NOWFOREVER

# A100 Series Inverter

# User Manual

# V1.6

SHENZHEN NOWFOREVER ELECTRONICS TECHNOLOGY CO.,LTD.

# Contents

# Inspection

Don’t install or use any inverter that is damaged or have fault part, otherwise may cause injury.

Check the following items when unpacking the inverter,

1. Ensure there is operation manual and warranty card in the packing box.
2. Inspect the entire exterior of the Inverter to ensure there are no scratches or other damage caused by the transportation.
3. Inspect the nameplate and ensure it is what you ordered.
4. Ensure the optional parts are what you need if have ordered any optional parts.

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

# Sofeware updated description

x809 software upgraded on the basis of the x806.

x809 software includes two versions: 0809 corresponds to 380V class inverter, 1809 corresponds to 220V class inverter .

| Distinguish Items | x806 Software | x809 Software |
|---|---|---|
| P0-003<br>Main frequency source<x>choice | Setting range:0～8 | Setting range:0～10<br>Increase the VCI input mode 2,When the segment-speed terminal in effect, switch to the multi-segment-speed mode immediately.<br>Increase the CCI input mode 2, when the segment-speed terminal in effect, switch to a multi-speed mode immediately. |
| P0-004<br>Assistant frequency source<Y>choice | | |
| P0-014<br>Carrier frequency | Setting range:<br>2.0 ～ 10.0KHz | Setting range:1.0～10.0KHz,<br>Carrier can be set to 1k. |
| P0-117<br>Default Monitoring Parameters | Setting range:<br>0～12 | Setting range:0～13<br>When parking was increased, the set frequency is displayed; running, the output frequency is displayed. |
| P0-170<br>PID channel selection for a given | Setting range:<br>0～6 | Setting range:0～7<br>Increase in CCI input , a given method on 4 ~ 20mA current . |
| P0-172<br>PID Feedback channel selection | Setting range:<br>0～4 | Setting range:0～6<br>Increase 4 ~ 20mA current-feedback mode in CCI input.Increase the VCI-CCI feedback mode to achieve difference temperature control. |
| P0-184<br>Local address | Setting range:<br>1～32 | Setting range:1～254<br>Address numbers increased to 254 |
| P0-195<br>AO1 output Bias | Without this function | You can set the minimum output value, meet the P0-077 can achieve 4 ~ 20mA Output（P0-077=0.8，P0-195=2.00）. |

| Distinguish Items | x806 Software | x809 Software |
|---|---|---|
| P0-196<br>AO2 output Bias | Without this function | You can set the minimum output value, meet the P0-078 can achieve 4 ~ 20mA Output（P0-078=0.8，P0-196=2.00） |
| P0-197<br>Minimum input of keypad potentiometer | Without this function | When the setting value of keyboard can not be regulated to 0hz, to increase the value. |
| P0-198<br>Maximum input of keypad potentiometer | Without this function | When the setting value of keyboard can not be regulated to 50hz ,to reduce the value. |
| P0-199<br>filter coefficient of keypad potentiometer | Without this function | When the setting value of keyboard wave, increase the value. |
| P0-200<br>VCI Input Bias | Without this function | Adjust the input bias on the VCI analog input channel . |
| P0-201<br>CCI Input Bias | Without this function | Adjust the input bias on the CCI analog input channel . |

# 1 Safety Precautions

**Safety Difinition**

**In this manual,the safety precautions were sorted to "Danger" or "Caution"**

DANGER

**Indicates a potentially dangerous situation which, if can not avoid will result in death or serious injury.**

CAUTION

**Indicates a potentially dangerous situation which, if can not avoid will cause minor or moderate injury and damage the device. This Symbol is also used for warning any un-safety operation.**

## 1.1 Safety Items

**Before installation :**

DANGER

1. Please don't use the inverter of being scathed or loss of parts!
2. Please use insulating motor upwards B class，otherwise will result in death or serious injury on account of getting an electric shock!

**When installation:**

DANGER

Please install the inverter on the fireproofing material (such as metal) to prevent fire.

CAUTION

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

2. When moving the inverter please lift by its base and don't lift by the panel. Otherwise may cause the main unit fall off which may result in personal injury.

**When wiring:**

DANGER

1. Wiring must be performed by the person certified in electrical work!
2. Inverter and power must be comparted by breaker,， otherwise the firing will be caused！
3. Cannot install the inverter until discharged completely after the power supply is switched off for 5 minutes.
4. Be sure to ground the ground terminal！

CAUTION

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

   Otherwise it will cause damage the inside part of inverter！
2. To ensure the wiring according with EMC requirements and safety standards in the region, the wire diameter used reference the manual suggested, or might be an accident!
3. Brake resistor can not be directly connected between "DC bus +" to "DC bus- "terminals, or may cause a fire!

**Before power-on:**

DANGER

1. Please confirm whether the power and voltage level is consistent with the rated voltage of the converter, input and output wiring position is correct or not, and pay attention to check whether there are short-circuit in the external circuit phenomenon, insure the line is fastened, otherwise the inverter may cause damage!

2. Inverter cover must be covered in the pre-power, otherwise may cause an electric shock!

⚠CAUTION

1. Inverters do not need to do pressure test, factory products have made this test, factory products have been made this test, otherwise it might cause an accident!
2. All the external parts is connected exactly in accordance with this manual , or may cause an accident!

**After power-on:**

⚠DANGER

1. Do not open the lid after power-on, otherwise there is a risk of electric shock!
2. Do not wire and operate the inverter with wet hands. Otherwise there is a risk of electric shock!
3. Do not touch inverter terminals (including the control terminal), otherwise there is a risk of electric shock!
4. Just power-on, the inverter can carry out safety testing for external strong electric circuit automatically, this time, please do not touch the U, V, W terminals or motor terminals, otherwise there is a risk of electric shock!

⚠CAUTION

1. If the need for parameter identification, please note that the risk of injuries in motor rotation, otherwise may cause an accident!
2. Please do not arbitrarily change the parameters of inverter manufacturers, otherwise may result in equipment damage!

**Run state:**

⚠DANGER

1. When the user selects the function re-starting, please do not close to the mechanical equipment, otherwise may cause personal injury!
2. Do not touch the cooling fan and discharge resistance in order to test the temperature, otherwise it might cause burn!
3. To detect the signal must be performed by the person certified in electrical work, otherwise may cause personal injury or equipment damage!

⚠CAUTION

1. Inverter is running, please avoid the sundries fall into the device, otherwise it would cause equipment damage!
2. Please do not use this method of contactor on and off to control the converter's start-stop, otherwise it would cause equipment damage!

**When maintaining:**

⚠DANGER

1. Never service and maintain the inverter with electrification,May cause injury or electric shock.
2. When power off,should not maintain the inverter until after 5 minutes, which can ensure the device discharge completely.
3. The person without passing the speciality training, Don't is permitted to operate and maintain this equipment,otherwise will cause severe injury or property loss.

## 1.2 Notice Items

1. Before using this motor at first a long time not being used and regular inspection, should do insulation inspection for the motor, to prevent damaging to the inverter due to the motor winding insulation failure.be sure to separate the electrical connection from the inverter when the insulation inspection, ensure to use 500V voltage model megger. Should

ensure the measured insulation resistance is no less than 5 megohm.

2. Thermal protection of the motor

If the selection of motor and rated capacity of the inverter does not match，especially when rated power of the inverter bigger than rated power of the motor, be sure to adjust the motor protection-related parameters in the inverter or pre-installed in the motor thermal relay for motor protection.

3. Running the above Work-frequency

The inverter can provide 0Hz ~ 600Hz output frequency, if the customer need to run at 50Hz and above, consider the affordability of mechanical devices.Please consider the affordability of mechanical devices.

4. The vibration of mechanical devices

When the output frequency to achieve certain values of the inverter，you may encounter a mechanical resonance point of the load devices. It can be avoided by setting the parameters of the frequency jump in inverter.

5. Regarding motor heat and noise

Because output voltage of the inverter is the PWM wave，contains some harmonics wave，Therefore, the motor temperature rise, noise and vibration compared to the Work-frequency in running will be a slight increase.

6. Have pressure-sensitive parts or improving the capacitance of power factor on output side ,Inverter output is a PWM wave，the capacitors to improve the power factor has been installed at the output side or pressure-sensitive resistance for lightning strike protection, etc. .Can easily lead to transient currents and even damage to the inside part of inverter ,please do not use.

7. Contact is installed between input and output in the converter，But not

allowed to use this contact to control the inverter's start-stop.Necessarily need to control inverter's start-stop by using the contact , not less than one hour intervals.Easy to reduce the use life for capacitors within inverter by reason of charging and discharging continually.If equipped with a contactor and other switching device between the output and the motor，Should ensure that the inverter to carry out On-off operation in the absence of output. Otherwise easily lead to damage to the inverter module.

8. The use without the rated voltage value

Our inverters can not be used exceed permited work voltage range, easy to cause damage to the device within the inverter. If necessary, please use the appropriate step-up or pressure-relief devices .

9. Three-phase input change to two-phase input

Don’t permit of changing three-phase inverter as two-phase to be used, or will result in failure or damage to inverter.

10. Lightning surge protection

The inverter is equipped with over-current protection devices caused by lightning strike， Have a certain capacity for self-protection for lightning， Customers should also install protect at the front-end converter for places where lightning often.

11. 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 contact us.

12. Some special usages

If the customer need to use the wiring diagram that the manual did not mention ， such as the common DC bus ,please consult us.

13. Inverters scrapped

1）The inverter burned inside the electrolytic capacitor may explode.

2）Inverters contain the plastic, rubber and other products,that may bring harmful, toxic gases, in the burning ,Please particularly careful.

3）Please treat the inverter as industrial waste.

14. Adaptive motor

1）Standard adaptive motor for 4 grade Squirrel-cage asynchronous induction motor. If it is not above motor that may select the inverter according to rated current of motor. If you need to drive permanent magnet synchronous motor, please ask for support.

2）The cooling fan of non-inverter motor and the rotor axis is a coaxial connection, the effect of fan cooling is poor when the speed decreases, therefore, should be retrofitted with exhaust fan or replace for the inverter motor in the motor overheat occasion.

3）The inverter has built-in standard parameters of adaptive motor, according to the actual situation ,Motor parameter identification needs to be done or personality default value in order to be compatible with the actual value, otherwise it will affect the running results and protection performance.

4）If the short-circuit occurred in the cable or the internal motor will cause the inverter alarm, and even deep-fried machine. When the motor and cable just installed, please first conduct insulation short-circuit tests, routine maintenance is also required to conduct this test regularly.

Notice : To do such testing all must be turn-off between the inverter and tested parts.

**Before using, please read this manual thoroughly to ensure proper usage. Keep this manual at an easily accessible place so that can refer anytime as necessary.**

# 2 Summarize

Please check the following items when unpacking the inverter, the nameplate and ensure it is what you ordered，the entire exterior of the inverter to ensure there are no scratches or other damage caused by the transportation, ensure there is operation manual and warranty card in the packing box, ensure the optional parts are what you need if have ordered any optional parts.

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

Reference "Software Update", different versions of the software functions are different.

## 2.1 Description of Nameplate

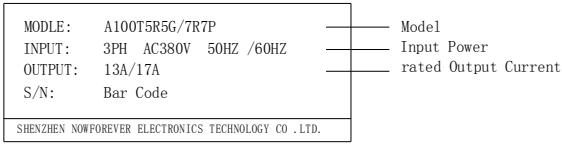



Chart 2-1 description of nameplate

## 2.2 Production Information

The series is made of 3 model，power range and naming rule as below chart.

| Symbol | Model | Power Range |
|---|---|---|
| G | Universal Model | 0.4～280KW |
| P | Wind/Water pump Model | 0.75～315KW |
| Z | Injection Machine Model | 11～75KW |

Chart 2-2 power description of model

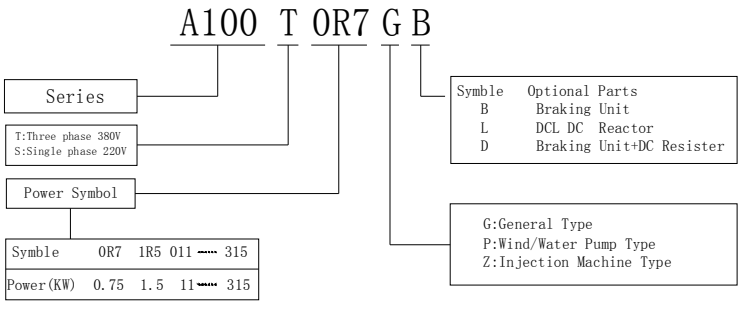



Chart 2-3 Naming rule

## 2.3 Selection Guide

### 2.3.1 220V Series Description

| Model | Input Power | Rated Output Power（KW） | Rated Output Current（A） | Motor Power（KW） |
|---|---|---|---|---|
| A100S0R4G | single/3phase AC220V | 0.4 | 3.0 | 0.4 |
| A100S0R7G | single/3phase AC220V | 0.75 | 5.0 | 0.75 |
| A100S1R5G | single/3phase AC220V | 1.5 | 8.0 | 1.5 |
| A100S2R2G | single/3phase AC220V | 2.2 | 10.0 | 2.2 |
| A100S3R7G | 3phase AC220V | 3.7 | 18.0 | 3.7 |
| A100S5R5G | 3phase AC220V | 5.5 | 26.0 | 5.5 |
| A100S7R5G | 3phase AC220V | 7.5 | 34.0 | 7.5 |
| A100S011G | 3phase AC220V | 11 | 50.0 | 11 |
| A100S015G | 3phase AC220V | 15 | 64.0 | 15 |
| A100S018G | 3phase AC220V | 18.5 | 75.0 | 18.5 |
| A100S022G | 3phase AC220V | 22 | 90.0 | 22 |

Summarize

| | | | | |
|---|---|---|---|---|
| A100S030G | 3phase AC220V | 30 | 120.0 | 30 |
| A100S037G | 3phase AC220V | 37 | 150.0 | 37 |
| A100S045G | 3phase AC220V | 45 | 180.0 | 45 |
| A100S055G | 3phase AC220V | 55 | 220.0 | 55 |
| A100S075G | 3phase AC220V | 75 | 300.0 | 75 |
| A100S090G | 3phase AC220V | 90 | 350.0 | 90 |
| A100S110G | 3phase AC220V | 110 | 420.0 | 110 |

Chart 2-4 220V series description

### 2.3.2 380V Series Description

| Input Power:3phase AC380V | | | Rated Output Power (KW) | Rated Output Current (A) | Motor Power (KW) |
|---|---|---|---|---|---|
| Model | | | | | |
| G Series (General) | P Series (Pump) | Z Series (Injection) | | | |
| A100T0R4G | | | 0.4 | 1.6 | 0.4 |
| A100T0R7G | A100T0R7P | | 0.75 | 2.6 | 0.75 |
| A100T1R5G | A100T1R5P | | 1.5 | 3.8 | 1.5 |
| A100T2R2G | A100T2R2P | | 2.2 | 5.1 | 2.2 |
| A100T3R7G | A100T3R7P | | 3.7 | 9 | 3.7 |
| A100T5R5G | A100T5R5P | | 5.5 | 13 | 5.5 |
| A100T7R5G | A100T7R5P | | 7.5 | 17 | 7.5 |
| A100T011G | A100T011P | A100T011Z | 11 | 25 | 11 |
| A100T015G | A100T015P | A100T015Z | 15 | 32 | 15 |
| A100T018G | A100T018P | A100T018Z | 18.5 | 37 | 18.5 |
| A100T022G | A100T022P | A100T022Z | 22 | 45 | 22 |
| A100T030G | A100T030P | A100T030Z | 30 | 60 | 30 |
| A100T037G | A100T037P | A100T037Z | 37 | 75 | 37 |

| | | | | | |
|---|---|---|---|---|---|
| A100T045G | A100T045P | A100T045Z | 45 | 90 | 45 |
| A100T055G | A100T055P | A100T055Z | 55 | 110 | 55 |
| A100T075G | A100T075P | A100T075Z | 75 | 150 | 75 |
| A100T090G | A100T090P | | 90 | 176 | 90 |
| A100T110G | A100T110P | | 110 | 210 | 110 |
| A100T132G | A100T132P | | 132 | 250 | 132 |
| A100T160G | A100T160P | | 160 | 300 | 160 |
| A100T200G | A100T200P | | 200 | 380 | 200 |
| A100T220G | A100T220P | | 220 | 420 | 220 |
| A100T250G | A100T250P | | 250 | 480 | 250 |
| A100T280G | A100T280P | | 280 | 540 | 280 |
| A100T315G | A100T315P | | 315 | 600 | 315 |
| A100T355G | A100T355P | | 355 | 700 | 355 |
| A100T400G | A100T400P | | 400 | 780 | 400 |
| A100T450G | A100T450P | | 400 | 780 | 400 |
| A100T500G | A100T500P | | 450 | 880 | 450 |
| A100T560G | A100T560P | | 500 | 980 | 500 |
| | A100T630P | | 560 | 1100 | 560 |

Chart 2-5 380V series description

## 2.4 Technology Criterion

| Items | Criterion |
|---|---|
| Frequency range | 0～600Hz |
| Output frequency precision | 0.01Hz |
| Frequency | Digital setting:0.01Hz.<br>Analog setting:AD switch precision for one in thousand. |
| Speed range | 1:100 |
| Overload | G model:150%rated current60s；180%rated current 2s. |

| | |
|---|---|
| capability | P model:120％rated current 60s；150％rated current 2s.<br>Z model:150％rated current 60s；180％rated current 2s. |
| Control Mode | Open-loop VF control；Open-loop simple vector control. |
| Torque boost | Manual torque can be adjust；Auto-Torque upgrade the whole frequency band. |
| Start up Torque | when0.5Hz, rated torque for 150％ |
| Acceleration and deceleration curves | Straight or S curve acceleration and deceleration; four kinds of acceleration and deceleration time; 0.1 ~ 3200.0s continuously adjustable |
| Jog Function | Jog Frequency: 0.00 ~ 50.00hz; jog acceleration and deceleration: 0.1 ~ 3200.0s continuously adjustable |
| Standard functions | Start function of REV tracking、Start DC braking、Coast to stop DC braking、Restart after power off instantaneous、Automatic fault reset 、 When accelerating over-current suppression 、 over-current reduce the frequency function When constant speed 、 over-voltage suppression when slowing down、Skip frequency function、simple "one drag two function"、16th-step running 、simple PLC program running、Traverse frequency function applies to textile、closed-loop PID regulator control |
| Run Rule Channel | Three kinds control mode: keyboard control, analog terminal control, serial communication control |
| Frequency Source Selection | Digital setting, analog voltage setting, analog current setting, pulse input setting, the serial communication port setting; can be combined through a variety of ways to switch. |
| Input Terminals | 8 digital input terminals, as many as 27 kinds of custom features, is compatible with the active PNP input or NPN input, which one can be used as a high-speed pulse input;<br>Two analog input terminals, one receive only a voltage signal (0 ~ 10V), the other can receive voltage signals (0 ~ 10V) and current signals (0 ~ 20mA); |
| Output Terminals | Two open-collector output, 16 user defined functions;<br>1 relay output, up to 27 kinds of user defined functions;<br>2 analog output, 8 kinds of user defined functions; can export voltage signal (0 ~ 10V) or current signals (0 ~ 20mA) |
| Protection | Overvoltage, undervoltage and external fault,overcurrent,overheating,overload |
| Installation place | Indoor, Altitude of less than 1 km, clean, non-corrosive gases and no direct sunlight |

| | |
|---|---|
| Temperature | -10°C ～ +40°C （Inverter will be derated if ambient temperature exceeds 40° C.） |
| Humidity | 20%～90%RH（without dewfall） |
| Vibration | Less than 0.5g |
| Storage Temperature | -25°C～+65°C |

Chart 2-6 technology criterion

## 2.5 Functions

1. A100 series inverter with V / f control and vector control technology, with excellent functional module of application .
2. Sensorless vector control (SLVC), built-in test programs of motor parameters, you can easily use the superior performance of vector control.
3. V / F control. Through the whole frequency band of the torque automatic compensation, compensate output torque to meet the requirements of customers for high torque; to improve the dynamic response and motor control features.
4. With a proportional, integral and differential (PID) of the closed-loop control function can be used for constant pressure water supply process control,and so on.
5. With special injection interface board, you can use in injection molding machine energy-saving occasions.
6. Fast current limit (FCL) function, to avoid undue running trip.
7. Built-in DC injection braking.
8. Acceleration / deceleration ramp features have a programmable smoothing function.
9. Automatic voltage regulator, in the case of input voltage changes, the output voltage is basically unchanged, maintaining V / F values constant.
10. Rotate speed tracking ,the inverter will automatically detect the motor

rotate speed, rusult in the motor is running renewedly and smoothly without the impact to the input enactment frequency .

11. To prevent over-voltage bring on abnormaly speed, the runing inverter automatically limit the increase of DC bus voltage.
12. The monitoring function of runing, the inverter is runing can monitor the output frequency, output current, rotate speed, load rate, accumulated working time, parameters such as DC bus voltage.
13. The fault function of inquiring and monitoring .

## 2.6 DC reactor Options Description

Parts of the A100 series general inverter can be built-in DC reactor, details as below list:

| Model | DC reactor | | Remarks |
|---|---|---|---|
| | Built-in | External | |
| A100T0R7G——A100T5R5G | × | × | No special instructions |
| A100T7R5G——A100T055G | √ | × | Inverter model + "L" |
| A100T075G——A100T200G | × | √ | Customers can add by their own |
| A100T220G——A100T355G | √ | √ | Inverter model + "L" |

"√" yes, "×" not.

Chart 2-7 reactor option description

**Notice: Because A100T7R5G - A100T055G models can not be an external DC reactor,please give clear indication in speaking for goods if the customer needs.**

## 2.7 Braking Resistor Selection Guide

When the inverter-driven control equipment requires rapid braking, need to select the braking unit to release the energy ,when the motor braking feed

back to the DC bus.

The braking resistor of different power levels and different voltage levels inverter selection guide as follows (brake torque 100%).

| Model | Braking Resistor Recommended Power | Braking Resistor Recommended Resistance | Braking Unit | Remarks |
|---|---|---|---|---|
| A100T0R7 | 150W | ≧400Ω | Standard built-in | no special |
| A100T1R5 | 250W | ≧300Ω | | |
| A100T2R2 | 300W | ≧220Ω | | |
| A100T3R7 | 400W | ≧200Ω | | |
| A100T5R5 | 500W | ≧130Ω | | |
| A100T7R5 | 800W | ≧90Ω | | |
| A100T011 | 1000W | ≧65Ω | | |
| A100T015 | 1300W | ≧43Ω | | |
| A100T018 | 1500W | ≧32Ω | built-in can be selected | Inverter model + "B" |
| A100T022 | 2500W | ≧25Ω | | |
| A100T030 | 3500W | ≧22Ω | | |
| A100T037 | According to the requirements and recommended values of braking unit to select | | External braking unit:ABU055 | May to use the braking unit of other factory |
| A100T045 | | | | |
| A100T055 | | | | |
| A100T075 | | | | |
| A100T090 | | | | |
| A100T110 | | | | |

Chart 2-8 Braking Resistor Selection Guide

## 2.8 Braking Resistor wiring Description

A100 series inverter braking resistors connected as below.

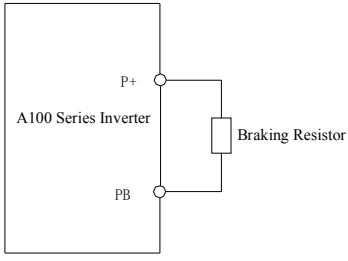



Chart 2-9 wiring at braking resistor[less than 30kW]

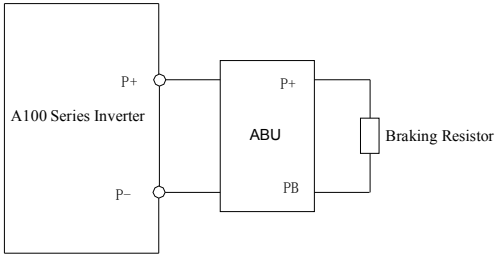



Chart 2-10 wiring at braking resistor [above 37kW]

## 2.1 The wiring Description at the signal board of injection machine

ONS-ZS-01-930 is our company's option parts of injection molding machine ,it can be used to match with A100 series inverter, which can be directly input 0 ~ 1A (through the CI ~ COM terminal) DC current signal, or 0 ~ 24V (through VI ~ COM terminal) DC voltage signal. after treatment of optical coupling isolation, converted into 0 ~ 10V voltage signal ,through the cable directly connected to the VCI interface of the inverter, users do not need to connect external analog signal line in addition.

**Notice: When using the injection molding machine signal board, the external analog input VCI、 CCI can not be used.**

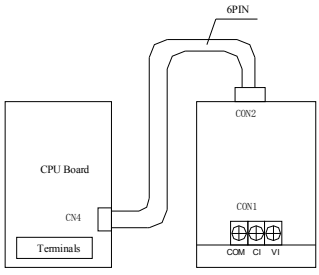



Chart 2-11 wiring at the signal board of injection machine

Injection Molding Machine Connection Description:

You can use the following two kinds of wiring methods, but they can not be used simultaneously.

1. Injection molding machine control panel 0 ~ 24V voltage output to the injection signal plate, VI connect voltage positive terminal, COM connect voltage negative terminal.(relative to injection molding machine control panel)

2. Injection molding machine control panel 0 ~ 1A current output signal to the injection signal plate, CI connect to current inflow terminal (relative to injection molding machine signal board), COM connect to current outflow side (relative to injection molding machine signal board).

# 3 Installation

## 3.1 Installation Environment

1. There are vents or ventilation devices in indoor places.
2. Ambient temperature -10 ℃ ~ 40 ℃. If the ambient temperature is bigger than 40 ℃, but lower than 50 ℃, may take off the cover board of inverter or open the front door cabinet, in order to reduce temperature.
3. Try to avoid high temperature and wet places, humidity less than 90%, and without dewfall.
4. Avoid direct sunlight.
5. Away from air pollution such as flammable and corrosive gases, liquids.
6. No dust, floating particles of fiber and metal.
7. It is not allowed that the inverter falls down or suffers from fierce impact or the inverter installed at the place that vibration frequently.
8. Keep away from the electromagnetic radiation source.

## 3.2 Installation Direction and Space

In order not to affect the life of converter and reduce its performance, it should be noted mounting direction and the surrounding space, and be properly fixed.

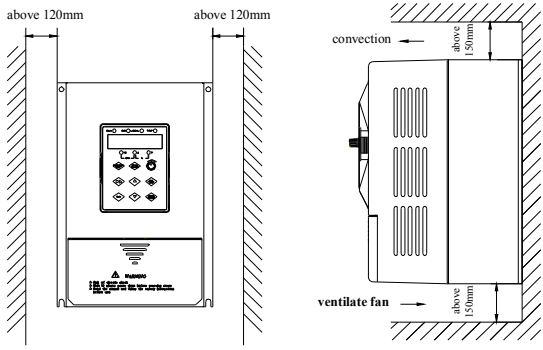



Chart 3-1 safe space

## 3. 3 Installation dimensions of Inverter

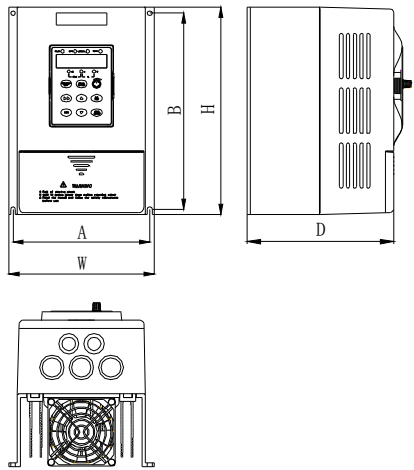



Chart 3-2 External Dimension(0.4～5.5KW)

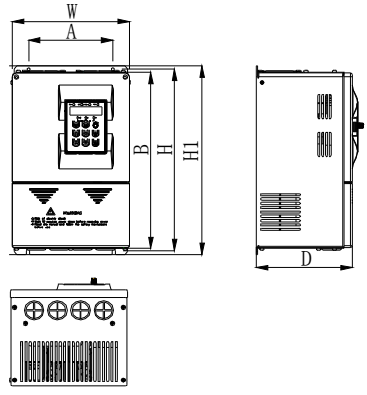



Chart 3-3 External Dimension (7.5～15KW)

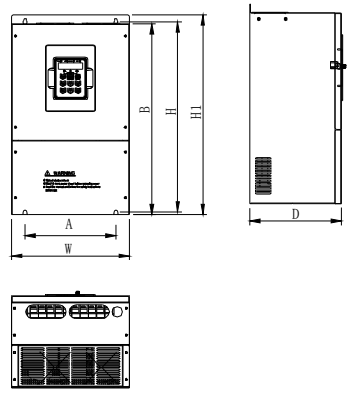



Chart 3-4 External Dimension (18.5～200KW)

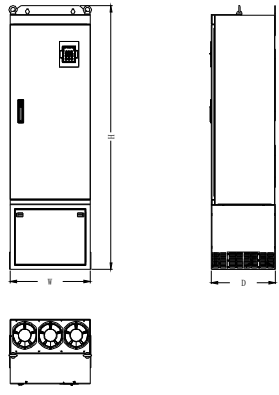


Chart 3-5 External Dimension (220～560KW)

| 220V Model | A (mm) | W (mm) | B (mm) | H (mm) | H1 (mm) | D (mm) | Installation Hole (mm) | Net Weight (Kg) |
|---|---|---|---|---|---|---|---|---|
| A100S0R4G<br>A100S0R7G<br>A100S1R5G<br>A100S2R2G | 112 | 125 | 170 | 180 | -- | 137 | φ5.0 | -- |

Chart 3-6 220V External Dimension

| 380V Model | | | A (mm) | W (mm) | B (mm) | H (mm) | H1 (mm) | D (mm) | Installation Hole (mm) | Net Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| G Series | P Series | Z Series | | | | | | | | |
| A100T0R7G | A100T1R5P | -- | 112 | 125 | 170 | 180 | -- | 137 | φ5.0 | -- |
| A100T1R5G | A100T2R2P | -- | | | | | | | | |
| A100T2R2G | A100T3R7P | -- | | | | | | | | |
| A100T3R7G | A100T5R5P | -- | 162 | 172 | 233 | 246 | -- | 174 | φ5.5 | -- |
| A100T5R5G | A100T7R5P | -- | | | | | | | | |
| A100T7R5G | A100T011P | -- | 156 | 218 | 327 | 337 | 350 | 178 | φ5.5 | -- |

| 380V Model | | | A (mm) | W (mm) | B (mm) | H (mm) | H1 (mm) | D (mm) | Installation Hole (mm) | Net Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| G Series | P Series | Z Series | | | | | | | | |
| A100T011G | A100T015P | -- | | | | | | | | |
| A100T015G | A100T018P | A100T011Z | | | | | | | | |
| A100T018G | A100T022P | A100T015Z | | | | | | | | |
| A100T022G | A100T030P | A100T018Z | 220 | 285 | 461 | 459 | 482 | 222 | φ10 | -- |
| A100T030G | A100T037P | A100T022Z | | | | | | | | |
| A100T037G | A100T045P | A100T030Z | | | | | | | | |
| A100T045G | A100T055P | A100T037Z | 250 | 380 | 625 | 626 | 647 | 295 | φ10 | -- |
| A100T055G | A100T075P | A100T045Z | | | | | | | | |
| A100T075G | A100T090P | A100T055Z | | | | | | | | |
| A100T090G | A100T110P | A100T075Z | 260 | 466 | 693 | 714 | 740 | 325 | φ10 | -- |
| A100T110G | A100T132P | -- | | | | | | | | |
| A100T132G | A100T160P | -- | 270 | 480 | 753 | 775 | 800 | 325 | φ11 | -- |
| A100T160G | A100T200P | -- | | | | | | | | |
| A100T200G | A100T220P | -- | 283 | 500 | 1175 | 1246 | 1275 | 397 | φ13 | -- |
| A100T220G | A100T250P | -- | | | | | | | | |
| A100T250G | A100T280P | -- | | | | | | | | |
| A100T280G | A100T315P | -- | -- | 750 | -- | 1785 | -- | 400 | -- | -- |
| A100T315G | A100T355P | -- | | | | | | | | |
| A100T355G | A100T400P | -- | | | | | | | | |
| A100T400G | A100T450P | -- | | | | | | | | |
| A100T450G | A100T500P | -- | | | | | | | | |
| A100T500G | A100T560P | -- | -- | 1010 | -- | 1630 | -- | 400 | -- | -- |
| A100T560G | A100T630P | -- | | | | | | | | |

Chart 3-7 380V External Dimension

# 4 Wiring

## 4.1 Connection of Periperal devices

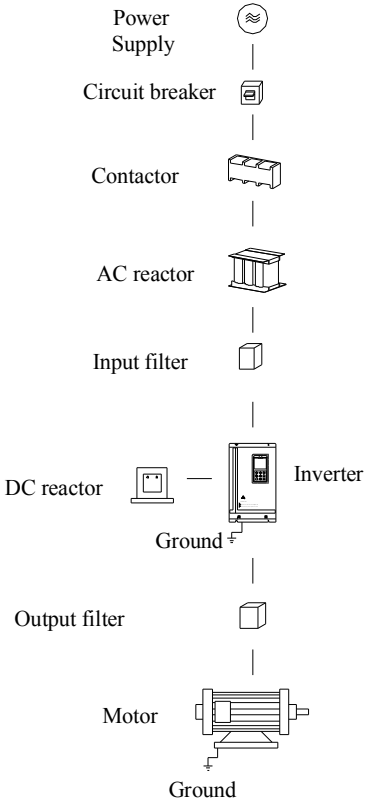



Chart 4-1 connection of periperal devices

# 4.2 Typical Wiring Diagram

## 4.2.1 Wiring Diagram

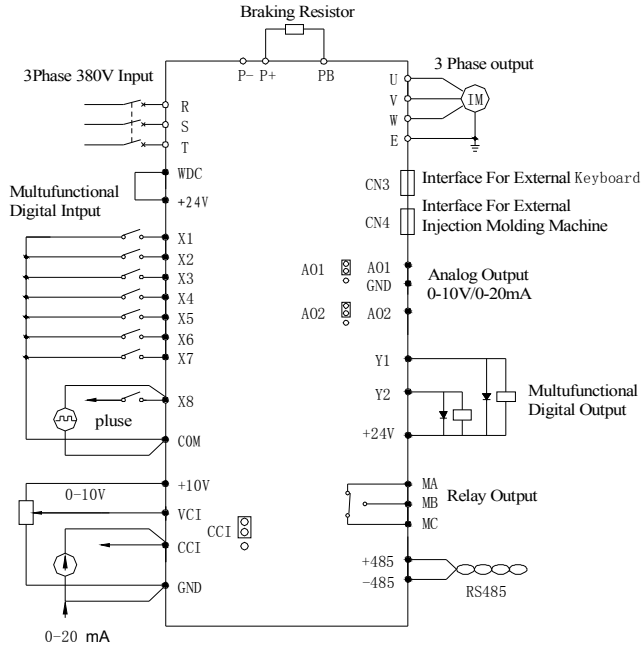



Chart 4-2 wiring diagram(A100T3R7G～A100T030G)

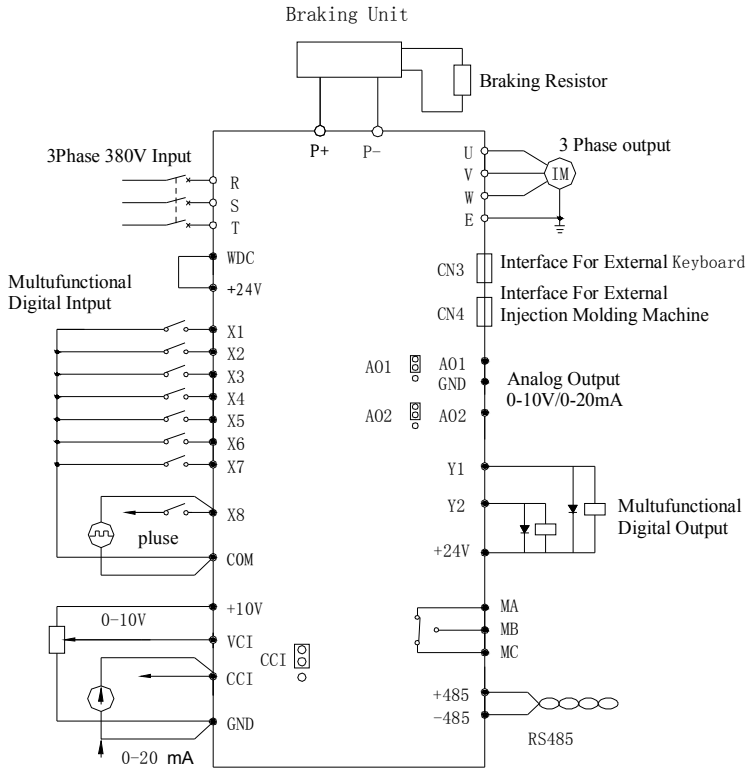



Chart 4-3 wiring diagram(A100T037G～A100T055G)

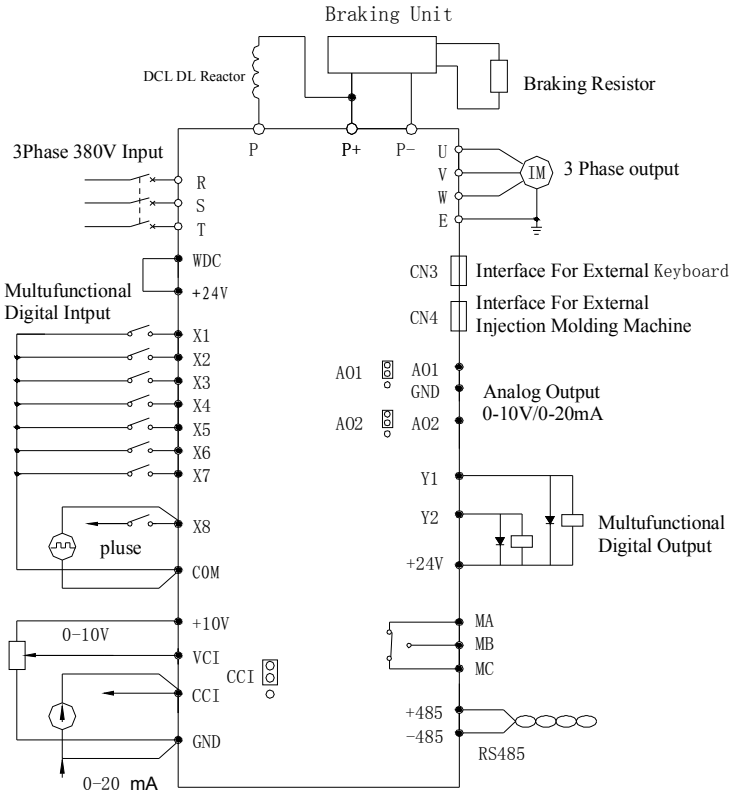



Chart 4-4 wiring diagram(A100T075G～A100T280G)

## 4.2.1 Termimal configuration

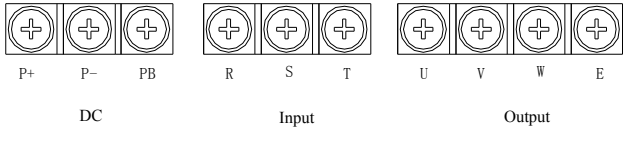



Chart 4-5 Main circuit terminals

| Termimal Symbol | Function Description |
|---|---|
| R，S，T | Terminals of 3 phase AC input |
| U，V，W | Terminals of 3 phase AC output（connect to motor） |
| P+ | Terminal of positive DC bus |
| P- | Terminal of negative DC bus |
| P | Can install DC reactor between P and P+ |
| PB | Can install DC braking resistor between P+ and PB |
| E | Terminal of ground |

Chart 4-6 Description of main circuit symbol

## 4. 3 Description of Control Circuit Terminals

A variety of application interfaces can be provided for users by controlling Board , including digital input and output signals, analog input and output signals, keyboard interface, injection molding machine-specific interface.

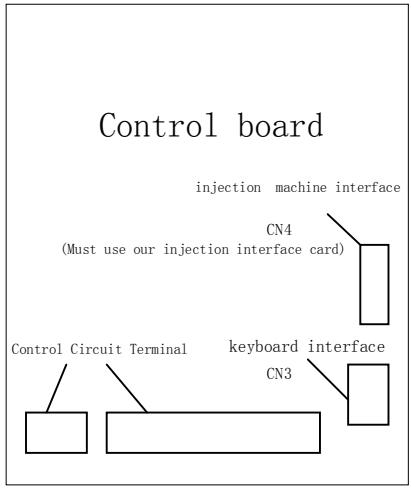



Chart 4-7 control board layout

### 4.3.1 Control Circuit Terminal Layout

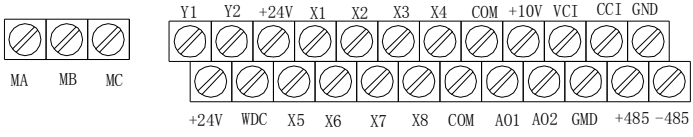



Chart 4-8 Control circuit terminals layout

### 4.3.2 Description of Control Circuit Terminals

| Items | | Terminals | Name | Function | Specifications |
|---|---|---|---|---|---|
| Input | Digital | X1 | Multufunctional Intput<X1> | Factory settings:forward run | Optical Coupling Insulation:DC24V/8mA When using an external power，voltage range :9～30V |
| | | X2 | Multufunctional Intput <X2> | Factory settings:reverse run | |
| | | X3 | Multufunctional Intput <X3> | Factory settings:Forward jog | |

| Items | | Terminals | Name | Function | Specifications |
|---|---|---|---|---|---|
| | | X4 | Multufunctional Intput <X4> | Factory settings:reverse jog | |
| | | X5 | Multufunctional Intput <X5> | Factory settings:Multistage speed terminals 1 | |
| | | X6 | Multufunctional Intput <X5> | Factory settings: Multistage speed terminals 2 | |
| | | X7 | Multufunctional Intput <X7> | Factory settings: Multistage speed terminals 3 | |
| | | X8 | Multufunctional Intput <X8> | Factory settings: Multistage speed terminals 4(as below notice1) | |
| | | WDC | Multufunctional Intput Common | when leaving factory between " +24 V"to WDC are shorted by the short film | |
| | Analog | +10V | Analog 10V power | Output capacity:less than 50mA | |
| | | VCI | Analog frequency setting1 | DC:0～10V(distinguish:1/1000) | |
| | | CCI | Analog frequency setting2 | DC:0～10Vor 0～20mA(distinguish 1/1000) | |
| | | GND | Analog common | 0V | |
| output | Relay | MA | A node output | Factory setting:the stop-machine fault occurred in running<br>MA—MC:NC node<br>MB—MC:NO node | Node Capacity: AC250V，less than 2A; DC30V，less than 1A. |
| | | MB | B node output | | |
| | | MC | node output common | | |
| | Digital | Y1 | Optical Coupling output1 | Factory setting:the inverter is running | Open-collector output; Optical Coupling Output Capacity: |

| Items | | Terminals | Name | Function | Specifications |
|---|---|---|---|---|---|
| | | Y2 | Optical Coupling output 2 | Factory setting:running frequency reaches the enactment value | DC36V，less than 50mA. |
| | | COM | Optical Coupling output common | 0V | |
| | Analog | AO1 | Analog output1 | Voltage and current output；factory setting: output frequency | Output Capacity: voltage:0～10V，less than 2mA；current:0～20mA,less than 10V |
| | | AO2 | Analog output 2 | Voltage and current output；factory setting: output current | |
| | | GND | Analog COM | 0V | |
| Power | | +24V | DC24V:power positive | meet“digital input”、“digital output” | Output capacity:less than 100mA；When leaving factory “+24V”and“WDC”is shorted |
| | | COM | DC24V:power negative | | |
| Communication | | +485 | RS485+ | MODBUS | MEMOBUS protocol Max38.4kBPS |
| | | -485 | RS485- | | |

Notice1:You can set the high-speed pulse input terminals, maximum input 50kHz.

Chart 4-9 control circuit terminals description

### 4.3.3 Wiring Description on Control Circuit Terminals

4.3.3.1 Analog Input Terminals

Analog input is easy interfered by environment on account of voltage signal had used,please use shielded cables, and to ensure a reliable shield grounding. Wiring distances as short as possible and away from power lines. When occuring Serious interfere in a occasion, can plus filter capacitor or iron oxide core in the signal lines.

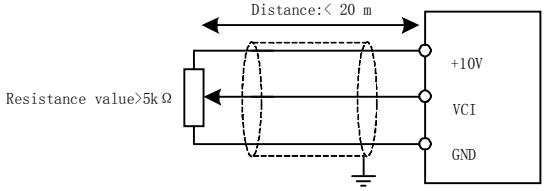



Chart 4-10 wiring diagram of analog input

4.3.3.2 Digital Input Terminals

Digital input is divided into NPN transistor input and PNP transistor input.

NPN transistor input, use internal 24V power, +24 V terminal and the WDC terminals are shorted.

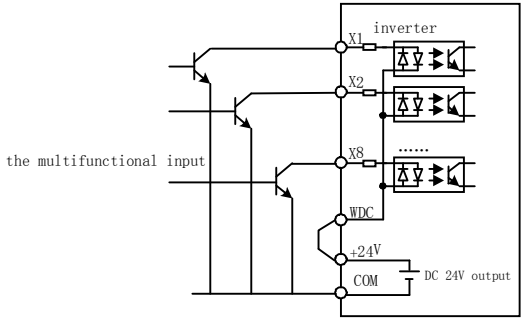



Chart 4-11 wiring diagram of NPN transistor input

When using PNP transistor input, use an external 24V power supply, its negative terminal connect WDC; external power positive terminal for the public point. external power voltage range: 9 ~ 30V.

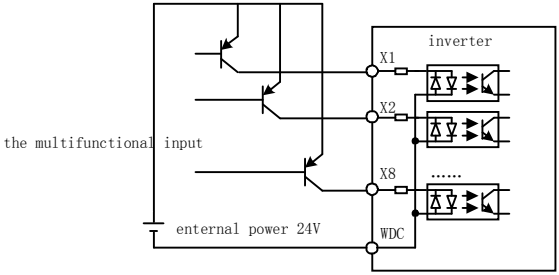



Chart 4-12 PNP wiring diagram of NPN transistor input

（enternal power positive terminal for common point）

4.3.3.3 Digital Output Terminals

Digital output for the open-collector output, if you use an external power supply, please connect the external power negative terminal to COM terminal. The maximum current of open-collector output is 50mA, if the relay is external load, please install freewheeling diode at both ends of relay.

Notice: Please properly install freewheeling diode polarity, otherwise it will damage the internal components.

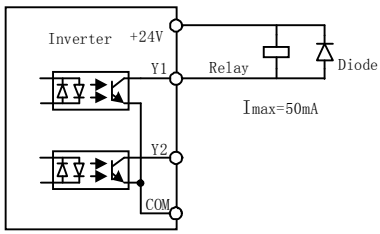



Chart 4-13 wiring diagram of digital output

## 4.3.4 Jumpers and interface on control board

| Name | Function |
|---|---|
| AO1 jumper | choice AO1 output analog :<br>voltage0～10V； current 0～20mA |

| Name | Function |
|---|---|
| AO2 jumper | choice AO2 output analog :<br>voltage0～10V；current 0～20mA |
| CCI jumper | choice CCI input analog :<br>voltage0～10V；current 0～20mA |
| CN3 interface | Keyboard interface |
| CN4 interface | Interface For External Injection Molding Machine |

Chart 4-14 Jumpers on control board

# 5 Operation

## 5.1 Keypad Description

### 5.1.1 Keypad schematic diagram

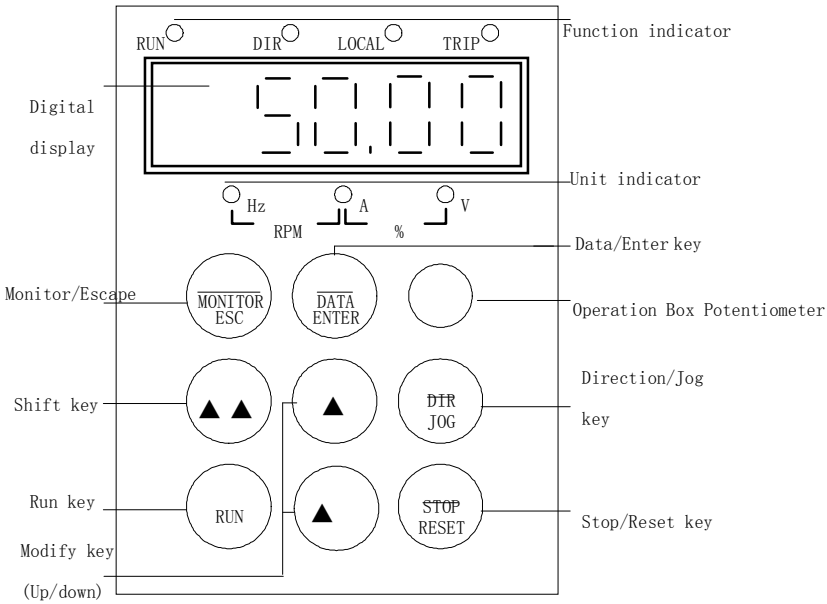



Chart 5-1 Keypad schematic diaagram

### 5.1.2 Key function description

| Button symbol | Name | Function |
|---|---|---|
| MONITOR/ ESC | Monitor/ Escape key | 1. Switch to system minitor state.<br>2. Escape to previous menu.<br>3. In alarm state,clear away alarm. |
| DATA/ ENTER | Data/ Enter key | 1. Enter menu<br>2. Confirm modified data. |

| Button symbol | Name | Function |
|---|---|---|
| >> | Shift key | 1. In fast monitor state, switch the monitor parameters.<br>2. When you want to modify the data, switch to the bit you want to modify<br>3. When modifying function code, per10 to increase. (valid only P0 function group). |
| ▲ | UP key | Increase data or function codes |
| DIR/ JOG | Jog key | According to this function code can achieve a function:<br>1. Switch between forward and reverse.<br>2. Start-up the inverter in JOG state, relax the key result in stopping JOG. |
| RUN | Run key | Start to run the inverter in keypad control mode. |
| ▼ | DOWN key | Decrease function codes or data. |
| STOP/ RESET | Stop / Reset key | 1. In running status,stop the inverter.<br>2. When fault alarm, can be used to reset the inverter without any restriction.<br>3. Emergency stop function can be realized. (Equivalent to the external fault input) |

Chart 5-2 Key function description

### 5.1.3 Indicator light description

5.1.3.1 Run state indication

| Indicator Light Name | Indicator Light State | State Description |
|---|---|---|
| RUN | Light on | Operating or JOG status |
| | Flickering | The inverter is decreasing speed until stop. |
| | Extinguished | stop status |
| DIR | Light on | Reverse state |
| | Flickering | Switching to forward and reverse. |
| | Extinguished | Forward state |
| LOCAL | Light on | Operation panel control state（local contol） |
| | Extinguished | Terminals or communication control state |
| TRIP | Light on | Not serions fault alarm（over current、over voltage） |
| | Extinguished | The inverter output current and generatris voltage are normal |

Chart 5-3 run state indicator light description

5.1.3.2 Unit indication

In fast monitor state, indicate monitor unit and data.

| Data order | Indication | Range | Unit |
|---|---|---|---|
| Setting frequency | Hz light on | 0.00～600.00Hz | 0.01Hz |
| Output frequency | Hz flickering | 0.00～600.00Hz | 0.01Hz |
| Output current | A light on | 0.1～2000.0A | 0.1A |
| Output voltage | V light on | 0.1～2000.0V | 0.1V |
| DC bus voltage | V flickering | 100～1000V | 1V |
| Run rotate speed | Hz、A light on | 0～30000rpm | 1rpm |
| Load rate | A、V light on | 0.0～200.0%（motor rated load） | 0.1% |
| Output power | A、V flickering | 0.00～200.00%（motor rated power） | 0.01% |
| Output torque | A flickering | 0.00～200.00%（motor rated torque） | 0.01% |
| Over loading counter | Hz、V light on | 0.0～100.0% | 0.1% |
| Inverter temperature | Hz、V flickering | 0～100℃ | 1℃ |
| PID closed loop setting | Hz、A、V light on | 0.00～10.00V | 0.01V |
| PID closed loop feedback | Hz、A、V flickering | 0.00～10.00V | 0.01V |

Chart 5-4 unit indicator light description

### 5.1.4 Digital display

Have 6 digit LED , which can display data values.

## 5.2 Operation process

Four levels of menu as below:

| Operation state | Main contents |
|---|---|
| Fast monitor | Fast monitor 13 kinds of run states such as setting frequency, output frequency and so on. |
| Function code setting | Modify function code, the P function group of first-level menu. |
| Information query | Inquire about information and run state .the d function group of first-level menu. |
| Fault Alarm Reset | The inverter fault alarm display and reset. |

| | |
|---|---|
| Quick modify keyboard digital setting | When the frequency setting source is the keyboard digital setting, modify the setting frequency rapidly. (UP, DOWN function) |

Chart 5-5 Description of the inverter operation status

### 5.2.1 Fast-monitoring

After power-on initialization, the inverter automatically switches to the fast monitor status. If enter the fast-monitoring status in other states, you can press "monitor key" to enter. In the fast-monitoring state, use the "shift key" to switch monitor parameters. A total of 13 operational status can be monitored, the monitor status order and the dicator light reference Chart 5-4.

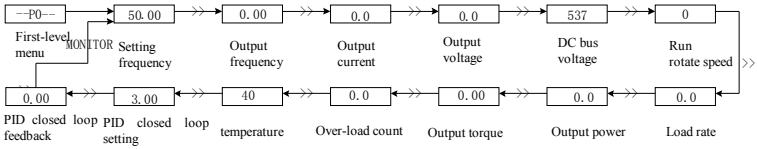



Chart 5-6 fast-monitoring diagram

### 5.2.2 Function codes setting

The function codes of P0、P1、P2 function group in first-level menu are can read-write parameters, users can modify.

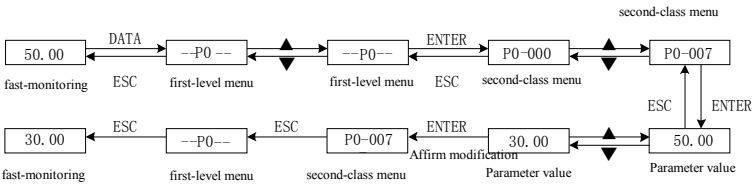



Chart 5-7 Function code setting diagram

### 5.2.3 Information Query

The function codes of d0、d1、d2、d3 function group in first-level menu for read only parameters, users can only look over.

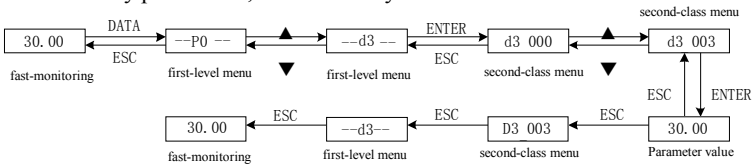



Chart 5-8 Information query diagram

### 5.2.4 Fault Alarm Reset

If the inverter has fault or alarm, it will prompt the related fault information. Codes for the E001 to E030.

If the inverter has E001 to E029 fault, please use the "reset button" to clear the fault.

If the inverter has a E030 alarm, please use the "ESC button" to clear the alarm.

### 5.2.5 Keyboard digital setting modify rapid

When P0-002 = 0, P0-003 = 1, the frequency source for the keypad digital setting.

Inverter in a parking state, UP, DOWN monitor a given frequency in effect in the fast-monitoring mode;

Inverter in running, UP, DOWN in effect in the fast-monitoring mode;

You can set P0-008, to prohibit UP, DOWN adjustment function

## 5.3 Motor parameter autotuning

If select the vector control run mode, in order to ensure control

performance, need to check motor parameters. Motor parameters self-learning the steps are as follows:

First, set the key P0-001 = 0, using the disc control mode.

And then set the detection mode P0-026.

P0-026 = 1 for spin detection, detect the no-load current and stator resistance, the motor can running during the operation, Accelerate time and decelerate time can be set by the P0-012, P0-013 when the rotation detect, but when P0 -012, P0-013 value is less than 15.0s, it will use the accelerate and decelerate time of 15.0s. Please set the accelerate and decelerate timeis more than 60s for 50kW motor;

P0-026 = 2 for static testing, only the stator resistance is test, the motor can not running during the operation.

Set Motor nameplate parameters.

P0-016: Motor rated power; P0-017: Motor rated frequency; P0-018: Motor rated voltage; P0-019: Motor rated current; P0-020: Motor rated speed.

And then press the "Run button" of the operation keyboard，the inverter will automatically detect motor parameters, and then stop running.

If the detection had been completed successfully,P0-026 will automatically be changed to 0, inverter return to static state.

.If the automatic detection fails, the inverter will stop testing; when re-run, it will resume testing. If after a fault, do not want to re-start the detection, please modify P0-026 to 0.

## 5.4 Quick debugging

Set the basic function code in operation ,refer to the following diagram .

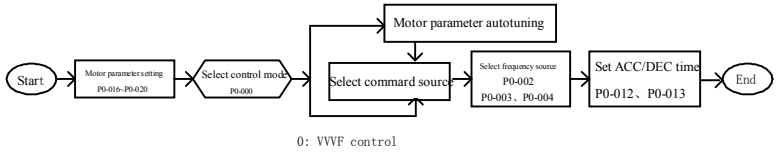



Chart 5-9 Quick debugging flowchart

# 6 Detailed Function description

This chapter introduces the function code setting of the P0, P1, P2 function group. d0, d1, d2, d3 function group for running information demand of the inverter, reference "9 Function Code List" .

## 6.1 P0 Group--Basic Function

### 6.1.1 Basic Function

| | | | |
|---|---|---|---|
| P0-000 | Control mode for speed | setting range:0～1 | factory setting:0 |

0:VVVF Control.

1:vector control. Before using this control mode, please had completed motor parameter autotuning.

Notice: Function Group 6.1.3 V / F curve parameters in vector control is also effective.

| | | | |
|---|---|---|---|
| P0-001 | Select commard source | Setting range:0～2 | factory setting:0 |

Command source is that a channel ,the inverter receives some instructions (run、stop、jog、running direction).

0: keyboard control.

1:Analog terminal control

2:communication control

Notice: You can use"command source switch" Terminal, switch to local control (keyboard control).

| Control terminal of command source state | P0-001 setting | the command source of actual use |
|---|---|---|
| Invalid | 0 | 0 |
| Invalid | 1 | 1 |
| Invalid | 2 | 2 |

| Control terminal of command source state | P0-001 setting | the command source of actual use |
|---|---|---|
| Effective | 0 | 0 |
| Effective | 1 | 0 |
| Effective | 2 | 0 |

Chart 6-1 switch description of command source

Setting frequency is controlled by the commends of running and JOG, both are valid, it will be in the running. Reference the logic diagram as shown below.

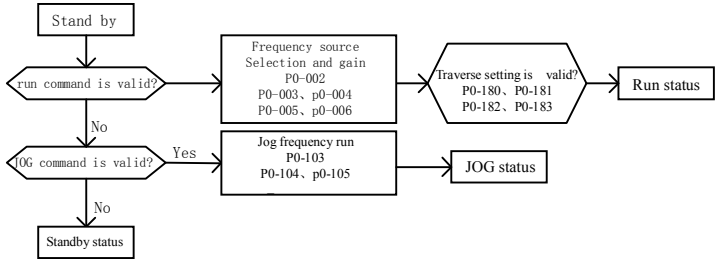



Chart 6-2 PRI description of running and JOG

| P0-002 | Select frequency source | Setting range:0～4 | Fctory value:0 |
|---|---|---|---|

0:Main frequency source x.

1:Assisiant frequency source Y.

2:Main frequency source X＋Assistant frequency source Y.

3:MAX（Main frequency source X，Assisiant frequency source Y）.

4:Ensured by selection terminals of frequency source.

| Selection terminals of frequency source1 | Selection terminals of frequency source2 | Frequency source in using |
|---|---|---|
| Invalid | Invalid | 0 |
| Invalid | Effective | 1 |
| Effective | Invalid | 2 |
| Effective | Effective | 3 |

Chart 6-3 selection terminals description of frequency source

| | | | |
|---|---|---|---|
| P0-003 | Main frequency source x selection | Setting range:0～10 | Factory value:0 |
| P0-004 | Assistant frequency source Yselection | Setting range:0～10 | Factory value:0 |

0: Keyboard potentiometers. Adjustable range between the lower frequency and maximum frequency.

1: Keyboard digital settings (UP, DOWN). When inverter in a parking state, it is effective to monitor setting frequency in the fast-monitoring mode with UP, DOWN key ; When inverter in running, it is effective in the fast-monitoring mode with UP, DOWN key.

2:VCI. Setting frequency is controlled by the input analog terminal VCI . reference P0-057 instructions.

3:CCI.Setting frequency is controlled by the input analog terminalCCI. reference P0-062 instructions.

4:Simple PLC running. Setting frequency is controlled by interior PLC program. reference P0-149 instructions.

5:Multi-segment speed. Setting frequency is controlled by the multi-function input terminals . reference P0-132 instructions.

6:PID closed loop running. Setting frequency is set by PID operation.reference P0-170 instructions.

7: PULSE input setting. Setting frequency is controlled by the input pulse . reference P0-067 instructions.

8:serial communication settings. Setting frequency is set by the serial communication, reference the description of serial communication.

9:VCI mode 2. When the multi-segment speed terminal is invalid, the setting frequency is controlled by the analog input terminal VCI . When the multi-segment speed terminal is effective, select multi-segment speed 1 to 15. Reference P0-132 instructions.

10:CCI Mode 2. When the multi-segment speed terminal is invalid, the setting frequency is controlled by the analog input terminal CCI . When the multi-segment speed terminal is effective,select multi-segment speed 1 to speed 15.

Reference P0-132 instructions.

| | | | |
|---|---|---|---|
| P0-005 | Main frequency source x gain | Setting range:0.10～10.00 | Factory value:1.00 |
| P0-006 | Assistant frequency source Y gain | Setting range:0.10～10.00 | Factory value:1.00 |

Set the frequency gain of frequency source. Significance of 0.10 is 0.1 times; 10.00 means that magnify 10 times.

| | | | |
|---|---|---|---|
| P0-007 | Keyboard digital setting frequency | Setting range: 0.00～600.00Hz | Factory value:50.00Hz |

Set the keyboard digital setting frequency velue .

| | | | |
|---|---|---|---|
| P0-008 | Keyboard and terminals UP/DOWN setting | Setting range:0～2 | Factory value:1 |

0:invalid.

1:effective，no saving after power off. After having changed the set frequency P0-007 by UP / DOWN, when the inverter power off, P0-007 is not stored in the EPP.

2:effective，saving after power off. After having changed the set frequency P0-007 by UP / DOWN, when the inverter power off, P0-007 is stored in the EPP.

| | | | |
|---|---|---|---|
| P0-009 | Running direction control | Setting range:0～2 | Factory value:0 |

0: It is same with setting direction. Run according to the instruction direction .

1: It is opposite with the setting direction. Run according to the instruction

opposite direction . the function can change the direction of motor rotation ,but don't change the wiring between the inverter and the motor .

2: reverse prohibited. reverse run is prohibited.

In run or Jog mode, the control of running direction please refer to the logic diagram shown below.

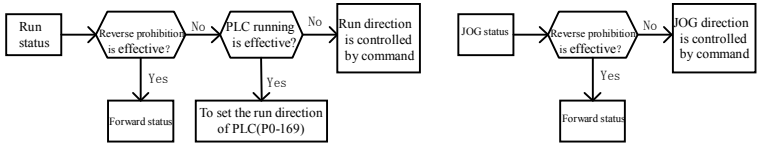



Chart 6-4 PRI description of running directions control

| | | | |
|---|---|---|---|
| P0-010 | Upper limit frequency | Setting range:0.00～600.00Hz | Factory value:50.00Hz |
| P0-011 | Lower limit frequency | Setting range:0.00～600.00Hz | Factory value:0.00Hz |

Set the maximum and minimum value of output frequency.

Notice :set the upper and lower limit frequency mostly prevent personnels mistake operation.inverter will avoid the motor overheat caused by low frequency , or because of the high frequency caused by mechanical wear and so on.

| | | | |
|---|---|---|---|
| P0-012 | Accelerate speed time0 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-013 | Decelerate speed time0 | Setting range:0.1～3200.0s | Factory value:15.0s |

Acc/Dec time of the "0" group , default Acc/Dec time in using. Can use Acc/Dec time of the other three groups by Multi-function terminal selection.

This function code of 15.0s the meaning for the accelerate time(0 Hz ~50 Hz) or deceleration time(50 Hz~0 Hz).

Notice: The factory value is different according to inverter power.

| | | | |
|---|---|---|---|
| P0-014 | Carrier frequency | Setting range:1.0～10.0KHz | Factory value:Model |

| | | | |
|---|---|---|---|
| | | | option |

Set the PWM output carrier frequency. Carrier frequency have effect for the motor noise、inverter thermal and environment interference、temperature rise of motor and inverter.

When carrier setting value higher than the default factory value, the inverter heat increased, please select bigger capacity inverter

| Carrier frequency | Electromagnetism noise | Cacophony/leak current | Inverter temperature rise | Motor temperature rise | Motor noise | outputcurrentwave |
|---|---|---|---|---|---|---|
| 2KHZ | small | small | small | big | big | poor |
| 5KHZ | \| | \| | \| | \| | \| | \| |
| 10KHZ | big | big | big | small | small | Good |

Chart 6-5 Setting reference of carrier frequency

| | | | |
|---|---|---|---|
| P0-015 | Adjust selection of carrier frequency | Setting range:0～3 | Factory value:Model option |

0: Fixed PWM, the carrier temperature adjustment is invalid.

1: fixed PWM, the carrier temperature adjustment is effective.

2: random PWM, the carrier temperature adjustment is invalid.

3: random PWM, the carrier temperature adjustment is effective.

G model default value for 0, P model default value for 2.

### 6.1.2 Motor Parameters

| | | | |
|---|---|---|---|
| P0-016 | Rated power of motor | Setting range:0.4～1000.0KW | Factory value:Model option |
| P0-017 | Rated frequency of motor | Setting range:1.00～600.00Hz | Factory value:50.00Hz |
| P0-018 | Rated voltage of motor | Setting range:10.0～440.0V | Factory value:Model option |
| P0-019 | Rated current of motor | Setting range:1.0～2000.0A | Factory value:Model option |
| P0-020 | Rated rotate speed of motor | Setting range:5～30000rpm | Factory value:1460rmp |

Please set it according to motor nameplate .

| | | | |
|---|---|---|---|
| P0-021 | No-load current of motor | Setting range:10.0～100.0% | Factory value:40.0% |

This parameter affect the performance of vector control，please use the motor parameter autotuning.

| | | | |
|---|---|---|---|
| P0-022 | Stator resistance | Setting range:0.001～65.000Ω | Factory value:Model option |

This parameter affect the performance of vector control，please use the motor parameter autotuning.

In “VVVF”control，VVVF control, this parameter will also affect automatic torque compensation and automatic slip compensation.

| | | | |
|---|---|---|---|
| P0-026 | motor parameter autotuning | Setting range:0～2 | Factory value:0 |

0:invalid. After successful tests will also be automatically set to 0.

1: Rotation Test. Motor run under no-load condition, to check the two parameters of motor no-load current and stator resistance.

2: static test. If the motor and the load connected, when the motor does not run under no-load , check the parameter of stator resistance.

Details please refer to 5.3 Motor parameters autotuning.

### 6.1.3 V/F Curve Parameter

The function group is valid in the VVVF and vector control.

| | | | |
|---|---|---|---|
| P0-027 | V/F curve setting | Setting range:0～7 | Factory value:0 |

0:linearity； 1: 1.3order； 2: 1.7order； 3: 2.0order；

4: High-torque curve 1； 5: High-torque curve 2； 6: High-torque curve 3;

7：four-point curve

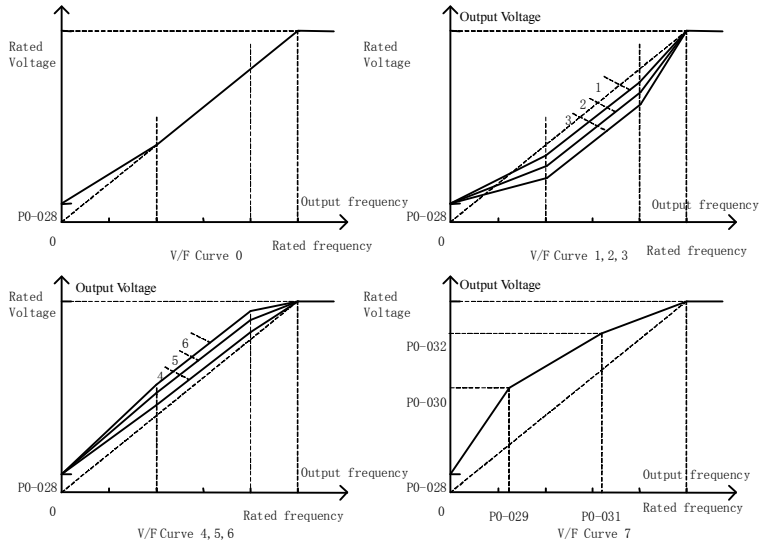



Chart 6-6 V/F curve chart

| | | | |
|---|---|---|---|
| P0-028 | V/F voltage point 0 | Setting range:0.0～15.0% | Factory value:1.0% |

Set 0Hz corresponding output voltage. 1.0% significance of the function code for motor rated voltage (P0-018). For the heavy load can be a gradual increase rate of 1.0% of the value.

| | | | |
|---|---|---|---|
| P0-029 | V/F frequency point1 | Setting range:0.0～100.0% | Factory value:40.0% |
| P0-030 | V/F voltage point1 | Setting range:0.0～100.0% | Factory value:40.0% |
| P0-031 | V/F frequency point2 | Setting range:0.0～100.0% | Factory value:80.0% |
| P0-032 | V/F voltage point2 | Setting range:0.0～100.0% | Factory value:80.0% |

Set the frequency and voltage of two mid-point in a four-point V / F curve . This function code “ 1.0%”, respectively correspond with 1.0% motor rated frequency (P0-017) or 1.0% motor rated voltage (P0-018).

### 6.1.4 VVVF Control Parameter

The function group is only effective under the VVVF control.

| | | | |
|---|---|---|---|
| P0-033 | Automatic torque compensation gain | Setting range:0.0～250.0% | Factory value:100.0% |

Inverter will automatically adjust the output voltage to maintain motor torque constant, especially low-frequency running to make up the voltage drop of stator resistance. When the torque is not enough to increase the function code, when the motor current is too large to decrease the function code.

This function code for 0.0 mean that the automatic torque compensation is prohibited.

| | | | |
|---|---|---|---|
| P0-034 | Automatic torque compensation filter | Setting range:0.01～5.00s | Factory value:0.10s |

This function code is used to set the response speed of automatic torque compensation. When the motor jitter and fluctuation of rotate speed are large, please increase the function code.

| | | | |
|---|---|---|---|
| P0-035 | Automatic slip compensation gain | Setting range:0.0～250.0% | Factory value:0.0% |

This function is used to improve the motor speed by reason of load changes. When Load is stable, if the motor fluctuation of rotate speed is large, please reduce the function code.

This function code for 0.0 mean that the automatic slip compensation is prohibited.

| | | | |
|---|---|---|---|
| P0-036 | Auto slip compensation filter | Setting range:0.01～5.00s | Factory value:0.10s |

The function code is used to set response speed of automatic slip compensation. When the motor jitter and fluctuation of rotate speed are large, please increase the function code.

| | | | |
|---|---|---|---|
| P0-037 | AVR ( Auto Voltage Regulation) | Setting range:0～2 | Factory value:2 |

0:Invalid.

1: Effective at all time. When the input voltage is not stable, automatically adjust output voltage to prevent output voltage is influenced by the fluctuation of input voltage.

2: Invalid only as deceleration to stop mode.Because the braking torque will be reduced owing to use AVR function in speed-down, so that you can choose to close the function in speedup .

| | | | |
|---|---|---|---|
| P0-038 | energy-saving run | Setting range:0～1 | Factory value:0 |

0:Invalid

1:Effective.Output power of the inverter will automatically reduce the output voltage to achieve energy-saving purposes. For the heavy load, the function will be prohibited.

| | | | |
|---|---|---|---|
| P0-039 | voltage limit of energy-saving running | Setting range:20.0～100.0% | Factory value:80.0% |

Set the minimum voltage of energy-saving running. When the function code for100.0%, it said that standard voltage of output in accordance with VF curve.

### 6.1.5 Vector control parameter

The function group is only effective under the vector control.

| | | | |
|---|---|---|---|
| P0-040 | ASR gain | Setting range:50.0～200.0% | Factory value:100.0% |
| P0-041 | ASR filter | Setting range:0.01～1.00s | Factory value:0.10s |

Speed loop PI regulation. When the velocity fluctuation, an increase in the speed loop filter.

| | | | |
|---|---|---|---|
| P0-042 | Current-loop gain | Setting range:50.0～200.0% | Factory value:100.0% |
| P0-043 | Current-loop filter | Setting range:0.01～1.00s | Factory value:0.10s |

Current loop PI regulator. When the velocity fluctuation, an increase in current loop filtering.

| | | | |
|---|---|---|---|
| P0-044 | Vc torque compensation gain | Setting range:50.0～250.0% | Factory value:100.0% |

To set torque compensation value during vector control

| | | | |
|---|---|---|---|
| P0-045 | VC Slip compensation gain | Setting range:50.0～250.0% | Factory value:100.0% |

To set slip compensation value during vector control

### 6.1.6 Input terminals

| | | | |
|---|---|---|---|
| P0-046 | X1 terminal function | Setting range:0～30 | Factory value:1 |
| P0-047 | X2 terminal function | Setting range:0～30 | Factory value:2 |
| P0-048 | X3 terminal function | Setting range:0～30 | Factory value:7 |
| P0-049 | X4 terminal function | Setting range:0～30 | Factory value:8 |
| P0-050 | X5 terminal function | Setting range:0～30 | Factory value:23 |
| P0-051 | X6 terminal function | Setting range:0～30 | Factory value:24 |
| P0-052 | X7 terminal function | Setting range:0～30 | Factory value:25 |
| P0-053 | X8 terminal function | Setting range:0～30 | Factory value:26 |

Notice: When the X terminal as an "internal counter clock input", set the P0-054 for 1.

0: invalid. Idle input terminals.

1: Forward run. Forward run command input.

2: Reverse run. Reverse run command input.

3: 3-wire control. 3-wire system to run auxiliary input commands.

4: Fault reset. Fault reset command input, equal to the "reset button."

5: UP command. Increasing frequency command input.

6: DOWN command. Reduce the frequency command input.

7: Forward jog. Forward jog command input.

8: Reverse jog. Reverse Jog command input.

9: Coast to stop. Receives the instruction,the inverter stop output immediately,motor coast to stop.

10: external fault input. Used as external mechanical fault signal of inverter.

11: Acc/Dec speed Pause. Acc/Dec speed pause, the output frequency remain unchanged.

12: PLC run reset. PLC from the first segment 0 starts running again.

13: PLC pause. PLC internal timer stop time.

14: Traverse run reset. After output frequency reaches set frequency，it will start again traverse run.

15: Traverse pause. output frequency will remain unchanged.

16: PID operation pause. Set frequency of PID operation will remain unchanged.

17: Clear PID integral time.

18: switch command source. This command is used to switch to local control (keyboard control). See P0-001 Function Code Description.

19: Frequency Source Select 1. See P0-002 Function Code Description.

20: Frequency source selection 2.

21: Acc/dec speed selection1. See P0-094 Function Code Description.

22: Acc/dec speed selection 2.

23: Muti-step speed terminal 1. See P0-132 Function Code Description.

24: Muti-step speed terminal 2.

25: Muti-step speed terminal 3.

26: Muti-step speed terminal 4.

27: Internal counter clock input. Counter clock input. When using this function, please set P0-054 for 1.

28: Reset internal counter. Counters will be cleared.

29: Enabled internal timer . When the signal is effective, the timer began to time.

30: Reset internal timer. Timer will be cleared.

| | | | |
|---|---|---|---|
| P0-054 | X input filter times | Setting range:1～50 | Factory value:20 |

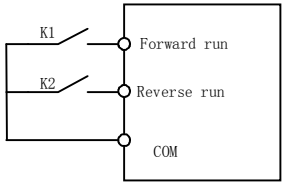
Set 8 X terminal filter, the bigger value match the bigger the filtering. when the X terminal has error action , please increase the value.

| | | | |
|---|---|---|---|
| P0-055 | Control mode of terminal | Setting range:0～3 | Factory value:0 |

0: 2-wire mode1； 1: 2-wire mode 2.

2: 3-wire mode 1； 3: 3-wire mode 2.

2-wire run mode only need to connect two signals: Forward run and reverse run.




2-wire mode 1

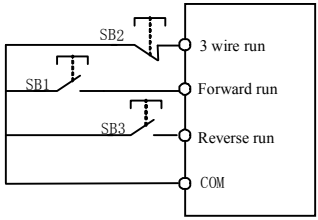
| K1 | K2 | Run command |
|---|---|---|
| OFF | OFF | stop |
| ON | OFF | Forward |
| OFF | ON | Reverse |
| ON | ON | stop |

2-wire mode 2

| K1 | K2 | Run command |
|---|---|---|
| OFF | OFF | Stop |
| ON | OFF | Forwaed |
| OFF | ON | Stop |
| ON | ON | Reverse |

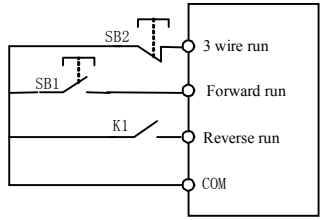
Chart 6-7 Diagram of two-wire run mode

3-wire run mode need to connect three signals: Forward run, reverse run, 3-wire run assistant.




SB1:Run
SB2:stop
SB3:Switiching for direction

3 wire mode 1




SB1:run
SB2:stop
K1: Running direction(OFF:forward; ON:reverse)

3 wire mode 2

Chart 6-8 3-wire run mode diagram

| | | | |
|---|---|---|---|
| P0-056 | UP/DOWN range | Setting range:0.01～100.00Hz/s | Factory value:10.00Hz/s |

Adjust the setting frequency range to use a keyboard or terminal

| | | | |
|---|---|---|---|
| P0-057 | VCI min input | Setting range:0.00 ～ 10.00V | Factory value:0.00V |
| P0-058 | VCI min input corresponding frequency | Setting range:0.00 ～ 600.00Hz | Factory value:0.00Hz |
| P0-059 | VCI max input | Setting range:0.00 ～ 10.00V | Factory value:10.00V |
| P0-060 | VCI max input corresponding frequency | Setting range:0.00 ～ 600.00Hz | Factory value:50.00Hz |

Input curve diagram, such as chart 6-9

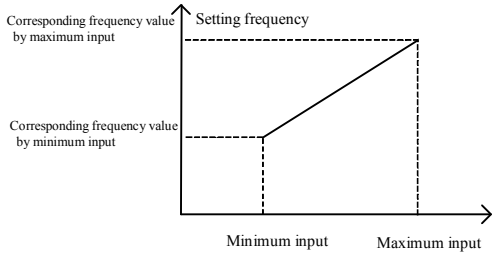



Chart 6-9 Analog or pulse corresponding frequency setting curve

| | | | |
|---|---|---|---|
| P0-061 | VCI input filter time | Setting range:0.01～5.00s | Factory value:0.10s |

Set VCI analog input filter time, when the analog fluctuation is severe, please increase the value .

| | | | |
|---|---|---|---|
| P0-062 | CCI min input | Setting range:0.00～10.00V | Factory value:0.00V |
| P0-063 | CCI min input corresponding frequency | Setting range:0.00～600.00Hz | Factory value:0.00Hz |
| P0-064 | CCI max input | Setting range:0.00～10.00V | Factory value:10.00V |
| P0-065 | CCI max input corresponding frequency | Setting range:0.00～600.00Hz | Factory value:50.00Hz |

Input curve diagram, such asChart 6-9 chart 6-9.

| | | | |
|---|---|---|---|
| P0-066 | CCI input filter time | Setting range:0.01～5.00s | Factory value:0.10s |

Set CCI analog input filter time, when the analog fluctuation is severe, please increase the value.

| | | | |
|---|---|---|---|
| P0-067 | PULSE min input | Setting range:0.00～50.00KHz | Factory value:0.00KHz |
| P0-068 | PULSE min input corresponding frequency | Setting range:0.00～600.00Hz | Factory value:0.00Hz |

| | | | |
|---|---|---|---|
| P0-069 | PULSE max input | Setting range:0.00～50.00KHz | Factory value:50.00KHz |
| P0-070 | PULSE max input corresponding frequency | Setting range:0.00～600.00Hz | Factory value:50.00Hz |

PULSE can only input through X8 terminal. X8 as a high-speed pulse input, please set P0-053 to 0.

Input curve diagram, such as the chart 6-9.

| | | | |
|---|---|---|---|
| P0-071 | PULSE input filter time | Setting range:0.01～5.00s | Factory value:0.10s |

Set the pulse input filter time, when the pulse fluctuation is severe, please increase the value .

### 6.1.7 Output terminals

| | | | |
|---|---|---|---|
| P0-072 | Relay output selection | Setting range:0～19 | Factory value:1 |
| P0-073 | Y1 output selection | Setting range:0～19 | Factory value:2 |
| P0-074 | Y2 output selection | Setting range:0～19 | Factory value:3 |

0: No output. Output terminal is idle.

1: Stop fault occurred in running. the effective signal will be output when stop fault.

2: inverter running. the effective signal will be output when running.

3: Run frequency reaches the setting value. See P0-110 Function Code Description.

4: Upper limit frequency running. When run frequency reaches Upper limit, output is an effective signal.

5: Lower limit frequency running. When run frequency reaches lower frequency, output is an effective signal.

6: Inverter zero speed running. When run frequency reaches 0Hz, output is an effective signal.

7: The run frequency level detection. See P0-111 Function Code Description.

8: overload pre-alarm. When the output current is bigger than or equal

overload warning value, output is an effective signal.

9: A minor fault occurred in running. A minor over-voltage or over-current fault occured in running, output is an effective signal.

10: Inverter run is ready. Inverter without fault, waiting for run commands, output is an effective signal.

11: External fault stopped. When have a external fault signal, output is an effective signal.

12: inverter under voltage stopped in running. undervoltage fault occures in running, output is an effective signal.

13: Inverter forward running. Forward running, output is an effective signal.

14: Inverter reverse running. Reversal running, output is an effective signal.

15: auxiliary motor. As simple " a drag two functions." See P0-113 ~ P0-114 Function Code Description.

16: The internal counter reaches the specified value. See P0-188 ~ P0-190 Function Code Description.

17: The internal counter reach the final value. See P0-188 ~ P0-190 Function Code Description.

18: Internal timer cycles to be reached. See P0-191 ~ P0-192 Function Code Description.

19: under-voltage pre-alarm. See P0-194 Function Code Description.

| | | | |
|---|---|---|---|
| P0-075 | AO1output selection | Setting range:0～7 | Factory value:0 |
| P0-076 | AO2 output selection | Setting range:0～7 | Factory value:1 |

Set the physical meaning of analog output. The maximum output range is 10V.

0: Output frequency. Output frequency is 50.00Hz corresponds to 10V output.

1: output current. Output current for rated current of motor corresponds to 10V output.

2: output voltage. The output voltage is 500.0V corresponds to 10V output.

3: Setting frequency. Setting frequency is 50.00Hz corresponds to 10V output.

4: DC bus voltage. DC bus voltage is 500V corresponds to 10V output.

5: VCI input voltage. VCI input voltage is 10V corresponding to 10.00V Output

6: CCI input voltage. CCI input voltage is 10.00V corresponds to 10V output. (when CCI for the current input, 20mA corresponds to 10V)

7: PULSE input. PULSE Input is 10V correspond to 50.00kHz output.

| | | | |
|---|---|---|---|
| P0-077 | AO1 output gain | Setting range:0.10～10.00 | Factory value:1.00 |
| P0-078 | AO2 output gain | Setting range:0.10～10.00 | Factory value:1.00 |

Set analog output gain.

The following diagram for the analog function of AO1 as "output frequency" , show the output gain setting.

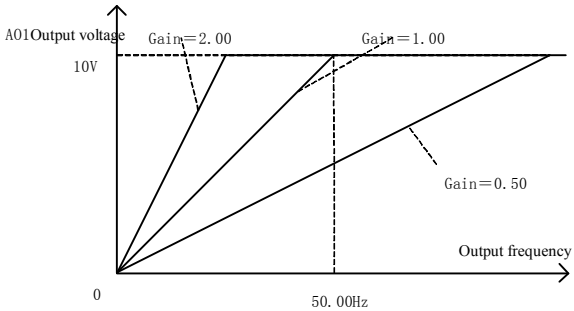



Chart 6-10 Analog Output Gain diagram

### 6.1.8 Start and Stop Control

| | | | |
|---|---|---|---|
| P0-079 | Start mode | Setting range:0～2 | Factory value:0 |

0: Start the inverter at the starting frequency. Start the inverter according to a certain starting frequency .

1: First DC-braking before starting. Inverter will output DC current firstly and then start the motor at the starting frequency. It is suitable for the motor which

have small inertia load.

2: Speed Tracking start. It is suitable for the motor which have small inertia load. Inverter output voltage is automatically adjusted according to the output current, in order to reduce over-current faults at starting..

| | | | |
|---|---|---|---|
| P0-080 | Sarting frequency | Setting range:0.00～10.00Hz | Factory value:0.00Hz |
| P0-081 | Hold time of sarting frequency | Setting range:0.00～60.00s | Factory value:0.00s |

Set starting frequency at starting and hold time of start frequency.

| | | | |
|---|---|---|---|
| P0-082 | Start DC braking cruuent | Setting range:0.0～150.0% | Factory value:0.0% |
| P0-083 | Start DC braking time | Setting range:0.0～60.00s | Factory value:0.00s |

Set DC braking current at starting and braking time.

| | | | |
|---|---|---|---|
| P0-084 | Start mode of REV tracking | Setting range:0～1 | Factory value:0 |

0: Start to track starting at setting frequency . It is suitable for to majority running environment, but when the motor speed of the free glide is higher than the motor speed of setting frequency, over-voltage fault will easy occur. Please set the setting frequency higher the motor speed of the free glide in order to prevent overvoltage faults.

1: Track start from Upper limit began. When the motor speed of the free glide close to Upper limit, please use this mode.

| | | | |
|---|---|---|---|
| P0-085 | Stop mode | setting range:0～1 | Factory value:0 |

0: Deceleration to stop. When the stop command takes effect, the inverter decreases the output frequency according to the selected Acc/Dec time till stop.

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.

| | | | |
|---|---|---|---|
| P0-086 | Starting frequency of DC braking | Setting range:0.00～50.00Hz | Factory value:0.00Hz |
| P0-087 | Waiting time before DC braking | Setting range:0.01～60.00s | Factory value:0.01s |
| P0-088 | DC braking current | Setting range:0.0～150.0% | Factory value:0.0% |
| P0-089 | DC braking time | Setting range:0.0～60.00s | Factory value:0.00s |

The inverter decelerate to stop, inverter stop output period of time(Waiting time before DC braking) when output frequency decelerates to starting frequency of DC braking，then DC braking will be start. DC braking current and DC braking time can be set separately .

When P0-086 = 0, that stop DC braking is invalid.

| | | | |
|---|---|---|---|
| P0-090 | Dead of time FWD/REV | Setting range:0.01～60.00s | Factory value:0.50s |

Set the hold time at zero frequency in the transition between forward and reverse running.

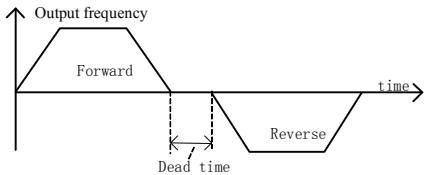



Chart 6-11 FWD/REV dead time diagram

| | | | |
|---|---|---|---|
| P0-091 | Restart after power off instantaneous | Setting range:0～1 | Factory value:0 |

0: invalid.

1: effective. When running the bus voltage is too low result in under-voltage fault occurs, the inverter will automatically reset the fault, and then run

automatically.

| P0-092 | waiting time for restart | Setting range:0.01～60.00s | Factory value:0.10s |
|---|---|---|---|

Set waiting time for restart , the inverter wait for setting value of the function code after under -voltage occurs, then reset the fault automatically to run.

| P0-093 | least output frequency setting | Setting range:0～1 | Factory value:0 |
|---|---|---|---|

When setting frequency less than lower limit frequency, set the inverter output frequency.

0: limit frequency to run less than 0.

1: Sleep Stand-by (0Hz output).

### 6.1.9 Acc/Dec assistant

| P0-094 | Acc/Dec mode selection | Setting range:0～1 | Factory value:0 |
|---|---|---|---|

0: Linear acceleration and deceleration. According to setting acceleration and deceleration time to change output frequency. 4 group acceleration and deceleration time can be selected, you can choose acceleration and deceleration time via multi-function input terminals. See the chart 6-12.

1: S curve acceleration and deceleration. Smooth acceleration and deceleration of the initial segment and end segment, reducing the impact to machinery and equipment.

| Acc/Dec selection1 | Acc/Dec selection 2 | Acc/Dec time selected |
|---|---|---|
| OFF | OFF | Acc time0、Dec time0 |
| OFF | ON | Acc time1、Dec time1 |
| ON | OFF | Acc time2、Dec time2 |
| ON | ON | Acc time3、Dec time3 |

Chart 6-12 Acc/Dec time of terminals selection

| | | | |
|---|---|---|---|
| P0-095 | S curve acceleration characteristic time | Setting range:0.2～2.0s | Factory value:0.5s |
| P0-096 | S curve deceleration characteristic time | Setting range:0.2～2.0s | Factory value:0.5s |

S curve characteristic time means that the acceleration and deceleration time from 0 to the time of setting deceleration time. Acceleration and deceleration set separately.

| | | | |
|---|---|---|---|
| P0-097 | ACC time 1 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-098 | DEC time 1 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-099 | ACC time 2 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-100 | DEC time 2 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-101 | ACC time 3 | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-102 | DEC time 3 | Setting range:0.1～3200.0s | Factory value:15.0s |

Group 1, Group 2, Group 3 Acc/Dec time, can be selected by multi-function terminals. can also be selected at PLC run time.

Notice: Factory value will be different according to different inverter power.

### 6.1.10 Auxiliary function

| | | | |
|---|---|---|---|
| P0-103 | Jog frequency | Setting range:0.00～600.00Hz | Factory value:5.00Hz |

After inverter receives Jog command, will run at setting frequency in the function code .

| | | | |
|---|---|---|---|
| P0-104 | Jog acceleration time | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-105 | Jog deceleration time | Setting range:0.1～3200.0s | Factory value:15.0s |

Set acceleration and deceleration time of jog run. This function code is 15.0s meaning that the accelerate time from 0Hz to 50Hz or the deceleration time from 50Hz to 0Hz.

| | | | |
|---|---|---|---|
| P0-106 | Skip frequency 1 | Setting range:0.00～600.00Hz | Factory value:0.00Hz |
| P0-107 | Skip frequency 2 | Setting range:0.00～600.00Hz | Factory value:0.00Hz |

| | | | |
|---|---|---|---|
| P0-108 | Skip frequency 3 | Setting range:0.00～600.00Hz | Factory value:0.00Hz |
| P0-109 | Skip frequency bandwidth | Setting range:0.00～50.00Hz | Factory value:0.00Hz |

By means of setting skip frequency, the inverter can keep away from the mechanical resonance with the load.

In order to avoid mechanical resonance point with the load, the inverter output frequency can jump run near the setting frequency . most 3 jump points can be defined.

Notice: Do not overlap 3jump frequency range or nesting set.

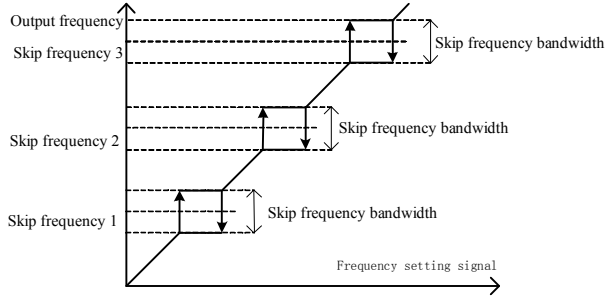



Chart 6-13 skip frequency run diagram

| | | | |
|---|---|---|---|
| P0-110 | Frequency arrive detecting range | Setting range:0.00～600.00Hz | Factory value:1.00Hz |

With the use of multi-function output terminal. When difference of running frequency and setting frequency is less than setting value of function code, the output effective signal.

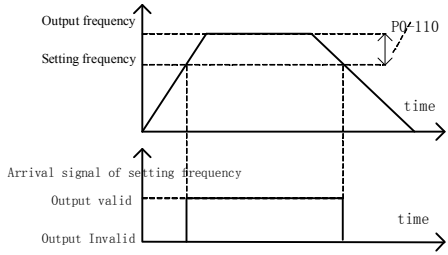



Chart 6-14 description of frequency arrive detecting range

| | | | |
|---|---|---|---|
| P0-111 | FDT level | Setting range:0.00～600.00Hz | Factory value:50.00Hz |
| P0-112 | FDT delay value | Setting range:0.00～10.00Hz | Factory value:5.00Hz |

With the use of multi-function output terminal. When running frequency is bigger than setting value of P0-111 Function Code, the output effective signal. P0-112 function code set detection hysteresis.

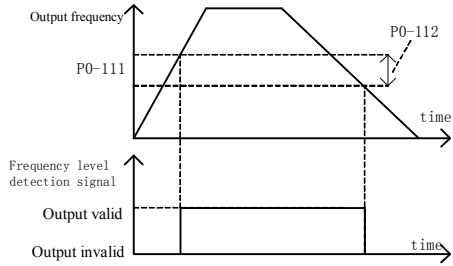



Chart 6-15 description of FDT level

| | | | |
|---|---|---|---|
| P0-113 | Starting delay time of auxiliary motor1 | Setting range:0.1～600.0s | Factory value:15.0s |
| P0-114 | Stopping delay time of auxiliary motor1 | Setting range:0.1～600.0s | Factory value:15.0s |

With the use of multi-function output terminal. When running frequency is Upper limit, and maintain setting value of the P0-113function code, the output

effective level; When running frequency is lower limit frequency, and maintain setting value of the P0-114function code, the output level is invalid; This function can be used to control a work-frequency motor start-stop, to achieve simple "one drag two function."

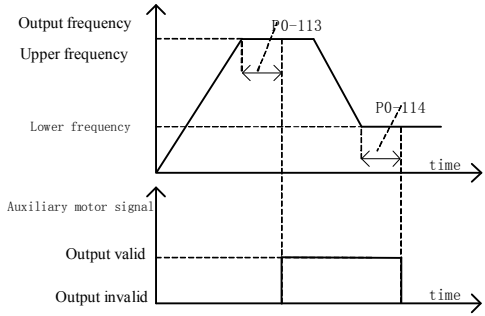



Chart 6-16 simple"one drag two function"description

### 6.1.11 Keyboard setting

| | | | |
|---|---|---|---|
| P0-115 | DIR/JOG function selection | Setting range:0～2 | Factory value:0 |

0: switching at running direction.

1: jog command. The key is a jog command.

2: The key is invalid.

| | | | |
|---|---|---|---|
| P0-116 | Keyboard STOP key function setting | Setting range:0～1 | Factory value:0 |

0: It is invalid in the analog terminal / serial communication control mode.

1: It is effective in the analog terminal / serial communication control mode (equivalent to the external fault input).

| | | | |
|---|---|---|---|
| P0-117 | Default monitor parameters | Setting range:0～13 | Factory value:0 |

This function code is set for the default monitoring parameter in the fast-monitoring state.

0: Setting frequency；1: Output frequency；2: Output current；3: Output voltage；

4: DC BUS voltage；5: Running rotate speed； 6: Load rate；7: Output power；

8: Output torque； 9: count of overheat due to Overload； 10: Inverter temperature；

11: PID closed loop setting；12: PID closed loop feedback；13: Display setting frequency when stopping; display

Output frequency in running.

### 6.1.12 Protect function setting

| | | | |
|---|---|---|---|
| P0-118 | Motor overload protection coefficient | Setting range:80.0%～110.0% | Factory value:100.0% |

Overload protection is based on the motor rated current as the benchmark. When this function code 100.0%, the corresponding overload ability is: G-model at 150% motor rated current for one minute , P-model at 120% motor rated current for one minute , using inverse-time limit curve control. When this function code is 110.0%, the corresponding overload ability is: G-model at 165% motor rated current for one minute , P-model at 132% motor rated current for one minute , using inverse-time limit curve control.

| | | | |
|---|---|---|---|
| P0-119 | Pre-alarm value of motor overload | Setting range:100.0%～180.0% | Factory value:130.0% |

This 100.0% of function code corresponding to motor rated current. When the output current is higher than the value of this function code is set, output overload pre-alarm signal. This function is required to meet the use of multi-function output terminal .

| | | | |
|---|---|---|---|
| P0-120 | Over-current protection when lose speed | Setting range:110.0%～200.0% | Factoryvalue:Model option |

This 100.0% of function code corresponding to rated current of motor.

The G-model (constant torque load) default value is 160.0%; the P-model (fan, pump model load) default value is 130.0%.

Surge current phenomenon of inverter will occur in the accelerating running process , due to acceleration time and motor inertia does not match or load inertia alters suddenly . By checking the inverter output current, and with this setting value of function code to compare, when the actual current exceeds the value, the Acc speed will be suspended until the current is reduced to less than the 5.0% of setting value.

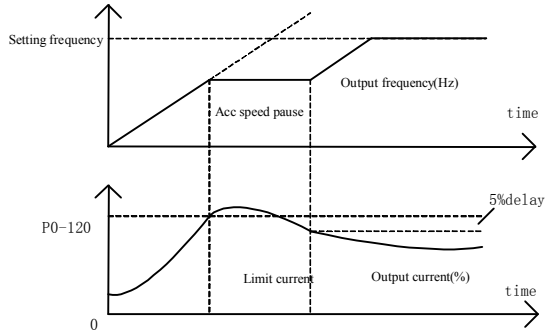



Chart 6-17 Diagram of over-current protection when lose speed

| | | | |
|---|---|---|---|
| P0-121 | Over-current reducing frequency protection current | Setting range:110.0 % ～220.0% | Factory value:Model option |
| P0-122 | Over-current reducing frequency delay time | Setting range:1～1000ms | Factory value:20ms |

100.0% of P0-121 function code corresponding to rated current of motor. G-model (constant torque load) default value is 170.0%; P-model (fan, pump model load) default value is 140.0%. Surge current phenomenon of inverter will occur in running of constant speed (output frequency), due to the load alters suddenly.

By checking the inverter output current, and with P0-121 setting value to

compare, when the actual current exceeds the setting value of P0-121 and maintains setting time by P0-122 , the inverter will reduce the output frequency , until the current is reduced to less than the 5.0% of setting value , and then continue to accelerate to the setting output frequency.

Notice: In the traverse frequency running, the parameter is invalid.

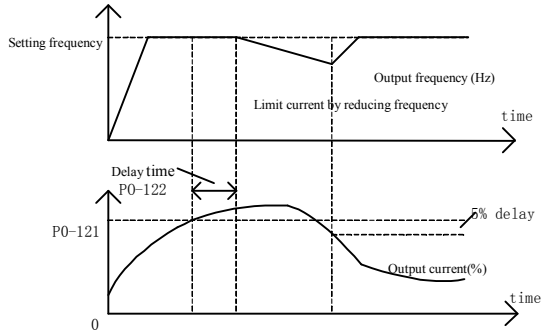



Chart 6-18 Diagram of lower frequency limit current

| | | | |
|---|---|---|---|
| P0-123 | Over-voltage protection when lose speed | Setting range: 120.0%～150.0% | Factory value: 130.0% |

This 100.0% of function code corresponding to the bus voltage 537 volts.

The surge phenomenon of inverter bus voltage will occur in the deceleration running process, due to deceleration time is set too short, does not match with the motor inertia. By detecting the bus voltage of inverter, and with the setting value of this function code to compare, when the actual bus voltage exceeds this value, the inverter will pause slow down until the bus voltage is reduced to less than the 5.0% of setting value , and then continue to slow down.

| | | | |
|---|---|---|---|
| P0-124 | Output open-phase protection function | Setting range:0～1 | Factory value:0 |

0: Invalid. Does not detect missing phase fault of output.

1: effective. Detect missing phase fault of output.

| | | | |
|---|---|---|---|
| P0-125 | Auto reset times | Setting range:0～3times | Factory value:0times |
| P0-126 | Reset interval | Setting range:0.01～60.00s | Factory value:1.00s |

Auto reset function can reset the fault in preset times （P0-125）and interval （P0-126）. When P0-125 is set to be 0, it means “auto reset” is invalid, the protective device will be activated in case of fault. and the fault times will be cleared.

Notice: After normal running for 60s, the fault times occurred in the past will be cleared.

| | | | |
|---|---|---|---|
| P0-127 | Stop fault output selection during auto resetting | Setting range:0～1 | Factory value:0 |

effective.0: No action. Stop fault output is invalid.

1: Action. Stop fault output effective.

| | | | |
|---|---|---|---|
| P0-128 | Voltage value in under-voltage protection | Setting range:50.0%～85.0% | Factory value:75.0% |
| P0-129 | Over-voltage protection point | Setting range:120.0%～150.0% | Factory value:140.0% |

Set inverter under-voltage and over-voltage protection action levels. This 100.0% of function code corresponding for the bus voltage 537 volts.

When the inverter input three-phase power supply fluctuation is large, or load inertia is large, the frequent under-voltage and over-voltage fault occur, may be appropriate to adjust above 2 functions code.

| | | | |
|---|---|---|---|
| P0-130 | Dynamic braking voltag value | Setting range:110.0%～140.0% | Factory value:125.0% |

Set brake threshold voltage value, 100.0% corresponding for the bus voltage 537 volts.

Dynamic braking means that inverter through connecting the built-in braking resistor or external braking resistor in order to expend the bus power of inverter, this method is effective to avoid the fault of bus over-voltage.

| P0-131 | Cooling fan control selection | Setting range:0～1 | Factory value:0 |
|---|---|---|---|

0: running after Inverter run (according to the temperature of inverter automatically start and stop the fan).

1: running at all times.

### 6.1.13 Multi-step speed and simple PLC

| P0-132 | Terminals input mode of Muti-step speed | Setting range:0～1 | Factory value:0 |
|---|---|---|---|

0: combination form . By a binary combination form of multi-step speed terminal to select the 16-step speed of multi-step speed.

1: Non-combination form. By a non-combination form of multi-stage speed to select the 5-step speed of multi-stage speed.

Under combination form, the terminal 4 of multi-stage is lowest binary bit .

When the frequency source for the "VCI mode 2" or "CCI Model 2", it will not use the "multi-speed 0."

| Muti-step speed terminal1 | Muti-step speed terminal 2 | Muti-step speed terminal 3 | Muti-step speed terminal 4 | Speed stage under combination form |
|---|---|---|---|---|
| OFF | OFF | OFF | OFF | Muti-step speed 0 |
| OFF | OFF | OFF | ON | Muti-step speed 1 |
| OFF | OFF | ON | OFF | Muti-step speed 2 |
| OFF | OFF | ON | ON | Muti-step speed 3 |
| OFF | ON | OFF | OFF | Muti-step speed 4 |
| OFF | ON | OFF | ON | Muti-step speed 5 |
| OFF | ON | ON | OFF | Muti-step speed 6 |
| OFF | ON | ON | ON | Muti-step speed 7 |
| ON | OFF | OFF | OFF | Muti-step speed 8 |
| ON | OFF | OFF | ON | Muti-step speed 9 |

| Muti-step speed terminal1 | Muti-step speed terminal 2 | Muti-step speed terminal 3 | Muti-step speed terminal 4 | Speed stage under combination form |
|---|---|---|---|---|
| ON | OFF | ON | OFF | Muti-step speed10 |
| ON | OFF | ON | ON | Muti-step speed 11 |
| ON | ON | OFF | OFF | Muti-step speed 12 |
| ON | ON | OFF | ON | Muti-step speed 13 |
| ON | ON | ON | OFF | Muti-step speed 14 |
| ON | ON | ON | ON | Muti-step speed 15 |

Chart 6-19 Diagram of multi-stage speed mode 0

Under non-compound form, the terminal 4 of multi-stage speed has highest priority, when it is effective, the other multi-stage speed terminal will be ignored.

| Multi-step speed terminal 1 | Multi-step speed terminal 2 | Multi-step speed terminal 3 | Multi-step speed terminal 4 | Speed stage under non-combination form |
|---|---|---|---|---|
| OFF | OFF | OFF | OFF | Muti-step speed 0 |
| ON | OFF | OFF | OFF | Muti-step speed 1 |
| ignore | ON | OFF | OFF | Muti-step speed 2 |
| ignore | ignore | ON | OFF | Muti-step speed 3 |
| ignore | ignore | ignore | ON | Muti-step speed 4 |

Chart 6-20 Diagram of multi-step mode1

| | | | |
|---|---|---|---|
| P0-133 | Muti-step speed 0 | Setting range:0.00～600.00Hz | Factory value:0.00Hz |
| P0-134 | Muti-step speed 1 | Setting range:0.00～600.00Hz | Factory value:1.00Hz |
| P0-135 | Muti-step speed 2 | Setting range:0.00～600.00Hz | Factory value:2.00Hz |
| P0-136 | Muti-step speed 3 | Setting range:0.00～600.00Hz | Factory value:3.00Hz |
| P0-137 | Muti-step speed 4 | Setting range:0.00～600.00Hz | Factory value:4.00Hz |
| P0-138 | Muti-step speed 5 | Setting range:0.00～600.00Hz | Factory value:5.00Hz |
| P0-139 | Muti-step speed 6 | Setting range:0.00～600.00Hz | Factory value:6.00Hz |
| P0-140 | Muti-step speed 7 | Setting range:0.00～600.00Hz | Factory value:7.00Hz |
| P0-141 | Muti-step speed 8 | Setting range:0.00～600.00Hz | Factory value:8.00Hz |
| P0-142 | Muti-step speed 9 | Setting range:0.00～600.00Hz | Factory value:9.00Hz |
| P0-143 | Muti-step speed10 | Setting range:0.00～600.00Hz | Factory value:10.00Hz |
| P0-144 | Muti-step speed 11 | Setting range:0.00～600.00Hz | Factory value:11.00Hz |
| P0-145 | Muti-step speed 12 | Setting range:0.00～600.00Hz | Factory value:12.00Hz |

| | | | |
|---|---|---|---|
| P0-146 | Muti-step speed 13 | Setting range:0.00～600.00Hz | Factory value:13.00Hz |
| P0-147 | Muti-step speed 14 | Setting range:0.00～600.00Hz | Factory value:14.00Hz |
| P0-148 | Muti-step speed 15 | Setting range:0.00～600.00Hz | Factory value:15.00Hz |

Set the frequency of multi-stage speed 16

| | | | |
|---|---|---|---|
| P0-149 | PLC run mode | Setting range:0～2 | Factory value:0 |

0: single-cycle. PLC cycle only once, after the Muti-step speed 15 has been finished , it will stop.

1: continuous cycle. PLC in cycles, after the Muti-step speed 15 has been finished , a new cycle will start from Muti-step speed 0.

2: running at Muti-step speed 15 after single-cycle .after the Muti-step speed 15 has been finished . running at Muti-step speed 15 at all times.

| | | | |
|---|---|---|---|
| P0-150 | Unit setting of PLC run times | Setting range:0～1 | Factory value:0 |

0: second. The unit of PLC running time for second, set units ( P0-151 ~ P0-166 ).

1: hour. The unit of PLC running time for hour, set units (P0-151 ~ P0-166).

| | | | |
|---|---|---|---|
| P0-151 | $0^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-152 | $1^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-153 | $2^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-154 | $3^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-155 | $4^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-156 | $5^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-157 | $6^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-158 | $7^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-159 | $8^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-160 | $9^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-161 | $10^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-162 | $11^{th}$-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |

| | | | |
|---|---|---|---|
| P0-163 | 12th-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-164 | 13th-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-165 | 14th-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |
| P0-166 | 15th-step running time | Setting range:0.0～6553.5s（h） | Factory value:0.0s |

Set running time of PLC per step.

| | | | |
|---|---|---|---|
| P0-167 | PLC Acc/Dec time setting1 | Setting range:0～65535 | Factory value:0 |
| P0-168 | PLC Acc/Dec time setting2 | Setting range:0～65535 | Factory value:0 |

Set acceleration and deceleration time of PLC per step, need to binary switching. binary number of 16-bit, the lowest bit for the BIT0, the highest for the BIT15.

| Fnction code | Binary bit | PLCstep number | Acc/Dec time 0 | Acc/Dec time 1 | Acc/Dec time 2 | Acc/Dec time 3 |
|---|---|---|---|---|---|---|
| P0-167 | BIT1 BIT0 | 0 | 00 | 01 | 10 | 11 |
| P0-167 | BIT3 BIT2 | 1 | 00 | 01 | 10 | 11 |
| P0-167 | BIT5 BIT4 | 2 | 00 | 01 | 10 | 11 |
| P0-167 | BIT7 BIT6 | 3 | 00 | 01 | 10 | 11 |
| P0-167 | BIT9 BIT8 | 4 | 00 | 01 | 10 | 11 |
| P0-167 | BIT11 BIT10 | 5 | 00 | 01 | 10 | 11 |
| P0-167 | BIT13 BIT12 | 6 | 00 | 01 | 10 | 11 |
| P0-167 | BIT15 BIT14 | 7 | 00 | 01 | 10 | 11 |
| P0-168 | BIT1 BIT0 | 8 | 00 | 01 | 10 | 11 |
| P0-168 | BIT3 BIT2 | 9 | 00 | 01 | 10 | 11 |
| P0-168 | BIT5 BIT4 | 10 | 00 | 01 | 10 | 11 |
| P0-168 | BIT7 BIT6 | 11 | 00 | 01 | 10 | 11 |
| P0-168 | BIT9 BIT8 | 12 | 00 | 01 | 10 | 11 |
| P0-168 | BIT11 BIT10 | 13 | 00 | 01 | 10 | 11 |
| P0-168 | BIT13 BIT12 | 14 | 00 | 01 | 10 | 11 |
| P0-168 | BIT15 BIT14 | 15 | 00 | 01 | 10 | 11 |

Chart 6-21 PLC Acc/Dec time selection

To select a group of Acc/Dec time by 2 binary bits, a total of four groups can be selected. Convert the 16-bit binary number to decimal number and set to the function code.

| | | | |
|---|---|---|---|
| P0-169 | PLC run direction setting | Setting range:0～65535 | Factory value:0 |

Set the PLC running directions , need binary switching. A binary number of 16-bit, the lowest is the BIT0, highest is the BIT15.

BIT0 means that PLC 0th-step running direction. When BIT0＝0，the 0th-step running direction is positive; when BIT0＝1，the 0th-step running direction is opposite.

……

BIT15 means that PLC 15th-step running direction. When BIT15＝0，the 15th-step running direction is positive;；when BIT15＝1，the 15th-step running direction is opposite.

Convert the 16-bit binary number to decimal number and set to the function code.

### 6.1.14 PID control

| | | | |
|---|---|---|---|
| P0-170 | PID setting channels selection | Setting range:0～7 | Factory value:0 |

0: keyboard digital setting. The PID setting is set by “P0-171” .

1: Keyboard potentiometers. The PID setting is set by keyboard potentiometer. Setting range is 0 ~ 10.00V.

2: VCI (0 ~ 10V). The PID setting is set by the VCI voltage of control terminal.

3:CCI(0～10V). The PID setting is set by the CCI voltage of control terminal. Input current is automatically converted into voltage, 20mA corresponds to 10V.

4:PULSE input setting. Internal conversion, pulse 10.00kHz converted to 10.00V.

5: PLC. Internal conversion, the setting frequency of PLC operation is converted to voltage, 10.00Hz corresponds to 10.00V.

6: serial communication settings. See the description of serial communication protocol.

7: CCI (4 ~ 20mA). The PID setting is set by the CCI current of control terminal. Note that CCI input jumper should select current input.

| | | | |
|---|---|---|---|
| P0-171 | PID Keyboard digital setting | Setting range:0.00～10.00V | Factory value:3.00V |

Set PID number setting value.

| | | | |
|---|---|---|---|
| P0-172 | PID feedback channel selection | Setting range:0～6 | Factory value:0 |

0: VCI (0 ~ 10V). The PID feedback is set by the VCI voltage of control terminal .

1:CCI(0～10V). The PID feedback is set by the CCI voltage of control terminal . Input current is automatically converted into voltage, 20mA corresponds to 10V.

2: MAX (VCI, CCI). VCI and CCI comparison, the large value as the PID feedback .

3:PULSE input setting. Internal conversion, pulse 10.00kHz converted to 10.00V.

4: Keyboard potentiometer (use when testing).

5:CCI（4～20mA）. The PID feedback is set by the CCI current of control terminal. Note that CCI input jumper should select current input.

6: VCI-CCI. The PID feedback is set by the value of subtracting between VCI and CCI voltage. This function is mainly used for difference in temperature

and pressure control.

| | | | |
|---|---|---|---|
| P0-173 | PID feedback channel gain | Setting range:0.10～10.00 | Factory value:1.00 |

Set PID feedback gain

| | | | |
|---|---|---|---|
| P0-174 | PID feedback signal characteristic | Setting range:0～1 | Factory value:0 |

0: positive characteristic. When the feedback value is bigger than PID setting, requires output frequency of the inverter to reduce in order to make PID balance.

1: inverse characteristic. When the feedback value is bigger than PID setting, requires output frequency of the inverter to rise in order to make PID balance.

| | | | |
|---|---|---|---|
| P0-175 | Proportional gain P | Setting range:0.00～10.00 | Factory value:1.00 |
| P0-176 | Integral time I | Setting range:0.00～100.00s | Factory value:2.00s |
| P0-177 | Differential time D | Setting range:0.00～100.00s | Factory value:0.00s |

The proportion, integral, differential in PID regulator is independent of each other, through their respective codes to adjust the function.

The proportional gain P: the value is bigger means that the proportion regulation is stronger. This function code is 1.00 means when the deviation of PID setting and feedback is 10.00V , the output frequency command of PID regulator is 10.00Hz (ignore the role of integral and differential).

Notice: when the function code is 0, means that the proportional regulation t is prohibited.

Integral time I: the value is smaller means that the integral adjustment is stronger. This function code is 1.00s means when the deviation of PID setting and feedback is 10.00V , the output frequency command of PID regulator is 10.00Hz (ignore the role of proportion and differential).

Notice: when the function code is 0, means that the integral regulation is prohibited.

Differential time D: the value is larger means that the differential adjustment is stronger. This function code is 1.00s means when the change rate of deviation of PID setting and feedback is 10.00Vwithin 1s, the output frequency command of PID regulator is 10.00Hz (ignore the role of proportion and integral).

Notice: when the function code is 0, means that the differential regulation is prohibited.

| | | | |
|---|---|---|---|
| P0-178 | Sampling cycle | Setting range:0.01～10.00s | Factory value:0.10s |

Set the refresh cycles of setting and feedback value of PID regulator.

| | | | |
|---|---|---|---|
| P0-179 | Bias limit | Setting range:0.00～2.00V | Factory value:0.00V |

When the deviation value of PID setting and feedback is less than the value, then the PID stop operation, will maintain the output frequency

### 6.1.15 Traverse frequency setting

| | | | |
|---|---|---|---|
| P0-180 | Traverse amplitude | Setting range:0.0～100.0%（relative to setting frequency） | Factory value:0.0% |
| P0-181 | Jitter frequency | Setting range:0.0～50.0%（relative to traverse amplitude） | Factory value:0.0% |
| P0-182 | Rise time of traverse | Setting range:0.1～3200.0s | Factory value:15.0s |
| P0-183 | Fall time of traverse | Setting range:0.1～3200.0s | Factory value:15.0s |

Traverse frequency function applies to textile and chemical fiber industries.

When traverse frequency running, the output frequency of inverter will traverse up and down according to setting frequency as the center, in which raverse amplitude is set by P0-180, when the P0-180 is set to 0, the traverse

frequency running is invalid.

Notice: When the P0-180 set is too large, result in output frequency during traverse running will be higher than Upper limit, traverse running will be automatically invalid.

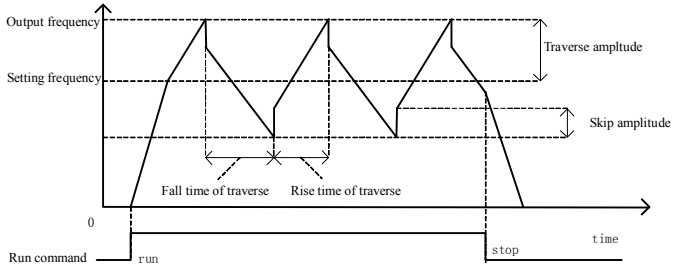



Chart 6-22 Traverse frequency run diagram

### 6.1.16 Serial Communication Settings

| P0-184 | Local address | Setting range:1～254 | Factory value:1 |
|---|---|---|---|

During serial communication, the identification address of inverter.

1～31，33～254: address of slave inverter.

32: address of master inverter (be used by many inverters at the same time).

| P0-185 | Baud rate | Setting range:0～4 | Factory value:2 |
|---|---|---|---|

Select data speed when serial communication.

0:2400bps；1:4800bps；2:9600bps；3:19200bps；4:38400bps.

| P0-186 | Data format | Setting range:0～2 | Factory value:0 |
|---|---|---|---|

0: 1 start bit,8 data bits,no parity check, 1 stop bit.

1: 1 start bit, 8 data bits, even parity check, 1 stop bit

2: 1 start bit, 8 data bits, odd parity check, 1 stop bit.

| | | | |
|---|---|---|---|
| P0-187 | Responsion delay | Setting range:1～150ms | Factory value:10ms |

After inverter receives data, first delay the setting time of function code and then send a response data duning serial communication.

### 6.1.17 Counter 、timer function

When using the count function, “X-terminal” input filter times for P0-054 must be set to 1 .Clock cycles by counter clock input required is bigger than 4ms, the minimum pulse width is bigger than 1.5ms.

| | | | |
|---|---|---|---|
| P0-188 | Internal counter clock input frequency | Setting range:1～65535 | Factory value:1 |

After the clock input of internal counter receives the signal, needs internal frequency operation then is summed up to the internal counter.

For example: when this parameter is set to 100, after the counter input had received 100 pulses , count value of internal counter is sumed up 1.

| | | | |
|---|---|---|---|
| P0-189 | Internal counter stetting value | Setting range:1～65535 | Factory value:100 |
| P0-190 | Internal counter end value | Setting range:1～65535 | Factory value:200 |

With the output terminal to use. When the count value of internal counter is bigger than the specified value, the output terminal will output the specified value of internal counter to reach the signal. When the count value of internal counter is equal to the end value, the output terminal will output the end value to reach the signal .

Notice: the counter is cleared may use the "internal counter reset" of terminal function.

For example: When the P0-188 is set to 2, P0-189 is set to 5, P0-190 is set to 9 , counting and signal diagram shown below.

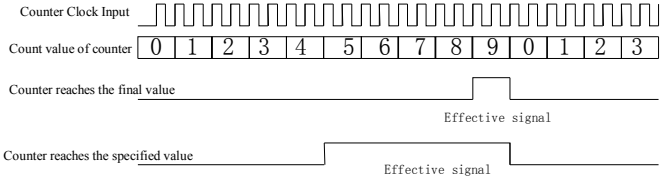



Chart 6-23 Counting function diagram

| | | | |
|---|---|---|---|
| P0-191 | Internal timer unit | Setting range:0.01s～655.35s | Factory value:1.00s |
| P0-192 | Internal timer cycle | Setting range:1～65535 | Factory value:10 |

With the output terminal to use. When the internal timer reaches the cycle of timer, the output terminal will output the signal of the internal timer cycle reached.Time-cycle of timer is a product of parameter P0-191 and parameter P0-192.

Notice: You must use the"internal timer time enabled" of terminal function then the internal timer starts time. You can use the "internal timer reset" of terminal function to clear the timer.

For example: When the P0-191 is set to 0.1s, P0-192 is set to 5, the time-cycle of timer for 0.1s × 5 = 0.5s. Timing and signal diagram shown below.

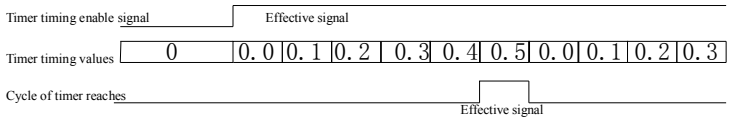



Chart 6-24 Timing function diagram

### 6.1.18 Reserved for function group

The group is reserved parameter for software upgrades or custom parameter by customers.

| | | | |
|---|---|---|---|
| P0-193 | System locked | Setting range:0～50 | Factory value:20 |

When motor no-load or light load, the surge current usually occurs. It is very serious thing when the motor power bigger than 30kW and the motor line more than 20 meters.

When the surge current occurs, it can be suppressed by adjusting the output frequency.

This parameter set this function, when this parameter is 0, it is invalid to control the surge current.

This parameter is bigger so that the function is stronger, but the speed wave may be bigger .

| | | | |
|---|---|---|---|
| P0-194 | judgement value of Under-voltage pre-warning | Setting range:50.0 % ～100.0% | Factory value:80.0 % |

With the use of multi-function output terminal. This function code 100.0% corresponding to the bus voltage 537 volts.

When the bus voltage less than the setting value, the signal of under-voltage and pre-warning will be output; when the bus voltage rises to the value bigger than the 5.0%setting value, it will stop output the signal of under-voltage and pre-warning.

| | | | |
|---|---|---|---|
| P0-195 | AO1 output bias | Setting range:0.00～10.00V | Factory value:0.00V |

Set AO1 minimum output value. Can achieve 2 ~ 10V output with P0-077. (P0-077 = 0.8, P0-195 = 2.00)

| | | | |
|---|---|---|---|
| P0-196 | AO2 output bias | Setting range:0.00～10.00V | Factory value:0.00V |

Set AO2 minimum output value. can achieve the 4 ~ 20mA output with P0-078. (P0-078 = 0.8, P0-196 = 2.00)

| | | | |
|---|---|---|---|
| P0-197 | Min input of keypad poentionmeter | Setting range:0.00～5.00V | Factory value:0.00V |

| | | | |
|---|---|---|---|
| P0-198 | Max input of Keypad poentionmeter | Setting range:0.00～5.00V | Factory value:5.00V |
| P0-199 | filter coefficient of keypad potentiometer | Setting range:1～12 | Factory value:6 |

When the keyboard line is bigger than 10 meters, the power supply of keyboard potentiometer will be low, the setting frequency will be affected. can amend this shortcoming through the relevant parameters.

When the keyboard setting can not be adjusted to 0hz , to increase P0-197.

When the keyboard setting can not be adjusted to 50hz ,to reduce P0-198.

When the keyboard setting waves, to increase P0-199.

| | | | |
|---|---|---|---|
| P0-200 | VCI input bias | Setting range:0.00～1.00V | Factory value:0.30V |
| P0-201 | CCI input bias | Setting range:0.00～1.00V | Factory value:0.30V |

This parameter is used to adjust the input bias of analog input channels. When the VCI or the CCI does not connected analog input, adjust the value so that the monitoring value of VCI or CCI (d3-003, d3-004) is 0.

### 6.1.19 Function Code modify setting

| | | | |
|---|---|---|---|
| P0-205 | Function code initialization | Setting range:0～65535 | Factory value:0 |

0: No action.

1: Initialization for the factory default values. P0 function group renews to factory state.

555: Initialization for the user default values. P0 function group renews to the " saving region of user"

777: Save the current function code for the user default value. P0 function group save to the " saving region of user ".

999: Initialize EPP. P0 function group and the " saving region of user " renew to factory state.

| | | | |
|---|---|---|---|
| P0-206 | Function code writing protection | Setting range:0～1 | Factory value:0 |

0: Invalid. P0 function group can modify.

1: effective. P0 function group can be modified only by the function code, other functions can not modify it.

## 6.2 P1 function groups（supplier setting function code）

| | | | |
|---|---|---|---|
| P1-000 | supplier password | Setting range:0～65535 | Factory value:Model option |

This function code is password input, if the password is wrong, will not be able to access other functions code of P1 function groups.

| | | | |
|---|---|---|---|
| P1-001 | Mode option | Setting range:0～2 | Factory value:0 |

0: G-model. Overload ability is 150% rated current 60s; 180% rated current 2s.

1: P-model. Overload ability is 120% rated current 60s; 150% rated current 2s.

2: Z-model. Overload ability is 150% rated current 60s; 180% rated current 2s.

| | | | |
|---|---|---|---|
| P1-002 | Clear working time and fault record | Setting range:0～1 | Factory value:0 |

0: No action.

1: Clear the accumulated hours of work and fault records.

| | | | |
|---|---|---|---|
| P1-003 | Use time-limit setting（hour） | Setting range:0～65535h | Factory value:Model option |

0: mean that there is no use time-limit.

1 ~ 65535: set the use time-limit, when the working time of inverter is more than this value, the inverter will stop work.

## 6.3 d0 function groups（read only）

d function groups are divided into four parts (d0, d1, d2, d3), display the historical fault information、inverter information、running status of inverter、the user interface status respectively, please look over "Function Code List."

# 7 Fault and trouble shooting

## 7.1 Fault and alarm

Fault and alarm are abnormal working status of inverter.But both have obvious distinguish.

Inverter in running for self-monitoring. If fault issued，fault code of inverter will be displayed，and the inverter output will be shut down ，result in the motor in a free-running state until stopping；If alarm issued, alarm code of inverter will be displayed,the inverter output will be not shut down,and the motor still is controlled by the inverter.

### 7.1.1 Fault Indication and Fault Reset

E001～E015 for fault indications.

Fault reset of inverter has many ways: operate the "reset key" of keyboard、terminal reset function, or, if necessary, shut off the main power supply for some time can make fault reset. If the fault has disappeared, inverter will resume normal operation; if the fault still exists, inverter will be tripped again.

Notice: If the jump-start command is effective, fault reset will jump-start transmission equipment.

### 7.1.2 Alarm indication and alarm reset

E030 for alarm indication.

The inverter can realize alarm reset only by “ESC key”of operation keyboard.

## 7.2 Fault and trouble shooting

| Code | Model | Reason | Solution |
|---|---|---|---|
| E001 | Over-current fault | Acc/Dec time is too short.<br>Inverter power is too small.<br>Voltage is too low. | Increase Acc/Dec time.<br>Select bigger capacity inverter.<br>Inspect input voltage. |
| E002 | Power module fault | Acc/Dec time is too short.<br>Short-circuit on output side of inverter.<br>Power module damaged.<br>Exterior disturbances. | Increase Acc/Dec time.<br>Inspect motor insulation.<br>Ask for support.<br>Inspect external equipment if has strong interference source. |
| E003 | DC bus over-voltage fault | Dec time is too short and regenerative energy from the motor is too large.<br>Network voltage is too high.<br>Load is too heavy and regenerative energy is too large. | Extend the Dec time.<br>Inspect input voltage.<br>Select bigger capacity inverter |
| E004 | DC bus under-voltage fault | Network voltage is too low. | Inspect input voltage. |
| E005 | Motor over-load fault | Network voltage is too low.<br>Load is too heavy.<br>Motor rated current setting is Incorrect.<br>Inverter power is too small. | Inspect input voltage.<br>Check the load，adjust the amount of torque to enhance.<br>Reinstall rated current of the motor.<br>Select bigger capacity inverter |
| E006 | Inverter over-heat fault | Ambient temperature is too high.<br>Inverter airiness is badness.<br>Cooling fans of inverter stop or damaged<br>Detection circuit of temperature damaged | Install colling unit.<br>To improve the ventilation.<br>Check or replace cooling fans<br>Ask for support. |
| E007 | Soft Startup fault | Soft startup circuit or contactor damaged | Ask for support. |
| E008 | Input phase fault | Open-phase occurred in three-phase AC input | Check input power and wiring. |
| E009 | Output phase fault | Current asymmetry on three-phase | Check output wiring and motor |

| Code | Model | Reason | Solution |
|---|---|---|---|
| | | input side . | insulation. |
| E010 | External fault | Input terminals of external fault signal take effect.<br>Keyboard “stop key” is set as an emergency stop . | Check the cause.<br>Check the setting of keyboard“stop key”. |
| E011 | Use time arrived fault | Use time arrived by Supplier setting. | Contact with the supplier. |
| E012 | Current detection circuit fault | Current detection device is damaged. | Ask for support. |
| E013 | EEPROM failure to read and write | Control board parts are damaged.<br>External disturbances. | Ask for support.<br>Inspect external equipment if has strong interference source. |
| E014 | Motor parameter detection fault | Deviation of the actual value and the theoretical value is too large.<br>Motor parameter setting is Incorrect. | Affirm the motor in no-load state .<br>Check the setting of motor parameter. |
| E015 | CPU is disturbed fault | External disturbances | Inspect external equipment if has strong interference source. |
| E030 | Operation error alarm | This is a alarm, inverter output is not turn-off.<br>Function code is locked<br>Function code is prohibited to modify. | Press the"ESC key" exit alarm state.<br>Check P0-206 function code Settings.<br>The function code is ptohibited to modify in running. |

Chart 7-1 fault and trouble shooting

## 7. 3 Common faults and solutions

Inverter may have following faults or malfunctions during operation, reference the following solutions.

### 7. 3. 1 No display after power on:

1. Inspect if the voltage of power supply and the rated voltage of inverter is consistent with multi-meter. If the power supply has problem,

inspect and solve it.

2. Inspect whether the three-phase rectify bridge is in good condition or not.

3. Check the CHARGE light.

4. If the above are normal, the fault may lie part of the switching power supply. Please ask for support.

### 7.3.2 Motor doesn't move after inverter running

1. For the motor has brake device, make sure that motor is not in a brake condition.

2. Disconnect the inverter and the motor wiring, run inverter in 50Hz，inspect if there is balanced three-phase output among U, V, W with multi-meter, notice: due to U, V, W phase between is a high-frequency pulse，please use analog voltage meter to measure(range for AC 500V). If the voltage is not balanced or no voltage, the inverter module is damaged. Please ask for support.

3. If the above are normal. Please ask for support.

# 8 Maintenance

## 8.1 Inspect the inverter periodically

On account of the change of inverter using environment ，such as temperature、humidity、fog and other effects, as well as the internal components of inverter are aging and other factors that could cause a variety of faults. Thus, during in storage and use of inverter must be carried out daily inspections and maintain the inverter periodically.

| Items to be checked | Inspection contents | Methods |
|---|---|---|
| Terminals and screws | Whether all screws be tightened | tighten them with a screwdriver |
| Radiator disc | No dust | with a vacuum cleaner in 4～6kg/cm$^2$ pressure blow off |
| PCB | No dust | with a vacuum cleaner in 4～6kg/cm$^2$ pressure blow off |
| Cooling fan | smooth operation and no vibration | Replace cooling fan |
| Power Components | No dust | with a vacuum cleaner in 4～6kg/cm$^2$ pressure blow off |
| Electrolytic capacitors | Whether change colour 、peculiar smell、bubbling | Replace |

Chart 8-1 Inspect the inverter periodically

## 8.2 Replacement of wearing parts

Fans and electrolytic capacitors are wearing parts, please make periodic replacement to ensure long term, In the less than 30 ℃ ambient temperature, load rate 80% or less, run rate of 12 hours / day cases,The replacement periods are as follows:

1. Fan: Must be replaced when using up to 3 years;

2. Electrolytic Capacitor: Must be replaced when using up to 5 years.

## 8.3 Warranty description

The manufacturer warrants its products from the date of purchase. Manufacturer is responsible only for quality problems is caused by product design and production process, it is not responsible for the products were damaged in the course of transportation or discharge box. For the incorrect installation and use,such as temperature, dust, corrosion and other non-compliance of the working conditions and overload operation , manufacturer is irresponsible.

# 9 List of Function Parameters

× indicates that this parameter cannot be modified during running. ○ indicates that this parameter can be modified during running. Address items for the MODBUS register address.

## 9.1 P0 function groups（users setup function code）

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| Basic Function | | | | | | |
| P0-000 | Speed control mode | 0:VVVF control<br>1:Vector control | 1 | 0 | × | 000H |
| P0-001 | Select command source | 0:Keypad<br>1:Terminal<br>2:Communication | 1 | 0 | ○ | 001H |
| P0-002 | Select frequency source | 0:main frequency source x<br>1:Auxiliary frequency source Y<br>2:main frequency source x＋Auxiliary frequency source y<br>3:max(main frequency source x，Auxiliary frequency source y）<br>4:be confirmed by selection terminal of frequency source. | 1 | 0 | ○ | 002H |
| P0-003 | Main frequency source x selection | 0:keyboard poentionmeter<br>1:keyboard digital setting（UP、DOWN）<br>2:VCI<br>3:CCI<br>4:simple PLC | 1 | 0 | ○ | 003H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-004 | Auxiliary frequency source Y selection | 5:multi-step speed<br>6:PID<br>7:PULSE<br>8:communication<br>9:VCI mode2<br>10:CCImode2 | 1 | 0 | ○ | 004H |
| P0-005 | Main frequency source X gain | 0.10～10.00 | 0.01 | 1.00 | ○ | 005H |
| P0-006 | Auxiliary frequency source Y gain | 0.10～10.00 | 0.01 | 1.00 | ○ | 006H |
| P0-007 | Digital setting frequency of keyboard | 0.00～600.00Hz | 0.01Hz | 50.00Hz | ○ | 007H |
| P0-008 | Keyboard and terminal UP/DOWN setting | 0:invalid<br>1:effective, power off no saving<br>2:effective, power off saving | 1 | 1 | × | 008H |
| P0-009 | Running direction control | 0:setting direction same<br>1:setting direction reverse<br>2:forbid reverse | 1 | 0 | × | 009H |
| P0-010 | Upper limit frequency | Lower limit ～ 600.00Hz | 0.01Hz | 50.00Hz | ○ | 00AH |
| P0-011 | Lower limit frequency | 0.00Hz～upper limit | 0.01Hz | 0.00Hz | ○ | 00BH |
| P0-012 | Acc time0 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 00CH |
| P0-013 | Dec time0 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 00DH |
| P0-014 | Carrier frequency | 1.0～10.0KHz | 0.1KHz | 4.0KHz | ○ | 00EH |
| P0-015 | Carrier frequency adjust selection | 0: fixed PWM，carrier temperature adjust is invalid<br>1: fixed PWM,carrier temperature adjust is effective<br>2:Random | 1 | Model option | ○ | 00FH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | | PWM,carrier temperature adjust is invalid<br>3:Random PWM,carrier temperature adjust is effective | | | | |
| Motor parameter | | | | | | |
| P0-016 | Motor rated power | 0.4 ～ 1000.0KW（Model option） | 0.1KW | Model option | × | 010H |
| P0-017 | Motor rated frequency | 1.00～600.00Hz | 0.01Hz | 50.00Hz | × | 011H |
| P0-018 | Motor rated voltage | 10.0～440.0V（Model option） | 0.1V | Model option | × | 012H |
| P0-019 | Motor rated current | 1.0～2000.0A（Model option） | 0.1A | Model option | × | 013H |
| P0-020 | Motor rated rotation speed | 5～30000rpm | 1rpm | 1460rmp | × | 014H |
| P0-021 | Motor no load current | 10.0～100.0% | 0.1% | 40.0% | ○ | 015H |
| P0-022 | Stator resistance | 0.001～65.000Ω | 0.001Ω | Model option | ○ | 016H |
| P0-023 | reserved | | | | ○ | 017H |
| P0-024 | reserved | | | | ○ | 018H |
| P0-025 | Reserved | | | | ○ | 019H |
| P0-026 | Motor parameters autotuning | 0:invaide<br>1:Rotatation test<br>2:Static test | 1 | 0 | × | 01AH |
| VVVF control parameter | | | | | | |
| P0-027 | V/F curve setting | 0:linear minus<br>1:1.3(order)<br>2:1.7 (order)<br>3:2.0 (order)<br>4:High torque curve 1<br>5:High torque curve 2<br>6:High torque curve3<br>7:Four points curve | 1 | 0 | × | 01BH |
| P0-028 | V/F voltage point 0 | 0.0～15.0% | 0.1% | 1.0% | × | 01CH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-029 | V/F frequency point 1 | 0.0～100.0% | 0.1% | 40.0% | × | 01DH |
| P0-030 | V/F voltage point 1 | 0.0～100.0% | 0.1% | 40.0% | × | 01EH |
| P0-031 | V/F frequency point 2 | 0.0～100.0% | 0.1% | 80.0% | × | 01FH |
| P0-032 | V/F voltage point 2 | 0.0～100.0% | 0.1% | 80.0% | × | 020H |
| P0-033 | Automatic torque compensation gain | 0.0～250.0% | 0.1% | 100.0% | ○ | 021H |
| P0-034 | Automatic torque compensation filter | 0.01～5.00s | 0.01s | 0.10s | ○ | 022H |
| P0-035 | Automatic slip compensation gain | 0.0～250.0% | 0.1% | 0.0% | ○ | 023H |
| P0-036 | Auto slip compensation Filter time | 0.01～5.00s | 0.01s | 0.10s | ○ | 024H |
| P0-037 | AVR function | 0:invalid<br>1:still effective<br>2:invalid only duing Dec speed until having stopped | 1 | 2 | × | 025H |
| P0-038 | Saving energy run | 0:invalid；1:effective | 1 | 0 | ○ | 026H |
| P0-039 | Saving energy running Voltage limit | 20.0～100.0% | 0.1% | 80.0% | ○ | 027H |
| Vector Control parameter | | | | | | |
| P0-040 | ASR gain | 50.0～200.0% | 0.1% | 100.0% | ○ | 028H |
| P0-041 | ASR filter | 0.01～1.00s | 0.01s | 0.10s | ○ | 029H |
| P0-042 | Current-loop gain | 50.0～200.0% | 0.1% | 100.0% | ○ | 02AH |
| P0-043 | Current-loop filter | 0.01～1.00s | 0.01s | 0.10s | ○ | 02BH |
| P0-044 | Vc torque compensation gain | 50.0～250.0% | 0.1% | 100.0% | ○ | 02CH |
| P0-045 | VC Slip compensation gain | 50.0～250.0% | 0.1% | 100.0% | ○ | 02DH |
| Input terminals | | | | | | |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-046 | X1 terminal function | 0:invalid<br>1:Forward<br>2:Reverse<br>3:3-wire control<br>4:Reset fault<br>5:UP command<br>6:DOWN command<br>7:JOG forward<br>8:JOG reverse<br>9:Coast to stop<br>10:External fault input<br>11:Acc/Dec speed Pause<br>12:PLC run reset<br>13:PLC pause<br>14:traverse run reset<br>15:traverse pause<br>16:PID operation pause<br>17:Clear PID integral time<br>18:switch command source<br>19:Frequency selection 1<br>20:Frequency selection 2<br>21:Acc/dec speed 1<br>22:Acc/dec speed 2<br>23:Muti-step speed terminal 1<br>24:Muti-step speed terminal 2<br>25:Muti-step speed terminal 3<br>26:Muti-step speed terminal 4<br>27:Internal counter clock | 1 | 1 | × | 02EH |
| P0-047 | X2 terminal function | | 1 | 2 | × | 02FH |
| P0-048 | X3 terminal function | | 1 | 7 | × | 030H |
| P0-049 | X4 terminal function | | 1 | 8 | × | 031H |
| P0-050 | X5 terminal function | | 1 | 23 | × | 032H |
| P0-051 | X6 terminal function | | 1 | 24 | × | 033H |
| P0-052 | X7 terminal function | | 1 | 25 | × | 034H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-053 | X8 terminal function | input<br>28:Reset internal counter<br>29:Enabled internal timer<br>30: Reset internal timer | 1 | 26 | × | 035H |
| P0-054 | X input filter times | 1～50 | 1 | 20 | ○ | 036H |
| P0-055 | Control mode of terminal | 0: 2-wire mode1<br>1: 2-wire mode 2<br>2: 3-wire mode 1<br>3: 3-wire mode 2 | 1 | 0 | × | 037H |
| P0-056 | UP/DOWN range | 0.01～100.00Hz/s | 0.01Hz/s | 10.00Hz/s | ○ | 038H |
| P0-057 | VCI min input | 0.00～10.00V | 0.01V | 0.00V | ○ | 039H |
| P0-058 | VCI min input corresponding frequency | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 03AH |
| P0-059 | VCI max input | 0.00～10.00V | 0.01V | 10.00V | ○ | 03BH |
| P0-060 | VCI max input corresponding frequency | 0.00～600.00Hz | 0.01Hz | 50.00Hz | ○ | 03CH |
| P0-061 | VCI input filter time | 0.01～5.00s | 0.01s | 0.10s | ○ | 03DH |
| P0-062 | CCI min input | 0.00～10.00V | 0.01V | 0.00V | ○ | 03EH |
| P0-063 | CCI min input corresponding frequency | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 03FH |
| P0-064 | CCI max input | 0.00～10.00V | 0.01V | 10.00V | ○ | 040H |
| P0-065 | CCI max input corresponding frequency | 0.00～600.00Hz | 0.01Hz | 50.00Hz | ○ | 041H |
| P0-066 | CCI input filter time | 0.01～5.00s | 0.01s | 0.10s | ○ | 042H |
| P0-067 | PULSE min input | 0.00～50.00KHz | 0.01KHz | 0.00KHz | ○ | 043H |
| P0-068 | PULSE min input corresponding frequency | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 044H |
| P0-069 | PULSE max input | 0.00～50.00KHz | 0.01KHz | 50.00KHz | ○ | 045H |
| P0-070 | PULSE max input corresponding | 0.00～600.00Hz | 0.01Hz | 50.00Hz | ○ | 046H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | frequency | | | | | |
| P0-071 | PULSE input filter time | 0.01～5.00s | 0.01s | 0.10s | ○ | 047H |
| Output terminals | | | | | | |
| P0-072 | Relay output selection | 0: Invalid<br>1:stop fault in running<br>2:inverter running<br>3:run frequency arrived setting value<br>4: Upper limit frequency running<br>5: Lower limit frequency running<br>6: Inverter running at zero speed<br>7: FTD reached<br>8: Overload pre-warning<br>9:Slight fault during runing<br>10:inverter ready<br>11: External fault stop<br>12:stop in Running under voltage<br>13: Forward running<br>14: Reverse running<br>15: Auxiliary motor<br>16:Appoint value of internal counter reached<br>17:end-value of internal counter arrived.<br>18: end-value of internal timer arrived.<br>19:alarm for under voltage | 1 | 1 | × | 048H |
| P0-073 | Y1 output selection | | 1 | 2 | × | 049H |
| P0-074 | Y2 output selection | | 1 | 3 | × | 04AH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-075 | AO1output selection | 0:Output frequency<br>1:Output current<br>2:Output voltage<br>3:Setting frequency<br>4:DC BUS voltage<br>5:VCI input voltage<br>6:CCI input voltage<br>7:PULSE input | 1 | 0 | ○ | 04BH |
| P0-076 | AO2 output selection | | 1 | 1 | ○ | 04CH |
| P0-077 | AO1output gain | 0.10～10.00 | 0.01 | 1.00 | ○ | 04DH |
| P0-078 | AO2output gain | 0.10～10.00 | 0.01 | 1.00 | ○ | 04EH |
| Start and stop control | | | | | | |
| P0-079 | Start mode | 0: Starting frequency<br>1:DC brake before start<br>2:Rotate speed tracking start | 1 | 0 | ○ | 04FH |
| P0-080 | Starting frequency | 0.00～10.00Hz | 0.01Hz | 0.00Hz | ○ | 050H |
| P0-081 | Hold time of starting frequency | 0.00～60.00s | 0.01s | 0.00s | ○ | 051H |
| P0-082 | start DC Braking current | 0.0～150.0% | 0.1% | 0.0% | ○ | 052H |
| P0-083 | start DC Braking time | 0.0～60.00s | 0.01s | 0.00s | ○ | 053H |
| P0-084 | Start mode of REV tracking | 0:Start by setting frequency<br>1: Start by upper limit frequency | 1 | 0 | ○ | 054H |
| P0-085 | Stop mode | 0: DEC stop<br>1: Coast to stop | 1 | 0 | ○ | 055H |
| P0-086 | frequency of DC braking | 0.00～50.00Hz | 0.01Hz | 0.00Hz | ○ | 056H |
| P0-087 | Waiting time before DC braking | 0.01～60.00s | 0.01s | 0.01s | ○ | 057H |
| P0-088 | DC braking current | 0.0～150.0% | 0.1% | 0.0% | ○ | 058H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-089 | DC braking time | 0.0～60.00s | 0.01s | 0.00s | ○ | 059H |
| P0-090 | Dead of time FWD/REV | 0.01～60.00s | 0.01s | 0.50s | ○ | 05AH |
| P0-091 | Restart after power off instantaneous | 0:invalid；1:effective | 1 | 0 | ○ | 05BH |
| P0-092 | waiting time for restart | 0.01～60.00s | 0.01s | 0.10s | ○ | 05CH |
| P0-093 | least output frequency setting（setting frequency less than lower limit frequency） | 0: Running at the Frequency is limited<br>1:dormancy Stand-by（0Hz output） | 1 | 0 | ○ | 05DH |
| Acc/Dec assistant | | | | | | |
| P0-094 | Acc/Dec mode selection | 0: Linear Acc/Dec<br>1:S curve Acc/Dec | 1 | 0 | ○ | 05EH |
| P0-095 | S curve acceleration characteristic time | 0.2～2.0s | 0.1s | 0.5s | ○ | 05FH |
| P0-096 | S curve deceleration characteristic time | 0.2～2.0s | 0.1s | 0.5s | ○ | 060H |
| P0-097 | ACC time 1 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 061H |
| P0-098 | DEC time 1 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 062H |
| P0-099 | ACC time 2 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 063H |
| P0-100 | DEC time 2 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 064H |
| P0-101 | ACC time 3 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 065H |
| P0-102 | DEC time 3 | 0.1～3200.0s | 0.1s | 15.0s | ○ | 066H |
| Auxiliary function | | | | | | |
| P0-103 | Jog frequency | 0.00～600.00Hz | 0.01Hz | 5.00Hz | ○ | 067H |
| P0-104 | Jog acceleration time | 0.1～3200.0s | 0.1s | 15.0s | ○ | 068H |
| P0-105 | Jog deceleration time | 0.1～3200.0s | 0.1s | 15.0s | ○ | 069H |
| P0-106 | Skip frequency 1 | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 06AH |
| P0-107 | Skip frequency 2 | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 06BH |
| P0-108 | Skip frequency 3 | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 06CH |
| P0-109 | Skip frequency bandwidth | 0.00～50.00Hz | 0.01Hz | 0.00Hz | ○ | 06DH |
| P0-110 | Frequency arrive detecting range | 0.00～600.00Hz | 0.01Hz | 1.00Hz | ○ | 06EH |
| P0-111 | FDT level | 0.00～600.00Hz | 0.01Hz | 50.00Hz | ○ | 06FH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-112 | FDT delay value | 0.00～10.00Hz | 0.01Hz | 5.00Hz | ○ | 070H |
| P0-113 | Starting delay time Of auxiliary motor1 | 0.1～600.0s | 0.1s | 15.0s | ○ | 071H |
| P0-114 | Stopping delay time of auxiliary motor1 | 0.1～600.0s | 0.1s | 15.0s | ○ | 072H |
| Keyboard setting | | | | | | |
| P0-115 | DIR/JOG function selection | 0:Running direction switch<br>1:JOG command<br>2: Invalid | 1 | 0 | ○ | 073H |
| P0-116 | Keyboard STOP key function setting | 0:Invalid,when controlling by analog terminals /communication<br>1:effective,when controlling by analog terminals /communication<br>（be equal external fault input） | 1 | 0 | ○ | 074H |
| P0-117 | Default monitor parameters | 0:Setting frequency<br>1: Output frequency<br>2: Output current<br>3: Output voltage<br>4: DC BUS voltage<br>5:Running rotate speed<br>6: Load rate<br>7: Output power<br>8: Output torque<br>9:count of overheat due to Overload<br>10:Inverter temperature（part of model reserved）<br>11:PID closed loop setting<br>12:PID closed loop feedback<br>13: Display | 1 | 0 | ○ | 075H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | | setting frequency when stopping; display Output frequency in running. | | | | |
| Protect function setting | | | | | | |
| P0-118 | Motor overload protection coefficient | 80.0 % ～ 110.0 %（rated current of motor） | 0.1% | 100.0% | ○ | 076H |
| P0-119 | Pre-alarm value of motor overload | 100.0 % ～ 180.0 %（rated current of motor） | 0.1% | 130.0% | ○ | 077H |
| P0-120 | Over-current protection when lose speed | 110.0%～200.0% | 0.1% | Model option | ○ | 078H |
| P0-121 | Over-current reducing frequency protection current | 110.0%～220.0% | 0.1% | Model option | ○ | 079H |
| P0-122 | Over-current reducing frequency delay time | 1～1000ms | 1ms | 20ms | ○ | 07AH |
| P0-123 | Over-voltage protection when lose speed | 120.0%～150.0% | 0.1% | 130.0% | ○ | 07BH |
| P0-124 | Output open-phase Protection function | 0:invalid；1:effective | 1 | 0 | ○ | 07CH |
| P0-125 | Auto reset times | 0～3times | 1times | 0times | ○ | 07DH |
| P0-126 | Reset interval | 0.01～60.00s | 0.01s | 1.00s | ○ | 07EH |
| P0-127 | Stop fault output selection during auto resetting | 0:no action 1:action | 1 | 0 | ○ | 07FH |
| P0-128 | Voltage value in under-voltage protection | 50.0%～85.0% | 0.1% | 75.0% | ○ | 080H |
| P0-129 | Over-voltage protection point | 120.0%～150.0% | 0.1% | 140.0% | ○ | 081H |
| P0-130 | Dynamic braking voltag value | 110.0%～140.0% | 0.1% | 125.0% | ○ | 082H |
| P0-131 | Cooling fan control | 0: Auto stop mode | 1 | 0 | ○ | 083H |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | selection | 1:Allways working | | | | |
| Multi-stage speed and simple PLC | | | | | | |
| P0-132 | Terminals input mode of Muti-step speed | 0: Binary combination format<br>1: No combination format | 1 | 0 | ○ | 084H |
| P0-133 | Muti-step speed 0 | 0.00～600.00Hz | 0.01Hz | 0.00Hz | ○ | 085H |
| P0-134 | Muti-step speed 1 | 0.00～600.00Hz | 0.01Hz | 1.00Hz | ○ | 086H |
| P0-135 | Muti-step speed 2 | 0.00～600.00Hz | 0.01Hz | 2.00Hz | ○ | 087H |
| P0-136 | Muti-step speed 3 | 0.00～600.00Hz | 0.01Hz | 3.00Hz | ○ | 088H |
| P0-137 | Muti-step speed 4 | 0.00～600.00Hz | 0.01Hz | 4.00Hz | ○ | 089H |
| P0-138 | Muti-step speed 5 | 0.00～600.00Hz | 0.01Hz | 5.00Hz | ○ | 08AH |
| P0-139 | Muti-step speed 6 | 0.00～600.00Hz | 0.01Hz | 6.00Hz | ○ | 08BH |
| P0-140 | Muti-step speed 7 | 0.00～600.00Hz | 0.01Hz | 7.00Hz | ○ | 08CH |
| P0-141 | Muti-step speed 8 | 0.00～600.00Hz | 0.01Hz | 8.00Hz | ○ | 08DH |
| P0-142 | Muti-step speed 9 | 0.00～600.00Hz | 0.01Hz | 9.00Hz | ○ | 08EH |
| P0-143 | Muti-step speed10 | 0.00～600.00Hz | 0.01Hz | 10.00Hz | ○ | 08FH |
| P0-144 | Muti-step speed 11 | 0.00～600.00Hz | 0.01Hz | 11.00Hz | ○ | 090H |
| P0-145 | Muti-step speed 12 | 0.00～600.00Hz | 0.01Hz | 12.00Hz | ○ | 091H |
| P0-146 | Muti-step speed 13 | 0.00～600.00Hz | 0.01Hz | 13.00Hz | ○ | 092H |
| P0-147 | Muti-step speed 14 | 0.00～600.00Hz | 0.01Hz | 14.00Hz | ○ | 093H |
| P0-148 | Muti-step speed 15 | 0.00～600.00Hz | 0.01Hz | 15.00Hz | ○ | 094H |
| P0-149 | PLC run mode | 0:Stop after one cycle<br>1:continuous cycle<br>2: running according to $15^{th}$-step after one cycle | 1 | 0 | × | 095H |
| P0-150 | Unit setting of PLC run times | 0: Second<br>1: Hour | 1 | 0 | × | 096H |
| P0-151 | $0^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 097H |
| P0-152 | $1^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 098H |
| P0-153 | $2^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 099H |
| P0-154 | $3^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09AH |
| P0-155 | $4^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09BH |
| P0-156 | $5^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09CH |
| P0-157 | $6^{th}$-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09DH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-158 | 7th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09EH |
| P0-159 | 8th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 09FH |
| P0-160 | 9th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A0H |
| P0-161 | 10th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A1H |
| P0-162 | 11th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A2H |
| P0-163 | 12th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A3H |
| P0-164 | 13th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A4H |
| P0-165 | 14th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A5H |
| P0-166 | 15th-step running time | 0.0～6553.5s（h） | 0.1s | 0.0s | ○ | 0A6H |
| P0-167 | PLC Acc/Dec time setting1 | 0～65535（Binary bit conversion） | 1 | 0 | ○ | 0A7H |
| P0-168 | PLC Acc/Dec time setting2 | 0～65535（Binary bit conversion） | 1 | 0 | ○ | 0A8H |
| P0-169 | PLC run direction setting | 0～65535（Binary bit conversion） | 1 | 0 | ○ | 0A9H |
| PID control | | | | | | |
| P0-170 | PID setting channels selection | 0:Keyboard digital setting<br>1:Keyboard poentionmeter<br>2:VCI<br>3:CCI<br>4:PULSE input<br>5:PLC<br>6:Communication<br>7:CCI（4～20mA） | 1 | 0 | ○ | 0AAH |
| P0-171 | PID Keyboard digital setting | 0.00～10.00V | 0.01V | 3.00V | ○ | 0ABH |
| P0-172 | PID feedback selection | 0:VCI（0～10V）<br>1:CCI（0～10V）<br>2:MAX(VCI,CCI)<br>3: PULSE input | 1 | 0 | ○ | 0ACH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | | 4:Keyboard poentionmeter （testing） 5:CCI（4～20mA） 6:VCI-CCI | | | | |
| P0-173 | PID feedback channel gain | 0.10～10.00 | 0.01 | 1.00 | ○ | 0ADH |
| P0-174 | PID feedback signal characteristic | 0: Positive ; 1: Negative | 1 | 0 | ○ | 0AEH |
| P0-175 | Proportional gain P | 0.00～10.00 | 0.01 | 1.00 | ○ | 0AFH |
| P0-176 | Integral time I | 0.00（no integral）～100.00s | 0.01s | 2.00s | ○ | 0B0H |
| P0-177 | Differential time D | 0.00（no differential）～100.00s | 0.01s | 0.00s | ○ | 0B1H |
| P0-178 | Sampling cycle | 0.01～10.00s | 0.01s | 0.10s | ○ | 0B2H |
| P0-179 | Bias limit | 0.00～2.00V | 0.01V | 0.00V | ○ | 0B3H |
| Traverse frequency setting | | | | | | |
| P0-180 | Traverse amplitude | 0.0%～100.0%（relative to setting frequency） | 0.1% | 0.0% | ○ | 0B4H |
| P0-181 | Jitter frequency | 0.0%～50.0%（Relative to the traverse amplitude） | 0.1% | 0.0% | ○ | 0B5H |
| P0-182 | Rise time of traverse | 0.1～3200.0s | 0.1s | 15.0s | ○ | 0B6H |
| P0-183 | Fall time of traverse | 0.1～3200.0s | 0.1s | 15.0s | ○ | 0B7H |
| Serial Communication Setting | | | | | | |
| P0-184 | Local address | 1～31，33～254:slave address 32:master address(common by inverters) | 1 | 1 | ○ | 0B8H |
| P0-185 | Baud rate | 0:2400bps 1:4800bps 2:9600bps 3:19200bps 4:38400bps | 1 | 2 | ○ | 0B9H |
| P0-186 | Data format | 0:1 start bit，8 data bits，no parity check, 1 | 1 | 0 | ○ | 0BAH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| | | stop bit.<br>1: 1 start bit, 8 data bits, even parity check, 1 stop bit<br>2: 1 start bit, 8 data bits, odd parity check, 1 stop bit | | | | |
| P0-187 | Responsion delay | 1～150ms | 1ms | 10ms | ○ | 0BBH |
| Counter 、timer function | | | | | | |
| P0-188 | Internal counter clock input frequency | 1～65535 | 1 | 1 | ○ | 0BCH |
| P0-189 | Internal counter stetting value | 1～65535 | 1 | 100 | ○ | 0BDH |
| P0-190 | Internal counter end value | 1～65535 | 1 | 200 | ○ | 0BEH |
| P0-191 | Internal timer unit | 0.01s～655.35s | 0.01s | 1.00s | ○ | 0BFH |
| P0-192 | Internal timer cycle | 1～65535 | 1 | 10 | ○ | 0C0H |
| Reserved for functional group | | | | | | |
| P0-193 | System locked | 0～50 | 1 | 20 | ○ | 0C1H |
| P0-194 | Under-voltage pre-warning judgement value | 50.0%～100.0% | 0.1% | 80.0% | ○ | 0C2H |
| P0-195 | AO1 output bias | 0.00～10.00V | 0.01 | 0.00V | ○ | 0C3H |
| P0-196 | AO2 output bias | 0.00～10.00V | 0.01 | 0.00V | ○ | 0C4H |
| P0-197 | Keypad poentionmeter min input | 0.00～5.00V | 0.01V | 0.00V | ○ | 0C5H |
| P0-198 | Keypad poentionmeter max input | 0.00～5.00V | 0.01V | 5.00V | ○ | 0C6H |
| P0-199 | filter coefficient of keypad potentiometer | 1～12 | 1 | 6 | ○ | 0C7H |
| P0-200 | VCI input bias | 0.00～1.00V | 0.01V | 0.30V | ○ | 0C8H |
| P0-201 | CCI input bias | 0.00～1.00V | 0.01V | 0.30V | ○ | 0C9H |
| P0-202 | Reserved | | | | | 0CAH |

| Code | Function name | Setting range | Units | Factory setting | Modify | Address |
|---|---|---|---|---|---|---|
| P0-203 | Reserved | | | | | 0CBH |
| P0-204 | Reserved | | | | | 0CCH |
| Function Code modify setting | | | | | | |
| P0-205 | Function code initialization | 0: Invalid<br>1:factory default data<br>555: user default data<br>777:Saving current data as user default data<br><br>999: Initialize EPP | 1 | 0 | × | 0CDH |
| P0-206 | Function code writing protection | 0:invalid<br>1:effective | 1 | 0 | ○ | 0CEH |

## 9.2 P1 function groups（supplier setting function code）

| code | function name | setting range | unit | factory setting | modify |
|---|---|---|---|---|---|
| P1-000 | supplier password | 0～65535 | 1 | 0 | ○ |
| P1-001 | Model option | 0:G （constant torque load）<br>1:P（fans、pumps load）<br>2:Z（injection machine special product）） | 1 | 0 | × |
| P1-002 | Clear working time and fault record | 0: Invalid<br>1: Clear working time and fault record | 1 | 0 | ○ |
| P1-003 | Use time-limit setting（hour） | 0（No use time-limit）～65535h | 1 | 0 | ○ |
| P1-004 | Reserved | | | | ○ |

## 9.3 d0 function groups（fault information of history）

| code | function name | range | units | address |
|---|---|---|---|---|

| code | function name | range | units | address |
|---|---|---|---|---|
| d0-000 | Current fault number | 0（no fault）～18 | 1 | 300H |
| d0-001 | Output frequency at current fault | 0.00～600.00Hz | 0.01Hz | 301H |
| d0-002 | Output current at current fault | 0.0～2000.0A | 0.1A | 302H |
| d0-003 | Output voltage at current fault | 0.0～500.0V | 0.1V | 303H |
| d0-004 | DC bus voltage at current fault | 0～1000V | 1V | 304H |
| d0-005 | Latest fault number | 0（no fault）～18 | 1 | 305H |
| d0-006 | Output frequency at latest fault | 0.00～600.00Hz | 0.01Hz | 306H |
| d0-007 | Output current at latest fault | 0.0～2000.0A | 0.1A | 307H |
| d0-008 | Output voltaget at latest fault | 0.0～500.0V | 0.1V | 308H |
| d0-009 | DC bus voltage at latest fault | 0～1000V | 1V | 309H |
| d0-010 | Second latest fault numbe | 0（no fault）～18 | 1 | 30AH |
| d0-011 | Output frequency at second latest fault | 0.00～600.00Hz | 0.01Hz | 30BH |
| d0-012 | Output current at second latest fault | 0.0～2000.0A | 0.1A | 30CH |
| d0-013 | Output voltage at second latest fault | 0.0～500.0V | 0.1V | 30DH |
| d0-014 | DC bus voltage at second latest fault | 0～1000V | 1V | 30EH |

## 9.4 d1 function groups（inverter information）

| code | function name | range | units | address |
|---|---|---|---|---|
| d1-000 | Software Version number | 0～65535 | 1 | 400H |
| d1-001 | Software checkout | 0～65535 | 1 | 401H |
| d1-002 | Machine model setting | 0:G (constant torque load）<br>1:P(fans、pumps load）<br>2:Z(injection machine special product） | 1 | 402H |
| d1-003 | Inverter rated power | 0.5～1000.0KW | 0.1KW | 403H |
| d1-004 | Inverter rated voltage | 100.0V～1000.0V | 0.1V | 404H |
| d1-005 | Inverter rated current | 1.0～2000.0A | 0.1A | 405H |
| d1-006 | Inverter accumulate working times（hour） | 0～65535h | 1h | 406H |
| d1-007 | Inverter accumulate working times（second） | 0～3600s | 1s | 407H |
| d1-008 | Inverter Use time-limit（hour） | 0（no use limit-time）～65535h | 1h | 408H |
| d1-009 | IPUFIFO（factory test） | | | 409H |
| d1-010 | IPULIMIT（factory test） | | | 40AH |

## 9.5 d2 function groups（Inverter running state）

| code | function name | range | units | address |
|---|---|---|---|---|
| d2-000 | Inverter running state | Bit0: run sign<br>0:Stopping<br>1:Running<br>Bit1:Running direction<br>0:Forward<br>1:Reverse<br>Bit2:<br>0:long-distance control<br>1:Local keypad control<br>Bit3:<br>0:No slight fault<br>1:Slight fault（trip）<br>Bit4:<br>0:No fault<br>1:in Faulting<br>（Binary，Bit0 for the lowest bit） | 1 | 500H |
| d2-001 | Setting frequency | 0.00～600.00Hz | 0.01Hz | 501H |
| d2-002 | Output frequency | 0.00～600.00Hz | 0.01Hz | 502H |
| d2-003 | Output current | 0.1～2000.0A | 0.1A | 503H |
| d2-004 | Output voltage | 0.1～2000.0V | 0.1V | 504H |
| d2-005 | DC bus voltage | 100～1000V | 1V | 505H |
| d2-006 | Run rotation speed | 0～30000rpm | 1rpm | 506H |
| d2-007 | Load ratio | 0.0～200.0%<br>（Motor rated load） | 0.1% | 507H |
| d2-008 | Output power | 0.00～200.00%<br>（Motor rated power） | 0.01% | 508H |
| d2-009 | Output torque | 0.00～200.00%<br>（Motor rated torque） | 0.01% | 509H |
| d2-010 | Over-load count | 0.0～100.0% | 0.1% | 50AH |
| d2-011 | Inverter temperature<br>（parts of model reserved） | 0～100 ℃ | 1℃ | 50BH |
| d2-012 | PID closed loop setting | 0.00～10.00V | 0.01V | 50CH |
| d2-013 | PID closed loop feedcack | 0.00～10.00V | 0.01V | 50DH |

| code | function name | range | units | address |
|---|---|---|---|---|
| d2-014 | Setting frequency of main frequency source X（after calculating gain） | 0.00～600.00Hz | 0.01Hz | 50EH |
| d2-015 | Setting frequency of auxiliary frequency source Y (after calculating gain） | 0.00～600.00Hz | 0.01Hz | 50FH |
| d2-016 | Count value of internal counter | 0～65535 | 1 | 510H |
| d2-017 | Time value of internal timer | 0～65535 | 1 | 511H |
| d2-018 | PLC current running step | 0～15 | 1 | 512H |
| d2-019 | FPIOUT（factory test） | | | 513H |
| d2-020 | UPIOUT（factory test） | | | 514H |

## 9.6 d3 function groups（users interface state）

| code | function name | range | unit | address |
|---|---|---|---|---|
| d3-000 | Input terminal status 0 | LED bit1:X1<br>0:invalid<br>1:effective<br>LED bit2:X2<br>0:invalid<br>1:effective<br>LED bit3:X3<br>0:invalid<br>1:effective<br>LED bit4:X4<br>0:invalid<br>1:effective | 1 | 600H |
| d3-001 | Input terminal status 1 | LED bit1:X5<br>0:invalid<br>1:effective<br>LED bit2:X6<br>0:invalid<br>1:effective<br>LED bit3:X7<br>0:invalid<br>1:effective<br>LED bit4:X8<br>0:invalid<br>1:effective | 1 | 601H |

| code | function name | range | unit | address |
|---|---|---|---|---|
| d3-002 | Output terminal status 0 | LED bit1:Y1<br>0:invalid<br>1:effective<br>LEDbit2:Y2<br>0:invalid<br>1:effective<br>LED bit3:MAMC<br>0:invalid<br>1:effective | 1 | 602H |
| d3-003 | VCI input voltage | 0.00～10.00V | 0.01V | 603H |
| d3-004 | CCI input voltage | 0.00～10.00V | 0.01V | 604H |
| d3-005 | PULSE Input frequency | 0.01～50.00KHz | 0.01KHz | 605H |
| d3-006 | AO1 output voltage | 0.00～10.00V | 0.01V | 606H |
| d3-007 | A02 output voltage | 0.00～10.00V | 0.01V | 607H |
| d3-008 | AD1C（factory test） | | | 608H |
| d3-009 | AD2C（factory test） | | | 609H |
| d3-010 | AD1IN（factory test） | | | 60AH |
| d3-011 | AD2IN（factory test） | | | 60BH |
| d3-012 | AD3IN（factory test） | | | 60CH |

# 10 MODBUS Communication Protocol

This chapter describes the MODBUS communication function. Modbus protocol supports RTU mode

## 10.1 MODBUS Communication Modes

MODBUS communication is made of a master station (PLC or PC)and maximum of 31 slave stations. It communicates in 'point to point' master-slave mode. Master and slave communication (serial communication) is usually the way of slave station respond to the command after master station had communicated. Each master station only with a serial communication between slave.Therefore, each slave station address to be pre-set number, master station through the numbers with the signal communication. It will respond to the specified command sent by the master station.

Interval between each information must be kept as below:

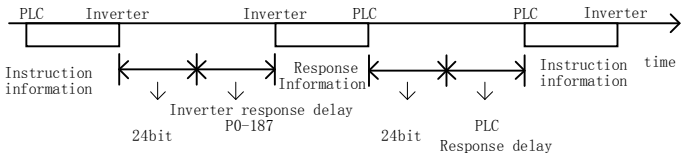



Chart 10-1 Serial Communication diagram

## 10.2 Information format

MODBUS communication adopts the format that master issue the directions and the slave to respond . The message formats(receive/send) are shown in chart 10-2 , according to the different content of instructions (function) , the length of the data also will be changed.

| Slave address |
|---|
| Function code |
| data |
| Check error |

Chart 10-2 Information formats of serial communication

1. Slave address

Inverter address（0～1FHex）.If setting for 0,slave will not respond to the command sent by the master .

2. Function code

Function code is used to specify the command code. See the table below.

| Function code（hex） | Function | Instruction info | | Response info | |
|---|---|---|---|---|---|
| | | Min（bit） | Max（bit） | Min（bit） | Max（bit） |
| 03H | To read the contents of storage register | 8 | 8 | 7 | 37 |
| 08H | Loopback test | 8 | 8 | 8 | 8 |
| 10H | Multiple storage register read-in | 11 | 41 | 8 | 8 |
| 80H | Error receiving data from slave | | | 5 | 5 |

Chart 10-3 Serial Communication Function Code Description

3. Data

Storage register number (the test code in numbering) and its datas constitute a series of data. According to the contents of the data length the instruction will change.

4. Check error

Using the CRC-16 (cyclic redundancy check, check sum means) to check communication errors.

The result (Check and calculate) is stored in a data(16bit）, its a start value of FFFFH.The data to be sent (slave address, function code and data), a fixed value A001H put together XOR and shift calculation. After the calculation , this data contains a checksum value.

Check and calculation according to the following methods：

1) The start value of 16-bit data used to calculate must be set to FFFFH.

2) Must be used starting value and slave address to do the XOR calculation.

3) The results must be shifted to the right until the overflow bit becomes 1.

4) When the overflow bit becomes 1, must use the results of step 3, and a fixed value A001H to do the XOR calculation.

5) 8 times shift to calculate after (whenever the overflow bit becomes 1, must be carried out as described in Step 4 to do the XOR calculation), use the results of the previous and the next data (8-bit function code) for XOR operation. The results of this operation must again shifted eight times, when the shift in the overflow bit is 1, the need for a fixed value A001H XOR.

6) The data follow the same steps for processing. First deal with high byte, then low byte, until all data are processed.

7) The result is a check sum ,contains a high byte and low bytes.

Notice: when adding the checksum in the data frame, the first to add low byte, and then add the high bytes.

## 10.3 Examples of MODBUS Information

### 10.3.1 To read the contents of storage register

A maximum of 16 can be read out the contents of inverter memory registers every time.

First, the instruction information must contain to read out the beginning address of the first register and the amount of register. Response message will contain the contents of the register to be read. Store register content is divided into high 8 bit and low 8 bit, according to number order turn into data within a response message.

Read from the slave 2，the inverter register information 000H, 001H examples as below:

| Command information | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 03H |
| start address | High byte | 00H |
| | Low byte | 00H |
| Number | High byte | 00H |
| | Low byte | 02H |
| CRC-16 | High byte | C4H |
| | Low byte | 38H |

| Response information (normal) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 03H |
| Data code | | 04H |
| Start storage register | High byte | 00H |
| | Low byte | 00H |
| The next storage register | High byte | 00H |
| | Low byte | 00H |
| CRC-16 | High byte | C9H |
| | Low byte | 33H |

| Response information (fault) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 80H |
| Error code | | 02H |
| CRC-16 | High byte | 30H |
| | Low byte | 01H |

Chart 10-4 Examples of serial communication

### 10.3.2 Test circuit

The instruction information directly as a response message back out. To use master and slave communication testing . Test code, the data can use any value.

Carry out the slave 2 of the inverter loop test of the information shown as below:

| Command information | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 08H |
| Test code | High byte | 01H |
| | Low byte | 02H |
| Number | High byte | 03H |
| | Low byte | 04H |
| CRC-16 | High byte | 41H |
| | Low byte | 37H |

| Response information (normal) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 08H |
| Test code | High byte | 01H |
| | Low byte | 02H |
| Number | High byte | 03H |
| | Low byte | 04H |
| CRC-16 | High byte | 41H |
| | Low byte | 37H |

| Response information (fault) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 80H |
| Error code | | 03H |
| CRC-16 | High byte | F1H |
| | Low byte | C1H |

Chart 10-5 Examples of serial communication loop testing

### 10.3.3 Write into multi-storage register

A maximum of 16 can be written into the contents of inverter memory registers every time.

The specified data are written specified number into the specified storage register . Write into data must in accordance with the number order of register, respectively, according to a high 8 bits, low 8bits order array in the instruction

information.

From PLC to the slave2 of inverter modify 000H、001H information of register,samples as below:

| Command information | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 10H |
| Start address | High byte | 00H |
| | Low byte | 00H |
| Number | High byte | 00H |
| | Low byte | 02H |
| data number | | 04H |
| Start data | High byte | 00H |
| | Low byte | 01H |
| The next data | High byte | 00H |
| | Low byte | 01H |
| CRC-16 | High byte | 6CH |
| | Low byte | EBH |
| Remarks:Data number=quantity*2 | | |

| Response information (normal) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 10H |
| Start address | High byte | 00H |
| | Low byte | 00H |
| Number | High byte | 00H |
| | Low byte | 02H |
| CRC-16 | High byte | 51H |
| | Low byte | 9FH |

| Response information (fault) | | |
|---|---|---|
| Slave address | | 02H |
| Function code | | 80H |
| Error code | | 01H |
| CRC-16 | High byte | 31H |
| | Low byte | C2H |

Chart 10-6 write instruction samples of serial communication

### 10.3.4 Data saved instruction

After using MODBUS communication, if function code data had been written from the PLC into the inverter, it will be temporarily stored in the data field of inside converter.

Save command mean that RAM function code data is written into the internal EEPROM of inverter (permanent storage ). Write 1 to the register number 0909H mean that had carried out the data storage instruction.

### 10.3.5 Broadcast model sent data

When using broadcast model sent data, an instruction can be simultaneously sent to all slaves. The slave address of instruction information must be set to 00H. All slaves have been received from the message, rather than make a response.

## 10.4 Inverter for slave

When the inverter address for 1 to 31, the slave converter will accept the

following data.

### 10.4.1 Instruction Data

Instruction data as below list. only can be written by using function code10H.

| MODBUS register address | Countents | |
|---|---|---|
| 900H | Bit 0 | Run instruction: 1 run; 0 stop |
| | Bit 1 | Direction instruction: 1 reverse;0 forward |
| | Bit 2 | JOG instruction: 1 JOG; 0 stop |
| | Bit 3 | Reset instruction: 1 fault reset; 0 no |
| | Bit 4~F | reserved |
| 901H | Frequency instruction | |
| 902H | PID setting value | |
| 903H~908H | reserved | |
| 909H | Save instruction: 1 parameter data save to EEPROM | |
| Remarks: Bit 0 for the lowest bit | | |

Chart 10-7 Data definition of communication instruction

### 10.4.2 Monitoring Data

The function code of d0, d1, d2, d3 function groups can be used as surveillance data, use the 03H function Code to read the content. Each function code MODBUS register address see the function list. Transfer data to an integer, pay attention to the unit of each function code.

### 10.4.3 Set Data

The function code of P0 function group can be modified, use the 10H function code is written. MODBUS register address of all function codes see the function list. Transfer data to an integer, pay attention to the unit of each

function code.

### 10.4.4 Test Data

When Looping test, receive test data of 08H function code, and respond reply.

## 10.5 Inverter for master

When the address of inverter is 32, the inverter will act as the master converter to send the following broadcast data. At this time the master inverter in currently running to send run and stop instructions. Setting frequency is sent as frequency instruction. MODBUS register address is 900H and 901H.

The transmission frequency of master inverter command is 50.0Hz, set the forward running information as shown below.

| MODBUS register address | Contents | |
|---|---|---|
| 900H | Bit0 | Run command 1:run; 0:stop |
| | Bit1 | Direction command 1:reverse; 0:forward |
| | Bit2 | Reserved |
| | Bit 3~F | Reserved |
| 901H | Frequency command | |
| Remarks: Bit0 is the lowest bit | | |

| Command information | | |
|---|---|---|
| Slave address | | 00H |
| Function code | | 10H |
| Start address | High byte | 09H |
| | Low byte | 00H |
| Number | High byte | 00H |
| | Low byte | 02H |
| data number | | 04H |
| Start data | High byte | 00H |
| | Low byte | 01H |
| The next data | High byte | 13H |
| | Low byte | 88H |
| CRC-16 | High byte | C1H |
| | Low byte | 95H |

Chart 10-8 serial command samples of master inverter

## 10.6 MODBUS Communication Error Codes

When the slave inverter receives the data is incorrect, it will respond to function code for the data frame of 80H , see the table below:

| Error codes | Contents |
|---|---|
| 01H | In running, not allowed to access. |

| | |
|---|---|
| 02H | Data overflow<br>1.MODBUS address exceed range<br>2. The data to write exceed the range<br>3. The data to write exceed the upper-lower limit range of data comments. |
| 03H | Function code overflow |

Chart 10-9 Error codes of serial communication

## 10.7 Back-check of no response fault for slave

In the following conditions, slaves ignore the master command information, and do not send the response information.

1. Had checked up the send error in instruction information( exceed melody、frame、checkout、CRC-16).
2. It is different that slave address of instruction information and slave address of inverter side.
3. When time intervals of data and data of composing information exceed the length(24 bit).

# Chart Index

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