**45A/60A WATERPROOF SENSORLESS SPEED CONTROLLER FOR 1/10 RC CAR/TRUCK**

Thank you for your purchasing this HobbyStar Electronic Speed Controller (ESC). This electronic speed controller is specifically designed for operating 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 of 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 programmable options using either LED program card or Snapshot link and FC application
- Multiple protection features: Low-voltage cut-off protection, over-heat protection and signal loss protection
- Compatible with Sensorless brushless motors

**Begin to Use The New ESC:**
- Connect wires as indicated

**45A/60A Sensorless Mode**

**NOTE:** In order to make fan replaceable it has a removable plug. It is recommended to unplug fan if running in heavy water conditions.

1. Blue motor wire A
2. Yellow motor wire B
3. Orange motor wire C
4. ESC signal lead
5. Programming lead

**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.

**ESC Calibration**

*ESC MUST be calibrated before initial use and any time a new radio/receiver is connected*

1. Switch off the ESC, then connect ESC to battery. Throttle and brake and points MUST be set to their maximum setting on your radio, (usually as shown in a manual or by pressing the brake button etc. on radio). Maximum Throttle and maximum brake is from 100% to 100%.
2. Hold the “Set” button and switch on the ESC, both the red and blue LED’s will be lit. Continue to hold the set button until only the blue LED is lit. Release the set button and immediately apply full throttle and hold it, red LED will flash then turn solid red and motor will beep.
3. Push the throttle trigger to Full Brake until the blue LED flashes and then turns solid (motor will beep).
4. Now return the throttle trigger to the Neutral position, the red and blue LED’s will flash, turn solid, then turn off and motor will beep. Calibration is complete.
5. Turn off the ESC power switch.
6. Turn the ESC back on. You are ready to use the ESC now.

**Programmable items and default settings:**

<table>
<thead>
<tr>
<th>Programmable</th>
<th>Items</th>
<th>1</th>
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<th>3</th>
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<tr>
<td>Cut-off</td>
<td>2.4V/0.06A</td>
<td>2.8V/0.06A</td>
<td>3.0V/0.06A</td>
<td>3.2V/0.06A</td>
<td>3.4V/0.06A</td>
<td>No cut-off</td>
<td></td>
<td></td>
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<tr>
<td>Running Mode</td>
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<td>w/o Reverse</td>
<td>Forward w/o Reverse</td>
<td>Forward Reverse</td>
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<tr>
<td>Motor Timing</td>
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<td>Normal</td>
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<td></td>
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<tr>
<td>Throttle Reverse Percent</td>
<td>100%</td>
<td>90%</td>
<td>80%</td>
<td>70%</td>
<td>60%</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Throttle Limit</td>
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<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Percentage Braking</td>
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<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
</tr>
<tr>
<td>Percentage Drag Brake</td>
<td>0%</td>
<td>4%</td>
<td>8%</td>
<td>12%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Motor Rotation</td>
<td>Normal</td>
<td>Reverse</td>
<td>Normal</td>
<td>Reverse</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Neutral Range</td>
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<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>6%</td>
<td>10%</td>
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**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 program 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 done 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 to prevent 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 6.0V. 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 w/o Reverse**

  - Race setting. In this mode reverse is disabled.
  - **Forward with pause then Reverse:** (DEFAULT)

    Default mode for general driving, braking 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.

- **Forward / Reverse**

  - Vehicle will go forward and backward, but no braking will be available.

- **ESC - reverse operation**

  - Should you get into a situation that requires reverse, after you have applied any brakes you may have needed, return the throttle trigger to the neutral position. Wait a moment or two and then push the trigger forward for reverse.

- **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.

- **4. Low Power**

  - Provides maximum efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency. Lower timing is typically the motor will generate more heat. Each brushless motor will respond differently. Generally good for running on paved, or harder surfaces, and racing with high KV rated or low-torque motors.

- **5. Low Power for running through soft surfaces, bushing and longer run times**

  - Provides better performance through soft surfaces, bushing 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 much faster using this setting. A safe high temperature range is 165°F to 180°F (74°C - 82°C), which may damage your motor, or damage your Electronic Speed Controller (ESC).

- **Very High**

  - This is a very high power 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 are not operating higher than 165°F (74°C) while using this setting. A safe high temperature range is 165°F to 180°F (74°C - 82°C), which may damage your motor. If your ESC or the controller gets hot, consider setting this at a lower value.

- **Low**

  - Using this option will reduce run times even faster, and is easier on the battery. It is a good choice for beginners.

- **Medium**

  - Medium may move you from your batteries, and is good for low traction surfacing.

- **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**

  - Use this to limit the power available using reverse throttle. The lower the percent or level the less speed will be available in reverse.

- **6. Throttle Limit**

  - Use this to limit the power available using forward throttle. The lower the percent the less throttle speed will be available.

- **7. Throttle Braking**

  - Braking you the ability to have full control over the amount of brake your vehicle will have.

- **8. Percentage Drag Brake**

  - This option enables you to enter a set percentage of brake when you have the transmitter resting in neutral. This will create the “feel” of a brushed motor.

  - Drag brake is used in racing to slow a vehicle as you let off approaching a corner versus the driver having to push the brake at every corner.

  - If you are using this setting, we recommend you try to take a sense of how you might use this for your track.

  - If you are running on a high traction track with tight corners, a stronger setting should work best.

  - If you are running in an open area, you will find a smaller percentage will result in better control.

  - If you are running in dusty or slippery surfaces, you will more than likely want to use the lowest option.

- **9. Motor Rotation**

  - Normal (default) Reverse

- **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 when you 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 the setting will provide a wider Deadband.

  - **2%**

  - **3%**

  - **4% (Default)**

  - **5%**

  - **6%**

  - **10%**

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