

Power supplies and dry joints

A recent problem was brought to my attention concerning assembly , installation and use of the hydrogen fuel systems

One of my clients contacted me and informed me that the gas production was normal but that the relay / solenoid switching on the system was running very hot - 60 celsius.

This concerned me as any electrical or electronic component that is generating excess heat is potentially about to fail and or damage other components of the circuit.

The relay was used to conduct 30 amp and was itself a extra large 100 amp relay.... Over size for the system being used at 30 amp

We checked the relay and found it to be in good order and not the cause of the excessive heat generation. A relay unit is simply a switch that should generate no heat at all when operating. If a Relay is generating heat then it is using input voltage that is needed for the system to operate.

We checked the wiring connecting the battery supply to the solenoid relay and the wiring taking the current from the solenoid relay to the 1500 watt power supply system. It was seen that the wires from the battery connecting to the solenoid relay were cold , however the power cable from the solenoid relay to the power supply were hot . These wires are 8 mm copper wires and easily able to carry 60 amp without heating. The current flowing was only 32 amp and should have been cold. What is even more noticeable was that the wire closest and connected to the relay was hotter than the power supply.

This showed that the o ring crimped connector was faulty and probably a “dry Joint” that was wasting input voltage and generating heat.

This is a serious matter as the alternator input voltage is only 13.8 volt , and there was a 2 volt drop over the relay , voltage that is necessary for the system to work correctly.

Our solution to the problem was to replace the crimped connector and resolder it to ensure a good joint.

The trickiest part of this situation was that the joint had been soldered as well as crimped and yet was still a dry joint. This will always happen if the soldered joint is moved while the solder is cooling and setting as a solid

Please make sure that all joints in these systems are good joints and are not generating heat. If they are getting hot , replace them and check their operation,

Remember a relay solenoid is designed to act as a switch and have zero resistance.... They should not and will not get hot when operating when conducting current for which they are designed. A overheating relay / solenoid is faulty and should be replaced , but first check the crimped o ring connectors to see that they are not faulty.