2004 BRAKES Antilock Brake System - Ascender

2004 BRAKES

Antilock Brake System - Ascender

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

	Specif	ication
Application	Metric	English
EBCM to BPMV	5 N.m	39 lb in
EHCU to Bracket	9 N.m	7 lb in
EHCU Bracket Mounting Bolts	25 N.m	18 lb ft
Front Brake Lines to BPMV	25 N.m	18 lb ft
Front Wheel Speed Sensor Mounting Bolt	17 N.m	12 lb ft
Master Cylinder brake lines to BPMV	25 N.m	18 lb ft
Rear Brake Line to BPMV	25 N.m	18 lb ft
Steering Knuckle to Front Hub/Bearing Mounting Bolts	180 N.m	133 lb ft

SCHEMATIC AND ROUTING DIAGRAMS

ABS SCHEMATIC ICONS

ABS Schematic Icons

Icon	Icon Definition
Icon	Icon Definition IMPORTANT: Twisted-pair wires provide an effective shield that helps protect sensitive electronic components from electrical interference. If the wires were covered with shielding, install new shielding.
	degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted-pair wires shown :
	 The wires must be twisted a minimum of 9 turns per 31 cm (12 in) as measured anywhere along the length of the wires. The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in).

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ABS SCHEMATICS

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Fig. 1: EBCM Power, Ground, Serial Data, Indicator, And Signal Circuits Schematic Courtesy of GENERAL MOTORS CORP.

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Fig. 2: Wheel Speed Sensors And Traction Control Switch Schematic - NW7 Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

ABS COMPONENT VIEWS

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Fig. 3: Frame Rail, Left Side Component View Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Chassis Harness
2	Electronic Brake Control Module (EBCM)
3	G304

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Fig. 4: I/P Trim Panel Component View Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

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Fig. 5: Front Hubs And Rotors Component View Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	LH Steering Knuckle
2	Wheel Speed Sensor - LF
3	Wheel Speed Sensor - RF
4	RH Steering Knuckle

ABS CONNECTOR END VIEWS

Electronic Brake Control Module (EBCM) Connector End View C1

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Connector	 Connector Part Information 2-Way F Metri-Pack-480 Sealed (BK) 			
Pin	Wire Color	Circuit No.	Function	
A	BK	1850	Ground	
В	RD	642	Battery Positive Voltage	

Electronic Brake Control Module (EBCM) Connector End View C2 - w/NW7



Connector Part Information		 12193519 16-Way F Micro-Pack 100W (BK) 	
Pin	Wire Color	Circuit No.	Function
A1	BN	441	Ignition 3 Voltage
A2	YE	873	Left Front Wheel Speed Sensor Low Reference
A3	D-GN	872	Right Front Wheel Speed Sensor Signal

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A4	TN/BK	464	Delivered Torque Signal (2WD)
A5	-	-	Not Used
A6	WH	1808	Traction Control Off Indicator Control
A7	-	-	Not Used
A8	BN/WH	1571	Traction Control Switch Signal
B1	YE/BK	1827	Vehicle Speed Signal
B2	L-BU	830	Left Front Wheel Speed Sensor Signal
B3	TN	833	Right Front Wheel Speed Sensor Low Reference
B4	OG/BK	463	Requested Torque Signal (2WD)
В5	PU	420	TCC Brake Switch /Cruise Control Release Signal
B6	L-BU	1122	ABS/TCS Class 2 Serial Data
B7	L-BU	832	Traction Control Active Indicator Control
B8	PU	333	Brake Fluid Level Sensor Signal

Electronic Brake Control Module (EBCM) Connector End View C2 - w/o NW7



Connector	Part Information	 15339077 20-Way F	7 F Micro-Pack 100W (BK)	
Pin	Wire Color	Circuit No. Function		
A1	YE	873	Left Front Wheel Speed Sensor Low Reference	
A2	D-GN	872	Right Front Wheel Speed Sensor Signal	
A3	PU	420	TCC Brake Switch /Cruise Control Release Signal	
A4-A8	-	-	Not Used	
A9	L-BU	1122	ABS/TCS Class 2 Serial Data	
A10	PU	333	Brake Fluid Level Sensor Signal	

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B1	L-BU	830	Left Front Wheel Speed Sensor Signal
B2	TN	833	Right Front Wheel Speed Sensor Low Reference
B3	YE/BK	1827	Vehicle Speed Signal
B4-B9	-	-	Not Used
B10	BN	441	Ignition 3 Voltage

Traction Control Switch (w/NW7) Connector End View

Connector	Part Information	 12065873 7-Way F I	Micro-Pack 100 Series (BK)		
Pin	Wire Color	Circuit No.	Function		
1	L-BU	832	Traction Control Active Indicator Control		
2	BN/WH	1571	Traction Control Switch Signal		
2	РК	639	Ignition 3 Voltage (CJ3)		
3	BN	341	Ignition 3 Voltage (CJ2)		
4	PU/WH	1382	LED Dimming Signal		
5	WH	1808	Traction Control Off Indicator Control		
6	BN/WH	230	Instrument Panel Lamps Dimming Control		
7	BK	2250	Ground		

Wheel Speed Sensor Connector End View - LF

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	B		A
Connector	Connector Part Information 15326801 2-Way F GT 150 Series (BK) 		
Pin	Wire Color	Circuit No.	Function
Α	L-BU	830	Left Front Wheel Speed Sensor Signal
В	YE	873	Left Front Wheel Speed Sensor Low Reference

Wheel Speed Sensor Connector End View - RF

	B		
Connector	Part Information	• 15326801 • 2-Way F	GT 150 Series (BK)
Pin	Wire Color	Circuit No.	Function
А	D-GN	872	Right Front Wheel Speed Sensor Signal
В	TN	833	Right Front Wheel Speed Sensor Low

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1	I	
		Reference

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - ANTILOCK BRAKE SYSTEM

Begin the system diagnosis with **<u>Diagnostic System Check - ABS</u>**. The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - ABS

Circuit Description

The ABS Diagnostic System Check is an organized approach to identifying problems associated with the ABS. This must be the starting point for any ABS related concern and will direct you to the next logical step in diagnosing a malfunction. Most system malfunctions are linked to faulty wiring, connections and occasionally, to components. Understanding the ABS system and using the diagnostic tables correctly will reduce diagnostic time and prevent unnecessary parts replacement.

Test Description

The numbers below refer to the step numbers in the diagnostic table.

2: Lack of communication may be due to partial or total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

4: The presence of DTCs that begin with a "U" indicates that some other module is not communicating. The specified procedure will compile all of the available information before tests are performed.

Step	Action	Yes	No
	Install a scan tool.		Go to <u>Scan Tool</u>
1	Does the scan tool power up?		Does Not Power Up
1			in Data Link
		Go to Step 2	Communications
	1. Turn the ignition ON.		
	2. Use the scan tool in order to establish communication with the following modules:		

Diagnostic System Check - ABS

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2	 4WAL 3 Sensor Powertrain Instrument Panel Cluster Body Control Module Does the scan tool communicate with all of the control modules listed above?	Go to Step 3	Go to <u>Scan Tool</u> <u>Does Not</u> <u>Communicate with</u> <u>Class 2 Device</u> in Data Link Communications
3	Use the scan tool in order to display DTCs for the following control modules: 4WAL 3 Sensor Powertrain Instrument Panel Cluster Body Control Module Does the scan tool display any DTCs for the control modules listed above?	Go to Step 4	Go to <u>Symptoms -</u> <u>Antilock Brake</u> System
4	Does the scan tool display any DTCs that begin with a "U", DTC C0290, C0292-C0297?	Go to <u>Scan Tool</u> <u>Does Not</u> <u>Communicate with</u> <u>Class 2 Device</u> in Data Link Communications	Go to Step 5
5	Does the scan tool display DTC P0500, P0502, P0503, P0562, P0563, P0601-P0607, P1381, P1621, P1627 or P1683?	Go to <u>Diagnostic</u> <u>Trouble Code</u> (<u>DTC</u>) <u>List</u> in Engine Controls - 4.2L or <u>Diagnostic</u> <u>Trouble Code</u> (<u>DTC</u>) <u>List</u> in Engine Controls 4.8L, 5.3L, and 6.0L	Go to Step 6
6	Does the scan tool display DTC B1372?	Go to <u>Diagnostic</u> <u>Trouble Code</u> (<u>DTC</u>) <u>List</u> in Instrument Panel, Gages, and Console	Go to <u>Diagnostic</u> <u>Trouble Code</u> <u>(DTC) List</u>

SCAN TOOL OUTPUT CONTROLS (W/NW7)

Scan Tool Output Controls (W/NW7)

_		
Control	Selections	Description

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Refer to the scan tool r	nanual for complete sc	an tool operating instructions.	
Function Test	-	The EBCM commands the system relay, valve solenoids and pump motor ON and OFF. The EBCM sets a DTC if a malfunction is detected.	
Automated Bleed	-	The EBCM commands each valve solenoid and the pump motor ON and OFF in a special sequence in order to bleed air out of the BPMV. Refer to <u>ABS Automated Bleed</u> <u>Procedure</u> for a step-by-step procedure.	
ABS Motor	-	This function allows the technician to command the ABS pump motor On and Off.	
System Identification	-	The scan tool displays the hardware and software revision of the EBCM.	
Tire Size Calibration	 Read Tire Calibration New Tire Size 	IMPORTANT:The PCM must also be programmed with the correct tiresize calibration when different size tires are installed onthe vehicle. Refer to Service Programming System (SPS)in Programming.This function allows the technician to read the tire sizecalibration of the EBCM or calibrate the EBCM to thecorrect tire size. Calibration must be performed when theEBCM is replaced or when different size tires are installedon the vehicle.	
Lamp Tests	 ABS Lamp Brake Lamp	This function allows the technician to command the ABS indicator or the red BRAKE warning indicator On and Of	
Solenoid Tests	 Left Front Isolation Valve Left Front Dump Valve Right Front Isolation Valve Right Front Dump Valve Rear Isolation Valve Rear DumpValve 	 This function allows the technician to command a selected valve solenoid On and Off. Use the procedure below in order to verify proper operation of the EBCM and BPMV. Solenoid Test Procedure Raise the vehicle so the wheels are about 15 cm (6 in) off the floor. Refer to Lifting and Jacking the Vehicle in General Information. Select the desired Solenoid Test on the scan tool. IMPORTANT: Steps 3, 4 and 5 must be performed within a 5 second time period. The EBCM will only energize a solenoid for 5 seconds. Command the solenoid On. Apply the brake. 	

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		brake circuit being tested. The wheel should spin even though the brake is being applied.
ABS Relay	-	This function allows the technician to command the system relay On and Off.
Low Trac Lamp	-	This function allows the technician to command the LOW TRACTION indicator On and Off.
Traction Off Lamp	-	This function allows the technician to command the TRACTION OFF indicator On and Off.
Requested Torque	-	This function allows the technician to turn Off engine torque reduction in order to verify proper operation of the Traction Control System.

SCAN TOOL OUTPUT CONTROLS (W/O NW7)

Left Front

Scan Tool Output **Additional Menu** Control Selections Description Refer to the scan tool manual for complete scan tool operating instructions. The EBCM commands the system relay, valve solenoids and pump motor ON and OFF. The EBCM sets a DTC if a Function Test malfunction is detected. The EBCM commands each valve solenoid and the pump motor ON and OFF in a special sequence in order to bleed Automated Bleed air out of the BPMV. Refer to ABS Automated Bleed **Procedure** for a step-by-step procedure. This function allows the technician to command the ABS ABS Motor pump motor On and Off. The scan tool displays the hardware and software revision System Identification of the EBCM. **IMPORTANT:** The PCM must also be programmed with the correct tire size calibration when different size tires are installed on the vehicle. Refer to Service Programming System (SPS) in Programming. • Read Tire Tire Size Calibration Calibration This function allows the technician to read the tire size • New Tire Size calibration of the EBCM or calibrate the EBCM to the correct tire size. Calibration must be performed when the EBCM is replaced or when different size tires are installed on the vehicle. This function allows the technician to command a selected valve solenoid On and Off. Use the procedure below in order to verify proper operation of the EBCM and BPMV.

Solenoid Test Procedure

Scan Tool Output Controls (W/O NW7)

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	Isolation Valve • Left Front Dump Valve	 Raise the vehicle so the wheels are about 15 cm (6 in) off the floor. Refer to <u>Lifting and Jacking the</u> <u>Vehicle</u> in General Information.
	 Right Front Isolation Valve 	2. Select the desired Solenoid Test on the scan tool.
	Right Front	IMPORTANT:
~	Dump Valve	Steps 3, 4 and 5 must be performed within a 5
Solenoid Tests	 Rear Isolation Valve 	second time period. The EBCM will only energize a solenoid for 5 seconds.
	• Rear DumpValve	3. Command the solenoid On.
	Dump vuive	4. Apply the brake.
		5. Have an assistant attempt to spin the wheel of the brake circuit being tested. The wheel should spin even though the brake is being applied.
ABS Relay	-	This function allows the technician to command the system relay On and Off.

SCAN TOOL DATA LIST

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value	
Ignition ON, Engine OFF and Brake released				
4WD Status	ABS	Two wheel drive/Four wheel drive	Varies	
ABS Lamp Command	ABS	On/Off	Off	
ABS Pump Motor	ABS	On/Off	Off	
ABS Relay Command	ABS	On/Off	ON	
ABS Stop State	ABS Traction Assist	On/Off	Off	
Brake Switch Status	ABS Traction Assist	On/Off	Off	
Brake Warning Lamp Command	ABS	On/Off	Off	
Diff. Pressure/Fluid Level Switch	ABS	Ok/Low	Ok	
Delivered Torque	Traction Assist	%	35%	
DRP Active	ABS	Yes/No	No	
Left Front Wheel Speed	ABS Traction	km/h or mph	5 km/h/3 mph	

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	Assist		
LF Dump Valve Command	ABS	On/Off	Off
LF Dump Valve Feedback	ABS	On/Off	Off
LF ISO Valve Command	ABS	On/Off	Off
LF ISO Valve Feedback	ABS	On/Off	Off
Low Traction Lamp Command	Traction Assist	On/Off	Off
Rear Dump Valve Command	ABS	On/Off	Off
Rear Dump Valve Feedback	ABS	On/Off	Off
Rear ISO Valve Command	ABS	On/Off	Off
Rear ISO Valve Feedback	ABS	On/Off	Off
Rear Wheel Speed	 ABS Traction Assist 	km/h or mph	5 km/h/3 mph
Requested Torque	Traction Assist	%	91%
Requested Torque RF Dump Valve Command	Traction Assist ABS	% On/Off	91% Off
Requested Torque RF Dump Valve Command RF Dump Valve Feedback	Traction Assist ABS ABS	% On/Off On/Off	91% Off Off
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command	Traction Assist ABS ABS ABS	% On/Off On/Off On/Off	91% Off Off Off
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback	Traction Assist ABS ABS ABS ABS	% On/Off On/Off On/Off On/Off	91% Off Off Off Off
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback Right Front Wheel Speed	Traction Assist ABS ABS ABS ABS • ABS • Traction Assist	% On/Off On/Off On/Off km/h or mph	91% Off Off Off 5 km/h/3 mph
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback Right Front Wheel Speed Traction Control Active	Traction Assist ABS ABS ABS ABS • ABS • Traction Assist Traction Assist	% On/Off On/Off On/Off km/h or mph Yes/No	91% Off Off Off 5 km/h/3 mph No
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback Right Front Wheel Speed Traction Control Active Traction Control Enabled	Traction Assist ABS ABS ABS ABS • ABS • Traction Assist Traction Assist Traction Assist	% On/Off On/Off On/Off On/Off km/h or mph Yes/No Yes/No	91% Off Off Off 5 km/h/3 mph No Varies
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback Right Front Wheel Speed Traction Control Active Traction Control Enabled Traction Control Equipped	Traction Assist ABS ABS ABS ABS • ABS • Traction Assist Traction Assist Traction Assist Traction Assist	% On/Off On/Off On/Off On/Off km/h or mph Yes/No Yes/No Yes/No	91% Off Off Off 5 km/h/3 mph No Varies Yes
Requested Torque RF Dump Valve Command RF Dump Valve Feedback RF ISO Valve Command RF ISO Valve Feedback Right Front Wheel Speed Traction Control Active Traction Control Enabled Traction Control Equipped Traction Control Slip	Traction Assist ABS ABS ABS ABS • ABS • Traction Assist Traction Assist Traction Assist Traction Assist Traction Assist	% On/Off On/Off On/Off On/Off km/h or mph Yes/No Yes/No Yes/No Yes/No	91% Off Off Off 5 km/h/3 mph No Varies Yes No

SCAN TOOL DATA DEFINITIONS

The ABS scan tool data definitions contain a brief description of all ABS related parameters available on the scan tool. The parameters available on the scan tool are listed below in alphanumeric order.

4WD Status

The scan tool displays Two wheel drive/Four wheel drive. The scan tool displays Two wheel drive when the transfer case is shifted into two wheel drive.

ABS Lamp Command

The scan tool displays On/Off. The scan tool displays On when the ABS indicator is commanded on.

ABS Pump Motor

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The scan tool displays On/Off. The scan tool displays On when the ABS pump motor is commanded on.

ABS Relay Command

The scan tool displays On/Off. The scan tool displays On when the system relay is commanded on.

ABS Stop State

The scan tool displays On/Off. The scan tool displays On when the ABS is active.

Brake Switch Status

The scan tool displays On/Off. The scan tool displays On when the brake is applied.

Brake Warning Lamp Command

The scan tool displays On/Off. The scan tool displays On when the red brake warning indicator is commanded on.

Diff. Pressure/Fluid Level Switch

The scan tool displays Ok/Low. The scan tool displays Ok when the brake fluid reservoir has an adequate fluid level.

Delivered Torque

The scan tool displays 25-95%. The scan tool displays 25% when the PCM provides the minimum percentage of available torque in an attempt to eliminate wheel slip.

DRP Active

The scan tool displays Yes/No. The scan tool displays Yes when the DRP is active.

Left Front Wheel Speed

The scan tool displays 5-257 km/h (3-160 mph). The scan tool displays 5 km/h (3 mph) when the vehicle is not moving or is moving at speeds less than or equal to 5 km/h (3 mph).

LF Dump Valve Command

The scan tool displays On/Off. The scan tool displays On when the left front dump valve solenoid is commanded on.

LF Dump Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the left front dump valve solenoid is energized.

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LF ISO Valve Command

The scan tool displays On/Off. The scan tool displays On when the left front isolation valve solenoid is commanded on.

LF ISO Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the left front isolation valve solenoid is energized.

Low Traction Lamp Command

The scan tool displays On/Off. The scan tool displays On when the low traction indicator is commanded on.

Rear Dump Valve Command

The scan tool displays On/Off. The scan tool displays On when the rear dump valve solenoid is commanded on.

Rear Dump Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the rear dump valve solenoid is energized.

Rear ISO Valve Command

The scan tool displays On/Off. The scan tool displays On when the rear isolation valve solenoid is commanded on.

Rear ISO Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the rear isolation valve solenoid is energized.

Rear Wheel Speed

The scan tool displays 5-257 km/h (3-160 mph). The scan tool displays 5 km/h (3 mph) when the vehicle is not moving or moving at speeds less than or equal to 5 km/h (3 mph).

Requested Torque

The scan tool displays 40-95%. The scan tool displays 40% when the EBCM requests the minimum percentage of available torque in an attempt to eliminate wheel slip.

RF Dump Valve Command

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The scan tool displays On/Off. The scan tool displays On when the right front dump valve solenoid is commanded on.

RF Dump Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the right front dump valve solenoid is energized.

RF ISO Valve Command

The scan tool displays On/Off. The scan tool displays On when the right front isolation valve solenoid is commanded on.

RF ISO Valve Feedback

The scan tool displays On/Off. The scan tool displays On when the right front isolation valve solenoid is energized.

Right Front Wheel Speed

The scan tool displays 5-257 km/h (3-160 mph). The scan tool displays 5 km/h (3 mph) when the vehicle is not moving or moving at speeds less than or equal to 5 km/h (3 mph).

Traction Control Active

The scan tool displays Yes/No. The scan tool displays Yes when the traction control system is active.

Traction Control Enabled

The scan tool displays Yes/No. The scan tool displays Yes when the traction control system is enabled.

Traction Control Equipped

The scan tool displays Yes/No. The scan tool displays Yes when the vehicle is equipped with traction control.

Traction Control Slip

The scan tool displays Yes/No. The scan tool displays Yes when the rear wheel slip occurs during acceleration.

Traction Off Lamp Command

The scan tool displays On/Off. The scan tool displays On when the traction off indicator is commanded on.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

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DTC	Diagnostic Procedure	Modules
C0035	DTC C0035 or C0040	EBCM
C0040	DTC C0035 or C0040	EBCM
C0055	DTC C0055	EBCM, PCM
C0110	DTC C0110	EBCM
C0161	DTC C0161	EBCM
C0201	DTC C0201	EBCM
C0221	DTC C0221-C0227	EBCM
C0222	DTC C0221-C0227	EBCM
C0223	DTC C0221-C0227	EBCM
C0225	DTC C0221-C0227	EBCM
C0226	DTC C0221-C0227	EBCM
C0227	DTC C0221-C0227	EBCM
C0228	DTC C0228	EBCM
C0229	<u>DTC C0229</u>	EBCM
C0235	DTC C0235-C0237 or P0609	EBCM
C0236	DTC C0235-C0237 or P0609	EBCM
C0237	DTC C0235-C0237 or P0609	EBCM
C0238	<u>DTC C0238</u>	EBCM
C0241	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0242	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0243	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0244	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0245	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0246	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0247	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0248	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0251	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0252	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0253	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM

Diagnostic Trouble Code (DTC) List

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C0254	DTC C0241-C0254 (W/NW7) or DTC C0241- C0254 (W/O NW7)	EBCM
C0265	DTC C0265 or C0266	EBCM
C0266	DTC C0265 or C0266	EBCM
C0267	DTC C0267 or C0268	EBCM
C0268	DTC C0267 or C0268	EBCM
C0269	DTC C0269 or C0274	EBCM
C0271	DTC C0271-C0273, C0284	EBCM
C0272	DTC C0271-C0273, C0284	EBCM
C0273	DTC C0271-C0273, C0284	EBCM
C0274	DTC C0269 or C0274	EBCM
C0279	DTC C0279	EBCM, PCM
C0281	DTC C0281	EBCM
C0283	DTC C0283	EBCM
C0284	DTC C0271-C0273, C0284	EBCM
C0287	DTC C0287, P1644, or P1689	EBCM, PCM
C0290	DTC C0290 or C0292	EBCM, PCM
C0291	DTC C0291	EBCM, BCM
C0292	DTC C0290 or C0292	EBCM, PCM
C0297	DTC C0297	EBCM, PCM
C0298	DTC C0298 or P0856	EBCM, PCM
C0550	DTC C0550	EBCM
U1000	DTC U1000 in Data Link Communications	EBCM
U1064	DTC U1001-U1254 in Data Link Communications	EBCM
U1300	DTC U1300, U1301, or U1305 in Data Link Communications	EBCM

DTC C0035 OR C0040

Circuit Description

As the wheels spin, each wheel speed sensor produces an AC signal. The electronic brake control module (EBCM) uses the frequency of the AC signals to calculate each wheel speed.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 13 km/h (8 mph).

Conditions for Setting the DTC

Any of the following occurrences may cause the DTC to set.

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- The EBCM detects an open or shorted wheel speed sensor circuit for 500 milliseconds.
- The EBCM detects the absence of a wheel speed sensor signal for 5 seconds. If more than one absent wheel speed sensor signal is detected, the condition must be present for 120 seconds to set DTCs.
- The EBCM detects an erratic wheel speed sensor signal for 200 milliseconds.

Action Taken When the DTC Sets

- The EBCM disables the ABS and may disable the DRP if more than one wheel speed sensor DTC is set.
- The ABS indicator turns ON.
- The brake warning indicator may turn ON.

The actions above are maintained during subsequent ignition cycles until the EBCM completes a power up selftest. This test concludes when the vehicle achieves a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u>, <u>Connector Repairs</u>, <u>Testing for Electrical Intermittents</u> and to <u>Wiring Repairs</u> in Wiring Systems.

If the customer's concern is that the ABS indicator is on only during humid conditions such as rain, snow or vehicle wash, thoroughly inspect the wheel speed sensor circuits for signs of water intrusion. Use the following procedure in order to help isolate the problem area:

- 1. Spray the suspected area with a 5 percent salt water solution.
- 2. Operate the vehicle at a speed greater than 13 km/h (8 mph) for at least 30 seconds.

Repair or replace the suspect harness if the DTC sets.

Step	Action	Values	Yes	No
Schema	atic Reference: <u>ABS Schematics</u>			
1	Did you perform the ABS Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check <u>- ABS</u>
2	 Use a scan tool in order to clear the DTCs. Operate the vehicle at a speed greater than the specified value. 	13 km/h (8 mph)		

DTC C0035 or C0040

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	Does the DTC set?			Go to
			Go to Step 3	Diagnostic Aids
	1. Turn OFF the ignition.			
	 Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> in General Information. 			
3	3. Disconnect the wheel speed sensor connector.	700-10,000 ohms		
	4. Use a DMM in order to measure the resistance across the wheel speed sensor.			
	Does the resistance measure within the specified range?		Go to Step 4	Go to Step 8
	1. Slowly spin the wheel by hand.			
4	2. Use a DMM in order to measure the AC voltage across the wheel speed sensor as the wheel spins.	100 mV		
	Does the AC voltage measure greater than the specified value?		Go to Step 5	Go to Step 8
5	Inspect for poor connections at the harness connector of the wheel speed sensor. Refer to Testing for Intermittent Conditions and Poor <u>Connections</u> and to <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 6
	 Disconnect from the EBCM, the harness connector containing the wheel speed sensor circuits. Test the wheel speed sensor circuits for the 			
6	following: • An open • A short to ground • A short to voltage • Shorted together	-		
	Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> in Wiring Systems.Did you find and correct the condition?		Go to Step 10	Go to Step 7
7	Inspect for poor connections at the harness connector for the EBCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and to <u>Connector Repairs</u> in Wiring Systems.	-		

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	Did you find and correct the condition?		Go to Step 10	Go to Step 9
8	Replace the wheel speed sensor. Refer to <u>Wheel</u> <u>Speed Sensor Replacement</u> . Did you complete the replacement?	-	Go to Step 10	-
9	IMPORTANT: Use the scan tool in order to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?	-	Go to Step 10	-
10	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	-	Go to Step 2	System OK

DTC C0055

Circuit Description

The powertrain control module (PCM) converts the signal from the vehicle speed sensor (VSS) to a 128k pulses/mile signal. The electronic brake control module (EBCM) uses the vehicle speed signal from the PCM to calculate the rear wheel speed.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 13 km/h (8 mph).

Conditions for Setting the DTC

- The EBCM detects an open or shorted vehicle speed signal circuit for 500 milliseconds.
- The EBCM detects the absence of the vehicle speed signal for 5 seconds. If more than one absent wheel speed sensor signal is detected, the condition must be present for 120 seconds to set DTCs.
- The EBCM detects an erratic vehicle speed signal for 200 milliseconds.

Action Taken When the DTC Sets

- The EBCM disables the ABS/DRP.
- The ABS indicator turns ON.
- The brake warning indicator turns ON.

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The actions above are maintained during subsequent ignition cycles until the EBCM completes a power up selftest. This test concludes when the vehicle achieves a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u>, <u>Connector Repairs</u>, <u>Testing for Electrical Intermittents</u> and to <u>Wiring Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for a voltage signal from the PCM.

4: This step tests for a missing or erratic vehicle speed signal from the PCM. An assistant may be required to perform this test.

Step	Action	Values	Yes	No
Schem	atic Reference: <u>ABS Schematics</u>			
1	Did you perform the ABS Diagnostic System Check?	-	Go to Step 2	Go to <u>Diagnostic</u> <u>System Check</u> <u>- ABS</u>
	 Use a scan tool in order to clear the DTCs. Operate the vehicle at a speed greater than 	13 km/h (8		
2	the specified value.	mph)		Go to
	Does the DTC set?		Go to Step 3	Diagnostic Aids
	1. Turn OFF the ignition.			
3	2. Disconnect from the electronic brake control module (EBCM), the harness connector containing the vehicle speed signal circuit.			
	3. Turn ON the ignition.	10 V		
	4. Use a DMM in order to measure the DC voltage between the vehicle speed signal circuit and a good ground.			
	Does the voltage measure greater than the			

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	specified value?		Go to Step 4	Go to Step 7
4	 Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> in General Information. Place the transmission in neutral (N). Set up the DMM in order to measure the DC voltage between the vehicle speed signal circuit and a good ground. Slowly spin the rear wheels by hand for at least 30 seconds and while ensuring the driveshaft is rotating, observe the DMM. 	5-7 V		
	Does the voltage measure within the specified range for the entire time that the driveshaft is rotating?		Go to Step 5	Go to Step 7
5	Inspect for poor connections at the harness connector of the EBCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 6
6	IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you	-		-
7	complete the replacement? Test the vehicle speed signal circuit for an open, a short to ground or a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems Did you find and correct the condition?	_	Go to Step 10 Go to Step 10	Go to Step 8
8	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to <u>Testing for Intermittent</u> <u>Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 9
9	IMPORTANT: Perform the setup procedure for the PCM. Replace the powertrain control module (PCM). Refer to <u>Powertrain Control Module (PCM)</u> <u>Replacement</u> in Engine Controls - 4.2L or	_		-

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	Powertrain Control Module (PCM) Replacement in Engine Controls - 4.8L, 5.3L, and 6.0L.Did you complete the replacement?		Go to Step 10	
10	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	-	Go to Step 3	System OK

DTC C0110

Circuit Description

Ground is continuously supplied to the low side of the ABS pump motor. The EBCM activates the ABS pump by supplying battery voltage to the high side of the motor.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM detects an open pump motor circuit, a shorted pump motor, or a seized pump motor or ABS pump.

Action Taken When the DTC Sets

- The EBCM disables the ABS.
- The ABS indicator turns ON.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Separate the EBCM from the BPMV in order to inspect for corrosion or any other condition that may cause a poor connection at the pump motor connector. Refer to <u>Electronic Brake Control Module Replacement</u> and <u>Testing for Intermittent Conditions and Poor Connections</u>. If severe corrosion or other damage exists, the BPMV or the EBCM may need to be replaced.

DTC C0110

Step	Action	Yes	No		
Schematic Reference: <u>ABS Schematics</u>					
Connec	Connector End View Reference: <u>ABS Connector End Views</u>				

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1	Did you perform the ABS Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic</u> <u>System Check -</u> <u>ABS</u>
2	Use a scan tool in order to clear the DTCs. Does the DTC reset?	Go to Step 3	Go to Diagnostic Aids
3	 Separate the EBCM from the BPMV. Refer to <u>Electronic Brake Control Module Replacement</u>. Inspect for poor connections at the pump motor connector. Refer to <u>Testing for Intermittent</u> <u>Conditions and Poor Connections</u> and <u>Connector</u> <u>Repairs</u> in Wiring Systems. 		
	Did you find and correct the condition?	Go to Step 5	Go to Step 4
4	IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM and the BPMV. Refer to Electronic Brake Control Module Replacement and Brake Pressure Modulator Valve (BPMV) Replacement.Did you complete the replacements?	Go to Step 5	-
5	 Use a scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	Go to Step 3	System OK

DTC C0161

Circuit Description

The brake switch informs the electronic brake control module (EBCM) when the brake is depressed. The brake switch is normally closed, supplying 12 volts to the EBCM when the brake is released. When the brake pedal is pressed, voltage on the torque converter clutch (TCC) brake switch signal circuit is 0 volts.

Conditions for Running the DTC

Any of the following conditions may cause the diagnostic trouble code (DTC) to run.

- The vehicle accelerates from 0 km/h (0 mph) to a speed greater than 56 km/h (35 mph).
- The vehicle experiences an ABS event involving all hydraulic circuits.

Conditions for Setting the DTC

2004 BRAKES Antilock Brake System - Ascender

Any of the following conditions may cause the DTC to set.

- Voltage on the TCC brake switch signal circuit is always low.
- Voltage on the TCC brake switch signal circuit is always high.

Action Taken When the DTC Sets

The EBCM stores this information-only DTC for as long as the condition is present.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u>, <u>Connector Repairs</u>, <u>Testing for Electrical Intermittents</u> and to <u>Wiring Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- **4:** This step tests for a shorted stop lamp switch.
- **5:** This step tests for an open stop lamp switch.

DTC C0161

Step	Action	Yes	No
Schem	atic Reference: <u>ABS Schematics</u>		•
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1			System Check -
		Go to Step 2	ABS
	1. Install a scan tool.		
	2. Select the 4WAL 3 Sensor Data Display function.		
2	3. Observe the Brake Switch Status on the scan tool.		
	Does the scan tool display Off?	Go to Step 3	Go to Step 5
	1. Apply the brake.		
3	2. Observe the Brake Switch Status on the scan tool.		
		Go to Diagnostic	
	Does the scan tool display On?	Aids	Go to Step 4
	1. Turn OFF the ignition.		
	2. Disconnect the stop lamp switch. Refer to Stop		
	Lamp Switch Replacement in Lighting Systems.		

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	3 Turn ON the ignition		
4	4 Observe the Brake Switch Status on the scan tool		
4			
	Does the scan tool display On?	Go to Step 9	Go to Step 7
	1. Turn OFF the ignition.		
	2. Disconnect the stop lamp switch. Refer to <u>Stop</u>		
	Lamp Switch Replacement in Lighting Systems.		
	3. Connect a fused jumper wire between the ignition 3		
_	(TCC) brake switch signal circuit at the stop lamp		
5	switch harness connector. Refer to Using Fused		
	Jumper Wires in Wiring Systems.		
	4. Turn ON the ignition.		
	5. Observe the Brake Switch Status on the scan tool.		
		Contra Stars 0	Carla Stars (
	Does the scan tool display OII?	Go to Step 9	Go to Step 6
	switch signal circuit for an open or a short to ground.		
6	Refer to Circuit Testing and to Wiring Repairs in		
	Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 8
	rest the TCC brake switch signal circuit for a short to voltage. Refer to Circuit Testing and to Wiring Repairs		
7	in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 8
	Inspect for poor connections at the harness connector of		
	the electronic brake control module (EBCM). Refer to		
8	Connections and to Connector Repairs in Wiring		
	Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 10
	Inspect for poor connections at the harness connector of the stop lamp switch. Pofer to Testing for Intermittent		
9	Conditions and Poor Connections and to Connector		
	Repairs in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 11
	IMPORTANT:		
	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure		
10			_
-	Replace the EBCM. Refer to Electronic Brake Control		
	Module Replacement. Did you complete the	~ ~ ~ ~	
	replacement?	Go to Step 12	
	Replace the stop lamp switch. Refer to <u>Stop Lamp</u>		

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11	Switch Replacement in Lighting Systems. Did you complete the replacement?	Go to Step 12	_
12	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	Go to Step 2	System OK

DTC C0201

Circuit Description

The system relay, located within the electronic brake control module (EBCM), supplies battery voltage to all of the valve solenoids and to the ABS pump motor. When the relay contacts close, the EBCM monitors the voltage supplied to the valve solenoids and compares this voltage to monitored ignition voltage.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM detects that the voltage supplied to the valve solenoids is less than 80% of monitored ignition voltage for 50 milliseconds.

Action Taken When the DTC Sets

- The EBCM disables the ABS/DRP.
- The ABS indicator turns ON.
- The brake warning indicator turns ON.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Refer back to the diagnostic table, steps 3 through 7, if this DTC continues to set intermittently.

Test Description

The number below refers to the step number on the diagnostic table.

3: A shorted ABS pump motor may damage the contacts within the system relay. It is imperative that the steps in the table be followed to prevent damage to a replacement EBCM.

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DTC C0201

 tic Reference: <u>ABS Schematics</u> Did you perform the ABS Diagnostic System Check? 1. Use a scan tool in order to clear the DTCs. 2. Use the scan tool in order to perform an ABS Function Test. Does the DTC set? 1. Separate the EBCM from the BPMV. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u>. 2. Use a DMM in order to measure the 	-	Go to Step 2 Go to Step 3	Go to Diagnostic System Check <u>- ABS</u> Go to Diagnostic Aids
 Did you perform the ABS Diagnostic System Check? 1. Use a scan tool in order to clear the DTCs. 2. Use the scan tool in order to perform an ABS Function Test. Does the DTC set? 1. Separate the EBCM from the BPMV. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u>. 2. Use a DMM in order to measure the 	-	Go to Step 2 Go to Step 3	Go to <u>Diagnostic</u> <u>System Check</u> <u>- ABS</u> Go to Diagnostic Aids
 Use a scan tool in order to clear the DTCs. Use the scan tool in order to perform an ABS Function Test. Does the DTC set? Separate the EBCM from the BPMV. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u>. Use a DMM in order to measure the 	-	Go to Step 3	Go to Diagnostic Aids
 Separate the EBCM from the BPMV. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u>. Use a DMM in order to measure the 		00 to Step 5	Diagnostic Alus
The resistance across the ABS pump motor. Does the resistance measure within the specified range?	0.3-1.0 ohms	Go to Sten 4	Go to Sten 6
Use a DMM in order to measure the resistance between the high side of the pump motor and a good ground. Does the resistance measure less than the specified value?	OL	Go to Step 6	Go to Step 5
IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?	-	Go to Step 7	-
IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM and the BPMV. Refer to Electronic Brake Control Module Replacement and Brake Pressure Modulator Valve (BPMV) Replacement. Did you complete the replacements?	-	Go to Step 7	-
	Pesistance across the ABS pump motor. Does the resistance measure within the specified ange? Use a DMM in order to measure the resistance etween the high side of the pump motor and a ood ground. Does the resistance measure less than the pecified value? MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration Drocedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you omplete the replacement? MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration Drocedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you omplete the replacement? MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration Drocedure. Replace the EBCM and the BPMV. Refer to <u>Clectronic Brake Control Module</u> <u>Replacement</u> and <u>Brake Pressure Modulator</u> <u>Calve (BPMV) Replacement</u> .Did you complete the replacements?	Presistance across the ABS pump motor. Does the resistance measure within the specified ange? Jse a DMM in order to measure the resistance etween the high side of the pump motor and a ood ground. 0L Does the resistance measure less than the pecified value? 0L MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? - MPORTANT: - Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Explace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? - MPORTANT: - - Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - . - - WPORTANT: - - Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - . - - . - - . - - . - - . - - . - - <td>resistance across the ABS pump motor. Go to Step 4 Does the resistance measure within the specified ange? Go to Step 4 Jse a DMM in order to measure the resistance etween the high side of the pump motor and a ood ground. OL Does the resistance measure less than the pecified value? Go to Step 6 MPORTANT: Go to Step 6 Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? Go to Step 7 MPORTANT: Go to Step 7 Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? Go to Step 7 MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM and the BPMV. Refer to Clectronic Brake Control Module Replacement and Brake Pressure Modulator Yalve (BPMV) Replacement. Did you complete te replacements? - Go to Step 7 1. Use the scan tool in order to clear the -</td>	resistance across the ABS pump motor. Go to Step 4 Does the resistance measure within the specified ange? Go to Step 4 Jse a DMM in order to measure the resistance etween the high side of the pump motor and a ood ground. OL Does the resistance measure less than the pecified value? Go to Step 6 MPORTANT: Go to Step 6 Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? Go to Step 7 MPORTANT: Go to Step 7 Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you omplete the replacement? Go to Step 7 MPORTANT: Following EBCM replacement, use the scan ool to perform the Tire Size Calibration procedure. - Replace the EBCM and the BPMV. Refer to Clectronic Brake Control Module Replacement and Brake Pressure Modulator Yalve (BPMV) Replacement. Did you complete te replacements? - Go to Step 7 1. Use the scan tool in order to clear the -

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7	DTCs.2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.	-		
	Does the DTC reset?		Go to Step 3	System OK

DTC C0221-C0227

Circuit Description

As the wheel spins, the wheel speed sensor produces an AC signal. The electronic brake control module (EBCM) uses the frequency of the AC signal to calculate the wheel speed.

Conditions for Running the DTC

C0221 and C0225

The ignition is ON.

C0222, C0223, C0226 and C0227

The vehicle speed is greater than 32 km/h (20 mph) when the brake is applied or 19 km/h (12 mph) when the brake is released.

Conditions for Setting the DTC

C0221 and C0225

The EBCM detects an open or shorted wheel speed sensor or wheel speed sensor circuit for 500 milliseconds.

C0222 and C0226

The corresponding wheel speed sensor signal is less than 6 km/h (4 mph) for 5 seconds, or 120 seconds in order to set both DTCs.

C0223 and C0227

The EBCM detects an erratic signal from the corresponding wheel speed sensor for 105 milliseconds.

Action Taken When the DTC Sets

C0221, C0225

If equipped, the following actions occur:

• The EBCM disables the ABS/TCS.

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- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.

C0222, C0223, C0226, and C0227

If equipped, the following actions occur:

- The EBCM disables the ABS/TCS and may disable DRP.
- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.
- The red Brake warning indicator may turn ON.

Conditions for Clearing the DTC

- Repair the condition responsible for setting the DTC.
- Use a scan tool in order to clear the DTC.
- After the DTC is cleared and the ignition is ON, the ABS indicator may remain ON until the EBCM completes a power-up self-test. This test concludes when the vehicle reaches a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Diagnostic Aids

Operating the vehicle on extremely rough terrain can set DTC C0223, C0227 or C0229 even if the system is functioning normally.

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u>, <u>Connector Repairs</u>, <u>Testing for Electrical Intermittents</u> and to <u>Wiring Repairs</u> in Wiring Systems.

If the customer's concern is that the ABS indicator is on only during humid conditions such as rain, snow or vehicle wash, thoroughly inspect the wheel speed sensor circuits for signs of water intrusion. Use the following procedure in order to help isolate the problem area:

- 1. Spray the suspected area with a 5 percent salt water solution.
- 2. Drive the vehicle at a speed greater than 19 km/h (12 mph) for at least 30 seconds.

Repair or replace the suspect harness if the DTC sets.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: Measure the resistance of the wheel speed sensor in order to determine if the sensor has a valid resistance value.

4: Ensures that the wheel speed sensor is generating a valid AC voltage output.

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DTC C0221-C0227

Step	Action	Values	Yes	No
Schematic Reference: <u>ABS Schematics</u>				
Connector End View Reference: <u>ABS Connector End Views</u>				
IMPORTANT:				
If DTC C0229 is set, diagnose DTC C0229 before diagnosing any other wheel speed sensor DTCs.				
	Did you perform the ABS Diagnostic System			Go to
1	Check?	-		Diagnostic System Check
			Go to Step 2	<u>- ABS</u>
2	1. Use a scan tool in order to clear the DTCs.			
	2. Operate the vehicle at a speed greater than	19 km/h (12		
	the specified value.	mph)		~
	Does the DTC set?		Go to Step 3	Go to Diagnostic Aids
	1 Turn OFF the ignition			
3	 Turn Off the ignition. 2 Raise and support the vehicle. Refer to 			
	Lifting and Jacking the Vehicle in			
	General Information.			
	3. Disconnect the wheel speed sensor	700-10,000		
	4 Use a DMM in order to measure the	ohms		
	resistance across the wheel speed sensor.			
	Does the resistance measure within the specified		Go to Step 4	Go to Step 8
	1 Spin the wheel by hand as fast as possible		0010 Bitp 4	
4	2 Use a DMM in order to measure the AC			
	voltage across the wheel speed sensor as	100 mV		
	the wheel spins.			
	Does the AC voltage measure greater than the			
	specified value?		Go to Step 5	Go to Step 8
5	Inspect for poor connections at the harness			
	Connector of the wheel speed sensor. Refer to Testing for Intermittent Conditions and Poor			
	Connections and to Connector Repairs in	-		
	Wiring Systems.		G / S(10	
	Did you find and correct the condition?		GO TO Step 10	Go to Step 6
	1. Disconnect the EBCM harness connector.			
	2. Test the wheel speed sensor circuits for the following:			
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6	 An open A short to ground A short to voltage Shorted together 	-		
	Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> in Wiring Systems.Did you find and correct the condition?		Go to Step 10	Go to Step 7
7	Inspect for poor connections at the harness connector for the EBCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and to <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Step 9
8	Replace the wheel speed sensor. Refer to <u>Wheel</u> <u>Speed Sensor Replacement</u> . Did you complete the replacement?	-	Go to Step 10	-
9	IMPORTANT: Use the scan tool in order to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?	-	Go to Step 10	-
10	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	-	Go to Step 2	System OK

DTC C0228

Circuit Description

During an ABS event, the EBCM calculates the total time that a dump valve is energized while attempting to unlock a locked wheel.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle is experiencing an ABS event.

Conditions for Setting the DTC

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The total dump time for any dump valve has exceeded 9 seconds and the EBCM has not received a wheel speed signal from the corresponding wheel during this activity.

Action Taken When the DTC Sets

- The EBCM disables the ABS/DRP.
- The ABS indicator turns ON.
- The brake warning indicator turns ON.

The actions above are maintained during subsequent ignition cycles until the EBCM completes a power up selftest. This test concludes when the vehicle achieves a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

The most likely cause of this DTC is a mechanical failure that causes a wheel to lock and remain locked. The DTC may also set, conceivably, when the ABS is activated on surfaces that are nearly impossible to get traction on. If the DTC sets within these conditions, diagnosis of the ABS system is not necessary.

Test Description

The number below refers to the step number on the diagnostic table.

2: Performing Solenoid Tests determines if there is a mechanical malfunction inside the BPMV.

Step	Action	Yes	No
1	Did you perform the ABS Diagnostic System Check?	Go to Sten 2	Go to <u>Diagnostic</u> <u>System Check -</u> ABS
2	 Use a scan tool in order to clear the DTCs. Use the scan tool in order to perform the necessary Solenoid Tests. Refer to <u>Scan Tool Output</u> <u>Controls (W/NW7)</u> or <u>Scan Tool Output</u> <u>Controls (W/O NW7)</u>. 		
	Do the Solenoid Tests show the system to be functioning normally?	Go to Diagnostic Aids	Go to Step 3
3	Replace the BPMV. Refer to Brake Pressure Modulator Valve (BPMV) Replacement . Did you complete the replacement?	Go to Step 4	-

DTC C0228

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4	Use the scan tool in order to perform the necessary Solenoid Tests. Do the Solenoid Tests show the system to be functioning		
	normally?	System OK	Go to Step 3

DTC C0229

Circuit Description

As the wheel spins, the wheel speed sensor produces an AC signal. The electronic brake control module (EBCM) uses the frequency of the AC signal to calculate the wheel speed.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 32 km/h (20 mph) when the brake is applied or 19 km/h (12 mph) when the brake is released.

Conditions for Setting the DTC

The EBCM detects an erratic signal from both front wheel speed sensors for 105 milliseconds.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the ABS/TCS/DRP.
- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.
- The red brake warning indicator turns ON.

Conditions for Clearing the DTC

- Repair the condition responsible for setting the DTC.
- Use a scan tool in order to clear the DTC.
- After the DTC is cleared and the ignition is ON, the ABS indicator may remain ON until the EBCM completes a power-up self-test. This test concludes when the vehicle reaches a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Diagnostic Aids

Operating the vehicle on extremely rough terrain can set DTC C0223, C0227 or C0229 even if the system is functioning normally.

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> Intermittent Conditions and Poor Connections, Connector Repairs, Testing for Electrical Intermittents

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and to **Wiring Repairs** in Wiring Systems.

If the customer's concern is that the ABS indicator is on only during humid conditions such as rain, snow or vehicle wash, thoroughly inspect the wheel speed sensor circuits for signs of water intrusion. Use the following procedure in order to help isolate the problem area:

- 1. Spray the suspected area with a 5 percent salt water solution.
- 2. Drive the vehicle at a speed greater than 19 km/h (12 mph) for at least 30 seconds.

Repair or replace the suspect harness if the DTC sets.

DTC C0229

Step	Action	Yes	No				
Schem	Schematic Reference: ABS Schematics						
1	Did you perform the ABS Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic</u> <u>System Check -</u> ABS				
2	 Use a scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC set? 	Go to Step 3	Go to Diagnostic Aids				
3	Inspect for poor connections at the harness connector of the EBCM. Refer to <u>Testing for Intermittent Conditions</u> <u>and Poor Connections</u> and to <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 5	Go to Step 4				
4	IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you complete the replacement?	Go to Step 5	_				
5	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 	Go to Step 3	System OK				

DTC C0235-C0237 OR P0609

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Circuit Description

The powertrain control module (PCM) converts the data from the vehicle speed sensor to a 128k pulses/mile signal. The electronic brake control module (EBCM) uses the vehicle speed signal from the PCM in order to calculate the rear wheel speed.

Conditions for Running the DTC

C0235

The ignition is ON.

C0236 and C0237

- The ignition is ON.
- The vehicle speed is greater than 32 km/h (20 mph) when the brake is applied or 19 km/h (12 mph) when the brake is released.

P0609

- The ignition is ON.
- The vehicle is not moving.

Conditions for Setting the DTC

C0235

The EBCM detects low voltage on the vehicle speed signal circuit for 500 milliseconds.

C0236

The rear wheel speed signal is less than 6 km/h (4 mph) for 5 seconds, or 120 seconds in order to set multiple missing sensor signal DTCs.

C0237

The EBCM detects an erratic rear wheel speed signal for 105 milliseconds.

P0609

The PCM detects low voltage on the vehicle speed signal circuit for 45 seconds.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the ABS/TCS/DRP.
- The ABS indicator turns ON.

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- The TRACTION OFF indicator turns ON.
- The red brake warning indicator turns ON.
- The DIC displays the SERVICE BRAKE SYSTEM message.

Conditions for Clearing the DTC

- Repair the condition responsible for setting the DTC.
- Use a scan tool in order to clear the DTC.
- After the DTC is cleared and the ignition is ON, the ABS indicator may remain ON until the EBCM completes a power-up self-test. This test concludes when the vehicle reaches a speed greater than 13 km/h (8 mph) and the wheel speeds are verified by the EBCM.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Electrical Intermittents</u>, <u>Testing for Intermittent Conditions and Poor Connections</u>, <u>Wiring Repairs</u> and <u>Connector Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table:

3: This step tests for a voltage signal from the PCM.

4: This step tests for a missing or erratic vehicle speed signal from the PCM. An assistant may be required to perform this test.

Step	Action	Values	Yes	No
Schem	atic Reference: <u>ABS Schematics</u>			
1	Did you perform the ABS Diagnostic System Check?	_	Go to Step 2	Go to Diagnostic System Check <u>- ABS</u>
2	 Use a scan tool in order to clear the DTCs. Operate the vehicle at a speed greater than the specified value. Does the DTC set?	19 km/h (12 mph)	Go to Step 3	Go to Diagnostic Aids
3	 Turn OFF the ignition. Disconnect from the EBCM, the harness connector containing the vehicle speed signal circuit. Turn ON the ignition. 	10 V		

DTC C0235-C0237 or P0609

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	4. Use a DMM in order to measure the DC voltage between the vehicle speed signal circuit and a good ground.			
	Does the voltage measure greater than the specified value?		Go to Step 4	Go to Step 7
	 Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> in General Information. Place the transmission in neutral (N). 			
4	 3. Set up the DMM in order to measure the DC voltage between the vehicle speed signal circuit and a good ground. 4. Spin the page wheels as fast as pageible by 	5-7 V		
	4. Spin the rear wheels as fast as possible by hand for at least 30 seconds and while ensuring the driveshaft is rotating, observe the DMM.			
	Does the voltage measure within the specified range the entire time the driveshaft is rotating?		Go to Step 5	Go to Step 7
5	Inspect for poor connections at the harness connector of the EBCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 10	Go to Sten 6
	IMPORTANT:		00 10 Step 10	00 to Step 0
6	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure.	-		-
	Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?		Go to Step 10	
7	Test the vehicle speed signal circuit for an open, a short to ground or a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems.	-		
	Did you find and correct the condition?		Go to Step 10	Go to Step 8
0	Inspect for poor connections at the harness connector of the PCM. Refer to <u>Testing for</u>			
8	and <u>Connector Repairs</u> in Wiring Systems.	-	Go to Stop 10	Co to Stop 0
				00 10 Step 9

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	Perform the setup procedure for the PCM.			
9	Replace the PCM. Refer to <u>Powertrain Control</u> <u>Module (PCM) Replacement</u> in Engine Controls - 4.2L or <u>Powertrain Control Module</u> (PCM) Replacement in Engine Controls - 4.8L, 5.8L and 6.0L.Did you complete the replacement?	-	Go to Step 10	-
10	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 	-		
	Does the DTC reset?		Go to Step 3	System OK

DTC C0238

Circuit Description

As the front wheels spin, the wheel speed sensors (WSSs) produce an AC signal. The electronic brake control module (EBCM) uses the frequency of the AC signal to calculate the wheel speed. The powertrain control module (PCM) converts the data from the vehicle speed sensor (VSS) to a 128k pulses/mile signal. The EBCM uses the vehicle speed signal from the PCM in order to calculate the rear wheel speed.

Conditions for Running the DTC

The ignition is ON and the vehicle speed is between 24 km/h (15 mph) and 80 km/h (50 mph).

Conditions for Setting the DTC

The EBCM detects that one wheel speed input is 10 percent greater than or 10 percent less than the other wheel speed inputs within 3.2 km (2 mi) of driving.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the ABS/TCS/DRP.
- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.
- The red brake warning indicator turns ON.

Conditions for Clearing the DTC

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The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Installing one tire of significantly different size on the vehicle causes DTC C0238 to set. Operating the vehicle with a tire that has very low air pressure may also set this DTC. Inspect the vehicle for an incorrect or damaged wheel speed sensor or vehicle speed sensor if the tires and the EBCM and PCM calibrations are OK.

Test Description

The number below refers to the step number on the diagnostic table.

4: If the front tires are not the same size as the rear tires, the EBCM calibration must match the FRONT tire size and the PCM calibration must match the REAR tire size.

DTC C0238

Step	Action	Yes	No
1	Did you perform the ABS Diagnostic System Check?	C a ta Star 2	Go to Diagnostic System Check -
2	Inspect both of the front tires on the vehicle to ensure that both tires are of equal size. Are both of the front tires of equal size?	Go to Step 2	Go to Diagnostic Aids
3	Inspect both of the rear tires on the vehicle to ensure that both tires are of equal size. Are both of the rear tires of equal size?	Go to Step 4	Go to Diagnostic Aids
4	Verify the EBCM and the PCM both have the correct tire size calibration. Use the scan tool in order to view the EBCM tire size calibration or perform the Tire Size Calibration procedure and refer to <u>Service Programming</u> <u>System (SPS)</u> in Programming. Did you find and correct the condition?	Go to Step 5	Go to Diagnostic Aids
5	 Use a scan tool in order to clear the DTCs. Operate the vehicle for at least 3 minutes within the Conditions for Running the DTC as specified in the supporting text. 	Go to Step ?	System OK

DTC C0241-C0254 (W/NW7)

Circuit Description

The ABS relay supplies battery voltage to 6 valve solenoids. The electronic brake control module (EBCM) microprocessor applies the grounds needed to activate each solenoid. The low side of each solenoid coil has a feedback circuit to the EBCM microprocessor. When a solenoid is commanded OFF, the feedback voltage is

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high. When a solenoid is commanded ON, the feedback voltage is low.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 6 km/h (4 mph).

Conditions for Setting the DTC

The EBCM detects an internal malfunction.

Action Taken When the DTC Sets

C0241, C0242, C0245, C0246, C0251, C0252, C0253, C0254

If equipped, the following actions occur:

- The EBCM disables the DRP/ABS.
- The ABS indicator turns ON.
- The red brake warning indicator turns ON.

C0243, C0244, C0247, C0248

If equipped, the following actions occur:

- The EBCM disables the ABS.
- The ABS indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

An intermittent open/shorted solenoid DTC can be set by several different internal EBCM problems. Replace the EBCM if an open/shorted solenoid DTC continues to set intermittently.

DTC C0241-C0254 (W/NW7)

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1			System Check -
		Go to Step 2	ABS
	1. Use a scan tool in order to clear the DTCs.		
2	2. Operate the vehicle within the Conditions for		
	Running the DTC as specified in the supporting		
	text		

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	Does the DTC set?	Go to Step 3	Go to Diagnostic Aids
3	IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable. Replace the EBCM. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u> .Did you complete the replacement?	Go to Step 4	-
4	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	Go to Step 3	System OK

DTC C0241-C0254 (W/O NW7)

Circuit Description

As the front wheels spin, each wheel speed sensor produces an AC signal. The electronic brake control module (EBCM) uses the frequency of the AC signals to calculate each wheel speed. The powertrain control module (PCM) converts the signal from the vehicle speed sensor (VSS) to a 128k pulses/mile signal. The EBCM uses the vehicle speed signal from the PCM to calculate the rear wheel speed.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 8 km/h (4 mph).
- No brake application or deceleration is detected.
- No wheel slip is detected.
- No turning maneuvers are detected.

Conditions for Setting the DTC

- At least one wheel speed sensor signal is 15 percent less than or greater than other wheel speed sensor signals.
- All of the Conditions for Running and Setting the DTC are present for a cumulative time of 3 minutes during a single ignition cycle.

Action Taken When the DTC Sets

- The EBCM disables the ABS and DRP.
- The ABS indicator turns ON.

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• The brake warning indicator turns ON.

Conditions for Clearing the DTC

The Conditions for Setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Installing one tire of significantly different size on the vehicle causes this DTC to set. Operating the vehicle with a tire that has very low air pressure may also set this DTC. Inspect the vehicle for an incorrect or damaged wheel speed sensor or vehicle speed sensor if the tires and the EBCM and PCM calibrations are OK.

Test Description

The number below refers to the step number on the diagnostic table.

4: If the front tires are not the same size as the rear tires, the EBCM calibration must match the FRONT tire size and the PCM calibration must match the REAR tire size.

Step	Action	Yes	No
1	Did you perform the ABS Diagnostic System Check?		Go to <u>Diagnostic</u> System Check -
		Go to Step 2	ABS
	Inspect both of the front tires on the vehicle to ensure that		
2	both tires are of equal size.		Go to Diagnostic
	Are both of the front tires of equal size?	Go to Step 3	Aids
	Inspect both of the rear tires on the vehicle to ensure that		
3	both tires are of equal size.		Go to Diagnostic
	Are both of the rear tires of equal size?	Go to Step 4	Aids
	Verify the EBCM and the PCM both have the correct tire		
	size calibration. Use the scan tool in order to view the		
4	EBCM tire size calibration or perform the Tire Size		
-	Calibration procedure and refer to Service Programming		
	System (SPS) in Programming.		Go to Diagnostic
	Did you find and correct the condition?	Go to Step 5	Aids
	1. Use a scan tool in order to clear the DTCs.		
5	2. Operate the vehicle for at least 3 minutes within the		
	Conditions for Running the DTC as specified in the		
	supporting text.		
	Does the DTC reset?	Go to Step 2	System OK

DTC C0241-C0254 (W/O NW7)

DTC C0265 OR C0266

Circuit Description

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The ABS relay supplies battery voltage to 6 valve solenoids. The electronic brake control module (EBCM) microprocessor applies the grounds needed to activate each solenoid. The low side of each solenoid coil has a feedback circuit to the EBCM microprocessor. When a solenoid is commanded OFF, the feedback voltage is high. When a solenoid is commanded ON, the feedback voltage is low.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 6 km/h (4 mph).

Conditions for Setting the DTC

- The EBCM detects an internal malfunction
- Low system voltage
- Open ground at the EBCM

Action Taken When the DTC Sets

C0265

If equipped, the following actions occur:

- The EBCM disables the DRP/ABS.
- The ABS indicator turns ON.
- The brake warning indicator turns ON.

C0266

If equipped, the following actions occur:

- The EBCM disables the ABS.
- The ABS indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

IMPORTANT: Whenever the EBCM is replaced for DTC C0265 or C0266, the ABS pump motor and motor circuitry must be tested for the proper resistance. Refer to steps 7 and 8 in the diagnostic table below for testing procedures and resistance values.

Check ground G110 for an open or a high resistance.

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Check the EBCM power supply for an intermittent open.

C0265

Thoroughly inspect connections and circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u>, <u>Testing for Electrical Intermittents</u>, <u>Connector Repairs</u> and to <u>Wiring Repairs</u> in Wiring Systems.

C0266

Replace the EBCM if DTC C0266 continues to set intermittently.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4: This step tests if the battery positive voltage circuit can supply adequate power to the system relay.

7: A shorted ABS pump motor or shorted motor circuitry may damage the contacts within the system relay. Follow this step to prevent damage to a replacement EBCM.

Step	Action	Values	Yes	No
Schem Conne	atic Reference: <u>ABS Schematics</u> ctor End View Reference: <u>ABS Connector End</u>	Views		
1	Did you perform the ABS Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - ABS
2	 Use a scan tool in order to clear the DTCs. Use the scan tool in order to perform an ABS Function Test. 	-	Co to Stop 7	Co to Stor 2
3	Does DTC C0265 set?		Go to Step 7	Go to Step 3 Go to Diagnostic Aids
4	 Turn OFF the ignition. Disconnect from the EBCM, the harness connector containing the battery positive voltage circuit. Connect a test lamp between the battery positive voltage circuit and a good ground. 	_	Go to Step 6	Go to Step 5
	Repair the open in the battery positive voltage circuit. Refer to Circuit Testing and Wiring			

DTC C0265 or C0266

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_	Repairs in Wiring Systems.			
5	Did you complete the repair?	-	Go to Step 11	-
6	Inspect for poor connections at the harness connector of the EBCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 11	Go to Step 7
7	 IMPORTANT: It may be necessary to separate the EBCM from the BPMV to gain access to the pump motor pigtail connector. If so, refer to Electronic Brake Control Module Replacement. 1. Disconnect from the EBCM, the ABS pump motor pigtail connector. 2. Use a DMM in order to measure the resistance across the ABS pump motor. 	0.3-1.0 ohms		
	Does the resistance measure within the specified range?		Go to Step 8	Go to Step 10
8	Use a DMM in order to measure the resistance between the high side of the pump motor and a good ground. Does the resistance measure less than the specified value?	0L	Go to Sten 10	Go to Sten 9
9	IMPORTANT: Use the scan tool in order to perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?	-	Go to Step 11	-
10	IMPORTANT: Use the scan tool in order to perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable. Replace the EBCM and the BPMV. Refer to <u>Electronic Brake Control Module</u> <u>Replacement</u> and <u>Brake Pressure Modulator</u> <u>Valve (BPMV) Replacement</u> .Did you complete the replacements?	-	Go to Step 11	-
	1. Use the scan tool in order to clear the DTCs.			

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11	2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.	-		
	Does the DTC reset?		Go to Step 2	System OK

DTC C0267 OR C0268

Circuit Description

The EBCM applies the ground needed for pump motor activation. The low side of the pump motor has a feedback circuit to the EBCM. When the pump motor is commanded OFF and at rest, feedback voltage is high. When the pump motor is winding down after being commanded ON and then OFF, feedback voltage is low. The EBCM monitors this feedback voltage in order to determine if the motor is functioning properly.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 6 km/h (4 mph).

Conditions for Setting the DTC

The EBCM detects any of the following conditions:

- An open or shorted pump motor
- An open or shorted pump motor driver circuit
- A seized pump motor

Action Taken When the DTC Sets

- The EBCM disables the ABS.
- The ABS indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Electrical Intermittents</u>, <u>Testing for Intermittent Conditions and Poor Connections</u>, <u>Wiring Repairs</u> and <u>Connector Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

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2: It is imperative that the vehicle be driven to attempt to reset the DTC. Using the scan tool to perform a function test may not produce the same result, and therefore may cause misdiagnosis of the vehicle.

7: This step tests if the EBCM is capable of activating the ABS pump motor.

8: A shorted ABS pump motor may damage the EBCM. It is imperative that the steps in the table be followed in order to prevent damage to a replacement EBCM.

DTC C0267 or C0268

Step	Action	Values	Yes	No		
Schema Connec	Schematic Reference: <u>ABS Schematics</u> Connector End View Reference: <u>ABS Connector End Views</u>					
1	Did you perform the ABS Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check <u>- ABS</u>		
2	 Use a scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does DTC C0267 set? 	-	Go to Step 6	Go to Step 3		
3	Does DTC C0268 set?	-	Go to Step 4	Go to Diagnostic Aids		
4	 Turn OFF the ignition. Disconnect from the EBCM, the 2-way harness connector which contains the battery positive voltage circuit and the ground circuit. CAUTION: Refer to Battery Disconnect Caution in Cautions and Notices. Disconnect the negative battery cable. Disconnect the positive battery cable. Place one lead of a DMM on the positive battery cable where the cable normally connects to the battery. Place the other lead on the battery positive voltage circuit terminal within the 2-way EBCM harness connector. Measure the total resistance between the positive battery cable and the EBCM. 	0.0-0.2 ohms				

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	Does the resistance measure within the specified			
	range?		Go to Step 5	Go to Step 10
5	Use a DMM to measure the resistance of the ground circuit. Does the resistance measure within the specified range?	0.0-0.2 ohms	Go to Step 7	Go to Step 11
	IMPORTANT:		i	
	On some applications, it may be necessary to separate the EBCM from the BPMV in order to perform this test. Also, DTC C0268 may set when this test is performed.			
6	 Turn OFF the ignition. Disconnect from the EBCM, the ABS pump motor pigtail connector. For systems which have no pump motor pigtail, it is necessary to separate the EBCM from the BPMV in order to gain access to the pump motor connector of the EBCM. Refer to Electronic Brake Control Module Replacement. Use a connector adapter test kit in order to connect a test lamp between the ABS pump motor power and ground circuits at the pump motor connector of the EBCM. Turn ON the ignition. Use the scan tool in order to perform an table. 	-		
	ABS Function Test.		Go to Sten 12	Go to Sten 9
		1		co to step y
	 On some applications, it may be necessary to separate the EBCM from the BPMV in order to perform this test. Also, DTC C0268 may set when this test is performed. 1. Reconnect both battery cables. 2. Disconnect from the EBCM, the ABS pump motor pigtail connector. For systems which have no pump motor pigtail, it is necessary to separate the EBCM from the BPMV in order to gain access to the pump 			

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7	 Electronic Brake Control Module <u>Replacement</u>. 3. Use a connector adapter test kit in order to connect a test lamp between the ABS pump motor power and ground circuits at the pump motor connector of the EBCM. 4. Turn ON the ignition. 5. Use the scan tool in order to clear the DTCs. 6. Use the scan tool in order to perform an ABS Function Test. 	_		
	Does the test lamp illuminate and then turn OFF when the Function Test is performed?		Go to Step 13	Go to Step 8
8	Use a DMM in order to measure the resistance across the ABS pump motor. Does the resistance measure within the specified	0.3-1.0 ohms	Co to Stop 12	Co to Stop 14
9	Inspect for poor connections at the pump motor pigtail connector. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and to <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?		Go to Step 12	Go to Step 14
10	Repair the high resistance in the underhood electrical center or the battery positive voltage circuit. Refer to <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	_	Go to Step 15	-
11	Repair the high resistance in the ground circuit. Refer to <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	-	Go to Step 15	-
12	IMPORTANT:Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable.Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you complete the replacement?Replace the BPMV. Refer to Brake Pressure	-	Go to Step 15	-
13	Modulator Valve (BPMV) Replacement. Did you complete the replacement?	-	Go to Step 15	-
	IMPORTANT: Following EBCM replacement, use the scan			

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14	tool perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable. Replace the EBCM and the BPMV. Refer to Electronic Brake Control Module	-		-
	Replacement and to Brake Pressure Modulator Valve (BPMV) Replacement Did			
	you complete the replacements?		Go to Step 15	
15	 Use a scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 	-		
	Does the DTC reset?		Go to Step 3	System OK

DTC C0269 OR C0274

Circuit Description

The system relay is energized when the ignition is ON. The system relay supplies voltage to the valve solenoids and the pump motor. This voltage is referred to as the system voltage. The electronic brake control module (EBCM) microprocessor activates the valve solenoids by grounding the control circuit.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle is experiencing an ABS event.

Conditions for Setting the DTC

C0269

The EBCM commands a dump solenoid ON for 9 consecutive seconds.

C0274

The EBCM commands an isolation solenoid ON for 255 consecutive seconds.

Action Taken When the DTC Sets

If equipped, the following actions may occur:

- The EBCM disables the ABS/TCS/DRP.
- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.

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• The red brake warning indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

The most likely cause of DTC C0269 or DTC C0274 is a mechanical failure that causes a wheel to lock and remain locked. The DTCs may also set, conceivably, when the ABS is activated on surfaces that are nearly impossible to get traction on. If the DTC sets within these conditions, diagnosis of the ABS system is not necessary.

Test Description

The number below refers to the step number on the diagnostic table:

2: Performing solenoid tests determines if there is a mechanical malfunction inside the BPMV. Perform dump valve solenoid tests for DTC C0269 or isolation valve solenoid tests for DTC C0274.

Step	Action	Yes	No
1	Did you perform the ABS Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - <u>ABS</u>
2	 Use a scan tool in order to clear the DTCs. Use the scan tool in order to perform the necessary Solenoid Tests. Refer to <u>Scan Tool Output</u> <u>Controls (W/NW7)</u> or <u>Scan Tool Output</u> <u>Controls (W/O NW7)</u>. Do the Solenoid Tests show the system to be functioning normally? 	Go to Diagnostic	Go to Step 3
3	Replace the BPMV. Refer to <u>Brake Pressure Modulator</u> Valve (BPMV) Replacement. Did you complete the replacement?	Go to Step 4	-
4	Use the scan tool in order to perform the necessary Solenoid Tests. Do the Solenoid Tests show the system to be functioning normally?	System OK	Go to Step 3

DTC C0269 or C0274

DTC C0271-C0273, C0284

Circuit Description

This DTC identifies a malfunction within the electronic brake control module (EBCM).

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Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM detects an internal malfunction.

Action Taken When the DTC Sets

If equipped, the following actions may occur:

- The EBCM disables the ABS/TCS/DRP.
- The ABS indicator turns ON.
- The TRACTION OFF indicator turns ON.
- The red brake warning indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Replace the EBCM if DTC C0273 or DTC C0284 continues to set intermittently.

DTC C0271-C0273, C0284

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1		~ ~ ~	System Check -
		Go to Step 2	ABS
2	Is DTC C0271 or DTC C0272 set in the EBCM memory?	Go to Step 4	Go to Step 3
	1. Use a scan tool in order to clear the DTCs.		
	2. Turn OFF the ignition for 5 seconds.		
3	3. Turn ON the ignition.		
			Go to Diagnostic
	Does the DTC set?	Go to Step 4	Aids
	IMPORTANT:		
4	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure and the Trim Level Calibration procedure, if applicable.		_
	Replace the EBCM. Refer to Electronic Brake Control		
	Module Replacement. Did you complete the		
	replacement?	Go to Step 5	
	Use the scan tool in order to clear the DTCs.		

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5	Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.		
	Does the DTC reset?	Go to Step 2	System OK

DTC C0279

Circuit Description

The PCM sends engine/axle/tire IDs to the EBCM via serial data communications immediately after the modules are powered up.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM receives invalid information from the PCM.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the TCS.
- The traction off indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Diagnose other ABS or TCS related DTCs prior to diagnosing DTC C0279.

If multiple TCS related DTCs are set, or the vehicle being serviced is not equipped with TCS, verify the correct EBCM is installed in the vehicle.

Test Description

The number below refers to the step number on the diagnostic table.

3: The PCM must have the correct part number for the specified application.

DTC C0279

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		
			Go to Diagnostic

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1		Go to Step 2	<u>System Check -</u> ABS
2	 Use a scan tool in order to clear the DTCs. Turn OFF the ignition for 5 seconds. 		
2	3. Turn ON the ignition and wait 10 seconds. Does the DTC set?	Go to Step 3	Go to Diagnostics Aids
3	Verify the correct PCM is installed in the vehicle. Does the vehicle have the correct PCM?	Go to Step 4	Go to Step 6
4	Use the scan tool in order to read the Calibration IDs of the PCM. Are the PCM Calibration IDs correct?	Go to Diagnostics Aids	Go to Step 5
5	Perform the set up procedure for the PCM. Refer to Service Programming System (SPS) in Programming. Did you complete the action?	Go to Step 7	-
	IMPORTANT: Perform the set up procedure for the PCM.		
6	Replace the PCM. Refer to Powertrain Control Module (PCM) Replacement in Engine Controls - 4.8L, 5.3L, and 6.0L.Did you complete the replacement?	Go to Step 7	-
7	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 		
	Does the DTC reset?	Go to Step 3	System OK

DTC C0281

Circuit Description

The stop lamp switch signal informs the electronic brake control module (EBCM) when the brake pedal is pressed.

Conditions for Running the DTC

Either of the following conditions will cause the DTC to run:

- The ignition is ON and the vehicle achieves at least 56 km/h (35 mph) before coming to a stop.
- The ignition is ON and the vehicle experiences an antilock brake system (ABS) event lasting at least 1 second.

Conditions for Setting the DTC

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The EBCM detects an open or shorted brake switch or brake switch circuit.

Action Taken When the DTC Sets

This information-only DTC is stored in EBCM memory until it is cleared by using the specified procedure.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Electrical Intermittents</u>, <u>Testing for Intermittent Conditions and Poor Connections</u>, <u>Wiring Repairs</u> and <u>Connector Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4: This step tests for a shorted stop lamp switch.

5: This step tests for an open stop lamp switch.

DTC C0281

Step	Action	Yes	No
Schem	atic Reference: <u>ABS Schematics</u>	-	
1	Did you perform the antilock brake system (ABS) Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic</u> <u>System Check -</u> <u>ABS</u>
2	 Install a scan tool. Select the 4WAL 3 Sensor Data Display function. Observe the Brake Switch Status on the scan tool. Does the scan tool display OFF?	Go to Step 3	Go to Step 5
3	 Apply the brake. Observe the Brake Switch Status on the scan tool. Does the scan tool display ON? 	Go to Diagnostic Aids	Go to Step 4
4	 Turn OFF the ignition. Disconnect the stop lamp switch. Refer to <u>Stop</u> <u>Lamp Switch Replacement</u> in Lighting Systems. Turn ON the ignition. Observe the Brake Switch Status on the scan tool. 		

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	Does the scan tool display ON?	Go to Step 9	Go to Step 7
	1. Turn OFF the ignition.		
	 Disconnect the stop lamp switch. Refer to <u>Stop</u> <u>Lamp Switch Replacement</u> in Lighting Systems. 		
5	 Connect a fused jumper wire between the ignition 3 voltage circuit and the torque converter clutch (TCC) brake switch signal circuit at the stop lamp switch harness connector. Refer to <u>Using Fused</u> <u>Jumper Wires</u> in Wiring Systems. 		
	4. Turn ON the ignition.		
	5. Observe the Brake Switch Status on the scan tool.		
	Does the scan tool display OFF?	Go to Step 9	Go to Step 6
6	Test the ignition 3 voltage circuit and the TCC brake switch signal circuit for an open or a short to ground. Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 8
7	Test the TCC brake switch signal circuit for a short to voltage. Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 8
8	Inspect for poor connections at the harness connector of the electronic brake control module (EBCM). Refer to Testing for Intermittent Conditions and Poor		
	<u>Connections</u> and to <u>Connector Repairs</u> in Wiring Systems.		
	Did you find and correct the condition?	Go to Step 12	Go to Step 10
9	Inspect for poor connections at the harness connector of the stop lamp switch. Refer to <u>Testing for Intermittent</u> <u>Conditions and Poor Connections</u> and to <u>Connector</u> <u>Repairs in Wiring Systems</u>		
	Did you find and correct the condition?	Go to Step 12	Go to Step 11
	IMPORTANT:		
	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure		
10			-
	Replace the EBCM. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u> .Did you complete the replacement?	Go to Step 12	
11	Replace the stop lamp switch. Refer to <u>Stop Lamp</u>		
11	Did you complete the replacement?	Go to Step 12	-
	1. Use the scan tool in order to clear the DTCs.		

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12	2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.		
	Does the DTC reset?	Go to Step 2	System OK

DTC C0283

Circuit Description

The traction control switch is a momentary-contact, normally-open switch that can be used to disable the traction control system (TCS). Each time the traction control switch is pressed, the TCS enabled/disabled status changes. When TCS is disabled, the electronic brake control module (EBCM) illuminates the traction off indicator by opening the service traction control signal circuit.

Conditions for Running the DTC

- The ignition is ON.
- The engine is running at a rate greater than 450 RPM.

Conditions for Setting the DTC

The EBCM detects low voltage on the traction control switch signal circuit for 10 seconds.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the TCS.
- The traction off indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Electrical Intermittents</u>, <u>Testing for Intermittent Conditions and Poor Connections</u>, <u>Wiring Repairs</u> and <u>Connector Repairs</u> in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

4: This step tests the traction control switch circuitry. If the fuse opens when you perform this test, the

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traction control switch signal circuit is shorted to ground.

DTC C0283

Step	Action	Yes	No			
Schem	Schematic Reference: <u>ABS Schematics</u>					
Conne	Connector End View Reference: <u>ABS Connector End Views</u>					
	Did you perform the antilock brake system (ABS)		Go to Diagnostic			
	Diagnostic System Check?	Co to Stop 2	System Check -			
		Go to Step 2	ADS			
	1. Use a scan tool in order to clear the DTCs.					
	2. Turn OFF the ignition for 5 seconds.					
2	3. Start the engine and allow the engine to run for at					
	least 20 seconds.		Go to Diagnostic			
	Does the DTC set?	Go to Step 3	Aids			
	1. Turn OFF the ignition.	-				
	2. Disconnect the traction control switch harness					
	connector. Refer to <u>Traction Control Switch</u>					
	<u>Replacement</u> .					
3	3. Turn ON the ignition.					
	4. Connect a test lamp between the ignition 1 voltage					
	circuit and a good ground.					
	Does the test lamp illuminate?	Go to Step 4	Go to Step 8			
	1. Use the scan tool in order to clear the DTCs.					
	2. Turn OFF the ignition.					
	3. Connect a fused jumper wire between the ignition 1					
	voltage circuit and the traction control switch signal					
4	circuit at the traction control switch harness					
	4. Stort the engine and ellow the engine to my for st					
	4. Start the engine and allow the engine to run for at least 20 seconds					
	Toust 20 seconds.					
	Does the DTC set?	Go to Step 5	Go to Step 9			
	Test the traction control switch signal circuit for an open					
5	or a short to ground. Refer to <u>Circuit Testing</u> and <u>Wiring</u>					
	<u>Repairs</u> in wiring Systems. Did you find and correct the condition?	Go to Sten 11	Go to Step 6			
	Inspect for poor connections at the harness connector of	0010544911				
	the electronic brake control module (EBCM). Refer to					
6	Testing for Intermittent Conditions and Poor					
	<u>Connections</u> and <u><u>Connector Repairs</u> in Wiring Systems.</u>					
	Did you find and correct the condition?	Go to Step 11	Go to Step 7			

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7	IMPORTANT:Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure.Replace the EBCM. Refer to Electronic Brake Control Module Replacement. Did you complete the replacement?	Go to Step 11	-
8	Repair the open in the ignition 1 voltage circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	Go to Step 11	-
9	Inspect for poor connections at the harness connector of the traction control switch. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 10
10	Replace the traction control switch. Refer to <u>Traction</u> <u>Control Switch Replacement</u> . Did you complete the replacement?	Go to Step 11	-
11	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 	Go to Sten 3	System OK

DTC C0287, P1644, OR P1689

Circuit Description

The EBCM supplies 5 VDC to the powertrain control module (PCM) on the delivered torque signal circuit. The PCM toggles this voltage to ground in order to create the delivered torque signal at the EBCM. A signal with a frequency of 128 Hz +/- 5 percent and a duty cycle of 25-95 percent is a valid delivered torque signal. The percentage of duty cycle is proportionate to the percentage of delivered torque.

Conditions for Running the DTC

- The ignition is ON.
- The engine is running at a speed greater than 450 RPM for 1 second.

Conditions for Setting the DTC

C0287

The EBCM receives an invalid delivered torque signal for 300 milliseconds.

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The PCM detects the delivered torque signal voltage as being less than 4.75 volts or greater than 5.25 volts.

Action Taken When the DTC Sets

- The EBCM disables the TCS.
- The traction off indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Diagnostic Aids

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to <u>Testing for</u> <u>Electrical Intermittents</u>, <u>Testing for Intermittent Conditions and Poor Connections</u>, <u>Wiring Repairs</u> and <u>Connector Repairs</u> in Wiring Systems.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for voltage supplied to the PCM from the EBCM.

9: The PCM may be damaged if the delivered torque signal circuit is shorted to voltage.

Step	Action	Values	Yes	No
Schem	atic Reference: <u>ABS Schematics</u>			
Conne	ctor End View Reference: <u>ABS Connector End V</u>	Views or <u>Powe</u>	rtrain Control I	Module (PCM)
Conne	ctor End Views in Engine Controls - 4.8L, 5.3L	and 6.0L		
	Did you perform the ABS Diagnostic System			Go to
1	Check?			Diagnostic
1		-		System Check
			Go to Step 2	<u>- ABS</u>
	1. Use the scan tool in order to clear the DTCs.			
2	2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.	-		
				Go to
	Does the DTC set?		Go to Step 3	Diagnostic Aids
	1. Turn OFF the ignition.			
	2. Disconnect from the PCM, the harness connector containing the delivered torque signal circuit.			
	3. Turn ON the ignition.			

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3	4. Use a DMM in order to measure the voltage between the delivered torque signal circuit and a good ground.Does the voltage measure within the specified range?	4.75-5.25 V	Go to Step 5	Go to Step 4
4	Test the delivered torque signal circuit for an open, a short to voltage or a short to ground. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 12	Go to Step 7
5	 Turn OFF the ignition. Reconnect the PCM harness connector. Start the engine. Select the Traction Assist Data Display on the scan tool. Observe the Delivered Torque parameter on the scan tool. Is the duty cycle of the delivered torque signal is within the specified range? 	25-95%	Go to Step 6	Go to Step 9
6	 Turn OFF the ignition. Install a J 39700 100-pin breakout box using a. See <u>Special Tools and</u> <u>Equipment</u>.J 39700-325 breakout box adaptor. See <u>Special Tools and</u> <u>Equipment</u>. Install the equipment between the EBCM and the EBCM harness connector. Start the engine. Use a DMM in order to measure the Hz frequency of the delivered torque signal. Does the frequency of the delivered torque signal measure within the specified range? 	121-134 Hz	Go to Step 7	Go to Step 9
7	 Turn OFF the ignition. Inspect for poor connections at the harness connector of the EBCM. Refer to <u>Testing</u> <u>for Intermittent Conditions and Poor</u> <u>Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition? 	_	Go to Step 12	Go to Step 8

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8	IMPORTANT: Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure. Replace the EBCM. Refer to <u>Electronic Brake</u> <u>Control Module Replacement</u> .Did you complete the replacement?	-	Go to Step 12	-
9	 Turn ON the ignition. Test the delivered torque signal circuit for a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition? 	-	Go to Step 12	Go to Step 10
10	Inspect for poor connections at the harness connector of the PCM. Refer to <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 12	Go to Step 11
11	IMPORTANT: Perform the setup procedure for the PCM. Replace the PCM. Refer to <u>Powertrain Control</u> <u>Module (PCM) Replacement</u> in Engine Controls - 4.8L, 5.3L, and 6.0L.Did you complete the replacement?	-	Go to Step 12	-
12	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? 	-	Go to Step 3	System OK

DTC C0290 OR C0292

Circuit Description

The powertrain control module (PCM) sends a state of health message to the EBCM within 5.5 seconds after the modules are powered up. This message is sent via serial data communications.

Conditions for Running the DTC

The ignition is ON.

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Conditions for Setting the DTC

The EBCM fails to receive serial data from the PCM.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the TCS.
- The traction off indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

DTC C0290 or C0292

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?	Go to <u>Scan Tool</u>	
		Does Not	
		<u>Communicate</u>	
1		with Class 2	
		Device in Data	Go to Diagnostic
		Link	System Check -
		Communications	ABS

DTC C0291

Circuit Description

The body control module (BCM) sends a state of health serial data message to the electronic brake control module (EBCM) within 5.5 seconds after the ignition is turned ON.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM fails to receive serial data from the BCM.

Action Taken When the DTC Sets

The EBCM sets this information-only DTC as a current DTC for as long as the conditions for setting the DTC are present.

Conditions for Clearing the DTC

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The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

DTC C0291

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?	Go to <u>Scan Tool</u>	
		Does Not	
		<u>Communicate</u>	
1		with Class 2	
		Device in Data	Go to Diagnostic
		Link	System Check -
		Communications	<u>ABS</u>

DTC C0297

Circuit Description

The PCM sends engine/axle/tire IDs to the EBCM via serial data communications immediately after the modules are powered up.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The EBCM fails to receive serial data from the PCM.

Action Taken When the DTC Sets

If equipped, the following actions occur:

- The EBCM disables the TCS.
- The traction off indicator turns ON.

Conditions for Clearing the DTC

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

Step	Action	Yes	No			
	Did you perform the ABS Diagnostic System Check?					
		Go to <u>Scan Tool</u>				
		Does Not				
1		Communicate				
		with Class 2				
		Device in Data	Go to Diagnostic			
		Link	System Check -			

DTC C0297

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DTC C0298 OR P0856

Circuit Description

C0298

The powertrain control module (PCM) and the electronic brake control module (EBCM) communicate on the serial data link whenever the ignition is ON.

P0856

The PCM supplies 5 volts through an internal resistor, to the EBCM on the requested torque signal circuit. The EBCM toggles this voltage to ground to create the requested torque signal at the PCM.

Conditions for Running the DTC

C0298

The ignition is ON.

P0856

- The ignition is ON.
- The engine is running at a speed greater than 450 RPM for 5-20 seconds.

Conditions for Setting the DTC

C0298

The EBCM receives a serial data message stating that the PCM has lost the ability to reduce engine torque.

P0856

The PCM receives an invalid requested torque signal for 3 seconds.

Action Taken When the DTC Sets

C0298

- The EBCM disables the traction control system (TCS).
- The traction off indicator turns ON.

P0856

• The PCM sends a serial data message to the EBCM stating that the PCM has lost the ability to reduce engine torque.

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• The EBCM sets DTC C0298 as a current DTC for as long as the malfunction is present.

Conditions for Clearing the DTC

C0298

The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.

P0856

- The conditions for setting the DTC are no longer present and you use the scan tool Clear DTCs function.
- A history DTC clears automatically after 40 consecutive warm-up cycles without a PCM detected failure.

Diagnostic Aids

C0298

A requested torque signal malfunction is only one possible cause for the PCM to lose the ability to perform traction control. DTC C0298 may set due to engine overheating, throttle actuator control failure, loss of ignition timing control by the PCM, etc. If DTC P0856 has not set, refer to **<u>Diagnostic System Check - Engine</u>** <u>**Controls**</u> in Engine Controls - 4.8L, 5.3L and 6.0L in order to identify other possible causes of DTC C0298.

P0856

Thoroughly inspect connections or circuitry that may cause an intermittent malfunction. Refer to the following procedures in Wiring Systems.

- <u>Testing for Electrical Intermittents</u>
- Connector Repairs
- <u>Testing for Intermittent Conditions and Poor Connections</u>
- Wiring Repairs

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4: This step tests for voltage supplied to the EBCM from the PCM.

5: This step tests for a shorted resistor in the PCM or a short to voltage within the requested torque circuit by verifying that a large voltage drop occurs when a test lamp is connected in parallel with the DMM.

DTC C0298 or P0856

Step	Action	Values	Yes	No	
Schematic Reference: <u>ABS Schematics</u>					
Connector End View Reference: <u>ABS Connector End Views</u>					
	Did you perform the antilock brake system			Go to	
	(ABS) Diagnostic System Check?			Diagnostic	
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1		_	Go to Sten 2	System Check
2	Is DTC P0856 set?		Go to Step 2	Go to Diagnostic Aids
3	 Use a scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does DTC P0856 set? 	_	Go to Step 4	Go to Diagnostic Aids
4	 Turn OFF the ignition. Disconnect from the electronic brake control module (EBCM), the harness connector containing the requested torque signal circuit. Turn ON the ignition. Use a DMM in order to measure the voltage between the requested torque signal circuit and a good ground. Does the voltage measure greater than the specified value? 	4.75 V	Go to Step 5	Go to Step 8
5	 With the DMM still connected to monitor the requested torque signal circuit, connect one end of a test lamp to a good ground. Connect the other end of the test lamp to the positive lead of the DMM. Does the voltage measure less than the specified value? 	0.15 V	Go to Step 6	Go to Step 9
6	 Turn OFF the ignition. Install a J 39700 Universal Breakout Box and a. See <u>Special Tools and</u> <u>Equipment</u>.J 39700-325 Adapter Cable. See <u>Special Tools and Equipment</u>. Install the equipment between the EBCM and the EBCM harness connector. Start the engine. Use the DMM in order to measure the Hz frequency of the requested torque signal. Does the Hz frequency of the requested torque signal measure within the specified range? 	121-134 Hz	Go to Step 7	Go to Step 11

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	of the requested torque signal circuit.			1
7	Does the duty cycle of the requested torque	40-95%		
	signal measure within the specified range?		Go to Step 12	Go to Step 13
	Test the requested torque signal circuit for an			
8	open or a short to ground. Refer to <u>Circuit</u>	_		
0	Testing and Wiring Repairs in Wiring Systems.			
	Did you find and correct the condition?		Go to Step 14	Go to Step 10
	Test the requested torque signal circuit for a short			
9	to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring</u>	-		
-	<u>Repairs</u> in Wiring Systems.			
	Did you find and correct the condition?		Go to Step 14	Go to Step 12
	Inspect for poor connections at the harness			
	connector of the powertrain control module			
10	(PCM). Refer to <u>Testing for Intermittent</u>	-		
	Conditions and Poor Connections and			
	Did you find and correct the condition?		Go to Step 14	Go to Step 12
	Inspect for peer connections at the homeon		00 to Step 14	0010 Step 12
	connector of the EBCM Defer to Testing for			
11	Intermittent Conditions and Poor Connections	_		
11	and Connector Renairs in Wiring Systems	_		
	Did you find and correct the condition?		Go to Step 14	Go to Step 13
			F	
	Perform the setup procedure for the PCM			
	r chorm the setup procedure for the rolm.			
12	Replace the PCM Refer to Powertrain Control	_		-
	Module (PCM) Replacement in Engine			
	Controls - 4.8L, 5.3L and 6.0L. Did you complete			
	the replacement?		Go to Step 14	
	IMPORTANT:			
	Following FBCM replacement use the scan			
	tool to perform Tire Size Calibration			
12	procedure.			
15		-		-
	Replace the EBCM. Refer to Electronic Brake			
	Control Module Replacement.Did you			
	complete the replacement?		Go to Step 14	
	1. Use the scan tool in order to clear the			
	DTCs.			
	2. Operate the vehicle within the Conditions			
14	for Running the DTC as specified in the	-		
	supporting text.			
	Does DTC P0856 reset?		Go to Step 4	System OK

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DTC C0550

Circuit Description

The EBCM performs several self-tests for any internal problems which may affect proper operation.

Conditions for Running the DTC

- The ignition is ON.
- The engine is running at a rate greater than 450 RPM.

Conditions for Setting the DTC

The EBCM detects an internal malfunction.

Action Taken When the DTC Sets

The following actions may occur.

- The EBCM disables the ABS/DRP.
- The ABS indicator turns ON.
- The brake warning indicator turns ON.

Conditions for Clearing the DTC

Certain failures that may cause this DTC to set cannot be cleared. Other failures that may cause this DTC to set may be cleared, at least temporarily, by using the scan tool Clear DTCs function.

Diagnostic Aids

Replace the EBCM if this DTC continues to set intermittently.

DTC C0550

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1			<u>System Check -</u>
		Go to Step 2	ABS
2	Use a scan tool in order to clear the DTCs.		
۷	Can the DTC be cleared?	Go to Step 3	Go to Step 4
2	Start the engine and allow the engine to idle.		Go to Diagnostic
5	Does the DTC reset?	Go to Step 4	Aids
	IMPORTANT:		
4	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure.		-
	Replace the EBCM. Refer to Electronic Brake Control		

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	Module Replacement.Did you complete the replacement?	Go to Step 5	
5	 Use the scan tool in order to clear the DTCs. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. 	Go to Step 3	System OK

SYMPTOMS - ANTILOCK BRAKE SYSTEM

IMPORTANT: The following steps must be completed before using the symptom tables.

- 1. Perform the ABS Diagnostic System Check before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
- 2. Review the system description and operation in order to familiarize yourself with the system functions. Refer to <u>ABS Description and</u> <u>Operation (W/O NW7)</u> or <u>ABS Description and Operation (W/NW7)</u>.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the ABS. Refer to <u>Checking</u> <u>Aftermarket Accessories</u> in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer <u>Testing for</u> <u>Intermittent Conditions and Poor Connections</u> in Wiring Systems.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- ABS Indicator Always On
- <u>ABS Indicator Inoperative</u>
- Traction Off Indicator Always On
- Traction Off Indicator Inoperative

ABS INDICATOR ALWAYS ON

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Circuit Description

The instrument panel cluster (IPC) illuminates the ABS indicator by supplying ground to the lamp. The electronic brake control module (EBCM) sends class 2 serial data messages to the IPC in order to command the indicator ON or OFF.

Diagnostic Aids

The malfunction must be present during diagnosis in order to prevent unnecessary parts replacement. Always begin diagnosis with **Diagnostic System Check - ABS**.

Test Description

The number below refers to the step number on the diagnostic table.

3: This step tests if the IPC is able to turn OFF the ABS indicator.

ABS Indicator Always On

Step	Action	Yes	No
IMPOF	RTANT:		
After a until th speed	wheel speed sensor DTC is cleared and the ignition is Ol the EBCM completes a power-up self test. This test conclu- greater than 13 km/h (8 mph) and the wheel speeds are ve	N, the ABS indicato des when the vehic erified by the EBCN	r may remain ON le reaches a I.
1	Did you perform the ABS Diagnostic System Check?		Go to <u>Diagnostic</u> System Check -
		Go to Step 2	ABS
	1. Turn OFF the ignition for 5 seconds.		
2	2. Turn ON the ignition while observing the ABS indicator.		
	Does the ABS indicator illuminate for 2 seconds and then turn OFF?	Go to Diagnostic Aids	Go to Step 3
3	 Install a scan tool. Select the Instrument Panel Cluster Special Functions menu on the scan tool. Command the ABS Lamp Off. 		
	Does the ABS indicator turn OFF?	Go to Step 5	Go to Step 4
4	Replace the instrument panel cluster. Refer to <u>Instrument Panel Cluster (IPC) Replacement</u> in Instrument Panel, Gages, and Console. Did you complete the replacement?	Go to Step 6	_
	IMPORTANT:	L	
	Following EBCM replacement, use the scan tool to perform the Tire Size Calibration procedure.		

5	Replace the EBCM. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u> .Did you complete the replacement?	Go to Step 6	-
6	 Turn OFF the ignition for 5 seconds. Turn ON the ignition while observing the ABS indicator. Does the ABS indicator illuminate for 2 seconds and then 		
	turn OFF?	System OK	Go to Step 3

ABS INDICATOR INOPERATIVE

Circuit Description

The instrument panel cluster (IPC) illuminates the ABS indicator by supplying ground to the lamp. The electronic brake control module (EBCM) sends class 2 serial data messages to the IPC in order to command the indicator ON or OFF.

Diagnostic Aids

Replace the Instrument Panel Cluster if the ABS indicator intermittently fails to operate during the bulb check.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step tests if the IPC is able to illuminate the ABS indicator during the bulb check.

ABS Indicator Inoperative

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1			System Check -
		Go to Step 2	ABS
	1. Turn OFF the ignition for 5 seconds.		
	2. Turn ON the ignition while observing the ABS		
2	indicator.		
		Go to Diagnostic	
	Does the ABS indicator illuminate?	Aids	Go to Step 3
	Replace the instrument panel cluster. Refer to		
2	Instrument Panel Cluster (IPC) Replacement in		
5	Instrument Panel, Gages, and Console.		-
	Did you complete the replacement?	Go to Step 4	
	1. Turn OFF the ignition for 5 seconds.		

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4	2. Turn ON the ignition while observing the ABS indicator.		
	Does the ABS indicator illuminate?	System OK	Go to Step 3

TRACTION OFF INDICATOR ALWAYS ON

Circuit Description

The instrument panel cluster (IPC) illuminates the traction off indicator by supplying ground to the lamp. The electronic brake control module (EBCM) sends serial data messages to the IPC to command the indicator ON or OFF.

Diagnostic Aids

The malfunction must be present during diagnosis in order to prevent unnecessary parts replacement. Always begin diagnosis with **Diagnostic System Check - ABS**.

Test Description

The number below refers to the step number on the diagnostic table.

3: This step tests if the IPC is able to turn OFF the traction off indicator.

Traction Off Indicator Always Of

Step	Action	Yes	No
Schema	atic Reference: <u>ABS Schematics</u>		
Connec	ctor End View Reference: <u>ABS Connector End Views</u>	·	
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1		Co to Stop 2	System Check -
		Go to Step 2	ABS
	1. Turn OFF the ignition for 5 seconds.		
	2. Turn ON the ignition while observing the traction		
2	off indicator.		
	Does the traction off indicator illuminate for	Co to Disensatio	
	approximately 2 seconds and then turn OFF?	Aids	Go to Step 3
			001054405
	1. Select the Instrument Panel Cluster Special		
	Functions menu on the scan tool.		
3	2. Select Lamp Tests.		
C	3. Command the IPC indicator lamps Off.		
	Does the traction off indicator turn OFF?	Go to Step 5	Go to Step 4
	Replace the instrument panel cluster. Refer to		

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4	Instrument Panel Cluster (IPC) Replacement in Instrument Panel, Gages, and Console. Did you complete the replacement?	Go to Step 6	-
5	IMPORTANT: Following EBCM replacement, perform the set-up procedure for the EBCM and use the scan tool to perform the Tire Size Calibration procedure.		-
	Replace the EBCM. Refer to <u>Electronic Brake Control</u> <u>Module Replacement</u> .Did you complete the replacement?	Go to Step 6	
6	 Turn OFF the ignition for 5 seconds. Turn ON the ignition while observing the traction off indicator. 		
	approximately 2 seconds and then turn OFF?	System OK	Go to Step 3

TRACTION OFF INDICATOR INOPERATIVE

Circuit Description

The instrument panel cluster (IPC) illuminates the traction off indicator by supplying ground to the lamp. The electronic brake control module (EBCM) sends serial data messages to the IPC to command the indicator ON or OFF.

Diagnostic Aids

Replace the IPC if the traction off indicator intermittently fails to illuminate during the bulb check.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step tests if the IPC is able to illuminate the traction off indicator during the bulb check.

Traction Off Indicator Inoperative

Step	Action	Yes	No
	Did you perform the ABS Diagnostic System Check?		Go to Diagnostic
1			<u>System Check -</u>
		Go to Step 2	ABS
	1. Turn OFF the ignition for 5 seconds.		
2	2. Turn ON the ignition while observing the traction off indicator.		
		Go to Diagnostic	

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	Does the traction off indicator illuminate?	Aids	Go to Step 3
3	Replace the instrument panel cluster. Refer to Instrument Panel Cluster (IPC) Replacement in Instrument Panel, Gages, and Console. Did you complete the replacement?	Go to Step 4	-
4	 Turn OFF the ignition for 5 seconds. Turn ON the ignition while observing the traction off indicator. Does the traction off indicator illuminate? 	System OK	Go to Step 3

REPAIR INSTRUCTIONS

ABS AUTOMATED BLEED PROCEDURE

Two - Person Procedure

IMPORTANT:

- Use the two-person bleed procedure under the following conditions:
 - Installing a new Electro-Hydraulic Control Unit (EHCU) or new Brake Pressure Modulator Valve (BPMV).
 - $\circ\,$ Air is trapped in the valve body.
- Do not drive the vehicle until the brake pedal feels firm.
- Do not reuse brake fluid that is used during bleeding.
- Use the vacuum, the pressure and the gravity bleeding procedures only for base brake bleeding.
- 1. Raise the vehicle in order to access the system bleed screws.
- 2. Bleed the system at the right rear wheel first.
- 3. Install a clear hose on the bleed screw.
- 4. Immerse the opposite end of the hose into a container partially filled with clean DOT 3 brake fluid.
- 5. Open the bleed screw 1/2 to 1 full turn.
- 6. Slowly depress the brake pedal. While the pedal is depressed to its full extent, tighten the bleed screw.
- 7. Release the brake pedal and wait 10-15 seconds for the master cylinder pistons to return to the home position.
- 8. Repeat the previous steps for the remaining wheels. The brake fluid which is present at each bleed screw should be clean and free of air.
- 9. This procedure may use more than a pint of fluid per wheel. Check the master cylinder fluid level every four to six strokes of the brake pedal in order to avoid running the system dry.
- 10. Press the brake pedal firmly and run the Scan Tool Automated Bleed Procedure. Release the brake pedal between each test.
- 11. Bleed all four wheels again using Steps 3-9. This will remove the remaining air from the brake system.

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- 12. Evaluate the feel of the brake pedal before attempting to drive the vehicle.
- 13. Bleed the system as many times as necessary in order to obtain the appropriate feel of the pedal.

ELECTRONIC BRAKE CONTROL MODULE REPLACEMENT

Removal Procedure

IMPORTANT: After installation, calibrate the new electronic brake control module (EBCM) to the tire size that is appropriate to the vehicle.



Fig. 6: Removing/Installing EBCM Electrical Connectors (Side) Courtesy of GENERAL MOTORS CORP.

- 1. Raise the vehicle. Lifting and Jacking the Vehicle in General Information.
- 2. Remove 2 electrical connectors on the side of the EBCM.

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Fig. 7: Removing/Installing EBCM Electrical Connectors (Back) Courtesy of GENERAL MOTORS CORP.

3. Using a long flat-bladed screwdriver, release the lock tab on the electrical connector located on the back of the EBCM.

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<u>Fig. 8: TORX® Screw Heads</u> Courtesy of GENERAL MOTORS CORP.

- IMPORTANT: When performing the following service procedure, make sure that the TORX® screw heads are clean for the proper installation of the T 25-TORX® bit. If the 25-TORX® screw are damaged or can not be removed, replace both the EBCM and the brake pressure modulator valve (BPMV).
- 4. Using a T 25-TORX® bit, remove the 4 mounting screws.

IMPORTANT: Removal may require a light amount of force. DO NOT pry on the EBCM or the BPMV.

5. Remove the EBCM from the BPMV.

Installation Procedure

IMPORTANT: Do not reuse the old mounting screws. Always install new mounting screws with the new EBCM.

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<u>Fig. 9: TORX® Screw Heads</u> Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not use RTV or any other type of sealant on the EBCM gasket or mating surfaces.

1. Install EBCM on to the BPMV.

NOTE: Refer to <u>Component Fastener Tightening Notice</u> in Cautions and Notices.

2. Install the 4 new T-25 TORX® screws in the EBCM.

Tighten: Tighten the 4 T-25 TORX® screws to 5 N.m (39 lb in) in an X-pattern.

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Fig. 10: Removing/Installing EBCM Electrical Connectors (Side) Courtesy of GENERAL MOTORS CORP.

3. Install the 2 electrical connectors on the side of the EBCM.

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Fig. 11: Removing/Installing EBCM Electrical Connectors (Back) Courtesy of GENERAL MOTORS CORP.

- 4. Install the electrical connector on the back of the EBCM.
- 5. Lower the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
- 6. Revise the tire calibration using the Scan Tool Tire Size Calibration function.

BRAKE PRESSURE MODULATOR VALVE (BPMV) REPLACEMENT

CAUTION: Refer to Brake Fluid Irritant Caution in Cautions and Notices.

Removal Procedure

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Fig. 12: Electronic Brake Control Module (EBCM) View Courtesy of GENERAL MOTORS CORP.

- 1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
- 2. Remove the electronic brake control module (EBCM) from the vehicle. Refer to <u>Brake Pressure</u> <u>Modulator Valve (BPMV) Replacement</u>.

IMPORTANT: In the following service procedures, insert rubber plugs or caps on the exposed brake pipe fittings to prevent brake fluid loss and contamination.

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3. Remove the left front brake pipe.



Fig. 13: Right Front Brake Pipe Removed Courtesy of GENERAL MOTORS CORP.

4. Remove the right front brake pipe.

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<u>Fig. 14: Rear Brake Pipe Removed</u> Courtesy of GENERAL MOTORS CORP.

5. Remove the rear brake pipe.

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Fig. 15: Brake Pipe To Brake Master Cylinder Removed Courtesy of GENERAL MOTORS CORP.

6. Remove the brake pipe to the brake master cylinder.

Installation Procedure

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Fig. 16: Brake Pipe To Brake Master Cylinder Removed Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to <u>Fastener Notice</u> in Cautions and Notices.

1. Install the brake pipe to the brake master cylinder.

Tighten: Tighten the brake pipe fitting 25 N.m (18 lb in).

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Fig. 17: Rear Brake Pipe Removed Courtesy of GENERAL MOTORS CORP.

2. Install the rear brake pipe.

Tighten: Tighten the brake pipe fitting to 25 N.m (18 lb in).

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Fig. 18: Right Front Brake Pipe Removed Courtesy of GENERAL MOTORS CORP.

3. Install the right front brake pipe.

Tighten: Tighten the brake pipe fitting to 25 N.m (18 lb in).

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Fig. 19: Electronic Brake Control Module (EBCM) View Courtesy of GENERAL MOTORS CORP.

4. Install the left front brake pipe.

Tighten: Tighten the brake pipe fitting to 25 N.m (18 lb in).

- 5. Install the EBCM to the vehicle. Refer to **Brake Pressure Modulator Valve (BPMV) Replacement**.
- 6. Lower the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.

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7. Bleed the brake system. Refer to <u>ABS Automated Bleed Procedure</u>.

WHEEL SPEED SENSOR REPLACEMENT

Removal Procedure



Fig. 20: Brake Rotor Removed From Hub Courtesy of GENERAL MOTORS CORP.

- 1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
- 2. Remove tire and wheel. Refer to **<u>Tire and Wheel Removal and Installation</u>** in Tires and Wheels.
- 3. Remove the brake rotor. Refer to **Brake Rotor Replacement Front** in Disc Brake.

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Fig. 21: Identifying Wheel Speed Sensor Wiring Harness Courtesy of GENERAL MOTORS CORP.

4. Remove wheel speed sensor wiring harness the retainers.

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<u>Fig. 22: Locating Connector</u> Courtesy of GENERAL MOTORS CORP.

5. Disconnect the wheel speed sensor electrical connector.

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Fig. 23: Removing/Installing Sensor Mounting Screw Courtesy of GENERAL MOTORS CORP.

6. Remove the sensor mounting screw.

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Fig. 24: Removing/Installing Speed Sensor Courtesy of GENERAL MOTORS CORP.

NOTE: Carefully remove the sensor by pulling it straight out of the bore. DO NOT use a screwdriver, or other device. Prying will cause the sensor body to break off in the bore.

- NOTE: Do not attempt to remove the stainless steel shim from the bearing assembly. The shim is permanently attached. If the shim is damaged or bent, replace the bearing assembly. Failure to comply will result in diminished sensor and ABS performance.
- IMPORTANT: The wheel speed sensor mounts into a bore that leads to the center of the sealed bearing. Use caution when cleaning or working around the bore. Do not contaminate the lubricant inside the sealed bearing. Failure to do so can lead to premature bearing failure.
- 7. Remove wheel speed sensor from hub and bearing assembly.

Installation Procedure

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Fig. 25: Removing/Installing Speed Sensor Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The new speed sensor will have a new O-ring. Dispose of the old O-ring. Lubricate the new O-ring lightly with bearing grease prior to installation. You may also lubricate the sensor just above and below the new O-ring. DO NOT lubricate the bore.

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1. Install the speed sensor into the hub and bearing assembly.



Fig. 26: Removing/Installing Sensor Mounting Screw Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to <u>Fastener Notice</u> in Cautions and Notices.

2. Install the speed sensor mounting screw.

Tighten: Tighten the speed sensor mounting screw to 17 N.m (12 lb ft).

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Fig. 27: Locating Connector Courtesy of GENERAL MOTORS CORP.

3. Reconnect the wheel speed sensor electrical connector.

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Fig. 28: Identifying Wheel Speed Sensor Wiring Harness Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The new speed sensor has new mounting clips already installed on the

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wire. DO NOT reuse the old clips.

4. Install wheel speed sensor wiring harness to the frame and control arm.



Fig. 29: Brake Rotor Removed From Hub Courtesy of GENERAL MOTORS CORP.

- 5. Install the brake rotor. Refer to **<u>Brake Rotor Replacement Front</u>** in Disc Brake.
- 6. Install tire and wheel. Refer to Lifting and Jacking the Vehicle in General Information.

TRACTION CONTROL SWITCH REPLACEMENT

Removal Procedure

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- 1. Remove the accessory trim plate.
 - For TrailBlazer/Bravada, refer to <u>Trim Plate Replacement Instrument Panel (I/P) Accessory</u> in Instrument Panel, Gauges and Console.
 - For TrailBlazer/Envoy/Bravada, refer to <u>Bezel Replacement Instrument Panel (I/P) Cluster</u> in Instrument Panel, Gauges and Console.



Fig. 30: Removing/Installing Traction Control Switch Electrical Connector Courtesy of GENERAL MOTORS CORP.

- 2. Disconnect the electrical connector from the traction control switch.
- 3. Release the traction control switch locking tabs located behind the trim plate.
- 4. Remove the traction control switch from the trim plate

Installation Procedure

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Fig. 31: Removing/Installing Traction Control Switch Electrical Connector Courtesy of GENERAL MOTORS CORP.

- 1. Position the traction control switch to the trim plate
- 2. Install the traction control switch to the instrument panel trim plate by seating the locking tabs.
- 3. Connect the electrical connector to the traction control switch.
- 4. Install the accessory trim plate.
 - For Envoy/Bravada, refer to <u>Trim Plate Replacement Instrument Panel (I/P) Accessory</u> in Instrument Panel, Gauges and Console.
 - For TrailBlazer/Envoy/Bravada, refer to <u>Bezel Replacement Instrument Panel (I/P) Cluster</u> in Instrument Panel, Gauges and Console.

DESCRIPTION AND OPERATION

ABS DESCRIPTION AND OPERATION (W/O NW7)

This vehicle is equipped with an EBC 325EV ABS/DRP module.
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This module provides the following vehicle performance enhancement systems.

- Antilock Brake System (ABS)
- Dynamic Rear Proportioning (DRP)

The following components are involved in the operation of the above systems.

• Electronic brake control module (EBCM) - The EBCM controls the system functions and detects failures.

The EBCM contains the following components.

- System relay The system relay is internal to the EBCM. The system relay is energized when the ignition is ON. The system relay supplies battery positive voltage to the valve solenoids and to the ABS pump motor. This voltage is referred to as system voltage.
- Solenoids The solenoids are commanded ON and OFF by the EBCM to operate the appropriate valves in the brake pressure modulator valve (BPMV).
- Brake pressure modulator valve (BPMV) The BPMV uses a 3-circuit configuration to control hydraulic pressure to each front wheel independently, and to the rear wheels as a pair.

The BPMV contains the following components.

- ABS pump motor and pump
- Three isolation valves
- o Three dump valves
- A front low-pressure accumulator
- A rear low-pressure accumulator
- Wheel speed sensors (WSS) As the wheels spin, toothed rings interrupt magnetic fields in the wheel speed sensors. This causes each wheel speed sensor to generate an AC signal. The EBCM uses these AC signals to calculate the wheel speed. Any imperfections in the toothed ring, such as a missing or damaged tooth, can cause an inaccurate WSS signal.

Antilock Brake System (ABS) Operation

When wheel slip is detected during a brake application, an ABS event occurs. During antilock braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel. The ABS does not, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During antilock braking, a series of rapid pulsations is felt in the brake pedal. These pulsations are caused by the rapid changes in position of the individual solenoid valves as the EBCM responds to wheel speed sensor inputs and attempts to prevent wheel slip. These pedal pulsations are present only during antilock braking and stop when normal braking is resumed or when the vehicle comes to a stop. A ticking or popping noise may also be heard as the solenoid valves cycle rapidly. During antilock braking on dry pavement, intermittent chirping noises may be heard as the tires approach slipping. These noises and pedal pulsations are considered normal

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during antilock operation.

Vehicles equipped with ABS may be stopped by applying normal force to the brake pedal. Brake pedal operation during normal braking is no different than that of previous non-ABS systems. Maintaining a constant force on the brake pedal provides the shortest stopping distance while maintaining vehicle stability. The typical ABS activation sequence is as follows.

Pressure Hold

The EBCM closes the isolation valve and keeps the dump valve closed in order to isolate the slipping wheel when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

If a pressure hold does not correct the wheel slip condition, a pressure decrease occurs. The EBCM decreases the pressure to individual wheels during deceleration when wheel slip occurs. The isolation valve is closed and the dump valve is opened. The excess fluid is stored in the accumulator until the pump can return the fluid to the master cylinder or fluid reservoir.

Pressure Increase

After the wheel slip is corrected, a pressure increase occurs. The EBCM increases the pressure to individual wheels during deceleration in order to reduce the speed of the wheel. The isolation valve is opened and the dump valve is closed. The increased pressure is delivered from the master cylinder.

Dynamic Rear Proportioning (DRP) Operation

The dynamic rear proportioning (DRP) is a control system that enhances the hydraulic proportioning function of the mechanical proportioning valve in the base brake system. The DRP control system is part of the operation software in the EBCM. The DRP uses active control with existing ABS in order to regulate the vehicle's rear brake pressure.

Power-up Self-Test

The EBCM is able to detect many malfunctions whenever the ignition is ON. However, certain failures cannot be detected unless active diagnostic tests are performed on the components. Shorted solenoid coil or motor windings, for example, cannot be detected until the components are commanded ON by the EBCM. Therefore, a power-up self-test is required at the beginning of each ignition cycle to verify correct operation of components before the various control systems can be enabled. The EBCM performs the power-up self-test when the ignition is first turned ON. The system relay, solenoids and the ABS pump motor are commanded ON and OFF to verify proper operation and the EBCM verifies the ability to return the system to base braking in the event of a failure. The power-up self-test may be heard by the driver, depending on how soon the engine is cranked and started after turning ON the ignition.

ECE 13 Response

The EBCM illuminates the ABS indicator when a malfunction which disables ABS is detected. Usually, the

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ABS indicator is turned OFF during the following ignition cycle unless the fault is detected during that ignition cycle. However, the setting of a wheel speed sensor related DTC may cause the ABS indicator to remain illuminated during the following ignition cycle until the vehicle is operated at a speed greater than 13 km/h (8 mph) or, occasionally, 64 km/h (40 mph), depending on which DTC sets. This allows the EBCM to verify that no malfunction exists, before turning OFF the ABS indicator. It is important to verify that ECE 13 is not the cause of an ABS indicator which is illuminated when no DTCs are set, before attempting to diagnose other possible causes.

Driver Information Indicators and Messages

The following indicators are used to inform the driver of several different factors.

Brake Warning Indicator

The instrument panel cluster (IPC) illuminates the brake warning indicator when the following occurs.

- The body control module (BCM) detects that the park brake is engaged. The IPC receives a serial data message from the BCM requesting illumination. The brake warning indicator flashes at a rate of approximately twice per second when the park brake is engaged.
- The EBCM detects a low brake fluid condition or a base brake pressure differential and sends a serial data message to the IPC requesting illumination.
- The IPC performs the bulb check.
- The EBCM detects an ABS-disabling malfunction which also disables dynamic rear proportioning (DRP) and sends a serial data message to the IPC requesting illumination.

ABS Indicator

The IPC illuminates the ABS indicator when the following occurs.

- The electronic brake control module (EBCM) detects an ABS-disabling malfunction and sends a serial data message to the IPC requesting illumination.
- The IPC performs the bulb check.
- The IPC detects a loss of serial data communication with the EBCM.
- A DTC is set during the previous ignition cycle which requires an ECE 13 response at the beginning of the current ignition cycle. The EBCM sends a serial data message to the IPC requesting illumination.

ABS DESCRIPTION AND OPERATION (W/NW7)

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<u>Fig. 32: Left Side Frame Rail - w/o JL4</u> Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 32

Callout	Component Name
1	Electronic Brake Control Module (EBCM)
2	Electronic Brake Control Module (EBCM) Electrical Connector - C1
3	Electronic Brake Control Module (EBCM) Electrical Connector - C2
4	Frame

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Fig. 33: BPMV Hydraulic Flow Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 33

Callout	Component Name
1	Master Cylinder
2	Master Cylinder Reservoir
3	Pump
4	Brake Pressure Modulator Valve (BPMV)
5	Damper
6	Rear Isolation Valve
7	Accumulator
8	Rear Dump Valve
9	Right Rear Brake

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10	Left Rear Brake
11	Left Front Isolation Valve
12	Left Front Dump Valve
13	Left Front Brake
14	Accumulator
15	Right Front Brake
16	Right Front Dump Valve
17	Right Front Isolation Valve
18	Damper

This vehicle is equipped with one of the following antilock braking systems.

- EBC325
- EBC325S (w/NW7)

The vehicle is equipped with the following braking enhancement systems.

- Antilock Brake System (ABS)
- Dynamic Rear Proportioning (DRP)
- Traction Control System (TCS) (w/NW7)

The following components are involved in the operation of the above systems.

• Electronic brake control module (EBCM) - The EBCM controls the system functions and detects failures.

The EBCM contains the following components.

- System relay The system relay is internal to the EBCM. The system relay is energized when the ignition is ON. The system relay supplies battery positive voltage to the solenoid valves and to the pump motor. This voltage is referred to as system voltage.
- Solenoids The solenoids are commanded ON and OFF by the EBCM to operate the appropriate valves in the brake pressure modulator valve (BPMV).
- Brake pressure modulator valve (BPMV) The BPMV uses a 3-circuit configuration to control the left front wheel, the right front wheel, and the combined rear wheels. The BPMV directs fluid to the left front and right front wheels independently. The BPMV directs fluid to the two rear wheels on a single hydraulic circuit.

The BPMV contains the following components.

- \circ Pump motor
- o Three isolation valves
- o Three dump valves
- o A front low-pressure accumulator

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- o A rear low-pressure accumulator
- Wheel speed sensors (WSS) As the front wheels spin, toothed rings located at each wheel hub interrupt magnetic fields in the wheel speed sensors. This causes each wheel speed sensor to generate an AC signal. The EBCM uses these AC signals to calculate the wheel speed. The wheel speed sensors are serviceable only as part of the wheel hub and bearing assemblies. Any imperfections in the toothed ring, such as a missing or damaged tooth, can cause an inaccurate WSS signal.
- Vehicle speed sensor (VSS) The input signal for rear wheel speed originates at the VSS. The powertrain control module (PCM) receives rear wheel speed input from the VSS and supplies this information to the EBCM.
- Traction control switch (w/NW7) The TCS is manually disabled or enabled using the traction control switch. The TCS can be programmed to be automatically enabled or disabled when the ignition is turned ON. The factory default is for the TCS to be automatically enabled. Refer to Programming the Traction Control Automatic Engagement Feature.

Initialization Sequence

The EBCM performs one initialization test each ignition cycle. The initialization of the EBCM occurs when the following conditions are met:

- The ignition is ON.
- The bulb check has been completed.
- Vehicle speed is greater than 6 km/h (4 mph).

The initialization sequence briefly cycles each solenoid and the pump motor to verify proper operation of the components. The EBCM sets one or more DTCs in accordance with any malfunction that is detected.

The EBCM defines a drive cycle as the completion of the initialization sequence.

Antilock Brake System

When wheel slip is detected during a brake application, the ABS enters antilock mode. During antilock braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel brake. The ABS cannot, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During antilock braking, a series of rapid pulsations is felt in the brake pedal. These pulsations are caused by the rapid changes in position of the individual solenoid valves as the EBCM responds to wheel speed sensor inputs and attempts to prevent wheel slip. These pedal pulsations are present only during antilock braking and stop when normal braking is resumed or when the vehicle comes to a stop. A ticking or popping noise may also be heard as the solenoid valves cycle rapidly. During antilock braking on dry pavement, intermittent chirping noises may be heard as the tires approach slipping. These noises and pedal pulsations are considered normal during antilock operation.

Vehicles equipped with ABS may be stopped by applying normal force to the brake pedal. Brake pedal operation during normal braking is no different than that of previous non-ABS systems. Maintaining a constant

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force on the brake pedal provides the shortest stopping distance while maintaining vehicle stability.

Pressure Hold

The EBCM closes the isolation valve and keeps the dump valve closed in order to isolate the slipping wheel when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

If a pressure hold does not correct the wheel slip condition, a pressure decrease occurs. The EBCM decreases the pressure to individual wheels during deceleration when wheel slip occurs. The isolation valve is closed and the dump valve is opened. The excess fluid is stored in the accumulator until the pump can return the fluid to the master cylinder or fluid reservoir.

Pressure Increase

After the wheel slip is corrected, a pressure increase occurs. The EBCM increases the pressure to individual wheels during deceleration in order to reduce the speed of the wheel. The isolation valve is opened and the dump valve is closed. The increased pressure is delivered from the master cylinder.

Dynamic Rear Proportioning (DRP)

The dynamic rear proportioning (DRP) is a control system that replaces the hydraulic proportioning function of the mechanical proportioning valve in the base brake system. The DRP control system is part of the operation software in the EBCM. The DRP uses active control with existing ABS in order to regulate the vehicle's rear brake pressure.

The red brake warning indicator is illuminated when the dynamic rear proportioning function is disabled.

Traction Control System (TCS)

When drive wheel slip is noted while the brake is not applied, the EBCM will enter traction control mode.

The EBCM uses a 5-volt pulse-width modulated (PWM) signal to request the PCM to reduce the amount of torque to the drive wheels. The PCM reduces torque to the drive wheels by retarding spark timing and by commanding the throttle actuator control. The PCM uses a 5-volt PWM signal in order to report to the EBCM the amount of torque delivered to the drive wheels.

Brake Warning Indicator

The instrument panel cluster (IPC) illuminates the brake warning indicator when the following occurs:

- The body control module (BCM) detects that the park brake is engaged. The IPC receives a class 2 message from the BCM requesting illumination.
- The EBCM detects a low brake fluid condition and sends a class 2 message to the IPC.
- The IPC performs the bulb check.

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• An ABS-disabling malfunction also disables dynamic rear proportioning (DRP).

ABS Indicator

The IPC illuminates the ABS indicator when the following occurs:

- The electronic brake control module (EBCM) detects an ABS-disabling malfunction. The IPC receives a class 2 message from the EBCM requesting illumination.
- The IPC performs the bulb check.
- The IPC detects a loss of class 2 communications with the EBCM.

Traction Control Indicators (w/NW7)

TRACTION ACTIVE

The traction active message is displayed on the instrument panel cluster (IPC) during a traction control event.

TRACTION OFF

The EBCM illuminates the traction off indicator if any of the following conditions are present.

- The EBCM inhibits the traction control system.
- The driver manually disables the traction control system by pressing the traction control switch.
- The automatic transmission shift lever is in the low (1) position.

The EBCM inhibits the traction control system when a TCS-disabling malfunction occurs, or when the automatic engagement feature is programmed to disable the TCS when the ignition is turned ON. Refer to Programming the Traction Control Automatic Engagement Feature.

Programming the Traction Control Automatic Engagement Feature

The automatic engagement feature may be programmed so that the traction control system activates or does not activate automatically at the start of each ignition cycle. In order to change the status of the automatic engagement feature, perform the following procedure:

IMPORTANT: Failure to follow the correct procedure may cause DTC C0283 to set in EBCM memory.

- 1. Park the vehicle and apply the parking brake.
- 2. Unlock the ignition and shift the transmission into NEUTRAL (N).
- 3. Turn the ignition ON, engine OFF.
- 4. Press and hold the brake pedal and the accelerator pedal.
- 5. Press and hold the traction assist switch for 5 seconds.
- 6. Release the brake and accelerator pedals and the traction control switch.

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7. Turn the ignition OFF.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/ Description
	J 39700 Universal Breakout Box
	J 39700-325 ABS Adapter Cable