



TW 40A/80A Instruction Manual for Underwater Brushless Motor Electronic Speed Controller1.0 (2025.3.3)

Thank you for using our product! The brushless power system is powerful, and incorrect use may cause personal injury and equipment damage. Therefore, we strongly recommend that you carefully read this instruction manual before using the device. We will not assume any liability for the use of this product, including but not limited to liability for compensation for incidental or consequential damages. At the same time, we will not assume any liability for unauthorized modifications to the product or incorrect use.

We reserve the right to change the product design, appearance, performance, and usage requirements without prior notice.

Product Features

- IP68 waterproof, throttle can be reversed, easy to use, stable and reliable, with strong anti-interference ability and good speed regulation performance.
- Multiple safety protections: over-current protection, stall protection, and signal loss protection.
- Optically isolated signal input and output interfaces.
- Serial port outputs real-time data: power supply voltage, motor speed, current, ESC temperature, and debugging data.

Specification Parameters

- Operating voltage: 6 - 12S LIPO
- Maximum current: (TW40A)45A/ (TW80A)90A(ambient temperature 25°C, with good heat dissipation, test voltage 48V, lasting 3 seconds)
- Throttle range: PWM 1000us - 1500us for forward rotation / 1500us - 2000us for reverse rotation, reversible
- Signal frequency: PWM 50 - 400HZ
- Standby current: ≤50mA @48V

Protection Functions

- Stall protection: If a stall occurs during normal operation (usually caused by external forces), try to restart (note that a stall at high throttle may damage the ESC).
- Over-current protection: The maximum over-current protection value is 1.1 - 1.5 times the normal operating maximum value, with a response time of 0.1 seconds to limit the average current below the limit value.
- Runaway protection: After losing the signal for 200ms, the output power will gradually decrease, and can be reduced by up to 50% of full throttle.



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Power Connection



One end with a red and black output line is the power input (6-12S LIPO). The red line is connected to the positive pole, and the black line is connected to the negative pole of the input power supply.

Three phase connection between motor and ESC



The same end as the copper nozzle is the output terminal of the three-phase wire, which is connected to the three-phase wire of the motor.

Copper mouth connection



The yellow copper nozzle is connected to the water pump pipe with one inlet and one outlet at both ends (the outer diameter of the copper nozzle is 4mm).

PWM Throttle Calibration

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When the ESC is correctly connected and powered on, throttle calibration will start when the throttle is at its maximum value (2000us), and a sound "♪ 123 - 3 - 3 - 3" will be emitted. Then, within a few seconds, set the throttle to its minimum value (1000us). The calibration is completed after waiting for the sound to end. After successful calibration, set it to 1500us (zero throttle).

PWM Throttle Forward and Reverse Rotation

When the ESC is correctly connected and powered on, set the throttle to 1500us (zero throttle). When the throttle is between 1500us - 2000us, it rotates forward; when it is between 1500us - 1000us, it rotates reverse. After the test, turn the value to 1500us, and the motor stops.

Signal Line Definition



Serial Port Line Definition



Data Output

The data output uses a 3 - wire UART - TTL with a baud rate of 38400bps in character mode.
Data packet format: SPD:XXXX TMOS:XXXX TMOT:XXXX TMCX:XXXXXXXXXXXX
CURI:XXXX VOLT:XXXX PWAC:XXXX SYS:XXXXXXXXXXXX
DBG:XXXXXXXXXXXX
SPD:XXXX: Motor speed (RPM)
TMOS:XXXX: ESC temperature (°C)
TMOT:XXXX: Motor temperature (°C, reserved data)
TMCX:XXXXXXXXXXXX: (Debugging reserved data)
CURI:XXXX: Motor current (×0.01A)
VOLT:XXXX: Power supply voltage (×0.01V)
PWAC:XXXX: Power supply ripple (Debugging reserved data)
SYS:XXXXXXXXXXXX: (Debugging reserved data)
DBG:XXXXXXXXXXXX: (Debugging reserved data)

Precautions

- ❖ The signal pulse width and frequency must meet the requirements. Do not plug or unplug the control signal line while powered on. Ensure that the ESC signal line is reliably connected without looseness to prevent interference signals from causing control abnormalities.



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- ❖ Use a stable load. When the propeller is blocked by an external object, close the throttle or power off as soon as possible to prevent the ESC from being damaged by excessive stall current.
- ❖ Must be used underwater! Ensure good heat dissipation of the ESC. If the ESC works at a high temperature for a long time, it will accelerate the aging of components and greatly reduce the service life of the ESC.
- ❖ It is recommended to monitor the working temperature in real - time. Determine whether the current working condition is safe based on the real - time output temperature data (a temperature below 90°C is relatively safe, 90 - 110°C indicates poor heat dissipation or excessive load, and over 110°C is unsafe).
- ❖ Do not short - circuit the phase wires when the ESC still has residual power, as it may damage the ESC.
- ❖ It is recommended to use an anti - spark plug for power connection to prevent sparks and damage to the plug, and improve the power - on safety. Do not use a large throttle before the ESC starts up completely.
- ❖ Ensure that the power supply voltage is stable and the connection is reliable; otherwise, it may damage the ESC.
- ❖ Please use the recommended configuration with the ESC to obtain the best performance (force - efficiency, power, and safety). If an incompatible motor, propeller (or even a non - propeller load or variable load) or incorrect voltage is used, the optimal performance may not be achieved, and the ESC may even be damaged.