

ELECTRIC MOTOR C-6145

Check all parts before beginning assembly

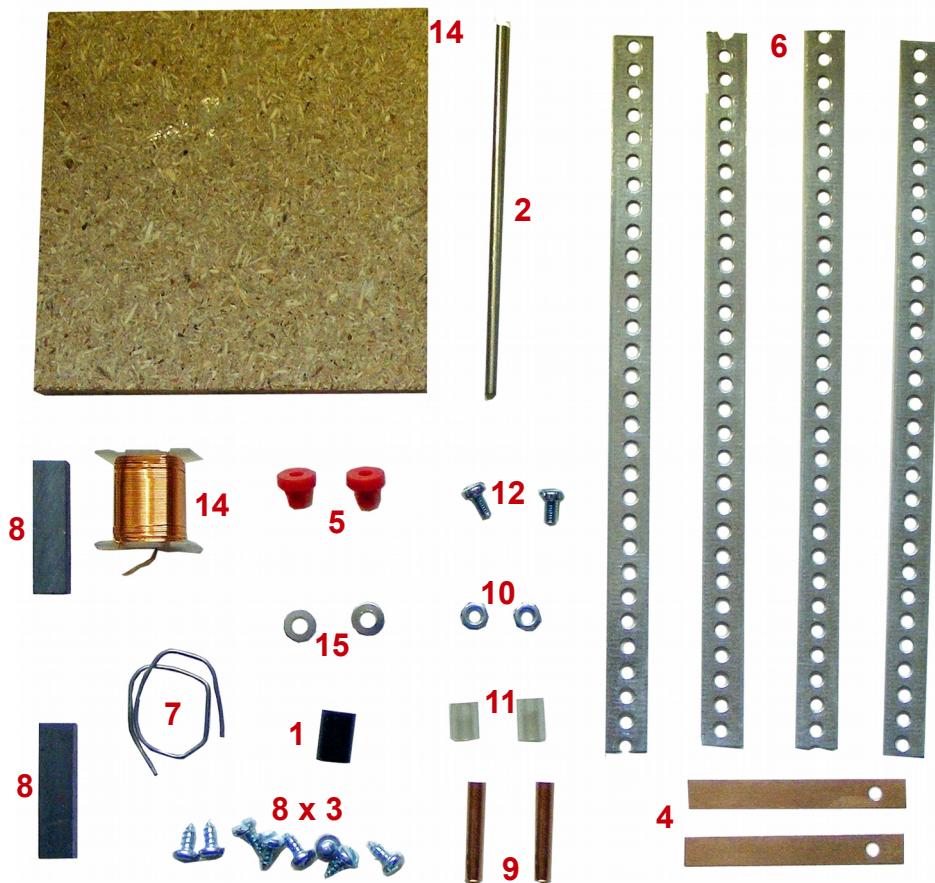
Tools required to assemble the electric motor

1. Pliers or shears for cutting sheet metal
2. Lime
3. Punch
4. 2-component adhesive to seal the coil (recommended)
5. Screwdriver
6. Key for M3
7. flat nose pliers
8. Vise
9. Fine sandpaper:

NOTE: Duct tape and a stack "body pack" type 4.5V 3R12, or a holder with 1, 2 or 3 1.5V is also needed to make the kit work. WHAT IS NOT INCLUDED IN THE KIT.

Materials included in the kit.

Nº	Quantity	Description
1	1	Plastic spacer 10mm
2	1	Axis Ø3x80mm
3	8	Self-threading screws 2.9 x 6.5 mm
4	2	Contacts bronze 45 x 6 with 3mm hole
5	2	Special plastic mounting for the collector
6	4	150 mm perforated strips (30 holes)
7	1	Tin100mm
8	2	Magnet 27x7x5mm
9	2	20 mm copper collector
10	2	M3 nuts
11	2	Pieces of transparent tube
12	2	Screw M3x8mm
13	1	Chipboard 80x80x8mm
14	1	Weldable coil wire 4 Ohm
15	2	Washers M3

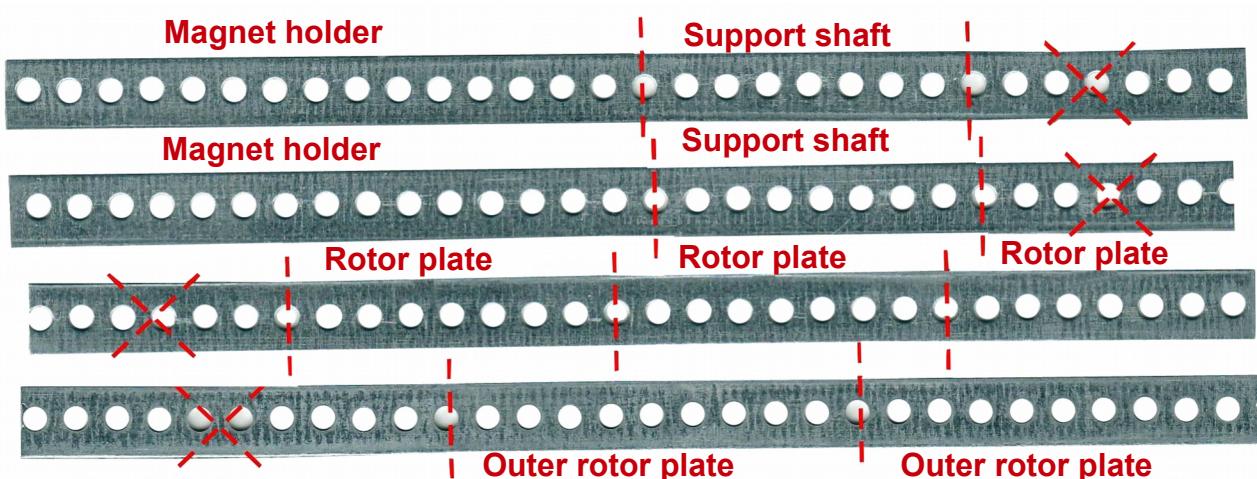


NOTE: Remember that before starting the engine mounting and cut once all the pieces have to polish all the edges well, so they can not be cut.

- The perforated plates are supplied cut to size with scissors for cutting sheet metal.
- Will cut the chamfered corners. After the limaremos and, if necessary, the enderezaremos.
- To fold forms and will always use the vise.
- We must double L-shaped or U for the marked locations as appropriate.

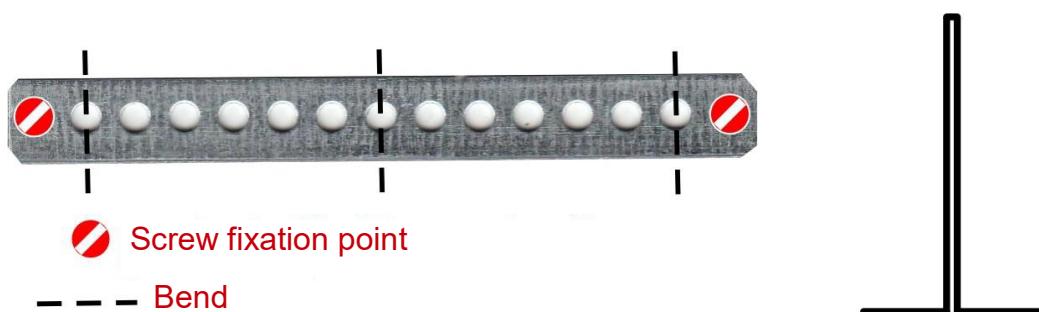
As the metal mounting brackets

A) All supplied perforated strips measuring 150 mm (30 holes). The first thing you have to do is plan how we will cut the strips to come out nine pieces we need. For instance.



B) Media magnets.

You need two pieces cut and bend as you can see in the drawing. The picture on the right, is the profile of the bent piece.



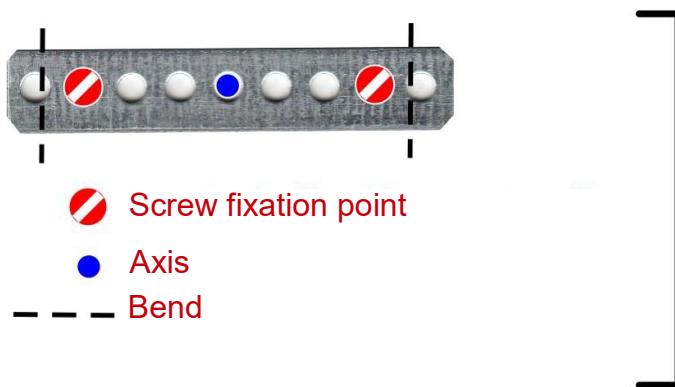
C) Shaft Bearings

You must make 2 pieces as you can see in the drawing. The picture on the right, is the profile of the bent piece.



D) External rotor plates

You must make 2 pieces as you can see in the drawing. The picture on the right, is the profile of the bent piece.



E) inner rotor plates

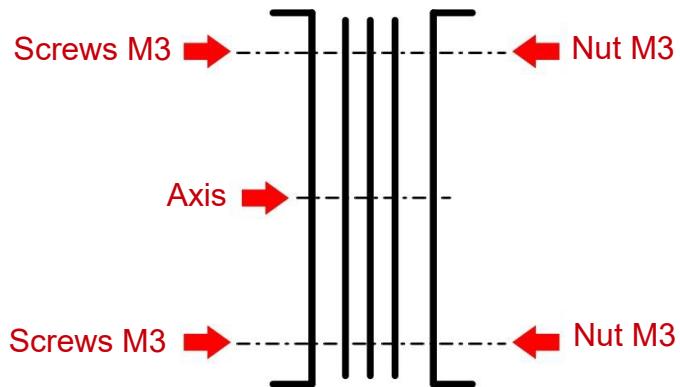
You must make 2 pieces as you can see in the drawing. Remember that you can not bend the plate.



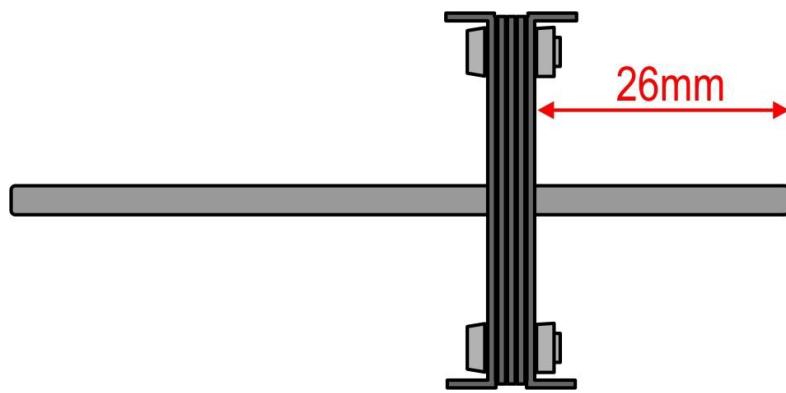
How to fit the rotor

A) mounting the plates forming the rotor according to the following scheme.

We begin by entering the shaft into the center hole. Then will the M3x5mm screws and nuts close with the M3. It is important to tighten the screws



B) The motor shaft must be in this position:



C) Finally the rotor core tape roll up well with the metal sheets. At least a couple of layers so that it is well insulated.

D) Now we wind the thread to the rotor. In the kit we will find a coil of copper wire. It is pre-painted wire, thus the coils do not produce short when touched. We must search for the beginning of the string and release the tip.

E) will start leaving 4cm Free wire in the middle and roll up 50 laps in one of the two halves of the rotor. We try not running and winding best. Pass across the rotor and bobinaremos 50 laps also on this side. Back to the first side of the rotor and give 20 more laps. Repeat 20 laps in the second section of the rotor. If we can continue thread you are 10 laps on each side. You have to let loose the 4 cm thread end, and both sides must have the same number of turns (turns).

NOTE: The coil must be spinning in the same direction of winding on both sides.

F) We will check the thread tight. Leave 4 cm wire along the axis (if necessary the'll hold tape). Now we will stick coil 2-component adhesive. You have to let it dry the hours needed.

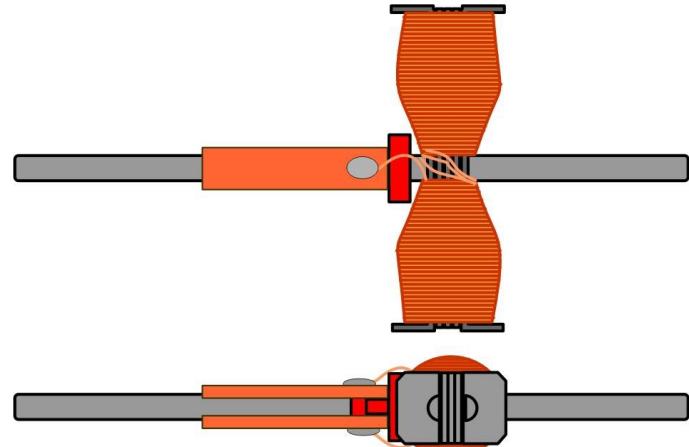
G) Once dry, fine paper puliremos both ends of the wire sandpaper until clean the protective varnish. Then we solder two wires. Under no circumstances we will burn the thread end to strip the protective lacquer.

H) Carefully weld each wire half copper collector. We will do it carefully so that the tin does not suffer much by the collector.

I) Now insert the long side of the axis, one of the special plastic fasteners, so that the wide part touches the coil. As you can see in the drawing.

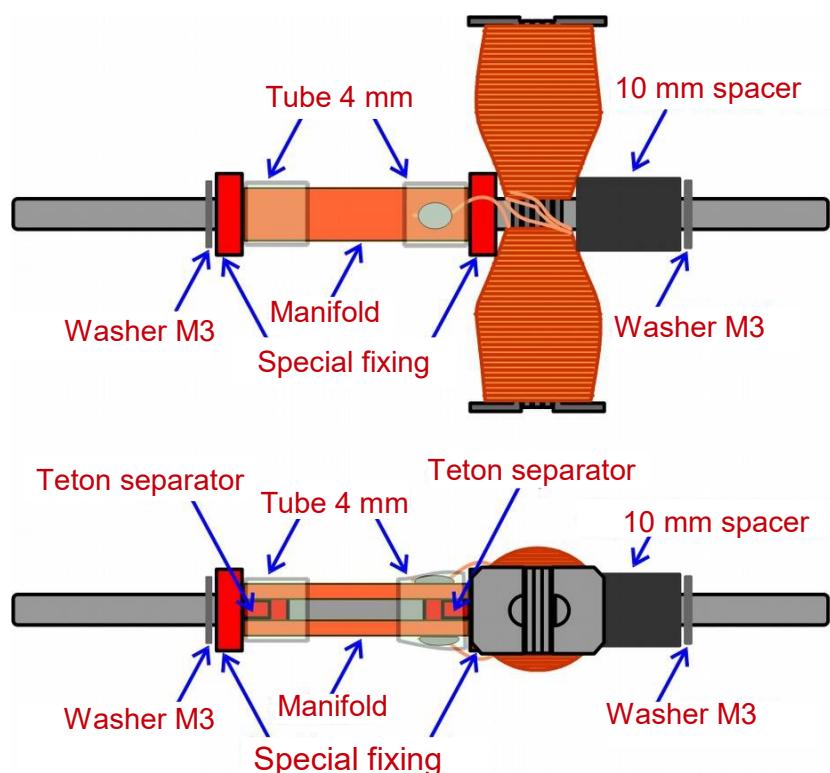
J) Then will the two manifolds on the special fixture, so that both collectors are separated by two small lugs fasteners. This prevents contact each other.

It is important that the relative position between the coils and the collectors is, as shown in the drawing.



K) Will insert the piece of transparent tube so that tightening the collector against the special setting. If the tube is larger than 4mm it must be trimmed.

L) Will insert another piece of pipe on the manifold and then the other (narrower part by the collector) Special fixation. Then carefully get up the two collectors and place them on the special fixture. See drawing.



M) Finally insert the black plastic spacer 10mm at the short end of the shaft and a washer on each end M3

Mounting the base plate

A) Place a support shaft on the base plate 80x80x8mm. It will be placed centered and singing 10mm. It is fixed with screw 2,9x6,5mm.

B) inserting the short end of the shaft in the support.

C) Insert the other bracket at the free end of the shaft, find the best position to secure. You should have a slight lateral play. Secure the bracket with screw 2,9x6,5mm.

D) We will post the brackets magnets to the motherboard.

We will put the rotor in a horizontal position, mark the point where the rotor ends on the motherboard and will add 1mm out. This is where we will put the set screw 2,9x6,5mm support on the inside.

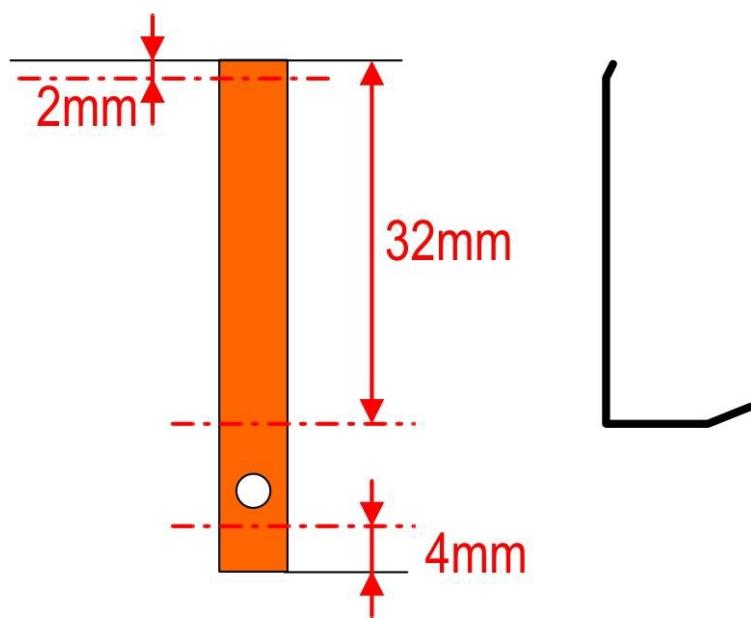
NOTE: Do not place still the second screw each bracket Magnet

E) We will check if it is well located. We will put magnets into their holders. The spinning rotor has successfully passing between 1 and 2mm away from the magnets. If it is not necessary to correct it.

F) When we are sure that it works correctly with the second screw sure 2,9x6,5mm.

NOTE: The magnets must be placed in reverse polarity, with respect to each other, otherwise the engine will not run.

G) Fold the two contacts bronze 45x6mm (brush) as you can see in the scheme. On the right profile of the bent piece is shown.



H) Set screws brushes with 2.9x, 6.5mm, so that properly press the collector. Monitoring the brushes correctly at all times and not touch the collector remain above the plastic tubes.

I) If everything is correct we should start the motor. Connect one 4.5V battery (type 3R12) through a pair of wires with alligator clips (items not included). The battery is connected directly to the brushes.

This engine has only two coils, the simplest are three. For this reason it will be necessary to start the engine driving by hand.

In the case of not having alligator clips, you can connect a wire to each screw brush. At the other end of the cable we connect a metal paper clip, which is a great system to connect the battery terminals 4.5V.

It can also work with 1, 2 or 3 1.5V batteries connected in series.

J) if desired can be connected to a pulley shaft, a gear module or a module 1 0.5 to 3mm shaft, and drive vehicles or machines.

This kit is to build a small electric motor by the student / a over 12 years.

Will be built all metal engine parts from the shaft bearings, brackets, collector, brushes, until the rotor plates. Also the armature winding will be handmade by the students themselves.

NOTE: This kit is recommended for children over 12 years, always accompanied by an adult.



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Notas: