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Also, all 4 tires and wheels must be of the same manufacturer recommended size for the wheel speed sensor to generate an accurate wheel speed signal. REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description (206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) C0033:07	Right Front Tone Wheel: Mechanical Failures	These Diagnostic Trouble Codes (DTCs) set in continuous memory and on-demand if there is damage to the wheel speed sensor or encoder ring, After ABS (anti-lock brake system) initialization and when vehicle speed is above 48 km/h (30 mph), the ABS (anti-lock brake system) module monitors the raw wheel speed sensor signal for a cyclically reoccurring gap or slope in the signal. This indicates a possible missing tooth in the encoder ring. If the signal is incorrect for more than 1 minute, the DTC (diagnostic trouble code) is set.
ABS (anti-lock brake system) C0036:07	Left Rear Tone Wheel: Mechanical Failures	These Diagnostic Trouble Codes (DTCs) set in continuous memory and on-demand if there is damage to the wheel speed sensor or encoder ring, After ABS (anti-lock brake system) initialization and when vehicle speed is above 48 km/h (30 mph), the ABS (anti-lock brake system) module monitors the raw wheel speed sensor signal for a cyclically reoccurring gap or slope in the signal. This indicates a possible missing tooth in the encoder ring. If the signal is incorrect for more than 1 minute, the DTC (diagnostic trouble code) is set.
ABS (anti-lock brake system) C0039:07	Right Rear Tone Wheel: Mechanical Failures	These Diagnostic Trouble Codes (DTCs) set in continuous memory and on-demand if there is damage to the wheel speed sensor or encoder ring, After ABS (anti-lock brake system) initialization and when vehicle speed is above 48 km/h (30 mph), the ABS (anti-lock brake system) module monitors the raw wheel speed sensor signal for a cyclically reoccurring gap or slope in the signal. This indicates a possible missing tooth in the encoder ring. If the signal is incorrect for more than 1 minute, the DTC (diagnostic trouble code) is set.
ABS (anti-lock brake system) C0030:07	Left Front Tone Wheel: Mechanical Failures	These Diagnostic Trouble Codes (DTCs) set in continuous memory and on-demand if there is damage to the wheel speed sensor or encoder ring, After ABS (anti-lock brake system) initialization and when vehicle speed is above 48 km/h (30 mph), the ABS (anti-lock brake system)

		and encoder or high frequency interference and it affects the sensor input to the ABS (anti-lock brake system) module.
ABS (anti-lock brake system) C003A:64	Right Rear Wheel Speed Sensor: Signal Plausibility Failure	Sets when the wheel speed sensor is damaged, if the encoder is missing or damaged, if there is an excessive gap between the sensor and encoder, if the wrong sensor is installed (bi-directional versus uni-directional) or if the tire size is incorrect for the vehicle affects the sensor input to the ABS (anti-lock brake system) module.
ABS (anti-lock brake system) C1A95:64	Wheel Speed Sensor: Signal Plausibility Failure	This DTC (diagnostic trouble code) is set when the ABS (anti-lock brake system) module monitoring determines an implausible ABS (anti-lock brake system) control activation has been requested for more than 1 second.

Possible Sources

- Wiring, terminals or connectors
- Incorrect or mismatched tire
- Tire pressure
- Wheel speed sensor
- Wheel speed sensor encoder ring
- Wheel bearing
- ABS (anti-lock brake system)

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST C : ABS (ANTI-LOCK BRAKE SYSTEM) MODULE COMMUNICATION CONCERN WITH RFA (REMOTE FUNCTION ACTUATOR) - BLUETOOTH LOW ENERGY MODULE

Refer to Wiring Diagrams Cell 14for schematic and connector information.

Normal Operation and Fault Conditions With the ignition ON, the RFA (remote function actuator) sends messages to the GWM (gateway module A) over the HS-CAN1 (high-speed controller area network 1) . The GWM (gateway module A) relays these messages to the ABS (anti-lock brake system) module over the FD-CAN (Flexible Data Rate Controller Area Network) . If the ABS (anti-lock brake system) module does not receive these messages within the specified time frame, the ABS (anti-lock brake system) module sets Diagnostic Trouble Codes (DTCs). This can be due to a RFA (remote function actuator) failure, a circuit failure on the CAN (controller area network) or an excessive load on the network. For information on the messages sent to the ABS (anti-lock brake system) module by the RFA (remote function actuator) , REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description (206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions

No	DIAGNOSE the GWM (gateway module A) does not communicate with the diagnostic scan tool. REFER to: Controller Area Network (CAN) Module Communications Network - Electric (418-00A Controller Area Network (CAN) Module Communications Network, Diagnosis and Testing).

C3 RECHECK THE ABS MODULE FOR THE LOST COMMUNCATION DTC

- Using a diagnostic scan tool, clear the ABS (anti-lock brake system) module Diagnostic Trouble Codes (DTCs).
- Put the ABS (anti-lock brake system) module in sleep mode by performing the following steps:
  - With ALL doors closed, set the ignition from ON to OFF.
  - Disconnect the diagnostic scan tool.
  - Open the door, exit the vehicle and close the door.
  - Wait a minimum of 90 seconds for the ABS (anti-lock brake system) module to enter sleep mode.
- Ignition ON.
- **NOTE**

  When retrieving Diagnostic Trouble Codes (DTCs), ignore all historical or continuous memory Diagnostic Trouble Codes (DTCs).

  Using a diagnostic scan tool, carry out the ABS (anti-lock brake system) module self-test.

Are any of the Diagnostic Trouble Codes (DTCS) listed in the DTC (diagnostic trouble code) Fault Trigger Conditions table present and active in the ABS (anti-lock brake system) module?

Yes	GO to C4

No	The system is operating correctly at this time. The DTC (diagnostic trouble code) may have been set due to high network traffic or an intermittent fault condition.

C4 REVIEW THE ABS MODULE SELF-TEST FOR VOLTAGE-REALTED DIAGNOSTIC TROUBLE CODES (DTCS)

- Review the results from the ABS (anti-lock brake system) module self-test.

Is DTC (diagnostic trouble code) U3003:16 or U3003:17 present?

If new modules were installed prior to the DTC (diagnostic trouble code) being set, the module configuration can be incorrectly set during the PMI (programmable module installation) or the PMI (programmable module installation) may not have been carried out.

- Check the vehicle service history for recent service actions related to the RFA (remote function actuator) or the ABS (anti-lock brake system) module. 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 C8

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

C8 CHECK FOR COMMUNICATION DIAGNOSTIC TROUBLE CODES (DTCS) IN OTHER MODULES

- Ignition ON.
- Using a diagnostic scan tool, carry out the Network Test to retrieve Diagnostic Trouble Codes (DTCs) from all modules.

Is any DTC (diagnostic trouble code) from the Fault Trigger Conditions Table set in 1 or more modules in addition to the ABS (anti-lock brake system) module?

Yes	GO to C9

No	GO to C10

C9 VERIFY RFA MODULE OPERATION

- Ignition OFF.
- Disconnect RFA (remote function actuator) module C9026.

    - pushed-out pins - install new pins as necessary
    - spread terminals - install new terminals as necessary
- Connect RFA (remote function actuator) module C9026. Make sure the connector seats and latches correctly.
- Connect GWM (gateway module A) C2431C. Make sure the connector seats and latches correctly.
- Connect ABS (anti-lock brake system) module C135. Make sure the connector seats and latches correctly.
- Operate the system and verify the concern is still present.

Is the concern still present?

Yes	CHECK OASIS (Online Automotive Service Information System) for any service articles: TSB (Technical Service Bulletin) , GSB (General Service Bulletin) , SSM (special service message) or FSA (Field Service Action) . If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern, INSTALL a new EBB (electric brake booster) unit. REFER to: Electric Brake Booster (EBB) (206-09 Anti-Lock Brake System (ABS) and Stability Control, 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.

PINPOINT TEST D : LOST COMMUNICATION WITH BODY CONTROL MODULE

Refer to Wiring Diagrams Cell 14for schematic and connector information.

Normal Operation and Fault Conditions With the ignition ON, the BCM (body control module) sends messages to the GWM (gateway module A) over the HS-CAN1 (high-speed controller area network 1) , the GWM (gateway module A) relays these messages to the ABS (anti-lock brake system) module over the FD-CAN (Flexible Data Rate Controller Area Network) . If the ABS (anti-lock brake system) module does not receive these messages within a certain time frame, the module sets Diagnostic Trouble Codes (DTCs). For information on the messages sent to the ABS (anti-lock brake system) module by the BCM (body control module) , REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description
(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

. **DTC Fault Trigger Conditions**

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST F : ABS (ANTI-LOCK BRAKE SYSTEM) MODULE BATTERY VOLTAGE CONCERNS

NOTE

The ABS (anti-lock brake system) module may set an overcharge or overvoltage DTC (diagnostic trouble code) if the vehicle has been recently jump started, the battery has been recently charged or the battery has been discharged. The battery may become discharged due to excessive load(s) on the charging system from aftermarket accessories or if the battery has been left unattended with the accessories on.

Normal Operation and Fault Conditions

The ABS (anti-lock brake system) module, hydraulic pump and solenoid valves require an operating voltage between 10 and 17 volts. The ABS (anti-lock brake system) module receives this voltage from the BJB (battery junction box) . The ABS (anti-lock brake system) module has 2 ground circuits spliced together and terminating at a signal location. An overcharging condition in the charging system results in the ABS (anti-lock brake system) module setting a DTC (diagnostic trouble code) .

REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) U3003:17	Battery Voltage: Circuit Voltage Above Threshold	Sets when the ABS (anti-lock brake system) module detects the voltage supply is above 16 volts. This DTC (diagnostic trouble code) may also set in the ABS (anti-lock brake system) module due to battery charging or vehicle jump starting event.

Possible Sources

- Charging system concern
- ABS (anti-lock brake system) module

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST G : U2001:00

Normal Operation and Fault Conditions

ABS (anti-lock brake system) C1020:00	Brake System Fill Not Complete: No Sub Type Information	This DTC (diagnostic trouble code) is pre-set in a new ABS (anti-lock brake system) module and can only be cleared when the brake system has been successfully bled.

Possible Sources

- Brake system has not been bled

H1 CHECK THE ABS (ANTI-LOCK BRAKE SYSTEM) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the ABS (anti-lock brake system) / module self-test.

Is DTC (diagnostic trouble code) C1020:00 present?

Yes	REFER to: Brake System Pressure Bleeding(206-00 Brake System - General Information, General Procedures).

No	The system is operating correctly at this time.

PINPOINT TEST I : U3001:68

Normal Operation and Fault Conditions

This DTC (diagnostic trouble code) is for informational purposes only and sets in conjunction with other ABS (anti-lock brake system) module Diagnostic Trouble Codes (DTCs). Retrieve and diagnose all other ABS (anti-lock brake system) module Diagnostic Trouble Codes (DTCs).

REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) U3001:68	Control Module Improper Shutdown Performance: Event Information	This DTC (diagnostic trouble code) sets when the ABS (anti-lock brake system) module has not shut down properly. This is usually due to a loss of power before the module has shut down, such as a low battery or open circuit.

Possible Sources

Yes	REFER to: Instrumentation, Message Center and Warning Chimes(413-01 Instrumentation, Message Center and Warning Chimes, Diagnosis and Testing).

No	For DTC (diagnostic trouble code) C0049:7B, CHECK the brake fluid level and FILL as necessary. For all other ABS (anti-lock brake system) module Diagnostic Trouble Codes (DTCs), GO to the DTC (diagnostic trouble code) Chart in this section.

PINPOINT TEST ZA : C0078:56

Normal Operation and Fault Conditions

The BCM (body control module) is programmed with vehicle tire size information during the module configuration step. The BCM (body control module) shares tire size information with other module over the HS-CAN (high-speed controller area network) . When this DTC (diagnostic trouble code) sets, the ABS (anti-lock brake system) module sends a message to the IPC (instrument panel cluster) to illuminate the ABS (anti-lock brake system) warning indicator.

REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description(206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
ABS (anti-lock brake system) C0078:56	Tire Diameter: Invalid/Incompatible Configuration	If the tire size message sent to the ABS (anti-lock brake system) module from the BCM (body control module) contains invalid data, this DTC (diagnostic trouble code) sets.

Possible Sources

- Temporary or mini-spare tire in use
- Under inflated tires
- Mismatched sized wheels and tires
- Network communication concern
- Incorrect BCM (body control module) configuration

Pinpoint Test Steps available in the on-line Workshop Manual.

		NOT pressing the brake pedal and there are no hydraulic system Diagnostic Trouble Codes present.
ABS (anti-lock brake system) C0041:01	Brake Pedal Switch 'B': General Electrical Failure	When the ABS (anti-lock brake system) module detects the brakelamp output signal is shorted to ground, this DTC (diagnostic trouble code) is set.
ABS (anti-lock brake system) C0041:04	Brake Pedal Switch 'B': System Internal Failures	When the brake pedal is not being pressed, the ABS (anti-lock brake system) module detects greater than 1.95 volts on the BPS circuit.
ABS (anti-lock brake system) C0041:14	Brake Pedal Switch 'B': Circuit Short To Ground Or Open	When the ABS (anti-lock brake system) module detects the brakelamp output signal is shorted to voltage, this DTC (diagnostic trouble code) is set.
ABS (anti-lock brake system) C0041:4B	Brake Pedal Switch 'B': Over Temperature	Sets when the ABS (anti-lock brake system) module has calculated a possible over-termperature condition in the EBB (electric brake booster) unit.

Possible Sources

- Wiring, terminals or connectors
- EBB (electric brake booster) unit

Pinpoint Test Steps available in the on-line Workshop Manual.

PINPOINT TEST M : FRONT WHEEL SPEED SENSOR ELECTRICAL FAULTS

Refer to Wiring Diagrams Cell 42for schematic and connector information.

Normal Operation and Fault Conditions Active wheel speed sensors generate a voltage signal proportional to wheel speed which is sent to the ABS (anti-lock brake system) module. Each wheel speed sensor is connected to the ABS (anti-lock brake system) module through 2 wires and a connector at each wheel speed sensor. The 2 circuits provide both sensor power and sensor signal return. REFER to: Anti-Lock Brake System (ABS) and Stability Control - System Operation and Component Description (206-09 Anti-Lock Brake System (ABS) and Stability Control, Description and Operation).

DTC Fault Trigger Conditions