



## 1 Overview:

BLD70B DC brushless motor driver is a high-performance, low-cost brushless driver for 10W~70W low-voltage DC brushless motor. The DC brushless driver can also support Modbus communication protocol, providing users with more flexible choices in practical applications.

### 1.1 Characteristics

- It also has built-in potentiometer RV speed regulation control and external analog speed regulation control
- Support operation within 12V~24V voltage range
- Support the ambient working temperature range of  $-20\text{ }^{\circ}\text{C}\sim+55\text{ }^{\circ}\text{C}$
- Speed open and closed loop options are available. During closed loop control, ensure that the speed will not drop under rated power and load
- Support the drive of brushless motor with rated power of 10W~70W
- 5 seconds stall waiting time
- BRK external input signal power on reset alarm
- Support the expansion of Modbus communication protocol, which is suitable for users to use touch screen or PC control (you need to contact the business to inquire about relevant content, and the standard does not have this function)
- Support the adjustable output power of expansion (contact the business for relevant information, which is not available for standard products)

## 2 Electrical parameters, Environmental indicators

### 2.1 Electrical parameters

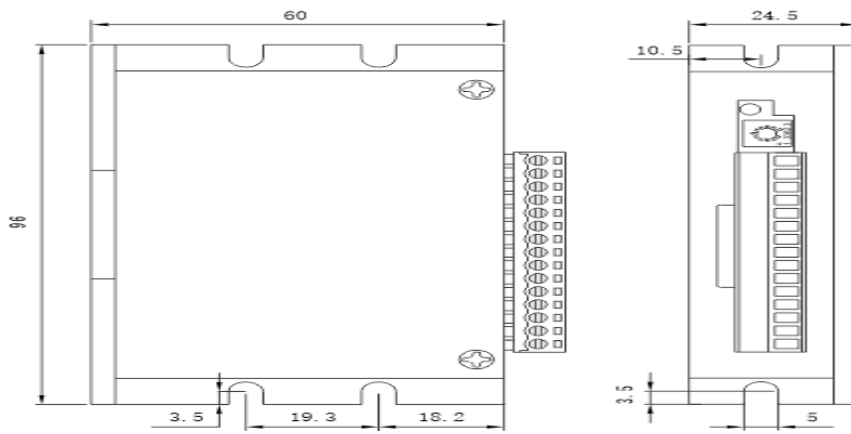
parameter	Min	Typical	Max
Input voltage DC(V)	1 2	24	30
Bus current (A)		4.2	4.5
Motor speed(rpm)	100①	-	-

- ① In closed-loop control, the minimum motor speed requires that the number of poles set by the driver is consistent with the number of poles set by the motor; During open-loop control, this value is related to the design of the motor itself, not necessarily the value in the table; Due to different use scenarios and different workmanship of brushless motor, it is recommended that the minimum working speed of motor be no less than 200 rpm

### 2.2 Environmental indicators

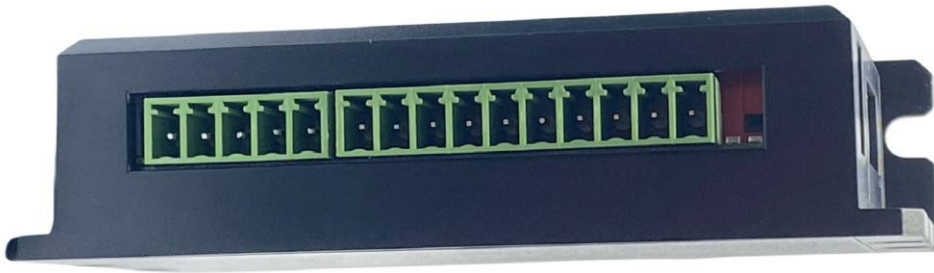
environmental factor	Environmental indicators
cooling method	Natural cooling or forced cooling
Use occasion	Avoid dust, oil and corrosive gases
Operating temperature	$-20\text{ }^{\circ}\text{C}\sim+55\text{ }^{\circ}\text{C}$
storage temperature	$-30\text{ }^{\circ}\text{C}\sim+70\text{ }^{\circ}\text{C}$

### 3 Mechanical dimensions and installation drawings: mm



## 4 Driver interface and wiring diagram:

### 4.1 Driver interface



## 4.2 Input connection

signal	Termin als	content
Power input	GND	DC power input cathode
	24V	DC power input 12V~24V
Motor signal	U	U phase of DC brushless motor
	V	V phase of DC brushless motor
	W	W phase of DC brushless motor
Hall signal	GND	DC brushless motor Hall signal grounding
	HW	DC brushless motor Hall signal HW
	HV	DC brushless motor Hall signa HV
	HU	DC brushless motor Hall signa HU
	+5V	DC brushless motor Hall signal power line
control signal	SV	1) External speed regulation potentiometer 2) External analog signal input 3) PWM pulse signal speed regulation
	BRK	The motor runs when the BRK end is disconnected from the GND end, and the motor brake stops when the BRK end is shorted
	F/R	When the F/R terminal is disconnected from the GND terminal, the motor rotates forward and reverses in case of short circuit
	GND	ground wire
	NC	Spare port (input signal)

## 5 Function selection, setting and operation

### 5.1 brake

Disconnecting or connecting the connecting wire at BRK end and GND end can control the natural operation and fast stop of the motor. When connecting the connecting line at BRK and GND ends, the motor stops quickly. On the contrary, the motor operates normally.

By connecting the switch between GND and BRK or using PLC to control its on-off, the switching between motor operation and fast stop can be realized. When the driver has a red light alarm, you can also turn on BRK and GND, and then release them to restore the alarm.

### 5.2 Direction control

Connecting or disconnecting the connecting wire at F/R end and GND end can control the forward and reverse rotation of the motor. When the connecting wire between F/R end and GND end is disconnected, the motor rotates forward.

When connecting the connecting wire at F/R end and GND end, the motor reverses.

### 5.3 Closed loop operation

SW1	SW2	
0	0	Open loop
1	0	Closed loop 2 pole pair
0	1	Closed loop 4 pole pair
1	1	Closed loop 5 pole pair

**Note:** During closed-loop, the maximum speed of the standard is 3000rpm

## Selection and setting of speed regulation method

### 5.4 Speed regulation with built-in potentiometer RV

Turn the built-in speed regulating potentiometer RV clockwise, and the motor starts to run. Continue to rotate clockwise, and the motor speed increases. Rotate the built-in potentiometer RV counterclockwise to reduce the motor speed;

Turn it counterclockwise to the limit position, then the built-in speed regulating potentiometer RV will close and the motor will stop running.

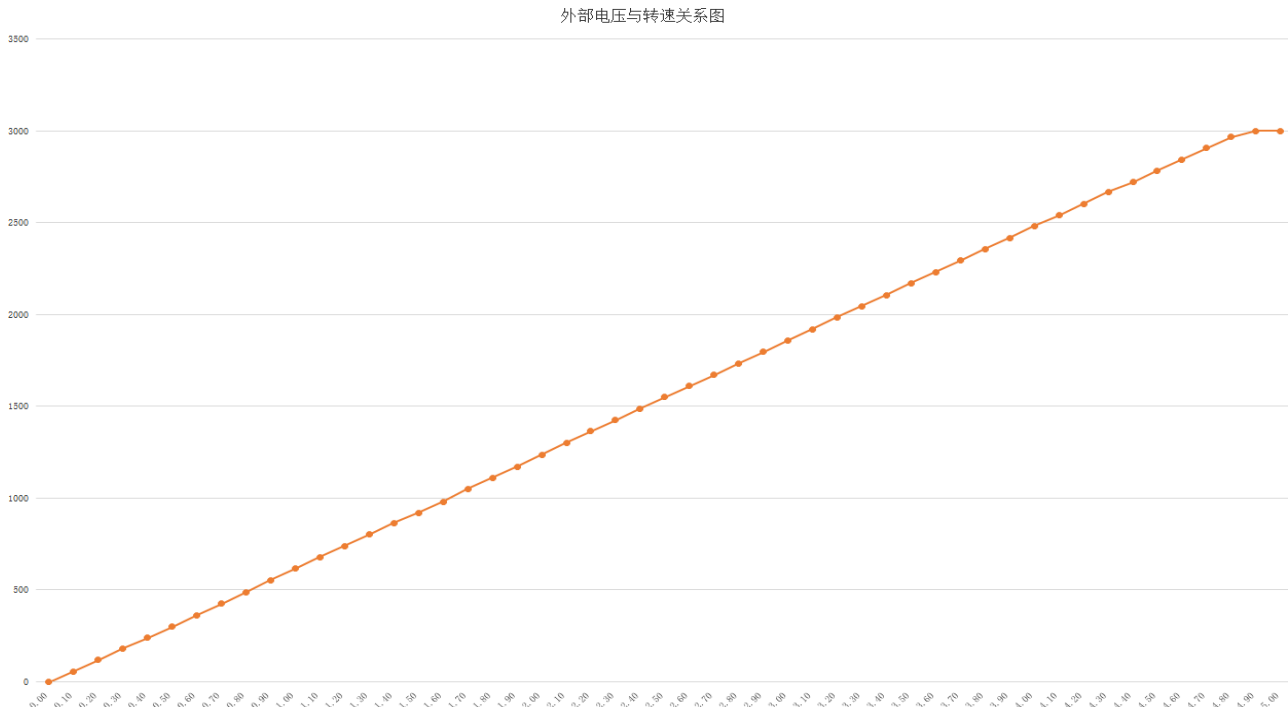
### 5.5 Speed regulation with external potentiometer

When using an external speed regulating potentiometer, please use a potentiometer with a resistance value of 10k  $\Omega$ . The middle leading out end of the potentiometer is connected to the SV end, and the leading out ends on both sides are respectively connected to the +5V and GND ends.

### 5.6 Speed regulation DC 0V~5V with external analog signal

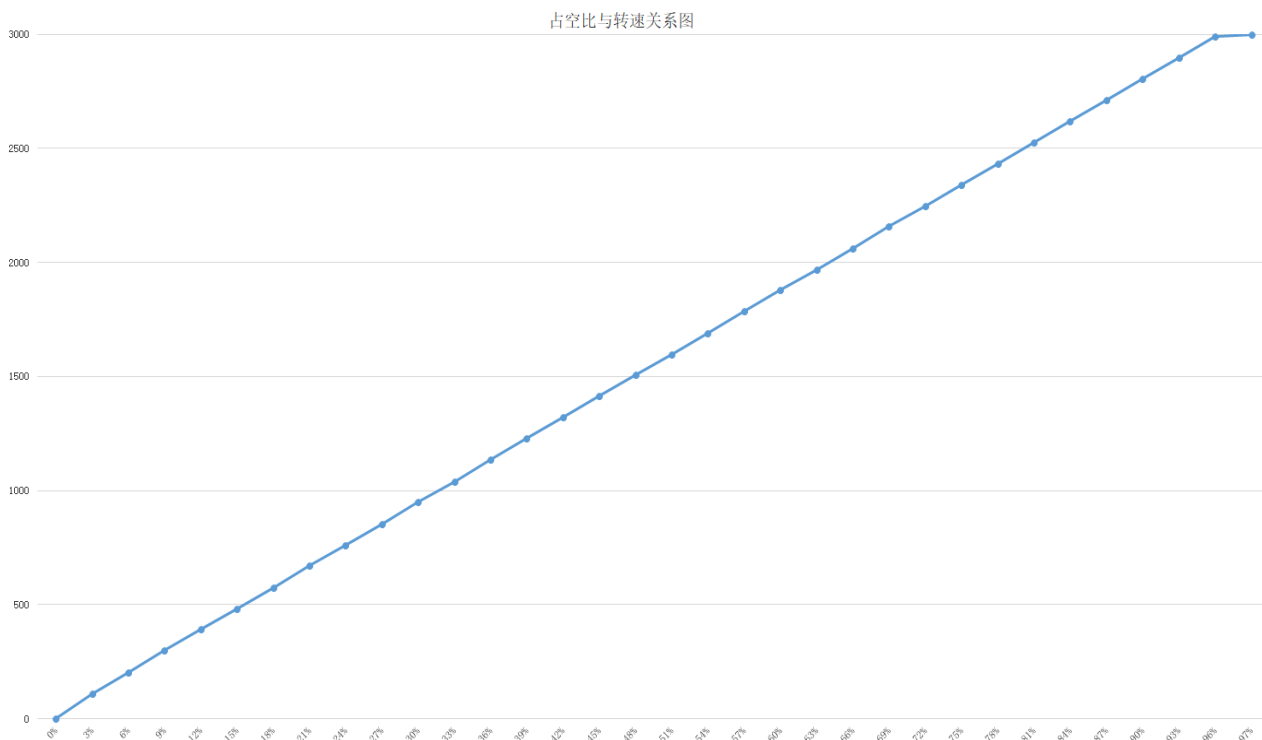
When it is necessary to switch to the external analog control speed mode, the built-in potentiometer RV must be closed. Rotate the built-in potentiometer RV counterclockwise to the limit position.

The following figure shows the curve of speed regulation linearity test of an external analog quantity (SV interface). A 24V 3000rpm 4-pole motor is used, and a closed-loop 4-pole motor is set on the board.



### 5.7 Speed regulation with external PWM pulse signal (recommended speed regulation range: 5%~96%)

The following figure shows the linearity test curve of a duty cycle PWM speed regulation (SV interface). A 24V 3000rpm 4-pole motor is used, and a closed-loop 4-pole motor is set on the board. PWM signal is high level 5V, low level 0V, frequency 3KHz (recommended range 3K~15K Hz)



## 6 Status indication • exception handling

### 6.1 Status indication

When the motor has overvoltage, Hall signal error, locked rotor, over temperature and other conditions, the driver will send an alarm signal, and the driver will stop working at the same time.

Alarm indication	Status Description
The green light flashes regularly	The output power has reached the P-SV setting value (the standard setting value is fixed at 70W)
The red light flashes 5 times	Driver fails to receive Hall signal or receives wrong Hall signal
The red light flashes 8 times	The motor is locked or the drive circuit is abnormal
The red light flashes 9-15 times	Abnormal peripheral circuit of master control chip

When the green light is flashing, it indicates that the driver is starting to limit current, which will not affect normal use.

### 6.2 Exception handling

In case of any abnormality in the above table, send a reset command to the driver to eliminate the alarm signal. If the alarm signal cannot be eliminated, handle it according to the following table. The reset command refers to one of the following three commands, which can enable the drive to remove the alarm.

- ◆ Adjust the speed regulation of internal potentiometer and external analog quantity to 0
- ◆ BRK is closed and then disconnected
- ◆ Power on again

Note that if the internal potentiometer and the external potentiometer are set to 0 at the same time, or BRK is shorted to GND, the driver will not alarm when there is a fault.



Alarm indication	exception handling
The red light flashes 5 times	Please check whether the motor wiring is secure and ensure that the motor is not damaged
The red light flashes 8 times	Please confirm whether the motor load is too large and the motor is not damaged. If not, please replace it with another one of the same type Driver experiment
The red light flashes 9-15 times	repair