Hot Air Welders "Rules of the Road"

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Hot air welders are highly sophisticated pieces of electronic equipment that are placed into the hands of trained professionals and used every day. Hot air welders are used for heating, curing, melting, shrinking, sterilization, drying, and warming.

Like most equipment, repairs are a fact of life. With tool costs ranging from $450 to $7,000, servicing hot air welders is the only way to assure a return on investment. Having said this, please refer to the line above, "highly sophisticated… electronic equipment." Simply said, repairing these tools is a job for factory trained technicians who have both the proper tools and the proper credentials to provide warranted service.

Please let me explain one of the major points regarding these tools: the manufacturers will not warranty any tool that has been altered, opened, changed or otherwise not in their original condition. Therefore, your workers and supervisors should be instructed not to attempt field repairs other than replacing elements, cleaning or replacing tips, cleaning the air filter, or replacing the brushes. In fact, if your hand tool is at the point of needing brushes, it should be sent in for service.

Now we'll look at some preventable problems; power cords, plugs and extension cords, and generators. Factory equipment comes with cords that meet the requirements for that machine. For example, the Leister Triac S hand gun has a double insulated power cord with a two prong plug end which does not have a third grounding prong. The ground is built into the plug, the wire, and its connections to the internal parts of the machine. Too often we see a jerry-rigged plug in its place with a ground prong. This "field repair" does not conform to factory standards, voids the warranty, and will most likely short out or burn at the point of attachment inside the gun.

Automatic welders use 230-volt, 20-amp circuits. We often see male plugs at the end of the factory power cord that have one prong partially nipped so it can be jammed into a receptacle. There are scores of different plug designs for 220/230-volt machines. It is imperative to insure that both male and female plugs are exactly the same. The result of this "mis-fit" can be a major overheating of the circuit board; material cost around $450 (plus labor). NOTE: when Roofmaster installs a plug onto a Varimat V it is 3-wire 30-amp twist loc NEMA L6-30A.

Hot air welders need to generate as much as 1,148°F of heat at the nozzle. To accomplish this feat, the proper combination of power source, plug, extension cord, another plug, then the power cord to the machine, must be working in sync. Handguns should not exceed 100' of extension cord and that is specified as a 12-3 wire cord. Automatic welders, likewise, should not exceed 100' of extension cord and that is specified as a 10-3 wire cord.

The generator comment, above, regarding size is far too common. In it the decision to use a 10,000-watt generator was the result of adding up all the wattage from the tools being plugged into the generator. This conclusion is simply wrong. Generators produce peak power and continuous power. The peak is the number used to sell the unit, ie, a 12-kw generator has 10,500 watts of continuous power; a 9.5-kw has 8,500 continuous watts.

Let's plan our job for one auto welder and two hand welders, 7,800 total watts; let's also use the electrician's rule of thumb to never exceed 80% of a power source draw. So the 12,000-watt generator with 10,500-watt continuous output leaves us with 8,400-watts of power to perform our work. This is within the range of the three tools we will use and this rule keeps our machines running as they were designed.

Another point to remember is the manner in which the power is drawn from the generator. Hot air welders are always in use, always asking for power; this is called a linear load. The digital PID [proportional-integral-derivative] controller incorporated into an automatic welder is designed for a linear load.

When power tools [i.e., saws and drills] are used, with the constant on/off power demand, this creates a non-linear load. Non-linear loads cause a great deal of harmonic distortion [heat, high peak loads, or dirty power] on a generator. Those harmonic distortions will damage "highly sophisticated… electronic equipment." The best rule of thumb is to separate linear and non-linear using separate generators for each.

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