ENERGY

Hitec

INTRODUCTION

Congratulations on purchasing your new Hitec ENERGY electronic brushless motor speed control! Pre-wired with standard motor and battery connectors, this economically-priced, high efficiency ESC promises the reliability and performance your hobby demands.

SPECIFICATIONS

Model	Part #	Continuous /Burst Current Rating	Battery/Cell	BEC Output	Dimensions Inches	Weight Ounces	Motor Connector
Energy Sport 20 amp	59046	20A\30A	5-12N\2-4Li	5V/2A	0.9 x 1.7 x 0.3	0.85	3.5 mm Bullet
Energy Sport 40 amp	59047	40A\50A	5-12N\2-4Li	5V/3A	1.1 x 2.0 x 0.4	1.3	3.5 mm Bullet
Energy Sport 50 amp	59048	50A\60A	5-18N\2-6Li	5.5V/5A	1.2 x 2.2 x 0.6	1.6	3.5 mm Bullet
Energy Sport 60 amp	59049	60A\70A	5-18N\2-6Li	5.5V/5A	1.2 x 2.2 x 0.6	1.6	4mm Bullet
Energy Sport 80 amp	59050	80A\90A	5-18N\2-6Li	5.5V/5A	1.5 x 2.7 x 0.7	2.9	4mm Bullet

IMPORTANT WARNINGS

- Flying model aircraft can be dangerous if safety precautions are not taken. Always make safety the number one priority while flying your aircraft.
- The Academy of Model Aeronautics publishes a list of guidelines to follow while flying model aircraft. You can download those guidelines at http://www.modelaircraft.org/files/105.pdf. Make sure you follow them properly.
- Hitec will not be responsible for the use of this product or any damage or injuries that may result from its usage.
- Electric motors that are connected to a battery pack and ESC can start unexpectedly and cause serious injury.
- Use extreme caution when connecting the battery and make sure nothing is interfering with the motor.
- Hitec recommends that you remove the propeller when you are working on the plane that is connected to a power source.

SAFETY FEATURES

Temperature Protection: If the temperature of the ESC exceeds 230°F (110°C), the ESC will reduce the output power to allow it to cool.

SAFETY FEATURES [CONT.]

If this occurs, we recommend you promptly land your plane and determine the cause of the overheating.

Lost Signal Protection: The ESC will automatically cut power to the motor when it detects a loss of throttle signal for 2 seconds, then the motor will emit a continuous beeping tone.

CONNECTORS

Hitec speed controls come pre-wired with motor and battery connectors. If these connectors are not appropriate for your application and you wish to change them, use the following guidelines:

• Make sure they are rated at or above the amperage of the ESC.
• Always use new connectors.
• Make sure the cables and soldering posts are insulated with shrink tubing.
• Make sure the battery is soldered with the correct polarity.

⊗ Warning   When initially installing your ESC, it is recommended that you remove the propeller for safety purposes.

CONNECTING THE ESC

It is best to connect your ESC in the following order:

1. Connect the motor leads to the motor.
2. Connect the S Type receiver lead to the throttle channel of your receiver.
3. Connect the battery connector to the battery.
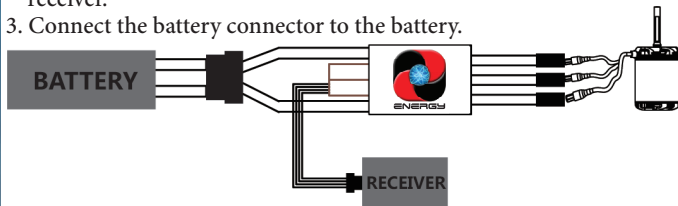
BEC OPERATION

The Energy Sport ESCs feature an onboard BEC circuit that provides power for the receiver and servos. Depending on the model, the BEC is capable of supplying up to 5 amps of power. If your servos have the ability to pull more than this current, we recommend using an external power source. If an external power source is used, the red positive wire on the throttle lead must be disconnected from the receiver. You can easily lift the plastic retaining tab and slide the small connector out of the housing. Cover this connector with electrical tape or shrink wrap.

MOUNTING YOUR ESC

1. Choose a location that has adequate airflow to cool the ESC and prevent overheating.
2. Mount the ESC with a combination of hook and loop tape or double sided foam tape.

⊗ **Warning**	DO NOT apply Velcro® or mounting tape to the heat sink (label) side of the ESC as this will lower its effectiveness considerably and lead to overheating.

THROTTLE CALIBRATION

1. Turn on your radio and put the throttle in the full "ON" position.
2. Connect the battery pack to the ESC and wait about 2 seconds. The motor will beep twice. Put the throttle in the minimum, full "OFF" position and the motor will beep again. This indicates that your ESC has established the signal range of the throttle from your transmitter.

USING THE ESC

1. Turn on your radio and put the throttle stick in the lowest position.
2. Connect the battery pack to the ESC.

USING THE ESC [CONT.]

3. The motor will emit two sets of audible tones in succession. This tells you that the ESC is armed and ready to use. The first set of tones counts the number of cells in the battery and the second set indicates the brake setting.

PROGRAMMABLE FUNCTIONS

The Energy Sport line has several programmable features that allow the user to customize the ESC to their specific application. Programming can be done through the transmitter or by using the optional programming card. (PN# 29051).

Features that can be programmed are:
- Brake
- Battery Type (NiCd, NiMH, or LiPo)
- Low Voltage Cut-Off Protection Threshold
- Low Voltage Cut-Off Type
- Acceleration
- Timing
- Switching Frequency

FACTORY DEFAULT SETTINGS

- **Brake:** OFF
- **Battery Type:** LiPo with Automatic Cell Detection
- **Low Voltage Cutoff Threshold:** Medium (3.0V/60%)
- **Timing Setup:** Automatic
- **Acceleration:** Soft Acceleration
- **Governor Mode:** RPM OFF
- **Frequency:** 8 kHz
- **Low Voltage Cutoff Type:** Reduce Power

ENTERING THE PROGRAMMING MODE

Use the following steps to place the ESC in the programming mode:
1. Turn on your radio and set the throttle stick to top, full "ON" positon (100%).

ENTERING THE PROGRAMMING MODE [CONT.]

2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, 4 varying beeps, tones and melodies will sound that indicate you are in a specific programming function.

Tip

Refer to the Programing Tone Reference chart to determine which function's programming section you are in. You can also visit the Energy ESC page on www.hitecrcd.com to listen to the tones.

Note

You can only program and save one setting at a time. Once you have completed programming a function, the ESC will automatically save and exit the function. If you need to program additional items, unplug the battery and power on the ESC again.

BRAKE SETTING: On/Off

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, 4 varying beeps, tones and melodies will sound.
4. When you hear _ * _ * _ * _ *, you are in the Brake menu. The default setup is "OFF". If you want to turn on the brake, pull the throttle stick to the lowest, "OFF" position.
5. The sound will stop, indicating you have finished programming this function and your settings are saved.

BATTERY TYPE: NiCd/NiMH/LiPo

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.

BATTERY TYPE: NiCd/NiMH/LiPo [CONT.]

3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, 4 varying beeps, tones and melodies will sound.
4. When you hear ~ ~ ~ ~, it indicates you are in the Battery Type menu NiCd/NiMH selection. If this is your battery choice, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear ~~ ~~~~ ~~, it indicates you are in the Battery Type menu LiPo selection. If this is your battery choice, pull the throttle stick to the lowest, "OFF" position.
6. The sound will stop, indicating you have finished programming this function and your settings are saved.

LOW VOLTAGE CUTOFF: Low 2.8v/50%, Med. 3.0v/60%, High 3.2v/65%

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear *_ _* *_ _* *_ _* *_ _*, it indicates you are in the Low Voltage Cutoff Threshold menu, Low 2.8V/ 50% setting. If this is the cutoff voltage you want to use, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear *_ _ _* *_ _ _* *_ _ _* *_ _ _*, it indicates you are in the Low Voltage Cutoff Threshold menu, Medium 3.0V/60% setting. If this is the cutoff voltage you want to use pull the throttle stick to the lowest, "OFF" position or;
6. When you hear *_ _ _ ¬_* *_ _ _ _* *_ _ _ _* *_ _ _*, it indicates you are in the Low Voltage Cutoff Threshold menu, High 3.2V/65% setting. If this is the cutoff voltage you want to use, pull the throttle stick to the lowest, "OFF" position.
7. The sound will stop, indicating you have finished programming this function and your settings are saved.

Note

For Lithium packs, the number of cells is automatically calculated and requires no user input apart from defining the battery type. This ESC provides 3 setting options for the low voltage protection threshold: Low (2.8V)/ Medium (3.0V)/ High (3.2V). For example: the voltage cutoff options for an 11.1V/ 3 cell Li-Po pack would be 8.4V (Low)/ 9.0V (Med)/ 9.6V (High).

Warning

Setting the cutoff threshold too low for Lithium chemistry batteries can damage your battery and render it unusable. The low cutoff should never be lower than what is recommended by the battery manufacturer.

Note

For NiCd or NiMH packs, the low / medium / high cutoff voltages are 50%/60%/65% of the initial voltage of the battery pack. For example: a fully charged 6-cell NiMH pack's voltage is 1.44V per cell or 6=8.64V for the pack. When the "Low" cutoff voltage is set, the cutoff voltage is 4.3V (8.64V x 50%). When "Medium"" is set, the cutoff voltage is 5.18 (8.64V x 60%) or if "High" is used then it is 5.61V (8.64 x 65%).

SETUP DEFAULTS: Restore Factory Defaults

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear — — — —, you are in the Factory Setup Defaults section. If you would like to reset to the factory default settings, pull the throttle stick to the lowest, "OFF" position.
5. The sound will stop, this indicates you have finished programming this function and your settings are saved.

TIMING SETUP: (Auto, Low: 7-22° and High: 22-30°)

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear "– – – –", you are in the Automatic Timing Setup selection, if this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear – – – – – – – –, you are in the Low Timing Setup selection. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;
6. When you hear – – – – – – – – – – – – , you are in the High Timing Setup selection. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position.
7. The sound will stop, indicating you have finished programming this function and your settings are saved.
   - **Automatic (7-30°):**
     The ESC automatically detects the best motor timing.
   - **Low (7-22°):**
     Standard setting for most 2-pole motors.
   - **High (22-30°):**
     Recommended setting for motors with 6 or more poles.

Note

It is recommended that beginner pilots use the automatic timing setting to get the best performance from their aircraft.

ACCELERATION: Soft, Normal and Hard

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.

ACCELERATION: Soft, Normal and Hard [CONT.]

3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear "VV VV VV VV", you are at the Soft Acceleration setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear "V V V V", you are at the Normal Acceleration setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;
6. When you hear "VVV VVV VVV VVV", you are at the Hard Acceleration setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position.
7. The sound will stop indicating you have finished programming this function and your settings are saved.

   • **Soft:**
     Recommended setting for airplanes or helis with gear drive systems.
   • **Normal:**
     Recommended setting for airplanes with gear drive systems.
   • **Hard:**
     Recommended setting for direct drive systems.

HELI GOVERNOR MODE: Off/Mode 1/Mode 2

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear _*_ _*_ _*_ _*_, you are now in the Heli Mode Off program setting. If you do not want to use the Heli Mode, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear _**_ _**_ _**_ _**_, you are now in the Heli Mode 1 program setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;

HELI GOVERNOR MODE: Off/Mode 1/Mode 2 [CONT.]

6. When you hear _***_ _***_ _***_ _***_, you are now in the Heli Mode 1 program setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position.
7. The sound will stop, indicating you have finished programming this function and your settings are saved.
   - **OFF:**
     Default Setting.
   - **Heli Mode 1:**
     5 second delay from start to full rotor head speed.
   - **Heli Mode 2:**
     15 second delay from start to full rotor head speed.

> **Note**
>
> The ESC's Brake and Low Voltage Cutoff Type will automatically reset to Brake Off and Reduce Power after activating the Heli mode.

MOTOR ROTATION: Off/ Reverse

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear W W W W, it indicates that you are in the Motor Rotation program setting. The default setup is OFF. To turn this setting on and reverse the current direction of the motor, pull the throttle stick to the lowest, "OFF" position.
5. The sound will stop, indicating you have finished programming this function and your settings are saved.

SWITCHING FREQUENCY: 8kHz and 16kHz

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear // // // //, you are at the 8kHz Switching Frequency setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;
5. When you hear \\ \\ \\ \\, you are at the 16kHz Switching Frequency setting, if this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position.
6. The sound will stop, indicating you have finished programming this function and your settings are saved.

Recommended switching frequency settings:
   8kHz for in-runner type motors.
   16kHz for out-runner motors.

LOW VOLTAGE CUTOFF TYPE

1. Turn on your radio and set the throttle stick to the top, full "ON" positon (100%).
2. Plug the battery pack into your controller.
3. Wait 2 seconds. You will hear 4 groups of two fast beeps. After this, groups of 4 varying beeps, tones and melodies will sound.
4. When you hear _ ‾ _ ‾ _ ‾ _ ‾, you are at the Low Voltage Cutoff Type - Reduce Power setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position or;

5. When you hear ¯ _ ¯ _ ¯ _ ¯ _, you are at the Low Voltage Cutoff Type – Hard Cut-off setting. If this is the setting you would like to use, pull the throttle stick to the lowest, "OFF" position.

6. The system will exit automatically and save the setting after finishing the desired item. You can only set up one item at a time. If you want to program another item, you need to unplug the battery and power on the ESC again.

Reduce Power:

Lowers the power output so that you can land.

Hard Cutoff:

Immediately cuts the power to the motor once the voltage reaches the preset value.

Programming Tone Reference Chart

After plugging in your ESC to your battery pack, within four seconds you will here 4 groups of two fast beeps. After this, you will hear groups of 4 varying beeps, tones and melodies. This chart indicates the flow of those sounds and references the programming function for it.

Programmable Items / Sounds		Options	
Brake			
* * * *		On / Off	
~ ~ ~ ~		NiCd / NiMh	
~ ~ ~ ~ ~ ~ ~ ~		LiPo	
Low Voltage Cut-off Threshold		**LiPo / NiXx**	
* * * * * * * *		Low 2.8V / 50%	
* * * * * * * *		Medium 3.0V / 60%	
* * * * * * * *		High 3.2V / 65%	
Restore Factory Defaults			
— — — —		Reset to Defaults	
Timing Setup			
- - - -		Automatic = 7° - 30°	
- - - - - - - -		Low = 7° - 22°	
- - - - - - - - - - - -		High = 22° - 30°	
Acceleration			
V V V V V V V V		Soft	
V V V V		Normal	
V V V V V V V V V V V V		Hard	
Heli Governor Mode			
* * * *		RPM Off	
** ** ** **		Heli Mode 1	
*** *** *** ***		Heli Mode 2	
Motor Reverse			
W W W W		Forward / Reverse	
Switching Frequency			
// // // //		8 kHz	
\\ \\ \\ \\		16 kHz	
Low Voltage Cut-off Type			
__-- __-- __-- __--		Reduce Power	
--__ --__ --__ --__		Cut Power	

TWO YEAR LIMITED WARRANTY

For a period of two years from the date of purchase, HITEC RCD USA, INC. shall REPAIR OR REPLACE, at our option, defective equipment covered by this warranty, otherwise the purchaser and/or consumer is responsible for any charges for the repair or replacement of the unit. This warranty does not cover cosmetic damages and damages due to acts of God, accident, misuse, abuse, negligence, improper installation, or damages caused by alterations by unauthorized persons or entities. This warranty only applies to the original purchaser of this product and for products purchased and used in the United States of America, Canada and Mexico. Plastic cases are not covered by this warranty.

THIS WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND WHETHER EXPRESS OR IMPLIED. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY. HITEC RCD, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THIS PRODUCT, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. REPAIR AND SERVICE.

LIABILITY EXCLUSION

This electronic speed control is designed and approved exclusively for use with the types of batteries and motors stated in this Instruction Manual. Hitec RCD, USA accepts no liability of any kind if the electronic speed control is used for any purpose other than that stated. We are unable to ensure that you follow the instructions supplied with the ESC and we have no control over the methods you employ for installing, operating and maintaining the device. For this reason, we are obliged to deny all liability for loss, damage or costs which are incurred due to any misuse or operation of our products. Unless otherwise prescribed by law, our obligation to pay compensation, regardless of the legal argument employed, is limited to the invoice value of Hitec RCD USA products which were immediately and directly involved in the event in which the damage occurred.

SERVICE AND REPAIR INFORMATION

To have your Hitec ESC serviced:

1. Visit the Hitec website at www.hitecrcd.com and download the service request form (under Support section).
2. Fill out the service request form completely and include a copy of your original receipt showing the purchase date.
3. Package your product in its original packaging or use a suspension-type packaging (foam peanuts or crumpled newspaper). Hitec RCD shall not be responsible for goods damaged in transit.
4. Ship prepaid (COD or postage-due returns will not be accepted) via a traceable common courier (UPS, insured parcel post, FedEx, etc.) to:

Hitec RCD USA, Inc.
Customer Service Center
12115 Paine St., Poway CA 92064