60A Sensored/Sensorless Brushless Speed Controller for Car or Truck

Thank you for your purchasing this HobbyStar Electronic Speed Controller (ESC). This electronic speed controller is specifically designed for operating Sensored/Sensorless brushless motors. High power systems for RC model can be very dangerous and we strongly suggest that you read this manual carefully. We have no control over the correct use, installation, application or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of this item. Any claims arising from the operating, failure or malfunction etc. will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation for compensation is limited to the invoice amount of product in question.

**Features:**
- Enhanced throttle response, excellent acceleration, strong brakes and throttle linearity
- Several programable options using either LED program card or Stenlink USB link and PC application
- Multiple protection features: Low-voltage cut-off protection, over-heat protection and signal loss protection
- Compatible with sensorless and sensorless brushless motors

**Begin to Use The New ESC:**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>Motor wire A</td>
</tr>
<tr>
<td>Red</td>
<td>Motor wire B</td>
</tr>
<tr>
<td>Orange</td>
<td>Motor wire C</td>
</tr>
<tr>
<td>Power (red wire)</td>
<td>Power (+)</td>
</tr>
<tr>
<td></td>
<td>Capacitor</td>
</tr>
<tr>
<td></td>
<td>Switch</td>
</tr>
<tr>
<td></td>
<td>Set Button</td>
</tr>
<tr>
<td></td>
<td>Fan wire</td>
</tr>
<tr>
<td></td>
<td>Signal wire</td>
</tr>
</tbody>
</table>

**Sensored Mode**
- When using a Sensored Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the ESC must be connected with the Sensored motor wire A,B,C respectively. It is necessary to connect the Sensor wire to the "Sensor" socket on the ESC.

**Sensorless Mode**
- When using a Sensorless Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the ESC can be connected with the motor wires freely. If the motor runs in the opposite direction, please swap any two wire connections.

**Connection to the Receiver**

ESC Calibration

1. Switch on the ESC, then connect ESC to battery. Throttle and brake and points MUST be set to their maximum setting on your radio, (usually listed as RAW/Traxxas etc). On radio and maximum voltage is from 100%-150%. Turn off all/Motor if equipped.
2. Hold the "Set" button and switch on the ESC, both the red and orange LEDs will be lit. Continue to hold the Set button until only the orange LED is lit. Release the button and immediately apply full throttle and hold it until red light turns solid and motor spins.
3. Push the throttle trigger to Full Brake until the Orange LED blinks and then turns solid (motor will stop).
4. Now return the throttle trigger to Neutral position, the red and orange LED's will flash, turn solid, then turn off and motor will stop.

**Programmable items and default settings:**

| Default settings are shown in the grey boxes |
|---|---|---|---|---|---|---|---|
| **programmable** | **Items** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **Cut-off Voltage** | | 2.4V/cell | 2.8V/cell | 3.0V/cell | 3.2V/cell | 3.4V/cell | No cut-off |
| **Running Mode** | Forward | Forward/Reverse | Forward/Reverse | Reverse |
| **Motor Timing** | Very Low | Low | Normal | High | Very High |
| **Initial Acceleration** | Low | Medium | High | Very High |
| **Throttle Reverse** | 10% | 30% | 40% | 50% | 60% | 70% | 80% | 90% |
| **Throttle Limit** | 0% | 20% | 30% | 40% | 50% | 60% | 70% | 80% |
| **Percentage braking** | 10% | 30% | 30% | 40% | 50% | 60% | 70% | 85% |
| **Percentage Drag brake** | 0% | 4% | 8% | 12% | 15% | 20% | 25% | 30% |
| **Motor Rotation** | Normal | Reverse |
| **Neutral Range** | 2% | 4% | 5% | 6% | 10% |

**Programming information:**

**LED Program Card:**
- It is important to follow the appropriate sequence when using the LED program card. If the sequence is not followed you will not be able to access programming functions.
- With ESC switched off, plug the signal lead into the port on the right side of the card (3 symbols in front of it). The port on the left is for external power if ESC is not connected to a battery. Align the black wire with the "-" symbol. Turn ESC on, the menu function is shown on the left and the current setting on the right. Press "Menu" to scroll through functions, and press "Value" to change the selection. Press "OK" to save changes. When making changes, switch off ESC and unplug card.

1. **Cut-off Voltage**
- This setting selects the battery voltage at which the ESC will cut off power to protect the battery. This is shown as volts per cell. The ESC auto-detects cell count, so selecting 3.0V/cell would cut battery power when pack voltage is at 5.4V. It is recommended to never discharge lithium batteries to less than 3.0V/cell. **NOTE:** When using NiMH/NiCd batteries set to "No Cut-off" or power may be cut prematurely.

2. **Running Mode**
- **Forward** = Forward
- **Reverse** = Reverse
- **Running Mode** = Race setting. In this mode reverse is disabled.
- **With forward then Reverse:** (DEFAULT)
- Default mode for general driving, bashing and racing if reverse is allowed. The Electronic Speed Controller requires 2 seconds of continuous neutral from the transmitter prior to allowing reverse to operate.
- Note: There must be a time delay after any change in the ESC. Only after you have stopped and returned the trigger to neutral will reverse become available. If while traveling in reverse, pull the trigger to go forward. This is to help prevent serious damage to the drive train.

3. **Motor Timing**
- This option affects the power band and efficiency (run time) of an electric motor. The default is "Normal" and is a good starting point to deliver power and provide good run time.
- **Very Low:** Provides maximum efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency (run time) and typically the motor will generate more heat. Each brushless motor will respond differently to timing. Generally for running around on paved, or harder surfaces, and racing with high KV rated or low-torque motors
- **Low:** Provides for running through soft surfaces, bashing and longer run times
- **Normal (Default):** Good mix of power and efficiency using any motor
- **High:** More power than efficiency & run time will be reduced. Motor temps MUST be monitored. The higher KV or lower turn motors will generate heat using this setting. A safe high temperature range is 165°F to 180°F (74 - 82°Celsius), which may damage your motor, or damage your Electronic Speed Controller (ESC).
- **Very High:** This is very high and must be used with caution.
- **Note:** Any motor has the potential to over-heat in this setting. Frequently check the motor temperature and make sure you’re not operating higher than 165°F (74°C). Fast throttle application may cause the motor to damage (165°F to 180°F (74 - 82°Celsius), which may damage your motor.

4. **Throttle Percent Reverse**
- This limit is to limit the initial power that is sent to the motor when starting from a complete stop.
- Using the low option, the vehicle will launch very slowly and provide the longest run times. When using the HIGH choose, you will have wheel-spinning acceleration at the cost of run time. This is also very tough on the batteries as the ampereage draw can be very high. If your vehicle cuts out, hesitates or loses radio control, you should consider setting this at a lower value.
- **Low:** Low using this option will provide longer run times and is easiest on the batteries. It is a good choice for beginners.
- **Medium:** Medium may require more from your batteries, and is good for low traction surfaces.
- **Very High:** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.
- **Very high:** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.
- **5. Throttle Percent Reverse**
- This limit is to limit the power available using reverse throttle. The lower the percent or level the less speed will be available in reverse.
- **25%, 30%, 40%, 50%, 60%, (Default), 70%, 80%, 90%, 100%**

6. **Throttle Limit**
- This limit is to limit the power available using forward throttle.
- The lower the percent the less forward speed will be available.
- **0%, (Default), 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%**

7. **Throttle Reverse**
- This limit is to limit the power available using reverse throttle.
- The lower the percent the less reverse speed will be available.
- **10%, 20%, 30%, 40%, 50%, (Default), 60%, 70%, 80%, 90%, 100%**

8. **Throttle Drag Brake**
- This limit is to limit the power available using reverse throttle.
- The lower the percent the less reverse speed will be available.
- **0%, (Default), 4%, 8%, 12%, 15%, 20%, 25%, 30%**

9. **Throttle Limit**
- This limit is to limit the power available using forward throttle.
- The lower the percent the less forward speed will be available.
- **0%, (Default), 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%**

10. **Neutral Range**
- This setting adjusts the amount of "Deadband" off neutral on the throttle trigger. This is in Milli-Seconds (MS) and is the amount of neutral you wish to pull the trigger.
- The smaller the value the less "Deadband" or movement is required off-center for the ESC to begin throttle functions.
- Using a higher value for this setting will provide a wider Deadband.
- **3%, 4%, (Default) 5%, 6%, 10%**