

## THROTTLE PROFILE SELECTION

The Goat 3S Brushless/Brush Crawler speed control is equipped with 3 user-selectable Throttle Profiles, as shown below.

**NOTE:** The Goat 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.

### GOAT 3S THROTTLE PROFILES

	BRUSHLESS MOTOR PROFILES		BRUSH MOTORS
	1 Standard	2 Worm Drive	3 Brush-Mode
w/Reverse	yes	yes	yes
Reverse%	100%	100%	100%
Throttle Curve	expo	expo	linear
Programmable	yes	yes	yes
Drag/Hill Brake	3%	0%	10%
Dead Band%	5%	5%	5%
Min.Drive%	2%	2%	2%
Li-Po	active	active	active
Drive Frequency	N/A	N/A	3.5kHz
Motor Rotation	CCW	CCW	N/A

**NOTE:** The Goat 3S is factory set to Profile #2

In Brushless-Mode, One-Touch set-up reverts ESC back to Profile #2 & default settings.

### SELECTING BRUSHLESS PROFILES:



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, remove the ESC's input signal harness from the receiver--Green 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 Brushless Throttle Profile selection (1 of 2).
- QUICK PRESS (& release) SET BUTTON TO CHANGE SELECTION**  
Each press will change to the next consecutive Throttle Profile. (After Profile 2 in Brushless-Mode, the sequence begins again at Profile 1)  
*Note: there is a time constraint during this selection process.*

- ESC STORES SELECTION & BEGINS TO EXIT PROGRAMMING**  
If SET button is not pressed for 3 seconds, ESC stores selected Profile in memory, exits to neutral & is ready to go. (LEDs turn off in a rolling motion left to right, then Red LED turns on solid--Green LED will be on if no transmitter signal present & Blue or Blue & Amber LEDs on if Drag or Min. Brakes above 0%).

*Note: ESC reverts to factory default settings & Throttle Profile #2 whenever One-Touch set-up is performed (reverts to Profile #3 Brush-Mode if no brushless motor sensor harness is connected).*

## PROPER GEAR SELECTION

**Motor operating temperature is the proper way to set the vehicle gearing**

The motor should not exceed 160°F at end of run!

Change the gearing to avoid overheating.

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

With the extremely broad power band of the Novak Crawler brushless motors, you can gear your vehicle for more top speed (without going to a higher voltage battery pack), but remember gearing higher will produce more speed control & motor heating. Always check the motor's operating temperature after making any gearing adjustments--motors are designed to operate safely up to 160°F.

## PROFILE ADJUSTMENTS

The following parameters are adjustable in the ESC's software:

**DRAG BRAKE** (1 of 10 settings from 1 to 15% in Brushless Profile #1, & 1 of 10 settings from 10 to 90% in Brush-Mode)--The amount of braking applied while the transmitter is at neutral. Also known as 'hill' or 'auto' brakes.

*Raising this setting makes the motor slow down more without pushing the transmitter's trigger into the brake/reverse direction.*

*This adjustment is not available in Profile #2.*

**DEAD BAND** (1 of 5 settings from 3 to 9%)--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/reverse will begin.*

**MINIMUM DRIVE** (1 of 5 settings from 2 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.*

**DRIVE FREQUENCY-Brush-Mode Only**-(1 of 7 settings from 3.5 to 15kHz)--The frequency at which the duty cycle information is being sent from the speed control to the motor to control the speed.

*Raising this setting makes the control of the motor feel more smooth.*

*Normally this value would be lowered for use with higher turn motors to get more 'punch', and it would be raised for hotter, low-turn motors or slippery track conditions for more control of the power delivery.*

**MOTOR ROTATION SELECTION** (adjustable in Brushless Mode) -- The Goat 3S's software lets you reverse the brushless motor's rotation direction. This allows installation in vehicles with counter-rotating drive trains (or opposed transmissions), without compromising performance.

*See reverse side of this sheet for programming instructions*

## LI-PO CUT-OFF CIRCUITRY

When active (see programming on reverse side to turn ON/OFF), the built-in Novak Smart-Stop Li-Po Cut-Off Circuitry lets you safely use 2S or 3S Lithium Polymer battery packs by cutting off the speed control's throttle output when the critical safety voltages are reached.

The circuitry constantly monitors the pack voltage. The Goat 3S automatically selects a 2S or 3S Li-Po cut-off voltage value (6.25V for 2S and 9.375V for 3S). When the ESC detects that either critical safety voltage value will soon be reached, 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 motor again, this is not good for Li-Po batteries.

*Reaching critical safety voltage too many times can damage the cells.*

**DO NOT CONTINUE TO RUN VEHICLE AFTER THE SMART-STOP HAS SHUT DOWN THE THROTTLE OUTPUT THE FIRST TIME.**

**When the 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.*

## EXPO THROTTLE CURVE

The brushless profiles in the Goat 3S ESC's software features an exponential throttle curve in both the forward and reverse directions. This provides you with extremely smooth throttle response for the precision movements required in the most demanding technical rock crawling courses.

## PROGRESSIVE BRAKING

The Goat 3S ESC's braking use battery power to slow the motor, and can supply amazing amounts of braking. In Brushless Profile #1, the brakes linearly ramp up to the value of Drag/Hill brakes that you program. This provides smooth application of braking without risk of roll-overs.

# ADVANCED -- CUSTOM PROGRAMMING

## TO CUSTOM PROGRAM PROFILES:

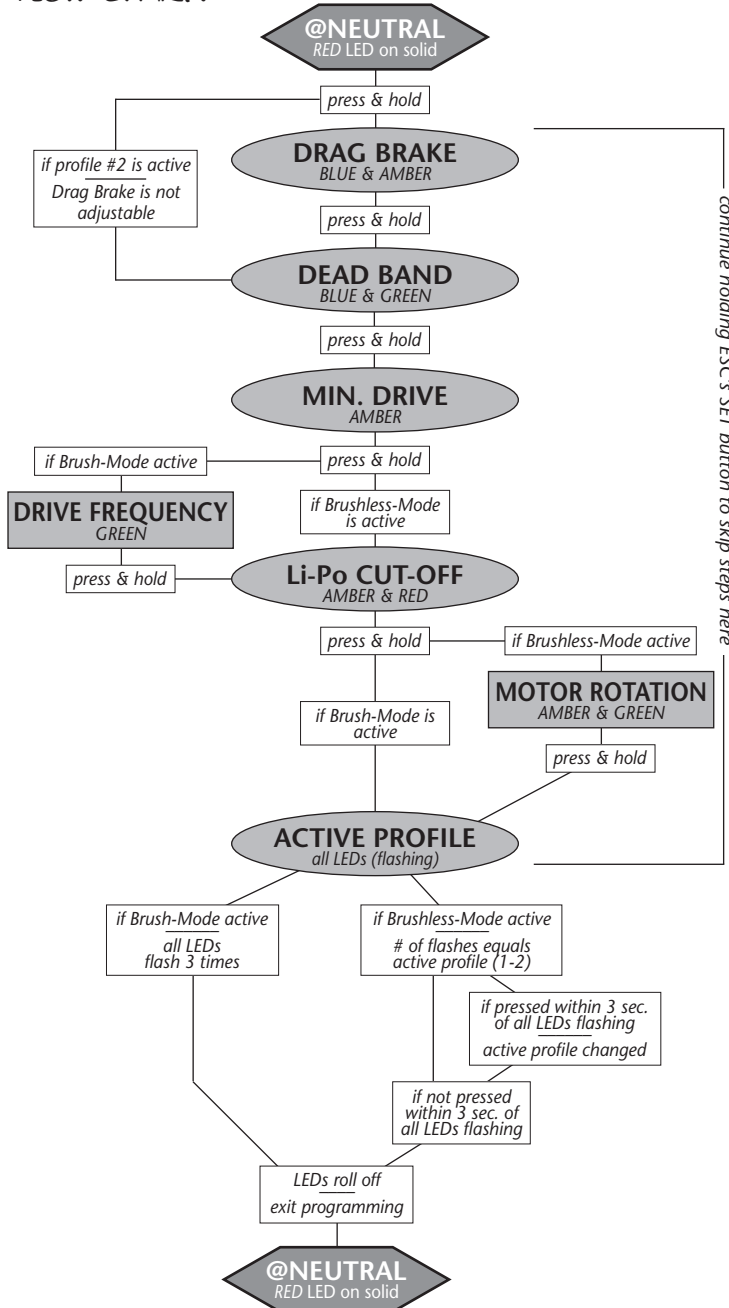
Your transmitter can be either ON or OFF:

- IF TRANSMITTER IS OFF, DISCONNECT ESC FROM RECEIVER**  
Remove input signal harness from receiver to avoid radio interference.
- CONNECT SPEED CONTROL TO A CHARGED BATTERY PACK**
- SLIDE ESC's ON/OFF SWITCH TO 'ON' POSITION**
- MAKE SURE THE THROTTLE PROFILE TO ADJUST IS ACTIVE**  
If you are not sure what profile is selected, follow the procedures in 'Throttle Profile Selection' to check or select the desired profile.
- FOLLOW STEPS ON RIGHT SIDE OF THIS PAGE TO CUSTOMIZE ESC**  
You can adjust different parameters (described on back side of this sheet) to fine tune the speed control to perform & feel the way you like it.

**Remember that you can not access the Brush-Mode (Profile #3) without disconnecting the brushless motor's sensor harness from the ESC.**

Note: there is no time constraint during selection process of custom parameters.

## GOAT 3S SOFTWARE FLOW CHART:



## RESTORING FACTORY DEFAULTS:

Every time you perform the One-Touch Set-Up, the factory default settings are restored for each of the throttle profiles & ESC reverts to Profile #2.

## TO ADJUST DRAG BRAKE: (Profiles 1 & 3 ONLY)

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until the **BLUE & AMBER** status LEDs turn on solid---Release SET button once LEDs are on solid.

- B. **SELECT DRAG BRAKE PERCENTAGE**   
Blue & Amber status LEDs flash to indicate the Drag Brake setting. Quick press & release the SET button to change the Drag Brake setting.

Drag Brake Value for Brushless Profile 1:

Setting (# of flashes):	1	2	3	4	5	6	7	8	9	10
Drag/Hill Brake (%):	1	1.5	3	4.5	6	7.5	9	10.5	12	15

Drag Brake Values for Brush-Mode:

Setting (# of flashes):	1	2	3	4	5	6	7	8	9	10
Drag/Hill Brake (%):	10	20	25	30	40	50	60	70	80	90

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs will also be on)---ESC is at neutral & ready to go.

## TO ADJUST DEAD BAND:

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until the **BLUE & GREEN** status LEDs turn on solid---Release SET button once LEDs are on solid.

- B. **SELECT DEAD BAND PERCENTAGE**   
Blue & Green status LEDs flash to indicate active Dead Band setting. Quick press & release SET button to change setting.

Setting (# of flashes):	1	2	3	4	5
Dead Band (%):	3	5	6	7	9

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs may also be on)---ESC is at neutral & ready to go.

## TO ADJUST MINIMUM DRIVE:

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until **AMBER** status LED turns on solid---Release SET button once LED is on solid.

- B. **SELECT MINIMUM DRIVE PERCENTAGE**   
Amber status LED flashes to indicate active Minimum Drive setting. Quick press & release SET button to change setting.

Setting (# of flashes):	1	2	3	4	5
Minimum Drive (%):	2	3	5	8	12

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs may also be on)---ESC is at neutral & ready to go.

## TO ADJUST DRIVE FREQUENCY: (Profile 3 ONLY)

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until **GREEN** status LED turns on solid---Release SET button once LED is on solid.

- B. **SELECT DRIVE FREQUENCY**   
Green status LED flashes to indicate active Drive Frequency setting. Quick press & release SET button to change setting.

Setting (# of flashes):	1	2	3	4	5	6	7
Drive Frequency (kHz):	3.5	4.5	5.5	6.5	7.5	10	15

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs may also be on)---ESC is at neutral & ready to go.

## TO TURN LI-PO CUT-OFF CIRCUITRY ON/OFF:

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until the **AMBER & RED** status LEDs turn on solid---Release SET button once LEDs are on solid.

- B. **TURN LI-PO CUT-OFF CIRCUITRY ON or OFF**   
Amber & Red status LEDs flash to indicate Li-Po Cut-Off Circuitry setting. Quick press & release SET button to change setting.  
**1 flash = OFF 2 flashes = ON**

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs may also be on)---ESC is at neutral & ready to go.

## TO REVERSE MOTOR ROTATION: (Profiles 1 & 2 ONLY)

- A. **PRESS & HOLD SPEED CONTROL'S SET BUTTON**  
With ESC at neutral, press & hold SET button until **AMBER & GREEN** status LEDs turn on solid---Release SET button once LEDs are on solid.

- B. **SELECT MOTOR ROTATION DIRECTION**   
Amber & Green status LEDs flash to indicate motor rotation direction. Quick press & release SET button to change setting.  
**1 flash = Normal 2 flashes = Reverse**

- C. **PRESS & HOLD SET BUTTON TO STORE SELECTION**  
Selection is stored in memory--Status LEDs scroll back & forth and ESC exits programming. Red LED turns on solid (Blue & Amber LEDs may also be on)---ESC is at neutral & ready to go.