

RioRand RR-PWM-3A DC Motor Speed Controller User Manual

Model: RR-PWM-3A

1. Introduction

This manual provides detailed instructions for the installation and operation of the RioRand RR-PWM-3A DC Motor Speed Controller. This device is designed to control the speed and direction of low-voltage brushed DC motors within a specified voltage and current range. Please read this manual thoroughly before use to ensure proper and safe operation.

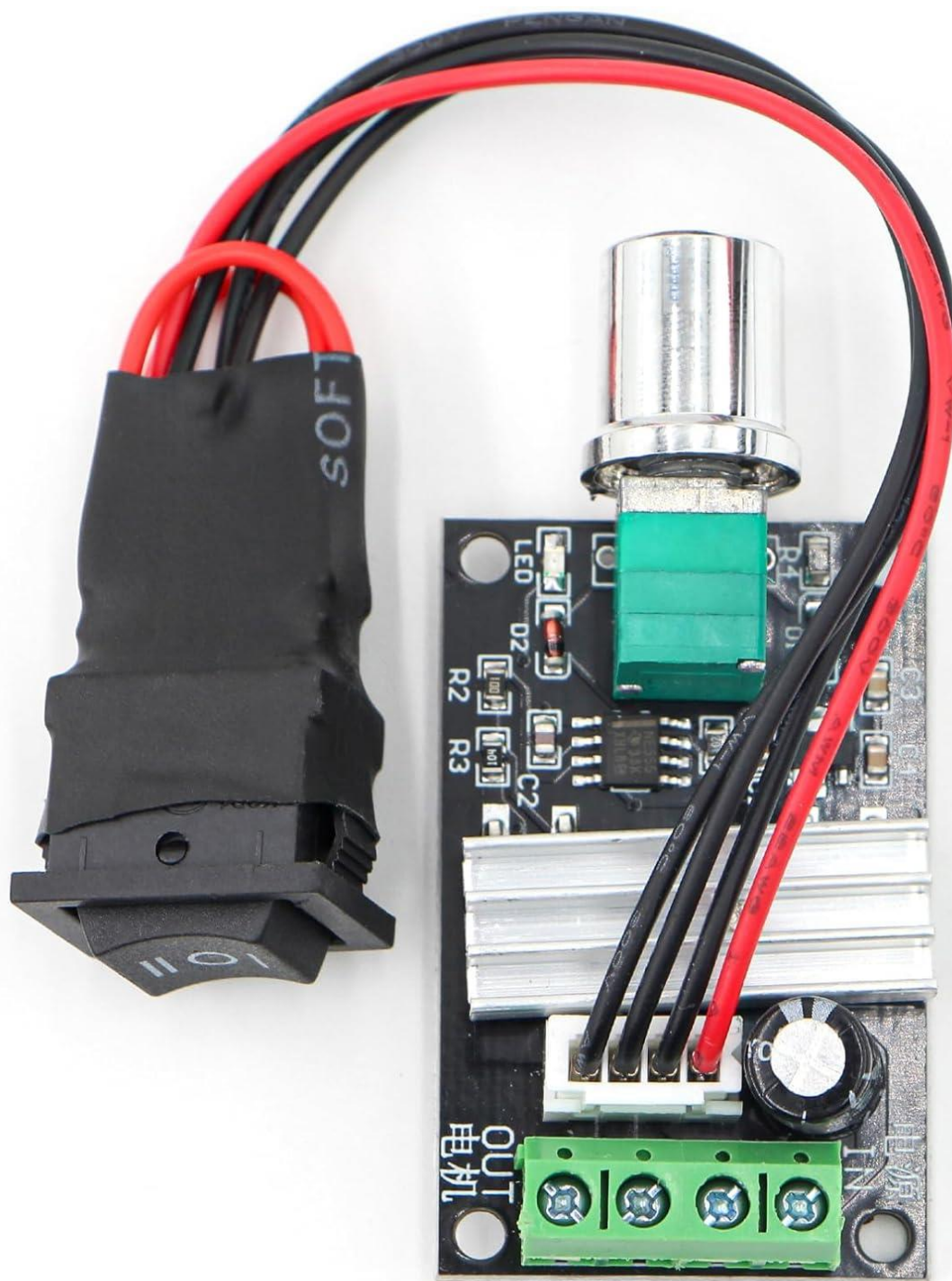


Image 1.1: The RioRand RR-PWM-3A DC Motor Speed Controller with its integrated potentiometer and forward/reverse switch.

2. Safety Information

- **Power Source:** The DC motor speed controller must be connected to a DC power source only. **Do not connect directly to a 220V AC household power supply.** Connecting to an AC supply will damage the device and may pose a safety hazard.
- **Voltage Range:** Ensure the input power range is within DC 6-28V. Operating outside this range can damage the controller and connected motor.
- **Current Limit:** The maximum continuous output current is 3A. **Never exceed 3A.** Exceeding this limit can lead to overheating and permanent damage to the controller.
- **Low Voltage Brushed DC Motors:** This controller is designed for low-voltage brushed DC motors. Verify your motor type before connection.
- **Polarity:** Observe correct polarity when connecting the power supply and motor. Incorrect polarity can cause damage. Refer to the wiring diagram.
- **Environment:** The circuit board is exposed. Ensure the controller is installed in a suitable enclosure to protect it from dust, moisture, and accidental contact, especially if used in environments where it could be exposed to elements or human contact.
- **Not a Voltage Regulator:** This is a speed controller, not a voltage regulator. It controls motor speed by adjusting the duty cycle of the DC voltage, not by regulating the output voltage directly.

3. Product Features

- **PWM Technology:** Utilizes Pulse Width Modulation (PWM) for efficient and smooth DC motor speed control.
- **Wide Input Voltage Range:** Supports DC input voltages from 6V to 28V.
- **Current and Power Capacity:** Maximum continuous output current of 3A and maximum output power of 80W.
- **Forward/Reverse Switch:** Integrated switch for easy control of motor direction.
- **Potentiometer with Switch Function:** The speed adjustment knob also functions as an ON/OFF switch.
- **Compact Design:** Small form factor for easy integration into various projects.
- **High-Quality Wiring:** Features ultra-soft, high-temperature resistant silicone rubber wire for durability.

**Forward/Reverse
Switch Control**

Silicone Wire

Soft but high temperature resistance

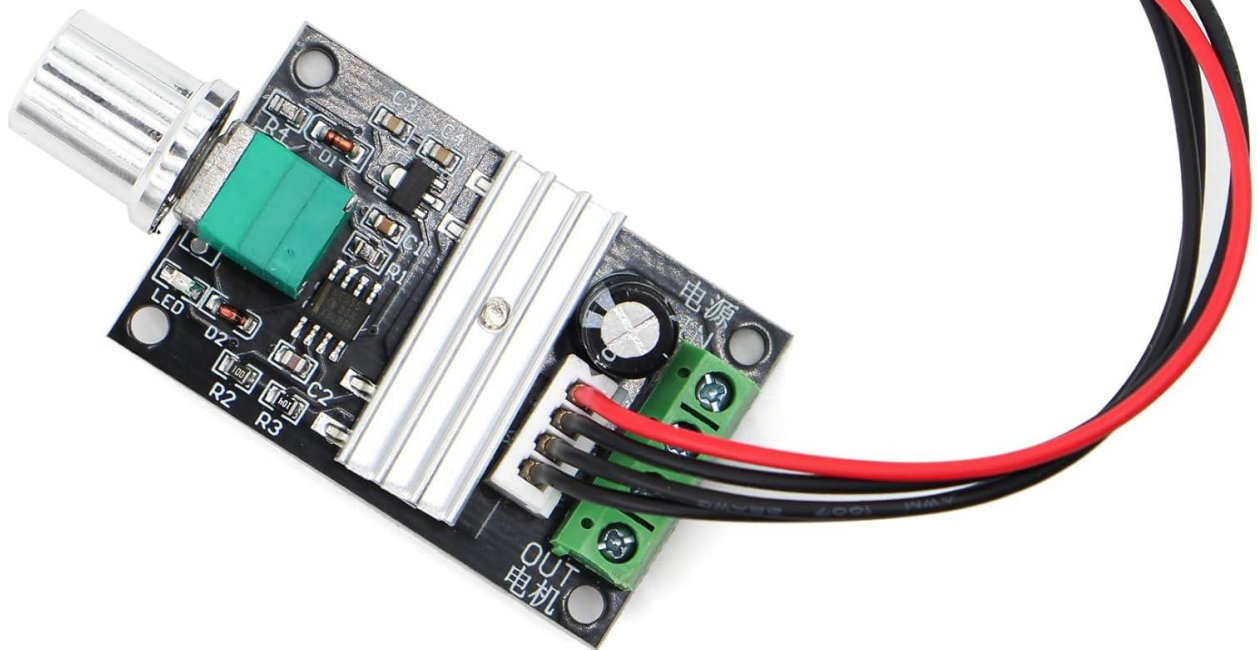


Image 3.1: Close-up view of the RioRand DC Motor Speed Controller highlighting the Forward/Reverse Switch Control and the silicone wire.

4. Specifications

Feature	Specification
Model Number	RR-PWM-3A
Input Voltage Range	DC 6V - 28V
Maximum Continuous Output Current	3A (Do not exceed)
Maximum Output Power	80W
Control Type	PWM (Pulse Width Modulation)
Motor Type Compatibility	Low-voltage brushed DC motors
Dimensions (L x W x H)	Approx. 50mm x 32mm x 15mm (2 x 1.3 x 0.4 inches)
Net Weight	Approx. 1.13 ounces
Material	Copper (circuit board components)
Switch Cable Length	15 cm (5.9 inches)

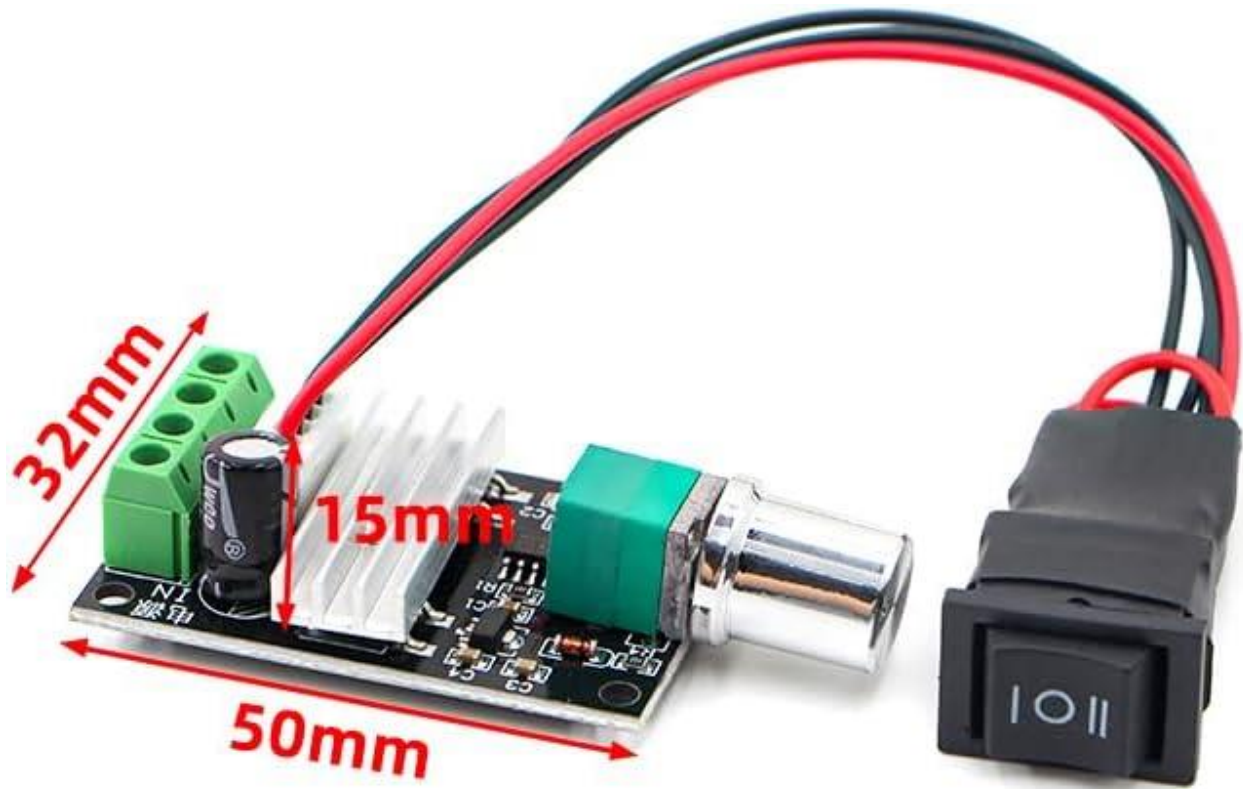


Image 4.1: Dimensions of the RioRand RR-PWM-3A DC Motor Speed Controller, showing approximate measurements of 50mm length and 32mm width.

5. Package Contents

- 1 x RioRand RR-PWM-3A DC Motor Speed Controller

6. Setup and Installation

Follow the wiring diagram carefully to connect the power supply and the DC motor to the controller. Ensure all connections are secure and correct polarity is observed.

1. **Identify Terminals:** The controller has clearly labeled terminals for Power Input (POWER+ / POWER-) and Motor Output (MOTOR+ / MOTOR-).
2. **Connect Power Supply:** Connect your DC power supply (6V-28V) to the POWER+ and POWER- terminals. Ensure the positive (+) terminal of the power supply connects to POWER+ and the negative (-) terminal connects to POWER-.
3. **Connect DC Motor:** Connect your brushed DC motor to the MOTOR+ and MOTOR- terminals. The polarity here will determine the initial direction of the motor. You can reverse this later using the forward/reverse switch.

4. **Secure Connections:** Tighten the screw terminals to ensure a firm connection for both power and motor wires.

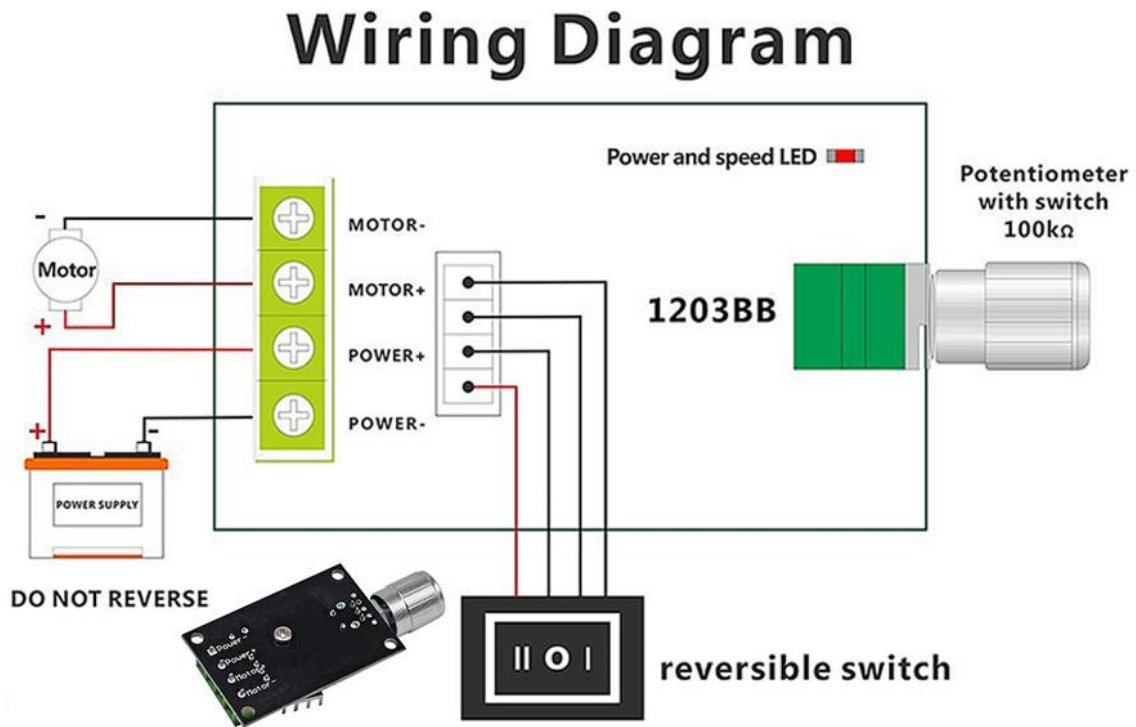


Image 6.1: Detailed wiring diagram illustrating connections for the power supply, DC motor, potentiometer, and reversible switch. Note the "DO NOT REVERSE" warning for the power supply input.

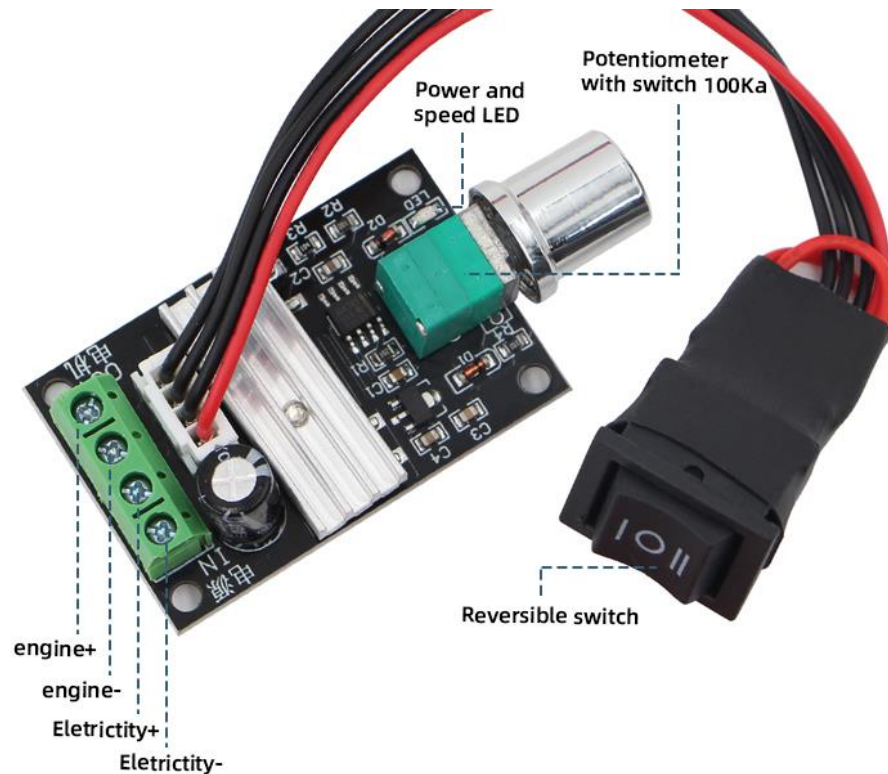


Image 6.2: An overhead view of the controller board, indicating the Power and Motor connection terminals, the potentiometer, and the reversible switch connection points.

7. Operation

1. **Power On/Off:** The potentiometer knob functions as an ON/OFF switch. Rotate the knob clockwise from the fully counter-clockwise position to turn the controller on. Continue rotating to increase speed. Rotate fully counter-clockwise to turn off.
2. **Adjusting Speed:** Once powered on, rotate the potentiometer knob clockwise to increase the motor speed and counter-clockwise to decrease it.
3. **Changing Direction:** Use the integrated forward/reverse switch to change the direction of the motor rotation. The switch typically has three positions: Forward, Off (center), and Reverse.
4. **Monitoring:** The power and speed LED indicator will illuminate when the controller is active.

8. Troubleshooting

Problem	Possible Cause	Solution
Motor does not run	No power, incorrect wiring, potentiometer in OFF position, motor fault.	Check power supply connection and voltage. Verify wiring against diagram. Rotate potentiometer clockwise. Test motor independently.
Motor runs intermittently or at incorrect speed	Loose connections, power supply instability, motor overload.	Ensure all connections are secure. Use a stable DC power supply. Reduce motor load if exceeding 3A.
Controller gets hot	Motor drawing too much current (over 3A), insufficient ventilation.	Reduce motor load. Ensure adequate airflow around the controller. Verify motor current draw does not exceed 3A.
Motor direction cannot be changed	Faulty forward/reverse switch, incorrect motor wiring.	Check the switch operation. Verify motor wiring.
Controller damaged after connection	Connected to AC power, reverse polarity, over-voltage, over-current.	Review safety information. Ensure correct DC power source and polarity. Verify voltage and current are within specifications.

9. Maintenance

- **Cleaning:** Keep the controller free from dust and debris. Use a soft, dry cloth for cleaning. Do not use liquids or solvents.
- **Inspection:** Periodically inspect wiring connections for looseness or damage.
- **Storage:** Store the controller in a dry, cool environment away from direct sunlight and extreme temperatures.
- **Enclosure:** If not already done, consider placing the exposed circuit board in a protective enclosure to prevent damage and ensure long-term reliability.

10. Warranty and Support

For warranty information or technical support, please refer to the product's purchase documentation or contact RioRand customer service through the retailer where the product was purchased.