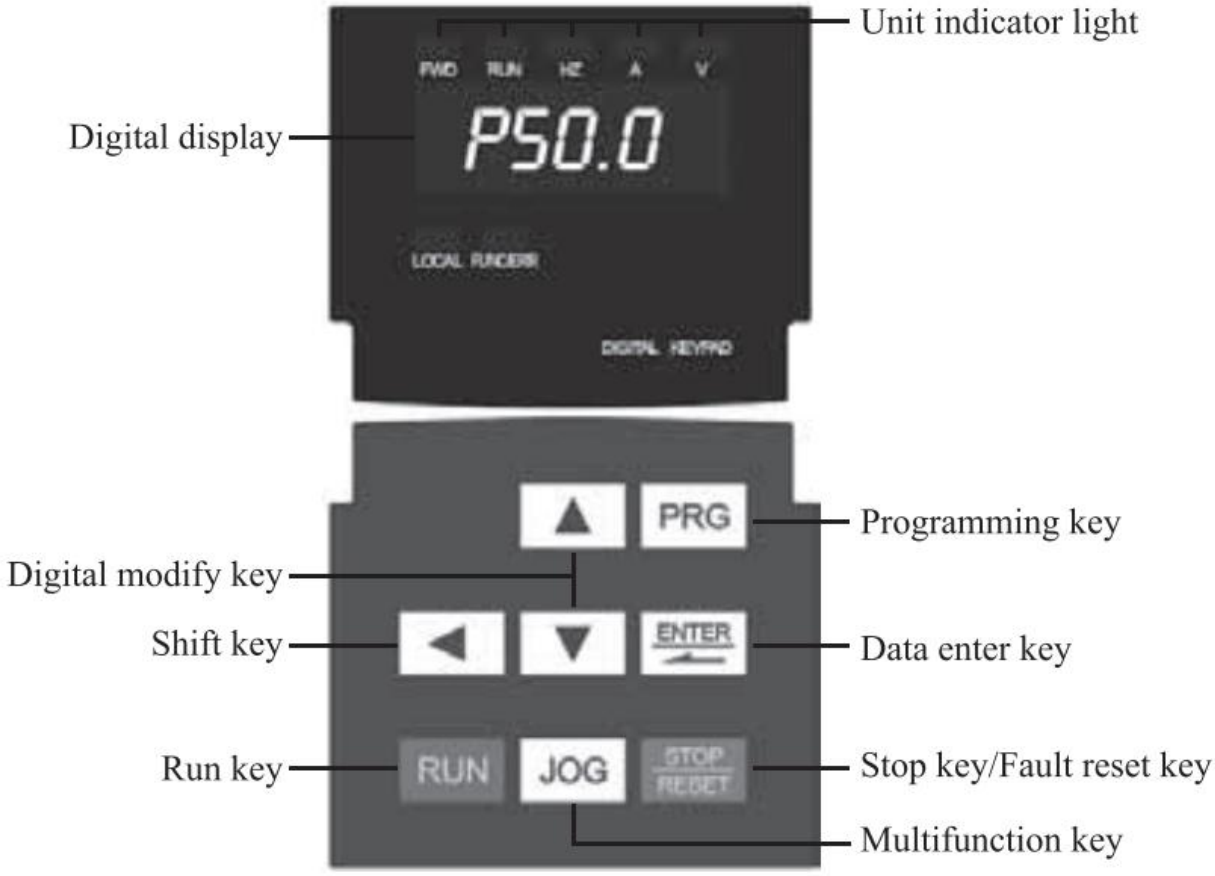
3.1 Digital Operator Description

Digital Operator can also be called Panel.

3.1.1 the picture of the panel

(1) 0.2-22kW

(2) 30kW or above



3.1.2 the descriptions of the key's function

Key	Name	Description
	Programming key	Entry or escape of first-level menu
	Data enter key	Progressively enter menu and confirm parameters
	UP Increment Key	Progressively increase data or function codes
	DOWN Decrement Key	Progressive decrease data or function codes
	Right shift Key	n parameter setting mode, press this button to select the bit to be modified n other modes, cyclically displays parameters by right shift
	Run key	Start to run the inverter in keypad control mode.
	Stop key/Fault reset key	In running status, restricted by F7.02 can be used to stop the inverter When fault alarm, can be used to reset the inverter without any restriction.
	Multifunction key	

3.1.3 Indicator light descriptions

Indicator Name	Indicator Description
Hz	Frequency unit
A	Current unit
V	Voltage unit
FWD/REV	Light off: forward operation. Light on: reverse operation

3.2 Operational process

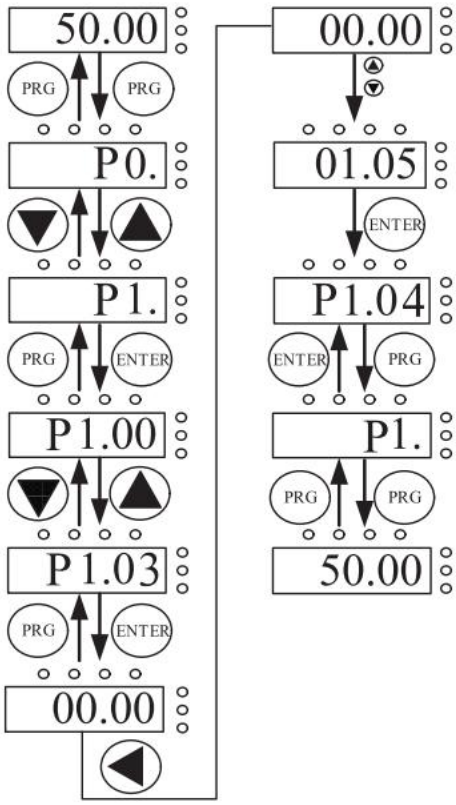
3.2.1 Parameter Settings

Three-level menu:

1. The function code group (first menu);
2. Function code symbols (second menu);
3. Function code set value (third menu).

Explanation: the three-level menu operation, can press PRG or ENTER to return to the secondary menu. The difference between the two is: press ENTER to set parameters in control panel, and then return to the secondary menu, and automatically move to the next function code; Press PRG directly to return to the secondary menu, don't store parameters, and keep staying in the current function code.

Example: change the function code P1.03 from 00.00 Hz change the sample set to 50.00 Hz.



Flow chart of parameter setting.

In three-level state, if the parameter is not flashing, said the function code cannot be modified, possible reasons are:

1) The function code parameters can not be modified. Such as the actual testing parameters, operation records, etc.;

2) The function code in the running state cannot be modified, need to stop to modify;

3.2.2 Fault reset

After the failure of the inverter, the inverter will be prompted to related fault information. Users can press STOP key on the keyboard or terminal function to conduct the fault reset (P5), after fault reset, the inverter is in the standby state. If the inverter is in fault state, the user does not carry on the fault reset, the inverter is in the running to protect state, inverter can't run.

3.2.3 Motor parameter self learning

1: The dynamic parameter self learning

Choosing no PG vector control operation mode, input moto nameplate parameters must be accurate, inverter will be based on nameplate parameters matching standard motor; In order to get better control performance, motor parameter auto-tuning is suggested and auto-tuning steps are as follows:

First will run command channel choice (P2.00) choice for keyboard commands. Then the actual parameters according to the motor, please input the following parameters.

P2.00: the motor type;

P2.01: the motor rated power;

P2.02: the motor rated voltage;

P2.03: the motor rated current;

P2.04: the motor rated frequency;

P2.05: the motor rated speed.

In the process of self learning, the keyboard will display "study", when the keyboard display END, the motor parameter self learnings is end.

✎**Note: in the process of auto-tuning, motor and load should be released. Otherwise, the motor parameters obtained from the auto-tuning may not be correct.**

2: The static parameters of the self learning

Motor static parameters auto-tuning, don't need to release motor with the load, motor parameter auto-tuning, must correct the input parameters of motor nameplates (P2.01 -P2.05), since auto-tuning will detect the motor stator resistance and rotor resistance and leakage inductance of the motor. And mutual inductance of the motor and no-load current will not be able to measure, the user can input the corresponding values according to the motor nameplates.

3.3 Running state

3.3.1 Power-on initialization

In the process of the Inverter's power-on, the system first initializes, LED display for "2000", and seven lights all bright. After the initialization is complete, the drive is in standby mode.

3.3.2 Standby status

In the stopping or running status, a variety of state parameters can display. By Function Code P7.03 (operating parameters), P7.05 (stop parameter) binary bits. Various definitions can refer to P7.03 and P7.05 function code.

3.3.3 Motor parameters self-learning

Please refer to the detailed description of P2.37 a function code.

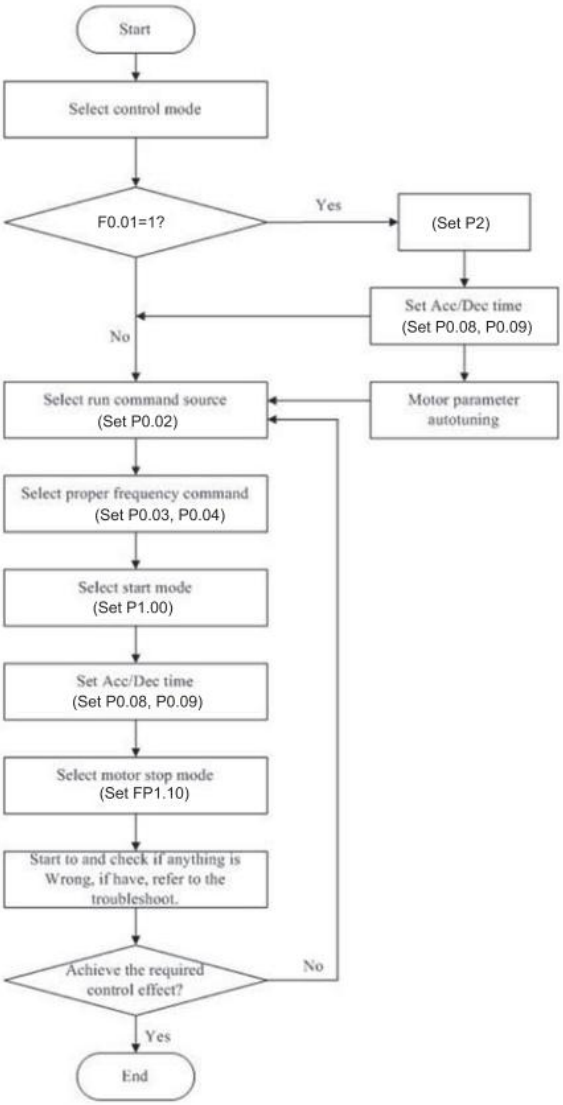
3.3.4 Running

In the running state, a total of sixteen can choose whether to display the status parameters are: operating frequency, set frequency, bus voltage, output voltage, output current,operating speed, output power,output torque, PID setting, PID FIV analog input voltage, analog input voltage FIC, the number of segments multi-speed, torque setpoint, whether to display the function code is decided by P7.03 and P7.04 bit (converted into binary)choice, press the key to switch the display order of the selected parameters, press the JOG key to left in order to switch the display selected parameters.

3.3.5 Failure

VZ2000 series offers a variety of fault information, please refer VZ2000 series inverter faults and their countermeasures.

3.4 Quick commissioning



Chapter 4 List of Function Parameters

If PP.00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu. To cancel the password protection function, enter with password and set PP.00 to 0.

Parameters menu the user customizes are not protected by password. Group P is the basic function parameters, Group D is to monitor the function parameters. The symbols in the function code table are described as follows:

"☆": The parameter can be modified when the AC drive is in either stop or running state.

"★": The parameter cannot be modified when the AC drive is in the running state.

"●": The parameter is the actually measured value and cannot be modified.

"*": The parameter is factory parameter and can be set only by the manufacturer.

Standard Function Parameters

Function Code	Parameter Name	Setting Range	Default	Property
Group P0: Standard Function Parameters				
P0.00	G/P type display	1: G type (constant torque load) 2: P type (vanable torque load, e.g fan and pump)	Model dependent	★
P0.01	Control mode selection	0: Voltage/Frequency (V/F) control 1: Sensorless flux vector control (SFVC)	0	★
P0.02	Command source selection	0: Operation panel control 1: Terminal control 2: Communication control	0	☆
P0.03	Frequency source superposition selection	Unit's digit (Frequency source) 0: Main frequency source X 1: X and Y operation (operation relationship determined by ten's digit) 2: Switchover between X and Y 3: Switchover between X and "X and Y operation" 4: Switchover between Y and "X and Y operation" Ten's digit (X and Y operation) 0: X+Y 1: X-Y 2: Maximum 3: Minimum	00	☆
P0.04	Main freguency source X selection	0: Digital setting (P01.0 preset frequency, can modify the UP/DOWN, power lost don't memory) 1: Digital setting (P0, 10 preset frequencies, can modify the UP/ DOWN, power lost memory) 2: FIV 3: FIC 4: Reserved 5: Pulse setting (S3) 6: Multistage instruction 7: Simple PLC 8: PID 9: Communications given	0	★
P0.05	Auxiliary frequency source Y selection	The same as P0.04 (Main frequency source X selection)	0	★
P0.06	Auxiliary frequency source superposition Y	0: Relative to the maximum frequency 1: Relative to the main frequency	0	☆

	range selection	source X		
P0.07	Auxiliary frequency source superposition Y range	0%-150%	100%	☆
P0.08	Acceleration time 1	0.00s-65000s	Model dependent	☆
P0.09	Deceleration time 1	0.00s-65000s	Model dependent	☆
P0.10	Frequency preset	0.00Hz-maximum frequency (P0.12)	50.00Hz	☆
P0.11	Rotatio direction	0: Same direction 1: Reverse direction	0	☆
P0.12	Maximum frequency	50.00Hz-320.00Hz	50.00Hz	★
P0.13	Upper limit frequency source	0: P0.12 1: FIV 2: FIC 3: Reserved 4: PULSE settings 5: Communication settings	0	★
P0.14	Upper limit frequency	Frequency lower limit P0.16-Maximum frequency P0.12	50.00Hz	☆
P0.15	Upper limit frequency offset	0.00Hz-Maximum frequency P0.12	0.00Hz	☆
P0.16	Frequency lower limit	0.00Hz-Upper limit frequency P0.14	0.00Hz	☆
P0.17	Carrie frequency	1kHz-16.0kHz	Model dependent	☆
P0.18	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
P0.19	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
P0.21	Frequency offset of auxiliary frequency source for X and Y operation	0.00Hz-Maximum frequency P0.12	0.00Hz	☆
P0.07	Auxiliary frequency source superposition Y range	0%-150%	100%	☆
P0.08	Acceleration time 1	0.00s-65000s	Model dependent	☆
P0.09	Deceleration time 1	0.00s-65000s	Model dependent	☆
P0.10	Frequency preset	0.00Hz-maximum frequency (P0.12)	50.00Hz	☆
P0.11	Rotatio direction	0: Same direction 1: Reverse direction	0	☆
P0.12	Maximum frequency	50.00Hz-320.00Hz	50.00Hz	★
P0.13	Upper limit frequency source	0: P0.12 1: FIV 2: FIC 3: Reserved 4: PULSE settings 5: Communication settings	0	★

P0.14	Upper limit frequency	Frequency lower limit P0.16-Maximum frequency P0.12	50.00Hz	☆
P0.15	Upper limit frequency offset	0.00Hz-Maximum frequency P0.12	0.00Hz	☆
P0.16	Frequency lower limit	0.00Hz-Upper limit frequency P0.14	0.00Hz	☆
P0.17	Carrier frequency	1kHz-16.0kHz	Model dependent	☆
P0.18	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
P0.19	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
P0.21	Frequency offset of auxiliary frequency source for X and Y operation	0.00Hz-Maximum frequency P0.12	0.00Hz	☆
P1.00	Start mode	0: direct start 1: Rotational speed tracking restart 2: Pre-excited start (asynchronous motor)	0	☆
P1.01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed 2: From maximum frequency	0	★
P1.02	Rotational speed tracking speed	1-100	20	☆
P1.03	Startup frequency	0.00Hz-10.00Hz	0.00Hz	☆
P1.04	Startup frequency holding time	0.0s-100.0s	0.0s	★
P1.05	Startup DC braking current/Pre-excited current	0%-100%	0%	★
P1.06	Startup DC braking time/ pre-exciting time	0.0s-100.0s	0.0s	★
P1.07	Acceleration/ Deceleration mode	0: Linear acceleration/ deceleration 1: S-curve acceleration/ deceleration A 2: S-curve acceleration/ deceleration B	0	★
P1.08	Time proportion of S-curve start	0.0%- (100.0%-P1.09)	30.0%	★
P1.09	Time proportion of S-curve end	0.0%- (100.0%-P1.08)	30.0%	★
P1.10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
P1.11	Initial frequency of stop DC braking	0.00Hz-maximum frequency	0.00Hz	☆
P1.12	Waiting time of stop DC braking	0.0s-100.0s	0.0s	☆
P1.13	Stop DC braking current	0%-100%	0%	☆
P1.14	Stop DC braking time	0.0s-100.0s	0.0s	☆
P1.15	Brake use ratio	0%-100%	100%	☆
Group P2: Motor Parameters				
P2.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous	0	★

		motor		
P2.01	Rated motor power	0.1kW-30.0kW	Model dependent	★
P2.02	Rated motor voltage	1V-2000V	Mode dependent	★
P2.03	Rated motor current	0.01A-655.35A	Model dependent	★
P2.04	Rated motor frequency	0.01Hz-maximum frequency	Model dependent	★
P2.05	Rated motor rotational speed	1rpm-65535rpm	Model dependent	★
P2.06	Stator resistance (Asynchronous motor)	0.0012-65.535Ω	Model dependent	★
P2.07	Rotor resistance (Asynchronous motor)	0.001Ω-65.535Q	Model dependent	★
P2.08	Leakage inductive reactance (Asynchronous motor)	0.01mH-655.35mH	Model dependent	★
P2.09	Mutual inductive reactance (Asynchronous motor)	0.1mH-6553.5mH	Model dependent	★
P2.10	No-load current (Synchronous motor)	0.01A-P2.03	Model dependent	★
P2.11-P2.36 Reserved				
P2.37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning	0	★

Function Code	Parameter Name	Setting Range	Default	Property
Group P3: Vector Control Parameters				
P3.00	Speed loop proportional gain	1-100	30	☆
P3.01	Speed loop integral time 1	0.01s-10.00s	0.50s	☆
P3.02	Switchover frequency	0.00-P3.05	5.00Hz	☆
P3.03	Speed loop proportional gain 2	1-100	20	☆
P3.04	Speed loop integral time 2	0.01s-10.00s	1.00s	☆
P3.05	Switchover frequency 2	P3.02-maximum output frequency	10.00Hz	☆
P3.06	Vector contro slip gain	50%-200%	100%	☆
P3.07	Time constant of speed loop filter	0.000s-0.100s	0.000s	☆
P3.08	Vector control over-excitation gain	0-200	64	☆
P3.09	Torque uppe limit source in speed control mode	0: P3.10 1: FIV 2: FIC 3: Reserved 4: Pulse setting	0	☆

		5: Communication setting 6: MIN (FIV, FIC) 7: MAX (FIV, FIC)		
P3.10	Digital setting of torque upper limit in speed control mode	0.0%-200.0%	150.0%	☆
P3.13	Excitation adjustment proportional gain	0-60000	2000	☆
P3.14	Excitation adjustmen integral gain	0-60000	1300	☆
P3.15	Torque adjustment proportional gain	0-60000	2000	☆
P3.16	Torque adjustment integral gain	0-60000	1300	☆
P3.17	Speed loop integral property	Unit's digit: integral separation 0: Disabled 1: Enabled	0	☆
P3.18 Reserved				
P3.19 Reserved				
P3.20 Reserved				
P3.21 Reserved				
P3.22 Reserved				
Group P4: V/F Control Parameters				
P4.00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★
P4.01	Torque boost	0.0%: (Automatic torque boost 0.1%-30.0%	Model dependent	☆
P4.02	Cut-off frequency of torque boost	0.00Hz-maximum output frequency	50.00Hz	★
P4.03	Multi-point V/F frequency1 (F1)	0.00Hz-P4.05	0.00Hz	★
P4.04	Multi-point V/F voltage 1 (V1)	0.0%-100.0%	0.0%	★
P4.05	Multi-point V/F frequency 2 (F2)	P4.03-P4.07	0.00Hz	★
P4.06	Multi-point V/F voltage 2 (V2)	0.0%-100.0%	0.0%	★
P4.07	Multi-point V/F frequency 3 (F3)	P4.05-rated motor frequency (P1.04)	0.00Hz	★
P4.08	Multi-point V/F voltage 3 (V3)	0.0%-100.0%	0.0%	★
P4.09	V/F slip compensation gain	0.0%-200.0%	0.0%	☆
P4.10	V/F over- excitation gain	0-200	64	☆
P4.11	V/F oscillation	0-100	Model	☆

	suppression gain		dependent	
P4.13	Voltage source for V/F separation	0: Digital setting (P4.14) 1: FIV 2: FIC 3: Reserved 4: PULSE setting (S3) 5: Multi-reference 6: Simple PLC 7: PID 8: Communication setting 100.0%corresponds to the rated motor voltage	0	☆
P4.14	Voltage digital setting for V/F separatior	0V-rated motor voltage	0V	☆
P4.15	Voltage rise time of V/F separatior	0.0s-1000.0s It indicates the time for the voltage rising from 0 V to rated motor voltage.	0.0s	☆
P4.16	Voltage decline time of V/F separation	0.0s-1000.0s It indicates the time for the voltage to decline from rated motor voltage to 0 V.	0.0s	☆
Group P5: Input Terminals				
P5.00	FWD function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three-line control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: Normally open (NO) input of external fault 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/ deceleration time selection 17: Terminal 2 for acceleration/ deceleration time selection 18: Frequency source switchover 19: UP and DOWN setting clear (Terminal, operation panel) 20: Command source switchover terminal 21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset	1	★

		29: Torque control prohibited 30: Pulse input (Enabled only for S3) 31: Reserved 32: Immediate DC braking 33: Normally closed (NC) input of external fault		
P5.01	REV function selectior		4	★
P5.02	S1 function selection		9	★
P5.03	S2 function selection		12	★
P5.04	S3 function selection	34: Frequency modification forbidden 35: Reverse PID action direction 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switchover 44: Reserved 45: Reserved 46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC braking 50: Clear the current running time 51-59: Reserved	13	★
P5.05	S4 function selection		0	★
P5.10	S filter time	0.000s-1.000s	0.010s	☆
P5.11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
P5.12	Terminal UP/ DOWN rate	0.001Hz/s-65.535Hz/s	1.00Hz/s	☆
P5.13	FI curve 1 minimum input	0.00V-P5.15	0.00V	☆
P5.14	Corresponding setting of FI curve 1 minimum input	-100.0%-+100.0%	0.0%	☆
P5.15	FI curve 1 maximum input	P5.13-+10.00V	10.00V	☆
P5.16	Corresponding setting of FI curve 1 maximum input	-100.0%-+100.0%	100.0%	☆
P5.17	FI curve 1 filter time	0.00s-10.00s	0.10s	☆
P5.18	FI curve 2 minimum input	0.00V-P5.20	0.00V	☆

P5.19	Correspondin setting of FI curve 2 minimum input	100.0%-+100.0%	0.0%	☆
P5.20	FI curve 2 maximum input	P5.18-+10.00V	10.00V	☆
P5.21	Corresponding setting of FI curve 2 maximum input	-100.0%-+100.0%	100.0%	☆
P5.22	FI curve 2 filter time	0.00s-10.00s	0.10s	☆
P5.23	FI curve 3 minimum input	-10.00V-P5.25	-10.00V	☆
P5.24	Corresponding setting of FI curve 3 minimum input	-100.0%-+100.0%	-100.0%	☆
P5.25	FI curve 3 maximum input	P5.23-+10.00V	10.00V	☆
P5.26	Corresponding setting of FI curve 3 maximum input	100.0%-+100.0%	100.0%	☆
P5.27	FI curve 3 filter time	0.00s-10.00s	0.10s	☆
P5.28	PULSE minimum input	0.00kHz-P5.30	0.00kHz	☆
P5.29	Corresponding setting of pulse minimum input	-100.0%-100.0%	0.0%	☆
P5.30	PULSE maximum input	P5.28-100.00kHz	50.00kHz	☆
P5.31	Corresponding setting of pulse maximum input	-100.0%-100.0%	100.0%	☆
P5.32	PULSE filter time	0.00s-10.00s	0.10s	☆
P5.33	FI curve selection	Unit's digit: FIV curve selection 1: Curve 1 (2 points, see P5.13-P5.16) 2: Curve 2 (2 points, see P5.18-P5.21) 3: Curve 3 (2 points, see P5.23-P5.26) 4: Curve 4 (4 points, see C6.00-C6.07) 5: Curve 5 (4 points, see C6.08-C6.15) Ten's digit: FIC curve selection (1-5, same as FIV) Hundred's digit: FIA curve selection (1-5, same as FIV)	321	☆
P5.34	Setting fo FI less than minimum input	Unit's digit: Setting for FIV less than minimum input 0: Minimum value 1: 0.0% Ten's digit: Setting for FIC less than minimum input (0-1, same as FIV) Hundred's digit: Setting for FIA less than minimum input (0-1, same as FIV)	000	☆
P5.35	FWD delay time	0.0s-3600.0s	0.0s	★
P5.36	REV delay time	0.0s-3600.0s	0.0s	★
P5.37	S1 delay time	0.0s-3600.0s	0.0s	★
P5.38	S valid mode selection 1	0: High level valid 1: Low level valid	00000	★

		Unit's digit: FWD Ten's digit: REV Hundred's digit: S1 Thousand's digit: S2 Ten thousand's digit: S3		
P5.39	S valid model selection 2	0: High level valid 1: Low level valid Unit's digit: S4	0	★
Group P6: Output Terminals				
P6.00	M01 terminal output mode	1: Switch signal output (M01)	0	☆
P6.01	MO1 function	0: No output 1: AC drive running 2: Fault output (stop) 3: Frequency-level detection FDT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle complete 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: FIV>FIC 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Under voltage state output 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detectio FDT2 output 26Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: FIV input limit exceeded 32: Load becoming 0 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Software current limit exceeded	0	☆
P6.02	Relay output function (RA-RB-RC)	37: Frequency lower limit reached (Having output at stop)	2	☆

		38: Alarm output 39: Reserved 40: Current running time reached		
P6.07	FOV function selection	0: Running frequency	0	☆
P6.08	Reserved	1: Set frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% for 100.0kHz) 7: FIV 8: FIC 9: Reserved 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current (100.0% for 1000.0A) 15: Output voltage (100.0% for 1000.0V) 16: Reserved		
P6.09	Reserved			☆
P6.10	FOV offset coeffcient	-100.0%-+100.0%	0.0%	☆
P6.11	FOV gain	-10.00-+10.00	1.00	☆
P6.12	Reserved			☆
P6.13	Reserved			☆
P6.17	M01 outpu delay time	0.0s-3600.0s	0.0s	☆
P6.18	RA-RB-RC output delay time	0.0s-3600.0s	0.0s	☆
P6.19	RA-RB-RC output delay time	0.0s-3600.0s	0.0s	☆
P6.20	Reserved			
P6.21	Reserved			
P6.22	Output terminal valid mode selection	0: Positive logic 1: Negative logic Unit's digit: M01 Ten's digit: RA-RB-RC	00	☆
Group P7: Operation Panel and Display				
P7.00	Output power correction factor	0.0-200.0	100.0	☆
P7.01	Reserved			
P7.02	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1	☆
P7.03	LED display running parameters 1	0000-FFFF Bit00: Running frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: S input status	1F	☆

		Bit08: M01 output status Bit09: FIV voltage (V) Bit10: FIC voltage (V) Bit11: Reserved Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting		

Function Code	Parameter name	Setting Range	Default	Property
P7.04	LED display running parameters 2	0000-FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Pulse setting frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: FIV voltage before correction (V) Bit06: FIC voltage before correction (V) Bit07: Reserved Bit08: Linear speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Pulse setting frequency (Hz) Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆
P7.05	LED display stop parameters	0000-FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: S input status Bit03: M01 output status Bit04: FIV voltage (V) Bit05: FIC voltage (V) Bit06: Reserved Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: Pulse setting frequency (kHz) Bit13: PID feedback value	33	☆
P7.06	Load speed display coeffcient	0.0001-6.5000	1.0000	☆
P7.07	Heatsink temperature of inverter	0.0℃-150.0℃		
P7.08	Temporary software version	0.0℃-150.0℃		
P7.09	Accumulative running time	0h-65535h		
P7.10	Reserved			
P7.11	Software version			
P7.12	Numbers of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimalplaces	1	☆

P7.13	Accumulative power-on time	0h-65535h		
P7.14	Accumulative power consumption	0kW-65535kWh		
Group P8: Auxiliary Functions				
P8.00	JOG running frequency	0.00Hz-maximum frequency	2.00Hz	☆
P8.01	JOG acceleration time	0.0s-6500.0s	20.0s	☆
P8.02	JOG deceleration time	0.0s-6500.0s	20.0s	☆
P8.03	Acceleration time 2	0.0s-6500.0s	Mode dependent	☆
P8.04	Deceleration time 2	0.0s-6500.0s	Model dependent	☆
P8.05	Acceleration time 3	0.0s-6500.0s	Model dependent	☆
P8.06	Deceleration time 3	0.0s-6500.0s	Mode dependent	☆
P8.07	Acceleration time 4	0.0s-6500.0s	Model dependent	☆
P8.08	Deceleration time 4	0.0s-6500.0s	Model dependent	☆
P8.09	Jump frequency 1	0.00Hz-maximum frequency	0.00Hz	☆
P8.10	Jump frequency 2	0.00Hz-maximum frequency	0.00Hz	☆
P8.11	Frequency jump amplitude	0.00Hz-maximum frequency	0.01Hz	☆
P8.12	Forward/ Reverse rotation dead-zone time	0.0s-3000.0s	0.0s	☆
P8.13	Reverse control	0: Enabled 1: Disabled	0	☆
P8.14	Running mode when set frequency lower than frequency ower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆
P8.15	Droop control	0.00Hz-10.00Hz	0.00Hz	☆
P8.16	Accumulative power-on time threshold	0h-65000h	0h	☆
P8.17	Accumulative running time threshold	0h-65000h	0h	☆
P8.18	Startup protection	0: No 1: Yes	0	☆
P8.19	Frequency detection value (FDT1)	0.00Hz-maximum frequency	50.00Hz	☆
P8.20	Frequency detection hysteresis (FDT1)	0.0%-100.0% (FDT1 level)	5.0%	☆
P8.21	Detection range of frequency reached	0.0%-100.0% (maximum frequency	0.0%	☆
P8.22	Jump frequency during acceleration/ deceleration	0: Disabled 1: Enabled	0	☆

P8.25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz-maximum frequency	0.00Hz	☆
P8.26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00Hz-maximum frequency	0.00Hz	☆
P8.27	Terminal JOG preferred	0: Disabled 1: Enabled	0	☆
P8.28	Frequency detection value (FDT2)	0.00Hz-maximum frequency	50.00Hz	☆
P8.29	Frequency detection hysteresis (FDT2)	0.0%-100.0% (FDT2 level)	5.0%	☆
P8.30	Any frequency eaching detection value 1	0.00Hz-maximum frequency	50.00Hz	☆
P8.31	Any frequency reaching detection amplitude	0.0%-100.0% (Maximum frequency)	0.0%	☆
P8.32	Any frequency eaching detection value 2	0.00Hz-maximum frequency	50.00Hz	☆
P8.33	Any frequency reaching detection amplitude 2	0.0%-100.0% (Maximum frequency)	0.0%	☆
P8.34	Zero current detection level	0.0%-300.0% 100.0%for rated motor current	5.0%	☆
P8.35	Zero current detection delay time	0.01s-600.00s	0.10s	☆
P8.36	Output over current threshold	0.0% (No detection) 0.1%-300.0% (Rated motor current)	200.0%	☆
P8.37	Output over current detection delay time	0.00s-600.00s	0.00s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8.38	Any current reaching 1	0.0%-300.0% (Rated motor current)	100.0%	☆
P8.39	Any current eaching 1 amplitude	0.0%-300.0% (Rated motor current)	0.0%	☆
P8, 40	Any current reaching 2	0.0%-300.0% (Rated motor current)	100.0%	☆
P8.41	Any current reaching 2 amplitude	0.0%-300.0% (Rated motor current)	0.0%	☆
P8.42	Timing function	0: Disabled 1: Enabled	0	☆
P8.43	Timing duration source	0: P8.44 1: FIV 2: FIC 3: Reserved 100% of analog input corresponds to the value of P8.44	0	☆
P8.44	Timing duration	0.0Min-6500.0Min	0.0Min	☆
P8.45	FIV input voltage lower limit	0.00V-P8.46	3.10V	☆
P8.46	FIV input voltage uppe limit	P8.45-10.00V	6.80V	☆

P8.47	Module temperature threshold	0°℃-150℃	100℃	☆
P8.48	Cooling fan control	0: Fan working during running 1: Fan working continuously	0	☆
P8.49	Wakeup frequency	Dormant frequency (P8.51) -maximum frequency (P0.12)	0.00Hz	☆
P8.50	Wakeup delay time	0.0s-6500.0s	0.0s	☆
P8.51	Dormant frequency	0.00Hz-wakeup frequency (P8.49)	0.00Hz	☆
P8.52	Dormant delay time	0.0s-6500.0s	0.0s	☆
P8.53	Current running time reached	0.0Min-6500.0Min	0.0Min	★

Function Code	Paramete Name	Setting Range	Default	Property
Group P9: Fault and Protection				
P9.00	Motor overload protection selection	0: Disabled 1: Enabled	1	☆
P9.01	Motor overload protection gain	0.20-10.00	1.00	☆
P9.02	Motor overload warning coeffcient	50%-100%	80%	☆
P9.03	Overvoltage stall gain	0-100	0	☆
P9.04	Overvoltage stall protective voltage	120%-150%	130%	☆
P9.05	Over current stall gain	0-100	20	☆
P9.06	Over current stall protective current	100%-200%	150%	☆
P9.07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	1	☆
P9.09	Fault auto reset times	0-20	0	☆
P9.10	M01 action during fault auto reset	0: Not act 1: Act	0	☆
P9.11	Time interval of fault auto reset	0.1s-100.0s	1.0s	☆
P9.12	Reserved			☆
P9.13	Output phase loss protection selection	0: Disabled 1: Enabled	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9.14	1st fault type	0: No fault 1: Inverter unit protection 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistance overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Reserved 13: Power output phase loss 14: Module overheats 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Reserved 21: EEPROM read-write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25: Reserved 26: Accumulative running time reached 27: Reserved 28: Reserved 29: Accumulative power-on time reached 30: Load becoming 0 31: PID feedback lost during running 40: With-wave current limit fault 41-43: Reserved 51: Reserved		●
P9.15	2nd fault type			●
P9. 16	3rd (latest) fault type			●
P9.17	Frequency upon 3rd fault	-	-	●
P9.18	Current upon 3rd fault	-	-	●
P9.19	Bus voltage upon 3rd fault	-	-	●
P9.20	Input terminal status upon 3rd fault	-	-	●
P9.21	Output terminal status upon 3rd fault	-	-	●
P9.22	AC drive status upon 3rd fault	-	-	●
P9.23	Power-on time upon 3rd fault	-	-	●
P9.24	Running time upon 3rd fault	-	-	●
P9.27	Frequency upon 2nd fault	-	-	●
P9.28	Current upon 2nd fault	-	-	●

P9.29	Bus voltage upon 2nd fault	-	-	●
P9.30	lutput terminal status upon 2nd fault	-	-	●
P9.31	Output terminal status upon 2nd fault	-	-	●
P9.32	Frequency upon 2nd fault	-	-	●
P9.33	Current upon 2nd fault	-	-	●
P9.34	Bus voltage upon 2nd fault	-	-	●
P9.37	lutput terminal status upon 1st fault	-	-	●
P9.38	Output terminal status upon 1st fault	-	-	●
P9.39	Frequency upon 1st fault	-	-	●
P9.40	Current upon 1st fault	-	-	●
P9.41	Bus yoltage upon 3rd fault	-	-	●
P9.42	lutput terminal status upon 1st fault	-	-	●
P9.43	Output terminal status upon 1st fault	-	-	●
P9.44	Frequency upon 1st fault	-	-	●
P9.47	Fault protection action selection 1	Unit's digit: Motor overload (OL1) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Ten's digit: Reserved Hundred's digit: Power output phase loss (LO) Thousand's digit: External equipment fault (EF) Ten thousand's digit: Communication fault (CE)	00000	☆
P9.48	Fault protection action selection 2	Unit's digit: Reserved 0: Coast to stop Ten's digit: EEPROM read-write fault (EEP) 0: Coast to stop 1: Stop according to the stop mode Hundred's digit: Reserved Thousand's digit: Reserved Ten thousand's digit: Accumulative running time reached (END1)	00000	☆

P9.49	Fault protection action selection 3	Unit's digit: Reserved Unit's digit: Reserved 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Ten's digit: Reserved 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Hundred's digit: Accumulative power-on time reached (END2) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Thousand's digit: Load becoming 0 0: Coast to stor 1: Stop according to the stop mode 2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers Ten thousand's digit: PID feedback loss of running 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run	00000	☆
P9.50	Reserved			☆
P9.54	Frequency selection for continuing to run	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆
P9.55	Backup frequency upon abnormality	60.0%-100.0%	100.0%	☆
P9.56	Reserved			☆
P9.57	Reserved			☆
P9.58	Reserved			☆
P9.59	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
P9.60	Action pause judging voltage at instantaneous power failure	0.0%-100.0%	100.0%	☆
P9.61	Voltage rally udging time at instantaneous power failure	0.00s-100.00s	0.50s	☆
P9.62	Action judging voltage at instantaneous power failure	60.0%-100.0% (standard bus voltage)	80.0%	☆
P9.63	Protection upon load becoming 0	0: Disablec 1: Enabled	0	☆
P9.64	Detection level of load becoming 0	0.0-100.0%	10.0%	☆
P9.65	Detection time of load becoming 0	0.0-60.0s	1.0s	☆

P9.67	Reserved			☆
P9.68	Reserved			☆
P9.69	Reserved			☆
P9.70	Reserved			☆
Group PA: Process Control PID Function				
PA.00	PID setting source	0: PA.01 1: FIV 2: FIC 3: Reserved 4: PULSE setting (S3) 5: Communication setting 6: Multi-reference	0	☆
PA.01	PID digita setting	0.0%-100.0%	50.0%	☆
PA.02	PID feedback source	0: FIV 1: FIC 2: Reserved 3: FIV-FIC 4: PULSE setting (S3) 5: Communication setting 6: FIV+FIC 7: MAXIFIVI.IFIC 8: MIN (IFIV), |FICI|)	0	☆
PA.03	PID action direction	0: Forward action 1: Reverse action	0	☆
PA.04	PID setting feedback range	0-65535	1000	☆
PA.05	Proportiona gain Kp1	0.0-100.0	20.0	☆
PA.06	Integral time Ti1	0.01s-10.00s	2.00s	☆
PA.07	Differential time Td1	0.000s-10.000s	0.000s	☆
PA.08	Cut-off frequency of PID reverse rotation	0.00-maximum frequency	2.00Hz	☆
PA.09	PID deviation limit	0.0%-100.0%	0.0%	☆
PA.10	PID differential limit	0.00%-100.00%	0.10%	☆
PA.11	PID setting change time	0.00-650.00s	0.00s	☆
PA.12	PID feedback filter time	0.00-60.00s	0.00s	☆
PA.13	PID output filter time	0.00-60.00s	0.00s	☆
PA.14	Reserved			☆
PA.15	Proportiona gain Kp2	0.0-100.0	20.0	☆
PA.16	Integral time Ti2	0.01s-10.00s	2.00s	☆
PA.17	Differential time Td2	0.000s-10.000s	0.000s	☆
PA.18	PID parameter switchover condition	0: No switchover 1: Switchover via S 2: Automatic switchover based on deviation	0	☆
PA.19	PID parameter switchover deviation 1	0.0%-PA.20	20.0%	☆
PA.20	PID parameter switchover deviation 2	PA.19-100.0%	80.0%	☆
PA.21	PID initial value	0.0%-100.0%	0.0%	☆
PA.22	PID initial value holding time	0.00-650.00s	0.00s	☆

PA.23	Maximum deviation between two PID outputs in forward	0.00%-100.00%	1.00%	☆
PA.24	Maximum deviation between two PID outputs in reverse	0.00%-100.00%	1.00%	☆
PA.25	PID integra property	Unit's digit: Integral separated 0: Invalid 1: Valid Ten's digit: Whether to stop integral operation when the output reaches 0: Continue integral operation 1: Stop integral operation	00	☆
PA.26	Detection value of PID feedback loss	0.0%Not judging feedback loss 0.1%-100.0%	0.0%	☆
PA.27	Detection time of PID feedback loss	0.0s-20.0s	0.0s	☆
PA.28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0	☆
Group Pb: Swing Frequency, Fixed Length and Count				
Pb.00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆
Pb.01	Swing frequency amplitude	0.0%-100.0%	0.0%	☆
Pb.02	Jump frequency amplitude	0.0%-50.0%	0.0%	☆
Pb.03	Swing frequency cycle	0.1s-3000.0s	10.0s	☆
Pb.04	Triangular wave rising time coefficient	0.1%-100.0%	50.0%	☆
Pb.05	Set length	0m-65535m	1000m	☆
Pb.06	Actual length	0m-65535m	0m	☆
Pb.07	Number of pulses per meter	0.1-6553.5	100.0	☆
Pb.08	Set count value	1-65535	1000	☆
Pb.09	Designated count value	1-65535	1000	☆
Group PC: Multi-Reference and Simple PLC Function				
PC.00	Reference 0	-100.0%-100.0%	0.0%	☆
PC. 01	Reference 1	-100.0%-100.0%	0.0%	☆
PC.02	Reference 2	-100.0%-100.0%	0.0%	☆
PC.03	Reference 3	-100.0%-100.0%	0.0%	☆
PC.04	Reference 4	-100.0%-100.0%	0.0%	☆
PC.05	Reference 5	-100.0%-100.0%	0.0%	☆
PC.06	Reference 6	-100.0%-100.0%	0.0%	☆
PC.07	Reference 7	-100.0%-100.0%	0.0%	☆
PC.08	Reference 8	-100.0%-100.0%	0.0%	☆
PC.09	Reference 9	-100.0%-100.0%	0.0%	☆
PC.10	Reference10	100.0%-100.0%	0.0%	☆
PC.11	Reference11	-100.0%-100.0%	0.0%	☆
PC.12	Reference12	-100.0%-100.0%	0.0%	☆
PC.13	Reference13	-100.0%-100.0%	0.0%	☆
PC, 14	Reference14	-100.0%-100.0%	0.0%	☆
PC.15	Reference15	-100.0%-100.0%	0.0%	☆

PC.16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆
PC.17	Simple PLC retentive selection	Unit's digit: Retentive upon power failure 0: No 1: Yes Ten's digit: Retentive upon stop 0: No 1: Yes	00	☆
PC.18	Running time of simple PLC reference 0	0.0s (h) -6553.5s (h)	0.0s (h)	
PC.19	Acceleration/deceleration time of simple PLC reference 0	0-3	0	
PC.20	Running time of simple PLC reference 1	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.21	Acceleration/deceleration time of simple PLC reference 1	0-3	0	☆
PC.22	Running time of simple PLC reference 2	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.23	Acceleration/deceleration time of simple PLC reference 2	0-3	0	☆
PC.24	Running time of simple PLC reference 3	0.0s (h) -6553.5s (h	0.0s (h	☆
PC.25	Acceleration/ deceleration time of simple PLC reference 3	0-3	0	☆
PC.26	Running time of simple PLC reference 4	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.27	Acceleration/ deceleration time of simple PLC reference 4	0-3	0	☆
PC.28	Running time of simple PLC reference 5	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.29	Acceleration/ deceleration time of simple PLC reference 5	0-3	0	☆
PC.30	Running time of simple PLC reference 6	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.31	Acceleration/ deceleration time of simple PLC reference 6	0-3	0	☆
PC.32	Running time of simple PLC reference 7	0.0s (h) -6553.5s (h)	0.0s (h)	☆

PC.33	Acceleration/deceleration time of simple PLC reference 7	0-3	0	☆
PC.34	Running time of simple PLC reference 8	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.35	Acceleration/ deceleration time of simple PLC reference 8	0-3	0	☆
PC.36	Running time of simple PLC reference 9	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.37	Acceleration/ deceleration time of simple PLC reference 9	0-3	0	☆
PC.38	Running time of simple PLC reference 10	0.0s (h) -6553.5s (h)	0.0s (h)	☆
PC.39	Acceleration/ deceleration time of simple PLC reference 10	0-3	0	☆
PC.40	Running time of simple PLC reference 11	0.0s (h) -6500.0s (h)	0.0s (h)	☆
PC.41	Acceleration/deceleration time of simple PLC reference 11	0-3	0	☆
PC.42	Running time of simple PLC reference 12	0.0s (h) -6500.0s (h)	0.0s (h)	☆
PC.43	Acceleration/deceleration time of simple PLC reference 12	0-3	0	☆
PC. 44	Running time of simple PLC reference 13	0.0s (h) -6500.0s (h)	0.0s (h)	☆
PC.45	Acceleration/deceleration time of simple PLC reference 13	0-3	0	☆
PC.46	Running time of simple PLC reference 14	0.0s (h) -6500.0s (h)	0.0s (h)	☆
PC.47	Acceleration/deceleration time of simple PLC reference 14	0-3	0	☆
PC.48	Running time of simple PLC reference 15	0.0s (h) -6500.0s (h)	0.0s (h)	☆
PC.49	Acceleration/deceleration time of simple PLC reference 15	0-3	0	☆
PC.50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0	☆

PC.51	Reference 0 source	0: Set by PC.00 1: FIV 2: FIC 3: Reserved 4·PULSE setting 5: PID Set by preset frequency (P010), modified via terminal UP/DOWN	0	☆
Group PD: Communication Parameters				
PD.00	Baud rate	Unit's digit: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Ten's digit: Reserved Hundred's digit: Reserved Thousand's digit: Reserved	0005	☆
PD.01	Data format	0: No check, data format <8, N, 2> 1: Even parity check, data format<8, E, 1> 2: Odd Parity check, data format<8, 0, 1> 3: No check, data format <8, N, 1>Valid for Modbus	3	☆
PD.02	Local address	1-247, 0: Broadcast address	1	☆
PD.03	Response delay	0ms-20ms	2	☆
PD.04	Communication timeout	0.0 (Invalid), 0.1s-60.0s	0.0	☆
PD.05	Modbus protocol selection	Unit's digit: Modbus protocol 0: Non-standard Modbus protocol 1: Standard Modbus protocol Ten's digit: reserved	1	☆
PD.06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆
Group PE: reserved				
Group PP: User-Defined Function Codes				
PP.00	User password	0-65535	0	☆
PP.01	Restore default settings	0: No operation 01: Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user parameters	0	★
Group C0: Torque Control and Restricting Parameters				
C0.00	Speed/Torque control selection	0: Speed control 1: Torque control	0	★
C0.01	Torque setting source in torque control	0: Digital setting (C0.03) 1: FIV 2: FIC 3: Reserved	0	★

		4: PULSE setting 5: Communication setting 6: MIN (FIV, FIC) 7: MAX (FIV, FIC)		
C0.03	Torque digita setting in	200.0%-200.0%	150.0%	☆
C0.05	Forward maximum frequency in torque control	0.00Hz-maximum frequency	50.00Hz	☆
C0.06	Reverse maximum frequency in torque contro	0.00Hz-maximum frequency	50.00Hz	☆
C0.07	Acceleration time in torque control	0.00s-650.00s	0.00s	★
C0.08	Deceleration time in torque control	0.00s-650.00s	0.00s	☆
Group C1-C4: reserved				
Group C5: Control Optimization Parameters				
C5.00	PWM switchover frequency upper limit	0.00Hz-15.00Hz	12.00Hz	☆
C5.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
C5.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
C5.03	Random PWM depth	0: Random PWM invalid 1-10: PWM carrier frequency random depth	0	☆
C5.04	Rapid current limit	0: Disabled 1: Enabled	1	☆
C5.05	Current detection compensation	0-100	5	☆
C5.06	Undervoltage threshold	60.0%-140.0%	100.0%	☆
C5.07	SFVC optimization mode selection	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆
Group C6: FI Curve Setting (FI is FIV or FIC)				
C6.00	FI curve 4 minimum input	-10.00V-C6.02	0.00V	☆
C6.01	Corresponding setting of FI curve 4 minimum input	-100.0%-+100.0%	0.0%	☆
C6.02	FI curve 4 inflexion 1 input	C6.00-C6.04	3.00V	☆
C6.03	Corresponding setting of FI curve 4 inflexion 1 input	-100.0%-+100.0%	30.0%	☆
C6.04	FI curve 4 inflexion 2 input	C6.02-C6.06	6.00V	☆
C6.05	Corresponding setting of FI curve 4 inflexion 2 inputs	-100.0%-+100.0%	60.0%	☆
C6.06	FI curve 4 maximum input	C6.06-+10.00V	10.00V	☆
C6.07	Corresponding setting of	-100.0%-+100.0%	100.0%	☆

	FI curve 4 maximum input			
C6.08	FI curve 5 minimum input	-10.00V-C6.10	0.00v	☆
C6.09	Corresponding setting of FI curve 5 minimum input	-100.0%-+100.0%	-100.0%	☆
C6.10	Fl curve 5 inflexion 1 input	C6.08-C6.12	3.00V	☆
C6.11	Corresponding setting of FI curve 5 inflexion 1 input	-100.0%-+100.0%	-30.0%	☆
C6.12	FI curve 5 inflexion 2 input	C6.10-C6.14	6.00V	☆
C6.13	Corresponding setting of FI curve 5 inflexion 2 inputs	-100.0%-+100.0%	30.0%	☆
C6.14	FI curve 5 maximum input	C6.12-+10.00V	10.00V	☆
C6.15	Corresponding setting of FI curve	-100.0%-+100.0%	100.0%	☆
C6.16	Jump point of FIV	-100.0%-100.0%	0.0%	☆
C6.17	Jump amplitude of FIV input	0.0%-100.0%	0.5%	☆
C6.18	Jump point of FIC input	-100.0%-100.0%	0.0%	☆
C6.19	Jump amplitude of FIC input	0.0%-100.0%	0.5%	☆
C9.00	PID Sleep frequency	0-P0.12	00.00 Hz	☆
C9.01	PID Sleep Time	0-5000.0S	10.0 S	☆
C9.02	PID wake-up value	0-100.0 %	60.0 %	☆
Group CC: Fl/FO Correction				
CC.00	FIV measured voltage 1	0.500V-4.000V	Factory-corrected	☆
CC.01	FIV displayed voltage 1	0.500V-4.000V	Factory-corrected	☆
CC.02	FIV measured voltage 2	6.000V-9.999V	Factory-corrected	☆
CC.03	FIV displayec voltage 2	6.000V-9.999V	Factory-corrected	☆
CC.04	FIC measured voltage 1	0.500V-4.000V	Factory-corrected	☆
CC.05	FIC displayed voltage 1	0.500V-4.000V	Factory-corrected	☆
CC.06	FIC measured voltage 2	6.000V-9.999V	Factory-corrected	☆
CC.07	FIC displayed voltage 2	6.000V-9.999V	Factory-corrected	☆
CC.08	Reserved		Factory corrected	☆
CC.09	Reserved		Factory-corrected	☆
CC.10	Reserved		Factory corrected	☆

CC.11	Reserved		Factory-corrected	☆
CC.12	FOV targe voltage 1	0.500V-4.000V	Factory corrected	☆
CC.13	FOV measured voltage 1	0.500V-4.000V	Factory-corrected	☆
CC.14	FOV targe voltage 2	6.000V-9.999V	Factory-corrected	☆
CC.15	FOV measured voltage 2	6.000V-9.999V	Factory corrected	☆
CC.16	Reserved		Factory corrected	☆
CC.17	Reserved		Factory-corrected	☆
CC.18	Reserved		Factory corrected	☆
CC.19	Reserved		Factory-corrected	☆

Group D0: Monitoring Parameters

Function Code	Parameter Name	Unit
D0.00	Running frequency (Hz)	0.01Hz
D0.01	Set frequency (Hz)	0.01Hz
D0.02	Bus voltage (V)	0.1V
D0.03	Bus voltage (V)	1V
D0.04	Output current (A)	0.01A
D0.05	Output power (kW)	0.1kW
D0.06	Output torque (%)	0.1%
D0.07	S input state	1
D0.08	MO1 output state	1
D0.09	FIV voltage (V)	0.01V
D0.10	FIC voltage (V)	0.01V
D0.11	Reserved	
D0.12	Count value	1
D0.13	Length	1
D0.14	Load speed	1
D0.15	PID setting	1
D0.16	PID feedback	1
D0.17	PLCstage	1
D0.18	Input pulse frequency	0.01kHz
D0.19	Reserved	
D0.20	Remaining running time	0.1Min
D0.21	FIV voltage before correction	0.001V
D0.22	FIC voltage before correction	0.001V
D0.23	Reserved	
D0.24	Linear speed	1m/Min
D0.25	On the current time	1Min
D0.26	The current running time	0.1Min
D0.27	Pulse input frequency	1Hz
D0.28	Communication setting value	0.01%
D0.29	Reserved	
D0.30	Reserved	
D0.31	Auxiliary frequency Y	0.01Hz
D0.32	View any memory address values	1

D0.33	Reserved	
D0.34	Motor temperature	1℃
D0.35	Target torque	0.1%
D0.36	Reserved	
D0.37	Power factor angle	0.1
D0.38	Reserved	
D0.39	Target voltage upon V/F separation	1V
D0.40	Output voltage upon V/F separation	1V
D0.41	Reserved	
D0.42	Reserved	
D0.43	Reserved	
D0.44	Reserved	
D0.45	Current fault code	0

Chapter 5 Communication Protocol

VZ2000 series inverter provides RS232/RS485 communication interface, and support the Modbus communication protocol. Users can be achieved by computing machine or PLC central control, through the communication protocol set inverter running commands, modify or read function code parameters, read the inverter working condition and fault information, etc.

5.1 The agreement content

The serial communication protocol defines the serial communication transmission of information content and format. Including: host polling or wide planting format; Host encoding method, the content includes: the function of the required action code, data transmission and error checking, etc. From the ring of machine should be used is the same structure, content including: action confirmation, return the data and error checking, etc. If there was an error in receiving information from a machine, or cannot achieve the requirements of the host, it will organize a fault feedback information in response to the host.

5.2 Application methods

Application mode inverter with RS232/RS485 bus access to the "from" single main PC/PLC control network.

5.3 Bus structure

(1) The interface way RS232/RS485 interface hardware.

(2) Asynchronous serial transmission mode, half-duplex transmission mode. At the same time the host and the only one to send data from the machine and the other can only receive data.

Data in the process of serial asynchronous communication, the form of a message, a frame of a frame to send.

(3) Topological structure from single host machine system. From the machine address set in the range of 1~247, 0 for broadcast communication address. In the network from the machine address must be unique.

5.4 Protocol Description

VZ2000 series inverter is a kind of asynchronous serial port communication protocol of master-slave Modbus communication protocol, the network has only one equipment (host)to establish agreement (called "query/command"). Other equipment (machine) can only by providing data response of the main machine "query command", or "query/command" according to the host to make the corresponding action. Host in this refers to the personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., from machine refers to VZ2000 inverter. The host can communicate to a separate from the machine, also can to all under a broadcast information from machine release. For access to the host alone "query/command", from the machine to return to an information (called response), for radio host information, from the machine without feedback response to the host.

5.5 Communications data structure

Communication data structure VZ2000 series inverter of the Modbus protocol communication data format is as follows: using the RTU mode, messages are sent at least begin with 3.5 characters pause time interval.

In network wave rate under varied characters of the time, this is the easiest to implement (below T1, T2, T3, T4).

Transmission equipment is the first domain address.

The transmission character of you can use is the hex 0…9, A.…F. Continuously detect network bus network facilities, including pause interval of time. When the first domain (domain) to receive, every equipment decoding to determine whether to own. After the last transmission character, a pause at least 3.5 characters time calibration for the end of the message. A new message can be started after the pause.

The entire message frame must be as a continuous flow of transmission. If the timeframe to complete more than 1.5 characters before pause time, receiving equipment will refresh incomplete.
message and assume that the next byte is a new message the address of the domain. Likewise, if a new message in less than 3.5 characters of time and then a message before, receiving equipment will think it is a continuation of the previous message. This will result in an error, because in the final CRC field value can't be right.
RTU frame format:

The frame header START	3.5 characters
Slave address ADR	Communication address:1~247
command code CMD	03: Read the machine parameters; 06: write the machine parameters
Date content DATA (N-1)	Information content: Function code parameter address, function code number of parameters, function code parameter values, etc
Data content DATA (N-2)	
.....	
Data contentDATA0	
high-order position of CRC CHK	Estimated value: CRC value
ow-order position of CRC CHK	
END	3.5 characters'time

CMD (Command instruction) and DATA (the description of data word) command code:03H, read N word (Word) (Can read the most words of 12) For example, from the machine address of 01 inverter startup F105 continuous read for two consecutive values
The host command information

ADR	01H
CMD	03H
high-order position of the starting address	F1H
ow-order position of the starting address	05H
high-order position of register	00H
ow-order position of register	02H
ow-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

In response to information from the slave machine
Set PD.05 to 0:

ADR	01H
CMD	03H
high-order position of bytes	00H
ow-order position of bytes	04H
Data high-order position of F002H	00H
Data low-order position of F002H	00H
Data high-order position of F003H	00H
Data low-order position of F003H	01H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

Set PD.05 to 1:

ADR	01H
CMD	03H
The number of bytes	04H
Data high-order position of F002H	00H
Data low-order position of F002H	00H
Data high-order position of F003H	00H
Data low-order position of F003H	01H
low-order position of CRC CHK	Wait to calculate the CRC CHK values

high-order position of CRC CHK	

The command code:06H write a word (Word)For example, write 000(BB8H) to slave machine.

Address 05H inverter's F00AH address.

The host command information

ADR	05H
CMD	06H
high-order position of data address	FOH
ow-order position of data address	OAH
high-order position of information content	0BH
ow-order position of information content	B8H
ow-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

In response to information from the slave machine

ADR	02H
CMD	06H
high-order position of data address	FOH
ow-order position of data address	OAH
high-order position of information content	13H
ow-order position of information content	88H
ow-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

Check way——CRC Check way: CRC (Cyclical Redundancy Check) use RTU frame format, the message includes error detection field based on the method of CRC. CRC domain test the whole content of a message. CRC domain is two bytes, contains a 16-bit binary values.it is calculated by the transmission equipment, added to the message. receive messages the device recalculate. And compared with receives the CRC in the domain of value, if the two CRC value is not equal, then there is an error in transmission.

CRC is saved in OxFFFF. Then call a process to continuous 8-bit bytes of the message and the values in the current register for processing. Only 8-bit data in each character of CRC is effective, starting bit and stopping bit and parity bits are invalid.

In the process of CRC, each of the eight characters are separate and dissimilar or register contents (XOR), The results move to the least significant bit direction, set the most significant bit to 0.LSB is extracted to test, if set LSB to 1, Register and preset value dissimilarity or alone, if set LSB to 0, is not to. The whole process will repeat 8 times. when the last time (the eighth time) is completed, next 8-bit bytes and separate and register under the current value of the alien or. The values in the final register, is all bytes in the message is executed after the CRC value.

When CRC added to the messages. The low byte to join first and then high byte. CRC Simple function is as follows:

```
unsigned int crc_cal_value (unsigned char *data_value, unsigned char data_length)
int i;
unsigned int crc_value=Oxfff;
while(data_length--)
crc_value^=*data_value++;
for(i=0;i<8;i++)
lf(crc_value&0x0001)
crc_value=(crc_value>>1)^0xa001;
else
crc_value=crc_value>>1;
}
Return(crc_value);
```

Address definition of communication parameters

This part is the content of the communication, used to control the operation of the inverter, inverter status and related parameters setting. Read and write functional code parameter (Some function code which cannot be changed, only for the use of manufacturers or monitoring): function code parameter address label rules:
By function block number and the label for the parameter address representation rules. High byte: F0~FF (P group), AO~AF(C group),70~7F(D group)low byte: 00~FF
Such as: P3.12, The address is expressed as F30C; attention: PF group: Neither read the parameters, and do not change parameters; Group D group: only can read, do not change the parameters.
When some parameters in inverter is in operation, do not change; Some parameters of the inverter in any state, cannot be changed; Change function code parameters, but also pay attention to the range of parameters, units, and related instructions.
In addition, because the EEPROM is stored frequently, the service life of the block can reduce the life of the block EPROM, so some function code under the mode of communication, do not need to be stored, just change the value of RAM. If it is P group of parameters, in order to realize the function, as long as putting this function code address high F into 0 can be achieved. If it is C group of parameters, in order to realize the function, as long as putting the function code the address of high A into 4 can be achieved.
Corresponding function codes are shown as the following address:
the high byte:00 0F (P group),40 4F (group B) low byte:00 to FF
Such as:
Function code P3.12 is not stored in the EEPROM, the address is expressed as 030C; Function code C0-05 is not stored in the EEPROM, the address is expressed as 4005; The address representation can only do writing RAM, can't do reading action, when reading, it is invalid address. For all the parameters, can also use the command code 7H to implement this function.
Stopping/starting parameters:

Parameter address	Parameter description
1000	Communication Setting value (-10000-10000) (Decimal system)
1001	Operating frequency
1002	Bus voltage
1003	Output voltage
1004	Current output
1005	Output power
1006	Output torque

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