How To Setup The Futaba GY401 Gyro

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The GY401 gyro by Futaba is perhaps the most popular RC helicopter gyro ever.

It's simple to use, works with a wide variety of analog and digital servos and has a very attractive price point.

Did I also mention that it does a great job at being a gyro and holding your heli's tail rock solid?

I've used it on everything from .30 sized RC helicopters all the way up to .90 sized birds – and if you check any of the popular turbine RC helicopter sites, you'll find that a lot of the much larger turbine RC heli's use them as well.

Because of it's popularity, the GY401 is often the first gyro many beginner RC helicopter pilots get their hands wet with, which is the reason for the GY401 'how to' article. While this how to article will be specifically for the Futaba GY401 gyro, similar principals can be applied to almost any heading hold RC helicopter tail gyro.



By the way, if you have a GY611 gyro, you can read the GY611 setup article here. Or if you need the manual for the GY401, you can grab that here.

Also, before we get stated, make sure you're tails pushrod and tail slider moves smoothly and there's no binding. Also, it would be a good idea to check that your ball links are on snug, but not too tight and can move freely.

Pre-Setup Setup

Plug the gyro's main lead (black with 3 wires – black, red, green) into the rudder channel on your receiver. This is channel 4 on most receivers, but consult your radio's manual if you're not sure.

Then plug the other lead (red servo plug – yellow wire) into the gain channel in your receiver. This is normally channel 5, but can be also be set to any aux channel. Again, if you're not sure, check your manual.

Since there is only one wire on this channel, you need to make sure you plug it in correctly. The yellow wire should line up with the other lighter colored wires in the receiver. Depending on the servos and other electronics you're using, these could be white, orange or yellow.

And finally, plug the other servo lead (black female lead) into your rudder servo,



Warning: If you have DS (digital servo) mode enabled and you're using an analog servo, there's a good change you're going to burn out the servo motor. If you've got analog mode selected for a digital servo, you'll want to get it switched around, but it's not likely to cause any immediate problems. Check the switch on the gyro and make sure it matches the tail servo you'll be using.

You'll also need to mount your gyro to your helicopter using the foam mounting pads that come with it in a place where it will be secure and stay relatively safe in a crash.

Radio Setup

Step 1 – Set ATV's, Reset Trims, Disable Mixing

Set the endpoints or ATV's on your rudder channel (usually channel 4) to 100% each way. This number doesn't affect the actual servo throw, but piro rate which I'll explain later on.

Make sure all trims and subtrims are set to 0. There is no need to veer use trim on the rudder channel. If your tail is drifting, you'll need to check your gyro gain or mechanical setup.

Also, make sure that there is no revo or any other mixing on your rudder channel.

Step 2 – Check Rudder / Gyro Direction

Check that your rudder and gyro channels don't need reversing.

When you spool up and input right rudder, the nose of your heli should move to the right and the tail to the left and vice versa. If the nose moves to the left when you input right rudder input, reverse the rudder channel (usually channel 4) in your radio.

To check that the gyro is working in the right direction, push the rudder stick to the right and note the way the tail servo moves. Then take the tail of the heli and yaw it left. If the rudder moves the same way both times, then your gyro direction is set correctly. If it moves in opposite directions, then you need to reverse the gyro using the switch on it.

T-Rex 600 GY401 Test Video

Step 3 – Set Gyro Gain

Setup the gyro gain in your radio. Here's how:

The different modes (heading hold and rate mode) are controlled by the gain setting in your radio transmitter. If you're not sure how the different modes affect flight, you can read more about it here. Though, for a beginner (or almost any RC heli pilot except scale), you'll almost always want to fly in heading hold mode.

Please note: Heading hold mode can also be referred to as AVCS mode and rate mode can also be called normal mode.

If you're using a JR radio, heading hold mode is set when the gyro's gain is set to 50% and above. Conversely, rate model is when the gain is set at less than 50%. On Futaba radios, 0 to 100% gain is heading hold mode and 0 to -100% gain is rate mode.

Therefore, a gain setting of 42% (heading hold mode) on a Futaba radio is equal to a gain setting of 71% on a JR radio: ((42 / 2) + 50) = 71%

Or a gain setting of -42% (rate mode) on a Futaba radio is equal to a gain setting of 29% on a JR radio: (50 – (42 / 2)) = 29%

Or 77% gain on a JR radio is the same as 54% gain on a Futaba radio: ((77 – 50) x 2) = 54%

Or 24% gain on a JR radio is the same as -52% gain on a Futaba radio: ((24 – 50) x 2) = -52%

Anyways, that's enough math for this article.

To make it simple, if you're starting on a Futaba radio (or any other that uses a similar gain structure) you might want to start with a gain of around 40% – 50%. If you're a JR person, that's 70% – 75%.

How do you know when you've got the gain right?

If the tail is wagging, you've got it set to high. If it's drifting or doesn't snap to a stop after a pirouette, then it's not high enough.

Quick Tip: When I'm setting the gain for a new RC helicopter, I like to use the idle up switch to try different gain settings. For example, normal mode (Futaba radio) might have a 40% gain, idle 1 would have 45%, idle 2 at 50% and idle 3 at 55%. The pitch and throttle curves would all be the identical.

This method allows you to fine tune the gain fairly quickly and try different settings with a flick of the switch without landing, powering down and changing your radio programming.

Once the mechanical setup is complete, you may need to come back to this step to get the gain setting fine tuned. Ideally, you should get it set as high as possible without it causing your tail to wag.

Step 4 – Assign Switch To Gyro

If you haven't already done so, setup a switch in your radio so you ca switch between heading hold and rate mode in your gyro by either assigning a switch or using the idle up switch I mentioned above. We'll need this for the mechanical setup that's coming up next.

Mechanical Setup

Step 1 – Install Ball On Servo Arm

Consult your helicopters manual for where the ball needs to go onto the servo arm. For most RC helicopters, this is anywhere from 14 – 20mm out from the servo. This is usually the 2nd or 3rd hold in the servo arm.

Step 2 – Center Servo

Before we can install the servo arm, we need to tell the gyro where neutral is. To do this, put the gyro in rate mode (change gain setting) and toggle the rudder stick on your radio left to right a few times, then let go. This centers the servo to a neutral position.

Once it's centered, install the servo arm so it's as close to 0 degrees to the tail pushrod as possible without using any trim or subtrim.

Step 3 – Setup In Rate Mode

Once you get the servo arm installed at 90 degrees, you need to adjust the tail linkage length until the tail holds in rate mode without any rudder input. You should do this with a gain setting of about -37% (Futaba) or 32% (JR).

Power on the gyro in heading hold mode and wait 5 – 10 seconds for it to initialize and the red light is solid. If you move the helicopter during the gyro initialization, it will disrupt the process and cause it to not set properly which can cause the tail to drift.

Switch the gyro to rate mode on your radio.

Spool up your heli and bring it into a low hover – you're going to need to provide left or right rudder input to keep the tail steady. If you don't want to hover your heli, you can spool it up and get it light on the skids on a very smooth surface until it's just about to take off – though the rotor wash can come into play here. Make a mental note of which way you need to apply rudder input, land your heli and adjust the pushrod length to compensate for the rudder input you had to give.

Keep adjusting the length of the pushrod until your heli will hover and the tail will hold without any rudder input.

Also, instead of adjusting the pushrod length, you can also slide the tail servo along the boom (depending on your heli and where it's installed) until the helicopter will hover without any rudder input.

Please note: It is not imperative that you get this step perfect or even complete this step.

If you adjust the pushrod so it's just off center a bit (to compensate for the main rotor torque) and go from there without completing this step, your helicopter will fly fine.

Though if you want a perfect mechanical setup, maximum throw in each direction for your tail and more tail authority, you should complete this step – in fact, I'd recommend that you complete it either way.

Once you get the heli setup, the GY401 will memorize the rudder trim / subtrim setting as rudder neutral anytime you initialize it in heading hold mode. Since you shouldn't be using any trim or subtrim, this doesn't matter, but if you do have it set, it won't make any difference and the gyro will assume that it's 0 putting the rudder at it's neutral position.

Alternatively, you can also set the rudder neutral for position for heading hold mode by switching between rate mode and heading hold mode 3 or more times at intervals of less than one second ending in heading hold mode with the heli powered on. You can do this using the switch that you set up earlier.

Once the tail's set up in rate mode, land your heli, power down and change to heading hold mode. The red light should come on the gyro and the tail should hold like a rock (assuming your gain is set right – see above). If your tail is drifting or wagging, fine tune the gain settings as per the instructions above.

Step 4 – Set Travel Limits

Once you get your gyro setup in rate mode, you'll need to adjust the throw of the tail servo.

What you want to do here is get the most travel possible in each direction without it binding. You'll be able to tell if there's binding by listening to the tail servo – if it's making a buzzing noise, it's binding. You should also be able to tell visually by looking at the tail pitch slider.



Power up everything and move the rudder stick on the radio left to right to see how much throw you have. If there's room to spare and no binding, then adjust the limit pot on the gyro until you get the maximum throw possible in each direction without binding, but so it right up against the tail case.

You might be able to get more throw in one direction than the other and that's ok – because you set up the gyro in rate mode (you did didn't you?) you'll have a perfect mechanical setup and don't need to worry about that unless there's a large difference in the travel – and there shouldn't be.

Ideally, your limit pot should be around 100 on the gyro. If it's less than 80, your ball may be too far out on the servo arm and should be brought in a hole. If you're not getting full throw and it's up over 120, then you might want to bring the ball out a hole on the servo arm.

Step 5 – Adjust Piro Speed

This couldn't be easier.

To adjust the pirouette speed of your heli, you simply adjust the endpoints or ATV's on your rudder channel.

If you're a beginner, you might want to go with a lower number like 70% (each side) for a decent tail response that's not too fast, or if you're into more advanced 3D flying, you might wan to go with something around the 125% – 130% mark for a faster pirouettes and more tail response. The default value of 100% is good for your average pilot, though you'll probably want to fine tune it to your personal preference at some point.

Whatever number you go with, it should be the same in each direction for consistent piro speeds either way.

Please Note: There's another adjustment on the gyro for delay. This is not something you need to worry about and should be set to 0. Some scale pilots using slower analog servos may use it for more realistic flight, but you can set it to 0 and forget it.

That's it – your GY401 gyro should be set and if you followed all the steps, you should have a tail that holds like a rock.