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GOVERNORS

NOT JUST A POLITCAL GOVERNMENT POSITION!

words: Jeff Green

In the world of RC helicopters, a governor is a radio accessory that controls throttle RPM and keeps rotor head speed (rotational speed of the blades) set at a chosen RPM. The RC governor is a "gyro" for the throttle channel, so to speak. The governor has one lead that plugs into the throttle channel on a receiver, a lead that plugs into an auxiliary channel for RPM switching from a switch or condition on your radio, and possibly a lead to turn the governor on and off from your transmitter. A governor uses a magnet and sensor or an optical sensor and aluminum tape to count motor RPM and to know if an adjustment to the throttle servo's position needs to be made to keep a chosen RPM under control. Governors can also have other options like fuel mixing controls but those and beyond the basic controls and vary from manufacturer to manufacturer. Governors are not new by any means. Many different brands and types have been available for many years. Some brands have disappeared and some have stayed. If your flying skills are evolving into higher end aerobatics and 3D and you want to save yourself some field setup time fine tuning a throttle curve, a governor is a tool that will be a asset.

How Does a Governor Work?

A governor tracks motor RPM via a magnet mounted to the fan or clutch bell as it passes a sensor mounted in very close proximity to the magnet. Then based on the gear ratio you tell the governor you are using and the rotor head speed you set, the governor will calculate how much throttle adjustment is needed to maintain the rotor head RPM you have programmed for a flight condition. How the governor works with your particular radio depends on the governor design and the radio's software. One combination can be a simple switch for on and off with an ATV adjustment feature for rotor head RPM setting, and the other combination could be a fully calibrated, integral, multiple speed, multiple condition setup remotely accessed from your transmitter. Some governors have LCD displays with setup buttons for adjustment, while others require the use of an optical tachometer to find the ATV setting that will result in the head speed you want to use. Don't try to tach your helicopter by yourself, have a friend help you. You fly the model, he tachs it. Be safe!

Governor components.

Who Needs a Governor?

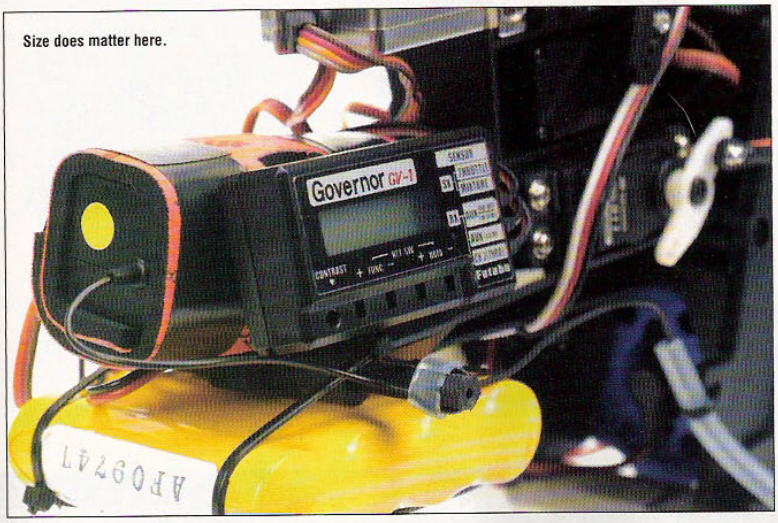
Cool radio/governor interfaces for easy usage.

According to the Empire and Grand Moff Tarkin, the local territories do. (Sorry, I am a Star Wars geek and that thought came to mind with that question!) Anyway, a rank beginner does not need one and in fact a governor may add some level of frustration to the learning process with regards to setup and finding someone to help them set it up correctly for their radio. If your radio has software to support a governor, then setting up and using one can be easier. Check your radio's manual for this info. Recent Futaba Radios from the 7C up to the 14MZ have nice software features to make governor setup easier and efficient.

Basic aerobatics like loops, rolls, stall turns, 540 stall turns, and maneuvers like that can be done well without the use of a governor. A governor is ideal for maneuvers like tail slides to keep the rotor head from over speeding while you are falling at ripping speeds. A governor is also a good piece of equipment to expand a radio's capabilities for cyclic to throttle mixing which is needed for precision and 3D aerobatics as some radios do not have good mixing capabilities for this condition. Most do, but when you need a cyclic to throttle mix, chances are that one would save a lot of time using a governor as a setup tool. Most helis today have cooling fans ready to accept a magnet and some have other areas to place the magnet and sensor. Basically intermediate to 3D pilots will benefit from the use of a governor, while beginners can wait a little bit.

CHOOSING A GOVERNOR

Elections do not work in this process. However, what the guys at your field use and who you can ask for help is the biggest factor when choosing a Governor. Governor costs can vary from just under $100 up to $170, so what you can afford may be a factor. Also look at the features and how the governor will interact with your radio. Another consideration is space in your model; do you want or need a small size control box or do you have space for a unit with an LCD display?



Size does matter here.

Novice Glossary

ATV
Also referred to as EPA, this is an adjustment on radios that allows the user to adjust the maximum throw of each servo or channel.

Head Speed
The speed of the head or the rotor blades expressed as RPM. A higher head speed means that the helicopter is more responsive for aggressive aerobatics. Lower head speed is typically easier for beginners to control and fly.

Optical Tachometer
Handheld device used to measure rotor head RPM from a safe distance away. Also referred to as a "tach."

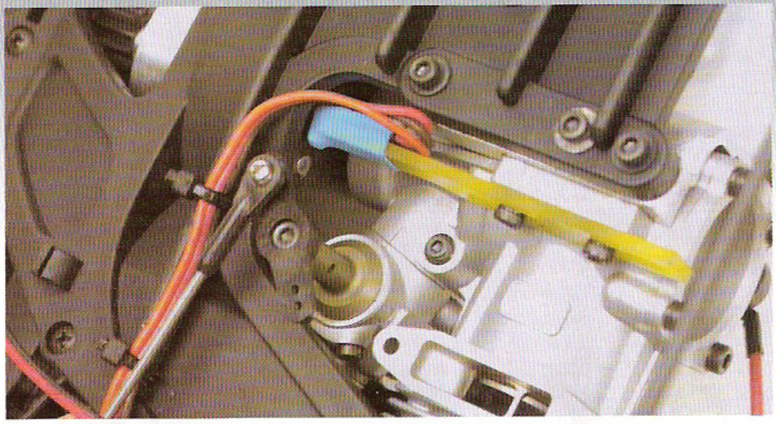
Overspeed
Main rotor RPM exceeding the allowable mechanical limits for continued flight, can be catastrophic.

RPM
Revolutions Per Minute, a unit of frequency commonly used to measure rotational speed.

Setting Up a Governor

The first step is installing the magnet to the fan, clutch bell or main gear which all depends on your model. Most models have a hole in the fan. You will also need to install the magnet in the proper direction so the sensor can work properly. Check the governor instructions for proper magnet direction and then make a distinguishable mark on the magnet showing which side should face the sensor when installed. For glue, follow the instructions as well. A 30 minute epoxy or a silicone-based flexible glue works well. Make sure you install the magnet correctly. If you don't, time to start over. Your governor will not work.

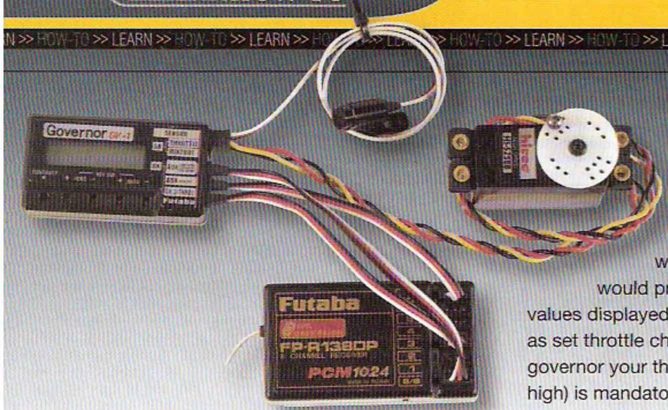
Next, mount the sensor to the included sensor mount placed high enough in the slots so the sensor will see the magnet but not so high that the fan will hit the sensor when spinning. There are multiple brackets for 30-size, 50-size, and 60/90-size motors. Choose the appropriate bracket for the motor you will be using. Make sure the sensor is connected/plugged in to the governor now. To check signal flow, a Futaba Gyro will give a signal strength percentage in the control box menu and others will have a LED that will



Governors & JR Radios

JR radios don't offer a setup menu for governors. The governor setup on a JR radio is a little more complicated, but still workable. The key here is that each radio has different setup specifics and switch placement. The JR radios may require extra mixes and may require you to change your gyro setting to get the governor set up properly.

LEARNHOW-TO



light when the signal is strong enough. Make sure you get that signal indication.

Now plug the governor's throttle channel input lead into your receiver's throttle channel followed by the on/off and switching leads if necessary. Actual set up will be determined by the type of governor you are using. Be sure to check if the governor is turned on and activated and turns off as it is designed to do before your model leaves the bench. Each governor is different, so be sure to read the manual for rotor head speed selection and operation. On basic governors, rotor head speed setup is done with an ATV radio channel adjustment whereas on governors with LCD displays you would press buttons and input values displayed on the screen as well as set throttle channel limits. Telling the governor your throttle settings (idle, stop, high) is mandatory as that is the range it will know where to work during flight. See the instruction manual for your governor's specific method of calibration.

This is what you want to see for proper signal flow.

Conclusion

A governor is a neat gadget to add to your model and very helpful for quick throttle curve setup to stop those unwanted overspeeds in some maneuvers. But they are not mandatory at all levels of flying. If you are a beginner, using a governor may hinder your progress as you may not understand how it works and how to set it up, especially if you have no one available to check its operation for you. However if you are getting into high end aerobatics and 3D, a governor is highly recommended to spend more time flying the maneuvers instead of using that time to test and set up a proper throttle curve. Check around at your local field to see what others using. They will be your best place for help. It is still a good idea to program a basic throttle curve for all your conditions just in case the magnet falls out or is lost in flight. Take your time to read the manuals, ask questions, and understand what you are using. They are not hard to use. Good Luck! RCH