

# Is my Kwikiee Step Motor Bad?

Well is it a bad motor or not? Is the only option to have the motor replaced? Well it may be bad, but how is bad defined. In most cases if the motor has just decided to stop moving the steps in and out then there may be more life in the old step motor.

If the steps have been bent or damaged in some way. Or the gearbox has been broken and the steps just flop back and forth then this piece of paper will be of little assistance to you. It's time to get out the wallet or pocketbook and go shopping. **But if the steps just decided to stop part of the way open or closed and just will not move then read on.**

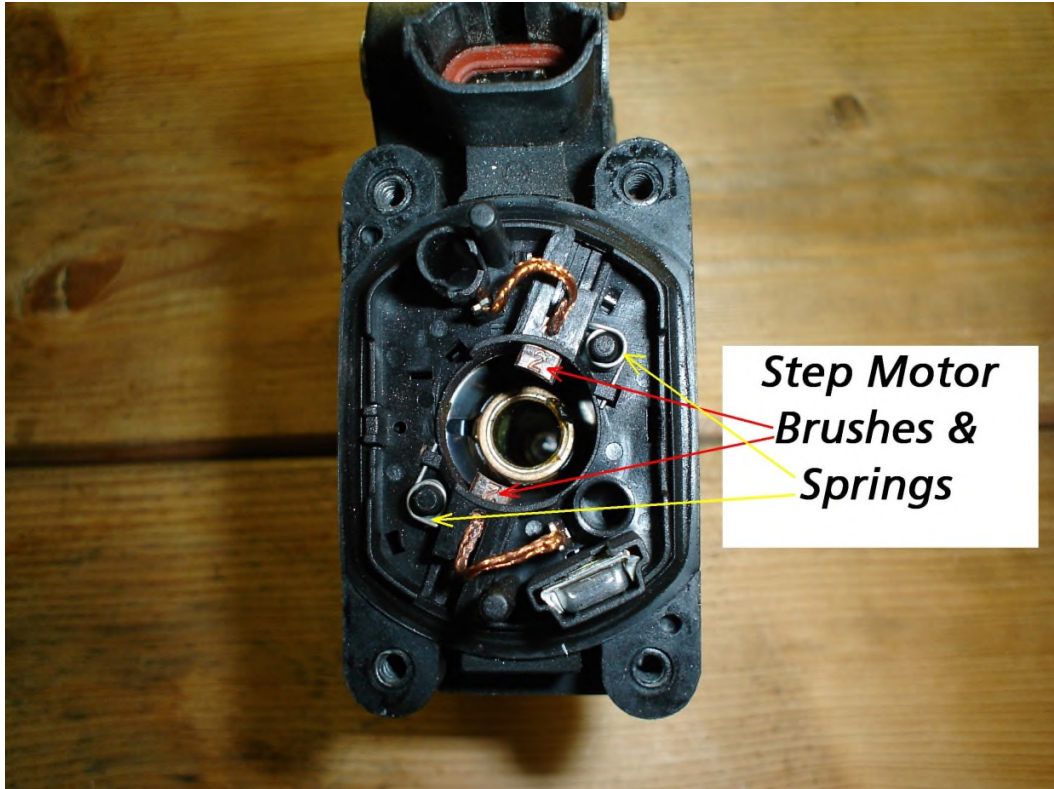
The step motor is just a simple DC (direct current) motor. There are just a few parts which can be bad and a few which can be **cleaned**. Cleaning the commutator may be all that is needed to extend the life of the old motor.

Below is a picture of the Kwikiee step motor and gearbox assembly.



Removing the three screws will allow the motor assembly to be removed. Make sure to have the steps either supported or tied in place, because when

the motor is removed the steps will be able to move and could cause injury. Remove the four screws holding the motor cover to the motor gearbox. When removing the cover the two permanent magnets will attempt to fight your efforts. Be careful not to drop the armature when you are able to separate the cover from the armature.

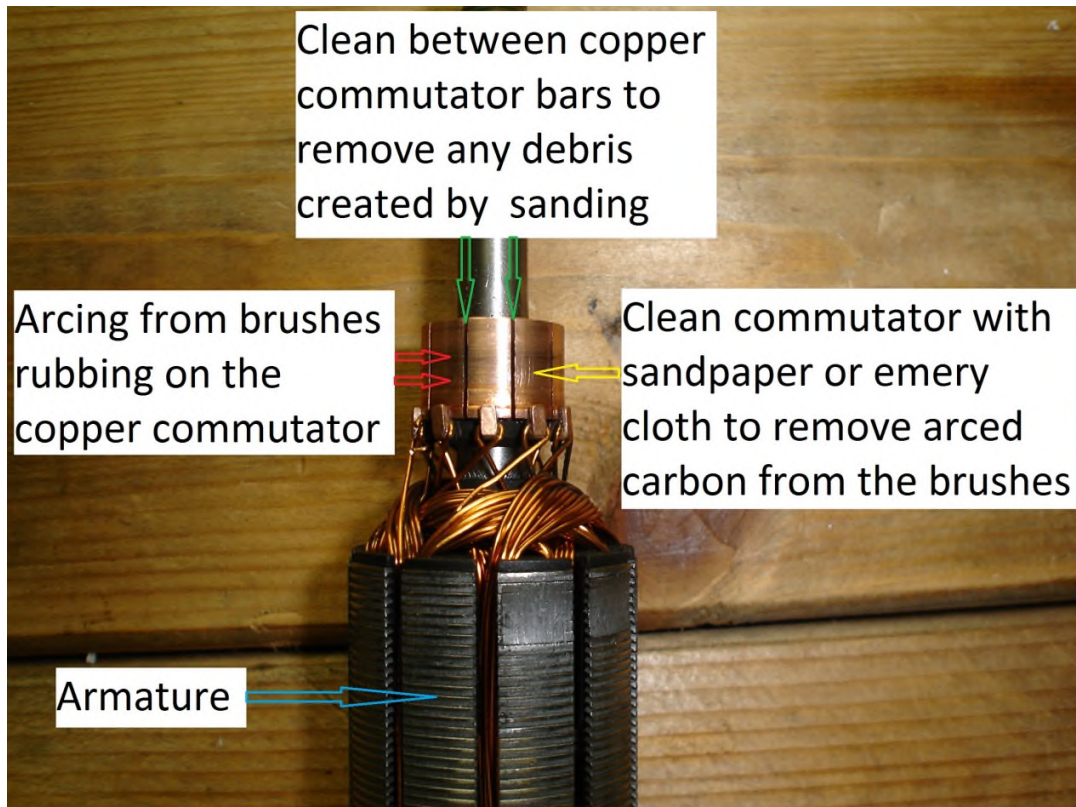


We now have removed the armature from the cover. And the motor brushes and retaining springs are in front of us. The brushes can be pushed back into their holders and the spring will hold the brush retracted.

Now it is time to check out the armature. This is usually where the problem lies. The carbon from the brushes when the motor turns gets rubbed away by the commutator bars. There are ten copper bars which are wired to the two brushes. Five alternating copper bars are connected to each brush. When voltage is applied the adjoining bars have the opposite voltage applied. The first bar is positive voltage the second is negative voltage, the third is positive voltage and it continues until it starts all over at the first bar again. What is happening is a "Push Pull Effect". While the power to one brush is pushing the power leaving the second brush is pulling.

As you can see in the picture as the motor turns the brushes get worn away by rubbing on the copper bars and each gap acts as a file and wears away the carbon. After many operations the brushes will either need to be replaced or

in most cases the commutator just needs cleaning. When, the carbon builds up enough the voltage is unable to pass through the copper bar to power the motor, when that happens it is time to clean the carbon residue from the copper bars. After disassembly I use fine sandpaper to clean the carbon from the copper bars. I just wrap a small piece around the commutator and rotate the armature around until the copper is shiny. Then I use a toothpick to clean the slots between the bars.



After cleaning I use air pressure to clean the dirt and grit from the components.

It is now time to re-assemble the motor. The next step can be really easy to perform or you can make it hard. The easy way is to push the brushes back into their holders, push them back until the springs will retain the brush in place and you will not need to fight them.

When the armature is pushed back into the gear housing the brushes are held out of the way by the springs. After the armature is seated the brushes can be pushed back into position. Just take a small screwdriver and push on the rear of the brush until the spring slips into place. The spring will hold the brush against the armature.





OK, almost back together. Be careful when placing the motor cover back over the armature. The magnets will attempt to grab the armature and if you are not holding the armature in place the magnets will PULL the armature out of the gear housing. When that happens the springs will push the brushes out and the armature will not slip back into place. So now you have to remove the cover, the armature and push the brushes back into the holder until the springs hold them in place. The second time you will have a tighter grip on the armature unless you want to try for three times.

OK, so now we have the cover back on the step motor housing. Install the four cover screws. If the motor was the problem and you did not find any broken parts in the cover then the motor should now work like a new motor. When reassembling the motor housing to the gearbox, take care not to lose the centering bushing which aligns the gears between the gearbox and the motor housing.

**Revision 1**, an additional warning added to this file. When reassembling the motor care must be taken to re-install the motor housing turned the same way it was when disassembled. If the housing is rotated 180 ° the motor will run in REVERSE of what you want it to do. When the door is OPENED the step will RETRACT and when the door is CLOSED the step will EXTEND. Take care to properly align the motor housing during reassembly.