

## Freon Charge

Now that everything is installed, it is high time Freon is charged on the system. So off we go to the A/C shop for vacuum testing and Freon charge. The system will be vacuum tested for about 30 minutes and should there be no obvious leak indicated by a fall of pressure on the gauges then we are ready to charge the system with refrigerant.



R134a service valves adaptors have been installed on top of R12 valves



Vacuum/charging machine next to the car ready to do its job.



Charging hoses are attached to the compressor ...





... and vacuum test is initiated; if within the 30 minutes test the gauges remain at 29 mm Hg then the system is considered vacuum tight and we are ready to proceed charging the system with Freon. This vacuum machine is quite "intelligent " to measure ambient temperature and calculate the amount of Freon required in order to charge the system. In my case the system showed no leaks and 650 of refrigerant were added at an ambient temperature of 18 C.



After charging the system with Freon, it was set to operation. An indication of smooth operation is the sight glass of the drier filter. In case you see a continuous flow of liquid then the system is filled with the correct amount of refrigerant. The green color seen on the glass is attributed to the leak detector dye added during Freon charge.

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It should be noted that tags should be placed at visible places indicating type of refrigerant and the presence of leak detector dye added to the system.

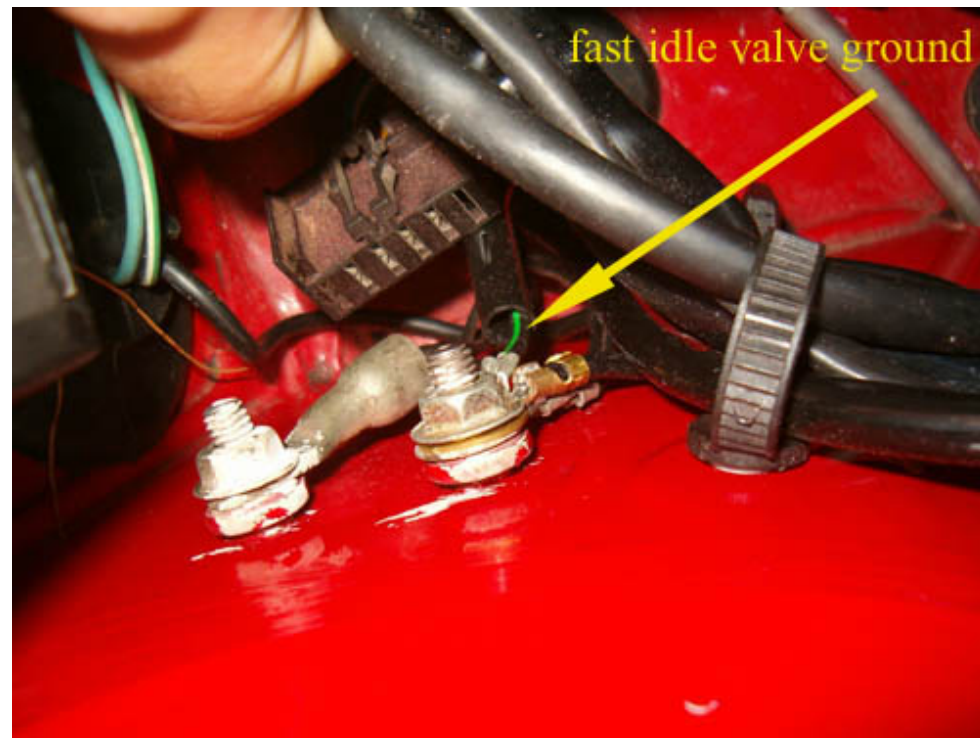
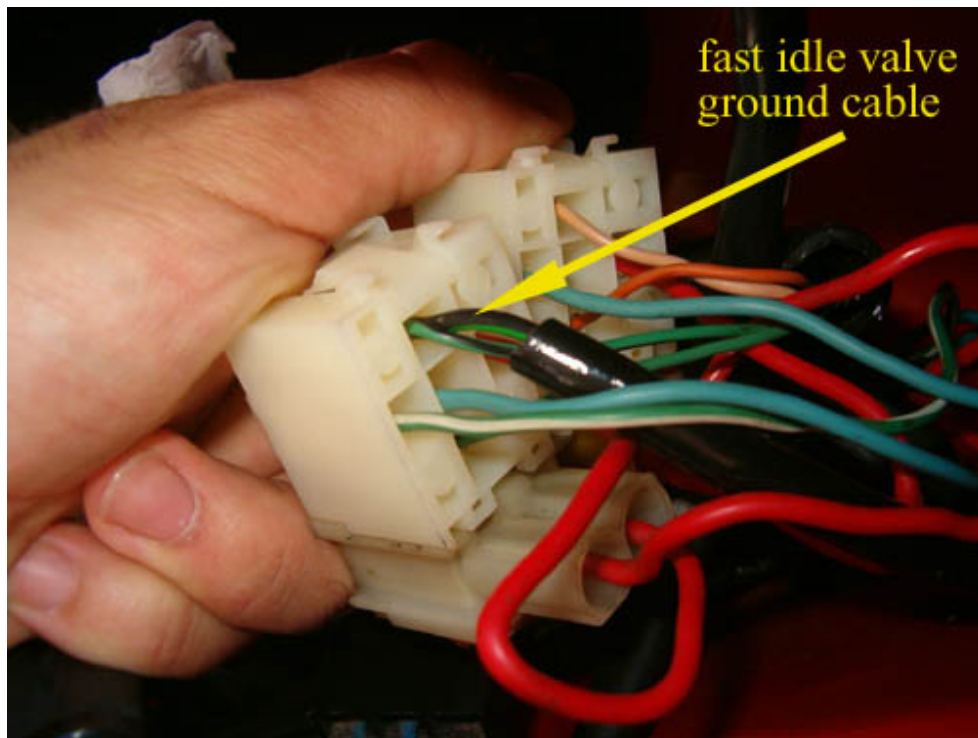


And for the purists... "Aria Condizionata" decal on the rear screen!

## Troubleshooting

Following Murphy's law that "whatever can go wrong, will go wrong", there were some issues that I couldn't trace prior my visit to the A/C shop for Freon charge. These issues were actually everyday cases for the experts but quite puzzling for the DIY or home mechanic like me.



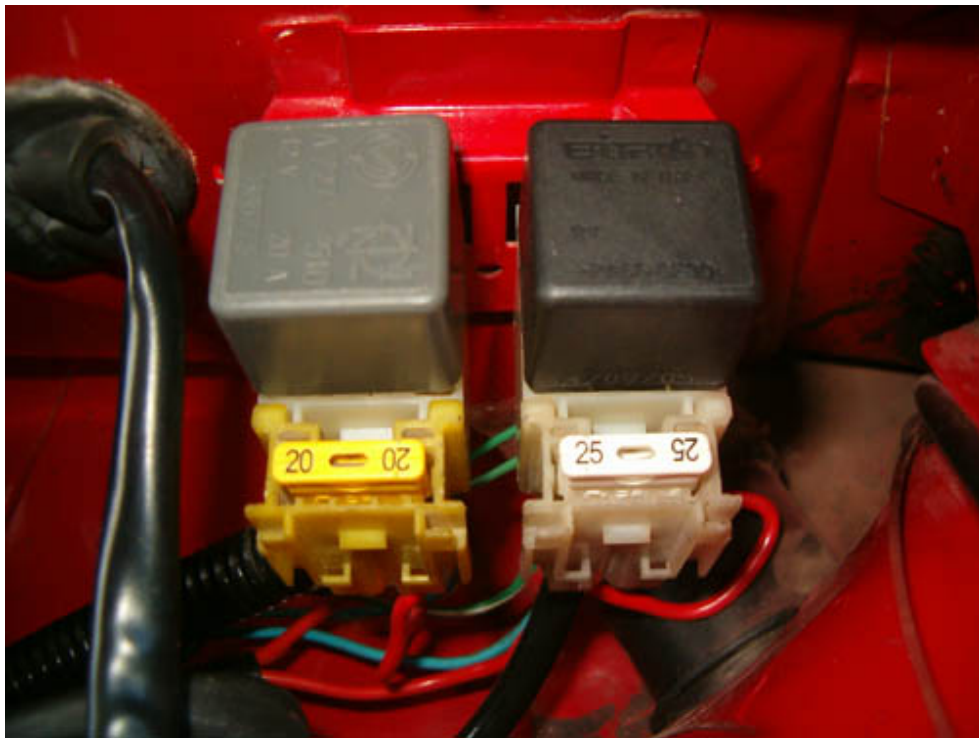


The most frustrating issue was the fact that the A/C wouldn't power on by acting on the switch from the control panel. Since I am not capable of tracking down the source of electrical problems it was solved by the A/C shop. It was quite a straight forward omission by me since there was no electrical connection to ground of the fast idle valve... I should have noticed it during installation; I only attached the positive terminal connector on the junction box. No ground was present on the main harness so there was no way to make ends meet. A ground cable was installed from the fast idle valve connector to the car chassis along with a pair of new relay holders since the old ones had surely seen better days in the past.

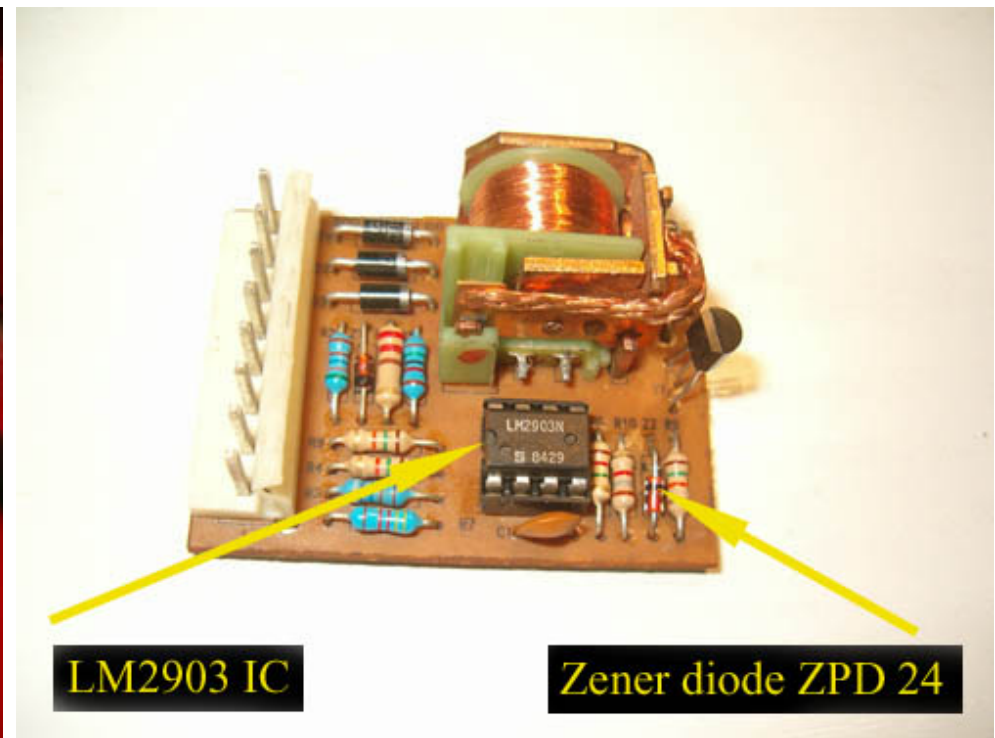
However, the lack of this very ground cable is probably attributed to the fact that the donor car featured the Marelli-Weber IAW management system and there might be differences between the last one and L-Jetronic that my car features. Who knows .... the fact is that with this ground cable addition, the A/C works as it is supposed to do, so there is no need to further talk about it.



Second problem was the use of an inappropriate relay. The relay intended for compressor/left condenser fan needed to be replaced. Upon switching off the A/C, the fan stopped receiving current but in the mean time still revolving, it was transformed to a power source producing current, until it stopped revolving. This power generated, was finding its way back to the compressor clutch which it turn was delaying to disengage for a few seconds. It was a typical issue of reverse current and it was solved by using a relay of the same type (20A) but its terminals designated as 87a and 87b in contrast to the original one which featured two 87 terminals. Looks like the e-Per catalogue needs some error correction since I had ordered the relays based on it...



So, relays are back for good at their place.

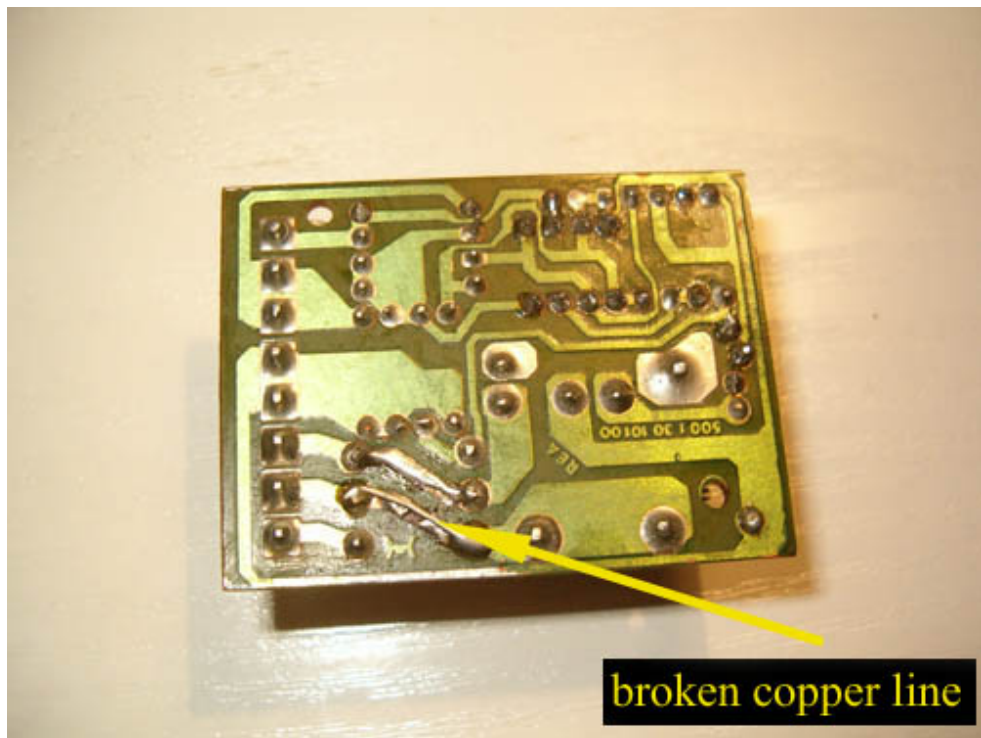


**LM2903 IC**

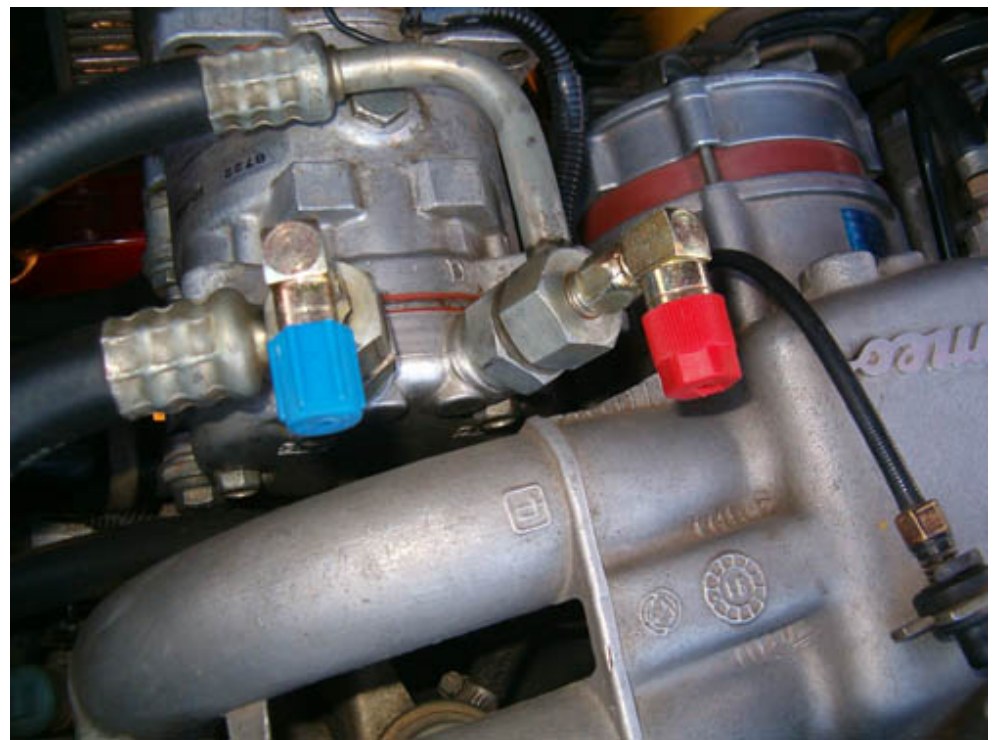
**Zener diode ZPD 24**

The third problem had to do with the electronic thermostat. This device actually regulates the compressor cycling on and off. This is a very important element of the A/C since it actually protects the evaporator from water freezing and the compressor from liquid Freon suction; both cases lead to expensive A/C failure. In my case the compressor wouldn't cycle on/off as the two electronic elements were burned out. Replacing them solved the problem and the compressor now cycles on and off as it is supposed so.





Another smaller problem was a broken copper line on the printed circuit easily solved by connecting the two parts with a small piece of wire.



Fourth major problem was Freon leakage from the Discharge port of the compressor and it was noticeable about 20 days after the initial system charge. Performance was getting lower and I had to track down the cause. The check was done at the A/C shop by inspecting the pipe unions with UV light which fortunately didn't return any findings. Having eliminated the Freon hoses unions, the suspects were the service valves; the problem was laying at the Discharge valve pin and it was just a matter to recover the remaining amount of Freon, remove old valve pin and install new service valves on top of the old R12 ones. Doing this cured the problem.



Close - ups of the new service valves