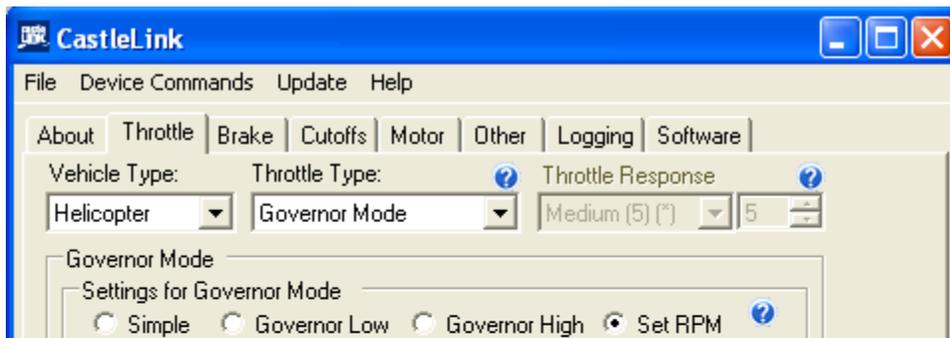


Setting Up Set RPM Governor Mode

By setting up this feature on your Castle Creations ESC you will be able to maintain a good constant head speed throughout the duration of your flight.

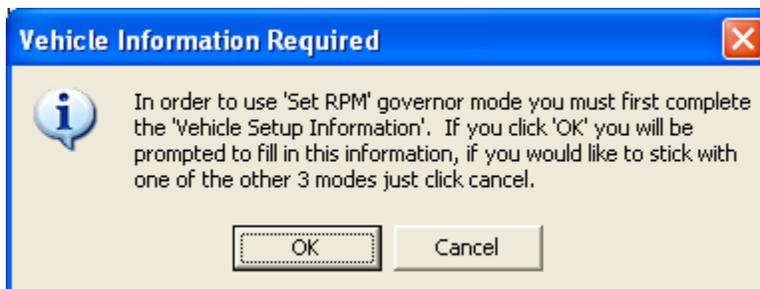
***For this function to work properly the throttle channel of you Tx must be calibrated in accordance to the “Setting Up Fixed Endpoint” Instructions.**

With the Castle Link connected to the ESC go to the “Throttle” Tab. Choose the following options. “Vehicle Type” – Helicopter, “Throttle Type” – Governor Mode.

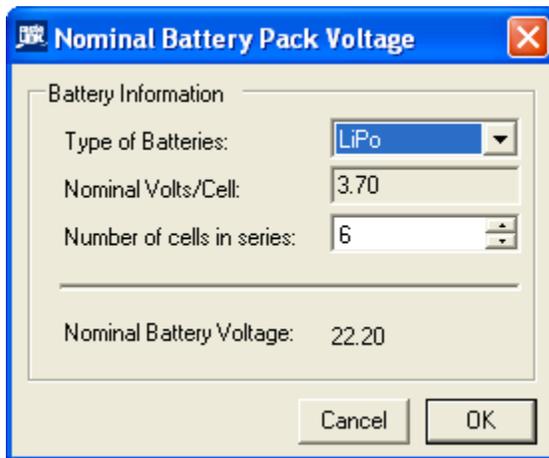


Then choose “Set RPM” in the “Governor Mode” Section of the Castle Link. This pop-up will appear.

***If it does not appear return the controller to it’s default setting’s by selecting the “Defaults” tab at the bottom of the screen or go to the “Calculate Battery Voltage” & “Enter Motor/Gearing Information Tabs in the “Vehicle Setup Information Box”. Information in both categories must be entered.**



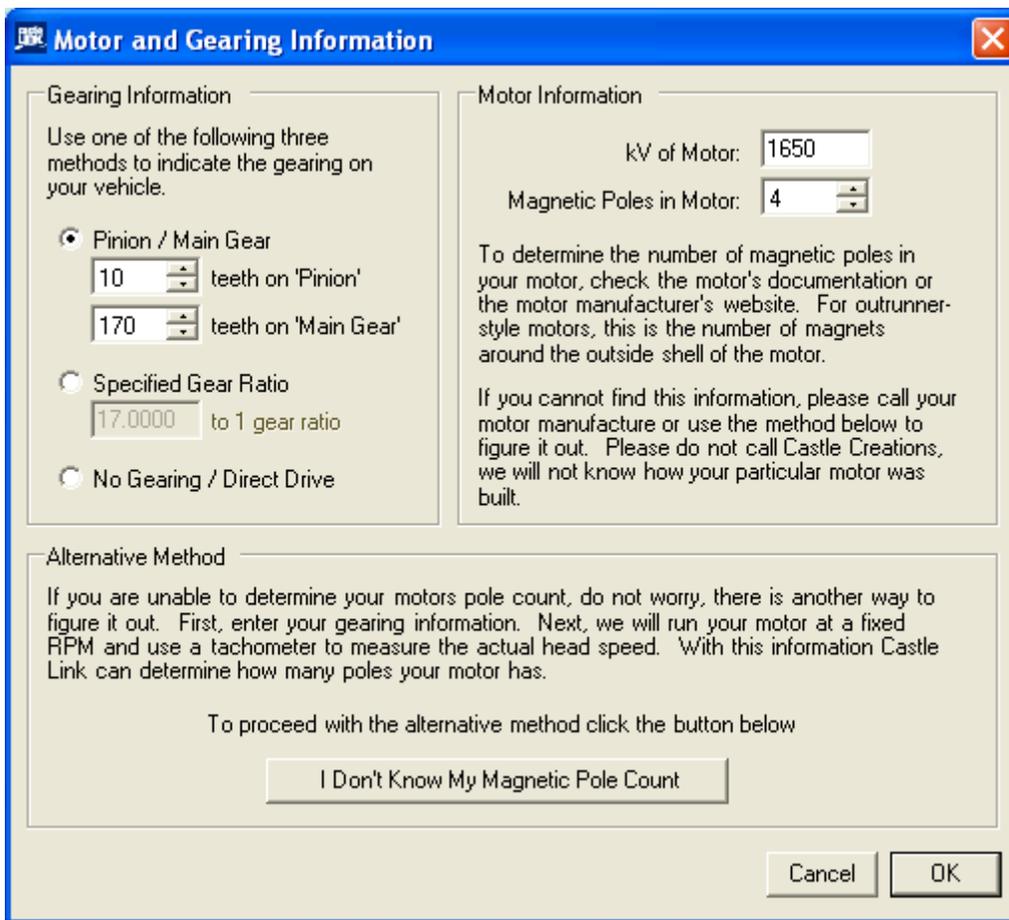
Choose OK to begin the Vehicle Setup. Battery Type & Voltage will be the first info to be entered.



The dialog box is titled "Nominal Battery Pack Voltage" and contains the following fields:

- Battery Information**
 - Type of Batteries: LiPo (dropdown menu)
 - Nominal Volts/Cell: 3.70 (text input)
 - Number of cells in series: 6 (spin button)
- Nominal Battery Voltage: 22.20 (displayed value)
- Buttons: Cancel, OK

Once that is entered select OK. You will then need to enter "Motor & Gearing Information".



The dialog box is titled "Motor and Gearing Information" and is divided into two main sections:

- Gearing Information**
 - Use one of the following three methods to indicate the gearing on your vehicle.
 - Pinion / Main Gear
 - 10 teeth on 'Pinion' (spin button)
 - 170 teeth on 'Main Gear' (spin button)
 - Specified Gear Ratio
 - 17.0000 to 1 gear ratio (text input)
 - No Gearing / Direct Drive
- Motor Information**
 - kV of Motor: 1650 (text input)
 - Magnetic Poles in Motor: 4 (spin button)
 - Text: To determine the number of magnetic poles in your motor, check the motor's documentation or the motor manufacturer's website. For outrunner-style motors, this is the number of magnets around the outside shell of the motor.
 - Text: If you cannot find this information, please call your motor manufacture or use the method below to figure it out. Please do not call Castle Creations, we will not know how your particular motor was built.
- Alternative Method**
 - Text: If you are unable to determine your motors pole count, do not worry, there is another way to figure it out. First, enter your gearing information. Next, we will run your motor at a fixed RPM and use a tachometer to measure the actual head speed. With this information Castle Link can determine how many poles your motor has.
 - Text: To proceed with the alternative method click the button below
 - Button: I Don't Know My Magnetic Pole Count
- Buttons: Cancel, OK

***Entering the correct information is imperative to maintaining the correct set head speed.**

Once this is entered select OK & you will be taken back to the main “Throttle” tab of the Castle Link to continue with the next settings.

For “Initial Spool Up Rate” a Medium setting of 5 will be proper for the initial start up of the Helicopter. A lower number will result in a slower spool up, a higher number – faster.

As each type of heli can be different according to the equipment used the next settings are suggestions but good starting points and should be tailored to your specific set-up & flying style.

***Auto-Rotation – This function will allow you to “Bail Out” of an auto with a faster spool up rate than set with the “Initial-Spool Up Rate” and must be set up in accordance to the “Setting Up The Auto-Rotation” Instructions.**

“Governor Gain” – In the illustration below I have chosen the medium setting. This setting will have to be tailored to your model on the first few flights. There are a couple of ways to tune this setting in.

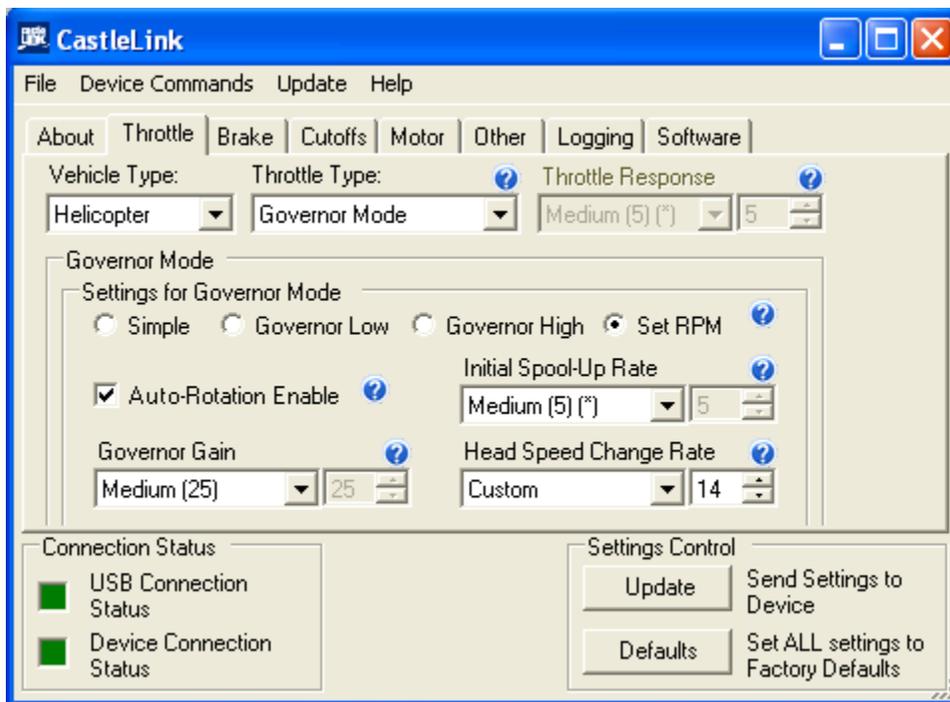
- 1) In a hover do a moderate climb out straight up. If the motor sags or the head speed reduces drastically then the gain is too low. Be careful with a setting that is too low as it could affect the performance of the tail rotor. If the head speed noticeably increases the gain may be too high. With a high setting you may get a tail kick in a hover or gear chatter from the motor speeding up & slowing down at an excessive rate.

2) The second & probably the easiest way to set the gain is to go ahead & set the Gain value high until you get the tail kick or the gear chatter & then back the setting down from there just until the tail holds solid with no gear chatter.

It will be imperative to get this setting correct for hard 3D flying!

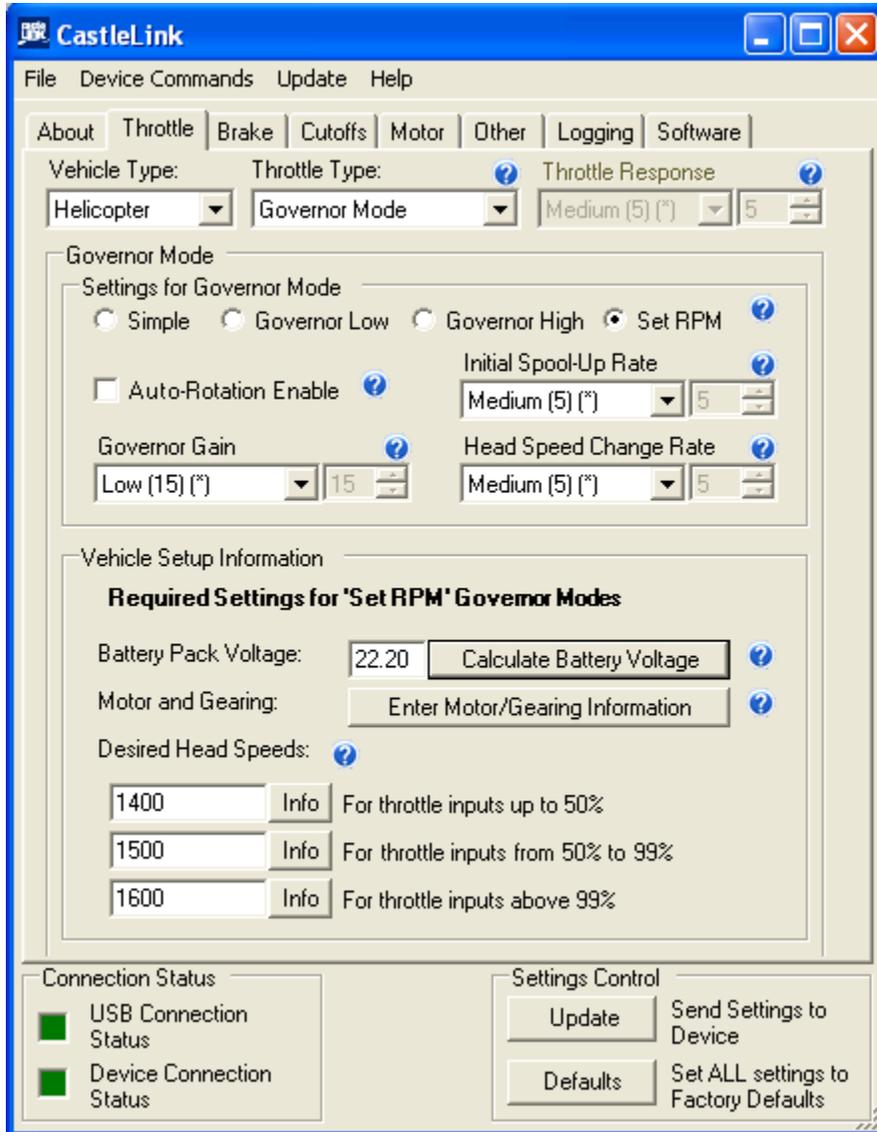
“Head Speed Change Rate” – This setting controls how quickly the head changes between set speeds and most importantly **how quickly the head speed recovers when used in the “Auto-Rotation Enable” mode.**

The setting shown below is only a suggestion. Recovery speed should be tested by switching in & out of throttle hold with 0 pitch in the blades on the ground and the first few recovery attempts at a safe altitude. A Custom of 10 – 14 will be a good starting point.



You will now set proper head speeds in accordance to your gearing.

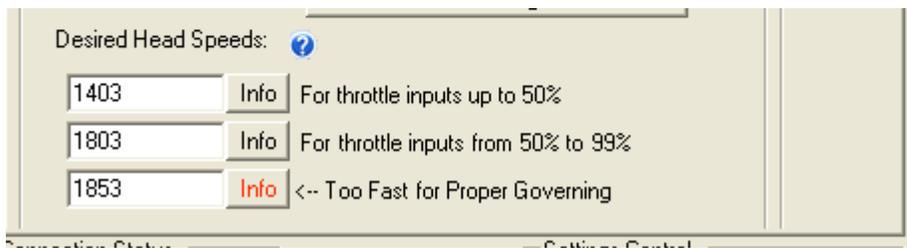
On the “Throttle” tab go to the “Desired Head Speeds” in the “Vehicle Setup Information” section (Battery & Motor/Gearing info tabs are located here as well so this information can be accessed at any time).



Enter the desired head speeds in the 3 designated boxes.

*In accordance to the gearing info you entered, proper governed head speeds will be between 70 & 95% of your

motor power output. Anything outside this range will result in the “Info” tab turning red & the result beside it.



If you would like to know where you are at in this range, click on the “Info” tab beside the head speed.



The best efficiency will be seen between 90 - 92%.

* You may have to change to a different pinion to get into the range of speeds you are looking for.

Once all head speeds are entered, make other changes on the available programming tabs & don't forget to “Update” the controller!

Setting Up The Throttle Curves In The Tx

*For this function to work properly your throttle channel must be calibrated in accordance to the “Setting Up Fixed Endpoint” Instructions.

*If you are using the Auto-Rotation feature you will lose the ability to use the first selected head speed as ALL points on the Normal throttle curve will have to be set at 0 for the ESC to arm

or initialize on start-up. ANY OTHER SETTING BESIDES 0 ON AN POINT IN THE NORMAL THROTTLE CURVE COULD RESULT IN THE UNEXPECTED STARTUP OF THE MODEL! The ability to use this head speed can be regained if you have the a 3 position switch on the Tx for Throttle Hold where a 0 value can be programmed & used to show the ESC a 0 value for start up in addition to the value for the auto rotation calibration.

See the “Auto-Rotation Set-up Instructions to properly calibrate the Throttle Hold on your Tx.

Beside each “Desired Head Speed” box you will see what you need to enter in to the Tx throttle curves.

For our first head speed the instructions state “For throttle inputs up to 50%”

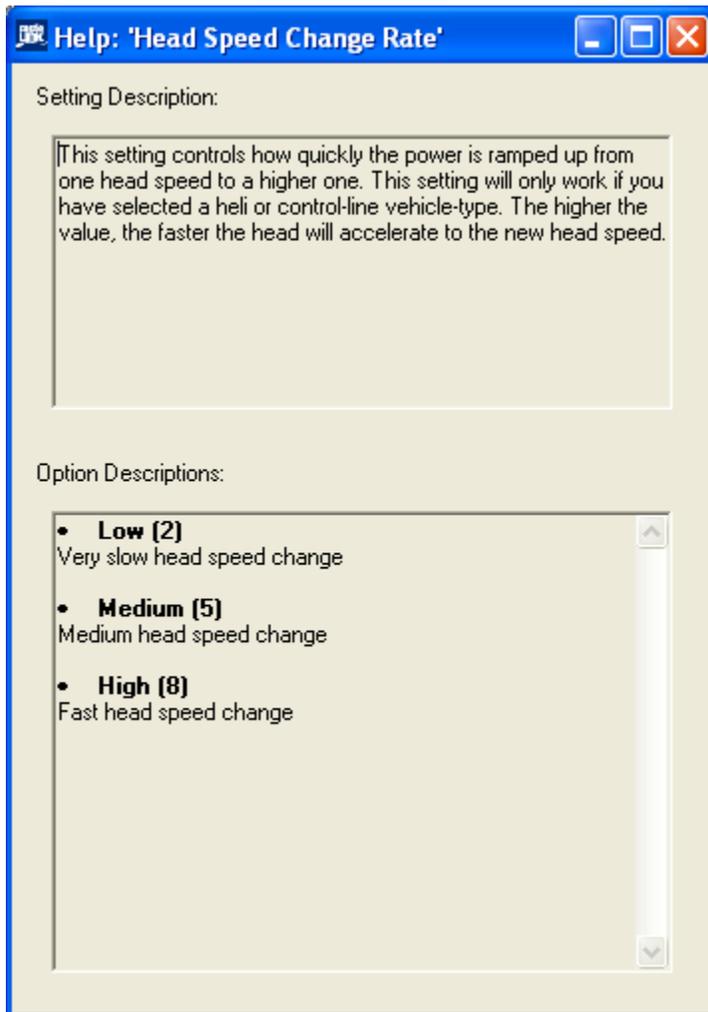
This means that we will need to set ALL points on our first throttle curve (usually known as Normal throttle curve) with a value lower than 50. A good medium here is to set ALL points from low to high at 30. **0's may have to be used here in accordance to the use of the “Auto-Rotation Enable” feature.** When this is done you should have a straight line between low & high on the screen of the Tx.

The second box will be our head speed of Idle 1 or Stunt 1. The info box states “For throttle inputs from 50 – 99%”. A good medium here is to set ALL points on your Idle/Stunt 1 throttle curve to 75%. You should have a straight line from the low point to the high point.

The third box or idle/stunt 2 states “ For throttle inputs above 99%”. Here you will need to set ALL points to 100%.

You should now be able to start “tuning” your “Governor Gain” and “Head Speed Change Rate” Settings!

If you need further instructions please try clicking on the **BLUE** dots with the ? in them next to the questionable setting. Once selected a pop-up containing info about that setting will appear.



Initial Spool Up

For the initial spool up the ESC will need to see the 0 value to arm or initialize. With "Auto-Recovery Enabled" selected you will need to be in the Normal Mode where all 0's were set on the throttle curve. If not using the Auto-Recovery Enable" throttle hold is used with the lowest possible setting for the value in the Tx.

By switching out of throttle hold or out of normal mode the model should start a smooth spool up. When finished select the setting you have for the 0 value (throttle hold or normal throttle curve depending on where you set it.).

Happy Flying!

Steve

Castle Creations

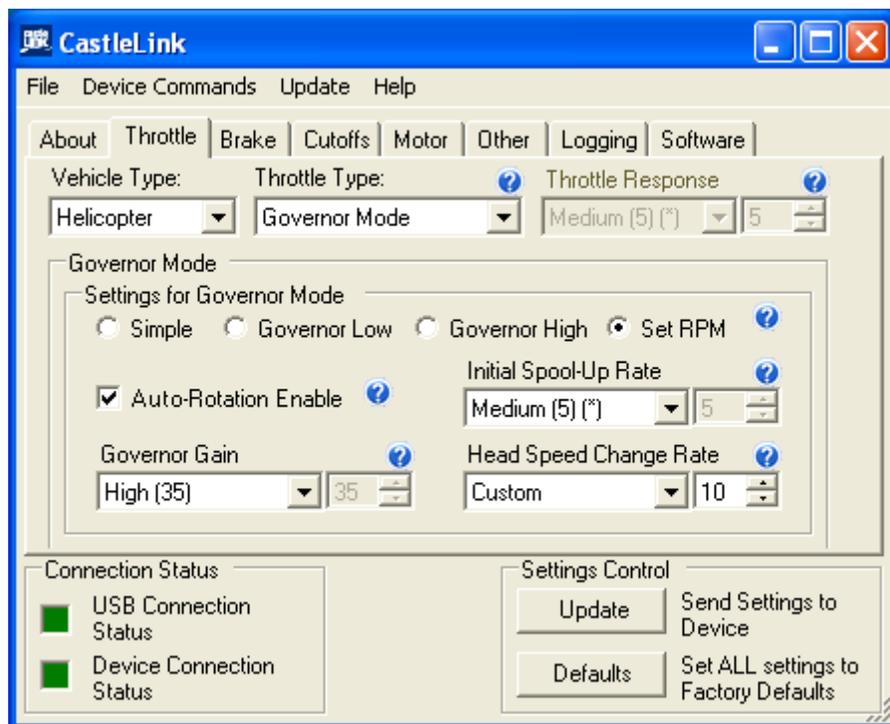
Setting Up The Auto Rotation Enable Function

Setting up the Auto Rotation Mode allows a small window in Throttle Hold where the motor is not powered but the Controller has not seen “Zero” thus allowing you to use the Head Speed Change Rate to give a faster controllable spool up for recovery when bailing out of an auto.

- **Caution – For safety please disengage the motor & pinion from the main gear when setting the Tx. settings in Throttle Hold.**

Using the Castle Link under the Throttle Tab select the Auto-Rotation Enable Tab. As an initial setting 10-14 will be a good starting point but will need to be tailored to you desire.

***If you are just selecting this option please calibrate the ATV or EPA on the throttle channel of your Tx.**



In your Tx. go to the Throttle Hold Screen. Depending on the Tx. you may have to activate the screen. When it is activated the value of the Throttle Hold position will possibly be a negative value. Move this value to its highest positive setting. Now go to the Normal Throttle Curve screen & set all values a zero. We will use this as a safety & controller initializing switch. With the motor disengaged from the driven, throttle hold off and Throttle Hold Screen open on the Tx. initialize the controller. Now switch in to Stunt or Idle 1 and give the motor time to ramp up. Once it is up to speed flip into throttle hold and In the Throttle Hold Screen slowly decrease the value pausing briefly between each point until you hear the motor loose power & begin to slow – go no further! Before the motor stops flip out of throttle hold and the motor should ramp back to its preset speed. Verify the settings a few times by going in & out of throttle hold. You can adjust the rate at which the the head speed will be regained by the “Head Speed Change Rate” on the Castle Link but use caution & work the setting up slowly to suit your self & the models capability.

Re-engage the motor to the main gear & verify once again the throttle hold setting with the model on the ground and zero pitch in the blades. It is also recommended in the first few flights to try the Auto-Rotation function starting from a safe altitude until you learn the best setting for you & the model.

Happy Flying!

Steve

Castle Creations

Setting Fixed Endpoints

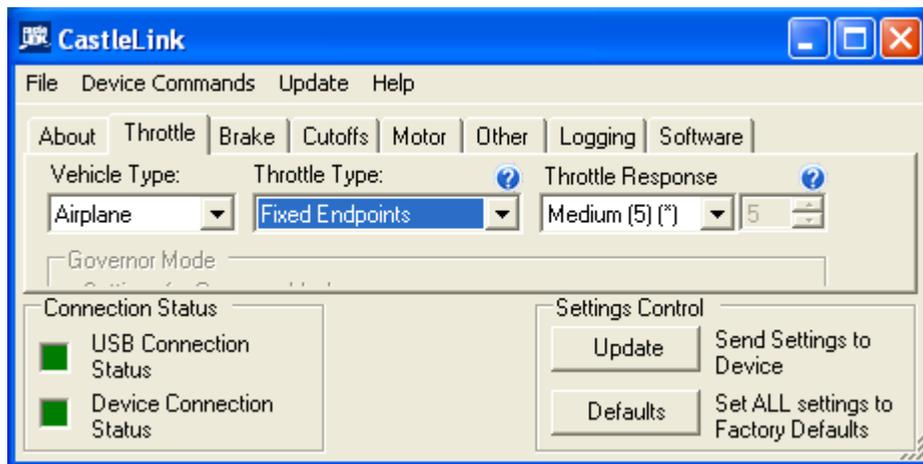
By setting Fixed Endpoints your new Castle Controller will know the exact location of zero and full throttle

*Caution - For safety please remove the prop from the aircraft or disengage the motor from the main gear from helicopters when setting up fixed endpoints

Using the Castle Link got to the throttle tab & choose Fixed Endpoints. Make other settings needed for your application as well.

*If Vehicle Type is Helicopter, calibrate in the Normal Throttle Curve with linear values of 0-50-100. These values will change when setting up Governor Mode but need to be 0-50-100 for calibration purposes.

If you intend to use the “Auto-Rotate Enable” function please enable it on the controller before proceeding. If the function is chosen after calibration it is recommended to recalibrate again.



With the controller installed remove the prop or disengage the motor from the driven.

In your Tx. go to the ATV or Travel Adjust Screen.

On both hi & low throttle bring the ATV closer to zero. Your default setting will more than likely be 100 on hi & low so bring both settings in to around 50. With the Tx on place the throttle at the hi position & plug in your battery. You will hear the speed control initialize but you won't get the final tone for the programming mode via the Tx. The indicator light will also be flashing rapidly. Slowly increase your ATV out or back closer to 100 pausing at each increment. When the controller sees full throttle you will get the last initialization tone and if applicable, the red indicator light will now have a slow steady flash, go 2 more points on the ATV. Now move the throttle stick to low. *If the speed control initializes at the setting you have disconnect the battery & move the low ATV closer to zero. As in hi throttle we now want to slowly bring the low ATV out or closer to 100 pausing briefly at each increment until you hear the controller initialize then go 2 more points. The indicator light, if applicable will flash a slow steady amber. At this your Castle Controller now knows exactly where zero and full throttle is in accordance with your Tx. output to the Rx.

Happy Flying!

Steve

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