Renault Zoe **refusing to charge**

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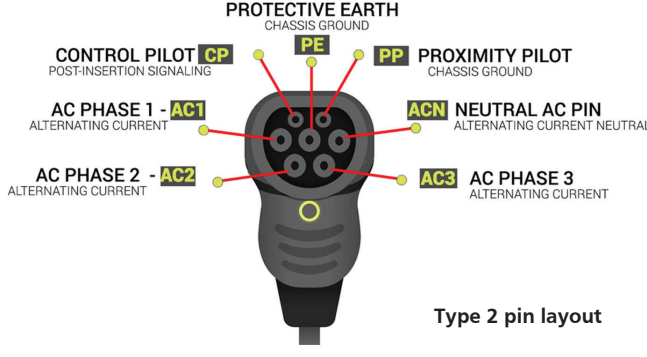
After completing their IMI Level 3 EV training, an Autobiz Technical Helpline member workshop, did not see any EV work coming through the workshop for quite some time. Then, a Renault Zoe with a charging issue, and only 2% remaining on the battery, landed in their workshop. Reviewing everything they had learned on the training course was a struggle. So a call to the technical helpline was made, to form an action plan.

They first noticed that the charging cable had been replaced, commonly known as a granny charger. This is a very slow charging cable for a domestic 13-amp sockets.

As the workshop was not equipped with dedicated electric vehicle supply equipment (EVSE), the granny charger was used. The first issue encountered was that after a few minutes, the vehicle did not start charging and the workshop's residual-current device (RCD) tripped, switching off the workshop's power.

The charging cable was tested, and found to be good. The Proximity Pilot circuit was showing 1.5kohms to the PE line. The Line and Neutral also tested good. The Control Pilot line, between the EVSE and the onboard charger, would require a scope to monitor the signals between both.

These are 12 volts sent from the onboard charger, and the voltage drops to 9 volts when first connected. When charging is authorized and begins, it drops to a 6 volt, 1 kHz square wave, and the EVSE sets the duty cycle depending on the current that the charging cable is capable of. In this case, it would be 20% @12amp supply, the maximum the granny charger is capable of supplying



Type 2 pin layout

The next test was to check the insulation of high voltage circuits to the onboard charger, this required an insulation tester. The workshop did not have an insulation tester, so this had to be ordered before they could continue. When the tester arrived, the diagnosis continued.

The Zoe only had a high voltage (HV) AC compressor, and was not fitted with a PTC heater. The AC compressor was disconnected, and the insulation of the HV lines was tested. They passed 269 volts @5.5gigaohms, which is good. The HV battery leads tested well, with the same insulation figures.

With the AC compressor unplugged and the interlock circuit bridged, the workshop RCD still tripped after a few minutes. The onboard charger was replaced, and with the AC compressor still offline, the vehicle started to charge for the first time.

The next day, the battery showed a healthy charge state, so the AC compressor was reconnected. With the AC connected, the vehicle refused to enter a charging state, so an insulation test was done on the AC compressor, and it failed.

A new AC compressor was installed. With every component installed and connected, the vehicle entered a charging state, and there were no issues with the supply equipment tripping.

Although this was a challenging repair, the workshop gained confidence as they worked through the testing of all the components. The need for correct test equipment, and all of the proper PPE before taking on HV testing and repairs, cannot be overstated. It is critical to success and safety. They now feel more able to work on any EV issues that may come into their workshop.