Forword

V6-G and V5-G series variable speed drive (frequency inverter) is a high performance special inverter for crane application. The products adopt current international leading synchronous torque vector control technology, The product has excellent torque control, reliable brake control timing, speed monitoring, torque monitoring, power optimization, location processing, intelligent deceleration functions, and fully guarantee the safety of the crane, efficient and reliable, widely used in ports, ships , marine engineering, mining, construction, metallurgy, factories and other industries crane machinery.

V6-G applied to motor with encoder for high performance requirements of the occasion.

V5-G applied to the motor without encoder control applications.

■ V6-G and V5 - G High Performance crane special inverter Technical Features

◆ Professional carne function, it is PLC and **high-performance vector inverter perfect combination.**

V6-G series and V5-G series Crane special inverter with built-in unique crane special features that are crane dedicated PLC and high-performance vector inverter perfect combination . Its powerful, easy adjustment, easy wiring, cost-effective.

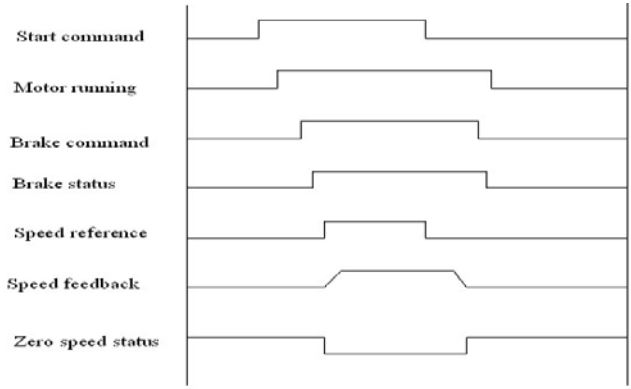
◆ Powerful low starting torque

V6 - G series and V5-G series take precise torque vector control algorithm, vector control without encoder 0.5Hz up to 180% rated torque, the torque response is less than 20ms; vector control with encoder 0.00Hz up to 180% rated torque, the torque response is less than 10ms. With reliable brake control logic, to ensure opening and closing of the brake will not appear slip phenomenon.

◆ reliable brake control, to eliminate the phenomenon of slip hook

Precise torque vector control algorithm combined with a reliable brake control logic, to ensure opening and closing of the brake will not appear slip phenomenon.

The first thing to start Motor is to ensure that the motor has reached a certain frequency, the output torque was sufficient to open the mechanical brake and after process mechanical brake delay can normally accelerate to the setting speed; when stop motor, firstly let the motor as reasonable deceleration gradually decelerate to the brake close speed, andlet the motor still output torque, then closed mechanical brake. Through the above functions can be better able to prevent heavy slip hook phenomenon at the moment of opening and closing the brake.



Brake is the most crucial and most important institutions of Crane control and operation system. Brake reliability related to safety of complete machine. In addition, except the brake control time sequence to ensure reliable operation of the brake, also need to fully consideration brake faults safety. Inverter used control circuit three class control logic&main circuit two class contactor control for the aspect hardware of brake control. The three class control logic included whole machine safety protection, machine structure security protection and PLC and inverter control operation. main circuit two class contacts are safety contactor and work contactor. safety contactors was interlock controlled by the machine safety protection and machine structure security protection. work contactor was controlled by PLC and inverter’s control logic. Under normal circumstances, security contactor keep normally closed, brake release and engage was controlled by work contactor. When a dangerous situation, the whole security protection, machine structure security protection, work safety contactors and work contactor was disconnect at same time, and ensure the brake is closed.

◆ **smooth and reliable ascending and descending speed speed**

Unique process of acceleration and deceleration speed torque control and perfect reliable brake time sequence control function to ensure that the process of the rise and fall more stable control characteristics.

◆ **multiple sets of motor parameters function**

Through multiple sets of motor parameters are saved automatically after parameter auto tuning and flexible switching. It can achieve single inverter control multiple motors in different time division, significant save users cost.

◆ **stronger overload**

Taking the practical condition of crane equipment application into account, V6-G series and V5-G series Crane special inverter overload capacity is 1.2 times of universal heavy duty inverter’s. with a more powerful overload, achieve excellent control effect.

◆ **have power optimization features**

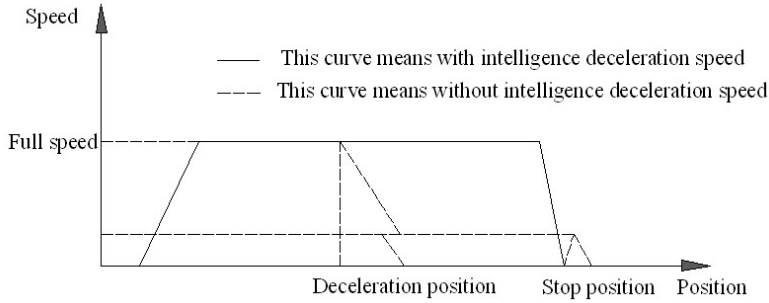
The inverter automatically calculates the weight of the load in the process of motor running and calculated the maximum speed of motor promoting the load can be arrived. both high-speed operation while protecting the motor to run in the security rated power. Maximize useful motor power, while ensuring safety while improving working efficiency.

◆ **position processing functionality and intelligence deceleration function**

By PG feedback speed signal processing, no additional hardware, automatic calculation of the actual position can be precisely to the millimeter. provide data for position control such as intelligence deceleration and spot parking & display , and when inverter power down can memorize the location ;

Intelligent deceleration function, according to the user's settings or protection requirement, the system determines the motor deceleration time and speed, in the shortest time to safely and efficiently achieve designated parking , to ensure the safety of the driving mechanism and stop location accurate, accurate to cm;

The unique position protection and hardware limit mutual monitoring to ensure the system more secure and efficient.



◆ **international standard bus communication and optimized communication format**

With dual 485 communication interface, support for international standard MODBUS protocol (RTU), optional ProfiBus - DP expansion card, CanOpen expansion cards and other communication formats to meet different application requirements;

Optimized fast communication format, greatly accelerated the speed of communications;

With communication loop detection check function, once the communication error, brake immediately brakes to ensure system security.

◆ **Security perfect keyboard functions**

Using the keyboard on-site to operate inverter can achieve all cranes start, stop, control time sequence. The main purpose of this feature is when there is any failure for the crane control system; by operate the keyboard to safely and efficiently put down the load, an exit the fault site to minimize the impact on production.

◆ **Comprehensive monitoring and fault protection**

Except universal inverter overcurrent, overload, overvoltage and other 30 kinds of protection function, but also has the speed monitoring function, torque monitoring, communications detection, brake monitoring and other crane special protection. ensure safe, reliable operation.

With fault site Exit function, once the system organization has problems, when it can not start, use inverter keyboard to control to exit the fault site to minimize the impact on production.

Typical applications crane industry

■ **Port tire cranes, portal cranes**

◆ Reliable brake control time sequence to ensure safe and reliable;

◆ Unique torque verification feature ensures the heavy will not have slip phenomenon when the brake release;

◆ Innovative power optimization and optimization functions ensure that the motor can up to operation efficiency maximization by safety rated power;

◆ Precise position control and intelligent deceleration function to ensure the system more secure and reliable, and through intelligent deceleration to prevent upward to the top phenomenon;

◆ fast response capability ensures easy operation, easy jog to position operation;

◆ Powerful zero speed torque to ensure safety and reliability of the whole system;

◆ Optimized communication format, greatly improving the efficiency and speed of communication;

◆ Compatible with a variety of communication modes to meet the communication needs of different systems.

■ **Tower cranes/ lifts**

◆ Arbitrary acceleration and deceleration and arbitrary impact load conditions, the inverter runs stable without tripping on the premise of improving energy efficiency;

◆ Strong ability to adapt to the environment, to ensure that the inverter in the wind, rain, sun, strong vibration and other harsh outdoor environment safe and reliable operation;

◆ Powerful low frequency torque to ensure that does not occur slip phenomenon when heavy objects is upward;

◆ Excellent control performance ensure that the system is compatible with the open-loop and closed-loop control;

◆ No need independent fault reset button, intelligent fault reset mode, making the system easy to operate, more secure and reliable;

◆ optimized lift control logic, making the rise and fall during the startup and shutdown smoothly without shocks.

■ **Electric hoist, bridge crane**

◆ Modular electric hoist special inverter, installation easier;

◆ The characteristics of the motor in the tapered, development control software for conical motor, the inverter perfect integrated with conical motor;

◆ Accurate low speed vector running algorithm to ensure that low-speed region can achieve sufficient startup ability to prevent slip hook phenomenon;

◆ No need auto tuning normal operation of the performance without affecting, truly maintenance free debugging features;

◆ High reliability, low cost nature, no need PLC control circuits, simplifying the technical program, the protection of the product quality and safety of the premise, reduce customer costs, improve customer competitiveness in the market.

■ **Mine hoist, winch**

◆ Powerful low frequency torque to eliminate the phenomenon of slip hook;

◆ smooth acceleration and deceleration process greatly reduces the chance of off road;

◆ Easy to use, operating habits unchanged, the operator first operating frequency winch, still remember it perfectly;

◆ Support and coexistence of the original system, without changing the original system anything;

◆ be able to brake and safety circuits and mechanical perfection with the use of the original system can be compatible with the safety circuit, and also to various types of mechanical brakes perfect match to maximize the protection of the safety of the entire system;

◆ maximize efficiency, energy-saving space, in line with national energy conservation policy;

■ **Grab Control**

◆ for grabs for precise control, crawl quantity controllable;

◆ opening and closing have been taken to positions control, reduce excessive closed when closed bucket;

◆ Support and opening and closing rope torque balance, neither spillage nor excessive force when opening and closing mechanism;

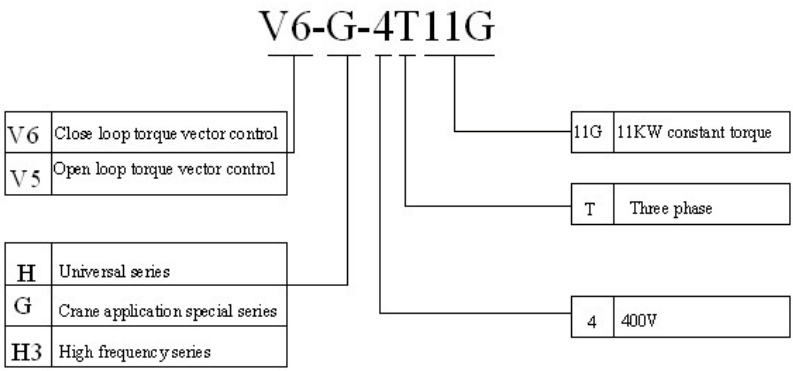
◆ to improve the working efficiency of grab bucket and extend Grab life rope, reduce the labor intensity of drivers.

Contents

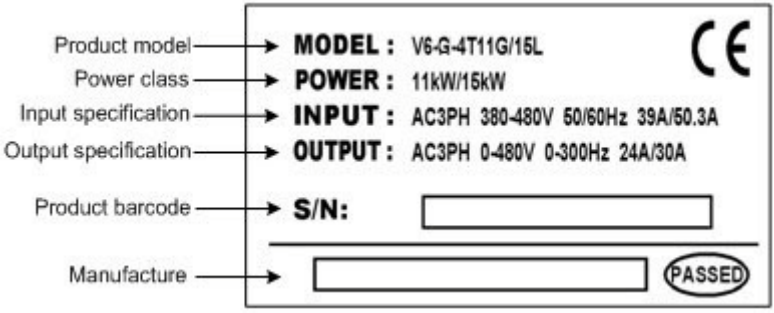
Chapter 1 Introduction to V5/V6-G Series Inverter

1.1 Product Model Description

The digits and letters in the inverter model field on the nameplate indicate such information as the product series, power supply class, power class and software/hardware versions.



1.2 Product Nameplate Description



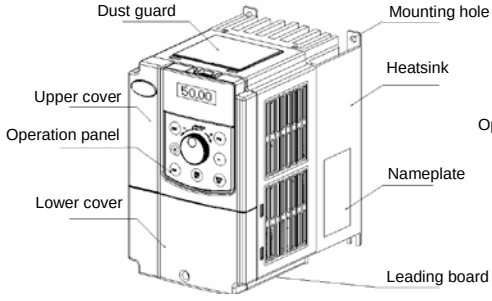
1.3 Product Series

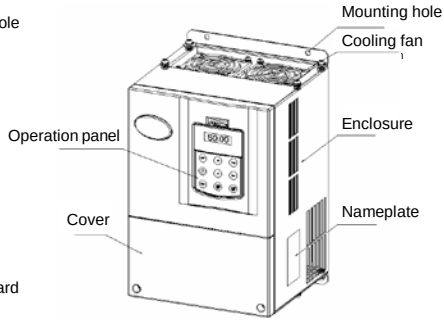
- V6-G-4T□□□G AND V5-G-4T□□□G
- Three-phase 400V Constant torque/heavy-duty application

Power (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Motor power (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Output	Voltage (V)	Three-phase 0 to rated input voltage														
	Rated current (A)	2.5	3.8	5.5	9	13	17	24	30	39	45	60	75	91	112	150
	Overload capacity	150% 1 minute, 180% 10 seconds, 200% 0.5 second, interval: 10 minutes (inverse time lag feature)														
Input	Rated voltage/frequency	Three-phase 380V/480V; 50Hz/60Hz														
	Allowable voltage range	323V ~ 528V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: ±5%														
	Rated current (A)	3.5	6.2	9.2	14.9	21.5	27.9	39	50.3	60	69.3	86	104	124	150	201
Braking unit		Built-in as standard								Built-in as standard						
Protection class		IP20														
Cooling mode		Self-cooling	Forced air convection cooling													
Power (kW)		75	90	110	132	160	185	200	220	250	280	315	355	400	450	
Motor power (kW)		75	90	110	132	160	185	200	220	250	280	315	355	400	450	
Output	Voltage (V)	Three-phase 0 to rated input voltage														
	Rated current (A)	176	210	253	304	350	380	426	470	520	600	650	690	775	860	
	Overload capacity	150% 1 minute, 180% 10 seconds, 200% 0.5 second, interval: 10 minutes (inverse time lag feature)														
Input	Rated voltage/frequency	Three-phase 380V/480V; 50Hz/60Hz														
	Allowable voltage range	323V ~ 528V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: ±5%														
	Rated current (A)	160*	196*	232*	282*	326*	352*	385*	437*	491*	580*	624*	670*	755*	840*	
Braking unit		External braking unit needed														
Protection class		IP20														
Cooling mode		Forced air convection cooling														

*V6-G-4T75G and V5-G-4T75G above products are equipped with external DC reactor as standard.

1.4 Product Component Name



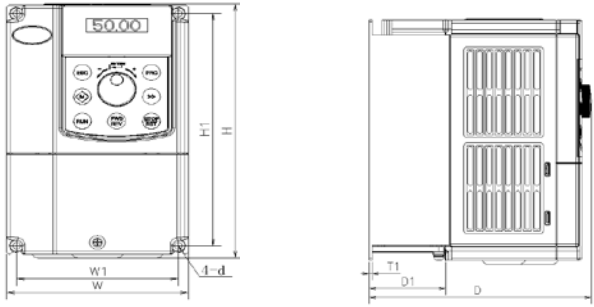


V5/V6-G-4T0.4G~ V5/V6-G-4T5.5G
V5/V5/V6-G-4T7.5G/11L and below power class

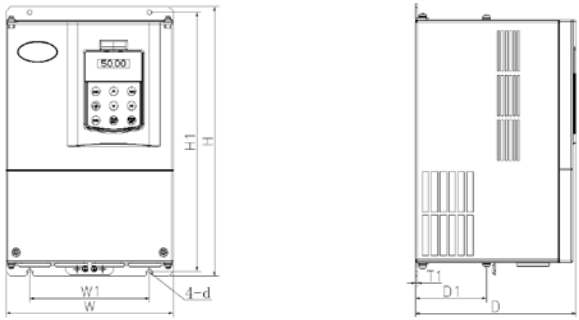
V5/V5/V6-G -4T7.5G and above power class

Fig. 1-1 Product component name

1.5 Product Outline, Mounting Dimension, and Weight



V5/V6-G-4T5.5G and below power class



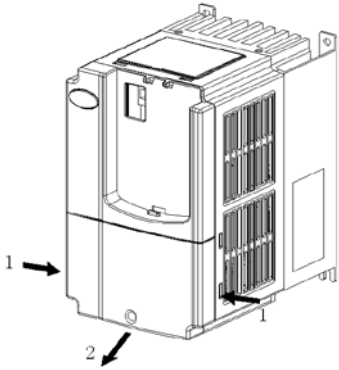
V5/V5/V6-G -4T7.5G and above power class

Fig. 1-2 Product outline and mounting dimension

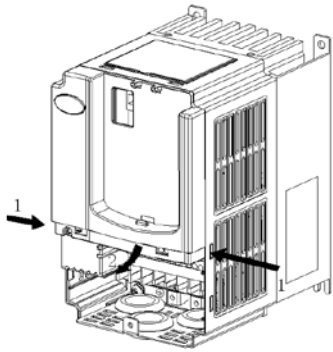
Product outline, mounting dimension, and weight

voltage	item	product outline, mounting dimension, and weight（mm）								NW（kg）
		W	H	D	W1	H1	D1	T1	Install hole d	
400V	V6/V5-G-4T0.4G	118	190	175	105	173	60.5	4	5.5	2.6
	V6/V5-G-4T0.75G									
	V6/V5-G-4T1.5G									
	V6/V5-G-4T2.2G									
	V6/V5-G-4T3.7G	155	249	185	136	232	69	8	5.5	3
	V6/V5-G-4T5.5G									
	V6/V5-G-4T7.5G	210	337	200	150	324	88	2	7	8.5
	V6/V5-G-4T11G									
	V6/V5-G-4T15G	289	440	220	200	425	88	2.5	7	17
	V6/V5-G-4T18.5G									
	V6/V5-G-4T22G									
	V6/V5-G-4T30G	319	575	218	220	553	90.5	2.5	10	25
	V6/V5-G-4T37G									
	V6/V5-G-4T45G	404	615	255	270	590	86.5	3.0	10	35
	V6/V5-G-4T55G									
	V6/V5-G-4T75G	465	745	325	343	715	151.5	3.0	12	55
	V6/V5-G-4T90G									
	V6/V5-G-4T110G	540	890	385	370	855	205.5	4.0	14	85
	V6/V5-G-4T132G									
	V6/V5-G-4T160G									
	V6/V5-G-4T185G									
	V6/V5-G-4T200G	700	1010	385	520	977	210	4.0	14	125
	V6/V5-G-4T220G									
	V6/V5-G-4T250G									
	V6/V5-G-4T280G	810	1358	425	520	1300	210	4.0	14	215
	V6/V5-G-4T315G									
	V6/V5-G-4T355G									
	V6/V5-G-4T400G									
	V6/V5-G-4T450G									

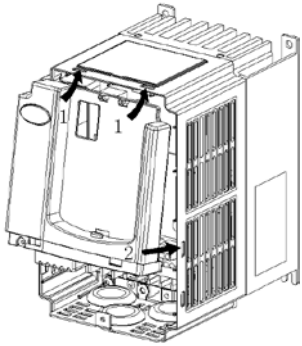
1.6 Removal and Mounting of Covers of Inverter with Plastic Enclosure



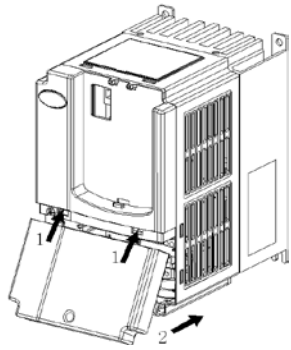
Removal of lower cover



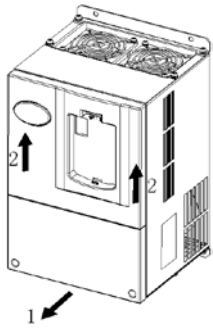
Removal of upper cover



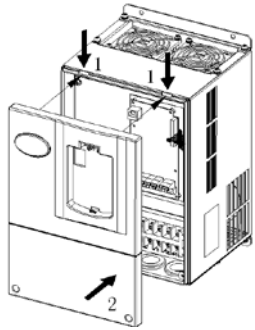
Mounting of upper cover



Mounting of lower cover

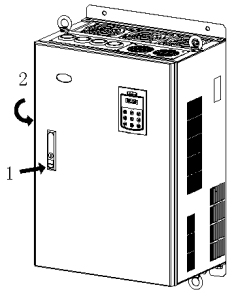


Removal of cover

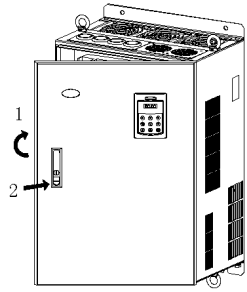


Mounting of cover

◆ Mounting of operation panel



opening the door



closing the door

1.7 Lectotype of Main Circuit Peripheral Devices

Inverter item	Brake unit	Brake unit & resistor				BRAKING TORQUE %
		Standard power	Standard resistor	Mini ultimate resistance	QTY	
V6/V5-G-4T0.4G		0.24kW	750Ω	125Ω	1	130
V6/V5-G-4T0.75G		0.45kW	400Ω	100Ω	1	125
V6/V5-G-4T1.5G		0.78kW	250Ω	100Ω	1	135
V6/V5-G-4T2.2G		1.3kW	150Ω	66.7Ω	1	135
V6/V5-G-4T3.7G		2.2kW	100Ω	66.7Ω	1	135
V6/V5-G-4T5.5G		3.3kW	75Ω	66.7Ω	1	130
V6/V5-G-4T7.5G		4.5kW	50Ω	25Ω	1	135
V6/V5-G-4T11G		6.6kW	40Ω	25Ω	1	125
V6/V5-G-4T15G		9kW	32Ω	20Ω	1	125
V6/V5-G-4T18.5G		11kW	27.2Ω	20Ω	1	125
V6/V5-G-4T22G		13kW	20Ω	14Ω	1	125
V6/V5-G-4T30G		20kW	16Ω	14Ω	1	125
V6/V5-G-4T37G		22kW	13.6Ω	10Ω	1	125
V6/V5-G-4T45G		13.5kW	20Ω	7Ω	2	135
V6/V5-G-4T55G		18kW	13.6Ω	5Ω	2	145

Chapter 2 Wiring of Inverter

2.1 Connection of the Product and Peripheral Devices

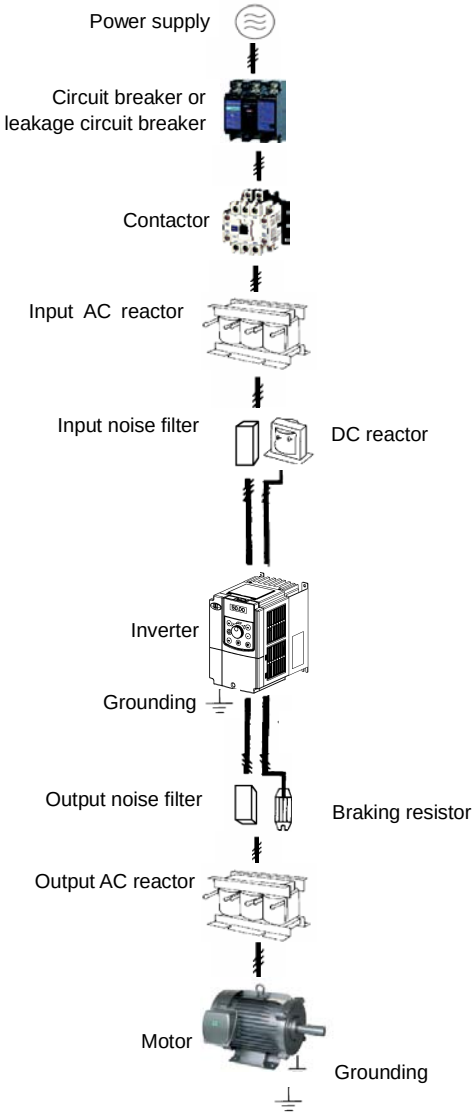


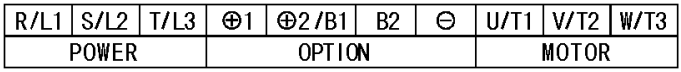
Fig.2-1 Connection diagram of the product and peripheral devices

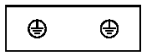
2.2 Description of Peripheral Devices for Main Circuit

Circuit breaker	The capacity of the circuit breaker shall be 1.5 ~ 2 time of the rated current of the inverter. The time features of the circuit breaker shall fully consider the time features of the inverter overload protection.
Leakage circuit breaker	Because the inverter output is the high-frequency pulse, there will be high-frequency leakage current. Special leakage circuit breaker shall be used when installing leakage circuit breaker at the input end of the inverter. It is suggested that B type leakage circuit breaker be used, and the leakage current value shall be set as 300mA.
Contactor	Frequent open and close of contactor will cause inverter failure, so the highest frequency for the open and close of contactor shall not exceed 10 times/min. When braking resistor is used, to void the overtemperature damage of the braking resistor, thermal protection relay with braking resistor overtemperature detection shall be installed to disconnect the contactor at the contact control power side of the thermal protection relay.
Input AC reactor or DC reactor	1. The inverter power supply capacity is more than 600kVA or 10 times of the inverter capacity. 2. If there is switch type reactive-load compensation capacitor or load with silicon control at the same power node, there will be high peak current flowing into input power circuit, causing the damage of the rectifier components. 3. When the voltage unbalancedness of the three-phase power supply of the inverter exceeds 3%, the rectifier component will be damaged. 4. It is required that the input power factor of the inverter shall be higher than 90%. When the above situations occur, install the AC reactor at the input end of the inverter or DC reactor to the DC reactor terminal.
Input noise filter	The noise input from the power end to the inverter and output from the inverter to the power end can be reduced.
Thermal protection relay	Although the inverter has motor overload protection function, when one inverter drives two or more motors or multi-pole motors, to prevent the motor overtemperature failure, thermal protection relay shall be installed between the inverter and each motor, and the motor overload protection parameter P9.16 shall be set as “2” (motor protection disabled).
Output noise filter	When the output end of the inverter is connected with noise filter, the conduction and radiation interference can be reduced.
Output AC reactor	When the cable connecting the inverter and the motor is longer than 100m, it is suggested to install AC output reactor to suppress the high-frequency oscillation to avoid the damage to motor insulation, large leakage current and frequent inverter protective action.

2.3 Functions of Main Circuit Terminal

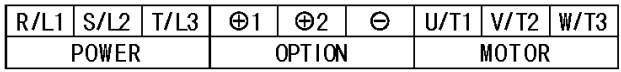
2.3.1 V5/V6-G-2T0.4G~V5/V6-G-2T11G with buit-in brake unit as standard

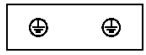




Terminal symbol	Terminal name and function description
R/L1, S/L2, T/L3	Three-phase AC input terminal
⊕1, ⊕2/B1	DC reactor connecting terminal, short circuited with copper bus upon delivery
⊕2/B1, B2	Connecting terminal of braking resistor
⊕2/B1, ⊖	DC power input terminal; DC input terminal of external braking unit
U/T1, V/T2, W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

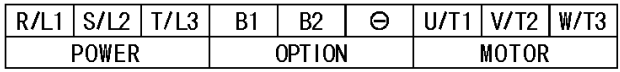
2.3．2 V5/V6-G-4T15G~V5/V6-G-4T55G/90L,without brake unit

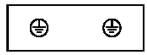




Terminal symbol	Terminal name and function description
R/L1, S/L2, T/L3	Three-phase AC input terminal
⊕1, ⊕2	DC reactor connecting terminal, short circuited with copper bus upon delivery
⊕2, ⊖	DC power input terminal; DC input terminal of external braking unit
U/T1, V/T2, W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

2.3.3 Internal Braking Unit for V5/V6-G-4T125~V5/V6-G-4T55





Terminal symbol	Terminal name and function description
R/L1, S/L2, T/L3	Three-phase AC input terminal
B1, ⊖*	DC reactor connecting termina *
B1, B2 *	Connecting terminal of braking resistor *
U/T1, V/T2, W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

2.4 Functions of Control Circuit Terminals

Type	Terminal symbol	Terminal function description	Technical specification
Terminal 485	485+	Positive end of 485 differential signal	Rate: 4800/9600/19200/38400/57600bps Up to 32 sets of equipment can be paralleled. Relay shall be used if the number exceeds 32. Maximum distance: 500m (adopt standard twisted shielding cable)
	485-	Negative end of 485 differential signal	
	GND	Shielding grounding of 485 communication	Internal isolated with COM
Operation panel 485	CN7	485 port of operation panel	When used for communication connection with host computer, it is the same as terminal 485.
			The maximum distance is 15m for the communication connection of operation panel (adopt standard twisted non-shielding network cable)
Digital input	+24V	+24V	24V±10%, internal isolated with GND, Maximum load: 200mA, with overload and short circuit protection
	PLC	Common end of multi-functional input terminal	Short circuited with +24V upon delivery
	X1~X6	Multi-functional input terminals 1 ~ 6	Input specification: 24VDC,5mA Frequency range: 0~200Hz Voltage range: 24V±20%
	X7/DI	Multi-functional input or pulse input	Multi-functional input: same as X1~X6 Pulse input: 0.1Hz~50kHz; voltage range: 24V±20%
	COM	+24V grounding	Internal isolated with GND
	RA/RB/RC	Replay output	RA-RB: normally closed , RA-RC: normally open Contact capacity: 250VAC/1A, 30VDC/1A
Digital output	Y1	Open collector output	Voltage range: 24V±20%, maximum input current: 50mA
	Y2/DO	Open collector or pulse output	Open collector: Same as Y1 Pulse output: 0~50kHz; voltage range: 24V±20%
	COM	Open collector output common end	Internal isolated with GND
Analog input	+10V	Analog input reference voltage	10V ±3%, internal isolated with COM, Maximum output current: 10mA, with short circuit and overload protection
	AI1	Analog input channel 1	0~20mA: Input impedance 500Ω, maximum input current: 30mA 0~10V: Input impedance 20kΩ, maximum input voltage : 15V Resolution: 12 bits (0.025%) 0~20mA or 0~10V analog input can be selected through jumper.
	AI2	Analog input channel 2	Same as AI1
	AI3	Analog input channel 3	-10V~10V: Input impedance 20kΩ Resolution: 12 bits (0.025%) Maximum input voltage: ±15V

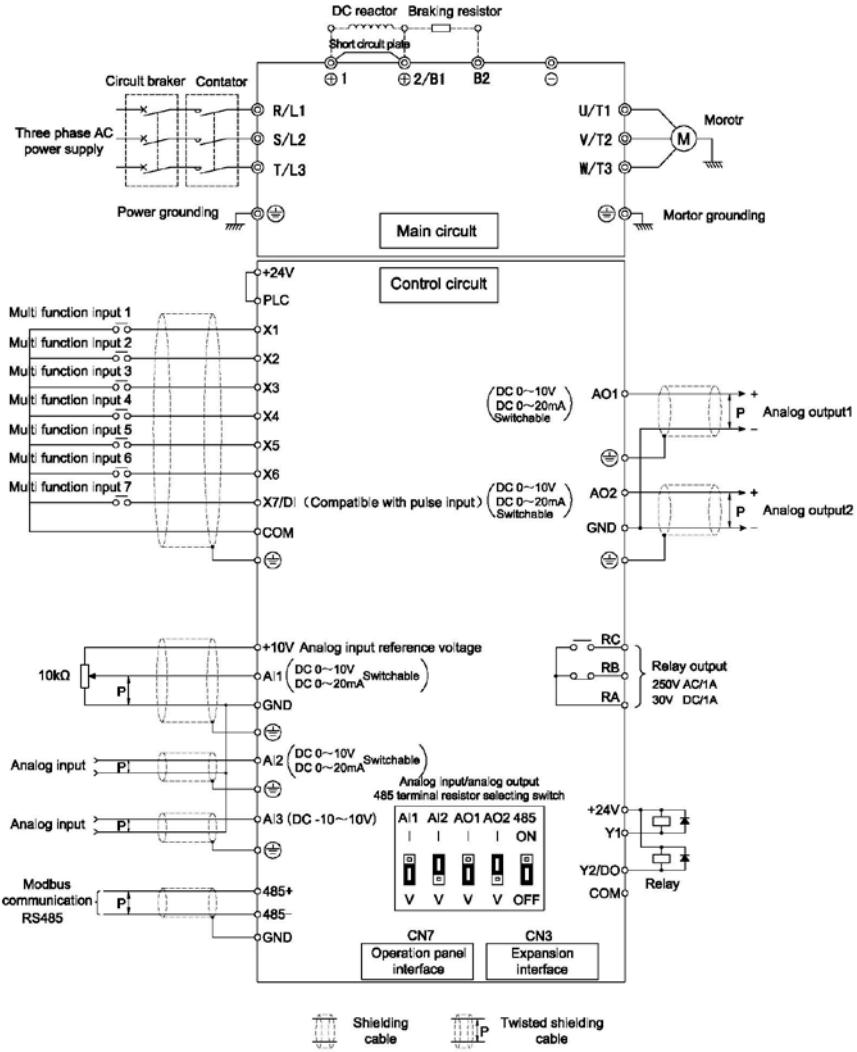
Type	Terminal symbol	Terminal function description	Technical specification
	GND	Analog grounding	Internal isolated with COM
Analog output	AO1	Analog output 1	0~20mA: allowable output impedance 200~500Ω 0~10V: allowable output impedance ≥10kΩ Output precision: 2%, resolution: 10 bits (0.1%) with short circuit protection function, 0~20mA or 0~10V analog output can be selected through jumper.
	AO2	Analog output 2	Same as AO1
	GND	Analog grounding	Internal isolated with COM
Relay output	RA/RB/RC	Relay output	RA-RB: Normally closed RA-RC: Normally open Contact capacity: 250VAC/1A, 30VDC/1A

Note: * If the user connects adjustable potentiometer between +10V and GND, the resistance of the potentiometer shall be no less than 5kΩ,

Note:

1. The arrangement sequence of the control circuit terminals is as follows:

2.5 Wiring diagram



Chapter 3 Using Instructions of Operation Panel

3.1 Introduction to Operation Panel

Shuttle type operation panel (V6-DP01) Key-type operation panel (V6-DP02)

Fig. 4-1 Display unit of operation panel

3.2 Descriptions of Indicators

Symbol of Indicator		Name	Meanings	Color
Unit indicator	Hz	Frequency indicator	On: Current display parameter is running frequency Flash: Current display parameter is setting frequency	Green
	A	Current indicator	On: Current display parameter is current	Green
	V	Voltage indicator	On: Current display parameter is voltage	Green
	Hz+A	Rotating speed indicator	On: Current display parameter is rotating speed Flash: Current display parameter is setting rotating speed	Green
	Hz+V	% indicator	On: Current display parameter is %	Green
	A+V	Self definable indicator	On/Flash: Current display parameter is self-defined, see description of P2 group.	Green
	Hz+A+V	Time indicator	On: Current display parameter is time	Green
		No unit indicator	Off: Current display parameter is no unit	-
Status indicator	MULTI	Multi-function key indicator	Refer to table 4-1 for using method of multi function keys and the meanings of MULTI indicator	Red
	MON	Running command reference mode indicator	On: Running command is given via operation panel Off: Running command is given via terminals Flash: Running command is given via host computer	Red
	RUN	Running status indicator	On: Inverter is running Off: Inverter has stopped Flash: Inverter is stopping	Red
	FWD	Run forward indicator	On: In stop status, inverter has run forward command; In running status, inverter is running forward Flash: Changing from running forward to running reverse	Red
	REV	Run reverse indicator	On: In stop status, inverter has run reverse command; In running status, inverter is running reverse Flash: Changing from running reverse to running forward	Red

3.3 Description of Keys on Operation Panel

Symbol		Name	Function
Key-type	Shuttle-type		
		Programming key PRG	1、 Enter each level of menu 2、 Confirm data storage 3、 Check function code in sequence 4、 Confirm the running command reference mode with M key
		Escape Key ESC	1、 Back to first level menu from second level menu; Back from first level menu to standby status, running status, and fault status 2、 Give up data storage after modifying data. 3、 Back to basic menu mode after pressing this key for more than 5s. Refer to 4.4.3. When LCD cannot display all the function codes, use this method to re-display all the function codes. 4、 After using >> key to switch from fault display to Stop / Run parameter display, press ESC to back to fault display status.
	Knob+ 	Increase Key ∧	1、 In first level menu, increase function code according to edit bit. 2、 In second level menu, increase the function code data. 3、 In stop/run status, increase the input frequency or close loop input.
	Knob-	Decrease Key ∨	1、 In first level menu, decrease function code according to edit bit. 2、 In second level menu, decrease the function code data. 3、 In stop/run status, decrease the input frequency or close loop input.
		Shift Key >>	1、 In first level menu, use >> key to move edit bit of PX.YZ menu 2、 In second level menu, use >> key to move the edit bit of data 3、 In stop/run status, switch the panel display parameters such as frequency, current and voltage. 4、 In fault status, change from fault display to stop/run display.
		Run Key RUN	1、 When running command is given via operation panel, the key is used to control the start of inverter. 2、 After setting the parameter auto tuning,start parameter auto tuning for inverter startup
		Stop/Reset Key STOP/RST	1、 When running command is given via operation panel, the key is used to control the stop of inverter. 2、 This key is used as a stop key when inverter only has fault alarm but does not stop. 3、 When the inverter has fault and has stopped, this key is used as RESET key to clear the fault alarm.
		Multi-function Key M	See table 4-1 for the using method of multi-function key and the meanings of MULTI indicator.
		Forward/reverse Key FWD/REV	When running command is given via operation panel, this key is used to confirm the output direction of inverter

Note:

- The ENTER key of shuttle type operation panel is equivalent to PRG Key.
- Using PRG key continuously can realize fast browse of all function codes.

Table 3-1 Method of using multi-function key and meanings of MULTI indicator

Definition of M key (P2.01)	Function	Meanings of function	Meanings of MULTI indicator
0	No function	Multi-function key is defined as no function.	Normally Off: No function
1	JOG	Used as JOG operation key and is only enabled when running command is given via operation panel. In stop status, press M key to enter jog operation status, and release this key to stop.	On: Press M Off: Release M to finish the jog operation
2	Emergent stop 1 (Stop in shortest time)	Press M key, inverter will stop in shortest time.	On: Press M Off: Release M
3	Emergent stop 2 (Coast to stop)	Press M key, inverter will coast to stop	On: Press M Off: Release M
4	Switch the reference method of running command	Press M key to switch the reference method of giving running command: Via operation panel→Via terminal→Via host computer→Via operation panel. During switching time, there is a 5-second response time limit and the change is cancelled automatically after 5-second time is exceeded. Within 5s, press PRG key to confirm the change. MON indicator indicates the method of giving the running command.	On: Press M Off: M key has been released for more than 5s or PRG key has been used to confirm the changing of the method of giving running command
5	Switching between FASt/base menus	Press M key to switch between FASt and bASE menus, operation panel should prompt as FASt and bASE	On: FASt fast menu mode Off: bASE basic menu mode
6	ndFt/bASE menu switching	Press M key to switch between ndFt and base menus,the indications on the operation panel are ndFt and base respectively.	On: ndFt – non-leave-factory value menu mode Off: bASE- basic menu mode
7	LASt/bASE menu switching	Press M key to switch between LASt and bASE menus,the indications on the operation panel are LASt and bASE respectively.	On: LASt- last change menu mode Off: bASE- basic menu mode
8	Menu mode switching	bASE→FASt→ndFt→LASt→bASE	On: non-bASE basic menu mode Off: bASE- basic menu mode

3.4 Menu Style

The menu style is 2-level menu.

3.4.1 Format of First Level Menu

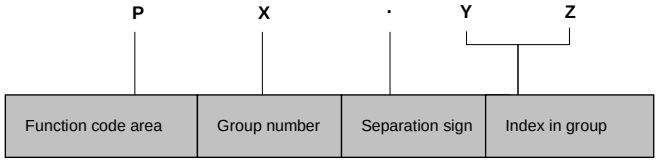


Fig. 4-2 Format of first level menu

◆ Dividing the first level menu

Password action area	Function code area	Group number in area	Function code range
Protection area of user password P0.00	User operation area (P area)	P0 group	P0.00 ~ P0.16
		P1 group	P1.00 ~ P1.08
		P2 group	P2.00 ~ P2.07
		P3 group	P3.00 ~ P3.13
		P4 group	P4.00 ~ P4.36
		P5 group	P5.00 ~ P5.13
		P6 group	P6.00 ~ P6.24
		P7 group	P7.00 ~ P7.25
		P8 group	P8.00 ~ P8.10
		P9 group	P9.00 ~ P9.18
		PA group	PA.00 ~ PA.22
		Pb group	Pb.00 ~ Pb.23
		PC group	PC.00 ~ PC.06
		Pd group	Pd.00 ~ Pd.36
		PE group	Reserved
	Equipment status area (d area)	d0 group	d0.00 ~ d0.11
		d1 group	d1.00 ~ d1.11
		d2 group	d2.00 ~ d2.24
A0.00 protection area	Function code display/hidden area defined by user (A area)	A0 group	A0.00 ~ A0.02
C0.00 reserved area	Reserved (C area)	Reserved parameter area	Reserved
U0.00 reserved area	Reserved (U0 area)	Reserved parameter area	Reserved
U1.00 reserved area	Reserved (U1 area)	Reserved parameter area	Reserved

◆ Structure of first level menu

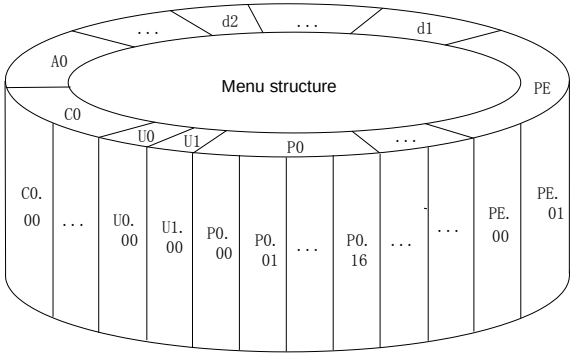


Fig. 4-3 Structure of first level menu

3.4.2 Format of Second Level Menu

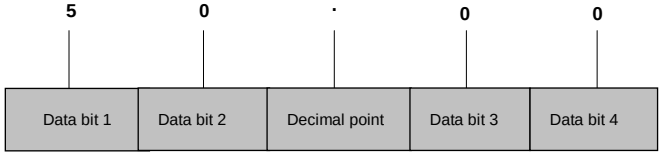


Fig. 4-4 Format of second level menu

◆ Format of display/set for second level menu

Display/set decimal

From data bit 1 to 4, the characters of 0, 1……9 can be displayed or set.

When displayed data >9999, the last bit will be omitted:

For example: When data is 12345, operation panel displays “1234”.

When data is 1234.5, operation panel displays “1234”.

When data is 123.45, operation panel displays “123.4”.

When data is 12.345, operation panel displays “12.34”.

Display/set hex code:

From data bit 1 to 4, the characters of 0, 1……9, A, B, C, D, E and F can be displayed or set.

◆ Meanings of 0. 0. 0. 0. displayed in second level menu

After entering second level menu, besides the displayed data, there are also 4 dots, this means the password protection and you need to enter the password. The function codes that needs password input are P0.00, PE.00, A0.00, C0.00, U0.00 and U1.00. PE area, C area, U0 area and U1 area are factory reserved parameter area.

3.4.3 Menu Mode

Menu mode setting (P0.02)	Menu mode name	Visible function code range	Operation panel display
0	Basic menu	See 5.1 for the table of basic menu function code parameter	bASE
1	Fast menu	Quickly display the menu function codes in common use	FASt
2	Non-leave-factory value function code menu	Only display the function codes different from the leave-factory values	ndFt
3	Menu of last changed 10 function codes	Display the last changed 10 function codes and P0.02	LASt

◆ Basic menu bASE

Basic menu includes all the function codes mentioned in this user manual. Except for the special descriptions, all the descriptions of this manual are in this menu mode. See 5.1 for the table of basic menu function code parameter.

◆ Fast menu FASt

Fast menu includes some common function codes and you can start the inverter by setting only a few function codes so as to realize the fast application. See 5.2 for the table of fast menu function code parameter.

◆ Non-leave-factory value function code menu ndFt

This menu mode is used to search for the function codes different from the leave-factory values for the convenience of understanding the parameter setting.

◆ Menu of last changed 10 function codes LASt

If this menu mode is set, it enters password protection status. Only P0.00 and C0.00 can be viewed. The recently changed function codes, P0.00 and P0.02 can be viewed only when correct password is entered into P0.00.

◆ Method of back to basic menu

1. By editing the function code: Set P0.02=0, then the menu returns to basic menu mode after bASE is displayed.
2. By using M key: Define the function of multi-function key M as menu switching function, then press this key to switch the menu mode. Refer to table 4-1 for the using method of multi-function key and the meanings of MULTI indicator.
3. By pressing ESC for a long time: Press ESC and do not release it for more than 5s, then the menu returns to basic menu mode after bASE is displayed. If bASE is not displayed, this means the menu is already in basic menu mode.

3.4.4 Common Characters Displayed by LED

Except the function codes in first and second level menus, the operation panel will also display the following characters as shown in the following table:

Prompt symbol	Meaning	Prompt symbol	Meaning
8.8.8.8.	Instantaneous display of inverter when inverter is powered on	LoAd	Inverter parameters are being copied and this symbol will be displayed when parameters are uploaded to operation panel. For example, set Pb.23=1
-LU-	Inverter power off under voltage	Loc1	Operation panel is locked and the keys are disabled
-dc-	Inverter is in DC braking status	Loc2	Except M key, other keys are locked
-At-	Inverter is in auto tuning	Loc3	Except RUN and STOP/RST keys, other keys are locked
bASE	Basic menu (P0.02=0)	ndFt	Non factory setting of function code (P0.02=2)
CoPy	Inverter parameters are being downloaded and this symbol will be displayed when parameters are downloaded to inverter. For example, set Pb.23=2 or 3	P.CLr	Password is cleared, see 4.5 for password operation
dEFt	Restore to factory settings (P0.01=2 to 5)	P.SEt	Password is set successfully, see 4.5 for password operation
E.XXX	E. means fault or alarm happens. Analysis the fault or alarm according to the fault or alarm list in 7.1	Prot	Password protection is enabled, see 4.6 for key locking and unlocking
FASt	Fast menu (P0.02=1)	SLId	Operation panel is identified as shuttle type
HoLd	The parameter copy or upload function of operation panel is disabled	ULoc	Press ESC+>>+V together to unlock the panel
LASt	10 function codes modified recently (P0.02=3)	UpDn	Operation panel is identified as key type.
LInE	Communication of operation panel fails		

If the symbol is not listed in the table, please contact the local distributor or our company directly.

3.4.5 Identify Symbols Displayed Via LED

The relationship between characters displayed by LED and characters/numbers are as follows:

LED display	Meanings of characters	LED display	Meanings of characters	LED display	Meanings of characters	LED display	Meanings of characters
	0		A		I		S
	1		b		J		T
	2		C		L		t
	3		c		N		U
	4		d		n		V
	5		E		O		y
	6		F		o		-
	7		G		P		8.
	8		H		q		.
	9		h		r		

3.5 Password Operation

- **Set Password**

  Enter password function code and set to the identical parameters for two times continuously. After “P.Set” is displayed, the password setting is successful. See 4.8.3 for password setting.

- **Password Verification**

  Enter password function code, enter password correctly and you can see the parameters protected by password. See 4.8.4 descriptions of password verification.

- **Clear Password**

  After passing password verification, enter password function code, set 0000 continuously for two times, ”P. CLr” is displayed, this means the password is successfully cleared. From now on, you need not enter password for access the password protection area. See 4.8.5 descriptions of clearing password.

- **Method of Enabling Password**

  One of following three modes can be selected:

  1. Press ESC+PRG +Λ at the same time (for shuttle type, turning close wise is equivalent to the Λ key) to display “Prot”. If key locking function is enabled, “Loc1” (P2.00=1) or

"Loc2"(P2.00=2) or "Loc3"(P2.00=3) is displayed.

2. No key operation for continuous 5 minutes.
3. Power on again

3.6 Lock/Unlock Keys

- Lock Keys
  - Set the function of locking keys

Select the P2.00 key locking functions:

0: Do not lock the keys on the operation panel and all the keys can be used;

1: Lock the keys on the operation panel and all the keys cannot be used;

2: Except multi-function key M, all the keys cannot be used;

3: Except RUN and STOP/RST keys, all the keys cannot be used.

- Key Locking Function is Enabled

One of following three modes can be selected:

1. Press ESC+PRG +∧ at the same time (for shuttle type, turning close wise is equivalent to the ∧ key) to display "Loc1" (P2.00=1) or "Loc2"(P2.00=2) or "Loc3"(P2.00=3), the operation panel is locked according to the setting method of P2.00. When P2.00=0, "Prot" is displayed and the operation panel is not locked and only the password protection is enabled.
2. Power on the inverter again to lock the operation panel.
3. If there is no key operation within 5 minutes after setting the function code, the operation panel is locked automatically.

- Unlock Keys:

Press ESC+>>+∨ keys at the same time (for shuttle type, turning anti-close wise is equivalent to ∨ key) to unlock.

3.7 Operation Panel Display and Key Operation

3.7.1 Classification of Display Status

There are 8 types of display status of operation panel:

SN	Status	Meaning
1	Display status of stopping parameters	Press >> key to switch the displayed parameters, P2.03 can be used to set the displayed parameters.
2	Display status of running parameters	Press >> key to switch the displayed parameters, P2.02 can be used to set the displayed parameters.
3	Display status of fault and alarm	In other 7 kinds of display status, if there is any fault happens, directly enter this status.
4	Display status of first level menu	When the keys are not locked, in status of SN1, SN2, SN3 and SN7, press PRG to enter.
5	Display status of second level menu	In the display status of first level menu, press PRG to enter.
6	Password verification status	If password protection is enabled, press PRG to enter in the display status of first level menu.
7	Password modification status	In the display status of stopping and running parameters, press ∧ and ∨ to enter.
8	Information prompt status	See 4.4.5 for identifying the LED display characters.

3.7.2 Display Status and Operation Process

◆ >> key

In the display status of first level menu, press >> key to select the edit bit of function code PX.YZ.

In second level menu or password verification status, press >> key to select the data edit bit.

◆ Auto switch between status

If no key is operated for 30s, the screen automatically returns to the display status of stopping parameters, or the display status of running parameters.

If no key is operated for 1 minute, clear menu edit status of PX.YZ to return to P0.00.

If there is password setting or key locking setting, if no key is operated for 5 minutes, enter password protection or operation panel locking status automatically.

◆ Display Status and Operation Procedure

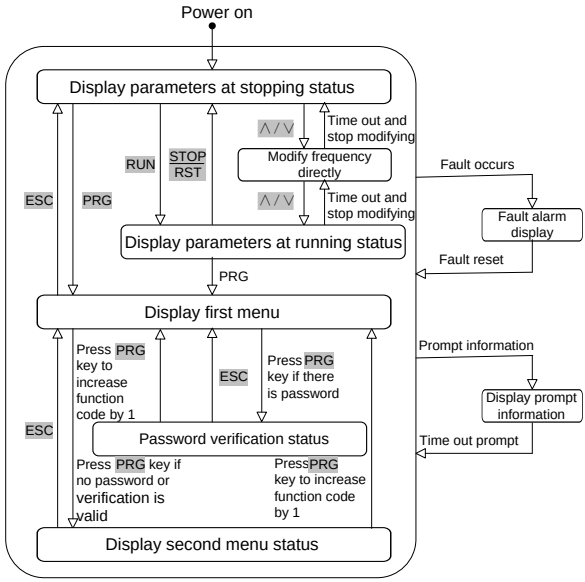


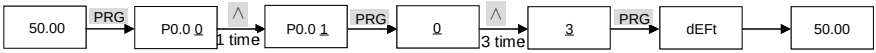
Fig. 4-5 Display status and operation procedure

3.8 Operation Example

In following example, the displayed parameters at stopping status is reference frequency, the factory setting is 50.00Hz. The underscored line in the figure means the bit that is being edited.

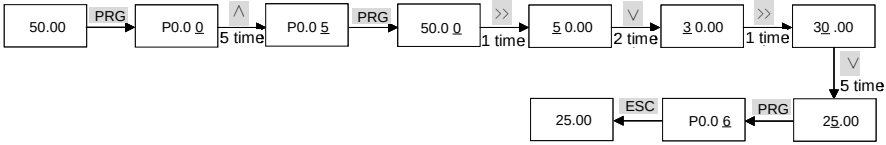
3.8.1 Restore Factory Setting

For example, setting P0.01=3: Restore all the parameters in P area to factory settings except the motor parameters (F9 group).



3.8.2 Setting Frequency

For example, setting P0.05=25.00Hz.



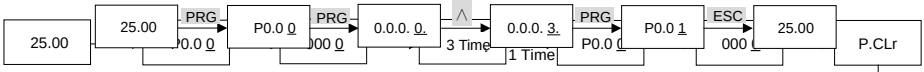
3.8.3 Setting Password

For example, setting user password P0.00 to 0003.

3.8.4 Password Verification

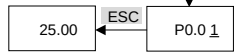
Assume that the function codes after P0.00 are protected by password and the password is 3. If the password protection is not enabled, you can press ESC+PRG+∧ to enable the password in last example of P0.00. You can perform the password verification according to the following process:

Note: If you use RS 485 communication mode to perform password verification, please refer to the Appendix A. The description of register 0xF000 in Modbus communication protocol.



3.8.5 Clear Password

For example, clear the user password P0.00.



3.

3.8.6 Monitoring parameters

1 running, stop the display parameters

In operation, shutdown state, the default display 4 parameters, parameter passing >> key switch.

In the running of the state, need to monitor the parameters can be selected through P2.02, a bit, ten, one hundred, one thousand select a parameter to monitor each of four parameters for monitoring, you can >> key switch.

Bits, ten, one hundred, one thousand every one can choose 0 ~ F, 0 ~ F represents 16 can be monitored parameters:

0: reference frequency（Hz）;	1：BUS voltage （V）;	2：AI1 （V）;	3：AI2 （V）;
4：AI3 （V）;	5：DI （%）;	6：external count;	7 ： motor rotate speed(rpm);
8：close reference （%）;	9：close loop feedback（%）;	A：reference torque （%）;	B ： running frequency （Hz）;
C：output current （A）;	D：output torque （%）;	E：output power （kW）;	F：output voltage （V）;

In shutdown mode, parameter monitoring required by P2.03 be selected bits, ten, one hundred, one thousand select a parameter to monitor each of four parameters for monitoring, you can >> key switch.

Bits, ten, one hundred, one thousand every one can choose 0 ~ F, 0 ~ F represents 16 can be monitored parameters:

0: reference frequency（Hz）;	1：BUS voltage （V）;	2：AI1 （V）;	3：AI2 （V）;
4：AI3 （V）;	5：DI （%）;	6：external count;	7 ： motor rotate speed(rpm);
8：close reference （%）;	9：close loop feedback（%）;	A：reference torque （%）;	B～F：reserved;

2 Monitoring of other parameters

d2.00: heat sink temperature

d2.09: X terminal input status display, 0 for off, 1 for close to 16 hexadecimalcombination, the lowest bit indicates X1.

Chapter 4 Special inverter for crane application parameters lists

Meaning of each item in function code parameterTable:

Item	meaning
Function code number	The number of function code, such as P0.00
Function code name	The number of function code, which explians the function code’s meaning
Factory setting	Restore the setting of the function code after the product is delivered(see P0.01)
Setting arange	The value from minimum value to maximun value that can be set to thid function code
Unit	V: Voltage; A: Current; °C: Celsius degree; Ω: Ohm; mH: Milli-henry; rpm: Rotating speed; %: Percentage; bps: baud rate; Hz, kHz: Frequency; ms, s, min, h, kh: Time; kW: Power; /: No unit
Property	○: This function code can be changed during operation; ×: This function code can only be changed during stopping status; *: The setting of this function code is read-only and cannot be changed.
Function code selection	Function code parameter setting list

4.1 list of function code

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
Basic parameters of torque vector control						
P0.00	User password	0000	0～FFFF	/	○	0000: No password; Other: Password protection
P0.01	Function code protection	0	0～5	/	×	0: All the parameters can be modified; 1: All the parameters cannot be modified; 2: Restore parameters in zone P to factory settings; 3: Restore parameters in zone P to factory settings; (except for P9 group) 4: Recover the parameters in zone P and zone A to factory settings; 5: Recover all the parameters to factory settings. (except for d group)

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
P0.02	Function code display	0	0～3	/	○	0: Basic menu mode 1: Fast menu mode 2: Menu mode of non-leave-factory setting value function codes; 3: Menu mode of last changed 10 function codes;
P0.03	encoder installation option	0	0～8	/	×	0: Do not install the encoder, open-loop torque vector control; 8: Install the encoder, closed-loop torque control(V6-G effectively);
P0.04	Remote Control Speed reference mode	0	0～4	/	○	Remote control is effective, ie P0.06 ≠ 0 0: Multi-speed (d2.03,H0.00 ~ H0.14); 1: AI1 analog; 2: AI2 analog; 3: AI3 analog;
P0.05	Digital reference of Operation panel control speed	10.00	0.00～300.00	Hz	○	Panel available,P0.06=0
P0.06	Start/stop mode selection	1	0～2	/	○	0: Operation panel; 1: Terminal; 2: Host computer
P0.07	Operation panel running direction	0	0～1	/	○	Panel available, P0.06=0 0: Run forward; 1: Run reverse
P0.11	Maximum output frequency	50.00	0.01～300.00	Hz	×	Frequency upper P0.13～300.00Hz
P0.12	Maximum output voltage	380	1～480	V	×	1～480V
P0.13	Frequency upper	50.00	0.00～300.00	Hz	×	Lower frequency limit P0.14 ~ Maximum output frequency P0.11
P0.15	Basic operating frequency	50.00	0.00～300.00	Hz	×	0.00Hz ~ Maximum output frequency P0.11
Torque vector control ADVANCED PARAMETERS						
P1.00	Brake unit operating voltage	720	650～750	V	×	650～750V
P1.01	Torque build ready frequency	0.50	0.50～60.00	Hz	×	
P1.02	Torque build prepare time	0.5	0.0～3600.0	s	○	
P1.03	Torque cancel delay time	2.0	0.0～3600.0	s	○	

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
P1.04	Torque build working time	40.0	0.0～130.0	%	×	
P1.05	Torque protection limit values (without encoder)	200.0	20.0～200.0	%	×	P0.03 = 0 is valid without encode
P1.06	Slip switching frequency	40.00	0.00～300.00	Hz	○	
P1.07	Low Slip compensation	100.0	0.0～300.0	%	○	
P1.08	High-speed slip compensation	100.0	0.0～300.0	%	○	
Key and display parameters						
P2.00	Key-lock function selection	0	0～3	/	○	0: No locking; 1: Locking all keys; 2: Locking all keys except MULTI key; 3: Locking all keys except RUN and STOP/RST keys
P2.02	Display parameter selection at running	1CB0	0～FFFF	/	○	LED ones place: 0: Reference frequency (Hz); 1: Bus voltage (V); 2: AI1(V); 3: AI2(V); 4: AI3(V); 5~6: reserve 7: Motor rotation speed (rpm); 8~9: reserve A: Reference torque (%); B: Running frequency (Hz); C: Output current (A); D: Output torque (%); E: Output power (kW); F: Output voltage (V); LED tens, hundreds, thousands place: Same with above
P2.03	Display parameter selection at stopping	3210	0～FFFF	/	○	LED ones place: 0: Reference frequency (Hz); 1: Bus voltage (V); 2: AI1(V); 3: AI2(V); 4: AI3(V); 5~F: Reserved; LED tens, hundreds, thousands place: Same with above
Multi-functional Input Parameter						
P5.00	X1terminal input function selection	99	0～99	/	×	Refer to definition of multi function input terminal
P5.01	X2terminal input function	99	0～99	/	×	

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
	selection					
P5.02	X3terminal input function selection	99	0～99	/	×	
P5.03	X4terminal input function selection	99	0～99	/	×	
P5.04	X5terminal input function selection	99	0～99	/	×	
P5.05	X6terminal input function selection	99	0～99	/	×	
P5.06	X7terminal input function selection	99	0～99	/	×	
P5.07	X1~X7 terminal filtering time	0.050	0.000～1.000	/	×	
Multi-functional Output Parameter						
P7.00	Y1terminal output function selection	14	0～47	/	○	Refer to definition of multi function input terminal
P7.01	Y2/DOterminal output function selection	33	0～71	/	○	
P7.02	Relay terminal output function selection	32	0～47	/	○	
P7.03	AO1terminal output function selection	48	48～71	/	○	
P7.04	AO2terminal output function selection	49	48～71	/	○	
Motor parameters						
P9.01	Number of motor poles	4	2～128	/	×	2～128
P9.02	Rated speed	1500	0～30000	rpm	×	0～30000rpm
P9.03	Rated power	11.0	0.4～999.9	kW	×	0.4～999.9kW
P9.04	Rated current	21.7	0.1～999.9	A	×	0.1～999.9A
P9.05	Zero load current I0	8.4	0.1～999.9	A	×	0.1～999.9A
P9.06	Stator resistance R1	0.407	0.000～65.000	Ω	×	0.000～65.000Ω
P9.07	Stator leakage inductance L1	2.6	0.0～2000.0	mH	×	0.0～2000.0mH
P9.08	Rotor resistance R2	0.219	0.000～65.000	Ω	×	0.000～65.000Ω
P9.09	Mutual inductance L2	77.4	0.0～2000.0	mH	×	0.0～2000.0mH
P9.10	Magnetic saturation1	87.00	0.00～100.00	%	×	0.0～100.00%
P9.11	Magnetic saturation2	80.00	0.00～100.00	%	×	0.0～100.00%
P9.12	Magnetic saturation3	75.00	0.00～100.00	%	×	0.0～100.00%

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
P9.13	Magnetic saturation4	72.00	0.00～100.00	%	×	0.0～100.00%
P9.14	Magnetic saturation5	70.00	0.00～100.00	%	×	0.0～100.00%
P9.15	Parameter auto tuning	0	0～2	/	×	0: No action; 1: Static auto tuning; 2: Rotating auto tuning
Communication Parameters						
PC.00	Communication baud rate	8	4～8	bps	○	4;4800 bps; 5;9600 bps; 6;19200 bps; 7;38400 bps; 8;57600 bps;
PC.01	Data format	0	0～2	/	○	0;1-8-1 format, no parity 1;1-8-1 format, even parity 2;1-8-1 format, odd parity
PC.02	Local address	1	1～247	/	○	1～247, 0 is broadcasting address
PC.03	0x06 and 0x10 command write RAM selection	303	000～FFF	/	○	303;communication Write RAM; F0F;communication Write EEPROM;
Closed-loop torque control parameters						
Pd.01	Speed loop proportional gain1(ASR_P1)	3.00	0.000～30.00	/	○	
Pd.02	Speed loop integral time1(ASR_I1)	0.200	0.000～6.000	s	○	0.000～6.000s
Pd.03	Speed loop proportional gain2(ASR_P2)	3.00	0.000～30.00	/	○	
Pd.04	Speed loop integral time2(ASR_I2)	0.200	0.000～6.000	s	○	0.000～6.000s
Pd.05	ASR switching frequency	5.00	0.00～300.00	Hz	○	0.00～frequency upperP0.13
Pd.08	Drive torque limit	180.0	0.0～200.0	%	○	Constant torque;0.0～200.0%;
Pd.09	Braking torque limit	180.0	0.0～200.0	%	○	Constant torque;0.0～200.0%;
Pd.15	Current loop scale coefficient (ACR_P)	1000	0～2000	/	○	0～2000
Pd.16	Current loop integral coefficient (ACR_I)	1000	0～6000	/	○	0～6000
Pd.19	ASR input filtering time	0.5	0.0～500.0	ms	○	0.0～500.0ms
Pd.20	ASR output filtering time	0.5	0.0～500.0	ms	○	0.0～500.0ms
Pd.21	Number of pulses per turn for encoder	1024	1～9999	/	×	1~9999 个 pulses/turn
Multi-speed parameters						
d2.03	0step speed	100.00	0～100.00	%	○	0～100.00means 0～P0.11MAX. frequency
H0.00	1step-speed	5.00	0～300.00	Hz	○	0～300.00

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
H0.01	2step speed	8.00	0～300.00	Hz	○	0～300.00
H0.02	3step speed	10.00	0～300.00	Hz	○	0～300.00
H0.03	4step speed	15.00	0～300.00	Hz	○	0～300.00
H0.04	5step speed	18.00	0～300.00	Hz	○	0～300.00
H0.05	6step speed	20.00	0～300.00	Hz	○	0～300.00
H0.06	7step speed	25.00	0～300.00	Hz	○	0～300.00
H0.07	8step speed	28.00	0～300.00	Hz	○	0～300.00
H0.08	9step speed	30.00	0～300.00	Hz	○	0～300.00
H0.09	10step speed	35.00	0～300.00	Hz	○	0～300.00
H0.10	11step speed	38.00	0～300.00	Hz	○	0～300.00
H0.11	12step speed	40.00	0～300.00	Hz	○	0～300.00
H0.12	13step speed	45.00	0～300.00	Hz	○	0～300.00
H0.13	14step speed	48.00	0～300.00	Hz	○	0～300.00
H0.14	15step speed	50.00	0～300.00	Hz	○	0～300.00
Acceleration and deceleration time parameters						
H0.16	Forward acceleration time	8.0	0.0～3600.0	s	○	0～3600.0s
H0.17	Forward deceleration time	8.0	0.0～3600.0	s	○	0～3600.0s
H0.18	Reverse Acceleration time	8.0	0.0～3600.0	s	○	0～3600.0s
H0.19	Reverse Deceleration time	8.0	0.0～3600.0	s	○	0～3600.0s
Brake control parameters						
H0.20	Forward brake release speed limit	3.00	0.00～300.00	Hz	○	speed limit before releasing the brake
H0.21	Forward brake release Torque current limit	10.0	0.0~200.0	%	○	It is valid (closed-loop with encoder)
H0.22	Forward brake release torque current limit	30.0	0.0~200.0	%	○	It is valid (open-loop with encoder)
H0.23	Reverse brake release speed limit	3.00	0.00～300.00	Hz	○	speed limit before releasing the brake
H0.24	Reverse brake release torque current limit	0.0	0.0~200.0	%	○	It is valid (closed-loop with encoder)
H0.25	Reverse brake release torque current limit	30.0	0.0~200.0	%	○	It is valid (open-loop with encoder)
H0.26	Brake release delay 1	0.0	0.0~3600.0	s	○	
H0.27	Brake release delay 2	0.1	0.0~3600.0	s	○	
H0.28	Brake release delay 3	0.0	0.0~3600.0	s	○	
H0.29	Open loop closed loop brake control sequence selection	0100	0000～1111	/	○	0000;with encoder control; 0100;without encoder control;
H0.34	Torque calibration fault detection time	3.0	0.0～30.0	s	○	

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
H0.35	Amount of torque force 1	4.0	0.0～30.0	%	○	
H0.36	Amount of torque force 2	3.0	0.0～30.0	%	○	
H1.00	Enable the brake feedback	0000	0000～1111	/	○	
H1.01	Forward Brake engage frequency	3.00	0.00～300.00	Hz	○	0.00～300.00Hz
H1.02	Reverse Brake engage frequency	3.00	0.00～300.00	Hz	○	0.00～300.00Hz
H1.03	Brake engage delay1	0.0	0.0~3600.0	s	○	
H1.04	Brake engage delay 2	0.3	0.0~3600.0	s	○	
H1.05	Reserved	0.0	0.0～3600.0	s	○	
H1.06	Brake failure detection delay	3.0	0.0～3600.0	s	○	
Terminal Up/Dn regulating function						
H1.09	Terminal Up/Dn function selection	0	0～FFFF	/	○	Ones place;Up/D nmode selection 0;Up/Dn Adjustment is invalid 1;Up single terminal mode 2;Up/Dn double terminals mode 3;Up/D ndouble terminals mode2; 1; Ten place;Up/Dn stop save 0;Stop clear; 1; stop save; Hundreds place;Up/Dn Adjustment speed too low protection function selection 0;maintain adjustment lowest frequency 1;maintain Zero step Speed
H1.10	Terminal Up/Dn lowest frequency regulation	5.00	0.00～50.00	Hz	○	Up/Dn Adjust Min. Protection frequency
H1.11	Terminal Up/Dn superposition step	1.00	0.00～10.00	Hz	○	
H1.12	Terminal Up/Dn superposition delay	100	0～60000	ms	○	
Speed detecting						
H1.20	Zero speed detecting value	1.00	0～300.00	Hz	○	0～300.00Hz
H1.21	Zero speed detecting delay	0.1	0～3600.0	s	○	0～3600.0s
H1.22	Over speed detection value	110.0	0～200.0	%	○	relative maximum frequency P0.11
H1.23	Over speed detection delay	0.5	0～3600.0	s	○	0～3600.0s

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
EX-DT01 expansion card function code parameter						
H1.57	EX-DT01 卡使能	0	0～1	/	○	0～1
H1.58	Relay RA1ternimal output functions	0	1～47	/	○	Refer to definition of multi function
H1.59	Relay RA2terminal output function	1	1～47	/	○	
H1.60	Relay RA3terminal output function	2	1～47	/	○	
H1.61	RA1～RA3Virtual terminal valid selection	0	0～1	/	○	1;valid
H1.62	RA1 ～ RA3terminal valid status selection	0	0～7	/	○	bit0～bit2;RA1～RA3;0;positive logic; 1;antilogical;
H1.63	Relay RA1terminal delay time	0	0.0～999.9	s	○	0.0～999.9
H1.64	Relay RA2terminal delay time	0	0.0～999.9	s	○	0.0～999.9
H1.65	Relay RA3terminal delay time	0	0.0～999.9	s	○	0.0～999.9
H2.00	X8terminal input function selection	99	0～99	/	○	Don't support5/28/47function
H2.01	X9terminal input function selection	99	0～99	/	○	Don't support5/28/47function
H2.02	X10terminal input function selection	99	0～99	/	○	Don't support5/28/47function
H2.03	X11terminal input function selection	99	0～99	/	○	Don't support5/28/47function
H2.04	X8～X11terminal filter time	0.001	0.001～1.000	s	○	0～6553.5
H2.05	X8 ～ X11Virtual terminal valid selection	0	0～1	/	○	1;valid
H2.06	X8 ～ X11valid status selection	0	0～F	/	○	bit0～bit3means X8～X11; 0;positive logic; 1;antilogical;
H2.07	AI1(As multifunctional digital terminal)	99	0～99	/	○	
H2.08	AI2(As multifunctional digital terminal)	99	0～99	/	○	
H2.09	AI3(As multifunctional digital terminal)	99	0～99	/	○	
Fault record parameters						
d0.00	fault type record2	0	0～62	/	*	Reference 7.1 faults and Alarm information list
d0.01	fault type record1	0	0～62	/	*	
d0.02	Latest Time fault type record 0	0	0～62	/	*	
d0.03	The Last Time fault Bus	0	0～999	V	*	0～999V

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
	voltage					
d0.04	The Last Time fault real current	0.0	0.0～999.9	A	*	0.0～999.9A
d0.05	The Last Time fault Running frequency	0.00	0.00～300.00	Hz	*	0.00～300.00Hz
d0.06	LocalHost power on time cumulative	0.000	0.000～65.535	kh	*	0.000～65.535kh
d0.07	LocalHost running time cumulative	0.000	0.000～65.535	kh	*	0.000～65.535kh
d0.08	heat sink temperature maximum value record	0.0	0.0～100.0	℃	*	0.0～100.0℃
d0.09	Bus voltage fluctuation maximum value record	0	0～1000	V	*	0～1000V
Communication receive and send address collection						
d2.00	Heat sink 1Temperature	0.0	0.0～100.0	℃	*	0.0～100.0℃
d2.01	control command word	0010	0000～FFFF	/	*	bit0;Forward command bit1;Reverse command bit2～bit3;Reserved bit 4; Run permission bit5～bit15;Reserved
d2.02	Reserved	0	0～65535	/	○	0～65535
d2.03	Communication speed reference	100.00	0～100.00	%	*	0～100.00 corresponding 0～Max. Frequency P0.11
d2.09	I/O Terminal input Status display	0000	0000～FFFF	/	*	bit0;X1Terminal Status bit1;X2Terminal Status bit2;X3Terminal Status bit3;X4Terminal Status bit4;X5Terminal Status bit5;X6Terminal Status bit6;X7Terminal Status bit7～bit9;Reserved bit10;Y1Terminal Status bit11;Y2Terminal Status bit12;Tc Relay Terminal Status bit13～bit15;Reserved
d2.10	Speed feedback	0	0～10000	/	*	0 ～ 10000 corresponding 0 ～ Max. Frequency P0.11
d2.11	Torque feedback	0	0～10000	%	*	0 ～ 10000 corresponding 0 ～ Max. Frequency P0.11
d2.12	Current feedback	0	0～65535	A	*	0～65535
d2.13	Power feedback	0	0～65535	kW	*	0～65535

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection
d2.14	Motor voltage feedback	0	0～65535	V	*	0～65535
d2.15	Bus voltage feedback	0	0～65535	V	*	0～65535
d2.16	Position calculation feedback	0	0～65535	cm	*	0～65535
d2.17	Reserved	0	0～65535	0.01t	*	0～65535
d2.18	Faults feedback	0	0～99	/	*	0～99

Chapter 5 Parameter Description

5.1 Basic Function Parameter (Group P0)

P0.00	User password	0~FFFF(0)

This function is used to prevent the irrelevant personnel from inquiring and changing the parameters, so as to protect the safety of the inverter parameters.

0000: No password protection: All the parameters in Zone P can be inquired and changed (If P0.01=1, the change to parameters is disabled), and no password is set upon inverter delivery.

Set password:

Input four digits as user password, and press PRG key for confirmation. Repeat this operation once.

Change password:

Press PRG key to enter the password verification status, and 0.0.0.0. is displayed. Input correct password, and it enters parameter editing status. Select P0.00 (parameter P0.00 displayed as 0000). Input new password and press PRG key for confirmation. Set the same password for P0.00 twice.

When "P.Set" is displayed, the new password is successfully set.

Cancel password:

Press PRG key to enter the password verification status, and 0.0.0.0. is displayed. Input correct user password to enter the parameter editing status, check if P0.00 is 0000. Press PRG key for confirmation, and set P0.00=0000 again, and then "P.Clr" is displayed and the password is cancelled.

- Method of Enabling Password

  One of following three modes can be selected:

  1. Press ESC+PRG +∧ at the same time (for shuttle type, turning close wise is equivalent to the ∧ key) to display "Prot".
  2. No key operation for continuous 5 minutes.
  3. Power on again

P0.01	Function code protection	0~5(0)

This function is used to set the modification authority and initialization level of the parameters.

0: All the parameters are allowed for modification.

1: All the parameters are disallowed for modification.

2: Restore all the parameters in zone P to leave-factory setting.

3. Restore all the parameters in zone P except for the motor parameters (group P9) to leave-factory setting.

4: Restore all the P zone parameters and A zone parameters (user's customized function code display/hide zone) to leave-factory values.

5: Restore all the user parameters except for d group to leave-factory values.

Note: After the parameters are initialized, the password set by the user will be automatically reset.

P0.02	Function code display	0~3(0)

Set this function, and the operation panel will display the function code parameters according to the actual need of the user to improve the work efficiency.

0: Basic menu mode: The operation panel can display all the parameters.

1: Fast menu mode: The operation panel only displays the fast parameters defined by the manufacturer. When the basic functions of the inverter are used, this menu mode shall be set.

2: Menu mode of non-leave-factory value function code: The operation panel only displays the parameters different from the leave-factory values.

- ◆ When the technical personnel perform onsite maintenance, to quickly view the parameters set by the user and detect the failure, this mode can be used.
- ◆ After the inverter commissioning is completed, to conveniently record and inquire the modified parameters, this mode can be set.

3: Menu mode of last changed 10 function codes: When the inverter has abnormal operation or it is necessary to inquire the commissioning parameters, the last changed 10 parameters can be inquired by setting this menu mode. When the leave-factory parameters are recovered, the record of the last changed 10 function codes will also be cleared.

Note:

- ◆ Both P0.00 and P0.02 are visible in all the menu display modes for the convenience of menu mode switching.
- ◆ Press ESC key and hold for over 5 seconds, it will restore to basic menu mode, and P0.02 is automatically restored to 0.

In non-basic menu mode, the >> key cannot be used to switch the function zone code and group number. The current menu mode will be displayed after pressing the >> key for several time

P0.03	encoder installation option	0～8(0)

0; Do not install the encoder, run by open-loop torque vector control, it is applied for application without encoder, V5-G&V6-G are valid

8; Install the encoder, run by closed-loop torque control, it needs to install pulse encoder . Compared with sensorless vector control, it has steady speed with a higher accuracy, faster torque response, more powerful low-frequency torque control performance, only valid V6-G.

P0.04	Remote Control Speed reference mode	0～4(0)

By Remote Control Speed reference mode(P0.06≠0)

If reference frequency is lower that brake open frequency, then reference frequency is brake open frequency.

0; by d2.03 scalar to set frequency, d2.03 from 0～100.00 correspond to 0～P0.11 Max. Frequency.

Notes; If multi-section digital voltage terminals 1 ~ 4 are valid the frequency is determined by the terminal combination. Refers to 0.00～H0.14.

1: Set frequency reference via AI1 port.

2: Set frequency reference via AI2 port.

Input specification of AI1 and AI2 terminals: 0~10V or 0~20mA. The correspondence relation between the analog and the reference frequency is defined by group P6.

Note: When adopting the current input of 0~20mA, refer to the description of P6.01~P6.08.

3: Set frequency reference via AI3 port.

Input specification of AI3 terminal: -10~10V. The correspondence relation between the analog absolute value and the reference frequency is defined by group P6. The operation direction is determined by the sign of the AI3 analog input..

4:Reserved

Notes; by control panel, P0.06=0 speed reference please refer P0.05function code.

P0.05	Digital reference of Operation panel control speed	0.00～300.00 Hz(10.00Hz)

P0.06=0, frequency reference to P0.05, all kinds of P0.04 setting and multi-speed reference are invalid.

P0.06	Start/stop mode selection	0～2(1)

Three different operating command reference modes can be selected for the inverter.

0: Operation panel mode: Perform the Run, Stop, Forward/reverse operation of the inverter through the RUN, STOP/RST, FWD/REV buttons of the operation panel.

1: Terminal mode: Perform the Run, Stop, Forward/reverse operation of the inverter by defining the multi-functional terminals X1~X7. Refer to the description of P5.00~P5.06.

2: Host computer mode: Perform the Run, Stop, Forward/reverse operation of the inverter through communication. Refer to the appendix A Modbus communication protocol.

P0.07	Running direction command	0~1(0)

This parameter is used to change the rotation direction of the motor under operation panel running command reference mode (P0.06=0).

0: Forward; 1: Reverse

Note: This function code is invalid under Remote Control, and the running direction is controlled by terminal command.

P0.11	Maximum output frequency	0.01~300.00 Hz(50.00Hz)
P0.12	Maximum output voltage	1~480 V(380V)
P0.13	Frequency upper limit	0.00~300.00 Hz(50.00Hz)
P0.14	Frequency lower limit	0.00~300.00 Hz(0.00Hz)
P0.15	Basic operating frequency	0.00~300.00 Hz(50.00Hz)

5.2 Torque vector control ADVANCED PARAMETERS

P1.00	Brake unit operating voltage	650～750 V(720V)

Adjust P1.00 can select Brake unit operating voltage, valid just for inverter with built-in brake unit.selecting proper operating voltage can promptly Energy consumption braking down

Notes; in Crane application, Brake unit and resistor is necessary, and make sure PA.09=1,

P1.01	Torque build ready frequency	0.00～60.00 Hz(0.50Hz)

Start frequency inverter, to Torque build ready frequency, and accelerate according to the setting acceleration time. properly setting is good for starting

P1.02	Torque build prepare time	0.1～3600.0s(0.5s)
P1.03	Torque cancel delay time	0.1～3600.0s(2.0 s)

After start frequency inverter, though Torque build prepare time(P1.02 set), then run by torque prepare frequency (P1.01 set),

After the implementation of the inverter stop command, then decelerate to zero and still maintain a certain torque output (P1.04 set), after the revocation of the torque build time (P1.03 setting), the output will be completely blocked.

P1.04	Torque build working time	0.0～130.0%(40.0%)

Before Torque build and torque has not been fully revocation, inverter maintain the value of the work.

P1.05	Torque protection limit values (without encoder)	20.0～200.0%(200.0%)

Normally, when the set speed or motor load dramatic changes, the inverter output torque may reach over torque protection values, and resulting in excessive torque current to occur overcurrent fault. By the torque protection limit to limit the rapidly changing output does not exceed the value of conservation action, which can effectively reduce the incidence of failure to ensure continuous reliable operation of the system. When the torque exceeds the torque limit value protection (P1.05), the inverter enters the torque limit state; constant speed operation, by limiting, can guarantee stability of the load capacity and it is not a fault, when the load is relieve, automatically Exit the limited state and resume normal operation. This feature is ideal for lifting/crane applications.

For crane application, this value can not be set too small, too small will cause the output torque is not enough to ascend the heavy weights. Especially when heavy in the air and start up going, it needs to output larger torque than the heavy from the ground start to ascend

Note: This feature only applies to P0.03 = 0 without encoder control applications.

P1.06	Slip switching frequency (no encoder)	0.00～300.00Hz(40.00Hz)
P1.07	Low Slip compensation (no encoder)	0.0～1000.0%(100.0%)
P1.08	High-speed slip compensation (no encoder)	0.0～1000.0%(100.0%)

5.3 Key and Display Parameters (Group P2)

P2.00	Key-lock function selection	0～3(0)

It is to realize the locking function of the keys on the operation panel, so as to avoid mis-operation.

0: The keys on the operation panel are not locked, and all the keys are usable.

1: The keys on the operation panel are locked, and all the keys are unusable.

2: All the keys except for the multi-functional key are unusable.

3: All the keys except for the RUN AND STOP/RST keys are unusable.

P2.02	Display parameter selection at running	0～FFFF(1CB0)

g

Up to 4 parameters can be set and display at running status, and viewed circularly by pressing >>key.

P2.02 Run Display parameters selection		
Ones place	0;reference frequency(Hz); 2;AI1(V); 4;AI3(V); 7;Motor Rotate Speed(rpm); A; reference Torque(%); C; output current(A); E; output power(kW);	1;Bus voltage(V); 3;AI2(V); 5~6;Reserved; 8~9;Reserved; B; Running frequency(Hz); D;Output torque(%); F; Output voltage(V)
Ten place	ditto	
Hundred place	ditto	
Thousands place	ditto	

P2.03	Display parameter selection at stopping	0～FFFF(3210)

Up to 4 parameters can be set and display at stopping status, and viewed circularly by pressing >>key.

P2.03Stop Display parameters selection		
Ones place	0;reference frequency(Hz); 2;AI1(V); 4;AI3(V);	1;Bus voltage(V); 3;AI2(V); 5~F;Reserved;
Ten	ditto	
Hundr	ditto	
Thous	ditto	

5.4Multi-functional input parameters

P5.00	X1Terminal input function	0～99(99)
P5.01	X2Terminal input function	0～99(99)
P5.02	X3Terminal input function	0～99(99)
P5.03	X4Terminal input function	0～99(99)
P5.04	X5Terminal input function	0～99(99)

P5.05	X6Terminal input function	0～99(99)
P5.06	X7Terminal input function	0～99(99)
P5.07	X1～X7 Terminal filter time	0.000～1.000(0.050)

Relevant term explanation:

Terminal Xi: Refers to any of terminal X1, X2, X3, X4, X5, X6 or X7, also called terminal X.

Terminal Yi: Refers to terminal Y1, Y2 or relay also called terminal Y.

Terminal function enabled: Means that terminal Xi has set the function under description.

Terminal function disabled: Means that terminal Xi has not set the function under description;

The leave-factory setting of terminal Xi (i=1~7) is no function (function code set as 99).

multifunction input terminal Definition Table

Item	Function Defnition	Item	Function Defnition
0～1	Reserved	**2**	**Forward(FWD)**
3	**Reverse(REV)**	4～8	Reserved
9	**Multistage speed terminals1**	**10**	**Multistage speed terminals2**
11	**Multistage speed terminals3**	**12**	**Multistage speed terminals4**
13～15	Reserved	16	Frequency increase instruction (Up terminal function)
17	Frequency decrease instruction (Dn terminal function)	18	Acceleration and deceleration disable
19	**External failure input**	**20**	**Terminal failure reset input**
21	External interrupt contact input	22	Inverter running disabled
23	Shutdown via terminal	24	Free shutdown via terminal
25	Shutdown via terminal with DC braking	26	Emergency shutdown 1 (fastest
27	Shutdown via terminal with DC braking 2	28	Counter trigger input
29	Counter trigger reset	30～37	Reserved
38	**upper limit (Slowing down)**	**39**	**lower limit (Slowing down)**
40	**Brake confirm signal input**	**41**	**enable hardware running permission**
42	**Position synchronization signal input**	43～98	Reserved

5.5 多功能输出参数

P7.00	Y1terminal output function selection	0～47(14)
P7.01	Y2/DOterminal output function selection	0～71(33)
P7.02	Relay terminal output function selection	0～47(32)
P7.03	AO1terminal output function selection	48～71(48)
P7.04	AO2terminal output function selection	48～71(49)

Y1 and relay terminals can be defined as multifunctional digital signal output. AO1 and AO2 terminals can be defined as multifunctional analog value output, and the analog value type (0 ~ 10V/0 ~ 20mA) can

be selected via the jumper..

The definition table of multifunctional digital signal output is as follows:

Function setup	Meaning	Function setup	Meaning
0	Signal indicating that the inverter is running (RUN)	1	Frequency arrival signal (FAR)
2	Frequency level detection signal 1(FDT1)	3	Frequency level detection signal 2(FDT2)
4	Pre-warning signal indicating inverter or motor overload (OL)	5	Stop and lock due to under voltage (LU)
6	Stop due to external failure (EXT)	7	Frequency upper limit(FHL)
8	Frequency lower limit(FLL)	9	Inverter is running at zero speed
10	Preset counting value action	11	Counting value arrival action
12	Reserved	13	End of Inverter ready for operation (RDY)
14	Inverter failure	15	Inverter reports alarm
16	Reserved	17~18	Reserved
19~20	Reserved	21	Reserved
22	Zero current detection arrival (relative to motor)	23	Stop command indication
24~31	Reserved	32	Brake output
33	No fault signal output	34	Zero speed signal out put
34~37	Reserved		

Multifunctional **Analog output** Function Definition table;

Item	Function Definition	Analog output scope definition
48	Output frequency	Max. FrequencyP0.11correspond to10V/20mA
49	Set frequency	Max. FrequencyP0.11correspond to10V/20mA
50	output current	2times Frequency inverter Rated current correspond to10V/20mA
51	Motor current	2times Motor Rated current correspond to10V/20mA
52	Output torque	2times motor rated torque correspond to10V/20mA
53	Output voltage	2 time Output voltageP0.12correspond to10V/20mA
54	Bus voltage	1000Vcorrespond to10V/20mA
55	AI1	10Vcorrespond to10V/20mA;20mAcorrespond to10V/10mA
56	AI2	Same with AI1
57	AI3	-10V～10Vcorrespond to0～10V/20mA
58	DI	Reserved
59	output power	2 times Motor Rated output powercorrespond to10V/20mA
60	Host computer	10000correspond to10V/20mA

Item	Function Definition	Analog output scope definition
	percentage	
61	Heatsink temperature	0～100℃correspond to0～10V/20mA
62	Output frequency 2	Max. FrequencyP0.11correspond to10V/20mA
63～71	Reserved	

5.6 **Motor parameters**

P0.11	Maximum output frequency	0.01～300.00 Hz(50.00Hz)
P0.12	Maximum output voltage	1～480 V(380V)
P0.13	Frequency upper	0.00～300.00 Hz(50.00Hz)
P0.15	Motor rated frequency	0.00～300.00 Hz(50.00Hz)
P9.01	Number of motor	2～128(4)
P9.02	Motor Rated speed	0～30000 rpm(1500rpm)
P9.03	Motor Rated power	0.4～999.9 kW(factory)
P9.04	Motor Rated current	0.1～999.9 A(factory)

P9.01～P9.04use to set frequency inverter drivin motor parameters. Before use, please correctly set it according to the namaplate of motor

P9.05	Zero load current I0	0.1～999.9 A(factory)
P9.06	Stator resistance R1	0.000～65.000 Ω(factory)
P9.07	Stator leakage inductance L1	0.0～2000.0 mH(factory)
P9.08	Rotor resistance R2	0.000～65.000 Ω(factory)
P9.09	Mutual inductance L2	0.0～2000.0 mH(factory)
P9.10	Magnetic saturation1	0.00～100.00 %(factory)
P9.11	Magnetic saturation2	0.00～100.00 %(factory)
P9.12	Magnetic saturation3	0.00～100.00 %(factory)
P9.13	Magnetic saturation4	0.00～100.00 %(factory)
P9.14	Magnetic saturation5	0.00～100.00 %(factory)
P9.15	Parameter auto tuning	0～2(0)

Though the implementation of Parameter auto tuning, make sure the key motor paramters of influence inverter operation control, those motor parameters will be automatic reserved after finished parameter auto tuning

parameter auto tuning processing as below;

Step1; input motor parameters according to the nameplate of motor

P9.01 Number of motor poles;	P9.02 motor Rated speed;
P9.03motor Rated power;	P9.04 motor Rated current ;
P0.12 motor rated voltage;	P0.15 motor rated frequency;
P0.11MAX. output frequency ;	P0.13frequency upper;
H0.16～H0.19;setting proper acceleration and deceleration time;	P9.05motor empty load current(set to about 40% of P9.04);

Step2;set P9.15 Select the implementation mode of parameter auto-tuning P9.15:

1: Static parameter auto-tuning. Press the run key to automatically measure the motor parameters P9.06 ~ P9.08

2: Rotating parameter auto-tuning. Press the run key to automatically measure the motor parameters P9.05～P9.14.

Step3; Press the run key to start parameter auto-tuning, after finished parameter auto tuning P9.15 automatically to 0.

Note:

☐ If the motor can be disconnected from the load, it can select rotation auto-tuning , otherwise it can select static auto-tuning only. Make sure that the motor is in the static status when starting the parameter auto-tuning. If there is over current or over voltage failure during the auto-tuning Process, it can prolong the acceleration/deceleration time P0.08 and P0.09 properly.

If the lifting machinery generally need to do disengage coupling section rotation parameter self-learning, if it can not do without load parameter rotating auto-tuning, in accordance with the above parameters first s static auto-tuning, and then load running at steady speed, check the current value, the number of this current Value is set in the load current P9.05.

If the motor parameters are given, please enter the parameters to P9.05 ~ P9.09 directly. If the motor parameters are not given, please execute the parameter auto-tuning. The magnetic saturation and coefficient value in P9.10 ~ P.14 is automatically set during auto-tuning, eliminating the need of setting by the user.

☐ During the process of parameter auto-tuning, “-At-“ will appear on the operation panel.

5.7Comminication parameters

PC.00	Communication baud rate	4～8(8)
PC.01	data format	0～2(0)
PC.02	Local address	1～247(1)

Support Modbus protocol, RTU format.

PC.00confirm Communication baud rate, support from 4800～57600bps.

4;4800bps;

5;9600bps;

6;19200bps;

7;38400bps;

8;57600bps;

PC.01set Communnication Fromat, even and odd parity

0;1-8-1format, no parity;

1;1-8-1format, even partity

2;1-8-1format, odd parity.

PC.02set local Local address,0is broadcast address, slave address: 1～247,248～255 for reservation.

PC.03	0x06 and 0x10 command write RAM selection	000～FFF(303)

303; 0x06 and 0x10 command write RAM;

F0F;0x06 and 0x10 command write EEPROM.

5.8 Closed-loop torque control parameters

This group functions is oliy valid for encoder control, P0.03=8 valid, for Without encoder control P0.03=0 invalid.

Pd.01	Speed loop proportional gain1(ASR_P1)	0.000～30.00(2.00 或 3.00)
Pd.02	Speed loop integral time1(ASR_I1)	0.000～6.000 s(0.200s)
Pd.03	Speed loop proportional gain2(ASR_P2)	0.000～30.00(2.00 或 3.00)
Pd.04	Speed loop integral time2(ASR_I2)	0.000～6.000 s(0.200s)
Pd.05	ASR switching frequency	0.00～300.00 Hz(5.00Hz)

proportional gain P;

In the case of vector control 2 without encoder speed feedback, the leave-factory value of this parameter is 2.00. In the case of vector control 2 with encoder speed feedback, the leave-factory value is 3.00.

Adjust according to rotating inertia of machines connecting with motor. For machines with large rotating inertias, please increase P gain; for machines with small rotating inertias, please decrease P gain.

When P gain is greater than inertia, although the control response can be accelerated, the motor may shock or overshoot. Reversely, if P gain is smaller than inertia, the control response will get slower and the time taken to adjust the speed to the stable value will longer.

Integral time I:

The integral is invalid when setting the integral time I to 0 (controlled by P alone). To ensure the difference between the speed instructions and real speed is 0 under steady-state conditions, set the integral time I to non-0 values. When I value is smaller, the system responses quickly. But if the value is very small, shock will occur. If I value is greater, the system responds slowly.

Adjust PI settings when operating quickly or slowly:

High speed and low speed PI value adjustment,; When the motor speed is greater than ASR switching frequency Pd.05, Pd.01 and Pd.02 will act to make

the system obtain reasonable dynamic response when no shock occurs. If the motor speed is smaller than ASR switching frequency Pd.05, Pd.03 and Pd.04 will act. To obtain reasonable dynamic response when operating slowly, increase proportional gain Pd.03 and reduce integral time Pd.04 properly.

Pd.08	Drive torque limit value	0.0～200.0 %(180.0%)

Pd.09	Braking torque limit value	0.0～200.0 %(180.0%)

Pd.08 and Pd.09 are used to limit the maximum output torque of the inverter. The limit value is proportion of the rated output torque of motor. When large braking torque is required, please adopt additionally the energy braking method.

Pd.15	Current loop scale coefficient (ACR_P)	0～2000(1000)
Pd.16	Current loop integral coefficient (ACR_I)	0～2000(1000)

Vector control will control the output current of motor and keep track of current instruction value. Scale and integral gain of current control (ACR) shall be set here. Usually the factory default shall not be changed. Generally, increase P gain when coil inductance is high, decrease P gain when coil inductance is low. Current oscillation will be occurred as a result of setting I gain to extremely high.

Pd.19	ASR input filtering time	0.0～500.0 ms(0.5ms)
Pd.20	ASR output filtering time	0.0～500.0 ms(0.5ms)

Pd.19 and Pd.20 This function defines the input filtering time of speed adjuster (ASR). In general, it needs no modification.

Pd.21	Number of pulses per turn for encoder (vector control 2 with encoder speed feedback)	1~9999 pulses/turn（1024）

Under with encoder speed feedback vector control 2, it must definition Number of pulses per turn for encoder, please setting according to Number of pulses per turn for encode.

5.9Multi-step Speed Parameter lists

d2.03	0step speed	00.00～100.00 %(100.00%)
H0.00	1step speed	00.00～300.00 Hz(5.00Hz)
H0.01	2step speed	00.00～300.00 Hz(8.00Hz)
H0.02	3step speed	00.00～300.00 Hz(10.00Hz)
H0.03	4step speed	00.00～300.00 Hz(15.00Hz)
H0.04	5step speed	00.00～300.00 Hz(18.00Hz)
H0.05	6step speed	00.00～300.00 Hz(20.00Hz)
H0.06	7step speed	00.00～300.00 Hz(25.00Hz)
H0.07	8step speed	00.00～300.00 Hz(28.00Hz)
H0.08	9step speed	00.00～300.00 Hz(30.00Hz)
H0.09	10step speed	00.00～300.00 Hz(35.00Hz)
H0.10	11step speed	00.00～300.00 Hz(38.00Hz)

H0.11	12step speed	00.00～300.00 Hz(40.00Hz)
H0.12	13step speed	00.00～300.00 Hz(45.00Hz)
H0.13	14step speed	00.00～300.00 Hz(48.00Hz)
H0.14	15step speed	00.00～300.00 Hz(50.00Hz)

Multistage speed	Multistage	Multistage	Multistage speed	Set speed
OFF	OFF	OFF	OFF	0step speed(d2.03)
OFF	OFF	OFF	ON	1step speed
OFF	OFF	ON	OFF	2step speed
OFF	OFF	ON	ON	3step speed
OFF	ON	OFF	OFF	4step speed
OFF	ON	OFF	ON	5step speed
OFF	ON	ON	OFF	6step speed
OFF	ON	ON	ON	7step speed
ON	OFF	OFF	OFF	8step speed
ON	OFF	OFF	ON	9step speed
ON	OFF	ON	OFF	10step speed
ON	OFF	ON	ON	11step speed
ON	ON	OFF	OFF	12step speed
ON	ON	OFF	ON	13step speed
ON	ON	ON	OFF	14step speed
ON	ON	ON	ON	15step speed

d2.03; Unit is %,0～100.00 % means 0～P0.11Max. Frequency.

H0.00～H0.14;unit is Hz,Directly set frequency value

H0.15	encoder pulse count display	0～65535(0)

H0.15 means encoder pulse count display

Cumulant is encoder pulse count×4,0～65535 recycling display. ByThis value can detect if the encoder and the VFD is connected correctly

5.10 Acceleration and deceleration time parameters

H0.16	Forward acceleration time	0.0～3600.0 s(8.0 s)
H0.17	Forward deceleration time	0.0～3600.0 s(8.0 s)
H0.18	Reverse Acceleration time	0.0～3600.0 s(8.0 s)
H0.19	Reverse Deceleration time	0.0～3600.0 s(8.0 s)

Forward acceleration time、Reverse acceleration time;From 0Hz accelerate to Max. Frequency P0.11 required time.

Forward deceleration time、Reverse Deceleration time; from Max. FrequencyP0.11 decelerate 0Hz required time.

5.11 Brake control parameters

H0.20	Forward brake release speed limit	0.00～300.00 Hz(3.00Hz)
H0.21	Forward brake release Torque current limit	0.0～200.0 %(10.0%)
H0.22	Forward brake release torque current limit	0.0～200.0 %(30.0%)
H0.23	Reverse brake release speed limit	0.00～300.00 Hz(3.00Hz)
H0.24	Reverse brake release torque current limit	0.0～200.0 %(0.0%)
H0.25	Reverse brake release torque current limit	0.0～200.0 %(30.0%)
H0.26	Brake release delay 1	0.0～3600.0 s(0.0s)
H0.27	Brake release delay 2	0.0～3600.0 s(0.1s)
H0.28	Brake release delay 3	0.0～3600.0 s(0.0s)
H0.29	Open loop closed loop brake control sequence selection	0000～1111 (0100)
H0.34	Torque calibration fault detection time	0.0～3600.0 s(3.0s)

Above parameters corresponds to the sequence in the process of brake control.

Forward acceleration; If the run command is forward (corresponds to crane is upgoing), then according to F orward rotation direction output the value of H0.20setting. When Output Torque current arrival H0.22(close-l oop is H0.21)setting value, after delay H0.26 and H0.27setting time, output brake release signal and delay t he time be set by H0.28, VFD start to acceleration running.

Reverse Acceleration; If the run command is Reverse (corresponds to crane is going down), then according t o reverse rotation direction output the value of H0.23setting.When Output Torque current higher than H0.25 (close-loop is H0.24)setting value, after delay H0.26 and H0.27setting time, output brake release signal and delay the time be set by H0.28, VFD start to acceleration running.

Starting from the starting time, after the time of H0.34 setting, if haven’t arrival reference torque current, then itwill be display E.tPF Fault

H0.29 Open loop closed loop brake control sequence selection;

0000; with encoder control;

0100; ;without encoder control, as this setting, set H0.21and H0.24 to 0, Otherwise start, it may be occur E.tPF failure

H0.35	Amount of torque force1	0.0～30.0 %(4.0%)
H0.36	Amount of torque force2	0.0～30.0 %(3.0%)

H0.35and H0.3 is Amount of torque force under the condition of low speed, properly setting is good for the low speed torque when hoist Ascending and descending

H1.00	Brake confirm function selection	0000～1111(0000)
H1.01	Forward brake engage frequency	0.00～300.00 Hz(3.00Hz)

H1.02	Reverse brake engage frequency	0.00～300.00 Hz(3.00Hz)
H1.03	Brake engage delay 1	0.0～3600.0 s(0.0s)
H1.04	Brake engage delay 2	0.0～3600.0 s(0.3s)
H1.06	Brake failure detection delay	0.0～3600.0 s(3.0s)

H1.00; Brake confirm function selection

If H1.00=0000,then without Brake feedback confirm; if H1.00=0001,Brake feedback confirm function is enable. If enable Brake confirm feedback, then brake feedback signal input by multifunctional terminals, and will change terminal function set to 40, in this state, if brake control command of Inverter sending is close, then input signal is disconnection. if brake control command of Inverter sending is open, then input signal is closed.

if the inverter sending brake control commands and the input signal is inconsistent, after brake failure detection delay time, the inverter will report brake fault (E.BLF or E.BEF).

Forward Deceleration: When decelerating state, when the speed reaches the set value H1 .01, and by after the set time delay H1.03, the brake is engaged, through H1.04 set time, the speed dropped to 0 .

Reverse Deceleration: When the deceleration state, when the speed reaches the set value H1.02, by after H1.03 set time delay, the brake is engaged, then after H1.04 set time, the speed dropped to 0 .

5.12Terminal Up/Dn **regulating function**

H1.09	Terminal Up/Dn function selection	0000～FFFF(0000)
H1.10	Terminal Up/Dn lowest frequency regulation	0.00～50.00 Hz(5.00Hz)
H1.11	Terminal Up/Dn superposition step	0.00～10.00 Hz(1.00Hz)
H1.12	Terminal Up/Dn superposition delay	0～60000 ms(100ms)

Up/Dn functions means frequency Increasing and decreasing functions, that is X1～X7be set 16 frequency Increasing functions and 17 decreasing function.

H1.09～H1.12 just special for crane application terminal Up/Dn function, this function is valid just in the state of terminal dunning.

H1.09 Ones place;Up/Dn mode selection

0;Up/Dn regulating valid, Under this setting,H1.10～H1.12functions also valid;

1;Up single terminal mode, no Dn terminal, valid just in running. Under this mode, close running terminal, Running frequency up to reference frequency; close Up terminal, Running frequency Increasing; disconnection Up terminal,Running frequency keep currently Running frequency and don't change; disconnection running terminal,Running frequency decrease, close running terminal again, Running frequency keep currently Running frequency and don' change;

2;Up/Dn double terminals mode 1,valid just in running Under this mode, close running terminal, Running frequency up to reference frequency; close Up terminal, Running frequency Increasing; close Dn terminal, Running frequency decrease; disconnection Up and Dn , both of them be closed or open, Running frequency keep currently Running frequency and don' change;

3;Up/Dn double terminals mode 2,Both stop and run are valid. Under this mode,Up/Dn regulating rate

Associated with H1.11 and H1.12 Setting. close Up terminal,reference frequency increase; close Dn terminal,reference frequency descrease. disconnection Up and Dn , both of them be closed or open,Running frequency keep currently Running frequency and don’ change;

H1.09Ten place;Up/Dn stop reserved function

0; stop clear;

1; stop reserved.

H1.09 Hundred place;Up/Dn Up/Dn Adjustment speed too low protection function selection

0;speed too low,Up/Dn maintain Up/Dn Adjustment Min. frequency,that is keep H1.10 setting value;

1; speed too low,Up/Dn maintain the 0step speed,that is Up/Dn regulating clear,running in the setting frequency.

H1.10 is terminal Up/Dn regulating Min. frequency,Avoid because of Up/Dn regulating speed too low may result in torque shortag.

When H1.11and H1.12 is Up/Dn superposition step size&delay time of Ones place of H1.09 setting to 3, it canchange Up/Dn speed rate.

H1.09 Up/Dn mode select	
Ones place	Up/Dn mode select 0;Up/Dn regulation invalid; 1;Up single terminal mode,no Dnterminal,valid just in running; 2;Up/Dn double terminals mode 1,valid just in running;
Ten place	Up/Dnstop reserved function 0; stop don’; 1; stop reserve;
Hundred place	Up/Dn Adjustment speed too low protection function selection 0;speed too low,Up/Dn maintain H1.10 setting Up/Dn regulating Min. frequency; 1;spped too low,Up/Dn mantain 0 step speed;

5.13 **Speed detection**

H1.20	speed detecting value	0.00～300.00 Hz(1.00Hz)
H1.21	Zero speed detecting delay	0.0～3600.0 s(0.1s)
H1.22	Over speed detection value	0～200.0%(110.0%)
H1.23	Over speed detection delay	0.0～3600.0 s(0.5s)

Zero speed detecting, when speed lower than this value then regard as speed is arrived at Zero speed, thenoutput signal;

Over speed detection, when motor speed over speed detection value and delay the time of Over speed detection delay, then regard as motor overspeed

5.14 Fault record parameters

d0.00	fault type record 2	0～62(0)
d0.01	fault type record 1	0～62(0)
d0.02	Latest Time fault type record 0	0～62(0)
d0.03	Latest Time fault Bus voltage	0～999 V(0V)
d0.04	The Last Time fault real current	0.0～999.9 A(0.0A)
d0.05	The Last Time fault Running frequency	0.00～300.00 Hz (0.00Hz)

Frequency inverter can record Recent three times faults code item(Reference 7.1 faults and Alarm information list), and record recently faults Bus voltage、output current、Running frequency, for more easy to Troubleshoot faults and repair.

Notes; Under voltage display LU don’t reserve faults type and faults time referencei

d0.06	LocalHost power on time cumulative	0.000～65.535 kh(0.000kh)
d0.07	LocalHost running time cumulative	0.000～65.535 kh(0.000kh)
d0.08	heat sink temperature maximum value record	0.0～100.0 ℃(0.0 ℃)
d0.09	Bus voltage fluctuation maximum value record	0～1000 V(0V)

Frequency inverter can recors above information;

5.15 **Communication receive and send address collection**

d2.01	control command word	0000～FFFF(0010)

d2.01is control command word of communication, Host computer can though communication to write address tp realize control function.

d2.01;bit1is Forward command;bit2 is Reverse command;bit4 is run command permission.

d2.03	Communication speed reference	0～100.00 %(100.00%)

d2.03is Communication speed reference,0～100.00 means 0.00Hz～P0.11Max. Frequency.

In the communication, 0～100.00 corresponding communication numerical is 0～10000.

Setting examples;

Supposed P0.11=50.00Hz,Written communication d2.03 numerical value is 5000,then frequency is;(d2.03/10000)×P0.11=25.00Hz.

d2.09	I/O feedback	0000～FFFF(0000)
d2.10	Speed feedback	0000～65535(0000)
d2.11	Torque feedback	0.0～200.0 %(0.0%)
d2.12	Current feedback	0.0～200.0 %(0.0%)
d2.13	Power feedback	0000～6553.5(0000)
d2.14	Motor voltage feedback	0～65535 V(0V)
d2.15	Bus voltage feedback	0～65535 V(0V)

d2.16	Position calculation feedback	0～65535 cm(0 cm)
d2.17	Reserved	0～65535 Kg(0 Kg)
d2.18	Fault feedback	0～99(0)

d2.09;bit0～bit6 is X1～X7terminal status,bit10～bit12is Y1、Y2and relay terminal status

5.16 EX-DT01digital terminal expansion card parameters

H1.57	EX-DT01 card enable	0～1(0)
H1.58	Relay RA1 terminal output function	00～99(00)
H1.59	Relay RA2 terminal output function	00～99(01)
H1.60	Relay RA3 terminal output function	00～99(02)
H1.61	RA1～RA3 Virtual terminal valid selection	0～1(0)
H1.62	RA1～RA3 Terminal valid state selection	0～7(0)
H1.63	Relay RA1 terminal delay time	0.0～999.9(0.0)
H1.64	Relay RA2 terminal delay time	0.0～999.9(0.0)
H1.65	Relay RA3 terminal delay time	0.0～999.9(0.0)
H2.00	X8 Terminal input function selection	00～99(99)
H2.01	X9 Terminal input function selection	00～99(99)
H2.02	X10Terminal input function selection	00～99(99)
H2.03	X11 Terminal input function selection	00～99(99)
H2.04	X8～X11 Terminal filter time	0.001～1.000(0.001)
H2.05	X8～X11 Virtual terminal valid selection	0～1 (0)
H2.06	X8～X11 valid status selection	0～F (0)

H1.57=1; enable EX-DT01expansion card.

H1.58;Expansion card relayRA1output function selection, function same with P7.00～P7.02;

H1.59;Expansion card relayRA2output function selection, function same with P7.00～P7.02;

H1.60;Expansion card relayRA3output function selection, function same with P7.00～P7.02;

H2.07	AI1doing digital terminal selection	00～99 (99)
H2.08	AI2doing digital terminal selection	00～99 (99)
H2.09	AI3doing digital terminal selection	00～99 (99)

If H2.07=99,then AI1 is analog input, others will be digital input, digital terminal definition please reference P5.00～P5.06;

If H2.08=99,then AI2 is analog input,others will be digital input, digital terminal definition please reference

P5.00～P5.06;

If H2.09=99,then AI3 analog input,others will be digital input, digital terminal definition please reference P5.00～P5.06;

Notes; if AI1、AI2 as digital terminal input , jumper jump V side

Chapter 6 debugging processes

6.1 confirm the correctness and robustness of wiring

◆ Before wiring, make sure that everything is in the off state;

◆ Main circuit: Input power connect R / S / T, motor connect U / V / W;

If built-in braking unit, braking resistor connect to B1 and B2; if external braking unit connect to +2 and -, braking resistor connect to the brake unit;

◆ control loop: Confirm forward, reverse, speed, fault reset, safety interlock protection, fault output, brakes and other wiring correct;

Ensure that the external safety interlock signal is normal, and is normally closed mode connected to the inverter X terminal, and set this terminal function to 41;

◆ wiring is completed, check the cables to be reliable, no virtual connection or loose terminals phenomenon.

6.2 Self-learning parameter settings

◆ Please disengaged the motor load when auto tuning, when auto tuning the motor rotates, we must pay attention to safety;

◆ After finished auto tuning please record all the parameter of motors, if later restore parameters no need to auto tuning, input directly;

◆when confirm Forward the direction is upward, reverse is the downward direction; if the opposite direction, please swap any two motor wires.

Function code	Numerical	Function Code Description
P0.06	0	Panel Control
P0.11		Maximum frequency in(Hz), according to actual requirements set
P0.13		Frequency limit, the unit is Hz, according to actual requirements set
P0.12, P0.15,P9.01 ~ P9.04		Namely motor rated voltage, rated frequency, number of poles, rated speed, rated power, rated current, according to the motor nameplate set
P9.05		Motor no-load current, A, is set to P9.04 30% to40%
P9.15		1, if the load off, set the parameter P9.15 = 2 rotating auto tuning, s when auto tuning the motor rotates, **do not touch the motor, the motor shaft and the motor connected to the drum and any other things.** In order to obtain better results, it is recommended to rotate without load auto tuning 2, can not be disengaged if the load parameter setting P9.15 = 1 stationary auto tuning

6.3 with encoder control parameter settings

◆ Only valid under the V6-G, V5-G is invalid; without using encoder feedback control no need to set;

◆ Setting P0.03 = 0, P0.05 = 5.00 Press the RUN key to run, observed if H0.15 have any data changes;

If H0.15 has changed, then enter the next step;

If H0.15 always displayed as 0, check the encoder wiring is normal, PG card is plugged in, PG card and encoder matches, etc.;

◆ Set P0.03 = 8, Pd.21 = number of pulses per encoder revolution;

◆ Press Set P0.05 = 5.00Hz, press the RUN key operation, observe whether it is normal, if normal, the next step;

If abnormal, exchange the PG card wiring A + and B + , A-and B-on the exchange;

◆ If the above operating normally, then the closed-loop vector run correctly.

6 4 startup parameter settings

◆ If you use terminal control start and stop the machine, set P0.06 = 1; if communication control, set P0.06 = 2;

◆ Set acceleration time forward, reverse acceleration time, deceleration time forward, reverse deceleration time;

P0.06	1 or 2	Terminal control is set to 1, the communication is set to 2, must be set, otherwise will not boot（start inverter）
P5.00 ~ P5.07		X1 ~ X7 terminal function
H0.16 ~ H0.19		Forward acceleration time, deceleration time forward, reverse acceleration time, deceleration time reversal

6.5 Speed reference mode

Note: The panel control (P0.06 = 0) in the case, the frequency of the control panel is reference as P0.05settings, P0.04 set way invalid.

P0.04	0-4	0: Multi-speed setting, through d2.03 and H0.00 ~H0.14 settings; 1: AI1 analog settings; 2: AI2 analog settings; 3: AI3 analog settings;
d2.03		0 Speed section, 0 ~ 0 ~ P0.11 100.00 represents the maximum frequency, according to the actual needs
H0.00 ~ H0.14		Unit of frequency Hz, according to the actual needs That is the speed when multiple-speed signal input

6 6 brake control parameter settings

◆ Setting control the brake switch value output function as 32: If passed Y1, then set P7.00 = 32, if

passedY2, then set P7.01 = 32, if passed relay, set P7.02 =32;

◆

P7.02	32	By RA-RC relay control band-type brake signal
H0.20		Forward brake release speed limit, according to real condition to set.
H0.21		Suitable for closed-loop, open loop set to 0
H0.22		open loop Forward brake release torque current limit, according to real condition to set.
H0.23		Reverse brake release speed limit, according to real condition to set.
H0.24		Suitable for closed-loop, open loop set to 0
H0.25		open loop Reverse brake release torque current limit, according to real condition to set.
H0.26		Brake release delay1, according to real condition to set.
H0.27		Brake release delay2, according to real condition to set.
H0.28		Brake release delay3, according to real condition to set.
H0.29		Open loop closed loop brake control sequence selection 0100 is open loop,0000 is close loop
H1.01		Forward Brake engage frequency, according to real condition to set.
H1.02		reverse Brake engage frequency, according to real condition to set.
H1.03		Brake engage delay1, according to real condition to set.
H1.04		Brake engage delay2,according to real condition to set.

6 7 Conical motor debugging

◆ Conical motor embedded with brake without external mechanical brake, there is a strong current through it, the brake will automatically open, no current flows through it, the brake will return to its original position to Implementing brake;

◆ For conical motor brake control, not the inverter control cone motor brake, but to adapt to the brake without brake open logic, need to set the brake release torque current limit is smallest value;

◆ When debugging , first to H0.20 and H0.23 frequency should be set to a larger value, and appropriately adjust acceleration and deceleration time.

6.8 Parameter copy function to realize the batch debugging

After finished debugging parameters of one inverter, you can use the debug parameter copy function to copy the parameters to another drive on without debugging.

Parameter copy detailed steps as follows

● install keyboard A to one inverter A has finished debugging parameters;

● Set parameters Pb.23 = 1 for parameter upload;

- Install keyboard A to one inverter B without debugging;
- If the motor and inverter are identical, set Pb.23 = 3 for download with a motor parameters;
- If the motor or inverter or two are not the same, but the function is the same wiring, make a parameter auto tuning, and then set Pb.23 = 2 for download without motor parameters;
- Set d2.01 = 0010, and set the low frequency d2.03 = 1000 (ie, need to re-set the first paragraph of the frequency);
- Then power down completely re-commissioning is completed, must be completely powered down, the inverter keypad completely off and then power on.

6 9 inverter control circuit wiring diagram example

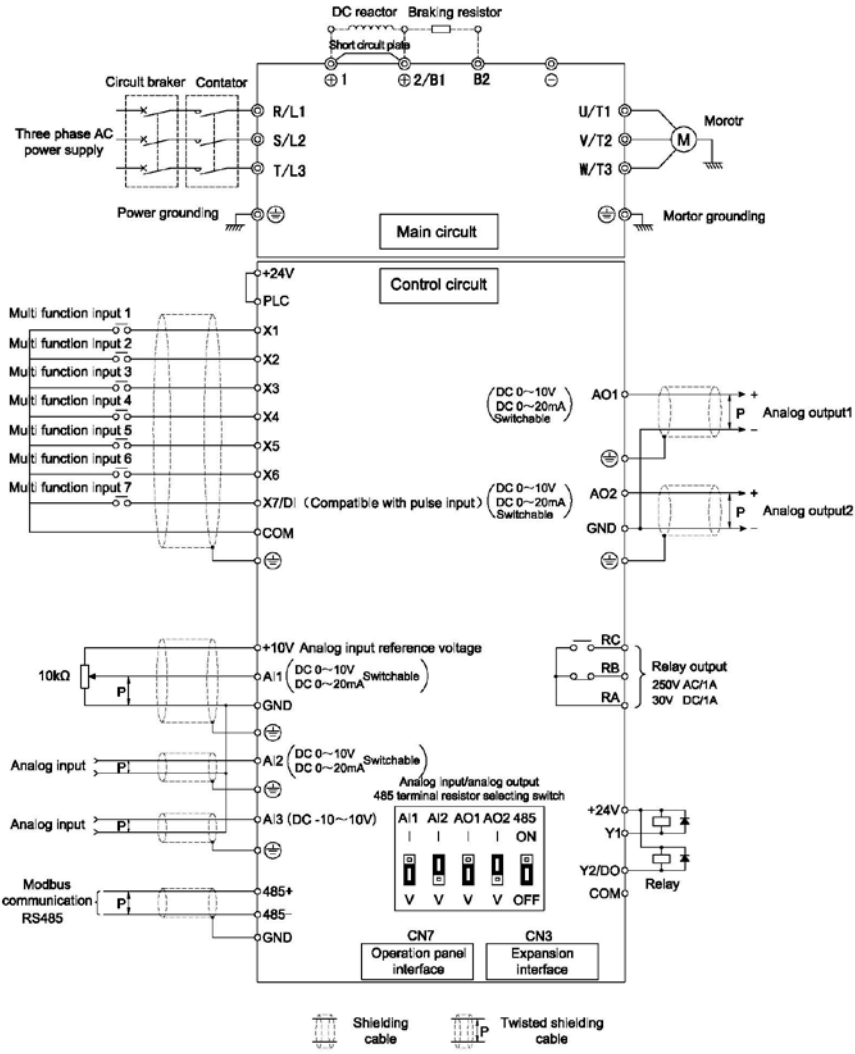


Figure 6-1 inverter control circuit wiring diagram

Chapter 7 Lifting special inverter faults and troubleshooting

7.1 Fault Display

Fault number	Fault Code	Fault Description	Possible Causes	Countermeasure
39	E.CoF	Communication failure	Communication Error	Check the communication module and inverter communication is normal Check the communication cable is intact Check the communication baud rate settings are correct
40	E.bLF	Brake failure	With brake release command but did not receive open feedback	Check whether the brake is faulty
41	E.bEF	Brake set faults	With brake engaged command but did not receive a close feedback	Check whether the brake is faulty
43	E.oPF	Overspeed fault	Speed exceeds the setting maximum speed	Check whether reference is normal Check parameter settings are too small Check the encoder is normal Check that the drive/inverter is running correctly
46	E.tPF	Torque verification failure	output torque does not reach the brake open torque	Check the torque verify whether id normal value Check the validation failure detection time is too short

7.2 Hoisting mechanism causes of common failures and analysis

◆ **there is any slide down phenomenon When start , low torque is insufficient**

1) Confirm if correct select inverter power, inverter selection according to the motor rated current for selection, requires inverter rated current corresponding motor rated current based on the amplification of one power levels,

while , because it is in crane applications, the inverter and the motor are required to leave some margin;

2) to ensure that lifting weight is in the range of rated weigh;

3) To ensure that no mechanical problems;

4) Do not switch direction during operation running.

5) If you use the traditional brake control, need to make sure brake control sequence selection is correct , when brake open the inverter output torque is adequate;

6) If it is conical motor, you need to set the brake open frequency is larger, so that current is sufficient to open the brake;

7) Confirm have set the motor parameters already and conduct auto tuning;

8) Improve initial frequency of inverter;

9) if use open-loop control mode P0.03 = 0, then increase the amount of low-speed torque boost; if use P0.03 = 8 closed-loop encoder control mode, adjust the low speed loop parameters Pd.03 and Pd.04 .

◆during downward, speed too fast

1) Confirm if correct select inverter power, inverter selection according to the motor rated current for selection, requires inverter rated current corresponding motor rated current based on the amplification of one power levels, while , because it is in crane applications, the inverter and the motor are required to leave some margin;

2) To ensure that the braking unit and braking resistor selection is correct, make sure that the braking unit and braking resistor can be in the process of decentralization of energy through the braking resistor freed, the braking resistor selection, also need to Ensure brake resistor and brake unit to match;

3) to ensure that lifting weight is in the range of rated weigh;

4) Confirm have set the motor parameters already and conduct auto tuning;

5) To ensure inverter output torque is enough, the motor's rated output torque is adequate;

6) Ensure brake resistor is turn on.

◆There is any slide down phenomenon when Stop

1) Confirm if correct select inverter power, inverter selection according to the motor rated current for selection, requires inverter rated current corresponding motor rated current based on the amplification of one power levels, while , because it is in crane applications, the inverter and the motor are required to leave some margin;

2) Ensure that the load within the range of rated load;

3) If use traditional type brake equipment, ensure there is no problem about brake pads;

4) of it is tapered motor, make sure when motor start to stop it maintains adequate output torque to ensure motor braking torque is sufficient;

5) Confirm have set the motor parameters already and conduct auto tuning;

6) improve Brake engage frequency.

◆ **Overcurrent overload phenomenon**

1) Confirm if correct select inverter power, inverter selection according to the motor rated current for selection, requires inverter rated current corresponding motor rated current based on the amplification of one power levels, while , because it is in crane applications, the inverter and the motor are required to leave some margin;

2) Ensure that the load within the range of rated load;

2) Ensure that the load at rated load range;

3) Confirm have set the motor parameters already and conduct auto tuning;

4) to ensure that the brake is normal intact, the opening and closing logic is correct, there was no abnormal phenomenon;

5) ensure reasonable acceleration and deceleration time.

◆ **Improve safety recommendations**

1) Use the inverter hardware chain, using the normally closed contact, when the external safety circuit power failure or due to other fault once it is disconnected immediately fastest parking;

2) external mechanical auxiliary contacts also can be connected in series into the safety circuit, use the normally closed contact;

3) Regularly check the brake is OK, if the brake pads has wear;

4) Regularly check the perimeter security equipment is intact, is working properly;

5) without the rigorous verification, it is recommended not to run in the constant power region, to run in the constant power region, to ensure that the motor torque constant power output enough to pull up area load.