



How To Reverse a Shaft on a 4-Max Brushless Outrunner Motor

**Please be advised by carrying out this modification you will invalidate our guarantee as mentioned in our Terms and Conditions of Sale, a copy of which can be found on our website.
<http://www.4-max.co.uk/terms.htm>**

4-Max Models Ltd takes no responsibility for the outcome of this modification

Please read this guide in full before commencing any work

4-Max Do not carry out this procedure or supply motors with reversed shafts

Only the shafts on 28mm and 35mm diameter motors can be reversed

1. Carefully remove the "C" clip from shaft and put it in a safe place as you will need it later.
2. Remove the washer from the shaft and put in the same safe place.
3. Pull the two halves of the motor apart, this may take a lot of force as the magnets are very strong. The part with the magnets and the shaft we call the "Bell" section, the other half we call the "Windings" section.
4. Remove the 2 "grub" screws (some motors only have 1 grub screw) holding the shaft in the Bell housing and place in the same safe place.
5. Open the jaws on a bench vice a suitable distance (around 15mm for small motors and a bit wider for larger motors) and place the Bell part of the motor on top of the vice with the shaft pointing downwards through the jaws.
6. "Drift" the shaft out of the Bell housing using a small flat ended centre punch or an old slightly smaller drill bit. The shafts are a tight fit and may actually require a bit more force than you might think to remove them.
7. Install the "C" clip in the groove at the very end of shaft then install the washer on to the shaft.
8. Insert the shaft into the "Windings" half of the motor (wire exit end) so that the washer is just touching the bearing.
9. Test fit the two halves together making sure that the flat (if there is one) on the shaft lines up with the grub screw hole in the bell housing. Take care not to get your fingers trapped as the two halves will snap together very quickly and can give you a nasty blood blister. I know from experience!
10. It is very important when re-inserting the shaft in to the Bell Housing that it goes in perfectly straight. If you damage the aluminum of the Bell housing, the motor may not run true and cause vibration and premature failure of the motor.
11. With the two halves together the bell half should rotate freely but there should be no end play between the "C" clip and washer and the bearing. End play will cause vibration and a lot of noise. Gently tap the shaft at either end until the desired results have been achieved.
12. Re-fit and tighten the grub screw(s) in the bell housing that stops the shaft rotating in the Bell housing. A tiny amount of "Threadlock™" is a good idea to stop the grub screw(s) coming loose in operation.
13. Job Done! ☺