

“Parasitic Battery Drain” Job Aid

This information is not intended to replace Technical Training, Wiring Diagram or Workshop Manual information.

This Job Aid contains the following:

- 1. Introduction**
- 2. Detection of Parasitic Battery Drain**
 - a. Examples**
- 3. Battery Drain Test Procedure**

“Parasitic Battery Drain” Job Aid

Introduction

- This Job-Aid highlights a few conditions that can create parasitic battery losses, and how to correct them.
- Battery drain through parasitic draws can be very difficult to resolve on any vehicle.
- Often, parasitic losses are from owner-installed accessories or owner-used accessories. However, some conditions can create a parasitic battery loss with existing Ford-installed accessories.
- Losses may occur at random times under very specific conditions. This makes detecting the root cause difficult.

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Introduction (continued)

- Electrical systems on most vehicles will have a continuous, **very small** current drain of up to 50 mA (0.05 A), even after a complete power-down of the electrical system.
- Some system components require periodic message inputs to provide proper system operation (PCM, TPMS, etc.). These inputs will occasionally cause a fluctuation or spike of 80 mA – 200 mA (.08A – .2 A) for a few seconds, or less. However, this small current drain will not drain a battery overnight or even within several days.
- In some cases the root cause of the drain may be an input from a module or component causing the battery management system (BMS) to keep modules online falsely. This can create a mis-diagnosis if not identified properly.

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Detection of Parasitic Battery Drain

The place to start when diagnosing a parasitic battery drain is to evaluate the vehicle as it was designed. This means evaluate the vehicle without any add-on or owner plug-in accessories. Ask the owner if they are using an accessory that is not present when the vehicle is dropped off for service. Items such as:

- Insurance Company-issued recording and monitoring devices, typically connected to the data link connector (DLC)
- Cell Phone Charger
- After-market Remote Start
- Laptop Charger
- Power Inverter
- Trailer Brake Controller (Non-Ford)
- Snow Plow Wiring
- Police or Fire Department Wiring/Lights
- Specialty Fleet accessories
- Rear Seat Entertainment (DVD – Game Systems)

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Detection of Parasitic Battery Drain – Example 1

This example is caused by a component doing what it is commanded to do. The Instrument Cluster is staying awake due to an open circuit in the Park Detect Signal (not seeing a ground). The root cause is an intermittent mechanical concern with the Shift Interlock and/or its ground circuit. The Instrument Cluster backlighting would remain on intermittently with the key removed and the doors closed.

The Shift Interlock circuit failed to provide a signal ground, the Instrument Cluster gear position indicator did not display the “P” for Park, and the Instrument Cluster backlighting was turned on.

Why did it cause a parasitic drain?

The Shift Interlock circuit did not provide a consistent ground signal to the Instrument Cluster.

The Instrument Cluster interpreted the open circuit as an “electrical not-in-Park” condition.

The Instrument Cluster uses this circuit as one input to the battery management power down process (sleep mode) – see Figure 1 on page 6.

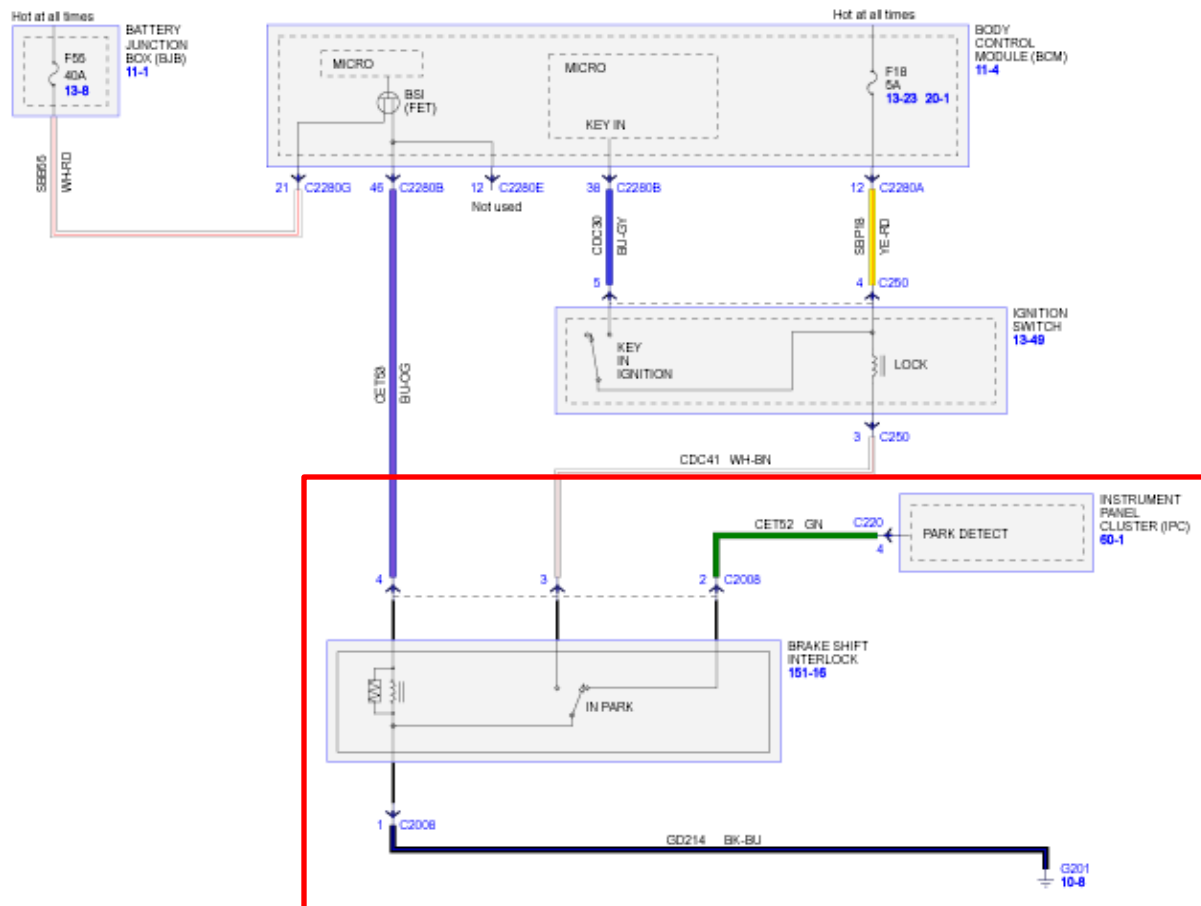
NOTE: The Shift Interlock did not interfere with the shift linkage or shifter operation. The transmission was always able to shift physically into park with the park pawl engaged.

NOTE: This example only applies to vehicles with systems in which the park detect circuit is normally grounded. (Refer to cell 37-1 of the vehicle Wiring Diagrams)

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Detection of Parasitic Battery Drain – Example 1 (cont.)

Figure 1



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Detection of Parasitic Battery Drain – Example 2

Water intrusion into a connector containing a Communications circuit and a power feed (12v) could cause a parasitic battery drain. If you suspect a connector may be causing the concern, a quick visual inspection might not show the real cause (figure 2). You may need to remove the connector insert and inspect the connector closely (figure 3).



(figure 2)



(figure 3)

Why did it cause a parasitic drain?

The Body Chassis Module (BCM) saw this stray voltage signal as a valid network signal. The BCM recognized this signal as a “stay awake” input to allow network traffic command resulting in an excessive parasitic battery drain overnight.

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Battery Drain Test Procedure

Refer to Workshop Manual , Section 414-01 “General Procedures” for the specific battery drain test for the vehicle being worked on, or use the generic Battery Drain Test below:

WARNING: Batteries contain sulfuric acid and produce explosive gases. Work in a well-ventilated area. Do not allow the battery to come in contact with flames, sparks or burning substances. Avoid contact with skin, eyes or clothing. Shield eyes when working near the battery to protect against possible splashing of acid solution. In case of acid contact with skin or eyes, flush immediately with water for a minimum of 15 minutes, then get prompt medical attention. If acid is swallowed, call a physician immediately. Failure to follow these instructions may result in serious personal injury.

NOTE: *No factory-equipped vehicle should have more than a 50 mA (0.050 amp) draw.*

NOTE: *Many electronic modules draw 10 mA (0.010 amp) or more continuously.*

NOTE: *Typically, a drain of approximately 1 amp is attributed to an engine compartment lamp, glove compartment lamp or interior lamp staying on continually. Other component failures or wiring shorts are located by selectively pulling fuses to pinpoint the location of the current drain. When the current drain is found, the meter reading falls to an acceptable level. If the drain is still not located after checking all the fuses, it may be due to the generator. Disconnect the generator and retest.*

NOTE: *To accurately test the drain on a battery, an in-line ammeter must be used between the negative battery post and its respective cable. Use of a test lamp or voltmeter is not an accurate method.*

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Battery Drain Test Procedure (cont.)

Test Steps

1. Make sure the junction box(es)/fuse panel(s) are accessible without turning on the interior or the underhood lights.
2. Drive the vehicle at least 5 minutes and over 30 mph (48 km/h) to turn on and activate the vehicle systems.
3. Allow the vehicle to sit with the key out of the ignition for at least **40 minutes** to allow the modules to time out/power down.
4. Connect a fused jumper wire (30A) between the negative battery cable and the negative battery post to prevent modules from resetting.
5. Disconnect the negative battery cable from the negative battery post **without breaking the connection** of the jumper wire.
6. Connect the ammeter between the negative battery cable and the post **without breaking the continuity** between the battery post and the battery cable, then remove the fused jumper wire. The meter must be capable of reading milliamps and should have a 10-amp capability minimum.

NOTICE: To prevent damage to the meter, do not crank the engine or operate accessories that draw more than 10A.

NOTE: *If the meter settings need to be switched or the test leads need to be moved to another jack, the jumper wire must be reinstalled to avoid breaking continuity.*

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Battery Drain Test Procedure (cont.)

Test Steps (continued)

7. If the current draw is excessive, remove the fuses from the Battery Junction Box (BJB) one at a time and note the current drop.
8. When the current level drops to an acceptable level, the circuit containing the excessive draw has been located. Reinstall the fuse and allow the vehicle to sit with the key out of the ignition for at least **40 minutes** to allow the modules to time out/power down again.
9. The excessive draw can be isolated by continuing to pull sub-system fuses and components. **Do not reinstall the fuses or components until testing is finished.** To correctly isolate each of the circuits, all of the fuses may need to be removed, then install one fuse and note the amperage draw, remove the fuse and install the next fuse. Continue this process with each fuse.

Check the wiring diagram for any circuits that run directly from the battery without passing through the BJB or the SJB. If the current draw is still excessive, disconnect these circuits until the draw is found.

If necessary, disconnect the generator electrical connections and retest. The generator may be internally shorted causing the current drain.