# OK2D57ECS

# New generation digital display closed loop stepper driver

## 1.Product introduction

## 1. Overview

OK2D57ECS is a new closed loop stepper driver developed by our company based on more than ten years of stepper and servo R&D experience. It can used to drive NEMA 23, NEMA 24 closed loop stepper motor. It adapts the latest ARM chip and applied vector closed-loop control algorithm to completely overcome the loss of open-loop stepper motors. At the same time, it can significantly improve the high-speed performance and torque output of the motor, and reduce the heating and low-speed resonance problems of the motor. In addition, when the motor is continuously overloaded, the driver will output an alarm signal, which has the same reliability as the AC servo system. The traditional stepper drive solution is easy to upgrade, and the cost is not much higher than that of the open-loop stepper motor, which is only equivalent to 30-50% of the traditional AC servo system.

## 2. Performance parameters

◆ Built-in microcontroller function can replace PLC in most occasions, significantly reducing user costs.;

◆ Internally supports jog mode, open-loop/closed-loop option functions.

◆ Built-in smoothing filter function, external input can operate normally

without acceleration or deceleration;

◆ Adopts a new 32-bit motor control dedicated ARM smart chip;

◆ 4-digit LED digital tube display with 4 button operations, intuitive and easy to operate.;

◆ Adopt advanced vector current, speed and position closed-loop control algorithms;

◆ The current can be set arbitrarily (within the range of 0---6A);

◆ The standard motor comes with a 1000-line high-precision photoelectric or magnetic encoder.;

◆ Optocoupler isolation differential signal input, pulse response frequency up to 200KHZ.;

◆ Arbitrary microstep setting (200-60000) to meet all occasions;

It has protection functions such as overcurrent, overvoltage, overspeed, overheating, and excessive tracking error;

### 3. Application:

Suitable for various small and medium-sized automation equipment and instruments, such as: engraving machines, wire stripping machines, marking machines, cutting machines, laser phototypesetting, plotters, CNC machine tools, automatic assembly equipment, etc. Particularly adapt to the applications desired with low noise, low heating, high speed and high precision.

二、 **Electrical, mechanical and environmental specifications**
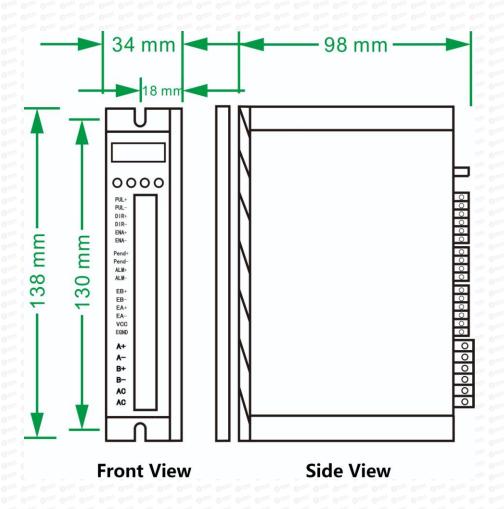
1. *Electrical Specification*

| Parameters | OK2D57ECS | | | |
|---|---|---|---|---|
| | Min | Typical | Max | **Unit** |

| | | | | |
|---|---|---|---|---|
| **Continuous output current** | 1.0 | - | 6.0 | A |
| | | | | |
| **Input Voltage** | 24 | - | 48 | VDC |
| **Logic Signal Current** | 7 | 10 | 20 | mA |
| **Power** | | | 150 | W |
| **Pulse input frequency** | 0 | - | 200 | kHz |
| **Isolation resistance** | 500 | | | MΩ |
| **Digital output port logic current** | | | 100 | mA |
| **Digital output port voltage resistance** | - | - | 24 | V |

## 2. Operating Environment and other Specifications

| Cooling | Natural Cooling or Forced cooling | |
|---|---|---|
| **Operating environment** | Environment | Avoid dust, oil fog and corrosive gases |
| | Ambient Temperature | 0℃－50℃ |
| | Humidity | 40－90%RH |
| | Vibration | 10~55Hz/0.15mm |
| **Storage Temperature** | -20℃－+65℃ | |
| **Weight** | About 300g | |

## 3. Mechanical Specifications: (unit: mm [1inch=25.4mm])

**Front View**    **Side View**

34 mm  98 mm  18 mm  138 mm  130 mm

PUL+
PUL−
DIR+
DIR−
ENA+
ENA−
Pend+
Pend−
ALM+
ALM−
EB+
EB−
EA+
EA−
VCC
EGND
A+
A−
B+
B−
AC
AC

## 4. Methods of quick heat dissipation

（1）The reliable operating temperature of the driver is usually within 60°C, and the operating temperature of the motor is within 80°C;

（2）When installing the driver, please install it upright on its side to form strong air convection on the surface of the radiator. If necessary, install a fan close to the driver to force heat dissipation to ensure that the driver operates within a reliable temperature.

# 3.Introduction to driver interface and wiring

## 1. Interface definition

**Motor and power input ports**

| PIN | Mark | Neme | Lead color | |
|-----|------|------|------------|---|
| 1 | A+ | Motor Phase A+ | White | Red |
| 2 | A- | Motor Phase A- | Green | Green |
| 3 | B+ | Motor Phase B+ | Blue | Yellow |
| 4 | B- | Motor Phase B- | Black | Blue |
| 5 | +VDC | Input DC voltage positive pole | 24-48VDC **Pay attention to the direction** | |
| 6 | GND | Input DC voltage negative pole | | |

**Note: The closed-loop motor wiring must strictly follow the color definitions and cannot be wired at will.**

**Encoder：Encoder signal input port**

| Pin | Name | Description | Note |
|-----|------|-------------|------|
| 1 | EB+ | Encoder channel B+ input | YELLOW |
| 2 | EB− | Encoder channel B- input | Green |
| 3 | EA+ | Encoder channel A+ input | Black |

| 4 | EA－ | Encoder channel A- input | Blue |
| --- | --- | --- | --- |
| 5 | VCC | Encoder power supply +5V input | RED |
| 6 | EGND | Encoder power ground | White |

**Control Signal：Control signal port**

| PIN | Name | Description | Note |
| --- | --- | --- | --- |
| 1 | PUL＋ | Pulse positive input | The signal source is universal from +5V to 24V, no need to connect resistors in series. |
| 2 | PUL－ | Pulse negative input | |
| 3 | DIR＋ | Direction positive input | The signal source is universal from +5V to 24V, no need to connect resistors in series. |
| 4 | DIR－ | Direction negative input | |
| 5 | ENA＋ | Motor enable positive input | When this signal is valid, the motor is in a free state and does not lock the machine. |
| 6 | ENA－ | Motor enable negative input | |
| | | | |
| 9 | ALM＋(BRK+) | Alarm/brake signal positive output | P-11 Setup to select alarm/brake |
| 10 | ALM－(BRK-) | Alarm/brake signal negative output | |

## 2. Control signal interface circuit diagram

Control signal input and output interface circuit diagram, as shown in the figure.
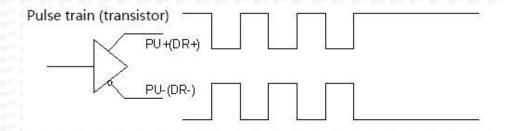
**（1）Input signal connection**



Common anode connection method          Common cathode connection

**Special note: This driver supports 5V-24V and does not require a series resistor!**
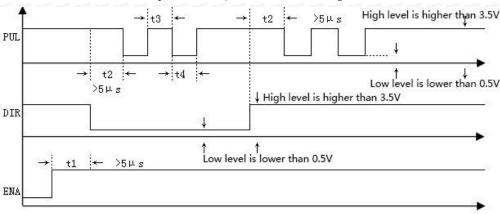
**（2）When using differential input, please wire as shown below.**

4

Pulse train (transistor)



Pic 3(a) Differential mode control signal interface wiring diagram

### 3．Control signal timing diagram

In order to avoid some malfunctions and deviations, PUL, DIR and ENA should meet certain requirements, as shown in Figure 4 below:



Picture 4 Timing diagram

Note：

(1) t1：ENA must be ahead of DIR by at least 5ms. Usually, ENA+ and ENA- are NC (not connected).

(2) t2：DIR must be ahead of PUL effective edge by 5ms to ensure correct direction;

(3) t3：Pulse width not less than 2.5ms.

(4) t4：Low level width not less than 2.5ms.

## 4. Introduction to drive status indicators

### 1．Fault description

| Number | Error code | Fault description | Troubleshooting |
|--------|-----------|-------------------|-----------------|
| 1 | Er01 | hardware malfunction | Need to return to factory for testing |
| 2 | Er02 | Motor overcurrent | Check whether the motor is short-circuited or reduce the current |
| 3 | Er03 | Drive overvoltage | Check whether the input voltage is too high |
| 4 | Er04 | Driver undervoltage | Check whether the input voltage is too low |
| 5 | Er05 | Location out of tolerance | The motor is overspeeding, increase the current and voltage appropriately. |

### 2．Parameter monitoring instructions

| PIN | Function code | Function Description | Function introduction |
|-----|---------------|----------------------|-----------------------|
| 1 | L-00 | Speed | Monitor the current speed, voltage, and current to check whether the drive is working normally and resolve any abnormalities in time! |
| 2 | L-01 | Voltage | |
| 3 | L-02 | A phase current | |
| 4 | L-03 | B phase current | |

| | | | |
|---|---|---|---|
| 5 | L-04 | Following error | |
| 6 | L-05 | Number of received pulses | Check the number of received pulses in real time to determine whether the motor has lost step. |
| 7 | L-06 | Motor feedback pulse number | |
| 8 | L-08 | Software version number | The bigger the number, the newer the version |

Note：L-01 What is displayed is the DC voltage inside the driver；

### 3．Description of commonly used function codes

| Number | Parameter settings | Function code | Function Description |
|---|---|---|---|
| 1 | Number of subdivided pulses | P-00 | 200-60000 can be set at will, factory default setting is 1600 |
| 2 | Closed loop holding current | P-01 | 1.0-6.0, factory default 2.0A |
| 3 | Jog operation | P-06 | Enter into JOG，Press ▲ ▼ Jog |
| 4 | Motor direction | P-12 | 0 reverse, 1 forward |
| 5 | Reset | S-20 | Set to 1 to restore factory settings |

## 5.Driver button parameter settings:

The driver's operation panel consists of 4 LED digital displays and 4 buttons M, ▲, ▼, and ◂, which are used to display various system status, parameter settings, etc.

**Button function description table**

| Button | Function Description |
|---|---|
| M | Function selection: P parameter, S parameter, L parameter switching |
| ▲ | When the value changes: +1, long press to increase quickly. In jog mode: press and hold the motor to rotate forward |
| ▼ | When the value changes: -1, press and hold to quickly reduce. In jog mode: press and hold the motor to reverse |
| ◂ | 1、Press and hold this button for 0.5 seconds to enter parameter setting<br>2、When setting parameters, press once and shift to the left once<br>3、After the setting is completed, press and hold this button for 0.5 seconds to confirm that the setting is successful and return to the current function code.<br>4、In case of a fault, press and hold this button for 2 seconds to reset the fault. |

After the driver is powered on, the enable display is run, indicating that the motor is powered on and the driver is working normally.
When the motor enable is turned off, stop is displayed.

**Complete parameter menu：**
The driver provides 2 sets of parameters for user operation. The P parameter is used to set several general parameters of the driver. Parameter value (such as microstep resolution, lock current, motor type, etc.), S parameter is used to set the performance parameter index value of the driver.

## P parameter function table

| Parameter | Name | Parameter range | Factory default | Description |
|---|---|---|---|---|
| P-00 | Microstep resolution option | 200-60000 | 1600 | Any microstep resolution settings |
| P-01 | Closed loop holding current | 1.0～6.0 | 2.0 | Motor load setting current |
| P-02 | low speed current | 1.0～6.0 | 4.0 | Generally do not change |
| P-03 | Closed loop peak current | 6.0～9.0 | 8.0 | Generally do not change |
| P-04 | Open loop mode operating current | 1.0～8.0 | 4.0 | Generally do not change |
| P-05 | Open loop mode automatic semi-flow | 10～90% | 50% | Generally do not change |
| P-06 | Jog operation | JOG | | Press ▲, ▼ to move forward and reverse |
| P-07 | Jog speed | 0～100 | 100 | Jog speed |
| P-08 | pulse mode | 0～1 | 0 | 0-pulse+ direction，1-AB Orthogonal |
| P-09 | operating mode | 0～1 | 0 | 0: pulse mode，1: Internal position mode 2: speed mode |
| P-10 | ALM alarm polarity | 0～1 | 1 | 0: Normally closed， |
| | Output settings | | | 1: Normally open |
| P-11 | ALM function selection | 0～1 | 0 | 0: Alarm Output， 1: Brake control 2: Z pulse |
| P-12 | Motor running direction | 0～1 | 0 | 0 reverse, 1 forward |
| P-13 | ENA enable control | 0～1 | 1 | 0: Low level enable 1: High level enable |
| P-14 | Pulse input pin filter | 0～5 | 0 | The larger the number, the stronger the filtering0 --> 4MHZ, 5 --> 150KHZ |
| P-16 | Anti-disturbance time | 0～1000ms | 1000 | Generally do not change |
| P-17 | Tracking error alarm threshold | 0～32000 | 4000 | Generally do not change |
| P-18 | Open and closed loop mode selection | 0～1 | 1 | 0 open loop, 1 closed loop |
| P-25 | Smoothing filter enabled | 0～1 | 0 | 0 is not enabled, 1 is enabled (important) |
| P-26 | Position loop smoothing filter | 0～10000 | 150 | Adjust this parameter if the |

| Parameter | Name | Parameter range | Factory default | Description |
|---|---|---|---|---|
| | | | | input pulse has no acceleration or deceleration. |
| P-98 | Undervoltage, overvoltage alarm | 0～1 | 0 | 0 alarm, 1 shield |
| P-99 | Position loop acceleration and deceleration time | 0～1000 | 8 | When starting and stopping quickly, adjust this parameter |
| | | | | |
| | | | | |

Special note: The bold yellow shading in the P parameter table is the commonly used function settings. The rest generally do not need to be changed. Just restore the factory settings to S-20 and set it to 1!

After setting the function, power off and restart is required!

## S parameter function table

| Parameter | Name | Parameter range | Factory default | Description |
|---|---|---|---|---|
| S-19 | Encryption | 2020 | 0 | Only when 2020 is set can other parameters of S be modified (the data of 2020 is still displayed as 0) |
| S-01 | Encoder resolution settings | 4000 | 4000 | 1.8°4000; 0.9°2000 |
| S-03 | Current loop proportional gain P | 1～32000 | 1500 | The larger the setting value, the higher the gain and the greater the stiffness. |
| S-04 | Current loop integral gain I | 1～32000 | 200 | The smaller the setting value, the faster the integration speed, the stronger the system's resistance to deviations, and the greater the rigidity. If it is too small, it will easily cause overshoot.。 |
| S-05 | Position loop proportional gainKP | 1～32000 | 2500 | The larger the setting value, the higher the gain, the greater the stiffness, and the faster the position tracking. But a value that is too large may cause motor oscillation or overshoot. |
| S-06 | Position loop integral gain KI | 1～32000 | 500 | |
| S-07 | Position ring KD | 1～32000 | 100 | |
| S-08 | Position loop KVFF | 1～32000 | 30 | The larger the setting value, the faster the tracking speed and the greater the rigidity. It is strongly recommended to use the factory parameters and do not modify them at will. |
| S-20 | Reset | 0～1 | 0 | Restore factory settings after setting to 1 |

**Special note: The driver's factory default current loop parameters, position loop parameters, etc. are the optimum parameters for the matching motor, and customers generally do not need to modify them. If the customer's application environment is special, the parameters with * can be modified under the guidance of professionals to achieve the best use results.**

## After setting the function, power off and restart is required!

Case 1: The user starts and stops quickly, brakes suddenly, and the motor shakes unstable when stopped. Set S-05 to 2000 and S-07 to 400 to achieve satisfactory results!

### 6. Power supply precautions

The DC input voltage is DC24V~50V, and the power supply power is not higher than 150W. The higher the voltage input and the larger the current setting, the greater the motor torque and the better the high-speed performance. However, the motor generates more heat. In principle, as long as it meets the use, the smaller the current setting. The better.

Please note:

1）When wiring, pay attention to strictly follow the colors of the motors;

2）The driver must not be connected to 220V. The driver is DC, so pay attention to the direction;

3）The encoder power supply is provided by the driver and does not need to be powered separately;

4) The control signal wire and the motor phase wire cannot be entangled together, and it is better to add a shielding layer to the signal wire;

## 7. Open loop and closed loop settings

This driver is a closed-loop driver can drive Nema 34 (86 x 86) stepper motor which must be equipped with a 1000-line encoder. The motor's operating performance can be greatly improved by more than 30% compared to open-loop.

When an unexpected situation occurs, such as encoder failure or poor contact of the encoder line, you can set P-18 to 0 (need to power off and restart) and turn on the open-loop mode to solve customer problems to the greatest extent.

## 8. Brake control settings

When the motor is braked, the brake signal is controlled by the ALM alarm output pin.

**Set P-11 to 1, P-85 power-on brake release delay time, P-86 alarm power-off delay time!**
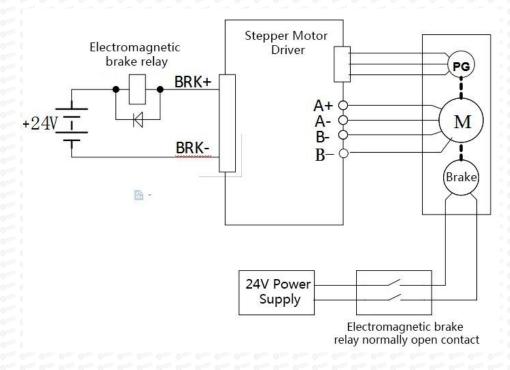
**Press and hold left arrow to save**

**Wiring method for motor with brake:**

Since the brake coil will generate a relatively large surge current when it operates, if the brake coil is directly connected to the output port of the driver, the optocoupler at the driver output port will be damaged, so a relay must be used as a relay control. Since the brake coil and relay are both inductive loads, it is recommended to add a freewheeling diode. Do not connect the diode in the opposite direction when wiring.

It is recommended that customers choose solid-state relays, then you don't need to use freewheeling diodes. The advantages of solid-state relays are: fast response, no need for freewheeling diodes, and no sound when powered on.

The wiring of the brake and relay is as shown below:

the number of cycles is determined by P-49. If the time interval is 0, it will switch to the next group of operations when the speed is the highest. If P-49=0 at this time, the cycle will continue. If you need to trigger the operation through the input terminal each time after the multi-segment setting is completed, instead of running according to the set time interval, please set P-19 to 1.

| User parameters | | Location command source |
|---|---|---|
| P-09 | 1 | Multiple location settings |

| User parameters | | Location command source |
|---|---|---|
| P-19 | 0 | Segment continuous running mode, trigger once and execute everything |
| | 1 | Segment single trigger mode, trigger once and execute a segment sequentially |

Multi-position position external input trigger mode selection.

| User parameters | | Function |
|---|---|---|
| P-23 | 0 | high level signal |
| | 1 | Rising edge signal factory default 1 |
| | 2 | Falling edge signal |
| | 3 | low level signal |

The multi-segment position mode can be set to relative mode and absolute mode according to P-28.

## 9.Microcontroller-multi-segment setting instructions

Multi-segment position means that the driver stores 8-segment position instructions internally, and the displacement, maximum operating speed, and acceleration and deceleration time of each segment can be set separately. The waiting time and connection method between each section can also be selected according to actual needs.

The time interval between each group of positions is determined by P-66~P-73, and

| User parameters | | significance |
|---|---|---|
| P-28 | 0 | Relative mode: Each time it is triggered, the forward and reverse speeds are increased or decreased by the original command pulses at the current position according to the original command. |
| | 1 | Absolute mode: Each time it is triggered, it will rotate forward or reverse to the absolute position of the given pulse according to the absolute value of the current given speed. |

Absolute type and relative type are widely used. Users can easily complete periodic operation by using the table above.

| Multi-segment position mode internal trigger operation | | | |
|---|---|---|---|
| Predetermined area | Set unit | Factory default | Effective method |
| 0：Not triggered 1：trigger | G | 0 | Effective immediately |

P-29 Set to 1 to trigger the multi-segment position mode. This parameter will automatically return to 0 after triggering.

| Internal position PUL function | | Location command source |
|---|---|---|
| P-39 | 0 | PUL triggers emergency pause function and continues operation after restart |
| | 1 | PUL triggers the emergency stop function and resets to run from the first stage after restarting. |

| The number of segments to run in multi-segment | | | |
|---|---|---|---|
| Predetermined area | Set unit | Factory default | Effective method |
| 1~8 | G | 2 | Effective immediately |

(P-48)

| Number of internal position loops of multiple segments | | | |
|---|---|---|---|
| Predetermined area | Set unit | Factory default | Effective method |
| 0~30000 | G | 0 | Effective immediately |

(P-49)

External port function description

| PUL | Input a stop signal, and it needs to be terminated or paused every time it runs (select P-39). Please connect PUL+ to 24V and PUL- to 0V. |
|---|---|
| DIR | Input the start signal, and each trigger starts continuous operation or single operation. Please connect DIR+ to 24V and DIR- to 0V. |

| DIR pin filter time | | | |
|---|---|---|---|
| Predetermined area | Set unit | Factory default | Effective method |
| 0~3000 | ms | 0 | Effective immediately |

(P-88)

The 8-segment position inside the multi-segment position mode can have different acceleration and deceleration settings according to actual needs. The relevant function codes are as follows：

| P-30 | Position 1 acceleration and deceleration time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-31 | Position 2 acceleration and deceleration time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-32 | Position 3 acceleration and subtraction time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-33 | Position 4 acceleration and subtraction time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-34 | Position 5 acceleration and deceleration time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective |

| | | | | immediately |
|---|---|---|---|---|
| P-35 | Position 6 acceleration and subtraction time | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-36 | Position 7 acceleration and subtraction time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

| P-37 | Position 8 acceleration and subtraction time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~32000 | ms | 100 | Effective immediately |

The 8-segment position inside the multi-segment position mode can be set at different speeds according to actual needs. The relevant function codes are as follows：

| P-40 | Position 1 running speed | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | r/min | 100 | Effective method |

| P-41 | Position 2 running speed | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory | Effective |

| | | | default | method |
|---|---|---|---|---|
| | | 0~2000 | r/min | 100 | Effective immediately |

| | Position 3 running speed | | | |
|---|---|---|---|---|
| P-42 | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | r/min | 100 | Effective immediately |

| | Position 4 running speed | | | |
|---|---|---|---|---|
| P-43 | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | r/min | 100 | Effective immediately |

| | Position 5 running speed | | | |
|---|---|---|---|---|
| P-44 | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | r/min | 100 | Effective immediately |

| | Position 6 running speed | | | |
|---|---|---|---|---|
| P-45 | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | r/min | 100 | Effective immediately |

| | Position 7 running speed | | | |
|---|---|---|---|---|
| P-46 | Predetermined area | Set unit | Factory default | Effective method |
| | 0~3000 | r/min | 100 | Effective immediately |

| P-47 | Position 8 running speed |
|---|---|

| Predetermined area | Set unit | Factory default | Effective method |
|---|---|---|---|
| 0~3000 | r/min | 100 | Effective immediately |

The 8-segment position in the multi-segment position mode can be set to continuous operation according to actual needs, that is, a multi-segment position cycle, in which the position, acceleration and deceleration time and interval time of each position can be set according to different needs. The relevant function codes are as follows：

| | Position 000 given position | | | |
|---|---|---|---|---|
| P-50 | Predetermined area | Set unit | Factory default | Effective method |
| | -2147483647~+2147483647 | G | 0 | Effective method |

| | Position 001 given position | | | |
|---|---|---|---|---|
| P-52 | Predetermined area | Set unit | Factory default | Effective method |
| | -2147483647~+2147483647 | G | 0 | Effective method |

| | Position 010 given position | | | |
|---|---|---|---|---|
| P-54 | Predetermined area | Set unit | Factory default | Effective method |
| | -2147483647~+2147483647 | G | 0 | Effective method |

| | Position 011 given position | | | |
|---|---|---|---|---|
| P-56 | Predetermined area | Set unit | Factory default | Effective method |

**Left column**

| P-58 | | | |
|---|---|---|---|
| -2147483647~+2147483647 | G | 0 | Effective method |
| Position 100 given position | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -2147483647~+2147483647 | G | 0 | Effective immediately |

| P-60 | | | |
|---|---|---|---|
| Position 101 given position | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -2147483647~+2147483647 | G | 0 | Effective method |

| P-62 | | | |
|---|---|---|---|
| Position 110 given position | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -2147483647~+2147483647 | G | 0 | Effective method |

| P-64 | | | |
|---|---|---|---|
| Position 111 given position | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -2147483647~+2147483647 | G | 0 | Effective method |

| P-66 | | | |
|---|---|---|---|
| Interval time after the end of segment 1 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective method |

| P-67 | | | |
|---|---|---|---|
| Interval time after the end of segment 2 | | | |
| Predetermined area | Set unit | Factory | Effective |

**Right column**

| | | default | method |
|---|---|---|---|
| -32000~+32000 | ms | 1000 | Effective method |

| P-68 | | | |
|---|---|---|---|
| Interval time after the end of segment 3 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective method |

| P-69 | | | |
|---|---|---|---|
| Interval time after the end of segment 4 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective immediately |

| P-70 | | | |
|---|---|---|---|
| Interval time after the end of segment 5 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective immediately |

| P-71 | | | |
|---|---|---|---|
| Interval time after the end of segment 6 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective immediately |

| P-72 | | | |
|---|---|---|---|
| Interval time after the end of segment 7 | | | |
| Predetermined area | Set unit | Factory default | Effective method |
| -32000~+32000 | ms | 1000 | Effective immediately |

| P-73 | The interval after the end of segment 8 |
|---|---|

| Predetermined area | Set unit | Factory default | Effective method |
|---|---|---|---|
| -32000~+32000 | ms | 1000 | Effective immediately |

| | Origin search selection | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| P-74 | 0： Not looking for the origin<br>1： Automatically find the origin when turning on the machine<br>2： I/O port triggers to find the origin | G | 0 | Effective immediately |

| Function | PIN |
|---|---|
| I/O trigger signal | **Enable terminal** |
| ORGP signal | **Pulse terminal** |

| Parameter name | Function | Note |
|---|---|---|
| **P-75=H□□□0** | Reverse to find the origin | |
| **P-75=H□□□1** | Turn forward to find the origin | |
| **P-75=H□□1□** | Use the input terminal ORGP as the origin reference point to search. | |
| **P-75=H□0□□** | After reaching the origin reference point, decelerate and stop. | |
| **P-75=H□1□□** | After reaching the input terminal ORGP, use the opposite direction to find the rising edge of the input terminal ORGP at the second speed as the origin. | |

## 10.Origin function search

1．Features

2．When using the origin return function, you can use the input contact ORGP (external detector input terminal) as the origin reference point, and you can use forward search or reverse search.

3．User parameter settings

| **P-76** | Origin/mechanical origin search first speed | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~2000 | 0.1r/min | 500 | Effective immediately |
| **P-77** | Origin/machine search second speed | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~1000 | 0.1r/min | 200 | Effective immediately |
| **P-78** | Origin search offset pulse number | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | -32000~+32000 | G | 0 | Effective immediately |

## 11、Speed mode

Speed mode is mostly used in the precision CNC machining industry. Users can select the mode through P-09 and make different settings according to different occasions.

**User parameter settings**

Digital setting refers to storing the set speed value through function code P-93 or P-94 or P-95 and using it as a speed command.

（1）Digital given speed mode

There are two application methods for digital given speed mode: the first is for the user to set different speed command values in the P-93 or P-94 or P-95 function code before making an action, and then pass the pulse, Direction The terminal performs speed switching; the second is to use communication methods to change the value of the function code.

A：User related parameters

| User parameters | | Speed command source | |
|---|---|---|---|
| P-09 | 2 | Digital given | |
| P-93 | Speed command keyboard setting value 1 | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~±4000 | r/min | 100 | Effective immediately |
| P-94 | Speed command keyboard setting value 2 | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~±4000 | r/min | 200 | Effective immediately |
| P-95 | Speed command keyboard setting value 3 | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0~±4000 | r/min | 300 | Effective immediately |

B: Input signal setting, use the following input signals to switch the operating speed.

| Signal name | Name | Function |
|---|---|---|
| Digital given speed selection 1 | Pulse terminal | Digital given speed selection |
| Digital given speed selection 2 | Direction terminal | |

C：Digital given speed operation

| Pulse terminal | Direction terminal | |
|---|---|---|
| OFF | OFF | 0： Zero speed |
| OFF | ON | P-93： Setting value 1 speed |
| ON | OFF | P-94： Setting value 2 speed |
| ON | ON | P-95： Setting value 3 speed |

**If external terminals are not needed, it will run automatically after power-on. Set P-96 to 1, and then the speed at this time is specified by P-93.**。

## Command ramp function settings

The ramp function control function refers to converting a large-changing speed command into a relatively smooth constant acceleration and deceleration speed command, that is, by setting the acceleration and deceleration time to achieve the purpose of controlling acceleration and deceleration. In the speed control mode, if the given speed command changes too much, the motor will jump or vibrate violently. If the acceleration and deceleration time of the soft start is increased, the motor can start smoothly and avoid the above situation. Mechanical parts are damaged.

User parameter settings

| P-89 | Acceleration time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 1~30000 | ms | 200 | Effective immediately |
| P-90 | Deceleration time | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 1~30000 | ms | 200 | Effective immediately |

## S-curve smoothing function

During the acceleration and deceleration process, since acceleration and deceleration changes such as starting and stopping will cause impact, it is necessary to add an S-curve acceleration and deceleration command to the speed command, that is, by adding an arc to the acceleration and deceleration slope to make the servo motor run more smoothly. .

（1） User parameter settings

| P-91 | S-curve deceleration time | | | |
|---|---|---|---|---|
| | Predetermined area | Set unit | Factory default | Effective method |
| | 1~12000 | ms | 100 | Effective immediately |
| P-92 | S Curve start flag | | | |
| | Predetermined area | Set unit | Factory default | Effective method |
| | 0： Does Switch on 1： Switch on | G | 0 | Effective immediately |

## 12、Product warranty terms

### 1. One year warranty

Our Company warrants its products against defects in materials and workmanship for a period of 12 months from

shipment out of factory. During the warranty period, We will either, at its option, repair or replace products which proved to be

defective.

### 2. Not covered by warranty

The above warranty does not extend to any product damaged by reasons of improper or inadequate handlings by customer, improper or inadequate customer wirings, unauthorized modification or misuse, or operation beyond the electrical specifications of the product and/or operation beyond environmental specifications for the product.

### 3. Maintenance process

If it is necessary to repair the product, it will be handled according to the following process：

（1）Before shipping, you need to call the agent to obtain the return permit number.；

（2）A written description is attached with the product, explaining the fault phenomenon of the drive being returned for repair；the voltage, current and usage environment when the fault occurred；and the name, phone number and mailing address of the contact person.

（3）Please pay the postage first and send it to the company's location or designated repair point. The company refuses to accept any express freight collect.

### 4. Warranty limitations

We make no other warranty, either expressed or implied, with respect to the product. We specifically disclaim the implied warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not allow limitations on how long and implied warranty lasts, so the above limitation or exclusion may not apply to you. However, any implied warranty of merchantability or fitness is limited to the 12-month duration of this written warranty.

### 5. Maintenance requirements

When returning for repair, please fill in the "Maintenance Report" truthfully to facilitate repair analysis.