SECTION : 414-00 Charging System - General Information

VEHICLE APPLICATION : 2008.0 Falcon

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DESCRIPTION AND OPERATION

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Description and Principles of Operation

The charging system consists of an alternator, alternator regulator, battery, charge indicator light and the necessary wiring to connect to the components. All vehicles are equipped with a non-adjustable integral electronic regulator. Six cylinder vehicles use a Mitsubishi alternator and eight cylinder vehicles use a Visteon alternator. These alternators are essentially the same internally but the exterior casing varies. Both the Mitsubishi (6 Cyl.) and Visteon (8 Cyl.) alternators are three phase alternating current (AC) generators with integrally mounted diodes that convert the AC into direct current (DC) suitable for charging the battery.

Charging system troubles such as low alternator output, no alternator output (indicated by the indicator light being on while the engine is running), or alternator output voltage too high, require testing of both the alternator and the alternator regulator.

Alternator regulator failures are usually not recognised except by the direct effect on the alternator output, and, hence, consequently battery discharge. As the regulator is the control valve for the alternator, it acts to protect the battery by preventing excessive voltage output.

Discharge of the battery to ground through the alternator is prevented by the diodes of the alternator which permit current flow in one direction (to the battery) only. A discharged battery is not always due to charging system defects. Excessive use of lights and accessories while the engine is either off or running at low idle; corroded battery cables and connectors; low acid level in the battery; or prolonged disuse of the battery, which would permit self-discharge; are all possible reasons which should be considered when a battery is run down or low in charge.

The procedures which follow will assist in a logical sequence of pinpointing specific troubles.

Always determine the cause of failure as well as making the repair.

1. **Polarity and connections.** The alternator is for use on negative earth electrical systems only. Polarity cannot be reversed by 'flashing' the field terminals as with the dynamo. Any attempt to do so will damage the alternator.
2. **Refitting Vehicle Battery.** Reversed battery connections will damage the alternator rectifiers. When refitting, first fit the positive (+) connector to the battery positive (+) terminal. Then fit the negative (-) connector to the negative (-) battery terminal.
3. **Battery Charging.** First disconnect the battery negative cable, thus isolating the alternator from the battery and external charging equipment.
4. **Battery Connections.** The battery must never be disconnected while the engine is running or damage may occur to the rectifier and/or control box semi-conductor devices. For this reason the practice of using a slave battery to start the engine, then reconnecting the original battery whilst the engine is running must not be attempted. It is likewise inadvisable to break or make any other connections in the alternator circuit while the engine is running.
5. **Alternator Main Output Cable**
   - The cable connecting the alternator and the battery is 'live' even when the engine is not running. Care must be taken not to earth this live cable if it should ever be removed, or damage to the cable will occur.
   - The alternator must never be run with the main output cable disconnected either at the alternator or battery end while the field remains energised or the rectifiers may be damaged.
6. **Arc Welding.** The possibility of damage to the semiconductor devices during arc welding operations on a vehicle is very slight. However, it is a worthwhile precaution to isolate the control box and alternator by disconnecting their wiring connectors prior to carrying out any arc welding on the vehicles.

Removal notes

7. Ensure battery shroud is not damaged or dislodged during battery removal.
8. Use a universal battery removal tool to enable removal of battery with shroud in situ.
9. Ensure shroud and venting pipes are installed correctly.