Should the specifications have changed, there shall be no further notice.
MJB Controls shall reserves the right of final interpretation for the following data.

Inside chart is for reference only.

♻ This manual is printed with ecological paper.

MJB Controls
SY7000 Series
High-performance Vector Inverter
Operating Instruction Manual

Controlling and Protecting your motor

MJB Controls Pty Ltd

SY7000 series inverter is a new generation of high-performance Vector Inverters launched by MJB Controls.

SY7000 series inverter is general vector control inverter that is researched and developed by our company with the characteristics of high-quality, multifunctional, Low-frequency, great torque and ultra silent. The realization of fast response of torque, strong load adaptability, stable operation, high accuracy and perfect liability can most greatly enhance power factor and efficiency.

SY7000 series inverters have the function of parameter automatic tuning, zero servo non-speed sensor, vector control and V/F control and switch, perfect user password protection, shortcut menu design, rotate speed tracking, built-in PID controller, given and feedback signal Disconnection detection switch, Off load protection, fault signal tracking, failure automatic restart, built-in brake unit, 25 fault protection, failure monitoring, abundant I/O terminals, various speed setting ways, automatic voltage adjustment, wobble frequency control and multi-speed control, which can meet of the various load's requirements on drive control.

If the keyboard is operated, LED displays the running data and fault code, and LCD displays the Chinese state information and operation instructions, and copies the parameters and delivers them; the background adjustment and monitoring software can monitor the operation through the built-in standard RS485 interface; MODBUS bus protocol add expansion card can be compatible with PROFIBUS, DeviceNet and CANopen for field bus control. Compact structure to be unique in style; design and test are according to international standard to ensure product reliability; Rich Optional Components for your multiple configuration choices.

This handbook provides the user with relevant precautions and guidance on model selection, installation, parameter setting, field commissioning, failure diagnosis and daily maintenance. Before the use of SY7000 series general vector frequency inverter, please read carefully this manual, to ensure proper use. Incorrect use may cause inverter work abnormally, breakdown occurrence service life reduced and even personal injury accidents occurred. Therefore repeated reading of this manual before use and use strictly according to the instructions are necessary.

This manual is random sent attachment, be sure to safe keeping it after use. Equipment supporting customers please send this manual to the end user with the equipment.

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This manual includes use instructions and precautions.
And, this manual should be given to end users.

Safety Caution
In order to use them correctly, please read carefully this manual and its supplementary material before the installation, operation, maintenance and inspection of frequency converter. Use them after you get familiar with the knowledge, safety information and all the safety precautions of the machine. In the manual, safety precautions are rated "dangerous" and "caution". ·Dangerous: Danger due to operation not according to the requirement, which can result in serious injury or death. ·Caution: danger caused by operation not according to the requirement, which may cause Poisoning damage or minor injuries and damage of equipment.

1.1 Safety points

A Before Installation

⚠Danger	Please don't use damaged inverters and missing parts inverters, which risk injury.

B Installation:

⚠Danger	Please installed flame retardant objects like metal; Away from combustible matter or it may cause a fire.

⚠Caution	When two or more inverters are put in the same cabinet, please notice its location (refer to Chapter 3 machinery and electrical equipment install) to ensure heat dissipation effect.
	Can't let conductor head or screws fall into the frequency inverter, or it may cause damage to the inverter.

C Wiring

⚠ Danger	Should be done by professional electrical engineering staff, otherwise may leads to electric shock hazard!
	Inverter and power should be separated by a circuit breaker, otherwise may cause fire!
	Before connection, please confirm power is in off state, or may leads to electric shock hazard!
	Please correctly ground according to standard requirements, or may leads to electric shock hazard!

⚠ Caution	Not to connect input power to the output end U, V, W, otherwise may cause damage to inverters!
	Ensure that lines meet EWC requirements and safety standard of the area they locate. Diameter of wires used please reference manual suggest, or might cause accident!
	Braking resistance cannot be directly connected between (+), (-) terminals of dc bus or it may cause a fire!

D Before power on：

⚠ Danger	● Please confirm whether power voltage and inverter power voltage are in consistency; whether input and output wiring position are correct, check whether any short-circuit phenomenon at peripheral circuit and whether the lines are tighten, or it may cause damage to converter!
	● Inverter must connect power with plate covered or it may cause an electric shock!

	● Inverter must undertake compression

	experiment; the product has done the testing before it goes out factory. Otherwise it may cause accident!
⚠ Caution	● Whether all peripheral accessories are correctly connected according to circuit provided by this manual, or it may cause accident!

E After power on:

⚠ Danger	● Do not open the plate after power on, or may cause an electric shock!
	● Don't touch inverter and peripheral circuitry with wet hand, or may cause an electric shock!
	● Don't touch inverter terminals, or may cause an electric shock!
	● (At the beginning of power on, inverter automatically conducts safety inspections to external &high loop, at this time, please do not touch inverter U, V, W terminals or motor terminals, or may cause an electric shock!

	● If Parameter identification is needed, please note the danger of motor spiraling hurt, or it may cause accident!
⚠ Caution	● Do not optional change converter manufacturer parameters or it may cause damage to equipment!

F Operation：

⚠ Danger	● If choose restarting function, do not near the mechanical equipment, or it may cause a body harm!
	● Don't touch cooling fans and discharge resistance to tempt temperature, or it may cause burns!
	● Amateur technicians do not test signal during operation, or it may cause a body injury or damage of equipment!

⚠ Caution	● During inverter running, avoid anything fall into the equipment. Otherwise may cause damage to the equipment!
	● Don't adopt contactor on/off methods to control of the start/stop of frequency converter. Otherwise, cause damage to the equipment!

G Maintenance：

Danger	● Do not repair and maintain the equipment when power is on. Otherwise may cause an electric shock!
	● Confirm maintenance and repair must be done to frequency converter after charge lights off. Otherwise the residual capacitance on the capacitance may cause personal injury!
	● People did not take professionally training cannot implement repair and maintenance to inverter. Otherwise may cause personal injury or damage of equipment!

1.2 Precautions

A motor insulation inspection

Insulation inspection should be done when the first time we use the motor or before reuse it and regular inspection to prevent damage due to motor winding insulation failures. During insulation inspection,

motor connection must be separated from the inverter. It is recommended to adopt 500V voltage type megger and should guarantee insulation resistance is not less than 5MΩ.

B motor thermal protection

If motor used not match with the converter set capacity, especially when inverter rated power is greater than motor rated power, be sure to adjust related motor parameters in the inverter or install electric relay in front of the motor to protect it.

C above power frequency operation

This converter can provide 0 ~ 600Hz output frequency. If customer needs to run above 50Hz, please consider the affordability of mechanical device.

D mechanical device vibration

Inverter may encounter mechanical resonance point of load device in some frequency output place, which can be avoided by setting hopping frequency parameters inside inverter.

E about motor fever and noise

As converter output voltage are PWM waves and contains certain harmonics, so the temperature, motor noise and vibration will increase a little compared with power frequency operation.

F the output side has pressure-sensitive device or improve factors capacitance

Frequency converter output PWM waves, if its output side has installed improved power factor capacitance or pressure-sensitive resistance for lightning protection, easily causes inverter instant CLP or even cause damage to inverter. Please don't use it.

G switch device like contactor at the input and output terminal of inverter

If a contactor is installed between the power and frequency converter, then the contactor cannot be used to control the start-stop of frequency converter. If this contactor must be used to control the start-stop of frequency converter, the interval should be no less than an hour. Frequent charge-discharge may easily reduce the service life of capacitor in frequency convertor. If a contactor is installed between the power and frequency converter, should ensure inverter operates charge-discharge without output, otherwise may cause damage to

modular in frequency converter.

H the use beyond rated voltage value

It is not suitable to use SY7000 series frequency inverter beyond the scope of operate voltage allowed by this manual, which may easily cause damage to devices in the inverter. If necessary, please conduct voltage transformation by using corresponding voltage-lifting or voltage-reducing device.

I three-phase input converted into two phase input

SY7000 series three-phase inverters can not be converted into two phase. Or it will lead to failure or inverter damage.

J lightning shock protection

This series of converters are equipped with lightning CLP protection device, which have certain ability of self-protection for induction lightning. At the place where induction lightning frequently occurs, protection device should be installed in front of inverter.

K altitude and derate use

In the areas whose altitude are more than 1,000 meters, frequency converter cooling effect gets worse due to thin air, it is necessary to use by derating. Please make technical consult to our company about this situation.

L some special usages

If user needs the connection methods that are not specified in this manual, such as the common DCbus, please contact us.

M Attentions against the rejections of inverter

Burning of main circuit electrolytic capacitors and electrolytic capacitors on printed board may cause explosion. Burning of plastic parts produces toxic gases. Please dispose it as industrial garbage.

N Applicable motor

1) The standard adapter motor is four-pole squirrel cage asynchronous induction motor.If it is not the motor mentioned above, please select inverter according to voltage rated current. If drive permanent magnet synchronous motor is needed, please consult our company;
2) The cooling fan of non-frequency conversion motor and the rotor is coaxial connected, and when rotate speed is reduced, fan cooling effect is also reduced. Therefore, in the motor overheating situation, the ventilator should be strengthened or be converted into

frequency conversion motor;

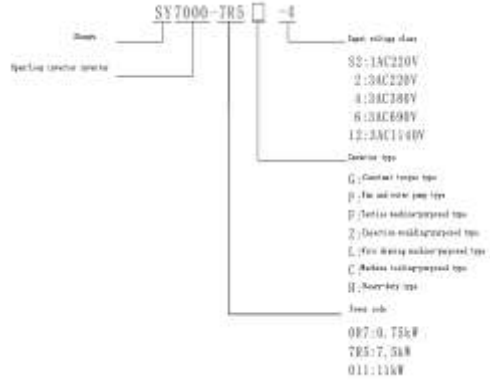
3) The inverter has provided the standard parameters of built-in motor, it is necessary to identify motor parameter or modify the default value according to actual condition to make it conform to the actual value, otherwise, it will affect operation effect and protect performance;
4) If the short-circuit inside cable or motor will cause inverter to alarm, even explode. Therefore, please conduct insulation and short-circuit test to initial installed motor and cable first, the test is also conducted frequently during routine maintenance. Make sure the inverter and tested part are disconnected when conduct the test.

Chapter 2 Product information

Type of SY7000 series inverter
220V series

Inverter model	Input voltage	Rated output power (KW)	Rated input current (A)	Rated output current (A)	Applicable motor(KW)
SY7000-0R7G-2	Three-phase 220V voltage range: -15% ～ +15%	0.75	5.0	4.5	0.75
SY7000-1R5G-2		1.5	7.7	7	1.5
SY7000-2R2G-2		2.2	11	10	2.2
SY7000-004G-2		4.0	17	16	4
SY7000-5R5G-2		5.5	21	20	5.5
SY7000-7R5G-2		7.5	31	30	7.5
SY7000-011G-2		11.0	43	42	11
SY7000-015G-2		15.0	56	55	15
SY7000-018G-2		18.5	71	70	18.5
SY7000-022G-2		22.0	81	80	22
SY7000-030G-2		30.0	112	110	30
SY7000-037G-2		37.0	132	130	37
SY7000-045G-2		45	163	160	45

2.1 Denomination rules



2.2 Nameplate

Chapter 2 Product information

Model SY7000-7R5G-4
Power 7.5 KW
Input 3PH AC400V 50HZ
Output 17A 0-600Hz
2.3 Type of SY7000 series inverter
380V series

Inverter model	Input voltage	Rated output power (KW)	Rated input current (A)	Rated output current (A)	Applicable motor (KW)
SY7000-0R7G-4	Three-phase 380V voltage range: -15% ～ +15%	0.75	3.4	2.5	3.7
SY7000-1R5G-4		1.5	5.0	5.0	9.0/13.0
SY7000-2R2G-4		2.2	5.8	13.0/17.0	17.0/25.0
SY7000-004G/5R5P-4		4.0/5.5	10.0/15.0	25.0/32.0	32.0/37.0
SY7000-5R5G/7R5P-4		5.5/7.5	15.0/20.0	37.0/45.0	45.0/60.0
SY7000-7R5G/011P-4		7.5/11.0	20.0/26.0	60.0/75.0	75.0/90.0
SY7000-011G/015P-4		11.0/15.0	26.0/35.0	90.0/110.0	110.0/150.0
SY7000-015G/018P-4		15.0/18.5	35.0/38.0	150.0/176.0	176.0/210.0
SY7000-018G/022P-4		18.5/22.0	38.0/46.0	210.0/253.0	253.0/300.0
SY7000-022G/030P-4		22.0/30.0	46.0/62.0	300.0/340.0	340.0/380.0
SY7000-030G/037P-4		30.0/37.0	62.0/76.0	380.0/420.0	420.0/470.

					0
SY7000-037G/045P-4		37.0/45.0	76.0/90.0	470.0/520.0	520.0/600.0
SY7000-045G/055P-4		45.0/55.0	90.0/105.0	600.0/640.0	640.0/690.0
SY7000-055G/075P-4		55.0/75.0	105.0/140.0	0.75	1.5
SY7000-075G/090P-4		75.0/90.0	140.0/160.0	2.2	4.0/5.5
SY7000-090G/110P-4		90.0/110.0	160.0/210.0	5.5/7.5	7.5/11.0
SY7000-110G/132P-4		110.0/132.0	210.0/240.0	11.0/15.0	15.0/18.5
SY7000-132G/160P-4		132.0/160.0	240.0/290.0	18.5/22.0	22.0/30.0
SY7000-160G/185P-4		160.0/185.0	290.0/330.0	30.0/37.0	37.0/45.0
SY7000-185G/200P-4		185.0/200.0	330.0/370.0	45.0/55.0	55.0/75.0
SY7000-200G/220P-4		200.0/220.0	370.0/410.0	75.0/90.0	90.0/110.0
SY7000-220G/250P-4		220.0/250.0	410.0/460.0	110.0/132.0	132.0/160.0
SY7000-250G/280P-4		250.0/280.0	460.0/500.0	160.0/185.0	185.0/200.0
SY7000-280G/315P-4		280.0/315.0	500.0/580.0	200.0/220.0	220.0/250.0
SY7000-315G/350P-4		315.0/350.0	580.0/620.0	250.0/280.0	280.0/315.0
SY7000-350G/		350.0/4	620.0/6	315.0/3	350.0

400P-4		00.0	70.0	50.0	/400.0

2.4 Technical specifications

Item		Spec.
Input	Rated voltage: frequency	380V or 220V: 50Hz/60Hz
	Allowed voltage working range	Fluctuation range: :≤±1 5 %;Voltage imbalance rate:<3%
Output	Rated voltage	0～380V or 0～220V
	Frequency	0～600 Hz
	Overload capacity	Type G: 150% of rated current for 60s; 180% of rated current for 1s; 200% of rated current instant protection; Type P: 120% of rated current for 60s; 150% of rated current for 1s; 180% of rated current instant protection
Main control performance	Control mode	V/F control, Magnetic flux vector control, Non-PG current vector control
	Modulation mode	Space voltage vector PWM modulation
	Speed regulation range	1:100 (vector control without PG)
	Starting torque	150% of rated torque at 2.0 Hz (Magnetic flux vector control,) 180% of rated torque at 0.5 Hz (current vector control without PG)
	Speed stabilization	≤±0.2% of rated synchronous speed

Basic spec.	accuracy	
	Speed fluctuation	≤±0.5% of rated synchronous speed
	Torque response	≤100ms current vector control without PG
	Torque control	Supporting torque control under vector control mode without PG with the torque control accuracy of ±5%
	Resolution of input frequency	Digital setting: 0.01Hz Analog setting: Max frequency ×0.05%
	Torque increase	Automatic torque increase, manual torque increase 0.1%～30.0%
	V/F curve	Six modes: One kind of user setting V/F curve, four kinds of decrease torque characteristic curve (2.0 power, 1.7 power, 1.5 power, 1.3 power) and linearity curve
	Acc/De curve	Three modes: Straight-line acceleration and decoration mode, S-curve acceleration and decoration mode, shortest acceleration and decoration mode; four kinds of acceleration and decoration time: time unit (minute/second) selected; longest time: 60 hours
	DC brake	DC braking frequency: 0.0Hz~max output frequency; braking time: 0.0~50.0s; braking current: 0.0%~150.0% of rated current
	Automatic voltage regulation (AVR)	When the network voltage makes the change, it can automatically keep the output voltage constant.
	Automatic current	It can automatically limit current during working to prevent tripping

	limiting	caused by frequent over current.
	Voltage stall	Control the voltage during deceleration to prevent over voltage and protect stopping.
	Automatic carrier regulation	It can automatically regulate carrier frequency according to load characteristic and temperature characteristic; and multiple carrier modes can be selected.
Customization function		
	Wobble frequency control for spinning	Wobble frequency control for spinning can realize functions of fixed wobble frequency and change wobble frequency
	Frequency combination function	Running command channel and frequency setting channel can be optionally combined.
	Fixed length function	Length achieves stop function and the max length is 65.535 KM.
	Jogging control	Jogging frequency range: 0.00Hz-the Max; jogging acceleration and deceleration time: 0.1-3600.0s,jogging interval time:0.1-3600.0s
	Multi-speed running	Realizing multi-speed running via built-in PLC or control terminal
	Built-in process closed loop control	Realizing the process closed loop control system conveniently
	Electric quantity calculation	It can calculate electric energy consumed by electric motor to observe energy-saving effect conveniently.
	Running	Operation panel, control terminal,

Running function	command channel	serial port, external expansion setting can be shifted via various methods.
	Frequency setting channel	Three kinds of digital settings, analog voltage setting, analog current setting, pulse setting, terminal combination setting, multi-segment speed setting and so on
	Auxiliary frequency setting	Realizing flexible auxiliary frequency fine regulation, frequency synthesis
	Impulse output terminal	0~50kHz of impulse square signal output, it can realize physical quantity output of setting frequency, output frequency and so on.
	Analog output terminal	Two routes of analog signal output, output range can be flexibly set between 0~20mA or 0~10V and it can realize physical quantity output of setting frequency, output frequency and so on.
	LED display	Displaying sixty-one kinds of parameters of setting frequency, output frequency, output voltage and output current and the like.
	LCD display	NO
	Parameter copy	NO
	Option of key function	Defining function range of part keys to prevent wrongly operating
Protection function		Open-phase protection (option), over-current protection, over-voltage protection, low-voltage protection, overheat protection, overload protection and off-load protection, etc.
	Service Location	Indoors, free from direct sunlight, dust, corrosive gas, combustible gas,

Environment		oil mist, water vapor, drip or salt, etc.
	Altitude	Please use it by derating when it is higher than 1.000m and derated 10% per increasing 1000m.
	Ambient temp.	-10℃ ～+ 40℃(at 40℃ ～50℃，please use it by derating)
	Humidity	Less than 95% RH, no water condensation.
	Vibration	Less than 5.9 n/s²(0.6g)
	Storage temp.	-40℃～ +70℃
Structure	Protection level	IP20
	Cooling method	Wind cooling, control with fans
Efficiency		45kW and lower than 45kW≥93%; 55kW and more than 55kW≥95%

2.5 Outline & installation dimension

2.5.1 Outline diagram

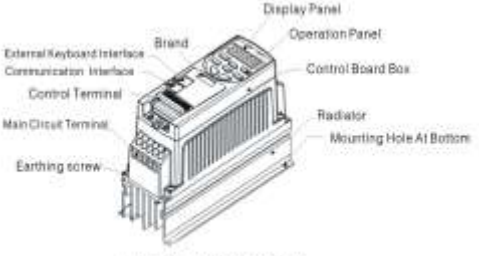


Fig. 2-1 Inverter outline diagram

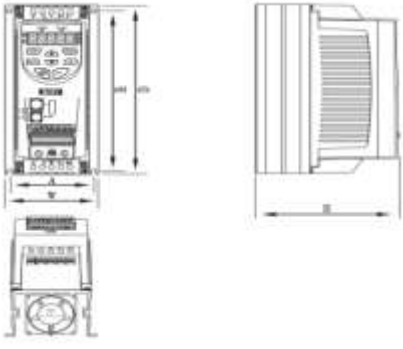


Fig. 2-2 Inverter outline & installation dimension diagram

2.5.2 Dimensions for mounting hole

	Outline dimensions			Mounting dimensions	
	A	B	C	D	E
30G/55P	940	325	245	915	220
55G/90P	855	360	280	810	220
90G/132P	1040	360	290	1000	220
160P/200P	1315	515	320	1270	400
200G/280P	1665	555	365	1630	400
280G/400P	1665	600	365	1630	420

Note: Floor-mounted dimensions, see the object.

Inverter SY7000 G/P kg

0.75G/2.2G	2.2G/5.5P	5.5G/11P	11G/18P	18G/30P	30G/55P	55G/90P	90G/160P	160G/200P	200G/280P	280G/400P
1.0	3.0	4.5	11	14	30	62	72	138	270	285

2.6 Options

Name	Instruction
Built-in braking unit	The single-phase 0.75~2.2KW of built-in braking unit, needing a built-out braking resistor additionally. The three-phase 0.75~15KW of built-in braking unit, needing a built-out braking resistor additionally.
Built-out braking unit	Three-phase built-out braking unit of 18.5KW and above.

2.7 Daily maintenance

2.7.1 Daily maintenance

The effect of temperature, humidity, dust and vibration leads to the aging of inner parts of inverter, potential fault or reduction of service life of inverter. Therefore, it is necessary to implement the daily and regular maintenance for inverter.

⚠Caution	• After switching off the power, if the filter capacitor still has the high voltage, the inverter can't be maintained immediately, only waiting the charge lamp goes out ,and the bus voltage measured by the multimeter should not exceed 36V, the maintenance can be performed.

Daily inspection items

1) Check whether the motor makes some abnormal sound during running.
2) Check whether the motor has the vibration during running.
3) Check whether the installation environment of inverter is changed.
4) Check whether the cooling fan of inverter works normally.
5) Check whether the inverter is too hot.

Daily cleaning

Keep the inverter clean.

Clear away the dust on the surface of inverter effectively and prevent the dust entering into the inner part of the inverter, especially the metallic dust.

Clear away the oil pollution of the cooling fan of inverter effectively.

2.7.2 Regular inspection

Please regularly examine the part that is difficult to be checked during running.

Regular inspection items

1) Check the air duct and conduct the regular cleaning.
2) Check whether the screw is slack.
3) Check whether the inverter is corrosive.
4) Check whether the wiring terminal has the track of arc discharge.
5) Main circuit insulation test.

Reminder: When testing the insulation resistance with the megohmmeter (Please use DC 500V megohmmeter), separate the main circuit lines from the inverter. Never use the insulation ohmmeter to test the insulation of control circuit. HV test needn't to be performed, because this test has been finished before the inverter leaves factory.

2.7.3 Change of wearable parts of inverter

Parts name	Service life
Fan	2~3 years
Electrolytic capacitor	4~5 years

The wearable parts of inverter include the cooling fan and electrolytic capacitor for filtering and their service life is closely related to the service environment and maintenance.

User can determine the age limit according to the running time.

1) Cooling fan

Possible cause for damage: Bearing abrasion and blade aging.

Examination standard: Check whether the fan blade has cracks and whether the fan has some abnormal vibration sounds when it is started.

2) Electrolytic capacitor for filtering

Possible cause for damage: Bad quality of input power, higher environment temperature, frequent jump of load and aging of electrolyte.

Examination standard: Leakage of liquid, projection of safety valve and test of static capacitance and insulation resistance.

2.7.4 Storage of inverter

After user purchases the inverter, please pay attention to the following points for temporary storage and long-time storage.

1) Try your best to put the inverter with the original package into our packing case when it is stored.

2) The long-term storage will result in degradation of electrolytic capacitor, so the inverter must be electrified once every two years, the electrified time should be 5 hours at least and the input voltage must rise to the rated value step by step with the voltage regulator.

2.8 Guidance for selecting type

Two control modes are available: Common V/F control and SVC control.

When selecting the inverter, first, you must identify the system technical requirements of frequency-conversion speed regulation, application location of inverter, load characteristics, etc.. and take the applicable motor, output voltage, rated output current, etc. into the consideration, then to select the machine type at your request and determine the running way.

Basic principle: The rated load current or motor should not exceed the rated current of inverter, in general, select the inverter according to the applicable motor capacity that is specified as the manual, please compare the rated current of motor with that or inverter. The overload capacity of inverter makes actually sense to the starting and braking operation. Whenever the inverter has the short-time over load, the load speed will be changed. If the speed accuracy is demanding, please take a higher class into current.

Fan and water pump type: The overload capacity is undemanding. Because the load torque is directly proportional to the square of speed, the load (except the rose fan) is very light when it runs at a low speed. And these loads have no special requirements on the rotation accuracy, so the square torque V/F is selected.

Constant-torque load: Many loads such as the extruder, agitator conveyer belt, plant trolley, crane translating mechanism have the constant-torque characteristics; however, their rotation speed and dynamic performance are undemanding. Accordingly, multi-segment V/F operation way is available when choosing the type.

The controlled object has a certain dynamic and static state requirement: The strong mechanical characteristics are required for this type of load when it runs at a low speed, to meet the control system requirements of dynamic and static indicators, SVC control way is available.

3.1 Mechanical installation

3.1.1 Installation environment

1) Environment temperature: The ambient temperature has a large impact on the service life of inverter, and the running environment temperature of inverter should not exceed the temperature of -1 0℃ ～ 50℃.

2) The inverter is installed on the surface of flame-retardant object; and it should have the enough space for ventilation, because it produces much heat easily when working. And, it should be vertically installed at the mounting rack with the screw.

3) Please install it in the firm area with easy vibration occurrence. The vibration should not be more than 0.6G. Especially, it should be kept away from the punch.

4) It is installed in the area free from the direct sunlight, dampness and drip.

5) It is installed in the area free from the corrosive, flammable, explosive gas, etc..

6) It is installed in the position free from the oil pollution, much dust and metallic dust.

3.1.2 Prompt for installation environment

Monomer installation diagram

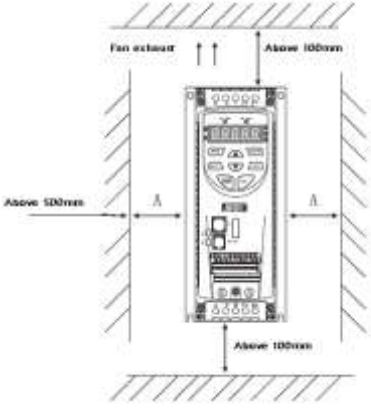


Fig.3-1 Installation gap

Note: When the inverter power is not larger than 22KW, the dimension A may not be taken into consideration, and when larger than 22KW, the dimension A should be larger than 50mm.

Top and bottom installation diagram

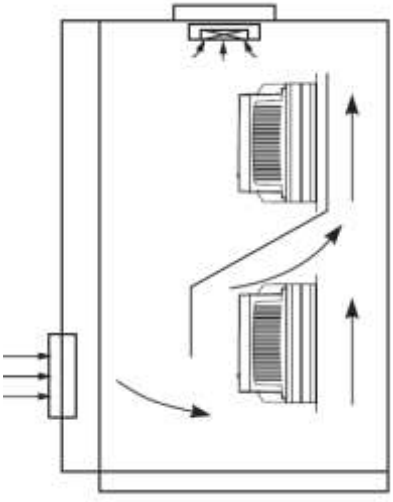


Fig.3-2 Installation of multi inverters

Note: When the inverter is installed vertically, please mount a heat-insulated baffler shown as Fig.3-2.

Please pay attention to the following points about heat emission when performing the mechanical installation.

1) The inverter should be installed vertically, which enables the heat to emit upwards easily, but it should not be mounted reversely. If many inverters need to be installed in a cabinet, you'd better install them side by side. If the inverts need the top and bottom installation, please mount a heat-insulated baffler shown as Fig.3-2.
2) Make sure the inverter has enough space for heat emission and the installation space is shown as Fig.3-1. However, when laying it, please consider the heat emission of other parts in the cabinet.
3) The mounting rack must be made of the flame-retardant

materials.

4) For the area with full metallic dust, it is suggested the installation outside the cabinet of radiator should be adopted and the space inside the full-seal cabinet should be as large as possible.

3.1.3 Dismounting and mounting of lower cover plate

SY7000 series inverter of 22KW below adopts plastic shell, exposed main circuit terminal without disassembling the cover plate.

SY7000 series inverter of 30KW above adopts a sheet metal enclosure; and the lower cover plate of the sheet metal enclosure needs to be dissembled just through slacking the screw of the lower cover plate directly.

Danger	• When disassembling the lower cover plate, please avoid its drop, otherwise, the equipment may be damaged.

3.2 Electrical installation

3.2.1 Circuit breaker, cable and contactor

Inverter mode	Circuit breaker （A）	Input/output wire (Copper wire and cable)	Contactor （A）
SY7000-0R7G-2/S2	16	2.5	10
SY7000-1R5G-2/S2	20	4	16
SY7000-2R2G-2/S2	32	6	20
SY7000-004G-2	40	6	25
SY7000-5R5G-2	63	6	32
SY7000-7R5G-2	100	10	63
SY7000-011G-2	125	16	95
SY7000-015G-2	160	25	120
SY7000-018G-2	160	25	120
SY7000-022G-2	200	35	170
SY7000-030G-2	200	35	170
SY7000-037G-2	200	50	170
SY7000-045G-2	250	70	230
SY7000-0D7G-4	10	2.5	10
SY7000-1R5G-4	16	2.5	10
SY7000-2R2G-4	16	2.5	10
SY7000-004G/5R5P-4	25	4	16
SY7000-5R5G/7R5P-4	25	4	16
SY7000-7R5G/011P-4	40	6	25
SY7000-011G/015P-4	63	6	32
SY7000-015G/018P-4	63	6	50
SY7000-018G/022P-4	100	10	63
SY7000-022G/030P-4	100	16	80
SY7000-030G/037P-4	125	25	95
SY7000-037G/045P-4	160	25	120
SY7000-045G/055P-4	200	35	135
SY7000-055G/075P-4	200	35	170
SY7000-075G/090P-4	250	50	230
SY7000-090G/110P-4	315	70	280
SY7000-110G/132P-4	400	95	315

SY7000-132G/160P-4	400	150	380
SY7000-160G/185P-4	630	185	450
SY7000-185G/200P-4	630	185	500
SY7000-200G/220P-4	630	240	580
SY7000-220G/250P-4	800	150*2	630
SY7000-250G/280P-4	800	150*2	700
SY7000-280G/315P-4	1000	185*2	780
SY7000-315G/350P-4	1200	240*2	900
SY7000-350G/400P-4	1200	240*2	900

3.2.2 AC input reactor

The input AC reactor can resist the high-order harmonic wave of input current of inverter, and obviously improves the power factor of inverter. It is suggested that the input AC reactor should be used under following conditions:

1) The ratio of power capacity for inverter and the capacity of inverter reaches over 10:1.
2) The thyristor or power factor compensating device with the switching control is connected at the same power supply.
3) The voltage unbalance degree of three-phase power is quite large (more than 3%).
4) If the power factor on power side needs to be improved, the power factor can be increased to o.75~0.85.

AC input reactors of common specifications are shown as the following table.

Spec.& mode	Power （KW）	Current （A）	Inductance （MH）	Voltage drop(V)
ACL-0005-EISC-E3M8	1.5	5	3.800	2%
ACL - 0007-EISC-E2M5	2.2	7	2.500	2%
ACL-0010-EISC-E1M5	3.7	10	1.500	2%
ACL-0015-EISH-E1M0	5.5	15	1.000	2%
ACL-0020-EISH-EM75	7.5	20	0.750	2%
ACL-0030-EISH-EM60	11	30	0.600	2%
ACL-0040-EISH	15	40	0.420	2%

- E M 4 2				
A C L - 0 0 5 0- E I S H - E M 3 5	18.5	50	0.350	2%
A C L - 0 0 6 0- E I S H - E M 2 8	22	60	0.280	2%
A C L - 0 0 8 0- E I S H - E M 1 9	30	80	0.190	2%
A C L - 0 0 9 0- E I S H - E M 1 9	37	90	0.190	2%
A C L - 0 1 2 0- E I S H - E M 1 3	45	12	0.130	2%
A C L - 0 1 5 0- E I S H - E M 1 1	55	150	0.110	2%
A C L - 0 2 0 0- E I S H - E M 0 8	75	200	0.080	2%
A C L - 0 2 5 0- E I S H - E 6 5 U	90/110	250	0.065	2%
A C L - 0 3 3 0- E I S H - E M 0 5	132/160	330	0.050	2%
A C L - 0390- E I S H - E 44 U	185	400	0.044	2%
A C L - 0 490- E I S H - E 35 U	220/200	490	0.035	2%
A C L - 0 660- E I S H - E 25 U	250/280	530	0.025	2%
A C L - 0 660- E I S H - E 25 U	315	660	0.025	2%
ACL-0800-EISH-E25U	355	800	0.025	2%

3.2.3 AC output reactor

The AC output reactor is used for resist the emission interface and inductance interface of inverter as well as the voltage fluctuation of motor; and it also can prevent the wire on output side leaking the electricity and reduce the electricity leakage when multi motors work in parallel and wire is laid at along distance.

AC output reactors of common specifications are shown as the following table.

Spec.& mode	Power （KW）	Current （A）	Inductance （MH）	Voltage drop(V)
ACL-0005-EISC-EIM5	1.5	5	1.500	0.5%
ACL- 0007- E I S C - E I M 0	2.2	7	1.000	0.5%
ACL- 0 0 1 0- E I S C - E M 6 0	3.7	10	0.600	0.5%
ACL- 0 0 1 5- E I S H - E M 2 5	5.5	15	0.250	0.5%
ACL- 0 0 2 0- E I S H - E M 1 3	7.5	20	0.130	0.5%
ACL- 0 0 3 0- E I S H - E 8 7 U	11	30	0.087	0.5%
ACL- 0 0 4 0- E I S H - E 6 6 U	15	40	0.066	0.5%
ACL- 0 0 5 0- E I S H - E 5 2 U	18.5	50	0.052	0.5%
ACL- 0 0 6 0- E I S H - E 4 5 U	22	60	0.045	0.5%
ACL- 0 0 8 0- E I S H - E 3 2 U	30	80	0.032	0.5%
ACL- 0 0 9 0- E I S H - E 3 2 U	37	90	0.032	0.5%
ACL- 0 1 2 0- E I S H - E 2 3 U	45	12	0.023	0.5%
ACL- 0 1 5 0- E I S H - E 1 9 U	55	150	0.019	0.5%
ACL- 0 2 0 0- E I S H - E 1 4 U	75	200	0.014	0.5%
ACL- 0 2 5 0- E I S H - E 1 1 U	90/110	250	0.011	0.5%
ACL- 0 3 3 0- E I S H - E M 0 1	132/160	330	0.010	0.5%
ACL- 0 3 9 0- E I S H - E 8 U 0	185	400	0.008	0.5%
ACL- 0 4 9 0- E I S H -	220/200	490	0.005	0.5%

E 5 U 0				
ACL- 0 6 6 0- E I S H - E 4 U 0	250/280	530	0.004	0.5%
ACL - 0 6 6 0- E I S H - E 4 U 0	315	660	0.004	0.5%
ACL-0800-EISH-E5U0	355	800	0.005	0.5%

3.2.4 DC reactor

When the capacity of power grid is far larger than that of inverter, or the power capacity is larger than 1, 000KVA, the power factor is demanded higher, the DC reactor should be installed at DC immediate link buses. The reactor may input high order harmonic. The series of inverter of 30KW above can be equipped with the DC reactor and the inverter of 160KW above has the built-in DC reactor.

DC reactors of common specifications are shown as the following table.

Spec.& mode	Power（KW）	Current（A）	Inductance（MH）
D CL-0006-EIDC	1.5/2.2	6	11
D CL-0012-E I D C	3.7	12	6.3
D CL-0023-E I D H	5.5/7.5	23	3.6
D CL-0033-E I D H	11/15	33	2.0
D CL-0040-E I D H	18.5	40	1.3
D CL-0050-E I D H	22	50	1.08
D CL-0065-E I D H	30	65	0.8
D CL-0078-E I D H	37	78	0.7
D CL-0095-E I D H	45	95	0.54
D CL-0115-E I D H	55	115	0.45
D CL-0160-E I D	75	160	0.36

H			
D CL-0180-E I D H	90	180	0.33
D CL-0250-E I D H	110/132	250	0.26
D CL-0340-E I D H	160	340	0.17
D CL-0460-E I D H	185/200/220	460	0.09
D CL-0650-E I D H	250/280	650	0.072
D CL-0800-E I D H	315/355	800	0.072

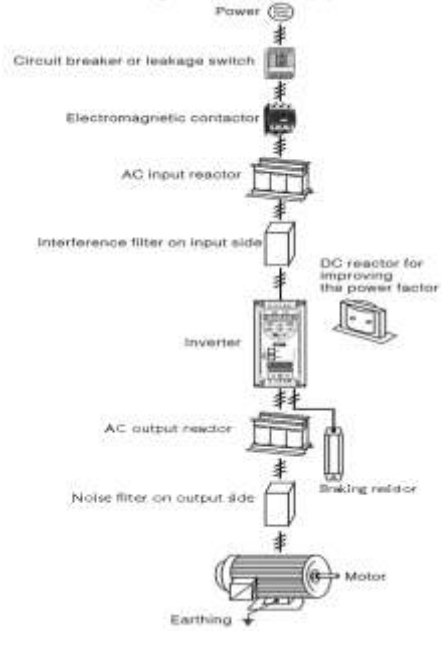
3.2.5 Braking unit and braking resistor

When the braking torque is 10%, the resistance value and the power of a braking resistor of common specification are shown as the following table.

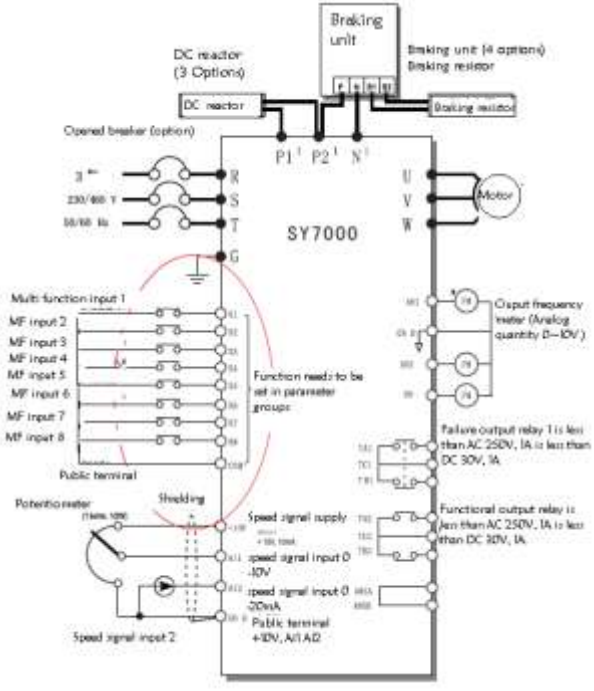
Voltage（V）	Inverter power（KW）	Braking unit（10 % E D）		Braking power （1 0 % E D）	
		Spec.	Qty.	Spec.	Purchase
380	0.4			70W/750	1
	0.75			70W/750	1
	1.5			260W/400	1
	2.2			260W/250	1
	3.7			390W/150	1
	5.5			520W/100	1
	7.5			780W/75	1
	11			1040W/50	1
	15			1560W/32	1
	18.5	4030	1	4800W/27.2	1
	22	4030	1	4800W/27.2	1
	30	4030	1	6000W/20	1
	37	4045	1	9600W/16	1

	45	4045	1	9600W/13.6	1
	55	4030	2	6000W/20	2
	75	4045	2	9600W/13.6	2
	110	4220	1	9600W/20	3
	160	4220	1	9600W/13.6	4
	185	4220	1	9600W/13.6	4
	220	4220	1	9600W/16	5
	300	4220	2	9600W/13.6	6

3.2.6 Connection diagram of peripheral equipments



3.3 Connection way



Note) ● display main circuit terminal; ○ display control signal terminal

1. The terminal construction is different according to the difference of different module.
2. Analog speed command can be set simultaneously by voltage, current or respectively.
3. The public bus between P1 and P2 must be removed when installing DC reactor.
4. Built-in a braking circuit in the circuit board for 0.7~15 KW inverter.

3.4 Main circuit terminal and connection

Danger	• Only the power switch is in the "OFF" state, you can perform the wiring operation otherwise, the accident of electric shock may happen! • The wiring operation must be performed by the professional electrician, otherwise, the equipment damage and human injury may happen! • Earthing must be reliable, otherwise, the accident of electric shock or fire will happen!
Caution	• Make sure the input power is identical with the rated value of inverter, otherwise, the inverter may be damaged! • Ensure the inverter matches with the motor, otherwise, the motor may be damaged or inverter protection will be caused. • The power should not be connected with terminals U, V and W, otherwise, the inverter will be damaged. • The braking resistor may not be connected with DC bus P+ and P–, otherwise, the fire will happen!

3.4.1 Instruction for the main loop terminals of three-phase inverter:

Terminal mark	Name	Description
R、S、T	Three-phase power input terminal	AC three-phase 380V power connection points
U、V、W	Inverter output terminal	Connecting with three-phase motor
P+、P-	Positive and negative terminals of DC bus	Common DC bus input point; connection point of external braking unit or 18.5 KW and above
P+、BR	Connection terminal of braking resistor	Connecting point of braking resistor of 15 KW and below
PE(⏚)	Earthing terminal	Earthing terminal

3.4.2 Attentions for wiring:

1) Input power R, S and T:

The connection on the input side of inverter has no requirement of phase sequence.

2) DC bus P+ and P- terminals:

Note: After the power supply is just cut off, the DC bus P+ and P- still have residual voltage, only the lamp in the power panel goes out and the voltage is less than 36V, you can touch the inverter, otherwise, the electric shock accident will happen.

When selecting the built-out braking unit for the inverter of 18.5 KW and above, never connection the polarity of terminals P+ and P- reversely, otherwise, the inverter will be damaged, even the fire will happen. The wiring length of braking unit should not exceed 10m and the wire must be twisted in pairs or compact double-wire.

3) Braking resistor connection terminals P+ and P-

The inverter of 15 KW and below has been provided with a built-in braking unit so only the braking resistor is connected to terminals P+ and BR.

Please refer to the recommended values for the type selection for braking resistor and the wiring distance should be less than 5m, otherwise, the inverter will be damaged.

4) Inverter output side terminals U, V and W:

The capacitor or surge absorber should not be connected on the output side of the inverter; otherwise, the inverter will suffer from frequent protection or damage.

If the motor cable is too long, the electric resonance will be easily produced for the effect of distributed capacitance to cause the damage of motor insulation or produce large leakage current to make the inverter perform an over-current protection. If the motor cable is longer than 50m, the AC output reactor must be mounted additionally.

5) Earthing terminal

The terminal must be reliably earthed, the resistance of earthing wire should be less than 5Ω, otherwise, the equipment will work abnormally, even to be damaged. Never commonly use the earthing terminal and power neutral line N terminal.

3.5 Control terminal and connection

3.5.1 Layout of control loop terminal function:

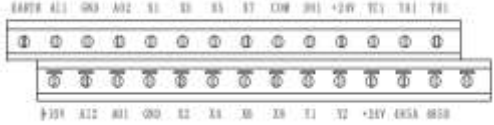


Fig.3-1 0.75 KW-2.2 KW (G type) Control loop terminal diagram 1

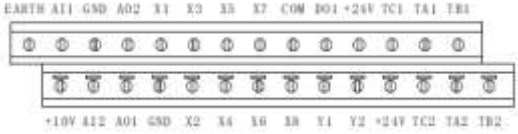


Fig.3-2 2.2 KW (C type) Control loop terminal and above diagram 2

In order to reduce interference and attenuation, connection length of control signal should be

Limited within 50m and the gap with the power wire is more than 30 cm. Try best to avoid wiring the control wire parallel with the power wire. When connecting the analog input and output signal, please use shielding twisted-pair. And the concrete function of terminal is shown as follows

Type	Terminal marking	Name	Function instruction	Spec.
Analog input	AI 1	Analog input 1	Receiving voltage/current flow input, choose by J1，AI2 receive voltage signal and current signal ,AI1 only receive voltage signal. defaulting input voltage	Input voltage range：0～10V (input resistance：100 kΩ) Input current range：0～20 mA（input resistance：500Ω）
	AI 2	Analog input 2		

			when leaving factory. Range setting function code P 6.00~P6.11 instruction (J1 selection, see 2.1 analog input terminal wiring). （ Reference ground：GND）	
Analog output	A01	Analog output 1	Providing output of analog voltage/ current flow, AO2 receive voltage and current signal, AO1 only receive current signal. Selecting by jump wire J2; defaulting output voltage when leaving factory. Correspond output frequency (before compensating slip) see the function code P6.18~P6.19	Current output range: 0/4~20 mA Voltage output range: 0/2~10V
	A02	Analog output 2		

			instruction. (J2 selection see analog output terminal wire) （ Reference ground：GND）	
Communication	485A	Rs 485 Communication interface	485 differential signal positive terminal (485+)	Standard RS-485 communication interface, please use twisted-pair or shielded wire and GND without separation
	485B		485 differential signal negative terminal (485-)	
Multifunctional input terminal	X1	Multifunctional input terminal 1	Capable of programming to define as multifunctional switch vector input terminal, which reaches 99. See function instruction of 7 groups of input terminals (Public terminal ： COM)	light-coupled isolation input Input impedance R=3.9 Ω Highest input frequency: 200HZ Input voltage range: 20~30V
	X2	Multifunctional input terminal 2		
	X3	Multifunctional input terminal 3		
	X4	Multifunctional input terminal 4		
	X5	Multifunctional input terminal 5		
	X7	Multifunctional input terminal 7		
	X8	Multifunctional input		

		terminal 8		
	X6	Multifunctional input terminal 6	X6 can be taken as common multifunctional terminal and can be programmed to be high speed impulse input terminal. See P7.05 function instruction. (Public terminal：COM)	light-coupled isolation input equivalent diagram as above Max input frequency: 50KHz Input voltage range: 0~30V
Multifunction output terminal	D01	Open-circuit collector impulse output terminal	Programming various function of impulse signal output terminal, which can reach 99. See P7.19, P7.19 output terminal function instruction. (Public terminal：COM)	Collector open-circuit output frequency range: setting the highest frequency at 50KHz from P6.29~P6.32
	Y1	Two-way open circuit collector output Y1	Programming various function of switch vector	Collector open-circuit output of light-coupled

	Y2	Two-way open circuit collector output Y2	output terminal, which can reach 99. See P7.19, P7.19 output terminal function instruction. (Public terminal : COM)	isolation working voltage range: 12V~30V Max output current: 50mA
Relay output terminal	TA1 TB1 TC1 TA2 TB2 TC2	Relay output	Capable of programming to define as multifunctional switch vector input terminal, which reaches 99. See P7.20 P7321 output terminal function instruction	RA-TB: always closed TA-TC: always opened Contac capacity: 250VAC/2A (COSΦ=1) 250VAC/1A (COSΦ=0.4) 30VDC /1A
Power supply	10V	+10V power	Providing +10V power supply outside (reference ground: GND)	Max output current 20mA
	24V	+24V power	Providing +24V power supply outside (reference ground: GND)	Max output current 200mA
	COM	+24V power common	reference ground of	Internal and CND

		terminal	+24V power	separation
	GND	+10V power reference ground:	Analog signal and +10V power reference ground:	Internal separating from COM and CME, +10V, AII, AI2 A01 and A02 signal reference ground:
	EARTH	Safe ground	Safe ground connection terminal, analog signal wire, shielding layer of 485 communication can be connected with the terminal	Resistance of safe ground to ground is less than 10Ω

3.5.2 Control loop terminal wiring

Analog input terminal wiring

AI2 terminal receives analog signal input, I-I and U-I jump wire selects input voltage (0~10V) or input current (0~20mA). Terminal wire mode is shown as Fig. 3-3

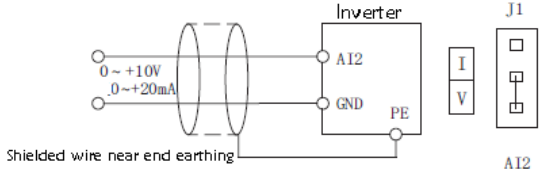
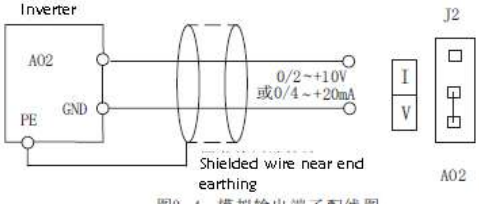


Fig. 3-3 Analog input terminal wiring diagram

Analog output terminal wiring

Analog output terminal A02 externally connects with an analog meter can indicate multiple physical quantities, respectively select output voltage (0/2~10V) or output current (0/4~20 mA) by jump wire I-0 and U-0. Terminal wire mode is shown as Fig. 3-4:



Tips:

1) It means current and voltage respectively when J1 and J2 jump to “I” and “V”.
2) Analog input/output signals are easily interfered, so shielded cabled must be adopted and grounded while wiring. The wire should be short enough.
3) When frequency converter analog input connects analog signal output device, analog signal output device or frequency may be interfered and therefore causes errors. In this circumstance, we can connect a
4) capacitance or hard magnetic ring (wind three times) of 0.01~0.1uF/50V to the external analog output device.

3.5.3 Serial Communication Interface

This kind of frequency converter provides users with standard RS485 serial communication interface, helping to form a master-slave control system. With host PC (PC or PLC controller), real-time, remote, automatic and even more complex monitoring can be realized.

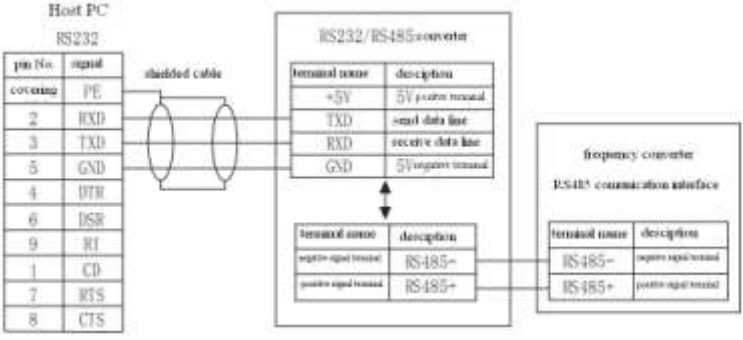


Fig. 3-5 Host PC and frequency converter interface and cable connection diagram

Interference in communication increases when a number of frequency converters are connected to the same RS485 system. The upper limit of frequency converters connected to one RS485 system through USB is 247. Wiring is very important. The bus must be shielded twisted pair. We recommend the following wiring method:

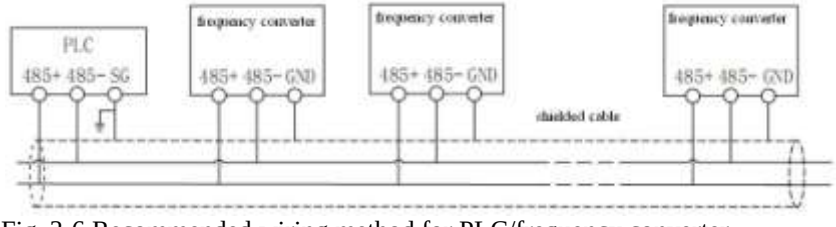


Fig. 3-6 Recommended wiring method for PLC/frequency converter multi-computer communication

The host computer can be PC or PLC, and the slave computers are frequency converters. If PC is the host computer, a RS232/RS485

adapter should be added between host computer and bus. If PLC is the host computer, all you have to do is to connect RS485 terminals between host computer and slave ones.

If more than one frequency converters are connected to one RS485 system, the signal interfaces of frequency converts on both ends must be connected to shielded resistances (generally100 Ω/1/4w).

If the above wiring does not work, please try the following measures:

1) Power PLC (or Host PC) independently, or separate their power sauce from others'.
2) If RS232/RS485 adapter is adopted, try powering the adaptor independently. Adaptor with optical coupler is strongly recommended.
3) Use magnetic poles in communication lines. If it is possible, reduce the carrier frequency of frequency converter.

3.5.4 Multifunction Input Terminal Wiring

The multifunction input terminal of this frequency converter adopts the full bridge rectifier. 24V is the common power terminal of X1~X7 that will fall to 5V after optical coupling isolation during output and a direction connection to CPU is realized. Input is effective when the switch and COM close. The wiring method is shown in Fig 3-7.

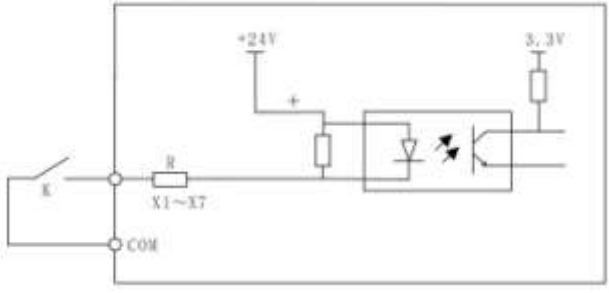


Fig. 3-7 Multifunction input terminal wiring

Source-drain method

1) Use the internal +24V power of the frequency converter; the external controller connects NPN-shape emitter and supports its

output. Please refer to Fig. 3-8.

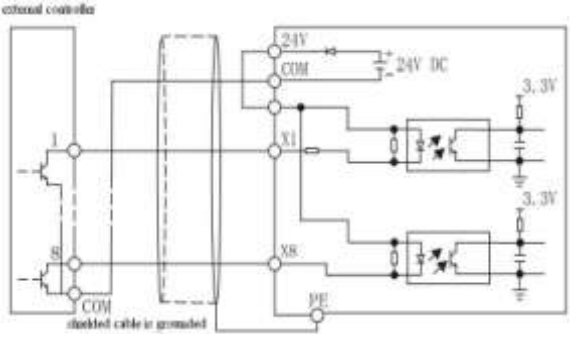


Fig.3-8 Source connection of using frequency converter's internal +24 power

2) Use the internal +24V power of the frequency converter; the external controller connects PNP-shape emitter and supports its output. Please refer to Fig. 3-9.

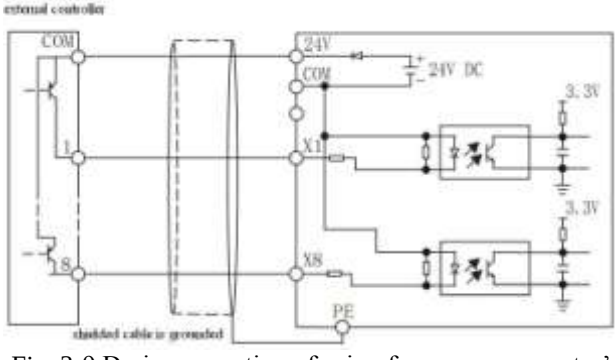


Fig. 3-9 Drain connection of using frequency converter's internal +24 power

3.5.5 Multifunction Output Terminal Wiring

1) Multifunction output terminals Y1 and Y2 are adaptable to the 24V power of frequency converter. The wiring method is shown in Fig 3-10.

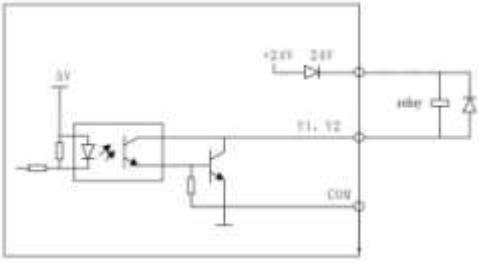


Fig. 3-10 Multifunction output terminal connection

3) Digital pulse frequency output DO is adaptable to frequency converter's power of 24 V. The wiring method is shown in Fig. 3-11.

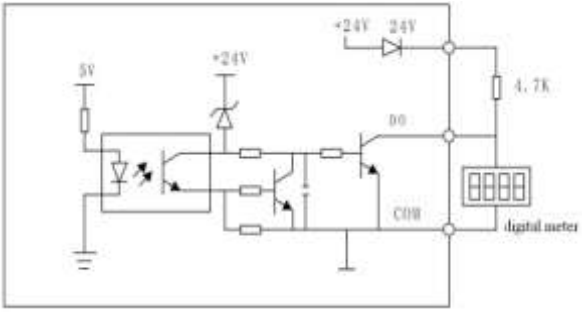


Fig. 3-11 Output terminal DO connection

3.5.6 Relay Output Terminal TA1/TB1/TC1 Wiring and TA2/TB2/TC2 Wiring.

If an inductive load (such as electromagnetic relay and contactor) is driven, a surge voltage absorbing circuit like RC absorbing circuit, VDR or free wheeling diode (used in direct current electromagnetic circuit, note the polar of diode) must be added. Absorbing circuit components must be installed at the ends of relay or contactor loops.

Tips:

1) Do not shorten 24V terminal and COM terminal; otherwise it

would cause damage of the control panel.

2) Connect control terminals with multi-core shielded cable or twisted pair (over 1m ㎡).
3) While using shielded cable, the terminal near the frequency converter should be connected to the earthed terminal PE through corresponding clamps.
4) Keep the cables over 30 cm away from main circuit and heavy-current circuits (including power line, machine wire, relay wire, contactor connections, etc.). Do not place them in parallel. To avoid errors caused by interference, do not interlock or intersect control cables and heavy-current cables.

3.6 Solutions for EMC problems

3.6.1 Influence of harmonic

1）The high order harmonic of power supply will bring about the damage of inverter, therefore, it is suggested that AC input reactor should be mounted in the area where the power grid is quite bad.

2）Because there is high order harmonic appearing on the output side of the inverter output side, therefore, the capacitor for improving the power factor and surge suppressor may suffer from the electrical vibration on the output side, thus, the equipment will be damaged. Accordingly, the capacitor or surge suppressor should not be mounted on the output side.

3.6.2 Electromagnetic interference and solution

1）Two kinds of electromagnetic interference

One is the interference from the peripheral electromagnetic noise which leads to the error operation of inverter itself. This interference has the low impact, because the inverter has the internal treatment against it when being designed, with the strong ability to resist the interference. The other is the inverter impact on peripheral equipment.

Common solutions

① The earthing wires of inverter and other electrical products should be earthed well, and the earthing resistance should not be larger than 5Ω.

② The dynamo—power line of inverter should not be laid with the control circuit in parallel, they can be vertically laid if available.

③ Where the interference resistance is demanding, the power line from the inverter to motor uses the shielded cable, the shielded layer should be earthed reliably.

④ The lead of interfered equipment should be shielded twisted pair, and the shielded layer should be earthed well.

2）Solutions against the interference from the peripheral electromagnetic equipment

The electromagnetic impact comes from many relays, contactors or electromagnetic brakes that are installed around the inverter. If the inverter performs the error operations for the interference from abovementioned equipment, the following solutions may be taken.

① A surge suppressor is mounted at the equipment that can produce the interference.

② The filter is mounted at the input terminal of inverter.

③ The control signal wire of inverter and lead of detection circuit adopt the shielded cable, and the shielded layer should be earthed reliably.

3）Solutions against the inverter noise interference to peripheral equipment:

The noise comes from two operations: one is the emission of inverter itself, the other is the emission of lead from the inverter to motor. These two kinds of emission enable the surface of lead of peripheral electric equipment to suffer from the electromagnetic and static inductance, so that the equipment actuates the error operation. For

abovementioned different interferences, the following methods can be taken for handling.

① The signal of metering meter, receiver and sensor are quite weak, if they are mounted near the inverter or installed with the inverter in the same control cabinet, they will be interfered easily and performs the error operation. The following methods may be taken to handle against the interference: keep them away the interference source as far as possible, don't lay the signal wire and power line in parallel, especially, don't bind them in parallel; adopt the shielded cable as the signal wire and power wire; mount the linear filter or wireless noise filter on the input and output side of inverter.

②When the interfered equipment and inverter use the same power supply, if the above methods are useless for eliminating the interference, the linear filter or wireless noise filter should be mounted between the inverter and power supply.

③ The peripheral equipment should be earthed independently, thus, in commonly earthing, the interference from the leakage current that is produced by the earthing wire of inverter may be avoided.

4）Leakage current and solutions

The leakage current includes line-to-line leakage current and to-earth leakage current.

① Causes for impacting the to-earth leakage current and solutions

The distribution capacitance appears between the inverter and ground, the larger the distribution capacitance is, the larger the leakage current will be; this distribution capacitance may be reduced through efficiently reducing the distance from inverter to motor. And, the larger the carrier frequency, the larger the leakage current will be. This leakage current may be lowered by reducing the carrier frequency. However, please pay attention to that the reduction of carrier

frequency will lead to the increase of motor noise. The installation of reactor is also an effective method for eliminating the leakage current. As the leakage current increases with the loop current, the larger power of motor will bring the larger leakage current.

②Causes for producing line-to-line leakage current and solutions

The distribution capacitance appears among the output wires of inverter, if the current passing through the circuit includes the high order harmonic, the resonance will be caused that will produce the leakage current. In this case, if the thermal relay is used, the inverter will actuate some error operations.

The solution is to reduce the carrier frequency or mount an output reactor. It is suggested the thermal relay should not be mounted in front of motor when using the inverter and the electronic overheat protection function should be used.

4.1 Introduction for operation and display interface

Operation keyboard is the main unit for inverter receiving commands and displaying parameter. The panel outline is shown as fig.-1.

Fig. 4-1 SY7000 operation panel deployment diagram

4.1.1 Instruction for button function

There are 8 buttons for operating the inverter and function of each button is defined as Table 4-1.

Table 4-1 Functions of operating keyboard

Button symbol	Name	Function
P R O G	PROGRAM /EXIT key	Let primary menu enter or exit
	ENTER key	Enter into the menu picture step by step, confirm the setting parameters
S H I F T	SHIFT key	In the “shutdown” interface and “run” interface, move to right and circularly select the displayed parameters, in amending the parameters, please select the amended places of parameters.
RUN	RUN key	In the mode of keyboard operating, it is used for “RUN” control.

	Stop/Reset key	Inverter is in normal operation, if the inverter running Settings are Stop effectively for the keyboard, press this button to set Stop. Inverter is in fault, press this button to reset inverter, and returns to normal Stop.
	UP key	Increase the data or function code (continuous press can increase speed),
	DOWN key	Decrease the data or function code (continuous press can decrease speed),

4.1.2 Instructions of LED digital pipe and lights

1) Instructions of function indicators

Names of indicators	Instructions of function indicators
R U N	The out- lamp means the inverter stops; on –light means the inverter is in motion, Flashing lamp means the inverter is self-learning states
L O C / R E M	Keyboard, terminal operations and remote communication control indicators, Out- lamp means control of Keyboard, flashing Lights means control of terminal operation; on-lamp means remote operation control
F W D / R E V	Positive &negative indicator, out-lamp turns positive, on-lamp turns negative
F L T	Failure indicator., When in fault , on; when at normal ,out
H Z	Frequency unit
V	Voltage unit
A	Current unit

2) Digital pipe displaying areas

50.00 for L E D display, That is, displaying Settings frequency, output frequency, etc. Various monitoring data, and alarm code.

4.1.3 Keyboard displaying state

SY7000 operating keyboard displaying state is divided into electricity initialization display, functional code parameters and monitor parameter

display, Fault alarm status display, running parameter display four state. This machine is on, L E D indicators are on, then digital tube (L E D) will show" p. o F F" characters, and then come to setting frequency, as shown in figure 4-2

4.1.4 Outage parameter displaying state

When the inverter stops operating keyboard displays stopping monitoring parameters, leaving the factory, set digital frequency Rate. As shown in figure 4-3 the unit of digital tube lights shows that the parameters of the unit H z. Outage parameter depends on group D-monitoring parameters, as follows is table D- 0 0 D - 57.

Users Can press PRG key (twice) into monitoring parameters, press Enter and ▲ key to check each of Control parameters

4.2 The status of operation parameter display

After the inverter received the efficient order, into operation state Operation status monitoring parameters shown by operation keyboard

Output frequency is default in factory .As illustrated 4-4, the unit is HZ shown on indicator's parameter of the unit above the digital tube. It may via PRG key (two times) into monitor interface , via ▲ with ENTER , can check the monitor parameter one by one , read the function details in d-00 d-57 table.

As illustrated 4-2, "P. oFF" is shown on electricity initialization of the electricity parameter display state.

As illustrated 4-3, the setting frequency of stopping is shown "50.00" of the machine when stopped parameter display state

As Illustrated 4-4, output frequency when running shown by "20. 00" on the running parameter display state

4.3 Fault alarm display state

When the fault signal is detected by the fault alarm display inverter, is entering the fault alarm display state, the display fault code is as illustrated 4-5, when the fault information should be checked, press PRG into the programming state to inquire the parameter of group D.

After checked and exclude the fault, can via [RESET] of operation keyboard, controlling the terminal or telecom order to reset the fault operation. If the fault exists all the time, the fault code will be shown

constantly.
As illustrated 4-5

The flow when accelerating of fault alarm display
Note: Refer to some serious fault, such as inverter modules, over-current, over voltage etc. When never confirm excluding the fault, it should not be reset operating absolutely, it should run again in order to avoid damaging the inverter

4.4 Editing display state of function code

When it is the status of halting, running or fault alarming, press [PRG] to enter editing state. If user password has been set, the password should be inputted to enter editing state. The 5.3 for reference, editing state is as per method of level 2 menus to display. Press [ENTER] to enter as per levels. When under the state of parameter display, press [ENTER] to operate the storing parameter, but it won't be saved if press [PRG], only return to upper menu.

5 Keyboard operation instructions

The operation of frequency converters can be made by operating keyboard. Examples below:

5.1 Monitor parameter check

EX 1: Examine monitor parameter item d-05 (output current)

Method one:

1) Press PRG button into program status, LED shows function parameter P0.00. Press PRG button again, LED shows function parameter d-00, and flashing position stays in units. Regulate ▲ or ▼ button till monitor code is d-05.
2) Press ENTER button, you will see the data corresponding to d-05. At the same time, LED (A) corresponding to the unit "ampere" shines.
3) Press PRG button to exit monitor status.

Method two:

1) Press ENTER button in the interface of specific monitor model, jump to next monitor parameter item d-xx. Press SHIFT button and regulate flashing position to units of monitor parameter. Next regulate ▲ or ▼ button till monitor code is d-05. At last, repeat method one's steps 2), 3), it will be finished.

EX 2: Check monitor parameter in fault state

Instruction:

1) Users can check D group's monitor parameter by pressing PRG button in fault state. Check range is D-00 ~ D-57.
2) When the use is checking fault parameters, it will switch back to fault alarm show state after stopping operating for 5s if the fault is not solved.
3) Fault code shows in D-48~D-57 (current and first three times).

5.2 Set function code parameter

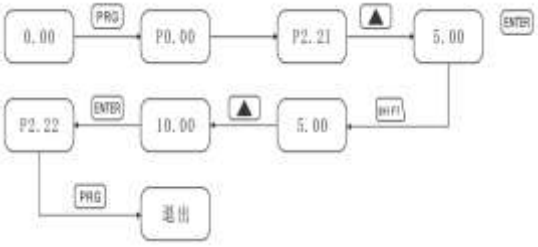
This frequency converter's functional parameter system includes function code P0 ~ PP, fault code E group and monitor code D group. Each function group covers some function codes. Function code takes "function group number + function code number" mode to recognize,

for example, "P5. 08" indicates the 8th function code in 5th function group.

Examples of setting functional code:

EX 1: Change normal inching turning frequency from 5 Hz into 10 Hz. (Change P2.21 from 5.00 Hz to 10.00 Hz).

1) Press PRG button into program status. LED shows functional parameter P0.00, flashing position stays in units.
2) Press SHIFT button, you will see flashing position shines in hundreds place, tens place and units place of the function item.
3) Press ▲ or ▼ button to change corresponding place's figure. LED shows P2.21.
4) Press ENTER button, you will see the figure 5.00 corresponding to P2.21. At the same time, the LED corresponding to the unit frequency shines.
5) Press SHIFT button, flashing position is in the highest place "5". Press ▲ button five times to change it into 10.00.
6) Press ENTER button, save P2.21 and automatically show the next function code (P2.22).
7) Press PRG button to exit the program status.



5.3 Accessing function code editing status after setting user's password.

The function of user's password setting is used to protect function parameter from the unauthorized checking and changing. The factory value of user's password P0.00 is "00000". In this interface, the user can set the parameter. (Please notice that in this state parameter setting is just not limited by password protection but by other conditions including it can be changed or cannot be changed without the limitation

of processing, monitor parameter etc.).

When setting user's password, input 5-digit number, and press ENTER to ensure. The password will take effect automatically after one minute or power down directly. After password taking effect, the keyboard will show "- Err-" for wrong setting password. At the same time, check the other function codes all of which are "-----" except the set one (password item shows "00000") and the user cannot set the function code parameter successfully. Having set the password successfully, you can check and change the function code when the keyboard shows "-En--".

When you need to change the password, choose the P0.00 function code, and press ENTER into the password testing status. If tested successfully, enter to changing status, input new password, and press ENTER to ensure. If password is changed successfully, it will take effect automatically after one minute or power down directly.

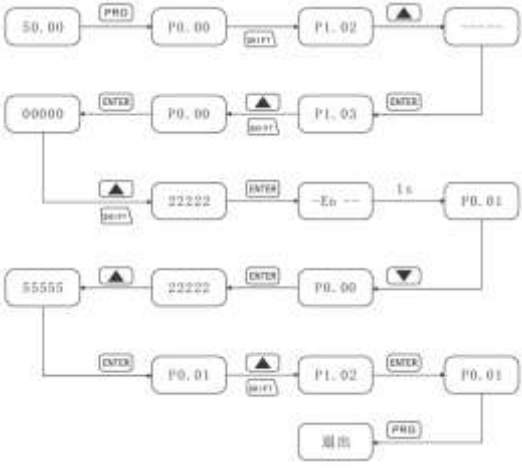
EX 1: Having changed the password "22222" to "55555", check the monitor code P1.02.

1) Press PRG button into program status. LED shows functional parameter P0.00, flashing position stays in units.
2) Press SHIFT button, you will see flashing position shines in hundreds place, tens place and units place of the function item.
3) Press ▲ or ▼ button to change corresponding place's figure. LED shows P1.02.
4) Press ENTER button, you will see the figure "----" corresponding to P2.21.
5) Press ENTER button into P1.03, next repeat the steps 2, 3 to check the figure "00000" corresponding to P0.00.
6) Press ▲ or ▼ button to change corresponding place's figure. LED shows "22222". The password is set successfully.
7) Press ENTER button, you will see LED shows "- En --". At the same time, function code shows P0.01.
8) Repeat the steps 2, 3, check figure "22222" corresponding to P0.01, and change it into "55555". Press ENTER button to finish

password change and enter into P0.01 item.

9) Repeat the steps 2, 3, check figure "0" corresponding to P1.02, and it can be changed by pressing ▲ or ▼.

10) Press PRG button to exit the program status.



The function parameter of this kind of variable-frequency drive adopts three-level menu, for example, "P8. 08" represents function code NO. 8 of the group of P8, PF is the manufacturer's parameter, and the users have no right to get excess to these parameter.

In order to facilitate the set-up of the function code, the function group should match with first level menu, the function code should match with the second menu, and the set-up value of the function code should match with the third level menu.

1) See the instructions of the content listed in function menu below:

The 1st row "function group": P0-PF altogether 17 groups; The 2nd row "function code": functional parameter group and serial number of the parameter; The 3rd row "name": the complete name of the function parameter; The 4th row "detailed instructions of parameter": detailed description of this function parameter; The 5th row" omitted value"": the original ex-works set-up value of this function parameter; The 6th row "alternation" is the alternation attribution of the function parameter (i.e., whether or not alternation is permitted, and the conditions of alternation), instructions as below:

"○": represents that the set-up value of the parameter can be altered when the variable-frequency drive is in shutdown or operation state.

"×": represents that the set-up value of the parameter cannot be altered when the variable-frequency drive is in operation state;

"◆": represents that the value of the parameter is the actual detected value, and cannot be altered;

(The variable-frequency drive has carried out automatic detection restriction, so it can help users avoid mistaken alternation.)

The 7th row "serial number": is the arrangement serial number of this function code in the whole functions codes, and represents the register address during communication;

2) "Parameter system" is decimal system (DEC), if the parameter adopts hexadecimal to be represented, dada of every digit is independent while the parameters are edited, the value range of some digits can be (O-F) of hexadecimal.
3) "Omitted value": represents the updated value of the function code parameter when it is restored to ex-works parameter; but the value of the actual detected parameter or the recorded value will not be updated.

4) In order to more effectively protect the parameter, the variable-frequency drive provides password-protection for function code. After setting up the user password (i.e., the parameter of P0.00 is not 0), when the user presses on button to enter editing state of the function code, the system will enter verification state of the user's password, and it will show"-----", the operator has to input the correct password, or he cannot enter. As to the area of the parameter set up by the manufacturer, you cannot enter it unless you input the correct password set up by the manufacturer. (We warn the users against trying to alter the parameters set up by the manufacturer, it will result in abnormal operation of the variable-frequency drive or even damage to it the parameters are not set up appropriately.) In the state that the password protection has not been locked up, you can alter the user password at any time; the value inputted the last time is taken as the ultimate correct password. You can cancel the user password by setting up the P0.00 to zero; re-connect it with electric power, and then the password becomes effective. If P0.00 is not 0 when it is connected with electric power, the password is protected.
5) The users should also comply with the above-mentioned principles while altering the function parameter by using serial communication.

Attribution instructions for SY 7000 parameter

Function group	Function code	Name	Parameter description	Minimum unit	Default	Amendment
P1 group basic operation parameters	P0.00	User password	0-65535 0: No password protection	1	0	○
	P0.01	LCD language selection (it is only effective for the LCD panel)	0: Chinese 1: English 2: Reserved	1	0	○
	P0.02	Parameter initialization	0: No operation 1: All user parameters are restored to ex-works set-up except for the parameter of the electric motor 2: All user parameters are restored to ex-works set-up 3: Remove failure record	1	0	×

	P0.03	Parameter alternation protection	0: Allow all parameter to be amended (some parameters cannot be amend in running state) 1: Only allow frequency set-up P1.07, P1.08 and this function code to be amended 2: Inhibit all parameters from being amended except for this function code Attention: the above-mentioned restriction is invalid for this function code and P0.00	1	0	○
	P0.04	Parameter copy function (only valid for the LCD panel)	0: No operation 1: The parameter is uploaded to the panel 2: All parameters of all function codes are downloaded to the inverter 3: All parameters of the function codes are downloaded to the inverter	1	0	×

			except for the parameters of the electric motor			
	P0.05	Function selection of JOG key	0: Jog control 1: Shift between forward operation and reverse control 2: Remove the set-up frequency of panel▲/▼key 3: Shift between local control and remote control(reserved)	1	0	×
	P0.06	Function selection of STOP/RST key	0: Only vaild for panel control 1: Valid both for panel and terminal control 2: Valid both for panel and communication control 3: Valid for all control modes	1	3	×
	P0.07	Immediate stop function of STOP key +RUN key	0: Invalid 1: Automatic stop	1	1	×
	P0.08	Version NO. of	1.00-99.99	0.01	1.01	◆

		the control software				
	P0.09	Version NO. of the panel software	1.00-99.99	0.01	1.00	◆
	P1.00	Way of control	0:V/F control 1: Magnetic flux control 2: Control without PG current vector (SVC)	1	0	×
	P1.01	Operation order passage selection	0: Operation order passage of control panel "L/R" indication light will be turn off) 1: Terminal operation order passage ("L/R" indication light twinkles) 2: Communication operation order passage (all "L/R" indication lights will be turn on)	1	0	○
			0: Number-given 1(panel▲/▼key, Encoder) 1: Number-given			

	P1.02	Main frequency source A selection	2(terminal UP/DOWN adjustment) 2: Number-given 3(communication set-up) 3:A11 Simulation-given(0-10V/20 mA) 4:A12 Simulation-given(0-10V/20 mA) 5: Impulse-given(0-50 KHZ) 6: Simple PLC set-up 7: Multi-section operation set-up 8: PID control set-up 9: Terminal combination-given	1	0	○
	P1.03	Ancillary frequency source B selection	0: No ancillary-given 1: Number-given 1(panel▲/▼key, Encoder) 2: Number-given 2(terminal UP/DOWN adjustment) 3: Number-given 3(communication set-up) 4:A11	1	0	○

			simulation-given (0-10V/20 mA) 5: A12 simulation-given (0-10V/20 mA) 6: Impulse-given(0 -50 KHZ)			
	P1.04	Combination algorithm of frequency source	0: Main frequency source A 1: K1*A+k2*B 2: K1*A-k2*B 3: | k1*A-k2*B | 4: MAX(A,B) 5: MIN(A, B) 6: Shift between A and B 7: Shift between A and (A+B) 8: SQRT (k1*A)+SQRT(k2*B) 9: SQRT (k1*A+k2*B)	1	0	○
	P1.05	Number-given 1 control	0: Valid, inverter storage against the power failure 1: Valid, inverter no storage against the power failure 2: Invalid, inverter storage against the power failure	1	0	○

			3: Invalid, inverter no storage against the power failure			
	P1.06	Number-given 2 control	0: Valid, inverter storage against the power failure 1: Valid, inverter no storage against the power failure 2: Invalid, inverter storage against the power failure 3: Invalid, inverter no storage against the power failure	1	0	○
	P1.07	Frequency source number 1 set-up	0.00 Hz-[p1.11]	0.01 Hz	50.00	○
	P1.08	Frequency source number 2 set-up	0.00 Hz-[p1.11]	0.01 Hz	50.00	○
	P1.09	weight coefficient k1 set-up of the main frequency source	0.01-10.00	0.01	1.00	○

	P1.10	weight coefficient k1 set-up of the ancillary frequency source	0.01-10.00	0.01	1.00	○
	P1.11	Maximum output frequency	MAX[50.00, upper limit{P1.12}]-600.00	0.01 Hz	50.00	×
	P1.12	Upper limit frequency	{p1.13}-{P1.11}	0.01 Hz	50.00	×
	P1.13	Lower limit frequency	0.00 Hz-{P1.12}	0.01 Hz	0.00	×
	P1.14	Acceleration time 1	0.1-3600.0s	0.1s	Machine-type set-up	○
	P1.15	Deceleration		0.1s	Machine-type set-up	○
	P1.16	reserved	-	-	0	◆
	P1.17	Operation direction set-up	0: Forward 1: Reverse 2: Reverse-inhibition	1	0	×
	P1.18	Carrier wave	1.0-15.0KHz 0.4-4.0KW 8.0KHz 1.0-15.0KHz	0.1 KHz	Machine-type	○

		frequency set-up	5.5-30KW 6.0KHz 1.0-15.0KHz 37-132KW 4.0KHz 1.0-10.0KHz 160-630KW 2.0KHz 1.0-5.0KHz		set-up	
P2 group basic operation parameters	P2.00	Way of start-up	0: Start-up frequency start-up 1: Direct current braking +start-up frequency start-up 2: Rotational speed tracking start-up	1	0	×
	P2.01	Start-up frequency	0.00-50.00 Hz	0.01 Hz	1.00	○
	P2.02	Start-up frequency maintaining time	0.0-10.0s	0.1s	0.0	○
	P2.03	Start-up frequency braking current	0.0-150.0%*Ie	0.1%	0.0	○
	P2.04	Start-up frequency braking	0.0-50.0s	0.1s	0.0	○

		time				
	P2.05	Way of acceleration and deceleration	0: Straight line acceleration and deceleration 1:S curve acceleration and deceleration 2: Shortest time acceleration and deceleration	1	0	×
	P2.06	Time proportion of the beginning section of the S curve	10.0-50.0%	0.1%	20.0%	○
	P2.07	Time proportion of the last section of the S curve	10.0-50.0%	0.1%	20.0%	○
	P2.08	Way of shutdown	0: Decelerating shutdown 1: Free shutdown	1	0	×
	P2.09	Initial frequency of shutdown direct braking	0.00-[P1.11]	0.01 Hz	0.00	○
	P2.10	Waiting time of shutdow	0.0-50.0s	0.1s	0.0	○

		n direct braking				
	P2.11	Shutdown direct current braking current	0.0-150.0%	0.1%	0.0%	○
	P2.12	Shutdown direct current braking time	0.0: Direct current braking with no motion 0.1-50.0s	0.1s	0.0	○
	P2.13	Reserved	-	-	0	◆
	P2.14	Acceleration time 2	0.1-3600.0s	0.1	Machine-type set-up	○
	P2.15	Deceleration time 2		0.1	Machine-type set-up	○
	P2.16	Acceleration time 3	0.1-3600.0s		Machine-type set-up	○
	P2.17	Deceleration time 3			Machine-type set-up	○

Note:

"○" represents the parameter setting values may be amendable under any state;

"×" represents the parameter setting values are unallowable to be amended when the inverter is in the running state;

"◆" represents the parameter is unallowable to be mended when it is actual measured;

"○"represents the parameter setting values are unallowable to be amended by users, be amended by the suppliers only.

P2 Group - supplementary run parameters	P2.18	Acceleration time 4th	0.1～3600.0 S	0.1	Model set	O
	P2.19	Deceleration time 4th		0.1	Model set	O
	P2.20	Acceleration and deceleration time units selection	0：second 1：minute	1	0	O
	P2.21	Forward jog run frequency setting	0.00～【P1.11】	0.01Hz	5.00	O
	P2.22	Jog acceleration time setting	0.1～3600.0s			O
	P2.23	Jog deceleration time setting				O
	P2.24	Jog interval setting				O
	P2.25	Jump frequency 1st	0.00 ～ Upper-limit frequency	0.01Hz	0.00	O
	P2.26	Rang of jump frequency 1st	0.00 ～ Upper-limit frequency	0.01Hz	0.00	O
	P2.27	Jump frequency 2nd	0.00 ～ Upper-limit	0.01Hz	0.00	O

			frequency			
	P2.28	Rang of jump frequency 2nd	0.00 ～ Upper-limit frequency	0.01Hz	0.00	O
	P2.29	Jump frequency 3rd	0.00 ～ Upper-limit frequency	0.01Hz	0.00	O
	P2.30	Rang of jump frequency 3rd	0.00 ～ Upper-limit frequency	0.01Hz	0.00	O
	P2.31	Action when the setting frequency below the down limit	0: Run on the down limit frequency 1: Halting 2: Run on zero speed	1	0	X
	P2.32	Reversible dead time	0.0～3600.0s	0.1s	0.0	O
	P2.33	Reversing switch mode	0: Zero-frequency switching 1: Starting frequency switching	1	0	X
	P2.34	Threshold of zero-frequency operation	0.00～50.00 Hz	0.01Hz	0.00	O
	P2.35	Zero frequency hysteresis	0.00～50.00 Hz	0.01Hz	0.00	O
	P2.36	Reverse jog run frequency setting	0.00～【P1.11】	0.01Hz	5.00	O
P3 Group Inv	P3.00	Inverter models selection (Vector	0: G-type (constant torque load type) 1:P type (fan	1	0	X

		program on hold)	and pump type load models)			
	P3.01	Motor rated power	0.4～999.9 KW	0.1KW	Model set	X
	P3.02	Rated motor frequency	0.01 Hz ～【P1.11】	0.01Hz	50.00	X
	P3.03	Motor rated speed	0～36000 RPM	1 RPM	Model set	X
	P3.04	Motor rated voltage	0～999V	1V	Model set	X
	P3.05	Motor rated current	0.1～6553.5A	0.1A	Model set	X
	P3.06	Stator resistance	0.001 ～ 65.535Ω	0.001Ω	Model set	X
	P3.07	Rotor resistance	0.001 ～ 65.535Ω	0.001Ω	Model set	X
	P3.08	Inductance of stator and rotor in motor	0.1 ～ 6553.5 mH	0.1 mH	Model set	X
	P3.09	Mutual inductance of stator and rotor in motor	0.1 ～ 6553.5 mH	0.1 mH	Model set	X
	P3.10	No load current of motor	0.1～655.35A	0.1A	Model set	X
	P3.11	Motor tuning options	0: No action 1: Static tuning 2: Full turning	1	0	X
	P3.12	Reservations	-	-	0	◆
P4 Group - Flux control parameters	P4.00	A speed ring(ASR1) proportional gain	0～100	1	20	O
	P4.01	A speed ring(ASR1) integration time	0.01～10.00S	0.01 S	0.50	O

	P4.02	ASR1 filter time constant	0.000 ～ 0.100S	0.001S	0.000	O
	P4.03	Low frequency switching	0.00 Hz ～【P4.07】	0.01 Hz	5.00	O
	P4.04	A speed ring(ASR2) proportional gain	0～100	1	15	O
	P4.05	A speed ring(ASR2) integration time	0.01～10.00S	0.01 S	1.00	O
	P4.06	ASR2 filter time constant	0.000 ～ 0.100S	0.001S	0.000	O
	P4.07	High frequency switching	【P4.03】～【P1.11】	0.01 Hz	10.00	O
	P4.08	Compensation factor for deterioration of vector control (electric state)	50.0% ～ 200.0%	0.1 %	100%	O
	P4.09	Compensation factor for negative slip of vector control (braking)	50.0% ～ 200.0%	0.1 %	100%	O
	P4.10	Reservations	-	-	0	◆
	P4.11	Reservations	-	-	0	◆
	P4.12	Reservations	-	-	0	◆
	P4.13	Selection of speed and torque control	0: Speed 1: Torque 2: Conditions valid (terminal switch)	1	0	X
	P4.14	Speed and torque switching	0.01～1.00S	0.01 S	0.05	X

		time delay				
	P4.15	Torque command Selection	0: Given by keyboard figures 1: AI1 2: AI2 3: Given by RS 485 communication	1	0	O
	P4.16	Keyboard number of torque settings	-250.0% ～ 250.0%	0.1 %	0.0%	O
	P4.17	Channel selection based on the speed in torque control mode 1(Forward)	0: Given by keyboard figures for 1 1: AI1 2: AI2 3: Given by RS 485 communication	1	0	O
	P4.18	Channel selection based on the speed in torque control mode 1(Reverse)	0: Given by keyboard figures for 2 1: AI1 2: AI2 3: Given by RS 485 communication	1	0	O
	P4.19	Speed limit by keyboard 1	0.0～100.0%	0.1 %	0.0%	O
	P4.20	Speed limit by keyboard 2	0.0～100.0%	0.1 %	0.0%	O
	P4.21	Torque rise time	0.0～10.0S	0.1 S	2.0	O

	P4.22	Torque fall time	0.0～10.0S	0.1 S	2.0	O
	P4.23	Forward electric torque limit on vector mode	0.0 % ～ 250.0 %*Ite	0.1 %	180.0 %	O

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P4 Group - Flux control parameters P3 Group-Inverter models and motor parameters	P4.24	Forward braking torque limit on vector mode	0.0 % ～ 250.0 % *Ite	0.1 %	180.0 %	O
	P4.25	Reverse electric torque limit on vector mode	0.0 % ～ 250.0 % *Ite	0.1 %	180.0 %	O
	P4.26	Reverse braking torque limit on vector mode	0.0 % ～ 250.0 % *Ite	0.1 %	180.0 %	O
	P4.27	Selection of action for Torque detection	0: Detected invalid 1: Detect over-torque at Constant speed and continue to operate 2: The inverter continues to run after over-torque detection in processing 3: Cut output after detect over-torque in constant speed 4: Cut output after detect over-torque in operation	1	0	X

			5: Detect less-torque at Constant speed and continue to operate			
			6: The inverter continues to run after less-torque detection in processing			
			7: Cut output after detect less-torque in constant speed			
			8: Cut output after detect less-torque in operation			
	P4.28	torque detection level	0.0％～200.0％*Ite	0.1％	0.0%	X
	P4.29	torque detection time	0.0～10.0S	0.1S	0.0	X
	P4.30	the magnetic flux conpensation coefficient 1	0.10～1.50	0.01	0.50	X
	P4.31	the magnetic flux conpensation coefficient 2	0.10～1.50	0.01	1.00	X
	P4.32	the magnetic flux conpensation coefficient boundary	1.00～10.00 Hz	0.01Hz	5.00	X
	P4.33	the magnetic flux close-loop ratio coefficient	0.01～5.00	0.01	1.00	O

	P4.34	the magnetic flux integral constant	0.01～10.00S	0.01S	1.00	O
	P4.35	Reservations	-	-	0	◆
	P4.36	Reservations	-	-	0	◆
P5 Group-V/F control parameters	P5.00	V/F curve setting	0: Linear curve 1: Torque curve fall 1 (1.3 times power) 2: Torque curve fall 1 (1.5 times power) 3: Torque curve fall 1 (1.7 times power) 4: Square curve 5: User set V / F curve(determined by the P5.01 ~ P5.06)	1	0	×
	P5.01	V / F frequency F1	0.00 frequency F2	0.01 Hz	12.50	○
	P5.02	V / F voltage V1	0.0 ~ voltage V2	0.1 %	25.0%	○
	P5.03	V / F frequency F2	Frequency F1 frequency F3	0.01 Hz	25.00	○
	P5.04	V / F voltage V2	Voltage V1 Voltage V3	0.1 %	50.0%	◆
	P5.05	V / F frequency F3	Frequency P2 【P1.11】	0.01 Hz	37.50	×
	P5.06	V / F voltage V3	Voltage V2 100.0 The maximum voltage output	0.1 %	75.0%	×

	P5.07	Torque rising set	0.0 ～ 30.0 % Note：0.0 is Automatic torque rise	0.1 %	Model set	×
	P5.08	Torque rising cut-off frequency	0.0 ～ 50.0 % *【P1.11】	0.1 %	30.0%	×
	P5.09	V / F control frequency of positive slip compensation	0.0 ～ 200.0 % * rated slip	0.1 %	0.0%	×
	P5.10	V / F control frequency of negative slip compensation	0.0 ～ 200.0 % * rated slip	0.1 %	0.0%	×
	P5.11	Reservations	-	-	0	×

P6 Group- Analog and pulse input and output parameters	P6.00	The corresponding physical input AI 1	0: Speed command (output frequency, 100.0% -100.0%) \1: Torque command (output torque, 200.0% -200.0%) 2: Flux command (reserved) 3: Voltage command (reserve) 4: PID command (0.0% to 100.0%) If the Set value is more than 100%, the frequency for a given time is a default 100%. While for torque or voltage, the corresponding	1	0	×

			maximum torque or voltage is 200%.			
	P6.01	AI 1 input lower limit	0.00V/A～10.00V	0.01V	0.00	○
	P6.02	Corresponding physical input of AI 1 lower limit	-200.0%～200.0%	0.1%	0.0%	○
	P6.03	AI 1 input upper limit	0.00V～10.00V	0.01V	10.00	○
	P6.04	Corresponding physical input of AI 1 upper limit	-200.0%～200.0%	0.1%	100.0%	○
	P6.05	AI 1 input filter time	0.00S～10.00S	0.01S	0.10	○
	P6.06	The corresponding physical input AI 2	0: Speed command (output frequency, -100.0% 100.0%) 1: Torque command (output torque, -200.0% 200.0%) 2: Flux command (reserved) 3: Voltage command (reserved) 4: PID command (0.0% to 100.0%)	1	0	×
	P6.07	AI 2 input lower limit	0.00V/0.00 mA ～ 10.00V/20.00 mA	0.01V	0.00	○
	P6.08	Corresponding physical input of AI 2 lower	-200.0%～200.0%	0.1%	0.0%	○

		limit				
	P6.09	AI 2 input upper limit	0.00V/0.00 mA ～ 10.00V/20.00 mA	0.01V	10.00	○
	P6.10	Corresponding physical input of AI 2 upper limit	-200.0%～200.0%	0.1%	100.0%	○
	P6.11	AI 2 input filter time	0.00S～10.00S	0.01S	0.10	○
	P6.12	Corresponding physical input of Outside leach input	0: Speed command (output frequency, -100.0% 100.0%) 1: Torque command (reserved) 2: PID command (0.0% to 100.0%)	1	0	×
	P6.13	Outside leach input lower limit	0.00～50.00 kHz	0.01 kHz	0.00	○
	P6.14	Corresponding physical input of Outside leach lower limit	-100.0%～100.0%	0.1%	0.0%	○
	P6.15	Outside leach input upper limit	0.00～50.00 kHz	0.01 kHz	20.00	○
	P6.16	Corresponding physical input of Outside leach upper	-100.0%～100.0%	0.1%	100.0%	○

		limit				
	P6.17	Outside leach input filter time	0.00S～10.00S	0.01S	0.10	○
	P6.18	Multi-function analog Output terminal function selection AO 1	0: Output frequency (before slip compensation) 1: Output frequency (after slip compensation) 2: Set frequency 3: Motor speed 4: Output Current 5: Output voltage 6: Bus voltage 7: Reserved 8: Reserved 9: AI 1 10: AI 2 11: Input pulse frequency 12: torque current 13: magnetic flux current	1	0	○
	P6.19	Multi-function analog Output terminal function selection AO 2		1	1	○

P6 Group- Analog and pulse input and output parameters	P6.20	DO multi-function pulse volume Output terminal function selection	(after slip compensation) 2: Set frequency 3: Motor speed 4: Output Current 5: Output voltage 6: Bus voltage 7: Reserved 8: Reserved 9: AI 1 10: AI 2 11: Input pulse frequency 12: torque current 13: magnetic flux current	1	11	○
	P6.21	AO 1 output lower limit	-200.0% ～ 200.0%	0.1%	0.0%	○
	P6.22	Corresponding Lower limit of AO 1 output	0.00～10.00V	0.01 V	0.00	○
	P6.23	AO 1 output upper limit	-200.0% ～ 200.0%	0.1%	100.0%	○
	P6.24	Corresponding upper limit of AO 1 output	0.00～10.00V	0.01 V	10.00	○
	P6.25	AO 2 output lower limit	-200.0% ～ 200.0%	0.1%	0.0%	○
	P6.26	Corresponding Lower limit of AO	0.00V/0.00mA ～ 10.00V/20.00m	0.01 V	0.00	○

		2 output	A			
	P6.27	AO 2 output upper limit	-200.0% ～ 200.0%	0.1%	100.0%	○
	P6.28	Corresponding upper limit of AO 2 output	0.00V/0.00mA ～ 10.00V/20.00mA	0.01 V	10.00	○
	P6.29	DO output lower limit	-200.0% ～ 200.0%	0.1%	0.0%	○
	P6.30	Corresponding Lower limit of DO output	0.00 ～ 50.00 kHz	0.01 kHz	0.00	○
	P6.31	DO output upper limit	-200.0% ～ 200.0%	0.1%	100.0%	○
	P6.32	Corresponding upper limit of DO output	0.00 ～ 50.00 kHz	0.01 kHz	20.00	○
P7 Group- Digital input and output parameters	P7.00	Input terminal function X1	0: Idle radmin 1: Forward operation (FWD) 2: Reverse operation (REV) 3: Three-wire operation control 4: Forward jog control 5: Reverse jog control 6: Free parking	1	0	×
	P7.00	Input terminal function X1		1	0	×
	P7.01	Input terminal function X2		1	0	×
	P7.02	Input terminal function X3		1	0	×

	P7.03	Input terminal function X4	control 7: External reset input (RST) 8: Normally open input of external equipment fault 9: Normally close input of external equipment fault 10: Normally open contacts input of External equipment interrupt 11:Normally close contacts input of External equipment interrupt 12: Frequency increment instruction 13: Frequency reduced instruction 14: UP / DOWN terminal frequency clear 15: Multi-speed select 1 16: Multi-speed select 2	1	0	×

			17: Multi-speed select 3 18: Multi-speed select 4 19: Main frequency channel selection 1 20: Main Frequency Channel Selection 2 21: Main Frequency Channel Selection 3 22: Main Frequency Channel Selection 4 23: Reserved 24: Reserved 25: Acceleration and deceleration time selection TT 1 26: Acceleration and deceleration time selection TT 2 27: Operation command channel select 1			

			28: Operation command channel selection 2			

P7 Group- Digital input and output parameters	P7.04	Input terminal function X5	29: Inverter instruction of acceleration and deceleration Prohibition 30: Inverter instruction of operation Prohibition 31: Operation command switch to the terminal 32: Operation command switch to the terminal 33: Auxiliary Frequency Clear 34: Switching frequency source with A and B 35: Switching frequency source with A and A+B 36: Reservation 37: Reservation 38: PID control input 39: PID Control pause 40: Traverse control input 41: Traverse control suspension 42: Traverse state reset 43: PLC control input 44: PLC suspension 45: PLC reset 46: Counter reset signal input 47: Counter trigger signal input 48: Timer trigger input 49: Timing clear input 50: External pulse frequency input (valid only for X6) 51: Reserved 52: Length Clear	1	7	×
	P7.05	Input terminal function X6		1	50	×
	P7.06	Input terminal function X7 FWD function		1	0	×
	P7.07	Input terminal function X8 REV function		1	0	×
	P7.07	Input terminal function X8 REV function		1	2	×

			53: Count of the length input (valid only for X6) 54: Reserved 55: Reserved 56: Reserved 57: Pre-excitation command 58: Speed and torque control switch 59: Prohibition of torque control 60: Reserved 61: Reserved 62: Reserved 63: Single-phase speed input (valid only for X6) 64 ~ 99: reserved			
	P7.08	Switching value of number of digital filter	1～10	1	5	○
	P7.09	Terminal Test selection Function with power	0: Run command is invalid when the terminal with power 1: Run command is valid when the terminal with power	1	0	○
	P7.10	Effective logic input terminals Set (X1 ~ X8)	0 ~ FFH 0 for positive logic, it is valid that Xi terminals are connected with the common terminal and invalid when disconnect.	1	00	○

			1 is anti-logic, it is invalid that Xi terminals are connected with the common terminal and valid when disconnect.			
	P7.11	FWD / REV terminal control Mode	0: Two-wire control mode 1 1: Two-wire control mode 2: Three-wire control mode 1 3: Three-wire control mode 2	1	0	○

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P7 Group- Digital input and output parameters	P7.12	Modification rate for UP/DOWN Terminal frequency	0.01～50.00Hz/S	0.01Hz/S	1.00	O
	P7.13	Reserved	-	-	0	O
	P7.14	Delay time for Y1 output	0.0～10.0S	0.1S	0.0	X
	P7.15	Delay time for Y2 output	0.0～10.0S	0.1S	0.0	X
	P7.16	Delay time for R1 output	0.0～10.0S	0.1S	0.0	X
	P7.17	Delay time for R2 output	0.0～10.0S	0.1S	0.0	X
	P7.18	Open collector electrode output Set for terminal Y1	0：No output 1：Converter running prograde 2: Converter reversal running 3: Fault output 4: Frequency/speed level detection signal（FDT1）	1	0	X
	P7.19	Open collector		1	0	X

		electrode output Set for terminal Y2	5: Frequency/speed level detection signal （FDT2） 6: Frequency/speed reaching signal (FAR) 7: Indication for converter running with zero speed 8: Output frequency reaches the upper limit 9: Output frequency reaches the lower limit 10: Set the frequency of lower limit reaching during running 11: Alarm signal for converter overload 12: The counter detection signal output			
	P7.20	Programmable relay R2 output	13: The counter homing signal output	1	3	X

	P7.21	Programmable relay R2 output	14: Converter ready for running 15: Programmable Multi-speed finished running a cycle 16: Programmable Multi-speed finished stage running 17: Upper and lower limit for oscillating frequency 18: In the action of limit for the flow 19: In the action of overvoltage stall 20: Undervoltage, locked, shutdown 21：Reserved 22：Reserved 23：AI1＞AI2 24: Length reaches output 25: Reach regular time 26: Dynamic braking action	1	0	X

			27: Startup DC braking action 28: Shutdown DC braking action 29：Reserved 31：Reserved 32：Reserved 33～48：Indication for multi-speed or easy PLC running segment 49：Reserved			
	P7.22	Effective logic setting for output terminal(Y1～Y2)	0～3H 0: Indicate positive logic, i.e. Yi terminal connecting with public terminal is valid, disconnecting is invalid 1: Indicate negative logic, i.e. Yi terminal connecting with public terminal is invalid, disconnecting is valid	1	0	X

	P7.23	Frequency reaches the FAR detection width	0.0～100.0％ (max frequency)	0.1%	100.0 %	○
	P7.24	FDT1 detection method	0: Speed setting value 1: Speed detection value (reserved)	1	0	○
	P7.25	FDT1 level setting	0.00Hz～【P1.11】	0.01Hz	50.00	○

P7 Group- Digital input and output parameters	P7.26	FDT1 hysteresis value	0.0～100.0%*【P7.25】	0.1%	2.0%	○
	P7.27	FDT2 detection method	0: Speed setting value 1: Speed detection value (reserved)			○
	P7.28	FDT2 level setting	0.00Hz～【P1.11】	0.01Hz	25.00	○
	P7.29	FDT2 hysteresis value	0.0～100.0%*【P7.28】	0.1%	4.0%	○
	P7.30	Counting mode	0: Counting from 0 in increasing order 1: Counting from count value in decreasing order	1	0	X
	P7.31	Counting start condition	0: Been starting at power 1: Start at running and stop at shutdown The precondition is that there is counting pulse input	1	1	○
	P7.32	Counter reset value setting	0～65535	1	0	○

	P7.33	Counter detection value setting	0～【P7.32】	1	0	○
	P7.34	Condition for startup at regular time	0: been starting at power 1: start at running and stop at shutdown The precondition is the regular time triggering terminal needs to be shut down.	1	1	X
	P7.35	Regular time setting	0～65535S	1S	0	○
	P8.00	PID operation mode	0: Automatic 1: Manual operating input through defined terminal with multi-functions	1	0	X
	P8.01	PID given channel selection	0: Figures given 1：AI1 2：AI2 3: Pulse given 4: RS485 communicatio n	1	0	○
	P8.02	Given number amount setting	0.0～100.0％	0.1%	0.0%	○
			0：AI1			

	P8.03	PID feedback channel selection	1：AI2 2：AI1+AI2 3：AI1-AI2 4：MAX｛AI1，AI2｝ 5：MIN｛AI1，AI2｝ 6：Pulse given 7: RS485 communication	1	0	○
	P8.04	PID polarity selection	0：Positive 1: Negative	1	0	X
	P8.05	Min given amount	0.0%～【P8.07】	0.1%	0.0%	○
	P8.06	Corresponding feedback amount of the min give amount	0.0～100.0%	0.1%	0.0%	○
	P8.07	Max given amount	【P8.05】～100.0%	0.1%	100.0%	○
	P8.08	Corresponding feedback amount of the mAX give amount	0.0～100.0%	0.1%	100.0%	○
	P8.09	Proportional gain KP	0.01～10.00s	0.01	1.00	○
	P8.10	Integral time	0.01～10.00s	0.01s	0.10	○

	P8.11	Integral adjustment selection	0: Stop integral adjustment when frequency reached the upper and lower limit 1: Continue integral adjustment when frequency reached the upper and lower limit	1	0	X

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P8 Group-PID control parameters	P8.12	Differential time	0.01～10.00s 0.0：No differential	0.01s	0.00	○
	P8.13	Sampling cycle	0.01～10.00s 0.00: automatic	0.01s	0.10	○
	P8.14	Deviation limit	0.0～100.0%	0.1%	0.0%	○
	P8.15	Reserved			0	◆
	P8.16	Closed loop preset frequency	0.00～frequency in upper limit	0.01Hz	0.00	○
	P8.17	Retention time for preset frequency	0.0～6000.0s	0.1s	0.0	X
	P8.18	Selection for sleep shut down mode	0: Shut down decelerating 1:Free shutdown	1.00	0	○
	P8.19	Sleep threshold value	0.00～10.00V	0.01V	10.00	○

	P8.20	Wake up threshold value	0.00～10.00V	0.01V	0.00	○
	P8.21	Sleep delay time	1.0～6000.0S	0.1S	100.0	○
	P8.22	Wake up delay time	1.0～6000.0S	0.1S	100.0	○
	P8.23	Reserved	-	-	0	◆
P9 Group- Control parameter of multi-speed and operation of PLC, Swing frequency and fixed-length	P9.00	Selection of PLC running mode	0: Shut down after single cycle 1: Retain running with final value after single cycle 2: Continuous cycle with finite times 3: Continuous cycle	1	0	x
	P9.01	PID operation input mode	0: Automatic 1: Manual operating input through defined terminal with multi-functions	1	0	x
	P9.02	Memory of PLC running with power failure	0: No memory 1: Memorize the stage and frequency of power failure	1	0	x
	P9.03	PLC startup mode	0: Began to re-start from the first segment 1: Start from the stage of shutdown (failure) 2: Start from the stage and frequency of	1	0	x

			shutdown (failure)			
	P9.04	Number of continuous cycle with finite times	0～65535	1	0	○
	P9.05	Unit selection of PLC running time	0：s 1: m	1	0	x
	P9.06	Multi-speed frequency 0	-100.0～100.0%	0.1 %	0.0 %	○
	P9.07	Multi-speed frequency 1	-100.0～100.0%	0.1 %	0.0 %	○
	P9.08	Multi-speed frequency 2	-100.0～100.0%	0.1 %	0.0 %	○
	P9.09	Multi-speed frequency 3	-100.0～100.0%	0.1 %	0.0 %	○
	P9.10	Multi-speed frequency 4	-100.0～100.0%	0.1 %	0.0 %	○
	P9.11	Multi-speed frequency 5	-100.0～100.0%	0.1 %	0.0 %	○
	P9.12	Multi-speed frequency 6	-100.0～100.0%	0.1 %	0.0 %	○
	P9.13	Multi-speed frequency 7	-100.0～100.0%	0.1 %	0.0 %	○
	P9.14	Multi-speed frequency 8	-100.0～100.0%	0.1 %	0.0 %	○
	P9.15	Multi-speed frequency 9	-100.0～100.0%	0.1 %	0.0 %	○
	P9.16	Multi-speed frequency 10	-100.0～100.0%	0.1 %	0.0 %	○
	P9.17	Multi-speed frequency 11	-100.0～100.0%	0.1 %	0.0 %	○

P9 Group- Control parameter of multi-speed and operation of PLC, Swing frequency and fixed-length	P9.18	Multi-speed frequency 12	-100.0～100.0%	0.1%	0.0%	○
	P9.19	Multi-speed frequency 13	-100.0～100.0%	0.1%	0.0%	○
	P9.20	Multi-speed frequency 14	-100.0～100.0%	0.1%	0.0%	○
	P9.21	Multi-speed frequency 15	-100.0～100.0%	0.1%	0.0%	○
	P9.22	Acceleration and deceleration time at speed 0	0～3	1	0	○
	P9.23	Run time at speed 0	0.0～6553.5S(M)	0.1S(M)	5.0	○
	P9.24	Acceleration and deceleration at speed 1	0～3	1	0	○
	P9.25	Run time at speed 1	0.0～6553.5S(M)	0.1S(M)	5.0	○
	P9.26	Acceleration and deceleration time at speed 2	0～3	1	0	○
	P9.27	Run time at speed 2	0.0～6553.5S(M)	0.1S(M)	5.0	○
	P9.28	Acceleration and deceleration time at speed 3	0～3	1	0	○
	P9.29	Run time at speed 3	0.0～6553.5S(M)	0.1S(M)	5.0	○
	P9.30	Acceleration and deceleration time at speed 4	0～3	1	0	○

	P9.31	Run time at speed 4	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.32	Acceleration and deceleration at speed 5	0～3	1	0	○
	P9.33	Run time at speed 5	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.34	Acceleration and deceleration time at speed 6	0～3	1	0	○
	P9.35	Run time at speed 6	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.36	Acceleration and deceleration time at speed 7	0～3	1	0	○
	P9.37	Run time at speed 7	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.38	Acceleration and deceleration time at speed 8	0～3	1	0	○
	P9.39	Run time at speed 8	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.40	Acceleration and deceleration time at speed 9	0～3	1	0	○
	P9.41	Run time at speed 9	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.42	Acceleration and deceleration time at speed 10	0～3	1	0	○
	P9.43	Run time at speed 10	0.0～6553.5S(M)	0.1S (M)	5.0	○
	P9.44	Acceleration and deceleration time at speed 11	0～3	1	0	○
	P9.45	Run time at speed	0.0～6553.5S(M)	0.1S	5.	○

		11		(M)	0	
	P9.46	Acceleration and deceleration time at speed 12	0～3	1	0	○
	P9.47	Run time at speed 12	0.0～6553.5S(M）	0.1S (M)	5.0	○
	P9.48	Acceleration and deceleration time at speed 13	0～3	1	0	○
	P9.49	Run time at speed 13	0.0～6553.5S(M）	0.1S (M)	5.0	○

	P9.50	Acceleration and deceleration time at speed 14	0～3	1	0	○
	P9.51	Run time at speed 14	0.0 ～ 6553.5S(M）	0.1S(M)	5.0	○
	P9.52	Acceleration and deceleration at speed 15	0～3	1	0	○
	P9.53	Run time at speed 15	0.0 ～ 6553.5S(M）	0.1S(M)	5.0	○
	P9.54	Reserved	-	-	0	◆
	P9.55	Control of oscillating frequency	0: Forbidden 1: Valid	1	0	x
	P9.56	Oscillating frequency running input mode	0: Automatic 1: Manual operating input through defined terminal with multi-functions	1	0	x

	P9.57	Control of amplitude of oscillation	0: Fixed amplitude of oscillation 1: Changed amplitude of oscillation	1	0	x
	P9.58	Shutdown and startup mode selection of oscillating frequency	0: Startup of memory state before shutdown 1: Begin to re-start	1	0	x
	P9.59	Oscillating frequency state storage at the time of power failure	0: Store 1: Do not store	1	0	x
	P9.60	Preset frequency of oscillating frequency	0.00Hz～ frequency in upper limit	0.01Hz	10.00	○
	P9.61	Wait time for preset oscillating frequency	0.0～3600.0s 0.1s 0.0	0.1s	0.1s	×
	P9.62	Amplitude value of oscillating frequency	0.0～100.0％	0.1%	0.1%	○
	P9.63	snap-through frequency	0.0～50.0％（relative amplitude value of oscillating frequency）	0.1%	0.1%	○
	P9.64	rise time of oscillating frequency	0.1～3600.0s	0.1s	5.0	○
	P9.65	Fall Time of oscillating	0.1～3600.0s	0.1s	5.0	○

		frequency				
	P9.66	Reserved	-	-	0	◆
	P9.67	Fixed length control	0: forbidden 1: valid	1	0	x
	P9.68	Set length	0.000 ～ 65.535(KM)	0.001KM	0.000	○
	P9.69	Actual length	0.000 ～ 65.535(KM)	0.001KM	0.000	○
	P9.70	Length ratio	0.100 ～ 30.000	0.001	1.000	○
	P9.71	Length correction factor	0.001～1.000	0.001	1.000	○
	P9.72	Circumference of measurement axles	0.10 ～ 100.00CM	0.01CM	10.00	○
	P9.73	The number of pulses per revolution for axles (X6)	1～65535	1	1000	○
PA Group-protection parameters	PA.00	Protection selection of motor overload	0: Forbidden 1: General Motor (electronic thermal relay mode, low-velocity zone with compensation) 2: Motor with frequency conversion (electronic thermal relay mode, low-velocity	1	1	x

			zone with no compensation)			
	PA.01	Protection coefficient of motor overload	20.0 % ～ 120.0%	0.1%	100.0%	x
	PA.02	Action selection of undervoltage	0: Forbidden 1: Allowed (undervoltage as fault)	1	0	x
	PA.03	Protection level of undervoltage	60 ～ 90 % *Udce	1%	70%	x
	PA.04	Stall protection of overvoltage	0: Forbidden 1: Allowed	1	1	x

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PA Group-protection parameters	PA.05	Limit level of over voltage	110～150％*Udce	1 %	135 %/1 22 %	x
	PA.06	Selection of current limiting action	0: Forbidden 1: Valid in entire process 2: Running at Constant speed is invalid	1	1	x
	PA.07	Limiting the level of current	100％～200％	1 %	160 %/1 20 %	x
	PA.08	Declining rate of limit current decreasing frequency	0.00～100.00 Hz/S	0. 01 H z /S	2.0 0	○
	PA.09	Reserved	-	-	0	◆
	PA.10	Protection selection of failed load	0: Forbidden 1: Valid	1	0	x
	PA.11	Checking time of failed load	0.1S～60.0S	0. 1S	5.0	x
	PA.12	Checking level of failed load	0.0～100.0%*Ie	0. 1 %	30. 0%	○
	PA.13	Reserved				x
	PA.14	Pre-alarm level of overload	20～180％	1 %	130 %/1 20 %	○
	PA.15	Pre-alarm delay of overload	0.0～15.0s	0. 1s	5.0	x

	PA.16	Reserved	-	-	0	◆
	PA.17	Input and output phase-missing protection selection	0: Forbidden 1: Input forbidden, output allowed 2: Input allowed, output forbidden 3: Both allowed	1	0	x
	PA.18	Delay time of input phase-missing	0.1-20.0s	0.1s	1.0	x
	PA.19	Benchmarks of output phase-missing protection	0%～100%*Ie	1%	10%	x
	PA.20	Reserved	-	-	0	◆
	PA.21	PID feedback disconnect handling	0: No action 1: Warn and retain running with the frequency of disconnect 2: Protection action and stop freely 3: Decrease to zero speed running according to set mode	1	0	x
	PA.22	Detection value of feedback disconnect	0.0～100.0%	0.1%	0.0%	○
	PA.23	Detection time of feedback disconnect	0.0～3600.0S	0.1S	10.0	○
	PA.24	Reserved	-	-	0	◆
	PA.25	Abnormal action selection	0: Protection action and stop freely 1: Warn and retain	1	1	x

		of RS485 communication	the current state to run 2: Warn and shut down as set mode			
	PA.26	Detection time of RS485 communication overtime	0.0～100.0s	0.1s	0.5	x
	PA.27	Abnormal action selection of panel communication	0: Protection action and stop freely 1: Warn and retain the current state to run 2: Warn and shut down as set mode	1	1	x
	PA.28	Detection time of panel communication overtime		0.1s	0.5	x
	PA.29	Reserved	-	-	0	◆
	PA.30	Action selection of EEFROM read and write error	0: Protection action and stop freely 1: Warn and retain running	1	0	x
	PA.31	Action selection of limited run time reach	0: Protection action and stop freely 1: Warn and shut down as set mode	1	0	x

	PA.32	Reserved	-	-	0	◆
PB	PB.00	Protocol selection	0：MODBUS 1: Customize	1	0	x
	PB.0	Local Address	0: Broadcast address	1	1	x

	1		1～247：from station			
	PB.02	Communication baud rate setting	0：2400BPS 1：4800BPS 2：9600BPS 3：19200BPS 4：38400BPS 5：115200BPS	1	3	x
	PB.03	Data Format	0：No parity（N，8，1）for RTU 1：Even parity（E，8，1）for RTU 2：Odd parity（0，8，1）for RTU 3：No parity（N，8，2）for RTU 4：Even parity（E，8，2）for RTU 5：Odd parity（0，8，2）for RTU 6：No parity（N，7，1）for ASCII 7：Even parity（E，8，1）for ASCII 8：Odd parity（0，7，1）for ASCII ASCII mode temporarily reserved	1	0	x
	PB.04	Answer delay of local host	0～200ms	1ms	5	x
	PB.05	Transmission response handling	0: Response of writing operation 1:No response of writing operation	1	0	x
PC	PC.00	Function set of dynamic braking	0: Valid 1: Valid in entire process 2: Valid only when	1	2	○

			slowing down			
	PC.01	Initial voltage of dynamic braking	115.0 ～ 140.0 % *Udce	0.1 %	130.0%/120.0 %	○
	PC.02	Return difference voltage of dynamic braking	0.0～10.0%*Udce	0.1 %	5.0%	○
	PC.03	Action ratio of dynamic braking	10～100%	1%	50%	○
	PC.04	Instantaneous ceaseless control	0: Forbidden 1: Valid	1	0	
	PC.05	Decreasing frequency point of instantaneous power failure	70.0～110.0%*Udce	0.1 %	80.0%	○
	PC.06	Decreasing rate set of instantaneous power failure frequency	0.0～100.00Hz/S	0.01Hz/S	10.00	○
	PC.07	AVR function	0: Forbidden 1: Valid in entire process 2: Invalid only when slowing down	1	2	○
	PC.08	Energy-saving run	0: Forbidden 1: Intelligent mode 2: Determined by energy-saving coefficient	1	0	X
	PC.09	Control coefficient of	1～10	1	3	○

		energy-saving				
	PC.10	Selection of oscillation suppression	0: Valid 1: Valid	1	1	○
	PC.11	Lower frequency threshold value point of oscillation suppression	1～50	1	100	○

PC group - Advanced function parameters	PC.12	High frequency threshold value point of oscillation suppression	0～500	1	50	○
	PC.13	Amplitude limit value of oscillation suppression	0～5000	1	1000	○
	PC.14	High and low frequency dividing point of oscillation suppression	0.00～100.00Hz	0.01Hz	15.00	○
	PC.15	Drooping control	0.00～10.00Hz 0.00：Invalid function of drooping control	0.01Hz	0.00	○
	PC.16	Reserved	-	-	0	◆
	PC.17	Wait time of rotational speed tracking	0.1～5.0S	0.1S	2.0	X
	PC.18	Speed search mode selection	0: Down search from the run speed before tracking 1: Up search from the min speed 2: Fast intelligent search	1	2	X
	PC.19	The speed of rotational speed tracking	1～100	1	30	X
	PC.20	Curve selection of rotational speed tracking	1～4	1	2	X

	PC.21	Re-start set of power cut	0: Forbidden 1: Start up from startup frequency 2: Startup of rotational tracking	1	0	X
	PC.22	Wait time for re-start when power cut	0.0～60.0S	0.1S	5.0	X
	PC.23	Automatic reset times when there is fault	0～100 Set as 100 means no limit of times, i.e. numerous	1	0	○
	PC.24	Interval time of automatic reset when there is fault	0.1～100.0S	0.1	1.0	X
	PC.25	Cooling fan control	0: Automatic control mode 1：Run all time during power on process	1	0	○
	PC.26	Carrier wave control mode	0: PWM mode 1: fixed PWM, temperature related adjustment 0: PWM mode 2: random PWM, temperature related adjustment 2: PWM mode 1: fixed PWM, temperature unrelated adjustment 3: PWM mode 2: random PWM,	1	1	X

			temperature unrelated adjustment 4: synchronous modulating PWM			
	PC.27	Carrier wave automatic adjustment	0: Valid 1: Low-frequency adjustment	1	0	X
	PC.28	Over-modulation run	0: Forbidden 1: Mode 1(weak over-modulation) 2: Mode 2(strong over-modulation)	1	0	X
	PC.29	Function password of run limit		1	0	○
	PC.30	Function selection of run limit	0: Forbidden 1: Limit running	1	0	○
	PC.31	Limit time	1～65535(h)	1	0	x
	PC.32	With dead time compensation	0: Forbidden 1: With	1	1	x
	PC.33	Reserved	-	-	0	◆

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PD Group-Display control parameters	PD.00	Closed loop display coefficient	0.01～100.00	0.01	1.00	○
	PD.01	Load speed display coefficient	0.01～100.00	0.01	1.00	○
	PD.02	Line speed coefficient	0.01～100.00	0.01	1.00	○

	PD.03	Monitoring parameter selection 1 of running state	0～FFFFH Note: LCD screen can control 3 parameters at the same time, should select multi monitoring parameters; if 【PD.09】=1, screen would refresh to display each parameter; if 【PD.09】=0, LED would only display 3 parameters in front	1	1063	○
	PD.04	Monitoring parameter selection 2 of running state	0～FFFFH	1	0080	○
	PD.05	Monitoring parameter selection 3 of running state	0～FFFFH	1	0000	○
	PD.06	Monitoring parameter selection 1 of shutdown state	0～FFFFH	1	3003	○
	PD.07	Monitoring parameter selection 2 of shutdown state	0～FFFFH	1	0060	○
	PD.08	Monitoring parameter	0～FFFFH	1	0000	○

		selection 3 of shutdown state				
	PD.09	Cycle display selection of monitoring parameter	0: not cycle 1: automatic cycle	1	0	○
	PD.10	Reserved	-	-	0	◆
	PD.11	Reserved	-	-	0	◆
PE Group- Retention parameters						
PF Group- Factory parameters						
	PF.00	Manufacturers Password	0～65535	1	0	O

D Group-Control parameter set and fault records

Function Code	Title	Setting range	Smallest unit	Factory setting	Amendment
d-00	Output frequency	0.00-max output frequency【P1.11】	0.01Hz	0.00	◆
d-01	Setting frequency	0.00-max output frequency【P1.11】	0.01Hz	0.00	◆
d-02	Motor estimating frequency	0.00-max output frequency【P1.11】	0.01Hz	0.00	◆
d-03	Main setting frequency	0.00-max output frequency【P1.11】	0.01Hz	0.00	◆
d-04	Auxiliary setting frequency	0.00-max output frequency【P1.11】	0.01Hz	0.00	◆
d-05	Output current	0.0-6553.5 A	0.1A	0.0	◆
d-06	Output voltage	0-999 V	1V	0	◆

d-07	Output torque	-200.0-+200.0%	0.1%	0.0%	◆
d-08	Motor revolving speed（RPM/min）	0-36000 （ RPM/min）	1	0	◆
d-09	Motor power factor	0.00-1.00	0.01	0.00	◆
d-10	Operating linear velocity(m/s)	0.01-655.35(m/s)	0.01(m/s)	0.00	◆
d-11	Setting linear velocity(m/s)	0.01-655.35(m/s)	0.01(m/s)	0.00	◆
d-12	Generatrix voltage	0-999V	1V	0	◆
d-13	Input voltage	0-999V	1V	0	◆
d-14	PID setting value	0.00-10.00V	0.01V	0.00	◆
d-15	PID feedback value	0.00-10.00V	0.01V	0.00	◆
d-16	Analog input AI1（V/mA）	0.00-10.00V	0.01V	0.00	◆
d-17	Analog input AI2（V/mA）	0.00-10.00V	0.01V	0.00	◆
d-18	Input impulse frequency （KHz）	0.00-50.00kHz	0.01kHz	0.00	◆
d-19	Analog input AI01（V/mA）	0.00-10.00V	0.01V	0.00	◆
d-20	Analog input AI02（V/mA）	0.00-10.00V	0.01V	0.00	◆
d-21	Input terminal state	0-FFH	1	0	◆
d-22	leading-out terminal state	0-3H	1	0	◆
		0～FFFFH BIT0：Run/Halt BIT1 ：Reverse/Forward BIT2：Run on zero speed			

d-23	Operating state of frequency converter	BIT3：Reservation BIT4：Acceleration BIT5：Deceleration BIT6：Constant speed operation BIT7：Pre-excitation BIT8：Motor parameters tuning BIT9：Over-current limit BIT10：Over-voltage limit BIT11：Torque amplitude limiting（medium） BIT12：Speed amplitude limiting（medium） BIT13：Speed control BIT14：Torque control BIT15：Reservation			◆

Function Code	Title	Setting range	Smallest unit	Factory setting	Amend ment
d24	Present segment of	0-15	1	0	◆

	multiple segment				
d25	Reservation			0	◆
d26	Reservation			0	◆
d27	Present counting value	0-65535	1	0	◆
d28	Setting counting value	0-65535	1	0	◆
d29	Present timing value（S）	0-65535S	1S	0	◆
d30	Setting timing value（S）	0-65535S	1S	0	◆
d31	Present length	0.000-65.535(KM)	0.001KM	0.000	◆
d32	Setting length	0.000-65.535(KM)	0.001KM	0.000	◆
d 33	Radiator temperature 1	0.0℃-+110.0℃	0.1℃	0.0	◆
d 34	Radiator temperature 2	0.0℃-+110.0℃	0.1℃	0.0	◆
d 35	Accumulative operating time of this machine（h）	0-65535H	1H	0	◆
d 36	Accumulative electrifying time of this machine（h）	0-65535H	1H	0	◆
d 37	Accumulative operating time of air	0-65535H	1H	0	◆

	fan				
d 38	Accumulative electricity consumption （low）	0-9999 KWH	1H	0	◆
d 39	Accumulative electricity consumption （high）	0-9999 KWH	1H	0	◆
d 40	Special machine supervising parameters （Reservation）			0	◆
d 41	Special machine supervising parameters （Reservation）			0	◆
d 42	Special machine supervising parameters （Reservation）			0	◆
d 43	Special machine supervising parameters （Reservation）			0	◆
d 44	Special machine			0	◆

	supervising parameters （Reservation）				
d 45	Special machine supervising parameters （Reservation）			0	◆
d 46	Special machine supervising parameters （Reservation）			0	◆
d 47	Special machine supervising parameters （Reservation）			0	◆
d 48	First three faults type	0-25	1	0	◆
d 49	First two faults type	0-25	1	0	◆
d 50	First fault type	0-25	1	0	◆
d 51	Present fault type	0-25	1	0	◆
d 52	Operating frequency of present fault	0.00 AX output frequency 【P1.11】	0.01 Hz	0.00	◆
d 53	Output	0.0-6553.5A	0.1A	0.0	◆

	current of present fault				
d 54	Busbar voltage of present fault	0-999V	1V	0	◆
d 55	Input terminal state of present fault	0-FFH	1	0	◆
d 56	Leading-out terminal state of present fault	0-3H	0	0	◆
d 57	Frequency converter operating state of present fault	0-FFFFH	1	0	◆

PO system ADMINISTRATIVE PARAMETERS

P0.00	User's password	0～65535	0

User password setting function is used to prohibit non-authorized personnel accessing and modifying the function parameters.

When you don't need user password function, set the function code to 0.

When set the user password, enter five digits, pressure ENTER key, and the password automatically take effect in one minute.

When need to change the password, select the P0.00 function code, press ENTER to enter the password verification status. After password authentication succeed, go to the modified state, enter the new password and press ENTER to confirm, the password changed successfully. The password automatically takes effect in one minute.

Tips:

Users should save the user password. If lost, please consult the manufacturers.

P0.01	LCD language(LCD panel)	0～2	0

0: Chinese 1: English 2: reserved

P0.02	Parameter initialization	0～3	0

0: No action

The parameter is in a normal reading, writing state. Whether the Function code setting can be changed relate to user password status and the current working condition of the parameter.

1: All users' parameters can be restored to factory settings except motor parameters. Other user parameters recovered by models

Factory settings:

2: All users' parameters restore to factory settings;

All users' parameters restore to factory settings by model.

3: fault Clearing records

Do clear operation for content of fault records (D-48 ~ D-57).

When the Operation is completed, the function code automatically changes to 0.

P0.03	Parameter writing protection	0～2	0

0: allows you to modify all parameters (some parameters cannot be modified in operation)

1: Only allowed to modify frequency setting parameter P1.07, P1.08, and the function code.
2: all parameters can't be changed except function code.
This feature prevents unauthorized change the parameters setting. When leave the factory, the function code is set to 0 and allows you to modify.
When the data modification is complete, if need to protect the parameters, the function code can be set to the level hope to be protected.

Note:

Above Restrictions is invalid for function code of P0.00 and P0.03.

P0.04	Parameter copy function	0～3	0

0: No action
1: The parameter uploads to the panel
When Set to 1, and confirm, the inverter uploads all function code parameters in control panel board P1.00 ~ PD.09 to preserve in the EEPROM of the operation panel.
2: All functions code parameters download to the inverter.
When Set to 2, and confirm, the inverter down loads all function code parameters in control panel board P1.00 ~ PD.09 to preserve in control panel board memory and refresh EEPROM.
3: All functions code parameters downloaded to the inverter except motor parameter.
When Set to 3, and confirm, the inverter downloads all function code parameters in control panel board between P1.00 ~ PD.09 to preserve in control panel board memory (except P3 motor parameter) and refresh EEPROM.

Note:

1. On the control panel, the parameters must do the operation of uploading or operation panel EEPROM is empty. Once the uploading operation is completed, the function code data has been stored in the EEPROM in the operation panel;
2. Before do the operation of downloading parameters to the inverter, the inverter will check the integrity and version information of function code data in the operation panel. If the

content is empty, incomplete parameters, or version of parameters don't match the current inverter software version, the quantity of function code is different, the parameters cannot be downloaded and prompts wrong copy information E-22 (ER-CP).

3. When parameter download is complete, EEPROM in the panel data is still there, and it can be copied repeatedly with several inverters.

4. This feature is effective only to LCD panel.

P0.05	JOG key function selection	0～3	0

0: JOG jogging control

JOG Key is jogging control. The default direction determines by P1.17.

1: reversing switch

In running state, JOG button equals to reversing switch. In outage state the key is invalid. This reversing switch is effective only to running panel

Command channel

2: Clear the panel button ▲▼ to set the frequency

Clear the frequency value with button ▲▼ to recover the frequency back to the initial value. The function is valid only to change frequency with panel ▲▼.

3: switches of local operation and remote operation (reserved)

P0.06	STOP/RESET Key function selection	0～3	3

RESET Key function selection P0.06 0 ~ 3 3

0: valid only for control panel

Only when P1.01 = 0, the key can shut down the inverter.

1: valid for control panel and the terminal simultaneously

Only when P1.01 = 0 or 1, the key can stop the inverter. In communication control operation mode, this key is invalid.

2: valid for panel and communication control simultaneously

Only when P1.01 = 0 or 2, the key can stop the inverter. In the terminal control operating mode, this key is invalid.

3: valid for all control modes

In any run command channel mode, the key can stop the inverter.

Tip:

In any run command channel mode, the reset function is valid.

P0.07	STOP/RESET Key + RUN key emergency stop function	0 1	1

0: Invalid
1: Free parking
Press key STOP/RESET and key RUN, the inverter will stop freely.

P0.08	Control software version No.	1.00 ~ 99.99	1.01
P0.09	Panel software version No.	1.00 ~ 99.99	1.01

Above relevant information is used to indicate the change of inverter, and can only be viewed, not modified.
P1 Basic operating parameters

P1.00	Control mode	02	0

0: V / F control
The control is chose when need to use a single inverter drives more than one motor, the motor parameters can not be correctly self-learned or can't get from controlled motor parameters through other means. This control method is the most common motor control. This control method can be used in any Motor control performance on the less demanding situations.
1: flux vector control
When introduce such a control mode into flux closed loop control theory, it can greatly enhance the whole spectrum of motor torque response, enhance motor's torque output of low-Frequency, at the same time it is not too sensitive like vector control to motor parameters. In some situation that have a claim on torque (such as wire drawing machine, ball mill, etc.), this control mode is particularly applicable.
2: Current vector control without PG (SVC)
That is non-speed sensor vector control mode. It can be used for demanding applications, such as Digit Control Machine Tool, stretching force control.

⚠ **NOTE:**

PG is the Photoelectric speed detection pulse encoder .

1. Select vector control mode. Before first running, firstly we should

regulate motor parameter in order to obtain the correct motor parameters. Once the regulating process for motor parameter finished ordinarily, the access parameters stored inside the motor control board for later use of control operation.

2. Set speed regulator parameters properly to ensure good steady state and dynamic control performance. The adjustment and regulating of Speed controller and parameter settings, please see parameter group P4 relevant instructions.

3. When select vector control mode, one should pay attention that one inverter can only drive a motor; and the class discrepancy between inverter capacity and electrical capacity can't be too big. The power class of motor can be two levels lower or one level higher than inverter or it may lead to the control performance degradation, or the drive system can't operate normally.

P1.01	command channel selection	0 2	0

The function codes select the physical channel that the drive accepts commands to run and stop operations.

0: operation panel Run command channel.

Implement operational control by keys such as RUN STOP/RESET on operation panel.

1: terminal run command channel

Multi-functional terminal defined by FWD, REV, JOG forwarding, JOG reversing implements the operation control.

2: communication running command channel

Implement the operation control by host computer through communications.

Note

Even in the running process, the operation command channel can be changed by modifying the function code settings. Please set carefully!

P1.02	primary frequency source selection	0 9	0

0: reference number 1 (panel ▲▼ encoder)

Initial frequency is set to P1.07. Adjust with a control panel key ▲▼ or digital encoder. The revised frequency value stored in P1.07 power is off. (if you don't want store the frequency, you can set P1.05 = 1 or 3 to achieve.

1: The figures give 2 (UP / DOWN terminal adjustment)
Initial frequency is set to P1.08. Multi-function terminals defined as an external UP / DOWN function to change the operating frequency (See P7 group the frequency of terminal X go crescendo-decrescendo function code). when the UP terminal and COM terminal is closed, the frequency increased; when DOWN terminals and COM terminal is closed, the frequency decreased; when UP / DOWN and COM terminals is closed or disconnected, the frequencies remain unchanged. If set the frequency rate power-down store, the revised frequency value store to P1.08 after the power down. Changing operating frequency rate of UP / DOWN terminal can be set by function code P7.12.

Tip

Whether it is control panel ▲▼ regulating or terminal UP/DOWN regulating, the set value is to add a regulated quantity on the base P1.07 or P1.08. The final output frequency is between the lowest frequencies to the maximum output frequency. The regulated quantity of terminal UP / DOWN can be cleared by selecting "UP / DOWN terminal frequency to 0" of terminal X.
2: The figures given 3 (Communication Settings) change the setting frequency by serial port Frequency setting command, see PB group communication parameters.
3: AI 1 Analog given (0 ~ 10V/20 mA)
Frequency set by the terminal AI1 analog voltage. And it determines the input range: DC0 ~ 10V.
Related settings, see the definition of the function code P6.00 ~ P6.05.
4: AI2 analog given (0 ~ 10V/20mA)
Frequency set by the terminal AI2 analog voltage / current. And it determines the input range: DC0 ~ 10V/20mA (J1 wire jumper selectable).
Related settings, see the definition of the function code P6.06 ~ P6.11.
Pulse reference
5. Frequency set determine by the terminal pulse frequency (only

by X6 input, see P7.05 defined), the input pulse signal specification: Level range 15 ~ 30V; frequency range of 0 ~ 50KHz. Related settings, see the definition of the function code P6.12 ~ P6.17.

6: Easy to set PLC

Select a Simple PLC with given frequency mode, and you need to set function code P9.00 ~ P9.05 and function code P9.06 ~ P9.21 to determine

PLC various stages of operating frequency, Function code P9.22 ~ P9.53 separately define acceleration, deceleration time and the stage of running time of PLC various stages.

7: Multi-speed operation set

Select this frequency setting mode and the inverter operate in multi-speed. Need to set the P7 group "terminal X for multi-speed select" And P9 group "multi-speed frequency" function code to determine a correspondence between given number of multi-speed segments and a given frequency.

8: PID control settings

Select this frequency setting mode and operation mode of inverter identified as process PID control. At this point, need to set the P8 group "process PID

Parameters" and simulation for a given correlation function, and pulse for a given code. Inverter operating frequency is the frequency value after the PID function operated. Specific set please refer to P8 Group function set details.

9: The combination of a given terminal

Select this frequency setting mode, and the inverter selects frequency reference channel through a combination of external terminals. See P7 group instruction of parameter of X terminals "the main frequency channel selection".

P1.03	Auxiliary frequency source B Select	0 ~ 6	0

0: No Auxiliary given

1: The figures given 1 (panel ▲ ▼, encoder)

2: The figures given 2 (UP / DOWN terminal adjustment)

3: The figures given 3 (Communication Settings)

4: AI1 Analog given (0 ~ 10V)

5. AI2 analog given (0 ~ 10V/20mA)

6. Pulse given

The meaning Auxiliary frequency reference channel is the same as the meaning of a given channel of main frequency, please refer to P1.02 detailed instruction.

Note:

Auxiliary frequency reference channel is not a given multi-speed. The external terminal of PID is given selection.

P1.04	Frequency source combination algorithm	0 ~ 9	0

0: primary frequency source

1: K1 * A + K2 * B

A primary frequency for a given frequency channel A and auxiliary frequency channel B multiply by the respective weight Coefficient of K1, K2, then add the two-frequency together as the final given frequency.

2: K1 * A-K2 * B

A primary frequency for a given frequency channel A and auxiliary frequency channel B multiply by the respective weight Coefficient of K1, K2, then minus the two-frequency as the final given frequency.

3: | K1 * A-K2 * B |

A primary frequency for a given frequency channel A and auxiliary frequency channel B multiply by the respective weight Coefficient of K1, K2, then minus the two-frequency and get the Absolute value as the final given frequency.

4: MAX (A, B)

Comparing a primary frequency for a given frequency channel A with auxiliary frequency reference channel B, whichever is greater given as the final given frequency.

Frequency.

5: MIN (A, B)

Comparing a primary frequency for a given frequency channel A with auxiliary frequency reference channel B, whichever is less as a given the final given frequency.

6: A and B switch

The function mating No.34 functional items in P7 X1 ~ X8. When P1.04 = 6, and terminal X function selected 34, X terminals is effective, frequency for a given source to switch from A to B; X terminal is

invalid, the frequency of the source is back to A.

7. A and (A + B) switch

The function mating No.35 functional items in P7 X1 ~ X8. When P1.04 = 7, and terminal X function selected 35, X terminals is effective, frequency for a given source to switch from A to A+B; X terminal is invalid, the frequency of the source is back to A.

8: SQRT (K1 * A) + SQRT (K2 * B)

A primary frequency for a given frequency channel A and auxiliary frequency channel B multiply by the respective weight Coefficient of K1, K2, then get the sum rate of square root for the two-frequency as the final given frequency.

9: SQRT (K1 * A + K2 * B)

A primary frequency for a given frequency channel A and auxiliary frequency channel B multiply by the respective weight Coefficient of K1, K2, then get the square root of sum rate for the two-frequency as the final given frequency.

NOTE

The frequency of a given size is still limited by the starting frequency, upper and lower frequency. The positive and negative of frequency determine the operating direction.

K1, K2 is the combination weight coefficient of channel A and B respectively. For specific setting, please refer to P1.09, P1.10 function code details.

P1.05	Given a digital frequency control 1	0~3	0

This function code defines the panel for a given frequency (main frequency source 0 and the auxiliary frequency source 1). When it changes, the Storage state after drive power shutting down and the frequency maintain state when re-operation after shut down.

0: Inverter stores after Power-down and maintain after stop.

When the inverter is power down or under-voltage, P1.07 refresh automatically according to the current value of the actual frequency setting; when inverter shutdown, the frequency set the fixed value as the final modified value.

1: The inverter does not store when drive power shut down, but it maintain when it stop working.

When the inverter is power failure or under-voltage, P1.07 remains

unchanged; inverter stops working, the frequency setting is the final modified value.
2: when inverter does not store when drive power shut down, and it doesn't maintain when it stop working.
When the inverter is power failure or under voltage, P1.07 refresh automatically according to the current value of the actual frequency setting; when inverter shutdown, automatically recover the frequency settings back to P1.07.
3: Inverter does not store when power-down shut down, and it doesn't maintain after stop working.
When the inverter is power failure or under-voltage, P1.07 remains unchanged; when inverter shutdown, automatically recover the frequency settings back to P1.07.

P1.06	Given a digital frequency control 2	0 ~ 3	0

This function code defines the panel for a given frequency (main frequency source 0 and the auxiliary frequency source 1). When it changes, the Storage state after drive power shutting down and the frequency maintain state when re-operation after shut down.
0: Inverter stores after Power-down and maintain after stop.
When the inverter is power down or under-voltage, P1.08 refresh automatically according to the current value of the actual frequency setting; when inverter shutdown, the frequency set the fixed value as the final modified value.
1: The inverter does not store when drive power shut down, but it maintain when it stop working.
When the inverter is power failure or under-voltage, P1.08 remains unchanged; inverter stops working, the frequency setting is the final modified value.
2: when inverter does not store when drive power shut down, and it doesn't maintain when it stop working.
When the inverter is power failure or under voltage, P1.08 refresh automatically according to the current value of the actual frequency setting; when inverter shutdown, automatically recover the frequency settings back to P1.08
3: Inverter does not store when power-down shut down, and it doesn't maintain after stop working.
When the inverter is power failure or under-voltage, P1.08 remains

unchanged; when inverter shutdown, automatically recover the frequency settings back to P1.08.

P1.07	frequency source digits given as 1	0.00Hz P1.11	【50.00】

When the frequency channel define for a given digit 1 (main frequency source 0 and the auxiliary frequency source 1), the function parameter is the initial set frequency given by inverter panel digit frequency.

P1.08	frequency source digits given as 2	0.00Hz P1.11	【50.00】

When the frequency channel define for a given digit 2 (main frequency source 1 and the auxiliary frequency source 2), the function parameter is the initial set frequency given by inverter terminal.

P1.09	frequency source weight coefficient set K1	0.01 ~ 10.00	1.00

K1 set as the frequency weight coefficient, and P1.04 is valid when it is 1, 2,3,8,9.

P1.10	frequency source weight coefficient set K2	0.01 ~ 10.00	1.00

K2 set as the frequency weight coefficient, and P1.04 is valid when it is 1, 2,3,8,9.

P1.11	Maximum output frequency	Max｛50.00, maximum frequency(P1.12)｝600	50.00
P1.12	Maximum frequency	(P1.13) (P1.11)	50.00
P1.13	Minimum frequency	0.00Hz (P1.12)	0.00

Maximum output frequency is the highest frequency inverter allows to output and it is setting base of acceleration and deceleration time, as shown below fmax; fundamental operating frequency is the corresponding minimum frequency which usually is the motor rated frequency when inverter output the highest voltage, as Shown below diagram fb; the highest output voltage Vmax is the corresponding output voltage which usually is the motor rated voltage when the inverter output fundamental operating frequency, as shown below

Vmax, fH, fL respectively defined as the highest frequency and lowest frequency, as shown in Figure P1-1:

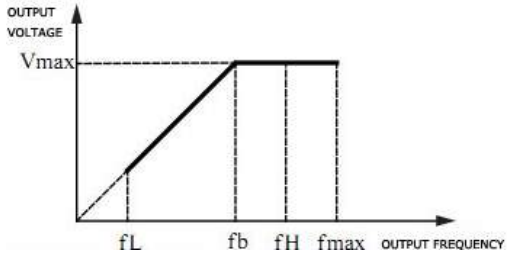


DIAGRAM P1-1 VOLTAGE AND FREQUENCY SCHEMATIC DIAGRAM

NOTE

1. Maximum output frequency, maximum frequency and minimum frequency should be carefully set according to the rating parameter of controlled motor and the requirements of operation condition, settings; otherwise it may cause equipment damage.

2. Upper frequency limits is effective for jog (JOG) operating restrictions. Lower frequency limits is invalid for Jog (JOG) operation.

3. In addition to the maximum frequency, minimum frequency limit, the inverter output frequency is also limit by setting parameters such as the starting frequency, stopping DC braking starting frequency and hopping frequency.

4. The relationship between maximum output frequency, upper frequency, and lower frequency diagram P1-1 shown above. Please note the order while setting.

5. The lower and upper frequency is used to limit the frequency value for the actual output value of the motor. If the set frequency is higher than the upper frequency, then operate as upper frequency; if the set frequency

is below the lower limit frequency, then operate as lower frequency. (The operation state that frequency below the lower limit frequency is related to the setting of function code P2.31);

If the set frequency is lower than starting frequency, start to operate with frequency 0.

P1.14	Acceleration time	0.1 ~ 36000S	model set
P1.15	deceleration time	0.1 ~ 36000S	model set

Acceleration time is the time inverter accelerate from frequency 0 to maximum output frequency, as shown in below diagram t1.
Deceleration time is the time inverter decelerates from maximum output frequency to frequency 0, as shown in below diagram t2.
There are totally four group parameters for inverter acceleration and deceleration time and the other three groups of acceleration and deceleration time defined in the function code P2.14 ~ P2.19. The factory default deceleration time is determined by models. If need to select other groups of acceleration and deceleration time, please select through the multi-function terminals (see P7 Group function code). The acceleration and deceleration of jogging operation time is solely defined in P2.22, P2.23.

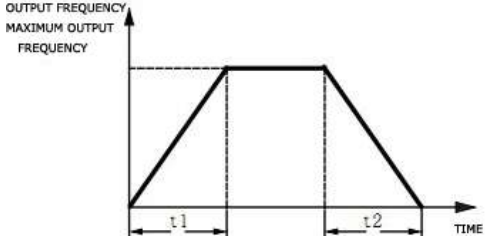


DIAGRAM P1-2 THE ACCELERATION AND DECELERATION SCHEMATIC DIAGRAM
Running direction set P1.17 0 ~ 2 0

P1.16	reserve	reserve	0
P1.17	Operation direction setting	02	0

0. Forward
when select this mode, the phase sequence of actual output of the inverter is the same as phase rotated by default. At this point, the panel and terminal function key FWD is forward control.
1: Reverse
when select this mode, the phase sequence of actual output of the inverter is reverse as phase rotated by default. At this point, the panel and terminal function key FWD is reverse control.

2: Reverse prevents
In any case, the motor can only run forward. This feature is available for the situation that reverse operation can be dangerous or brings property damage. Given reversal Command, the inverter operates in speed 0.

Tip:

This function code is effective to operation direction control of all command channels.

P1.18	carrier frequency setting	1.0～15.0KHz	Mode set
	0.4～4. 0KW	8.0KHz	1.0 ～ 15.0KHz
	5.5～30KW	6.0KHz	1.0 ～ 15.0KHz
	37～132KW	4.0KHz	1.0 ～ 10.0KHz
	160～630KW	2.0KHz	1.0 ～ 5.0 KHz

The function code is used to set the carrier frequency of inverter output PWM wave. Carrier frequency may affect the noise when the motor is running. For the situation which need quiet operation, the carrier frequency can be appropriately raised to meet the requirements. But the raise of carrier frequency will increase in heat of inverter, in the meanwhile the interference increases to the outside electromagnetic.
When Carrier frequency is higher than the factory setting, the inverter must derate to use. Normally the inverter current amount reduces about 5% according to each increase 1 KHz of download wave.

NOTE

1 It can select carrier frequency with function code PC.26 and PC.27

Auxiliary operating parameters P2

P2.00	starting way	0 2	0

0. Starting with starting frequency

Start by setting the frequency (P2.01) and the starting frequency keeping time (P2.02).
1: DC braking + starting frequency starts
First DC brakes (see P2.03, P2.04), and then start by way of 0.
2: rotating speed tracking start
Before inverter start, the drive motor may be in the rotation state. If you start from the starting frequency at this time, it may lead to the inverter over-current protection. Speed tracking start is that when the inverter put into operation, first detect the motor speed and direction, then operate Shock-free smooth start with the rotating motor according to test results, current Speed and direction of rotation of the motor. When use this way, please note that don't start a small horse-drawn carts, or it is easy to be over-current protection. When inertia of the system is large, we should consider the appropriate increase of acceleration and deceleration value. Please refer to the relevant function code set PC.17 ~ PC.20.

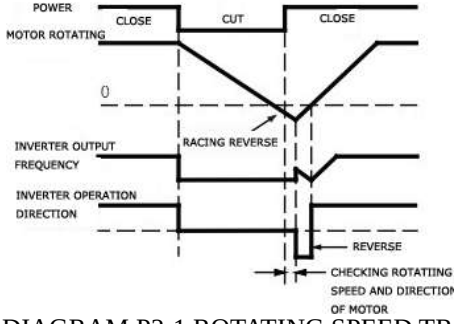


DIAGRAM P2-1 ROTATING SPEED TRACKING DIAGRAM

P2.01	Starting frequency	0.00 ~ 50.00Hz	1.00
P2.02	Starting frequency keeping time	0.0 ~ 10.0s	0.0

Starting frequency is the initial frequency of the inverter starting. As shown below diagram fs, for some system of relatively large starting torque, set reasonable starting frequency can effectively overcome the problems of difficult starting. Starting keeping time is the inverter in the starting process maintains the starting frequency protection, as shown in t1. Starting frequency diagram is as follows:

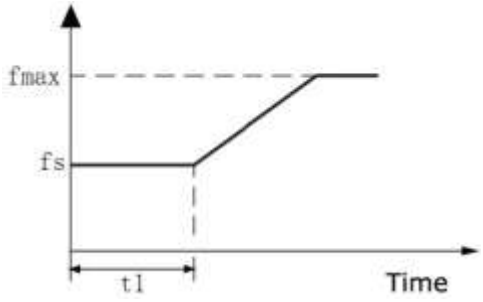


DIAGRAM P2-2 Starting frequency diagram

TIPs

Starting frequency does not limit by lower frequency. Jogging frequency does not limit by lower frequency but limits by starting frequency.

P2.03	Starting DC braking current	0.0 ~ 150.0% * Ie	0.0%
P2.04	Start DC braking time	0.00 ~ 50.0s	0.0

Starting DC braking current setting is the percentage compared with inverter Rated Output Current.

When Starting DC braking time is 0.0S, there is no starting DC braking process.

See as below diagram:

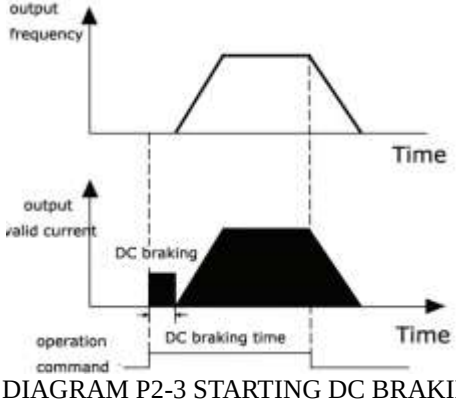


DIAGRAM P2-3 STARTING DC BRAKING DIAGRAM

P2.05	Acceleration and deceleration method	0 2	0

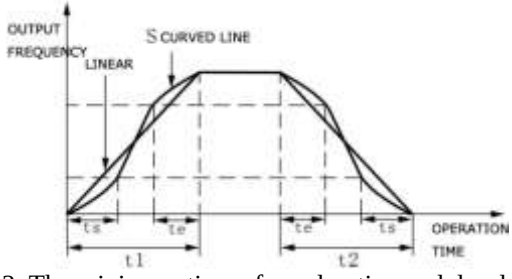
0: Linear acceleration and deceleration

The relationship of Output frequency and time increase or decrease progressively in accordance with a constant slope, as shown below.

1: S curve acceleration and deceleration

The relationship of Output frequency and time increase or decrease progressively is in accordance with S-shaped curve. When start acceleration and reach the speed as well as start to deceleration and arrive the speed, let the speed setting value in S shaped curve. This allows smooth acceleration and deceleration and reduces the impact of loading. S curve acceleration and deceleration mode is Suitable for handling the load transfer from start to stop, such as elevators, conveyors and so on. As shown below: t1 is the acceleration time, t2 is the deceleration time, ts for the S curve

initial section time, and te for S curve the end section, P2.06 = ts/t1, P2.07 = te/t2.



2. The minimum time of acceleration and deceleration

Motor accelerates and decelerates rapidly with the accelerating speed of not exceeding current amplitude limit and deceleration speed of not exceeding standard voltage amplitude limit as well as without inverter protect protection.

P2.06	S curve initial time ratio	10.0 ~ 50.0%	20.0%
P2.07	S curve end time ratio	10.0 ~ 50.0%	20.0%

See S curve acceleration and deceleration notes in P2.05..

P2.08	Shutdown mode	0 ~ 1	0

0: Deceleration stop

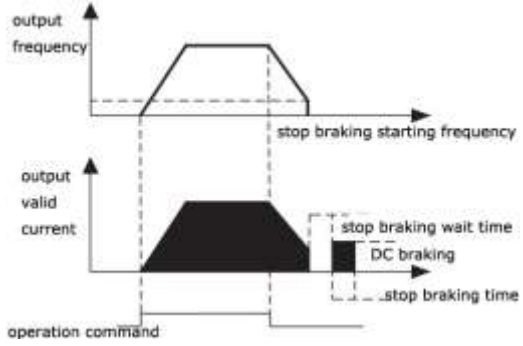
Inverter reduces output frequency gradually in accordance with the deceleration time after receiving the stop command, and shutdown after the frequency reduces to zero. If the DC braking stop Function is effective, then reach shutdown DC braking starting frequency (according to P2.09 settings, you may have to wait for a stop DC braking wait time). And operate a DC braking process, and then shut down.

1: Free parking

Inverter immediately terminates output after received the stop command and the load stop by free mechanical inertia.

P2.09	DC braking starting frequency	0.00 ~ P1.11	【0.00】
P2.10	DC braking wait time	0.0 ~ 50.0s	0.0
P2.11	Stop DC braking current	0.0 ~ 150.0%	0.0%
P2.12	DC braking time	0.0: DC braking control does not control, For 0.1 ~ 50.0s	0.0

DC braking current setting is percentage referred to inverter rated current. When Stop braking time is 0.0s, there is non-DC Brake Process. As shown below.



P2.13	Reserved	reserved	0
P2.14	Acceleration time 2	0.1 ~ 3600.0	model set
P2.15	Deceleration time 2	0.1 ~ 3600.0	Model

			set
P2.16	Acceleration time 3	0.1 ~ 3600.0	Model set
P2.17	Deceleration time 3	0.1 ~ 3600.0	Model set
P2.18	Acceleration time 4	0.1 ~ 3600.0	Model set
P2.19	Deceleration time 4	0.1 ~ 3600.0	Model set

You can define four types of acceleration and deceleration time, and choose of inverter operation during acceleration and deceleration time 1, 4 by controlling the different terminal combinations, please see P7.00 ~ P7.07 the definition of terminal function in acceleration and deceleration time.

Tip:

Definition of Acceleration and deceleration time in P1.14 and P1.15

P2.20	DC braking current	0 1	0

0: Second

1: Minute

This function code defines the dimensions of acceleration and deceleration time.

P2.21	jogging operation frequency setting	0.00 [P1.11]	5.00
P2.22	jogging acceleration time setting	0 1 3600 0S	model set
P2.23	Jog deceleration time setting	0 1 3600 0S	Model set
P2.24	Set jog interval setting	0 1 3600 0S	Model set

P2.21 ~ P2.24 jogging run-time relate parameters. As shown in Figure P2-6, t1, t3 is for the actual operation of the jog acceleration and deceleration Time; t2 is jogging time; t3 + t4 to jog interval time (P2.24); f1 is forward jogging run frequency (P2.21); f2 for reverse jogging run frequency (P2.36). Actual operation time of the jog acceleration t1 is determined according to the following: t1 = P2.21 * P2.22/P1.11 or

t1 = P2.36 * P2.22/P1.11. Similarly, the actual operation of the jog deceleration time t3 can be defined as: t3 = P2.21 * P2.23/P1.11 or t3 = P2.36 * P2.23/P1.11

P1.11 is the Maximum output frequency.

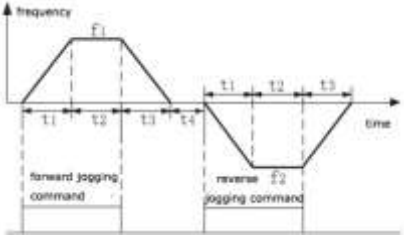


DIAGRAM P2-6 JOGGING OPERATION DIAGRAM

TIP

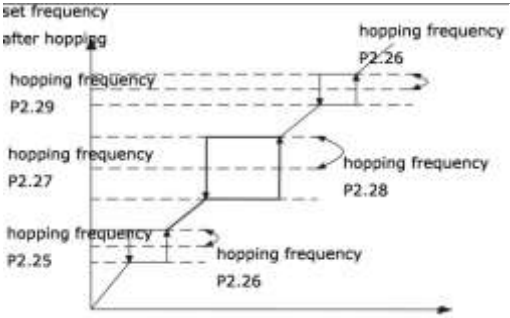
1. Jog operation mode start and stop in accordance with starting 0 (starting frequency start) and stop mode 0 (slow down), and acceleration and deceleration is determined in P2.20.

2. The control panel, control terminals and serial ports can be carried out to jog control.

P2.25	hoping frequency 1	upper frequency 0.00	0.00
P2.26	hopping frequency range 1	upper frequency 0.00	0.00
P2.27	hoping frequency 2	upper frequency 0.00	0.00
P2.28	hopping frequency range 2	upper frequency 0.00	0.00
P2.29	hoping frequency 3	upper frequency 0.00	0.00
P2.30	hopping frequency range 3	upper frequency 0.00	0.00

1. Above function code is setting function that the output frequency of inverter avoids the mechanical resonance frequency of the load. Ways of Setting the inverter Frequency can be hopping given in a near certain frequencies in accordance with the below drawing. Its specific meaning is that the frequency of the inverter cannot operation steadily in the hopping frequency range, but will go through this range in the process of acceleration and deceleration.

DIAGRAME P2-7



HOPPING FREQUENCY DIAGRAM

P2.31	Set the frequency below the lower limit frequency operation	0 2	0

0: The following limited frequency operation

When set the frequency lower than the lower limit frequency setting value (P1.13), the inverter runs with the lower frequency.

1: stop

When set the frequency lower than the lower limit frequency setting value (P1.13), the inverter shut down.

2: Zero speed running

When set the frequency lower than the lower limit frequency setting value (P1.13), the inverter runs with zero frequency.

P2.32	Forward and reverse dead time	0. 0 3600.0S	0.0

The dead time is operating the inverter from forward to reverse direction or operating the inverter from reverse to forward direction, as shown below

t1. The switching frequency is relative to the position of P2.33.

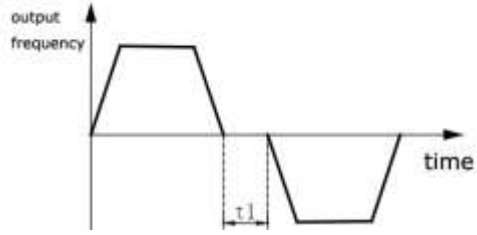


DIAGRAM P2-8 FORWARD AND REVERSE DEAD TIME DIAGRAM

P2.33	Forward and reverse switching mode	0 1	0

0: Zero-frequency switching
1: Starting frequency switching off

P2.34	Zero-frequency operation threshold	0.00 50.00	0.0
P2.35	Zero-frequency hysteresis	0.00 50.00	0.0

This function code can explicitly specify the analog input curve corresponding voltage / current threshold in zero frequency pole, not only decided by the upper and lower of frequency and analog input, as shown below. When AI1 input adjustment from zero to P2.34 (zero frequency threshold) increases, the output is Zero frequency, lower frequency is not affected; when AI1 input is above P2.34, the rate began to increase; when AI1 input regulator from the upper to P2.34 (zero frequency threshold) minus; the output frequency decreases when the input AI1 is less than (P2.34-P2.35), the output frequency is 0.

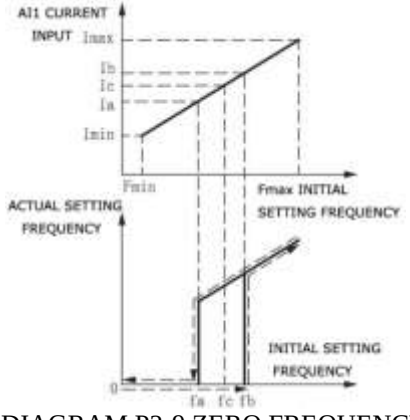


DIAGRAM P2-9 ZERO FREQUENCY FUNCTION DIAGRAM
fb: zero-frequency operation threshold
fa: fb-zero frequency hysteresis

fc: AI1 input Ic corresponding frequency

Tip:
Avoid the analog input signal zero drift causing frequent fluctuations around zero frequency by setting zero-frequency hysteresis. Zero frequency threshold limit by Upper frequency and have no impact from lower frequency.

P2.36	reverse jog operation frequency setting	0 1	0

P3 motor parameters

P3.00	Inverter model Selection	0 1	0

This function is temporarily reserved

P3.01	motor rated power	0.4 ~ 999.9KW	model set
P3.02	Rated motor frequency	0.1Hz [P1. 11]	50.00
P3.03	Motor rated speed	0 36000RPM	Model set
P3.04	Motor rated voltage	0 999V	Model set
P3.05	Motor rated current	0.1 6553.5 A	model set

NOTE:

Above function code must be set in accordance with the motor rating parameters shown in Figure P3-1. Please configure corresponding motor according to the power of inverter. if the difference of power is too big, the Control performance of inverter decreased significantly.

P 3.06	motor stator resistance	0.001 ~ 65.535Ω	model set
P3.07	Rotor resistance	0.001 ~ 65.535Ω	Model set
P3.08	Motor stator and rotor inductance	0.1 ~ 6553.5mH	Model set
P3.09	Motor stator and rotor mutual inductance	0.1 ~ 6553.5mH	Model set
P3.10	Motor no-load current	0.01 ~ 655.35A	Model set

The specific meaning of above motor parameters please see diagram P3-1.

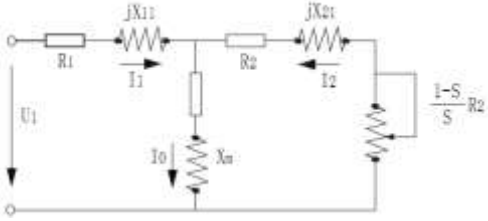


DIAGRAM P3-1 asynchronous motor steady state equivalent circuit diagram

R1, X11, R2, X21, Xm, Io in Figure P3-1 separately represent: stator resistance, stator leakage inductance, rotor resistance, rotor leakage inductance, Mutual resistant, no-load current. Function code P3.08 is the sum of stator, rotor leakage inductance and mutual inductance.

If regulate the motor, settings of P3.06 ~ P3.10 will be updated.

If rated power of induction motor P3.01 Change, P3.03 ~ P3.10 will automatically update the corresponding power as the induction motor default parameters.

P3.02 is motor rated frequency, do not belong to the scope of default parameters of induction motors, and require the user to set in accordance with the nameplate.

P3.11	Motor tuning Select	0 2	0

0: No action

1: Static tuning

Parameter measurement mode when the motor is static, this mode is suitable for occasion of motor not separate from load.

2: complete tuning

Use complete motor parameter measurement mode to test the situation that motor and load can separate from each other as far as possible.

In vector control mode, P3.06 ~ P3.10 represent motor parameters which is the key parameters required in system control, so you must enter Line motor parameter tuning before the inverter develop to be superior performance.

TIP

1: When set P3.11 as 2, if the event of over current, over voltage fault happen in the tuning process, may be appropriate to increase the acceleration and deceleration time;
2: When a complete tuning set P3.11 as 2, should off load the motor shaft, and avoid motor complete tuning load;
3: The motor parameter start tuning before the motor is stopped, otherwise the tuning can not be on the rails;
4: In some cases (such as the motor and load can not be divorced from such circumstances)that a complete motor control tuning is not facilitate or users who don't have high requirements, static tuning can be used.
5: If the user cannot tune, and know the exact motor parameters, then the user can directly enter the motor nameplate parameters (P3.01 ~ P3.10). It can also real the superior performance of the inverter. If Tuning is not successful, **conservation action displays E-20**.

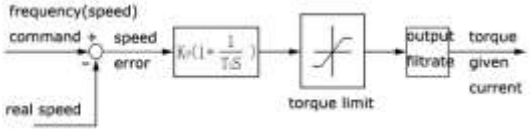
P3.12	reserved	reserved	0

P4 control parameters of speed torque and flux

P4.00	speed loop (ASR1) proportional gain	0 100	20
P4.01	speed loop (ASR1) integration time	0.01 ~ 10.00s	0.50
P4.02	ASR1 filter time constant	0.000 ~ 0.100S	0.000
P4.03	Low switching frequency	0. 00Hz [P4.07]	5.00
P4.04	speed loop (ASR2) proportional gain	0 100	15
P4.05	speed loop (ASR2) integration time	0.01 ~ 10.00S	0.50
P4.06	ASR2 filter time constant	0.000 ~ 0.100S	100.0%
P4.07	high frequency switching	[P4.03] ~ [P1.11]	100.0%

Function Code P4.00 ~ P4.07 is effective without PG vector control (SVC).
In vector control mode, change the speed of vector control Response by setting the speed regulator proportional gain P and integral time I.

the form of Speed Regulator (ASR) is shown in Figure 4-1.
The figure KP for the proportional gain P, TI is the integration time I.



1. When Integration time is set to 0 (P4.01 = 0, P4.05 = 0), there are no integral action and speed loop is simply a ratio regulator.
2. Set Speed Regulator (ASR) of the proportional gain as P and integral time as I.

Figure P4-2 Speed Regulator (ASR) step response and the relationship with PI parameters the Increase of proportional gain P can accelerate the dynamic response; but if P is too large, the system prone to oscillation.
Reduce of integration time I can accelerate the dynamic response; but if I is too short and system prone to oscillation.
Usually adjusting the proportional gain P and increase P as much as possible under the premise that the system does not oscillation; and then adjust the integration time I to make the system both faster
Speed of response and little overshoot. Figure P4-3 is a good step response curve of the selecting speed of P, I (speed analog output response curve can be observed by Terminal AO1, AO2, see group

parameters P6).

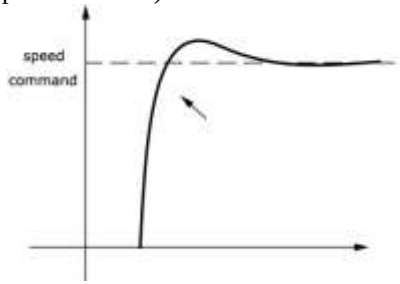


DIAGRAM P4-3 Better step response of dynamic performance

⚠**Note:**

If selection of PI parameter is not proper, the system from the quick start to the high-speed, may lead to over-voltage fault (if there are no external braking resistor or braking unit). It is due to the regenerative braking energy in the system feedback after speed overshoot in the rate of descent. It can be avoid PI to adjust parameters.

1. **Speed Regulator (ASR) adjusts PI parameters in the high / low speed operation occasion.**

If the system has requirements of rapid response in high and low load operation, we can switch ASR to low frequency (P4.03) and high frequency (P4.07). Usually when the system is running in low frequency, it needs to improve the dynamic response characteristic, and it can relatively increase proportional gain P and reduce integral Time I. Generally adjust the speed controller parameters in the following order:

1) Select the appropriate switching frequency P4.03 and P4.07.

2) Adjust the low speed proportional gain P4.00 and integration time P4.01, to ensure that the system have dynamic response characteristic and no oscillation in low frequency.

3) Adjust the low speed proportional gain P4.04 and integration time P4.05, to ensure that the system have dynamic response characteristic and no oscillation in high frequency.

4. Get given torque current by a delay output filter for speed regulator (ASR). P4.02, P4.06 are filter time constant respectively for ASR1 And ASR2.

P4.08	vector control positive slip compensation factor power status	50.0% 200.0%	100.0%
P4.09	vector control Negative slip compensation power status	50.0% 200.0%	100.0%

The above function code parameter used to adjust the precision of the motor steady speed under Vector control without PG. when the motor is overloaded, increase the parameter if speed is low; otherwise reduce the parameter.

Positive slip coefficient condensate the speed when the motor slip rate is positive number; on the contrary, the negative slip coefficient condensate the speed when the motor slip rate is negative number.

P4.10	Reservation	Reservation	0
P4.11	reservation	Reservation	0
P4.12	reservation	Reservation	0
P4.13	selection of speed and torque control	0 2	0

0: Speed control

Objects of Current vector control without PG control is speed control.

1: Torque Control

Subjects of Current vector control without PG control is torque control, please refer to P4.15 ~ P4.29 for the relevant parameters.

2: The condition is active (terminal switch)

Control object of Current vector control without PG is switch to switch control input terminals de fined as speed and torque control, please refers to No. 58 Function description of P7 group function digital input terminal.

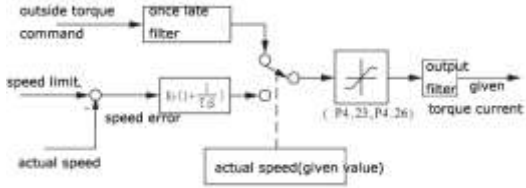


DIAGRAM P4-4 TORQUE CONTROL SIMPLIFIED DIAGRAM

P4.14	speed and torque switching delay	0.01 1.00S	0.05

This function code defines the switching delay time of torque and

speed.

P4.15	torque instruction selection	0 3	0

The torque control function code set the torque to a given physical channel.

0: given Keyboard figures

Torque command is given by the keyboard command. Setting value, please See P4.16

1: AI 1

Torque command set by inputting the analog AI 1. The positive and negative value input in AI 1 corresponding to the positive and negative torque command value of direction.

Users should input the corresponding physical quantity for torque command When use the feature, but also set the corresponding curves and Input filter time for AI 1. Please refer to the function code description P6.00 ~ P6.05.

2: AI 2

Torque command set by inputting the analog AI2. The positive and negative value input in AI2 corresponding the positive and negative torque command value of direction.

Users should input the corresponding physical quantity for torque command When use the feature, but also set the corresponding curves and Input filter time for AI2. Please refer to the function code description P6.06 ~ P6.11.

3: given communication RS485

Torque command is given by communication RS485.

P4.16	keyboard digital set torque	-250.0% 250.0%	0.0%

This function code is keyboard commands to select the torque figures given time settings corresponding to the torque setting selection.

P4.17	The speed limit torque control mode channel select 1 (Positive)	0～3	0

The torque control function code set forward as the speed limit channel.

0: Keyboard Digital given 1, please refer to setting P4.19.

1: AI1

Forward speed torque control limit is given by AI1. Please refer to the

function code P6.00 ~ P6.05 description.
2: AI2
Forward speed torque control limit is given by AI1. Please refer to the function code P6.06 ~ P6.11 description.
3: RS485 communication for a given
Forward speed torque control limit is given by RS485.

P4.18	The speed limit torque control mode 2 channel selection (Reverse)	0～3	0

Reverse speed in the torque control function code set limit channel.
0: Keyboard Digital reference 2, see P4.20 setting.
1: AI1
Speed torque control limit is given by AI1. Please refer to the function code P6.00 ~ P6.05 description.
2: AI2
Reverse speed torque control limit is given by AI1. Please refer to the function code P6.06 ~ P6.11 description.
3: RS485 communication for a given
Reverse speed torque control limit is given by RS485. Reverse torque control the speed limit when the communication channel given by RS485.

P4.19	Limit speed 1 of a digital keyboard	0.0 100.0%	0.0%

The limit value of Limit the speed 1 of a digital keyboard is relative to the maximum output frequency. When the function code is corresponding to P4.17 = 0, reverse speed limits the value.

P4.20	Limit speed 2 of a digital keyboard	0.0 100.0%	0.0%

The limit value of Limit the speed 2 of a digital keyboard is relative to the maximum output frequency. When the function code is corresponding to P4.18 = 0, reverse speed limits the value.

P4.21	Torque rising time	0.1S～100.0S	2.0
P4.22	Torque falling time	0.1S～100.0S	2.0

Torque rise / fall time defines the time which torque raises from a

maximum value to 0 or from 0 to the maximum value.

P4.23	vector mode electric torque limit for positive direction	0.0% ~ 250.0%* Ite	180.0%
P4.24	vector mode braking torque limit for positive direction	0.0% ~ 250.0%* Ite	180.0%
P4.25	vector mode electric torque limit for negative direction	0.0% ~ 250.0%* Ite	180.0%
P4.26	vector mode braking torque limit for negative direction	0.0% ~ 250.0%* Ite	180.0%

Above function code defines that the vector control limits torque value.

P4.27	Torque detecting action selection	0 8	0
P4.28	Torque detecting level	0.0% ~ 200.0% * Ite	0.0%
P4.29	Torque detecting time	0.0 ~ 10.0S	0.0

When the actual torque in P4.29 (torque detecting time) is constantly higher than P4.28 (torque detecting level), the inverter will select action corresponding to P4.27 Setting. 100% detection level of Torque setting is corresponding to the motor rated torque.

0: detect invalid

No torque detecting.

1: detect over-torque at Constant speed and continue to operate.

Dectect whether there is over-torque only in constant speed and inverter continue to run after over torque detection.

2: The inverter continues to run after over-torque detection in processing.

The inverter continues to run after over-torque detection during operation,.

3: cut output after detect over-torque in constant speed.

Detected whether there is over-torque only in constant speed, and the inverter stops to output and motor stop with free gliding.

4: cut output after detect over-torque in operation.

The inverter stops to output after the inverter detects over-torque and

motor stop with free gliding.
5: detect less-torque at Constant speed and continue to operate.
Detect whether there is less-torque only in constant speed and inverter continue to run after over torque detection.
6: The inverter continues to run after less-torque detection in processing.
The inverter continues to run after less-torque detection during operation.
7: cut output after detect less-torque in constant speed.
Dectected whether there is less-torque only in constant speed, the inverter stops to output and motor stop with free gliding.
8: cut output after detect less-torque in operation.
The inverter stops to output after the inverter detects over-torque and motor stop with free gliding.

P4.30	flux compensation coefficient 1	0.10 1.50	0.50
P4.31	flux compensation coefficient 2	0.10 1.50	1.00
P4.32	flux compensation coefficient cut-off point	1.00 10.00Hz	5.00
P4.33	Closed-loop flux ratio factor	0.01 5.00	1.00
P4.34	flux loop integration time constant	0.01 10.00S	1.00

Adjust magnetic flux compensation and speed with the function code when the motor is running at low speed. It is mainly used for flux vector control mode no need to adjust in general.

P4.35	Reservation	reservation	0
P4.36	Reservation	reservation	0

P5 VF control parameters

P5.00	V / F curve setting	0 5	0

The group function code defines the motor V / F curve setting method to meet different requirements of load characteristics. According to the definition of P5.00, we can Select 5 fixed curves and a custom curve.
0: linear curve
Linear torque curve is used for ordinary Constant type of load, the relationship between output voltage and output frequency is linear. See straight line 0 in Figure P5-1.

1: torque curve fall 1 (1.3 times power)
Falling torque curve 1, the relationship of output voltage and output frequency is 1.3 times power. See curve 1 in Figure P5-1
2: Torque curve fall 1 (1.5 times power)
Falling torque curve 2, the relationship of output voltage and output frequency is 1.5 times power. See curve 2 in Figure P5-1.
3: torque curve fall 1 (1.7 times power)
Falling torque curve 3, the relationship of output voltage and output frequency is 1.7 times power. See curve 3 in Figure P5-1
4: square curve
Square curve is used for square type torque load such as fans, pumps in order to achieve the best energy-saving effect, and the output voltage and output frequency form a square curve. See curve 4 in Figure P5-1.

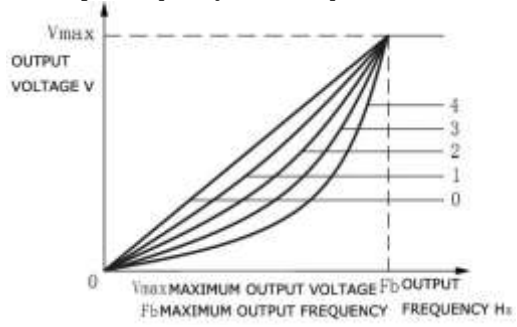


DIAGRAM P5-1 V/F CURVE DIAGRAM

5: User set V / F curve (determined by the P5.01 ~ P5.06). when P5.00 select 5, the user can customize P5.01 ~ P5.06 V / F Curve, to increase (V1, F1), (V2, F2), (V3, F3), and define V / F curve with point of origin and the maximum frequency to apply to a particular load characteristics. As shown in Figure P5-2.

P5.01	V / F frequency value F1	0.00 frequency F2	12.50
P5.02	V / F voltage V1	0.0 ~ voltage V2	25.0%
P5.03	V / F frequency F2	frequency F1 frequency F3	25.00
P5.04	V / F voltage V2	voltage V1 voltage V3	50.0%
P5.05	V / F frequency F3	frequency P2	37.50

		【P1.11】	
P5.06	V / F voltage V3	Voltage V2 100.0 the maximum voltage output	75.0%

Schematic diagram of the voltage and frequency as follows:

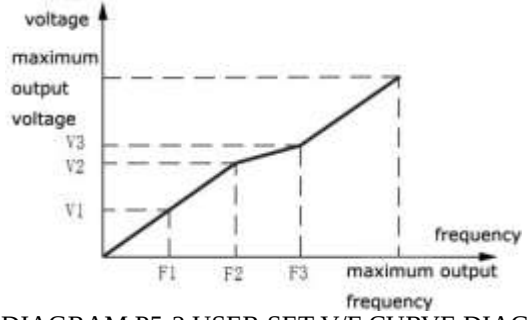


DIAGRAM P5-2 USER SET V/F CURVE DIAGRA

P5.07	Torque boost settings	0.0~30.0% Note： 0.0is automatic torque boost	Model set

Make some boost compensation for output voltage in order to compensate the features of low-frequency torque. If the function code is set as 0.0%, it is automatic torque boost. When it is set as any quantity that is not 0.0%, it is hand-actuated torque boost. See the chart P5-3.

Vb-the quantity of hand-actuated torque boost

Chart P5-3 schematic diagram of torque boost

◆ Note:

1. The automatic torque boost mode is ineffective under the standard V/F mode.
2. The automatic torque boost mode is ineffective only under the vectorization V/F mode.

P5.08	edge frequency of torque boost	0.0~50.0%*[P1.11]	20.0%

P5.08 has defined the edge frequency of hand-actuated torque boost as fz. See chart P5-3.

P5.09	V/F control the compensation of positive slip frequency	0.0~200.0%* rated slip	0.0%
P5.10	V/F control the compensation of negative slip frequency	0.0~200.0%* rated slip	0.0%

It will bring out the decrease of revolving speed when the asynchronous machine is loaded. Slip compensation enables the motor speed to approach its synchronizing speed so as to improve the control accuracy of motor speed. The positive slip compensates the frequency when the motor slip frequency is positive; conversely, the negative slip compensates the frequency when the motor slip frequency is negative.

P5.11	reservation	reservation	0

P6 the simulation and in-out parameter of pulse

P6.00	The corresponding physical quantity of AI1 input	0~4	0

0: speed command (output frequency, -100.0%-100.0%)
1: torque command (output torque, -100.0%-200.0%)
AI1 presets the set point of torque command. The preset torque ranges from -100.0%-200.0%. About the relevant settings, please refer to detailed description of the functions in P4 set.
2: magnetic flux command (reservation)
3: voltage command (reservation)
4: PID command
AI1 presents the set point or feedback of PID. Please see the PID parameter settings of procedure in the P8 set.

P6.01	lower limit of AII input	0.00V/~10.00V	0.00
P6.02	Set the corresponding physical quantity of the lower limit of AI1 input	-200.0%~200.0%	0.0%
P6.03	upper limit of AI1 input	0.00V/~10.00V	10.00
P6.04	Set the corresponding physical quantity of the upper limit of AI1 input	-200.0%~200.0%	100.0%
P6.05	Smoothing time of AI1 input	0.00S~10.00S	0.10
P6.06	The corresponding physical quantity of AI2 input	0~4	0

0: speed command (output frequency, -100.0%-100.0%)
1: torque command (output torque, -100.0%-200.0%)
AI 1 presets the set point of torque command. The preset torque ranges from -100.0%-200.0%. About the relevant settings, please refer to detailed description of the functions in P4 set.
2: magnetic flux command (reservation)
3: voltage command (reservation)
4: PID command
AI 1 presents the set point or feedback of PID. Please see the PID parameter settings of procedure in the P8 set.

P6.07	lower limit of AI2 input	0.00V/0.00mA~ 10.00V/20.00mA	0.00
P6.08	Set the corresponding	-200.0%~200.0%	0.0%

	physical quantity of the lower limit of AI2 input		
P6.09	upper limit of AI2 input	0.00V/0.00mA~ 10.00V/20.00mA	10.00
P6.10	Set the corresponding physical quantity of the upper limit of AI2 input	-200.0%~200.0%	100.0%
P6.11	Smoothing time of AI2 input	0.00S~10.00S	0.10

The above function codes have defined input range of voltage analog input channel AI1 and AI2, the percentage of corresponding physical quantity, and smoothing time constant. AI2 can be selected as voltage/ current input via the jumper of J1 and its figure setting can be set according to the relationship of 0~20mA corresponding to 0~10V. The detailed setting should be decided by the facts of signal input.

The smoothing time constant of AI1 and AI2 input is used for the smoothing of mimic input signal to eliminate the influence of interference. The bigger the time constant is, the stronger the anti-interference capability will be, the more stable the control will be and the slower the response will be; conversely, the smaller the time constant is, the quicker the response will be, however, the anti-interference capability will be weaker and control may be unstable. If it is difficult to determine the optimal value in practical application, we should regulate the parameter value properly according to whether the control is stable and the status of operating lag.

P6.12	the corresponding physical quantity of external impulse input	0~2	0

0: speed command (output frequency, -100.0%-100.0%)

1: torque command (reserved)

2：PID command

External impulse input serves as the set point or feedback of PID. Please see the PID parameter settings of procedure in the P8 set.

P6.13	lower limit of external impulse input	0.00V/0.00mA~ 10.00V/20.00mA	0.00

P6.14	Set the corresponding physical quantity of the lower limit of external impulse input	-200.0%~200.0%	0.0%
P6.15	upper limit of external impulse input	0.00~50.00KHz	20.00
P6.16	Set the corresponding physical quantity of the upper limit of external impulse input	-200.0%~200.0%	100.0%
P6.17	Smoothing time of external impulse input	0.00S~10.00S	0.10

The above function codes have defined input range and the percentage of physical quantity of impulse input channel. This moment, multifunction terminal X6 should be defined as impulse frequency input.

The smoothing time constant of impulse input is mainly use in smoothing of pulse signal. Its principle is the same with smoothing time constant of analog input.

Item	A01	Scope
output frequency (before slip compensation)	0V/0mA~ upper limit of AO	0~ maximum output frequency
	2V/4mA~ upper limit of AO	0~ maximum output frequency
output frequency (after slip compensation)	0V/0mA~ upper limit of AO	0~ maximum output frequency
	2V/4mA~ upper limit of AO	0~ maximum output frequency
setting frequency	0V/0mA~ upper limit of AO	0~ maximum output frequency
	2V/4mA~ upper limit of AO	0~ maximum output frequency
motor speed	0V/0mA~ upper limit of AO	0~synchronous speed of motor
	2V/4mA~ upper limit of AO	0~synchronous speed of motor
output current	0V/0mA~ upper limit of AO	0~double rated current
	2V/4mA~ upper limit of AO	0~double rated current
output voltage	0V/0mA~ upper limit of AO	0~1.2 times of rated output voltage
	2V/4mA~ upper limit of AO	0~1.2 times of rated output voltage
busbar voltage	0V/0mA~ upper limit of AO	0~800V
	2V/4mA~ upper limit of AO	0~800V
output power	0V/0mA~ upper limit of AO	0~200%*Pe
	2V/4mA~ upper limit of AO	0~200%*Pe
output torque	0V/0mA~ upper limit of AO	0~200%*Ie
	2V/4mA~ upper limit of AO	0~200%*Ie
AI1	0V/0mA~ upper	0~10V

	limit of AO	
	2V/4mA~ upper limit of AO	0~10V
AI2	0V/0mA~ upper limit of AO	0~20mA
	2V/4mA~ upper limit of AO	0~20mA
output impulse frequency	0V/0mA~ upper limit of AO	0~50KHZ
	2V/4mA~ upper limit of AO	0~50KHZ
Torque current	0V/0mA~ upper limit of AO	0~double rated current
	2V/4mA~ upper limit of AO	0~double rated current
magnetic flow current	0V/0mA~ upper limit of AO	0~double rated current
	2V/4mA~ upper limit of AO	0~double rated current

P6.18	function selections of the analog quantity output terminal of AO1 multifunction	0-13	0
P6.19	function selections of the analog quantity output terminal of AO2 multifunction	0-13	1
P6.20	function selections of the pulse quantity output terminal of A0 multifunction	0-13	11

The above function codes determined the output terminal AO of multifunction analog quantity and the output terminal DO of impulse. The detail of the corresponding relationship between them and each physical quantity can be seen in the following table:

DO ranges from the lower limit of DO to the upper limit of DO, and they separately correspond to the lower limit and the upper limit of the physical quantity in the above table.

P6.21	Lower limit of AO1 output	-200.0%~200.0%	0.0%
P6.22	Lower limit corresponds to AO1 output	0.00V~10.00V	0.00
P6.23	Upper limit of AO1 output	-200.0%~200.0%	0.0%
P6.25	Upper limit corresponds to AO1 output	0.00V~10.00V	10.00
P6.25	Lower limit of AO2 output	-200.0%~200.0%	0.0%
P6.26	Lower limit corresponds to AO2 output	0.00V/0.00mA~10.00V/20.00mA	0.00
P6.27	Upper limit of AO2 output	-200.0%~200.0%	0.0%
P6.28	Upper limit corresponds to AO2 output	0.00V/0.00mA~10.00V/20.00mA	10.00
P6.29	Lower limit of AO output	-200.0%~200.0%	0.0%

P6.30	Lower limit corresponds to AO output	0.00V~10.00V	0.00
P6.31	Upper limit of AO output	-200.0%~200.0%	100.0%
P6.32	Upper limit corresponds to AO output	0.00V~10.00V	20.00

P7 switching value in-out

P7.00	function of input terminal X1	0~99	0
P7.01	function of input terminal X2	0~99	0
P7.02	function of input terminal X3	0~99	0
P7.03	function of input terminal X4	0~99	0
P7.04	input terminal X5	0~99	7
P7.05	input terminal X6	0~99	50
P7.06	function of input terminal X7/FWD	0~99	1
P7.07	function of input terminal X8/REV	0~99	2

0: Leave control terminal unused

1: corotation operation (FWD)

The terminal and COM is short circuited; the frequency converter operates forward. It is only effective when P1.01=1.

2: reversal operation (REV)

The terminal and COM is short circuited; the frequency converter operates reversely. It is only effective when P1.01=1.

3: three-wire operation control

See the function description of operation mode 2 and 3 (three-wire control mode 1 and 2) in P7.11.

4: EWD inching control

The terminal and COM is short circuited; the frequency converter conducts EWD inching. It is only effective when P1.01=1.

5: REV inching control

The terminal and COM is short circuited; the frequency converter conducts REV inching. It is only effective when P1.01=1.

6: free stop control

This function possesses the same meaning with free-running parking defined in P2.08. However, this function is realized by controlling the terminal and it is convenient for long-range control.

7: external reset and signal input (RST)

We can reset the error via this terminal when the frequency converter breaks down. It corresponds to the key STOP/RESET in function. It is effective in any command channel.

8: normal open input of external equipment failure

9: normal close input of external equipment failure

We can input the trouble signal of external devices via the terminal to make it convenient for frequency converter to conduct stoppage surveillance of external devices. Once the frequency converter receives the trouble signal of external devices, it will display E-16 namely failure warning of external devices. The input patterns of trouble signal are normal open and normal close.

10: normally open contact input of external interrupt

11: normally close contact input of external interrupt

With the frequency converter operating, it will block output and work with zero frequency after it receive external interrupt signal. Once external interrupt signal is removed, the frequency converter will revolve speed and start automatically, recovering its operation. The input patterns of external interrupt input are normal open and normal close.

12: increasing frequency command

The terminal and COM is short circuited; the frequency is increasing progressively. It is only effective when the frequency preset channel is figure preset 2 (terminal UP/DOWM regulation).

13: decreasing frequency command

The terminal and COM is short circuited; the frequency is decreasing progressively. It is only effective when the frequency preset channel is number preset 2 (terminal UP/DOWM regulation).

14: clear reset of the frequency of UP/DOWM terminal

It conducts clear reset of numerical frequency 2 (regulate the frequency of UP/DOWM terminal) via the terminal.

15: multistage speed selection 1

16: multistage speed selection 2

17: multistage speed selection 3

18: multistage speed selection 4
We can select 16 segments of speed at most by selecting the ON/OFF groups of these functional terminals. The details are as seen in the following table:

multistage speed selection1	multistage speed selection1	multistage speed selection1	multistage speed selection1	Speed section
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	**ON**	1
OFF	OFF	**ON**	OFF	2
OFF	OFF	**ON**	**ON**	3
OFF	**ON**	OFF	OFF	4
OFF	**ON**	OFF	**ON**	5
OFF	**ON**	**ON**	OFF	6
OFF	**ON**	**ON**	**ON**	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	**ON**	9
ON	OFF	**ON**	OFF	10
ON	OFF	**ON**	**ON**	11
ON	**ON**	OFF	OFF	12
ON	**ON**	OFF	**ON**	13
ON	**ON**	**ON**	OFF	14
ON	**ON**	**ON**	**ON**	15

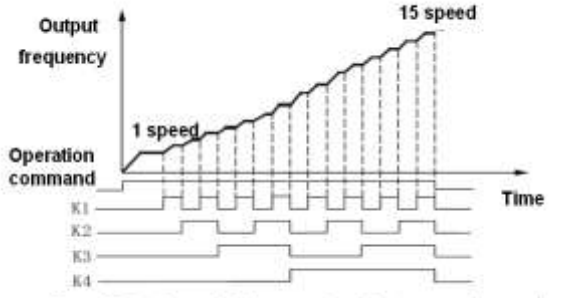


Chart P7-1 schematic diagram of multistage speed operation

9: principal frequency channel selection 1
20: principal frequency channel selection 2
21: principal frequency channel selection 3
22: principal frequency channel selection 4

We can select 9 kinds of frequency channel at most by selecting the ON/OFF groups of these functional terminals. The details are as seen in the following table:

frequency channel selection terminal 1	**frequency channel selection terminal 1**	**frequency channel selection terminal 1**	**frequency channel selection terminal 1**	**Given channel of principle frequency**
OFF	OFF	OFF	OFF	0: number preset 1
OFF	OFF	OFF	**ON**	1: number preset 2
OFF	OFF	**ON**	OFF	2: number preset 3
OFF	OFF	**ON**	**ON**	3: AI1 simulation preset
OFF	**ON**	OFF	OFF	4: AI2 simulation preset

OFF	**ON**	OFF	**ON**	5: terminal impulse preset
OFF	**ON**	**ON**	OFF	6: simple PLC preset
OFF	**ON**	**ON**	**ON**	7: multistage speed preset
ON	OFF	OFF	OFF	8: PID preset

23: reservation
24: reservation
25: acceleration and deceleration time selection TT1
26: acceleration and deceleration time selection TT2
We can select 4 kinds of acceleration and deceleration time at most by selecting the ON/OFF groups of these functional terminals. The details are as seen in the following table:

Selection terminal 2 of acceleration and deceleration time	Selection terminal 1 of acceleration and deceleration time	acceleration and deceleration time selection
OFF	OFF	Acceleration time1/ deceleration time1
OFF	**ON**	Acceleration time2/ deceleration time2
ON	OFF	Acceleration time3/ deceleration time3
ON	**ON**	Acceleration time4/ deceleration time4

27: command operation channel selection 1
28: command operation channel selection 2

We can select 3 kinds of command channel and 4 patterns at most by selecting the ON/OFF groups of these functional terminals. The details are as seen in the following table:

Selection terminal 2 of command operation channel	Selection terminal 2 of command operation channel	command operation channel
OFF	OFF	ensured by function code P1.01
OFF	**ON**	0: operative surface operates command channel
ON	OFF	1:terminal operates command channel
ON	**ON**	2: communication operates command channel

29: Inhibition instructions for acceleration and deceleration of the variable-frequency drive.
When this terminal is effective, the variable-frequency drive will not be affected by signals from outside (except for shutdown order), and will maintain the operation of the current frequency.
30: Inhibition instructions for operation of the variable-frequency drive.
When this terminal is effective, the operating variable-frequency drive will automatically stop operating, and will not start in standby state, it is mainly used in situations where safe linkage is needed.
31: The operating order is transferred to the terminal:
When this terminal is effective, the control of the operation order will be forcibly transferred to the terminal from the current passage, disconnecting the terminal can return the operation order to the original passage.
32: The operation order is transferred to communication:
When this terminal is effective, the control of the operation order will be forcibly transferred to communication from the current passage, disconnecting the terminal can return the operation order to the original passage.
33: Ancillary frequency is cleared to zero:
It is only effective for numerical ancillary frequency (p1.03=1, 2, 3), when the function terminal is effective, the ancillary frequency will be cleared to zero, the frequency that is set up is totally determined by the mainly-given way.
34: Switch between frequency source A and B:
When this terminal is effective, and if p1.04 (algorithm of frequency combination),
Choose 6, the frequency-given passage will be forcibly switched to frequency source B, after it becomes ineffective, the frequency-given passage will be restored to A.
35: Switch between frequency source A and A+B:
When this terminal is effective, and if p1.04 (algorithm of frequency combination),
Choose 7, the frequency-given passage will be forcibly switched to frequency source A+B, after it becomes ineffective, the frequency-given passage will be restored to A.

36: Reserved.
37: Reserved.
38: PID control and input:
When the frequency-given passage is PID-given way, and the way of PID input is manual, and the terminal is effective, then it will operate in the PID, please refer to the parameter set-up of P8 for detailed function.
39: Suspension of the PID control:
It is used to control and suspend the operating PID, the terminal is effective, and the PID adjustment is suspended, the frequency of the variable-frequency drive operates at the current frequency,. Continue to adjust the PID after the terminal is ineffective, the operating frequency will change as the amount of adjustment changes.
40: Wobbling frequency input:
When the way of starting up the wobbling frequency is manual input, the terminal is effective, and the function of the wobbling frequency is effective. If it is ineffective, it will operate at the pre-set frequency of the wobbling frequency. Please refer to the function instructions of p9. 55-p9. 65.
41: Suspension control of wobbling frequency:
Short-connect the terminal with the COM, the variable-frequency drive suspend the operating way of the wobbling frequency, the wobbling frequency of the variable-frequency drive operates at the current frequency; the wobbling frequency continues to operate offer the terminal becomes ineffective.
42: State restoration of the wobbling frequency:
When this function is chosen, whether or not the way of input is automatically or manual, shutting down the terminal will remove the state information of the wobbling frequency recorded in the inside memory of the variable-frequency drive. After disconnecting the terminal, the wobbling frequency resumes (if there's any pre-set frequency, the pre-set frequency will operate first). Please refer to the function instructions of p9. 55-p9. 65.
43: PLC control and input:
When the input way of PLC is manual input through defined multi-functional terminal, when the terminal is effective and the operation order arrives, the PLC operates normally; if the terminal is

ineffective, when the operation order arrives, the PLC operates at the frequency of zero.

44: Suspension of PLC:

It is used to control and suspend the process of the operating PLC, when the terminal is effective, the variable-frequency drive operates at the frequency of zero, and the PLU dose not count time; after the terminal becomes ineffective, the variable-frequency drive starts in rotational speed tacking way, and the PLC continues to operate, Please refer to the function instructions of p9. 00-p 9. 53.

45: Restoration of PLC:

In the shutdown state of the PLC operating mode, when this function's terminal is effective, it will remove the information of the shutdown memory, including the PLC operation period, operation time and operation frequency, etc. After this function's terminal becomes ineffective, it will restart operation. Please refer to the function instruction of p9.

46: Clear the counter to zero, and input signal:

Connect the terminal with COM, clear the interior counter to zero, and use this function in concert with Function NO. 47.

47: Trigger signal input of the counter

When the input entry of the counte impulse of the interior counter receives an impulse, the counted value of the counter will increase by 1 (if the way of counting is downwards, the value will decrease by 1), the highest count impulse is 500Hz.

See the detailed function in p7.30-p7.33.

48: Timing trigger input:

The trigger port of the interior timer, See the detailed function in p7.34-p7.35.

49: Timing clearance input:

Short-connect the terminal with COM, clear the interior counter to zero; use this function in concert with Function NO.48.

50: Input of the main set-up outside impulse frequency (it is only effective for X6):

When the main frequency passage A chooses the impulse -given way, it is only effective for X6, it should be use in concert with the set-up in p1. 02.

51: Input of the ancillary set-up outside impulse frequency (it is only effective for X6):
When the ancillary frequency passage B chooses the impulse -given way, it is only effective for X6, it should be use in concert with the set-up in p1. 03.
52: Length cleared to zero:
When this function's terminal is effective, it will remove the data of P9. 69(the actual length),which prepares for re-calculation of the length. Please refer to the function parameter of p9. 67-p9. 73.
53: Count input of the length:
It is only effective for X6 of multi-functional input terminal, the impulse signal received by the function terminal is treated as length-given, the relationship between the number of the input signal impulse and the length, please refer to the function parameter of p9. 67-p9. 73.
54-56: Reserved
57: Pre-excitation Order:
If the terminal is effective, it will start the pre-excitation of the electric motor, until the terminal becomes ineffective.
58: Control switch between speed and torque:
When the selection conditions of the control of the speed and torque is effective (switch of the terminal), the terminal is effective, it is torque control; if the terminal is ineffective, it is speed control, please refer to the relevant function instructions of p4. 13-p4. 14, in which p4. 14 is delayed time of the switch between speed and torque.
59: Control inhibition of torque:
It inhibits the torque control of the variable-frequency drive.
60~62 reserved
63: Input of the single-phase velocity (it is only effective for X6. reserved).
64-99: Reserved.

P7.08	Times of wave-suppressing of switch number	1-10	5

It is used to set up and input the level of sensitivity of the terminal. If the numerical input terminal is prone to interference, which leads to wrong motion,, you can increase the parameter so that its

anti-interference ability increases. However, if the parameter is too big, the sensitivity of the input terminal will decrease.

P7.09	Detection selection of the terminal function while connecting electric power	0-1	0

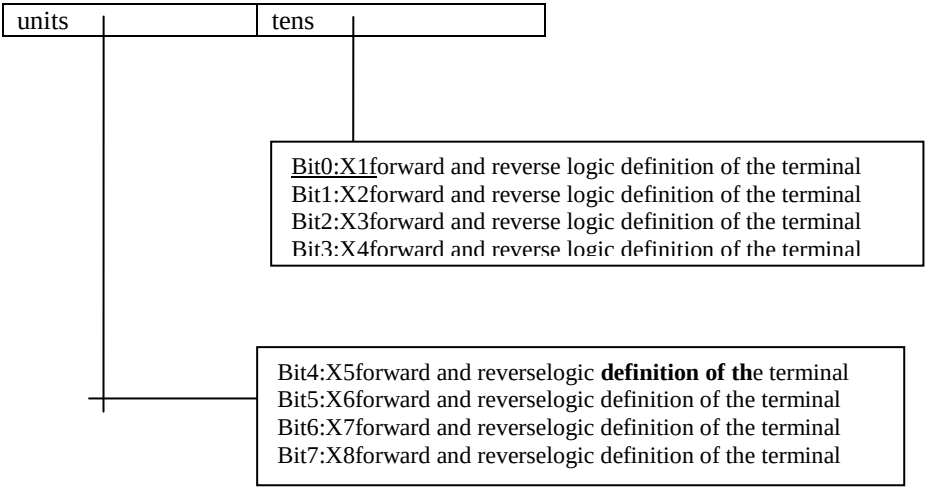
0: The operation order of the terminal is ineffective when it is connected with electric power.

In the process of connecting electric power, even if the operation order terminal detected by the variable-frequency drive is effective (closed), the variable-frequency drive will not be started up, only when the variable-frequency drive is disconnected and is connected again can the variable-frequency drive be started up.

1: The operation order of the terminal is effective when it is connected with electric power.

If the operation order terminal detected by the variable-frequency drive is effective (closed) in the process of connecting electric power, the variable-frequency drive can be started up.

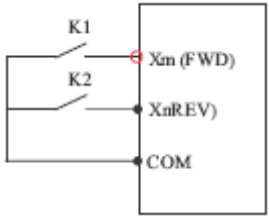
P7.10	Effective logic set-up of the input terminal(X1-X8)	0-FF	00


units
tens
Bit0:X1forward and reverse logic definition of the terminal
Bit1:X2forward and reverse logic definition of the terminal
Bit2:X3forward and reverse logic definition of the terminal
Bit3:X4forward and reverse logic definition of the terminal
Bit4:X5forward and reverselogic definition of the terminal
Bit5:X6forward and reverselogic definition of the terminal
Bit6:X7forward and reverselogic definition of the terminal
Bit7:X8forward and reverselogic definition of the terminal

0: represents forward logic, it is effective to connect Xi terminal with common terminal, ineffective if disconnected;
1 represents reverse logic, it is ineffective to connect Xi terminal with common terminal, effective if disconnected;

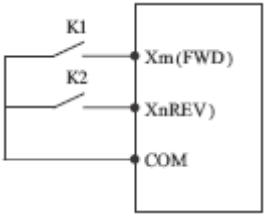
P7.11	FWD/REV Terminal control mode	0-3	0

This function defines 4 different ways to control the operation of the variable-frequency drive through outside terminal.
0: two-line control mode 1
Xm: Forward operation demand(FWD), Xn: Reverse operation demand(REV); xm and xn respectively represent two random terminals defined as FWD and REV function from x1-x8, under this control mode, k1 and k2 can independently control the operation and operation direction of the variable-frequency drive.



K2	K1	Operation order
0	0	stop
1	0	stop
0	1	Forward
1	1	stop

Picture p7-2 two-line control mode 1 schematic diagram
1: two-line control mode 2
Xm: Forward operation demand(FWD), Xn: Reverse operation demand(REV); xm and xn respectively represent two random terminals defined as FWD and REV function from x1-x8, under this control mode, k1 represents operation, if you turn off the switch, k2 is the switch of direction shift.

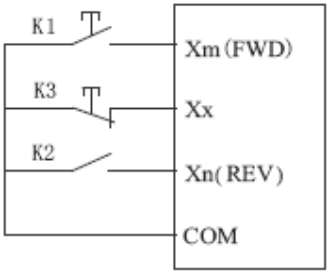


K2	K1	Operation order
0	0	stop
1	0	stop
0	1	Forward
1	1	Reverse

Picture p7-3 two-line control mode 2 schematic diagram

3: Three-line control mode1

Xm: Forward operation demand(FWD), Xn: Reverse operation demand(REV), Xx: Stop demand; xm, xn and Xx respectively represent three random terminals defined as FWD, REV and three-line control function from x1-x8. Before connecting k3, it is ineffective to connect k1 or k 2. After connecting k3, triggering k1 leads to forward of the variable-frequency drive; triggering k 2 leads to reverse of the variable-frequency drive;



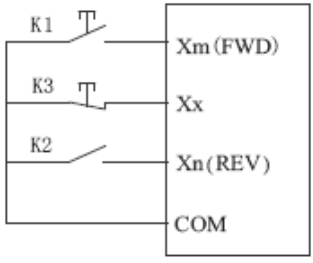
K2	K1	Operation order
0	0	stop
1	0	Reverse
0	1	Forward

1	1	stop

Picture p7-4 three-line control mode1 schematic diagram

3: three-line control mode 2

Xm: Forward operation demand(FWD), Xn: Reverse operation demand(REV), Xx: Stop demand; xm, xn and Xx respectively represent three random terminals defined as FWD, REV and three-line control function from x1-x8. Before connecting k3, it is ineffective to connect k1 or k2,. After connecting k3, triggering k1 leads to forward of the variable-frequency drive; triggering k2 is ineffective; after connecting k1, connecting k2 leads to shift of the operation direction of the variable-frequency drive; disconnecting k3 leads to shutdown of the variable-frequency drive



Picture p7-5 three-line control mode2 schematic diagram

⚠ Attention:

During the forward operation under three-line control Moe, the terminal defined as REV needs to be long-connected to operate stably, it will return to forward operation after disconnection.

P7.12	Alteration velocity of the frequency of UP/DOWN terminal	0.01-50.00Hz	1.00

This function is the alteration velocity of the frequency while setting up the set-up frequency of the UP/DOWN terminal, that is the amount of frequency change while short-connecting the UP/DOWN terminal with Com for one second.

P7. 13	reserved	reserved	0
P7. 14	Delayed time of Y1 output	0.0s-10.0s	0.0

P7. 15	Delayed time of Y2 output	0.0s-10.0s	0.0
P7. 16	Delayed time of Y1 output	0.0s-10.0s	0.0
P7. 17	Delayed time of Y2 output	0.0s-10.0s	0.0

This function defines the delayed time from the moment that the output terminal of switch number and state of the relay electric device begin to change to the moment that output begins to change.

P7. 18	Y1 set-up of the output terminal of the open collector electrode	0-99	0
P7. 19	Y2 set-up of the output terminal of the open collector electrode	0-99	0
P7. 20	R1 output of the programmable relay electric device	0-99	3
P7. 21	R2 output of the programmable relay electric device	0-99	0

0: no output

1: The forward operation of the variable-frequency drive

It is the outputted indication signal when the variable-frequency drive is in forward operation state.

2: The reverse operation of the variable-frequency drive

It is the outputted indication signal when the variable-frequency drive is in reverse operation state.

3: Output of breakdown

It is the outputted indication signal when the variable-frequency drive breaks down.

4: Detection signal of the level of frequency /velocity (FDT1).

Please refer to the parameter function instruction in p7. 24-p7. 26.

5: Detection signal of the level of frequency /velocity (FDT2).

Please refer to the parameter function instruction in p7. 27-p7. 29.

6: Arrival signal of frequency /velocity (FAR).

Please refer to the parameter function instruction in p7. 23.

7: Indication that the variable-frequency operates at zero velocity.

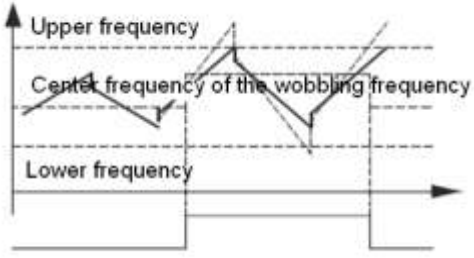
It is the outputted indication signal when the output frequency of the variable-frequency is 0.00 Hz and it is still in operation state at the same time.

8: The output frequency reaches the upper limit.

It is the outputted indication signal when the output frequency of the

variable-frequency drive reaches the upper limit.
9: The output frequency reaches the lower limit.
It is the outputted indication signal when the output frequency of the variable-frequency drive reaches the lower limit.
10: The arrival of the set-up frequency of lower limit.
When the variable-frequency drive is operating, if the set-up frequency is =< the frequency of lower limit, it outputs the indication signal.
11: Alarming signal of the overload of the variable-frequency drive.
When the output electric current of the variable-frequency drive exceeds the overload pre-alarming level (PA. 14), it will output the indication signal after the delayed time of alarming (PA. 15), it is usually used for overload alarming.
12: Detection signal output of the counter.
When the value of the counter detection arrives, it will output this indication signal, it will not be removed until the restoration value of the counter arrives. Please refer to the function instruction in p7. 33.
13: Restoration signal output of the counter.
When the restoration value of the counter arrives, it will output this indication signal, please refer to functional instruction in p7.32.
14: The operation of the variable-frequency drive is ready.
When the operation of the variable-frequency drive is ready, ie, the variable-frequency drive has no problems, the voltage of the busbar is normal, the operation inhibition terminal of the variabl-frequency drive is ineffective, and it can directly receive operation signal and start, it will output this indication signal.
15: Completion of one operation cycle of the programmable multi-section.
When the programmable multi-section (PLC) completes one operation cycle, it will output an effective impulse indication signal, the width of the signal is 500 ms.
16: Completion of phase operation of the programmable multi-section.
When the programmable multi-section (PLC) completes the current phase operation, it will output an effective impulse indication signal; the width of the signal is 500ms.
17: The upper and lower limit of the wobbling frequency.
When you choose the wobbling frequency function, if the fluctuation

range of the wobbling frequency computed according to center frequency is higher than the upper limit P1. 12 or lower than the lower limit P1. 13, it will output this indication signal, see the schematic diagram:



Picture p7-6 Schematic diagram of the limit of the range of wobbling frequency

18: Under the flow restriction motion.

When the variable-frequency drive is under the flow restriction motion, it will output this indication signal. Please refer to function instruction in PA. 06-PA. 08 for flow restriction protection set-up.

19: Under velocity-loss motion of over voltage.

When the variable-frequency drive is under velocity-loss motion of over voltage, it will output this indication signal. Please refer to functional instruction in PA. 04-PA. 05 for over-voltage velocity-loss motion protection set-up.

20: Under voltage blockade shutdown.

When the busbar voltage of direct current is lower than the limited level of under voltage, it will output this indication signal.

⚠ **Attention:**

When the busbar is under voltage in shutdown, the digital diode shows "PoFF", when the busbar is under voltage in operation, PA. 02=0, the digital diode shows "PoFF", if PA.02=1, the digital diode shows "E-07" breakdown, and the alarming indication light will be turn on.

21: Under torque control.

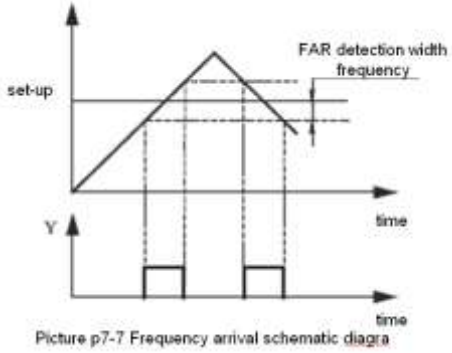
When the way of control is torque control, it will output this indication signal, please refer to detailed parameter instruction in P4 for torque control.
22: Detection output of over-torque/under-torque.
The variable-frequency drive outputs the corresponding indication signal according to the set-up in p4. 27-p4. 29.
23: A11>A12
When you input A11 > A12 in simulated amount it will output this indication signal, please refer to the detailed parameter instruction of simulated amount input in p6.
24: Arrival output of length.
When the actual length (p. 69) >=set-up length (p. 68), it will output this indication signal, the length count terminal X6 is set up as function NO.53.
25: Reserved.
26: Energy-consuming braking motion.
When the variable-frequency drive is in energy-consuming braking motion, it will output this indication signal, please refer to the detailed parameter function instruction of energy-consuming braking function set-up of PC.00-PC.03.
27: Start-up direct current braking motion.
When the variable-frequency drive is in start-up direct current braking motion, it will output this indication signal, please refer to the detailed parameter function instruction of start-up direct current braking motion set-up of P2.00-P2.04.
28: Shutdown direct current braking motion.
When the variable-frequency drive is in shutdown direct current braking motion, it will output this indication signal, please refer to the detailed parameter function instruction of shutdown direct current braking motion set-up of P2.09-P2.12.
29: Reserved
31: Reserved
32: Reserved
33-48: Indication of operation section number of multi-faction of simple PLC.
Item 33-48 of the output terminal function respectively match with

section 0-15 of the multi-faction of simple PLC, when the corresponding set-up section number of the output terminal arrives, it will output this indication signal.

49-99: Reserved

P7.23	The frequency reaches the detection width of FAR	0.0-100.0%(the maximum of frequency)	100.0%

This function is the supplement instruction for the 6th function of p7. 18-p7.21, when the output frequency of the variable-frequency drive is within the positive and negative detection width of the set-up frequency, the terminal outputs effective signal (signal of the open collector electrode, after resistance is increased, it will be low level.). See the schematic diagram below:



Picture p7-7 Frequency arrival schematic diagra

P7.24	FDT1 feedback method	0～1	0

0：Speed setting value

1：Speed inspection value

P7.25	FDT1 level setting	0.00Hz ～	50.00
P7.26	FDT1 hysteresis value	0.0～100.0%*（FDT1 level）	2.0%
P7.27	FDT2 feedback method	0～1	0

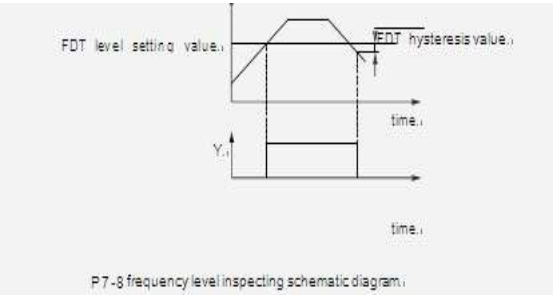
0：Speed setting value

1：Speed inspection value

P7.28	FDT1 level setting	0.00Hz～【P1.11】	25.00
P7.29	FDT1 hysteresis value	0.0～100.0%*（FDT2 level）	4.0%

The above function code（P7.24～P7.29） is the complementary function description of P7.18～P7.21(No.4 and 5), when output frequency of transducer is above the PDT setting value, it outputs effective signal. （open-collector (OC) signal, the pull-up resistors is low level）when output frequency of transducer is lower than the PDT setting value(setting value- hysteresis value), it outputs invalid signal(high impedance).

As shown in the following figure.



P7-8 frequency level inspecting schematic diagram

P7.30	Count mode	0～1	0
P7.31	Count entry criteria	0～1	0

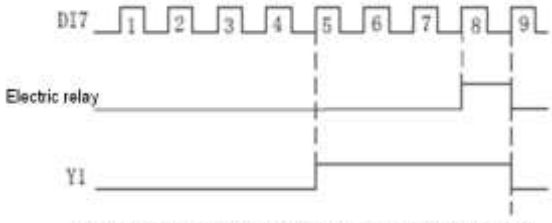
.

P7.32	Counter resetting value	0～65535	0
P7.33	Counter inspection value setting	0～【P7.32】	0

This function code defines counter resetting value and inspecting value. when the count reaches to the value that sets on P7.32, the multi-function terminal outputs valid signals（counter will output resetting signal ）and the counter resets to zero. When the counter reaches to the value set on P7.33, the multi-function terminal outputs valid signals (the counter inspects the signals). If the counter continues and surpasses the value set on P7.32. The counter would resets to zero, and the output signal would be canceled.

As the following figure shows, the programmable electric relay outputting sets to restarting signal outputting, open collector output (y1) sets to counter detection output, P7. 32 sets to 8, P7. 33 sets to 5. When the detection to "5", y1 output signal remains effective and holds; when the value reaches to"8", the electric relay outputs a valid signal of a

whole pulses cycle, the counter would be zero out, at the same time, y1, electric relay would stop outputting signals.



P7-9 Counter resetting and inspection value schematic diagram

P7.34	time starter condition	0～1	1

0：Start with power

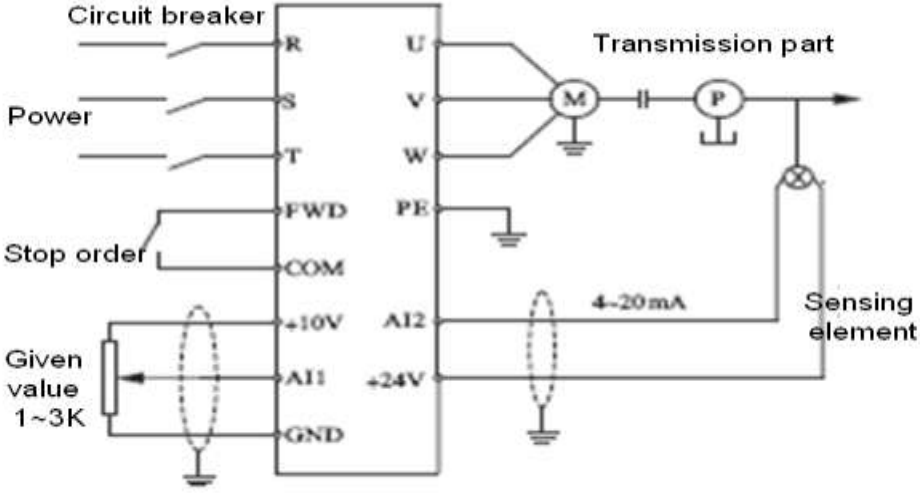
1：In the running state, it would starts; in the shutdown state, it would stop.

P7.35	**SUB INSTIME**	0～65535S	0

P8 process PID parameter

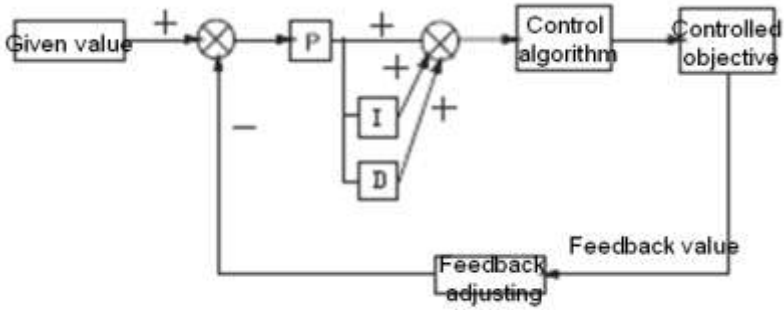
It can form a complete feedback-control system by setting the parameters. The feedback-control system: specified rate inputs with AI 1, and put the controlled object physical quantity converts to 4～20mA electric current which runs through the frequency transformer AI 2 input and closed-loop control system formed by the built-in pi regulator,

As shown in the following figure



P8-1 simulate feedback control system schematic diagram

PID adjusting function：



P8-2 PID adjusting schematic diagram

P8.00	PID operation method	0～1	0

0：Automatic

1：Through the definition of multi-functions terminals for manual inputting

P8.01	PID Given access	0～4	0

0：by Given number

PID specified rate is given by numbers; it is set by function code P8.02.

1：AI1

PID specified rate is given by outer analog signal AI1（0～10V）.

2：AI2

PID specified rate is given by outer analog signal AI2(0～10V/0-20mA).

3：Impulse given

PID specified rate is given by outer impulsive signal.

4：RS485 telecommunication

PID specified rate is given by telecommunication

P8.02	Given number setting	0.0～100.0%	0.0%

When adopting given number feedback method, the functions code can be carried out by using a panel to set up the closed-loop controlled given numbers. Only when the closed-loop control choose the figures (p8. 01 0), this function will be available.

for example ： at a constant pressure water supply and control system, this code should give full consideration of the relationship between further pressure on the quantum and its output feedback signal, for example, the range of pressure gauge is 0 ～ 10mpa, the output is 0 ～ 10v, we need 6mpa pressure, then we can set the given number to 6.00V,in other words, in order to make the PID works smoothly, we need 6 PPa pressure.

P8.03	PID feedback methods	0～7	0

0：AI1

PID is given by outer analog signal AI1.

1：AI2

PID is given by outer analog signal AI2.

2：AI1+AI2

PIDPID is determined by outer analog signal AI1 and AI2

3：AI1-AI2

PID is determined by D-value between outer analog signal AI1 and AI2, when the value reaches to negative, the PID feedback value would be zero out.

4：MAX {AI1, AI2}

5：MIN {AI1, AI2}

6：Impulse given

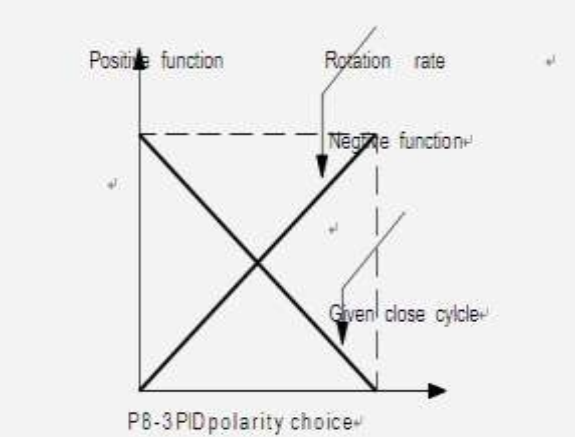
7：RS485 telecommunication

P8.04	PID polarity choice	0～1	0

0 ： Positive polarity

when feedback signals is more than the given value, the transformer output frequency will decrease（ that means the feedback signals will decreasing） by this way, the PID would be balanced, this is positive polarity. Such as winding tension control, constant voltage water –supplying system, etc.

1: Negative polarity，when feedback signals is less than the given value, the transformer output frequency will increase（ that means the feedback signals will increasing） by this way, the PID would be balanced, this is negative polarity. Such as released tension control, central air-conditioning control,

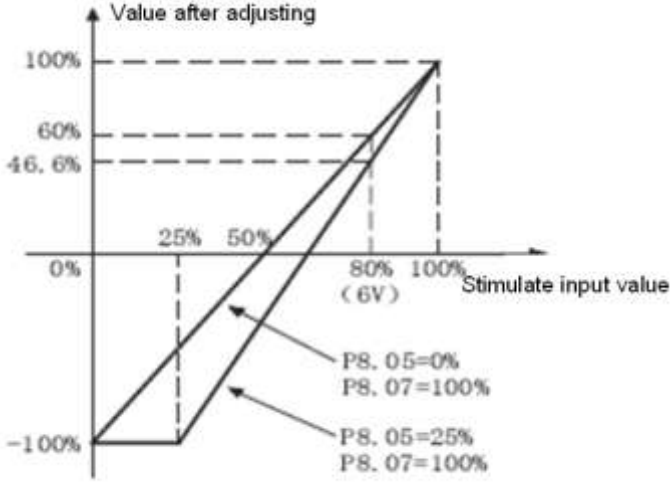


P8-3 PID polarity choice

P8.05	Min given value	0.0%～【P8.07】	0.0%
P8.06	Feedback correspondent with Min	0.0～100.0%	0.0%
P8.07	Max given value	【 P8.05 】 ～	100.0%
P8.08	Feedback correspondent with Max given value	0.0～100.0%	100.0%

The adjusting relationship of the given value P8.05、P8.07 shows as the following figures, when analogue input to 6V, 8.05＝0%， P8.07＝

100%，,then the value after adjusting is 60%. If we set P8.05＝25％，P8.07＝100%, then the value after adjusting is 46.6%.



P8-4 PID feedback curve chart

P8.09	PID KP	0.01～10.00s	1.00
P8.10	integration time Ti	0.01～10.00s	0.10
P8.11	Integration adjusting choice	0～1	0

0: when the Frequency reach to a superior limit, the integration would stop.

1 ： When the Frequency reaches to a superior limit, the integration would continue, but we recommend stopping adjusting integrations.

P8.12	Derivative time Td	0.01～10.00s	0.00

0.00：Regulating valve adjusting

PID (Kp) determine the adjusting intensity of the bigger the P value, the stronger of intensity value. But it is of stronger value, it would be easier to be shocked. , when feedback and given value have a deviation, then we can set a PID, if PID is a constant value, so does the deviation.

Ratio control would be in response to feedback quickly, but only a single proportion regulation cannot fulfill the static control. The bigger the enhancement proportion, the faster the systematic regulation speed.

If oscillation appears, the adjusting method is setting integration time longer, the derivative time return to zero, in order to make the system to run smoothly and change given value. pay more attention the derivation between given value and the feedback signals（steady-state difference ）, if steady-state difference is in the same direction with the given value.（ for example, after the system runs smoothly, the feedback value is smaller than the given value）, in this condition, we need to increase the proportion, whereas the decrease proportion and repeat the process until steady-state difference become smaller.(it is really difficult to remove the steady-state difference)

Integration time (Ti):

Integration time determines the integral-governing speed, when feedback and given value comes to deviation, the adjusting output would continue to increase until no deviation. The adjuster can

effectively eliminate steady-state difference. If the adjuster is too strong, it would adjust many times, the system would shock. The integration time parameters gradually decreased in order to adjusted the integration time until the system stability

Derivative time Td

Derivative time Td determines regulator's adjusting strength to deviation changing strength. when feedback and given value comes to deviation, it would output an adjusting value that is in proportional to the deviation rate, the adjustment amount is only affected by the direction and size of the deviation direction, not by the deviation itself.

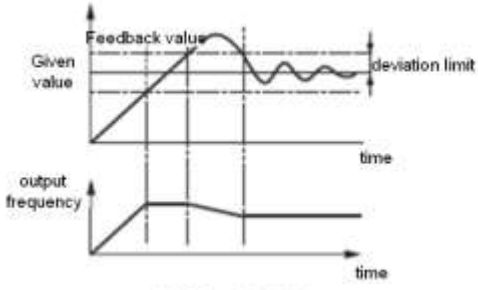
The function of differential regulation is to reflect the change of feedback single. We would adjust it according to its tendency so as to curb the feedback signals. Please careful when using the differential regulator, Because of the system would enlarge the interference, especially the big frequency interference.

P8.13	sampling period T	0.01 ～	0.10

0.00：The auto sampling cycle is the feedback period of the sampling period. The longer the sampling period, the slower the response. The well the interference signals, generally please not set.

P8.14	limiting deviations	0.0～100.0%	0.0%

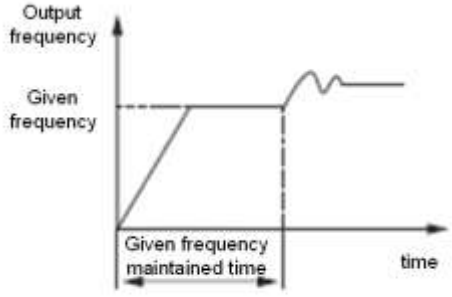
Limiting deviation is a ratio between system feedback value and given deviation value, when feedback is in the margin range, and PID stops. The details please convert the following figure. The reasonable adjustment can protect system from frequent adjustment near the target value system, and help to improve the stability.



P8-5 Deviation Limit

P8.15	reservation	reservation	0
P8.16	closed cycle presetting frequency	0.00 ～ top limit frequency	0.00
P8.17	Preset reserving-time	0.0～6000.0s	0.0

This function is defined when the PID control is effective, the frequency and time of converter at the beginning of the PID operational running. in some control system, in order to let controlled object rapidly approaching the set data, the converter would be set according to the function code, enforce to output some frequency value P8. 16 and frequency keep time P8 .17. When the controlled object close to the control objectives, it would input PID controller to increase the response rate. As the following figure shows ：



P8-6 closed cycle presetting frequency running figure

P8.18	Sleep-shutting down method	0～1	0

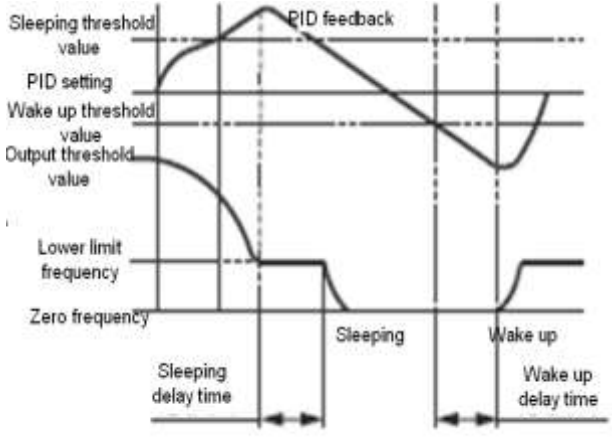
0：speed reduction stop

1：free stop

P8.19	Sleeping threshold value	0.00～10.00V	10.00
P8.20	Wake upthreshold value	0.00～10.00V	0.00

P8.19 defines the converter feedback limit from working state to sleeping state. If the actual feedback values is more than the set value, and the output frequency reach to lower rate limit. the converter goes to sleep after the delay waiting time defined in P8.21.（ that is zero speed to run ）.

P8.20 defines the converter feedback limit from sleeping state to working state. If the actual feedback value is less than the set value, the converter goes to work after the delay waiting time defined in P8.22.



P8-7 Functional diagram of sleeping and wake up

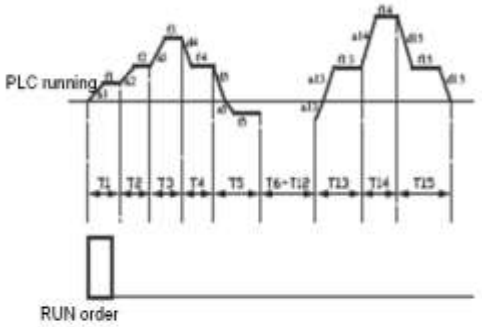
P8.21	Sleeping delay time	1.0～6000.0S	100.0
P8.22	Revive delay time	1.0～6000.0S	100.0

P8.23	reserve	reserve	0

P9 programmable parameters

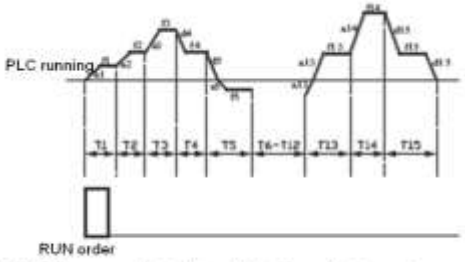
P9.00	PLC running mode selection	0～3	0

0：Stop after the completion of a single-running process,. The converter would stop automatically after the completion of a single-running process; it needs another order to start running. If a period running time is 0, it would jump over the period directly to the next stage. As the following figure shows



P9-1 PLC diagrammatic sketch (stop after a single-running process-)

1： Keep running with the final value after a single-running. The converter automatically keeps running with the final value and the last frequency and direction after the completion of a single-running process. As the following figure shows ：



P9-2PLC diagrammatic sketch (maintain after a single-running process-)

2: Limited times continuous cycle.

In P9.04, we would set limited continuous times. The PLC running times is determined by the setting value. After reaching the value (P9.04=0), the PLC and the converter would stop running.

3： Continuous cycle: After the completion of a cycle, the converter would begin automatically to the next one until receiving the stopped order. As the following figure shows

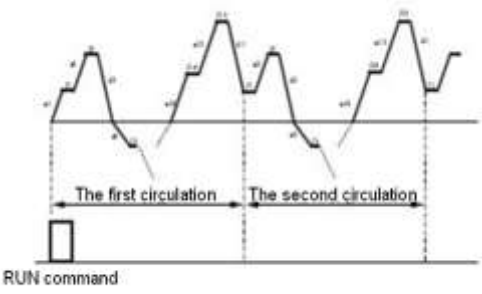


Figure P9-3 PLC Continuous circulation diagram

P9.01	PCL running input	0-1	0

0: Automatic

1: Manual input by defined multi-functional terminal

P9.02	PLC Running interruption memory	0-1	0

0: No memory

In case of interruption, the PLC operation status will not be stored. After being energized, it will be restarted and run from the first phase.

1: Store the phase and frequency when the power is interrupted

When interruption the PLC operation status will be stored, including the interruption phase, operation frequency and operation time; after being energized, it will be restarted and automatically enter this phase and continue the operation in the remained time at defined frequency in this phase.

P9.03	PLC Start mode	0-2	0

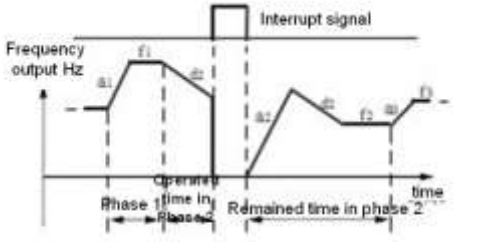
0: Restart from the first phase

Shutdown occurs during the running (caused by shutdown command, fault or failure of power). Restart to run from the first phase.

1: Run from the moment when the shutdown (fault) occurred

Shutdown occurs during the running (caused by shutdown command, fault or failure of power). Inverter will automatically record the running time at current phase. After restart, it will automatically

enter this phase and continue running in the remained time at the defined frequency in this phase. See picture below:

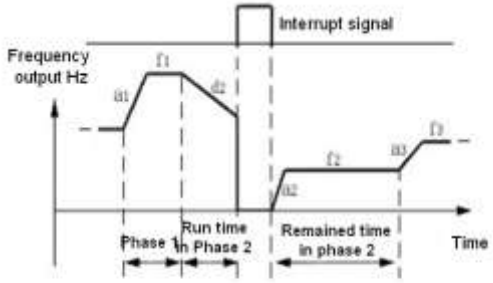


A1: Acceleration time in phase 1 f1: Frequency in phase 1
A2: Acceleration time in phase 2 f1: Frequency in phase 2
A 3:Acceleration time in phase 3 f1: Frequency in phase 3
D2:Deceleration time in phase 2

Figure P9-4 PLC Start model

2: Start running from the phase and frequency when shutdown (fault) occurred

A shutdown occurs during the running (caused by shutdown command, fault or failure of power) and the inverter will not only automatically record the running time in current phase but also record the running frequency at the time shutdown occurred. After restart, first restore to the running frequency when shutdown occurred. Running for remained phase at this frequency will be shown as below:



A1: Acceleration time in phase 1 f1: Frequency in phase 1
A2: Acceleration time in phase 2 f1: Frequency in phase 2
A 3: Acceleration time in phase 3 f1: Frequency in phase 3
D2: Deceleration time in phase 2

Figure P9-5 PLC Start mode 2

⚠ **Note:**

The difference between Mode 1 and Mode 2 is that Mode 2 stores one more operating frequency at the shutdown moment than Mode 1. Also it will continue running from this frequency after restart.

P9.04	Finite continuous cycling times	0-65535	0
P9.05	PLC operation time unit selection	0-1	0

0: s

1: m

P9.06	Multi-velocity frequency 0	-100～100%	0.0%
P9.07	Multi-velocity frequency 1	-100～100%	0.0%
P9.08	Multi-velocity frequency 2	-100～100%	0.0%
P9.09	Multi-velocity frequency 3	-100～100%	0.0%
P9.10	Multi-velocity frequency 4	-100～100%	0.0%
P9.11	Multi-velocity frequency 5	-100～100%	0.0%
P9.12	Multi-velocity frequency 6	-100～100%	0.0%
P9.13	Multi-velocity frequency 7	-100～100%	0.0%
P9.14	Multi-velocity frequency 8	-100～100%	0.0%
P9.15	Multi-velocity frequency 9	-100～100%	0.0%
P9.16	Multi-velocity frequency 10	-100～100%	0.0%
P9.17	Multi-velocity frequency 11	-100～100%	0.0%
P9.18	Multi-velocity frequency 12	-100～100%	0.0%
P9.19	Multi-velocity frequency 13	-100～100%	0.0%
P9.20	Multi-velocity frequency 14	-100～100%	0.0%
P9.21	Multi-velocity frequency 15	-100～100%	0.0%

The symbol of multi-velocity determines the operation direction. Minus represents operation in reverse direction and the frequency setting 100% corresponds to maximum output frequency P1.11. Frequency input mode is set via P1.02=6 and the start and stop command is set by P1.01.

P9.22	Acceleration and deceleration time in Phase 0	0～3	0
P9.23	Operation time in Phase 0	0.0～6553.5S(M)	5.0
P9.24	Acceleration and deceleration time in Phase 1	0～3	0
P9.25	Operation time in Phase 1	0.0～6553.5S(M)	5.0
P9.26	Acceleration and deceleration time in Phase 2	0～3	0
P9.27	Operation time in Phase 2	0.0～553.5S(M)	5.0

P9.28	Acceleration and deceleration time in Phase 3	0～3	0
P9.29	Operation time in Phase 3	0.0～6553.5S(M)	5.0
P9.30	Acceleration and deceleration time in Phase 4	0～3	0
P9.31	Operation time in Phase 4	0.0～6553.5S(M)	5.0
P9.32	Acceleration and deceleration time in Phase 5	0～3	0
P9.33	Operation time in Phase 5	0.0～6553.5S(M)	5.0
P9.34	Acceleration and deceleration time in Phase 6	0～3	0
P9.35	Operation time in Phase 6	0.0～6553.5S(M)	5.0
P9.36	Acceleration and deceleration time in Phase 7	0～3	0
P9.37	Operation time in Phase 7	0.0～6553.5S(M)	5.0
P9.38	Acceleration and deceleration time in Phase 8	0～3	0
P9.39	Operation time in Phase 8	0.0～6553.5S(M)	5.0
P9.40	Acceleration and deceleration time in Phase 9	0～3	0
P9.41	Operation time in Phase 9	0.0～6553.5S(M)	5.0
P9.42	Acceleration and deceleration time in Phase 10	0～3	0
P9.43	Operation time in Phase 10	0.0～6553.5S(M)	5.0
P9.44	Acceleration and deceleration time in Phase 11	0～3	0
P9.45	Operation time in Phase 11	0.0～6553.5S(M)	5.0
P9.46	Acceleration and deceleration time in Phase 12	0～3	0
P9.47	Operation time in Phase 12	0.0～6553.5S(M)	5.0
P9.48	Acceleration and deceleration time in Phase 13	0～3	0
P9.49	Operation time in Phase 13	0.0～6553.5S(M)	5.0
P9.50	Acceleration and deceleration	0～3	0

	time in Phase 14		
P9.51	Operation time in Phase 14	0.0～6553.5S(M)	5.0
P9.52	Acceleration and deceleration time in Phase 15	0～3	0
P9.53	Operation time in Phase 15	0.0～6553.5S(M)	5.0

Above functional codes are used to set the acceleration and deceleration time and run time of programmable multi-velocity. The acceleration and deceleration time of these 16 phases can be separately set by the acceleration and deceleration time in Phase 1-4; the run time of these 16 phases can be separately set by the run time in Phase X.

The acceleration and deceleration time of these 16 phases is set as 0, representing acceleration and deceleration time 1 (P1.14～P1.15). Setting as 1,2,3 separately represents acceleration and deceleration time 2 (P1.14～P1.15), 3 (P1.16～P1.17), 4 (P1.18～P1.19). (X can be 0～15).

⚠ **Notice:**

1: When the run time at a certain phase set to 0, this phase is invalid.

2: Control on PLC process like inputting, suspending, storing and etc. can be accomplished via terminals. Please refer to P7 group definition of terminal function.

3: PLC phase running direction is commonly determined by frequency plus and minus together with the operation command. The actual motor operation direction can be timely altered by external direction command.

P9.54	Remain	Remain	0
P9.55	Wobble frequency control	0～1	0

0: Disabled

1: Valid

Prompt:

Compare with the given way (P1.02) of other frequencies, the wobble frequency has the top priority. When PLD is in operation, the wobble frequency is disabled.

P9.56	Wobble frequency running input mode	0～1	0

0: Automatic

1: Manual input via defined multi-functional terminal

P9.56 selects 1, when the multi-functional X-terminal selects #40 function, inputting wobble frequency when running, otherwise, the wobble frequency is invalid.

P9.57	Swing control	0～1	0

0: Fixed swing

The reference value of swing is maximum output frequency P1.11.

1: Variable swing

The reference value of swing is given channel frequency.

P9.58	Start mode option for wobble frequency shutdown	0～1	0

0: Start according to the memory status before the shutdown

1: Restart

P9.59	Power failure storage in wobble frequency status	0～1	0

0: Storage

1: No storage

When power fails, store the parameters in wobble frequency status. This function is valid only when the mode “Start according to the memory status before the shutdown” is selected.

P9.60	Wobble frequency preset frequency	0.00Hz ～ Upper limiting frequency	10.00
P9.61	Waiting time of Wobble frequency preset frequency	0.0～3600.0s	0.0

Above functional codes define running frequency and running time at this frequency point of the inverter before it enters the wobble frequency mode or it is out of wobble frequency mode. If setting the functional code P9.61≠0(waiting time of wobble frequency preset frequency), then the inverter directly enters wobble frequency preset frequency to start running after start-up, and enters wobble frequency mode after going through the waiting time of wobble frequency preset frequency.

P9.62	Wobble frequency amplitude	0.0～100.0% (Relative set frequency)	0.0%

The reference value of wobble frequency amplitude is determined by P.57.If P9.57=0, then the amplitude AW=Maximum*P9.62. If P9.57=1, the amplitude AW=the given channel frequency*P9.62.

Prompt:

1: The wobble frequency running frequency is limited by the upper and lower frequency limit. If it is set improperly, the wobble frequency will not work normally.

2: Short-time run PID control mode, the wobble frequency will automatically become invalid.

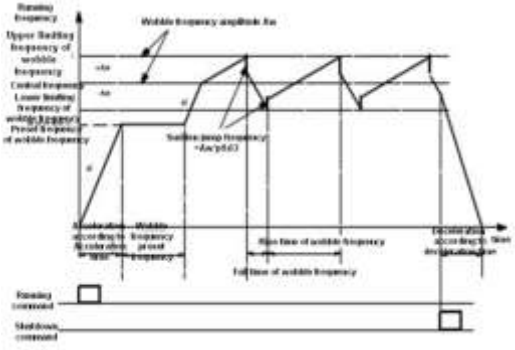
P9.63	Sudden jump frequency	0.0～50.0% (Relative wobble frequency amplitude)	0.0%

This functional code refers to the rapid descending amplitude after the frequency reaches the upper frequency limit of the wobble frequency during the wobble frequency period. It also certainly refers to the rapid rising amplitude after the frequency reaches the lower frequency limit of the wobble frequency.

When setting to 0.0%, there is no sudden jump frequency.

P9.64	Rise time of wobble frequency	0.1～3600.0s	5.0
P9.65	Fall time of frequency	0.1～3600.0s	5.0

This functional code defines the running time when the wobble frequency comes from the lower limiting frequency to the upper limiting frequency and the running time from the wobble frequency comes from the upper limiting frequency to the lower limiting frequency during the wobble frequency is running.



Prompt:

1. Central frequency can be given by number-given frequency, analog quantity, pulse, PLC and multi-velocity.

2. When Short-time running and closed-loop running, automatically cancel the wobble frequency.

3. PLC is running together with the wobble frequency simultaneously. The wobble frequency will become invalid when switching between PLC phases. Start the wobble frequency after the acceleration and deceleration setting of PLC phase's transit to PLC set frequency.

The wobble frequency is applicable in textile, chemical fiber industries and in the locations where traversing and winding functions are required. The typical working diagram is shown in figure P9-6.

Usually the wobble frequency has the following procedures: First follow the acceleration time to speed up to the wobble frequency preset

frequency (P9.60) and waits for a period (P9.61). Then follow the acceleration and deceleration time to transit to the wobble frequency central frequency and perform the cycle running according to the wobble frequency amplitude (P9.62), sudden jump frequency (P9.63), the wobble frequency rise time (P9.64) and the wobble frequency fall time (P9.65)until there is shutdown command to force it to stop according to the deceleration time.

P9.66	Remain	Remain	0
P9.67	Fixed-length control	0～1	0

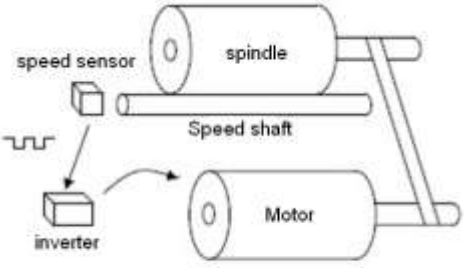
0: Disabled
1: Valid

P9.68	Set length	0.000～65.535(KM)	0.000
P9.69	Actual length	0.000～65.535(KM)	0.000
P9.70	Length rate	0.100～30.000	1.000
P9.71	Length correction coefficient	0.001～1.000	1.000
P9.72	Measured Shaft perimeter	0.10～100.00	10.00
P9.73	Number of shaft pulse per revolution(X6)	1～65535	1000

The function of this group is used to realize the function of fixed length shutdown.

The inverter inputs count pulse from the terminal(X6 is defined as function 53). The calculated length is obtained according to the number of pulse per revolution of the speed shaft (P9.73) and shaft perimeter (P9.71).

Calculated length=(count pulses/number of pulse per revolution0)*speed shaft perimeter and then correct the calculated length via length rate (P9.70)and length correction coefficient (P9.71).
Actual length= (Calculated length*length rate)/Length correction coefficient. When the actual length (P9.69) ≥ set length (P9.68), the inverter automatically gives the shutdown command to stop the unit. Before re-running, zero-clear the actual length (P9.69) or modify the actual length (P9.69)<set length (P9.68), otherwise it has no way to start up.
Chapter 6 Parameter introduction
Tips:
The multi-function input terminal can be used for deleting actual length (Input terminal is set up to function 52, length count is deleted to zero). If the terminal is working, it should delete previous length count number. It can not count numbers and actual length normally till the terminal is disconnected.
Actual length is P9.69 and it will be saved self-automatically when power is off.
When set length P9.68 is 0, long time stopping function is invalid but length count is still valid.
Application examples of Long time stopping functional setting:



Picture P9-7 long time stopping function example

In picture P9-7, inverter drives motor, motor drives spindle shaft to run by conveyor belt, speed shaft contacts spindle and then count the line

speed of spindle and send to inverter with the way of pulse by number counting terminal, inverter checks pulse and gets result of actual length. When actual length ≥ setting length, inverter will send a stopping command and spinning process is over. Operator takes off the spindle, close length clearing terminal (choose one 52 function number from X1~X8) for clearing away actual length, restart again and continue producing next spindles.

PA. Protection parameters

PA.00	protection choices of motor overload	0~2	2

0： Prohibition

Without motor overload protection, it should be cautious to be used.

1: common motor（ electronic thermal relay ways ,compensated by slow speed)

Because common motor's cooling effect changes to bad on slow speeding running, related heat protection value should be adjusted. The feature of slow speed compensation is to adjust down the motor overload protection threshold whose running frequency is lower than 30Hz.

2: Frequency conversion motor (electronic thermal relay ways, slow speed without compensations)

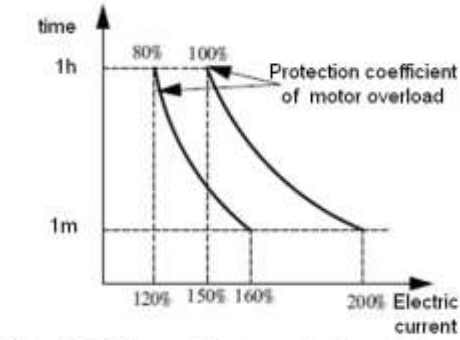
Because frequency conversion special motor's cooling is not affected by running speed, it doesn't need to adjust the protection value of low speeding running.

PA.01 protection coefficient of motor overload 2 0. 0％～1 2 0 . 0％ 100. 0 %

It needs to set up right overload protection coefficient and limit the maximum current of inverter output for effective overload protection implementation of different load motors. Motor overload protection coefficient is the percentage between rated current of the motor and rated output current of the inverter.

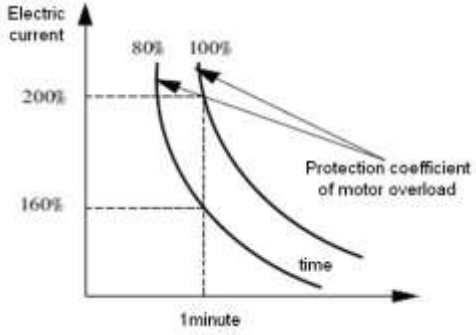
When the power grade of inverter driving is matched motor, motor overload protection coefficient can set to 100%. Setting picture is as following:

Chapter 6: parameter introductions



Picture PA-1 Curve of motor overload protection

When inverter capacity is bigger than motor capacity, it needs to set right protection coefficient of motor overload for effective overload protection implementation of different load motors. Setting picture is as following:



Picture Pa-2 Schematic diagram of motor overload protection coefficient

Motor overload protection coefficient can be decided by the formula below:

Motor overload protection coefficient=allowed maximum load current/inverter rated output current * 100%

Usually, maximum load current means rated current of load motor.

0

PA.02	choice of under-voltage protection action	0~1	0

0：Prohibition

1: permission (under-voltage is as breakdown)

PA.03	under-voltage protection level	60~90%*Udce	70%

This function code fixed the threshold voltage of DC bus when inverter works normally.

Attention: When grid voltage is too low, motor output torque will go down. When under the condition of constant power load and constant torque load, too low grid voltage will increase inverter input and output current and then reduce reliability of inverter running. So when inverter runs long time under low grid voltage, it needs deceleration.

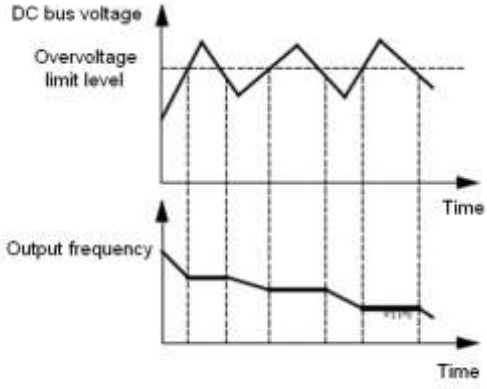
PA.04	overvoltage stall protection	0~1	1

0: prohibition

1; permission

During the process of inverter running slow down, as the influence of load inertia, the actual rate of decline of motor speed may be lower than that of output frequency, on this point, motor will feedback power to inverter and make the DC bus voltage of inverter increase. If there is no any measures, overvoltage trip will happen.

Overvoltage stall protection function is: during the process of inverter deceleration, testing generator and comparing it with stall overvoltage point as delimited in overvoltage limit level PA.04, if it is over the stall overvoltage point, inverter output frequency will stop decreasing. Checking the bus bar voltage again till it is lower than stall overvoltage in a range, finally run it speed down. Picture as below:



Picture PA-3 introduction schematic diagram of overvoltage limit level

PA.05	overvoltage limit level	110~150%*Udce	135%/122%

Overvoltage limit level delimited the action voltage of voltage stall protection.

PA.06	action choice of limit current	0~2	1

Current limit function controls motor current to limit it automatic not over set current limit level(PA.07), in order to prevent breakdown trip for current over clash. This function is especially suitable for the condition of big inertia or violent load changes. During the process of speed increasing, when the output current of inverter is over the set value of function command PA.07, inverter will adjust speed increasing time automatic till the current fall back to a certain scope under this level, and then continue increasing speed to the goal frequency value. During constant speed running process, when output current of inverter is over the set value of function command PA.07, inverter will adjust output frequency (decrease frequency and uninstall) to limit the current in a fixed range in order to prevent over current trip.

0: prohibition

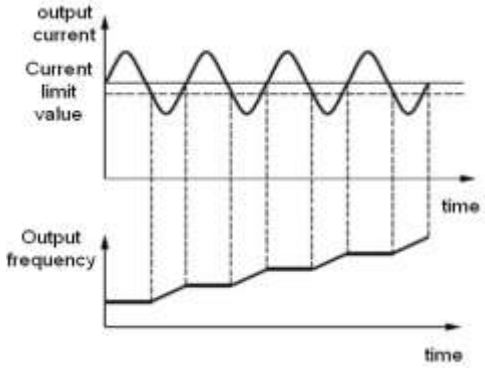
No limit current running.

1: Valid in the whole process

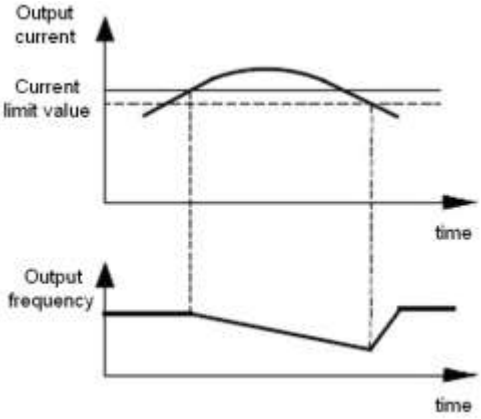
Limit function is valid under the whole running status.

2: Invalid in constant speed running

Limit current function is only valid under the condition that the inverter in the process of increasing and decreasing speed and it is invalid in process of constant speed. This function is used in the situation that constant speed without speed changes.



Picture PA-4 Current limit Schematic diagram of speed increasing



Picture PA-5 Current limit Schematic diagram of constant speed

PA.07	current limit level	100%~200%	160%/120%

Current limit level delimits current threshold of automatic current limit action, its set value is relative to the percentage of inverter rated

current.

PA.08	frequency decline ratio of current limit and frequency decreasing	0.00~655.35Hz/S	2.00

Frequency decline ration under current limit delimited the rate of constant current limit action to the adjustment of output frequency.

It's can't work, if the parameter set as 0. If frequency decline ratio is too low in current limit action, it will not be easy to cast of current limit condition and may lead to overload breakdown finally; if decline ratio is too big, frequency adjustment level will be increased, inverter will be under a power generation situation ordinary time and lead to overvoltage protection. So please keeping proper setting.

PA.09	Reservation	Reservation	0
PA.10	Setting out protection choice	0~1	0

0: prohibition

Inverter setting out protection is prohibited.

1: Valid

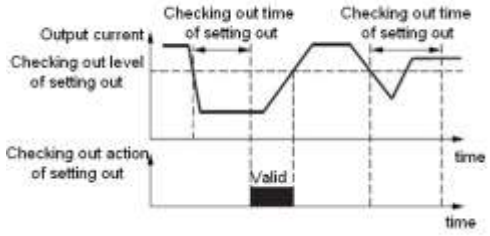
Protection actions on inverter setting out

PA.11	checking out time of setting out	0.1S~60.0S	5.0
PA.12	checking out level of setting out	0.0~100.0%*Ie	30.0%

Checking out level of setting out (PA.12) delimited the current threshold of setting out action and its set value is the percentage of relative inverter fixed current.

Checking out time of setting out (PA.11) delimited that when inverter output current is constant smaller than checking out level of setting out for a certain period, setting out signal will be output.

Setting out situation valid means inverter working current is smaller than checking out level of setting out and keep a period which is over checking out time of setting out.



Picture PA-6checking out schematic diagram of setting out

Attention:
In the process of checking out time, if work current is bigger than checking out time of setting out, the checking out time inside the machine will be count again.

Overload pre-alarm mainly monitors the overload situation before inverter overload protection action. Overload pre-alarm level delimits the current threshold of overload pre-alarm action and its set value is the percentage of relative inverter fixed current.

PA.13	reservation	reservation	0
PA.14	Overload pre-alarm level	20~180%	130%/120%

PA.15	Overload pre-alarm delay	0.0~15.0s	5.0

Overload pre-alarm means the delay period from inverter output current which is constant bigger than overload pre-alarm level extent (PA.14) to output overload pre-alarm signal.

PA.16	reservation	reservation	0
PA.17	Phase protection choices of input and outpu	0~3	0

0: All are prohibited.
1: Input is prohibited, output is allowed.
2: input is allowed, output is prohibited.
3： All are allowed.

PA.18	Protection delay time of input phase	0.1s~20.0s	1.0

When choose valid input phase protection and it is breakdown, inverter passes the fixed time of PA.18, protection action is [E-12], it will stop freely.

PA.19	Test standards of output phase protection	0%~100%*Ie	10%

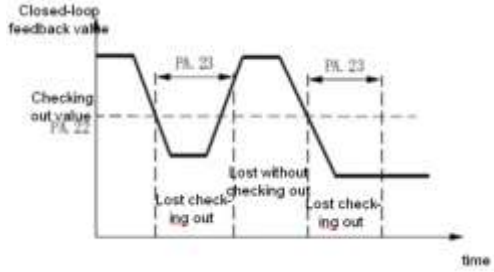
When the actual output current of motor is bigger than fixed current *PA.19, if output phase protection is valid, after the delay time of 5S, inverter protection action is [E-13] and it will stop freely.

PA.20	reservation	reservation	0
PA.21	PID feedback break treatment	0~3	0

0: no action
1: Alarm and keep on running by break frequency.
2: Protect action and stop freely.
3: Alarm and decrease speed from fixed model to running speed 0 .

PA.22	Testing value of feedback break	0.0~100.0%	0.0%

To protect the constant time before action after feedback break happens.



Picture PA-7 Checking out time of Closed-loop feedback lost

PA.24	Reservation	Reservation	0
PA.25	Irregular communications action choice	0~2	1

0: protection action and stop freely
1: Alarm, keep status and continue running
2: Alarm and stop by fixed stopping ways

PA.26	Checking out time of communications overtime	0.0~100.0s	0.5

If communications RS485 doesn't get right data signal during the period fixed by this function command, communications RS485 is considered as irregular, inverter will take relative action according to the setting of PA.25.

PA.27	Action choices of irregular panel communications	0~2	1

0: Protect action and stop freely
1： Alarm, keep status and continue running
2: Alarm and stop by fixed stopping ways.

PA.28	Checking out time of	0.0~100.0s	0.5

	panel communications overtime		

If panel communications doesn't get right data signal during the period fixed by this function command, panel communications is considered as irregular, inverter will take relative action according to the setting of PA.27.

Chapter 6：Parameter introduction

PA.29	Reserved	Reserved	0
PA.30	Mistakes action choice of reading and writing	0~1	0

0: Protect action and stop freely
1: Alarm and keep running

PA.31	Action choices of limit running time reach	0~1	0

0: Protect action and stop freely
2: Alarm and stop by fixed stopping ways.
Refer to function command introduction of PC.29~PC.31

PA.32	Reservation	Reservation	0

PB communication parameters

PB.00	Agreement choices	0~1	0

0: MODBUS
1: customize

PB.01	Local address	0~247	1

0: broadcast address

1~247：Slave
When in communication 485, this function is used for marking the address of this inverter.

Attention:
PB.01 sets 0 is broadcast address; it only can receive and execute the order of PC but can not answer PC.

PB.02	Set communication Baud Rate	0~5	3

0：2400BPS
1：4800BPS
2：9600BPS
3：19200BPS
4：38400BPS
5：115200BPS
This function command is used for delimiting the data transmission speed between PC and inverter. The fixed Baud Rate of PC and inverter should be consistent or communication can not be continued. The big Baud Rate setting it is, the fast data communication is, but too large Baud Rate will affect stable communications.

PB.03	Date format	0~7	0

0: No calibration （N，8，1）for RTU
1: Even calibration （E，8，1）for RTU
2: Odd calibration （0，8，1）for RTU
3: No calibration （N，8，2）for RTU
4: Even calibration（E，8，2）for RTU
5: Odd calibration（0，8，2）for RTU
6: No calibration（N，7，1）for ASCII
7: Even calibration（0，7，1）for ASCII
8: Odd calibration（0，7，1）for ASCII
Attention: Mold ASCII is reserved temporarily

The data setting format between PC and inverter should be consistent or it will not be communicate normally.

PB.04	local machine delays answer time	0~200ms	5

This function command delimited that after finishing receiving inverter data frame and sending internal time of answering data frame to PC, if the answer time is less than system treat time, the standard time is system treat time.

If delay time is more than system treat time, after system treating data, it needs delay waiting time till the delay answer time arrive , then send data to PC.

PB.05	Transmission response treatment	0~1	0

0: Writing operation has response

Inverter has all response of reading and writing orders to PC.

1: Writing operation has no response.

Inverter has all response of reading orders to PC but no response to writing orders, it is in order to increase communication effect.

PC advanced function parameters

PC.00	Breaking function settings 0: invalid	0~2	2

0: invalid

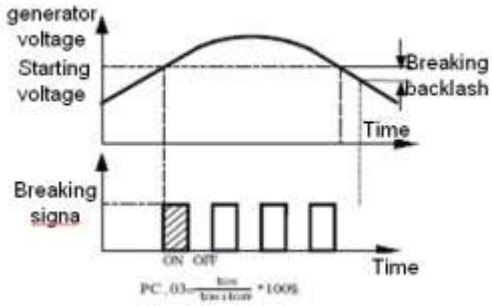
1: valid to whole process

2: valid only on speed decreasing

PC.01	Breaking originate voltage xx	115.0~140.0%	130.0%/120.0%
PC.02	Breaking backlash voltage	0.0~10.0%*Udce	5.0%
PC.03	Breaking action	10~100%	50%

	ratio		

The functions above are used for setting voltage threshold of inverter internal breaking unit action, using ratio of backlash voltage value and breaking unit. If the voltage of inverter inner DC is higher than starting voltage, internal breaking unit will take action. If there is breaking resistance at the same time, pump voltage power of internal inverter will be released by breaking resistance to make DC voltage fall back. When the DC side voltage decrease to a value (starting voltage - breaking backlash)， internal breaking unit will be closed.



Picture PC-1 breaking diagram

PC.04	No moment stopping control	0~1	0

No moment stopping control function is used when voltage decreased or a moment under-voltage whether inverter compensate low voltage automatic or not. It can keep inverter running without trip in a short time by decreasing frequency appropriately and load feedback power.
0: prohibition 1: valid.

PC.05	Decline frequency point of moment power stopping	70.0%~110.0%*Udce	80.0%

If generator voltage decreases to the value lower than that of PC.05*

and no moment stopping control is valid, no moment stopping starts action.

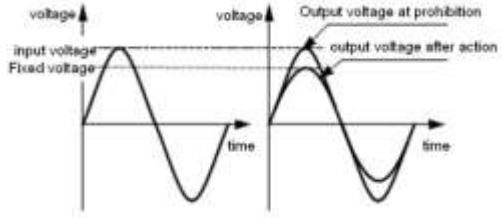
PC.06	Frequency decline settings of moment power stopping	0.00~655.35Hz/s	10.00

When no moment is valid, it needs to set PC.06 reasonably. If the frequency compensation ratio of voltage compensation setting is too large, load feedback power will be large too and may lead to over-voltage protection; if the setting is too small, load feedback power will be small too and can not take the action of low voltage compensation. So, when adjusting frequency parameter, it need reasonable setting according to inertia load torque and load weight.

PC.07	AVR Function	0~2	2

0: prohibition
1: valid in whole process
2: invalid in decreasing speed

AVR is automatic adjustment function of voltage. When there is deviation between input voltage and fixed value, the function is used for keeping output voltage constant of inverter in order to prevent motor working in a overvoltage condition. This function will be invalid when output order voltage is bigger than input power voltage. During the process of decreasing speed, if AVR is not working, the speed deceasing time will be short, if AVR is working, motor speed decline is stable, running current is small, but speed decreasing time is long.



Picture PC-2 AVR function diagram

PC.08	Energy-saving operation	0~2	0

When motor is in a light load or no load running process, adjusting output voltage or flux appropriately, it will save energy.
0: prohibition
1: intelligent mode (reserve temporarily)
Intelligent mode is the mode of searching motor's best energy-save working point automatic and making it work on this point.
2: decide by energy-saving coefficient
When sets to 2, the output voltage amount adjusts by PC.09 (energy-saving control coefficient)

PC.09	Energy-saving control coefficient	1~10	3

The bigger this parameter sets, the better the energy-saving effect is, but may bring unstable running factors.

PC.10	Choices of oscillation suppression	0~11	3

Most motor will have current oscillation phenomenon in some frequency phrase or motor runs unstably, seriously will lead to inverter over-current protection. Setting reasonable parameter according to oscillation suppression function can reduce this kind of negative effect.
0: valid 1: invalid

Attention:
The function is valid for V/F controlling.

PC.11	Low frequency threshold point of oscillation suppression	0~500	100
PC.12	High frequency threshold point of oscillation suppression	0~500	50
PC.13	Limiting value of	0~5000	2000

	oscillation suppression		
PC.14	High and low frequency demarcation point of oscillation suppression	0~100.0	15.00

This function command delimited specific parameter settings of oscillation suppression. Among it, when PC.11 and PC.12 set small, suppression effect will be obvious, when set small, effect will be worse. PC.13 can suppress big voltage increasing value when under oscillation PC.14 is the demarcation point of PC.11 and PC.12.

PC.15	Sagging control	0.00~10.00Hz	0.00

When multiple inverters drive same load, different speed causes load distributing uneven, that makes big speed inverter sustains heavier load. Sagging control can make speed sags along with load increasing, it can distribute load evenly. This parameter adjusts frequency changing amount of sagging inverter.
0.00: sagging control function is invalid.

PC.16	Reservation	Reservation	0
PC.17	Waiting time for tracking turning speed	0.1~5.0s	2.0

Before inverter turning speed tracking starting, it needs delay time to start tracking.

PC.18	Choices of speed searching methods	1~2	2

Choosing the way of inverter tracking motor turning speed is for finishing turning tracking process in a short time:
0: Down searching from running speed before tracking
1: Up searching from smallest speed
2: Down searching from the biggest speed (the biggest frequency)

PC.19	Fast and slow of turning speed tracking	1~100	30

When restart turning speed tracking, choose fast and slow of turning

speed tracking. The smaller the parameter is, the faster tracking speed is. But to fast will affect unreliable tracking.

PC.20	Curve line choice of turning speed tracking	0~4	2

This function chooses voltage curve line of turning speed tracking to suit different load motor, usually, it doesn't need setting.

PC.21	Restart setting of power stopping	0~2	0

0: prohibition

Power on after power off, inverter will not run automatic.

1: Start on the frequency starting

Power on after power off, if it satisfies starting conditions, and after inverter waiting the time decided in PC.22，it will start running from the frequency starting point.

2: Power on after power off, if it satisfies starting conditions, and after inverter waiting the time decided in PC.22，it will start running from the frequency starting point by a way of turning tracking.

PC.22	Waiting time of starting after power off	0.0~60.0s	5.0

In the period of waiting for restarting, any input order is invalid. If input stopping order, inverter will remove restarting condition of turning tracking and return to normal power off situation.

Attention:

1：Valid restarting after power off is related to setting PA.02, at this moment Pa.02 should be set to 0.

2: This parameter will lead to un-predict motor start, may will bring potential hurt to equipment and persons, please take cautious.

PC.23	Fault Auto Reset	0~100	0
PC.24	Fault Auto Reset time	0.1~100.0s	1.0

If there is breakdown in running process, inverter will stop output and display breakdown code. After reset time in PC.24, inverter will reset breakdown automatic and restart to run by the way of turning tracking. Fault auto reset time is set by PC.23. When fault auto reset time set to 0, there is no auto reset function, only hand reset. When PC.23 set to 100, it means time is not limit, same as no times.
For IPM breakdown and outside equipment breakdown, inverter doesn't allow auto reset operation.

PC.25	Cooling fan control	0~1	0

0: auto control modes
1: it is running during the whole power process.

PC.26	Carrier control way	0~4	1

0：PWM mode 1: fix PWM, temperature is related to adjustment
PWM molds 1 has small noisy, but in middle frequency phrase there may be some current oscillation； When radiator temperature gets alert value, inverter will decrease carrier frequency automatic till the temperature not over alert.
1: PWM mode 2: random PWM, temperature is related to adjustment
PWM mode 2 will increase noisy in middle and high frequency phrase, but current output is more stable；when radiator temperature gets alert value, inverter will decrease carrier frequency automatic till the temperature not over alert.
2: PWM mode 3: fix PWM, temperature is not related to adjustment
The setting is as same as description in 0, but temperature is not related to carrier.
3: PWM mode 4: random PWM, temperature is not related to adjustment
The setting is as same as description in 1, but temperature is not related to carrier.
4: Synchronous modulation PWM
Please take proper setting on all the functions above

PC.27	Carrier auto adjust	0~1	0

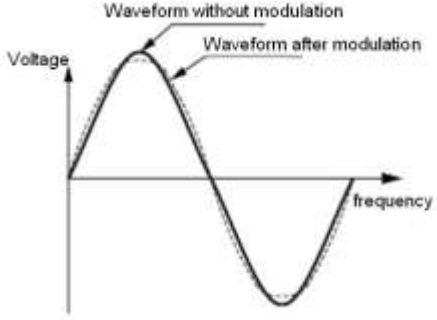
0: invalid

1: low-frequency adjust

This parameter is only valid for asynchronous modulation

PC.28	carrier auto adjust	0~2	0

Over modulation, function means inverter adjusts generator voltage using ratio, then increase output voltage, at last increase output torque. When over modulation is valid, output harmonic will be increase. This function is used in special conditions that grid voltage is lower and need running heavy load.
0: prohibition
1: mode 1(inferior over modulation)
2: mode 2(inferior over modulation) （reserved）



Picture PC-3 Over modulation diagram

PC.29	Running limit function code	0~65535	0

When in default condition, password is 0, it can be set as in PC.30, PC.31, when there is password, passing password verifying to make setting as in PC.30, PC.31. If there is no need for running limit function password, this function code sets to 0.
When setting running limit password, first input five digits, then press

key ENTER to ensure, the password will be valid after one minute. When need to change password, choose PC.29 function code, press ENTER and go into password verifying situation, after password verifying successfully, go into modify condition, input new password, press ENTER to ensure, password modify successful , after one minute, new password is valid； If want to delete password, setting running limit password as "00000"is ok.

PC.30	Function choices of running limit	0~1	0

0: prohibition
1: running limit
When under running limit, only the running time of inverter is over the fixed time which set in C.31, inverter will take related action according to the ways set in PA.31: When PA.31 set on 0, inverter will take protection action and stop freely, operation panel will display E - 2 4(RUNLT)； When PA.31 is set on 1, inverter will alarm and stop as fixed way, operation panel displays A-24. If want to clear away this breakdown, only need to verify PC.29 (running limit code), then set PC. 30 (running limit function choice) on 0(invalid), can delete running limit breakdown.

PC.31	Limited time	0~65535（h）	0

Details are in introduction PC.30

PC.32	Dead area compensation control function	0~1	1

0: prohibition 1: using ability

PC.33	Reservation	Reservation	0

PD monition and display parameters

PD.00	closed-loop display coefficient	0.01~100.00	1.00

This function is used for correcting display errors between actual physical matters (pressure and flow amount ect) and fixed or feedback matters (voltage and current) during closed-loop controlling, there is no influence on closed-loop adjustment.

PD.01	Display coefficient of load turning speed	0.01~100.00	1.00

This function is used for correcting display errors of turning speed calibration, there is no influence on actual turning speed.

PD.02	Line speed coefficient	0.01~100.00	1.00

This function is used for correcting display errors of line speed calibration, there is no influence on actual turning speed.

运行状态监控选择： Monitor choices of running conditions

PD.03	Monitor choices of running conditions1	0~FFFFH	1063
PD.04	Monitor choices of running conditions2	0~FFFFH	0080
PD.05	Monitor choices of running conditions3	0~FFFFH	0000

To change the setting value of above functions can change monitoring project of main monitoring panel, for example: set PD.03=020H, means: when choose output current d-05 and when it is running, default display project of main monitoring panel is current output current.

PD.06	Monitoring parameters choices under stopping condition1	0~FFFFH	3002
PD.07	Monitoring parameters choices under stopping condition2	0~FFFFH	0060

PD.08	Monitoring parameters choices under stopping condition3	0~FFFFH	0000

To change the setting value of above functions can change monitoring project of main monitoring panel, for example: set PD.03=040H, means: when choose output current d-06 and when it is stopping, default display project of main monitoring panel is current output voltage value.

PD.09	cycle display choices of monitoring parameters	0~1	0

0: no cycle 1: auto cycle

Auto cycle display of monitoring parameters is divided into stopping condition and running situation.

When display project of PD.06~PD.08 (stopping monitoring parameters project choices) is over one item, operation panel can display parameters from low monitoring parameter to high under machine stopping, every three seconds update one and update circularly. Certainly, when there is only one monitoring project, cycle displaying displays only one item.

When display project of PD.03~PD.05 (running monitoring parameters project choices) is over one item, operation panel can display parameters from low monitoring parameter to high under machine running, every three seconds update one and update circularly. Certainly, when there is only one monitoring project, cycle displaying displays only one item.

All chose monitoring parameter can be checked through key SHIFT.

Attention:

LCD screen can monitor 3 parameters at same time, when choose multiple monitoring parameters, if PD.09=1, screen will refresh and display every parameters, if PD.09=0, screen only displays the first 3 parameters and LED will only display the first one parameter.

PD.10	Reservation	Reservation	0

PD.11	Reservation	Reservation	0

PF factory parameters

PF.00	factory password	0~65535	0
PF.01	models choice	Reservation	0
PF.02	inverter models	0~30	Models setting
PF.03	fixed power of inverter	0.4~999.9KW	Models setting
PF.04	fixed voltage of inverter	0~999V	380
PF.05	fixed current of inverter	0.1~6553.5A	Models setting
PF.06	dead area time	3.2~16.0Ms	Models setting
PF.07	software over-voltage point	0~999V	800
PF.08	fixed power of inverter	0.4~999.9KW	400
PF.09	software over-current point	50.0~250.0%	200.0%
PF.10	correcting coefficient of voltage	95.0~105.0%	100.0%
PF.11	correcting coefficient of output current	50.0~150.0%	100.0%
PF.12	temperature checking ways	0~1	100
PF.13	protection threshold of first road temperature sensor	80.0℃~90.0℃	85.0
PF.14	protection threshold of second road temperature sensor	80.0℃~90.0℃	85.0
PF.15	Reservation	Reservation	0
PF.16	specific messages clear	0~4	0

	function		

0: Prohibition
1: Delete cumulative running hours.
Delete contents of monitoring parameters D-35
2: Delete cumulative power hours.
Delete contents of monitoring parameters D-36
3: Delete cumulative fan running hours.
Delete contents of monitoring parameters D-37
4: Delete cumulative electricity consumption
Delete contents of monitoring parameters D-38 and D-39.

PF.17	machine factory code1	0~65535%	0
PF.18	machine factory code2	0~65535	0
PF.19	machine factory date(M/D)	0~1231	0
PF.20	machine factory date(Y)	2010~2100	0
PF.21	software protection password	0~65535	0

Monitoring parameters

d-00	output frequency （before slip compensation） maximum output frequency	0.00~maximum output frequency[P1.11]	0
d-01	output frequency（after slip compensation） maximum output frequency	0.00~maximum output frequency[P1.11]	0
d-02	motor estimate frequency maximum output frequency	0.00~maximum output frequency[P1.11]	0.00
d-03	main setting frequency maximum output	0.00~maximum output	0.00

	frequency	frequency[P1.11]	
d-04	aid setting frequency maximum output frequency	0.00~maximum output frequency[P1.11]	0.00
d-05	output current	0.0~6553.5A	0.0
d-06	output voltage	0~999V	0
d-07	output torque	-200.0~+200.0%	0.0%
d-08	motor turning speed	0~36000RPM/min	0
d-09	motor power factor	0.00~1.00	0.00
d-10	running line speed	0.01~655.35m/s	0.00
d-11	set line speed	0.01~655.35m/s	0.00
d-12	generator voltage	0~999V	0
d-13	input voltage	0~999V	0
d-14	PID set value	0.00~10.00V	0.00
d-15	PID feedback value	0.00~10.00V	0.00
d-16	imitation input AI 1	0.00~10.00V	0.00
d-17	imitation input AI 2	0.00~10.00V	0.00
d-18	pulse frequency input	10.0~50.0kHz	0.00
d-19	imitation output A01	0.00~10.00V	0.00
d-20	imitation output A02	0.00~10.00V	0.00
d-21	terminal input condition	0~FFH	0
d-22	terminal output condition	0~FH	0
d-23	inverter running condition	0~FFFFH	0

0~FFFFH
0: on/off
1: reverse turning/direct turning
2: 0 speed running
3: reservation
4: acceleration
5: deceleration
6: constant speed

7: pre-excitation in the magnetic
8：Motor parameters under tuning
9: limitation of over current
10: limitation of over voltage
11: limiting of turning torque
12：Limiting of speed
13: speed control
14: torque controlling
15: reservation

d-24	current paragraph of multiple phrases	0~15	0
d-25	current paragraph of multiple turning torques	0~7	0
d-26	current paragraph of multiple closed-loops	0~7	0
d-27	current count value	0~65535	0
d-28	Fixed count value	0~65535	0
d-29	current timing value	0~65535	0
d-30	fixed timing value	0~65535	0
d-31	current length	0.000~65.535(km)	0.000
d-32	fixed length	0.000~65.535(km)	0.000
d-33	Radiator temperature 1	0.0℃~+110.0℃	0.0
d-34	radiator temperature 2	0.0℃~+110.0℃	0.0
d-35	cumulative running time(hours)	0~65535H	0
d-36	cumulative power time	0~65535H	0
d-37	fan cumulative running time	0~65535H	0.000
d-38	cumulative power	0.1~9999KWH	0.000

	amount (low)		
d-39	cumulative power amount (high)	0.1~9999KWH(*10000)	0
d-40	monitoring parameters of specific models (reserved)	Reservation	0
d-41	monitoring parameters of specific models (reserved)	Reservation	0
d-42	monitoring parameters of specific models (reserved)	Reservation	0
d-43	monitoring parameters of specific models (reserved)	Reservation	0
d-44	monitoring parameters of specific models (reserved)	Reservation	0
d-45	monitoring parameters of specific models (reserved)	Reservation	0
d-46	monitoring parameters of specific models (reserved)	Reservation	0
d-47	monitoring parameters of specific models (reserved)	Reservation	0
d-48	current paragraph of	0~15	0

	multiple phrases		
d-49	first two breakdown type	0~26	0
d-50	first one breakdown type	0~27	0
d-51	current breakdown type	0~25	0
d-52	running frequency of current breakdown	0.00~ maximum output frequency	0.00
d-53	output current of current breakdown	0.0~6553.5A	0.0
d-54	generator voltage of current breakdown	0~999V	0
d-55	input terminal situation of current breakdown	0~FFH	0
d-56	output terminal situation of current breakdown	0~FH	0
d-57	inverter-running situation of current breakdown	0~FFFFH	0.000

7.1 Fault information and diagnosis method

Fault code	Symptom	Possible fault cause	Remedy
E-01	Overcurrent during acceleration running	Accelerate too fast Lower voltage of power grid Lower power of the inverter	Increase acceleration time Check input power Select an inverter with higher power
E-02	Overcurrent during deceleration running	Decelerate too fast Bigger inertia load torque Lower power of the inverter	Increase acceleration time Add a proper dynamic baking assembly Select an inverter with higher power
E-03	Overcurrent during constant speed running	Transient or abnormal load Lower power grid voltage Lower power of the inverter	Check load or minimize the transient load Check input power Select an inverter with higher power
E-04	Overvoltage during constant speed running	Abnormal input voltage After momentary power interruption, restart the E-motor that is rotating	Check input power Restart to avoid shutdown
E-05	Overvoltage during deceleration running	Decelerate too fast Big inertia load Abnormal input voltage	Increase deceleration time Increase dynamic braking assemblies Check input

			power
E-06	Overvoltage during constant speed running	Abnormal input voltage Big inertia load	Install input reactor Add proper dynamic braking assemblies
E-07	Bus bar under voltage	Lower power grid voltage	Check power grid input power
E-08	E-motor overload	Lower power grid voltage Incorrect setting of motor rated current Blocked motor rotation or bigger transient load Inverter drags motor with smaller rotation speed	Check power grid voltage Redesign the rated current of E-motor Check load and adjust torque hoisting load Select proper inverter
E-09	Inverter overload	Accelerate too fast Restart the E-motor that is rotating Ultra low power grid voltage Overlarge load	Increase acceleration time Restart to avoid shutdown Check power grid voltage Select inverter with bigger power
E-10	Inverter off-load	Disconnected input cord of inverter Severe fluctuation of load	Check the input cord of inverter Check the change status of load
E-11	Power module failure	Damaged inner IGB Misuse caused by interference Poor grounding	Seek for aid Check to see whether strong interference source exits

			Check whether grounding is in good condition
E-12	Input side phase lack	Phase lack in R,S,T input	Check input power Check installation wiring
E-13	Output side phase lack	Phase lack in U,V,W output	Check output wiring Check E-motor and cables
E-14	Heat sink overheat 1	Instant overcurrent of inverter Output 3-phase has interphase or grounding is short Blocked air duct or broken fan Over-high ambient temperature	Refer to overcurrent strategy Rewiring Open air duct or change fan Reduce ambient temperature
E-15	Heat sink overheat 2		
E-17	RS 485 communication fault	Improper baud rate setting Communication mistake of adopting serial communication Long-time communication time	Set proper baud rate Press STOP/RST key to reset, seeking for service Check communication interface wiring
E-18	Key board communication failure	Key board displays fault Bad contact of key board connection cord	Replace key board display panel Check key board connection cord
		Bad contact of control board connector	Check connectors and re-connect the

E-19	Current sensing error	Damaged auxiliary power supply Damaged Hall current sensor Abnormal amplifying circuit	cord Seek for service Seek for service Seek for service
E-20	E-motor tuning fault	Unmatched E-motor capacity and inverter capacity Improper setting of E-motor rated parameter Bid difference between self-learning Parameter and standard parameter Self-learning overtime	Replace inverter model Set rated parameter according to E-motor label Enable an empty load of E-motor and identify again Check the E-motor connections and parameter setting
E-21	EEPROM read and write fault	Read and write fault on control parameter Damaged EEPROM	Seek for service Seek for service
E-22	Parameter copy mistake	LCD panel failure	Replace LCD panel
E-23	PID feedback disconnection	PID feedback disconnection Vanished PID feedback source	Check PID feedback signal cable Check PID feedback source
E-24	Reached running limiting time	Confirm running time	Reset running time limit
E-25	EMI interference	Interference with inverter	Check the interference source that interferes with

			inverter and enforce anti-interference measure
E-00	Indicates no fault code	-	-

7.2 Regular failures and failure elimination

During the use of inverter, the following failure conditions may occur. Please refer to the following methods to make a simple analysis on the failure:

No display after Power ON

Adopt a millimeter to check whether the input power of invert complies with the rated voltage of inverter. If the power supply has problems, check it and iron out the problems. Check whether the 3-phase rectifier bridge is in good condition. If the rectifier bridge is exploded, please seek for service.

Check whether Charge light is ignited. If this light is not bright, the failure may be caused by the rectifier bridge or buffer resistance. If the light is ON, the fault may focus on the switch power supply part. Please seek for service.

Air switch of the power supply toggles after Power ON:

Check whether grounding or short condition occurs between the input powers and eliminate the existing problem.

Check whether the rectifier bridge is broken down. If damaged, please seek for service.

Non-rotation of the E-motor after inverter is running:

Check whether there is balanced 3-phase output among U, V, and W. If there is balanced output, the electric machine circuit may be damaged or blocked for mechanical reason. Please eliminate the problem.

If there is output but the 3-phase is not balanced, the problem should be that the inverter driver board or output module is damaged.

If the output voltage is not present, the driver board or output module is damaged. Please seek for service.

Check whether circuit is short between the output modules. If so, please seek for service. Check whether the E-motor leads are short or

grounded. If so, please shoot this trouble.
If the trip is present occasionally and the motor is located in a far distance from the inverter, then consider adding output AC reactor.

Warning
Maintenance personnel must follow the specified method for service and maintenance to perform the relevant work. Maintenance personnel must be professional and qualified persons. Do NOT directly touch the elements on the PCB board. Otherwise, the produced static electricity will damage the inverter. After service or maintenance, make sure all screws are secured tightly.

8.1 Daily maintenance

To prevent the inverter from failure, ensure normal operation of the equipment and extend the service life of the inverter, daily maintenance on the inverter must be performed. The content of daily maintenance is listed as below

Inspection item	Content
Temperature/Humidity	Make sure the ambient temperature is ranged in 0°～50° and humidity is 20～90%.
Oil spray or mist and dust	Make sure no oil mist and dust as well no condensed water is inside the inverter.
Inverter	Check whether the inverter produces abnormal heating and whether it vibrates abnormally.
Fan	Make sure the fan runs normally and no foreign objects are jammed.
Input power supply	Make sure the voltage and frequency of the input power supply is within the allowable scope.
E-motor	Check whether the E-motor has abnormal vibration, heating, and whether it has abnormal noise and phase lack problems.

8.2 Periodic maintenance

To prevent the inverter from failure, ensure stable operation in longtime and high performance, the user must perform periodic maintenance (within 6 months) on the inverter. Inspection content is shown below:

Inspection item	Inspection content	Remedy
Screws on the external terminal	Whether the screws are loosened or not	Tighten them
PCB board	Dust and dirty particles	Use dry compressed air to thoroughly clear these foreign objects
Fan	Whether the accumulated time for abnormal noise and vibration exceed 20 thousand hours	Clear up the foreign objects Replace the fan
Electrolytic capacitor	Whether the color is changed and whether it is smelly	Replace electrolytic capacitor
Radiator	Dust and dirty particles	Use dry compressed air to thoroughly clear these foreign objects
Power components	Dust and dirty particles	Use dry compressed air to thoroughly clear these foreign objects

8.3 Replacement on the wearable parts of inverter

The fan and electrolytic capacitor in the inverter are wearing parts. To ensure long-time, safe, trouble-free operation of the inverter, the wearing parts should be replaced periodically. Time for wearing parts replacement is as below:

Fan: Must be replaced after over 20 thousand hours of use

Electrolytic capacitor: Must be replaced after 30～40 thousand hours of use

8.4 Inverter warranty

Free warranty only applies to the inverter itself.

- Under normal use, if failure or damage occurs, our company assumes the responsibility of 12-month warranty (starting from the ex-factory date). For exceeding 12 months, our company will charge reasonable maintenance fee.
- Within 12 months, in case of the following conditions, extra charge for maintenance may occur:
  - The unit is damaged due to the user not following the specified instructions in the manual;
  - Damage is caused by flood, fire and abnormal voltage;
  - Damage is caused by applying the inverter to abnormal functions;

Related service fee is calculated based on the same standard of the manufacturer. If having agreement, take the agreement as top priority to handle this matter.

Communication protocol

SY series inverter provides RS 485 communication port and adopts international standard Modbus communication protocol to proceed with the master-slave communication. The users can use PL/PLC and control PC to achieve centralized control (Set control command and running frequency of the inverter, modify the relevant functional code parameters and monitor the work status and failure or fault information of the inverter) to meet the special application requirements.

9.1 Protocol content

The Modbus serial communication protocol defines frame content and use format of the asynchronous transmission in the serial communication. It includes host polling and broadcast frame, slave frame format; the frame content of host organization includes slave address (or broadcast address), executive command, data and error verification. The slave response also employs the same structure, including action confirmation, data return and error verification. If error occurs when the slave is receiving frame, or the salve could not finish the action required by host, it will take one fault frame of the organization as response to feed back to the host.

9.2. Application way

SY series inverter accesses to the control network of 'Single-host multi-slave" that has RS232/RS 485 bus line.

9.3 Bus structure

- Interface mode: RS485 hardware interface
- Transmission mode
  Asynchronous serial, half-duplex transmission mode. At the same time, only host machine or slave machine sends data, and the other one receives data. During the serial asynchronous communication, the data is transmitted in message mode and send one by one.
- Topological structure
  System of single host machine and multi slave machines. Setting range of address of slave machine is 1-247, 0 is the address of broadcast communication. Address of each slave machine in the network is unique, this guarantees base for ModBus serial communication.

9.4 Protocol instruction

Communication protocol of SY series inverter is a kind of asynchronous serial and host-slave ModBus communication protocol, there is only one equipment (host machine) is able to establish protocol (called "search/command"). Other equipment (slave machine) only is able to respond to the "search/command" through providing data, or make corresponding actions according to the "search/command" . Host machine here means the personal computer (PC), industrial control equipment or programmable logic controller (PLC), slave machine means the SY series inverter or other control equipment that has similar communication protocol. The host machine not only is ab e to communicate with a single slave machine, but also is able to send broadcast information to all slave machines. For "search/command" of single accessing, the slave machine will feed back an information (called response), for broadcast information sent out by host machine, slave machines need not to feed back.

9.5 Structure of communication frame

Communication data format of ModBus protocol of SY series inverter can be divided into RTU
(remote terminal unit) and ASCII (American Standard Code for Information International Interchange) two types.
Under mode RTU, format of each byte as follows:,

Under mode RTU, the new one always starts with a quiescence that is equal to transmission time of 3.5 bytes at least. In the network where the transmission rate is calculated with baud rate, transmission time of 3.5 bytes can be mastered easily. The data domains followed closely are address of slave machine, operating command code, data and CRC check character, transmission bytes of each domain are 0…9 and A…F of hexadecimal system. The network equipment always monitors the action of communication bus, even if in the interval time of quiescence. When receiving the first domain (address information), each network equipment will make a confirmation to this byte. Along with the finish of transmission of the last byte, there will be another similar transmission time interval of 3.5 bytes, this means that this frame is

finished, after that; it will start to transmit a new frame.

Information of a frame must be transmitted in a continuous data flow, if there is an interval that is more than 1.5 bytes before the whole frame transmission is finished, the receiving equipment would clear up this incomplete information, and judge the followed byte as a part of address domain of new frame by mistake, in the same way, when interval between new frame and previous frame is less than transmission time of 3.5 bytes, the receiving equipment would also judge it as a part of previous frame by mistake, and the CRC check value would be incorrect due to error of frame, this would lead to communication fault finally.

Standard structure of RTU frame

Frame head START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Address domain of slave machine ADDR	Communication address: 0～247 (decimal system) (0 is the broadcast address)
Function domain CMD	03H: read parameters of slave machine; 06H: write parameters of slave machine
Data domain DATA (N-1)-DATA (0)	Data of 2*N bytes, this part is the main content of communication, also is the core of data exchange in communication.
CRCCHK low bit	Detection value: CRC check value (16BIT)
CRCCHK high bit	
Frame end END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

9.6 Command code and communication data

9.6.1 Command code: 03H (0000 0011), read N characters (Word) (16 characters at most continuously)

E.g. when an inverter whose address of slave machine is 01H, start address of internal memory is 0004, read consecutive 2 characters, then

the structure description of this frame as follows:

RTU host machine command information

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
ADDR	01H
CMD	03H
High bit of start address	00H
Low bit of start address	04H
High bit of data number	00H
Low bit of data number	02H
CRC CHK Iow bit	85H
CRC CHK high bit	CAH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

RTU slave machine response information

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
ADDR	01H
CMD	03H
Byte number	04H
High bit of data address 0004H	00H
Low bit of data address 0004H	00H
High bit of data address 0005H	00H
Low bit of data address 0005H	00H
CRC CHK Iow bit	43H
CRC CHK high bit	07H
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

9.6.2 Command code: 06H (0000 0110), write a character (Word)

e.g. write 5000 (1388H) at the address 0008H of inverter of the slave machine address 02H, then the structure of this frame can be described as follows:

RTU host machine command information

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
ADDR	02H
CMD	06H
High bit of write data address	00H
Low bit of write data address	08H
High bit of data content	13H
Low bit of data content	88H
CRC CHK Iow bit	05H
CRC CHK high bit	6DH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

RTU slave machine response information

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
ADDR	02H
CMD	06H
High bit of write data address	00H
Low bit of write data address	08H
High bit of data content	13H
Low bit of data content	88H
CRC CHK Iow bit	05H
CRCCHK high bit	6DH

END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

9.6.3 Verify ways of communication frame mistakes

Verify ways of frame mistakes include two parts, one is digit verify (odd/even) another one is total data verify (CRC or LRC)

9.6.3.1 Byte bit verify

Users can choose different verify ways according to their demands, also can choose no verifying, this will influence verify digit setting of every byte bit.

The meaning of even verify is: Adding one even digit before transferring data, it is used to show that *1'* numbers of sending data is odd or even, if it is even , verify position is *0*, or will set it to be *1* in order to keep data's parity.

The meaning of odd verify is adding one odd digit before transferring data, it is used to show that *1'* numbers of sending data is odd or even, if it is odd, verify position is *0*, or will set it to be *1* in order to keep data's parity.

For example: there needs to transfer *11001110* ,there are 5 *1* in the data, if adopt even verify, its even verify number is 1, if adopt odd verify ways, its verify number is 0, when transferring date, even or odd verify numbers will be put in verifying position through counting. Receiving equipment also need even and odd verifying, if the parity of receiving data is not consistent with fixed one, it will be considered communication mistakes.

9.6.3.2 CRC verifying method——CRC（Cyclical redundancy check）:

Using RTU form, frame is based on mistake checking area of CRC. CRC area checks contents of the whole frame. CRC area is 2 bytes, including binary value of 16 bits. It is added into frame after counting by transfer equipment. Receive equipment count frame CRC again and compares it with the value of received CRC, if the two CRC are not

equal, that means there are transferring mistakes.
CRC will be stocked into 0xffff first, then calling one process to treat the continuous bytes more than 6 pcs and the value, which is in current register. In every byte only data 8Bit is valid to CRC, start number, ending number and even odd verifying numbers are invalid.
During the process of CRC producing, every 8 bit bytes is singled with the contents of register dissimilar or (XOR)， the result will be moved to lowest valid direction, the highest valid number is filled with 0. LSB will be extracted for checking, if LSB is 1, single register and fixed value are dissimilar or , if LSB is 0, can not work. The process needs to repeat 8 times. At the last one (the 8^{th} number) finishes, next 8 bit bytes will be compared singly with the current value of register as dissimilar or. The final value of the register is CRC value after frame bytes executed.
This count way of CRC adopts international standard CRC verify rules. When users edit CRC count ways, can refer to related CRC count ways and edit out true CRC count programs that meets the requirements.
Now we provide a simple function of CRC count method for users' referring (edited with C language).
In ladder logic, CKSM counts CRS according to frame content with looking-up table, procedure of this methods is simple, count fast, but the procedure occupied big space, if u have requirement of procedure space, please be cautious to use it.

9.6.3.3 Verifying of ASCII modes (LRC check)
Verify code (LRC Check) is the plus value from address to data content, for example as above.
9.6.3.4 Verifying code of communication information:
0 x 0 2 + 0 x 0 6 + 0 x 0 0 + 0 x 0 8 + 0 x 1 3 + 0 x 8 8 = 0 x A B, take 2's compensation code=0x55.

9.6.4 Definition of communication data address

This part is address definition of communication data, it is used for running inverter, getting inverter situation information and inverter related function parameter settings.
1) Address showing rules of function code:

Taking function code numbers as parameters correspond to register address, but need to change into Hex. For example, P4.15, its number is 79; function code address shows as 004FH with Hex.

Scope of high and low bytes is : high position bytes: 00~01； Low position bytes: 00~FF

Attention: PE group is factory setting parameters and can not be read and change; some parameters when the inverter is running can not be changed; some parameter whenever the situation the inverter is can not be changed. If want to change function parameters, must pay attention on setting scope, unit and related introduction of parameters.

Additionally, because EEPROM is put in storage frequently, using time will decrease. To users, some function code does not need storage, only changing the RAM value of chip can satisfy using requirement. To achieve this function, just change the function address from 0 to 1. For example:

Function codes P0.03 doesn't keep in EEPROM, only changing the value of RAM and can set address as 800CH; this address is only used for writing RAM of internal chip , can not use for reading function, if use for reading it is invalid address.

1) Other address function introductions:

Function introduction	Address definition	Data meaning explain	R/WSpecification
Communication control orders	2000H	0001H: direct turning run	W/R
		0002H：direct turning jog	
		0003H：brake stop	
		0004H：free stop	
		0009H：reverse	

		running 000A：reverse jog 0010H：breakdown reset	
Inverter running situation	D017HH	Refer to parameter sheet d-23	R
Run / Stop parameter address note	D000H	running frequency	R
	D003H	fixed frequency	R
	D00CH	generator voltage	R
	D006H	output voltage	R
	D005H	output current	
	D008H	running and turning speed	R
	D012H	Pulse frequency input	R
	D007H	output torque	R
	D00EH	PID given value	R
	D00F	PID feedback value	R
	D015H	terminal input mark situation	R
	D016H	terminal output mark	R

		situation	
	D010H	imitation AI1 value	R
	D011H	imitation AI 2 value	R
	D013H	Analog AO1 value	R
	D014H	Analog AO2 value	R
	D01BH	Current mount value	R
	D01DH	Current time value	R
	3012H	current paragraph of multiple speed phrases	R

Inverter breakdown address	E000H	Breakdown code is consistent with breakdown type number of function code menu. Only here returns back to PC Hex data not breakdown character.	R

9.6.4 Additional response for wrong communications

When inverter is connected with communication, if mistake happens, inverter will response wrong codes and send back to main system with fixed format to make it know mistake happens. Inverter breakdown response order byte will be 06 whether inverter communication order code is 03 or 06 and it will be fixed as 0x5001 according to data address. For example:

RTU response information

START	T1-T2-T3-T4(3.5 bytes transferring time)

ADDR	01H
CMD	06H
High bit of fault rapture address	50H
Low bit of fault return address	01H
High position of mistake codes	00H
Low position of mistake codes	05H
CRC CHK Low position	09H
CRC CHK High position	09H
END	T1-T2-T3-T4(3.5 bytes transferring time)

Meaning of wrong codes:

Error code	Description
01H	Invalid function code
02H	Invalid address
03H	Invalid data
04H	Invalid length of register
05H	CRC check code error
06H	parameter modification is ineffective in running
07H	Parameter modification is invalid
08H	Control command invalid
09H	Parameter protected by password
0AH	Password wrong

Version amendment information:

number	name	version	Date	Main amendment content
1	SY7000 inverter product introduction	V1.0	2011.05	
2				

3				
4				
5				
6				
7				
8				
9				