

# Renault Zoe refusing to charge

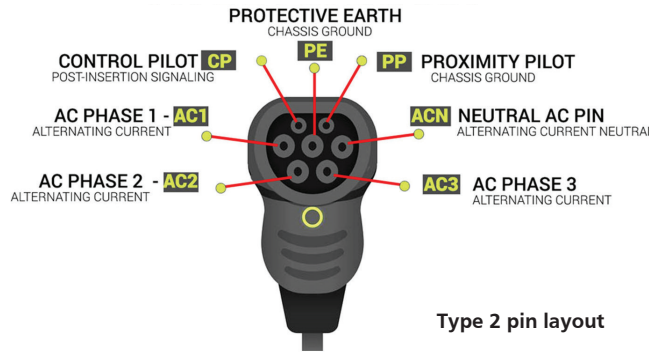
After completing their IMI Level 3 EV training, an Autobiz Technical Helpline member workshop, did not see any EV work coming through the workshop for quite some time. Then, a Renault Zoe with a charging issue, and only 2% remaining on the battery, landed in their workshop. Reviewing everything they 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



Type 2 pin layout

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

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



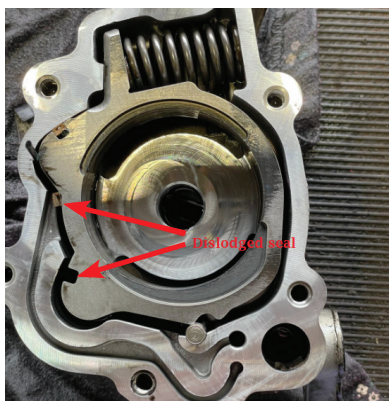
Tim Stock, Autobiz Helpline

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.



A dislodged apex seal had jammed the pump

A recent call to the Autobiz Technical Helpline confirms that variable oil pump failures are causing problems. Although this call was about an Opel Mokka 1.6 litre engine, this warning applies to many Makes and Models.

To increase engine efficiency, the oil pump has gone through some design changes over the years. This development has come with some issues regarding reliability.

The initial aim was to reduce mechanical

# Variable oil pump failures

load on the engine, to improve fuel efficiency. At idle and lower engine speed, the pressure could be significantly reduced. When high engine load and speed were required, the pump control would increase flow and pressure.

The design would use a pulse width control valve, operated via the engine control module.

Two different locations are adopted, depending on the manufacturer. Variable oil pumps are either internally mounted on the oil pump, or externally on the outside of the block. External valves have the benefit of easy testing.

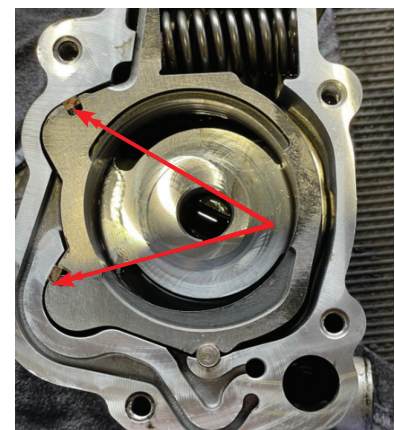
All valves have oil screens, to prevent contamination from affecting the valve operation, but they still suffer from sticking open or closed. This can affect the oil pressure. holding it permanently low or high. When this happens, it will generate a fault code for oil pressure out of range.

At the Autobiz Technical Helpline, we have found that engines that run a wet timing belt system, can produce fine powder contamination that blocks the filter screen.

A secondary issue can be a loss of electrical

supply, or an open circuit within the valve and the control circuit back to the ECM.

We have also seen mechanical failures within the pump itself, due to the design of the internal components. No matter the cause, the failure has to be corrected properly.



Apex seals in the correct positions