



'Electrocooler'
Air Conditioning
for your Classic 911
(and other great cars)

Introduction

Thanks for your interest in our electric A/C system for your 911. We all know the 911 is a great driver's car but on a hot day it can be unbearable for both the driver and passenger.

We have created the new system with the following design goals:

- Maximise efficiency by use of modern components.
- Compact and easy to install.
- Lightweight (also better weight distribution).
- Not require any major modifications to the bodyshell.
- Value for money.

All of our products are designed as both engineers *and* 911 addicts. We sincerely hope our system maximises the enjoyment of your 911.

As with all engineering projects, there have been challenges. We have solved many of them with ingenuity but some simply involve compromise or some minor changes to your car.

This pamphlet outlines what to expect from our system and any compromises that may have to be made.

The air cooled 911 had a very long production run, with largely the same bodyshell. This has an advantage in that our kit *should* theoretically fit all models. Within those years, there are however, hundreds of variations and additions made to the car. If you then add aftermarket modifications, 'backdated' cars and 'hot rods' to the equation, you have a multitude of different configurations. For this reason, we cannot guarantee 'plug and play' for all cars. Fitment may require some engineering skills depending on your car.

Our main 'test mule' is a RHD 1982 911 SC. We do know that the kit fits this model without any major modification to the bodyshell. It is likely that this is the case for most models, but we cannot guarantee that.

Other vehicles. We are actively seeking other vehicle types to install the kit. We currently have installs in several other vehicles where an engine driven compressor could not be mounted off the engine. These include:

- E-type Jaguar with a V12 conversion
- Ford GT40 replica
- Marcos Mantis with an LS3 conversion.

Please contact us if you have another requirement. info@classicretrofit.com

System Overview

The system has the following components:

- An electric compressor with bespoke ECU module.
- A replacement blower incorporating modern evaporator and fan.
- A condenser and fan assembly with drier.
- Thin wall a/c pipework and bespoke fittings.
- Wiring harness with cabin pushbutton.



At this stage, the kit we are offering has been designed specifically for impact bumper models (1974 – 1989). It may be adapted to suit other model years (and other vehicles) but there are so many variations we cannot possibly guarantee fitment to all models.

The kit doesn't use any of the original factory Porsche A/C system. It is a pre-requisite that the original A/C is removed before fitting our system

Let's go through some of these parts in more detail.

Compressor and ECU

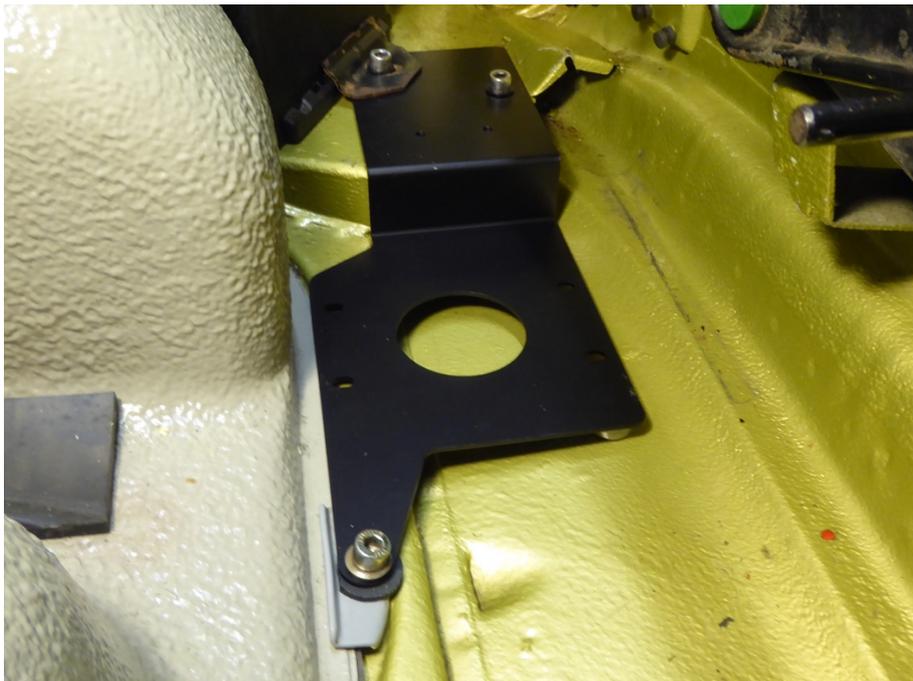
The electric A/C compressor is one commonly found in truck cabin and other off highway vehicle applications. It takes a fair amount of power to get reasonable cooling output on a hot day and usually these type of vehicles are 24V and have high output alternators.

The challenge for a 12V vehicle with a small alternator is to provide adequate cooling without running the battery down. The ECU which we have designed is used to regulate the compressor according to the output of the vehicle charging system. A software algorithm in the ECU monitors the available power to prevent the battery from discharging. There are parameters that can be adjusted to maximise cooling or minimise battery use.

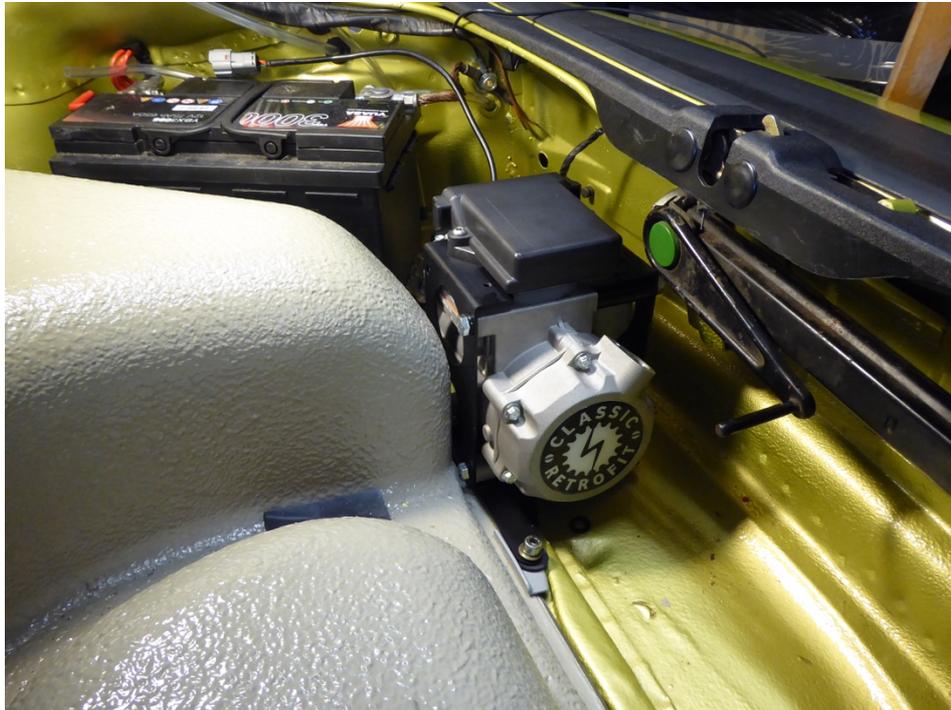
Our testing shows that the system can provide ample cooling but there are some constraints:

- You must install a 90A alternator from a Carrera 3.2 and uprate the wiring to suit.
- Make sure the battery is of adequate capacity (75Ah) and in good order.
- The ECU may reduce compressor speed or switch it off completely during long periods of low alternator output. E.g. when the car is left at idle for an extended period. A built-in recovery time allows the battery to recharge. The time is configurable but usually around 1 minute.
- The ECU may switch off the compressor if many high power items are switched on at the same time. E.g rear defogger, wipers and headlights at the same time for an extended period.
- Avoid too many short journeys at low speed. Engine cranking really depletes the battery and needs a reasonable amount of road time to replenish.

RHD Install. Compressor mount plate picks up on original mounts for battery and fuel tank:



Compressor / ECU secured on mounting plate:



RHD car. Still room for spare wheel and jack. Note the replacement washer bottle on left – in this case from a T2 VW bus.



On a LHD vehicle, the compressor can be mounted in the smugglers box. Pictures to follow.

Replacement Blower

During prototype testing we found the original blower to be lacking in air volume so we chose to re-engineer it. The new blower features a modern 'double cage' fan and a/c evaporator. It has been quite a challenge to package this into the small space under the scuttle panel. The blower also adds recirculation to the system which is vital to the operation of the a/c.

Although the new unit is a direct replacement for the old, we could not make this work with the original card trim piece. The carpet can still be put back over the blower and since the blower is a nice shape, the carpet looks presentable. With some thought, it may be possible to get the card trim to work with some spacers.

Since the card trim doesn't exactly represent Porsche's finest hour, we decided this was hardly a sacrifice!

On the lower side of the blower a modification will also be required for the steering column cover. This will need a notch cutting out or you can leave the cover off completely.

This is the prototype blower mounted. Production units have a black finish.





Condenser and Fan Assembly

We wanted to place the condenser away from sources of heat and as close to the rest of the system as possible to keep the hoses short. We found a solution in removing the washer bottle fitted to the impact bumper models. The bottle is enormous and many people chose to delete it anyway. Our condenser assembly mounts through the original hole in the bottom of the headlamp bowl.



The condenser assembly has been test fitted on an 1982 SC so we know it fits this model. It will also fit single battery 911s prior to 1969 as the space here is empty.

Currently we don't have a 'plug and play' condenser solution for the twin battery cars (1969 – 1973) as the left side battery box is in the way. We are working on an alternative solution. It would be possible to mount our existing condenser in the rear fender but we have not tested the system in this configuration.

On later Carrera 3.2 models with inset fog lights, the fog light bracket on the left side will need modification to clear the condenser.

Vents and Cabin Controls

By putting the evaporator inside what was the fresh air blower, we have negated the need to add additional vents to the cabin. This means that all the vents in the vehicle can now provide A/C cooled air, something that was not possible with the Porsche factory or dealer fitted A/C systems. This gives a much cleaner look at saves some weight too.

SC and Carrera 3.2. models, benefit from having centre and side vents in addition to those in the screen and footwell.

Interestingly, even on cars without the centre vents, cool A/C to the screen and feet does reduce the heat in the car. You don't get the immediate impact of cool to your face but over time the car becomes more comfortable.

On earlier cars, you may wish to provide direct face ventilation by fitment of a centre vent. Options here include a round face vent in the clock position or an aftermarket vent in the ashtray position. We don't currently provide these but there are extra ports on our air blower for you to experiment with.

Similarly, we wanted a low impact approach on the cabin controls. The flow of a/c is now controlled from the standard vent sliders. The only addition being a single push button switch with led indication.

Press once for 'normal' and again for 'boost', the mode being indicated by the brightness of the LED. The actual temperature levels are (at the moment) setup using a laptop (a USB cable is supplied). Down the line, temperature can be set by smartphone.

Less is more. The only clue that this vehicle has air conditioning is the discrete push button:



Setup

When a laptop is connected, the onboard ECU provides realtime feedback of system parameters (voltage, current, temperature, inputs, outputs). Parameters can be changed to configure the system. E.g. normal and boost temperatures, battery voltage thresholds etc. The system comes pre-configured with typical parameters.

Currently, configuration is via a terminal program, e.g. 'putty'

```

COM3 - PuTTY
>
>list
(c) Classic Retrofit Ltd 2017
Electrocooler A/C ECU Settings:
=====
Description                Setting  Value
-----
Firmware Version           1.00
Battery Low Voltage        BLO     11.0 V
Battery Moderate Voltage   BMD     13.2 V
Compressor Target Current  CTG     35.0 A
Max Compressor Current     CMX     48.0 A
Current fan on high threshold CFN     10.0 A
Current fan off low threshold CFO     8.0 A
Cabin Temperature Setpoint CTS     23.0 C
Vent Temperature Setpoint  VTS     10.0 C
Max Time Below Good Voltage TBG     300 s
Max Time Below Moderate Voltage TBM     200 s
Compressor low speed [0-100] CLO     5 %
Compressor high speed [0-100] CHI     30 %
=====
LIST:OK
>

```

The A/C ECU has onboard Bluetooth. The ultimate goal is to have setup and live temperature readback via smart phone. We are working on this and early systems will be upgradeable to add this functionality.

Performance

The subject of air conditioning certainly is a lively one amongst old car enthusiasts. There are many offerings on the market which promise to 'blow ice cubes'. It's all very subjective and everyone has an opinion.

We chose to prove our system through controlled testing, the results of which we publish on our website. Testing shows that our system outperforms a typical 964/993 system but cannot quite compete with that of a new car. This is down to the design of the car, not so much the performance of the A/C. You can read about the testing and download the full test report from [this blog post](#) (link to the full report is at the bottom of the post)

The 911 is an old car, it has a large glass area and poor insulation. You sit close to the windscreen and the vents are small (or non-existent). Anything you can do to prevent heat entering the car will assist. Make sure your heat 'flappers' are definitely closing. In very hot climates, apply some window tint (3M Crystalline is very effective and not too dark in colour).

Summary

- The kit we are offering is designed for 'impact bumper' 911 models. It may fit others but please check with us before purchase.
- You must fit a 90A alternator from a Carrera 3.2. On earlier 911 models, the fan housing can be machined to fit the longer alternator. Wiring between the alternator and starter plus the ground wire should be upgraded to 110A wire.
- Battery must be in good order. Fit a new one of at least 75Ah.
- The blower fits in place of the original but the cardboard cover cannot be fitted.
- The condenser assembly fits under the left hand wing/fender on single battery models. We do not have a front mounted solution for twin battery 911s at this time.
- The ECU is designed to prevent battery drain within normal driving conditions. Avoiding many short stop-start journeys will safeguard against battery drain. Although tempting, avoid multiple short demonstrations to curious folk at car shows. Take them out on the road instead!

A full and detailed install manual will be available in due course.

Jonny Hart

Classic Retrofit Ltd.

info@classicretrofit.com

www.classicretrofit.com

+44(0)1825 830 323