

Although we use jumper wires everyday some of us have felt the ‘tickle of electricity’ and wondered if sometimes the practice of using a jumper is a safe thing to do at all? It turns out that maybe you are using the wrong jumper. When you are placing a jumper across a low voltage circuit (24 Vac), like trying to verify if a thermostat is working, almost anything will do. When you are placing a jumper into a line voltage circuit (120 Vac) a bit more care must be taken.

In **Figure 1**, we show two types of jumpers, on the top is a jumper made of #14 wire with a suitable alligator clip and a protective boot that has a CAT III 1000V rating, we call it our J1. On the bottom is a #18 wire jumper with a covered alligator clip. In **Figure 2** we show their relative size using a standard #2 Phillips for comparison. As we already said with 24Vac and other even lower voltages, used around batteries and such, almost anything that is safely made and will form the connection will do the job. In **Figure 3** we show the smaller set of jumpers, what we call J2, being used on a newer oil burner control.



Figure 1



Figure 2

You really need to be careful of 120Vac because as the old expression goes; it’s not the voltage that will get you, it’s the current. In most high voltage ignition systems used on today’s modern gas and oil powerburners the current is only about 25 milliamps (mA), but in the 120 Vac circuit that powers these ignitors and burners you will find typically 15 amps. Here’s the rundown on amperage. With a circuit running at just more than three mA you can get a painful shock. With more than 10 mA you face muscle contraction and ‘no-let-go’ danger. With more than 30 mA you can get lung paralysis (usually temporary) and with more than 50 mA possible ventricular fibrillation that can cause heart dysfunction which is usually fatal. Now at this point it gets really nasty because with a current of between 100 mA and four amps you get certain ventricular fibrillation and that’s almost always fatal. Finally, anything over four amps of continuous contact and you get instant heart paralysis, severe burns and the ‘no-let-go’ danger and as they say ‘you’re toast’.



Figure 3

So, say you want to just do a simple thing like get a motor running on a 120 Vac line voltage gas powerburner and all you have to do is jumper two terminals on the burner’s sub-base like the RIELLO gasburner shown in **Figure 4**. All that’s needed is the proper good quality jumper, like the J1, and some knowledge. By putting a J1 jumper between terminals 5 and 8 when you turn on the power your motor should start, but be careful, because with a RIELLO oilburner that jumper goes between terminals 5 and 6. Now you can easily finish your troubleshooting and know that the connection is safe and so are you.

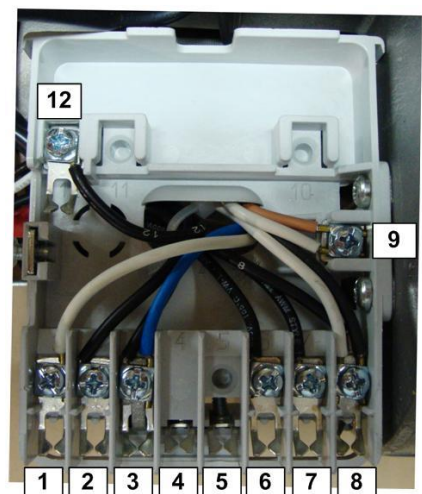


Figure 4

Finally, more from one of our books and this is on the correct use of meter test probes. Make sure you use good lead probes like our U36 and never let your fingers get beyond the stops, **Figure 5**, if you do you just could feel that ‘tickle of electricity’ or worse.



Figure 5