杰美康机电
JUST MOTION CONTROL

Hybrid Stepper Servo Drive

Manual

1. Overview

JSSD2505M-XX hybrid stepper servo drive 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 μ 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. This kind of servo drive also has an excellent cost performance.

2. Features

1. No lost step, accurate positioning
2.100% rated torque drive motor
3. Variable current control technology, high current efficiency
4. Low vibration and stable operation at low speed
5. Use the dial code to select the position over tolerance threshold and alarm polarity
6. Rich output control (alarm, brake control and in-position output)
7. Single and double pulse can be selected by dialing code
8. Built-in acceleration and deceleration control to improve start-stop smoothness
9. User can customize the segment
10. Compatible with 1000 line and 2500 line encoders
11. General application parameters do not need to be adjusted
12. Overcurrent protection, overvoltage protection, over tolerance protection

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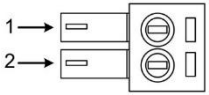
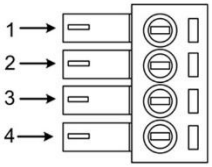
3. Ports Introduction

Brake control signal output ports



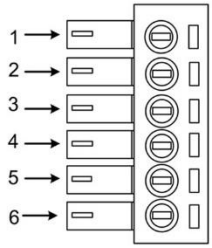
Port	Symbol	Name	Remark
1	BREAK+	Brake Control Output +	
2	BREAK-	Brake Control Output -	

ALM and PEND Signal Output ports



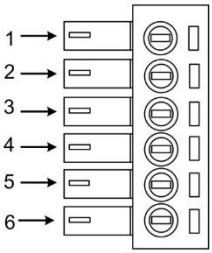
Port	Symbol	Name	Remark
1	PEND+	In position signal output +	
2	PEND-	In position signal output -	
3	ALM+	Alarm output +	
4	ALM-	Alarm output -	

Control Signal Input ports



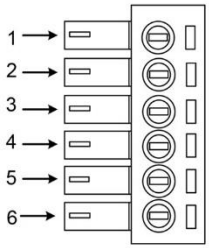
Port	Symbol	Name	Remark
1	PLS+	Pulse signal +	Compatible with
2	PLS-	Pulse signal -	5V or 24V
3	DIR+	Direction signal+	Compatible with
4	DIR-	Direction signal-	5V or 24V
5	ENA+	Enable signal +	Compatible with
6	ENA-	Enable signal -	5V or 24V

Encoder Feedback Signal Input Ports



Port	Symbol	Name	Wiring color
1	PB+	Encoder phase B +	Blue
2	PB-	Encoder phase B -	White
3	PA+	Encoder phase A +	Yellow
4	PA-	Encoder phase A -	Green
5	VCC	Input power	Red
6	GND	Input power ground	Black

3.4 Power Interface Ports



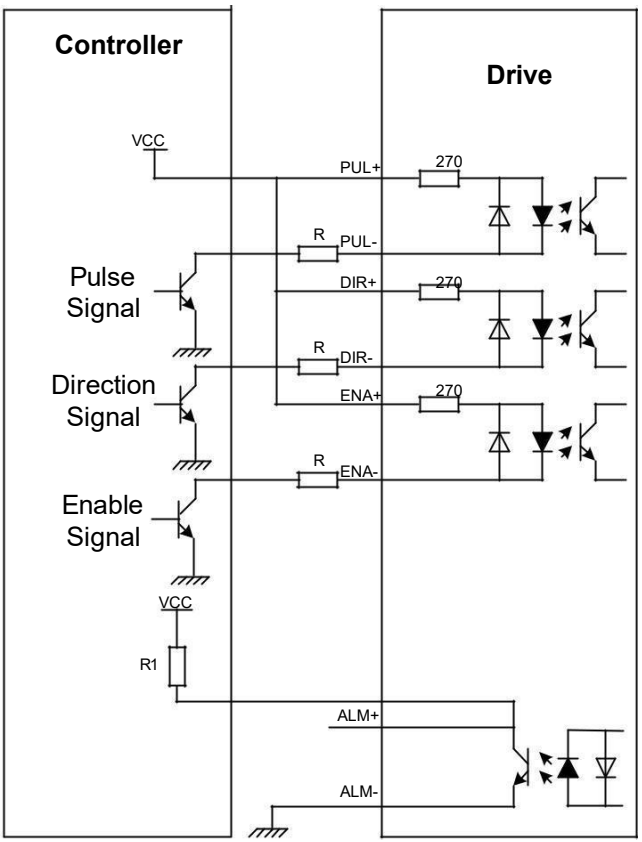
Port	Identification	Symbol	Name	Remark
1	Motor Phase Wire Input Ports	A+	Phase A+（Red）	Motor Phase A
2		A-	Phase A-（Blue）	
3		B+	Phase B+（Green）	Motor Phase B
4		B-	Phase B-（Black）	
5	Power Input Ports	VCC	Input Power +	24-50VDC
6		GND	Input Power-	

4. Technological Index

Input Voltage		24~60VDC(36V Typical)
Output Current		4.5A 20KHz PWM
Pulse Frequency max		200K
Communication rate		57.6Kbps
Protection		● Over current peak value 8A±10% ● Over voltage value 80V ● The over position error range can be set through the HISU
Overall Dimensions（mm）		111.5×75.5×34
Weight		Approximate 300g
Environment Specifications	Environment	Avoid dust, oil fog and corrosive gases
	Operating Temperature	70℃ MAX
	Storage Temperature	-20℃~+65℃
	Humidity	40~90%RH
	Cooling method	Natural cooling or forced air cooling

5. Connections to Control Signal

5.1 Connections to Common Anode



Remark: R=0, if VCC=5V;

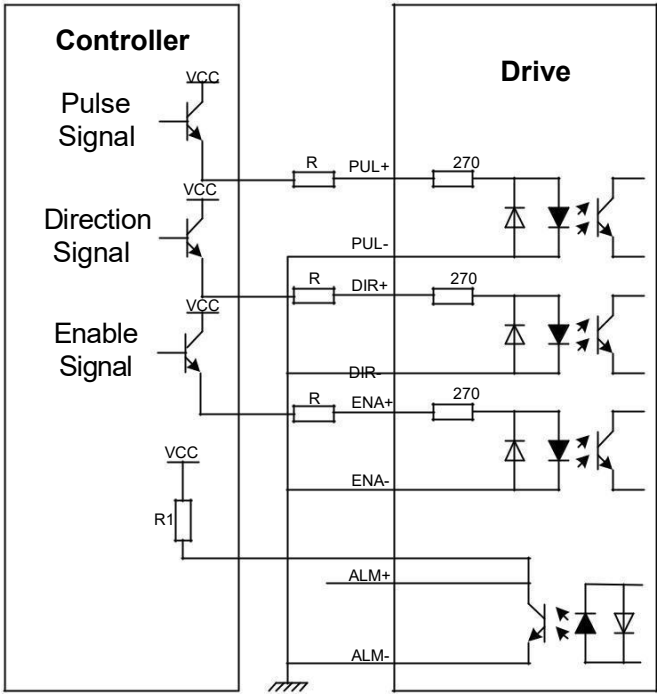
R=1K (Power > 0.125W), if VCC=12V;

R=2K (Power > 0.125W), if VCC=24V;

Connections to

R1(3~5K) must be connected to control signal terminal.

5.2 Common Cathode



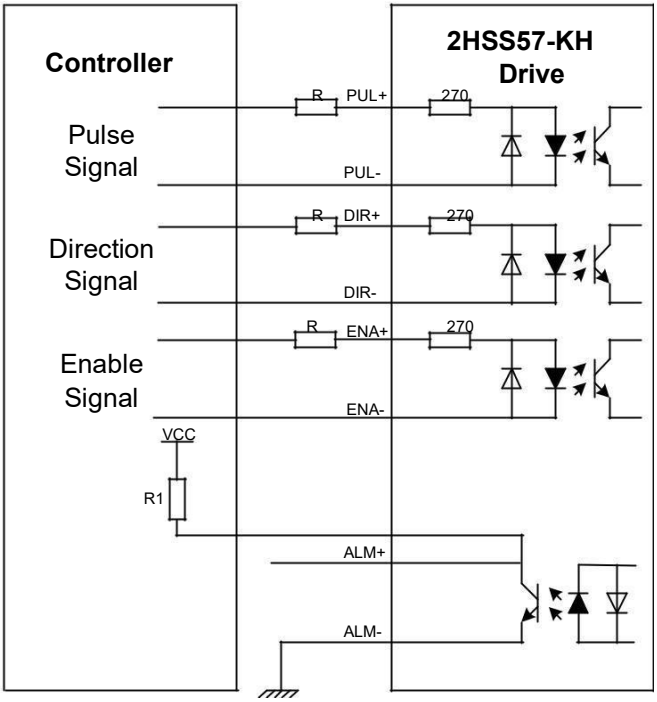
Remark: R=0, if VCC=5V;

R=1K (Power > 0.125W), if VCC=12V;

R=2K (Power > 0.125W), if VCC=24V;

R1(3~5K) must be connected to control signal terminal.

5.3 Connections to Differential Signal



Remark: R=0, if VCC=5V;

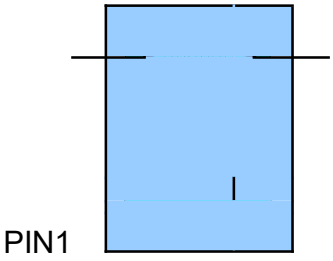
R=1K (Power > 0.125W), if VCC=12V;

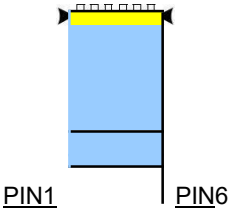
R=2K (Power > 0.125W), if VCC=24V;

R1(3~5K) must be connected to control signal terminal.

Connections to

5.4 232 Serial Communication Interface

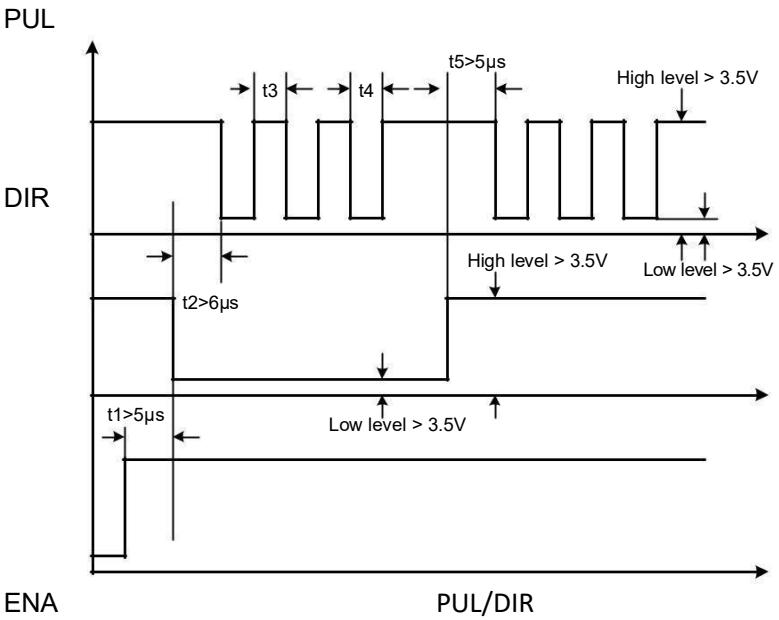




Crystal Head foot	Definition	Remark
1	TXD	Transmit Data
2	RXD	Receive Data
4	+5V	Power Supply to HISU
6	GND	Power Ground

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:

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

b. t2: DIR must be ahead of PUL active edge by 6μ s to ensure correct direction;

c. t3: Pulse width not less than 2.5μ s;

d. t4: Low level width not less than 2.5μ s.

6. DIP Switch Setting

6.1 Activate Edge Setting

SW1 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.

6.2 Running Direction Setting

SW2 is used for setting the running direction, “off” means CCW, while “on” means CW.

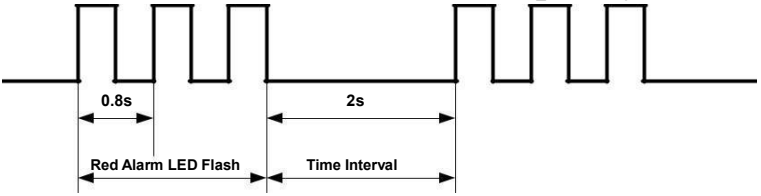
6.3 Micro steps Setting

The micro steps setting is in the following table, while SW3、SW4、SW5、SW6 are all on, the internal default micro steps inside is activate，this ratio can be setting through the HISU.

Dial switch / Micro steps	SW3	SW4	SW5	SW6
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

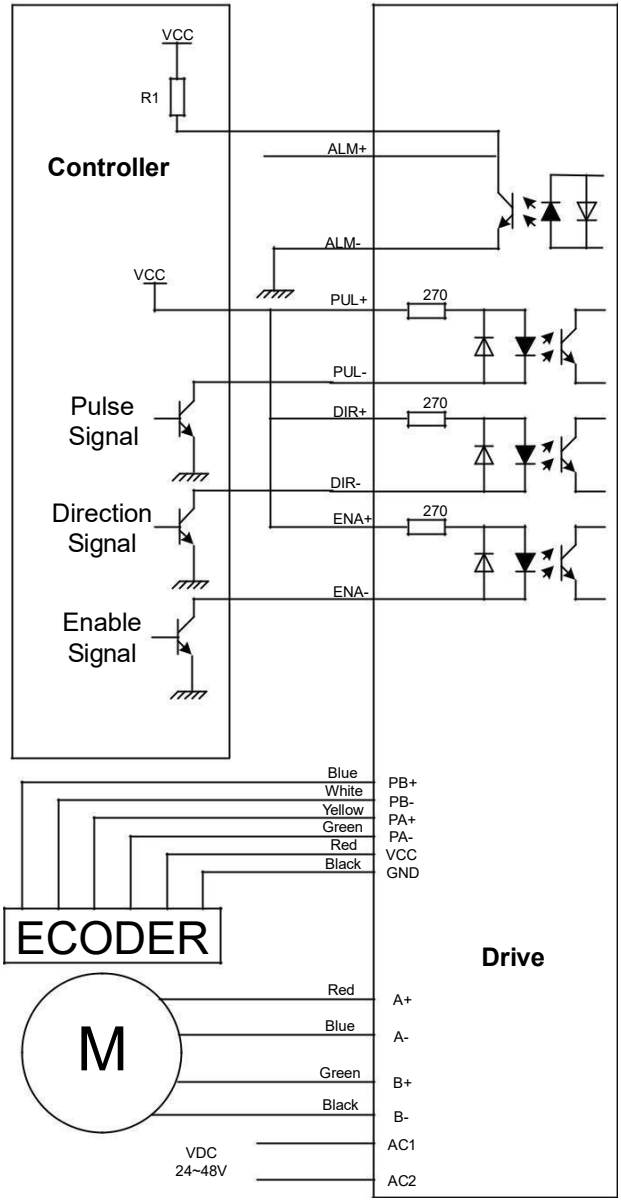
7. Faults alarm and LED flicker frequency



Flicker Frequency	Description to the Faults
1	Error occurs when the motor coil current exceeds the drive's current limit.
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. Typical Connection

This drive can provide the encoder with a power supply of +5v, maximum current 80mA. It adopts a quadruplicated-frequency counting method, and the resolution ratio of the encoder multiply 4 are the pulses per rotate of the servo motor.


VCC
R1
Controller
ALM+
ALM-
VCC
PUL+
270
PUL-
Pulse Signal
DIR+
270
DIR-
Direction Signal
ENA+
270
ENA-
Enable Signal
Blue
White
Yellow
Green
Red
Black
PB+
PB-
PA+
PA-
VCC
GND
ECODER
Drive
M
Red
Blue
Green
Black
A+
A-
B+
B-
VDC
24~48V
AC1
AC2

10. Parameter Setting

The parameter setting method of drive is to use a HISU adjuster through the 232 serial communication ports, only in this way can we setting the parameters we want. There are 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

Mode	Definition	Range	Dimension	Drive Restart	Default Value

P1	Current loop Kp	0—4000	1	N	1000
P2	Current loop Ki	0—1000	1	N	100
P3	Damping coefficient	0—1000	1	N	100
P4	Position loop Kp	0—4000	1	N	1300
P5	Position loop Ki	0—1000	1	N	250
P6	Speed loop Kp	0—3000	1	N	50
P7	Position loop Ki	0—1000	1	N	10
P8	Open loop current	0—40	0.1	N	30
P9	Close loop current	0—30	0.1	N	20
P10	Alarm level	0—1	1	N	0
P11	Reserved				
P12	Stop lock enable	0—1	1	N	0
P13	Enable signal level	0—1	1	N	0
P14	Arrival level	0—1	1	N	1
P15	Encoder line number	0—1	1	Y	0
P16	Position error limit	0—3000	10	N	1000
P17	Reserved				
P18	Motor type	0—5	0	Y	3
P19	Speed smoothness	0—10	1	N	0
P20	User-defined p/r	4-1000	50	Y	8

11. Processing Methods to Common Problems and

Faults

11.1 Power on power light off

■

No power input, please check the power supply circuit. The voltage is too low.

11.2 Power on red alarm light on

■

Please check the motor feedback signal and if the motor is connected with the drive.

■

The stepper servo drive is over voltage or under voltage. Please lower or increase the input voltage.

11.3 Red alarm light on after the motor running a small angle

■

Please check the motor phase wires if they are connected correctly，if not， please refer to the 3.4 Power Ports.

■

Please check the parameter in the drive if the poles of the motor and the encoder lines are corresponding with the real parameters, if not, set them correctly.

■

Please check if the frequency of the pulse signal is too fast, thus the motor may be out of it rated speed, and lead to position error.

11.4 After input pulse signal but the motor not running

■

Please check the input pulse signal wires are connected in reliable way.

■

Please make sure the input pulse mode is corresponding with the real input mode.