

How to Fix Loose Magnets in Brushless Motors

Brushless motors in your car or plane take a pretty hard beating and it's not uncommon to see a motor throw a magnet. In this article we discuss how to fix it and get back on the road or into the sky the easy way. Sure, you could buy a new motor but it might be quicker to fix the one you have.

I've bought many different varieties of brushless motors and some are better than others. Some are very expensive for no particular reason and others can be just awful. If you're like me you've learned that middle of the road is the place to be. Few of us have bottomless pits of money from which to draw upon so learning how to fix a common issue such as loose magnet is a skill worth acquiring. I leave the gold plated and ridiculously overpriced motors remain on the top shelf and prefer the very reliable NTM or SK3 motors. If I had to guess, I've owned around 20+ NTM or SK3 motors and for the most part have been thoroughly dependable units.

Just recently one of my older motors had decided to throw magnet and this happens for a number of reasons;

1. Your motor is reaching a temperature that is weakening the glue and deboning the magnet.
2. Glue perishes over time and the result is a deboned magnet.
3. Shock in the form of a crash or perhaps being dropped

Early NTM motors had a reputation for throwing magnets however the later variants in the Turnigy Propdrive range are bulletproof with better performance, finish and fittings than the first generation. If you happen to throw a magnet it is easy enough to repair and you should give it a go because you're just throwing money away if you don't at least have a go. Most hobbyists would have the required materials in their workshop and no special skills are required. In this example we will service an NTM 50-50 size motor but the method can be applied to any size outrunner motor.

Required Hardware

- Paint Thinner Solvent
- Glass jar and lid (Big enough to fit the bell)
- Spray can of lacquer (Type is irrelevant)
- Thin CA glue (Cyanoacrylate)
- HobbyKing Super Glue CA (50g / 1.7oz) Super Thin
- Baking Soda



Firstly, disassemble the motor by removing the c-clip on that back of the motor and separate the motor into two pieces. The stator along with any other loose parts should be set aside and placed into a small plastic tub for safe keeping.

Place the rotor into the jar and then fill the jar with thinners until the rotor is fully immersed in the fluid. The thinners will begin to dissolve the remainder of the glue so that the magnets can be removed with greater ease. Allow the rotor to sit in the thinners for 24 hours and even longer is fine. This will dissolve or soften the epoxy and paint from the rotor.

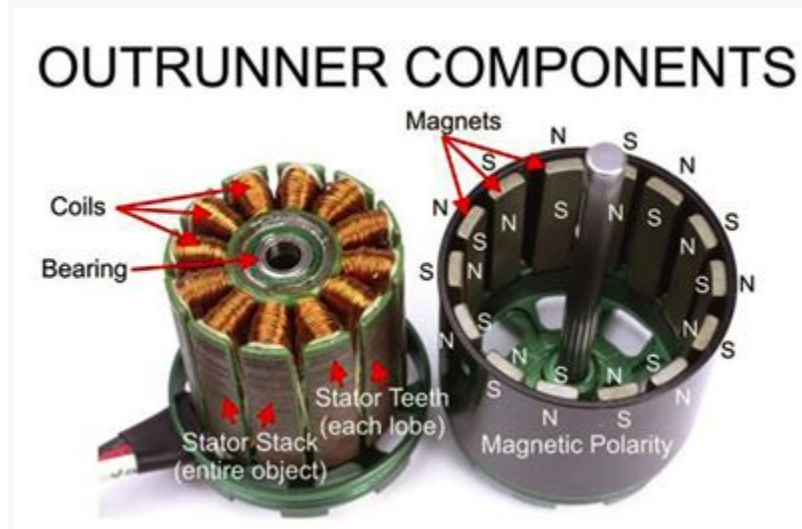


To remove the magnets use a flat head screw driver and gently pry them free. Be very careful handling magnets as they are very fragile and may break

with any impact. When bringing magnets together do not allow them to snap together as they will break and you will not be able to use that magnet rendering the repair useless.

Magnets have a north and south pole and are assembled alternately inside the casing. To avoid incorrect installation you should mark the back side of all the magnets so that they can be installed easily and without mistake. If you bring all the magnets together you simply mark the front and rear surface with a red or black marker.

Outrunner Components



Clean the rotor and remove any remaining paint or glue ensuring that the surface is free from debris. Do the final cleaning with sandpaper as this will also create a rough surface for the adhesive to bond to. The earlier process along with the sanding will ensure that the surface is free from lubricants or other substances that could inhibit a strong bond. Once you have removed the paint from the outside of the bell seal the outside with lacquer. The bell is made of steel and will rust if not protected. Moisture and fingerprints will be sufficient to quickly tarnish the surface if not protected. Do not spray the inside as this will be glued shortly.

Choose one pole and start sliding the magnets into place. Use the shaft to locate the correct alignment angle of the magnets. NTM rotors have grooves which assist in aligning the magnets. Once you have installed all of one pole type you can then install the remainder. Before you apply

the glue you should double check alignment and then carefully apply a few drops of thin CA between the gaps to fix them in place. Be sure to use thin CA so that the glue wicks into the gaps of the magnets.

Once all the magnets have had thin CA applied and the glue has cured we can move on to filling the void between each magnet and holding them in place more securely. Lay the rotor on it's side and begin to fill the magnet void with baking soda. The baking soda should only be about $\frac{3}{4}$ full. Once the desired height has been reached start by applying thin CA to the baking soda in the gap. The baking soda and CA glue forms an incredibly strong bond and can be used in a variety of other situations. CA is generally quite brittle however when you add baking soda it becomes a very versatile product. You should do each gap in turn. Handy hint... two strips of bluetac either side keep the rotor steady and stop it rolling around.



Place the rotor back onto the motor and spin to make sure that it spins freely. If the rotor does not spin freely you should remove the rotor and grind off any of the offending CA and baking soda that could be touching the stator. Once the rotor spins freely you can reassemble the motor and take it up for a spin.

So, repairing motors isn't that hard and you should absolutely give it a try. Keep an open for someone at the field looking to throw one out. You could repair it and give it back to him or use it for practice. The baking soda and CA glue forms an incredibly strong bond.

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