

# **FL48CBL-IE3 Series**

## **Integrated Brushless Motor**

### **Instruction Manual**

**Versions: V1.0**

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[ Please read this manual carefully before use to avoid damaging the driver ]



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# **Instruction Manual**

## **For FL48CBL-IE3 Series**

### **Integrated Brushless Motor**

#### **1. Product introduction**

##### **1. Introduction**

The FL48CBL-IE3 integrated brushless motor is a high-performance motor independently developed by CHANGZHOU FULLING MOTOR CO., LTD. It adopts a three-phase inductive square wave motor control chip with high integration, small size, and complete protection measures. This motor has the advantages of high rotation, low vibration, low noise, and good stability.

##### **2. Characteristics**

- Input voltage 18VDC~28VDC, wide voltage input
- Adopting PWM speed regulation
- Equipped with functions such as speed feedback, forward and reverse rotation, braking, etc
- It has protection functions such as undervoltage, overvoltage, overtemperature, overcurrent, and locked rotor
- Ultra high cost-effectiveness, economically efficient
- Acceptable customization

##### **3. Application Fields**

Widely used in various small and medium-sized automation equipment and instruments, such as electronic processing equipment, 3C non-standard automation equipment, screw locking machines, wire stripping machines, winding machines, terminal machines, laser machines, marking machines, spray painting machines, small



## FL48CBL-IE3 Integrated Brushless Motor

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and medium-sized carving machines, automatic grabbing equipment, specialized CNC machine tools, packaging equipment and robots.



## 2. Electrical, Mechanical and Environmental Indicators

### 1. Electrical index

Parameters	Index			
	Minimum value	Typical value	Maximum value	Unit
Power supply voltage	18	24	28	VDC
Continuous output current	0	4	8	A
Analog input voltage	0	5	5	VDC
Output logic voltage	0	5	5	VDC
PWM pulse frequency	/	20	/	kHz

### 2. Use environment and parameters

Parameters	Index
Temperature	-20°C ~ 50°C
Humidity	40 ~ 90%RH (No condensation)
Vibration	< 55Hz / 0.15mm
On site environment	Avoid approaching other heat sources, avoid dust, oil mist, corrosive gases, places with high humidity and strong vibrations, and prohibit the presence of combustible gases and conductive dust
Storage temperature	-20°C ~ 65°C
Type of cooling	Natural cooling or forced air cooling

### 3. Mechanical structure dimension diagram

#### 3.1 Mechanical dimension diagram

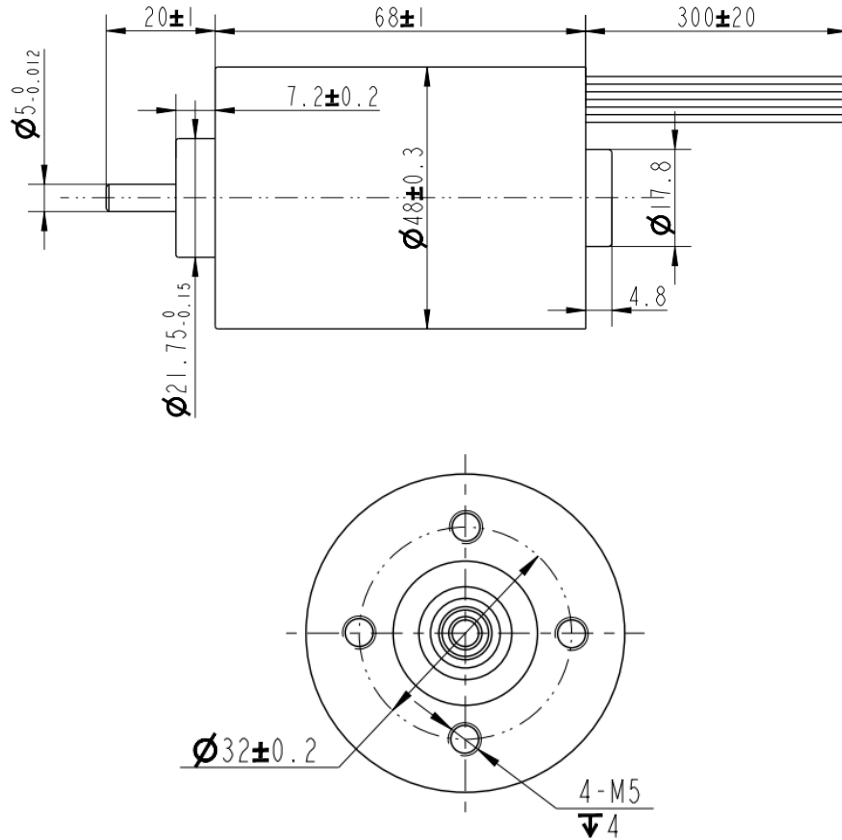


Figure 1 Mechanical dimension diagram

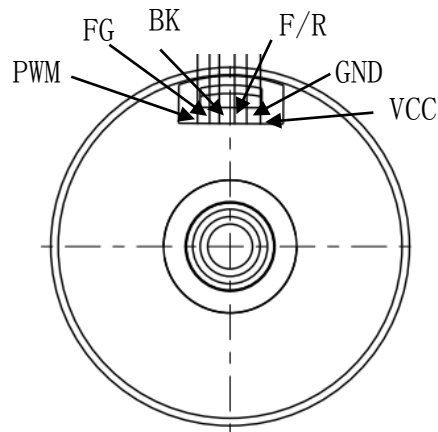


Figure 2 Definition diagram of lead out line



#### 4. Heat dissipation precautions

The reliable working temperature of an integrated closed-loop brushless motor is usually within 80 °C. When installing, please use an upright side installation to create strong air convection on the surface of the heat sink. If necessary, install a fan near the driver to forcibly dissipate heat, ensuring that the driver operates within a reliable working temperature range.

### 3. Driver interface definition and wiring introduction

#### 1. Interface Description

##### 1.1 Control Port

Pin number	signal	function	Explanation
1	PWM	Speed regulation signal	PWM speed regulation: 0~5% Full speed 5~95% Linear speed regulation 95~100% cease
2	PG	Speed signal	TTL-5V level, 1 pulse /1 Antipolar / rotate
3	F/R	Directional signal	Suspended or connected to a high voltage level: CW(4V~5V) Connect to low level: CCW(0V~0.5V)
4	BK	Brake signal	Invalid when suspended or connected to a high level (4V~5V) Connected to low-level brake effective (0V~0.5V)



## 1.2 Power Port

Pin number	Signal	Function Description
1	VDD	Power input positive terminal, input voltage 18V~28Vdc
2	GND	Power input negative terminal



## 2. Interface circuit

Input signal of FL48CBL-IE3

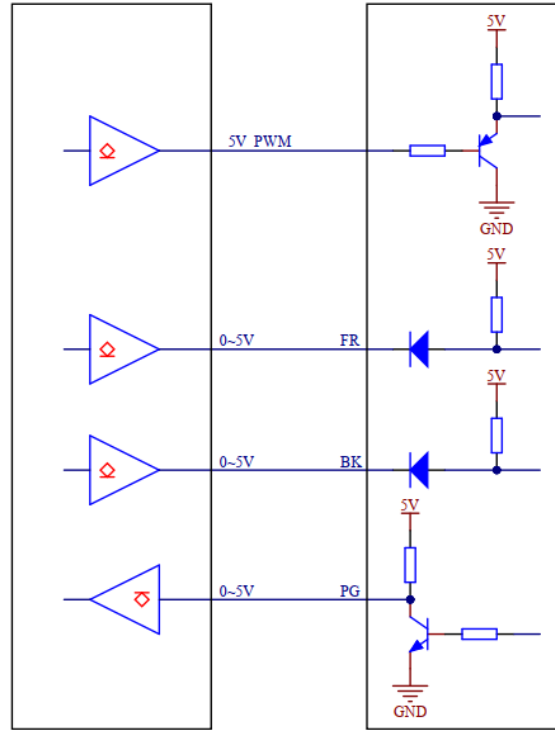


FIG. 3 Wiring diagram of control signal

## 3. Wiring requirements

- 1) To prevent interference with the driver, it is recommended to use shielded cables for control signals, and the shielding layer should be short circuited to the ground wire. Unless otherwise specified, the shielding wire of the control signal cable should be grounded at one end: the upper computer end of the shielding wire should be grounded, and the driver end of the shielding wire should be suspended. Grounding is only allowed at the same point within the same machine. If it is not a true grounding wire, it may cause serious interference, and the shielding layer is not connected at this time.
- 2) If a power supply supplies multiple drives, parallel connection should be adopted at the power supply, and chain connection from one to another is not allowed.
- 3) It is strictly prohibited to plug and unplug the driver terminals with electricity.



When a live motor stops, there is still a large current flowing through the coil, and plugging and unplugging the terminals will cause a huge instantaneous induced electric potential that will burn out the driver.

- 4) It is strictly prohibited to solder the wire head and connect it to the wiring terminal, otherwise it may overheat and damage the terminal due to increased contact resistance.
- 5) The wiring terminal should not be exposed outside the terminal to prevent accidental short circuit and damage to the driver.

## **4. Introduction to Protection Functions**

### **1. Undervoltage protection**

When the input voltage is too low, the motor will trigger undervoltage protection, the motor will stop working, and the input voltage can be restored.

### **2. Overvoltage protection**

When the input voltage exceeds the overvoltage protection setting value, the motor will trigger overvoltage protection, stop working, and restore the input voltage.

### **3. Overcurrent protection**

When the instantaneous value of the motor phase current exceeds the peak value set for overcurrent protection, the motor will trigger overcurrent protection. At this point, the motor enters standby mode and needs to be powered on again before it can be started.

### **4. Over temperature protection**

When the driving temperature exceeds the set value, the motor triggers over temperature protection and enters standby mode. Need to wait for the motor to cool down again before restarting.

### **5. Blockage protection**

As the external load gradually increases, the motor speed will gradually decrease.



When the load exceeds the peak load, the motor stalls, and the motor detects that the Hall level is no longer jumping, triggering the stall protection. The motor needs to be powered on again before it can be started.

## **5. Product warranty clause of FULLING MOTOR**

### **1) One year warranty**

FULLING provides a one-year warranty against defects in the raw materials and workmanship of its products from the date of shipment. During the warranty period, FULLING provides free repair service for defective products.

### **2) Not covered by warranty**

A、 Inappropriate wiring, such as reversed polarity of the power supply and live plugging and unplugging

B、 Unauthorized modification of internal components

C、 Use beyond electrical and environmental requirements

D、 Poor environmental heat dissipation

### **3) Repair process**

If the product needs to be repaired, the following process will be followed:

(1) Before shipping, please call the customer service personnel of FULLING to obtain a repair permit number;

(2) Please send a written explanation along with the goods, explaining the phenomenon of the faulty drive being repaired; The voltage, current, and usage environment at the time of the malfunction; The name, phone number, and mailing address of the contact person.

(3) Prepaid postage to CHANGZHOU FULLING MOTOR Co., Ltd., No. 69 Kunlun Road, Xinbei District, Changzhou City, Jiangsu Province  
Postal code: 213032.

### **4) Warranty Limitations**

A、 The warranty scope of FULLING's products is limited to the components and



processes of the products (i.e. consistency)

B、FULLING does not guarantee that its products will be suitable for the specific use of customers, as the suitability is also related to the technical specifications, usage conditions, and environment of the use.

**5) Maintenance requirements**

When repairing, please truthfully fill out the "Repair Report" (this form can be downloaded from [www.fullingmotor.com](http://www.fullingmotor.com)) for maintenance analysis. Mailing address: CHANGZHOU FULLING MOTOR Co., Ltd., No. 69 Kunlun Road, Xinbei District, Changzhou City, Jiangsu Province. Postal code: 213032.

**6. Version Description**

Version number	Summary of Revision Content	date
V1.0	Create	2024-12-3



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