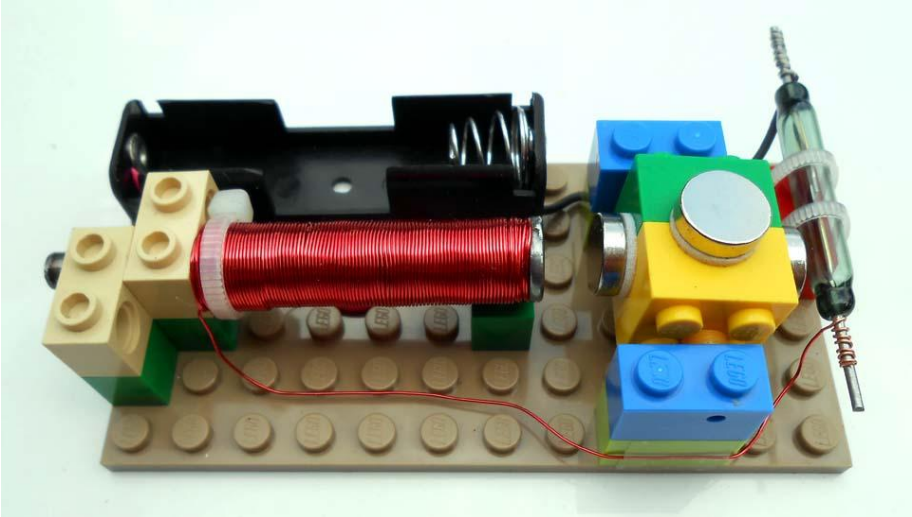
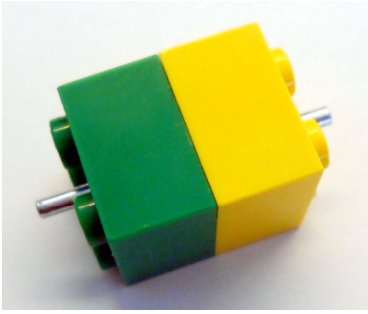
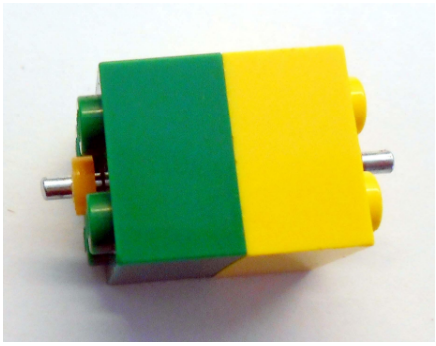
Assembly Instructions: Kit #12 Rapid Assembly Basic QuikLock Reed Switch Motor

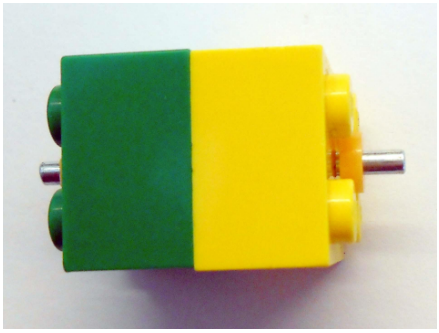


1. Insert the motor shaft through the holes in two 2x2 rotor pieces as shown*. Center the shaft.



2. Add plastic sleeves (washers) to both ends of the shaft. They fit tightly and require some effort. You may put the sleeve on the table and push the shaft in with the negative end of the battery. Leave a small gap so the sleeves are slightly above the surface of the knobs.





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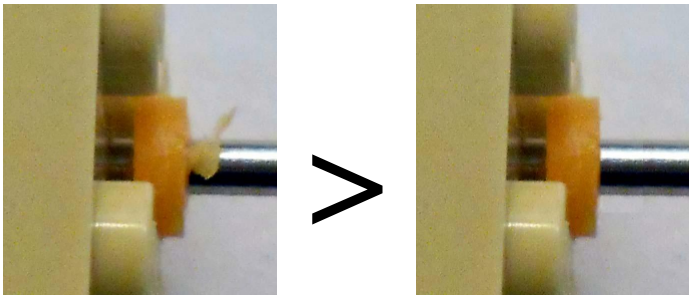
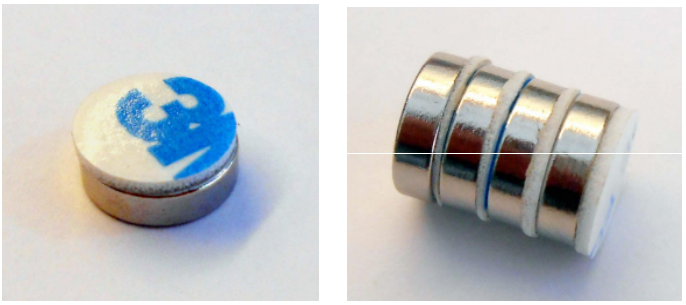
If you notice burrs on the plastic sleeves remove them with a sharp knife.



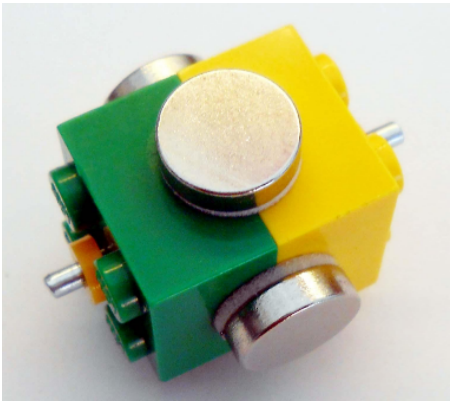
3. Attach double sided sticky pads to the magnets. It does not matter to which side you attach them as long as you use the same pole for all magnets. **This is very important!** If you do not use the same pole for all magnets your motor will not work.

   The easiest way to achieve it is to attach the pad to the top of the stack and then move top magnet to the bottom; after you attach all four pads your stack should look as shown. Do not remove the second liner from the pads yet.



   Neodymium magnets used in this motor are very strong! Be very careful – if they are allowed to fly to each other they may shatter.

4. Attach all four magnets to the rotor. Try to be accurate and center them on each side. Make sure there is no gap between the plastic halves.



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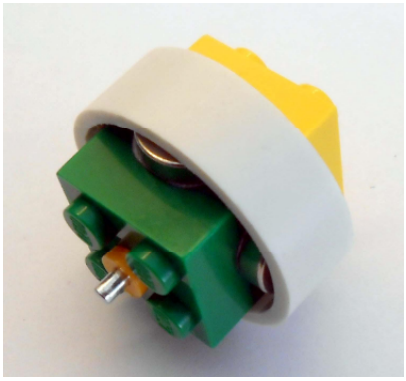
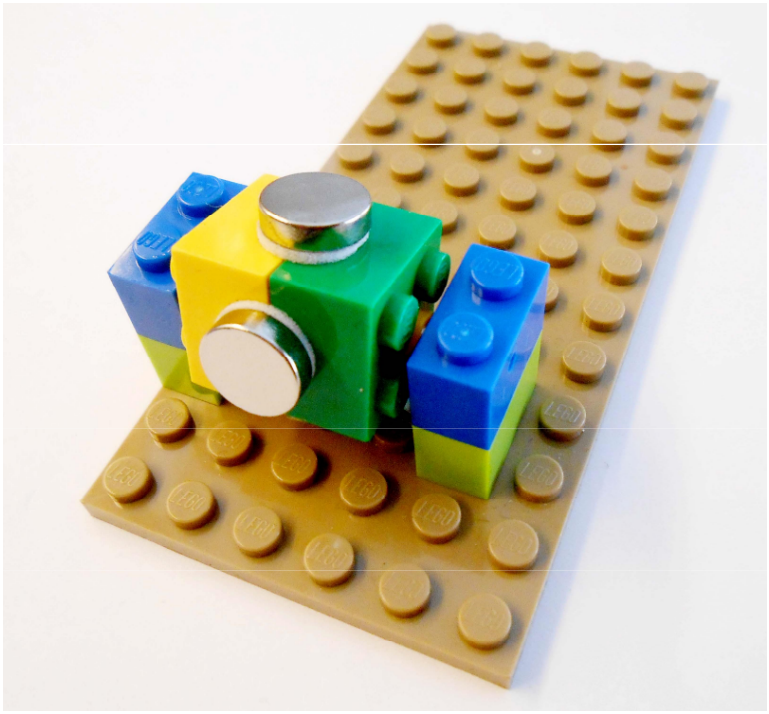
5. If you assembled the motor properly and lubricated the axle this motor on 1.5 Volts battery may rotate with the speed up to 2600 RPM or even faster. This is really fast but may not be fast enough for magnets to lose the adhesion and break the reed switch or fly off the rotor. However as a precaution you may add a safety ring that completely eliminates this possibility. This step is optional for your first experiments with the motor, but we strongly recommend adding the ring later.

   The ring fits tightly and requires some effort. After centering the ring squeeze the rotor halves together to make sure that there is no gap between them.



6. Assemble rotor on the base plate. Try to spin it by hand. If it does not spin freely you might need to squeeze blue bricks slightly together to push plastic shaft sleeves in. There should be a tiny gap between sleeves and inner sides of the bricks with holes.



   We strongly recommend lubricating the shaft ends. It allows the motor to run smoother and faster. You may use a small drop of oil from your car dipstick, WD-40, or even vegetable oil.

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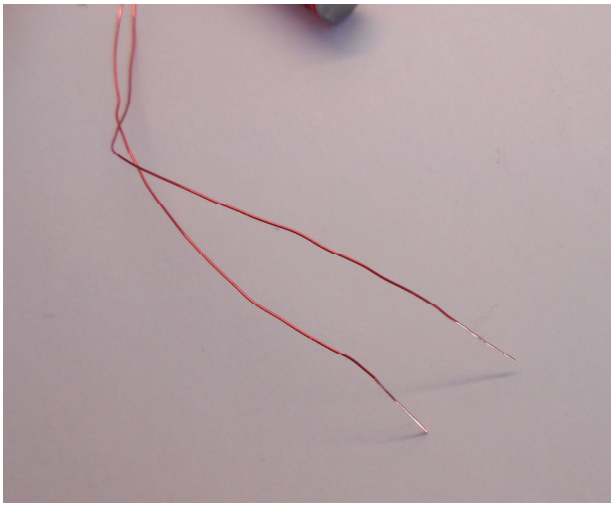
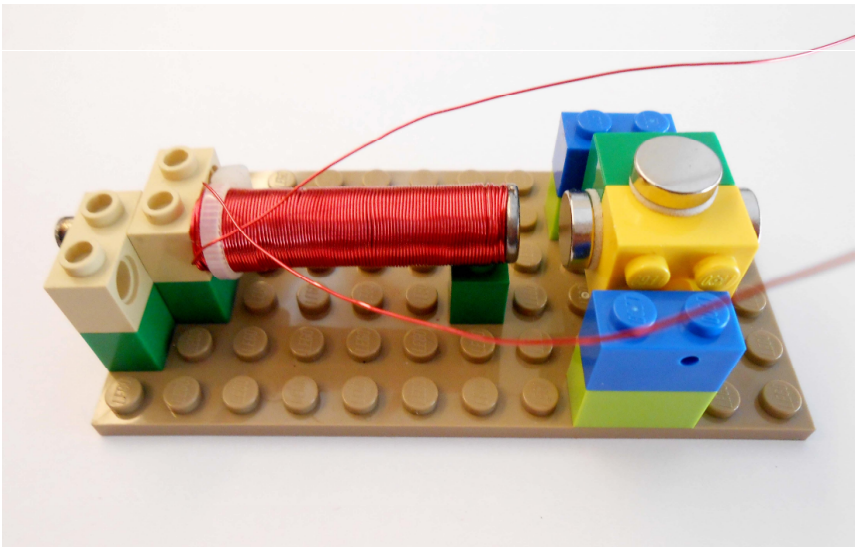
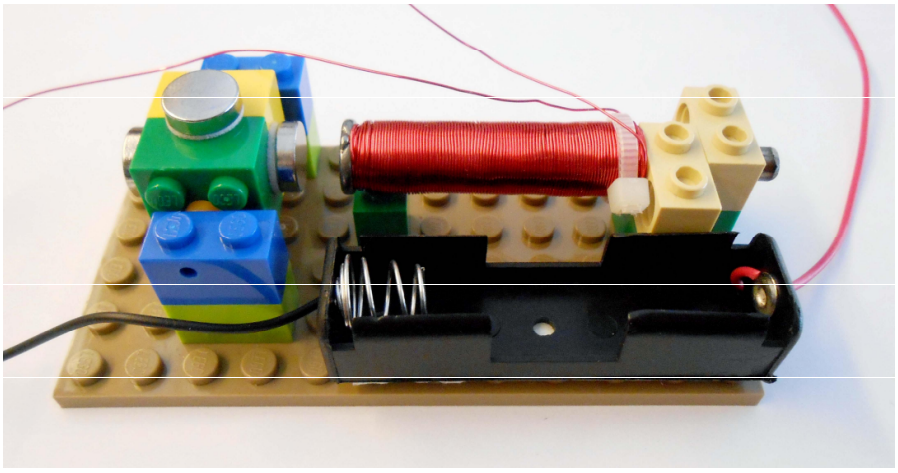
7. Remove the insulation from the electromagnet wire tips with fine sandpaper (included) or a sharp knife.



8. Assemble electromagnet on the base plate.



9. Attach the battery holder to the base plate.



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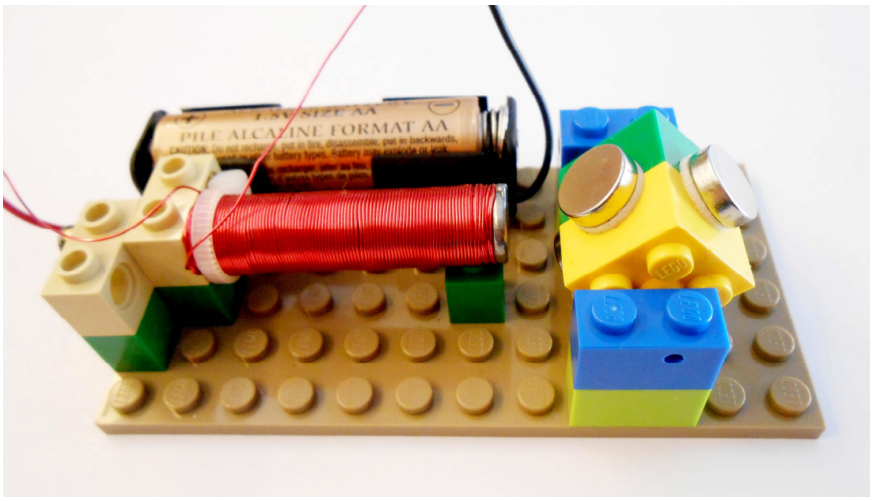
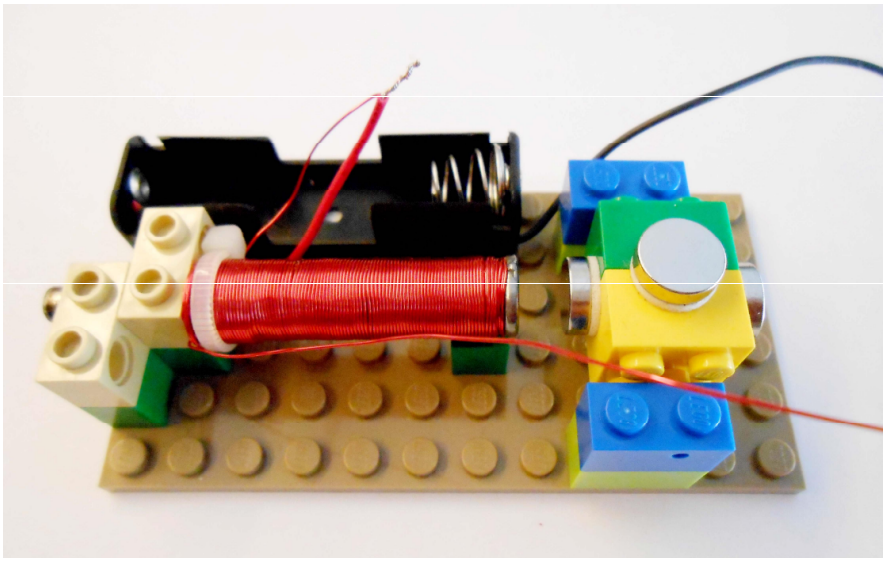
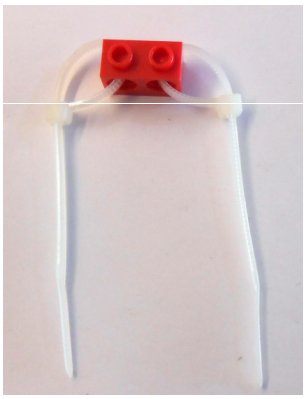
10. Insert the battery and briefly connect electromagnet wires to the battery. If nothing happens switch the wires. With the correct connection electromagnet repels the permanent magnets and the rotor stops in the position shown below. This is a perfect test for the electromagnet and the magnets orientation: rotate rotor quarter turn four times – if all permanent magnets are oriented properly rotor should always stay in the position shown.

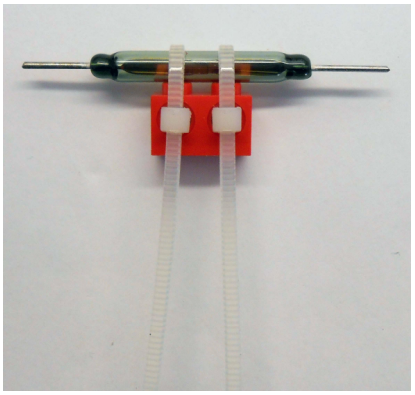


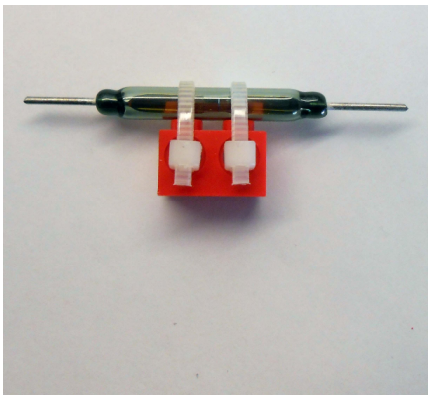
11. After you found the correct connection trim red (positive) wire from the battery holder and corresponding electromagnet wire. Remove the insulation from the wire tips and twist them together. You may tack this connection under the battery holder.



12. Fasten the reed switch to 1x2 brick with side holes using cable ties. Trim them with scissors.







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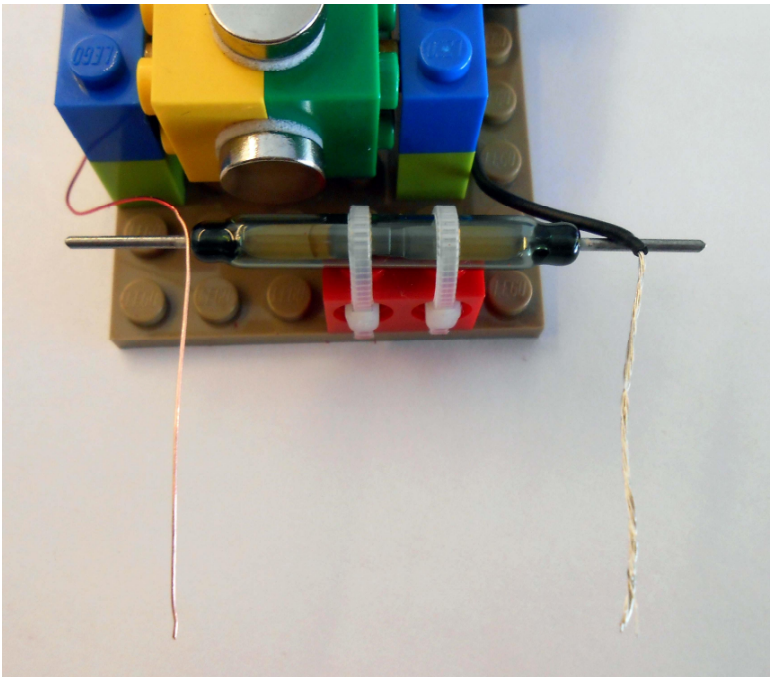
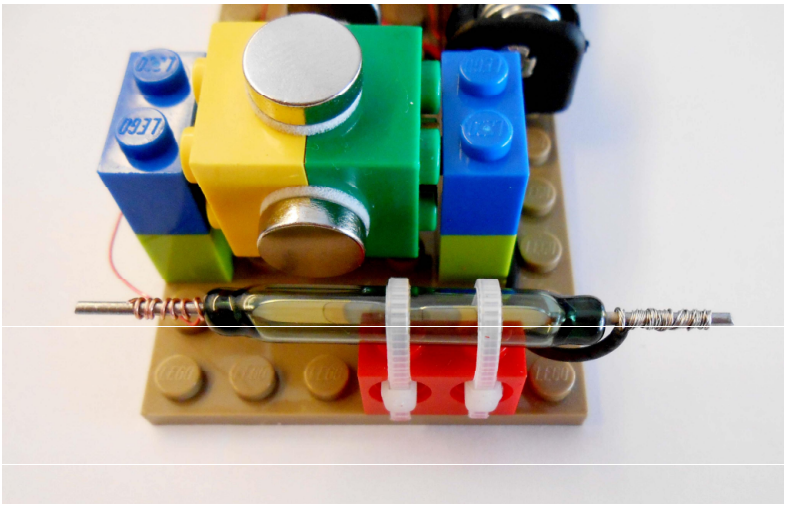
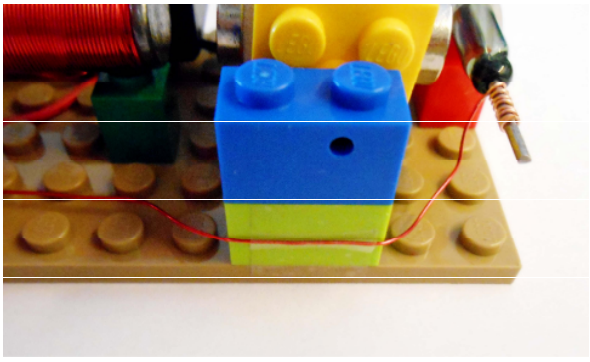
13. Assemble the reed switch on the base plate. Trim the wires as necessary and remove at least 1” (2.5 cm) of insulation.



14. Wind bare wire ends tightly around the reed switch contacts.



15. You may tape the electromagnet wire that is connected to the reed switch to the side of the rotor stand (clear tape is shown).



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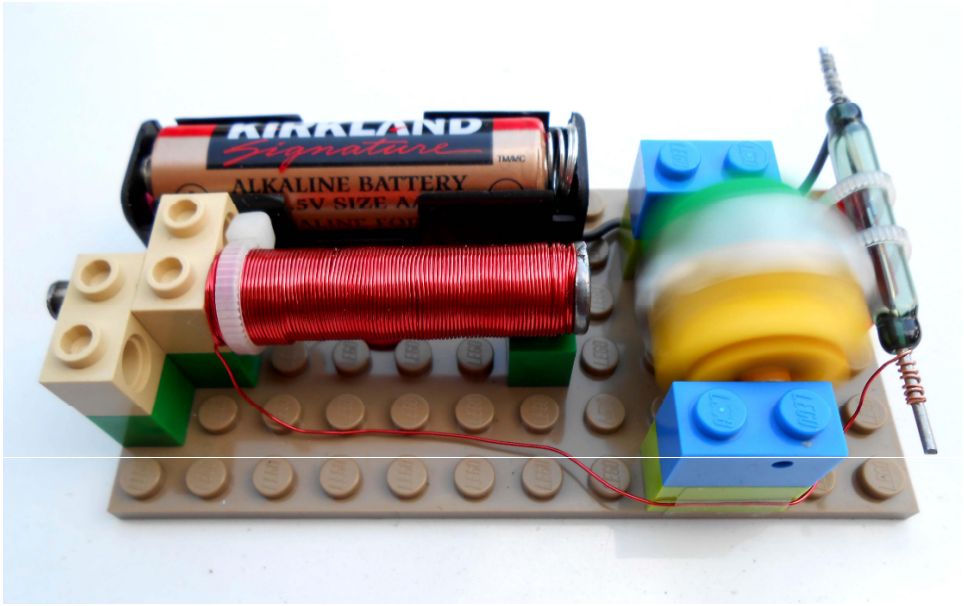
Spin the rotor by hand. Make sure it does not hit the electromagnet, reed switch or wires. You should hear the click every time the magnet passes the reed switch.

Your motor is ready! If it does not start on its own you may need to give it a slight push. Generally if your battery is fresh it should start rotating without the push if the magnets on the rotor sides are centered.



If you have not done it already add the safety ring as shown in step 5.

You may glue bricks together and to the plate if you do not plan to disassemble it.

Visit our site at www.simplemotor.com for principles of this motor operation, troubleshooting, speed measurement, and other related questions.

Enjoy your motor! We hope you had fun building it.

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* Colors of the parts may vary.

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