

HAVOC 3S GEARING & ADJUSTABLE PARAMETERS

#55-1733P-1 Ver. 2

4-2010

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 & 3-cell Li-Po or 6 & 9-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 range recommendations are intended to provide initial safe operation.

BRUSHLESS MOTORS	PINION GEAR w/ 2S	PINION GEAR w/ 3S
Ballistic 8.5 (#3608) / SS8.5 Pro (#3408)	15 – 20-tooth	10 – 15-tooth
Ballistic 10.5 (#3610) / SS10.5 Pro (#3410)	17 – 22-tooth	12 – 17-tooth
Ballistic 13.5 (#3613) / SS13.5 Pro (#3413)	20 – 27-tooth	15 – 22-tooth
Ballistic 17.5 (#3617) / SS17.5 Pro (#3417)	25 – 30-tooth	20 – 25-tooth
Ballistic 21.5 (#3621) / SS21.5 Pro (#3421)	28 – 33-tooth	23 – 28-tooth

The Havoc 3S's included fan is required when using a 3S Li-Po battery pack.

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 a Novak 8.5-turn brushless motor installed, the RTR kit's included 18-tooth and 23-tooth pinion gears will provide speeds above 40 mph with various battery packs. For more specific speed run information and tips to reaching higher speeds, please visit the Novak Web site.

THROTTLE PROFILES

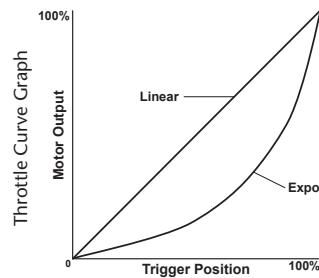
NOTE: The Havoc 3S has the ability to run on either two or three-cell Li-Po batteries via Novak's auto detect software. When Li-Po circuitry is active (see programming on reverse side to turn ON/OFF), it automatically switches to the proper Li-Po cut-off voltage for the battery packs you connect.

	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	4 kHz	3 kHz fixed
Motor Rotation	CCW ↺	N/A
Li-Po Cut-Off	on	on

The Havoc 3S ESC reverts back to default settings when One-Touch set-up is performed.

The Havoc 3S 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 DETECT & CUT-OFF

This ESC is compatible with 2-3S Li-Po or 4-9 Ni-MH cells. Novak's exclusive Smart-Stop Li-Po Cut-Off Circuitry is built-in and when active (see programming on reverse side to turn ON/OFF), it automatically switches to the proper Li-Po cut-off voltage for the battery packs you connect.

ESC's factory default is ON for Li-Po Cut-Off Circuitry

This circuitry lets you safely use 2S or 3S Lithium Polymer battery packs by cutting off the speed control's throttle output when a critical safety voltage is reached (6.25V for 2S and 9.375V for 3S).

The circuitry constantly monitors the pack voltage. When it gets close to the critical safety voltage 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 FOR THE FIRST TIME.

During power-up when the ESC is switched ON, the Amber & Red LEDs will flash together 2 times for 2S or 3 times for 3S packs 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, due to the different characteristics of these batteries. To deactivate software, see page 6.

MOTOR ROTATION SELECTION

The Havoc 3S 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.



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*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 3S 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 3S ESC SOFTWARE FLOW CHART

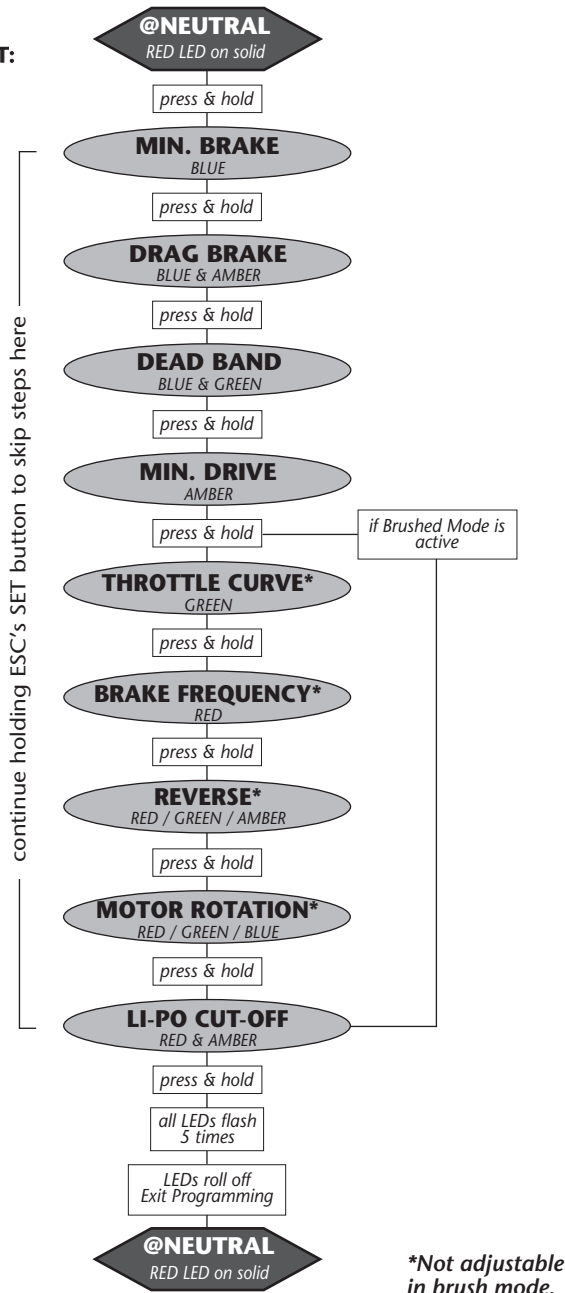
The Havoc 3S ESC features **nine parameters** that can be adjusted.

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 3S SOFTWARE FLOW CHART:



**Not adjustable in brush mode.*

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 (%):	0	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 (%):	0	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 (%):		2	3	4	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 (%):	1	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):	1	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