"Revolution" DIY Motor Kit: (400 class) Instruction

Install Shaft :

Parts: Rotor, Shaft

Note: The shaft needs to be inserted from the inside out.

Step 1:

Put a little Loctite on the center hole of the rotor.

Step 2:

Insert the shaft from inside out and fix it in place.

Step3

The shaft should protrude for an appropriate length with enough left on the other side for assembling the E-clip.

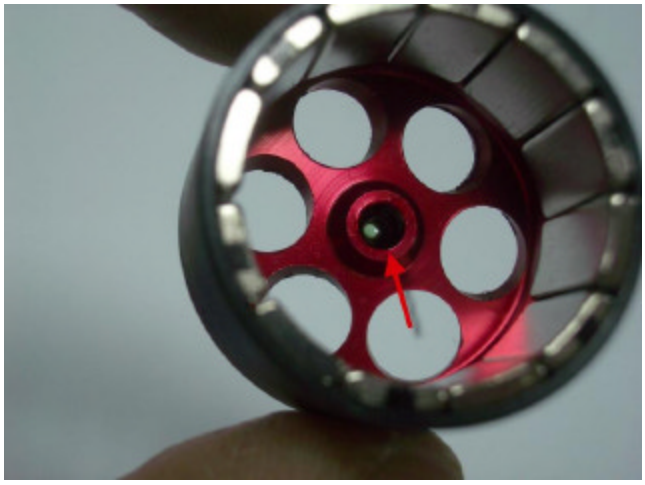
Step 4:

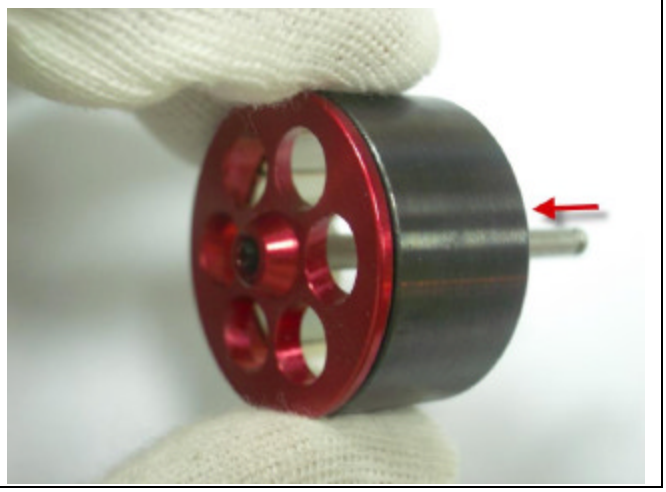
Wipe off the loctite overflow, and wait for 24 hours in order to have the loctite dry completely.

Photo 1: Put the loctite on the bearing and wipe off the loctite overflow.

Photo 2: Insert the shaft.

Photo 3: Shows the shaft remainder left for the E-clip.





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Place Bearing:

Parts: Base Mount or Tube Mount, Bearing

Note: Bearing needs to be installed vertically. Please put an appropriate quantity of glue on it.

Be aware that the overflow of glue will influence the operation of the bearing.

Step 1:

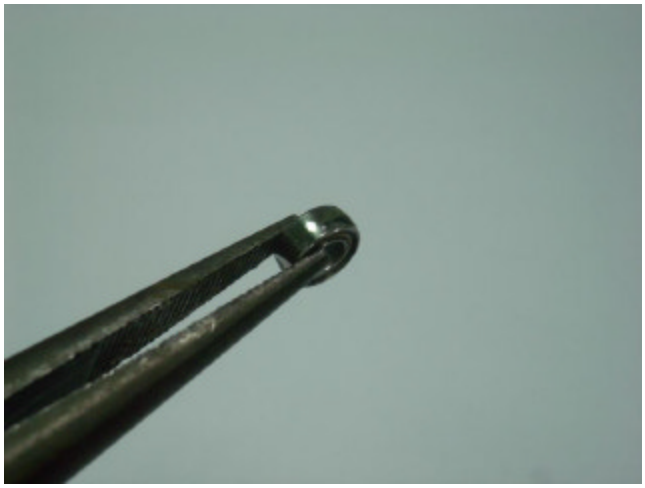
Set the bearing support vertically. Put loctite on the side of the bearing and the bearing hole.

Step 2:

Wipe off t he loctite overflow and wait for 24 hours in order to have the loctite dry completely.

Photo 1: Put the loctite on the side face of the bearing and wipe off the loctite overflow.

Photo 2: Insert the bearing on the mount base.



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Winding:

Parts: wire and stator.

Note:

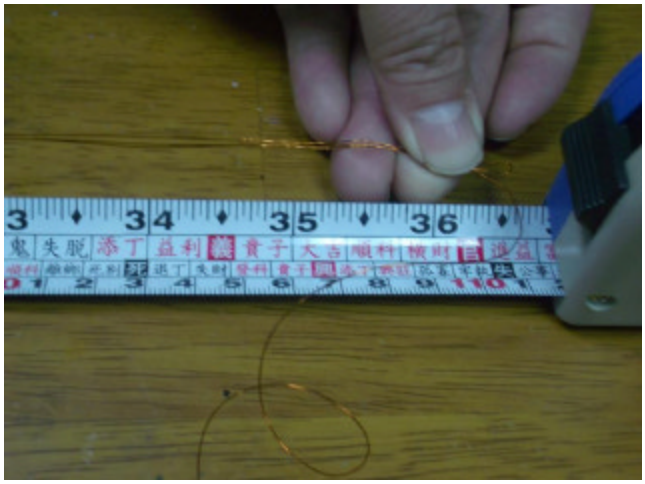
1. That the number of turns and the direction of the windings on all 9 polls of the stator need to be the same.
2. Wires need to be put in order rather than twisted.
3. The wound wire shouldn't exceed the dimension of the slot depths of the stators.
4. "One Turn" of winding means that the wire is crossed over the upper face of the stator.
5. The number of "turns" of windings will directly influence the KV value of motor, so it needs to be decided before winding.
6. While winding the wire, make it neat and tight. Be careful not to scrape the insulation.
7. The way of calculating the length of wound wire is:

(number of poles X number of turns X 2.76cm)+20cm

Our example here is "3 wires - 12 turns" winding.

So each wire should have a length of (3*12*2.76)+20= 119.36 cm. Just use this length and fold it twice to cut for 3 wires of equal length.

8. The protruding point on the stator at pole A1 is the direction in which the wires will come out (output) from.
9. After winding one turn, you need to use a tool such as a slice of bamboo, ceramic screwdriver or any tool without sharp edges to press the wire. The purpose is to make the wire tightly stacked and leave enough space for the last turn, (winding group C poles).
10. After finishing the windings, the length of



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the three wires left should be about the same; otherwise, there could be an unequal number of turns made on the stator.

11. There are 9 poles. We could divide them into 3 groups:

1st group:A1, A2, A3

2nd group:B1, B2, B3

3rd group:C1, C2, C3.

12. The rule of winding: First, you wind a pole, then jump two poles and go directly to the next pole in the same group.

For example, you wind A1 then skip B1 and C1 and go directly to A2. Do the same for A3.

13. The wire could be wound in the clockwise or anticlockwise direction. No matter which way you choose, just keep them the same direction.

Photo 1: Measure the length of one wire.

Photo 2: Fold the wire twice for a three wire winding.

Winding the A group poles:

1. Winding pole A1.

Keep the loose end at 10cm. Hold the end and start winding. From the direction of the wire output, begin to winding from inside out.

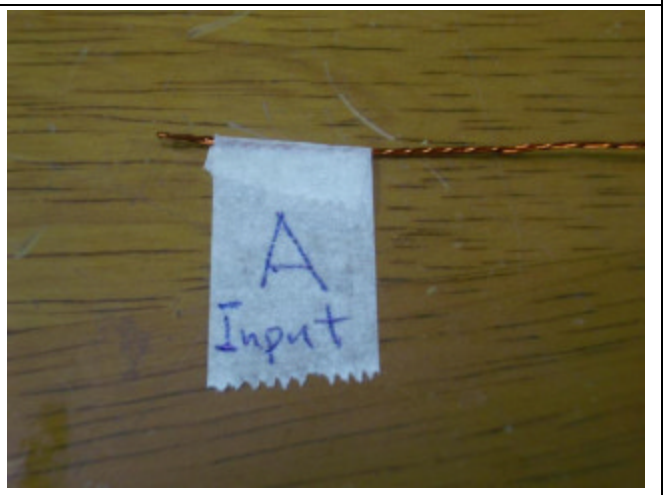
After each turn of winding, use a slice of bamboo, ceramic screwdriver or a tool without a sharp edge to press the wire and make it tightly stacked.

2. Winding pole A2.

After winding the first pole, A1, the wire should cross B1 and C1 and wind the second pole, A2 in the same direction as A1.

3. Winding pole A3.

Following the steps listed above. After finishing winding A2, skip 2 poles and wind pole A3



following the same steps as A2. Don't forget to press the wire and make it neat and tight.

After finishing the winding, use the 1mm heat shrink tube to cover the wire.

This completes the winding of group A poles.

Output wire of group A poles:

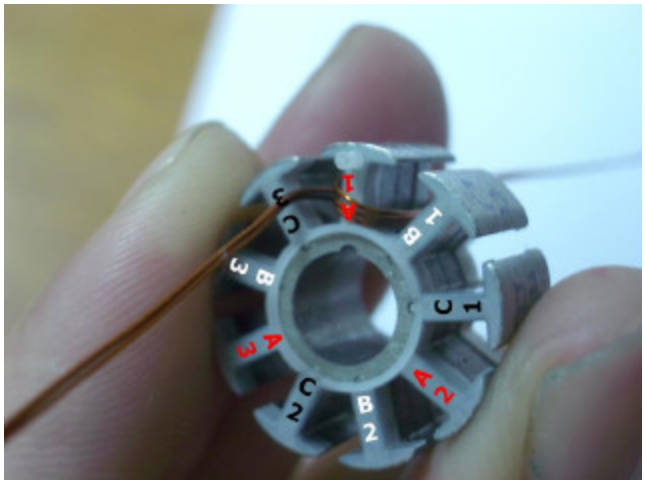
Photo 1: The input head of wire A

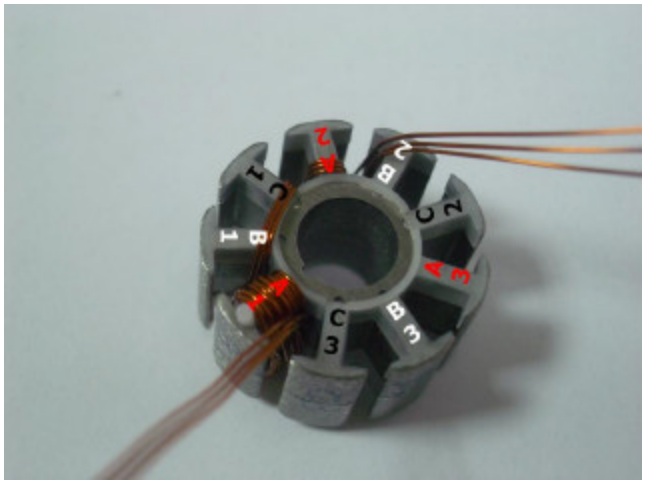
Photo 2: Start to wind from pole A1

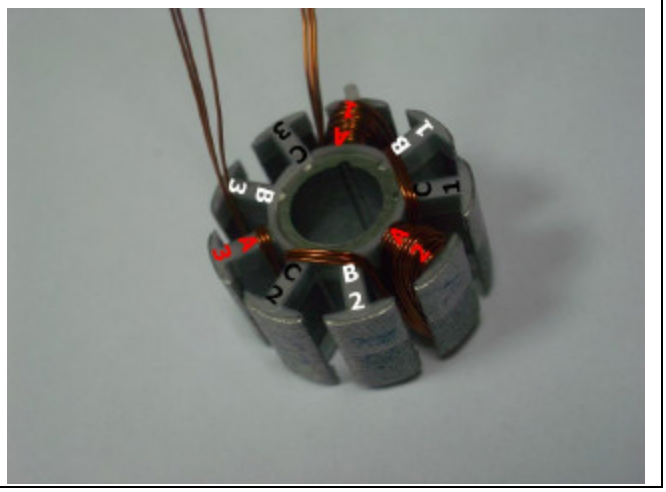
Photo 3: Wind pole A2.

Photo 4: Wind pole A3

Photo 5: Group A poles winding complete.







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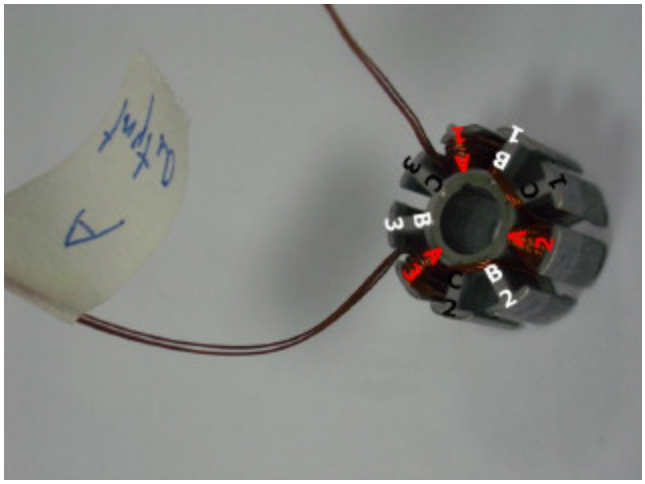


Winding the B group poles:

1. Winding pole B1.

Keep the loose end at 10cm. Hold the end and start winding. From the direction of the wire output, begin to wind from the inside out. After each turn of winding, use the tool to press the wire and make it tightly stacked.

2. Winding pole B2.

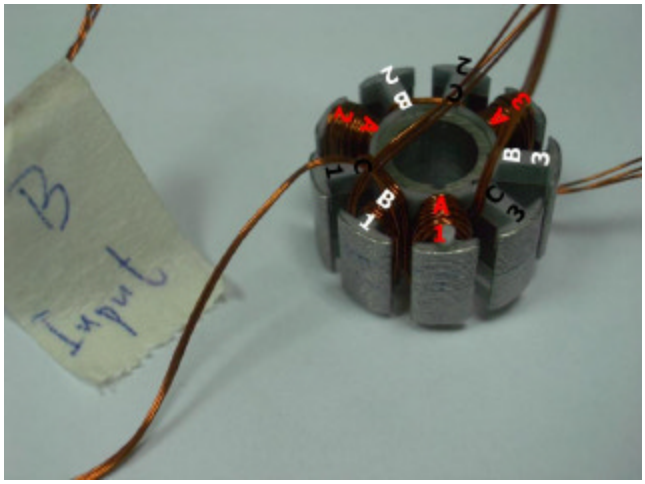
After winding the first pole, B1, the wire should cross C1 and A2 and wind the second pole, B2, in the same direction as B1.

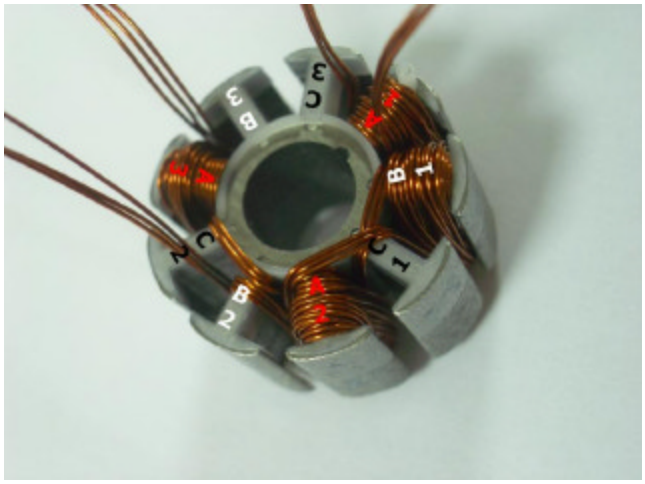
3. Winding pole B3.

Following the steps listed above. After finishing winding A2, skip 2 poles and wind pole A3 following the same steps as A2. Don't forget to press the wire and make it neat and tight.

After finishing the winding, please use 1mm heat shrink tube to cover the wire.

Then the winding of group B poles are completed.





Output wire of B group poles:

Photo 1: Hold the input (head) of wire and start to wind B1.

Photo 2: Wind pole B2.

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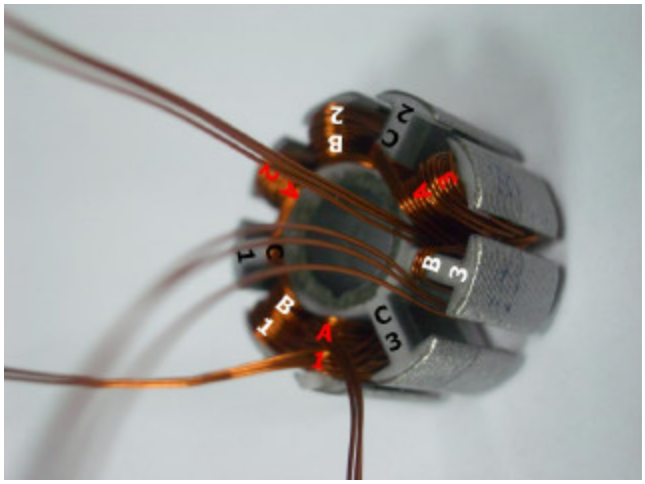
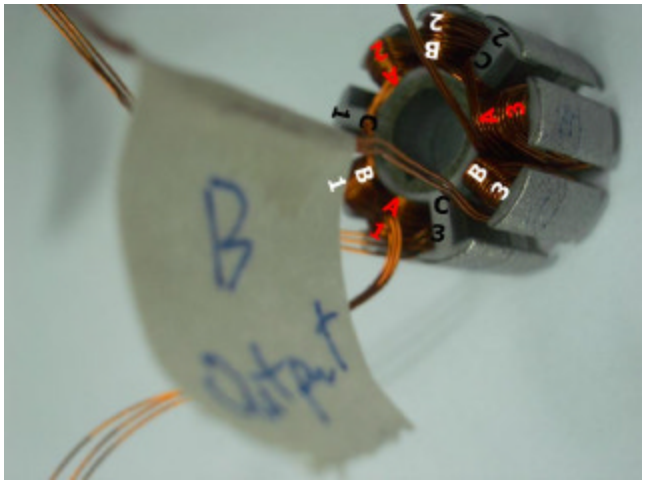
Photo 3: Wind pole B3.

Photo 4: Group B poles complete.





Winding the C group poles:

1. Winding pole C1.

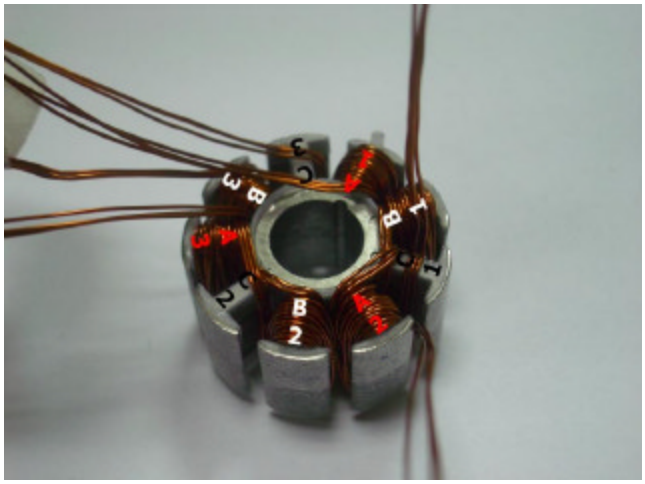
Keep the loose end at 10cm. Hold the end and start winding. From the direction of the wire output, begin to wind from the inside out. After each turn of winding, use the tool to press the wire and make it tightly stacked.

2. Winding pole C2.

After winding the first pole, C1, the wire should cross A2 and B2 and wind the second pole C2 in same direction as C1.

3. Winding pole C3.

Following the steps listed above. After finishing



winding pole A2, skip 2 poles and wind pole A3 following the same steps as A2. Don't forget to press the wire and make it neat and tight.

After finishing the winding, use the 1mm heat shrink tube to cover the wire.

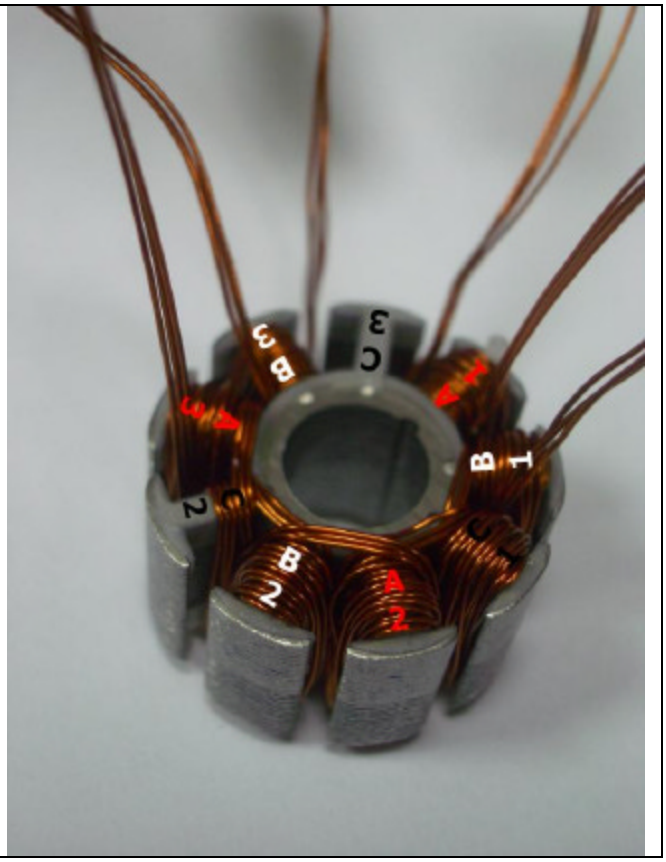
Then the winding of group C poles are completed.

Photo 1: Hold the input (head) of wire and start to wind from C1.

Photo 2: Wind pole C2.

Photo 3: Wind pole C3.

Photo 4: Group A, B, and C poles are completed.



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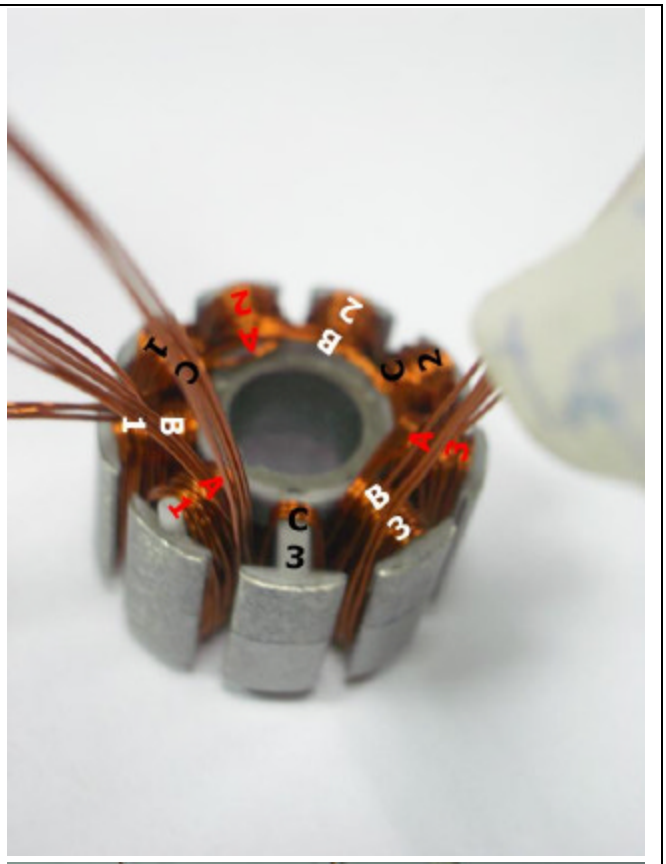

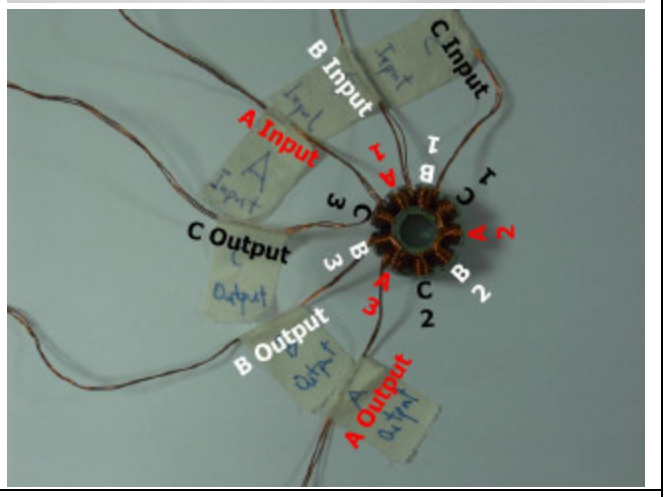

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Soldering the wire:

Part: Soldering iron, sand paper or file.

(Y winding)

Twist the end of the three input (head) wires, (Group A, B, and C) and cut it so that there is 0.5cm left. Then scrape the insulation of each wire by sandpaper or rasp, and solder the heads of wires all together.

Please note that the insulation on the wire should be scraped completed and soldered correctly.

The quality of soldering has a direct and significant impact on the efficiency of the motor.

Also, scrape the ends of the three output wires, (Group A, B, and C) and solder on the gold connectors and cover with the heat shrink tube.

(Delta Winding)

Twist the input (head) of the A wire with the output (end) of the C wire. Twist the input (head) of B wire with output (end) of A wire. Then twist the input (head) of C wire with output (end) of B wire.

Scrape the three wires and solder them to the gold connectors. Cover with the heat shrink tube.

Photo 1: Y winding input wire.

Photo 2: Y winding– scraping the insulation on the input wire.

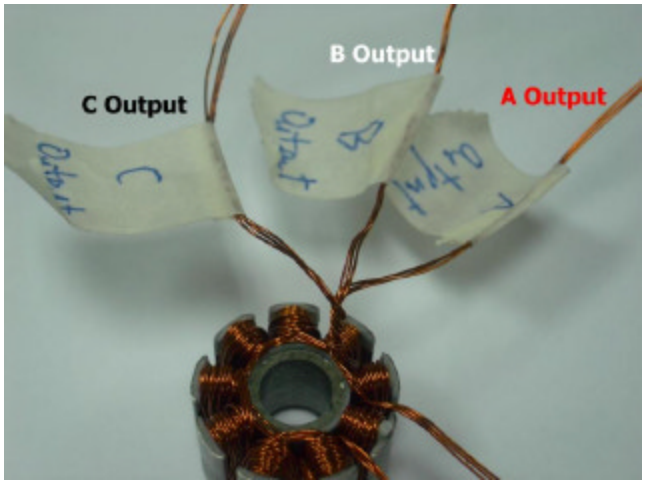
Photo 3: Y winding- the input wire after scraping the insulation.

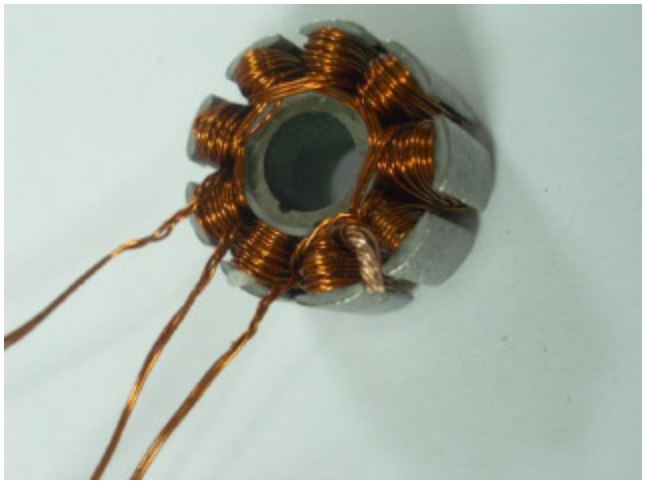
Photo 4: Soldering.

Photo 5: Y winding- input wires are covered with heat shrink tube.

Photo 6: Deta winding input wire.

Photo 7: Scraping the insulation on the output





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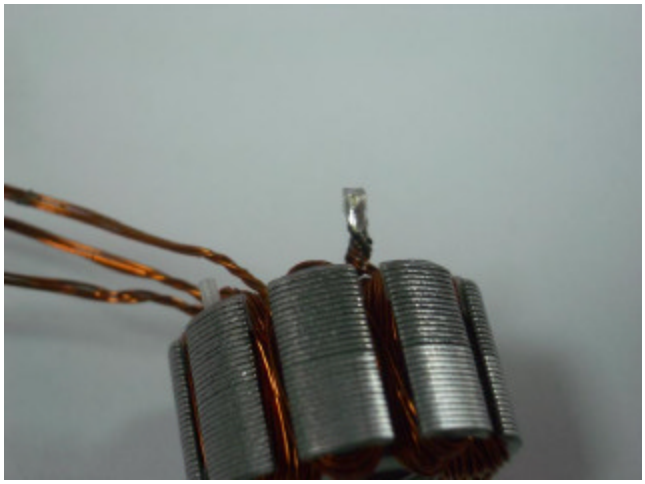
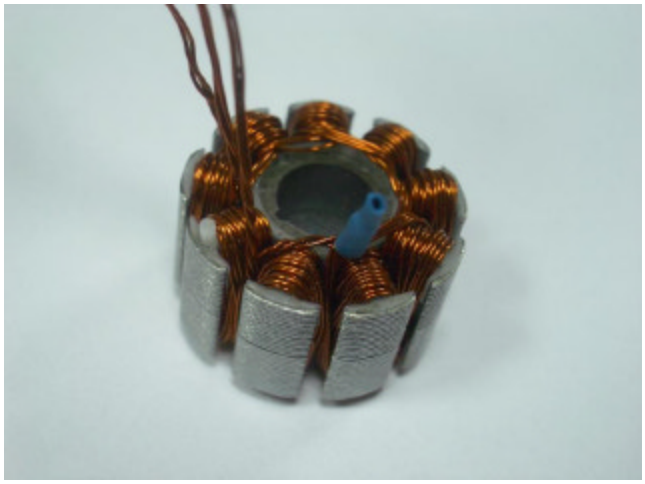
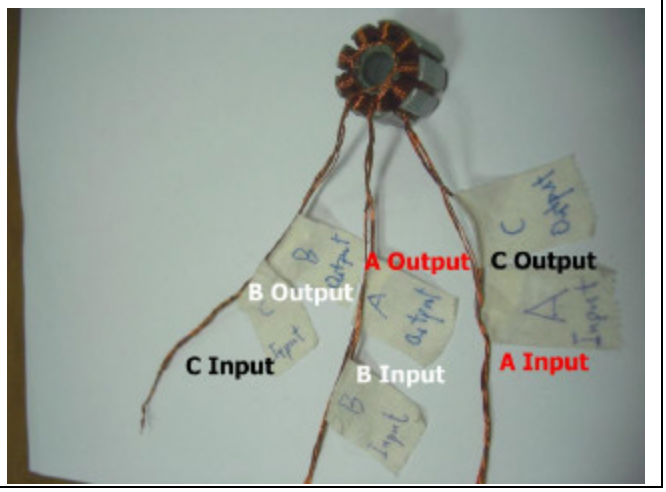
wire.

Photo 8: Output wire covered with heat shrink tube.

Photo 9: Output wire soldered with the gold connector.







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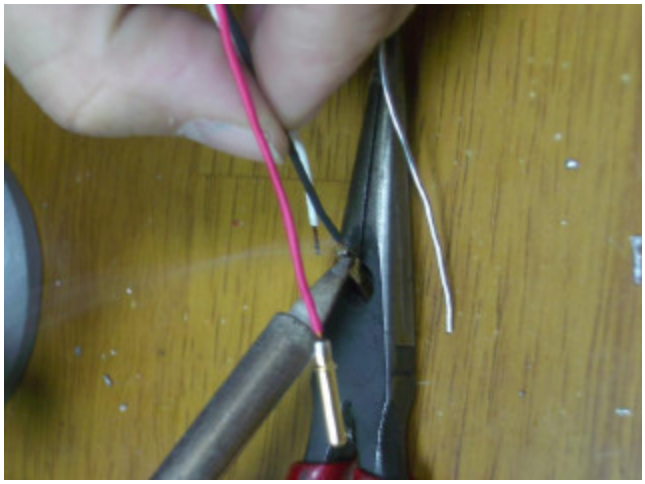

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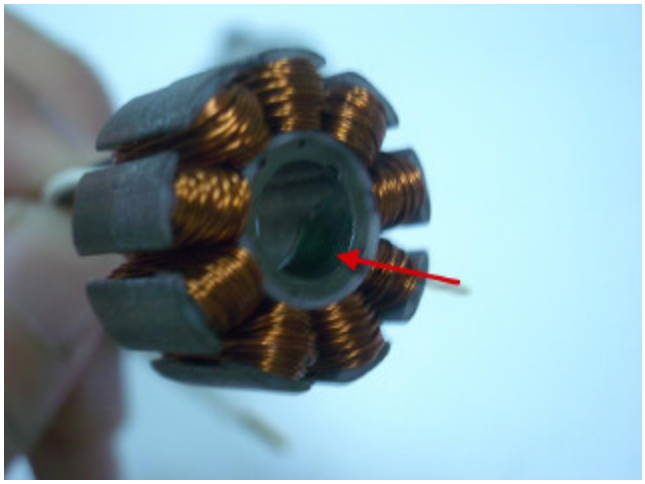
Operation testing (Stick mount only) Put the wound stator onto the tube base, and use a rubber band to fasten the end. Then cover it with the rotor and connect it to an electric speed control. Turn on throttle and test the operation at slow speed. If the motor starts without a hitch and spins smoothly without vibration, then the motor is winded successfully.	
Glue Stator with Base: Put loctite on the base and stator at the point that the photo shows. Assemble them together. Wait for 24 hours in order to have the stator and the base tightly attach together. Photo 1: Put the loctite on the inside edge of the stator.	
Complete Assemble: Test the motor at low throttle and see if every part is fastened tightly. Then assemble it on the plane with a suitable propeller. Enjoy your flight! Photo 1: Assembly completed	

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Revolution Test Data

Wire Dimension: 0.32mm

Winding Method	Wires	Propeller	Battery	RPM
"Y" method winding	4 wires 7 turns	6*4	11V, 11A~10A	14000
"Y" method winding	4 wires 7 turns	7*5	11.1V, 16A~15A	11000
"Y" method winding	4 wires 9 turns	7*5	11.1V, 12A~11A	9200
"Y" method winding	3 wires 12 turns	1047	11.1V, 9-10A	5600
"Y" method w inding	3 wires 12 turns	1047	7.4V, 6-7A	4800
"Delta" method winding	4 wires 8 turns	5025	11.1V, 12A	18700
"Delta" method winding	4 wires 8 turns	5025	11.1V, 16A	20000
"Delta" method winding	4 wires 8 turns	Wattage Ducted Fan	11.1V, 13A	25000

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