Schools & Homes Energy Education Project

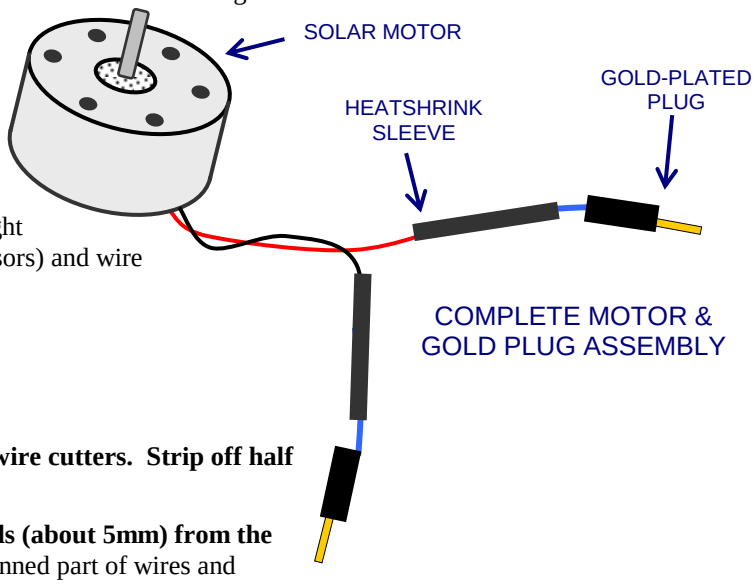
Guidance Sheet for Fitting 'Gold' Plugs to Solar Motor & LED.

INTRODUCTION

This paper takes you through a procedure for fitting extension wires with gold plated plugs to the solar motor and LED. The modification allows easier and more robust electrical connection between motor and PV terminals and allows for wires to be connected to PV cell along with the motor.

BACKGROUND INFORMATION

Our solar motor is manufactured by Mabuchi and is designed to be more efficient and requiring a lower current than an ordinary small dc motor. The red & black wires are thin due to the low working current and because the motor is intended for permanent fixing in a device (such as a CD-ROM drive), so flex durability of wires is not a design issue. We use this motor because its specification is ideal for model solar cars and other small PV powered machines.



YOU WILL NEED: solar motor, LED, heat-shrink sleeve (1.5mm bore size before shrinking) 30mm length, 4 gold plated 1mm plugs each with 30mm of wire, tea light candle or other suitable heat source, wire cutters (or scissors) and wire strippers.

PROCEDURE

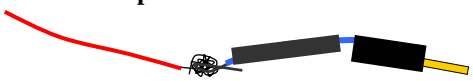
1. Cutting wires & stripping insulation

Cut wire on the gold plugs to a length of 30mm with wire cutters. Strip off half (15mm) of the insulation with wire strippers.

IMPORTANT: Cut the ends (about 5mm) from the motor wires (this removes tinned part of wires and makes it easier to strip insulation**). DO NOT PULL WIRES AWAY FROM MOTOR Strip half (about 25mm) of the insulation from motor wires - PULLING IT AWAY FROM REMAINING INSULATION NOT MOTOR.** Care must be taken not to cut any of the conducting strands of wire inside the insulation. Some automatic wire strippers cannot deal with such delicate wires without cutting all the way through.

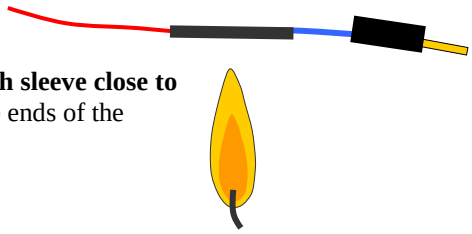
2. Threading heat-shrink sleeve & winding wire connections

Cut 2 pieces of sleeve to about 15mm. Slide on heat-shrink sleeve - 1 over each gold plug wire. **Wind the thinner motor wires around the thicker gold plug wires** many times then fold the thicker wire back on itself. If the wound joint pulls apart then it will be because of the thinner wire unwinding so this should be twisted many times around the thicker wire. Test the strength of the winding by gently pulling on the wires. At this point you could apply a little solder to the joint, but this is not necessary if you make a strong wound connection. **For LED it is best solder gold plug wires to LED positive and negative 'terminals' before heat-shrink is heated.**



3. Heat-shrinking sleeve

Slide the two sleeves over the wound joints. Pass the middle of each sleeve close to the heat source until it shrinks tight. It is not necessary to shrink the ends of the sleeve - to try and do so may cause insulation on the wires to melt.



The red and black wires are still relatively weak so the motor should always be handled with care.

 www.pluggingintothesun.org.uk