

## BLD-120A BLDC driver Instruction



Aiming at small power brushless dc motor, our company is taking advantage of high performance DSP processor to research and develop BLD-120A brushless dc motor driver independently. The type of drive adopts low-cost solution, which is a more cost efficient solution, to be used in all kinds of automatic control equipments, such as transfer equipments, medical instruments, packing machinery, food machinery, fitness facilities, teaching facilities,, garden machines and so on. It is designed for 3-phase sine-wave brushless dc motors' speed regulation. It also has functions which enable external potentiometer, external simulation voltage, principle computer (PLC, MCU etc. ), PWM adjust the motor's running speed. What's more, the driver processes high-torque start, quick -start, and braking, positive& negative switching, combination of manual and automatic speed control.

### Features:

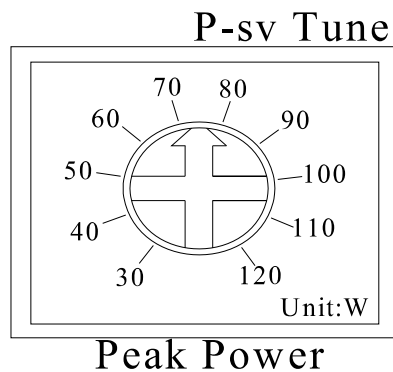
- It can be adopted in principal computer (PLC or MCU) PWM or simulation speed control.
- Manual speed adjustment is accepted cause it has own potentiometer. (External potentiometer running control is available as well. )
- PID speed loop, electric current loop to control
- Start-up stop item(EN)
- Positive & negative control (F/R)
- Parking brakes quickly (BRK)
- Overload protection setting: set protection data for different motors with different watts by potentiometer linear.
- Smooth high torque output and stable running speed
- Low-speed with high torque output
- Protection: over current, over voltage, under voltage, lock rotor, illegal hall sensor signal and temperature will cause the power abnormality
- Speed signal output
- Abnormal alarm signal output

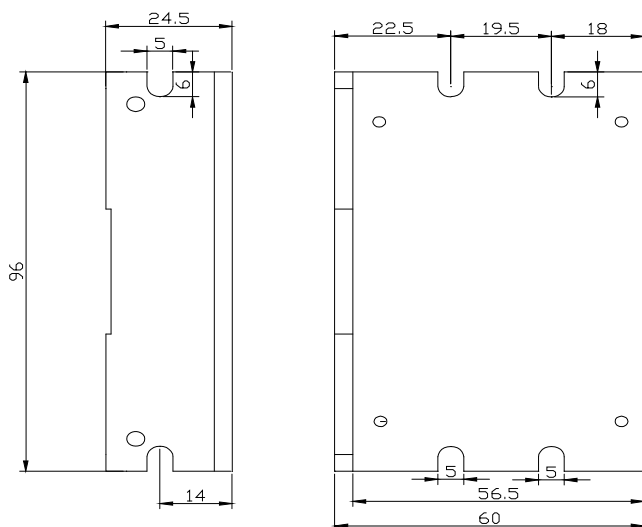
**Electrical characters:**

- Input voltage: +12V~+30V DC
- Output Current: rated current: 8A, Instantaneous maximum current:30A(<3S)
- Insulation Resistance: NPT>500M  $\Omega$

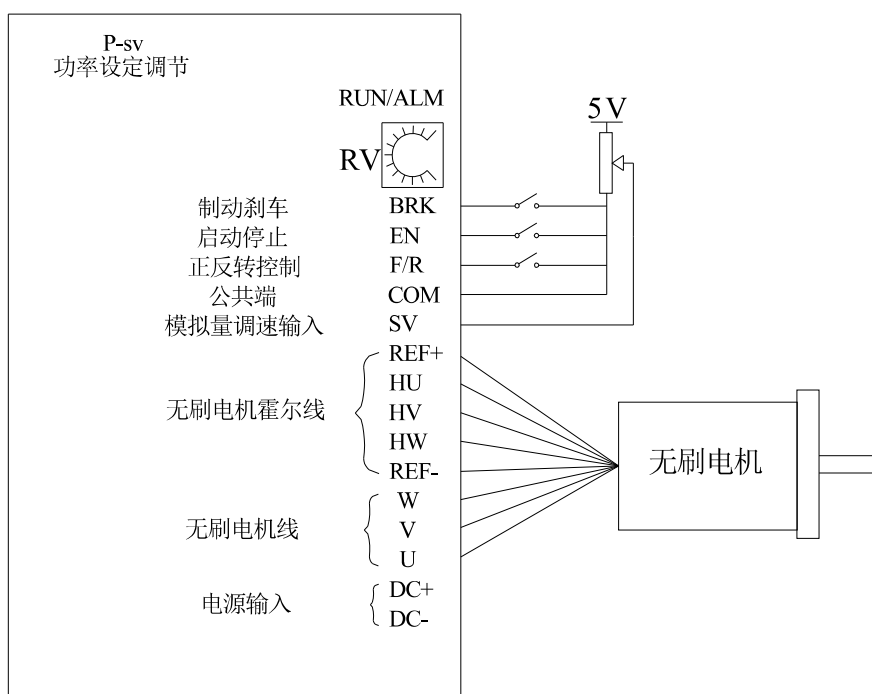
**Environmental Requirements:**

- Cooling: natural
- Occasions: avoid dust, oil contamination and corrosive objections
- Temperature:  $-10^{\circ} \sim +50^{\circ}$
- Humidity: <80%RH, Not condensation, no water droplets
- Vibration:  $\leq 5.7\text{M/S}^2$
- Conservation:  $-20^{\circ} \sim +125^{\circ}$  ,avoid dust, original package is better

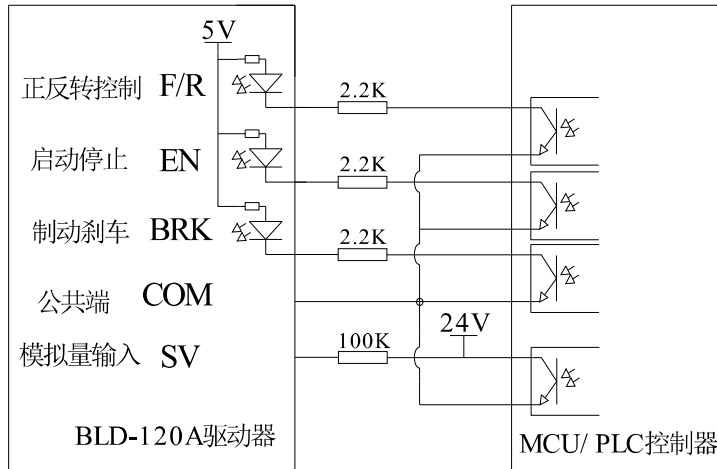
**Settings for driver's Watts:****Installation Dimensions:**



### Wiring Diagram:



### Controlling diagram:



### Power Supply & Motor Terminal:

No.	Terminal name	Description
1	DC-	12V~30V
2	DC+	12V~30V
4	U	BLDC winding phase A ( U )
5	V	BLDC winding phase B ( V )
6	W	BLDC winding phase C ( W )

### Hall Sensor Signal Terminal:

No.	Terminal name	Description
1	GND	Hall sensor GND
2	HW	Hall sensor phase C ( W )
3	HV	Hall sensor phase B ( V )
4	HU	Hall sensor phase A ( U )
5	+5V	Hall sensor input power

### Driver Control Terminal:

No.	Terminal name	Description
1	SV	input signal terminal
2	COM	COM terminal
3	F/R	CW/CCW terminal: High level forward ( corresponding COM )
4	EN	Control signal enable Pin low level forward ( corresponding COM )
5	BRK	Control signal brakes terminal: hing level forward ( corresponding COM )

### **Indicator light Instructions:**

Green means power is good, red means wrong output.

### **Functions Instructions:**

#### **(1) Speed Command:**

There are 3 ways to adjust speed. Users can choose any one of them.

**A.** Built-in Potentiometer to adjust speed: Rotate it directly.

**B.** Simulation voltage to adjust speed: Connect on the +5V and COM of the drivers, speed can be adjusted on external potentiometer(10K~100K) when connect SV terminal. Input simulate voltage through other control command (e.x. PLC, SCM etc.) to SV terminal to achieve the speed adjustment as well (relative COM),The range of the SV terminal is DC 0V~+5V, the relevant motor speed is 0~ rated speed. (Turn RV terminal to left when using this function)

**C.** External signal output circuit: Add 5V between SV and GND, speed can be adjusted by PWM control between 1KHz~10KHz, motor speed is influenced by duty.(Turn RV terminal to left when using this way)

#### **(2) Motor running/stop control (EN)**

Control the brushless dc motor to run or stop by controlling the terminal En and COM connecting. The motor will run when we connect the terminal EN to COM. When shut down, the motor will stop.

#### **(3). Motor rotation direction control (F/R)**

Control the motor rotation direction by controlling the terminal F/R and COM connecting. When shut off terminal F/R to terminal COM, the motor will run at CW(view from motor output side), and when connect on, the motor will run at another direction. In order to avoid damage the driver,please stop the motor running and the change the motor rotation direction.While changing the motor rotation direction, it will stop once changing the signal directly and restart at the opposite direction.

#### **(4) Break the motor to stop (BRK)**

Motor stop can be controlled by connecting terminal BRK and COM terminal. When shut off, motor is running, otherwise motor will stop quickly. Motor stopping time is decided by the motor inertia and load added on the motor.

### **Using Method and Attentions:**

**A.** All the connections should be under the condition of power-off.

**B.** Strictly follow the figure. Connect the winding wires, hall sensor signal wires and power wires correctly. Please note the sequence of UVW three phases.

**C.** It can not achieve CW and CCW through changing the connections just like asynchronous motor. The motor will run through the terminal F/R. Wrong connections will make the motor run abnormally.

**D.** Setting for power protection: Choose the most close to the rated watts of the motor from the

parameters setting chart. Rotate the potentiometer to the relevant position in order to help the motor avoid over-heat or burning up.

E. When finishing the connection, please open the potentiometer, and then power on. When on occasions of external simulation speed adjustment or external PWM, you have to turn the potentiometer to left, or it will fail.

F. When connecting the driver to the switching power supply, please note that do not connect the opposite. Meanwhile, you have to choose the same voltage with the rated voltage. By doing so will keep the motor run functionally.(less than 35V)

G. Output power should be above or equal to 1.5 times of rated power.

### **FAQ:**

A. Q: Why can't I control the running speed through the MCU?

A: If MCU output 5V pulse, you have to reduce the series resistance by 1~10k.

B. Q: Why does the motor not run since the red light is on?

A: Check whether the power setting is too low or too high.

C. Q: What is the reason for red light is on?

A ; This means failure alarm. Check if there is any wrong of the relevant input or if the current is too high.

D. Q: The motor has to wait for a long time to start, or it will not run?

A: Check the connection wire. If it connects right, check if the power is too low.

### **Security Notice:**

★ Do not take apart the driver as one please in order to avoid function damage.

★ Do not touch any components when power is on .

★ Operating without housing is forbidden.

★ Damage will occur if the driver is strike.