

Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (BM)

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC	Description	Action
BCM	B11D9:09	Vehicle Battery: Current voltage above threshold	GO to Pinpoint Test A
BCM	B11D9:16	Vehicle Battery: circuit voltage below threshold	GO to Pinpoint Test B
BCM	B11D9:17	Vehicle Battery: Circuit Voltage Above Threshold	GO to Pinpoint Test A
BCM	B11DB:02	Battery Monitoring Module "A": General Signal Failure	GO to Pinpoint Test K
BCM	B11DB:08	Battery Monitoring Module "A": Bus Signal/Message Failures	GO to Pinpoint Test K
BCM	B11DB:09	Battery Monitoring Module "A": Component Failures	GO to Pinpoint Test K
BCM	B11DB:11	Battery Monitoring Module "A": Circuit Short To Ground	GO to Pinpoint Test K
BCM	B11DB:49	Battery Monitoring Module "A": Internal Electronic Failure	GO to Pinpoint Test L
BCM	B11DB:55	Battery Monitoring Module "A": Not Configured	GO to Pinpoint Test M
BCM	B11DB:9A	Battery Monitoring Module "A": Component or System Operating Conditions	GO to Pinpoint Test K
BCM	B130C:12	Load Shed Control Circuit: Short To Battery	GO to Pinpoint Test N
BCM	B130C:14	Load Shed Control Circuit: Short To Ground or Open	GO to Pinpoint Test N
BCM	B1438:03	Battery Current Sensor: FM (Frequency Modulated) / PWM (Pulse Width Modulated) Failure	GO to Pinpoint Test N
BCM	B1489:11	Battery Monitoring System (BMS) Sensor Power: Circuit Short To Ground	GO to Pinpoint Test K
BCM	B1513:09	Vehicle Battery "B": Component Failure	GO to Pinpoint Test D
BCM	B1513:09	Vehicle Battery "B": Component Failure	GO to Pinpoint Test F
BCM	B1513:09	Vehicle Battery "B": Component Failure	GO to Pinpoint Test I
PCM	P0562:00	System Voltage Low: No Sub Type Information	GO to Pinpoint Test B
PCM	P0563:00	System Voltage High: No Sub Type Information	GO to Pinpoint Test A
PCM	P065B:00	Generator "A" Control Circuit Range/Performance: No Sub Type Information	GO to Pinpoint Test B
PCM	P065C:00	Generator "A" Mechanical Performance: No Sub Type Information	GO to Pinpoint Test B
PCM	P0A3B:00	Generator Over Temperature: No Sub Type Information	GO to Pinpoint Test C
PCM	P2D57:00	Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test D
PCM	P2D58:00	Generator "B" Mechanical Performance: No Sub Type Information	GO to Pinpoint Test I
PCM	P2D59:00	Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test E
PCM	U012D:00	Lost Communication With Generator "A" Control Module: No Sub Type Information	GO to Pinpoint Test G
PCM	U012F:00	Lost Communication With Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test H
PCM	U042E:00	Invalid Data Received From Generator "A" Control Module: No Sub Type Information	GO to Pinpoint Test G
PCM	U044D:00	Invalid Data Received From Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test H

Global Customer Symptom Code (GCSC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

Global Customer Symptom Code Chart

Customer Symptom	Action
Comfort & Entertainment > Audio > Radio FM > Sound Quality	GO to Pinpoint Test J
Driver Aides & Information > Warning Indicators/Messages/Chimes > Charging System > Stays On	GO to Pinpoint Test A

Inspection and Verification

1. Verify the customer concern by operating the charging system.

2. Before diagnosing or repairing the charging system inspect the following items:
 - Check the battery for loose, damaged or corroded connections.
 - Check the generator for loose, damaged or corroded connections.
 - Check engine and battery grounds for loose, damaged or corroded connections.
 - Check high current **BJB** for loose or corroded connections.
 - Verify fuses or fusible links.
 - Inspect wiring, terminals and connectors.
3. Inspect the **FEAD** system.
 REFER to: [Accessory Drive](#) (303-05A Accessory Drive - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).
 REFER to: [Accessory Drive](#) (303-05C Accessory Drive - 3.5L EcoBoost (BM), Diagnosis and Testing).
4. Check the battery condition and state of charge.
 REFER to: [Battery](#) (414-01 Battery, Mounting and Cables, Diagnosis and Testing).
5. Check for abnormal ignition-off current drain(s).
 REFER to: [Battery Drain Check](#) (414-01 Battery, Mounting and Cables, General Procedures).
6. If an obvious cause for an observed or reported concern is found, repair as necessary (if possible) before proceeding.
7. Using the diagnostic scan tool, retrieve all **DTC**. Refer to the appropriate **DTC** Chart in this section.

Symptom Chart(s)

Symptom Chart: Charging System

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices. For information about these practices, REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

Symptom Chart

Condition	Possible Sources	Actions
System voltage high	Refer to the Pinpoint Test	GO to Pinpoint Test A
System voltage low or battery is discharged	Refer to the Pinpoint Test	GO to Pinpoint Test B
The generator is noisy	Refer to the Pinpoint Test	GO to Pinpoint Test F
Radio interference	Refer to the Pinpoint Test	GO to Pinpoint Test J
Charging system warning indicator is never or always ON	Refer to the Pinpoint Test	GO to Pinpoint Test O

Pinpoint Tests

PINPOINT TEST A : SYSTEM VOLTAGE HIGH SYSTEM VOLTAGE HIGH

NOTE: ***DTC** P0563 can be set if the vehicle has been recently jump started or the battery has been recently charged. The battery may become discharged due to excessive load(s) on the charging system from aftermarket accessories or if vehicle accessories have been operating for an extended period of time without the engine running.*

Refer to Wiring Diagrams Cell 12 for schematic and connector information.

Normal Operation and Fault Conditions

With the engine running, the charging system supplies voltage to the battery and the vehicle electrical system through the high current **BJB** and battery B+ cable. The voltage that is supplied to the vehicle electrical system is used for the operation of the various vehicle systems and modules. Many modules monitor this voltage and if it rises above or below their calibrated setpoints, a **DTC** sets.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
PCM P0563:00	System Voltage High: No Sub Type Information	This DTC sets in the PCM when the PCM detects voltage from the charging system greater than 15.9 volts with vehicle speed above 8 km/h (5 mph).
BCM B11D9:09	Vehicle Battery: Component Failures	A continuous and on-demand DTC that sets in the BCM if the BCM detects higher or Lower than expected battery voltage on the voltage supply input circuit.
BCM B11D9:17	Vehicle Battery: Circuit Voltage Above Threshold	A continuous and on-demand DTC that sets in the BCM if the BCM detects higher than expected battery voltage on the voltage supply input circuit.

Possible Sources

- Battery

- Generator
- Engine, generator or battery ground
- PCM
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect GND G105, G106 and G107 for loose, damaged or corroded connections.
- Inspect the high current BJB for loose, damaged or corroded connections.
- Inspect High Current BJB fuse F201 (300A),

NOTE: Make sure battery voltage is greater than 12.2 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

A1 PERFORM INSPECTION AND VERIFICATION

- Perform Inspection and Verification procedure in this section.

Was an obvious cause for an observed or reported concern found?

Yes	CORRECT the cause as necessary.
No	GO to A2

A2 MONITOR THE GENERATOR VOLTAGE DESIRED (GENVDSD) PID (PARAMETER IDENTIFICATION)

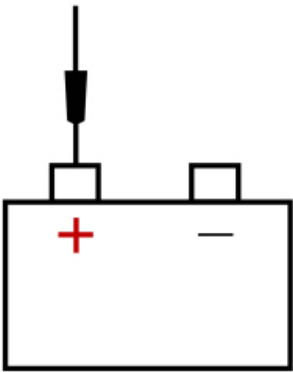
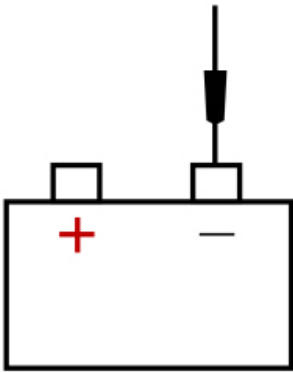
- Start the engine.
- Using a diagnostic scan tool, view the PCM PID s.
- Access the PCM and monitor the GENVDSD(V) PID

Does the PID indicate 15.9 volts or less?

Yes	GO to A3
No	GO to A10

A3 COMPARE THE GENERATOR VOLTAGE DESIRED (GENVDSD) PID (PARAMETER IDENTIFICATION) WITH BATTERY VOLTAGE

- With the engine still running at idle, measure and record:

Positive Lead	Measurement / Action	Negative Lead
		

- Using a diagnostic scan tool,

Access the PCM and monitor the GENVDSD(V) PID

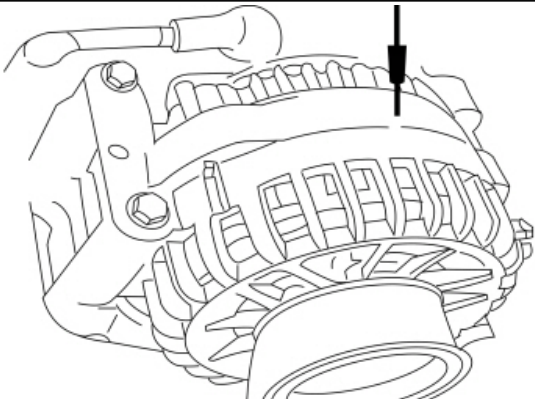
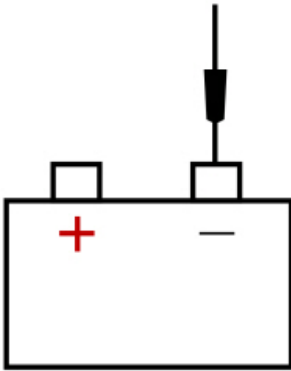
Is the recorded battery voltage within ± 0.5 volt of the PID ?

Yes	The system is operating correctly at this time. The concern may have been caused by an intermittently loose or corroded connector. ADDRESS the root cause of any connector or pin issues.
No	GO to A4

A4 CHECK THE VOLTAGE DROP IN THE VEHICLE GROUNDS

terminal.

- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
 Generator case		

Is the voltage drop less than 0.5 volt?

Yes	GO to A5
No	INSPECT and REPAIR the engine ground, generator ground or the battery ground for corrosion.

A5 MONITOR THE GENERATOR VOLTAGE DESIRED (GENVDSD) PID (PARAMETER IDENTIFICATION) WHILE COMMANDED

- Using a diagnostic scan tool, view the

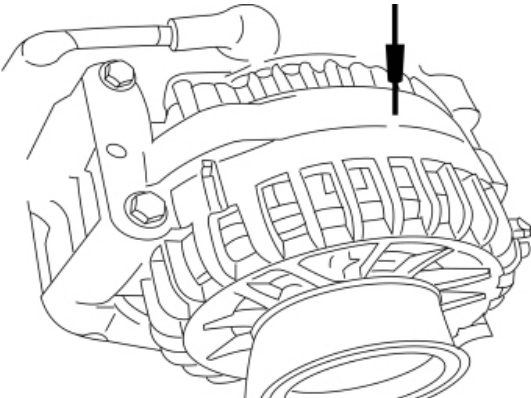
Access the PCM and monitor the GENVDSD(V) PID

- Using a diagnostic scan tool active command, set access the PCM and command GENVDSD PID

Access the PCM and monitor the GENVDSD(V) PID

to 14 volts.

- With the engine still running at idle, measure battery and record:

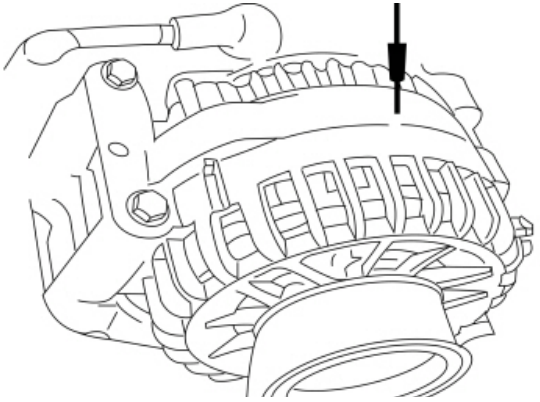
Positive Lead	Measurement / Action	Negative Lead
C102B-1		

Is the recorded battery voltage within +/- above 0.5 volt of the PID ?

Yes	GO to A6
No	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).

A6 CHECK THE GENERATOR OUTPUT

- Increase the engine rpm, While still commanding GENVDSD (V) PID to 14 Volts.
- With the engine running, measure and record:

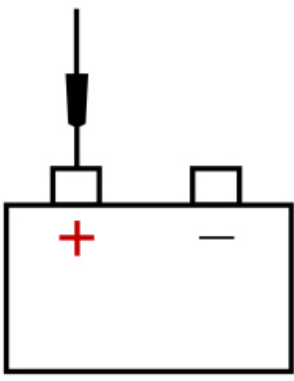
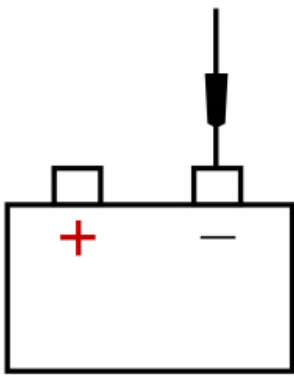
Positive Lead	Measurement / Action	Negative Lead
C102B-1		

Is the voltage above 0.5 volt of the PID?

Yes	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	GO to A7

A7 COMPARE THE SUPPLY VOLTAGE (VPWR) PID (PARAMETER IDENTIFICATION) TO BATTERY VOLTAGE

- With the engine running at idle, measure and record:

Positive Lead	Measurement / Action	Negative Lead
		

- Using a diagnostic scan tool, view [PCM PID](#).
- Access the [PCM](#) and monitor the [VPWR\(V\)](#) [PID](#)

Does the [PID](#) accurately display battery voltage within ± 0.5 volt of the recorded battery voltage?

Yes	The system is operating correctly at this time. Check for loose wiring.
No	GO to A8

A8 CHECK PCM (POWERTRAIN CONTROL MODULE) SUPPLY VOLTAGE CIRCUITS

- Turn the headlamps and heater blower off.
- Ignition OFF.
- Disconnect for 2.7L engine [PCM_C1232B](#) .
- Disconnect for 3.5L engine [PCM_C175B](#) .
- Connect a fused jumper wire:

Positive Lead	Measurement / Action	Negative Lead
2.7L engine C1232B-74 PCMPR		Ground
3.5L engine C175B-74 PCMPR		Ground

- Ignition ON, engine OFF.
- Measure: for 2.7L engine

Positive Lead	Measurement / Action	Negative Lead
C1232B-2		Ground
C1232B-16		Ground
C1232B-17		Ground

- Measure: for 3.5L engine

Positive Lead	Measurement / Action	Negative Lead
C175B-2		Ground
C175B-16		Ground
C175B-17		Ground

Are the voltages greater than 10.5 V?

Yes	GO to A9
No	REPAIR the affected circuit(s).

A9 CHECK PCM (POWERTRAIN CONTROL MODULE) GROUND FOR HIGH RESISTANCE

- Turn the headlamps and heater blower off.
- Ignition OFF.
- Disconnect for 2.7L engine PCM C1232B .
- Disconnect for 3.5L engine PCM C175B .
- Ignition ON.
- Measure: for 2.7L engine

Positive Lead	Measurement / Action	Negative Lead
C1232B-47		Ground
C1232B-61		Ground
C1232B-62		Ground
C1232B-46		Ground
C1232B-76		Ground
C1232B-77		Ground

- Measure: for 3.5L engine

Positive Lead	Measurement / Action	Negative Lead
C175B-46		Ground
C175B-47		Ground
C175B-61		Ground
C175B-62		Ground
C175B-76		Ground
C175B-77		Ground

Are the voltages within 0.5 volt of the recorded battery voltage?

Yes	GO to A10
No	REPAIR the affected circuit(s).

A10 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the PCM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK <u>OASIS</u> for any applicable service articles: <u>TSB</u> , <u>GSB</u> , <u>SSM</u> or <u>FSA</u> . If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern,  Guided Routine available in the on-line Workshop Manual.
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST B : SYSTEM VOLTAGE LOW OR BATTERY IS DISCHARGED

Refer to Wiring Diagrams Cell 12 for schematic and connector information.

Normal Operation and Fault Conditions

With the engine running, the charging system supplies voltage to the battery and the vehicle electrical system through the high current BJB and battery B+ cable. The PCM monitors this B+ voltage through PCM VPWR or FPPWR circuits. If the charging system voltage drops 1.5 volts or more below the generator voltage desired (GENVDSD), the DTC sets and the charging system MIL illuminates after 30 seconds.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
<u>PCM</u> P0562:00	System Voltage Low: No Sub Type Information	If voltage drops 1.5 volts or more below the generator voltage desired (calculated by the <u>PCM</u>), this <u>DTC</u> sets after 30 seconds.
<u>PCM</u> P065B:00	Generator 'A' Control Circuit Range/Performance: No Sub Type Information	This <u>DTC</u> sets when the generator reports an internal regulator failure.
<u>PCM</u> P065C:00	Generator 'A' Mechanical Performance: No Sub Type Information	This <u>DTC</u> sets by a defective OAD pulley, slipping belt or defective alternator.
<u>BCM</u> B11D9:16	Vehicle Battery: Circuit Voltage Below Threshold	A continuous and on-demand <u>DTC</u> that sets in the <u>BCM</u> if the <u>BCM</u> detects less than expected battery voltage on the voltage supply input circuit.

Possible Sources

- Battery
- Fuses or fusible links
- Generator
- PCM
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect the FEAD system. REFER to 303-05.
- Inspect for abnormal ignition-off current drain(s).
- Inspect the battery.
- Inspect the high current BJB for loose, damaged or corroded connections.
- Verify the high current BJB fuse 201 (300A).

NOTE: Make sure battery voltage is greater than 12.2 volts with engine OFF, prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

B1 PERFORM INSPECTION AND VERIFICATION

- Perform Inspection and Verification procedure in this section.

Was an obvious cause for an observed or reported concern found?

Yes	CORRECT the cause as necessary.
No	GO to B2

B2 RETRIEVE DIAGNOSTIC TROUBLE CODES (DTCS)

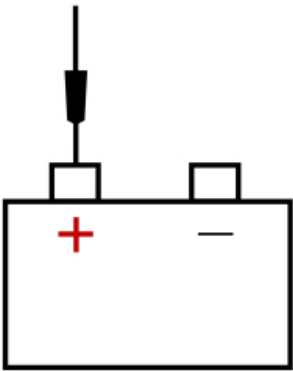
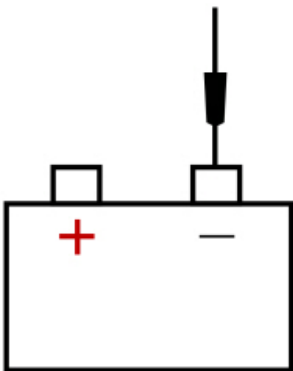
- Using a diagnostic scan tool, perform the PCM self-test.

Is **DTC P065B, P065C, U012D or U042E** present?

Yes	P065B and P065C are present, GO to Pinpoint Test F If P065B is present without P065C, INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation). If P065C is present without P065B, GO to Pinpoint Test F If U012D or U042E is present, GO to Pinpoint Test G
No	GO to B3

B3 CHECK THE GENERATOR CONNECTIONS

- Ignition OFF.
- Disconnect all of the generator connectors and inspect for:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the generator connectors. Make sure they seat and latch correctly.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
		Battery negative (-) post 

- Measure:

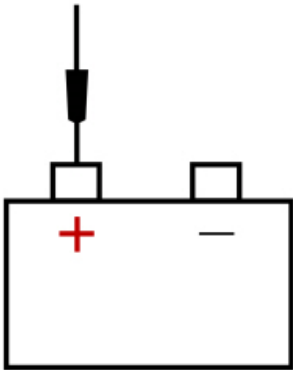
Positive Lead	Measurement / Action	Negative Lead
C102B-1		Ground

Is the voltage within 0.5 volt of the recorded battery voltage?

Yes	GO to B4
No	TIGHTEN or INSTALL a new generator B+ nut as needed. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation). VERIFY high current BJB fuse F201 (300A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

B4 CHECK THE VOLTAGE DROP IN THE GENERATOR B+ CIRCUIT

- Start the engine.
- Using a diagnostic scan tool active command, GENVDSD to 14.5V Measure:

Positive Lead	Measurement / Action	Negative Lead
C102B-1 Generator (B+)		 Battery positive (+) post side.

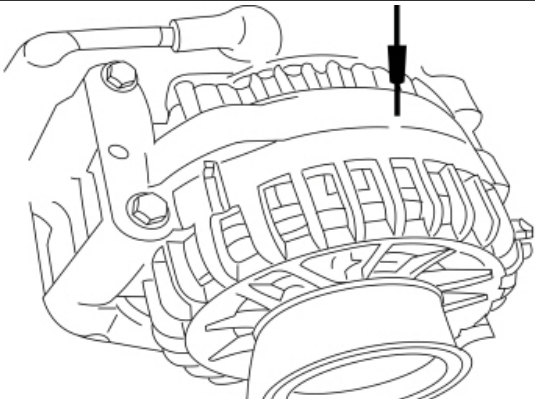
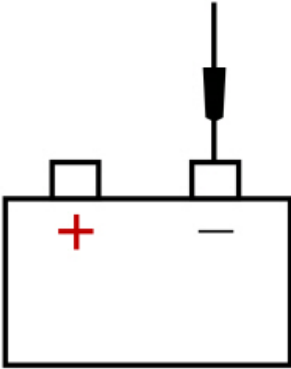
- Perform a wiggle test of the generator wiring and connections while measuring voltage drop.

Is the voltage drop less than 0.5 volt?

Yes	GO to B5
No	INSPECT and REPAIR any corrosion in the generator B+ circuit or positive battery cable connections.

B5 CHECK THE VOLTAGE DROP IN THE VEHICLE GROUNDS

- With the engine still running at idle, headlamps on and heater blower on high, measure:

Positive Lead	Measurement / Action	Negative Lead
 Generator case		Battery negative (-) post side. 

Is the voltage drop less than 0.5 volt?

Yes	GO to B6
No	INSPECT and REPAIR the engine ground, generator ground or the battery ground for corrosion.

B6 MONITOR THE GENERATOR VOLTAGE DESIRED (GENVDSD) PID (PARAMETER IDENTIFICATION) WHILE COMMANDED

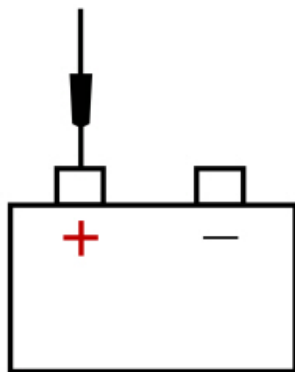
- Using a diagnostic scan tool, view the PCM GENVDSD PID.
- Using a diagnostic scan tool active command, set

Access the PCM and monitor the GENVDSD (V) PID

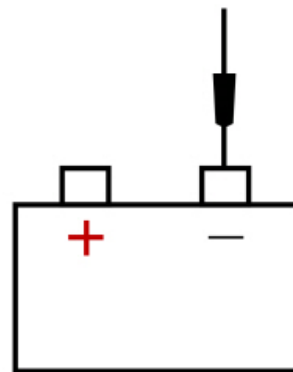
to 14.5 volts.

- With the engine still running at idle, measure battery and record:

Positive Lead	Measurement / Action	Negative Lead
		Battery negative (-) post side.



V



Is the recorded battery voltage within ± 0.5 volt of the PID ?

Yes	GO to B7
No	GO to B11

B7 COMPARE THE SUPPLY VOLTAGE (VPWR) PID (PARAMETER IDENTIFICATION) TO BATTERY VOLTAGE

- With the engine still running at idle, headlamps on and blower on high, measure and record:

Positive Lead	Measurement / Action	Negative Lead
	V	Battery negative (-) post side.

- Access the PCM and monitor the VPWR (V) PID

Does the PID accurately display battery voltage within ± 0.5 volt of the recorded battery voltage?

Yes	GO to B8
No	REPAIR high resistance or loose connections in the affected <u>PCM</u> power circuit(s).

B8 CHECK PCM (POWERTRAIN CONTROL MODULE) VOLTAGE SUPPLY CIRCUITS

- Ignition OFF.
- Disconnect for 2.7L PCM C1232B .
- Disconnect for 3.5L PCM C175B .
- Connect a fused jumper wire:

Positive Lead	Measurement / Action	Negative Lead
2.7L engine C1232B-74 PCMPR		Ground
3.5L engine C175B-74 PCMPR		Ground

- Ignition ON, engine OFF.

- Measure and record: for 2.7L

Positive Lead	Measurement / Action	Negative Lead
C1232B-2	$\overline{\overline{V}}$	Ground
C1232B-16	$\overline{\overline{V}}$	Ground
C1232B-17	$\overline{\overline{V}}$	Ground

- Measure and record: for 3.5L

Positive Lead	Measurement / Action	Negative Lead
C175B-2	$\overline{\overline{V}}$	Ground
C175B-16	$\overline{\overline{V}}$	Ground
C175B-17	$\overline{\overline{V}}$	Ground

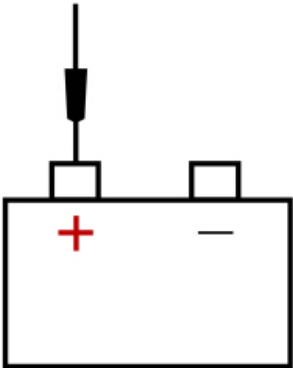
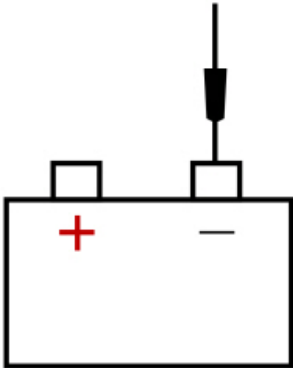
Are the voltages within 0.5 volt of the recorded battery voltage?

Yes	GO to B9
No	REPAIR the affected circuit(s).

B9 CHECK PCM (POWERTRAIN CONTROL MODULE) GROUND FOR HIGH RESISTANCE

- NOTE:** Measure battery voltage at the battery.

With the engine still running at idle, turn off all accessory loads, measure and record:

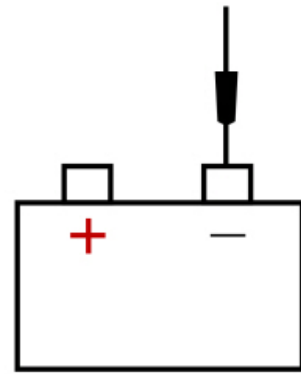
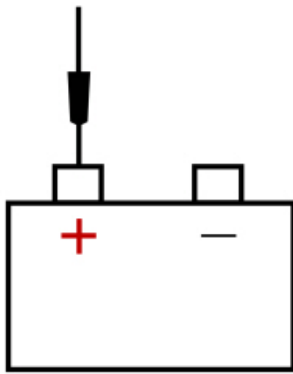
Positive Lead	Measurement / Action	Negative Lead
	$\overline{\overline{V}}$	

- Access the PCM and monitor the VPWR(V) PID

and record.

- With the engine still running at idle, turn headlamps ON and blower on HIGH.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
	$\overline{\overline{V}}$	



- Using a diagnostic scan tool, view

Access the PCM and monitor the VPWR (V) PID

and record.

Does the PID read within ± 0.5 volt of battery voltage with accessory loads on and off?

Yes	GO to B10
No	REPAIR the affected <u>PCM</u> ground circuit(s).

B10 MONITOR THE SUPPLY VOLTAGE (VPWR) PID (PARAMETER IDENTIFICATION)

- NOTE:** Measure battery voltage at the battery.
With the engine still running at idle, turn off all accessory loads.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead

- Access the PCM and monitor the VPWR (V) PID
- and record.
- Momentarily accelerate the engine to Wide Open Throttle (WOT) and release. Repeat this step 4-5 times while continuing to monitor the PID.

Does the PID stay within 0.5 volt of the recorded battery voltage when the engine Revolutions Per Minute (RPM) are increased?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. INSPECT and REPAIR any connector or pin issues found. If no connector or pin issues are found, PERFORM the battery drain test. REFER to: Battery Drain Check (414-01 Battery, Mounting and Cables, General Procedures).
No	GO to B12

B11 CHECK GENERATOR CLUTCH OPERATION

NOTE: A low coefficient belt can slip and destroy the generator clutch. A slipping belt gets hot enough to shrink. The tensioner mark indicator location will show the belt to be out of tolerance on the small side.

- Ignition OFF.

- Perform the generator clutch component test. [GO to Pinpoint Test I](#)

Is the generator clutch OK?

Yes	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	INSTALL a new generator clutch. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).

B12 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

NOTE: A low coefficient belt can slip and destroy the generator clutch. A slipping belts get hot enough to shring. The tensioner mark indicator location will show the belt to be out of tolerance on the small side.

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the PCM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable service articles: TSB , GSB , SSM or FSA . If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern,  Guided Routine available in the on-line Workshop Manual.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST C : GENERATOR OVER TEMPERATURE

Normal Operation and Fault Conditions

DTC Fault Trigger Conditions

<u>DTC</u>	Description	Fault Trigger Condition
<u>PCM</u> P0A3B:00	Generator 'A' Over Temperature: No Sub Type Information	Sets in the <u>PCM</u> when generator over temperature is detected.

Possible Sources

- PCM

C1 PERFORM INSPECTION AND VERIFICATION

- Ignition ON.
- Using a diagnostic scan tool, perform the PCM self-test and DIAGNOSE any cooling fan Diagnostic Trouble Codes (DTCs).

Is DTC P0A3B recorded?

Yes	If no cooling fan Diagnostic Trouble Codes (DTCs) are present, INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	The system is operating correctly at this time.

PINPOINT TEST D : P2D57

Refer to Wiring Diagrams Cell 12 for schematic and connector information.

DTC Fault Trigger Conditions

<u>DTC</u>	Description	Fault Trigger Condition
<u>PCM</u> P2D57:00	Generator 'B' Control Circuit Range/Performance: No Sub Type Information	This <u>DTC</u> sets when the generator reports an internal regulator failure.
<u>BCM</u>		A continuous and on-demand <u>DTC</u> that sets in the <u>BCM</u> if the <u>BCM</u> detects higher or

Possible Sources

- Battery
- Fuses or fusible links
- Generator
- PCM
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect the FEAD system. REFER to 303-05.
- Inspect for abnormal ignition-off current drain(s).
- Inspect the battery.
- Inspect the high current BJB for loose, damaged or corroded connections.
- Verify the BJB fuse F1 (125A).

NOTE: Make sure battery voltage is greater than 24 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

D1 PERFORM INSPECTION AND VERIFICATION

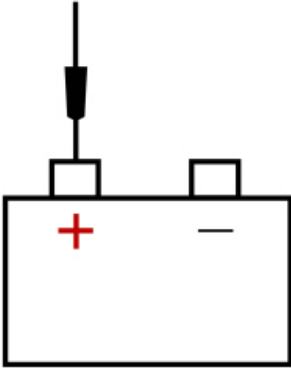
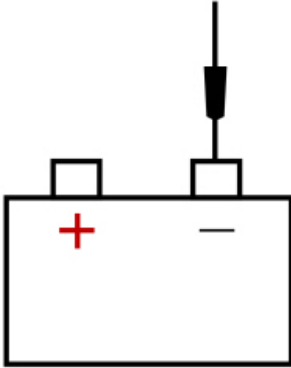
- Perform Inspection and Verification procedure in this section.

Was an obvious cause for an observed or reported concern found?

Yes	CORRECT the cause as necessary.
No	GO to D2

D2 MEASURE THE "B" SENSE VOLTAGE

- Ignition OFF.
- Disconnect generator C1251B .
- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
24V Battery 		24V Battery 

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1251A-1		Ground

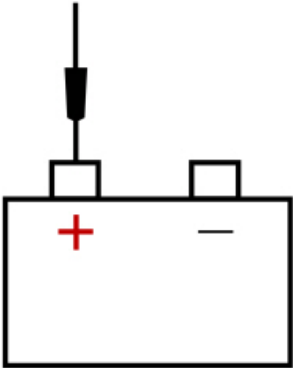
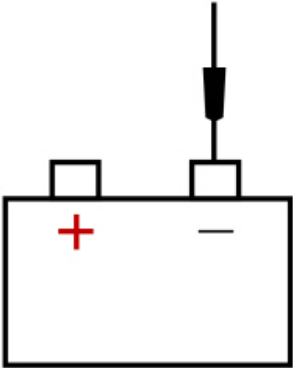
Is the "B" sense voltage equal to the recorded battery voltage?

Yes	GO to D3
No	VERIFY the BJB fuse F1 (125A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

D3 "B" SENSE CIRCUIT LOAD TEST

at the beginning of this section. To avoid connector terminal damage, use the Flex Probe Kit for the test light probe connection to the vehicle. Do not use the test light probe directly on any connector.

- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
Battery positive (+) post 	$\overline{\overline{V}}$	Battery negative (-) post 

- Connect the load to each circuit and measure:

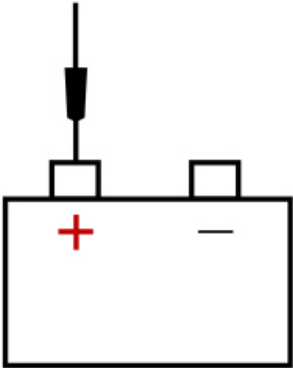
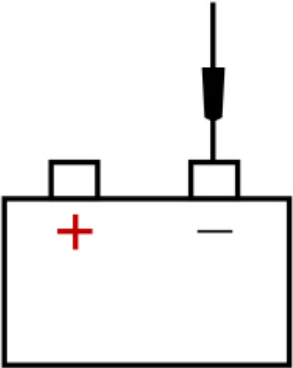
Positive Lead	Measurement / Action	Negative Lead
C1251B-1	$\overline{\overline{V}}$	Ground

Is the "B" sense voltage within ± 0.5 volt of the recorded battery voltage?

Yes	GO to D4
No	VERIFY the BJB fuse 25 (10A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

D4 CHECK THE GENERATOR CONNECTIONS

- Ignition OFF.
- Disconnect Generator C1251B .
- Disconnect Generator C1251A .
- Inspect for :
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins pushed-out pins – install new pins as necessary
 - Reconnect the generator connectors. Make sure they seat and latch correctly
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
Battery positive (+) post 	$\overline{\overline{V}}$	Battery negative (-) post side. 

- Measure :

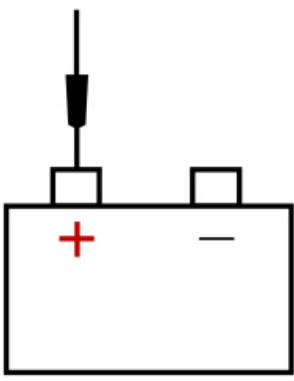
Positive Lead	Measurement / Action	Negative Lead
C1251B		Ground

Is the voltage within 0.5 volt of the recorded battery voltage?

Yes	GO to D5
No	TIGHTEN or INSTALL a new generator B+ nut as needed. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation). VERIFY BJB fuse F201 (300A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

D5 CHECK THE VOLTAGE DROP IN THE GENERATOR B+ CIRCUIT

- Start the engine.
- With the engine running at idle, headlamps on and blower on high, measure:

Positive Lead	Measurement / Action	Negative Lead
C1251A-1		 Battery (+) positive terminal pole side

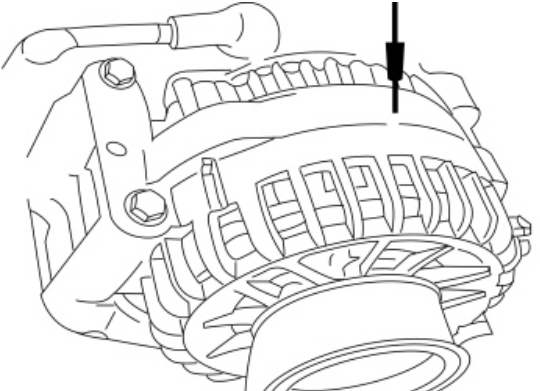
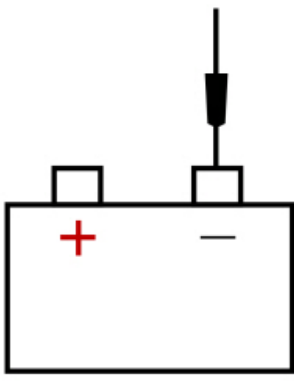
- Perform a wiggle test of the generator wiring and connections while measuring voltage drop.

Is the voltage drop less than 0.5 volt?

Yes	GO to D6
No	INSPECT and REPAIR any corrosion in the generator B+ circuit or positive battery cable connections.

D6 CHECK THE VOLTAGE DROP IN THE VEHICLE GROUNDS

- With the engine still running at idle, headlamps on and heater blower on high, measure:

Positive Lead	Measurement / Action	Negative Lead
 Generator case		

Is the voltage drop less than 0.5 volt?

Yes	GO to D7
No	INSPECT and REPAIR the engine ground, generator ground or the battery ground for corrosion.

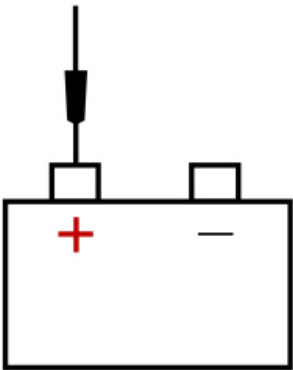
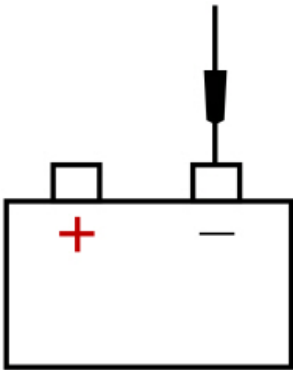
D7 MONITOR THE GENERATOR VOLTAGE DESIRED (GENVDSD) PID (PARAMETER IDENTIFICATION) WHILE COMMANDED

- Using a diagnostic scan tool, view the DC / AC inverter GENVDSD PID.
- Using a diagnostic scan tool active command, set

Access the PCM and monitor the GENVDSD (V) PID

to 14 volts.

- With the engine still running at idle, measure battery and record:

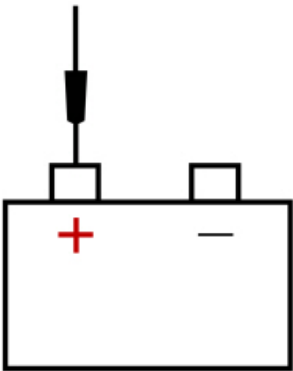
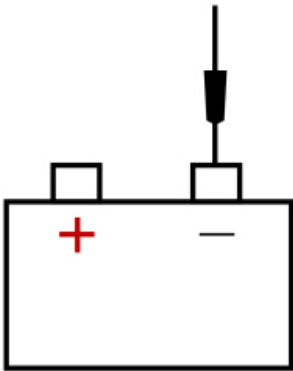
Positive Lead	Measurement / Action	Negative Lead
		

Is the recorded battery voltage within ± 0.5 volt of the PID ?

Yes	GO to D8
No	GO to D12

D8 COMPARE THE SUPPLY VOLTAGE (VPWR) PID (PARAMETER IDENTIFICATION) TO BATTERY VOLTAGE

- With the engine still running at idle, headlamps on and blower on high, measure and record:

Positive Lead	Measurement / Action	Negative Lead
		

- Access the PCM and monitor the VPWR (V) PID

Does the PID accurately display battery voltage within ± 0.5 volt of the recorded battery voltage?

Yes	GO to D9
No	REPAIR high resistance or loose connections in the affected <u>DC</u> / <u>AC</u> inverter power circuit(s).

D9 CHECK DC (DIRECT CURRENT) / AC (ALTERNATING CURRENT) INVERTER VOLTAGE SUPPLY CIRCUITS

- Ignition OFF.
- Disconnect DC / AC inverter C3501C .
- Ignition ON.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C3501C-6	$\overline{\text{V}}$	Ground

Are the voltages within 0.5 volt of the recorded battery voltage?

Yes	GO to D10
No	REPAIR the affected circuit(s).

D10 CHECK DC (DIRECT CURRENT) / AC (ALTERNATING CURRENT) INVERTER MODULE GROUND FOR HIGH RESISTANCE

- Measure and record:

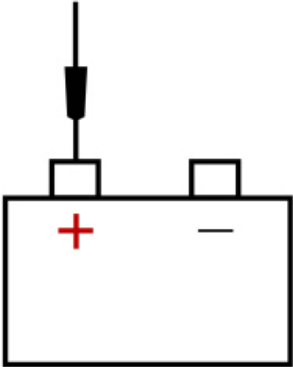
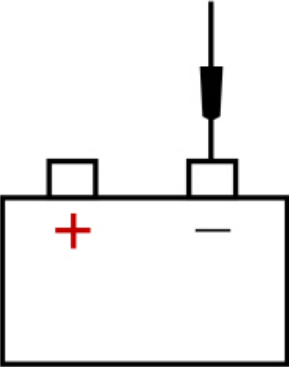
Positive Lead	Measurement / Action	Negative Lead
C3501B-1	$\overline{\text{V}}$	Ground

Is the voltage drop less than 0.5 volt?

Yes	GO to D11
No	REPAIR the affected the <u>DC</u> / <u>AC</u> ground circuit.

D11 MONITOR THE SUPPLY VOLTAGE (VPWR) PID (PARAMETER IDENTIFICATION)

- **NOTE:** Measure battery voltage at the battery.
With the engine still running at idle, turn off all accessory loads.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
	$\overline{\text{V}}$	

- Access the PCM and monitor the VPWR (V) PID and record.
- Momentarily accelerate the engine to Wide Open Throttle (WOT) and release. Repeat this step 4-5 times while continuing to monitor the PID.

Does the PID stay within 0.5 volt of the recorded battery voltage when the engine Revolutions Per Minute (RPM) are increased?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. INSPECT and REPAIR any connector or pin issues found. If no connector or pin issues are found, PERFORM the battery drain test. REFER to: Battery Drain Check (414-01 Battery, Mounting and Cables, General Procedures).
No	GO to D12

D12 CHECK GENERATOR CLUTCH OPERATION

- Ignition OFF.
- Perform the generator clutch component test. [GO to Pinpoint Test I](#)

Is the generator clutch OK?

Yes	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	INSTALL a new generator clutch. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).

D13 CHECK FOR CORRECT DC (DIRECT CURRENT) / AC (ALTERNATING CURRENT) INVERTER OPERATION

- Ignition OFF.
- Disconnect and inspect all [DC](#) / [AC](#) inverter connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the [DC](#) / [AC](#) inverter connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW the TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Guided Routine available in the on-line Workshop Manual.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST E : SECONDARY GENERATOR OVER TEMPERATURE

Normal Operation and Fault Conditions

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
PCM P2D59:00	Generator 'B' Over Temperature: No Sub Type Information	Sets in the PCM when secondary generator over temperature is detected.

Possible Sources

- [PCM](#)

E1 PERFORM INSPECTION AND VERIFICATION

- Ignition ON.
- Using a diagnostic scan tool, clear the Diagnostic Trouble Codes (DTCs).
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the [PCM](#) self-test and DIAGNOSE any cooling fan Diagnostic Trouble Codes (DTCs).

Is [DTC P0A3B](#) recorded?

Yes	If no cooling fan DTC s are present, INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	The system is operating correctly at this time.

PINPOINT TEST F : PRIMARY GENERATOR NOISE OR MECHANICAL PERFORMANCE

Normal Operation and Fault Conditions

The generator is belt-driven by the engine [FEAD](#) system. There are several sources of generator noise which include bearing noise, electrical fault noise, generator or belt pulley misalignment. A generator with certain types of diode or stator failures can also produce an audible noise.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
BCM B1513:09	Vehicle Battery 'B': Component Failures	A continuous and on-demand DTC that sets in the BCM if the BCM detects higher or Lower than expected battery voltage on the voltage supply input circuit.

Possible Sources

- [FEAD](#) belt
- Loose bolts/brackets
- Generator/pulleys

Visual Inspection and Pre-checks

- Inspect the [FEAD](#) belt.
- Inspect for loose bolts/brackets.
- Inspect the generator/pulley.

F1 CHECK FOR ACCESSORY DRIVE BELT NOISE AND LOOSE MOUNTING BRACKETS

- Ignition OFF.
- Check the [FEAD](#) belt and tensioner for damage and correct installation.
REFER to: [Accessory Drive](#) (303-05A Accessory Drive - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing).

Is the accessory drive OK?

Yes	GO to F2
No	REPAIR as necessary.

F2 CHECK THE GENERATOR MOUNTING

- Check the generator mounting for loose bolts or misalignment.

Is the generator mounted correctly?

Yes	GO to F3
No	REPAIR as necessary.

F3 CHECK THE GENERATOR FOR NOISE

- Start the engine.
- With the engine running, use a stethoscope or equivalent listening device to probe the generator and the accessory drive area for unusual mechanical noise.

Is the generator the noise source?

Yes	GO to F4
No	Diagnose the source of the engine noise. REFER to: Engine - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline (303-00 Engine System - General Information, Diagnosis and Testing).

F4 CHECK GENERATOR CLUTCH OPERATION

- Ignition OFF.
- Perform the generator clutch component test. [GO to Pinpoint Test I](#)

Is the generator clutch OK?

Yes	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	INSTALL a new generator clutch. REFER to: Generator Pulley (414-02 Generator and Regulator, Removal and Installation).

PINPOINT TEST G : U012D, U042E

Refer to Wiring Diagrams Cell 12 for schematic and connector information.

Normal Operation and Fault Conditions

The charging system supplies voltage to the battery and the vehicle electrical system through the battery B+ cable. The PCM monitors the generator output through a LIN communication circuit shared with the automatic grill shutters (AGS). The PCM uses this LIN circuit to communicate the desired voltage setpoint to the generator internal voltage regulator. The generator also uses this to communicate the generator load and error conditions to the PCM.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
PCM U012D:00	Lost Communication With Generator 'A' Control Module: No Sub Type Information	Sets if the <u>PCM</u> does not detect communication through the <u>LIN</u> circuit. This can be a result of an open or short in the <u>LIN</u> circuit. This <u>DTC</u> also sets if the generator B+ circuit is open.
PCM U042E:00	Invalid Data Received From Generator 'A' Control Module: No Sub Type Information	Sets when the <u>PCM</u> receives invalid data from the generator.

Possible Sources

- Battery monitoring sensor
- Generator
- PCM
- Active Grille Shutter (Upper Grille Shutter Actuator or Lower Grille Shutter Actuator)
- Front Active Air Dam (AAD) Actuator
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Water intrusion for LIN circuit connectors.
- Inspect high current BJB for loose, damaged or corroded connections.
- Inspect the BJB fuse 201 (300A).
- Inspect the FEAD belt.
- Inspect the battery monitoring sensor.

NOTE: Make sure battery voltage is greater than 12.2 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

G1 CHECK VEHICLE FOR PRESENCE OF GRILLE SHUTTERS

- U012D:00 and U042E:00 are usually caused by wiring or water intrusion in inline connectors.
- Clear DTC 's.
- Start engine.
- Run for 2 minutes.
- check for DTC 's.

Did DTC 's return?

Yes	GO to G2
No	Check connectors C134 and C146 under the fuse panel in engine compartment for signs of water intrusion.

G2 RETRIEVE PCM (POWERTRAIN CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS) WITH GRILLE SHUTTER ACTUATOR DISCONNECTED

- Ignition OFF.
- Disconnect Upper Grille Shutter Actuator C1766, Lower Grille Shutter Actuator C1767, Front Active Air Dam (AAD) Actuator RH C1968 .
- Ignition ON.
- Clear the DTC codes.
- Start the engine.
- Wait two minutes, Codes will not set unless engine is running.
- Using a diagnostic scan tool, scan for DTC .

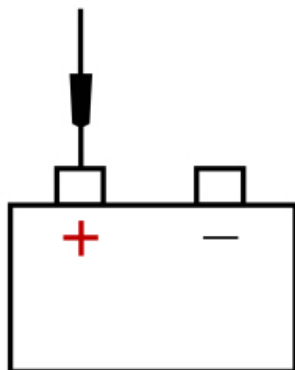
Is DTC U012D or U042E present?

Yes	If U012D or U042E is present, GO to G3
No	If there are any other DTCs present, REFER to: Active Grille Shutter (501-02 Front End Body Panels, Diagnosis and Testing). and REFER to: Active Air Dam (AAD) (501-19 Bumpers, Diagnosis and Testing).

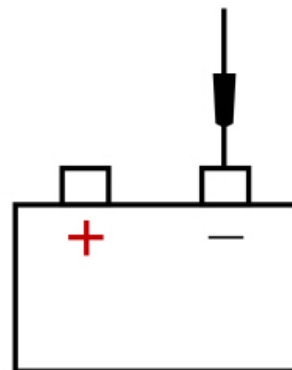
G3 COMPARE THE GENERATOR B+ CIRCUIT TO BATTERY VOLTAGE

- Measure and record:

Positive Lead	Measurement / Action	Negative Lead



V



- Measure: for (2.7L and 3.5L engines)

Positive Lead	Measurement / Action	Negative Lead
C102B-1	V	Ground

Is the voltage within 0.5 volt of the recorded battery voltage?

Yes	GO to G4
No	TIGHTEN or INSTALL a new generator B+ nut as needed. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation). VERIFY high current BJB BCMC fuse F201 (300A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

G4 CHECK THE GENERATOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect Generator (2.7L and 3.5L engines) C102A .
- Disconnect [PCM](#) (2.7L engine) C1232B .
- Disconnect [PCM](#) (3.5L engine) C175B .
- Ignition ON.
- Measure: for (2.7L and 3.5L engines)

Positive Lead	Measurement / Action	Negative Lead
C102A-1	V	Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to G5

G5 CHECK THE GENERATOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- For 2.7L and 3.5L engines, Measure:

Positive Lead	Measurement / Action	Negative Lead
C102A-1	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to G6
No	REPAIR the circuit.

G6 CHECK THE GENERATOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR AN OPEN

- For 2.7L engine, Measure:

Positive Lead	Measurement / Action	Negative Lead
C102A-1	Ω	<u>PCM</u> C1232B-49
C102A-1	Ω	Upper Active Grille shutter Actuator C1766-2
C102A-1	Ω	Lower Active Grille shutter Actuator C1767-2
C102A-1	Ω	Front Active Air Dam (AAD) Actuator <u>RH</u> C1968-2

- For 3.5L engine, Measure:

Positive Lead	Measurement / Action	Negative Lead
C102A-1	Ω	<u>PCM</u> C175B-49
C102A-1	Ω	Upper Active Grille shutter Actuator C1766-2
C102A-1	Ω	Lower Active Grille shutter Actuator C1767-2
C102A-1	Ω	Front Active Air Dam (AAD) Actuator <u>RH</u> C1968-2

Is the resistance less than 3 ohms?

Yes	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation). REPEAT the <u>PCM</u> self-test. If <u>DTC</u> U012D is retrieved again, GO to G7
No	REPAIR the affected circuit.

G7 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the PCM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK <u>OASIS</u> for any applicable Technical Service Bulletins (TSBs). If a <u>TSB</u> exists for this concern, DISCONTINUE this test and FOLLOW the <u>TSB</u> instructions. If no Technical Service Bulletins (TSBs) address this concern,  Guided Routine available in the on-line Workshop Manual.
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST H : LIN COMMUNICATION FAULT U012F AND U044D

Refer to Wiring Diagrams Cell 12-4 for schematic and connector information.

Refer to Wiring Diagrams Cell 13-70 for schematic and connector information.

Refer to Wiring Diagrams Cell 44-13 for schematic and connector information.

Normal Operation and Fault Conditions

The secondary alternator is a 24V alternator which provides current to the DC / AC for the "power to the box" feature. The regulator receives 12V power from fuse F25. The PCM communicates via LIN to the DC / AC. The DC / AC uplifts the LIN voltage to 24V and relays the signal to the 24V alternator.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
PCM U012F:00	Lost Communication With Generator 'B' Control Module: No Sub Type Information	Sets if the <u>PCM</u> does not detect communication through the <u>LIN</u> circuit. This can be a result of an open or short in the <u>LIN</u> circuit. This <u>DTC</u> also sets if the generator B+ circuit is open or <u>DC</u> / <u>AC</u> missing 12V power.
PCM U044D:00	Invalid Data Received From Generator 'B' Control Module: No Sub Type Information	Sets when the <u>PCM</u> receives invalid data from the generator.

Possible Sources

- Generator
- Wiring shorted to ground or voltage
- Alternator B+ wiring open
- Alternator regulator 12V line open
- DC / AC inverter
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

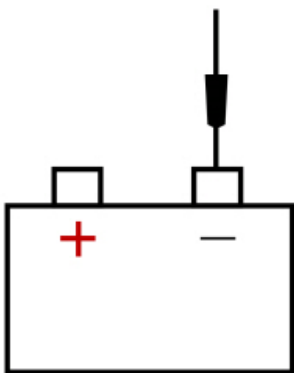
- Inspect the high current fuse F1 (125A) for loose or corroded connections
- Inspect the BJB BCMC fuse F25 (10A) for loose or corroded connections

NOTE: Make sure battery voltage is greater than 12.2 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

H1 CHECK VOLTAGE ON ALTERNATOR B+

- Measure / Record:

Positive Lead	Measurement / Action	Negative Lead
C1251B-1	$\overline{\text{V}}$	 Battery negative (-) post

Is the voltage greater than 22V?

Yes	GO to H2
No	Repair fuse F1 (125A) or charge auxiliary battery 1 and 2. or INSTALL a new battery as necessary. REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

H2 CHECK IGNITION LINE ON REGULATOR CONNECTOR

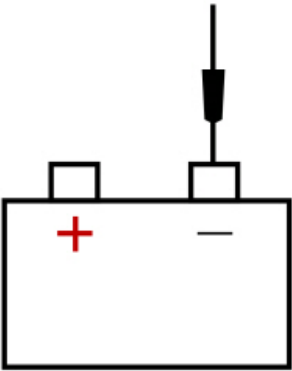
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1251A-1	$\overline{\text{V}}$	 Battery Negative (-) post

Is voltage equal to 12V battery?

Yes	GO to H3
No	Check and replace the <u>BJB BCMC</u> fuse F25 (10A) or REPAIR the wiring circuit.

- Ignition OFF.
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
C1251A-2	Ω	
		Battery Negative (-) post

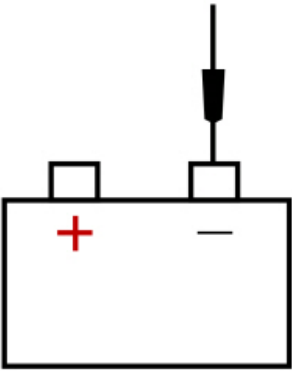
Is the resistance greater than 10,000 ohms?

Yes	GO to H4
No	REPAIR the circuit.

H4 CHECK THE ALTERNATOR LIN CIRCUIT FOR VOLTAGE

NOTE: The duty cycle on the LIN (local interconnect network) circuit should be 77%.

- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1251A-2	$\overline{\text{V}}$	
		Battery Negative (-) post

Does voltage measured equal voltage from H1 times .77 +/-1V?

Yes	REPLACE the secondary generator (24V). REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	GO to H5

H5 CHECK LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR CONTINUITY

- Ignition OFF.
- Measure:

Positive Lead	Measurement / Action	Negative Lead

C1251A-2

 Ω

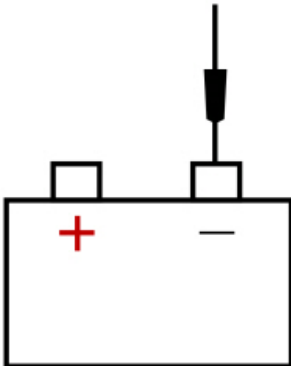
C3501C-6

Is resistance less than 3 ohms?

Yes	GO to H6
No	Repair the circuit.

H6 CHECK DC (DIRECT CURRENT) / AC (ALTERNATING CURRENT) FOR 12V IGNITION VOLTAGE

- Ignition ON.
- Disconnect DC / AC C3501C .
- Measure / Record:

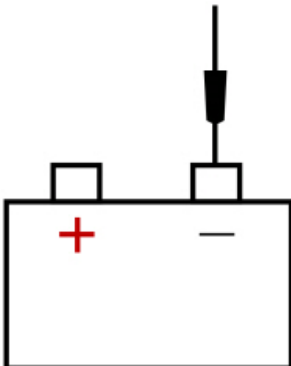
Positive Lead	Measurement / Action	Negative Lead
C3501C-1	$\overline{\text{V}}$	 Battery Negative (-) post

Is voltage equal to 12V main battery?

Yes	GO to H7
No	Check and replace the <u>BCM</u> fuse F2 (10A) or REPAIR the wiring circuit.

H7 CHECK THE DC/AC LIN CIRCUIT FOR VOLTAGE**NOTE:** The duty cycle on the LIN (local interconnect network) circuit should be 77%.

- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3501C-12	$\overline{\text{V}}$	 Battery Negative (-) post

Does voltage measured equal voltage from H6 times .77 +/-1V?

Yes	REPLACE the secondary generator (24V). REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation).
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	REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).
No	GO to H8

H8 CHECK DC/AC LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR CONTINUITY

- For 2.7L EcoBoost engine Measure:

Positive Lead	Measurement / Action	Negative Lead
C3501C-12	Ω	C1232B-34

- For 3.5L EcoBoost engine Measure:

Positive Lead	Measurement / Action	Negative Lead
C3501C-12	Ω	C175B-34

Is the resistance less than 3 ohms?

Yes	GO to H9
No	Repair the circuit.

H9 CHECK INLINE CONNECTORS LIN (LOCAL INTERCONNECT NETWORK) LINE

- Ignition OFF.
- The LIN inline connector C146-8, the pin 8 should be electrically isolated to all other pins in the connector for both male and female side.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
12A581 male harness connector inline C146-8 and 14B060 female harness connector C146-8	Ω	12A581 male harness connector C146 all other pins and 14B060 female harness connector C146 All other pins

Is resistance less than 10,000 ohms to any other pin?

Yes	Repair connector/wiring harness
No	GO to H10

H10 CHECK INLINE CONNECTORS LIN LINE

- Ignition OFF.
- The LIN inline connector C265-42, the pin 42 should be electrically isolated to all other pins in the connector except for pin 32 for both male and female side.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
12A58 male harness connector C265-42 and 14B060 female harness connector C265-42	Ω	12A58 male harness connector C265-32 all other pins except pin 32 and 14B060 female harness connector C265-32 All other pins except pin 32.

Is the resistance less than 10,000 ohms to any other pin?

Yes	Repair connector/wiring harness.
No	If DTC U044D is present the issue is most likely an intermittent wiring connection If <u>DTC</u> U012F present without U044D. The cause could be defective Alternator, <u>PCM</u> or intermittent wiring issue.

H11 CHECK INLINE CONNECTORS LIN LINE

- Ignition OFF.
- The LIN inline C265-32, the pin 32 should be electrically isolated to all other pins in the connector except for pin 42 for both male and female side.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
12A581 male harness connector C265-32 and 14B060 female harness connector C265-42	Ω	12A581 male harness connector C265-42 all other pins except pin 42 and 14B060 female harness connector C265-42 all other pins except pin 42

Is the resistance less than 10,000 ohms to any other pin?

Yes	Repair connector/wiring harness.
No	If <u>DTC U044D</u> is present the issue is most likely an intermittent wiring connection. If <u>DTC U012F</u> present without U044D. The cause could be defective Alternator, <u>PCM</u> or intermittent wiring issue. CHECK <u>OASIS</u> for any applicable <u>TSB</u> s. If a <u>TSB</u> exists for this concern, DISCONTINUE this test and FOLLOW the <u>TSB</u> instructions.

PINPOINT TEST I : GENERATOR CLUTCH COMPONENT TEST

Normal Operation and Fault Conditions

The generator clutch allows the generator rotor to continue to rotate when the engine or FEAD system slows. The clutch should slip freely and smoothly in a clockwise direction. It should not rotate freely in the counterclockwise direction. A loose FEAD belt or a weak or binding tensioner can cause the pulley to overheat. REFER to: [Charging System - 2.7L EcoBoost \(238kW/324PS\)/3.5L EcoBoost \(BM\) - System Operation and Component Description](#) (414-00 Charging System - General Information, Description and Operation).

The generator is belt-driven by the engine FEAD system. There are several sources of generator noise which include bearing noise, electrical fault noise, generator or belt pulley misalignment. A generator with certain types of diode or stator failures can also produce an audible noise.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
<u>PCM</u> P2D58:00	Generator 'B' Mechanical Performance: No Sub Type Information	This <u>DTC</u> sets when the generator "B" reports an internal mechanical failure.
<u>BCM</u> B1513:09	Vehicle Battery 'B': Component Failures	A continuous and on-demand <u>DTC</u> that sets in the <u>BCM</u> if the <u>BCM</u> detects higher or Lower than expected battery voltage on the voltage supply input circuit.

Possible Sources

- FEAD belt
- Loose bolts/brackets
- Generator/pulleys

Visual Inspection and Pre-checks

- Inspect the FEAD belt.
- Inspect for loose bolts/brackets.
- Inspect the generator/pulley.

I1 INSPECT THE GENERATOR CLUTCH

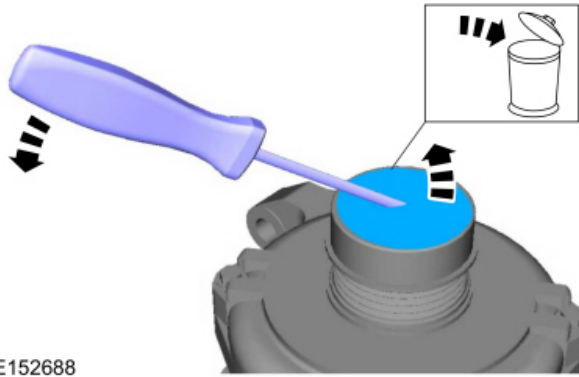
- Remove the generator.
REFER to: [Generator - 2.7L EcoBoost \(238kW/324PS\)](#) (414-02 Generator and Regulator, Removal and Installation).
REFER to: [Generator - 3.5L EcoBoost \(BM\)](#) (414-02 Generator and Regulator, Removal and Installation).
- Inspect the generator clutch for heat damage.

Is there evidence of heat damage?

Yes	INSTALL a new generator clutch. REFER to: Generator Pulley (414-02 Generator and Regulator, Removal and Installation). INSPECT the <u>FEAD</u> system. REFER to: Accessory Drive Belt - Vehicles With: Dual Generators (303-05A Accessory Drive - 2.7L EcoBoost (238kW/324PS), Removal and Installation). REFER to: Accessory Drive Belt (303-05C Accessory Drive - 3.5L EcoBoost (BM), Removal and Installation).
No	GO to I2

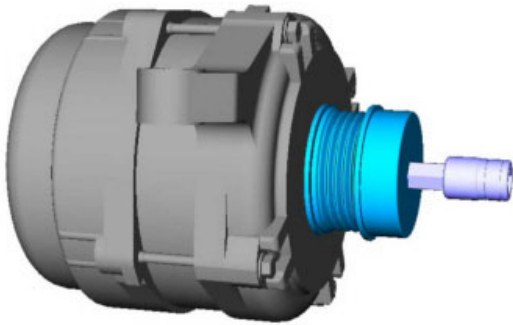
I2 CHECK THE GENERATOR CLUTCH FOR SMOOTH ROTATION

- Using a small screwdriver or similar tool, insert the tool through the rubber button on the center of the pulley cap and pry off the cap. Discard the cap. A new cap must be installed.



E152688

- Using a 17 mm hex tool bit (such as a Snap-on® SAM17E2 or equivalent) and socket wrench, insert the 17 mm hex tool bit into the end of the clutch shaft.



E152689

- While holding the clutch pulley firmly by hand, turn the clutch shaft clockwise. The clutch shaft should rotate smoothly and freely.

Does the clutch shaft rotation feel rough or seized?

Yes	INSTALL a new generator clutch (If equipped). REFER to: Generator Pulley (414-02 Generator and Regulator, Removal and Installation).
No	GO to I3

I3 CHECK FOR REVERSE ROTATION RESISTANCE

- While holding the clutch pulley firmly by hand, turn the clutch shaft counterclockwise.

Is there some resistance (a spring feel)?

Yes	GO to I4
No	INSTALL a new generator clutch (If equipped). REFER to: Generator Pulley (414-02 Generator and Regulator, Removal and Installation).

I4 CHECK FOR REVERSE ROTATION

- While holding the clutch pulley firmly by hand, turn the clutch shaft counterclockwise.

Does the clutch shaft rotate freely?

Yes	INSTALL a new generator clutch (If equipped). REFER to: Generator Pulley (414-02 Generator and Regulator, Removal and Installation).
No	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).

PINPOINT TEST J : RADIO INTERFERENCE

NOTE: If the Original Equipment Manufacturer (OEM) Audio Control Module (ACM) has been replaced with an aftermarket unit, the vehicle may not pass this test. Return the vehicle to Original Equipment Manufacturer (OEM) condition before following this pinpoint test.

NOTE: If the engine is operated at greater than 2,000 Revolutions Per Minute (RPM) momentarily, the generator self-excites. Make sure when the

generator is disconnected the engine rpm stays below 2,000 Revolutions Per Minute (RPM). If it rises above 2,000 Revolutions Per Minute (RPM), turn the ignition to the OFF position and start the test over again.

NOTE: Inspect for any aftermarket accessories that have been added to the vehicle. Check the wiring for these accessories and be sure they have not been attached to the generator circuits and are positioned away from the generator wiring.

Normal Operation and Fault Conditions

The generator radio suppression equipment reduces interference transmitted through the speakers by the vehicle electrical system.

Possible Sources

- Generator
- In-vehicle entertainment system
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect the generator.
- Inspect the in-vehicle entertainment system.

J1 VERIFY THE GENERATOR IS THE SOURCE OF THE AUDIO SYSTEM INTERFERENCE

- Start the engine.
- Allow the engine to idle.
- Tune the audio system to a station where interference is present.
- Ignition OFF.
- Disconnect Generator C102A .
- Start the engine.
- Allow the engine to idle.

Is the interference present with the generator disconnected?

Yes	DIAGNOSE the audio system. Refer to the appropriate section in Group 415 for the procedure.
No	INSTALL a new generator. REFER to: Generator - 2.7L EcoBoost (238kW/324PS) (414-02 Generator and Regulator, Removal and Installation). REFER to: Generator - 3.5L EcoBoost (BM) (414-02 Generator and Regulator, Removal and Installation).

PINPOINT TEST K : BATTERY MONITORING SENSOR FAULTS

Refer to Wiring Diagrams Cell 12 for schematic and connector information.

Normal Operation and Fault Conditions

The **BCM** monitors the battery state of charge using the battery monitoring sensor attached to the negative battery cable. Battery voltage is hardwired to the battery monitoring sensor and data is transferred from the battery monitoring sensor to the **BCM** via a **LIN** circuit.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
BCM B11DB:02	Battery Monitoring Module 'A': General Signal Failure	This DTC sets if the BCM receives corrupted data from the battery monitoring sensor over the LIN .
BCM B11DB:08	Battery Monitoring Module 'A': Bus Signal/Message Failures	This DTC sets if the BCM receives corrupted data from the battery monitoring sensor over the LIN .
BCM B11DB:09	Battery Monitoring Module 'A': Component Failures	This DTC sets if the BCM detects a fault on the battery monitoring sensor LIN .
BCM B11DB:11	Battery Monitoring Module 'A': Circuit Short To Ground	This DTC sets if the BCM detects low voltage on the battery monitoring sensor LIN .
BCM B11DB:9A	Battery Monitoring Module 'A': Component or System Operating Conditions	This DTC sets if the BCM receives corrupted data from the battery monitoring sensor over the LIN .
BCM B1489:11	Battery Monitoring System (BMS) Sensor Power: Circuit Short To Ground	This DTC sets if the BCM receives no data from the battery monitoring sensor over the LIN .

Possible Sources

- Battery monitoring sensor
- **BCM**
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect the battery monitoring sensor.

- Inspect the battery monitoring sensor connector.
- Inspect the BJB fuse 201 (300A).

NOTE: Make sure battery voltage is greater than 12.2 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

K1 CHECK ELECTRICAL CONNECTOR CONDITION

- Disconnect battery monitoring sensor C1689 .
- Check the Battery Monitoring Sensor electrical connections for security, damage and corrosion.
- Check the battery cable connections.
- Connect battery monitoring sensor C1689 .

Are all connectors clean and connected properly?

Yes	GO to K2
No	REPAIR any corrosion in the battery cable connections. REPAIR any damaged, bent or pushed-out pins.

K2 RETRIEVE BCM (BODY CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCs)

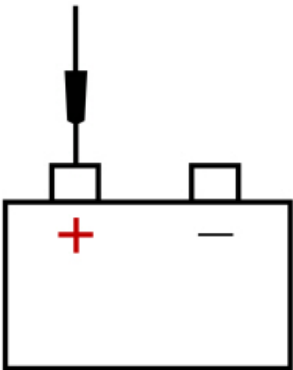
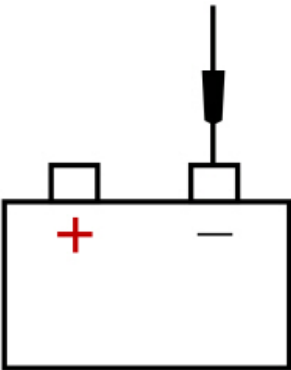
- Ignition ON.
- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs) in all modules.
- Using a diagnostic scan tool, perform the BCM self-test.

Did the DTC return?

Yes	GO to K3
No	For any PCM or BCM DTC refer to <u>DTC</u> charts in this section. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

K3 CHECK THE BATTERY MONITORING SENSOR SUPPLY VOLTAGE

- Ignition OFF.
- Disconnect battery monitoring sensor C1689 .
- Measure and record:

Positive Lead	Measurement / Action	Negative Lead
		

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1689-2		Ground

Is the voltage within 0.5 volt of the recorded battery voltage?

Yes	GO to K4
No	VERIFY <u>BJB</u> fuse 201(300A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

K4 CHECK THE BATTERY MONITORING SENSOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect [BCM_C2280F](#) .
- Disconnect [BMS_C1689](#) .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1689-1	$\overline{\text{V}}$	Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to K5

K5 CHECK THE BATTERY MONITORING SENSOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1689-1	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to K6
No	REPAIR the circuit.

K6 CHECK THE BATTERY MONITORING SENSOR LIN (LOCAL INTERCONNECT NETWORK) CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1689-1	Ω	C2280F-4

Is the resistance less than 3 ohms?

Yes	INSTALL a new battery monitoring sensor. REFER to: Battery Monitoring Sensor (414-01 Battery, Mounting and Cables, Removal and Installation). CLEAR all Diagnostic Trouble Codes and PERFORM self-test again. If BCM DTC U1007:00 returns, GO to K7
No	REPAIR the circuit.

K7 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all [BCM](#) connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the [BCM](#) connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW the TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new BCM . REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST L : B11DB:49**Normal Operation and Fault Conditions****DTC Fault Trigger Conditions**

<u>DTC</u>	Description	Fault Trigger Condition
<u>BCM_B11DB:49</u>	Battery Monitoring Module 'A': Internal Electronic Failure	Sets in the <u>BCM</u> when an internal electronic failure is detected.

Possible Sources

- BCM

L1 PERFORM INSPECTION AND VERIFICATION

- Ignition ON.
- Using a diagnostic scan tool, clear the Diagnostic Trouble Codes (DTCs).
- Wait 10 seconds.
- Using a diagnostic scan tool, perform the BCM self-test.

Is DTC B11DB:49 recorded?

Yes	CLEAR the <u>DTC</u> . REPEAT the <u>BCM</u> self-test. If <u>DTC B11DB:49</u> is retrieved, INSTALL new battery monitoring sensor. REFER to: Battery Monitoring Sensor (414-01 Battery, Mounting and Cables, Removal and Installation).
No	The system is operating correctly at this time.

PINPOINT TEST M : B11DB:55**Normal Operation and Fault Conditions**

CHECK the vehicle service history for recent service actions related to this module.

DTC Fault Trigger Conditions

<u>DTC</u>	Description	Fault Trigger Condition
<u>BCM_B11DB:55</u>	Battery Monitoring Module 'A': Not Configured	Sets due to incomplete or incorrect <u>PMI</u> procedures.

Possible Sources

- Incomplete or incorrect PMI procedures.

M1 RETRIEVE BCM (BODY CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCs)

- Using a diagnostic scan tool, perform the BCM self-test.

Is DTC B11DB:55 recorded?

Yes	INSTALL <u>BCM</u> As-Built data from <u>PTS</u> following diagnostic scan tool instructions under Module Programming>BCM - Configuration.
No	GO to M2

M2 RELEARN THE BATTERY MONITOR SYSTEM (BMS) STATUS

- Using the service scan tool, run the BMS reset function.
- Using a diagnostic scan tool, perform the BCM self-test.

Is the B11DB:55 still stored?

Yes	Locate the part number on the <u>BMS</u> installed and ensure it is the correct <u>BMS</u> for this vehicle using the Ford Parts catalog. Replace the <u>BMS</u> with the correct component. REFER to: Battery Monitoring Sensor (414-01 Battery, Mounting and Cables, Removal and Installation).
No	Verify repairs are completed and that the customer symptom has been resolved.

PINPOINT TEST N : BATTERY CURRENT SENSOR FAULTS**Normal Operation and Fault Conditions**

CHECK the vehicle service history for recent service actions related to this module.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Condition
<u>BCM</u> B130C:12	Load Shed Control: Circuit Short To Battery	This <u>DTC</u> sets in the <u>BCM</u> when the <u>BCM</u> senses a short in the battery current sensor control circuit.
<u>BCM</u> B130C:14	Load Shed Control: Circuit Short To Ground Or Open	This <u>DTC</u> sets in the <u>BCM</u> when the <u>BCM</u> senses an open or ground in the battery current sensor control circuit.
<u>BCM</u> B1438:03	Battery Current Sensor: Frequency Modulated / Pulse Width Modulated Failures	This <u>DTC</u> sets in the <u>BCM</u> when the <u>BCM</u> does not indicate current from the battery current sensor.

Possible Sources

- Battery current sensor
- Wiring, terminals or connectors

Visual Inspection and Pre-checks

- Inspect the battery current sensor
- Inspect the battery current sensor connector

NOTE: Make sure battery voltage is greater than 12.2 volts prior to and during this pinpoint test.

NOTE: Do not have a battery charger attached during vehicle testing.

N1 CHECK THE BATTERY CURRENT SENSOR

- Inspect the battery current sensor for the following:
 - physical damage
 - corrosion
 - disconnected electrical connector
 - battery ground cable routed through the battery current sensor
 - debris between the battery current sensor and the battery ground cable

Are any of these conditions found during inspection?

Yes	REPAIR as necessary or INSTALL a new battery current sensor. REFER to: Battery Current Sensor (414-01 Battery, Mounting and Cables, Removal and Installation).
No	GO to N2

N2 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT

- Ignition OFF.
- Disconnect Battery current sensor C3888 .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1		Ground

Is the voltage between 4.8 and 5.2 volts?

Yes	GO to N6
No	If the voltage is less than 4.8 volts, GO to N4 . If the voltage is greater than 5.2 volts, GO to N3

N3 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect BCM C2280F .
- Using the Terminal Release Kit, release and temporarily remove BCM C2280F-3.
- Connect BCM C2280F .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	INSTALL C2280F-3 and GO to N14

N4 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect BCM C2280F .
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to N5
No	REPAIR the circuit.

N5 CHECK THE BATTERY CURRENT SENSOR REFERENCE VOLTAGE CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	Ω	C2280F-3

Is the resistance less than 3 ohms?

Yes	GO to N13
No	REPAIR the circuit.

N6 CHECK THE BATTERY CURRENT SENSOR SIGNAL RETURN CIRCUIT

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-1	$\overline{\text{V}}$	C3888-2

Is the voltage between 4.8 and 5.2 volts?

Yes	GO to N9
No	GO to N7

N7 CHECK THE BATTERY CURRENT SENSOR SIGNAL RETURN CIRCUIT FOR VOLTAGE

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-2	$\overline{\text{V}}$	Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to N8

N8 CHECK THE BATTERY CURRENT SENSOR SIGNAL RETURN CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect BCM C2280F .
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-2	Ω	C2280F-19

Is the resistance less than 3 ohms?

Yes	GO to N13
No	REPAIR the circuit.

N9 CHECK THE BATTERY CURRENT SENSOR FEEDBACK CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect BCM_C2280F .
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-3	$\overline{V}$	Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to N10

N10 CHECK THE BATTERY CURRENT SENSOR FEEDBACK CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect BCM_C2280F .
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-3	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to N11
No	REPAIR the circuit.

N11 CHECK THE BATTERY CURRENT SENSOR FEEDBACK CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C3888-3	Ω	C2280F-8

Is the resistance less than 3 ohms?

Yes	GO to N12
No	REPAIR the circuit.

N12 CHECK THE BATTERY CURRENT SENSOR FEEDBACK CIRCUIT FOR A SHORT TO THE SIGNAL RETURN OR REFERENCE CIRCUIT

- Measure:

Positive Lead	Measurement / Action	Negative Lead

C3888-3	Ω	C3888-1
C3888-3	Ω	C3888-2

Are the resistance greater than 10,000 ohms?

Yes	GO to N13
No	REPAIR the affected circuit.

N13 CHECK THE BATTERY CURRENT SENSOR CONNECTION

- Ignition OFF.
- Disconnect Battery Current Sensor C3888, if necessary.
- Inspect the battery current sensor connector for:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Connect Battery Current Sensor C3888 .
- Connect BCM C2280F .
- Ignition ON.
- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs) in all modules.
- Using a diagnostic scan tool, perform the BCM self-test.

Did the DTC return?

Yes	REPAIR as necessary or INSTALL a new battery current sensor. REFER to: Battery Current Sensor (414-01 Battery, Mounting and Cables, Removal and Installation). CLEAR the Diagnostic Trouble Codes (DTCs). REPEAT the self-test. If the <u>DTC</u> returns, GO to N14
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

N14 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Connect **all** connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	Check <u>OASIS</u> for any applicable <u>TSB</u> s. If a <u>TSB</u> exists for this concern, DISCONTINUE this test and FOLLOW the <u>TSB</u> instructions. If no <u>TSB</u> s address this concern, INSTALL a new <u>BCM</u> . REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST O : CHARGING SYSTEM WARNING INDICATOR IS NEVER OR ALWAYS ON

Normal Operation and Fault Conditions

RETRIEVE DTC from all modules. If any DTC s are found, Refer to DTC Chart in this section. If no DTC s are found, REFER to: [Instrumentation, Message Center and Warning Chimes](#) (413-01 Instrumentation, Message Center and Warning Chimes, Diagnosis and Testing).

Possible Sources

- Wiring, terminals or connectors
- IPC procedures.
- Generator

Diagnostic steps are not provided for this symptom or DTC. REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).