

Pitch curve set up 101

By Brian James

It's a little confusing at first. You hear the term "pitch curve", and "throttle curve" and you know it's something you're supposed to "program" into your radio, but how? And how do you get the right amount of pitch? This set up works for electric, and nitro powered helicopters. Here's the set up guide!

1. Build your heli to all the original manufacturers specs. This is important. Make sure all your linkage rods are exactly the length determined in the manual included with your helicopter kit.

2. First, go to the pitch curve menu in your radio for Idle up 1, or Stunt mode 1. You'll see numbers, a graph or both. There will generally be 5 points you can adjust. You'll have to imagine the points (1,2,3,4,5) as representing points on the collective stick, where point 1 represents full bottom stick, and 5 represents full top stick. Obviously that makes point 3 center stick and that's where we start.

3. Now it can get a little confusing, but follow along, we want point 3 (center stick) to equal 50% of the swashplate's up and down travel, meaning the in the middle of it's available travel. So, turn on your transmitter, and receiver, flip the flight mode switch to idle-up 1 or Stunt mode, and scroll to the pitch curve menu. Now place the left stick in the center.

4. Using a pitch gauge, ensure that there is 0 degrees pitch on the blades (both!) and that the mixing arms, and washout arms are perpendicular to the mainshaft. If any of this is untrue, you'll need to make it so, by adjusting the length of the pushrods, and or the position of the servo horn. The position of the servo horn becomes brand specific, but basically you want to achieve the same thing...i.e. at center stick, the servo is also in the center of it's available travel.

5. Now that you've got 0 degrees at center stick, and point 3 on the pitch curve has a value of 50% (don't deviate here!) We can set up the top and bottom stick pitch. Generally we want to have the same amount of pitch on the bottom stick as we do on the top stick in idle up. That means positive 10 degrees on top stick, and negative 10 degrees on bottom stick. (many pilots are now using more pitch 12, 13 or even 14 degrees, but most people find 10 degrees a perfect place to learn 3d flying).

6. Now that the radio is in idle up, or stunt mode place the collective stick at the top of it's travel, and take a reading of the pitch gauge and remember that number, now place the collective stick at the full bottom of it's travel. Does that number match the first number? It should be the reciprocal. If the value is not close to 10 degrees then making it so is model specific. Many helicopters are CCPM these days, so if that's the case go to your menu in the radio and find something that says "swash mix" or "swash AFR". You'll see three options. Elevator, Aileron, and Pitch. Scroll to pitch. Making the number higher gives you a greater pitch range, and making the number lower gives you a smaller pitch range.

7. If you find that at full top stick, you get a negative pitch value, and at bottom stick you get a positive pitch value, you would go back to that "swash mix" menu, and make the value the reciprocal. Meaning if it was 60%, make the number -60%. That will change the direction of the swash travel.

8. You'll notice that your pitch "curve" isn't really a curve at all, it's a straight line. You can adjust this if you wish by changing points 2 and 4. Right now, point 2 is 25%, and point 4 is 75%. You

can change those values and it will affect how “jumpy” or responsive the collective is. Usually leaving it a straight line is best until you really get the “feel” for 3d flying.

9. So now we have idle up, or stunt mode set up, but if you’re a beginner chances are you’ll want to fly your heli around in “normal” mode. Normal mode means that at full bottom stick the engine is at idle and the blades are not turning (or turning very little and are easily stopped by hand). You also don’t have any need for there to be negative 10 degrees of pitch, in fact, a lot less is usually what is needed.

10. Usually in normal mode I limit the negative pitch to around negative 4 or 5 degrees by raising points 1 and 2. Scroll in the transmitter menu to pitch curve for normal mode, and increase point 1 from 0% to about 35%, and then you can usually inhibit point 2, so it makes a straight line from point 1 to point 3, which should still be 50%.

11. Most modern computer radios also offer idle up or stunt mode 2, and a throttle hold switch. You can do what you want with idle up 2, usually people will make it similar to idle up 1 these days, but possibly with a higher headspeed. Throttle hold’s pitch curve should look real similar to stunt mode. Throttle hold is generally used for performing autorotations, but can also be used as a “crash severity lessening mode” Meaning if you know you are going to crash, you flip the throttle hold switch, and the engine goes to idle and less damage sometimes occurs because the headspeed is less when the heli hits.

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