Foreword

The V5-GA series inverter adopts high-performance sensor-less vector control technology, which not only has excellent control performance, but also combines crane application characteristics. V5-GA series inverter has reliable mechanical brake control logic, speed monitoring, torque monitoring and other functions, which fully ensure the safety, reliability and high efficiency of the crane. It is widely used for crane machinery in ports, ships, marine engineering, mines, buildings, metallurgy, factories and other industries.

C O N T E N T S

Chapter 1 Product Information

1.1 Product Model Description

The digits and letters in the inverter model field on the nameplate indicate such informations as the inverter series, input voltage, power, software version and hardware version.

V5 - GA - 4 T 11G - AX - XX

Vector control/Torque control technology platform	

H	Universal series
GA	Heavy load series

2	220V
4	400V
6	690V

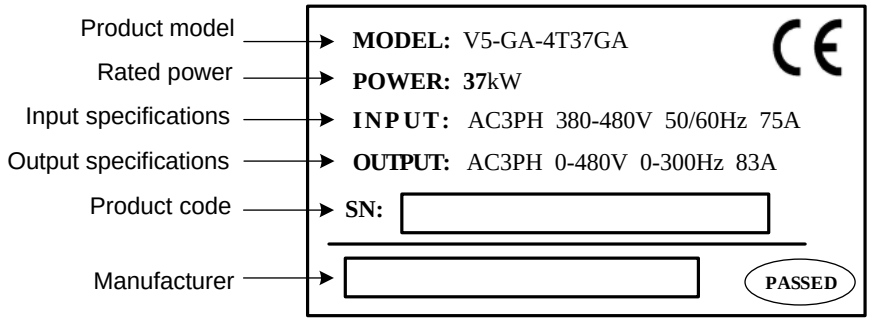
None	Hardware standard version
00～99：	Hardware non-standard version

None	Software standard version
SJ02	Construction Elevator series
A0～Z9：	Software non-standard version

11G	11kW

D	DC input
T	Three-phase
S	Single-phase

1.2 Product Nameplate Description



1.3 Product Series

■ V5-GA-4T□□□G

Three-phase 400V constant torque/ heavy-load application

Power (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Applicable Motor (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output	Voltage (V)	3 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 capability	150% for 60s, 180% for 10s, 200% for 0.5s, interval: 10 minutes (Inverse time characteristic)														
Input	Rated voltage / frequency	3 –phase 380V to 480V；50Hz/60Hz														
	Allowable voltage	323V ~ 528V; voltage imbalance ≤3%; allowable frequency fluctuation: ±5%														
	Rated current (A)	2.8	4.2	6.1	10	15	19	26	33	43	50	66	83	100	123	165
Brake chopper*2		Built-in as standard								Built-in as optional						
IP code		IP20														
Cooling mode		Natural cooling	Force air cooling													

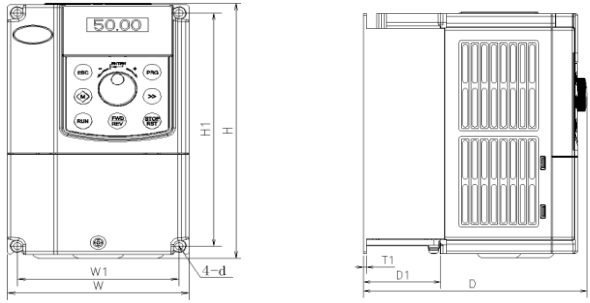
Power (kW)		90*3	110	132	160	185	200	220	250	280	315	355	400	450	500	
Applicable Motor (kW)		90	110	132	160	185	200	220	250	280	315	355	400	450	500	
Output	Voltage (V)	3 phase 0 to rated input voltage														
	Rated current (A)	176	210	253	304	350	380	426	470	520	600	650	690	775	860	
	Overload capability	150% for 60s, 180% for 10s, 200% for 0.5s, interval: 10 minutes (Inverse time characteristic)														
Input	Rated voltage / frequency	3 –phase 380V to 480V；50Hz/60Hz														
	Allowable voltage	323V ~ 528V; voltage imbalance ≤3%; allowable frequency fluctuation: ±5%														
	Rated current (A)	195	196*	232*	282*	326*	352*	385*	437*	491*	580*	624*	670*	755*	840*	
Brake chopper*2		Built-in as optional	External													
IP code		IP20														
Cooling mode		Force air cooling														

* 110kW and above power class are equipped with external DC reactor as standard.

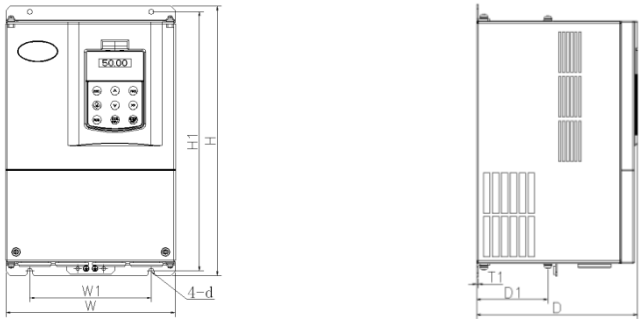
*2 18.5kW～90kW : Built-in brake chopper as optional, if selected, please add -06 suffix to the model.

*3 90kW cannot use DC as power supply, and cannot direct common DC bus(need precharge circuit.

1.4 Product Outline Dimension



V5−GA−4T7.5G and below power class



V5−GA−4T11G and above power class

Figure 1−1 Product outline and mounting dimension

Product outline, mounting dimension and weight

Voltage	Model	Outline and mounting dimension (mm)							Weight (kg)
		W	H	D	W1	H1	T1	Mounting hole diameter d	
400V	V5-GA-4T0.75G	118	190	155	105	173	3	5.5	1.5
	V5-GA-4T1.5G	118	190	175	105	173	4	5.5	2.6
	V5-GA- 4T2.2G								
	V5-GA-4T3.7G								
	V5-GA-4T5.5G	155	249	185	136	232	8	5.5	3
	V5-GA-4T7.5G								
	V5-GA-4T11G	210	337	200	150	324	2.5	7	8.5
	V5-GA-4T15G								
	V5-GA-4T18.5G	285	440	220	200	425	2.5	7	17
	V5-GA-4T22G								
	V5-GA-4T30G								
	V5-GA-4T37G	285	440	220	200	425	2.5	7	20
	V5-GA-4T45G	315	575	227	220	553	2.5	10	25
	V5-GA-4T55G	315	575	237	220	553	2.5	10	28
	V5-GA -4T75G	400	615	265	270	590	3	10	35
	V5-GA -4T90G	400	615	313	270	590	3	10	40
	V5 -GA-4T110G	465	745	325	343	715	3	12	55
	V5-GA -4T132G	465	745	360	343	715	3	12	60
	V5-GA -4T160G	540	890	385	370	855	4	14	85
	V5-GA-4T185G								
	V5- GA-4T200G								
	V5-GA-4T220G	540	890	416	370	855	4	14	90
	V5-GA-4T250G	700	1010	385	520	977	4	14	125
	V5-GA-4T280G								
	V5- GA-4T315G	700	1010	418.5	520	977	4	14	135
	V5- GA -4T355G	810	1358	425	520	1300	4	14	215
	V5-GA-4T400G								
	V5-GA-4T450G								
	V5-GA-4T500G								

1.5 Brake Resistor

Inverter model	Brake chopper	Brake resistor		
		Power	Resistance	Min. resistance
V5-GA-4T0.75G	Built-in	0.24kW	750Ω	125Ω
V5-GA-4T1.5G		0.45kW	400Ω	100Ω
V5-GA-4T2.2G		0.78kW	250Ω	100Ω
V5-GA-4T3.7G		1.3kW	150Ω	66.7Ω
V5-GA-4T5.5G		2.2kW	100Ω	66.7Ω
V5-GA-4T7.5G		3.3kW	75Ω	66.7Ω
V5-GA-4T11G		4.5kW	50Ω	25Ω
V5-GA-4T15G		6.6kW	40Ω	25Ω
V5-GA-4T18.5G-06	Built-in as optional if selected, please add -06 suffix to the model.	9kW	32Ω	20Ω
V5-GA-4T22G-06		11kW	27.2Ω	20Ω
V5-GA-4T30G-06		13kW	20Ω	14Ω
V5-GA-4T37G-06		20kW	16Ω	14Ω
V5-GA-4T45G-06		22kW	13.6Ω	10Ω
V5-GA-4T55G-06		27kW	10Ω	7Ω
V5-GA-4T75G-06		36kW	6.8Ω	5Ω
V5-GA-4T90G-06		45kW	5Ω	3.5Ω

Note:

- The resistance value of brake resistor must be higher than the minimum resistance value of the above table, otherwise the built-in brake chopper will be damaged.
- The higher power of the brake resistor, the better. The brake resistor power in the table is calculated with the braking duration within 30s. If the braking duration is longer, the brake resistor power must be higher. Please determine the appropriate brake resistor power according to the actual situation.
- The selection of brake resistor and brake chopper is related to system inertia, deceleration time, descent distance, time (i.e. potential energy). To select the model according to the actual situation. If the system inertia is larger, the deceleration time is shorter, and the braking is more frequent, the brake resistor needs higher power and smaller resistance value.
- It is requiring external brake chopper for higher power. For the selection of external brake chopper and brake resistor, please contact the manufacturer or local distributor.

Chapter 2 Mechanical Installation

2.1 Environment for Product Installation

- Do not install the inverter in the sites with oil mist, metal powder and dust.
- Do not install the inverter in the sites with hazardous gas and liquid, and corrosive, combustible and explosive gas.
- Do not install the inverter in salty sites.
- Do not install the inverter in the sites with direct sunlight.
- Do not mount the inverter on the combustible materials, such as wood.
- Keep the drilling scraps away from the inverter during the installation.
- Mount the inverter vertically in the electric control cabinet, mount the cooling fan or air conditioner to prevent the ambient temperature from rising to above 45 ºC.
- For the sites with adverse environment, it is recommended to mount the inverter heat-sink outside the cabinet.

2.2 Mounting Direction and Space

For excellent cooling effect, the inverter must be mounted vertically, and certain clearance must be maintained, as shown in the following figure.

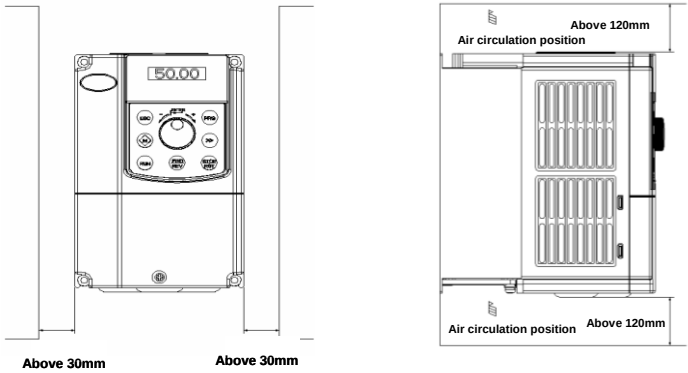


Figure2−1 Mounting direction and space for V5−GA−4T7.5G and below power class

☞ Note:

When the V5−GA−4T7.5G and below power class inverters are mounted side by side in the cabinet, please remove the upper dust guard and the lower leading board.

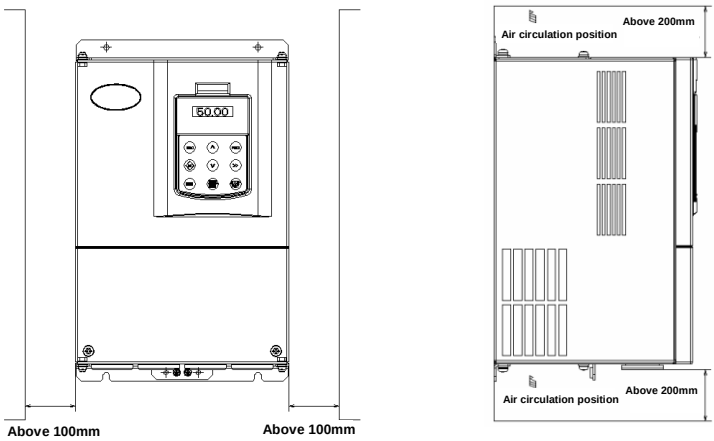


Figure 2−2 Mounting direction and clearance for V5−GA−4T11G and above power class

2.3 Removal and Mounting of Operation Panel and Cover

2.3.1 Removal and Mounting of Operation Panel

◆ Removal of operation panel

As shown in Figure 2−3, the grab on the operation panel forcefully in direction 1, and then lift the panel body in direction 2.

◆ Mounting of operation panel

As shown in Figure2−4, align with the lower clamping position of the operation panel in direction 1, and then press down the operation panel in direction 2, until the "crack" sound is heard.

Do not mount the operation panel in any other direction; otherwise, the operation panel will have poor contact.

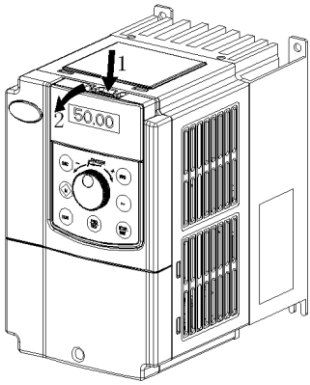


Figure 2−3 Removal of operation panel

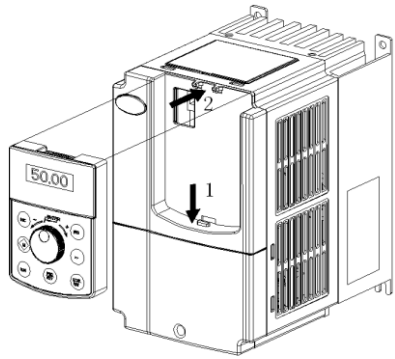


Figure2−4 Mounting of operation panel

2.3.2 Removal and Mounting of Covers with Plastic Enclosure

◆ Removal of operation panel

Please refer to 2.3.1 Removal and Mounting of Operation Panel.

◆ Removal of lower cover

After removing the mounting screws of the cover, press the left and right sides of the cover forcefully in direction 1 and lift the cover in direction 2 simultaneously, as shown in Figure 2−5.

◆ Removal of upper cover

As shown in Figure2−6, press the left and right sides of the cover forcefully in direction 1, and lift the cover in direction 2 simultaneously.

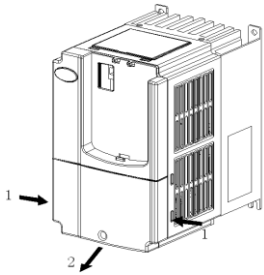


Figure 2−5 Removal of lower cover

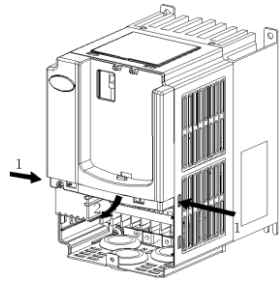


Figure 2−6 Removal of high cover

◆ Mounting upper cover

After connecting the cables of main circuit terminals and control circuit terminals, insert the upper claw grab of the upper cover into the groove of the inverter body, as shown in position 1 in Figure2−7, and then press the lower part of the upper cover in direction 2 as shown in Figure2−7, until the "crack" sound is heard.

◆ Mounting lower cover

Insert the upper claw grab on the lower cover into the groove of the upper cover, as shown in position 1 of Figure2−8, and then press the lower part of the lower cover in direction 2 of Figure2−8, until the "crack" sound is heard. Now, tighten the cover screws.

◆ Mounting operation panel

Please refer to 2.3.1 Removal and mounting of operation panel.

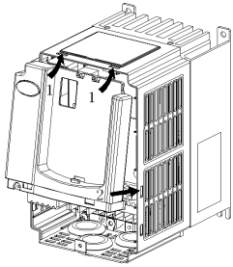


Figure2−7 Mounting of upper cover

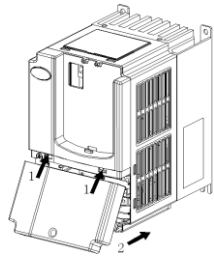


Figure2−8 Mounting of lower cover

2.3.3 Removal and Mounting of Covers of V5−GA−4T11G ~ V5−GA−4T75G with Sheet−metal Enclosure

◆ Removal of operation panel

Please refer to 2.3.1 Removal and Mounting of Operation Panel.

◆ Removal cover

Remove the mounting screws on the lower part of the cover, lift the cover in direction 1 as shown in Figure2−9, and then take out the cover in direction 2.

◆ Mounting cover

After connecting the cables of the main circuit terminals and control circuit terminals, cramp the cover in direction 1 as shown in Figure2−10, press down the cover in direction 2 and then tighten the cover screws.

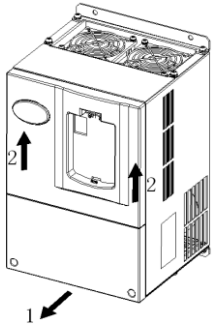


Figure2−9 Removal of cover

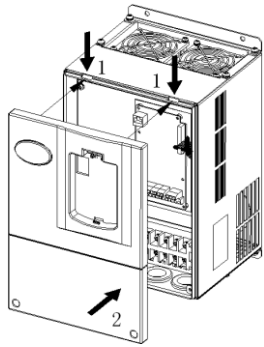


Figure2−10 Mounting of cover

◆ Mounting operation panel

Please refer to 2.3.1 Removal and Mounting of Operation Panel.

☞ Note:

Do not directly mount the cover with operation panel; otherwise, the operation panel will have poor contact.

2.3.4 Open and Close of Doors of V5−H−4T90G and Above Power Class with Sheet−metal Enclosure

- Opening of the door

  Press the latch following direction 1 in Figure2−11 and open the door following direction 2.

- Removal of operation panel

  The operation panel is connected to the control board through the standard network cable and will not interfere with the open/close of the door. To remove the operation panel, refer to 2.3.1 Removal and Mounting of Operation Panel

- Mounting of cover

  After the wiring operation of main circuit terminals and control circuit terminals is completed, close the door following direction 1 in Figure2−12, and then press down the latch following direction 2 to lock the door.

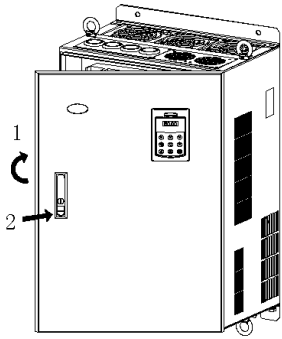


Figure 2−11 Opening the door

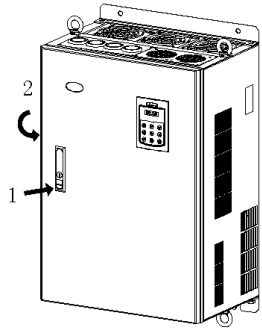


Figure 2−12 Closing the door

Chapter 3 Electrical Installation

3.1 Peripheral Devices Connection

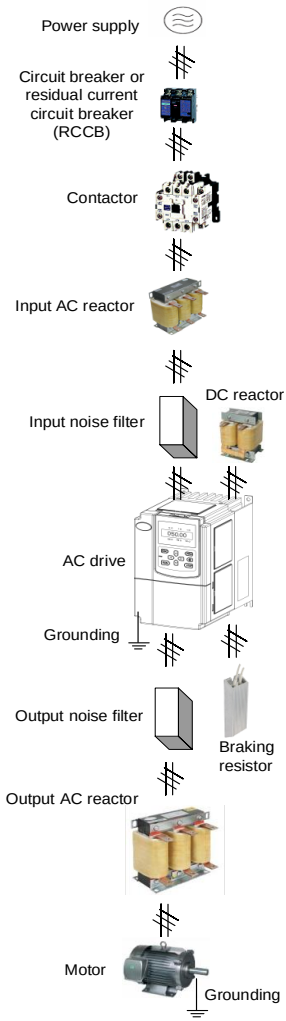


Figure 3−1 Connection diagram of the product and peripheral devices

3.2 Peripheral Devices Description

Device	Model selection reference
Circuit breaker	The circuit breaker capacity should be 1.5 to 2 times of the drive rated current. The time characteristics of the circuit breaker must fully consider the time characteristics of the drive overload protection.
RCCB (Residual current circuit breaker)	The drive output is high-frequency pulse so as generates leakage currents to ground. When installing the RCCB at the input end, please use the specialized RCCB. It is suggested to choose type B RCCB, and set the leakage current value to 300mA.
Contactor	Frequent contactor action will cause drive failure, so the highest frequency for the open and close the contactor shall not exceed 10 times/min. When brake resistor is used, to avoid the over-temperature damage of the brake resistor, a thermal protection relay with brake resistor over-temperature detection should be installed to disconnect the contactor of power supply.
Input AC reactor or DC reactor	1. The power supply capacity is more than 600kVA or 10 times of the drive capacity. 2. If there is a switch-type reactive compensation capacitor or a thyristor phase-controlled load on the same power supply node. There will be a large peak current flowing into the input power circuit, which will cause damage to the rectifier. 3. When the voltage imbalance of drive's three-phase power supply exceeds 3%, it may cause interference to the system or cause damage to the rectifier. 4. The input power factor of the drive is required to be higher than 90%, and the input AC reactor can improve the power factor of the input side. 5. Improve the input side of the high-order harmonic, prevent damage to other equipment caused by distortion of the voltage waveform. 6. Improve the influence of input side higher harmonics on the drive, and reduce external conduction and radiation interference. When exists the above situations, the AC reactor at the drive input side or DC reactor should be installed.
Input noise filter	It can reduce the interference from power supply to the drive and improve the anti-interference ability of the drive. It can reduce the external conduction and radiation interference of the drive.
Thermal protection relay	Although the drive has its own motor overload protection function, when one drive drives two or more motors or drives a multi-poles motor, it is recommended to install a thermal protection relay between the drive and every motor.
Output noise filter	It can reduce the external conduction and radiation interference of the drive.
Output AC reactor	When the cable from the drive to the motor exceeds 100 meters, it is recommended to install an AC output reactor that can suppress high-frequency oscillation to avoid motor insulation damage, excessive leakage current and drive protection.

3.3 Main Circuit Terminal Description

◆ **V5-GA-4T0.75G～V5-GA-4T15G：Built-in brake chopper as standard**

R/L1	S/L2	T/L3	+1	+2/B1	B2	—	U/T1	V/T2	W/T3
POWER			OPTION				MOTOR		

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

◆ **V5-GA-4T18.5G-06～V5-GA-4T90G-06：Built-in brake chopper is selected**

R/L1	S/L2	T/L3	B1	B2	—	U/T1	V/T2	W/T3
POWER			OPTION			MOTOR		

Terminal symbol	Terminal name and function
R/L1、S/L2、T/L3	Three-phase AC input terminal
B1、B2	Connecting terminal of braking resistor
B1、—	DC power input terminal; DC input terminal of external braking chopper
U/T1、V/T2、W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

Note[1]: The products can realize both built-in brake chopper and common DC bus function. If it is necessary to realize both built-in brake chopper and external DC reactor, contact the manufacturer to change the main circuit terminals, the terminals "B1", "B2" and "-" are changed to "+ 1", "+ 2 / B1" and "B2".

Note[2]: V5-GA-4T90G can not directly common DC bus because the internal buffer is controlled by thyristor.

◆ **V5-GA-4T18.5G～V5-GA-4T90G：Built-in brake chopper is not selected**

R/L1	S/L2	T/L3	+1	+2	—	U/T1	V/T2	W/T3
POWER			OPTION			MOTOR		

Terminal symbol	Terminal name and function
R/L1、S/L2、T/L3	Three-phase AC input terminal
+1、+2	DC reactor connecting terminal, short circuited with copper bus by default
+2、—	DC power input terminal; DC input terminal of external braking chopper
U/T1、V/T2、W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

◆ **V5-GA-4T110G and below power class：no built-in brake chopper**

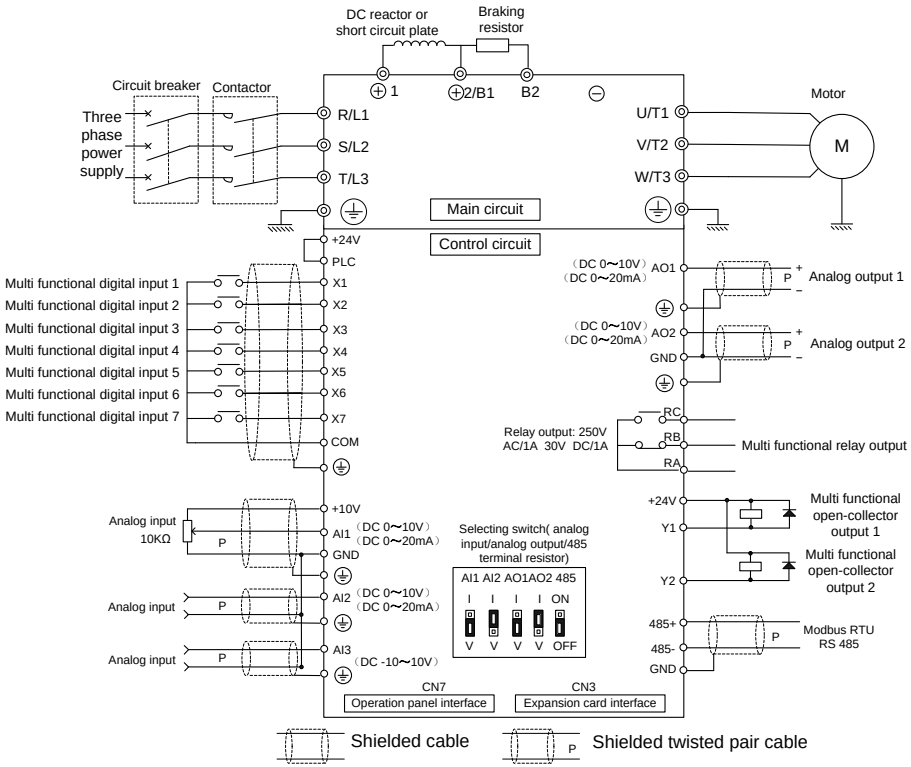
POWER		
R/L1	S/L2	T/L3

+1	+2	—
OPTION		

U/T2	V/T2	W/T3
MOTOR		

Terminal Symbol	Description
R/L1、S/L2、T/L3	Three-phase AC input
+1、+2	DC reactor connecting terminal The keypad will no display after power on if not connect the DC reactor.
+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

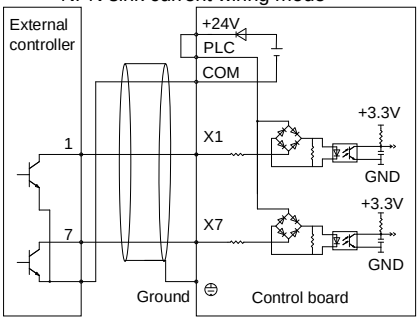
3.4 Terminal Wiring



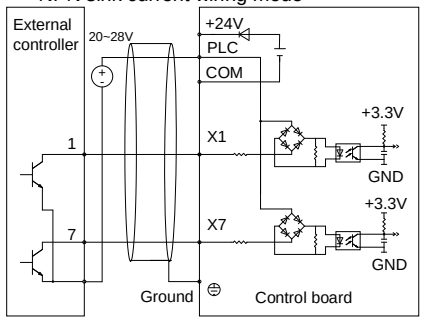
Terminal wiring diagram 1（≤V5−GA−4T7.5G）

3.5 Digital Inputs and Outputs

■ Apply internal +24V power supply
NPN sink current wiring mode

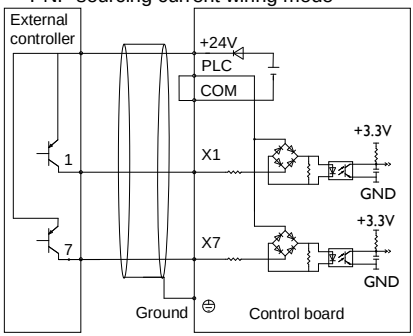


■ Apply external power supply
NPN sink current wiring mode



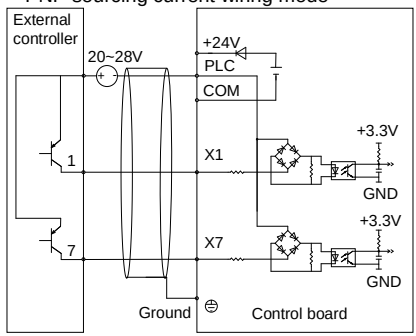
Note: Short-link line between +24V and PLC must be removed.

■ Apply internal +24V power supply
PNP sourcing current wiring mode



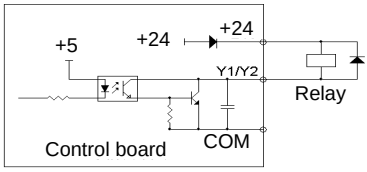
Note: Short-link line between +24V and PLC must be removed and short PLC and COM

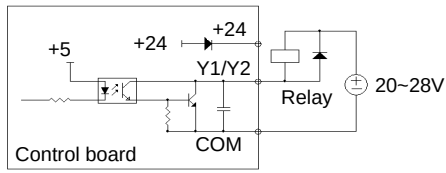
■ Apply external power supply
PNP sourcing current wiring mode



Note: Short-link line between +24V and PLC must be removed.

■ The wiring modes of the multi−function output terminals apply internal +24V and external power supply





Note: Please confirm that the polarity direction of the diode is correct, otherwise, Y1/Y2 terminal will be damaged.

3.6 Control Circuit Description

Terminal	Symbol	Function description	Technical specifications
Modbus	485+	RS485 positive end	● Baud rate: 4800/9600/19200/38400/57600/57600bps ● Up to 32 units are connected in parallel. ● If more than 32 units are used, repeaters are required.
	485−	RS485 negative end	
	GND	Modbus gnd	
Keypad	CN7	RS485 port of keypad	The maximum distance for keypad is 15 m (network cable)
Digital inputs	+24V	+24V	24V±10%, internal isolated with GND Maximum output current: 200mA
	PLC	Power supply of DI	Short to +24V by default
	X1～X7	Digital inputs 1～7	Input specification: 24VDC ± 20%, 5mA Frequency range: 0-1KHz
	COM	Digital inputs common	The interior isolated from GND
Digital outputs	Y1	Open collector output 1	Voltage range: 24V±20% Maximum output current: 50mA
	Y2/DO	Open collector output 2	
	COM	Y1 and Y2 common	The interior isolated from GND
Relay outputs	RA/RB/RC	Relay output 1	RA－RB: Normally closed RA－RC: Normally open Contact capacity: 250VAC/1A, 30VDC/1A
Analog inputs	+10V	AI reference voltage	10V ±3%, internal isolated with COM Maximum output current: 10mA
	AI1	Analog input 1	−10V~10V: Input impedance 20kΩ, max. voltage: ±15V 0~20mA: Input impedance 500Ω, max. current: 30mA Resolution: 12 bits (0.025%) **Note**: AI3 does not support input current 0~20mA
	AI2	Analog input 2	
	AI3	Analog input 3	
	GND	Analog GND	The interior isolated from COM
Analog outputs	AO1	Analog output 1	Select analog voltage or current output by jumper 0～20mA: Output allowable impedance 200 to 500 Ω 0～10V: Output allowable impedance ≥10kΩ
	AO2	Analog output 2	
	GND	Analog ground terminal	The interior isolated from COM

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

Chapter 4 Operation Panel

4.1 Introduction to Operation Panel

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

Figure 4−1 Display unit of operation panel

4.2 Descriptions of Indicators

Symbol of Indicator		Name	Descriptions	Color
Unit indicator	Hz	Frequency indicator	On: Current displayed value unit is running frequency Flash: Current displayed value unit is setting frequency	Green
	A	Current indicator	On: Current displayed value unit is current	Green
	V	Voltage indicator	On: Current displayed value unit is voltage	Green
	Hz+A	Rotating speed indicator	On: Current displayed value unit is rotating speed Flash: Current displayed value unit is setting rotating speed	Green
	Hz+V	% indicator	On: Current displayed value unit is %	Green
	A+V	Self definable indicator	On/Flash: Current displayed value unit is self−defined, see descriptions of parameter P2.04 to P2.07.	Green
	Hz+A+V	Time indicator	On: Current displayed value unit is time	Green
		No unit indicator	Off: Current displayed value unit is no unit	−
Status indicator	MULTI	Multi−function M key indicator	Refer to table 4−1 for using method of multi function selection keys and the meanings of MULTI indicator	Red
	MON	Run command reference channel indicator	On: Run command reference is operation panel Off: Run command reference is terminals Flash: Run command reference is communication	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 had run forward command In running status, inverter is running forward Flash: Changing from forward running to reverse running	Red
	REV	Run reverse indicator	On: In stop status, inverter had run reverse command In running status, inverter is running reverse Flash: Changing from reverse running to forward running	Red

4.3 Keys Description

Symbol		Name	Function
Key type	Shuttle type		
		Programming key PRG	1. Enter each level of menu 2. Confirm displayed data storage 3. Check parameters in sequence 4. Confirm the changeover of run command channel 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 from first level menu 2. Give up data storage after modifying data 3. Back to all parameters displayed mode after pressing this key for more than 5s. Refer to 4.4.3. When LCD cannot display all the parameters, use this method to re−display all the parameters 4. After pressing >> key to switch from fault display to Stop / Run parameters display, press ESC to back to fault display status
	Knob+ 	Increase Key ∧	1. In first level menu, increase parameters according to edit bit 2. In second level menu, increase the parameters value 3. In stop/run status, increase the frequency reference or PID main reference
	Knob−	Decrease Key ∨	1. In first level menu, decrease parameters according to edit bit 2. In second level menu, decrease the parameters value 3. In stop/run status, decrease the frequency reference or PID main reference
		Shift Key >>	1. In first level menu, press >> key to select edit bit of PX.YZ menu 2. In second level menu, press >> key to select the edit bit of data 3. In stop/run status, press >> key to display parameters such as frequency, DC BUS voltage, current and voltage, etc. 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 start the motor 2. After setting the motor data identification, press RUN key to start motor data identification
		Stop/Reset Key STOP/RST	1. When running command is given via operation panel, the key is used to stop the motor 2. This key is used as a stop key when inverter has fault alarm but not stop 3. When the inverter has fault and stopped, this key is used as RESET key to clear the fault alarm
		Multi－function selection Key M	See table 4−1 for the using method of multi−function M key function selection and the meanings of MULTI indicator
		Forward/Reverse Key FWD/REV	When running command is given via operation panel, this key is used to change the output direction of motor

Note:

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

Table 4−1 Multi−function M key function selection and the meanings of MULTI indicator

Value setting (P2.01)	Function	Descriptions	Meanings of MULTI indicator
0	No function	M key is defined as no function.	Normally Off: No function
1	JOG	Used as JOG operation key and is only enabled when run 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	Emergency stop 1 (stop in shortest time)	Press M key, inverter will stop in shortest time	On: Press M Off: Release M
3	Emergency stop 2 (coast to stop)	Press M key, inverter will coast to stop	On: Press M Off: Release M
4	Switchover of run command channel	Press M key to switch the run command channel: Operation panel→Terminal → Communication → Operation panel During switchover time, there is a 5−second response time limit and the change is canceled automatically after 5−second time is exceeded. Within 5s, press PRG key to confirm the change. MON indicator indicates the run command channel	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 run command source
5	Switchover of parameters displayed mode FASt/bASE	Press M key to switch between FASt and bASE parameters displayed mode panel should prompt as FASt and bASE	On: FASt, fast parameters displayed mode Off: bASE, basic parameters displayed mode
6	Switchover of parameters displayed mode ndFt/bASE	Press M key to switch between ndFt and bASE parameters displayed mode, the indications on the operation panel are ndFt and bASE respectively	On: ndFt,non−factory setting parameters displayed mode Off: bASE, basic parameters displayed mode
7	Switchover of parameters displayed mode LASt/bASE	Press M key to switch between LASt and bASE parameters displayed mode, the indications on the operation panel are LASt and bASE respectively	On: LASt, last change 10 parameters displayed mode Off: bASE, basic parameters displayed mode
8	Switchover of parameters displayed mode	bASE→FASt→ndFt→LASt→bASE	On: non−bASE basic parameters displayed mode Off: bASE, basic parameters displayed mode

4.4 Menu Style

The menu style is 2−level menu.

4.4.1 Format of First Level Menu

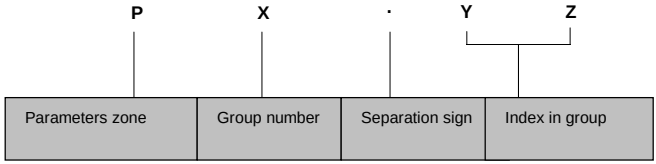


Figure 4−2 Format of first level menu

◆ Dividing the first level menu

Password action range	Parameters **area**	**Group number in area**	Parameter **numbers range**
Protection range of user password P0.00	User operation zone (Group P0 to PE)	Group P0	P0.00 ~ P0.16
		Group P1	P1.00 ~ P1.08
		Group P2	P2.00 ~ P2.07
		Group P3	P3.00 ~ P3.13
		Group P4	P4.00 ~ P4.36
		Group P5	P5.00 ~ P5.13
		Group P6	P6.00 ~ P6.24
		Group P7	P7.00 ~ P7.25
		Group P8	P8.00 ~ P8.10
		Group P9	P9.00 ~ P9.18
		Group PA	PA.00 ~ PA.22
		Group Pb	Pb.00 ~ Pb.23
		Group PC	PC.00 ~ PC.06
		Group Pd	Pd.00 ~ Pd.36
		Group PE	Reserved
	Status displayed zone (Group d0 to d2)	Group d0	d0.00 ~ d0.11
		Group d1	d1.00 ~ d1.11
		Group d2	d2.00 ~ d2.24
A0.00 protection zone	Parameters displayed and hidden area defined by user (Group A0)	Group A0	A0.00 ~ A0.02
C0.00 protection zone	Reserved (Group C0)	Reserved	Reserved
U0.00 protection zone	Reserved (Group U0)	Reserved	Reserved
U1.00 protection zone	Reserved (Group U1 to U3)	Reserved	Reserved

◆ Structure of first level menu

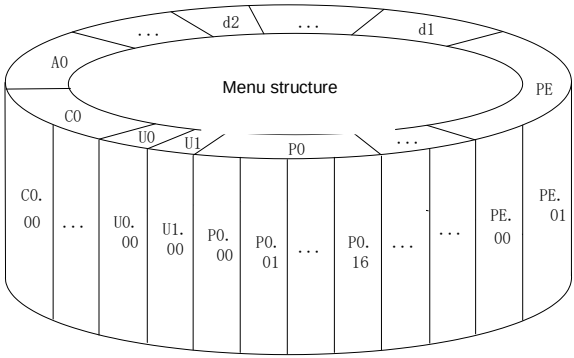


Figure 4−3 Structure of first level menu

4.4.2 Format of Second Level Menu

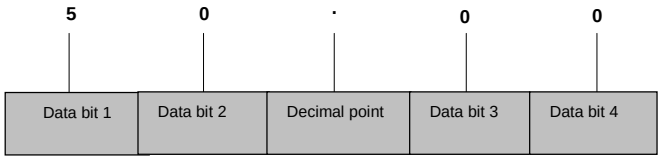


Figure 4−4 Format of second level menu

◆ 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 parameters that require password input are P0.00, PE.00, A0.00, C0.00, U0.00 and U1.00. Group PE, C0, U0 and U1 are factory reserved.

4.4.3 Menu Mode

◆ Basic menu mode bASE

Basic menu includes all the parameters mentioned in this user manual. Except for the special descriptions, all the descriptions of this manual are in this menu mode.

◆ Fast menu mode FASt

Fast menu includes some common parameters and you can start the inverter by setting only a few parameters so as to realize the fast application.

◆ Non−factory setting menu mode ndFt

This menu mode is used to search for the parameters different from the factory settings for the convenience of understanding the parameter setting.

◆ Last changed 10 parameters menu mode LASt

This menu mode is used to display the last changed 10 parameters and P0.02. If the password protection is set, only P0.00 and C0.00 can be viewed. The last changed 10 parameters, P0.00 and P0.02 can be viewed only when correct password is entered into P0.00.

◆ Method of back to basic menu

- By setting parameter P0.02 to 0, then the menu returns to basic menu mode after bASE is displayed.
- By using M key: Define the function of multi−function key M as menu switchover function, and then press this key to switch the menu mode. Refer to table 4−1 for the methods of using multi−function key and meanings of MULTI indicator.
- 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.

4.4.4 Common Characters Displayed by LED

Except the parameters 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	The parameters are being copied and this symbol will be displayed.
−LU−	Inverter DC BUS voltage too low	Loc1	Operation panel is locked
−dc−	Inverter is in DC braking status	Loc2	Except M key, other keys are locked
−At−	Inverter is in motor data identification	Loc3	Except RUN and STOP/RST keys, other keys are locked
bASE	Basic menu (P0.02=0)	ndFt	Non factory setting parameters displayed
CoPy	The parameters are being downloaded and this symbol will be displayed	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
E.XXX	Fault is displayed. Refer to chapter 7	Prot	Password protection is enabled
FASt	Fast menu (P0.02=1)	SLId	Operation panel is identified as shuttle type
HoLd	The parameter copy or upload is disabled	ULoc	Press ESC+>>+∨ together to unlock the panel
LASt	Last changed 10 parameters displayed	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 manufacture.

4.4.5 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		

4.5 Password Operation

- Set Password

  Enter password parameter P0.00 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 parameter P0.00 and 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 parameter P0.00 and set to 0000 continuously for two times, after "P. CLr" is displayed, this means the password is successfully cleared. Then you can access the password protection area without password verification. See 4.8.5 descriptions of clearing password.

- Method of Enabling Password

  One of following three methods can be used to activate the password:

  1.Press ESC+PRG +∧ simultaneously (for shuttle type, turning clock wise is equivalent to the ∧ 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.Do not press any key for continuous 5 minutes.

  3.Power off till the inverter without display and power on again.

4.6 Lock and 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.

  ◆ Activate key locking function. One of following three modes can be selected to activate key locking function:

  1. Press ESC+PRG +∧ simultaneously (for shuttle type, turning clock 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 key locking function, the operation panel is locked automatically.

- Unlock Keys:

  Press ESC+>>+∨ keys simultaneously (for shuttle type, turning anti−clock wise is equivalent to ∨ key) to unlock.

4.7 Key Operation

4.7.1 Classification of Display Status

There are 8 types of display status of operation panel:

SN	Status	Meaning
1	Display parameters in stop status	Press >> key to switch the displayed parameters, P2.03 can be used to set the displayed parameters
2	Display parameters in running status	Press >> key to switch the displayed parameters, P2.02 can be used to set the displayed parameters
3	Fault and alarm display status	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 stop and running parameters, press ∧ and ∨ to enter
8	Information prompt status	See 4.4.5 for identifying the LED display characters

4.7.2 Display Status and Operation Process

◆ >> key

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

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

◆ Display status auto changed

If no key is pressed for 30s, the screen automatically returns to the display status of parameter in stop status or running status.

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

If there is password setting or key locking setting, and if no key is pressed for 5 minutes, the password protection or locking status will be activated automatically.

◆ Display status and operation procedure

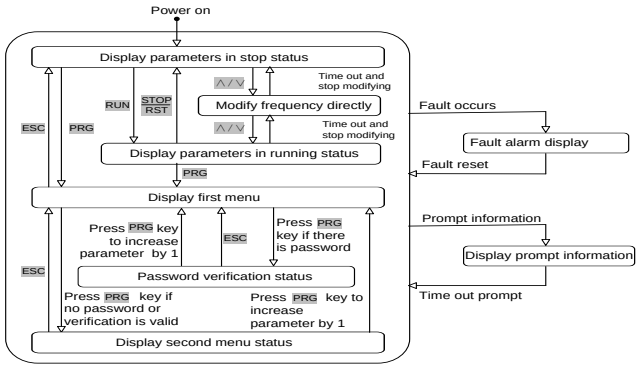


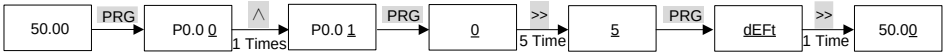
Figure 4−5 Display status and operation procedure

4.8 Operation Example

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

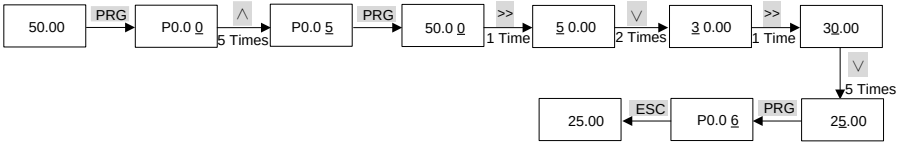
4.8.1 Restore to Factory Setting

For example, setting P0.01=5: Restore all the parameters in zone P to factory settings.



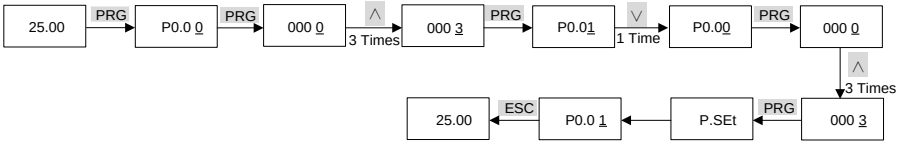
4.8.2 Setting Frequency

For example, setting P0.05=25.00Hz.



4.8.3 Setting Password

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



4.8.4 Password Verification

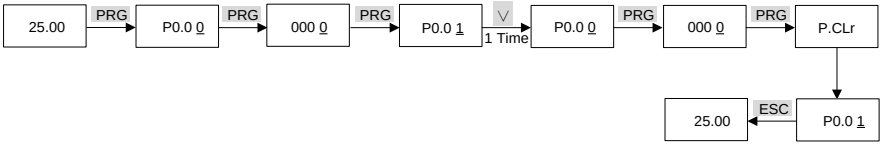
Assume that the parameters are protected by password and the password is 3. If the password protection is not enabled, you can press ESC+PRG+∧ to enable the password in last example of P0.00. You can perform the password verification according to the following process:

Note:

If you use RS 485 communication mode to perform password verification, please refer to the Appendix A.

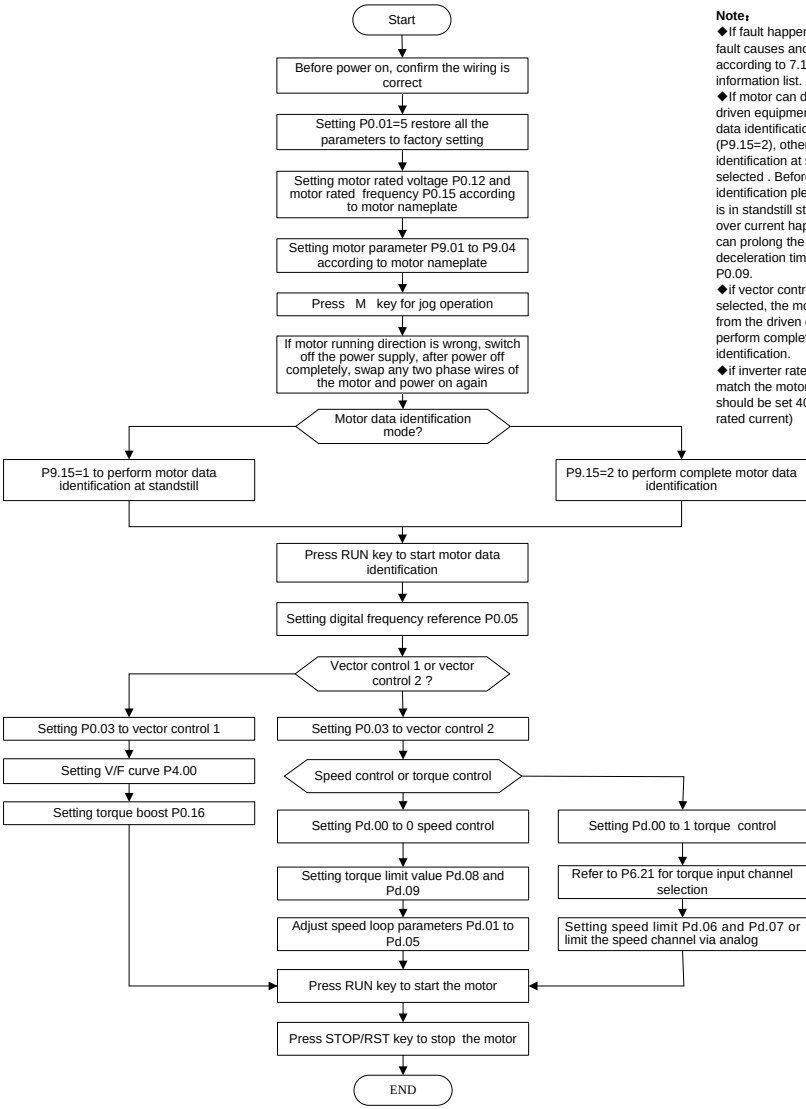
4.8.5 Clear Password

For example, clear the user password P0.00.



4.9 Running for the First Time

Please follow the procedures to run for the first time:



Note:

◆If fault happens, please judge the fault causes and clear the fault according to 7.1 Fault and alarm information list.

◆If motor can de-coupled from the driven equipment, complete motor data identification should be selected (P9.15=2), otherwise only motor data identification at standstill can be selected . Before perform motor data identification please ensure the motor is in standstill status .If over voltage or over current happens in process, you can prolong the acceleration and deceleration times of P0.08 and P0.09.

◆if vector control 2(P0.03=4~11) is selected, the motor must de-coupled from the driven equipment and perform complete motor data identification.

◆if inverter rated power does not match the motor rated power, P9.05 should be set 40% of P9.04 (motor rated current)

Chapter 5 Parameters list

Description of each meaning in the parameter list

Item	Explanation
Parameter	Indicates the code of the parameter, such as P0.00.
Name	The name of the parameter, explaining the function of the parameter.
Default	The parameter value after reset the default value
Range	Allowable set parameter value form minimum to maximum
Unit	V: voltage; A: current; °C: degrees Celsius; Ω: ohm; rpm: rev/min; %: percentage; kW: power; bps: baud rate; Hz, kHz: frequency; mH: milli-henry; ms, s, min, h, kh: time; /: no unit.
Attribute	○: This parameter can be changed while the drive is running; ×: This parameter can only be changed in stop status; *: This parameter is a read-only parameter and cannot be modified.
Description	Describe the parameters and values

5.1 Parameters List

No.	Name	Default	Range	Unit	Property	Description
Group P0 Basic Function Parameters						
P0.00	User password	0000	0000 ~ FFFF	/	○	0000: No password Other: Password protection
P0.01	Parameters 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 setting 3: Restore parameters in zone P to factory setting except group P9 4: Restore parameter values in zone P and zone A to factory setting 5: Restore all the parameters to factory setting except group d
P0.02	Parameters display mode	0	0 ~ 3	/	○	0: Basic menu mode 1: Fast menu mode 2: Non−factory setting menu mode 3: Last changed 10 parameters menu mode
P0.03	Control mode	00	00 ~ 11	/	×	00: Sensor-less vector control 1 04: Sensor-less vector control 2 08: Sensor vector control
P0.04	Open loop main reference channel	00	0 ~ FF	/	○	0: Open loop digital frequency reference (P0.05) 1: AI1 analog reference 2: AI2 analog reference 3: AI3 analog reference 4: Reserved

No.	Name	Default	Range	Unit	Property	Description
P0.05	Open loop digital frequency reference	50.00	0.00 ~ 300.00	Hz	○	P0.13 ~ P0.14
P0.06	Run command selection	0	0 ~ 2	/	○	0: Operation panel 1: External digital input 2: Communication
P0.07	Running direction command	0	0 ~ 1	/	○	0: Run forward 1: Run reverse
P0.11	Max. output frequency	50.00	0.01 ~ 300.00	Hz	×	P0.13 ~ 300.00Hz
P0.12	Max. output voltage	380	1 ~ 480	V	×	Motor rated voltage
P0.13	Frequency upper limit	50.00	0.00 ~ 300.00	Hz	×	P0.14 ~ P0.11
P0.14	Frequency lower limit	0.00	0.00 ~ 300.00	Hz	×	0.00Hz ~ P0.13
P0.15	Basic operating frequency	50.00	0.00 ~ 300.00	Hz	×	Motor rated frequency
Group P1 Main and Auxiliary Reference Parameters						
P1.00	FWD acceleration time	8.0	0.0～3600.0	s	○	Acceleration time: Time accelerate from 0Hz to P0.11. Deceleration time: Time decelerate from P0.11 to 0Hz If the multi acceleration and deceleration time is effective, then the actual acceleration and deceleration time will be based on the digital inputs. Please refer to the parameter P4.09-P4.14.
P1.01	FWD deceleration time	8.0	0.0～3600.0	s	○	
P1.02	REV acceleration time	8.0	0.0～3600.0	s	○	
P1.03	REV deceleration time	8.0	0.0～3600.0	s	○	
P1.04	S-curve acceleration and deceleration time	0.0	0.0～6553.5	s	○	
P1.05	Forward torque boost	4.0	0.0～30.0	%	○	Auto torque boost: 0.0 Manual torque boost: 0.1% ~ 30.0% When operating at low frequencies, increase the output voltage and torque. The amplitude of the increase should be appropriately set according to the load situation. If the increase is too much, there will be a large current impact during the starting process. **Note**: This function is applicable under vector control 1
P1.06	Reverse torque boost	3.0	0.0～30.0	%	○	
P1.07	Slip compensation at low speed	100.0	0.0～1000.0	%	○	This function helps maintain stable motor speed under load fluctuations and heavy loads. **Note**: This function is effective in vector 1 control mode.
P1.08	Slip compensation at high speed	100.0	0.0～1000.0	%	○	
P1.09	Slip compensation switching speed	10.00	0.00～300.00	Hz	○	
Group P2 Key and Display Parameters						
P2.00	Operation panel key−locking 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
P2.01	Multi−function M key function selection	1	0 ~ 8	/	○	0~2: No function 3: Emergency stop 2 (coast to stop) 4: Switchover of run command channel 5~8: Reserved.

No.	Name	Default	Range	Unit	Property	Description
P2.02	Display parameter selection in running status	1CB0	0000 ~ FFFF	/	○	Ones place: 0: Reference frequency (Hz) 1: Bus voltage (V) 2: AI1(V) 3: AI2(V) 4: AI3(V) 5~6: Reserved 7: Motor speed (rpm) 8~9: Reserved A: Reference torque (%) B: Running frequency (Hz) C: Output current (A) D: Output torque (%) E: Output power (kW) F: Output voltage (V) Tens, hundreds, thousands place: Same with above
P2.03	Display parameter selection in stop status	3210	0000 ~ FFFF	/	○	Ones place: 0: Reference frequency (Hz) 1: Bus voltage (V) 2: AI1(V) 3: AI2(V) 4: AI3(V) 5~F: Reserved Tens, hundreds, thousands place: Same with above
Group P3 Start/stop Parameters						
P3.00	Start mode	0	0 ~ 1	/	×	0: Normal start 1: Start after DC injection
P3.01	Reserved	0.0	0.0 ~ 120.0	%	×	
P3.02	DC injection active time	0.00	0.00 ~ 30.00	s	×	Inject current is defined by parameter P3.07
P3.03	Start frequency	0.00 0.50	0.00 ~ 60.00	Hz	×	Range: 0.00 ~ the lower of P0.13 and 60.00Hz P0.03=8, the value is 0.00 by default P0.03=0/4, the value is 0.50 by default
P3.04	Start frequency holding time	0.0	0.0 ~ 3600.0	s	×	0.0 ~ 3600.0s
P3.05	Stop mode	0	0 ~ 1	/	×	0: Deceleration to stop, if P3.08 is a non-zero value, then DC braking after deceleration 1: Coast to stop
P3.06	DC braking frequency	0.00	0.00 ~ 300.00	Hz	×	0.00 ~ 300.00Hz
P3.07	DC braking current	0.0	0.0 ~ 120.0	%	×	100.0% = Inverter rated current
P3.08	DC braking active time	0.00	0.00 ~ 30.00	s	×	0.00 ~ 30.00s
P3.09	RUN reverse selection	0	0 ~ 1	/	×	0: Run reverse is allowed 1: Run reverse is not allowed
P3.10	FWD/REV switchover dead zone time	0.0	0.0 ~ 3600.0	s	×	0.0 ~ 3600.0s
P3.11	Forward and reverse switching frequency	2.00	0.00~300.00	Hz	×	0.10 ~ 300.00Hz
Group P4 Multi−step Parameters						
P4.00	V/F curve selection	0	0 ~ 6	/	×	0: Linear V/F 1: Multi−point V/F (P4.01 ~ P4.08) 2~6: Reserved
P4.01	Multi-point V/F frequency F0	0.00	0.00 ~ 300.00	Hz	×	F0<F1
P4.02	Multi-point V/F voltage V0	0.0	0.0 ~ 100.0	%	×	0.0 ~ 100.0%
P4.03	Multi-point V/F frequency F1	0.00	0.00 ~ 300.00	Hz	×	F1<F2

<table>
<tr><th>No.</th><th>Name</th><th>Default</th><th>Range</th><th>Unit</th><th>Property</th><th>Description</th></tr>
<tr><td>P4.04</td><td>Multi-point V/F voltage V1</td><td>0.0</td><td>0.0 ~ 100.0</td><td>%</td><td>×</td><td>0.0 ~ 100.0%</td></tr>
<tr><td>P4.05</td><td>Multi-point V/F frequency F2</td><td>0.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>×</td><td>F2<F3</td></tr>
<tr><td>P4.06</td><td>Multi-point V/F voltage V2</td><td>0.0</td><td>0.0 ~ 100.0</td><td>%</td><td>×</td><td>0.0 ~ 100.0%</td></tr>
<tr><td>P4.07</td><td>Multi-point V/F frequency F3</td><td>0.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>×</td><td>F3≤Motor rated frequency P0.15</td></tr>
<tr><td>P4.08</td><td>Multi-point V/F voltage V3</td><td>0.0</td><td>0.0 ~ 100.0</td><td>%</td><td>×</td><td>0.0 ~ 100.0%</td></tr>
<tr><td>P4.09</td><td>Acceleration time 1</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td><td rowspan="5"><table><tr><th>Multi ACC/DEC time digital input 2</th><th>Multi ACC/DEC time digital input 1</th><th>ACC / DEC time</th></tr><tr><td>OFF</td><td>OFF</td><td>P1.00～P1.04</td></tr><tr><td>OFF</td><td>ON</td><td>P4.09，P4.10</td></tr><tr><td>ON</td><td>OFF</td><td>P4.11，P4.12</td></tr><tr><td>ON</td><td>ON</td><td>P4.13，P4.14</td></tr></table></td></tr>
<tr><td>P4.10</td><td>Deceleration time 1</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td></tr>
<tr><td>P4.11</td><td>Acceleration time 2</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td></tr>
<tr><td>P4.12</td><td>Deceleration time 2</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td></tr>
<tr><td>P4.13</td><td>Acceleration time 3</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td></tr>
<tr><td>P4.14</td><td>Deceleration time 3</td><td>20.0</td><td>0.1 ~ 3600.0</td><td>s</td><td>×</td></tr>
<tr><td>P4.22</td><td>Multi−step frequency 1</td><td>5.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td><td rowspan="16"><table><tr><th>Multi frequency digital input 4</th><th>Multi frequency digital 3</th><th>Multi frequency digital 2</th><th>Multi frequency digital 1</th><th>Frequency reference</th></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>P0.05</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>P4.22</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>P4.23</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>P4.24</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>P4.25</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>P4.26</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>P4.27</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>P4.28</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>P4.29</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>P4.30</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>P4.31</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>P4.32</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>P4.33</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>P4.34</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>P4.35</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>P4.36</td></tr></table></td></tr>
<tr><td>P4.23</td><td>Multi−step frequency 2</td><td>8.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.24</td><td>Multi−step frequency 3</td><td>10.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.25</td><td>Multi−step frequency 4</td><td>15.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.26</td><td>Multi−step frequency 5</td><td>18.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.27</td><td>Multi−step frequency reference 6</td><td>20.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.28</td><td>Multi−step frequency 7</td><td>25.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.29</td><td>Multi−step frequency 8</td><td>28.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.30</td><td>Multi−step frequency 9</td><td>30.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.31</td><td>Multi−step frequency 10</td><td>35.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.32</td><td>Multi−step frequency 11</td><td>38.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.33</td><td>Multi−step frequency 12</td><td>40.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.34</td><td>Multi−step frequency 13</td><td>45.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.35</td><td>Multi−step frequency 14</td><td>48.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><td>P4.36</td><td>Multi−step frequency 15</td><td>50.00</td><td>0.00 ~ 300.00</td><td>Hz</td><td>○</td></tr>
<tr><th colspan="7">Group P5 Multi−function Input Parameters</th></tr>
<tr><td>P5.00</td><td>Digital input terminal X1 function selection</td><td>99</td><td>00 ~ 99</td><td>/</td><td>×</td><td rowspan="2">02: Terminal run forward input (FWD)
03: Terminal run reverse input (REV)
09: Multi− step frequency terminal 1
10: Multi− step frequency terminal 2</td></tr>
<tr><td>P5.01</td><td>Digital input terminal X2 function selection</td><td>99</td><td>00 ~ 99</td><td>/</td><td>×</td></tr>
</table>

No.	Name	Default	Range	Unit	Property	Description
P5.02	Digital input terminal X3 function selection	99	00 ~ 99	/	×	11: Multi− step frequency terminal 3 12: Multi− step frequency terminal 4 13: ACC / DEC time terminal 1 14:ACC / DEC time terminal 2 15: Clear UP/DN regulation value 16: Terminal UP (Frequency increase) 17: Terminal DN (Frequency decrease) 18: ACC / DEC is prohibited 19: External fault input. When this terminal is ON, inverter will stop running and display "E.oUt" fault. 20: Fault reset (RESET) 21: Run pause 22: Run is prohibited 23: Stop via terminal 24: Coast to stop via terminal 25: Stop via terminal with DC braking 1 32: Mechanical brake release acknowledge 33: Position synchronization input 34: Force position synchronization invalid 35: Change frequency to P0.13 36: Change frequency to P0.05 37: FWD operation allowed 1, if the FWD operation status is interrupted, will DEC to stop. 38: REV operation allowed 1, if the REV operation status is interrupted, will DEC to stop. 39: Operation allowed 1, if the operation status is interrupted, will DEC to stop. 40: FWD operation allowed 2, if the FWD operation status is interrupted, will coast to stop. 41: REV operation allowed 2, if the REV operation status is interrupted, will coast to stop. 42: Operation allowed 2, if the operation status is interrupted, will coast to stop.
P5.03	Digital input terminal X4 function selection	99	00 ~ 99	/	×	
P5.04	Digital input terminal X5 function selection	99	00 ~ 99	/	×	
P5.05	Digital input terminal X6 function selection	99	00 ~ 99	/	×	
P5.06	Digital input terminal X7/DI function selection	99	00 ~ 99	/	×	
P5.07	X1 to X7 filter time	0.001	0.000 ~ 1.000	s	×	0.000 ~ 1.000s
P5.08	X1 delay time	0.0	0.0～999.9	s	×	Digital input X1 delay time
P5.09	X2 delay time	0.0	0.0～999.9	s	×	Digital input X2 delay time
Group P6 Analog Reference Parameters						

No.	Name	Default	Range	Unit	Property	Description
P6.00	AI1 to AI3 and DI input curve selection	4444	0000 ~ 4444	/	○	0: Curve 1(2 points, P6.01 to P6.04) 1: Curve 2(2 points, P6.05 to P6.08) 2: Curve 3(2 points, P6.09 to P6.12) 3: Curve 4(4 points, P6.13 to P6.20) 4: None Ones place: AI1 input curve selection Tens place: AI2 input curve selection Hundreds place: AI3 input curve selection Thousands place: DI input curve selection
P6.01	Curve 1 input point A0	0.0	0.0 ~ 110.0	%	○	0.0 ~ 110.0%
P6.02	Reference frequency f0 corresponding to curve1 input point A0	0.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P6.03	Curve 1 input point A1	100.0	0.0 ~ 110.0	%	○	0.0 ~ 110.0%
P6.04	Reference frequency f1 corresponding to curve1 input point A1	50.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P6.05	Curve2 input point A0	0.0	0.0 ~ 110.0	%	○	0.0 ~ 110.0%
P6.06	Reference frequency f0 corresponding to curve2 input point A0	0.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P6.07	Curve2 input point A1	100.0	0.0 ~ 110.0	%	○	0.0 ~ 110.0%
P6.08	Reference frequency f1 corresponding to curve2 input point A1	50.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P6.09	Curve3 input point A0	0.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.10	Per unit value B0 corresponding to curve3 input point A0	0.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.11	Curve3 input point A1	100.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.12	Per unit value B1 corresponding to curve3 input point A1	100.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.13	Curve4 input point A0	0.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.14	Per unit value B0 corresponding to curve4 input point A0	0.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.15	Curve4 input point A1	25.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.16	Per unit value B1 corresponding to curve4 input point A1	25.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.17	Curve4 input point A2	50.0	0.0 ~ 110.0	%	○	0.0~110.0%

No.	Name	Default	Range	Unit	Property	Description
P6.18	Per unit value B2 corresponding to curve4 input point A2	50.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.19	Curve4 input point A3	100.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.20	Per unit value B3 corresponding to curve4 input point A3	100.0	0.0 ~ 110.0	%	○	0.0~110.0%
P6.21	AI1 ~ AI3、DI analog channel function selection	0000	0000 ~ 6666	/	×	0: Open loop frequency reference Close loop analog reference Close loop analog feedback 1: Torque reference 1 (torque control) 2: Torque reference 2 (torque control) 3~4: Reserved 5: Motor temperature feedback 6: Speed limit (torque control)
						Ones place: AI1 function selection
						Tens place: AI2 function selection
						Hundreds place: AI3 function selection
						Thousands place: DI function selection
P6.22	AI1 filter time	0.004	0.000 ~ 1.000	s	×	0.000 ~ 1.000s
P6.23	AI2 filter time	0.004	0.000 ~ 1.000	s	×	0.000 ~ 1.000s
P6.24	AI3 filter time	0.004	0.000 ~ 1.000	s	×	0.000 ~ 1.000s
Group P7 Multi-function Output Parameters						
P7.00	Y1 output function selection	0	0 ~ 47	/	○	0: Running (RUN) 1: Frequency arrive(FAR) 2: Frequency level detection (FDT1) 3: Frequency level detection 2 (FDT2) 4: Pre-overload warning detection (OL) 5: Under voltage (LU) 6: External fault stop(EXT) 7: Frequency upper limit (FHL) 8: Frequency lower limit (FLL) 9: Zero speed running 10-12: Reserved 13: Ready 14: Fault 15: Alarm 19: Output X1 state 20: Output X2 state 22: Zero current detected 23: Stop command indication 32: Mechanical brake control 33-47: Reserved
P7.01	Y2/DO output function selection	1	0 ~ 71	/	○	
P7.02	Relay output function selection	14	0 ~ 47	/	○	
P7.03	AO1 output function selection	48	48 ~ 71	/	○	48: Running frequency 49: Reference frequency 50: Output current 51: Motor current

No.	Name	Default	Range	Unit	Property	Description
P7.04	AO2 output function selection	49	48 ~ 71	/	○	52: Output Torque 53: Voltage 54: DC voltage 55: AI1 56: AI2 57: AI3 58: DI 59: Output Power
P7.05	AO1 gain	100.0	0.0 ~ 200.0	%	○	0.0 ~ 200.0%
P7.06	AO1 bias	0.0	0.0 ~ 200.0	%	○	0.0 ~ 200.0%
P7.07	AO2 gain	100.0	0.0 ~ 200.0	%	○	0.0 ~ 200.0%
P7.08	AO2 bias	0.0	0.0 ~ 200.0	%	○	0.0 ~ 200.0%
P7.09	Positive or negative selection for gain and bias	0000	0 ~ 1111	/	○	Ones place: AO1 gain: 0: Positive 1: Negative Tens place: AO1 bias: 0: Positive 1: Negative Hundreds place: AO2 gain: 0: Positive 1: Negative Thousands place: AO2 bias: 0: Positive 1: Negative
P7.10	Y2/DO maximum output pulse frequency	10.0	0.1 ~ 50.0	kHz	○	0.1 ~ 50.0kHz
P7.18	Zero current detection level	0.0	0.0 ~ 50.0	%	○	0.0 ~ 50.0%
P7.19	Running frequency arrival detection level	2.50	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P7.20	FDT1 level upper limit	50.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P7.21	FDT1 level lower limit	49.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P7.22	FDT2 level upper limit	25.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P7.23	FDT2 level lower limit	24.00	0.00 ~ 300.00	Hz	○	0.00 ~ 300.00Hz
P7.24	Virtual terminal selection	000	000 ~ 111	/	○	Ones place: Multi function input terminal Xi: 0: Real terminal is enabled 1: Virtual terminal is enabled Tens place: Reserved Hundreds place: Y1/Y2/Relay terminal: 0: Real terminal is enabled 1: Virtual terminal is enabled

No.	Name	Default	Range	Unit	Property	Description
P7.25	Input and output terminal active state selection	0000	000 ~ 1131	/	○	Ones place: Multi function input terminal Xi: 0: Xi is active if current flowing through Xi 1: Xi is active if no current flowing through Xi Tens place: Multi function output terminal Yi: 0: Y1 is active if current flowing through Y1 Y2 is active if current flowing through Y2 1: Y1 is active if no current flowing through Y1 Y2 is active if current flowing through Y2 2: Y1 is active if current flowing through Y1 Y2 is active if no current flowing through Y2 3: Y1 is active if no current flowing through Y1 Y2 is active if no current flowing through Y2 Hundreds place: Relay terminal: 0: Relay is active if in magnetizing status 1: Relay is active if not in magnetizing status Thousands place: Reserved
Group P8 Monitoring parameters						
P8.00	Over speed detect level	110.0	0.0～200.0	%	○	100.0% = P0.11 maximum speed
P8.01	Over speed detect time	0.200	0.000～60.000	s	○	
P8.02	Speed error detect level	8.00	0.00～300.00	Hz	○	
P8.03	Speed error detect time	0.200	0.000～60.000	s	○	
P8.04	Zero current detect level	10.0	0.0～200.0	%	○	100.0 = inverter rated current
P8.05	Zero current detect time	1.000	0.000～60.000	s	○	
Group P9 Motor Parameters						
P9.01	Motor poles	4	2 ~ 128	/	×	2 ~ 128
P9.02	Motor rated speed	1500	0 ~ 30000	rpm	×	0 ~ 30000rpm
P9.03	Motor rated power	Factory	0.4 ~ 999.9	kW	×	0.4 ~ 999.9kW
P9.04	Motor rated current	Factory	0.1 ~ 999.9	A	×	0.1 ~ 999.9A
P9.05	No-load current I0	Factory	0.1 ~ 999.9	A	×	Set to about 40% of P9.04.
P9.06	Stator resistance R1	Factory	0.000 ~ 65.000	Ω	×	The parameters from P9.05 to P9.14 are obtained through motor data identification. If the load can be disconnected, choose complete motor data identification, otherwise only motor data identification at standstill can be selected. The steps for motor data identification are as follows: 1. Input motor parameters: P0.12 rated voltage, P0.15 rated frequency, P9.01 poles, P9.02 rated speed, P9.03 rated power, P9.04 rated current, P9.05 no-load current (set to 40% of P9.04) 2. Set P0.06=0, P9.15=1 or 2, and then press the RUN
P9.07	Stator leakage inductance L1	Factory	0.0 ~ 2000.0	mH	×	
P9.08	Rotor resistance R2	Factory	0.000 ~ 65.000	Ω	×	
P9.09	Mutual inductance L2	Factory	0.0 ~ 2000.0	mH	×	
P9.10	Magnetic flux saturation coefficient 1	87.00	0.00 ~ 100.00	%	×	
P9.11	Magnetic flux saturation coefficient 2	80.00	0.00 ~ 100.00	%	×	
P9.12	Magnetic flux saturation coefficient 3	75.00	0.00 ~ 100.00	%	×	

No.	Name	Default	Range	Unit	Property	Description
P9.13	Magnetic flux saturation coefficient 4	72.00	0.00 ~ 100.00	%	×	key for motor data identification. Note: During motor data identification, the motor may rotate. Please pay attention to safety
P9.14	Magnetic flux saturation coefficient 5	70.00	0.00 ~ 100.00	%	×	
P9.15	Motor data identification	0	0 ~ 2	/	×	0: No action 1: Motor data identification at standstill 2: Complete motor data identification
P9.16	Motor overload protection	00	00 ~ 12	/	×	Ones place: Protection mode: 0: Motor current 1: Sensor mode 2: Inactive Tens place: Low speed de-rated: 0: Active 1: Inactive
P9.17	Motor over temperature protection threshold	10.00	0.00 ~ 10.00	V	×	0.00 ~ 10.00V
P9.18	Motor overload protection time	10.0	0.5 ~ 30.0	min	×	0.5 ~ 30.0min
Group PA Control Parameters						
PA.00	Switching frequency	8.0 4.0 3.0 2.0	0.7 ~ 16.0	kHz	○	15kW and below power class : 0.7kHz ~ 16.0kHz 18.5kW ~ 45kW power class : 0.7kHz ~ 10.0kHz 55kW ~ 75kW power class: 0.7kHz ~ 8.0kHz 90kW and above power class: 0.7kHz ~ 3.0kHz
PA.01	Switching frequency automatic adjustment	1	0 ~ 1	/	○	0: No auto adjustment 1: Auto adjustment
PA.02	Reserved					
PA.03	Droop control	0.00	0.00 ~ 10.00	Hz	○	0.00 ~ 10.00Hz
PA.04	Current limit selection	1	0 ~ 1	/	×	0: Current limit function is disabled 1: Current limit function is enabled
PA.05	Current limit level	200.0	20.0 ~ 200.0	%	×	Constant torque: 20.0 ~ 200.0% Variable torque: 20.0 ~ 150.0%
PA.06	Auto voltage regulation	000	000 ~ 111	/	×	Ones place: Over voltage regulation 0: Disabled 1: Enabled Tens place: Under voltage regulation 0: Disabled 1: Enabled Hundreds place: Over modulation 0: Disabled 1: Enabled
PA.07	Energy saving coefficient	0	0 ~ 50	%	○	0 ~ 50%
PA.08	Magnetic flux braking	1	0 ~ 1	/	×	0: Disabled 1: Enabled
PA.09	Dynamic braking	1	0 ~ 1	/	×	0: Disabled 1: Enabled
PA.10	Braking unit hysteresis	000	0 ~ 100	V	×	
PA.11	Braking unit action voltage	720	650 ~ 750	V	×	650 ~ 750V

No.	Name	Default	Range	Unit	Property	Description
PA.12	Special fault activated selection	100	000 ~ 111	/	×	Ones place: Under voltage fault 0: Disabled 1: Enabled Tens place: During automatic reset 0: Disabled 1: Enabled Hundreds place: Fault locking 0: Disabled 1: Enabled
PA.13	Inverter or motor overload pre-alarm	000	000 ~ 111	/	×	Ones place: Detected mode selection: 0: Motor overload pre−alarm, relative to motor rated current 1: Inverter overload pre−alarm, relative to inverter rated current Tens place: Action after overload pre−alarm: 0: Continue running 1: Report overload fault and stop Hundreds place: Detecting condition selection 0: Detect all the time 1: Only detect at constant speed
PA.14	Overload pre−alarm detection level	130.0	20.0 ~ 200.0	%	×	20.0 ~ 200.0%
PA.15	Overload pre−alarm detection time	5.0	0.1 ~ 60.0	s	×	0.1 ~ 60.0s
PA.16	Faults shield and alarm attribute setting 1	0020	0000 ~ 2222	/	×	Ones place: Motor or motor output cable is short circuited to ground Tens place: Power supply is switched off during running process Hundreds place: Power supply is abnormal Thousands place: Output phase loss
PA.17	Faults shield and alarm attribute setting 2	0000	0000 ~ 2222	/	×	Ones place: EEPROM fault Tens place: Pre-charging contactor fault Hundreds place: Temperature sensor abnormal Thousands place: Encoder disconnection
PA.18	Faults shield and alarm attribute setting 3	2000	0000 ~ 2222	/	×	Ones place: +10V output error Tens place: Analog input error Hundreds place: Motor over temperature(PTC) Thousands place: Communication fault 1 (Keypad)
PA.19	Faults shield and alarm attribute setting 4	0002	0000 ~ 2222	/	×	Ones place: Communication fault 2 (terminal 485) Tens place: Software version incompatible Hundreds place: Reserve Thousands place: Reserve
PA.20	Fault locking function selection	0	0 ~ 1	/	×	0: Fault is not locked 1: Fault is locked
PA.21	Automatic reset times	0	0 ~ 20	/	×	0 ~ 20
PA.22	Automatic reset interval	2.0	2.0 ~ 20.0	s	×	2.0 ~ 20.0s

No.	Name	Default	Range	Unit	Property	Description
Group Pb Enhanced Function Parameters						
Pb.00	Jump frequency 1 lower limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.01	Jump frequency 1 upper limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.02	Jump frequency 2 lower limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.03	Jump frequency 2 upper limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.04	Jump frequency 3 lower limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.05	Jump frequency 3 upper limit	0.00	0.00 ~ 300.00	Hz	×	Upper/ lower frequency limit (P0.13 ~ P0.14)
Pb.15	Automatic restart	0	0 ~ 1	/	×	0: Disabled 1: Enabled
Pb.16	Automatic restart waiting time	0.5	0.0 ~ 20.0	s	○	0.0 ~ 20.0s
Pb.23	Parameters copy	0	0 ~ 5	/	×	0: No function 1: Parameter upload 2: Parameter download (without motor parameters) 3: Parameter download (with motor parameters) 4: Parameter upload is not allowed 5: Parameter upload is allowed
Group PC Communication Parameters						
PC.00	Communication baud rate	6	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	Communication parameters setting	303	303 ~ F0F	/	○	Ones place: Terminal RS485 setting bit0=0: Without reply bit0=1: Reply if communication with host computer bit1=0: Will not reply if communication disconnected bit1=1: Reply if communication disconnected bit2=0: Communication will not detect password bit2=1: Communication will detect password bit3=0: 0x06 and 0x10 command communication write RAM bit3=1: 0x06 and 0x10 command communication write EEPROM Tens place: Reserved Hundreds place: Operation panel RS485 setting: same as ones place

No.	Name	Default	Range	Unit	Property	Description
Group Pd Vector Control 2 Parameters						
Pd.00	Speed/torque control	00	00 ~ 21	/	○	Ones place: Speed/torque control selection: 0: Speed control 1: Torque control Tens place: Torque direction: 0: Torque direction determine by analog input 1: The same as run command direction 2: Reverse run command direction
Pd.01	Speed loop proportional gain 1 (ASR_P1)	2.00 3.00	0.000 ~ 30.00	/	○	Vector control 2 without encoder: 2.00 by default Vector control 2 with encoder: 3.00 by default
Pd.02	Speed loop integral time 1 (ASR_I1)	0.200	0.000 ~ 6.000	s	○	0.000 ~ 6.000s
Pd.03	Speed loop proportional gain 2 (ASR_P2)	2.00 3.00	0.000 ~ 30.00	/	○	Vector control 2 without encoder:2.00 by default Vector control 2 with encoder: 3.00 by default
Pd.04	Speed loop integral time 2 (ASR_I2)	0.200	0.000 ~ 6.000	s	○	0.000 ~ 6.000s
Pd.05	ASR switchover frequency	5.00	0.00 ~ 300.00	Hz	○	0.00 ~ frequency upper limit P0.13
Pd.06	Forward max. speed limit in torque control	50.00	0.00 ~ 300.00	Hz	○	0.00 ~ frequency upper limit P0.13
Pd.07	Reverse max. speed limit in torque control	50.00	0.00 ~ 300.00	Hz	○	0.00 ~ frequency upper limit P0.13
Pd.08	Max. torque limit in speed control (motoring)	180.0	0.0 ~ 200.0	%	○	Constant torque: 0.0 ~ 200.0% Variable torque: 0.0 ~ 150.0%
Pd.09	Max. torque limit in speed control (regenerating)	180.0	0.0 ~ 200.0	%	○	Constant torque: 0.0 ~ 200.0% Variable torque: 0.0 ~ 150.0%
Pd.10	Reserved	4	0 ~ 65535	/	○	Reserved
Pd.11	Reserved	0.010	0.000 ~ 65.535	s	○	Reserved
Pd.12	Torque acceleration time	0.10	0.00 ~ 120.00	s	○	0.00 ~ 120.00s
Pd.13	Torque deceleration time	0.10	0.00 ~ 120.00	s	○	0.00~120.00s
Pd.14	Pre-excitation time	0.300	0.000 ~ 8.000	s	○	0.000 ~ 8.000s
Pd.15	Current loop proportional coefficient (ACR_P)	1000	0 ~ 2000	/	○	0 ~ 2000
Pd.16	Current loop integral coefficient (ACR_I)	1000	0 ~ 6000	/	○	0 ~ 6000
Pd.17	Vector control 2 slip compensation (motoring)	100.0	10.0 ~ 300.0	%	○	10.0 ~ 300.0%
Pd.18	Vector control 2 slip compensation (regenerating)	100.0	10.0 ~ 300.0	%	○	10.0 ~ 300.0%
Pd.19	ASR input filter time	0.5	0.0 ~ 500.0	ms	○	0.0 ~ 500.0
Pd.20	ASR output filter time	0.5	0.0 ~ 500.0	ms	○	0.0 ~ 500.0

No.	Name	Default	Range	Unit	Property	Description
Pd.21	Encoder pluse	1024	1 ~ 9999	/	*	1 to 9999 pulses/rev
Pd.22	Encoder direction selection	0	0 ~ 1	/	*	0: Forward 1: Reverse
Pd.23	Encoder disconnection detection time	2.0	0.0 ~ 8.0	S	*	0.0 ~ 8.0
Pd.24	Ratio between motor and encoder	1.000	0.001 ~ 65.535	/	○	0.001 ~ 65.535
Group d0 Fault Record Parameters						
d0.00	Fault record 2	0	0 ~ 62	/	*	Refer to 7.1 fault and alarm information list
d0.01	Fault record 1	0	0 ~ 62	/	*	
d0.02	Fault record 0 of latest fault	0	0 ~ 62	/	*	
d0.03	DC voltage of latest fault	0	0 ~ 65535	V	*	0 ~ 999V
d0.04	Current of latest fault	0.0	0.0 ~ 6553.5	A	*	0.0 ~ 999.9V
d0.05	Running frequency of latest fault	0.00	0.00 ~ 300.00	Hz	*	0.00 ~ 300.00Hz
d0.06	Total power−on time	0.000	0.000 ~ 65.535	kh	*	0.000 ~ 65.535kh
d0.07	Total running time	0.000	0.000 ~ 65.535	kh	*	0.000 ~ 65.535kh
d0.08	Heat-sink Max. temp	0.0	0.0 ~ 100.0	ºC	*	0.0 ~ 100.0ºC
d0.09	Bus voltage maximum fluctuation record	0	0 ~ 1000	V	*	0 ~1000V
d0.10	Reserved	0.00	0.00 ~ 300.00	Hz	*	0.00 ~ 300.00Hz
d0.11	E.FAL protection type	0	0 ~ 5	/	*	0: None 1: Module protection 2: Over current 3: Over voltage 4: Short circuited to ground 5: Vagueness state, interfere or all of above are possible
Group d1 Product Identity Parameters						
d1.00	Serial number	Factory	0.0 ~ FFF.F	/	*	0 ~ FFF.F
d1.01	Software version of control board	Factory	0.00 ~ 99.99	/	*	0.0 ~ 99.99
d1.02	Software non-standard version of control board	Factory	0.00 ~ FF.FF	/	*	0.00 ~FF.FF
d1.03	Software version of operation panel	Factory	0.000 ~ F.FFF	/	*	0.000 ~F.FFF
d1.04	Software version of extension card	Factory	0.000 ~ F.FFF	/	*	0.000 ~F.FFF
d1.05	Manufacture's bar code 1	Factory	0 ~ 9999	/	*	0 ~ 9999
d1.06	Manufacture's bar code 2	Factory	0 ~ 9999	/	*	0 ~ 9999

No.	Name	Default	Range	Unit	Property	Description
d1.07	Manufacture's bar code 3	Factory	0 ~ 9999	/	*	0 ~ 9999
d1.08	Manufacture's bar code 4	Factory	0 ~ 9999	/	*	0 ~ 9999
d1.09	Operation panel copy identification code	Factory	0.00 ~ 655.35	/	*	0.00 ~ 655.35
d1.10	Control board software identification code	Factory	0 ~ 65535	/	*	0 ~ 65535
d1.11	Reserved	Factory	0 ~ 65535	/	*	0 ~ 65535
Group d2 Display Parameters						
d2.00	Heat-sink 1 temperature	0.0	0.0 ~ 100.0	ºC	*	0.0 ~ 100.0ºC
d2.01	Terminal count value	0	0 ~ 65535	/	*	0 ~ 65535
d2.02	AI1 percentage after curve transformation	0.0	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.03	AI2 percentage after curve transformation	0.0	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.04	AI3 percentage after curve transformation	0.0	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.05	DI percentage after curve transformation	0.0	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.06	Operation panel ∧ /∨ adjustment value	0	0 ~ 65535	/	*	0 ~ 65535
d2.07	Terminal UP/DN adjustment value	0	0 ~ 65535	/	*	0 ~ 65535
d2.08	Software compile date	Factory	0 ~ FFFF	/	*	0 ~ FFFF
d2.09	Xi terminal status	0000	0 ~ FFFF	/	*	0: OFF 1: ON Bit 0 ~ bit 7 corresponds to X1 ~ X7
d2.10	Reference voltage 1	Factory	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.11	Reference voltage 2	Factory	0.0 ~ 100.0	%	*	0.0 ~ 100.0%
d2.12	AI fault source display	Factory	0 ~ 5	/	*	1: AI1 exceeding limit 2: AI2 exceeding limit 3: AI3 exceeding limit 4: AV4/AI4 exceeding limit 5: AV5/AI5 exceeding limit
d2.13	Output current detection fault source display	Factory	0 ~ 6	/	*	2: Phase W abnormal 4: Phase V abnormal 6: Phase U abnormal
d2.14	Frequency corresponds to motor rotation speed	0.00	0 ~ 655.35	Hz	*	0 ~ 655.35Hz
d2.15	Encoder pulse display	0	0 ~ 65535	/	*	0 ~ 65535
d2.16 ~ d2.24	Reserved	Factory	0 ~ 65535`	/	*	0 ~ 65535

No.	Name	Default	Range	Unit	Property	Description
Group H0 Mechanical brake control parameters						
H0.00	Mechanical brake control function selection	0003	0000～FFFF	/	○	Bit0: Brake control enable 0: Not enabled; 1: Enable Bit1: Acceleration to the reference frequency 0: Not necessary to wait the brake is opened; 1: Wait until the brake is opened. Bit2: REV start model 0: Start from REV direction 0: Start from FWD direction Bit3~bit11: Reserved Bit12: Brake feedback enable 0: Not enabled; 1: Enable Bit13: FWD and REV switching 0: Brake will close 1: Brake keep open Bit14~bit15: Reserved
H0.01	Forward brake open frequency	3.00	0.00～300.00	Hz	○	After the inverter receives a start command, the output frequency will increase. If the output frequency reaches the brake open frequency, the output current reaches the brake open current, and the output torque reaches the brake output torque, it means the conditions for opening the brake are met, after brake open delay time, the inverter will send the brake open command to open the brake. When the start command is received, if the brake open condition is not reached after the time reaches the set time of H0.16, a brake open fault will be reported.
H0.02	Forward brake open torque	10.0	0.0～200.0	%	○	
H0.03	Forward brake open current	30.0	0.0～200.0	%	○	
H0.04	Reverse brake open frequency	3.00	0.00～300.00	Hz	○	
H0.05	Reverse brake open torque	0.0	0.0～200.0	%	○	
H0.06	Reverse brake open current	30.0	0.0～200.0	%	○	
H0.07	Forward start delay frequency	3.00	0.00～300.00	Hz	○	H0.07 ≥ H0.01, H0.08 ≥ H0.04, after reaching the start delay frequency, the frequency remains at the brake delay frequency. If the brake opening condition is reached, delay the time defined bu H0.09 and send a brake opening command, then accelerate to the reference frequency after the time delay by H0.10.
H0.08	Reverse start delay frequency	3.00	0.00～300.00	Hz	○	
H0.09	Brake open delay time 1	0.000	0.0～60.000	s	○	
H0.10	Brake open delay time 2	0.000	0.0～60.000	s	○	
H0.11	Forward brake close frequency	3.00	0.00～300.00	Hz	○	When decelerating, if the frequency is less than the (forward / reverse) brake close frequency, then sends a command to close the brake.
H0.12	Reverse brake close frequency	3.00	0.00～300.00	Hz	○	
H0.13	Forward brake close delay frequency	3.00	0.00～300.00	Hz	○	H0.11 ≥ H0.13, H0.12 ≥ H0.14. When decelerating, if the frequency drops to the (forward / reverse) brake close delay frequency, maintain the delay frequency. After reaching the brake close delay time, decelerate to 0.
H0.14	Reverse brake close delay frequency	3.00	0.00～300.00	Hz	○	
H0.15	Brake close delay time	0.000	0.000～65.535	Hz	○	

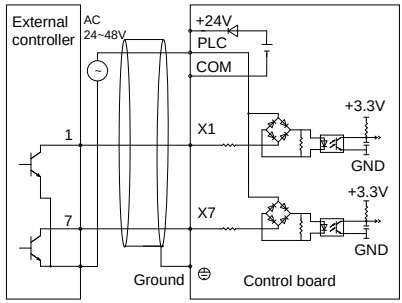
No.	Name	Default	Range	Unit	Property	Description
H0.16	Brake open fault time	3.000	0.0～60.000	s	○	Detection delay time from receive a start signal to brake opening
H0.17	Brake acknowledge fault time	3.000	0.0～60.000	s	○	If brake acknowledge (bit 12 of H0.00) is enabled, when the inverter controls the brake to release, the brake feedback signal is closed; When the inverter controls the brake to be closed, the brake feedback signal is open. Brake feedback signal should be connected to a digital input terminal, and the function is set to【32: brake acknowledge】 If the brake command sent by the inverter is inconsistent with the brake feedback, the brake fault will be reported after the brake fault detection time.
Group H2 Extension card parameters						
H2.01	RA1output function	32	00～47	/	x	The selections refer to parameter P7.00 ... P7.02
H2.02	RA2 output function	35	00～47	/	x	

Chapter 6 Commissioning Steps

6.1 Confirm the Wiring

- Please confirm everything is in the power-off state before wiring, live operation is strictly prohibited.
- Main circuit: the input power supply is connected to R / S / T, motor terminal is connected to U / V / W; If the brake chopper is built-in, please ensure that the brake resistor wiring is correct.
  If brake chopper is installed external, please ensure that the wiring of the brake chopper is correct and the wiring of the brake resistor is correct.
- Control circuit: confirm the correct wiring of forward signal, reverse signal, speed reference signal, fault reset signal, safety interlock signal, fault output, mechanical brake control, etc; Ensure that all external wiring is correct.
- After wiring, please confirm that the wiring is reliable and free from looseness.
- Digntal input terminal support AC input methods wiring method (support voltage range：from AC 24V to AC 48V，if digital input terminal for AC36V to AC 48V is required, please add −67 suffix for the ordering model)

Note：Please remove the short connector between + 24V and PLC.



6.2 Auto Tune Steps

- Please disconnect the load of the motor for rotate tune. The motor will rotate during rotate tune. Please pay attention to safety.
- After auto-tune, please write down all the motor parameters and set to motor parameters. If the parameters are reset later, you can input the motor parameters directly without auto-tune again.
- For hoist, please confirm that the forward rotation is in the upward direction and the reverse rotation is in the downward direction; If the direction is opposite, please replacing any two-phase motor wires.
- In order to ensure safety, it is better to start the commissioning with the motor without load. If

the motor cannot be disconnected from the load, do not hang heavy things on the hook for commissioning.

Parameters	Value	Description
P0.01	5	Reset to default value (if necessary, reset to default value)
P0.03		Motor control model 0= sensor-less vector control 1 (without encoder) 4 = sensor-less vector control 2 (without encoder) 8 = sensor vector control (with encoder)
Pd.21		Incremental encoder PPR
Pd.22		Incremental encoder direction 0- forward direction; 1-reverse direction
P0.12		Motor rated voltage (V), value setting according to motor nameplate
P0.15		Motor rated frequency (Hz), value setting according to motor nameplate
P9.01		Motor poles
P9.02		Motor rated speed (rpm), value setting according to motor nameplate
P9.03		Motor rated power (kW), value setting according to motor nameplate
P9.04		Motor rated current (A), value setting according to motor nameplate
P9.05		Motor no-load current (A), Set to about 40% of P9.04
P9.15		● The static auto-tune can be used when the motor is loaded and it is not possible to remove the load from the motor shaft. ● The motor must be free from load for the rotate auto-tune. A rotating auto-tune first performs a static auto-tune, before rotating the motor at 70% of rated speed in the forward direction for several seconds, please be careful.

6.3 Operation with Encoder

- In order to ensure safety, it is necessary to ensure that the motor is disconnected from the load. If it is not possible, it is not allowed to hang a load for commissioning.
- After the parameter auto tune, press the RUN key on the keyboard to see if the motor operates normally. If there is any abnormality, press the stop and M keys at the same time, and the the motor will coast to stop immediately.
- If it is impossible to determine whether the encoder is normal, please change the motor control mode P0.03 to 0, and check whether the encoder feedback value display in P2.02 is normal under VF control. After confirming that the encoder feedback is normal, change P0.03 to 8 (closed loop vector operation mode)
- After the closed-loop vector control operates normally, the next step of the crane function commissioning can be carried out.
- If there is without encoder control, make sure it operates normally before the next commissioning.

6.4 Start and Stop Parameters Setting

- If digital input terminal is used to start and stop the motor, set P0.06 = 1; If communication is used to start and stop the motor, set P0.06 = 2.

◆ Set acceleration time and deceleration time

P0.06	1/2	1 - Digital input start and stop 2 - Modbus-RTU communication to start and stop
P1.00		FWD acceleration time
P1.01		FWD deceleration time
P1.02		REV acceleration time
P1.03		REV deceleration time
P5.00～P5.06		X1～X7 terminal function

6.5 Speed Reference

P0.04	0	Speed reference channel 0：Multi-step speed reference 1：Analog AI1
P0.05		Low speed setting. Please set it according to the actual situation.
P4.22～P4.36		Multi-step speed reference setting

6.6 Mechanical Brake Control

◆ set the output function of the control mechanical brake is "32":

If Y1 output is used to control the mechanical brake, P7.00 = 32;

If Y2 output is used to control the mechanical brake, P7.01 = 32;

If relay 1 output is used to control the mechanical brake, P7.02 = 32;

If relay 1 on the extension card output is used to control the mechanical brake, P7.02 = 32;

P7.02	32	relay 1 (RA-RC) output is used to control the mechanical brake
H0.00		Crane control selection 0000：Crane control is disabled 0003：Control logic for main hoist 2007：Control logic for construction elevator
H0.01		Forward brake open frequency，This value should be set to ≤ E1-007
H0.02		Forward brake open current / main trolley or main long travel should set to 0
H0.03		Forward brake open torque
H0.04		Reverse brake open frequency，This value should be set to ≤ E1-008
H0.05		Reverse brake open current / main trolley or main long travel should set to 0
H0.06		Reverse brake open torque
H0.07		Forward brake open delay frequency
H0.08		Reverse brake open delay frequency
H0.09		Brake open delay time 1
H0.10		Brake open delay time
H0.11		Forward brake close frequency
H0.12		Reverse brake close frequency
H0.13		Forward brake close delay frequency
H0.14		Reverse brake close delay frequency
H0.15		Brake close delat time
H0.16		Brake open fault time

6.7 Conical Motor Control

- Conical motor does not have an external brake, but has an internal brake, the brake open and close according to the motor flux level. The brake opens when the motor flux level is higher than the normal flux level and closes when the flux level is below the normal flux level.
- For conical motor brake control, please set the brake open torque, brake open current to 0.
- Increase torque boost.
- Set motor control mode to vector control mode.

6.8 Run without Motor

- The current and torque detection function of V5-GA series inverter are activated by default. Under the default parameters, the inverter will give an error if run without a motor.
- If you need to run the inverter without a motor, please set the following parameters to 0：P8.04, H0.02，H0.03，H0.05，H0.06 and set P0.03 = 0

6.9 Parameters Copy Function Steps

- It must be ensured that the machine has been stopped before operation.
- Please make sure that the software version are consistent with the inverter uploaded before copying the parameters, otherwise it may cause parameter confusion.
- Install the keypad on the inverter that has been adjusted OK.
- Set Pb.23 = 1 to start parameters upload.
- Install the keypad with parameters uploaded just now on the inverter that has not been adjusted.
- Set Pb.23 = 3 to start parameters download.
- Completely power off and then power on again. Be sure to completely power off, and then power on after the inverter keypad is completely off.

6.10 Digital Input Monitoring

- D2.09: The digital input status is identified by binary and display in hexadecimal, 0-OFF, 1-ON

d2.09 one position	X4	X3	X2	X1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
A	1	0	1	0
b	1	0	1	1
C	1	1	0	0
D	1	1	0	1
E	1	1	1	0
F	1	1	1	1

d2.09 tens position	X7	X6	X5
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

Chapter 7 Troubleshooting

7.1 List of Fault and Alarm Information

This chapter lists all the fault and alarm messages including the possible causes and corrective actions, Once a fault is detected, the following fault code will be displayed on the operation panel, the fault contact output operates, and the output to motor is disable, the motor will coast to stop. For details, refer to the following table to identify and correct the cause of the fault.

For damages on units or questions that can't be resolved, please contact with local distributors/agents, service centers or manufacturer for solutions.

Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
1	E.oc1	Over current during acceleration	Low grid voltage	Check input power supply
			Start when the motor is spinning	Restart after the motor at standstill
			Rotating inertial of load is too large or shock load is too heavy	Increase the acceleration time and reduce the sudden change of load
			Improper setting motor parameters	Set motor parameters properly
			Set start frequency too high	Decrease start frequency
			Acceleration time too short	Prolong acceleration time
			V/F curve setting are not correct	Adjust V/F setting and torque boost
			Output power is too small	Replace inverter with higher model
2	E.oc2	Over current during deceleration	Low grid voltage	Check input power supply
			Rotating inertial of load is too large	Choose appropriate dynamic braking unit and braking resistor
			Improper setting motor parameters	Set motor parameters properly
			Deceleration time is too short	Prolong deceleration time
			Output power is too small	Replace inverter with higher model
3	E.oc3	Over current at constant speed	Sudden load change of during operation	Decrease load's abrupt frequency change and amplitude
			Improper setting motor parameters	Set motor parameters properly
			Output power is too small	Replace inverter with higher model
4	E.oV1	Over voltage during acceleration	Motor short-circuit to ground	Check motor wiring
			Abnormal input power supply	Check input power supply
			Start when the motor is still rotating	Restart after the motor at standstill
5	E.oV2	Over voltage during deceleration	Motor short-circuit to ground	Check motor wiring
			Rotating inertial of load is too large	Choose appropriate dynamic braking unit and braking resistor
			Deceleration time is too short	Prolong deceleration time
6	E.oV3	Over voltage at constant speed	Motor short-circuit to ground	Check motor wiring
			Abnormal input power supply	Check input power supply
			Rotating inertial of load is too large	Choose appropriate dynamic braking unit and braking resistor

Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
7	E.PCU	Interference protection	Severely interfered by exterior signal	Ask professional technicians to maintain
8	E.rEF	Abnormal comparison level	Loose connection of connectors inside the inverter	Ask professional technicians to maintain
			Abnormal switching power supply	Seek for technical support
			Abnormal signal sampling and comparison circuit	Seek for technical support
9	E.AUt	Motor data identification failure	Enabled motor data identification function during motor spinning	Perform motor data identification after the motor at standstill
			Motor data identification overtime	Check whether motor wiring are well connected Length of motor wiring within 100m
			Incorrect setting of motor parameters in group P9	Set motor parameters according to the nameplate on the motor
10	E.FAL	Module protection	Output over current	Check whether the motor the output connection are short circuited Check whether ground is short circuited and whether the load is too heavy
			DC BUS over-voltage	Check the mains power supply Check whether the large inertia load and quickly stop Check the braking unit and braking resistor is property selected
			Output terminal short circuited to ground	Check the motor wiring
			Loose connection of connectors inside the inverter	Ask professional technicians to maintain
11	E.oH1	Heat-sink 1 over temperature protection	Ambient over−temperature	Lower the ambient temperature and strengthen ventilation and heat dissipation.
			Blockage of air duct	Clean the dusts, wool and other foreign matters in the air duct.
			Fan failure	Check whether fan wiring are well connected Replace a new fan
			Inverter module failure	Seek for technical support
			Temperature detection circuit failure	Seek for technical support
12	E.oH2	Heat-sink 2 over temperature protection	Ambient over−temperature	Lower the ambient temperature and strengthen ventilation and heat dissipation.
			Blockage of air duct	Clean the dusts, wool and other foreign objects in the air duct
			Fan failure	Check whether fan wiring is well connected. Replace a new fan of the same model
			Rectifier module failure	Seek for technical support

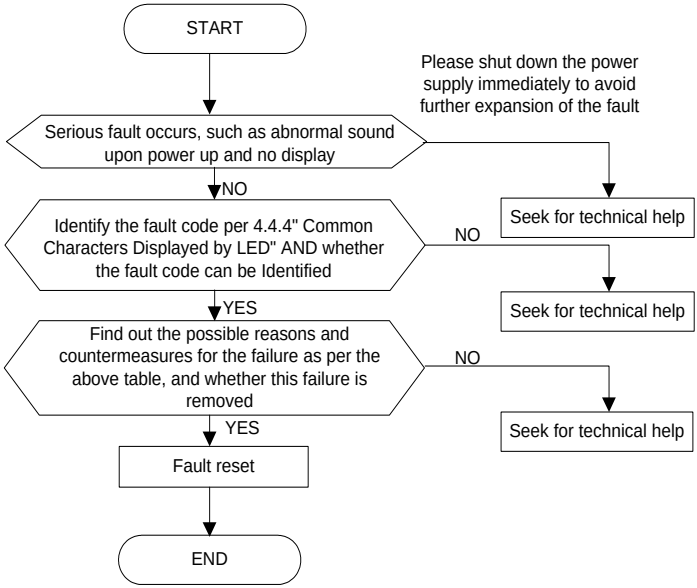
Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
			Temperature detection circuit failure	Seek for technical support
13	E.oL1	Inverter overload protection	Input power under voltage	Check input power supply
			Start when motor is spinning	Start again after the motor at standstill
			Keep overloading for a long period of time	Shorten the overloading time and reduce load
			Too short acceleration or deceleration time	Prolong the acceleration or deceleration time
			V/F curve setting are not correct	Adjust V/F curve setting and torque boost
			Output power is too small	Replace with higher model
14	E.oL2	Motor overload protection	Input power under voltage	Check input power supply
			Motor rotation is blocked or load suddenly changed	Prevent the motor rotation from blocking and reduce the load suddenly changed
			Common motor maintains running under heavy load for a long period of time	Replace the common motor with variable frequency motor or increase the running frequency
			Motor overload protection time is set too small	Increase the motor overload protection time
			V/F curve setting are not correct	Adjust V/F curve setting and torque boost
			DC braking current is set too high	Reduce the DC braking current
15	E.oUt	Peripheral protection	External terminal fault active	Check the external failure terminal status
			Over voltage stall or over current stall time lasts for more than one minute	Check whether the external load is normal
19	E.CUr	Current detection fault	Current detection circuit failure	Seek for technical support
20	E.GdF	Output short circuited to ground	Wrong connection	Correct the connection error as per the user manual
			Motor abnormal	Replace the motor after performing ground insulation test
			Invert module fault	Seek for technical support
			Ground leakage current at the output side is too large	Seek for technical support
21	E.LV1	Abnormal power off in running status	Mains power fluctuation or momentary power failure	Check the mains power supply
22	E.ILF	Input power fault	Abnormal connection, missing connection or disconnection at the power supply	Check the power connections as per the operational regulations and eliminate the errors of missing connection and disconnection
			Serious imbalance of three phases power supply	Check whether the imbalance of three phases power comply with the requirements

Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
			Capacitor aging	Seek for technical support
			Abnormal snubber circuit	Seek for technical support
23	E.oLF	Abnormal output phase loss	Abnormal connection, missing connection or disconnection at the output side	Check the three phase output whether exits missing connection or disconnection
			Imbalance of output three phases	Check whether motor is kept well Switch off the power supply to check whether the terminal characteristics at the output side and DC side are consistent
24	E.EEP	EEPROM failure	EEPROM reading and writing failure	Seek for technical support
25	E.dL3	Pre-charging contactor contact failure	Loose connection inside the inverter	Ask professional technicians to maintain
			Abnormal snubber circuit	Seek for technical support
26	E.dL2	Temperature sensor disconnection	Ambient under temperature	Check whether the ambient temperature complies with the requirements
			The temperature sampling circuit inside the inverter is faulty	Seek for technical support
27	E.dL1	Encoder cable disconnection	Encoder connection is incorrect	Change the encoder cable connection
			Encoder has no signal output	Check whether the encoder and power supply are normal.
			Encoder cable disconnection	Reconnect
			Abnormal parameter setting	Confirm the relevant parameters of encoder are set properly
28	E.P10	+10V power output abnormal	+10V power overload	Increase +10V power load impedance Use externally independent power supply
			+10V and GND is short circuited	Eliminate the short circuit failure
			+10V power terminal circuit failure	Seek for technical support
29	E.AIF	Analog input abnormal	Analog input voltage is too large	Check whether the analog input voltage complies with the requirements
			Analog input circuit failure	Seek for technical support
			Analog input circuit signal is interfered	Increase the P6.22 ~ P6.24 AI filter time
30	E.Ptc	Motor over temperature(PTC)	The motor temperature signal reaches the alarm setting value	Strengthen ventilation and heat dissipation
			Thermistor resistance failure	Check the thermistor
			The sensor protection threshold of the motor is set improperly	Adjust the sensor protection threshold of the motor
31	E.SE1	Communication abnormal 1	The communication of operation panel RS485 is disconnected	Check the connection of the equipment communications

Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
		(Operation panel RS485)	Communication failure of operation panel RS485	Check whether the data receiving and transmission complies with the protocol, whether the check sum is correct and whether the receiving and transmission interval complies with the requirements
			The inverter is set to master mode	Set the inverter to slave mode
32	E.SE2	Communication abnormal 2 (Terminal 485)	The communication of terminal RS485 is disconnected	Check the connection of the equipment communications
			The baud rate is set improperly	Set compatible baud rate
			Communication failure of terminal RS485	Check whether the data receiving and transmission complies with the protocol, whether the check sum is correct and whether the receiving and transmission interval complies with the requirements
			The communication of terminal RS485 is time−out	Check whether the communication timeout is set properly and confirm the communication cycle of the application program
			Improper setting of failure alarm parameters	Adjust the failure alarm parameter
			The inverter is set to master mode	Set the inverter to slave mode
33	E.VEr	Version incompatibility	Incompatible software version of the operation panel	Seek for technical support
34	E.CPy	Copy fault	The data error when uploading	Check connection of operation panel
			The data error when downloading	Check connection of operation panel
			Operation panel no parameters is uploaded	Upload the parameters to operation panel first
			Software version incompatible	Check if d1.09 is consistent
36	E.dL4	Expansion card connection abnormal	Expansion card disconnection	Ask professional technicians to maintain
			Expansion card failure	Seek for technical support
37	E.IoF	Terminal mutual exclusion check failed	The functions of X1 to X7, AI1, AI2 and DI terminals are set a same function	Modify the settings of X1 to X7, AI1, AI2 and DI terminals and ensure the setting functions are not repeated (excluding null function)
38	E.oL3	Hardware overload protection	Abnormal load	Check whether motor is stalled Replace inverter with higher model
			Abnormal input power supply	Check whether there is phase loss
			Output failure	Check whether the output phase loss or short circuit
39	E.tPF	Torque prove fault	The brake opening condition is not met	Check mechanical brake parameters setting Check motor cable connection
40	E.bLF	Brake open fault	There is a brake open command but no brake open feedback signal received	Check mechanical brake Check feedback signal connection
41	E.bEF	Brake close fault	There is a brake closing command but no closing feedback signal received	Check mechanical brake Check feedback signal connection

Fault No.	Fault display on panel	Fault description	Possible causes	Corrective actions
42	E.oPF	Over speed fault	Speed exceeds the over speed detect value	Check if the over speed parameters setting are reasonable Check if the encoder signal normal Check if the drive operates normally
43	E.PbF	Speed error fault	There is a deviation between the output speed and the actual feedback speed	Check for mechanical malfunctions Check the encoder and connection
44	E.0cF	Zero current fault	The motor output current is less than the zero current detection value P8.04 for the time set by P8.05	Check if the motor cable is connected properly Check if the value of P8.04 and P8.05 setting correctly
63	−LU−	Power supply under voltage	The power supply voltage is lower than the minimum operating voltage	Check input power supply
			Abnormal internal switching power supply	Seek for technical support

7.2 Troubleshooting Procedures



7.3 FAQ

I. Why occur over current trip or over load trip in vector control 2 with encoder speed feedback?

Check the parameter settings:

(1) Check if the motor parameters are properly set

(2) Check if the encoder pulse Pd.21 is properly set

(3) Check if the encoder direction parameter of Pd.22 is properly set

(4) Check if the ratio between motor and encoder Pd.24 is properly set

Check the hardware connection

(1) Check if the PG card matches the encoder

(2) Check if the PG card and the encoder are properly connected

(3) Check if the encoder in good condition

(4) Check if the lines for Hall sensor is loosen or dislocated for V5-GA-4T18.5G and above power class

II. Why have abnormal operation in vector control 2 without encoder speed feedback?

(1) Check if there exists large difference between the motor rated current and inverter rated current

(2) Check if complete motor data identification has been performed

(3) Check if the lines for Hall sensor is loosen or dislocated for V5-GA-4T18.5G and above power class

III. Why have abnormal in open loop torque control or close loop torque control ?

(1) Check if there exists large difference between the motor rated current and inverter rated current

(2) Check if complete motor data identification has been performed

(3) Check if the torque reference channel and speed limit channel are properly set

(4) Check if the lines for Hall sensor is loosen or dislocated for V5-GA-4T18.5G and above power class

IV. Why have abnormal operation in vector control 1?

(1) Check if motor data identification has been performed

(2) Check if the lines for Hall sensor is loosen or dislocated for V5-GA-4T18.5G and above power class

V. Why the running frequency kept at 0Hz when run reverse ?

(1) Check if the frequency is set to 0

(2) Check if the parameter value of P3.09 is set to 0. If not, change it to 0

VI. Why the braking resistor didn't it work?

(1) Check if the braking resistor is connected between the main circuit terminals B1 and B2

(2) Check if the parameter value of PA.09 is set to 1. If not, change it to 1

(3) If external braking unit check braking unit is selected, ensure the wiring is correct

(4) Even if external braking unit is installed, PA.09 need to set to 1 too

VII. Why there is large deviation between the analog input and the setting frequency?

(1) Check if the analog input type is correct and the jumpers of control board for select 0 ~ 10V or 0 ~ 20mA are properly set. For the analog voltage input, the jumper turn to V side and for the analog current input, the jumper turn to I side

(2) Check if the analog input curve is properly set, for details, refer to parameters of P6.00 to P6.20

VIII. Why there is large deviation between the analog output and the running frequency?

(1) Check if the analog output type is correct and the jumpers of control board for select 0 ~ 10V or 0 ~ 20mA are properly set. For the analog voltage output, the jumper turn to V side and for the analog

current output, the jumper turn to I side

(2) Check if the analog output curve is properly set, for details, refer to parameters of P7.05 to P7.09

IX. Why report E.AIF analog input abnormal error?

(1) Check if the analog input type is correct and the jumpers of control board for select 0 ~ 10V or 0 ~ 20mA are properly set. For the analog voltage input, the jumper turn to V side and for the analog current input, the jumper turn to I side

(2) Check if the analog input voltage exceeds 11V

(3) When the analog power supply is inner +10V of the control board, check if the voltage of +10V is lower than 9V or higher than 11V. If yes, check if the resistance value between the +10V and the GND is less than 1KΩ after powered off completely

X. Why report E.P10 abnormal error?

(1) Check if the voltage of +10V on the control board is lower than 9V or higher than 11V. If yes, check if the resistance value between +10V and GND is less than 1KΩ after power off completely

XI. Why the host computer and inverter have abnormal communication?

(1) Check if the data format, address and baud rate are consistent with the host computer

(2) Check if the host computer address needs to be added by 1 (that is,"Address +1")

(3) Check if the host computer adopts Modbus RTU format

(4) Check if the register address of the host computer is converted to hexadecimal format

(5) Check if the 485 wires are properly connected

XII. Why there exist abnormality when perform parameter copy?

(1) The parameters for V5 series and V6 series cannot be copied between each other

(2) The copy operation can be performed only when the parameter value of d1.09 are consistent

(3) After download, should completely power off and power on again, the parameters copy is completed

XIII. Why the operation panel displayed "8.8.8.8" or no display?

(1) Check if the operation panel are properly connected to the control board

(2) Check if the network cable adopt straight-through connection between the operation panel and control board

XIV. Why the operation panel can not see the parameter or can not change parameter value?

(1) If the parameter value can not changed, check if P0.01 is set to 1. If is set to 1, change it to 0

(2) Check if the parameter is only read

(3) If change parameter in running status, check if the parameter could not be changed in running status

(4) When display is not available, check if the parameter has been encrypted

(5) When display is not available, check if the operation panel has been locked

XV. How the motor keep the locking force in static status?

(1) Running at 0 frequency in the control mode of vector control 2 with encoder speed feedback

(2) Enabled the zero−servo function in the control mode of vector control 2 with encoder speed feedback

XVI. How to change the motor direction?

(1) If P0.06=0, setting P0.07 or press FWD/REV key to change the running direction in real time

(2) If P0.06=1, motor running direction is determine by the terminal command

(3) Operation panel UP/DN key or terminal UP/DN can change the running direction,for details, refer to the parameter of Pb.08 and Pb.10 descriptions

(4) PID control and composite control can change the motor direction, or details, refer to the parameter of P8.08 description

XVII. Why some model inverter, the fans will run after power on, and some not after power on?

(1) 15kW and below power class: The fan will run after power on

(2) 18.5kW to 45kW : The fan is controlled by the heat-sink temperature

(3) 55kW to 75kW : The fan will run after power on

(4) 90kW and above power class: The fan is controlled by the heat-sink temperature and running command. The fan will run when in running status or the heat-sink temperature reach fan running temperature

XVIII. What will happen if the CN1 busbar of the control board is loose or damaged?

(1) If the CN1 busbar of the control board is loose or damaged, the cannot run or will report various errors. Such as the may display "−LU−" , E.oc1, E.FAL, E.oH1, E.oH2, E.Cur and E.dL3,etc.

XIV. How to solve the trouble if occur E.FAL fault?

(1) When the inverter trip by over current, over voltage, short circuited to ground, output phase imbalance, etc. There may be occur E.FAL fault.

(2) Check the fault record of d0.00 to d0.05 and d0.11 E.FAL protection type:

d0.11 E.FAL protection type:

0: None

1: Module protection

2: Over current

3: Over voltage

4: Short circuited to ground

5: Vagueness state, interfere and all of above are possible

(3) Check when occur E.FAL fault:

A. Report E.FAL when power on

B. Report E.FAL when start to run

C. Report E.FAL during running status

Integrated above data, parameter settings, hardware and the load to solve the problem.

7.4 Crane Common Problems Solving

◆ The phenomenon of slippage occurs when starting, and the low frequency torque is insufficient

1) Confirm that the power selection of the inverter is correct. The selection of the inverter should be selected according to the rated current of the motor. The rated current of the inverter is required to be amplified by a power level based on the rated current of the corresponding motor. In addition, both the inverter and the motor need to have a certain margin;
2) Make sure that the lifted weight is within the rated weight range of the crane.
3) To ensure that there is no problem with the machine;
4) Do not switch the running direction during operation;
5) If the external brake control is used, it is necessary to confirm whether the control sequence of the brake is correct, and whether the output torque of the inverter is sufficient when the brake open;
6) If it is a conical motor, check whether the torque boost is enough so that the flux current is enough to open the brake;
7) Confirm that the parameters of the motor are setting correctly and auto tune is performed;
8) Increase the starting frequency of the inverter;
9) If the open-loop VF control mode is used, increase the low-speed torque boost; if the vector control mode is used, adjust the speed speed loop parameters.

◆ **The speed is too fast in downwards direction**

1) Confirm that the power selection of the inverter is correct. The selection of the inverter should be selected according to the rated current of the motor. The rated current of the inverter is required to be amplified by a power level based on the rated current of the corresponding motor. In addition, both the inverter and the motor need to have a certain margin;
2) Make sure that the lifted weight is within the rated weight range of the crane.
3) To ensure that the selection of the brake chopper and brake resistor is correct, to ensure that the brake chopper and brake resistor wiring is correct, to ensure the brake chopper function is actived.
4) Confirm that the parameters of the motor are setting correctly and auto tune is performed;
5) To ensure whether the output current of the inverter is sufficient, and the rated output torque of the motor is sufficient;
6) Make sure the brake chopper function is ON;
7) Please confirm that the overvoltage control function is invalid.

◆ **The phenomenon of slippage occurs when stops**

1) Confirm that the power selection of the inverter is correct. The selection of the inverter should be selected according to the rated current of the motor. The rated current of the inverter is required to be amplified by a power level based on the rated current of the corresponding motor. In addition, both the inverter and the motor need to have a certain margin;
2) Make sure the load is within the rated load;
3) make sure that the brake pads of the brake have no problem;
4) Confirm that the braking action is timely. If it is caused by the slow braking action, try to extend the brake close delay time; try the DC braking stop mode;

5) Increase the brake closefrequency.
6) For the conical motor, ensure that the motor maintains sufficient output torque when during stop, and ensure that the mechanical braking torque of the conical motor is sufficient;
7) For the conical motor, if the mechanical brake is open during the DC braking time, please set it to coast to stop mode;
8) Confirm that the parameters of the motor are setting correctly and auto tune is performed;

◆ **The phenomenon of overcurrent and overload occurs**

1) Confirm that the power selection of the inverter is correct. The selection of the inverter should be selected according to the rated current of the motor. The rated current of the inverter is required to be amplified by a power level based on the rated current of the corresponding motor. In addition, both the inverter and the motor need to have a certain margin;
2) Make sure the load is within the rated load;
3) Confirm that the parameters of the motor are setting correctly and auto tune is performed;
4) Make sure that the mechanical brake working well and the logic for opening and closing mechanical brake is correct;
5) Ensure reasonable acceleration and deceleration time.

◆ **The upwards direction running is normal, but downwards direction running report the over-voltage protection**

1) Check the wiring of brake chopper and brake resistor if are normal;
2) Check the brake resistor and brake chopper in good condition;

◆ **Reasons for brake chopper damaged**

1) Check whether there is a short circuit in the brake resistor;
2) Check whether the connecting wires of the brake resistor and the brake chopper are short-circuited or short-circuited to ground;
3) Check whether the selection of brake resistor matches that of brake chooper;
4) Check whether the braking conditions on site match the selection of brake chopper and brake resistor;
5) How to measure whether the built-in brake chopper is damaged: first cut off the power supply, remove the wiring of brake resistors B1 and B2, and set the multimeter to 1-ohm resistance or diode. The red probe connect to "B2"; the black probe is connected to "B1", if the value is about 0.4V, which is normal.

◆ **The phenomenon of tripping occurs as soon as the power is turned on**

1) Check whether there is a short circuit in the three-phase input power supply;
2) Check whether the rectifier bridge is normal. The measurement method is as follows, first cut off the power supply, remove the R, S, T wiring, and set the multimeter to 1-ohm resistance or diode. Connect the black probe of the multimeter to the "+1" terminal of the DC bus, and the red probe to R, S, and T to observe the three values; then use the red probe of the multimeter to connect the "-" terminal, and the black probe to R, S, and T respectively. Observe these 3 values, the deviation of these 6 values should not be too large, and the general value is normal between 0.3 and 0.5V.

◆ **-LU- occurs at start**

1) Check whether the three-phase input power is normal, whether the three-phase input voltage and voltage are normal, whether the three-phase input power is balanced; whether there is a loose wiring, etc.;
2) Check whether the pre-charge circuit of the inverter is normal.

◆ **E.FAL protection appears as soon as it is started**

1) Check whether there is a phase-to-phase short circuit in the motor cable;
2) Check whether there is a short circuit to ground in the three phases of the motor;
3) Check whether the insulation level of the motor is normal;
4) Check whether the inverter module of the inverter is normal. The measurement method is as follows, first cut off the power supply, remove the U, V, W wiring, and set the multimeter to 1-ohm resistance or diode.

   The black probe is connected to "+", and the red probe is connected to U, V, and W respectively to observe these 3 values;

   The red probe is connected to "-", and the black probe is connected to U, V, and W respectively to observe these 3 values;

   The six value should about 0.28~0.5V is normal.

◆ **Suggestions on improving safety**

1) The circuit design must ensure fault safety. In the event of any external safety circuit, inverter, mechanical brake, motor or any safety device losing power, short circuit, fault and other abnormal conditions, it must ensure safety, immediately realize the fastest shutdown and prohibit operation;
2) There must be enough margin in the selection of inverter and motor;
3) Auxiliary contacts of external machinery can also be connected in series to the safety circuit;
4) Regularly check whether the mechanical brakes are in good condition and whether the brake pads are worn;
5) Regularly check whether the peripheral safety equipment is in good condition and working normally;
6) Without rigorous verification, it is recommended not to operate in the constant power area.

Chapter 8 Maintenance and Inspection

The application environment (such as temperature, humidity, dust and powder, wool, smoke and oscillation), burning and wearing of internal devices and other factors may reduces the service life. To reduce the fault and prolong the service life, it is necessary to perform daily inspections and periodic maintenance.

Note

1. Only the professionals can dismantle and replace the inverter components.
2. Before inspection and maintenance, please make sure that the power supply to the has been shut down for at least ten minutes or the CHARGER indicator is OFF, otherwise, electric shock may be happened (the power level of V5−GA−4T11G or above has CHARGER indicator).
3. Do not leave metal components and parts in the inner of inverter, otherwise, inverter me be damaged.

8.1 Daily Inspections

The inverter should be used under the allowable conditions as recommended in this manual and its daily inspections should be performed as the table.

Item	Inspection Contents	Inspection Means	Criteria
Environment	Temperature	Thermometer	−10 ~ +40ºC De-rated at 40 to 50ºC, and the rated output current shall be decreased by 1% for every temperature rise of 1ºC.
	Humidity	hygrometer	5 ~ 95%, no condensing
	Dust, oil, water and drop	Visual check	There are no dust, oil, water and drop
	Vibration	Special test instrument	3.5m/s^2, 2 ~ 9Hz 10m/s^2,9 ~ 200Hz 15m/s^2,200 ~ 500Hz
	Gas	Special test instrument, smell check and visual check	There are no abnormal smell and smoke
Inverter	Heat dissipation effect	Special test instrument	Exhaust normal
	Noise	Listen	There is no abnormal noise
	Gas	Smell and visual check	There are no abnormal smell and smoke
	Physical appearance	Visual check	The physical appearance is kept intact
	Heat-sink fan ventilation	Visual check	There are no fouling and wool that block the air duct
	Input current	Ampere-meter	In the allowable operating range, refer to the nameplate
	Input voltage	Voltmeter	In the allowable operating range, refer to the nameplate
	Output current	Ampere-meter	In the rated value range. It can be overloaded for a short while
	Output voltage	Voltmeter	In the rated value range
Motor	Heat dissipation effect	Special test instrument and smell	There are no over temperature and burning smell
	Noise	Listen	There is no abnormal noise
	Vibration	Special test instrument	There is no abnormal oscillation

8.2 Periodic Maintenance

It needs to perform periodic maintenance every three to six months according to the application environment and work conditions.

Item	Inspection Contents	Inspection Means	Criteria
Inverter	Main circuit terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well
	PE terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well
	Control circuit terminal	Screwdriver	The screws are tightened and the cables are kept well
	Reliability of internal connections and connectors	Screwdriver and hands	Connection is firm and reliable
	Expansion card connector	Screwdriver and hands	Connection is firm and reliable
	Mounting screws	Screwdriver/sleeve	The screws are tightened
	Cleaning the dusts and powders	Cleaner	There are no dusts and wool
	Internal foreign matter	Visual check	There are no foreign matter
Motor	Insulation test	500VDC megger	Normal

8.3 Component Replacement

Different types of components have different service lives. The service lives of the components are subject to the environment and application conditions. Better working environment may prolong the service lives of the components. The cooling fan and electrolytic capacitor are vulnerable components and should be periodic maintenance. If any fault occurs, the component should be replaced.

Vulnerable Components	Damage Causes	Solutions	Items for Routine Inspection
Fan	Bearing worn, blade aging	Replace	The fan blade has no cracks and rotates normally. The screws are tightened
Electrolytic capacitor	High ambient temperature and electrolyte volatilizes.	Replace	There are no electrolyte leakage, color change, crack and shell inflation. The safety valve is normal Static capacity is equal to or higher than the initial value *0.85

Note

When the inverter is stored for a long time, power connection test should be conducted once within two years and last at least five hours. It can use voltage regulator to gradually increase the value to the rated value after power connection is performed.

8.4 Insulation Test

Insulation test had been perform before leaving−factory, the user should not perform such test as much as possible under general condition. If the test is unavoidable, please perform the test strictly according to the following procedures, or inverter may be damaged.

High voltage testing is strictly prohibited, or inverter may be damaged. If the test is unavoidable, please contact the manufacture.

■ Main Circuit Insulation Test

- ◆ Utilize 500VDC megger to perform test under condition of main power shutdown.
- ◆ Disconnect all the control board circuits to prevent the control circuits from connecting with the test voltage. For the power level of V5−GA−4T11G and V5−GA−4T15G, it must disconnect between the terminal J1 on the drive board and the PE. For the power level of V5− GA− 4T18.5G or above, it must disconnect three cables of the surge absorption circuit. Pack the disconnected cable heads with insulating tapes properly.
- ◆ The main circuit terminal should be connected with public conducting wires:

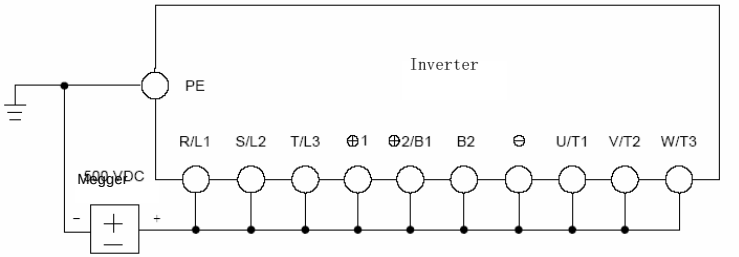


Figure8−1 Main Circuit Insulation Test forV5−GA−4T0.75G to V5−GA−4T15G

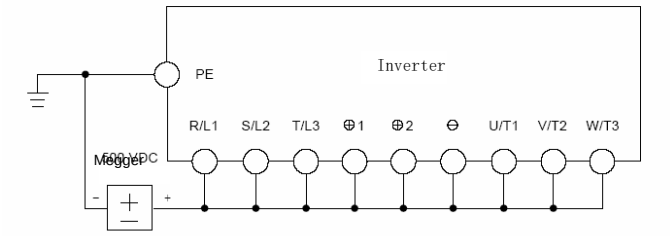


Figure8−2 Main Circuit Insulation Test for V5−GA−4T18.5G to V5−GA−4T500G

- ◆ Megger voltage can only be imposed between the public conducting wire of the main circuit and the PE terminal.
- ◆ The normal indication value of the Megger is 200MΩ or above.

Appendix A Modbus Communication

1. Support Protocol

Support Modbus RTU protocol, broadcast address is 0, the slave address range is1 to 247, 248 to 255 is reserved.

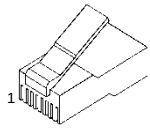
2. Interface mode

RS485: Asynchronous, half duplex, LSB sending priority. Low byte is follow the high byte.

Communication port A (Operation Panel RJ45 interface) default data format: 8−N−1, 38400 bps

Communication port B (terminal RS485+/−) default data format: 8−N−1, 19200 bps, see group PC description.

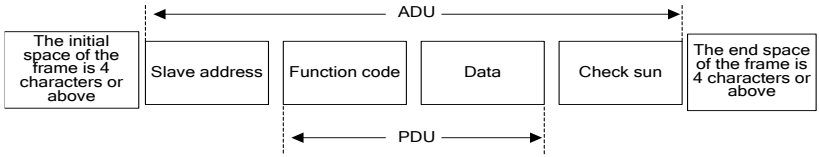
It is recommended to adopt EIA/TIA T568B network cable straight-through connection, the interface of port A is defined as:



Appendix Figure 1 RJ45 interface

Pin of communication port A	1	2	3	4	5	6	7	8
Signal of communication port A	+5V	GND	485+	485−	485+	485−	GND	+5V
EIA/TIA T568A	White green	Green	White orange	Blue	White blue	Orange	White brown	Brown
EIA/TIA T568B	White orange	Orange	White green	Blue	White blue	Green	White brown	Brown

3. Protocol Format



Appendix Figure 2 Protocol Format

ADU (Application Data Unit) check sum is the CRC16 check sum of the front three parts of ADU (slave address, function code and data), through exchange of high byte and low byte.

If the communication request response error, the feedback of PDU(Protocol Data Unit) will be error code and abnormal code. Error code is 0x80, abnormal code shows the error type.

Abnormal codes:

Abnormal code	Definition	Abnormal code	Definition
0x01	Illegal command	0x20	Frame error: frame length error, check sum error
0x02	Illegal data address	0x21	Parameters are unchangeable
0x03	Illegal data, data beyond upper limit or lower limit	0x22	Parameter is unchangeable in running status
0x04	Slave operation failure, the data is in the normal range, but it is invalid	0x23	The parameter is protected by password
0x05	Command is valid, and is in process, mainly occurs when storing data into EEPROM	0x24	Run command source is not through communication, Communication command is not useful
0x06	Slave is busy, mainly occurs when storing data into EEPROM		

4. Function Interpretation

◆ Function 0x03 reads multiple parameters and status words

PDU Part Contents	Data Length (Byte)	Range
Request:		
Function code	1	0x03
Start address of register	2	0x0000 ~ 0xFFFF
Number of registers	2	0x0001 ~ 0x0010
Response:		
Function code	1	0x03
Read bytes	1	2*Number of registers
Read contents	2*Number of registers	

◆ Function 0x06(0x41) write single parameter

PDU Part Contents	Data Length (Byte)	Range
Request:		
Function code	1	0x06(0x41)
Register address	2	0x0000 ~ 0xFFFF
Register data	2	0x0000 ~ 0xFFFF
Response:		
Function code	1	0x06(0x41)
Register address	2	0x0000 ~ 0xFFFF
Register data	2	0x0000 ~ 0xFFFF

◆ Function 0x10(0x42) write multiple parameters

PDU Part Contents	Data Length (Byte)	Range
Request:		
Function code	1	0x10(0x42)
Start address of register	2	0x0000 ~ 0xFFFF
Number of register	2	0x0001 ~ 0x0010
Bytes of register contents	1	2*Number of registers
Register contents	2*Number of registers	
Response:		
Function code	1	0x10(0x42)
Start address of register	2	0x0000 ~ 0xFFFF
Number of register	2	0x0001 ~ 0x00100

◆ Function 0x17 read and write multiple parameters

PDU Part Contents	Data Length (Byte)	Range
Request (Response):		
Function code	1	0x17
The start address of reading register	2	0x0000 ~ 0xFFFF
The number of reading register	2	0x01 ~ 0x10
The start address of writing register	2	0x0000 ~ 0xFFFF
The number of writing register	2	0x01 ~ 0x10
The number of writing register bytes	1	2*Number of registers
The writing register contents	2*Number of registers	
Response:		
Function code	1	0x17
Read the number of register bytes	1	0x02 ~ 0x20
Read data contents	2*Read bytes	0x0000 ~ 0xFFFF

Operating sequence: Read firstly and rewrite secondly, but the register 0xF080 is an exception, which shall be written firstly and read secondly so as to facilitate the management of the operation panel.

☞ **Note:**

- In case continuous storage is required, will store from the lower address to upper address, with maximum of 16 parameters being stored in one command.
- If change parameter frequently, such as change setting frequency repeat, the parameter **PC.03 should be set to 303, so the communication change in RAM** or use 0x41(0x42) command replace 0x06 (10) to not stored the value into EEPROM, prevent from damage inner EEPROM.
- The life of EEPROM is about 100000 times, if change parameters frequently, EEPROM service life will be reduced quickly.

5. Parameters Address Definition

Appendix Table−1

<table>
<tr><th>Address range</th><th>Meaning</th></tr>
<tr><td>0x0000 ~
0x1A00</td><td>All the parameters with a address, and the parameter values can be read and written through series communication (the write function according to the parameter property define in Chapter 5). The address express with hexadecimal.
High-order bytes: Parameter group number
Low-order bytes: Index in group, convert to hexadecimal
<table>
<tr><td>Group number</td><td>P0</td><td>...</td><td>PE</td><td>d0</td><td>d1</td><td>d2</td><td>H0</td><td>H1</td><td>H2</td><td>A0</td><td>C0</td><td>U0</td><td>U1</td></tr>
<tr><td>High-order bytes</td><td>0x00</td><td></td><td>0x0e</td><td>0x0f</td><td>0x10</td><td>0x11</td><td>0x12</td><td>0x13</td><td>0x14</td><td>0x15</td><td>0x16</td><td>0x17</td><td>0x18</td></tr>
</table>
For example,the Modbus address of Pb.23 is : (0x0b<<8)+23=0x0b17</td></tr>
<tr><td>0x4000 ~
0x5A00</td><td>The parameter address with an attribute word address. The attribute word address:
High-order bytes: Parameter group number+0x40
Low-order bytes: Index in group, convert to hexadecimal
For example,the attribute word address of Pb.23 is : ((0x0b+0x40)<<8)+23=0x4b17
The attribute words are defined in the following order: bit0 ~ bit2 are unit, bit3 ~ bit4 are modifying attribute, bit5 ~ bit6 are precision and bit7 ~ bit15 are reserved.</td></tr>
<tr><td>0x8000~ 0x800D</td><td>Control word register</td></tr>
<tr><td>0x810B ~ 0x819F</td><td>Status word register</td></tr>
<tr><td>0xF000 ~
0xF002</td><td>Special register for input password authentication</td></tr>
<tr><td>0xF080~ 0xF084</td><td>Read the current value, upper limit, lower limit and factory setting of parameter</td></tr>
</table>

◆ Control word registers: 0x8000 ~ 0x800D

Register	Name of Parameters	Register	Name of Parameters
0x8000	Control command word	0x8007	AO2 output host computer percentage
0x8001	Open loop digital frequency reference	0x8008	Y2 output host computer percentage
0x8002	Run command reference source selection	0x8009	Slave setting frequency coefficient
0x8003	Open loop main reference mode	0x800A	Virtual terminal
0x8004	Close loop digital voltage reference (analog feedback)	0x800B	Y1 terminal output function
0x8005	Close loop digital rotation reference(single phase pulse feedback)	0x800C	Acceleration time 0
0x8006	AO1 output host computer percentage	0x800D	Deceleration time 0

Note: The virtual terminals from LSB to MSB are X1, X2, X3, X4, X5, X6, X7, AI1, AI2, AI3, Y1, Y2 and relay, bit13 ~ bit15 are reserved.

◆ Status word registers: 0x810B ~ 0x819F

Register	Name of Parameters	Precision	Registe	Name of Parameters	Precision
0x810B	Equipment status word 1		0x8114	Display parameters in stop status	According to parameters
0x810E	Equipment status word 4		0x8116	Display parameters in running status	According to parameters
0x8120	Reference frequency （Hz）	0.01Hz	0x8180	Reference frequency （Hz）	0.01Hz
0x8122	Bus voltage(V)	1V	0x8182	Bus voltage(V)	1V
0x8124	AI1（V）	0.01V	0x8184	AI1（V）	0.01V
0x8126	AI2（V）	0.01V	0x8186	AI2（V）	0.01V
0x8128	AI3（V）	0.01V	0x8188	AI3（V）	0.01V
0x812A	DI（%）	0.1%	0x818A	DI（%）	0.1%
0x812C	External counts	1	0x818C	External counts	1
0x812E	Motor speed	1	0x818E	Motor speed	1
0x8130	Close loop reference (%)	0.1%	0x8190	Close loop reference (%)	0.1%
0x8132	Close loop feedback (%)	0.1%	0x8192	Close loop feedback (%)	0.1%
0x8134	Reference torque(%)	0.1%	0x8194	Reference torque (%)	0.1%
0x8136	Running frequency (Hz)	0.01Hz	0x8196	Reserved	
0x8138	Output current(A)	0.1 or 0.01A	0x8198	Reserved	
0x813A	Output torque (%)	0.1%	0x819A	Reserved	
0x813C	Output power (kW)	0.1kW	0x819C	Reserved	
0x813E	Output voltage(V)	1V	0x819E	Reserved	

Note:

- 0x8121 ~ 0x813F odd numbers are attribute word of status word 0x8120 ~ 0x813E, 0x8181 ~ 0x819F odd numbers are attribute word of status word 0x8180 ~ 0x819E
- Attribute use to describe status word, the attribute words from LSB to MSB are Hex/Dec for 1 bit, precision for 2bit, modification for 2 bits and unit for 3 bits
- The register addresses 0x8120 ~ 0x813F refer to the display parameters corresponding to P2.02, the register addresses 0x8180 ~ 0x8193 refer to the display parameters corresponding to P2.03
- 3.7kW and below power class, output current precision is 0.01A

  5.5kW and above power class output current precision is 0.1A

Control command word description: 0x8000

Bit	Meaning	Bit	Meaning
0	0: Stop command 1: Run command	3	0: Jog running is inactive 1: Jog running is active
1	0: Run forward 1: Run reverse	14	0: Emergency stop is inactive 1: Emergency stop is active
2	0: Fault reset is inactive 1: Fault reset is active	15	0: Coast to stop is inactive 1: Coast to stop is active
Note: Bit 4 to bit 13 are reserved.			

Status word 1 description: 0x810B

Bit	Meaning	Bit	Meaning
0	0: Stop status 1: Running status	5 ~ 6	Run command channel selection 0: Operation panel reference 1: Terminal reference 2: Host computer reference
3	0: Forward running status 1: Reverse running status		
4	0: Operation panel keys are unlocked 1: Operation panel keys are locked	8 ~ 15	0: Normal Others: Fault code
Note: Bit 1,bit 2 and bit 7 are reserved			

Status word 4 description: 0x810E

Bit	Meaning	Bit	Meaning
0	0: Non−jog running 1: Jog running	5	0: Non−open loop multi−step voltage running 1: Open loop multi−step voltage running
1	0: Non−close loop operation 1: Close loop operation	6	0: Normal voltage 1: Under voltage
2	0: Non−open loop multi−step frequency running 1: Open loop multi−step frequency running	7	0: Non−single phase pulse input close loop running 1: Single phase pulse input close loop running
3	0: Non−close loop multi−step frequency running 1: Close loop multi−step frequency running	14	0: Speed control 1: Reserved
4	0: Non−common operation 1: Common operation	15	0: Vector control 1 1: Vector control 2
Note: Bits 8 ~ 13 are reserved.			

◆ Register for input password authentication

Sub function code of PDU	Meaning
0xF000	User password P0.00 authentication and it will be closed automatically if no operation is performed within five minutes
0xF001	PE.00 password authentication for the display and hidden areas of the specially authenticated parameters, and it will be closed automatically if no operation is performed within five minutes
0xF002	A0.00 password authentication for the display and hidden attributes customized areas of the parameters, and it will be closed automatically if no operation is performed within five minutes

◆ Register for parameter attributes

Register address	Meaning	Range	Read (R) and Write (W)
0xF080	Relative address of the parameter	See Appendix Table−1	R/W
0xF081	Current value	0 ~ 65535	R/W
0xF082	Upper limit	0 ~ 65535	R
0xF083	Lower limit	0 ~ 65535	R
0xF084	Factory setting	0 ~ 65535	R

Write the parameter address into 0xF080 by reading and writing multiple register command 0x17 firstly and then read attributes of the parameter.

6. CRC16 Function

```
unsigned int  crc16(unsigned char *data,unsigned char length)
{
    int i,crc_result=0xffff;
    while(length−−) {
        crc_result^=*data++;
        for(i=0; i<8; i++) {
            if(crc_result&0x01)
                crc_result=(crc_result>>1) ^0xa001;
            else
                crc_result=crc_result>>1;
        }
    }
    return (crc_result=((crc_result&0xff) <<8) |(crc_result>>8) ) ;
}
```

7. Modbus Communication Exemplified

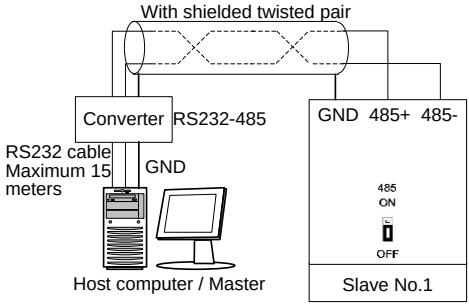
Start the 1# inverter to run forward and set the frequency to 50.00Hz (indicating 5,000 internally)							
	Address	Function code	Register start address	Number	Bytes	Register contents	Check sum
Request	0x01	0x10	0x8000	0x0002	0x04	0x0001,0x1388	0xCEFF
Response	0x01	0x10	0x8000	0x0004	None	None	0xE80A
Read the 1# inverter running frequency of and the response running frequency is 50.00Hz							
	Address	Function code	Register start address	Number		Register contents	Check sum
Request	0x01	0x03	0x8136	0x0001		None	0x4C38
Response	0x01	0x03	None	0x02		0x1388	0xB512
Stop the 1# inverter in default mode							
	Address	Function code	Register Address	Register Contents			Check Sum
Request	0x01	0x06	0x8000	0x0000			0xA00A
Response	0x01	0x06	0x8000	0x0000			0xA00A

☞ **Note:**

It needs to set P0.06 to 2 first.

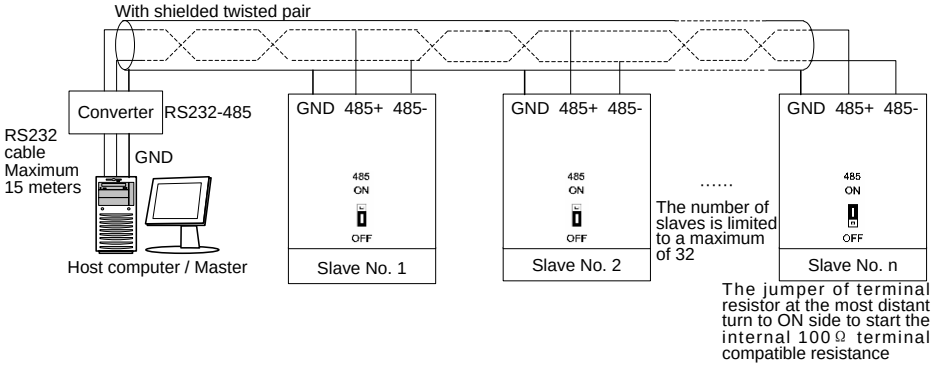
8. Communication Bus Topology

◆ Bus topology of master and slave



Appendix Figure3 Bus topology of master and slave

◆ Bus topology of master and slaves



Appendix Figure 4 Bus topology of master and slaves