1Product overview

HB2722 is a high-voltage digital two-phase stepper motor driver with integrated intelligent motion controller function and built-in S-shaped acceleration and deceleration instructions. The driver can be easily configured through the TTL port to expand the application of the driver.

1.1 characteristic

- Working voltage: 110~220VAC
- communication mode ：TTL
- Maximum phase current output: 7.2A/ phase (sine peak)
- PUL+DIR/CW+CCW pulse mode is optional
- Deficiency alarm function
- Semi-flow function
- Digital IO ports:
- 3 digital signal inputs with optical isolation, high level can directly receive 24V DC level;
- 1 optical isolation digital signal output, maximum tolerance voltage 30V, maximum inrush or pull-out current 50mA.
- The 8th file allows users to customize the current
- The 16 files can be customized by users, and any resolution within the range of 200~ 65535 is supported
- IO control mode, supports 16 speed customization
- Input port and output port are programmable

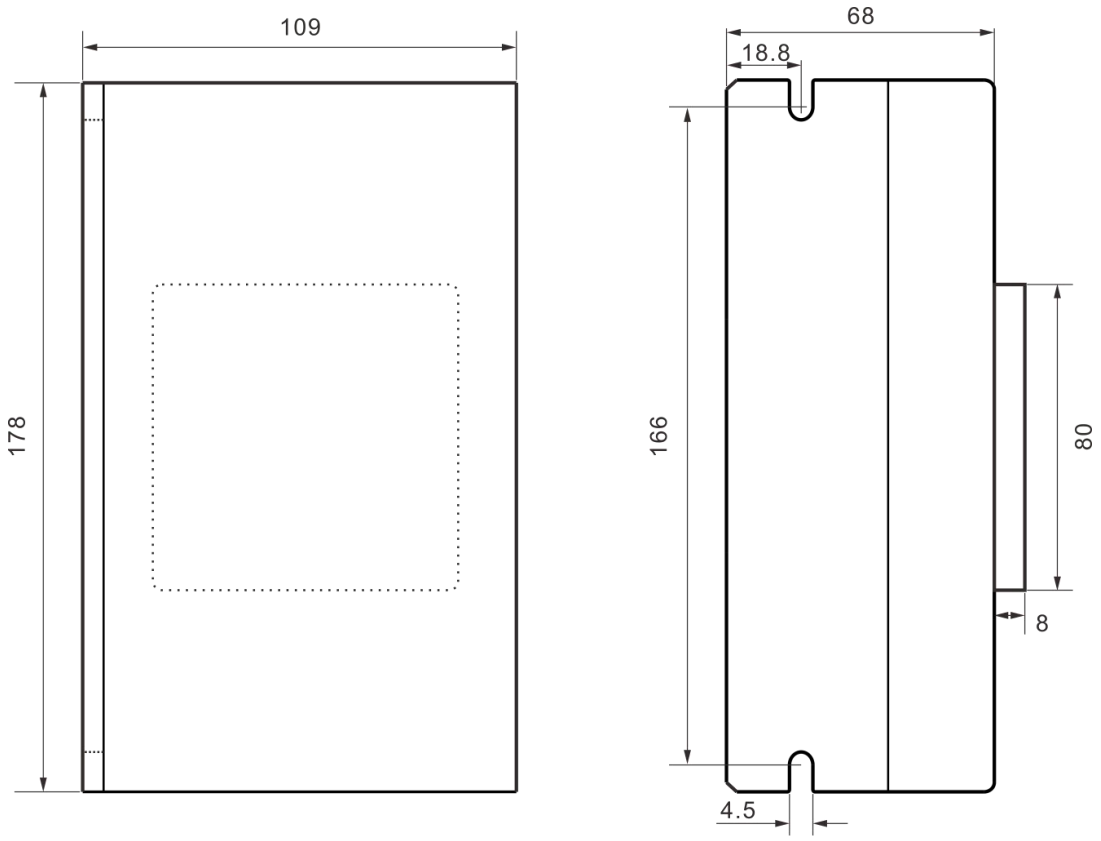
2.Application environment and installation

2.1 Application environment requirements

project	HB2722
Installation environment	Avoid dust, oil and corrosive environment
vibrate	0.5G（4.9m/s2） Max
Use temperature/ humidity	0 ℃ ~ 45℃ / 90%RH below (no condensation)
Storage and transportation temperature	-10 ℃ ~70 ℃
cooling-down method	Natural cooling/removal from heat source

classification of waterproof	IP54

2.2 Drive installation size



3. Driver ports and wiring

3.1 Power supply and motor port function description

function	grade	definition	remarks
source	PE	Single-phase 220VAC power input	
	AC		
	AC		
any power-generating or power-driven machine	PE		You can switch to A+, A-, or B+, B-

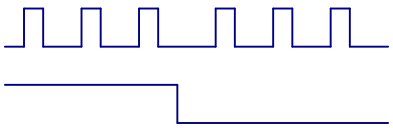
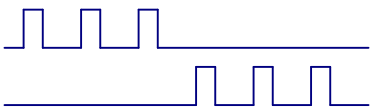
	B-	Two phase stepper motor B phase winding	Make the motor run in the opposite direction
	B+		
	A-	Two phase stepper motor A phase winding	
	A+		

3.2 Control signal wiring

function	characteristic	explain
Pulse / IN1	PUL+	Control signal 5~24V compatible. No additional current limiting resistor is required.
	PUL-	
Direction / IN2	DIR+	
	DIR-	
Enable / IN3	ENA+	
	ENA-	
Alarm/OUT1	ALM+	Optical coupling isolation, open collector output
	ALM-	

3.2.1 PUL and DIR (IN1, IN2) ports:

When operating in external pulse instruction mode by default, HB2722 can receive two types of pulse instruction signals: PUL+DIR, CW+CCW.

Pulse & Direction (PUL + DIR)	
Double pulse (CW +CCW)	

The instruction form of the external pulse is set through the debugging software:

3.2.2 ENA (IN3) port:

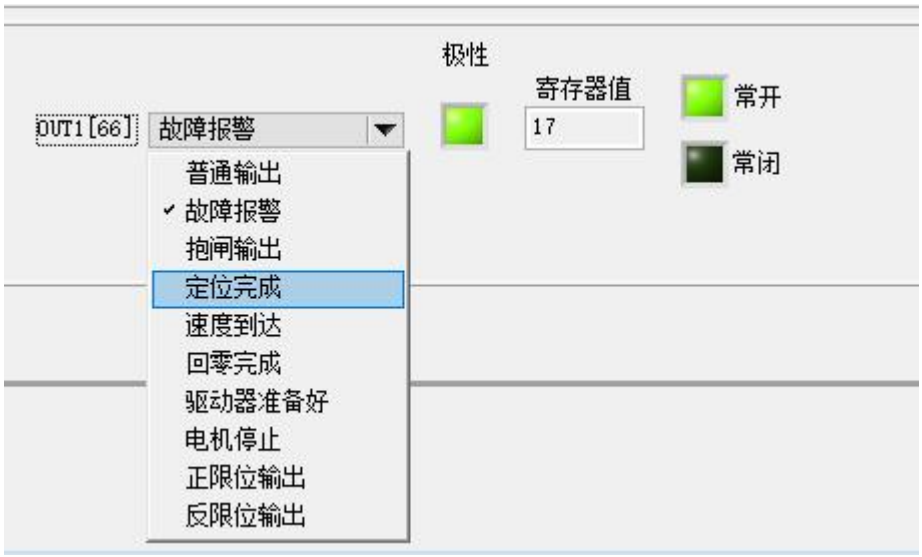
The default ENA port is for the driver offline (enable) function:
When the internal optocoupler is closed, the driver output current is given to the motor;

When the internal optocoupler is on, the driver will cut off the current of each phase of the motor to make the motor free. At this time, the stepping pulse is not responded to. When the motor is in error state, it enables automatic disconnecti-on.

The logic level of the enable signal can be set to the opposite.
At the same time, this port can be reused for other functions like IN1 and IN2.

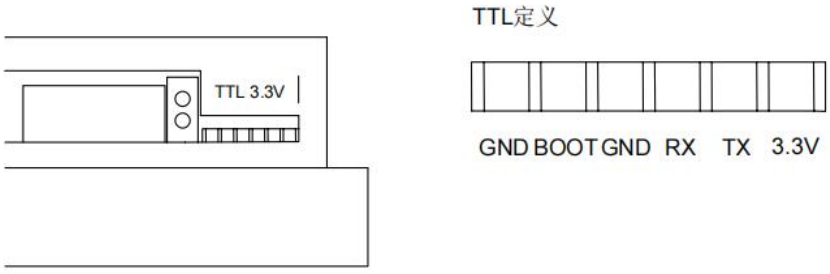
3.2.3 ALM (OUT1) port:

The driver contains a photoelectrically isolated output port ALM. By default, the ALM port is an alarm output. When the driver is in error state and normal working state, ALM outputs different optocoupler levels respectively.
At the same time, it can be reused for other functions, as shown in the following figure:

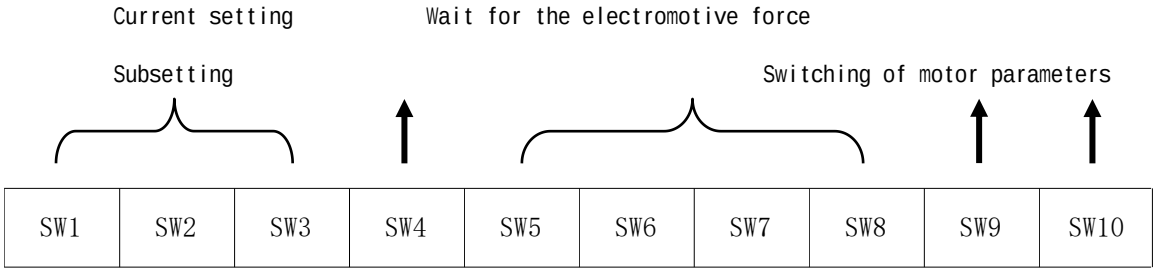


3.3 TTL port

This port is used to debug the connection with the computer



4. Dialing code and running parameter setting



4.1 Current setting

Sinusoidal peak A	SW1	SW2	SW3	remarks
2.3	on	on	on	The user can set the 8 current levels through the debugging software
3.0	off	on	on	
3.7	on	off	on	
4.4	off	off	on	
5.1	on	on	off	
5.8	off	on	off	
6.5	on	off	off	
7.2	off	off	off	

4.2 Wait for the electromotive force

SW4 is used to set the percentage of current during driver standby,

SW4 = ON, the current is maintained at the set current as long as the driver is enabled

SW4 = OFF. After the driver stops receiving pulses for a certain period of time, it enters the standby state and the current drops to a certain percentage of the set current. The default setting is: after stopping receiving pulses for 1 second, the motor winding current will be 50%.

4.3 Set each pulse per revolution

Set the number of pulses required to make the motor run one turn. Due to the use of digital control, the fine number can be set to any number between 200 and 65535.

Steps/ revolutions	SW5	SW6	SW7	SW8	remarks
7200	on	on	on	on	Users can set up 16 subdivisions through debugging software
400	off	on	on	on	
800	on	off	on	on	
1600	off	off	on	on	
3200	on	on	off	on	
6400	off	on	off	on	
12800	on	off	off	on	
25600	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	
25000	off	off	off	off	

4.4 Pulse instruction filtering

The driver has built-in pulse command smoothing function, which can make the motor start more smoothly.

The default instruction filtering time is 512*61us=31ms

The command filter can smooth the motor movement, but also introduces lag. Users need to choose whether to enable this function according to the actual situation.

The filter time can be set through the debugging software:

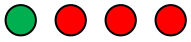


4.5 Switching of motor parameters

In order to simplify the model and increase the adaptability of the product, the code matching motor parameters are added.

Motor model	SW9	SW10
86	ON	ON
86H	OFF	ON
110	ON	OFF
130	OFF	OFF

5.Driver working status LED indicator

LED state		Driver status
	The green light is on	The driver is not enabled
	The green light is flashing	The driver is working properly
	1 Green, 1 red	The driver is overcurrent
	1 Green, two reds	The driver input power supply is overvoltage
	1 Green, three reds	The internal voltage of the driver is wrong
	1 Green, seven red	The motor is out of phase

6. Low phase alarm

The driver is equipped with a motor phase loss alarm function, which can detect phase loss during both stationary and moving states of the motor. During operation, mechanical issues may cause the motor windings to loosen or break. In such cases, the driver will issue an alarm signal to prevent the equipment from performing incorrect actions.

Since this function depends on the current detection of the motor winding, when the motor current is too small (less than 300mA), this function will have a false alarm. In this case, users can turn off this function. In the parameter management and setting interface of the debugging software, set parameter 188: phase loss detection enabled to 0.

7Internal motion control function

When working in the internal pulse instruction mode, PUL, DIR and port are used as IO input signals. The function of IO needs to be set through the debugging software RStepper Configurator. As shown in the following figure:



7.1 Communication control mode

In this mode, the user can make the motor run a specified pulse stroke or point operation by communicating with the given running instruction. In the internal pulse mode, the motor is controlled by register 18

0: Waiting state.

The driver receives any control command, and after processing the driver, it will return to the waiting state of the recovery bit. Therefore, reading this register always returns 0.

1: Fixed length forward rotation.

In the relative position mode, the motor runs forward according to the parameters of registers 70~74.

In absolute position mode, the operating state is determined according to the current position and the absolute position set from 70 to 74.

2: Fixed length reversal.

In the relative position mode, the motor runs in reverse according to the parameters of registers 70~74.

In absolute position mode, the operating state is determined according to the current position and the absolute position set from 70 to 74.

3: Speed mode, continuous forward rotation.

The motor runs forward with acceleration according to registers 75 and 76

4: Speed mode, continuous reversal.

The motor is operated in reverse acceleration according to registers 75 and 76

5: Stop.

The motor decelerates and stops according to the 77 register

6: Stop at a reduced speed.

In the position mode, the motor decelerates and stops according to register 71

In speed mode, the motor decelerates and stops according to register 76

Other: No effect.

7.1.1 Point control mode

The communication control motor runs the specified pulse stroke function. The specific modes and parameters to be set are as follows (the register address is decimal unless otherwise marked or explained):

(1) Set the value of register address 20 (preset application selection in internal pulse mode) to 0 (communication control, respond to instruction at register address 18);

(2) Set the function of digital input and output ports according to application requirements and actual terminal connections;

(3) Set motion parameters:

address	unit	parameter declaration
70	R/S^2	Acceleration of the point motion
72	RPM	The speed of the point movement
73	command pulse	The number of command pulses for the point movement is low in the 16-bit register
74	command pulse	The number of command pulses for the point movement is stored in the high 16-bit register
78	R/S^2	Emergency deceleration
84	-	Set the location and operation mode: 0: incremental 1: Absolute

(4) Communication to give the given operation instruction: Start the point movement by writing the value 1 (fixed-length forward) and 2 (fixed-length reverse) to register 18 (for details about this register, please refer to register 18 in "Driver control mode Settings [17~23]");

(5) During operation, if you need to stop the machine, you can write a value of 6 (deceleration stop, deceleration is set by register 71) or a value of 5 (emergency stop, deceleration is set by register 78) to register 18.

pay attention to ：

During the operation of the motor, it only responds to the shutdown command (slow down or stop). If you need to change the running direction of the motor through the instruction, you need to send the stop command and then send another start signal in the other direction after the motor stops.

During the motor's operation, changes to acceleration (register 70), deceleration (register 71), and speed (register 72) are made. However, the driver does not immediately respond to these settings; it only operates according to the set values after the motor is restarted after a shutdown. It is important to note that the emergency stop deceleration (register 78) is activated when the current movement's emergency stop is triggered, without waiting for the next movement's emergency stop.

7.1.2 Point control mode

The function of controlling the motor to run in a spot motion mode through communication is described below. The specific modes and parameters that need to be

set are as follows (register addresses are not specifically marked

Notes or explanations are in decimal):

(1) Set the value of register address 20 (preset application selection in internal pulse mode) to 0 (communication control, respond to instruction at register address 18);

(2) Set the function of digital input and output ports according to application requirements and actual terminal connections;

(3) Set motion parameters:

address	unit	parameter declaration
75	R/S^2	Acceleration of point motion
76	R/S^2	Deceleration of point motion
77	RPM	The speed of the point motion
78	R/S^2	Emergency deceleration

(4) Communication to give the given operation instruction: Start the point movement by writing the value 3 (continuous forward) and 4 (continuous reverse) to register 18 (for details about this register, please refer to register 18 in "Driver control mode Settings [17~23]");

(5) During operation, if you need to stop the machine, you can write a value of 6 (deceleration stop, deceleration is set by register 76) or a value of 5 (emergency stop, deceleration is set by register 78) to register 18.

pay attention to ：

During the operation of the motor, it only responds to the shutdown command (slow down or stop). If you need to change the running direction of the motor through the instruction, you need to send the stop command and then send another start signal in the other direction after the motor stops.

During the motor's operation, the acceleration (register 75) and deceleration (register 76) are adjusted. However, the driver does not immediately respond to these settings; it must be restarted after the motor has stopped to operate according to the set values. It is important to note that the emergency stop deceleration (register 78) is activated when the current movement stops, without waiting for the next movement to stop.

The motor can change the speed (register 77) during operation, and the driver will respond immediately, that is, the motor will run at the set speed value immediately, without stopping and restarting to respond.

7.2 IO control: start/stop + direction

Through this mode, two IN ports are used to control the operation of the motor. One IN terminal is used to control the start/stop of the motor, and one IN terminal is used to control the running direction of the motor. The specific setting is as follows:

(1) Instruction mode: 0-Internal pulse mode

(2) Internal application mode: 2-IO speed control: start/stop + direction


参数编辑及管理
上传
下发
保存至驱动器
恢复出厂设置
比较参数
保存至文件
从文件导入
参数读取路径
退出
参数汇总
P00 - 99
P100 - 199
MODBUS地址 参数名称 参数值 默认值 单位 最小值 最大值 读写属性
17 Pulse source 0-Inner Pulse command 1 — 0 1 RW
19 Pulse mode 0-PUL+DIR 0 — 0 1 RW
20 App 2-IO Speed:Start+dir 2 — 0 20 RW
21 Motor type 0-Two phase 0 — 0 1 RW
23 Motion direction 0-Normal 0 — 0 1 RW
26 Idle current 50 50 % 1 100 RW

(3) IO set up ：



(4) The speed of this mode is the speed defined by the speed meter and is selected through SW5, 6, 7, and 8

(5) Set the motion parameters to modify acceleration and deceleration



7.3 IO control: forward + reverse

As in 7.2, only (2) needs to be modified to: 3-IO speed control: forward + reverse, and it is ok.



8Common problems and countermeasures

phenomenon	Possibly a case	countermeasure
Motor not turning	The power light does not illuminate	Check the power supply circuit and supply power normally
	The motor is locked but does not turn	The pulse signal is weak, and the signal current is increased to 7-16mA
	Speed is too small	Choose the right segment

	The drive is protected	Remove the alarm and power on again
	Enable signal problem	The enable signal will be pulled up or not connected
	The command pulse is wrong	Check whether the upper computer has pulse output
The motor steering is wrong mistake	The motor turns in the opposite direction	Adjust the motor wiring, or change the direction in software
	The motor wire is open circuit	Check for poor contact between the wires
	The motor only goes one way	The pulse mode is incorrect or the DIR port is damaged
alarm indicator bright	The motor wire is wrong	Check motor wiring
	Voltage is too high or too low	Check the power supply
Position or velocity wrong	The signal is jammed	Remove interference and reliable grounding
	The command entry was incorrect	Check the upper computer instructions to ensure correct output
	The pulse setting is incorrect	Check the status of the code switch and connect it to the pair
Drive terminals burnout	Short circuit between terminals	Check for power polarity or external short circuit
	The internal resistance between terminals is too high	Check whether excessive solder has been added at the connection of the line to form a solder ball

Appendix A Warranty Terms

A.1 Warranty period: 18 months

We provide a one-year warranty on our products from the date of shipment,

during which we will provide free maintenance services for our products. A.2 It is not covered by the warranty

■ Improper wiring, such as reverse polarity of power supply and plugging in motor leads while energized.

■ Used beyond electrical and environmental requirements.

■ Change internal components without authorization.

A.3 Maintenance process

If you need to repair the product, follow the following procedures:

(1) Contact our customer service personnel for permission to return the repair.

(2) The written description of the driver's fault and the contact information and mailing method of the sender shall be attached with the goods. Mailing address:

zip code ：

telephone ：