



How To Replace a Bent Or Broken Shaft on a Brushless Outrunner Motor

Due to the construction of Inrunner motors, shafts on these motors can not be replaced.

To Remove a Shaft

1. If the shaft is broken then skip to instruction 5.
2. If the shaft is bent try and straighten it as best you can as it will make the separation of the two motor halves easier later on.
3. Remove "C" clip from shaft
4. Remove brass coloured washer from shaft and put in a safe place. This may have disappeared if shaft was broken.
5. Pull the two halves of the motor apart, this may take a lot of force as the magnets are very strong and there may be a small lip on a broken shaft. The part with the magnets and the shaft we call the "Bell" section.
6. Remove the "grub" screw holding the shaft and place it in a safe place.
7. 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.
8. Drift the old shaft out of the housing using a small 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.
9. While the motor is apart it is a good idea to put some light machine oil on the bearings. Do not use WD40 or other penetrating/release oils. 3 in 1 oil is too thick. The ideal oil is a light high quality machine oil, sewing machine oil is ideal. put a few drops on the top bearing and give it a few spins and allow it to seep through in to the bearing for a few minutes. Turn the motor over and repeat with the other bearing.

To Install a New Shaft

1. If you have a bench pillar drill, insert the new shaft in the chuck ensuring the flat section on the shaft is at the bottom.
2. Place the bell end of the motor on the drill platform and then press the new shaft in to position (with the bench drill **not** rotating) take care to line up the flat on the shaft with the hole in the bell housing for the grub screw. This method ensures the shaft enters the bell housing dead square.
3. If you do not have a pillar drill then carefully tap the new shaft in to the bell housing making sure the shaft is dead square to the bell housing, failure to do this correctly will mean the motor will run out of true and cause a lot of vibration and premature failure of the motor. Take care to line up the flat on the shaft with the hole in the bell housing for the grub screw.
4. Test fit the two halves together taking care not to get your fingers trapped as the two halves will snap together very quickly and can give you a nasty blood blister.
Install the brass coloured washer and check where the groove on the shaft for the circlip sits. The correct position is obtained when the circlip can only just be installed. you shouldn't be able to see the full diameter of the shaft inside the motor. Adjust the position of the shaft in the bell housing by separating the two halves of the motor and gently tapping the shaft until the desired result is obtained.
5. Re-fit the grub screw in the bell housing that stops the shaft rotating. A tiny amount of "threadlock" is a good idea to stop the grub screw coming loose in operation.
6. Install the new circlip. Job Done! ☺