**HB860HDigital hybrid servo driver**

**An instruction manual**

**Product introduction**

1. Summary

HB860H is a new type of hybrid servo driver. It adopts the latest special motor control DSP chip and vector closed-loop control technology to overcome the problem of losing step of open-loop stepper motor thoroughly. It can also significantly improve the high-speed performance of the motor, reduce the heat level of the motor and reduce the vibration of the motor, so as to enhance the machine. The processing speed and accuracy and reduce the 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.

1. Technical characteristics

·A new 32 bit DSP chip for motor control is adopted；

·Advanced vector closed loop control technology is adopted；

·Trapezoidal wave testing function；

·Quiescent current and dynamic current can be set arbitrarily (within 0-8.2A)；

·Drive 86 series hybrid servo motor；

·Optocoupler isolation differential signal input；

·The pulse frequency is up to 200KHz；

·Subdivision settings (800-51200)；

·It has over-current, overvoltage, and tracking error overshoot protection.。

1. application area

Suitable for various small and medium-sized automation equipment and instruments, such as: engraving machine, stripping machine, marking machine, cutting machine, laser typesetting, plotter, CNC machine tools, automatic assembly equipment. It has a very good application effect in users who expect small noise and high speed.

**Electrical, mechanical and environmental indicators**

1. Electrical index

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| parameter | HB860H | | | |
| minimum value | Typical value | Maximum value | Company |
| Continuous output current | 0 | - | 8.2 | A |
| Input voltage | +18 | 60 | +80 | VAC |
| Logic input voltage | 7 | 10 | 20 | mA |
| Pulse frequency | 0 | - | 200 | kHz |
| insulation resistance | 500 |  |  | MΩ |
| Encoder current is provided |  |  | 50 | mA |

1. Usage environment and parameters

|  |  |  |
| --- | --- | --- |
| Cooling mode | Natural cooling or external radiator | |
| Use of the environment | Application | Try to avoid dust, oil mist and corrosive gases |
| temperature | 0℃-50℃ |
| humidity | 40-90%RH |
| shock | 10-55Hz/0.15mm |
| Keep the temperature | -20℃-65℃ | |
| weight | About 570 grams | |
| working temperature | The reliable temperature of the driver should be within 50 C, and the motor temperature is less than 70 C | |

1. Mechanical installation dimension drawing

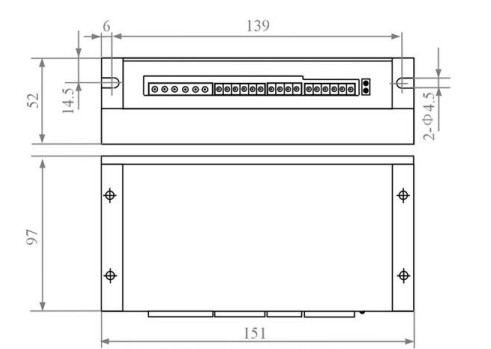


Figure 1 Mechanical installation dimension drawing（Company：m）

**Introduction of driver interface and wiring**

1. Interface definition
2. Motor and power input port

|  |  |  |  |
| --- | --- | --- | --- |
| Terminal number | Symbol | Name | Explain |
| 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 | AC | Input power supply | AC24V-80V |
| 6 | AC | Input power supply | And DC24V-110V |

1. Encoder signal input port

|  |  |  |  |
| --- | --- | --- | --- |
| Terminal number | Symbol | Name | Explain |
| 1 | EB+ | Motor encoder B positive input |  |
| 2 | EB- | Motor encoder B negative phase input |  |
| 3 | EA+ | Motor encoder A positive input |  |
| 4 | EA- | Motor encoder B negative phase input |  |
| 5 | VCC | Encoder power supply | +5V |
| 6 | EGND | Encoder power source | 0V |

1. Control signal port

|  |  |  |  |
| --- | --- | --- | --- |
| Terminal number | Symbol | Name | Explain |
| 1 | PUL+ | Positive pulse input | 5-24V general signal |
| 2 | PUL- | Pulse negative input |  |
| 3 | DIR+ | Directional positive input | 5-24V general signal |
| 4 | DIR- | Directional negative input |  |
| 5 | ENA+ | Enable positive input | 5-24V general signal |
| 6 | ENA- | Enable negative input |  |
| 7 | Pend+ | In place signal positive output | 5-24V general signal |
| 8 | Pend- | In place signal negative output |  |
| 9 | ALM+ | Positive output of alarm signal | 5-24V general signal |
| 10 | ALM- | Alarm signal negative output |  |

4) State indication

The green LED is the power indicator, which is always on when the driver is connected to the power supply, and goes out when the driver is turned off. The red LED is the fault indicator. When the fault occurs, the indicator flashes in a cycle of 5 seconds. When the fault is cleared by the user, the red RED goes out for a long time. The flashing frequency of red LED is 2Hz, of which LED is bright 200ms and 300ms is eliminated. Red LED flashes in 5 seconds.

Notes:

1. t1：ENA (enabling signal) should be DIR at least 5μs in advance. In general, it is recommended that ENA+ and ENA- be suspended.
2. t2：DIR At least PUL ahead of time, the falling edge 5μs determines its state is high or low.
3. t3：The pulse width is not less than 2.5μs.
4. t4: Low level width is less than 2.5μs.

3.、Serial port connection

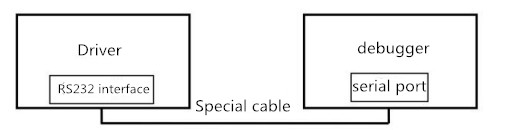
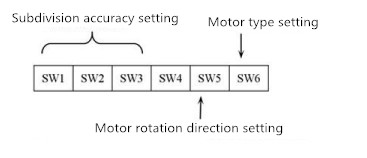


Fig. 6 schematic diagram of parameter debugging wiring

**Dial switch settings**

The driver uses a six-digit dialing switch to set the subdivision accuracy, the control signal along the effective direction of rotation and the motor setting, which is described in detail as follows:



**Subdivision setting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Step / circle | SW1 | SW2 | SW3 | SW4 |
| Defauit | 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 |

**Driver parameter setting**

The parameter setting of HB860H drive must be modified through the connection between special debugger and RS232 serial communication port. There is a set of best default factory configuration parameters of corresponding motor in the drive. Users only need to adjust the internal subdivision of the drive according to the specific usage. Please check the debugger usage. bright

Note: The default parameters of current loop, position loop and speed loop are the best parameters of the matching motor. Customers do not need to modify them. They only need to select the motor subdivision and the percentage of open and closed loop current according to the need of system control. For example, in the case of belt drive, it is necessary to adjust the rigidity of motor, current loop, position loop and speed loop to improve the effect. If unable to adjust to the best effect, we can call our service telephone for consultation and adjustment, we have professional and technical personnel to solve such problems for you.

**Typical application wiring diagram**

The typical wiring diagram of the DC servo system composed of HB860H drivers is shown in Figure 7. The power supply is recommended for the size range. The higher the voltage, the better the high speed performance.

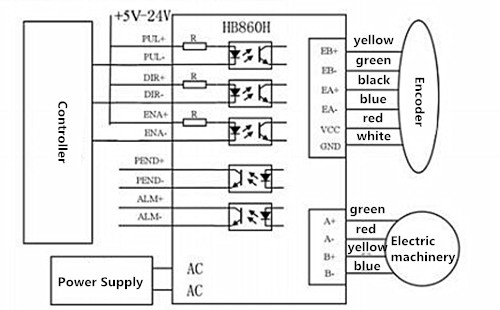


Figure. 7 typical wiring diagram

1. Color and definition of lead for hybrid servo motor encoder

|  |  |  |  |
| --- | --- | --- | --- |
| Pin | colour | signal | describe |
| 1 | yellow | EB+ | Encoder B channel positive output |
| 2 | green | EB- | Encoder B channel negative output |
| 3 | black | EA+ | Encoder A channel positive output |
| 4 | brown | EA- | Encoder A channel negative output |
| 5 | red | VCC | Encoder +5V power input |
| 6 | white | GND | Encoder GND input |

1. Color and definition of mixed servo motor line

|  |  |  |  |
| --- | --- | --- | --- |
| Pin | colour | signal | describe |
| 1 | green | A+ | A phase motor winding + |
| 2 | red | A- | A phase motor winding - |
| 3 | yellow | B+ | B phase motor winding + |
| 4 | blue | B- | B phase motor winding - |

Product warranty clause

1. One year warranty period

The company provides quality assurance for the product's raw materials and process defects for one year from the date of delivery. During the warranty period, our company provides free maintenance service for defective products.

1. It is not a guarantee.

·Improper wiring, such as supply voltage exceeding quota (80VAC, 110VDV) or plug error.

·Unauthorized modification of internal devices

·Exceed electrical and environmental requirements.

·Environmental heat dissipation is too poor.