Manual of Thunder 300A intelligent brushless motor ESC(IESC) 2.1

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Characteristics

Easy to use, stable and reliable, strong anti-interference ability, good speed regulation performance.
Muti-safety protection: low-voltage protection, high-voltage protection, overcurrent protection, over-temperature protection, startup failure protection, stall protection, lost signal protection.
Photoelectric isolation PWM control interface.
Isolated serial port data post back: post back supply voltage, RPM, current, ESC temperature and debug data.
Extraposition temperature sensor, temperature measurement precision.
6KHZ high frequency modulation, less modulation noise

Performance Parameter

Voltage: 14-24s(highest voltage:100V)
Max thrust: 300A(environment temperature 25℃，good heat dissipation, test data 100V, continue 3seconds)
Throttle: PWM: 1000us-2000uS, need calibration
Signal Frequency: PWM: 50-400HZ. DSHOT: 50-1000 HZ
Serial port output baud rate: 38400 bps
Standby current: 100V 6mA; 60V 9mA
high-voltage protection: Do not start the motor when the supply voltage exceeds the allowable voltage
low-voltage protection: Customization
Starting Protection: Auto reboot if startup failed
Stall protection: Stall during normal operation(generally caused by external forces), try to reboot
over-temperature protection: the maximum output power slowly decreases if the temperature exceeds 110℃; Can be reduced to 40% of full throttle power; original power is restored after the temperature is lowered
overcurrent protection: maximum current protection value is 1.1-1.5 times of normal working maximum value, the reaction time is 0.1 seconds, and average current is limited within limit value
lost signal protection: Output power is gradually reduced after loss of signal after 200ms, at most reduce 50% of full throttle.

PWM throttle calibration

When the power is switched on, throttle at maximum will initiate throttle calibration with bee-bee-bee three times, then set throttle to a minimum value after several seconds, wait for the music to complete the calibration.

Power system match

ESC is generally optimized for a certain power configuration to obtain the best performance(efficiency, max power, safety). If mismatched motors and propellers are used, the optimal performance and safety may not be achieved and even ESC may be damaged. Please be clear about the matching power configuration of hardware and firmware

Data postback

Adopt three wire UART DATA postback, signal wire definition in sequence: ground wire, signal wire, power wire(3.3-5.0V), baud rate 38400bps, character mode

Data package format：SPD:XXXX TMOS:XXXX TMOT:XXXX TMCX:XXXXXXXXXXXX
CURI:XXXX VOLT:XXXX PWAC:XXXX SYS:XXXXXXXXXXXX
DBG:XXXXXXXXXXXX。
SPD:XXXX   RPM
TMOS:XXXX   ESC temperature(℃)。
TMOT:XXXX   Motor temperature(℃，retention data)。
TMCX:XXXXXXXXXXXX (debug retention data)。
CURI:XXXX   Motor current(X 0.01 A)。
VOLT:XXXX   supply voltage(X 0.01 V)。
PWAC:XXXX   Power Ripple(ebug retention data)。
SYS:XXXXXXXXXXXX (ebug retention data)。
DBG:XXXXXXXXXXXX (ebug retention data)。

Signal line definition

Signal line plug as shown above. For the control interface, 1 is signal ground, 2 is empty, 3 is PWM input; For the data post back interface, 1 is post back signal ground, 2 is post back signal wire TXD, 3 is power supply 3.3-5.0V(current＞10ma)

Notes:

Please shut down once prop is stalled externally to avoid ESC damaged from large current.

Do not plug and move control signal wire when power on to prevent interference signal, and avoid being injured by a suddenly turning prop.

Do not work long time at maximum power, which will greatly reduce the service life.

Ensure good heat dissipation, safe and reliable use(check whether configuration is safe based on the real-time post back temperature, safer to go below 90℃; 90-110℃ indicates poor heat dissipation or heavy load); If the heat dissipation is poor, it is necessary to reduce the working current to prevent the damage of ESC; in general, if ESC is in a sealed environment with poor heat dissipation, the operating current should be reduced by more than half of the maximum current.

Working at high temperature for a long period will accelerate the aging of components. Postback temperature can be tested irregularly to determine whether it is safe or not. If the operating temperature can be monitored in real time, it is more appropriated.

Ensure connection of signal line is reliable without looseness to prevent abnormal control and signal loss which may cause shutdown.

Ensure control signal is not interfered, the pulse width and frequency must meet the requirements.

The output phase line is not allowed to short circuit before power is discharged, which may cause damage of ESC.

The use of anti-spark plug to connect the power supply can reduce the impact on ESC and improve the safety of power on.

Ensure the power supply voltage is stable, otherwise it may cause damage of ESC.