HANPOSE®

CL 86

Closed-loop two-phase step drive operating instruction

[Read this manual carefully before use to avoid damage to the drive]

HANPOSE®

catalogue

HANPOSE®

I. Product brief introduction

◆ summary

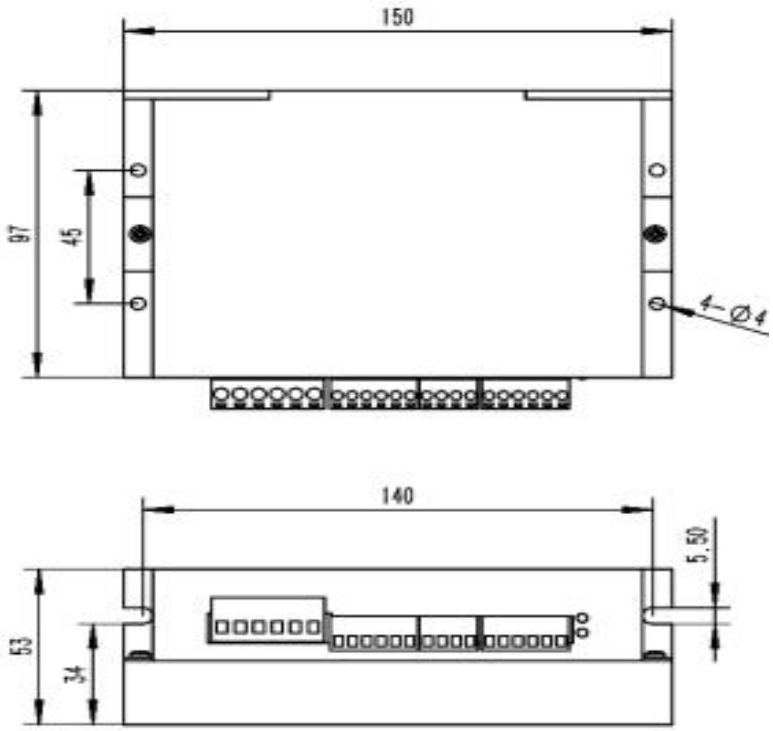
CL 57 with the latest digital integrated motor control chip and application vector closed-loop control technology, to completely overcome the open ring step motor step problem, but also can significantly improve the high speed performance of the motor, reduce the heating degree of motor, and reduce the motor vibration, so as to improve the processing speed and accuracy of the machine and reduce the energy consumption of the machine. In addition, when the motor is continuously overloaded, the driver will output the alarm signal, with the same reliability of the AC servo control system, compatible with 57,60 closed-loop stepper motor, the traditional stepping drive scheme is easy to upgrade, and the cost is far lower than the traditional AC servo system, is a very cost-effective motion control product.

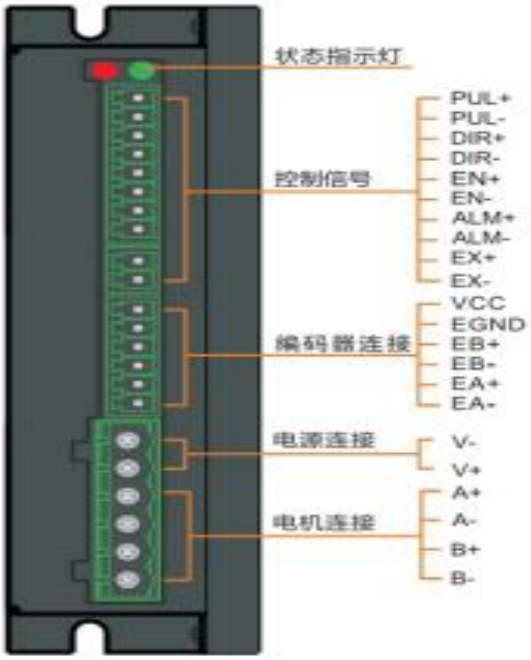
◆ characteristic

Using a unique algorithm, low heat, large torque
Voltage range: AC 18V ~AC 80V; DC 20V ~DC 110V
16 subdivisions, which can be customized according to customer requirements
The signal input is 5 ~ 24V compatible without external series resistance
The highest response frequency was 400 KHz
The torque attenuation is small, the maximum speed up to 3000 rmp
External alarm and output port in place for convenient monitoring and control
Intelligent current, reduce power consumption when low load, and improve torque when high load
The effective current can be set through the dial switch to adapt to different motors
The dial switch shall set single and double pulse, factory default pulse + direction control
The dial switch sets the pulse delay, the default is 40m s
Excellent high-speed performance and rigidity, perfect fusion of servo and step advantages in one.

HANPOSE®

◆ mechanical installation diagram





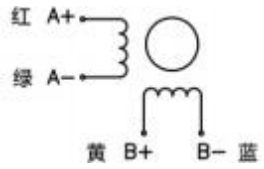
Typical application of ◆

Mainly used for engraving machine, special industrial sewing machine, wire stripping machine, marking machine, cutting machine, laser phototypesetting, plotter CNC machine tool, dispensing machine, screw machine and other automation equipment and instruments.

2. Introduction of interface and wiring

◆ signal input end

PWR /FLT	Voltage and fault indicator lamp Green light flashing: the drive is normal, no pulse signal is received; Green light is always on: receive the pulse signal, the motor rotation; A red one green: over current or interphase short circuit fault; Two red and one green: no motor or motor wiring error is detected; Three red and one green: overpressure fault; Four red and one green: underpressure fault; Five red and one green: tracking error error fault.
PUL + PUL -	The pulse signal voltage can be driven from 3.3 to 24 V The drop edge is effective whenever the pulse changes from high to low. The pulse width was greater than 2.5 microseconds
DIR + DIR -	The directional signal voltage 3.3~24V can be driven; used to change the motor steering. The drop edge is effective whenever the pulse changes from high to low. The pulse width was greater than 2.5 microseconds
EN + EN -	The enabling signal voltage of 3.3~24V can be driven Turn off the motor coil current when effective (low level), and the motor is in a free state and clear the alarm signal
ALM + ALM -	When the red light flashes, the alarm signal is valid (output optical coupling conduction). ALM + is connected to the pull resistance to the output power positive, ALM- output power negative, the maximum drive current is 10 mA.
EX + EX -	When the driver passes through a given pulse, the active signal is valid (the output optical coupling is on). EX + is connected to the pull resistance to the output power positive, EX-connected to the output power negative, the maximum drive current is 10 mA.
V CC	Positive power supply of encoder; positive power supply end of encoder 5V
E GND	Encoder power source ground

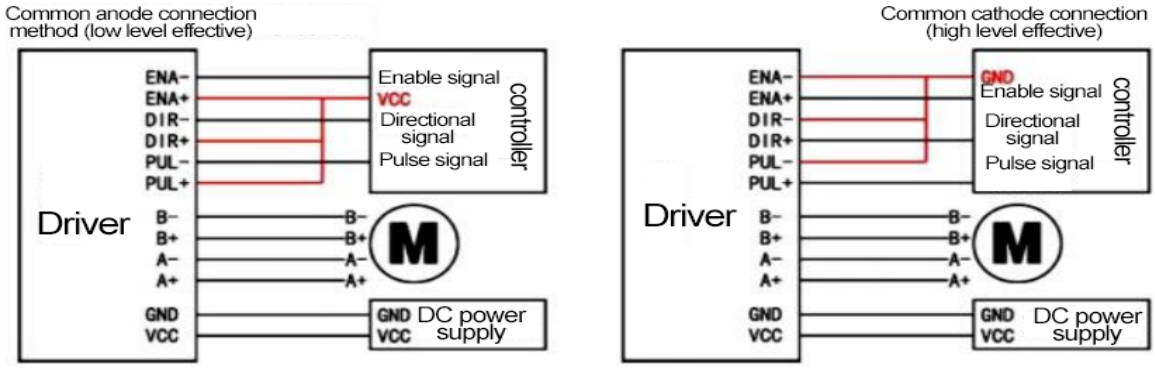
EB + EB -	Connect encoder B channel positive input Negative encoder B channel
EA + EA -	Connect encoder A channel positive input Connect encoder A channel negative input
V + V -	Drive power supply is negative Drive power supply is positive, 18-90VDC
A + A - B + B -	Motor wiring A + Motor wiring A- Motor wiring B + Motor wiring B- 

pay attention to:

1. Please ensure that the motor and encoder are wired correctly, otherwise the motor will alarm when receiving the pulse.
2. When the motor is installed, it is strictly prohibited to knock on the back cover of the motor to avoid damage to the encoder.

◆ mode of connection

There are two connection methods for the input signal interface, and users can use the co-anode connection method or co-cathode connection method as needed.



pay attention to:

1. Do not share the VCC and GND of the controller and the drive in the picture.
2. The ENA terminal is not connected. When the ENA is valid, the motor rotor is in a free state (offline state), so you can manually turn the motor rotating shaft to make the adjustment suitable for you. After the manual adjustment, set ENA to invalid to continue automatic control.

◆ wiring requirements

(1) In order to prevent the drive from being disturbed, it is suggested to use the shielding cable for the control signal, and the shielding layer is short connected to the ground wire. Only the same machine is allowed at the same point. If the grounding signal is not the real grounding line, the interference may be seriously caused, and the shielding layer is not connected.

(2) Pulse and direction signal line and motor line and power line are not allowed to be wrapped side by side, it is best to separate at least 10cm, otherwise the motor noise is easy to interfere with the pulse direction signal to cause inaccurate motor positioning, system instability and other faults.

(3) If one power supply is supplied to multiple drives, a parallel connection should be adopted at the power supply, and it is not allowed to connect to one power supply first and then to another in a chain type.

(4) It is strictly prohibited to unplug the power terminal of the drive. When the live motor stops, there is still a large current to flow

through the coil. Unplug the power terminal will lead to a huge instantaneous induced electric motive force that will burn out the drive.

(5) It is strictly prohibited to tin the wire head to the terminal, otherwise the terminal may be damaged due to the large contact resistance.

(6) The wiring head should not be exposed outside the terminal, in case of accidental short circuit and damage to the drive.

HANPOSE®

Three, subdivision, current dial code switch setting

◆ Operating current setting

Fine score	Pulse / turn	Sw 1	Sw 2	Sw 3	Sw 4
2	400	ON	ON	ON	ON
4	800	OFF	ON	ON	ON
8	1600	ON	OFF	ON	ON
16	3200	OFF	OFF	ON	ON
32	6400	ON	ON	OFF	ON
64	12800	OFF	ON	OFF	ON
128	25600	ON	OFF	OFF	ON
256	51200	OFF	OFF	OFF	ON
5	1000	ON	ON	ON	OFF
10	2000	OFF	ON	ON	OFF
20	4000	ON	OFF	ON	OFF
25	5000	OFF	OFF	ON	OFF
40	8000	ON	ON	OFF	OFF
50	10000	OFF	ON	OFF	OFF
100	20000	ON	OFF	OFF	OFF
200	40000	OFF	OFF	OFF	OFF

Sw 5	Set rotation direction of rotation (OFF = clockwise; ON = counterclockwise)
Sw 6	Single and double pulse setting (OFF = pulse + direction; ON = double pulse)

◆ SW 7, SW 8 pulse delay setting

Pulse delay (ms)	0	4	20	40
Sw 7	ON	OFF	ON	OFF
Sw 8	ON	ON	OFF	OFF

4. Environmental indicators

◆ Use of the environment and the parameters

cooling-down method		Natural cooling or forced air cooling
service environment	occasion	Can not be placed next to other heating equipment, to avoid dust, oil, corrosive gas, humidity and strong earthquake places, prohibit combustible gas and conductive dust
	temperature	0 ~+50X
	humidity	40~90%RH
	vibrate	10~55Hz /0 15mm
Save the temperature		-20℃~65℃
weight		540 grams

Five, the motor matching

The CL 86 driver can be used to drive a 4,6,8-line two-phase closed-loop stepping motor of 86 with a step Angle of 1.8 degrees. The motor is mainly determined by the torque and rated current of the motor. The torque size is mainly determined by the motor size. Large motor torque; and the current is mainly related to inductance, small inductor motor good high speed performance, but the current is large.

◆ motor optional

(1) Determine the load torque, transmission ratio working speed range

T motor =C (J ε + T load)

J: moment of inertia of load ε: maximum angular acceleration of load C: safety factor, recommended value 1.2-1.4 T Load: maximum load torque, including active load, friction, transmission efficiency and other resistance torque (2)

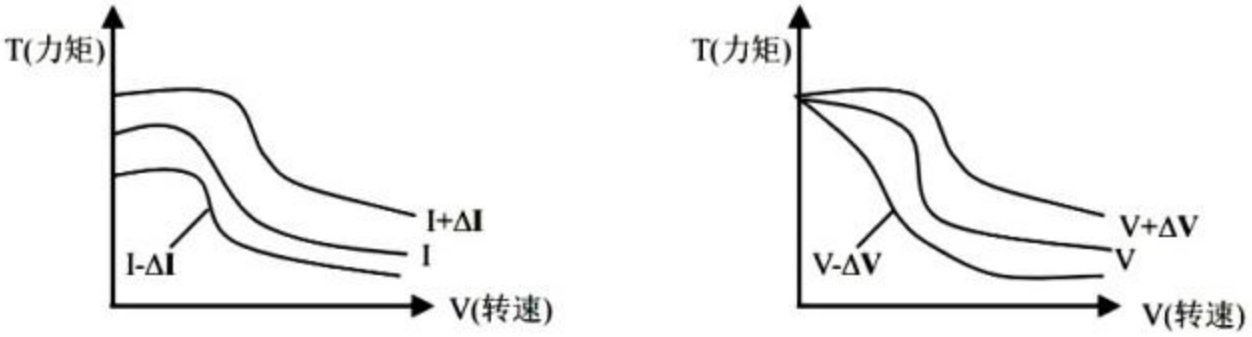
Which factors determine the output torque of the motor

For a given stepping motor and coil connection method, the output torque has the following characteristics:

● The greater the actual current of the motor, the greater the output torque, but the more the motor copper loss (P=I2R), the more the motor;

● The higher the power supply voltage of the driver, the greater the high-speed torque of the motor;

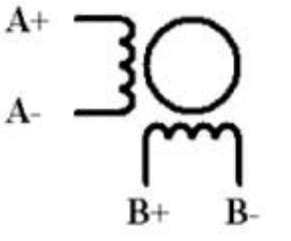
● According to the moment and frequency characteristic diagram of the stepping motor, the high speed torque is smaller than the medium and low speed torque.



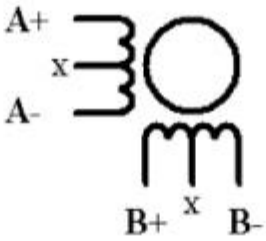
矩频特性图

◆ motor wiring

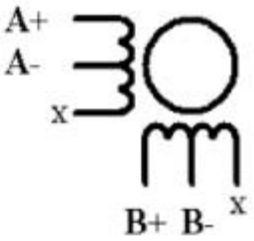
Two-phase 4,6,8 wire motor wiring, as shown in the figure below



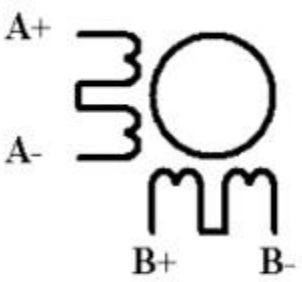
四线电机接线方法



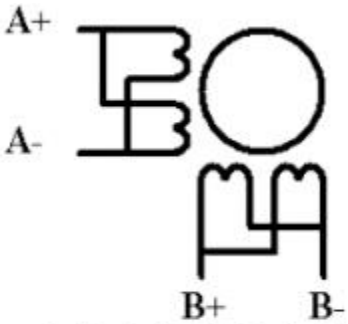
六线电机接线方法
高力矩输出



六线电机接线方法
高速度输出



八线电机接线方法
高力矩输出



八线电机接线方法
高速度输出

◆ Selection of power supply voltage and output current

(1) Setting of the power supply voltage

Generally speaking, the higher the power supply voltage, the greater the torque when the motor is at high speed. The more you can avoid the loss caused by insufficient torque at high speed. But on the other hand, too high voltage will lead to overvoltage protection, the motor heat more, and may even damage the drive. When working at high voltage, the vibration of the motor movement at low speed will be greater.

(2) Set value of the output current

For the same motor, the greater the current setting value, the greater the output torque of the motor, but the heat of the motor and the driver is also more serious when the current is large. The specific amount of heat is not only related to the current setting value, but also related to the type of movement and residence time. The following setting method adopts the rated current value of the stepping motor as a reference, but the optimal value in the actual application should be adjusted on this basis. In principle, if the temperature is very low (<40℃), the current setting value may be appropriately increased to increase the output power of the motor (torque and high speed response).

- Four-wire motor: the output current is set to be equal to or slightly greater than the rated current value of the motor;
- Six-wire motor high torque mode: the output current is set at 50% of the rated current of the motor unipolar connection method;
- Six-wire motor high-speed mode: the output current is set to 100% of the rated current of the motor unipolar connection method;
- Eight-wire motor series connection method: the output current can be set into 70% of the rated current of the motor unipolar connection method;
- Eight-wire motor parallel connection method: the output current can be set into 140% of the rated current of the motor unipolar connection method.

△ Note: After the current is set, please run the motor for 15-30 minutes. If the temperature rise of the motor is too high (> 70℃), the

current setting value should be reduced. Therefore, the general situation is to set the current into the motor long-term work when the warm but not hot value.

Vi. Product warranty terms

◆ One Year Warranty

We provide one year warranty from delivery date for raw materials and process defects. During the warranty period, our company provides free maintenance service for the defective products.

◆ Does not included in the warranty

- Inappropriate wiring, such as the positive and negative power supply connection and power unplug
- Change the internal devices without permission

- Use beyond the electrical and environmental requirements
- Environmental heat dissipation is too poor
- Running with two motors at the same time

7. Common problems

◆ Common problems and handling methods in applications

phenomenon	Possible problem	countermeasure
The motor does not turn	The power lamp is not on	Normal-range power supply
	Current setting is too small	Select the appropriate current gear according to the rated current of the motor
	The drive is protected	After troubleshooting, re-again
	The enable signal is low	This signal is raised or disconnected
	Control signal problem	2. Check whether the amplitude and width of the control signal meet the requirements. 2. The motor starts at high speed, and the controller signal should be accelerated and reduced. 3
Motor steering error	The motor wire is connected wrong	Two wires of the same phase of any switching motor (e. g. A +, A-switching wiring position)
	The motor line has an open circuit	Check and get it right
Alarm indicator light is on	The motor wire is connected wrong	Check the wiring
	High-voltage or overheated voltage	Check the supply voltage; place the temperature drop before use
	Damaged motor or driver	Replace the motor or driver
Location is not allowed	The signal is disturbed	1. Eliminate the interference; 2. Do the shield line processing
	The ded ground is not connected or not connected	Reliable grounding

	Subdivision error	Set the right subdivision
	Current is small	Increase current appropriately
	Control signal problem	Check that the control signal meets the timing requirements
The motor accelerates the blocking of the rotation	The acceleration time is too short	Increase the acceleration time appropriately
	Motor torque is too small	Select the large-torque motor
	Low voltage or too little current	Raise the voltage appropriately or set a larger current