

HV PRO CUSTOM PROGRAMMING & PROPER GEAR SELECTION SHEET

#55-3221P-1

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The **Novak HV Pro High-Voltage Brushless ESC** includes **3 Fully Programmable Throttle Profiles** (2 w/Reverse & 1 w/without) and has on-board programming for extreme versatility & fine-tuning of **Minimum Brake, Drag Brake, Dead Band, Minimum Drive, Throttle Curve, Brake Frequency, Brake Disable, Motor Rotation, and LiPo Cut-Off**--all at the touch of a button!

This ESC is compatible with 6-14 NiMH or 2-4S LiPo cells. Novak's exclusive **Smart-Stop LiPo Cut-Off Circuitry** is built-in and when active, it automatically switches to the proper LiPo cut-off voltage for the battery packs you connect.

IMPORTANT! If using dual battery packs, and upgrading or replacing the connectors, it is critical that you replace one connector at a time to avoid improper wiring and cross-connection of battery leads, which will damage ESC and void the warranty.

(We recommend using Novak 4mm Hi-Amp Connectors (#5740 or 5741) or other high-quality connectors like the Deans® Ultra Plug™)

The motors that come in Novak HV brushless systems now include **heavy-duty 5mm output shafts** that are recommended for use with **Novak 1/8th Scale Conversion Kits** (Novak part #5010-5019) and other power-hungry monster vehicles. Novak HV motors feature high-strength sintered neodymium rotors for optimum performance. Novak offers **5mm Mod 1 & 32 Pitch Steel Pinion Gears** for use with the 5mm shaft equipped HV motors (5mm Mod 1 Gears available in Novak part #5100-5110; 5mm 32 Pitch Gears available in Novak part #5152-5157).

THROTTLE PROFILE SELECTION

The HV Pro High-Voltage Brushless ESC is equipped with **3 user-selectable Throttle Profiles** (all programmable), as shown below.

HV PRO THROTTLE PROFILES:

Throttle Profile:	#1	#2	#3
w/Reverse	YES	NO	YES
Reverse %	100%	0%	25%
Minimum Brake	9%	9%	9%
Drag Brake	9%	9%	9%
Dead Band	5%	5%	5%
Minimum Drive	1%	1%	1%
Throttle Curve	Llinear	Llinear	Llinear
Brake Frequency	3kHz	3kHz	3kHz
Brake Disable	OFF	OFF	OFF
Motor Rotation	CCW ↺	CCW ↺	CCW ↺
LiPo Cut-Off	ON	ON	ON

NOTE: The HV Pro ESC is factory default set to Profile #1.

SELECTING THROTTLE PROFILES:



NOTE: The HV Pro ESC will always revert back to Profile #1 when the One-Touch set-up is performed.

With ESC on & connected to a charged battery (transmitter ON or OFF):

- IF TRANSMITTER IS OFF, DISCONNECT ESC FROM RECEIVER**
To avoid possible radio interference or signals from other transmitters, remove ESC's input signal harness from the receiver--Green & Red LED will stay on to indicate no signal from receiver.
- PRESS & HOLD THE ESC'S ONE-TOUCH SET BUTTON**
Continue to hold SET button on ESC until all 4 LEDs turns on.
Note: You will continue holding past all the LED programming indicators in the ESC's software as shown in the flow chart on back side of this sheet.
- RELEASE SET BUTTON AS SOON AS ALL 4 LEDs COMES ON**
Once released, the 4 status LEDs will flash to indicate what Throttle Profile is currently selected. The number of times the LEDs flash indicates the Throttle Profile selection (1 of 5).
- QUICK PRESS (& release) SET BUTTON TO CHANGE SELECTION**
Each press will change ESC to the next consecutive Throttle Profile. (After Profile 5, the sequence begins again at Profile 1)
Note: There is a time constraint during this selection process.
- ESC STORES SELECTION & EXITS PROGRAMMING**
If SET button is not pressed for 3 seconds, ESC stores selected Throttle Profile in its memory, exits to neutral, and is ready to go. (LEDs turn off in a scrolling motion, then the Red LED turns on solid--Green LED will be on if no transmitter signal present & Blue or Blue & Amber LEDs on if Drag or Minimum Brakes are above 0%).

PROPER GEAR SELECTION

Motor operating temperature is the ONLY way to properly set vehicle gearing
The Motor and Speed Control should not exceed 160-170°F MAX at end of the run!

Change the gearing to avoid overheating!

DO NOT FREE-REV MOTOR!

Free-running your brushless motor in a no-load condition can cause rotor failure & ESC transistor damage and will void the product's warranty.

Recommended Gearing for Traxxas® E-Maxx™:

NOVAK MOTOR	New Version Traxxas E-Maxx™ Motor Heat Sink Must be Trimmed				Original Traxxas® E-Maxx™ Use First Gear for Shaded Areas			
	12-cell NiMH / 4S LiPo		14 cell NiMH		12-cell NiMH / 4S LiPo		14 cell NiMH	
	Spur	Pinion	Spur	Pinion	Spur	Pinion	Spur	Pinion
HV4.5	68	13	68	12	66-68	18	66-68	16
HV5.5	68	14	68	13	74-76	14	66-68	18
HV6.5	68	15	68	14	70-72 74-76	14 15	64-66	18
HV7.5	68	16	68	15	70-72 74-76	15 16	64-66	20

See www.teamnovak.com for updated gearing charts & final drive ratios

ADJUSTABLE PARAMETERS

In addition to several items that can be turned on & off, many ESC parameters are adjustable. Here are some parameter descriptions that can help you fine tune the ESC to your requirements:

MINIMUM BRAKE (1 of 10 settings from 0 to 30%)--The amount of braking applied with the first pulse of transmitter throttle information.
--Raising this setting starts the braking at a stronger/higher level.
--Setting the Minimum Brake turns off the Drag Brake feature.

DRAG BRAKE (1 of 10 settings from 0% {off} to 30%)--Amount of braking applied while transmitter is at neutral. Known as 'coast' or 'auto' brakes.
--Raising this setting makes the motor slow down more, without pushing the transmitter's trigger into the brake/reverse direction.
**With Drag Brake on setting 2-10, Min. Brake value is same as Drag Brake value

DEAD BAND (1 of 5 settings from 2 to 6%)--The space between Minimum Brake and Minimum Drive, with neutral in the middle.
--Raising this setting will increase the 'free play', or distance your trigger must move before forward drive or braking will begin--Can be helpful to resolve minor "glitching" issues when the vehicle is in neutral.

MINIMUM DRIVE (1 of 5 settings from 1 to 12%)--The amount of forward drive applied with the first pulse of transmitter throttle information.
--Raising this setting makes the motor start at a stronger/higher level so it takes off more aggressively from neutral.

THROTTLE CURVE (1 of 2 settings--Linear & Expo)--The response of the motor to transmitter throttle information being sent to it.
--Expo setting provides smoother, more controlled low-end power delivery.

BRAKE FREQUENCY (1 of 7 settings from 1 to 8kHz)--Frequency the braking duty cycle information in being sent to the motor.
--Raising this setting makes the braking feel smoother and easier to control.
--Decreasing this setting makes the braking feel more abrupt or 'grabbier'.

HV PRO CUSTOM PROGRAMMING & PROPER GEAR SELECTION SHEET

PLEASE NOTE: This sheet 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?)

HV PRO ESC SOFTWARE FLOW CHART

The HV Pro ESC features **nine parameters** that can be adjusted. Refer to below flowchart and settings at right. One-Touch programming should be completed before custom programming.

DEFAULT SETTINGS ARE IN SHADED BOXES @ RIGHT -->

TO CHANGE PARAMETER SETTINGS:

Transmitter can be either ON or OFF:

1. IF THE TRANSMITTER IS OFF, DISCONNECT THE SPEED CONTROL FROM RECEIVER

Remove ESC's input signal harness from receiver to avoid radio interference.

2. CONNECT ESC TO CHARGED BATTERY PACKS

3. TURN ESC'S POWER SWITCH 'ON'

4. 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, continue to hold ESC's SET button until you reach the desired parameter.

5. SELECT PARAMETER VALUE

LED flashes to indicate active setting (see tables at right). Quick press & release SET button to change the value.

6. PRESS & HOLD SET BUTTON TO STORE SELECTION

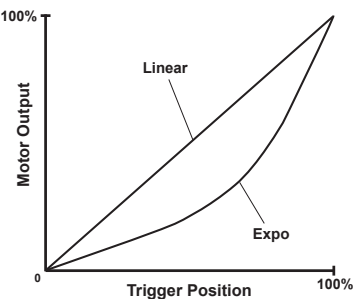
When SET button is pressed & held for about 1 second, new selection is stored in ESC's memory--The status LEDs scroll across indicating you are exiting programming & ESC returns to neutral.

Note: there is no time constraint during the selection of custom parameters while in the programming.

Parameter	Default	Custom
Minimum Brake	9%	
Drag Brake	9%	
Dead Band	5%	
Minimum Drive	1%	
Throttle Curve	Linear	
Brake Freq.	3 kHz	
Brakes (on/off)	ON	
Motor Rotation	CCW ↺	
Li-Po Cut-Off	ON	

THROTTLE CURVES

The HV Pro software has 2 throttle curves as seen below. The 'Expo' curve provides more controllable bottom end.



@NEUTRAL
RED LED on solid

press & hold

MINIMUM BRAKE
BLUE

press & hold

DRAG BRAKE
BLUE & AMBER

press & hold

DEAD BAND
BLUE & GREEN

press & hold

MINIMUM DRIVE
AMBER

press & hold

THROTTLE CURVE
GREEN

press & hold

BRAKE FREQUENCY
RED

press & hold

BRAKE DISABLE
RED / GREEN / AMBER

press & hold

MOTOR ROTATION
GREEN & AMBER

press & hold

LI-PO CUT-OFF
RED & AMBER

press & hold

LEDs roll off
Exit Programming

@NEUTRAL
RED LED on solid

continue holding ESC's SET button to skip steps here

THROTTLE PARAMETER SETTINGS (defaults shaded)

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	30

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

Amount of braking applied while transmitter is at neutral. AKA '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 (%):	off	3	6	9	12	15	18	21	24	30

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	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 (%):	1	3	5	8	12

5. THROTTLE CURVE SELECTION (3) GREEN LED

Response curve of drive power applied to motor for a given trigger position.

--Changing this setting changes the throttle response of the motor and ease of low end drivability--Expo has smoother bottom end.

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

6. BRAKE FREQUENCY (7) RED LED

Frequency at which duty cycle information for braking is sent to the motor.

--Raising this setting makes the brake response smoother and less aggressive.

Setting (# of flashes)	1	2	3	4	5	6	7
Brake Frequency (kHz):	1	2	3	4	5	7.5	8

7. BRAKE DISABLE (2) RED, GREEN, & AMBER LEDs

--Changing this setting activates/deactivates the ESC's braking.

Setting (# of flashes)	1	2
Brakes (On/Off):	ON	OFF

8. MOTOR ROTATION (2) GREEN & AMBER LEDs

--Changing this setting changes direction of motor rotation.

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

9. LIPO CUT-OFF (2) RED & AMBER LEDs

--Changing this setting enables/disables Auto-Detect LiPo Cut-Off.

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

RESTORING FACTORY DEFAULTS:

Every time you perform the One-Touch Set-Up, the ESC is defaulted to the factory default parameter settings.