6) Part 1: Burnt-Out Alternator Cabling

Heading for Mareeba, there was a quick burst of electrical burning smell. Not too much, and only for a short time, but we had both noticed it. Shortly afterwards, the ignition light started to flicker and eventually came on permanently. Then the rev counter stopped counting and then the alternator stopped charging.

Time to investigate. Initially there seemed to be nothing wrong, I did all the basic checks and everything seemed to be fine, so we motored on to a more civilised location to take a more detailed look. We weren't worried about charging the batteries since our solar panels were charging them just fine in the hot Queensland sun.

After stocking up in Mareeba we stopped for a few maintenance days at Mt Molloy where there is a very good free, but crowded, rest area.

After taking the drivers seat out and removing the engine side panel I noticed some burnt wires from the alternator which had been tie-wrapped to the air conditioning hoses, themselves tie-wrapped to the chassis.

They were in a bunch inside some plastic sleeving and thus fairly well hidden from view, and was one of the few areas that I had not previously done any work on.

Remains of the burnt out alternator wiring

After removing numerous tie-wraps and cutting off the plastic sleeving, I was

faced with a mass of burnt and melted wires. Some were burnt brown but still working, some were just bits of blackened copper wire with no insulation and a couple had disappeared completely, just leaving their terminals and blobs of molten copper.

The wiring after being sorted out

It took quite a while to unravel what I had left and what was missing. Fortunately I had an electronic version of the wiring diagrams on my computer and I traced the identifiable wires and replaced them with new wire and new terminals. But the thin wire from alternator to the rev counter had disappeared completely, so I had to re-run a new wire from the back of the rev counter to the back of the alternator.

After rechecking and tidying up the new cables I ran the engine and everything was OK again. It had taken the best part of a day to analyse and fix the wiring but what had caused the problem in the first place?

The section of burnt cables started where they were bunched closely together in a plastic sleeve (which allowed them to overheat) and ended roughly where they were tie-wrapped to the air conditioner hose near one of the metal ferrules on the hose. These were close to the point where the valves are located to recharge the a/c gas, which we'd had done only a few weeks before.

What I think had happened was that the edge of the ferrule on the hose had rubbed on the cables and shorted one of them to either another wire, or the

chassis. The hose ferrules were not grounded in themselves, they might have also been touching the chassis. Maybe the act of re-gassing the air conditioning had disturbed the wires and hoses and caused a partial penetration of the insulation on some wires, and subsequent vibration had finally caused the short circuit. Since the wires came directly from the alternator connectors and were fairly low current signals there are no fuses to protect them, so we were fortunate that the short circuit was not sufficiently solid to cause damage to the alternator itself.

The new wiring bunch, kept well clear of the hose ferrules

Anyway, all was then well but to ensure it couldn't happen again, the new cable bunch was kept well away from the hose ferrules.