Classic Retrofit ‘Electrocooler’

Prototype Test Report

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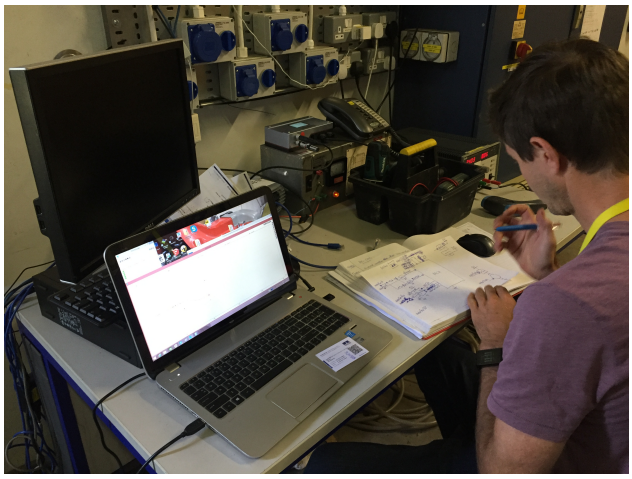
Tests carried out at Ricardo facility in Shoreham, UK on 31st August in climate chamber.

Tests conducted by Classic Retrofit under direction of a Ricardo test engineer.

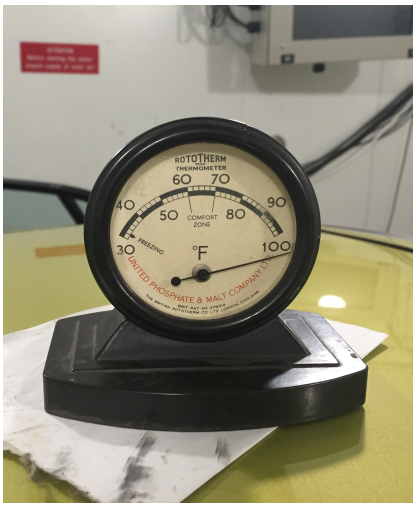
Trevor Dale and Jonny Hart pictured below with a rather warm 964.

Monitoring test runs from the control room.



Thermocouples on test stand in driver's position at head and shoulder level on all three cars. Additional thermocouple in footwell, centre vent and outside to record chamber ambient temperature.

'Electrocooler' system under test on the 911 SC in the climate chamber.



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The Tests

Objective

Classic Retrofit has developed a lightweight electric A/C system for the Porsche 911. The test session will compare the performance of the system against a Porsche 964 and a modern car, both with factory installed standard A/C systems.

The Cars

The 964 and the modern car have both been described by their owners as having A/C in good working order. The 964 recently did a trip to France and back in fine weather for Classic Leman.

The cars: 1991 Porsche 964, 1982 Porsche 911, 2011 Seat Ibiza


Ramp Test

The chamber was set to 20 degrees C and the cars brought in from outside. It was a cool day so all cars interiors were around 24C (measured on a pyrometer) at start of test.

The air conditioning was then switched on and the chamber temperature setpoint set to 45 degrees C (around 114 deg F). The chamber starts to heat to meet the setpoint.

Five thermocouples were used to record temperatures at driver head, shoulder and feet positions as well as the vent and outside (ambient) temperature.

The relative humidity was 60% at start of test, but falls to 30% as the chamber temperature rises. There is no humidity control in this chamber.

Soak test

To make best use of time, at the end of the ramp test, the chamber was left at 45 deg C and the car doors opened until the cabin temperature approached ambient.

The A/C was switched on and the thermocouple temperatures recorded until the cabin temperature stabilised or the test was aborted (in the case of the 964)

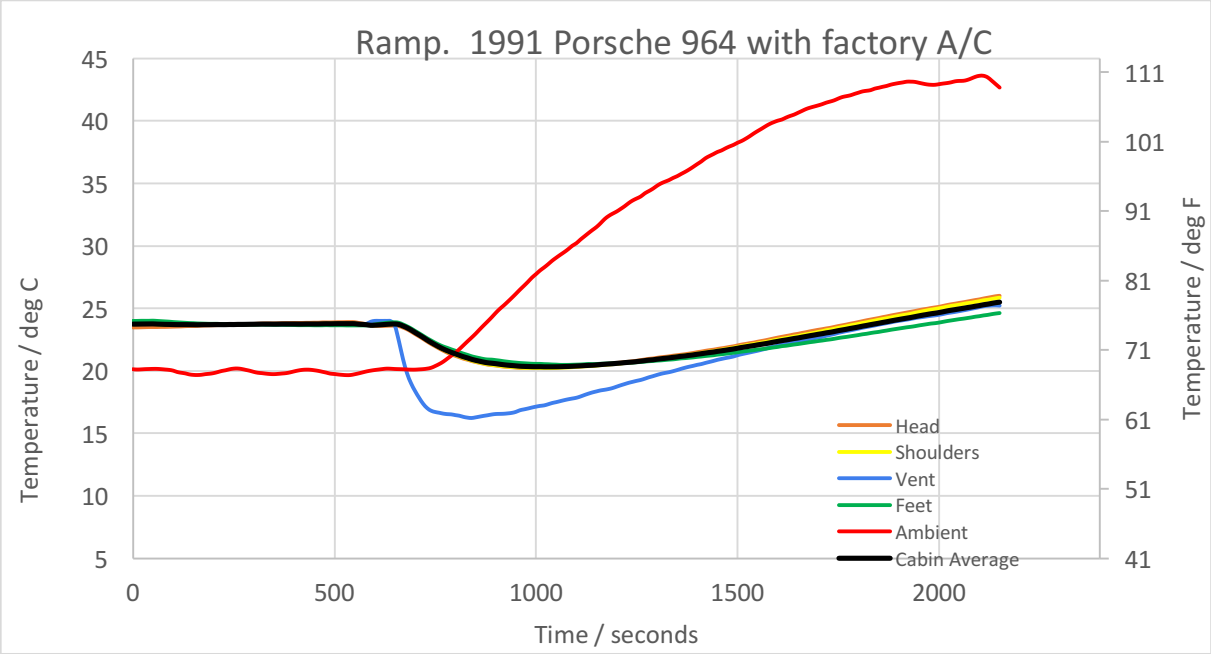
Solar Loading

We chose not to introduce solar loading for these tests. The main reason for this is it makes the comparison between vehicles more difficult. It is hard to measure the amount of solar gain which makes separating the solar and ambient components difficult. Also, we simply did not have enough time available!

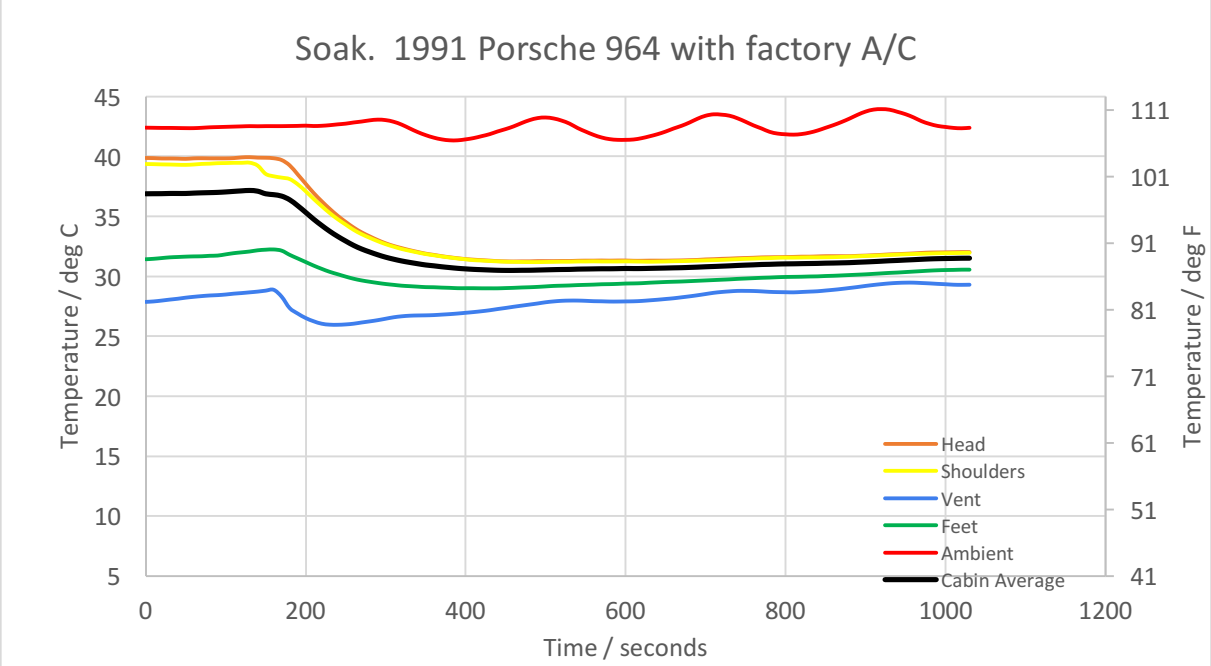
Factory A/C 1991 Porsche 964.

1991 Porsche 964 Factory Air Con. A/C Set to low temperature (16 deg C), fan speed hi (4)

Very poor result. Vent temperature not maintained. Although the system has been serviced, it is hard to say whether this is comparable to when the car left the factory. It is probably fair to say the performance is 'typical' of a 25 year old car

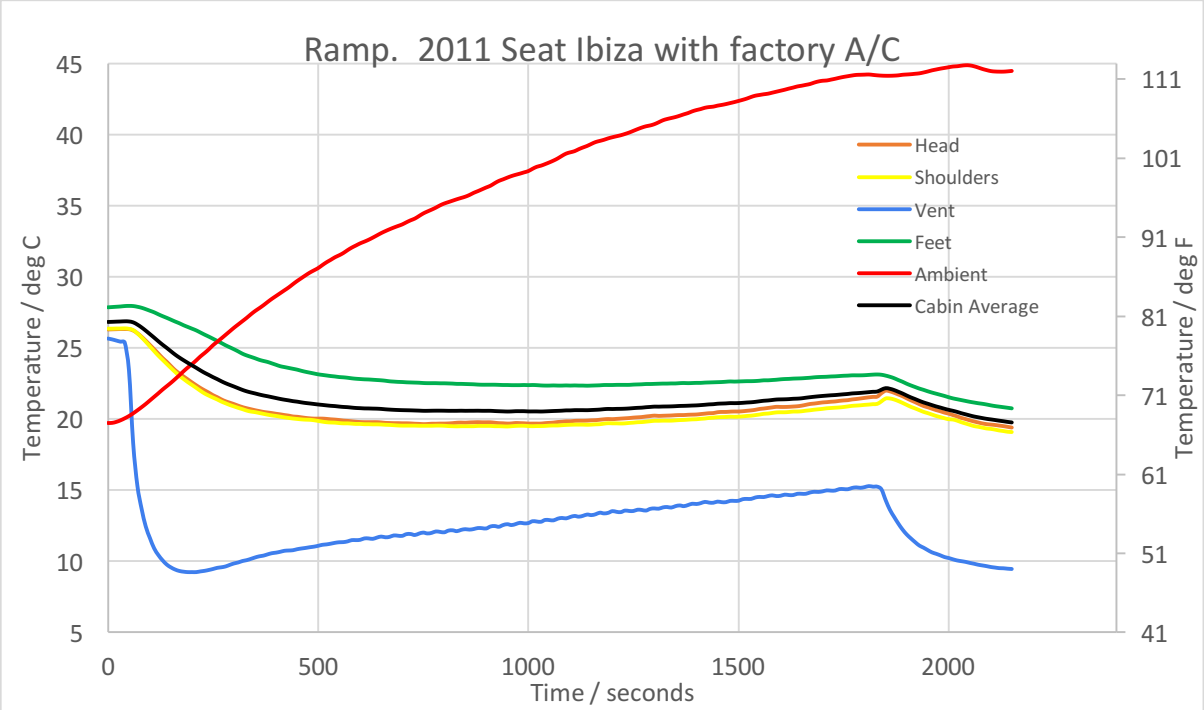


Heat soak test suffers because of poor vent temperature, although fan is better than 911.

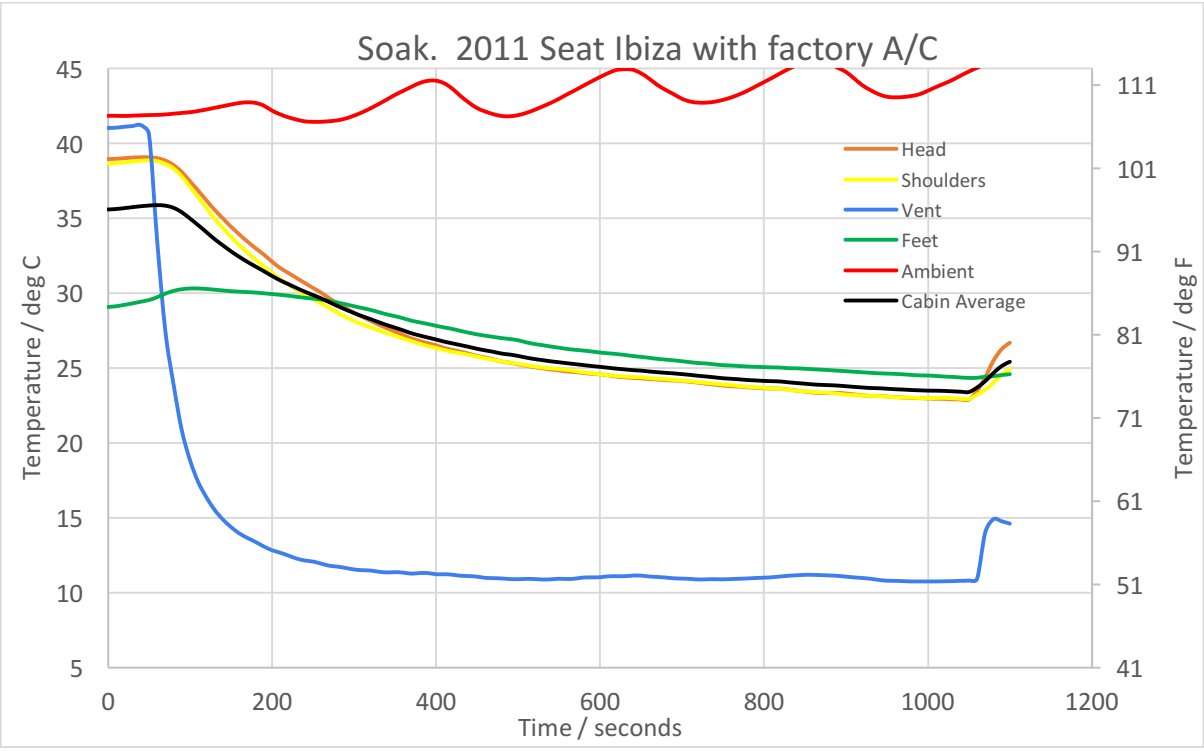


Factory A/C Modern car. 2011 Seat Ibiza

The ramp test was started without recirculation. At 1840 seconds, the recirculation was switched on. This really highlights how important recirculation is for a hot climate vehicle.



The soak test was started after leaving the doors open to bring the cabin temperature up towards ambient. Excellent as expected. Strong blower fan, good recirc and insulation.

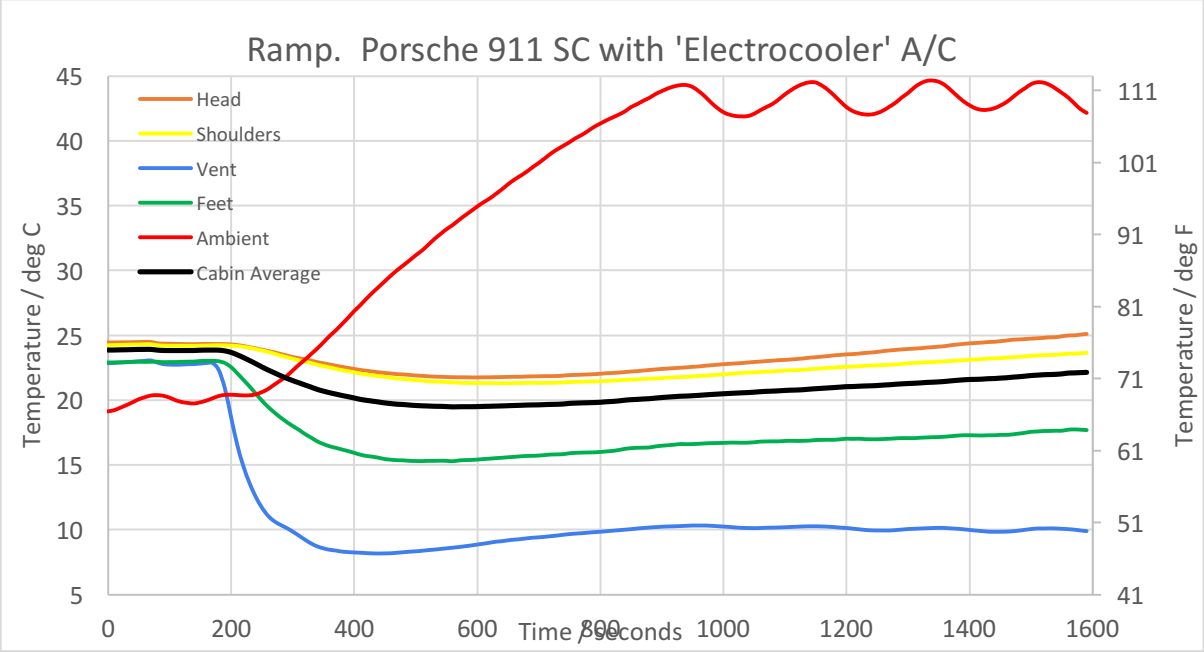


‘ElectroCooler’ in Porsche 911 SC

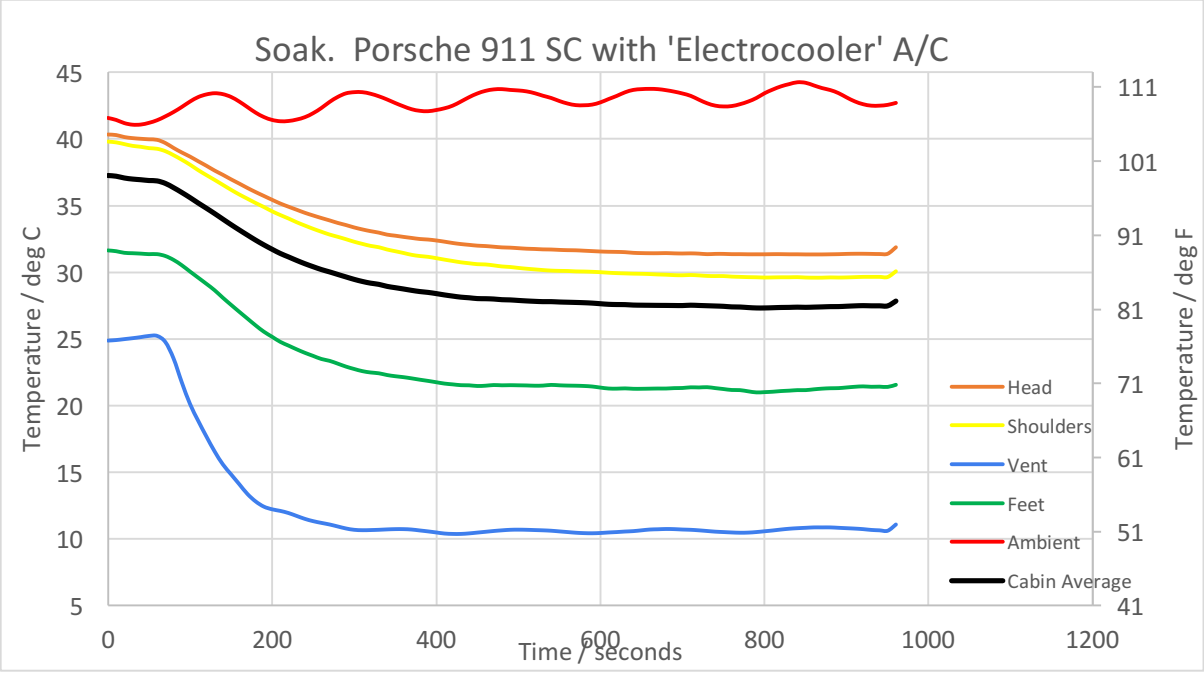
Electric Compressor set to 20%. Using 40A at 20 deg C. Linear rise to 50A at 44 deg C.

Blower fan set to high. Vent valves set to blend between central vents and footwells. A bit too much in favour of footwell judging by results.

The car has a very crude modification to give some recirculation. Air from one 60mm duct being pulled from the cabin.



Good vent temperatures. Needs more airflow to reduce cabin temperature.



Conclusions

The Classic Retrofit 'Electrocooler' A/C System shows a level of performance closer to that of a modern car and far better than a 'typical' 964 with factory A/C.

Although the 964 system had been serviced, the A/C parts are likely to be the original item and so blockages in radiators and other wear is likely to be affecting performance.

The vent temperatures recorded for the electric system were almost identical to the modern car, in some cases a degree or so colder.

The cabin temperatures achieved by the electric system in extreme temperatures were not quite as good as the modern car. As the vent temperatures are similar, it suggests that the weak link is the amount of air moved into the cabin. In very hot climates, this should be addressed by use of a more powerful blower and bigger vents (the SC has tiny side vents which are next to useless)

Despite high ambient temperatures, the condenser seems to have performed very well, even though it is a fairly old serpentine design. Consider also, we had very little airflow under the car.