

SECTION 414-00: Charging System
DESCRIPTION AND OPERATION

2014 F-150 Workshop Manual
Procedure revision date: 10/25/2013

Charging System

The charging system is a negative ground system consisting of:

- a generator with an internal voltage regulator
- a charging system warning indicator
- a battery
- circuitry and cables
- a PCM
- a radial arm adapter (serviced separately from the generator)
- a battery current sensor
- a generator current sensor

The generator is driven by the accessory drive belt. When the engine is started, the generator begins to generate AC voltage which is internally converted to DC voltage. The DC voltage is controlled by the voltage regulator (located on the rear of the generator) and supplied to the battery. The PCM controls the voltage regulation set point, working with the generator internal voltage regulator over 2 control and communication circuits.

This vehicle is equipped with load shed strategy. The Body Control Module (BCM) monitors the battery state of charge using the battery current sensor attached to the negative battery cable and the battery open circuit voltage as measured by the BCM during 8 continuous hours of vehicle sleep time (ignition off with doors closed).

With the engine off and the ignition in the ACC, RUN or delayed accessory position, when the BCM determines the battery state of charge is low, a message is sent to shut down the audio/navigation system in order to save the remaining battery charge. Under this condition:

- the Front Display Interface Module (FDIM) displays SYS OFF TO SAVE BATT (without navigation) or BATTERY SAVER — SYSTEM OFF PLEASE START THE ENGINE (with navigation).
- the Instrument Panel Cluster (IPC) message center may also display TURN POWER OFF TO SAVE BATT (base message center) or TURN POWER OFF TO SAVE BATTERY (optional message center) to notify the driver that battery protection actions are active.
- the battery indicator may also illuminate.

If the vehicle battery has been charged or battery replaced , it takes approximately 8 hours for the BCM to learn the new battery state of charge. During this 8 hour period, the vehicle must be undisturbed, with no doors opened or keyless entry buttons pressed. If the vehicle is used before the BCM is allowed to learn the new battery state of charge, engine off load shedding may occur earlier than normal and a message may be displayed.

If the vehicle has been jump started , engine off load shedding can still occur and a message may be displayed until the BCM determines the battery state of charge is above 40%.

With the engine running, when the BCM and Power Steering Control Module (PSCM) voltage is low, a message is sent from the BCM to either minimize or shut down the climate controlled seats, rear defrost, heated mirrors and Dual Automatic Temperature Control (DATC) blower motor to improve system voltage. Under this condition, the IPC message center displays either LOW BATTERY LESS FEATURES (base message center) or LOW BATTERY FEATURES TEMPORARILY TURNED OFF (optional message center) to notify the driver that battery protection actions are active.

The PCM monitors the generator current using the generator current sensor attached to the generator B+ battery cable. This is used for engine idle stability and torque control.

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