BRUSHLESS MOTOR DRIVER BLD-300C

BLD-300C
Instruction BOOK

1 Description

BLD-300C DC brushless motor driver is a high-performance brushless driver for 69W to 300W low voltage DC brushless motor, which is developed by ICAN Technology Co., Ltd.

1.1 Features
● Five speed regulation modes are supported
● Input voltage VDC 15~48, working temperature -20℃~+60℃
● Adjustable acceleration and deceleration time
● Closed loop control to ensure uniform speed when loading
● Suitable for 69W to 300W brushless dc motor
● 10 seconds of stall waiting time

2 Electrical performance and environmental indicators

2.1 Electrical parameters

Parameter	Min.	Typical	Max
Input Voltage DC (V)	15	48	62
Peak Current (A)	2	-	20.6
Rotate Speed(rpm)	60[1]	-	-

[1] The minimum value requires the number of pole pairs of the driver to be consistent with the motor
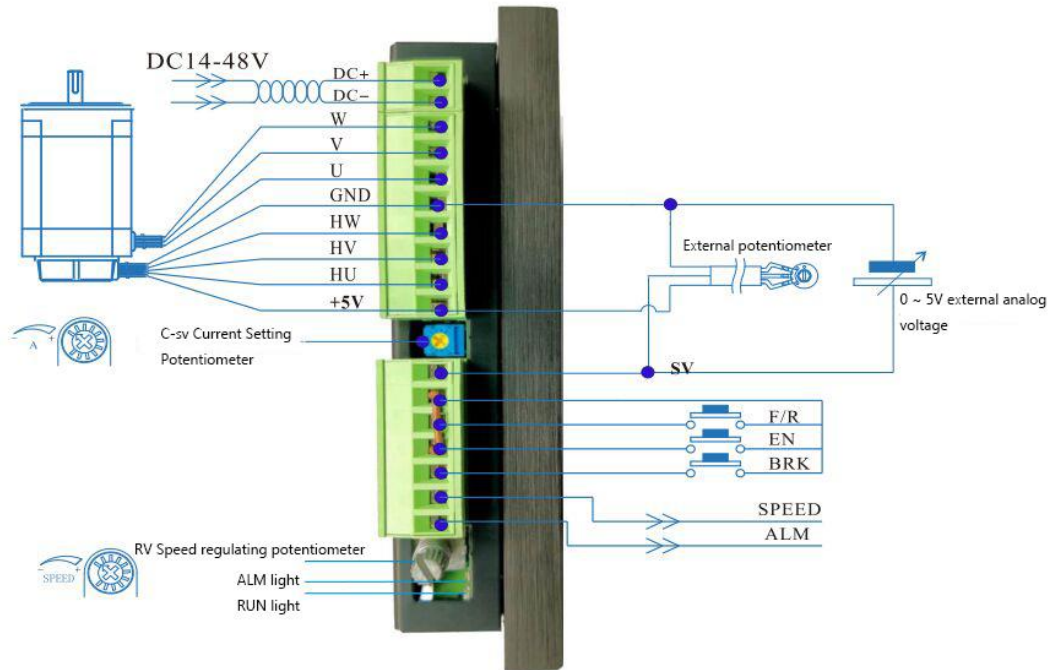
2.2 Environmental indicators

Heat Sinking Method	Natural cooling or forced cooling
Occasions	avoid dust, oil and corrosive gases
Operating Temperature	-20℃~+60℃
Storage Temperature	-30℃~+70℃

3 Dimension (Unit: mm)
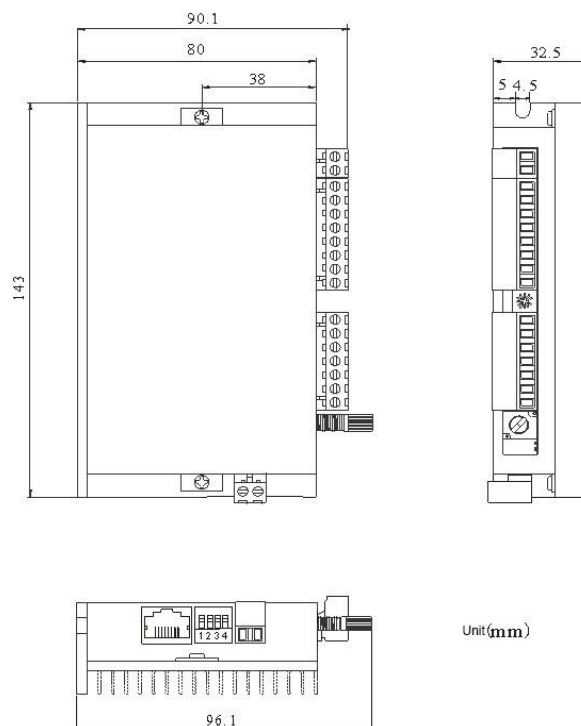
4 **Interface and wiring diagram**

### 4.1 Driver interface

4.2 Port signal description

Signal	Terminal	Function
Power	DC+	Power supply positive
Connection	DC-	Power supply negative
Motor	W	Motor line W phase
Connection	V	Motor line V phase
	U	Motor line U phase
Hall Signal	GND	Hall sensor signal ground electrode
	HW	Hall sensor signal HW
	HV	Hall sensor signal HV
	HU	Hall sensor signal HU
	+5V	Hall sensor signal power supply+
Control	SV	1> External potentiometer 2>External analog signal input
Signal	COM	Common port
	F/R	F/R disconnected with COM, motor rotates CW, otherwise motor rotates CCW
	EN	EN and COM disconnected, motor stops slowly, motor runs.
	BRK	BRK and COM disconnect, the motor runs, otherwise motor brakes to stop
	PWM / F	PWM or Frequency regulation input. SW3=OFF, Frequency; SW3=ON, PWM. The signal supports 5 volts.
Output Signal	SPEED	Refer to 4.3. According to the motor running speed, the pulse signal of the corresponding frequency is output, and the speed of the motor can be calculated using this frequency. The formula is: $N(rpm)= (F/P)×10$ F: output pulse frequency (Hz); P: motor pole pair number; N: motor speed Example: Motor with 4 pairs of poles F=500HZ N(RPM)=(500/4)×10=1250
	ALM	Refer to 4.3. Normally high-impedance output, low-level output when a fault occurs

4.3 ALM, SPEED, and PLC Wiring

The internal structure of ALM and SPEED of this drive is as follows, which is related to the PLC wiring and the type of PLC input. For example, input modules such as AX40/741/42/50/60 of Mitsubishi A series PLC and QX40/41/42 of Q series only support source mode, and users should connect according to the characteristics of this input type.

Output interface circuit of brushless driver


BLDC Driver interface circuit
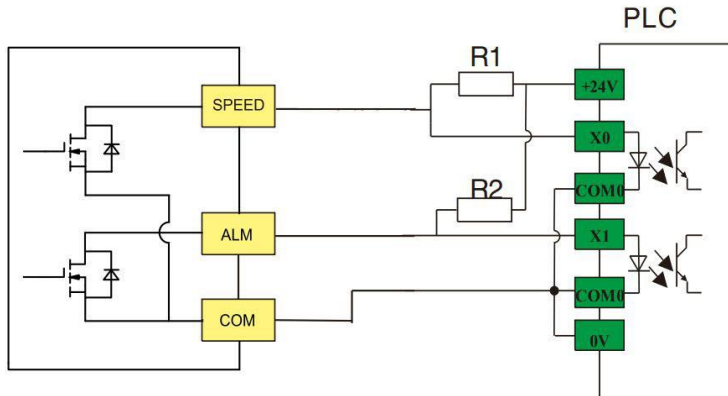
R1,R2=1KΩ 12V When the PLC external voltage is 24V.
R1,R2=2KΩ 24V 2K resistance is needed

5 Function setting

5.1 Start and stop

EN and COM terminals can control the motor operation. When EN and COM terminal are connected, the motor runs. Otherwise, the motor stops slowly.

By connecting a switch between COM and EN or using PLC can
control the motor start and stop.
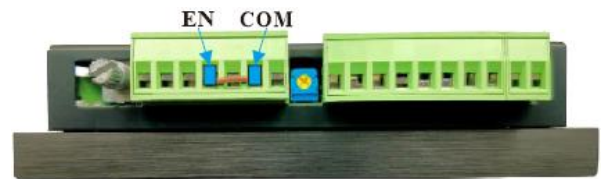
5.2 Brake

BRK and COM terminals can control the natural operation and rapid stop of the motor. When connecting the BRK and COM, the motor stops quickly. Otherwise, the motor runs.

By connecting a switch between COM and BRK or using PLC can control run and rapid stop.

⚠️

The difference between EN and BRK:
EN control is natural stop; BRK control is rapid stop.
For example, it takes 592ms for the motor to completely stop after EN is disconnected, and it only takes 12ms after BRK is connected.

5.3 Direction control

F/R and COM disconnects in default, when power is
on, motor will start to run CW.
F/R and COM disconnect, motor runs clockwise.
F/R and COM connect, motor runs anticlockwise.
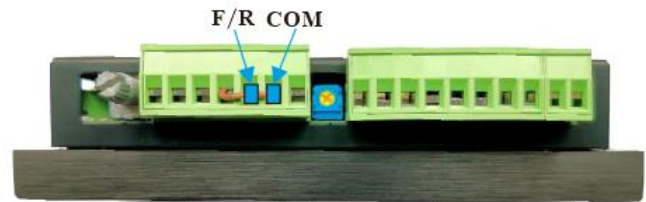
5.4 Closed loop work

The driver always runs in the speed closed loop state.

5.5 Current limit value adjustment

Current limit value adjustment(C-sv) is to limit the peak value of the motor phase current,
when the load suddenly increases. The output current will be limited to the set value to
reduce the motor speed and protect the motor not damaged. The setting range is 3.5 ~
20.6A.

Please set the peak current according to the scale in the right figure.
Since the error between the set peak output current and the actual peak output current is
about ±10%. For safety, please appropriately reduce the peak output current.
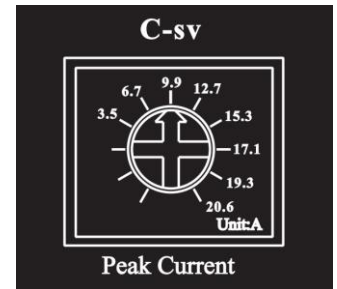
5.6 Acceleration and deceleration time setting

When the potentiometer ACC is adjusted to the maximum value, it means that it takes about 15s for the motor
speed from 0 to the maximum speed regulation value.

5.7 Stalling torque holding

When the load suddenly rises, the output current of the motor is limited to the set value of C-sv to protect the
motor and the driver. When the motor is locked, the torque will be maintained for 10s.
If the reason for the restriction of the rotor is solved within 10 seconds, the motor can rotate again. If not, the
motor will stop and report 8times RED alarms.
Note: If users want to restart the motor after stalling alarms, the user needs to remove the obstacle and send a
reset signal at the same time.

5.8 Dial menu

Dialing status			Function mode
SW1	SW2	SW3	
1	0	--	Closed loop 2 pairs of poles
0	1	--	Closed loop 4 pairs of poles
1	1	--	Closed loop 5 pairs of poles
0	0	--	Open loop
--	--	0	Frequency regulation
--	--	1	PWM speed regulation

6 Speed setting methods and settings

6.1 Via built-in potentiometer

Motor speed is increase when RV knobs is rotated clockwise, when anticlockwise, motor speed decreases.

⚠️ If user use other speed modes, RV should be rotated anticlockwise to limit position.
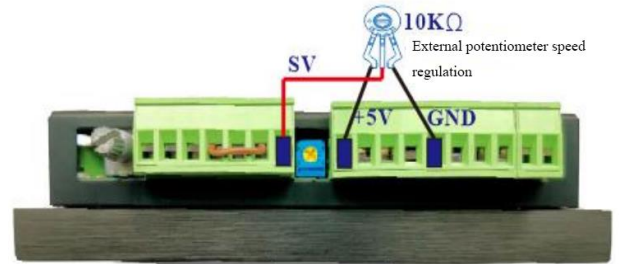
6.2 Via external potentiometer

Use a suitable potentiometer with a resistance value of 10kΩ; When connect external potentiometer, the middle terminal connects to SV, the other two terminals connect to +5V and GND.

⚠️

① Built in potentiometer RV should be rotated anticlockwise to limit position.
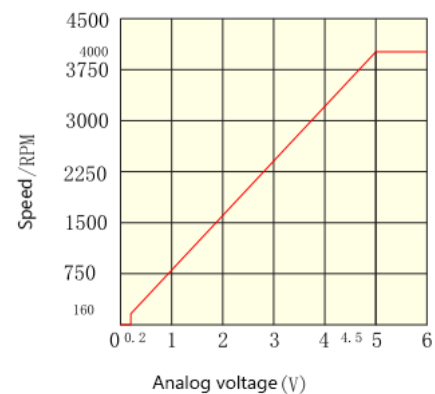② Notice the connection sequence of the potentiometer.

6.3 Via external analog signal 0-5V

When use external analog signal， the built-in potentiometer RV should be rotated anticlockwise to limit position.

⚠️

The factory set maximum speed is 3000rpm. If other default value is needed, contact us to change.

6.4 PWM speed regulation

Set SW3=ON to set PWM speed regulation. Duty cycle pulse frequency range: 1-3khz. Waveform: pulse wave. Amplitude: 0-5V. Duty range: 2% ~ 95%

When the duty cycle is larger than 95%, the motor speed is the maximum value, and the maximum speed value depends on the motor specification and power supply voltage.
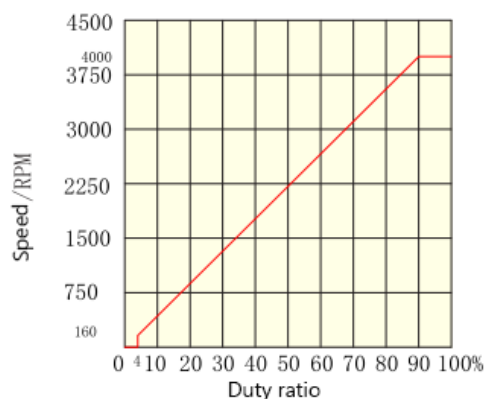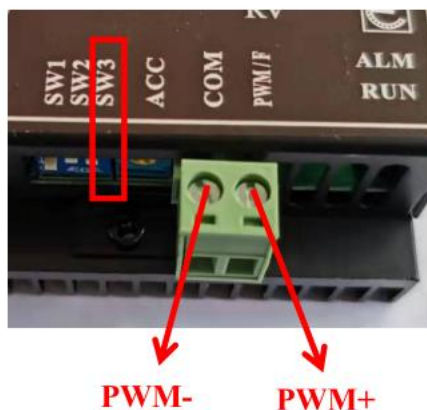
⚠️ Built in potentiometer RV should be rotated anticlockwise to limit position.
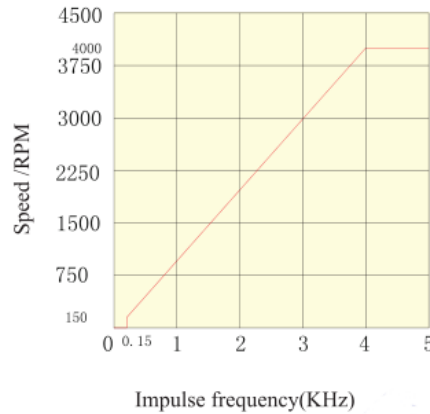
6.5 Frequency regulation

Set SW3=OFF to select frequency speed regulation.

Duty should be 50%; Waveform: Square wave; Amplitude: 0-5V; Frequency range: 100-3000HZ.

In closed-loop mode, the frequency value is the speed value; In open loop, and the maximum speed value depends on the motor specification and power supply voltage.

7   Status indicator & Issue handling

7.1 ALM alarm signal output

The level of ALM port can be detected to judge whether the driver is normal. When the abnormality occurs, the ALM and COM terminals will be short-circuited to output low level; when the driver is normal, the ALM output is high impedance.

7.2 Status indicator

When overvoltage, Hall signal error, locked rotor, over temperature, etc., the driver will send out an alarm signal, and the driver will stop working at the same time.

LED display	Status statements
Red LED flashes twice	PCB temperature is detected to exceed 85℃
Red LED flashes 3 times	Power supply voltage exceeds 63V
Red LED flashes 4 times	Power supply voltage is less than 14V
Red LED flashes 5 times	Driver cannot receive the Hall signal or receives the wrong Hall signal
Red LED flashes 8 times	The motor is blocked, or the driver circuit is abnormal
Red LED flashes 21-22 times	I2C communication physical layer error
Red LED flashes 23 times	The memory chip cannot finish writing
Red LED flashes 24 times	The memory chip cannot be read
Red LED flashes 30-42 times	The peripheral circuit of the main control chip is abnormal

7.3 Issue Handling

When an abnormality occurs in the above table, reset the driver as one of the below steps firstly:

◆Rotate built-in potentiometer anticlockwise to limit position.

◆Adjust external analog signal to 0.

◆Open EN with COM, then reconnect.

◆Open BRK with COM, then Re-connect.

◆Turn off power and restart.

If above doesn't work, then follow the table to deal with it.

| LED display	Issue handling
Red LED flashes twice	Cool down the driver before powering on
Red LED flashes 3 times	Check the power supply voltage
Red LED flashes 4 times	Check the power supply voltage
Red LED flashes 5 times	Check whether the motor wiring is secure and make sure the motor is not damaged.
Red LED flashes 8 times	Make sure whether the motor load is too large, and the motor is not damaged. If no, try another new drive
Red LED flashes 21-22 times	Return to factory for repair
Red LED flashes 23 times	Return to factory for repair
Red LED flashes 24 times	Return to factory for repair
Red LED flashes 30-42 times	Return to factory for repair

8 Recommended and suitable motor

The following brushless DC motors have good compatibility with BLD-300C brushless DC driver.

8.1 57mm Round flange size motor
Electrical specifications

Model	Output power（W）	Voltage （V）	Rated speed （rpm）	Rated torque （N·m）	Length L （mm）	Recommended current limit （A）
57BLY-0730NBB	69	24	3000	0.22	66.5	6.1
57BLY-1030NBB	103	24	3000	0.33	88	11.9
57BLY-1230NBB	125	24	3000	0.44	106.5	11.8

Motor dimensions
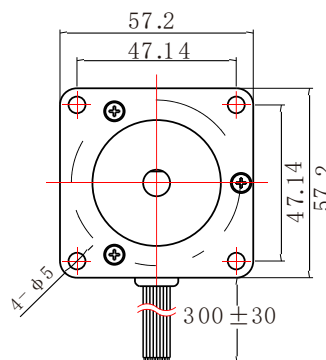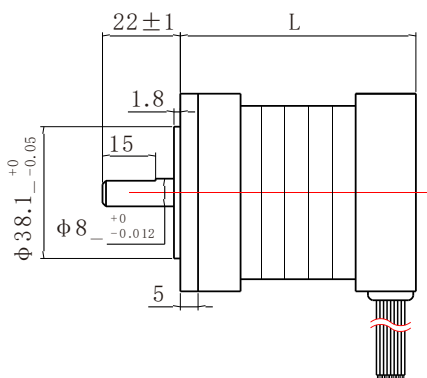
8.2   57mm Square brushless DC motor

Electrical specifications

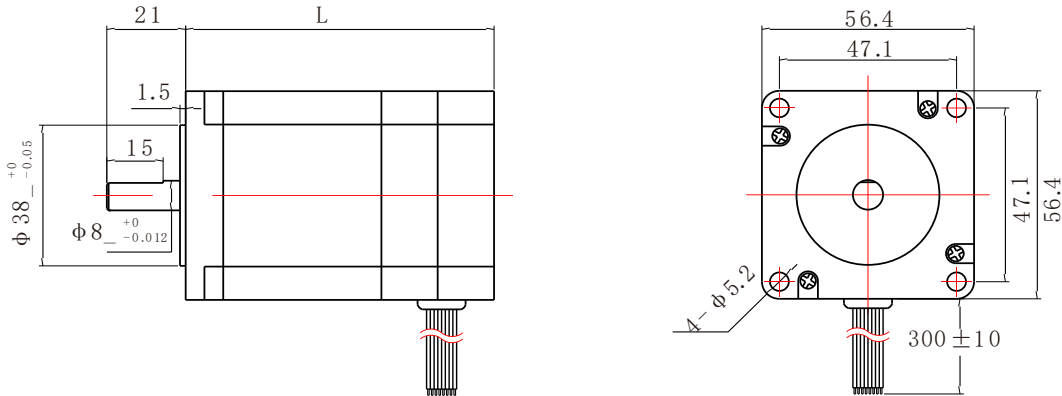| Model	Output power（W）	Voltage (V)	Rated speed (rpm)	Rated torque (N·m)	Length L (mm)	Recommended current limit (A)
57BLF-0615NBB	65	24	1500	0.4	80	6
57BLF-1230NBB	125	24	3000	0.4	80	12.6
57BLF-1830NBB	188	24	3000	0.6	101	16.3

Motor dimensions

8.3 60mm Square brushless DC motor

Electrical specifications

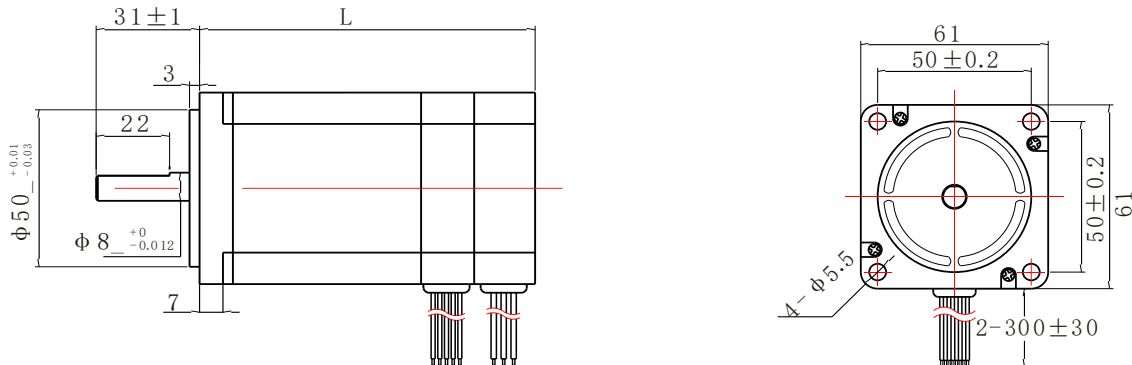| Model	Output power (W)	Voltage (V)	Rated speed (rpm)	Rated torque (N·m)	Length L (mm)	Recommended current limit (A)
60BLF-0815NBB	80	24	1500	0.5	100	11.6
60BLF-0830NBB	80	24	3000	0.25	78	10.8
60BLF-1630NBB	160	24	3000	0.5	100	14

Motor dimensions

8.4   86mm Square brushless DC motor

Electrical specifications

Model	Output power (W)	Voltage (V)	Rated speed (rpm)	Rated torque (N·m)	Motor length L (mm)	Limited current （A）
86BLF-2230LBB	220	48	3000	0.7	82	10

Motor dimensions

DONG GUAN ICAN TECHNOLOGY CO·, LTD

401, No2 Building, No7 Xinhe Shengfeng Road, Wanjiang Street, Dongguan City, Guangdong Province

Tel: 0769-22327568 Fax:0769-22327578 Website: ican-motor.com EMAIL: inquiry@ican-tech.com