



**ON-TRAX**

**BRUSHLESS SYSTEM**

**HIGH TECH HIGH SPEED POWERFUL**



**hobbyking.com**



## **HobbyKing Brushless Electronic Speed Control for car or truck**

Thank you for purchasing the HobbyKing Brushless Electronic Speed Controller(ESC). The HobbyKing electronic speed control (ESC) is specifically designed for operating Sensored /Sensoreless brushless motors. High power systems for RC model can be very dangerous and we strongly suggest that you read this manual carefully. HobbyKing Model 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 malfunctioning 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 the product in question.

### **Features:**

- Enhanced throttle response, excellent acceleration, strong brakes and throttle linearity
- Using program card to make adjustments.
- Automatically detects the number of cells within the battery pack.
- Multiple protection features: Low voltage cut-off protection, over-heat protection, throttle signal loss protection and motor blocked protection
- Compatible with NOVAK, LRP , ORION Sensored brushless motor

## Begin to Use The New ESC:

Before using the new ESC please carefully check for every connections are correct or not.

### \* Connected with Sensored Brushless motor

When using the HobbyKing Sensored Brushless motor, the Blue motor wire A, Yellow motor wire B and Orange motor wire C of the ESC must connect with the Sensored motor wire A,B,C respectively. It is necessary to connect the Sensor wire to the "Sensor" socket on the ESC. Don't change the wires sequence optionally.

### \* Connected with Sensorless Brushless motor

When using the HobbyKing 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 freely. If the motor runs in the opposite derection, please swap any two wire connections.

### \* Connect the ESC signal wire to the Receiver

Black wire    RX-

Red wire      RX+6.0V

White wire    RX-Signal

## ESC's indicating LEDs:

### Conversion of Sensored and Sensorless function

\* When Power wires on the ESC are connected with the battery pack, the ESC can automatically identify the motor type (Sensored/Sensorless) via indicated LED.

\*If the ESC works at the status of Sensored, remove the Sensor wire, the ESC can be automatically change to the status of Sensorless.

Sensored/Sensorless ESC's indicating LED		
Function	Indicating LED	LED Status
Low voltage of the battery	Red LED	Blinking
Over-heat of the ESC and motor (95℃)	Orange LED	Blinking
Sensored motor	Red and Orange LED	ON
Sensorless motor	Orange LED	ON

### Throttle Range Calibration ( For first time using the transmitter or changing the transmitter you must set throttle Range calibration)

1. Switch off the ESC, then connect ESC with the battery packs and turn on the transmitter; set the direction of the throttle channel to REV; set the EPA/ATV value of the throttle channel to 100%.
2. Hold the Set button and switch on the ESC, wait for about 4 seconds until the Orange LED is on solid, then release the Set button, pull the throttle trigger to full throttle until Red LED blinks and will be On Solid, the motor beeps.
3. Push the throttle trigger to Full Brake until the Orange LED blinks and will be on solid, the motor beeps.
4. Now return the throttle trigger to the Neutral position, both of the Red LED and Orange LED blink simultaneity and will be on solid, the motor beeps , both of Red LED and Orange LED wink, the Throttle Range Calibration is confirmed.
5. Turn off the ESC power switch.
6. Turn the ESC back ON; you are now ready to use the ESC.

## Programmable items and default

programmable items	Programmable Value								
	1	2	3	4	5	6	7	8	9
Low voltage cutoff Threshold	2.6V/cell	2.8V/cell	3.0V/cell	3.2V/cell	3.4V/cell	No protection			
Running Mode	Forward w/o reverse	Forward with pause then Reverse							
Motor timing	Very low	Low	Normal	High	Very high				
Initial Acceleration	low	Medium	High	Very high					
Reverse throttle limit	20%	30%	40%	50%		70%	80%	90%	100%
Throttle limit	0%	20%	30%	40%	50%	60%	70%	80%	90%
Braking percent	10%	20%	30%	40%	50%	60%	70%	80%	100%
Percent Drag Brake	10%	4%	8%	12%	15%	20%	25%	30%	
Motor Rotation	Normal	Reverse							
Neutral range	2%	3%	4%	5%	6%	10%			

## HobbyKing Sensored/Sensorless brushless ESC general information

### 1. Low Voltage Cutoff Threshold

- Automatically detect the number of the cells
- According to the type of your batteries, set up the type of the batteries and Low

Voltage Cutoff Threshold via program card. The ESC can detect the Voltage of the battery anytime and will stop working once the Voltage of the battery is lower than the preset Low Voltage Cutoff Threshold.

- For NiMH battery packs, If the voltage of the whole NiMH battery pack is higher than 9.0V but lower than 12V, it will be considered as a 3 cell lithium battery pack; if it is lower than 9.0V, it will be considered as a 2cell lithium battery pack. For example, if the NiMH battery pack is 8.0V, and the threshold is set to 2.6V/cell, so it will be considered as a 2 cell lithium battery pack, and the low-voltage cut-off threshold for this NiMH BATTERY PACK is  $2.6 \times 2 = 5.2V$ .

### 2. Running Mode

- Forward w/o Reverse**

This is a Race setting - Reverse is disabled.

You will find in racing, most tracks will not allow racing with reverse enabled.

- Forward with pause then Reverse: (DEFAULT)**

General bashing around (FUN) or racing if reverse is allowed for the event. The Electronic Speed Control requires 2 seconds of continuous neutral from the transmitter prior to allowing reverse to operate.

**Note:** There is automatic protection within the HobbyKing 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.

### 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.

- **Very low** Provides maximum efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency (less run time) and typically the motor will generate more heat. Each brushless motor will respond to timing differently. Good for running around on paved, or harder surfaces, and racing with high Kv rated or low-turn motors
- **Low** Provides power for running through soft surfaces, having fun and longer run time.
- **Normal (Default)** Good mix of power and efficiency using any motor
- **High** More power than efficiency so run time will reduce, and you should be monitoring motor heat. The higher Kv or lower turn motors will generate heat quickly using this setting. A safe high temperature range is 165F to 180F (74° - 82° Celsius), going higher may damage your motor.
- **Very High** This is maximum 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're not operating higher than 165° and 180° Fahrenheit (74° - 82° Celsius), which may damage your motor, or damage your Electronic Speed Control (ESC).

**4. Initial Acceleration** - Use this 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 choice, you will have wheel-spinning acceleration at the cost of run time. This is also very tough on the batteries as the amperage 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** Using this option will provide longer run times and is easiest on the batteries. It is a good choice for beginners.
- **Medium** Medium requires more from your batteries, and is good for low traction surfaces.
- **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.

20%, 30%, 40%, 50%, 60% (Default), 70%, 80%, 90%, 100%

**6. Throttle Limit** - Use this to limit the power available using forward throttle.

The lower the percent the less forward throttle speed will be available.

0% (Default), 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%

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

10%, 20%, 30%, 40%, 50% (Default), 60%, 70%, 80%, 100%

### **8. Percent Drag Brake** -0%( Default),4%,8%,12%,15%,20%,25%,30%

The drag brake function provides the driver a set percentage of brake when you have the transmitter resting in neutral. This will create the "feel" of a brushed motor.

Drag brake are 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.

Try working with this to get 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 this setting will provide a wider Deadband.

- 2%
- 3%
- 4% (Default)
- 5%
- 6%
- 10%

## **Program method**

The HobbyKing HKSS Program Card is used to make all adjustments to the active profile in your ESC.

### **Using Program card**

1. The HobbyKing HKSS Program card with LED display is easy to use and convenient to carry. All of the programmable functions are shown on the program card.
2. Turn on the ESC. Remove the Signal wire and plug it into the top-socket on the Program card, wait for 2 seconds until the LED is ON.  
The first programmable function will be shown, if an error occurs, please reconnect them.
3. If ESC is not connected with the batteries, the Program card should be connected with other power supply, the range of power supply is within 5.0-6.3V.
4. Press the button " Menu" on the Program card and circularly select each programmable function. At that time the number of the programmable function will be displayed on the left of the LED, the current value will be displayed on the right. Then press the button Value to change the value and press the button OK to confirm. At the same time the Red indicating LEDs of both program card and the ESC blink. Turn off the ESC, the modified settings will be saved in the ESC's memory.
5. Press the button Reset to restore the default settings.

### Hobbyking Sensored /Sensorless Brushless Electronic Speed Control Specifications:

Model		HK-SENS-35A	HK-SENS-60A	HK-SENS-100A	HK-1-8-80A	HK-1-8-120A	HK-1-8-150A
Continuous Current / peak		35A/190A	60A/380A	100A/760A	80A/270A	120A/760A	150A/1080A
Motor Type		Sensorless and Sensored Brushless Motor					
Car Type		1/10 1/12 On-road、 Off-road			1/8 1/5 On-road、 Off-road		
Motor "X" T	2S	≥13.5T (On-road) (Off-road)	≥5.5T (On-road) ≥8.5T (Off-road)	≥3.5T (On-road) ≥5.5T (Off-road)	≥10T (On-road) (Off-road)	≥7T (On-road) (Off-road)	≥2T (On-road) (Off-road)
	Lipo						
	3S		≥10.5T (On-road) ≥17.5T (Off-road)	≥5.5T (On-road) ≥8.5T (Off-road)			
Battery		5-9 Cell Ni、 2-3 Cell Lipo			5-10 Cell Ni、 2-4 Cell Lipo		5-18 Cell Ni、 2-6 Cell Lipo
BEC Output		6V/2A		6V/3A	6V/3A		
Resistance		0.0015 Ohm	0.0006 Ohm	0.0003 Ohm	0.0018Ohm	0.0003Ohm	0.00015Ohm
Weight		50g	60g	102g	150g	150g	150g
Dimensions		27*31*34mm	27*31*39mm	27*43*39mm	55*60*40mm		