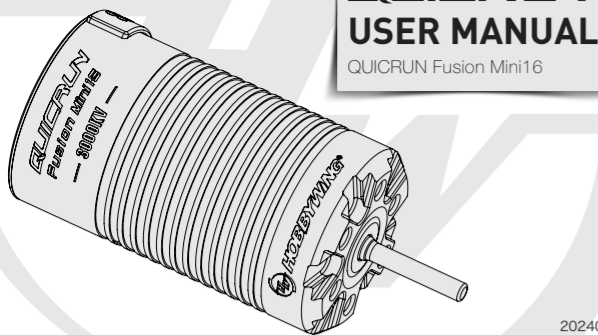


01 Disclaimer



Thank you for purchasing this HOBBYWING product! Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend reading through this user manual before use and strictly abide by the specified operating procedures. We shall not be liable for any liability arising from the use of this product, including but not limited to reimbursement for incidental or indirect losses. Meanwhile, we do not assume any responsibility caused by unauthorized modification of the product. We have the right to change the product design, appearance, performance and use requirements without notice.



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02 Attentions

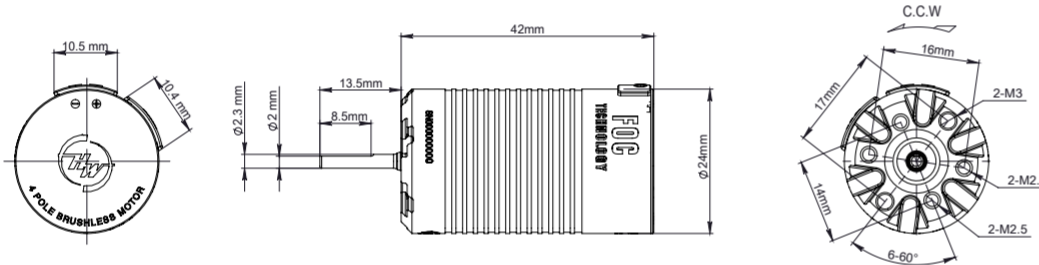
- Ensure all wires and connections are well insulated before connecting the 2-in-1 system to related devices, as short circuit will damage the system.
- Read the manuals of all the items being used in the build. Ensure gearing, setup, and overall install is correct and reasonable.
- It is important to ensure that all wires & connectors soldered are properly secured to avoid short circuits from happening. A good soldering station is recommended to do such a job to ensure connections are properly soldered.
- Do not let the external temperature of the system exceed 90°C/194°F, high temperature will damage the power system.
- The battery must be disconnected after use. There is a small draw even when the system is off, and will eventually fully drain the battery. This may cause damage to the ESC, and will NOT BE COVERED UNDER WARRANTY.

03 Features

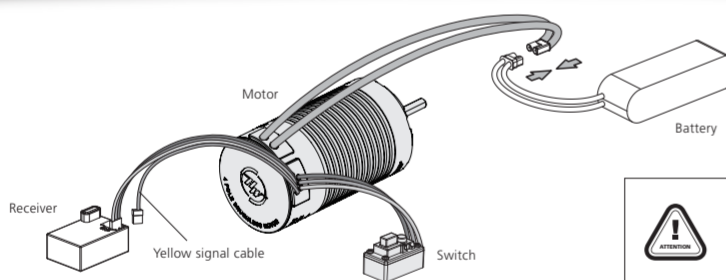
- The integrated design of the ESC and the motor, makes the layout and wiring of car frame simpler and more convenient.
- FOC(Field Oriented Control) driving mode to the power system of rock crawler. The low speed torque is very strong. This improves over standard brushless setups and is even preferred over the brushed setups for overall feel.
- The system has high efficiency, less heat, and effectively extends the run time; and the motor runs more quietly and soft.
- The protection grade of the whole system is IP65, capable of running in all conditions.
- Intelligent torque output and speed closed-loop control, making the control handy.
- Active drag brake force adjustment, providing super Holding Power on inclines.
- With strong built-in switch mode BEC, the continuous current is up to 4A, and support switch between 6V and 7.4V, capable of driving high torque and high voltage servos.
- Multiple protection functions: battery low voltage protection, overheat protection, throttle lost protection, lock-up protection.
- It supports LED and LCD G2/Pro program box to set ESC parameters, making setting parameters more convenient.

04 Specifications

Model	QUICRUN Fusion Mini16
Continuous / peak current	30A / 80A
Main applications	1/16&1/18 Crawler
Lipo Cells	2-3S Lipo, 6-9 Cells NiMH
BEC output	6V / 7.4V adjustable, continuous current 4A (Switch mode)
Size/Weight	24mm(diameter)x42mm(length) / 72g (including wires&connectors)
Programming port	Independent programming cable
Motor KV	3000KV
Diameter / Length of motor	24mm / 42mm
Shaft diameter / exposed shaft length	2.3mm / 13.5mm
Motor Poles	4



05 Connections



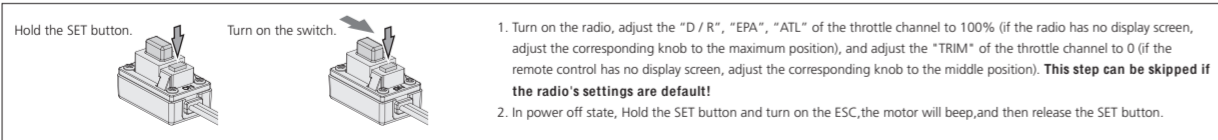
Warning: The power of the system is powerful. For the safety of you and other people around you, we strongly recommend that you remove the pinion gear before calibrating and setting the system, and turn on the control switch of the ESC when the wheel is suspended!

- **Installation of the motor**
This motor has 4xM2.5 and 2xM3 installation screw holes, and the mounting holes are 4mm in depth, before installing the motor on the vehicle, please carefully confirm whether the length of the screws is appropriate, as not to damage the motor due to excessive length.
- **Connect receiver**
Insert the throttle cable of the ESC into the throttle channel of receiver. Because the red line of throttle cable output 6V/7.4V voltage to receiver and steering servo, do not supply power to receiver, otherwise the ESC may be damaged. If need to supply power, unpin/disconnect the red wire with the throttle cable, insulate it and secure it away.
- **Yellow signal cable**
This cable has two functions. 1. As a programming cable, it is used to connect the program box to set the parameters of the esc. For details, please refer to the "Parameter Setting Method" item. 2. As an auxiliary cable, it is used to connect to an AUX/idle channel on the receiver, and the Drag Brake Force can be adjusted in real time using the channel switch/knob specified by the transmitter.
- **Connect battery**
The input line of the system has polarity. When connecting the battery, make sure that the (+) pole of the ESC is connected to the (+) pole of the battery and the (-) pole is connected to the (-). If the system is connected in reverse, the system will be damaged. There is no warranty service for damaging ESC due to reversed polarity.

06 ESC Setup

1 Set the Throttle Range – ESC Calibration

On the first use the system or the radio/transmitter changes "Throttle TRIM", or the radio has been replaced, the throttle range is need to reset, otherwise the esc may not work correctly. We recommend to set the fail-safe function of throttle channel ("F/S") to close output mode or set the protection value to the neutral position, making the motor stop running when the receiver cannot receive signal of the radio. The method of setting the throttle range is as following:



1. Turn on the radio, adjust the "D / R", "EPA", "ATL" of the throttle channel to 100% (if the radio has no display screen, adjust the corresponding knob to the maximum position), and adjust the "TRIM" of the throttle channel to 0 (if the remote control has no display screen, adjust the corresponding knob to the middle position). **This step can be skipped if the radio's settings are default!**
2. In power off state, Hold the SET button and turn on the ESC, the motor will beep, and then release the SET button.

3. At this time, three points need to be set: the neutral position, the end position of forward and the end position of reverse.
 - The throttle trigger stays at the neutral position, press the SET button, the motor emits "beep" once, indicating that the neutral position has been stored.
 - Pull the throttle trigger to the end position of forward, press SET button, the motor emits "beep" twice, indicating that the end position of forward has been stored.
 - Push the throttle trigger to the end position of reverse, press SET button, the motor emits "beep" three times, indicating that the end position of reverse has been stored.
4. After calibrating, the motor can be operated normally.

2 Instruction for power on/off and Tones

Instruction for power on/off: Short press the switch button to start in off state; long press the switch button to shut down in on state.
Instruction for sound: Start in normal condition (Not setting throttle range), the times of beep emitted by motor indicates the number of Lipo Cells, for example, "Beep, Beep" indicates 2S Lipo; "Beep, Beep, Beep" indicates 3S Lipo.

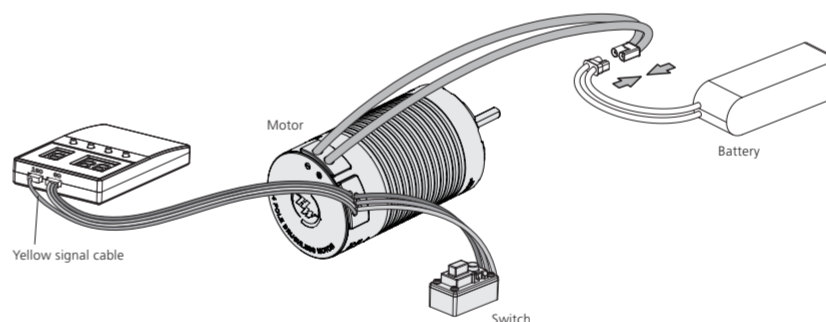
3 Instruction for programmable items

The highlighted options are the default settings of the system.

No.	Setting item	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
1	Running Mode	Forward and Reverse (RPM Matching)	Forward/Reverse with Brake (Normal mode)	Forward and Reverse (Normal mode)						
2	Lipo Cells	Auto	2S	3S						
3	Cutoff Voltage	Disabled	Low	Medium	High					
4	Thermal Protection	105°C/221°F	125°C/257°F							
5	Motor Rotation	CCW	CW							
6	BEC Voltage	6.0V	7.4V							
7	Drag Brake Force	Disabled	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
8	Drag Brake Rate	Auto	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
9	Max. Reverse Force	25%	50%	75%	100%					
10	Max. Brake Force	10%	20%	30%	40%	50%	60%	70%	85%	100%
11	RPM Decrease Rate	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9
12	Punch	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9
13	Neutral Range	4%	6%	8%	10%	12%				

1. **Running Mode:**
Option 1: Forward/Reverse(RPM Matching)
When the throttle trigger is pushed from neutral to reverse area, the motor reverses immediately.
Through speed closed-loop control to realize cruised control function, that is, when the resistance of the vehicle changes, the ESC will automatically adjust the output torque.
Option 2: Forward/Reverse with Brake(Normal mode)
The vehicle only brakes on the first time you push the throttle trigger to the reverse/brake position. If the motor stops when the throttle trigger return to the neutral position and then re-push the trigger to reverse position, the vehicle will reverse. If the motor does not completely stop, then your vehicle won't reverse but still brake, you need to return the throttle trigger to the neutral position and push it to reverse again. This method is for preventing vehicle from being accidentally reversed.
Like common sensed brushless or brushed ESC, the ESC will not automatically adjust the output torque in this mode, that is, when the resistance of the vehicle changes, the speed will change accordingly.
Option 3: Forward/Reverse(Normal mode)
When the throttle trigger is pushed to reverse position, the motor reverses immediately.
Like common sensed brushless or brushed ESC, the ESC will not automatically adjust the output torque in this mode, that is, when the resistance of the vehicle changes, the speed will change accordingly.
2. **Lipo Cells:**
The default setting is auto detect. If you usually use the same battery, we suggest you set manually the number of Lipo Cells to avoid miscalculation of the cell count (Which may mistakenly judge 3S Lipo that have no power as 2S Lipo that are fully charged, which will cause the low-voltage protection function of the ESC operates incorrectly.
3. **Cutoff Voltage:**
This function is mainly to prevent the irrecoverable damage caused by over discharge of Lipo Cells. If the voltage protection is turned on, the ESC will monitor the battery voltage all the time during operation. Once the voltage is lower than the set threshold value, the power output will gradually reduce to 50% of the full power, and the power will be completely disabled after 40 seconds. When entering the low-voltage protection, the motor will beep three times in a cycle. When set to "Disabled", there will be no low voltage protection function, for NiMH batteries, you can set this parameter to "Disabled". The low, medium and high options correspond to 3.0V/Cell, 3.25V/Cell, 3.5V/Cell.
4. **ESC Thermal Protection:**
After the system temperature rises to the set value, the power output will decrease to 50% of full power, and after about 40 seconds, it will completely shut down, the motor will beep twice in a cycle. After the system temperature drops below a certain value, the output can be automatically restored.
5. **Motor Rotation:**
The rotation will correspond to the direction of rotation of the shaft when the motor shaft is facing you. The back of the motor will be away from you. The default setting is CCW (counter clock wise) when applying throttle. If your vehicle requires the motor to rotate CW (clock wise) while facing the motor shaft then change the programming to CW.
6. **BEC Voltage:**
BEC voltage support 6V/7.4V. Generally, 6.0V is suitable for standard servos, while 7.4V is suitable for high-voltage servos. Please set according to the servo specifications.
Note: Do not set the BEC voltage above the maximum operating voltage of the servo and receiver, as this may damage the servo, receiver, or even the system.
7. **Drag Brake Force:**
Drag brake means a brake force on the motor when the throttle trigger returns to the neutral position. There are 9 options of drag brake force to adjust, "Disabled" means the drag brake force is 0; the corresponding drag brake force increases from level 1 to level 8. Select the appropriate drag brake force according to the actual situation.
This parameter value can be adjusted in real time through the transmitter, when the yellow signal cable of the esc is connected to AUX channel of the receiver, the drag brake can be set in real time through the corresponding keys/knobs of the channel. When the yellow wire is used to control the drag brake, the highest signal will be the drag brake setting and decrease linearly as the signal is reduced to lowest signal. The lowest signal will be 0 drag brake.
8. **Drag Brake Rate:**
Usually called slow brake, this will set how aggressively the drag brake is applied when the throttle is returned to neutral. This setting has 9 options to adjust, the higher the level is, the more aggressive the drag brake will apply. When set properly for the surface being driven on the vehicle can stop stably. In Auto mode, the system adjusts the drag brake rate automatically as per the current draw, the higher the current draw, the lower the drag brake rate, it can help prevent vehicle from flipping over or the drivetrain from damage due to the aggressive application of drag brake when driving at a high speed but also provides precision control when driving at a low speed.
9. **Max. Reverse Force:**
Select different parameter value can produce different max. reverse force.
10. **Max. Brake Force:**
The ESC provides proportional braking function, with the size of the braking force and the position of the throttle trigger relatable. The maximum braking force refers to the braking position when the brake is applied. Depending on the vehicle, select the appropriate maximum braking force.
11. **RPM Decrease Rate:**
This refers to the speed of rpm change when reducing the throttle (from high to low throttle) in the normal mode. The higher the value, the faster the change. If you would like to have a "coasting" feeling when the throttle is reduced, like a normal brushless system, this value needs to be set low.
Note: this parameter is only valid for normal running mode.
12. **Punch:**
The Punch setting is used to control how aggressive the motor starts. The higher the value the more aggressive the starts will be. Lowering the punch setting can help with low traction situations, or stuttering when the throttle is aggressively applied.
13. **Neutral Range:**
Some radios will have a larger neutral range. If you have difficulties calibrating the neutral position increase the value.

4 Parameter setting method



This system supports the use of LED and LCD G2/Pro program box for parameter settings. Below is an example of the setting method using the LED program box, the connection method for the LCD G2/Pro program box is the same.
The system is in off state, connect the throttle cable (white/red/black-) to the interface marked with "+ +" upper the LED program box (red to positive, black to negative), and at the same time, connect the yellow signal cable to the interface marked with "- + n" upper the LED program box (the yellow wire corresponds to the signal interface). Then power on the ESC, after a few seconds, all parameters of the ESC can be displayed. The "ITEM" and "VALUE" button on the programming card can quickly select the programming items and parameter values, press "OK" button to save the new parameters in ESC.

5 Factory reset

Use LED program box to restore factory settings:
After connect program box and the ESC, press "RESET" button and then press "OK" button to save, the factory settings can be restored.
Use LCD Pro program box to restore factory settings:
After connecting the program box to the ESC, click on **Parameter Settings** and select the **Reset Parameters** to restore the factory settings.

6 Automatic Motor Pairing(Optional)

- If the motor has been subjected to severe impact or has abnormal heating and abnormal power output during operation, need to do the following automatic motor pairing. The operation method is as follows:
- Step 1: Unplug the throttle wire from the receiver, and separate the motor from the gearbox (the motor is in an unloaded state).
 - Step 2: Connect the esc to the battery and the esc is in the off state. Long press and hold the SET button while pushing the switch to turn on, after about 3 seconds, the motor will beep, wait for about 8 seconds until the motor stops beeping, and you can release the SET button to enter the motor pairing process (the motor will not rotate), after about 3 seconds, the system will restart and emit a self-check sound, indicating that the pairing is completed. Finally, the motor will slowly beep to indicate no throttle signal.
 - Step 3: Connect the throttle cable to the receiver to operate normally.

07 Motor beep

1. The motor slowly beeps "beep-, beep-, ...": Prompt for no/abnormal throttle signal.
2. The motor quickly beeps "beep, beep, beep, ...": The throttle is not in the neutral position.
3. The motor beeps twice "beep, beep, beep, beep, beep, ...": The system temperature is too high and enters the overheat protection state. If it beeps like this when turned on, it means that the battery voltage is not within the working range of the system.
4. The motor beeps three times "beep, beep, beep, beep, beep, beep, beep, beep, ...": Entering the low voltage protection state of the battery.

08 Troubleshooting

Malfunction	Cause	Solution
The motor does not work after power on, sounds an alarm	1. The motor beeps slowly indicates a loss of throttle signal; 2. The motor beeps quickly indicates that the throttle is not at the neutral position; 3. The motor beeps twice in a cycle indicates that the input voltage is not within the working range of the esc.	1. Check if the transmitter is turned on and if the throttle cable is connected correctly and reliably; 2. Check if the throttle trim of the transmitter is at the midpoint position and re-calibrate the throttle range; 3. Check the battery voltage.
The car is going in the reversed direction when the forward.	The default rotation direction setting of motor and car frame is unmatched.	Set the parameter item "Motor Rotation" to the opposite direction via LED program box.
The motor suddenly stopped or significantly reduced the output in running.	1. The receiver is interfered; 2. The ESC enters low voltage protection; 3. The ESC enters overheat protection.	1. Check why the receiver is interfered. Check battery level of transmitter; 2. The motor beeps three times means low voltage protection, please replace battery; 3. The motor beeps twice means overheat protection. Please use it after the temperature drops.
When the throttle is in neutral position, the car slowly moves forward or backward.	1. The middle position of radio drifts and the signal is unstable; 2. Throttle range is not calibrated well.	1. Replace a radio with stable signal; 2. Recalibrate throttle range or use throttle TRIM to calibrate midpoint.
The throttle range setting could not be completed.	1. The throttle cable of esc is not inserted the correct channel of receiver, or inserted reversely; 2. Problem with the receiver or transmitter.	1. Check whether the throttle cable is correctly connected to the receiver; 2. If the servo works normally, you can connect the throttle cable of esc to the steering channel to have a test, or change the transmitter/receiver system for test directly.
Abnormal operation, such as high initial rpm.	The system has not been calibrated.	Firstly, do the "Motor Pairing", and then calibrate the throttle range.