

08 - Electrical / 8F - Engine Systems / Battery System / SENSOR, Intelligent Battery (IBS) / Operation

OPERATION

The Intelligent Battery Sensor (IBS) contains a low value resistor, or shunt. The shunt creates a voltage drop, which is read by an internal microcontroller to determine the current flow in and out of the battery. In addition to the shunt, the IBS contains a sensor to monitor the battery's temperature. Data gathered by the IBS, including temperature, voltage, and current measurements, are transmitted over a Local Interface Network (LIN) communication bus to either the Body Control Module (BCM) or the Powertrain Control Module (PCM), depending on the application. The IBS serves two primary purposes. The first is to provide the PCM with both immediate and historical battery information, so the PCM can precisely control the charging system. Precise charging is important on a vehicle equipped with an Absorbent Glass Material (AGM) battery, because they are especially sensitive to overcharging. The second purpose is to provide data to the BCM for operation of the load-shedding feature. A fused power circuit and the LIN bus are connected to the IBS through a two-terminal connector.

The IBS is readable and diagnosable via the diagnostic scan tool. The tool can display all of the available parameters needed for vehicle servicing or troubleshooting.

In addition to real-time measurements, the IBS transmits some calculated battery data over the LIN bus. These values are calculated by storing measurements over time.

Information the IBS sends on the Controller Area Network-Interior High Speed (CAN-IHS):

- SOC = Battery state of charge (or SOC) is expressed as a percentage. The IBS calculates the SOC based on measured voltage, and charge and discharge rates. Therefore, SOC is not a direct percentage of battery voltage.
- SOF = Battery State of Function: Battery state of function (or SOF) is a calculated prediction of the lowest voltage the battery will drop to during engine cranking.

The PCM and BCM use this calculated information to optimize vehicle power management for increased fuel efficiency.

When the IBS is powered up for the first time or is powered after a power disconnection, it enters a "re-calibration" phase, where the IBS must recognize the type of battery and its characteristics and state. So in this phase the tolerances on the state functions (SOC, SOF) are greater than in normal working condition. When IBS is disconnected from the battery, the device loses its stored memory. When power is restored, the IBS starts a relearn process. Until the relearn process is complete, accurate battery state information is unavailable to other vehicle systems. The IBS relearn process requires three to five normal, operator initiated starts with at least eight hours of engine off time between each start. Usually, the process takes a few days of vehicle operation to complete. Remember, the relearn process is restarted every time power is reconnected to the IBS. This has a major effect on the stop/start feature.

A Note about Electric Stop/Start (ESS) and the IBS - ESS operation places a heavy demand on the battery. So, during ESS events, the PCM boosts the charging system's output to immediately recharge the battery after a start.

If the IBS is faulty it cannot be serviced, it must be replaced.