SX3000 Series
Advanced Vector Control Inverter

User's Manual

•Thank you very much for your buying SX3000 series High-performance Vector Control Inverter.
•Before use, please read this manual thoroughly to ensure proper usage. Keep this manual at an easily accessible place so that can refer 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 to -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 un-safety operation.

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

DANGER
·Risk of Injury and electric shock. ·Read the manual and follow the safety instruction before use. ·Isolate from supply and wait 10minutes before removing his cover. ·Ensure proper earth connection. ·Mount the inverter on a non-combustible surface.

2. Inspection

Careful

·Do not install or use any inverter that is damaged or have fault part; otherwise may cause injury.

Check the following items when unpacking the inverter

①Inspect the entire exterior of the inverter to ensure there are no scratches or other damage caused by the transportation.

②Ensure there is operation manual and warranty card in the packing box.

③Inspect the nameplate and ensure it is what you ordered.

④Ensure the optional parts are what you need if have ordered any optional parts.

Please contact the local agent if there is any damage in the inverter or optional parts.

3 Disassemble and installation warning

Warning

·The person without passing the training manipulate the device or any rule in the “Warning” being violated, will cause severe injury or property loss. Only the person, who has passed the training on the design, installation, is permitted to operate this equipment.

·Input power cable must be connected tightly, and the equipment must be grounded securely.

·Even if the inverter is not running, the following terminals still have dangerous voltage:

- Power terminals R、S、T
- Motor connection terminals U、V、W

·When power off, should not install the inverter until 10 minutes after, which can ensure the device discharge completely.

·The section area of grounding conductor must no less than 10mm²，Or according to below data, select the maximum value of the two as the grounding conductor area :

Power supply cable area of S mm^2	Area of grounding conductor conductor
S≤6	S
16＜S≤35	16
35＜S	S/2

Careful

·When moving the inverter please lift by its base and don't lift by the panel, otherwise may cause the main unit fall off which may result in personal injury.

·Install the inverter on the fireproofing material (such as metal) to prevent fire.

·When need install two or more inverters in one cabinet, cooling fan should be provided to make sure that the air temperature is lower than 40℃, otherwise it could cause fire or damage the device.

Chapter 1 Introduction

1-1 Technology Features

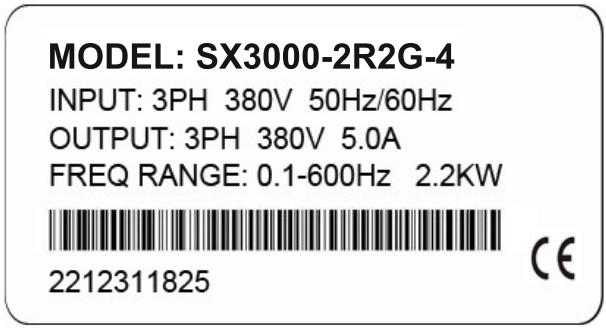
ITEM		SX3000
Basic function	Maximum frequency	Vector control:0~600Hz V/F control: 0~3200Hz
	Carrier frequency	0.5kHz~16kHz The carrier frequency can be automatically adjusted based on the load features.
	Input frequency resolution	Digital setting:0.01Hz Analog setting: maximum frequency×0.025%
	Control mode	Sensorless flux vector control (SFVC) Voltage/Frequency (V/F) control
	Startup torque	G Type:0.5Hz/150%（SFVC）; P Type:0.5Hz/100%
	Speed range	1:100 （No PG）
	Speed stability accuracy	±0.5%（No PG）
	Torque control accuracy	±5%（FVC）
	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:0.00Hz~50.00Hz. JOG acceleration/deceleration time0.0s~6500.0s。
	Onboard Multiple preset speeds	It implements up to 16 speeds via the simple PLC function or by input 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.
	Over-voltage/ Over-current stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to over-voltage/over-current.
	Rapid current limit	It helps to avoid frequent over-current faults of the inverter.
	Torque limit and torque control	It can limit the torque automatically and prevent frequent over-current tripping during the running process.

Individualized function	High performance	Control of asynchronous motor is implemented through the high-performance current vector control technology.
	Instantaneous stop doesn't stop	The load feedback energy compensates the voltage reduction so that the AC drive can continue to run for a short time.
	Timing control	Timing range 0.0Min~6500.0Min
	Communication methods	Modbus-RS485; EtherCAT, CAN, Profibus-DP is optional
	Running command channel	Given by the panel, control terminals, Serial communication port, can be switched by many ways

Operation	Frequency source	10 kinds of frequency source, given by digital analog voltage, analog current, Pulse, serial port. can be switched by many ways
	Auxiliary frequency source	There are ten auxiliary frequency sources. It can implement fine tuning of auxiliary frequency and frequency synthesis
	Input terminals	5 digital input terminals, one of which supports up to 100 kHz high-speed pulse input; 1 analog input terminal, supports 0-10V voltage input or 4–20 mA current input.
	Output terminal	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
Display and 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, input 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 fog, steam, drip or salt.
	Altitude	Lower than 1000 m(Lower the grades when using higher then 1000m)
	Ambient temperature	-10°C ~40°C (Lower the grades if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9m/s^2（0.6g）
	Storage temperature	－20℃~＋60℃

1-2 Description of Name Plate



SX3000-2R2G-4

- 2 - 220V
  4 - 380V
- 2R2 - 2.2kW
- G - Constant torque
  P - Variable torque
- Series VFD

1-3 Selection Guide

Model	Input voltage	Rated output power (KW)	Rated input current(A)	Rated output current (A)	Motor power (KW)
SX3200-0R4G	1PH AC 220V±15%	0.4	5.4	2.1	0.4
SX3200-0R75G		0.75	7.2	3.8	0.75
SX3200-1R5G		1.5	10.0	7.2	1.5
SX3200-2R2G		2.2	16.0	9.0	2.2
SX3400-0R75G	3PH AC 380V±15%	0.75	3.8	2.1	0.75
SX3400-1R5G		1.5	5.0	3.8	1.5
SX3400-2R2G		2.2	5.8	5.1	2.2
SX3400-3R7G-4		4	10.0	9.0	4
SX3400-5R5G/7R5P		5.5/7.5	15.0/20.0	13.0/17.0	5.5/7.5
SX3400-7R5G/11P		7.5/11	20.0/26.0	17.0/25.0	7.5/11
SX3400-11G/15P		11/15	26.0/35.0	25.0/32.0	11/15
SX3400-15G/18.5P		15/18.5	35.0/38.0	32.0/37.0	15/18.5

Chapter 2 Installation and wiring

2-1 2.1Environment 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 specification of environment, protection or fault could lead to the Inverter. SX3000 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)

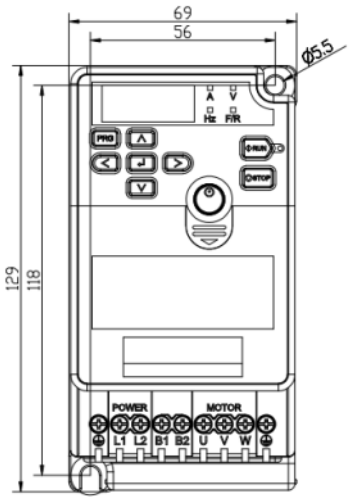
(08) Installed planar solid, no vibration, if it cannot avoid vibration, please add anti-vibration pads to reduce the vibration

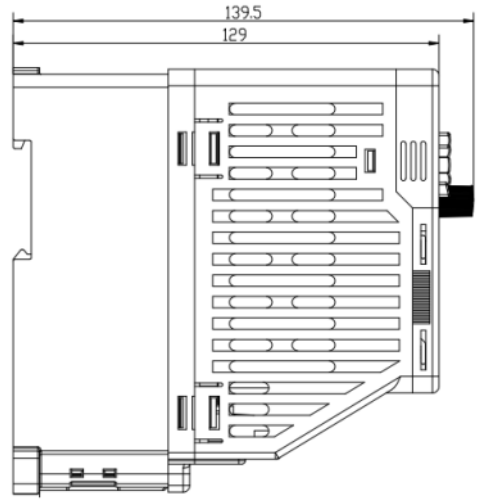
(09) Please install the inverter in the well ventilated place, easy to check and maintain, and install on the solid non-combustible material, away from the heating element (such as braking resistance, etc.)

(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°C.

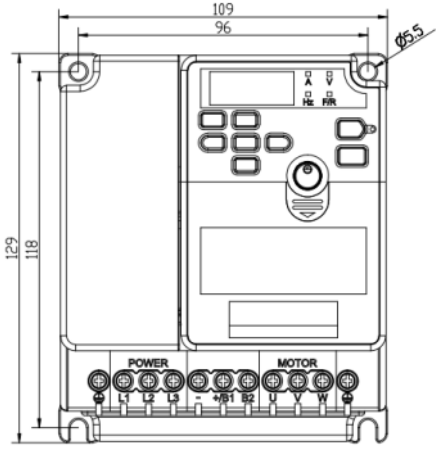
2-1-1 The inverter's outside shape and the installation dimensions

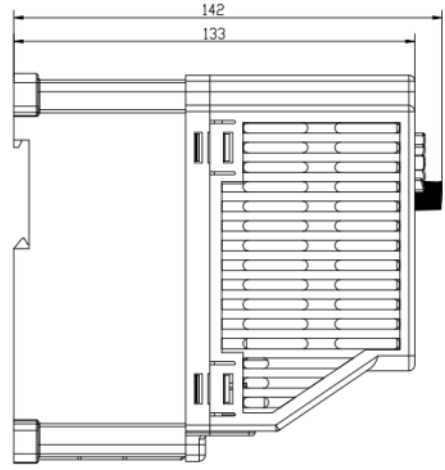
② AC220V 0.4--1.5KW



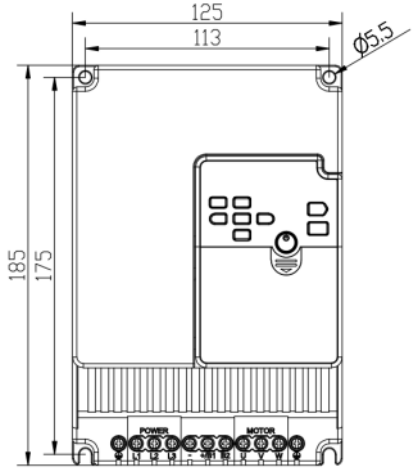


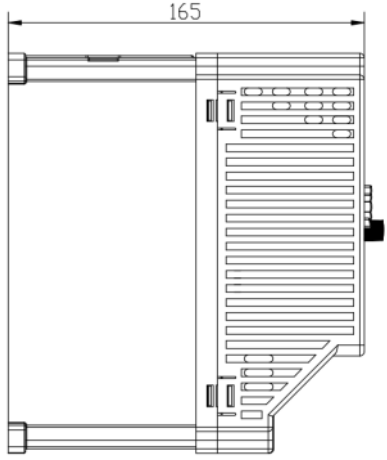
②AC220V 2.2KW & AC380V 0.4—4 KW



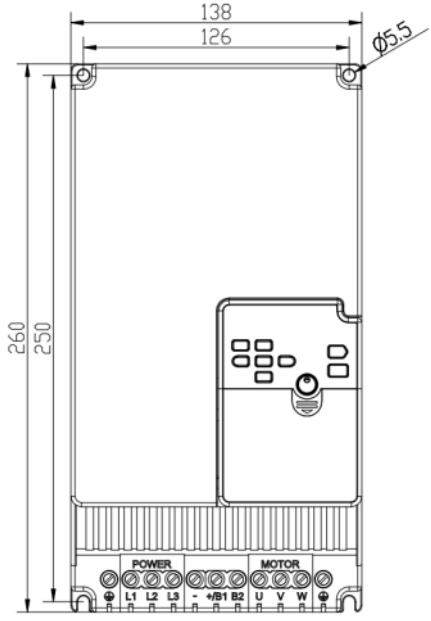


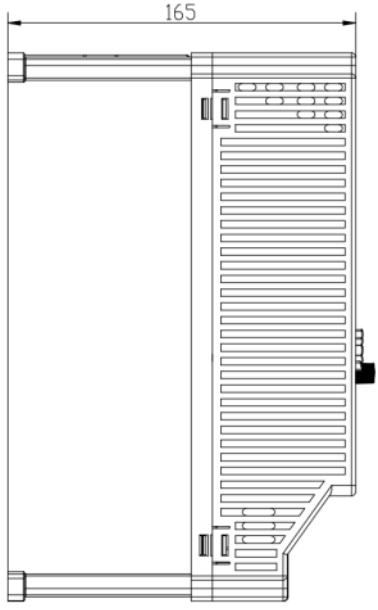
③ AC400V 5.5--7.5KW





④ AC400V 11--15KW





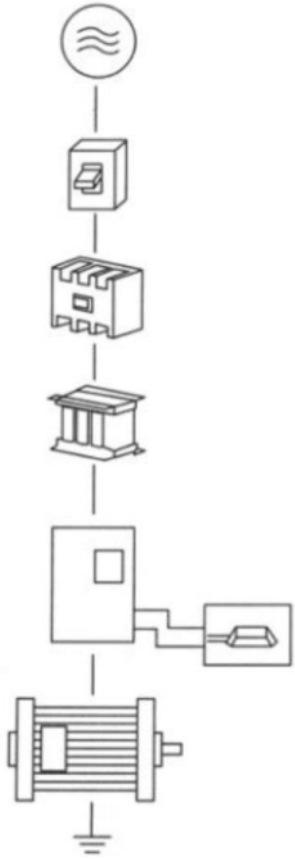
2-2 The opening size of the keyboard:

（1）0.4--3.0KW

（2）

2-3 The Inverter Wiring

2-3-1 The inverter wiring of the main part



Power supply: Use with in the permissible power supply specification of the inverter.

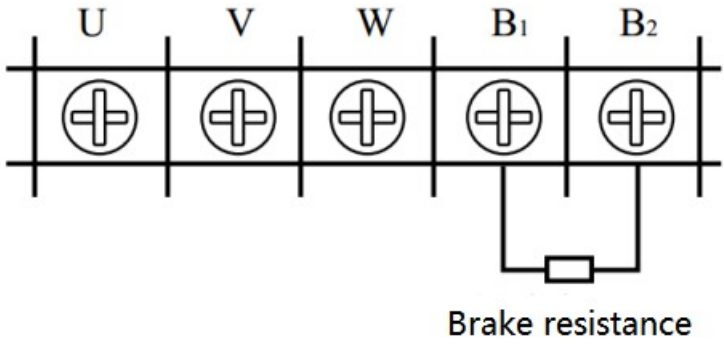
Circuit breaker: No melting wire circuit breaker (MCCB) or leakage circuit break, when the power supply is invested, it contains a large impact current flow into the inverter. Please pay attention to the selection of the circuit breaker.

Contactor: Current contactor (MC), note: please do not use electromagnetic contactor to start and stop the inverter, otherwise it will reduce the life of the inverter.

AC reactor: Optional, inhibit high harmonics and improve power factors, please select suitable reactor.

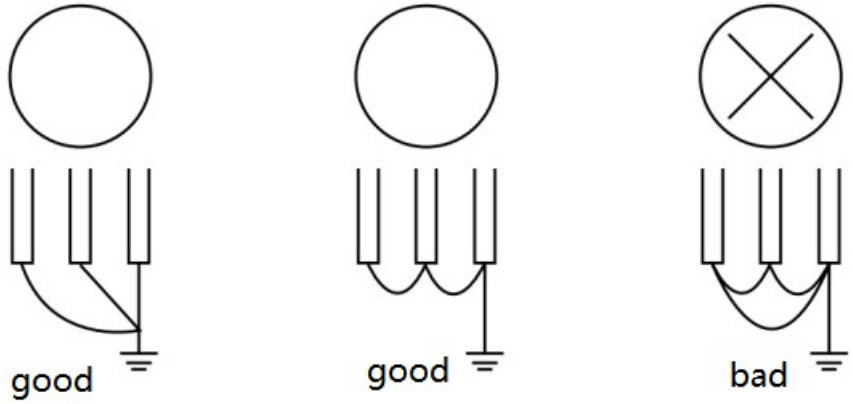
Braking resistor: Can improve the braking capacity of the built -in brake of the inverter.

2-3-2 The descriptions of peripheral devices
(1)AC power
Use with in the permissible power supply specifications of the inverter.
(2)Molded 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 this breaker to separate this inverter from the power supply.
(3)Magnetic contract(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
b:Improve power factor
(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, connect of brake resistor as below:



2-3-3 Precautions main circuit wiring
(I)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 100Ω
(6)Use the shortest earth cable possible.
(7)Many inverters are earthed, pay attention not to cause ground loops. As

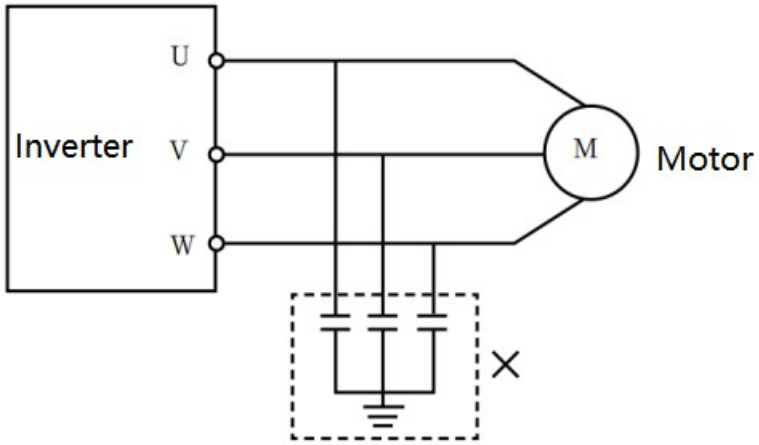
below:



(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 paralleled 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 distance 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 at output side of the inverter.



(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, cause sparks and the short circuit

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

2-3-4 Device recommended specifications

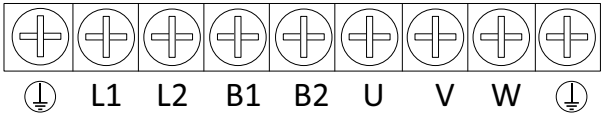
Model	Input voltage	Motor output (KW)	Main Circuit Cable Type (mm^2)	Breaker Selection (A)	Magnetic contractor (A)
SX3200-0R4G	1PH 220V±15%	0.4	0.75	10	9
SX3200-0R75G		0.75	0.75	16	12
SX3200-1R5G		1.5	1.5	25	18
SX3200-2R2G		2.2	2.5	32	25
SX3400-0R75G	3PH 380V±15%	0.75	0.75	6	9
SX3400-1R5G		1.5	0.75	10	9
SX3400-2R2G		2.2	0.75	10	9
SX3400-3R7G		4	1.5	16	12

*The above data are for reference only.

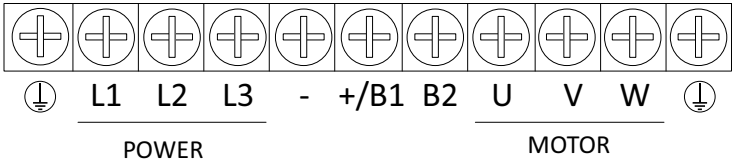
2-3-5 Main circuit terminals and description

1. Main circuit terminal arrangement SX3000 series inverter is as follows:

a.1PH AC 220V 0.4-1.5KW



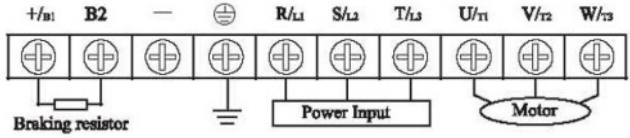
b.3PH AC 380V 0.4 - 4 KW & 1PH AC 230V 2.2KW



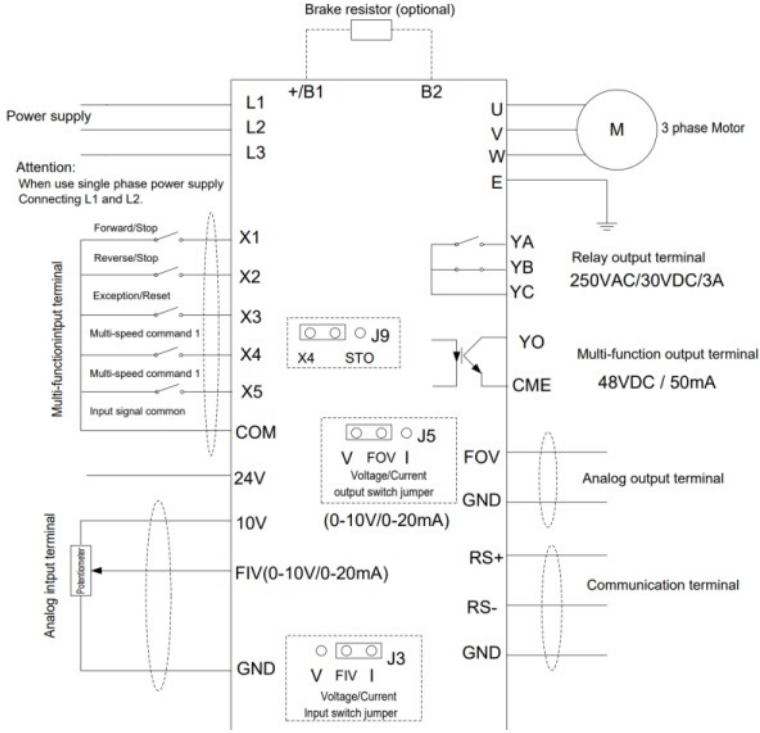
2. Description of main circuit terminals

Terminal name	Description
⏚	Earth(ground)
R/L1 S/L2 T/L3	Power input
U/T1、V/T2、W/T3	Connect a three-phase AC motor.
+/B1、B2	Connect brake resistor
+/B1、-	DC bus terminal, can be connect to brake unit

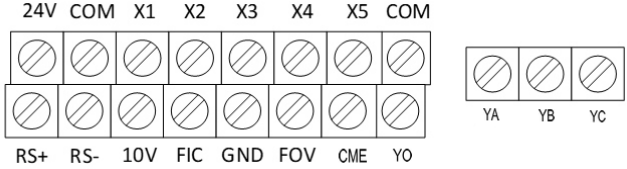
3.Wiring example:



4. The basic wiring diagram



2-4 Control terminal



2-4-1 Control Terminal Description

Terminal name	Function Description	Remarks
X1	Forward command input (multi-function input terminals)	Terminals X1 ~ X5 can be set through parameters P4.00~P4.04 , set the terminal and COM closed effective
X2	Reverse command input (multi-function input terminals)	
X3	Fault reset	
X4	Multi-speed command 1	
X5	Multi-speed command 2（High speed pulse input）	
COM	Digital input common	
FOV	Analog output terminal	0~10V/0~20mA
10V	Frequency setting power	
FIC	Analog input terminal	0~10V/0~20mA
24V	24V auxiliary power	
GND	Input signal common	
CME	Optically coupled output common	
YO	Multifunctional optical coupling output contacts	
YA	Relay output contacts (normally open)	
YB	Relay output contacts (normally closed)	
YC	Relay output contacts RA, RB common	

Control panel switch description:

Switch name	Switch description
J5	V, FOV short for voltage output; I, FOV short for current output
J3	V, FIC short for voltage input; I, FIC short for current input

J9	X4 is standard multi-function input terminal，Enable the STO function on the STO side

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 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 potentiometer, 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.

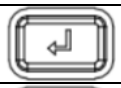
Chapter 3 Operation

3-1 Digital Operator Description

Digital Operator can also be called Panel

3-1-1 The picture of the panel

3-1-2 The descriptions of the key's function

Key	Name	Description
PRG	Programming key	Entry or escape of first-level menu, delete shortcut parameters
	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.
	Left shift key	In parameter setting mode, press this button to select the bit to be modified. In other modes, cyclically displays parameters by left shift
	Right shift key	In parameter setting mode, press this button to select the bit to be modified. In other modes, cyclically displays parameters by right shift
RUN	Run key	Start to run the inverter in keypad control mode
STOP	Stop key/Fault reset key	In running status, restricted by F7.04, can be used to stop the inverter. When fault alarm, can be used to reset the inverter without any restriction.。

3-1-3 Indicator light description:

Indicator light name	Indicator light description
Hz	Frequency unit

A	Current unit
V	Voltage unit
F/R	Light off: forward operation. Light on: reverse operation.

3-2 Operational process

3-2-1Parameter Settings

Three-level menu :

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

Explanation: The three-level menu operation, can press PRG or  to return to the secondary menu. The difference between the two is: press  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.

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 (P4), after fault reset, the inverter is in the standby state. If the inverter is in fault state, the user does not conduct on the fault reset, the inverter is in the running to protect state, inverter can't run.

3-2-3 Motor parameters auto-tuning

1:The dynamic parameter auto-tuning

Choosing no PG vector control operation mode, input motor nameplate parameters must be accurate, inverter will base 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 (P0.02) choice for keyboard commands. Then the actual parameters according to the motor, please input the following parameters.

P1.01: the motor rated power;

P1.02: the motor rated voltage;

P1.03: the motor rated current;

P1.04: the motor rated frequency;

P1.05: the motor rated speed.

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 auto-tuning

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 (P1.01 - P1.05), 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 4 lights are all bright. After the initialization is complete, the drive is in the standby mode.

3-3-2 Standby status

In the stopping or running status, can display a variety of state parameters. select whether to display this parameter 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 descriptions of P1.37 function code.

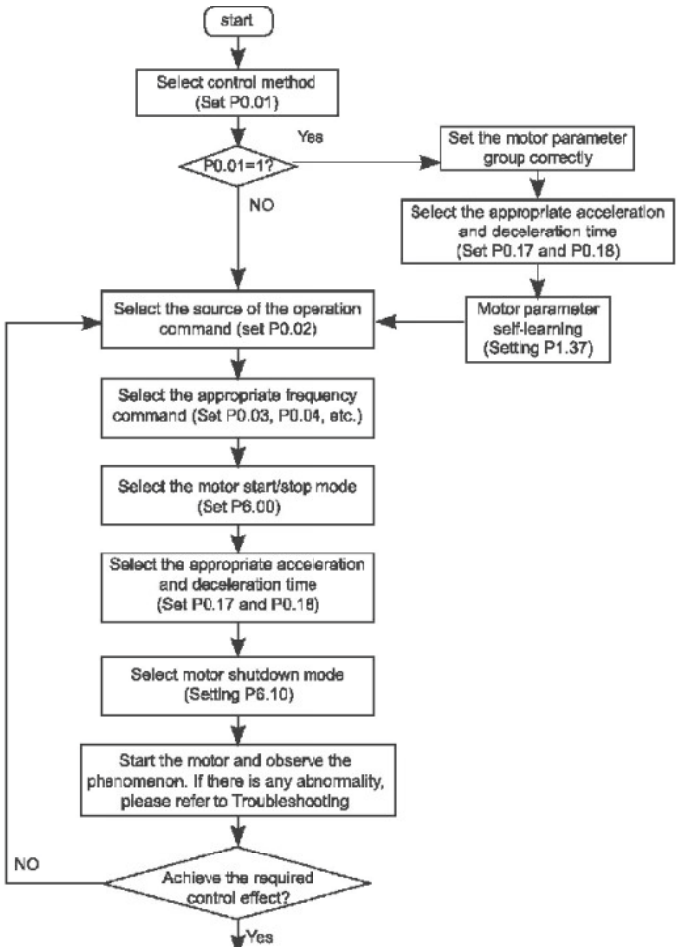
3-3-4 Running

In the running state, a total of 29 status parameters can choose whether to display the status parameters : operating frequency, set frequency, bu s voltage, output voltage, output current, 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 Left/right shift key to switch in order to the selected display parameters.

3-3-5 Failure

SX3000 series offers a variety of fault information, please refer SX3000 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,C 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	Name	Setting range	Default	Property
Group P0 Basic function				
P0.00	G/P type display	1:G type (constant torque load) 2: P type (variable torque load e.g. fan and pump)	Model dependent	●
P0.01	Control mode selection	0: Sensor less flux vector control 1: Closed-loop vector control 2: V/F control	2	★
P0.02	Command source selection	0:Operation panel control (LED off） 1:Terminal control (LED on) 2:Communication control (LED linking)	0	☆
P0.03	Main frequency source X selection	0:Digital setting (P0.10 preset frequency, can modify the UP/DOWN, power lost don't memory) 1:Digital setting (P0.08 preset frequency, can modify the UP/DOWN,	0	★

		power lost memory) 2:FIV 3:FIC 4:Reserved 5:Pulse setting 6:Multistage instruction 7:Simple PLC 8:PID 9:Communications given		
P0.04	Auxiliary frequency source Y selection	The same as P0.03（(Main frequency source X selection）	0	★
P0.05	Auxiliary frequency source superposition Y range selection	0:Relative to the maximum frequency 1:Relative to the main frequency source X	0	☆
P0.06	Auxiliary frequency source superposition Y range	0%~150%	100%	☆
P0.07	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:Both the maximum 3:Both the minimum	00	☆
P0.08	Frequency preset	0.00Hz~maximum frequency（P0.10）	50.00Hz	☆
P0.09	Rotation direction	0:Same direction 1:Reverse direction	0	☆

P0.10	Maximum frequency	50.00Hz~600.00Hz	50.00Hz	★
P0.11	Upper limit frequency source	0:P012 setting 1:FIV 2:FIC 3:Reserved 4:PULSE settings 5:Communication settings	0	★
P0.12	Upper limit frequency	Frequency lower limit P0.14~Maximum frequency P0.10	50.00Hz	☆
P0.13	Upper limit frequency offset	0.00Hz~Maximum frequency P0.10	0.00Hz	☆
P0.14	Frequency lower limit	0.00Hz~Upper limit frequency P0.12	0.00Hz	☆
P0.15	Carrier frequency	0.5kHz~16.0kHz	Model dependent	☆
P0.16	Carrier frequency adjustment with temperature	0:No 1:Yes	1	☆
P0.17	Acceleration time 1	0.00s~65000s	Model dependent	☆
P0.18	Deceleration time1	0.00s~65000s	Model dependent	☆
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 frequencyP0.10	0.00Hz	☆
P0.22	Frequency command resolution	2:0.01Hz	2	★
P0.23	Retentive of digital setting frequency upon power	0:Not retentive 1:Retentive	0	☆
P0.25	Acceleration/ Deceleration time base frequency	0:Maximum frequency（P0.10） 1:Set frequency 2:100Hz	0	★
P0.26	Base frequency for UP/DOWN modification during running	0:Running frequency 1:Set frequency	0	★

P0.27	Binding command source to frequency source	Unit's digit:Binding operation panel command to frequency source 0:No binding 1:Frequency source by digital setting 2:FIV 3:FIC 4:Reserved 5:Pulse setting 6:Multi-Reference 7:Simple PLC 8:PID 9:Communication setting Ten's digit:Binding terminal command to frequency source Hundred's digit:Binding communication command to frequency source	0000	☆
Group P1 Motor parameters				
P1.00	Motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
P1.01	Rated motor power	0.1kW~1000.0kW	Model dependent	★
P1.02	Rated motor voltage	1V~2000V	Model dependent	★
P1.03	Rated motor current	0.01A~655.35A （AC drive power<=55kW） 0.1A~6553.5A （AC drive power>55kW）	Model dependent	★
P1.04	Rated motor frequency	0.01Hz~Maximum frequency	Model dependent	★
P1.05	Rated motor rotational speed	1rpm~65535rpm	Model dependent	★
P1.06	Stator resistance (asynchronous motor)	0.001Ω~65.535Ω （AC drive power<=55kW） 0.0001Ω~6.5535Ω （AC drive power>55kW）	Auto-tuning	★
		0.001Ω~65.535Ω		

P1.07	Rotor resistance (asynchronous motor)	（AC drive power<=55kW）0.0001Ω~6.5535Ω （AC drive power>55kW）	Auto-tuning	★
P1.08	Leakage inductive reactance (asynchronous motor)	0.01mH~655.35mH （AC drive power<=55kW）0.001mH~65.535mH （AC drive power>55kW）	Auto-tuning	★
P1.09	Mutual inductive reactance (asynchronous motor)	0.1mH~6553.5mH （AC drive power<=55kW）0.01mH~655.35mH （AC drive power>55kW）	Auto-tuning	★
P1.10	No-load current (synchronous motor)	0.01A~P1.03（AC drive power<=55kW） 0.1A~P1.03（AC drive power>55kW）	Auto-tuning	★
P1.27	Encoder resolution	1~65535	1024	★
P1.28	Encoder type	0:ABZ incremental encoder 2:Resolver	0	★
P1.30	AB phase sequence of ABZ incremental encoder	0:Forward 1:Reverse	0	★
P1.31	Encoder angle offset	0.0~359.9°	0.0°	★
P1.34	Number of pole pairs of resolver	1~65535	1	★
P1.36	Speed feedback PG disconnection detection time	0.0:No action 0.1s~10.0s	0.0	★
P1.37	Auto-tuning selection	0:No operation 1:Static auto-tuning 2:Dynamic auto-tuning 3:Complete static auto-tuning	0	★
Group P2 Motor vector control parameters				
P2.00	Speed loop proportional gain1	1~100	30	☆
P2.01	Speed loop integral time1	0.01s~10.00s	0.50s	☆
P2.02	Switchover frequency 1	0.00~P2.05	5.00Hz	☆
P2.03	Speed loop proportional gain2	1~100	20	☆

P2.04	Speed loop integral time2	0.01s~10.00s	1.00s	☆
P2.05	Switchover frequency 2	P2.02~Maximum frequency	10.00Hz	☆
P2.06	Vector control slip gain	50%~200%	100%	☆
P2.07	Time constant of speed loop filter	0.000s~0.100s	0.015s	☆
P2.08	Vector control over-excitation gain	0~200	64	☆
P2.09	Torque upper limit source in speed control mode	0:Function code P2.10 setting 1:FIV 2:FIC 3:Reserved 4:Pulse setting 5:Communication setting 6:MIN（FIV,FIC） 7:MAX（FIV,FIC） 1-7's Full Scale to P2.10	0	☆
P2.10	Digital setting of torque upper limit in speed control mode(electrical)	0.0%~200.0%	150.0%	☆
P2.11	Torque upper limit command selection in speed control mode (power generation)	0:Function code P2.10 setting 1:FIV 2:FIC 3:Reserved 4:PULSE setting 5:Communication setting 6:MIN（FIV,FIC） 7:MAX（FIV,FIC） 8:Function code P2.12 setting 1-7's Full Scale to P2.12	0	☆
P2.12	Digital setting of torque upper limit in speed control mode (power generation)	0.0%~200.0%	150.0%	☆
P2.13	Excitation adjustment proportional gain	0~60000	2000	☆
P2.14	Excitation adjustment integral gain	0~60000	1300	☆

P2.15	Torque adjustment proportional gain	0~60000	2000	☆
P2.16	Torque adjustment integral gain	0~60000	1300	☆
P2.17	Speed loop integral property	Unit's digit: integral separation 0:Disabled 1:Enabled	0	☆
P2.21	Maximum torque coefficient of field weakening area	50%~200%	100%	☆
P2.22	Generation power limit enable	0:Disabled 1:Full effect 2:Constant speed effect 3:Deceleration effect	0	☆
P2.23	Generation power upper limit	0.0%~200.0%	Model dependent	☆
Group P3 V/F control parameters				
P3.00	VF 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	★
P3.01	Torque boost	0.0%: （Automatic torque boost） 0.1%~30.0%	Model dependent	☆
P3.02	Cut-off frequency of torque boost	0.00Hz~Maximum frequency	50.00Hz	★
P3.03	Multi-point V/F frequency 1	0.00Hz~P3.05	0.00Hz	★
P3.04	Multi-point V/F voltage 1	0.0%~100.0%	0.0%	★
P3.05	Multi-point V/F frequency 2	P3.03~P3.07	0.00Hz	★
P3.06	Multi-point V/F voltage 2	0.0%~100.0%	0.0%	★
P3.07	Multi-point V/F frequency 3	P3.05~rated motor frequency（P1.04）	0.00Hz	★
P3.08	Multi-point V/F voltage 3	0.0%~100.0%	0.0%	★

P3.09	VF slip compensation gain	0.0%~200.0%	0.0%	☆
P3.10	VF over-excitation gain	0~200	64	☆
P3.11	VF oscillation suppression gain	0~100	Model dependent	☆
P3.13	Voltage source for V/F separation	0:digital setting（P3.14） 1:FIV 2:FIC 3:Reserved 4:PULSE setting 5:Multi-Reference 6:Simple PLC 7: PID 8:Communication setting Note: 100% corresponding to rated motor voltage	0	☆
P3.14	Voltage digital setting for V/F separation	0V~rated motor voltage	0V	☆
P3.15	Voltage acceleration time of V/F separation	0.0s~1000.0s It indicates the time for the voltage accelerate from 0V to rated motor voltage	0.0s	☆
P3.16	Voltage deceleration time of V/F separation	0.0s~1000.0s .It indicates the time for the voltage decelerate from rated motor voltage to 0V	0.0s	☆
P3.17	Stop mode of V/F separation	0:Frequency/voltage independently decrease to 0 1:After voltage decrease to 0, frequency decrease again	0	☆
P3.18	Action current of over current stall	50%~200%	150%	★
P3.19	Over current stall enable	0:Disabled 1: Enabled	1	★
P3.20	Over current stall suppression gain	0~100	20	☆
P3.21	Action current compensation coefficient of multiple over current stall	50%~200%	50%	★

P3.22	Action voltage of over current stall	650.0V~800.0V	770.0V	★
P3.23	Over voltage stall enable	0:Disabled 1:Enabled	1	★
P3.24	Over voltage stall suppression gain	0~100	30	☆
P3.25	Over voltage stall suppression voltage gain	0~100	30	☆
P3.26	Maximum rising frequency limit of over voltage stall	0~50Hz	5Hz	★
Group P4 Input terminals				
P4.00	X1 function selection	0:No function 1:Forward RUN（FWD） 2:Reverse RUN（REV） 3:Three-line control 4:Forward JOG（JOG-F） 5:Reverse JOG（JOG-R） 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	1	★
P4.01	X2 function selection		2	★
P4.02	X3 function selection		9	★
P4.03	X4 function selection		12	★
P4.04	X5 function selection		13	★
P4.05	X6 function selection （Expansion card）		0	★
P4.06	X7 function selection （Expansion card）		0	★
P4.07	Reserved		0	★

		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 29:Torque control prohibited 30:Pulse frequency input（enabled onlyfor X5） 31:Reserved 32:Immediate DC braking 33:Normally closed (NC) input of external fault 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:Reserved 42:Reserved 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		
P4.10	Filter time	0.000s~1.000s	0.010s	☆
P4.11	Terminal command mode	0:Two-line mode 1 1:Two-line mode 2 2:Three-line mode 1 3:Three-line mode 2	0	★
P4.12	Terminal UP/DOWN rate	0.001Hz/s~65.535Hz/s	1.00Hz/s	☆
P4.13	FI curve 1 minimum input	0.00V~P4.15	0.00V	☆
P4.14	Corresponding setting of FI curve 1 minimum input	-100.0%~+100.0%	0.0%	☆
P4.15	FI curve 1 maximum input	P4.13~+10.00V	10.00V	☆
P4.16	Corresponding setting of FI curve 1 maximum input	-100.0%~+100.0%	100.0%	☆
P4.17	FI curve 1 filter time	0.00s~10.00s	0.10s	☆
P4.18	FI curve 2 minimum input	0.00V~P4.20	0.00V	☆
P4.19	Corresponding setting of FI curve 2 minimum input	-100.0%~+100.0%	0.0%	☆
P4.20	FI curve 2 maximum input	P4.18~+10.00V	10.00V	☆
P4.21	Corresponding setting of FI curve 2 maximum input	-100.0%~+100.0%	100.0%	☆
P4.22	FI curve 2 filter time	0.00s~10.00s	0.10s	☆
P4.23	FI curve 3 minimum input	-10.00V~P4.25	-10.00V	☆
P4.24	Corresponding setting of FI curve 3 minimum input	-100.0%~+100.0%	-100.0%	☆
P4.25	FI curve 3 maximum input	P4.23~+10.00V	10.00V	☆
P4.26	Corresponding setting of FI curve 3 maximum input	-100.0%~+100.0%	100.0%	☆
P4.27	FI curve 3 filter time	0.00s~10.00s	0.10s	☆
P4.28	PULSE minimum input	0.00kHz~P4.30	0.00kHz	☆
P4.29	Corresponding setting of pulse minimum input	-100.0%~100.0%	0.0%	☆

P4.30	PULSE maximum input	P4.28~100.00kHz	50.00kHz	☆
P4.31	Corresponding setting of pulse maximum input	-100.0%~100.0%	100.0%	☆
P4.32	PULSE filter time	0.00s~10.00s	0.10s	☆
P4.33	FI curve selection	Unit's digit: FIV curve selection 1:Curve 1（2 points, see P4.13~P4.16） 2:Curve 2（2 points, see P4.18~P4.21） 3:Curve 3（2 points, see P4.23~P4.26） 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: Reserved	321	☆
P4.34	Setting selection for FI less than minimum input	Unit's digit: Setting for FIV less than minimum input 0: Corresponds to the minimum input settings 1:0.0% Ten's digit：Setting selection for FIC less than minimum input（0~1，same as FIV）	000	☆
P4.35	X1 delay time	0.0s~3600.0s	0.0s	★
P4.36	X2 delay time	0.0s~3600.0s	0.0s	★
P4.37	X3 delay time	0.0s~3600.0s	0.0s	★
P4.38	X valid mode selection 1	0:High level valid 1:Low level valid Unit's digit:X1 Ten's digit:X2 Hundred's digit:X3 Thousand's digit:X4 Ten thousand's digit:X5	00000	★
		0:High level valid 1:Low level valid		

P4.39	X valid mode selection 2	Unit's digit:X6(expansion card) Ten's digit:X7(Expansion card) Hundred's digit: Reserved Thousand's digit: Reserved Ten thousand's digit: Reserved	00000	★
Group P5 Output terminals				
P5.00	MO1 terminal output mode selection (expansion card)	0:Pulse output（MO1-COM） 1:Switch signal output（MOA-MOB-MOC）	0	☆
P5.01	MOA-MOB-MOC output function selection(expansion card)	0:No output 1:AC drive running 2:Fault output 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:Setting 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 (relate to run) 19:Under voltage state	0	☆
P5.02	Control board relay function selection（YA-YB-YC）		2	☆
P5.03	Reserved		0	☆
P5.04	YO output function selection		1	☆
P5.05	Reserved		4	☆

		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 detection FDT2 output 26:Frequency 1 reached output 27:Frequency 2 reached output 28:Current 1 reached output 29:Current 2 reached output 30:Timing reached output 31:FIV input limit exceeded 32:Load becoming 0 33:Reverse running 34:Zero current state 35:Module temperature reached 36:Output current limit exceeded 37:Frequency lower limit reached (having output at stop) 38:Alarm output(Keep running) 39:Motor overheat pre-warning 40:Current running time reached 41: Fault output(No output at under voltage)		
P5.06	MO1 output function selection	0:Running frequency 1:Setting frequency 2:Output current 3:Output torque 4:Output power 5:Output voltage	0	☆
P5.07	FOV output function selection		0	☆
P5.08	FOC output function selection		1	☆

		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:Output torque (Actual value, corresponding to motor percentage)		
P5.09	MO1 output Maximum frequency	0.01kHz~100.00kHz	50.00kHz	☆
P5.10	FOV bias coefficient	-100.0%~+100.0%	0.0%	☆
P5.11	FOV gain	-10.00~+10.00	1.00	☆
P5.12	FOC bias coefficient	-100.0%~+100.0%	0.0%	☆
P5.13	FOC gain	-10.00~+10.00	1.00	☆
P5.17	MOA-MOB-MOC output delay time	0.0s~3600.0s	0.0s	☆
P5.18	YA-YB-YC output delay time	0.0s~3600.0s	0.0s	☆
P5.19	Reserved	0.0s~3600.0s	0.0s	☆
P5.20	Reserved	0.0s~3600.0s	0.0s	☆
P5.21	Reserved	0.0s~3600.0s	0.0s	☆
P5.22	Output terminal valid mode selection	0:Positive logic 1:Negative logic Unit's digit:MOA-MOB-MOC Ten's digit:YA-YB-YC Hundred's digit: Reserved	00000	☆
Group P6 Start/Stop				
P6.00	Start mode	0:Direct start 1:Rotational speed tracking restart 2:Pre-excited start	0	☆

		(asynchronous motor) 3: SVC quick start		
P6.01	Rotational speed tracking mode	0:From frequency at stop 1:From zero speed 2:From maximum frequency	0	★
P6.02	Rotational speed tracking speed	1~100	20	☆
P6.03	Startup frequency	0.00Hz~10.00Hz	0.00Hz	☆
P6.04	Startup frequency holding time	0.0s~100.0s	0.0s	★
P6.05	Startup DC braking current/ Pre-excited current	0%~100%	0%	★
P6.06	Startup DC braking time/Pre-excited time	0.0s~100.0s	0.0s	★
P6.07	Acceleration/ Deceleration mode	0:Linear acceleration/deceleration 1:S-curve acceleration/deceleration A 2:Dynamic S-curve acceleration/deceleration B	0	★
P6.08	Time proportion of S-curve start	0.0%~（100.0%-P6.09）	30.0%	★
P6.09	Time proportion of S-curve end	0.0%~（100.0%-P6.08）	30.0%	★
P6.10	Stop mode	0:Decelerate to stop 1:Coast to stop	0	☆
P6.11	Initial frequency of stop DC braking	0.00Hz~Maximum frequency	0.00Hz	☆
P6.12	Waiting time of stop DC braking	0.0s~100.0s	0.0s	☆
P6.13	Stop DC braking current	0%~100%	0%	☆
P6.14	Stop DC braking time	0.0s~100.0s	0.0s	☆
P6.15	Brake use ratio	0%~100%	100%	☆
P6.18	Speed tracking current	30%~200%	Model dependent	★
P6.21	Demagnetization time (SVC valid)	0.00~5.00s	Model dependent	☆
P6.23	Overexcitation selection	0:Invalid 1:Only valid when deceleration	0	☆

		2:Valid		
P6.24	Overexcitation suppression current value	0~150%	100%	☆
P6.25	Overexcitation gain	1.00~2.50	1.25	☆
Group P7: Operation Panel and Display				
P7.01	JOG function parameters	0:No function 1:Switchover between operation panel control and remote command control. If current command source is operation panel, the key is invalid 2:Switchover between forward rotation and reverse rotation, the function only valid when command source is operation panel 3:Forward JOG through operation panel（JOG-FWD） 4:Reserve JOG through operation panel（JOG-REV）	0	★
P7.02	STOP/RESET 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: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09:FIV voltage (V)	1F	☆

		Bit10: FIC voltage (V) Bit11: Reserved Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting		
P7.04	LED display running parameters 2	0000–FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Pulse input 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: Motor rotation speed Bit09: Current power-on time(Hour) Bit10: Current running time (Min) Bit11: Pulse input frequency (KHz) Bit12: Communication setting value Bit13: Encoder feedback speed 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:DI input status Bit03: DO output status Bit04: FIV voltage (V) Bit05: FIC voltage (V) Bit06: Reserved	33	☆

		Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: Pulse setting frequency (kHz)		
P7.06	Load speed display coefficient	0.0001~6.5000	1.0000	☆
P7.07	Heatsink temperature of inverter	0.0℃~120.0℃	-	●
P7.08	Rectifier bridge radiator temperature	0.0℃～120.0℃	-	●
P7.09	Total running time	0h～65535h	-	●
P7.10	Performance software version	-	-	●
P7.11	Functional software version	-	-	●
P7.12	Load speed displays decimal places	0：0 decimal places 1：1 decimal places 2：2 decimal places 3：3 decimal places	1	☆
P7.13	Total power-on time	0h～65535h	-	●
P7.14	Total 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	0.00s~65000s	Model dependent	☆
P8.04	Deceleration time 2	0.0s~65000s	Model dependent	☆
P8.05	Acceleration time 3	0.0s~65000s	Model dependent	☆
P8.06	Deceleration time 3	0.0s~65000s	Model dependent	☆
P8.07	Acceleration time 4	0.0s~65000s	Model dependent	☆
P8.08	Deceleration time 4	0.0s~65000s	Model dependent	☆

P8.09	Jump frequency 1	0.00Hz~Maximum frequency	1.00Hz	☆
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 lower 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 reaching detection value 1	0.00Hz~Maximum frequency	50.00Hz	☆
P8.31	Any frequency reaching detection amplitude 1	0.0%~100.0%（Maximum frequency）	0.0%	☆
P8.32	Any frequency reaching 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 tim	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	☆
P8.38	Any current reaching 1	0.0%~300.0%（rated motor current）	100.0%	☆
P8.39	Any current reaching 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 selection	0:Disabled 1:Enabled	0	☆
P8.43	Timing duration source	0:P8.44 setting 1:FIV 2:FIC 3:Reserved 100% of analog input corresponds to the value of P8.44	0	☆
P8.44	Timing duration source	0.0Min~6500.0Min	0.0Min	☆
P8.45	FIV input voltage lower limit	0.00V~P8.46	3.10V	☆
P8.46	FIV input voltage upper limit protection value	P8.45~10.00V	6.80V	☆
P8.47	Module temperature	0℃~100℃	75℃	☆

	threshold			
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 （P0.10）	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 setting	0.0Min~6500.0Min	0.0Min	☆
P8.54	Output power correction coefficient	0~200%	100%	☆
P8.55	Rapid deceleration time	0~6553.5s	Model dependent	☆
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 coefficient	50%~100%	80%	☆
P9.03	Over-voltage stall gain	0~100	30	☆
P9.04	Over-voltage stall protective voltage	120%~150%	130%	☆
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	MO1 action during fault auto reset	0:No action 1:Action	0	☆
P9.11	Time interval of fault auto reset	0.1s~100.0s	1.0s	☆
P9.12	Input phase loss/contactor suction protection selection	Unit's digit: Input phase loss protection selection Unit's digit: Contactor suction protection selection 0:Disabled 1:Enabled	11	☆
P9.13	Output phase loss	0:Disabled	1	☆

	protection selection	1:Enabled Unit's digit: Output phase loss protection selection Ten's digit: Output phase loss protection before running		
P9.14	1st fault type	0: No fault 1: Reserved 2: Over-current during acceleration 3: Over-current during deceleration 4: Over-current at constant speed 5: Over-voltage during acceleration 6: Over-voltage during deceleration 7: Over-voltage at constant speed 8: Snubber resistor overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Input phase loss		●
P9.15	2nd fault type	25:Reserved 13: Output phase loss 14: Module overheat 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder/PG card fault 21: Parameters read-write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25: Reserved	—	●
		26:Accumulative running time reached 27: Reserved		

P9.16	3rd (latest) fault type	28: Reserved 29: Accumulative power-on time reached 30: Load becoming 0 31: PID feedback lost during running 40: Rapid limit overtime 41: Switch motor during running 42: Speed deviation too large 43: Motor over speed 45: Reserved	—	●
Group PA PID function				
PA.00	PID setting source	0:PA.01 1:FIV 2:FIC 3:Reserved 4:PULSE setting 5:Communication setting 6:Multi-reference	0	☆
PA.01	PID digital setting	0.0%~100.0%	50.0%	☆
PA.02	PID feedback source	0:FIV 1:FIC 2:Reserved 3:FIV-FIC 4:PULSE setting 5:Communication setting 6:FIV+FIC 7:MAX（|FIV|, |FIC|） 8:MIN（|FIV|, |FIC|）	0	☆
PA.03	PID action direction	0:Forward action 1:Reverse action	0	☆
PA.04	PID setting feedback range	0~65535	1000	☆
PA.05	Proportional 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	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	Proportional gain KP1	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 X 2:Automatic switchover based on deviation 3: Automatic switchover based on running frequency	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.25	PID integral 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 stop operation	0:No PID operation at stop 1:PID operation at stop	0	☆
Group PC Multi-Reference and Simple PLC Function				
PC.00	Multi-Reference0	-100.0%~100.0%	0.0%	☆

PC.01	Multi-Reference1	-100.0%~100.0%	0.0%	☆
PC.02	Multi-Reference2	-100.0%~100.0%	0.0%	☆
PC.03	Multi-Reference3	-100.0%~100.0%	0.0%	☆
PC.04	Multi-Reference4	-100.0%~100.0%	0.0%	☆
PC.05	Multi-Reference5	-100.0%~100.0%	0.0%	☆
PC.06	Multi-Reference6	-100.0%~100.0%	0.0%	☆
PC.07	Multi-Reference7	-100.0%~100.0%	0.0%	☆
PC.08	Multi-Reference8	-100.0%~100.0%	0.0%	☆
PC.09	Multi-Reference9	-100.0%~100.0%	0.0%	☆
PC.10	Multi-Reference10	-100.0%~100.0%	0.0%	☆
PC.11	Multi-Reference11	-100.0%~100.0%	0.0%	☆
PC.12	Multi-Reference12	-100.0%~100.0%	0.0%	☆
PC.13	Multi-Reference13	-100.0%~100.0%	0.0%	☆
PC.14	Multi-Reference14	-100.0%~100.0%	0.0%	☆
PC.15	Multi-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 selection 0:No 1:Yes Ten's digit: Retentive upon stop selection 0:No 1:Yes	00	☆
PC.18	Running time of simple PLC reference 0	0.0s（h）~6500.0s（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）~6500.0s（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	0.0s（h）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（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）~6500.0s（h）	0.0s（h）	☆

PC.39	Acceleration/deceleration time of simple PLC reference 10	0~3	0	☆
PC.40	PLC 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	Multi-Reference 0 setting mode	0:Set by PC.00 1:FIV 2:FIC 3:Reserved 4:PULSE 5:PID 6:Preset frequency（P0.08）setting，UP/DOWN can be modified	0	☆
Group Pd Communication parameters				
		个位:MODBUS		

PD.00	Baud rate	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（8-N-2） 1:Even parity check（8-E-1） 2:Odd Parity check（8-O-1） 3:8-N-1	3	☆
PD.02	Local address	1~247	1	☆
PD.03	Response delay	0ms~20ms	2	☆
PD.04	Communication timeout	0.0（invalid），0.1s~60.0s	0.0	☆
PD.05	Data transfer format selection	Unit's digit: MODBUS 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 PP User-Defined Function Codes				
PP.00	User password	0~65535	0	☆
PP.01	Parameter Initialization	0:No operation 01:Restore factory settings except motor 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 selection in torque control	0:Digital setting（C0.03） 1:FIV 2:FIC	0	★

		3:Reserved 4:PULSE 5:Communication setting 6:MIN（FIV,FIC） 7:MAX（FIV,FIC） （Full Scale 1-7 options, corresponding C0.03 digital set）		
C0.03	Torque digital setting in torque control	-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 control	0.00Hz~Maximum frequency	50.00Hz	☆
C0.07	Acceleration time in torque control	0.00s~65000s	0.00s	☆
C0.08	Deceleration time in torque control	0.00s~65000s	0.00s	☆
Group C5 Control Optimization Parameters				
C5.00	DPWM switchover frequency upper limit	0.00Hz~Maximum frequency	8.00Hz	☆
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	1	☆
C5.03	Random PWM depth	0:Random PWM invalid 1~10:PWM carrier frequency random depth	0	☆
C5.04	Rapid current limit enable	0:Disabled 1:Enabled	1	☆
C5.05	Voltage overmodulation coefficient	100~110	105	☆
C5.06	Under voltage threshold setting	210~420	350	☆
C5.08	Dead zone time adjustment	100%~200%	150%	☆
C5.09	Over voltage threshold setting	200.0V~2500.0V	Model dependent	

Monitoring Parameters:

Function code	Parameter name	Unit
Group D0 Monitoring parameters		
D0.00	Running frequency（Hz）	0.01Hz
D0.01	Set frequency（Hz）	0.01Hz
D0.02	Bus voltage（V）	0.1V
D0.03	Output voltage（V）	1V
D0.04	Output current（A）	0.01A
D0.05	Output power（kW）	0.1kW
D0.06	Output torque（%）	0.1%
D0.07	DI input state	1
D0.08	DO 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 value	1
D0.14	Load speed display	1
D0.15	PID setting	1
D0.16	PID feedback	1
D0.17	PLC stage	1
D0.18	Input pulse frequency（kHz）	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	Current power on time	1Min
D0.26	Current running time	0.1Min
D0.27	Input pulse frequency	1Hz
D0.28	Communication setting	0.01%
D0.29	Reserved	
D0.30	Reserved	
D0.31	Auxiliary frequency Y display	0.01Hz
D0.32	View any memory address values	1

D0.33	Reserved	
D0.34	Motor temperature value	1℃
D0.35	Target torque （%）	0.1%
D0.36	Reserved	1
D0.37	Power factor angle	0.1°
D0.38	Reserved	1
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	Fault information	0
D0.58	Z signal counter	1
D0.59	Setting frequency（%）	0.01%
D0.60	Running frequency（%）	0.01%
D0.61	AC drive state	1
D0.74	AC drive output torque	0.1

Chapter 5 Fault checking and ruled out

5-1 Fault alarm and countermeasures

SX3000 inverter with kinds of warning information and the protection function, once the failure, protection function action, inverter will stop output, and fault relay contact action, and display the fault code shown on the panel. The user can check according to the tips before seeking service, analyze the cause of the problem, find out the solution. If it is belong to the dotted line frame stated reason, please seek service ,with your purchased inverter agents or direct contact with our company.

Warning information OUOC is over current or over voltage signals for hardware, in most cases the hardware over voltage fault cause OUOC alarm.

Fault Name	Display of Panel	Possible Causes	Solutions
Inverter unit protection	OC	1: The output circuit short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5:The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty	1:Eliminate external faults. 2: Install a reactor or an output filter. 3:Check the air filter and the cooling fan. 4:Connect all cables properly. 5:Looking for technical support 6:Looking for technical support 7:Looking for technical support

Over-current during acceleration	oc1	1: The output circuit is grounded or short circuited. 2: Control mode is vector control, Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning . 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.
Over-current during acceleration	oc2	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.

Over-current at constant speed	OC3	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Over-voltage during acceleration	OU1	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
Over-voltage during deceleration	OU2	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 4: Install the braking unit and braking resistor.
Over-voltage at constant speed	OU3	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.

Control power supply fault	POF	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
Lack of voltage	LU	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are abnormal. 5: The drive board is abnormal. 6: The main control board is abnormal.	1: Reset the fault. 2: Adjust the voltage to normal range. 3,4,5,6:Looking for technical support
AC drive overload	OL2	1: The load is too heavy or motor-stalled occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2:Select an AC drive of higher power class.
Motor overload	OL1	1: P9.01 is set improperly. 2: The load is too heavy or motor-stalled occurs on the motor. 3: The AC drive model is of too small power class.	1:Set P9.01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3:Select an AC drive of higher power class.

Input phase loss	Li	1. Three phase input power is abnormal 2. Drive board is abnormal 3. Lightning protection board is abnormal 4. Main control board is abnormal	1:Check the wiring 2,3,4 Looking for technical support
Power output phase loss	LO	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase output is unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1:Eliminate external faults. 2:Check whether the motor three-phase winding is normal. 3:Looking for technical support .
Module overheat	OH	1: The ambient temperature is too high.. 2: The air filter is blocked. 3: The fan is damaged. 4:The thermally sensitive resistor of the module is damaged. 5:The inverter module is damaged.	1:Lower the ambient temperature. 2:Clean the air filter. 3:Replace the damaged fan. 4:Replace the damaged thermally sensitive resistor. 5:Replace the inverter module.
External equipment fault	EF	1: External fault signal is input via S.	Reset the operation.

Communication fault	CE	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: The communication parameters in group PD are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set the communication parameters properly.
Contactor fault	rAY	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty Contactor.
Current detection fault	IE	1: The HALL device is faulty. 2: The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.
Motor auto-tuning fault	TE	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
EEPROM read-write fault	EEP	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	OUOC	1: Over-voltage exists. 2: Over-current exists.	1: Handle based on over-voltage. 2: Handle based on over-current.

Short circuit to ground fault	GND	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	END1	The accumulative running time reaches the setting value.	Clear the record through The parameter initialization function.
Accumulative power-on time reached	END2	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	LOAD	The AC drive running current is lower than P9.64.	Check that the load is disconnected or the setting of P9.64 and P9.65 is correct.
PID feedback lost during running fault	PIDE	The PID feedback is lower than the setting of PA.26.	Check the PID feedback signal or set PA.26 to a proper value.
Pulse-by-pulse current limit fault	CBC	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Too large speed deviation fault	ESP	1: No parameters identification 2:Parameters of too large speed deviation P9.69 and P9.70 are set incorrectly.	1: Motor parameters identify

Motor over-speed fault	OSP	1: No parameters identification	1: Motor parameters identify

6.2 Common Faults and Solutions

You may come across the following faults during the use of the AC drive. Refer to the following table for simple fault analysis.

Troubleshooting to common faults of the AC drive

SN	Fault	Possible Causes	Solutions
1	There is no display when the power is on	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is Faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the operation panel breaks.	1: Check the power supply. 2: Check the bus voltage. 3:Looking for technical support
2	“2000” is displayed when the power is on	1: The cable between the drive board and the control board is in poor contact. 2: Related components on the control board are damaged. 3: The motor or the motor cable is short circuited to the ground. 4: The HALL device is faulty. 5: The power input to the AC drive is too low.	Looking for technical support

3	"GND" is displayed when power on	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable with a meter. 2: Looking for technical support
4	The AC drive display is normal when the power is on. But "2000" is displayed after running and stops immediately.	1:The cooling fan is damaged or locked-rotor occurs. 2: The external control terminal cable is short circuited.	1: Replace the damaged fan. 2: Eliminate external faults.
5	OH (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked. 3: Components inside the AC drive are damaged (thermal coupler or others).	1: Reduce the carrier frequency (P0.17). 2: Replace the fan and clean the air filter. 3: Looking for technical support
6	The motor does not rotate after the AC drive runs.	1: Check the motor and the motor Cables. 2: The AC drive parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the AC drive and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and reset motor parameters.

7	The S terminals are disabled.	1: The parameters are set incorrectly. 2: The external signal is incorrect 3: The jumper bar across OP and +24 V becomes loose. 4: The control board is faulty.	1: Check and reset the parameters in group P5. 2: Re-connect the external signal cables. 3: Re-confirm the jumper bar across OP and +24 V. 4:Looking for technical support
8	Reserved		
9	The AC drive reports Over-current and over-voltage frequently.	1: The motor parameters are set improperly. 2: The acceleration/deceleration time is improper. 3: The load fluctuates.	1:Reset motor parameters or re-perform the motor auto-tuning . 2: Set proper acceleration/ deceleration time. 3: Looking for technical support
10	RAY is reported when the power is or the AC drive is running.	The soft startup contactor is not picked up.	1: Check whether the contactor cable is loose. 2: Check whether the contactor is faulty. 3: Check whether 24 V power supply of the contactor is faulty. 4: Looking for technical support

Appendix SX3000 Modbus communication protocol

SX3000 series inverter provides 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 frequency converter running commands, modify or read function code parameters, read the inverter working condition and fault information, etc.

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.

2、Application methods

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

3、Bus structure

（1） The interface way 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.

4、Protocol Description

SX3000series 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 NZ2000 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 a information (called response), for radio host information, from the machine without feedback response to the host.

5、Communications data structure

Communication data structure SX3000 series frequency converter 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 most easy to implement. 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 time frame 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:

<table>
<tr><td>The frame header START</td><td>3.5 characters</td></tr>
<tr><td>Slave address ADR</td><td>Communication address:1~247</td></tr>
<tr><td>command code CMD</td><td>03:Read the machine parameters;06:write the machine parameters</td></tr>
<tr><td>Date content DATA（N-1）</td><td rowspan="4">Information content: Function code parameter address, function code number of parameters, function code parameter values, etc</td></tr>
<tr><td>Data content DATA（N-2）</td></tr>
<tr><td>…….</td></tr>
<tr><td>Data contentDATA0</td></tr>
</table>

high-order position of CRC CHK	estimated value: CRC value
low-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
low-order position of the starting address	05H
high-order position of register	00H
low-order position of register	02H
low-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
Low-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	01H

F003H	
Low-order position of CRC CHK	Wait to calculate the CRC CHK value
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 value
High -order position of CRC CHK	

The command code :06H write a word (word) for example, write 000(BB8H) to machine
Address 05H frequency converter's F00AH address
The host command information

ADR	05H
CMD	06H
High-order position of data address	F0H
Low-order position of data address	0AH
High-order position of information content	0BH
Low-order position of information content	B8H
Low-order position of CRC CHK	Wait to calculate the CRC CHK value
High-order position of CRC CHK	

In response to information from the slave machine

ADR	02H
CMD	06H
High-order position of data address	F0H
Low-order position of data address	0AH
High-order position of information content	13H
Low-order position of information content	88H
Low-order position of CRC CHK	Wait to calculate the CRC CHK value
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 0xFFFF,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 8CRC 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=0xffff;
    while(data_length--)
{
crc_value^=*data_value++;
    for(i=0;i<8;i++)
    {
If(crc_value&0x0001)
crc_value=(crc_value>>1)^0xa001;
            else
crc_value=crc_value>>1;
        }
    }
Return(crc_value);
}
```

Address definition of communication parameters

This 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 can not 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）、A0~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 converter is in operation, do not change; Some parameters of the frequency converter 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.

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	Output current
1005	Output current
1006	Output torque
1007	Running velocity
1008	S input flag
1009	MO1 output flag
100A	FIV voltage
100B	FIC voltage
100C	Reserved
100D	Count value input
100E	The length of the input
100F	The load speed
1010	PID setting
1011	PID feedback
1012	PLC steps
1013	PULSE input pulse frequency,unit：0.01kHz
1014	Reserved
1015	The remaining running time
1016	FIV voltage before correction
1017	FIC voltage before correction
1018	Reserved

1019	Linear velocity
101A	Current power on time
101B	Current running time
101C	PULSE input pulse frequency, unit: 1Hz
101D	Communication setting value
101E	Reserved
101F	The main frequency X display
1020	The auxiliary frequency Y display

Attention:
Communication setting value is relative percentage, 10000 corresponds to 100.00% and - 10000-100.00%.The frequency of dimensional data, the percentage is relative to the percentage of maximum frequency (P0.10);Counter rotating torque dimensional data, the percentage is P2.10.
Control command input to the inverter:(write-only)

The command word address	Command function
2000	0001: Forward running
	0002:Reserve running
	0003:Forward JOG
	0004:Reserve JOG
	0005:Coast to stop
	0006:Deceleration to stop
	0007:Fault reset

Read the inverter state (read-only)

The command word address	Command function
3000	0001:Forward running
	0002:Reverse running
	0003:Stop

Parameter lock password check: (if return to 888H, it indicates that the password check through)

Password address	The content of the input password
1F00	*****

Command address	Command content
2001	BIT0:（Reserved） BIT1:（Reserved） BIT2:RA-RB-RC output control BIT3:Reserved BIT4:YOR output torque

Analog output FOV control: (write-only)

Command address	Command content
2002	0~7FFF represent 0％~100％

Analog output FOC control:（write-only）

Command address	Command content
2003	0~7FFF represent 0％~100％

Pulse output control:（write-only）

Command address	Command content
2004	0~7FFF represent 0％~100％

Frequency converter fault description

Fault address	Fault information
8000	0000:No fault 0001:Inverter unit protection 0002:Over current during acceleration 0003:Over current during deceleration 0004:Over current at constant speed 0005:Over-voltage during acceleration 0006:Over-voltage during deceleration 0007:Over-voltage at constant speed 0008:Control power fault 0009:Undervoltage 000A:AC drive overload 000B:Motor overload 000C:Reserved 000D:Power output phase loss 000E:Module overheat 000F:External equipment fault 0010:Communication fault 0011:Contactor fault 0012:Current detection fault 0013:Motor auto-tuning fault 0014:Reserved 0015:Parameters read-write error 0016:AC drive hardware fault 0017:Motor short circuit to ground 0018:Reserved 0019:Reserved 001A:Running time reached

	001B: Reserved 001C: Reserved 001D: Power-on time reached 001E: Load becoming 0 001F:PID feedback lost during running 0028:Rapid limit overtime 0029:Switchover motor during running 002A: Speed deviation too large 002B:Motor over speed 002D:Motor over temperature 005A:The number of Encoder lines set incorrect 005B:Do not connect encoder 005C:Initial position fault 005E:Speed feedback error

Communication fault address	Fault function information
8001	0000:No fault 0001:Password mistake 0002:Command code error 0003:CRC check error 0004:Invalid address 0005:Invalid parameter 0006:Correcting parameter invalid 0007:System is locked 0008:Under EEPROM operation

Group PD Communication parameters display

PD.00	Baud rate	Default	0005
	Setting range	Unit's digit: MODUBS baud rate 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	

This parameter is used to set data transfer rate between the PC and inverter. Notice: Setting the baud rate of upper machine and inverter must be corresponding. Otherwise, the communication can't carry on. The larger the baud rate, the faster the communication.

PD.01	The data format	Default	0
	Setting range	0:No check: data format <8,N,2> 1:Even-parity:data format <8,E,1> 2:Odd-parity:data format <8,O,1> 3:No check: data format <8,N,1>	

PC and data format must be set corresponding, otherwise, communication can't carry on.

PD.02	Machine address	Default	1
	Setting range	1~247，0 is the broadcast address	

When the machine address set to 0, it is broadcast address, realize PC broadcasting functions,

The machine address has uniqueness (except the broadcast address), which is to achieve the basis of the upper machine and inverter peer to peer communications.

PD.03	Response delay	Default	2ms
	Setting range	0~20ms	

Response delay: refers to the frequency converter data to accept the end up to a upper machine to send data n the middle of the interval of time. If the response time delay is less than the system processing time, the response time delay will be subject to system processing time. Such as, response time delay is longer than system after processing the data, the system will delay waiting, until the response delay time is up to a upper machine to send data

PD.04	Communication timeout	Default	0.0 s
	Setting range	0.0 s（invalid） 0.1~60.0s	

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

When the function code set to valid values, if a communication and interval time of the next communication beyond the communication timeout, system will be submitted to the communication fault error(CE). Usually, it is set to invalid. If in the continuous communication system, set the second parameter, it can monitor the communication status

PD.05	Communication protocol selection	Default	0
	Setting range	0:Nonstandard Modbus protocol 1:Standard Modbus protocol	

PD.05=1:Select standard Modbus protocol.

PD.05=0:When reading a command, the number of bytes returned by the slave is one byte more than the standard Modbus protocol. For details,

refer to the "Communication Data Structure" part of this protocol.

PD.06	Read the current resolution	Default	0
	Setting range	0:0.01A 1:0.1A	

Use to determine the communication while reading the output current, current value of the output units.