

## DB10LR(BLD-120A ) Brushless DC motor drives



### Overview:

DB10LR is a DC brushless driver developed and produced by our company with high-performance DSP as the computing core and multi-functional control mode. The all-digital design makes it have flexible and diverse input control methods, perfect software and hardware protection functions, and the driver can communicate through RS-485

The interface is connected with the computer to realize parameter adjustment, protection parameters, motor parameters, acceleration and deceleration time and other parameter settings.

### Function:

- Acceleration/deceleration time setting
- Open/closed loop control
- Motor stall torque maintenance
- Built-in potentiometer RV speed control
- External analog signal speed regulation
- Motor pole number selection
- Maximum current output setting
- Various alarm indications
- External potentiometer speed control
- PWM speed regulation control

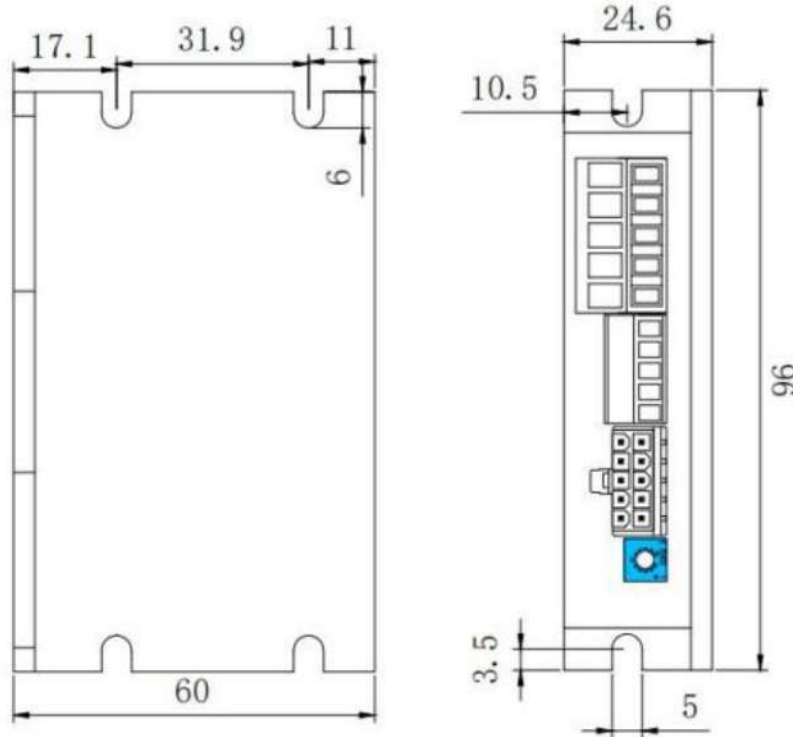




- RS-485 communication control

- Automatic reset and restart after alarm

**Dimension(96\*60\*24.6mm):**



### Electrical parameters:

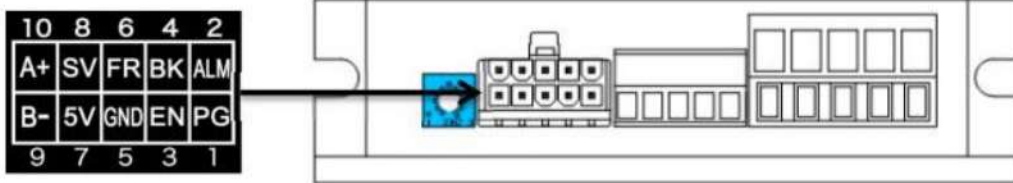
Parameter	Min	Rated	Max	Unit
DC input voltage	10	24	60	V
Driving current output	1	8	15	A
Applicable motor speed	100	3000	30000	rpm
overvoltage protection			60	V
Speed mode	1: 0-5VDC analog input 2: 0-100%PWM input (PWM frequency range: [1Kz-20KHz]) 3: External potentiometer speed regulation 4: Set via RS-485 communication			
Overcurrent protection function	When the current exceeds the operating current setting value and lasts for a set time, over-current protection will be generated			
overvoltage	Overvoltage Protection When Voltage Exceeds 60V			
Undervoltage	Undervoltage Protection When Voltage Below 9V			
Hall anomaly	Hall signal abnormal value			





Acceleration and deceleration time setting	Acceleration and deceleration time can be set through software host computer software
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**Connection definitions:**



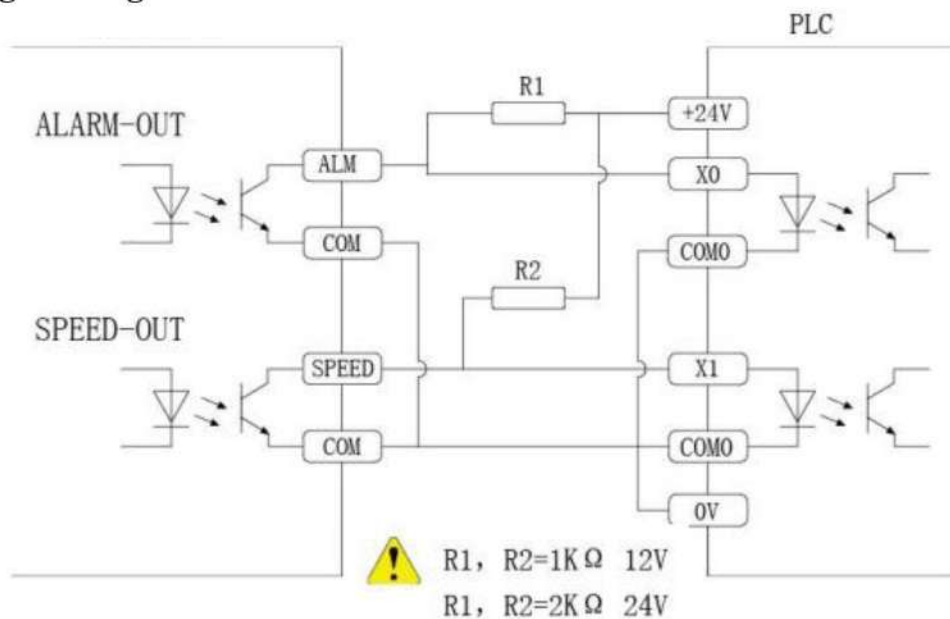
POWER	+ / -	(DC24V ~ DC60V) positive and negative
Motor wire	W	Motor leads W
	V	Motor leads V
	U	Motor leads U
Hall signal	GND	Hall ground connected to this port
	HC	Hall signal line HC
	HB	Hall signal line HB
	HA	Hall signal line HA
	+5V	power supply to the motor Hall + 5V
Control signal	+5V	Potentiometer external power cord
	SV	① External speed regulating potentiometer; ② External analog signal speed regulating input; ③ PWM speed regulating signal input.
	GND	Public port (low level)
	FR	FR disconnect GDN or high level ,motor is Forward;short connect or low level then reverse
	EN	EN disconnect GDN or high level motor stop;short connect or low level then run
	BK	BK disconnect GDN or high level motor stop;short connect or low level then run
	A+	RS-485 port
B-	RS-485 port	
Output signal	PG	Corresponding to the running speed of the motor,output the corresponding pulse frequency . PG can be used to calculate the motor speed. $N(\text{rpm}) = (F/P) \times 60$ F: output pulse frequency Hz; P: number of motor pole pairs; N: motor speed





	<p>Example: motor with 4 pairs of poles  <math>F = 1\text{sec}/2\text{ms} = 500\text{Hz}</math>  <math>N(\text{rpm}) = (500/4) \times 60 = 2500</math></p>
ALM	Motor or driver control output signal normal is 5V, when fault occurs, level will be 0V..

### Output signal diagram



#### Restart function after alarm

When the motor is blocked, the driver will stop working for 3 seconds, and then the driver will start automatically. After restarting, if it fails again, An alarm will be issued, the protection function will start and stop working.

#### Start and stop(EN):

The factory setting of the EN terminal and the GND terminal is to open the EN terminal and the GND terminal. When the power is turned on, the motor does not run. Requires EN and BK to be connected to GND at the





connected to the GND terminal. Otherwise, the motor decelerates and stops.

◆ By connecting a switch between EN and GND or using PLC to control its on-off, the switch between motor start and stop can be realized.

### **Quick stop (BK):**

The factory setting of the BK terminal and the GND terminal is that the BK terminal and the GND terminal are open. When the power is turned on, the motor does not run. It needs to connect EN and BK to GND at the same time to operate.

Connect or disconnect the BK terminal and GND terminal to control the motor start and stop quickly.

When disconnecting the connecting line between BK terminal and GND terminal, the motor stops quickly.

◆ By connecting a switch between BK and GND or using PLC to control its on-off, the switch between motor start and brake stop can be realized.

Note:

Differences between EN and BK and usage options:

- ① EN control is natural stop; BK control is quick stop
- ② The startup states of EN and BK control are the same.
- ③ When selecting one of EN or BK to control the start and stop, The other way the wiring should stay connected.

### **Directional Control (FR):**

The factory setting of the FR terminal and the GND terminal is that the FR terminal and the GND terminal are not connected. When the power is turned on, the motor rotates forward.



Connecting or disconnecting the connecting wires between the FR terminal and the GND terminal can control the forward and reverse rotation of the motor.

When disconnecting the connecting wire between FR terminal and GND terminal, the motor reverses.

When the connecting wires of FR terminal and GND terminal are connected, the motor rotates forward.

## Selection and setting of speed regulation method:

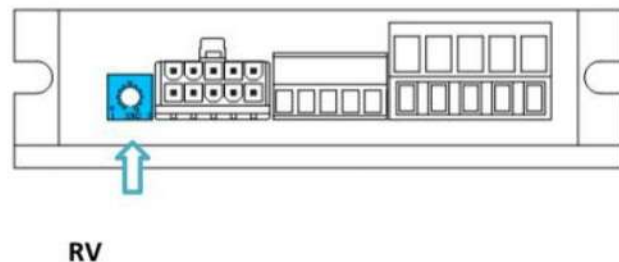
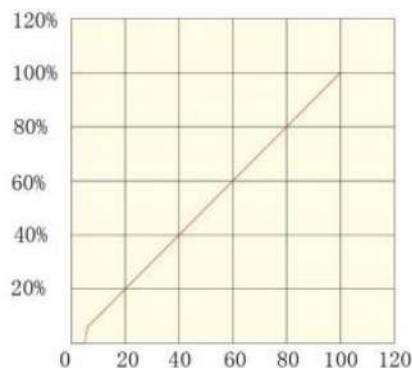
### 1: Use the built-in potentiometer RV to adjust the speed

Turn the built-in speed regulating potentiometer RV clockwise, and the motor starts to run. Continue to rotate clockwise,

The motor speed increases. Rotate the built-in speed potentiometer RV counterclockwise to reduce the motor speed;

Continue to rotate counterclockwise to the minimum to the limit position.

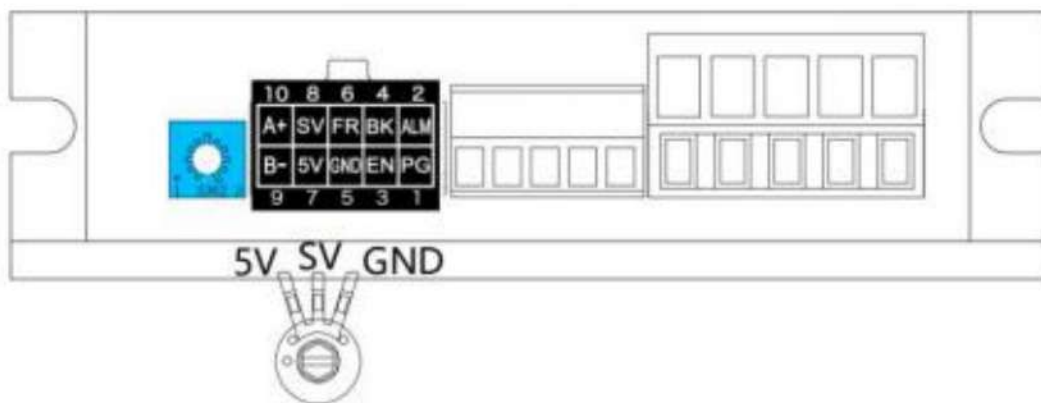
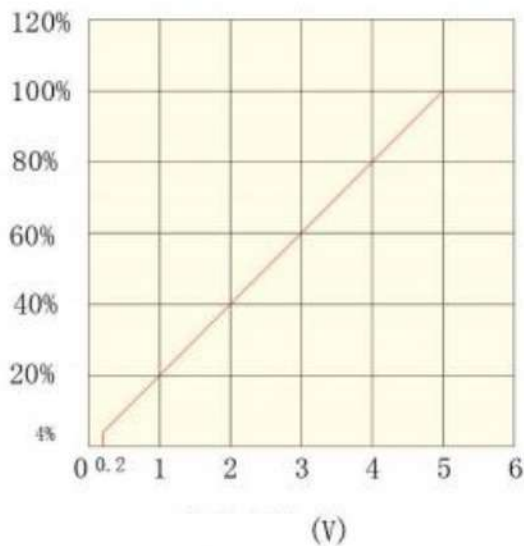
At this time, the built-in speed regulating potentiometer RV is closed, and the motor stops running.



### 2: Speed adjustment with external potentiometer

When using an external speed potentiometer to adjust the speed, please use a suitable potentiometer with a resistance value of 10K $\Omega$ . The middle terminal of the potentiometer is connected to the SV terminal,

The leads on both sides are connected to 5V and GND respectively.

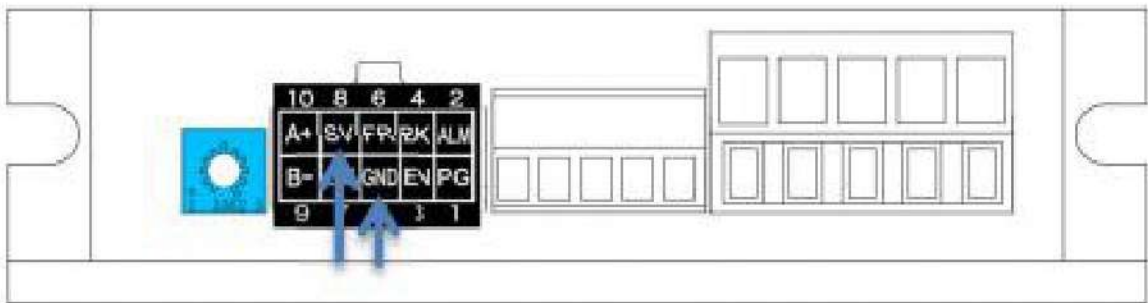
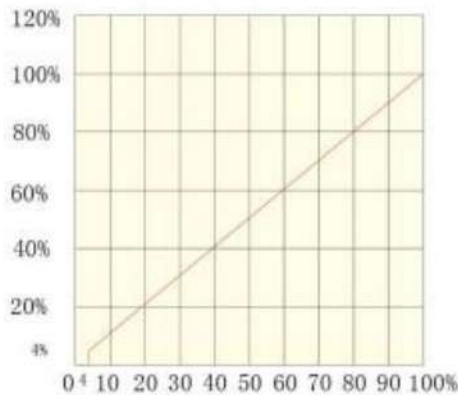


When the input voltage is about 0.2V, the motor speed is 5% of the maximum speed;  
When the input voltage is about 5V, the speed of the motor is at its maximum.  
The maximum speed value depends on the motor size and supply voltage.

### 3:Use PWM speed regulation (external analog speed regulation)

When it is necessary to switch to the external SV input control speed mode, the built-in potentiometer RV must be turned counterclockwise to the minimum state. That is, the built-in potentiometer RV is rotated counterclockwise to the limit position.





PWM speed regulation or analog input port

When the duty cycle is 4%, the motor speed is 4% of the maximum speed;

When the duty cycle is 100%, the speed of the motor is at its maximum.

The maximum speed value depends on the motor size and supply voltage.

## Status Indication • Exception Handling

When the motor has over-current, Hall input error, locked-rotor, over-temperature, over-voltage, etc., the driver will send out an alarm signal. At this time, the fault alarm output terminal

(ALM) and the common terminal (COM) will be connected, so that the fault alarm output terminal (ALM) will become low level, and at the same time the drive will stop working, and the alarm light will flash.







Red light flicker		Solution
2 times	Over voltage	Please check the bus voltage
3 times	Power tube over current alarm	Determine if the model is correct
4 times	Over current	Check the P-sv settings and verify the motor parameters. Or increase the acceleration time
5 times	Undervoltage alarm	Check the power supply voltage, and at the same time check whether the power supply meets the condition of greater than 1.5 times the motor power
6 times	Hall alarm	Please check whether the motor wiring is secure
7 times	Locked-rotor alarm	Please confirm whether the motor load is too large
8 times	Two or more alarms	The common situation is only Hall and stall alarm. When the motor speed cannot be adjusted, please adjust P-sv to the maximum

