



杰美康机电
JUST MOTION CONTROL

iHSS86-XX

**Integrated stepper servo
motor**

User Manual

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Preface

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Content

| | |
|--|---|
| 1、 Introduction | Fehler! Textmarke nicht definiert. |
| 2、 Features..... | - 7 - |
| 3、 Ports | 7 |
| 3.1 ALM and PED signal output port | - 8 - |
| 3.2 Control signal input port..... | Fehler! Textmarke nicht definiert. |
| 3.3 Power port | - 10 - |
| 4、 Technological Index | - 11 - |
| 5、 Connections to Control Signal..... | - 12 - |
| 5.1 Control signalSingle terminal common anode wiring | - 12 - |
| 5.2 Control signal single terminal cocathode wiring | - 13 - |
| 5.3 Control signal differential wiring mode..... | - 14 - |
| 5.4 232Parameter adjustment serial communication wiring..... | - 15 - |
| 5.5 Control signal timing diagram | - 16 - |
| 6、 Subdivision code switch settings | - 16 - |
| 6.1 Subdivision setup..... | Fehler! Textmarke nicht definiert. |
| 6.2 Single and double pulse setup..... | - 19 - |
| 6.3 Motor rotation direction setting | - 19 - |
| 6.4 Pulse Interference Filter Settings | - 19 - |
| 6.5 Directive Smooth Settings | - 20 - |
| 7、 Error alarm and LED light flicker times | - 21 - |
| 8、 Installation Size | - 22 - |
| 9、 Parameters setup | - 22 - |
| 10、 Frequently Asked Questions and Fault Handling | - 26 - |
| 10.1 Power light is not on..... | Fehler! Textmarke nicht definiert. |
| 10.2 Power on red alarm light on..... | Fehler! Textmarke nicht definiert. |

10.3 Red alarm light on after the motor running a small angle **Fehler!**

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10.4 After input pulse signal but the motor not running **Fehler!**

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1. Overview

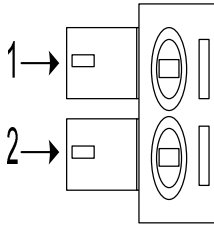
The iHSS86-XX Integrate Stepper Servo Motor is merged the stepper servo driver and motor together. This motor system integrates the servo control technology into the digital stepper drive perfectly. And this product adopts an optical encoder with high speed position sampling feedback of $50 \mu\text{s}$, once the position deviation appears, it will be fixed immediately. This product is compatible the advantages of the stepper drive and the servo drive, such as lower heat, less vibration, fast acceleration, and so on.

2. Features

- ◆ Integrated compact size for saving mounting space
- ◆ Without losing step, High accuracy in positioning
- ◆ 100% rated output torque
- ◆ Variable current control technology, High current efficiency
- ◆ Small vibration, Smooth and reliable moving at low speed
- ◆ Accelerate and decelerate control inside, Great improvement in smoothness of starting or stopping the motor
- ◆ User-defined micro steps
- ◆ No adjustment in general applications
- ◆ Over current, over voltage and over position error protection
- ◆ Green light means running while red light means protection or off line

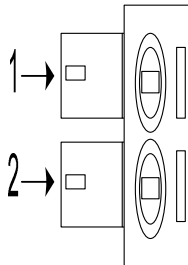
3. Ports Introduction

3.1 ALM and PED signal output port



| Symbol | Name | Instruction |
|--------|-------------------------|-------------|
| ALM- | Alarm output - | |
| ALM+ | Alarm output + | |
| PED- | Arrive position output- | |
| PED+ | Arrive position output+ | |

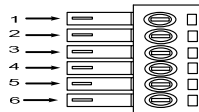
3.2 Control Signal Input Ports



| Symbol | Name | Instruction |
|--------|------|-------------|
|--------|------|-------------|

| | | |
|------|------------------|------------------------------|
| ENA- | Enable signal- | Compatible with 5V or 24V |
| ENA+ | Enable signal+ | |
| DIR- | Direction input- | Compatible with 5V or 24V |
| DIR+ | Direction input+ | |
| PUL- | Pulse input - | Compatible with 5V or 24V |
| PUL+ | Pulse input+ | |

3.3 Power Interface Ports



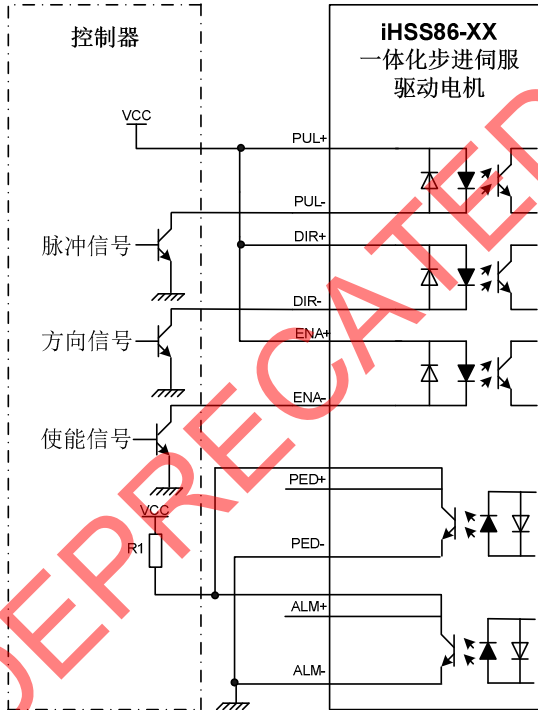
| Mark | Symbol | Name | Instruction |
|--------------------|--------|--------|-------------|
| Power input end | VCC | Power+ | 24-80VDC |
| | GND | Power- | |

4、 Technological Index

| | | |
|-------------------------------|-----------------------|--|
| Input voltage | | 24~80VDC |
| Continuous current | | 6A 20KHz PWM |
| Max frequency | | 200K |
| Default communicate frequency | | 57.6Kbps |
| Protect | | Over current peak value $10A \pm 10\%$ Over voltage value 100VDC The over position error range can be set through the HISU |
| Working environment | Environment | Avoid dust, oil fog and corrosive gases |
| | Operating Temperature | 0~70°C |
| | Storage temperature | -20°C ~+80°C |
| | Humidity | 40~90%RH |
| | Cooling method | Natural cooling or forced air cooling |

5、Connections to Control Signal

5.1 Control signal Single terminal common anode wiring

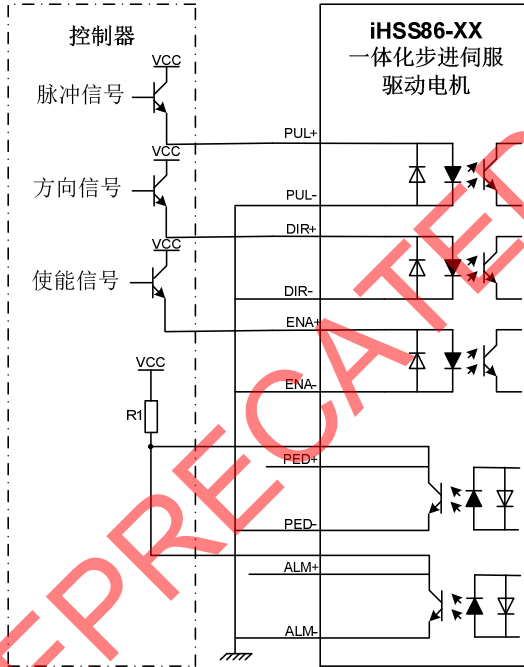


Note:

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal

5.2 Connections to Common Cathode

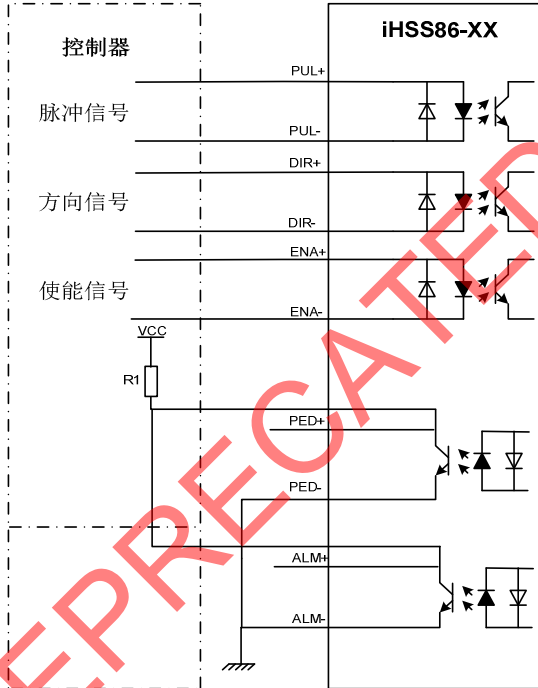


Remark:

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal

5.3 Connections to Differential Signal

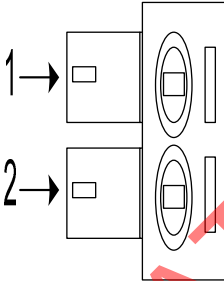


Remark:

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal

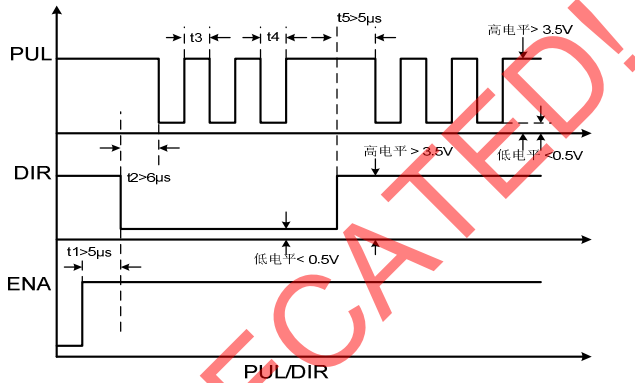
5.4 232 Connections to 232 Serial Communication Interface



| Definition | Instruction |
|------------|-------------|
| NC | Hang |
| RX | Receiver |
| GND | Power - |
| TX | Transmitter |
| VCC | Power+ |

5.5 Sequence Chart of Control Signals

In order to avoid some fault operations and deviations, PUL, DIR and ENA should abide by some rules, shown as following diagram:



Remark:

- t_1 : ENA must be ahead of DIR by at least $5\mu\text{s}$. Usually, ENA+ and ENA- are NC (not connected).
- t_2 : DIR must be ahead of PUL active edge by $6\mu\text{s}$ to ensure correct direction;
- t_3 : Pulse width not less than $2.5\mu\text{s}$;
- t_4 : Low level width not less than $2.5\mu\text{s}$.

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6、 DIP Switch Setting

6.1 Micro steps Setting

The micro steps setting is in the following table, while SW1、SW2、SW3、SW4 are all on, the internal default micro steps inside is activate, this ratio can be setting through the HISU

| Dial switch | SW1 | SW2 | SW3 | SW4 |
|-------------|-----|-----|-----|-----|
| Micro steps | | | | |
| Default | on | on | on | on |
| 800 | off | on | on | on |
| 1600 | on | off | on | on |
| 3200 | off | off | on | on |
| 6400 | on | on | off | on |
| 12800 | off | on | off | on |
| 25600 | on | off | off | on |
| 51200 | off | off | off | on |
| 1000 | on | on | on | off |
| 2000 | off | on | on | off |
| 4000 | on | off | on | off |
| 5000 | off | off | on | off |
| 8000 | on | on | off | off |
| 10000 | off | on | off | off |
| 20000 | on | off | off | off |
| 40000 | off | off | off | off |

6.2 Running Direction Setting

SW5 is used for setting the activate edge of the input signal, “off” means the activate edge is the rising edge, while “on” is the falling edge

| | | |
|-----|-------------------|-------------------|
| SW5 | Off | on |
| | Single pulse mode | Double pulse mode |

6.3 Motor rotation direction setting

When SW6 switches between off and on, it can change the rotation direction of the motor. off=CCW, on=CW.

| | | |
|-----|-----|----|
| SW6 | Off | on |
| | CCW | CW |

6.4 Pulse Interference Filter Settings

When the SW7 change between off or on ,the degree of pulse filtering will be changed . The maximum pulse frequency can pass in “off” state is 200K, and the maximum pulse frequency can pass in “on” state is 100K. In addition, other pulse filtering levels in the on state can be set by P22 parameters. (Note: When the P22 parameter is set, the SW7 dialing code needs to be in on state.)

| | | |
|-----|---------------------------------|---------------------------------|
| SW7 | Off | on |
| | The max pulse frequency 200K | The max pulse frequency 100K |

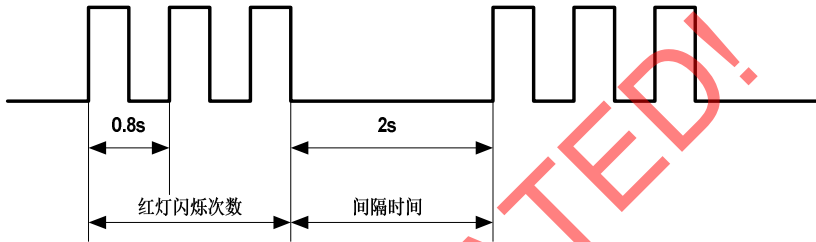
6.5 Instruction smoothing setup

The SW8 set instructions smooth, the off state instruction smooth is turn off while it turns off when in “on “ state. In addition, the level of instruction smoothing can be set by the P19 parameter(Note: When the P19 parameter is set, the SW8 dialing code is required in the on state.)

| | | |
|-----|------------------------------------|-----------------------------------|
| SW8 | Off | on |
| | Turn off the instruction smooth | Turn on the instruction smooth |

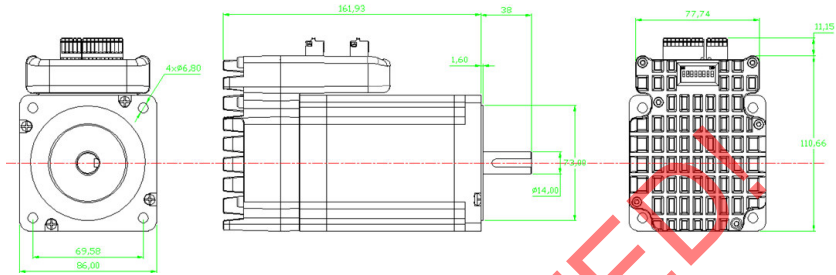
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7、 Faults alarm and LED flicker frequency



| Flicker frequency | Description of the fault |
|-------------------|--|
| 1 | Over current of the driver |
| 2 | Voltage reference error in the drive |
| 3 | Parameters upload error in the drive |
| 4 | Error occurs when the input voltage exceeds the drive' s voltage limit. |
| 5 | Error occurs when the actual position following error exceeds the limit which is set by the position error limit |

8、 Installation Dimensions



9、 Parameter Setting

The parameter setting method of IHSS86-XX drive is to use a HISU adjuster through the 232 serial communication ports, only in this way can set the parameters we want. There is a set of best default parameters to the corresponding motor which are carefully adjusted by our engineers, users only need refer to the following table, specific condition and set the correct parameters

Actual value = Set value × the corresponding dimension

| Mod e | Name | Range | Dimensi on | Drive Restart | Default Value |
|----------|-----------------|--------|---------------|------------------|------------------|
| P1 | Current loop Kp | 0—4000 | 1 | NO | 1000 |

| | | | | | |
|-----|----------------------|--------|------|------|------|
| P2 | Current loop Ki | 0—1000 | 1 | NO | 100 |
| P3 | Damping coefficient | 0—500 | 1 | NO | 30 |
| P4 | Position loop kp | 0—3000 | 1 | NO | 2000 |
| P5 | Position loop Ki | 0—1000 | 1 | NO | 200 |
| P6 | Speed loop Kp | 0—3000 | 1 | NO | 300 |
| P7 | Speed loop ki | 0—1000 | 1 | NO | 1000 |
| P8 | Open loop current | 0—40 | 0.1 | N | 30 |
| P9 | Close loop current | 0—30 | 0.1 | N | 30 |
| P10 | Alarm level | 0—1 | 1 | N | 1 |
| P11 | Reserved | Keep | Keep | Keep | Keep |
| P12 | Reserved | Keep | Keep | Keep | Keep |
| P13 | Enable level | 0—1 | 1 | N | 0 |
| P14 | Stop lock enable | 0—1 | 1 | N | 1 |
| P15 | Encoder line choose | 0—1 | 1 | Yes | 0 |
| P16 | Position error limit | 0—3000 | 10 | N | 400 |

| | | | | | |
|-----|---|--------|------|------|------|
| P17 | Reserved | Keep | Keep | Keep | Keep |
| P18 | Reserved | Keep | Keep | Keep | Keep |
| P19 | Instruction smoothing | 0—10 | 0 | No | 2 |
| P20 | User-defined subdivision | 4—1000 | 50 | yes | 8 |
| P21 | Reserve | Keep | Keep | Keep | Keep |
| P22 | Pulse filter | 0—1000 | 1 | Yes | 0 |
| P23 | Enable lock | 0—1 | 1 | NO | 0 |
| P24 | Discharge response threshold | 0—1000 | 0.01 | Yes | 120 |
| P25 | Open and close loop superposition ratio | 0—40 | 1 | NO | 30 |
| P26 | In place output threshold | 0—500 | 1 | NO | 10 |
| P27 | Close loop/Open loop choose | 0—1 | 1 | NO | 1 |
| P28 | Reserve | Keep | Keep | Keep | Keep |
| P29 | Reserve | Keep | Keep | Keep | Keep |
| P30 | Phase Loss Function Selection | 0—1 | 1 | Yes | 0 |

There are 35 parameters that can be adjusted for this driver:

Parameters P1, P2, P3, P4, P5, P6, P7 are used for setting current ring,

system damping coefficient, speed ring, and position ring respectively. Parameters P8 and P9 are used to set the open-loop control current and closed-loop control current respectively. (actual current = open-loop current + closed-loop current)

The parameter P10 is used for the alarm output level selection, and parameter 1 represents the normal working time coupling output transistor cut-off; Drive alarm time coupling output triode pilot. And vice versa.

Parameter P11, Keep

Parameter P12, Keep

The parameter P13 is used to select the level of the energy signal. Generally, 0 is selected, and the low level energy is used, that is, there is no need for external energy to input the signal. And vice versa.

Parameter P14, select the in-position output level, 1 indicates that the drive satisfies the in-place condition time coupling output transistor cut-off; Unsatisfied in place condition time coupling output triode pilot. And vice versa.

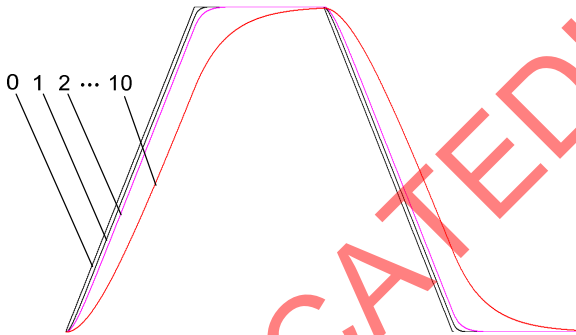
Parameter P15, the number of lines selected for the encoder, 0 for 1000 lines, 1 for 2500 lines.

Parameter P16, setting the threshold for position difference. (Actual value = set value * 10)

Parameter P17, retained.

Parameter P18, retained.

Parameter P19, instruction smooth coefficient. (Note: This parameter modification only works when the SW8 instruction is smoothly dialled to the on position.)



Parameter P20, subdivision dialing to the full on file, can enable user-defined subdivision, subdivision value = $P20 * 50$.

Parameter P21, retained.

The parameter P22, the pulse filter parameter, the larger the value of this parameter, the higher the corresponding filtering degree. P22 is 12 o'clock and the pulse frequency is above 200K. When P22 is 33, the pulse frequency is more than 100K and will be filtered out. (Note: This

parameter modification only works when the SW7 instruction is smoothly dialled to the on position.))

Parameter P23, drive enable energy lock, this parameter is 0, given the enable signal, the motor does not lock axis, drive does not count external pulses. This parameter is 1, given the energy signal after the motor locking axis, the drive does not count external pulses.

Parameter P24, shutdown response threshold, used to control motor response during downtime.

Parameter P26, in place output threshold, used to set the sensitivity of the in place output signal.

Parameter P27, open closed-loop selection, 1: closed-loop mode; 0: Open loop mode. This function can be used to select a single machine working mode, default 1, closed-loop mode.

Parameter P30, phase deficiency detection, 1: open phase deficit

detection; 0: Turn off phase defect detection. Default closed phase

missing detection

10.Frequently Asked Questions and Fault Handling

10.1 Power supply light is not on

Please check the power line for input power failure. Is the voltage too low?

10.2 When power on,the red light alarm

Check whether the motor feedback signal line and the motor power supply phase line are connected

Whether the input voltage of the servo drive is too high or too low

10.3 Turn the red light alarm at a small angle

Whether the pulse input speed is greater than the rated speed of the motor.

Is the motor blocked?

10.4 Do not rotate after pulse input

Reliability of wiring at the pulse input end of a stepper servo drive

Is the input mode in the configuration of the stepping servo drive system

the input mode associated with the pulse input.

Whether the enable of motor is released.