Auxiliary Brake System - Vehicles With: Trailer Brake Control

DTC Chart: Trailer Brake Control Module (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).

DTC	Description	Action
U0100:00	Lost Communication with ECM / PCM "A": No Sub Type Information	GO to Pinpoint Test I
U0121:00	Lost Communication With Anti-Lock Brake System (ABS) Control Module: No Sub Type Information	GO to Pinpoint Test J
U0140:00	Lost Communication With Body Control Module: No Sub Type Information	GO to Pinpoint Test K
U0155:00	Lost Communication With Instrument Panel Cluster (IPC) Control Module: No Sub Type Information	GO to Pinpoint Test L
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. • Using a diagnostic scan tool, RETRIEVE and 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). • If the diagnostic scan tool cannot communicate with the ABS module, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing). • If there are no Diagnostic Trouble Codes (DTCs) in the ABS module, the DTC may be caused by an intermittent concern. • SET the ignition to OFF. DISCONNECT and INSPECT all ABS module electrical connectors, TBM electrical connectors and all in-line electrical connectors between the ABS module and TBM for corrosion, bent pins, pushed-out pins and spread terminals. REPAIR as necessary.
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. • Using a diagnostic scan tool, RETRIEVE and 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). • If the diagnostic scan tool cannot communicate with the ABS module, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing). • If there are no Diagnostic Trouble Codes (DTCs) in the ABS module, the DTC may be caused by an intermittent concern. • SET the ignition to OFF. DISCONNECT and INSPECT all ABS module electrical connectors, TBM electrical connectors and all in-line electrical connectors between the ABS module and TBM for corrosion, bent pins, pushed-out pins and spread terminals. REPAIR as necessary.

DTC	Description	Action
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. • Using a diagnostic scan tool, RETRIEVE and 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). • If the diagnostic scan tool cannot communicate with the ABS module, REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing). • If there are no Diagnostic Trouble Codes (DTCs) in the ABS module, the DTC may be caused by an intermittent concern. • SET the ignition to OFF. DISCONNECT and INSPECT all ABS module electrical connectors, TBM electrical connectors and all in-line electrical connectors between the ABS module and TBM for corrosion, bent pins, pushed-out pins and spread terminals. REPAIR as necessary.
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.
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 G
U3003:17	Battery Voltage: Circuit Voltage Above Threshold	GO to Pinpoint Test F
U3008:13	Control Module Ground "A": Circuit Open	GO to Pinpoint Test H

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

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 WIRING FAULT	Refer to the Pinpoint Test	GO to Pinpoint Test C
The message center intermittently displays TRAILER DISCONNECTED or TRAILER WIRING FAULT while towing a trailer	Refer to the Pinpoint Test	GO to Pinpoint Test C
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: Trailer Brake Control Module (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 Programming (418-01 Module Configuration, General Procedures).
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 message when no trailer is connected to the vehicle	Refer to the Pinpoint Test	GO to Pinpoint Test D
The message center displays a false TRAILER DISCONNECTED message when a trailer is connected to the vehicle	Refer to the Pinpoint Test	GO to Pinpoint Test E

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, 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.

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. 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 BPP switch or 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 8 (40A) is OK.
- Make sure BCM fuse 30 (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: Trailer Brake Control Module (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	DIAGNOSE the BPP (stoplamp) switch. REFER to: Stoplamps (417-01 Exterior Lighting, Diagnosis and Testing).

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 brake pedal during this test. Brake pedal apply is speed sensitive, sitting still the max TBM output during an brake pedal apply is 15 percent.*

  Have an assistant press the manual slider switch fully to the left with a gain of 10 on the TBM.
- **NOTE:** *Testing is performed at the 7 way trailer tow connector.*

  Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

Is the voltage 10 volts?

Yes	The TBM is operating correctly. **SEND** the trailer to an authorized camper/trailer repair center.
No	GO to A7

A7 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect TBM C2142.
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

Positive Lead	Measurement / Action	Negative Lead
C2142-14	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to A8
No	REPAIR the circuit.

A8 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) PWM (PULSE WIDTH MODULATION) OUTPUT CIRCUIT FOR AN OPEN

- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	TRAILER TOW CONNECTOR

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C2142-14	Ω	C439-3

TRAILER BRAKE CONTROL MODULE (TBM)	TRAILER TOW CONNECTOR

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C2142-14	Ω	C4099-3

Is the resistance less than 3 ohms?

Yes	GO to A9
No	REPAIR the circuit.

A9 VERIFY ALL WIRING CONNECTIONS

- Disconnect TBM C2142.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Disconnect C439 (If equipped with 5th wheel).
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Disconnect C4099
- Disconnect all in-line electrical connectors between the TBM and the 7 way connector.
- 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 A10
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

A10 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Connect all in-line electrical connectors between the TBM and the 7 way connector. Make sure they seat and latch correctly.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Connect C439 (If equipped with 5th wheel). Make sure it seats and latches correctly.
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Connect C4099. Make sure it seats and latches 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.

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.

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. The TBM receives fused battery voltage from the BJB.

A short to voltage on the PWM signal output circuit, a shorted or stuck BPP switch 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 8 (40A) is OK.
- Make sure BCM fuse 30 (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)

- Verify a trailer is **not** connected to the trailer tow connector.
- 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: Trailer Brake Control Module (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.
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

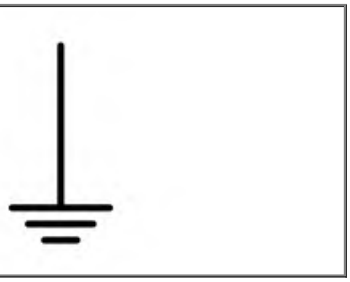
Positive Lead	Measurement / Action	Negative Lead
C2142-12	V	Ground

Is any voltage present?

Yes	GO to B7
No	GO to B10

B7 ISOLATE THE BCM (BODY CONTROL MODULE)

- Remove BCM fuse 30 (5A).
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

Positive Lead	Measurement / Action	Negative Lead
C2142-12	V	Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	INSTALL a new BCM. Click here to access Guided Routine (BCM).

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.
- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

Is a steady voltage present?

Yes	GO to B9
No	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 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.
- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to B10

B10 VERIFY ALL WIRING CONNECTIONS

- Ignition OFF.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Disconnect C439. (If equipped with 5th wheel)
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Disconnect C4099.
- Disconnect all in-line electrical connectors between the TBM C2142 and the 7 way trailer tow connector.
- 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 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 all in-line electrical connectors between the TBM C2142 and the 7 way trailer tow connector. Make sure they seat and latch correctly.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Connect C439 (If equipped with 5th wheel). Make sure it seats and latches correctly.
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Connect C4099. Make sure it seats and latches 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 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 TRAILER WIRING FAULT

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 TRAILER WIRING FAULT, 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 TRAILER WIRING FAULT 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
B148A:11	Trailer Brake Output: Circuit Short to Ground	This DTC sets in continuous memory when the ignition is set to ON or during the on-demand self test if the current draw on the PWM output circuit is greater than 49 amps.
B148A:12	Trailer Brake Output: Circuit Short to Battery	This DTC sets in continuous memory when the ignition is set to ON 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 8 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: Trailer Brake Control Module (TBM). If no Diagnostic Trouble Codes (DTCs) return, the system is operating correctly at this time. INSPECT the 7-pin trailer tow connector C439 or 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.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Disconnect C439 (If equipped with 5th wheel).
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Disconnect C4099
- 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 C439 (If equipped with 5th wheel).
- Connect C4099.
- Disconnect TBM C2142.
- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead

Positive Lead	Measurement / Action	Negative Lead
C439-3	Ω	Ground

TRAILER TOW CONNECTOR	

Rear Bumper

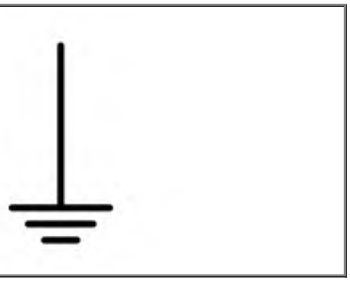
Positive Lead	Measurement / Action	Negative Lead
C4099-3	Ω	Ground

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 C439 (If equipped with 5th wheel).
- Connect C4099.
- Disconnect TBM C2142.
- Ignition ON.
- Operate the park lamps and measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

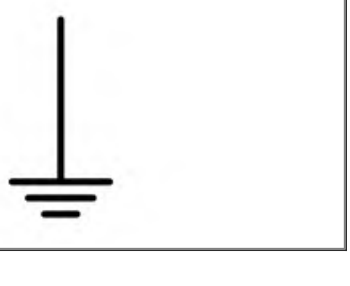
Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

- Operate the stoplamps and measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

- Operate the reversing lamps and measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

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

- Disconnect TBM C2142 (if not previously disconnected).
- Disconnect C439 (If equipped with 5th wheel).
- Disconnect C4099.
- Disconnect all in-line electrical connectors between the TBM and the 7-pin trailer tow connector.
- 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
- Connect all in-line electrical connectors between the TBM and the 7-pin trailer tow connector. Make sure they seat and latch correctly.
- Connect C439 (If equipped with 5th wheel). Make sure it seats and latches correctly.
- Connect C4099. Make sure it seats and latches correctly
- Connect TBM C2142. 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.

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

At any time, 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

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.

The message center displays TRAILER CONNECTED message when no trailer is connected to the vehicle

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.

Both the TBM and the TRM use trailer connectivity to monitor system. The TBM looks at the trailer brake circuit and the TRM looks at the lighting circuit. For TRM issues refer to
REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
.

Possible Sources

- Wiring, terminals or connectors
- TBM
- TRM

Visual Inspection and Diagnostic Pre-checks

- Trailer without trailer brakes will not be detected in message center.
- Electric over hydraulic type trailer brakes disables the inductance test from TBM , make sure the **Trailer Brake Type** in the message center matches the customers trailer.

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

D1 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 D2

D2 CHECK MESSAGE CENTER TOWING STATUS

NOTE: *Before performing any testing check customers message center setting's in* ***TOWING****. Set* ***TRAILER BRAKE TYPE*** *to* ***Electric*** *or misdiagnosis could occur.*

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

- Ignition ON. **NOTE:** *Observe message center when turning ignition to ON, message only displayed for limited amount of time.*

Does the vehicle indicate a trailer is connected in the message center?

Yes	GO to D3
No	GO to D4

D3 CHECK TBM (TRAILER BRAKE CONTROL MODULE) TRAILER CONSTAT PID STATUS

NOTE: *Before performing any testing check customers message center setting's in* ***TOWING****. Set* ***TRAILER BRAKE TYPE*** *to* ***Electric*** *or misdiagnosis could occur.*

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

- Ignition ON.
- Using a diagnostic scan tool, access the TBM PID's (parameter identifications).
- Apply the vehicle brakes for at least 2 seconds.
- Monitor the TBM PID: **CONSTAT**

Does the CONSTAT PID display ON?

Yes	GO to D5
No	GO to D4

D4 CHECK TRM (TRAILER MODULE) TRAILER ON PID STATUS

- Using a diagnostic scan tool, access the TRM PID's (parameter identifications).
- Apply the vehicle brakes for at least 2 seconds.
- Monitor the TRM PID: **TRAILER ON**

Does the TRAILER ON PID display ON?

Yes	REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
No	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 HS-CAN2.

D5 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR A SHORT TO GROUND

- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3	Ω	Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to D6
No	REPAIR the circuit.

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

- Ignition ON.
- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to D7

D7 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 D8
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

D8 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.

The message center displays a false TRAILER DISCONNECTED message when a trailer is connected to the vehicle

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.

Both the TBM and the TRM use trailer connectivity to monitor system. The TBM looks at the trailer brake circuit and the TRM looks at the lighting circuit. For TRM issues refer to
REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).
.

Possible Sources

- Wiring, terminals or connectors
- TBM
- TRM

Visual Inspection and Diagnostic Pre-checks

- Trailer without trailer brakes will not be detected in message center.
- Electric over hydraulic type trailer brakes disables the inductance test from TBM , make sure the **Trailer Brake Type** in the message center matches the customers trailer.

PINPOINT TEST E : THE MESSAGE CENTER DISPLAYS INCORRECT OR FALSE MESSAGE

E1 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 E2

E2 CHECK MESSAGE CENTER TOWING STATUS

NOTE: *Before performing any testing check customers message center setting's in **TOWING**. Set **TRAILER BRAKE TYPE** to **Electric** or misdiagnosis could occur.*

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

- Ignition ON. **NOTE:** *Observe message center when turning ignition to ON, message only displayed for limited amount of time.*

Does the vehicle indicate No Trailer Connected in the message center?

Yes	GO to E3
No	GO to E4

E3 CHECK TBM (TRAILER BRAKE CONTROL MODULE) TRAILER CONSTAT PID STATUS

NOTE: *Before performing any testing check customers message center setting's in **TOWING**. Set **TRAILER BRAKE TYPE** to **Electric** or misdiagnosis could occur.*

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

- Ignition ON.
- Using a diagnostic scan tool, access the TBM PID's (parameter identifications).
- Apply the vehicle brakes for at least 2 seconds.
- Monitor the TBM PID: **CONSTAT**

Does the CONSTAT PID display OFF?

Yes	GO to E5
No	GO to E4

E4 CHECK TRM (TRAILER MODULE) TRAILER ON PID STATUS

- Using a diagnostic scan tool, access the TRM PID's (parameter identifications).
- Apply the vehicle brakes for at least 2 seconds.
- Monitor the TRM PID: **TRAILER ON**

Does the TRAILER ON PID display OFF?

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 HS-CAN2.
No	REFER to: Trailer Lamps (417-01 Exterior Lighting, Diagnosis and Testing).

E5 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect TBM C2142.
- **NOTE:** *C439 connects to the back of the 7 way trailer tow connector.*

  Disconnect C439 (If equipped with 5th wheel).
- **NOTE:** *C4099 connects to the back of the 7 way trailer tow connector.*

  Disconnect C4099.
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	TRAILER TOW CONNECTOR

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C2142-14	Ω	C439-3

TRAILER BRAKE CONTROL MODULE (TBM)	TRAILER TOW CONNECTOR

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C2142-14	Ω	C4099-3

Is the resistance less than 3 ohms?

E6 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR A SHORT TO GROUND

Yes	GO to E6
No	REPAIR the circuit.

- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3	Ω	Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to E7
No	REPAIR the circuit.

E7 CHECK THE 7 PIN TRAILER TOW CONNECTOR TRAILER BRAKES CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON.
- Measure:

TRAILER TOW CONNECTOR	

5th Wheel Inside Truck Bed

Positive Lead	Measurement / Action	Negative Lead
C439-3		Ground

TRAILER TOW CONNECTOR	

Rear Bumper

Positive Lead	Measurement / Action	Negative Lead
C4099-3		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to E8

E8 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 E9
No	REPAIR the affected connectors or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

E9 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 F : U3003:17

F1 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 charging system concern.
No	GO to F2

F2 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 F3
No	DIAGNOSE the overcharging condition.

F3 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 F4
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.

F4 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Disconnect TBM C2142 (if not previously disconnected).
- Disconnect all in-line electrical connectors between the TBM and the BJB.
- 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
- Connect all in-line electrical connectors between the TBM and the BJB. 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 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 8 (40A) is OK.

PINPOINT TEST G : 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.

G1 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 G2
No	The system is operating correctly at this time. The DTC may have set due to a previous low battery voltage condition.

G2 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).
No	GO to G3

G3 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 G4
No	INSTALL a new battery. REFER to: Battery (414-01 Battery, Mounting and Cables, Removal and Installation).

G4 CHECK THE TBM (TRAILER BRAKE CONTROL MODULE) VOLTAGE SUPPLY FOR AN OPEN

- Ignition OFF.
- Disconnect TBM C2142.
- Remove BJB fuse 8 (40A).
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

Positive Lead	Measurement / Action	Negative Lead
C2142-8	Ω	BJB fuse 8 (40A) output side

Is the resistance less than 3 ohms?

Yes	GO to G5
No	VERIFY BJB fuse 8 (40A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the cause of the circuit short.

G5 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).
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

Positive Lead	Measurement / Action	Negative Lead
C2142-3	Ω	Ground

Is the resistance less than 3 ohms?

Yes	GO to G6
No	REPAIR the circuit.

G6 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Disconnect TBM C2142 (if not previously disconnected).
- Disconnect all in-line electrical connectors between the TBM and the BJB.
- 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
- Connect all in-line electrical connectors between the TBM and the BJB. Make sure they seat and latch correctly.
- Connect TBM C2142. Make sure it seats and latches correctly.
- Connect the battery negative cable.
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
- Install BJB fuse 8 (40A).
- 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 fuse 8 (40A). 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 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 **only** when a trailer is connected to the 7-pin trailer tow connector. 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, this DTC sets.

Possible Sources

- Wiring, terminals or connectors
- TBM

PINPOINT TEST H : 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.

H1 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).
- Measure:

TRAILER BRAKE CONTROL MODULE (TBM)	

Positive Lead	Measurement / Action	Negative Lead
C2142-3	Ω	Ground

Is the resistance less than 3 ohms?

Yes	GO to H2
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.

H2 VERIFY ALL WIRING CONNECTIONS

- Ignition OFF.
- Disconnect all in-line electrical connectors between the TBM and the BJB.
- 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 H3
No	REPAIR the connector or terminals. Refer to Wiring Diagrams Cell 5 for schematic and connector information.

H3 CHECK FOR CORRECT TBM (TRAILER BRAKE CONTROL MODULE) OPERATION

- Connect all in-line electrical connectors between the TBM and the BJB. Make sure they seat and latch correctly.
- 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

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 I : U0100:00

I1 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 I2
No	DIAGNOSE the PCM or GWM 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 U0100:00 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 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 G For DTC U3003:17, GO to Pinpoint Test F
No	GO to I4

I4 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 I5

I5 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 - 6.2L V8, Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 6.2L V8, Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14B Electronic Engine Controls - 6.7L Power Stroke Diesel, Diagnosis and Testing).
No	GO to I6

I6 CHECK FOR OTHER CAUSES OF COMMUNICATION NETWORK CONCERN

NOTE: *If new modules were installed prior to the DTC being set, the module configuration can be incorrectly set during the PMI or the PMI may not have been carried out.*

- Check the vehicle service history for recent service actions related to the PCM or TBM. If recent service history is found:
  - verify the correct replacement module was installed.
    - HVBOM may be used to verify correct part fitment.
  - verify the configuration of replacement module was correct.
    - re-configure the module using as-built data if prior configuration is suspect.
  - verify the module was not obtained from a like vehicle and installed into customer vehicle.
    - return the swapped module to source vehicle and obtain new replacement module.
- Operate the system and determine if the observable symptom is still present.

Is the observable symptom still present?

Yes	GO to I7
No	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

I7 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, Click here to access Guided Routine (PCM).
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

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.

Possible Sources

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

PINPOINT TEST J : U0121:00

J1 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 J2
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).

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 U0121:00 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 G For DTC U3003:17, GO to Pinpoint Test F
No	GO to J4

J4 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 J5

J5 CHECK FOR OTHER CAUSES OF COMMUNICATION NETWORK CONCERN

NOTE: *If new modules were installed prior to the DTC being set, the module configuration can be incorrectly set during the PMI or the PMI may not have been carried out.*

- Check the vehicle service history for recent service actions related to the ABS module or TBM. If recent service history is found:
  - verify the correct replacement module was installed.
    - HVBOM may be used to verify correct part fitment.
  - verify the configuration of replacement module was correct.
    - re-configure the module using as-built data if prior configuration is suspect.
  - verify the module was not obtained from a like vehicle and installed into customer vehicle.
    - return the swapped module to source vehicle and obtain new replacement module.
- Operate the system and determine if the observable symptom is still present.

Is the observable symptom still present?

Yes	GO to J6
No	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

J6 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0121: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 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 K : U0140:00

K1 CHECK THE COMMUNICATION NETWORK

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

Do the BCM and GWM pass the Network Test?

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

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 G For DTC U3003:17, GO to Pinpoint Test F
No	GO to K5

K4 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 K5

K5 RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE GWM (GATEWAY MODULE A) SELF-TEST

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

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

Yes	DIAGNOSE the GWM Diagnostic Trouble Codes (DTCs). REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	GO to K6

K6 CHECK FOR OTHER CAUSES OF COMMUNICATION NETWORK CONCERN

NOTE: *If new modules were installed prior to the DTC being set, the module configuration can be incorrectly set during the PMI or the PMI may not have been carried out.*

- Check the vehicle service history for recent service actions related to the BCM or TBM. If recent service history is found:
  - verify the correct replacement module was installed.
    - HVBOM may be used to verify correct part fitment.
  - verify the configuration of replacement module was correct.
    - re-configure the module using as-built data if prior configuration is suspect.
  - verify the module was not obtained from a like vehicle and installed into customer vehicle.
    - return the swapped module to source vehicle and obtain new replacement module.
- Operate the system and determine if the observable symptom is still present.

Is the observable symptom still present?

Yes	GO to K7
No	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

K7 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

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 L : U0155:00

L1 CHECK THE COMMUNICATION NETWORK

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

Do the IPC and GWM pass the Network Test?

Yes	GO to L2
No	DIAGNOSE the IPC or GWM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

L2 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 L3
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.

L3 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 G For DTC U3003:17, GO to Pinpoint Test F
No	GO to L4

L4 RETRIEVE THE DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE GWM (GATEWAY MODULE A) SELF-TEST

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

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

Yes	DIAGNOSE the GWM Diagnostic Trouble Codes (DTCs). REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	GO to L5

L5 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 L6

L6 CHECK FOR OTHER CAUSES OF COMMUNICATION NETWORK CONCERN

NOTE: *If new modules were installed prior to the DTC being set, the module configuration can be incorrectly set during the PMI or the PMI may not have been carried out.*

- Check the vehicle service history for recent service actions related to the IPC or TBM. If recent service history is found:
  - verify the correct replacement module was installed.
    - HVBOM may be used to verify correct part fitment.
  - verify the configuration of replacement module was correct.
    - re-configure the module using as-built data if prior configuration is suspect.
  - verify the module was not obtained from a like vehicle and installed into customer vehicle.
    - return the swapped module to source vehicle and obtain new replacement module.
- Operate the system and determine if the observable symptom is still present.

Is the observable symptom still present?

Yes	GO to L7
No	The system is operating correctly at this time. The concern may have been due to incorrect parts replacement procedures or incorrect module configuration.

L7 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).