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## 1. Unpacking Inspection

Before opening the box, please make sure that the product box is not damaged caused by transport.

After opening the box, check the following items.

1. Check whether the contents of the box are consistent with the packing list or not.
2. Check whether the inverter has any damage or not during transport (damage or chipping on the machine body).
3. Check the nameplate of the inverter and confirm whether it is the product you ordered or not.
4. If you have ordered options, please confirm whether they are the options you ordered or not.

If you find damage to the inverter or options, contact your dealer immediately.

As we are committed to the continuous improvement of our inverters, the information we provide is subject to change without notice.

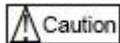
## 2. Safety Precautions

### Security Definitions

In this manual, safety precautions consist of the following two categories:



**Hazards caused by failure to operate as required can lead to serious injury or even death.**



**Hazards caused by failure to operate as required may result in moderate or minor injuries, and equipment damage.**

### 2.1 Security matters

**Before installation:**

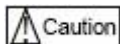


1. Do not use damaged inverters or inverters with missing parts, as there is a risk of injury!
2. Please use a motor with insulation of class B or above, otherwise there is a danger of electric shock!

**During installation:**



Please install the inverter on a flame-retardant object such as metal and keep the inverter away from combustible materials. Otherwise, it may cause fire alarm!

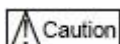


1. If two or more inverters are placed in the same cabinet, please pay attention to the installation location (refer to Chapter 3 Installation), it is required to ensure heat dissipation effect
2. Do not allow wire heads or screws to fall into the inverter, otherwise it may cause damage to the inverter!

**When wiring:**



1. The work shall be carried out by professional electricians, otherwise there is a risk of electric shock!
2. The inverter and the power supply must be separated by a circuit breaker, otherwise a fire alarm may occur!
3. Make sure that the power supply is off before wiring, otherwise there is a risk of electric shock!
4. The grounding terminal must be reliably grounded, otherwise there is a risk of electric shock!



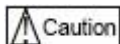
1. Do not connect the input power cable to the output terminals U, V and W, otherwise it will cause damage to the inverter!
2. Ensure that the wiring complies with the EMC requirements and the safety standards of the area in which the inverter is located, and refer to the recommendations of the manual for the diameter of the wires used, otherwise accidents may occur!

3. The braking resistor shall not be connected directly between the + and - terminals of the DC bus, otherwise it may cause a fire alarm!

**Before power-on:**



1. Please make sure whether the voltage level of power supply is the same as the rated voltage of the inverter or not, whether the wiring positions of input and output are correct or not, and pay attention to checking whether there is a short-circuit phenomenon in the peripheral circuits or not, and whether the connected wiring is fastened or not, otherwise it may cause damage to the inverter!
2. The inverter must be covered with the cover plate before power-on, otherwise it may cause electric shock!

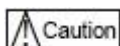


1. For the inverter, it does not need to carry out the withstand voltage test, the products have undergone such at the factory, otherwise it may cause accidents!
2. Whether all peripheral accessories are wired properly according to the circuit provided in this manual or not, otherwise it may cause accidents!

**After power-on:**



1. Do not open the cover after power-on, otherwise there is a danger of electric shock!
2. It is strictly prohibited to touch the inverter and the peripheral circuits with wet hands, otherwise there is a risk of electric shock!
3. It is strictly prohibited to touch the inverter terminals (including control terminals), otherwise there is a risk of electric shock!
4. At the beginning of power-on, the inverter automatically conducts safety checks on external heavy current circuits, at this time, it is strictly prohibited to touch the U, V, W terminals or motor wiring terminals, otherwise there is a risk of electric shock!

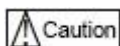


1. If parameter identification is required, pay attention to the danger of injury during motor rotation, otherwise it may cause accidents!
2. Do not change the inverter manufacturer's parameters arbitrarily, otherwise it may cause equipment damage!

**During running:**



1. If the restart function is selected, do not approach the mechanical equipment, otherwise it may cause personal injury!
2. Do not touch the cooling fan and the discharge resistor, otherwise it may cause burns!
3. Non-professionals shall not test the signals during operation, otherwise it may cause personal injury or equipment damage!



1. During the operation of the inverter, please avoid dropping debris into the equipment, otherwise it will cause damage to the equipment!
2. Do not switch contactor on or off to control startup or shutdown of the inverter, otherwise it will cause equipment damage!

**During maintenance:**



1. Please do not carry out repairs and maintenance on the equipment while it is live, otherwise there is a danger of electric shock!
2. After 10 minutes of power failure, it can implement maintenance and repair of the inverter

only after measured voltage of the positive and negative bus terminals is less than 36V, otherwise the residual charge on the capacitor will cause harm to people!

3. People who have not received professional training shall not repair or maintain the inverter, otherwise it may cause personal injury or equipment damage!

## 2.2 Precautions

### 1. Motor insulation check

Motor insulation check shall be done before the motor is used again after the first placement for long period time and during the regular inspection to prevent damage to the inverter due to insulation failure of the motor windings. For insulation check, it must separate the motor wire(s) from the inverter, it is recommended to use 500V voltage type megohmmeter, it shall ensure that the measured insulation resistance is not less than 5 megohm.

### 2. Thermal protection of motors

If the selected motor does not match the rated capacity of the inverter, especially when the rated power of the inverter is greater than the rated power of the motor, be sure to adjust the parameters related to motor protection in the inverter or install a thermal relay in front of the motor to protect the motor.

### 3. Operation above power frequency

This inverter can provide output frequency from 0Hz to 3200Hz. If the customer needs to operate above 50Hz, please consider the bearing capacity of the mechanical devices.

### 4. Vibration of mechanical devices

The inverter may encounter mechanical resonance points of the load device at some output frequencies, mechanical resonance points can be avoided by setting the jump frequency parameter in the inverter.

### 5. On motor heat and noise

Since the output voltage of the inverter is a PWM wave, which contains certain harmonics, the temperature rise, noise and vibration of the motor will be slightly increased compared with the operation at power frequency.

### 6. The presence of a voltage-sensitive device or a capacitor improving the power factor on the output side

The output of the inverter is PWM wave, and at the output side, if installed with capacitors to improve power factor or varistors for lightning protection, etc., it is prone to cause instantaneous overcurrent or even damage to the inverter, so please do not use such devices or such capacitors.

### 7. If a contactor is added to the inverter, it is not permitted to use this contactor to control the start/stop of the inverter.

It must use such contactor to control the start and stop of the inverter, the intervals must be greater than one hour. Frequent charging and discharging is likely to reduce the service life of the capacitors in the inverter. If contactors and other switching devices are installed between output end and the motor, it shall ensure that the inverter is switched on or off in the absence of output, otherwise it is easy to cause damage to the module in the inverter.

### 8. Use at voltage other than the rated voltage

It is not suitable to use our series of inverters outside the permissible working voltage range specified in the manual, otherwise it is easy to cause damage to the devices inside the inverter. If necessary, use the appropriate voltage boosting or voltage reducing device for voltage transformation.

### 9. Conversion of three-phase inputs to two-phase inputs

Do not change the three-phase inverter in this series for use at two-phase, otherwise it will result in fault or damage to the inverter.

### 10. Lightning impulse protection

This series of inverter is equipped with lightning overcurrent protection device, the inverter has a certain self-protection ability for induced lightning. For the place where lightning occurs frequently, the customer shall also install the protection at the front end of the inverter.

#### 11. Altitude and derating

In areas where the altitude exceeds 1000M, it is necessary to derate the inverter due to the deterioration of heat dissipation effect caused by thin air, if this situation occurs, please consult this Company.

#### 12. Some special uses

If the customer needs to use a method other than the recommended wiring diagrams provided in this manual, such as a common DC busbar, please consult this Company.

#### 13. Precautions on the scrapping of inverters

- 1) Electrolytic capacitors in the inverter may explode during incineration.
- 2) Plastic and rubber products on the inverter may produce harmful and toxic gases when being burned, so please be especially careful when burning such plastic and rubber products.
- 3) Please dispose of the inverter as industrial waste.

#### 14. On adapted motors

1) The standard adapted motor is a four-level squirrel cage asynchronous induction motor. If it is not the above motor, please be sure to select the inverter according to the rated current of the motor. If it is necessary to drive a permanent magnet synchronous motor, please consult this Company.

2) The cooling fan of a non-variable frequency motor is coaxially connected to the rotor shaft, the fan cooling effect is reduced when the speed is reduced, therefore, for scenario of the motor overheating, it shall install the addition exhaust fan, the motor is replaced with the variable frequency motor.

3) Inverter has been provided with the built-in adapted motor standard parameters, according to the actual situation, it is necessary to conduct motor parameter identification or make individualized default value to try to meet the actual value, otherwise it will affect the operating effect and protection performance.

4) Due to the short circuit inside the cable or motor will cause the inverter alarm, or even damage to the inverter. Therefore, please firstly carry out the insulation short-circuit test on the initially installed motor and cable, and it also need to carry out this test frequently in the daily maintenance. Please note that when carrying out this test, be sure to disconnect the inverter from the tested part completely.

**Before using the inverter, please read this manual carefully and understand the contents so that you can use the inverter correctly.**

**This manual is a randomly configured accessory. After the manual has been used, be sure to keep it properly, for future reference at any time.**

### 3. Product Specifications and Options

#### 3.1 Product technical specifications

Table 3-1 Product Technical Specifications

Item		Specification		
Basic functions	Maximum frequency	Vector control: 0~300Hz V/F control: 0~3200Hz		
	Carrier frequency	0.5kHz~16kHz The carrier frequency can be automatically adjusted according to the load characteristics.		
	Input frequency resolution	Digital setting: 0.01Hz Analogue setting: Maximum frequency × 0.025%		
	Control method	Open-loop vector control (SVC) Closed-loop vector control (FVC) V/F control		
	Starting torque	G-machine: 0.5Hz/150% (SVC); 0Hz/180% (FVC)		
	Speed range	1:100 (SVC)	1:1000 (FVC)	
	Steady speed accuracy	±0.5% (SVC)	±0.02% (FVC)	
	Torque control accuracy	±5% (FVC)		
	Overload capacity	G-type machine: 150% of rated current for 60s; 180% of rated current for 3s.		
	Torque boost	Automatic torque boost; manual torque boost: 0.1%~30.0%		
	V/F curve	Three types: linear; multipoint; Nth power type V/F curve (1.2th power, 1.4th power, 1.6th power, 1.8th power, 2nd power)		
	V/F separation	2 ways: full separation, half separation		
	Acceleration and deceleration curves	Linear or S-curve acceleration and deceleration methods. Four types of acceleration and deceleration time, acceleration and deceleration time range 0.0~6500.0s		
	DC Brake	DC braking frequency: 0.00Hz~maximum frequency Braking time: 0.0s~36.0s Braking action current value: 0.0%~100.0%		
	Jogging control	Jogging frequency range: 0.00Hz~50.00Hz. Jogging acceleration and deceleration time 0.0s~6500.0s.		
Simple PLC, multispeed operation	Up to 16 speeds via built-in PLC or control terminals			

Item		Specification
	Built-in PID	Closed-loop process control systems can be easily realized
	Automatic voltage regulation (AVR)	Automatically keep the output voltage constant when the grid voltage changes
	over-voltage and overcurrent speed control	Automatic limitation of current and voltage during operation to prevent frequent over-current and over-voltage failure and shutdown.
	Fast current limiting function	Minimizes overcurrent faults and protects the inverter from normal operation
	Torque limiting and control	Automatic torque limiting during operation prevents frequent overcurrents and faulty shutdowns
Individualized function	Excellent performance	Asynchronous and synchronous motor control with high-performance current vector control technology
	No shutdown in case of transient power failure	Compensate for voltage drop during transient power failure by feeding energy back to the load, maintaining the inverter in continuous operation for a short period of time
	Fast current limiting	Avoiding frequent overcurrent faults in inverters
	Virtual IO	Five sets of virtual terminals for easy logic control
	Timed control	Timed control function: Setting time range 0.0Min~6500.0Min
	Multi-motor switch	Two sets of motor parameters for switching control of two motors
	Bus Support	Fieldbus support: RS-485
Running	Multi-Encoder Support	Supports differential, open collector, UVW, resolver, sine and cosine encoders
	Command source	Operation panel giving, control terminal giving, serial communication port giving. Can be switched in a variety of ways
	Frequency source	10 types of frequency sources: digital give and take, analogue voltage give and take, analogue current give and take, pulse give and take, serial port give and take. Switchable in various ways
	Auxiliary frequency source	10 kinds of auxiliary frequency sources. Flexible realization of auxiliary frequency trimming, frequency synthesis
	Input terminal	Standard: 6 digital input terminals, 1 of which supports high-speed pulse inputs up to 100kHz 2 analogue input terminals, both support 0 to 10V voltage input or 0 to 20mA current input
Output terminal	Standard: 1 high-speed pulse output terminal (optional open collector type), support 0~100kHz square wave signal output 1 digital output terminal 2 relay output terminals	

Item		Specification
		2 analogue output terminals, support 0~20mA current output or 0~10V voltage output
Display and keyboard operation	LED display	Displaying parameters
	Key lock and function selection	Partial or full locking of keys, defining the scope of action of some keys to prevent misuse.
	Protective function	Motor short circuit detection, input and output phase loss protection, over-current protection, over-voltage protection, under-voltage protection, over-heating protection, overload protection, etc.
Environment	Location	Indoors, out of direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapour, dripping water or salt, etc.
	Altitude	Below 1000m
	Ambient temperature	-10 °C ~+40 °C (Please use at a reduced rating if the ambient temperature is 40°C~50°C)
	Humidity	Less than 95% RH, no water droplet condensation
	Vibration	Less than 5.9 m/s <sup>2</sup> (0.6 g)
	Storage temperature	-20°C~+60°C

## 3.2 Product introduction

### 3.2.1 VL600 Series Inverter Models

Table 3-2 Inverter Series Models

Inverter Model	Voltage range	Rated input current (A)	Rated output current (A)	Adapted motor (kW)
VL600-2S0R75G	Single-phase 220V -15%~20%	8.2	4.0	0.75
VL600-2S1R5G		14.0	7.0	1.5
VL600-2S2R2G		23.0	9.0	2.2
VL600-2S4R0G		36.0	17.0	4.0
VL600-2S5R5G		55.0	25.0	5.5
VL600-4T0R75GB/1R5PB	Three-phase 380V -20%~20%	3.4/5.0	2.3/3.7	0.75/1.5
VL600-4T1R5GB/2R2PB		5.0/5.8	3.7/5.0	1.5/2.2
VL600-4T2R2GB/4R0PB		5.8/10.0	5.0/9.0	2.2/4.0
VL600-4T4R0GB/5R5PB		10.0/14.6	9.0/13.0	4.0/5.5
VL600-4T5R5GB-S		14.6	13.0	5.5
VL600-4T5R5GB/7R5PB		14.6/20.5	13.0/17.0	5.5/7.5
VL600-4T7R5GB/11PB		20.5/26.0	17.0/25.0	7.5/11

Inverter Model	Voltage range	Rated input current (A)	Rated output current (A)	Adapted motor (kW)
VL600-4T11GB/015PB		26.0/35.5	25.0/32.0	11/15
VL600-4T15GB-S		35.0	32.0	15
VL600-4T15GB/18.5PB		35.0/38.5	32.0/37.0	15.0/18.5
VL600-4T18GB/22PB		38.5/46.5	37.0/45.0	18.5/22
VL600-4T22BG/30PB		46.5/62.0	45.0/60.0	22/30
VL600-4T30GB-S		62.0	60.0	30
VL600-4T30G/37P		62.0/76.0	60.0/75.0	30/37
VL600-4T37G/45P		76.0/92.0	75.0/90.0	37/45
VL600-4T45G/55P		92.0/113.0	90.0/110.0	45/55
VL600-4T55G/75P		113.0/157.0	110.0/152.0	55/75
VL600-4T75G/93P		157.0/180.0	152.0/176.0	75/90
VL600-4T93G/110P		180.0/214.0	176.0/210.0	90/110
VL600-4T110G/132P		214.0/256.0	210.0/253.0	110/132
VL600-4T132G/160P		256.0/307.0	253.0/304.0	132/160
VL600-4T160G-S		307.0	304.0	160
VL600-4T160G/185P	Three-phase 380V -20%~20%	307.0/345.0	304.0/340.0	160/185
VL600-4T185G/200P		345.0/385.0	340.0/380.0	185/200
VL600-4T200G/220P		385.0/430.0	380.0/426.0	200/220
VL600-4T220G/250P		430.0/488.0	426.0/470.0	220/250
VL600-4T250G/280P		488.0/525.0	470.0/520.0	250/280
VL600-4T280G/315P		525.0/605.0	520.0/590.0	280/315
VL600-4T315G/355P		605.0/667.0	590.0/650.0	315/355
VL600-4T355G/400P		667.0/750.0	650.0/725.0	355/400
VL600-4T400G/450P		750.0/830.0	725.0/820.0	400/450
VL600-4T450G/500P		830.0/920.0	820.0/900.0	450/500
VL600-4T500G-S	920	900	500	

 **Note:**

**For VL600-4T-160G~VL600-4T-500G, DC reactors are optional.**

### 3.2.2 Model and Nameplate Description of VL600 Series Inverters

The model description of the VL600 inverter is shown in Figure 3-1 and the nameplate description is shown in Figure 3-2.

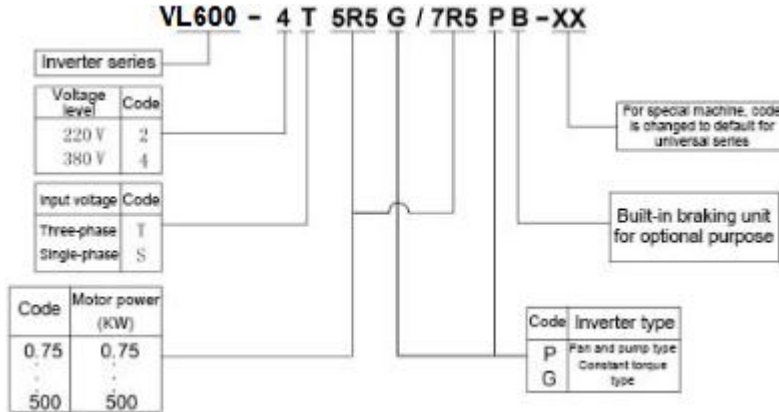


Figure 3-1 VL600 Inverter Models

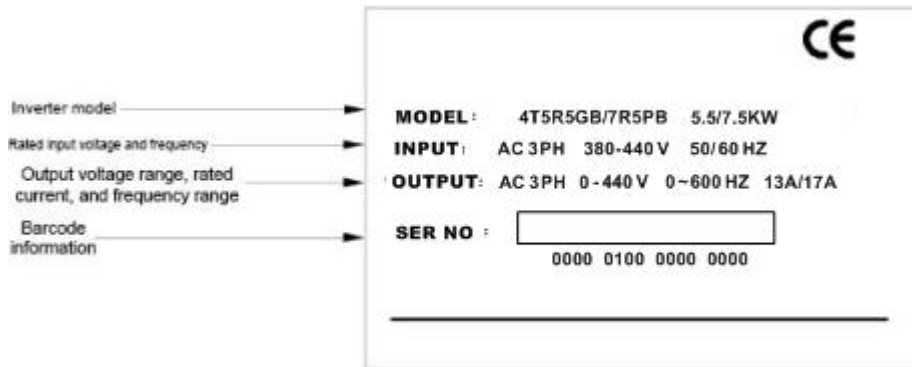


Figure 3-2 VL600 Inverter Nameplate

### 3.2.3 VL600 Series Inverter External Dimensions

The shape of VL600 series inverter is shown in Figure 3-3, and the specific shape and installation dimensions are shown in Table 3-3.

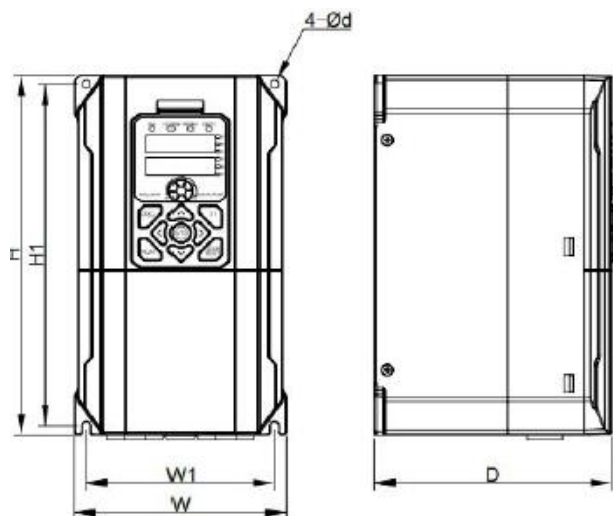


Figure a

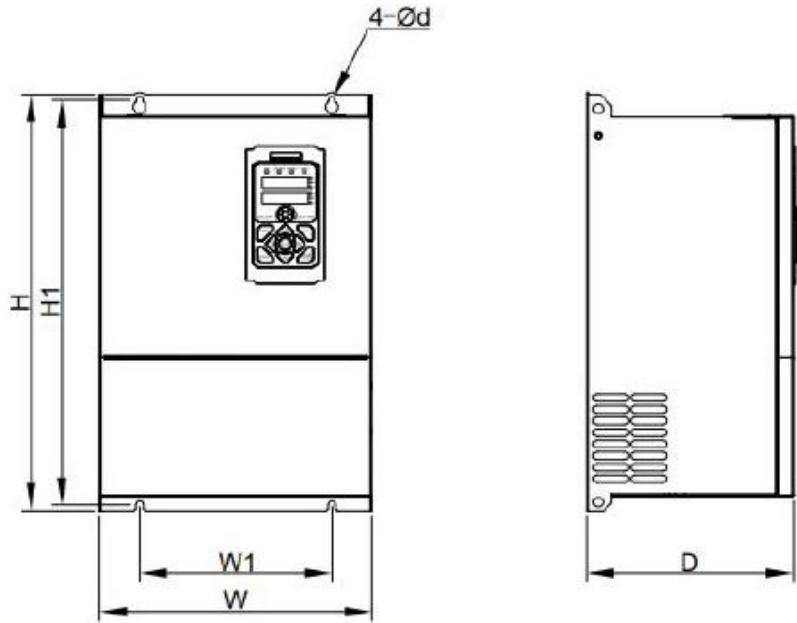


Figure b

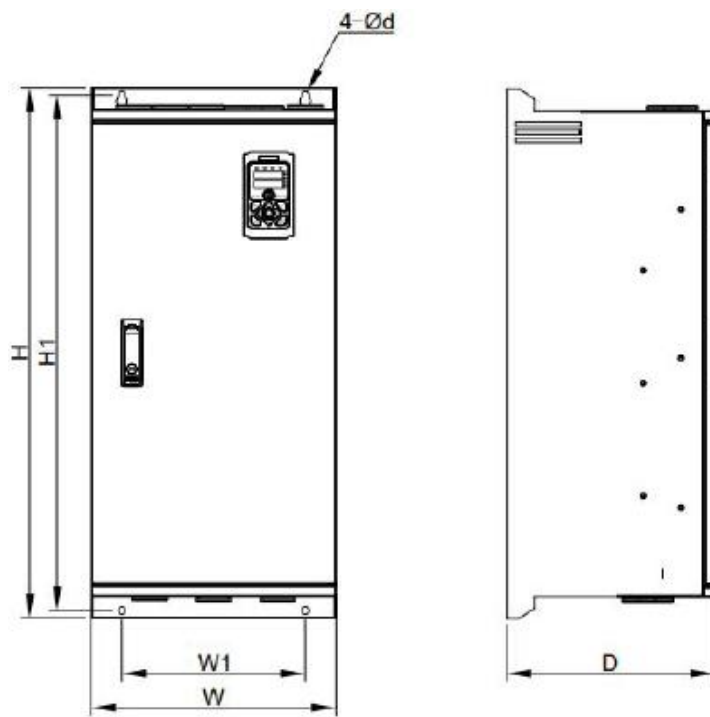


Figure c

Table 3-3 VL600 series inverter external size table (mm)

Inverter Model	D	W1	H1	H	W	Outline drawing number	Hole diameter (mm)	Approximate weight (kg)	Installation method
VL600-2S0R75G	155	118	176.5	186	126	Figure a	4.5	2.1	Hanging type
VL600-2S1R5G									
VL600-2S2R2G									
VL600-4TR75GB/1R5PB									
VL600-4T1R5GB/2R2PB									
VL600-4T2R2GB/4R0PB									
VL600-4T4R0GB/5R5PB									
VL600-4T5R5GB-S	169	133	243	256	150	Figure a	5.5	4.5	Hanging type
VL600-2S5R5G									
VL600-2S7R5G									
VL600-4T5R5GB/7R5PB									
VL600-4T7R5GB/11PB									
VL600-4T11GB/015PB									
VL600-4T15GB/18.5PB	196	150	318	338	221	Figure b	6.5	8.5	Hanging type
VL600-4T18GB/22PB									
VL600-4T22GB/30PB									
VL600-4T30GB-S	230	200	418	430	283	Figure b	6.5	18	Hanging type
VL600-4T30G/37P									
VL600-4T37G/45P									
VL600-4T45G/55P	280	270	495	510	340	Figure b	8.0	38	Hanging type
VL600-4T55G/75P									
VL600-4T75G/93P									
VL600-4T93G/110P	297	334	645	671	395	Figure c	12.0	65	Hanging type
VL600-4T110G/132P									
VL600-4T132G/160P									
VL600-4T160G-S									
VL600-4T160G/185P	350	300	840	870	400	Figure c	12.0	120	Compatible with hanging type and cabinet type
VL600-4T200G/220P									
VL600-4T220G/250P									
VL600-4T250G/280P	375	250	932	966	569	Figure c	12.0	160	Compatible with hanging type and cabinet type
VL600-4T280G/315P									
VL600-4T315G/355P									

Inverter Model	D	W1	H1	H	W	Outline drawing number	diameter of hole	Approximate weight (kg)	Installation
VL600-4T355G/400P	380	300	1130	1235	720	Figure c	14.0	240	Hanging type
VL600-4T400G/450P				1684					Cabinet type
VL600-4T450G/500P									
VL600-4T500G-S									

### 3.2.4 LED keypad display unit size

The shape and mounting dimensions of the VL600 series inverter LED keypad display unit are shown in Figure 3-4.

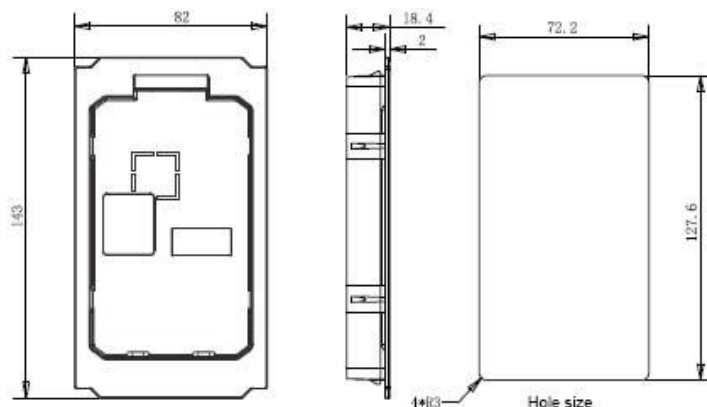


Figure 3-4 Keyboard Box Outline and Mounting Dimensions

### 3.3 Options

If the following options are required, please order separately from this Company.

Option name	Scope of selection	Specification	Note
Brake unit	See table 3-4	See Table 3-4	
Keyboard tray	0.4KW~500KW for option	See Figure 3-4	Hole size
Keyboard extension cable	0.4KW~500KW for option	0.5m, 1.5m, 3m	Flat cable (valid for keyboard potentiometers)
		0.5m, 1.5m, 3m	Network cable (invalid for keyboard potentiometer)
DC reactors	160KW~500KW for option	-	-

#### 3.3.1 Recommended Brake Resistors and Brake Units

VL600 series inverter contains a braking unit, if there is a requirement of energy consumption braking, please refer to Table 3-4 for the braking resistor or braking unit, and refer to Table 4-2 for the wire specification between the braking resistor or braking unit and the inverter.

Table 3-4 Braking Resistor and Brake Unit Selection Recommendation Table

Inverter Model	Recommended Resistance Value of Braking Resistor	Recommended power of braking resistor	Recommended models of brake units	Note
VL600-4T0R75GB/1R5PB	250-350Ω	100W	Built-in standard configuration	Configuration of applicable motors
VL600-4T1R5GB/2R2PB	200-300Ω	200W		
VL600-4T2R2GB/4R0PB	100-250Ω	250W		
VL600-4T4R0GB/5R5PB	100-150Ω	300W		
VL600-4T5R5GB/7R.5PB	80-100Ω	500W		
VL600-4T7R5GB/011PB	60-80Ω	700W		
VL600-4T11GB/015PB	40-50Ω	1KW		
VL600-4T15GB/18.5PB	30-40Ω	1.5KW		
VL600-4T18GB/22PB	25-30Ω	2KW		
VL600-4T22GB/030PB	20-25Ω	2.5KW		
VL600-4T30G/37P	15-20Ω	3KW	Built-in options	Add "B" to the inverter model.
VL600-4T37G/45P	15-20Ω	3.5KW		

Inverter Model	Recommended Resistance Value of Braking Resistor	Recommended power of braking resistor	Recommended models of brake units	Note
VL600-4T45G/55P	10-15Ω	4.5KW		
VL600-4T55G/75P	10-15Ω	5.5KW		
VL600-4T75G/93P	8 to 10Ω	7.5KW		
VL600-4T93G/110P	8 to 10Ω	9.0KW	BU4R150	External options
VL600-4T110G/132P	6 to 8Ω	11.0KW		
VL600-4T132G/160P	6 to 8Ω	13.5KW	BU4R250	External options
VL600-4T160G/185P	4 to 6Ω	16.0KW		
VL600-4T200G/220P	4 to 6Ω	20.0KW		
VL600-4T220G/250P	6 to 8Ω	11.0*2KW		
VL600-4T250G/280P	6 to 8*2Ω	12.5*2KW	BU4R250*2	External options
VL600-4T280G/315P	4 to 6*2Ω	14*2KW		
VL600-4T315G/335P	4 to 6*2Ω	16*2KW		
VL600-4T355G/400P	4 to 6*3Ω	11*3KW		
VL600-4T400G/450P	4 to 6*3Ω	14*3KW	BU4R250*3	External options
VL600-4T450G/500P	4 to 6*3Ω	17*3KW		
VL600-4T500G-S	4 to 6*3Ω	17*3KW	BU4R250*3	External options

Attachment: Calculation of braking resistance

When braking, the regenerative energy of the motor is almost entirely consumed in the braking resistance. It can be based on Eq:

$$U \times U/R = P_b$$

U - braking voltage of the system stabilized braking (U value is different for different systems, 700V is generally taken for 380Vac system);

P<sub>b</sub> - brake power

Selection of braking resistor power

Theoretically, the power of the braking resistor is the same as the braking power, but considering the derating as 70%. It can be based on Eq:

$$0.7 \times P_r = P_b \times D$$

P<sub>r</sub> - Power of the resistor;

D - Braking frequency, i.e., the proportion of the regeneration process to the whole working process.

Common applications, lift, uncoiling and coiling, centrifuges, occasional braking loads, general applications

Common applications	Lifts	Uncoiling and coiling	Centrifuges	Occasional braking loads	General applications
Braking frequency value	20%~30%	20~30%	50%~60%	5%	10%

In table 3-4, guidance data is provided, the user can choose different resistor resistance value and power according to the actual situation, (but the resistance value must not be less than the recommended value in the table, the power can be larger.) The selection of braking resistor needs to be determined according to the power generated by the motor in the actual application system, and is related to the inertia of the system, deceleration time, and the energy loaded in potential energy, etc., and braking resistor shall be selected by the customer according to the actual situation. The larger the inertia of the system, the shorter the

deceleration time required, and the more frequent the braking, the braking resistor with the larger power and the smaller resistance value needs to be selected.

### 4. Installation and Wiring

#### 4.1 Installation environment

Ambient temperature: Ambient temperature is required to be within the range of -10 °C ~40 °C, if the temperature exceeds 40 °C, it is necessary to take measures to dissipate heat or to operate by derating;

Humidity: Humidity is required to be less than 95%, with no water condensation;

Avoid installing in places with direct sunlight;

Avoid installing in places with oil, dust and metal powder;

It is strictly prohibited to install in places with corrosive and explosive gas;

Please install it vertically, the inverter is easy to generate heat when working, please take appropriate heat dissipation or cooling measures;

Installation interval and distance requirements, as shown in Figure 4-1; the installation of multiple inverters is shown in Figure 4-2, when two inverters are installed in the upper and lower positions, the diversion baffle shall be utilized between such two inverters, as shown in Figure 4-3.

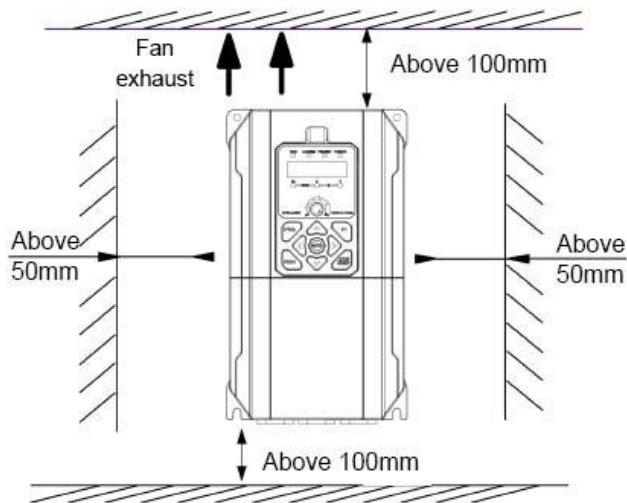


Figure 4-1 Installation interval distance

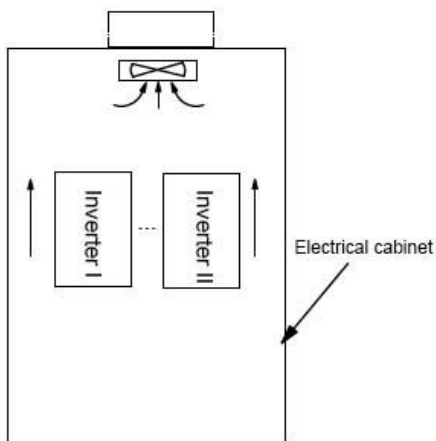


Figure 4-2 Installation of multiple inverters

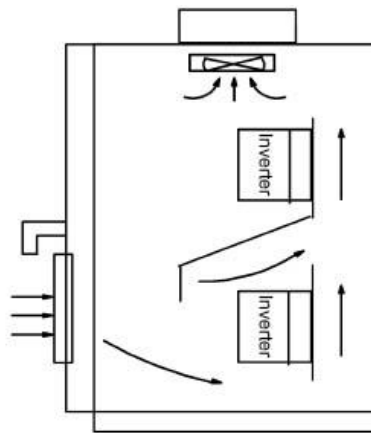


Figure 4-3 Installation of multiple

## inverters

**4.1.1 EMC-compliant mounting method**

In a drive system consisting of an inverter and a motor, if the inverter, the control unit and the sensors are mounted in a cabinet, the noise emitted externally is to be limited at the main connection point, and thus noise filters and incoming reactors are to be installed in the cabinet. The cabinet shall also fulfil EMC requirements.

The working principle of the inverter determines the inverter external electromagnetic interference is unavoidable. Inverter is generally installed in the metal cabinet, for the instrumentation outside the metal cabinet, by the inverter itself has little impact on the radiation emission. External connection cable is the main source of radiation emission, in accordance with the cable requirements described in this chapter wiring, can effectively inhibit the cable radiation emission.

Consideration of spatial isolation of noise sources and use of noise absorbers at the mechanical/system design stage is the most effective measure to minimize interference, but is more costly. If there is only individual sensitive equipment on site, installing power filters on the sensitive equipment side alone can reduce costs. Inverters and motors form a drive system in which inverters, contactors, etc. can be noise sources, and automation devices, encoders and sensors are susceptible to noise interference.

Divide the machinery/system into different EMC zones according to the electrical characteristics, it is recommended to place the device in the zones divided as shown in Figure 4-4.

**📖 Tips:**

**1. After correctly installing the EMI filter and AC reactor, VL600 inverter can meet the relevant requirements of IEC 61800-3 standard formulated by the International Electrotechnical Commission.**

**2. Input (output) EMI filters shall be located as close as possible to the inverter.**

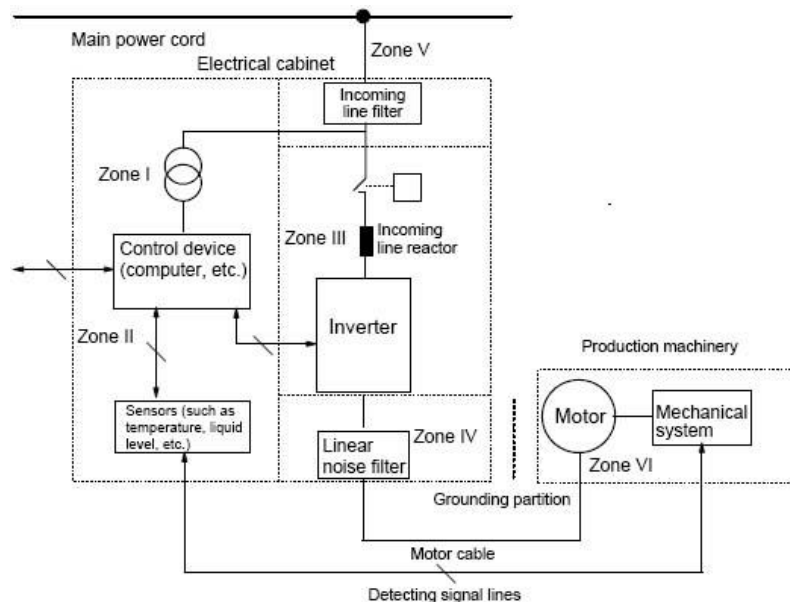


Figure 4-4 Schematic diagram of the recommended area division for inverter EMC installation

Description:

Zone I: Control power transformers, control systems and sensors, etc.

Zone II: Signal and control cable interface section, requiring a certain level of immunity.

Zone III: Noise sources such as incoming reactors, inverters, braking units, contactors, etc.

Zone IV: Output noise filter and its wiring section.

Zone V: Power supply (including radio noise filter wiring section).

Area VI: Electric motors and their cables.

The minimum interval between each zone is 20cm. it is better to decouple each zone with a grounding partition, and the cables of different zones shall be put into different cable ducts.

The filter shall be installed at the inter-area interface. All communication cables (e.g. RS485) and signal cables leading from the cabinet shall be shielded.

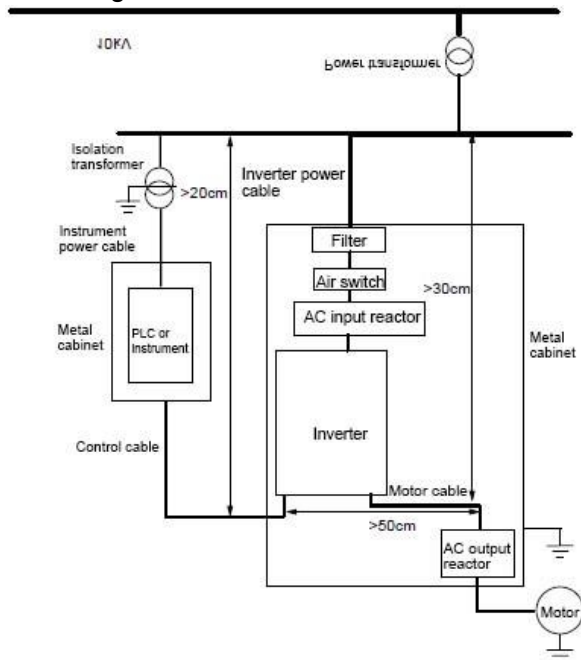


Figure 4-5 Installation Schematic of Inverter

**4.1.2 Noise suppression**

Noise generated by inverter operation may affect nearby instruments and equipment, and the degree of impact is related to the inverter control system, the equipment's ability to resist noise interference, the wiring environment, the placement distance and grounding methods and other factors.

Table 4-1 Noise Suppression Countermeasures Table

Noise propagation path	Impact mitigation measures
When the power supply of peripheral equipment is shared with the power supply of the inverter, the noise generated by the inverter spreads against the power line and can cause other equipment in the same system to fault.	Noise filters are installed at the input of the inverter; noise isolation of other equipment is performed with isolation transformers or power filters.

Noise propagation path	Impact mitigation measures
<p>Measuring instruments, radio devices, sensors and other equipment with weak signals and their signal lines are installed in the same cabinet as the inverter, and the wiring is very close to each other, so it is easy to be affected by space noise and generate faults.</p>	<p>1) The easily affected equipment and signal lines shall be installed as far away from the inverter as possible. Signal lines shall use shielded wires, with the shield grounded, and signal line cables sleeved in metal tubes, and shall be kept as far away as possible from the inverter and its input and output lines. If the signal cable must cross the power cable, keep orthogonal between the two.</p> <p>2) Radio noise filters and linear noise filters (ferrite common-mode chokes) are installed on the input and output sides of the inverter respectively, which can suppress the radiated noise from the power line;</p> <p>3) The motor cable line shall be placed in a barrier of greater thickness, such as placed in a pipe of greater thickness (more than 2mm) or buried in a cement tank. The power cable is sleeved in a metal pipe and grounded with a shielded wire (the motor cable is a 4-core cable, in which one end of the grounding cable is grounded on the inverter side and the other end is connected to the motor shell).</p>
<p>If the signal line and power line are wired in parallel or bundled with the power line in a bundle, the equipment may sometimes fault due to electromagnetic induction noise and electrostatic induction noise propagating in the signal line.</p>	<p>Such wiring shall be avoided and the easily affected equipment shall be kept as far away as possible from the inverter; the easily affected signal lines shall be kept as far away as possible from the input and output lines of the inverter; shielded wires shall be used for the signal lines and power lines. It is more effective if they are set into metal tubes separately, and the distance between metal tubes is at least 20cm.</p>

**4.1.3 Using a surge suppressor**

Relays, contactors and electromagnetic brakes that generate a lot of noise must be fitted with a surge suppressor even if they are installed outside the inverter chassis.

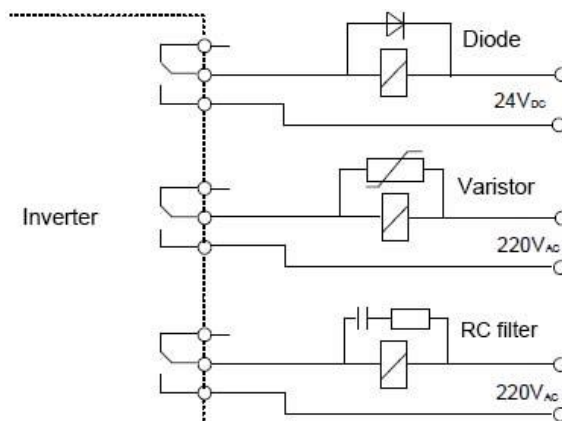


Figure 4-6 Relay, Contactor and Electromagnetic Brake Requirements

**4.1.4 Leakage current and its countermeasures**

Leakage current includes inverter-to-ground leakage current and leakage current between inverter input and output lines. Its size depends on the distribution capacitance, carrier

frequency.

Leakage current to ground:

Leakage currents will not only flow into the inverter system, but may also flow into other equipment through the ground, and these leakage currents may cause leakage circuit breakers, relays or other equipment to operate incorrectly. The higher the carrier frequency of the inverter, the higher the leakage current; the longer the motor cable, the higher the leakage current.

Suppression measures:

Reduce the carrier frequency, but the motor noise will increase;

Keep motor cables as short as possible;

Use earth leakage circuit breakers to protect the inverter system from high harmonic/surge leakage currents.

Leakage current between wires:

Leakage current flowing through the distribution capacitor between the cables on the output side of the inverter, and its high harmonics may cause the external thermal relay to operate incorrectly, and when it is wired for a long time (more than 50m), the leakage current is relatively increased, which is easy to cause the external thermal relay to operate incorrectly.

Suppression measures:

Reduce the carrier frequency, but the motor noise will increase;

Install a reactor on the output side.

In order to reliably protect the motor, it is recommended to use a temperature sensor to directly monitor the motor temperature and to replace the external thermal relay with the overload protection function (electronic thermal relay) of the inverter itself.

#### **4.1.5 Occasions where the power filter is used**

Equipment that generates strong interference from the outside world and equipment that is sensitive to outside interference shall use power filters. The power line filter is a bidirectional low-pass filter that allows DC or 50Hz industrial frequency current to pass through, and does not allow higher-frequency EMI current to pass through. The input side optional EMI filter can suppress the high-frequency noise interference from the inverter power line, the output side optional EMI filter can suppress the interference noise and wire leakage current generated by the output side of the inverter.

Power filters are installed to enable the equipment to meet the requirements of the EMC standards for conducted emissions and conducted sensitivity, preventing electromagnetic interference generated by the equipment itself from entering the power line, and preventing interference on the power line from entering the equipment.

Common errors in power line filter installation:

The power input cable is too long;

The filter in the cabinet shall be mounted close to the power line inlet, and the filter's power input cable shall be as short as possible inside the chassis.

The input and output wires of the power line filter are too close together.

The input and output lines of the filter are too close together, and high frequency interference signals are directly coupled through the input and output lines of the filter, bypassing the filter and thus rendering the power line filter useless.

Poor filter grounding:

The filter housing must be reliably connected to the metal case. The filter housing usually has a dedicated earth terminal, but if a wire is used to connect the filter to the housing, it is useless for high-frequency interfering signals because the impedance (non-resistance) of a long wire is so high at high frequencies that it does not act as an effective bypass. The correct installation method is to attach the filter housing directly to the conductive plane of the metal housing of the equipment, and take care to remove the insulating paint.

#### **4.1.6 Occasions where AC reactors are used**

AC input reactor:

When the grid waveform distortion is serious and the interaction of high harmonics between the inverter and the power supply is not enough to meet the requirements, an AC input

reactor can be added. The AC input reactor can also improve the power factor of the input side of the inverter.

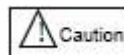
AC output reactors:

When the connection line from the inverter to the motor exceeds 80 meters, it is recommended to use multi-stranded wires and install an AC output reactor that can suppress high-frequency oscillations. Avoid motor insulation damage, excessive leakage current and frequent protection of the inverter.

## 4.2 Inverter wiring



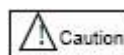
- The inverter cover plate can be opened only after reliably disconnecting the power supply to the inverter, switching off all indicators of the LED keypad display unit and waiting for at least 10 minutes.
- Internal wiring work can be started only after confirming that the voltage value between (+) and (-) of the main circuit terminals is below DC36V.
- Inverter internal wiring work shall only be carried out by trained and authorized qualified professionals.
- When connecting an emergency stop or safety circuit, carefully check its wiring before and after operation.
- Be careful to check the voltage level of the inverter before switching on the power, otherwise it may cause injury or death and equipment damage.



- Carefully verify whether the rated input voltage of the inverter is the same as the voltage of the AC power supply or not before use.
- The inverter has passed the voltage withstand test before leaving the factory, and the user may not carry out the voltage withstand test on the inverter again.
- When an external braking resistor or braking unit is required, refer to 2.3.1 in Chapter 2.
- Prohibit connecting the power cord to U, V, and W.
- Grounding wire is generally copper wire with the cross-section area of 2.5mm<sup>2</sup> or more, grounding resistance is less than 10Ω.
- Leakage current exists in the inverter, for safety, the inverter and motor must be earthed.
- To provide input-side overcurrent protection and ease of maintenance in case of power failure, the inverter shall be connected to the power supply through an air switch or a fused switch.



- VL600 series inverter is designed for basic insulation level between the control circuit and the power circuit, when the wiring of the control terminals must be connected to the control circuit of the external equipment accessible to the user, at least one level of additional insulation shall be added, and the insulation voltage level is based on the AC power input of the user's equipment.
- If the control circuit terminals are connected to other safety voltage level circuits (SELV) (e.g. RS485 terminals are connected to a PC computer via some kind of adapter), one level of additional insulation shall be added to ensure that the original SELV insulation level is not changed.



- The inverter control terminals are ELV (Extra Low Voltage) circuits and shall not be touched when energized;
- If the external device is equipped with ports that can be reached during energization

(SELV-Safety Extra Low Voltage circuit), take care that additional protective isolation devices are installed, otherwise the SELV circuit safety voltage characteristic of the external device will be reduced to the ELV circuit safety voltage characteristic;

•When connecting with a PC, use an RS485 protective isolation converter that meets the safety requirements.

#### 4.2.1 Overview

When wiring the inverter, you need to complete the power circuit and control circuit wiring.

Firstly, open the upper panel of the inverter and you will see the terminals for the power and control circuits.

Below the mounting position of the keypad display unit is the control circuit terminal block and jumpers J1, J7, J8, J9, J10, J11.

The terminal blocks are relay output ports and analogue and digital inputs, outputs and communication interfaces.

J1, J8, J9 and J11 jumpers can be used to select the analogue inputs and outputs as voltage or current signals. The function of each terminal is described separately below.

The following figure shows the general wiring diagram of the inverter.

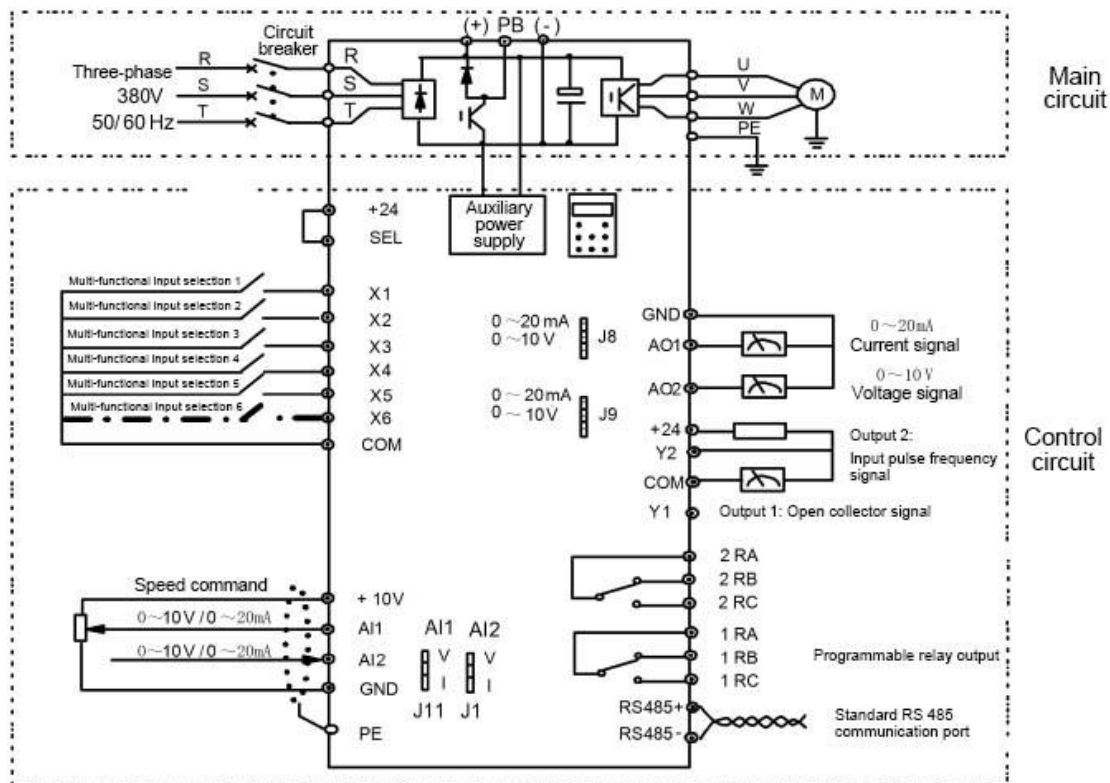


Figure 4-7 Basic Wiring Diagram

#### 📖 Tips:

1. In the figure, "O" is the main circuit terminal and "⊙" is the control terminal;
2. AI2 selects the input voltage or current signal, which is switched by the position of the J1 jumper on the control board;
3. Braking unit is included, when using energy consumption braking, it is necessary to connect braking resistor between PB, (+);
4. For the use of the control terminals, refer to section 4.2.3.
5. An overcurrent protection device MCCB must be added to the input of each inverter and fixed in the electrical cabinet.

**6. It is recommended that the wire diameter of the inverter and the capacity of the MCCB meet the requirements of Table 4-2 below.**

Table 4-2 Recommended circuit breaker capacity and copper core insulated conductor cross section

Model	MCCB circuit breaker (A)	Power circuit (mm <sup>2</sup> )				Control circuit wires (mm <sup>2</sup> )
		input line	brake line	output line	grounding wire	
VL600-2S0R75G	20	2.5	1.0	1.0	2.5	1.0
VL600-2S1R5G	32	4.0	1.5	2.5	4.0	1.0
VL600-2S2R2G	50	6.0	1.5	2.5	6.0	1.0
VL600-2S4R0G	75	8.0	1.5	4.0	6.0	1.0
VL600-4T0R75GB/1R5PB	10	1.0	1.0	1.0	2.5	1.0
VL600-4T1R5GB/2R2PB	16	1.5	1.0	1.5	2.5	1.0
VL600-4T2R2GB/4R0PB	16	1.5	1.5	1.5	2.5	1.0
VL600-4T4R0GB/5R5PB	25	2.5	1.5	2.5	2.5	1.0
VL600-4T5R5GB/7R5PB	32	4.0	2.5	4.0	4.0	1.0
VL600-4T7R5GB/011PB	32	4.0	2.5	4.0	4.0	1.0
VL600-4T11GB/015PB	40	6.0	4.0	6.0	6.0	1.0
VL600-4T15GB/18.5PB	63	6.0	4.0	6.0	6.0	1.0
VL600-4T18GB/022PB	63	10	10	10	10	1.0
VL600-4T22GB/30PB	80	16	16	16	16	1.0
VL600-4T30G/37P	100	25	25	25	16	1.0
VL600-4T37G/45P	160	25	25	25	16	1.0
VL600-4T45G/55P	200	35	35	35	16	1.0
VL600-4T55G/75P	200	35	35	35	25	1.0
VL600-4T75G/93P	250	70	70	70	35	1.0
VL600-4T93G/110P	310	70	70	70	35	1.0
VL600-4T110G/132P	400	95	95	95	50	1.0
VL600-4T132G/160P	400	150	150	150	75	1.0
VL600-4T160G/185P	500	185	Refer to the brake unit manual	185	95	1.0
VL600-4T200G/220P	600	150*2		150*2	150	1.0
VL600-4T220G/250P	800	185*2		185*2	185	1.0
VL600-4T250G/280P	800	185*2		185*2	185	1.0
VL600-4T280G/315P	800	185*2		185*2	185	1.0
VL600-4T315G/355P	800	150*3		150*3	125*2	1.0
VL600-4T355G/400P	800	150*4		150*4	150*2	1.0
VL600-4T400G/450P	1000	150*4		150*4	150*2	1.0
VL600-4T450G/500P	1200	180*4		180*4	180*2	1.0
VL600-4T500G-S	1200	180*4		180*4	180*2	1.0

**Note:**


If a multi-core cable is used for the control circuit, the single cable wire diameter can be 0.5mm<sup>2</sup>.

#### 4.2.2 Input and output terminals of main circuit

For the introduction of the main circuit terminals of the VL600 series inverter, please refer to the following section according to the inverter model you have purchased:

Table 4-3 Description of main circuit terminals

Terminal name	Function description
R, S, T /L, N	Three-phase AC input terminal /single-phase AC input terminal

(+), PB	Brake Resistor Connection Terminal
(+), (-)	DC power input terminals. External brake unit DC output terminal
U, V, W	Three-phase AC output terminals
	Ground terminal

### 4.2.3 Configuration and wiring of control circuit

4.2.3.1 Brief description of the relative positions and functions of control panel terminals and jumpers

Table 4-6 Jumper Switch Functions Used by Users

No.	Functions and Settings	Factory value
J1	AI2 current/voltage input method selection I: 0~20mA current signal V: 0 to +10V voltage signal	0 to +10V
J7	GND ground	-
J8	AO1 output current/voltage type selection 0~20mA: AO1 terminal output current signal 0~+10V: AO1 terminal output voltage signal	0 to +10V
J9	AO2 output current/voltage type selection 0~20mA: AO2 terminal output current signal 0 to +10V: Voltage signal output from AO2 terminal	0 to +10V
J10	COM Ground	-
J11	AI1 current/voltage input method selection I: 0~20mA current signal V: 0 to +10V voltage signal	0 to +10V

4.2.3.2 How to use jumper cables

How to use jumper cables for J1 and J11:

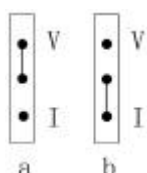


Figure a indicates that 0 to +10V analogue voltage input is selected; Figure b indicates that 0 to 20mA analogue current input is selected.

How to use jumper cable for J7:

How to use jumper cables for J8 and J9:

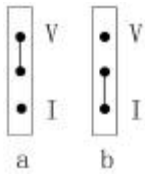
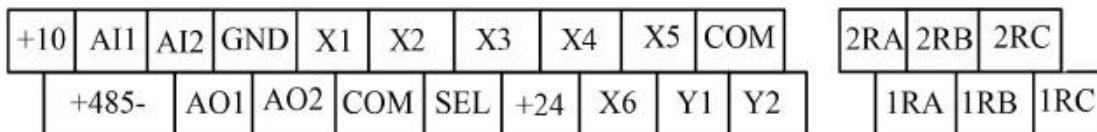


Figure a indicates that 0 to 10V analogue voltage output is selected; Figure b indicates that 0/4 to 20mA analogue current output is selected.

#### 4.2.3.3 Terminal block wiring

The terminals are arranged as follows



RA-RB: Normally closed; RA-RC: Normally open

Contact capacity: 250Vac/2A (COS $\phi$ =1), 250Vac/1A (COS $\phi$ =0.4), 30Vdc/1A

RA, RB, RC can be programmed to define switching output terminals for multiple functions, see Chapter 6, Section 6.6 Terminal Function Parameters (P5 Group Function Codes) Output Terminal Description for details.

Relay output terminals RA, RB, RC wiring:

If driving inductive loads (e.g. electromagnetic relays, contactors), surge voltage absorption circuits shall be added; e.g. RC absorption circuits (note that their leakage currents shall be less than the holding current of the contactor or relay under control), varistors, or continuity diodes, etc. (used in DC magnetic circuits, and the polarity must be noted when installing them). The components of the absorption circuit shall be installed close to the coil ends of the relay or contactor.



#### Tip:

The "+485-" in the control row terminal indicates two terminals of RS485 interface: 485+, 485-.

Table 4-7 Control Board Terminal Function Table

Category	Terminal Marking	Name	Terminal Function Description
Communication	+485-	RS485 communication interface	RS485 differential signal positive
			RS485 Differential Signal Negative
Analogue input	AI1-GND	Analogue input AI1	1. Input range: DC 0V~10V/0~20mA, determined by the J11 jumper selection on the control board. 2. Input impedance: 22kΩ for voltage input, 500Ω for current input.
	AI2-GND	Analogue input AI2	1. Input range: DC 0V~10V/0~20mA, determined by the J1 jumper selection on the control board. 2. Input impedance: 22kΩ for voltage input, 500Ω for current input.
Analogue output	AO1-GND	Analogue output 1	Voltage or current output is determined by the J8 jumper selection on the control board. Output voltage range: 0V~10V Output current range: 0mA~20mA
	AO2-GND	Analogue output 2	Provide analogue voltage/current output, output voltage and current are selected by jumper J9, factory default output voltage.
Digital input	X1 to X5	Multi-function input terminal 1 to 5	1. Optocoupler isolation, compatible with bipolar inputs 2. Input impedance: 2.4kΩ 3. Voltage range at level input: 9V~30V
	X6	Multi-function input terminal 6	In addition to the features of X1 to X5, X6 can be used as a high-speed pulse input channel. Maximum input frequency: 100kHz
	SEL	External power input terminal	
	+24	+24V power supply	Provide +24V power supply
	COM	+24V power supply common	Internally isolated from GND
Digital output	Y1-COM	Digital Output 1	Optocoupler isolated, bipolar open collector outputs Output voltage range: 0V~24V Output current range: 0mA~50mA
Digital output	Y2-COM	High-speed pulse output	Subject to function code P6-00 "Y2 terminal output method selection". When used as a high-speed pulse output, the maximum frequency goes up to 100kHz; When used as an open collector output, it is the same as Y1 specifications.
Power supply	+10-GND	External +10V power supply	Supply +10V externally, max. output current: 10mA Generally used as an external potentiometer operating power supply, potentiometer resistance range:

Category	Terminal Marking	Name	Terminal Function Description
			1kΩ~5kΩ
	+24-COM	External +24V power supply	Provide +24V external power supply, generally used as the digital input and output terminals and external sensor power supply Maximum output current: 200mA
Other	1RA/1RB/1RC 2RA/2RB/2RC	Relay output	Programmable definition for a variety of functions of the switching output programmable terminals, see Chapter 6, section 6.7 Terminal function parameters (Group P6 function code) Output terminal description

1) Control terminal wiring instructions:

a) Analogue input terminal: Because the weak analogue voltage signal is particularly vulnerable to external interference, it is generally necessary to use shielded cable, and the wiring distance is as short as possible, not more than 20 m, as shown in Figure 4-9. In some analogue signals are subjected to serious interference occasions, the analogue signal source side of the need to add a filtering capacitor or ferrite core, as shown in Figure 4-10.

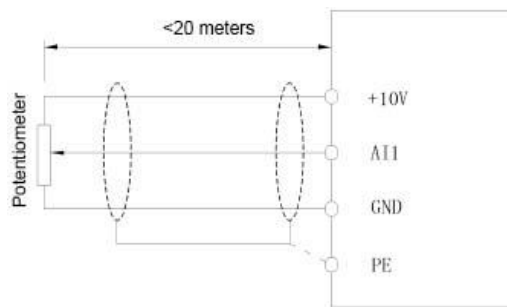


Figure 4-9 Analogue Input Terminal Wiring Schematic

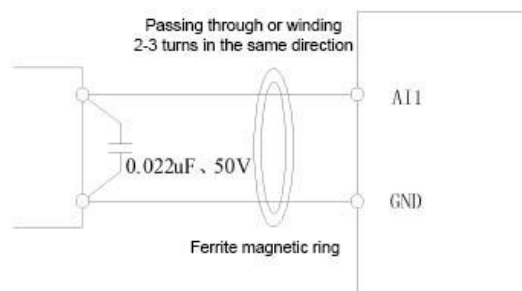


Figure 4-10 Analogue input terminal processing wiring diagram

b) X digital input terminal: generally need to use shielded cable, and wiring distance as short as possible, not more than 20 m. Elected to drive the active way, need to take the necessary filtering measures on the power supply crosstalk. It is recommended to choose the contact control mode.

Sink type wiring method

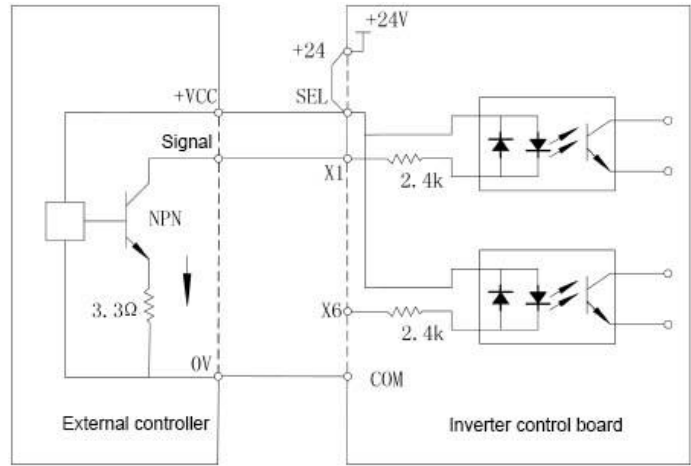


Figure 4-11 Sink type wiring method

This is one of the most commonly used wiring methods. If an external power supply is used, the shorting tab between +24 and SEL must be removed, and the positive terminal of the external power supply must be connected to SEL and the negative terminal of the external power supply must be connected to COM.

Note: Under this wiring method, the X terminals of different inverters can not be connected in parallel, otherwise it may cause X fault; if X terminals need to be connected in parallel (between different inverters), it is necessary to connect a diode in series at the X terminal (anode connecting to X), and the diode needs to satisfy the following requirements:  $I_F < 10\text{mA}$ ,  $U_F < 1\text{V}$ , as shown in the figure below.

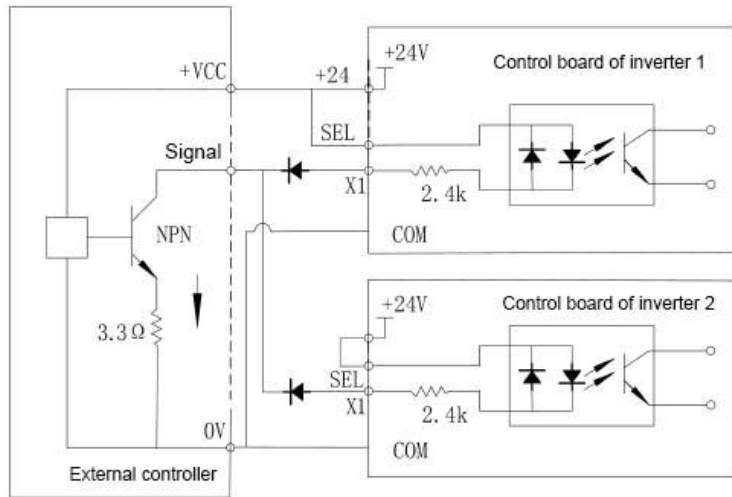


Figure 4-12 Multiple inverter X1 terminal parallel connection sink type wiring method

Source type wiring method

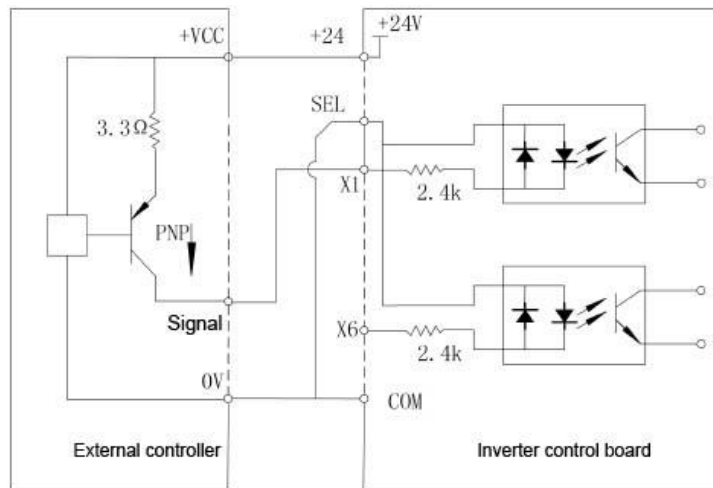


Figure 4-13 Source Type Wiring Method

If an external power supply is used, the shorting tab between +24 and SEL must be removed, and the negative terminal of the external power supply must also be connected to SEL.

c) Digital output terminal: When the digital output terminal needs to drive the relay, absorption diodes shall be added on both sides of the relay coil. Otherwise, it is easy to cause damage to the DC 24V power supply.

**Note: Be sure to install the polarity of the snubber diode correctly. As in Figure 4-14. Otherwise the DC 24V power supply will be burned out immediately when there is output from the digital output terminals.**

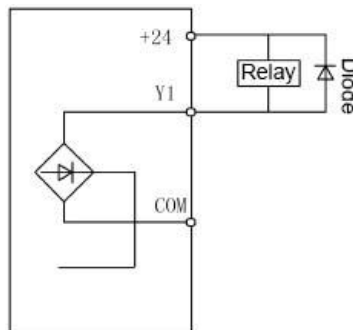


Figure 4-14 Digital Output Terminal Wiring Schematic Diagram

#### 4.2.4 Field wiring requirements

In order to avoid mutual coupling interference, control cables, power cables and motor cables shall be installed separately, and generally they shall be kept far enough apart and as far away as possible from each other, especially when the cables are installed in parallel and extended over long distances. When the signal cable must cross the power cable or motor cable, keep the two crossing vertically.

Motor cables shall be derated when the cross-sectional area is too large. Inverter cable shall use the specified area of the cable (see Table 4-2) due to the cable cross-sectional area of the larger, the greater the capacitance to ground, the greater the leakage current to ground, such as the use of a larger cross-sectional area of the cable, the output current shall be reduced,

the area of each increase in the current is reduced by about 5%.

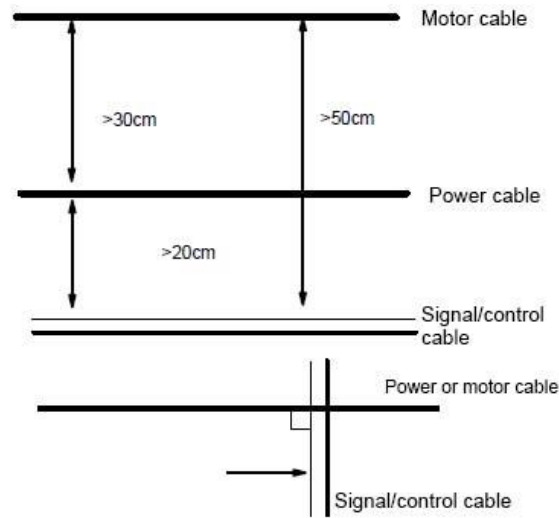


Figure 4-15 System Wiring Requirements

Shielded/armoured cables: High-frequency low-impedance shielded cables shall be used. For example, braided copper wire mesh, aluminium wire mesh or iron wire mesh.

Control cables are generally shielded and the shielded wire mesh must be connected to the metal chassis of the inverter (ground point or ground terminal) via cable clamps at both ends.

Use toothed paint-breaking spacers and conductive mounting plates to ensure good electrical conductivity between the mounting plates, mounting screws and the metal chassis of the inverter.

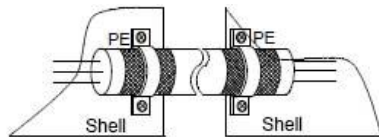


Figure 4-16 Correct Shield Grounding Method

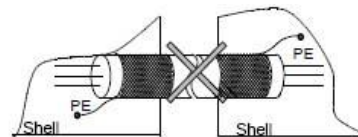


Figure 4-17 Incorrect Shield Grounding Method

### 4.2.5 Grounding Requirements

Dedicated grounding electrode (recommended)

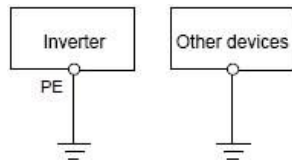


Figure 4-18 Grounding Schematic Diagram 1

Shared grounding electrode (permitted)

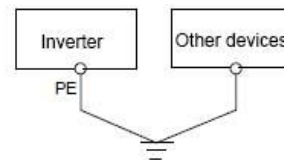


Figure 4-19 Grounding Schematic Diagram 2

Shared earth wire (not permitted)

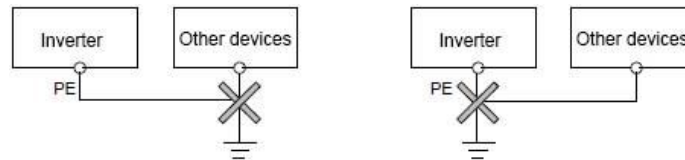


Figure 4-20 Grounding Schematic Diagram 3

In addition, the following points shall be noted:

To ensure that the impedance of the different grounding systems is as low as possible, the largest possible standard size of grounding cable shall be used. The choice of flat cables is relatively good, because the high-frequency impedance of a flat conductor is smaller than that of a round conductor for cables with the same cross-sectional area.

One end of the grounding cable in the 4-core motor cable is grounded on the inverter side, and the other end is connected to the motor grounding terminal; it is more effective if the motor and the inverter have special grounding poles.

If the grounding terminals of the system are connected to one place, the leakage current becomes a source of noise that affects the equipment in the system, so the grounding terminals of the inverter shall be separated from those of other audio equipment, sensors and computers.

To obtain a lower high frequency impedance, the fixing bolts of the unit can be used as high frequency terminals for connection to the rear panel of the cabinet, taking care to remove the insulating varnish from the fixing points.

The grounding cable shall be located away from the wiring of the noise-sensitive equipment I/O and the grounding wire shall be as short as possible, i.e. the grounding point shall be as close as possible to the inverter.

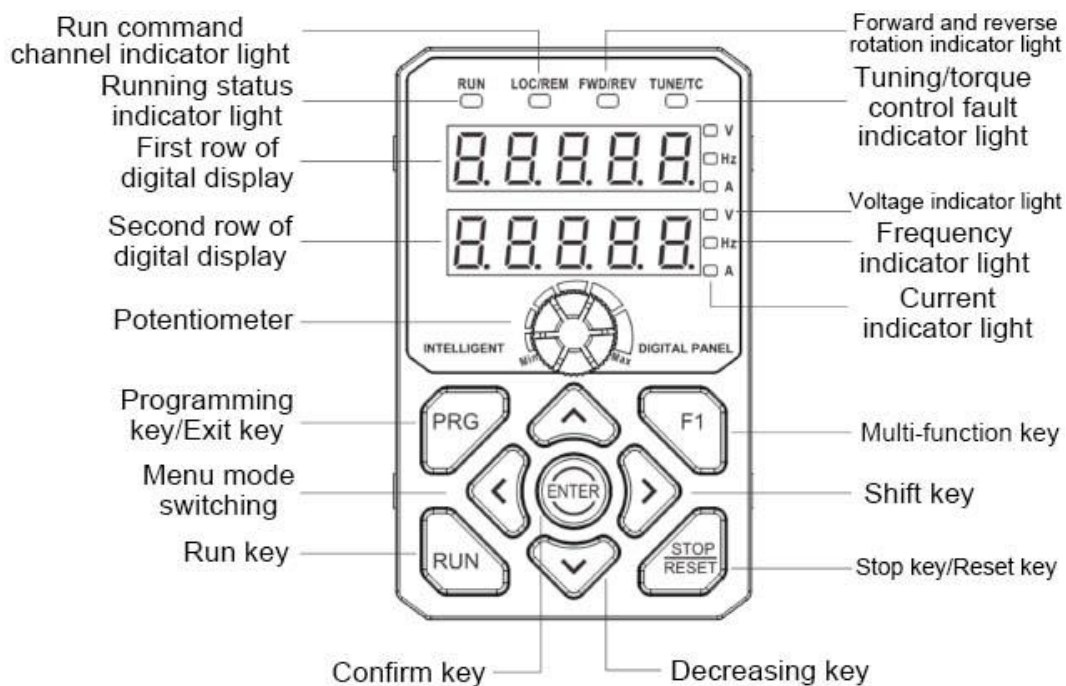
## 5. Operating Instructions

This chapter describes the product knowledge necessary for operation, as well as related operating steps and methods.

### 5.1 Operating panel

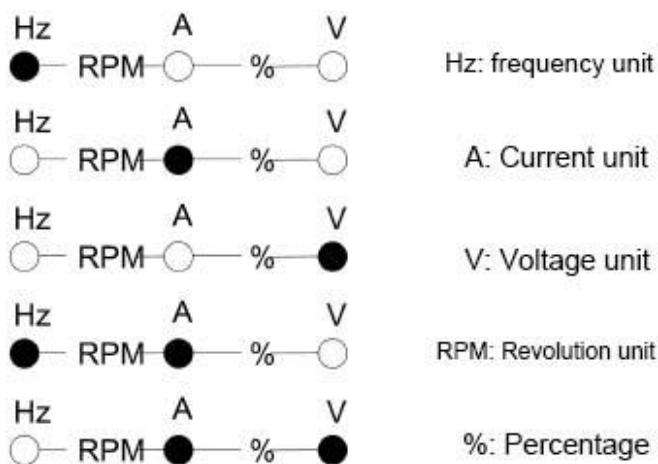
#### 5.1.1 Appearance of operation panel and description of key functions

The operation panel is the main unit where the inverter receives commands and displays parameters.



LED operation panel schematic diagram

Unit combinations:



The operation panel is equipped with 9 keys, and the function of each key is defined as shown in Table 5-1.

Table 5-1 Table of Operation Panel Functions

Key	Name	Function
PRG	Programming Key/Exit Key	Entering or exiting the programming state
ENTER	Confirmation key	Access to lower level menu or data confirmation
∧	Increment key	Increment of data or function codes
∨	Decrement key	Decrement of data or function codes
>	Shift key	The modification bit of the setting data can be selected while in the editing state; In other states, the display can be switched to show the status parameters
<	Menu mode switching	Setting the mode to be switched via PP-04
F1	Multi-function key	The F1 multi-function key can be defined for functions such as command source switching, tapping, and display mode switching. Setting by PE-05
RUN	Run key	In the operation panel mode, press this key to run the
STOP/RESET	Stop/Reset key	Stop or fault reset
⊙	Potentiometer	Setting frequency

### 5.1.2 Description of LED digital tube and indicators

Description of keyboard Indicators

Indicator Name	Status	Description
RUN	Keeping on	Inverter is running
	Keeping off	Inverter stop output
Hz	Keeping on	Displayed as frequency
A	Keeping on	Displayed as current
V	Keeping on	Displayed as voltage
LOC	Keeping off	Indicates that it is currently keyboard controlled;
	Keeping on	Indicates that it is currently terminal controlled;

The operation panel is equipped with a 5-digit 8-segment LED digital tube, 3 unit indicators, and 4 status indicators. As shown in Figure 5-1. The digital tube can display the status parameters, function code parameters, fault alarm code, etc.. The three unit indicator lamps correspond to five kinds of unit indication respectively.

4 Status Indicators: The status indicators are located on top of the digital tube display, and from left to right, they are the Run indicator, Run command channel indicator, Forward/Reverse indicator, and Alarm indicator. See Table 5-2 for a description of the significance of the indicators.

Table 5-2 Status Indicator Description

Indicator	Display Status	The current state of the indication
Operation status indicator	Off	Downtime
	On	Operational state
Run command channel indicator	Off	Operation panel control status

	On	Terminal control status
	Flicker	Serial Port Control Status

### 5.1.3 How to operate the operation panel

The following are examples of eight common operations that can be performed from the operation panel.

#### 5.1.3.1 Example 1: Setting Function Code Parameters

Example: Change the setting of function code P1-01 from 0.00Hz to 0.50Hz.

1. In the shutdown parameter display state, press the PRG key to enter the first level menu P0-00;
2. Press  $\triangleright$  to select the next higher digit;
3. Press  $\wedge$  to change P0-00 to P1-00;
4. Press  $\triangleright$  to select ones digit;
5. Press  $\wedge$  to change P1-00 to P1-01;
6. Press ENTER to enter the secondary menu;
7. Press  $\wedge$  key, to change 0.00 to be 0.50;
8. Press ENTER key confirms the modification and returns to the first level menu, the modification is successful.

The above procedure can be seen in the figure below:

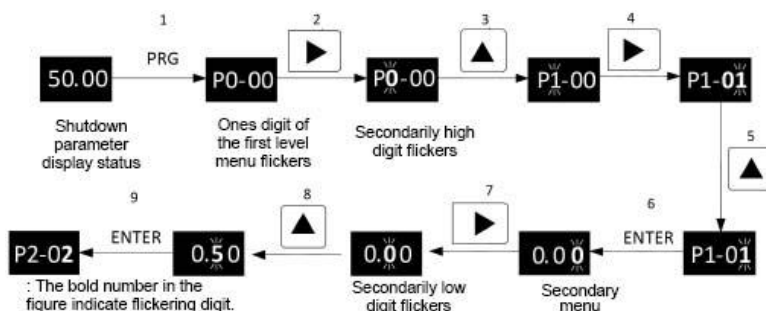


Figure 5-2 Example of Function Code Parameter Setting

In the function parameter display state, if the parameter does not have a blinking bit, it means that the function code cannot be modified, the possible reasons are:

1. The function code is a non-modifiable parameter. Such as the actual detection parameters, operation record parameters, etc.;
2. The function code can not be modified in the running state, and can only be modified after stopping the machine;
3. Parameters are protected. When the function code PP-01 is 1, the function code cannot be modified, which is a parameter protection to avoid misoperation. If you want to edit the function code parameters, you need to set the function code PP-01 to 0 first.

#### 5.1.3.2 Example 2: Switch display status parameters

The function code PE-02 allows you to set the parameters to be displayed by the operating panel in the shutdown state, e.g. set frequency, bus voltage, etc. (see the detailed description of the PE group function codes). After setting the parameters that can be displayed in the shutdown state, you can check these state parameters sequentially through the  $\triangleright$  key on the

operation panel. Figure 4-4 shows an example of the display of status parameters when PE-02 is shut down at 33.

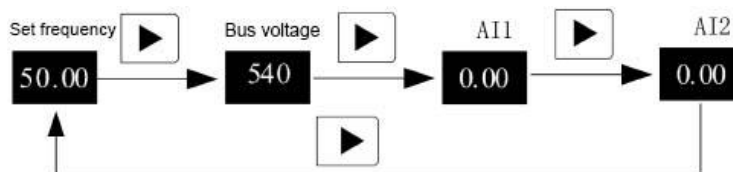


Figure 5-3 Operation Example of Parameter Display of Stopping Status

The method of switching the operation status is the same as above.

### 5.1.3.3 Example 3: Switching the Run Command Channel

Set PE-05 to 1 before operation, while P0-02=1 operation command is set to terminal control.

Press F1 key, when switching the operation panel run command channel, the LOC lamp goes out; when switching to the terminal run command channel, the LOC lamp goes out;

Set PE-05 to 1 before operation, while P0-02=2 operation command is set to communication control.

Press F1 key, when switching the operation panel to run the command channel, the LOC lamp goes out; when switching to the serial port to run the command channel, the LOC lamp goes out;

## 5.2 Motor characteristic parameter setting and auto tuning

### 5.2.1 Motor parameters to be set

Inverter to "vector control" (P0-03 = 0 or 1) mode of operation, the accurate motor parameters are very strong dependence, which is one of the important differences with the "VF control" (P0-03 = 2) mode, in order to make the inverter have good drive performance and operating efficiency, the inverter must obtain the accurate parameters of the controlled motor. This is one of the important differences from the "VF control" (P0-03=2) mode.

The required motor parameters are (default motor 1 function code):

Motor 1 parameters	Parameter description	Description
P4-00	Motor type	Asynchronous, variable frequency asynchronous, synchronous
P4-01 to P4-05	Motor rated power/frequency/current/voltage/speed	Model parameters, manual entry
P4-06 to P4-15	Equivalent stator resistance, inductive reactance, rotor inductance, etc. inside the motor	Tuning parameter
P4-17 to P4-24	Encoder parameters, required for vector mode with sensors	Encoder parameters

For a multi-motor complex application system, the corresponding parameters for motor 2 are:

Motor 2 parameters	Description
A2-00	Asynchronous, variable frequency asynchronous, synchronous
A2-01 to A2-05	Model parameters, manual entry
A2-06 to A2-15	Tuning parameter
A2-17 to A2-24	Encoder parameters

## 5.2.2 Automatic tuning of motor parameters

Let the inverter get the controlled motor internal electrical parameters of the method: no-load dynamic identification, dynamic identification with load, static identification, manual input motor parameters and other ways.

Identification method	Application	Tuning effect
No-load dynamic recognition	For synchronous and asynchronous motors. Where the motor is easily detached from the application	Best
Dynamic load recognition	For asynchronous motors. Where the motor is not easily detached from the application	Ordinary
Static identification	Only for asynchronous motors, where it is difficult to disengage the motor from the load and where dynamic identification of the operation is not permitted	Mediocre
Manual parameter input	Only for asynchronous motors. When it is difficult to separate the motor from the application system, copy the parameters of the same type of motor that has been successfully tuned by the inverter and input them into the corresponding function codes from P4-00 to P4-10.	Ordinary

The steps for auto-tuning the motor parameters are as follows:

The following is an example of the parameter tuning method of the default motor 1 to be explained, the tuning method of motor 2 is the same, only the function code number shall be changed in a targeted way.

Step 1: If the motor can be completely disconnected from the load, mechanically disengage the motor from the load partially with the power disconnected so that the motor can rotate freely with no load.

Step 2: After power on, first select the inverter command source (P0-02) as the operation panel command channel.

Step 3: accurately enter the nameplate parameters of the motor (e.g. P4-00 to P4-05), please enter the following parameters according to the actual parameters of the motor (according to the current motor selection):

Motor Selection	Parameter
Motor 1	P4-00: Motor type selection; P4-01: motor rated power P4-02: Motor rated frequency; P4-03: motor rated current P4-04: Motor rated voltage; P4-05: motor rated speed
Motor 2	A2-00 to A2-05: Same definition as above

Step 4: If it is an asynchronous motor, P4-27 (tuning selection, motor 2 is corresponding to A2-27 function code), please select 2 (dynamic tuning of asynchronous motor), press ENTER to confirm, and then press RUN on the keypad panel, the inverter will drive the motor acceleration and deceleration, forward and reverse operation, the running indicator, identify the duration of the operation is about 2 minutes, when the above display information disappears, return to the When the above display information disappears, return to the normal parameter display state, indicating that the tuning is completed.

As a result of this dynamic tuning, the inverter automatically calculates the following parameters of the motor:

Motor Selection	Parameter
Motor 1	P4-06: Asynchronous motor no-load current; P4-07: Asynchronous motor stator resistance P4-08: Leakage inductive reactance of asynchronous motor; P4-09:

	Rotor resistance of asynchronous motor P4-10: Mutual inductive resistance of asynchronous motors
Motor 2	A2-06 to A2-10: Same definitions as above

If the motor cannot be completely disconnected from the load, select 1 (asynchronous motor static tuning) for P4-27 (A2-27 for motor 2) and press the RUN key on the keypad panel to start the motor parameter identification operation.

## 6. Description of Parameters

### 6.1 Group P0 Basic function group

P0-00 Motor selection	Range: 0 to 1	Factory value: 0
-----------------------	---------------	------------------

0: Motor 1.

1: Motor 2.

The VL600 supports the storage of two sets of motor parameters, and you can select which set of motor parameters to use via P0-00, and in addition, you can switch the motor parameters via the multi-function terminal (function 41).

Motor 1 corresponds to the P4 group of motor and P3 control parameters, and motor 2 corresponds to the A2 group of parameters.

Note: The terminal switching function has a higher priority than P0-00. When the P0-00 setting is inconsistent with the multi-function terminal selection, the motor parameters selected by the multi-function terminal shall prevail.

P0-01 Model selection	Range: 1 to 2	Factory value: determined based on model
-----------------------	---------------	--

1: Type G: Constant torque load.

2: Type P: Variable torque load.

P0-02 Command source selection	Range: 0 to 2	Factory value: 0
--------------------------------	---------------	------------------

Select the input channel for inverter control commands.

Inverter control commands include: start, stop, forward, reverse, and jogging.

0: Operator panel command channel ("LOC/REM" lamp off);

Operation command control is performed by the RUN and STOP/RESET buttons on the operation panel.

1: Terminal command channel ("LOC/REM" lamp is lit);

Operation command control by multi-function input terminals FWD, REV, JOGF, JOGR, etc.

2: Communication command channel ("LOC/REM" lamp blinking)

The run command is given by the host computer via communication.

For communication-related function parameters, see "Group PA Communication Parameters" and the manual appendix.

P0-03 1st motor control mode selection	Range: 0 to 2	Factory value: 2
--	---------------	------------------

0: No PG vector control

It refers to the vector operation mode without speed sensor to achieve high performance control without encoder and high load adaptability. One inverter can only drive one motor.

1: With PG vector control

It refers to the vector operation mode with speed sensor, encoder must be added at the

motor end, and the inverter must be equipped with a suitable PG card. It is suitable for high precision speed control or torque control. One inverter can only drive one motor.

## 2: V/F control

Constant voltage/frequency ratio control. Suitable for applications that do not require high drive performance, drive multiple motors with a single inverter, or where motor parameter identification cannot be performed correctly.

P0-04 Main frequency source X selection	Range: 0 to 9	Factory value: 1
---	---------------	------------------

Selects the input channel for the inverter's main given frequency. There are a total of 10 main given frequency channels:

### 0: Digital given (no memory for power down)

Digitally given, adjustable by keypad ▲, ▼ keys or terminals UP, DN, initial value P0-06 (keypad digitally given).

When the inverter is powered down and powered up again, the given frequency is restored to the P0-06 (keypad digitally given) value.

### 1: Digitally given (power-down memory)

Digitally given, adjustable by keypad ▲, ▼ keys or terminals UP, DN, initial value P0-06 (keypad digitally given).

When the inverter is powered down, the final given frequency is memorized, and when it is powered up again, the given frequency is restored to the value memorized before power down.

### 2: AI1: The specific output frequency is determined by P5-10~P5-25.

### 3: AI2: The specific output frequency is determined by P5-10~P5-25.

4: Keypad potentiometer given: the specific output frequency is determined by P5-10~P5-25.

### 5: Pulse giving (X6) Frequency giving is given by terminal pulses.

X6 Pulse Feed Signal Specifications: Voltage range 9V to 30V, Frequency range 0kHz to 100kHz The correspondence between the X6 input pulse frequency and the given frequency can be set via P5-26 to P5-29, and the 100.0% of the setting corresponding to the pulse input corresponds to the max. frequency P0-13. Pulse feeds can only be input from the multi-function input terminal X6.

### 6: Multi-segment instruction

When multi-segment command is selected, the inverter runs in multi-segment speed mode, and the function of X terminal is selected through P5-00~P5-05 (option 12~15), and the different state combinations of X terminal correspond to different set frequency values of P7-00~P7-15 (multi-segment command). VL600 can set up at most 4 terminals of multi-segment command, and corresponds to 16 kinds of states through the combination of on-off.

### 7: Simple PLC

In case of simple PLC, according to the setting of Pd-00~Pd-34, the inverter can be operated sequentially between 16 states at maximum, and the operation frequency, operation time, acceleration and deceleration time of each state can be set independently.

### 8: PID

When PID is selected, the process PID starts the operation, and the given value, feedback value, PID regulator coefficient and so on required for PID operation are set by setting the relevant parameters of P9 group (process PID parameter group), and the result of PID operation is taken as the frequency given value of the inverter.

### 9: Communication given

When the communication give time is selected, the main frequency source is given by the upper computer via communication. See Group PA (communication parameters) and Appendix I (VL600 Modbus communication protocol) for details.

P0-05 Auxiliary frequency source Y selection	Range: 0 to 9	Factory value: 0
--	---------------	------------------

When the P0-07 (Frequency Overlay Selection) bit is set to 2 (switching between main frequency source X and auxiliary frequency source Y), auxiliary frequency source Y is used in exactly the same way as main frequency source X.

When P0-07 (frequency superposition selection) bits are set to 1, 3, 4, arithmetic is required between the main and auxiliary frequencies. When P0-05 is set to 0, 1 (numbers given), frequency adjustment can only be made by the ▲, ▼ keys of the keypad (or UP, DN of the multi-function input terminals).

When the auxiliary frequency source is analogue input given (AI1, AI2, keypad potentiometer) or pulse input given, the superimposed range of the auxiliary frequency can be set via P0-15 and P0-16.

Note: P0-04 (Main Frequency Source X Selection) and P0-05 (Auxiliary Frequency Source Y Selection), cannot be set to the same value, i.e., the same frequency source cannot be selected, otherwise it will cause confusion. For main and auxiliary frequency operation, the analogue feed priority is set at P0-05 auxiliary frequency source selection.

P0-06 Preset frequency setting	Range: 0.00 to maximum frequency	Factory value: 50.00Hz
--------------------------------	----------------------------------	------------------------

When the frequency source is selected as "digitally given", the function code value is the initial setting frequency of the inverter.

P0-07 Frequency source overlay selection	Range: 1st digit: 0 to 4; 10th digit: 0 to 3	Factory value: 0
--	--	------------------

This parameter allows you to set how the main frequency source X and the auxiliary frequency source Y are combined.

**Digits:** frequency source selection:

0: Main frequency source X

The main frequency X is used as the target frequency.

1: Primary and secondary arithmetic results

The result of the main and auxiliary operations is used as the target frequency, and the relationship between the main and auxiliary operations is described in the "10 digits" of the function code.

2: Switching between main frequency source X and auxiliary frequency source Y

When multifunction input terminal function 18 (frequency source switching) is invalid, the main frequency X is used as the target frequency.

When multifunction input terminal function 18 (frequency source switching) is active, auxiliary frequency Y is used as the target frequency.

3: Switching between main frequency source X and main and auxiliary operation results

When multifunction input terminal function 18 (frequency source switching) is invalid, the main frequency X is used as the target frequency.

When multifunction input terminal function 18 (frequency source switching) is active, the result of the main and auxiliary operations is used as the target frequency.

4: Auxiliary frequency source Y and main and auxiliary operation result switching

When multifunction input terminal function 18 (frequency source switching) is not available, the auxiliary frequency Y is used as the target frequency.

When multifunction input terminal function 18 (frequency source switching) is active, the result of the main and auxiliary operations is used as the target frequency.

**Tens:** frequency source primary and secondary arithmetic relationships:

0: Primary frequency source X + secondary frequency source Y

The sum of main frequency X and auxiliary frequency Y is used as the target frequency. Realize the frequency superposition given function.

1: Primary frequency source X - Auxiliary frequency source Y

The difference between the primary frequency X minus the auxiliary frequency Y is used as the target frequency.

2: MAX (primary frequency source X, secondary frequency source Y)

Take the largest absolute value of the primary frequency X and the auxiliary frequency Y as the target frequency.

3: MIN (primary frequency source X, auxiliary frequency source Y)

The absolute minimum of the primary frequency X and the auxiliary frequency Y is taken as the target frequency.

In addition, when the frequency source is selected as the main and auxiliary operation, the bias frequency can be set by P0-17 (Auxiliary frequency source bias frequency when superimposed) to superimpose the bias frequency on the result of the main and auxiliary operation.

P0-08 Acceleration time 1	Range: 0.00s~65000s	Factory value: determined based on model
P0-09 Deceleration time 1	Range: 0.00s~65000s	Factory value: determined based on model

Acceleration time refers to the time required for the inverter to accelerate from 0 Hz to the acceleration/deceleration reference frequency (determined by P8-19), see t1 in Figure 6-1.

Deceleration time refers to the time required for the inverter to decelerate from the acceleration and deceleration reference frequency (determined by P8-19) to 0 Hz, see t2 in Figure 6-1.

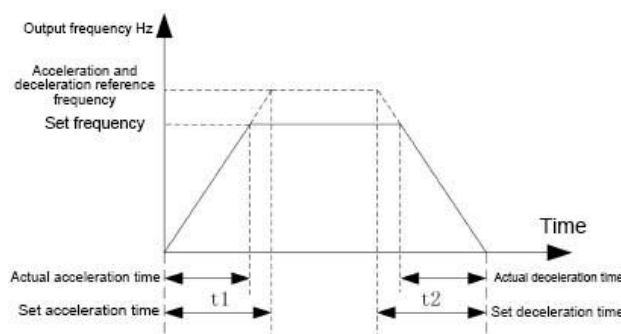


Figure 6-1 Acceleration and deceleration time diagram

VL600 provides 4 groups of acceleration and deceleration times, which can be switched by the multi-function input terminal, and the factory default is acceleration and deceleration time 1. The other three groups of acceleration and deceleration times are P7-16~P7-21.

P0-10 Direction of operation	Range: 0 to 9	Factory value: 0
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0: Positive.

1: Reverse.

Note: After the initialization of the parameters, the motor running direction will be restored to the positive direction, for the system debugging is strictly prohibited to change the motor steering occasions with caution.

P0-11 Upper limit frequency	Range: Lower limit frequency P0-08~Maximum frequency P0-13	Factory value: 50.00Hz
P0-12 Lower limit frequency	Range: 0.00Hz to upper limit frequency P0-11	Factory value: 0.00Hz

When the given frequency is lower than the lower limit frequency set by P0-12, you can choose to stop, run at the lower limit frequency, or run at zero speed by setting P8-21 (Setting frequency lower than the lower limit frequency operation mode).

P0-13 Maximum frequency	Range: 50.00Hz to 320.00Hz	Factory value: 50.00Hz
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For analogue inputs, pulse inputs (X6), multispeed commands, etc., 100% of the input settings correspond to P0-09 (maximum output frequency).

Note: The upper limit of the maximum output frequency can be switched between 320Hz and 3200Hz by setting P8-13 (frequency command resolution).

P0-14 Anti reverse rotation selection	Range: 0 to 1	Factory value: 0
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0: Reversals are permitted.

1: Inversion is prohibited.

This parameter sets whether the inverter is allowed to run in the reverse state or not, and in the case where the motor is not allowed to reverse, set P0-14=1.

P0-15 Auxiliary frequency source Y range selection during stacking	Range: 0 to 1	Factory value: 0
--	---------------	------------------

- 0: Relative to P0-13 maximum frequency.  
1: relative to the main frequency source X.

P0-16 Auxiliary frequency source Y range at stacking	Range: 0% to 150%	Factory value: 0
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P0-07 (frequency superposition selection) bits set to 1, 3, 4, between the main and auxiliary frequency need to do arithmetic, through the P0-15 can be set to set the frequency corresponding to the auxiliary frequency is given as 100%, P0-16 is used to set the auxiliary frequency is given to the percentage of the adjustment range.

For example, if P0-15 is set to 1 (relative to the main frequency source) and P0-16 is set to 50%, when the main frequency is given as 20Hz, the adjustment range of the auxiliary frequency is 0~10Hz.

P0-17 Auxiliary frequency source bias frequency during stacking	Range: 0.00Hz to maximum frequency P0-13	Factory value: 0.00Hz
---	--	-----------------------

When the bits of P0-07 (frequency superimposed selection) are set to 1, 3 or 4, this function code is valid, and P0-17 is used as the bias frequency, which is superimposed with the result of the main and auxiliary operations as the final frequency setting value.

P0-18 Upper limit frequency source	Range: 0 to 5	Factory value: 0
------------------------------------	---------------	------------------

- 0: P0-11 setting.  
1: AI1.  
2: AI2.  
3: Keyboard potentiometer.  
4: PULSE setting.  
5: Communication settings.

This function code is used to set the upper limit frequency selection channel so that 100% of the input setting corresponds to P0-11 when an analogue input or pulse input is used as the upper limit frequency source.

P0-19 Upper Frequency Bias	Range: Lower limit frequency P0-08 to maximum frequency P0-09	Factory value: 0.00Hz
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When P0-18 is selected from 1 to 4 (analogue or PULSE setting), P0-19 is used as an offset for the set value, and the set value of P0-19 is superimposed with the value of P0-18 setting the upper limit frequency as the final upper limit frequency setting value.

P0-20 Reserved	Range: -	Factory value: 0
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## 6.2 Group P1 Start-stop parameters

P1-00 Startup mode	Range: 0 to 2	Factory value: 0
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- 0: Starting from starting frequency

Operation starts from the starting frequency P1-01 and accelerates to the set frequency after the starting frequency holding time P1-02.

- 1: Speed tracking start

The inverter recognizes the speed and direction of the rotating motor and directly tracks the start, which is smooth and shockless.

To ensure that the speed tracking restart works properly, the correct motor parameters P4-00 to P4-05 need to be set.

- 2: Brake then start

Firstly, inject DC to the motor and apply DC braking to the motor, the braking current is P1-03, the braking time is P1-04, and then press mode 0 to start after the braking is finished.

P1-01 Start-up frequency	Range: 0.00Hz to 10.00Hz	Factory value: 0.00Hz
P1-02 Starting frequency hold time	Range: 0.0s to 100.0s	Factory value: 0.0s

Starting frequency: the initial frequency when the inverter starts;

Starting Frequency Hold Time: The time that the inverter runs at the starting frequency during the starting process;

For heavy load starting applications, setting the above two parameters appropriately will help to ensure the starting torque.

P1-03 Start-up DC braking Current	Range: 0% to 100%	Factory value: 0%
P1-04 Start-up DC braking Time	Range: 0.0s to 100.0s	Factory value: 0.0s

Starting DC braking current: the amount of current injected into the motor during starting, as a percentage relative to the rated current of the inverter.

Starting DC Brake Time: DC brake action time.

P1-05 Acceleration and deceleration mode selection	Range: 0 to 2	Factory value: 0
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0: linear acceleration and deceleration

The output frequency increases or decreases in a straight line.

1: S-curve acceleration and deceleration mode 1

S-curve acceleration and deceleration is completed according to the start and end time set by P1-06 and P1-07, suitable for handling lifting, conveyor belts and other occasions where smooth speed regulation is required.

2: S-curve acceleration and deceleration mode 2

S-curve acceleration and deceleration with the rated frequency of the motor as the inflection point.

P1-06 S-curve start time scale	Range: 0.0% to (100.0%-P1-07)	Factory value: 30.0%
P1-07 Proportion of time at the end of the S-curve	Range: 0.0% to (100.0%-P1-06)	Factory value: 30.0%

The S curve begins with a time scale: as shown in t1 in Figure 6-2, the slope of the output frequency change gradually increases from 0;

S-curve end time scale: the slope of the output frequency change gradually decreases to 0, as shown by t2 in Figure 6-2;

Note: P1-06 + P1-07 ≤ 100.0%.

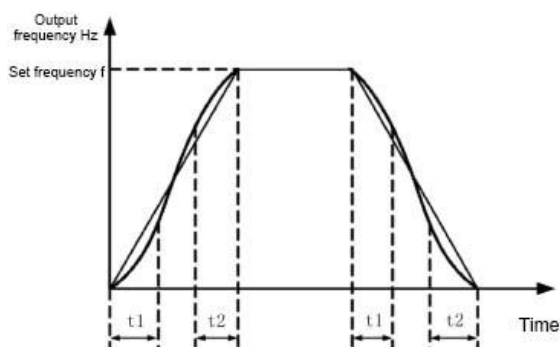


Figure 6-2 S-Curve acceleration and deceleration mode 1 schematic diagram

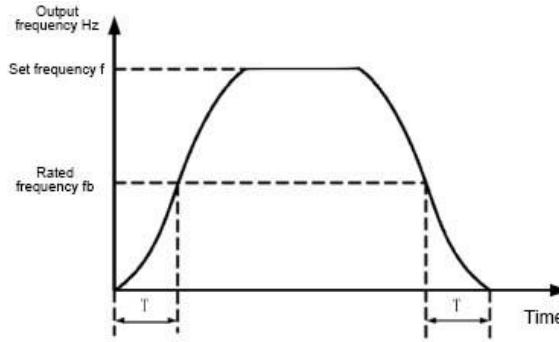


Figure 6-3 Schematic diagram of S-curve acceleration and deceleration mode 2

P1-08 Shutdown mode	Range: 0 to 1	Factory value: 0
<p>0: Decelerate and stop                  Gradually reduce the output frequency according to the set deceleration time, and stop the machine when the frequency drops to zero.</p> <p>1: Free parking                  When the inverter receives the stop command, it blocks the output and the motor stops freely.</p>		
P1-09 Stopping DC Braking Start Frequency	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz
P1-10 Stopping DC braking wait time	Range: 0.0s to 36.0s	Factory value: 0.0s
P1-11 Stopping DC braking current	Range: 0% to 100%	Factory value: 0%
P1-12 Stopping DC braking time	Range: 0.0s to 36.0s	Factory value: 0.0s

Shutdown DC braking start frequency: DC braking starts when this frequency is reached during shutdown.

Stopping DC braking waiting time: Before DC braking starts, the inverter blocks the pulse, and after this waiting time, DC braking starts, which is used to prevent the current overshoot at the starting moment of braking for high-power motors.

Stopping DC braking current: the percentage relative to the rated current of the inverter, the higher the braking current, the stronger the braking effect, the greater the heating of the motor and inverter.

Stop DC braking time: DC braking action time, set to 0, no DC braking process. The stopping DC braking process is shown in Figure 6-4.

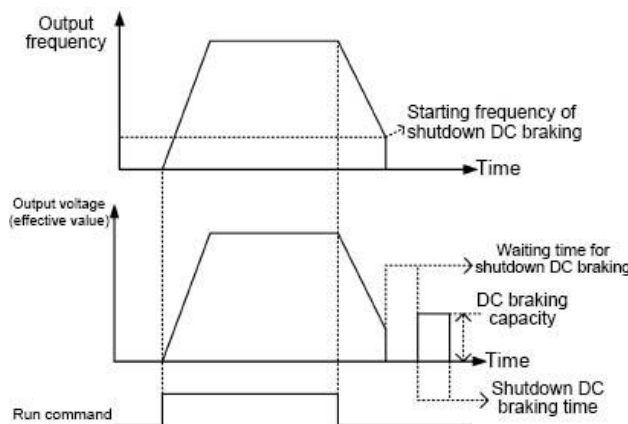


Figure 6-4 Shutdown DC Braking Schematic

P1-13 Brake utilization rate	Range: 0% to 100%	Factory value: 100%
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Effective for models with built-in brake unit, the setting of this function shall take into account the resistance value and power of the braking resistor, the higher the braking usage rate, the stronger the braking effect and the higher the heat generated by the resistor.

P1-14 Speed Tracking Method	Range: 0 to 2	Factory value: 0
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In order to complete the speed tracking process in the shortest possible time, the inverter is selected to track the motor speed:

0: Downward tracking from the stop frequency, which is used by default.

1: Tracking upwards from zero speed, with longer intervals between stopping and restarting applies.

2: Downward tracking from maximum frequency, applicable to generating loads.

P1-15 Speed Tracking Response Time	Range: 1 to 100	Factory value: 20
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Sets how fast or slow the RPM tracking response is; setting the response time too short may cause tracking failure.

P1-16~P1-19 Reserved	Range: -	Factory value: -
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### 6.3 Group P2 V/F control parameters

This group of function codes defines how the V/F is set to meet different load characteristic requirements.

P2-00 V/F Curve Setting	Range: 0 to 11	Factory value: 0
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0: Linear V/F. Suitable for normal constant torque loads.

1: Multi-point V/F. Customize the V/F curve by setting parameters P2-01~P2-06, as shown in Figure 6-5.

2: 2.0 power drop torque curve.

3: 1.2 power drop torque curve.

4: 1.4 power drop torque curve.

5: Reservations.

6: 1.6 power drop torque curve.

7: Reservations.

8: 1.8 power drop torque curve.

9: Reserved.

10: VF completely separated mode. At this time, the output frequency and output voltage of the inverter are completely independent, and the output frequency is determined by the frequency source The output voltage is determined by P2-11 (VF separated voltage source).

11: VF semi-detached mode.

The output frequency is determined by the frequency source, and the output voltage is multiplied by P2-11 (in%) on the basis of the corresponding voltage of the linear V/F, ie: Output voltage = P2-11 \* (linear V/F corresponding voltage)

P2-01 VF frequency value F3	Scope: P2-03 ~Motor rated frequency (P4-02) Note: 2nd motor rated frequency A2-02	Factory value: 0.00Hz
P2-02 VF voltage value V3	Range: 0.0% to 100.0%	Factory value: 0.0%
P2-03 VF frequency value F2	Range: P2-01 to P2-05	Factory value: 0.00Hz
P2-04 VF voltage value V2	Range: 0.0% to 100.0%	Factory value: 0.0%
P2-05 VF frequency value F1	Range: 0.00Hz to P2-03	Factory value: 0.00Hz
P2-06 VF voltage value V1	Range: 0.0% to 100.0%	Factory value: 0.0%

The V/F curve can be customized through P2-01 to P2-06, as shown in Figure 6-5, the

three voltage points and frequency points need to be set to satisfy the relationship,  $V1 < V2 < V3$ ,  $F1 < F2 < F3$ .

The low-frequency voltage must not be set too high, or it may cause the motor to overheat or even burn out, and the inverter may lose speed or overcurrent overload protection.

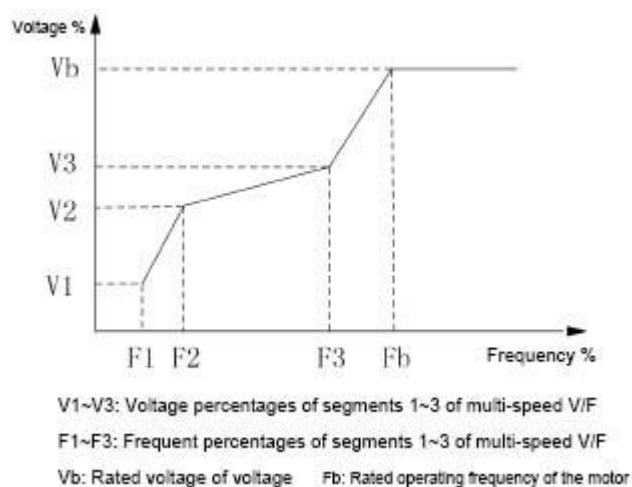


Figure 6-5 Schematic of Multi-point V/F Curve Setting

P2-07 torque boost	Range: 0.0%to 30%	Factory value: determined based on model
P2-08 Manual Torque Boost Cutoff Frequency	Range: 0.00Hz to maximum frequency	Factory value: 50.00Hz

When the inverter operates at low frequency, the torque boost value is set reasonably, and the output voltage is increased to offset the stator as well as the line voltage drop in order to achieve sufficient output torque, as shown in Figure 6-6.

P2-07 Torque Boost:

0: Automatic torque boost;

Non-0: Manual torque boost.

P2-08 Manual torque boost cut-off frequency: below this frequency, manual torque boost is effective, above this frequency, manual torque boost is not effective.

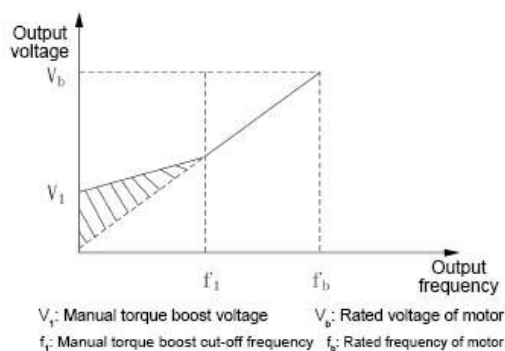


Figure 6-6 Manual Torque Boost Schematic

P2-09 V/F Differential Compensation Gain	Range: 0% to 200.0%	Factory value: 0.0%
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This parameter is valid only for V/F control of asynchronous motor, used to maintain the accuracy of steady speed of the motor, increase this parameter when the speed of the motor is low during heavy load, otherwise decrease this parameter.

P2-10 VF Overexcitation Gain	Range: 0 to 200	Factory value: 64
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This parameter is valid only for asynchronous motor V/F control, and is used to suppress the bus voltage rise caused by feed-back energy during inverter deceleration.

The larger the overexcitation gain setting is, the stronger the bus voltage suppression effect during deceleration is, but the setting is too large, resulting in too large an output current; if the braking resistor is connected to the occasion, the overexcitation gain can be set to 0.

P2-11 VF separated voltage source	Range: 0 to 8	Factory value: 0
P2-12 Voltage digital setting for VF separation	Range: 0V to rated motor voltage	Factory value: 0V

P2-11 is used to set the output voltage source for V/F separation control:

VF separation is generally used in applications such as induction heating, inverter power supplies and torque motor control.

When VF separation control is selected, the output voltage can be set by function code P2-12 or from analogue, multi-segment command, PLC, PID or communication givens. When set with non-digital settings, 100% of each setting corresponds to the rated motor voltage.

0: Digital setting (P2-12).

The output voltage is set by P2-12.

1: AI1.

2: AI2.

3: Keyboard potentiometer.

100% of rated motor voltage for 100% analogue input

4. PULSE pulse setting (X6)

A pulse frequency of 100% corresponds to 100% of the rated motor voltage.

Specification of Pulse Feed Signal: Voltage range 9V to 30V, Frequency range 0kHz to 100kHz.

5. Multi-segment instruction

When multispeed command is selected, set the parameters of group P5 (multifunction terminal setting) and group P7 (multispeed command), and determine the percentage of output voltage corresponding to the rated voltage of the motor through the combination of X terminal status, which is equivalent to the percentage of set frequency and maximum frequency in group P7.

6. Simple PLC

When selecting the recommended PLC, set the parameters of group Pd (simple PLC) to determine the percentage of the given output voltage corresponding to the rated voltage of the motor through the percentage setting of the PLC operating segment, which is equivalent to the percentage of the set frequency to the maximum frequency in group P7.

7. PID

When PID is selected, the percentage of the PID output is taken as the percentage of the output voltage corresponding to the rated voltage of the motor.

8. Communication given

The output voltage is given by the host computer using communication.

P2-13 Voltage acceleration time for VF separation	Range: 0.0s~1000.0s	Factory value: 0.0s
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The time required for the output voltage to rise from 0V to the rated voltage of the motor in V/F separation control.

P2-14 Voltage acceleration time for VF separation	Range: 0.0s~1000.0s	Factory value: 0.0s
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The time required for the output voltage to drop from the rated voltage of the motor to 0V

for V/F separation control.

P2-15 VF Oscillation Suppression Gain	Range: 0 to 100	Factory value: determined based on model
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This parameter is valid only when the asynchronous motor is controlled by V/F. Ordinary motors sometimes have current oscillations during light load or no-load operation, which can lead to abnormal operation in serious cases. When the current display fluctuates greatly, adjusting the size of this function code on the basis of the factory parameters can eliminate the oscillations and make the motor run smoothly.

P2-16 VF Oscillation suppression gain mode	Range: 0 to 4	Factory value: 3
P2-17 VF Separation Shutdown Method Selection	Range: 0 to 1	Factory value: 0

0: Output voltage and frequency decelerate independently to 0.

1: The output voltage first drops 0V before the frequency starts to decrease.

P2-18 VF Overcurrent rapid-action current	Range: 50 to 200%	Factory value: 130%
P2-19 VF overcurrent loss speed enable	Range: 0 to 1	Factory value: 1
P2-20 VF overcurrent loss of velocity suppression gain	Range: 0~100	Factory value: 20
P2-22 VF overvoltage stall action voltage	Range: 200.0V to 2000.0V	Factory value: determined based on model
P2-23 VF overvoltage stall enable	Range: 0 to 1	Factory value: 1
P2-24 VF overvoltage stall suppression frequency gain	Range: 0~100	Factory value: 10
P2-25 VF overvoltage stall suppression voltage gain	Range: 0~100	Factory value: 30
P2-26 VF Overvoltage Stall Maximum Rise Limit Frequency	Range: 0~50 Hz	Factory value: 5 Hz

During the operation of the inverter, due to the impact of load inertia, there may be a motor to the inverter to feed back power, resulting in the inverter bus voltage rises, such as not to take measures, will cause over-voltage fault shutdown.

P2-22 Over-voltage Stall Action Voltage: the opening point of over-voltage stall function, the frequency regulation starts when the bus voltage is higher than this point, and stops when it is lower than this voltage point.

P2-24 Overvoltage stall suppression frequency gain: When the bus voltage is higher than P2-22 (overvoltage stall action voltage), the output frequency is adjusted by this gain, and the superimposed maximum frequency is limited by P2-26 to suppress the bus voltage rise. The larger the gain setting is, the stronger the suppression ability is, but setting it too large will cause the system response to become slower, in the case of not generating an overvoltage fault, this gain setting is as small as possible.

P2-25 Overvoltage stall suppression voltage gain: prevents overshoot from occurring in the overvoltage stall control bus voltage.

P2-27 Differential compensation time	Range: 0.1s~10.0s	Factory value: 0.5 s
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The smaller the rotational compensation time, the faster the response of the compensation frequency.

## 6.4 Group P3 First group of motor vector control parameters

The P3 group function code is valid only for vector control, not for VF control.

P3-00 Speed loop proportional gain 1	Range: 1 to 100	Factory value: 30
P3-01 Velocity loop integration time 1	Range: 0.01s~10.00s	Factory value: 0.50s
P3-02 Switching frequency 1	Range: 0.00 to P3-05	Factory value: 5.00Hz
P3-03 Speed loop proportional gain 2	Range: 0 to 100	Factory value: 15
P3-04 Velocity loop integration time 2	Range: 0.01s~10.00s	Factory value: 1.00s
P3-05 Switching frequency 2	Range: P3-02 to maximum frequency	Factory value: 10.00Hz

P3-00 to P3-05 are valid only in vector control mode, where the speed response characteristics of vector control are changed by setting the proportional gain and integration time of the speed loop.

By setting the two switching frequencies of P3-02 and P3-05, in order to take into account the dynamic performance of low speed and the stability of high speed, the proportional gain is appropriately increased and the integration time is reduced at low speed to adapt to the requirements of fast response.

When the operating frequency is less than the switching frequency 1 (P3-02), the speed loop PI adjustment parameters are P3-00 and P3-01. when the operating frequency is greater than the switching frequency 2 (P3-05), the speed loop PI adjustment parameters are P3-03 and P3-04. the speed loop PI parameters between the switching frequency 1 and the switching frequency 2 are two sets of PI parameters switching linearly as shown in Fig. 6-7:

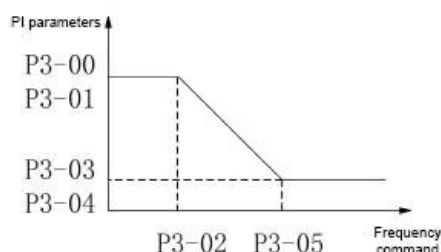


Figure 6-7 Schematic diagram of PI parameters

The speed loop parameters are generally adjusted in the following order:

- (1) Select the appropriate switching frequencies P3-02 and P3-05;
- (2) Adjust the PI parameters P3-03 and P3-04 at high speed to ensure that the system does not oscillate and has good dynamic response characteristics;
- (3) Adjust the PI parameters P3-00 and P3-01 at low speed to ensure that there is no oscillation and good dynamic characteristics at low frequency;
- (4) Increasing the proportional gain and decreasing the integration time can improve the dynamic response, but the proportional gain is too large and the integration time is too small will cause the system to oscillate, which needs to be reasonably adjusted.

P3-06 Vector Control Differential Gain	Range: 50 to 200%	Factory value: 100%
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When vector control, this parameter is used to adjust the accuracy of steady speed with load, after the load is heavier, if the motor speed is low, then increase this parameter, if the speed is high, then decrease this parameter.

P3-07 Velocity Loop Filter Time Constant	Range: 0.000s~0.100s	Factory value: 0.000s
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The output filtering time of the speed loop regulator generally does not need to be adjusted; the larger the filtering time, the more stable the output of the speed loop regulator, but the dynamic response becomes slower.

P3-08 Vector Control Overexcitation Gain	Range: 0 to 200	Factory value: 64
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When the inverter decelerates, through the overexcitation regulation, the kinetic energy of the motor can be consumed in the motor winding to avoid over-voltage faults. The larger the overexcitation gain, the faster the energy consumption, and the stronger the busbar suppression effect, but the output current increases at the same time, and the capacity of the motor needs to be considered.

P3-09 Torque upper limit source in speed control mode	Range: 0 to 7	Factory value: 0
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- 0: P4-10.
- 1: AI1.
- 2: AI2.
- 3: Keyboard potentiometer.
- 4: PULSE setting.
- 5: Communication settings.
- 6: MIN (AI1, AI2).
- 7: MAX (AI1, AI2).

This function code is used to set the source of the upper limit of the output torque in the speed control mode. When set to options 1~7, the torque source input corresponds to P3-10 when it is 100%.

P3-10 Digital setting of upper torque limit in speed control mode	Range: 0.0% to 200.0%	Factory value: 150.0%
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The P4-10 setting value of 100% corresponds to the rated torque of the inverter.

P3-13 Excitation Regulation Proportional Gain	Range: 0 to 20000	Factory value: 2000
P3-14 Excitation Regulation Integral Gain	Range: 0 to 20000	Factory value: 1300
P3-15 Torque Adjustment Proportional Gain	Range: 0 to 20000	Factory value: 2000
P3-16 Torque Regulation Integral Gain	Range: 0 to 20000	Factory value: 1300

P3-13~P3-16 are used to set the vector control current loop PI parameters, which will be obtained automatically after dynamic tuning and generally do not need to be modified.

Increasing the current loop proportional gain and integral gain can speed up the dynamic response of the system, but the setting is too large to affect the stability of the system, which needs to be adjusted according to the actual effect.

P3-18 Vector weak magnetic mode selection	Range: 0 to 2	Factory value: 0
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- 0: Not weakly magnetic.
- 1: Effective when slowing down.
- 2: Effective at constant speed or deceleration.

P3-19 Overmodulation selection	Range: 0~1	Factory value: 0
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- 0: Overmodulation is invalid.
- 1: Overmodulation enable.

P3-20 Overmodulation coefficient	Range: 100% to 110%	Factory value: 105%
P3-21 Weak Magnetic Maximum Torque Coefficient	Range: 50 to 200%	Factory value: 100%
P3-22 Reserved	Range: -	Factory value: -

## 6.5 Group P4 First motor parameters

P4-00 Motor Type Selection	Range: 0 to 2	Factory value: 0
<p>0: Ordinary asynchronous motor.</p> <p>1: Inverter asynchronous motor.</p> <p>2: Permanent magnet synchronous motor.</p>		
P4-01 Rated Power	Range: 0.1kW to 1000.0kW	Factory value: determined based on model
P4-02 Rated frequency	Range: 0.01Hz to maximum frequency	Factory value: determined based on model
P4-03 Rated Current	Scope: 0.01A~655.35A (Inverter power ≤55kW) 0.1A~6553.5A (Inverter power >55kW)	Factory value: determined based on model
P4-04 Rated voltage	Range: 1V to 2000V	Factory value: determined based on model
P4-05 Rated speed	Range: 1rpm to 65535rpm	Factory value: determined based on model

Before running, please make sure to set the P4-01~P4-05 parameters correctly according to the motor nameplate or motor parameter table, otherwise it may cause control fault or even motor damage.

Note: In order to get better control performance, VL600 provides motor parameter tuning function, but P4-01~P4-05 must be set correctly, otherwise the tuned motor parameters will be inaccurate.

P4-06 Asynchronous motor no-load current	Scope: 0.01A~P4-03 (Inverter power ≤55kW) 0.1A~P4-03 (Inverter power >55kW)	Factory value: determined based on model
P4-07 Asynchronous Motor Stator Resistance	Scope: 0.001Ω~65.535Ω (Inverter power ≤55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Factory value: determined based on model
P4-08 Leakage reactance of asynchronous motors	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
P4-09 Asynchronous Motor Rotor Resistance	Scope: 0.001Ω~65.535Ω (Inverter power ≤55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Factory value: determined based on model
P4-10 Asynchronous motor mutual inductive resistance	Scope: 0.1mH~6553.5mH (Inverter power ≤55kW) 0.01mH~655.35mH (Inverter power >55kW)	Factory value: determined based on model

When P4-27 selects 1 (asynchronous motor stationary tuning) and the tuning is successful, P4-07~P4-09 parameters will be updated;

When P4-27 selects 2 (Dynamic tuning of asynchronous motor) and the tuning is successful, P4-06~P4-10 parameters will be updated.

Note: When changing the rated power (P4-01) or rated voltage (P4-04), the inverter will automatically modify the parameter values of P4-06 to P4-10.

P4-11 Synchronous Motor Stator Resistance	Scope: 0.001Ω~65.535Ω (Inverter power ≤55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Factory value: determined based on model
P4-12 Synchronous motor D-axis inductance	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
P4-13 Synchronous motor Q-axis inductance	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
P4-14 Reservations	Range: -	Factory value: -
P4-15 Synchronous motor reverse electromotive force	Range: 0.1V to 6553.5V	Factory value: determined based on model

When P4-27 selects 12 (Dynamic tuning of synchronous motor) and the tuning is successful, P4-11~P4-15 parameters will be updated, and the above parameters cannot be obtained by static tuning of synchronous motor.

If the above parameters of the motor are known, it is also possible to set the relevant function codes directly without tuning.

Note: When changing the motor rated power (P4-01) or motor rated voltage (P4-04), the inverter will automatically modify the parameter values of P4-11 to P4-15.

P4-17 Encoder line(s)	Range: 1 to 65535	Factory value: 1024
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Set according to the number of pulses per revolution of the selected pulse encoder.

Note: Please make sure to set this parameter correctly when there is PG vector control mode, otherwise the motor can not run normally.

P4-18 Encoder type	Range: 0 to 2	Factory value: 0
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0: ABZ incremental encoder.

1: UVW incremental encoder.

2: Rotary transformer.

Please purchase the appropriate PG card according to the type of encoder installed in the motor and set P4-18 correctly, otherwise the motor will not operate normally.

P4-20 ABZ Incremental Encoder AB Phase Sequence	Range: 0 to 1	Factory value: 0
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0: Positive.

1: Reverse.

This function code is used to set the phase sequence of the AB signal of the ABZ incremental encoder, and is only valid for the ABZ incremental encoder, i.e., only when P4-18 = 0.

Note: The AB phase sequence of the ABZ encoder can be obtained during full asynchronous motor tuning or no-load synchronous motor tuning.

P4-26 PG disconnection detection time	Range: 0.0s to 10.0s	Factory value: 0.0s
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Confirm the duration of detection of the encoder disconnection fault. When the disconnection fault is detected and lasts for the time set in P4-26, the inverter reports an E.EC fault.

When P4-26 is set to 0, wire break faults are not detected.

P4-27 Tuning selection	Range: 0 to 12	Factory value: 0
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Before carrying out static tuning, it is necessary to set motor-related parameters P4-00~P4-05. before carrying out dynamic tuning, besides setting P4-00~P4-05, if the motor encoder has been connected to the PG card of the inverter, it is also necessary to correctly set the encoder-related parameters P4-17, P4-18, P4-24, P4-25. when one inverter drags several motors, no tuning is required.

**0:** No action.

**1:** Stationary tuning of asynchronous motors.

If the motor is unable to disengage the load, please select stationary tuning; after the tuning is completed, P4-07~P4-09 parameters will be updated.

**2:** Complete tuning of asynchronous motors.

After the motor load is disengaged, please select dynamic tuning; after the tuning is completed, P4-06~P4-10, P4-13~P4-16 parameters will be updated.

**3:** asynchronous motor stationary complete tuning .

**11:** Synchronized machine stationary tuning.

**12:** Complete tuning of Synchronized machines.

Select stationary tuning if the motor cannot be disconnected from the load.

After the motor load is disengaged, please select dynamic tuning; after the tuning is completed, P4-11~P4-15, P4-20~P4-23, P4-13~P4-16 parameters will be updated.

The motor parameter tuning process is as follows:

- (1) Confirm that the current command source is the operation panel;
- (2) Enter P4-00 to P4-05 correctly according to the motor nameplate;
- (3) Set the appropriate acceleration and deceleration times P0-08, P0-09;
- (4) Select the P4-27 tuning mode:

Asynchronous motor loads can be taken off to select dynamic tuning 1 and asynchronous motor loads cannot be taken off to select static tuning 0;

Synchronous motor loads can be taken off to select dynamic tuning 12 and asynchronous motor loads cannot be taken off to select static tuning 11;

(5) Press ENTER, then press RUN to start the parameter self-learning, and P4-27 will be restored to 0 after the self-learning is completed;

(6) If self-learning is successful, it returns to standby, if not, report E.tU fault.

## 6.6 Group P5 Input terminals

The VL600 series inverter is equipped with 6 multi-function digital input terminals (of which X6 can be used as a high-speed pulse input terminal) and 2 analogue input terminals as standard.

P5-00 X1 Terminal Function Selection	Range: 0 to 50	Factory value:1
P5-01 X2 terminal function selection	Range: 0 to 50	Factory value:2
P5-02 X3 Terminal Function Selection	Range: 0 to 50	Factory value:0

P5-03 X4 terminal function selection	Range: 0 to 50	Factory value:0
P5-04 X5 Terminal Function Selection	Range: 0 to 50	Factory value:0
P5-05 X6 Terminal Function Selection	Range: 0 to 50	Factory value:0

These parameters are used to set the functions of the digital multi-function input terminals, and the functions that can be selected are shown in the table below:

Set value	Function	Description
0	No function	
1	FWD	Forward or reverse operation of the inverter is controlled via the terminals.
2	Reverse Run (REV)	
3	Three-wire operation control	There are two-wire and three-wire operation modes for forward and reverse rotation, when the three-wire operation mode, this terminal function is required to be used together, refer to P5-08 for specific usage instructions.
4	Point-to-point forward rotation	Terminal tap operation control, tap operation frequency is set by P8-05, tap acceleration and deceleration time is set by P8-07 and P8-08.
5	Jogging to invert	
6	Terminal UP	Effective when P0-04 or P0-05 (frequency source) is set to 0/1 (digitally given), the rate of increase or decrease is set by P5-09.
7	Terminal DOWN	
8	Free parking input	When this terminal function is active, the inverter blocks the output and the motor stops freely.
9	Fault reset	This terminal function allows the reset of faults, in line with the function of the RESET key of the keypad.
10	Run pause (in computing)	When the function of this terminal is effective, the inverter decelerates and stops, and when the kinetic energy of this terminal is invalid, the inverter returns to the running state before stopping.
11	External fault normally open input	This terminal function allows the input of fault signals from external devices. When it is a valid state, the inverter reports an E.Ed fault.
12	Multi-speed terminal 1	When the terminal function is set to 12~15, different multi-band frequencies are selected by changing the terminal status, and the specific combination of corresponding frequencies is shown in the attached table 1.
13	Multi-Speed Terminal 2	
14	Multi-Speed Terminal 3	
15	Multi-Speed Terminal 4	
16	Acceleration and deceleration times Selection terminal 1	Selection of acceleration and deceleration times 1 to 4 can be achieved by combining ON/OFF of terminal functions 16 and 17, see Exhibit 2.
17	Acceleration and deceleration times Select terminal 2	
18	Frequency source switching	Switch between the two frequency sources according to the setting of P0-05.
19	UP/DN setting clear	When P0-04 or P0-05 (frequency source) is set to 0/1 (digital given) and this terminal function is active, the frequency adjusted by terminal UP/DN or keypad UP/DN is cleared to zero and the given frequency is restored to the P0-06 setting.
20	Command source switched to keyboard	If the command source is set to terminal control (P0-02=1), the command source switches to keypad control when the terminal is valid. If the command source is set to communication control

Set value	Function	Description
		(P0-02=2), the command source switches to keypad control when the terminal is valid. This terminal allows switching between communication control and keypad control.
21	Acceleration and deceleration disabled	Keeps the inverter unaffected by any external signals (except the stop command) and maintains the current output frequency.
22	PID pause	When the terminal is valid, PID suspends regulation and the inverter keeps the current output frequency unchanged; after the terminal is invalid, PID resumes regulation.
23	PLC status reset	In the shutdown state of the PLC operation mode, this terminal function, when active, will clear the PLC operation phase, operation time, operation frequency, and other information memorized at the time of shutdown.
24	Swing frequency function suspended	When this terminal function is active, the inverter outputs at the centre frequency and the swing frequency function is suspended.
25	Counter trigger signal input	The counting pulse input port of the built-in counter is described in Pd-44 and Pd-45 for usage.
26	Counter zero signal input	The built-in counter is cleared to zero when this terminal function is active.
27	Length Count Input	This terminal function is used for fixed length control, the length is calculated by pulse input, see Pd-41~Pd-43 for usage.
28	Length reset	This terminal function clears Pd-41 (actual length) to zero when it is active.
29	Torque Control Prohibition	When this terminal function is valid, the inverter is prohibited from torque control and the inverter enters the speed control mode
30	PULSE Frequency Input	Only X6 can select this function to receive the pulse signal as the frequency given, see P5-26~P5-30 for the specific correspondence.
31	Reserved	Reserved
32	Immediate DC braking	When this terminal is active, the inverter switches directly to the DC braking state
33	External Fault Normally Closed Input	When this terminal function is active, the inverter reports an E.Ed fault and stops.
34	Frequency Modify Enable	The inverter does not respond to any frequency modification when this terminal function is invalid; The frequency is allowed to be modified when the terminal is valid.
35	PID action direction reversed	When this terminal function is active, the direction of PID action is opposite to the direction set by P9-16.
36	External parking terminal 1	When this terminal function is active (only when controlled by the keypad), the inverter stops.
37	Command source switching to communication control	When this terminal function is valid, the command source switches to communication control (valid only when P0-02 = 1).
38	PID integral pause	When the function of this terminal is valid, the integrator of PID stops regulating and keeps the current value; when the function of this terminal is invalid, the integrator of PID resumes regulating.
39	Frequency source X switches to the digitally given	When this terminal function is active, the frequency source X switches to the digital feed (P0-06).
40	Frequency source Y is switched to the digitally given	When this terminal function is active, the frequency source Y switches to digital feed (P0-06).

Set value	Function	Description
41	Motor Terminal Selection	When this terminal function is active, group A2 motor parameters (2nd motor parameters) are used; When this terminal function is invalid, group P4 motor parameters (1st motor parameters) are used.
42	Reservation	
43	PID switching parameter	When P9-20=1 (switching PID parameters via X terminal), if the function of this terminal is valid, parameters P9-23~P9-25 will be used; if this terminal is invalid, parameters P9-12~P9-14 will be used.
44	User-defined fault 1	When the user-defined fault 1 (fault 2) terminal function is valid, the inverter alarms E.Cd1 (E.Cd2), and according to the setting of PL-14, the inverter does the corresponding fault protection action.
45	User-defined fault 2	
46	Speed control/torque control switching	When this terminal function is invalid, the inverter maintains the currently set control mode, and when the terminal function is valid, the inverter switches to another control mode.
47	Emergency stop	When this terminal function is valid, the inverter decelerates to zero speed in the shortest time, and the current during deceleration is controlled within the current limit, which is used for emergency stop in case of emergency.
48	External terminal 2 parking	In any control mode (panel control, terminal control, communication control), this terminal can be used to decelerate the inverter to stop, at which time the deceleration time is fixed as deceleration time 4.
49	Shutdown DC Brake Input	When this terminal function is active, the inverter first decelerates to the stopping DC braking start frequency and then switches to the DC braking state.
50	This run time is cleared to zero	When this terminal function is valid, the running time used for the timing function is cleared to zero, and this function is used in conjunction with the P8-44 to P8-47 timing functions.

When the multifunction terminal is set to 12~14 functions, different multi-band frequencies can be selected by changing the terminal status, ON is valid for the terminal, OFF is invalid for the terminal, and up to 16 band frequencies can be defined.

Exhibit 1 Terminal Control Multi-Segment Speed Correspondence Table

Multi-Speed Terminal 4	Multi-Speed Terminal 3	Multi-Speed Terminal 2	Multi-speed terminal 1	Frequency setting
OFF	OFF	OFF	OFF	P7-00 (Multi-segment instruction 0)
OFF	OFF	OFF	ON	P7-01 (Multi-segment instruction 1)
OFF	OFF	ON	OFF	P7-02 (Multi-segment instruction 2)
OFF	OFF	ON	ON	P7-03 (Multi-segment instruction 3)
OFF	ON	OFF	OFF	P7-04 (Multi-segment instruction 4)
OFF	ON	OFF	ON	P7-05 (Multi-segment instruction 5)
OFF	ON	ON	OFF	P7-06 (Multi-segment instruction 6)
OFF	ON	ON	ON	P7-07 (Multi-segment instruction 7)
ON	OFF	OFF	OFF	P7-08 (Multi-segment instruction 8)
ON	OFF	OFF	ON	P7-09 (Multi-segment instruction 9)
ON	OFF	ON	OFF	P7-10 (Multi-segment instruction 10)
ON	OFF	ON	ON	P7-11 (Multi-segment instruction 11)
ON	ON	OFF	OFF	P7-12 (Multi-segment instruction 12)
ON	ON	OFF	ON	P7-13 (Multi-segment instruction 13)
ON	ON	ON	OFF	P7-14 (Multi-segment instruction 14)

ON	ON	ON	ON	P7-15 (Multi-segment instruction 15)
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In addition, the multispeed command can be used as a PID feed source or as a voltage source in case of V/F separation.

Exhibit 2: Terminal Control Acceleration and Deceleration Time Selection Options

Acceleration and deceleration time terminal 2	Acceleration and deceleration time terminal 1	Acceleration or deceleration time selection
OFF	OFF	Acceleration time 1 (P0-12) / Deceleration time 1 (P0-13)
OFF	ON	Acceleration time 2 (P7-16) / Deceleration time 2 (P7-17)
ON	OFF	Acceleration time 3 (P7-18) / Deceleration time 3 (P7-19)
ON	ON	Acceleration time 4 (P7-20) / Deceleration time 4 (P7-21)

P5-07 X-terminal filter time	Range: 0.000s to 1.000s	Factory value: 0.010s
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Set the software filtering time of X terminal status. If the use of input terminals vulnerable to interference and cause false action, you can increase this parameter to enhance the anti-interference ability, the larger the filtering time, the slower the response of the X-terminal.

P5-08 Terminal Control Operation Mode	Range: 0 to 3	Factory value: 0
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This parameter defines four ways of controlling the inverter operation via the external terminal.

**0: Two-wire 1:**

Select X1 as the forward signal and X2 as the reverse signal, and set the terminal functions as follows:

Function code	Terminals	Set value	Descriptions
P5-08	Terminal command method	0	Two-wire 1
P5-00	X1 terminal function selection	1	FWD
P5-01	X2 terminal function selection	2	Reverse Run (REV)

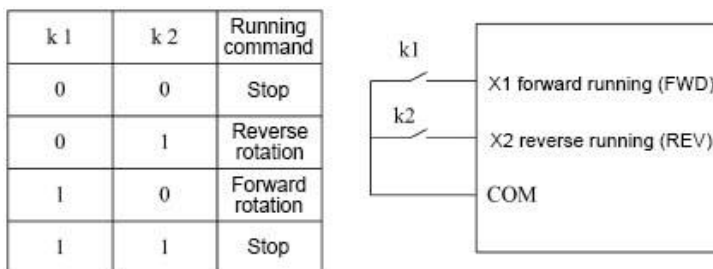


Figure 6-8 Two-wire mode 1

As shown in the above figure: under this control mode, k1 is closed, the inverter runs forward; k2 is closed, the inverter runs reverse; k1 and k2 are closed or disconnected at the same time, the inverter stops.

**1: Two-wire 2:**

Select X1 as the run enable and X2 as the direction signal, and set the function of terminal as follows:

Function code	Terminals	Set value	Descriptions
P5-08	Terminal command method	1	Two-wire 2
P5-00	X1 terminal function selection	1	Run enable (computing)
P5-01	X2 terminal function selection	2	Forward and reverse running directions

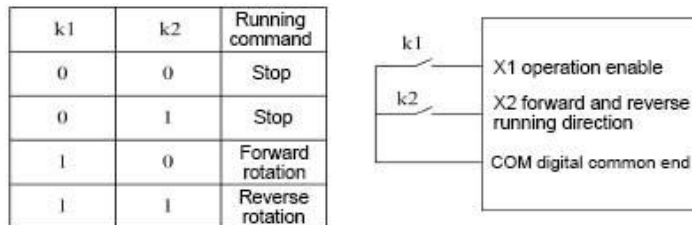


Figure 6-9 Two-linear Module 2

As shown in the above figure: in this control mode, under the state of k1 closed, k2 disconnects the inverter forward, k2 closes the inverter reverse; k1 disconnects and the inverter stops.

**2: Three-wire 1:**

Select X1 as the forward signal, X2 as the reverse signal, and X3 as the start/stop signal, and set the terminal functions as follows:

Function code	Terminals	Set value	Descriptions
P5-08	Terminal command method	2	Three-linear 1
P5-00	X1 terminal function selection	1	FWD
P5-01	X2 terminal function selection	2	Reverse Run (REV)
P5-02	X3 terminal function selection	3	Three-wire operation control

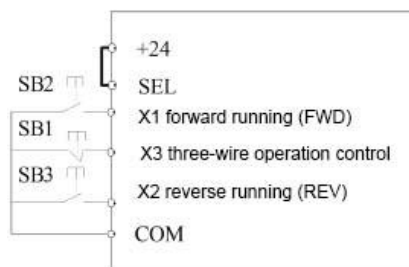


Figure 6-10 Three-Wire Control Mode 1

As shown above:

SB1: Stop button SB2: Forward button SB3: Reverse button

In this control mode, under the closed state of SB1, press SB2 inverter forward, press SB3 inverter reverse; SB1 is disconnected, inverter stops.

SB2 and SB3 are pulse active and SB1 is level active.

**3: Three-wire 2:**

Select X1 as the run signal, X2 as the run direction control, and X3 as the stop signal. The terminal functions are set as follows:

Function code	Terminals	Set value	Descriptions
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P5-08	Terminal command method	3	3-Line 2
P5-00	X1 terminal function selection	1	Operating signal
P5-01	X2 terminal function selection	2	Running direction control
P5-02	X3 terminal function selection	3	3-wire operation control (stop signal)

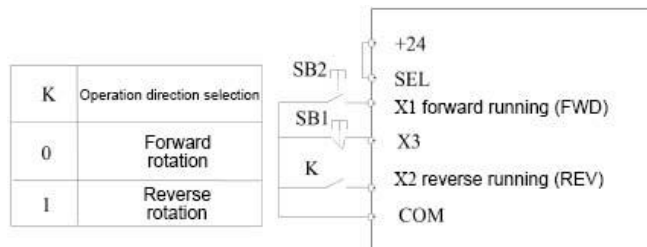


Figure 6-11 Three-Wire Control Mode 2

As shown above: SB1: Stop button SB2: Run button k: Run direction selector switch.

In this control mode, when the SB1 button is closed, press the SB2 button inverter running, k disconnect inverter forward, k close inverter reverse; when the SB1 button is disconnected, the inverter stops.

SB1 and k are level active and SB2 is pulse active.

P5-09 Terminal UP/DN Rate	Range: 0.01Hz/s to 65.535Hz/s	Factory value: 1.00Hz/s
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Used to set the rate of frequency change, i.e., the amount of frequency change per second, when terminal UP/DN adjusts the set frequency.

When P9-13 (frequency decimal point) is 2, the value ranges from 0.001 Hz/s to 65.535 Hz/s.

When P9-13 (frequency decimal point) is 1, the value ranges from 0.01 Hz/s to 655.35 Hz/s.

P5-10 AI curve selection	Range: Single digit: AI1 curve selection 1~5 Tenth position: AI2 curve selection (1~5 as above) Hundredths: Keypad potentiometer curve selection (1~5 as above)	Factory value: 321
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1: Curve 1 (2 points, see P5-14 to P5-17). 2: Curve 2 (2 points, see P5-18 to P5-21).  
3: Curve 3 (2 points, see P5-22 to P5-25). 4: Curve 4 (4 points, see A0-00 to A0-07).  
5: Curve 5 (4 points, see A0-08 to A0-15).

This function code is used to define the corresponding curves selected by the three AIs, curves 1~3 are two-point curves and curves 4~5 are four-point curves.

P5-11 AI1 filter time	Range: 0.00s to 10.00s	Factory value: 0.10s
P5-12 AI2 Filter Time	Range: 0.00s to 10.00s	Factory value: 0.10s
P5-13 Keypad Potentiometer Filter Time	Range: 0.00s to 10.00s	Factory value: 0.10s
P5-14 AI curve 1 minimum input	Range: 0.00V to P5-16	Factory value: 0.00V
P5-15 AI Curve 1 Minimum Input Correspondence Setting	Range: -100.00% to 100.0%	Factory value: 0.0%
P5-16 AI Curve 1 Maximum Input	Range: P5-14 to 10.00V	Factory value: 10.00V
P5-17 AI Curve 1 Maximum Input Corresponding Setting	Range: -100.00% to 100.0%	Factory value: 100.0%

P5-11~P5-13 define the filtering time of analogue input terminals AI1, AI2 and keypad

potentiometer, the larger the filtering time setting, the stronger the anti-interference ability, but the slower the response. The shorter the filtering time, the faster the response becomes, but the weaker the anti-interference ability.

For P5-14 and P5-16, if the input is a current signal, 1mA current signal corresponds to 0.5V voltage signal (20mA corresponds to 10V). When the input voltage is lower than P5-14, the corresponding input value is determined according to the setting of P5-31; when the input voltage is higher than P5-16, it is calculated according to the setting of P5-16.

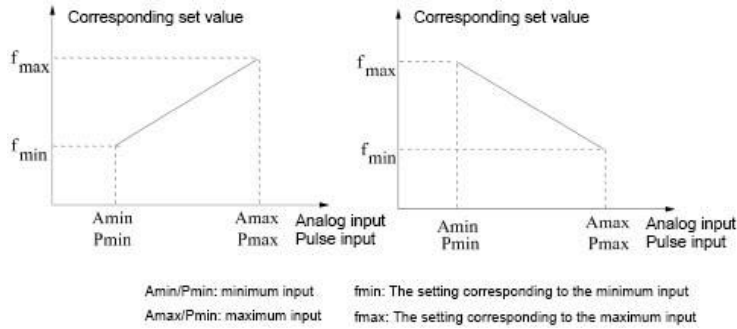


Figure 6-12 Correspondence between analogue/pulse feed and set amount

P5-18 AI curve 2 minimum input	Range: 0.00V to P5-20	Factory value: 0.00V
P5-19 AI Curve 2 Minimum Input Correspondence Setting	Range: -100.00% to 100.0%	Factory value: 0.0%
P5-20 AI Curve 2 Maximum Input	Range: P5-18 to 10.00V	Factory value: 10.00V
P5-21 AI Curve 2 Maximum Input Correspondence Setting	Range: -100.00% to 100.0%	Factory value: 100.0%

For the function and use of Curve 2, refer to the description of Curve 1.

P5-22 AI Curve 3 Minimum Input	Range: 0.00s to P5-24	Factory value: 0.00V
P5-23 AI Curve 3 Minimum Input Correspondence Setting	Range: -100.00% to 100.0%	Factory value: 0.0%
P5-24 AI Curve 3 Maximum Input	Range: P5-22 to 10.00V	Factory value: 10.00V
P5-25 AI Curve 3 Maximum Input Correspondence Setting	Range: -100.00% to 100.0%	Factory value: 100.0%

For the function and use of Curve 3, refer to the description of Curve 1.

P5-26 PULSE Minimum Input	Range: 0.00kHz to P5-28	Factory value: 0.00kHz
P5-27 PULSE Minimum Input Correspondence Setting	Range: -100.00 %to 100.0%	Factory value: 0.0%
P5-28 PULSE Maximum Input	Range: P5-26 to 50.00kHz	Factory value: 50.00kHz
P5-29 PULSE Maximum Input Correspondence Setting	Range: -100.00 %to 100.0%	Factory value: 100.0%
P5-30 PULSE Filter Time	Range: 0.00s to 10.00s	Factory value: 0.10s

The pulse frequency input (X6 only) and the corresponding setting are similar to curve 1, and the correspondence is shown in Figure 6-12.

P5-31 AI below minimum input setting selection	Range: Individual: AI1 below minimum input setting selection (0 to 1) Ten bits: AI2 below minimum input setting selection (0 to 1) Hundredths: Keypad potentiometer below minimum input setting selection (0 to 1)	Factory value: 000
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When the AI input is lower than the set minimum input (P5-14/P5-18/P5-22), the corresponding setting is selectable:

0: Corresponds to the minimum input setting (P5-15/P5-19/P5-23).

1: 0.0%.

P5-32 X1 delay time	Range: 0.0s~3600.0s	Factory value: 0.0s
P5-33 X2 delay time	Range: 0.0s~3600.0s	Factory value: 0.0s
P5-34 X3 delay time	Range: 0.0s~3600.0s	Factory value: 0.0s

P5-32~P5-34 are used to set the delayed response time of X1~X3 terminals, in which the X terminal of the inverter delays the response for the time set by the above function code after receiving the signal change.

## 6.7 Group P6 Output terminals control parameters

VL600 series inverters are equipped with 2 multifunctional analogue output terminals, 1 multifunctional digital output terminal, 2 multifunctional relay output terminals, and 1 DO terminal as standard (high-speed pulse output mode/open collector mode selectable).

P6-00 Y2 terminal output mode selection	Range: 0 to 1	Factory value: 0
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0: Pulse output (Y2-P).

1: Switching output (Y2-R).

When the Y2 terminal is used as a pulse output (Y2-P), the maximum frequency of the output pulse is 100kHz, and the pulse output function is set by P6-06; when Y2 is used as an open collector output (Y2-R), the function is set by P6-01.

P6-01 Y2-R Switching Output Function Selection	Range: 0 to 40	Factory value: 0
P6-02 Relay 1 output function selection (1RA-1RB-1RC)	Range: 0 to 40	Factory value: 2
P6-03 Relay 2 Output Function Selection (2RA-2RB-2RC)	Range: 0 to 40	Factory value: 0
P6-04 Y1 output function selection	Range: 0 to 40	Factory value: 1

The multifunction output terminal functions are described below:

Set value	Function	Description
0	No output	The output terminals have no function.
1	Signals during inverter operation	The signal is valid when the inverter is running.
2	Inverter fault	When a fault occurs in the inverter and the fault stops, the ON signal is output.
3	Frequency level detection signal 1 (FDT1)	See P6-24, P6-25 for instructions.
4	Frequency arrival signal (FAR)	See P6-23 for instructions.
5	Inverter in zero speed operation (no output at shutdown)	An indication signal is output when the inverter output frequency is 0 and it is in the running state.
6	Motor overload pre-warning	Before the motor overload protection is actuated, judgement is made based on the overload pre-warning threshold, and an ON signal is output after the pre-warning threshold is exceeded. Refer to function codes PL-00 to PL-04 for motor overload parameter settings. According to the motor overload warning coefficient set by PL-04, an indication signal is output when the output current accumulation reaches the condition.
7	Inverter overload pre-warning	An indication signal is output 10s before the overload protection of the inverter occurs.
8	The set count value reaches	See Pd-44 instructions for details.

Set value	Function	Description
9	The specified count value reaches	See Pd-45 instructions for details.
10	Length reached	When the actual length Pd-42 reaches the length set by Pd-41, an indication signal is output.
11	PLC cycle completion	After the simple PLC has completed a run cycle, it outputs an indication signal (a single pulse signal with a width of 250ms).
12	Cumulative running time reaches	When the accumulated running time (Pn-01) of the inverter reaches the set running time (P8-49), an indication signal is output.
13	Under frequency limitation	When the set frequency $\geq$ upper limit frequency (or set frequency $\leq$ lower limit frequency) and the output frequency $\geq$ upper limit frequency (or output frequency $\leq$ lower limit frequency), an indication signal is output.
14	Under torque limitation	An indication signal is output when the torque command is limited in the speed control mode.
15	Running readiness	When there is no fault in the inverter, the bus voltage is normal, there is no prohibited operation signal, and the output indication signal.
16	AI1>AI2	When the value of analogue input AI1 is greater than the input value of AI2, an indication signal is output.
17	Upper frequency limit	When the output frequency reaches the upper limit frequency, an indication signal is output.
18	Frequency Lower Limit Limit (no output at shutdown)	When the output frequency reaches the lower limit frequency, an indication signal will be output, and no output will be made in the shutdown state.
19	Undervoltage status output	Outputs an indication signal when the bus voltage falls below the undervoltage value.
20	Communication setting	Please refer to the communication protocol.
21	Reserved	Reservation
22	Reserved	Reservation
23	Inverter in zero speed operation (output at shutdown)	When the inverter output frequency is 0, an indication signal is output. Indicator signals are also output in the shutdown state.
24	Cumulative power-up time reaches	When the accumulated power-up time (Pn-00) reaches the value set by P8-48, an indication signal is output.
25	Frequency level detection signal 2 (FDT2)	See P6-26, P6-27 for instructions.
26	Frequency arrival signal 1	See P8-37, P8-38 for instructions.
27	Frequency arrival signal 2	See P8-39, P8-40 for instructions.
28	Current arrival signal 1	See P8-50, P8-51 for instructions.
29	Current arrival signal 2	See P8-52, P8-53 for instructions.
30	Timed Arrival Output	When the timing function selection (P8-44) is valid, the inverter outputs an indication signal after the current running time of the inverter reaches the timing time set by P8-45.
31	AI1 input overrun	When the value of analogue input AI1 is greater than the upper limit of AI1 input protection (P8-42) or less than the lower limit of AI1 input protection (P8-41), an indication signal is output.
32	Load loss signal	Outputs an indication signal when the inverter is in the off-load state.

Set value	Function	Description
33	Running in reverse rotation	Output indication signal when the inverter is in reverse operation
34	Zero current state	See P8-30, P8-31 for instructions.
35	Module temperature reaches	When the inverter module heat sink temperature (Pn-03) reaches the set module temperature arrival value (P8-34), an indication signal is output.
36	Software current overrun	See P8-32, P8-33 for instructions.
37	Frequency Lower Limit Limit (output at shutdown)	When the output frequency reaches the lower limit frequency, an indication signal is output, and the output is output in the shutdown state.
38	Alarm signal output	When a fault occurs in the inverter, or when the protective action for that fault is set to continue operation, an alarm signal is output.
39	Motor over-temperature alarm	When the motor temperature reaches the motor overheating pre-alarm threshold (PL-23), an indication signal is output.
40	This run time arrives	The inverter outputs an indication signal when the current start running time reaches the set value of P8-47.

P6-06 Y2-P Pulse output function selection	Range: 0 to 16	Factory value: 0
P6-07 AO1 terminal function selection	Range: 0 to 16	Factory value: 0
P6-08 AO2 terminal function selection	Range: 0 to 16	Factory value: 1

The maximum frequency of Y2-P pulse output can be set by P6-09. the range of pulse frequency output from Y2-P terminal is 0.01kHz ~P6-09 (maximum frequency of Y2-P output), and P6-09 can be set from 0.01 to 100.00kHz.

The analogue outputs AO1 and AO2 have an output range of 0V to 10V or 0mA to 20mA. The ranges of the pulse outputs or analogue outputs are shown in the table below in relation to the calibration of the corresponding functions:

Set value	Function	Indication range
0	Operating frequency	0 to maximum output frequency
1	Set frequency	0 to maximum output frequency
2	Output current	0~2 times rated motor current
3	Output torque	0~2 times rated motor torque
4	Output power	0 to 2 times the rated power of the motor
5	Output voltage	0 to 1.2 times the rated voltage of the inverter
6	PULSE Pulse Input	0.01kHz to 100.00kHz
7	AI1	0V to 10V
8	AI2	0V to 10V (or 0 to 20mA)
9	Keyboard potentiometers	0V to 10V
10	Length	0 to maximum set length
11	Count value	0 to maximum count value
12	Communication setting	0.0% to 100.0%
13	Motor speed	0~Rotational speed corresponding to maximum output

Set value	Function	Indication range
		frequency
14	Output current	0.0A~1000.0A
15	Output voltage	0.0V~1000.0V

P6-09 Y2-P Output Maximum Frequency (DO as Pulse Output)	Range: 0.01kHz to 100.00kHz	Factory value: 50.00kHz
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This function code is used to set the maximum frequency value of the output pulse when the DO terminal is selected as a pulse output.

P6-10 AO1 zero bias factor	Range: -100.0% to +100.0%	Factory value: 0.0%
P6-11 AO1 Gain	Range: -10.00 to +10.00	Factory value: 1.00
P6-12 AO2 zero bias factor	Range: -100.0% to +100.0%	Factory value: 0.0%
P6-13 AO2 gain	Range: -10.00 to +10.00	Factory value: 1.00

The output zero drift and proportional error of AO1 and AO2 can be corrected by setting the appropriate zero bias and gain through P6-10~P6-13.

If the zero bias is represented by b, the gain is represented by k, the actual output is represented by y, and the standard output is represented by x, then the actual output is:  $y = kx + b$ . The factory value of the zero bias coefficient is 0.0%, and the factory value of the gain is 1.00, and at this time, the AO is the standard output, that is, the AO output of 0~10V (or 0~20mA) corresponds to the "0~Maximum Indication Range"

For example, if the AO function selects "Operating Frequency", and you want to output 2V when the frequency is 0, and 6V when the frequency is the maximum frequency, then the gain shall be set to 0.40, and the zero bias shall be set to "20%".

P6-17 Y2-R Output Delay Time (Open Collector Output)	Range: 0.0s~3600.0s	Factory value: 0.0s
P6-18 Relay 1 output delay time	Range: 0.0s~3600.0s	Factory value: 0.0s
P6-19 Relay 2 Output Delay Time	Range: 0.0s~3600.0s	Factory value: 0.0s
P6-20 Y1 Output Delay Time	Range: 0.0s~3600.0s	Factory value: 0.0s

P6-17 to P6-20 are used to set the delay time for Y2-R, Relay 1, Relay 2, and Y1, from when the state is changed to when the actual output produces a change.

P6-22 Output Terminal Effective state selection	Scope: Ones digit: Y2-R active state selection (0 to 1) Tens digit: Relay 1 active state setting (0 to 1) Hundred digits: Relay 2 terminal active state setting (0 to 1) Thousand bits: Y1 terminal valid state setting (0 to 1) 10,000 digits: reserved	Factory value: 00000
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P6-22 is used to set the output positive and negative logic of output terminals Y2-R, Relay 1, Relay 2 and Y1.

**0**: Positive logic, output terminals and the corresponding common terminal are connected and valid, disconnected and invalid;

**1**: Inverse logic, the output terminals and the corresponding common terminals are invalidly connected and validly disconnected.

P6-23	Frequency Detection Width	Arrival	Range: 0.00 to 100% of maximum frequency	Factory value: 2.0%
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This parameter is an additional definition of function No. 4 in P6-01~P6-04. As shown in Fig. 6-13, When the inverter output frequency is within the positive and negative detection width of the set frequency, an indication signal is output.

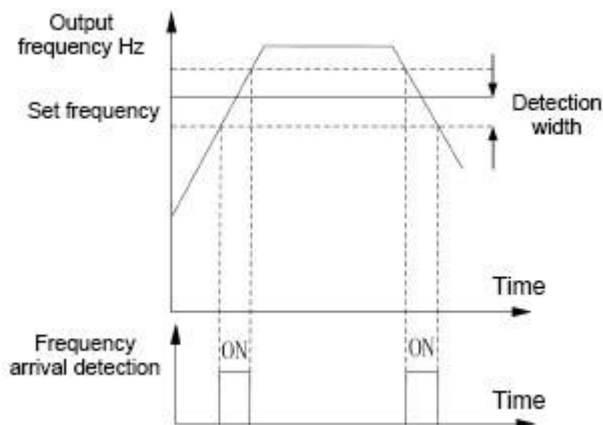


Figure 6-13 Frequency Arrival Detection Amplitude Schematic

P6-24	FDT1 level	Range: 0.00Hz to maximum frequency	Factory value: 50.00Hz
P6-25	FDT1 hysteresis	Range: 0.0% to 100.0% (FDT1 level)	Factory value: 5.0%

P6-24~P6-25 are additional definitions of function No. 3 in P6-01~P6-04, as shown in Figure 6-14, which outputs an indication signal when the output frequency exceeds the FDT1 level (P6-24) until the output frequency drops below (P6-24-P6-24\*P6-25) and stops the output. P6-25 is the hysteresis frequency relative to the FDT1 level (P6-24) as a percentage.

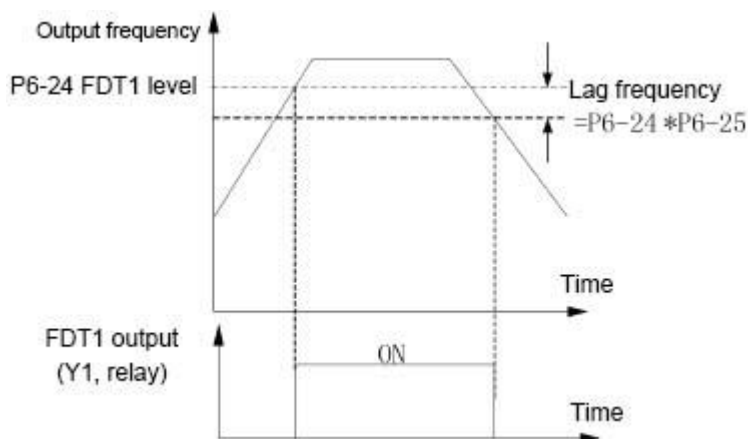


Figure 6-14 Schematic of FDT frequency detection

P6-26	FDT2 level	Range: 0.00Hz to maximum frequency	Factory value: 50.00Hz
P6-27	FDT2 lag	Range: 0.0% to 100.0% (FDT2 level)	Factory value: 5.0%

The FDT2 function is exactly the same as the FDT1 function, please refer to the related description of P6-24 and P6-25 (FDT1).

### 6.8 Group P7 Multi-segment instruction parameters

The VL600's multi-segment command has a richer utility than the usual multi-segment speeds. In addition to realizing the multi-segment speed function, it can also be used as a voltage source for VF separation and as a source for the process PID feed.

P7-00 Multi-segment instruction 0	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-01 Multi-segment instruction 1	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-02 Multi-segment instruction 2	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-03 Multi-segment instruction 3	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-04 Multi-Segment Instruction 4	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-05 Multi-Segment Instruction 5	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-06 Multi-Segment Instruction 6	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-07 Multi-segment instruction 7	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-08 Multi-segment instruction 8	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-09 Multi-segment instruction 9	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-10 Multi-segment instruction 10	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-11 Multi-segment instruction 11	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-12 Multi-segment instruction 12	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-13 Multi-segment instruction 13	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-14 Multi-Segment Instruction 14	Range: -100.0% to 100.0%	Factory value: 0.0%
P7-15 Multi-segment instruction 15	Range: -100.0% to 100.0%	Factory value: 0.0%

The multispeed command can be used as a frequency source, a voltage source for VF separation, and a setting source for process PID. When used as a frequency source, it is switched and selected according to the state of the multifunction terminal; when used as a VF separated voltage source, it is a percentage relative to the rated voltage of the motor, which is equivalent to the percentage between the set frequency and the maximum frequency of the P7 group.

P7-16 Acceleration time 2	Range: 0.0s~6500.0s	Factory value: determined based on model
P7-17 Deceleration time 2	Range: 0.0s~6500.0s	Factory value: determined based on model
P7-18 Acceleration time 3	Range: 0.0s~6500.0s	Factory value: determined based on model
P7-19 Deceleration time 3	Range: 0.0s~6500.0s	Factory value: determined based on model
P7-20 Acceleration time 4	Range: 0.0s~6500.0s	Factory value: determined based on model
P7-21 Deceleration time 4	Range: 0.0s~6500.0s	Factory value: determined based on model

The inverter provides a total of 4 groups of acceleration and deceleration times, P0-08/P0-09 and P7-16~P7-21, which can be switched through the multi-function terminals, see function 16/17 of P5-00~P5-06.

## 6.9 Group P8 Enhanced functional parameters

P8-00 Digital Set Frequency Shutdown Memory Selection	Range: 0 to 1	Factory value: 0
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0: No memory.

1: Memory.

This function is valid only when the frequency source is set digitally (P0-04=0~1).

No memory: means that after the inverter stops, the frequency setting frequency value is restored to the value of P0-06.

Memory: After the inverter stops, the frequency setting value is the final modified value

(modified by keypad ▲, ▼ keys or terminal UP, DOWN).

P8-01 Forward and reverse dead time	Range: 0.00s~3000.0s	Factory value: 0.0s
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The transition time for the inverter to zero output frequency during forward and reverse switching is shown in the figure below.

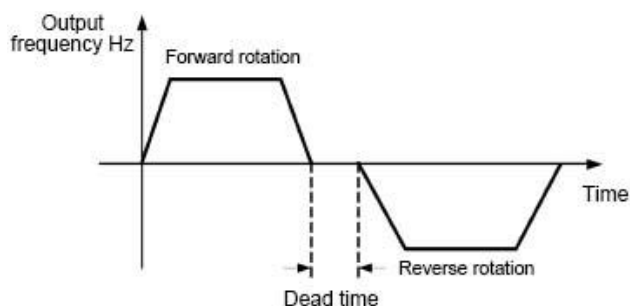


Figure 6-18 Forward and reverse dead time diagram

P8-02 Carrier frequency	Range: 0.5kHz to 16.0kHz	Factory value: determined based on model
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By adjusting the carrier frequency can reduce the motor noise, avoid the resonance point of the mechanical system, reduce the leakage current of the line to ground and reduce the interference generated by the inverter.

When the carrier frequency is low, the high harmonic component of the output current increases, the motor loss increases and the motor temperature rise increases. When the carrier frequency is higher, the motor loss decreases, the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases.

This function adjusts the carrier frequency of the inverter. By adjusting the carrier frequency, it can reduce the noise of the motor, avoid the resonance point of the mechanical system, reduce the leakage current of the line to the ground and reduce the interference generated by the inverter.

When the carrier frequency is low, the high harmonic component of the output current increases, the motor loss increases and the motor temperature rise increases. When the carrier frequency is higher, the motor loss decreases, the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases.

Adjusting the carrier frequency has an effect on the following performance:

Carrier frequency	Low → High
Motor noise	Large → Small
Motor temperature rise	High → Low
Temperature rise of frequency converter	Low → High
Leakage current	Small → Large
Radiation interference with the outside world	Small → Large
Output current waveform	Poor → good

P8-03 Carrier frequency auto tuning	Range: 0~1	Factory value: 0
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Individual: Adjustment of carrier frequency according to temperature

0: No action.

1: Action.

Tenth position: Adjust the carrier frequency according to the frequency

0: Automatically adjusted according to frequency.

1: Carrier Forcing.

P8-04 Start-up protection selection	Range: 0 to 1	Factory value: 0
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0: not protected

1: protected

This parameter relates to the safety protection function of the inverter.

No protection: the run command is valid at the moment of power-on of the inverter, and the inverter responds to the run command immediately;

Protection: When the inverter is powered on (or after fault reset) the run command is valid, the inverter does not respond to the run command, and the inverter responds only after the run command is revoked and valid again. The inverter responds only after the run command is valid again.

P8-04 is set to 1 to prevent danger caused by the motor responding to a run command at power-up or during a fault reset.

P8-05 Frequency of pointing operation	Range: 0.00Hz to maximum frequency	Factory value: 2.00Hz
P8-06 Terminal Jogging Priority	Range: 0~1	Factory value: 0

0: Invalid.

1: Valid.

When P8-06 is set to 1, terminal pointing has the highest priority, and if the terminal pointing command is valid during operation, the inverter switches to the terminal pointing operation state.

P8-07 Punctual acceleration time	Range: 0.0s~6500.0s	Factory value: 20.0s
P8-08 Jogging Deceleration Time	Range: 0.0s~6500.0s	Factory value: 20.0s

P8-07 and P8-08 are the acceleration and deceleration times used for pointing operation. The start method for pointing operation is fixed as direct start and the stop method is fixed as deceleration stop.

P8-09 Jump Frequency 1	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz
P8-10 Jump Frequency 2	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz
P8-11 Jump Frequency Amplitude	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz

In order to avoid the mechanical resonance point, by setting the jump frequency and amplitude, when the set frequency of the inverter falls into the jump frequency interval, it will be automatically adjusted to the upper limit or lower limit of the jump interval, and more than two jump intervals can be defined, and the working principle of the jump frequency is shown in the following figure.

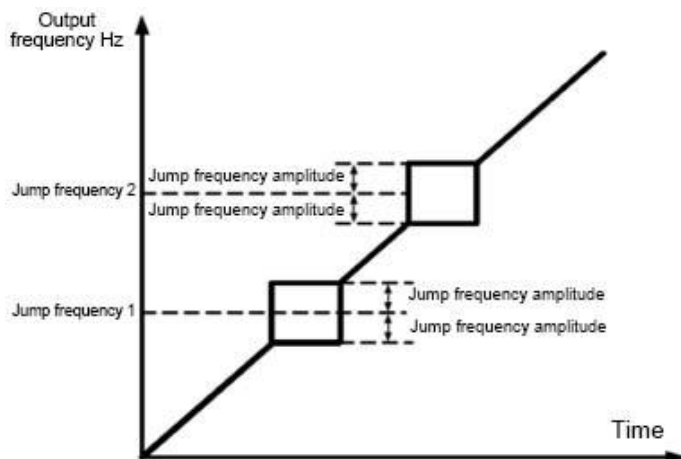


Figure 6-19 Schematic diagram of jump frequency and amplitude

**Note: If only one hopping point is used, both hopping frequencies must be set to the same.**

P8-12 Is the jump frequency valid during acceleration and deceleration?	Range: 0 to 1	Factory value: 0
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- 0: Invalid.
- 1: Valid.

P8-12 is used to set whether the jump frequency is valid during acceleration and deceleration.

When set to valid, the actual operating frequency jumps over the set jump frequency boundary when running into the jump frequency range, as shown in the figure below.

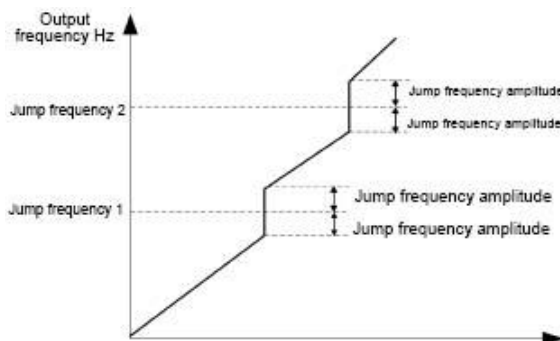


Figure 6-20 Effective diagram of jump frequency during acceleration and deceleration

P8-13 Frequency command resolution	Range: 1 to 2	Factory value: 2
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- 1: 0.1 Hz
- 2: 0.01Hz

0.1Hz: the frequency is 1 decimal, the maximum output frequency is 3200Hz;

0.01Hz: the frequency is 2 decimal places, the maximum output frequency is 320Hz;

Note: When this function code is modified, the decimal point of all frequency-related function codes will change, and the actual frequency value will also change.

P8-14 X terminal active mode selection 1	Scope: Bit: X1 terminal valid state selection (0 to 1) Ten bits: X2 terminal valid state selection (0 to 1) Hundred digits: X3 terminal valid state selection (0 to 1) Thousand bits: X4 terminal valid state selection (0 to 1)	Factory value: 00000
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	10,000 bits: X5 terminal valid state selection (0 to 1)	
P8-15 X terminal active state selection 2	Scope: Position: X6 terminal valid state selection (0 to 1) Tenth place: reserved	Factory value: 00000

0: X terminal is valid when shorted to common, invalid when disconnected.

1: X terminal is invalid when shorted to common, valid when disconnected.

P8-16 Command Channel and Frequency Channel Binding	Scope: Bit: Operation panel command binding frequency channel selection 0~9 Tens digit: terminal command binding frequency channel selection 0~9 Hundreds digit: communication command binding frequency channel selection 0~9	Factory value: 000
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Bit: Operator panel command binding frequency channel selection.

0: No bundles.

1: Digitally set frequency source.

2: AI1.

3: AI2.

4: Keyboard potentiometer.

5: PULSE pulse setting (X6).

6: Multi-segment instructions.

7: Simple PLC.

8: PID.

9: Communication given.

Ten bits: terminal command binding frequency channel selection (0 to 9, same bit).

Hundred bits: communication command binding frequency channel selection (0 to 9, same bit).

Synchronous switching between the bound command channel and the frequency given channel can be achieved via P0-02 (operation command channel selection) or the X terminal.

P8-17 Frequency point for switching between acceleration time 1 and acceleration time 2	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz
P8-18 Deceleration Time 1 and Deceleration Time 2 Switching Frequency Points	Range: 0.00Hz to maximum frequency	Factory value: 0.00Hz

By setting P8-17 and P8-18 switching frequency points, the inverter adopts different acceleration and deceleration times in different output frequency bands to meet the process requirements.

During acceleration, acceleration time 2 is selected if the running frequency is less than P8-17, and acceleration time 1 is selected if the running frequency is greater than P8-17; during deceleration, deceleration time 1 is selected if the running frequency is greater than P8-18, and deceleration time 2 is selected if the running frequency is less than P8-18, as shown in the figure below.

This function is invalid when the acceleration and deceleration time is selected as valid for the X terminal (functions 16 and 17 of the multi-function terminal).

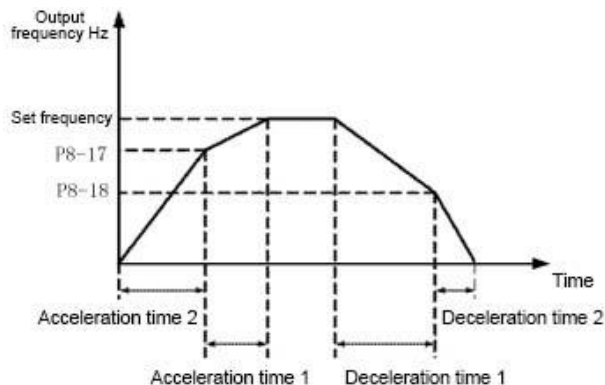


Figure 6-21 Acceleration and deceleration time switching diagram

P8-19 Acceleration and deceleration time reference frequency	Range: 0 to 2	Factory value: 0
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- 0: Maximum frequency (P0-13).
- 1: Set the frequency.
- 2: 100Hz.

With the reference frequency set by P8-20, the change time of the output frequency from 0Hz to this reference frequency is the acceleration and deceleration time.

P8-20 Run-time frequency command UP/DN reference	Range: 0 to 1	Factory value: 0
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- 0: Running frequency, when keypad ▲, ▼ key or terminal UP/DN.
- 1: Setting frequency, keypad ▲, ▼ key or terminal UP/DN when the set frequency is used.

P8-21 Setting frequency below lower limit frequency operation mode	Range: 0 to 2	Factory value: 0
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- 0: Operate at the lower frequency limit.
- 1: shutdown
- 2: Zero speed operation.

P8-22 Fan control	Range: 0 to 1	Factory value: 0
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- 0: Automatic control.  
The inverter's fan runs all the time in the running state, and in the stopping state it selects stopping or running depending on the temperature of the heat sink.
- 1: The fan runs all the time when power is applied.

P8-23 Acceleration and deceleration time units	Range: 0 to 2s	Factory value: 1
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- 0: 1 second.
- 1: 0.1 seconds.
- 2: 0.01 seconds.

P8-24 Droop frequency	Range: 0.00Hz to 10.00Hz	Factory value: 0.00Hz
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When multiple inverters drive the same load, this parameter realizes equal sharing of load among inverters.

When a certain inverter is heavily loaded, the output frequency is automatically reduced according to the parameters set in this function to unload part of the load. When debugging, the value can be adjusted gradually from small to large.

P8-26 Wake-up frequency	Range: Dormant frequency (P8-28) to maximum frequency	Factory value: 0.00Hz
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	(P0-13)	
P8-27 Wake-up delay time	Range: 0.0s~6500.0s	Factory value: 0.0s
P8-28 Sleep frequency	Range: 0.00Hz to wake-up frequency (P8-26)	Factory value: 0.00Hz
P8-29 Sleep delay time	Range: 0.0s~6500.0s	Factory value: 0.0s

During the operation of the inverter, when the set frequency is less than or equal to the P8-28 hibernation frequency and lasts for the P8-29 delay time, it enters the hibernation state and stops automatically.

If the inverter is in hibernation state and the current run command is valid, when the set frequency is greater than or equal to the P8-26 wake-up frequency and lasts for P8-27 delay time, the inverter resumes operation.

In general, please set the wake-up frequency greater than or equal to the hibernation frequency. Setting both the wake-up frequency and the hibernation frequency to 0.00Hz invalidates the hibernation and wake-up functions.

When the hibernation function is enabled, if the frequency source uses PID, you must select the PID stop-time operation (P9-11=1).

P8-30 Zero Current Detection Level	Range: 0.0% to 300.0% (rated motor current)	Factory value: 5.0%
P8-31 Zero Current Detection Delay Time	Range: 0.00s to 600.00s	Factory value: 0.10s

If the output current of the inverter is less than or equal to the zero-current detection level (P8-30) and continues to exceed the zero-current detection delay time (P8-31), the inverter multifunction terminal outputs an indication signal (Output terminal 34 function). The principle of zero current detection is shown below.

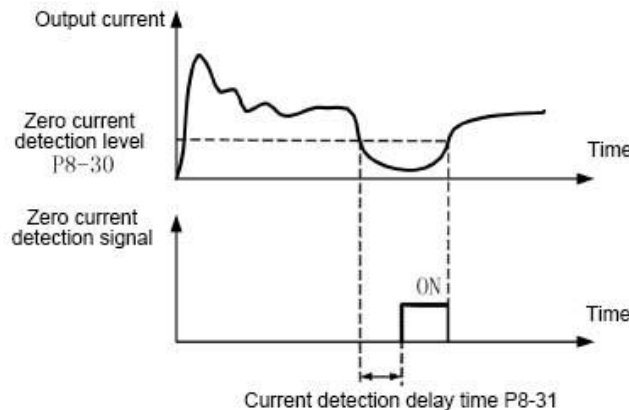


Figure 6-22 Schematic diagram of zero current detection

P8-32 Output current overrun	Range: 0.0% to 300.0% (rated motor current)	Factory value: 200.0%
	0.0% (non-detectable).	
	0.1% to 300.0% (motor rated current).	
P8-33 Output current overrun detection delay time	Range: 0.00s to 600.00s	Factory value: 0.00s

When the output current of the inverter is greater than or equal to the overrun value (P8-32)

and continues to exceed the overrun detection delay time (P8-33), the inverter multifunction terminal outputs an indication signal (Output Terminal No. 36 function) as shown below.

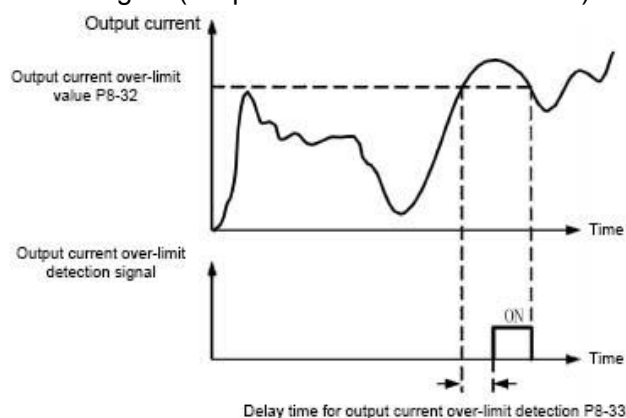


Figure 6-23 Schematic diagram of output current overrun detection

P8-34 Module Temperature Arrival	Range: 0.00V to 110°C	Factory value: 75°C
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When the temperature of the inverter module heat sink reaches this temperature (P8-34), the inverter multifunction terminal outputs an indication signal (output terminal 35 function).

P8-35 Over-voltage point setting	Range: 200.0V to 2000.0V	Factory value: determined based on model
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As shown in the table below, the factory value of the overvoltage point of the inverter for each voltage level, when the set value is higher than the factory value, the factory value shall prevail:

Voltage level	Factory value of over-voltage point
Single-phase 220V	400.0V
Three-phase 220V	400.0V
Three-phase 380V	810.0V

P8-36 Under-voltage point setting	Range: 200.0V to 2000.0V	Factory value: determined based on model
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This parameter is used to set the undervoltage value of the bus voltage as shown in the table below:

Vltage level	Udervoltage point
Single-phase 220V	200V
Three-phase 220V	200V
Three-phase 380V	350V

P8-37 Arbitrary arrival frequency detection value 1	Range: 0.00Hz to maximum frequency	Factory value: 50.00Hz
P8-38 Arbitrary arrival frequency detection amplitude 1	Range: 0.0% to 100.0% (maximum frequency)	Factory value: 0.0%
P8-39 Arbitrary arrival frequency detection value 2	Range: 0.00Hz to maximum frequency	Factory value: 50.00Hz

P8-40 Arbitrary Arrival Frequency Detection Amplitude 2	Range: 0.0% to 100.0% (maximum frequency)	Factory value: 0.0%
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P8-37~P8-39 correspond to the function of multi-function output terminals No. 26 and 27, which output an indication signal when the output frequency is located within the detection range of any arrival frequency, as shown in the figure below.

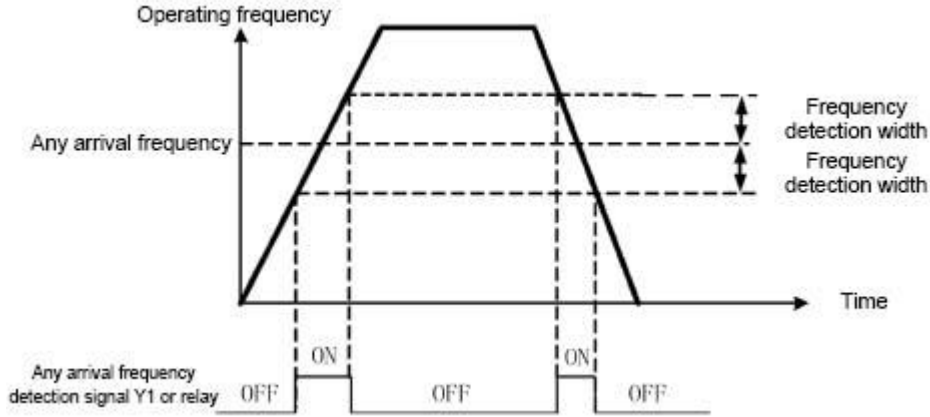


Figure 6-24 Schematic of arbitrary arrival frequency detection

P8-41 AI1 input voltage protection value lower limit	Range: 0.00V to P8-42	Factory value: 3.10V
P8-42 AI1 input voltage protection value upper limit	Range: P8-41 to 10.00V	Factory value: 6.80V

P8-41~P8-42 correspond to the function of multifunctional output terminal 31, which outputs an indication signal when the output analogue voltage value of AI1 exceeds the range set by P8-41 and P8-42.

P8-43 PWM Modulation Method	Range: 0 to 1	Factory value: 0
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- 0: Asynchronous modulation, the carrier frequency does not vary with the output frequency.
- 1: Synchronous modulation, where the carrier frequency varies with the output frequency, is generally used when the output frequency is high to improve the quality of the output voltage.

This parameter is only valid under V/F control.

P8-44 Timing Function Selection	Range: 0 to 1	Factory value: 0
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- 0: Invalid.
- 1: Valid.

P8-44~P8-46 Timing parameters correspond to the function of multi-function output terminal 30.

When the timer function is effective, the inverter starts timing, and when it reaches the time set by P8-45, it stops automatically, and the multi-function terminal outputs an indication signal.

P8-45 Timed Run Time Selection	Range: 0 to 3	Factory value: 0
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- 0: P8-46 Settings.
- 1: AI1.
- 2: AI2.
- 3: Keyboard potentiometer.

100% of the analogue input corresponds to the time set by P8-46.

P8-46 Timed Runtime	Range: 0.0Min~6500.0Min	Factory value: 0.0Min
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The timed remaining running time can be viewed with d0-20, and the timed time is cleared to zero when shutdown occurs.

P8-47 Arrival time for this run	Range: 0.0Min~6500.0Min	Factory value: 0.0Min
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This parameter corresponds to the function of multifunction output terminal No. 40, which outputs an indication signal when the running time of this start-up reaches the set value of P8-47.

P8-48 Setting the cumulative power-up arrival time	Range: 0h~65000h	Factory value: 0h
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This parameter corresponds to the function of multifunction output terminal 24, which outputs an indication signal when the accumulated power-up time (Pn-00) reaches the set value of P8-48.

P8-49 Setting the cumulative running arrival time	Range: 0h~65000h	Factory value: 0h
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This parameter corresponds to the function of multifunction output terminal No. 12, which outputs an indication signal when the accumulated running time (Pn-01) reaches the set value of P8-49.

P8-50 Arbitrary arrival current 1	Range: 0.0% to 300.0% (rated motor current)	Factory value: 100.0%
P8-51 Arbitrary arrival current 1 width	Range: 0.0% to 300.0% (rated motor current)	Factory value: 0.0%
P8-52 Arbitrary arrival current 2	Range: 0.0% to 300.0% (rated motor current)	Factory value: 100.0%
P8-53 Arbitrary arrival current 2 width	Range: 0.0% to 300.0% (rated motor current)	Factory value: 0.0%

P8-50~P8-53 corresponds to the function of multi-function output terminals No. 28 and 29, which outputs an indication signal when the output current is located in any arrival current detection range, as shown in the figure below.

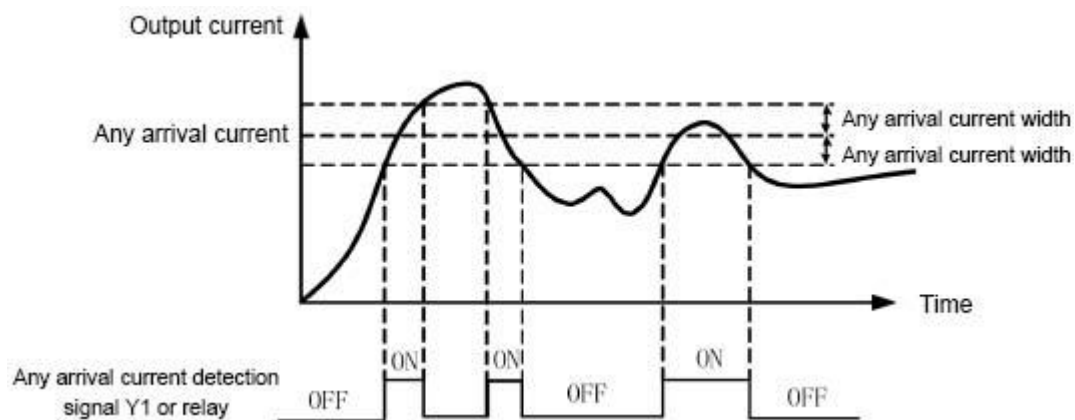


Figure 6-25 Schematic diagram of arbitrary arrival current detection

P8-56 Motor Tone Adjustment	Range: 0 to 10	Factory value: 0
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0: No motor tone adjustment.

1~10: The motor tone adjusts the depth.

Adjust this parameter to change the pitch of the motor when it is running.

P8-57 Fast Current Limit Function	Range: 0 to 1	Factory value: 1
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0: Not enabled.

1: Enable.

The fast current limiting function can minimize overcurrent faults in the inverter, if it is in the fast current limiting state for a long time, the inverter reports E.CLo current limiting fault and stops.

P8-61 Brake unit operating voltage	Range: 200.0~2000.0V	Factory value: power determination
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This function code is valid only for models with built-in braking unit. The brake unit operates when the inverter bus voltage reaches this value.

Voltage level (AC)	Power range	P8-61 Default Value (DC)
Single/three-phase 220V	4.0KW and below	360.0V
Three-phase 380V	0.75KW~630KW	700.0V

P8-62 AVR Functions	Range: 0 to 1	Factory value: 1
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0: Invalid throughout.

1: Invalid only for deceleration.

2: Valid for whole process.

AVR is Automatic Voltage Regulation, in which the inverter is automatically adjusted according to the bus voltage to keep the actual output voltage constant.

P8-63 Auxiliary Function Selection	Range: 0 to 1111H	Factory value: 0001H
------------------------------------	-------------------	----------------------

Bit: Whether the undervoltage fault is automatically reset.

0: No automatic reset;

1: Automatic reset.

Tens digit: Reservations. Hundreds digit: Reservations. Thousands digit: Reservations.

P8-66 Motor Temperature Sensor Type	Range: 0 to 2	Factory value: 0
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0: No temperature sensor.

1: PT100.

2: PT1000.

P8-67 Motor Overheating Protection Thresholds	Range: 0°C~200°C	Factory value: 110°C
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P8-68 Motor overheating warning value	Range: 0°C~200°C	Factory value: 90°C
---------------------------------------	------------------	---------------------

When the temperature detection value is greater than the protection value set by PL-67, the inverter reports an over-temperature fault and handles it according to the fault protection action selection.

When the temperature detection value is greater than the PL-68 motor overheating warning value, the inverter multi-function output terminal outputs an indication signal.

A special expansion card is required to collect the motor temperature signal, and this card is optional.

## 6.10 Group P9 Process control PID function

PID control is a common method used for process control, through the controlled amount of the feedback signal and the target signal deviation amount of proportional, integral, differential operation, to adjust the output frequency of the inverter, constituting a negative feedback system, so that the controlled amount of stability in the target value. Applicable to flow control, pressure control and temperature control and other process control occasions, the control principle block diagram is as follows:

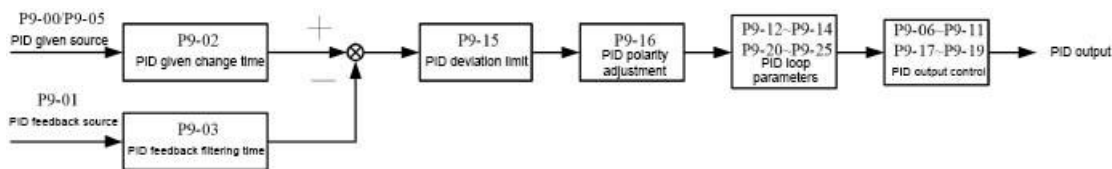


Figure 6-15 Process PID Schematic Block Diagram

P9-00 PID source	Range: 0~6	Factory value: 0
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- 0: P9-05 Settings.
- 1: AI1.
- 2: AI2.
- 3: Keyboard potentiometer.
- 4: PULSE Pulse (X6).
- 5: Communication.
- 6: Multi-speed command.

P9-01 PID Feedback Source	Range: 0 to 8	Factory value: 0
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- 0: AI1.
- 1: AI2.
- 2: Keyboard potentiometer.
- 3: AI1-AI2.
- 4: PULSE Pulse (X6).
- 5: Communication.
- 6: AI1+AI2.
- 7: MAX (|AI1|, |AI2|).
- 8: MIN(|AI1|, |AI2|).

Both the amount of feed and feedback for the process PID are relative values with a range of 0.0% to 100.0%.

P9-02 PID given change time	Range: 0.00s to 650.00s	Factory value: 0.00s
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PID given change time, refers to the time required for the PID given value to change from 0.0% to 100.0%, by setting the P9-02 change time, you can make the PID given amount change gradually, preventing the sudden change of the PID output to cause impact.

P9-03 PID Feedback Filter Time	Range: 0.00s~60.00s	Factory value: 0.00s
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PID feedback signal is often superimposed on a certain interference, by setting the P9-03 filtering time, the feedback signal filtering, the longer the filtering time, the stronger the anti-jamming ability, but the response slows down; the shorter the filtering time, the faster the response, but the anti-jamming ability becomes weak.

P9-04 PID Feedback Range for PID Setting	Range: 0 to 65535	Factory value: 1000
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P9-04 is used to set the display values corresponding to d0-15 and d0-16 when the give or feedback is 100%. If P9-04 is set to 1000, d0-17 will be displayed as 1000 when the PID is given as 100%. this parameter only affects the display values of d0-15 and d0-16, and has no effect on the actual PID output.

P9-05 PID Value Setting	Range: 0.0% to 100.0%	Factory value: 50.0%
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When P9-00 is set to 0, the PID given value is set via P9-05.

P9-06 PID Inversion Cutoff Frequency	Range: 0.00 to maximum frequency	Factory value: 0.00Hz
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P9-06 is used to set the maximum inversion frequency allowed when the PID output is negative.

P9-07 PID Differential Limiting	Range: 0.00% to 100.00%	Factory value: 0.10%
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Some occasions when using differential regulation, too large differential output value may cause system oscillation, by setting P9-07 differential limit, you can control the range of differential output.

P9-08 PID Output Filter Time	Range: 0.00s~60.00s	Factory value: 0.00s
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P9-08 is used to set the filtering time of the PID output, the larger the setting, the slower the PID output changes and the slower the dynamic response.

P9-09 Maximum value of deviation between two PID outputs	Range: 0.0% to 100.0%	Factory value: 1.00%
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P9-10 Minimum deviation between two PID outputs	Range: 0.0% to 100.0%	Factory value: 1.00%
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The difference between the two PID regulation output values is limited to a value not greater than P9-09 when the difference is positive and not less than (-P9-10) when the difference is negative, i.e., the difference between the two PID outputs before and after is limited to (-P9-10~P9-09).

P9-11 PID stopping operation	Range: 0~1	Factory value: 0
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0: The shutdown is not calculated.

1: Downtime arithmetic.

P9-12 Proportional Gain Kp1	Range: 0.0 to 100.0	Factory value: 20.0
-----------------------------	---------------------	---------------------

P9-13 Integral time Ti1	Range: 0.01s~10.00s	Factory value: 2.00s
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P9-14 Differential time Td1	Range: 0.00 to 10.000	Factory value: 0.000s
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The process PID has two groups of proportional, integral, and differential parameters that can be switched by the conditions set in P9-20, with P9-12~P9-14 as the first group and P9-23~P9-25 as the second group.

Proportional gain Kp: Increasing the proportional gain can speed up the dynamic response of the system, but too large is likely to cause system oscillation.

Integration time Ti: Reducing the integration time can speed up the dynamic response of the system, but the system is easy to oscillate if it is too small.

Differential Time Td: The longer the differential time, the greater the amount of differential adjustment. Differential time means that when the feedback quantity changes by 100.0% in that time, the adjustment of the differential regulator is the maximum frequency.

P9-15 PID Deviation Limit	Range: 0.0% to 100.0%	Factory value: 0.01%
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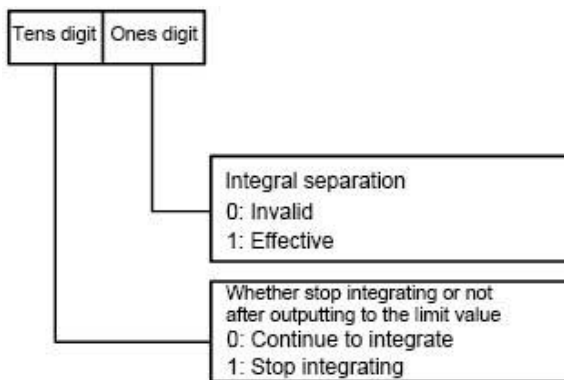
In order to balance control accuracy and stability, the deviation limit is appropriately set so that closed-loop regulation is stopped and stable output is maintained when the deviation amounts of the given and feedback are within the deviation limit, and closed-loop regulation continues when the deviation exceeds the deviation limit.

P9-16 Direction of PID action	Range: 0 to 1	Factory value: 0
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0: Positive polarity: the frequency increases when the given value is larger than the feedback value.

1: Reverse polarity: the frequency decreases when the given value is larger than the feedback value.

P9-17 PID Integral Properties	Range: 0~11	Factory value: 00
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Individuals: Separation of Points

0: Invalid, no separation of points;

1: Valid, when Multi-function terminal X Integral pause (function 22) is valid, the PID integral stops the calculation.

Tenth position: whether to stop integrating after the output reaches the limit value

0: Continued credit: Continued credit when the frequency reaches the upper or lower limit;

1: Stop the points, when the frequency reaches the upper or lower limit.

P9-18 Preset Frequency	Range: 0.0% to 100.0%	Factory value: 0.0%
P9-19 Preset Frequency Hold Time	Range: 0.00s to 650.00s	Factory value: 0.00s

After the closed-loop control is started, first run P9-19 at the P9-18 preset frequency for a period of time, and then run according to the closed-loop output frequency, and the proper setting can make the closed-loop system enter the steady state quickly to avoid overshooting.

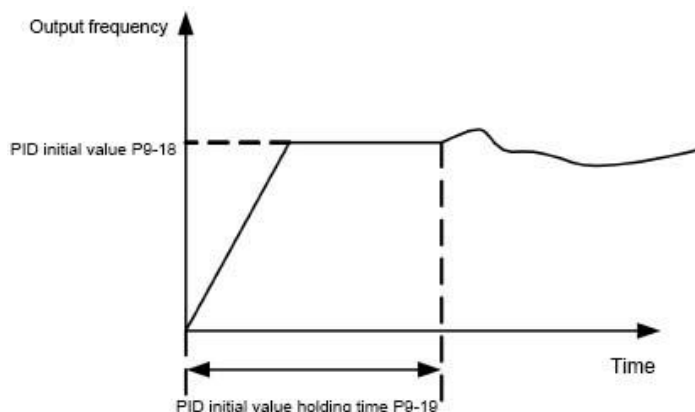


Figure 6-16 Schematic diagram of PID initial value function

P9-20 PID parameter switching conditions	Range: 0 to 2	Factory value: 0
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0: No switching.

1: Switching via the X terminal.

2: Automatic switching according to deviation.

Switching via multifunction X terminal: The multifunction terminal function is set to 43 (PID parameter switching terminal), and parameter group 1 (P9-12 to P9-14) is selected when the terminal function is invalid, and parameter group 2 (P9-23 to P9-25) is selected when it is valid.

Automatic switching according to the deviation: when the absolute value of the deviation between the given and the feedback is less than the PID parameter switching deviation 1 (P9-21), the PID parameter selection selects parameter group 1. when the absolute value of the deviation between the given and the feedback is greater than the PID switching deviation 2

(P9-22), the PID parameter selection selects parameter group 2.

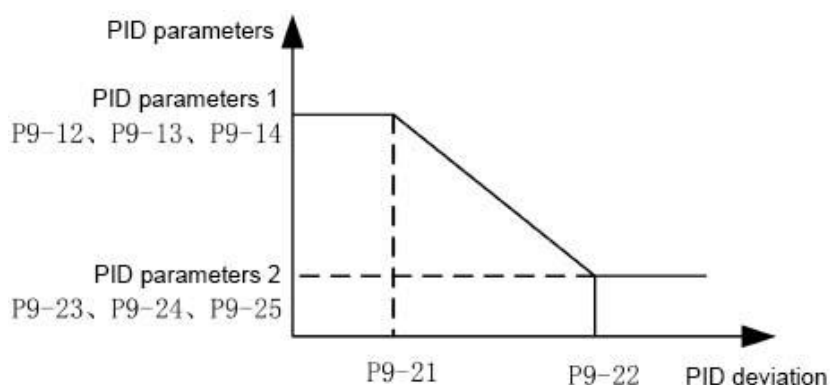


Figure 6-17 PID parameter switching

P9-21 PID parameter switching deviation 1	Range: 0.0% to P9-22	Factory value: 20.0%
P9-22 PID parameter switching deviation 2	Range: P9-21 to 100.0%	Factory value: 80.0%
P9-23 Proportional gain Kp2	Range: 0.0 to 100.0	Factory value: 20.0
P9-24 Integral time Ti2	Range: 0.01s~10.00s	Factory value: 2.00s
P9-25 Differential time Td2	Range: 0.00 to 10.000	Factory value: 0.000s
P9-26 PID Feedback Loss Detection Value	Range: 0.0%: no judgement on loss of feedback 0.1% to 100.0%	Factory value: 0.0%
P9-27 PID Feedback Loss Detection Time	Range: 0.0s~20.0s	Factory value: 0.0s

When the amount of PID feedback is less than P9-26 (feedback loss detection value) and the duration exceeds P9-27 (PID feedback loss detection time), the inverter alarms the fault E.LoF and handles it according to the selected troubleshooting method. When P9-26 is set to 0.0%, the feedback loss fault is not judged.

## 6.11 Group PA Communication parameters

PA-00 Baud rate selection	Range: 0~9	Factory value: 6005
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- 0: 300 BPS
- 1: 600 BPS
- 2: 1200 BPS
- 3: 2400 BPS
- 4: 4800 BPS
- 5: 9600 BPS
- 6: 19200 BPS
- 7: 38400 BPS
- 8: 57600 BPS
- 9: 115200 BPS

**Note:** The baud rate set by the upper computer and the inverter must be the same, otherwise communication is impossible. The larger the baud rate, the faster the communication speed, but the weaker the anti-interference ability.

PA-01 Local address	Range: 1~247, 0 is the broadcast address	Factory value: 1
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When the local address is set to 0, it is the broadcasting address to Realize the upper computer broadcasting function.

The local address is unique (except for the broadcast address), which is the basis for realizing point-to-point communication between the host computer and the inverter.

PA-02 Communication timeout time	Range: 0.0s~60.0s	Factory value: 0.0s
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When the set value is 0.0, the communication timeout detection is invalid.

When the set value is non-zero, such as the disappearance of the serial port communication signal, after the time interval between the last communication and the next communication exceeds the set value of this function code, the inverter is judged to be a communication timeout fault (E.485).

PA-03 Communication response delay	Range: 0~20ms	Factory value: 2ms
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The communication answer delay is the time between the end of receiving data from the serial port of the inverter and sending the answer data to the host computer.

PA-04 Data format	Range: 0~3	Factory value: 0
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0: No checksum: data format <8, N, 2>.

1: Even test: data format <8, E, 1>.

2: Odd check: data format <8, O, 1>.

3: No checksum: data format <8-N-1>.

In the data format <8, N, 1>, 8 means 8 data bits, N means no parity, and 1 means 1 stop bit.

The data format set by the host computer and the inverter must be the same, otherwise communication is not possible.

PA-07 Communication Master-Slave Method	Range: 0~1	Factory value: 0
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0: As a slave.

1: Make a host.

PA-08 Slave frequency correction factor1	Range: 0.000~10.000	Factory value: 1.000
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PA-09 Slave frequency correction factor 2	Range: 0.000~10.000	Factory value: 1.000
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## 6.12 Group PB Water supply parameter group

Pb-00 Water Supply Mode Selection	Range: 0 to 3	Factory value: 0
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0: General function

The inverter does not enable the dedicated constant pressure water supply function.

1: Single pump constant pressure water supply function

The inverter drags a variable frequency pump for water supply control.

2: Simple one tow two constant pressure water supply function

The inverter drags an inverter pump and an industrial frequency pump, and the industrial frequency pump is controlled using a relay.

Output terminals, the original relay function will be invalidated when this function is required.

Note: When opening the special constant pressure water supply function, it is necessary to set P0-04 to 8 at the same time to enter the closed-loop mode, and it is necessary to set the PID function parameters with the P9 group parameters to Realize the PID intelligent control of

constant pressure water supply.

Pb-01 Sleeping frequency	Range: 0.00 to upper limit frequency	Factory value: 25.00 HZ
Pb-02 Sleep delay time	Range: 0 to 3600s	Factory value: 0s

When the output frequency is not higher than Pb-01, after the time set by Pb-02, it will enter the dormant state and shut down as selected by Pb-09.

When the given pressure is greater than the feedback pressure, it is first accelerated to Pb-01 according to the acceleration time (generally slightly higher than this value), and then closed-loop regulation is carried out.

Pb-03 Awakening pressure	Range: 0.0% to 100.0%	Factory value: 80.0%
Pb-04 Wake-up delay time	Range: 0 to 3600s	Factory value: 0s
Pb-05 Gauge Range	Range: 0.01~5.00MPa	Factory value: 1.00MPa
Pb-06 Target pressure	Range: 0.00 to Pb-05	Factory value: 0.50MPa
Pb-07 Upper frequency runtime	Range: 0 to 3600s	Factory value: 10s
Pb-08 Reduced Pump Frequency Runtime	Range: 0 to 3600s	Factory value: 10s

Pb-07 and Pb-08 only work when Pb-00 is selected as 2 or 3.

When the inverter output frequency is the upper limit frequency (P0-11) and continues for the time set by Pb-07, the pumping process is performed;

When the inverter output frequency is the dormant frequency (Pb-01) and continues for the time set by Pb-08, pump reduction processing is performed;

Pb-09 Dormant mode	Range: 0 to 1	Factory value: 0
--------------------	---------------	------------------

Used to select the stopping method when the inverter enters the dormant state.

0: deceleration shutdown hibernation

Press P0-09 Deceleration Time to decelerate to 0HZ to hibernate.

1: Free downtime hibernation

Free stop to 0HZ hibernation.

Pb-10 One to Two Relay Selection	Range: 0 to 1	Factory value: 0
----------------------------------	---------------	------------------

0: Relay 1 controls the industrial pump;

1: Relay 2 controls the industrial pump;

When Pb-00 = 2, one of the relays retains its original relay function.

Pb-17 PID feedback oversize detection value	Range: 0.0%to 100.0%	Factory value: 95.0%
Pb-18 PID feedback oversize detection time	Range: 0.0s: no judgement of excessive feedback 0.1s~20.0s	Factory value: 0.0s

When the amount of PID feedback is greater than Pb-17 (feedback oversize detection value) and the duration exceeds Pb-18 (PID feedback oversize detection time), the inverter alarms the fault E.oEF and handles it in accordance with the selected troubleshooting method. When Pb-18 is set to 0.0%, the feedback oversize fault is not judged.

### 6.13 Group PC Torque control parameters

PC-00 Speed/Torque Control Method Selection	Range: 0~1	Factory value: 0
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0: Speed control.

1: Torque control.

When function No. 29 (torque control prohibition) of X terminal is valid, it is fixed to the

speed control method.

When function No. 46 (speed control/torque control switching) of terminal X is invalid, the control mode is determined by the PC-00; when the function of terminal No. 46 is valid, it switches to another control mode.

PC-01 Selection of torque setting source in torque control mode	Range: 0~7	Factory value: 0
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0: Digital setting (PC-03).

1: AI1.

2: AI2.

3: Keyboard potentiometer.

4: PULSE pulse.

5: Communication given.

6: MIN (AI1, AI2).

7: MAX (AI1, AI2).

When PC-01 is set to 0, PC-03 is used as the torque setting source; when PC-01 is set to 1~7, 100% of communication, analogue input and pulse input correspond to PC-03.

PC-02 Reserved	Range: -	Factory value: -
PC-03 Digital Setting of Torque in Torque Control Mode	Range: -200.0% to 200.0%	Factory value: 150%

100.0% corresponds to the rated torque of the inverter, and the maximum setting is 2 times the rated torque of the inverter.

PC-05 Torque Control Forward Maximum Frequency	Range: 0.00Hz to maximum frequency (P0-13)	Factory value: 50.00Hz
PC-06 Torque Control Reverse Maximum Frequency	Range: 0.00Hz to maximum frequency (P0-13)	Factory value: 50.00Hz

PC-05 and PC-06 are used to set the speed limit value of the motor in the torque control mode, which is used to limit the forward or reverse maximum operating frequency respectively.

PC-07 Torque Control Acceleration Time	Range: 0.00s~65000s	Factory value: 0.00s
PC-08 Torque controlled deceleration time	Range: 0.00s~65000s	Factory value: 0.00s

In the torque control mode, the motor acceleration and deceleration times are determined by the difference between the motor's output torque and the load torque, so when the difference between the two is large, the motor speed is likely to change too quickly, causing problems such as noise or excessive mechanical stress. By setting PC-07 and PC-08 (torque control acceleration and deceleration times), the motor speed can be made to change gently.

However, if a fast torque response is required, the torque control acceleration and deceleration time is set to 0.00s.

PC-09 Torque Control Maximum Frequency Acceleration Time	Range: 0.0~6500.0s	Factory value: 0.0s
PC-10 Torque Control Maximum Frequency Deceleration Time	Range: 0.0~6500.0s	Factory value: 0.0s

Torque control upper frequency acceleration time means the time required to accelerate from 0Hz to the maximum frequency in the torque control mode.

Torque Control Lower Frequency Acceleration Time, the time required to decelerate from the maximum frequency to 0Hz in the torque control mode.

## 6.14 Group PD Simple PLC, swing frequency, fixed length and counting

**functions parameters**

The simple PLC is a multispeed generator where the inverter automatically changes the running time and direction to meet the process requirements based on the running time.

Pd-00 Simple PLC operation method	Range: 0 to 2	Factory value: 0
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The simple PLC function serves two purposes: as a frequency source or as a voltage source for VF separation.

Figure 6-26 shows the schematic diagram when simple PLC is used as frequency source. When the simple PLC is used as the frequency source, the positive and negative values of P7-00 to P7-15 determine the running direction, and if they are negative, it means that the inverter runs in the opposite direction.

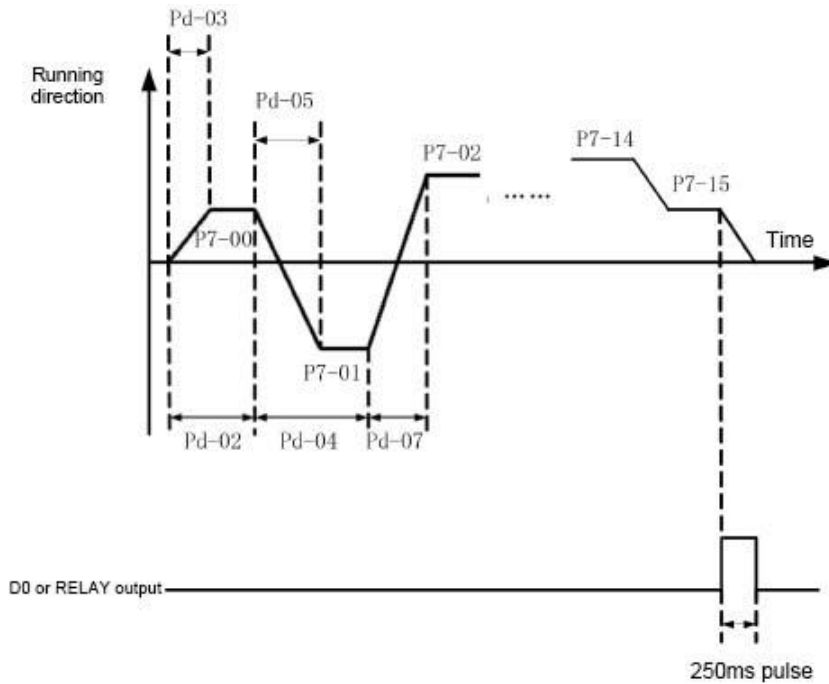


Figure 6-26 Simple PLC Schematic

When used as a frequency source, the PLC has three modes of operation, which it does not have when used as a VF separation voltage source. Among them:

**0:** Shutdown at the end of a single run

The inverter automatically stops after completing a single cycle and needs to be given the run command again to start.

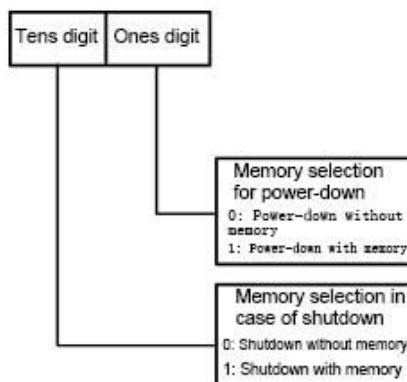
**1:** End of single run holds final value

After the inverter completes a single cycle, it automatically maintains the operating frequency and direction of the last segment.

**2:** Continuous cycle

After the inverter completes a cycle, it automatically starts the next cycle until it stops when there is a stop command.

Pd-01 Simple PLC Power-down Memory Selection	Range: 00~11	Factory value: 00
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Power-down memory selection (digits):

0: No memory, no memory of PLC operation status when power down, after power up, start again from the first segment.

1: Memory, memory PLC operation status when power down, including power down moment stage, frequency, power up from the memory stage to continue to run.

Stop memory selection (ten digits):

0: No memory, no memory of PLC operation status at shutdown, next operation, start again from the first segment.

1: Memory, memory PLC operating status during shutdown, including power-down moment stage, frequency, next run from the memory stage to continue to run.

Pd-02 Simple PLC 0th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 0th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0

Simple PLC acceleration and deceleration time selection

0: Acceleration and deceleration time 1.

1: Add time to slow down 2.

2: Acceleration and deceleration time 3.

3: Acceleration and deceleration time 4.

Pd-04 Simple PLC 1st Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 1st Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-06 Simple PLC 2nd Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 2nd Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-08 Simple PLC 3rd Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 3rd Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-10 Simple PLC 4th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 4th Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-12 Simple PLC 5th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 5th Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0

Selection		
Pd-14 Simple PLC 6th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 6th Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-16 Simple PLC 7th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 7th Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-18 Simple PLC Section 8 Runtime	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 8th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-20 Simple PLC 9th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 9th Acceleration/Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-22 Simple PLC 10th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 10th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-24 Simple PLC 11th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 11th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-26 Simple PLC 12th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 12th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-28 Simple PLC 13th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 13th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-30 Simple PLC 14th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 14th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-32 Simple PLC 15th Run Time	Range: 0.0s (h) to 6500.0s (h)	Factory value: 0.0s (h)
Pd-03 Simple PLC 15th Acceleration and Deceleration Time Selection	Range: 0~3	Factory value: 0
Pd-34 Simple PLC Runtime Unit	Range: 0 to 1	Factory value: 0

0: s (second).

1: h (hour).

Pd-35 Multi-segment Instruction 0 Giving Mode	Range: 0~6	Factory value: 0
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0: Function code P7-00 given.

1: AI1. 2: AI2. 3: Keypad potentiometer.

4: PULSE pulse.

5: PID.

6: Keypad numeric give-and-take (P0-06) give-and-take (UP/DN modifiable).

Pd-35 can be used to set the multiple ways of giving multispeed command 0. When the frequency source is "Multi-speed command" or "Simple PLC", this function code can be used to

switch the giving method. When Pd-35  $\neq$  0, P7-00 of P7 group is the first frequency.

Swing frequency function is suitable for textile, chemical fibre and other industries, as well as the need for traverse, winding function, its typical mode of operation as shown in Figure 6-27, Pd-37 (pendulum amplitude) is set to 0, the swing frequency does not work.

Usually the swing frequency working process is as follows: first accelerate to the centre frequency according to the acceleration time (P0-07 to determine), and then run cyclically according to the swing frequency amplitude (Pd-37), burst frequency amplitude (Pd-38), swing frequency period (Pd-39), triangular wave rise time (Pd-40) until there is a stopping order, decelerate and stop according to deceleration time.

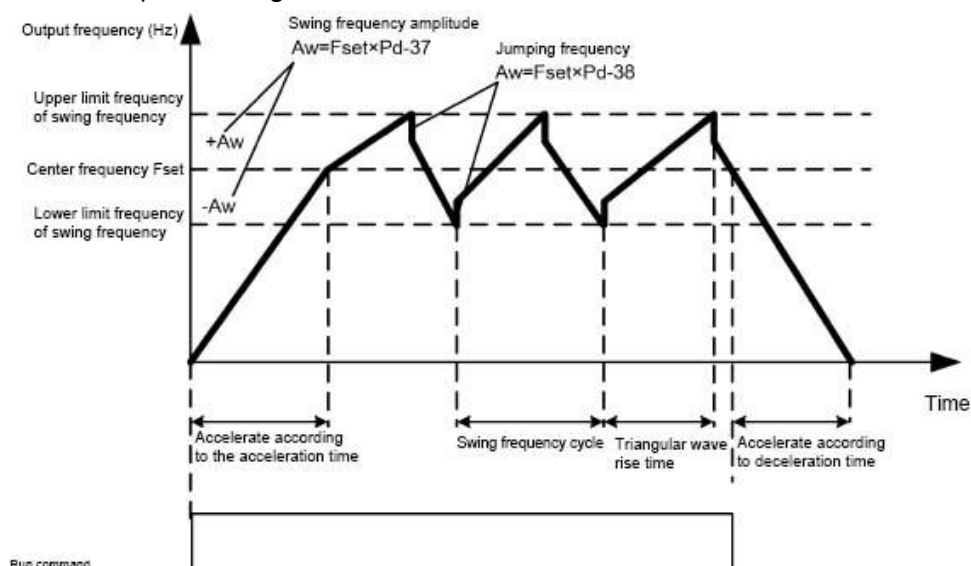


Figure 6-27 Swing frequency Working Diagram

Pd-36 Swing amplitude setting method	Range: 0~1	Factory value: 0
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Set the swing frequency amplitude with Pd-36 and Pd-37.

0: Relative to the centre frequency (P0-07 frequency source), variable pendulum, pendulum AW varies with the centre frequency.

1: Relative maximum frequency (P0-13), fixed pendulum amplitude, pendulum amplitude determined by maximum frequency and Pd-37.

Pd-37 Swing frequency	Range: 0.0% to 100.0%	Factory value: 0.0%
Pd-38 Sudden jumping frequency amplitude	Range: 0.0% to 50.0%	Factory value: 0.0%

When Pd-36 is set to 0 (variable swing):

Swing AW = frequency source P0-07  $\times$  swing amplitude Pd-37

Sudden jump frequency = swing AW  $\times$  sudden jump frequency amplitude Pd-38

When Pd-36 is set to 1 (fixed pendulum):

Oscillation amplitude AW = maximum frequency P0-13  $\times$  oscillation amplitude Pd-37

Sudden jump frequency = swing AW  $\times$  sudden jump frequency amplitude Pd-38

Swing frequency operation frequency, subject to the upper limit frequency and lower limit frequency constraints, if not set properly, the swing frequency work is not normal.

Pd-39 Swing frequency period	Range: 0.0s~3000.0s	Factory value: 10.0s
Pd-40 Triangle wave rise time	Range: 0.0% to 100.0%	Factory value: 50.0%

Pd-39 Swing frequency Period: defines a complete cycle time for the swing frequency rise and fall process.

Pd-40 Triangle Wave Rise Time Factor: is the percentage of time that the triangle wave rise time is relative to the swing frequency period Pd-39.

Triangle wave rise time = Pendulum period Pd-39 × Triangle wave rise time Pd-40 (sec).

Triangle wave fall time = Pendulum period Pd-39 × (1 - Triangle wave rise time Pd-40) (sec).

Pd-41 set length	Range: 0m to 65535m	Factory value: 1000m
Pd-42 actual length	Range: 0m to 65535m	Factory value: 0m
Pd-43 pulses per meter	Range: 0.1 to 6553.5	Factory value: 100.0

Pd-41~Pd-43 are used to implement the fixed length control function. The inverter inputs counting pulses from terminal X and calculates the length according to Pd-43 (pulses per metre).

The X terminal function shall be set to function No. 27 (length counting input), and the X6 port shall be used when the pulse frequency is high. When the calculated actual length (Pd-42) is greater than or equal to the set length (Pd-41), the Y terminal outputs the "length arrival" (function No. 10) indication signal.

Length zero reset can be performed by using "Length zero" (function 28) on the X terminal.

Pd-44 Set count value	Range: 1 to 65535	Factory value: 1000
Pd-45 Specify the count value	Range: 1 to 65535	Factory value: 1000

Pd-44~Pd-45 are additional definitions for the function of X terminal 25 and 26, and the X6 port must be used when the pulse frequency is high.

Pd-44 set count value: When Pd-44 pulses are input from the X terminal, an indication signal is output from the Y terminal (Y terminal 8 function "set count value reached").

Pd-45 specified count value: When Pd-45 pulses are input from terminal X, Y outputs an indication signal until the number of pulses reaches Pd-44 (Y terminal 9 function "Specified count value reached").

The specified count value Pd-45 shall not be greater than the set count value Pd-44. Figure 6-28 shows a schematic diagram of the set count arrival and specified count arrival functions, with Pd-44 set to 8 and Pd-45 set to 5.

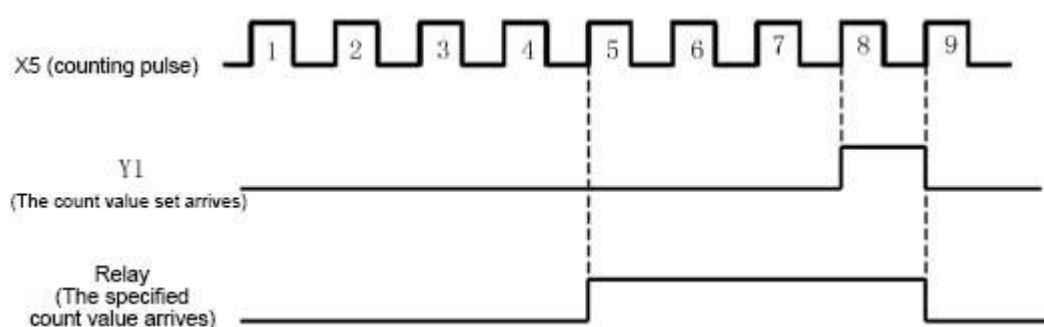


Figure 6-28 Schematic of Setting and Specifying Count Values

## 6.15 Group PE Keypad and display parameters

PE-00 LED operation display parameter 1	Range: 0000 to FFFF	Factory value: 0F
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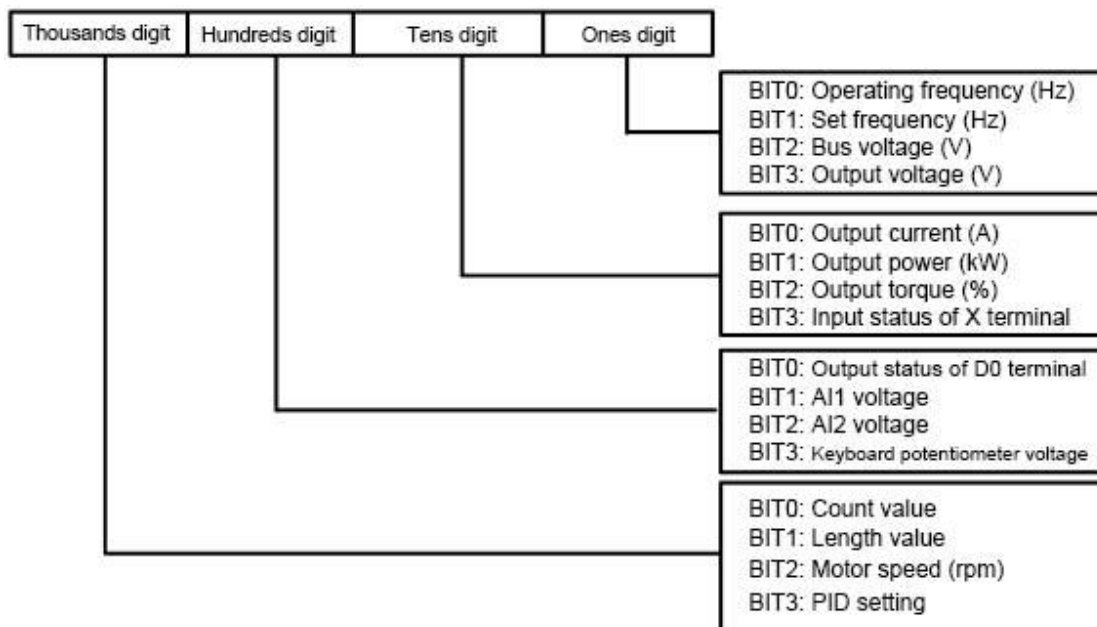
PE-00 and PE-01 define the status parameters that can be displayed via the keypad when

the inverter is running.

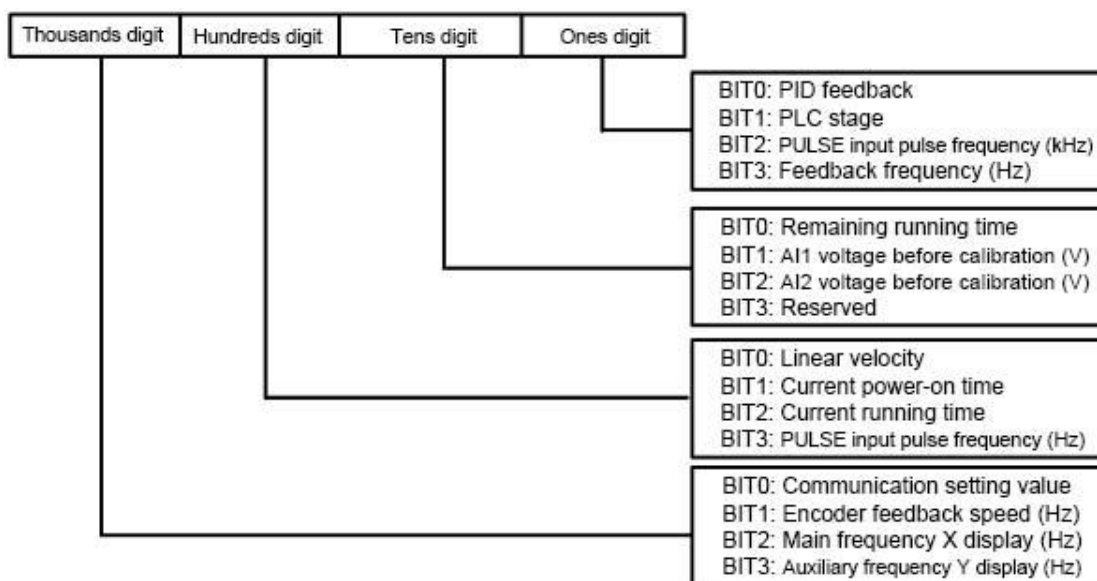
When the BIT bit selects 0: indicates that the parameter is not displayed;

When the BIT bit selects 1: indicates that the parameter is displayed;

The display parameters can be switched via the **000** key.



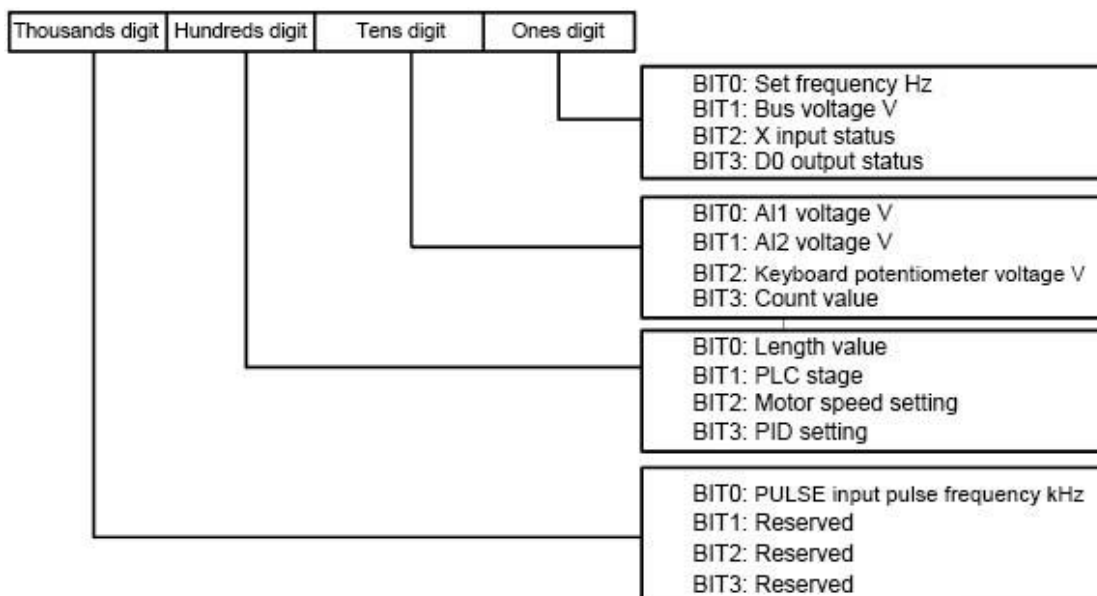
PE-01 LED operation display parameter 2	Range: 0000 to FFFF	Factory value: 0
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The maximum number of status parameters that can be viewed is 32, and the status parameters to be displayed are selected according to the binary digits of each of the PE-00 and PE-01 parameter values, and the display order starts from the lowest bit of PE-00.

PE-02 LED stop display parameters	Range: 0000 to FFFF	Factory value: 33
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PE-02 defines the status parameters that can be displayed through the keypad when the inverter is stopped. The setting and display mode is the same as PE-00 and PE-01.



PE-03 Reserved	Range: -	Factory value: -
PE-04 Reserved	Range: -	Factory value: -
PE-05 F1 Multi-Function Key Function Selection	Range: 0~5	Factory value: 3

0: This key has no function.

1: The command source is switched to the keyboard.

If the current command source is keyboard controlled, this key function is invalid.

2: Forward and reverse switching

Switching of the running direction by means of the F1 key is only valid for keyboard control.

3: Positive rotation point movement

4: Reverse point movement

5: Display mode switching

When setting PP-04=11, you can switch the display mode with the F1 key.

PE-06 STOP/RESET Key Function	Range: 0~1	Factory value: 1
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0: The STOP/RESET key stop function is valid only in the keyboard operation mode.

1: The STOP/RESET key stop function is effective in any operation mode.

### 6.16 PL Group Fault and protection parameters

PL-00 Motor Overload Protection Options	Range: 0 to 1	Factory value: 1
PL-01 Motor Overload Protection Gain	Range: 0.20 to 10.00	Factory value: 1.00

PL-00=0: The inverter has no overload protection for the motor (use with caution), there may be a risk of overheating damage to the motor, it is recommended to heat the relay between the inverter and the motor;

PL-00=1: The inverter makes comparison with the inverse time curve of motor overload protection according to the accumulated value of output current and overload protection judgement.

The inverse time curve protection point is:

175% × (PL-01) × rated motor current for 2 minutes will alarm motor overload;  
 150% × (PL-01) × rated motor current for 60 minutes will alarm motor overload.

PL-01 = maximum permissible load current / motor rated current, in general the maximum permissible load current is set to the motor rated current, PL-01 is set too large easily lead to motor overheating damage and the inverter is not alarmed, need to be set carefully.

PL-04 Motor overload warning factor	Range: 50 to 100%	Factory value: 80%
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Overload warning is used to send a warning signal through the output terminals before motor overload protection. When the accumulated value of the inverter output current is greater than (overload inverse time limit curve \*PL-04), the inverter multifunction terminal outputs an indication signal.

PL-05 Power-up to ground short circuit protection selection	Range: 0 to 1	Factory value: 1
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- 0: Invalid.
- 1: Valid.

Optionally, the inverter detects whether the motor is short-circuited to ground at power-up.

PL-09 Fault auto reset times	Range: 0 to 20	Factory value: 0
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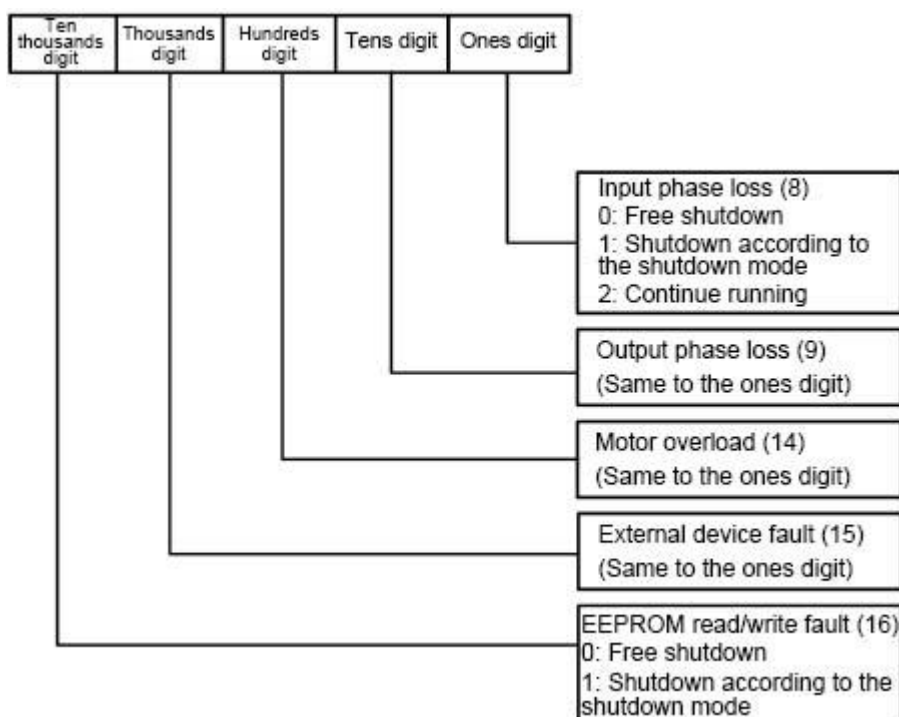
PL-10 Fault auto reset interval	Range: 0.1s~100.0s	Factory value: 1.0s
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Fault automatic reset function: the fault generated during operation can be automatically reset according to the set number of reset times (PL-09) and reset interval time (PL-10). When the number of reset times exceeds the set value, the inverter maintains the fault state. When this function code is set to 0, there is no automatic reset function.

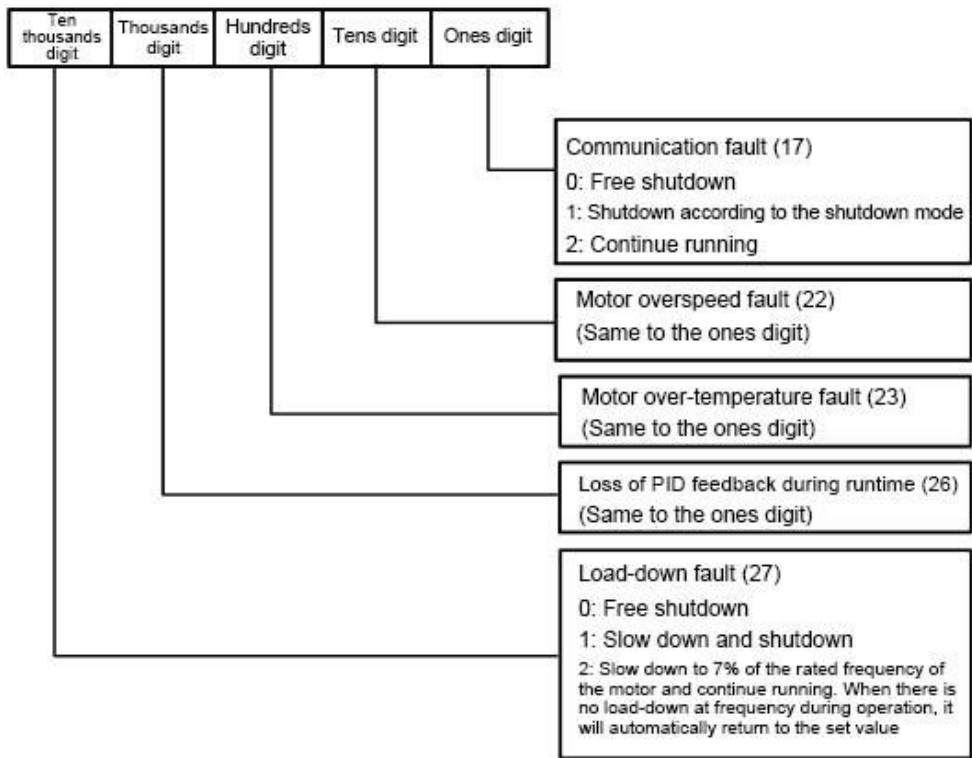
PL-11 Terminal output action selection during automatic fault reset	Range: 0 to 1	Factory value: 1
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- 0: inaction.
- 1: action.

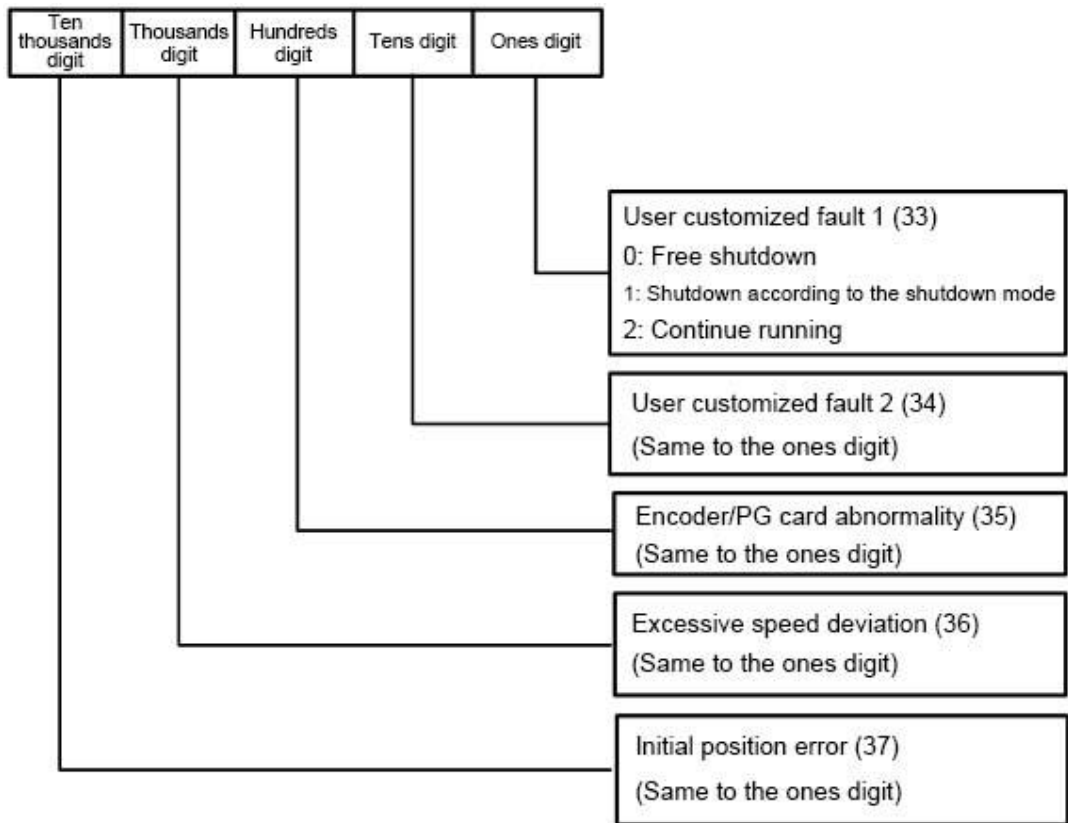
PL-12 Fail-safe action selection 1	Range: 0~22222	Factory value: 00000
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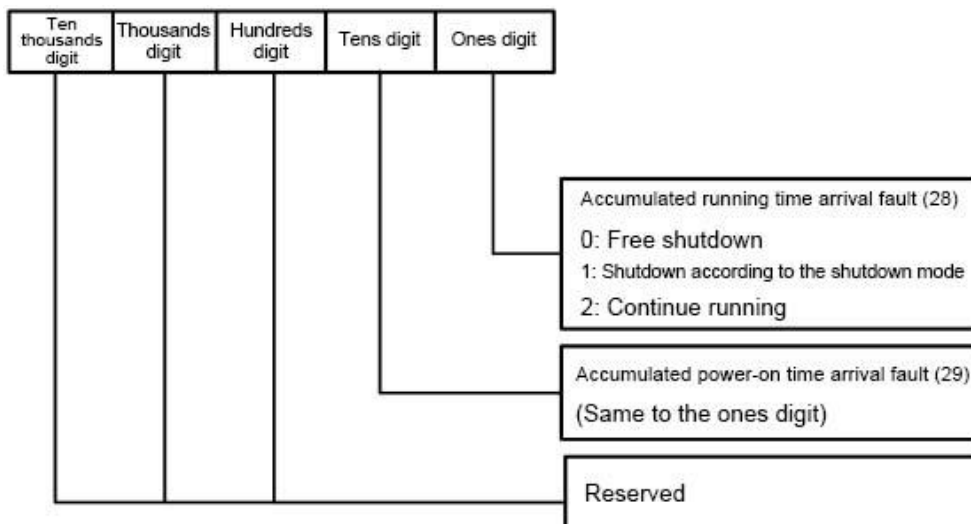
PL-13 Fail-safe action selection 2	Range: 0~22012	Factory value: 00000
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PL-14 Fail-safe action selection 3	Range: 0~22222	Factory value: 00000
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PL-15 Fail-safe action selection 4	Range: 0~02222	Factory value: 00000
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The fault alarm and shutdown are masked by setting PL-12~PL-15 Fault Protection Action Selection to enable the inverter to run continuously under certain abnormal conditions.

When "Free stop" is selected, the inverter displays E.\*\* and stops directly.

When "Stop by stopping" is selected: The inverter displays A.\*\* and stops by stopping, and E.\*\* is displayed after stopping.

When "Continue to run" is selected: the inverter continues to run and displays A.\*\*, the running frequency is set by PL-19.

Note: Please set PL-12~PL-15 carefully and be sure to select it after confirming the cause of the fault, otherwise the scope of the accident may be expanded, personal injury or property damage may result.

PL-19	Continued operation frequency selection in case of failure	Range: 0~4	Factory value: 0
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- 0: Runs at the current operating frequency.
- 1: Runs at the set frequency.
- 2: Operate at the upper frequency limit.
- 3: Operate at the lower frequency limit.
- 4: Operate at an abnormal standby frequency.

PL-20	Abnormal Standby Frequency	Range: 60.0%to 100.0%	Factory value: 100.0%
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When a fault is generated during inverter operation, such as when PL-19 is set to 4 and the handling of this fault is set to continue operation, the inverter displays A.\*\* and runs at the frequency set by PL-20.

100% of PL-20 corresponds to the maximum frequency.

PL-21	Instantaneous stop action selection	Range: 0 to 2	Factory value: 0
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- 0: invalid
- 1: deceleration

The inverter decelerates to maintain the bus voltage during momentary power loss and returns to normal output frequency when the voltage is restored.

- 2: deceleration and shutdown

In the event of a momentary power failure or sudden voltage drop, the inverter slows down until it stops.

Instantaneous stop non-stop function is used when the bus voltage drops or instantaneous under-voltage, the inverter compensates the bus voltage by appropriately reducing the output frequency and feeding back energy through the load to maintain the inverter from under-voltage shutdown.

PL-22	Instantaneous deceleration frequency switching point	Range: 80.0%to 100.0%	Factory value: 85.0%
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PL-23	Instantaneous voltage return judgement time	Range: 0.00s to 100.00s	Factory value: 0.50s
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PL-24 Instantaneous Non-stop Judgement Voltage	Range: 60.0% to 100.0% (standard bus voltage)	Factory value: 80.0%
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PL-22 instantaneous stop deceleration frequency switching point: During the frequency reduction process, "Deceleration time 3" is used when the output frequency is higher than PL-22, and "Deceleration time 4" is used when the output frequency is lower than PL-22.

PL-23 Instantaneous Stop Voltage Recovery Judgement Time: During the frequency reduction process, when the bus voltage is higher than PL-24 (Instantaneous Stop Non-stop Judgement Voltage) and maintains the PL-23 setting time, the output frequency returns to normal.

PL-24 Instant Stop Non-stop Judgement Voltage: The Instant Stop Non-stop function starts to work when the busbar voltage is lower than the PL-24 set value.

PL-25 Instantaneous non-stop gain	Range: 0 to 100	Factory value: 40
PL-26 Instantaneous stop without stopping points	Range: 0 to 100	Factory value: 30
PL-27 Instantaneous non-stop deceleration time	Range: 0.0~300.0s	Factory value: 20.0s

The principle of operation of the instant-stop non-stop function is shown in the figure below.

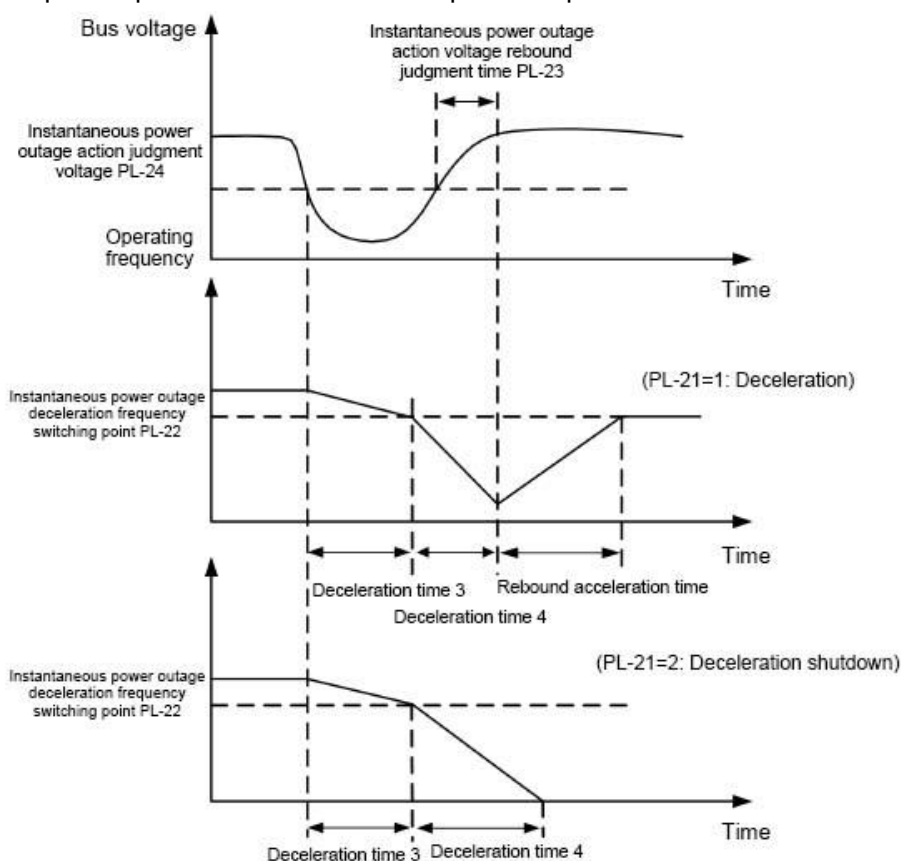


Figure 6-29 Instantaneous Power Failure Action Diagram

PL-28 Dropout Protection Option	Range: 0 to 1	Factory value: 0
---------------------------------	---------------	------------------

0: Invalid.

1: Valid.

PL-29 Drop Detection Level	Range: 0.0% to 100.0% (rated motor current)	Factory value: 10.0%
PL-30 Drop Detection Time	Range: 0.0s~60.0s	Factory value: 1.0s

PL-29 Load shedding detection level: the current threshold for load shedding protection action, 100% corresponds to the rated current of the inverter.

PL-30 Load shedding detection time: when the load shedding protection is set to be effective, the inverter output current is less than the PL-29 setting value, and the duration exceeds the PL-30 setting value, report the load shedding protection fault, and deal with it according to the corresponding fault protection action selection.

PL-32 Overspeed detection value	Range: 0.0% to 50.0% (maximum frequency)	Factory value: 20.0%
PL-33 Overspeed Detection Time	Range: 0.0s~60.0s	Factory value: 1.0s

The overspeed detection frequency is:  $(1+PL-32) \times \text{maximum frequency}$ .

If the feedback frequency detected by the inverter is greater than the above detection frequency and the duration exceeds the PL-33 set value, the inverter reports the motor over-speed fault and selects the processing according to the corresponding fault protection action, and does not detect the over-speed fault when PL-33 is set to 0.

This function is only valid when the inverter is running with speed sensor vector control.

PL-34 Excessive speed deviation detection value	Range: 0.0% to 50.0% (maximum frequency)	Factory value: 20.0%
PL-35 Excessive speed deviation detection time	Range: 0.0s~60.0s	Factory value: 5.0s

$$\text{Relative value of speed deviation} = \left| \frac{\text{Set frequency} - \text{Feedback frequency}}{\text{Maximum frequency}} \right| * 100\%$$

When the above relative value of speed deviation is greater than the set value of PL-34 and lasts longer than the time set by PL-35, the excessive speed deviation fault is reported and processed in accordance with the corresponding fault protection action selection, and when PL-35 is set to 0, the excessive speed deviation fault is not detected.

This function is only valid when the inverter is running with PG vector control.

PL-36 Output phase loss protection selection	Range: 0 to 1	Factory value: 1
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0: Disabled.

1: Enabled.

PL-37 Input phase loss and contactor suction protection selection	Range: 0 to 1	Factory value: 11
---	---------------	-------------------

Ones digit: Input phase loss protection selection

0: Disabled.

1: Enabled.

The input phase loss protection function is only valid for models above 5.5kWG.

Tens digit: Contactor Suction Protection Selection

0: Disabled.

1: Enabled.

The contactor suction protection function is only valid for models above 45kWG.

PL-38 Type of first failure	Range: 0 to 99	Factory value: -
PL-39 Second failure type	Range: 0 to 99	Factory value: -
PL-40 Third (most recent) failure type	Range: 0 to 99	Factory value: -

Record the type of the last three faults of the inverter, 0 is no fault, and the detailed description and treatment of the protection alarms are described in Chapter 7 (Fault Countermeasures and Abnormality Treatment).

PL-41 Frequency at third (most recent) failure	Recorded value: Frequency at the time of the most recent failure
--	--

PL-42 Current at third (most recent) fault	Recorded value: current at last fault												
PL-43 Busbar voltage at third (latest) fault	Recorded value: bus voltage at the time of the last fault												
PL-44 Input terminal status at third (latest) fault	<p>Recorded value: the state of the digital input terminals at the time of the most recent fault, in that order:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>BIT5</td><td>BIT4</td><td>BIT3</td><td>BIT2</td><td>BIT1</td><td>BIT0</td> </tr> <tr> <td>X6</td><td>X5</td><td>X4</td><td>X3</td><td>X2</td><td>X1</td> </tr> </table> <p>When the input terminal is ON its corresponding secondary bit is 1, OFF is 0, and the status of all X's is converted to a decimal number display.</p>	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0	X6	X5	X4	X3	X2	X1
BIT5	BIT4	BIT3	BIT2	BIT1	BIT0								
X6	X5	X4	X3	X2	X1								
PL-45 Output terminal at third (latest) fault	<p>Recorded value: status of all output terminals at the time of the most recent fault, in that order:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>BIT3</td><td>BIT2</td><td>BIT1</td><td>BIT0</td> </tr> <tr> <td>Y1</td><td>Relay 2</td><td>Relay 1</td><td>Y2</td> </tr> </table> <p>When the input terminal is ON its corresponding secondary bit is 1, OFF is 0, and the status of all X's is converted to a decimal number display.</p>	BIT3	BIT2	BIT1	BIT0	Y1	Relay 2	Relay 1	Y2				
BIT3	BIT2	BIT1	BIT0										
Y1	Relay 2	Relay 1	Y2										
PL-46 Inverter status at third (latest) fault	Recorded values:Reserved												
PL-47 Power-up time at third (most recent) fault	Recorded value: current power-up time at the time of the most recent failure												
PL-48 Runtime at third (most recent) failure	Recorded value: current running time at the time of the most recent failure												
PL-51 Frequency at second failure	Same as PL-41 to PL-48												
PL-52 Current at second fault													
PL-53 Busbar voltage at second fault													
PL-54 Input Terminal Status at Second Failure													
PL-55 Output terminal on second fault													
PL-56 Inverter status at second fault													
PL-57 Power-up time on second failure													
PL-58 Runtime at second failure													
PL-61 Frequency at first failure													
PL-62 Current at first fault													
PL-63 Busbar voltage at first fault													
PL-64 Input terminal status at first failure													
PL-65 Output terminal at first fault													
PL-66 Inverter status at first fault													
PL-67 Power-up time at first failure													
PL-68 Runtime at first failure													

**6.17 Group Pn Inverter status**

Pn-00 Cumulative power-up time	Range: 0h to 65535h	Factory value: 0h
--------------------------------	---------------------	-------------------

Displays the inverter's power-up time from the factory to the present.

When this time reaches the set power-up time (P8-48), the inverter multifunction terminal (function 24) outputs an indication signal.

Pn-01 Accumulated Running Time	Range: 0h to 65535h	Factory value: 0h
--------------------------------	---------------------	-------------------

Displays the accumulated running time of the inverter.

When this time reaches the set running time (P8-49), the inverter multifunction terminal (function 12) outputs an indication signal.

Pn-02 Rectifier Module Heat Sink Temperature	Range: 0.0°C to 100.0°C	Factory value: 0
--	-------------------------	------------------

Displays the temperature of the rectifier module heat sink.

The rectifier module over-temperature protection value may vary from model to model.

Pn-03 Inverter Module Heat Sink Temperature	Range: 0.0°C to 100.0°C	Factory value: 0
---	-------------------------	------------------

Displays the temperature of the inverter module heat sink.

The over-temperature protection value of the inverter module may vary from model to model.

Pn-04 Accumulated power consumption	Range: 0 to 65535 degrees	Factory value: -
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Displays the accumulated power consumption of the inverter so far.

## 6.18 PP Group Parameter protection

PP-00 User password	Range: 0 to 65535	Factory value: 0
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The user password setting function is used to prohibit unauthorized personnel from accessing and modifying function parameters.

When the user password function is not required, this function code can be set to 0.

When the user password function is required, set any non-zero number and confirm it to take effect. The next time you enter the menu, you must enter the password correctly, otherwise you cannot view and modify the function parameters.

Change of password: Press PRG or MENU to enter the password verification status, enter the correct password, select PP-00, enter the new password, press to confirm and then the new password will take effect (if the new password is 0, the user password function will be canceled).

PP-01 Parameter Write Protection	Range: 0~1	Factory value: 0
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0: Rewriting is allowed.

All function codes are allowed to be modified.

1: Rewriting is prohibited.

All function codes, except PP-01, can only be viewed and cannot be modified.

PP-02 Parameter initialization	Range: 0 to 3	Factory value: 0
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0: No operation.

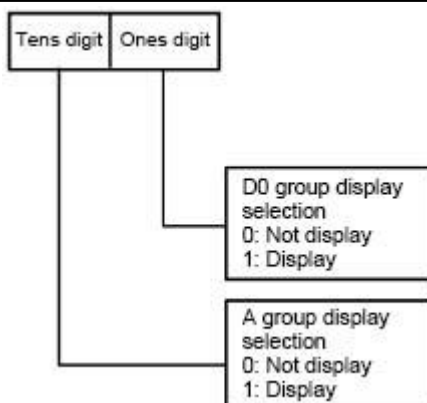
1: Clear the record information.

Clears the inverter fault record information, accumulated running time (Pn-01), accumulated power-on time (Pn-00), and accumulated power consumption (Pn-04).

2: Restore factory parameters (motor parameters are not restored).

3: Restore factory parameters (motor parameters are also restored).

PP-03 Function Parameter Mode Display Attributes	Range: 0~11	Factory value: 11
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PP-04 Personalized parameter display selection	Range: 0~11	Factory value: 00
PP-05 Software version number	Scope: Control board software version number	Factory value: -
PP-06 Product No.	Scope: Inverter product number	Factory value: -

### 6.19 Group A2 Second motor parameters

VL600 can store 2 sets of motor parameters, and both motors can be independently set up for control and time-sharing drive.

The second group of motor parameters (group A2) is identical to the first group of motor parameters (group P4) in terms of function code layout and definition.

A2-00 Motor Type Selection	Range: 0 to 2	Factory value: 0
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- 0: Ordinary asynchronous motor
- 1: Inverter asynchronous motor

A2-01 Rated power	Range: 0.1kW to 1000.0kW	Factory value: determined based on model
A2-02 Rated frequency	Range: 0.01Hz to maximum frequency	Factory value: determined based on model
A2-03 Rated current	Scope: 0.01A~655.35A (Inverter power <=55kW) 0.1A~6553.5A (Inverter power >55kW)	Factory value: determined based on model
A2-04 Rated voltage	Range: 1V to 2000V	Factory value: determined based on model
A2-05 Rated Speed	Range: 1rpm to 65535rpm	Factory value: determined based on model
A2-06 Asynchronous motor no-load current	Scope: 0.01A~A2-03 (Inverter power <=55kW) 0.1A~A2-03 (Inverter power >55kW)	Factory value: determined based on model
A2-07 Asynchronous motor stator resistance	Scope: 0.001Ω~65.535Ω (Inverter power <=55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Factory value: determined based on model
A2-08 Leakage reactance of asynchronous motors	Scope: 0.01mH~655.35mH (Inverter power <=55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
A2-09 Asynchronous	Scope:	Factory value: determined

motor rotor resistance	0.001Ω~65.535Ω (Inverter power ≤55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	based on model
A2-10 Asynchronous motor mutual inductive resistance	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
A2-11 Synchronous Motor Stator Resistance	Scope: 0.001Ω~65.535Ω (Inverter power ≤55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Factory value: determined based on model
A2-12 Synchronous motor D-axis inductors	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
A2-13 Synchronous motor Q-axis inductance	Scope: 0.01mH~655.35mH (Inverter power ≤55kW) 0.001mH~65.535mH (Inverter power >55kW)	Factory value: determined based on model
A2-14 Reservations	Range: -	Factory value: -
A2-15 Synchronous motor reverse electromotive force	Range: 0.1V to 6553.5V	Factory value: determined based on model
A2-16 to A2-26 Reserved	Range: -	Factory value: -
A2-17 Number of Encoder Lines	Range: 1 to 65535	Factory value: 1024
A2-18 Encoder type	Range: 0 to 2	Factory value: 0

- 0: ABZ incremental encoder.  
1: UVW incremental encoder.  
2: Rotary transformers.

A2-19 Speed Feedback PG Selection	Range: 0 to 2	Factory value: 0
-----------------------------------	---------------	------------------

- 0: Local PG.  
1: Extended PG.  
2: PULSE pulse input (X6).

A2-20 ABZ incremental encoder AB phase sequence	Range: 0 to 1	Factory value: 0
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- 0: forward.  
1: reverse.

A2-24 Rotary Transformer Pole Pairs	Range: 1 to 65535	Factory value: 1
A2-25 Reserved	Range: -	Factory value:-
A2-26 Speed Feedback PG Break Detection Time	Range: 0.0s to 10.0s	Factory value: 0.0s

- 0.0: inaction.  
0.1s to 10.0s: action.

A2-27 Tuning selection	Range: 0 to 12	Factory value: 0
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0: inaction.

1: Static tuning of asynchronous motors.

2: Complete tuning of asynchronous motors.

3: asynchronous motor stationary complete tuning.

A2-28 Speed loop proportional gain 1	Range: 1 to 100	Factory value: 30
A2-29 Velocity loop integration time1	Range: 0.01s~10.00s	Factory value: 0.50s
A2-30 Switching frequency 1	Range: 0.00 to A2-33	Factory value: 5.00Hz
A2-31 Speed loop proportional gain 2	Range: 0 to 100	Factory value: 20
A2-32 Velocity loop integration time2	Range: 0.01s~10.00s	Factory value: 1.00s
A2-33 Switching frequency 2	Range: A2-30 to maximum output frequency	Factory value: 10.00Hz
A2-34 Vector Control Differential Gain	Range: 50 to 200%	Factory value: 100%
A2-35 Speed Loop Filter Time Constant	Range: 0.000s~0.100s	Factory value: 0.000s
A2-36 Vector Control Overexcitation Gain	Range: 0 to 200	Factory value: 64
A2-37 Upper Torque Limit Source in Speed Control Mode	Range: 0 to 7	Factory value: 0

0: A2-38 setting.

1: AI1.

2: AI2.

3: Keyboard potentiometer.

4: PULSE setting.

5: Communication settings.

6: MIN (AI1,AI2).

7: MAX (AI1,AI2).

A2-38 Digital setting of upper torque limit in speed control mode	Range: 0.0%to 200.0%	Factory value: 150.0%
A2-39~A2-40 Reserved	Range: -	Factory value:-
A2-41 Excitation Regulation Proportional Gain	Range: 0 to 20000	Factory value: 2000
A2-42 Excitation Regulation Integral Gain	Range: 0 to 20000	Factory value: 1300
A2-43 Torque Adjustment Proportional Gain	Range: 0 to 20000	Factory value: 2000
A2-44 Torque Regulation Integral Gain	Range: 0 to 20000	Factory value: 1300
A2-45 Speed Ring Integral Properties	Range: 0 to 1	Factory value: 0

Bit: Integral separation

0: Invalid.

1: Effective.

A2-46 Vector Weak Magnetic Mode Selection	Range: 0 to 2	Factory value: 0
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- 0: Invalid for weak magnetic
- 1: Effective when decelerating.
- 2: Effective at constant speed or deceleration.

A2-47 Overmodulation selection	Range: 0 to 1	Factory value: 0
A2-48 Overmodulation coefficient	Range: 100% to 110%	Factory value: 105%
A2-49 Weak Magnetic Maximum Torque Coefficient	Range: 50 to 200%	Factory value: 100%
A2-50 Reserved	Range: -	Factory value: -
A2-51 2nd Motor Control Method	Range: 0 to 2	Factory value: 0

- 0: Speed sensorless vector control (SVC).
- 1: With speed sensor vector control (FVC).
- 2: V/F control.

A2-52 2nd motor acceleration/deceleration time selection	Range: 0 to 4	Factory value: 0
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- 0: Same as 1st motor.
- 1: Acceleration and deceleration time 1.
- 2: Acceleration and deceleration time 2.
- 3: Acceleration and deceleration time 3.
- 4: Acceleration and deceleration time 4.

A2-53 2nd motor torque boost	Range: 0.0% to 30.0%	Factory value: determined based on model
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- 0.0%: automatic torque boost.
- 0.1% to 30.0%: manual torque boost.

A2-55 2nd Motor Oscillation Suppression Gain	Range: 0 to 100	Factory value: determined based on model
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## 7. Troubleshooting and Abnormality Treatment

### 7.1 Fault Alarms and Countermeasures

VL600 inverter has various warning messages and protection functions, once the fault occurs, the protection function acts, the inverter stops output, the inverter fault relay contact acts, and the fault code is displayed on the inverter display panel. Before seeking service, the user can carry out self-examination according to the tips in this section, analyse the cause of the fault and find out the solution. If it belongs to the reasons described in the dotted box, please seek service and contact with the agent of the inverter you purchased or directly with this Company.

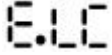
No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
1	E.oC1	E.oC1	Acceleration overcurrent	<ol style="list-style-type: none"> <li>1. Low grid voltage</li> <li>2. Acceleration time is too short</li> <li>3. The control mode is vector but no parameter identification is done.</li> <li>4. Load rotational inertia is too large, shock load is too heavy</li> <li>5. V/F curve ratio set too large</li> <li>6. When an instantaneous stop occurs, the rotating motor is restarted.</li> <li>7. Motor parameter setting is not normal</li> <li>8. Inverter power is too small</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the input power supply</li> <li>2. Perform motor parameter identification</li> <li>3. Extended acceleration time</li> <li>4. Reduce the sudden change of load and prolong the acceleration time</li> <li>5. Adjust the V/F curve setting, adjust the manual torque boost or set the motor parameters correctly to ensure that the automatic torque boost is normal.</li> <li>6. Start the motor after it has stopped</li> <li>7. Set the motor parameters correctly</li> <li>8. Selection of inverters with large power levels</li> </ol>
2	E.oC2	E.oC2	Deceleration overcurrent	<ol style="list-style-type: none"> <li>1. The inverter output circuit there is a ground or short circuit</li> <li>2. Control mode is vector and there is no parameter identification.</li> <li>3. Deceleration time is too short</li> <li>4. Low voltage</li> <li>5. Suddenly add load during deceleration</li> <li>6. No braking unit and braking resistor installed</li> </ol>	<ol style="list-style-type: none"> <li>1. Troubleshooting peripheral faults</li> <li>2. Motor parameter identification</li> <li>3. Increase the deceleration time</li> <li>4. Adjust the voltage to the normal range</li> <li>5. Cancellation of surge loads</li> <li>6. Adding brake unit and resistor</li> </ol>
3	E.oC3	E.oC3	Constant speed overcurrent	<ol style="list-style-type: none"> <li>1. The inverter output circuit there is a ground or short circuit</li> <li>2. Control mode is vector and there is no parameter identification.</li> <li>3. Low voltage</li> <li>4. Whether there is a sudden load in the operation</li> <li>5. Inverter selection is small</li> </ol>	<ol style="list-style-type: none"> <li>1. Troubleshooting peripheral faults</li> <li>2. Motor parameter identification</li> <li>3. Adjust the voltage to the normal range</li> <li>4. Cancellation of surge loads</li> <li>5. The choice of power level greater inverter</li> </ol>

No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
4	E.oU1	E.oU1	Acceleration overvoltage	<ol style="list-style-type: none"> <li>1. High input voltage</li> <li>2. The acceleration process there is an external force drag motor operation</li> <li>3. Acceleration time is too short</li> <li>4. No braking unit and braking resistor installed</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the voltage to the normal range</li> <li>2. Cancel this power or add braking resistance</li> <li>3. Increase acceleration time</li> <li>4. Adding brake unit and resistor</li> </ol>
5	E.oU2	E.oU2	Deceleration overvoltage	<ol style="list-style-type: none"> <li>1. High input voltage</li> <li>2. Deceleration process there is an external force drag motor operation</li> <li>3. The deceleration time is too short</li> <li>4. No braking unit and braking resistor installed</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the voltage to the normal range</li> <li>2. Cancel this power or add braking resistance</li> <li>3. Increase the deceleration time</li> <li>4. Adding brake unit and resistor</li> </ol>
6	E.oU3	E.oU3	Constant speed overvoltage	<ol style="list-style-type: none"> <li>1. High input voltage</li> <li>2. The existence of external forces during operation drag motor operation</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the voltage to the normal range</li> <li>2. Cancel this power or add braking resistance</li> </ol>
7	E.FAL	E.FAL	Reserved		
8	E.IPL	E.IPL	Input phase loss	<ol style="list-style-type: none"> <li>1 Three-phase input power is not normal</li> <li>2. Driver board abnormality</li> <li>3. Lightning protection board abnormality</li> <li>4. Main control board abnormality</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and eliminate problems in the peripheral wiring</li> <li>2. Seek technical support</li> <li>3. Seek technical support</li> <li>4. Seek technical support</li> </ol>
9	E.oPL	E.oPL	Output phase loss	<ol style="list-style-type: none"> <li>1. The inverter to the motor lead is not normal</li> <li>2. Motor running inverter three-phase output imbalance</li> <li>3. Driver board abnormality</li> <li>4. Module exceptions</li> </ol>	<ol style="list-style-type: none"> <li>1. Troubleshooting peripheral faults</li> <li>2. Check the motor three-phase winding is normal and troubleshooting</li> <li>3. Seeking technical support</li> <li>4. Seek technical support</li> </ol>
10	E.oH1	E.oH1	Inverter module overheating	<ol style="list-style-type: none"> <li>1. High ambient temperature</li> <li>2. Air duct blockage</li> <li>3. Fan damage</li> <li>4. Module thermistor damage</li> <li>5. Damage to the inverter module</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ambient temperature</li> <li>2. Clean the air duct</li> <li>3. Replace the fan</li> <li>4. Replacement of thermistor</li> <li>5. Replacement of inverter module</li> </ol>
11	E.oH2	E.oH2	Rectifier module overheating	<ol style="list-style-type: none"> <li>1. High ambient temperature</li> <li>2. Obstruction of air ducts</li> <li>3. Fan damage</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ambient temperature</li> <li>2. Clean the air duct</li> <li>3. Replace the fan</li> </ol>
12	E.oH3	E.oH3	Internal module	<ol style="list-style-type: none"> <li>1. High ambient temperature</li> <li>2. Obstruction of air ducts</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ambient temperature</li> <li>2. Clean the air duct</li> </ol>

No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
			over-temperature	3. Fan damage	3. Replace the fan
13	E.oL1	E.oL1	Inverter overload	1. Whether the load is too large or occurs motor blocking 2. Inverter selection is small	1. Reduce the load and check the motor and mechanical conditions 2. Select a larger power level inverter
14	E.oL2	E.oL2	Motor overload	1. Whether the motor protection parameter PL-01 is set appropriately or not 2. Whether the load is too large or occurs motor blocking 3. Inverter selection is small	1. Set this parameter correctly 2. Reduce the load and check the motor and mechanical conditions 3. The choice of power level greater inverter
15	E.Ed	E.Ed	External equipment failure	1. Signaling of external faults via multi-function terminal X 2. Input the signal of external fault through virtual IO function	1. Reset operation 2. Reset operation
16	E.EEP	E.EEP	EEPROM read/write failure	1. EEPROM chip damage	1. Replace the main control board
17	E.485	E.485	Communication fault	1. The upper computer is not working properly 2. Communication line is not normal 3. Incorrect setting of communication parameter Group PA	1. Check the upper computer wiring 2. Check the communication connection line 3. Correctly set communication parameters
18	E.Con	E.Con	Contactors fault	1. The driver board and power supply is not normal 2. Contactors are not normal	1. Replace the driver board or power board 2. Replacement of contactors
19	E.Ct	E.Ct	Current Detection Fault	1. Check the Hall device abnormality 2. Driver board abnormality	1. Replacement of Hall devices 2. Replace the driver board
20	E.Sor	E.Sor	Switching motor failure during operation	1. Change the current motor selection through the terminal during the inverter running process	1. Motor switching operation after the inverter is stopped
21	E.Gnd	E.Gnd	Short-circuit fault to ground	1. Motor short circuit to ground	1. Replace the cable or motor
22	E.SPL	E.SPL	Motor overspeed fault	1. Incorrect encoder parameter setting 2. No parameter tuning 3. Motor overspeed detection parameter PL-32, PL-33 not set up properly	1. Correctly set the encoder parameters 2. Motor parameter identification 3. Reasonable setting of detection parameters according to the actual situation
23	E.oH4	E.oH4	Motor over-temperature fault	1. Temperature sensor wiring loose 2. Motor temperature is too	1. Test temperature sensor wiring and troubleshooting 2. Reduce the load frequency or

No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
				high	take other heat dissipation measures to the motor for heat dissipation processing
24	E.tU	E.tU	Motor tuning faults	1. Motor parameters are not set according to the nameplate 2. Parameter identification process timeout	1. Correctly set the motor parameters according to the nameplate 2. Check the inverter to motor lead
25	E.CLo	E.CLo	Wave-by-wave current limiting faults	1. Whether the load is too large or occurs motor blocking 2. Inverter selection is small	1. Reduce the load and check the motor and mechanical conditions 2. Select a larger power level inverter
26	E.LoF	E.LoF	Runtime PID feedback loss fault	1, PID feedback is less than P9-26 set value	1. Check the PID feedback signal or set P9-26 to a suitable value
27	E.oLL	E.oLL	Load loss fault	1. Inverter running current less than PL-29	1. To confirm whether the load is detached or PL-29, PL-30 parameter settings are in line with the actual operating conditions
28	E.to1	E.to1	Cumulative running time to reach failure	1. Accumulated running time reaches the set value	1. Use the parameter initialization function to clear the record information
29	E.to2	E.to2	Cumulative power-up time to reach fault	1. Accumulated power-up time reaches the set value	1. Use the parameter initialization function to clear the record information
30	E.to3	E.to3	Reserved		Contact Agent
31	E.CnP	E.CnP	Buffer Resistor Frequent On/Off Failure	1. Input terminal voltage is not in the range required by the specification	1. Adjust the voltage to the normal range
32	E.LU	E.LU	Under-voltage fault	1. Instantaneous power failure 2. Inverter input voltage is not in the range of specification requirements 3. Bus voltage is not normal 4. Rectifier bridge and buffer resistance is not normal 5. Driver board abnormality 6. Control board abnormality	1. Reset fault 2. Adjust the voltage to the normal range 3. Seeking technical support 4. Seek technical support 5. Seeking technical support 6. Seek technical support
33	E.Cd1	E.Cd1	User-defined fault 1	1. Input of user-defined fault 1 signal via multi-function terminal X 2. Input the signal of user-defined fault 1 through the virtual IO function	1. Reset operation 2. Reset operation

No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
34	E.Cd2	E.Cd2	User-defined fault 2	<ol style="list-style-type: none"> <li>1. Input of user-defined signal for fault 2 via multi-function terminal X</li> <li>2. Input the signal of user-defined fault 2 through the virtual IO function</li> </ol>	<ol style="list-style-type: none"> <li>1. Reset operation</li> <li>2. Reset operation</li> </ol>
35	E.EC	E.EC	Encoder/PG card failure	<ol style="list-style-type: none"> <li>1. Mismatch of encoder model</li> <li>2. Encoder wiring error</li> <li>3. Damaged encoder</li> <li>4. PG Card Abnormal</li> </ol>	<ol style="list-style-type: none"> <li>1. Correctly set the encoder type according to the actual</li> <li>2. Troubleshooting wiring</li> <li>3. Replacement of encoder</li> <li>4. Replacement of PG cards</li> </ol>
36	E.oSP	E.oSP	Excessive speed deviation fault	<ol style="list-style-type: none"> <li>1. Incorrect encoder parameter setting (When P0-03 = 1)</li> <li>2. Motor blocking</li> <li>3. Speed deviation is too large detection parameters PL-34, PL-35 set unreasonable</li> <li>4. Inverter output UVW to motor The wiring is not working properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Correctly set the encoder parameters</li> <li>2. Check whether the machinery is abnormal, whether the motor to carry out the sen Number of tuning, is the torque setting value P3-10 too small</li> <li>3. Speed deviation is too large detection parameters PL-34, PL-35 set unreasonable</li> <li>4. Check whether the wiring between the inverter and the motor is disconnected or not impunity</li> </ol>
37	E.Pon	E.Pon	Magnetic pole initial position angle detection	<ol style="list-style-type: none"> <li>1. Motor parameters and the actual deviation is too large</li> </ol>	<ol style="list-style-type: none"> <li>1. Reconfirm whether the motor parameters are correct, focusing on whether the rated current is set small</li> </ol>
38	E.uFb	E.uFb	UVW signal feedback error	<ol style="list-style-type: none"> <li>1. Damaged encoder</li> <li>2. PG Card Abnormal</li> </ol>	<ol style="list-style-type: none"> <li>1. Replacement of encoder</li> <li>2. Replacement of PG cards</li> </ol>
39	E.LoG	E.LoG	Program logic error	<ol style="list-style-type: none"> <li>1. Encoder abnormality</li> <li>2. PG Card Abnormal</li> </ol>	<ol style="list-style-type: none"> <li>1. Replacement of encoder</li> <li>2. Replacement of PG cards</li> </ol>
41	E.CoF	E.CoF	Reverse Potential Abnormal fault	<ol style="list-style-type: none"> <li>1. Motor parameters are set incorrectly</li> </ol>	<ol style="list-style-type: none"> <li>1. Correctly set the motor parameters</li> </ol>
43	E.oEF	E.oEF	Excessive PID feedback fault during operation	<ol style="list-style-type: none"> <li>1. PID feedback is greater than Pb-17 set value</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the PID feedback signal or set Pb-17 to a suitable value</li> </ol>

No.	Fault code	Digital tube display	Type of fault	Possible causes of fault	Countermeasures
46	E.LC		Continuous current limiting fault	1. Whether the load is too large	1. Reduce the load and check the motor and mechanical conditions

## 7.2 Common faults and their treatment

The following fault conditions may be encountered during the use of the inverter, please refer to the following method for simple fault analysis:

Table 6-1 Common Faults and Their Handling Methods

No.	Fault phenomenon	Possible causes	Troubleshooting
1	No display on power up	Grid voltage is absent or too low; The switching power supply on the inverter drive board is faulty; The rectifier bridge is damaged; The inverter buffer resistor is damaged; Control board, keypad fault; The control board is disconnected from the driver board and keyboard;	Check the input power supply; Check busbar voltage; Re-plug the 40-core cable; Seek the services of the manufacturer;
2	Always show -H-t-	Poor contact of the connecting wire between the driver board and the control board; The relevant device on the control board is damaged; Motor or motor wires have a short to ground; Hall fault; The grid voltage is too low;	Re-plug the 40-core cable; Seek factory service;
3	Power-up display "E. Gnd" give a warning	Motor or output wire shorted to ground; The inverter is damaged;	Measure the insulation of the motor and output wires with a rocking meter; Seek the services of the manufacturer;
4	Power on the inverter display is normal, after running the display "-H-t-" and immediately shutdown	The fan is damaged or blocked; There is a short in the peripheral control terminal wiring;	Replace the fan; Troubleshoot external short circuits;
5	Frequent Newspaper E.oH1 (Module Overheat) Failure	The carrier frequency is set too high; Damaged fan or clogged air ducts; Inverter internal device damage (thermocouple or other);	Reduce the carrier frequency (P8-02); Replace the fan and clean the air ducts; Seek the services of the manufacturer;
6	The motor does not rotate after the inverter is running.	Motor and motor cables; Inverter parameter setting error (Motor parameters); Poor contact between driver board and control board wires;	Reconfirm the wiring between the inverter and the motor; Replace the motor or clear the mechanical problem;

No.	Fault phenomenon	Possible causes	Troubleshooting
		Driver board failure;	Check and reset motor parameters;
7	X terminal failed.	The parameters are set incorrectly; External signal error; SEL and +24 shorting tabs are loose; Control board failure;	Check and reset the Group P5 related parameters; Reconnect the external signal cable; Reconfirm the SEL and +24 shorting tabs; Seek factory service;
8	With closed-loop vector control, the motor speed cannot be increased.	Encoder failure; The encoder is connected to the wrong wire or has poor contact; PG card failure; driver board failure;	Replace the code disc and reconfirm the wiring; Replace the PG card; Seek services;
9	Frequent overcurrent and overvoltage faults are reported by the inverter.	The motor parameters are not set correctly; The acceleration and deceleration times are not appropriate; Load fluctuations;	Reset motor parameters or perform motor tuning; Set the appropriate acceleration and deceleration times; Seek the services of the manufacturer;
10	Power up (or run) reports E.Con	Soft start contactor is not engaged;	Check for loose contactor cables; Check for faulty contactors; Check for faulty 24V supply power to the contactor; Seek factory service;
11	Power-up display <b>EEEE#</b>	The relevant device on the control board is damaged;	Replace the control board;

## 8. List of Function Parameters

Function code	Name	Setting range	Factory value	Address	Change
P0 Basic Function Group					
P0-00	Motor Selection	0: Motor 1 1: Motor 2	0	F000H	★
P0-01	Model Selection	1: G type (constant torque load model) 2: P type (variable torque load model)	1	F001H	●
P0-02	Run command channel selection	0: Panel command channel ("LOC" lamp off) 1: Terminal command channel ("LOC" lamp lit) 2: Communication command channel ("LOC" lamp blinking)	0	F002H	☆
P0-03	1st Motor Control Mode Selection	0: No PG vector control 1: With PG vector control 2: V/F control	2	F003H	★
P0-04	Main frequency source X selection	0: digital given (preset frequency P0-06, UP/) (DN can be modified, no memory for power down) 1: Digital setting (preset frequency P0-06, UP/) (DN can be modified, power-down memory) 2: AI1 3: AI2 4: Keypad potentiometer given 5: PULSE pulse setting (X6) 6: Multi-segment instruction 7: Simple PLC 8: PID 9: Communication given	1	F004H	★
P0-05	Auxiliary frequency source Y selection	Same as P0-04 (main frequency source X selection)	0	F005H	★
P0-06	Keypad Numeric Settings	0.00Hz to maximum frequency (P0-13)	50.00 Hz	F006H	☆
P0-07	Frequency source stack selection	Digit: Frequency source selection 0: Main frequency source X 1: Primary and secondary arithmetic results (Arithmetic relations are determined by the tens place) 2: Switching between main frequency source X and auxiliary frequency source Y 3: Switching between main frequency source X and main and auxiliary operation results 4: Auxiliary frequency source Y and main and auxiliary operation result switching Tenth position: Frequency source main and auxiliary arithmetic relations 0: Primary + Secondary 1: Primary - Secondary 2: Maximum value of both 3: Minimum of two	00	F007H	☆
P0-08	Acceleration time 1	0.00s~65000s	Determination of model	F008H	☆
P0-09	Deceleration time 1	0.00s~65000s	Determination of model	F009H	☆
P0-10	running direction	0: Positive 1: Reverse	0	F00AH	☆
P0-11	Upper frequency	Lower limit frequency P0-12 to maximum frequency P0-13	50.00 Hz	F00BH	☆

Function code	Name	Setting range	Factory value	Address	Change
<b>P0 Basic Function Group</b>					
P0-12	lower frequency	0.00Hz to upper limit frequency P0-11	0.00Hz	F00CH	☆
P0-13	Maximum frequency	50.00Hz to 320.00Hz	50.00 Hz	F00DH	★
P0-14	Anti-reversal options	0: Reversal allowed 1: Prohibition of inversion	0	F00EH	☆
P0-15	Auxiliary Frequency Source Y Range Selection for Stacking	0: Relative to P0-13 maximum frequency 1: relative to frequency source X	0	F00FH	☆
P0-16	Auxiliary frequency source Y range when stacked	0% to 150%	100%	F010H	☆
P0-17	Auxiliary frequency source bias frequency during superposition	0.00Hz to maximum frequency P0-13	0.00Hz	F011H	☆
P0-18	Upper Frequency Source	0: P0-11 setting 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse setting (X6) 5: Communication given	0	F012H	★
P0-19	Upper Frequency Bias	0.00Hz to maximum frequency P0-13	0.00Hz	F013H	☆

Function code	Name	Setting range	Factory value	Address	Change
<b>P1 Start-stop control</b>					
P1-00	Starting method	0: Starting from starting frequency 1: Speed tracking start 2: Brake then start	0	F100H	☆
P1-01	Starting frequency	0.00Hz to 10.00Hz	0.00Hz	F101H	☆
P1-02	Starting frequency holding time	0.0s to 100.0s	0.0s	F102H	★
P1-03	Starting DC braking current	0% to 100%	0%	F103H	★
P1-04	Starting DC braking time	0.0s to 100.0s	0.0s	F104H	★
P1-05	Acceleration and deceleration mode selection	0: linear acceleration and deceleration 1: S-curve acceleration and deceleration mode 1 2: S-curve acceleration and deceleration mode 2	0	F105H	★
P1-06	Proportion of time at the beginning of the S-curve	0.0%to (100.0%-P1-07)	30.0%	F106H	★
P1-07	Proportion of time at the end of the S-curve	0.0%to (100.0%-P1-06)	30.0%	F107H	★
P1-08	Stopping mode of machine	0: Decelerate and stop 1: Free parking	0	F108H	☆
P1-09	Stopping DC braking start frequency	0.00Hz to maximum frequency	0.00Hz	F109H	☆
P1-10	Shutdown DC braking wait time	0.0s to 100.0s	0.0s	F10AH	☆

Function code	Name	Setting range	Factory value	Address	Change
P1 Start-stop control					
P1-11	Stopping DC braking current	0% to 100%	0%	F10BH	☆
P1-12	Stopping DC braking time	0.0s to 100.0s	0.0s	F10CH	☆
P1-13	Brake utilization rate	0% to 100%	100%	F10DH	☆
P1-14	Rotation speed tracking method	0: Downward tracking from the stop frequency 1: Tracking upwards from zero speed 2: Downward tracking from maximum frequency	0	F10EH	★
P1-15	RPM Tracking Response Time	1 to 100	20	F10FH	☆
P1-16	Speed tracking current Kp	0~1000	500	F110H	
P1-17	Speed tracking current Ki	0~1000	800	F111H	
P1-18	RPM Tracking Current	30%~200%	Determination of model	F112H	

Function code	Name	Setting range	Factory value	Address	Change
Group P2 V/F control parameters					
P2-00	V/F curve setting	0: linear V/F 1: Multi-point V/F 2:2.0 power drop torque curve 3:1.2 power drop torque curve 4:1.4 power drop torque curve 6:1.6 power drop torque curve 8:1.8 power drop torque curve 9: Reservations 10: V/F fully separated mode 11: V/F semi-detached mode	0	F200H	★
P2-01	V/F frequency value F3	P2-03 ~Motor rated frequency (P4-02)	0.00Hz	F201H	★
P2-02	V/F voltage value V3	0.0% to 100.0%	0.0%	F202H	★
P2-03	V/F frequency value F2	P2-01 to P2-05	0.00Hz	F203H	★
P2-04	V/F voltage value V2	0.0% to 100.0%	0.0%	F204H	★
P2-05	V/F frequency value F1	0.00Hz to P2-02	0.00Hz	F205H	★
P2-06	V/F voltage value V1	0.0% to 100.0%	0.0%	F206H	★
P2-07	torque boost	0.0%: (automatic torque boost) 0.1% to 30.0%	Determination of model	F207H	☆
P2-08	Manual Torque boost cut-off frequency	0.00Hz to maximum frequency	50.00 Hz	F208H	★

Function code	Name	Setting range	Factory value	Address	Change
Group P2 V/F control parameters					
P2-09	V/F Differential Compensation Gain	0.0% to 200.0%	0.0%	F209H	☆
P2-10	V/F Overexcitation Gain	0 to 200	64	F20AH	☆
P2-11	V/F separated voltage source	0: Digital setting (P2-12) 1: AI1 2: AI2 3: Keypad potentiometer 4: PULSE pulse setting (X6) 5: Multi-segment instruction 6: Simple PLC 7: PID 8: Communication given Note: 100.0% corresponds to the rated voltage of the motor.	0	F20BH	☆
P2-12	V/F separated voltage digital setting	0V~Motor rated voltage	0V	F20CH	☆
P2-13	Voltage acceleration time for V/F separation	0.0s~1000.0s Note: Indicates the time for 0V to change to the rated voltage of the motor	0.0s	F20DH	☆
P2-14	Voltage deceleration time for V/F separation	0.0s~1000.0s	0.0s	F20EH	
P2-15	V/F oscillation suppression gain	0 to 100	Determination of model	F20FH	☆
P2-16	VF Oscillation Suppression Gain Mode	0~4	3	F210H	
P2-17	Selection of VF separation shutdown method	0~1	0	F211H	
P2-18	VF over loss speed action current	50~200%	150%	F212H	
P2-19	VF overcurrent loss speed enable	0~1	1	F213H	
P2-20	VF Overcurrent Velocity Suppression Gain	0~100	20	F214H	
P2-21	VF overcurrent compensation factor	50%~100%	50%	F215H	
P2-22	VF overvoltage stall action voltage	200.0V~2000.0V	Determination of model	F216H	
P2-23	VF overvoltage stall enable	0~1	1	F217H	
P2-24	VF overvoltage stall suppression frequency gain	0~100	30	F218H	
P2-25	VF overvoltage stall suppression voltage gain	0~100	30	F219H	
P2-26	over-voltage Stall Maximum Rise Limit Frequency	0~50	5Hz	F21AH	
P2-27	Divergence compensation time constant	0.1~10.0s	0.5s	F21BH	

Function code	Name	Setting range	Factory value	Address	Change
Group P3 First motor vector control parameter set					

Function code	Name	Setting range	Factory value	Address	Change
Group P3 First motor vector control parameter set					
P3-00	Velocity loop proportional gain 1	1 to 100	30	F300H	☆
P3-01	Velocity loop integration time1	0.01s~10.00s	0.50s	F301H	☆
P3-02	Switching frequency 1	0.00 to P3-05	5.00 Hz	F302H	☆
P3-03	Velocity loop proportional gain 2	1 to 100	20	F303H	☆
P3-04	Velocity loop integration time2	0.01s~10.00s	1.00s	F304H	☆
P3-05	Switching frequency 2	P3-02 ~Maximum Frequency	10.00 Hz	F305H	☆
P3-06	Vector Control Differential Gain	50%to 200%	100%	F306H	☆
P3-07	Velocity loop filter time constant	0.000s to 0.100s	0.000s	F307H	☆
P3-08	Vector control overexcitation gain	0 to 200	64	F308H	☆
P3-09	Upper torque limit source in speed control mode	0: Function code P3-10 setting 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse setting 5: Communication given 6: MIN (AI1,AI2) 7: MAX (AI1,AI2) The full scale range of options 1-7 corresponds to P3-10.	0	F309H	☆
P3-10	Digital setting of upper torque limit in speed control mode	0.0% to 200.0%	150.0%	F30AH	☆
P3-13	Excitation regulation proportional gain	0 to 60000	2000	F30DH	☆
P3-14	Excitation Regulation Integral Gain	0 to 60000	1300	F30EH	☆
P3-15	Torque adjustment proportional gain	0 to 60000	2000	F30FH	☆
P3-16	Integral gain for torque regulation	0 to 60000	1300	F310H	☆
P3-17	Speed Ring Points Properties	0~1	0	F311H	☆
P3-18	Vector weak magnetic mode selection	0:Weak magnetic ineffective 1:Effective when decelerating 2:Effective at constant speed or deceleration	1	F312H	☆
P3-19	Overshooting	0: Invalid overmodulation 1: Overmodulation enable	0	F313H	☆
P3-20	modulation factor	100% to 110%	105%	F314H	☆
P3-21	Maximum moment coefficient of weak magnetism	50%to 200%	100%	F315H	☆

Function code	Name	Setting range	Factory value	Address	Change
P4 First motor parameters					
P4-00	Motor type selection	0: Ordinary asynchronous motor 1: Inverter asynchronous motor	0	F400H	★
P4-01	Motor rated power	0.1kW~1000.0kW	Determined based on model	F401H	★
P4-02	Motor rated frequency	0.01Hz to maximum frequency	Determination of model	F402H	★
P4-03	Motor rated current	0.01A~655.35A (Inverter power <=55kW) 0.1A~6553.5A (Inverter power >55kW)	Determination of model	F403H	★
P4-04	Motor rated voltage	1V to 2000V	Determined based on model	F404H	★
P4-05	Rated motor speed	1rpm~65535rpm	Determination of model	F405H	★
P4-06	Asynchronous motor no-load current	0.01A~P4-03 (Inverter power <=55kW) 0.1A~P4-03 (Inverter power >55kW)	Tuning parameter	F406H	★
P4-07	Asynchronous motor stator resistance	0.001Ω~65.535Ω (Inverter power <=55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Tuning parameter	F407H	★
P4-08	Leakage reactance of asynchronous motors	0.01mH~655.35mH (Inverter power <=55kW) 0.001mH~65.535mH (Inverter power >55kW)	Tuning parameter	F408H	★
P4-09	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (Inverter power <=55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Tuning parameter	F409H	★
P4-10	Asynchronous motor mutual inductive resistance	0.1mH~6553.5mH (Inverter power <=55kW) 0.01mH~655.35mH (Inverter power >55kW)	Tuning parameter	F40AH	★
P4-17	Number of encoder lines	1 to 65535	1024	F411H	★
P4-18	Encoder Type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary Transformer	0	F412H	★
P4-20	ABZ Incremental Encoder AB Phase Sequence	0: Positive 1: Reverse	0	F414H	★
P4-24	Rotary Transformer Pole Pairs	1 to 65535	1	F418H	★
P4-26	PG disconnection detection time	0.0: No action 0.1s~10.0s: Action	0.0	F41AH	★
P4-27	Tuning Options	0: No operation 1: Static tuning of asynchronous motors 2: Complete tuning of asynchronous motors 3: Static complete tuning of asynchronous motors	0	F41BH	★

Function code	Name	Setting range	Factory value	Address	Change
Group P5 Input terminal control parameter group					
P5-00	X1 terminal function selection	0: No function 1: Positive rotation operation (FWD)	1	F500H	★
P5-01	X2 terminal function selection	2: Reverse operation (REV) 3: Three-wire operation control 4: Positive rotation at the point 5: Jogging to reverse 6: Terminal UP 7: Terminal DN 8: Free parking input 9: Fault reset 10: Running pause 11: External fault normally open input	2	F501H	★
P5-02	X3 terminal function selection	12: Multi-segment command terminal 1 13: Multi-segment command terminal 2 14: Multi-segment command terminal 3 15: Multi-segment command terminal 4 16: Acceleration and deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Frequency source switching 19: UP/DN setting cleared to zero 20: Command source switch to keyboard	0	F502H	★
P5-03	X4 terminal function selection	21: Acceleration and deceleration prohibited 22: PID suspension 23: PLC status reset 24: Pendulum pause 25: Counter trigger signal input 26: Counter zero signal input 27: Length Count Input 28: Zeroing of length	0	F503H	★
P5-04	X5 terminal function selection	29: Torque control prohibited 30: PULSE (pulse) frequency input 31: Reservations 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification enable 35: Reverse direction of PID action 36: External parking terminal 1 37: Command source switching to communication control 38: PID points suspension 39: Frequency source X switches to the digitally given 40: Frequency source Y switches to digital feed 41: Motor selection terminal	0	F504H	★

Function code	Name	Setting range	Factory value	Address	Change
Group P5 Input terminal control parameter group					
P5-05	X6 terminal function selection	42: Reservations 43: PID parameter switching 44: User-defined fault 1 45: User-defined faults 2 46: Speed control/torque control switching 47: Emergency stops	0	F505H	★
P5-06	Reservation	48: External parking terminal 2 49: Shutdown DC brake input 50: This run time is cleared to zero 51-59: Reservations	0	F506H	★
P5-07	X-terminal filter time	0.000s~1.000s	0.010s	F507H	☆
P5-08	Terminal control operation mode	0: 2-wire 1 1: Two-wire 2 2: Three-wire 1 3: Three-wire 2	0	F508H	★
P5-09	Terminal UP/DN Rate	0.001Hz/s to 65.535Hz/s	1.00 Hz/s	F509H	☆
P5-10	AI curve selection	Single digit: AI1 curve selection 1: Curve 1 (2 points, see P5-14 to P5-17) 2: Curve 2 (2 points, see P5-18 to P5-21) 3: Curve 3 (2 points, see P5-22 to P5-25) 4: Curve 4 (4 points, see A0-00 to A0-07) 5: Curve 5 (4 points, see A0-08 to A0-15) Tenth position: AI2 curve selection, as above Hundredths: Keypad potentiometer Curve selection, as above	321	F50AH	☆
P5-11	AI1 filter time	0.00s to 10.00s	0.10s	F50BH	☆
P5-12	AI2 filter time	0.00s to 10.00s	0.10s	F50CH	☆
P5-13	Keypad potentiometer filter time	0.00s to 10.00s	0.10s	F50DH	☆
P5-14	AI curve 1 minimum input	0.00V to P5-16	0.10V	F50EH	☆
P5-15	AI curve 1 minimum input setting	-100.0%to +100.0%	0.0%	F50FH	☆
P5-16	AI curve 1 maximum input	P5-14 to +10.00V	10.00V	F510H	☆
P5-17	AI curve 1 maximum input setting	-100.0%to +100.0%	100.0%	F511H	☆
P5-18	AI curve 2 minimum input	0.00V to P5-20	0.10V	F512H	☆
P5-19	AI Curve 2 Minimum Input Correspondence Setting	-100.0%to +100.0%	0.0%	F513H	☆
P5-20	AI Curve 2 Maximum Input	P5-18 to +10.00V	10.00V	F514H	☆
P5-21	AI curve 2 maximum input setting	-100.0%to +100.0%	100.0%	F515H	☆
P5-22	AI curve 3 minimum input	-10.00V to P5-24	0.20V	F516H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group P5 Input terminal control parameter group					
P5-23	AI Curve 3 Minimum Input Correspondence Setting	-100.0%to +100.0%	0.0%	F517H	☆
P5-24	AI Curve 3 Maximum Input	P5-22 to +10.00V	10.00V	F518H	☆
P5-25	AI Curve 3 Maximum Input Correspondence Setting	-100.0%to +100.0%	100.0%	F519H	☆
P5-26	PULSE Minimum Input	0.00kHz to P5-28	0.00kHz	F51AH	☆
P5-27	PULSE Minimum Input Correspondence Setting	-100.0%to 100.0%	0.0%	F51BH	☆
P5-28	PULSE Maximum Input	P5-26 to 100.00kHz	50.00kHz	F51CH	☆
P5-29	PULSE Maximum Input Setting	-100.0%to 100.0%	100.0%	F51DH	☆
P5-30	PULSE filter time	0.00s to 10.00s	0.10s	F51EH	☆
P5-31	AI below minimum input setting selection	Position:AI1 below minimum input setting selection 0: Corresponds to the minimum input setting 1:0.0% Tenth position: AI2 below minimum input setting selection, same as above Hundredths: Keypad potentiometer below minimum input setting selection, as above	000	F51FH	☆
P5-32	X1 delay time	0.0s~3600.0s	0.0s	F520H	★
P5-33	X2 delay time	0.0s~3600.0s	0.0s	F521H	★
P5-34	X3 delay time	0.0s~3600.0s	0.0s	F522H	★

Function code	Name	Setting range	Factory value	Address	Change
Group P6 Output terminal control parameter group					
P6-00	Y2 terminal output mode selection	0: Pulse output (Y2-P) 1: Switching output (Y2-R)	0	F600H	☆
P6-01	Y2-R switching output function selection	0: no output 1: Signals during inverter operation 2: Inverter failure 3: Frequency level detection signal 1 (FDT1) 4: Frequency arrival signal (FAR) 5: Inverter in zero speed operation 6: Motor overload pre-warning 7: Inverter overload pre-warning 8: Setting notation value arrives 9: Arrival of the designated notation value 10: Length Arrival 11: PLC cycle complete 12: Cumulative running time reached	0	F601H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group P6 Output terminal control parameter group					
P6-02	Relay 1 output function selection (1ra-1rb-1rc)	13: Frequency limited 14: Torque limited 15: Ready to run 16: AI1 > AI2	2	F602H	☆
P6-03	Relay 2 output function selection (2ra-2rb-2rc)	17: Upper frequency limit 18: Lower frequency limit (no output at shutdown)	0	F603H	☆
P6-04	Y1 output function selection	19: Undervoltage status output 20: Communication settings 21: Positioning complete (reserved) 22: Positioning proximity (reserved) 23: Zero-speed operation of inverter (output at shutdown) 24: Cumulative power-up time reached 25: Frequency level detection signal 2 (FDT2) 26: Frequency arrival signal 1 27: Frequency arrival signal 2 28: Current arrival signal 1 29: Current arrival signal 2 30: Timed arrival output 31: AI1 input overrun 32: Dropout signal 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Output current overrun 37: Lower frequency limit (output at shutdown) 38: Alarm signal output 39: Motor over-temperature pre-warning 40: This running time arrives	1	F604H	☆
P6-06	Y2-P pulse output function selection	0: Operating frequency 1: Setting frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: PULSE input (100.% corresponds to 100.0 kHz) 7: AI1 8: AI2	0	F606H	☆
P6-07	AO1 terminal function selection	9: Keyboard potentiometers 10: Length 11: Notation of values	0	F607H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group P6 Output terminal control parameter group					
P6-08	AO2 terminal function selection	12: Communication settings 13: Motor speed 14: Output current (100.0%corresponds to 1000.0 A) 15: Output voltage (100.0%corresponds to 1000.0 V) 16: Reservations	1	F608H	☆
P6-09	Y2-P Output Maximum Frequency	0.01kHz to 100.00kHz	50.00kHz	F609H	☆
P6-10	AO1 zero bias factor	-100.0%to +100.0%	0.0%	F60AH	☆
P6-11	AO1 gain	-10.00 to +10.00	1.00	F60BH	☆
P6-12	AO2 zero bias factor	-100.0%to +100.0%	0.0%	F60CH	☆
P6-13	AO2 Gain	-10.00 to +10.00	1.00	F60DH	☆
P6-17	Y2-R Output Delay Time	0.0s~3600.0s	0.0s	F611H	☆
P6-18	Relay 1 output delay time	0.0s~3600.0s	0.0s	F612H	☆
P6-19	Relay 2 output delay time	0.0s~3600.0s	0.0s	F613H	☆
P6-20	Y1 output delay time	0.0s~3600.0s	0.0s	F614H	☆
P6-22	Output terminal valid state selection	0: Positive logic 1: Anti-logic Single digit: Y2-R Tenth position: Relay 1 Hundred: Relay 2 Thousandths: Y1 10,000 digits: reserved	00000	F616H	☆
P6-23	Frequency Reach Detection Width	0.0% to 100.0% (maximum frequency)	2.0%	F617H	☆
P6-24	FDT1 level	0.00Hz to maximum frequency	50.00 Hz	F618H	☆
P6-25	FDT1 lag	0.0% to 100.0% (FDT1 level)	5.0%	F619H	☆
P6-26	FDT2 level	0.00Hz to maximum frequency	50.00 Hz	F61AH	☆
P6-27	FDT2 lag	0.0% to 100.0% (FDT2 level)	5.0%	F61BH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group P7 Multi-Segment Instruction Parameters					
P7-00	Multi-segment instruction 0	-100.0%to 100.0%	0.0%	F700H	☆
P7-01	Multi-segment instruction 1	-100.0%to 100.0%	0.0%	F701H	☆
P7-02	Multi-segment instruction 2	-100.0%to 100.0%	0.0%	F702H	☆
P7-03	Multi-segment instruction 3	-100.0%to 100.0%	0.0%	F703H	☆
P7-04	Multi-segment instruction 4	-100.0%to 100.0%	0.0%	F704H	☆
P7-05	Multi-segment instruction 5	-100.0%to 100.0%	0.0%	F705H	☆
P7-06	Multi-segment instruction 6	-100.0%to 100.0%	0.0%	F706H	☆
P7-07	Multi-segment instruction 7	-100.0%to 100.0%	0.0%	F707H	☆
P7-08	Multi-segment instruction 8	-100.0%to 100.0%	0.0%	F708H	☆
P7-09	Multi-segment instruction 9	-100.0%to 100.0%	0.0%	F709H	☆
P7-10	Multi-segment instruction 10	-100.0%to 100.0%	0.0%	F70AH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group P7 Multi-Segment Instruction Parameters					
P7-11	Multi-segment instruction 11	-100.0%to 100.0%	0.0%	F70BH	☆
P7-12	Multi-segment instruction 12	-100.0%to 100.0%	0.0%	F70CH	☆
P7-13	Multi-segment instruction 13	-100.0%to 100.0%	0.0%	F70DH	☆
P7-14	Multi-segment instruction 14	-100.0%to 100.0%	0.0%	F70EH	☆
P7-15	Multi-segment instruction 15	-100.0%to 100.0%	0.0%	F70FH	☆
P7-16	Acceleration time 2	0.0s~6500.0s	Determination of model	F710H	☆
P7-17	Deceleration time 2	0.0s~6500.0s	Determination of model	F711H	☆
P7-18	Acceleration time 3	0.0s~6500.0s	Determination of model	F712H	☆
P7-19	Deceleration time 3	0.0s~6500.0s	Determination of model	F713H	☆
P7-20	Acceleration time 4	0.0s~6500.0s	Determination of model	F714H	☆
P7-21	Deceleration time 4	0.0s~6500.0s	Determination of model	F715H	☆

Function code	Name	Setting range	Factory value	Address	Change
P8Group Enhancement parameters					
P8-00	Digital set frequency shutdown memory selection	0: No memory 1: Memory	0	F800H	☆
P8-01	Forward and reverse dead time	0.0s~3000.0s	0.0s	F801H	☆
P8-02	carrier frequency	0.5kHz~16.0kHz	Determination of model	F802H	☆
P8-03	Automatic carrier frequency adjustment	Ladies and Gentlemen: Carrier Adjustment with Temperature 0: no action 1: action Ten bits: carrier adjusted with frequency 0: Carrier switching with frequency 1: Carrier Forcing	01	F803H	☆
P8-04	Startup Protection Selection	0: No protection 1: Protection	0	F804H	☆
P8-05	Jogging operation frequency	0.00Hz to maximum frequency	2.00Hz	F805H	☆
P8-06	Terminal Jogging Priority	0: Invalid 1: Effective	0	F806H	☆
P8-07	Jogging acceleration time	0.0s~6500.0s	20.0s	F807H	☆
P8-08	Jogging deceleration time	0.0s~6500.0s	20.0s	F808H	☆
P8-09	Jump Frequency 1	0.00Hz to maximum frequency	0.00Hz	F809H	☆
P8-10	Jump Frequency 2	0.00Hz to maximum frequency	0.00Hz	F80AH	☆
P8-11	hopping frequency amplitude	0.00Hz to maximum frequency	0.00Hz	F80BH	☆
P8-12	Effectiveness of jump frequency during acceleration and deceleration	0: Invalid 1: Effective	0	F80CH	☆
P8-13	Frequency command	1: 0.1Hz	2	F80DH	★

Function code	Name	Setting range	Factory value	Address	Change
P8Group Enhancement parameters					
	resolution	2: 0.01Hz			
P8-14	X terminal active state selection 1	0: X-terminal and common terminal are valid for short connection, invalid for disconnection 1: X terminal and common terminal are invalid when shorted, valid when disconnected. Single digit: X1 Ten: X2 Hundredths: X3 Thousandths: X4 10,000 positions: X5	00000	F80EH	★
P8-15	X terminal active state selection 2	0: X-terminal and common terminal are valid for short connection, invalid for disconnection 1: X terminal and common terminal are invalid when shorted, valid when disconnected. Single digit: X6 Tenth place: reserved	00	F80FH	★
P8-16	Command Source Bundle Frequency Source	Bit: Operation panel command binding frequency channel selection 0: No binding 1: Digital setting frequency 2: AI1 3: AI2 4: Keyboard potentiometer 5: PULSE pulse setting (X6) 6: Multi-Segment Speed Command 7: Simple PLC 8: PID 9: Communication given Ten positions: terminal command binding frequency channel selection Hundred bits: communication command binding frequency channel selection Thousands of bits: auto run bound frequency channel selection	0000	F810H	☆
P8-17	Acceleration time 1 and acceleration time 2 Switching frequency points	0.00Hz to maximum frequency	0.00Hz	F811H	☆
P8-18	Deceleration time 1 and Deceleration time 2 Switching frequency points	0.00Hz to maximum frequency	0.00Hz	F812H	☆
P8-19	Acceleration and deceleration time reference frequency	0: Maximum frequency (P0-13) 1: Setting frequency 2: 100Hz	0	F813H	★
P8-20	Runtime frequency command	0: Operating frequency 1: Setting frequency	0	F814H	★

Function code	Name	Setting range	Factory value	Address	Change
P8Group Enhancement parameters					
	UP/DN baseline				
P8-21	Set frequency below lower limit frequency operation mode	0: Operate at the lower frequency limit 1: Downtime 2: Zero speed operation	0	F815H	☆
P8-22	Fan control	0: Automatic control 1: The fan keeps running when power is on	0	F816H	☆
P8-23	Acceleration and deceleration time units	0: 1s 1: 0.1s 2: 0.01s	1	F817H	★
P8-24	sag frequency	0.00Hz to 10.00Hz	0.00Hz	F818H	☆
P8-26	wake-up call frequency	Dormant frequency (P8-28) to maximum frequency (P0-13)	0.00Hz	F81AH	☆
P8-27	Wake-up delay time	0.0s~6500.0s	0.0s	F81BH	☆
P8-28	Sleeping frequency	0.00Hz to wake-up frequency (P8-26)	0.00Hz	F81CH	☆
P8-29	Sleep delay time	0.0s~6500.0s	0.0s	F81DH	☆
P8-30	Zero current detection level	0.0% to 300.0% 100.0% corresponds to rated motor current	5.0%	F81EH	☆
P8-31	Zero current detection delay time	0.00s~600.00s	0.10s	F81FH	☆
P8-32	Output current overrun	0.0%(non-detectable) 0.1% to 300.0% (rated motor current)	200.0%	F820H	☆
P8-33	Output current overrun detection delay time	0.00s~600.00s	0.00s	F821H	☆
P8-34	Module temperature reaches	0°C to 100°C	75°C	F822H	☆
P8-35	over-voltage point setting	200.0V~2000.0V	Determined by model	F823H	☆
P8-36	Undervoltage point setting	200.0V~2000.0V	Determined by model	F824H	☆
P8-37	Arbitrary arrival frequency detection value 1	0.00Hz to maximum frequency	50.00 Hz	F825H	☆
P8-38	Arbitrary arrival frequency detection width1	0.0% to 100.0% (maximum frequency)	0.0%	F826H	☆
P8-39	Arbitrary arrival frequency detection value 2	0.00Hz to maximum frequency	50.00 Hz	F827H	☆
P8-40	Arbitrary arrival frequency detection width2	0.0% to 100.0% (maximum frequency)	0.0%	F828H	☆
P8-41	AI1 Input voltage protection value lower limit	0.00V to P8-42	3.10V	F829H	☆
P8-42	AI1 input voltage protection value upper limit	P8-41 to 10.00V	6.80V	F82AH	☆
P8-43	PWM modulation mode	0: Asynchronous modulation 1: Synchronized modulation	0	F82BH	☆
P8-44	Timer function selection	0: Invalid 1: Effective	0	F82CH	☆
P8-45	Timed runtime selection	0: P8-46 setting 1: AI1 2: AI2 3: Keyboard potentiometers 100% of analogue input corresponds to time set by P8-46	0	F82DH	☆
P8-46	Timed Runtime	0.0Min~6500.0Min	0.0 Min	F82EH	☆
P8-47	Arrival time setting for this run	0.0Min~6500.0Min	0.0 Min	F82FH	☆
P8-48	Setting the cumulative power-up arrival time	0h~65000h	0h	F830H	☆
P8-49	Setting the cumulative running arrival time	0h~65000h	0h	F831H	☆
P8-50	Arbitrary arrival current1	0.0% to 300.0% (rated motor current)	100.0%	F832H	☆
P8-51	Arbitrary arrival current1 width	0.0% to 300.0% (rated motor current)	0.0%	F833H	☆
P8-52	Arbitrary arrival current2	0.0% to 300.0% (rated motor current)	100.0%	F834H	☆
P8-53	Arbitrary arrival current2	0.0% to 300.0% (rated motor	0.0%	F835H	☆

Function code	Name	Setting range	Factory value	Address	Change
P8Group Enhancement parameters					
	width	current)			
P8-54	DPWM switching upper frequency	0.00Hz to 15.00Hz	12.00 Hz	F836H	☆
P8-55	Dead zone compensation selection	0: No compensation 1: Compensation	1	F837H	☆
P8-56	Motor Tone Adjustment	0: No motor tone adjustment 1 to 10: Depth of motor tone adjustment	0	F838H	☆
P8-57	Fast current limiting function	0: not enabled 1: Enabling	1	F839H	☆
P8-61	Brake unit operating voltage	200.0~2000.0V	Determination of model	F83DH	-
P8-62	AVR Functions	0: Invalid throughout 1: Invalid for deceleration only 2: Effective throughout	2	F83EH	-
P8-63	Auxiliary function selection	Position: whether the undervoltage fault is automatically reset or not 0: no automatic reset; 1: automatic reset; Tenth position: reserved; Hundred: reserved Thousandths digit: reserved	0x0000	F83FH	★
P8-66	Motor Temperature Sensor Type	0: No temperature sensor 1: PT100 2: PT1000	0	F842H	☆
P8-67	Motor overheating protection threshold	0°C~200°C	110°C	F843H	☆
P8-68	Motor overheating prevalence	0°C~200°C	90°C	F844H	☆

Function code	Name	Setting range	Factory value	Address	Change
P9 group PID function					
P9-00	PID given source	0: P9-05 setting 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse setting (X6) 5: Communication given 6: Multi-segment command given	0	F900H	☆
P9-01	PID Feedback Source	0: AI1 1: AI2 2: Keyboard potentiometers 3: AI1-AI2 4: PULSE pulse setting (X6) 5: Communication given 6: AI1+AI2 7: MAX ( AI1 , AI2 ) 8: MIN ( AI1 , AI2 )	0	F901H	☆
P9-02	PID given change time	0.00 to 650.00s	0.00s	F902H	☆
P9-03	PID feedback filtering time	0.00 to 60.00s	0.00s	F903H	☆
P9-04	PID feedback range	0 to 65535	1000	F904H	☆

Function code	Name	Setting range	Factory value	Address	Change
P9 group PID function					
P9-05	PID value given	0.0% to 100.0%	50.0%	F905H	☆
P9-06	PID inversion cut-off frequency	0.00 to maximum frequency	0.00Hz	F906H	☆
P9-07	PID differential limiting	0.00% to 100.00%	0.10%	F907H	☆
P9-08	PID output filter time	0.00 to 60.00s	0.00s	F908H	☆
P9-09	Maximum deviation between two PID outputs	0.00% to 100.00%	1.00%	F909H	☆
P9-10	Minimum deviation between two PID outputs	0.00% to 100.00%	1.00%	F90AH	☆
P9-11	PID stopping operation	0: shutdown without computing 1: Computing during downtime	0	F90BH	☆
P9-12	Proportional gain Kp1	0.0 to 100.0	20.0	F90CH	☆
P9-13	Integration time Ti1	0.01s~10.00s	1.00s	F90DH	☆
P9-14	Differential time Td1	0.000s~10.000s	0.000s	F90EH	☆
P9-15	PID Deviation Limit	0.0% to 100.0%	0.0%	F90FH	☆
P9-16	PID regulation polarity	0: positive polarity 1: Reverse polarity	0	F910H	☆
P9-17	PID Integral Properties	Individuals: Separation of Points 0: Invalid 1: Effective Tenth position: whether to stop integrating after the output reaches the limit value 0: Continued points 1: Stopping points	00	F911H	☆
P9-18	Preset Frequency	0.0% to 100.0%	0.0%	F912H	☆
P9-19	Preset frequency hold time	0.00 to 650.00s	0.00s	F913H	☆
P9-20	PID parameter switching conditions	0: No switching 1: Switching via X-terminal 2: Automatic switching according to deviation	0	F914H	☆
P9-21	PID parameter switching deviation1	0.0% to P9-22	20.0%	F915H	☆
P9-22	PID parameter switching deviation2	P9-21 to 100.0%	80.0%	F916H	☆
P9-23	Proportional gain Kp2	0.0 to 100.0	20.0	F917H	☆
P9-24	Integration time Ti2	0.01s~10.00s	2.00s	F918H	☆
P9-25	Differential time Td2	0.000s~10.000s	0.000s	F919H	☆
P9-26	PID feedback loss detection value	0.0%: no judgement on loss of feedback 0.1% to 100.0%	0.0%	F91AH	☆
P9-27	PID feedback loss detection time	0.0s to 20.0s	0.0s	F91BH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PA Communication Parameters					
PA-00	Baud rate selection	0: 300 BPS 1: 600 BPS 2: 1200BPS 3: 2400 BPS 4: 4800 BPS 5: 9600 BPS 6: 19200 BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS	5005	FA00H	☆
PA-01	Local address	1 to 247, 0 is the broadcast address	1	FA01H	☆
PA-02	Communication timeout	0.0 (invalid), 0.1s to 60.0s	0.0	FA02H	☆
PA-03	Communication response time	0ms to 20ms	2	FA03H	☆
PA-04	Data format	0: no checksum (8, N, 2) 1: Even check (8, E, 1) 2: Odd check (8, O, 1) 3: No checks (8, N, 1)	0	FA04H	☆
PA-07	Communication master-slave mode	0: as a slave 1: Make a host	0	FA07H	☆
PA-08	Slave frequency correction factor1	0.000~10.000	1.000	FA08H	☆
PA-09	Slave frequency correction factor 2	0.000~10.000	1.000	FA09H	☆
PA-09	Host sends data	0: Frequency; 1: Torque;	0	FA0EH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PB Water supply parameters					
PB-00	Water supply mode selection	0: General function 1: Single pump constant pressure water supply function 2: Simple one tow two constant pressure water supply function	0	FB00H	★
PB-01	Sleeping frequency	0.00 to upper limit frequency	35.00	FB01H	☆
PB-02	Sleep delay time	0 to 3600s	0	FB02H	☆
PB-03	Recuperative stress	0.0% to 100.0%	80.0%	FE03H	☆
PB-04	Delay in awakening	0 to 3600s	0	FB04H	☆
PB-05	Pressure gauge range	0.01 to 5.00MPa	1.00MPa	FB05H	★
PB-06	Target pressure	0.00 to PB-05	0.50MPa	FB06H	☆
PB-07	Upper frequency runtime	0 to 3600s	10s	FB07H	☆
PB-08	Reduced Pump	0 to 3600s	10s	FB08H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PB Water supply parameters					
	Frequency Runtime				
PB-09	Hibernation mode	0: deceleration shutdown hibernation 1: Free downtime hibernation	0	FB09H	★
PB-10	Reservation	--	0	FB0AH	★
Pb-17	PID feedback oversize detection value	0.0%to 100.0%	95.0%	FB0BH	☆
Pb-18	PID feedback oversize detection time	0.0s: no judgement on excessive feedback 0.1s~20.0s	0.0s	FB0CH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PC Torque control parameters					
PC-00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	FC00H	★
PC-01	Torque setting source selection in torque control mode	0: Digital setting 1 (PC-03) 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse 5: Communication given 6: MIN (AI1,AI2) 7: MAX (AI1,AI2) (Full scale for options 1-7, corresponding to PC-03 digital settings)	0	FC01H	★
PC-03	Digital setting of torque in torque control mode	-200.0%to 200.0%	150.0%	FC03H	☆
PC-05	Torque control forward maximum frequency	0.00Hz to maximum frequency	50.00 Hz	FC05H	☆
PC-06	Torque control reverse maximum frequency	0.00Hz to maximum frequency	50.00 Hz	FC06H	☆
PC-07	Torque controlled acceleration time	0.00s~65000s	0.00s	FC07H	☆
PC-08	Torque controlled deceleration time	0.00s~65000s	0.00s	FC08H	☆
PC-09	Torque Control Maximum Frequency Acceleration Time	0.0s~6500.0s	0.0s	FC09H	☆
PC-10	Torque control maximum frequency deceleration time	0.0s~6500.0s	0.00s	FC0AH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PD Simple PLC, swing frequency, fixed length and counting function parameters					
Pd-00	Simple PLC operation method	0: Shutdown at the end of a single run 1: End of single run holds final value	0	FD00H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PD Simple PLC, swing frequency, fixed length and counting function parameters					
		2: Keep looping			
Pd-01	Simple PLC power-down memory selection	Bit: Power-down memory selection 0: No memory for power down 1: Power down memory Tenth position: shutdown memory selection 0: Downtime without memory 1: Downtime memory	00	FD01H	☆
Pd-02	Simple PLC segment 0 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD02H	☆
Pd-03	Simple PLC section 0 acceleration and deceleration time selection	0 to 3	0	FD03H	☆
Pd-04	Simple PLC 1st runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD04H	☆
Pd-05	Simple PLC 1st Acceleration and Deceleration Time Selection	0 to 3	0	FD05H	☆
Pd-06	Simple PLC 2nd runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD06H	☆
Pd-07	Simple PLC 2nd stage acceleration/deceleration time selection	0 to 3	0	FD07H	☆
Pd-08	Simple PLC segment 3 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD08H	☆
Pd-09	Simple PLC 3rd Acceleration and Deceleration Time Selection	0 to 3	0	FD09H	☆
Pd-10	Simple PLC segment 4 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD0AH	☆
Pd-11	Simple PLC 4th Acceleration and Deceleration Time Selection	0 to 3	0	FD0BH	☆
Pd-12	Simple PLC segment 5 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD0CH	☆
Pd-13	Simple PLC 5th Acceleration and Deceleration Time Selection	0 to 3	0	FD0DH	☆
Pd-14	Simple PLC segment 6 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD0EH	☆
Pd-15	Simple PLC 6th Acceleration and Deceleration Time Selection	0 to 3	0	FD0FH	☆
Pd-16	Simple PLC segment 7 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD10H	☆
Pd-17	Simple PLC 7th Acceleration and Deceleration Time Selection	0 to 3	0	FD11H	☆
Pd-18	Simple PLC segment 8 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD12H	☆
Pd-19	Simple PLC Section 8 Acceleration and Deceleration Time Selection	0 to 3	0	FD13H	☆
Pd-20	Simple PLC segment 9 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD14H	☆
Pd-21	Simple PLC Section 9 Acceleration and Deceleration Time Selection	0 to 3	0	FD15H	☆
Pd-22	Simple PLC paragraph 10 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD16H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PD Simple PLC, swing frequency, fixed length and counting function parameters					
Pd-23	Simple PLC 10th Acceleration and Deceleration Time Selection	0 to 3	0	FD17H	☆
Pd-24	Simple PLC paragraph 11 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD18H	☆
Pd-25	Simple PLC 11th Acceleration and Deceleration Time Selection	0 to 3	0	FD19H	☆
Pd-26	Simple PLC paragraph 12 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD1AH	☆
Pd-27	Simple PLC 12th Acceleration and Deceleration Time Selection	0 to 3	0	FD1BH	☆
Pd-28	Simple PLC paragraph 13 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD1CH	☆
Pd-29	Simple PLC 13th Acceleration and Deceleration Time Selection	0 to 3	0	FD1DH	☆
Pd-30	Simple PLC paragraph 14 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD1EH	☆
Pd-31	Simple PLC 14th Acceleration and Deceleration Time Selection	0 to 3	0	FD1FH	☆
Pd-32	Simple PLC paragraph 15 runtime	0.0s (h) to 6553.5s (h)	0.0s (h)	FD20H	☆
Pd-33	Simple PLC 15th Acceleration and Deceleration Time Selection	0 to 3	0	FD21H	☆
Pd-34	Simple PLC runtime unit	0: s (seconds) 1: h (hours)	0	FD22H	☆
Pd-35	Multi-segment instruction 0 given way	0: Function code P7-00 given 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse 5: PID 6: Preset frequency (P0-06) given, UP/DOWN can be modified	0	FD23H	☆
Pd-36	Oscillation Frequency Setting Method	0: relative to the centre frequency 1: Relative to the maximum	0	FD24H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PD Simple PLC, swing frequency, fixed length and counting function parameters					
		frequency			
Pd-37	Swing amplitude	0.0% to 100.0%	0.0%	FD25H	☆
Pd-38	Burst frequency amplitude	0.0% to 50.0%	0.0%	FD26H	☆
Pd-39	Oscillation period	0.1s~3000.0s	10.0s	FD27H	☆
Pd-40	Triangular wave rise time of the swing frequency	0.1% to 100.0%	50.0%	FD28H	☆
Pd-41	Setting length	0m to 65535m	1000m	FD29H	☆
Pd-42	Actual length	0m to 65535m	0m	FD2AH	☆
Pd-43	Pulses per metre	0.1 to 6553.5	100.0	FD2BH	☆
Pd-44	Setting the count value	1 to 65535	1000	FD2CH	☆
Pd-45	Specify count value	1 to 65535	1000	FD2DH	☆
Pd-46	Current count value	1 to 65535	0	FD2EH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PE Keypad and Display Parameters					
PE-00	LED operating display parameter 1	0000 to FFFFF Bit00: Operating frequency (Hz) Bit01: Setting frequency (Hz) Bit02: Busbar voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: X-input status visualization Bit08: DO terminal output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Keypad potentiometer voltage before calibration (V) Bit12: Count value Bit13: Length value Bit14: Motor speed display Bit15: PID setting	17	FE00H	☆

Function code	Name	Setting range	Factory value	Address	Change
Group PE Keypad and Display Parameters					
PE-01	LED operating display parameter 2	0000 to FFFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse frequency (kHz) Bit03: Feedback frequency (Hz) Bit04: Remaining running time Bit05: AI1 pre-calibration voltage (V) Bit06: AI2 voltage (V) Bit07: Keypad potentiometer voltage before calibration (V) Bit08: Line speed Bit09: Current power-up time (Hour) Bit10: Current running time (Min) Bit11: PULSE input pulse frequency (Hz) Bit12: Communication set value Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	FE01H	☆
PE-02	LED stop display parameters	0000 to FFFFF Bit00: Setting frequency (Hz) Bit01: Busbar voltage (V) Bit02: X terminal input status Bit03: DO terminal output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Keypad potentiometer voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Motor speed setting Bit11: PID setting Bit12: PULSE input pulse frequency (kHz)	33	FE02H	☆
PE-03	Reservation	-	-	FE03H	☆
PE-04	Reservation	-	-	FE04H	☆
PE-05	F1 Multi-function key function selection	0: This key has no function 1: Command source switch to keyboard 2: Forward and reverse switching 3: Positive rotation point movement 4: Reverse point movement 5: Display mode switching	3	FE05H	★
PE-06	STOP/RESE	0: Only in keyboard mode	1	FE06H	☆

Function code	Name	Setting range	Factory value	Address	Change
<b>Group PE Keypad and Display Parameters</b>					
	T key function	STOP/RESET key stop function is effective 1: In any mode of operation STOP/RESET button stop function are effective			
PE-08	Second row of LED operation display	00: Operating frequency (Hz) 01: Set frequency (Hz) 02: Busbar voltage (V) 03: Output voltage (V) 04: Output current (A) 05: Output power (kW) 06: Output torque (%) 07: X input status visualization 08: DO terminal output status 09: AI1 voltage (V) 10: AI2 voltage (V) 11: Keypad potentiometer voltage before calibration (V) 12: Counting values 13: Length value 14: Motor speed display	4	FE08H	☆
PE-09	Second row LED stop display	00: Operating frequency (Hz) 01: Setting frequency (Hz) 02: Busbar voltage (V) 03: Output voltage (V) 04: Output current (A) 05: Output power (kW) 06: Output torque (%) 07: X input status visualization 08: DO terminal output status 09: AI1 voltage (V) 10: AI2 voltage (V) 11: Keypad potentiometer voltage before calibration (V) 12: Counting values 13: Length value 14: Motor speed display	2	FE09H	☆

**Group PF reserved**

Function code	Name	Setting range	Factory value	Address	Change
<b>PL Group Fault and Protection Parameters</b>					
PL-00	Motor overload protection options	0: Inverter has no overload protection for the motor (use with caution) 1: The inverter compares the accumulated output current and the inverse time curve of motor overload protection to make overload protection judgement.	1	D000H	☆
PL-01	Motor overload protection gain	0.20 to 10.00	1.00	D001H	☆
PL-02	Reservation	0 to 100	5	D002H	☆
PL-03	Reservation	120 to 150%	130%	D003H	☆

Function code	Name	Setting range	Factory value	Address	Change	
PL Group Fault and Protection Parameters						
PL-04	Motor overload warning factor	50-100%	80%	D004H	☆	
PL-05	Uplink to ground short circuit protection selection	0: not valid 1: valid	1	D005H	☆	
PL-06	Reservation	0 to 100	20	D006H	☆	
PL-07	Reservation	100% to 200%	150%	D007H	☆	
PL-09	Failure auto reset times	0 to 20	0	D009H	☆	
PL-10	Fault auto reset interval	0.1s to 100.0s	1.0s	D00AH	☆	
PL-11	Terminal output action selection during automatic fault reset	0: No action 1: Movement	0	D00BH	☆	
PL-12	Fail-safe selection 1	action	Bit: Input out of phase (8) 0: Free parking 1: Shutdown by stopping mode 2: Keep running Tenth digit: Output out of phase (9) (same digit) Hundredth: motor overload (14) (same digit) Thousandths digit: external fault (15) (same digit) 10,000 bits: function code read/write exception (16) 0: Free parking 1: Shutdown by stopping mode	00000	D00CH	☆
PL-13	Fail-safe selection 2	action	Single digit: communication anomalies (17) 0: Free parking 1: Shutdown by stopping mode 2: Keep running Tenth position: motor overspeed (22) (same place) Hundredths: Motor over-temperature faults (23) (same place) Thousands: Loss of PID feedback at runtime (26) (same place) Ten thousandths: dropout (27) 0: Free parking 1: Slow down and stop 2: Decelerate to 7% of the rated frequency of the motor to continue to run, and automatically return to the set frequency to run when the load is not dropped.	00000	D00DH	☆
PL-14	Fail-safe selection 3	action	Single digit: user-defined fault 1 (33) 0: Free parking 1: Shutdown by stopping mode 2: Keep running Tenth position: user-defined fault 2 (34) (same place) Hundredths: Encoder/PG card anomalies (35) 0: Free parking Thousandths: excessive speed deviation (36) (same place) 10,000: initial position error (51) (same place)	00000	D00EH	☆
PL-15	Fail-safe	action	Single digit: running time arrival (28)	00000	D00FH	☆

Function code	Name	Setting range	Factory value	Address	Change
PL Group Fault and Protection Parameters					
	selection 4	0: Free parking 1: Shutdown by stopping mode 2: Keep running Tenth position: arrival at power-up time (29) Hundred: reserved			
PL-19	Frequency selection for continued operation in case of failure	0: Run at current operating frequency 1: Run at set frequency 2: Upper frequency operation 3: Operating at the lower frequency limit 4: Operating at an abnormal standby frequency	0	D013H	☆
PL-20	Abnormal Standby Frequency	60.0%to 100.0% (100.0%corresponds to maximum frequency P0-09)	100.0%	D014H	☆
PL-21	Instantaneous blackout action selection	0: Invalid 1: Deceleration 2: Deceleration stop	0	D015H	☆
PL-22	Switching point for instantaneous stop and deceleration frequency	80.0%to 100.0%	85.0%	D016H	☆
PL-23	Instantaneous voltage recovery judgement time	0.00s to 100.00s	0.50s	D017H	☆
PL-24	Voltage judgement without stopping	60.0% to 100.0% (standard bus voltage)	80.0%	D018H	☆
PL-25	Stalling without stopping gain (i.e. without stopping for a moment)	0~100	40	D019H	☆
PL-26	Auto-stop without stopping for points	0~100	30	D01AH	☆
PL-27	Instantaneous non-stop deceleration time	0.0~300.0s	20.0s	D01BH	☆
PL-28	Load shedding protection options	0: Invalid 1: Effective	0	D01CH	☆
PL-29	Dropout detection level	0.0 to 100.0%	10.0%	D01DH	☆
PL-30	Load Drop Detection Time	0.0 to 60.0s	1.0s	D01EH	☆
PL-32	Over speed detection value	0.0 to 50.0%(maximum frequency)	20.0%	D020H	☆
PL-33	Over-speed detection time	0.0s to 60.0s	1.0s	D021H	☆
PL-34	Excessive speed deviation detection value	0.0 to 50.0%(maximum frequency)	20.0%	D022H	☆
PL-35	Excessive speed deviation detection time	0.0s to 60.0s	5.0s	D023H	☆
PL-36	Output out-of-phase protection selection	0: Prohibited 1: Permission	1	D024H	☆
PL-37	Input phase loss/contactorsuction protection selection	Input phase loss protection selection 0: Prohibited 1: Permission	1	D025H	☆

Function code	Name	Setting range	Factory value	Address	Change
PL Group Fault and Protection Parameters					
PL-38	Type of first failure	0: No faults 1: Accelerated overcurrent 2: Deceleration overcurrent 3: Constant speed overcurrent 4: Accelerated overvoltage 5: Deceleration overvoltage 6: Constant speed overvoltage 7: Reservations 8: Input phase loss 9: Output out of phase 10: Inverter module overheating 11: Rectifier module overheating 12: Internal module over-temperature 13: Inverter overload 14: Motor overload 15: Failure of external equipment 16: EEPROM read/write failure 17: Communication failures 18: Contactor failure 19: Current Detection Fault	-	D026H	•
PL-39	Second failure type	20: Switching motor fault during operation 21: Motor short circuit fault to ground 22: Motor overspeed fault 23: Motor over-temperature fault 24: Motor tuning faults 25: Wave-by-wave current limiting faults 26: Loss of PID feedback fault at runtime 27: Load shedding faults 28: Cumulative running time to reach failure 29: Cumulative power-up time reached fault 30: Reservations 31: Buffer resistor frequent on/off faults	-	D027H	•
PL-40	Third (most recent) failure type	32: Undervoltage fault 33: User-defined fault 1 34: User-defined faults 2 35: Encoder/PG card failure 36: Excessive speed deviation fault	-	D028H	•
PL-41	Frequency at third (most recent) failure	-	-	D029H	•
PL-42	Current at third (most recent) fault	-	-	D02AH	•
PL-43	Busbar voltage at third (latest) fault	-	-	D02BH	•
PL-44	Input terminal status at third (most recent) fault	-	-	D02CH	•
PL-45	Output terminal status at third (latest) fault	-	-	D02DH	•
PL-46	Inverter status at third (latest) fault	-	-	D02EH	•
PL-47	Power-up time at third (most recent) failure	-	-	D02FH	•
PL-48	Running time at third (most recent) failure	-	-	D030H	•
PL-51	Frequency at second failure	-	-	D033H	•
PL-52	Current at second fault	-	-	D034H	•
PL-53	Busbar voltage at	-	-	D035H	•

Function code	Name	Setting range	Factory value	Address	Change
PL Group Fault and Protection Parameters					
	second fault				
PL-54	Input terminal status at second fault	-	-	D036H	●
PL-55	Output terminal status at second fault	-	-	D037H	●
PL-56	Inverter status at second fault	-	-	D038H	●
PL-57	Power-up time at second failure	-	-	D039H	●
PL-58	Runtime at second failure	-	-	D03AH	●
PL-61	Frequency at first failure	-	-	D03DH	●
PL-62	Current at first fault	-	-	D03EH	●
PL-63	Busbar voltage at first fault	-	-	D03FH	●
PL-64	Input terminal status at first fault	-	-	D040H	●
PL-65	Output terminal status at first fault	-	-	D041H	●
PL-66	Inverter status at first fault	-	-	D042H	●
PL-67	Power-up time at first failure	-	-	D043H	●
PL-68	Running time at first failure	-	-	D044H	●

Function code	Name	Setting range	Factory value	Address	Change
Group Pn Inverter status					
Pn-00	Cumulative power-up time	0h~65535h	-	9F00H	●
Pn-01	Cumulative running time	0h~65535h	-	9F01H	●
Pn-02	Rectifier Bridge Heat Sink Temperature	0.0°C to 100.0°C	-	9F02H	●
Pn-03	Inverter module heat sink temperature	0.0°C to 100.0°C	-	9F03H	●
Pn-04	Cumulative power consumption	0kW~65535 degrees	-	9F04H	●

Function code	Name	Setting range	Factory value	Address	Change
Group PP Parameter protection					
PP-00	User password	0 to 65535	0	1F00H	☆
PP-01	Parameter write protection	0: Rewriting allowed 1: Prohibition of rewriting	0	1F01H	☆
PP-02	Parameter initialization	0: No operation 01: Clearance of recorded information 02: Restoration of factory parameters (motor parameters are not restored) 03: Restore factory parameters (motor parameters also restored)	0	1F02H	★

Function code	Name	Setting range	Factory value	Address	Change
Group PP Parameter protection					
PP-03	Functional parameter group display selection	Digits: d0 group display selection 0: not displayed 1: displayed Tenth position: Group A display selection 0: not displayed 1: displayed	11	1F03H	★
PP-04	Personalized parameter display options	digits: user-customized parameter selection 0: not displayed 1: displayed Ten positions: user change parameter selection 0: not displayed 1: displayed	00	1F03H	★
PP-05	Software version number	-	-	1F05H	●
PP-06	Product number	-	-	1F06H	●

Function code	Name	Setting range	Factory value	Address	Change
Group A2 Second motor control					
A2-00	Motor type selection	0: Ordinary asynchronous motor 1: Inverter asynchronous motor	0	A200H	★
A2-01	Motor rated power	0.1kW~1000.0kW	Determination of model	A201H	★
A2-02	Motor rated frequency	0.01Hz to maximum frequency	Determination of model	A202H	★
A2-03	Motor rated current	0.01A~655.35A (Inverter power <=55kW) 0.1A~6553.5A (Inverter power >55kW)	Determination of model	A203H	★
A2-04	Motor rated voltage	1V to 2000V	Determination of model	A204H	★
A2-05	Rated motor speed	1rpm~65535rpm	Determination of model	A205H	★
A2-06	Asynchronous motor no-load current	0.01A~A2-03 (Inverter power <=55kW) 0.1A~A2-03 (Inverter power >55kW)	Determination of model	A206H	★
A2-07	Asynchronous motor stator resistance	0.001Ω~65.535Ω (Inverter power <=55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Determination of model	A207H	★
A2-08	Leakage reactance of asynchronous motors	0.01mH~655.35mH (Inverter power <=55kW) 0.001mH~65.535mH (Inverter power >55kW)	Determination of model	A208H	★
A2-09	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (Inverter power <=55kW) 0.0001Ω~6.5535Ω (Inverter power >55kW)	Determination of model	A209H	★
A2-10	Asynchronous motor mutual inductive resistance	0.1mH~6553.5mH (Inverter power <=55kW) 0.01mH~655.35mH (Inverter power >55kW)	Determination of model	A20AH	★
A2-17	Number of encoder	1 to 65535	1024	A211H	★

Function code	Name	Setting range	Factory value	Address	Change
Group A2 Second motor control					
	lines				
A2-18	Encoder Type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary Transformer	0	A212H	★
A2-19	Speed Feedback PG Selection	0: Local PG 1: Extended PG 2: PULSE pulse input (X6)	0	A213H	★
A2-20	ABZ Incremental Encoder AB Phase Sequence	0: Positive 1: Reverse	0	A214H	★
A2-24	Rotary Transformer Pole Pairs	1 to 65535	1	A218H	★
A2-26	Speed Feedback PG Break Detection Time	0.0: No action 0.1s~10.0s: Action	0.0	A21AH	★
A2-27	Tuning Options	0: No action 1: Static tuning of asynchronous motors 2: Complete tuning of asynchronous motors 3: Static complete tuning of asynchronous motors	0	A21BH	★
A2-28	Velocity loop proportional gain 1	1 to 100	30	A21CH	☆
A2-29	Velocity loop integration time1	0.01s~10.00s	0.50s	A21DH	☆
A2-30	Switching frequency 1	0.00 to A2-33	5.00 Hz	A21EH	☆
A2-31	Velocity loop proportional gain 2	1 to 100	20	A21FH	☆
A2-32	Velocity loop integration time2	0.01s~10.00s	1.00s	A220H	☆
A2-33	Switching frequency 2	A2-30~Maximum frequency	10.00 Hz	A221H	☆
A2-34	Vector Control Differential Gain	50%to 200%	100%	A222H	☆
A2-35	Velocity loop filter time constant	0.000s to 0.100s	0.000s	A223H	☆
A2-36	Vector control overexcitation gain	0 to 200	64	A224H	☆
A2-37	Upper torque limit source in speed control mode	0: A2-38 setting 1: AI1 2: AI2 3: Keyboard potentiometers 4: PULSE pulse 5: Communication given 6: MIN (AI1,AI2) 7: MAX (AI1,AI2) Full scale for options 1-7, corresponding to digital settings A2-38	0	A225H	☆
A2-38	Digital setting of upper torque limit in speed control mode	0.0% to 200.0%	150.0%	A226H	☆
A2-41	Excitation regulation proportional gain	0 to 20000	2000	A229H	☆
A2-42	Excitation Regulation Integral Gain	0 to 20000	1300	A22AH	☆
A2-43	Torque adjustment proportional gain	0 to 20000	2000	A22BH	☆

Function code	Name	Setting range	Factory value	Address	Change
Group A2 Second motor control					
A2-44	Integral gain for torque regulation	0 to 20000	1300	A22CH	☆
A2-45	Speed Ring Points Properties	Individuals: Separation of Points 0: Invalid 1: Effective	0	A22DH	☆
A2-48	Maximum weak magnetic current	1% to 300%	50%	A230H	☆
A2-49	Automatic gain adjustment for weak magnetism	10% to 500%	100%	A231H	☆
A2-50	Weak magnetic integral multiple	2 to 10	2	A232H	☆
A2-51	2nd motor control method	0: No PG vector control (SVC) 1: With PG vector control (FVC) 2: V/F control	0	A233H	★
A2-52	2nd motor acceleration and deceleration time selection	0: Same as 1st motor 1: Increase Deceleration Time 1 2: Acceleration and deceleration time 2 3: Acceleration and deceleration time 3 4: Acceleration and deceleration time 4	0	A234H	☆
A2-53	2nd Motor Torque Boost	0.0%: automatic torque boost 0.1% to 30.0%: manual torque boost	Determination of model	A235H	☆
A2-55	2nd motor oscillation suppression gain	0 to 100	Determination of model	A237H	☆

Function code	Name	Minimum unit	Communication address
Group d0 Basic monitoring parameters			
d0-00	Operating frequency (Hz)	0.01Hz	7000H
d0-01	Setting frequency (Hz)	0.01Hz	7001H
d0-02	Busbar voltage (V)	0.1V	7002H
d0-03	Output Voltage (V)	1V	7003H
d0-04	Output current (A)	0.01A	7004H
d0-05	Output power (kW)	0.1kW	7005H
d0-06	Output torque (%)	0.1%	7006H
d0-07	X terminal input status	1	7007H
d0-08	Multi-function terminal output status	1	7008H
d0-09	AI1 voltage (V)	0.01V	7009H
d0-10	AI2 voltage (V)	0.01V	700AH
d0-11	Keypad potentiometer voltage (V)	0.01V	700BH
d0-12	Numerical value	1	700CH

Function code	Name	Minimum unit	Communication address
Group d0 Basic monitoring parameters			
d0-13	Length value	1	700DH
d0-14	Motor speed display	0.1rpm	700EH
d0-15	PID Setting	1	700FH
d0-16	PID feedback	1	7010H
d0-17	PLC stage	1	7011H
d0-18	PULSE Input Pulse Frequency (Hz)	0.01kHz	7012H
d0-19	Feedback frequency (Hz)	0.1Hz	7013H
d0-20	Remaining running time	0.1Min	7014H
d0-21	AI1 voltage before correction	0.001V	7015H
d0-22	AI2 voltage before correction	0.001V	7016H
d0-23	Keypad potentiometer voltage before calibration	0.001V	7017H
d0-24	Linear velocity	1m/Min	7018H
d0-25	Current power-up time	1Min	7019H
d0-26	Current Runtime	0.1Min	701AH
d0-27	PULSE Input Pulse Frequency	1Hz	701BH
d0-28	Communication set value	0.01%	701CH
d0-29	Encoder feedback speed	0.01Hz	701DH
d0-30	Mains frequency X display	0.01Hz	701EH
d0-31	Auxiliary frequency Y display	0.01Hz	701FH
d0-32	View any memory address value	1	7020H
d0-34	Motor temperature value	1°C	7022H
d0-35	Target torque (%)	0.1%	7023H
d0-36	Index position of rotary change	1	7024H
d0-37	Power factor perspective	0.1°	7025H
d0-38	ABZ position	1	7026H
d0-39	VF Separation Target Voltage	1V	7027H
d0-40	VF Separation Output Voltage	1V	7028H
d0-45	Error message (computing)	1	702DH
d0-58	Z Signal Counter	1	703AH
d0-59	Setting frequency (%)	0.01%	703BH
d0-60	Operating frequency (%)	0.01%	703CH

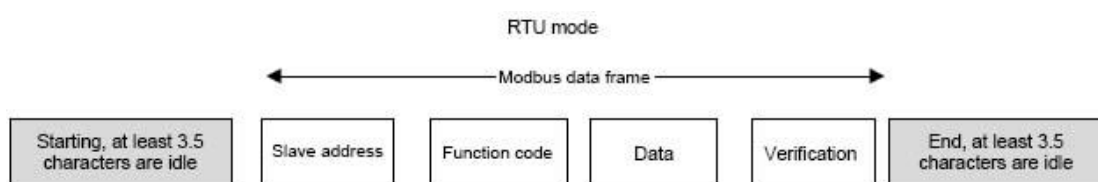
Function code	Name	Minimum unit	Communication address
Group d0 Basic monitoring parameters			
d0-61	Inverter status	1	703DH

## Appendix: VL600 Modbus Communication Protocol

1. The communication protocol of the inverter is Modbus protocol, which supports the reading and writing of commonly used registers.
2. The inverter is a slave with master-slave point-to-point communication. When the master sends commands using the broadcast address, the slave does not answer.
3. In the case of multi-machine communication or long distance, it is recommended to connect the signal ground of the master station and the signal ground of the inverter "GND" to improve the immunity of communication.

### Protocol format

The Modbus protocol supports RTU mode and the corresponding frame format is as follows:



Modbus uses the "Big Endian" encoding method, where the high byte is sent first, followed by the low byte.

RTU mode: In RTU mode, the idle time between frames takes the larger value of the function code setting and the Modbus internal agreed value. The Modbus internal agreed minimum idle time between frames is as follows: the header and the tail of the frame define the frame by the bus idle time of not less than 3.5 bytes time. The data checksum is CRC-16, the whole message is involved in the checksum, the high and low bytes of the checksum need to be exchanged and sent. For specific CRC checksums, please refer to the examples at the end of the protocol. It is worth noting that it is sufficient to keep at least 3.5 characters of bus idle between frames, and the bus idle between frames does not need to accumulate the start and end idle.

The following request frame is a data frame that reads the 0x1002 parameter of Unit 1:

Address	Function code	Register address		Number of words read		Checksum	
0x01	0x03	0x10	0x02	0x00	0x01	0x21	0x0A

The following is the response frame for the machine 1:

Address	Function code	Number of answer bytes	Register contents		Checksum	
0x01	0x03	0x02	0x14	0xB0	0xB6	0xF0

The inverter can set different response delays through function codes to suit the specific application needs of various master stations, and the actual response delay in RTU mode is not less than 3.5 character intervals.

The read/write characteristics and ranges of the function code parameters follow the instructions in the inverter user's manual. The group number of the inverter function code is mapped to the high byte of the register address, and the group index is mapped to the low byte of the register address. The control parameters and status parameters of the inverter are virtualised as inverter function code groups. The correspondence between the function code

group number and the high byte of its mapped register address is as follows:

Write RAM (write RAM, in case of power-down, not saved):

Group P0: 0x00; P1 group: 0x01; P2 group: 0x02; P3 group: 0x03; P4 group: 0x04; Group P5: 0x05; Group P6: 0x06; P7 group: 0x07; P8 group: 0x08; P9 group: 0x09; Group PA: 0x0A; Group PB: 0x0B; Group PC: 0x0C; Group PD: 0x0D; PE group: 0x0E; PF group: 0x0F; Group PP: 0x1F; Group PL: 0x8F; Group Pn: 0x9F; A0 group: 0x40; A1 group: 0x41; A2 group: 0x42; A3 group: 0x43.

For example, the register address of inverter function code parameter P3-02 is 0x0302, the register address of inverter function code parameter P5-12 is 0x050C, and the register address of function code PL-29 is 0x8F1D.

Read and write ROM (write ROM, in case of power-down, saved):

Group P0: 0xF0; P1 group: 0xF1; P2 group: 0xF2 .....PF group: 0xFF; Group PL: 0xD0; A0 group: 0xA0; A1 group: 0xA1; A2 group: 0xA2; A3 group: 0xA3.

**Note: Writing ROM reduces the life of the EEPROM as it is frequently stored. Therefore, some function codes do not need to be stored at power-down, but only need to rewrite the value in RAM.**

For example, the function code acceleration time P0-08 requires power-down storage, i.e. the register address of P0-08 is 0xF008; the function code PID value given P9-05 does not require power-down storage, i.e. the register address of P9-05 is 0x0905.

To read the value of the function code, you need to read the ROM address. For example, P0-06 reads the 0xF006 address instead of 0x0006.

The format of the entire data frame has already been described, the following will focus on the format and meaning of the function code and data part of the Modbus protocol, that is, the content of the "function code" and "data" part of the data frame format described above.

Stop/run parameter section:

Parameter address (Decimal)	Parameter description
4096	*Communication set value (-10000~10000) (decimal)
4097	Operating frequency
4098	Busbar voltage
4099	Output voltage
4100	Output current
4101	Output power
4102	Output torque
4103	Running speed
4104	X Input Flag
4105	DO output flag
4106	AI1 voltage

Parameter address (Decimal)	Parameter description
4107	AI2 voltage
4108	Keypad potentiometer given
4109	Count value input
4110	Length value input
4112	Load speed
4113	PID Setting
4114	PID feedback
4115	PLC Steps
4116	PULSE Input Pulse Frequency in 0.01kHz
4117	Feedback speed in 0.1Hz
4118	Remaining running time
4119	AI1 voltage before correction
4120	AI2 voltage before correction
4121	Keypad potentiometer voltage before calibration
4122	Linear velocity
4123	Current power-up time
4124	Current Runtime
4125	PULSE Input pulse frequency, unit 1Hz
4126	Communication set value
4127	Actual feedback speed
4128	Mains frequency X display
4129	Auxiliary frequency Y display

**Note:**

The communication setting value is a percentage of the relative value, with 10000 corresponding to 100.00% and -10000 corresponding to -100.00%. For data in the frequency scale, the percentage is a percentage of the relative maximum frequency (P0-13); for data in the torque scale, the percentage is P3-10, A2-38 (upper torque limit numerical settings, corresponding to the first and second motors, respectively).

Control command input to inverter: (write only)

Command word address (decimal)	Command function
8192	0001: Positive rotation operation

	0002: Reverse run
	0003: Positive rotation point movement
	0004: Reverse point movement
	0005: Free stops
	0006: Deceleration stop
	0007: Fault reset

Read inverter status: (read only)

Status word address (decimal)	Status word function
12288	0001: Positive rotation operation
	0002: Reverse run
	0003: Downtime

Command address (decimal)	Command content
8193	BIT0: Y1 output control BIT1: Reserved BIT2: Relay 1 output control BIT3: Relay 2 output control BIT4: Y2 output control (Y2 terminal as open collector output) BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

Analog output **AO1** control: (write-only)

Command address (decimal)	Command content
8194	0 to 7FFF indicates 0% to 100%.

Analog output **AO2** control: (write only)

Command address (decimal)	Command content
8195	0 to 7FFF indicates 0% to 100%.

Pulse output control: (write only)

Command address (decimal)	Command content
8196	0 to 7FFF indicates 0% to 100%.

Inverter fault description:

Inverter fault address (decimal)	Inverter fault message (hexadecimal)
32768	0000: No faults 0001: Accelerated overcurrent 0002: Deceleration overcurrent 0003: Constant speed overcurrent 0004: Acceleration overvoltage 0005: Deceleration overvoltage 0006: Constant speed overvoltage 0007: Reservations 0008: Input out of phase 0009: Output out of phase 000A: Inverter module heat sink overheating 000B: Rectifier module heat sink overheating 000C: Internal module over-temperature 000D: Inverter overload 000E: Motor overload 000F: External fault 0010: Parameter read/write exception 0011: Communication anomalies 0012: Contactor abnormality 0013: Current Detection Fault 0014: Switching motor failure during operation 0015: Motor short to ground fault 0016: Motor overspeed 0017: Motor over-temperature 0018: Motor tuning faults 0019: Fast Current Limit Timeout Fault 001A: Loss of PID feedback during runtime 001B: Dropped load 001C: Runtime arrival 001D: Power-up time arrival 001E: Reservations 001F: Buffer resistor overload fault

Inverter fault address (decimal)	Inverter fault message (hexadecimal)
32768	0020: Undervoltage fault 0021: User-defined fault 1 0022: User-defined fault 2 0023: Encoder/PG card failure 0024: Excessive speed deviation 0029: Braking resistor short-circuited
32769	0000: No fault 0001: Wrong password 0002: Command code error 0003: CRC checksum error 0004: Invalid address 0005: Invalid parameter 0006: Invalid parameter change 0007: System locked 0008: EEPROM operation in progress

## Application examples

(1) Rewrite the operating frequency of #1 inverter to 25.00 HZ, power down is not saved:

① Method 1: P0-04=9, i.e., the frequency source giving method is communication giving, write operation to 4096 address;

	Address	Function code	Register address	Register element	Checksum
Request	0x01	0x06	0x1000	0x1388	0x805C
Response	0x01	0x06	0x1000	0x1388	0x805C

The address of the communication set value is 4096, and the corresponding hexadecimal address is 0x1000.

The maximum frequency P0-13 = 50.00Hz, i.e. 50.00% of the maximum frequency is 25.00Hz, and the value of 50.00% is 5000, which corresponds to 0x1388 in hexadecimal.

② Method 2: P0-04=1, i.e., the frequency source giving method is panel digital setting, write operation to 0x0006 address;

	Address	Function code	Processor register address	Processor register element	Checksum
Requesting	0x01	0x06	0x0006	0x09C4	0x6E08
Responsive	0x01	0x06	0x0006	0x09C4	0x6E08

0x0006 is the address of keypad numeric setting P0-06.

(2) Rewrite the acceleration time 1 (i.e., function code P0-08) of 1# inverter to 2.0s, and power down is not saved.

	Address	Function code	Register address	Register contents	Checksum
Request	0x01	0x06	0x0008	0x0014	0x0807
Response	0x01	0x06	0x0008	0x0014	0x0807

(3) Read the running frequency of 1# inverter, the inverter responds the running frequency is 35.00Hz:

	Address	Function code	Register address	Number of registers or bytes read	Register contents	Checksum
Request	0x01	0x03	0x1001	0x0001	not have	0xD10A
Response	0x01	0x03	not have	0x02	0x0DAC	0xBCA9

Note: Read the 0x1001 address, if the value read is 0x0DAC is 35.00Hz.

(4) Read the output current of 1# inverter, the inverter answer output current is 5.42A.

The hexadecimal equivalent of address 4100 is 0x1004.

	Address	Function code	Register address	Number of registers or bytes read	Register contents	Checksum
Request	0x01	0x03	0x1004	0x0001	not have	0xC10b
Response	0x01	0x03	not have	0x02	0x021E	0x392C

(5) Read the bus voltage of 1# inverter, and the inverter responds that the bus voltage is 529.6V.

The hexadecimal equivalent of address 4098 is 0x1002.

	Address	Function code	Register address	Number of registers or bytes read	Register contents	Checksum
Request	0x01	0x03	0x1002	0x0001	not have	0x210A
Response	0x01	0x03	not have	0x02	0x14B0	0xB6F0

(6) Read the running status of 1# inverter, address 4098 corresponds to 0x3000 in hexadecimal.

	Address	Function code	Register address	Number of registers or bytes read	Register contents	Checksum
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Request	0x01	0x03	0x3000	0x0001	not have	0x8B0A
Response	0x01	0x03	not have	0x02	0x0001	0x7984

### 9. Application Examples

(1) External terminal control

Wiring: X1 or X2, COM. parameter setting: P0-02=1.

(2) AI1 analogue frequency is given with an upper limit frequency of 100Hz.

Wiring: +10V, AI1, GND. parameter setting: P0-04=2, P0-13=100.00Hz, P0-11=100.00Hz.

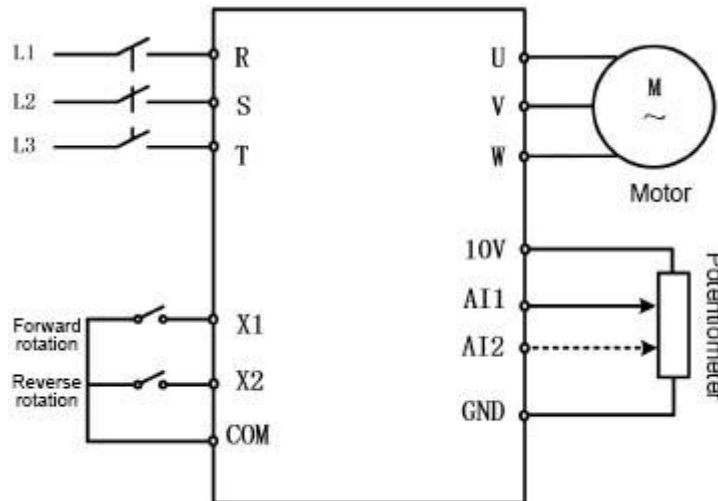


Figure 10-1 External Terminal and Analogue Input Wiring Diagram

(3) Multi-speed

Wiring: X5, X6, X7, COM. Parameter setting: P0-04=6, P5-03=12, P5-04=13, P5-05=14, selecting the multi-speed frequency corresponding to P7-00~P7-06 through the effective combination of X4, X5, X6 terminals.

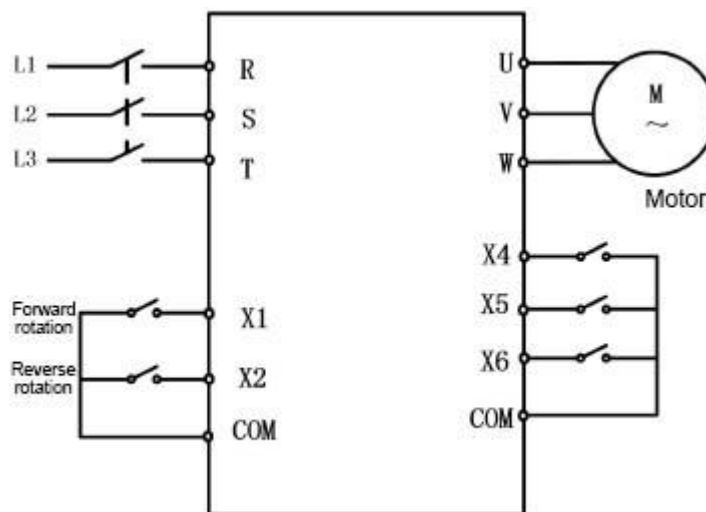


Figure 10-2 External Terminals and Multi-Speed Control Wiring Diagram

## 12. Warranty Terms

This Company solemnly promises that since the date when the user buys the product from this Company (hereinafter referred to as the manufacturer), the user enjoys the following product after-sales service.

This product comes with a 15 month free warranty from the date of purchase by the user from the manufacturer (excluding products exported to foreign countries/non-standard products), and an 18 month free warranty based on the body barcode.

2. In case of quality problem, this product is guaranteed to be returned, replaced, or repaired by the manufacturer within one month from the date of purchase.

3. In case of quality problem, this product is guaranteed to be replaced or repaired by the manufacturer within three months from the date of purchase by the user.

4. This product comes with a 6-month warranty from the date of purchase by the user from the manufacturer for overseas exports.

5. This product is entitled to paid lifetime service from the date of purchase by the user from the manufacturer.

6. Disclaimer: Product faults caused by the following reasons are not covered by the manufacturer's 15 month free warranty service commitment:

- (1) The user did not follow the procedures listed in *the User's Manual* for correct operation;
- (2) Product faults caused by users due to repairing or modifying products without communicating with the manufacturer;
- (3) Product faults caused by users due to exceeding the standard usage range of the product;
- (4) Abnormal aging or fault of product components caused by user's poor usage environment;
- (5) Product damage caused by force majeure such as earthquakes, fires, wind and water disasters, lightning strikes, abnormal voltage or other natural disasters;

7. In the following situations, the manufacturer has the right to refuse to provide warranty services:

- (1) When the brand, trademark, serial number, nameplate, and other markings indicated by the manufacturer in the product are damaged or unrecognizable;
- (2) When the user fails to pay off the payment for goods according to *the Purchase and Sale Contract* signed by both parties;
- (3) When the user intentionally conceals the undesirable use of the product during installation, wiring, operation, maintenance, or other processes from the manufacturer's after-sales service provider.

### Warranty Card

Customer name:		
Detailed address:		
Contact person:	Telephone/mobile phone:	
Product model:		
Product serial number:		
Date of purchase:	Time when fault occurs:	
Power of adapted motor:	Name of the utilized equipment:	
Whether to use the brake unit function or not  <input type="checkbox"/> Yes <input type="checkbox"/> No	Whether there is a abnormal sound or not at the time of fault  <input type="checkbox"/> Yes <input type="checkbox"/> No	Whether it smokes or not at the time when fault occurs  <input type="checkbox"/> Yes <input type="checkbox"/> No
Fault description:		

**Please send this card and the faulty product to this Company, thank you!**

### Certificate

**Inspector:** \_\_\_\_\_

**Date of manufacture:** \_\_\_\_\_



This product has been inspected by our quality control and quality assurance departments, and its performance parameters are in line with the standards of *the User's Manual* accompanying the product, and it is allowed to be released from the factory.