Operation manual

CHV180 Series frequency Inverter special for elevator

SHENZHEN INVT ELECTRIC CO., LTD.

CONTENTS

SAFETY PRECAUTIONS

Please read this operation manual carefully before installation, operation, maintenance or inspection.

In this manual, the safety precautions were sorted to "WARNING" or "CAUTION".

WARNING Indicates a potentially hazardous situation which, if not, will result in death or serious injury.

CAUTION Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury and physical damage. This sign is also used for alert of any unsafety operation.

In some cases, the contents of "CAUTION" could cause serious accident. Please follow these important precautions in any situation.

★ NOTE is the necessary step to ensure the proper operation.

Warning marks were shown on the front keypad of inverters.
Please follow these indications when using the inverter.

WARNING
•May cause injury or electric shock. **•Please follow the instructions in the manual before installation or operation.** **•Disconnect all power line before opening front cover of unit. Wait at least 5 minute until DC Bus capacitors discharge.** **•Use proper grounding techniques.** **•Never connect AC power to output UVW terminals**

1. INTRODUCTION

1.1 Technology Features

- **Input & output**
  - Input voltage range: 380V±15%
  - Input frequency range: 47~63Hz
  - Output voltage range: 0~rated input voltage
  - Output frequency range: 0~400Hz
- **I/O features**
  - Programmable digital input: Provide 6 terminals which can accept ON-OFF inputs and 4 inputs can be extended by I/O extension card.
  - Programmable analog input: AI1 can accept input of 0 ~10V, AI2 can accept input of 0~10V or 0~20mA.
  - Programmable open collector output: Provide 1 output terminal, 1 output can be extended by I/O card.
  - High speed pulse output: Provide 1 output terminal, it can be changed as open collector output or high speed pulse output by change the related functinonal code.
  - Relay output: Provide 2 output terminals, 1 output can be extended by I/O extension card.
  - Analog output: 1output terminal, 0~20 mA or 0~10 V. another 1 can be extended by I/O extension card.
- **Main control function**
  - Control mode: Sensorless vector control (SVC), Vector control with PG (VC), V/F control.
  - Overload capacity: 60s with 150% of rated current, 10s with 180% of rated current.
  - Starting torque: 150% of rated torque at 0.5Hz (SVC); 180% of rated torque at 0Hz (VC).
  - Speed adjusting range: 1:100 (SVC); 1:1000 (VC)
  - Speed accuracy: ± 0.5% of maximum speed (SVC); ± 0.02% of maximum speed (VC)
  - Carrier frequency: 1.0 kHz~16.0 kHz.
- **Functions**
  - Frequency reference source: Digital input, analog input, serial communication, multi-step speed and self-adaption running according the changing of analog input.

- Operating mode: Checking , emergency, decelerating.
- Elevator control logic: Internal contracting brake, contactor control.
- Pre-torque compensation of starting moment without weighing sensor. (only for the SIN / COS encoder)
- Starting pre-torque compensation with weighing sensor
- Identificate synchronous machine's initial angle of magnetic pole in static (only for the SIN / COS Encoder)
- DC braking at starting and stopping
- PG Card: SIN/COS synchronous motor PG Card, UVW synchronous motor PG Card, asynchronous motor PG Card.
- Automatic voltage regulation (AVR): Automatically keep the output voltage stable when input voltage fluctuating.

  Up to 30 fault protections: Protect from over current, over voltage, under voltage, phase failure, over load, speeding etc.

1.2 Description of Name Plate

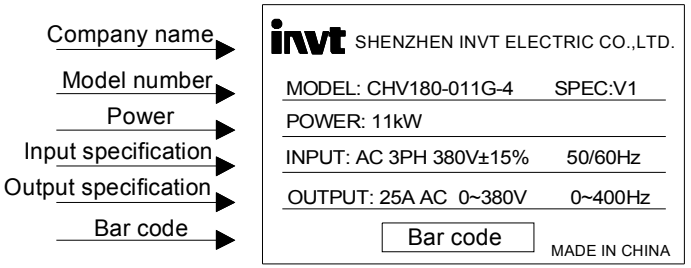


Figure 1.1 Nameplate of inverter

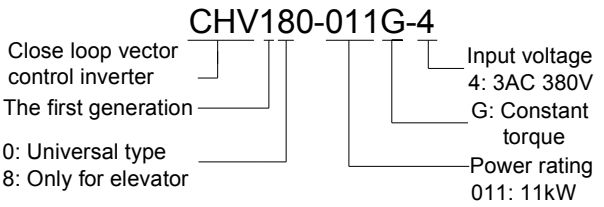


Figure 1.2 meaning of the model number

1.3 Selection Guide

3AC 380V ±15%

Model No.	Rated power (kW)	Rated input current (A)	Rated output current (A)	Size
CHV180-004G-4	3.7	10.0	9.0	C
CHV180-5R5G-4	5.5	15.0	13.0	C
CHV180-7R5G-4	7.5	20.0	17.0	D
CHV180-011G-4	11.0	26.0	25.0	D
CHV180-015G-4	15.0	35.0	32.0	D
CHV180-018G-4	18.5	38.0	37.0	E
CHV180-022G-4	22.0	46.0	45.0	E
CHV180-030G-4	30.0	62.0	60.0	E

1.4 Parts Description

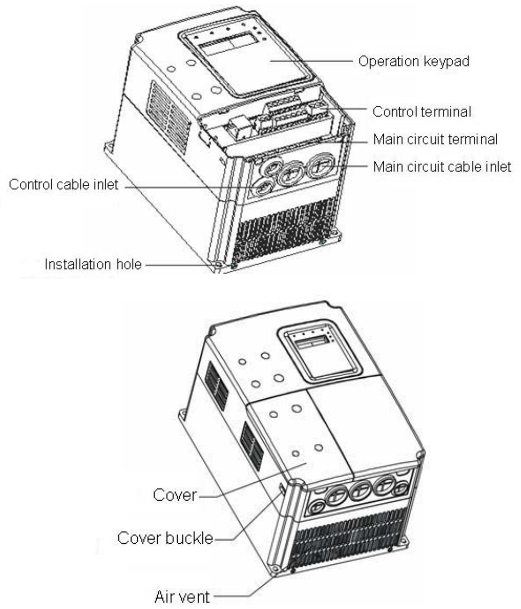


Figure 1.3 Parts of inverter (15kw and below)

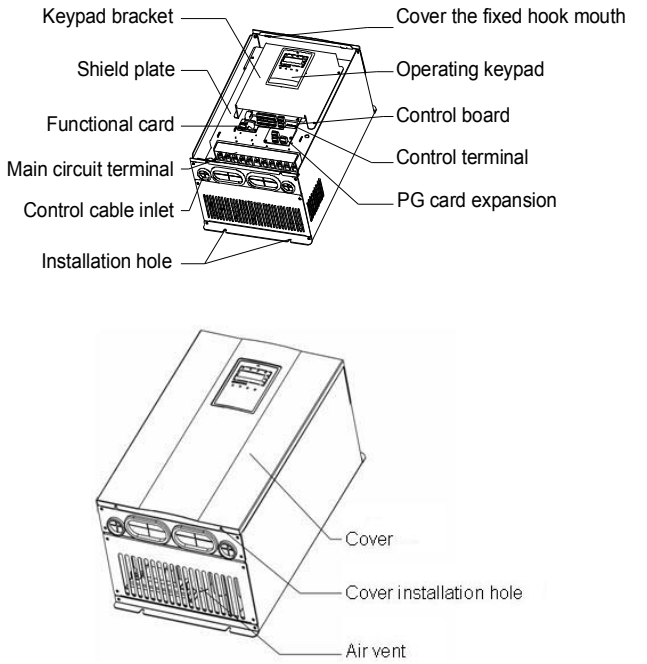


Figure 1.4 Parts of inverters (18.5KW and above)

1.5 Description of Extension Card

Thanks to advanced modular design, CHV180 series inverters can achieve specific functionality by using extension card to meet customer demand.

For details, please refer to operation manual of extension card.

Extension Card	Description
Communication Card	1. Offer RS232 and RS485 dual physical communication interface ,two communication mode can be switched by short-connecting module. 2. RS232 interface adopts standard DB9 master seat in order to the convinient connection , 3. RS485 interface adopt 3-hole with open type, 4. Modbus and RTU protocol.

Extension Card	Description
PG Card (asynchronous motor)	1. Receive high-speed pulse from encoder to realize high-accuracy close-loop vector control. 2. Both push-and-pull input and open-circuit collector input. 3. Offer frequency division output, the frequency division factor can be selected by dial switch.
SIN/COS PG Card (synchronous motor)	Receive high-speed pulse from encoder to realize high- accuracy close-loop vector control. Compatible SIN/COS encoder special for synchronous motor. Frequency division is 1, and just for read.
UVW PG Card (synchronous motor)	Receive high-speed pulse from encoder to realize high- accuracy close-loop vector control. Compatible UVW encoder special for synchronous motor, Offer frequency division output, the frequency-division factor can be selected by dial switch.
I/O Extension Card	Offer more input/output terminals to enhance the external function of inverter. RS 485 port is available,

More details please refer to capter 7 “DESCRIPTION OF CHV 180’S EXTENSION CARD”

2. UNPACKING INSPECTION

CAUTION
• **Never install or operate any inverter that is damaged or missing components. Doing so can result in injury.**

Check the following items when unpacking the inverter,

1. Inspect the entire exterior of the Inverter to see if there are any scratches or other damage resulting from shipping.
2. Ensure there is operation manual and warranty card in the packing box.
3. Ensure the nameplate that it is you ordered.
4. Ensure the optional parts are what you need if you ordered any optional parts.

Please contact the local agent if there is any damage of inverter or optional parts.

3. DISASSEMBLE AND INSTALLATION

WARNING

● Any untrained person working on any parts/systems of inverter or any rule in the "Warning" being violated, that will cause severe injury or property damage. Only licensed person, who has been trained on design, installation, commissioning and operation of inverter, is permitted to operate this equipment.

● Input power cable must be connected tightly, and the equipment must be grounded securely.

● Even if the inverter is not in operating situation, the following terminals still have dangerous voltage:

- Power Terminals: R, S, T;
- Motor Connection Terminals: U, V, W.

● Can not install the inverter until discharged completely after the power supply is switched off for 10 minutes.

● The section area of grounding conductor must be no less than that of power supply cable.

Section area of power line (mm^2)	Section area of grouding conductor
S≤16	S
16<S≤35	16
35<S	S/2

CAUTION

● Lift the cabinet by its base; do not lift it by holding its panel. Otherwise the main unit will fall off to result in personal injury.

● Install the inverter on top of the fireproofing material (such as, metal) to prevent fire.

● When need install two or more inverters in one cabinet, cooling fan should be applied to make sure that the air temperature is lower than 45°C. Otherwise it could cause fire or damage the device.

3.1 Environmental Requirement

3.1.1 Temperature & Humidity

Environment temperature range: -10°C ~ +40°C. Inverter will be derated if ambient temperature exceeds 40°C.

Less than 90% RH, without dewfall.

3.1.2 Altitude

Inverter can output the rated power when installed with altitude of lower than 1000m. It will be derated when the altitude is higher than 1000m. For details, please refer to the following figure:

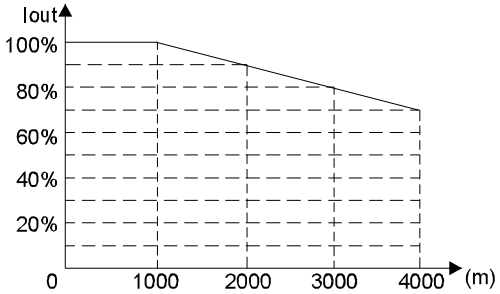


Figure 3.1 Relationship between output current and altitude

3.1.3 Others enviromental requirements

It is not allowed that the inverter falls down or suffers from fierce impact or the inverter installed at the place that oscillation frequently. The maximum swing should less than 5.8m/S^2 (0.6g).

3.1.5 Electromagnetic radiation

Keep away from the electromagnetic radiation source.

3.1.6 Water

Do not install the inverter at the wringing or dewfall place.

3.1.7 Air pollution

Keep away from air pollution such as dusty, corrosive gas.

3.1.8 Storage

Do not store the inverter in the environment with direct sunlight, vapor, oil fog and vibration.

4. WIRNING

WARNING

- Wiring must be performed by an authorized person qualified in electrical work.
- Do not test the insulation of cable that connects the inverter with high-voltage insulation testing devices.
- Can not install the inverter until discharged completely after the power supply is switched off for 10 minutes.
- Be sure to ground the ground terminal.

Ground to 10Ω or less.

Otherwise, an electric shock or fire can occur.

- Connect input terminals (R, S, T) and output terminals (U, V, W) correctly.

Otherwise it will cause damage the inside part of inverter.

- Before turn on the power, please ensure the power supply cables connected tightly to R,S,T terminals and the motor cables connected tightly to U,V,W terminals.
- Do not wire and operate the inverter with wet hands.Otherwise there is a risk of electric shock.

CAUTION

- Check to be sure that the voltage of the main AC power supply satisfies the rated voltage of the Inverter.

  Injury or fire can occur if the voltage is not correct.
- Connect power supply cables and motor cables tightly.

4.1 Connections of Peripheral Devices

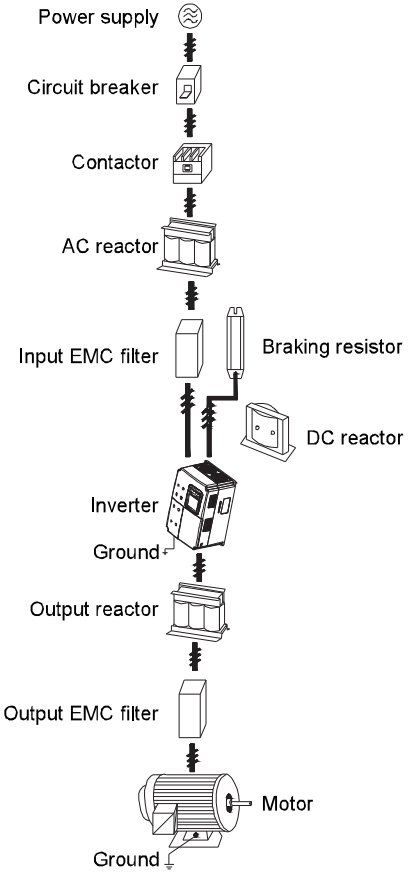


Figure 4.1 Connections of peripheral devices

4.2 Terminal Configuration

4.2.1 Main Circuit Terminals (380VAC)

(+)	PB	(-)	R	S	T	U	V	W	⏚
			POWER			MOTOR			

Figure 4.2 Main circuit terminals (4~5.5kW)

⏚	(+)	PB	(-)	R	S	T	U	V	W	⏚
				POWER			MOTOR			

Figure 4.3 Main circuit terminals (7.5~15kW).

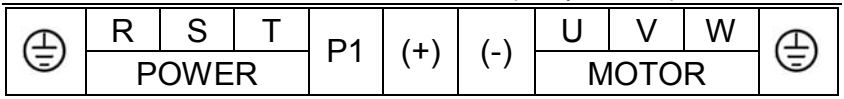


Figure 4.4 Main circuit terminals (18.5~30kW).

Main circuit terminal functions are summarized according to the terminal symbols in the following table. Wire the terminal correctly for the desired purposes.

Terminal	Description
R、S、T	Terminals of 3 phase AC input
(+)、(-)	Spare terminals of external braking unit
(+)、PB	Spare terminals of external braking resistor
P1、(+)	Spare terminals of external DC reactor
(-)	Terminal of negative DC bus
U、V、W	Terminals of 3 phase AC output
⏚	Terminal of ground

4.2.2 Control Circuit Terminals

S1	S2	S3	S4	S5	S6	GND	AI1	AI2	+10V	R01A	R01B	R01C
+24V	PW	COM	Y1	CME	COM	HDO	AO1	GND	PE	R02A	R02B	R02C

Figure 4.5 Control circuit terminals.

4.3 Typical Wiring Diagram

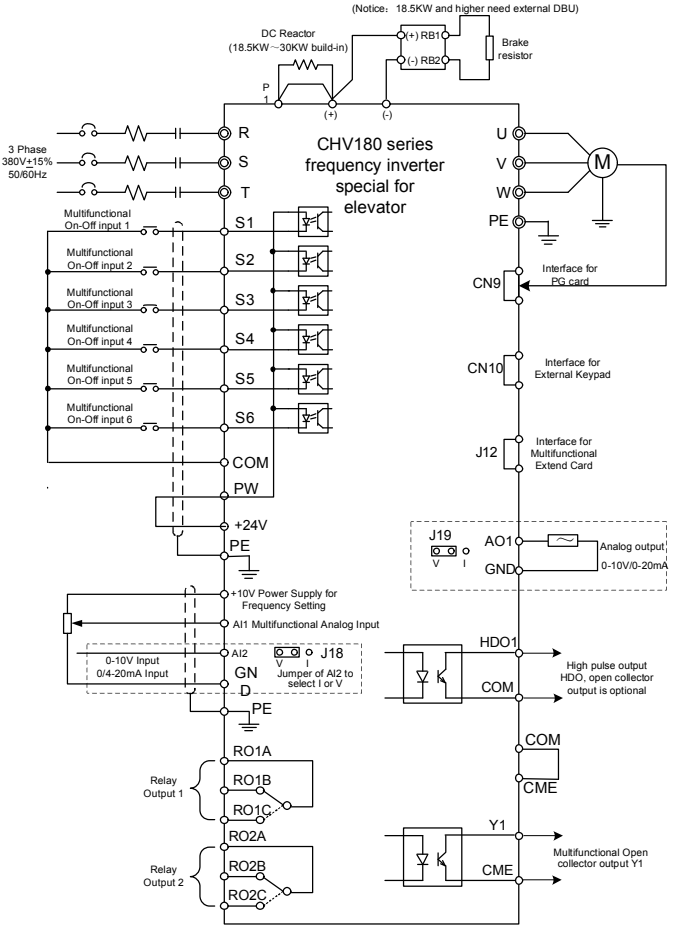


Figure4. 6 Wiring diagram.

- **Notice:**
- **Inverters between 18.5KW and 30KW have built-in DC reactor which is used to improve power factor.**
- **The inverters below 18.5KW have build-in braking unit. If need braking, only need to install braking resistor between PB and (+).**
- **For inverters above (including) 18.5KW, if need braking, should install external braking unit between (+) and (-).**
- **+24V connect with PW as default setting. If user need external power supply,**

disconnect +24V with PW and connect PW with external power supply.

4.4 Wiring the Main Circuits

4.4.1 Wiring at the side of power supply

●4.4.1.1 Circuit breaker

It is necessary to connect a circuit breaker which is compatible with the capacity of inverter between 3ph AC power supply and power input terminals (R, S, T). The capacity of breaker is 1.5~2 times to the rated current of inverter. For details, see <Specifications of Breaker, Cable, and Contactor>.

●4.4.1.2 Contactor

In order to cut off the input power effectively when something is wrong in the system, contactor should be installed at the input side to control the ON-OFF of the main circuit power supply.

●4.4.1.3 AC reactor

In order to prevent the rectifier damage result from the large current, AC reactor should be installed at the input side. It can also prevent rectifier from sudden variation of power voltage or harmonic generated by phase-control load.

●Input EMC filter

The surrounding device may be disturbed by the cables when the inverter is working. EMC filter can minimize the interference. Just like the following figure.

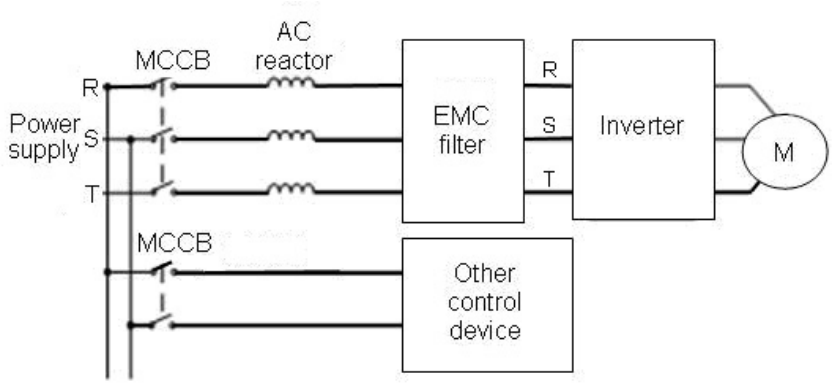


Figure4.7 Wiring at input side

4.4.2 Wiring for inverter

●4.4.2.1 DC reactor

Inverters from 18.5kW to 30kW (380V class) have built-in DC reactor which can

improve the power factor,

●4.4.2.2 Braking unit and braking resistor

• Inverters of 15KW and below have built-in braking unit. In order to dissipate the regenerative energy generated by dynamic braking, the braking resistor should be installed at (+) and PB terminals. The wire length of braking resistor should be less than 5m.

• The temperature of braking resistor will increase because the regenerative energy will be transformed to heat. Safety protection and good ventilation is recommended.

• Inverter of 18.5KW and above need connect external braking unit which should be installed at (+) and (-) terminals , and the braking resistor should be install at BR1,BR2 terminals.

• The cable between inverter and braking unit should be less than 5m. The cable between braking unit and braking resistor should be less than 10m.

Notice: Be sure that the electric polarity of (+) (-) terminals is right; it is not allowed to connect (+) with (-) terminals directly, Otherwise damage or fire could occur.

4.4.3 Wiring at motor side of main circuit

●4.4.3.1 Output Reactor

When the distance between inverter and motor is more than 50m, inverter may be tripped by over-current protection frequently because of the large leakage current resulted from the parasitic capacitance with ground. And the same time to avoid the damage of motor insulation, the output reactor should be installed.

●4.4.3.2 Output EMC filter

EMC filter should be installed to minimize the leakage current caused by the cable and minimize the radio noise caused by the cables between the inverter and cable. Just see the following figure.

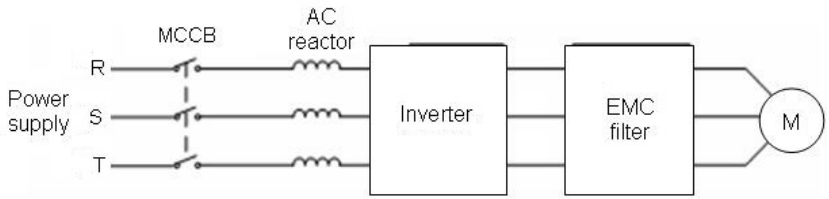


Figure 4.8 Wiring at motor side.

4.4.4 Wiring of regenerative unit

Regenerative unit is used for putting the electricity generated by braking of motor to the grid. Compared with traditional 3 phase inverse parallel bridge type rectifier unit,

regenerative unit uses IGBT so that the total harmonic distortion (THD) is less than 4%. Regenerative unit is widely used for centrifugal and hoisting equipment.

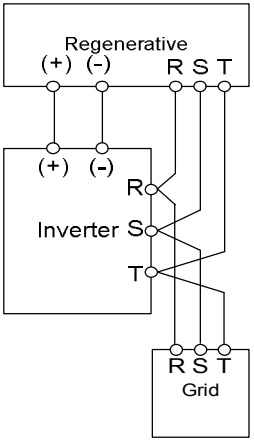


Figure 4.9 Wiring of regenerative unit.

4.4.5Ground Wiring (PE)

In order to ensure safety and prevent electrical shock and fire, terminal PE must be grounded with ground resistance, and the resistance should be less than 10Ω. The ground wire should be big and short, and it is better to use copper wire (>3.5mm^2). When multiple inverters need to be grounded, do not loop the ground wire.

4.5.5 Wiring of Common DC bus

Common DC bus method is widely used in the paper industry and chemical fiber industry which need multi-motor to coordinate. In these applications, some motors are in driving status while some others are in regenerative braking (generating electricity) status. The regenerated energy is automatically balanced through the common DC bus, which means it can supply to motors in driving status. Therefore the power consumption of whole system will be less compared with the traditional method (one inverter drives one motor).

When two motors are running at the same time (i.e. winding application), one is in driving status and the other is in regenerative status. In this case the DC buses of these two inverters can be connected in parallel so that the regenerated energy can be supplied to motors in driving status whenever it needs. Its detailed wiring is shown in the following figure:

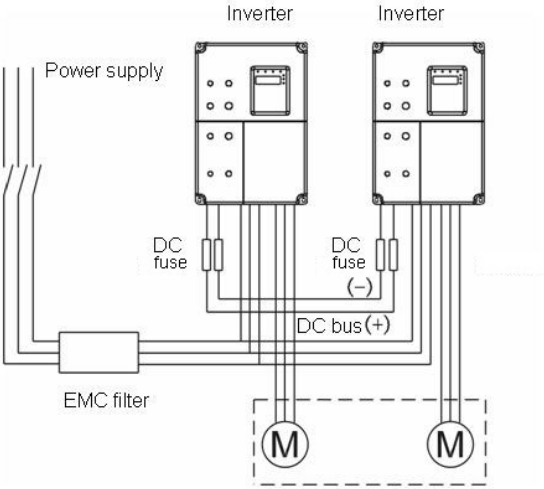


Figure 4.10 Wiring of common DC bus.

Notice: Two inverters must be the same model when connected with Common DC bus method. Be sure they are powered on at the same time.

4.5 Wiring Control Circuit Terminals

4.5.1 Precautions

- Use shielded or twisted-pair cables to connect control terminals.
- Connect the ground terminal (PE) with shield wire.
- The cable connected to the control terminal should leave away from the main circuit and heavy current circuits (including power supply cable, motor cable, relay and contactor connecting cable) at least 20cm and parallel wiring should be avoided. It is suggested to apply perpendicular wiring to prevent inverter malfunction caused by external interference.

4.5.2 Control circuit terminals

Terminal	Description
S1~S6	ON-OFF signal input, optical coupling with PW and COM. Input voltage range: 9~30V Input impedance: 3.3kΩ
PW	External power supply. +24V terminal is connected to PW terminal as default setting. If user need external power supply, disconnect +24V terminal with PW terminal and connect PW

Terminal	Description
	terminal with external power supply.
+24V	Provide output power supply of +24V. Maximum output current: 150mA
COM	Common ground terminal for digital signal and +24V (or external power supply).
AI1	Analog input, 0~10V Input impedance: 10kΩ
AI2	Analog input, 0~10V/ 0~20mA, switched by J18. Input impedance:10kΩ (voltage input) / 250Ω (current input)
GND	Common ground terminal of analog signal and +10V. GND must isolated from COM.
Y1（Y2）	Open collector output terminal, the corresponding common ground terminal is CME. External voltage range: 0~24V Output current range: 0~50mA 24V pull-up resistor range: 2kΩ~10kΩ
CME	Common terminal of open collector output
+10V	Supply +10V for inverter.
HDO	High speed pulse output terminal. The corresponding common ground terminal is COM. Output frequency range: 0~50 kHz
AO1（AO2）	Provide voltage or current output which can be switched by J19. Output range: 0~10V/ 0~20mA
PE	Ground Terminal.
RO1A、RO1B、RO1C	RO1 relay output: RO1A—common; RO1B—NC; RO1C—NO. Contact capacity: AC 250V/3A, DC 30V/1A.
RO2A、RO2B、RO2C	RO2 relay output: RO2A—common; RO2B—NC; RO2C—NO. Contact capacity: AC 250V/3A, DC 30V/1A.
RO3A、RO3B、RO3C	RO3 relay output: RO3A—common; RO3B—NC; RO3C—NO. Contact capacity: AC 250V/3A, DC 30V/1A.

4.5.3 Jumper on control board

Terminal	Description
J2, J4, J5, J13, J14	It is prohibited to be connected together, otherwise it will cause inverter malfunction.

Terminal	Description
J18	Switch between (0~10V) voltage input and (0~20mA) current input. V connect to GND means voltage input; I connect to GND means current input.
J19	Switch between (0~10V) voltage output and (0~20mA) current output. V connect to OUT means voltage output; I connect to OUT means current output.

4.6 Installation Guidline to EMC Compliance

4.6.1 General knowledge of EMC

EMC is the abbreviation of electromagnetic compatibility, which means the device or system has the ability to work normally in the electromagnetic environment and will not generate any electromagnetic interference to other equipments.

EMC includes two subjects: electromagnetic interference and electromagnetic anti-jamming.

According to the transmission mode, Electromagnetic interference can be divided into two categories: conducted interference and radiated interference.

Conducted interference is the interference transmitted by conductor. Therefore, any conductors (such as wire, transmission line, inductor, capacitor and so on) are the transmission channels of the interference.

Radiated interference is the interference transmitted in electromagnetic wave, and the energy is inverse proportional to the square of distance.

Three necessary conditions or essentials of electromagnetic interference are: interference source, transmission channel and sensitive receiver. For customers, the solution of EMC problem is mainly in transmission channel because of the device attribute of disturbance source and receiver can not be changed.

4.6.2 EMC features of inverter

Like other electric or electronic devices, inverter is not only an electromagnetic interference source but also an electromagnetic receiver. The operating principle of inverter determines that it can produce certain electromagnetic interference noise. And the same time inverter should be designed with certain anti-jamming ability to ensure the smooth working in certain electromagnetic environment. The following is its EMC features:

- Input current is non-sine wave. The input current includes large amount of high-harmonic waves that can cause electromagnetic interference, decrease the grid power factor and increase the line loss.
- Output voltage is high frequency PMW wave, which can increase the temperature rise and shorten the life of motor. And the leakage current will also increase, which can lead to the leakage protection device malfunction and generate strong electromagnetic interference to influence the reliability of other electric devices.
- As the electromagnetic receiver, too strong interference will damage the inverter and influence the normal using of customers.
- In the system, EMS and EMI of inverter coexist. Decrease the EMI of inverter can increase its EMS ability.

4.6.3 EMC Installation Guideline

In order to ensure all electric devices in the same system to work smoothly, this section, based on EMC features of inverter, introduces EMC installation process in several aspects of application (noise control, site wiring, grounding, leakage current and power supply filter). The good effective of EMC will depend on the good effective of all of these five aspects.

4.6.3.1 Noise control

All the connections to the control terminals must use shielded wire. And the shield layer of the wire must ground near the wire entrance of inverter. The ground mode is 360 degree annular connection formed by cable clips. It is strictly prohibitive to connect the twisted shielding layer to the ground of inverter, which greatly decreases or loses the shielding effect.

Connect inverter and motor with the shielded wire or the separated cable tray. One side of shield layer of shielded wire or metal cover of separated cable tray should connect to ground, and the other side should connect to the motor cover. Installing an EMC filter can reduce the electromagnetic noise greatly.

4.6.3.2 Site wiring

Power supply wiring: the power should be separated supplied from electrical transformer. Normally it is 5 core wires, three of which are fire wires, one of which is the neutral wire, and one of which is the ground wire. It is strictly prohibitive to use the same line to be both the neutral wire and the ground wire

Device categorization: there are different electric devices contained in one control cabinet, such as inverter, filter, PLC and instrument etc, which have different ability of

emitting and withstanding electromagnetic noise. Therefore, it needs to categorize these devices into strong noise device and noise sensitive device. The same kinds of device should be placed in the same area, and the distance between devices of different category should be more than 20cm.

Wire Arrangement inside the control cabinet: there are signal wire (light current) and power cable (strong current) in one cabinet. For the inverter, the power cables are categorized into input cable and output cable. Signal wires can be easily disturbed by power cables to make the equipment malfunction. Therefore when wiring, signal cables and power cables should be arranged in different area. It is strictly prohibitive to arrange them in parallel or interlacement at a close distance (less than 20cm) or tie them together. If the signal wires have to cross the power cables, they should be arranged in 90 angles. Power input and output cables should not either be arranged in interlacement or tied together, especially when installed the EMC filter. Otherwise the distributed capacitances of its input and output power cable can be coupling each other to make the EMC filter out of function.

4.6.3.3 Ground

Inverter must be ground safely when in operation. Grounding enjoys priority in all EMC methods because it does not only ensure the safety of equipment and persons, but also is the simplest, most effective and lowest cost solution for EMC problems.

Grounding has three categories: special pole grounding, common pole grounding and series-wound grounding. Different control system should use special pole grounding, and different devices in the same control system should use common pole grounding, and different devices connected by same power cable should use series-wound grounding.

4.6.3.2 Leakage Current

Leakage current includes line-to-line leakage current and over-ground leakage current. Its value depends on distributed capacitances and carrier frequency of inverter. The over-ground leakage current, which is the current passing through the common ground wire, can not only flow into inverter system but also other devices. It also can make leakage current circuit breaker, relay or other devices malfunction. The value of line-to-line leakage current, which means the leakage current passing through distributed capacitors of input output wire, depends on the carrier frequency of inverter, the length and section areas of motor cables. The higher carrier frequency of inverter, the longer of the motor cable and/or the bigger cable section area, the larger leakage current will occur.

Countermeasure:

Decreasing the carrier frequency can effectively decrease the leakage current. In the case of motor cable is relatively long (longer than 50m), it is necessary to install AC reactor or sinusoidal wave filter at the output side, and when it is even longer, it is necessary to install one reactor at every certain distance.

4.6.3.5 EMC Filter

EMC filter has a great effect of electromagnetic decoupling, so it is preferred for customer to install it.

For inverter, noise filter has following categories:

- Noise filter installed at the input side of inverter;
- Install noise isolation for other equipment by means of isolation transformer or power filter.

4.6.4 If user install inverter and EMI filter according to the installation guideline, we believe inverter system comply with following compliance.

- EN61000-6-4
- EN61000-6-3
- EN61800-3

4.6.5 Notice

- **This type of PDS is not intended to be used on a low-voltage public network which supplies domestic premise;**
- **Radio frequency interference is expected if used on such a network.**

5. OPERATIONT

5.1 Operating Keypad Description

5.1.1 Keypad schematic diagram

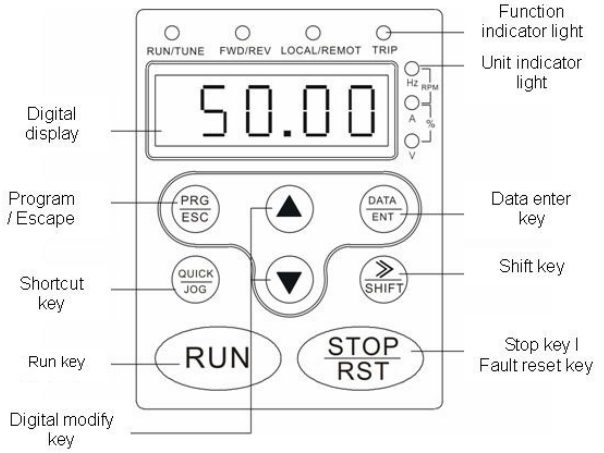
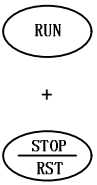


Figure 5.1 Keypad schematic diagram.

5.1.2 Button function description

Button	Name	Description
PRG ESC	Programming Key	Entry or escape of first-level menu.
DATA ENT	Enter Key	Progressively enter menu and confirm parameters.
▲	UP Increment Key	Progressively increase data or function codes.
▼	DOWN Decrement Key	Progressive decrease data or function codes.
>> SHIFT	Shift Key	In parameter setting mode, press this button to select the bit to be modified. In other modes, cyclically displays parameters by right shift
RUN	Run Key	Start to run the inverter in keypad control mode.

Button	Name	Description
	STOP/RESET Key	In running status, restricted by P7.04, can be used to stop the inverter. When fault alarm, can be used to reset the inverter without any restriction.
	Shortcut Key	Determined by Function Code P7.03: 0: Jog operation 1: Switch between forward and reverse 2: Clear the UP/DOWN settings. 3: Quick debugging mode1 (by menu) 4: Quick debugging mode2 (by latest order) 5: Quick debugging mode3 (by non-factory setting parameters)
	Combination Key	Pressing the RUN and STOP/RST at the same time can achieve inverter coast to stop.

5.1.3 Indicator light description

5.1.3.1 Function indicator light description

Function indicator	Description
RUN/TUNE	Extinguished: stop status Flickering: parameter autotuning status Light on: operating status
FWD/REV	Extinguished: forward operation Light on: reverse operation.
LOCAL/REMOT	Extinguished: keypad control Flickering: terminal control Light on: communication control
TRIP	Extinguished: normal operation status Flickering: overload pre-warning status Light on: the inverter is in fault status

5.1.3.2 Unit indicator light description

Unit indicator	Description
Hz	Frequency unit
A	Current unit
V	Voltage unit
RPM	Rotating speed unit
%	Percentage
Hz+V	m/s

5.1.3.3 Digital display

Have 5 digit LEDT T, which can display all kinds of monitoring data and alarm codes such as reference frequency, output frequency and so on.

5.2 Operation Process

5.2.1 Parameter setting

Three levels of menu are:

- Function code group (first-level);
- Function code (second-level);
- Function code value (third-level).

Remarks:

Press both the PRG/ESC and the DATA/ENT can return to the second-class menu from the third-class menu. The difference is: pressing DATA/ENT will save the set parameters into the control panel, and then return to the second-class menu with shifting to the next function code automatically; while pressing PRG/ESC will directly return to the second-class menu without saving the parameters, and keep staying at the current function code.

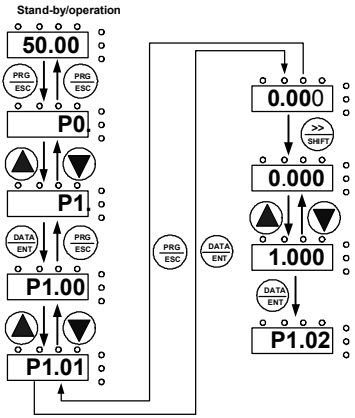


Figure 5.2 Flow chart of parameter setting.

Under the third-class menu, if the parameter has no flickering bit, it means the function code cannot be modified. The possible reasons could be:

- This function code is not modifiable parameter, such as actual detected parameter, operation records and so on;
- This function code is not modifiable running status, but modifiable in stop status.

5.2.2 Fault reset

If the inverter has fault, it will prompt the related fault information. User can use STOP/RST or according terminals determined by P5 Group to reset the fault. After fault reset, the inverter is at stand-by state. If user does not reset the inverter when it is at fault state, the inverter will be at operation protection state, and can not run.

5.2.3 Parameter copy

For details, please refer to the instructions of LCD keypad functions

5.2.4 Motor parameter autotune

If “Sensorless Vector Control” or “Vector Control with PG” mode is chosen, motor nameplate parameters must be input correctly as the autotuning is based on it. The performance of vector control depends on the parameters of motor strongly, so to achieve excellent performance, firstly must obtain the parameter of motor exactly.

This function is not the same between synchronous motor and asynchronous motor , for details please refer to the description of function code P0.08.

The procedure of motor parameter autotuning is as follows:

Firstly, choose keypad command as the run command source (P0.01).

And then input following parameters according to the actual motor parameters:

P2.01: motor rated frequency;

P2.02: motor rated speed;

P2.03: motor rated voltage;

P2.04: motor rated current

P2.05: motor rated power.

Set P0.17 to be 1, and for the detail process of motor parameter autotuning, please refer to the description of Function Code P0.17. And then press RUN on the keypad panel, the inverter will automatically calculate following parameter of the motor:

P2.06: motor stator resistance;

P2.07: motor rotor resistance;

P2.08: motor stator and rotor inductance;

P2.09: motor stator and rotor mutual inductance;

P2.10: motor current without load;

Then motor autotuning is finished.

In the self-learning process, you can use >> / SHIFT can change parameters and monitor running state of inverter.

Notice: the motor should be uncoupled with its load; otherwise, the motor parameters obtained by autotuning may be not correct.

5.2.5 Password setting

CHV180 series inverter offers user's password protection function. When P7.00 is set to be nonzero, it will be the user's password, and after exiting function code edit mode, it will become effective after 1 minute. If pressing the PRG/ESC again to try to access the function code edit mode, "-----"will be displayed, and the operator must input correct user's password, otherwise will be unable to access it.

If it is necessary to cancel the password protection function, just set P7.00 to be zero.

Notice: Password is not effective for parameters in shortcut menu.

5.3 Running State

5.3.1 Power-on initialization

Firstly the system initializes during the inverter power-on, and LED displays "8888". After the initialization is completed, the inverter is on stand-by status.

5.3.2 Stand-by

At stop or running status, parameters of multi-status can be displayed. Whether or not to display this parameter can be chosen through Function Code P7.06 (Running status

display selection) and P7.07 (Stop status display selection) according to binary bits, the detailed description of each bit please refer the function code description of P7.06 and P7.07.

In stop status, there are fourteen parameters which can be chosen to display or not. They are: reference speed ,reference frequency, DC bus voltage, Input-Output terminal status, open collector output status, PID setting, PID feedback, AI1 voltage, AI2 voltage, AI3 voltage/current, AI4 voltage, HDI1 frequency, HDI2 frequency, step number of simple PLC or multi-step speed, length value. Whether or not to display can be determined by setting the corresponding binary bit of P7.07. Press the 》/SHIFT to scroll through the parameters in right order . Press DATA/ENT + QUICK/JOG to scroll through the parameters in left order.

5.3.3 Operation

In running status, there are twenty one running parameters which can be chosen to display or not. They are: running frequency, reference frequency, DC bus voltage, output voltage, output current, rotating speed, output power, output torque, PID setting, PID feedback, ON-OFF input status, open collector output status, length value, count value, step number of PLC or multi-step speed, AI1 voltage, AI2 voltage, AI3 voltage/current, AI4 voltage, HDI1 frequency, HDI2 frequency. Whether or not to display can be determined by setting the corresponding binary bit of P7.06. Press the 》/SHIFT to scroll through the parameters in right order . Press DATA/ENT + QUICK/JOG to scroll through the parameters in left order.

5.3.4 Fault

In fault status, inverter will display parameters of STOP status besides parameters of fault status. Press the 》/SHIFT to scroll through the parameters in right order . Press DATA/ENT + QUICK/JOG to to scroll through the parameters in left order.

CHV180 serials inverter provide many information when fault occur, for more details please refer to chapter 8 .

6. DETAILED FUNCTION DESCRIPTIONT

6.1 P0 Group--Basic Function

Function Code	Name	Description	Setting Range	Factory Setting
P0.00	Speed control mode	0: Sensorless vector control 1: Vector control With PG 2: V/F control	0~2	1

0: Sensorless vector control: It is widely used for the low-grade elevator which requires lower accuracy or is used for debugging.

1: Vector control with PG: Close-loop vector control, requires the client to install the speed feedback equipment. Therefore it is suitable for the high-grade elevator requiring high speed control accuracy and speedy dynamic response.

2: V/F control: It is suitable for the low-end elevator which requires lower accuracy or is used for debugging.

Notice:

- **Inverter can drive only one motor when P0.00 is set to be 0 or 1. When P0.00 is set to be 2, inverter can drive multi motors.**
- **When P0.00 is set to be 0 or 1 , the set of parameters on the motor's nameplate and the encoder must be right, in order to get the accurate parameters and improve the performance of vector control , before running , the motor must have self-leaning.The autotuning of motor parameters must be accomplished properly when P0.00 is set to be 0 or 1.**
- **In order to achieve better control characteristic, the parameters of speed regulator (P3.00~P3.05) must be adjusted according to actual situation when P0.00 is set to be 0 or 1.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.01	Run command source	0: Keypad (LED extinguished) 1: Terminal (LED flickering) 2: Communication (LED lights on)	0~2	1

The control commands of inverter include: start, stop, up, down, fault reset and so on.

0: Keypad ("LOCAL/REMOT" LED extinguished);

Both RUN and STOP/RST key are used for running command control. If Multifunction key QUICK/JOG is set as FWD/REV switching function (P7.03 is set to be 1), it will be

used to change the rotating orientation. **In running status, pressing RUN and STOP/RST in the same time will cause the inverter coast to stop.**

1: Terminal ("LOCAL/REMOT" LED flickering)

The operation, including up, down etc. can be controlled by multifunctional input terminals.

2: Communication ("LOCAL/REMOT" LED lights on)

The operation of inverter can be controlled by host through communication. If select "Communication", the customer must chose the serial communication extention card which matches with CHV180 serials inverter.

Function Code	Name	Description	Setting Range	Factory Setting
P0.02	Elevator rated speed	0.100～4.000	1.500m/s	1

P0.02 is the rating speed on the elevator nameplate, the setting value should be less than the elevator rating speed. The relationship of the inverter's output frequence and the elevator's running line speed is linear. The expression is as follow:

$$f = \frac{60ikf_N}{3.14Dn_N}v$$

Thereinto, **f** represents output frequency of elevator, **v** represents running line speed of elevator, **D** represents diameter of tractor (P2.01), **i** represents reduction ratio(P2.02), **k** represents hoist hanging ratio(P2.03), f_N repesents rated frequency of motor (P2.05), n_N represents rated rotational speed of motor (P2.06).

Notice: The speed of elevator is limited by P0.02, and the maximum output frequency of inverter is limited by P0.04, so the maximum running line speed of elevator is limited by both P0.02 and P0.04.

Function Code	Name	Description	Setting Range	Factory Setting
P0.03	Speed command source	0: Keypad 1: AI1 2. AI2 3. Multi-Step speed 4. Communication 5. AI1 tracking running	0~5	3

0: Keypad

Please refer to description of P0.05.

1: AI1

2: AI2

The reference speed is set by analog input. AI1 is 0~10V voltage input terminal, while AI2 is 0~10V voltage input or 0(4) ~ 20mA current input. The switching between voltage input and current input is controlled by the jumper wire J18.

3: Multi-steps speed

The reference frequency is determined by P1 group and P5 group. The selection of steps is determined by combination of multi-step speed terminals.

Notice:

- **Multi-step speed mode will enjoy priority in setting reference frequency if P0.03 is not set to be 3. In this case, only step 1 to step 7 are available.**
- **If P0.03 is set to be 3, step 0 to step 7 can be realized.**
- **Jog has highest priority.**

4: Communication

The reference frequency is set through RS485. For details, please refer to operation manual of communication card.

5: AI1 tracking running

The s-curve when running is decided by external controller,and internal acceleration and deceleration is invalid.

Notice:

- **When P0.03 is set to be 5, the process of acceleration and deceleration is decided by external controller, the inverter tracks the change process of analog automaticly.P0.03 is set to be 1 or 2, the process of acceleration and deceleration is decided by internal controller.**
- **Speed command and analog weighing signal input can't select the same analog input channel.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.04	Maximum frequency	10~400.00Hz	10.0~400.00	50.00Hz

Notice:

- **The frequency reference should not exceed maximum frequency.**

- **Actual acceleration time and deceleration time are determined by maximum frequency.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.05	Keypad reference speed	0.00 ~ P0.02	1.500m/s	1.500m/s

When P0.03 is set to be 0, this parameter is the initial value of inverter reference speed.

Function Code	Name	Description	Setting Range	Factory Setting
P0.06	Running direction selection	0: Forward 1: Reverse 2: Forbid reverse	0~2	0

Notice:

- **The rotation direction of motor is corresponding to the wiring of motor.**
- **When the factory setting is restored (P0.09 is set to be 1), the rotation direction of motor may be changed. Please be cautious to use.**
- **If P0.06 is set to 2, user can not change rotation direction of motor by QUICK/JOG or terminal.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.07	Carrier frequency	1.0~16.0kHz	1.0~16.0	Depend on model

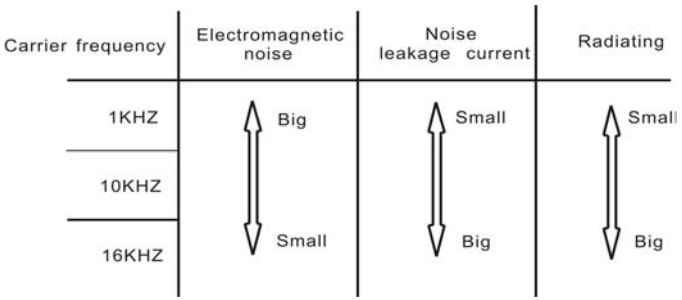


Figure 6.1 Effect of carrier frequency

Carrier frequency / Model	Highest Carrier Frequency(kHz)	Lowest Carrier Frequency(kHz)	Factory Setting(kHz)
G Model: 4kW~11kW	16	1	8
G Model: 15kW~30kW	8	1	4

Carrier frequency will affect the noise of motor and the EMI of inverter.

If the carrier frequency is increased, it will cause better current wave, less harmonic current and lower noise of motor.

Notice:

- **The factory setting is optimal in most cases. Modification of this parameter is not recommended.**
- **If the carrier frequency exceeds the factory setting, the inverter must be derated because the higher carrier frequency will cause more switching loss, higher temperature rise of inverter and stronger electromagnetic interference.**
- **If the carrier frequency is lower than the factory setting, it is possible to cause less output torque of motor and more harmonic current.**
- **If the set of carrier frequency exceed the default set , the inverter must be derated ,every increase of 1K the drop is 20%.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.08	Motor parameters autotuning	0: No action 1: Rotation autotuning 2: Static autotuning	0~2	0

0: No action: Forbid autotuning.

1: Rotation autotuning:

Do not connect any load to the motor when performing autotuning and ensure the motor is in static status.

Input the nameplate parameters of motor (P2.04~P2.08) correctly before performing autotuning. Otherwise the parameters detected by autotuning will be incorrect; it may influence the performance of inverter.

The operation process is as follow:

a. Set P0.08 to be 1 then press the DATA/ENT, LED will display “-TUN-” and flickers. During “-TUN-” is flickering, press the PRG/ESC to exit autotuning.

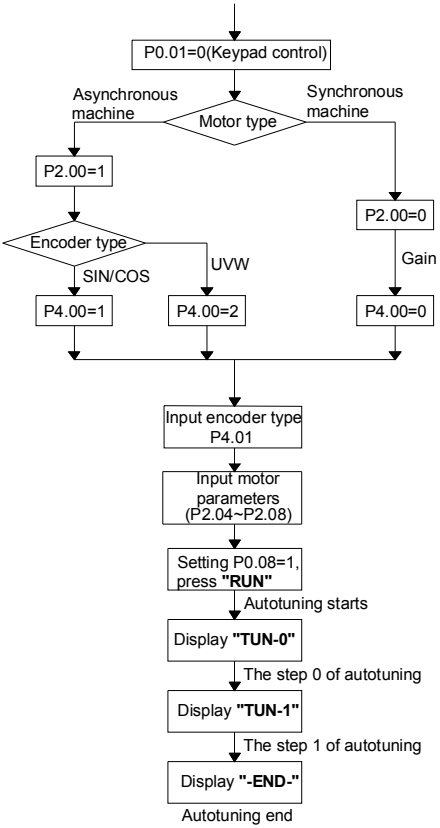
b. Press the RUN to start the autotuning. LED will display “TUN-0”.

c. After a few seconds the motor will start to run. LED will display “TUN-1” and

"RUN/TUNE" light will flicker.

d. After a few minutes, LED will display "-END-". That means the autotuning is finished and return to the stop status.

e. During the autotuning, press the >>/SHIFT, it can switch keypad to display parameters, and monitor the running status.Press the STOP/RST,it will stop the autotuning.



Notice: If it reports fault of PCDE in the process of autotuning, please modify

The direction of encoder.Please check the wiring of encoder when there are other faults related to encoder.

Aototuning of synchronous motor's result is the parameters（P4.03、P4.07~P4.09）related magnectic pole. Aototuning of asynchronous motor's result is the parameters（P2.10~P2.14）.

2: Static autotuning:

When performing static autotuning, If it is difficult to disconnect the load, static autotuning

is recommended,and choose the right motor style,input nameplate. parameters (P2.04~P2.08)

For asynchronous motor, the stator resistance, rotor resistance, leakage inductance of motor can be detected and the mutual inductance and current without load will not be detected by static autotuning.If needed, user should input suitable value according to experience.

For synchronous motor, the self-learning current (P4.10) is set to get the magnetic pole initial position (P4.03).

Notice:

- **Correct the zero-bias value of encoder (P4.08 and P4.09) which is displayed by Pb.06 and Pb.07 when it is not connected to the encoder.**
- **The direction of encoder (P4.02) must be right.When the inverter is forwarding, the motor is counterclockwise rotation seen from motor shaft side, and the direction of encoder is set to be forward.**
- **When autotuning, the actual current (Pb.03) should be between 80.0% and 110%, or adjust P4.10.**
- **Continuous autotuning for 3 times, if the deviation of each magnetic pole position is less than 10 degrees, the autotuning is right or reautotuning.**
- **Static autotuning is effect for SIN/COS encoder, and rotation autotuning is suitable for UVW encoder.**

Function Code	Name	Description	Setting Range	Factory Setting
P0.09	Restore parameters	0: No action 1: Restore factory setting 2: Clear fault records	0~2	0
P0.10	Reserved	Reserve	0~65535	0
P0.11	Reserved	Reserve	0~65535	0

6.2 P1 Group--Speed Curve

Function Code	Name	Description	Setting Range	Factory Setting
P1.00	Multi-step speed 0	0.000～P0.02	0.000～P0.02	0.000m/s
P1.01	Multi-step speed 1	0.000～P0.02	0.000～P0.02	0.000m/s

Function Code	Name	Description	Setting Range	Factory Setting
P1.02	Multi-step speed 2	0.000～P0.02	0.000～P0.02	0.000m/s
P1.03	Multi-step speed 3	0.000～P0.02	0.000～P0.02	0.000m/s
P1.04	Multi-step speed 4	0.000～P0.02	0.000～P0.02	0.000m/s
P1.05	Multi-step speed 5	0.000～P0.02	0.000～P0.02	0.000m/s
P1.06	Multi-step speed 6	0.000～P0.02	0.000～P0.02	0.000m/s
P1.07	Multi-step speed 7	0.000～P0.02	0.000～P0.02	0.000m/s

Multi-step speed is defined by P1.00~P1.07. The 8-step speed will be come ture by the combination of 3 multi-step speed terminals. The detailed description is as follow:

Multi-step speed terminal 3	Multi-step speed terminal 2	Multi-step speed terminal 1	Speed Setting	Function code
OFF	OFF	OFF	Multi-step speed 0	P1.00
OFF	OFF	ON	Multi-step speed 1	P1.01
OFF	ON	OFF	Multi-step speed 2	P1.02
OFF	ON	ON	Multi-step speed 3	P1.03
ON	OFF	OFF	Multi-step speed 4	P1.04
ON	OFF	ON	Multi-step speed 5	P1.05
ON	ON	OFF	Multi-step speed 6	P1.06
ON	ON	ON	Multi-step speed 7	P1.07

Function Code	Name	Description	Setting Range	Factory Setting
P1.08	Start quadric acceleration	0.001～10.000	0.001～10.000	0.350m/s^3
P1.09	Start acceleration	0.001～10.000	0.001～10.000	0.700m/s^2
P1.10	Speed-down	0.001～10.000	0.001～	0.350m/s^3

Function Code	Name	Description	Setting Range	Factory Setting
	quadric deceleration		10.000	
P1.11	Deceleration	0.001～10.000	0.001～10.000	0.700m/s^2
P1.12	Stop quadric deceleration	0.001～10.000	0.001～10.000	0.350m/s^2
P1.13	Stop deceleration	0.001～10.000	0.001～10.000	0.700m/s^2
P1.14	Start speed	0.000～0.250	0.000～0.250	0.000m/s
P1.15	Start holding time	0.0～5.0s	0.0～5.0s	0.0s

The sharp of S-curve was decided by P1.08~P1.13, the quality of S-curve can directly effect the comfortable feeling of elevator's start and stop. The parameters of S-curve were comprised of Start quadric acceleration (P1.08), Start acceleration(P1.09), Speed-down quadric deceleration(P1.10), Deceleration(P1.11), Stop quadric deceleration(P1.12), Stop deceleration(P1.13), Start speed(P1.14) and Start holding time(P1.15). The correspondence relation of the parameters and S-curve is as follow:

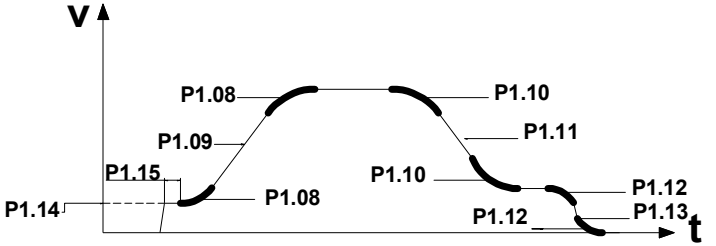


Figure 6.3 S - curve running diagram.

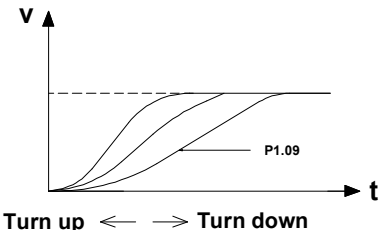


Figure 6.4 S - curve setting sketch map description.

The above diagram is the sketch map of setting S-curve of accelerated portion, the S-curve steepen as the parameter was increased, and the S-curve slacken as the parameter was decreased. S-curve adjustment principle of deceleration segment and stop segment is the same with principle of acceleration.

P1.14 is the initial speed when the inverter starts. If the setting speed is less than start speed, the output frequency is 0 when running. Only when the setting speed is greater than or equal to start speed, the inverter will start with start speed, and run according to S-curve.If you set a right value, you can overcome static friction,and decrease shock at starting.

P1.15 is the running time with starting speed in the process of starting.

Notice: P1.08, P1.10 and P1.12 are main parameters of S-curve, and these parameter can influence the passengers' comfortable feeling when accelerating, decelerating and stopping respectively, so you should carefully adjust the parameters.

Function Code	Name	Description	Setting Range	Factory Setting
P1.16	Overhaul running speed	0.000～P0.02	0.000～P0.02	0.300m/s
P1.17	Overhaul running acceleration	0.001～10.000	0.001～10.000	1.000m/s^2
P1.18	Overhaul running deceleration	0.001～10.000	0.001～10.000	1.000m/s^2

Setting overhaul running speed, acceleration and deceleration. The overhaul running curve is as follow:

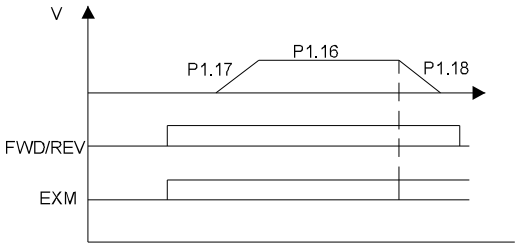


Figure 6.5 Overhaul runing curve.

For detailed curve and sequence diagram, please refer to chapter 8.2.2.

Notice: The priority of speed selection is that: force decelerate > emergency run > overhaul run > multi-step speed run > keypad setting, analog setting or communication setting.

Function Code	Name	Description	Setting Range	Factory Setting
P1.19	Motor autotuning acceleration	0.001～10.000	0.001～10.000	0.600 m/s^2
P1.20	Motor autotuning deceleration	0.001～10.000	0.001～10.000	0.600m/s^2

Setting acceleration and deceleration of motor's parameter autotuning.

Function Code	Name	Description	Setting Range	Factory Setting
P1.21	Emergency running speed	0.000～P0.02	0.000～P0.02	0.300m/s
P1.22	Emergency running acceleration/deceleration	0.001～10.000	0.001～10.000	1.000m/s^2

Setting speed, acceleration and deceleration of emergency running.

1. The description of emergency running is as follow: at the time of power-off, the control system accesses the accumulator into (+) and (-) terminals with bypass switch. Inverter receives the emergency running speed command and running direction from controller, and elevator will stop to the closer aiming storey automatically.
2. The wiring of emergency running:

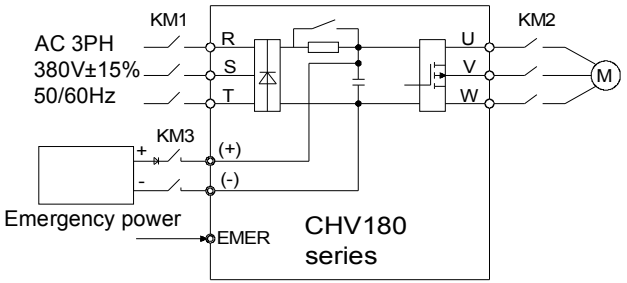


Figure 6.6 The wiring of emergency running.

3. The curve and sequence diagram of emergency running:

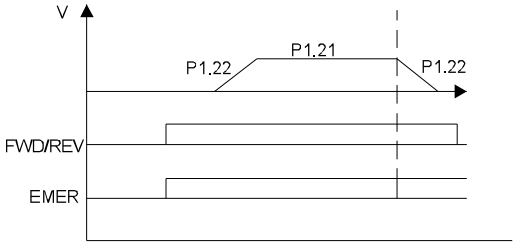


Figure 6.7 The emergency running curve.

For detailed emergency running, please refer to chapter 8.2.3.

Notice: if you use the function of emergency running, you need shield the inverter protection function of input open-phase(P9.00=0).

The emergency voltage is requested to be greater than DC 250V.

Function Code	Name	Description	Setting Range	Factory Setting
P1.23	Forcing slow-down deceleration 1	P1.25～10.000	P1.25～10.000	1.000m/s^2
P1.24	Forcing slow-down speed 1 detection	0.0～P1.26	0.0～P1.26	20.0%
P1.25	Forcing slow-down deceleration 2	P1.27～P1.23	P1.27～P1.23	0.900m/s^2
P1.26	Forcing slow-down speed 2 detection	P1.24～P1.28	P1.24～P1.28	40.0%
P1.27	Forcing slow-down deceleration 3	0.001～P1.25	0.001～P1.25	0.700m/sP^{2P}
P1.28	Forcing slow-down	P1.26～100.0%	P1.26～100.0%	80.0%

Function Code	Name	Description	Setting Range	Factory Setting
	speed 3 detection			

The above function codes will be effect after the forcing slow-down switch input is selected, the effect of forcing slow-down is to prevent elevator from top-hitting or bottom-clashing in the process of up or down running. There is only one group forcing slow-down switch in low speed elevator, and there are two or three groups forcing slow-down switches in the high speed elevator.The installation of sketch map is as figure 6.8:

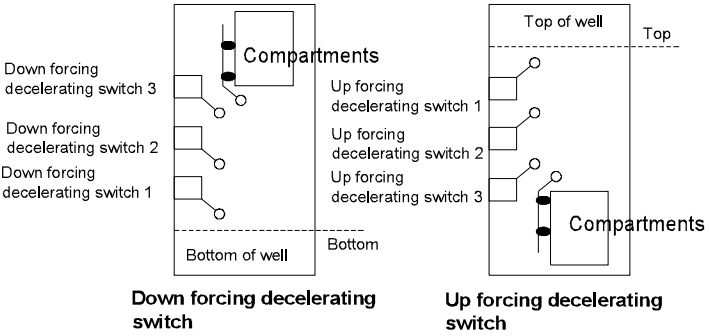


Figure 6.8 Installation sketch of forcing slow-down switch.

For example,when the elevator is running up close to top,forcing slow-down switch 3 will act, if the checked running speed is greater than P1.28XP0.02 at this time, elevator will decelerate with P1.27 to 0, The detailed curve is as follow:

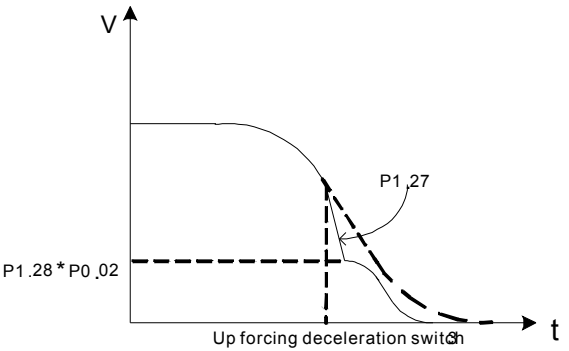


Figure 6.9 Forcing decelerating running chart.

Forcing slow-down running conditions:

- Feedback terminals signal of forcing slow-down switch action is effective.
- During run-up process, it comes across up forcing switch, or during run-down process, it comes across down forcing switch.
- Current running speed is greater than the check speed of corrsponding forcing slow-down switch, if not; the inverter will run with atempo.
- After the forcing decelerating action, the speed will be reduced continuously with P1.23, P1.25, and P1.27 until 0.

Notice:

1)The priority of forcing slow-down is only less than the priority of forcing slow–down to stop, the priority is like this: forcing slow-down 1 > forcing slow-down 2 > forcing slow-down 3.

2) The 100% of forcing slow-down detection value is corresponding with elevator rated speed(P0.02).

3) It will not response the forcing slow-down when motor autotuning.

Function Code	Name	Description	Setting Range	Factory Setting
P1.29	Stop mode selection	0: Deceleration to stop 1: Coast to stop	0~1	1

0: Deceleration to stop

When the stop command takes effect, the inverter decreases the output frequency according to stop deceleration and stop quadric deceleration till stops.

1: Coast to stop

When the stop command takes effect, the inverter stops the output immediately. The motor coasts to stop by its mechanical inertia.

Function Code	Name	Description	Setting Range	Factory Setting
P1.30	Reserved	0~65536	0~65536	0
P1.31	Reserved	0~65536	0~65536	0

6.3 P2 Group--Motor Parameters

Function Code	Name	Description	Setting Range	Factory Setting
P2.00	Inverter Model	0: asynchronous motor 1: synchronous motor	0~1	0

Notice: Select right model of motor before performing parameters autotuning.

Function Code	Name	Description	Setting Range	Factory Setting
P2.01	Traction motor wheel diameter	100~2000	100~2000	500mm
P2.02	Reduction ratio	1.00~100.00	1.00~100.00	30.00
P2.03	Hoist rope hanging ratio	1~8	1~8	1

P2.01, P2.02, P2.03 are parameters of the elevator traction motor,only when parameters are set correctly, the inviter running-speed can be right parallelism with elevator's factual speed. Frondose connection refers to P0.02.

Function Code	Name	Description	Setting Range	Factory Setting
P2.04	Motor rated power	0.4~900.0kW	0.4~900.0	Depend on model
P2.05	Motor rated frequency	0.01Hz~P0.04	0.01~P0.04	50.00Hz
P2.06	Motor rated speed	0~36000rpm	0~36000	1460rpm
P2.07	Motor rated voltage	0~460V	0~460	380V
P2.08	Motor rated current	0.1~1000.0A	0.1~1000.0	Depend on model

Notice:

- **In order to achieve superior performance, please set these parameters according to motor nameplate, then perform autotuning.**
- **The rated power of inverter should match the motor's. If the gap is too big, the control performances of inverter will be deteriorated distinctly.**
- **Reset P2.04 can initialize P2.10~P2.14.**

Function Code	Name	Description	Setting Range	Factory Setting
P2.09	Motor rated power factor	0.05~1.00	0.05~1.00	0.86

When the inverter cannot perform autotuning,it may optimize motor control performance by setting the motor rating power factor.

Function Code	Name	Description	Setting Range	Factory Setting
P2.10	Motor stator resistance	0.001~65.535Ω	0.001~65.535	Depend on model
P2.11	Motor rotor resistance	0.001~65.535Ω	0.001~65.535	Depend on model
P2.12	Motor leakage inductance	0.1~6553.5mH	0.1~6553.5	Depend on model
P2.13	Motor mutual inductance	0.1~6553.5mH	0.1~6553.5	Depend on model
P2.14	Motor current without load	0.01~655.35A	0.01~655.35	Depend on model

After autotuning, the value of P2.10~P2.14 will be automatically updated.

Notice: Do not change these parameters; otherwise it may deteriorate the control performance of inverter.

Function Code	Name	Description	Setting Range	Factory Setting
P2.15	Reserved	0~65536	0~65536	0
P2.16	Reserved	0~65536	0~65536	0

6.4 P3 Group--Vector Control

Function Code	Name	Description	Setting Range	Factory Setting
P3.00	ASR low speed proportion gain	0~100	0～100	20
P3.01	ASR low speed integral time	0.01~10.00s	0.01～10.00	0.50s
P3.02	Speed detection low speed filter time	0～9	0～9	3

Function Code	Name	Description	Setting Range	Factory Setting
P3.03	Switch low point frequency	0.00Hz~P3.07	0.00～P3.07	5.00Hz
P3.04	ASR high speed proportion gain	0~100	0～100	25
P3.05	ASR high speed integral time	0.01~10.00s	0.01~10.00s	1.00s
P3.06	Speed detection high speed filter time	0～9	0～9	3
P3.07	Switch high point frequency	P3.03～P0.04	P3.03～P0.04	10.00Hz

The above parameters are only valid for vector control.Through P3.00～P3.07, user can set the proportional gain K_p and integral time K_i of speed regulator (ASR), so as to change the speed response characteristic.

When under the low point switch frequency (P3.03), speed loop parameter PI is P3.00 and P3.01, when over the high low point switch frequency (P3.07), speed loop parameter PI is P3.04 and P3.05, K_p and K_i are proportional to the bias between P3.03 and P3.07. For details, please refer to following figure..

P3.00 and P3.01 only take effect when output frequency is less than P3.03. P3.04 and P3.05 only take effect when output frequency is greater than P3.07. When output frequency is between P3.03 and P3.07, K_p and K_i are proportional to the bias between P3.03 and P3.07. For details, please refer to following figure.

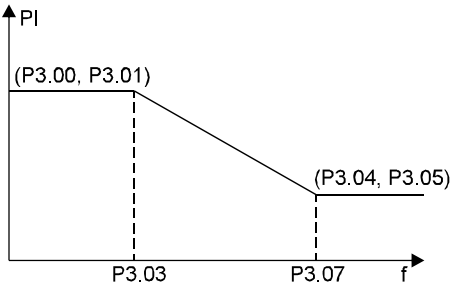


Figure 6.10 PI parameter diagram.

The system's dynamic response can be faster if the proportion gain K_p is increased; However, if K_p is too large, the system tends to oscillate.

The system dynamic response can be faster if the integral time K_i is decreased; However, if K_i is too small, the system becomes overshoot and tends to oscillate.

Speed loop parameter PI has strong relationship with the system's inertia,in order to meet the requirement of any situation, the PI should be adjusted based on the default set when the load of the system changed.

P3.00 and P3.01 are corresponding to K_p and K_i at low frequency, while P3.03 and P3.04 are corresponding to K_p and K_i at high frequency. Please adjust these parameters according to actual situation. The adjustment procedure is as follow:

P3.02 and P3.06 are filter times of motor speed detection which need not to be adjusted, increase the values if there is current noise when motor is running. For more details about fine adjustment, please refer to description of P9 group.

Function Code	Name	Description	Setting Range	Factory Setting
P3.08	ACR proportional gain P	0~65535	0~65535	1600
P3.09	ACR integral gain I	0~65535	0~65535	300

NOTICE: The two parameter above are the adjustment parameters PI of current loop .It affect the dynamic response speed and the control precision drectly, so they shouldn't be changed if not necessary.

The bigger the proportional gain P, the faster the response, but oscillation may easily occur. If only proportional gain P is applied in regulation, the bias cannot be eliminated. In order to eliminate the bias, apply the integral gain I to achieve PI regulator.

Function Code	Name	Description	Setting Range	Factory Setting
P3.10	Slip compensation rate of drive side	50.0~200.0%	50~200	100%
P3.11	Slip compensation rate of trig side	50.0~200.0%	50~200	100%

The parameter is used to adjust the slip frequency of vector control and improve the precision of speed control. Properly adjusting this parameter can effectively restrain the static speed bias.

CHV180 series inverter abet to set electromotion state and regenerate brake state separately, P3.10 is suitable for electromotion state, P3.11 is suitable for regenerate feeback state.

Function Code	Name	Description	Setting Range	Factory Setting
P3.12	Torque upper limit	0.0~200.0%	0.0~200.0	150.0%

100.0% corresponds with the rated current of inverter.

Function Code	Name	Description	Setting Range	Factory Setting
P3.13	Reserved	0~65536	0~65536	0
P3.14	Reserved	0~65536	0~65536	0

6.5 P4 Group -- Encoder Parameter

Function Code	Name	Description	Setting Range	Factory Setting
P4.00	Encoder type selection	0~2	0~2	1

When selecting the type of encoder, asynchronous motor and synchronous motor need different PG cards, please refer to chapter 7.3 and 7.4 for wiring of encoder.

0: Increment encoder

1: SIN/COS encoder

The matching model is ERN1387, Or the encoder compatible with its' signal.

2: UVM encoder

The pole number of encoder must be consistant with the motor's.

Notice:When p2.00=0(asynchronousmotor), only the increment encoder can be chosen; when P2.01=1(synchronous motor), only the SIN/COS and UVW encoder can be chosen.

Function Code	Name	Description	Setting Range	Factory Setting
P4.01	PG parameter	1~65536	1~65536	1000
P4.02	PG direction selection	0~1	0~1	0

P4.01: Setting the number of encoder pulse per cycle.

Notice: When P0.00 is set to be 1, P4.10 must be set correctly according to the encoder parameter, otherwise the motor will run abnormally. If the motor still run abnormally when P4.10 has been set correctly, please change the PG direction (P4.02).It needs to perform autotunning again for synchronous motor when P4.02 is changed.

Function Code	Name	Description	Setting Range	Factory Setting
P4.03	Magnetic pole initial position	0.00～360.00	0.00～360.00	0.00

Magnetic pole initial position will be updated automaticly after autotunning of synchronous motor, user do not need to modify it.

Notice: For the magnetic pole initial position, its' corresponding angle is electric angle.

Function Code	Name	Description	Setting Range	Factory Setting
P4.04	Thread break detection time of encoder low speed	0.0～100.0s	0.0～100.0	1.0
P4.05	Thread break detection time of encoder high speed	0.0～100.0s	0.0～100.0	1.0

Function Code	Name	Description	Setting Range	Factory Setting
P4.06	Reverse detection time of encoder	0.0～100.0s	0.0～100.0	1.0

Thread break detection time of encoder is defined by P4.04 and P4.05, when the time of encoder thread break is more than setting time of encoder thread break, the inverter will show fault of encoder thread break (PCE), P4.04 corresponds to low speed, and P4.05 corresponds to high speed.

Reverse detection time of encoder is defined by P4.06, when the time of reverse time of encoder is more than corresponding thread break deteaction time, the system will show fault of encoder reverse encoder (PCDE).

If the detection time setted to be 0 , it meas the detection function been canceled.

Notice: Setting the above parameters will influence delicacy of encoder fault protection, please adjust these parameters carefully.

Function Code	Name	Description	Setting Range	Factory Setting
P4.07	Magetic pole position amplitude gain	0.50～1.50	0.50～1.50	1.00
P4.08	C phase magnetic pole position offset	0～1024	0～1024	512
P4.09	D phase pole position offset	0～1024	0～1024	512

The above parameters will be updated automaticly after autotunning of synchronous motor,user do not need to modify it.

Function Code	Name	Description	Setting Range	Factory Setting
P4.10	Synchronous motor static identification current	10.0%~100.0%	10.0~100.0	50.0%

The angle is saved as P4.03 after the static autotunning been performed,and Pb.03 displays the actual current which is 80.0%~110.0% of Pb.03.If the current value is smaller

obviously,please increase P4.10.If the current is greater,it may report motor autotunning fault(the fault code is TE).

Function Code	Name	Description	Setting Range	Factory Setting
P4.11~P4.13	Reserved	0~65536	0~65335	0

6.6 P5 Group--Input Terminals

The standard configuration of CHV108 serials frequency has 6 multi-function digtal input terminals and 2 analog input terminals. If you need many more input/output terminals,please choose the correspond extension card.

Function Code	Name	Description	Setting Range	Factory Setting
P5.00	Terminal input mode selection	0～0x3FF	0～0x3FF	0

The function is to select the switch signal input terminals select normal open or normal closed. As corresponding bit is 1, the normal closed switch is on, the parameter is 16 hex setting. Switch signal corresponding bit is as follows:

BIT9	BIT8	BIT7	BIT6	BIT5
S10	S9	S8	S7	S6
BIT4	BIT3	BIT2	BIT1	BIT0
S5	S4	S3	S2	S1

Function Code	Name	Description	Setting Range	Factory Setting
P5.01	Terminal function input selection	0: Invalid 1: Valid	0~1	0

0: Switch signal is input through external terminals.

1: Switch signal is set through serial communication by host computer.

Function Code	Name	Description	Setting Range	Factory Setting
P5.02	S1 Terminal function	Programmable multifunction terminal	0~55	1
P5.03	S2 Terminal function	Programmable multifunction terminal	0~55	2

Function Code	Name	Description	Setting Range	Factory Setting
P5.04	S3 Terminal function	Programmable multifunction terminal	0~40	8
P5.05	S4 Terminal function	Programmable multifunction terminal	0~40	9
P5.06	S5 Terminal function	Programmable multifunction terminal	0~40	3
P5.07	S6 Terminal function	Programmable multifunction terminal	0~40	0
P5.08	S7 Terminal function	Programmable multifunction terminal	0~40	0
P5.09	S8 Terminal function	Programmable multifunction terminal	0~40	0
P5.10	S9 Terminal function	Programmable multifunction terminal	0~40	0
P5.11	S10Terminal function	Programmable multifunction terminal	0~40	0

This parameter is used for setting digital multi-function input terminals' corresponding function.

0：No function

1：Up running（FWD）

2：Down running（REV）

When the running command is controlled by terminal, the elevator's up and down commands are controlled by the terminal.

3：Examine running（EXM）

This terminal is used for selecting elevator come into EXM state, this signal works with up and down running signal, and can control elevator carry out EXM work.

4：Emergency running（EMER）

This terminal is used for selecting elevator come into EMER state，this signal works with up and down running signal, and can control elevator carry out EXM work.

5：Coast to stop（FSTP）

Inverter blockades output, motor's stopping process is not controlled by inverter. This mode has the same meaning as described in P1.29.

6：Fault reset

Exterior fault reset function, is used for far distance failure reset, and has the same function as STOP/RST key on keyboard.

7：External fault input（EF）

After this signal is available, inverter reports exterior fault (EF) and stop.

8～10：Multi-speed terminals 1～3

The combination of the three terminals can achieve the speed set in 8 steps.

Notice : Terminal 1 is for low-speed, terminal 3 is for high-speed.

Multi-step speed 3	Multi- step speed 2	Multi- step speed 1
BIT2	BIT1	BIT0

11～13：Uplink forcing deceleration 1~3

Uplink forcing signal, is use for preventing the elevator crash to the top. Please refer to P1.23 ~ P1.28 for the description of specific function.

14 ~ 16: Downlink forcing deceleration 1~3

Downlink forcing signal, is use for preventing the elevator clash to the bottom. Please refer to P1.23 ~ P1.28 for the description of specific function.

NOTICE: Uplink forcing deceleration and Downlink forcing deceleration is one-to-one correspondence.

17: Contactor feedback signal (TB)

P8.04 selects contactor control to be available, if contactor feedback signal is wrong, inverter will report contactor feedback fault (TbE).

18: Brake feedback signal (FB)

P8.04 selects brake control to be available, if brake feedback signal is wrong, inverter will report brake feedback fault (TbE).

19: Inverter enable (ENA)

When a multi-functional terminal is set to be inverter enabled, the inverter can run, only after the ENA signal is available, otherwise the inverter does not respond to running command. If not choose this function, inverter default can be effective.

20: Forcing deceleration stop

General forcing deceleration signal has the high priority, The deceleration is decided by P1.23 (Forcing speed-down deceleration 1), whenever running up/running down, the elevator is decelerated to stop with the setting deceleration of P1.23 when the signal is effective.

21～40:Reserved

Function Code	Name	Description	Setting Range	Factory Setting
P5.12	Switch signal filter times	1~10	1~10	5

This parameter is used to set sampling filter times of terminals (S1~S10). When interference is heavy, user should increase this value to prevent malfunction.

Function Code	Name	Description	Setting Range	Factory Setting
P5.13	AI1 lower limit	0.00V~10.00V	0.00~10.00	0.00V
P5.14	AI1 lower limit corresponding setting	-100.0%~100.0%	-100.0~100.0	0.0%
P5.15	AI1 upper limit	0.00V~10.00V	0.00~10.00	10.00V
P5.16	AI1 upper limit corresponding setting	-100.0%~100.0%	-100.0~100.0	100.0%
P5.17	AI1 filter time constant	0.00s~10.00s	0.00~10.00	0.10s

These parameters determine the relationship between analog input voltage and the corresponding setting value. When the analog input voltage exceeds the range between lower limit and upper limit, it will be regarded as the upper limit or lower limit.

The analog input AI1 can only provide voltage input, and the range is 0V~10V.

For different applications, the corresponding value of 100.0% analog setting is different. For details, please refer to description of each application.

Notice: AI1 lower limit must be less or equal to AI1 upper limit.

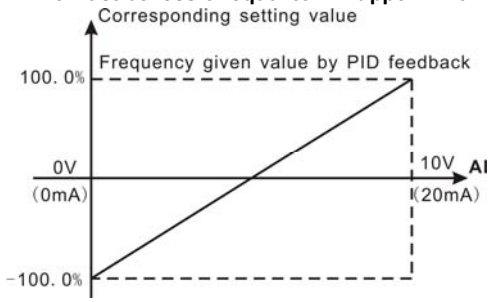


Figure 6.10 Relationship between AI and corresponding setting.

AI1 filter time constant: It is the key parameter for sensibility of analog input.If you want

to prevent the malfunction , turn up the time the anti-interface ability will be strong , but it will weaken the sensibility

Function Code	Name	Description	Setting Range	Factory Setting
P5.18	AI2 lower limit	0.00V~10.00V	0.00~10.00	0.00V
P5.19	AI2 lower limit corresponding setting	-100.0%~100.0%	-100.0~100.0	0.0%
P5.20	AI2 upper limit	0.00V~10.00V	0.00~10.00	5.00V
P5.21	AI2 upper limit corresponding setting	-100.0%~100.0%	-100.0~100.0	100.0%
P5.22	AI2 filter time constant	0.00s~10.00s	0.00~10.00	0.10s

Please refer to description of AI1.

Notice:

1) When AI2 is set as 0~20mA current input, the corresponding voltage range is 0~5V.

2) CHV180 series inverter provides 2 analog input terminals.

6.7 P6 Group -- Output Terminals

Function Code	Name	Description	Setting Range	Factory Setting
P6.00	HDO output selection	0: High-speed pulse output 1: Open collector output	0~1	0

0: Open collector High-speed pulse output: The maximum pulse frequency is 50.0 kHz. Please refer to description of P6.09.

1: Open collector output: Please refer to description of P6.03.

Notice: HDO terminal is for programmable multiplexing output.

Function Code	Name	Description	Setting Range	Factory Setting
P6.01	Y1 output selection	Open-collector output	0~20	1
P6.02	Y2 output selection	Open-collector output	0~20	0

Function Code	Name	Description	Setting Range	Factory Setting
P6.03	HDO Open collector output selection	Open-collector output	0~20	0
P6.04	Relay 1 output selection	Relay output	0~20	4
P6.05	Relay 2 output selection	Relay output	0~20	5
P6.06	Relay 3 output selection	Relay output	0~20	0

OC/Relay output functions are indicated in the following table:

Setting Value	Function	Description
0	No output	Output terminal has no function.
1	Elevator running(LR)	ON: During run.
2	Up running	ON: During running up
3	Down running	ON: During running down
4	Fault output	ON: When fault happened in inveter
5	Zero speed running	ON: When the output speed and setting speed are zero,and running.
6	Running is ready	ON: Inverter is ready (no fault, power is ON).
7	Holding-brake control	When the P8.04 setted to be 1,it will output the brake signal ON: take off the brake. OFF: hold the brake.
8	Contactor control	ON: close the contactor. OFF: open the contactor.
9	Frequency reached	Please refer to description of P6.24.
10	FDT reached	Please refer to description of P6.22, P6.23.

Setting Value	Function	Description
11	Elevator running 1(LR1)	ON: From brake-releasing delay finished to closing brake finished.
12	Holding-brake output	ON: From brake-closing delay finished to stop
13~20	Reserved	Reserved

Notice:

Multi-function output terminal 11 and 12 are main for noticing the holding-brake and Brake-releasing of system when adjust external control mode for holding-brake.Please refer Figure 8-2 for detailed relationship.

Function Code	Name	Description	Setting Range	Factory Setting
P6.07	AO1 output selection	0~14	0~14	0
P6.08	AO2 output selection	0~14	0~14	0
P6.09	HDO open collector high speed pulse output selection	0~14	0~14	0

The standard output of AO1 and AO2 is 0~10V/0~20mA, it can be selected by J19 jumper wire. The range of P6.09 is from 0 kHz to 50.kHz.

AO/HDO output functions are indicated in the following table:

Setting Value	Function	Range
0	Running speed	0~Elevator rated speed
1	Reference speed	0~Elevator rated speed
2	Motor running speed	0~2* motor rated synchronous speed
3	Output current	0~2* inverter rated current
4	Output voltage	0~2* inverter rated voltage
5	Output power	0~2* rated power
6	Output torque	0~2*rated rated current
7	AI1 input	0~10V

Setting Value	Function	Range
8	AI2 inut	0~10V/0~20mA
9~14	Reserved	Reserved

Function Code	Name	Description	Setting Range	Factory Setting
P6.10	AO1 lower limit	0.0%~P6.12	0.0~ P6.12	0.0%
P6.11	AO1 lower limit corresponding output	0.00V ~10.00V	0.00~10.00	0.00V
P6.12	AO1 upper limit	0.0%~100.0%	P6.10~100.0	100.0%
P6.13	AO1 upper limit corresponding output	0.00V ~10.00V	0.00~10.00	10.00V
P6.14	AO2 lower limit	0.0%~ P6.16	0.0~ P6.16	0.0%
P6.15	AO2 lower limit corresponding output	0.00V ~10.00V	0.00~10.00	0.00V
P6.16	AO2 upper limit	0.0%~100.0%	P6.14~100.0	100.0%
P6.17	AO2 upper limit corresponding output	0.00V ~10.00V	0.00~10.00	10.00V

These parameters determine the relationship between analog output voltage/current and the corresponding output value. When the analog output value exceeds the range between lower limit and upper limit, it will output the upper limit or lower limit.

When AO is current output, 1mA is corresponding to 0.5V.

For different applications, the corresponding value of 100.0% analog output is different.

For details, please refer to description of each application.

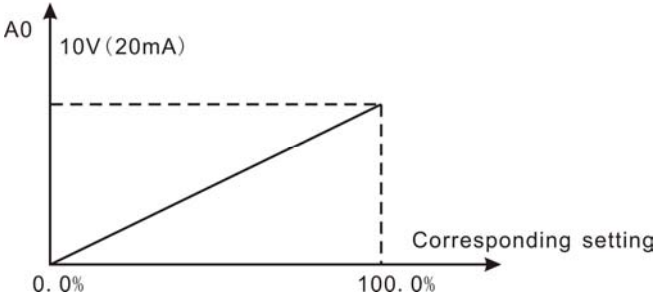


Figure 6.12 Relationship between AO and corresponding setting.

Function Code	Name	Description	Setting Range	Factory Setting
P6.18	HDO lower limit	0.0%~ P6.20	0.0~ P6.20	0.0%
P6.19	HDO lower limit corresponding output	0.0 ~ 50.0kHz	0.0~50.0	0.0kHz
P6.20	HDO upper limit	0.0%~100.0%	P6.18~100.0	100.0%
P6.21	HDO upper limit corresponding output	0.0 ~ 50.0kHz	0.0~50.0	50.0kHz

The description of P6.18~P6.21 is similar to AO.The HDO diagram is as following:

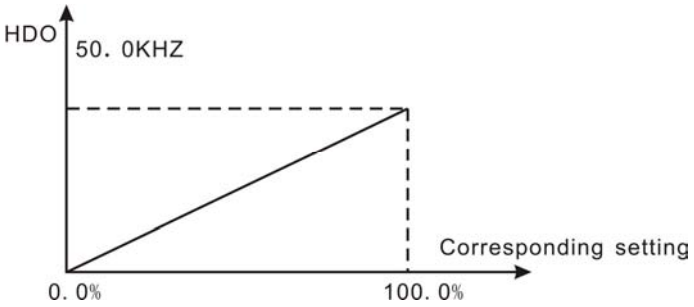


Figure 6.13 Relationship between HDO and corresponding setting.

Function Code	Name	Description	Setting Range	Factory Setting
P6.22	FDT level detection value	0.00～P0.07	0.00~P0.07	50.00Hz
P6.23	FDT lag detection value	0.0～100.0	0.0～100.0	5.0%

When the output frequency reaches a certain preset frequency (FDT level), output terminal will output an ON-OFF signal until output frequency drops below a certain frequency of FDT level (FDT level - FDT lag), as shown in following figure.

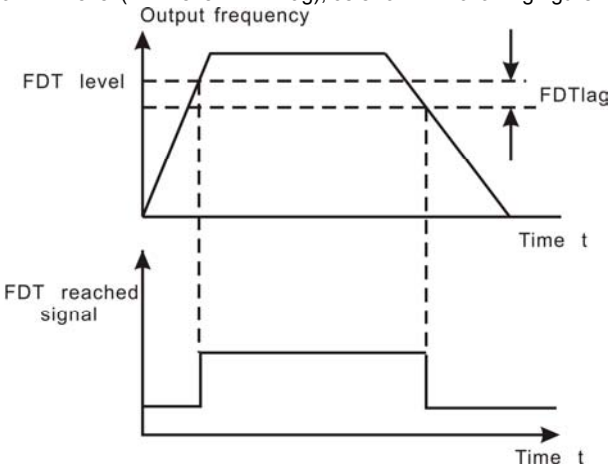


Figure 6.14 FDT Level diagram.

Function Code	Name	Description	Setting Range	Factory Setting
P6.24	Frequency arriving detecting range	0.00～100.0%	0.00~100.0	0.0%

When output frequency reaches reference frequency, it can adjust the detection amplitude.Description as follow:

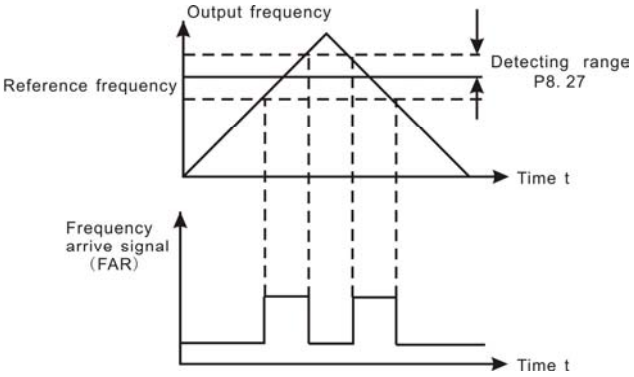


Figure 6.15 Frequency arriving detection diagram.

Function Code	Name	Description	Setting Range	Factory Setting
P6.25	Reserved	0~65536	0~65536	0
P6.26		0~65536	0~65536	0

6.8 P7 Group --Display Interface

Function Code	Name	Description	Setting Range	Factory Setting
P7.00	User password	0~65535	0~65535	0

The password protection function will be valid when set to be any nonzero data. When P7.00 is set to be 00000, user's password set before will be cleared and the password protection function will be disabled.

After the password has been set and becomes valid, the user can not access menu if the user's password is not correct. Only when a correct user's password is input, the user can see and modify the parameters. Please keep user's password in mind.

Function Code	Name	Description	Setting Range	Factory Setting
P7.01	LCD language selection	0: Chinese 1: English	0~1	0
P7.02	Parameter copy	0: Invalid 1: Upload parameters to LCD 2: Download parameters from LCD	0~2	0

P7.02 will take effect when LCD keypad is used.

1: All value of parameters will be uploaded from inverter to LCD keypad

2: All value of parameters will be downloaded from LCD keypad to inverter.

Notice: When upload or download operation is completed, P7.02 will be set to 0 automatically.The function is reserved temporary.

Function Code	Name	Description	Setting Range	Factory Setting
P7.03	QUICK/JOG function selection	0: Quick debugging mode 1: FDW/REV switching	0~1	0

QUICK/JOG is a multifunctional key, whose function can be defined by the value of P7.03.

0: Quick debugging mode: Please refer to description of Chapter 5.

1: FWD/REV switching: Press QUICK/JOG, the running direction of inverter will reverse. It is only valid if P0.01 is set to be 0.

Function Code	Name	Description	Setting Range	Factory Setting
P7.04	STOP/RST function selection	0: Valid only when keypad control (P0.01=0) 1: Valid when keypad or terminal control (P0.01=0 or 1) 2: Valid when keypad or communication control (P0.01=0 or 2) 3: Always valid	0~3	0

Notice:

- **The value of P7.04 only determines the STOP function of STOP/RST.**
- **The RESET function of STOP/RST is always valid.**

Function Code	Name	Description	Setting Range	Factory Setting
P7.05	Keypad display selection	0: Priority to external keypad 1: Both display, only external key valid. 2: Both display, only local key valid 3: Both display and key valid.	0~3	0

0: When external keypad exists, local keypad will be invalid.

1: Local and external keypad display simultaneously, only the key of external keypad is valid.

2: Local and external keypad display simultaneously, only the key of local keypad is valid.

3: Local and external keypad display simultaneously, both keys of local and external keypad are valid. **This function should be used cautiously, otherwise it may cause malfunction.**

Notice:

l When P7.05 is set to be 1, local keypad is valid if external keypad is not connected.

l When LCD keypad is connected, P7.05 must be set to be 0.

Function Code	Name	Description	Setting Range	Factory Setting
P7.06	Running status display selection	0~0xFFFF	0~0xFFFF	0x00FF

P7.06 defines the parameters that can be displayed by LED in running status. If Bit is 0, the parameter will not be displayed; If Bit is 1, the parameter will be displayed. Press 》/SHIFT to scroll through these parameters in right order . Press DATA/ENT + QUICK/JOG to scroll through these parameters in left order.

The display content corresponding to each bit of P7.06 is described in the following:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
AI2	AI1	Output terminal status	Input terminal status	Output torque	Output power	Rotation speed	Running frequency
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Pole position	Torque compensation

Notice: I/O terminal status is displayed in decimal. For details, please refer to description of P7.19 and P7.20.

Function Code	Name	Description	Setting Range	Factory Setting
P7.07	Stop status display selection	1~0xFFFF	1~0xFFFF	0x00FF

P7.07 determines the display parameters in stop status. The setting method is similar with P7.06.

The display content corresponding to each bit of P7.07 is described in the following table:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
AI2	AI1	Motor poles	Output terminal status	Input terminal status	DC bus voltage	Reference frequency	Reference speed
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Pole position

Function Code	Name	Description	Setting Range	Factory Setting
P7.08	Rectifier module temperature	0~100.0℃		
P7.09	IGBT module temperature	0~100.0℃		
P7.10	MCU software version			
P7.11	DSP software version			

Function Code	Name	Description	Setting Range	Factory Setting
P7.12	Accumulated running time	0~65535h		

Rectifier module temperature: Indicates the temperature of rectifier module. Overheat protection point of different inverter may be different.

IGBT module temperature: Indicates the temperature of IGBT module. Overheat protection point of different inverter may be different.

MCU Software version: Indicates current software version of MCU.

DSP Software version: Indicates current software version of DSP

Accumulated running time: Displays accumulated running time of inverter.

Notice: Above parameters are read only.

Function Code	Name	Description	Setting Range	Factory Setting
P7.13	Third latest fault type	0~31	0~31	Reserved
P7.14	Second latest fault type	0~31	0~31	
P7.15	Latest fault type	0~31	0~31	

These parameters record three recent fault types.0:No fault,1~31:different fault types. For details, please refer to description of chapter 8.

Function Code	Name	Description	Setting Range	Factory Setting
P7.16	Output frequency at current fault	Output frequency at current fault.	0	Reserved
P7.17	Output current at current fault	Output current at current fault.		
P7.18	DC bus voltage at current fault	DC bus voltage at current fault.		
P7.19	Input terminal status at current fault			
P7.20	Output terminal status at current fault			

This value records ON-OFF input terminal status at current fault. The meaning of each bit is as below:

9	8	7	6	5	4	3	2	1	0
S10	S9	S8	S7	S6	S5	S4	S3	S2	S1

1 indicates corresponding input terminal is ON, while 0 indicates OFF.

Notice: This value is displayed as decimal.

This value records output terminal status at current fault. The meaning of each bit is as below:

BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
RO3	RO2	RO1	HDO	Y2	Y1

1 indicates corresponding output terminal is ON, while 0 indicates OFF.

Notice: This value is displayed as decimal.

Function Code	Name	Description	Setting Range	Factory Setting
P7.21	Reserved	0~65536	0~65536	0
P7.22	Reserved	0~65536	0~65536	0

6.9 P8 Group --Enhanced Function

Function Code	Name	Description	Setting Range	Factory Setting
P8.00	Analog weigh signal input selection	0: No function 1: AI1 2: AI2	0～2	0

This parameter can improve start comfortable of elevator.

NOTICE: This analog signal can't use the same one analog input source with speed command selection (P0.03)

Function Code	Name	Description	Setting Range	Factory Setting
P8.01	Pre-torque offset	0.0～100.0%	0.0～100.0	30.0%
P8.02	Drive side gain	0.000～7.000	0.000~7.000	1.000
P8.03	Brake side gain	0.000～7.000	0.000~7.000	1.000

When elevator is running, the start comfortable is improved by pre-torque compensating difference value of elevator car and counterpoise. Only when P8.00 isn't set to be 0, pre- torque compensation will be available. The detailed way and size are as follow:

Direction running	Comparison	Pre-torque compensation value
Up running	Car > counterpoise	P8.02*(car - P8.01)
	Car < counterpoise	P8.03*(car - P8.01)
Down running	Car > counterpoise	P8.03*(car - P8.01)
	Car < counterpoise	P8.02*(car - P8.01)

The car weight is weighted by Simulation weighing transducer (include the load)

P8.01=（counterpoise weight-car weight）/ rated load weight of elevator.

Function Code	Name	Description	Setting Range	Factory Setting
P8.04	Holding brake, contactor control selection	0: Holding brake and contactor are controlled by exterior controller, not inverter. 1: Holding brake is controlled by inverter, and contactor is controlled by exterior controller. 2: Holding brake is controlled by exterior controller, and contactor is controlled by inverter. 3: Both holding brake and contactor are controlled by inverter.	0~3	0
P8.05	Close brake delay time	0.00～5.00s	0.00～5.00	0
P8.06	Open brake delay time	0.00～5.00s	0.00～5.00	0

Close brake delay time is from the ouput frequency reaches P8.13 to close brake output command. This paremeter can enhance stop comfortable.

Open brake delay time is from 0 speed running to output Open brake command. This parameter let inverter prevent starting concussion, before open brake.

Notice:

The delay of close brake and open brake are always effect, and is not matter with the close brake and contactor control mode.

Function Code	Name	Description	Setting Range	Factory Setting
P8.07	Brake threshold voltage	560.0～750.0V	560.0~750.0	700.0

This function code is to set the threshold DC bus voltage when dynamic braking , set the parameter correctly can improve the performance of braking .

When the DC bus voltage is greater than the value of P8.07, the inverter will start dynamic braking.

Notice:

- **Factory setting is 380V if rated voltage of inverter is 220V.**
- **Factory setting is 700V if rated voltage of inverter is 380V.**
- **The value of P8.07 is corresponding to the DC bus voltage at rated input voltage.**

Function Code	Name	Description	Setting Range	Factory Setting
P8.08	Fault auto reset times	0～10	0～10	0
P8.09	Fault relay action	0～1	0～1	0
P8.10	Reset interval	0. 1~100.0s	0. 1~100.0	1.0s

Auto reset function can reset the fault in preset times and interval. When P8.08 is setted to be 0, it means “auto reset” is disabled and the protective device will be activated in case of fault.and if P8.08 is setted not 0, when fault occur and the auto reset times exceed the setted number, the inverter will standby ,it must be operated by somebody.

P8.09 defines if fault relay active or not during auto reset. If continuous production without interruption is needed, please set P8.09=0.

The set of “Reset interval” means the time from fault occur to the fault been resetted.

Notice:

- **The fault such as OUT 1, OUT 2, OUT 3, OH1 and OH2 cannot be reset automatically.**
- **If fault has not occurred for ten minutes after the fault is reset, inverter will automatically clear the previous times of auto reset.**
-

Function Code	Name	Description	Setting Range	Factory Setting
P8.11	Contracting brake feedback inspecting interval	0.1～5.0s	0.1～5.0	2.0

After selecting contracting brake control, the fault time of elevator contracting brake action is greater than P8.11, inverter will report brake feedback fault (FAE).

Function Code	Name	Description	Setting Range	Factory Setting
P8.12	Contactor feedback inspecting interval	0.1～5.0s	0.1～5.0	2.0

After selecting contactor control, the fault time of elevator relay action is greater han P8.12, inverter will report contactor feedback fault (TbE).

Function Code	Name	Description	Setting Range	Factory Setting
P8.13	Stop contracting brake frequency	0.00~5.00Hz	0.00~5.00	0.00

The frequency adjusts that contracting brake is carried out at which frequency point.If set P8.05,and it starts timing when the inverter output frequency reaches the frequency point,output the contracting brake signal when the time is over.The closing brake and contracting brake of multi-function output signal also is stop. If P8.05 is set to be 0,when the inverter output frequency reaches setting frequency point,contracting brake is carried out immediately.

Function Code	Name	Description	Setting Range	Factory Setting
P8.14	Start DC brake current	0.0~120%	0.0~120	0.0
P8.15	Start DC brake time	0.0~50.0s	0.0~50.0	0.0

The start DC brake current is the percentage of relative inverter rated current,When inverter is starting,DC brake is carried out according to the setting start DC brake current,and it is accelerated to run when the setting start DC brake time is reached.If P8.15 is set to be 0,DC brake is invalid.Bigger the DC brake current is, bigger the braking torque will be.

8.15 should be greater than P8.06 when selecting first DC braking and start.

Function Code	Name	Description	Setting Range	Factory Setting
P8.16	Stop brake starting frequency	0.00~P0.04	0.00~P0.04	0.00
P8.17	Stop brake waiting time	0.0~50.0s	0.0~50.0	0.0
P8.18	Stop DC brake current	0.0~120%	0.0~120	0.0
P8.19	Stop DC brake time	0.0~50.0s	0.0~50.0	0.0

Stop brake starting frequency: when the shutdown mode is deceleration to stop(P1.29=0), it starts DC brake when the frequency point is reached, and it is considerated zero running in internal inverter,and the close brake delay start to timing.

Notice: Stop DC brake is only effect when it is decelerated to stop(P1.29=0).The inverter is considerated zero running when DC brake, both close brake delay and open brake delay are effect.

Function Code	Name	Description	Setting Range	Factory Setting
P8.20	Close brake stop delay	0.0～5.0s	0.0～5.0s	0.0s

The function is primarily to avoid that the brake is not closed steadly enough when inverter stop.

When P1.29 is set to be 1,in the process of running normally, then there is a signal of coast to stop ,inverter brake immediately to block output without stop delay time,when inverter run to zero speed and brake,after the stop delay time,inverter block output.

When P1.29 is set to be 0(deceleration to stop), inverter will block output after the delay time whenever inverter decelerate to stop.

Function Code	Name	Description	Setting Range	Factory Setting
P8.21	Two/Three-phase modulation selection	0~1	0~1	1

0: Two-phase modulation, the noise of running motor is lower, but the temperature rise quicker, inverter need to derating in this mode.

1: Three-phase modulation,the noise of running motor is bigger,but it is better for the inhibition of motor oscillation in this mode.

Function Code	Name	Description	Setting Range	Factory Setting
P8.22	Reserved	0~65535	0~65535	0
P8.23	Reserved	0~65535	0~65535	0

6.10 P9 Group -- Protection Parameters

Function Code	Name	Description	Setting Range	Factory Setting
P9.00	Input phase-failure protection	0: Disabled 1: Enabled	0~1	1
P9.01	Output phase-failure protection	0: Disabled 1: Enabled	0~1	1

Notice: Please be cautious to set these parameters as disabled. Otherwise it may cause inverter and motor overheat even damaged.

Function Code	Name	Description	Setting Range	Factory Setting
P9.02	Motor overload protection	0: Disabled 1: Normal motor 2: Variable frequency motor	0~2	2

1: For normal motor (within the function of low speed compensation), the lower the speed, the poorer the cooling effect. Based on this reason, if output frequency is lower than 30Hz, inverter will reduce the motor overload protection threshold to prevent normal motor from overheat.

2: For variable frequency motor (without the function of low speed compensation),As the

cooling effect of variable frequency motor has nothing to do with running speed, it is not required to adjust the motor overload protection threshold.

Function Code	Name	Description	Setting Range	Factory Setting
P9.03	Motor overload protection current	20.0%~120.0%	20.0~120.0	100.0%

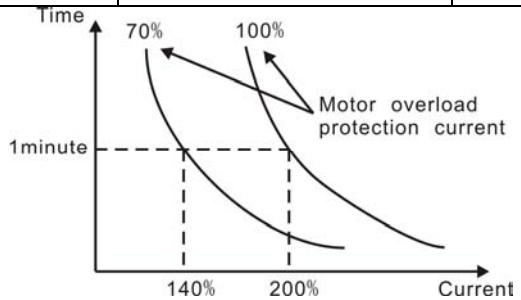


Figure 6.16 Motor overload protection curve .

The value can be determined by the following formula:

Motor overload protection current = (motor rated current / inverter rated current) * 100%

Notice:

- **This parameter is normally used when rated power of inverter is greater than rated power of motor.**
- **Motor overload protection time: 60s with 200% of rated current. For details, please refer to above figure.**

Function Code	Name	Description	Setting Range	Factory Setting
P9.04	Overload pre-warning threshold	20.0%~150.0%	20.0~150.0	130.0%
P9.05	Overload pre-warning selection	0: Always detect relative to motor rated current 1: Detect while constant speed relative to motor rated current 2: Always detect relative to inverter rated current	0~3	0

Function Code	Name	Description	Setting Range	Factory Setting
		3: Detect while constant speed relative to inverter rated current		
P9.06	Overload pre-warning delay time	0.0~30.0s	0.0~30.0	5.0s

The value of P9.05 determines the pre-warning category, such as motor overload (OL1) or inverter overload (OL2).

P9.04 determines the current threshold of pre-warning actionn, it is a percentage of the rated current. When output current of inverter exceeds the value of P9.04 and last the duration determined by Pb.06, inverter will output a pre-warning signal. Please refer to following diagram:

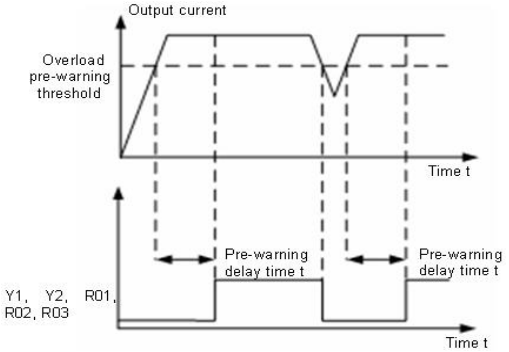


Figure 6.17 Overload pre-warning schematic diagram.

Function Code	Name	Description	Setting Range	Factory Setting
P9.07	Threshold of over speed diviation	0.0%～50%	0.0～50	20.0%
P9.08	Detection time of over speed diviation	0.000~10.000s	0.000~10.000	0.5000

The parameter defines the protection point of over speed diviation,and is main for prevent runaway of motor whose corresponding fault code is dEV.The speed threshold

fault detection is not carried out when detection time is set to be 0.

Function Code	Name	Description	Setting Range	Factory Setting
P9.08	Reserved	0~65536	0	Reserved

6.11 PA Group --Serial Communication

Function Code	Name	Description	Setting Range	Factory Setting
PA.00	Local commnication address	0～247	0～247	1

When the master is writing the frame, if the communication address of the slave is set to be 0 (that is the broadcast communication address), all slaves on the MODBUS bus will receive the frame, but the slaves will not make any response. Note that the slave address should not be set to be 0.

The local communication address is a unique address in the communication network. This is the basis for point-to-point communications between the upper computer and the inverter.

Function Code	Name	Description	Setting Range	Factory Setting
PA.01	Communication baud rate selection	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	0～5	4

This parameter is used to set the data transmission rate between the upper computer and the inverter.

Notice: The baud rate setting of the upper computer should be the same as that of the inverter. Otherwise, communications cannot be implemented. The higher the baud rate, the faster the communication speed is.

Function Code	Name	Description	Setting Range	Factory Setting
PA.02	Data format	0: No parity (8,N,2) for RTU 1: Even parity (8,E,1) for RTU 2: Odd parity (8,O,1) for RTU 3: No parity (8,N,2) for ASCII 4: Even parity (8,E,1) for ASCII 5: Odd parity (8,O,1) for ASCII 6: No parity (7,N,2) for ASCII 7: Even parity (7,E,1) for ASCII 8: Odd parity (7,O,1) for ASCII	0～8	1

The data format setting of the upper computer should be the same as that of the inverter. Otherwise, communications cannot be implemented.

Function Code	Name	Description	Setting Range	Factory Setting
PA.03	Communication reply delay	0～20ms	0~20	0ms

Reply delay: refers to the interval time between the end of data receiving of the inverter and the reply data sending of the upper computer. If the reply delay time is less than the system processing time, take the system processing time as reply delay reference. If the reply delay is longer than the system processing time, after data processing, the system has to wait until the reply delay time is reached before sending data to the upper computer.

Function Code	Name	Description	Setting Range	Factory Setting
PA.04	Communication timeout fault time	0.0～100.0s	0.0~100.0	0.0s

If the functional code is set to 0.0s, the communication delay time parameter is disabled.

When the functional code is set to be a valid value, if the interval between the current communication and the next communication exceeds the communication delay time, the system will send a communication fault error (Err18).

Normally, it is set to be “disabled”. If this parameter is set in a consecutive

communication system, communication status can be monitored.

Function Code	Name	Description	Setting Range	Factory Setting
PA.05	Communication reply enabled selection	0～1	0~1	0

0: communication reply enabled

1: communication reply disabled

Selecting whether replying or not to master command.

Function Code	Name	Description	Setting Range	Factory Setting
PA.06	Reserved	1～127	1～127	1
PA.07	Reserved	0~6	0~6	4
PA.08~PA.11	Reserved	0~65535	0~65535	0

CAN comnunication is reserved.

6.12 Pb Group – Display Monitor

Function Code	Name	Description	Setting Range	Factory Setting
Pb.00	Running frequency	0.0~Maximum frequency		
Pb.01	Reserved	0~65535		
Pb.02	Pole position angle	0.0~359.9		

The parameters display the running frequency, pole position angle, the function codes are only read.

Function Code	Name	Description	Setting Range	Factory Setting
Pb.03	Synchronizer static identify actual current value	0.0%~200.0%	0.0~200.0	

It displays the actual output current value when the synchronizer is performing static autotuning, and the function code is read only.

Function Code	Name	Description	Setting Range	Factory Setting
Pb.04	Mechanical angle	0.0~359.9	0.0~359.9	
Pb.05	Reserved	Reserved		

It displays the present mechanical angle for synchronizer, and it is read only.

Function Code	Name	Description	Setting Range	Factory Setting
Pb.06	AD detection value of encoder C phase	0~1024		
Pb.07	AD detection value of encoder D phase	0~1024		

The parameters display the sampling value of present encoder signal,the function codes are used to correct zero-bias of encoder(P4.08,P4.09) when the synchronizer performs static autoning.

Function Code	Name	Description	Setting Range	Factory Setting
Pb.08~Pb.09	Reserved	Reserved		

6.13 PC Group – No weighing starting parameters

Function Code	Name	Description	Setting Range	Factory Setting
PC.00	No weighing compensation enable	0:disable 1:Enable	0~1	0
PC.01	Load compensation time	0.000~5.000s	0.000~5.000	0.500s

During the load compensation time , speed loop ASR PI selects PC.03 and PC.04,

and position loop PC.05 and PC.06 are effective.The parameter starts timing from receiving running command,and it is generally set to be zero speed holding time.

Function Code	Name	Description	Setting Range	Factory Setting
PC.02	Load compensation lower time	0.000~5.000s	0.000~5.000s	0.300s

The parameter is the transition time of ASR from PC.03 and PC.04 to P3.00 and P3.01.

Function Code	Name	Description	Setting Range	Factory Setting
PC.03	No weighing compensation ASR proportion gain	0~100	0~100	30
PC.04	No weighing compensation ASR integral gain	0.01~10.00s	0.01~10.00s	0.04s
PC.05	Position loop APR proportion gain	0~100	0~100	0
PC.06	Position loop APR differential gain	0.01~10.00s	0.01~10.00	0.00s

The position loop PC.05 and PC.06 are needn't to be setted usually,too large setting of P0.5 causes motor oscillation easily.Please adjust PC.03 and PC.04 properly.Increase PC.04 if the motor is oscilating.Decrease PC.04 or increase PC.03 if the stroll down and overshoot of elevator happen when starting.

Function Code	Name	Description	Setting Range	Factory Setting
PC.07	Current compensation coefficient	0~2000	0~2000	1000

The parameter is effect in PC.01.If the stroll down and overshoot of elevator is

happened when starting,and the adjustment of PC.03 and PC.04 generates oscillation possibly.The oscillation can be eliminated when PC.07 is increased properly, usually 1000 is OK. If the motor vibration is happened when starting because PC.04 is smaller, PC.07 can be increased to eliminate the oscillation.

Function Code	Name	Description	Setting Range	Factory Setting
PC.08	Current command filter coefficient	0~65536	0~65536	1000

Bit0 and Bit1 are current loop filter parameters.The response of system will be decreased when they are increased, The parameter usually is adjusted with speed loop P3.02 and P3.06,If there is abnormal noise when the motor is running,the noise can be eliminated with increasing the parameter or P3.02 and P3.06.Bit2~bit5 are reserved.

6.14 PE Group –Factory Setting

This group is only used for inverter manufacture, please don't try to open and change the parameters, otherwise may cause the inverter couldn't work or damage.

7. DESCRIPTION OF CHV 180'S EXTENSION CARD

7.1 Description of Communication Card

7.1.1 Model

The model of CHV180's communication card is PN000TXWX, and it is compatible with CHV's extension card. This card provides two modes for communicating, which are RS232 and RS485.

7.2 Installation

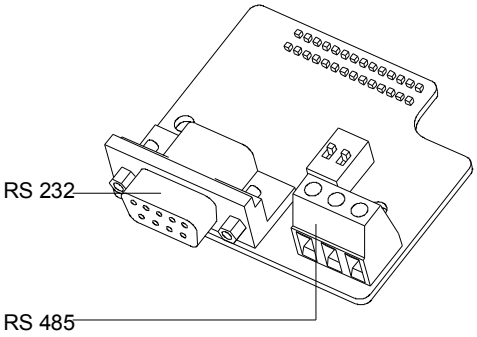


Figure 7.1 Communication card.

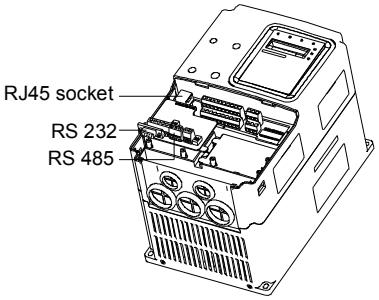


Figure 7.2 Installation of communication card.

7.1.3 Application of communication card

If need to use CHV 180 inverters and upper computer (PLC, industrial PC), the user must choose this communication card. It provides two physical communication modes (RS232 and RS485). The electric parameters can meet the related international standards completely and can implement smooth communications between CHV inverter and upper computer system. Please choose the corresponding physical

channel according to the actual applications.

7.1.4 Wiring Terminals

The communication card has two groups of wiring terminals, as shown in Figure 7.3.

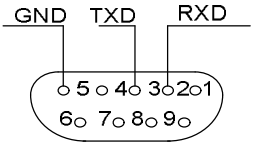


Figure 7.3 DB9: Bus-connector wiring terminal (RS232)

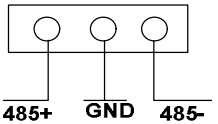


Figure 7.4 RS485 wiring terminal

7.1.5 Precautions of Wiring

- Please install this card after the inverter is completely powered off.
- Please make perfect connection between the communication card and the extension slot of control card.
- Use screws to fix the communication card.
- To prevent communication signals from external disturbance, please choose twisted pairs as communication line, and try to avoid parallel wiring with the drive power.
- It is better to choose the shielded cable as RS232 communication line.

7.2 Description of I/O Extension Card

7.2.1 Description of I/O extension card terminal and jumper

(1) Terminals

Terminal	Description
S7～S10	ON-OFF signal input，optical coupling with PW and COM Input voltage range：9～30V Input impedance：3.3KΩ
COM	Common ground terminal for +24V or exterior power
GND	Common ground terminal of +10V
Y2	Open collecter output terminal, the corrseponding common ground output terminal is CME Exterior voltage range：0～24V

Terminal	Description
	Output current range：0～50mA
CME2	Open collecter output common terminal
AO2	Analog quantity output terminal Output range：0～10V/0～20mA（select voltage er current output can be switched by J2）
RO3A、RO3B、RO3C	Relay output：RO3A common，RO3B NC，RO3C NO Contact capacity：AC250V/3A，DC30V/1A
RS485+、RS485-	RS485 Communication
CANH、CANL	CAN communication ports（reserved）

Notice: GND must isolate from COM.

(2) Jumper

Jumper	Description
J1	1 connect to 2 means paralleling a 120Ω matching resistance for CAN control output terminal,2 and 3 are be hanged in the air
J2	Switch between 0～10V coltage input or 0～20mA current input 1（V）connect to 2（GND）means voltage input； 2（GND） connect to 3（I）means current inout
S1	Selection of RS485 communication terminal organ setting. ON：enable terminal organ；OFF：forbidden terminal organ When the port of RS485 is at the end of RS485 communication network cable, that need enable terminal organ

7.2.2 Description of dimension and terminal compositor

(1) Dimension of I/O extension card and sketch map for CHV180

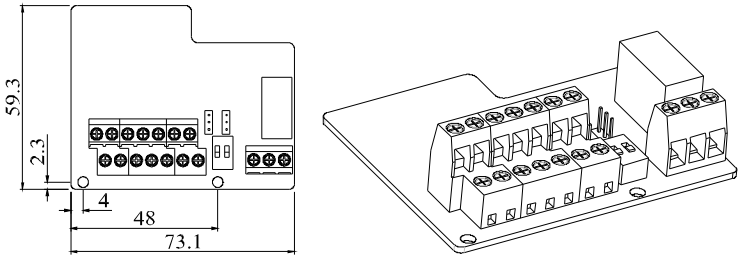


Figure 7.5 Dimension of I/O extension card.

(2) Sketch map of terminal compositor

S7	S8	S9	S10	GND	CANH	CANL
COM	COM	CME2	Y2	AO2	RS485+	RS485-

RO3A	RO3B	R03C

7.2.3 Installation of I/O extension card for CHV180

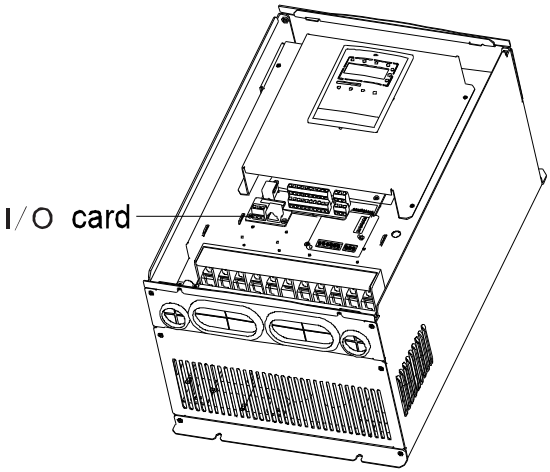


Figure 7.6 Installation of of I/O extension card and PG card.

7.3 Description of Asynchronous Motor PG card

7.3.1 Model and specifications

7.3.1.1 The model of PG card for CHV180 inverters is PN000PGWX. The technical features are as follow:

Terminal	Technical features
12V、COM1	Encoder power supply, maximum output current is 300mA
TERA+、TERA-、 TERB+、TERB-	Encoder signal input access Voltage range: 12～15V Response speed: 0～80kHz
TER-OA TER-OB	Frequency output: 0～80kHz Output impedance: 30Ω Frequency division range: 1～256

7.3.1.2 Dimensions and Installation

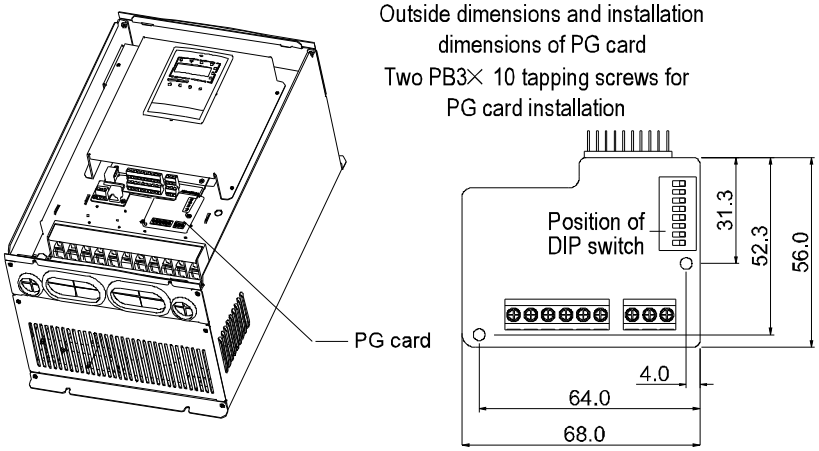


Figure 7.7 Installation and Dimensions of PG Card.

NOTICE: The contact pin of PG card is inserted into the below connector with control board CN9.

7.3.2 Operating Instructions of asynchronous motor PG card

7.3.2.1 Functions

If the user requires PG vector control, needs to select PG card. The function of the PG card includes processing circuits for two channels of orthogonal coder signals, capable of receiving signals from differential output, open-circuit collector output and push-pull output encoders, Coder power supply (+12V output, adjustable through the potentiometer on the PG card). In addition, it can output in frequency-division the inputted encoder signals (output are two channels of orthogonal signals). The user can make selection according to actual situations.

7.3.2.2 Description of Terminals and DIP Switch

The PG card has nine wiring terminals, as shown in Figure 7.7.

+12V	COM1	TERA+	TERA-	TERB+	TERB-	TER-OA	TER-OB	COM1

Figure 7.8 User Wiring Terminals of PG Card.

Where, +12V and COM1 are working voltage output for the coder; TERA+, TERA-, TERB+, and TERB- are signal input terminals for the coder; TER-OA, TER-OB, and COM1 are output terminals for frequency-division signals; PE is the wiring terminal for shielding cable (PE inside the PG card is not connected to the ground, and the user can connect it to the ground during use).

The frequency division factor is determined by the DIP switch on the card. The DIP

switch consists of 8 bits. When the binary digits are displayed by DIP switch pluses 1, the relative value is frequency division factor. The bit marked as “1” on the DIP switch is the lower binary bit, while “8” is the higher binary bit. When the DIP switch is switched to ON, the bit is valid, indicating “1”; otherwise, it indicates “0”.

Frequency division factors are shown in the table below:

Decimal Digit	Binary Digit	Frequency Division Factor
0	00000000	1
1	00000001	2
2	00000010	3
…	…	…
m	…	m+1
255	11111111	256

7.3.2.3 Wiring Diagram

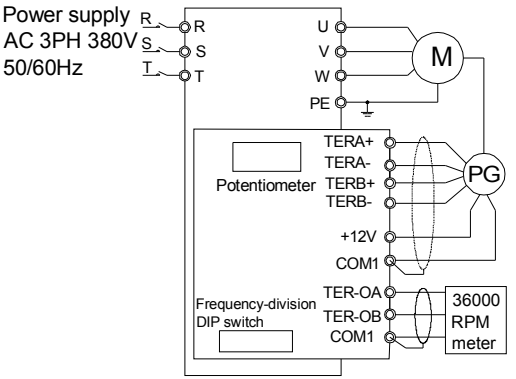


Figure 7.8 PG Card Wiring Diagram.

7.3.2.4 Notice

- **The signal line of PG card should be separated from the power line. Parallel wiring is forbidden.**
- **To prevent coder signals from disturbance, please select a shielded cable as the signal line of PG card.**
- **The shielding layer of shielded cable of PG card should be grounded (such as terminal PE of the inverter), and furthermore, only one end is grounded, to prevent signal from disturbance.**

- **If the frequency-division output of PG card is connected to user power supply, the voltage should be less than 24V; otherwise, the PG card may be damaged.**

7.3.3 Application Connection

(1) Wiring Diagram of Differential Output Coder

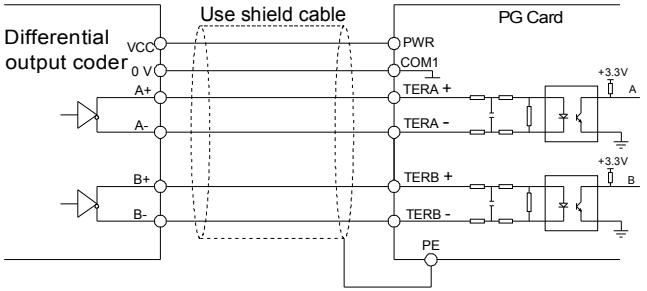


Figure 7.9 Wiring Diagram of Differential Output Coder.

(2) Wiring Diagram of Open Collector Output Coder

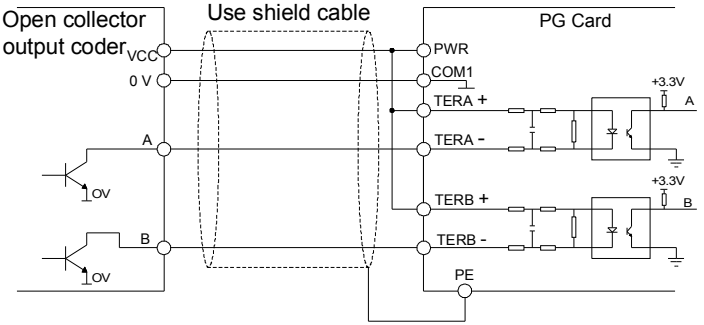


Figure 7.10 Wiring Diagram of Open Collector Output Coder.

(3) Wiring Diagram of Push-pull Output Coder

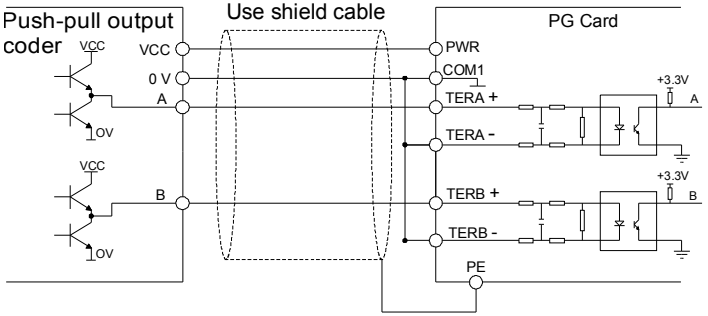


Figure 7.11 Wiring Diagram of Push-pull Output Coder.

(4) Wiring Diagram of PG Card Frequency-division Output

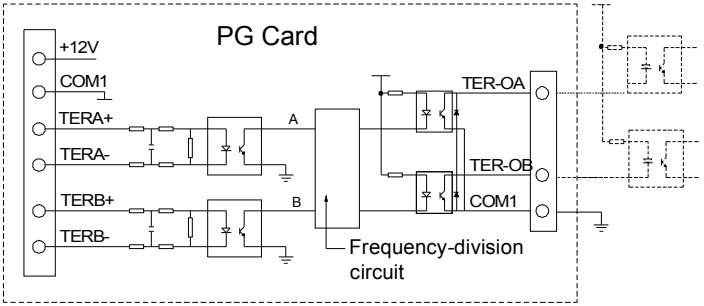


Figure 7.12 Wiring Diagram of PG Card Frequency-division Output.

7.4 Description of PG Card for Synchronous Motor

7.4.1 Model and specifications

The model of PG card for CHV180 inverters is ASY-2010-T. The technical features are as follow:

Model of PG card	CHV180-SY-PG-UVW	CHV180-SY-PG-SIN
The supported encoder types	UVW encoder	SIN/COS encoder
Frequency division coefficient	1~256(with dial switching)	1(without dial switching)
Encoder voltage	5V/±5%	5V/±5%
Signal port of PG	Same with the description of 7.4.3	Same with the description of 7.4.3

The user can sellects the card as your needs.

7.4.2 Dimensions and schematic diagram of UVW type synchronous PG

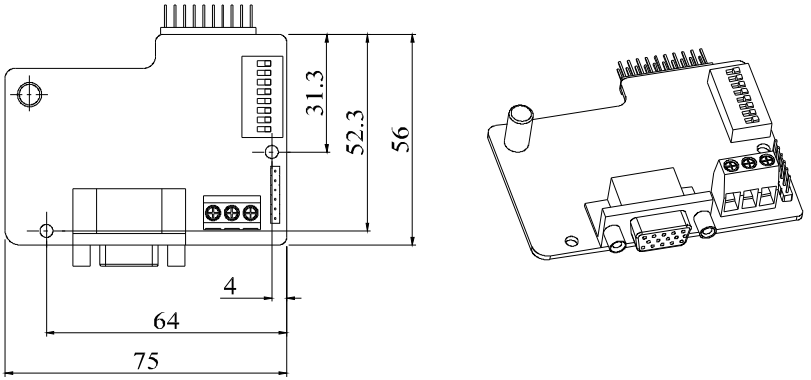


Figure 7.13 Dimensions and schematic diagram of UVW type synchronous PG

Notice:

1) The position and method of synchronous motor PG card are the same as the asynchronous motor PG card, but the contact pin has two lines, the contact pin of asynchronous motor PG card is only one line(the below line of CN9).

2) The dimension of SIN/COS type synchronous PG is consistent with UVW type PG card only without dial switching for frequency division.

3) The PG card of asynchronous motor is the same as all of CHV series inverters, but the PG card of synchronous motor is only used to CHV180 inverter. When user is using the synchronous tractor, they must select the PG card of synchronous motor.

7.4.3 Description of Terminals and Dial Switch

The PG card has one signal wire port and 3 user wire ports (output signal of frequency division) shown as Figure 7.14:

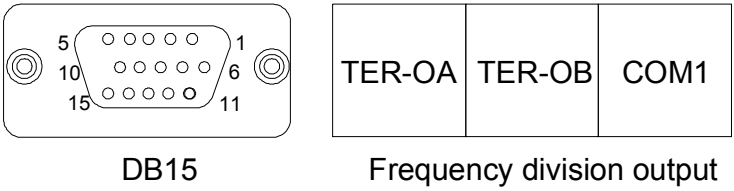


Figure 7.14 The PG card wire port and wire terminals.

TER-OA、TER-OB、COM1 are the signal frequence division output terminals.

NOTICE : PE terminal in PG card does not grounding, user can grounding it.

DB15 is the port of the encoder input signal. The order of the ports signal is as follow:

Port	SIN/COS	UVW
8	A	A
3	A-	A-
9	B	B
4	B-	B-
15	R	Z
14	R-	Z-
6	C	U
1	C-	U-
7	D	V
2	D-	V-
12	5V	5V
13	0V	0V
10	Empty	W
5	Empty	W-
11	Empty	Empty

When using the PG card, you only need to insert the connecting wire of SIN/COS or UVW whose signal array is corresponding with PG card into DB15 of PG card.

The frequency division factor is determined by the dial switch on the card. The dial switch consists of 8 bits. The frequency division is decided by the value of the binary digits(at dial switch) plus 1. The bit marked as “1” on the DIP switch is the lower binary bit, while “8” is the higher binary bit. When the dial switch is switched to ON, the bit is valid, indicating “1”; otherwise, it is invalid,and indicating “0”.

Frequency division coefficients are shown in the table below:

Decimal Digit	Binary Digit	Frequency Division Coefficients
0	00000000	1
1	00000001	2
2	00000010	3
…	…	…
m	…	m+1
255	11111111	256

8. TROUBLE SHOOTING

8.1 Fault and Trouble Shooting

The inverter have perfect functions for protection to carry out effect protection,meanwhile the performance of equipment can be full played.Please refer the following table to analyse the possible fault and find out the reason for exclusion.When the equipment is damaged and can not be fix,please contact local dealers,service center or manufacturers for the solution.

Fault Code	Fault Type	Reason	Solution
OUT1	IGBT Ph-U fault	1. Acc/Dec time is too short. 2. IGBT module fault. 3. Malfunction caused by interference. 4. Grounding is not properly.	1. Increase Acc/Dec time. 2. Ask for support. 3. Inspect external equipment and eliminate interference.
OUT2	IGBT Ph-V fault		
OUT3	IGBT Ph-W fault		
OC1	Over-current when acceleration	Acceleration time is too short.	Increase acceleration time.
		The voltage of power network is lower.	Check the input power.
		The power of inverter is lower.	Select bigger capacity inverter.
OC2	Over-current when deceleration	Deceleration time is too short.	Deceleration time is too short.
		The inertial torque of load is too heavy.	Added suitable energy braking component is in need.
		The power of inverter is lower.	Select bigger capacity inverter.
OC3	Over-current when constant speed running	The mutation and the abnormal of load.	Check the load.
		The voltage of power network is lower.	Check the input power.
		The power of inverter is	Select bigger capacity

Fault Code	Fault Type	Reason	Solution
		lower.	inverter.
		The wiring of code disc is disconnected or faulty when high speed running with closed loop vector control.	Check the code disc and its'wiring.
OV1	Over-voltage when acceleration	Abnormal input voltage.	Check the input power
		Restart the rotary motor when power fail suddenly	Avoid restarting the motor.
OV2	Over-voltage when deceleration	Deceleration time is too short.	Deceleration time is too short.
		The inertia of load is too heavy.	Increase the energy braking component
		Abnormal input voltage.	Check the input power.
OV3	Over-voltage when constant speed running	Abnormal change happened in input voltage.	Install input reactor.
		The inertia of load is too heavy.	Added suitable energy braking component is in need.
UV	Bus Undervoltage	The voltage of power network is lower.	Check the input power.
OL1	Motor overload	The voltage of power network is lower.	Check it.
		The rated current of motor isn't correct.	Reset the rated current of motor.
		The mutation of locked rotor or load of motor is too large.	Check the load,and adjust the lifting capacity of torque.
		The direction of code disc is reverse and running with a low speed for a long time with closed loop vector control.	Adjust the direction of code disc signal.

Fault Code	Fault Type	Reason	Solution
		Motor drive heavy load at low speed for a long time.	Select variable frequency motor.
OL2	Inverter overload	Acceleration time is too short.	Increase acceleration time.
		Restart the rotary motor	Avoid restarting the rotary motor when power fail.
		The voltage of power network is lower.	Check it.
		Load is too heavy	Select bigger capacity inverter.
		The direction of code disc is reverse and running with a low speed for a long time with closed loop vector control.	Adjust the direction of code disc signal.
SPI	Input phase failure	Input phases(R,S,T) are failure	Check the input power
			Check the wiring,and installation,
SPO	Output phase failure	Output phases(U,V,W) are failure.	Check the output wiring.
		Pre-excitation can not be over during pre-excitation if the inverter is disconnected to the motor.	Check the motor and cable.
OH1	Rectifier module overheat	Transient overcurrent	Refer the solution of overcurrent.
		Three output phases has interphase or grounding short-circuit.	Re-wiring.
		The duct is blocked or the fan is damaged.	Dredge the duct or replace the fan
		Ambient temperature is too high.	Install cooling unit.

Fault Code	Fault Type	Reason	Solution
		The wiring or the plug-in of control board is loose.	Check and wiring again.
		The auxiliary power is damaged,and the drive voltage is undervoltage.	Ask for help.
		The bridge arm of power module is direct.	Ask for help.
		The control board is abnormal.	Ask for help.
OH2	IGBT overheat	The control board is abnormal.	Ask for help.
EF	External fault	Si External fault input terminal take effect.	Inspect external equipment.
CE	Communication fault	Improper baud rate setting.	Set proper baud rate.
		Receive wrong data	Press STOP/RST to reset,ask for support.
		Communication is interrupted for long time.	Check communication interface wiring.
ITE	Current detection fault	connectors of control board are loose	Check the connectors and re-wiring.
		The auxiliary power is damaged	Ask for support.
		Hall sensor is damaged.	Ask for support.
		Amplifying circuit is abnormal.	Ask for support.
TE	Motor autotuning fault	The capacity of motor do not match the capacity of inverter.	Change the inverter model.
		Improper setting of motor rated parameters.	Set rated parameters according to motor nameplate.
		Too large deviation between the parameter of	Let motor is without load,identify it again.

Fault Code	Fault Type	Reason	Solution
		autotuning and the standard parameter.	
		Autotuning overtime.	Check the wiring and the parameter setting.
PCE	Encoder fault	Signal wire of encoder was broken with PG vector control.	Inspect encoder connection.
		Encoder was damaged.	Inspect whether there is output signal or not.
PCDE	Encoder reverse fault	Encoder signal wire was connected wrong.	Adjust encoder wiring.
EEP	EEPROM fault	Read/Write fault of control parameters.	Ask for support
		EEPROM is damaged.	Ask for support
PPCE	Detection fault of magnetic pole	The autotuning detection fault of magnetic pole.	1. Inspect motor parameters. 2. Input correct parameters of motor and re-autotuning.
bCE	Brake unit fault	Braking circuit failure or brake tube damaged.	Inspect braking unit, replace braking tube.
		Too low resistance of external connected braking resistor.	Increase braking resistance.
-END-	Trial time reached	Trial time which determined by factory reached.	Contact supplier and ask for support.
LCD-E	LCD is disconnected	LCD is disconnected, the upload and download of parameter is carried out.	Press STOP/RST to reset, connect LCD then download or upload parameter.
FAE	Holding brake fault	Fault of brake feedback	Check the elevator control system.
TbE	Contactor	Contactor feedback is	Check the elevator

Fault Code	Fault Type	Reason	Solution
	feedback fault	fault.	control system.
dEV	Too large speed deviation	The protection function of too large speed deviation.	Check the wiring of encoder is right, and whether the deviation is too small.

8.2 Common Faults and Solutions

Inverter may have following faults or malfunctions during operation, please refer to the following solutions.

No display after power on:

- Inspect whether the voltage of power supply is the same as the inverter rated voltage or not with multi-meter. If the power supply has problem, inspect and solve it.
- Inspect whether the three-phase rectify bridge is in good condition or not. If the rectification bridge is burst out, ask for support.
- Check the CHARGE light. If the light is off, the fault is mainly in the rectify bridge or the buffer resistor. If the light is on, the fault may be lies in the switching power supply. Please ask for support.

Power supply air switch trips off when power on:

- Inspect whether the input power supply is grounded or short circuit. Please solve the problem.
- Inspect whether the rectify bridge has been burnt or not. If it is damaged, ask for support.

Motor doesn't move after inverter running:

- Inspect if there is balanced three-phase output among U, V, W. If yes, then motor could be damaged, or mechanically locked. Please solve it.
- If the output is unbalanced or lost, the inverter drive board or the output module may be damaged, ask for support..

Inverter displays normally when power on, but switch at the input side trips when running:

- Inspect whether the output side of inverter is short circuit. If yes, ask for support.
- Inspect whether ground fault exists. If yes, solve it.
- If trip happens occasionally and the distance between motor and inverter is too far, it is recommended to install output AC reactor.

9. MAINTENANCE

WARNING

- **Maintenance must be performed according to designated maintenance methods.**
- **Maintenance, inspection and replacement of parts must be performed only by authorized personnel.**
- **After turning off the main circuit power supply, waiting for 10 minutes before performance maintenance or inspection.**
- **DO NOT directly touch components or devices of PCB board. Otherwise inverter can be damaged by electrostatic.**
- **After maintenance, all screws must be tightened.**

9.1 Daily Maintenance

In order to prevent the fault of inverter to make it operate smoothly in high-performance for a long time, user must inspect the inverter periodically (within half year). The following table indicates the inspection content.

Items to be checked	Main inspections		Criteria
	Inspection content	Frequency	Means/methods
Operation environment	(1) temperature, humidity (2)dust, vapor, leakage (3)gases	(1)point thermometer, hygrometer (2)observation (3)visual examination and smelling	(1)ambient temperature shall be lower than 40℃, otherwise, the rated values should be decreased. Humidity shall meet the requirement (2)no dust accumulation, no traces of water leakage and no condensate. (3)no abnormal color

Items to be checked	Main inspections		Criteria
	Inspection content	Frequency	Means/methods
			and smell.
Inverter	(1)vibration (2)cooling and heating (3)noise	(1)point thermometer comprehensive observation (2)listening	(1)smooth operation without vibration. (2)fan is working in good condition. Speed and air flow are normal. No abnormal heat. (3)No abnormal noise
Motor	(1)vibration (2)heat (3)noise	(1)comprehensive observation Listening (2)point thermometer (3)listening	(1)No abnormal vibration and no abnormal noise. (2)No abnormal heat. (3)No abnormal noise.
Operation status parameters	(1)power input voltage (2)inverter output voltage (3)inverter output current (4)internal temperature	(1)voltmeter (2)rectifying voltmeter (3)ammeter (4)point thermometer	(1)satisfying the specification (2)satisfying the specification (3)satisfying the specification (4)temperature rise is lower than 40℃

9.2 Periodic Maintenance

Customer should check the drive every 3 months or 6 months according to the actual environment

1. Check whether the screws of control terminals are loose. If so, tighten them with a screwdriver;

2. Check whether the main circuit terminals are properly connected; whether the mains cables are over heated;

3. Check whether the power cables and control cables are damaged, check especially for any wear on the cable tube;

4. Check whether the insulating tapes around the cable lugs are stripped;

5. Clean the dust on PCBs and air ducts with a vacuum cleaner;

6. For drives that have been stored for a long time, it must be powered on every 2 years. When supplying AC power to the drive, use a voltage regulator to raise the input voltage to rated input voltage gradually. The drive should be powered for 5 hours without load.

7. Before performing insulation tests, all main circuit input/output terminals should be short-circuited with conductors. Then proceed insulation test to the ground. Insulation test of single main circuit terminal to ground is forbidden; otherwise the drive might be damaged. Please use a 500V Mega-Ohm-Meter.

8. Before the insulation test of the motor, disconnect the motor from the drive to avoid damaging it.

9.3 Replacement of Wearing Parts

Fans and electrolytic capacitors are wearing part, please make periodic replacement to ensure long term, safety and failure-free operation. The replacement periods are as follows:

◆Fan: Must be replaced when using up to 20,000 hours;

◆Electrolytic Capacitor: Must be replaced when using up to 30,000~40, 000 hours.

10. COMMUNICATION PROTOCOL

10.1 Interfaces

RS485: asynchronous, half-duplex.

Default: 8-E-1, 19200bps. See Group PC parameter settings.

10.2 Communication Modes

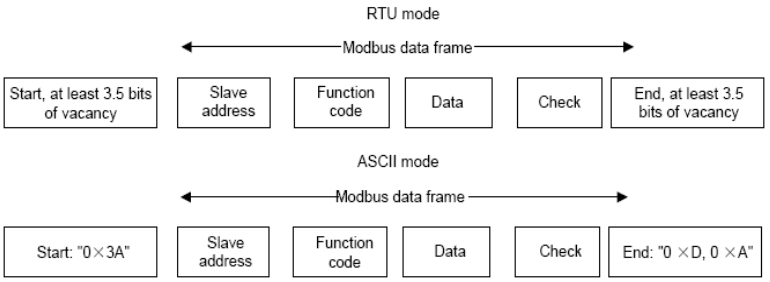
(1) The protocol is Modbus protocol. Besides the common register Read/Write operation, it is supplemented with commands of parameters management.

(2) The drive is a slave in the network. It communicates in 'point to point' master-slave mode. It will not respond to the command sent by the master via broadcast address.

(3) In the case of multi-drive communication or long-distance transmission, connecting a 100~120Ω resistor in parallel with the master signal line will help to enhance the immunity to interference.

10.3 Protocol Format

Modbus protocol supports both RTU and ASCII mode. The frame format is illustrated as follows:



Modbus adopts "Big Endian" representation for data frame. This means that when a numerical quantity larger than a byte is transmitted, the most significant byte is sent first.

RTU mode

In RTU mode, the Modbus minimum idle time between frames should be no less than 3.5 bytes. The checksum adopts CRC-16 method. All data except checksum itself sent will be counted into the calculation. Please refer to section: CRC Check for more information. Note that at least 3.5 bytes of Modbus idle time should be kept and the start and end idle time need not be summed up to it.

The table below shows the data frame of reading parameter 002 from slave node address 1.

Node addr.	Command	Data addr.		Read No.		CRC	
0x01	0x03	0x00	0x02	0x00	0x01	0x25	0xCA

The table below shows the reply frame from slave node address 1.

Node addr.	Command	Bytes No.	Data		CRC	
0x01	0x03	0x02	0x00	0x00	0xB8	0x44

ASCII mode

In ASCII mode, the frame head is “0x3A”, and default frame tail is “0x0D” or “0x0A”. The frame tail can also be configured by users. Except frame head and tail, other bytes will be sent as two ASCII characters, first sending higher nibble and then lower nibble. The data have 7/8 bits. “A”~“F” corresponds to the ASCII code of respective capital letter. LRC check is used. LRC is calculated by adding all the successive bytes of the message except the head and tail, discarding any carriers, and then two’s complementing the result.

Example of Modbus data frame in ASCII mode:

The command frame of writing 0x0003 into address “0x1000” of slave node address 1 is shown in the table below:

LRC checksum = the complement of (01+06+10+00+0x00+0x03) = 0xE5

	Frame head	Node addr.		Command		Data addr.			
Code		0	1	0	6	1	0	0	0
ASCII	3A	30	31	30	36	31	30	30	30

Data to write				LRC		Frame tail	
0	0	0	3	E	5	CR	LF
30	30	30	33	45	35	0D	0A

10.4 Protocol function

Different respond delay can be set through drive’s parameters to adapt to different needs. For RTU mode, the respond delay should be no less than 3.5 bytes interval, and for ASCII mode, no less than 1ms.

The main function of Modbus is to read and write parameters. The Modbus protocol supports the following commands:

0x03	Read inverter’s function parameter and status parameters
0x06	Write single function parameter or command parameter to inverter

All drive’s function parameters, control and status parameters are mapped to Modbus

R/W data address.

The data address of control and status parameters please refer to the following table.

Parameter Description	Address	Meaning of value	R/W Feature
Control command	1000H	0001H: Up running	W/R
		0002H: Down running	
		0003H: Up running overhaul	
		0004H: Down running overhaul	
		0005H: Stop	
		0006H: Coast to stop	
		0007H: Reset fault	
		0008H: overhauling ceased	
Inverter status	1001H	0001H: Up running	R
		0002H: Down running	
		0003H: Standby	
		0004H: Fault	
Communication setting	2000H	Communication Setting Range (-10000~10000) Note: the communication setting is the percentage of the relative value (-100.00%~100.00%). If it is set as frequency source, the value is the percentage of the maximum frequency (P0.04).	W/R
Virtual terminal input function setting	2001H	Reserved	W/R
Status parameters	3000H	Output speed	R
	3001H	Reference speed	R
	3002H	DC Bus voltage	R
	3003H	Output voltage	R
	3004H	Output current	R
	3005H	Running frequency	R
	3006H	Rotation speed	R
	3007H	Output power	R

Parameter Description	Address	Meaning of value	R/W Feature
	3008H	Output torque	R
	3009H	Input terminal status	R
	300AH	Output terminal status.	R
	300BH	Input of AI1	R
	300CH	Input of AI2	R
	300DH	Torque compensation	R
	300EH	Pole position	R
	300FH ~ 3014H	Reserved	R
	3015H	Torque direction (0: forward, 1: reverse)	R
	3016H	Device code	R
Parameter lock password check address	4000H	****	R
Parameter lock password command address	4001H	55AAH	R
Fault info address	5000H	This address stores the fault type of inverter. The meaning of each value is same as P7.15.	R

The above shows the format of the frame. Now we will introduce the Modbus command and data structure in details, which is called protocol data unit for simplicity. Also MSB stands for the most significant byte and LSB stands for the least significant byte for the same reason. The description below is data format in RTU mode. The length of data unit in ASCII mode should be doubled.

Protocol data unit format of reading parameters:

Request format:

Protocol data unit	Data length(bytes)	Range
Command	1	0x03
Data Address	2	0~0xFFFF
Read number	2	0x0001~0x0010

Reply format (success):

Protocol data unit	Data length(bytes)	Range
Command	1	0x03
Returned byte number	2	2* Read number
Content	2* Read number	

If the command is reading the type of inverter (data address 0x3016), the content value in reply message is the device code:

The high 8 bit of device code is the type of the inverter, and the low 8 bit of device code is the sub type of inverter.

For details, please refer to the following table:

High byte	Meaning	Low byte	Meaning
00	CHV	01	Universal type
		02	For water supply
		03	Middle frequency 1500HZ
		04	Middle frequency 3000HZ
01	CHE	01	Universal type
		02	Middle frequency 1500HZ
02	CHF	01	Universal type

If the operation fails, the inverter will reply a message formed by failure command and error code. The failure command is (Command＋0x80). The error code indicates the reason of the error; see the table below.

Value	Name	Mean
01H	Illegal command	The command from master can not be executed. The reason maybe: 1. This command is only for new version and this version can not realize. 2. Slave is in fault status and can not execute it.
02H	Illegal data address.	Some of the operation addresses are invalid or not allowed to access.
03H	Illegal value	When there are invalid data in the message framed received by slave. Note: This error code does not indicate the data value to write exceed the range, but indicate the message frame is a illegal frame.
06H	Slave busy	Inverter is busy(EEPROM is storing)
10H	Password	The password written to the password check address is not

Value	Name	Mean
	error	same as the password set by P7.00.
11H	Check error	The CRC (RTU mode) or LRC (ASCII mode) check not passed.
12H	Written not allowed.	It only happen in write command, the reason maybe: 1. The data to write exceed the range of according parameter. 2. The parameter should not be modified now. 3. The terminal has already been used.
13H	System locked	When password protection take effect and user does not unlock it, write/read the function parameter will return this error.

Protocol data unit format of writing single parameter:

Request format:

Protocol data unit	Data length(bytes)	Range
Command	1	0x06
Data Address	2	0~0xFFFF
Write Content	2	0~0xFFFF

Reply format (success):

Protocol data unit	Data length(bytes)	Range
Command	1	0x06
Data Address	2	0~0xFFFF
Write Content	2	0~0xFFFF

If the operation fails, the inverter will reply a message formed by failure command and error code. The failure command is (Command＋0x80). The error code indicates the reason of the error; see table 1.

10.5 Note:

10.5.1 Between frames, the span should not less than 3.5 bytes interval, otherwise, the message will be discarded.

10.5.2 Be cautious to modify the parameters of PC group through communication, otherwise may cause the communication interrupted.

10.5.3 In the same frame, if the span between two .near bytes more than 1.5 bytes interval, the behind bytes will be assumed as the start of next message so that communication will failure.

10.6 CRC Check

For higher speed, CRC-16 uses tables. The following are C language source code for CRC-16.

```
unsigned int crc_cal_value(unsigned char *data_value,unsigned char data_length)
{
int i;
unsigned int crc_value=0xffff;
while(data_length--)
{    crc_value^=*data_value++;
            for(i=0;i<8;i++)
            {
if(crc_value&0x0001)crc_value=(crc_value>>1)^0xa001;
            else crc_value=crc_value>>1;
            }       }
return(crc_value);
}
```

10.7 Example

10.7.1 RTU mode, read 2 data from 0004H

The request command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	03H
High byte of start address	00H
Low byte of start address	04H
High byte of data number	00H
Low byte of data number	02H
Low byte of CRC	85H
High byte of CRC	CAH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The reply is :

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	03H
Returned byte number	04H

Higher byte of 0004H	13H
Low byte of 0004H	88H
High byte of 0005H	05H
Low byte of 0005H	DCH
Low byte of CRC	7CH
High byte of CRC	54H
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

10.7.2 ASCII mode, read 2 data from 0004H:

The request command is:

START	':'
Node address	'0'
	'1'
Command	'0'
	'3'
High byte of start address	'0'
	'0'
Low byte of start address	'0'
	'4'
High byte of data number	'0'
	'0'
Low byte of data number	'0'
	'2'
LRC CHK Hi	'F'
LRC CHK Lo	'6'
END Lo	CR
END Hi	LF

The reply is

START	':'
Node address	'0'
	'1'
Command	'0'
	'3'
Returned byte number	'0'
	'4'

Higher byte of 0004H	'1'
	'3'
Low byte of 0004H	'8'
	'8'
High byte of 0005H	'0'
	'5'
Low byte of 0005H	'D'
	'C'
LRC CHK Lo	'7'
LRC CHK Hi	'C'
END Lo	CR
END Hi	LF

10.7.3 RTU mode, write 5000(1388H) into address 0008H, slave node address 02.

The request command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	02H
Command	06H
High byte of data address	00H
Low byte of data address	04H
High byte of write content	13H
Low byte of write content	88H
Low byte of CRC	C5H
High byte of CRC	6EH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The reply command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	02H
Command	06H
High byte of data address	00H
Low byte of data address	04H
High byte of write content	13H
Low byte of write content	88H
Low byte of CRC	C5H
High byte of CRC	6EH

END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

10.7.4 ASCII mode, write 5000(1388H) into address 0008H, slave node address 02.

The request command is:

START	':'
Node address	'0'
	'2'
Command	'0'
	'6'
High byte of data address	'0'
	'0'
Low byte of data address	'0'
	'4'
High byte of write content	'1'
	'3'
Low byte of write content	'8'
	'8'
LRC CHK Hi	'5'
LRC CHK Lo	'9'
END Lo	CR
END Hi	LF

The reply command is:

START	':'
Node address	'0'
	'2'
Command	'0'
	'6'
High byte of data address	'0'
	'0'
Low byte of data address	'0'
	'4'
High byte of write content	'1'
	'3'
Low byte of write content	'8'

	'8'
LRC CHK Hi	'5'
LRC CHK Lo	'9'
END Hi	CR
END Lo	LF

10.7.5 Command code 08H(0000 1000) for diagnosis

Sub-function Code	Description
0000	Return to inquire information data

For example: The inquiry information string is same as the response information string when the loop detection to address 01H of driver is carried out.

The RTU request command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	08H
High byte of sub-function code	00H
Low byte of sub-function code	00H
High byte of data content	12H
Low byte of data content	ABH
Low byte of CRC	ADH
High byte of CRC	14H
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The RTU reply command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	08H
High byte of sub-function code	00H
Low byte of sub-function code	00H
High byte of data content	12H
Low byte of data content	ABH
Low byte of CRC	ADH
High byte of CRC	14H
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The ASCII request command is:

START	':'

Node address	‘0’
	‘1’
Command	‘0’
	‘8’
High byte of sub-function code	‘0’
	‘0’
Low byte of sub-function code	‘0’
	‘0’
High byte of data content	‘1’
	‘2’
Low byte of data content	‘A’
	‘B’
LRC CHK Hi	‘3’
LRC CHK Lo	‘A’
END Hi	CR
END Lo	LF

The ASCII reply command is:

START	‘:’
Node address	‘0’
	‘1’
Command	‘0’
	‘8’
High byte of sub-function code	‘0’
	‘0’
Low byte of sub-function code	‘0’
	‘0’
High byte of data content	‘1’
	‘2’
Low byte of data content	‘A’
	‘B’
LRC CHK Hi	‘3’
LRC CHK Lo	‘A’
END Hi	CR
END Lo	LF

APPENDIX A: THE SELECTION GUIDE OF CHV180

A.1 Runing and Adjusting Parameter

After adjusting application parameters, you must check all parameters according to function requirement, especially the parameters that are interrelated to peripheral wiring of inverter, such as operation mode, control mode, setting of programmable input/output and selecting of feedback quantity, you must check these paramters, and then debug system runing.Debug runing is composed of motor parameters autotuning, overhaul runing, S-curve adjusting of good runing, comfortable adjusting of elevator on-off and precision adjusting of elevator flat bed.

A.1.1 Motor parameters autotuning

Before beginning to debug elevator, we suggest that user should carry out tractor parameters autotuning. During autotuning, the motor should be unloaded, the keypad control mode is selected (P0.01=0),and carry out parameter autotuning according to the description of P0.08.

Notice: It is different between the motor parameters autotuning of synchronous motor and asynchronous motor.

A.1.2 Overhaul runing

Overhaul runing is used to judge whether the elevator is in good runing.

During overhaul runing, we should pay attention to whether actual runing direction of elevator is in accordance with instruction direction, if they are inconsistent, we can change any two wirings of the output terminal (U,V,W), or adjust P0.06 to be 1.

Notice: Because parameter autotuning is needed again after changing the motor wiring for synchronous motor,so we suggest that user should adjust P0.06 to change elevator runing direction.

A.1.3 S-curve adjusting

Before runing, we should verify that whether the control logic and wiring are right. If they are right,and then we can carry out the adjusting of S-curve. We can refer the description of P1.08~P1.15.

A.1.4 Comfortable adjusting of elevator on-off

We set the following parameters to change the comfortable of elevator starting: P1.14 (starting speed), P1.15 (holding time of starting speed), P1.08 (starting quadric acceleration), P1.09 (starting acceleration), P3.00 and P3.01 (PI parameter of low speed), P8.06 (contracting brake open delay time). If you have used a weighing

equipment of analog quantity, you need to adjust pre-torque compensation of starting moment.Please refer to each function code to carry out adjusting.

We set the following parameters to change the comfortable of elevator stopping: P1.12 (stopping quadric decceleration), P1.13 (stopping decceleration), P3.00 and P3.01 (PI parameter of low speed), P8.06 (contracting brake close delay time).

A.1.5 Accuracy adjusting of elevator flat floor

When error of flat floor on every floor is not the same,adjust each position of flashboard to keep the same errors on every floor,then we can adjust creeping speed of elevator(setted by multi-step speed) and P1.12 (stopping quadric deceleration).

A.2 Elevator Runing Mode

There are two runing modes for CHV180, Multi-step speed and analog quantity speed. In fact, the Multi-step speed is the main way.

A.2.1 Multi-step speed mode(Contracting brake and contactor are controled by inverter)

Multi-step Speed mode is that the speed command can be selected by external multi-step terminals. As in the following project of elevator control: contracting brake and contrator are controled by inverter.Examining contracting brake, feedback signal of contractor and overhaul command are controled by input terminal (EXM). Run speed is given by MS1~MS3, and setted by analog quantity of weighing equipment.

Wiring diagram is as follows:

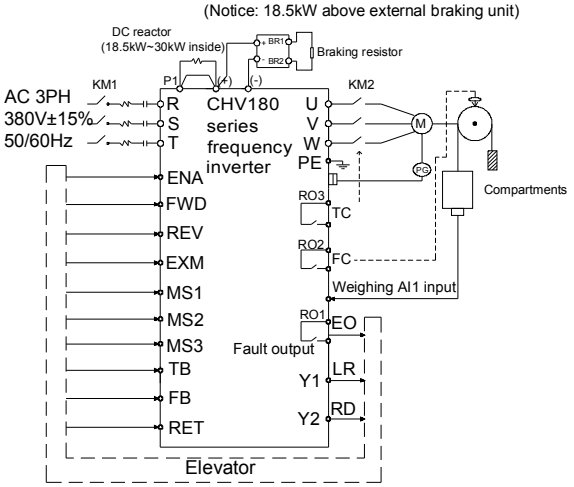


Figure A.1 Wiring principles for Multi-step speed control.

Sequence chart of running is as follows:

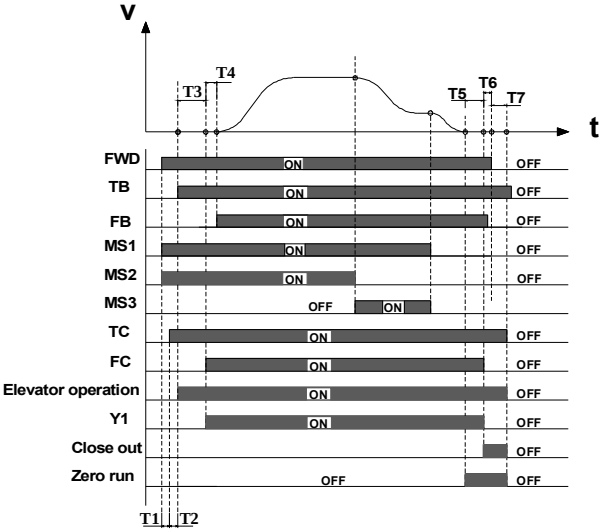


Figure A.2 Sequence chart of running for Multi-step speed control.

The meanings of T1~T7 are as follows:

Symbol	Meanings
T1	The time is the system delay time from inverter received running signal to output pull in command of contactor.
T2	The time is the wait delay time form inverter output contactor pull in command to receive contactor feedback signal.
T3	P8.06（Contacting brake close delay time）
T4	The time is the wait delay time form inverter brake-releasing output command to receive contracting brake feedback signal.
T5	P8.05（Contacting brake open delay time）
T6	The time is the wait delay time from inverter output closed-brake command to receive stopping command of external control.
T7	P8.20（Inverter stop delay time）

The description of sequence chart:

l After inverter receive the running command (FWD) and running speed command (MS1~MS3), delay the time of T1, the inverter output contactor pull in control

command (TC).

- After T2, when the inverter check the pull-in signal of contactor (TB), the inverter is running at 0 speed,and output Y1 at the same time. After T3, the inverter output contactor brake close signal (FC).
- After T4, the inverter checked the feedback signal of contracting brake, after affirming it is open completely, the inverter is accelerated running with S-curve.
- After the speed command (MS1~MS3) is cut off, the inverter is decelerated stopping with S-curve. When the speed reaches P8.13 (Stop contracting brake frequency),the inverter output the brake open command(FC) after T5 for cutting off running command.
- After T6, when it receives the stop command, and after T7, the inverter is stop, at the same time the inverter output cutting contactor command(TC) and stop signal of elevator. At this time, one operation cycle is over.

Notice:

Detailed functions of multi-step speed mode are as follows: The logics are the same with controlling contactor and brake signal, controller can control the brake with elevator running 1(LR1) and holding-brake output.

Detailed functions of multi-step speed mode are as follows:

Function Code	Name	Recommendation setting	Remark
P0.00	Speed control mode	1	Vector control with PG
P0.01	Run command source	1	Terminal control
P0.02	Rated speed of elevator	1.500m/s	User setting
P0.03	Speed command source	3	Multi-step Speed
P0.04	Maximum output frequence	50.00Hz	User setting
P1.00	Multi-step Speed 0	0	Setting parameters according to user's needs, and Multi-step speed 0 is set to be 0m/s
P1.01	Multi-step Speed 1	Re-flatlayer speed	
P1.02	Multi-step Speed 2	Creeping speed	
P1.03	Multi-step Speed 3	Urgency speed	
P1.04	Multi-step Speed 4	Reserved	
P1.05	Multi-step Speed 5	Normal low speed	

Function Code	Name	Recommendation setting	Remark
P1.06	Multi-step Speed 6	Normal high speed 1	
P1.07	Multi-step Speed 7	Normal high speed 2	
P1.08	Start quadratic acceleration	0.350m/s^3	Set by on-site debugging
P1.09	Start acceleration	0.700m/s^2	
P1.10	Speed-down quadratic deceleration	0.350m/s^3	
P1.11	Deceleration	0.700m/s^2	
P1.12	Stop quadratic deceleration	0.350m/s^3	
P1.13	Stop deceleration	0.700m/s^2	
P1.14	Start speed	0.000m/s	
P1.15	Start speed holding time	0.0s	
P1.16	Overhaul running speed	0.300m/s	
P1.17	Overhaul running acceleration	1.000 m/s^2	
P1.18	Overhaul running deceleration	1.000 m/s^2	
P2.00	Motor type selection	Affirm the type of motor	Set by tractor nameplate
P2.01	Tractive roller diameter	Tractor nameplate	
P2.02	Reduction ratio	Tractor nameplate	
P2.03	Suspension ratio	Tractor nameplate	
P2.04	Motor rated power	Tractor nameplate	
P2.05	Motor rated frequence	Tractor nameplate	
P2.06	Motor rated speed	Tractor nameplate	
P2.07	Motor rated voltage	Tractor nameplate	

Function Code	Name	Recommendation setting	Remark
P2.08	Motor rated current	Tractor nameplate	
P3 group	Vector control	Recommendation setting	Set by running effect
P4.00	Encoder type source	Affirm the type of encoder	Set by encoder
P4.01	Number of pulse of encoder		
P4.02	Encoder direction	0	Set by result of debugging
P5.02	S1 terminal function	1	Up run（FWD）
P5.03	S2 terminal function	2	Down run（REV）
P5.04	S3 terminal function	8	Multi-step Speed reference 1（MS1）
P5.05	S4 terminal function	9	Multi-step Speed reference 2（MS2）
P5.06	S5 terminal function	3	Overhaul run（EXM）
P5.07	S6 terminal function	19	Inverter enable（ENA）
P5.08	S7 terminal function	10	Multi-step Speed reference 3（MS3）
P5.09	S8 terminal function	17	Contractor feedback （TB）
P5.10	S9 terminal function	18	Contracting brake feedback（FB）
P5.11	S10 terminal function	6	Fault reset（RET）
P6.04	Relay 1 output	4	Fault output（EO）
P6.05	Relay 2 output	7	Contracting brake control（FC）
P6.06	Relay 3 output	8	Relay control（TC）
P8.04	Brake and contactor control selection	3	Inverter control contracting brake and contactor
P8.05	Brake close delay time	0.0s	
P8.06	Brake open delay time	0.0s	

Function Code	Name	Recommendation setting	Remark
P8.11	Brake feedback check time	2.0	Set by on-site debugging
P8.12	Relay feedback check time	2.0	
P8.13		0.00Hz	
P8.20	Delay time of stopping	0.0	

Notice: If the inverter is running with multi-step speed, the Multi-step Speed 0 must be set to be 0.

A.2.2 Analog quantity speed tracking running mode

The mode is that speed command is given by analog quantity, and the inverter only runs with the analog quantity signal,and the running curve of elevator is decided by analog quantity variation curve generated by external controller.The inverter is only responsible for driving the tractor.The input channel of analog quantity tracking running must select AI1.

The wiring diagram of analog quantity speed mode is as follow:

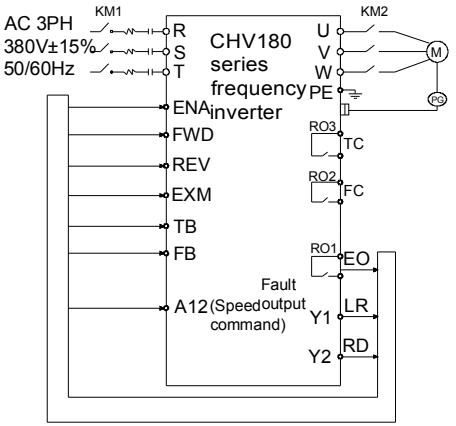


Figure A.3 Wiring diagram of analog quantity mode.

The time sequence:

The running time sequence is the same as Multi-step Speed's on the whole. For detailed description, please refer to Figure A.2.

Function Code	Name	Recommendation setting	Remark
P0.00	Speed control mode	1	Vector control with PG
P0.01	Run command source	1	Terminal control
P0.02	Rating speed of elevator	1.500m/s	User setting
P0.03	Speed command source	2	AI2
P0.04	Maximum frequence	50.00Hz	User setting
P1.16	Overhaul run speed	0.300m/s	
P1.17	Overhaul run acceleration	1.000 m/s^2	
P1.18	Overhaul run deceleration	1.000 m/s^2	
P2.00	Motor type source	Affirm the type of motor	
P2.01	Tractive roller diameter	Tractor nameplate	
P2.02	Reduction ratio	Tractor nameplate	
P2.03	Suspension ratio	Tractor nameplate	
P2.04	Motor rated power	Tractor nameplate	
P2.05	Motor rated frequence	Tractor nameplate	
P2.06	Motor rated speed	Tractor nameplate	
P2.07	Motor rated voltage	Tractor nameplate	
P2.08	Motor rated current	Tractor nameplate	
P3 group	Vector control	Recommendation setting	Set by running effect
P4.00	Encoder type source	Affirm the type of encoder	Set by encoder
P4.01	Number of encoder pulse		
P4.02	Encoder direction	0	Set by result of debugging
P5.02	S1 terminal function	1	Up run（FWD）
P5.03	S2 terminal function	2	Down run（REV）
P5.04	S3 terminal function	3	Overhaul run（EXM）
P5.05	S4 terminal function	19	Inverter enable（ENA）

Function Code	Name	Recommendation setting	Remark
P5.06	S5 terminal function	10	Multi-step Speed reference 3（MS3）
P5.07	S6 terminal function	17	Relay feedback（TB）
P5.08	S7 terminal function	18	Fault reset（RET）
P6.04	Relay 1 output	4	Fault output（EO）
P6.05	Relay 2 output	7	Contracting brake control（FC）
P6.06	Relay 3 output	8	Contactor control（TC）
P8.03	Trig side plus	1.000	
P8.04	Brake and contactor control selection	3	Inverter control contracting brake and contactor
P8.05	Brake close delay time	0.0s	Set by on-site debugging
P8.06	Brake open delay time	0.0s	
P8.11	Brake feedback check time	2.0	
P8.12	Contactor feedback check time	2.0	
P8.13	Stop contracting brake frequency	0.00Hz	
P8.20	Delay time of stopping	0.0	

Notice:

1) The s-curve of inner inverter is invalid with analog quantity speed tracking running mode.The run s-curve of elevator is generated by external controller. The adjustment of P5.17 or P5.22 will influence the input sensitivity of analog quantity.

2) If the change rate of analog quantity is too large,the mutation of running frequency which may cause the over-current or over-voltage may be caused.

A.2.3 Overhaul running

The wiring diagram of overhaul run mode is as follow:

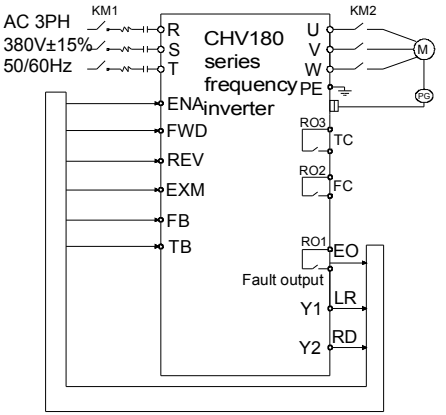


Figure A.4 Wiring diagram of overhaul run mode.

Sequence chart of overhaul running is as follows:

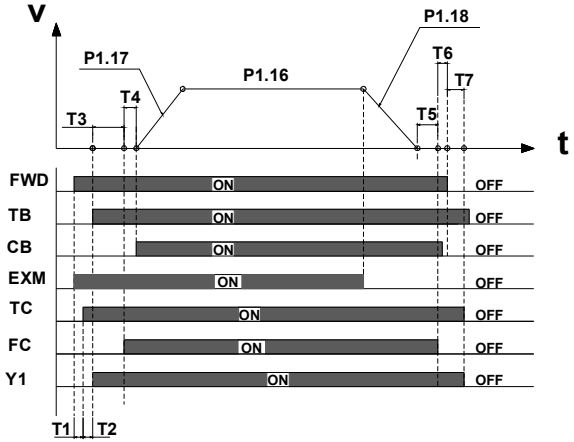


Figure A.5 Sequence chart of overhaul running.

The meanings of T1~T7 are as follows:

Sign	Meanings
T1	The time is the system delay time from inverter received running signal to output pull in command of contactor.
T2	The time is the wait delay time from inverter output contactor pull in command to receive contactor feedback signal.
T3	P8.06（Contacting brake close delay time）

Sign	Meanings
T4	The time is the wait delay time form inverter brake-releasing output command to receive contracting brake feedback signal.
T5	P8.05（Contacting brake open delay time）
T6	The time is the wait delay time from inverter output closed-brake command to receive stopping command of external control.
T7	P8.20（Inverter stop delay time）

- After inverter receive the running command (FWD) and running speed command (MS1~MS3), delay the time of T1, the inverter output contactor pull in ontrol command (TC).
- After T2, when the inverter check the pull-in signal of contactor (TB), the inverter is running at 0 speed,and output Y1 at the same time. After T3, the inverter output contactor brake close signal (FC).
- After T4, the inverter checked the feedback signal of contracting brake, after affirming it is open completely,the inverter is accelerated running with overhaul run acceleration (P1.17) to reach overhaul running speed(P1.16),and then run in a constant speed.
- After the overhaul command (EXM) is cut off, the inverter is decelerated stopping with overhaul run deceleration (P1.18). When the speed reaches P8.13,the inverter output the brake open command(FC), after T5 for cutting off running command.
- After T6, when it receives the stop command, and after T7, the inverter is stop, at the same time the inverter output cutting contactor command(TC) and stop signal of elevator(Y1). At this time, one operation cycle is over.

A.2.4 Emergency running

The wiring diagram of emergency run is as follows:

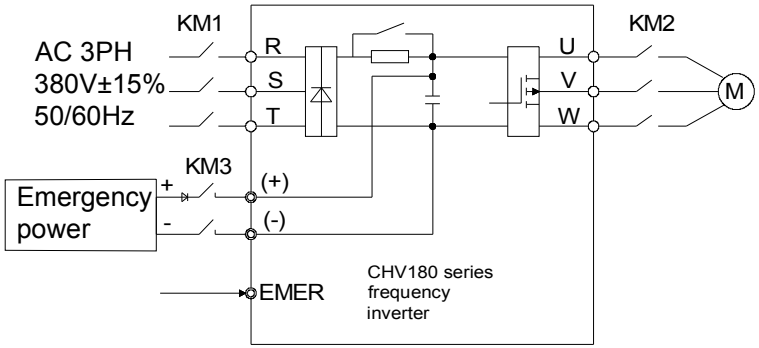


Figure A.6 Wiring diagram of emergency running.

Definition of terminal is as follow:

Terminal sign	Meanings
EMER	Emergency run
FWD	Up running elevator
REV	Down running elevator
(+)、(-)	DC bus voltage terminals of inverter
KM	Control contactor of main power
KM3	Control contactor of emergency power

Sequence chart of emergency running is as follows:

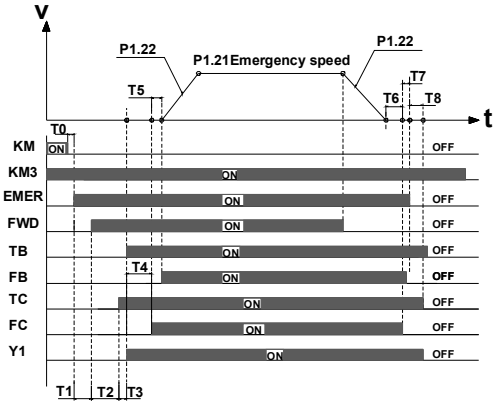


Figure A.7 Sequence chart of emergency run.

The meanings of T0~T8 are as follows:

Symbol	Description
T0	The time is the delay time from the main power is off to the switch of emergency power is on
T1	The time is the delay time from the controller output emergency command to output run command
T2	The time is the system delay time from inverter received running signal to output pull in command of contactor.
T3	The time is the wait delay time form inverter output contactor pull in command to receive contactor feedback signal.
T4	P8.06（Contacting brake close delay time）
T5	The time is the wait delay time form inverter brake-releasing output command to receive contracting brake feedback signal.
T6	P8.05（Contacting brake open delay time）
T7	The time is the wait delay time from inverter output closed-brake command to receive stopping command of external control.
T8	P8.20（Inverter stop delay time）

- When the main power is power-off, the controller cut off main power relay (KM1), after T0, the control switch(KM3) of emergency power will be closed, and output emergency command at the same time , after T1, the inverter receive running command from controller, then after the system time of T2, the inverter output pull in command of contactor.
- After T3, the inverter detect pull in signal (TB) of contactor, then the inverter start to run with zero speed, at the same time output running signal (Y1). After T4, the inverter output brake closed signal (FC).
- After T5, the inverter detect brake feedback signal(FB), after affirming the brake is open completely ,the inverter accelerate with emergency acceleration (P1.22) reach to emergency speed (P1.21), and then run in a constant speed.
- When elevator run to flat floor,the controller will cut off emergency command (EMER), and the inverter begin to decelerate to stop with emergency deceleration (P1.22), when decelerate to P8.13, after T6, the inverter output brake open command (FC), and the controller cut off running command.
- After T7, the inverter receive stop command, and then after the delay time of T8, the inverter stop, and ouput releasing command (TC) of contactor and stop signal (Y1) of elevator. At this time, one operation cycle is over.

APPENDIX B : RELATIVE DIMENSION OF INVERTER

B.1 External Dimension

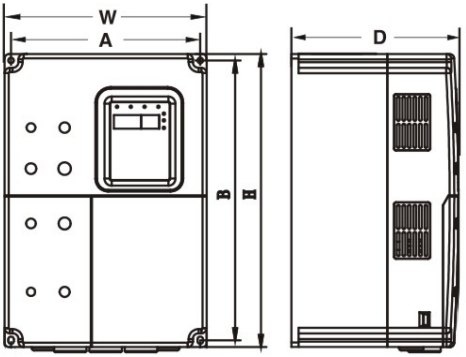


Figure B.1Dimensions (15kW and below).

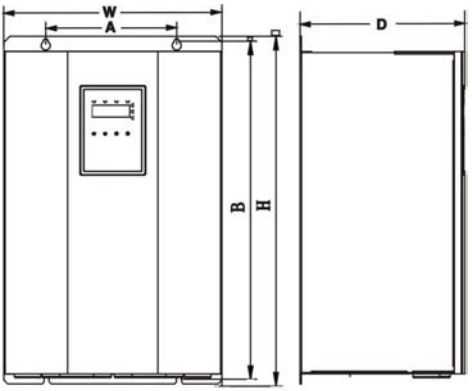
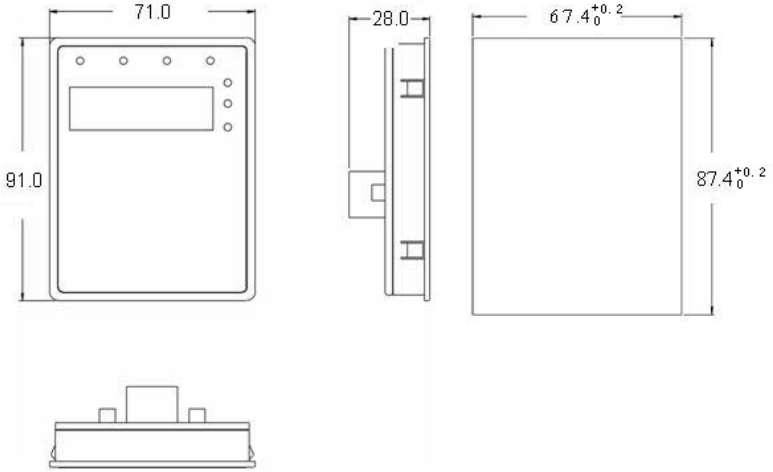


Figure B.2 Dimensions (18.5~30kW).

Power (kW)	Size	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Installation Hole (mm)
		Installation Dimension		External Dimension			
4.0~5.5	C	147.5	237.5	250	160	175	5
7.5~15	D	206	305.5	320	220	180	6
18.5~30	E	176	454.5	467	290	215	6.5

B.2 Dimensions of External Keypad



FigureB.3 Dimension of small keypad.

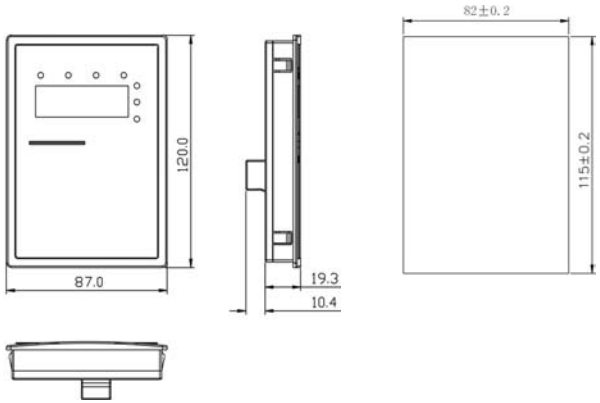


Figure B.4 Dimension of big keypad.

B.3 Installation Space

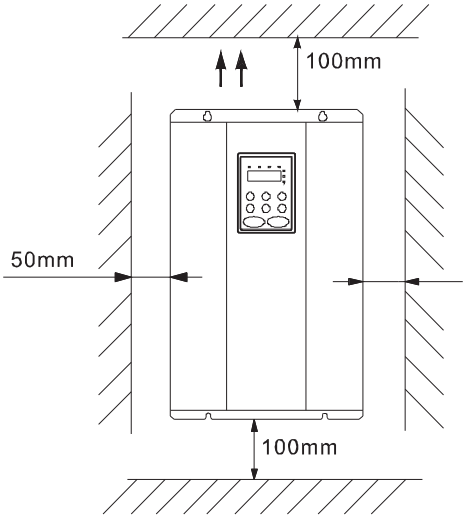


Figure B.5 Safety space.

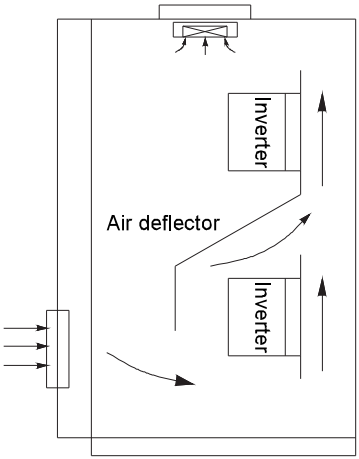


Figure B.6 Installation of multiple inverters.

Notice: Add the air deflector when apply the up-down installation.

B.4 Disassembly

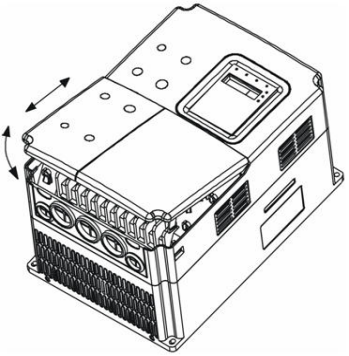
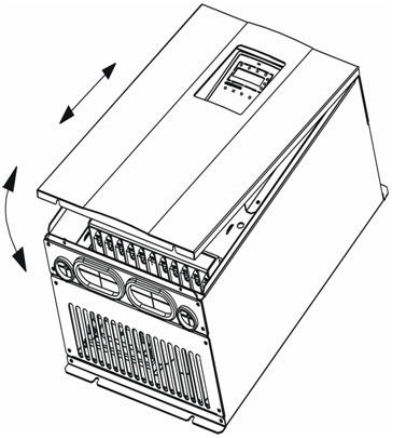


Figure B.7 Disassembly of plastic cover.



FigureB.8 Disassembly of metal plate cover.

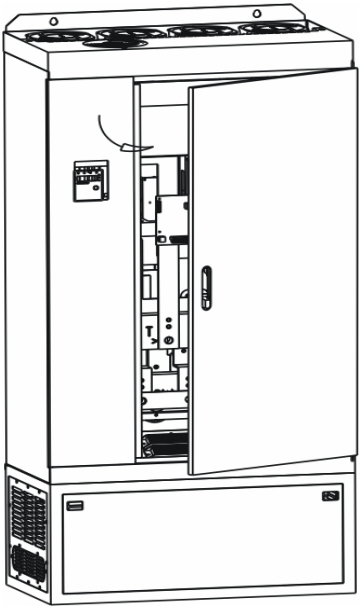


Figure B.9 Open inverter cabinet.

APPENDIX C: SPECIFICATIONS OF ACCESSORIES

C.1 Specifications of Breaker, Cable, Contactor and Reactor

C.1.1 Specifications of breaker, cable and contactor

Model No.	Circuit breaker (A)	Input/output cable (mm^2) (Coppery wire)	Rated current of contactor (A) (380V)
CHV180-004G-4	25	4	16
CHV180-5R5G-4	25	4	16
CHV180-7R5G-4	40	6	25
CHV180-011G-4	63	6	32
CHV180-015G-4	63	6	50
CHV180-018G-4	100	10	63
CHV180-022G-4	100	16	80
CHV180-030G-4	125	25	95

C1.2 Specifications of AC input/output and DC reactor

Model No.	AC Input reactor		AC Output reactor		DC reactor	
	Current (A)	Inductance (mH)	Current (A)	Inductance (mH)	Current (A)	Inductance (mH)
3AC 380V ±15%						
CHV180-004G-4	10	1.5	10	0.6	12	6.3
CHV180-5R5G-4	15	1.0	15	0.25	23	3.6
CHV180-7R5G-4	20	0.75	20	0.13	23	3.6
CHV180-011G-4	30	0.60	30	0.087	33	2
CHV180-015G-4	40	0.42	40	0.066	33	2
CHV180-018G-4	50	0.35	50	0.052	40	1.3
CHV180-022G-4	60	0.28	60	0.045	50	1.08
CHV180-030G-4	80	0.19	80	0.032	65	0.80

C.1.3 Specification of input filter and output filter

Inverter capacity (kW)	Input filter model	Output filter model
CHV180-004G-4	NFI-010	NFO-010
CHV180-5R5G-4	NFI-020	NFO-020
CHV180-7R5G-4	NFI-020	NFO-020

Inverter capacity (kW)	Input filter model	Output filter model
CHV180-011G-4	NFI-036	NFO-036
CHV180-015G-4	NFI-036	NFO-036
CHV180-018G-4	NFI-050	NFO-050
CHV180-022G-4	NFI-050	NFO-050
CHV180-030G-4	NFI-065	NFO-065

4.4.4 Specification of braking unit and braking resistor

Model No.	Braking unit		Braking resistor (100% braking torque)	
	Order No.	Quantity	Specification	Quantity
3AC 380V ±15%				
CHV180-004G-4	Build-in	1	150Ω/390W	1
CHV180-5R5G-4			100Ω/520W	1
CHV180-7R5G-4			50Ω/1040W	1
CHV180-011G-4				
CHV180-015G-4			40Ω/1560W	1
CHV180-018G-4	DBU-055-4	1	20Ω/6000W	1
CHV180-022G-4				
CHV180-030G-4				

Model No.	Braking unit		Braking resistor (100% braking torque)	
	Order No.	Specification	Resistance	Braking power
3AC 380V ±15%				
CHV180-004G-4	Build-in	1	122Ω	1200W
CHV180-5R5G-4		1	65Ω	1600W
CHV180-7R5G-4		1	50Ω	1600W
CHV180-011G-4		1	40Ω	4800W
CHV180-015G-4		1	32Ω	4800W
CHV180-018G-4	DBU-055-4	1	28Ω	6000W
CHV180-022G-4		1	20Ω	9600W
CHV180-030G-4		1	16Ω	9600W

Notice:

1. Above selection is based on following condition: 700V DC braking voltage threshold, 100% braking torque and 10% usage rate. If larger braking torque is needed,please decrease the resistance and increase the power of braking resistor .

2. Parallel connection of braking unit is helpful to improve braking capability.

3. Wire between inverter and braking unit should be less than 5m.

4. Wire between braking unit and braking resistor should be less than 10m.

5. Braking unit can be used for braking continuously for 5 minutes. When braking unit is working, temperature of cabinet will be high, user is not allowed to touch to prevent from injure.

2. When the usage rate is more than 20%,the power of braking resistor should be increased properly as required.

3. At the situation of DBU is used, please refer to related documents and set the parameter correctly especially for the braking voltage , if it not correctly, then the inverter can not work as normal .

For more details, please refer to DBU and RBU user manual.

APPENDIX D FUNCTON PARAMETERS

Notice:

- **PE group is factory reserved, users are forbidden to access these parameters.**
- **The column "Modify" determines the parameter can be modified or not.**
  "○" indicates that this parameter can be modified all the time.
  "◎"indicates that this parameter cannot be modified during the inverter is running.
  "●" indicates that this parameter is read only.
- **"Factory Setting" indicates the value of each parameter while restoring the factory parameters, but those detected parameters or record values cannot be restored.**

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P0 Group: Basic Function					
P0.00	Speed control mode	0:Sensorless vector control 1:Vector control With PG 2:V/F control	1	◎	CONTROL MODE
P0.01	Run command source	0: Keypad 1: Terminal 2: Communication	1	◎	RUN COMMAND
P0.02	Elevator rating speed	0.100~4.00m/s	1.500m/s	◎	RATING SPEED
P0.03	Speed command source	0: Keypad 1: AI1 2. AI2 3: Multi-Step speed 4: Communication 5. AI1 tracking running	3	◎	SPEED SOURCE
P0.04	Maximum frequency	10.0~400.00Hz	50.00Hz	◎	MAX FREQ
P0.05	Keypad reference speed	0.00 Hz ~ P0.02	1.500m/s	○	KEYPAD REF SPEED

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P0.06	Running direction selection	0: Forward 1: Reverse 2: Forbid reverse	0	◎	RUN DIRECTION
P0.07	Carrier frequency	1.0~16.0kHz	Depend on model	○	CARRIER FREQ
P0.08	Motor parameters autotuning	0: No action 1: Rotation autotuning 2: Static autotuning	0	◎	AUTOTUNING
P0.09	Restore parameters	0: No action 1: Restore factory setting 2: Clear fault records 3:Restore parameters for injection molding machine	0	◎	RESTORE PARA
P0.10 ~P0.11	Reserve function	0~65536	0	◎	RESERVE FUNCTION
P1 Group: Speed curve					
P1.00	Multi-step speed 0	0.000～P0.02	0.000m/s	○	MULTI-STEP SPEED 0
P1.01	Multi-step speed 1	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 1
P1.02	Multi-step speed 2	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 2
P1.03	Multi-step speed 3	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 3
P1.04	Multi-step speed 4	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 4
P1.05	Multi-step speed 5	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 5
P1.06	Multi-step speed 6	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 6

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P1.07	Multi-step speed 7	0.000～P0.02	0.000m/s	◎	MULTI-STEP SPEED 7
P1.08	Start quadric acceleration	0.001～10.000 m/s^3	0.350m/s^3	◎	START QUADRIC ACCEL
P1.09	Start acceleration	0.001～10.000 m/s^2	0.700m/s^2	◎	START ACCEL
P1.10	Speed-down quadric deceleration	0.001～10.000 m/s^3	0.350m/s^3	◎	SPEED-DOWN QUADRIC DECEL
P1.11	Deceleration	0.001～10.000 m/s^2	0.700m/s^2	◎	DECEL
P1.12	Stop quadric deceleration	0.001～10.000 m/s^3	0.350m/s^3	◎	STOP QUADRIC DECEL
P1.13	Stop deceleration	0.001～10.000 m/s^2	0.700m/s^2	◎	STOP DECEL
P1.14	Start speed	0.000～0.250 m/s	0.000m/s	◎	START SPEED
P1.15	Start holding time	0.0～5.0s	0.0s	◎	START HOLDING
P1.16	Overhaul running speed	0.000 m/s～P0.02	0.300m/s	◎	OVERHAUL RUNNING TIME
P1.17	Overhaul running acceleration	0.001～10.000 m/s^2	1.000m/s^2	◎	OVERHAUL RUNNING ACCEL
P1.18	Overhaul running deceleration	0.001～10.000 m/s^2	1.000m/s^2	◎	OVERHAUL RUNNING DECEL
P1.19	Motor autotuning acceleration	0.001～10.000 m/s^2	0.600 m/s^2	◎	MOTOR AUTOTUNING ACCEL
P1.20	Motor autotuning	0.001～10.000 m/s^2	0.600m/s^2	◎	MOTOR

Function Code	Name	Description	Factory Setting	Modify	LCD Display
	deceleration				AUTOTUNING DECEL
P1.21	Emergence running speed	0.000～P0.02 m/s	0.300m/s	◎	EMERGENCE RUNNING ACCEL
P1.22	Emergence running acceleration & deceleration	0.001～10.000 m/s^2	1.000m/s^2	◎	EMERGENCE RUNNING DECEL
P1.23	Forcing slow-down deceleration 1	P1.25～10.000 m/s^2	1.000m/s^2	◎	FORCING SLOW-DOWN DECEL 1
P1.24	Forcing slow-down speed 1 detection	0.0～P1.26	20.0%	◎	FORCING SLOW-DOWN SPEED 1 CHECK
P1.25	Forcing slow-down deceleration 2	P1.27～P1.23 m/s^2	0.900m/s^2	◎	FORCING SLOW-DOWN DECEL 2
P1.26	Forcing slow-down speed 2 detection	P1.24～P1.28	40.0%	◎	FORCING SLOW-DOWN SPEED 2 CHECK
P1.27	Forcing slow-down deceleration 3	0.001～P1.25 m/s^2	0.700m/s^2	◎	FORCING SLOW-DOWN DECEL 3
P1.28	Forcing slow-down speed 3 detection	P1.26～100.0%	80.0%	◎	FORCING SLOW-DOWN SPEED 3 CHECK
P1.29	Stop mode selection	0: Deceleration to stop 1: Coast to stop	1	◎	STOP MODE
P1.30~	Reserve function	0～65535	0	◎	RESERVE

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P1.31					FUNCTION
P2 Group: Motor Parameters					
P2.00	Motor model	0: asynchronous motor 1: synchronous motor	0	◎	INVERTER MODEL
P2.01	Traction motor wheel diameter	100~2000mm	500mm	◎	TRACTION MOTOR WHEEL DIA
P2.02	Reduction ratio	1.00~100.00	30.00	◎	SPEED-DOWN RATE
P2.03	Hoist rope hanging ratio	1~8	1	◎	TOW HANGING RATE
P2.04	Motor rated power	0.4~900.0kW	Depend on model	◎	MOTOR RATE POWER
P2.05	Motor rated frequency	0.01Hz~P0.04	50.00Hz	◎	MOTOR RATE FREQ
P2.06	Motor rated speed	0~36000rpm	1460 rpm	◎	MOTOR RATE SPEED
P2.07	Motor rated voltage	0~460V	380V	◎	MOTOR RATE VOLT
P2.08	Motor rated current	0.1~1000.0A	Depend on model	◎	MOTOR RATE CURR
P2.09	Motor rating power factor	0.05~1.00	0.86	◎	MOTOR RATE POWER FACTOR
P2.10	Motor stator resistance	0.001~65.535Ω	Depend on model	○	STATOR RESISTOR
P2.11	Motor rotor resistance	0.001~65.535Ω	Depend on model	○	ROTOR RESISTOR

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P2.12	Motor leakage inductance	0.1~6553.5mH	Depend on model	○	LEAK INDUCTOR
P2.13	Motor mutual inductance	0.1~6553.5mH	Depend on model	○	MUTUAL INDUCTOR
P2.14	Current without load	0.01~655.35A	Depend on model	○	NO LOAD CURR
P2.15~ P2.16	Reserve function	0～65535	0	◎	RESERVE FUNCTION
P3 Group: Vector Control					
P3.00	ASR low speed roportional gain	0~100	20	○	ASR Kp1
P3.01	ASR low speed integral time	0.01~10.00s	0.50s	○	ASR Ki1
P3.02	Speed inspect low speed filter times	0 ~ 9	3	○	SPEED INSPECT FILTER T1
P3.03	ASR switching point 1	0.00Hz~P3.07	5.00Hz	○	ASR SWITCHPOINT1
P3.04	ASR high speed proportional gain	0~100	25	○	ASR Kp2
P3.05	ASR high speed integral time	0.01~10.00s	1.00s	○	ASR Ki2
P3.06	Speed inspect high speed filter times	0～9	3	○	SPEED INSPECT FILTER T1
P3.07	ASR switching point 2	P3.03~P0.04	10.00Hz	○	ASR SWITCHPOINT2
P3.08	ACR proportional gain P	0~65535	500	○	ACR P
P3.09	ACR integral gain I	0~65535	500	○	ACR I

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P3.10	Slip compensation rate of drive side	50.0~200.0%	100%	○	DRIVE SLIP COMP
P3.11	Slip compensation rate of trig side	50.0~200.0%	100%	○	TRIG SLIP COMP
P3.12	Torque limit	0.0~200.0%(rated current of inverter)	150.0%	○	TORQUE LIMIT
P3.13~ P3.14	Reserve function	0～65535	0	◎	RESERVE FUNCTION
P4 Group: Encoder parameter					
P4.00	Encoder type selection	0: Increment encoder 1: SIN/COS encoder 2: UVM encoder	1	◎	ENCODE TYPR
P4.01	PG parameter	1~65536	1000	◎	TORQUE BOOST
P4.02	PG direction selection	0: forward 1: reverse	0	◎	BOOST CUT-OFF
P4.03	Pole initial position	0.00～360.00	0.00	◎	POLE INITIAL POSITION
P4.04	Thread break detection time of encoder low speed	0.0～100.0s (0.0 means don't detect)	1.0	◎	THREAD BREAK DETECTION T1
P4.05	Thread break detection time of encoder high speed	0.0～100.0s (0.0 means don't detect)	1.0	◎	THREAD BREAK DETECTION T2
P4.06	Reverse detection time of encoder	0.0～100.0s (0.0 means don't detect)	1.0	◎	REVERSE DETECTION TIME
P4.07	Pole position amplitude plus	0.50～1.50	1.00	◎	POLE POSITION AMP PLUS

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P4.08	C phase pole position offset	0～1024	512	◎	C POLE POSITION OFFSET
P4.09	D phase pole position offset	0～1024	512	◎	D POLE POSITION OFFSET
P4.10	Synchronous motor static identification current	10.0%~150.0%	50.0%		
P4.11~ P4.13	Reserve function	0～65535	0	◎	
P5 Group: Input Terminals					
P5.00	Terminal input mode selection	0～0x3FF	0	◎	INPUT MODE
P5.01	Terminal function input selection	0: Concrete 1: Virtual	0	◎	INPUT SELECTION
P5.02	S1 Terminal function	0:Invalid 1: Up running 2: Down running 3: Examine running 4: Emergency running 5: Free stop 6: Fault reset 7: Exterior fault input 8~10: Multi-speed terminals 1～3 11~13: Uplink forcing deceleration 1~3 14~16: Downlink forcing deceleration 1~3 17: Contactor	1	◎	S1 FUNCTION
P5.03	S2 Terminal function		2	◎	S2 FUNCTION
P5.04	S3 Terminal function		8	◎	S3 FUNCTION
P5.05	S4 Terminal function		9	◎	S4 FUNCTION
P5.06	S5 Terminal function		3	◎	S5 FUNCTION
P5.07	S6 Terminal function		0	◎	S6 FUNCTION
P5.08	S7 Terminal function		0	◎	S7 FUNCTION
P5.09	S8 Terminal function		0	◎	S8 FUNCTION

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P5.10	S9 Terminal function	feedback signal 18: Brake feedback signal 19: Inverter enable 20:Forcing deceleration stop 21~40: reversed	0	◎	S9 FUNCTION
P5.11	S10 Terminal function		0	◎	S10 FUNCTION
P5.12	ON-OFF filter times	1~10	5	○	Sx FILTER TIMES
P5.13	AI1 lower limit	0.00V~P5.15	0.00V	○	AI1 LOW LIMIT
P5.14	AI1 lower limit corresponding setting	-100.0%~100.0%	0.0%	○	AI1 LOW SETTING
P5.15	AI1 upper limit	P5.13~10.00V	10.00V	○	AI1 UP LIMIT
P5.16	AI1 upper limit corresponding setting	-100.0%~100.0%	100.0%	○	AI1 UP SETTING
P5.17	AI1 filter time constant	0.00s~10.00s	0.10s	○	AI1 FILTER TIME
P5.18	AI2 lower limit	0.00V~P5.20	0.00V	○	AI2 LOW LIMIT
P5.19	AI2 lower limit corresponding setting	-100.0%~100.0%	0.0%	○	AI2 LOW SETTING
P5.20	AI2 upper limit	P5.18~10.00V	5.00V	○	AI2 UP LIMIT
P5.21	AI2 upper limit corresponding setting	-100.0%~100.0%	100.0%	○	AI2 UP SETTING
P5.22	AI2 filter time constant	0.00s~10.00s	0.10s	○	AI2 FILTER TIME
P6 Group: Output Terminals					
P6.00	HDO selection	0: High-speed pulse output 1: ON-OFF output	0	◎	HDO SELECTION
P6.01	Y1 output selection	0: NO output	1	○	Y1

Function Code	Name	Description	Factory Setting	Modify	LCD Display
		1: Elevator running 2: Up running 3: Down running 4: Fault output 5: Zero speed running 6: Ready 7: Brake control 8: Contactor control 9: Frequency reached 10: FDT reached 11: Elevator running 12: Holding-brake output 13~20: Reserved			SELECTION
P6.02	Y2 output selection		0	○	Y2 SELECTION
P6.03	HDO Open collector output selection		0	○	HDO SELECTION
P6.04	Relay 1 output selection		4	○	RO1 SELECTION
P6.05	Relay 2 output selection		5	○	RO2 SELECTION
P6.06	Relay 3 output selection		0	○	RO3 SELECTION
P6.07	AO1 function selection	1:Running speed 2:Reference speed 3:Motor running speed 4:Output current 5:Output voltage 6:Output power 7:Output torque 8:AI1 input 9:AI2 input 10~14:Reserved	0	○	AO1 SELECTION
P6.08	AO2 function selection		1	○	AO2 SELECTION
P6.09	HDO function selection		0	○	HDO SELECTION
P6.10	AO1 lower limit	0.0%~P6.12	0.0%	○	AO1 LOW LIMIT
P6.11	AO1 lower limit corresponding output	0.00V ~10.00V	0.00V	○	AO1 LOW OUTPUT
P6.12	AO1 upper limit	P6.10~100.0%	100.0%	○	AO1 UP LIMIT
P6.13	AO1 upper limit corresponding output	0.00V ~10.00V	10.00V	○	AO1 UP OUTPUT
P6.14	AO2 lower limit	0.0%~P6.16	0.0%	○	AO2 LOW LIMIT

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P6.15	AO2 lower limit corresponding output	0.00V ~10.00V	0.00V	○	AO2 LOW OUTPUT
P6.16	AO2 upper limit	P6.14~100.0%	100.0%	○	AO1 UP LIMIT
P6.17	AO2 upper limit corresponding output	0.00V ~10.00V	10.00V	○	AO2 UP OUTPUT
P6.18	AO3 lower limit	0.0%~P6.20	0.0%	○	HDO LOW LIMIT
P6.19	HDO lower limit corresponding output	0.0 ~ 50.0kHz	0.0kHz	○	HDO LOW OUTPUT
P6.20	AO3 upper limit	P6.18~100.0%	100.0%	○	HDO UP LIMIT
P6.21	HDO upper limit corresponding output	0.0 ~ 50.0kHz	50.0kHz	○	HDO UP OUTPUT
P6.22	FDT level	0.00～P0.07	50.00Hz	○	FDT LEVEL
P6.23	FDT lag	0.0～100.0	5.0%	○	FDT LAG
P6.24	Frequency arrive detecting range	0.00～100.0%	0.0%	○	FREQ ARRIVE DETECT
P6.25~ P6.26	Reserve function	0～65535	0	◎	RESERVE FUNCTION
P7 Group: Display Interface					
P7.00	User password	0~65535	0	○	USER PASSWORD
P7.01	LCD language selection	0: Chinese 1: English	0	○	LANGUAGE SELECT
P7.02	Parameter copy	0: Invalid 1: Upload parameters to LCD 2: Download parameters from LCD	0	◎	PARA COPY
P7.03	QUICK/JOG function selection	0:Overhaul running (only for keypad	0	◎	QUICK/JOG FUNC

Function Code	Name	Description	Factory Setting	Modify	LCD Display
		control) 1: FDW/REV switching(only for keypad control)			
P7.04	STOP/RST function selection	0: Valid when keypad control (P0.01=0) 1: Valid when keypad or terminal control (P0.01=0 or 1) 2: Valid when keypad or communication control (P0.01=0 or 2) 3: Always valid	0	○	STOP/RST FUNC
P7.05	Keypad display selection	0: Preferential to external keypad 1: Both display, only external keypad valid. 2: Both display, only local keyad valid. 3: Both display and keypad valid.	0	○	KEYPAD DISPLAY

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P7.06	Running status display selection	1.Output speed 2.Reference speed 3.DC bus voltage 4.Output voltage 5.Output current Other parameters display is determined by 16 bit binary digit BIT0: Running frequncy BIT1: Rotation speed BIT2: Output power BIT3: Output torque BIT4: Input terminal status BIT5: Output terminal status BIT6: AI1 BIT7: AI2 BIT8: Torque compensation BIT9: Pole position BIT10~ BIT15: Reserved	0x00FF	○	RUNNING DISPLAY

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P7.07	Stop status display selection	BIT0: Reference speed BIT1: Reference frequency BIT2: DC bus voltage BIT3: Input terminal status BIT4: Output terminal status BIT5: Motor poles BIT6: AI1 BIT7: AI2 BIT8: Pole position BIT9: ~BIT15: Reserved	0x00FF	○	STOP DISPLAY
P7.08	Rectifier module temperature	0~100.0℃		●	RECTIFIER TEMP
P7.09	IGBT module temperature	0~100.0℃		●	IGBT TEMP
P7.10	MCU software version	Factory setting		●	MCU VERSION
P7.11	DSP software version	Factory setting		●	DSP VERSION
P7.12	Accumulated running time	0~65535h		●	TOTAL RUN TIME

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P7.13	Third latest fault type	0: Not fault 1: IGBT Ph-U fault(OUT1) 2: IGBT Ph-V fault(OUT2) 3: IGBT Ph-W fault(OUT3) 4: Over-current when acceleration(OC1) 5: Over-current when deceleration(OC2) 6: Over-current when constant speed running (OC3) 7: Over-voltage when acceleration(OV1) 8: Over-voltage whe deceleration(OV2) 9: Over-voltage when constant speed running(OV3) 10: DC bus Under-voltage(UV) 11: Motor overload (OL1) 12: Inverter overload (OL2) 13: Input phase failure (SPI) 14: Output phase failure (SPO) 15: Rectify overheat (OH1)		●	3rd LATEST FAULT
P7.14	Second latest fault type			●	2nd LATEST FAULT
P7.15	Latest fault type			●	CURRENT FAULT

Function Code	Name	Description	Factory Setting	Modify	LCD Display
		16: IGBT overheat (OH2) 17: External fault (EF) 18: Communication fault (CE) 19: Current detection fault (ITE) 20: Autotuning fault (TE) 21: Encoder fault(PCE) 22: Encoder reverse fault(PCDE) 23: System fault(OPSE) 24: EEPROM fault (EEP) 25: Pole position check fault (PPCE) 26: Brake unit fault (BCE) 27: Trial time reached(END) 28: LCD disconnected(LCD-E) 29: Brake action fault(FAE) 30: Contactor feedback fualt(TbE) 31:Speed bias is too large(dEV)			
P7.16	Output frequency at current fault			●	FAULT FREQ

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P7.17	Output current at current fault			●	FAULT CURR
P7.18	DC bus voltage at current fault			●	FAULT DC VOLT
P7.19	Input terminal status at current fault			●	FAULT Sx STATUS
P7.20	Output terminal status at current fault			●	FAULT DO STATUS
P7.21~ P7.22	Reserve function	0～65535	0	◎	RESERVE FUNCTION
P8 Group: Enhanced Function					
P8.00	Analog weigh signal input selection	0: No function 1: AI1 2: AI2	0	◎	ANALOG WEIGH INPUT
P8.01	Pre-torque offset	0.0～100.0%	30.0%	○	PREP TORQUE OFFSET
P8.02	Drive side gain	0.000～7.000	1.000	○	DRIVE PLUSE
P8.03	Brake side gain	0.000～7.000	1.000	○	BRAKE PLUSE
P8.04	Brake, contactor control selection(only effective at terminals control mode)	0: Invailble 1: Brake availble, contactor invailble 2: Brake invailble, contactor availble 3: Brake and contactor availble	0	◎	BRAKE CONTACTOR CONTROL
P8.05	Close brake delay time	0.00～5.00s	0	◎	CLOSE BRAKE DELAY
P8.06	Open brake delay	0.00～5.00s	0	◎	OPEN

Function Code	Name	Description	Factory Setting	Modify	LCD Display
	time				BRAKE DELAY
P8.07	Brake threshold voltage	320.0～750.0V	700.0V	○	BRAKE THRE VOLT
P8.08	Auto reset times	0~10	0	○	AUTO RESET TIMES
P8.09	Fault relay action	0: Disabled 1: Enabled	1	○	FAULT ACTION
P8.10	Reset interval	0.1~100.0s	1.0s	○	RESET INTERVAL
P8.11	Brake feedback inspecting interval	0.1～5.0s	2.0	◎	BRAKE FEEDBACK INTERVAL
P8.12	Contactor feedback inspecting interval	0.1～5.0s	2.0	◎	CONTACTOR FEEDBACK INTERVAL
P8.13	Stop contracting brake frequency	0.00~5.00Hz	0.00		
P8.14	Start DC brake current	0.0~120%	0.0		
P8.15	Start DC brake time	0.0~50.0s	0.0		
P8.16	Stop brake starting frequency	0.00~P0.04	0.00		
P8.17	Stop brake waiting time	0.0~50.0s	0.0		
P8.18	Stop DC brake current	0.0~120%	0.0		
P8.19	Stop DC brake time	0.0~50.0s	0.0		
P8.20	Stop delay time	0.0~50.0s	0.0		
P8.21～P8.22	Reserve function	0～65535	0	◎	RESERVE FUNCTION
P9 Group: Protection Function					
P9.00	Input phase-failure	0: Disabled	1	○	IN PHASE

Function Code	Name	Description	Factory Setting	Modify	LCD Display
	protection	1: Enabled			FAIL
P9.01	Output phase-failure protection	0: Disabled 1: Enabled	1	○	OUT PHASE FAIL
P9.02	Motor overload protection	0: Disabled 1: Normal motor(with the function of low speed compensation) 2: Variable frequency motor(without the function of low speed compensation)	2	◎	MOTOR OVERLOAD
P9.03	Motor overload protection current	20.0%~120.0%	100.0%	○	OVERLOAD CURR
P9.04	Overload pre-warning threshold	20.0%~150.0%	130.0%	○	OL WARN CURR
P9.05	Overload pre-warning selection	0: Always detect relative to motor rated current 1: Detect while constant speed relative to motor rated current 2: Always detect relative to inverter rated current 3: Detect while constant speed relative to inverter rated current	0	◎	OL WARN SELECT
P9.06	Overload pre-warning delay time	0.0~30.0s	5.0s	○	OL WARN DELAY
P9.07	Threshold of over speed diviation	0.0%～50%	0.0～50	20.0%	

Function Code	Name	Description	Factory Setting	Modify	LCD Display
P9.08	Detection time of over speed diviation	0.000~10.000s	0.000~10.000	0.5000	
PA Group: Serial Communication					
PA.00	Local address	1~247 0: broadcast address	1	○	LOCAL ADDRESS
PA.01	Baud rate selection	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	4	○	BAUD RATE
PA.02	Data format	0: No parity (8,N,2) for RTU 1: Even parity (8,E,1) for RTU 2: Odd parity (8,O,1) for RTU 3: No parity (8,N,2) for ASCII 4: Even parity (8,E,1) for ASCII 5: Odd parity (8,O,1) for ASCII 6: No parity (7,N,2) for ASCII 7: Even parity (7,E,1) for ASCII 8: Odd parity (7,O,1) for ASCII	1	○	DATA FORMAT
PA.03	Communication response delay time	0~20ms	0	○	COM DELAY TIME
PA.04	Communication timeout delay	0.0（invalid） 0.1~100.0s	0.0s	○	COM TIMEOUT

Function Code	Name	Description	Factory Setting	Modify	LCD Display
PA.05	Response action`	0: Enabled 1: Disabled	0	○	RESPONSE ACTION
PA.06	Reserve function	1～127	1	◎	RESERVE FUNCTION
PA.07	Reserve function	0～6	4	◎	RESERVE FUNCTION
PA.08~ PA.11	Reserve function	0～65535	0	◎	RESERVE FUNCTION
Pb Group: Display monitor					
Pb.00	Running frequency	0.0~Maximum frequency			
Pb.01	Reserved	0~65535			
Pb.02	Pole position angle	0.0~359.9			
Pb.03	Synchronizer static identify actual current value	0.0%~200.0%			
Pb.04	Mechanical angle	0.0~359.9			
Pb.05	Reserved	Reserved			
Pb.06	AD detection value of encoder C phase	0~1024			
Pb.07	AD detection value of encoder D phase	0~1024			
Pb.08~Pb. 09	Reserved	Reserved			
PC Group: No weighing starting parameters					
PC.00	No weighing compensation enable	0:disable 1:Enable	0		
PC.01	Load compensation time	0.000~5.000s	0.500s		
PC.02	Load compensation lower time	0.000~5.000s	0.300s		

Function Code	Name	Description	Factory Setting	Modify	LCD Display
PC.03	No weighing compensation ASR proportion gain	0~100	30		
PC.04	No weighing compensation ASR integral gain	0.01~10.00s	0.04s		
PC.05	Position loop APR proportion gain	0~100	0		
PC.06	Position loop APR differential gain	0.01~10.00s	0.00s		
PC.07	Current compensation coefficient	0~2000	1000		
PC.08	Current command filter coefficient	0~65536	0		
Pd Group: Distance control (reserve)					
PE Group: Factory function					
PE.00	Factory password	0~65535	0~65535	**** *	Factory password

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