

Antilock Brake System

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Pipe Fittings At Brake Pressure Modulator Valve (BPMV)	15 N-m	11 lb ft
Brake Pressure Modulator Valve Bracket Bolt/Nut	10 N-m	7 lb ft
Brake Pressure Modulator Valve Bracket Nut to Brake Pressure Modulator Valve	12 N-m	8 lb ft
Electronic Brake and Traction Control Module (EBCM/EBTCM) to Brake Pressure Modulator Valve Bolt/Screw	2.9 N-m	26 lb in
Wheel Speed Sensor Mounting Bolt	10 N-m	89 lb in
Adjuster Assembly Attaching Nuts	25 N-m	19 lb ft

ABS Diagnostic Specifications

WSS Temperature vs. Sensor Resistance

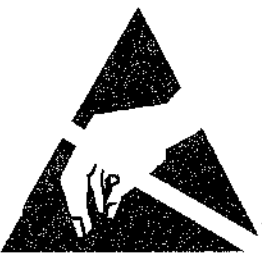
Sensor	°C	°F	Ohms
Front Wheel Speed Sensor	-34 to 4	-30 to 40	800 to 1100
Front Wheel Speed Sensor	5 to 43	41 to 110	950 to 1300
Front Wheel Speed Sensor	44 to 93	111 to 200	2250 to 3280
Rear Wheel Speed Sensor	-34 to 4	-30 to 40	2032 to 3107
Rear Wheel Speed Sensor	5 to 43	41 to 110	2417 to 3615
Rear Wheel Speed Sensor	44 to 93	111 to 200	2812 to 4266

GM SPO Group Numbers

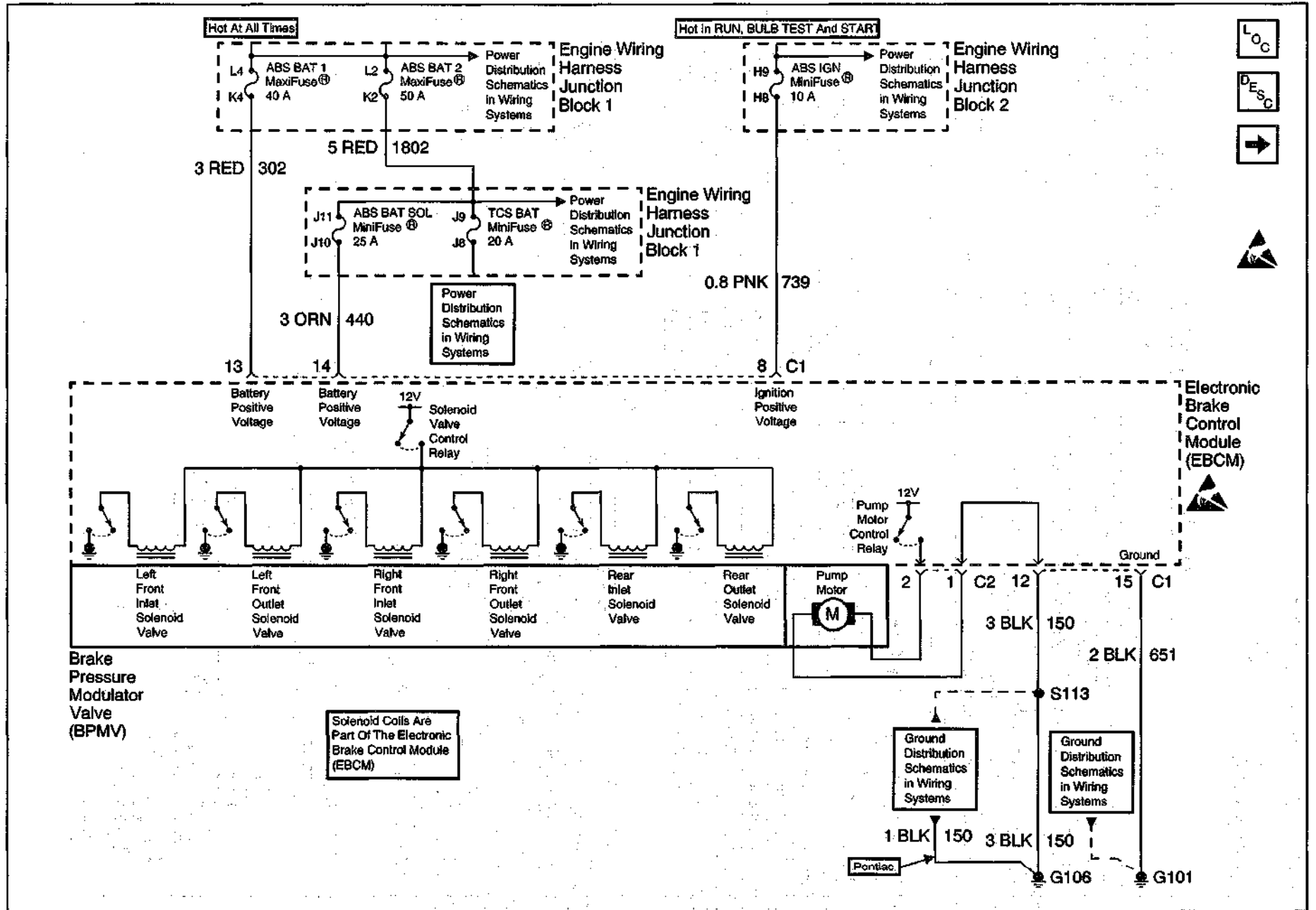
Application	GM SPO Group Number
Brake Pressure Modulator Valve	4.730
Brake Pressure Modulator Valve Bracket	4.730
Electronic Brake and Traction Control Module	4.720
Stoplamp Switch	2.447
Wheel Speed Sensor	4.710
Wheel Speed Sensor Jumper Harness	4.720

Schematic and Routing Diagrams

ABS Schematic Icons

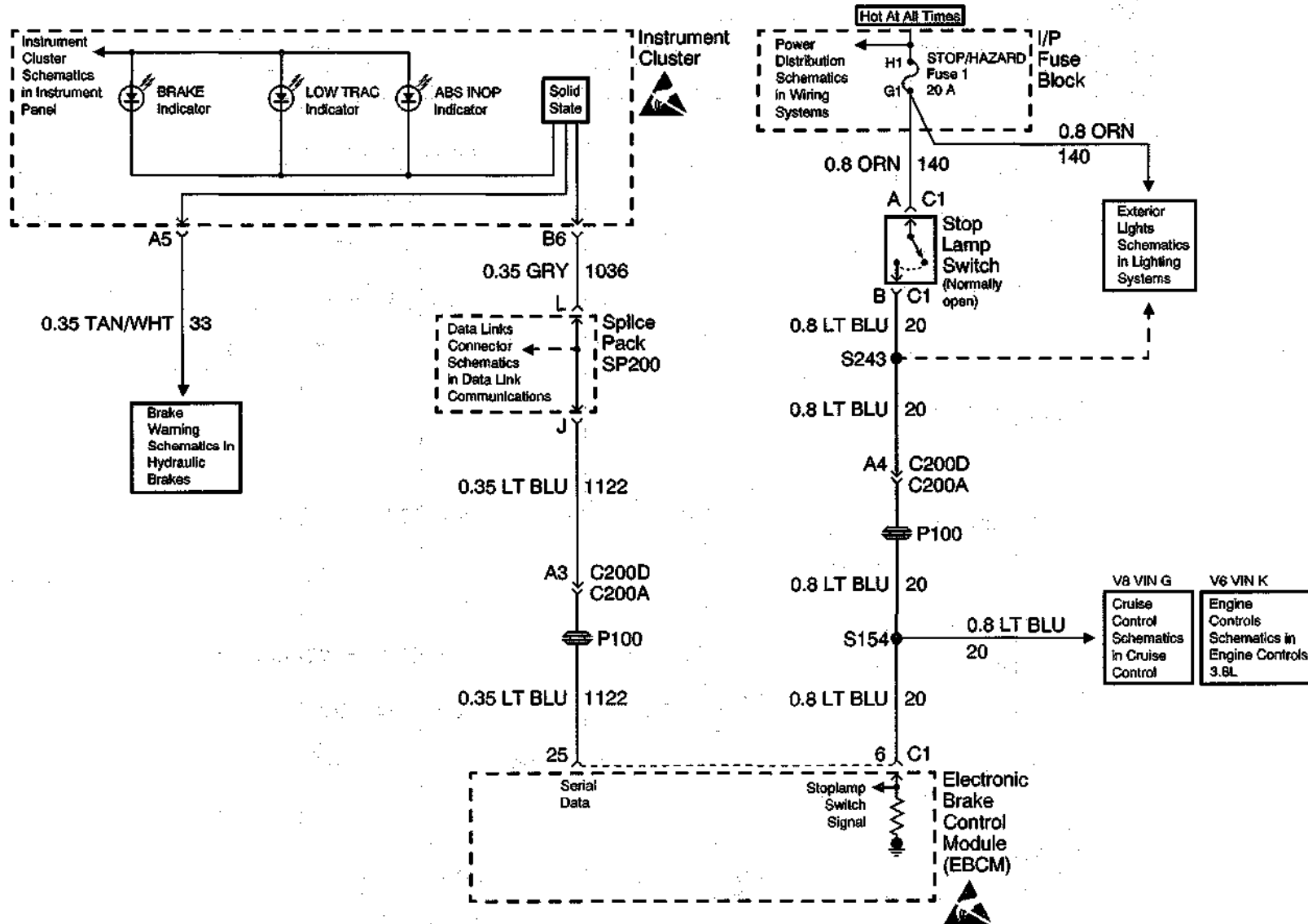
Icon	Icon Definition
	Refer to <i>ESD Notice</i> in Caution and Notices.

ABS Schematics (Without Traction Control 1 of 3)

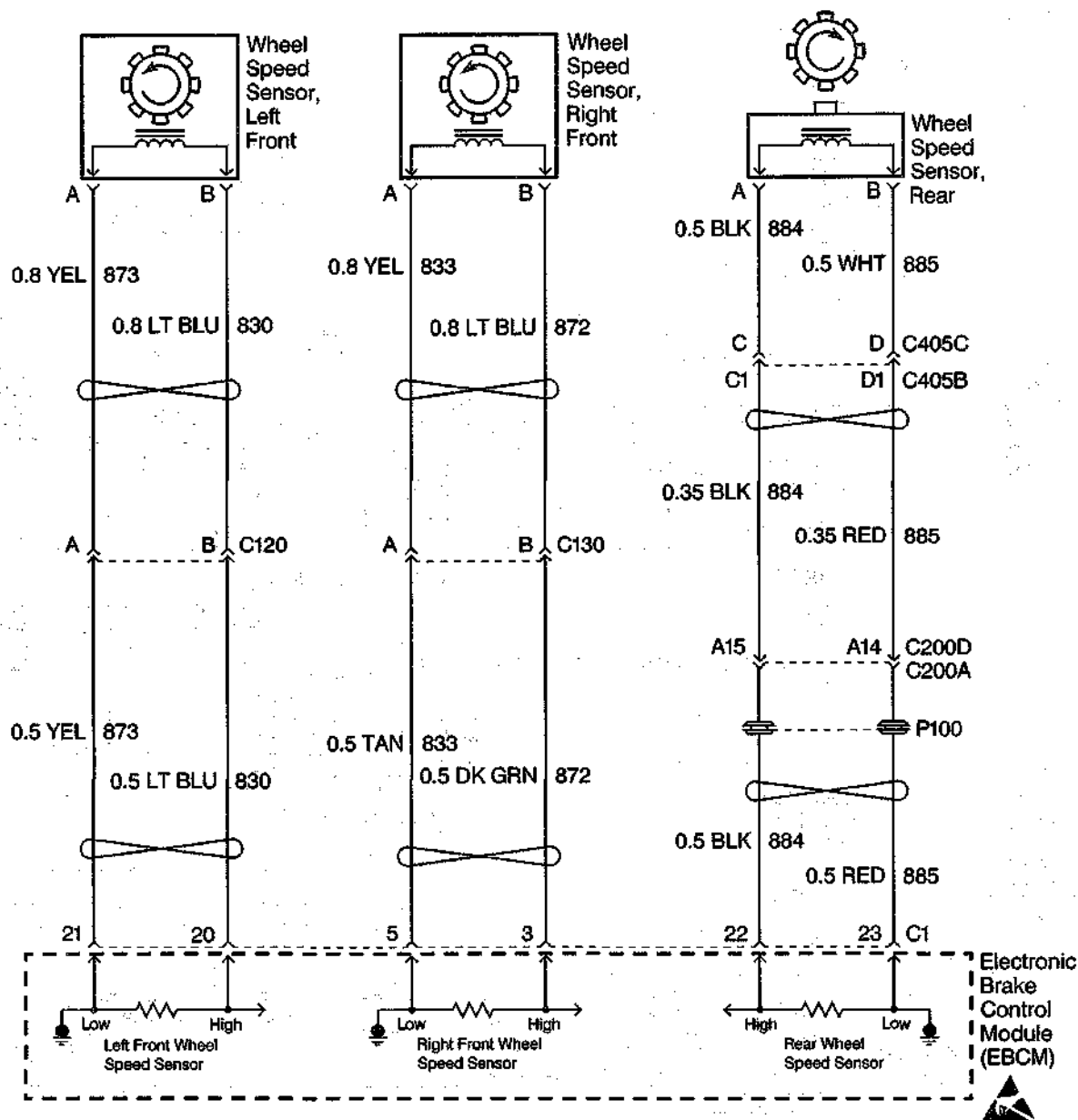


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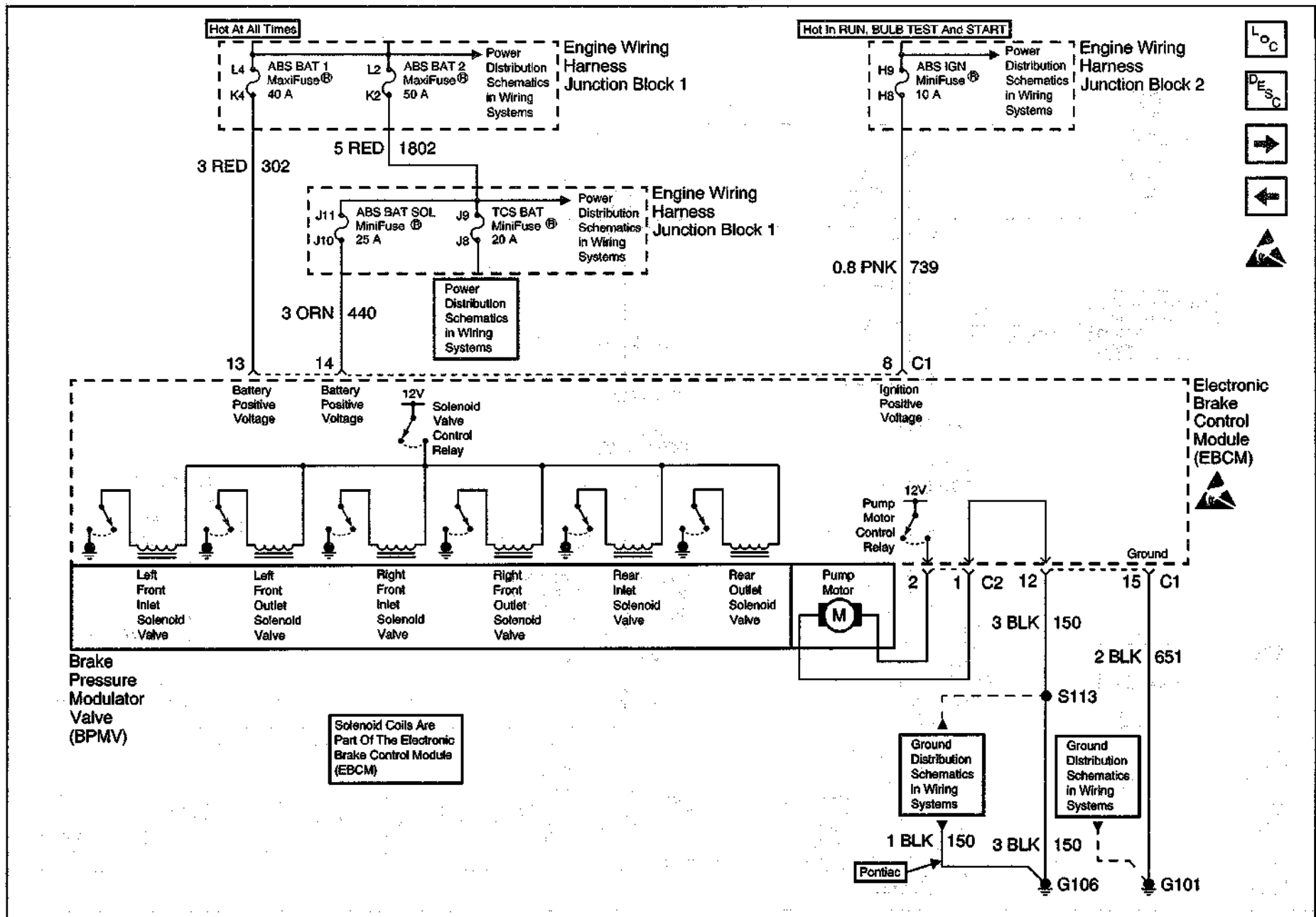
ABS Schematics (Without Traction Control 2 of 3)



ABS Schematics (Without Traction Control 3 of 3)



ABS Schematics (3.8L With Traction Control 1 of 4)

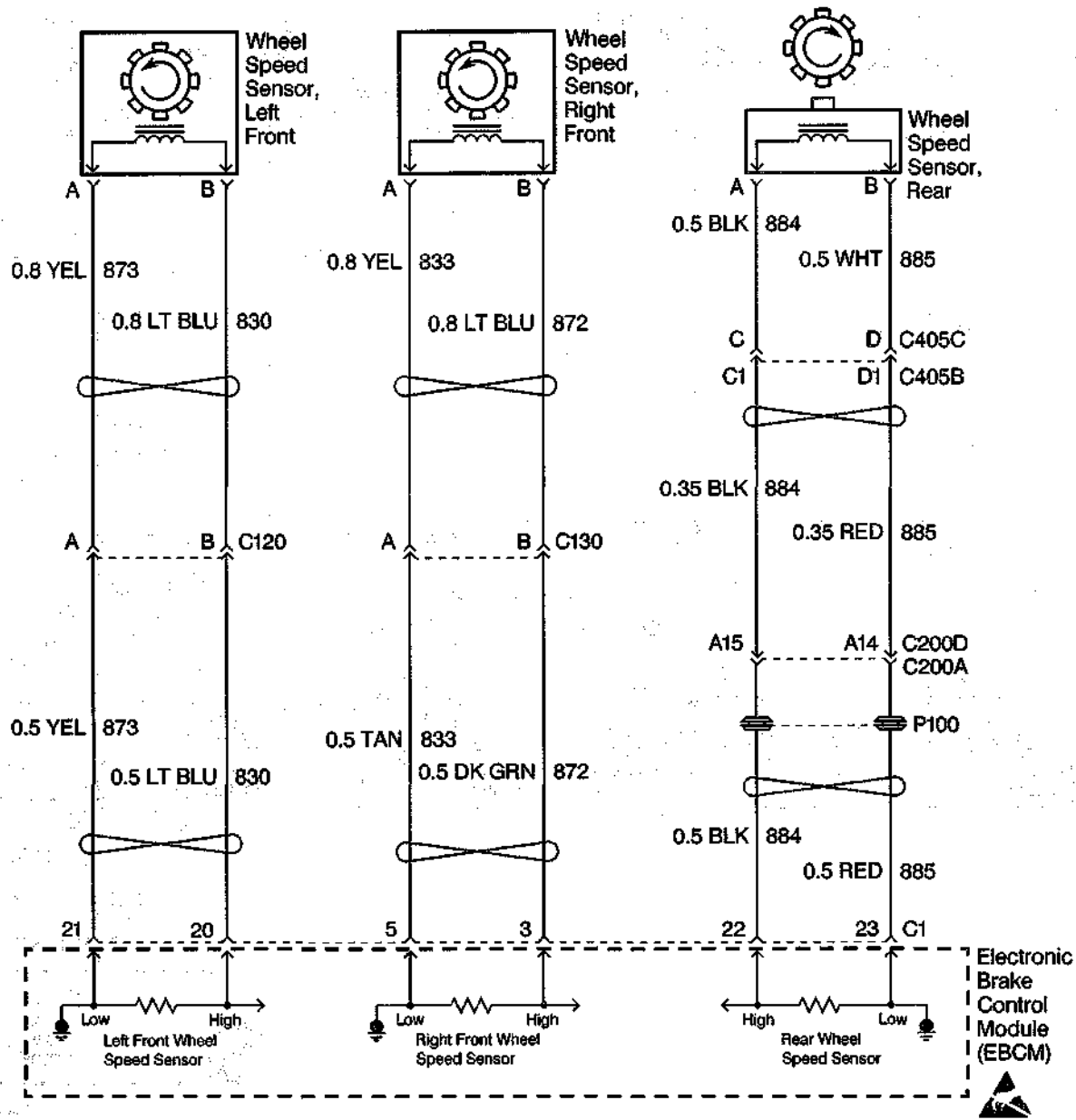


5-102 Antilock Brake System

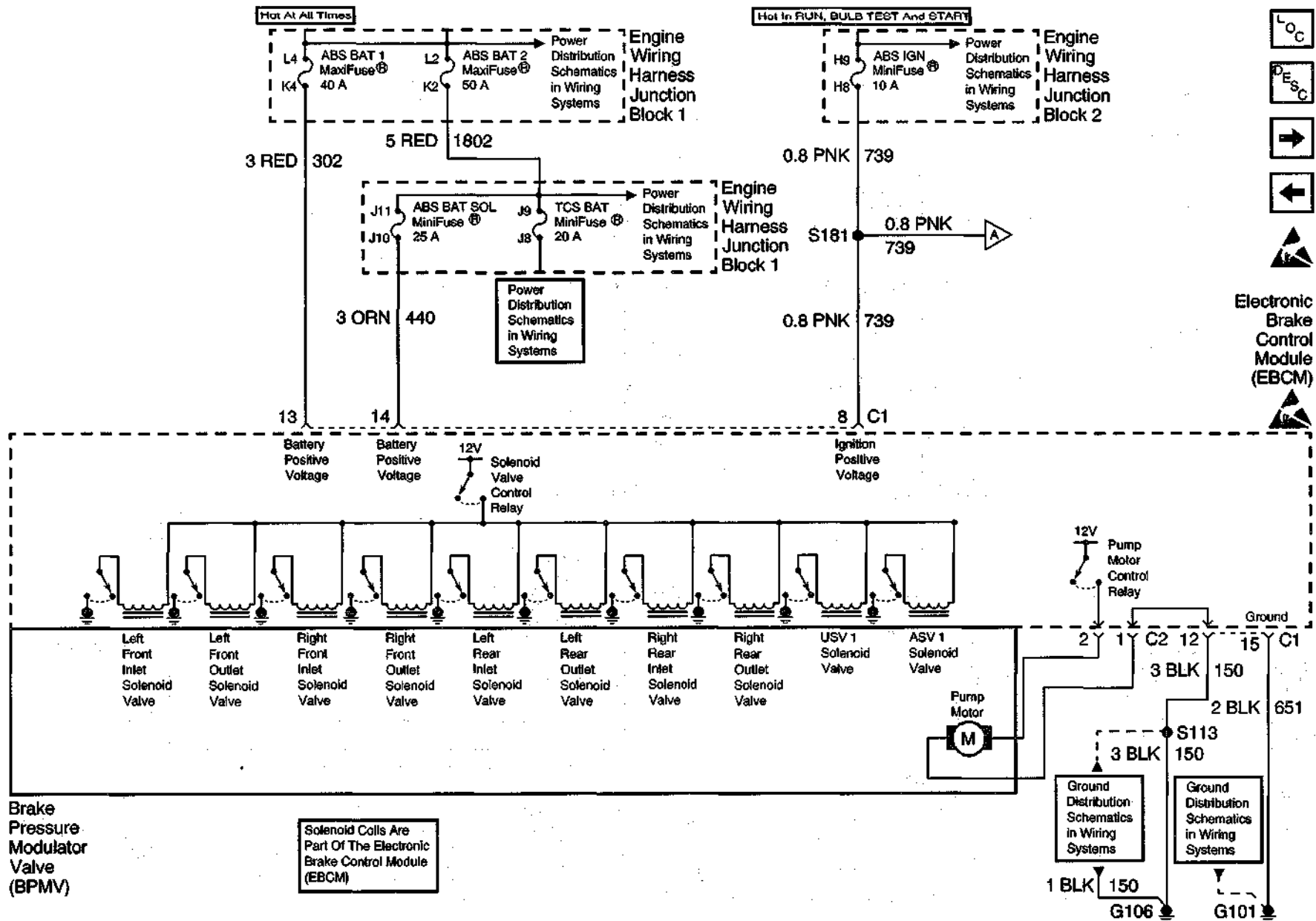


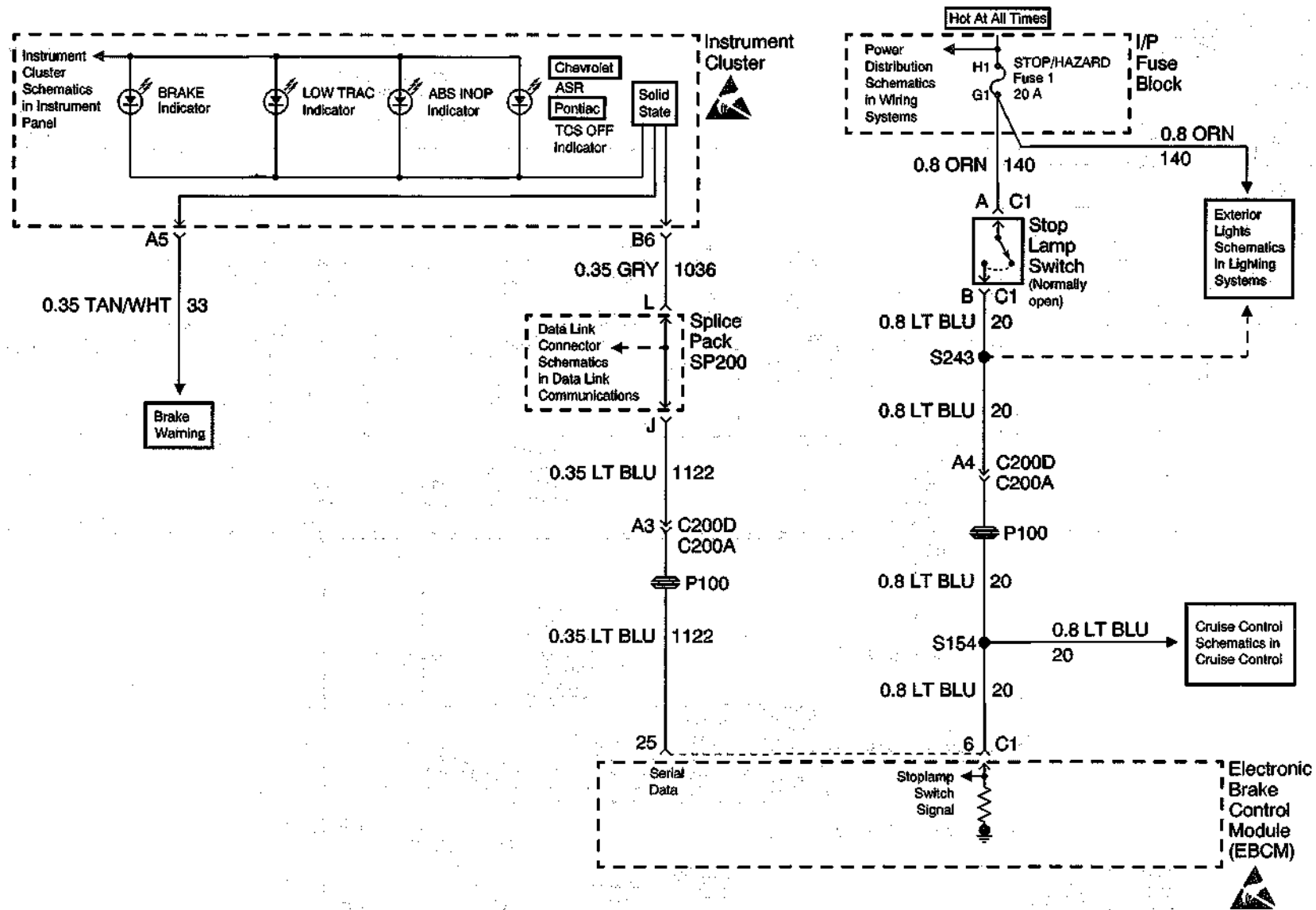
Antilock Brake System 5-103





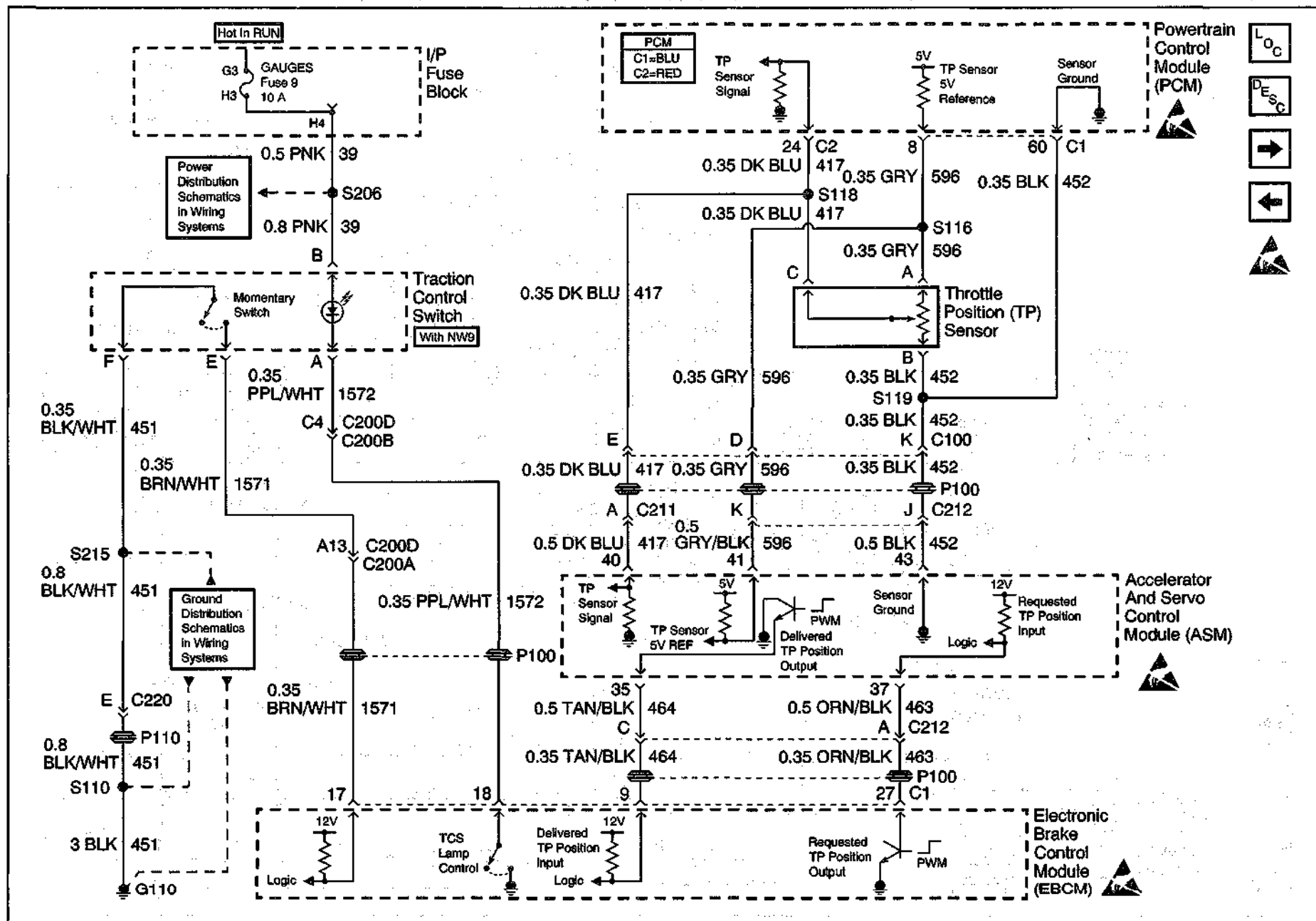
ABS Schematics (5.7L With Traction Control 1 of 5)



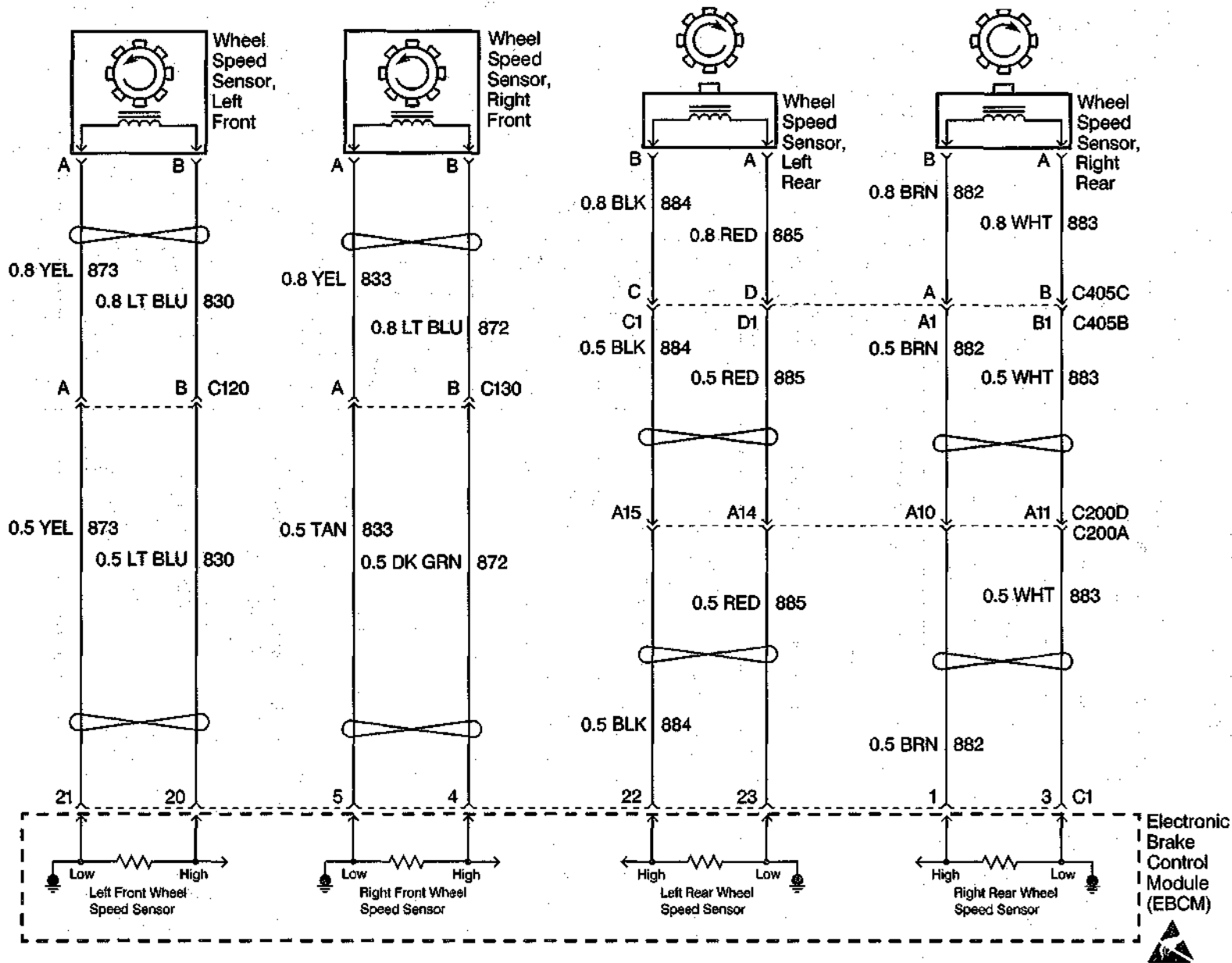


Antilock Brake System 5-107





ABS Schematics (5.7L With Traction Control 5 of 5)



Component Locator

ABS Components

Name	Location	Locator View	Connector End View
Accelerator and Servo Control Module (ASM)	Under the left side of the instrument panel, near the kick panel	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Accelerator Control and Adjuster	In the engine compartment, in the forward of the right front wheelhouse	Cruise Control Component Views in Cruise Control	ABS Connector End Views in Antilock Brake System
Brake Fluid Level Indicator Sensor	Part of the master cylinder	—	Hydraulic Brakes Connector End Views in Hydraulic Brakes
Brake Pressure Modulator Valve (BPMV)	Mounted to the left front frame rail	ABS Component Views in ABS Traction Control	—
Center High Mounted Stop Lamp (CHMSL)	In the center of the rear spoiler	—	—
Cruise Control Module	Mounted to the left frame rail, forward of the wheelhouse	Cruise Control Component Views in Cruise Control	Cruise Control Connector End Views in Cruise Control
Data Link Connector (DLC)	Under the IP, right of the steering column	Data Link Communications Component Views in Data Link Communications	Data Link Communications Connector End Views in Data Link Communications
Electronic Brake Control Module (EBCM)	Mounted with brake pressure modulator valve on the top of the left front frame rail	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Engine Wiring Harness Junction Block 1	In the left front corner of the engine compartment	Power and Grounding Component Views in Wiring Systems	—
Engine Wiring Harness Junction Block 2	In the left front corner of the engine compartment	Power and Grounding Component Views in Wiring Systems	—
Instrument Cluster	On the left side of the IP	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	Instrument Panel, Gauges, and Console Connector End Views in Instrument Panel, Gauges and Console
IP Fuse Block	On the left end of the IP carrier	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	—
Park/Neutral Position Switch	Under the center console, on the base of the shift control lever	—	Engine Controls Connector End Views in Engine Controls
Powertrain Control Module (PCM) (V6 VIN K)	On the right side of the engine compartment, rear of the wheelhouse	Power and Grounding Component Views in Wiring Systems	PCM Connector End Views in Engine Controls
Powertrain Control Module (PCM) (V8 VIN G)	On the right side of the engine compartment, rear of the wheelhouse	Engine Controls Component Views in Engine Controls	PCM Connector End Views in Engine Controls
Second Gear Start Switch (V6 VIN K) (Chevrolet w/o NW9)	In the center of the IP, above the HVAC control	ABS Component Views in ABS Traction Control	Engine Controls Connector End Views in Engine Controls
Stop Lamp/TCC Switch (Automatic)	Mounted on the brake pedal bracket	Cruise Control Component Views in Cruise Control	Lighting Systems Connector End Views in Lighting Systems

ABS Components (cont'd)

Name	Location	Locator View	Connector End View
Throttle Actuator Control (V6 VIN K)	On the plenum, with throttle body	—	Engine Controls Connector End Views in Engine Controls
Throttle Actuator Control (TAC) Module (V6 VIN K)	Mounted on the accelerator pedal bracket	—	Engine Controls Connector End Views in Engine Controls
Throttle Position (TP) Sensor (V8 VIN G)	Mounted to the front of the throttle body	Engine Controls Component Views in Engine Controls	Engine Controls Connector End Views in Engine Controls
Traction Control Switch (Chevrolet with NW9)	In the center of the IP, above the HVAC control	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Traction Control Switch (Pontiac)	On the left side of the upper console	Power-Door Systems Component Views in Door	ABS Connector End Views in Antilock Brake System
Vehicle Speed Sensor (Automatic) (V6 VIN K)	On the rear right side of the transmission	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	Engine Controls Connector End Views in Engine Controls
Vehicle Speed Sensor (Automatic) (V8 VIN G)	On the rear right side of the transmission	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	Engine Controls Connector End Views in Engine Controls
Vehicle Speed Sensor (Manual) (V6 VIN K)	On the rear left side of the transmission	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	Engine Controls Connector End Views in Engine Controls
Vehicle Speed Sensor (Manual) (V8 VIN G)	On the rear left side of the transmission	Instrument Panel, Gauges, and Console Component Views in Instrument Panel, Gauges and Console	Engine Controls Connector End Views in Engine Controls
Wheel Speed Sensor, Front	On the middle of the left and right front steering knuckle	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Wheel Speed Sensor, Rear (V8 VIN G with NW9)	Mounted to the left and right rear backing plate of the wheel disc	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Wheel Speed Sensor, Rear (w/o NW9)	On the top of the rear differential	ABS Component Views in ABS Traction Control	ABS Connector End Views in Antilock Brake System
Splice Pack SP200	Under the left side of the IP, near the DLC	Lighting Systems Component Views in Lighting Systems	Data Link Communications Connector End Views in Data Link Communications
C100 (10 cavities)	Engine to forward lamp harness, in the engine compartment, above the right wheelhouse	Harness Routing Views in Wiring Systems	Inline Harness Connector End Views in Wiring Systems
C120 (2 cavities)	Forward lamp to wheel speed sensor jumper harness, mounted to the left frame rail	Harness Routing Views in Wiring Systems	Inline Harness Connector End Views in Wiring Systems
C200A (17 cavities)	Forward lamp to IP harness, between the left kick panel and the steering column	Harness Routing Views in Wiring Systems	Inline Harness Connector End Views in Wiring Systems

ABS Components (cont'd)

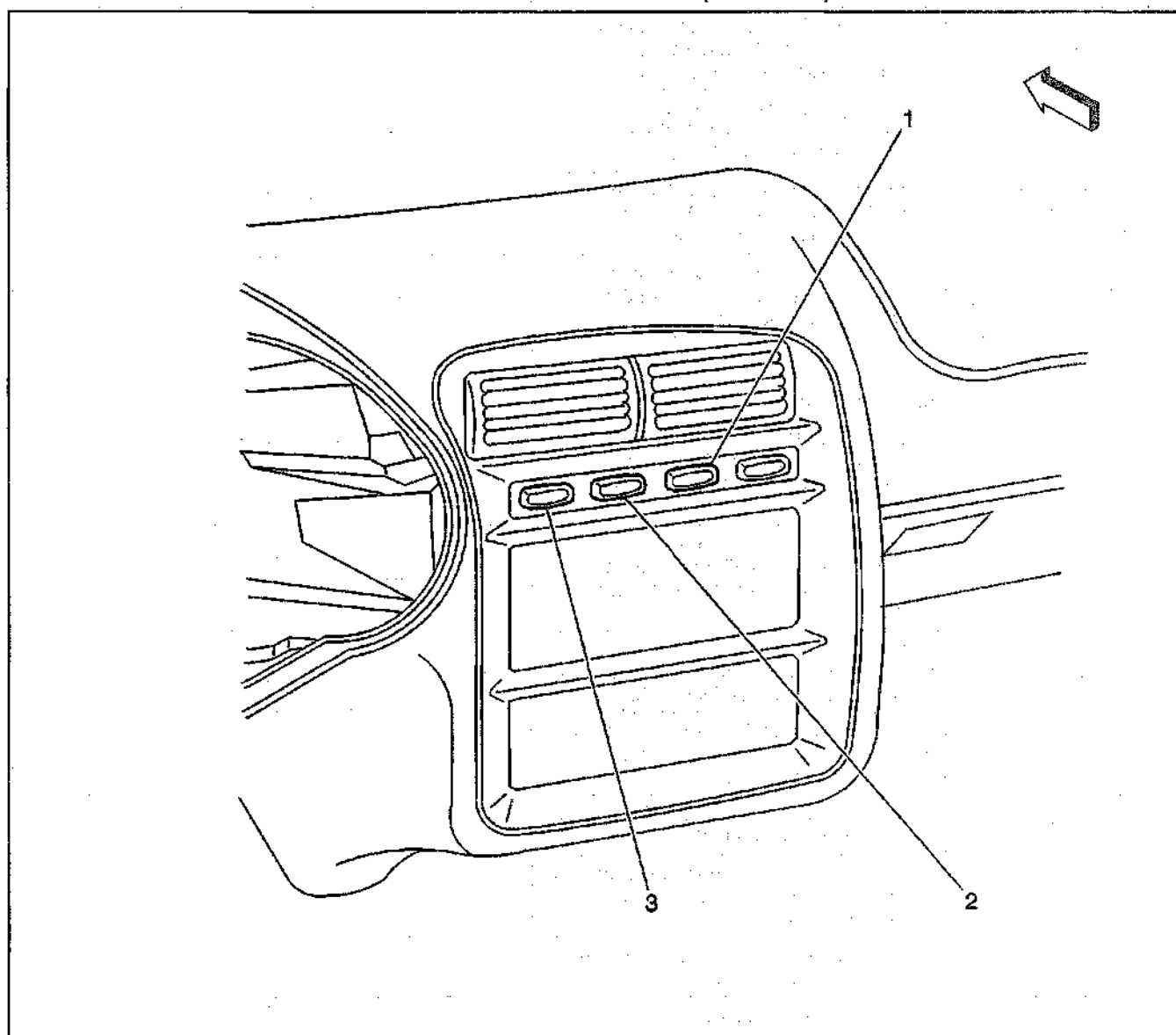
Name	Location	Locator View	Connector End View
C200B (18 cavities)	Forward lamp to IP harness, between the left kick panel and the steering column	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C200C (13 cavities)	Cross car to IP harness, between the left kick panel and the steering column	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C200D (48 cavities)	Part of the IP harness, between the left kick panel and the steering column	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C211 (8 cavities)	Forward lamp to traction control module jumper harness, under the left side of the IP, near the kick panel	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C212 (10 cavities)	Forward lamp to traction control module jumper harness, under the left side of the IP, near the kick panel	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C220 (10 cavities)	IP to engine harness, under the right side of the IP, behind the knee bolster	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C405B (16 cavities)	IP harness pass through connector, forward of the rear axle	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
C405C (4 cavities)	Rear wheel speed sensor jumper to the IP harness pass through connector, forward of the rear axle to the speed sensor	<i>Harness Routing Views in Wiring Systems</i>	<i>Inline Harness Connector End Views in Wiring Systems</i>
G100 (V6 VIN K)	On the lower right side of the engine, above the A/C compressor	<i>Harness Routing Views in Wiring Systems</i>	—
G100 (V8 VIN G)	On the lower right side of the engine, above the starter solenoid	<i>Harness Routing Views in Wiring Systems</i>	—
G101	In the engine compartment, attached to the front of the left wheelhouse	<i>Harness Routing Views in Wiring Systems</i>	—
G106	Attached to the top left side of the radiator support	<i>Harness Routing Views in Wiring Systems</i>	—
G110 (V6 VIN K)	In the front of the engine, bolted to the pulley above the A/C clutch connector	<i>Harness Routing Views in Wiring Systems</i>	—
G110 (V8 VIN G)	Attached to the rear of the left cylinder head	<i>Harness Routing Views in Wiring Systems</i>	—
P100	Left side in the dash panel, engine to the passenger compartment	<i>Harness Routing Views in Wiring Systems</i>	—
P110	Right side in the dash panel, engine to the passenger compartment	<i>Harness Routing Views in Wiring Systems</i>	—
S110 (V6 VIN K)	In the engine harness, approximately 4 cm (1.6 in) from the powertrain control module (PCM) breakout	—	—
S110 (V8 VIN G)	In the engine harness, main branch, approximately 20 cm (7.9 in) from the powertrain control module (PCM) breakout	—	—
S113	In the forward lamp harness approximately 7 cm (2.8 in) from the electronic throttle control (ETC) module/cruise control module breakout	—	—
S114 (V8 VIN G)	In the engine harness, approximately 17 cm (6.7 in) back from the A/C compressor clutch breakout	—	—
S115 (V6 VIN K)	In the engine harness at the generator breakout	—	—

ABS Components (cont'd)

Name	Location	Locator View	Connector End View
S116 (V8 VIN G)	In the engine harness, approximately 9 cm (3.5 in) from the manifold absolute pressure (MAP) sensor breakout	—	—
S118 (V8 VIN G)	In the engine harness, approximately 15 cm (6 in) from the manifold absolute pressure (MAP) sensor breakout	—	—
S119 (V8 VIN G) (Automatic Transmission)	In the engine harness, main branch, approximately 8 cm (3.1 in) from the automatic transmission breakout	—	—
S119 (V8 VIN G) (Manual Transmission)	In the engine harness, main branch, approximately 9 cm (3.5 in) from the vehicle speed sensor breakout	—	—
S121 (V6 VIN K)	In the engine harness, main branch, approximately 8 cm (3.1 in) from the powertrain control module (PCM) breakout	—	—
S154 (Chevrolet)	In the forward lamp harness, approximately 7 cm (2.8 in) from the C120 (left front wheel speed sensor) breakout	—	—
S154 (Pontiac)	In the forward lamp harness, approximately 13 cm (5.1 in) from the C120 (left front wheel speed sensor) breakout	—	—
S181	In the forward lamp harness, approximately 20 cm (8 in) from the engine wiring harness junction block 1 breakout	—	—
S203	In the forward lamp harness, main branch, approximately 4 cm (1.6 in) from the ignition switch breakout	—	—
S204	In the forward lamp harness, main branch, at the ignition switch breakout	—	—
S205	In the forward lamp harness, main branch, approximately 4 cm (1.5 in) from the ignition switch breakout	—	—
S206	In the IP harness, at the rear compartment lid release relay breakout	—	—
S207	In the IP harness, main branch, approximately 4 cm (1.6 in) from the data link connector (DLC) breakout	—	—
S209	In the forward lamp harness, main branch, approximately 11 cm (4.3 in) from the ignition switch breakout	—	—
S215	In the IP harness, main branch, approximately 11 cm (4 in) from the antenna cable breakout	—	—
S216	In the IP harness, main branch, approximately 10 cm (4 in) from the instrument cluster breakout	—	—

ABS Component Views

Center of Instrument Panel (Chevrolet)

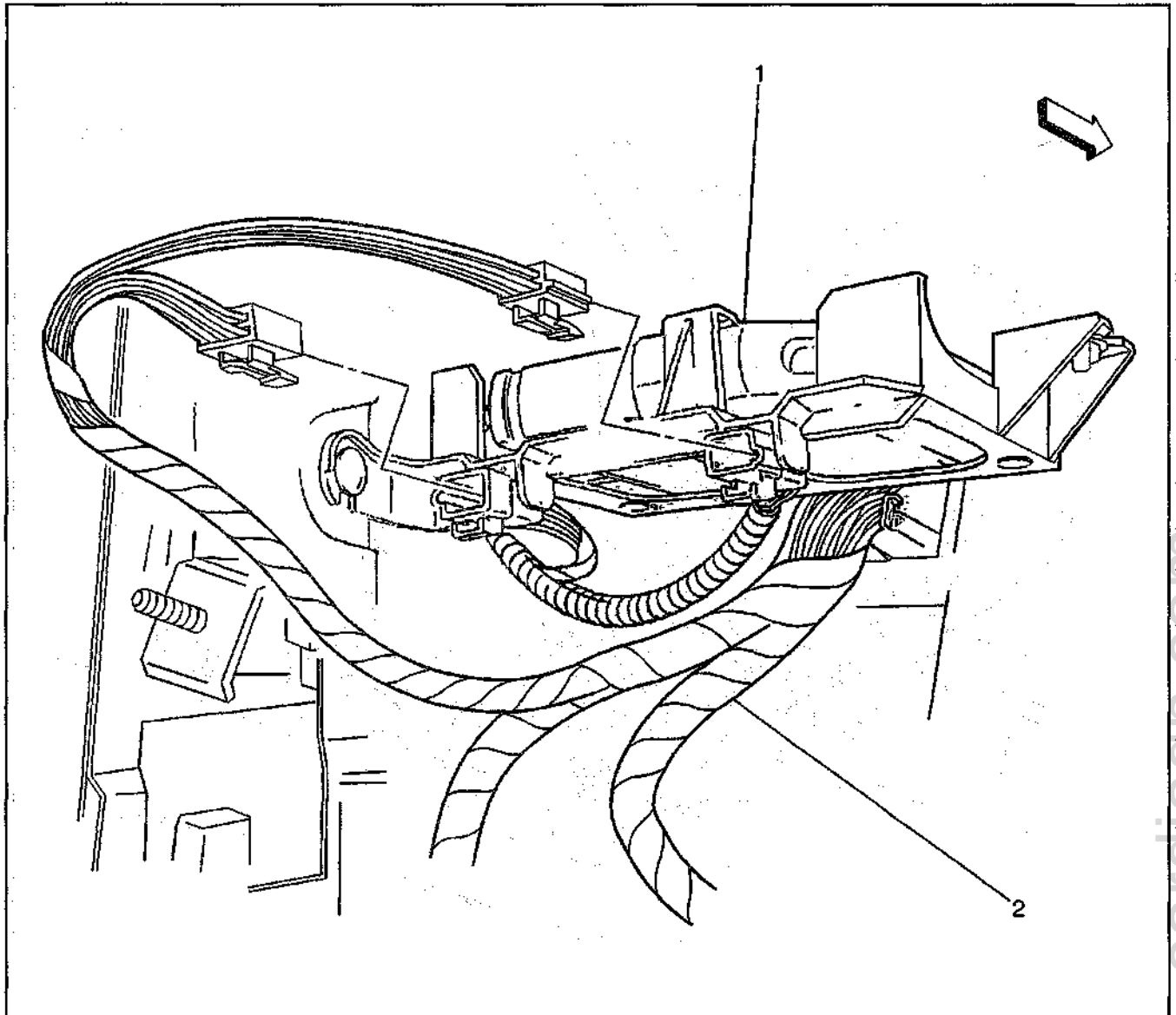


374362

Legend

- | | |
|--|---|
| (1) Rear Fog Lamp Switch (Export) | (3) Second Gear Start Switch or Fog Lamp Switch |
| (2) Second Gear Start Switch or Traction Control Switch or Rear Fog Lamp Switch (Export) | |

Behind the Lower Left Side of the Instrument Panel



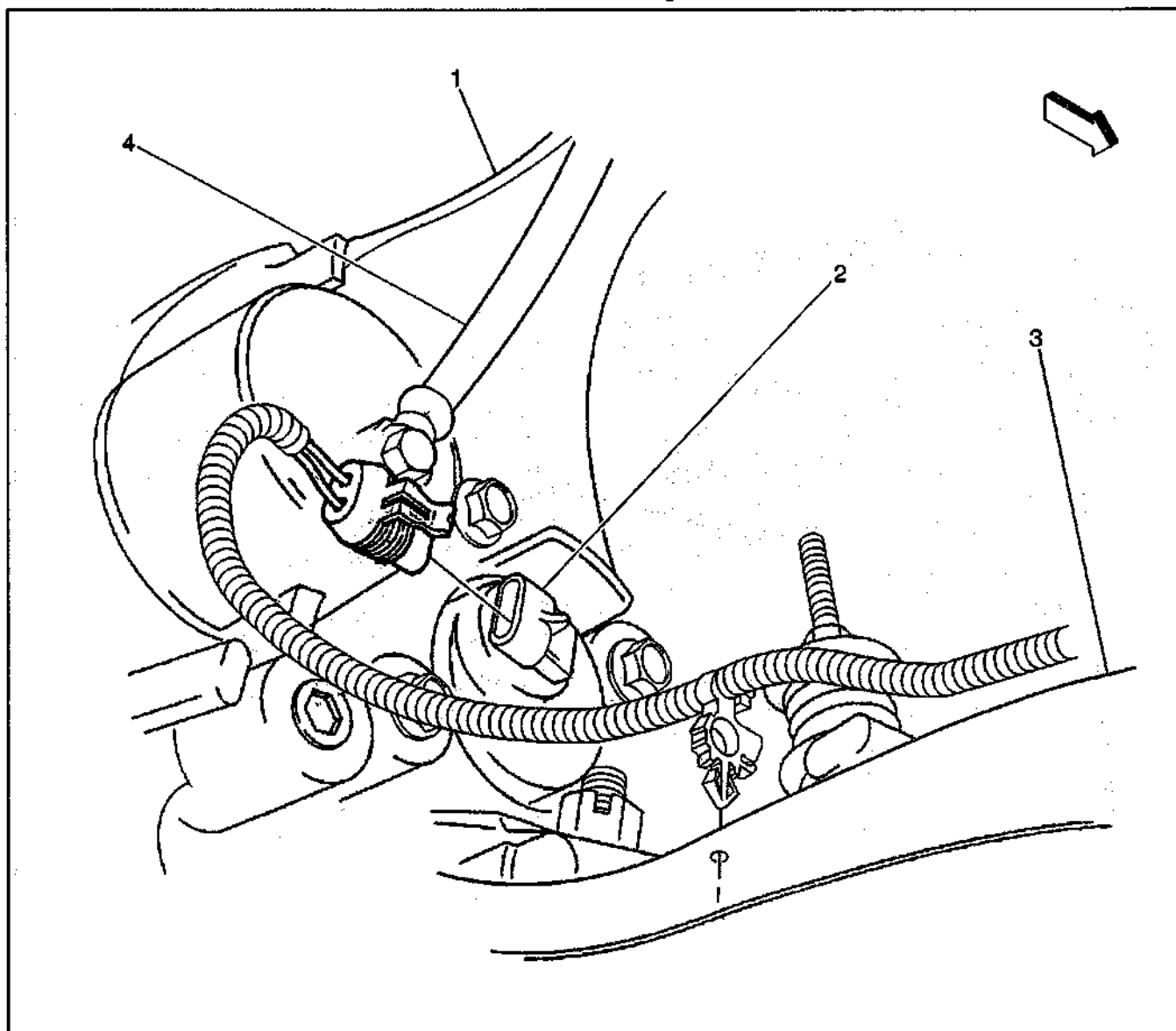
374363

Legend

(1) Accelerator and Servo Control Module

(2) Forward Lamp Wiring Harness

Inside of Left Steering Knuckle



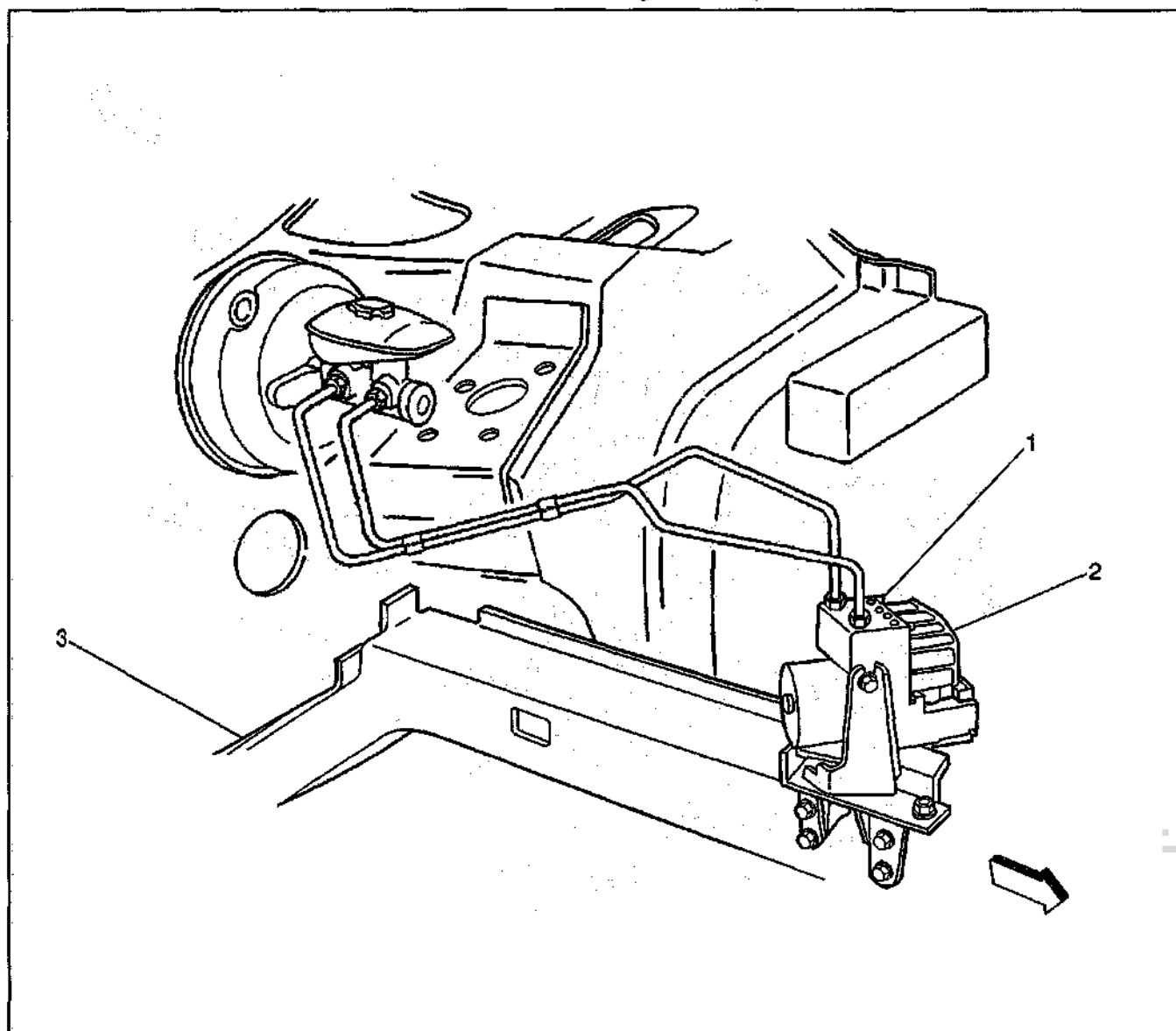
374393

Legend

- (1) Front Wheel
- (2) Left Front Wheel Speed Sensor
(Right side similar)

- (3) Lower Control Arm
- (4) Brake Line

Lower Left Front of the Engine Compartment



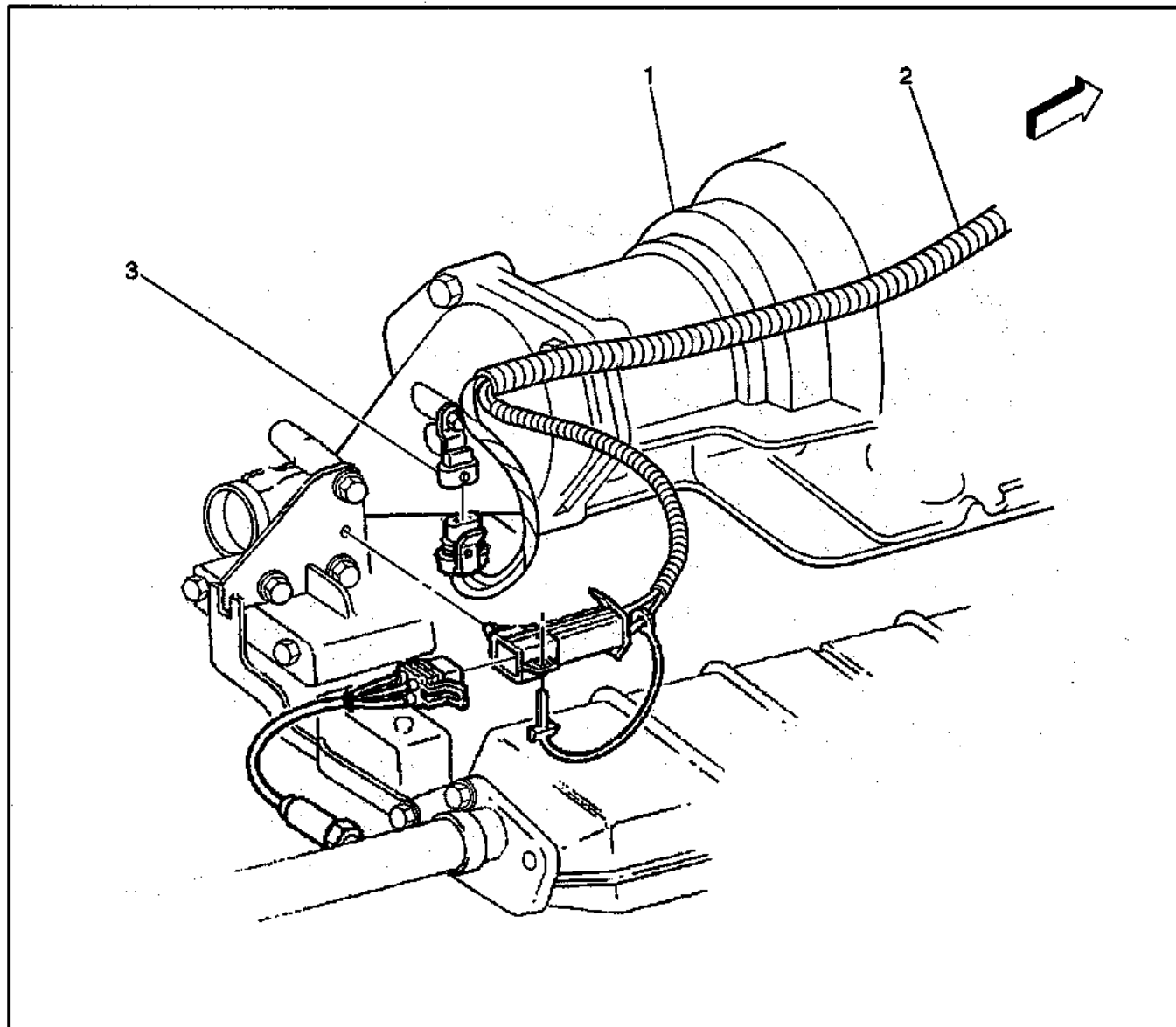
374373

Legend

- (1) Brake Pressure Modulator Valve (BPMV)
- (2) Electronic Brake Control Module (EBCM)

- (3) Left Front Frame Rail

Right Side of the Automatic Transmission (V6 VIN K M30)



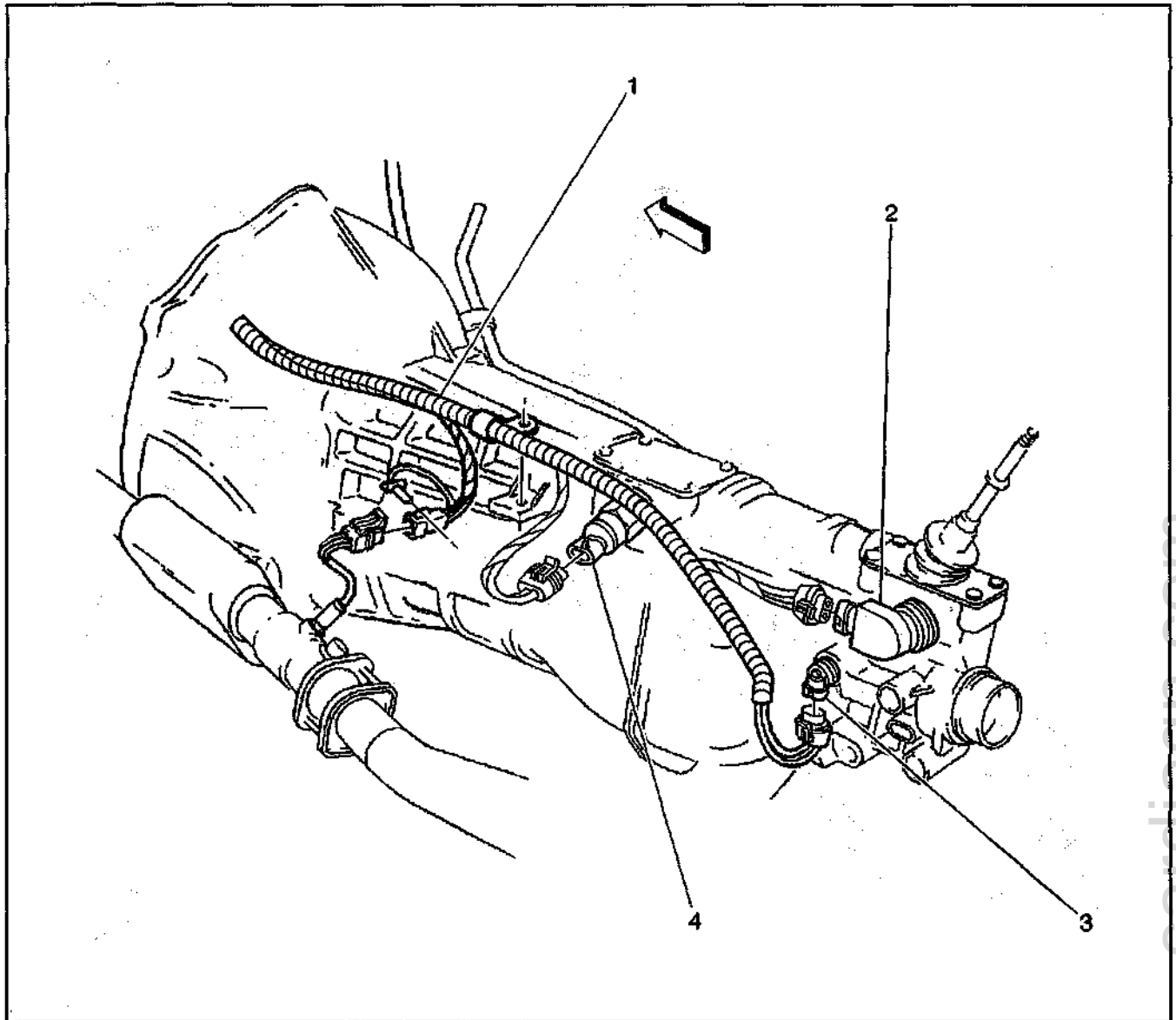
374368

Legend

- (1) Automatic Transmission
- (2) Engine Wiring Harness

- (3) Vehicle Speed Sensor

Left Side of the Manual Transmission



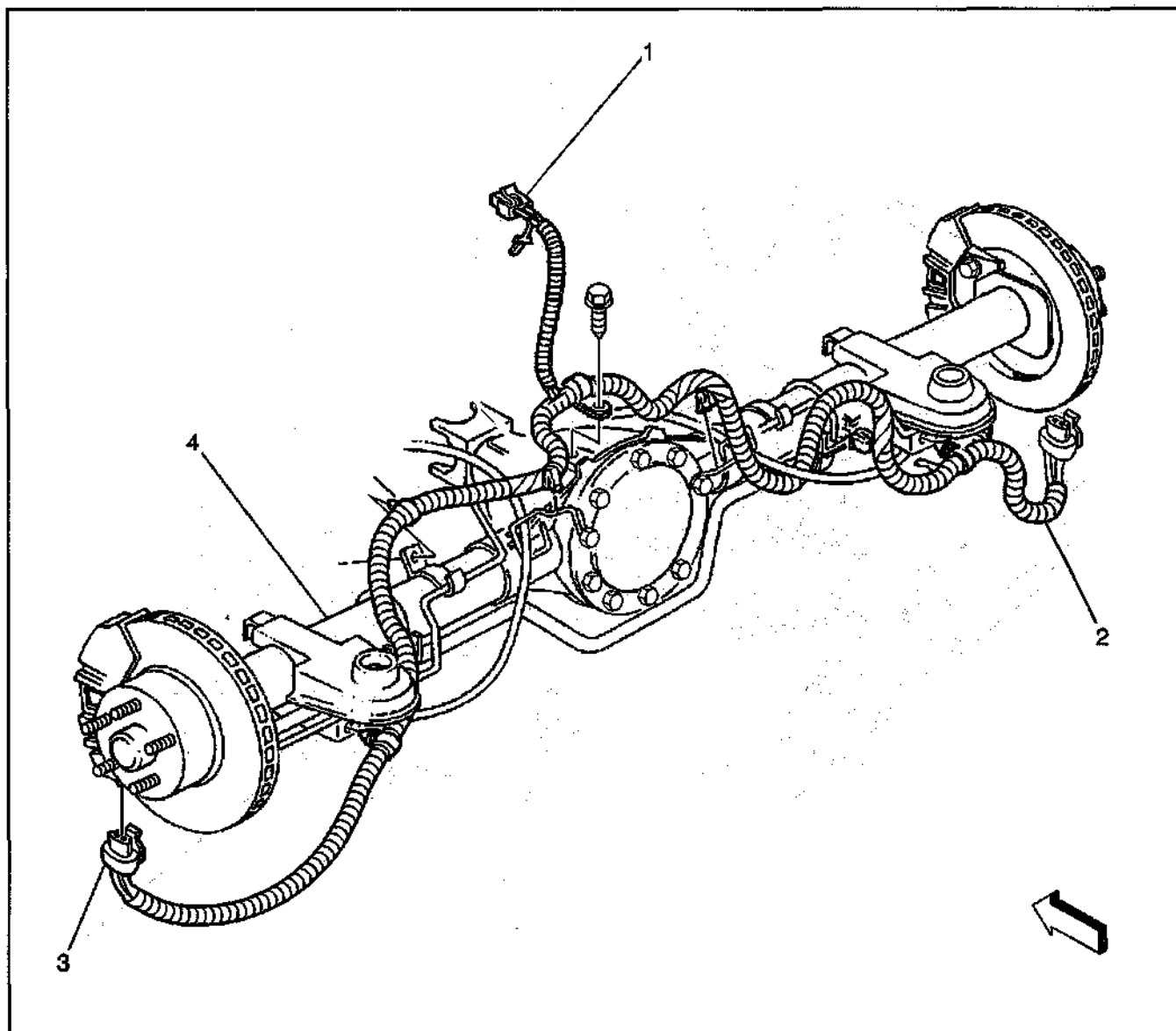
374377

Legend

- (1) Engine Wiring Harness
- (2) Reverse Lockout Solenoid

- (3) Vehicle Speed Sensor
- (4) Skip Shift Solenoid

Rear Wheel Speed Sensor (V8 VIN G With Traction Control)



374381

Legend

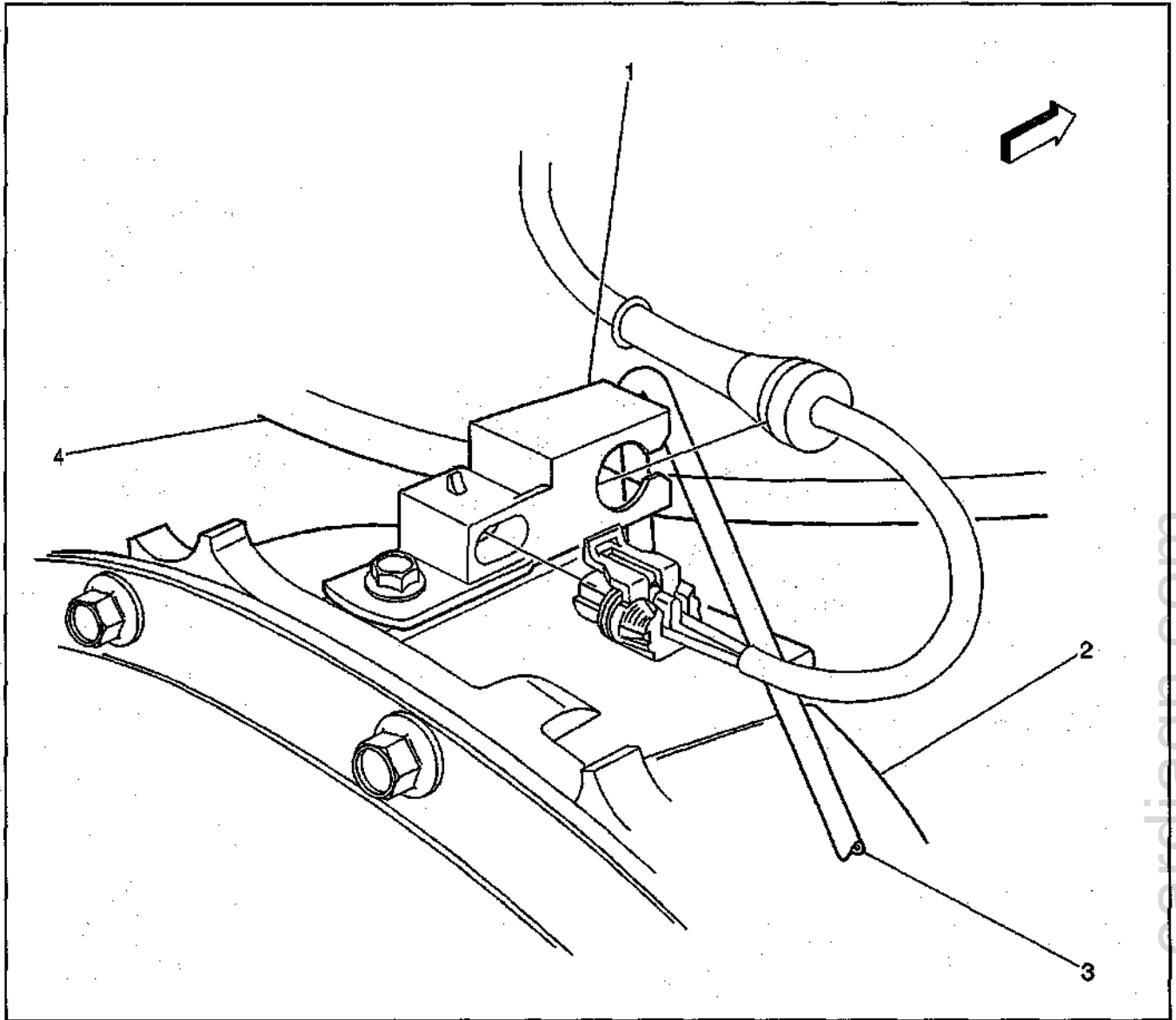
(1) Rear Wheel Speed Sensor Jumper Wiring Harness

(2) Right Rear Wheel Speed Sensor

(3) Left Rear Wheel Speed Sensor

(4) Rear Axle

Rear Wheel Speed Sensor (V8 VIN G Without Traction Control and V6 VINK)



374386

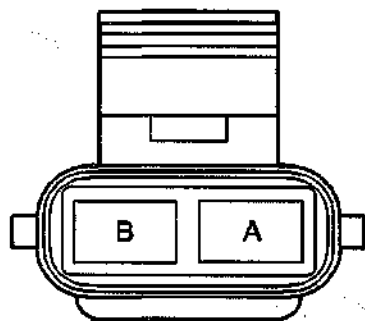
Legend

- (1) Rear Wheel Speed Sensor
- (2) Rear Axle

- (3) Brake Line
- (4) Park Brake Cable

ABS Connector End Views

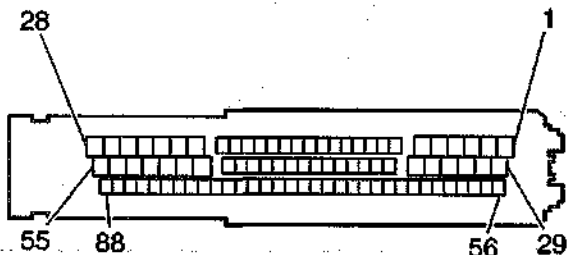
Accelerator Control and Adjuster



68721

Connector Part Information		• 1530-0027 • 2 Way F Metri-Pack 280 Series (BLK)	
Pin	Wire Color	Circuit No.	Function
A	WHT	560	Accelerator control and adjuster feed
B	GRY	561	Accelerator control and adjuster return

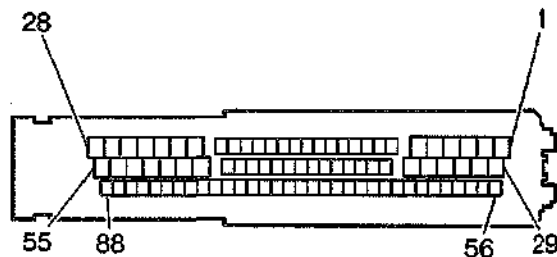
Accelerator and Servo Control Module (ASM)



235270

Connector Part Information		• 1218-6485 • 55 Way F (NAT)	
Pin	Wire Color	Circuit No.	Function
1	PNK	739	Fused ignition feed
2-21	—	—	Not used
22	WHT	560	Accelerator control and adjuster feed
23	—	—	Not used
24	ORN	1540	Fused battery feed

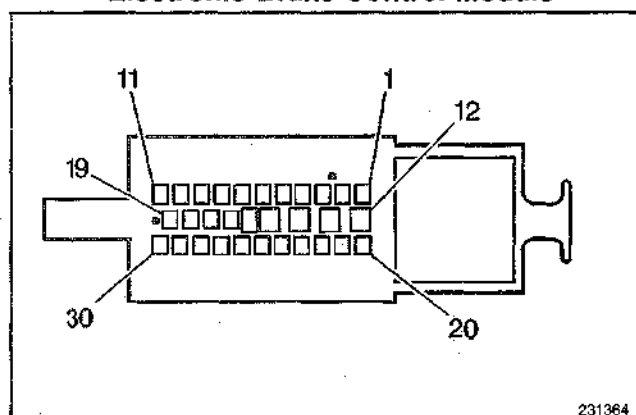
Accelerator and Servo Control Module (ASM) (cont'd)



235270

Connector Part Information		• 1218-6485 • 55 Way F (NAT)	
Pin	Wire Color	Circuit No.	Function
25	—	—	Not used
26	GRY	561	Accelerator control and adjuster return
27	—	—	Not used
28	BLK/WHT	151	Ground
29-34	—	—	Not used
35	TAN/BLK	464	Delivered TP position output
36	—	—	Not used
37	ORN/BLK	463	Requested TP position input
38-39	—	—	Not used
40	DK BLU	417	Throttle position sensor signal
41	GRY/BLK	596	Throttle position sensor 5 volt reference
42	—	—	Not used
43	BLK	452	Throttle position sensor ground
44-48	—	—	Not used
49	WHT	560	Accelerator control and adjuster feed
50	—	—	Not used
51	ORN	1540	Fused battery feed
52	—	—	Not used
53	GRY	561	Accelerator control and adjuster return
54	—	—	Not used
55	BLK/WHT	151	Ground
56-88	—	—	Not used

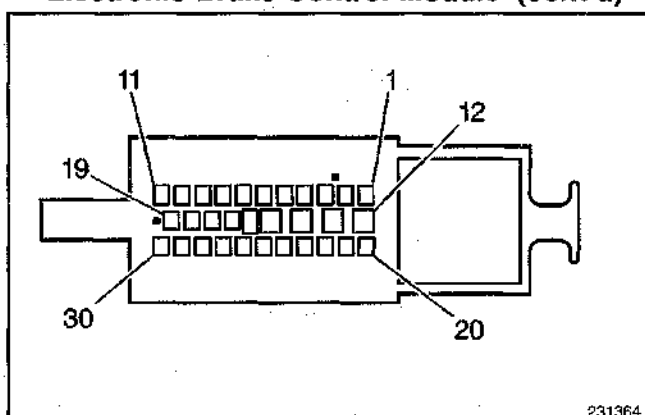
Electronic Brake Control Module



231364

Connector Part Information		• 1532-6390 • 30 Way F GT 150 Series Sealed (BLK)	
Pin	Wire Color	Circuit No.	Function
1	BRN	882	Right rear wheel speed sensor signal (LS1 with NW9)
2	—	—	Not used
3	DK GRN	872	Right front wheel speed sensor signal (LS1 without NW9 and L36)
3	WHT	883	Right rear wheel speed sensor return
4	DK GRN	872	Right front wheel speed sensor signal (LS1 with NW9)
5	TAN	833	Right front wheel speed sensor return
6	LT BLU	20	Stop lamp feed
7	—	—	Not used
8	PNK	739	Fused ignition feed
9	TAN/BLK	464	Delivered torque input (with NW9)
10	—	—	Not used
11	WHT	121	Tachometer input (with NW9)
12	BLK	150	Ground
13	RED	302	Fused battery feed
14	ORN	440	Fused battery feed
15	BLK	651	Ground
16	—	—	Not used

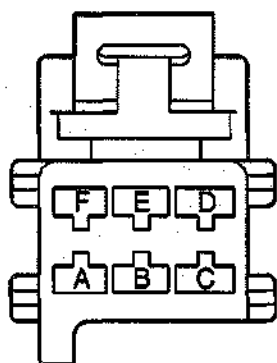
Electronic Brake Control Module (cont'd)



231364

Connector Part Information		• 1532-6390 • 30 Way F GT 150 Series Sealed (BLK)	
Pin	Wire Color	Circuit No.	Function
17	BRN/WHT	1571	Traction control switch signal (with NW9)
18	PPL/WHT	1572	Traction control lamp control
19	GRY/BLK	1687	TCS spark retard signal (LS1 with NW9)
20	LT BLU	830	Left front wheel speed sensor signal
21	YEL	873	Left front wheel speed sensor return
22	BLK	884	Rear wheel speed sensor signal (LS1 without NW9 and L36)
22	BLK	884	Left rear wheel speed sensor signal (LS1 with NW9)
23	RED	885	Rear wheel speed sensor return (LS1 without NW9 and L36)
23	RED	885	Left rear wheel speed sensor signal (LS1 with NW9)
24	—	—	Not used
25	LT BLU	1122	Class 2 serial data
26	—	—	Not used
27	ORN/BLK	463	Requested torque input (with NW9)
28-30	—	—	Not used

Traction Control Switch



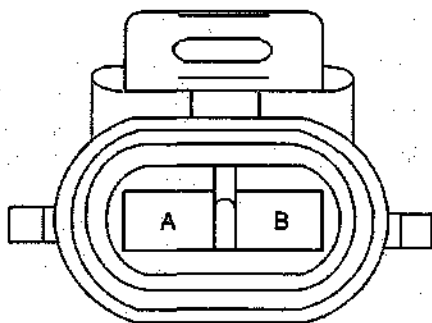
304345

Connector Part Information

- 1217-7195
- 6 Way F Metri-Pack 150 Series (BLK)

Pin	Wire Color	Circuit No.	Function
A	PPL/WHT	1572	Traction control lamp control
B	BRN	141	Fused ignition feed
C	GRY	8	Switch illumination lamp feed
D	—	—	Not used
E	BRN/WHT	1571	Traction control switch signal
F	BLK/WHT	451	Ground

Wheel Speed Sensor, Left Front



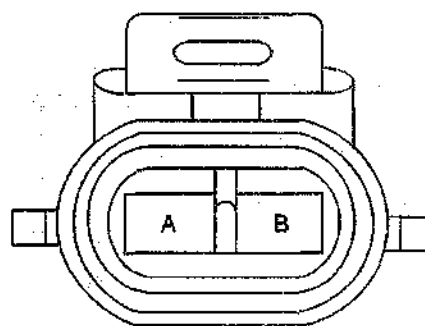
35437

Connector Part Information

- 1205-2644
- 2 Way F Metri-Pack 150 Sealed (GRY)

Pin	Wire Color	Circuit No.	Function
A	YEL	873	Left Front Wheel Speed Sensor Signal - Low
B	LT BLU	830	Left Front Wheel Speed Sensor Signal - High

Wheel Speed Sensor, Left Rear (With NW9)



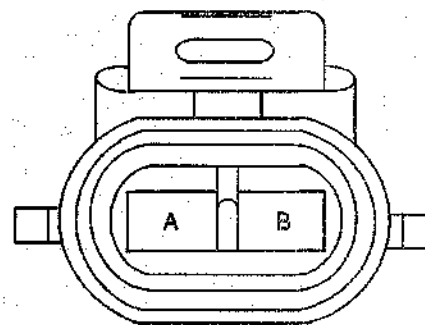
35437

Connector Part Information

- 1205-2644
- 2 Way F Metri-Pack 150 Sealed (GRY)

Pin	Wire Color	Circuit No.	Function
A	RED	885	Left Rear Wheel Speed Sensor Signal - Low
B	BLK	884	Left Rear Wheel Speed Sensor Signal - High

Wheel Speed Sensor, Right Front



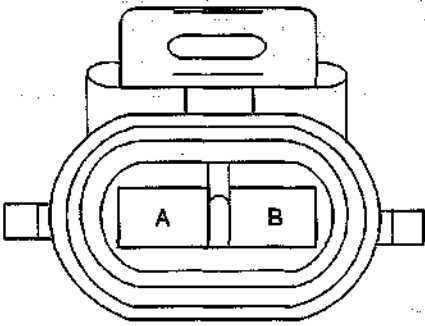
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Connector Part Information

- 1205-2644
- 2 Way F Metri-Pack 150 Sealed (GRY)

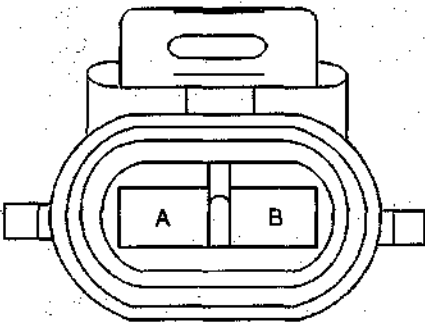
Pin	Wire Color	Circuit No.	Function
A	YEL	833	Right Front Wheel Speed Sensor Signal - Low
B	LT BLU	872	Right Front Wheel Speed Sensor Signal - High

Wheel Speed Sensor, Right Rear (With NW9)



Connector Part Information		• 1205-2644 • 2 Way F Metri-Pack 150 Sealed (GRY)	
Pin	Wire Color	Circuit No.	Function
A	WHT	883	Right Rear Wheel Speed Sensor Signal - Low
B	BRN	882	Right Rear Wheel Speed Sensor Signal - High

Wheel Speed Sensor, Rear (Without NW9)



Connector Part Information		• 1205-2644 • 2 Way F Metri-Pack 150 Sealed (LT GRY)	
Pin	Wire Color	Circuit No.	Function
A	BLK	884	Rear Wheel Speed Sensor Signal - High
B	WHT	885	Rear Wheel Speed Sensor Signal - Low

Diagnostic Information and Procedures

A Diagnostic Starting Point

Begin the system diagnosis with the *A Diagnostic System Check - ABS*. The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system.
- The ability of the control module(s) 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.

Scan Tool Diagnostics

Plug the scan tool into the Data Link Connector (DLC). The scan tool becomes part of the vehicle's electronic system. The scan tool performs the following functions:

- Display ABS/TCS data
- Display diagnostic trouble codes
- Clear ABS/TCS diagnostic trouble codes
- Control ABS/TCS components
- Perform extensive ABS/TCS diagnosis
- Provide diagnostic testing for intermittent ABS/TCS conditions

Each test mode has specific diagnostic capabilities which depend upon various keystrokes.

The keys on the scan tool perform the following functions:

- Select operating modes
- Perform functions within an operating mode
- Enter DTC designations
- Enter model year designations

Refer to *Enhanced Diagnostics* for more scan tool diagnostic information.

Scan Tool Data List

The EBCM Scan Tool Data Lists contain all the antilock brake system related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The column, 'Data List,' indicates the location of the parameter within the scan tool menu selections.

Use the EBCM Scan Tool Data Lists as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all the diagnostic procedures with the ABS Diagnostic Starting Point. Use the EBCM Scan Tool Data Lists only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- OR
- The DTC or symptom diagnostic procedure indicated by the diagnostic system check does not resolve the customer concern.

The Typical Data Values are obtained from a properly operating vehicle under the conditions specified in the first row of the Scan Tool Data List table. Comparison of the parameter values from the suspect vehicle with the Typical Data Values may reveal the source of the customer concern.

The ID Information menu is located on the EBCM main screen.

EBCM Scan Tool Data List

Ignition is ON, engine OFF, and vehicle is stationary

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Brake Switch Status	ABS	Applied/Released	Released
EBCM to PCM Requested Torque	TCS	%	90
Engine Speed	ABS/TCS	RPM	0
Left Front Wheel Speed	ABS/TCS	km/h or mph	0
Left Rear Wheel Speed	ABS/TCS	km/h or mph	0
Pump Monitor State	ABS	On/Off	Off
Right Front Wheel Speed	ABS/TCS	km/h or mph	0
Right Rear Wheel Speed	ABS/TCS	km/h or mph	0
Rear Wheel Speed	ABS/TCS	Km/h or mph	0
TCS State	ABS/TCS	Active/Inactive	Inactive
TCS Status	ABS/TCS	Inable/Disable	Inable
TCS Switch State	TCS	On/Off	Off
Throttle Angle	ABS/TCS	%	0
Valve Relay State	ABS/TCS	On/Off	Off
Vehicle Speed	ABS/TCS	km/h or mph	0

Scan Tool Data Definitions

The ABS Scan Tool Data Definitions contain a brief description of all the ABS/traction scan tool parameters. This list is in alphanumeric order.

Brake Switch Status: The scan tool displays Applied or Released - The scan tool displays the state of the brake switch.

Engine Speed: The scan tool displays 0–10200 RPM - This is essentially a digital tachometer display.

LF Wheel Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the actual speed of the left front wheel.

LR Wheel Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the actual speed of the left rear wheel.

Pump Monitor State: The scan tool displays On or Off - This parameter indicates the state of the return pump relay.

Rear Wheel Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the actual speed of the rear wheels.

RF Wheel Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the actual speed of the right front wheel.

RR Wheel Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the actual speed of the right rear wheel.

TCS State: The scan tool displays Active or Inactive - This parameter indicates if the TCS is currently in a TCS event or not.

TCS Status: The scan tool displays Inable or Disable - The parameter indicates the state of the TCS based on if the operator has disabled TCS by pressing the TCS On/Off switch, or if the TCS is disabled because of a malfunction.

TCS Switch State: The scan tool displays On or Off - This parameter indicates the state of the traction control switch.

Throttle Angle: The scan tool displays % - The scan tool displays in percent of throttle open.

Valve Relay State: The scan tool displays On or Off - This parameter indicates the state of the valve relay.

Vehicle Speed: The scan tool displays 0–255 km/h or 0–158 mph - The scan tool displays the vehicle speed.

Diagnostic Trouble Code (DTC) List/Type

DTC/Description	Type	Illuminate Indicator or Turn ON DIC Message
DTC C0035 LF Wheel Speed Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0036 LF Wheel Speed Circuit Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0040 RF Wheel Speed Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0041 RF Wheel Speed Circuit Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0045 LR Wheel Speed Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0046 LR Wheel Speed Circuit Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0050 RR Wheel Speed Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0051 RR Wheel Speed Circuit Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0055 Rear Wheel Speed Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0056 Rear Wheel Speed CKT Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0060 LF ABS Solenoid #1 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0065 LF ABS Solenoid #2 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0070 RF ABS Solenoid #1 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0075 RF ABS Solenoid #2 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0080 LR ABS Solenoid #1 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0085 LR ABS Solenoid #2 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0090 RR ABS Solenoid #1 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0095 RR ABS Solenoid #2 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0100 Rear ABS Solenoid #1 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0105 Rear ABS Solenoid #2 Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0110 Pump Motor Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0121 Valve Relay Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0161 ABS/TCS Brake Switch Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0166 TCS Priming Line Valve CKT Malfunction	ABS	ABS/TCS/BRAKE
DTC C0171 TCS Pilot Valve Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0181 Throttle Reduction Motor CKT Malfunction	ABS	ABS/TCS/BRAKE
DTC C0182 Throttle Reduction Motor CKT Range Perf	ABS	ABS/TCS/BRAKE
DTC C0236 TCS RPM Signal Circuit Malfunction	ABS	ABS/TCS/BRAKE
DTC C0237 TCS Throttle Position Signal Malfunction	ABS	ABS/TCS/BRAKE
DTC C0238 TCS TP Sensor Comparison Malfunction	ABS	ABS/TCS/BRAKE
DTC C0239 TCS Spark Retard Monitoring Malfunction	ABS	ABS/TCS/BRAKE
DTC C0240 PCM Traction Control Not Allowed	ABS	ABS/TCS/BRAKE
DTC C0241 PCM Indicated Requested Torque Malf	ABS	ABS/TCS/BRAKE
DTC C0244 PWM Delivered Torque Malfunction	ABS	ABS/TCS/BRAKE
DTC C0245 Wheel Speed Sensor Frequency Error	ABS	ABS/TCS/BRAKE
DTC C0266 ADS Controller Malfunction	ABS	ABS/TCS/BRAKE
DTC C0550 ECU Malfunction	ABS	ABS/TCS/BRAKE
DTC C0896 Device Voltage Range/Performance	ABS	ABS/TCS/BRAKE
DTC C0901 Device #2 Voltage Low	ABS	ABS/TCS/BRAKE
DTC U1000 and DTC U1255 Class 2 Communication Malfunction	ABS	ABS/TC/BRAKE
DTC U1300 Class 2 Data Link Low	ABS	ABS/TC
DTC U1301 Class 2 Data Link High	ABS	ABS/TC

Self-Diagnostics

The EBCM/EBTCM performs system self-diagnostics, and can detect and often isolate system malfunctions. When a malfunction is detected the EBCM/EBTCM sets a Diagnostic Trouble Code (DTC). The DTC represents the malfunction, and may turn on the Antilock Indicator, Red BRAKE Warning Indicator, and Traction Control indicators (if equipped), and may disable the ABS/TCS functions as necessary for the duration of the ignition cycle.

Initialization Sequence

The EBCM/EBTCM performs the Initialization test once each ignition cycle, when the vehicle speed reaches 6 Km/h (4 mph) and the EBCM/EBTCM does not see a brake switch input, if the EBCM/EBTCM sees a brake switch input the initialization test runs when the vehicle speed reaches 15 Km/h (9 mph). The Initialization sequence cycles each valve solenoid and the pump motor (as well as the necessary relays) to check component operation. If any error is detected, the EBCM/EBTCM will set a DTC. The Initialization sequence may be heard and felt while it is taking place, and is considered part of normal operation.

Enhanced Diagnostics

Enhanced diagnostic information is found in the DTC HISTORY function of the scan tool. Enhanced diagnostic information provides the service technician with specific malfunction occurrence information. The following occurs for each of the first five diagnostic trouble codes stored and the very last diagnostic trouble code stored:

- Data is stored to identify the specific DTC
- The number of diagnostic trouble code occurrences are stored
- The number of drive cycles since the malfunction first and last occurred are stored. A drive cycle occurs when the ignition is turned to ON.
- The drive cycle counter will increment by turning the ignition to ON and OFF if a malfunction is present.
- The first five diagnostic trouble codes are stored in the order of occurrence. The order of the first five diagnostic trouble codes are used to determine if a previous malfunction is linked to the most recent malfunction, such as an intermittent wheel speed sensor which later becomes completely open.

In difficult diagnostic situations use the above information to identify malfunction occurrence trends.

- Did the malfunction only occur once over a large number of drive cycles, indicating an unusual condition present when it occurred?
- Does the malfunction occur infrequently over a large number of drive cycles, indicating that special diagnostic techniques may be required to identify the source of the malfunction?

Review the following malfunction example:

- A malfunction occurred 1 out of 50 drive cycles
- This malfunction is intermittent and has not recurred for 49 drive cycles
- A malfunction of this type is difficult or impossible to duplicate
- The malfunction may have been caused by a severe vehicle impact such as a large pot hole or speed bump at high speed, etc.
- A severe vehicle impact can momentarily open an electrical connector
- A severe vehicle impact can cause unusual vehicle suspension movement
- A malfunction resolution is unlikely
- The malfunction may never recur
- Check the diagnostic aids provided for that DTC

Review the following examples:

- A malfunction occurred 3 out of 15 drive cycles
- The odds of finding the cause are not good
- However, the occurrence rate is known
- A malfunction occurred 10 out of 20 drive cycles
- The odds of finding the cause of the malfunction are good
- The malfunction may be easily reproduced

A malfunction that occurs more frequently increases the odds of finding the cause of the malfunction.

Use the additional malfunction data to determine if a malfunction is randomly intermittent. Use the additional malfunction data to determine if it has not recurred for long periods of time due to whether changes or a repair prior to this visit.

Review the following example:

- A DTC occurred 10 of 20 drive cycles, but has not recurred for 10 drive cycles
- This means a malfunction occurred 10 of 10 driver cycles, but has not reoccurred since.
- A significant environment change or a repair may have occurred 10 drive cycles ago
- If customer information confirms a recent repair, repair may not be necessary.
- If no repair was made, focus on diagnosis techniques used to locate difficult-to-recreate problems.

Electromagnetic Interference

Due to the sensitivity of electronics to Electromagnetic Interference (EMI), the following checks should be performed if an intermittent malfunction is suspected.

1. Check for proper installation of wiring harnesses resulting from add-on options.
2. Check for proper routing of front wheel speed sensor wiring near spark plug wires.

A Diagnostic System Check - ABS

Circuit Description

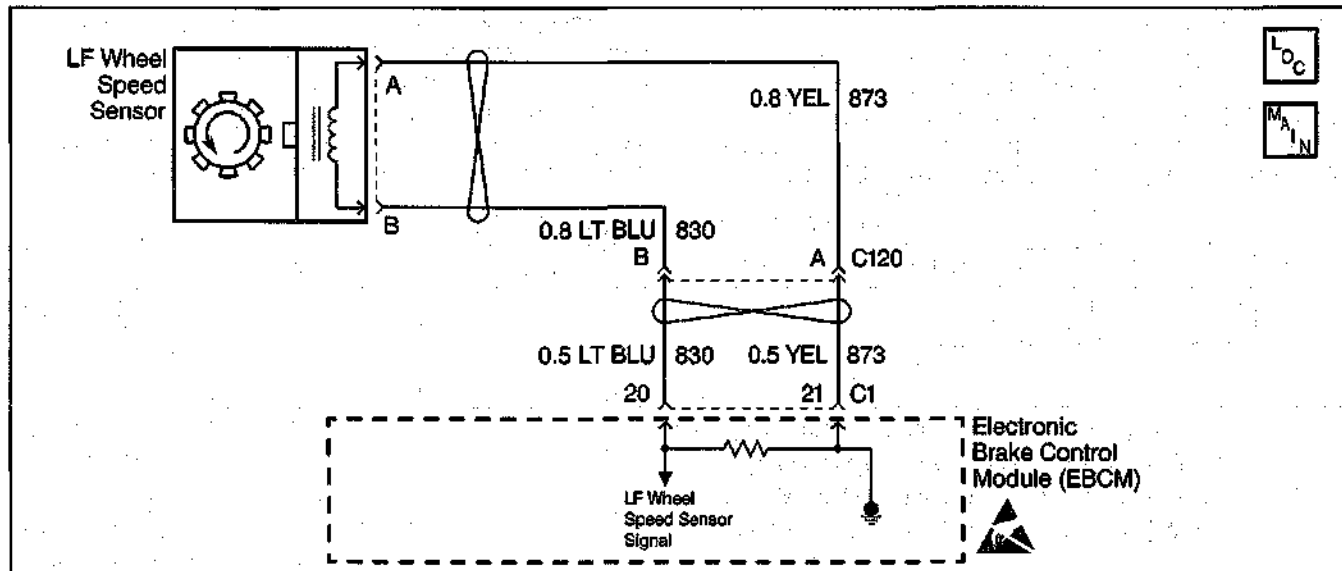
The ABS Diagnostic System Check is an organized approach to identify problems associated with the EBCM. This check must be the starting point for any EBCM complaint, and will direct you to the next logical step in diagnosing the complaint. The EBCM is a

very reliable component and is not likely the cause of the malfunction. Most system complaints are linked to faulty wiring, connectors, and occasionally to components. Understanding the ABS system and using the tables correctly will reduce diagnostic time and prevent unnecessary parts replacement.

A Diagnostic System Check - ABS

Step	Action	Value(s)	Yes	No
1	Install a scan tool. Does the scan tool power up?	—	Go to Step 2	Go to Scan Tool Does Not Power Up In Data Link Communications
2	1. Reconnect all previously disconnected components. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to establish communications with the EBCM. Does the scan tool communicate with the EBCM?	—	Go to Step 3	Go to Scan Tool Does Not Communicate w/Class 2 Data Line In Data Link Communications
3	1. With the scan tool, in ABS/TCS Special Functions in order to run the Automated Test. 2. Select the ABS/TCS display DTC function on the scan tool. Does the scan tool display any DTCs?	—	Go to Step 4	Go to Symptoms
4	Does the scan tool display any DTCs which begin with a U (i.e. DTC U1016, U1000 or U1300, U1301)?	—	Go to Scan Tool Does Not Communicate w/Class 2 Data Line	Go to Diagnostic Trouble Code (DTC) List/Type For The Applicable DTC

DTC C0035 LF Wheel Speed Circuit Malfunction



519697

Circuit Description

The speed sensor used on this vehicle is a multiple pole magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

The DTC can be set any time the ignition is in the RUN position and the EBCM detects an open or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator could turn on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.

2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
3. If the DTC returns, replace the suspected harness.

- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Front Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the front wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

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

6. This step checks for an open in the WSS or WSS CKT.
13. Checks for a short to voltage in the WSS CKT.
15. Checks for a short to voltage in the WSS CKT.

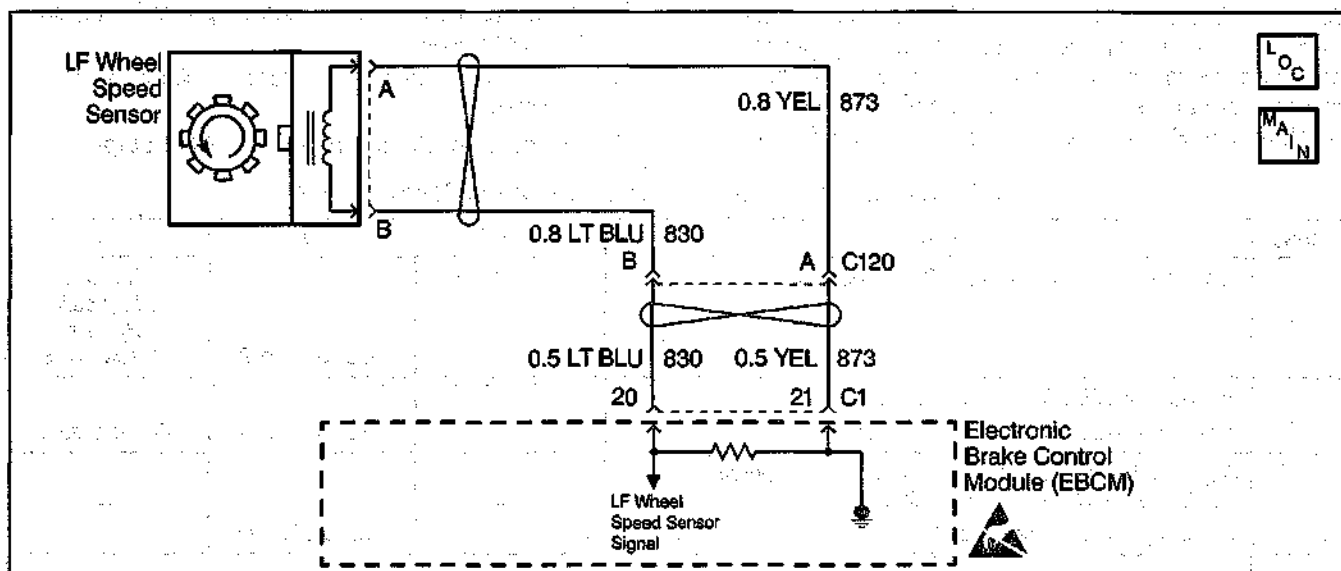
DTC C0035 LF Wheel Speed Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (Front)</i> in Front Suspension. Is the replacement complete?	—	Go to Step 18	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the replacement complete?	—	Go to Step 18	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 20 and 21 of J 39700. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 13	Go to Step 7
7	1. Disconnect the Wheel Speed Sensor. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the Wheel Speed Sensor Connector. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between terminal 20 of J 39700 and terminal B of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0–5 Ω	Go to Step 10	Go to Step 9
9	Repair CKT 830 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 18	—
10	Using J 39200 DMM, measure the resistance between terminal 21 of J 39700 and terminal A of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0–5 Ω	Go to Step 12	Go to Step 11
11	Repair CKT 873 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 18	—

DTC C0035 LF Wheel Speed Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 18	—
13	1. Disconnect the Wheel Speed Sensor. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at terminal 20 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 14	Go to Step 15
14	Repair CKT 830 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 18	—
15	Using J 39200 DMM, measure the voltage at terminal 21 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 16	Go to Step 17
16	Repair CKT 873 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 18	—
17	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
18	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0036 LF Wheel Speed Circuit Range/Performance



519697

Circuit Description

The speed sensor used on this vehicle is a multiple pole magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The DTC will set if one wheel speed = 0 and the other WSS are greater than 40 km/h (25 mph) for 10 ms, or if the EBCM detects a short to ground.
- The DTC will set if during drive off, one wheel speed = 0, and the other WSS are greater than 12 km/h (7.5 mph).

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator could turn on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 Ignition cycles pass with no DTC(s) detected.

Important: After the DTC is cleared by ignition cycle default, the vehicle must be driven above 12 km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:
 1. Spray the suspected area with a five percent saltwater solution.
 - Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 3. If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in Wiring Systems.

Front Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the front wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

6. This step checks for the proper resistance in the WSS.
7. This step checks for the proper WSS output.

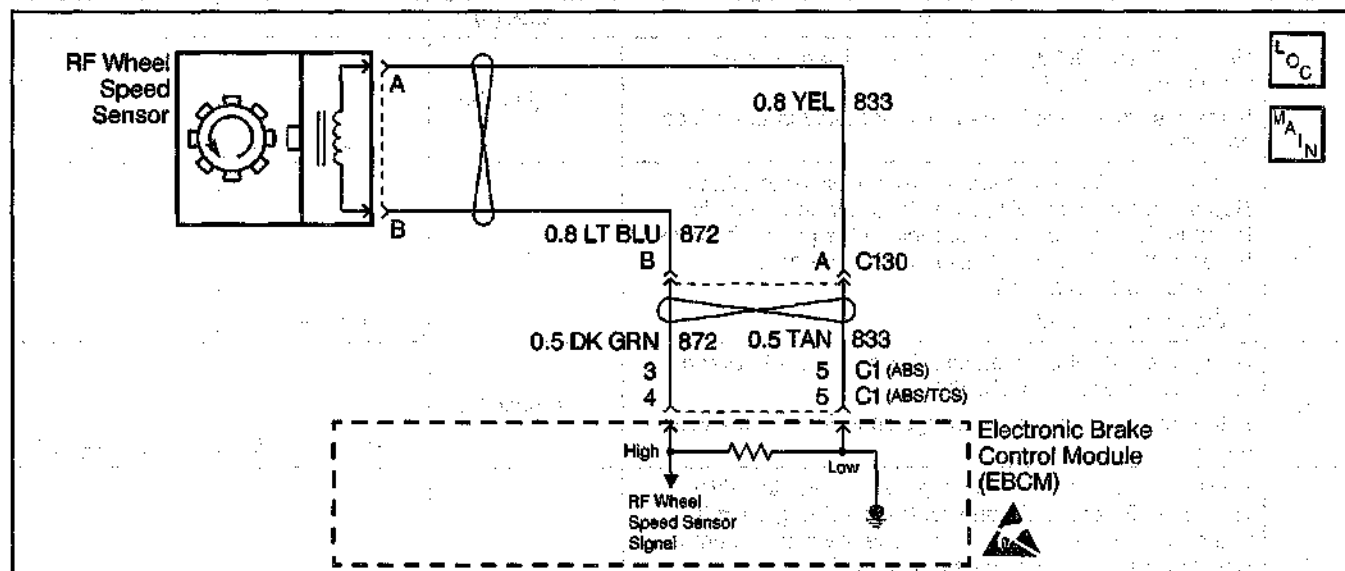
DTC C0036 LF Wheel Speed Circuit Range/Performance

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (Front)</i> in Front Suspension. Is the replacement complete?	—	Go to Step 16	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the replacement complete?	—	Go to Step 16	—
6	1. Disconnect the WSS connector directly at the WSS. 2. Using <i>J 39200</i> DMM, measure the resistance between terminals A and B of the WSS. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 7	Go to Step 3
7	1. With the <i>J 39200</i> DMM still connected to the WSS select the mV AC scale. 2. Spin the wheel as fast as you can by hand while monitoring the AC output. Is the AC voltage within the range specified in the value(s) column?	Above 100 mV	Go to Step 8	Go to Step 3
8	Using <i>J 39200</i> DMM, measure the resistance between the WSS terminal A and ground. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 9	Go to Step 3
9	1. Disconnect the EBCM harness connector C1. 2. Install the <i>J 39700</i> Universal Pinout Box using the <i>J 39700-530</i> cable adapter to the EBCM harness connector C1 only. 3. Using <i>J 39200</i> DMM, measure the resistance between terminals 20 and 21 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 11	Go to Step 10
10	Repair short between CKT(s) 830 and 873. Refer to <i>Wiring Repairs</i> . If a short between wheel speed sensor circuits is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 16	—

DTC C0036 LF Wheel Speed Circuit Range/Performance (cont'd)

Step	Action	Value(s)	Yes	No
11	Using J 39200 DMM, measure the resistance between terminals 20 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 13	Go to Step 12
12	Repair CKT 830 for a short to ground. Refer to <i>Wiring Repairs</i> in Electrical Diagnosis. If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 16	—
13	Using J 39200 DMM, measure the resistance between terminals 21 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 15	Go to Step 14
14	Repair CKT 873 for a short to ground. Refer to <i>Wiring Repairs</i> in Electrical Diagnosis. If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Left)</i> . Is the repair complete?	—	Go to Step 16	—
15	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0040 RF Wheel Speed Circuit Malfunction



519701

Circuit Description

The speed sensor used on this vehicle is a multiple pole magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

The DTC can be set any time the ignition is in the RUN position and the EBCM detects an open or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator could turn on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.

2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
3. If the DTC returns, replace the suspected harness.

- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Front Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the front wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

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

6. This step checks for an open in the WSS or WSS CKT.
13. Checks for a short to voltage in the WSS CKT.
15. Checks for a short to voltage in the WSS CKT.

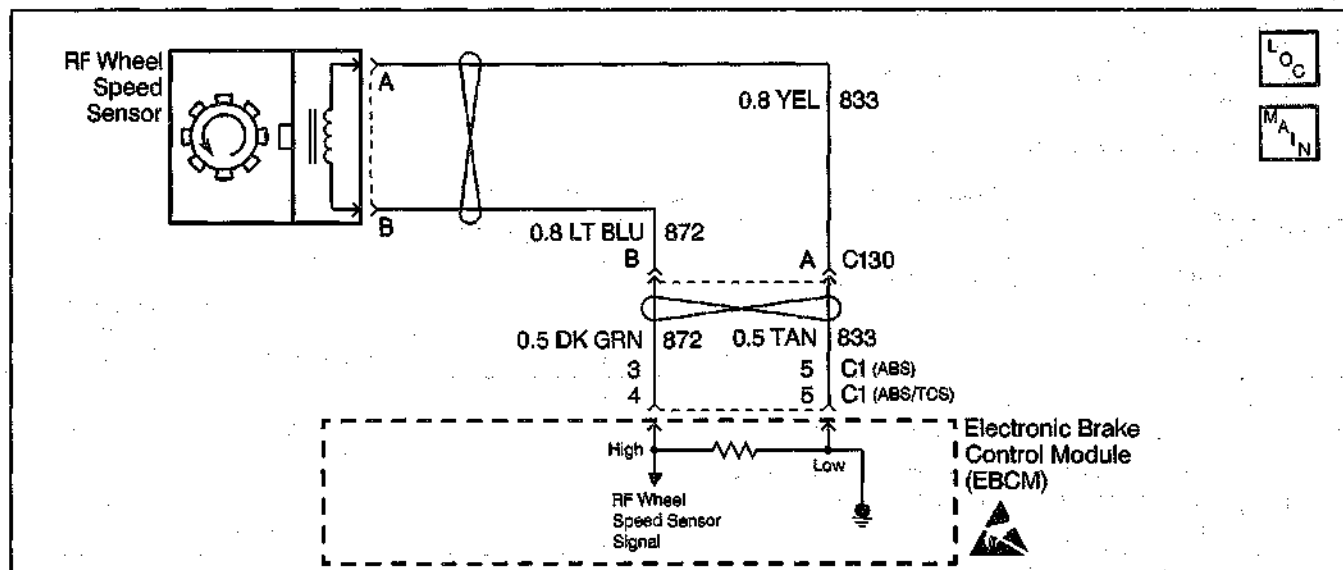
DTC C0040 RF Wheel Speed Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (Front)</i> in Front Suspension. Is the replacement complete?	—	Go to Step 18	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the replacement complete?	—	Go to Step 18	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 4 and 5 of J 39700 if the vehicle is equipped with Traction Control. If the vehicle is not equipped with Traction Control then measure the resistance between terminals 3 and 5 of J 39700. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 13	Go to Step 7
7	1. Disconnect the Wheel Speed Sensor. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the Wheel Speed Sensor Connector. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between terminal 4 of J 39700 and terminal B of the WSS harness connector if the vehicle is equipped with Traction Control. If the vehicle is not equipped with Traction Control measure the resistance between terminal 3 of J 39700 and terminal B of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0–5 Ω	Go to Step 10	Go to Step 9
9	Repair CKT 872 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 18	—
10	Using J 39200 DMM, measure the resistance between terminal 5 of J 39700 and terminal A of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0–5 Ω	Go to Step 12	Go to Step 11

DTC C0040 RF Wheel Speed Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
11	Repair CKT 833 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 18	—
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 18	—
13	1. Disconnect the Wheel Speed Sensor. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at terminal 4 of J 39700 if the vehicle is equipped with Traction Control. If the vehicle is not equipped with Traction Control measure the voltage at terminal 3 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 14	Go to Step 15
14	Repair CKT 872 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 18	—
15	Using J 39200 DMM, measure the voltage at terminal 5 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 16	Go to Step 17
16	Repair CKT 833 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 18	—
17	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
18	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0041 RF Wheel Speed Circuit Range/Performance



519701

Circuit Description

The speed sensor used on this vehicle is a multiple pole magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The DTC will set if one wheel speed = 0 and the other WSS are greater than 40 km/h (25 mph) for 10 ms, or if the EBCM detects a short to ground.
- The DTC will set if during drive off, one wheel speed = 0, and the other WSS are greater than 12 km/h (7.5 mph).

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator could turn on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Important: After the DTC is cleared by ignition cycle default, the vehicle must be driven above 12 km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:
 1. Spray the suspected area with a five percent saltwater solution.
 - Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 3. If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in *Wiring Systems*.

Front Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the front wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

6. This step checks for the proper resistance in the WSS.

7. This step checks for the proper WSS output.

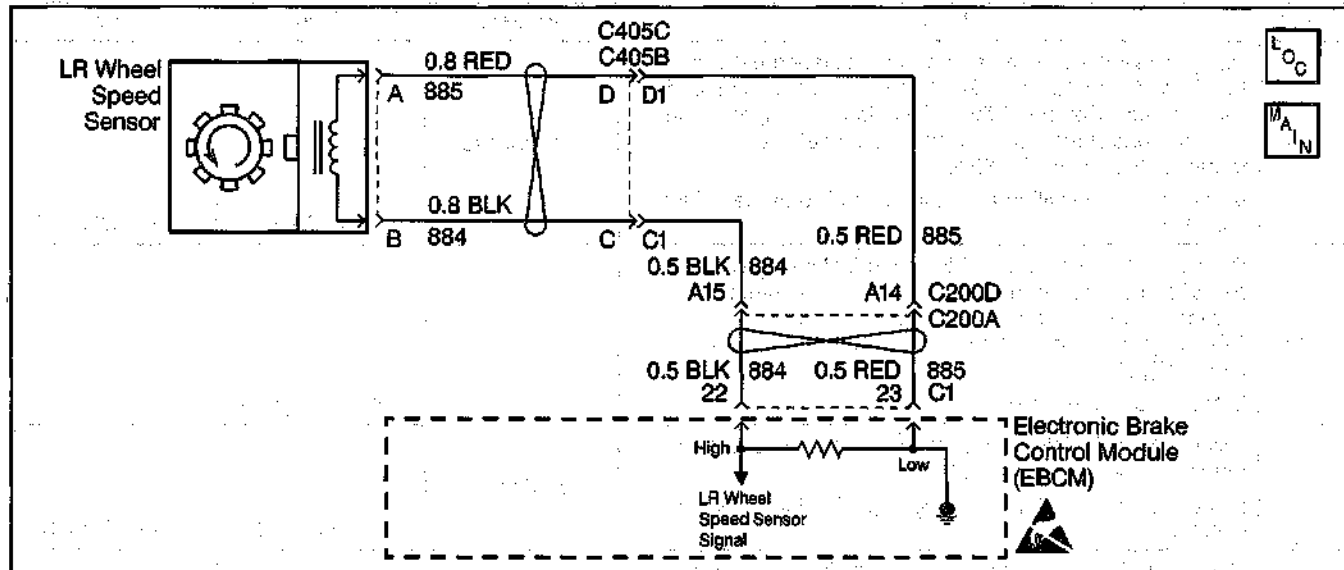
DTC C0041 RF Wheel Speed Circuit Range/Performance

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (Front)</i> in Front Suspension. Is the replacement complete?	—	Go to Step 16	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the replacement complete?	—	Go to Step 16	—
6	1. Disconnect the WSS connector directly at the WSS. 2. Using <i>J 39200</i> DMM, measure the resistance between terminals A and B of the WSS. Is the resistance within the range specified in the value(s) column?	800–1600 Ω	Go to Step 7	Go to Step 3
7	1. With the <i>J 39200</i> DMM still connected to the WSS select the mV AC scale. 2. Spin the wheel as fast as you can by hand while monitoring the AC output. Is the AC voltage within the range specified in the value(s) column?	Above 100 mV	Go to Step 8	Go to Step 3
8	Using <i>J 39200</i> DMM, measure the resistance between the WSS terminal A and ground. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 9	Go to Step 3
9	1. Disconnect the EBCM harness connector C1. 2. Install the <i>J 39700</i> Universal Pinout Box using the <i>J 39700-530</i> cable adapter to the EBCM harness connector C1 only. 3. Using <i>J 39200</i> DMM, measure the resistance between terminals 4 and 5 of <i>J 39700</i> if the vehicle is equipped with Traction Control. If the vehicle is not equipped with traction control measure the resistance between terminals 3 and 5 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 11	Go to Step 10
10	Repair short between CKT(s) 833 and 872. Refer to <i>Wiring Repairs</i> . If a short between wheel speed sensor circuits is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 16	—

DTC C0041 RF Wheel Speed Circuit Range/Performance (cont'd)

Step	Action	Value(s)	Yes	No
11	Using <i>J 39200</i> DMM, measure the resistance between terminals 4 and 15 of <i>J 39700</i> if the vehicle is equipped with Traction Control. If the vehicle is not equipped with traction control measure the resistance between terminals 3 and 15 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 13	Go to Step 12
12	Repair CKT 872 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 16	—
13	Using <i>J 39200</i> DMM, measure the resistance between terminals 5 and 15 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 15	Go to Step 14
14	Repair CKT 833 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Front Right)</i> . Is the repair complete?	—	Go to Step 16	—
15	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0045 LR Wheel Speed Circuit Malfunction



519704

Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

The DTC can be set any time the ignition is in the RUN position and the EBCM detects an open or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:

- A poor connection
- Rubbed-through wire insulation
- A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.

2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
3. If the DTC returns, replace the suspected harness.

- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in Wiring Systems.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

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

6. This step checks for an open in the WSS or WSS CKT.
13. Checks for a short to voltage in the WSS CKT.
15. Checks for a short to voltage in the WSS CKT.

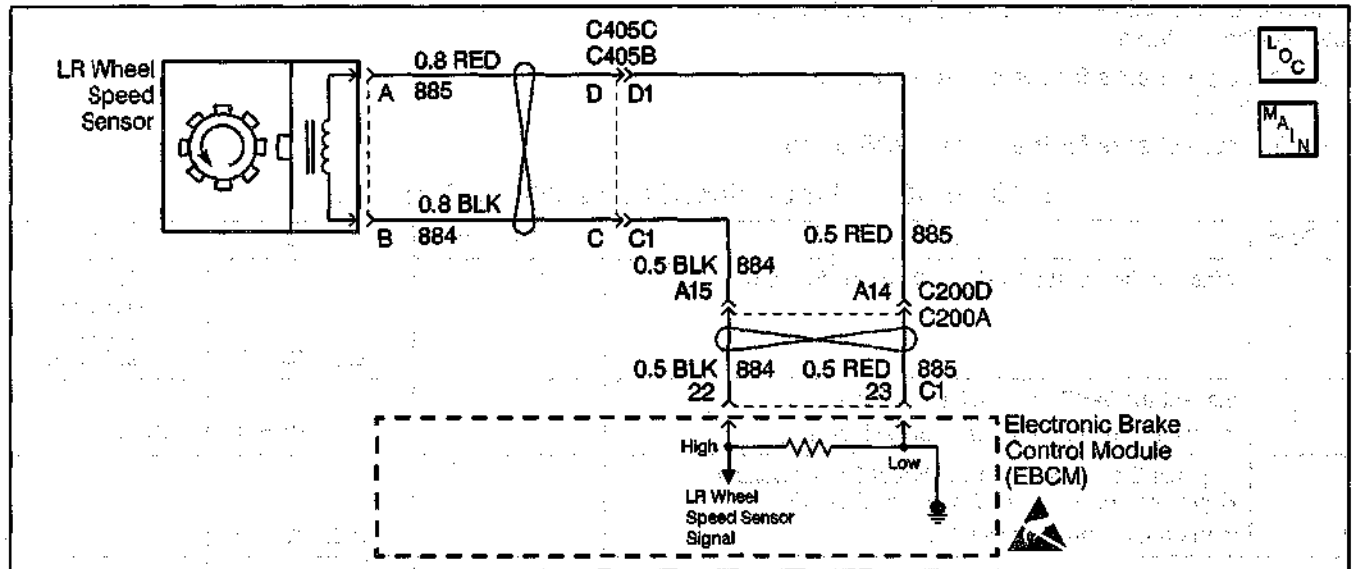
DTC C0045 LR Wheel Speed Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Tractional Control)</i> . Is the replacement complete?	—	Go to Step 18	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the replacement complete?	—	Go to Step 18	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 22 and 23 of J 39700. Is the resistance within the range specified in the value(s) column?	2032-4266Ω	Go to Step 13	Go to Step 7
7	1. Disconnect the Wheel Speed Sensor. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the Wheel Speed Sensor Connector. Is the resistance within the range specified in the value(s) column?	2032-4266Ω	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between terminal 22 of J 39700 and terminal B of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 10	Go to Step 9
9	Repair CKT 884 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
10	Using J 39200 DMM, measure the resistance between terminal 23 of J 39700 and terminal A of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 12	Go to Step 11
11	Repair CKT 885 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—

DTC C0045 LR Wheel Speed Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 18	—
13	1. Disconnect the Wheel Speed Sensor. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at terminal 22 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 14	Go to Step 15
14	Repair CKT 884 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
15	Using J 39200 DMM, measure the voltage at terminal 23 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 16	Go to Step 17
16	Repair CKT 885 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
17	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
18	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0046 LR Wheel Speed Circuit Range/Performance



519704

Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The DTC will set if one wheel speed = 0 and the other WSS are greater than 40 Km/h (25 mph) for 10 ms, or if the EBCM detects a short to ground.
- The DTC will set if during drive off, one wheel speed = 0, and the other WSS are greater than 12 Km/h (7.5 mph).

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Important: After the DTC is cleared by ignition cycle default, the vehicle must be driven above 12 Km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:
 1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 3. If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

6. This step checks for the proper resistance in the WSS.
7. This step checks for the proper WSS output.

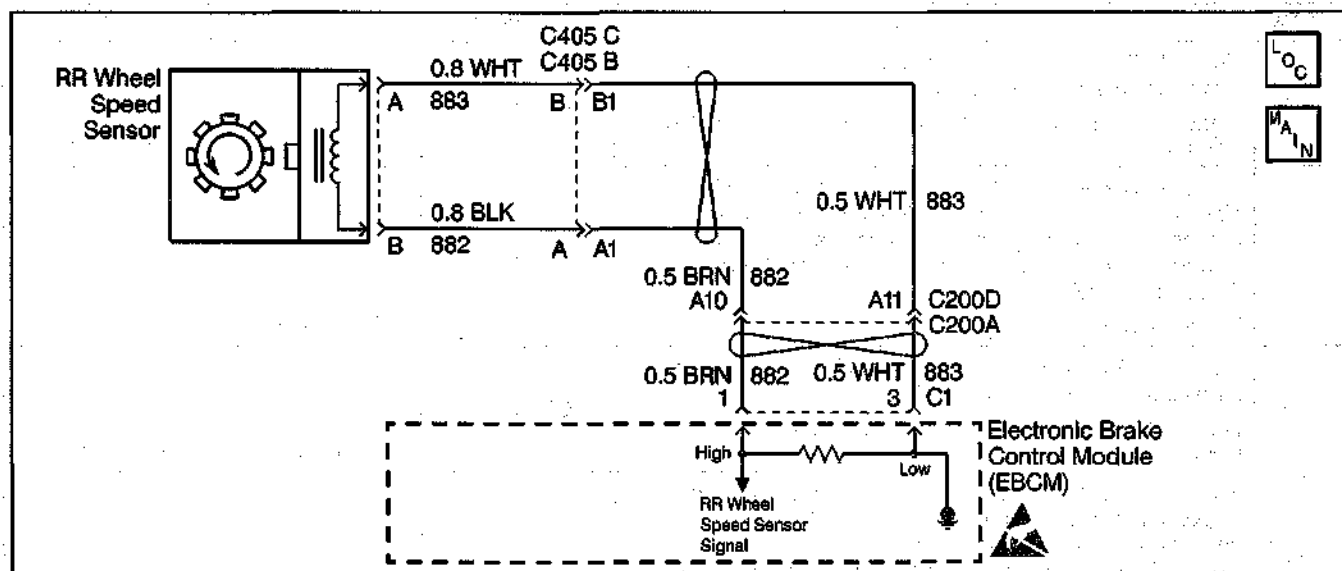
DTC C0046 LR Wheel Speed Circuit Range/Performance

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Tractional Control)</i> . Is the replacement complete?	—	Go to Step 16	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the replacement complete?	—	Go to Step 16	—
6	1. Disconnect the WSS connector directly at the WSS. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the WSS. Is the resistance within the range specified in the value(s) column?	2032–4266 Ω	Go to Step 7	Go to Step 3
7	1. With the J 39200 DMM still connected to the WSS select the mV AC scale. 2. Spin the wheel as fast as you can by hand while monitoring the AC output. Is the AC voltage within the range specified in the value(s) column?	Above 100 mV	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between the WSS terminal A and ground. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 9	Go to Step 3
9	1. Disconnect the EBCM harness connector C1. 2. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 3. Using J 39200 DMM, measure the resistance between terminals 22 and 23 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 11	Go to Step 10
10	Repair short between CKT(s) 884 and 885. Refer to <i>Wiring Repairs</i> . If a between wheel speed sensor circuits is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—

DTC C0046 LR Wheel Speed Circuit Range/Performance (cont'd)

Step	Action	Value(s)	Yes	No
11	Using J 39200 DMM, measure the resistance between terminals 22 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 13	Go to Step 12
12	Repair CKT 884 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
13	Using J 39200 DMM, measure the resistance between terminals 23 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 15	Go to Step 14
14	Repair CKT 885 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
15	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0050 RR Wheel Speed Circuit Malfunction



Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

The DTC can be set any time the ignition is in the RUN position and the EBCM detects an open or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:
 1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 3. If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

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

6. This step checks for an open in the WSS or WSS CKT.
13. Checks for a short to voltage in the WSS CKT.
15. Checks for a short to voltage in the WSS CKT.

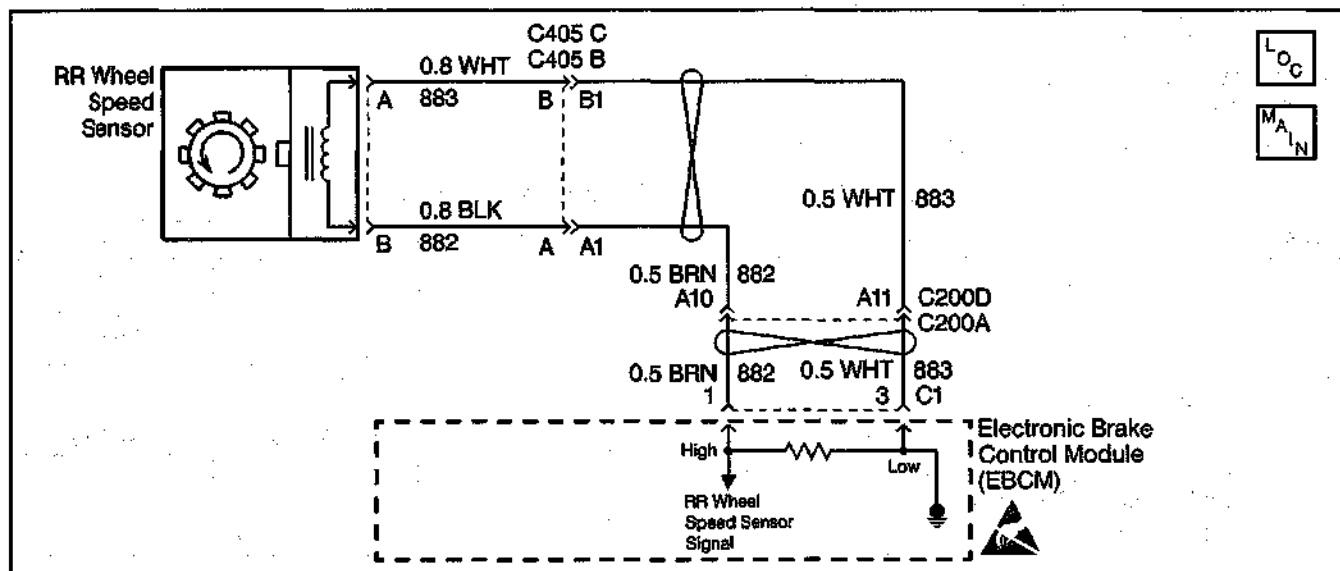
DTC C0050 RR Wheel Speed Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Tractional Control)</i> . Is the replacement complete?	—	Go to Step 18	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the replacement complete?	—	Go to Step 18	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 1 and 3 of J 39700. Is the resistance within the range specified in the value(s) column?	2032-4266Ω	Go to Step 13	Go to Step 7
7	1. Disconnect the Wheel Speed Sensor. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the Wheel Speed Sensor Connector. Is the resistance within the range specified in the value(s) column?	2032-4266Ω	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between terminal 1 of J 39700 and terminal B of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 10	Go to Step 9
9	Repair CKT 882 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
10	Using J 39200 DMM, measure the resistance between terminal 3 of J 39700 and terminal A of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 12	Go to Step 11
11	Repair CKT 883 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—

DTC C0050 RR Wheel Speed Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 18	—
13	1. Disconnect the Wheel Speed Sensor. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at terminal 1 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 14	Go to Step 15
14	Repair CKT 882 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
15	Using J 39200 DMM, measure the voltage at terminal 3 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 16	Go to Step 17
16	Repair CKT 883 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
17	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
18	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0051 RR Wheel Speed Circuit Range/Performance



519707

Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The DTC will set if one wheel speed = 0 and the other WSS are greater than 40 km/h (25 mph) for 10 ms, or if the EBCM detects a short to ground.
- The DTC will set if during drive off, one wheel speed = 0, and the other WSS are greater than 12 km/h (7.5 mph).

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Important: After the DTC is cleared by ignition cycle default, the vehicle must be driven above 12 km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:

- A poor connection
- Rubbed-through wire insulation
- A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.

2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
3. If the DTC returns, replace the suspected harness.

- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

6. This step checks for the proper resistance in the WSS.
7. This step checks for the proper WSS output.

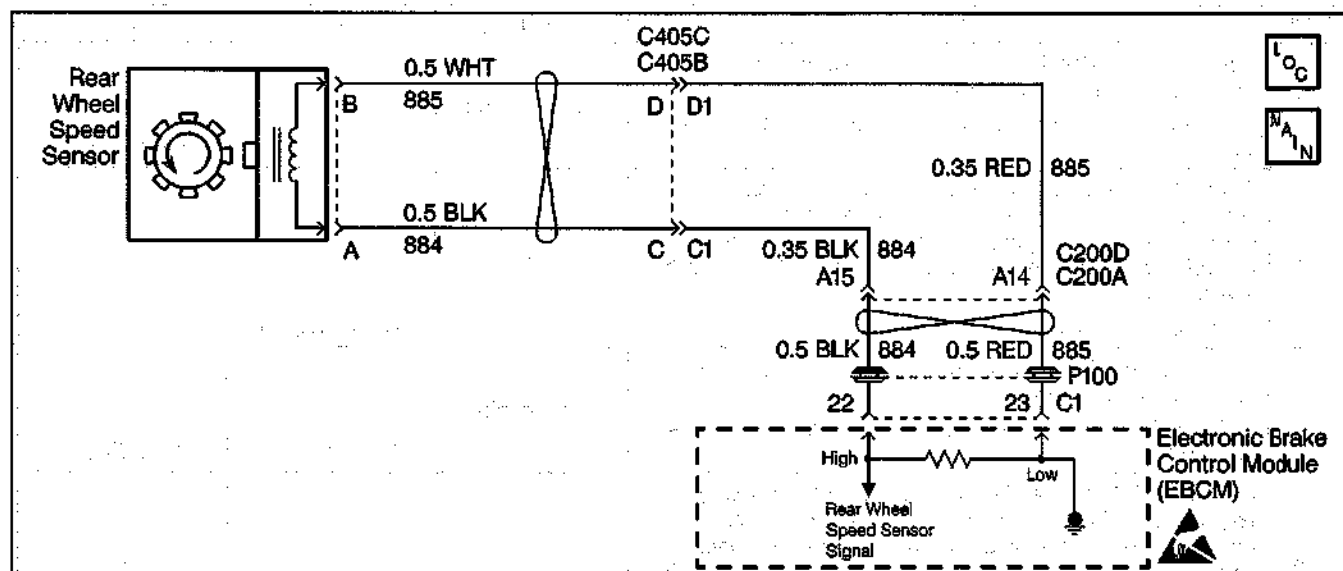
DTC C0051 RR Wheel Speed Circuit Range/Performance

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Tractional Control)</i> . Is the replacement complete?	—	Go to Step 16	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the replacement complete?	—	Go to Step 16	—
6	1. Disconnect the WSS connector directly at the WSS. 2. Using <i>J 39200</i> DMM, measure the resistance between terminals A and B of the WSS. Is the resistance within the range specified in the value(s) column?	2032–4266 Ω	Go to Step 7	Go to Step 3
7	1. With the <i>J 39200</i> DMM still connected to the WSS select the mV AC scale. 2. Spin the wheel as fast as you can by hand while monitoring the AC output. Is the AC voltage within the range specified in the value(s) column?	Above 100 mV	Go to Step 8	Go to Step 3
8	Using <i>J 39200</i> DMM, measure the resistance between the WSS terminal A and ground. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 9	Go to Step 3
9	1. Disconnect the EBCM harness connector C1. 2. Install the <i>J 39700</i> Universal Pinout Box using the <i>J 39700-530</i> cable adapter to the EBCM harness connector C1 only. 3. Using <i>J 39200</i> DMM, measure the resistance between terminals 1 and 3 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 11	Go to Step 10
10	Repair short between CKT(s) 882 and 883. Refer to <i>Wiring Repairs</i> . If a short between wheel speed sensor circuits is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—

DTC C0051 RR Wheel Speed Circuit Range/Performance (cont'd)

Step	Action	Value(s)	Yes	No
11	Using <i>J 39200</i> DMM, measure the resistance between terminals 1 and 15 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 13	Go to Step 12
12	Repair CKT 882 for a short to ground. Refer <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
13	Using <i>J 39200</i> DMM, measure the resistance between terminals 3 and 15 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 15	Go to Step 14
14	Repair CKT 883 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
15	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0055 Rear Wheel Speed Circuit Malfunction



519712

Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

The DTC can be set any time the ignition is in the RUN position and the EBCM detects an open or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS disables.
- The amber ABS indicator turns on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.
Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 3. If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

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

6. This step checks for an open in the WSS or WSS CKT.
13. Checks for a short to voltage in the WSS CKT.
15. Checks for a short to voltage in the WSS CKT.

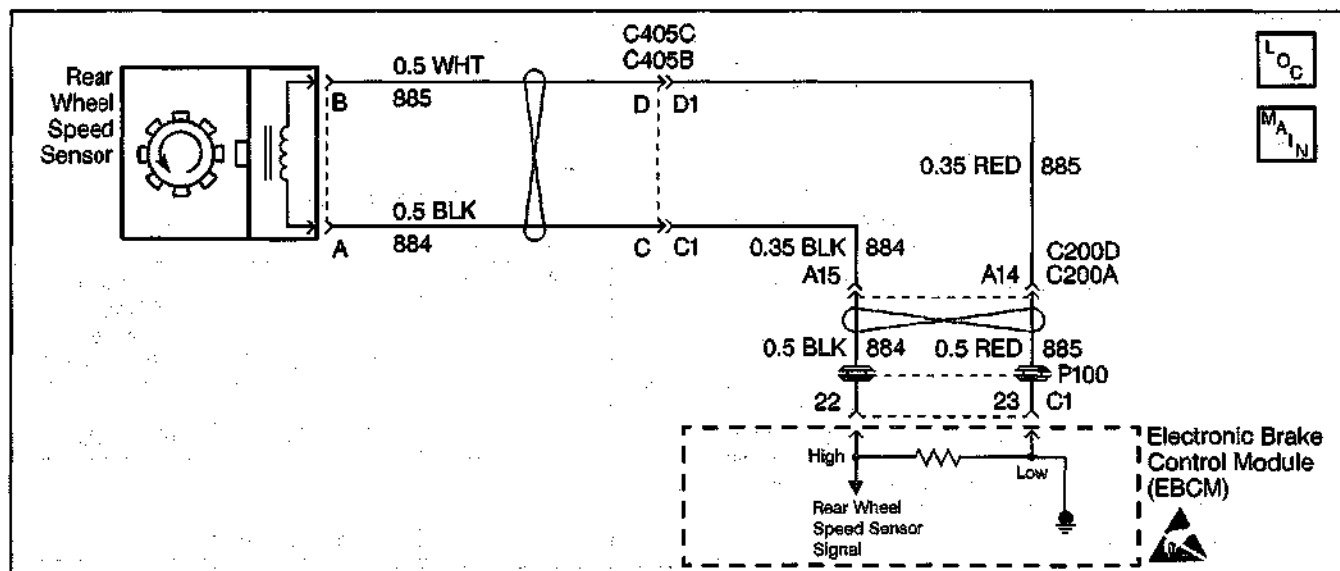
DTC C0055 Rear Wheel Speed Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Tractional Control)</i> . Is the replacement complete?	—	Go to Step 18	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the replacement complete?	—	Go to Step 18	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 22 and 23 of J 39700. Is the resistance within the range specified in the value(s) column?	763-1525Ω	Go to Step 13	Go to Step 7
7	1. Disconnect the Wheel Speed Sensor. 2. Using J 39200 DMM, measure the resistance between terminals A and B of the Wheel Speed Sensor Connector. Is the resistance within the range specified in the value(s) column?	763-1525Ω	Go to Step 8	Go to Step 3
8	Using J 39200 DMM, measure the resistance between terminal 22 of J 39700 and terminal A of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 10	Go to Step 9
9	Repair CKT 884 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
10	Using J 39200 DMM, measure the resistance between terminal 23 of J 39700 and terminal B of the WSS harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 12	Go to Step 11
11	Repair CKT 885 for an open or high resistance. Refer to <i>Wiring Repairs</i> . If an open or high resistance is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—

DTC C0055 Rear Wheel Speed Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 18	—
13	1. Disconnect the Wheel Speed Sensor. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at terminal 22 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 14	Go to Step 15
14	Repair CKT 884 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
15	Using J 39200 DMM, measure the voltage at terminal 23 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 16	Go to Step 17
16	Repair CKT 885 for a short to voltage. Refer to <i>Wiring Repairs</i> . If a short to voltage is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 18	—
17	Replace the EBCM. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
18	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0056 Rear Wheel Speed CKT Range/Performance



519712

Circuit Description

The speed sensor used on this vehicle is a single point magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The DTC will set if one wheel speed = 0 and the other WSS are greater than 40 km/h (25 mph) for 10 ms, or if the EBCM detects a short to ground.
- The DTC will set if during drive off, one wheel speed = 0, and the other WSS are greater than 12 km/h (7.5 mph).

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS disables.
- The amber ABS indicator turns on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTC(s) detected.

Important: After the DTC is cleared by ignition cycle default, the vehicle must be driven above 12 km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If the customer's comments reflect that the amber ABS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:
 - Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.
 - Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
 - If the DTC returns, replace the suspected harness.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Rear Wheel Speed Sensor Resistance

Use the following table that contains resistance values for the rear wheel speed sensors at varying sensor temperatures for use in diagnosis. The values are approximate and should be used as a guideline for diagnosis. Refer to *ABS Diagnostic Specifications*.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

6. This step checks for the proper resistance in the WSS.
7. This step checks for the proper WSS output.

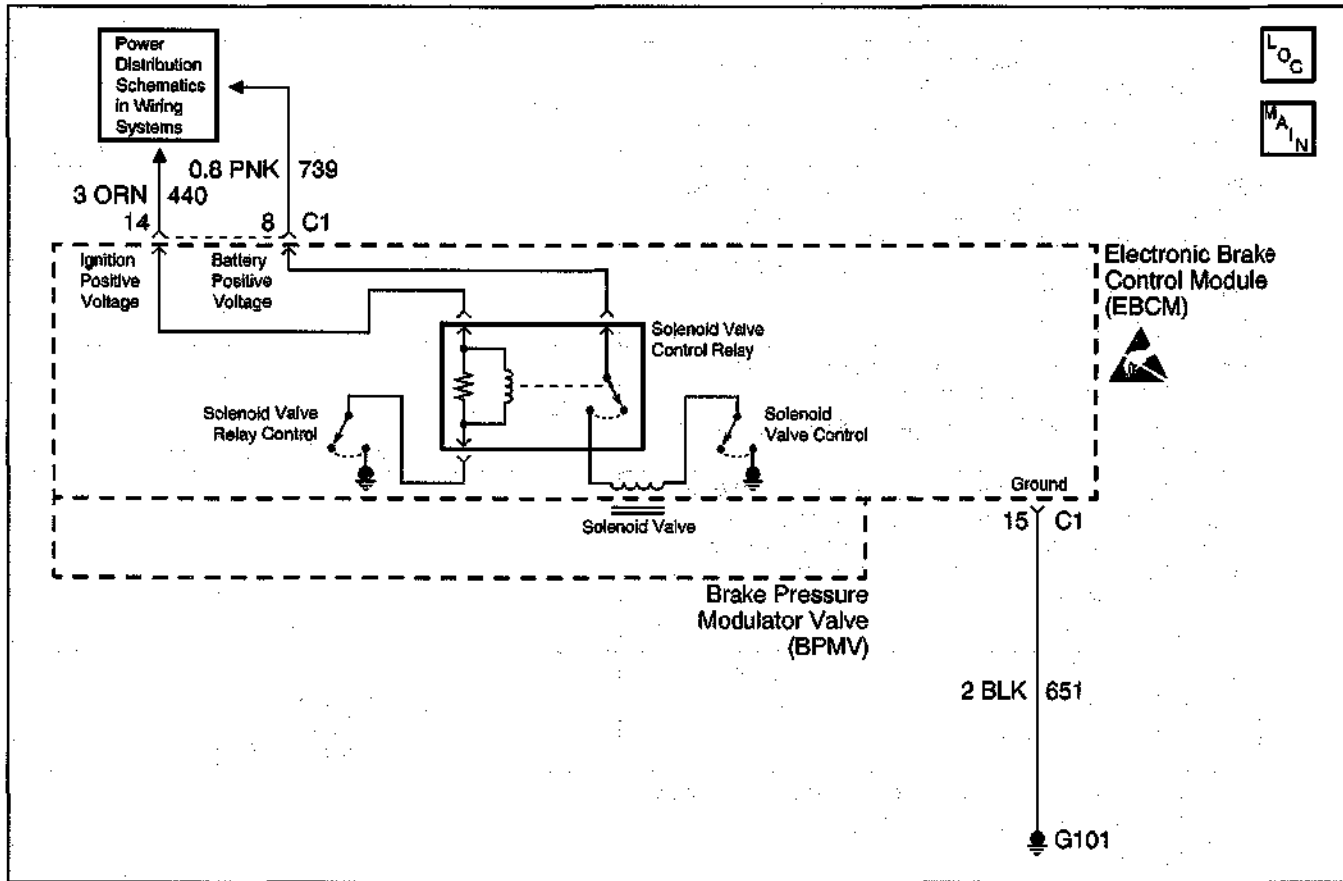
DTC C0056 Rear Wheel Speed CKT Range/Performance

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 3	Go to Step 4
3	Replace the WSS. Refer to <i>Wheel Speed Sensor Replacement (With out Traction Control)</i> . Is the replacement complete?	—	Go to Step 16	—
4	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 5	Go to Step 6
5	Replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the replacement complete?	—	Go to Step 16	—
6	1. Disconnect the WSS connector directly at the WSS. 2. Using <i>J 39200</i> DMM, measure the resistance between terminals A and B of the WSS. Is the resistance within the range specified in the value(s) column?	763–1525 Ω	Go to Step 7	Go to Step 3
7	1. With the <i>J 39200</i> DMM still connected to the WSS select the mV AC scale. 2. Spin the rear wheel as fast as you can by hand while monitoring the AC output. Is the AC voltage within the range specified in the value(s) column?	Above 100 mV	Go to Step 8	Go to Step 3
8	Using <i>J 39200</i> DMM, measure the resistance between the WSS terminal A and ground. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 9	Go to Step 3
9	1. Disconnect the EBCM harness connector C1. 2. Install the <i>J 39700</i> Universal Pinout Box using the <i>J 39700-530</i> cable adapter to the EBCM harness connector C1 only. 3. Using <i>J 39200</i> DMM, measure the resistance between terminals 22 and 23 of <i>J 39700</i> . Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 11	Go to Step 10
10	Repair short between CKT(s) 884 and 885. Refer to <i>Wiring Repairs</i> . If a short between wheel speed circuits is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—

DTC C0056 Rear Wheel Speed CKT Range/Performance (cont'd)

Step	Action	Value(s)	Yes	No
11	Using J 39200 DMM, measure the resistance between terminals 22 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 13	Go to Step 12
12	Repair CKT 884 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
13	Using J 39200 DMM, measure the resistance between terminals 23 and 15 of J 39700. Is the resistance within the range specified in the values column?	OL (infinite)	Go to Step 15	Go to Step 14
14	Repair CKT 885 for a short to ground. Refer to <i>Wiring Repairs</i> . If a short to ground is found in the jumper harness, replace the jumper harness. Refer to <i>Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)</i> . Is the repair complete?	—	Go to Step 16	—
15	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0060 LF ABS Solenoid #1 Circuit Malfunction



519718

Circuit Description

The Inlet valve solenoid circuits are supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

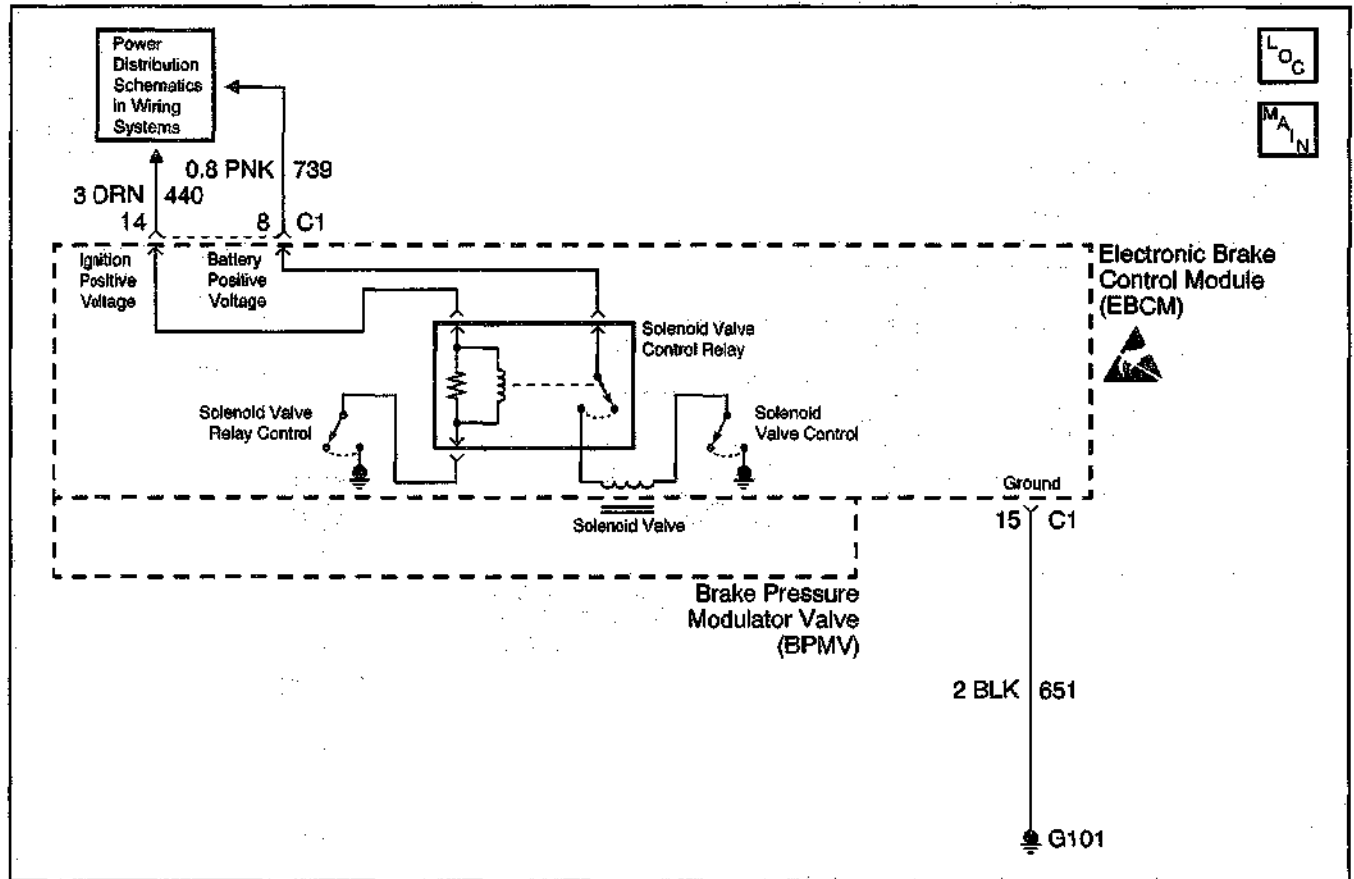
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0060 LF ABS Solenoid #1 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0060 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0065 LF ABS Solenoid #2 Circuit Malfunction



519718

Circuit Description

The Outlet valve solenoid circuits are supplied with battery power when the ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

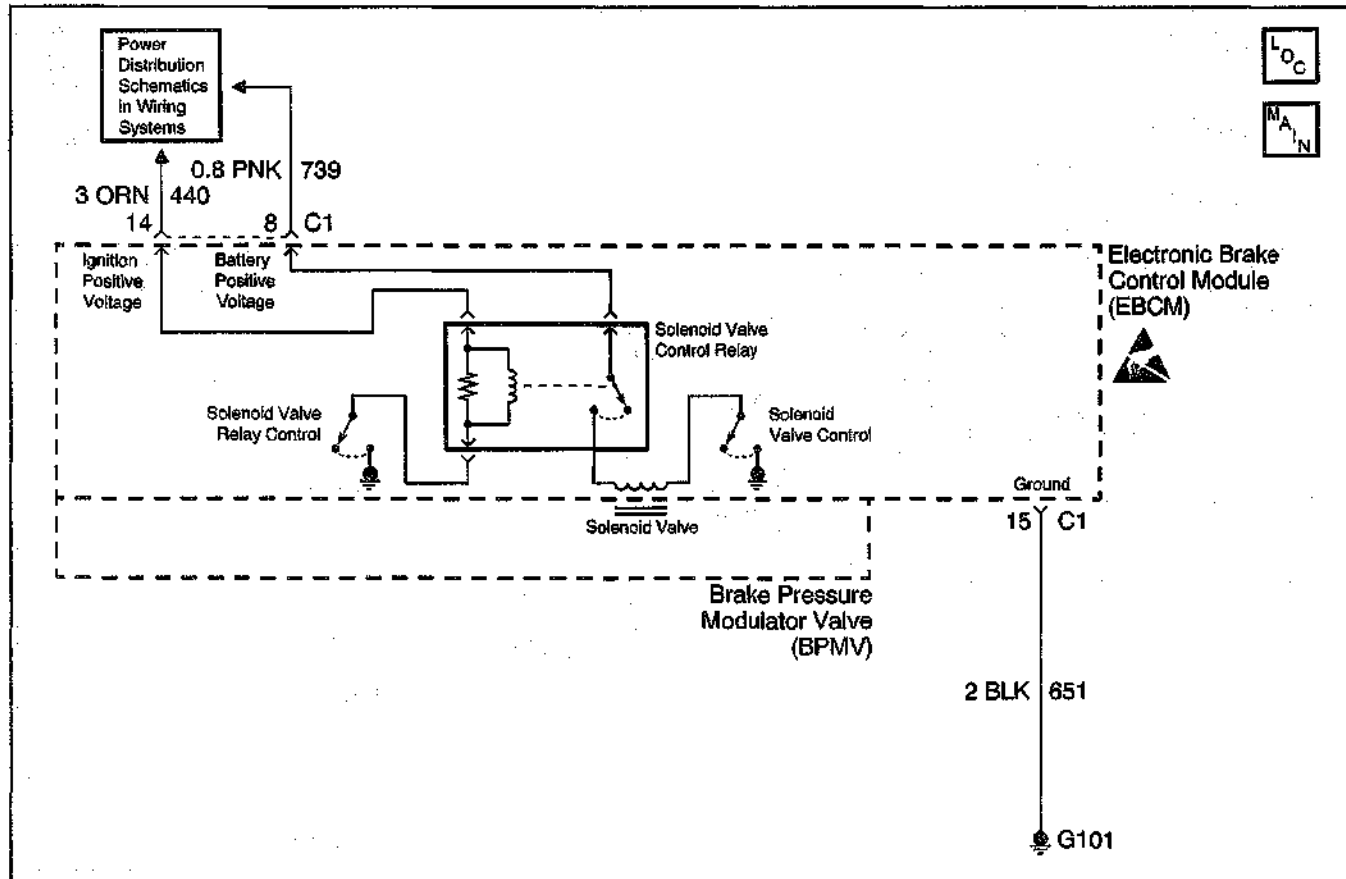
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0065 LF ABS Solenoid #2 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0065 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0070 RF ABS Solenoid #1 Circuit Malfunction



519718

Circuit Description

The Inlet valve solenoid circuits are supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

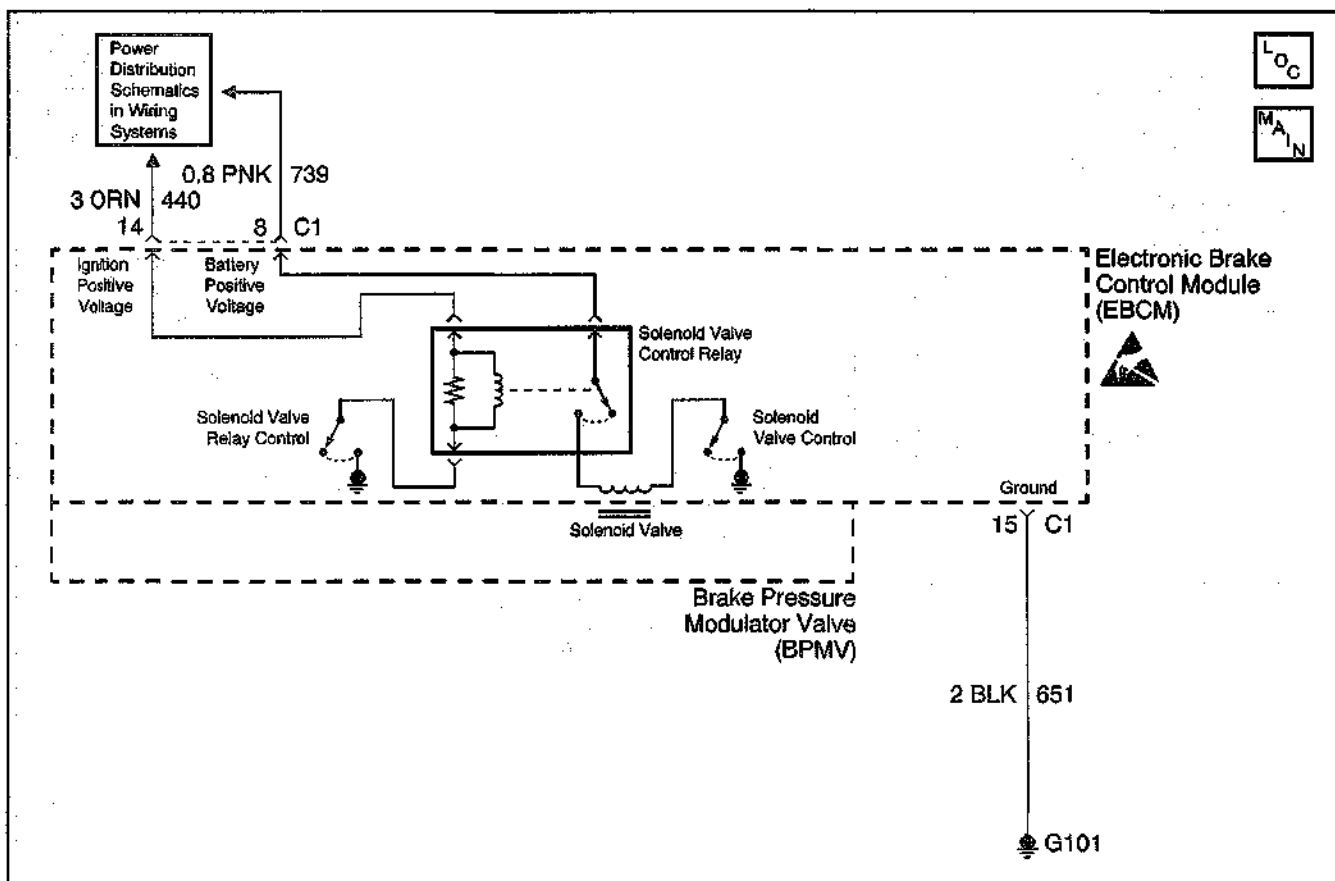
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0070 RF ABS Solenoid #1 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0070 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0075 RF ABS Solenoid #2 Circuit Malfunction



519718

Circuit Description

The Outlet valve solenoid circuits are supplied with battery power when the ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

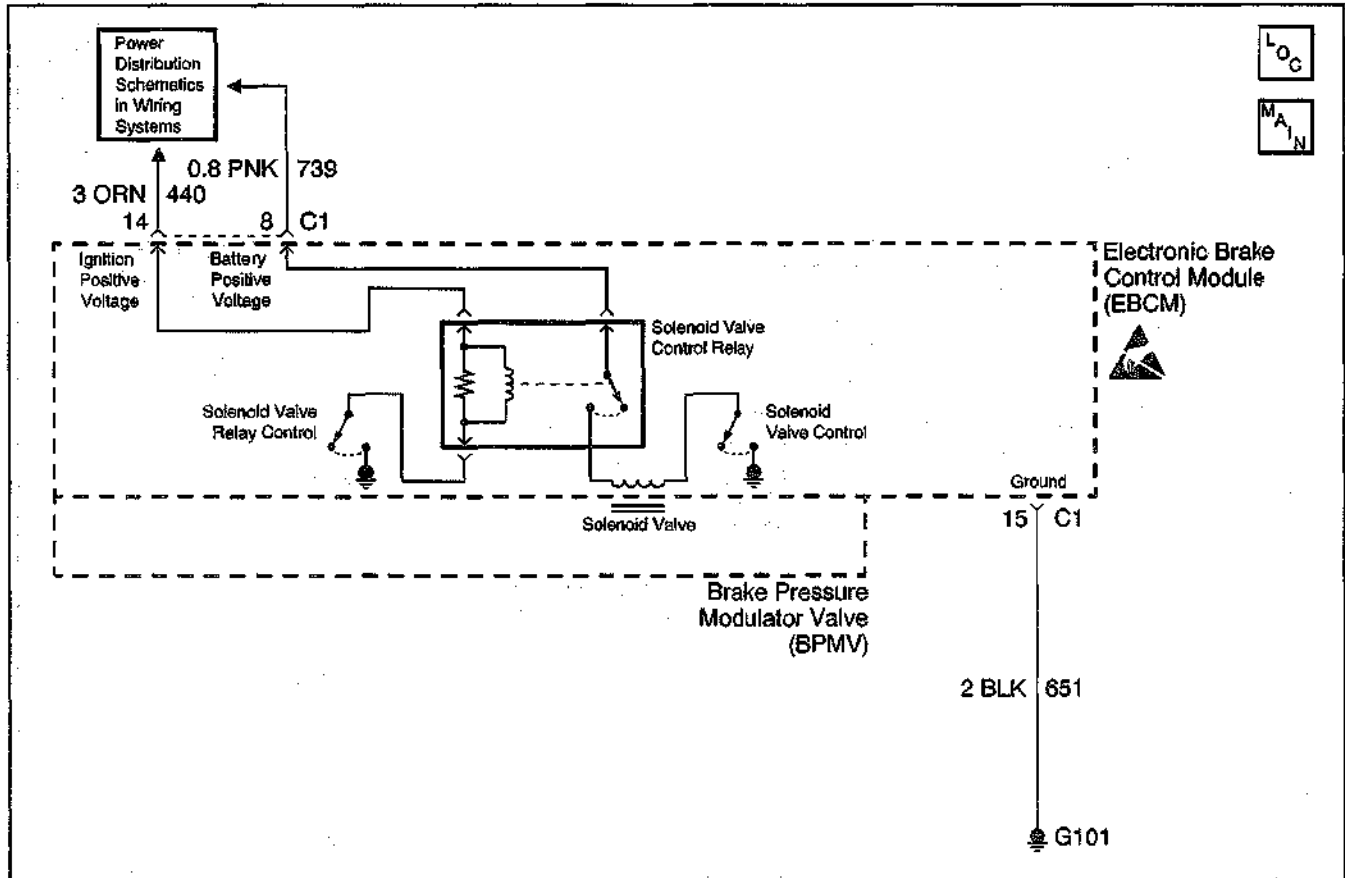
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0075 RF ABS Solenoid #2 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0075 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0080 LR ABS Solenoid #1 Circuit Malfunction



519718

Circuit Description

The Inlet valve solenoid circuits are supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

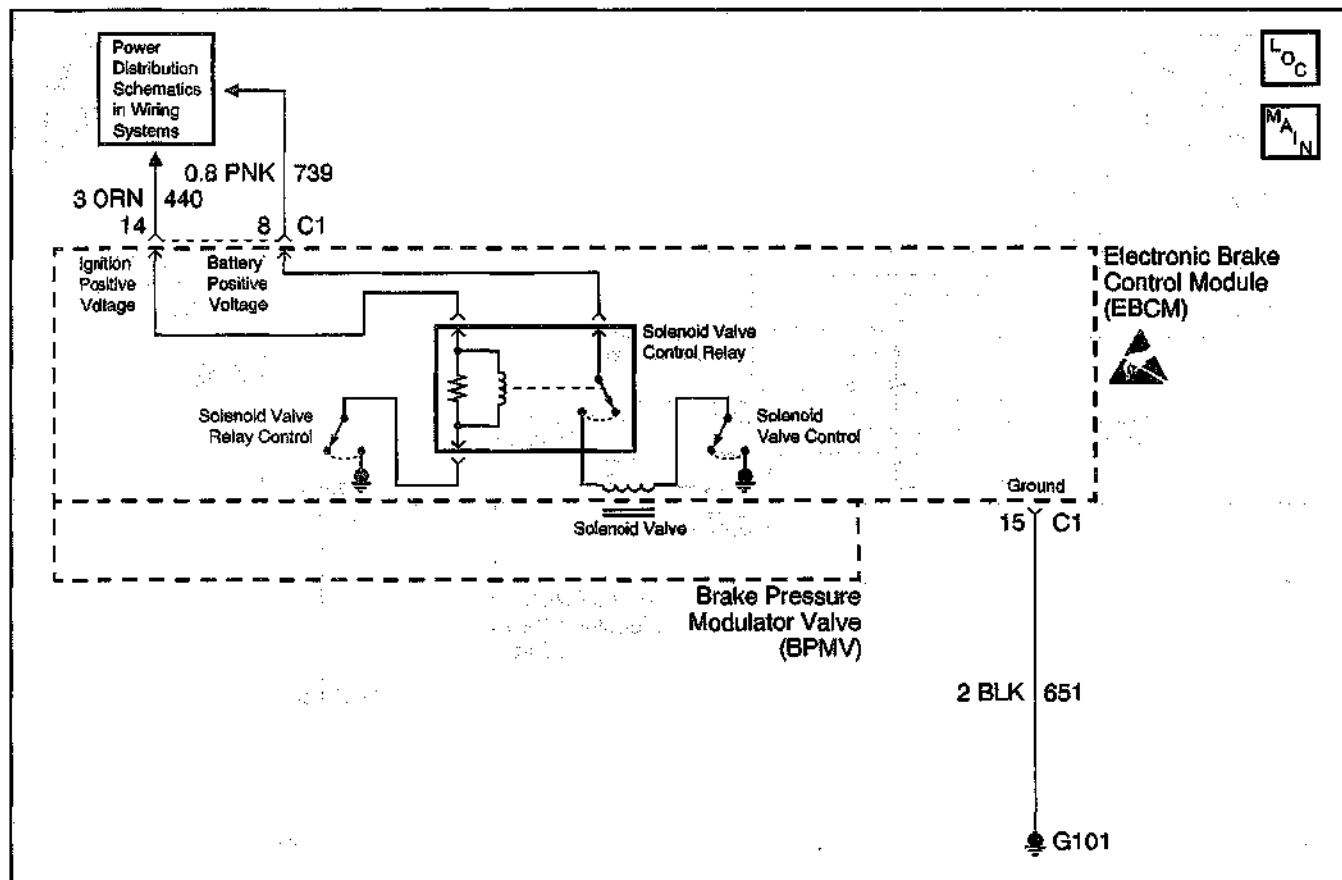
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0080 LR ABS Solenoid #1 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0080 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0085 LR ABS Solenoid #2 Circuit Malfunction



519718

Circuit Description

The Outlet valve solenoid circuits are supplied with battery power when the ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

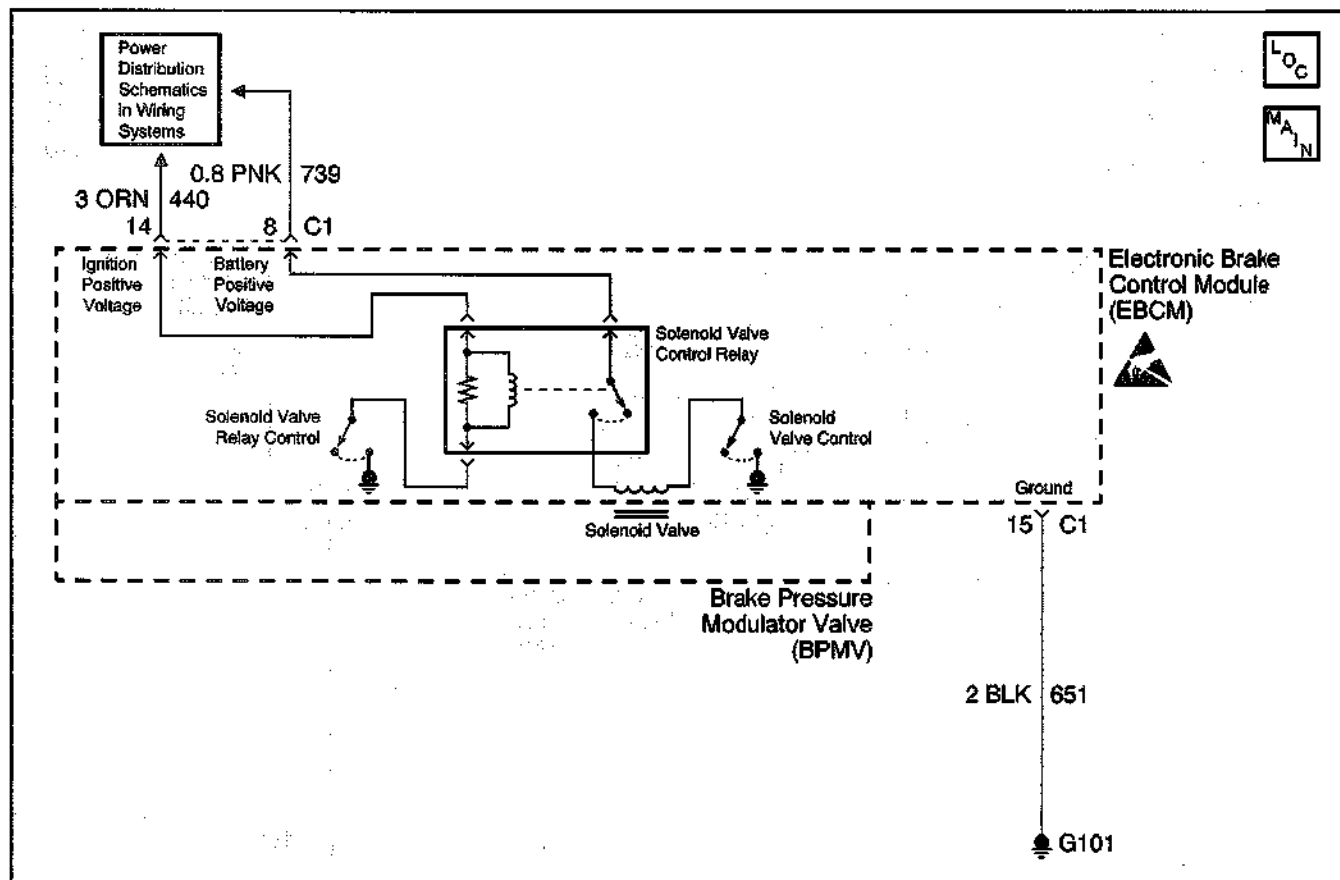
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0085 LR ABS Solenoid #2 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0085 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0090 RR ABS Solenoid #1 Circuit Malfunction



519718

Circuit Description

The Inlet valve solenoid circuits are supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

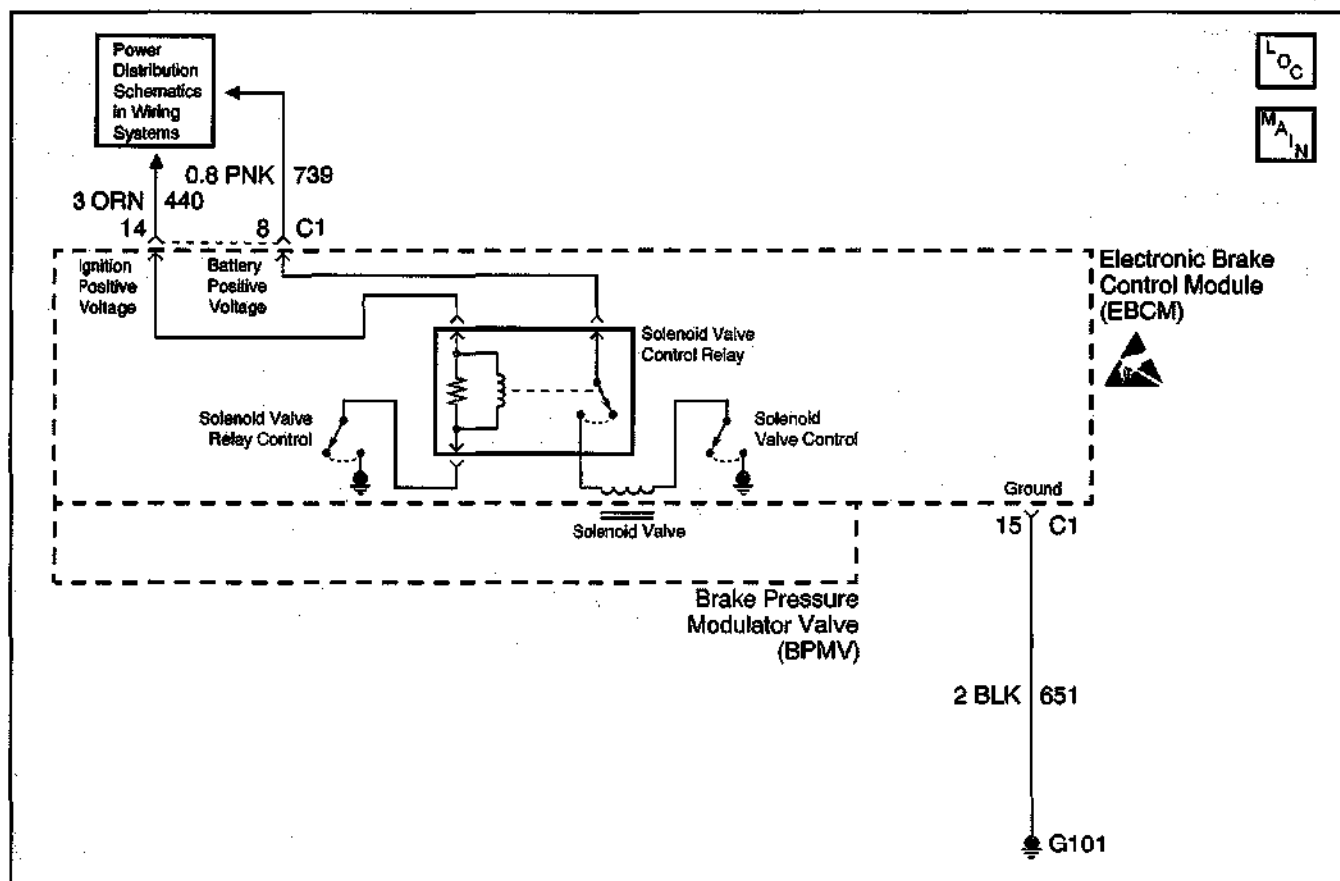
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0090 RR ABS Solenoid #1 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0090 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0095 RR ABS Solenoid #2 Circuit Malfunction



519718

Circuit Description

The Outlet valve solenoid circuits are supplied with battery power when the ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

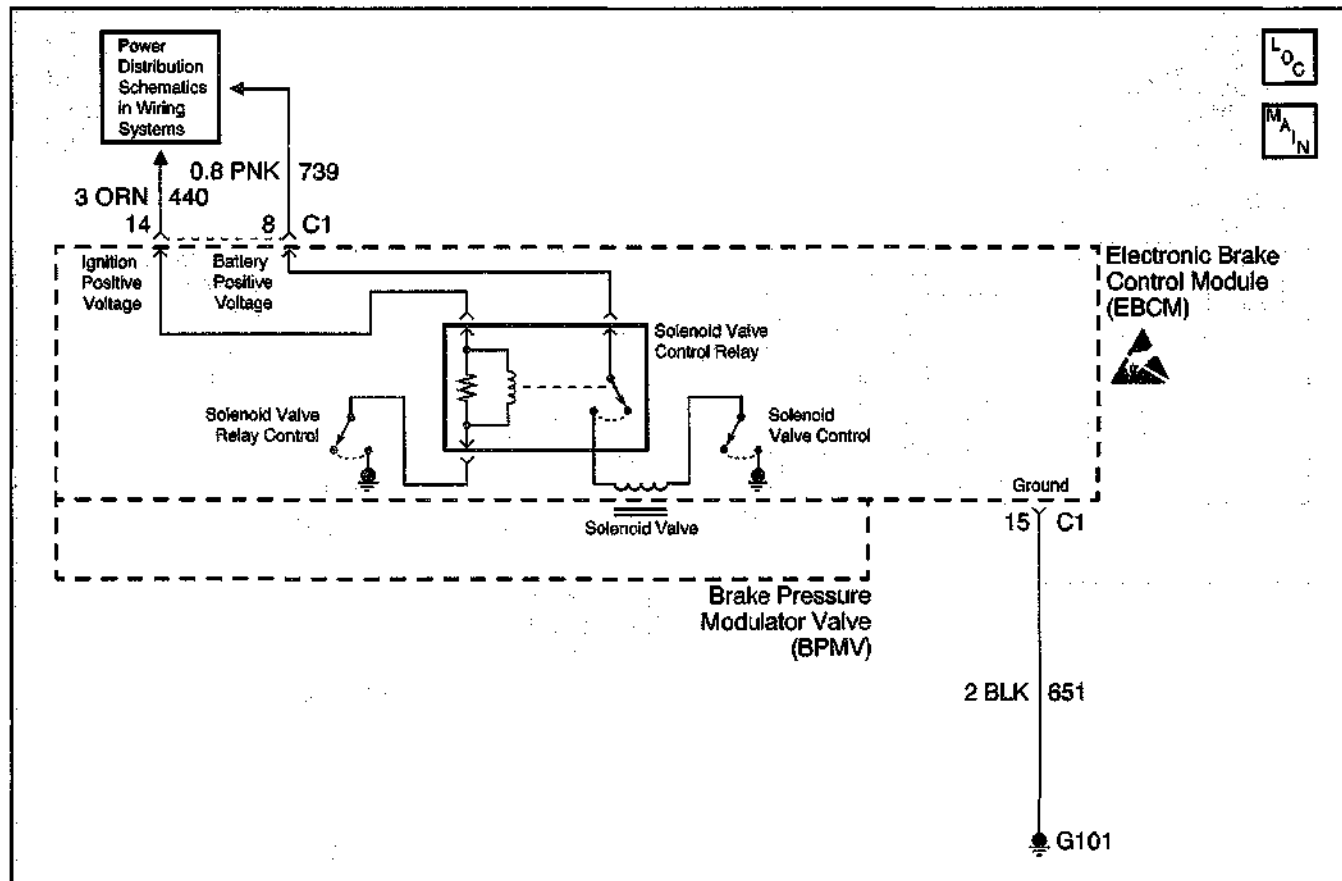
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0095 RR ABS Solenoid #2 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0095 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0100 Rear ABS Solenoid #1 Circuit Malfunction



519718

Circuit Description

The Inlet valve solenoid circuit is supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

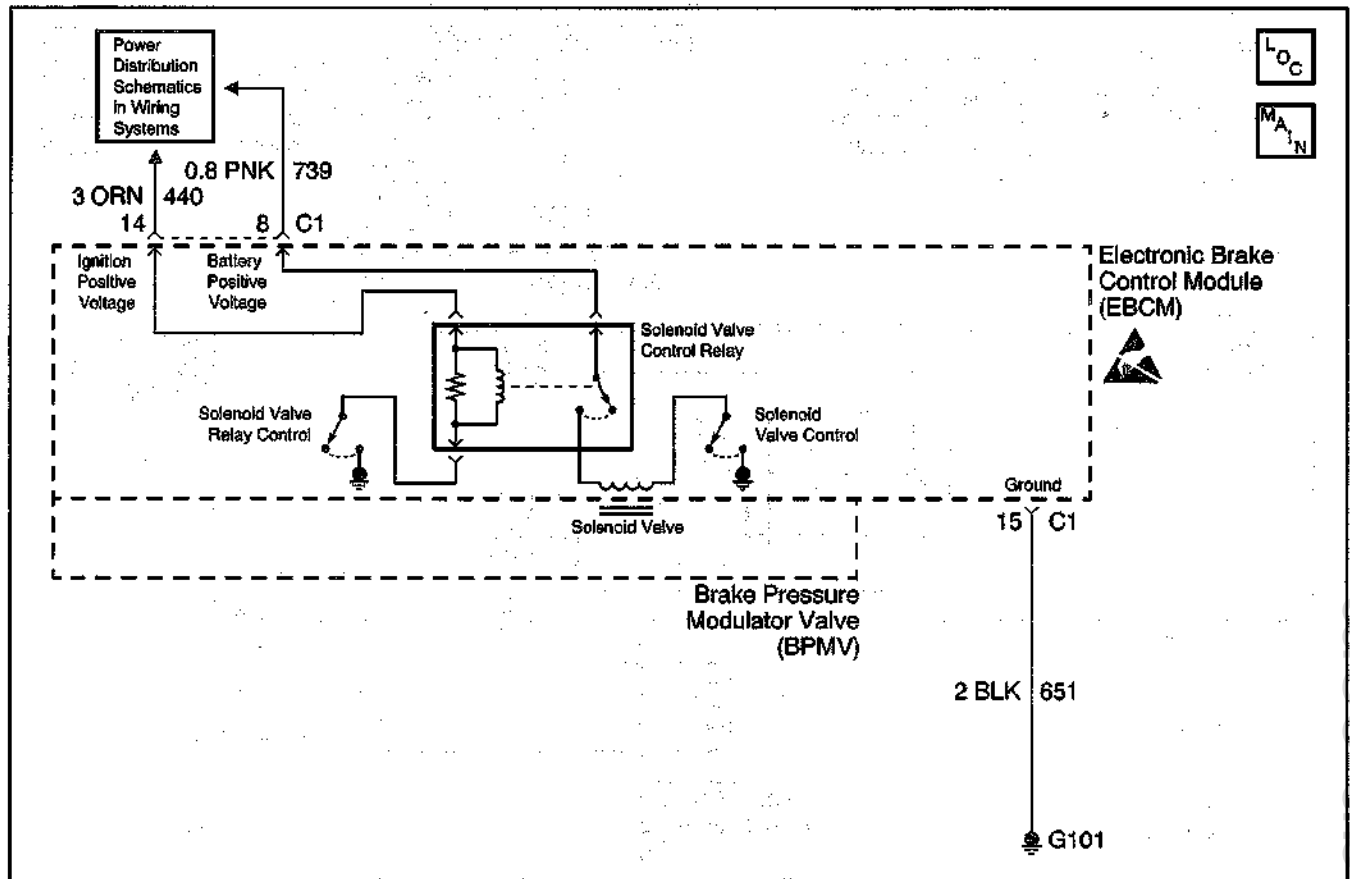
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0100 Rear ABS Solenoid #1 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0100 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0105 Rear ABS Solenoid #2 Circuit Malfunction



519718

Circuit Description

The Outlet valve solenoid circuit is supplied with battery power when the ignition is in the run position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

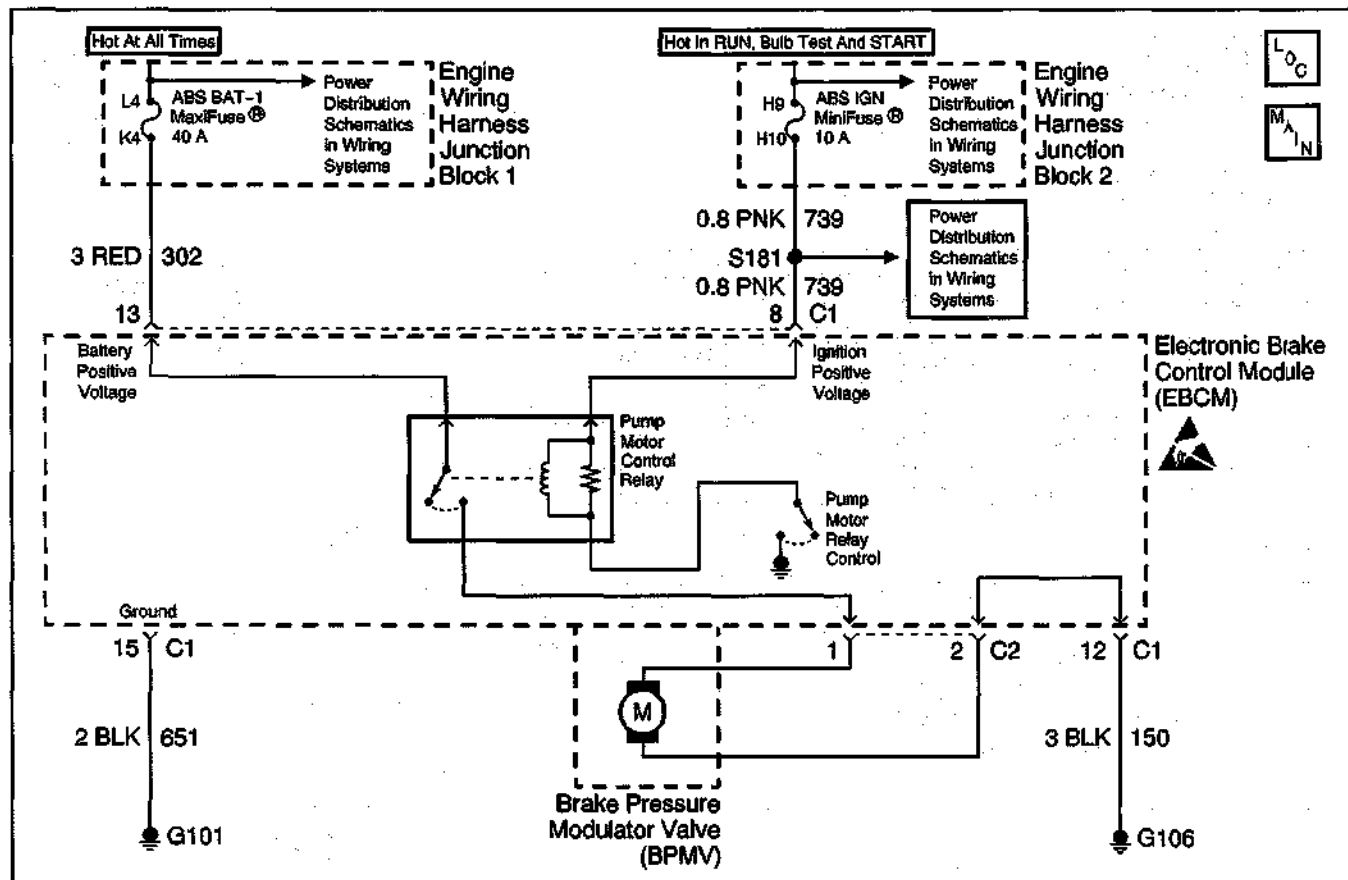
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0105 Rear ABS Solenoid #2 Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0105 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0110 Pump Motor Circuit Malfunction



519720

Circuit Description

The pump motor is an integral part of the BPMV, while the pump motor relay is integral to the EBCM. The pump motor relay is not engaged during normal system operation. When ABS or TCS operation is required the EBCM activates the pump motor relay and battery power is provided to the pump motor.

Conditions for Setting the DTC

- Pump motor voltage is not present 60 milliseconds after activation of the pump motor relay.
- Pump motor voltage is present for more than 2.5 seconds with no activation of the pump motor relay.
- Pump motor voltage is not present for 40 milliseconds after the pump motor relay is commanded off.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTCs detected.

Important: After the DTC is cleared using ignition cycle default, the vehicle must be driven above 12 Km/h (8 mph) for the ABS/TCS indicator(s) to turn off.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Test Description

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

- 4. This step checks for a short to ground in CKT 302.
- 10. This step checks for an open in CKT 302.

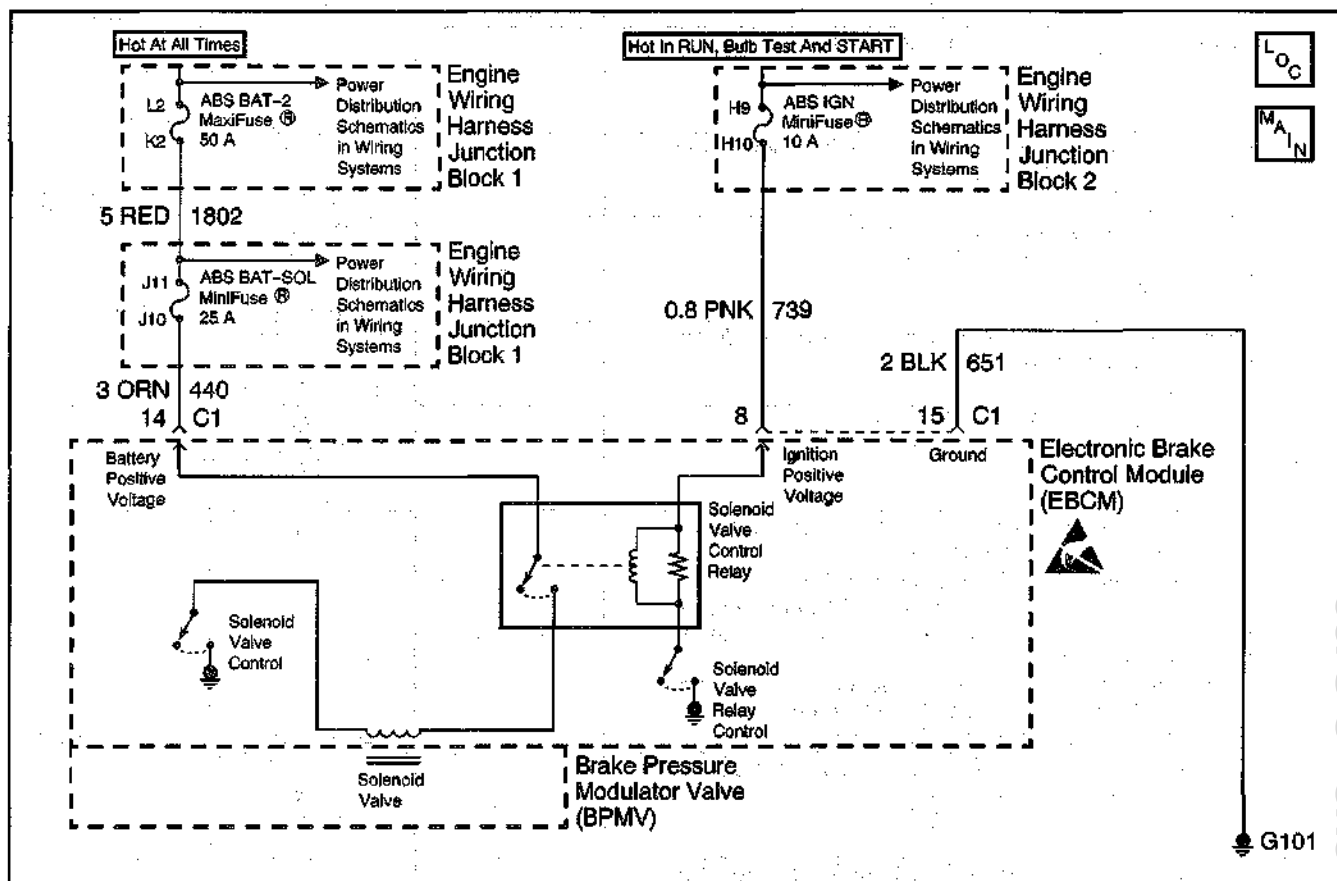
DTC C0110 Pump Motor Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the 40A ABS BATT 1 Maxifuse®, in the Underhood Electrical Center 1. Is the fuse OK?	—	Go to Step 7	Go to Step 3
3	1. Install a new 40A ABS BATT Maxifuse®. 2. Cycle the ignition switch from the OFF to RUN position, engine OFF. 3. Using a scan tool in ABS/TCS Special Functions attempt to run the AUTOMATED test. 4. Recheck the 40A ABS BATT 1 Maxifuse® fuse. Is the fuse OK?	—	Go to Step 16	Go to Step 4
4	1. Turn the Ignition switch to the OFF position. 2. Remove the 40A ABS BATT 1 Maxifuse®. 3. Disconnect the EBCM connector C1. 4. Connect the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector only. 5. Using J 39200 DMM, measure the resistance between terminals 13 and 15 of J 39700. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 5	Go to Step 12
5	1. Disconnect the EBCM pump motor connector C2. 2. Connect a 10A fused jumper wire between the pump motor connector C2 terminal 1 and battery voltage. 3. Connect a jumper wire between the pump motor connector C2 terminal 2 and ground. Only attempt to run the pump motor for 5 seconds. 4. Disconnect the jumper wires. 5. Inspect the 10A fuse in the jumper wire. Is the fuse OK?	—	Go to Step 11	Go to Step 6
6	Replace the BPMV. Refer to <i>Brake Pressure Modulator Valve (BPMV) Replacement</i> . Is the replacement complete?	—	Go to Step 16	—
7	1. Turn the Ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Connect J 39700 Universal Pinout Box using the J 39700-530 cable adaptor to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 12 and 15 of J 39700. Is the resistance within the range specified in the value(s) column?	0-5 Ω	Go to Step 9	Go to Step 8

DTC C0110 Pump Motor Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
8	Repair CKT 150 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 16	—
9	1. Install the fuse if removed. 2. Using <i>J 39200</i> DMM, measure the voltage at the 40A ABS BATT 1 Maxifuse® by probing between the fuse test terminals and a good ground. Is the voltage within the range specified in the value(s) column?	B+	Go to Step 10	Go to Power Distribution Schematics in Electrical Diagnosis
10	Using <i>J 39200</i> DMM, measure the voltage at terminal 13 of <i>J 39700</i> . Is the voltage within the range specified in the value(s) column?	B+	Go to Step 14	Go to Step 13
11	Replace EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
12	Repair short to ground in CKT 302. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 16	—
13	Repair open in CKT 302. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to Step 16	—
14	1. Disconnect the EBCM pump motor connector C2. 2. Connect a 10A fused jumper wire between the pump motor connector C2 terminal 1 and B+. 3. Connect a jumper wire between the pump motor connector C2 terminal 2 and ground. Only attempt to run the pump motor for 5 seconds. 4. Disconnect the jumper wires. 5. Inspect the 10A fuse in the jumper wire. Is the fuse OK?	—	Go to Step 15	Go to Step 6
15	1. Zero the <i>J 39200</i> DMM leads. 2. Using <i>J 39200</i> DMM, measure the resistance between terminals 1 and 2 of the pump motor connector C2. Is the resistance within the range specified in the value(s) column?	0–4 Ω	Go to Step 11	Go to Step 6
16	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0121 Valve Relay Circuit Malfunction



519725

Circuit Description

The solenoid valve relay supplies power to the solenoid valve coils in the EBCM. The solenoid valve relay, located in the EBCM, is activated whenever the ignition switch is in the RUN position and no faults are present. The solenoid valve relay remains engaged until the ignition is turned OFF or a failure is detected.

Conditions for Setting the DTC

- DTC C0121 will set anytime the solenoid valve relay is commanded on and the EBCM does not see battery voltage at the solenoid valves.
- DTC C0121 will set anytime the EBCM commands the solenoid valve relay off and battery voltage is still present at the solenoid valves.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.
- The solenoid valve relay is an integral part of the EBCM and is not serviced separately.

Test Description

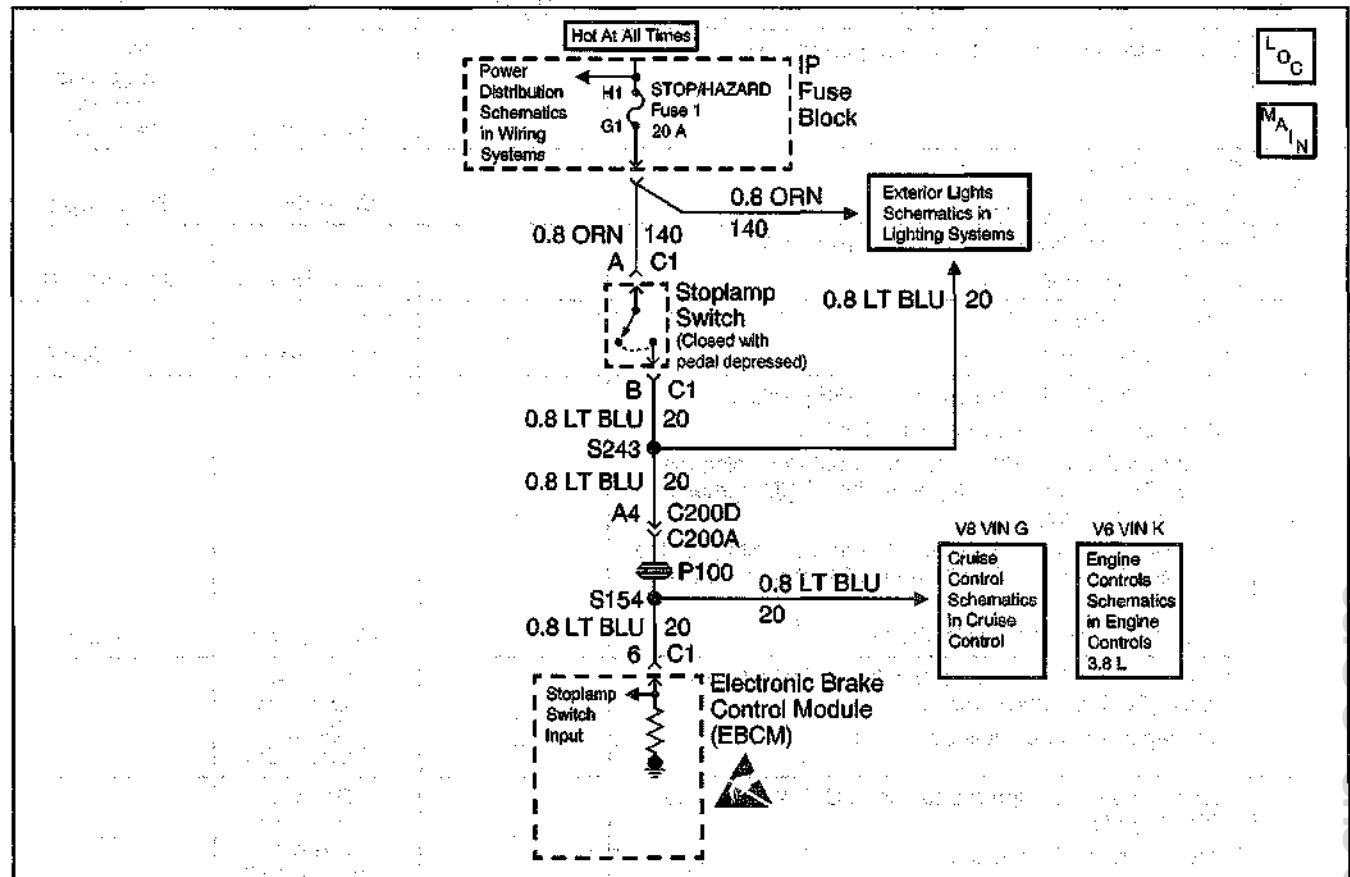
The numbers below refer to the step numbers on the diagnostic table.

- 6. This step checks for a short to ground in CKT 440.
- 13. This step checks for an open in CKT 440.

DTC C0121 Valve Relay Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect the ABS BATT 2 Maxifuse in the Engine Wiring Harness Junction Block 1. Is the fuse OK?	—	Go to Step 4	Go to Step 3
3	1. Install a new ABS BATT 2 fuse. 2. Inspect the ABS BATT 2 fuse. Is the fuse OK?	—	Go to A Diagnostic System Check - ABS	Go to Step 9
4	Inspect the ABS BATT Minifuse in the Engine Wiring Harness Junction Block 1. Is the fuse OK?	—	Go to Step 10	Go to Step 5
5	1. Install a new ABS BATT fuse. 2. Inspect the ABS BATT fuse. Is the fuse OK?	—	Go to A Diagnostic System Check - ABS	Go to Step 6
6	1. Turn the ignition switch to the OFF position. 2. Remove the ABS BATT Minifuse. 3. Disconnect the EBCM connector C1. 4. Connect the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector only. 5. Using the J 39200 DMM, measure the resistance between the J 39700 terminals 14 and 15. Is the resistance within specifications?	OL (infinite)	Go to Step 7	Go to Step 8
7	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
8	Repair the short to ground in CKT 440. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Repair the short to ground in CKT 1802. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
10	Using the J 39200 DMM, probe between the ABS BATT 2 fuse test terminals and a good ground in order to measure the voltage. Is the voltage within specifications?	B+	Go to Step 11	Go to Power Distribution Schematics in Electrical Diagnosis
11	Using the J 39200 DMM, probe between the ABS BATT Minifuse test terminals and a good ground in order to measure the voltage. Is the voltage within specifications?	B+	Go to Step 13	Go to Step 12
12	Repair the open or high resistance in CKT 1802. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Connect the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector only. 4. Turn the ignition switch to the RUN position, engine off. 5. Using the J 39200 DMM, measure the voltage at terminal 14 of the J 39700. Is the voltage within specifications?	B+	Go to Step 7	Go to Step 14
14	Repair the open or high resistance in CKT 440. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0161 ABS/TCS Brake Switch Circuit Malfunction



519727

Circuit Description

The Stoplamp Switch is a normally open switch, when the brake pedal is depressed the EBCM will sense battery voltage. This allows the EBCM to determine the state of the brake lamps.

Conditions for Setting the DTC

- EBCM detects battery voltage at all times.
- EBCM never detects battery voltage from CKT 20.
- Both brake lamps are faulty.

Action Taken When the DTC Sets

- DTC C0161 is set.
- ABS and TCS remains active.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.

- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in Wiring Systems.

Test Description

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

5. This step checks for voltage at the EBCM.
11. This step checks the Stoplamp switch.

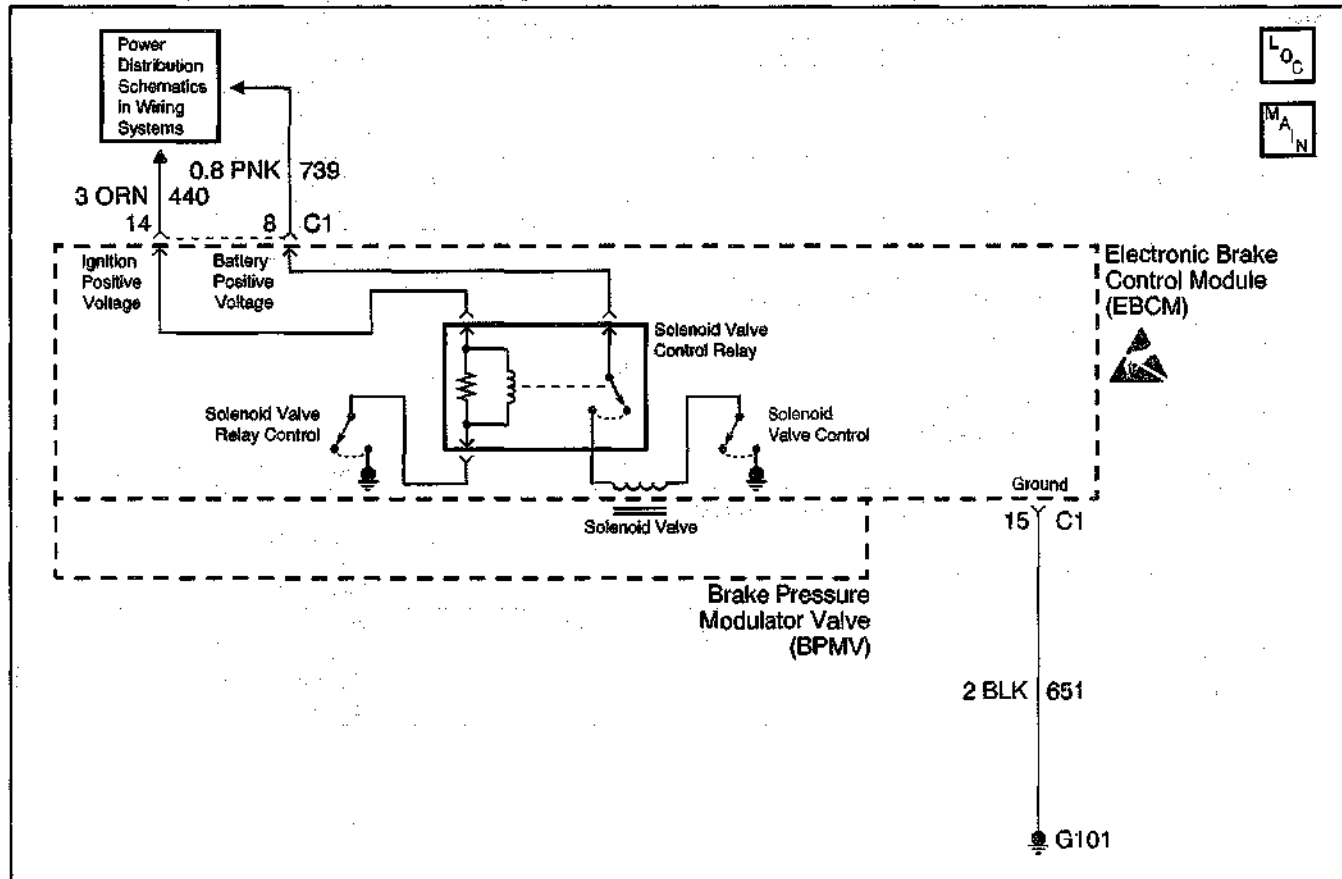
DTC C0161 ABS/TCS Brake Switch Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Observe the rear brake lamps. Are the brake lamps off?	—	Go to Step 4	Go to Step 3
3	Disconnect the Stoplamp Switch connector C1. Are the brake lamps on?	—	Go to Step 18	Go to Step 12
4	Press the brake pedal. Do the brake lights come on?	—	Go to Step 5	Go to Step 8
5	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector only. 4. Using the J 39200 DMM, measure the voltage at the J 39700 terminal 6 while an assistant presses the brake pedal. Is the voltage within specifications?	B+	Go to Step 6	Go to Step 7
6	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
7	Repair the open or high resistance in CKT 20. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
8	Check the STOP/HAZARD fuse in the I/P Fuse Block. Is the fuse OK?	—	Go to Step 9	Go to Step 13
9	1. Disconnect the Stoplamp Switch connector C1. 2. Using the J 39200 DMM, measure the voltage at the Stoplamp Switch harness connector terminal A. Is the voltage within specifications?	B+	Go to Step 11	Go to Step 10
10	Repair the open in CKT 140. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	Connect a fused jumper wire between the Stoplamp Switch harness connector terminals A and B. Do the brake lamps come on?	—	Go to Step 12	Go to Step 7
12	Adjust or repair the Stoplamp Switch as necessary. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	1. Replace the STOP/HAZARD fuse. (Do not press the brake pedal.) 2. Check the STOP/HAZARD fuse. Is the fuse OK?	—	Go to Step 15	Go to Step 14

DTC C0161 ABS/TCS Brake Switch Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
14	Repair the short to ground in CKT 140. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
15	1. Press the brake pedal. 2. Check the STOP/HAZARD fuse. Is the fuse OK?	—	Go to A Diagnostic System Check - ABS	Go to Step 16
16	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM. 3. Replace the fuse. 4. Depress the brake pedal. 5. Check the STOP/HAZARD fuse. Is the fuse OK?	—	Go to Step 6	Go to Step 17
17	Repair the short to ground in CKT 20. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
18	Repair CKT 20 for a short to voltage. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0166 TCS Priming Line Valve CKT Malfunction



519718

Circuit Description

The TCS Prime valve solenoid circuits are supplied with battery power when the Ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

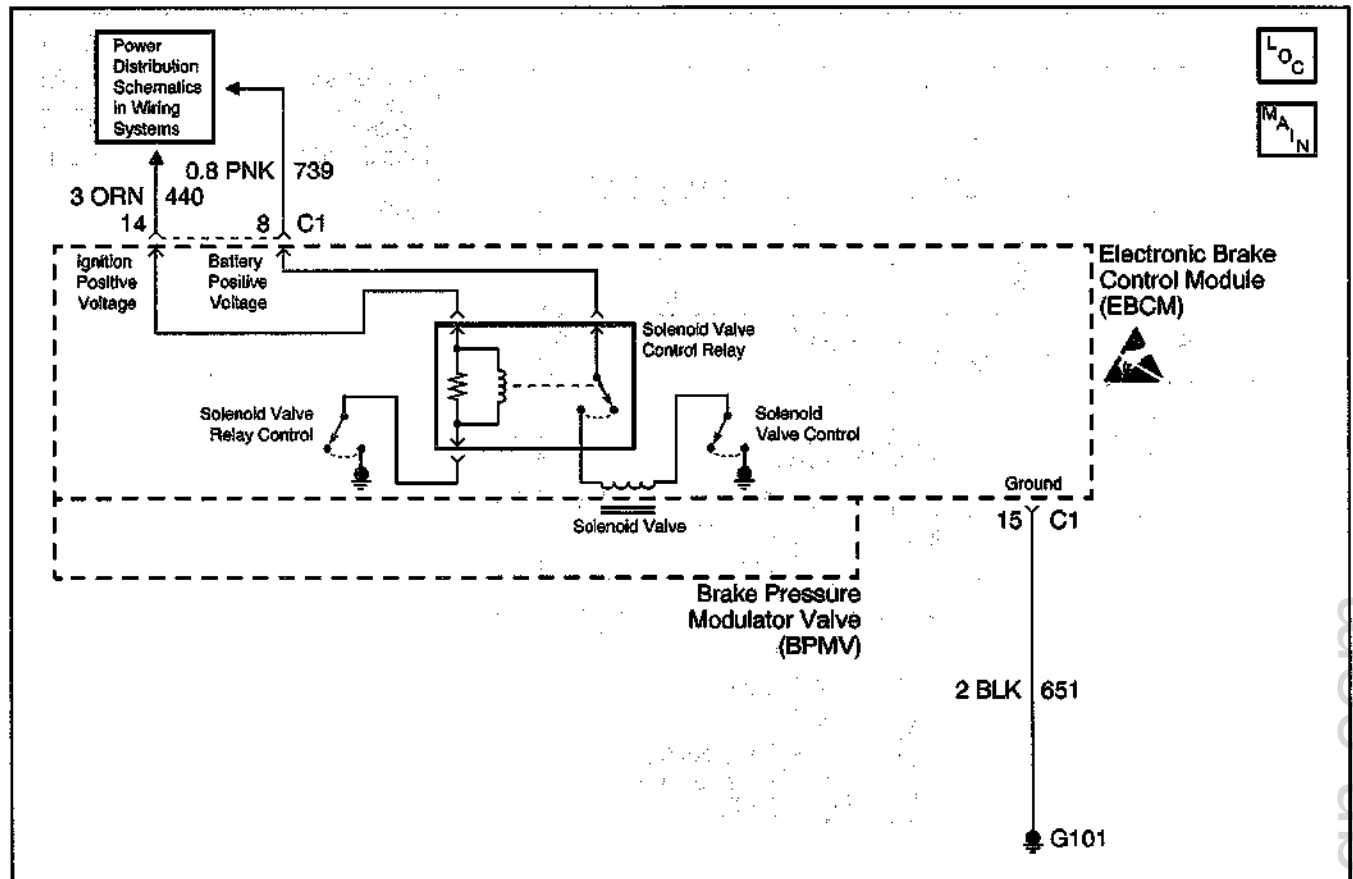
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0166 TCS Priming Line Valve CKT Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0166 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0171 TCS Pilot Valve Circuit Malfunction



519718

Circuit Description

The Master Cylinder Isolation valve solenoid circuits are supplied with battery power when the ignition is in the RUN position. The EBCM controls the valve functions by grounding the circuit when necessary.

Conditions for Setting the DTC

The EBCM senses a discrepancy such as an open, short to ground, or short to voltage in the circuit.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- ABS/TCS disabled

- ABS/TCS Indicators are turned on.
- The Red BRAKE Warning Indicator turns on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTC detected.

Test Description

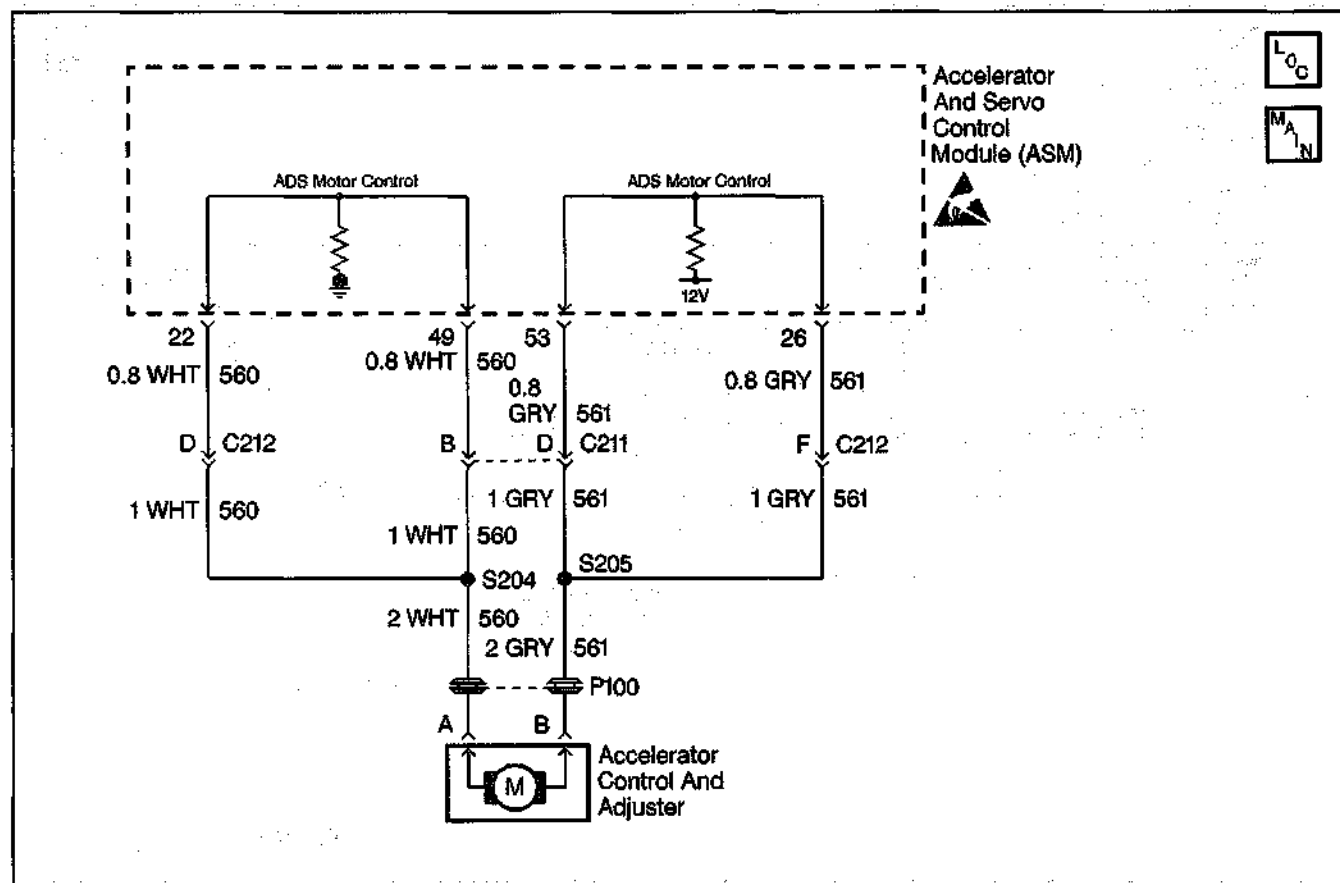
The numbers below refer to step numbers on the Diagnostic Table.

2. This step determines if the DTC is current.

DTC C0171 TCS Pilot Valve Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Install a scan tool. 3. Turn the ignition switch to the RUN position, engine off. 4. Using the scan tool run the Automated test. Does DTC C0171 reset as a current DTC?	—	Go to Step 3	Go to A Diagnostic System Check - ABS
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0181 Throttle Reduction Motor CKT Malfunction



519730

Circuit Description

Identifies an adjuster assembly motor circuit that is shorted to ground, shorted to voltage, or an open circuit. This malfunction will not allow the adjuster assembly motor to be controlled at the commanded current rate or will cause the driver circuit to allow current directly to ground.

Conditions for Setting the DTC

DTC C0181 can set anytime the ignition switch is in the RUN position and the EBCM detects an open, short to ground, or a short to voltage.

Action Taken When the DTC Sets

- A malfunction DTC stores
- The TCS disables
- The amber TCS indicator turns on

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTCs detected.

Diagnostic Aids

Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:

- Backed out terminals
- Improper mating
- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness

The following conditions may cause an intermittent malfunction:

- A poor connection
- Rubbed-through wire insulation
- A broken wire inside the insulation

If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in Wiring Systems.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

- 4. This step checks for a short to ground.
- 8. This step checks for an open.
- 14. This step checks for a short to voltage.

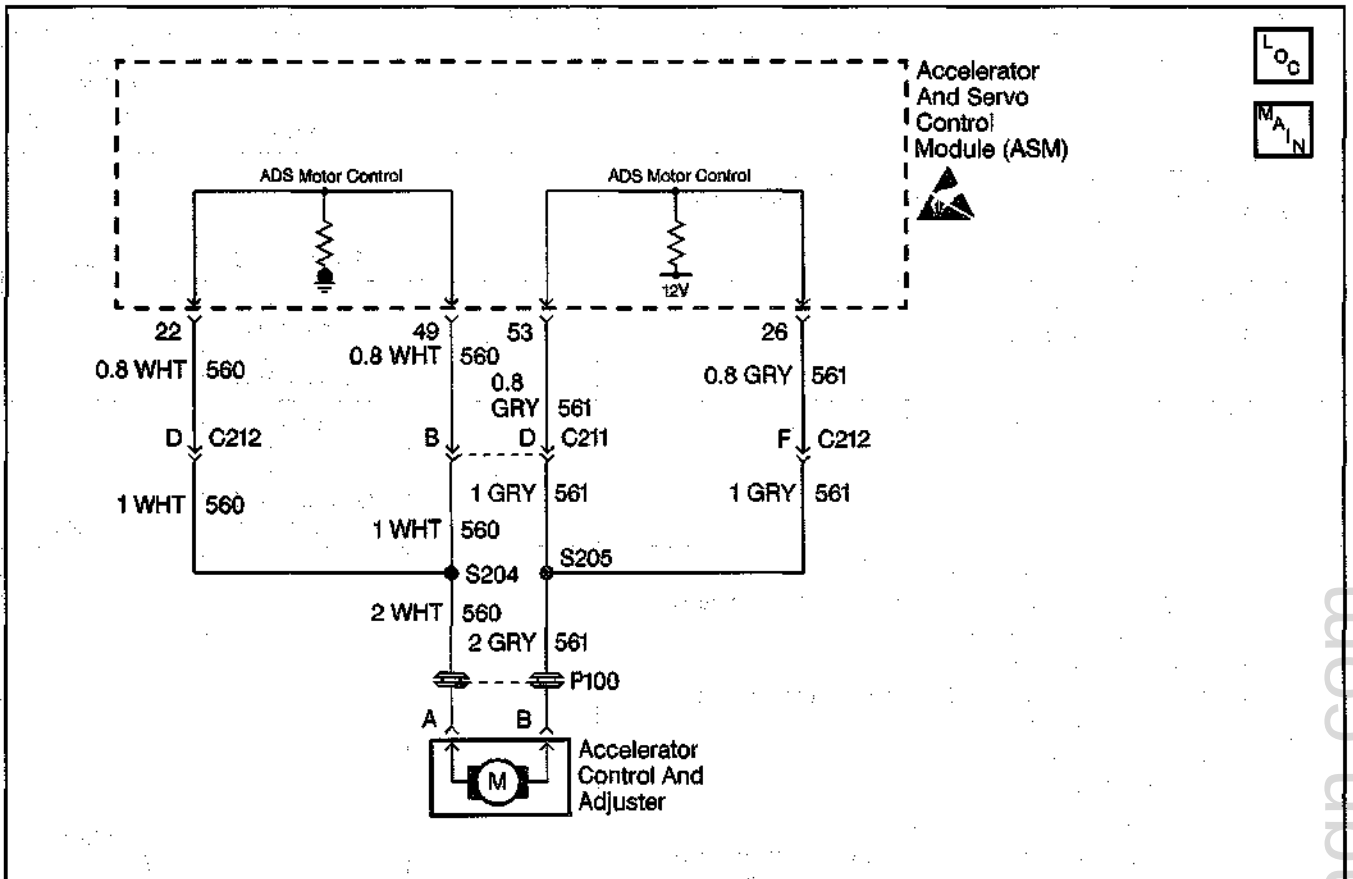
DTC C0181 Throttle Reduction Motor CKT Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Disconnect the Accelerator Control and Adjuster connector. 3. Disconnect all cables from the Accelerator Control and Adjuster. 4. Rotate Adjuster by hand fully, then release and allow to return to the stop. Repeat this procedure three times. 5. Zero the leads on the J 39200 DMM. 6. Using J 39200 DMM, measure the resistance between the Accelerator Control and Adjuster connector terminals A and B. Is the resistance within the range specified in the value(s) column?	0.5–10Ω	Go to Step 4	Go to Step 3
3	Replace the Accelerator Control and Adjuster. Refer to <i>Adjuster Assembly Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Disconnect the ASM harness connector. 2. Using J 39200 DMM measure the resistance between the ASM harness connector terminals 22 and 28. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 6	Go to Step 5
5	Repair CKT 560 for a short to ground. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
6	Using J 39200 DMM measure the resistance between the ASM harness connector terminals 26 and 28. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 8	Go to Step 7
7	Repair CKT 561 for a short to ground. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
8	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 22 and the Accelerator Adjuster harness connector terminal A. Is the resistance within the range specified in the value(s) column?	0–5Ω	Go to Step 10	Go to Step 9
9	Repair CKT 560 for an open. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0181 Throttle Reduction Motor CKT Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
10	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 49 and the Accelerator Adjuster harness connector terminal A. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 11	Go to Step 9
11	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 26 and the Accelerator Adjuster harness connector terminal B. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 13	Go to Step 12
12	Repair CKT 561 for an open. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 53 and the Accelerator Adjuster harness connector terminal B. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 14	Go to Step 12
14	1. Turn the ignition switch to the RUN position, engine off. 2. Using the J 39200 DMM, measure the voltage at the ASM harness connector terminal 22. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 15	Go to Step 16
15	Repair CKT 560 for a short to voltage. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
16	Using the J 39200 DMM, measure the voltage at the ASM harness connector terminal 26. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 17	Go to Step 18
17	Repair CKT 561 for a short to voltage. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
18	Replace the ASM. Refer to <i>Accelerator and Servo Control Module (ASM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0182 Throttle Reduction Motor CKT Range Perf



519730

Circuit Description

The throttle position signal is used by the ASM to control the actual throttle position that is requested by the EBCM. The EBCM compares the Delivered throttle position sensor value that is sent from the ASM to the throttle position sensor value sent from the PCM over the Class 2 serial data line.

Conditions for Setting the DTC

DTC C0182 will set if the ASM delivers current greater than 18 amps to the Accelerator Control and Adjuster for more than three seconds without the cable adjuster reaching its desired position.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS is disabled.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTCs detected.

Diagnostic Aids

If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections* in Wiring Systems.

Test Description

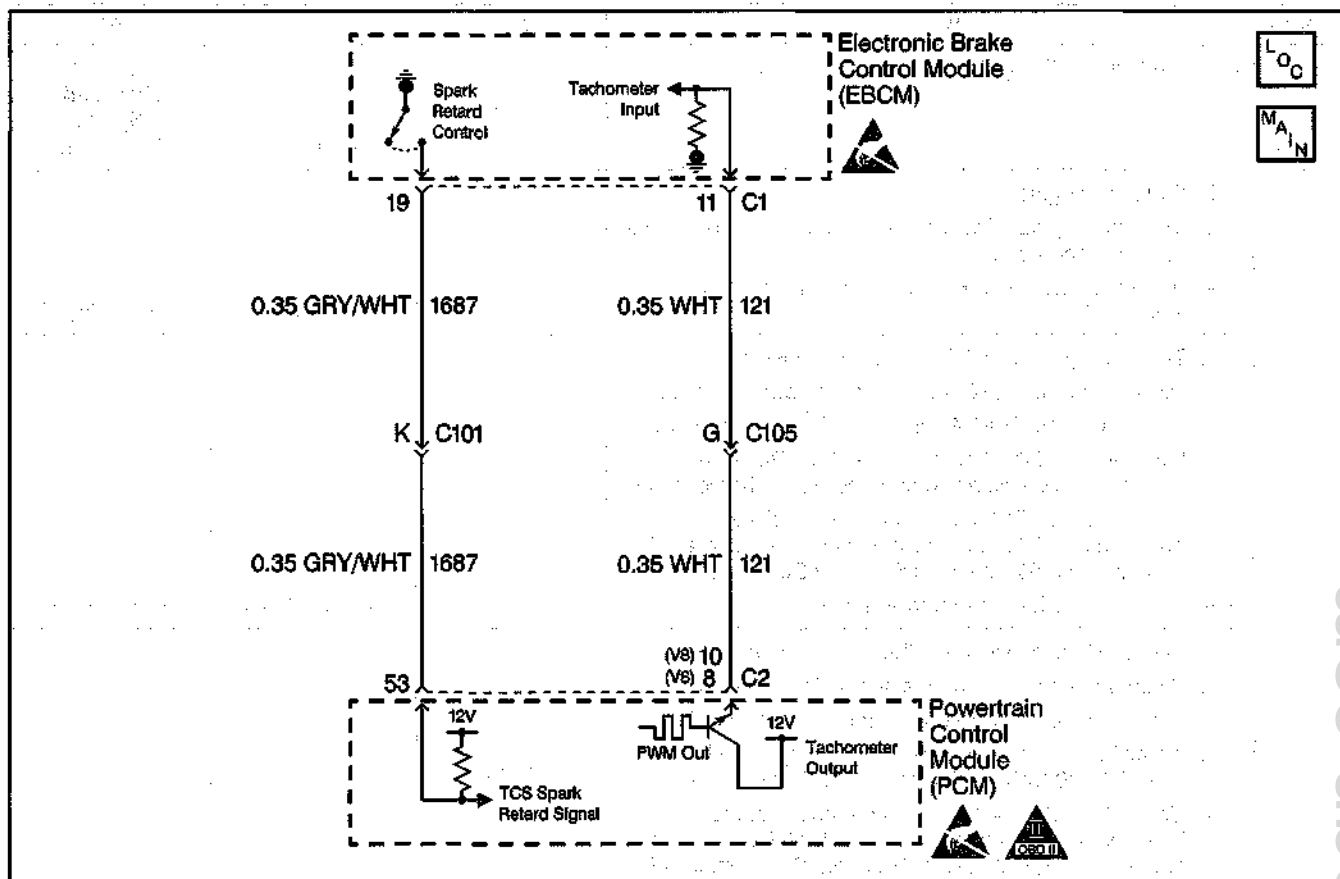
The number(s) below refer to the step number(s) on the diagnostic table.

4. This step checks if DTC C0181 is the cause for DTC C0182 for setting.
5. This step checks if DTC C0182 is a current fault.

DTC C0182 Throttle Reduction Motor CKT Range Perf

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Inspect all Accelerator Control and Adjuster cables and linkages for any obvious problems that could cause binding or sticking. Were any problems found?	—	Go to Step 3	Go to Step 4
3	Repair as necessary. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
4	Is DTC C0181 also set as a current DTC?	—	Go to DTC C0181 Throttle Reduction Motor CKT Malfunction	Go to Step 5
5	1. Using a scan tool clear DTC C0182. 2. Raise the rear of the vehicle so that both rear wheel are approximately 6 inches off the floor. 3. Start the engine. 4. Using a scan tool in TCS Data List monitor the Throttle Angle 5. Press the brake pedal. 6. Put vehicle in gear. 7. Release the brake pedal. 8. Depress and hold the Accelerator pedal between 15 degrees and 45 degrees for at least four seconds. Did DTC C0182 reset as a current DTC?	—	Go to Step 6	Go to A Diagnostic System Check - ABS
6	Replace the Accelerator Control and Adjuster, Refer to Adjuster Assembly Replacement. Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0236 TCS RPM Signal Circuit Malfunction



519733

Circuit Description

The RPM signal circuit provides the EBCM with an indication of engine RPM to help determine TCS control methods and rates when a TCS event takes place.

Conditions for Setting the DTC

The EBCM does not receive an RPM input signal after 1 second, after the engine has been started.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS indicator is turned on.
- The TCS is disabled. ABS remains functional.

Conditions for Clearing the DTC

- The condition for DTC is no longer present and the scan tool Clear DTCs function is used.
- 100 drive cycles have passed with no DTCs detected.

Diagnostic Aids

Perform a thorough inspection of the wiring. Perform a thorough inspection of the connectors. Failure to carefully and fully inspect the wiring and the connectors may result in misdiagnosis. Misdiagnosis causes part replacement with reappearance of the malfunction.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

2. If the instrument panel tachometer is working properly, the cause of the malfunction is most likely between S120 and the EBCM, or the EBCM itself.
10. At this point, the PCM is likely causing the malfunction. Refer to the appropriate OBD system check.

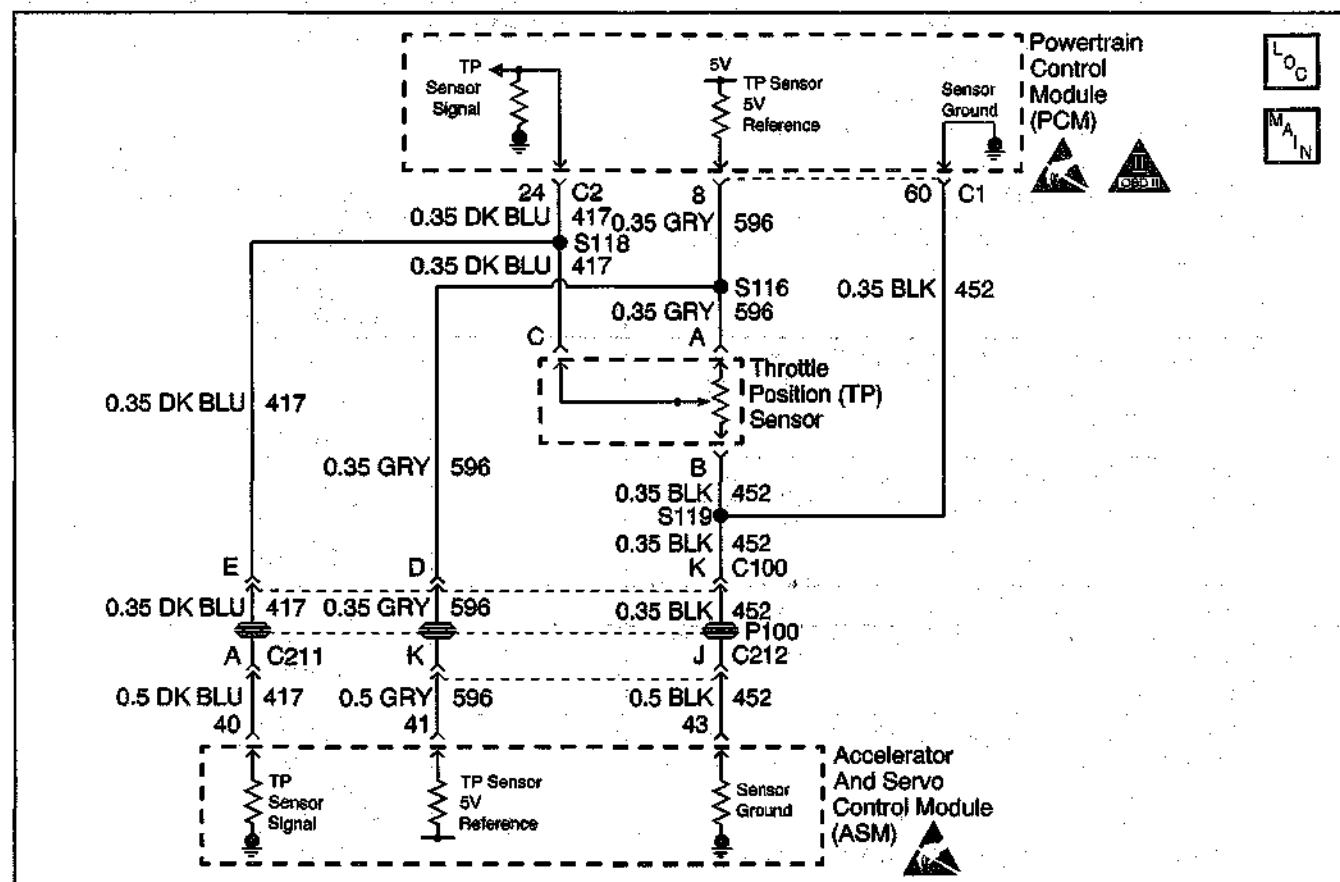
DTC C0236 TCS RPM Signal Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Start the engine. 2. Vary the engine RPM with the throttle while observing the I/P tachometer. Does the I/P tachometer work properly as the engine RPM changes?	—	Go to Step 3	Go to Step 4
3	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2 from the PCM. 3. Disconnect the EBCM connector C1 from the EBCM. 4. Install the J 39700 Universal Breakout Box with the J 39700-530 Cable Adapter to the EBCM harness only. 5. Use a J 39200 DMM to measure the resistance between the PCM harness connector C2 terminal 10 and the J 39700 Universal Breakout Box terminal 11. Is the resistance within the specified range?	0–5 Ω	Go to Step 9	Go to Step 11
4	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2 from the PCM. 3. Disconnect the EBCM connector C1 from the EBCM. 4. Install the J 39700 Universal Breakout Box with the J 39700-530 Cable Adapter to the EBCM harness only. 5. Use a J 39200 DMM to measure the resistance between the PCM harness connector C2 terminal 10 and the J 39700 Universal Breakout Box terminal 11. Is the resistance within the specified range?	0–5 Ω	Go to Step 5	Go to Step 12
5	Use a J 39200 DMM to measure the resistance between the J 39700 Universal Breakout Box terminal 11 and terminal 15. Is the resistance within the specified range?	OL (Infinite)	Go to Step 6	Go to Step 13
6	1. Turn the ignition switch to the RUN position. 2. Use a J 39200 DMM to measure the voltage between the J 39700 Universal Breakout Box terminal 11 and terminal 15. Is the voltage within the specified range?	0–2 V	Go to Step 7	Go to Step 14
7	1. Inspect the PCM connector for the following: • Inspect for damage. • Inspect for poor terminal contact. • Inspect for corrosion. 2. Inspect the EBCM connector for the following: • Inspect for damage. • Inspect for poor terminal contact. • Inspect for corrosion. 3. Ensure both the PCM connector and the EBCM connector are properly retained when connected. Are the following signs present on either connector: • Is poor terminal contact present? • Is corrosion present? • Is damaged terminals present?	—	Go to Step 15	Go to Step 8

DTC C0236 TCS RPM Signal Circuit Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
8	1. Reconnect all the connectors. 2. Using the scan tool clear the DTC. 3. Disconnect the scan tool from the DLC. 4. Start the engine. Did DTC C0236 reset?	—	Go to Step 10	Go to A Diagnostic System Check - ABS
9	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
10	Suspect PCM. Refer to <i>A Powertrain On Board Diagnostic (OBD) System Check</i> in Engine Controls. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	Repair an open in CKT 121 between S120 and the EBCM harness connector terminal 11. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
12	Repair an open in CKT 121 between S120 and the PCM harness connector C2 terminal 10. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	Repair a short to ground in CKT 121. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
14	Repair a short to voltage in CKT 121. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
15	Replace all the terminals or replace the connectors that exhibit signs of the following: • That exhibit signs of poor terminal contact. • That exhibit signs of corrosion. • That exhibit signs of damaged terminals. Refer to <i>Connector Repairs</i> in Electrical Diagnosis. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0237 TCS Throttle Position Signal Malfunction



552798

Circuit Description

The throttle position signal is used by the ASM to control the actual throttle position that is requested by the EBCM.

Conditions for Setting the DTC

- DTC C0237 will set if the ASM is not receiving a reference voltage.
- DTC C0237 will set if the reference signal is outside of a specified range.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS is disabled.
- The amber TCS indicator will turn on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions in Wiring Systems*.

Test Description

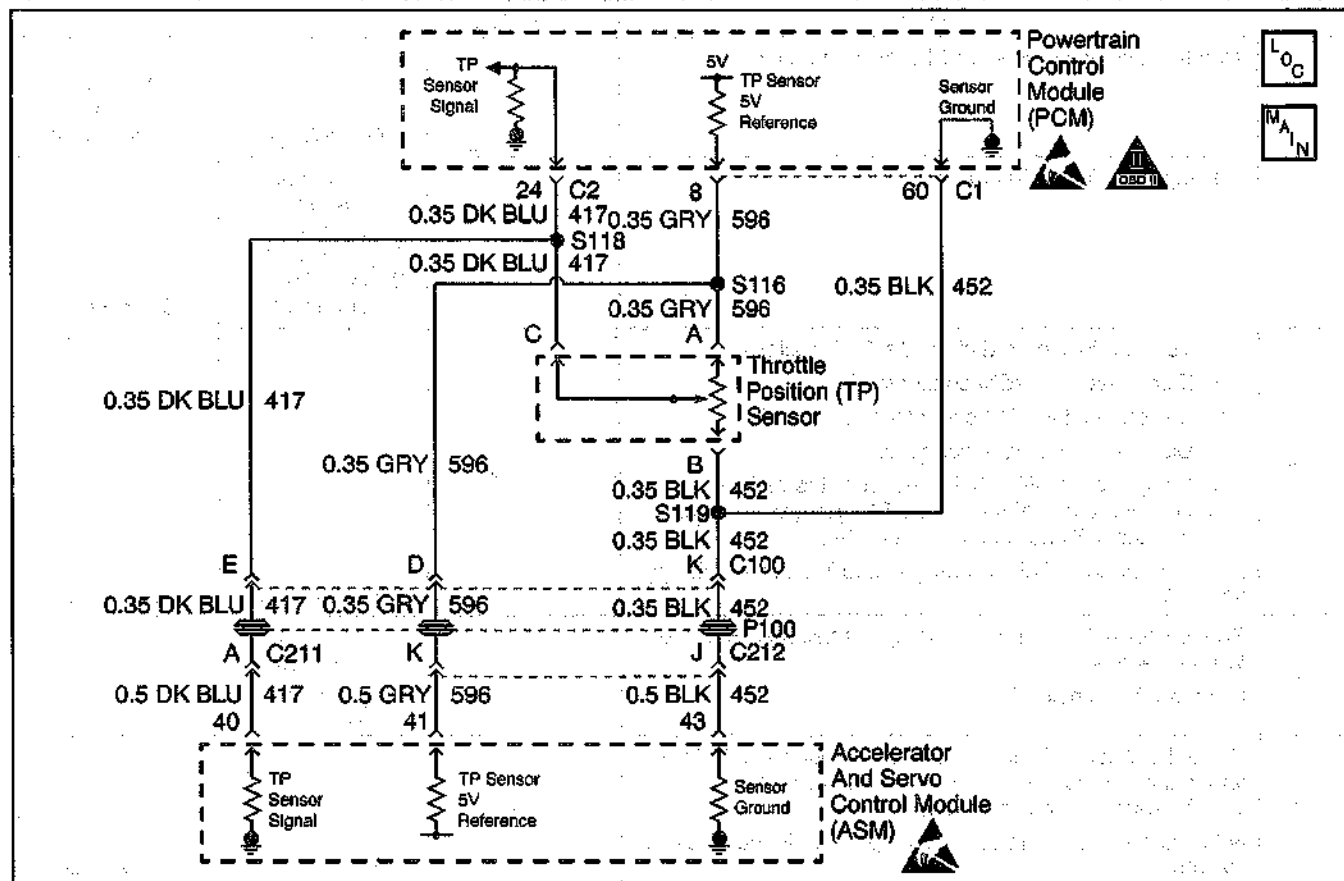
The number(s) below refer to the step number(s) on the diagnostic table.

3. This step checks for an open in CKT 417.
5. This step checks for an open in CKT 596.
7. This step checks for an open in CKT 452.

DTC C0237 TCS Throttle Position Signal Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Are any PCM TPS DTC(s) set?	—	Go to A Powertrain On Board Diagnostic (OBD) System Check in Engine Controls	Go to Step 3
3	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2. 3. Disconnect the TPS connector. 4. Disconnect the ASM connector. 5. Using the J 39200 DMM, measure the resistance between terminal 40 of the ASM harness connector and the TPS harness connector terminal C. Is the resistance within the range specified in the value(s) column?	0–5Ω	Go to Step 5	Go to Step 4
4	Repair CKT 417 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
5	Using the J 39200 DMM, measure the resistance between terminal 41 of the ASM harness connector and the TPS harness connector terminal A. Is the resistance within the range specified in the value(s) column?	0–5Ω	Go to Step 7	Go to Step 6
6	Repair CKT 596 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
7	Using the J 39200 DMM, measure the resistance between terminal 43 of the ASM harness connector and the TPS harness connector terminal B. Is the resistance within the range specified in the value(s) column?	0–5Ω	Go to Step 9	Go to Step 8
8	Repair CKT 452 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Replace the ASM. Refer to <i>Accelerator and Servo Control Module (ASM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0238 TCS TP Sensor Comparison Malfunction



Circuit Description

The throttle position signal is used by the ASM to control the actual throttle position that is requested by the EBCM. The EBCM compares the Delivered throttle position sensor value that is sent from the ASM to the throttle position sensor value sent from the PCM over the Class 2 serial data line.

Conditions for Setting the DTC

DTC C0238 will set if the EBCM detects a difference between the PCM throttle position and the throttle position sent from the ASM.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS is disabled.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Test Description

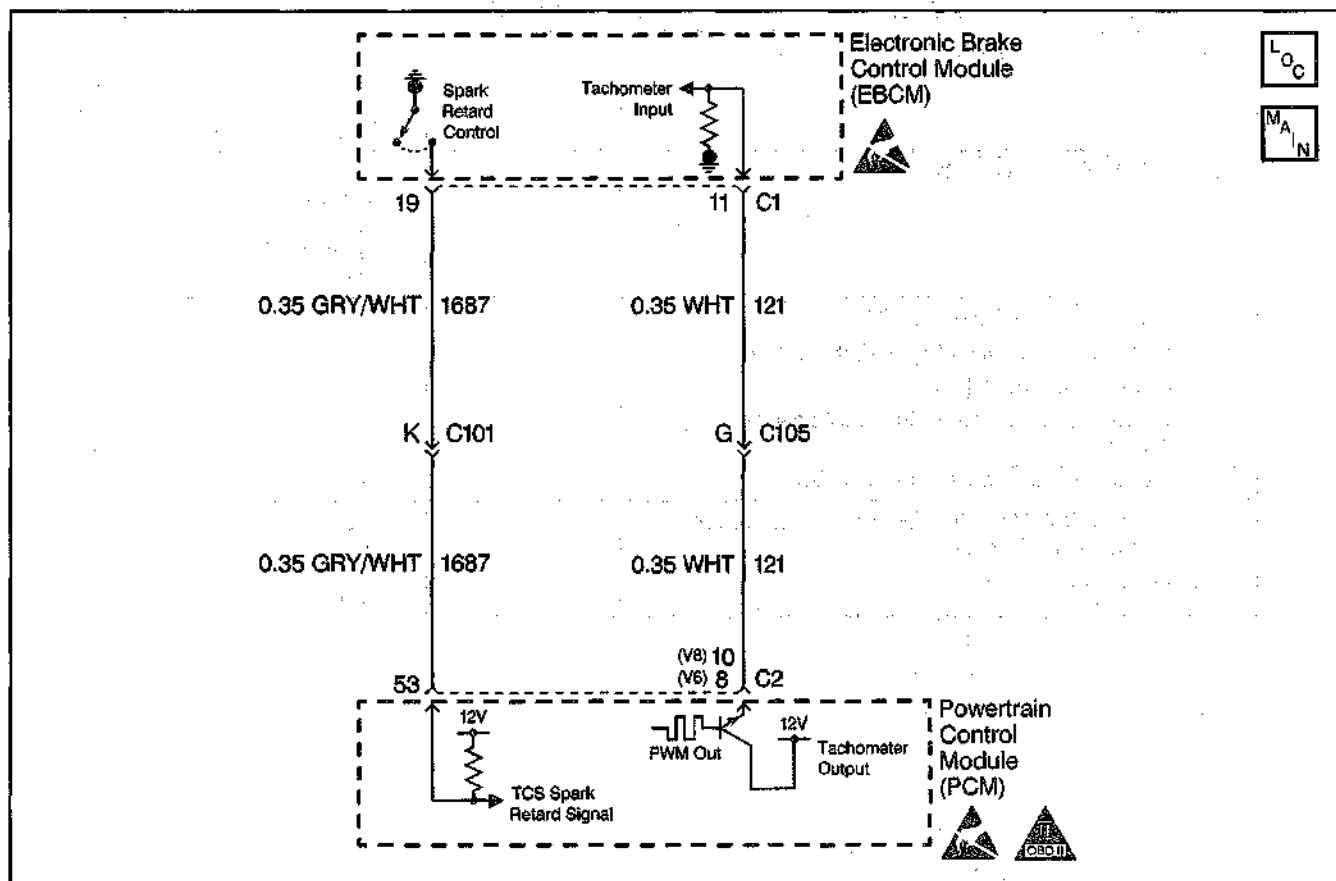
The number(s) below refer to the step number(s) on the diagnostic table.

2. This step checks if the PCM detected a fault.

DTC C0238 TCS TP Sensor Comparison Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Are any PCM TPS DTCs set?	—	Go to A Powertrain On Board Diagnostic (OBD) System Check	Go to Step 3
3	1. Using a scan tool clear the DTC. 2. Turn the ignition switch to the OFF position. 3. Disconnect the scan tool. 4. Turn the ignition switch to the RUN position, engine off. Does DTC C0238 reset as a current DTC?	—	Go to Step 4	Go to A Diagnostic System Check - ABS
4	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0239 TCS Spark Retard Monitoring Malfunction



519733

Circuit Description

Spark Retard is simultaneously controlled by the EBCM and the PCM. The PCM supplies a 12 volt pull up voltage. This voltage is monitored by the PCM, the EBCM requests spark retard by pulling the voltage low.

Conditions for Setting the DTC

DTC C0239 can be set anytime when the EBCM senses a short to ground, a short to battery voltage, or an open in CKT 1687.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The ABS/TCS is disabled.
- The Red BRAKE Warning indicator turn on.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- If an intermittent malfunction exists refer to *Testing for Intermittent and Poor Connections in Wiring Systems*.

Test Description

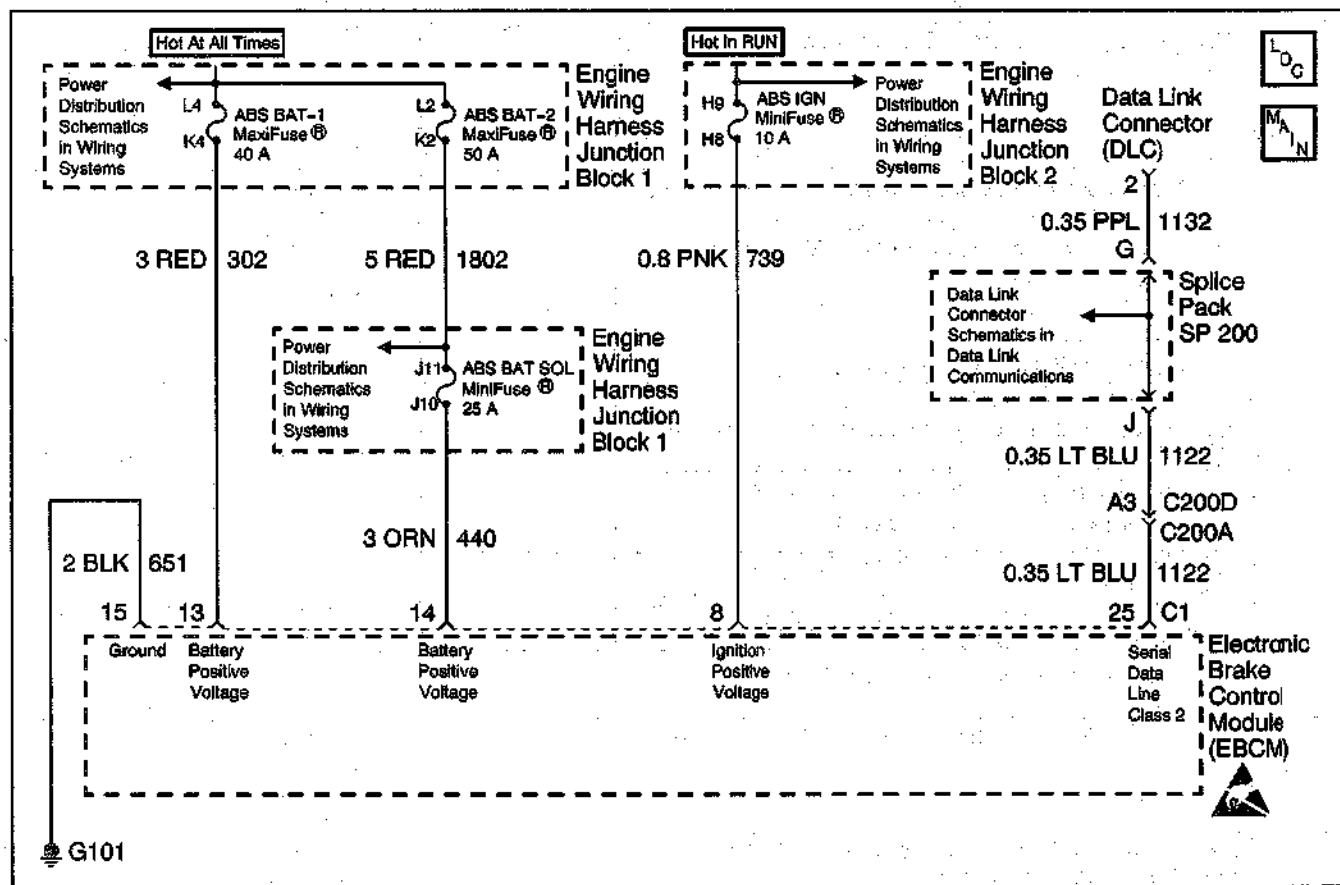
The number(s) below refer to the step number(s) on the diagnostic table.

2. This step checks for the pull up voltage from the PCM.
3. This step checks for a short to voltage.
6. This step checks for a short to ground.

DTC C0239 TCS Spark Retard Monitoring Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector C1 only. 4. Turn the ignition switch to the RUN position, engine off. 5. Using J 39200 DMM, measure the voltage at terminal 19 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 10V	Go to Step 3	Go to Step 6
3	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2. 3. Turn the ignition switch to the RUN position, engine off. 4. Using J 39200 DMM, measure the voltage at terminal 19 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 4	Go to Step 5
4	Repair CKT 1687 for a short to voltage. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
5	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2. 3. Using J 39200 DMM, measure the resistance between terminals 19 and 15 of J 39700. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 8	Go to Step 7
7	Repair CKT 1687 for a short to ground. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
8	Using J 39200 DMM, measure the resistance between terminal 19 of J 39700 and terminal 53 of the PCM connector C2. Is the resistance within the range specified in the value(s) column?	0–5Ω	Go to Step 10	Go to Step 9
9	Repair CKT 1687 for an open. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
10	Suspect the PCM. Refer to <i>A Powertrain On Board Diagnostic (OBD) System Check</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0240 PCM Traction Control Not Allowed



519691

Circuit Description

The PCM monitors various parameters and will not allow traction control operation if any parameter falls below a specified value.

Conditions for Setting the DTC

The PCM detects a malfunction and then causes TCS shut down until the malfunction has been corrected.

Action Taken When the DTC Sets

- A DTC C0240 is stored
- The TCS is disabled
- The TRAC OFF indicator is turned on
- If the TCS is again allowed to function, the indicator will be turned off but the DTC will be stored

Conditions for Clearing the DTC

- The condition for the DTC is no longer present and the scan tool clear DTC function is used
- 100 ignition cycles have passed with no DTCs detected

Test Description

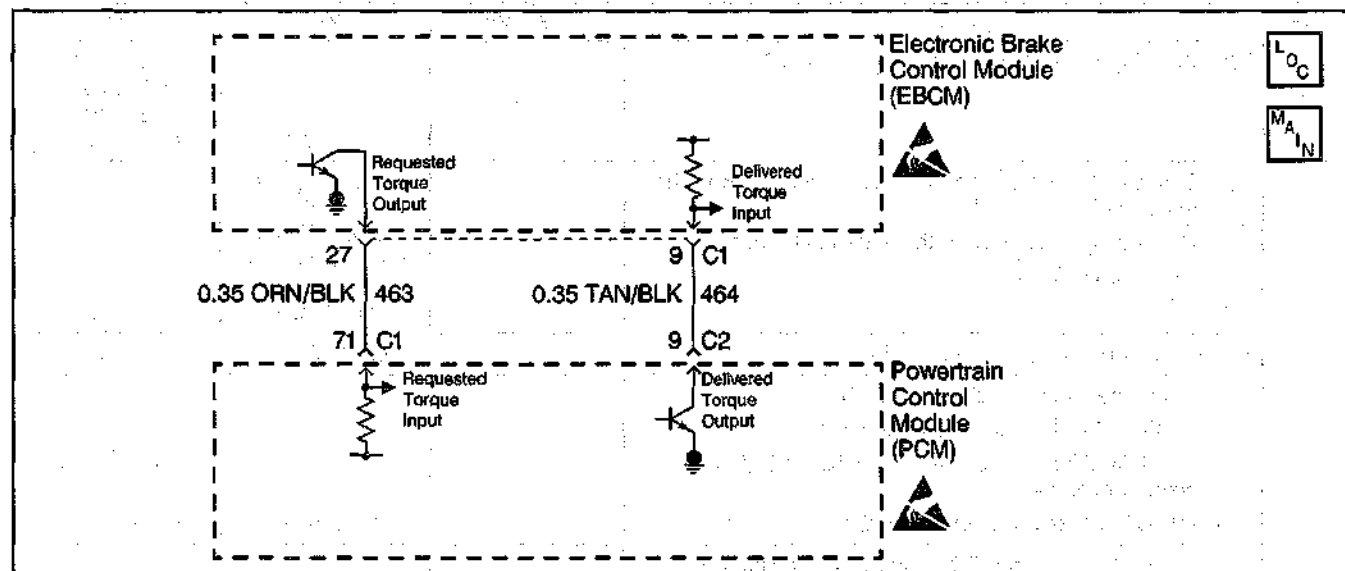
The numbers below refer to the step numbers on the diagnostic table.

4. This step checks if DTC C0240 resets.

DTC C0240 PCM Traction Control Not Allowed

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the Ignition switch to the RUN position with the engine off. 2. Using a Scan Tool, read the ABS/TCS DTCs. Are any other DTCs set?	—	Go to Diagnostic Trouble Code (DTC) List/Type for the appropriate DTC table	Go to Step 3
3	Is DTC C0240 set as a current code?	—	Go to Step 5	Go to Step 4
4	1. Using the scan tool clear the DTC. 2. Remove the scan tool from the DLC. 3. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Did DTC C0240 set as a current DTC?	—	Go to Step 5	Go to A Diagnostic System Check - ABS
5	Perform the Powertrain OBD System Check. Refer in A Powertrain On Board Diagnostic (OBD) System Check. Did the vehicle pass the OBD System Check?	—	Go to Diagnostic Aids	Go to Powertrain Control Module Diagnosis

DTC C0241 PCM Indicated Requested Torque Malf



519744

Circuit Description

Traction Control is simultaneously controlled by the EBCM and the ECM. The EBCM sends a requested torque message via a Pulse Width Modulated (PWM) signal to the ECM requesting a desired engine torque level for proper Traction Control system operation. The PCM supplies the pull up voltage.

Conditions for Setting the DTC

- If a defective requested torque signal is detected by the PCM, a message is broadcasted back to the EBCM via class 2.
- DTC C0241 can be set anytime when ignition voltage is present and the EBCM detects the first class 2 message of a defective requested torque signal from the PCM.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS is disabled.
- The TRAC OFF indicator is turned on. The ABS remains functional.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- If an intermittent malfunction exists, refer to *Checking Aftermarket Accessories* in Wiring Systems.
- Possible causes for DTC C0241 to set:
 - Open in the circuit 463.
 - Circuit 463 shorted to ground or voltage.
 - Communication problem.
 - Circuit 463 has a wiring problem, terminal corrosion, or poor connections.
 - PCM not receiving information from the EBCM.

Test Description

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

4. This step checks for the proper requested torque value received at the PCM. This value is in percent of torque.
5. This step checks for the proper requested torque value sent from the EBCM. This value is in newton meters of torque.
7. This step checks for the presence of a pull-up voltage from the PCM.

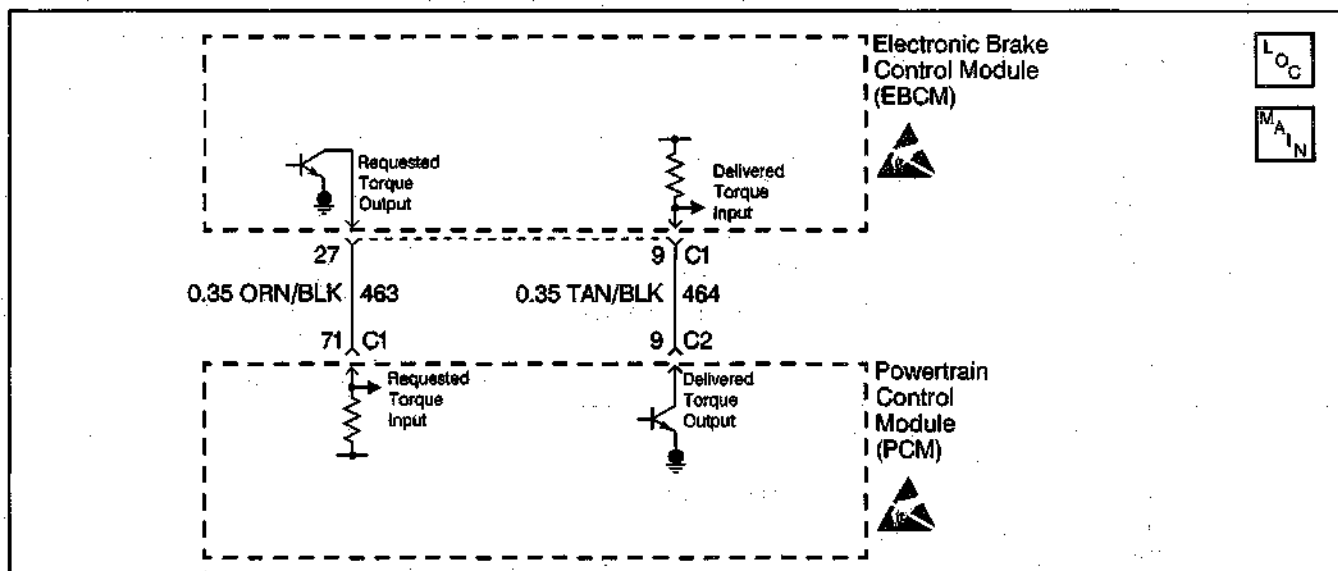
DTC C0241 PCM Indicated Requested Torque Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Check that ground, G101 and G106 is clean, tight and free of damage. Refer to <i>Power and Grounding Components in Wiring Systems</i> . Were any loose, damaged, or corroded grounds found?	—	Go to Step 3	Go to Step 4
3	Repair ground as necessary. Refer to <i>Wiring Repairs in Wiring Systems</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Turn the ignition switch to the OFF position. 2. Install the scan tool. 3. Start the engine. 4. Use the scan tool to select Engine 2 Data Display in Powertrain. 5. Using the scan tool, observe the Traction Control Desired Torque. Is the desired torque within the range specified in the value(s) column?	80–95 %	Go to Step 5	Go to Step 7
5	1. Turn the engine off. 2. Turn the ignition switch to the run position, engine off. 3. Using the scan tool, select ABS/TCS Data Display. 4. Observe the EBCM to PCM Requested Torque. Is the requested torque within the range specified in the value(s) column?	0 N·m	Go to Step 13	Go to Step 6
6	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
7	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector. 3. Install J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector. 4. Turn the ignition switch to the RUN position, engine off. 5. Using J 39200 DMM, measure the voltage between terminals 27 and 15 of J 39700. Is the voltage within the range specified in the value(s) column?	4.5–5.5 V	Go to Step 6	Go to Step 10
8	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C1. 3. Turn the ignition switch to the RUN position, engine off. 4. Using J 39200 DMM, measure the voltage between terminals 27 and 15 of J 39700. Is the voltage within the range specified in the value(s) column?	Greater than 1V	Go to Step 9	Go to Step 10

DTC C0241 PCM Indicated Requested Torque Malf (cont'd)

Step	Action	Value(s)	Yes	No
9	Repair CKT 463 for a short to voltage. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
10	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between J 39700 terminals 27 and 15. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 12	Go to Step 11
11	Repair CKT 463 for a short to ground. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
12	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between terminal 27 of J 39700 and the PCM connector C2 terminal 71. Is the resistance within the range specified in the value(s) column?	0-2 Ω	Go to Step 13	Go to Step 14
13	Suspect PCM. Refer to <i>A Powertrain On Board Diagnostic (OBD) System Check</i> in Engine Controls. Is the Repair complete?	—	Go to A Diagnostic System Check - ABS	—
14	Repair CKT 463 for an open. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0244 PWM Delivered Torque Malfunction



519744

Circuit Description

Traction Control is simultaneously controlled by the EBCM and the PCM. The PCM sends a DELIVERED TORQUE message via a Pulse Width Modulated (PWM) signal to the EBCM confirming the delivered torque level for proper Traction Control system operation. The EBCM supplies the pull up voltage.

Conditions for Setting the DTC

DTC C0244 can be set anytime when ignition voltage is present. A malfunction exists if the PWM signal is out of range or no signal is received for a period of 2 seconds.

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The TCS is disabled.
- The TRAC OFF indicator is turned on. The ABS remains functional.

Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles have passed with no DTC(s) detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- If an intermittent malfunction exists refer to *Checking Aftermarket Accessories* in Wiring Systems.
- Possible causes for DTC C0244 to set:
 - Open in CKT 464.
 - CKT 464 shorted to ground or voltage.
 - Communication frequency problem.
 - Communication duty cycle problem.
 - CKT 464 has a wiring problem, terminal corrosion, or poor connections.
 - EBCM not receiving information from the PCM.

Test Description

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

4. This step checks for proper torque value in N-m.
6. This step checks for the presence of a pull-up voltage from the EBCM.

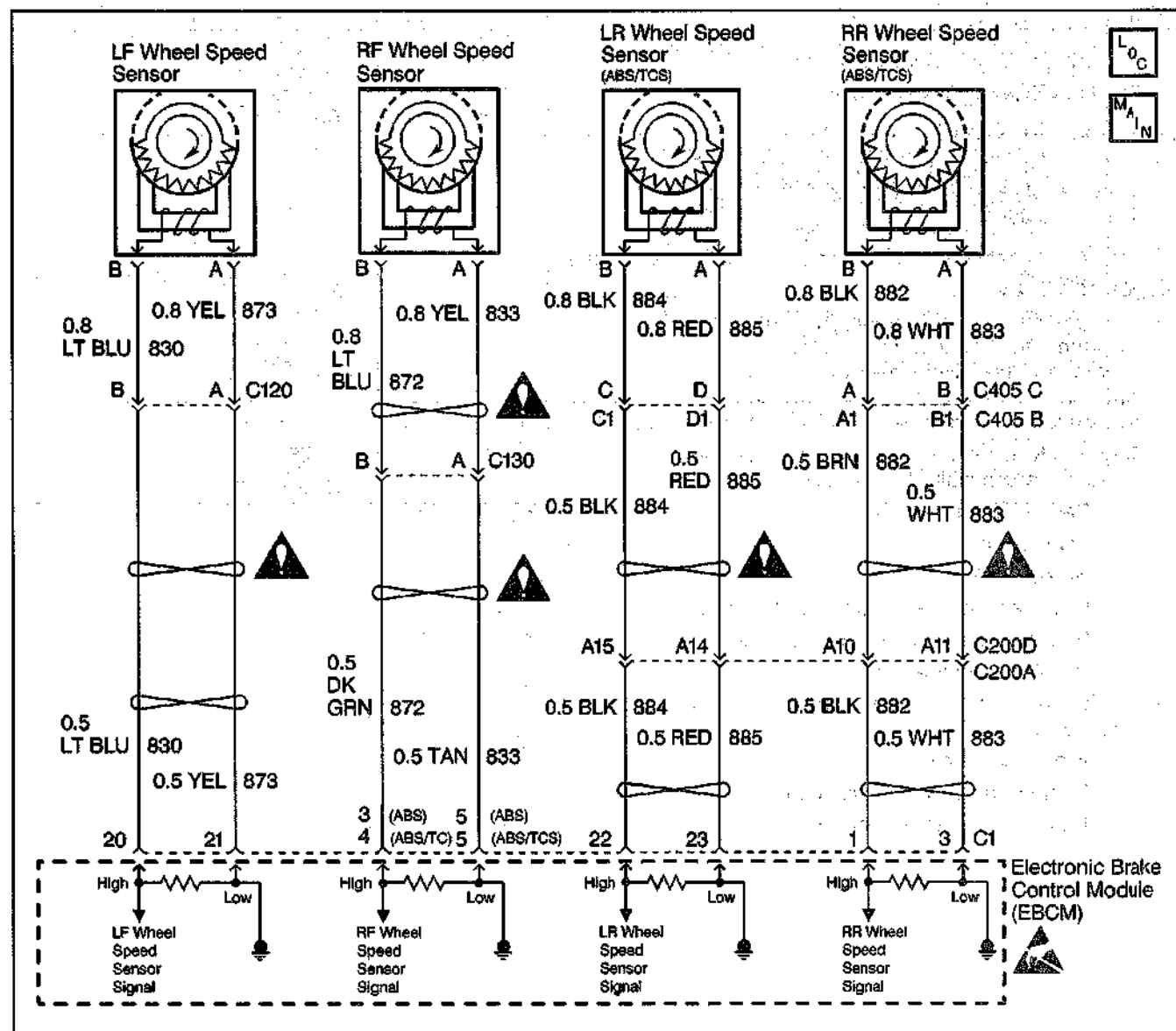
DTC C0244 PWM Delivered Torque Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Check that grounds, G101 and G106 are clean, tight and free of damage. Refer to <i>Power and Grounding Components</i> in Wiring Systems. Were any loose, damaged, or corroded grounds found?	—	Go to Step 3	Go to Step 4
3	Repair ground as necessary. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Turn the ignition switch to the OFF position. 2. Install the scan tool. 3. Turn the ignition switch to the ON position, engine off. 4. Using the scan tool, observe the PCM to EBCM delivered torque. Is the delivered torque within the range specified in the value(s) column?	0 N-m	Go to Step 5	Go to Step 6
5	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the PCM connector C2. 3. Disconnect the EBCM connector. 4. Install J 39700 Universal Pinout Box using the J 39700-530 cable adapter to the EBCM harness connector and the EBCM connector. 5. Turn the ignition switch to the ON position, engine off. 6. Using J 39200 DMM, measure the voltage between terminals 9 and 15 of J 39700. Is the voltage within the range specified in the value(s) column?	Battery Volts	Go to Step 7	Go to Step 9
7	1. Turn the ignition switch to the OFF position. 2. Disconnect the J 39700-25 cable adapter from the EBCM leaving the cable adapter connected to the EBCM harness only. 3. Turn the ignition switch to the ON position, engine off. 4. Using J 39200 DMM, measure the voltage between terminals 9 and 15 of J 39700. Is the voltage within the range specified in the value(s) column?	Greater than 1V	Go to Step 8	Go to Step 11
8	Repair CKT 464 for a short to voltage. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between J 39700 terminals 9 and 15. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 5	Go to Step 10

DTC C0244 PWM Delivered Torque Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
10	Repair CKT 464 for a short to ground. Refer to <i>Wiring Repairs</i> in <i>Wiring Systems</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between terminal 9 of J 39700 and the PCM connector C2 terminal 9. Is the resistance within the range specified in the value(s) column?	0–2 Ω	Go to Step 12	Go to Step 13
12	Suspect PCM. Refer to A <i>Powertrain On Board Diagnostic (OBD) System Check</i> . Is the Repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	Repair CKT 464 for an open. Refer to <i>Wiring Repairs</i> in <i>Wiring Systems</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0245 Wheel Speed Sensor Frequency Error



519748

Circuit Description

The speed sensors used on the front of this vehicle are multiple pole and the rear uses a single pole magnetic pickup. This sensor produces an AC signal that the EBCM uses the frequency from to calculate the wheel speed.

Conditions for Setting the DTC

- The EBCM detects a deviation between the left and right rear wheel speeds of greater than 6 km/h (3.75 mph) at a vehicle speed of less than 100 km/h (62 mph) on vehicles equipped with TCS.
- The EBCM detects a deviation between the left and right front wheel speeds of greater than 10 km/h (6.25 mph) at a vehicle speed of less than 100 km/h (62 mph).

- The EBCM detects a deviation between the left and right rear wheel speeds of greater than 6 percent of the vehicle speed at greater than 100 km/h (62 mph) on vehicles equipped with TCS.
- The EBCM detects a deviation between the left and right front wheel speeds of greater than 4 km/h plus 6 percent of the vehicle speed at greater than 100 km/h (62 mph).

This DTC will set when the EBCM cannot specifically identify which wheel speed sensor is causing the malfunction. If the EBCM can identify the specific wheel speed sensor causing the malfunction, DTC C0245 will become a history DTC, and the DTC associated with the sensor (DTC C0036, DTC C0041, DTC C0046, DTC C0051, or DTC C0056) will be set concurrent with DTC C0245.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turn on.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists and the scan tool Clear DTCs function is used.
- 100 ignition cycles pass with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation

- If the customer's comments reflect that the amber ABS/TCS indicator is on only during moist environmental conditions (rain, snow, vehicle wash), inspect all the wheel speed sensor circuitry for signs of water intrusion. If the DTC is not current, clear all DTCs and simulate the effects of water intrusion by using the following procedure:

1. Spray the suspected area with a five percent saltwater solution.

Add two teaspoons of salt to twelve ounces of water to make a five percent saltwater solution.

2. Test drive the vehicle over various road surfaces (bumps, turns, etc.) above 40 km/h (25 mph) for at least 30 seconds.
3. If the DTC returns, replace the suspected harness.

- If an intermittent malfunction exists refer to Troubleshooting Procedures Cell 4 in Electrical Diagnosis for further diagnosis.

Test Description

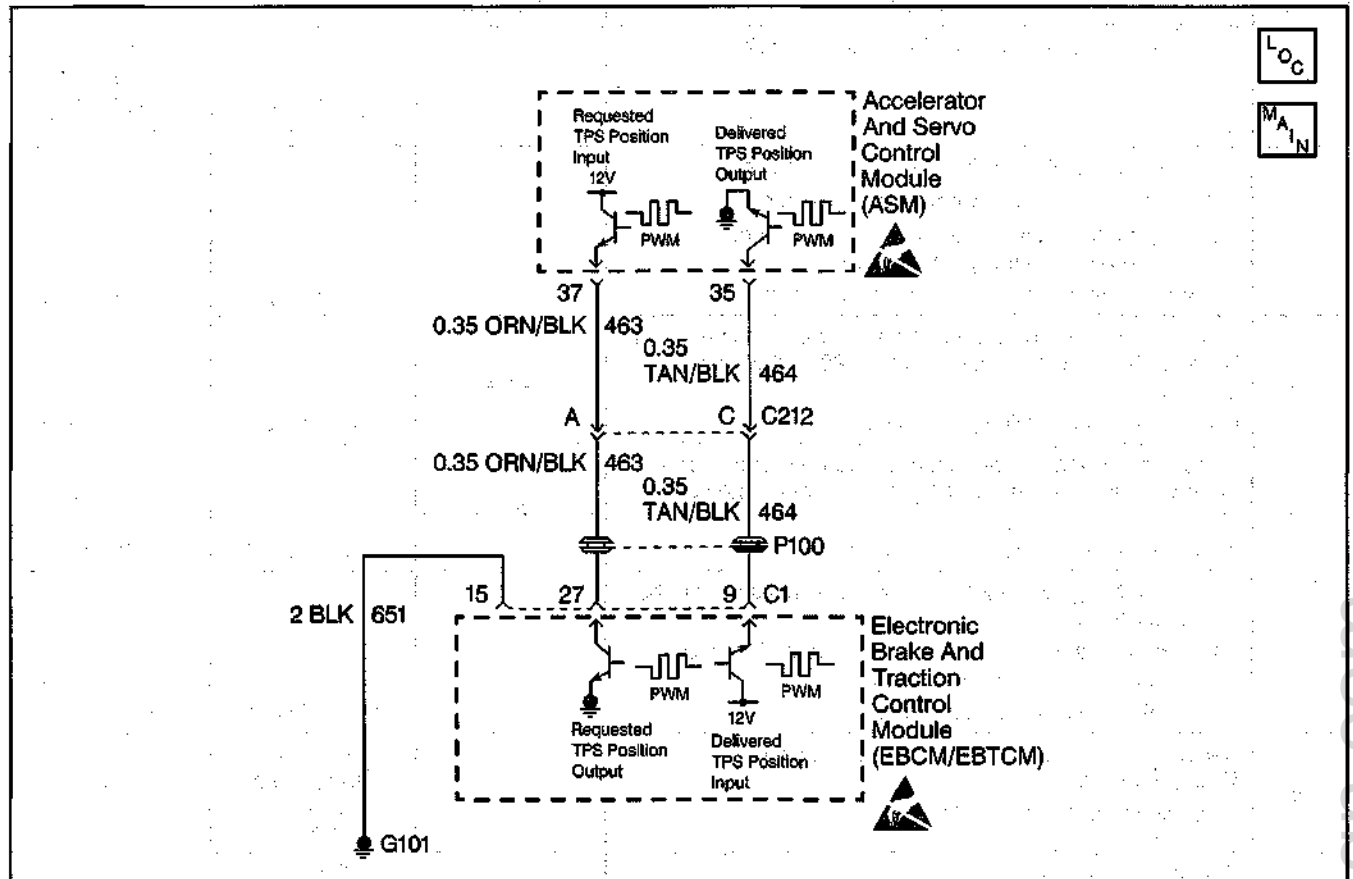
The numbers below refer to step numbers on the diagnostic table.

2. If DTC C0245 is a history code, this step checks if a specific Wheel Speed Circuit Malfunction DTC is set concurrently with DTC C0245.
7. This step checks if the wheel speed sensor harness is routed in close proximity to the spark plug wires.
9. In this step, if the scan tool can record any erroneous wheel speed sensor signals, diagnose that sensor(s) first.

DTC C0245 Wheel Speed Sensor Frequency Error

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Is the following DTC(s) set concurrently with a history DTC C0245? • DTC C0036 • DTC C0041 • DTC C0046 • DTC C0051 • DTC C0056	—	Go to DTC Diagnostic Trouble Code (DTC) List/Type	Go to Step 3
3	Inspect the WSS for physical damage. Is physical damage of the WSS evident?	—	Go to Step 4	Go to Step 5
4	Replace the WSS. Is the replacement complete?	—	Go to Step 14	—
5	Inspect the jumper harness for physical damage. Is physical damage of the jumper harness evident?	—	Go to Step 6	Go to Step 7
6	Replace the jumper harness. Is the replacement complete?	—	Go to Step 14	—
7	Check for Proper routing of the wheel speed sensor harness. Check that the wheel speed sensor harness is routed away from the spark plug wires. Is the wheel speed sensor harness properly routed?	—	Go to Step 9	Go to Step 8
8	Reroute the wheel speed sensor harness away from the spark plug wires. Is the reroute complete?	—	Go to Step 14	—
9	1. Install a scan tool. 2. Turn the ignition switch to the RUN position. 3. Set the scan tool to Snap Shot Auto Trigger mode and monitor the wheel speed sensors. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Did the scan tool trigger on any of the wheel speed sensors?	—	Go to Step 10	Go to Step 11
10	Note which wheel speed sensor triggered the scan tool. Follow the appropriate Wheel Speed Sensor Malfunction DTC table for the wheel speed sensor that triggered. Refer to DTC Table. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 13	Go to Step 12
12	Malfunction is intermittent. Inspect all connectors and harnesses for damage that may result in an open or high resistance when connected. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
13	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
14	1. Reconnect all previously disconnected components. 2. Using a scan tool clear the DTC. 3. Remove the scan tool from the DLC. 4. Carefully drive the vehicle above 12 Km/h (8 mph) for several minutes. Does the DTC reset as a current DTC?	—	Go to Step 2	Go to A Diagnostic System Check - ABS

DTC C0266 ADS Controller Malfunction



213300

Circuit Description

This circuit monitors the Delivered Throttle Position Input for proper operation.

Conditions for Setting the DTC

DTC C0266 can set anytime the ignition is in the RUN position and the EBCM does not receive a Delivered Throttle Position Input.

Action Taken When the DTC Sets

- The TCS is disabled
- The traction control indicator is turned on

Conditions for Clearing the DTC

- The condition for the DTC is no longer present and the scan tool clear DTC function is used
- 100 ignition cycles have passed with no DTCs detected

Diagnostic Aids

- Thoroughly inspect the wiring and the connectors. Failure to carefully and fully inspect the wiring and the connectors can result in misdiagnosis. Misdiagnosis may cause replacement of parts without repairing the malfunction.
- If an intermittent malfunction exists, refer to *Inducing Intermittent Fault Conditions* in Electrical Diagnosis.

Test Description

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

3. This step checks for a good ground.
5. This step checks for proper voltage.

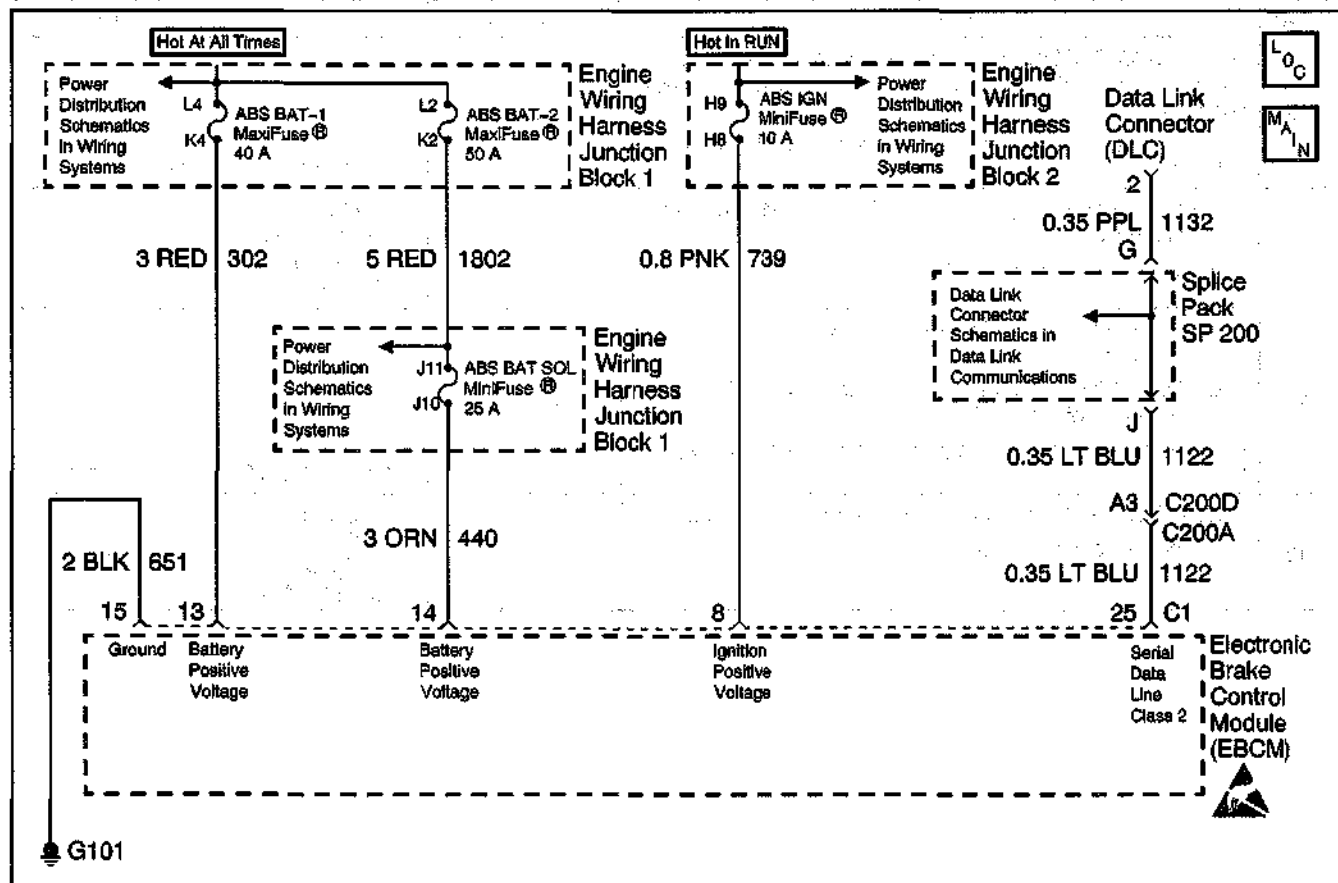
DTC C0266 ADS Controller Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the OFF position. 2. Disconnect the ASM harness connector. 3. Inspect the ASM harness connector and the connector for damage or corrosion. Is there any evidence of damage or corrosion?	—	Go to Step 7	Go to Step 3
3	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 28 and a good ground. Is the resistance within specifications?	0-5 Ω	Go to Step 4	Go to Step 8
4	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 55 and a good ground. Is the resistance within specifications?	0-5 Ω	Go to Step 5	Go to Step 8
5	1. Turn the ignition switch to the RUN position with the engine off. 2. Measure the voltage between the ASM harness connector terminals 1 and 28. Is the voltage within specifications?	B+	Go to Step 10	Go to Step 6
6	Repair CKT 739 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
7	Repair as necessary. Are the repairs complete?	—	Go to A Diagnostic System Check - ABS	—
8	Repair the open or high resistance in CKT 151. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Replace the ASM. Refer to <i>Accelerator and Servo Control Module (ASM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
10	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box using the J39700-530 cable adapter to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between terminals 9 and 15 of J 39700. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 12	Go to Step 11
11	Repair CKT 464 for a short to ground. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0266 ADS Controller Malfunction (cont'd)

Step	Action	Value(s)	Yes	No
12	Using J 39200 DMM, measure the resistance between terminal 9 of J 39700 and terminal 35 of the ASM harness connector. Is the resistance within the range specified in the value(s) column?	0-5Ω	Go to Step 14	Go to Step 13
13	Repair the open or high resistance in CKT 464. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
14	1. Turn the ignition switch to the RUN position, engine off. 2. Using J 39200 DMM, measure the voltage at terminal 9 of J 39700. Is the voltage within the range specified in the value(s) column?	Above 1V	Go to Step 15	Go to Step 9
15	Repair CKT 464 for a short to voltage <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0550 ECU Malfunction



519691

Circuit Description

This DTC identifies a malfunction within the EBCM.

Conditions for Setting the DTC

DTC C0550 is set when an internal EBCM malfunction exists.

Action Taken When the DTC Sets

- A malfunction DTC stores.
- The ABS/TCS disables.
- The amber ABS/TCS indicator(s) turn on.
- The Red BRAKE Warning indicator turn on.

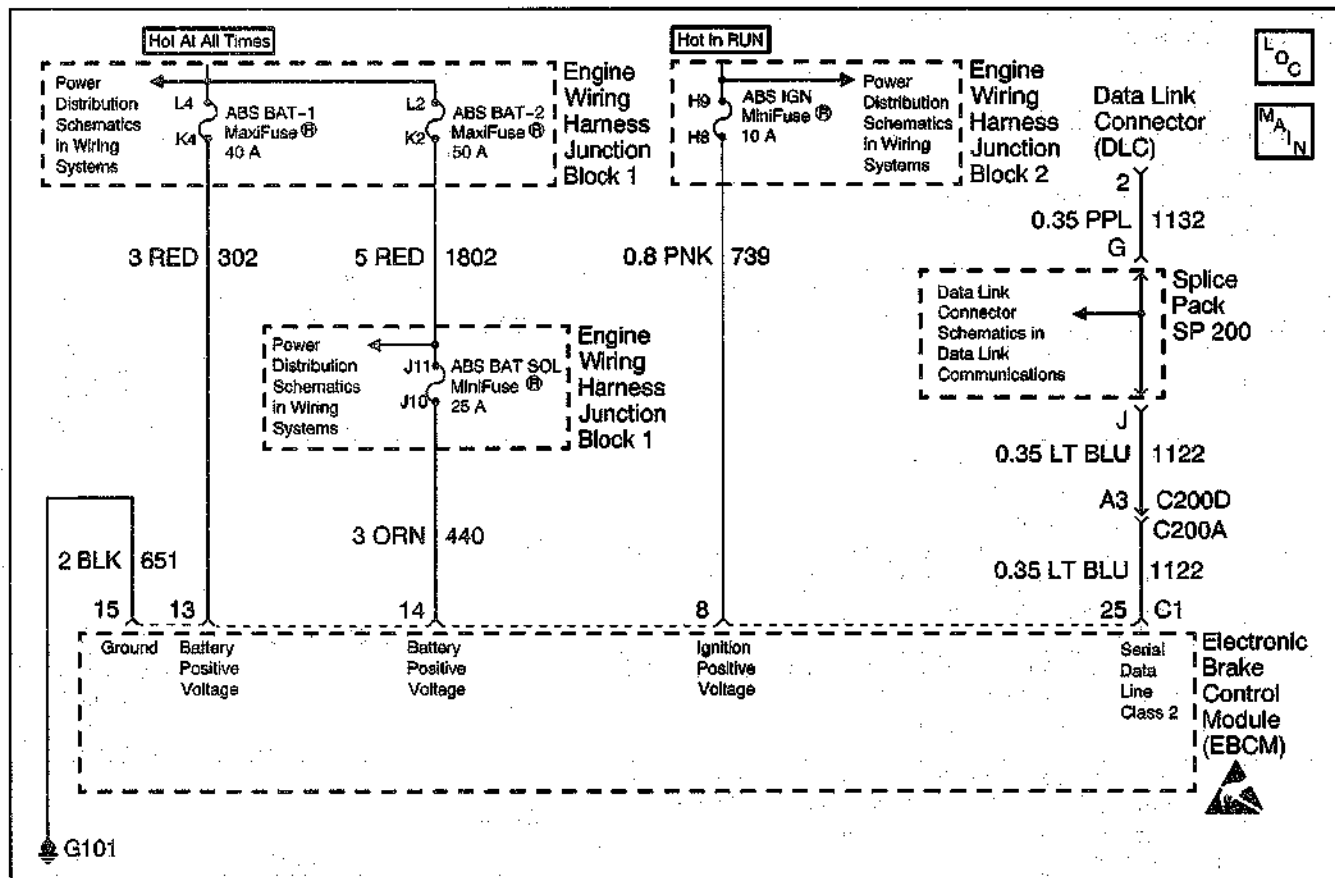
Conditions for Clearing the DTC

- Condition for DTC is no longer present and scan tool clear DTC function is used.
- 100 ignition cycles pass with no DTCs detected.

DTC C0550 ECU Malfunction

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Are any other DTC(s) present besides C0550?	—	Go to DTC Table	Go to Step 3
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0896 Device Voltage Range/Performance



Circuit Description

The EBCM is required to operate within a specified range of voltage to function properly. During ABS and TCS operation, there are current requirements that will cause the voltage to drop. Because of this, voltage is monitored out of ABS/TCS control to indicate a good charging system condition, and also during ABS/TCS control when voltage may drop significantly. The EBCM also monitors for high voltage conditions which could damage the EBCM.

Conditions for Setting the DTC

- The EBCM operating voltage falls below 9.4 volts out of ABS/TCS control, or 8.8 volts during ABS/TCS control.
- The EBCM operating voltage rises above 17.4 volts.
- The low voltage or the high voltage is detected for more than 500 milliseconds with the vehicle speed above 6 km/h (3.6 mph).

Action Taken When the DTC Sets

- A malfunction DTC is stored.
- The ABS and the Traction Control Indicators are turned on.
- The ABS/TCS is disabled.
- The Red BRAKE Warning indicator turns on.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present, the scan tool Clear DTCs function is used.
- 100 ignition cycles have passed with no DTCs detected.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions* in Electrical Diagnosis for further diagnosis.

Test Description

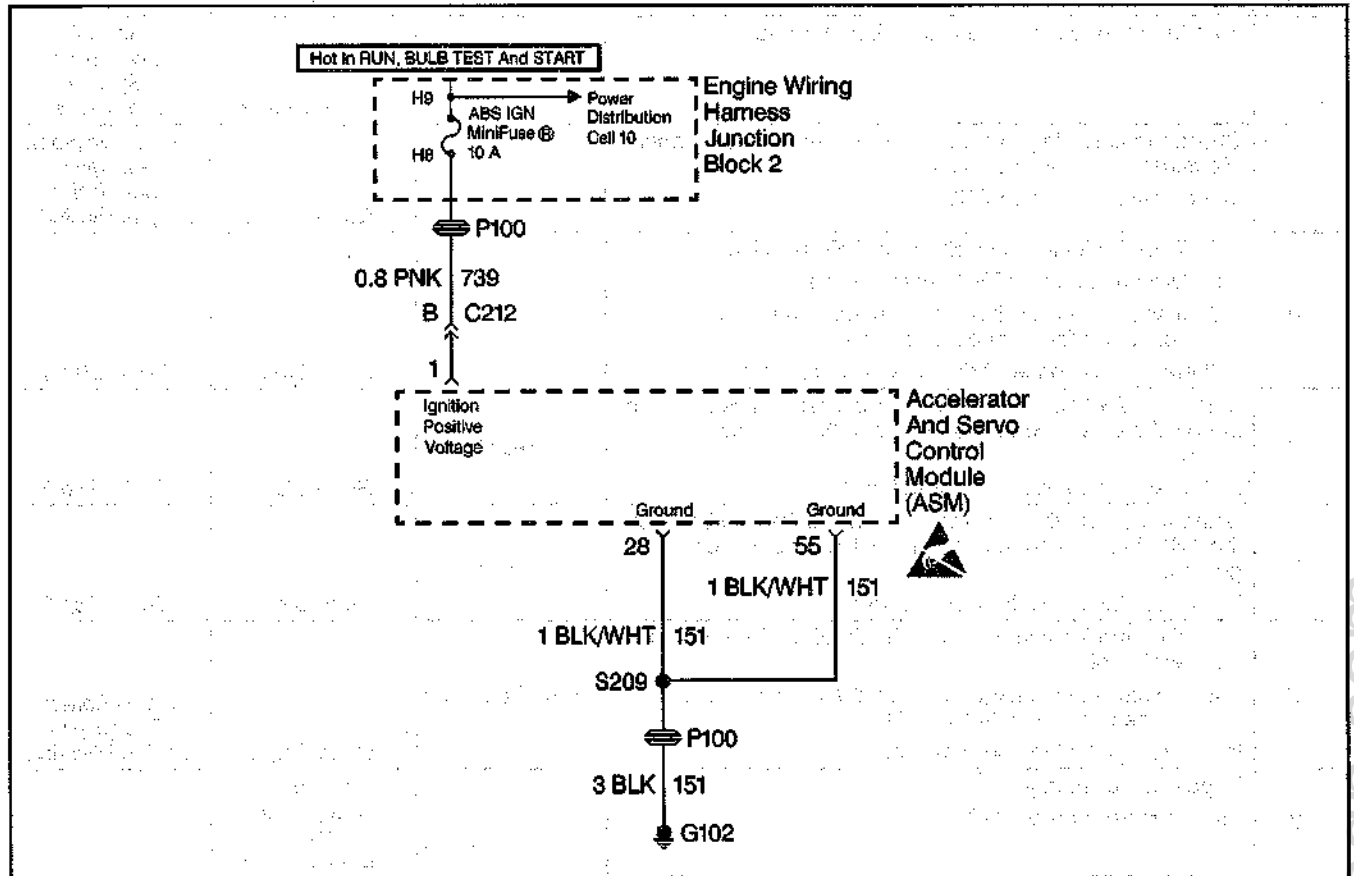
The number(s) below refer to the step number(s) on the diagnostic table.

2. This step checks if the voltage is above the maximum of the range.
4. This step checks if the voltage is below the minimum of the range.
6. This step checks for the integrity of the ground circuit.

DTC C0896 Device Voltage Range/Performance

Step	Action	Value(s)	Yes	No
1	Was a Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn all the accessories off. 2. Install a scan tool. 3. Start the engine. 4. Use the scan tool to monitor the battery voltage while running the engine at approximately 2000 RPM. Is the monitored battery voltage within the specified range?	0–17.4 V	Go to Step 4	Go to Step 3
3	Use a J 39200 DMM to measure the voltage between the battery positive terminal and ground. Is the voltage within the specified range?	0–17.4 V	Go to Step 5	Go to Symptoms - Engine Electrical in Engine Electrical
4	Continue to monitor the battery voltage with the scan tool while running the engine at approximately 2000 RPM. Is the monitored battery voltage within the specified range?	0–9.4 V	Go to Step 6	Go to Step 5
5	1. Turn the ignition switch to the OFF position. 2. Disconnect the scan tool if still connected. 3. Test drive the vehicle above 6 km/h (3.5 mph). Did DTC C0896 reset?	—	Go to Step 10	Go to A Diagnostic System Check - ABS
6	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Install the J 39700 Universal Pinout Box with the J 39700-530 Cable Adapter to the EBCM harness connector C1 only. 4. Use a J 39200 DMM to measure the resistance between the J 39700 terminal 15 and a good ground. Is the resistance within the specified range?	0–5Ω	Go to Step 8	Go to Step 7
7	Repair open or high resistance in CKT 651. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
8	1. Turn the ignition switch to the RUN position. 2. Use a J 39200 DMM to measure the voltage between the J 39700 terminal 8 and 15. Is the voltage within the specified range?	Above 9.4 Volts	Go to Step 9	Go to Symptoms - Engine Electrical in Engine Electrical
9	1. Turn the ignition switch to the OFF position. 2. Reconnect the EBCM connector C1. 3. Disconnect the scan tool if the scan tool is still connected. 4. Test drive the vehicle above 6 km/h (3.5 mph). Did DTC C0896 reset?	—	Go to Step 10	Go to A Diagnostic System Check - ABS
10	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—

DTC C0901 Device #2 Voltage Low



519750

Circuit Description

This circuit monitors the voltage level available to the ASM. If the voltage drops below 7.5 volts, full performance of the traction control system cannot be guaranteed.

Conditions for Setting the DTC

DTC C0901 can set anytime the ignition is in the RUN position and ignition voltage is less than 7.5 volts

Action Taken When the DTC Sets

- The TCS is disabled
- The traction control indicator is turned on

Conditions for Clearing the DTC

- The condition for the DTC is no longer present and the scan tool clear DTC function is used
- 100 ignition cycles have passed with no DTCs detected

Diagnostic Aids

- Thoroughly inspect the wiring and the connectors. Failure to carefully and fully inspect the wiring and the connectors can result in misdiagnosis. Misdiagnosis may cause replacement of parts without repairing the malfunction.
- Inspect for other low voltage conditions.
- Test the charging system. Refer to *Symptoms - Engine Electrical* in Engine Electrical.
- The following conditions are other possible causes of low system voltage:
 - A charging system malfunction
 - Excessive parasitic drain
 - A weak battery
 - A faulty system ground
- If an intermittent malfunction exists, refer to *Inducing Intermittent Fault Conditions* in Electrical Diagnosis.

Test Description

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

4. This step checks for a good ground.
6. This step checks for proper voltage.

DTC C0901 Device #2 Voltage Low

Step	Action	Value(s)	Yes	No
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Check the Charging System. Refer to <i>Symptoms - Engine Electrical</i> in Engine Electrical. Is the charging system OK?	—	Go to Step 3	Go to Symptoms - Engine Electrical in Engine Electrical
3	1. Turn the ignition switch to the OFF position. 2. Disconnect the ASM harness connector. 3. Inspect the ASM harness connector and the connector for damage or corrosion. Is there any evidence of damage or corrosion?	—	Go to Step 7	Go to Step 4
4	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 28 and a good ground. Is the resistance within specifications?	0-5 Ω	Go to Step 5	Go to Step 8
5	Using the J 39200 DMM, measure the resistance between the ASM harness connector terminal 55 and a good ground. Is the resistance within specifications?	0-5 Ω	Go to Step 6	Go to Step 8
6	1. Turn the ignition switch to the RUN position with the engine off. 2. Measure the voltage between the ASM harness connector terminals 1 and 28. Is the voltage within specifications?	More than 7.5 V	Go to Step 9	Go to Battery Charging in Engine Electrical
7	Repair as necessary. Are the repairs complete?	—	Go to A Diagnostic System Check - ABS	—
8	Repair the open or high resistance in CKT 151. Refer to <i>Wiring Repairs</i> . Is the circuit repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Symptoms

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

- Perform the A Diagnostic System Check - ABS before using the Symptom Tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control module(s) can communicate via the serial data link.
- Review the system operation in order to familiarize yourself with the system functions. Refer to *ABS Description*.

Visual/Physical Inspection

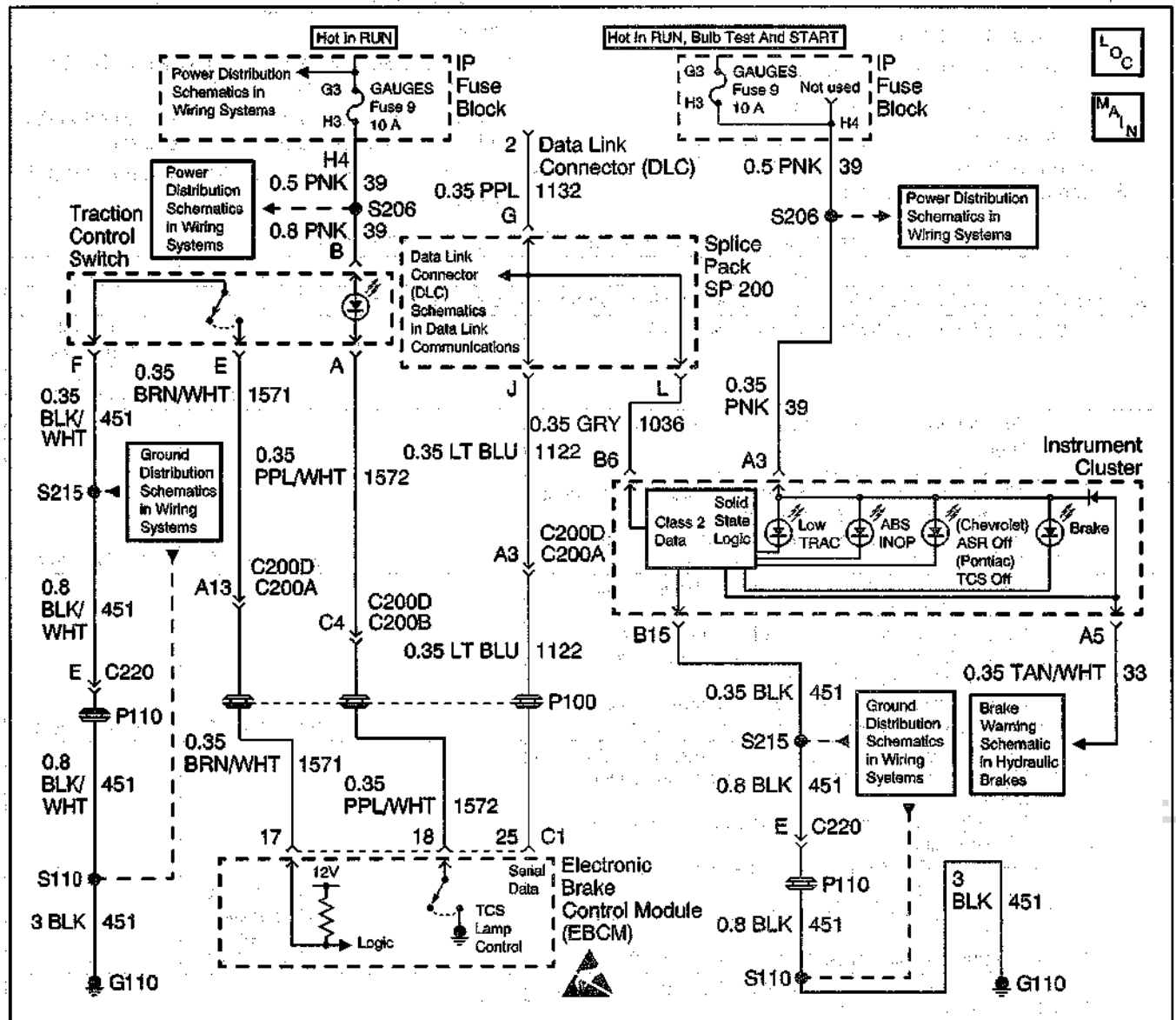
- Inspect for aftermarket devices which could affect the operation of the antilock brake system. Refer to *Checking Aftermarket Accessories*.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the master cylinder reservoir for the proper fluid level.

Symptom List

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

- Traction Control System Off Indicator Always On
- Traction Control System Off Indicator Inoperative
- Acceleration Slip Regulation Indicator Always On
- Acceleration Slip Regulation Indicator Inoperative
- No Communication with EBCM
- ABS Indicator Always On
- ABS Indicator Inoperative
- Low Traction Indicator Always On
- Low Traction Indicator Inoperative

Traction Control System Off Indicator Always On



519757

Circuit Description

The TCS OFF Indicator is controlled by the EBCM by sending class 2 messages to the Instrument Panel Cluster (IPC). It is turned on when the EBCM sets a DTC that turns on the TCS OFF indicator. It is also turned on or off when the Control Switch is pressed. The Electronic Brake Control Module (EBCM) supplies 12 volts to the Traction Control Switch, when the TCS switch is depressed the EBCM sees the voltage go low, and that the TCS switch state has changed. When the EBCM receives that a switch state has changed it turns on or off the Traction Control and sends a message to the IPC to turn on or off the TCS OFF indicator depending on its previous state.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions* in Wiring Systems for further diagnosis.

Test Description

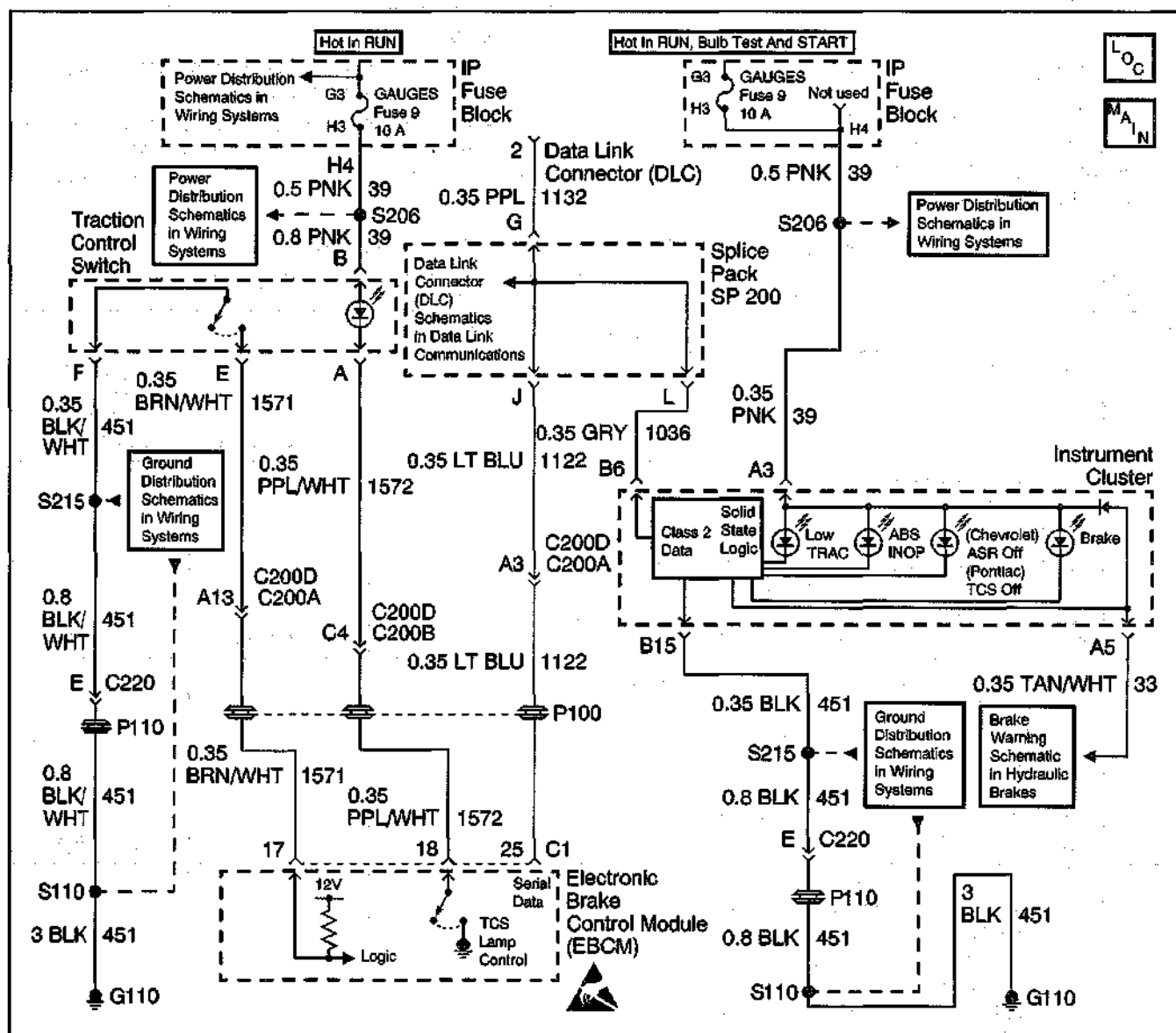
The number(s) below refer to the step number(s) on the diagnostic table.

- Checks if EBCM is receiving a Traction Control Switch message from the switch.
- Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
- Checks if the EBCM or Traction Control Switch is at fault.

Traction Control System Off Indicator Always On

Step	Action	Value(s)	Yes	No
DEFINITION: TCS Off indicator is on and traction control was not turned off. There are no DTC(s) set.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the RUN position, engine off. 2. Using a scan tool enter TCS Data List. 3. While monitoring the TCS On/Off switch status, press and release the TCS On/Off switch. Does the switch status change from pressed to released as the TCS switch is pressed and released?	—	Go to Step 3	Go to Step 5
3	1. Using a scan tool in the instrument Panel Cluster Special Function. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. 4. All indicators will turn ON when commanded on. Does the TCS OFF indicator turn on then off?	—	Go to Step 9	Go to Step 4
4	1. Disconnect the Instrument Cluster and connect a Test Light across the appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to cluster. 3. Test Light ON, Check the connector for poor connection to Cluster. 4. If OK, replace the Instrument Cluster <i>IP Cluster Replacement</i> . Is the Instrument Cluster replacement complete?	—	Go to Step A Diagnostic System Check - ABS	—
5	1. Remove the Traction Control Switch and disconnect the connector. Refer to 2. Using a scan tool in ABS/TC Data List read the TCS Switch Status. 3. With the Traction Control Switch disconnected. Does the TCS Switch status read released?	—	Go to Step 6	Go to Step 7
6	Replace the Traction Control Switch. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
7	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between the Traction Control Switch harness connector terminal E and a known good ground. Is the resistance within the range specified in the value(s) column?	OL (Infinite)	Go to Step 9	Go to Step 8
8	Repair CKT 1571 for a short to ground. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Traction Control System Off Indicator Inoperative



519757

Circuit Description

The TCS OFF Indicator is controlled by the EBCM by sending class 2 messages to the Instrument Panel Cluster (IPC). It is turned on when the EBCM sets a DTC that turns on the TCS OFF indicator. It is also turned on or off when the Traction Control Switch is pressed. The Electronic Brake Control Module (EBCM) supplies 12 volts to the Traction Control Switch, when the TCS switch is depressed the EBCM sees the voltage go low, and that the TCS switch state has changed. When the EBCM receives that a switch state has changed it turns on or off the Traction Control and sends a message to the IPC to turn on or off the TCS OFF indicator depending on its previous state.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer *Inducing Intermittent Fault Conditions in Wiring System* for further diagnosis.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

- Checks if EBCM is receiving a traction control switch message from the switch.
- Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
- Checks if the EBCM or Traction Control Switch is at fault.

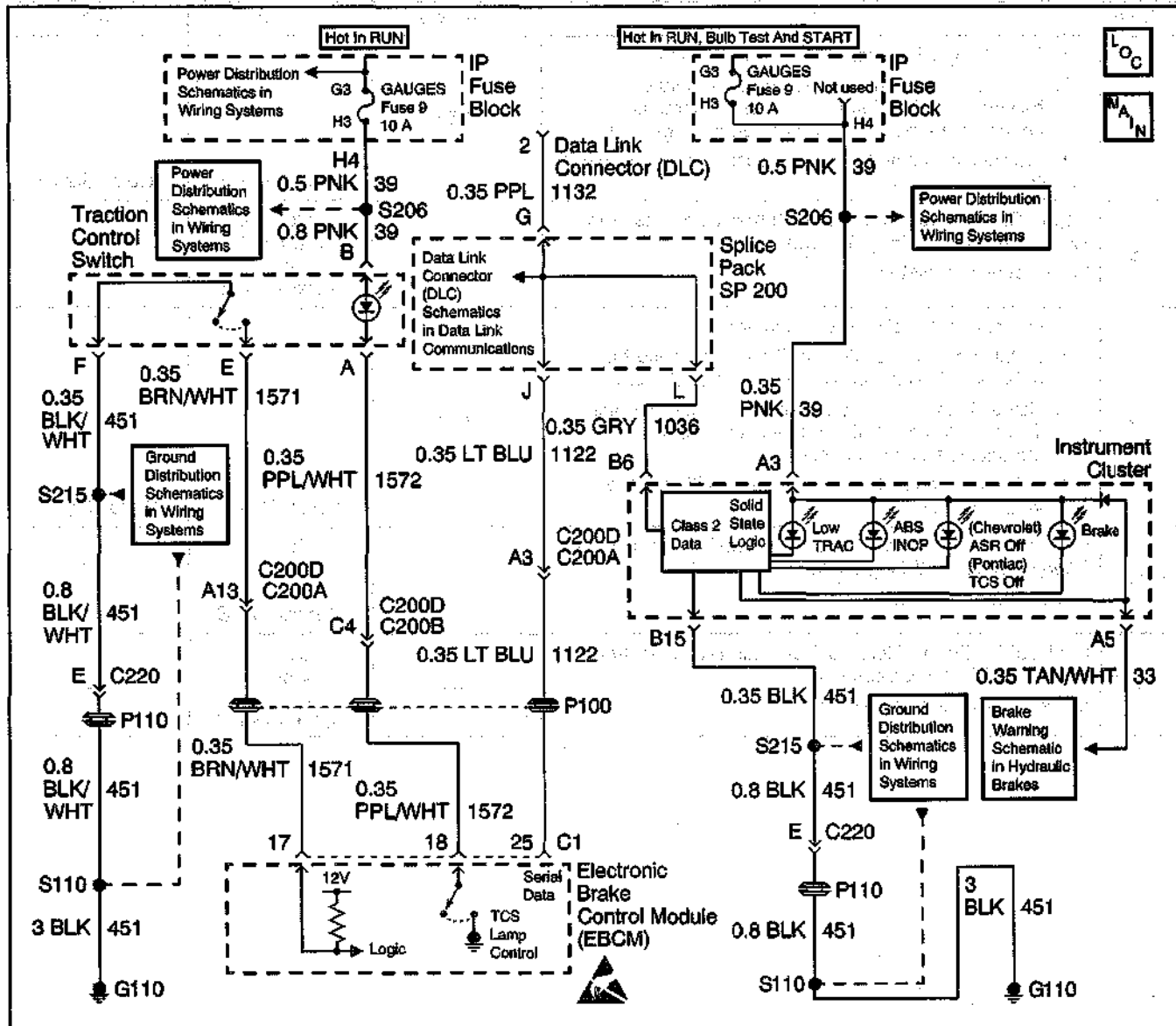
Traction Control System Off Indicator Inoperative

Step	Action	Value(s)	Yes	No
DEFINITION: TCS Off indicator is Inoperative when attempting to disable traction control.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the RUN position, engine off. 2. Using a scan tool enter TCS Data List. 3. While monitoring the TCS On/Off switch status, press and release the TCS On/Off switch. Does the switch status change from pressed to released as the TCS switch is pressed and released?	—	Go to Step 3	Go to Step 5
3	1. Using a scan tool in the instrument Panel Cluster Special Function. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. 4. All indicators will turn ON when commanded on. Does the TCS OFF indicator turn on then off?	—	Go to Step 11	Go to Step 4
4	1. Disconnect Instrument Cluster and connect a test light across the appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to Cluster. 3. Test Light ON, Check connector for poor connection to Cluster. 4. If OK, replace the Instrument Cluster <i>IP Cluster Replacement</i> . Is the instrument cluster replacement complete?	—	Go to Step A Diagnostic System Check - ABS	—
5	1. Remove the traction control switch and disconnect the connector. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> . 2. Using a scan tool in ABS/TC Data List read the TCS Switch Status. 3. Connect a jumper wire between terminals E and F of the Traction Control Switch harness connector. Does the TCS Switch status read pressed with the jumper wire connected?	—	Go to Step 6	Go to Step 7
6	Replace the Traction Control Switch. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Traction Control System Off Indicator Inoperative (cont'd)

Step	Action	Value(s)	Yes	No
7	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between the Traction Control Switch harness connector terminal F and a known good ground. Is the resistance within the range specified in the value(s) column?	0-5 Ω	Go to Step 9	Go to Step 8
8	Repair CKT 451 for an open or high resistance. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	1. Disconnect the EBCM Connector C1 2. Install the J 39700 Universal Pinout box using the J 39700-25 cable adapter to connector C1 only 3. Using DMM, measure the resistance between the Traction Control Switch harness connector terminal E and 17 of J 39700 4. Is the resistance within the range specified in the value(s) column?	0-5 Ω	Go to Step 11	Go to Step 10
10	Repair CKT 1571 for an open or high resistance. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Acceleration Slip Regulation Indicator Always On



519757

Circuit Description

The ASR OFF Indicator is controlled by the EBCM by sending class 2 messages to the Instrument Panel Cluster (IPC). It is turned on when the EBCM sets a DTC that turns on the ASR OFF indicator. It is also turned on or off when the Accelerator Slip Regulation (ASR) Switch is pressed. The Electronic Brake Control Module (EBCM) supplies 12 volts to the ASR Switch, when the ASR switch is depressed the EBCM sees the voltage go low, and that the ASR switch state has changed. When the EBCM receives that a switch state has changed it turns on or off the ASR and sends a message to the IPC to turn on or off the ASR OFF indicator depending on its previous state.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions* in Wiring System for further diagnosis.

Test Description

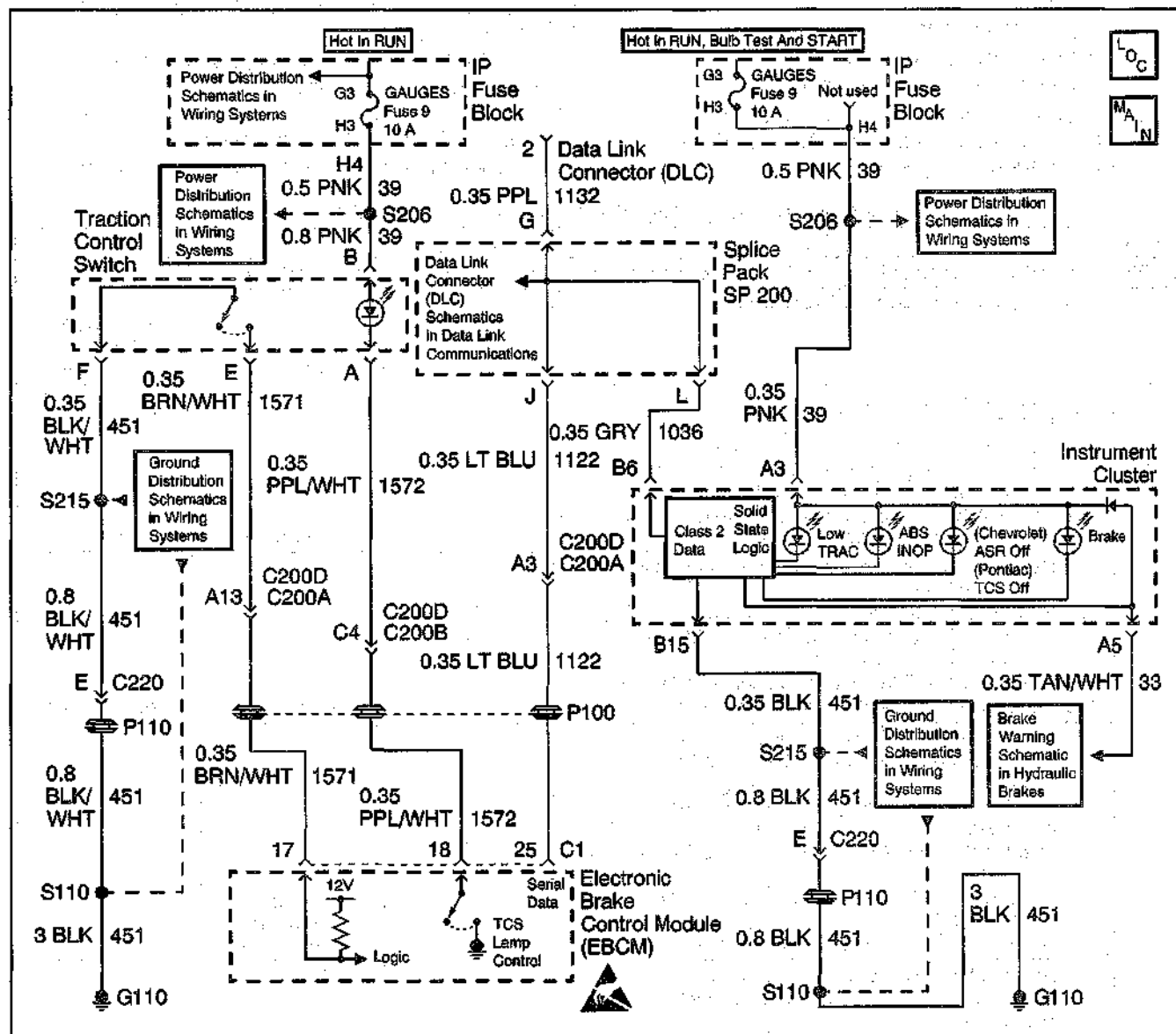
The number(s) below refer to the step number(s) on the diagnostic table.

- Checks if EBCM is receiving a ASR Switch message from the switch.
- Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
- Checks if the EBCM or ASR Switch is at fault.

Acceleration Slip Regulation Indicator Always On

Step	Action	Value(s)	Yes	No
DEFINITION: ASR Off indicator is on and traction control was not turned off. There are no DTC(s) set.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the RUN position, engine off. 2. Using a scan tool enter TCS Data List. 3. While monitoring the ASR On/Off switch status, press and release the ASR On/Off switch. Does the switch status change from pressed to released as the ASR switch is pressed and released?	—	Go to Step 3	Go to Step 5
3	1. Using a scan tool in the Instrument Panel Cluster Special Function. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. 4. All indicators will turn ON when commanded on. Does the ASR OFF indicator turn on then off?	—	Go to Step 9	Go to Step 4
4	1. Disconnect the instrument cluster and connect a Test light across the appropriate power and ground terminals. 2. Test light OFF, repair open in power or ground circuit to cluster. 3. Test light ON, check connector for poor connection to the cluster. 4. If OK, replace the instrument cluster <i>IP Cluster Replacement</i> . Is the instrument cluster replacement complete?	—	Go to Step A Diagnostic System Check - ABS	—
5	1. Remove the ASR Switch and disconnect the connector. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> . 2. Using a scan tool in ABS/TC Data List read the TCS Switch Status. 3. With the ASR Switch disconnected. Does the TCS switch status read released?	—	Go to Step 6	Go to Step 7
6	Replace the ASR Switch. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
7	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between the ASR switch harness connector terminal E and a known good ground. Is the resistance within the range specified in the value(s) column?	OL (Infinite)	Go to Step 9	Go to Step 8
8	Repair CKT 1571 for a short to ground. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Acceleration Slip Regulation Indicator Inoperative



519757

Circuit Description

The ASR OFF Indicator is controlled by the EBCM by sending class 2 messages to the Instrument Panel Cluster (IPC). It is turned on when the EBCM sets a DTC that turns on the ASR OFF indicator. It is also turned on or off when the Accelerator Slip Regulation (ASR) Switch is pressed. The Electronic Brake Control Module (EBCM) supplies 12 volts to the ASR Switch, when the ASR switch is depressed the EBCM sees the voltage go low, and that the ASR switch state has changed. When the EBCM receives that a switch state has changed it turns on or off the ASR and sends a message to the IPC to turn on or off the ASR OFF indicator depending on its previous state.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness

- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions* in Wiring Systems for further diagnosis.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

2. Checks if EBCM is receiving a ASR switch message from the switch.
3. Check if the scan tool can turn on and off the indicator lamps in the instrument cluster.
5. Checks if the EBCM or ASR Switch is at fault.

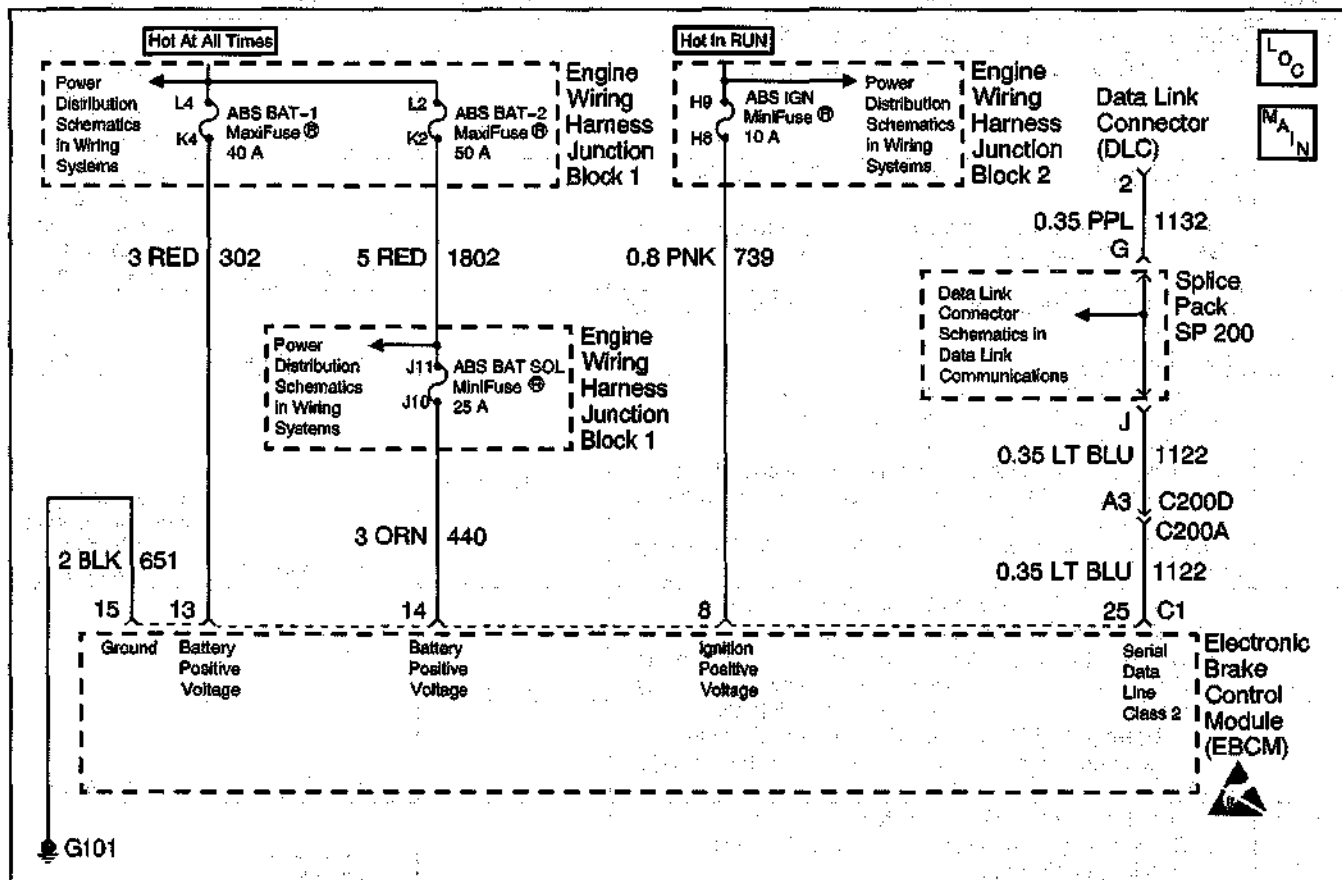
Acceleration Slip Regulation Indicator Inoperative

Step	Action	Value(s)	Yes	No
DEFINITION: ASR Off indicator is inoperative when attempting to disable traction control. There are no DTC(s) set.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Turn the ignition switch to the RUN position, engine off. 2. Using a scan tool enter TCS Data List. 3. While monitoring the TCS On/Off switch status, press and release the ASR On/Off switch. Does the switch status change from pressed to released as the ASR switch is pressed and released?	—	Go to Step 3	Go to Step 5
3	1. Using a scan tool in the Instrument Panel Cluster Special Function. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. 4. All indicators will turn ON when commanded on. Does the ASR OFF indicator turn on then off?	—	Go to Step 11	Go to Step 4
4	1. Disconnect instrument cluster and connect a test light across the appropriate power and ground terminals. 2. Test light OFF, repair open in power or ground circuit to cluster. 3. Test light ON, check connector for poor connection to Cluster. 4. If OK, replace the instrument cluster <i>IP Cluster Replacement</i> . Is the instrument cluster replacement complete?	—	Go to Step A Diagnostic System Check - ABS	—
5	1. Remove the ASR switch and disconnect the connector. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> 2. Using a scan tool in ABS/TC Data List read the TCS switch status. 3. Connect a jumper wire between terminals E and F of the ASR Switch harness connector. Does the TCS switch status read pressed with the jumper wire connected?	—	Go to Step 6	Go to Step 7
6	Replace the ASR switch. Refer to <i>Traction Control Switch Replacement (Chevrolet)</i> Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Acceleration Slip Regulation Indicator Inoperative (cont'd)

Step	Action	Value(s)	Yes	No
7	1. Turn the ignition switch to the OFF position. 2. Using J 39200 DMM, measure the resistance between the ASR switch harness connector terminal F and a known good ground. Is the resistance within the range specified in the value(s) column?	0-5 Ω	Go to Step 9	Go to Step 8
8	Repair CKT 451 for an open or high resistance. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	1. Disconnect the EBCM Connector C1 2. Install the J 39700 Universal Pinout box using the J 39700-25 cable adapter to connector C1 only. 3. Using DMM, measure the resistance between the ASR switch harness connector terminal E and 17 of J 39700 4. Is the resistance within the range specified in the value(s) column?	0-5 Ω	Go to Step 11	Go to Step 10
10	Repair CKT 1571 for an open or high resistance. Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
11	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

No Communication with EBCM



519691

Circuit Description

The Class 2 serial data line allows all the modules on the line to transmit information to each other as needed. Each module is assigned an ID and all the information sent out on the line is assigned a priority by which it is received. When the ignition switch is turned to the run position each module begins to send and receive information. Each module on the Class 2 serial data line knows what information it needs to send out and what information it should be receiving. What the modules do not know is which module is supposed to send them the information. This information is only learned after the module has received the information it needs along with the ID of the module that sent the information. This information is then remembered until the ignition switch is turned off.

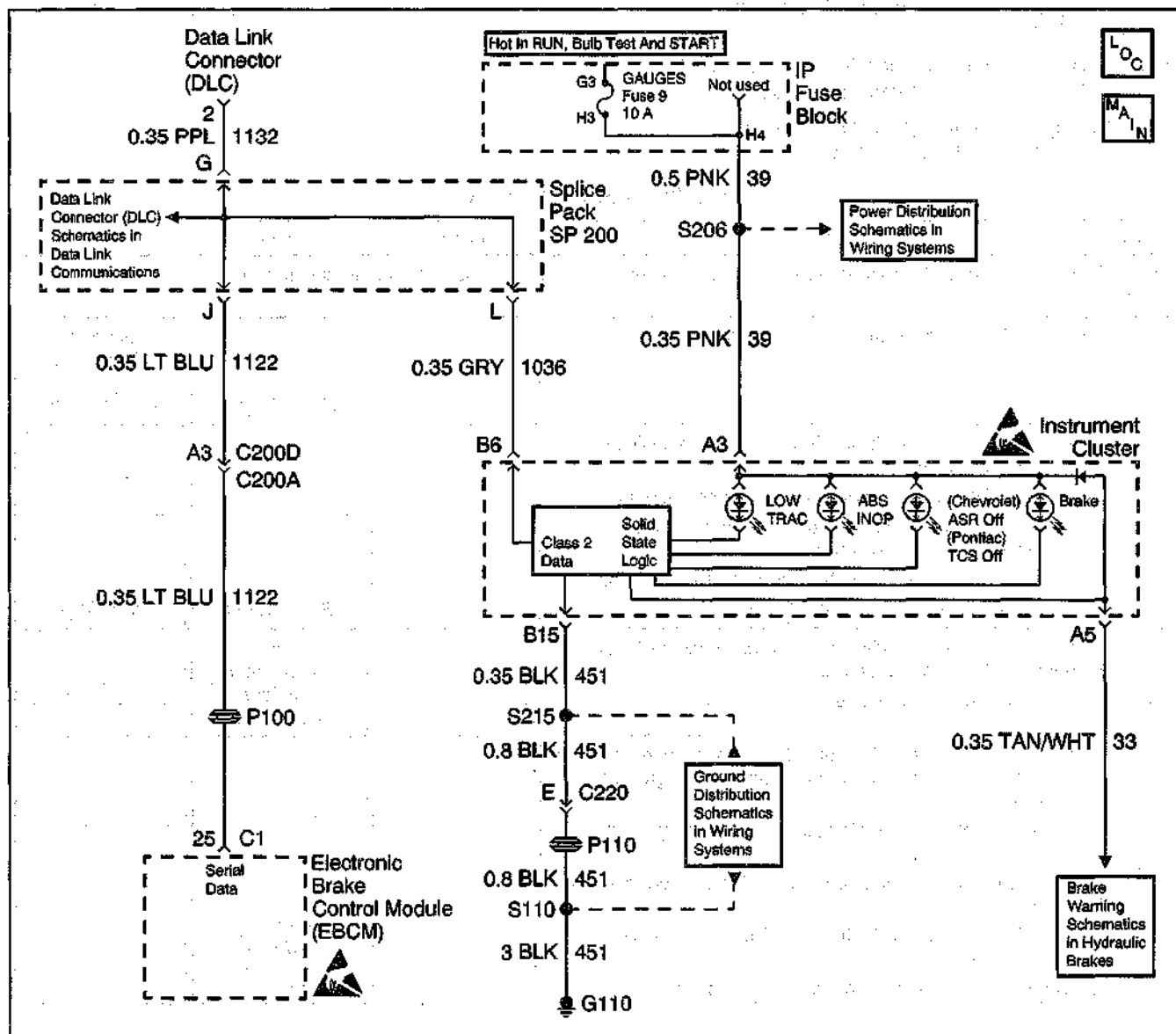
Diagnostic Aids

- Thoroughly inspect the wiring and the connectors. Failure to carefully and fully inspect the wiring and the connectors can result in misdiagnosis. Misdiagnosis may cause replacement of parts without repairing the malfunction.
- If an intermittent malfunction exists, refer to *Inducing Intermittent Fault Conditions* in wiring system.

No Communication with EBCM

Step	Action	Value(s)	Yes	No
DEFINITION: Scan tool can not communicate with the EBCM.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	Turn the Ignition switch to the RUN position with the engine off. Can the scan tool communicate with other modules on the Class 2 serial data line, such as the PCM?	—	Go to Step 3	Go to Scan Tool Does Not Communicate w/Class 2 Data Line
3	Inspect the 10A ABS IGN fuse in the Underhood Electrical Center 2. Is the fuse OK?	—	Go to Step 4	Go to Step 6
4	1. Install the fuses if removed. 2. Turn the ignition switch to the RUN position, engine off. 3. Using J 39200 DMM, measure the voltage at the 10A ABS IGN fuse by probing between the fuse test terminals and a good ground. Is the voltage within the range specified within the value(s) column?	Battery Volts	Go to Step 5	Go to Testing for Short to Ground in Wiring Systems
5	1. Turn the ignition switch to the OFF position. 2. Disconnect the EBCM connector C1. 3. Connect the J 39700 Universal Pinout Box using the J 39700-25 to the EBCM harness connector C1 only. 4. Using J 39200 DMM, measure the resistance between J 39700 terminal 15 and a good ground. Is the resistance within the range specified in the value(s) column?	0 - 5Ω	Go to Step 10	Go to Step 9
6	1. Install a new 10A ABS IGN fuse. 2. Cycle the ignition switch from the OFF to RUN position, engine off. 3. Recheck the fuse. Is the fuse OK?	—	Go to A Diagnostic System Check - ABS	Go to Step 7
7	1. Turn the ignition switch to the OFF position. 2. Remove the 10A ABS IGN fuse. 3. Disconnect the EBCM connector C1. 4. Connect the J 39700 Universal Pinout Box using the J 39700-25 to the EBCM harness connector C1 only. 5. Using J 39200 DMM, measure the resistance between terminals 8 and 15 of J 39700. Is the resistance within the range specified in the value(s) column?	OL (infinite)	Go to Step 12	Go to Step 8
8	Repair CKT 739 for a short to ground. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
9	Repair CKT 651 or G101 for an open or high resistance. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
10	1. Turn the ignition switch to the RUN position, engine off. 2. Using J 39200 DMM, measure the voltage between J 39700 terminals 8 and 15. Is the voltage within the range specified in the value(s) column?	Battery Volts	Go to Step 12	Go to Step 11
11	Repair CKT 739 for an open. Refer to <i>Wiring Repairs</i> . Is the repair complete?	—	Go to A Diagnostic System Check - ABS	—
12	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—

ABS Indicator Always On



519763

Circuit Description

The Instrument Panel Cluster (IPC) turns the ABS Indicator on during the IPC bulb check for approximately 3 seconds when the ignition switch is turned to the ON position. If the EBCM sets a Diagnostic Trouble Code (DTC) the EBCM sends a class 2 message to the IPC to command the ABS Indicator on.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions in Wiring Systems*.

Test Description

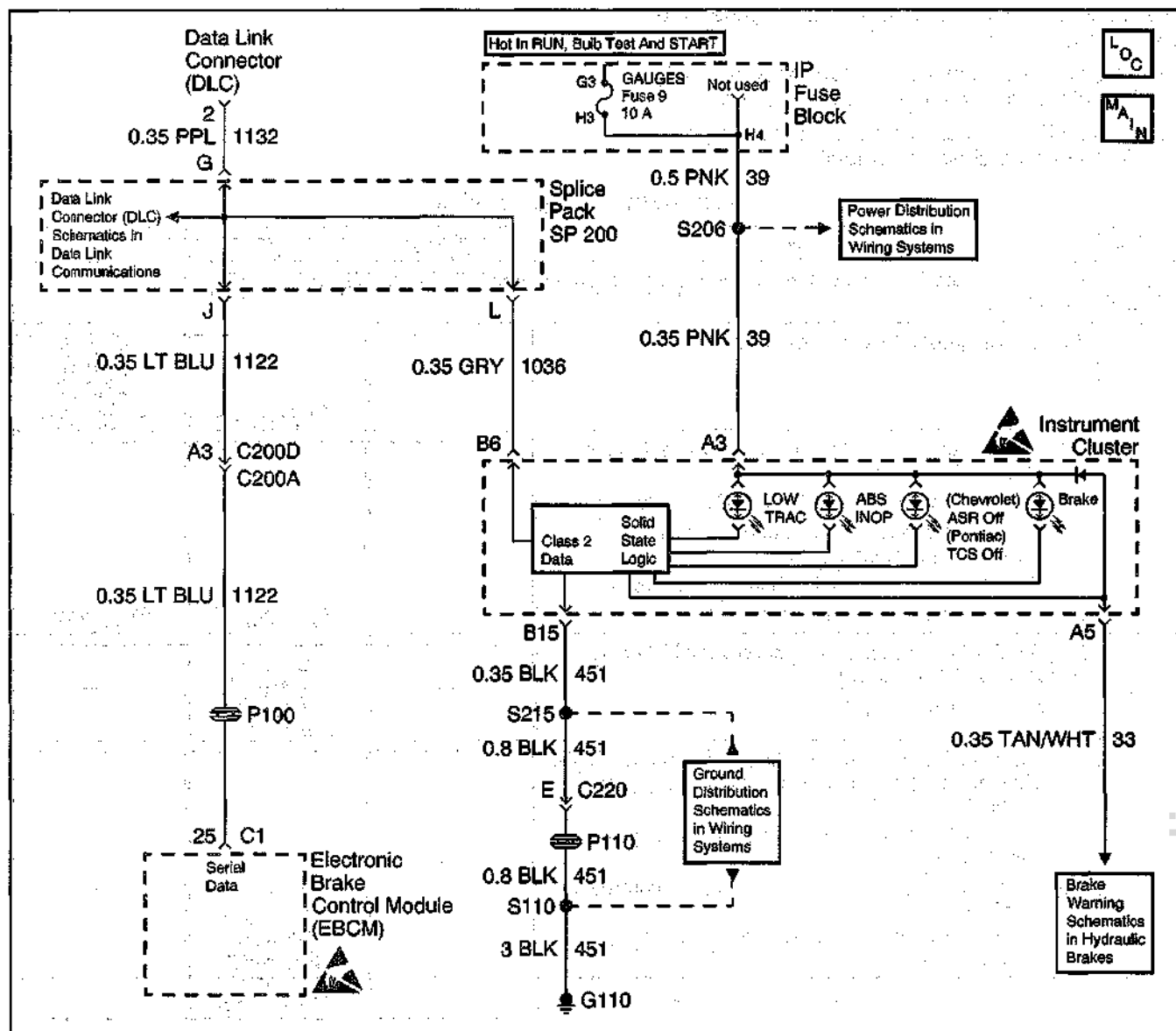
The number(s) below refer to the step number(s) on the diagnostic table.

2. Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
4. Checks if the circuits going to the instrument cluster or the cluster is at fault.

ABS Indicator Always On

Step	Action	Value(s)	Yes	No
DEFINITION: ABS indicator does not turn off after the Instrument Panel Cluster (IPC) bulb check and no ABS/TCS DTC(s) set.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Using a scan tool in the Instrument Panel Cluster Special Functions. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. All indicators will turn ON when commanded on. Does the ABS indicator turn on then off?	—	Go to Step 3	Go to Step 4
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Disconnect the Instrument Cluster and connect a Test Light across the appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to cluster 3. Test Light ON, check connector for poor connection to cluster. 4. If OK, replace the Instrument Cluster <i>IP Cluster Replacement</i> Is the Instrument Cluster replacement complete?	—	Go to A Diagnostic System Check - ABS	—

ABS Indicator Inoperative



519763

Circuit Description

The Instrument Panel Cluster (IPC) turns the ABS Indicator on during the IPC bulb check for approximately 3 seconds when the ignition switch is turned to the ON position. If the EBCM sets a Diagnostic Trouble Code (DTC) the EBCM sends a class 2 message to the IPC to command the ABS Indicator on.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions in Wiring Systems*.

Test Description

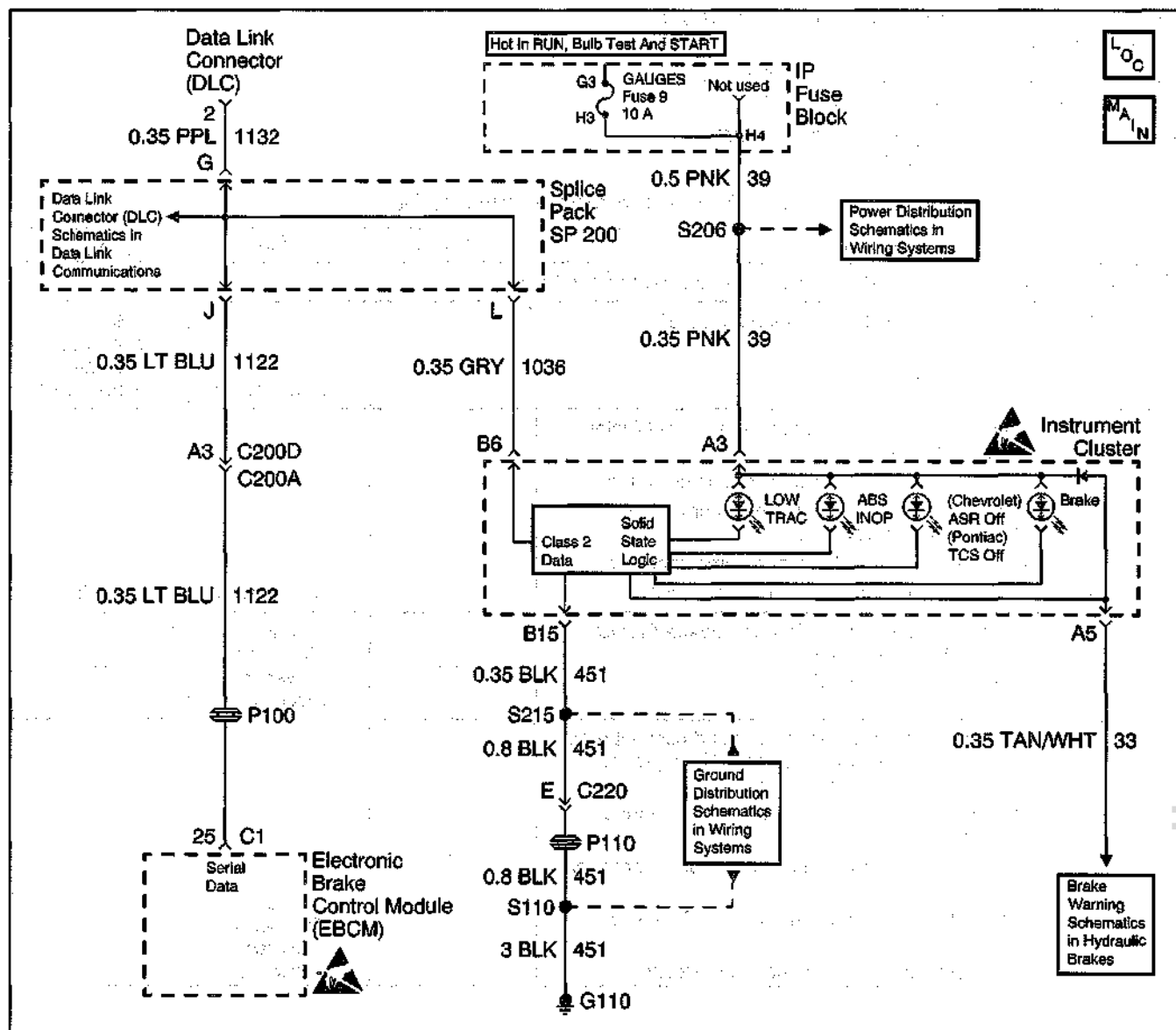
The number(s) below refer to the step number(s) on the diagnostic table.

2. Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
4. Checks if the circuits going to the instrument Cluster or the cluster is at fault.

ABS Indicator Inoperative

Step	Action	Value(s)	Yes	No
DEFINITION: ABS indicator does not turn ON during the Instrument Panel Cluster (IPC) bulb check and no ABS/TCS DTC(s) set.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Using a scan tool in the Instrument Panel Cluster Special Functions. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. All indicators will turn ON when commanded on. Does the ABS Indicator turn on then off?	—	Go to Step 3	Go to Step 4
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Disconnect the Instrument Cluster and connect a Test Light across the appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to cluster. 3. Test Light ON, check connector for poor connection to the cluster. 4. If OK, replace the Instrument Cluster <i>IP Cluster Replacement</i> .	—	Go to A Diagnostic System Check - ABS	—

Low Traction Indicator Always On



519763

Circuit Description

The Instrument Panel Cluster (IPC) turns the LOW TRAC Indicator on during the IPC bulb check for approximately 3 seconds when the ignition switch is turned to the ON position. If the EBCM sets a Diagnostic Trouble Code (DTC) the EBCM sends the IPC the command to turn the LOW TRAC Indicator on.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating
 - Broken locks
 - Improperly formed or damaged terminals
 - Poor terminal-to-wiring connections
 - Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions* in Electrical Diagnosis for further diagnosis.

Test Description

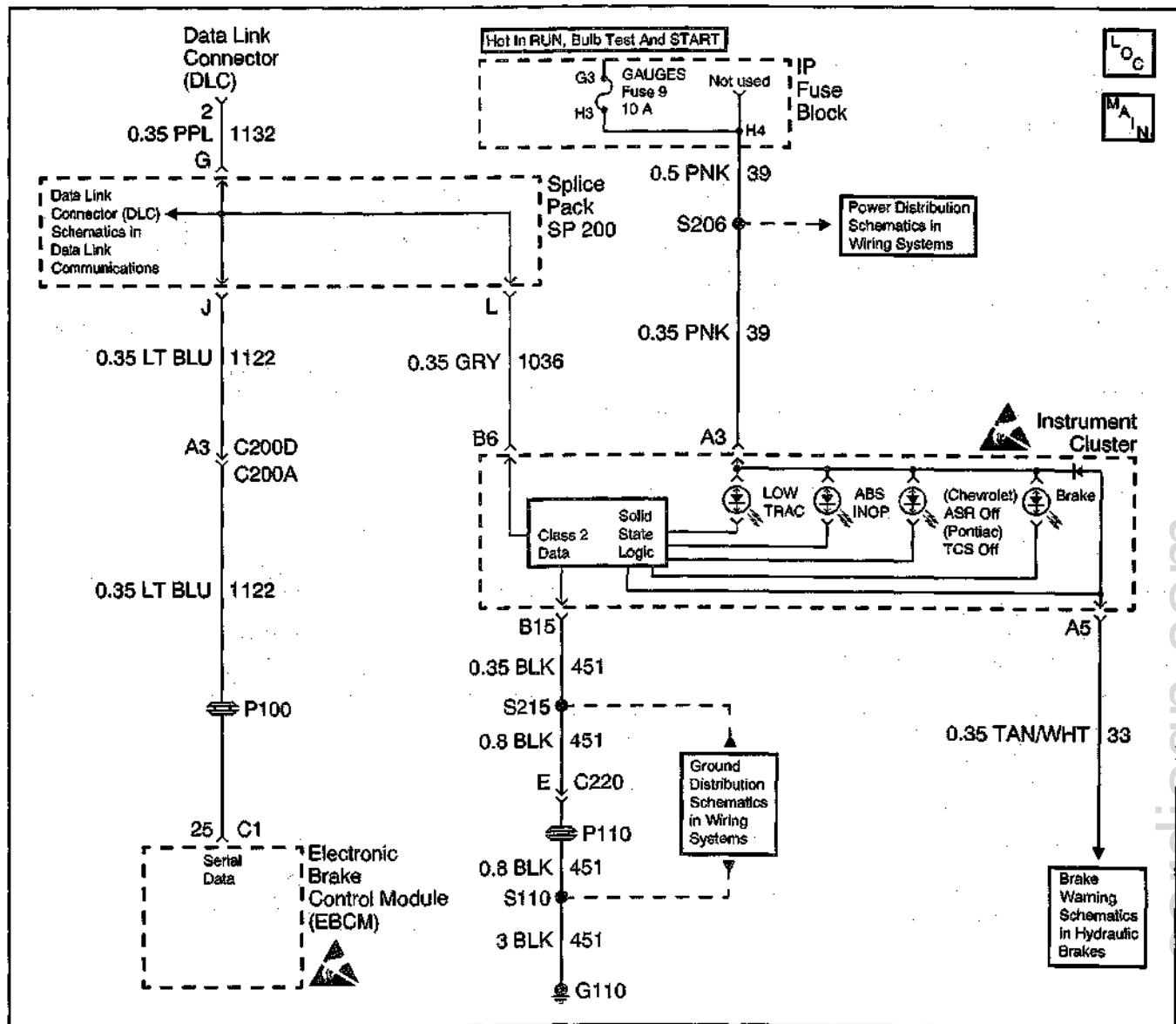
The number(s) below refer to the step number(s) on the diagnostic table.

2. Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
4. Checks if the circuits going to the instrument cluster or the cluster is at fault.

Low Traction Indicator Always On

Step	Action	Value(s)	Yes	No
DEFINITION: LOW TRAC Indicator On without a low traction condition.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Using a scan tool in the Instrument Panel Cluster Special Functions. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. All indicators will turn ON when commanded on. Does the LOW TRAC Indicator turn on then off?	—	Go to Step 3	Go to Step 4
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Disconnect the instrument cluster and connect a Test Light across the appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to cluster 3. Test Light ON, check connector for poor connection to cluster. 4. If OK, replace the instrument cluster <i>IP Cluster Replacement</i> Is the instrument cluster replacement complete?	—	Go to A Diagnostic System Check - ABS	—

Low Traction Indicator Inoperative



519763

Circuit Description

The Instrument Panel Cluster (IPC) turns the LOW TRAC Indicator on during the IPC bulb check for approximately 3 seconds when the ignition switch is turned to the ON position. If the EBCM sets a Diagnostic Trouble Code (DTC) the EBCM sends the IPC the command to turn the LOW TRAC Indicator on.

Diagnostic Aids

- It is very important that a thorough inspection of the wiring and connectors be performed. Failure to carefully and fully inspect wiring and connectors may result in misdiagnosis, causing part replacement with reappearance of the malfunction.
- Thoroughly inspect any circuitry that may be causing the complaint for the following conditions:
 - Backed out terminals
 - Improper mating

- Broken locks
- Improperly formed or damaged terminals
- Poor terminal-to-wiring connections
- Physical damage to the wiring harness
- The following conditions may cause an intermittent malfunction:
 - A poor connection
 - Rubbed-through wire insulation
 - A broken wire inside the insulation
- If an intermittent malfunction exists refer to *Inducing Intermittent Fault Conditions in Wiring System* for further diagnosis.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

2. Checks if the scan tool can turn on and off all the indicator lamps in the instrument cluster.
4. Checks if the circuits going to the instrument Cluster or the cluster is at fault.

Low Traction Indicator Inoperative

Step	Action	Value(s)	Yes	No
DEFINITION: LOW TRAC Indicator never comes on.				
1	Was the Diagnostic System Check performed?	—	Go to Step 2	Go to A Diagnostic System Check - ABS
2	1. Using a scan tool in the Instrument Panel Cluster Special Functions. 2. Go to WOW Instrument Panel in Output Control. 3. In the WOW mode you can turn on or off the instrument panel indicators. All indicators will turn ON when commanded on. Does the LOW TRAC Indicator turn on then off?	—	Go to Step 3	Go to Step 4
3	Replace the EBCM. Refer to <i>Electronic Brake Control Module (EBCM) Replacement</i> . Is the replacement complete?	—	Go to A Diagnostic System Check - ABS	—
4	1. Disconnect the Instrument Cluster and connect a Test Light across the Appropriate power and ground terminals. 2. Test Light OFF, repair open in power or ground circuit to cluster. 3. Test Light ON, check connector for poor connection to the cluster. 4. If OK, replace the Instrument Cluster <i>IP Cluster Replacement</i> .	—	Go to A Diagnostic System Check - ABS	—

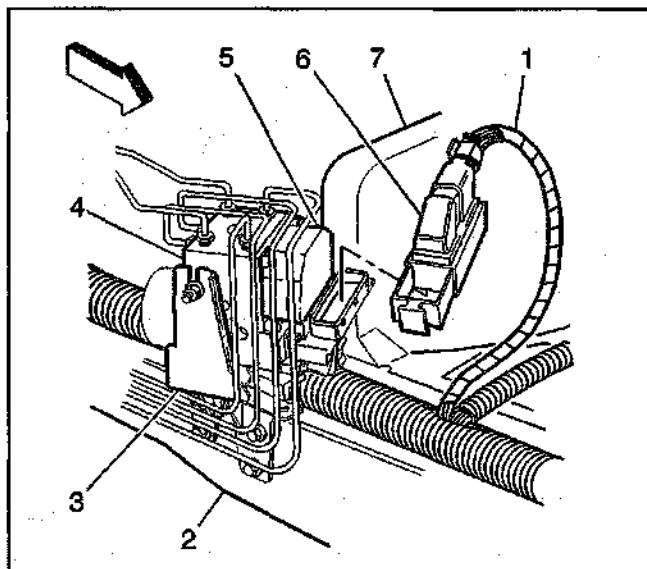
Repair Instructions

Electronic Brake Control Module (EBCM) Replacement

Removal Procedure

Notice: To prevent equipment damage, never connect or disconnect the wiring harness connection from the EBCM with the ignition switch in the ON position.

1. Turn the ignition switch to the OFF position.
2. Pull out lock tab from the EBCM harness connector.
3. Disconnect the EBCM harness connector (6).



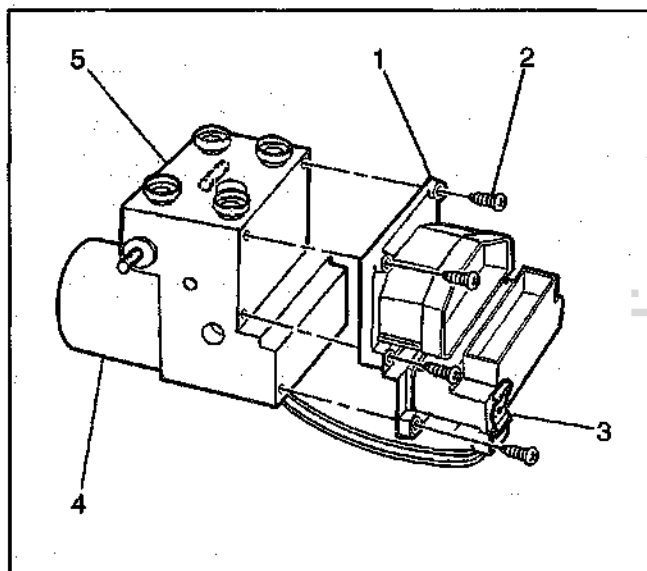
213428

4. Disconnect the pump motor connector (3) at the bottom of the EBCM.
5. Remove the six EBCM to BPMV screws (2) and discard.

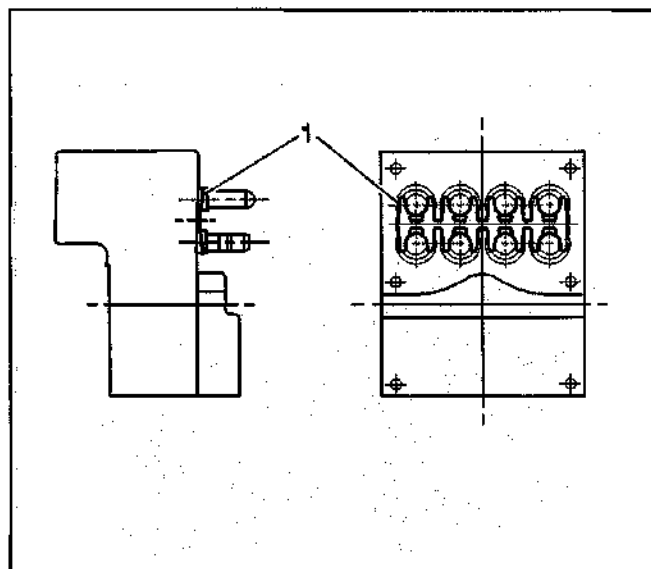
Important: Be careful not to damage seal. Do not pry apart using a tool.

Important: Care must be taken not to damage the solenoid valves when the EBCM is removed from the BPMV.

6. Separate the EBCM (1) from the BPMV (5) by gently pulling apart until separated.



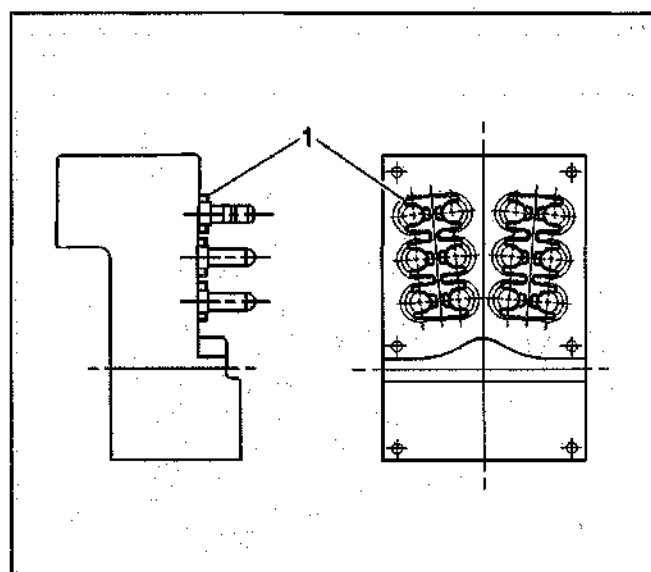
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255233

Important: Note the location and the orientation of the wave spring in order to aid during installation.

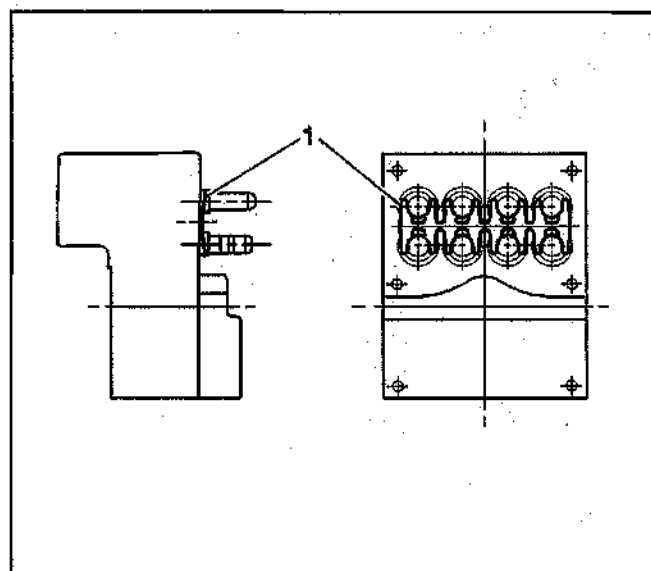
7. If equipped with ABS only, remove one wave spring (1) between the EBCM and BPMV and discard.



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Important: Note the location and the orientation of the wave spring in order to aid during installation.

8. If equipped with ABS/TCS remove two wave springs (1) between the EBCM and BPMV and discard.



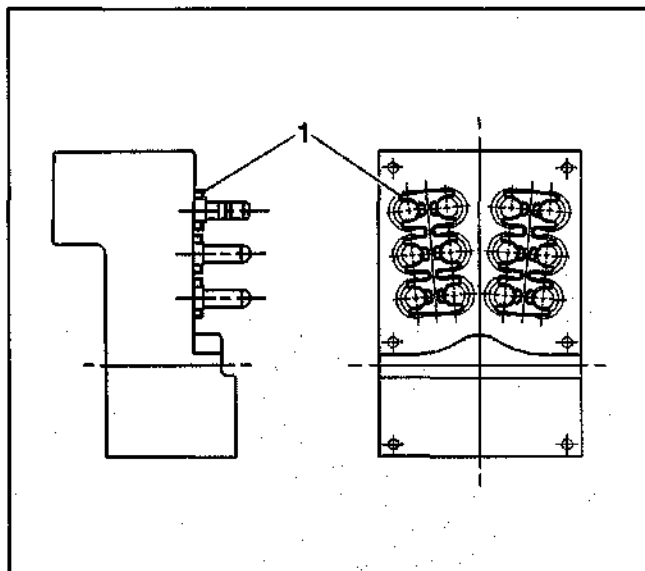
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Installation Procedure

Important: Only the new wave spring(s) and screws supplied with the new EBCM should be used.

1. Clean the BPMV gasket surface with alcohol using a clean rag.
2. If equipped with ABS only, install one wave spring (1) between the EBCM and BPMV. Use location and orientation noted during removal.

3. If equipped with ABS/TCS, install two wave springs (1) between the EBCM and BPMV. Use locations and orientation noted during removal.



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Notice: Refer to *Fastener Notice* in Cautions and Notices.

4. Install the EBCM (1) to the BPMV (5).

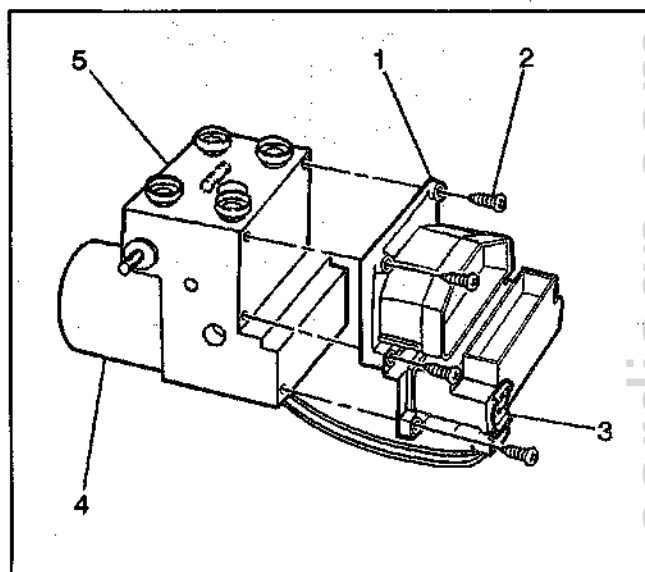
Tighten

Tighten the top four mounting screws (2) to 2.9 N-m (26 lb in.). Tighten screws in an X pattern.

Tighten

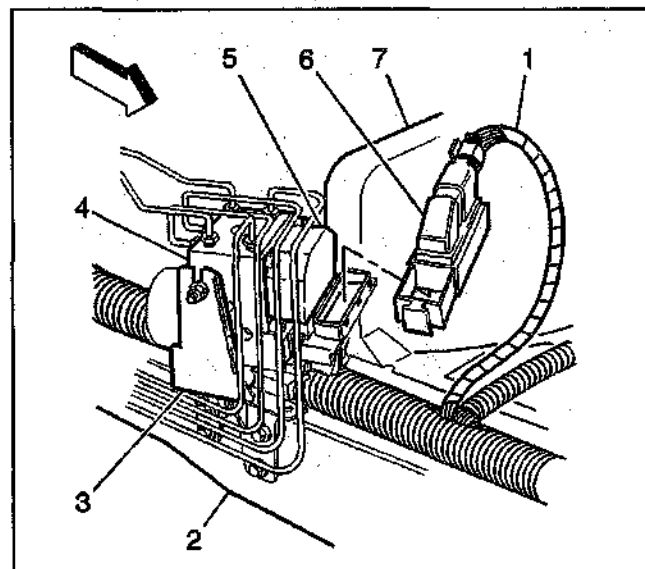
Tighten the bottom two mounting screws (2) to 2.9 N-m (26 lb. in.).

5. Connect the pump motor connector (3) to the bottom of the EBCM.

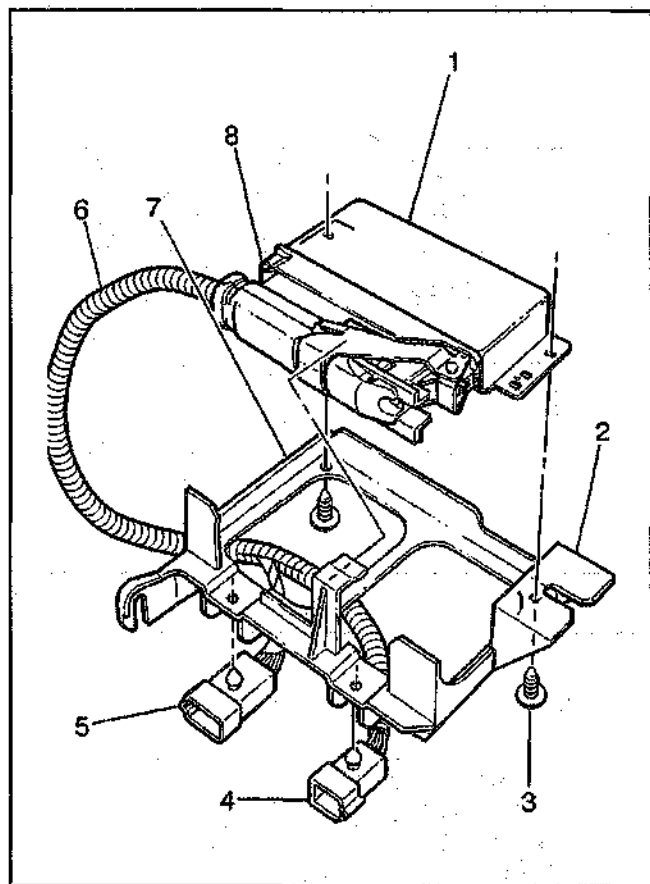


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6. Connect the EBCM harness connector. Push in lock tab.
7. Turn the ignition switch to the RUN position, engine off.
8. Perform the *A Diagnostic System Check - ABS*



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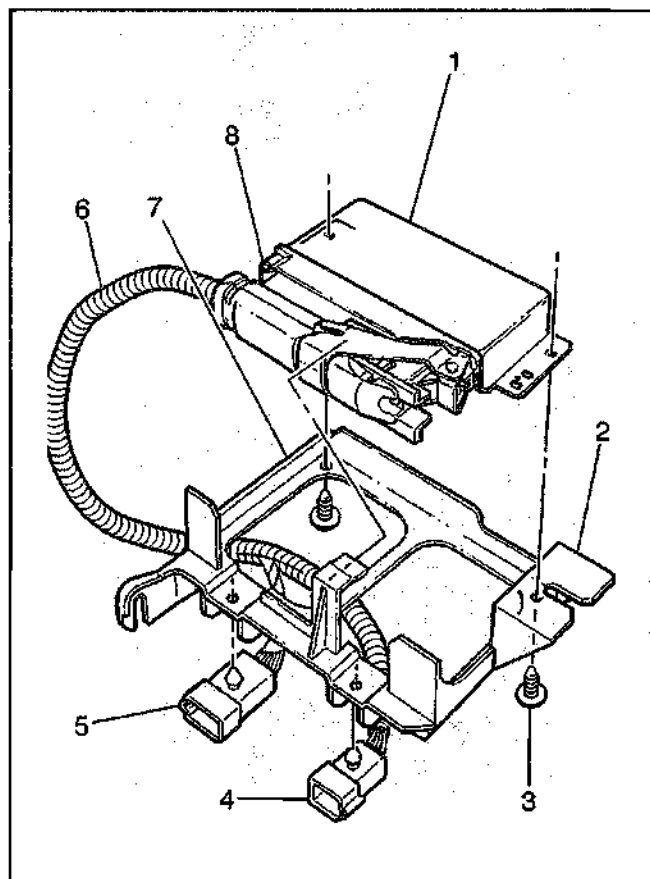


213425

Accelerator and Servo Control Module (ASM) Replacement

Removal Procedure

1. Disconnect the fasteners on the lower sound insulator panel under the steering column.
2. Remove the lower sound insulator panel from the vehicle.
3. Remove the left side kick panel on vehicles equipped with a manual transmission.
4. Remove the bolt attaching the ASM bracket to the upper I/P.
5. Remove the push in retainer attaching the ASM bracket to the side wall.
6. Remove the ASM bracket along with the ASM from the mounting place (1,2).
7. Disconnect the ASM harness connector.
8. Remove the ASM to ASM bracket mounting screws (3).
9. Remove the ASM and ASM bracket from the vehicle (1,2).



213425

Installation Procedure

1. Install the ASM to the ASM mounting bracket (1,2).
2. Install the ASM to ASM bracket screws (3).
3. Connect the ASM harness connector.
4. Install the ASM and ASM bracket in the mounting place.
5. Install the push in retainer attaching the ASM bracket to the side wall.
6. Install the bolt attaching the ASM bracket to the upper I/P.
7. Install the left side kick panel on vehicles equipped with a manual transmission.
8. Install the lower sound insulator panel in the vehicle.
9. Install the fasteners on the lower sound insulator panel under the steering column.

Brake Pressure Modulator Valve (BPMV) Replacement

Removal Procedure

Caution: For safety reasons, the Brake Pressure Modulator Valve (BPMV) must not be repaired, the complete unit must be replaced. With the exception of the EBCM/EBTCM, no screws may be loosened. If screws are loosened, it will not be possible to get the brake circuits leak-tight and personal injury may result.

1. Turn the ignition switch to the OFF position.
2. Disconnect the EBCM harness connector (6).

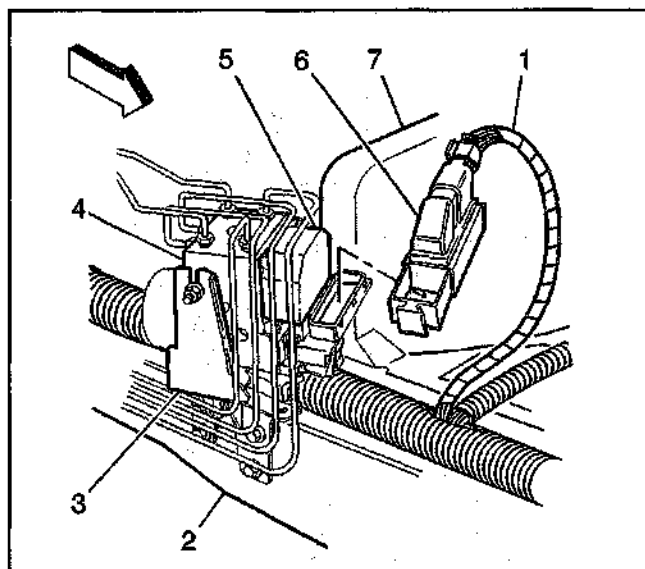
Important: Note the locations of the brake pipes in order to aid in installation.

3. Disconnect the brake pipes from the BPMV.

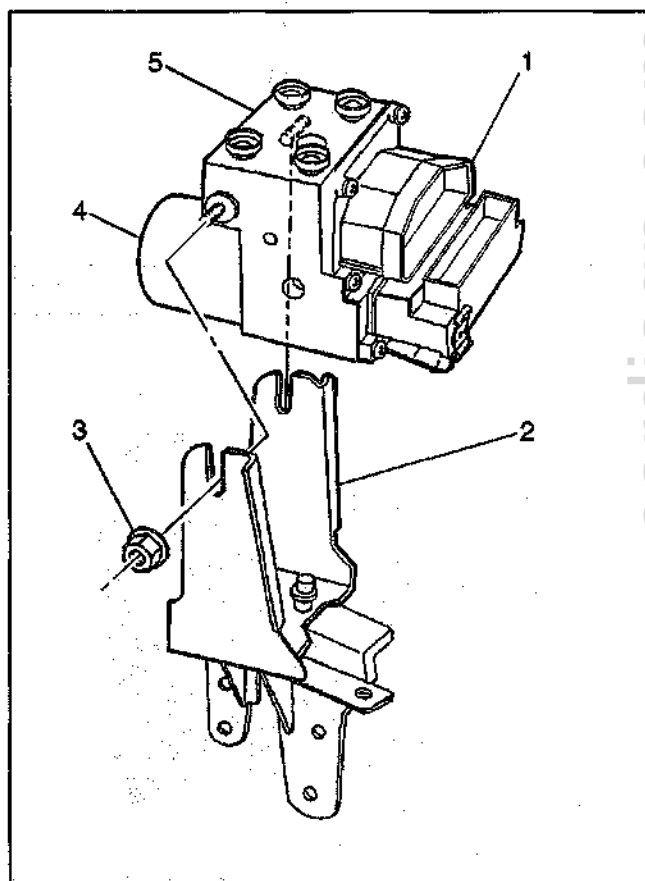
4. Remove the two nuts that connect the BPMV to the BPMV bracket (3).

Notice: When removing the brake pressure modulator valve, protect the vehicle exterior from possible brake fluid spillage. Brake fluid can cause damage to painted surfaces.

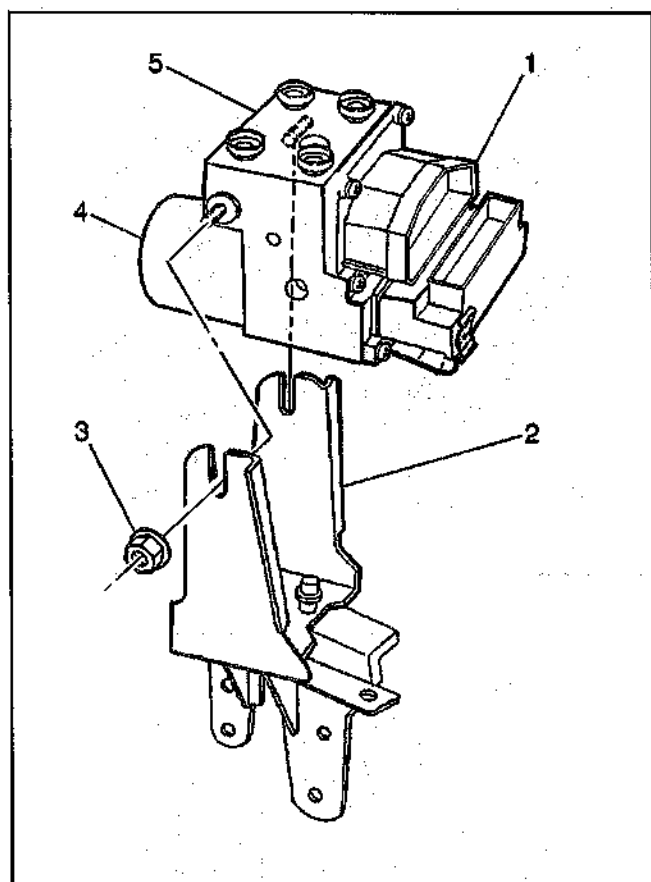
5. Remove the BPMV and EBCM as an assembly from the vehicle (5).



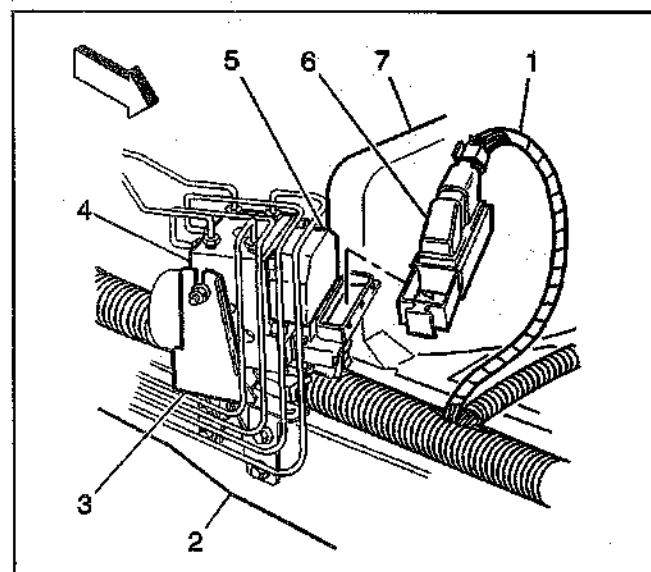
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Installation Procedure

Important: If a new BPMV is being installed, remove the shipping plugs from the valve openings in the compartment during the next step.

Important: Use the locations noted during removal.

1. Install BPMV and EBCM as an assembly into the BPMV bracket (2).
2. Install the two BPMV bracket nuts (3).

Tighten

Tighten the two BPMV to BPMV bracket nuts to 12 N·m (8 lb ft.)

Caution: Make sure brake pipes are correctly connected to brake pressure modulator valve. If brake pipes are switched by mistake, wheel lockup will occur and personal injury may result. The only two ways this condition can be detected are by using a Scan Tool or by doing an Antilock stop.

3. Install the brake pipes on to the BPMV.

Tighten

Tighten the brake pipe fittings to 15 N·m (11 lb ft).

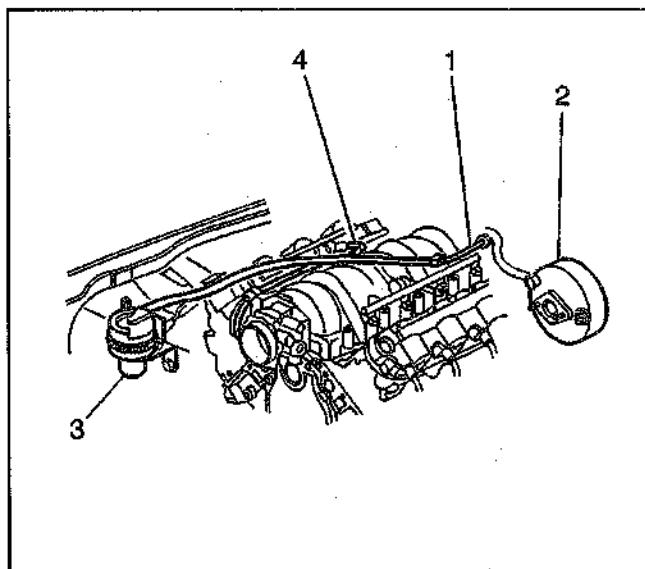
4. Connect the EBCM harness connector (6).
5. Turn the ignition switch to the RUN position, engine off.
6. Perform the A Diagnostic System Check - ABS

Adjuster Assembly Replacement

Removal Procedure

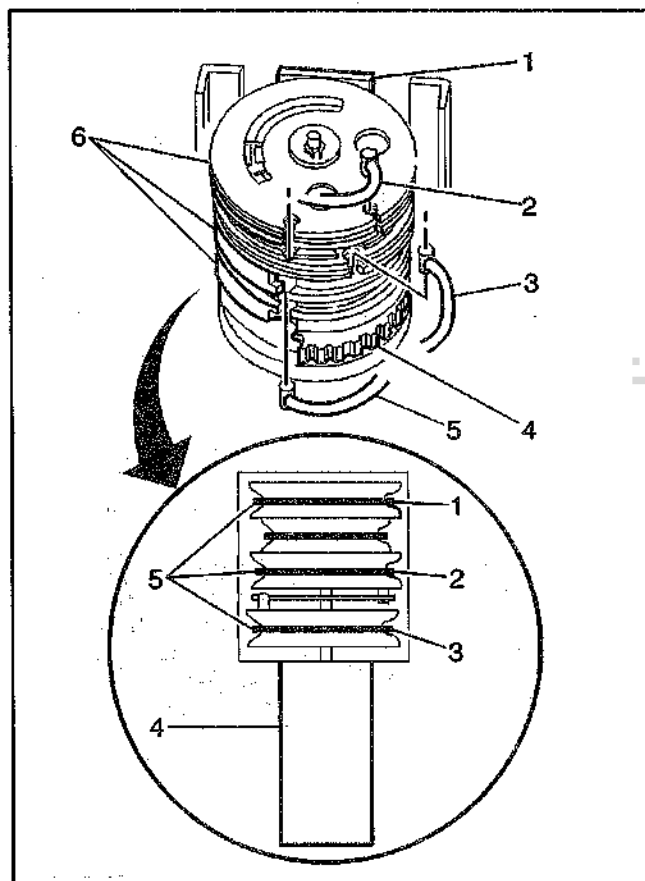
Important: The adjuster assembly cables must always be adjusted each time the adjuster assembly is removed and/or replaced to ensure optimum system performance. Refer to *Cable Adjustment Procedure*.

1. Remove the adjuster assembly splash cover.
2. Remove the cable cam cover.
3. Disconnect the adjuster assembly electrical connector.
4. Remove the nuts attaching the adjuster assembly to the bracket.

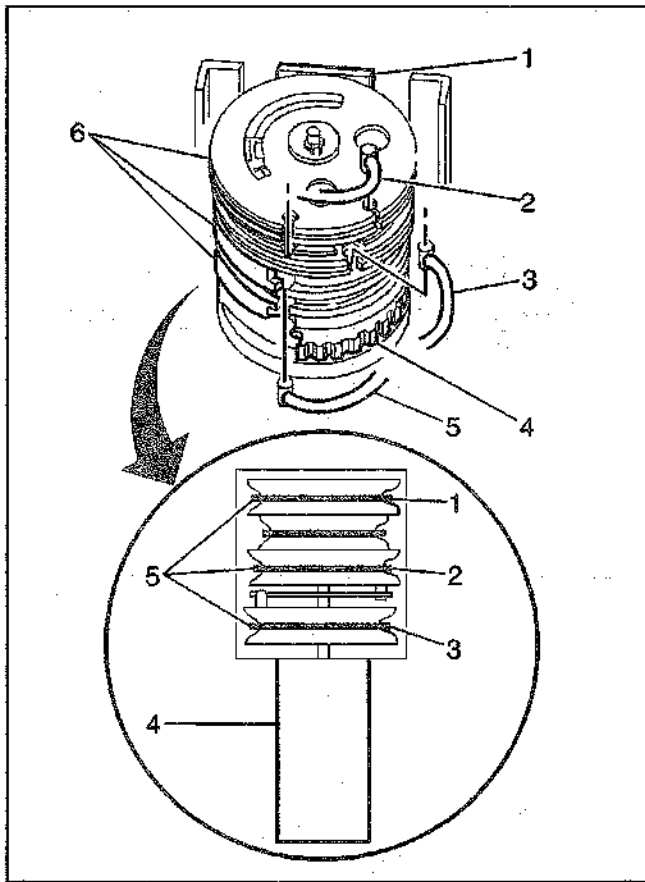


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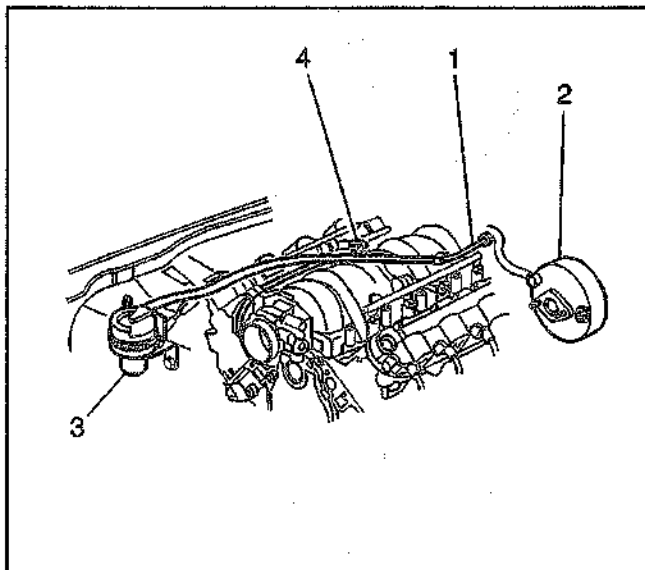
5. Remove the cables from the adjuster assembly.



213407



213407



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Installation Procedure

1. Install the cables to the adjuster assembly.

2. Install the adjuster assembly to the mounting bracket (3).
3. Install the adjuster assembly attaching nuts.

Tighten

Tighten the adjuster assembly attaching nuts to 25 N·m (18 lb ft).

4. Connect the adjuster assembly electrical connector.
5. Adjust the adjuster assembly cables. Refer to *Cable Adjustment Procedure*
6. Install the cable cam cover.
7. Install the adjuster assembly splash cover.

Cable Adjustment Procedure

The throttle body, accelerator pedal, and cruise control cables must be fully installed before making adjustments.

1. Remove the throttle body lever cover.
2. Unlock the throttle body cable and cruise control cable adjuster (1).
3. Hold throttle body lever firmly at stop/idle position.
4. Pull the throttle body cable assembly just rearward of the adjuster lock to remove slack from cable.

Important: Do not disturb cable after removing slack.

5. Lock the throttle body cable adjuster (1).
6. Hold throttle body lever firmly at stop/idle position.
7. Pull the cruise control cable assembly just rearward of the adjuster lock to remove slack from cable.

Important: Do not disturb cable after removing slack.

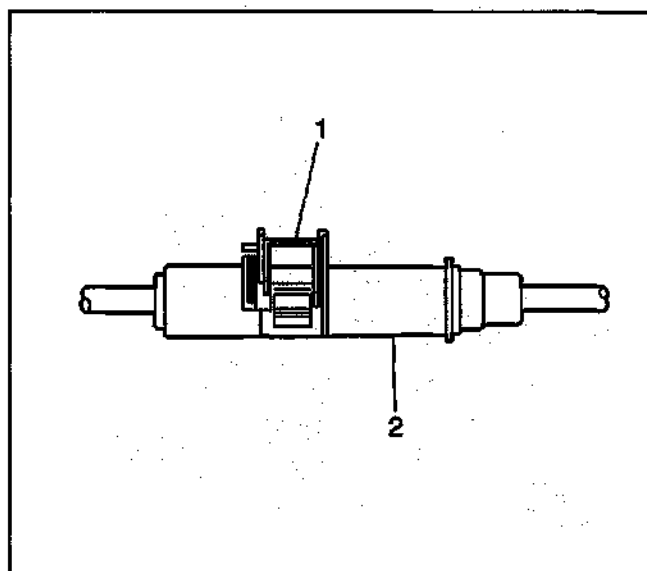
8. Lock the throttle body cable adjuster (1).

Important: Cables should never be adjusted so tight that tension from the cable will not allow the throttle to close completely. If the cable is adjusted to tight, the cable will prevent the engine from returning to idle and will cause unstable idle quality.

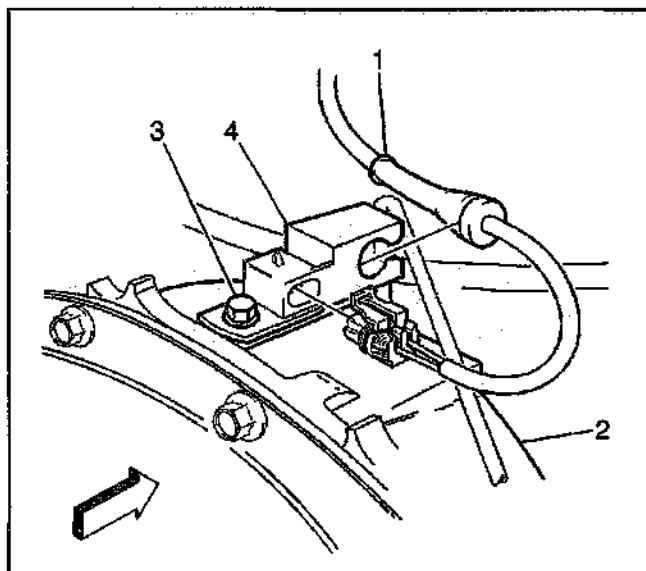
Using a scan tool check the throttle angle. When the accelerator is fully depressed the throttle angle should read 100 percent. When the accelerator is released the throttle angle should read 0 percent. If proper results are not obtained check cables for kinks or damage and repeat procedure.

Wheel Speed Sensor Replacement (Front)

1. Refer to *Wheel Bearing/Hub Replacement - Front* in Front Suspension.
2. After the replacement procedure is complete refer to *A Diagnostic System Check - ABS*.



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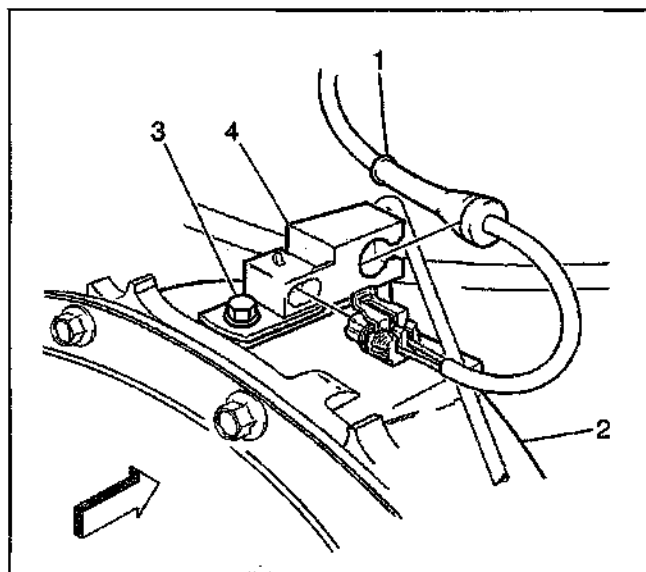


213402

Wheel Speed Sensor Replacement (With out Tractional Control)

Removal Procedure

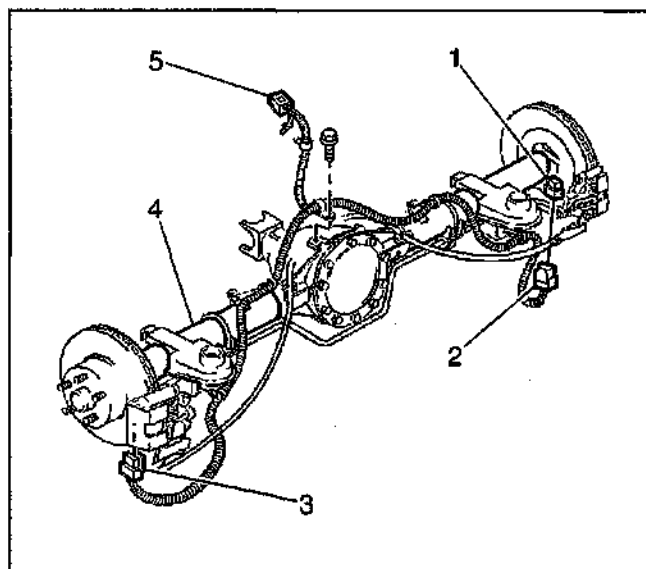
1. Remove the wheel speed sensor connector.
2. Clean all dirt and debris from sensor housing/sensor interface area.
3. Remove the Wheel Speed Sensor bolt (3).
4. Remove the Wheel Speed Sensor (4).



213402

Installation Procedure

1. Install the Wheel Speed Sensor (4).
 2. Install the Wheel Speed Sensor mounting bolt (3).
- Tighten**
Tighten the bolt to 10 N·m (89 lb.in)
3. Install the wheel speed sensor connector.



213413

Wheel Speed Sensor Replacement (With Traction Control)

Removal Procedure

1. Remove the wheel speed sensor connector (2).
2. Clean all dirt and debris from sensor housing/sensor interface area.
3. Remove the Wheel Speed Sensor attaching bolt.
4. Remove the Wheel Speed Sensor (1).

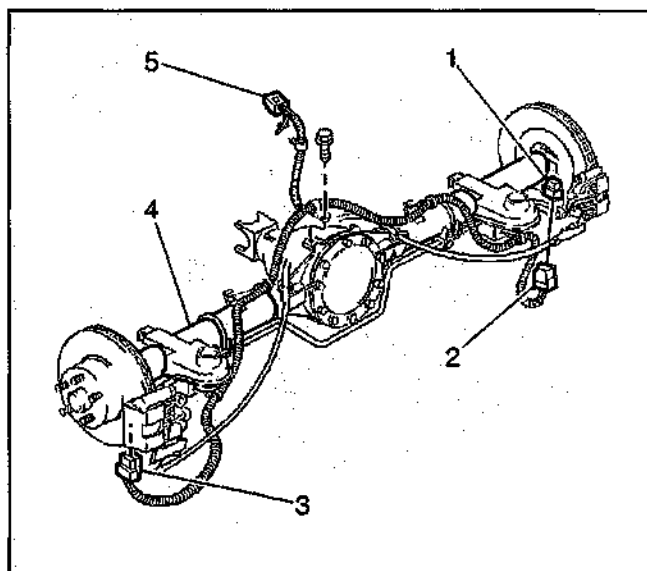
Installation Procedure

1. Install the Wheel Speed Sensor (1).
2. Install the Wheel Speed Sensor attaching bolt.

Tighten

Tighten the bolt to 10 N·m (89 lb.in)

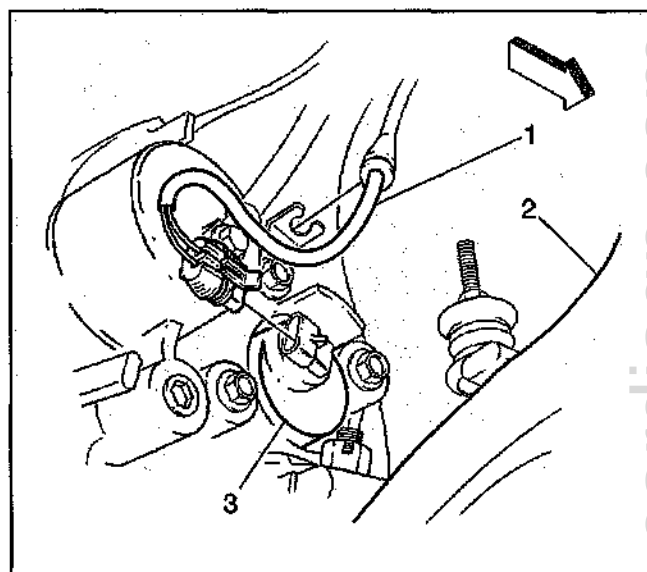
3. Install the wheel speed sensor connector (2).



213413

Wheel Speed Sensor Jumper Harness Replacement (Front Right)**Removal Procedure**

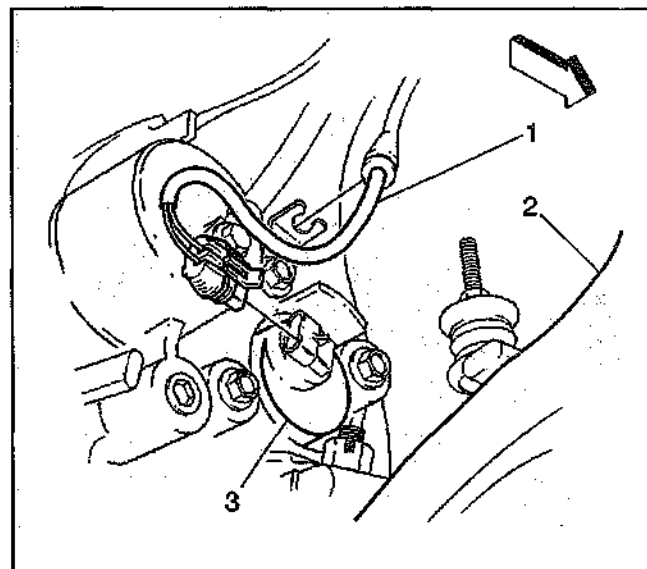
1. Remove the wheel speed sensor connector.
2. Remove the jumper harness from the retaining clip.
3. Remove the grommet retainer at the inner fender.
4. Remove the harness cover from the right strut tower.
5. Remove the upper jumper harness connector.
6. Pull the grommet through inner fender pass-thru and remove jumper harness.



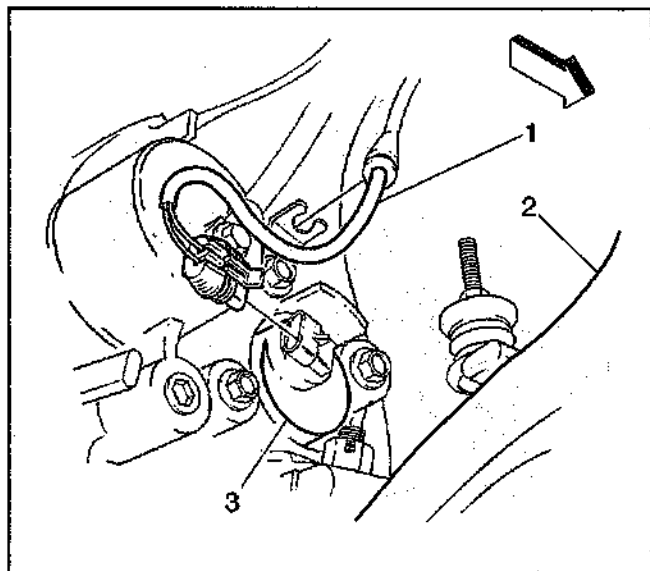
213395

Installation Procedure

1. Route the new jumper harness through inner fender pass-thru.
2. Install the upper jumper harness connector.
3. Install the harness cover on the right strut tower.
4. Install the grommet retainer at the inner fender.
5. Install the jumper harness from the retaining clip.
6. Install the wheel speed sensor connector.



213395

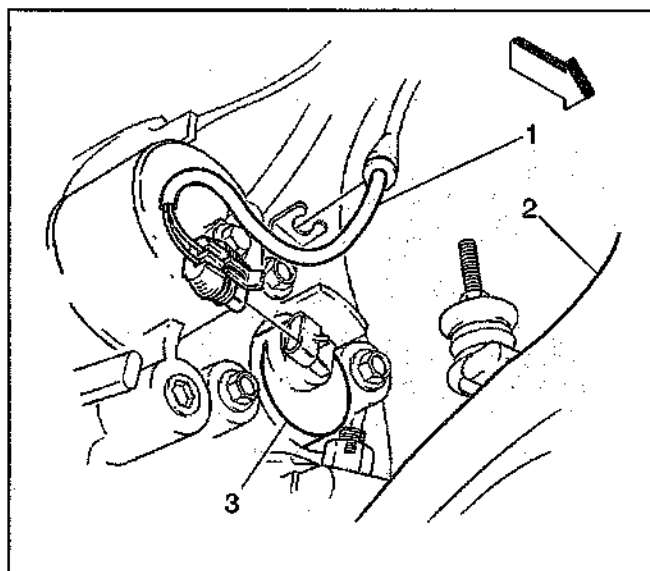


213395

Wheel Speed Sensor Jumper Harness Replacement (Front Left)

Removal Procedure

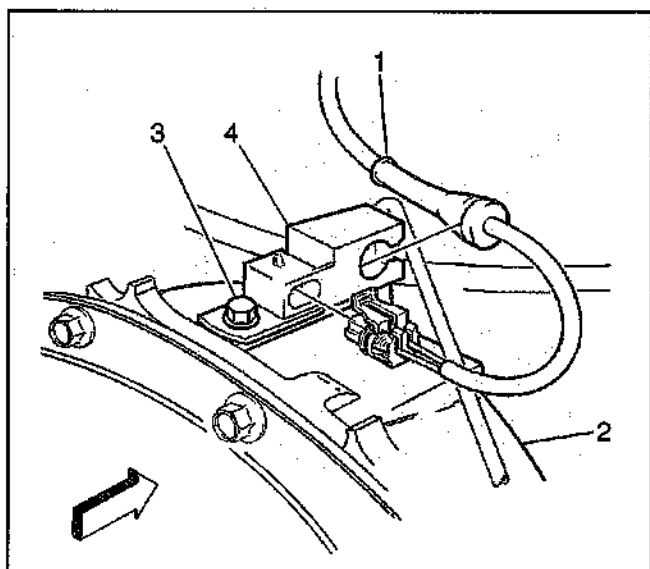
1. Remove the wheel speed sensor connector.
2. Remove the jumper harness from the retaining clip.
3. Remove the grommet retainer at the inner fender.
4. Remove the transmission cable retainer and various harnesses from restraints at left strut tower to access jumper harness connector.
5. Remove the upper jumper harness connector.
6. Pull the grommet through inner fender pass-thru and remove jumper harness.



213395

Installation Procedure

1. Route the new jumper harness through inner fender pass-thru.
2. Install the upper jumper harness connector.
3. Install the transmission cable retainer and various harnesses to restraints that may have been disconnected to access jumper harness.
4. Install the grommet retainer at the inner fender.
5. Install the jumper harness from the retaining clip.
6. Install the wheel speed sensor connector.



213402

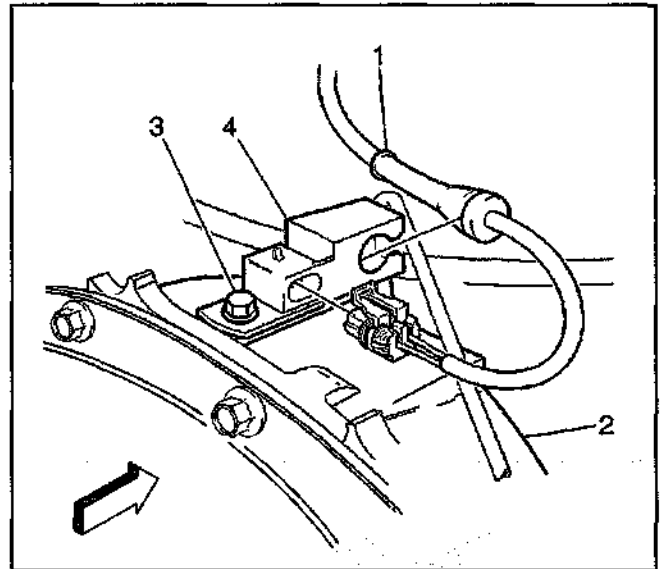
Wheel Speed Sensor Jumper Harness Replacement (Rear with out Traction Control)

Removal Procedure

1. Remove the wheel speed sensor connector.
2. Remove the rear wheel speed sensor jumper harness grommet from retainer (1).
3. Remove the upper harness connector from rear body pass-thru connector.

Installation Procedure

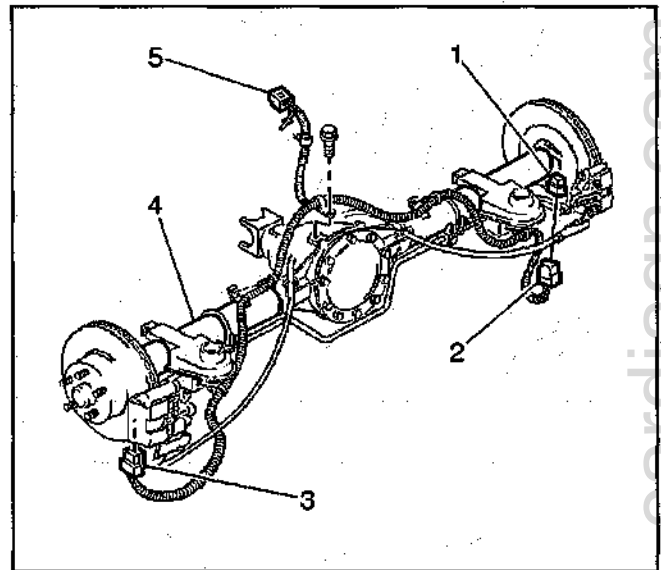
1. Install the upper harness connector from rear body pass-thru connector.
2. Install the rear wheel speed sensor jumper harness grommet from retainer (1).
3. Install the wheel speed sensor connector.



213402

Wheel Speed Sensor Jumper Harness Replacement (Rear with Traction Control)**Removal Procedure**

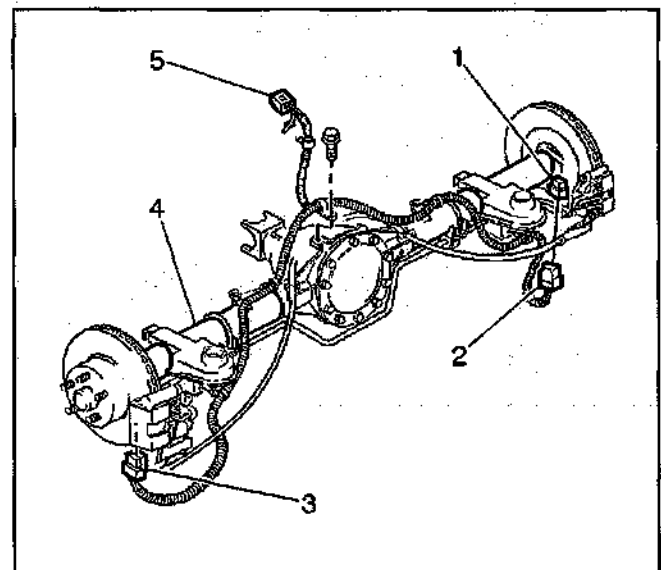
1. Remove the wheel speed sensor connectors (2,3).
2. Remove the jumper harness grommet from the retainer.
3. Remove the upper jumper harness connector from the rear body pass-thru connector.



213413

Installation Procedure

1. Install the upper jumper harness connector from the rear body pass-thru connector.
2. Install the jumper harness grommet to the retainer.
3. Install the wheel speed sensor connectors (2,3).



213413

Wheel Speed Sensor Ring Replacement (With out Traction Control)

The rear wheel speed sensor reluctor ring is located in the differential case. If the reluctor ring is determined to be damaged and must be replaced refer to Differential case in Rear Axle.

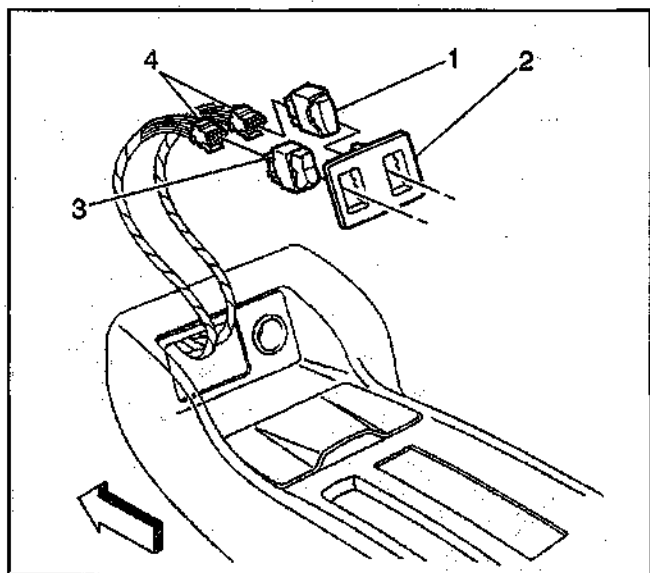
Wheel Speed Sensor Ring Replacement (With Traction Control)

The rear wheel speed sensor reluctor rings are an integral part of the rear axle shafts. If it has been determined they must be replaced refer to Axle Shaft in Rear Axle.

Traction Control Switch Replacement (Pontiac)

Removal Procedure

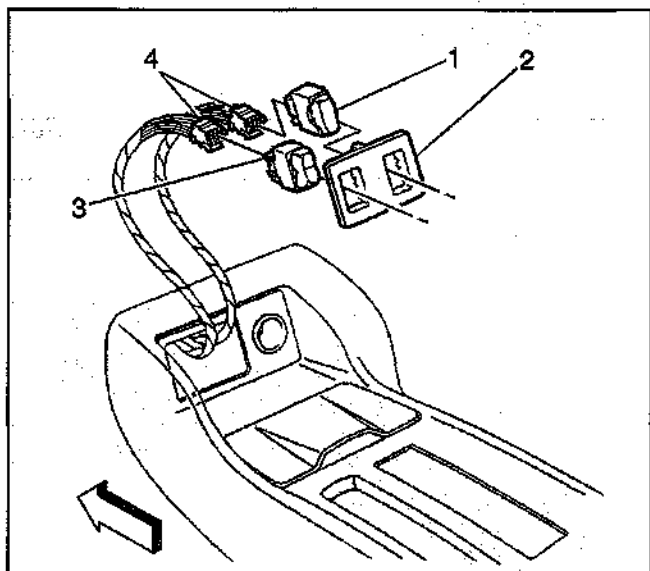
1. Unsnap the front floor console accessory trim plate (2).
2. Electrical connector from the traction control switch (4).
3. Electrical connector from the convertible top switch (3), if equipped.
4. Unsnap the traction control switch (1) from the front floor console accessory trim plate (2).



380686

Installation Procedure

1. Traction control switch (1) to the front floor console accessory trim plate (2).
2. Electrical connector to the convertible top switch (3), if equipped.
3. Electrical connector to the traction control switch (1).
4. Front floor console accessory trim plate (2).

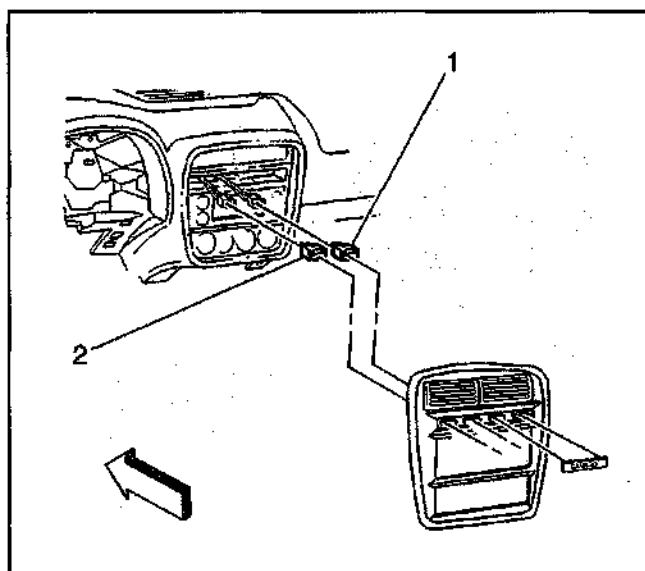


380686

Traction Control Switch Replacement (Chevrolet)

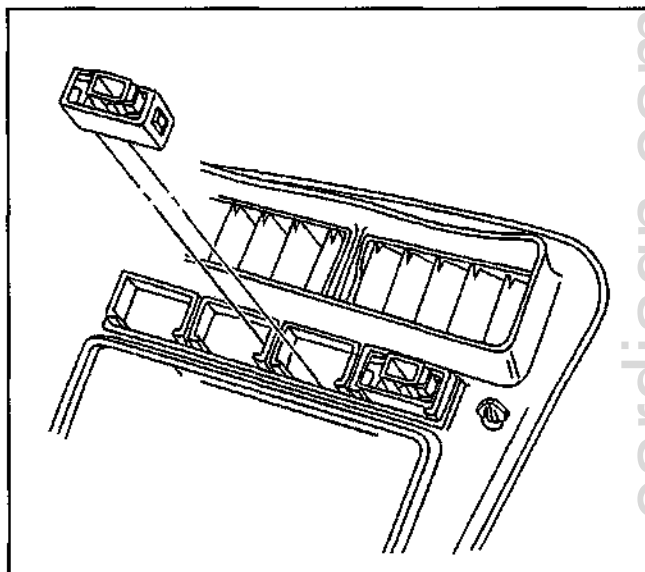
Removal Procedure

1. Unsnap the I/P accessory trim plate.
2. Disconnect the electrical connector from the fog lamp switch (2).
3. Disconnect the electrical connector from the traction control switch (1).



294806

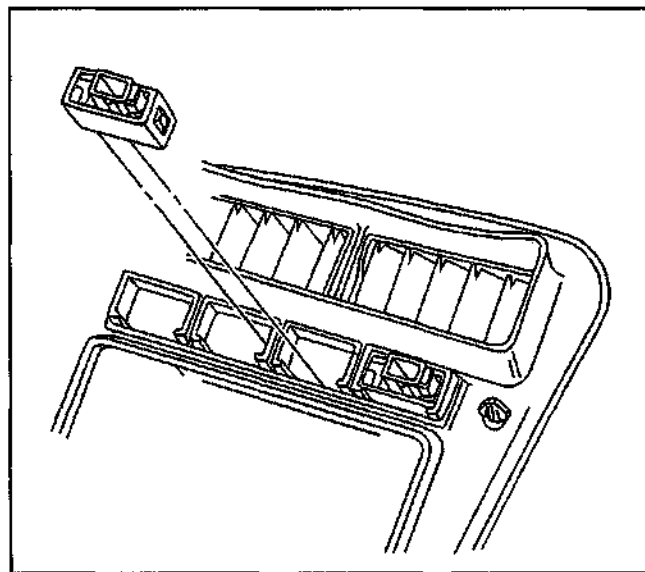
4. Unsnap the traction control switch from the I/P accessory trim plate.



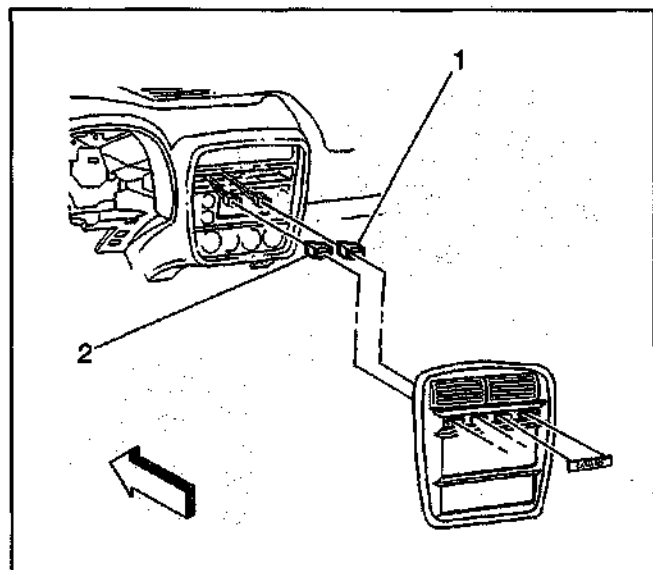
367395

Installation Procedure

1. Install the traction control switch to the I/P accessory trim plate.
2. Connect the electrical connector to the traction control switch.
3. Traction control switch to the instrument panel accessory trim plate (1).



367395



294806

4. Install the I/P accessory trim plate.

Description and Operation

Service Precautions

ABS/TCS System Service Precautions

Observe the following general precautions during any ABS/TCS service. Failure to adhere to these precautions may result in ABS/TCS system damage.

1. Unplug the EBCM/EBTCM harness connector before performing electric welding procedures.
2. Carefully note the routing of the ABS/TCS wiring and wiring components during removal. The ABS/TCS components are extremely sensitive to EMI (electromagnetic interference). Proper mounting is critical during component service.
3. Do not use a quick charger for engine starting or for battery charging with the battery still connected. Brake failure or ABS/TCS component damage may result.
4. Disconnect the battery with the ignition off.
5. Disconnect the EBCM/EBTCM connector with the ignition off.
6. Do not attempt to repair the BPMV or any other non serviceable ABS/TCS components where noted in this section. Many ABS/TCS components are serviceable by component replacement only.
7. Do not hang the suspension components from the WSS cables. The cables may be damaged.
8. Do not subject the EBCM/EBTCM to temperatures of more than 85°C (184°F).
9. Do not use petroleum based fluids in the master cylinder. Do not use any containers previously used for petroleum based fluids. Petroleum causes swelling and distortion of the rubber components in the hydraulic brake system, resulting in water entering the system and lowering the fluid boiling point.
10. Inspect the ABS/TCS system after service using a scan tool.

General System Description

The purpose of the Bosch 5.3 Antilock Brake System (ABS) is to minimize wheel slip during heavy braking. The Bosch 5.3 performs this function by monitoring the speed of each wheel and controlling the brake fluid pressure to each wheel independently during a braking event. This allows the driver to retain directional stability and better steering capability. The Traction Control System (TCS) also monitors rear wheel speed and compares the speed to the speed of the front wheel. If excessive rear wheel speed is detected in either rear wheels the TCS will be activated.

Abbreviations and Definitions

ABS:	Antilock Brake System
ASM:	Accelerator and Servo Control Module
B+:	Battery Voltage
BPMV:	Brake Pressure Modulator Valve
CKT:	Circuit
DLC:	Data Link Connector
DTC:	Diagnostic Trouble Code
DMM:	Digital Multimeter
EBCM:	Electronic Brake Control Module
EBD:	Electronic Brakeforce Distribution
EBTCM:	Electronic Brake and Traction Control Module
IPC:	Instrument Panel Cluster
PCM:	Powertrain Control Module
TCS:	Traction Control System
WSS:	Wheel Speed Sensor

Basic Knowledge Required

Before using this section, it is important that you have a basic knowledge of the following items. Without this basic knowledge, it will be difficult to use the diagnostic procedures contained in this section.

If you need a review of basic electrical troubleshooting knowledge, Refer to General Electrical Diagnosis Procedures in Wiring Systems. Additionally, electrical/electronic courses are offered through General Motors Service Training.

Basic Electrical Circuits

- You should understand the basic theory of electricity and know the meaning of voltage, current (amperes) and resistance (ohms).
- You should understand what happens in a circuit with an open or shorted wire.
- You should be able to read and understand a wiring diagram.

Use of Circuit Testing Tools

- You should be familiar with the Digital Multimeter (DMM) J 39200, and be familiar with the meter controls and how to use them correctly.
- You should be able to measure voltage, resistance and current.
- You should know how to use jumper wires to bypass components for testing circuits.

Important: When measuring the resistance to ground of circuit or component, make sure to use a solid, unpainted chassis ground or the negative battery terminal.

ABS Description

Brake Pressure Modulator Valve (BPMV)

The Brake Pressure Modulator Valve (BPMV) mounted on the left side of the engine compartment, provides brake fluid modulation for each of the individual wheel circuits as required during Antilock braking. During the Antilock mode, the BPMV can maintain or reduce brake fluid pressure independent of the pressure generated in the master cylinder. The BPMV does not provide more pressure than is applied by the master cylinder during braking.

The BPMV supplies Electronic Brakeforce Distribution (EBD). This function takes the place of the proportioning valve(s).

With the exception of the EBCM/EBTCM, the Brake Pressure Modulator Valve (BPMV) is an integral, non-serviceable component. The BPMV should never be disassembled.

If the vehicle is not equipped with traction control the BPMV uses a three circuit configuration with a front-rear split. Individual circuits are provided for the left front and right front wheels, and the rear wheels use one circuit.

If the vehicle is equipped with traction control the BPMV uses a four circuit configuration with a front-rear split. Individual circuits are provided for the left front and right front wheels, and left rear and right rear wheels.

The BPMV consists of several other components which are described as follows:

Pump Motor

The BPMV contains a motor driven recirculation pump. The pump serves two purposes: 1) During ABS Reduce Pressure events, it transfers fluid from the brake calipers back to the master cylinder; and 2) During traction control, it transfers fluid from the master cylinder reservoir to the rear brake calipers. The pump and motor are located within the BPMV and are not serviced separately.

ABS Valves

The ABS valves decrease or maintain brake fluid pressure at the individual wheel circuits. If the vehicle is not equipped with traction control there are three Inlet, and three Outlet solenoid valves. If the vehicle is equipped with traction control there are four Inlet, and four Outlet solenoid valves. The solenoid valves maintain, increase, or decrease brake fluid pressure to the individual wheel circuits. The EBCM/EBTCM commands the valves to their correct position during an antilock or traction event. During antilock mode, the pressure in each hydraulic circuit can be held or released by activating the appropriate valves. The normal state of the inlet valves is open, while the normal state of the Outlet valves is closed. This allows direct master cylinder pressure to the brakes during normal braking. The ABS valves are located within the BPMV and are not serviced separately.

TCS Master Cylinder Isolation Valves

If the vehicle is equipped with Traction Control there is one TCS Master Cylinder Isolation Valve within the BPMV. This valve isolates the master cylinder so the pump motor can build brake fluid pressure for the rear brakes during a traction event.

TCS Prime Valves

If the vehicle is equipped with Traction Control there is one TCS prime valve within the BPMV. This valve allows the pump to draw fluid from the master cylinder reservoir, through the compensating ports in the master cylinder bore.

Electronic Brake And Traction Control Module

The EBCM/EBTCM performs the following primary functions:

- Detects wheel slip tendencies
- Detects wheel speed differences
- Controls the brake system while in the antilock or traction control mode
- Controls the Electronic Brakeforce Distribution (EBD)
- Monitors the system for proper electrical operation

The EBCM/EBTCM also controls the display of the ABS and traction control DTCs while in diagnostic mode. The EBCM/EBTCM continuously checks the speed of each wheel in order to determine if any wheel is beginning to slip. If a wheel slip tendency is detected, the EBCM/EBTCM commands the appropriate valve positions to modulate the brake fluid pressure in some or all of the hydraulic circuits.

This action prevents wheel slip and provides optimum braking. The EBCM/EBTCM continues to control pressure in the individual hydraulic circuits until a slipping tendency is no longer present. The EBCM/EBTCM continuously monitors the ABS/TCS for proper operation. If an error is detected, the EBCM/EBTCM can disable the ABS/TCS and turn on the ABS or TCS OFF Indicators in the IPC.

Wheel Speed Sensors

A wheel speed sensor is located at each front wheel bearing assembly. If the vehicle is equipped with traction control a wheel speed sensor is located at each rear wheel bearing assembly. If the vehicle is not equipped with traction control then a single rear wheel speed sensor is located in the differential housing. The sensors use AC voltage in order to transmit wheel speed information to the EBCM/EBTCM. Passing a toothed sensor ring past a stationary sensor causes the magnetic induction that generates the voltage. A pair of wires carries the signal to the EBCM/EBTCM. The wheel speed sensors are located in their respective assemblies and are not adjustable.

Traction Control System ON/OFF Switch

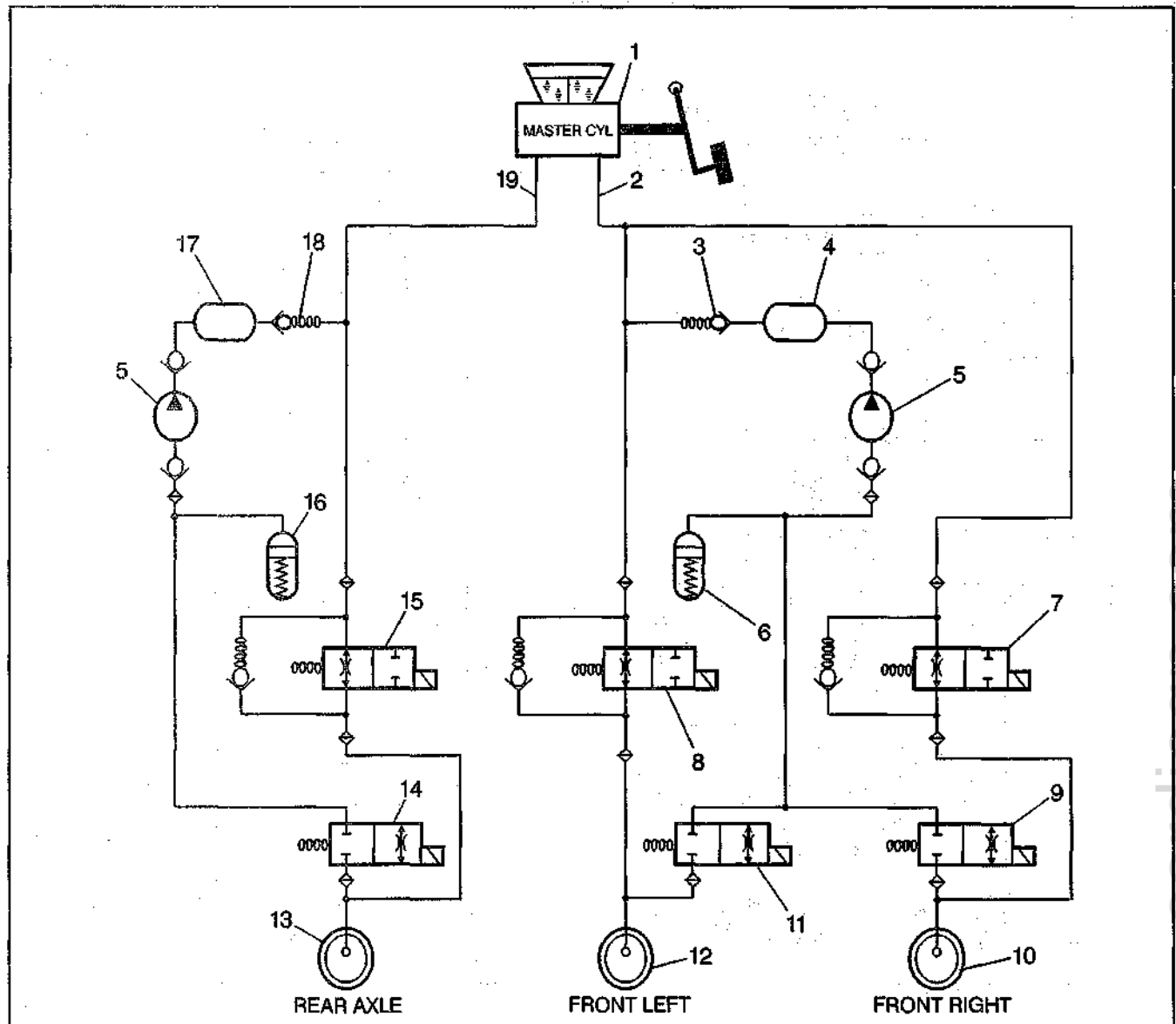
The Traction Control On/Off Switch is a momentary on switch that allows the driver to shut off the TCS for personal or diagnostic reasons. Turning the switch to off places the TCS in the passive mode while maintaining ABS functions. With the TCS system on, pressing the switch disables the TCS and the TRACTION OFF indicator turns on.

Stoplamp Switch

The stoplamp switch is an input to the EBCM/EBTCM. The EBCM/EBTCM uses the stoplamp switch in order to tell when the brake pedal is being applied.

ABS Operation

ABS BPMV Hydraulic Flow

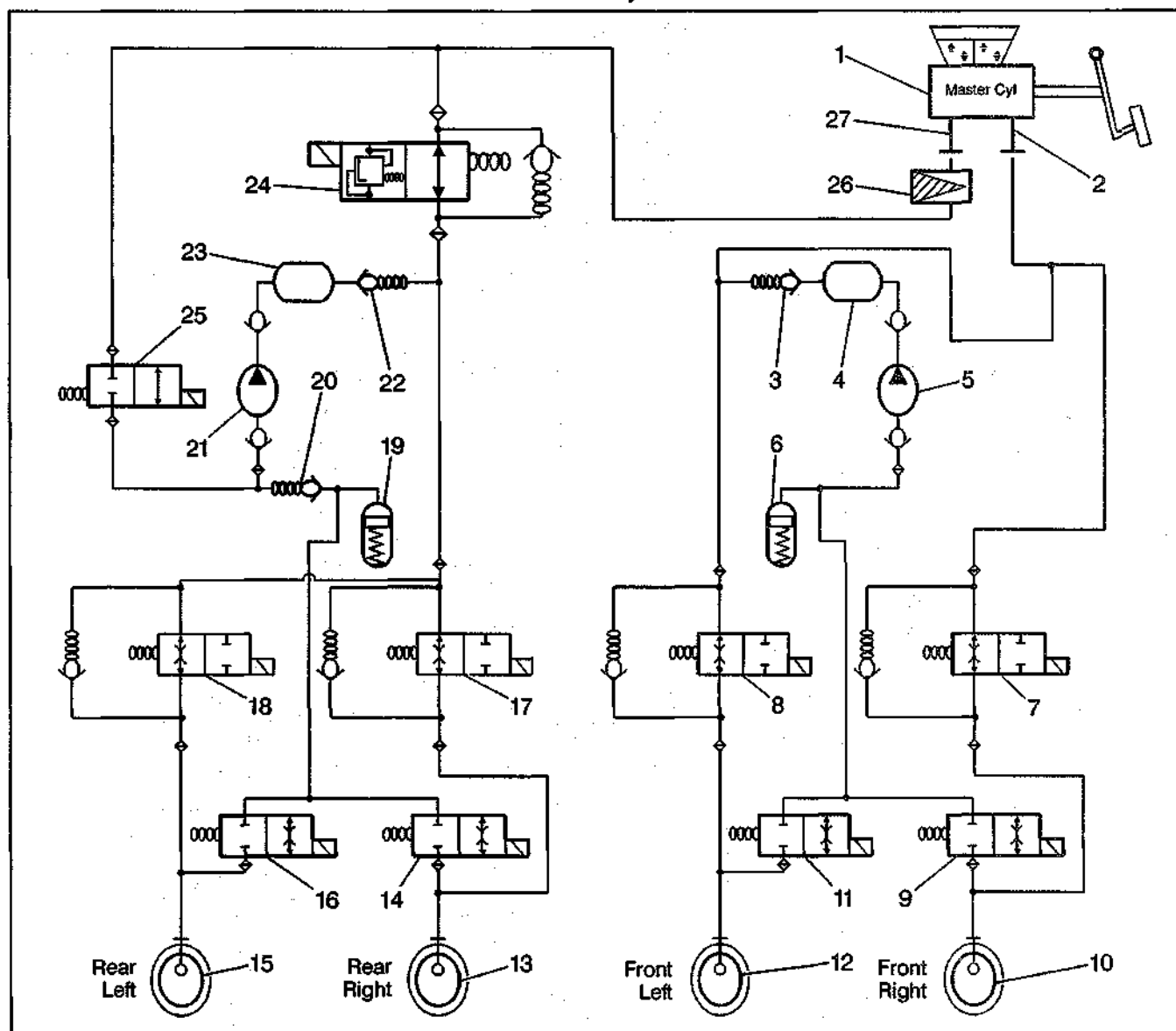


Legend

- (1) Master Cylinder
- (2) Front Brake Pipe
- (3) Check Valve
- (4) Damping Chamber
- (5) Pump
- (6) Pressure Accumulator
- (7) Right Front Inlet Valve
- (8) Left Front Inlet Valve
- (9) Right Front Outlet Valve

- (10) Right Front Rotor
- (11) Left Front Outlet Valve
- (12) Left Front Rotor
- (13) Rear Rotors
- (14) Rear Outlet Valve
- (15) Rear Inlet Valve
- (16) Pressure Accumulator
- (17) Damping Chamber
- (18) Check Valve

ABS/TCS BPMV Hydraulic Flow



215251

Legend

- | | |
|------------------------------|-----------------------------|
| (1) Master Cylinder | (15) Left Rear Rotor |
| (2) Front Brake Pipes | (16) Left Rear Outlet Valve |
| (3) Check Valve | (17) Right Rear Inlet Valve |
| (4) Damping Chamber | (18) Left Rear Inlet Valve |
| (5) Pump | (19) Pressure Accumulator |
| (6) Pressure Accumulator | (20) Check Valve |
| (7) Right Front Inlet Valve | (21) Pump |
| (8) Left Front Inlet Valve | (22) Check Valve |
| (9) Right Front Outlet Valve | (23) Damping Chamber |
| (10) Right Front Rotor | (24) Isolation Valve |
| (11) Left Front Outlet Valve | (25) Prime Valve |
| (12) Left Front Rotor | (26) Internal Damper |
| (13) Right Rear Rotor | (27) Rear Brake Pipes |
| (14) Right Rear Outlet Valve | |

Antilock Brake System

When wheel slip is noted during a brake application, the ABS will enter Antilock mode. During Antilock braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. If the vehicle is equipped with traction control a separate hydraulic line and specific solenoid valves are provided for each wheel. If the vehicle is not equipped with traction control then both front wheels have a separate hydraulic line and specific solenoid valves, the rear wheels have only one hydraulic line controlled by one set of solenoid valves. The ABS can decrease, hold, or increase hydraulic pressure to each wheel brake. However, it cannot increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During Antilock braking, a series of rapid pulsation's will be felt in the brake pedal. These pulsation's are caused by the rapid changes in position of the individual solenoid valves as they respond to their desired wheel speed. This pedal pulsation is present during Antilock braking and will 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 rapidly cycle. During Antilock braking on dry pavement, the tires may make intermittent chirping noises as they approach slipping. These noises and pedal pulsation's should be 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 should be no different than previous systems. Maintaining a constant force on the pedal will provide the shortest stopping distance while maintaining vehicle stability.

Pressure Hold

When the EBCM senses the wheel slip, the EBCM closes the Inlet valve and keeps the Outlet valve closed in the BPMV in order to isolate the system. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

If during the pressure hold mode the EBCM still senses wheel slip, the EBCM will decrease the pressure to the brake. The Inlet valve is left closed and the Outlet valve is opened. The excess fluid is stored in the accumulator until the return pump can return the fluid to the master cylinder.

Pressure Increase

If during the pressure hold or the pressure decrease mode the EBCM senses that the wheel speed is too fast, the EBCM will increase the pressure to the brake. The Inlet is opened and the Outlet valve is closed. The increased pressure comes from the master cylinder and is related to the pressure applied to the brake pedal.

Traction Control

Traction control will not have any effect on the operation of the vehicle until the control module detects one or both of the rear wheels rotating faster than the front wheels. At this time the Electronic Brake and Traction Control Module (EBCM) will request the Powertrain Control Module (PCM) to retard timing. If the EBCM continues to detect the rear wheel are rotating faster than the front it will request the ASM to reduce the throttle angle. The last measure taken to control the rear wheel is for the EBCM to apply the rear brakes, thus reducing torque to the rear wheels. Once the rear wheels begin to rotate at the same speed as the front wheels, the system will return full control to the driver. During Traction Control mode, if the brake is applied to only one rear wheel, most of the torque from the engine will be directed to the other rear wheel which will improve the traction of the vehicle.

The braking is accomplished by closing the TCS Master Cylinder Isolating Valve, this isolates the master cylinder from the rest of the system. The TCS Prime valve opens to allow the pump to get brake fluid to build pressure for braking. The drive wheel circuit solenoids are energized as needed to allow for pressure hold, pressure increase, or pressure decrease.

The TCS may be deactivated by the driver if desired. In order to deactivate the TCS with the engine running, depress the TCS On/Off switch. The system will remain deactivated until the ignition switch is cycled, or the switch is pressed again.

Tires with ABS/TCS

The compact spare tire rotates faster than the others. The EBCM compensates for this faster rotation. Refer to Tires and Wheels in Suspension for information on replacement tires.

Replacement Tires

The tire size is important for the performance of the ABS/TCS. The replacement tires should be the same size load range and construction as the original tires. Replace the tires in axle sets and only with tires of the same tire performance criteria specification number. Use of any other tire size or type may seriously affect ABS/TCS operation. For information on replacement tires for this vehicle, Refer to Tires and Wheels in Suspension.

BRAKE Warning Indicator

The red BRAKE Indicator in the instrument cluster will illuminate to warn the driver of conditions in the brake system which may result in reduced braking ability. The red BRAKE indicator will also illuminate when the park brake is applied. The BRAKE warning Indicator will stay illuminated until the condition has been repaired, or the park brake is released. Refer to *Brake System Testing* in Hydraulic Brakes.

ABS Indicator

The ABS is located in the instrument cluster and will illuminate if a malfunction in the ABS is detected by the Electronic Brake and Traction Control Module (EBCM). The ABS Indicator informs the driver that a condition exists which results in turning off the Antilock brake and traction control function if equipped. If only the ABS Indicator is on, normal braking with full power assist is available. If the BRAKE and Antilock Indicators are on, a problem may exist in the hydraulic brake system. Refer to *Brake System Testing in Hydraulic Brakes*. Conditions for the Antilock Indicator to turn on are as follows:

1. ABS malfunction detected. As previously described, the ABS Indicator turns on when a problem has been found in the ABS. The ABS Indicator indicates that the ABS and TCS if equipped have been disabled.
2. Instrument Panel Cluster bulb check. When the ignition is turned to RUN, the ABS Indicator will turn on for approximately three seconds and then turn off.
 - Illumination of the BRAKE warning Indicator may indicate reduced braking ability.
 - Illumination of the ABS Indicator without the BRAKE warning Indicator on indicates only that Antilock braking is no longer available. Power assisted braking without Antilock control is still available.
 - Refer to *Brake System Testing in Hydraulic Brakes* for diagnosis of any condition which causes the BRAKE warning Indicator to illuminate.

ASR Indicator (Chevrolet)

The ASR Indicator (Chevrolet only) is located in the instrument cluster and will illuminate if a malfunction in the traction control system is detected by the Electronic Brake and Traction Control Module (EBCM). The ASR Indicator informs the driver that a condition exists which results in turning off traction. Conditions for the ASR Indicator to turn on are as follows:

1. Traction control malfunction detected. As previously described, the ASR Indicator turns on when a problem has been found in the traction control system. The ASR Indicator indicates that traction control has been disabled.
2. Instrument Panel Cluster bulb check. When the ignition is turned to RUN, the ASR Indicator will turn on for approximately three seconds and then turn off.

TCS Off Indicator (Pontiac)

The TCS Off Indicator (Pontiac only) is located in the instrument cluster and will illuminate if a malfunction in the traction control system is detected by the Electronic Brake and Traction Control Module (EBCM). The TCS Off Indicator informs the driver that a condition exists which results in turning off traction. Conditions for the TCS Off Indicator to turn on are as follows:

1. Traction control malfunction detected. As previously described, the TCS Off Indicator turns on when a problem has been found in the traction control system. The TCS Off Indicator indicates that traction control has been disabled.
2. Instrument Panel Cluster bulb check. When the ignition is turned to RUN, the TCS Off Indicator will turn on for approximately three seconds and then turn off.

Low Trac Indicator

The Low Trac Indicator is located in the instrument cluster and will illuminate when the EBCM detects a low traction condition. Conditions for the Low Trac Indicator to turn on are as follows:

1. Instrument Panel Cluster bulb check. When the ignition is turned to RUN, the ASR Indicator will turn on for approximately three seconds and then turn off.
2. The EBCM detects an antilock braking condition.
3. The EBCM detects a traction control condition.

Special Tools and Equipment

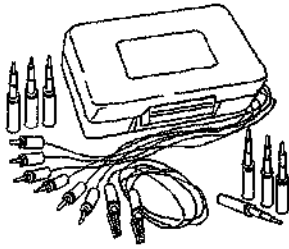
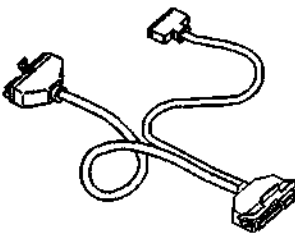
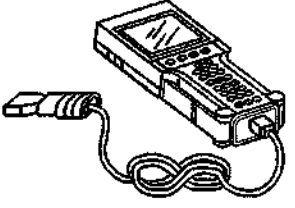
Illustration	Tool Number/ Description
 8917	J 35616-A Connector Test Adapter Kit
 3430	J 39200 Digital Multimeter
 98818	J 39700 Universal Pinout Box

Illustration	Tool Number/ Description
 98824	J 39700-530 Cable Adapter
 39438	Tech 2 Scan Tool

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