Auxiliary Brake System - Vehicles With: Trailer Brake Control

DTC Chart: TBM

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).

TBM DTC Chart

DTC	Description	Action
B148A:11	Trailer Brake Output: Circuit Short to Ground	GO to Pinpoint Test C
B148A:12	Trailer Brake Output: Circuit Short to Battery	GO to Pinpoint Test C
B148A:57	Trailer Brake Output: Invalid / Incompatible Software Component	• This DTC indicates the TBM hardware and software are incompatible. This is most likely due to an older version of software being downloaded into the TBM. • VERIFY the diagnostic scan tool is at the latest software level revision. REFLASH the TBM.

B148B:2A	Trailer Brake Manual Slider: Signal Stuck In Range	• This DTC sets when the manual slider switch is applied in a fixed, active position for more than 5 minutes. This is either an internal failure of the TBM or something is holding the manual slider switch in the applied position. • INSPECT for a stuck or damaged manual sliding lever. REPAIR or CLEAR any obstructions or foreign material. • Ignition ON. CLEAR the DTC. OPERATE the manual slider switch twice. CARRY OUT the TBM self-test. RETRIEVE and RECORD all Diagnostic Trouble Codes (DTCs). • If the DTC does not return, the concern may have been caused by something laying on or against the manual slider switch. INFORM the customer of the manual slider switch fault setting condition as stated above. • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
B148C:2A	Trailer Brake Gain Button: Signal Stuck In Range	• This DTC sets when either gain button is pressed for more than 2 minutes. This is either an internal failure of the TBM or something is holding either gain button in the applied position. • INSPECT for stuck or damaged gain buttons. REPAIR or CLEAR any obstructions or foreign material. • Ignition ON. CLEAR the DTC. Press both gain buttons twice. CARRY OUT the TBM self-test. RETRIEVE and RECORD all Diagnostic Trouble Codes (DTCs). • If the DTC does not return, the concern may have been caused by something laying on or against one or both gain buttons. INFORM the customer of the gain button fault setting condition as stated above. • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System,

		Removal and Installation).
P0604:94	Internal Control Module Random Access Memory (RAM) Error: Unexpected Operation	• REPAIR all other TBM Diagnostic Trouble Codes (DTCs) before diagnosing DTC P0604:94. • CLEAR the DTC. REPEAT the TBM self-test. • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
U0100:00	Lost Communication with ECM / PCM "A": No Sub Type Information	GO to Pinpoint Test H
U0121:00	Lost Communication With Anti-Lock Brake System (ABS) Control Module: No Sub Type Information	GO to Pinpoint Test I
U0140:00	Lost Communication With Body Control Module: No Sub Type Information	GO to Pinpoint Test J
U0155:00	Lost Communication With Instrument Panel Cluster (IPC) Control Module: No Sub Type Information	GO to Pinpoint Test K
U0415:81	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Invalid Serial Data Received	GO to Pinpoint Test I
U0415:82	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Alive / Sequence Counter Incorrect / Not Updated	GO to Pinpoint Test I
U0415:83	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Value of Signal Protection Calculation Incorrect	GO to Pinpoint Test I

U0423:55	Invalid Data Received from Instrument Panel Cluster Control Module: Not Configured	• This DTC sets when the value of trailer brake configuration message from the IPC is "No" and a value of "Yes" has not been received during the current ignition cycle. • CHECK the service history for recent service actions related to the IPC. This DTC sets due to incomplete or improper PMI procedures. • If there have been recent service actions with the IPC, REPEAT the PMI procedure using a diagnostic scan tool. FOLLOW all diagnostic scan tool instructions. • If there have been no recent service actions,   Click here to access Guided Routine (IPC).
U3000:46	Control Module: Calibration / Parameter Memory Failure	• CLEAR the DTC. CARRY OUT the TBM self-test. RETRIEVE and RECORD all Diagnostic Trouble Codes (DTCs). • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
U3000:49	Control Module: Internal Electronic Failure	• CLEAR the DTC. CARRY OUT the TBM self-test. RETRIEVE and RECORD all Diagnostic Trouble Codes (DTCs). • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
U3000:4B	Control Module: Over Temperature	• CLEAR the DTC. CARRY OUT the TBM self-test. RETRIEVE and RECORD all Diagnostic Trouble Codes (DTCs). • If the DTC returns, INSTALL a new TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).

U3003:16	Battery Voltage: Circuit Voltage Below Threshold	GO to Pinpoint Test F
U3003:17	Battery Voltage: Circuit Voltage Above Threshold	GO to Pinpoint Test E
U3008:13	Control Module Ground "A": Circuit Open	GO to Pinpoint Test G

Symptom Charts

Symptom Chart: Trailer Brake System

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).

Symptom Chart

Condition	Possible Sources	Actions
A module does not respond to the diagnostic scan tool	• Fuse • Wiring, terminals or connectors • Communication network concern • TBM	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
The trailer brakes are inoperative	Refer to the Pinpoint Test	GO to Pinpoint Test A
The trailer brakes are always engaged	Refer to the Pinpoint Test	GO to Pinpoint Test B
The message center displays TRAILER BRAKE MODULE FAULT	Diagnostic Trouble Codes (DTCs) present in the TBM	RETRIEVE and RECORD the Diagnostic Trouble Codes (DTCs). GO to the DTC Chart: TBM

The message center displays TRAILER BRAKE MODULE FAULT when the vehicle is not equipped with a TBM	Incorrect IPC configuration	CONFIGURE the IPC car configuration parameters. REFER to: Module Configuration - System Operation and Component Description (418-01 Module Configuration, Description and Operation).
The message center displays TRAILER DISCONNECTED, TRAILER GAIN XX.XX, NO TRAILER after a trailer is connected to the vehicle and the manual slider switch is moved or a gain button is pressed.	The TBM requires a minimum of 5 seconds after a trailer is connected to "detect" the trailer. This learning process requires **no input** from the brake pedal, TBM manual slider switch or gain buttons. If the brake pedal is pressed, the manual slider switch is moved or a gain button is pressed, the learning process is stopped and the TBM cannot detect the trailer.	INFORM the customer of the learning process and they must wait at least 5 seconds after connecting a trailer before pressing the brake pedal, moving the manual slider switch or pressing the gain buttons.
The message center intermittently displays TRAILER DISCONNECTED or WIRING FAULT ON TRAILER while towing a trailer	Refer to the Pinpoint Test	GO to Pinpoint Test C
The message center displays WIRING FAULT ON TRAILER	Refer to the Pinpoint Test	GO to Pinpoint Test C
No power at 7 way power/ charge wire	• Fuse • Wiring, terminals or connectors • Communication network concern • TRM	REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
The message center displays TRAILER CONNECTED when no trailer is connected	Refer to the Pinpoint Test	GO to Pinpoint Test D

The message center does not display a TRAILER CONNECTED message when a trailer is connected	Refer to the Pinpoint Test	GO to Pinpoint Test D

Pinpoint Tests

NOTE: *Unless instructed otherwise, carry out all pinpoint tests **without** a trailer connected to the vehicle.*

The Trailer Brakes are Inoperative

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The braking energy provided to the trailer is modulated with a PWM signal which varies between 0 volt and battery voltage, according to the TBM gain setting, the higher the duty cycle the more braking power available. The TBM varies the PWM signal based on various inputs such as vehicle speed, the brake torque message, BPP switch input, the manual slider switch and the gain buttons. With the vehicle stationary and with the manual slider switch fully to the left with a gain of 10, there should be more than 11 volts supplied to the trailer tow connector. Without a trailer connected, the TBM sends a voltage pulse to the trailer tow connector every 4 seconds as a trailer connectivity test.

When the brake pedal is pressed, the normally-open BPP switch closes and sends voltage from BCM fuse 14 (10A) to BCM fuse 4 (5A). The voltage passes through the BCM fuse and continues to the TBM. The TBM receives additional information from the ABS module over the HS-CAN. If there is a problem in the ABS module preventing this information from being sent to the TBM, the TBM enters a limited operating mode. The TBM receives fused battery voltage from the BJB.

An open circuit or short to ground in the PWM signal circuit, an open or short to ground in the TBM BPP switch circuit, damaged or corroded connectors, open fuses, an internal failure of the TBM, an open or short to ground in the trailer wiring can all prevent the trailer brakes from operating.

The trailer brake system only works with electric-magnet actuated drum type brakes and electric over hydraulic brakes. If the trailer is equipped with a different style of brakes or if the trailer is not equipped with brakes, the system does not function.

Possible Sources

- Fuse
- Wiring, terminals or connectors
- TBM
- Trailer

Visual Inspection and Diagnostic Pre-checks

- Make sure BJB fuse 49 (30A) is OK.
- Make sure BCM fuse 4 (5A) is OK.
- Make sure the trailer brakes are electric-magnet actuated drum type brakes.

PINPOINT TEST A : THE TRAILER BRAKES ARE INOPERATIVE

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.

A1 CHECK FOR BCM (BODY CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Ignition ON.
- Using a diagnostic scan tool, carry out the BCM self-test.

Are any Diagnostic Trouble Codes (DTCs) present in the BCM?

Yes	DIAGNOSE all BCM Diagnostic Trouble Codes (DTCs). REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).
No	GO to A2

A2 CHECK FOR ABS (ANTI-LOCK BRAKE SYSTEM) MODULE DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the ABS module self-test.

Are any Diagnostic Trouble Codes (DTCs) present in the ABS module?

Yes	DIAGNOSE all ABS module Diagnostic Trouble Codes (DTCs). REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
No	GO to A3

A3 CHECK FOR TBM (TRAILER BRAKE CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.

Does the TBM communicate with the diagnostic scan tool?

Yes	If there are Diagnostic Trouble Codes (DTCs) in the TBM, DIAGNOSE all TBM Diagnostic Trouble Codes (DTCs). GO to the DTC Chart: TBM. If there are no Diagnostic Trouble Codes (DTCs) in the TBM, GO to A4
No	DIAGNOSE the TBM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

A4 CHECK THE BCM (BODY CONTROL MODULE) BRAKE SWITCH 2 (BOO_2) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, monitor the BCM BOO_2 PID while pressing and releasing the brake pedal.

Does the BOO_2 PID display ON with the brake pedal pressed and OFF with the brake pedal released?

Yes	GO to A5
No	DIAGNOSE the vehicle stoplamps. REFER to: Stoplamps (417-01 Exterior Lighting, Diagnosis and Testing).

A5 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) BRAKE SWITCH (BRAKE_SW) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, monitor the TBM BRAKE_SW PID while pressing and releasing the brake pedal.

Does the BRAKE_SW PID display ON with the brake pedal pressed and OFF with the brake pedal released?

Yes	GO to A6
No	GO to A7

A6 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) OUTPUT

NOTE: *Battery voltage must be greater than 10 volts.*

- Ignition ON.
- **NOTE:** *If the manual slider switch is held to the full left position for more than 5 minutes, the TBM automatically shuts down.*

  NOTE: *Do not apply the barke pedal during this test.*

  Have an assistant press the manual slider switch fully to the left with a gain of 10 on the TBM.

Is the voltage greater than 10-12 volts?

Yes	The TBM is operating correctly. **SEND** the trailer to an authorized camper/trailer repair center.
No	GO to A9

A7 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) BPP (BRAKE PEDAL POSITION) SWITCH INPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect TBM C2142.
- Disconnect BCM C2280A.

Is the resistance greater than 10,000 ohms?

Yes	GO to A8
No	REPAIR the circuit.

A8 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) BPP (BRAKE PEDAL POSITION) SWITCH INPUT CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	VERIFY BCM fuse 4 (5A) is OK. If not OK, REFER to the Wiring Diagrams manual to identify the cause of the circuit short. If OK, GO to A11
No	REPAIR the circuit.

A9 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to A10
No	REPAIR the circuit.

A10 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to A11
No	REPAIR the circuit.

A11 VERIFY ALL WIRING CONNECTIONS

- Using a good light source, inspect TBM C2142 and BCM C2280A for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary

Are the connectors free of corrosion, damaged pins, bent pins, pushed-out pins and spread terminals?

Yes	GO to A12
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

A12 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Connect TBM C2142, make sure it seats and latches correctly.
- Connect BCM C2280A, make sure it seats and latches correctly.
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
No	The condition that caused the concern is not present at this time. The concern is intermittent and may have been caused by a loose or corroded connector, low battery voltage or an excessive load on the HS-CAN1 or HS-CAN2.

The Trailer Brakes are Always Engaged

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The braking energy provided to the trailer is modulated with a PWM signal which varies between 0 volts and battery voltage, according to the TBM gain setting, the higher the duty cycle the more braking power available. Without a trailer connected, the TBM sends the PWM signal to the trailer tow connector every 4 seconds as a trailer connectivity test. The TBM varies the PWM signal based on various inputs such as vehicle speed, the brake torque message, BPP switch input, the manual slider switch and the gain buttons.

When the brake pedal is pressed, the normally-open BPP switch closes and sends voltage from BCM fuse 14 (10A) to BCM fuse 4 (5A). The voltage passes through the BCM fuse and continues to the TBM. The TBM receives additional information from the ABS module over the HS-CAN. If there is a concern in the ABS module preventing this information from being sent to the TBM, the TBM enters a limited operating mode. The TBM receives fused battery voltage from the BJB.

A short to voltage on the PWM signal output circuit, a short to voltage on the TBM BPP switch input circuit or incorrect messages from other modules can cause the TBM to engage the trailer brakes.

Possible Sources

- Wiring, terminals or connectors
- TBM
- Trailer

Visual Inspection and Diagnostic Pre-checks

- Make sure BJB fuse 49 (30A) is OK.
- Make sure BCM fuse 4 (5A) is OK.
- Make sure the trailer brakes are electric-magnet actuated drum type brakes.

PINPOINT TEST B : THE TRAILER BRAKES ARE ALWAYS ENGAGED

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.
B1 CHECK FOR BCM (BODY CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)
• Ignition ON. • Using a diagnostic scan tool, carry out the BCM self-test. **Are there any Diagnostic Trouble Codes (DTCs) present in the BCM?**

Yes	DIAGNOSE all BCM Diagnostic Trouble Codes (DTCs). REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).
No	GO to B2

B2 CHECK FOR ABS (ANTI-LOCK BRAKE SYSTEM) MODULE DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the ABS module self-test.

Are there any Diagnostic Trouble Codes (DTCs) present in the ABS module?

Yes	DIAGNOSE all ABS module Diagnostic Trouble Codes (DTCs). REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
No	GO to B3

B3 CHECK FOR TBM (TRAILER BRAKE CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.

Does the TBM communicate with the diagnostic scan tool?

Yes	If there are Diagnostic Trouble Codes (DTCs) in the TBM, DIAGNOSE all TBM Diagnostic Trouble Codes (DTCs). GO to the DTC Chart: TBM. If there are no Diagnostic Trouble Codes (DTCs) in the TBM, GO to B4
No	DIAGNOSE the TBM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

B4 CHECK THE BCM (BODY CONTROL MODULE) BRAKE SWITCH 2 (BOO_2) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, monitor the BCM BOO_2 PID while pressing and releasing the brake pedal.

Does the BOO_2 PID display ON with the brake pedal pressed and OFF with the brake pedal released?

Yes	GO to B5
No	DIAGNOSE the vehicle stoplamps. REFER to: Stoplamps (417-01 Exterior Lighting, Diagnosis and Testing).

B5 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) BRAKE SWITCH (BRAKE_SW) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, monitor the TBM BRAKE_SW PID while pressing and releasing the brake pedal.

Does the BRAKE_SW PID display ON with the brake pedal pressed and OFF with the brake pedal released?

Yes	GO to B8
No	GO to B6

B6 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) BPP (BRAKE PEDAL POSITION) SWITCH INPUT CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect TBM C2142.
- Ignition ON.

Is any voltage present?

Yes	GO to B7
No	GO to B10

B7 ISOLATE THE BCM (BODY CONTROL MODULE)

- Remove BCM fuse 4 (5A).

Is any voltage present?

Yes	REPAIR the circuit.
No	INSTALL a new BCM. REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Removal and Installation).

B8 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) OUTPUT

NOTE: *Every 4 seconds a voltage pulse is output by the TBM as a trailer connectivity test.*

- Ignition ON.
- Make sure the brake pedal is **not** being pressed and the manual slider switch is **not** being applied.

Is a steady voltage present?

Yes	GO to B9
No	The condition that caused the concern is not present at this time. The concern is intermittent and may have been caused by a loose or corroded connector, or an excessive load on the HS-CAN1 or HS-CAN2.

B9 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect TBM C2142.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to B10

B10 VERIFY ALL WIRING CONNECTIONS

- Ignition OFF.
- Disconnect BCM C2280A.
- Using a good light source, inspect TBM C2142 and BCM C2280A for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary

Are the connectors free of corrosion, damaged pins, bent pins, pushed-out pins and spread terminals?

Yes	GO to B11
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

B11 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Connect TBM C2142, make sure it seats and latches correctly.
- Connect BCM C2280A, make sure it seats and latches correctly.
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
No	The condition that caused the concern is not present at this time. The concern is intermittent and may have been caused by a loose or corroded connector, low battery voltage or an excessive load on the HS-CAN1 or HS-CAN2.

The Message Center Displays WIRING FAULT ON TRAILER

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The braking energy provided to the trailer is modulated with a PWM signal which varies between 0 volt and battery voltage, according to the TBM gain setting, the higher the duty cycle the more braking power available. The TBM varies the PWM signal based on various inputs such as vehicle speed, the brake torque message, BPP switch input, the manual slider switch and the gain buttons. With the vehicle stationary and with the manual slider switch fully to the left with a gain of 10, there should be more than 11 volts supplied to the trailer tow connector. Without a trailer connected, the TBM sends a voltage pulse to the trailer tow connector every 4 seconds as a trailer connectivity test.

When a circuit fault is detected, the TBM sends a message to the IPC to display WIRING FAULT ON TRAILER, sound an audible alert chime and the TBM disables trailer brake output (except for the trailer connectivity test pulse).

When a trailer is connected to the vehicle the message center should display TRAILER CONNECTED.

If the WIRING FAULT ON TRAILER message is only displayed when the trailer is connected the fault is with the trailer wiring.

The trailer brake system only works with electric-magnet actuated drum type brakes and electric over hydraulic brakes. If the trailer is equipped with a different style of brakes or if the trailer is not equipped with brakes, the system does not function.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1418A:11	Trailer Brake Output: Circuit Short to Ground	This DTC sets in continuous memory when the ignition is set to RUN or during the on-demand self test if the current draw on the PWM output circuit is greater than 49 amps.
B1418A:12	Trailer Brake Output: Circuit Short to Battery	This DTC sets in continuous memory when the ignition is set to RUN and vehicle speed is greater than 3 km/h (2 mph) or during the on-demand self test if the PWM output is greater than 7.1 volts when **not** braking or greater than 4 volts **during** braking.

Possible Sources

- Wiring, terminals or connectors
- TBM
- Trailer

PINPOINT TEST C : THE MESSAGE CENTER DISPLAYS WIRING FAULT ON TRAILER

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.
C1 VERIFY TBM (TRAILER BRAKE CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Verify a trailer is **not** connected to the trailer tow connector.
- Ignition ON.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the Diagnostic Trouble Codes (DTCs).
- Test drive the vehicle in the following manner:
  - maintain a speed greater than 5 km/h (3 mph)
  - turn the headlights ON
  - lightly apply the brakes for more than 5 seconds
  - activate the left and right turn signals
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.

Is DTC B148A:11 or B148A:12 present?

Yes	GO to C2
No	For all other TBM Diagnostic Trouble Codes (DTCs), GO to the DTC Chart: TBM. If no Diagnostic Trouble Codes (DTCs) return, the system is operating correctly at this time. INSPECT the 7-pin trailer tow connector C4099 for water intrusion, corrosion, pushed-out pins and spread terminals. REPAIR or INSTALL new as necessary.

C2 CHECK THE TRAILER TOW CONNECTOR

- Ignition OFF.
- Disconnect in-line connector C423.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the Diagnostic Trouble Codes (DTCs).
- Test drive the vehicle in the following manner:
  - maintain a speed greater than 5 km/h (3 mph)
  - turn the headlights ON
  - lightly apply the brakes for more than 5 seconds
  - activate the left and right turn signals
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.

Is DTC B148A:11 or B148A:12 present?

Yes	For DTC B148A:11, GO to C3 For DTC B148A:12, GO to C4
No	INSTALL a new 7-pin trailer tow connector.

C3 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Connect in-line connector C423.
- Disconnect TBM C2142.

Is the resistance greater than 10,000 ohms?

Yes	GO to C4
No	REPAIR the circuit.

C4 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Connect in-line connector C423.
- Disconnect TBM C2142.
- Ignition ON.

At anytime, was any voltage present?

Yes	REPAIR the circuit. REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.
No	GO to C5

C5 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Disconnect TBM C2142 (if not previously disconnected).
- Using a good light source, inspect the connector for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary
- Connect TBM C2142 and make sure it seats and latches correctly.
- Test drive the vehicle in the following manner:
  - maintain a speed greater than 5 km/h (3 mph)
  - turn the headlights ON
  - lightly apply the brakes for more than 5 seconds
  - activate the left and right turn signals
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.

Is DTC B148A:11 or B148A:12 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
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.

NOTE: *Unless instructed otherwise, carry out all pinpoint tests **without** a trailer connected to the vehicle.*

The MESSAGE CENTER does not agree with actual Trailer connection

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The TBM receives information from the ABS module over the HS-CAN. If there is a concern in the ABS module preventing this information from being sent to the TBM, the TBM enters a limited operating mode.

Possible Sources

- Wiring, terminals or connectors
- TBM
- TRM

PINPOINT TEST D : THE MESSAGE CENTER DOES NOT AGREE WITH ACTUAL TRAILER CONNECTION

D1 CHECK TBM (TRAILER BRAKE CONTROL MODULE) TRAILER CONSTAT PID STATUS
• Ignition ON. • Using a diagnostic scan tool, access the TBM PID's (parameter identifications). • Monitor the TBM PID: **CONSTAT** **Does the CONSTAT PID agree with the actual trailer electrical connection to the vehicle?** **Yes** GO to D3 **No** GO to D2
D2 CHECK TBM (TRAILER BRAKE CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE)

- Ignition ON.
- Using a diagnostic scan tool, carry out the TBM self-test.

Are any Diagnostic Trouble Codes (DTCs) present in the TBM?

Yes	DIAGNOSE all TBM Diagnostic Trouble Codes (DTCs).
No	GO to D5

D3 CHECK TRM (TRAILER MODULE) TRAILER ON PID STATUS

- Using a diagnostic scan tool, access the TRM PID's (parameter identifications).
- Monitor the TRM PID: **TRAILER ON**

Does the TRAILER ON PID agree with the actual trailer electrical connection to the vehicle?

Yes	The condition causing the concern is not present at this time. The concern is intermittent and may have been caused by improper wiring on the trailer, a loose or corroded 7-pin connector or improper messages on the MS1-CAN (medium speed 1- controller area network).
No	GO to D4

D4 CHECK TRM (TRAILER MODULE) DTC (DIAGNOSTIC TROUBLE CODE)

- Using a diagnostic scan tool, carry out the TRM self-test.

Are any Diagnostic Trouble Codes (DTCs) present in the TRM?

Yes	REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
No	GO to D8

D5 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect TBM C2142.
- Disconnect: Trailer Tow C4099 (trailer connector).

Is the resistance less than 3 ohms?

Yes	GO to D6
No	REPAIR the circuit.

D6 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to D7
No	REPAIR the circuit.

D7 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to D14

D8 CHECK THE 7 PIN TRAILER TOW CONNECTOR STOP/TURN LAMP CIRCUITS FOR AN OPEN

- Ignition OFF.
- Disconnect TRM C2498C.
- Disconnect: Trailer Tow C4099 (trailer connector).

Is the resistance less than 3 ohms?

Yes	GO to D9
No	REPAIR the circuit.

D9 CHECK THE 7 PIN TRAILER TOW CONNECTOR STOP/TURN LAMP CIRCUITS FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to D10
No	REPAIR the circuit.

D10 CHECK THE 7 PIN TRAILER TOW CONNECTOR STOP/TURN LAMP CIRCUITS FOR A SHORT TOGETHER

Is the resistance greater than 10,000 ohms?

Yes	GO to D11
No	REPAIR the circuit.

D11 CHECK THE 7 PIN TRAILER TOW CONNECTOR STOP/TURN LAMP CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to D12

D12 VERIFY ALL WIRING CONNECTIONS

- Disconnect TRM and related in-line connectors.

- Using a good light source, inspect all disconnected electrical connectors for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary

Are the connectors free of corrosion, damaged pins, bent pins, pushed-out pins and spread terminals?

Yes	GO to D13
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

D13 CHECK FOR CORRECT TRM (TRAILER MODULE) OPERATION

- Connect all in-line electrical connectors. Make sure they seat and latch correctly.
- Connect TRM C2498. Make sure it seats and latches correctly.
- Operate the system and verify 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 TRM. REFER to: Trailer Module (TRM) (417-01 Exterior Lighting, Removal and Installation).
No	The condition causing the concern is not present at this time. The concern is intermittent and may have been caused by a loose or corroded connector, low battery voltage or an excessive load on the HS-CAN1 or HS-CAN2.

D14 VERIFY ALL WIRING CONNECTIONS

- Disconnect TBM and related in-line connectors.
- Using a good light source, inspect all disconnected electrical connectors for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary

Are the connectors free of corrosion, damaged pins, bent pins, pushed-out pins and spread terminals?

Yes	GO to D15
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

D15 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Connect all in-line electrical connectors. Make sure they seat and latch correctly.
- Connect TBM C2142. Make sure it seats and latches correctly.
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
No	The condition causing the concern is not present at this time. The concern is intermittent and may have been caused by a loose or corroded connector, low battery voltage or an excessive load on the HS-CAN1 or HS-CAN2.

U3003:17

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The TBM requires an operating voltage between 9 and 16 volts. The TBM receives this voltage from the BJB. The TBM has a single ground circuit. An overcharging condition in the charging system results in the TBM setting a DTC. This DTC may also set in the TBM due to battery charging or vehicle jump starting events. If the voltage exceeds 19 volts the TBM disables the trailer brake output and shuts down.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U3003:17	Battery Voltage: Circuit Voltage Above Threshold	This DTC sets in continuous memory and on-demand if the voltage supplied to the TBM is above 16 volts for more than 5 seconds while not braking. This DTC may also set in the TBM due to battery charging or vehicle jump starting events.

Possible Sources

- Charging system concern
- TBM

PINPOINT TEST E : U3003:17

E1 CHECK FOR HIGH VOLTAGE DIAGNOSTIC TROUBLE CODES (DTCS) SET IN OTHER MODULES

- Ignition ON.
- Using a diagnostic scan tool, retrieve and record all Continuous Memory Diagnostic Trouble Codes (CMDTCs).

Is DTC B1317, B1318, B1676, U3003:16 or U3003:17 present in one or more modules AND are any charging system Diagnostic Trouble Codes (DTCs) present in the PCM?

Yes	DIAGNOSE the PCM Diagnostic Trouble Codes (DTCs). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
No	GO to E2

E2 CHECK THE BATTERY VOLTAGE

- Turn off all interior lights, exterior lights and accessories.
- **NOTE:** *Do not allow the engine speed to increase above 2,000 RPM while performing this step or the generator may self-excite and result in default charging system output voltage. If engine speed goes above 2,000 RPM, turn the vehicle off and restart the engine before performing this step.*

  Start and run the engine at approximately 1,500 RPM for 3 minutes while monitoring the battery voltage.

Is the battery voltage between 13 and 15.2 volts?

Yes	GO to E3
No	DIAGNOSE the overcharging condition. REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing). REFER to: Charging System - 2.7L EcoBoost (238kW/324PS)/3.5L EcoBoost (272kW/370PS) (414-00 Charging System - General Information, Diagnosis and Testing).

E3 RECHECK FOR TBM (TRAILER BRAKE CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) U3003:17

- Turn the engine off.
- Ignition ON.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Using a diagnostic scan tool, carry out the TBM self-test.

Is DTC U3003:17 present?

Yes	GO to E4
No	The system is operating normally at this time. The DTC may have been set previously during battery charging or while jump starting the vehicle.

E4 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Disconnect TBM C2142 (if not previously disconnected).
- Using a good light source, inspect the connector for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary
- Connect TBM C2142, make sure it seats and latches correctly.
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
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.

U3003:16

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The TBM requires an operating voltage between 9 and 16 volts. The TBM receives this voltage from the BJB. The TBM has a single ground circuit. Excessive resistance or an open in one or more of these circuits, a discharged battery or a inoperative charging system results in the TBM setting a DTC. If the voltage drops below 8 volts the TBM disables the trailer brake output and shuts down.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U3003:16	Battery Voltage: Circuit Voltage Below Threshold	This DTC sets in continuous memory and on-demand if the voltage supplied to the TBM is less than 9 volts for longer than 5 minutes while not braking.

Possible Sources

- Fuses
- Wiring, terminals or connectors
- Charging system concern
- Battery
- TBM

Visual Inspection and Diagnostic Pre-checks

- Make sure the vehicle battery terminals and cables are free of any corrosion and other contaminants.
- Make sure the vehicle battery terminals are tightened to their correct torque specifications.
- Make sure BJB fuse 49 (30A) is OK.

PINPOINT TEST F : U3003:16

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.

F1 RECHECK THE TBM (TRAILER BRAKE CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Using a diagnostic scan tool, carry out the TBM self-test.

Is DTC U3003:16 still present?

Yes	GO to F2
No	The system is operating correctly at this time. The DTC may have set due to a previous low battery voltage condition.

F2 CHECK FOR CHARGING SYSTEM DIAGNOSTIC TROUBLE CODES (DTCS) IN THE PCM (POWERTRAIN CONTROL MODULE)

- Using a diagnostic scan tool, retrieve all Continuous Memory Diagnostic Trouble Codes (CMDTCs).

Is DTC B1317, B1318, B1676, U3003:16 or U3003:17 present in one or more modules AND are any charging system Diagnostic Trouble Codes (DTCs) present in the PCM?

Yes	DIAGNOSE the PCM Diagnostic Trouble Codes (DTCs). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
No	GO to F3

F3 CHECK THE BATTERY CONDITION AND STATE OF CHARGE

- Carry out the Battery Condition Test pinpoint test.
  REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

Did the battery pass the condition test?

Yes	GO to F4
No	INSTALL a new battery. REFER to: Battery (414-01 Battery, Mounting and Cables, Removal and Installation).

F4 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) VOLTAGE SUPPLY FOR AN OPEN

- Ignition OFF.
- Disconnect TBM C2142.
- Remove BJB fuse 49 (30A).

Is the resistance less than 3 ohms?

Yes	GO to F5
No	VERIFY BJB fuse 49 (30A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the cause of the circuit short.

F5 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect the battery negative cable.
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

Is the resistance less than 3 ohms?

Yes	GO to F6
No	REPAIR the circuit.

F6 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Disconnect TBM C2142 (if not previously disconnected).
- Using a good light source, inspect the connector for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary
- Connect TBM C2142, make sure it seats and latches correctly.
- Connect the battery negative cable (if previously disconnected).
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
- Install BJB fuse 49 (30A).
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
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.

U3008:13

NOTE: *A trailer **must be connected** to the vehicle for this DTC to set.*

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

The TBM receives battery and ignition voltage from BJB fuses 49 (30A). The TBM has a single ground circuit.

An open circuit in the wiring or a condition resulting in an open in the ground circuit, such as an internal failure of the TBM or a connector concern, results in the TBM setting this DTC. When this DTC sets, the TBM disables trailer braking and sends a TBC FAULT message to the message center. If a trailer is not connected to the vehicle when this DTC sets, the TBM sends a TRAILER BRAKE MODULE FAULT message to the message center.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

U3008:13	Ground ECU Circuit Open	This DTC sets in continuous memory and on-demand when the TBM detects a rise in battery voltage greater than 19 volts during a braking event **and** while not braking, the battery voltage rises greater than 0.75 volt after sending the PWM trailer connectivity test pulse.

Possible Sources

- Wiring, terminals or connectors
- TBM

PINPOINT TEST G : U3008:13

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.

G1 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect TBM C2142.
- Disconnect the battery negative cable.
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

Is the resistance less than 3 ohms?

Yes	GO to G2
No	LOCATE and INSPECT the ground circuit eyelet. Refer to Wiring Diagrams Cell 95 for schematic and connector information. DISCONNECT and CLEAN the ground circuit eyelet as necessary. If the ground circuit eyelet is OK, REPAIR the circuit.

G2 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Using a good light source, inspect TBM C2142 for the following:
  - corrosion - install new connector or terminal and clean the module pins
  - damaged or bent pins - install new terminals or pins
  - pushed-out pins - install new pins as necessary
  - spread terminals - install new terminals as necessary
- Connect TBM C2142, make sure it seats and latches correctly.
- Connect the battery negative cable (if previously disconnected).
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
- Operate the system and verify 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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).
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.

U0100:00

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

With the ignition ON, the PCM sends messages to the TBM through the GWM over the HS-CAN1. If the TBM does not receive these messages within the specified time frame, the TBM sets a DTC. For information on the messages sent to the TBM by the PCM,
REFER to: Auxiliary Brake System - Vehicles With: Trailer Brake Control - System Operation and Component Description (206-10 Auxiliary Brake System, Description and Operation).

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0100:00	Lost Communication with ECM / PCM "A": No Sub Type Information	This DTC sets in continuous memory and on-demand if the TBM does not receive any network messages from the PCM. This can be due to a PCM failure, a circuit failure on the HS-CAN1 or an excessive load on the network.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- GWM
- PCM
- TBM

PINPOINT TEST H : U0100:00

H1 CHECK THE COMMUNICATION NETWORK
• Ignition ON. • Using a diagnostic scan tool, carry out the Network Test. **Do the PCM and the GWM pass the Network Test?** **Yes** GO to H2

No	DIAGNOSE the GWM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing). DIAGNOSE the PCM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

H2 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODES (CMDTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Record the TBM Diagnostic Trouble Codes (DTCs).

Is DTC U0100:00 retrieved again?

Yes	GO to H3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

H3 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS) IN THE TBM (TRAILER BRAKE CONTROL MODULE)

- Review the recorded Diagnostic Trouble Codes (DTCs) from the TBM self-test.

Is DTC U3003:16 or U3003:17 present?

Yes	For DTC U3003:16, GO to Pinpoint Test F For DTC U3003:17, GO to Pinpoint Test E
No	GO to H4

H4 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS) IN THE GWM (GATEWAY MODULE A)

- Using a diagnostic scan tool, carry out the GWM self-test.

Are any Diagnostic Trouble Codes (DTCs) present?

Yes	DIAGNOSE the GWM Diagnostic Trouble Codes (DTCs). REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	GO to H5

H5 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS) IN THE PCM (POWERTRAIN CONTROL MODULE)

- Using a diagnostic scan tool, carry out the PCM KOEO self-test.

Are any Diagnostic Trouble Codes (DTCs) present?

Yes	DIAGNOSE the PCM Diagnostic Trouble Codes (DTCs). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing).
No	GO to H6

H6 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0100:XX SET IN OTHER MODULES

- Using a diagnostic scan tool, carry out the self-test for all modules.
- Retrieve the Continuous Memory Diagnostic Trouble Codes (CMDTCs) from all modules.

Is DTC U0100:xx set in 1 or more modules in addition to the TBM?

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 PCM. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation).
No	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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).

U0121:00, U0415:81, U0415:82, U0415:83

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

With the ignition ON, the ABS module sends messages to the TBM over the HS-CAN2. If the TBM does not receive these messages within the specified time frame, the TBM sets a DTC. For information on the messages sent to the TBM by the ABS module,
REFER to: Auxiliary Brake System - Vehicles With: Trailer Brake Control - System Operation and Component Description (206-10 Auxiliary Brake System, Description and Operation).

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0121:00	Lost Communication With Anti-Lock Brake System (ABS) Control Module: No Sub Type Information	This DTC sets in continuous memory and on-demand if the TBM does not receive any network messages from the ABS module. This can be due to a ABS module failure, a circuit failure on the HS-CAN or an excessive load on the network.
U0415:81	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Invalid Serial Data Received	This DTC sets in continuous memory and on-demand if network message data Total Brake Torque Request contains "unknown" or "fault" for more than 8 seconds instead of valid brake torque data.

U0415:82	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Alive / Sequence Counter Incorrect / Not Updated	The TBM software contains an event counter for various Diagnostic Trouble Codes (DTCs). When the data in the Total Brake Torque Request message does not change, the counter is increased by 1. When the counter reaches 10, this DTC sets in continuous memory.
U0415:83	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module: Value of Signal Protection Calculation Incorrect	The TBM uses sensor inputs and CAN message data to calculate the total braking torque required and compares this calculated value against the actual brake torque request message. If the calculated value is incorrect, a software counter is increased by 1. When the counter reaches 10, this DTC sets in continuous memory.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- ABS module
- TBM

PINPOINT TEST I : U0121:00, U0415:81, U0415:82, U0415:83

I1 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Using a diagnostic scan tool, carry out the Network Test.

Does the ABS module pass the Network Test?

Yes	GO to I2
No	DIAGNOSE the ABS module does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

I2 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODES (CMDTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Record the TBM Diagnostic Trouble Codes (DTCs).

Is DTC U0121:00 or U0415:81 retrieved again?

Yes	GO to I3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

I3 REVIEW THE RECORDED DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE TBM (TRAILER BRAKE CONTROL MODULE) SELF-TEST

- Review the recorded Diagnostic Trouble Codes (DTCs) from the TBM self-test.

Is DTC U3003:16 or U3003:17 present in the TBM?

Yes	For DTC U3003:16, GO to Pinpoint Test F For DTC U3003:17, GO to Pinpoint Test E
No	GO to I4

I4 RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE ABS (ANTI-LOCK BRAKE SYSTEM) MODULE SELF-TEST

- Using a diagnostic scan tool, carry out the ABS module self-test.

Is DTC U3003:16 or U3003:17 present in the ABS module?

Yes	DIAGNOSE the ABS module Diagnostic Trouble Codes (DTCs). REFER to: Anti-Lock Brake System (ABS) and Stability Control (206-09 Anti-Lock Brake System (ABS) and Stability Control, Diagnosis and Testing).
No	GO to I5

I5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0121:XX OR U0415:XX SET IN OTHER MODULES

- Using a diagnostic scan tool, carry out the self-test for all modules.
- Retrieve the Continuous Memory Diagnostic Trouble Codes (CMDTCs) from all modules.

Is DTC U0121:xx or U0415:xx set in 1 or more modules in addition to the TBM?

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 ABS module. REFER to: Anti-Lock Brake System (ABS) Module (206-09 Anti-Lock Brake System (ABS) and Stability Control, Removal and Installation).
No	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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).

U0140:00

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

With the ignition ON, the BCM sends messages to the TBM through the GWM over the HS-CAN1. If the TBM does not receive these messages within the specified time frame, the TBM sets a DTC. For information on the messages sent to the TBM by the BCM,
REFER to: Auxiliary Brake System - Vehicles With: Trailer Brake Control - System Operation and Component Description (206-10 Auxiliary Brake System, Description and Operation).

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

U0140:00	Lost Communication With Body Control Module: No Sub Type Information	This DTC sets in continuous memory and on-demand if the TBM does not receive any network messages from the BCM. This can be due to a BCM failure, a circuit failure on the HS-CAN1 or an excessive load on the network.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- GWM
- BCM
- TBM

PINPOINT TEST J : U0140:00

J1 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Using a diagnostic scan tool, carry out the Network Test.

Does the BCM pass the Network Test?

Yes	DIAGNOSE the BCM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	GO to J2

J2 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODES (CMDTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Record the TBM Diagnostic Trouble Codes (DTCs).

Is DTC U0140:00 retrieved again?

Yes	GO to J3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

J3 REVIEW THE RECORDED DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE TBM (TRAILER BRAKE CONTROL MODULE) SELF-TEST

- Review the recorded Diagnostic Trouble Codes (DTCs) from the TBM self-test.

Is DTC U3003:16 or U3003:17 present in the TBM?

Yes	For DTC U3003:16, GO to Pinpoint Test F For DTC U3003:17, GO to Pinpoint Test E
No	GO to J4

J4 RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE BCM (BODY CONTROL MODULE) SELF-TEST

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

Is DTC U3003:16 or U3003:17 present in the BCM?

Yes	DIAGNOSE the BCM Diagnostic Trouble Codes (DTCs). REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).
No	GO to J5

J5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0140:XX SET IN OTHER MODULES

- Using a diagnostic scan tool, carry out the self-test for all modules.
- Retrieve the Continuous Memory Diagnostic Trouble Codes (CMDTCs) from all modules.

Is DTC U0140:xx set in 1 or more modules in addition to the TBM?

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,   Click here to access Guided Routine (BCM).
No	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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).

U0155:00

Refer to Wiring Diagrams Cell 95 for schematic and connector information.

Normal Operations and Fault Conditions

With the ignition ON, the IPC sends messages to the TBM through the GWM over the HS-CAN3. If the TBM does not receive these messages within the specified time frame, the TBM sets a DTC. For information on the messages sent to the TBM by the IPC,
REFER to: Auxiliary Brake System - Vehicles With: Trailer Brake Control - System Operation and Component Description (206-10 Auxiliary Brake System, Description and Operation).

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0155:00	Lost Communication With Instrument Panel Cluster (IPC) Control Module: No Sub Type Information	This DTC sets in continuous memory and on-demand if the TBM does not receive any network messages from the IPC. This can be due to a IPC failure, a circuit failure on the HS-CAN or an excessive load on the network.

Possible Sources

- Wiring, terminals or connectors
- Network communication concern
- GWM
- IPC
- TBM

PINPOINT TEST K : U0155:00

K1 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Using a diagnostic scan tool, carry out the Network Test.

Does the IPC pass the Network Test?

Yes	DIAGNOSE the IPC does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	GO to K2

K2 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) CONTINUOUS MEMORY DIAGNOSTIC TROUBLE CODES (CMDTCS)

- Using a diagnostic scan tool, carry out the TBM self-test.
- Clear the TBM Diagnostic Trouble Codes (DTCs).
- Ignition OFF.
- Ignition ON.
- Wait at least 10 seconds for all modules to wake up and prove out.
- Using a diagnostic scan tool, carry out the TBM self-test.
- Record the TBM Diagnostic Trouble Codes (DTCs).

Is DTC U0140:00 retrieved again?

Yes	GO to K3
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

K3 REVIEW THE RECORDED DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE TBM (TRAILER BRAKE CONTROL MODULE) SELF-TEST

- Review the recorded Diagnostic Trouble Codes (DTCs) from the TBM self-test.

Is DTC U3003:16 or U3003:17 present in the TBM?

Yes	For DTC U3003:16, GO to Pinpoint Test F For DTC U3003:17, GO to Pinpoint Test E
No	GO to K4

K4 RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE IPC (INSTRUMENT PANEL CLUSTER) SELF-TEST

- Using a diagnostic scan tool, carry out the IPC self-test.

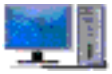
Is DTC U3003:16 or U3003:17 present in the IPC?

Yes	DIAGNOSE the IPC Diagnostic Trouble Codes (DTCs). REFER to: Instrumentation, Message Center and Warning Chimes (413-01 Instrumentation, Message Center and Warning Chimes, Diagnosis and Testing).
No	GO to K5

K5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0155:XX SET IN OTHER MODULES

- Using a diagnostic scan tool, carry out the self-test for all modules.
- Retrieve the Continuous Memory Diagnostic Trouble Codes (CMDTCs) from all modules.

Is DTC U0155:xx set in 1 or more modules in addition to the TBM?

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 IPC.   Click here to access Guided Routine (IPC).
No	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 TBM. REFER to: Trailer Brake Control Module (TBM) (206-10 Auxiliary Brake System, Removal and Installation).