Kre8 Basic DC Motor - Introduction

Note If you have the original version (before November 2010 email sales@kre8.com for version 1 instructions

Contents

Activities

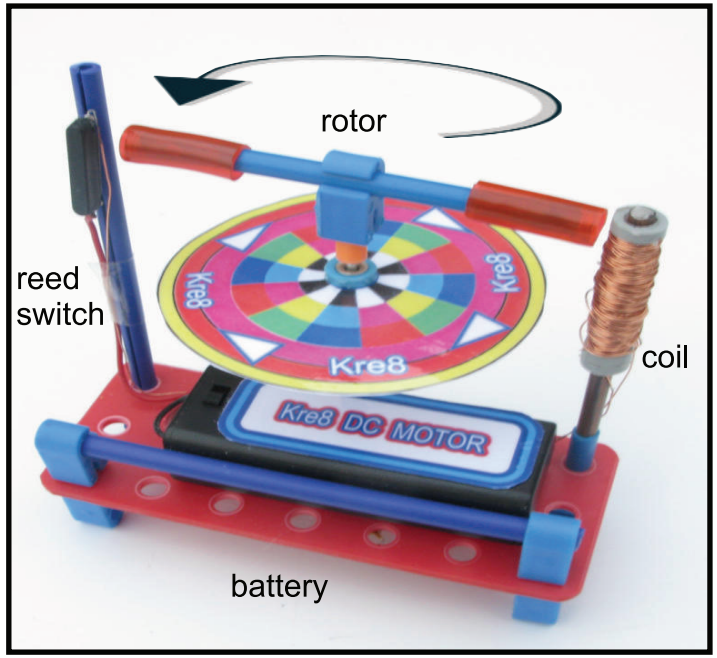
To make the motors central rotor spin. The motor consists of an electro-magnet made from a coil of insulated copper wire on a steel rod, 2 magnets, a reed switch, and a battery to power it. The challenge is to get it rotor spinning as fast as possible. Some parts are adjustable to fine tune it.

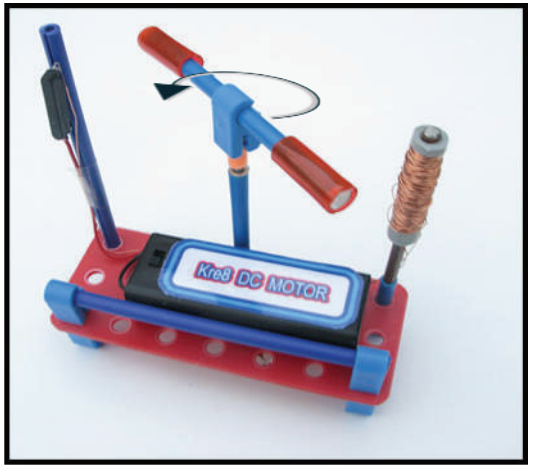
Key Words

Electric circuit, electric motor, bearing, friction, rotor, battery, soft soldering, AA battery, reed switch, fuse, resettable fuse, enamelled wire, conduction, insulation, friction.

Design opportunities

Design and decorate as you wish instead of using the given top .





Without disc decoration

Educational Benefits

Making and understanding a SELF ASSEMBLY kit involving:- simple electric circuit, electromagnetism, appreciation of power and efficiency, low friction spinning mechanism, and the importance of the electric motor in today's modern world.

Personal - Sharing a practical making experience together, quality outcome, testing, successful working outcome. Making a technical product. Co-operation and teamwork, able to follow instructions, problem solving, testing and evaluating. Possible links with science engineering computing and technology.

Health and Safety

Be very careful with the two **small magnets**. If swallowed you must seek medical help. (also very easy to loose - so keep in bag until needed)

Batteries if 'shorted' can heat up causing a chemical leakage, or even catch fire so a **resettable fuse** is included to prevent this.

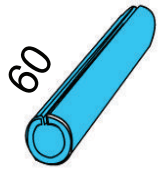
Kre8 Basic DC Motor - Parts

Version 4

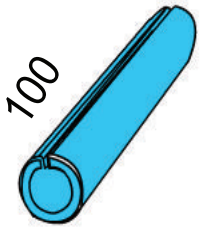
20p

1 x Red base 3 x 7 holes

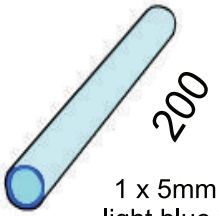
2 x Blue clip connectors



2 x 5mm dia.
slit rod
(*Non standard length)



4 x 5mm dia.
slit rod



1 x 5mm dia
light blue tube

1 x 1.5V battery holder with switch
[holds just one AA battery]

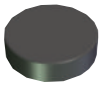
1 x 4mm dia steel rod
(copper coated welding rod)

1 x resettable fuse

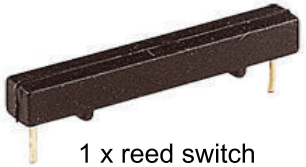
1 x orange tube
5mm x 12mm long

Optional decoration
the decoration page has parts that can be cut out and added.
(not supplied with kit)

1 x 27swg enamelled copper wire
(4 metres wound on folded card)



2 x magnets
6mm diameter



1 x reed switch

1 x PVC plastic tube
(about 40mm long 8mm dia)

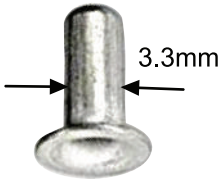
1 x thin steel rod
2mm dia x 75mm

2 x blue collars
(can be used to hold circle decoration)

4 x grey collars

1 x resealable bag

1 x card disc
(optional to use)



3 x
Smallest steel
eyelets
3.3mm diameter
2mm hole
Tin plated.

Abrasive paper

Go to
www.kre8.com
for your free
instructions

1 x paper insert

SD packed

Tools

ruler

Snips

Soldering?

The motor wires are best soft soldered or the wires and can be twisted together instead.

Hole punch or drill

Only needed if you want to add the decorative disc

Kre8 DC Motor - Making Frame

3

INTRODUCTION

TO MAKE

Use these 'step-by-step instructions' as a guide and adapt as you want.

NOTES

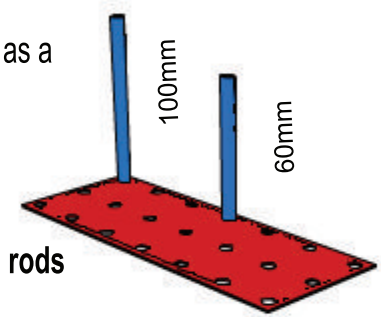
1) Use metric ruler for measuring

2) For **EASY assembly** -

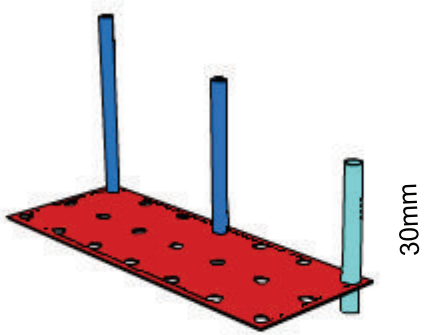
a) Smooth and **round the end of the rods** with abrasive paper then

b) **Push and twist** the rods into place.

1 Add two 5mm dia slit rods right through holes in back row as shown

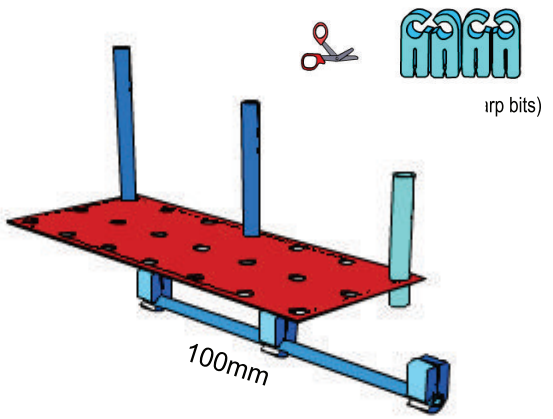


2 Add 5mm dia light blue tube to hold coil (made at **step 5)**



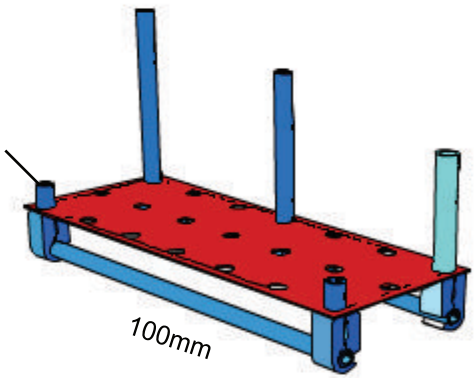
3 Add three single clip connectors underneath

(Note - You need from a full strip)

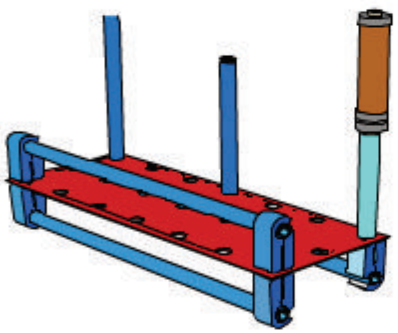


4 Add front slit rod and two clip connectors

20mm long light blue tube



5 After making the coil it can be added

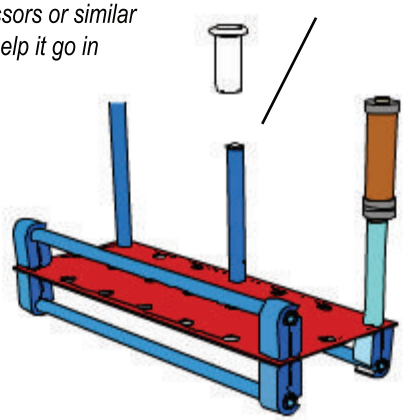


Make coil then return here

6

Note
May need to open end up a bit with scissors or similar to help it go in

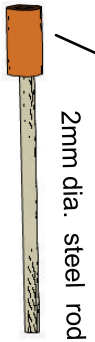
Push the eyelet into the centre rod to act as a bearing



Kre8® Making System

Making the Spinning Part

1

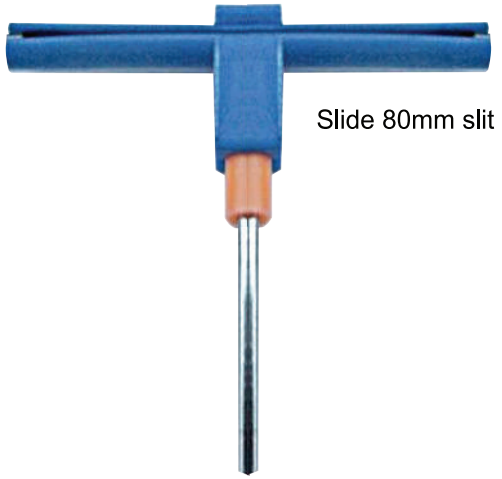


push 5mm orange part onto the long 2mm dia steel rod

2

Add one single clip connector

3



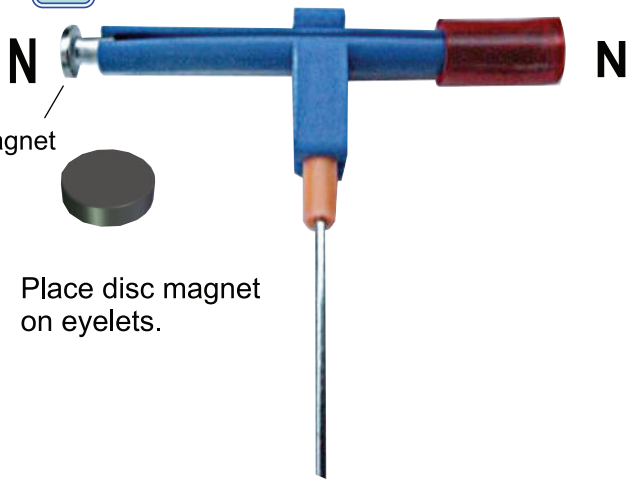
Slide 80mm slit rod in

4

Push eyelet right into the 80mm long slit tube.

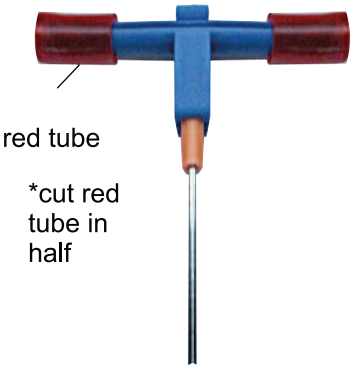
IMPORTANT
Magnets must be **same polarity at each end** as shown above [north (N) pole facing outwards]
To do this easily it is useful to have an extra magnet to check this OR use the electromagnet you will make later on)

5



Place disc magnet on eyelets.

6



*cut red tube in half

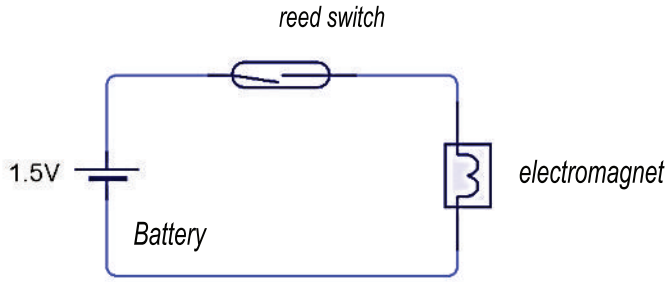
Slide red tube over magnets to protect them.

Note - if tube is too loose wrap piece of tape on blue slit rod first.

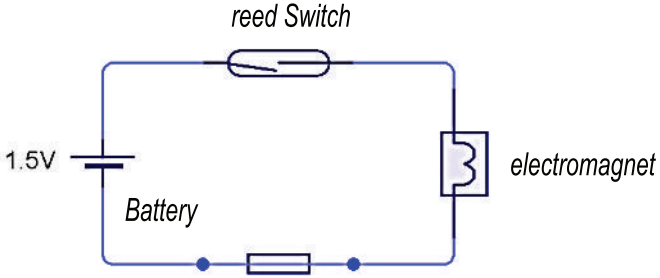
Beware

Small magnets if swallowed can be dangerous
Seek MEDICAL help if this happens.

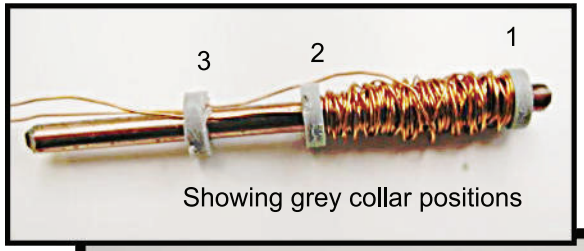
Kre8 Circuit for DC Motor - Circuit



Standard circuit with no protection



The **resettable fuse** is added to protect the battery from a 'short circuit' and possible fire risk if battery heats up too much.
A resettable fuse works like a normal fuse but when the 'short' is removed the circuit continues as normal because the fuse automatically resets itself.

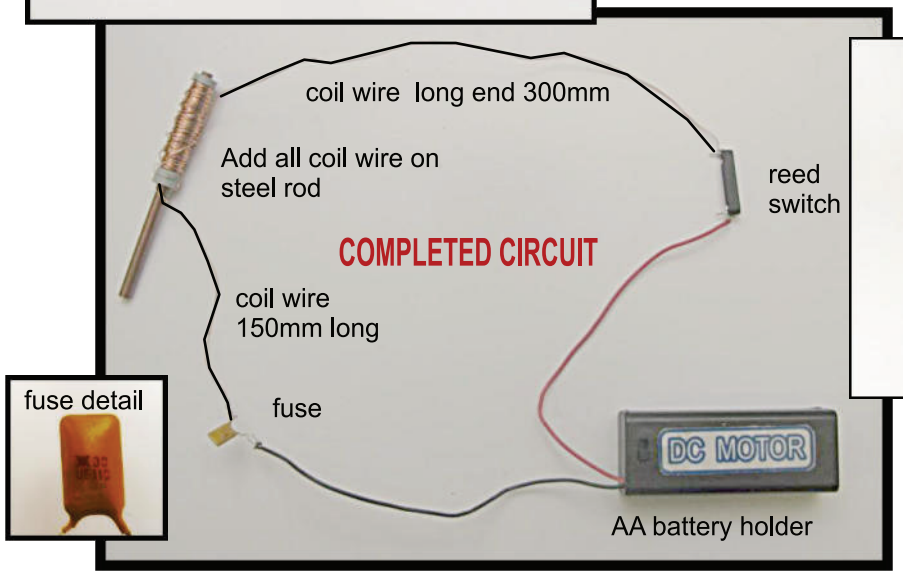


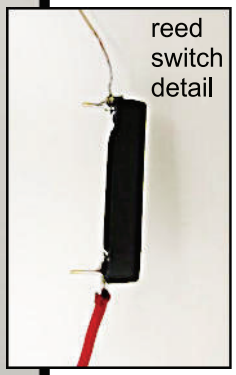
Showing grey collar positions

COIL WINDING
The varnished copper coated wire is wound and placed under a grey collar 2 then wound between that and collar 1. When coil made use collar 3 to hold end of wire.

WIRE ENDS
Use the abrasive paper to remove the clear varnish from the wire ends
DO THIS JOB WELL .

(Note - if you cut wire again you will need to repeat for new end)

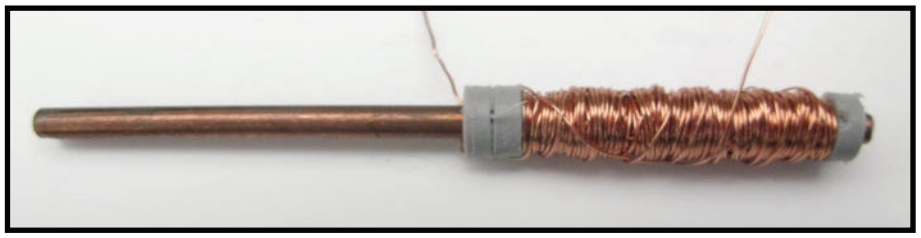




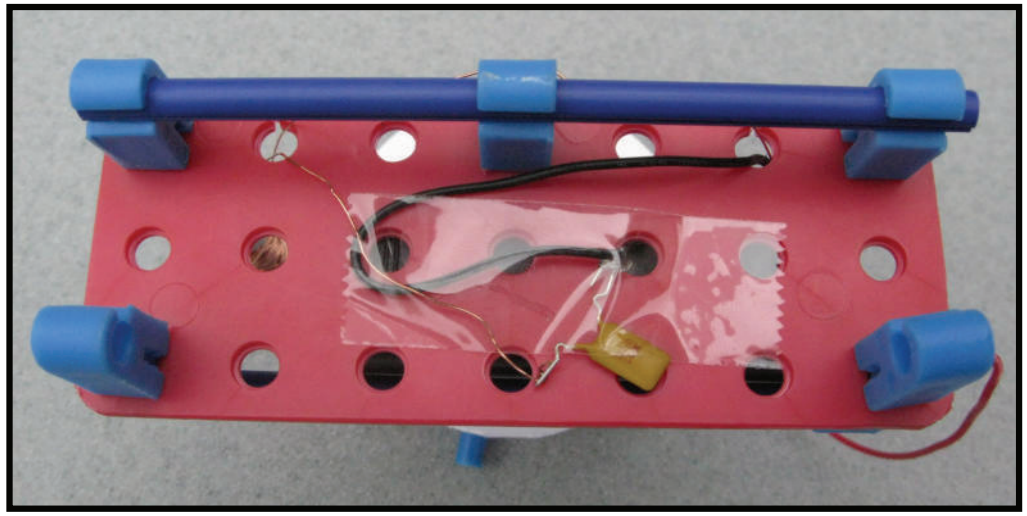
Reed Switch
Join by soft soldering (recommended) leaving the wires as shown

Reed switch wires can push into the slit rod slot as shown (or tape to rod)

Note - This is only a demonstration motor NOT and is designed to be left running for a long time or unattended. DON'T use more than 1.5V.

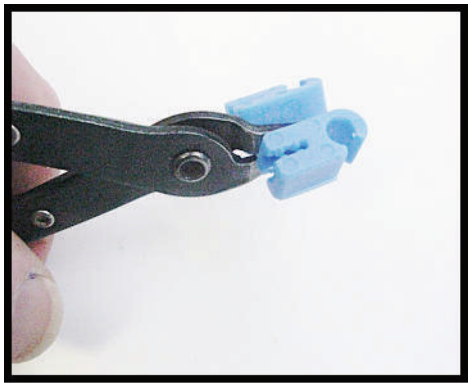


Assembled Electromagnet



underneath view showing fuse

Completed motor



cutting up a connector using side cutters

Punching hole in decorations

Kre8 Basic DC Motor - Setting up

Make sure it **spins well**
If not
adjust slit rod until central
OR
adjust electromagnet
OR
adjust reed switch
(they can be
moved outwards and
inwards about 5mm)

Adjust **reed switch**
up or down in the slit rod - magnet needs to end up facing the top of the reed switch

If the **rotor arms** hit the uprights push the uprights outwards.

Battery
If not working try a new battery.

Circuit
To check it is connected up right the electromagnet will attract a paper clip when either of the magnets is placed next to the top of the reed switch (and the battery is on)

Decoration
The decorative disc can be fixed on the rotor part or the fixed bearing part.

Kre8 Motor - Decoration

Kre8 DC MOTOR

Kre8 Motor - Decoration

Kre8 DC MOTOR

8

Kre8 DC MOTOR

One per kit
(laminate first)

Kre8 Motor - Decoration

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