Operation manual of AS-M210 series general-purposed vector low power inverter

Publishing status: standard
Product version:V1.00

Preface

Thank you very much for buying STEP inverter. In order to ensure the correct installation and use, please read this operation manual carefully, and use the product after understanding the safety precautions of the product. The operation should be operated by a professional electrical engineer.

Shanghai Sigriner STEP Electric Co., Ltd. (hereinafter referred to as STEP) has checked the content of this manual for consistency with the hardware and software described. However, there are still possible mistakes that cannot guarantee complete consistency. We will regularly review the contents covered in this manual and make any necessary amendment in future revisions. We welcome your suggestions for improvement. This manual will be supplemented and modified. Keep an eye on STEP's website for the updated one. For any question or problem while read this manual, please contact STEP according to the address and service hotline at the end of this manual.

Scan the code to download the product operation manual

Warranty period The warranty period of the product is 18 months from the date when the product leaves the factory.

Fault diagnosis In principle, the initial fault diagnosis is implemented by the user. However, at the request of the user, STEP may provide a paid service. At this time, according to the negotiation results with the user, STEP will provide free service if it is responsible for the fault.

Fault repair In case of any failure requiring repair and product replacement, STEP may send personnel to provide free door-to-door service. However, the following cases are the charging services:

1. Where a fault occurs due to improper storage, use, or design by the user or customer.
2. Where a fault occurs due to private remoulding of STEP product by the user without STEP' s knowledge.
3. Where a fault occurs due to use beyond the specification range of STEP products.
4. Where a fault occurs due to natural disasters, fire etc.
5. Other cases where the fault is not caused by the STEP' s responsibility.

Beyond warranty

Any inconvenience caused to users and customers or damage to non-STEP products due to the faults of STEP products, whether or not within the warranty period, shall not be covered by STEP warranty. STEP is not liable for joint and several losses.

Description of safety-related signs

When used incorrectly, it may cause a dangerous, possibly resulting in personal injury or death.

When used incorrectly, it may cause a dangerous, which may result in minor or severe personal injury and equipment damage.

"**Important**" indicates the section to be complied with and focused by the user.

(Customer service center) Service hotline:400-821-0325

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CATALOG

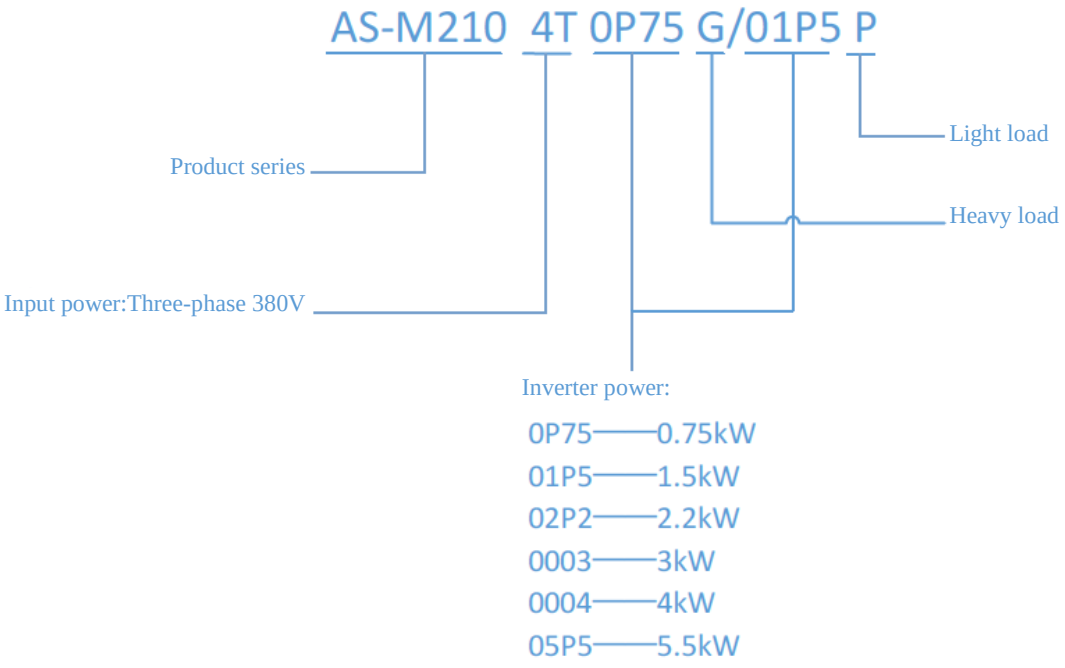
Chapter 1- Inverter Installation

Please carefully confirm when unpacking: Whether there is any damage during transportation; whether the model and specifications of the nameplate of the machine are consistent with the order requirements. If you find that the model does not match or the device is missing, please contact the manufacturer or supplier as soon as possible. For inverters stored for more than 1 year, the power supply should be slowly boosted through a voltage regulator when it is energized, otherwise there is a danger of electric shock and explosion. When carrying, please focus on the bottom of the body.

Attention
1. When transporting, do not lift the operation panel or cover, otherwise the inverter may fall and be damaged. 2. During installation, the bearing capacity of the platform should be considered, otherwise the inverter may fall and be damaged. 3. It is strictly prohibited to be installed in places where water splash may occur, otherwise there is a risk of damage to the inverter. 4. It is strictly forbidden for metal powder, oil, water, etc. to enter the inverter, otherwise there is a danger of damage to the inverter and explosion. 5. When the inverter is damaged or its parts are incomplete, please do not install and run it, otherwise there is a danger of damage to the inverter. 6. Do not install in a place exposed to direct sunlight, otherwise the inverter may overheat and cause an accident.

Danger
1. It must be installed on non-combustible materials such as metal, otherwise there is a risk of fire, otherwise there is a risk of fire. 2. No combustibles is allowed nearby, otherwise there is a risk of fire. 3. Do not install in an environment containing explosive gas, otherwise there is a danger of explosion.

I. Inverter model description

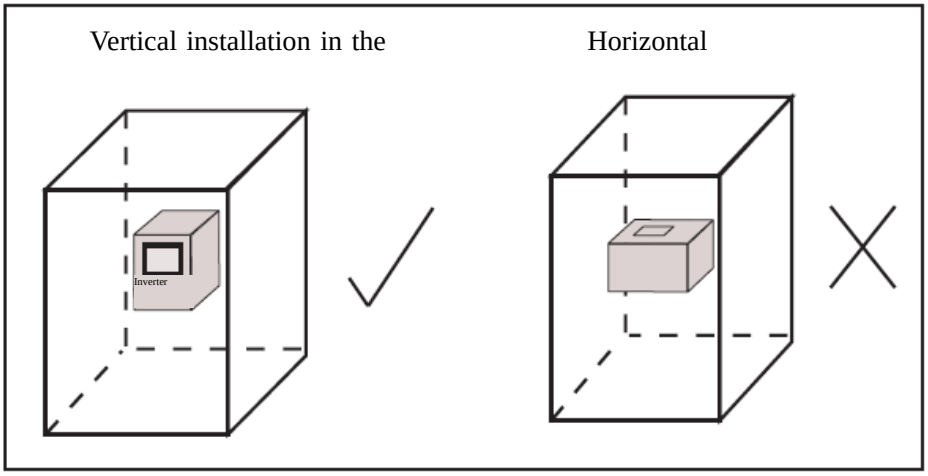


Rated specifications of inverter

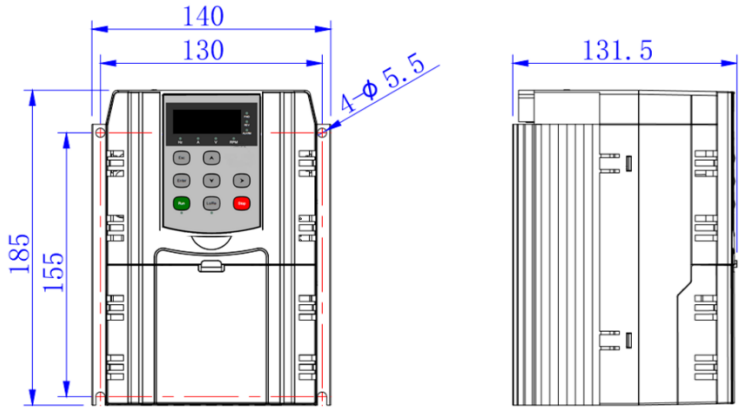
Ambient temperature of 40℃, stable and continuous operation G type: 150% overload, P type: 120% overload, 1min/10min			
Inverter model AS-M210	Rated input current Type G /P (A)	Adaptive motor （kW）	Rated output current Type G /P (A)
4T 0P75 G/01P5 P	2.7/4.3	0.75/1.5	2.5/4
4T 01P5 G/02P2 P	4.3/6.1	1.5/2.2	4/5.5
4T 02P2 G/0003 P	6.1/8.1	2.2/3	5.5/6.9
4T 0003 G/0004P	8.1/10.8	3/4	6.9/9.5
4T 0004 G/05P5 P	10.8/14.3	4.0/5.5	9.5/13

II. Installation conditions of inverter

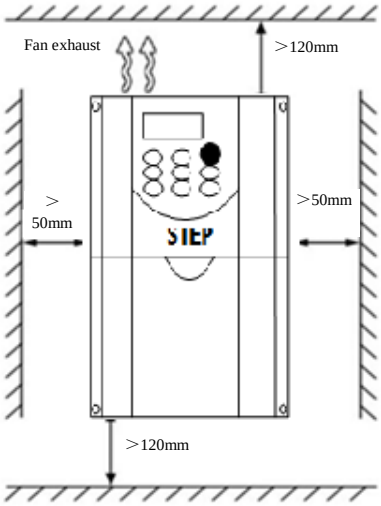
1) A clean place with no oil, mist or dust; or a fully enclosed cabinet where floating objects cannot invade.
2) Places free of radioactive materials.
3) Places with no harmful gases, liquids, and little salt.
4) Places with little vibration; fasteners shall have vibration-proof parts, such as spring washer; the screws of the inverter must be tightened.
5) When installing in a closed box, a cooling fan or cooling air conditioner is required, and the temperature is below 40°C.
6) Install in a well-ventilated place with vertical installation direction, as shown in the figure below.



7) Size of inverter
185mm(H)×140mm(W)×131.5mm (T)

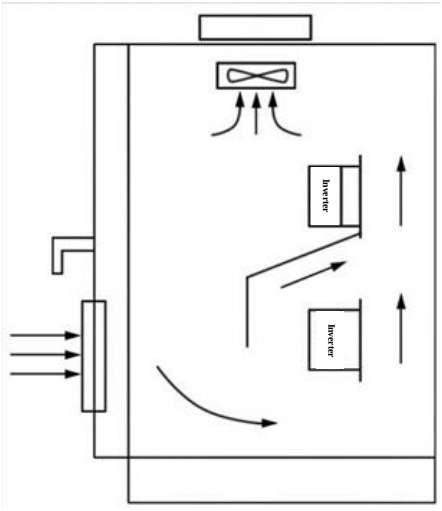


8) Installation spacing requirements of the inverter

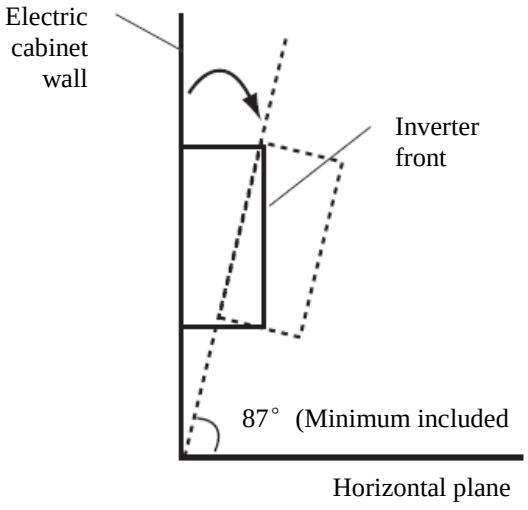


Installation spacing requirements of the inverter

9) When two inverters are installed up and down, a diversion baffle shall be applied in the middle, as shown in the figure below.



10) When the user installs the interval vertically, the included angle between the inverter and the horizontal plane can be between 87° and 90°, as shown in the figure below.



Chapter 2 Wiring of Inverter


Danger

◎ **Before wiring, confirm whether the input power is completely disconnected.**
Otherwise there is a risk of electric shock.

◎ **Ask electrical professionals to conduct wiring operation.**
Otherwise there is a risk of electric shock.

◎ **The grounding terminal PE must be reliably grounded.**
Otherwise there is a risk of electric shock.

◎ **Do not touch the terminal directly by hand. The output line of the inverter shall not contact with the outer cover.**
Otherwise there is a risk of electric shock.

◎ **Do not connect the power to the output terminals U/T1, V/T2 and W/T3 directly.**
Otherwise there is a risk of damage to the inverter.


Attention

◎ **Verify whether the voltage of the AC main circuit power supply is consistent with the rated voltage of the inverter.**
Otherwise there is a risk of fire and personal injury.

◎ **Please connect the braking resistor correctly according to the wiring diagram.**
Otherwise there is a risk of fire.

◎ **The main circuit terminal must be securely connected to the wire or wire crimp terminal.**
Otherwise there is a risk of damage to the inverter.

I. Connection between the inverter and the peripheral equipment

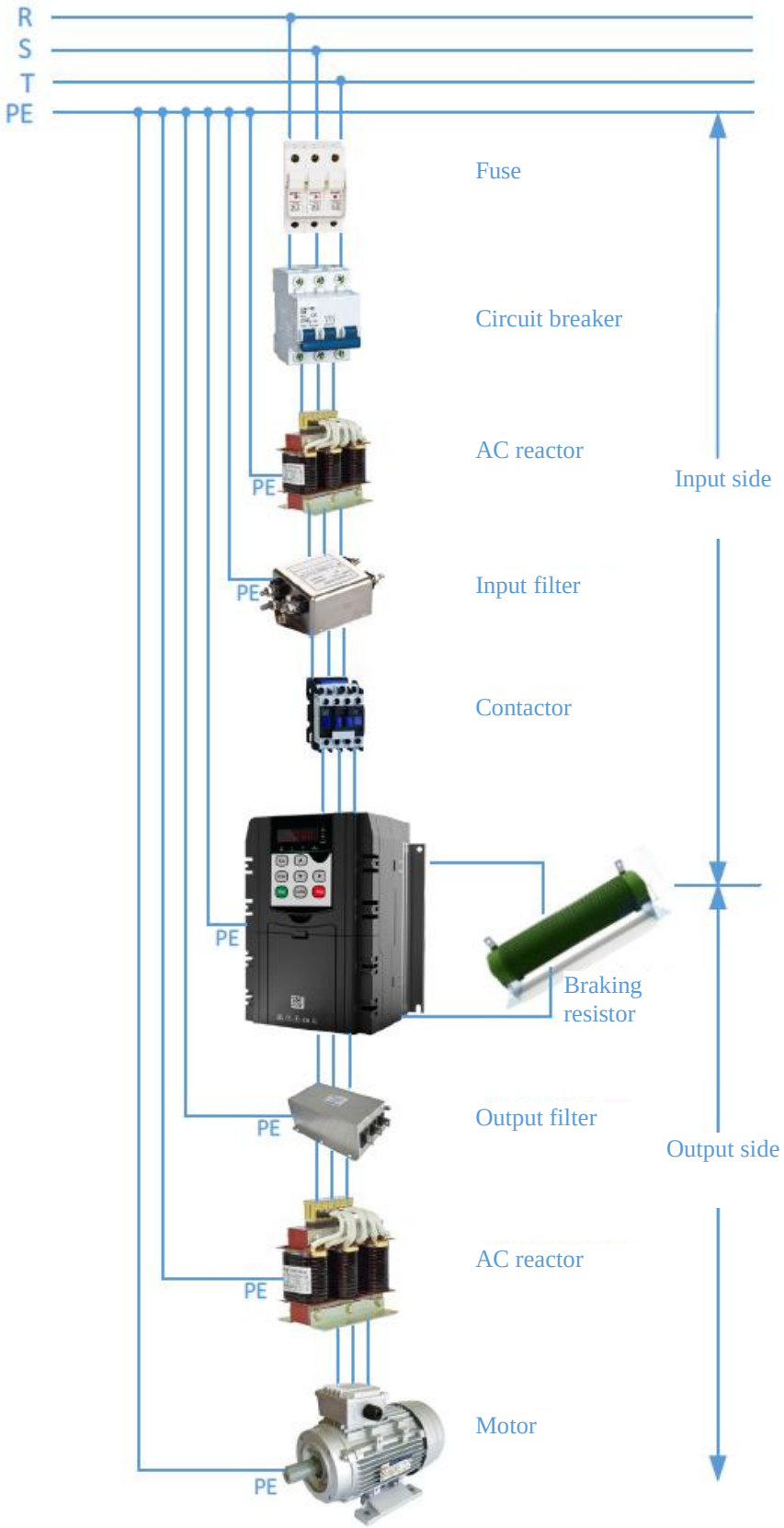


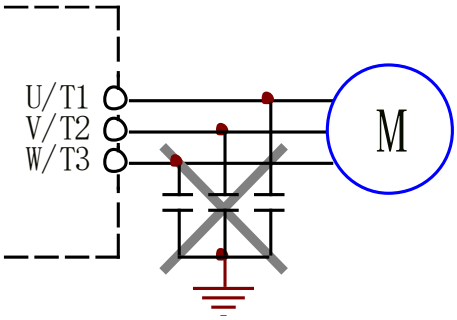
Figure 2.1 Connection between the inverter and the peripheral equipment

1. Input side of inverter

AC reactor: Improve the power factor of the input side power supply and reduce the higher harmonic current.
Inverter specific filter: suppress the high frequency noise interference of the inverter.

2. Output side of inverter

Inverter specific filter: suppress the high frequency noise interference of the inverter.
AC reactor: if the wiring between the inverter and the motor is too long, it will increase the high harmonic leakage current due to the influence of the distributed capacitance of the wire, which may make the output of the inverter overcurrent protection. Therefore, the wiring length between the inverter and the motor should not exceed 100 m. If the wiring length exceeds 100m, a reactor and output filter should be selected.
Do not connect a capacitor or surge filter to the output side of the inverter. Due to the higher harmonic in the inverter output, the connection of a capacitor or surge filter to the output side will result in the overheating and damage to the inverter.



3. Braking resistor

The inverter has a built-in braking unit and an external braking resistor;
It is necessary to fully consider the heat dissipation conditions of the braking resistor to ensure that it is well ventilated. The wiring length of the braking resistor cannot be greater than 5m.

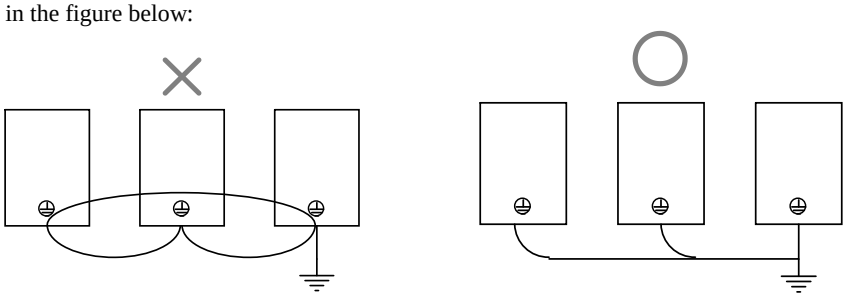
4. Grounding

The grounding terminal is best connected with a special grounding electrode, with the ground impedance less than 10Ω. Do not share with welding machine or other power equipment. The grounding wire shall be as short as possible and of the specification specified in the technical standards for electrical equipment. If the grounding wire is too far from the grounding point, the leakage current of the inverter will make the potential of the grounding terminal unstable. It is recommended to choose the special yellow and green ground wire. See Table for the cross-sectional area of the ground wire.

Table 2.1 Cross-sectional area of wire

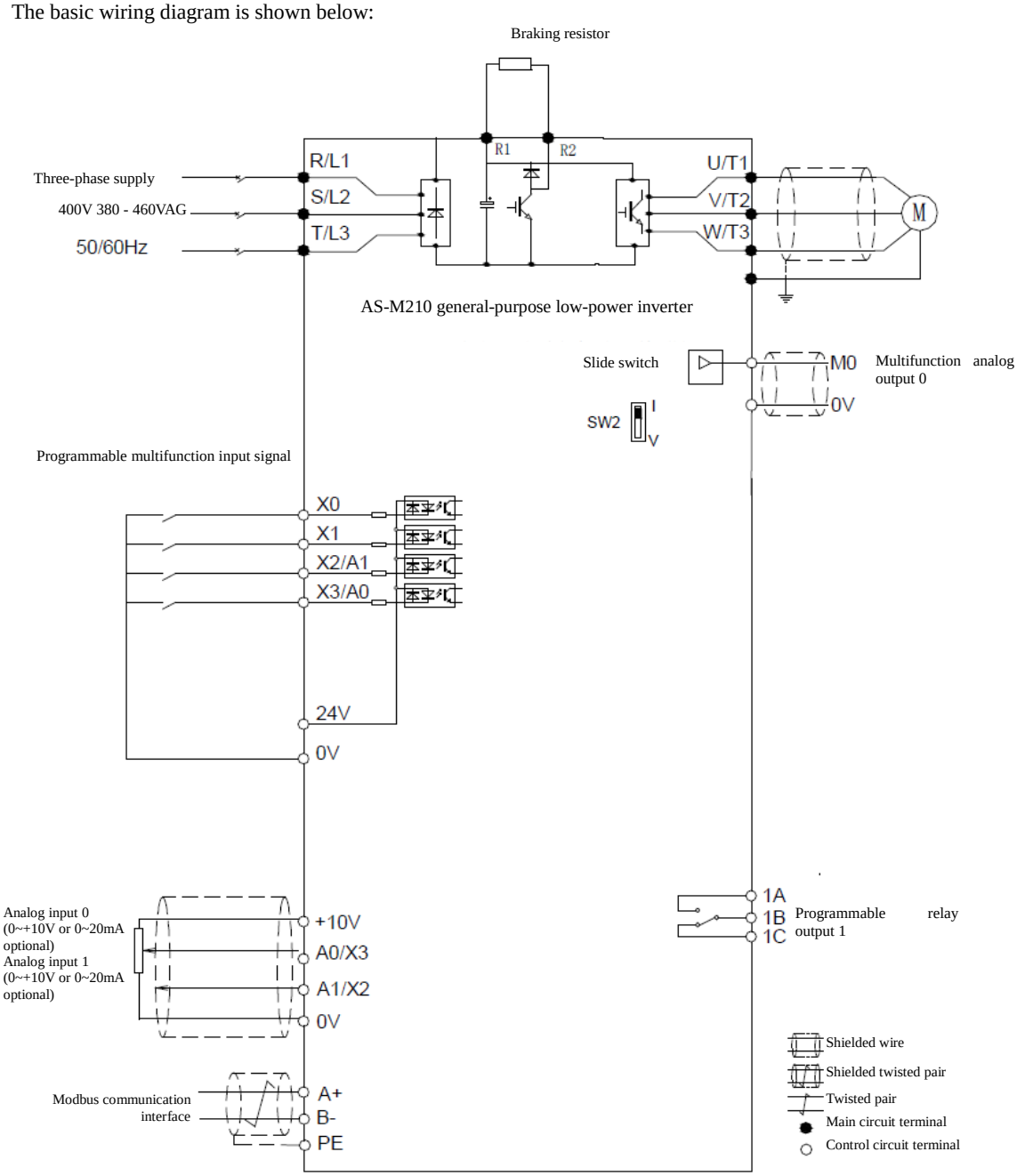
Cross-sectional area S of the wire at the time of installation (mm2)	Minimum cross-sectional area Smin of the corresponding ground wire （mm2）
S≤16	S
16＜S≤35	16
35＜S	S/2

When several inverters are grounded, it is recommended not to form a loop in order to avoid the formation of a circuit. As shown in the figure below:



II. Inverter terminal wiring diagram

The basic wiring diagram is shown below:



Tips:

1. A0/X3, X2/A1 are multiplexing terminals for analog input and digital input , and the function is selected by software parameters;
2. Analog input A0, A1 voltage type, current type optional signal, hardware circuit self-adaptation.

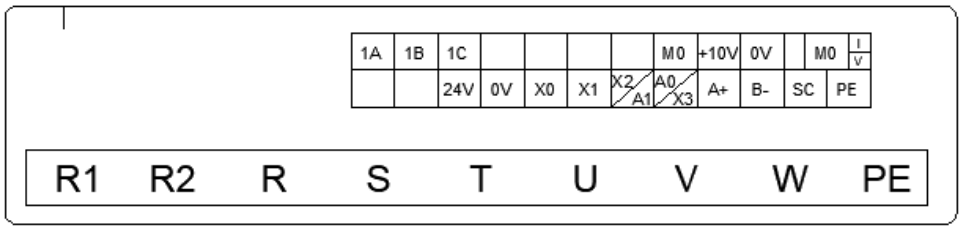
III. Description on main circuit terminal

R1	R2	R	S	T	U	V	W	PE

Figure of main circuit terminal arrangement

Terminal label	Terminal function description
R1	External braking resistor connection
R2	
R	Main circuit AC power input, connecting three-phase input power
S	
T	
U	Inverter output, connected to three-phase asynchronous motor
V	
W	
PE	Ground terminal, connecting the protection ground, the grounding resistance cannot be greater than 4Ω at 400 V

IV. Control circuit terminal description



Control circuit terminal arrangement

Name	Terminal label	Signal name	Remark
Digital input terminal	X0	Multifunction input 0 (function code P30.00)	Contact input. The input signal is valid when the contact is closed. Functions are selected by the parameters of the function group with function code P30. The digital input circuit specification is as follows: Internal power supply +24VDC; Maximum load current 80mA. Note: X2 and X3 are multiplexed with analog input, and the function is selected by parameters P30.02 and P30.03.
	X1	Multifunction input 1 (function code P30.01)	
	X2/A1	Multifunction input 2 (function code P30.02)	
	X3/A0	Multifunction input 3 (function code P30.03)	
	24	Internal +24VDC power output	
	0V	Internal 24V power supply 0V	

<table>
<tr><th>Name</th><th>Terminal label</th><th>Signal name</th><th>Remark</th></tr>
<tr><td rowspan="4">Analog input terminal</td><td>A0</td><td>Multifunction analog input 0 (function code P32.01)</td><td rowspan="2">Input analog voltage or current signal:
Voltage type signal: 0～+10V, Rin>9.99kΩ
Current type signal: 0～20mA or 4～20mA, Rin=120Ω
Used for Speed given analog signal input</td></tr>
<tr><td>A1</td><td>Multifunction analog input 1 (function code P32.07)</td></tr>
<tr><td>+10V</td><td>+10V power output</td><td>+10VDC power output terminal for analog input, maximum allowable current 20mA</td></tr>
<tr><td>0V</td><td>Analog input signal reference ground</td><td>Analog input signal reference ground</td></tr>
<tr><td>Relay output terminal</td><td>1A
1B
1C</td><td>Programmable relay output 1
(Function code P31.00)
1A-1B: normally open contact
1B-1C: normally closed contact</td><td>The programmable relay output function can be selected by the parameters of function code P31 group.
The contact specification is as follows:
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Rated capacity</td><td>Resistance:4.5A 250VAC/30VDC
Inductivity:0.4A 250VAC/30VDC</td></tr>
<tr><td>Switching frequency 120 times/min</td><td>Fault rate P level
10mA/5V</td></tr>
<tr><td>Actuation time</td><td>Below 10ms</td></tr>
</table></td></tr>
<tr><td rowspan="2">Analog output terminal</td><td>M0</td><td>Programmable analog output 0
(Function code P33.00)</td><td>Output analog voltage or current signal (via toggle switch SW2):
Voltage type signal: 0～10V, RL>1kΩ
Current type signal: 0～20mA or 4～20mA, RL=500Ω
Used for monitoring output</td></tr>
<tr><td>0V</td><td>Analog output signal reference ground</td><td>Analog output signal reference ground</td></tr>
<tr><td rowspan="4">Modbus Communication Terminal</td><td>A+</td><td>Modbus communication signal+</td><td rowspan="2">Signal terminal for Modbus communication</td></tr>
<tr><td>B-</td><td>Modbus communication signal -</td></tr>
<tr><td>SC</td><td>Communication signal ground</td><td></td></tr>
<tr><td>PE</td><td>Grounding terminal</td><td>Direct grounding, suitable for occasions with sound grounding conditions, grounding of shield of analog quantity and communication line</td></tr>
</table>

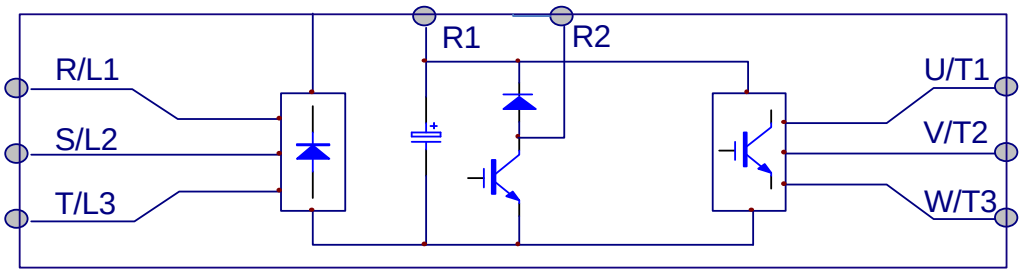
Note:The analog signal line adopts shielded wire, and the distance from the power line is more than 5cm. It is best to cross the power line and try not to be parallel to the power line.

Chapter 3 Quick Debugging of Inverter

I. Debugging steps before inverter power on:

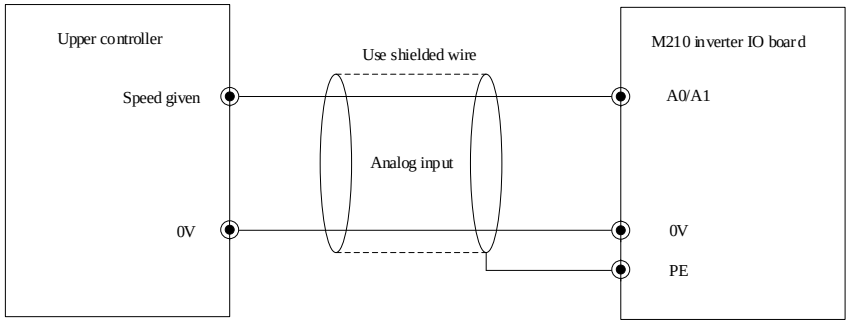
(I) Wiring and confirm of main circuit terminal

1) The three-phase power input wires are respectively connected to the inverter terminals R/L1, S/L2, and T/L3.
2) The inverter's three-phase output terminals U/T1, V/T2, W/T3 are respectively connected to the three-phase stator side windings of the motor.
3) All inverters contain a braking unit, and the braking resistor is installed between terminal R1 and terminal R2.
4) Then confirm whether the above connection is firm and secure.

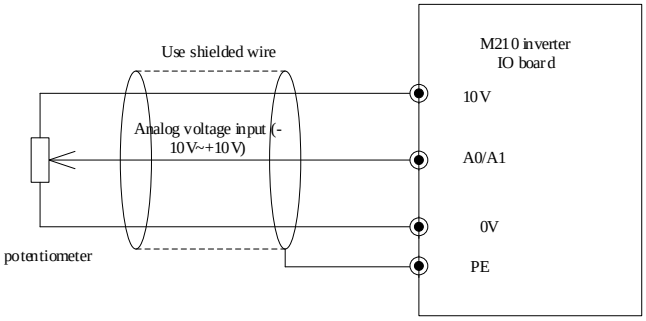


(II) Wiring and confirm of IO board control terminal

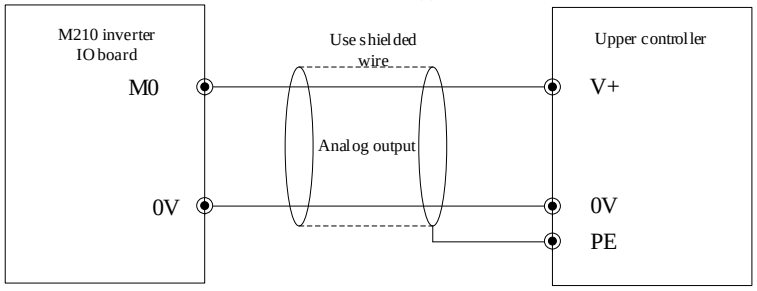
1) When the external controller input switch signal is a stem node, it can be used as a multi-stage control terminal wiring. The wiring method is as follows:
There are 16 options for multi-stage frequency. The external requires 4 digital input terminals for combination. For the specific wiring, it is that one end of the four external control wires is connected to X0~X3, and the other end of the corresponding four wires is connected to the 0V end.
2) Digital relay output terminal, 1A and 1B are normally open points, 1B and 1C are normally closed points.
3) For the analog input, the external voltage or current signal can be chosen; the external reference signal line is connected to the 0V terminal, and the signal line is connected to the A0 or A1 terminal (current type or voltage type hardware self-adaptation).



a) When the potentiometer is selected as the analog input, the two ends of the potentiometer are connected to 10V and 0V respectively, and the middle of the potentiometer is connected to A0 or A1.



4) Wiring of analog output terminal
For the analog output, voltage or current signal can be chosen. When outputting voltage signal, switch SW2 of the board needs to be set to the voltage terminal (V); when outputting current signal, switch SW2 on the board needs to be set to the current terminal (I) .



II. Debugging steps after power-on:

1) Confirm whether P96.00 rated power of the inverter, P96.01 rated current of the inverter, and P96.03 rated voltage of the inverter are the same as the actual nameplate parameter of the inverter.
2) For the first on-site debugging, perform a factory reset of the parameters. The operator is on the PArST (parameter reset) menu interface, press the Enter key and display no, then press the keys of ▲ and ▼ to display YES, and press the Enter key to start parameter reset, End (success).

3) Confirm whether the controlled motor is an asynchronous motor, and record the nameplate parameters of the motor, including: rated power, rated voltage, rated current, rated frequency, rated speed, pole number and slip, write these data into the corresponding parameters of group P20 .
Slip calculation fs=(synchronous speed-rated speed) * pole number/120
For example, the motor nameplate parameters: rated frequency 50Hz, number of poles (4 poles), rated speed 1470rpm, the slip frequency is:$f_s = (1500 - 1470) \times 4 \div 120 = 1\text{Hz}$

III. Parameter settings

1) List of commonly used parameters during debugging:

Parameter no.	Name	Set value (remarks)
P10.00	Control mode selection	0: voltage vector V/f control 1: Speed sensorless vector control (SVC) 4: General Vector Control (GVC)
P10.02	Command channel selection	0: Panel given running command 1: Terminal given running Command 2: Communication given running Command
P10.03	Speed channel selection	It usually chooses: 0 or 1 or 3 or 5 or 12
P11.00	Start mode selection	Default
P12.00	Stop mode selection	0: Inertial stop 1: Decelerated stop
P20.01	Rated power of motor 1	Motor nameplate parameter
P20.02	Rated current of motor 1	Motor nameplate parameter
P20.03	Rated frequency of motor 1	Motor nameplate parameter

Parameter no.	Name	Set value (remarks)
P20.04	Rated speed of motor 1	Motor nameplate parameter
P20.05	Rated voltage of motor 1	Motor nameplate parameter
P20.06	Number of poles of motor 1	Motor nameplate parameter
P20.07	Rated slip of motor 1	Calculate according to the motor nameplate parameters
P30.00	Input DI0 function	Default
P30.01	Input DI1 function	Default
P31.00	K1 Function	It usually chooses: 1 or 2 or 3
P40.02	Acceleration time	On-site requirement setting
P40.03	Deceleration time	On-site requirement setting
P70.01	Lower limit of frequency	On-site requirement setting
P70.02	Maximum frequency	On-site requirement setting
P71.05	Prohibit reverse rotation	0: Not prohibited 1: Prohibited
P71.14	PWM carrier frequency	Default value generally or adjust according to on-site needs

2) If you choose P10.03=1digital quantity multi-stage given, you need to set the following parameters, such as selecting X3, X4, X5, X6, and the terminal as the multi-stage given signal.

Parameter no.	Name	Set value
P30.02	Input DI2 function	Set the corresponding parameters according to actual needs. When the setting value is 0, the terminal is the analog input Ai0.
P30.03	Input DI3 function	Set the corresponding parameters according to actual needs. When the setting value is 0, the terminal is the analog input Ai1.

3) If P10.03=3 or 5 is selected, when the analog quantity A0/A1 given target speed, the following parameters need to be set.

Parameter no.	Name	Set value
P32.00	Input AI0 type	0:0~10V 1: -10~+10V 2: 0`20mA 3: 4~20mA
P32.02	Input lower limit of AI0	General default
P32.03	Input upper limit of analog input AI0	General default
P32.06	Input AI1 type	0:0~10V 1: -10~+10V 2:0~20mA 3: 4~20mA
P32.08	Input lower limit of AI1	General default
P32.09	Input upper limit of analog input AI1	General default
P32.11	Input AI1 amplitude limit	Generally the factory value, when P32.06=2or3, this value is set to 20.000mA

Note:When the analog input voltage value displayed by the operator is not equal to the input voltage value, the upper and lower limit coefficients of A0 or A1 can be adjusted to make the actual voltage value equal to the voltage value

displayed by the operator.

4) If you select P10.03=15 UP/DOWN given speed, you need to set the following parameters, such as selecting input terminal X1 as UP signal and terminal X3 as DOWN signal

Parameter no.	Name	Set value
P30.01	Input DI1 function	31 or 38
P30.03	Input DI3 function	32 or 39

IV. Special function description

1) Function selection below the lower limit of frequency

Parameter no.	Name	Set value
P70.01	Lower limit of frequency	On-site requirement setting
P70.22	Frequency selection below the lower limit	0: Run at lower limit of frequency 1: Stop 2: Set frequency is 0

Note: In some cases, the running command is always maintained. When the speed is lower than a certain frequency, the inverter output voltage is set to zero. At this time, set P70.01=0.50Hz (if lower than 0.5Hz) P70.22 =1; That is, if the output frequency is lower than 0.5Hz, the inverter will stop, and the inverter will start when it is higher than 0.5Hz.

2) Analog input description

When the analog input function is selected as the target speed given, the given value of 10V corresponding to the given speed is P70.00 (frequency upper limit), such as P20.13=50.00Hz, then the input 10V given speed is 50Hz, and the 5V given speed is input It is 25Hz, and so on.

3) Analog output description

If Analog output is 0~5V, it corresponds to 0~100% rated value (such as rated speed, rated current, etc.), if you need 0~100% rated value (such as rated speed, rated current, etc.), corresponding output 0~10V, you can set the output upper and lower limits to P33.02 or P33.05.

4) Speed tracking start

To select this function, you need to set P11.00=2, and you need to set the parameter value of P11.14

Parameter no.	Name	Set value
P11.00	Start mode selection	2
P11.14	Maximum current when tracking	Setting range 30~100%, set according to load conditions

5) Brake logics control

The function code of the digital output terminal is set to 25, and the parameters that need to be set are:

Parameter no.	Name	Set value
P11.01	Start holding frequency	1~3Hz depends on site conditions
P11.02	Start frequency holding time	0.1~2s depends on site conditions
P11.03	Start DC braking current	The factory value of 30% depending on site conditions
P11.19	The motor starts breaking current of negative rotation	The factory value of 20% depending on site conditions
P71.22	Zero speed threshold	0.2~3Hz The value is related to the P10.00 selection method

V. Inverter Debugging running process

1. Motor no-load test run
   - Confirm whether the motor is in no-load state (disconnect from the machine)
   - For the first trial run, the given frequency should not be too high and 5Hz is ok.
   - Whether the running direction of the motor is consistent with the set running direction
   - Whether the acceleration and deceleration of the motor are smooth and there is no abnormal sound
   - During operation, the actual current Irms is about 30% of the rated current of the motor
   - The output voltage value Uout and the current frequency value of Vref are basically linear.
2. Motor no-load test run
   - Confirm whether the motor is connected to the mechanical equipment, and confirm the safety of the motor and mechanical equipment
   - When starting to run with load, be ready to press the stop button at any time (if abnormality occurs)
   - Whether the running direction of the load is consistent with the direction set by the inverter
   - Whether the acceleration and deceleration of the motor are smooth during the loading process
   - Confirm whether the actual current Irms of the motor is too large
   - Check whether there is any abnormal sound or current oscillation when the load changes the frequency.

VI. Precautions

1) In the cotrol mode of VF control, that is, the P10.00=0. If current oscillation occurs, you can try to adjust the parameters of P61.06 and P61.07, and see the following table for details

Parameter no.	Name	Set value
P61.06	V/F control current loop Max	It is generally set to the factory value; P10.00=0 is valid, the current oscillates, and adjust this value (change 0.2% each time)
P61.07	V/F control current loop Min	It is generally set to the factory value; P10.00=0 is valid, the current oscillates, and adjust this value (change 0.2% each time)

2) Sensorless vector control 1 i.e. P10.00 = 5 control mode, if the motor fails to start due to overcurrent when starting with heavy load, you can try to adjust the following parameters, and see the table below for details

Parameter no.	Name	Set value
P71.35	SVC1 inertia coefficient	It is generally set to the factory value; P10.00=5 is valid, this value can be increased when carrying heavy load, and the setting should not exceed 200%.
P71.36	SVC1 Low speed torque lifting	It is generally set to the factory value; P10.00=5 is valid, this value can be increased when starting with heavy load, and it is generally set 150%~200%.

3) When the motor is running, it is found that the motor is noisy to ensure that the inverter will not report a fault, and the PWM carrier frequency value P71.14 parameter should be appropriately increased.

Chapter 4 Faultcode

Fault code	Fault display	Possible causes	Countermeasures
1	Module overcurrent protection	Excessive DC terminal voltage	Check the power supply to check whether the high inertia load stops quickly without dynamic braking
		Short circuit in the periphery	Check the motor and output wire for short circuit and whether it is shorted to ground.
		Output default phase	Check the motor and output wire for looseness
		Encoder fault	Check whether the encoder is damaged or whether the wiring is correct
		Poor hardware contact or damage	Ask professional technicians for maintenance
		Internal connector looseness of inverter	Ask professional technicians for maintenance
		Overheat of the power circuit parts due to cooling fan or cooling system problems.	Check the cooling fan. Check whether the cooling fan power supply is correct and check whether there is blockage.
		Warning: inverter can be started only after the cause of fault is cleared in order to avoid IGBT damage.	
2	ADC fault	Current sensor damage	Replace current sensor
		There is a problem with the current sampling loop	Control board replacement
3	Radiator overheated	Excess ambient temperature	Reduce the ambient temperature and strengthen ventilation and heat dissipation Keep the surrounding temperature below 40℃ or check the capacity of the inverter according to this performance
		Damage to cooling fan or foreign matter entering cooling system	Check whether the fan power line is properly connected, or replace with the same type of fan and remove foreign matters
		Abnormal cooling fan	Check the cooling fan. Check whether the cooling fan power supply is correct and check whether there is blockage.
		Temperature detection circuit fault	Ask professional technicians for maintenance
4	Brake unit fault	Brake unit damage	Replace the corresponding drive module or control board
		External brake resistance or short circuit	Replace the resistor or connect the line
5	Fuse fault	Excessive current leading to blown fuse	Check whether the fuse circuit is open or the connection point is loose
6	Output torque	Input power voltage is too low	Check the input power supply
		Motor stalling or the load sudden change	prevent motor stalling and reduce load sudden change
		Encoder fault	Check whether the encoder is damaged or whether the wiring is correct

Fault code	Fault display	Possible causes	Countermeasures
		Output default phase	Check the motor and output wire for looseness
7	Speed variation	The acceleration time is too short	Extend the acceleration time
		Excessive load	Lighten the load
		Current limit too low	Increase the current limit value appropriately within the allowable range
8	(In accelerated running) Bus overvoltage protection	Abnormal voltage of the input power	Check the input power supply
		High-speed starting again in the high-speed running of the motor	Start after the motor stops running
	(In slow running) Bus overvoltage protection	Excessive load moment of inertia	Use appropriate dynamic braking components
		The deceleration time is too short	Extend the deceleration time
		The resistance of the braking resistor is too large or it is not connected	To the proper braking resistor
	(In constant-speed running) Bus overvoltage protection	Abnormal input power	Check the input power supply
		Excessive load moment of inertia	Use appropriate dynamic braking components
		The resistance of the braking resistor is too large or it is not connected	To the proper braking resistor
9	Bus undervoltage	The power voltage is below the minimum working voltage of the equipment	Check the input power supply
		Momentary power failure	Check the input power supply. After the input power supply is normal, reset and restart
		The variation in voltage of the input power supply is too large	
		The terminal of the power supply is loose	Check the input wiring
		Abnormal internal switching power supply	Ask professional technicians for maintenance
		There is a load with high starting current in the same power system	Change the power system to meet the specification value
10	Output default phase	Abnormal wiring, missing connection or disconnection at the inverter output side	Check the wiring at the inverter output side according to the operating instructions to eliminate the missing connection and disconnection
		Loose output terminal	
		The motor power is too small to be less than1/20 of the maximum applicable motor capacity of the inverter	Adjust the inverter capacity or motor capacity
		Output three-phase imbalance	Check whether the motor wiring is intact
			Disconnect the power and check whether the terminal characteristics are consistent at the inverter output side and DC side

Fault code	Fault display	Possible causes	Countermeasures
11	Low-speed overcurrent of the motor (in accelerated running)	Low grid voltage	Check the input power supply
		The motor parameters are not set normally	Correctly set the motor parameters
		Quickly start directly during motor running	Start after the motor stops running
		The acceleration time is too short for the load inertia (GD2).	Extend the acceleration time
	Low-speed overcurrent of the motor (in slow running)	Low grid voltage	Check the input power supply
		Excessive load moment of inertia	Use appropriate dynamic braking components
		The motor parameters are not set normally	Correctly set the motor parameters
		The deceleration time is too short for the load inertia (GD2).	Extend the deceleration time
	Low-speed overcurrent of the motor (in constant-speed running)	Sudden load change during running	Reduce the sudden load change frequency and amplitude
		The motor parameters are not set normally	Correctly set the motor parameters
12	Encoder fault	Wrong encoder connection	Change the encoder wiring
		No signal output in the encoder	Check the encoder and the power supply
		Encoder wiring disconnected	Repair the disconnected wiring
		Abnormal function code setting	Confirm that relevant function codes of the inverter encoder are set correctly
13	Current detected when parking	The current flow is not effectively blocked when the motor stops	Motor slipping exists
			Ask professional technicians for maintenance
14	Reverse speed during operation	Speed reversal during operation	Check whether the external load changes suddenly
		Encoder and motor phase sequence inconsistent	Change phase sequence of motor or encoder
		The motor reverses when starting, and the current reaches the limit	The current limit is too low, or the motor is not matchable
15	Speed detected when parking	The brake is loose, and the motor slides	Check the brake
		The encoder is interfered, or the encoder is loose	Fasten encoder and eliminate interference
16	Motor phase sequence error	Motor reverse wiring	Reverse the wire or adjust the parameters
17	Overspeed in the same direction (within the allowable range of maximum speed)	Encoder parameter setting is incorrect or disturbed	Check the encoder loop
		Excessive forward load or sudden load change	Check the external causes for sudden load change

Fault code	Fault display	Possible causes	Countermeasures
18	Overspeed in the reverse direction (within the allowable range of maximum speed)	Encoder parameter setting is incorrect or disturbed	Check the encoder loop
		Excessive reverse load or sudden load change	Check the external causes for sudden load change
21	abc overcurrent (instantaneous value of three-phase)	Motor single phase short circuit to ground	Check the motor and output line loop
		Encoder fault	Check whether the encoder is damaged or whether the wiring is correct
		Drive board detection circuit error	Replace the drive board
22	Brake detection fault	The output relay is inactive	Check the relay control circuit
		The relay actuator is not open	Check whether the brake power line is loose and broken
		The feedback element does not detect the signal	Adjust the feedback element
23	Input overvoltage	Too high incoming line voltage	Check whether the incoming line voltage matches the inverter
		Problems in the switching supply voltage detection circuit	Ask professional technicians for maintenance
24	UVW encoder wiring disconnected	Encoder wiring circuit problem	Loose terminals or damage or breakage in the circuit
27	Output overcurrent (effective value)	Running too long in an overloaded state,(shorter time if greater load)	Stop running for a period of time, and if it reappears again after running, check whether the load is in the allowed range
		Motor stalling	Check the motor or brake
		Motor coil short circuit	Check the motor
		Output short circuit	Check the wiring or motor
28	SinCos encoder fault	Encoder damaged or wrong line	Check the encoder and its line
29	Input default phase	Abnormal voltage at the input side	Check the network voltage
		Input voltage default phase	
		Loose terminal at the input side	Check the input terminal wiring
30	Overspeed protection (Exceeding the maximum speed protection limit)	Encoder parameter setting is incorrect or disturbed	Check the encoder loop
		Sudden load change	Check the external causes for sudden load change
		Overspeed protection parameter setting error	Check the parameter
31	Motor high speed	Low grid voltage	Check the input power supply

Fault code	Fault display	Possible causes	Countermeasures
	overcurrent	Sudden load change during running	Reduce the sudden load change frequency and amplitude
		The motor parameters are not set normally	Correctly set the motor parameters
		Encoder parameter setting is incorrect or disturbed	Check the encoder loop
32	Grounding protection	Wiring error	Correct the incorrect wiring according to the user manual
		Abnormal motor	To replace the motor, the ground insulation test shall be carried out first
		Excessive earth leakage current at the output side of the inverter	Ask professional technicians for maintenance
33	Capacitor aging	Capacitor aging	Ask professional technicians for maintenance
34	External fault	External input fault signal	Check external fault causes
35	Output imbalance	Abnormal wiring, missing connection or disconnection at the inverter output side	Check the wiring at the inverter output side according to the operating instructions to eliminate the missing connection and disconnection
		Motor three-phase imbalance	Check the motor
36	Parameter settings error	Incorrect parameter settings	Modify inverter parameters
37	Current sensor fault	Drive board hardware fault	Ask professional technicians for maintenance
38	Brake resistance short circuit	External brake resistance short circuit	Check the wiring of the braking resistor
39	Excessive current instantaneous value	Alarm of excessive three-phase current instantaneous value when Ia, Ib and Ic are not running	Ask professional technicians for maintenance
40	KMY detection fault	Abnormal KMY output when there is KMY special function	Check the external connection to make sure the motor is running properly without load
41	Brake switch detection fault	Abnormal brake action	Check the brake mechanism and brake power supply
42	IGBT short-circuit protection	Short circuit in the phase bridge arm Drive optocoupling protection	Ask professional technicians for maintenance
43	Communicatio n fault	Communication disconnected No communication data received in the fixed time	Check the communication signal line
44	Abnormal input power	Excessive fluctuation of input supply voltage	Modify relevant parameters Check the input power supply
45	I^2t instantaneous value overcurrent	IGBT overheating	Ask professional technicians for maintenance
46	I2t effective value overcurrent	IGBT overheating	Ask professional technicians for maintenance

Fault code	Fault display	Possible causes	Countermeasures
47	Abnormal analog input	Analog input signal disconnection Abnormal analog input signal	Modify relevant parameters Check the analog input signal
48	Temperature sampling disconnection	Radiator temperature sampling disconnection	Check the temperature sampling connection
49	PT detection fault	PT input signal disconnected Abnormal PT input signal	Check PT input signal Modify relevant parameters
50	Humidity fault	HT input signal disconnected Abnormal HT input signal	Check PT input signal Modify relevant parameters
51	Abnormal output current in running	Improper parameter setting Inverter to motor disconnection Inverter hardware fault	Check parameter P70.21 Check the connecting cable Ask professional technicians for maintenance
52	Motor PTC overheating alarm	Motor overload Smaller motor selection PTC abnormality	Check the load Calculate the motor selection Check PTC
53	Main control board error	Main control board program error or mismatch	Contact the manufacturer
56	Abnormal motor fan	Motor fan blocked or abnormal	Check the fan

Appendix I LED manipulator

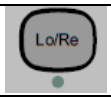
M210 series inverters are equipped with LED manipulator as standard, which can be detached and supports external lead-out of the panel.

Figure I-1 LED manipulator diagram

LED indicator

There are 4 LED symbol indicators on the manipulator, namely Hz (frequency), A (current), V (voltage), RPM (speed); there are 5 LED status indicators on the operator, respectively FWD (forward rotation)), REV (reverse), ALARM (fault light), RUN (run) and LO/RE (local/remote). The symbol indicator light indicates that the physical quantity displayed by the LED, and the status indicator light indicates the state of the motor. The indicators indicating the status of mechanical motor are shown in the following table I-1.

Table I-1 Indicators indicating the status of mechanical motors

Indicator light	Lamp on	Lamp off
	Display frequency value	The displayed value is not a frequency value
	Current value displayed	The displayed value is not a current value
	Voltage value displayed	The displayed value is not a voltage value
	Speed value displayed	The displayed value is not a speed value
	Forward running	Nor forward running
	Reverse running	Nor reverse running
	Fault detected	No fault
	Panel operation	Remote operation
	Forward/reverse running self-learning	Inverter stops running

LED Nixie tube

There are 5 LEC Nixie tubes at top of the Operation panel. Used to display menus, make parameter settings, view motor operating parameters, and view inverter fault codes (*is displayed with two digits).

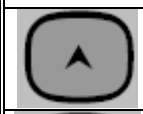
Table I-2 LED Nixie tube display and text comparison

Displayed text	LED display	Displayed text	LED display	Displayed text	LED display	Displayed text	LED display
0	0	9	9	I	ı	R	r
1	1	A	A	J	J	S	5
2	2	B	b	K	t	T	t
3	3	C	C	L	L	U	U
4	4	D	d	M	n*	V	v
5	5	E	E	N	n	W	vv*
6	6	F	F	O	o	X	无显示
7	7	G	G	P	P	Y	y
8	8	H	H	Q	q	Z	无显示

Keyboard

There are 9 keys at the bottom of the operation panel, and the key functions are shown in Table I-3 below.

Table I -3 Key functions instructions

Key	Name	Function
	Right shift	When selecting a function, select the next function group; Move the modify (cursor) bit to the right in [Parameter settings].
	Increase	When selecting a function, select the previous function code; Increase the parameter in [Parameter settings].
	Decrease	When selecting a function, select the next function code; Decrease the parameter in [Parameter settings].
	Enter	Enter the function selection interface under [Monitored state]; Enter the selected function interface in the function selection interface;
	Exit	Exit the [Monitored state] in the function selection interface; Exit the function selection interface in each function operation interface.
	Run key	It is Run function in the local panel control (LOCAL) state;
	Stop/fault reset key	It is Stop function in the local panel control (LOCAL) running state; It is Fault reset key in the halt state;
	Local/remote toggle key	Toggle key between local panel control (LOCAL) mode and remote control (REMOTE) mode. Note: The LO/RE key can only be switched to the local operation when the command given is chosen as the panel given in the non-running state and non-running command holding state; otherwise, the inverter cannot be controlled even if it is switched to the local operation.

[Monitored state] details

Mon(Monitor)

Double click  to enter the main menu, press  to find Mon,press  to enter the monitoring state, and press keys of  and  to query 8 groups of monitoring parameters. Press  again to read the corresponding parameter value. These data are real-time data of motor operation, which can only be displayed and cannot be modified.

The default display data can be modified by modifying the value corresponding to the P91 group parameter function code to modify the monitoring parameters.

Table I-4 LED manipulator monitoring parameters

Display	Name	Content	Setting range	Unit	Factory setting	Remark
Vobj	Target speed	Display the target speed command value of the motor	×	Hz	×	
Vref	Given speed	Display the speed given command value of the motor	×	Hz	×	
Vfbk	Feedback speed	Display the motor feedback speed value	×	Hz	×	
Irms	Output current	Display output current effective value	×	A	×	
Uout	Output voltage	Display the effective value of inverter output voltage	×	V	×	
Udc	DC bus voltage	Display the DC voltage of the main circuit inside the inverter	×	V	×	
Pout	Output power	Display the inverter output power	×	kW	×	
Torq	Output torque	Display the torque output value	×	%	×	
AI0	AI0 input voltage	Display the input voltage at the analog input port 0 (A0) of the inverter	×	V	×	
AI1	AI1 input voltage	Display the input voltage at the analog input port 1 (A1) of the inverter	×	V	×	
DI	Input X0-X5 state	Display the state of the input terminals X0~X5 From low bit to high bit (from right to left)	×	×	×	
DO	Output K1-K2, state	Display the state of the output terminals K1-K2 from low bit to high bit (from right to left)	×	×	×	
TEMP	Radiator temperature	Display the real-time temperature of the radiator	×	℃	×	

Note: DI/DO display forms and description:

Digital input DI:  , Display the status of X0~X3 from low to high (from right to left), and at this time, there is a signal at X0 high level, and there is no signal at X1~X5 low level;

Digital output DO:  The state of K1 is displayed in turn from low to high(from right to left), and at this time, there is a signal at high level of K1-K2.

Operation mode

The inverter has two operating modes: local mode (LO/RE light on) and remote mode (LO/RE light off).

Local mode: Run/stop the inverter, and monitor and display the running status (display items set).

Remote mode: View/set all the parameters of the inverter, and the self-learning can be performed, but the motor operation cannot be changed.

Note 1: The parameters can be viewed in the running state, but only the parameters that can be modified online; the parameters can be both viewed and modified in the non-running state.

Note 2: When setting P10.02 (running command given mode) to non-panel control, the running command can be executed even if it is set to a remote mode. When P10.02 (running command given mode) is set to 0 (panel control), only parameter viewing can be performed when switching to remote mode during operation, and parameter modification cannot be performed (except for online modification).

Operating state of operation panel

The operation panel has five operating states, which are These five states are [forward and reverse switching], [parameter setting], [fault check], [motor tune-in], and [parameter processing]. Under the main menu, press  and  to enter the following function selection interface

Selection from forward and reverse

Display For (forward selection), the motor defaults to forward, and the FWD forward indicator is on; press  , For flashes, press  and  to select rEv (reverse selection); if you press  to confirm, it will switch to reverse operation, and the REV reverse light will be on; if you don't press  , the modification will be invalid.

Parameter settings

The**PAr** [Parameter settings] of the operation panel is used to modify the parameters. See Chapter 6 for the parameter setting range.

Select the parameter group by pressing  in [Parameter settings] state. Select the parameter code in the parameter group by pressing  and  . Press  after selecting the parameter to be modified. It flashes in the parameter bit to be modified. Change the modified bit by pressing  . Modify the parameter value by pressing  and  . Press  to confirm the modification is valid; The modification of the parameter is invalid if  is not pressed. Press  to return to the previous menu state.

Fault checking

In Err[Fault checking] state, check the content of the recent 8 faults, and the voltage, current, given speed, feedback speed state and three-phase current instantaneous values of U, V and W recorded when the fault occurs.

Press the key 

to enter the fault list, display E01 (the first fault record), press keys of  and  to switch to other fault records; Changes occur between E01 and E08, where E01 represents the sequence number of the most recent fault, and E08 represents the sequence number occurred in a time furthest from the present.

Press the key 

to enter when the fault code is displayed (such as E01), view the corresponding value when the fault occurs, press the  key to display XX (fault code) → Udc output voltage value (V light on) → Irms output current value (A light on) → Vref given frequency (Hz light on) → Vfbk feedback frequency (Hz light on). Press the key 

again to return to the fault code display state. Press 

to return to the previous menu state.

Note: When a fault occurs, ErrXX (fault code) will be displayed and the fault light will be on. In the first-level menu, the fault code appears alternately with the menu; after entering the secondary-level menu, the fault code is not displayed.

Motor tune-in

Self-learn the motor (asynchronous), encoder phase angle and parameters manually in the [Motor setting] state and encoder phase angle parameters.

Press the 

key, and display nrmL (normal operating mode);Press keys of  and  to switch the self-learning mode AT0~AT5,

In the self-learning mode AT4, press the 

key to perform the static self-learning of the motor, and it will display End. If self-learning fails, ATTER is displayed.

AT0: nrml (normal operation mode)
AT1: Encoder static self-learning
AT2: Encoder correction
AT3: End of encoder self-learning
AT4: Motor static self-learning
AT5: Inverter optimized self-learning

Press 

to return to the previous menu state.

Parameter processing

In **PArOP**[parameter processing] state, parameters can be uploaded, downloaded, initialized, and all faults can be cleared.

Press the key 

, it displayes UP (upload); press keys of  and  , it respectively displays down (download), PArST (parameter reset), ErrST (fault reset).

- UP (upload), that is, upload the parameters to the inverter; press 

, it displays no, then press keys of  and  to display YES, press 

key to start uploading, o---I (uploading), End (success), failure display UPErr.
- Down (download), that is ,to download the parameters to the operator, press the 

key, display no (no), then press keys of  and  to displays YES, press 

to start downloading, I---o (downloading), End (success), UdErr is displayed if it fails.
- PArST (parameter reset), press 

key, display no (no), then press keys of  and  to display YES, press 

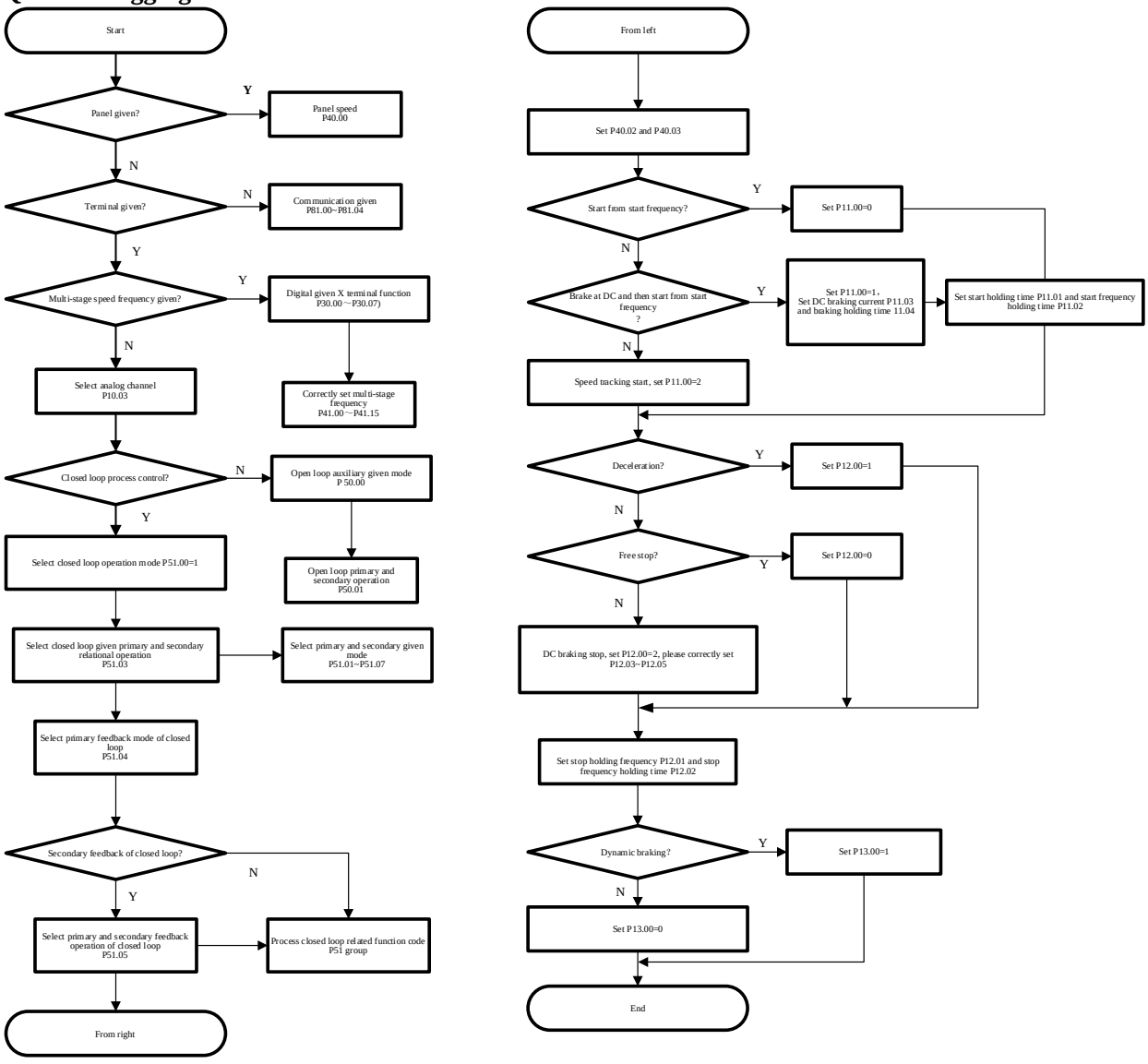
to start parameter reset, End (success).
- ErrST (fault reset), press 

key, and display no (no), then press  and  to display YES, press

Enter to start fault reset, End (success).

Esc Press to return to the previous menu state.

Quick debugging of V/F control



Simple debugging steps of motor V/F control

1. Connect the three-phase 380V power line and the motor line; take care to connect the ground wire and ensure that all terminals of the main circuit are in a tight state.
2. Power on to check whether the program version number (P95.01) is the scheduled program version;
3. Check whether P96.00 is consistent with the actual power of the inverter. If not, please do not run and contact us immediately.
4. Determine whether the parameter initialization is required. If so, do it. It is recommended to make the parameter initialization in the first use of the inverter or the replacement of the inverter drive motor.

5. Set P10.00 to 0 and P20.01~P20.06to rated parameters of 0 input motor and change P20.27 to 1
6. Set the control parameters and speed curve parameters.
7. Run the inverter directly if low speed and high load are not required.
8. Change P71.08 to 1070 in the occasions requiring low speed and high load. If the inverter cannot run after change, increase P71.36 by 50% step size.

Quick debugging without PG vector control

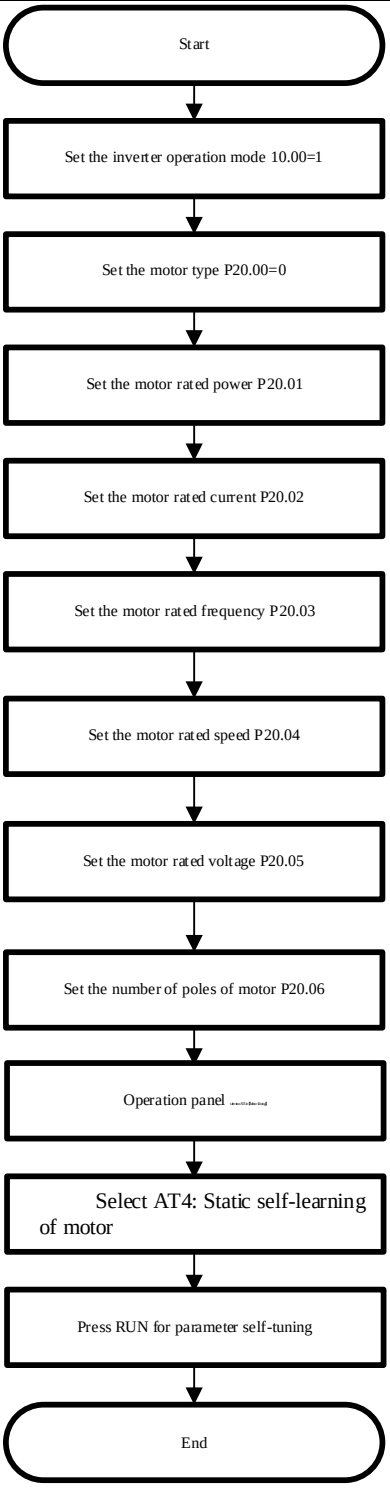
The following describes the steps of the quick debugging method for vector control without PG.

1. The same as v/f debugging 1~4
2. Set P10.00 to 1
3. Input the motor nameplate parameters in P20 group. Carry out the static self-learning of motor (self-learning 4) and optimized self-learning of inverter (self-learning 5).
4. Set the control parameters, speed curve and other parameters.
5. Run the motor. Adjust the speed loop and current loop parameters according to the motor operation.

Steps of debugging of motor GVC control mode

1. The same as v/f debugging 1~4
2. Set P10.00 to 4
3. Input the motor nameplate parameters in P20 group.
4. Set the control parameters, speed curve and other parameters.
5. Run the motor. Adjust the speed loop, DC injection size, current loop parameters, etc. according to the motor operation. Set P71.36 parameters reasonably according to the low-speed load capacity.
   Note: The motor self-learning is required in the control modes 0 and 4, but it is still recommended to improve the system performance

Motor parameter self-tuning (self-learning): for vector control, motor no-load rotation self-tuning is needed. If no-load rotation self-tuning is not possible, static auto-tuning can be performed on the motor, as follows:



Note: P20.10 “Motor no-load current coefficient”: adjust the magnetic flux intensity, so that the motor current in the vector control low-speed (non-flux weakening area) and no-load running is close to the motor no-load current;

In vector control, self-tuning is required. After the self-tuning is successful, you need to set some conventional parameters, such as commands, speed channels, start-stop mode, acceleration and deceleration time and other parameters. After all parameters are set, you can start and stop in the set mode.

.

Appendix II Functional Parameter Table

Function code parameter table description

Short form field	Explanation
Function code No.	Code name of function code, e.g. P00.00
Function code name	Name of function code to explain the function code
Factory default	Set value of function code after reset to factory default (see P00.01)
Setting range	Minimum to maximum value of function code allowed to set
Unit	V: voltage; A: current; ℃: degree centigrade; Ω: Ohm; mH: millihenry; rpm: speed; %: percentage; bps: Baud rate; Hz, kHz: frequency; ms, s, min, h, kh: time; kW: power; /: no unit
Attribute	0: Read/write, and initialize; 1: Read/write, do not initialize; 2: Read-only; 4: Online modification is allowed when running
Function code options	Function code parameter setting list
User defined	For the user to record parameters

Table of function code parameters

Group P00 Quick debugging Parameter						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P00.00	Login password	0	0～65535	/	1	0: no password; other: login password;
P00.01	Change password	0	0～65535	/	1	0: no password; other: password protection;
P00.02	No.	0	0～65535	/	1	
P00.03	Feature selection==========	0	0~2	/	0	0: Control start and stop but no speed adjustment 1: Control start-stop and speed adjustment 2: Prohibition of start-stop and speed adjustment
P00.04	Constant pressure water supply mode	0	0~3	/	0	0: Invalid; 3: Multi-pump control
P00.18	Command channel selection	0	0~2	/	0	Reference parameter: P10.02
P00.19	Speed channel selection 1	0	0~15	/	0	Refer to parameter P10.03
P00.20	Closed loop control selection	0	0~1	/	4	Refer to parameter P51.00

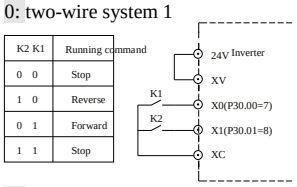
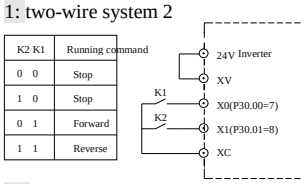
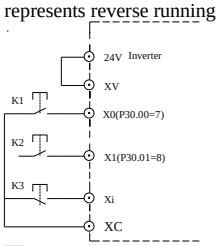
Group P01 Quick debugging Parameter						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P01.00	Acceleration time Ta0	5.00	0.00~650.00	s	4	Reference parameter: P40.02
P01.01	Deceleration time Td0	5.00	0.00~650.00	s	4	Refer to parameter P40.03
P01.02	Stop mode selection	0	0~4	/	4	Refer to parameter P12.00

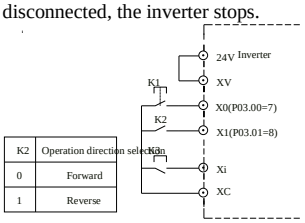
Group P02 Quick debugging Parameter						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P02.00	Type of motor 1	1	0~2	/	0	0: Asynchronous; 1: Permanent magnet synchronous; 2: Reluctance
P2.01	Rated power of motor 1	According to power	0.10～650.00	kW	0	Set by motor nameplate
P2.02	Rated current of motor 1	According to power	0.1～5000.0	A	0	Set by motor nameplate
P2.03	Rated frequency of motor 1	50.00	0.01～650.00	Hz	0	Set by motor nameplate
P2.04	Rated speed of motor 1	1460	1～18000	rpm	0	Set by motor nameplate
P2.05	Rated voltage of motor 1	220	100～690	V	0	Set by motor nameplate
P2.06	Number of poles of motor 1	4	2～200	P	0	Number of pole-pairs = number of poles/2
P2.07	Phase sequence of motor 1	1	0~1	/	0	0: reverse; 1: forward
P2.08	Upper limit of frequency	50.00	0.00~650.00	Hz	4	Refer to parameter P70.00
P2.09	Lower limit of frequency	20.00	0.00~300.00	Hz	4	Refer to parameter P70.01
P2.10	Maximum frequency	50.00	1.00～655.00	Hz	4	Refer to parameter P70.02

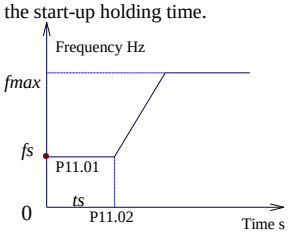
Group P03 Quick debugging Parameter						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P03.00	Input DI0 function	7	0~161	/	0	Refer to parameter P30.00
P03.01	Input DI1 function	8	0~161	/	0	Refer to parameter P30.01
P03.02	Input DI2 function	0	0~161	/	0	Refer to parameter P30.02
P03.03	Input DI3 function	0	0~161	/	0	Refer to parameter P30.03
P03.12	Output K1 function	2	0~199	/	0	Refer to parameter P31.00
P03.14	Input AI0 function	0	0~6	/	0	Refer to parameter P32.01
P03.20	Input AI1 function	0	0~6	/	0	Refer to parameter P32.07

P03.26	Output M0 type	1	0~50	/	4	Refer to parameter P33.00
P03.27	Output M0 type	4	0~4	/	0	Refer to parameter P33.06
P03.28	Lower limit of output M0	19	-100.00~100.00	%	4	Refer to parameter P33.01
P03.29	Upper limit of output M0	97.5	0~400.0	%	4	Refer to parameter P33.02

Group P04 Quick debugging Parameter						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P04.00	Communication mode selection	0	0~4	/	0	Refer to parameter P80.00

P10 group Basic control parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P10.00	Control mode selection	0	0～5	/	0	0: Voltage vector V/f control 1: Speed sensorless vector control (SVC) 2: Standby 3: Standby 4: General Vector Control (GVC) 5: Standby
P10.01	Operating mode selection	0	0～5	/	0	0: two-wire system 1  1: two-wire system 2  2: three-wire system 1 "9: Three-wire running control" function is set at Xi (i=2～7) terminal. When K3 is closed, K0(forward) and K1 (reverse) control is invalid; when K3 is disconnected, K0 and K1 control is invalid, and the inverter stops; The rising edge of X0 terminal represents forward running command; the rising edge of X1 terminal represents reverse running command.  3: three-wire system 2 "9: Three-wire running control" function is set at Xi (i=2～7) terminal. The rising edge of K1 terminal represents the running command; K2 terminal disconnected represents the forward direction command; K3 terminal closed represents the reverse direction command; when K3 is

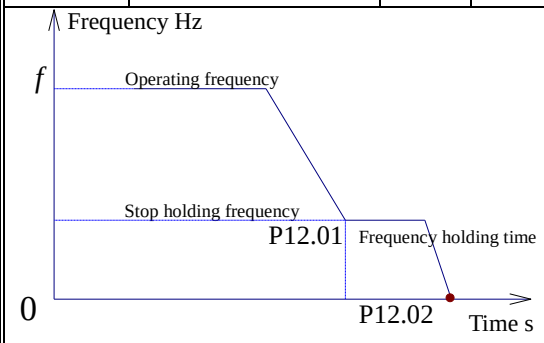
						disconnected, the inverter stops.  K2 Operation direction selection 0 Forward 1 Reverse 4: one- wiring operating mode system 5: Pulse start-stop mode
P10.02	Command channel selection	0	0～2	/	0	0: Panel given running command 1: Terminal given running Command 2: Communication given running Command
P10.03	Speed channel selection 1	0	0～15	/	0	0: panel frequency▲, ▼ given 1. Digital quantity multi-stage given target speed 2: Standby 3: analog 0 target speed given 4: analog 0 current speed given 5: analog 1 target speed given 6: analog 1 current speed given 7: internal communication given Current speed 8: PID given target speed 9: analog 2 target speed given 10: analog 2 current speed given 11: Standby 12: Modbus given target speed 13: Standby 14: Standby 15: Up/Down given speed:
P10.06	Speed limit selection	0	0～4	/	0	0: Internal parameter limit 1: Analog 0 limit 2: Analog 1 limit 3: Analog 2 limit 4: ModBus communication limit
P10.07	Speed channel selection 2	0	0～16	/	0	The same as P10.03
P10.08	Feature selection==========	0	0~2	/	0	0: Control start and stop but no speed adjustment; 1: Control start-stop and speed adjustment; 2: Prohibition of start-stop and speed adjustment
P10.09	YY	2070	2015~2099	/	0	
P10.10	MM	6	1~12	/	0	
P10.11	DD	18	1~31	/	0	
P10.12	Hour	0	0~23	/	0	
P10.113	Minute	0	0~59	/	0	
P10.14	Second	0	0~59	/	0	
P10.15	Week	1	1~7	/	0	
P11 group Start control parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**

P11.00	Start mode selection	0	0～2	/	0	Define the startup mode of the inverter. 0: Normal start, direct start. 1: Restart after DC braking, the inverter will inject the starting DC current into the motor within the starting DC injection time, and the motor will start after DC braking. 2: Speed tracking start; the inverter can be started directly when the motor is rotating, which is used to start the free-rotating motor (the synchronous motor speed tracking function is under development).
P11.01	Start holding frequency	0.00	0.00～50.00	Hz	0	The inverter starts to run from the start-up holding frequency, and it accelerates according to the set acceleration time after the start-up holding time.  Note: For start-up occasions, proper setting of the start-up frequency holding time is beneficial to start-up. Under vector control with encoder speed feedback, the starting frequency is factory-set to 0.00Hz, and others are 0.05Hz.
P11.02	Start frequency holding time	0.0	0.0～650.0	s	0	
P11.03	Start DC injection current	30.0	0.0～200.0	%	0	When setting the start mode to DC braking and then restarting, the inverter injects DC current into the motor. After the start DC injection time, the inverter starts. It is suitable for loads where the motor needs to stop when starting. The current is the percentage of the inverter's rated current. 0.0～120.0% in heavy load; 0.0～90.0% in light load. Among them, the DC injection current is also used as the GVC starting current
P11.04	Start DC injection time	5.0	0.0～650.0	s	0	
P11.05	Excitation time	2	0.0～650.0	s	0	0: No pre-excitation process Others: set pre-excitation time
P11.07	Brake actuation time	0.20	0.00～65.00	s	0	Brake actuation time is the time for the external brake to fully open from receiving the opening command. After opening, the external brake enters the zero servo time, namely the zero speed holding time
P11.08	Tracking delay time	1000	0～65000	ms	0	This time is used to wait for motor demagnetization. This value shall be increased if overcurrent appears at the beginning of tracking.
P11.09	Zero voltage tracking time	100	0～65000	ms	0	Enter the tracking waiting time
P11.10	Tracking voltage Kp	0.20	0.00～100.00	/	0	If the value is too small, the tracking process will be longer, leading to overcurrent in the tracking process.
P11.11	Tracking voltage Ki	0.30	0.00～100.00	/	0	
P11.12	Tracking voltage Kd	0.00	0.00～100.00	/	0	If the value is too small, the overshoot current suppression is not obvious in the tracking process; if the value is too large, overcurrent will appear in the tracking process.
P11.13	Tracking exit delay	1000	0～65000	ms	0	Ensure a smooth tracking exit process. Increasing this time is conductive to smooth exit.
P11.14	Maximum current when tracking	100.0	0.0～200.0	%	0	Percentage of rated current of motor. When small load drags large load, the maximum current when tracking shall be less than the rated current of inverter. This value shall be reduced in case of overcurrent in the tracking process.

P11.15	Tracking frequency variation gain	10.0	0.0～100.0	%	0	This value shall be reduced in case of overvoltage or P60.09 greater than 600V in the tracking process.
P11.17	Initial tracking frequency	50.00	0.00～300.00	Hz	0	It is usually set to the maximum operating frequency before tracking. If the inertial stop speed of the system decreases rapidly, the value can be appropriately reduced.
P11.19	Breaking current of negative rotation	20.0	0.0～100.0	%	0	Used the motor breaking control in the lifting industry. The breaking conditions can be met only when the motor reverse start current is greater than P11.19 current.

P12 group Stop parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P12.00	The shutdown mode selection	0	0～4	/	4	0: Inertial stop 1: Decelerated stop 2: Deceleration + DC braking 3: Deceleration + holding excitation 4: Deceleration + holding Torque
P12.01	Stop holding frequency	0.00	0.00～300.00	Hz	0	The inverter decelerates to the stop holding frequency, and it decelerates to zero according to the set deceleration time after the stop frequency holding time.
P12.02	Stop frequency holding time	0.0	0.0～6500.0	s	0	



P12.03	DC braking start frequency	2.50	0.00～10.00	Hz	0	It is valid in parking mode of P12.00=2. When the inverter decelerates to the starting frequency of DC braking, the inverter injects the parking DC braking current into the motor, and the DC current disappears after the parking DC braking time. The current is the percentage of the inverter's current. Under heavy load: 0.0～120.0%; under light load: 0.0～90.0%; under variable torque load: 0.0～90.0%.
P12.04	Stop DC braking current	50.0	0.0～100.0	%	0	
P12.05	Stop DC braking time	0.5	0.0～10.0	s	0	
P12.06	Stop excitation holding time	0	0～65000	s	0	The inverter stops when the stop mode is deceleration + holding excitation and the deceleration/torque time is greater than the value.

P13 group Brake function parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P13.00	Energy consumption braking option	0	0～1	/	0	0: Dynamic braking enabled 1: Dynamic braking not enabled (Inverter power relevant)
P13.01	Brake opening voltage	360	340～1160	V	0	It is only valid for inverters with built-in braking unit. Appropriate selection of the brake opening voltage can realize fast energy consumption braking and stop.

P14 group V/F control parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P14.00	V/F curve setting	0	0～6	/	0	0: standard V/F straight line; 1: 1.2-power curve; 2: 1.5-power curve; 3: 2-power curve; 4: User defined 5: VF complete separation 6: Simple MTPA.
P14.01	V/F voltage value V0	44	1～690	V	0	
P14.02	V/F frequency value F0	10.00	0.01～300.00	Hz	0	F0<F1
P14.03	V/F voltage value V1	88	1～690	V	0	
P14.04	V/F frequency value F1	20.00	0.01～300.00	Hz	0	F1<F2
P14.05	V/F voltage value V2	132	1～690	V	0	
P14.06	V/F frequency value F2	30.00	0.01～300.00	Hz	0	F2<F3
P14.07	V/F voltage value V3	176	1～690	V	0	
P14.08	V/F frequency value F3	40.00	0.01～300.00	Hz	0	F3<F4
P14.09	V/F voltage value V4	220	1～690	V	0	
P14.10	V/F frequency value F4	50.00	0.01～300.00	Hz	0	
P15 group SVC control parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P15.00	PM-SVC coefficient	25	0～65535	%	0	
P15.01	PM low speed compensation coefficient 1	40	0～65535	%	0	
P15.02	Control state word	64	0～65535	/	0	
P15.03	PM current control strategy	1	1～65535	/	0	0: id=0，1: MTPA，2UPF
P15.04	Initial magnetic pole judgment	2	1～65535	/	0	1: DC injection, 2: Pulse injection
P15.05	DC injection size	50	0～65535	Hz	0	DC injection size when started
P15.06	Injected high frequency	30.00	0～6553.5	%	0	
P15.07	Injected high frequency amplitude	8.0	1～690	V	0	
P15.08	High frequency Kp	15.00	0.00～655.35	/	0	
P15.09	High frequency Ki	0.0050	0.0000~6.5535	/	0	
P15.10	Pulse injection time	1.0	0.0～6553.5	ms	0	
P15.11	Upper limit of flux linkage compensation	0	0~65535	%	4	
P15.12	Pole positioning frequency	0.50	0.00~655.35	Hz	4	
P15.13	Pole positioning time	2.000	0.000~65.535	s	4	

P15.14	DC injection time	1.00	0.10~655.35	s	0	
P15.15	fc of M-Axis	100	0~1000	%	0	
P15.16	Damp of M-Axis	0.80	0.00~655.35	/	0	
P15.17	fc of T-Axis	100	0~1000	%	0	
P15.18	Damp of T-Axis	0.80	0.00~655.35	/	0	
P15.19	Para Err Comp kp	0.00	0.00~655.35	/	0	
P15.20	SRM Ferrite Emf	0.0	0~6553.5	V	0	
P15.21	Max.BW of Obs	50	0~600	Hz	0	
P15.22	Kp of MTPA	0.60	0.00~10.00	/	0	
P15.23	Ki of MTPA	10	0~1000	/	0	
P15.24	Imin of MTPA	5	0~100	%	0	
P15.25	LdOverride	100	50~200	%	0	
P15.26	Pulse injection amplitude	7.0	2~2000	%	0	Used to judge the initial position at pulse injection
P16 group	**Advanced parameters**					
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P16.00	Field weakening mode selection	0	0～5	/	0	
P16.01	Field weakening voltage given value	95	0～4095	%	0	
P16.02	Field weakening voltage band width	1.0	0.0～655.35	Hz	0	
P16.05	Sampling window	9.00	3.00～655.35	us	0	
P16.06	Sampling moment	1.00	0.00～655.35	us	0	
P17 group	**Auxiliary parameter**					
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P17.00	Low speed voltage compensation gain	0	0～500	%	0	
P17.01	Voltage compensation upper limit frequency	40	0～200	%	0	
P17.02	Vibration suppression gain	2.00	0.00～655.35	/	0	
P17.03	Vibration suppression restriction	90.10	0.00～655.35	/	0	
P17.04	Resistance compensation filter	10.00	0.00～200.00	Hz	0	
P17.05	MTPA output filter frequency	10.00	0.00～200.00	Hz	0	
P17.06	DC injection slope	1.00	0.00~100.00	s	0	
P17.07	External synchronization switching frequency	10	0~200	%	0	

P17.08	Current optimization coefficient	0.05	0.00～655.35	%	0	
P17.09	Feedback speed filter	20.00	0.00～200.00	Hz	0	
P17.10	Slip low-pass filter	1.00	0.00～200.00	Hz	0	
P17.11	Dead zone compensation current threshold	1.00	0.00~100.00	/	0	
P17.12	Lower limit of dead zone low-pass filter	20.00	0.00～100.00	Hz	0	
P17.13	Dead zone low-pass filter multiple	1.00	0.00~100.00	/	0	

P20 group	**Basic motor parameters**					
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P20.00	Type of motor 1	0	0	/	0	0: Asynchronous; 1: magnet synchronous; 2: reluctance
P20.01	Rated power of motor 1	According to power	0.4～400.0	kW	0	Set by motor nameplate
P20.02	Rated current of motor 1	According to power	0.1～999.9	A	0	Set by motor nameplate
P20.03	Rated frequency of motor 1	50.00	0.01～650.00	Hz	0	Set by motor nameplate
P20.04	Rated speed of motor 1	1460	1～18000	rpm	0	Set by motor nameplate
P20.05	Rated voltage of motor 1	220	100～690	V	0	Set by motor nameplate
P20.06	Number of poles of motor 1	4	2～200	/	0	Number of pole-pairs = number of poles/2
P20.07	Rated slip frequency of motor 1	0.30	0.10～20.00	Hz	0	Set by motor nameplate
P20.08	Maximum slip frequency of motor 1	0.60	0.10～40.00	Hz	1	Rated slip frequency of twice generally
P20.09	Phase sequence of motor 1	1	0～1	/	0	0: negative phase sequence; 1: positive phase sequence
P20.10	No-load current coefficient of motor 1	30.00	1.00～200.00	%	0	Generally around 30%
P20.12	Maximum power coefficient of motor 1	250	50～400	%	0	Is used to limit the maximum torque currently allowed to output by the inverter under the closed-loop vector control mode. When the current actual output power of the inverter is less than the power set by P20.12, the maximum torque allowed to output by the inverter is P70.04 output torque limit; otherwise, it will be gradually reduced and the power is maintained no more than P20.12.
P20.14	Type of motor 2	0	0	/	0	The same as motor 1
P20.15	Rated power of motor 2	According to power	0.4～400.0	kW	0	
P20.16	Rated current of motor 2	According to power	0.1～999.9	A	0	
P20.17	Rated frequency of motor 2	50.00	0.01～650.00	Hz	0	
P20.18	Rated speed of motor 2	1460	1～18000	rpm	0	

P20.19	Rated voltage of motor 2	380	100～690	V	0	
P20.20	Number of poles of motor 2	4	2～200	/	0	
P20.21	Rated slip frequency of motor 2	1.40	0.10～20.00	Hz	0	
P20.22	Maximum slip frequency of motor 2	2.80	0.10～40.00	Hz	1	
P20.23	Phase sequence of motor 2	1	0～1	/	0	
P20.24	No-load current coefficient of motor 2	30.00	1.00～200.00	%	0	
P20.25	Maximum power coefficient of motor 2	250	50～400	%	3	
P20.27	Motor parameter calculation enable	0	0~2	/	0	
Note: Different inverter powers correspond to different factory values.						

P21 group	**Advanced motor parameters**					
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P21.00	Motor setting	0	0	/	**2**	
P21.01	Stator resistance of motor 1	0.000	0.000～65.535	Ω	0	
P21.02	Rotor resistance of motor 1	0.441	0.000～65.535	Ω	0	
P21.03	Stator inductance of motor 1	0.1028	0.0000～6.5535	H	0	
P21.04	Rotor inductance of motor 1	0.1028	0.0000～6.5535	H	0	
P21.05	Mutual inductance of motor 1	0.0991	0.0000～6.5535	H	0	
P21.06	Stator resistance of motor 2	7.298	0.000～65.535	Ω	0	
P21.07	Rotor resistance of motor 2	8.885	0.000～65.535	Ω	0	
P21.08	Stator inductance of motor 2	0.6546	0.0000～6.5535	H	0	
P21.09	Rotor inductance of motor 2	0.6546	0.0000～6.5535	H	0	
P21.10	Mutual inductance of motor 2	0.6216	0.0000～6.5535	H	0	
P21.11	PM1 stator resistance	0.000	0.000～65.535	Ω	0	
P21.12	PM1 motor shaft D inductance	0.0	0.0~6553.5	/	0	
P21.13	PM1 motor shaft Q inductance	0.0	0.0~6553.5	/	0	
P21.14	PM1 counter electromotive force coefficient	196.9	0.0~6553.5	V	0	
P21.21	Self-learning mode	1	0~2	/	0	0: Non self-learning 1: Self-learning of all parameters 2: Self-learning of stator resistance
Note: The above parameters are related to the motor nameplate parameters.						

P22 group Motor auxiliary parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P22.00	Feedback speed filter time	5	0～65535	ms	0	

P23 group motor protection parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P23.00	Motor protection function selection	1	0~2	/	0	0: No protection 1: With independent cooling fan 2: Without independent cooling fan
P23.01	Continuous running current	110.0	70.0～150.0	%	0	
P23.02	1min overcurrent threshold	120.0	110～300.0	%	0	

P30 group Digital input parameters

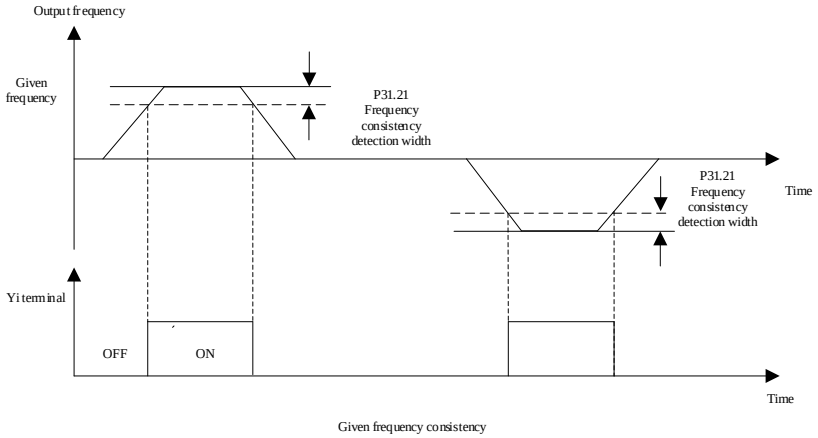
Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P30.00	X0 terminal input function selection	7	0～161	/	0	0: no function 1, 2: Acceleration and deceleration time selection 0, 1 3~6: Digital stage speed 0~3 7: Terminal forward input (FWD) 8: Terminal reverse input (REV) 9: Three-wire running control 10: Motor fan feedback 12: External fault terminal 2 13: External reset terminal 14: External fault terminal 16: Emergency power supply running 17:Weighing compensation % 18: Basic electrode locking signal 19: Light load switch input 20: Heavy load switch input 21: Output contactor detection 22: Brake contactor detection 23: Brake switch detection 24: Motor selection 28: Forward pulse start 29: Reverse pulse start 31/32: Frequency increase/decrease (not held) 33: Emergency stop (hanging signal) 34/35: Forward/reverse deceleration 36/37: Forward/reverse stop 38/39: Frequency increase/decrease (held) 40: Inching frequency selection 41: Command switched to the operation panel 42: Command switched to the terminal 43: Command switched to the upper computer 44: Open loop primary and secondary given switching 45: PID primary given to the internal 46: PID main given switch to analog A0 47: PID secondary given to invalid 48: PID secondary given to analog A0 49: FJOG command 50: RJOG command 51: PID secondary given to analog A1 52: PID secondary given to analog A1 53: Speed channel switch 54: PID paused Other: Standby The default high level, when there is an over-temperature signal, the level is pulled down
P30.01	X1 terminal input function selection	0	0～161	/	0	
P30.02	X2 terminal input function selection	0	0～161	/	0	
P30.03	X3 terminal input function selection	0	0～161	/	0	

P30.08	X0～ X3 input filter times	5	1～99	Times	4	Filter the digital input signal
P30.09	Choice of shared negative and positive	0	0～1	/	0	0: shared negative, 1: shared positve

P31 group Digital output parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P31.00	Output K1 function definition	2	0～155	/	0	0: no function 1 or 101: The inverter is ready for operation (RDY) 2 or 102: Inverter fault 3 or 103: Inverter running signal (RUN) 4 or 104: Frequency arrival output (FAR) 5 or 105: Consistent frequency speed output (FDT) 6 or 106: Inverter zero speed running 7 or 107: DC bus voltage normal 8 or 108: Exceeding 5% of the rated current in running and 10% of the rated current when stopping 9 or 109: Tuning 10 or 110, 11 or 111: Frequency detection 1, 2 12 or 112: Fault forecast 13 or 113: self-tuning request output 14 or 114: Zero servo torque direction judgment (use when the motor is powered off for emergency leveling) 15 or 115: Zero current detection 16: Judgment of power generation (1) and electric (0) stage 116: Judgment of power generation (0) and electric (1) stage 17: The contactor is closed (1) 117: The contactor is closed (0) 18: Brake release (1) 118: Brake release (0) 19 or 20: Pulse output 0,1 21 or 121: overheating alarm above 80℃ 22: Motor overheating alarm output 23: Motor switching output 25: Brake output 26: Cumulative running time reach 27: Single running time reach 28, 29: Output X1 and X2 30: Undervoltage blocking stopping 31: Fan control 32: Analog input disconnection 33: Motor PTC alarm 34: Reverse state 35: Sleep 51: Frequency detection 3 52: Frequency detection 4 53: Frequency detection 5 54: Alarm output

P31.20	Zero current detection width	4.0	0.0～6553.5	%	0	This function can be used for load change detection. Set the output terminal function to "15: Zero current detected" and output the indication signal when the inverter output current is less than the zero current detection width P31.20. When the inverter current is greater than the threshold at stop, the corresponding output end set by the function code 15 (or 115) acts. Note: The function parameter is the percentage of the output current of the inverter relative to the rated current of the motor.
P31.21	Frequency arrival detection width	1.00	0.00～655.35	Hz	0	It is used for deviation detection between output frequency and set frequency. Set the output terminal function to "4: Frequency arrival signal". When the deviation between the output frequency and set frequency of the inverter is within the set range of this function code, the indication signal is output, as shown in the frequency signal set frequency (FAR) in the figure.



P31.22	Detection frequency	1.00	0.00～655.35	Hz	0	For frequency detection function
P31.23	Detection frequency width	0.20	0.00～300.00	Hz	0	For frequency detection function
P31.24	Single running time arrival	2	0~65535	h	0	Output the indication signal when the single continuous running time reaches the set from the inverter run command. Achieve the output indication signal by defining the output terminal function code as “27”.
P31.25	Cumulative running time arrival	8	0~65535	h	0	Output the indication signal when the cumulative running time reaches the set from the inverter power on. Achieve the output indication signal by defining the output terminal function code as “26”.

P32 group Analog input parameters

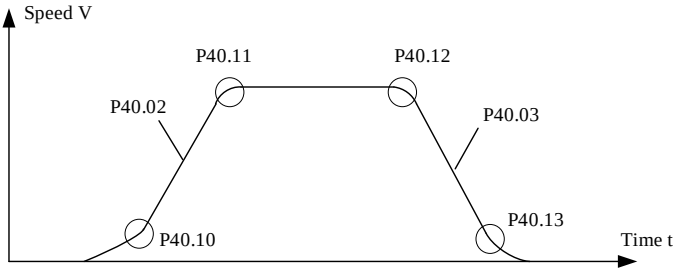
Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P32.00	A0 input type	0	0～3	/	0	0: 0V～10V 1: -10V～10V 2: 0~20mA 3: 4~20mA
P32.01	A0 terminal input function selection	0	0～6	/	0	0: no function 1: Target speed signal 2: Current speed signal 5: Speed limit signal 6: PTC protection signal When the frequency given mode P10.03=3, 5, 7, A0 and A1 will be automatically set to 1

						When the frequency given mode P10.03=4, 6, 8, A0 and A1 will be automatically set to 2
P32.02	Lower limit of analog input A0	0.00	-100～327.67	%	4	
P32.03	Upper limit of analog input A0	100.0	0.0～6553.5	%	4	
P32.04	A0 filter time	10	0～65535	ms	0	The default is 2000ms when PTC protection signal is selected
P32.05	A0 amplitude limit	10.000	0.000～65.535	V/mA	0	only limits the final processing signal of the analog input within a certain control range. If current type is selected, the amplitude limit shall be set to 20.000mA.
P32.06	A1 input type	0	0～3	/	0	The same as A0
P32.07	A1 terminal input function selection	0	0～6	/	0	
P32.08	Lower limit of analog input A1	0.00	-100～327.67	%	4	
P32.09	Upper limit of analog input A1	100.0	0.0～6553.5	%	4	
P32.10	A1 filter time	10	0～65535	ms	0	
P32.11	A1 amplitude limit	10.000	0.000～65.535	V	0	

P33 group Analog output parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P33.00	M0 Output function selection	1	0～30	/	4	0: no function; 1: Output current (with motor rated current as the reference), 0~Ie corresponds to 0~10V; 2: Output voltage, 0~Ue corresponds to 0~10V; 3: Torque setting, 0~2Te corresponds to 0~10V; 4: Bus voltage, 0~Udc corresponds to 0~10V; 5: Output active power, 0~P total corresponds to 0~10V; 6: Target speed (unsigned), 0~Ne corresponds to 0~10V; 7: Current speed (unsigned), 0~Ne corresponds to 0~10V; 8: Speed given (signed),0~Ne corresponds to 0~10V; 9: Speed feedback (signed),0~Ne corresponds to 0~10V; 10: Acceleration, 0~ 50Hz/s corresponds to 0~10V; 11: radiator temperature, 0~100 degrees corresponds to 0~10V; 12: Inverter output current (with inverter rated current as the reference) 13: Analog input A0, 0~10V corresponds to output 0~10V; 14: Analog A1 input, 0~10V corresponds to output 0~10V; 15: Analog A2 input, 0~10V corresponds to output 0~10V; 16: modbus analog output 0 17: modbus analog output 1 18: Total output power

P33.01	Lower limit of analog output M0	19.00	-100.00～100.00	%	4	
P33.02	Upper limit of analog output M0	97.5	0.0～400.0	%	4	
P33.06	M0 output type selection	4	0~4	/	0	1: 0~10V 2: -10V~+10V 3: 0~20mA 4: 4~20mA
P40 group Basic speed parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P40.00	Panel speed	5.00	0.00～650.00	Hz	4	Initial speed given by the panel, which can be changed by the button▲ and▼.
P40.01	Basic frequency	50.00	0.00～300.00	Hz	0	Basic operating frequency refers to the minimum frequency corresponding to the maximum output voltage of the inverter. It corresponds to the rated frequency of the standard AC motor, as shown in the motor nameplate.
P40.02	Acceleration time 0	5.00	0.00～650.00	s	4	Time taken for the output frequency of inverter to rise from zero frequency to the maximum frequency.
P40.03	Deceleration time 0	5.00	0.00～650.00	s	4	Time taken for the output frequency of inverter to fall from maximum frequency to zero
P40.04	Acceleration time 1	5.00	0.00～650.00	s	4	By defining the multi-function X terminal (acceleration/deceleration time 1 ~ 2), different acceleration/deceleration time is selected according to different terminal states. The meaning is the same as P40.02, P40.03
P40.05	Deceleration time 1	5.00	0.00～650.00	s	4	
P40.06	Acceleration time 2	5.00	0.00～650.00	s	4	
P40.07	Deceleration time 2	5.00	0.00～650.00	s	4	
P40.08	Acceleration time 3	5.00	0.00～650.00	s	4	
P40.09	Deceleration time 3	5.00	0.00～650.00	s	4	
P40.10	Acceleration rounded corner Ts0	0.00	0.00～100.00	s	4	Acceleration start
P40.11	Acceleration rounded corner Ts1	0.00	0.00～100.00	s	4	Acceleration end
P40.12	Deceleration rounded corner Ts2	0.00	0.00～100.00	s	4	Deceleration start
P40.13	Deceleration rounded corner Ts3	0.00	0.00～100.00	s	4	Deceleration end
P40.14	Top round corner suppression	0	0~3	/	4	
P40.15	Frequency switching point 1	1100	0~65535	%	4	Current running frequency <switching point 1: Use 40.02 and 40.03 for acceleration and deceleration time; Switching point 1<current running frequency<switching point 2: use 40.04 and 40.05 for acceleration and deceleration time Current running frequency> switching point 2: use 40.06 and 40.07 for acceleration and deceleration time;
P40.16	Frequency switching point 2	1120	0~65535	%	4	



P41 Group Digital multi-stage parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P41.00	Digital quantity multi-stage given 0	0.00	0.00～300.00	Hz	4	It can be set as the process open-loop frequency. By defining the multi-function X terminal (digital multi-stage 0 ~ 3), different multi-stage frequency is set with different terminal states. ON means that the terminal is valid, and OFF means that the terminal is invalid.
P41.01	Digital quantity multi-stage given 1	5.00	0.00～300.00	Hz	4	
P41.02	Digital quantity multi-stage given 2	10.00	0.00～300.00	Hz	4	
P41.03	Digital quantity multi-stage given 3	20.00	0.00～300.00	Hz	4	
P41.04	Digital quantity multi-stage given 4	30.00	0.00～300.00	Hz	4	
P41.05	Digital quantity multi-stage given 5	40.00	0.00～300.00	Hz	4	
P41.06	Digital quantity multi-stage given 6	0.00	0.00～300.00	Hz	4	
P41.07	Digital quantity multi-stage given 7	0.00	0.00～300.00	Hz	4	
P41.08	Inching frequency given	5.00	0.00～50.00	Hz	4	

Multi-stage combination code	Multi-stage given 3	Multi-stage given 2	Multi-stage given 1	Multi-stage given 0	Given frequency
0	0	0	0	0	Given speed 0
1	0	0	0	1	Given speed 1
2	0	0	1	0	Given speed 2
3	0	0	1	1	Given speed 3
4	0	1	0	0	Given speed 4
5	0	1	0	1	Given speed 5
6	0	1	1	0	Given speed 6
7	0	1	1	1	Given speed 7

P50 group Process open loop parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P50.00	Open loop auxiliary given mode	0	0～5	/	4	0: NA; 1: A0; 2: A1; 3: Standby 4: Standby 5: PID given target speed
P50.01	The open loop primary and secondary relational operation is defined as follows:	0	0～6	/	4	0: No operation 1: primary + secondary 2: primary - secondary 3: Standby 4: Standby 5: Maximum value 6: Minimum value

P51 group Process closed loop parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P51.00	Closed loop operation control selection	0	0～1	/	4	0: invalid closed loop operation control 1: valid closed loop operation control
P51.01	Primary given mode of closed-loop control	0	0～6	/	4	0: internal given 1: A0 2: A1 3~4: spare 5: Internal given by time 6: ModBus communication given
P51.02	Secondary given mode of closed-loop control	2	0～6	/	4	0: NA 1: A0 2: A1 3~5: Standby 6: ModBus communication given
P51.03	Closed loop primary and secondary given operation	0	0～6	/	4	0: No operation 1: primary + secondary 2: primary - secondary 3: Standby 4: Standby 5: Maximum value 6: Minimum value
P51.04	Primary feedback mode of closed-loop control	1	0～6	/	4	0: NA 1: A0 2: A1 3~5: Standby 6: ModBus communication given
P51.05	Secondary feedback mode of closed-loop control	2	0～6	/	4	0: NA 1: A0 2: A1 3~5: Standby 6: ModBus communication given
P51.06	Secondary feedback operation of closed-loop control	0	0～6	/	4	0: No operation 1: primary + secondary 2: primary - secondary 3: Standby 4: Standby 5: Maximum value 6: Minimum value
P51.07	PID internal given value	0.70	0.00～300.00	Mpa	4	
P51.08	Unit	2	0～3	/	4	Unit 0: V 1: % 2: Mpa 3: °
P51.09	Proportional gain Kp	10	0.00～655.35	/	4	The larger the Kp is, the faster the response will be, but it is easy to produce oscillation. Kp cannot completely eliminate the deviation, and Ki can be used to eliminate the residual deviation; the larger the KI is, the faster the inverter responds to the variation of deviation, but it is easy to produce oscillation; in case of frequent jump feedback in the system, Kd is required, which can quickly respond to the system feedback and given deviation variation. The larger the Kd is, the faster the response will be, but it is easy to produce oscillation.
P51.10	Integral gain Ki	0.02	0.00～655.35	/	4	
P51.11	Differential gain Kd	0.00	0.00～655.35	/	4	
P51.13	Integration mode selection	0	0～1	/	4	0: Frequency to the upper and lower limits and stop integral control 1: Frequency to the upper and lower limits and continue integral control
P51.14	Imported sensor channel	0	0~4	/	0	0: NA;1: AI0；2: AI1；3: AI2 4: AI3
P51.15	Output sensor channel	1	0~4	/	0	0: NA;1: AI0；2: AI1；3: AI2 4: AI3
P51.16	Imported sensor upper	1.00	0.00~20.00	MPa	0	

P51.18	Imported sensor lower	0.00	0.00~10.00	MPa	0	
P51.22	Upper limit of integral action	100.0	0.0～6553.5	%	4	It is used in combination with P51.13. When P51.13=1, the parameter setting value is valid.
P51.24	Upper limit of closed loop input	50.0	0.0～6553.5	%	4	The limit value in the process closed-loop control is set. If the limit value exceeds the upper input limit P51.24, it is adjusted according to the upper limit value; if it is less than the lower limit, PID regulation is not made, and the limit value in the process closed-loop control is set.
P51.25	Lower limit of closed loop input	0.0	0.0～6553.5	%	4	
P51.26	Upper limit of closed loop output	100.0	0.0～6553.5	%	4	
P51.28	Sleep wakeup selection	0	0~1		4	0: invalid; 1: valid
P51.29	Sleep frequency	30.00	0.00～655.35	Hz	4	P51.28= 1 valid
P51.30	Sleep delay	10.0	0.0～6553.5	s	4	
P51.31	Wakeup deviation	1.0	0.0～6553.5	Mpa	4	
P51.32	Wakeup delay	10.0	0.0～6553.5	s	4	
P51.33	Given acceleration time	0.0	0.0～6553.5	s	4	In case of sudden change in the closed-loop given value, the two parameters can be adjusted to make the given control in a certain response time, so that the closed-loop process in some environments can respond more smoothly.
P51.34	Closed loop output filter time	0.010	0.000～65.535	s	4	
P51.35	Lower limit of given quantity	0.00	0.00～655.35	MPa	4	P51.35～P51.38 define the relation curve between the analog closed-loop given and the expected feedback quantity. The set value is the percentage of the actual value of the given and feedback physical quantity relative to the reference value (10V or 20mA).
P51.36	Lower limit of feedback quantity range	0.00	0.00～655.35	MPa	4	
P51.37	Upper limit of given quantity	1.00	0.01～200.00	MPa	4	
P51.38	Upper limit of feedback quantity range	1.00	0.01～200.00	MPa	4	
P51.39	Preset frequency	22.00	0.00～655.35	Hz	4	0: No closed-loop preset frequency function
P51.40	Preset frequency holding time	0	0～65535	s	4	
P51.41	Positive and negative characteristics	0	0～1	/	4	0: positive characteristics 1: negative characteristics
P51.42	Proportional gain Kp2	40.00	0.00～100.00	/	4	PID parameter 2
P51.43	Integral gain Ki2	0.05	0.00～10.00	/	4	
P51.44	Differential gain Kd2	0.00	0.00～500.00	/	4	
P51.45	PID parameter switching deviation 1	0.5	0.0～100.0	%	4	PID parameter 1 switched to linear PID parameter
P51.46	PID parameter switching deviation 2	1.5	0.0～100.0	%	4	PID linear parameter switched to PID parameter 2
P51.47	Integral separation deviation	80.00	0.0～100.00	%	4	Integral separation threshold
P60 group	**Speed loop control parameters**					
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P60.03	Speed loop low speed P	5.00	0.00～655.35	/	0	
P60.04	Speed loop-low speed Ti	500	0.00～65535	ms	0	

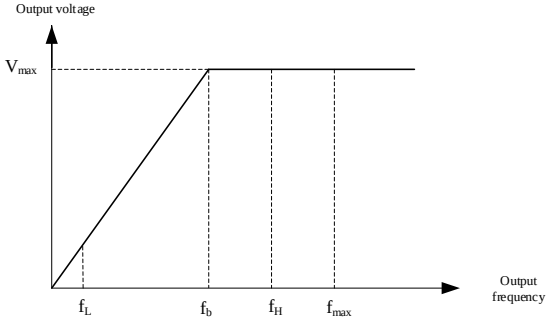
P60.05	Speed loop-low speed D	0.00	0.00～655.35	/	0	
P60.09	Speed loop high speed P	7.00	0.00～655.35	/	0	
P60.10	Speed loop high speed Ti	500	0～65535	ms	0	
P60.11	Speed loop high speed D	0.00	0.00～655.35	/	0	
P60.12	Switching frequency 0	10.0	0.0～100.0	%	0	
P60.13	Switching frequency 1	60.0	0.0～200.0	%	0	
P60.14	Speed loop execution cycle	2	0~1000	/	0	

P61 group Current loop control parameter

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P61.00	Current loop Kp	1.00	0.00～100.00	/	0	
P61.01	Current loop Ki	0.25	0.00～650.00	/	0	
P61.02	Current loop Kd	0.00	0.00～650.00	/	0	
P61.03	Current loop bandwidth	300.0	0.0～1000.0	Hz	0	
P61.05	Current loop selection	0	0～65535	/	0	
P61.06	V/F control current loop Max	10.0	0.0 ~30.0	%	0	
P61.07	V/F control current loop Min	10.0	0.0 ~30.0	%	0	

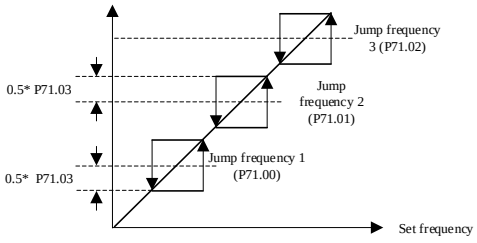
P70 group Restriction and protection parameters

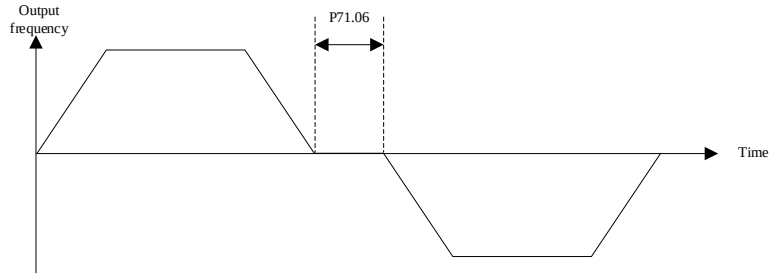
Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P70.00	Upper limit of frequency	50.00	0.00～650	Hz	4	The maximum output frequency fmax is the maximum frequency that the inverter can output. The maximum output voltage Vmax refers to the output voltage when the inverter is running at the basic operating frequency, and corresponds to the rated voltage value of the motor when a standard AC motor is used. The upper limit of frequency fH and lower limit of frequency fL are the highest and lowest frequency of motor operation set by the user according to the requirements of production process during use.
P70.01	Lower limit of frequency	20.00	0.00～300.00	Hz	4	
P70.02	Maximum output frequency	50.00	1.00～655.00	Hz	4	



P70.04	Output torque limit	250	0～500	%	0	

P70.05	Inverter acceleration overcurrent threshold	130	0～200	%	0	
P70.06	Inverter deceleration overvoltage threshold	750 (input 380V)	0～1200	V	0	Decelerate if the electricity generation is too fast, stop deceleration after the bus voltage reaches the modified threshold; decelerate after the voltage is lower than the modified threshold
P70.07	Overspeed protection factor	120.00	0.00～400.00	%	0	
P70.08	Special function selection	8209	0～65535	/	0	Bit0: 1 Over-current frequency reduction function enabled Bit1: 2 Overvoltage and frequency reduction function enabled Bit3 8 Whether to calculate rotor time constant depending on motor parameters (1: Depending on motor parameters; 0: Depending on slip frequency) Bit4: 16 Small speed decrease for sudden load increase; small speed increase for sudden load decrease. Bit5 32 Alarm for undervoltage (1: No alarm; 0: Alarm) Bit7 128 Zero servo mode (1: Calculate the zero servo torque depending on the acceleration; 0: Calculate the zero servo torque depending on the feedback speed) Bit8 256 Whether to 孑-learn encoder phase angle at each run (1: Yes; 0: learn once in power only on) Bit10: 1024 Is the bus voltage compensated when the emergency power supply is running (1: Yes; 0: No) Bit11: 2048: Standby Bit12: 4096: Standby Bit13: 8192 minimum current energy-saving control Bit14; 16384: Standby Bit15: 32768: Standby
P70.18	Bus undervoltage threshold	180	0~800	V	0	Subject to inverter rated voltage 380V
P70.19	Maximum torque of no-load uplink	0	0~65535	%	0	The inertia of the system when running without load is recorded. If the automatic speed limit function is used, the final speed limit is based on this parameter, which is usually used when the hoisting equipment has flux weakening control. After changing the acceleration/deceleration time of the system, set the software version parameter 95.01=12.34. The system goes up or down once. After stopping the operation, set the software version parameter 95.01=12.34 again, and run again in the opposite direction. After operation, parameters 70.19 and 70.20 record the no-load torque of the system up and down. In normal operation, the automatic limit function will judge the load weight, thereby determining the final running speed.
P70.20	Maximum torque of no-load downlink	0	0~65535	%	0	
P70.21	PWM detection delay	800	0~65000	ms	0	The inverter reports 51# fault after operation and parameter PWM detection delay if the output current is 0.
P70.22	Frequency selection below the lower limit	0	0～3	/	0	0: Run at lower limit of frequency 1: Stop 2: Zero speed operation 3: Inertial stop

P70.23	Current limit and frequency reduction current given	120	50-200	%	0	Reach 120% of the rated current of the motor, and turn on the frequency reduction function
P70.24	Current limit Kp	0.001	0.000-10.000	/	0	
P70.25	Current limit Ki	0.0001	0.0000-1.0000	/	0	
P70.26	Current limit OutMin	0.005	0.000-1.000	%	0	
P70.27	Limit current recovery value	10	0-100	%	0	Reach 90% of the rated current of the motor, and turn off the frequency reduction function
P70.28	Voltage limit and frequency reduction threshold	100	0-115	%	0	
P70.29	Limit power frequency reduction threshold	120	0~300	%	0	
P70.30	Power limit Kp	0.001	0.000~65.535	/	0	
P70.31	Power limit Ki	0.0001	0.0000~6.5535	/	0	
P70.32	Power limit OutMin	0.001	0.000-1.000	%	0	
P70.33	Limit power recovery threshold	10	0~65535	%	0	
P70.34	Over-temperature frequency reduction start temperature	80	60-100	℃	4	
P70.35	Over-temperature frequency reduction recovery temperature	75	50-95	℃	4	
P70.36	Over-temperature frequency reduction slope	5	0-100	/	4	
P70.37	Maximum over-temperature frequency reduction	10	0-100	%	4	
P71 group control optimization parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P71.00	Frequency hopping speed 1	0.00	0.00～300.00	Hz	4	To avoid mechanical resonance point, the frequency hopping range of the inverter can be set. When the set frequency of the inverter falls into the hopping frequency, it will automatically run in the hopping frequency range. The frequency hopping interval is from [frequency hopping speed 0.5× frequency hopping width, frequency hopping speed +0.5× frequency hopping width], and a total of three frequency modulation intervals can be set.
P71.01	Frequency hopping speed 2	0.00	0.00～100.00	Hz	4	
P71.02	Frequency hopping speed 3	0.00	0.00～100.00	Hz	4	
						
P71.03	Frequency hopping width	1.00	0.00～100.00	Hz	4	
P71.04	Inertia compensation coefficient	0.0	0.0～400.0	%	0	

P71.05	Prohibit reverse rotation	0	0～1	/	0	0: Reverse allowed, 1: Reverse prohibited.
P71.06	Positive and negative interval	0.0	0.0～6500.0	s	0	
						
P71.07	PWM modulation mode	2	0～2	/	0	0 indicates 5 segment and 1 indicates 7 segment. 2: <30%rpm 7-segment, >30% 5-segment
P71.08	Automatic torque lifting	1066	0～65535	/	0	0: NA 1: Automatic torque lifting 2: Oscillation suppression 4: Slip compensation 8: Stator resistance compensation 16: Dead zone compensation 32: Bus voltage compensation 64: Oscillation suppression 2 (Bit selection function)
P71.09	V/F torque compensation	0.0	0.0～50.0	%	0	Manual torque lifting, P71.08=0
P71.10	Maximum frequency of V/F compensation	10.0	1.0～300.0	Hz	0	
P71.12	Current slow fall time	0.00	0.00～655.35	s	0	The strike note at the motor stop can be reduced
P71.13	VF Minimum frequency of vibration suppression	3	0.0～50.0	Hz	0	
P71.14	Carrier frequency	6.000	1.100～16.000	kHz	0	if the inverter sounds too loud, the carrier frequency may be increased to reduce the sound.
P71.16	Regulator mode	1	0～3	/	0	The adjustment cycle of the speed loop, 0: 0.5ms, 1: 1ms, 2: 2ms, 3: 4ms; the larger the value, the slower the speed adjustment, which can reduce the electromagnetic noise of the motor. When the default carrier is not smaller than 4kHz, the regulator mode defaults to 1; when the default carrier frequency is not greater than 3kHz, the regulator mode defaults to 2.
P71.17	Contactor on delay	0.8	0.0～1000.0	s	0	
P71.18	Brake open delay	0.4	0.0～1000.0	s	0	
P71.19	Contactor off delay	1.0	0.0～6553.5	s	0	
P71.20	Brake close delay	0.1	0.0～6553.5	s	0	
P71.21	Output off delay	1.0	0.0～10.0	s	0	
P71.22	Zero speed threshold	0.20	0.00～10.00	Hz	0	It is considered as zero speed if the actual operating frequency is lower than the set value.
P71.23	Forward dead zone compensation	100	0～200	%	0	Compensates the dead zone time for the open-close conversion of the upper and lower bridge arms in positive rotation.
P71.24	Dead zone threshold coefficient	0.5	0.0~5.0	%	0	
P71.25	Zero servo compensation	0	0～65535	%	0	In the closed-loop vector control mode, if the incremental encoder is used and P71.25 is greater than 0, then the output of the zero servo regulating ring is superimposed with

						the compensation amount of P71.25 for the zero servo compensation time of P11.07.
P71.27	Motor current gain coefficient	150	32～400	%	0	
P71.28	Zero servo gain	100	48～65535	%	0	It can be adjusted appropriately when there is jitter and overcurrent in the zero servo process
P71.29	PWM modulation selection	8	0~255	/	0	0: underflow update 1: overflow/underflow update, if carrier frequency less than 4K, please set to 1.
P71.30	Power factor compensation angle	0.0	0~360	o	0	
P71.31	Power factor compensation direction	0	0~3	/	0	
P71.32	Power factor compensation mode	0	0~2	/	0	
P71.33	Speed accuracy adjustment	100.0	0.0～200.0	%	0	to set the characteristics in the speed sensorless vector control 1. If the acceleration and deceleration time is short, increase the value of P71.35 to accelerate the speed response. If the startup is difficult and the low-speed torque is required, increase the value of P71.36.
P71.34	Vector control compensation options	4136	0～65535	/	0	
P71.35	SVC1 inertia coefficient	0.0	0.0～6553.5	%	0	
P71.36	Torque compensation	100.0	0.0～1000.0	%	0	
P71.37	Droop control gain	0.0	0.0~100.0	%	0	
P71.38	Droop control filter	0.05	0.03~2.00	s	0	
P71.39	Power outage detection threshold	480	0~1000	V	0	Generally it is 480. In case of KEB process fault, the value can be appropriately increased by referring to the bus voltage of the inverter.
P71.40	KEB bus target voltage	500	0~1000	V	0	The value shall be greater than P71.39 (power outage detection threshold) and less than the bus voltage of the inverter in the normal power supply. This value can be appropriately increased by referring to the bus voltage of the inverter.
P71.41	Power outage disposal mode	0	0~4	/	0	0; No processing 1; Tracking start (limted time) 2; Tracking start (no time limit) 3; KEB (undervoltage detection) 4; KEB (no undervoltage detection)
P71.42	Maximum power outage compensation time	3.0	0.0~60.0	s	0	KEB enabled. Report undervoltage fault if the bus voltage is still low exceeding P71.42 (maximum power outage compensation time).
P71.43	KEB shortest actuation time	100	0~60000	ms	0	If KEB is enabled, at least P71.43 is required to exit (KEB shortest actuation time).
P71.44	KEB initial frequency drop	2.00	0.00~30.00	Hz	0	This value can be set within the range of 0~2 times the rated slip frequency of the motor in order to make the motor in the generating state quickly.
P71.45	KEB deceleration time	10.00	0.00~650.00	s	0	The value is increased in case of overvoltage during KEB action and is reduced in case of undervoltage or overcurrent.
P71.47	KEB acceleration time	25.00	0.00~650.00	s	0	Consistent with the set motor acceleration time.
P71.48	KEB proportion Kp	200.00	0.00~600.00	/	0	Set according to the default factory values, and generally it may not be changed.
P71.49	KEB integral Ki	0.00	0.00~600.00	/	0	
P71.50	KEB differential Kd	0.00	0.00~600.00	/	0	
P71.51	Upper limit of KEB integral	100.0	0.00~300.00	%	0	
P71.52	Lower limit of KEB integral	100.0	0.00~300.00	%	0	

P71.53	Upper limit of KEB closed loop output	100.0	0.00~600.00	%	0	
P71.54	Lower limit of KEB closed loop output	0.00	0.00~600.00	%	0	
P71.55	Upper limit of KEB voltage deviation	300.0	0.0~500.0	V	0	
P71.56	KEB voltage zero deviation	0.0	0.0~100.0	V	0	
P71.57	Carrier reduction starting temperature	75.0	0.0~100.0	℃	0	
P71.58	Fan control selection	0	0~4	/	0	0: When the inverter runs, the fan runs; when the inverter stops, the fan stops after 1min delay; 1: When the inverter runs, the fan runs; when the inverter stops, the fan stops after 5min delay; 2: When the inverter runs, the fan runs; when the inverter stops, the fan stops after 30min delay; 3: Fan running conditions: the fan runs when the radiator temperature is higher than 40℃; the fan stops after 1s delay when the radiator temperature is lower than 35℃; 4: It keeps running after inverter power on
P71.59	Optimization parameter 1	0.0040	0.0000~6.5535	/	0	The are valid for open-loop vector:
P71.60	Optimization parameter 2	100.0	0.1~300.0	%	0	
P71.61	Optimization parameter 3	100.0	0.1~300.0	%	0	
P71.62	UP/DOWN single step length	0.1	0.00～10.00	Hz	0	
P71.63	Phase locking function enabled	0	0~100	/	0	
P71.64	Screen off time	1.0	0.0~600.0	Min	0	
P71.65	Angle unit value	0	/	/	0	
P80 group Communication selection parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P80.00	Communication mode selection	0	0～4	\	0	0; No communication 2: Modbus；
P81 group Modbus communication parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P81.00	Communication baud rate	3	0～7	bps	0	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 76800 bps
P81.01	Data format	0	0～3	/	0	0: 1− 8− 1 format, no parity 1: 1− 8− 1 format, even parity check 2: 1− 8− 1 format, odd parity check 3: 1− 8− 2 format, no parity

P81.02	Transmission mode selection	1	0～1	/	0	0: ASCII；1: RTU
P81.04	Local address	1	1～247	/	0	1～247, 0 is broadcast address
P81.07	Communication address format selection	1		/	0	0: Hexadecimal 1: Decimal system
P90 group Language selection parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P90.00	Operation panel language selection	0	0～1	/	0	0: Chinese 1: English
P91 group LCD display parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P91.00	U01 display data	1	0～63	/	0	0: No definition 1: Target speed Hz 2: Given speed Hz 3: Feedback speed Hz 4: Given speed rpm 5: Feedback speed rpm 6: Bus voltage V 7: Output voltage V 8: Output current A 9: Output power kW 10: Output torque% 11: Input terminal state 12: Output terminal state 13: Analog input A0 14: Analog input A1 15: PID given Value 16: PID feedback value 17: Target torque% 18: Radiator temperature ℃ 19: Cumulative conduction time h 20: Cumulative running time h 21: Remaining conduction time day 22: Inverter running state 23: Analog output M0 25: Speed variation rpm 27: Inlet pressure Mpa 31: Vibration amount g 37: The maximum value of the bus at shutdown 38: The maximum value of the bus at running 39: The minimum value of the bus at running 43: IO board type 45: U-phase AD sampling value 46: V-phase AD sampling value 47: W-phase AD sampling value 55: Counting of successful communications 63: Inverter identification code
P91.01	U02 display data	2	0～63	/	0	
P91.02	U03 display data	3	0～63	/	0	
P91.03	U04 display data	8	0～63	/	0	
P91.04	U05 display data	7	0～63	/	0	
P91.05	U06 display data	6	0～63	/	0	
P91.06	U07 display data	9	0～63	/	0	
P91.07	U08 display data	10	0～63	/	0	
P92 group LED display parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**

P92.00	LED display data	2	0～63	/	0	See P91 group for the meaning
P92.01	LED display data 2	0	0～3		0	

P93 group Running record parameters

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P93.00	Cumulative conduction time	0	0～65535	h	*	
P93.01	Cumulative running time	0	0～65535	h	*	
P93.02	Set total conduction time	0	0～30000	Day	*	
P93.03	Remaining conduction time	0	0～30000	Day	*	
P93.04	Maximum radiator temperature	0.0	0.0～100.0	℃	*	
P93.05	Cumulative output work	0.0	0.0~999.9	kWh	*	
P93.06	Inverter output work	0	0~65535	MWh	*	
P93.07	Running time of fan	0	0~65535	h	*	
P93.08	Record maximum current	0.0	0.0~999.9	A	*	
P93.09	Record maximum power	0.0	0.0~999.9	Kw	*	
P93.30	Capacitor conduction time	0	0~65535	H	*	

P94 group Troubleshooting parameters

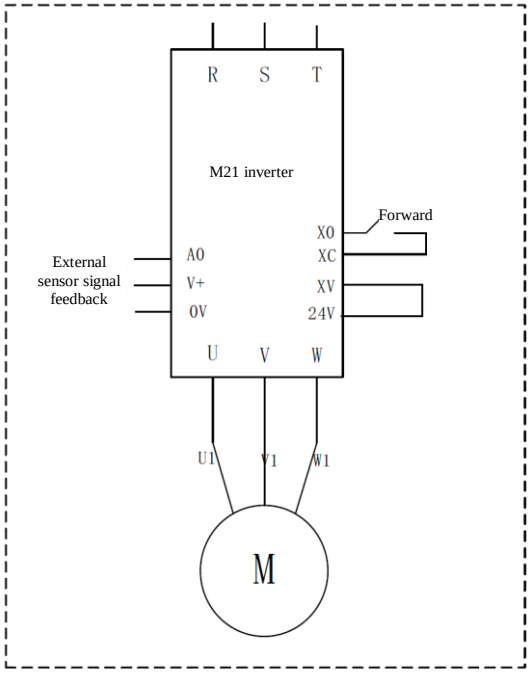
Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P94.00	Handling mode of inverter minor fault	1	0～3	/	0	0: Non output of fault relay in case of minor fault; 1: Output fault relay in case of minor fault; 2: When the 52#PTC motor is overheated, the fault relay will be output and the motor will stop, and the fault will not be reset automatically 3: Both 1 and 2 are valid
P94.01	Automatic fault reset time	10.0	0.0～6500.0	s	0	
P94.03	Overheating time of radiator	0.5	0.0～650.0	s	0	Overheating protection (fault No. 3) time
P94.04	Overspeed protection time	1.0	0.0～650.0	s	0	Recognition time of overspeed protection (30# fault);
P94.05	Input default phase voltage threshold	210	30～400	V	0	Input phase loss (No. 29 fault) to determine the voltage drop value
P94.06	Number of brake resistance short circuit	10	0～1000	Times	0	The number of confirmations of the braking resistor failure (No. 4 failure)
P94.07	Confirmed number of encoder disconnections	2	0～65535	Times	0	It is the number of confirmed SINCOS encoder disconnections when: 1） 94.07 protection lasts when the AB signal is at both high and low 2） 94.07 protection lasts 5 times when the CD signal is at both high and low
P94.08	Output default phase recognition time	2.000	0.000～65.000	s	0	It can be detected only in normal operation or dynamic self-learning of editor when the phase current is continuously longer than the time protection of P94.08.

P94.09	Relay fault recognition voltage	90	0～400	V	0	It is VDC1 when not running, VDCmax or VDCmin when running. Protect when (VDC1-VDCmax) is greater than 94.09 and greater than (VDCmax-VDCmin) *5 for 10 consecutive times every 20ms.
P94.10	CD misphase judgment threshold	300	9～65535	/	0	Protect when the difference between AB signal and CD signal of SinCos encoder exceeds 94.10 for consecutive 500ms; Protect when the difference between the absolute position of Endat and the position of AB signal exceeds 94.10.
P94.11	ABZ protection threshold	20	1～100	%	0	Synchronization: When P10.00=2/3, the feedback speed is less than 1% of the rated speed, and the output voltage is greater than the rated voltage *94.11 + pre-torque voltage + 3.5% of the rated voltage, for 100ms, protection. Asynchronization: When P10.00=3, the feedback speed is less than 1%, and when the speed error is large, the protection can be provided after 400ms.
P94.12	IGBT protection times	2	1～100	/	0	The number of times that the output current of the inverter is greater than the IGBT protection current threshold (21# fault).
P94.13	I2t protection selection	0	0~3	/	0	0: I2t protection valid 1: the protection fault only includes 45# or 46#, used in frequent start/stop occasions; 2: the protection fault includes 21# or 27#, used in continuous overload occasions; 3: I2t protection invalid
P94.14	Analog A0 disconnection value	0.0	0.0~100.0	%	4	Analog A0 input signal disconnection detection value, percentage relative to 10V. If the analog input voltage of A0 is less than the value of 10V multiplied by P94.14, it is considered that the analog input is disconnected.
P94.15	Analog A1 disconnection value	0.0	0.0~100.0	%	4	Analog A1 input signal disconnection detection value, percentage relative to 10V. If the analog input voltage of A0 is less than the value of 10V multiplied by P94.14, it is considered that the analog input is disconnected.
P94.16	Analog exception handling	0	0~1	/	0	0: Turn off the protection 1: Turn on the protection.
P94.17	Temperature sampling disconnection handling	0	0~1	/	0	0: Turn off the protection 1: Turn on the protection.
P94.18	Communication protection	1	0~2	/	4	0: G type 1: P type 2: Shutdown: Protected by power-on
P94.19	Communication disconnection protection time	2.000	0.000~65.000	s	4	Report 43# fault after normal communication is interrupted for P94.19 time.
P94.20	Number of grounding protections	100	1~60000	/	4	Set the number of confirmed 32# faults
P94.21	Fault action selection 1	00000	000000~12221	/	0	0: free stop 1: stop by stop mode
P94.22	Fault action selection 2	00000	00000~22222	/	0	0: free stop 1: stop by stop mode
P94.23	Fault action selection 3	00002	000000~22122	/	0	0: free stop 1: stop by stop mode
P94.24	Fault action selection 4	00000	000000~02222	/	0	0: free stop 1: stop by stop mode
P94.25	Continue operating frequency selection	0	0~4	/	0	0: Run at target frequency 1: Run at current frequency 2: Run at upper limit of frequency 3: Run at lower limit of frequency 4: Run at multi-stage speed 15
P95 group Product identification parameters						

Function code	Function code name	Factory default	Setting range	Unit	Attribute	Description
P95.00	Inverter hardware version	M21.04		/	*	
P95.01	Inverter software version	Manufacturer		/	*	The host computer oscilloscope function is not enabled by default. After P95.01 is set to 3728, the host computer oscilloscope function is enabled. After P95.01 is set to 3728, the host computer oscilloscope function is not enabled; You need to reset it to enable this feature after power off and then power on again.
P95.02	Version No.	Manufacturer		/	*	
P95.03	Profibus_DP software version	Manufacturer		/	*	
P95.03	Software R&D version	Manufacturer		/	*	
P95.05	Drive test version	Manufacturer		/	*	
P96 group Inverter product parameters						
Function code	**Function code name**	**Factory default**	**Setting range**	**Unit**	**Attribute**	**Description**
P96.00	Rated power of inverter	According to power	0.0～999.9	kW	*	Manufacturer initial setting
P96.01	Rated current of inverter		0.0～999.9	A	*	
P96.02	Maximum current of inverter		0.0～999.9	A	*	
P96.03	Rated voltage of inverter	380	0～460	V	*	
P96.04	Inverter power coefficient	According to power	0～99	%	*	
P96.05	Inverter sensor current		0～9999	A	*	Manufacturer parameters, read only
P96.06	Rated current of inverter module		0～9999	A	*	
P96.07	Current of built-in brake units;		0～9999	A	*	
P96.08	Three-phase current balance coefficient	1.000	0.000～99.999	%	*	
P96.14	Drive platform version	Manufacturer		/	*	
P96.15	Software upgrade number	21	/	/	*	
P96.16	Special parameters	90	/	/	*	
P96.17	Sensor coefficient correction	0	/	/	*	
P96.18	Bus voltage correction factor	100.0	90.0~110.0	%	×	
P96.19	Output current correction factor	100.0	50.0~200.0	%	×	
P96.21	Model load selection	1	0~1	/		0: G type selection 1: P type selection

Closed loop PID control function application

Inverter peripheral diagram



R, S, T are connected to the three-phase 400V power input, and U, V, W are connected to the three-phase stator side winding terminals of the motor;
The analog channel A0 (A1 is also optional) is connected to the external feedback signal. The specific wiring method is determined according to the external feedback signal equipment (wire system, signal type, power supply voltage level, etc.),; the analog channel dials the corresponding DIP switch (current terminal or voltage terminal) according to the actual input signal type; for 2-wire wiring, one connects to A0 and one connects to V+; for 3-wire wiring, one connects to A0, one connects to V+, and one connects to 0V; 24V and XV terminals are short-circuited, and X0 and XC are connected through a switch device (terminal start-stop function can be set). Set the PID target value and compare the received feedback value with the target value to perform closed-loop PID calculation and control, so as to achieve the purpose of constant target control and adjustment.

PID function parameter setting list

Function code	Function code name	Set value	Description
P10.00	Control mode selection	0	0:V/F control
P10.02	Command channel selection	0	0: Panel given command
P10.03	Speed channel selection	8	8: PID given target speed
P30.00	X0 terminal input function selection	7	7: Forward
P32.00	A0 input type	3	3: 4~20ma
P51.00	Closed loop control selection	1	1: PID closed loop control valid
P51.01	Primary given mode of closed loop	0	0: Panel internal given

P51.04	Primary feedback mode of closed loop	1	1: Analog quantity AI0 given
P51.07	PID internal given value	0.7	Given pressure 0.7MPa (set according to actual needs)
P51.08	Unit	2	MPa
P51.09	Proportional gain Kp	0.10	Adjust according to actual effect
P51.10	Integral gain Ki	0.10	Adjust according to actual effect
P51.11	Differential gain Kd	0.00	Adjust according to actual effect
P51.28	Sleep wakeup selection	0	0: Sleep wakeup prohibited
P51.29	Sleep frequency	30Hz	Set correctly according to sleep
P51.30	Sleep delay	10.0s	Adjust according to actual effect
P51.31	Wakeup deviation	0.1	Adjust according to actual effect
P51.32	Wakeup delay	10.0s	Adjust according to actual effect
P51.37	Upper limit of given quantity	1.6	Adjust according to actual situation
P51.38	Upper limit of feedback range	1.6	Adjust according to actual situation
P70.01	Lower limit of frequency	20hz	Adjust according to actual situation

The main parameter group related to closed-loop PID operation includes the P10 group of basic control parameters. Set the control mode and start-stop mode according to actual needs; P30 terminal start-stop function setting, multi-stage function setting; setting of P32 group external feedback analog signal related parameter; P51 group closed-loop PID control parameter setting. Some parameters in each of the above parameter groups can be set according to actual application requirements. For example, P10.02 is set to 0 when the panel in the field is used to start and stop, and P10.02 is set to 1 if the terminal is required to start and stop.

Modbus communication protocol and usage details

The M21 series inverter supports the modbus (RTU) communication protocol. Please read this chapter carefully before using the modbus communication protocol.

I. Set the modbus parameters to be used

Basic parameters of Modbus protocol

The default modbus baud rate to be adopted by the drive is 9600bps, the data format is 1-8-1 without check, the transmission mode is RTU, the modbus address is 1, and the communication address format can be hexadecimal or decimal. The following are introduced in hexadecimal format and decimal format respectively.

Introduction to unction codes of read and write

For instruction data, **read** the function code 3 for register in the command data table, **write** the function code 6 for register in the command data table, **read** the function code 1 for **bit** in the command data table, and **write** the function code 5 for **bit** in the command data table;

For monitoring data, **read** the function code 4 in the monitoring data table, and **read** the function code 2 for **bit** in the monitoring data table.

Communication data format

Send request data format

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit

Data format of response and read operation

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit

Data format of response and write operation

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit

II. Examples of setting Modbus address to hexadecimal address format communication (P81.07 = 0)

I. Modbus address setting

1. **Modbus address** of inverter parameter = parameter number in hexadecimal representation (example, Modbus address of parameter P10.23 is 0x1023)
2. Register **Modbus address** = register address + **0x999A**, because the maximum parameter address is 0x9999; (if the register address is 0x0069, then the register **Modbus address** = 0x0069 + **0x999A** = 0x9A03);
3. Modbus address of register bit = register address *16+ bit number n (n=0, …, 15), and there is no need to add 0x999A. (For example, **Modbus** address of bit 0 of "Inverter status word" 0x0470=0x0470*16+ 0 = 0x4700);

II. Modbus communication example

Example 1: Read parameter P20.07 (rated slip frequency of motor)

Send:

Modbus address	Function code	Parameter no. high bit	Parameter no. low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x20	0x07	0x00	0x01	0x81	0xF7

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x00	0x8C	0xB8	0x95

Response error

Modbus address	Function code	Number of bytes	CRC low bit	CRC high bit
0x01	0x84	0x02	0xC2	0xC1

Remarks:

1. The read-in data contains a decimal point, but the decimal point is not displayed in the data. The user should determine the position of the decimal point according to the parameter description in the manual. For example, if the value read in P01.07 above is 0x8c (200), it should be 2.00Hz after adding the decimal point and the unit, The same is below.
2. The function code for error response is sending function code + 0x80. No more examples are given below.
3. **For the hexadecimal parameter address, just put the upper 8 bits of the parameter address to the "parameter number high bits" in the above table, and the lower 8 bits of the address to the "parameter number low bits", and no other operations are required.**

Example 2: Write parameter P01.07 (rated slip frequency of motor) as 1.50Hz (0x96)

Send:

Modbus address	Function code	Parameter no. high bit	Parameter no. low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x01	0x07	0x00	0x96	0xB9	0x99

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x01	0x07	0x00	0x96	0xB9	0x99

Write 0x55 to the "parameter update request" register (register address 0x0069)

Send: Because 0x0069 is the register address, rather than the parameter address, so you need 0x0069+0x999A = 0x9A03

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x9A	0x03	0x00	0x55	0x97	0x2D

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x9A	0x03	0x00	0x55	0x97	0x2D

Remarks:

1. The write operation of Modbus does not save the parameters. After the power is off, the parameter restores the value before the write operation. If you need to save the parameter, you need to add the "parameter update request" command after the last parameter written, that is, send 0x55 to the register address 0x0069, which is in modbus address 0x9A03.
2. For a write operation, if the response data is the same as the sent data, the write is considered successful, otherwise the write is likely to fail.

Example 3: Reset parameters to factory values

Write 0xAA to the "parameter update request" register (register address 0x0069)

Send:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x9A	0x03	0x00	0xAA	0xD7	0x6D

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x9A	0x03	0x00	0xAA	0xD7	0x6D

Example 4: Read monitoring "fault indication 1" (0x048B)

Send: Because 0x048B is the register address, rather than the parameter address, so 0x048B +0x999A = 0x9E25 is required

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x9E	0x25	0x00	0x01	0x0F	0xE9

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x01	0x01	0x79	0x60

Example 5: Read monitoring View[1] (0x04BB)

Send:

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x9E	0x55	x00	0x01	0x0E	0x32

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x00	0x00	0xB9	0x30

Example 6: Write AO1 output value register

Write 0x3E8(1000) to “AO1 output value” register

Sending: // Since “AO1 output value” is a register, its Modbus address = 0x0005+ 0x999A=0x999F

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x99	0x9F	0x03	0xE8	0x97	0xC6

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x99	0x9F	0x03	0xE8	0x97	0xC6

Example 7: Read "AO1 output value" register

Sending: // Since “AO1 output value” is a register, its Modbus address = 0x0005+ 0x999A=0x999F

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x03	0x99	0x9F	x00	0x01	0x9A	0xB8

Correct response: //Assuming the current value of the "AO1 output value" register is 0x3E8(1000)

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x03	0x02	0x03	0xE8	0xB8	0xFA

Example 8: Write 1 to bit1 of "communication control word" 0x0000

Send: //Because it is a bit register, its Modbus address = 0x0000*16+ 1 = 1, no need to add 0x999A

When set to 1, the data content is set to 0xFF00; when it is cleared: the data content is set to 0x0000;

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit

0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

Example 9: Read bit0 of "Inverter status word" 0x0470

Send: //Because it is a bit register, its Modbus address = 0x0470*16+ 0 = 0x4700

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x47	0x00	0x00	0x01	0xAD	0x7E

Correct response:

Modbus address	Function code	Number of bytes	Data	CRC low bit	CRC high bit
0x01	0x02	0x01	0x01	0xA1	0x88

You can also read multiple bits, and each 8 bits occupies a byte. If you want to read all the bits of 0x0470, the data format is as follows

Send: //Because it is a bit register, its Modbus address = 0x0470*16+ 0 = 0x4700

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x47	0x00	0x00	0x10	0x6D	0x72

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x02	0x1C	0x00	0xBE	0x78

III. Detailed register address description

*Note: please write 0 if you need to write to the "unused" bit or register;
Do not write any data in the "reserved" bits or registers.

Command data [registers 3 and 6] [bits 1 and 5]

The registers in this table are read with function code 3 and written with function code 6
The bits in this table are read with function code 1 and written with function code 5

Register address	Content
0x0000	Communication control word bit0 1: forward 0: invalid bit1 1: reverse 0: invalid bit2 1: run 0: stop bit3 Reserved (1: with external fault) bit4 1: Reset fault command bit7~5 Reserved (multi-stage speed selection #Table Z-1) bit8 Reserved (1: inching frequency valid #) bit10~9Acceleration/deceleration time selection 0: curve 1 1: curve 2 bit11 Reserved (1: basic electrode locking#) bit12 Reserved (1: Select run and given command 2 0: Select run and given command 1) bit13 Reserved (1: Select PID parameter group 2 0: Select PID parameter group 1) bit14 PID paused bit15 Unused*

0x0001	modbus target frequency given value and communicates given value 0~30000: 0.00~300.00Hz
0x0002	Reserved (modbus target frequency given value) IQ10(1.0): rated frequency
0x0003	Reserved (Modbus PID given value) 10000 corresponds to 100% given value
0x0004	Reserved (Modbus PID target value validity 1: valid 0: invalid)
0x0005	Reserved (AO1 output value) -1024~1024: -5.00~5.00V
0x0006	Reserved (AO2 output value) -1024~1024: -5.00~5.00V
0x0007	Multifunction port output **#** bit0 1: DO0 (relay A) ON 0: OFF bit1 1: DO1 (relay B) ON 0: OFF bit2 1: DO2 ON 0: OFF bit3 1: DO3 ON 0: OFF bit4 1: DO4(OC) ON 0: OFF bit5 1: DO5(OC) ON 0: OFF bit6 Unused* bit7 Unused* bit15~8 Unused* ***# Actual terminal output value = Modbus set value | Internal output value of function terminals***
0x0008	Reserved (Modbus broadcast data validity) bit0 1: Terminal DI0 Modbus broadcast given valid 0: invalid bit1 1: Terminal DI1 Modbus broadcast given valid 0: invalid bit2 1: Terminal DI2 Modbus broadcast given valid 0: invalid bit3 1: Terminal DI3 Modbus broadcast given valid 0: invalid bit4 1: Terminal DI4 Modbus broadcast given valid 0: invalid bit5 1: Terminal DI5 Modbus broadcast given valid 0: invalid bit6 1: Terminal DI6 Modbus broadcast given valid 0: invalid bit7 1: Terminal DI7 Modbus broadcast given valid 0: invalid bit8 Unused* bit9 Unused* bit10 1: Target frequency broadcast given value valid 0: invalid bit11 1: Current frequency broadcast given value valid 0: invalid bit12 1: Running command (forward, reverse, start/stop command) broadcast given value valid Bit15~13 Unused
0x0009	Reserved (target frequency broadcast given value)

0x000A	Reserved (current frequency broadcast given value)
0x000B	Reserved (running signal broadcast given value) bit0 Terminal DI0 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit1 Terminal DI1 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit2 Terminal DI2 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit3 Terminal DI3 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit4 Terminal DI4 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit5 Terminal DI5 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit6 Terminal DI6 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit7 Terminal DI7 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit8 Unused* bit9 Unused* bit10 1: forward 0: invalid bit11 1: reverse 0: invalid bit12 1: run 0: stop bit13 1: with external fault bit14 1: Reset fault command bit15 Unused* # Adopted value of function input terminals = (Modbus broadcast value & broadcast given validity) | Actual input value of function terminals
0x000C~0x0018	Reserved (broadcast data)
0x0019	Reserved (Virtual input terminals) bit0: Virtual terminal X0 bit1: Virtual terminal X1 bit2: Virtual terminal X2 bit3: Virtual terminal X3 bit4: Virtual terminal X4 bit5: Virtual terminal X5 bit6: Virtual terminal X6 bit7: Virtual terminal X7 bit8~15: Reserved # Actual terminal input value = Modbus set value | External terminal input value
0x001A	Communication given torque
0x001B	Speed limit
0x001C	Process PID primary given
0x001D	Process PID secondary given
0x001E	Process PID primary feedback
0x001F	Process PID secondary feedback
0x001F~0x0068	Reserved control words (73 spaces)
0x0069	**Parameter update request** After the parameters are received from the slave inverter through Modbus, they are saved in the parameter image area of the inverter. 0x55: Update the actual parameters in RAM with the parameters in the image area 0xAA: Update the actual parameters in RAM with the default factory parameters Zero: Not update [Note]: The unit will be reset automatically after each update

0x006A~0x01F9	Reserved (parameter)
0x01FA~0x046F	630 spaces reserved

Monitoring data [register 4] [bit 2]

The bits in this table are read with function code 4 and written with function code 2

Register address	Content
0x0470	Inverter status word bit0 1: With running signal 0: without running signal bit1 1: Running bit2 1: At zero speed bit3 1: In forward 0: In reverse bit4 1: Normal inverter power on 0: Abnormal inverter power on bit5 1: Basic electrode locking bit6 Unused* bit7 1: Fault in progress bit8 Reserved (1: fault retrying) bit9 Reserved (1: incorrect parameter setting) bit10 1: Self-tuning bit11 1: Request self-tuning bit15~12Unused*
0x0471	Detection state bit0 1: frequency detection LF, frequency ≤ detection frequency bit1 1: frequency detection GF, frequency≥ detection frequency bit2 1: frequency detection EF, given and feedback frequency, in detection frequency band bit3 1: Speed arrival bit4 Reserved (1: loss of analog signal given frequency command) bit5 1: Overtorque detecting bit6 1: Undervoltage detecting bit7 1: Bus voltage greater than 85% of the rated voltage bit8 1: Exceeding 5% of the rated current in running and 10% of the rated current when stopping bit9 1: fault forecast bit15~10 Unused*
0x0472	Reserved (given target frequency)
0x0473	Current operating frequency 5000 corresponding to 50.00Hz
0x0474	Reserved (PID given value)
0x0475	Reserved (PID feedback value)
0x0476	Reserved (PID output value)
0x0477	Reserved (PID proportion item)
0x0478	Reserved (PID integral item)
0x0479	Reserved (PID differential item)
0x047A	Reserved (communication fault) bit0 1: communication timeout bit1 1: frame format bit2 1: CRC error bit3 1: data length error bit4 1: parity check error bit5 1: overload error bit6 1: illegal command bit7 Reserved (operation panel communication fault) bit15~8 Unused*

0x047B	Parameter update status bit0 1: updating 0: updated bit1 Reserved (1: data overrun) bit2 Reserved (1: data mismatch) bit3~15Unused*
0x047C~0x0484	Unused (9 units)
0x0485	Inverter output monitoring 1 bit0 1: normal power on 0: abnormal power on bit1 1: fault 0: normal bit2 1: With running signal 0: without running signal bit3 1: frequency/speed arrival signal bit4 1: frequency/speed consistency bit5 1: At zero speed bit6 1: DC bus voltage greater than 85% of the rated voltage bit7 1: Exceeding 5% of the rated current in running and 10% of the rated current when stopping bit8 1: Self-tuning bit9 1: Speed detection 1 bit10 1: Speed detection 2 bit11 1: fault forecast bit12 1: Self-tuning request
0x0486	Reserved (inverter output monitoring 2)
0x0487	Reserved (inverter output monitoring 3)
0x0488	Reserved (inverter output monitoring 4)
0x0489	Pump output monitoring 1 bit0 1: Pump sleep bit1 1: Motor 1 start bit2 1: Motor 2 start bit3 1: Motor 3 start bit4 1: Motor 4 start bit5 1: Motor 5 start bit6 1: Motor 6 start bit7 Reserved (Y8) bit8 Reserved (Y9) bit9 Reserved (Y10) bit10 Reserved (Y11) bit11 Reserved (Y12) bit12 Reserved (Y13) bit13 Reserved (Y14) bit14 Reserved (Y15) bit15 Reserved (Y16)
0x048A	Pump output monitoring 2 bit0 Reserved (Y17) bit1 Reserved (Y18) bit2 Reserved (Y19) bit3 Reserved (Y20) bit4 Reserved (Y21) bit5 Reserved (Y22) bit6 Reserved (Y23) bit7 Reserved (Y24) bit8 Reserved (Y25) bit9 Reserved (Y26) bit10 Reserved (Y27) bit11 Reserved (Y28) bit12 Reserved (Y29) bit13 Reserved (Y30) bit14 Reserved (Y31) bit15 Reserved (Y32)

0x048B	Fault indication 1 bit0 Module overcurrent protection bit1 ADC fault bit2 Radiator overheated bit3 Brake unit fault bit4 Reserved bit5 Reserved bit6 Speed variation bit7 Bus overvoltage bit8 Bus undervoltage bit9 Output default phase bit10 Low-speed overcurrent of the motor bit11 Encoder fault bit12 Reserved bit13 Reserved bit14 Reserved bit15 Motor phase sequence error
0x048C	Fault indication 2 bit0 Overspeed in the same direction bit1 Overspeed in the reverse direction bit2 Reserved bit3 Encoder communication fault bit4 abc overcurrent bit5 Brake detection fault bit6 Input overvoltage bit7 Reserved bit8 Reserved bit9 Encoder non-self-learning bit10 Output overcurrent bit11 SINCOS encoder fault bit12 Input default phase bit13 Overspeed protection bit14 Motor high speed overcurrent bit15 Grounding protection
0x048D	Fault indication 3 bit0 Capacitor aging bit1 External fault bit2 Reserved bit3 Reserved bit4 Current sensor fault bit5 Brake resistance short circuit bit6 Excessive current instantaneous value bit7 Output contactor fault bit8 Brake switch fault bit9 IGBT short-circuit protection bit10 Communication fault bit11 Abnormal input power bit12 Software overcurrent (abc phase current overcurrent) bit13 Software overcurrent (Current effective value overcurrent) bit14 Abnormal analog input bit15 Temperature sampling disconnection

0x048E	Reserved (fault indication 4) bit15~0 reserved
0x048F	Multifunction terminal input state bit0 1: Multifunction terminal X0 ON 0: OFF bit1 1: Multifunction terminal X1 ON 0: OFF bit2 1: Multifunction terminal X2 ON 0: OFF bit3 1: Multifunction terminal X3 ON 0: OFF bit4 1: Multifunction terminal X4 ON 0: OFF bit5 1: Multifunction terminal X5 ON 0: OFF bit6 1: Multifunction terminal X6 ON 0: OFF bit7 1: Multifunction terminal X7 ON 0: OFF bit8 Unused* bit9 Unused* bit15~10 Unused*
0x0490	Multifunction terminal output state bit0 1: K1 ON 0: OFF bit1 1: K2 ON 0: OFF bit2 1: Y0 ON 0: OFF bit3 1: Y1 ON 0: OFF bit4 1: Y3(K3) ON 0: OFF bit5 1: Y4(K4) ON 0: OFF bit6 Unused* bit7 Unused* bit15~8 Unused*
0x0491	Feedback speed (Hz) -30000~30000 → -300.00~300.00Hz
0x0492	Given speed -30000~30000 → -300.00~300.00Hz
0x0493	Given speed filter value
0x0494	Effective value of output voltage One decimal point
0x0495	Output current RMS One decimal point
0x0496	Output torque -1000~1000 → -100.0%~100.0% rated current of inverter
0x0497	Drive efficiency (reserved)
0x0498	Bus voltage

0x0499	Analog input AI0/TM motor temperature detection input -10000~10000→-10.000~10.000V
0x049A	Analog input AI1 -10000~10000→-10.000~10.000V
0x049B	Analog input AI2 (reserved)
0x049C	System time (reserved)
0x049D	Radiator temperature
0x049E	U phase voltage (instantaneous value (reserved)
0x049F	V phase voltage (instantaneous value (reserved)
0x04A0	W phase voltage (instantaneous value (reserved)
0x04A1	U phase current (instantaneous value)
0x04A2	V phase current (instantaneous value)
0x04A3	W phase current (instantaneous value)
0x04A4	Output active power 100.0% corresponding to rated power
0x04A5	Reactive power (reserved)
0x04A6	Total output power (reserved)
0x04A7	Power factor (reserved)
0x04A8	Feedback speed (rpm) -9999~9999→-999.9~999.9
0x04A9	Pre-torque
0x04AA~0x04B9	16 units reserved

0x04BA~0x04D9	View[0~31]: **The specific monitoring content is related to the inverter model. Please refer to the instructions of "Select LCD to display the data content" in the inverter manual.** 0x04BA: View[0]//Undefined 0x04BB: View[1] 0x04BC: View[2] 0x04BD: View[3] 0x04BE: View[4] 0x04BF: View[5] 0x04C0: View[6] 0x04C1: View[7] 0x04C2: View[8] 0x04C3: View[9] 0x04C4: View[10] 0x04C5: View[11] 0x04C6: View[12] 0x04C7: View[13] 0x04C8: View[14] 0x04C9: View[15] 0x04CA: View[16] 0x04CB: View[17] 0x04CC: View[18] 0x04CD: View[19] 0x04CE: View[20] 0x04CF: View[21] 0x04D0: View[22] 0x04D1: View[23] 0x04D2: View[24] 0x04D3: View[25] 0x04D4: View[26] 0x04D5: View[27] 0x04D6: View[28] 0x04D7: View[29] 0x04D8: View[30] 0x04D9: View[31]
0x04DA~0x04E5	Uxx monitoring data (curve data) 0x04DA: U01 data value (curve 1) 0x04DB: U02 data value (curve 2) 0x04DC: U03 data value (curve 3) 0x04DD: U04 data value (curve 4) 0x04DE: U05 data value (curve 5) 0x04DF: U06 data value (curve 6) 0x04E0: U07 data value (curve 7) 0x04E1: U08 data value (curve 8) 0x04E2: low byte: U01 identifier (curve 1 configuration); high byte: U02 identifier (curve 2 configuration) 0x04E3: low byte: U03 identifier (curve 3 configuration); high byte: U04 identifier (curve 4 configuration) 0x04E4: low byte: U05 identifier (curve 5 configuration); high byte: U06 identifier (curve 6 configuration) 0x04E5: low byte: U07 identifier (curve 7 configuration); high byte: U08 identifier (curve 8 configuration)

0x04E6~0x04E9	4 units reserved (for drive)
0x04EA~0x05E9	U phase current (buffer 256 points for graphic display) [sampling every 10 PWM cycles]
0x05EA~0x06E9	V phase current (buffer 256 points for graphic display)
0x06EA~0x07E9	W phase current (buffer 256 points for graphic display)
0x07EA	Output torque (for graphic display)
0x07EB	Given speed (for graphic display)
0x07EC	Feedback speed (for graphic display)
0x07ED	Bus voltage (for graphic display)
0x07EE~0x09ED	512 spaces reserved (for graphic display)
0x09EE	Reserved (thermal relay status) bit0 1: Thermal relay overload of water pump 0 bit1 1: Thermal relay overload of water pump 1 bit2 1: Thermal relay overload of water pump 2 bit3 1: Thermal relay overload of water pump 3 bit4 1: Thermal relay overload of water pump 4 bit5 1: Thermal relay overload of water pump 5 bit6~15Unused*
0x09EF	Reserved (station status) bit0~1 Pump 0 bit0 1: variable frequency drive mode 0: power frequency drive mode bit1 1: run in 0: stop bit2~3 Pump 1 bit4~5 Pump 2 bit6~7 Pump 3 bit8~9 Pump 4 bit10~11 Pump 5 bit12 Reserved (1: The liquid level of the pool exceeds the upper limit [Measures: Close the water inlet valve when exceeding the upper limit]) bit13 Reserved (1: The liquid level of the pool is below the lower limit [Measures: the pump stops working when below the lower limit]) bit14~15 Unused*
0x09F0	Reserved (actual water pressure)
0x09F1	Reserved (actual flow)
0x09F2	The cumulative number of operating days after pump 0 is powered on this time
0x09F3	The cumulative number of operating hours after pump 0 is powered on this time
0x09F4	The cumulative number of operating minutes after pump 0 is powered on this time
0x09F5	The cumulative number of operating days after pump 1 is powered on this time
0x09F6	The cumulative number of operating hours after pump 1 is powered on this time
0x09F7	The cumulative number of operating minutes after pump 1 is powered on this time
0x09F8	The cumulative number of operating days after pump 2 is powered on this time
0x09F9	The cumulative number of operating hours after pump 2 is powered on this time
0x09FA	The cumulative number of operating minutes after pump 2 is powered on this time
0x09FB	The cumulative number of operating days after pump 3 is powered on this time
0x09FC	The cumulative number of operating hours after pump 3 is powered on this time

0x09FD	The cumulative number of operating minutes after pump 3 is powered on this time	
0x09FE	The cumulative number of operating days after pump 4 is powered on this time	
0x09FF	The cumulative number of operating hours after pump 4 is powered on this time	
0x0A00	The cumulative number of operating minutes after pump 4 is powered on this time	
0x0A01	The cumulative number of operating days after pump 5 is powered on this time	
0x0A02	The cumulative number of operating hours after pump 5 is powered on this time	
0x0A03	The cumulative number of operating minutes after pump 5 is powered on this time	
0x0A04~0x0A33	48 spaces reserved	
0x0A34~0x0A38	Historical fault 0 (Recent)	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A39~0x0A3D	Historical fault 1	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A3E~0x0A42	Historical fault 2	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A43~0x0A47	Historical fault 3	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A48~0x0A4C	Historical fault 4	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A4D~0x0A51	Historical fault 5	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A52~0x0A56	Historical fault 6	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
0x0A57~0x0A5B	Historical fault 7 (First happen)	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point

0x0A5C~0x0A7B	View[32]~ View[63]: **The specific monitoring content is related to the inverter model. Please refer to the instructions of "Select LCD to display the data content" in the inverter manual.** 0x0A5C: View[32] 0x0A5D: View[33] 0x0A5E: View[34] 0x0A5F: View[35] 0x0A60: View[36] 0x0A61: View[37] 0x0A62: View[38] 0x0A63: View[39] 0x0A64: View[40] 0x0A65: View[41] 0x0A66: View[42] 0x0A67: View[43] 0x0A68: View[44] 0x0A69: View[45] 0x0A6A: View[46] 0x0A6B: View[47] 0x0A6C: View[48] 0x0A6D: View[49] 0x0A6E: View[50] 0x0A6F: View[51] 0x0A70: View[52] 0x0A71: View[53] 0x0A72: View[54] 0x0A73: View[55] 0x0A74: View[56] 0x0A75: View[57] 0x0A76: View[58] 0x0A77: View[59] 0x0A78: View[60] 0x0A79: View[61] 0x0A7A: View[62] 0x0A7B: View[63]

III. Examples in decimal address format communications (P81.07 = 1)

I. Modbus address setting

1. **Modbus address** of inverter parameter = parameter number in decimal representation (example, Modbus address of parameter P10.23 is 1023)
2. Register **Modbus address** = register address + **10000**, because the maximum parameter address is 9999; (for example, register address is 105, register **Modbus address** = 105 + 10000 = 10105 = 0x2779)
3. Register bit **Modbus address** = register address*16 + bit number n (n=0, …, 15), no need to add 10000; (such as inverter status word" register address is 1136, bit0 register bit **Modbus address** = 1136*16 + 0 = 18176 = 0x4700)

Note:

In the decimal communication, if you use the "serial debugging assistant" and other debugging, you must convert the parameter address to hexadecimal, otherwise the correct result may not be obtained. When programming, the system will automatically convert to hexadecimal, so there is no need for manual conversion.

II. Modbus communication example

Example 1: Read parameter P20.07 (rated slip frequency of motor)

Send: The decimal address of P20.07 is 2007, and the hexadecimal address is 0x07D7.

Modbus address	Function code	Parameter no. high bit	Parameter no. low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x07	0xD7	0x00	0x01	0x80	0x86

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x00	0x8C	0xB8	0x95

Response error

Modbus address	Function code	Number of bytes	CRC low bit	CRC high bit
0x01	0x84	0x02	0xC2	0xC1

Remarks:

1. The read-in data contains a decimal point, but the decimal point is not displayed in the data. The user should determine the position of the decimal point according to the parameter description in the manual. For example, if the value read in P01.07 above is 0x8c (200), it should be 2.00Hz after adding the decimal point and the unit, The same is below.
2. The function code for error response is sending function code + 0x80. No more examples are given below.
3. **When operating the address, you need to regard 2007 as a whole and split it into the high and low units of the parameter number. For example, the high address of 2007 is**

2007/256 = 7, the lower address is 2007%256 = 215 = 0xd7. Never split 2007 into 20 and 07.

Example 2: Write parameter P20.07 (rated slip frequency of motor) as 1.50Hz (0x96)

Send:

Modbus address	Function code	Parameter no. high bit	Parameter no. low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x07	0xD7	0x00	0x96	0xB8	0xE8

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x07	0xD7	0x00	0x96	0xB8	0xE8

Write 0x55 to the “parameter update request” register (register address 105)

Send: Since it is a register address, 105 + 10000 = 10105 = 0x2779

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x79	0x00	0x55	0x92	0x98

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x79	0x00	0x55	0x92	0x98

Remarks:

1. The write operation of Modbus does not save the parameters. After the power is off, the parameter restores the value before the write operation. If you need to save the parameter, you need to add the "parameter update request" command after the last parameter written, that is, send 0x55 to the register address 0105, which is in modbus address 0x2779..
2. For a write operation, if the response data is the same as the sent data, the write is considered successful, otherwise the write is likely to fail.

Example 3: Reset parameters to factory values

Write 0xAA to the "parameter update request" register (register address 105)

Send:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x79	0x00	0xAA	0xD2	0xD8

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x79	0x00	0xAA	0xD2	0xD8

Example 4: Read monitoring "fault indication 1" (register address 1163)

Send: (Because it is a register: 1163+10000 = 11163 = 0x2B9B)

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x2B	0x9B	0x00	0x01	0x49	0xC1

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x01	0x01	0x79	0x60

Example 5: Read monitoring View[1] (register address 1211)

Send: (Because it is a register: 1211+10000 = 11211 = 0x2B9B)

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x04	0x2B	0xCB	0x00	0x01	0x49	0xD0

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x04	0x02	0x00	0x00	0xB9	0x30

Example 6: Write AO1 output value register (register address 5)

Write 0x3E8(1000) to "AO1 output value" register

Send: (Because it is a register: 5+10000 = 10005 = 0x2715)

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x15	0x03	0xE8	0x92	0x04

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x06	0x27	0x15	0x03	0xE8	0x92	0x04

Example 7: Read "AO1 output value" register (register address 5)

Send: (Because it is a register: 5+10000 = 10005 = 0x2715)

Modbus address	Function code	Address high bit	Address low bit	Words high bit	Words low bit	CRC low bit	CRC high bit
0x01	0x03	0x27	0x15	0x00	0x01	0x9F	0x7A

Correct response: //Assuming the current value of the "AO1 output value" register is 0x3E8(1000)

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x03	0x02	0x03	0xE8	0xB8	0xFA

Example 8: Write 1 to bit1 of "communication control word" 0000

Send: //Because it is a bit register, its Modbus address does not need to be offset, so the decimal or hexadecimal does not matter.
Its address is 0000*16 +1 = 1
When set to 1, the data content is 0xFF00; when cleared: the data content is 0x0000;

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

Correct response:

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

Example 9: Read bit0 of 1136 of "Inverter status word"

Send: //Because it is a bit register, its Modbus address = 1136*16+ 0 = 18176 = 0x4700

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x47	0x00	0x00	0x01	0xAD	0x7E

Correct response:

Modbus address	Function code	Number of bytes	Data	CRC low bit	CRC high bit
0x01	0x02	0x01	0x01	0xA1	0x88

You can also read multiple bits, and each 8 bits occupies a byte. If you want to read all the bits of the "inverter status word", the data format is as follows

Send: //Because it is a bit register, its Modbus address = 1136*16+ 0 = 18176 = 0x4700

Modbus address	Function code	Address high bit	Address low bit	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x47	0x00	0x00	0x10	0x6D	0x72

Correct response:

Modbus address	Function code	Number of bytes	Data high bit	Data low bit	CRC low bit	CRC high bit
0x01	0x02	0x02	0x1C	0x00	0xBE	0x78

III. Detailed register address description

*Note: please write 0 if you need to write to the "unused" bit or register;
Do not write any data in the "reserved" bits or registers.

Command data [registers 3 and 6] [bits 1 and 5]

The registers in this table are read with function code 3 and written with function code 6
The bits in this table are read with function code 1 and written with function code 5

Register address	Content
0000	Communication control word bit0 1: forward 0: invalid bit1 1: reverse 0: invalid bit2 1: run 0: stop bit3 Reserved (1: with external fault) bit4 1: Reset fault command bit7~5 Reserved (multi-stage speed selection #Table Z-1) bit8 Reserved (1: inching frequency valid #) bit10~9Acceleration/deceleration time selection 0: curve 1 1: curve 2 bit11 Reserved (1: basic electrode locking#) bit12 Reserved (1: Select run and given command 2 0: Select run and given command 1) bit13 Reserved (1: Select PID parameter group 2 0: Select PID parameter group 1) bit14 PID paused bit15 Unused*
0001	modbus target frequency given value and communicates given value 0~30000: 0.00~300.00Hz
0002	Reserved (modbus target frequency given value) IQ10(1.0): rated frequency
0003	Reserved (Modbus PID given value) 10000 corresponds to 100% given value
0004	Reserved (Modbus PID target value validity 1: valid 0: invalid)
0005	Reserved (AO1 output value) -1024~1024: -5.00~5.00V
0006	Reserved (AO2 output value) -1024~1024: -5.00~5.00V
0007	Multifunction port output **#** bit0 1: DO0 (relay A) ON 0: OFF bit1 1: DO1 (relay B) ON 0: OFF bit2 1: DO2 ON 0: OFF bit3 1: DO3 ON 0: OFF bit4 1: DO4(OC) ON 0: OFF bit5 1: DO5(OC) ON 0: OFF bit6 Unused* bit7 Unused* bit15~8 Unused* ***# Actual terminal output value = Modbus set value | Internal output value of function terminals***

0008	Reserved (Modbus broadcast data validity) bit0 1: Terminal DI0 Modbus broadcast given valid 0: invalid bit1 1: Terminal DI1 Modbus broadcast given valid 0: invalid bit2 1: Terminal DI2 Modbus broadcast given valid 0: invalid bit3 1: Terminal DI3 Modbus broadcast given valid 0: invalid bit4 1: Terminal DI4 Modbus broadcast given valid 0: invalid bit5 1: Terminal DI5 Modbus broadcast given valid 0: invalid bit6 1: Terminal DI6 Modbus broadcast given valid 0: invalid bit7 1: Terminal DI7 Modbus broadcast given valid 0: invalid bit8 Unused* bit9 Unused* bit10 1: Target frequency broadcast given value valid 0: invalid bit11 1: Current frequency broadcast given value valid 0: invalid bit12 1: Running command (forward, reverse, start/stop command) broadcast given value valid bit15~13 Unused*
0009	Reserved (target frequency broadcast given value)
0010	Reserved (current frequency broadcast given value)
0011	Reserved (running signal broadcast given value) bit0 Terminal DI0 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit1 Terminal DI1 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit2 Terminal DI2 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit3 Terminal DI3 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit4 Terminal DI4 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit5 Terminal DI5 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit6 Terminal DI6 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit7 Terminal DI7 Modbus broadcast given value #(the corresponding specific function is set by the parameter) bit8 Unused* bit9 Unused* bit10 1: forward 0: invalid bit11 1: reverse 0: invalid bit12 1: run 0: stop bit13 1: with external fault bit14 1: Reset fault command bit15 Unused* # Adopted value of function input terminals = (Modbus broadcast value & broadcast given validity) | Actual input value of function terminals
0012~0024	Reserved (broadcast data)
0025	Reserved (Virtual input terminals) bit0: Virtual terminal X0 bit1: Virtual terminal X1 bit2: Virtual terminal X2 bit3: Virtual terminal X3 bit4: Virtual terminal X4 bit5: Virtual terminal X5 bit6: Virtual terminal X6 bit7: Virtual terminal X7 bit8~15: Reserved # Actual terminal input value = Modbus set value | External terminal input value

0026	Communication given torque
0027	Speed limit
0028	Process PID primary given
0029	Process PID secondary given
0030	Process PID primary feedback
0031:	Process PID secondary feedback
0032~0104	Reserved control words (73 spaces)
0105	**Parameter update request** After the parameters are received from the slave inverter through Modbus, they are saved in the parameter image area of the inverter. 0x55: Update the actual parameters in RAM with the parameters in the image area 0xAA: Update the actual parameters in RAM with the default factory parameters Zero: Not update [Note]: The unit will be reset automatically after each update
0106~0505	Reserved (parameter)
0506~1135	630 spaces reserved

Monitoring data [register 4] [bit 2]

The bits in this table are read with function code 4 and written with function code 2

Register address	Content
1136	Inverter status word bit0 1: With running signal 0: without running signal bit1 1: Running bit2 1: At zero speed bit3 1: In forward 0: In reverse bit4 1: Normal inverter power on 0: Abnormal inverter power on bit5 1: Basic electrode locking bit6 Unused* bit7 1: Fault in progress bit8 Reserved (1: fault retrying) bit9 Reserved (1: incorrect parameter setting) bit10 1: Self-tuning bit11 1: Request self-tuning bit15~12Unused*
1137	Detection state bit0 1: frequency detection LF, frequency ≤ detection frequency bit1 1: frequency detection GF, frequency≥ detection frequency bit2 1: frequency detection EF, given and feedback frequency, in detection frequency band bit3 1: Speed arrival bit4 Reserved (1: loss of analog signal given frequency command) bit5 1: Overtorque detecting bit6 1: Undervoltage detecting bit7 1: Bus voltage greater than 85% of the rated voltage bit8 1: Exceeding 5% of the rated current in running and 10% of the rated current when stopping bit9 1: fault forecast bit15~10 Unused*

1138	Reserved (given target frequency)
1139	Current operating frequency 5000 corresponding to 50.00Hz
1140	Reserved (PID given value)
1141	Reserved (PID feedback value)
1142	Reserved (PID output value)
1143	Reserved (PID proportion item)
1144	Reserved (PID integral item)
1145	Reserved (PID differential item)
1146	Reserved (communication fault) bit0 1: communication timeout bit1 1: frame format bit2 1: CRC error bit3 1: data length error bit4 1: parity check error bit5 1: overload error bit6 1: illegal command bit7 Reserved (operation panel communication fault) bit15~8 Unused*
1147	Parameter update status bit0 1: updating 0: updated bit1 Reserved (1: data overrun) bit2 Reserved (1: data mismatch) bit3~15Unused*
1148~1156	Unused (9 units)
1157	Inverter output monitoring 1 bit0 1: normal power on 0: abnormal power on bit1 1: fault 0: normal bit2 1: With running signal 0: without running signal bit3 1: frequency/speed arrival signal bit4 1: frequency/speed consistency bit5 1: At zero speed bit6 1: DC bus voltage greater than 85% of the rated voltage bit7 1: Exceeding 5% of the rated current in running and 10% of the rated current when stopping bit8 1: Self-tuning bit9 1: Speed detection 1 bit10 1: Speed detection 2 bit11 1: fault forecast bit12 1: Self-tuning request
1158	Reserved (inverter output monitoring 2)
1159	Reserved (inverter output monitoring 3)
1160	Reserved (inverter output monitoring 4)

1161	Pump output monitoring 1 bit0 1: Pump sleep bit1 1: Motor 1 start bit2 1: Motor 2 start bit3 1: Motor 3 start bit4 1: Motor 4 start bit5 1: Motor 5 start bit6 1: Motor 6 start bit7 Reserved (Y8) bit8 Reserved (Y9) bit9 Reserved (Y10) bit10 Reserved (Y11) bit11 Reserved (Y12) bit12 Reserved (Y13) bit13 Reserved (Y14) bit14 Reserved (Y15) bit15 Reserved (Y16)
1162	Pump output monitoring 2 bit0 Reserved (Y17) bit1 Reserved (Y18) bit2 Reserved (Y19) bit3 Reserved (Y20) bit4 Reserved (Y21) bit5 Reserved (Y22) bit6 Reserved (Y23) bit7 Reserved (Y24) bit8 Reserved (Y25) bit9 Reserved (Y26) bit10 Reserved (Y27) bit11 Reserved (Y28) bit12 Reserved (Y29) bit13 Reserved (Y30) bit14 Reserved (Y31) bit15 Reserved (Y32)
1163	Fault indication 1 bit0 Module overcurrent protection bit1 ADC fault bit2 Radiator overheated bit3 Brake unit fault bit4 Reserved bit5 Reserved bit6 Speed variation bit7 Bus overvoltage bit8 Bus undervoltage bit9 Output default phase bit10 Low-speed overcurrent of the motor bit11 Encoder fault bit12 Reserved bit13 Reserved bit14 Reserved bit15 Motor phase sequence error

1164	Fault indication 2 bit0 Overspeed in the same direction bit1 Overspeed in the reverse direction bit2 Reserved bit3 Encoder communication fault bit4 abc overcurrent bit5 Brake detection fault bit6 Input overvoltage bit7 Reserved bit8 Reserved bit9 Encoder non-self-learning bit10 Output overcurrent bit11 SINCOS encoder fault bit12 Input default phase bit13 Overspeed protection bit14 Motor high speed overcurrent bit15 Grounding protection
1165	Fault indication 3 bit0 Capacitor aging bit1 External fault bit2 Reserved bit3 Reserved bit4 Current sensor fault bit5 Brake resistance short circuit bit6 Excessive current instantaneous value bit7 Output contactor fault bit8 Brake switch fault bit9 IGBT short-circuit protection bit10 Communication fault bit11 Abnormal input power bit12 Software overcurrent (abc phase current overcurrent) bit13 Software overcurrent (Current effective value overcurrent) bit14 Abnormal analog input bit15 Temperature sampling disconnection
1166	Reserved (fault indication 4) bit15~0 Reserved
1167	Multifunction terminal input state bit0 1: Multifunction terminal X0 ON 0: OFF bit1 1: Multifunction terminal X1 ON 0: OFF bit2 1: Multifunction terminal X2 ON 0: OFF bit3 1: Multifunction terminal X3 ON 0: OFF bit4 1: Multifunction terminal X4 ON 0: OFF bit5 1: Multifunction terminal X5 ON 0: OFF bit6 1: Multifunction terminal X6 ON 0: OFF bit7 1: Multifunction terminal X7 ON 0: OFF bit8 Unused* bit9 Unused* bit15~10 Unused*
1168	Multifunction terminal output state bit0 1: K1 ON 0: OFF bit1 1: K2 ON 0: OFF bit2 1: Y0 ON 0: OFF bit3 1: Y1 ON 0: OFF bit4 1: Y3(K3) ON 0: OFF bit5 1: Y4(K4) ON 0: OFF bit6 Unused* bit7 Unused* bit15~8 Unused*

1169	Feedback speed (Hz) -30000~30000 → -300.00~300.00Hz
1170	Given speed -30000~30000 → -300.00~300.00Hz
1171	Given speed filter value
1172	Effective value of output voltage One decimal point
1173	Output current RMS One decimal point
1174	Output torque -1000~1000 → -100.0%~100.0% rated current of inverter
1175	Drive efficiency (reserved)
1176	Bus voltage
1177	Analog input AI0/TM motor temperature detection input -10000~10000→-10.000~10.000V
1178	Analog input AI1 -10000~10000→-10.000~10.000V
1179	Analog input AI2 (reserved)
1180	System time (reserved)
1181	Radiator temperature
1182	U phase voltage (instantaneous value (reserved)
1183	V phase voltage (instantaneous value (reserved)
1184	W phase voltage (instantaneous value (reserved)
1185	U phase current (instantaneous value)
1186	V phase current (instantaneous value)
1187	W phase current (instantaneous value)
1188	Output active power 100.0% corresponding to rated power
1189	Reactive power (reserved)
1190	Total output power (reserved)
1191	Power factor (reserved)
1192	Feedback speed (rpm) -9999~9999→-999.9~999.9
1193	Pre-torque
1194~1209	16 units reserved

1210~1241	View[0~31]: **The specific monitoring content is related to the inverter model. Please refer to the instructions of "Select LCD to display the data content" in the inverter manual.** 1210: View[0]//Undefined 1211: View[1] 1212: View[2] 1213: View[3] 1214: View[4] 1215: View[5] 1216: View[6] 1217: View[7] 1218: View[8] 1219: View[9] 1220: View[10] 1221: View[11] 1222: View[12] 1223: View[13] 1224: View[14] 1225: View[15] 1226: View[16] 1227: View[17] 1228: View[18] 1229: View[19] 1230: View[20] 1231: View[21] 1232: View[22] 1233: View[23] 1234: View[24] 1235: View[25] 1236: View[26] 1237: View[27] 1238: View[28] 1239: View[29] 1240: View[30] 1241: View[31]
1242~1253	Uxx monitoring data (curve data) 1242: U01 data value (curve 1) 1243: U02 data value (curve 2) 1244: U03 data value (curve 3) 1245: U04 data value (curve 4) 1246: U05 data value (curve 5) 1247: U06 data value (curve 6) 1248: U07 data value (curve 7) 1249: U08 data value (curve 8) 1250: low byte: U01 identifier (curve 1 configuration); high byte: U02 identifier (curve 2 configuration) 1251: low byte: U03 identifier (curve 3 configuration); high byte: U04 identifier (curve 4 configuration) 1252: low byte: U05 identifier (curve 5 configuration); high byte: U06 identifier (curve 6 configuration) 1253: low byte: U07 identifier (curve 7 configuration); high byte: U08 identifier (curve 8 configuration)

1254~1257	4 units reserved (for drive)
1258~1513	U phase current (buffer 256 points for graphic display) [sampling every 10 PWM cycles]
1514~1769	V phase current (buffer 256 points for graphic display)
1770~2025	W phase current (buffer 256 points for graphic display)
2026	Output torque (for graphic display)
2027	Given speed (for graphic display)
2028	Feedback speed (for graphic display)
2029	Bus voltage (for graphic display)
2030~2541	512 spaces reserved (for graphic display)
2542	Reserved (thermal relay status) bit0 1: Thermal relay overload of water pump 0 bit1 1: Thermal relay overload of water pump 1 bit2 1: Thermal relay overload of water pump 2 bit3 1: Thermal relay overload of water pump 3 bit4 1: Thermal relay overload of water pump 4 bit5 1: Thermal relay overload of water pump 5 bit6~15Unused*
2543	Reserved (station status) bit0~1 Pump 0 bit0 1: variable frequency drive mode 0: power frequency drive mode bit1 1: run in 0: stop bit2~3 Pump 1 bit4~5 Pump 2 bit6~7 Pump 3 bit8~9 Pump 4 bit10~11 Pump 5 bit12 Reserved (1: The liquid level of the pool exceeds the upper limit [Measures: Close the water inlet valve when exceeding the upper limit]) bit13 Reserved (1: The liquid level of the pool is below the lower limit [Measures: the pump stops working when below the lower limit]) bit14~15 Unused*
2544	Reserved (actual water pressure)
2545	Reserved (actual flow)
2546	The cumulative number of operating days after pump 0 is powered on this time
2547	The cumulative number of operating hours after pump 0 is powered on this time
2548	The cumulative number of operating minutes after pump 0 is powered on this time
2549	The cumulative number of operating days after pump 1 is powered on this time
2550	The cumulative number of operating hours after pump 1 is powered on this time
2551	The cumulative number of operating minutes after pump 1 is powered on this time
2552	The cumulative number of operating days after pump 2 is powered on this time
2553	The cumulative number of operating hours after pump 2 is powered on this time
2554	The cumulative number of operating minutes after pump 2 is powered on this time
2555	The cumulative number of operating days after pump 3 is powered on this time
2556	The cumulative number of operating hours after pump 3 is powered on this time

2557	The cumulative number of operating minutes after pump 3 is powered on this time	
2558	The cumulative number of operating days after pump 4 is powered on this time	
2559	The cumulative number of operating hours after pump 4 is powered on this time	
2560	The cumulative number of operating minutes after pump 4 is powered on this time	
2561	The cumulative number of operating days after pump 5 is powered on this time	
2562	The cumulative number of operating hours after pump 5 is powered on this time	
2563	The cumulative number of operating minutes after pump 5 is powered on this time	
2564~2611	48 spaces reserved	
2612~2616	Historical fault 0 (Recent)	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2617~2621	Historical fault 1	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2622~2626	Historical fault 2	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2627~2631	Historical fault 3	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2632~2636	Historical fault 4	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2637~2641	Historical fault 5	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2642~2646	Historical fault 6	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point
2647~2651	Historical fault 7 (First happen)	Fault code
		Actual speed at the time of fault-30000~30000→-300.00~300.00Hz
		Given speed at the time of fault-30000~30000→-300.00~300.00Hz
		Bus voltage at the time of the fault, no decimal point
		Current at the time of fault, one decimal point

2652~2683	View[32]~ View[63]: **The specific monitoring content is related to the inverter model. Please refer to the instructions of "Select LCD to display the data content" in the inverter manual.** 2652: View[32] 2653: View[33] 2654: View[34] 2655: View[35] 2656: View[36] 2657: View[37] 2658: View[38] 2659: View[39] 2660: View[40] 2661: View[41] 2662: View[42] 2663: View[43] 2664: View[44] 2665: View[45] 2666: View[46] 2667: View[47] 2668: View[48] 2669: View[49] 2670: View[50] 2671: View[51] 2672: View[52] 2673: View[53] 2674: View[54] 2675: View[55] 2676: View[56] 2677: View[57] 2678: View[58] 2679: View[59] 2680: View[60] 2681: View[61] 2682: View[62] 2683: View[63]