# BLD–750

## Brushless dc motor driver

# 1 Brief introduction

BLD-750 is designed by ICAN-Tech and mainly for BLDC motors of 48v less 750w. With DSP controlling technology, it has features of high torque, low vibration, low noise, closed loop control and rich speed control modes.

## 1.1 Features

- Acc/Dec time setting
- Pole-pairs selection
- Open/closed loop control
- Max output current P-sv setting
- Restart
- Alarm indication
- Built-in RV speed setting
- External potentiometer speed setting
- External analog signal speed setting
- PWM speed setting

# 2 Electrical properties and environmental indicators

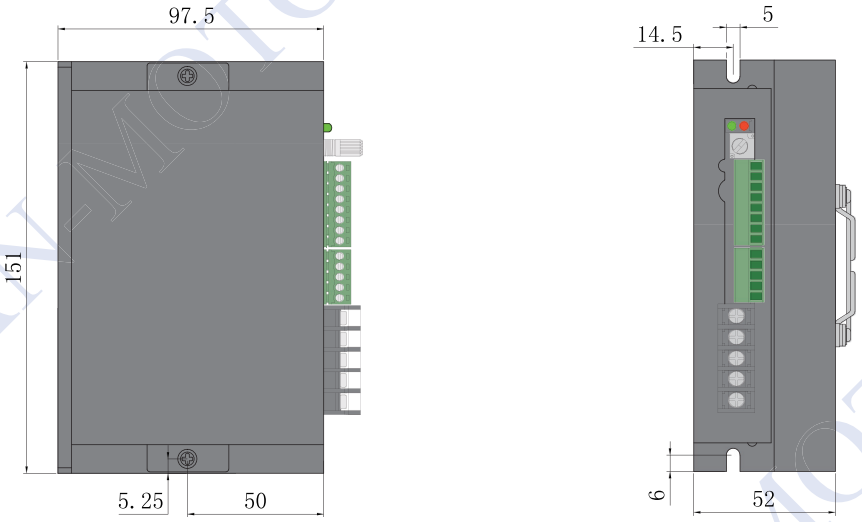
## 2.1 Electrical properties

| Driver parameter | Min Value | Typical Value | Max Value |
|---|---|---|---|
| Voltage input DC (V) | 12 | 48 | 52 |
| Current outpu(A) | - | - | 25 |
| Motor speed range(rpm) | - | - | 20000 |
| Hall signal voltage(V) | - | - | 5 |
| Hall drive current (mA) | - | 20 | - |
| External potentiometer(KΩ) | - | 10 | - |

## 2.2 Environmental indicators

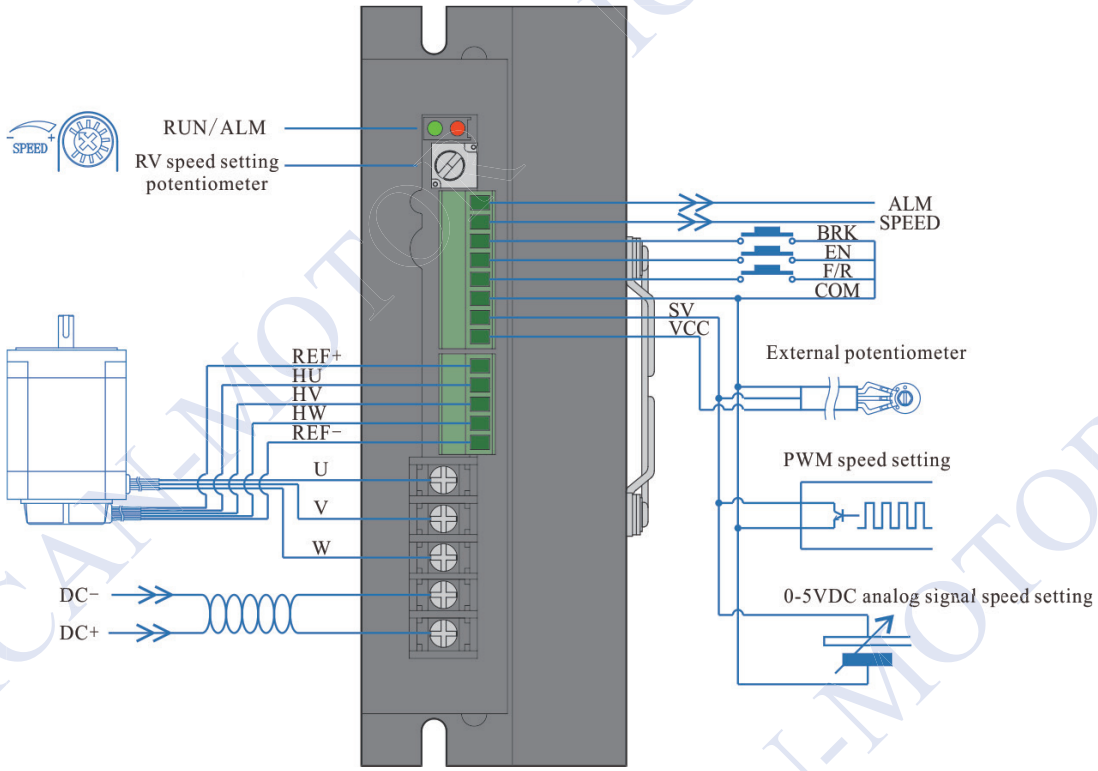
| | |
|---|---|
| Heat Sinking Method | Natural cooling or fan-forced cooling |
| Atmosphere | Avoid dust, oily mist and corrosive air |
| Operating Temperature | 0 ～ +40℃ |
| Ambient Humidity | 90% or less (non-condensing) |
| Vibration Resistance | 5.7m/s² maximum |
| Storage Temperature | 0 ～ +50℃ |

# 3 Dimension(Unit: mm)

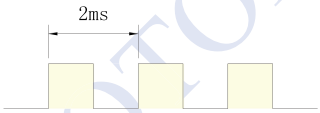



# 4 Driver interface and wiring diagram

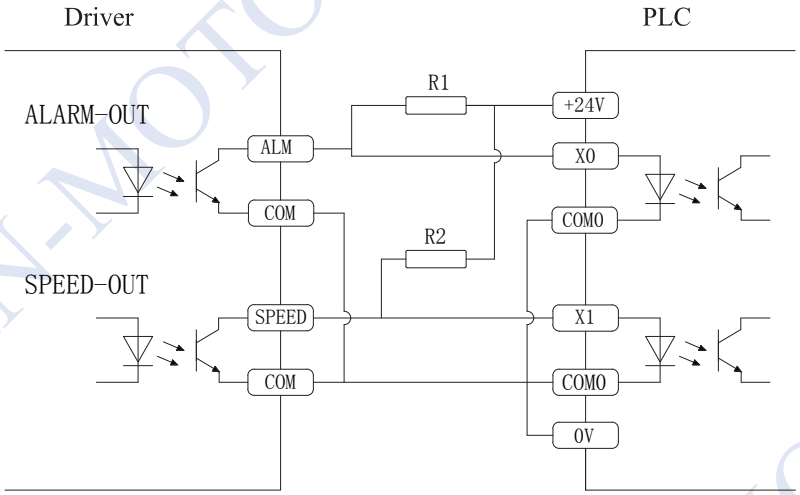
## 4.1 Driver interface



## 4.2 Port signal description

| Signal category | Terminal | Functional Description |
|---|---|---|
| Output signal | ALM | Motor or driver fault signal output. It is 5v in normal situation and 0V when fault occurs. |
| | SPEED | Output pulse frequency corresponded with running speed. Speed can be figured out according:<br>N(rpm)= (F/P)×60/3<br>F:Output pulse frequency P: Motor pole pairs N: Motor speed<br>For example: Motor has 4 pole pairs,<br>F=1sec/2ms=500Hz<br>N(rpm)=(500/4)×60/3=2500<br>  |
| Control signal | BRK | Motor brake stop control signal; BRK and COM connect in default, motor brake stops when BRK and COM disconnect. |
| | EN | Stop signal terminal;EN connects COM, motor runs, otherwise motor stops. |
| | F/R | Motor direction control terminal; F/R and COM disconnect, motor will rotates clockwise, and otherwise, motor will rotate anticlockwise. |
| | COM | Common port(0V) |
| | SV | ① External potentiometer speed setting input; ② External analog voltage input terminal ③ PWM speed setting input |
| | VCC | External power source |
| Hall signal | REF+ | Hall sensor signal power supply+ |
| | HU | Hall sensor signal Hu |
| | HV | Hall sensor signal Hv |
| | HW | Hall sensor signal Hw |
| | REF- | Hall sensor signal- |
| Motor connection | U | Motor line U phase |
| | V | Motor line V phase |
| | W | Motor line W phase |
| Power connection | DC- | Power supply negative electrode |
| | DC+ | Power supply positive electrode (12-52VDC) |

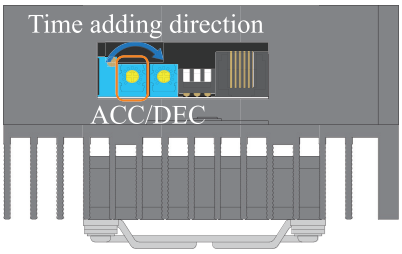
### 4.3 Output signal connection diagram




Notice R1,R2=1KΩ 12V
R1,R2=2KΩ 24V

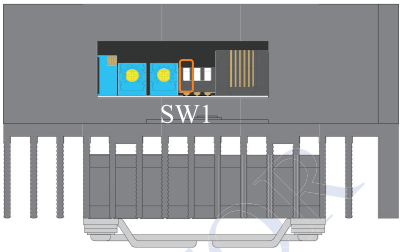
## 5 Function setting

### 5.1 ACC/DEC time setting




Set acceleration time and deceleration time by ACC/DEC, range is 0.3-15s. Acceleration time is time needed from 0 to rated speed. Deceleration time is time needed from rated speed to 0. Ti

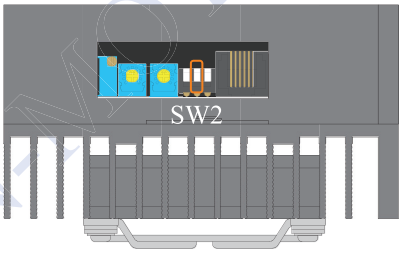
### 5.2 Open/Closed loop setting




SW1 ON=Closed loop; SW1 OFF=Open loop

Notice When closed-loop mode is selected, poles pair should be set rightly via SW2.

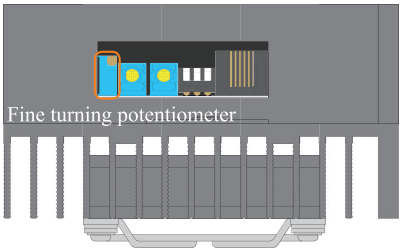
### 5.3 Motor poles pair selection




SW2 is for motor poles pair selection to match different BLDC motor.
SW2=ON, 2P, SW2=OFF, 4P

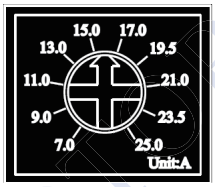
Notice When closed-loop mode is selected, poles pair should be set rightly.

## 5.4 Fine turning potentiometer

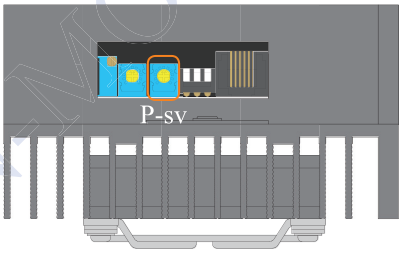



1. When analogue voltage(0-10V) is used, fine turning function is recommended to be used.
2. If the motor doesn't have the same speed with the set value, please reset via fine turning potentiometer.

## 5.5 Peak current setting




Use P-sv to set the output peak current. When load is increased suddenly, the output current will be limited by the setting value, which reduces motor speed and protects the motor. Current setting ranges: 4-25A.
Please set as the right.
As the admissible error of real current and setting value is ±10%, to ensure safety, set current lower accordingly.




Notice The duration of peak current is 3s when load increases suddenly. After 3s, of load is not reduced, driver will stop working. After 5s, it restarts automatically.

## 5.6 Stalling output current limitation

When motor is stalled, the output current is limited to 3A, which protects driver and motor from damage.

## 5.7 Stalling torque holding

When motor stalls, torque will be kept in short time.

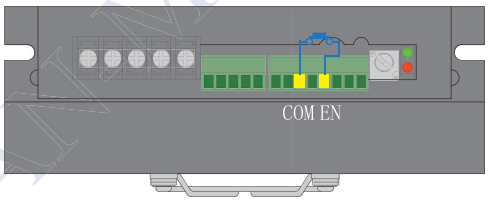
Notice This feature can't be used for brake stalling.

## 5.8 Restart function

When stalling occurs, driver stops working, after 5s, it restarts. If fault occurs again, alarm signal will be sent out and driver stop working.

## 5.9 Motor start and stop

### Start and stop



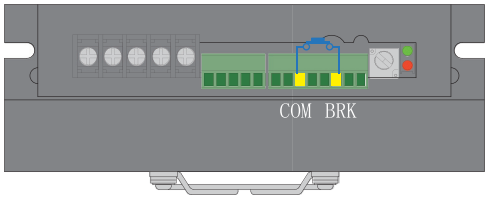

EN and COM terminal is short circuit in default. When power is on, driver will drive motor automatically. If EN disconnects with COM, motor stops.

◆ To add a switch or PLC between COM and EN can control the motor start and stop.

### Brake

BRK and COM terminal disconnect in default. Motor will brake stop if BRK and COM are in short circuit.

◆ To add a switch or PLC between COM and BRK can control the motor start and stop.




Notice

Difference between EN and BRK

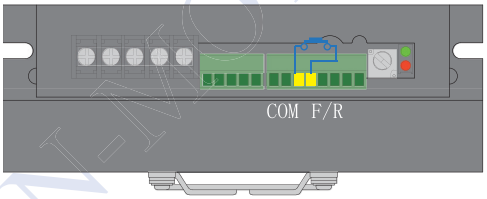
1. EN is for stop naturally, BRK is for stop suddenly.
2. EN and BRK have the same startup state
3. When selecting one of the modes, another mode must be kept as default setting.

◆ To add a switch or PLC between COM and BRK can control the motor start and stop.

## 5.10 Direction control

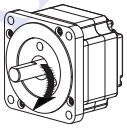
F/R and COM disconnect in default, when power is on, motor will start to run clockwise.

Connect F/R and COM, the motor will rotate anticlockwise, otherwise, the motor will rotate clockwise




Notice

The direction is judged from the quarter view of the axle.



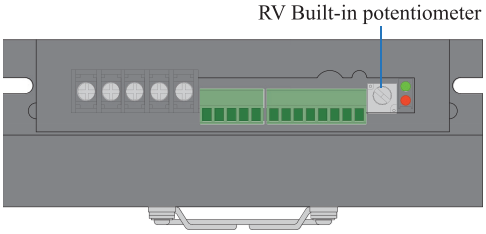
# 6 Speed setting methods and settings

## 6.1 Speed setting via built-in potentiometer

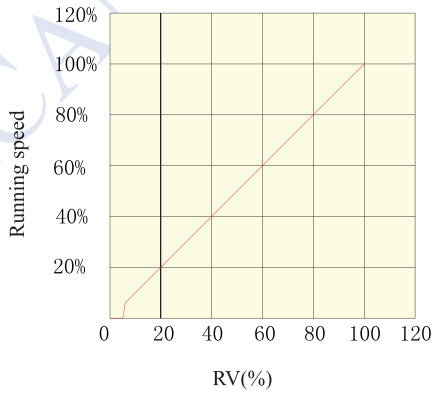
Motor speed increases when RV knobs is rotated clockwise, when anticlockwise, motor speed decreases.

Notice

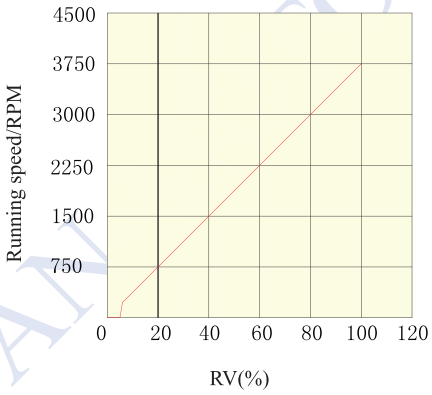
If customers use other speed modes, RV should be rotated anticlockwise to limit position.




Built-in speed potentiometer and motor speed diagram (open-loop no-load)

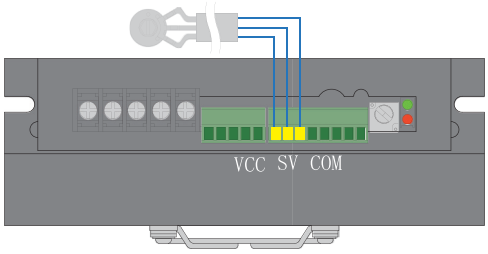



Built-in speed potentiometer and motor speed diagram (closed-loop no-load)



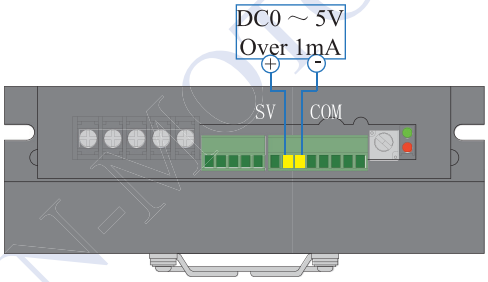
## 6.2 Speed setting via external potentiometer

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 REF+ and COM.



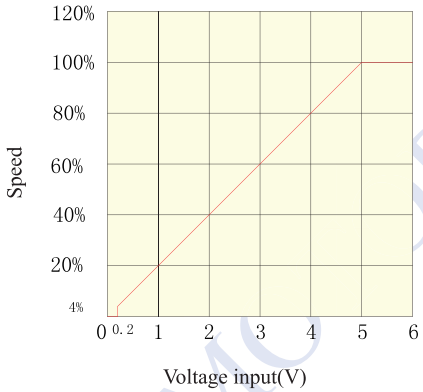

Notice
1.RV should be rotated anticlockwise to limit position.
2.Notice the order of connection of potentiometer.

## 6.3 Speed setting via external analog signal 0-5V



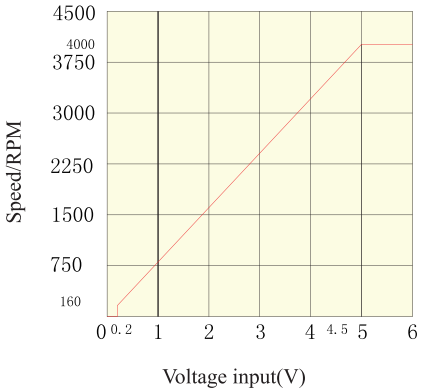

Notice
RV should be rotated anticlockwise to limit position.

Relational graph between duty ratio and the motor speed (open loop no load)




When analog voltage is 0.2V, motor speed is 4% of max speed, when analog voltage is 5V, motor reaches max speed. The max speed also depends on the motor specification and power voltage.

Relational graph between duty ratio and the motor speed (closed loop no load)

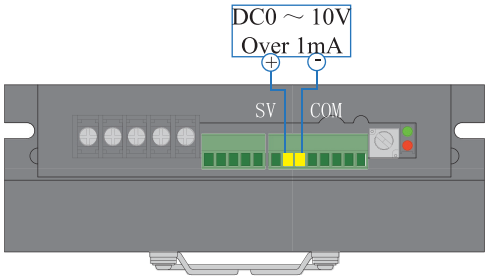



When analog voltage is 0.2V, motor speed is about 160rpm; when analog voltage is 5V, motor reaches max speed 4000rpm.

## 6.4 Speed setting via external analog signal 0-10V

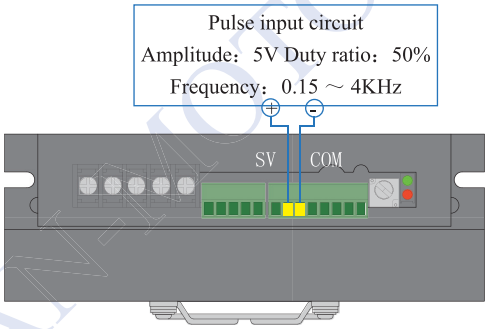
When analogue voltage(0-10V) is used, fine turning function is recommended to be used.

Notice RV should be rotated anticlockwise to limit position.

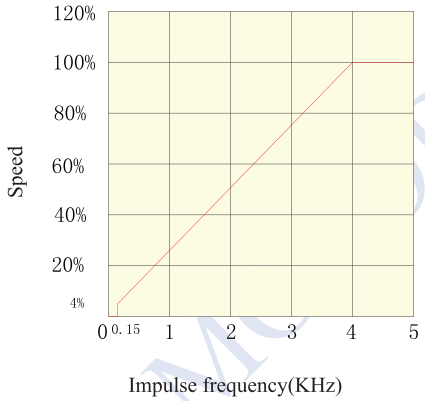



## 6.5 Speed setting via pulse frequency

Notice When analogue voltage(0-10V) is used, fine turning function is recommended to be used.

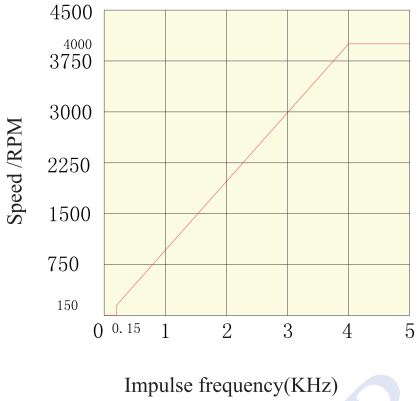



Relational graph between the impulse frequency and motor speed (open-loop no-load)




When the impulse frequency is 0.15KHz, the motor speed reaches 4% of fastest speed; when the impulse frequency is 4KHz, the motor speed reaches maximum value, which depends on the motor specification and power voltage.

Relational graph between the impulse frequency and motor speed (closed-loop no-load)



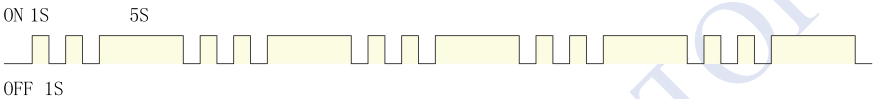
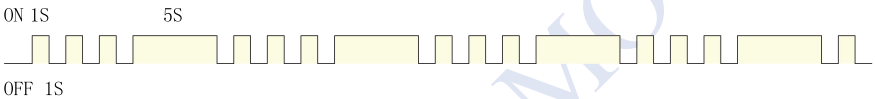
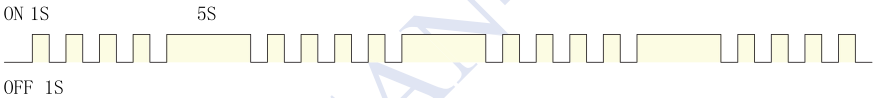
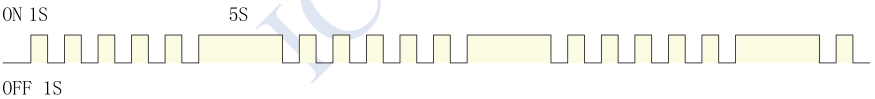
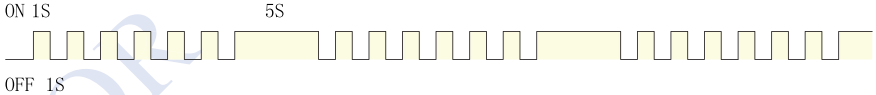
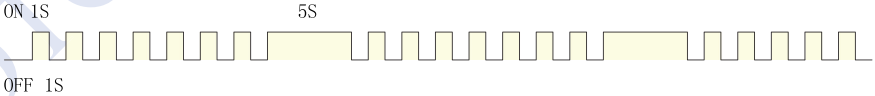
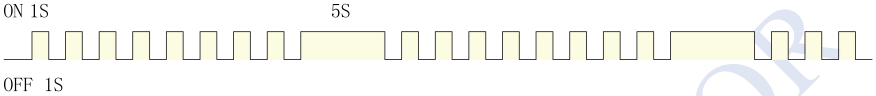

When the impulse frequency is 0.15KHz, the motor speed would be around 150rpm; when the impulse frequency is 4KHz, the motor speed reaches 4000rp.

*Motor speed would decrease via motor parameter and power supply.

# 7 Status indicator. Issue handling

## 7.1 Status indicator

When over-current, Hall fault, over-temperature, and over voltage occurs, driver will give an alarm signal, and ALM terminal and COM will be in short circuit, ALM terminal will be changed to low level. Motor driver stop working, alarm LED flashes.

| Led error display | Status statements | LED display |
|---|---|---|
| Red Led flashes twice | Over voltage |  |
| Red Led flashes three times | Tube over current |  |
| Red Led flashes four times | Over current |  |
| Red Led flashes five times | Low voltage |  |
| Red Led flashes six times | Hall error |  |
| Red Led flashes seven times | Locked-rotor |  |
| Red Led flashes eight times | Over two errors |  |

## 7.2 Exceptional handing

| Led error display | Status statements | Solution |
|---|---|---|
| Red Led flashes twice | Over voltage | Check the bus voltage |
| Red Led flashes three times | Tube over current | Ensure model selection is right |
| Red Led flashes four times | Over current | Check P-sv setting and motor parameter. |
| Red Led flashes five times | Low voltage | Increase the acceleration time<br>Check power voltage, and ensure power supply is 1.5times of motor power. |
| Red Led flashes six times | Hall error | Ensure motor connection is well |
| Red Led flashes seven times | Locked-rotor | Check if motor is overload |
| Red Led flashes eight times | Over two errors | Hall error or locked-rotor. When speed setting is not available, set P-sv to max value |

# 8 Matched motor

The following recommended motors are matched with BLD-750. They have stable speed, large torque, low noise and low vibration.

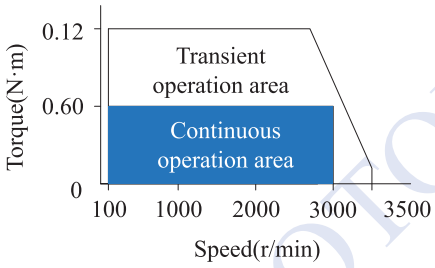
■ 57mm*57mm square BLDC motor

◇ Electrical specification

| Model | output power (W) | Voltage (VDC) | Rated speed (RPM) | Rated torque (Nm) | Motor length (mm) |
|---|---|---|---|---|---|
| 57BLF-1830NBB | 188 | 24 | 3000 | 0.6 | 101 |


◇ Torque curve

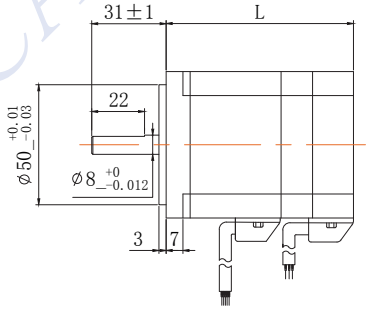
57BLF-1830NBB

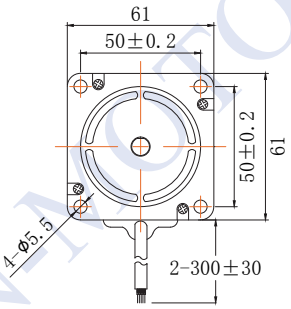


## 60mm*60mm square BLDC motor

### ◇ Electrical specification

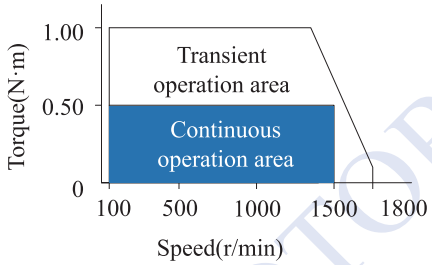
| Model | output power (W) | Voltage (VDC) | Rated speed (RPM) | Rated torque (Nm) | Motor length (mm) |
|---|---|---|---|---|---|
| 60BLF-0815NBB | 80 | 24 | 1500 | 0.5 | 100 |
| 60BLF-0830NBB | 80 | 24 | 3000 | 0.25 | 78 |
| 60BLF-1630NBB | 160 | 24 | 3000 | 0.5 | 100 |
| 60BLF-2430LBB | 240 | 48 | 3000 | 0.75 | 120 |



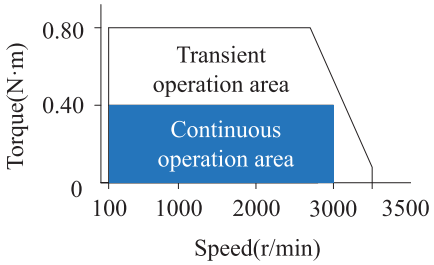




### ◇ Torque curve

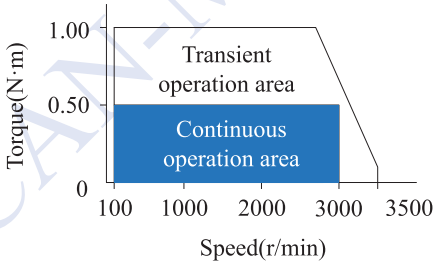
60BLF-0815NBB



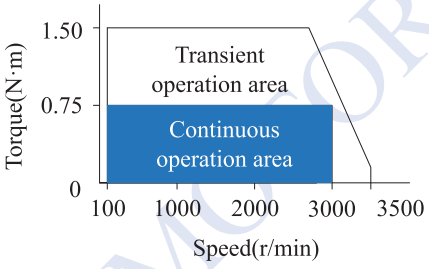

60BLF-0830NBB




60BLF-1630NBB



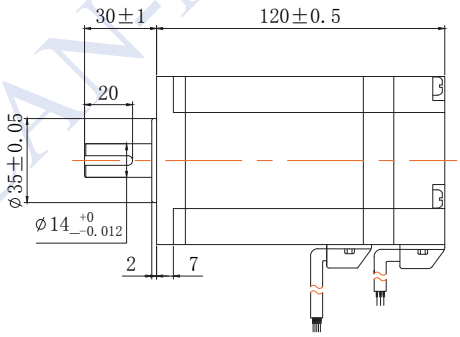

60BLF-2430LBB

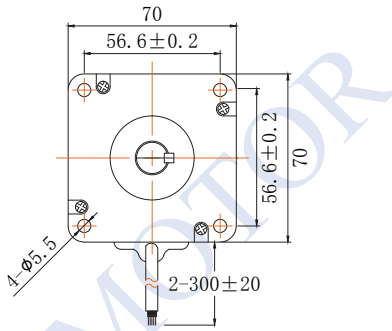


## 70mm*70mm square BLDC motor

### ◇ Electrical specification

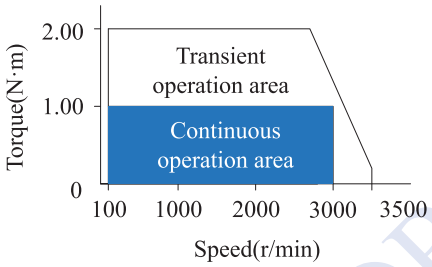
| Model | output power (W) | Voltage (VDC) | Rated speed (RPM) | Rated torque (Nm) | Motor length (mm) |
|---|---|---|---|---|---|
| 70BLF-3230LBB | 320 | 48 | 3000 | 1.0 | 120 |




### ◇ Torque curve

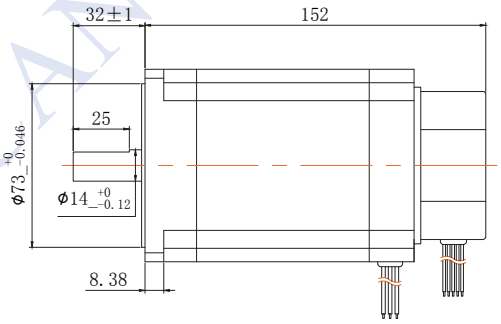
70BLF-3230LBB

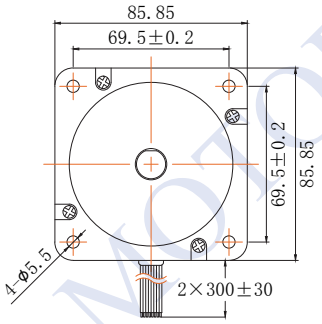


## 80mm*80mm square BLDC motor

### ◇ Electrical specification

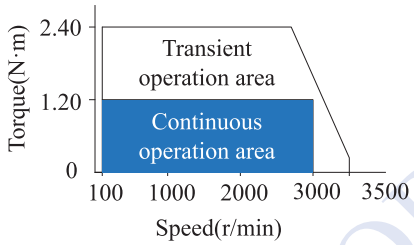
| Model | output power (W) | Voltage (VDC) | Rated speed (RPM) | Rated torque (Nm) | Motor length (mm) |
|---|---|---|---|---|---|
| 80BLF-3530LBB | 350 | 48 | 3000 | 1.2 | 130 |
| 80BLF-7530LBB | 750 | 48 | 3000 | 2.5 | 150 |



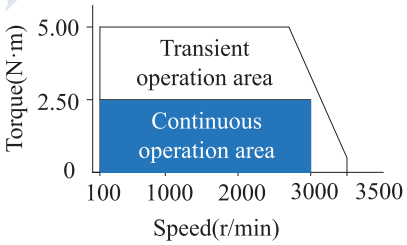




### ◇ Torque curve

80BLF-3530LBB



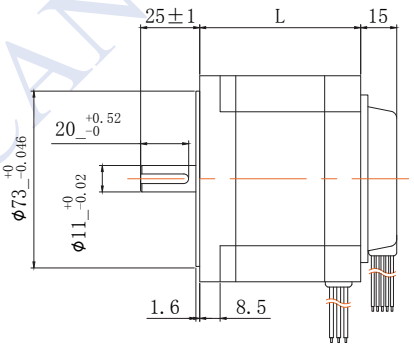

80BLF-7530LBB

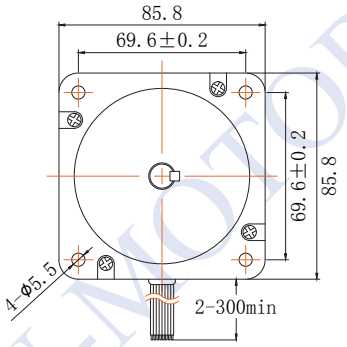


## 86mm*86mm square BLDC motor

### ◇ Electrical specification

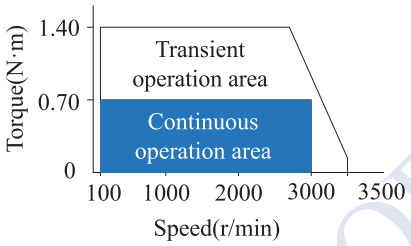
| Model | output power (W) | Voltage (VDC) | Rated speed (RPM) | Rated torque (Nm) | Motor length (mm) |
|---|---|---|---|---|---|
| 86BLF-2230LBB | 220 | 48 | 3000 | 0.7 | 82 |
| 86BLF-4430LBB | 440 | 48 | 3000 | 1.4 | 109 |



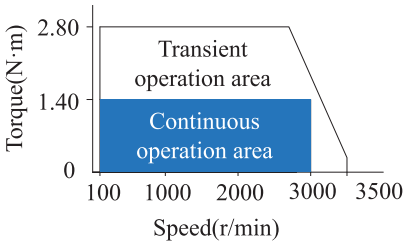




### ◇ Torque curve

86BLF-2230LBB




86BLF-4430LBB



# 9 After sale service

## 9.1 Warranty period

Dongguan ICAN Technology provides warranty for 1 year from the date of shipping.

## 9.2 Return policy

- After-use or man-made damage condition (etc, wrong wiring), no return.
- ICAN Technology guarantees the product quality, but product incompatibility is not in the return or maintain condition.
- Customers don't use the products under the specified electrical performance and environment indicators, no maintain condition.
- Customers change the internal parts.

## 9.3 Maintenance process

1 Get the maintenance permission.

2 Ship the package to the following address: 4/F, Block B, RuiLian Zhenxing Industrial Park, Wanjiang District, Dongguan City, Guangdong Province.
Tel: 86-0769-22327568



DONG GUAN ICAN TECHNOLOGY CO.,LTD

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