

Re: how to turn a universal motor into a generator

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- *From:* default <default@xxxxxxxxxxxxxx>
 - *Date:* Thu, 10 Jan 2008 16:36:07 -0500
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On Thu, 10 Jan 2008 12:14:28 -0800 (PST), gearhead
<nospam@xxxxxxxxxxxxxx> wrote:

I took apart an old vacuum cleaner with 12 amp motor, made for U.S. 60 Hz AC household use so I could experiment with turning the universal motor into a generator. I know it's a universal motor because applying 12 volts from a battery will get the motor to turn, same direction regardless of battery polarity. I wanted to experiment with it as a generator, so I used an electric hand drill to turn the motor's shaft (quarter inch shaft fit right into the chuck) and connected a car taillight bulb to the blades on the plug. Spinning the motor didn't light up the bulb, so I touched a twelve volt battery to it to get some juice going and set up a field in the motor/generator. The bulb went out as soon as I took the battery away, so that was no good. I tried this turning the shaft in both directions, and with a much smaller bulb that draws less than 100 mA at twelve volts.

Perhaps the hand drill is just too slow.

First question: Would this experiment likely work if I turn the motor several thousand rpm?

Second question: Which direction should I turn it?

You are going about it all wrong. In order to generate electricity (and universal motors do make good generators) you need coils of wire moving through magnetic fields.

The universal motor has a winding in the stator to produce the magnetic field the rotor-armature needs to turn – and to generate electricity.

If you disconnect the field on your motor and supply a small amount of DC to it (a 1.5 volt battery may be enough) and then spin the rotor (any direction – direction effects polarity not generation) and take energy off the brushes you should see the light glow.

Beyond that it is a matter of getting the field strength up for more

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voltage – the wire size in the armature (rotor) determines the current output – heavy wire more current – but less wire fits in the space so less turns and lower voltage – a compromise has to be reached.

There is such a thing as "residual magnetism" that can start a generator working just by spinning it – a vacuum cleaner is usually a series wound motor (field in series with the armature) shunt motors (field put in parallel with the armature) work better for self starting – the residual magnetism generates a small voltage then it powers the field and produces more. (better if the load kicks in after the voltage is up)

Sounds like a fun experiment though.

Universal motors always turn in one direction – in order to reverse the direction the field must reverse >>> with respect to the armature.

Ditto generation polarity.

Build some holders to put permanent magnets in place of the field poles and you wouldn't need to "excite" the field to produce electricity.

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