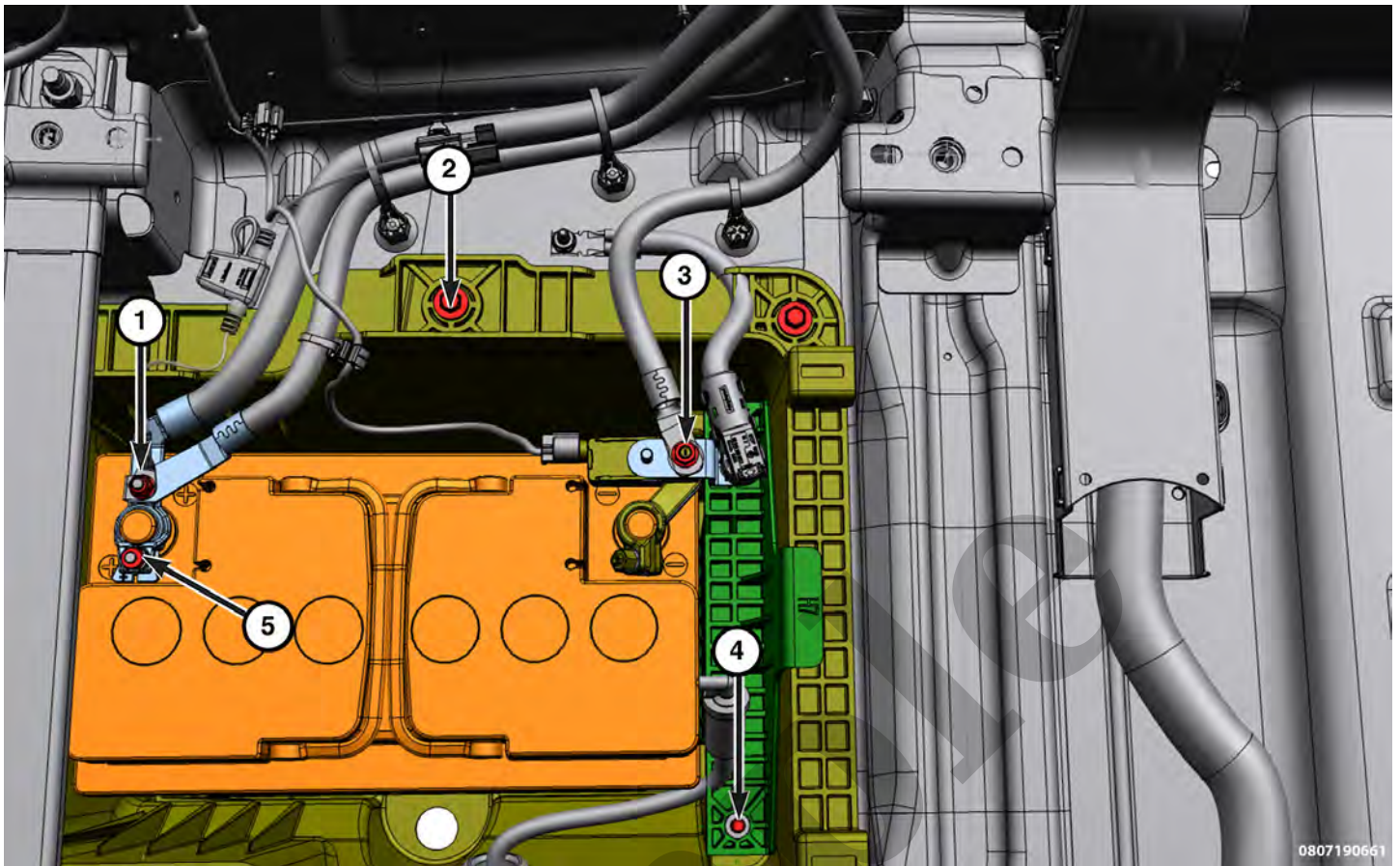


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2004 JEEP Wrangler Unlimited OEM Service and Repair Workshop Manual

[Go to manual page](#)



CALLOUT	DESCRIPTION	SPECIFICATION	COMMENT
1	Battery Positive Cable End Nut	7 N·m (63 In. Lbs.)	–
2	Battery Tray Bolts	10 N·m (89 In. Lbs.)	–
3	Battery Negative Cable to the IBS	11 N·m (8 Ft. Lbs.)	–
4	Battery Hold Down Bolt	5 N·m (44 In. Lbs.)	–
5	Battery Positive Clamp to Positive Post	7 N·m (63 In. Lbs.)	–
–	Intelligent Battery Sensor (IBS) Sensor to Negative Post	6 N·m (53 In. Lbs.)	–

AUXILIARY BATTERY

12 Volt Battery To Bulkhead Cable

12 VOLT BATTERY TO BULKHEAD CABLE

WARNING

Before performing any diagnostic or service procedure, you must thoroughly read and follow all applicable high voltage safety procedures. You must perform the high voltage power down procedures.

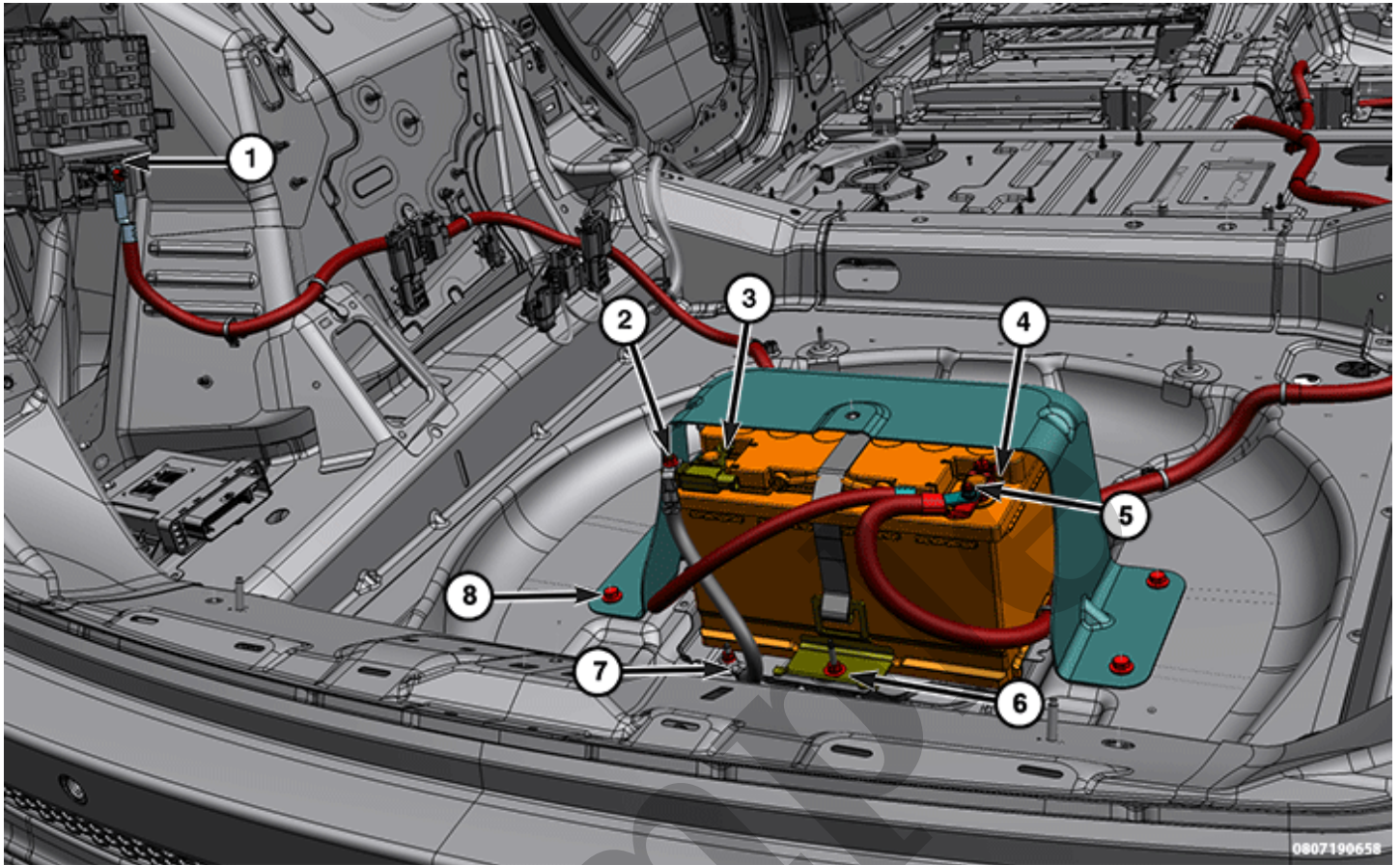
Loss of Isolation (LOI) must be performed before high voltage power up in cases where service has been performed on a high-voltage component or when diagnosing a LOI condition.

Be sure to use the proper safety equipment when working on any high voltage system or component. Failure to do so may result in serious or fatal injury.

Wait a minimum of two minutes after performing the high voltage battery disconnect procedure before attempting to access the high voltage system. Failure to do so may result in serious or fatal injury.

1. Power down the 12 volt system ([Refer to Electrical/Battery System/Standard Procedure](#)).
2. Remove the passenger front seat ([Refer to Body/Seats/SEAT/Removal and Installation](#))([Refer To List 1](#)).
3. Remove the instrument panel ([Refer to Body/Instrument Panel/PANEL, Instrument Panel/Removal and Installation](#)) .
4. If equipped, remove the air suspension reservoir ([Refer to Front Suspension/Air Suspension/RESERVOIR, Air Suspension/Removal and Installation](#)).
5. Remove the floor covering to gain access to the isolator(s).

TORQUE SPECIFICATIONS - 12 VOLT BATTERY SYSTEM



CALLOUT	DESCRIPTION	SPECIFICATION	COMMENT
1	Battery Positive B(+) at Power Distribution Center (PDC) M8 Nut	15 N·m (11 Ft. Lbs.)	-
2	12 Volt Negative Battery Cable to Intelligent Battery Sensor (IBS)	10 N·m (7 Ft. Lbs.)	-
3	Intelligent Battery Sensor (IBS) to the Battery Negative Post	8 N·m (71 In. Lbs.)	-
4	Battery Positive Cable Pinch Bolt (M5)	7 N·m (62 In. Lbs.)	-
5	Battery Positive Cable Nut (M6)	8 N·m (71 In. Lbs.)	-
6	Battery Hold Down Bolt	9 N·m (80 In. Lbs.)	-
7	12 Volt Battery Negative Battery Cable to Floor	9 N·m (80 In. Lbs.)	-

DESCRIPTION	SPECIFICATION	COMMENT
Second Row Seat to Floor Bolts - Rear	52 N-m (38 Ft. Lbs.)	—
Second Row Seat to Floor Nuts	50 N-m (37 Ft. Lbs.)	—

Refer To List:

List 1

- [23 - Body / Seats, Front / SEAT, Front / Removal and Installation](#)
- [23 - Body / Seats, Second Row / SEAT, Second Row / Removal and Installation](#)
- [23 - Body / Seats, Third Row / SEAT, Third Row / Removal and Installation](#)

12. Carefully remove the low voltage cable from the vehicle.

INSTALLATION

WARNING

Before performing any diagnostic or service procedure, you must thoroughly read and follow all applicable high voltage safety procedures. You must perform the high voltage power down procedures.

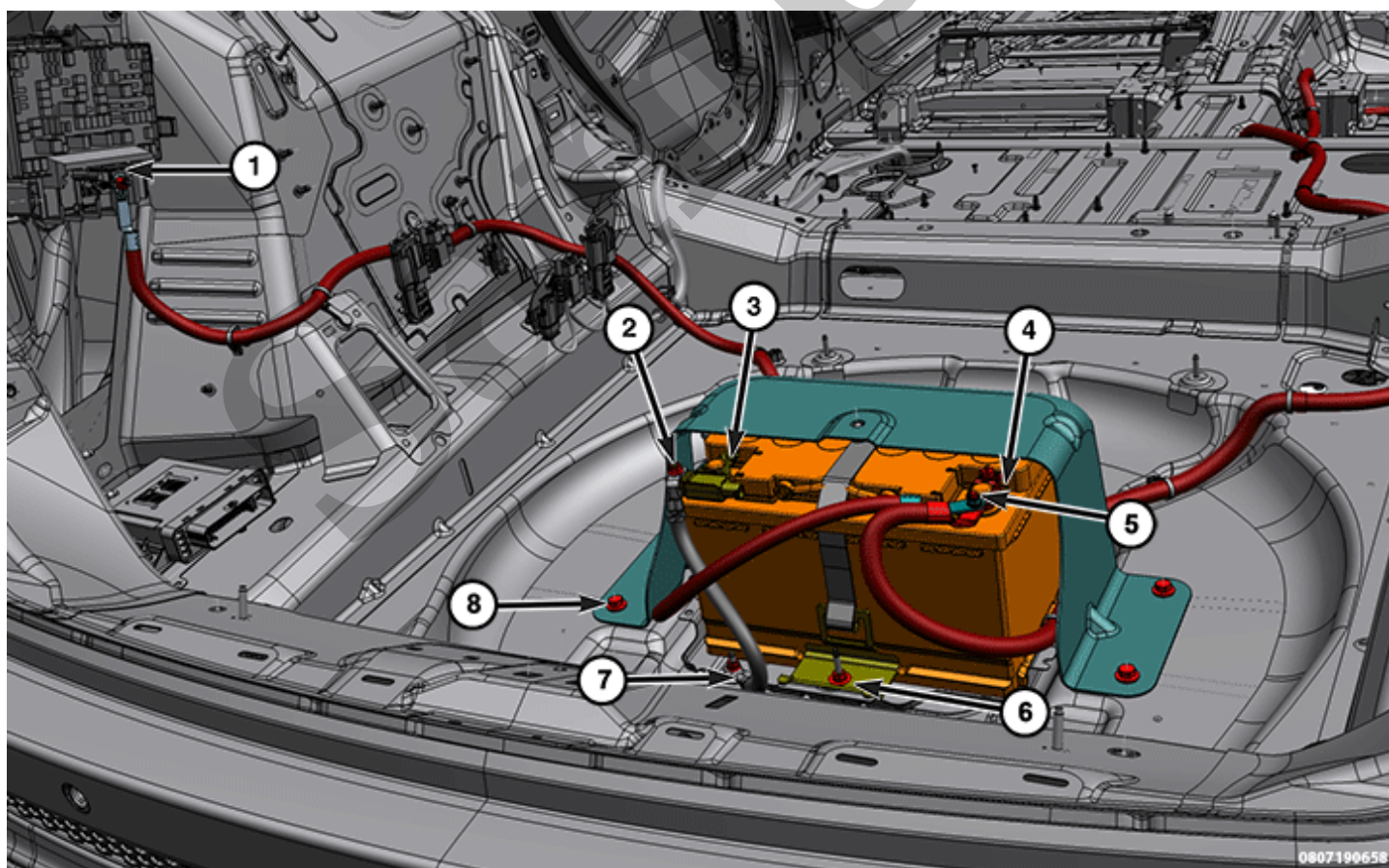
Loss of Isolation (LOI) must be performed before high voltage power up in cases where service has been performed on a high-voltage component or when diagnosing a LOI condition.

Be sure to use the proper safety equipment when working on any high voltage system or component. Failure to do so may result in serious or fatal injury.

Wait a minimum of two minutes after performing the high voltage battery disconnect procedure before attempting to access the high voltage system. Failure to do so may result in serious or fatal injury.

Follow the removal procedure in reverse for general reassembly of the components on the vehicle.

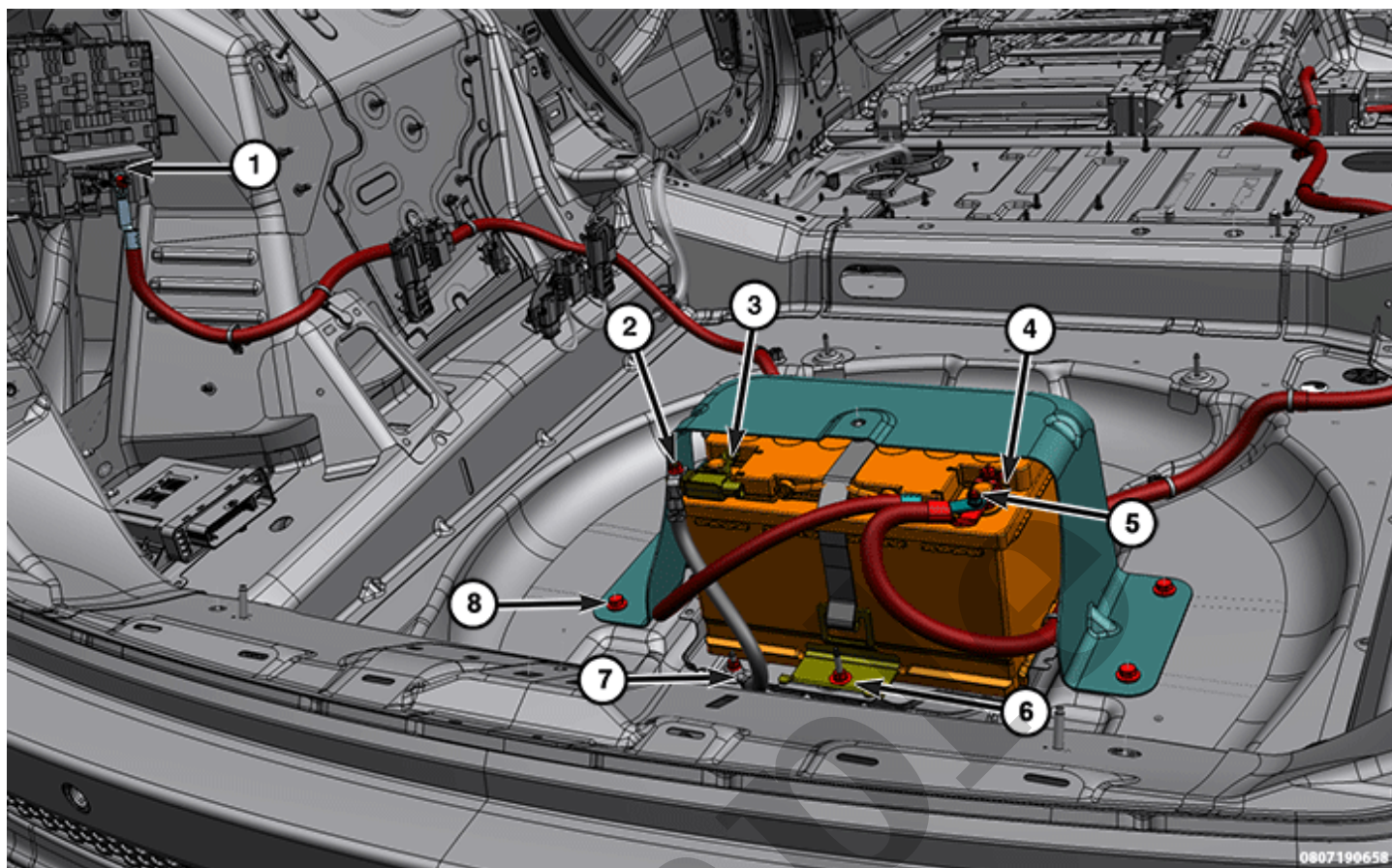
TORQUE SPECIFICATIONS - 12 VOLT BATTERY SYSTEM



DESCRIPTION	SPECIFICATION	COMMENT
Front Seat Crossbrace to Floor Nuts	50 N-m (37 Ft. Lbs.)	—
Front Seat to Floor Front Bolts	53 N-m (39 Ft. Lbs.)	—
Front Seat to Floor Rear Bolts	53 N-m (39 Ft. Lbs.)	—
Second Row Arm Rest to Arm Rest Bracket Bolt	23 N-m (17 Ft. Lbs.)	—
Second Row Seat Back Frame to Recliner A-Bracket Bolts	60 N-m (44 Ft. Lbs.)	—
Second Row Seat to Floor Bolts - Front	48 N-m (35 Ft. Lbs.)	—
Second Row Seat to Floor Bolts - Rear	48 N-m (35 Ft. Lbs.)	—
Second Row Seat to Floor Nuts	70 N-m (52 Ft. Lbs.)	—
Second Row Torsion Wire Protection Bracket to Seat Back Frame Bolt	10 N-m (7 Ft. Lbs.)	—
Third Row Seat to Floor Bolts - Front	48 N-m (35 Ft. Lbs.)	—
Third Row Seat to Floor Bolts - Rear	23 N-m (17 Ft. Lbs.)	—
Third Row Seat to Floor Nuts	70 N-m (52 Ft. Lbs.)	—

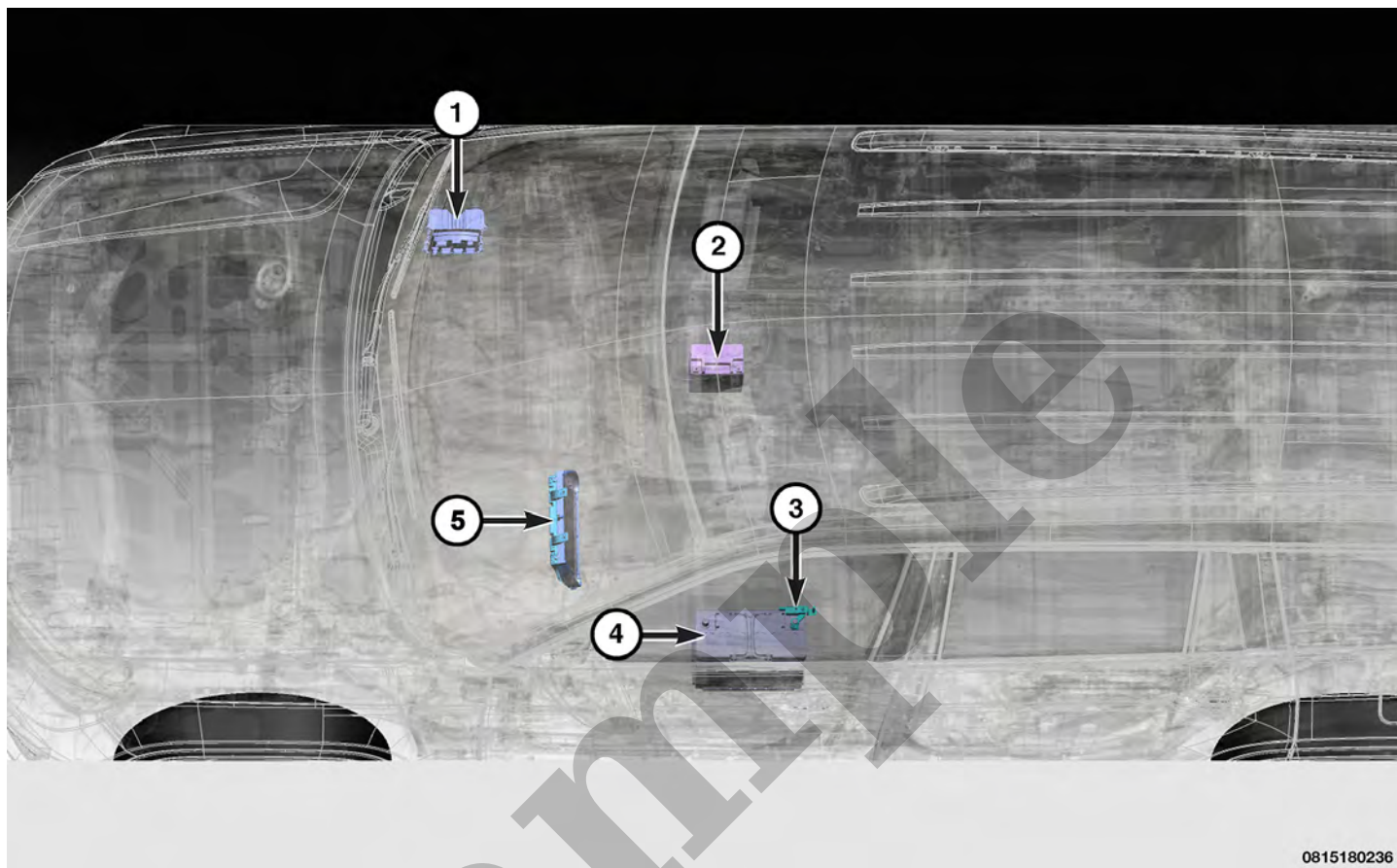
TORQUE SPECIFICATIONS - SEATS - SHORT WHEELBASE MODELS

DESCRIPTION	SPECIFICATION	COMMENT
Front Seat Crossbrace to Floor Bolt	52 N-m (38 Ft. Lbs.)	—
Front Seat Crossbrace to Floor Nuts	50 N-m (37 Ft. Lbs.)	—
Front Seat to Floor Front Bolts	53 N-m (39 Ft. Lbs.)	—
Front Seat to Floor Rear Bolts	53 N-m (39 Ft. Lbs.)	—
Second Row Seat to Floor Bolts - Front	52 N-m (38 Ft. Lbs.)	—



CALLOUT	DESCRIPTION	SPECIFICATION	COMMENT
1	Battery Positive B(+) at Power Distribution Center (PDC) M8 Nut	15 N·m (11 Ft. Lbs.)	-
2	12 Volt Negative Battery Cable to Intelligent Battery Sensor (IBS)	10 N·m (7 Ft. Lbs.)	-
3	Intelligent Battery Sensor (IBS) to the Battery Negative Post	8 N·m (71 In. Lbs.)	-
4	Battery Positive Cable Pinch Bolt (M5)	7 N·m (62 In. Lbs.)	-
5	Battery Positive Cable Nut (M6)	8 N·m (71 In. Lbs.)	-
6	Battery Hold Down Bolt	9 N·m (80 In. Lbs.)	-
7	12 Volt Battery Negative Battery Cable to Floor	9 N·m (80 In. Lbs.)	-
8	Spare Tire Bracket to Floor	17 N·m (13 Ft. Lbs.)	-

VEHICLES EQUIPPED WITH ADAS SYSTEM



1 - Body Control Module (BCM)	4 - Main Battery
2 - Auxiliary Battery	5 - Instrument Panel Cluster (IPC)
3 - Intelligent Battery Sensor (IBS)	

The batteries are connected through the Dual Battery Switch Module on vehicles that are equipped with the ADAS systems. These components are covered in more detail in the starting system.

SYSTEM OPERATION - 12 VOLT BATTERY SYSTEM

The 12 volt battery connects to the Power Distribution Center (PDC) to provide the electrical power for the vehicle modules and accessories. The battery will also absorb electrical spikes in the system. There is an Intelligent Battery Sensor (IBS) connecting in series on the negative battery cable which provides information about the battery to the Body Control Module (BCM) over a Local Interface Network (LIN) bus. The IBS

FUNCTIONAL DESCRIPTION - BATTERY CABLES

The battery cables connect the battery terminal posts to the vehicle electrical system. These cables also provide a path back to the battery for electrical current generated by the charging system for restoring the voltage potential of the battery. The female battery terminal clamps on the ends of the battery cable wires provide a strong and reliable connection of the battery cable to the battery terminal posts. The terminal pinch bolts allow the female terminal clamps to be tightened around the male terminal posts on the top of the battery. The eyelet terminals secured to the opposite ends of the battery cable wires from the female battery terminal clamps provide secure and reliable connection of the battery cables to the vehicle electrical system.

FUNCTIONAL DESCRIPTION - BODY CONTROL MODULE (BCM)

The Body Control Module (BCM) is the gateway for all bus communications needing to be gated from one bus network to a different bus network.

The BCM obtains battery voltage information from the Intelligent Battery Sensor (IBS) over the Local Interface Network (LIN) bus. The BCM is the LIN master for the IBS and manages the IBS initialization, LIN communication, signal gating and IBS diagnostics.

Load Shedding

Using the LIN, the BCM communicates with the IBS to provide load shedding. Load shedding is activated under the following conditions:

- The engine must be running with an engine speed equal to or higher than 400 RPM for greater than 50 seconds.
- The battery State of Charge (SOC) supplied signal value sent by the IBS over the LIN bus to the BCM must be less than or equal to 55%.
- The battery voltage measured by the IBS and supplied to the BCM over the LIN bus must be less than or equal to 12.2 volts.

When the vehicle is in a load shed operating state, the BCM will bus a signal to the Instrument Panel Cluster (IPC) to illuminate the "Battery Saver On" indicator.

If the battery SOC rises to a level equal to or greater than 65% and the battery voltage rises to 13 volts or higher, load shedding will begin to reverse itself putting the vehicle back to a normal operating state.

Any transition of the ignition state will reset all of the load shed output signals and therefore cancel load shedding operation.

Battery Critical State

If the battery SOC is equal to or less than 35% and the battery voltage is equal to or less than 11.8 volts, a "Battery Reached Critical State" output signal is broadcast by the BCM. Another condition to set this output signal is that the battery voltage is less than or equal to 10.9 volts and the state of charge is less than or equal to 55%.