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# OK2D86ECS

## New generation digital display closed loop 86 stepper drive

### I product introduction

#### 1. Overview

OK2D86ECS is the company based on more than ten years of stepper and servo research and development experience, the successful development of a new closed-loop 86 stepper driver, using the latest ARM chip and the application of vector closed-loop control algorithm, so as to completely overcome the open-loop stepper motor lost step problem, at the same time can significantly improve the motor high-speed performance and torque output, reduce the motor heating and low-speed resonance problems. 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. At the same time, the motor installation size is fully compatible with the traditional 86 series stepper motor, the traditional stepper drive program is easy to upgrade, and the cost is not much compared with the open-loop stepper motor, only equivalent to 30-50% of the traditional AC servo system.

#### 2. Performance parameters

- ◆ Built-in microcontroller function, can replace PLC in most occasions, greatly reduce user costs;
- ◆ Internal support point mode, support open loop/closed loop function optional
- ◆ Built-in smooth filtering function, external input can run normally without acceleration and deceleration;
- ◆ Adopt the new 32-bit motor control ARM smart chip;

- ◆ 4 digit LED digital tube display with 4 key operation, intuitive and easy to operate;
- ◆ Advanced vector current, speed and position closed-loop control algorithm;
- ◆ The current can be set arbitrarily (0-- 8A range);
- ◆ The motor is equipped with 1000-line high-precision photoelectric or magnetic encoder;
- ◆ Optical coupling isolation differential signal input, pulse response frequency up to 200KHZ;
- ◆ Arbitrary subdivision setting (200-60000), to meet all occasions;
- ◆ With overcurrent, overvoltage, overspeed, overheating, tracking error and other protection functions;

### 3. Field of application

Suitable for all kinds of small and medium-sized automation equipment and instruments, such as: engraving machine, wire stripping machine, marking machine, cutting machine, laser phototypesetting, plotter, CNC machine tools, automatic assembly equipment. The application effect is especially good in the equipment with low noise and high speed expected by the user.

## II electrical, mechanical and environmental indicators

### 1. Electrical Indicators

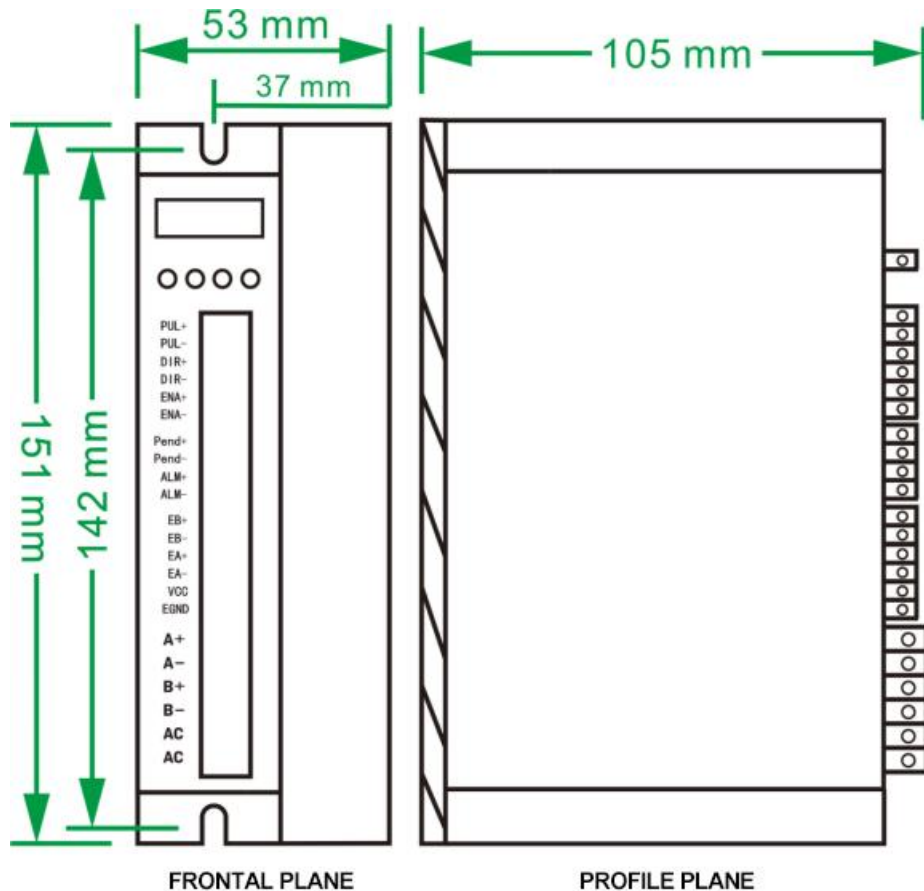
Parameters	OK2D86ECS			Units
	Min.	Typical value	Maximum value	
Continuous output current	1	-	8	A
Input supply voltage	18	48	80	VAC

Logic Input current	7	10	20	mA
Overall power			200	W
Pulse frequency	0	-	200	kHz
Insulation resistance	500			M Ω
Digital outlet logic current			100	mA
Digital outlet pressure resistant	-	-	24	V

### 2. Use the environment and parameters

Cooling method	Natural cooling or external radiator	
Use environment	Use occasion	Try to avoid dust, oil mist and corrosive gases
	Temperature	0 °C to 50 °C
	Humidity	40-90% RH
	Vibration	10 ~ 55 Hz / 0.15 mm
Store temperature	- 20°C to + 65°C	
Weight	About 600g	

### 3. Mechanical installation dimensions drawing (unit :mm)



### III the driver interface and wiring introduction

#### 1. Interface definition

#### Motor and power input ports

Terminal number	Terminal number	First name	Lead color description	
1	A+	A-phase motorr windings +	white	red
2	A-	A-phase motor windings -	green	green
3	B+	B phase motor windings +	blue	yellow
4	B-	B phase motor windings -	black	blue
5	AC	Input AC/DC voltage	18-80VAC; 24-110VDC regardless of direction	
6	AC	Input AC/DC voltage		

**Note: Closed loop motor wiring must be strictly in accordance with the color definition of wiring, not at will.**

#### 4. Strengthen the heat dissipation method

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

(2) Install the driver, please use the vertical side installation, so that the radiator surface to form a strong air convection; If necessary, install a fan near the driver to force heat dissipation to ensure that the driver works in a reliable temperature.

#### Encoder: encoder signal input port

Terminal number	Terminal number	First name	Lead color description
1	EB +	Motor encoder B phase positive input	yellow
2	EB -	Motor encoder B phase negative input	green
3	EA +	Motor encoder A phase	black

		positive input	
4	EA -	Motor encoder A phase negative input	blue
5	VCC	Encoder power +5V input	red
6	EGND	Encoder power ground	white

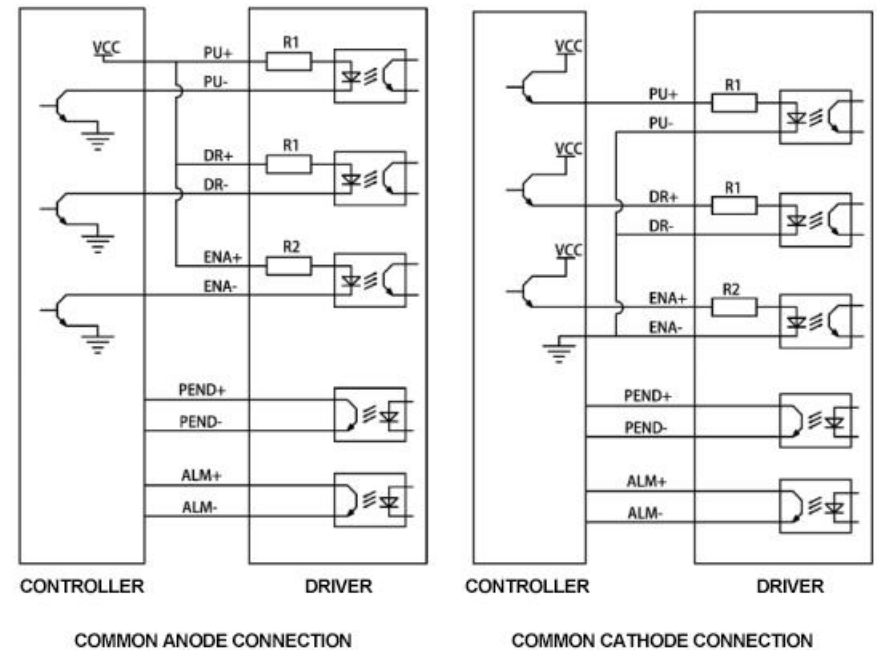
**Control Signal: Control signal port**

Terminal number	Terminal number	First name	Make clear
1	PU +	Pulse positive input	Signal source +5V ~ 24V universal, no need to series resistor
2	The PU -	Pulse negative input	
3	DR +	Directional positive input	Signal source +5V ~ 24V universal, no need to series resistor
4	DR -	Directional negative input	
5	ENA +	Motor enables positive input	When the signal is effective, the motor is in a free state and does not lock the machine
6	ENA -	Motor enables negative input	
7	Pend+	Position signal positive output	
8	Pend-	Place signal negative output	
9	ALM + (BRK +)	Alarm/lock signal positive output	P-11 Settings Select Alarm/brake
10	ALM - (BRK -)	Alarm/lock signal negative output	

2. Control signal interface circuit diagram

Control signal input and output interface circuit diagram, as shown in figure.

**(1) Input signal connection method**



**Special note: This drive supports 5V-24V, no series resistance!**

**(2) Differential input when please press the following figure wiring**

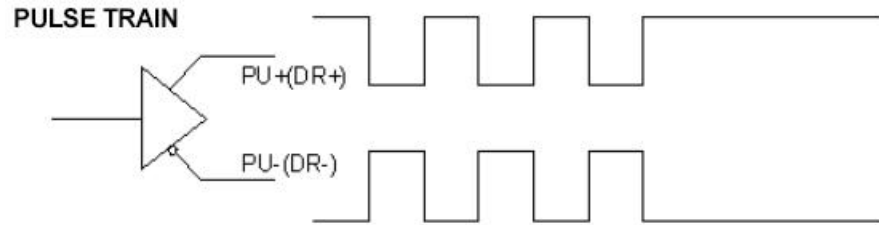


Figure 3(a) Differential control signal interface wiring diagram

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

**IV..drive status indication introduction**

**1.Troubleshooting**

Serial number	Trouble codes	Trouble instructions	Troubleshooting
1	Er01	Hardware failure	Return to the factory for testing
2	Er02	Motor overcurrent	Detect if the motor is short circuited, or reducing current
3	Er03	Drive overvoltage	Detect if the input voltage is too high
4	Er04	Drive undervoltage	Detect if the input voltage is too low
5	Er05	Out of position	Motor overspeed, increase the current and voltage appropriately
6	Er08	Encoder A phase-break wire	Detect if the code line EA+/EA- line is broken
7	Er09	Encoder B phase disconnected	Detect if the coded line EB+/EB- wire is disconnected
8	Er10	Motor line A phase break line	Detect if the motor line A+/A- line is broken
9	Er11	Motor line B phase break line	Detect if motor line B+/B- line is broken

**3. Control signal timing chart**

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

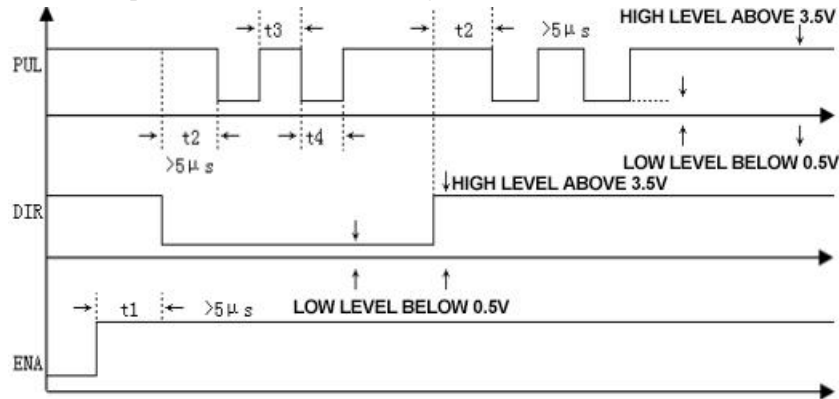


Figure 4 Timing diagram

Notes:

- (1) t1: ENA (Enable signal) should be DIR ahead at least 5μs, determined to be high. In general, it is recommended that ENA+ and ENA- be suspended.
- (2) t2: DIR at least ahead of PUL drop along 5μs to determine whether its status is high or low.
- (3) t3: Pulse width is at least not less than 2.5μs.

### 2. Parameter Monitoring Description

Serial number	Function code	Function description	Function brief
1	L-00	Speed	Real-time monitoring of the current speed, voltage, current, to see if the driver is working properly, abnormal in time to solve!
2	L-01	Voltage	
3	L-02	Phase A current	
4	L-03	B Phase current	
5	L-04	Following error	
6	L-05	Number of pulses received	Check the number of received pulses in real time to determine whether the motor is losing step
7	L-06	Number of motor feedback pulses	
8	L-11	Software version number	The larger the number, the newer the version
9	L-31	Number of pulses received (unsubdivided)	

**Note: L-01 shows the DC voltage inside the driver, which is 1.4 times the input AC voltage;**

### 3. Common function code instructions

Serial number	Parameter Settings	Function code	Function description
1	Number of subdivided pulses	P-00	200-60000 Arbitrary Settings, factory 1600
2	Closed-loop holding	P-01	1.0-6.0, factory 2.0A

	current		
3	Point-and-click operation	P-06	Enter JOG and click ▲ ▼
4	Motor direction	P-12	0 reverse, 1 forward turn
5	Factory reset	S-20	Set to 1 Restore factory Settings

#### ▼ Drive button parameter setting:

The operating panel of the driver is composed of four LED digital displays and four buttons M, ▲, ▼, and ◀, which are used to display various status and parameter Settings of the system.

#### Key function description table

Keys	Function description
M	Function selection: P parameter, S parameter, L parameter switching
▲	When the value is changed: +1, long press to increase quickly. Click mode: Press and hold the motor to turn forward
▼	When the value changes: -1, long press to quickly reduce. When in point mode: Long press motor to reverse
◀	1、 Hold down this key for 0.5 seconds to enter parameter setting 2、 When setting parameters, press once to shift to the left once 3、 After the setting is complete, press this key for 0.5 seconds and return to the current function code after confirming the successful setting 4、 In case of failure, long press this key for 2 seconds to reset the fault

After the drive is powered on, enable the display run to indicate that the motor has been powered on and the drive is working normally.

When the motor is enabled off, the stop display is displayed.

**Complete parameter function sheet**

The drive provides 2 sets of parameters for the user to manipulate, where the P parameter is used to set several conventions of the drive Parameter values (such as subdivision, lock current, motor type, etc.), S parameter is used to set the performance parameter index value of the drive, as detailed in the following table

**P parameter function table**

Parameters	Name	Parameter range	Factory defaults	Instructions
<b>P-00</b>	<b>Subdivision pulse number selection</b>	<b>200- 60000</b>	<b>1600</b>	<b>Arbitrary subdivision Settings</b>
<b>P-01</b>	<b>Closed-loop holding current</b>	<b>1.0~6.0</b>	<b>4.0</b>	<b>Motor load setting current</b>
P-02	Low speed current	1.0~6.0	4.0	Generally unchanged
P-03	Closed loop peak current	6.0~9.0	8.0	Generally unchanged
P-04	Open loop mode running current	1.0~8.0	4.0	Generally unchanged
P-05	<b>Percentage of standby current</b>	10~90%	50%	<b>The smaller the number, the less heat</b>

<b>P-06</b>	<b>Point running</b>	<b>JOG</b>		<b>Press ▲ and ▼ to rotate forward and backward</b>
P-07	Point speed	0~100	100	Dot RPM
P-08	Pulse mode	0~1	0	0-Pulse+ direction, 1-AB orthogonal
<b>P-09</b>	<b>Run mode</b>	<b>0~1</b>	<b>0</b>	<b>0: Pulse mode, 1:Internal position mode 2: Speed mode</b>
P-10	ALM alarm polarity Output Settings	0~1	<b>1</b>	0:Normally closed 1: normally open
P-11	ALM Feature Selection	0~1	<b>0</b>	0: Alarm output, 1: lock control 2: Z pulse
<b>P-12</b>	<b>Motor running direction</b>	<b>0~1</b>	<b>0</b>	<b>0 reverse 1 forward</b>
P-13	ENA Enables control	0~1	1	0: Low level enabled 1: Enable high level
P-14	Pulse input pin filtering	0~5	0	The larger the number, the stronger the filter 0 --> 4MHZ, 5 --> 150KHZ
P-16	Anti-disturbance time	0 to 1000ms	1000	Generally not changed

P-17	Tracking error alarm threshold	0~32000	4000	Generally not changed
<b>P-18</b>	<b>Open closed loop mode selection</b>	<b>0~1</b>	<b>1</b>	<b>0 open loop 1 closed loop</b>
<b>P-25</b>	<b>Smooth filtering is enabled</b>	<b>0~1</b>	<b>0</b>	<b>0 Disable 1 Enable (major)</b>
P-26	Position loop smoothing filter	0~10000	150	<b>Pulse smoothing filtering time</b>
<b>P-80</b>	<b>Power line break alarm</b>	<b>0~1</b>	<b>0</b>	<b>0 alarm, 1 Shield</b>
<b>P-81</b>	<b>Encoder disconnection alarm</b>	<b>0~1</b>	<b>0</b>	<b>0 alarm, 1 shield</b>
<b>P-98</b>	<b>Undervoltage, overvoltage alarm</b>	<b>0~1</b>	<b>0</b>	<b>0 alarm, 1 Shield</b>
<b>P-99</b>	<b>Position loop acceleration and deceleration time</b>	<b>0~1000</b>	<b>5</b>	<b>Set this parameter when fast start or stop is enabled</b>

**Special note: the bold yellow shading in the P parameter table is the common function setting, the rest generally do not need to change, restore the factory setting to S-20 set to 1!  
After the function setting, power off and restart!**

**S parameter function table**

Parameters	Name	Parameter range	Factory defaults	Instructions
S-03	Current loop proportional gain P	1~32000	1500	The higher the set value, the higher the gain and the greater the rigidity.
S-04	Current loop integral gain I	1~32000	200	The smaller the set value, the faster the integration speed, the stronger the system resistance to deviation, the greater the rigidity, too small easy to produce overshoot.
S-05	Position loop proportional gain KP	1~32000	2500	The higher the set, the higher the gain, the greater the rigidity, and the faster the position tracking. But too large a value may cause the motor to oscillate or overshoot.
S-06	Position loop integral gain KI	1~32000	500	
S-07	Position ring KD	1~32000	100	

S-08	Position ring KVFF	1~32000	30	The larger the set value, the faster the tracking corresponding outside speed, the greater the rigidity, it is strongly recommended to use factory parameters, do not modify at will.
S-20	factory data reset	0~1	0	Restore factory Settings after setting to 1

**Special note: the default current ring parameters and position ring parameters of the drive are the best parameters of the supporting motor, and customers generally do not need to modify them. If the customer's application environment is special, you can modify the \* parameters under the guidance of professional personnel to achieve the best use effect.**

**After setting the function, power off and restart!**

Case 1: The user starts and stops quickly, brakes sharply, and the motor wobbles when it stops. Set S-05 as 2000 and S-07 as 400 to achieve satisfactory results!

**VI power supply precautions**

Ac input voltage in AC18V~80V, DC input DC24V~110V can work normally,

the power is not higher than 200W, the higher the voltage input, the larger the current setting, the greater the motor torque, the better the high-speed performance, but the motor heat is larger, in principle as long as the use, the smaller the current setting, the better.

Please note that:

- 1) Wiring should pay attention to strictly according to the motor color one by one wiring;
- 2) the drive must not be connected to 220V;
- 3) the encoder line power supply is provided by the drive, it does not need to be powered separately;
- 4) the control signal line and the motor phase line can not be wound together, the signal line is best with a shielding layer;

**VII open loop, closed loop setting**

The driver is a closed-loop 86 driver, the motor must be equipped with 1000 line encoder, the motor performance compared with the open loop increase by more than 30%.

When the accident occurs, encoder failure or encoder line contact is poor, P-18 can be set to 0(need to power off and restart), open the open loop mode, to solve customer problems to the greatest extent, avoid production line shutdown.

**VIII. Lock control setting**

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

**P-11 set to 1, P-85 power-on lock release delay time, P-86 alarm power off delay time!**

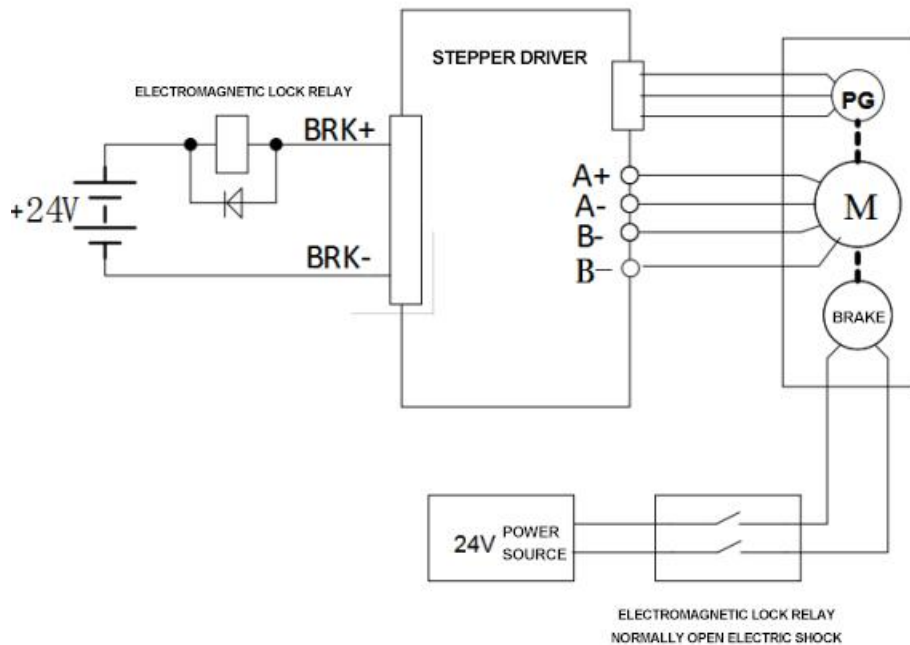
**Wiring method of holding brake motor:**

Due to the relatively large surge current generated when the lock coil is

operated, if the lock coil is directly connected to the output outlet of the driver, the optical coupling of the driver output outlet will be damaged, so the relay must be used as the relay control. Because the lock coil and relay are inductive load, it is recommended to add a continuing diode, the direction of the diode can not be reversed when wiring.

It is recommended that customers choose a solid-state relay, there is no need to add a continuous current diode. The advantages of a solid-state relay are: fast response, no need for a continuous current diode, and the power will not make a sound.

Lock and relay wiring is as follows:



### IX. microcontroller - multi-stage setting instructions

The multi-segment position means that the driver has 8 segments of position instructions stored inside, and the displacement, maximum running speed, acceleration and deceleration time of each segment can be set separately. The waiting time and connection mode between each segment can also be selected according to actual needs.

The time interval between each group of positions is determined by P-66~P-73, and the number of cycles is determined by P-49. If the time interval is 0, then switch to the next group of operation at the highest speed, if P-49=0 at this time, then continue the cycle. If after the multi-segment setting is completed, it is necessary to trigger the operation each time through the input terminal, instead of running according to the set time interval, please set P-19 to 1.

User Parameters		Location instruction Sources
P-09	1	Multi-segment position setting

User parameters		Location instruction Sources
P-19	0	Segment continuous run mode, triggers once all execution completed
	1	Segment single trigger mode, triggered once in order to execute a segment

Multi-segment position external input trigger mode selection.

User parameter	Meaning	
P-23	0	High level signal
	1	Rising edge signal factory default 1
	2	Falling edge Signal
	3	Low level signal

Multisegment position mode can be set to relative mode and absolute mode according to P-28.

User Parameters		Meaning
P-28	0	Relative mode: Increase or decrease the forward and reverse speed of the original command at the current position per trigger
	1	Absolute mode: Each time triggered, according to the absolute value of the current given speed, turn forward or reverse to the absolute position of the given pulse

Absolute mode and relative mode are widely used, and the user can easily complete the periodic operation by using the table above.

Multisegment position mode internal trigger run				
Set range		Set the unit	Factory defaults	Effective method
P-29	0: not triggered 1: Triggered	G	0	Effective immediately
	P-29 Set to 1 to trigger multi-segment position mode, this parameter automatically returns to 0 after triggering			

Internal position PUL function	Location Instruction Sources	
P-39	0	PUL triggers emergency pause function and continues to run after restarting
	1	PUL triggers emergency Stop function, reset after restart from first segment running

Multibit number of segments to run				
Set range		Set the unit	Factory defaults	Effective method
P-48	1 ~ 8	G	2	Effective immediately

Number of cycles of multiple internal positions				
Set range		Set the unit	Factory defaults	Effective method
P-49	0 ~ 30000	G	0	Effective immediately

Description of external port functions

<b>PUL</b>	Enter a stop signal that needs to be terminated or paused each time it runs (P-39 select), Please connect PUL+ to 24V and PUL- to 0V
<b>DIR</b>	Enter the start signal to start continuous run or single run with each trigger, Please connect DIR+ to 24V and DIR- to 0V

DIR pin filter time				
Set range		Set the unit	Factory defaults	Effective method
P-88	0 ~ 3000	ms	0	Effective immediately

Different acceleration and deceleration Settings can be performed for the 8 positions in the multi-segment position mode according to actual needs. The relevant function code is as follows:

P-30	Position 1 Accelerate the reduction time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-31	Position 2 Speed down time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-32	Position 3 Accelerate the reduction time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-33	Position 4 Speed down time			
	Set the range	Set the unit	Factory default	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-34	Position 5 Speed down time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately

P-35	Position 6 Speed down time			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-36	Position 7 Speed down time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately
P-37	Position 8 Speed down time			
	Set the range	Set the unit	Factory defaults	Effective method
	0 ~ 32000	ms	100	Effective immediately

The 8 positions inside the multi-segment position mode can be set at different speeds according to actual needs, and the relevant function code is as follows:

P-40	Position 1 Running speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-41	Position 2 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-42	Position 3 Run speed			

	Set range	Set the unit	Factory default	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-43	Position 4 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-44	Position 5 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-45	Position 6 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	r/min	100	Effective immediately
P-46	Position 7 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 3000	r/min	100	Effective immediately
P-47	Position 8 Run speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 3000	r/min	100	Effective immediately

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

P-50	Position 000 Set the position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-52	Position 001 Set the position			
	Set range	Set the unit	Factory default	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-54	Position 010 Set the position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-56	Position 011 Set the position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-58	Position 100 Set the position			
	Set range	Set the unit	Factory defaults	Effective method

	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-60	Position 101 Given position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-62	Position 110 Given position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-64	Position 111 Given position			
	Set range	Set the unit	Factory defaults	Effective method
	- 2147483647 ~ + 2147483647	G	0	Effective immediately
P-66	Interval after end of paragraph 1			
	Set the range	Set the unit	Factory defaults	Effective mode
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-67	Interval after the end of paragraph 2			
	Set the range	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-68	Interval after the end of paragraph 3			
	Set the scope	Set unit	Factory	Effective

			defaults	method
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-69	Interval after the end of paragraph 4			
	Set the scope	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-70	Interval after the end of paragraph 5			
	Set the scope	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-71	Interval after end of paragraph 6			
	Set the scope	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	With immediate effect
P-72	Interval after the end of paragraph 7			
	Set the scope	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	Effective immediately
P-73	Interval after end of paragraph 8			
	Set the range	Set the unit	Factory defaults	Effective method
	- 32000 ~ + 32000	ms	1000	Effective immediately

**X origin function retrieval**

**1. Function introduction**

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

**2. User Parameter setting**

Origin Search Selection				
	Set range	Set the unit	Factory defaults	Effective method
P-74	0: does not look for the origin 1: Automatically searches for the origin when the system starts 2: The I/O port triggers to find the origin	G	0	Effective immediately

P-75=H□0□□	Slow down to stop after reaching the origin reference point	
P-75=H□1□□	After reaching the input terminal ORGP, use the opposite direction and second speed to find the rising edge of the input terminal ORGP as the origin	

P-76	Origin/Mechanical origin retrieval First speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 2000	0.1 r/min	500	Effective immediately
P-77	Origin/Mechanical Retrieval Second speed			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ 1000	0.1 r/min	200	Effective immediately
P-78	Origin search offset pulse number			
	Set range	Set the unit	Factory defaults	Effective mode
	- 32000 ~ + 32000	G	0	Effective immediately

Features	Terminals
I/O port trigger signal	<b>Enable terminals</b>
ORGP signal	<b>Pulse terminals</b>

Parameter name	Meaning	Remarks
P-75=H□□□0	Invert to find origin	
P-75=H□□□1	Turn forward to find origin	
P-75=H□□1□	Use the input terminal ORGP as the origin reference point to find	

**XI Speed mode**

Speed mode is mostly used in precision CNC machining industry, users can choose the mode through P-09, according to different occasions need to carry out different Settings.

**User parameter setting**

Digital Settings, means through the function code P-93 or P-94 or P-95 to store the

set speed value and as a speed instruction.

(1) Digital set speed mode

There are two application ways of digital set speed mode: the first one 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 switch the speed through the pulse and direction terminal; The second is to use the communication mode to change the value of the function code.

A: User-related parameters

User parameters		Speed instruction Sources		
P-09	2	Number Given		
P-93	Speed command keyboard set value 1			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ + 4000	r/min	100	Effective immediately
P-94	Speed Command keyboard set 2			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ + 4000	r/min	200	With immediate effect
P-95	Speed command keyboard set 3			
	Set range	Set the unit	Factory defaults	Effective method
	0 ~ + 4000	r/min	300	Effective immediately

B: Input signal Settings

Use the following input signals to switch the running speed.

Signal name	Short for	Meaning
Number Given speed choose 1	Pulse terminal	Digital given speed selection
Number set Speed Pick 2	Directional terminals	

C: Number run at given speed

Pulse terminal	Directional terminals	
OFF	OFF	0: Zero speed
OFF	ON	P-93: Set point 1 Speed
ON	OFF	P-94: Set point 2 Speed
ON	ON	P-95: Set point 3 Speed

**If you do not need external terminals, power on automatically, set P-96 to 1, and then the speed is specified by P-93.**

**Command ramp function Settings**

The ramp function control function is to convert the variable speed instruction into the smooth constant acceleration and deceleration speed instruction, that is, to control acceleration and deceleration by setting the acceleration and deceleration time. In the speed control mode, if the speed instruction given changes too much will lead to the motor jumping or violent vibration phenomenon, if the acceleration and deceleration time of soft start is increased, the smooth start of the motor can be achieved to avoid the occurrence of the above situation, resulting in mechanical parts damage.

User parameter setting

P-89	Acceleration time			
	Set range	Set the unit	Factory defaults	Effective method
	1-30000	ms	200	Effective immediately
P-90	Deceleration time			
	Set range	Set the unit	Factory defaults	Effective method
	1-30000	ms	200	Effective immediately

**S-curve smoothing feature**

In the process of acceleration and deceleration, because the acceleration and deceleration changes such as starting and stopping will cause impact, it is necessary to add S-curve acceleration and deceleration instructions to the speed instruction, that is, by adding a circular arc on the acceleration and deceleration slope, the servo motor can run more smoothly.

(1) User parameter setting

P-91	S-curve acceleration and deceleration time			
	Set range	Set the unit	Factory default	Effective method
	1-12000	ms	100	Effective immediately
P-92	S-curve Start sign			
	Set range	Set the unit	Factory defaults	Effective method
	0: does not start 1: Start	G	0	Effective immediately

**XII Product Warranty**

**1. One year warranty**

Our company guarantees its products against defects in raw materials and workmanship for one year from the date of shipment. During the warranty period, the company provides free repair service for the defective products.

**2. Not covered by warranty**

- Improper wiring, such as power and motor wiring errors and live plug and plug
- Unauthorized changes to internal components
- Use beyond electrical and environmental requirements
- Poor environmental heat dissipation

**3. Repair process**

If the product needs to be repaired, it will be handled as follows:

(1) Call the agent to obtain the repair permit number before delivery;

(2) Send written instructions with the goods, explaining the fault phenomenon of the rerepair drive; The voltage, current and operating environment at the time of the failure; And the contact's name, phone number and mailing address.

(3) Pay postage first and send to the location of the company or the designated repair point, the company refuses to accept any freight collect express.

**4. Warranty Restrictions**

The warranty of a product is limited to the components and workmanship of the product (i.e., conformity).The Company does not guarantee that its products will be suitable for the specific purpose of the customer, as suitability is also related to the requirements of the technical specifications and the conditions and

environment of use for that purpose. The Company does not recommend the use of this product for clinical or medical purposes.

**5. Maintenance requirements**

When repairing, please fill in the "maintenance report" truthfully to facilitate maintenance analysis.