

# Electrical wiring confusion -- dim lights

Last Updated: Tuesday, June 4th, 2013, Created: Thursday, February 12th, 2004

Mat from Wellen, Ontario followed his buddy's instructions for wiring three lights together with a single switch on the other end of the room. They all came out dim. This is exactly why most provinces require you to get permits for electrical work, or even require licensed electricians for all electrical work. Click here for information on the LEGALITY OF DIY ELECTRICAL WORK. But what did go wrong? Mat probably wired the bulbs together as in the top of the photo above. Actually what happens here is that each bulb only gets a portion of the voltage in the line. With three bulbs, each would get  $120/3$  or only 40 volts. That is why they are so dim. And if one burned out, they would all go out just like the old Christmas tree lights because the electricity has to go through each bulb to get to the next one so if one is burned out, the electricity in the circuit stops. This is called a series circuit because the bulbs are lined up in a series along the same wire. The proper way to wire these bulbs would be to put the switch in one side of the line, technically in the side that is attached to the circuit breaker at the mains box, and then run that wire to one side of each of the bulbs. The other wire would run to the other side of each bulb. This way each bulb receives 120 volts and each one will work whether one is burned out or not. We call this a parallel circuit; each light is connected parallel to the others. To take the details one step further, the socket on a light bulb should be attached to the white wire that goes to the common connector in the mains box, and the centre tab of the light socket should be connected to the black wire that goes to the circuit breaker or fuse by way of the switch. The wires are colour coded precisely to help keep those things straight. That way, when you turn the switch off, there is no line source of electricity to the fixture and if the socket touches the outer part of a metal light fixture, you will not get a shock. We also talked about light dimmers on this show. For details, check out Lighting Dimmer details.

**Keywords:**

Lighting, Wire, Wiring, Switches, Light Bulbs, Techniques, Electrical