HBS86H Closed-loop Driver Manual

The HBS86H is a new type of closed-loop stepper motor driver developed by our company based on over ten years of experience in stepper and servo research and development. It uses the latest dedicated motor control dual-core DSP chip and vector closed-loop control algorithm, which completely overcomes the problem of step loss in open-loop stepper motors

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The HBS86H is a new type of closed-loop stepper motor driver developed by our company based on over ten years of experience in stepper and servo research and development. It uses the latest dedicated motor control dual-core DSP chip and vector closed-loop control algorithm, which completely overcomes the problem of step loss in open-loop stepper motors. It also significantly improves the motor's high-speed performance, reduces motor heating, and minimizes vibration at high, medium, and low speeds, thereby enhancing the machine's processing speed and accuracy while reducing energy consumption. Additionally, when the motor is continuously overloaded, the driver will output an alarm signal, providing the same reliability as an AC servo system. Of course, the motor installation dimensions are fully compatible with traditional two-phase 86 series stepper motors, making it easy to upgrade traditional stepper drive solutions. The cost increase compared to open-loop stepper motors is minimal, only about 30-50% of traditional AC servo systems.

1. Product Features

- **Compatible Motors**: Can drive 57, 60, and 86 flange closed-loop stepper motors without complex parameter adjustments; automatically matches the motor upon power-up.
- **Voltage Input Range**: 24~70 VAC or 18-100 VDC.
- **Maximum Peak Current**: 6A.
- **Subdivision Range**: 200~51200 ppr.
- **Signal Input**: Differential/single-ended, pulse/direction or dual pulse, signal level compatible with 5~24V.
- **Optically Isolated Signal Input**: Strong anti-interference capability.
- **Pulse Response Frequency**: 200 KHz.
- **Closed-loop Vector Control**: Ensures high-speed, high-torque motor output while preventing motor step loss.
- **Variable Current Control**: Automatically outputs matching current based on load and speed, significantly reducing motor heating.
- **Ultra-low Vibration and Noise**.
- **Protection Functions**: Over-voltage, over-current, and tracking error protection.

2. Electrical Specifications

- **Voltage Input Range**: 24~70 VAC or 18-100 VDC.
- **Maximum Peak Current**: 6A.
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HBS86H parameters:

Parameter	**HBS86H**			
	Minimum	**Typical**	**Maximum**	**Unit**
Maximum Peak Current	-	-	8	A
Input Power Voltage	18	48	70	VAC
Logic Input Current	7	10	16	mA
Pulse Frequency	-	200	-	kHz
Insulation Resistance	500	-	-	MΩ

Cooling Method	Natural cooling or forced cooling	
Operating Environment	Operating Environment	Avoid dust, oil mist, and corrosive gases
	Storage Temperature	-20% to +80°C
	Maximum Ambient Temperature	70°C
	Ambient Humidity	<80% RH, non-condensing, no frost
Vibration	5.9m/s²,Max	
Weight	0.58kg	

3. Motor and Power Input Ports

Terminal Number	**Symbol**	**Name**	**Description**
1	A+	A-phase Motor Winding +	If the initial motor direction is opposite to the required direction, set SW5
2	A-	A-phase Motor Winding -	
3	B+	B-phase Motor Winding +	
4	B-	B-phase Motor Winding -	
5	AC	AC Power Input	18V~70VAC
6	AC	AC Voltage	If using DC, polarity is not required

4. Encoder Signal Input Ports

Terminal Number	Symbol	Name	Description
1	EB+	Motor Encoder B-phase +	
2	EB-	Motor Encoder B-phase -	
3	EA+	Motor Encoder A-phase +	
4	EA-	Motor Encoder A-phase -	
5	VCC	Encoder Power Supply	+5V
6	EGND	Encoder Power Ground	0V

5. Control Signal Ports

Name	Description
PUL+	**Pulse Input Signal:** The effective edge of the pulse is adjustable, with the default being the rising edge. To reliably respond to the pulse signal, the pulse width should be greater than 1.2 μs. Compatible with 5~24VDC levels. In dual pulse mode: CW
PUL-	
DIR+	**Direction Input Signal:** High/low level signal. To ensure reliable motor direction change, the direction signal should be established at least 5 μs before the pulse signal. Compatible with 5~24VDC levels. In dual pulse mode: CCW
DIR-	
ENA+	**Enable Control Signal:** This input signal is used to enable or disable the driver output. When ENA is at low level (or the internal optocoupler is conducting), the driver will cut off the current to each phase of the motor, putting the motor in a free state and not responding to input signal pulses. If this function is not needed, leave the enable signal terminal unconnected. Compatible with 5~24VDC levels.
ENA-	
Pend+	**Position Signal Output:** Open-collector form
Pend-	
ALM+	**Alarm Signal Output:** Open-collector form
ALM-	

6. DIP Switch Settings

The HBS86H driver uses a six-position DIP switch to set the subdivision and motor rotation direction. The detailed description is as follows:

Subdivision Settings

Steps/Rev	SW1	SW2	SW3	SW4
Default	on	on	on	on
400	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

Additional Settings

- **SW5**: Motor DIR initial running direction, off = CCW (clockwise, positive direction), on = CW (counterclockwise, negative direction)
- **SW6**: off; standard mode, on; start acceleration assist (not applicable for arc interpolation signals)

SW7	SW8	Motor Type
on	on	60
off	on	86-80, 86-118
on	off	86-151
off	off	86 Open Loop, Current 6.0A

Voltage

- **VAC**: 18-70V (AC voltage)
- **VDC**: 24-100V (DC voltage)