

Low-Voltage Built-in Brushless Driver

EA-BLDC10-200-L User Manual



Before Use

Before operating this product, carefully read and observe the relevant safety information to ensure personal safety and product safety.

DANGER 	■ When wiring or installing the driver, always make sure the power is turned off. ■ The circuit components on the internal circuit board of the driver are easily damaged by static electricity. Before anti-static measures are in place, do not touch the circuit board by hand. ■ Do not modify the internal parts or circuits of the driver by yourself. ■ Do not expose this product to locations containing water vapor, corrosive gas, flammable gas, or similar substances; otherwise electric shock or fire may occur. ■ The installation location for the driver and accessories must be kept away from fire sources, heating elements, and flammable materials. Before mechanical equipment starts operation, adjust the set values according to the user parameters. If the values are not adjusted to the correct settings, the mechanical equipment may lose control or malfunction. ■ Before the machine starts operating, confirm that the emergency stop device can be activated at any time. ■ When powering on, make sure the motor shaft remains stationary and will not rotate due to mechanical inertia or other factors. rotate. ■ Do not change the wiring while the power is on; otherwise electric shock or personal injury may occur. injury may occur. ■ The grounding marks of the motor and driver must be grounded together with the power supply equipment; otherwise electric shock or equipment damage may occur. ■ Do not use a USB-to-micro-USB cable to directly connect the driver to a computer.
WARNING 	■ Do not input DC power to the driver output I/O terminals. ■ The rated voltage of the power supply system used for the driver is DC 24 V-48 V. ■ First test whether the driver and motor operate normally with no load, and then connect the load to avoid unnecessary danger. ■ Do not switch the power on and off frequently. If repeated power switching is required, keep it to less than once per minute. ■ Do not use it for vertical lifting/lowering of a load. ■ Only qualified professionals may install, wire, and maintain the driver.

Note:

1. In this manual, to explain product details clearly, the housing may be removed or the safety cover disassembled and described with text and figures.

During operation of this product, be sure to install the housing and wire it correctly as specified and operate it according to the manual, ensure safety.

2 The illustrations in this manual are for ease of explanation and may differ slightly from the actual product, but this does not affect customer rights.

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I. Product Inspection and Description

1.1 Product Inspection

To prevent oversights during purchase and transportation, carefully check the items listed below:

- Whether it is the product you intended to purchase check the product model on the driver package nameplate; refer to the model description in the next section. model description.
- Appearance damage: visually check whether there is any damage or scratch on the exterior.
- Loose screws: check whether any screws are not tightened or have fallen off.
- Missing accessories: check against the complete component list below.

If any of the above conditions occur, promptly contact the company or agent for a proper solution.

A complete operable driver package should include:

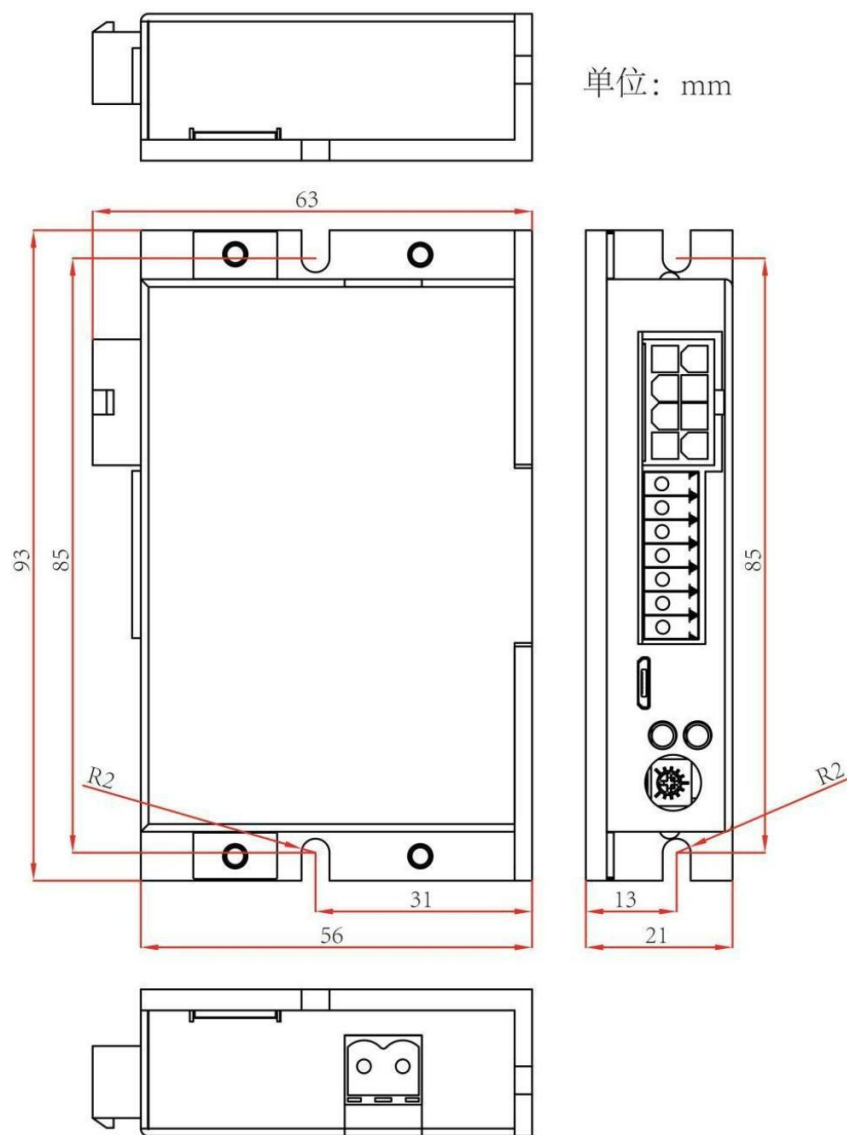
- (1) EA-BLDC10-200-L driver - 1 unit;
- (2) 2-pin power terminal - 1 pc;
- (3) 7-pin I/O terminal - 1 pc.

1.3 Specifications

Specification Model		EA-BLDC10-200-L
Power Input	Rated Input Voltage	DC24~48V ($\pm 10\%$)
Output Parameters	Output Current	7.5 A (adjustable through keypad)
	Output Power	DC24V, 120W DC48V, 200W
Control Performance	Speed Control Accuracy	Closed-loop speed control (control accuracy $\pm 0.5\%$)
	Overload Capability	1.5 times overload
	Default Maximum Speed	3000rpm
	Default Matched Pole Pairs	5 pole pairs (other pole pair numbers can be set through the keypad) Default AI1 knob
	Speed Setting	The setting channel can be switched using the external keypad.
General Functions	Digital Input	3 channels, supporting NPN DI signal connection; ports can be customized as required
	Digital Output	1 channel, open-collector output (transistor), switching capacity: 50 mA/30 V (max)
	Built-in Speed Adjustment Knob	Supports analog potentiometer speed adjustment (default AI1 knob)
	Analog Input	1 channel, external analog voltage speed control (0-5/10 V) / PWM speed control (3 kHz-10 kHz) Note: keypad setup is required before use
Bus Control	Modbus/RS485	/
Accessories	Host Computer	/
	Operation Panel	Optional C20 series handheld keypad for parameter setting and data reading
Protection Mechanism	Fault Protection Function	Undervoltage, overvoltage, overcurrent, overload, stall, short circuit, phase loss, overtemperature, etc.
	Undervoltage Alarm Protection	Driver undervoltage point: 15 V
	Overvoltage Alarm Protection	Driver overvoltage point: 60 V
Application Environment	Operating Temperature	When operating at rated current, ambient temperature must be between -10 and 40°C. When ambient temperature exceeds 40°C, reduce the rated current by 2.5% for every 1°C increase; maximum ambient temperature is 50°C.
	Storage Temperature	30~65°C
	Humidity	Below 90% RH, no condensation
	Cooling Method	Natural cooling (auxiliary heat dissipation required for full-power operation)
	Protection Grade	IP20
	Installation Type	Built-in type

II. Product Dimensions, Environmental Conditions, and Installation

2.1 Product Dimensions



2.2 Operating, Storage, and Transportation Environment

The driver must never be exposed to harsh environments such as dust, sunlight, corrosive or flammable gases, grease, humidity, water droplets, or vibration.			
The salt content in the air must be kept below 0.01 mg/cm ² per year.			
Protection Grade		IP20: Protected against solid foreign objects larger than 12 mm in diameter; no moisture protection.	
Environmental Characteristics	Ambient Temperature	Operation	Single Installation -10~40°C -20 to -10°C or 40 to 50°C (derating required use)
			Side-by-side Installation -10~30°C -20 to -10°C or 30 to 40°C (derating required use)
		Storage	-33~65°C
		Transportation	-20~50°C
		Non-condensing, non-freezing	
	Rated Humidity	Operation	Max. 85%
		Storage / Transportation	Max. 90%
		Condensation prohibited	
	Atmospheric Pressure	Operation	86~106kPa
		Storage / Transportation	70~106kPa
	Altitude	Operable below an altitude of 1000 m (derating is required above 1000 m; see section 2.2.2).	
Package Drop	Storage / Transportation	Dropping from a height is prohibited; risk of damage exists.	
Vibration	Operation / Storage / Transportation	continuous vibration is prohibited	
Impact	Operation / Storage / Transportation	excessive impact is prohibited	

2.2.1 Storage Conditions

Before installation, this product must be kept in its packaging. If it is not used temporarily, in order for this product to remain within the company warranty scope and to facilitate future maintenance, pay attention to the following during storage:

- 1 It must be placed in a dust-free and dry location;
- 2 The ambient temperature and relative humidity of the storage location must be within the required range;
- 3 Avoid storing it in an environment containing corrosive gases or liquids;
- 4 Preferably store it properly packaged on a shelf or flat surface.

2.2.2 Operating Conditions

Operating Condition	Ambient Temperature Limit
Abnormal Ambient Temperature Operation	When operating at rated current, ambient temperature must be between -10 and 40°C. When ambient temperature exceeds 40°C, for every increase of 1°C, the rated current must be reduced by 2.5%; the maximum ambient temperature is 50°C.
High-Altitude Operation	When the driver is used at an altitude of 0-1000 m, general operating limits apply. When used at an altitude of 1000-2000 m, for every 100 m increase in altitude, reduce the rated current by 1% or reduce the operating ambient temperature by 0.5°C. If To use it above an At the altitude of 2000 m, contact the manufacturer.

For long-term operations, an ambient temperature below 40°C and a well-ventilated location are recommended to ensure product reliability.

At altitudes above 1000 m, the thin air reduces equipment insulation strength and heat dissipation performance, so derated use is required. Use in high-altitude areas is not recommended.

In addition, the usage conditions include:

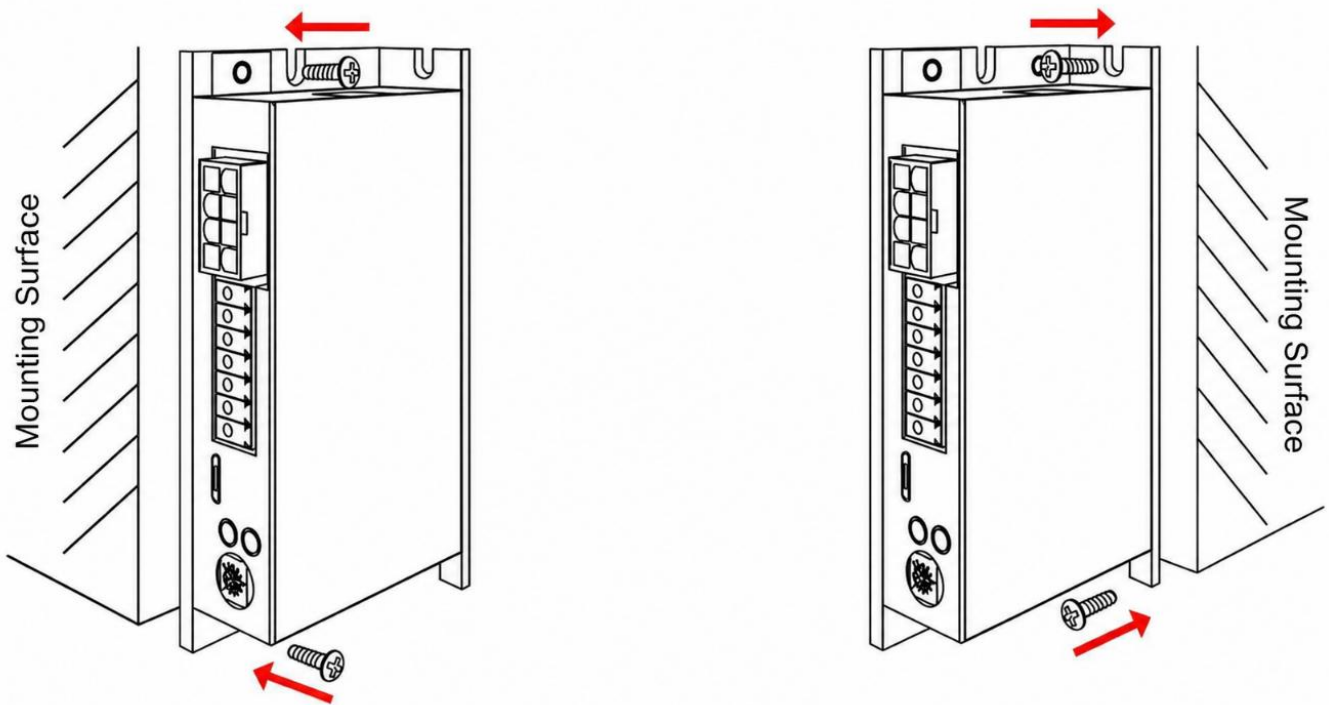
- 1 A location without a large amount of heat-generating equipment;
- 2 A location free from water droplets, steam, dust, and oily dust;
- 3 A location free from corrosive or flammable gases and liquids;
- 4 A location free from floating dust and metal particles;
- 5 A solid location without vibration;
- 6 A location without electromagnetic noise interference.

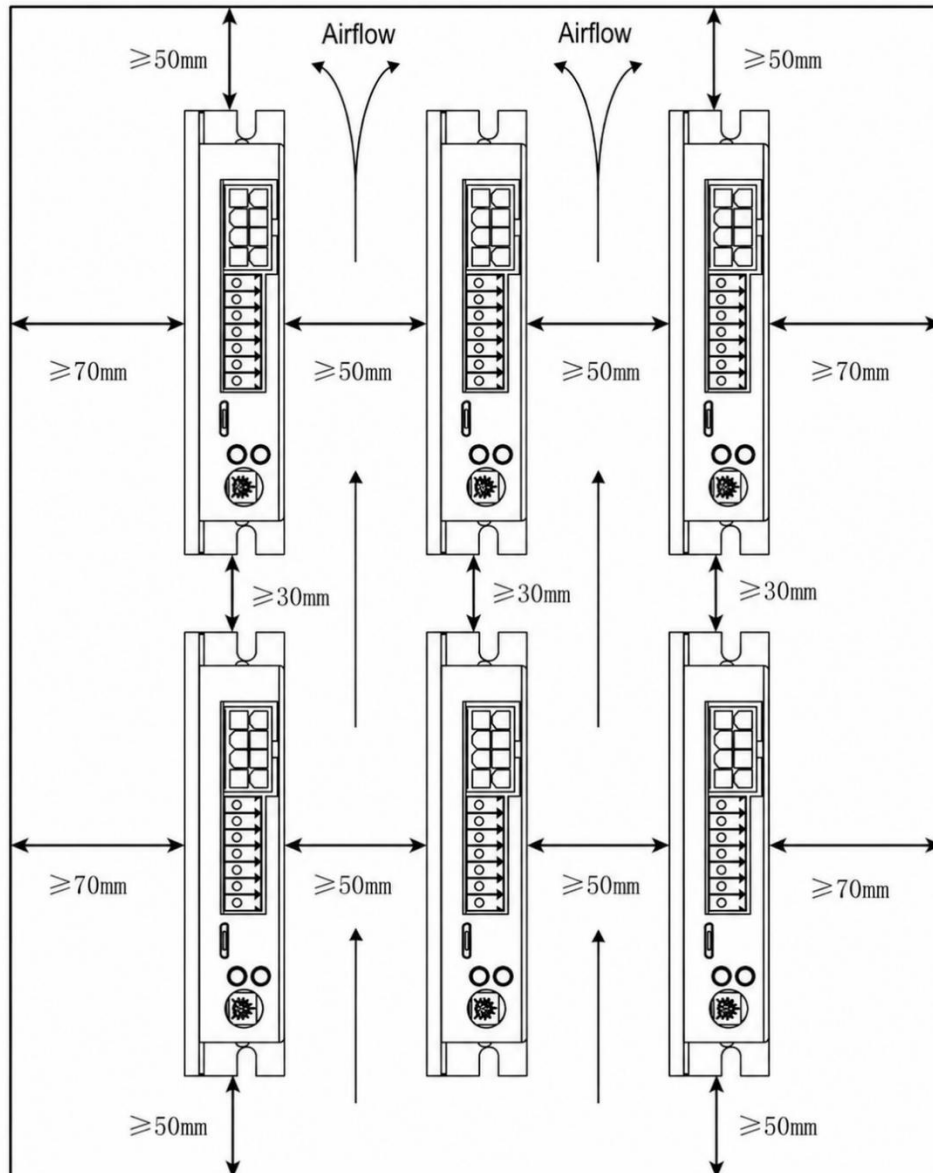
2.3 Installation Instructions

This product is installed by wall mounting. It is recommended to use M4 screws with washers for fixing, and to install it on a metal mounting surface with good **heat dissipation and proper grounding; otherwise a fire accident may easily occur.**

Recommended installation spacing for drivers: when multiple drivers are installed side by side, in order to ensure good heat dissipation, the installation spacing should keep the installation spacing above 50 mm.

The installation schematic and spacing schematic are shown below. The actual installation direction depends on customer requirements:





*The spacing and annotations in the installation drawing are not to scale; use the text annotations as the reference.

Precautions

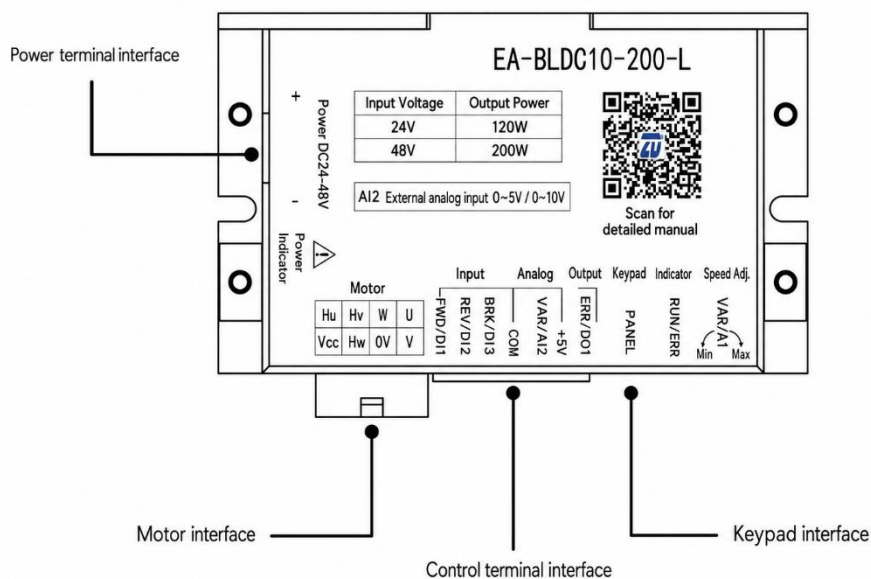
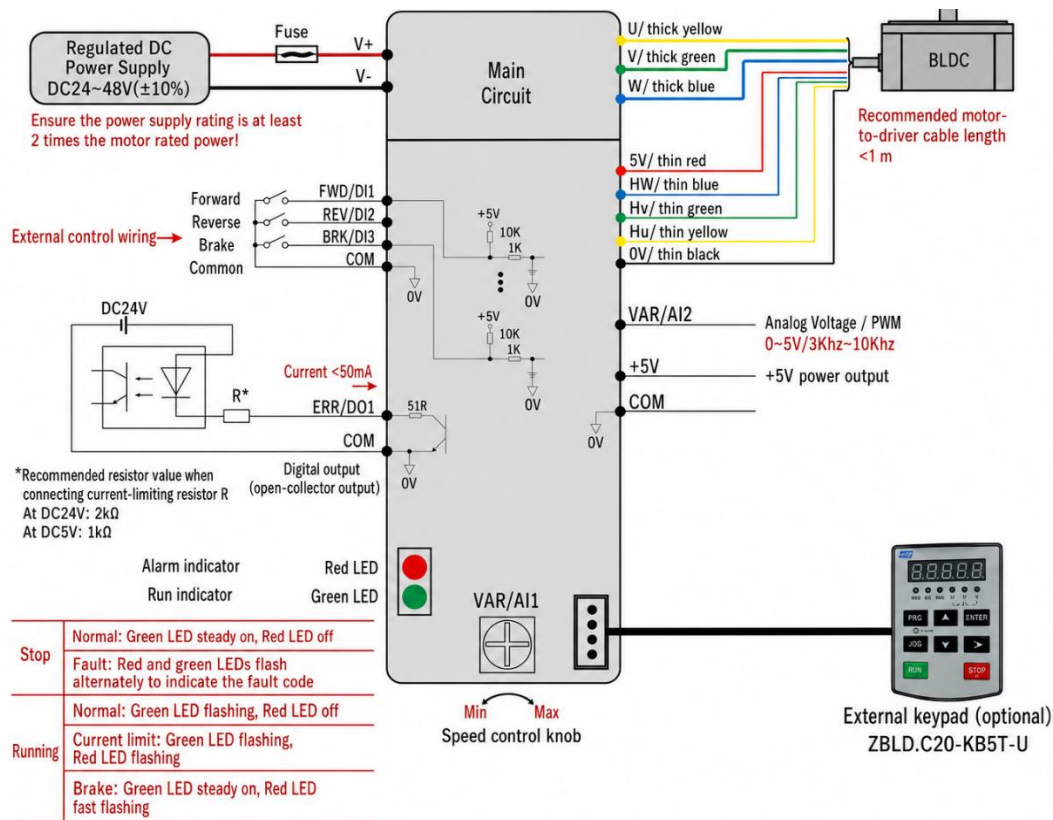
Users should pay special attention to the following:

- 1 The connecting cable between the driver and the motor must not be pulled tight, to prevent loosening or falling off;
- 2 When fixing the driver, all fixing screws must be tightened;
- 3 Use M4 combination screws to fix the two mounting holes;
- 4 Tightening torque: 1.2-1.5 N·m;
- 5 The motor shaft center must be well aligned concentrically with the equipment shaft center;
- 6 The screws fixing the motor must be tightened.

III. Wiring Method

3.1 Wiring Diagram

The following figure shows the C10-200L wiring schematic:



The following figure shows the actual wiring example:



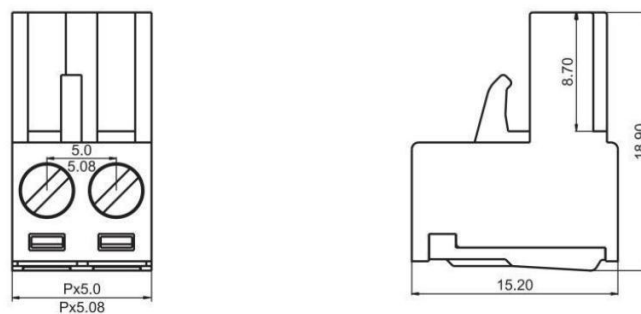
Precautions:

- 1 Before wiring, turn off the power first. Wiring must be performed by professionals to ensure personal safety;
- 2 Do not connect the power cable to any terminal other than the power terminal, otherwise the driver may be damaged;
- 3 The grounding terminal must be properly grounded;
- 4 The screws between each connection terminal and wire must be firmly tightened to prevent loosening due to vibration;
- 5 When wiring, select the wire diameter according to electrical regulations;
- 6 Make sure the power supply capacity is more than twice the rated motor power;
- 7 It is recommended that the cable length between the motor and driver be less than 1 m;
- 8 After completing circuit wiring, check the following again:
 - (1) Are all connections correct, especially whether the power cable is connected incorrectly?
 - (2) Are any wires missing?
 - (3) Is there any short circuit between terminals and connecting wires, or any short to ground?

3.2 Ports

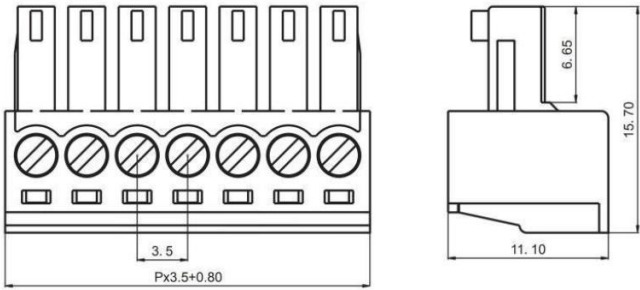
3.2.1 Power Terminal

Plug-in terminal block, 2P, screw wiring method. Use a flat-blade screwdriver with a blade width ≤ 4 mm. The power terminal input is DC 24-48 V. Wire according to the markings on the upper cover; do not reverse polarity.



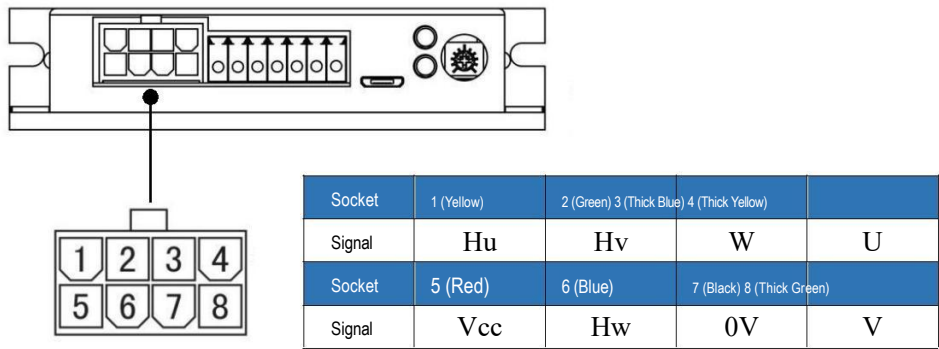
3.2.2 Control Terminal

Plug-in terminal block, 7P, screw wiring method. Use a flat-blade screwdriver with a blade width ≤ 2.8 mm.



3.2.3 Motor Interface

Description of signals and corresponding wire colors for low-voltage motor connector sockets



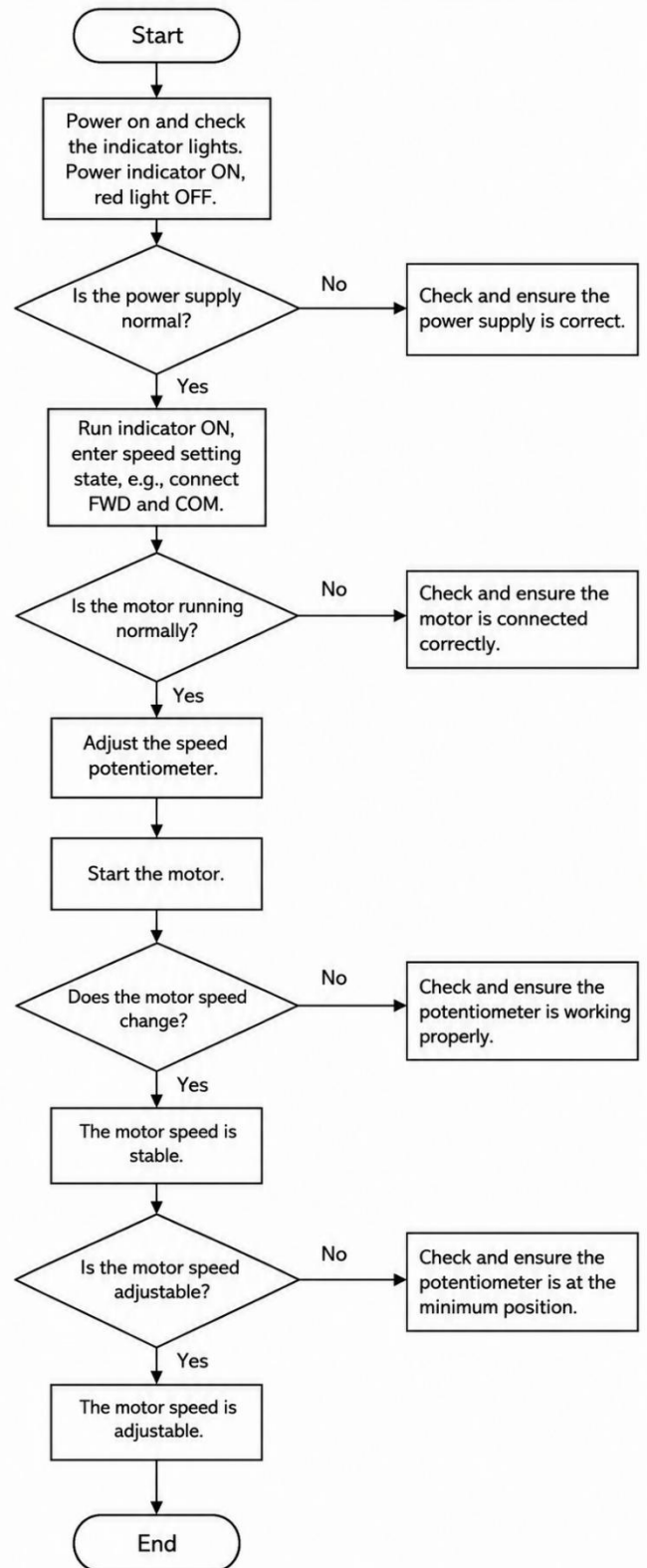
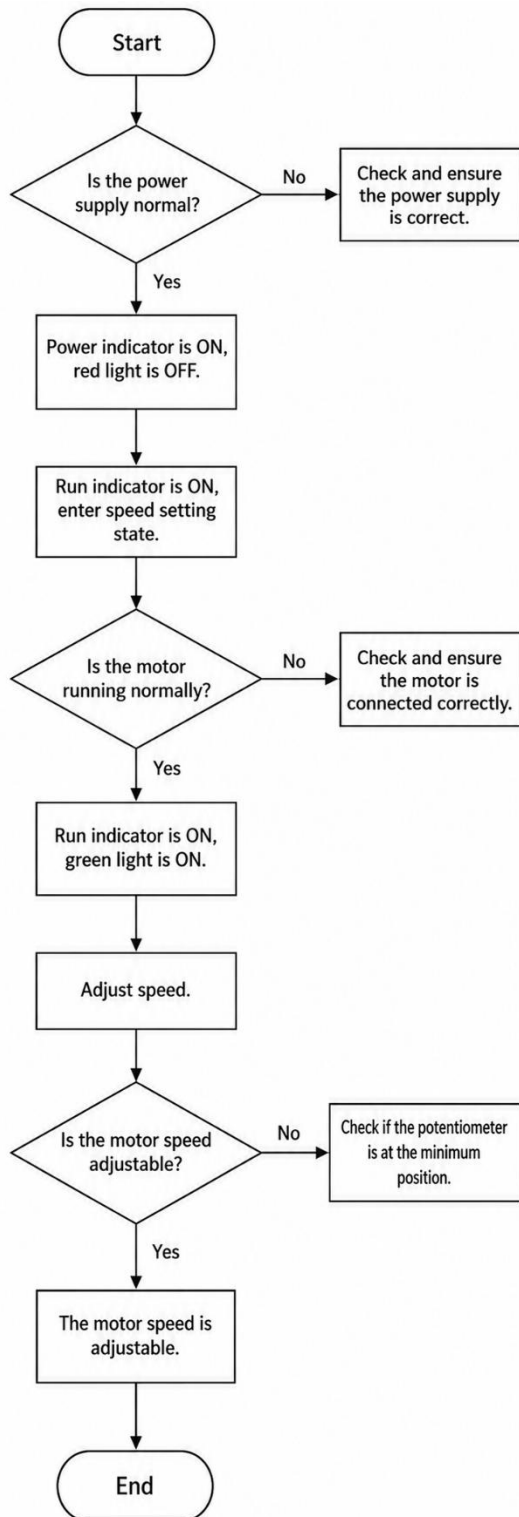
3.2.4 Keypad Interface

The keypad interface is a USB interface. The keypad connection cable is a purchased keypad accessory (see section 4.2.1).

IV. Operation Instructions

Precautions:

- 1 Unless otherwise specified, this product is factory-set to terminal control by default; keypad control requires purchasing the keypad accessory (ZBLD.C20-KB5T-U) ;
- 2 The keypad function codes listed in this manual apply to the EA-BLDC10-200-L product and do not apply to other products. For details, please see the C20 series keypad function code user manual;
- 3 Before operation, basic knowledge of this product is required; operation should be performed by professionals;
- 4 Before formal use, perform no-load commissioning. The figure below shows the no-load commissioning flowchart (left: terminal control; right: keypad control; factory default settings):



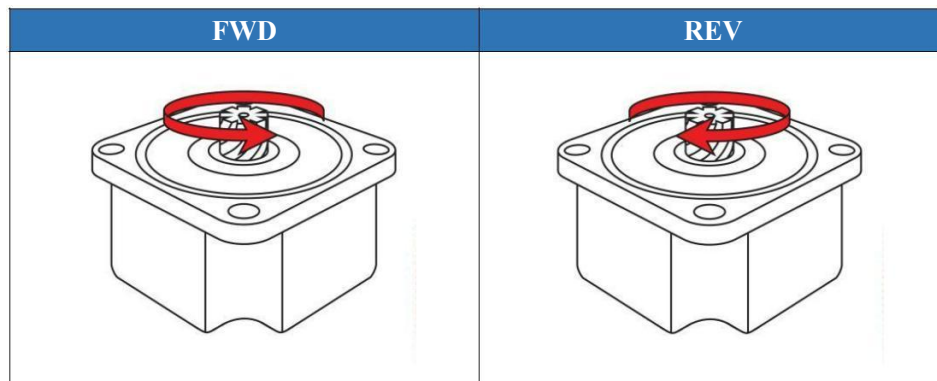
4.1 Terminal Control

4.1.1 Port Introduction

Users who have not purchased a keypad can refer to the default values of the keypad function codes to understand specific product parameters (see section 4.2.3).

Port	Name	Function
Input	FWD/D11	Forward Rotation
	REV/D12	Reverse Rotation
	BRK/D13	Brake (Electromagnetic Brake)
Common	COM	0V
Analog	VAR/A12	Analog Voltage (0-5 V/10 V) / PWM (3~10Khz)
	+ 5V	+5 V power output (output power current, only used for an external potentiometer; strictly prohibited for other equipment power supply)
Output	ERR/D01	Fault Output (Open-collector Output)

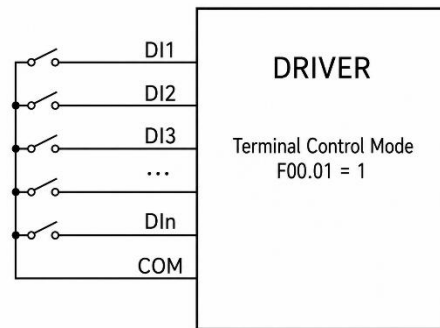
Motor rotation direction under factory default status (motors with different pole-pair numbers may have different default directions; before use, be sure to perform a no-load test to confirm the direction!):



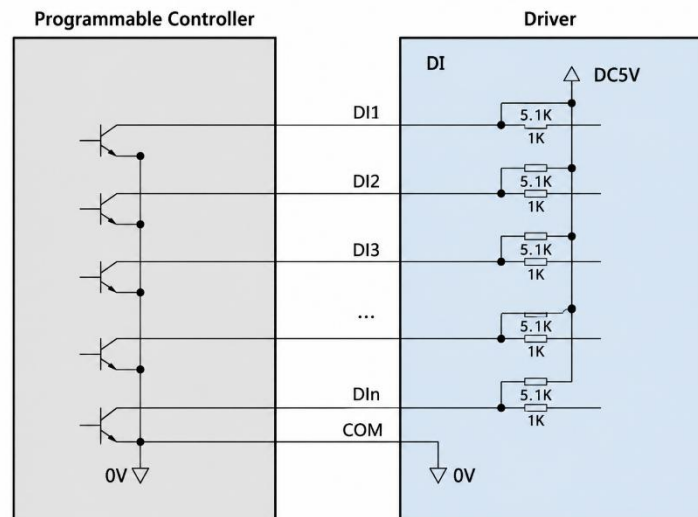
4.1.2 Input Terminal

- For terminal control, directly short the input terminal (FWD) and common terminal (COM); the motor rotates forward;
- Short the input terminal (REV) and common terminal (COM); the motor rotates in reverse;
- When the brake (BRK) and common terminal (COM) are connected during operation, the motor is in braking status. Except for safety emergency braking, avoid braking when the motor is running at high speed or when load inertia is large. To reduce action time, reduce the speed to a safer range before braking as much as possible.

Users may connect external switches (relays) themselves.



External PLC (NPN) control. The following figure shows the wiring schematic:



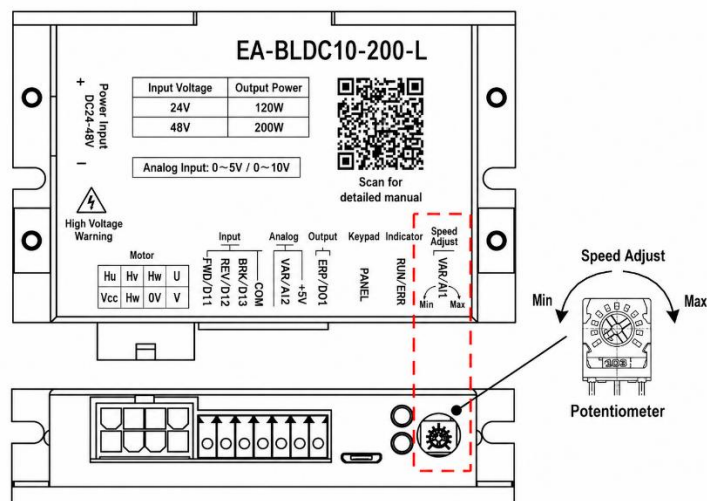
Note:

- 1 Do not connect FWD and REV terminals at the same time;
- 2 Avoid switching the rotation direction while the motor is at high speed; it is best to stop before switching;
- 3 If the braking function is used, calculate the safe braking speed and make sure the motor speed is below that speed when braking.

4.1.3 AI1 Built-in Knob Speed Ref.

Analog AI1 (built-in knob potentiometer) speed reference is the factory default speed reference selection for this product. Adjusting the knob adjusts the speed.

Use a Phillips screwdriver (tip diameter ≤ 3 mm) for adjustment. Turn the potentiometer clockwise to increase speed and counterclockwise to decrease speed.



4.1.4 AI2 External Voltage Speed Ref.

For analog AI2 (external voltage) speed reference, change function code F00.02 to "2" through the keypad and adjust speed by changing the external input voltage (default 0-5 V). The user must connect an external potentiometer (recommended resistance 10 K).

If 0-10 V external voltage input is required, change function code F05.39 to "10" through the keypad. The input upper limit is 10 V. The following figure shows the connection schematic and actual wiring diagram:



4.1.5 Output Terminal

Open-collector output, sink current less than 50 mA. The port function defaults to fault output and can be changed by modifying the function code F06.01 through the keypad to change the output selection.

The following figure shows a simplified PLC wiring diagram:

