

# ACT

## Electrofusion Control Unit *Generator Compatibility.*

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## Generator Compatibility.

The electrofusion process is technically very demanding on the input power supply (generator). The welding output is controlled using a triac or thyristor, so there is a portion of power that is discarded, or not used, to allow the correct welding output. This process is similar to a phenomenon known as "Power Factor", although as the output voltage and current are in-phase, this process is known as an "Apparent Power Factor".

The ACT welding unit (40 volt) has an apparent power factor of 0.75 which means it is only 75% efficient with the input power. A quarter of the power supplied by the generator is discarded as heat in the alternator windings. This can cause major problems with generators.

A 'load' with a power factor of 1.0 means it is 100% efficient with the power. This is a purely resistive load. As the power factor decreases, the load becomes less efficient. A load with a power factor of 0.5 is only 50% efficient and half of the supplied power will be lost as heat in the generator.

A good quality generator will be capable of supplying voltage with a power factor down to typically 0.8 . This means that a generator rated at 3.0 kW will have an equivalent rating of 3.75 kVA. This type of generator will be capable of running an electrofusion welding unit as it has the capability to generate the 'lost' power (3 kW to 3.75 kVA).

One way for manufacturers to make generators (alternators) cheaper, is to remove metal and wire from them. If the windings don't have quite as much metal in them (cheaper to make) then they won't be able to dissipate the lost power within them. There is less magnetism created in the windings, so less ability to generate the power. This means that the rated power factor will increase, and in some situations rise up to 0.95 or higher (3.0 kW to 3.15 kVA). This higher power factor rating means that the generator will not have the reserves to produce all of the power needed.

### IMPORTANT!

The VA rating of a generator is the most important measure of its power.

A 3.0 kW generator rated at 3.15 kVA will not be suitable for electrofusion.  
A 3.0 kW generator rated at 3.75 kVA will work.

Make sure you have a generator that is rated correctly.

ACT 1/2/3 : 40 volt welding units.

These have a rated output current of 65 amps at 39,5 volts. This means the maximum output power is 2568VA. These units have a power factor of 0.75 so the maximum input power requirement is 3423VA. To weld all specified fittings, you will need a generator rated at a minimum of **3.5 kVA**, normally rated as 3 kW.

ACT 4 : 80 volt welding unit.

This has a rated output current of 65 amps at 79 volts. This means the maximum output power is 5135VA. This unit has a power factor of 0.72 so the maximum input power requirement is 7132VA. To weld all specified fittings, you will need a generator rated at a minimum of **7.5 kVA**, normally rated as 6 kW.