BATTERY MONITOR SYSTEM

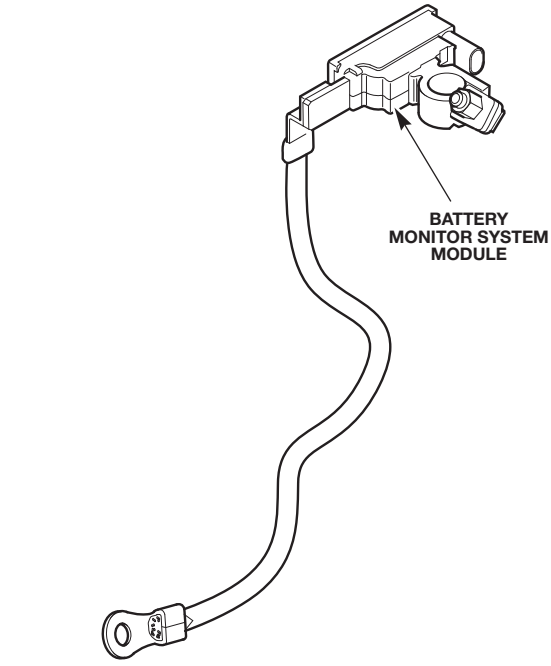
The Battery Monitor System (BMS) is new to Jaguar and introduced on the 2009 XF. The BMS module is mounted to the negative battery terminal and is integral to the negative battery cable. The BMS module communicates with the engine control module (ECM) via LIN and CAN bus networks.

NOTE: When using a Jaguar approved battery charger or maintainer, connect the charger to the recommended ground point to ensure the charge flows through the BMS module instead of the negative battery terminal. Failure to observe this will set a diagnostic trouble code (DTC) and incorrect battery condition information will be retained by the BMS module due to unmonitored current flow into the battery. However, the system will recognize and compensate for the change in the battery status after a period of time.

If a new battery is fitted to the vehicle, the BMS module will require recalibrating to the new battery parameters using IDS. Replacing the BMS module requires no action as the system will self-calibrate

CAUTION:

⚠ **To avoid damaging the BMS module, always use a suitable body ground point rather than the battery negative terminal when jump-starting the vehicle. The recommended ground connection for jump-starting is the spare wheel securing bracket.**



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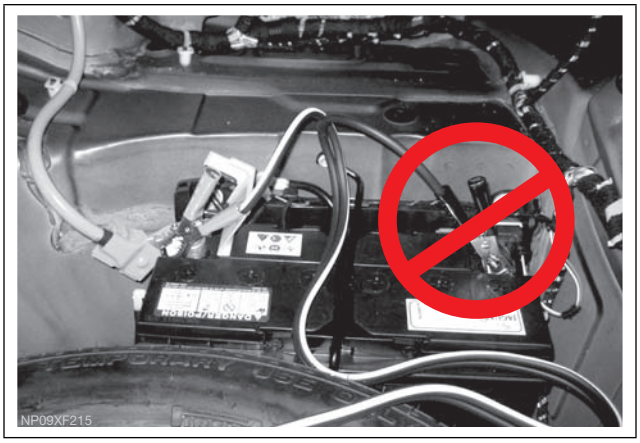
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Principles of Operation

The BMS module measures battery voltage and current which provides information about the battery state of charge (SOC) and state of health (SOH). SOH measurements provide an indication of battery condition. The BMS compares this information to new and used stored battery values.

Battery information is then communicated to the rear junction box (RJB) over a LIN bus connection. The RJB transmits the battery information to the instrument cluster via the MS CAN bus.

The instrument cluster displays battery charge warning messages to indicate generator or BMS faults. The instrument cluster also acts as a gateway between the MS CAN and HS CAN bus networks to transmit battery condition information to the ECM from other modules (audio and climate control, for example).

Based on the information received from the BMS module, the ECM will control the output from the generator via LIN bus. The ECM can also request the switching off or reducing of power to electrical loads if necessary and override the BMS signals if a fault is detected.

The BMS also monitors battery status with the engine switched off, sending a signal to switch off the infotainment system if necessary to protect the battery condition. Once triggered, the engine must be run for at least 5 minutes to charge the battery before the infotainment system will be allowed to operate with the engine switched off for a second time.

Calibration

Periodically the BMS module will instigate a self-calibration routine. To self-calibrate, the BMS first charges the battery to its full condition.

Once the battery is fully charged, the BMS will discharge the battery to approximately 75% of its full state of charge, but never lower than 12.2 V. The time taken to complete this part of the routine is dependent on the electrical load on the vehicle and the length of time the vehicle is used.

When the second part of the routine has been successfully completed, the BMS will return the battery to its optimum level of charge. The optimum level of charge will be between 12.6 V and 15 V, depending on battery condition, temperature and electrical loading. This process is run approximately twice a year.

NOTE: If the vehicle is only driven for short periods the self-calibration and charging process could take a number of days to complete.

CAUTION:

⚠ **Due to the self-calibration routine, it is recommended that all power supply diagnostic testing is carried out using IDS rather than a digital multi-meter.**

Diagnostics

BMS DTCs are stored in the RJB and ECM. These DTCs help diagnose battery or generator power supply issues and can be read using IDS. Part of the BMS diagnostic process includes an automated power supply diagnostic procedure. This feature provides a menu -driven test to locate the fault in a logical sequence. The test procedure uses the capability of the BMS and generator's LIN bus controlled functions to provide current flow information and will detect if the generator and/or BMS are functioning correctly.

NOTE: Results of the automated power supply diagnostic procedure will be required prior to replacement of components.

The battery positive terminal is directly connected to the BMS module via a 5-amp fusible link. This should prevent any potential voltage drop in the circuit which would result in incorrect information being received by the BMS.

If the fusible link becomes an open circuit, the RJB would detect communication loss with the BMS. The battery warning lamp would be shown in the instrument cluster message center, the system would default to a fixed charging voltage of 13.7 volts and a DTC would be set. The same would occur if the LIN circuit was open or short circuit.

If the fusible link has corrosion or high resistance, causing a high voltage drop, the BMS would interpret this as a low battery charge condition.

The generator/regulator communicates with the BMS via the following networks:

- Generator/regulator to ECM via a LIN bus
- ECM to instrument cluster via the HS CAN bus
- Instrument cluster to the RJB via the MS CAN bus
- RJB to the BMS via a LIN bus

Battery Monitor System Control Diagram