

## 2003 S-TYPE - Charging System - General Information - 414-00

### Charging System

The charging system for vehicles fitted with 2.5L or 3.0L engines consist of a 120 amp L3B generator. Vehicles fitted with 4.2L engines consist of a 130 amp SC1 generator. The generator and regulator assembly generates current to supply the vehicle electrical system with electricity when the engine is running and maintain the battery in a charged state.

The generator is belt driven by the accessory drive belt.<<303-05>> When the engine is started, the generator begins to generate alternating current (AC) which is converted to direct current (DC) internally. The DC current and voltage is controlled by the voltage regulator, (located inside the generator ) and then supplied to the battery through the main battery positive cable.

The 3.0L/2.5L generator is solidly mounted to the engine, while the 4.2L generator is pivot mounted. The generators are driven at approximately three times engine speed.

### Vehicles fitted with 2.5L or 3.0L engine (L3B generator)

Vehicles fitted with manual transmission have a one way clutch fitted to the drive pulley, which reduces belt slip.

The power train control module (PCM) can switch the voltage regulator between two voltages to optimize the charging of the battery.

The low voltage regulator setting is 13.6 volts and the high voltage regulator setting 15.3 volts, measured with the generator at 25 degrees centigrade (77 degrees fahrenheit) and charging at a rate of 5 amps. These values decrease with a rise in temperature or current flow.

The PCM determines the output voltage setting of the generator. The high voltage setting is always selected by the PCM once the vehicle has started. The PCM determines the period of time that the high voltage setting is selected for.

There are three different time periods selected by the PCM which is dependent upon the vehicle conditions when the vehicle is started:

- The longest period of time is selected if the PCM determines that the vehicle has been 'soaking' for sufficient time to allow the engine coolant temperature (ECT) and the air intake temperature (IAT) to fall within 6 degrees centigrade (43 degrees Fahrenheit) of each other.
- The intermediate time period is selected when the ECT and the IAT is below 15 degrees centigrade (59 degrees Fahrenheit).
- The shortest time period is the default time and is used to provide a short period of boost charge.

At the end of these time periods the voltage is always set to the low voltage setting to prevent the battery from being over charged.

The time periods are variable depending upon the temperature and battery voltage. The target voltage of the battery varies between 14 volts and 15 volts depending upon the ambient temperature and the vehicle operating conditions. Once this target voltage has been achieved, providing the vehicle has been operating for at least the shortest time period, the PCM will reduce the voltage regulator to the minimum setting of 13.6 volts.

### Vehicles fitted with 4.2L engine (SC1 generator)

The battery charging voltage is determined by the temperature of the generator. In cold conditions, starting the vehicle from cold the battery voltage will be between 14.2 volts and 15.1 volts and will reduce as the engine warms up. In hot conditions starting the vehicle when the engine is already warm the battery voltage will be between 13.5 volts and 14.3 volts.

A fault in the wiring or the connections from the generator to the PCM, will cause a fault code to be generated and

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stored in the PCM and the charge warning indicator lamp to be displayed in the instrument cluster after a short time.

With the ignition switch in the RUN position the charge warning lamp will be displayed in the instrument cluster when the generator is not generating power.

If a fault is detected with the generator a fault code will be generated and stored by the PCM. The charge warning indicator lamp will also be displayed in the IC. Units should be repaired as an assembly and not dismantled for repair.

<<414-02>>