

## Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (BM) - Overview

### Smart Regenerative Charging

The generator is driven by the FEAD belt. When the engine is started, the generator begins to generate AC voltage which is internally converted to DC voltage. The DC voltage level is controlled by the voltage regulator (located on the rear of the generator) and is supplied to the battery.

The PCM controls the voltage regulation setpoint and communicates this information to the generator internal voltage regulator over a LIN communication circuit.

This vehicle is equipped with an Electrical energy management system (load shed strategy). The BCM monitors the battery state of charge using information from the battery monitoring sensor attached to the negative battery post and manages battery charging.

The PCM monitors the generator current using over LIN. The information supplied to the PCM from the generator current sensor is used by the PCM to adjust the engine idle stability and torque control.

Smart Regenerative Charging is an intelligent charge control system that calculates and regulates the set generator voltage.

The basic idea of the system is to increase the generator charge voltage when the vehicle is decelerating and reduce it when it is accelerating.

This means that during the acceleration phase, there is no additional energy demand as a result of having a high generator load; however generator load is increased when the vehicle is decelerating.

This strategy enables further fuel savings to be achieved.

### Battery Monitoring Sensor

The Battery Monitoring Sensor continuously monitors the condition of the battery.

The sensor is equipped to vehicles which have Smart Regenerative Charging or Start-Stop. These systems require knowledge of the battery state of charge. The Battery Monitoring Sensor is the sensor used to provide this information.

### Battery Monitoring Sensor connection

The Battery Monitoring Sensor is clamped directly to the negative terminal of the battery and grounds to the vehicle at the chassis ground connection point by means of a thick (25 to 35mm<sup>2</sup>) cable and eyelet. External customer loads must **only** be connected to the vehicle at the customer battery connection point. If the external customer load is connected at the negative battery post, the Battery Monitoring Sensor accuracy cannot be guaranteed.

It is recommended that the Battery Monitoring Sensor pole clamp is not removed unless a battery replacement is required. Should the battery need to be isolated, this should be done by disconnecting the ground eyelet at the chassis ground.

### Battery Monitoring Sensor reset

The Battery Monitoring Sensor also estimates losses in the battery capacity over time. The Battery Monitoring Sensor should be reset to factory default settings, when the battery is replaced.

It is urgently recommended that the replacement battery has the exact same specification as the original battery. If it does not, the accuracy of the Battery Monitoring Sensor outputs will be compromised.

The Battery Monitoring Sensor reset is part of the battery replacement procedure in [IDS](#).

### **DC / AC INVERTER**

The [DC / AC](#) inverter converts 12 volts DC to 110 volts AC to power AC devices rated 400 watts or less.

---