

# PROPER GEARING & ADJUSTABLE PARAMETERS

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**ATTENTION: Correct gearing is essential to getting proper performance from your brushless motor system!**

## PROPER GEAR SELECTION

**Motor operating temperature is the ONLY way to properly set the vehicle gearing**

The motor should be 160-175°F MAX at end of run!

Change the gearing to avoid overheating.

**DO NOT FREE REV OR OPERATE WITHOUT LOAD!**

### General Gearing for 2-cell Li-Po or 6-Cell Ni-MH Use:

These recommendations are for sport or entry level setups. Stock radio equipment and sport "stick-type" battery packs should work safely. These gearing recommendations are intended to provide initial safe operation.

BRUSHLESS MOTORS	PINION GEAR RANGE
Havoc 8.5	15 through 20-tooth
SS8.5 Pro (Novak #3408)	15 through 20-tooth
SS10.5 Pro (Novak #3410)	17 through 22-tooth
SS13.5 Pro (Novak #3413)	20 through 27-tooth
SS17.5 Pro (Novak #3417)	25 through 30-tooth
SS21.5 Pro (Novak #3421)	28 through 33-tooth

Decrease the pinion tooth number by 2-3 for motors without sintered rotors.

**If you do not change gearing after switching to brushless, you will be over-gearred and will have slow acceleration & excessive temperatures!**

*With the broad brushless power band, you can go 1-2 teeth higher pinion than listed above for more top speed, but remember going higher will produce excessive ESC & motor heating. Check the motor's operating temperature after making any gearing adjustments—motors are designed to operate from 160°F-175°F. If you do overheat your ESC and motor, be sure to allow it to cool for several hours and install a smaller pinion gear.*

### FOR RTR KITS:

Most car kits include a pinion gear that is generally sized for mild motors and is fairly large. To be safe, replace the installed pinion gear with one that is about 3 to 5-teeth smaller. Most stock spur gears are safe to use.

### FOR TRAXXAS® SLASH™:

With the Havoc 8.5 motor installed, the RTR kit's included 18-tooth pinion gear will provide speeds above 30 mph with a 7-cell battery pack. The 23-tooth pinion gear included in the RTR kit will provide speeds above 40 mph with a 7-cell battery pack.\*

## THROTTLE PROFILES

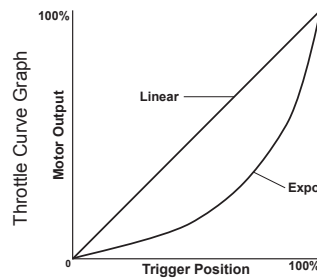
**NOTE:** The Havoc's software has an Auto-Detect Brush-Mode. This feature will automatically switch the ESC from the Brushless Throttle Profile to Brush-Mode when it does not have a brushless motor's sensor harness plugged into it at start-up.

	BRUSHLESS PROFILE 1	BRUSH-MODE 2
w/Reverse	on	on
Reverse%	100%	100%
Programmable	yes	yes
Minimum Brake%	0%	0%
Drag Brake	off	off
Dead Band%	6%	6%
Minimum Drive%	1%	1%
Throttle Curve	expo	linear
Brake Frequency	on	off
Motor Rotation	on	off
Li-Po Cut-Off	on	on

The Havoc ESC reverts back to default settings when One-Touch set-up is performed.

The Havoc ESC is fully programmable, refer to page 6 for fine-tuning options.

## THROTTLE CURVE SELECTION



Novak's Throttle Curve adjustment allows drivers to tailor the throttle response of a vehicle, creating either a quick burst of power with the Linear Curve setting, or a smoother, controlled low-end power delivery with the Expo Curve setting.

**Setting is fixed at "Linear" in Brush Mode. The Throttle Curve is selectable in Brushless Mode.**

## LI-PO CUT-OFF CIRCUITRY

When active (see programming on reverse side to turn ON/OFF), the built-in Smart-Stop Li-Po Cut-Off Circuitry lets you safely use Lithium Polymer batteries by cutting off the ESC's throttle output when a critical safety voltage is reached.

**ESC's factory default is Li-Po Cut-Off Circuitry Active**

The circuitry constantly monitors the pack voltage. When it gets close to the critical safety voltage (6.25V) it begins interrupting, or 'blipping' the throttle output as an early warning that the battery's voltage is getting low and the throttle output will soon be completely shut off.

When the critical voltage is reached, the throttle output to the motor gets completely shut down to keep the voltage from dropping further (Red & Green LEDs will alternately flash & you still have steering control). **Re-charge battery after Smart-Stop circuitry shuts off throttle.** Even though the pack's voltage will rise (after a short resting period) to a level high enough to run the motor again, this is not good for Li-Po batteries—**Reaching the critical safety voltage too many times can damage the cells.**

**DO NOT CONTINUE TO RUN VEHICLE AFTER THE LI-PO CUT-OFF HAS SHUT DOWN THE THROTTLE OUTPUT THE FIRST TIME.**

**During power-up when ESC is switched ON, the Amber & Red LEDs will flash together 3 times to indicate Li-Po Cut-Off is ACTIVE.**

*With the Li-Po Cut-Off turned ON & using Ni-Cd or Ni-MH cells, the circuitry will shut off the ESC's throttle output very early into the run, due to the different characteristics of these batteries. To deactivate software, see page 6.*

## MOTOR ROTATION SELECTION

The Havoc software lets you reverse a brushless motor's rotation direction (see reverse side of this sheet to select rotation). This allows installation in vehicles with counter-rotating drive trains (or opposed transmissions), without compromising performance. Because the ESC will be operating in its normal forward & reverse modes, features like Smart Braking continue to operate normally.



[www.teamnovak.com](http://www.teamnovak.com)

\*At the time of printing, the Traxxas® Slash™ RTR kit included an 18-tooth and a 23-tooth pinion gear. Slash™ is a registered trademark of Traxxas®.

# HAVOC SPORT ESC CUSTOM PROGRAMMING

**PLEASE NOTE: This page contains optional Advanced Programming items! No further adjustments are required.**  
*(But don't worry, you can always reset factory defaults by performing the One-Touch programming again, so go ahead & experiment—that's why the programming is in there, right?)*

## HAVOC SPORT ESC SOFTWARE FLOW CHART

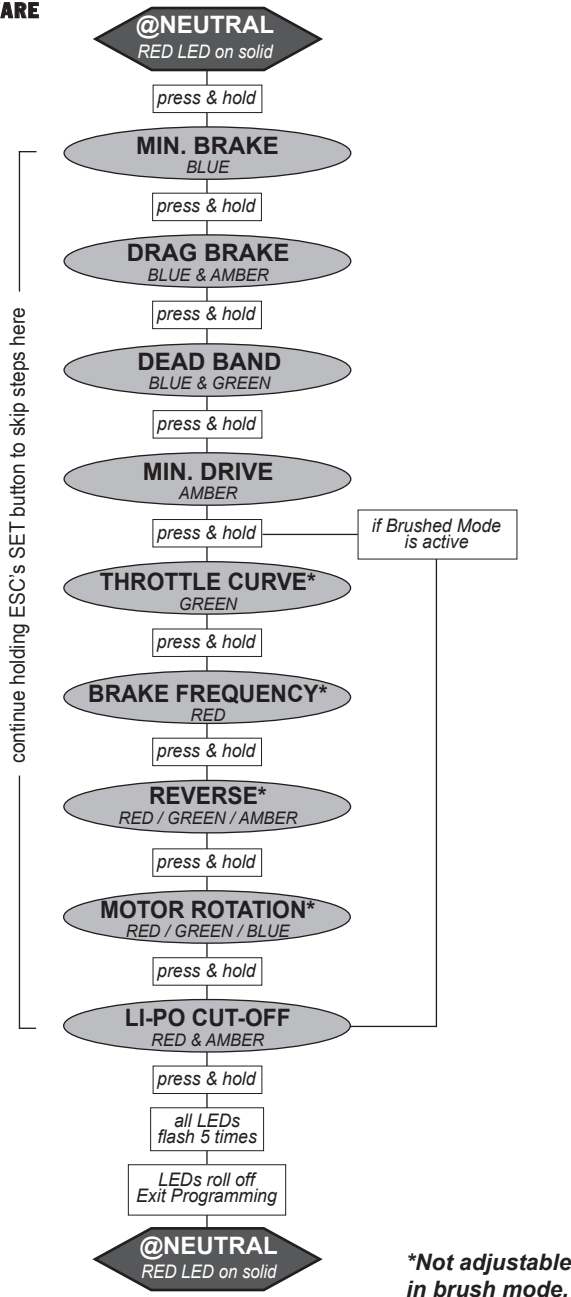
The Havoc Sport ESC features **nine parameters** that can be adjusted.

*Default settings are in bold in tables.*

Transmitter can be either ON or OFF:

- IF TRANSMITTER IS OFF, DISCONNECT ESC FROM RECEIVER**  
Remove input signal harness from the receiver to avoid radio interference.
- CONNECT ESC TO A CHARGED BATTERY PACK**
- SLIDE ESC'S ON/OFF SWITCH TO 'ON' POSITION**
- WITH ESC AT NEUTRAL PRESS & HOLD ESC'S SET BUTTON**  
*Release ESC's SET button once LED is at desired setting.*  
To skip a parameter, press and hold ESC's SET button to the desired parameter.
- SELECT PARAMETER VALUE**  
*LED flashes to indicate active setting* (refer to tables at right). Quick press & release SET button to select desired setting.
- PRESS & HOLD SET BUTTON TO STORE SELECTION**  
When SET button is pressed and held for about 1 second, the *new selection is stored* in ESC's memory—The 4 status LEDs will scroll across to indicate ESC is exiting programming and ESC returns to neutral.  
Note: There is no time constraint during selection process of custom parameters.

### HAVOC SOFTWARE FLOW CHART:



### RESTORING FACTORY DEFAULTS:

Perform One-Touch Set-Up to default ESC back to factory default parameters.

## THROTTLE PARAMETER SETTINGS (Defaults in Bold)

### 1. MINIMUM BRAKE SETTINGS (10) BLUE LED

Amount of braking applied with first pulse of transmitter throttle information.  
 >>Raising this setting starts the braking at a stronger/higher level.

Setting (# of flashes)	1	2	3	4	5	6	7	8	9	10
Minimum Brake (%):	<b>0</b>	3	6	9	12	15	18	21	24	27

### 2. DRAG BRAKE SETTINGS (10) BLUE & AMBER LEDs

Amount of braking applied while transmitter is at neutral. 'Coast' brakes.  
 >>Raising this setting makes the motor slow down more, without pushing the transmitter's trigger into the brake/reverse direction.

Setting (# of flashes)	1	2	3	4	5	6	7	8	9	10
Drag Brake (%):	<b>0</b>	3	6	9	12	15	18	21	24	27

### 3. DEAD BAND SETTINGS (5) BLUE & GREEN LEDs

Space between Minimum Brake & Minimum Drive, with neutral in middle.  
 >>Raising this setting will increase the 'free play', or distance your trigger must move before forward drive or braking will begin.

Setting (# of flashes)	1	2	3	4	5
Dead Band (%):	<b>2</b>	3	4	5	6

### 4. MINIMUM DRIVE SETTINGS (5) AMBER LED

Amount of forward drive applied with first pulse of transmitter information.  
 >>Raising this setting makes the motor start at a stronger/higher level so it takes off more aggressively from neutral.

Setting (# of flashes)	1	2	3	4	5
Minimum Drive (%):	<b>1</b>	2	3	4	5

### 5. THROTTLE CURVE SELECTION\* (2) GREEN LED

>>Changing this setting changes the throttle response and ease of driveability. Note: Setting is fixed at "Linear" in Brush Mode.

Setting (# of flashes)	1	2
Throttle Curve:	Linear	Expo

### 6. BRAKE FREQUENCY\* (7) RED LED

>>Raising this setting makes the brake response smoother and more controllable.

Setting (# of flashes)	1	2	3	4	5	6	7
Brake Frequency (KHz):	<b>1</b>	2	3	4	5	7.5	8

### 7. REVERSE\* (2) RED, GREEN & AMBER LEDs

>>Changing this setting activates/deactivates reverse direction.

Setting (# of flashes)	1	2
Reverse (On/Off):	Off (FWD/BRK)	On (FWD/BRK/REV)

### 8. MOTOR ROTATION\* (2) RED, GREEN & BLUE LEDs

>>Changing this setting changes direction of motor rotation.

Setting (# of flashes)	1	2
Motor Rotation (CCW/CW):	CCW ↺	CW ↻

### 9. LI-PO CUT-OFF (2) RED & AMBER LEDs

>>Changing this setting enables/disables Li-Po cutoff (@6.25 volts).

Setting (# of flashes)	1	2
Li-Po Cut-Off (On/Off):	OFF	ON