FLIPSKY Mini V6 MK5

FLIPSKY Mini V6 MK5 Electronic Speed Controller User Manual

Model: Mini V6 MK5

1. Introduction

The FLIPSKY Mini V6 MK5 is an advanced electronic speed controller (ESC) designed for various electric vehicle applications, including e-skateboards, e-bikes, scooters, and robots. Based on VESC6.6 hardware, it features an integrated power button and an aluminum anodized heat sink for efficient thermal management. This manual provides essential information for the safe and effective use of your Mini V6 MK5 ESC.

2. Safety Information

- Always disconnect the battery before performing any wiring or maintenance.
- Ensure all connections are secure and properly insulated to prevent short circuits.
- Operate the ESC within its specified voltage range. The Mini V6 MK5 supports 14V-60V (4-13S battery cells). It is safe for 4S to 12S configurations, but voltage spikes must not exceed 60V. Exceeding this limit can cause permanent damage.
- Avoid operating the ESC in wet conditions or environments with excessive dust or debris.
- Ensure adequate airflow around the heat sink to prevent overheating during operation.
- Keep out of reach of children.

3. Product Overview

The FLIPSKY Mini V6 MK5 ESC is a compact and powerful controller featuring a robust design with an aluminum anodized heat sink for improved heat dissipation. It includes an integrated power button for convenient operation.

Figure 3.1: Overall view of the FLIPSKY Mini V6 MK5 ESC, showing the main board, capacitors, motor wires, battery wires, and the external power button.

Figure 3.2: Top view of the ESC, highlighting the main integrated circuits, capacitors, and various connection ports.

Figure 3.3: Close-up view of the aluminum anodized heat sink, which aids in dissipating heat generated during operation, ensuring stable performance.

4. Specifications

Parameter	Value
Firmware Version	60
Hardware Version	VESC 6.4
Continuous Current	70A
Instantaneous Current	200A
Voltage Range	14V-60V (4-13S, safe for 4S to 12S; voltage spikes must not exceed 60V)
Control Interface Ports	USB, CAN, UART, SPI, IIC
Supported Sensors	ABI, HALL, AS5047, AS5048A
Input Set Support	PPM, ADC, NRF, UART

Control Modes	DC, BLDC, FOC (sinusoidal)
Regenerative Capacity	Yes
BEC Output	5V@1A
ERPM	150000
Programmable	Yes
Motor Wire Gauge	12AWG
Power Cable Gauge	12AWG
Dimensions (L x W x H)	67mm x 39mm x 18.7mm (2.64" x 1.54" x 0.74") (Including heatsink)
Weight	130g (0.13 Kilograms)
Material	Aluminum

Figure 4.1: Dimensions of the FLIPSKY Mini V6 MK5 ESC, showing length, width, and height measurements.

5. Setup and Wiring

Proper wiring is crucial for the safe and correct operation of the Mini V6 MK5 ESC. Follow the diagram below for connecting your battery, motor, and receiver.

5.1 Wiring Diagram

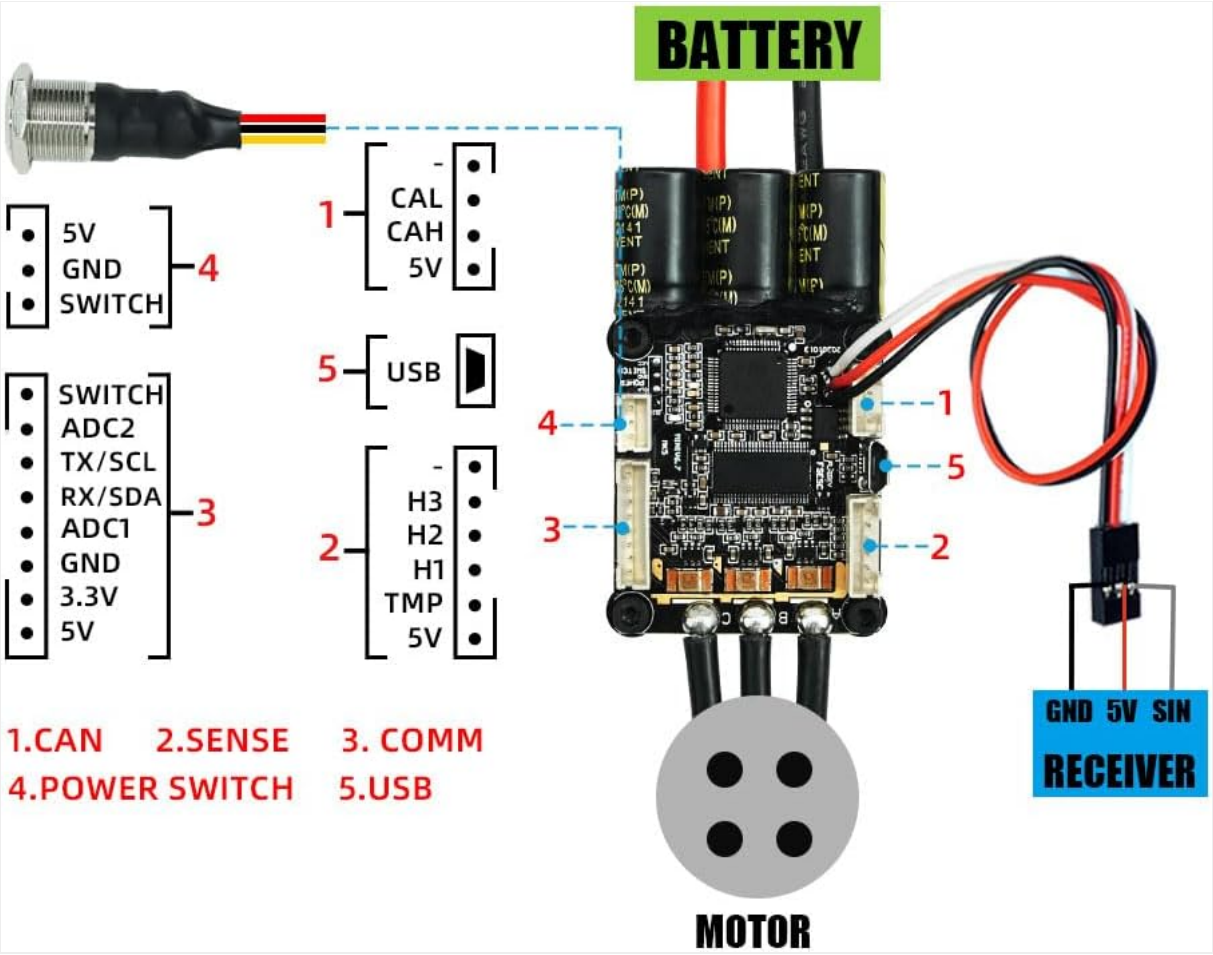

Figure 5.1: Detailed wiring diagram illustrating connections for battery, motor, receiver, and various control interfaces (CAN, SENSE, COMM, Power Switch, USB).

5.2 Connection Steps

1. **Battery Connection:** Connect your battery pack to the main power cables (red for positive, black for negative) of the ESC. Ensure correct polarity.
2. **Motor Connection:** Connect the three motor phase wires (A, B, C) from your motor to the corresponding outputs on the ESC. The order may affect motor rotation direction, which can be adjusted in software.
3. **Receiver Connection:** Connect your receiver to the COMM port or other appropriate input set support (PPM, ADC, NRF, UART) as per your setup.
4. **Power Button:** The integrated power button connects to the designated switch port.
5. **USB Connection:** Use the USB port to connect the ESC to a computer for initial configuration and firmware updates using compatible VESC tool software.
6. **Optional Modules:** For balancing car functions, connect an IMU module (e.g., MPU9250, MPU9150, MPU6050, LSM6DS3, BMI160) via the IIC interface.

6. Operating Modes and Functions

The Mini V6 MK5 ESC offers versatile control and power management features:

6.1 Control Modes

- **Current Control Mode:** Regulates the motor current.
- **Dutycycle Control Mode:** Controls the motor's duty cycle (voltage applied).
- **Speed Control Mode:** Maintains a set motor speed (RPM).
- **Position Control Mode:** Controls the motor's angular position.

6.2 Power Management

- **Sliding Power On:** Allows the device to power on automatically when motion is detected.
- **Automatic Power Off:** The ESC can be configured to power off after a period of inactivity.
- **Standby Function:** Supports 4 different standby modes for power efficiency.

7. Maintenance

To ensure the longevity and optimal performance of your FLIPSKY Mini V6 MK5 ESC, consider the following maintenance tips:

- **Regular Inspection:** Periodically check all wiring connections for looseness or damage.
- **Cleanliness:** Keep the ESC and its heat sink free from dust, dirt, and moisture. Use a soft, dry brush or compressed air for cleaning.
- **Thermal Management:** Ensure the heat sink is not obstructed and has adequate airflow, especially during high-load operations.
- **Firmware Updates:** Regularly check for and apply official firmware updates using the VESC tool to benefit from performance improvements and bug fixes.

8. Troubleshooting

The Mini V6 MK5 ESC incorporates several protection functions to safeguard itself and connected components. If you encounter issues, consider the following:

8.1 Protection Functions

- **Low Voltage Protection:** The ESC will reduce power or shut down if the battery voltage drops below a configurable threshold.
- **High Voltage Protection:** Protects against overvoltage conditions.
- **Over-Current Protection:** Limits current to prevent damage from excessive loads.
- **Temperature Abnormally Protection:** Monitors internal temperatures and reduces power if they exceed safe limits.
- **MOSFETs Over-Temperature Protection:** Specifically protects the MOSFETs from overheating.

8.2 Common Issues and Solutions

- **No Power:** Check battery connections, ensure the power button is pressed, and verify battery charge level.
- **Motor Not Spinning:** Verify motor phase wire connections, check sensor connections (if used), and ensure the ESC is properly configured via the VESC tool.
- **Intermittent Operation:** Inspect all wiring for loose connections or damage. Check for signs of overheating.
- **ESC Not Responding to Input:** Confirm receiver connection and proper configuration of input set support (PPM, ADC, NRF, UART) in the VESC tool.

9. Warranty and Support

The FLIPSKY Mini V6 MK5 ESC comes with a warranty description of "2m+". For specific warranty terms and conditions, please refer to your purchase documentation or contact the retailer.
For technical support, troubleshooting assistance beyond this manual, or inquiries regarding repairs, please contact FLIPSKY directly or your authorized dealer. Provide your product model number (Mini V6 MK5) and any relevant purchase information when seeking support.