

Easy DIY Surge Protected Light Bulb Type Current Limiter

A useful device for any electronics workbench



Starting with a Belkin part # 5FH300-EXT Surge Protector. This model was chosen because of its use of standard electrical receptacles, which will allow easy replacement in case of wear or failure. The Belkin can be bought lots of places. Here it is on the Belkin site:

http://catalog.belkin.com/IWCatProductPage.process?Product_Id=123499#



Upon opening the box, you will find five standard receptacles wired in parallel, and the surge protection circuit wired in-line. Note that the black jumper wire on the far left is an addition that is not present upon initial inspection and will be added as part of the next step...



We will be re-wiring the only one receptacle. It is the farthest to the right, and opposite the switch, when top is up. As shown in picture to left here: farthest left when up side down, but still at the opposite end of the box from the switch.

Once done, this receptacle will be wired such that the first socket is in series with the second, ON THAT RECEPTACLE ONLY. All others remain in parallel and can be used as normal receptacles to plug in tools or whatever. But only the one socket as marked in other pictures, is current protected. All others are normal receptacles.

The whole conversion of the last receptacle is as simple as cutting the copper buss bars on BOTH sides of this last receptacle only (see arrows on enlarged picture at left). And adding a jumper wire from one socket to the other on that one receptacle. These bars run from one socket to the other on both sides of the receptacle; cutting them disconnects the second socket completely. I've used a pair of wire cutters to cut through the buss bars. Adding the black jumper wire (on the far left) from one socket to the other, is the means by which the final socket is made to be in series (rather than parallel) with its previous counterpart.



Now, any type of light fixture may be plugged into the first socket in the last receptacle (as marked in the picture to the left), and it will be "in series" with the power "Line" of whatever device is plugged into the second socket of the last (far right) receptacle. Different wattage bulbs may be used to accent the amount of current drawn by higher or lower power devices, and also to change the amount of current the series socket is limited to. I prefer a 60watt standard bulb for most general use.

This simple device has many handy uses on the workbench of anyone working on electrical or electronic equipment. Examples:

(1) The light bulb slows the in rush of current when an older device that hasn't

been turned on in a long time is plugged in and turned on. This give old components an easy initial flow of current, and is much less likely to burn an old part that has been out or use for a long period of time (this especially applies to electrolytic capacitors which need time to re-form after sitting a long time).

(2) The brightness of the lamps glow is an indicator of how much current the device being worked on is drawing. Most normally working devices will only allow the light to glow dim or dull. If the bulb burns at full brightness, it is a warning that the downstream device is drawing a lot of current, and may have a "shorted" wire or device somewhere in it.

(3) By limiting the current in the circuit, the bulb protects the electrical circuit of the receptacle into which the limiter is plugged. It also protects the device being tested, and most importantly, it protects whoever might be working on the live equipment down-line from a higher and more dangerous potential electrical shock!

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