

Injectronics

TECHNICAL BULLETIN

VARIOUS

#T0018

Make: Various

Model: Delco engine management system

Subject: Coolant temperature sensor operation

The Delco engine management system utilises different coolant temperature sensor circuitry within the engine management module compared to previous type L-Jetronic systems. The reason for this is to increase the precision of the coolant temperature sensor over a broader range of temperatures. Injctronics has found that a number of coolant temperature sensors and ECM's have been incorrectly diagnosed and replaced, mainly due to a lack of understanding of the Delco system.

The coolant temperature sensors initial stage of operation (cold start up) acts the same as any other, whereas the coolant temperature sensor resistance lowers (temperature rises), the signal voltage back to the ECM also decreases. As the engine temperature rises and the sensor resistance continues to decrease, the signal voltage will also decrease to approximately 0.85v where suddenly it will sharply rise back up again to approximately 3.7v. The engine temperature at which this rise occurs is approximately 50°C. See figure 1.

From here on, the voltage again begins to decrease in relation to the decrease of sensor resistance and increase in engine temperature until the voltage falls to approximately 1.69v, where the engine cooling fans begin to operate. The cooling fans will then switch off when the C.T.S. voltage rises to approximately 1.95v, the voltage should then stabilise between these two values whilst the engine is at normal operating temperature (approximately 90 - 100°C).

| Temperature | Resistance | Voltage-KOEO | Voltage-Engine on |
|-------------|------------|--------------|-------------------|
| 0°C | 6000 ohms | 2.9 v | 2.9 v |
| 20°C | 2500 ohms | 1.9 v | 1.9 v |
| 30°C | 1800 ohms | 1.6 v | 1.6 v |
| 40°C | 1200 ohms | 1.2 v | 1.2 v |
| 70°C | 450 ohms | 0.55 v | 2.6 v |
| 90°C | 250 ohms | 0.33 v | 1.9 v |
| 100°C | 190 ohms | 0.26 v | 1.6 v |

KOEO = Key on, Engine Off.