

Raiden 7 User Guide

ZESC



Thank you for choosing our products!

For better experience, please carefully read the following document.

Product Specifications:

Model	Raiden 7	Raiden 7-HV
Phase current	120A 10 seconds 250A	120A 8 seconds 200A
Battery voltage and current	24-78V 80A cont, 140A peak	24V-94V 80A cont, 120A peak
Power rating	2-4KW	2-4KW
Peripherals	ADC1, ADC2, UART, PPM, IIC, CANbus, USB-C	
Size	71x89x25mm	
Screw terminals	Five m4 screw terminals Fit up to 10 AWG wires	
IMU	BMI160	

Motor current depends solely on cooling conditions. Raiden 7 can only safely operate with adequate cooling installed. Under ideal cooling conditions (water cooling), Raiden 7 can run at 120A continuously and even higher. Battery current and power must be in the range. For simplicity, just set battery current as 80 and wattage as 4000 in vesctool. Software will dynamically calculate limit for you. If you want to hit 140A and 250A limit, please don't last long. Please make sure temperature of everything including cables and connectors below 80C. All limits here are recommended values. You can go beyond the limit, but take your own risk.

Battery voltage	Battery current
24V to 60V	80A max
60.1V to 94V	$I_{batt} = \frac{4KW}{V_{batt}}$

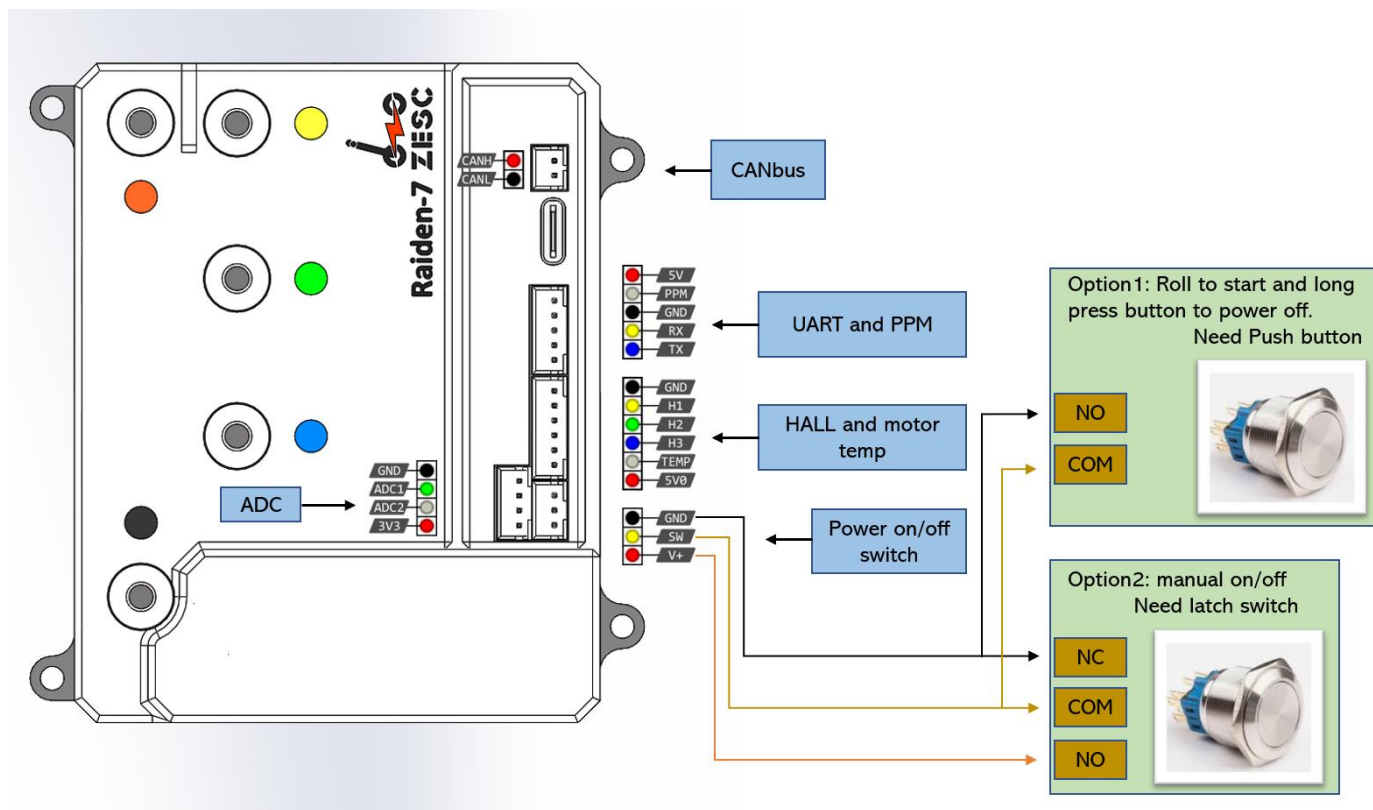
Guides for Moter current:

Heat is from conduction loss and switching loss of MOSfets. As the voltage increases, switching loss dominates. To make sure junction temperature is below the limit, please follow the table below to set max motor current. Motor current is also limited by motor itself. Don't supply 200A to a 50A motor.

Battery voltage	Motor current for R7	Motor current for HV	FOC frequency
25.2V to 58.5V (6S-14S)	250A MAX	200A MAX	20Khz to 30Khz
63V to 75.6V (15S-18S)	220A MAX	200A MAX	20Khz
79.8V to 84V (19S -20S)	NA	200A MAX	20Khz
88.2V to 92.4V (21S-22S)	NA	150A MAX	20Khz

Pinout:

Current version (Purchased after May 2023)



Power on/off:

Please choose either option 1 or 2. Connect needed switch in the way as shown above.

Option 1 is roll to start. Raiden-7 will be activated when rolling wheel. To power off, please long press button until the green led on ESC is out.

Option 2 is manual on/off control. Press the switch to power on and release the switch to power off.

Good to know:

1. Always **double check the wiring** before powering on!
2. Please use **FOC mode**. It can drive motor smoothly and silently.
3. For **sensorless and sensored** FOC mode, FOC frequency between 20k and 40k are recommended.
4. If you feel unexpected vibration during high current motor start up, please disable saturation compensation mode in FOC->sensorless
5. Do not connect any load on 3v3 and 5v. Only Bluetooth module, receiver and lcd/oled panel are allowed. Something like RC servo motor is not allowed.
6. When input voltage is over 72v, please stay with 20khz (default value) FOC frequency. Higher switching frequency results extra switching loss which generates heat.

Caution:

1. **Be careful with high voltage!**

More Questions? We got you covered.

If you have any questions, contact us through email: discoverzesc@gmail.com or private message us on ESK8.

Again, thank you and be careful when riding!

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