

How to modify a Futaba FP-S148 servo for 360° rotation

The Futaba FP-S148 is a fairly common entry level servo that comes with many Futaba radio packages. It is easily adapted for use in a Kite Aerial Photography (KAP) camera rig. As it comes from Futaba, the servo only rotates about 90°. For the pan servo on a KAP camera cradle, this means you either have to live with only 90° of pan rotation or gear the servo about 4:1 to achieve 360° rotation. The former severely limits the ability to aim the camera and the latter results in exaggerated camera rotation at the slightest movement of the servo controls. The following simple modification to the servo allows it to rotate endlessly in either direction eliminating the need for the 4:1 gearing. In fact, once you make the modification, you might want to gear it the other way around (1:4) to give very fine control over the positioning of the pan servo.

Here are the steps for the servo modification - read through all the instructions carefully, consult the servo diagrams (next page) and those included with your servo before attempting this modification. The principles of this modification may also be applicable to other similarly designed servos. Make sure that all gears involved have a full 360° of teeth - some servos have only partial gears (this modification will not work with such a servo).

1. before dismantling the servo, power it up, center and adjust the trim on the radio to stop it (a self centering transmitter control helps on this one)
2. remove the upper case (#1 in the diagram)
3. in the following steps, be careful not to turn the pot
4. cut and/or file the stop(s) on the final gear (#14)
5. remove the potentiometer drive plate (#7)
6. reassemble, you're done!

By simply removing the pot drive plate, the gears can spin endlessly in either direction and the pot doesn't turn. My only worry was that the pot might slip beyond what could be corrected with the trim adjustments on the transmitter, but the center trim position hasn't moved a bit, so this appears not to be a problem.

Modifying the Futaba S3003 servo for 360° rotation

Ralph Zwicker (ralphzw@earthlink.net) & I exchanged email on the Futaba S3003 servo. Here are Ralph's notes on modifying the S3003.

The S3003's are different from the S148 - 30% more torque (44.4 oz.), and I think lighter. To modify I cut the stop off the gear. The pot washer is built inside the pot. I didn't care to take apart the pot, so I cut off the top of the shaft, (just the part that has the two flats on it). Since the drive gear does not turn the pot every thing is ok. The pot can be trimmed to the zero point by turning the short end shaft by hand until the the drive gear stops turning. Reassemble, and if you have to correct any possible movement caused by reassembly, use the slider corrector for that servo to null the movement. The unit I modified works great.
- Ralph -

Disclaimer: Try this at your own risk after carefully reviewing these instructions. This will probably void any warranty from Futaba. Your mileage may vary... offer void where prohibited by law... objects in the mirror are closer than they appear... I'm not a doctor, but I play one on TV...

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