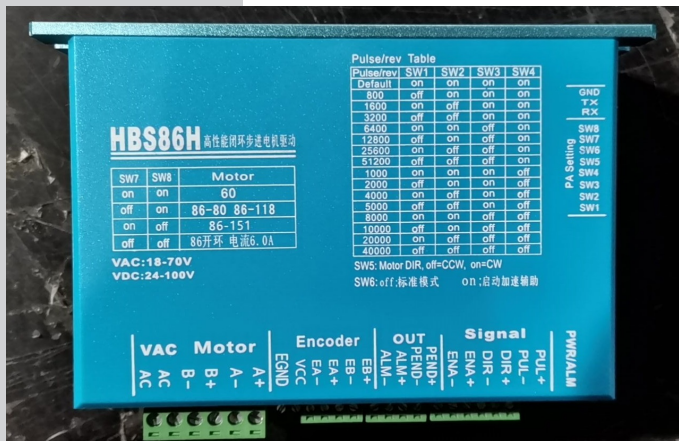# Hybride servo drive

HBS86H

Manual specification

Ⅰ.Product Introduction

1、Introduction

The ZDM-2HA860 is a new hybrid servo driver developed by our company based on more than ten years of experience in step and servo development，Using the latest DSP chip and vector closed loop control technology, the problem of step loss of open-loop stepper motor can be completely overcome，At the same time, it can obviously improve the high-speed performance of the motor, reduce the heating degree of the motor and reduce the vibration of the motor, so as to improve the machining speed and precision of the machine and reduce the energy consumption of the machine。In addition, when the motor is continuously overloaded, the driver will output an alarm signal, with the same reliability as the ac servo system。In addition, when the motor is continuously overloaded, the driver will output an alarm signal, with the same reliability as the ac servo system。

2.Technical Characteristics

- New 32 - bit motor control DSP chip is adopted；
- Advanced vector closed - loop control technology is adopted；
- With trapezoidal wave test function；
- Static current and dynamic current can be set arbitrarily (0--7.2A range)；
- Drive 86 series hybrid servo motor；
- The optocoupler isolates the differential signal input；
- The impulse response frequency can reach up to 200KHZ；
- Arbitrary subdivision (range 1--51200)；
- With over - current, over - voltage, over - heat and tracking error protection；

3. Application area

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

Ⅱ.Electrical, mechanical and environmental indicators

1. Electrical indicators

Parameter	Min	typical value	Max	Unit
Output Current	0	–	7.2	A
Input power supply voltage (DC)	30	–	110	VDC
Input power supply voltage (AC)	18	–	80	VAC
Logical input current	7	10	20	mA
impulse frequency	0	–	200	kHz
Insulation Resistance	500	–	–	MΩ
Provide the encoder current	–	–	50	mA

2. Use environment and parameters

type of cooling	Cool naturally or with an external radiator	
Operational environment	Environment	Try to avoid dust, oil mist and corrosive gases
	Temperature	0℃ — 50℃
	humidity	40 — 90%RH
	Vibration	5.9 m/s2 Max
Storage Temperature		−20℃ — +80℃
Weight		280g

3. Mechanical installation dimension drawing (unit :mm)
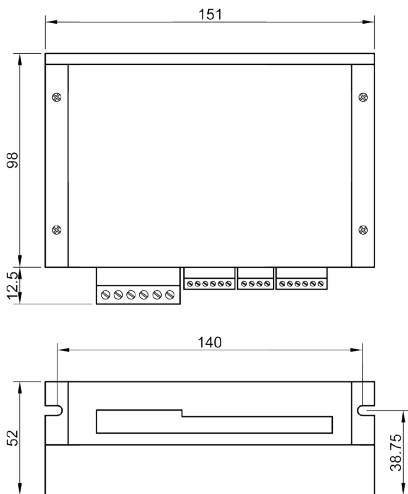
4. Enhanced heat dissipation mode

1) drives the reliable working temperature within the 60 ℃, usually within motor working temperature is 80 ℃;

2) when installing the drive, please install it on the vertical side to form strong air convection on the radiator surface. When necessary, install fan close to the drive to ensure that the drive works within a reliable operating temperature range.

III. The Driver Interface and Wiring

1. The driver interface and wiring

1) Motor and power input port

Terminals no.	Symbol	Name	Instruction
1	A +	A phase motor winding +	
2	A —	A phase motor winding —	
3	B +	B phase motor winding +	
4	B —	B phase motor winding —	
5	+VDC	Input dc power	+18V ∼ +80V
6	GND	Input power GND	0V

2) Encoder Signal Input port

Terminals no.	Symbol	Name	Color specification of leads
1	EB+	Motor encoder B phase positive input	Yellow
2	EB-	Motor encoder B phase negative input	Green
3	EA+	Motor encoder A phase positive input	Black
4	EA-	Motor encoder A phase negative input	Blue
5	VCC	Encoder power supply + 5V input	Red
6	EGND	Encoder power source	White

3) Control port

Terminals no.	Symbol	Name	Des.
1	PU+	Positive pulse input	Signal source + 5 ∼ 24V All can drive
2	PU-	Negative pulse input	
3	DR+	Positive direction input	Signal source + 5 ∼ 24V All can drive
4	DR-	Negative direction input	
5	ENA+	Motor enable positive input	The electrical machine is free when the signal is valid, Don't lock machine
6	ENA-	Motor enable Negative input	
7	Pend+	INPOS positive output	When the motor is in place, the driver output signal is sent to the upper computer
8	Pend-	INPOS Negative output	
9	ALM+	Alarm signal positive output	Driver fault protection after the output signal to the upper computer
10	ALM-	Alarm signal negative output	

4) RS232 communication port

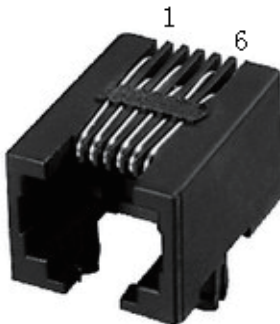| No.	Symbol	Name	Instruction
1	NC		
2	+5V	Power +	Only for external STU
3	TxD	RS232 sending port	
4	GND	Power Ground	0V
5	RxD	RS232 Receive port	
6	NC		

Figure 2 RS232 interface pin alignment

Note: the cable connecting the zdm-2ha860 to the PC, text display or STU server debugger must be a special cable (attached randomly according to the user's situation), please confirm before use to avoid damage.

5) Status Display

Green LED is the power indicator lamp. When the driver is switched on, the LED is always on. When the drive is powered off, the LED goes out. Red LED is the fault indicator light. When the fault occurs, the indicator light flashes in a cycle of 5 seconds. When the fault is cleared by the user, the red LED is usually out. The red LED flicker frequency is 2Hz, in which the LED lights up for 200ms and turns off for 300ms. The number of flashes of red LED within 5 seconds represents different fault information, and the specific relationship is shown in the table below:

No.	Flicker frequency	Red LED flashing waveform	Fault description
1	1		Overcurrent fault
2	2		Ovevoltage Fault
3	5		Tracking error out of tolerance

When the drive fails, the drive will stop and the corresponding fault code will be prompted. The fault can only be cleared when the user needs to power off and recharge. When the drive fails, the drive will be in queue to save the latest fault in the EEPROM of the drive, and the drive will save up to 10 latest historical failures. Users can read the corresponding fault code through PC and text display.

2. Control signal interface circuit diagram

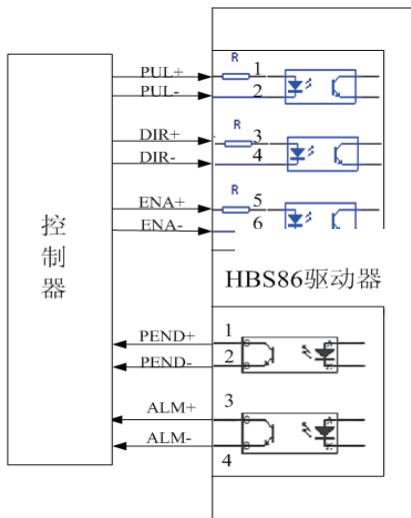Circuit diagram of control signal input and output interface, as shown in figure 3

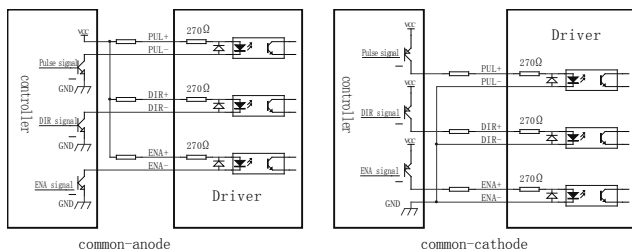FIG. 3(a) interface wiring diagram of difference mode control signal

common-anode   common-cathode

FIG. 3(b) interface wiring diagram of single-ended control signals

Note: VCC general+5v-24v

3. Control signal sequence diagram

In order to avoid some wrong actions and deviations, PUL, DIR and ENA should meet certain requirements.
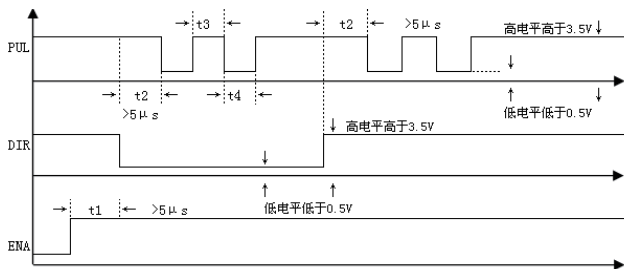
As shown in figure 4 below:

Figure 4 sequence diagram

Note:

(1) t1: ENA (enabling signal) should be at least 5μs , which is determined to be high. It is generally recommended that ENA+ and ENA- be suspended.

(2) t2: DIR at least prior to the decline edge of PUL 5, where the state is high or low.

(3) t3: pulse width shall not be less than 2.5μs.

(4) t4: the width of low level is not less than 2.5μs.

4. Control signal mode setting

Pulse triggering edge and single or double pulse selection: it is effective to set up pulse rising edge or descending edge through PC software ProTuner or STU debugger; You can also set up single or double pulse modes.

5. Encoder connection

When the current Icc required by the encoder is less than 50mA, it can be directly powered by HBS86H. At this time, the EGND should be connected to the encoder Vcc by E+5V, and the encoder A+, A-, B+ and B- trust Numbers in turn to the driver EA+, EA-, EB+ and eb-port. When the current required by the encoder is Icc>50mA, an additional 5V power supply is required. The specific connection mode is shown in figure 5. The encoder needs to be guaranteed to be co-located with the HBS86H.
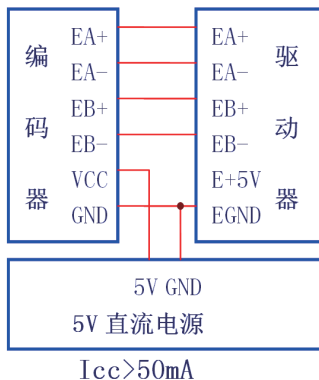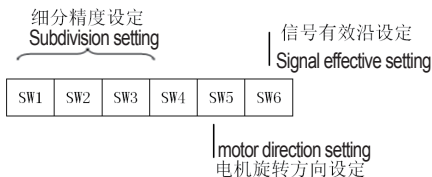

FIG. 5 wiring diagram of the encoder when power supply is added

ⅠⅠⅠⅠ. Setting of dial code switch

HBS86H driver adopts the six-dial code switch to set the subdivision precision, the control signal is effective along and the motor rotation direction is set, and the detailed description is as follows:

细分精度设定
Subdivision setting

信号有效沿设定
Signal effective setting

| SW1 | SW2 | SW3 | SW4 | SW5 | SW6 |

motor direction setting
电机旋转方向设定

Subdivision setting

steps/R	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

V. Settings of driver parameters

HBS86H Hybrid servo drive parameter Settings must be through the PC RS232 serial communication port, USES the special debugging software for parameter setting, internal deposit has a corresponding motor drives the best factory default configuration parameters, users must, in accordance with the specific usage adjustment drives internal fine fraction can, detailed usage please see Pro Tuner debug software instructions. See the table below for specific adjustable parameters and functions:

parameter symbolic	Name	Parameter range	Remarks
KcP	Ratio coefficient of current loop	0 ～ 65535	For factory Settings only, no modification is allowed
KcI	Integral coefficient of current loop	0 ～ 65535	
KpP	Position ring scale factor	0 ～ 65535	
KpI	The position ring integral coefficient	0 ～ 65535	
Kd	Velocity loop damping coefficient	0 ～ 100	
Kvff	Speed loop feedforward coefficient	0 ～ 100	
	Maintain current percentage	0 ～ 100%	Factory default setting 1
	Percent closed loop current	0 ～ 100%	
	Number of encoder lines	4000	4000
	Tracking error limit	0 ～ 65535	Factory default setting 4000
	division number	200 ～ 65535	
Hspeed	high speed	1 ～ 5000	default 1000
Aspeed	incre speed	1 ～ 900	default 100
Delay	amount of rest	0 ～ 32767	default 50
Pmove	stroke	/	default 32767
Repeat	multiplicity	1 ～ 65535	default 40000

Note: the output default current loop, position loop and speed loop parameters of the driver are the best parameters of the supporting motor. Customers generally do not need to modify, but only select the motor fine fraction and the percentage of open and closed loop current according to the requirements of system control.

Status Indicator lamp

Typical wiring diagram of dc servo system composed of
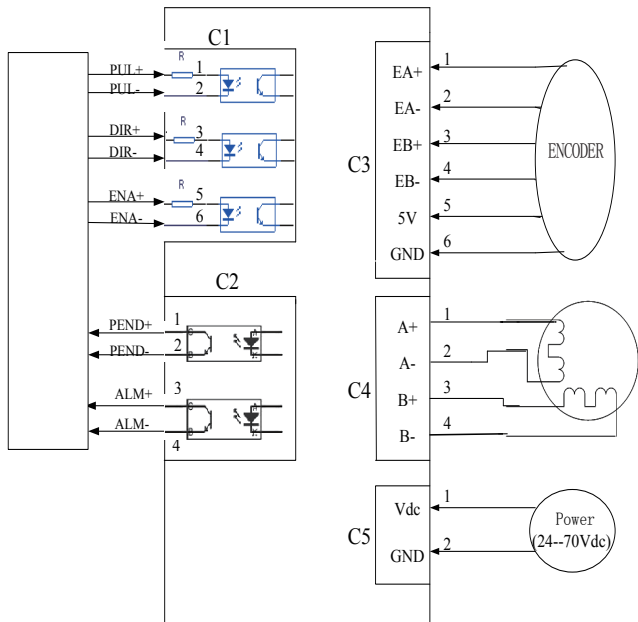HBS86H driver is shown in figure 7

Figure 7 typical wiring diagram

IIV.Encoder signal line color

1. Hybrid servo motor coder leads color and definition

Lead	Colour	Signal	DES.
1	YLW	EB+	Encoder B channel positive output
2	GRN	EB−	Encoder B channel negative output
3	BLK	EA+	Encoder A channel positive output
4	BLU	EA−	Encoder A channel negative output
5	RED	+5V	Encoder +5V power input
6	WHT	GND	Encoder GND input

2、Hybrid servo motor line colors and definitions

Lead	Colour	Signal	DES.
1	WHT	A+	A phase motor winding +
2	GRN	A−	A phase motor winding −
3	BLU	B+	B phase motor winding +
4	BLK	B−	B phase motor winding −