

# ANTI-LOCK BRAKE SYSTEM

## 1998 Pontiac Bonneville

1998-99 BRAKES

Anti-Lock/TCS - Bosch 5 - "C", "E", "H" & "K" Bodies  
GM

Bonneville, DeVille, Eighty Eight, Eldorado, LeSabre, LSS,  
Park Avenue, Regency, Seville

### IDENTIFICATION

#### MODEL IDENTIFICATION

---

Body Code (1)	Model
"C" .....	Park Avenue
"E" .....	Eldorado
"H" .....	Bonneville, Eighty Eight, LeSabre, LSS & Regency
"K" .....	(2) DeVille & Seville

(1) - Vehicle body code is fourth character of VIN.

(2) - Includes Concours and D'Elegance.

---

CAUTION: See ANTI-LOCK BRAKE SAFETY PRECAUTIONS article in GENERAL INFORMATION before servicing anti-lock brake system.

### DESCRIPTION

The Bosch 5 Anti-Lock Brake System/Traction Control System (ABS/TCS) increases vehicle steerability, directional stability and optimum deceleration in severe braking conditions on most road surfaces. The ABS monitors wheel speed and controls brakeline pressure to eliminate uncontrolled skidding.

The system also monitors rear wheel speed and compares it to front wheel speed. If excessive front wheel speed is detected at either front wheel, TCS will be activated. TCS uses front brake intervention and cylinder cut-out to provide improved traction and vehicle stability. System is also equipped with ABS and torque management TCS.

Major system components include Electronic Brake Control Module (EBCM) or Electronic Brake and Traction Control Module (EBTCM), speed sensors mounted at each wheel, 3 instrument cluster warning indicators, Driver Information Center (DIC) on "E" and "K" bodies, brakelight switch mounted at brake pedal, TCS on/off switch located on instrument panel on "C" and "H" bodies, or in glove box on "E" and "K" bodies, solenoid valve relay and pump motor relay located on EBCM/EBTCM, and Brake Pressure Modulator Valve (BPMV) assembly. BPMV assembly houses electric pump motor and solenoid valves. EBCM/EBTCM and BPMV assembly is located on left front side of engine frame rail.

On "E" and "K" bodies, additional components include steering wheel position sensor located at base of steering column, lateral accelerometer sensor located under front passenger seat, and yaw rate sensor mounted under rear package shelf.

NOTE: For more information on brake system, see appropriate DISC & DRUM article.

### OPERATION

During normal driving and braking operations, ABS acts like a conventional braking system. Wheel speed sensors transmit a small AC voltage signal about wheel acceleration, deceleration and slip value to EBCM/EBTCM. The EBCM/EBTCM controls braking by activating and deactivating BPMV.

The modulator valve consists of rapidly switching solenoid valves, accumulator chamber and a return pump. The valves increase and decrease brake fluid pressure to each wheel to prevent wheel lock-up.

The modulator valve can supply only as much fluid pressure as applied through the master cylinder. The modulator valve alone cannot apply the brakes. A slight pulsation should be felt through brake pedal when ABS is active.

BRAKE warning indicator (Red) will illuminate when ignition switch is turned to START position and should go out when ignition switch is turned to ON position. ANTI-LOCK indicator (Amber) and TRACTION OFF indicator (Amber) illuminates when ignition is turned on and goes out after about 2 seconds. If any indicator remains illuminated more than 30 seconds after vehicle is started, system malfunction is indicated. See DIAGNOSIS & TESTING.

Red BRAKE warning indicator will activate if parking brake is applied or brake fluid is low. Amber ANTI-LOCK indicator is controlled by EBCM or EBTCM and comes on if problem is detected with ABS. When indicator is illuminated, ABS is disabled and braking is accomplished by conventional brake system. If both warning indicators are illuminated, check conventional brake system for hydraulic system failure. Amber TRACTION OFF indicator is controlled by EBTCM and comes on if problem is detected with TCS. When indicator is illuminated, TCS is disabled and braking (conventional and ABS) is unaffected.

## **BLEEDING BRAKE SYSTEM**

### **MANUAL BLEEDING PROCEDURE**

1) Deplete vacuum reserve from power brake booster by depressing brake pedal several times with engine off. Fill master cylinder reservoir and keep at least half full during bleeding procedure. If master cylinder is not suspected of having air in bore, go to step 4). If master cylinder is known or suspected of having air in bore, go to next step.

2) Disconnect forward brakeline fitting at master cylinder. Allow fluid to flow from fitting. Tighten fitting to specification. See TORQUE SPECIFICATIONS. Have an assistant depress brake pedal slowly and hold. Again, loosen forward fitting. Tighten fitting while pedal is still at floor. Release brake pedal slowly. Wait 15 seconds.

NOTE: Rapid pumping of brake pedal causes master cylinder secondary piston to move into a position that makes bleeding system difficult.

3) Repeat step 2), including 15 second wait, until fluid is clear and free of air bubbles. Repeat procedure at other (rear most) brakeline fitting on master cylinder. Master cylinder is now bled. If wheel cylinders/calipers are not suspected to have air in them, it is not necessary to bleed them.

4) If wheel cylinders/calipers are known or suspected to have air in them, raise and support vehicle. On "C" and "H" bodies, remove bleeder valve cap from right rear wheel. On "E" and "K" bodies, remove bleeder valve cap from left front wheel. On all models, place proper size box end wrench over bleeder valve. Attach one end of clear tube over valve and submerge other end in container partially filled with clean brake fluid.

5) Have an assistant depress brake pedal slowly and hold.

Loosen bleeder valve to purge air from cylinder. Tighten bleeder valve to specification and slowly release brake pedal. See TORQUE SPECIFICATIONS. Wait 15 seconds. Repeat procedure, including 15 second wait, until all air is removed.

6) Remove tube and wrench. Install bleeder valve cap. Fill master cylinder reservoir with fluid. On "C" and "H" bodies, proceed to right rear, left rear and right front wheels in sequence. On "E" and "K" bodies, proceed to right front, left rear and right rear wheels in sequence. On all models, ensure there is no sponginess in brake pedal and that BRAKE warning indicator is off.

## PRESSURE BLEEDING PROCEDURE

1) Fill master cylinder reservoir with fluid to full mark. Install Bleeder Adapter (J-35589) to brake master cylinder. Pressurize bleeder to 20-25 psi (1.41-1.76 kg/cm<sup>2</sup>). Connect bleeder hose to adapter and bleed air from adapter.

2) Raise and support vehicle. On "C" and "H" bodies, remove bleeder valve cap from right rear wheel. On "E" and "K" bodies, remove bleeder valve cap from left front wheel. On all models, place proper size box end wrench over bleeder valve. Attach one end of clear tube over valve and submerge other end in container partially filled with clean brake fluid.

3) Loosen bleeder valve at least 3/4 turn to purge air from cylinder. Tighten bleeder valve when air is no longer present in tube. See TORQUE SPECIFICATIONS. Repeat procedure until all air is removed.

4) Remove tube and wrench. Install bleeder valve cap. Fill master cylinder reservoir with fluid. On "C" and "H" bodies, proceed to right rear, left rear and right front wheels in sequence. On "E" and "K" bodies, proceed to right front, left rear and right rear wheels in sequence. On all models, remove bleeder adapter. Ensure there is no sponginess in brake pedal and that BRAKE warning indicator is off.

## AUTO BLEED PROCEDURE

**CAUTION:** Perform manual bleeding or pressure bleeding procedure before performing auto bleeding procedure.

**NOTE:** Auto bleed procedure is used to provide a complete bleed procedure on ABS/TCS equipped vehicles. This procedure cycles system valves and runs the pump to purge air from circuits normally closed during non-ABS/TCS (normal) brake system operation and bleeding. This procedure should be used when air is suspected in secondary circuits or when Brake Pressure Modulator Valve (BPMV) assembly has been replaced.

1) Raise and support vehicle. Remove wheels. Inspect brake system for leaks or damage. Repair as necessary before continuing.

2) Ensure battery is fully charged. Connect scan tool to Data Link Connector (DLC) located under left side of instrument panel. Turn ignition on, with engine off. Using scan tool, select ABS/TCS system features. Select SPECIAL TESTS and then select AUTOMATED BLEED PROCEDURE.

3) Bleed brake system using conventional bleeding procedure. See MANUAL BLEEDING PROCEDURE or PRESSURE BLEEDING PROCEDURE. Follow scan tool menu-driven instructions until proper brake pedal height is achieved. If malfunctions are detected, bleeding procedure will be aborted.

4) If Diagnostic Trouble Codes (DTCs) are set, scan tool will display DTCS PRESENT, or list DTCs depending on when DTCs were set. Select TROUBLE CODES to display or clear codes. If DTCs are set, proceed to DIAGNOSIS & TESTING. If bleed procedure was aborted but no

DTCs are set, perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. Repair ABS/TCS as necessary before continuing.

5) When auto bleed procedure is complete, depress brake pedal. Brake pedal should be high and firm. If brake pedal is not high and firm, reinspect brake system for leaks or damage. If brake system is okay and pedal travel is still excessive, repeat auto bleed procedure.

6) Remove scan tool. Remove pressure bleeding equipment if used. Reinstall wheels and lower vehicle. Fill master cylinder reservoir with fluid as necessary. Road test vehicle. If brake pedal is spongy, perform conventional brake bleeding procedure.

## DIAGNOSIS & TESTING

NOTE: To diagnose ABS/TCS, manufacturer recommends using Tech 2 scan tool, DVOM, Breakout Box (J-39700 and J-41247) and Adapter Cable (J-39700-25).

The EBCM/EBTCM has self-diagnostic capability which can detect system failures. Diagnostic trouble codes stored by EBCM/EBTCM can be displayed using Climate Control Center (CCC)/Climate Control Panel (CCP) on "E" and "K" bodies, or scan tool. See USING CCC/CCP ("E" & "K" BODIES) or USING TECH 2 SCAN TOOL. Begin ABS/TCS diagnosis with PRE-DIAGNOSTIC INSPECTION procedure.

## PRE-DIAGNOSTIC INSPECTION

When checking potential ABS/TCS faults, check following before performing diagnostic trouble code testing:

- 1) Check all fuses related to ABS/TCS operation.
- 2) Check all ABS/TCS wiring harness connectors for proper engagement, loose wires or terminals and/or corrosion. Check harness routing; pay particular attention to wheel speed sensor wiring harness routing.
- 3) Ensure parking brake switch is functioning properly.
- 4) Ensure brake switch is properly adjusted.
- 5) Check brake system for leaks and proper fluid level.
- 6) Check ABS/TCS ground circuit for clean tight connections.

See appropriate DIAGRAM IN GROUND DISTRIBUTION article in WIRING DIAGRAMS.

7) Always perform diagnostic system check before diagnosing DTCs. See DIAGNOSTIC SYSTEM CHECK.

## USING CCC/CCP ("E" & "K" BODIES)

NOTE: Operating vehicle in self-diagnostics mode for more than 30 minutes with engine not running will discharge battery, possibly resulting in false diagnostic information being related or causing a no-start condition. If necessary, connect battery charger (turn ignition off before connecting).

NOTE: To exit diagnostics at any time, press MODE or DEFOG button, or turn ignition off.

NOTE: Vehicles with digital instrument panel clusters are equipped with Climate Control Center (CCC). Vehicles with analog instrument panel clusters are equipped with Climate Control Panel (CCP).

Entering Diagnostics

Turn ignition on. Simultaneously push OFF and WARM buttons on

Climate Control Center (CCC), or OFF and PASSENGER WARMER buttons on Climate Control Panel (CCP) until segment check appears on Instrument Panel Cluster (IPC).

#### Segment Check

A segment check of all LEDs on the Instrument Panel Cluster (IPC) should begin. During this check, all segments except the turn signal indicators should illuminate. If all segments do not illuminate, replace IPC. After segment check, diagnostic code display will automatically begin.

#### Diagnostic Code Display

1) System will begin displaying codes (if any are stored). Codes will be displayed in order, beginning with PCM codes, and followed by IPC, ACM, SDM, TCS, RSS, PZM, IRC, RFA, CCP AND PHN. CCP and PHN codes will only appear if vehicle is equipped with system. See SYSTEM LETTER CODE INTERPRETATION table. Pressing FAN DOWN button will by-pass code display.

2) The last character of the code is the letter "C" or "H". "C" stands for current code. Current means the fault currently exists (hard code), and the fault was present the last time the diagnostic test was run. "H" stands for history code. History means the fault does not currently exist, but existed before (intermittent code), and was not present the last time the diagnostic test was run.

#### SYSTEM LETTER CODE INTERPRETATION

---

Display Letters	System (Or Component)
PCM	Powertrain Control Module
IPC	Instrument Panel Cluster
ACM	Air Control Module
SDM	Sensing & Diagnostic Module
TCS	Traction Control System
RSS	Road-Sensing Suspension
PZM	Body Control Module
IRC	Integrated Radio Control Module
RFA	Remote Function Actuator
CCP	Climate Control Panel
PHN	Cellular Telephone

---

#### Select System Mode

After trouble codes have been displayed, PCM? will be displayed. (At this point, to return to diagnostic code display, press OFF button, otherwise, continue procedure.) Cycle through systems by pressing LO button until desired system is displayed, then press HI button.

#### Select Test Type Mode

TCS DATA will be displayed. (At this point, to return to SELECT SYSTEM MODE, press OFF button, otherwise, continue procedure.) Press LO button to cycle through tests until desired test is displayed. To enter desired test, press HI button.

#### Select Test Mode

Press HI button to advance to next test, or LO button to return to previous test. At this point, to return to SELECT TEST TYPE MODE, press OFF button.

#### Clearing Codes

To clear codes, press HI button. TCS CODES CLEAR message will be displayed for 3 seconds, then system will automatically return to

SELECT TEST TYPE MODE.

Exiting Diagnostics

To exit diagnostics, press MODE or DEFOG button, or turn ignition off. This will NOT cause codes to be erased.

## USING TECH 2 SCAN TOOL

NOTE: When using Tech 2 scan tool for diagnostics, ABS/TCS system is disabled by EBCM/EBTCM. ANTI-LOCK indicator will illuminate indicating only normal power assist braking is available. After diagnostics have been completed using Tech 2 scan tool, disconnect scan tool from Data Link Connector (DLC) and turn ignition off for a least 10 seconds before road testing. This procedure is done to reset EBCM/EBTCM.

Connect Tech 2 scan tool to Data Link Connector (DLC) located under left side of instrument panel. Follow scan tool manufacturer's instructions to retrieve stored fault codes.

If multiple codes are displayed, begin diagnosis with code that is displayed first. See DIAGNOSTIC TROUBLE CODE table. Diagnose all codes in the order displayed by Tech 2 scan tool.

## DIAGNOSTIC TROUBLE CODES

DTC	(1) Definition
C1211	ABS Indicator Light Circuit Malfunction
C1214	Solenoid Valve Relay Contact Or Coil Circuit Open
C1216	Solenoid Valve Relay Coil Circuit Open ("H" Body)
C1217	BPMV Pump Motor Relay Contact Circuit Open
C1221	Left Front Wheel Speed Sensor Input Signal Equals Zero
C1222	Right Front Wheel Speed Sensor Input Signal Equals Zero
C1223	Left Rear Wheel Speed Sensor Input Signal Equals Zero
C1224	Right Rear Wheel Speed Sensor Input Signal Equals Zero
C1225	Left Front Excessive Wheel Speed Variation
C1226	Right Front Excessive Wheel Speed Variation
C1227	Left Rear Excessive Wheel Speed Variation
C1228	Right Rear Excessive Wheel Speed Variation
C1232	Left Front Wheel Speed Sensor Circuit Open Or Shorted
C1233	Right Front Wheel Speed Sensor Circuit Open Or Shorted
C1234	Left Rear Wheel Speed Sensor Circuit Open Or Shorted
C1235	Right Rear Wheel Speed Sensor Circuit Open Or Shorted
C1236	Low System Voltage
C1237	High System Voltage
C1238	Brake Thermal Model Limit Exceeded
C1241	Magnasteer Circuit Malfunction
C1242	BPMV Pump Motor Ground Circuit Open
C1243	BPMV Pump Motor Stalled
C1252	ICCS2 Data Link Left Malfunction ("E" & "K" Bodies)
C1253	ICCS2 Data Link Right Malfunction ("E" & "K" Bodies)
C1255	EBCM/EBTCM Internal Malfunction
C1256	EBCM/EBTCM Internal Malfunction
C1261	Left Front Hold Valve Solenoid Malfunction
C1262	Left Front Release Valve Solenoid Malfunction
C1263	Right Front Hold Valve Solenoid Malfunction
C1264	Right Front Release Valve Solenoid Malfunction
C1265	Left Rear Hold Valve Solenoid Malfunction
C1266	Left Rear Release Valve Solenoid Malfunction
C1267	Right Rear Hold Valve Solenoid Malfunction
C1268	Right Rear Release Valve Solenoid Malfunction
C1271	Left Front TCS Master Cylinder Isolation Valve Malfunction
C1272	Left Front TCS Prime Valve Malfunction

C1273 .. Right Front TCS Master Cylinder Isolation Valve Malfunction  
 C1274 ..... Right Front TCS Prime Valve Malfunction  
 C1275 ..... PCM Serial Data Malfunction ("H" Body)  
 C1276 ..... Delivered Torque Signal Circuit Malfunction  
 C1277 ..... Requested Torque Signal Circuit Malfunction  
 C1278 ..... TCS Temporarily Inhibited By PCM  
 C1281 ..... ABS Sensors Uncorrelated ("E" & "K" Bodies)  
 C1282 .. Yaw Rate Sensor Bias Circuit Malfunction ("E" & "K" Bodies)  
 C1283 ..... Excessive Time To Center Steering ("E" & "K" Bodies)  
 C1284 .... Lateral Accelerometer Sensor Self Test Malfunction ("E" & "K" Bodies)  
 C1285 .. Lateral Accelerometer Sensor Circuit Malfunction ("E" & "K" Bodies)  
 C1286 .. Steering/Lateral Accelerometer Sensor Bias Malfunction ("E" & "K" Bodies)  
 C1287 ..... Steering Sensor Rate Malfunction ("E" & "K" Bodies)  
 C1288 ..... Steering Sensor Circuit Malfunction ("E" & "K" Bodies)  
 C1291 ..... Open Brakelight Switch During Deceleration  
 C1293 ..... DTC C1291 Set In Current Or Previous Ignition Cycle  
 C1294 ..... Brakelight Switch Circuit Always Active  
 C1295 ..... Brakelight Switch Circuit Open  
 C1297 .... PCM Indicated Extended Travel Brake Switch Failure ("E" & "K" Bodies)  
 C1298 ..... PCM Indicated Class 2 Serial Data Link Malfunction ("C", "E" & "K" Bodies)  
 U1016 ..... Loss Of PCM Communications ("C", "E" & "K" Bodies)  
 U1056 ..... Loss Of CVRSS Communications ("E" & "K" Bodies)  
 U1255 ..... Generic Loss Of Communications ("C", "E" & "K" Bodies)  
 U1300 .... Class 2 Circuit Shorted To Ground ("C", "E" & "K" Bodies)  
 U1301 ... Class 2 Circuit Shorted To Voltage ("C", "E" & "K" Bodies)

(1) - Always perform diagnostic system check before diagnosing DTCs.  
 See DIAGNOSTIC SYSTEM CHECK.

## CLEARING DIAGNOSTIC TROUBLE CODES (DTCs)

NOTE: DTCs cannot be cleared by disconnecting EBCM/EBTCM or negative battery cable, or by turning ignition off. DTCs will be erased when ignition is cycled 100 times without fault reappearing. Ignition cycle counter in EBCM/EBTCM will be reset to zero.

1) Connect Tech 2 scan tool. See USING TECH 2 SCAN TOOL. Before clearing DTCs, check and note current DTC data. Select ABS/TCS function. Select DTC(S) function and then CLEAR CODES function.

2) Verify DTCs are cleared. If other DTCs are displayed, either DTCs were not cleared or ABS/TCS fault still exists. Diagnose fault and repeat procedure.

## SYMPTOM DIAGNOSIS

If no DTCs are stored, perform appropriate symptom diagnostic test as necessary. See SYMPTOM DIAGNOSTIC INDEX table.

### SYMPTOM DIAGNOSTIC INDEX

Symptom	(1) Test
"C" Body	
TRACTION OFF Indicator On With No DTCs Set .....	A
TRACTION OFF Indicator Inoperative With No DTCs Set .....	B
No Communication With EBCM/EBTCM .....	C

ABS Indicator Inoperative With No DTCs Set .....	(2)
BRAKE Warning Light On .....	(2)
BRAKE Warning Light Inoperative .....	(2)
<b>"E" &amp; "K" Bodies</b>	
TRACTION OFF Message On With No DTCs Set .....	A
TRACTION OFF Message Inoperative With No DTCs Set .....	B
No Communication With EBTCM .....	C
BRAKE Warning Light On .....	(2)
BRAKE Warning Light Inoperative .....	(2)
<b>"H" Body</b>	
ABS Indicator On With No DTCs Set .....	A
ABS Indicator Inoperative With No DTCs Set .....	B
TRACTION OFF Indicator On With No DTCs Set .....	C
TRACTION OFF Indicator Inoperative With No DTCs Set .....	D
TRACTION ACTIVE Indicator On With No DTCs Set .....	E
TRACTION ACTIVE Indicator Inoperative With No DTCs Set .....	F
No Communication With EBCM/EBTCM .....	G
BRAKE Warning Light On .....	(2)
BRAKE Warning Light Inoperative .....	(2)

(1) - See appropriate test under SYMPTOM TESTS.

(2) - See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

## DIAGNOSTIC SYSTEM CHECK

### "C" Body

1) Reconnect all previously disconnected components. Turn ignition on, with engine off. Connect scan tool to Data Link Connector (DLC) under left side of instrument panel. If scan tool communicates with EBCM/EBTCM, go to next step. If scan tool does not communicate with EBCM/EBTCM, proceed to TEST C under SYMPTOM TESTS.

2) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. Using scan tool, display ABS/TCS DTCs. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, go to next step.

3) If vehicle is equipped with traction control system, go to next step. If vehicle is not equipped with traction control system, go to step 6).

4) Turn ignition off. Disconnect scan tool. Turn ignition on, with engine off. If TRACTION OFF indicator illuminates and then goes out, go to step 6). If TRACTION OFF indicator does not illuminate, go to next step.

5) If TRACTION OFF indicator remains illuminated, proceed to TEST A under SYMPTOM TESTS. If TRACTION OFF indicator goes out, proceed to TEST B under SYMPTOM TESTS.

6) If any history DTCs are set, go to next step. If no history DTCs are set, system is okay.

7) Go to appropriate history DTC for diagnosis. Investigate conditions required for DTC to set. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS DTCs. Check if history DTC set as current DTC while driving vehicle. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, system is okay.

### "E" & "K" Bodies

1) Reconnect all previously disconnected components. Turn ignition on, with engine off. Connect scan tool to Data Link Connector (DLC) under left side of instrument panel. If scan tool communicates with EBTCM, go to next step. If scan tool does not communicate with EBTCM, proceed to TEST C under SYMPTOM TESTS.

2) With scan tool in ABS/TCS/ICCS SPECIAL TESTS, run AUTO



TEST. Using scan tool, display ABS/TCS/ICCS DTCs. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, go to next step.

3) Turn ignition off. Disconnect scan tool. Turn ignition on, with engine off. Check if TRACTION OFF message is displayed on Driver Information Center (DIC). If message is displayed, proceed to TEST A under SYMPTOM TESTS. If message is not displayed, go to next step.

4) Press TCS on/off switch to disable traction control. Check if TRACTION OFF message is displayed on Driver Information Center (DIC). If message is displayed, go to next step. If message is not displayed, proceed to TEST B under SYMPTOM TESTS.

5) If any history DTCs are set, go to next step. If no history DTCs are set, system is okay.

6) Go to appropriate history DTC for diagnosis. Cycle ignition from off to on. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. Check if history DTC set as current DTC while driving vehicle. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, system is okay.

#### "H" Body

1) Reconnect all previously disconnected components. Turn ignition on, with engine off. Connect scan tool to Data Link Connector (DLC) under left side of instrument panel. If scan tool communicates with EBCM/EBTCM, go to next step. If scan tool does not communicate with EBCM/EBTCM, proceed to TEST G under SYMPTOM TESTS.

2) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. Using scan tool, display ABS/TCS DTCs. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, go to next step.

3) Turn ignition off. Disconnect scan tool. Turn ignition on, with engine off. If ANTI-LOCK indicator illuminates and then goes out, go to next step. If ANTI-LOCK indicator does not illuminate, go to step 6).

4) If vehicle is equipped with traction control system, go to next step. If vehicle is not equipped with traction control system, go to step 11).

5) Turn ignition on, with engine off. If TRACTION OFF indicator illuminates and then goes out, go to step 7). If TRACTION OFF indicator does not illuminate, go to step 8).

6) If ANTI-LOCK indicator remains illuminated, proceed to TEST A under SYMPTOM TESTS. If ANTI-LOCK indicator goes out, proceed to TEST B under SYMPTOM TESTS.

7) On Eighty-Eight, LSS and Regency, go to step 9). On Bonneville and LeSabre, go to step 11).

8) If TRACTION OFF indicator remains illuminated, proceed to TEST C under SYMPTOM TESTS. If TRACTION OFF indicator goes out, proceed to TEST D under SYMPTOM TESTS.

9) Turn ignition on, with engine off. If TRACTION ACTIVE indicator illuminates and then goes out, go to step 11). If TRACTION ACTIVE indicator does not illuminate, go to next step.

10) If TRACTION ACTIVE indicator remains illuminated, proceed to TEST E under SYMPTOM TESTS. If TRACTION ACTIVE indicator goes out, proceed to TEST F under SYMPTOM TESTS.

11) If any history DTCs are set, go to next step. If no history DTCs are set, system is okay.

12) Go to appropriate history DTC for diagnosis. Investigate conditions required for DTC to set. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS DTCs. Check if history DTC set as current DTC while driving vehicle. If any current DTCs are set, go to appropriate DTC for diagnosis. If no current DTCs are set, system is okay.

## INTERMITTENTS & POOR CONNECTIONS

Failures in ABS/TCS may be difficult to diagnose accurately. If an ABS/TCS failure or fault occurs, ANTI-LOCK and/or TRACTION OFF indicator will illuminate. If fault is an intermittent problem which has corrected itself (ANTI-LOCK and/or TRACTION OFF indicator off), DTC will be stored.

ABS/TCS self-diagnostic system can be used to help identify suspect circuit. Perform following procedure:

- \* Display and record DTC history data. Record any descriptive driving circumstances during failure occurrence. Clear any ABS/TCS DTCs set in EBCM/EBTCM.
- \* Test drive vehicle. Attempt to repeat failure under condition in which failure occurred. Use Tech 2 scan tool in mode F3 (snapshot) while test driving vehicle.
- \* After duplicating condition, stop vehicle and display any ABS/TCS DTCs which may have been stored.
- \* If no trouble codes were stored, see SYMPTOM TESTS for diagnosis by symptom.

Most intermittent problems are caused by faulty electrical connectors or wiring. When an intermittent failure is encountered, check suspect circuits for:

- \* Poor mating of connector halves, or terminals not fully seated in connector body (backed out).
- \* Improperly formed or damaged terminals. All connector terminals in a problem circuit should be carefully reformed to increase contact tension.
- \* Check for dirt or corrosion on terminals, which could impede proper terminal contact.
- \* Poor terminal-to-wire connection. This requires removing terminal from connector body to inspect.
- \* Wheel speed sensor cables not attached in retainers or routed too close to spark plug wires.
- \* If low system voltage is detected at EBCM/EBTCM, ABS will turn on ANTI-LOCK indicator until normal system voltage is achieved.

## SYMPTOM TESTS

NOTE: To diagnose ABS/TCS, manufacturer recommends using Tech 2 scan tool, DVOM, Breakout Box (J-39700 and J-41247) and Adapter Cable (J-39700-25). To identify circuits and wire colors referenced in testing, see WIRING DIAGRAMS.

### TEST A: TRACTION OFF INDICATOR ON WITH NO DTCS SET ("C" BODY)

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 5). If switch status does not change when switch is pressed and released, go to next step.
- 3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 24 and "B". If resistance is infinite, go to step 6). If resistance is not infinite,

go to next step.

4) Repair short to ground in Brown/White wire between TCS on/off switch and EBTCM. Also, check for short in TCS on/off switch.

5) Using scan tool, select ABS/TCS SPECIAL FUNCTIONS and then command TRACTION OFF indicator off. If TRACTION OFF indicator goes out, go to next step. If TRACTION OFF indicator remains illuminated, go to step 7).

6) Replace EBTCM.

7) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

#### **TEST A: TRACTION OFF MESSAGE ON WITH NO DTCS SET ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 5). If switch status does not change when switch is pressed and released, go to next step.

3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 24 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

4) Repair short to ground in Brown/White wire between TCS on/off switch and EBTCM. Also, check for short in TCS on/off switch.

5) Using scan tool, enter functional message data list normal mode. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 7). If switch status does not change when switch is pressed and released, go to next step.

6) Replace EBTCM.

7) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

#### **TEST A: ABS INDICATOR ON WITH NO DTCS SET ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Connect a fused jumper between terminals No. 13 and "B" Turn ignition on, with engine off. If ANTI-LOCK indicator goes out, go to next step. If ANTI-LOCK indicator remains illuminated, go to step 4).

3) Replace EBCM/EBTCM.

4) Turn ignition off. Remove jumper. Disconnect Light Driver Module (LDM) connector. Turn ignition on, with engine off. If ANTI-LOCK indicator illuminates, go to next step. If ANTI-LOCK indicator does not illuminate, go to step 6).

5) Repair short to ground in Light Green/Black wire between instrument panel cluster and LDM.

6) Replace LDM.

#### **TEST B: TRACTION OFF INDICATOR INOPERATIVE WITH NO DTCS SET ("C" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM

CHECK. After performing diagnostic system check, go to next step.

2) Using scan tool, select Standard Body Module (SBM) SPECIAL FUNCTIONS and then run Instrument Panel Cluster (IPC) indicator light test. If TRACTION OFF indicator illuminates and then goes out, go to next step. If TRACTION OFF indicator does not illuminate, go to step 4).

3) Replace EBTCM.

4) Check TRACTION OFF indicator bulb. If bulb is okay, go to next step. If bulb is blown, go to step 6).

5) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

6) Replace TRACTION OFF indicator bulb.

### **TEST B: TRACTION OFF MESSAGE INOPERATIVE WITH NO DTCS SET**

("E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 5). If switch status does not change when switch is pressed and released, go to next step.

3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 24 and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 6).

4) Repair open in Brown/White wire between TCS on/off switch and EBTCM. Also, check for open in TCS on/off switch.

5) Using scan tool, enter functional message data list normal mode. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 7). If switch status does not change when switch is pressed and released, go to next step.

6) Replace EBTCM.

7) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

### **TEST B: ABS INDICATOR INOPERATIVE WITH NO DTCS SET ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If ANTI-LOCK indicator illuminates, go to step 16). If ANTI-LOCK indicator does not illuminate, go to next step.

3) Turn ignition off. Reconnect EBCM/EBTCM connector. Check 15-amp fuse D1 in instrument panel fuse block. If fuse is okay, go to next step. If fuse is blown, go to step 5).

4) Reinstall 15-amp fuse D1 if removed. Turn ignition on, with engine off. Using DVOM, measure voltage probing between 15-amp fuse 1 test terminals and ground. If battery voltage is present, go to step 6). If battery voltage is not present, diagnose power distribution circuit. See appropriate diagram in POWER DISTRIBUTION article in WIRING DIAGRAMS.

5) Turn ignition off. Remove 15-amp fuse D1 in instrument panel fuse block. Disconnect Light Driver Module (LDM) connector. Using DVOM, measure resistance between terminal "B" (Pink wire) of LDM

connector (harness side) and ground. If resistance is infinite, go to step 9). If resistance is not infinite, go to step 8).

6) Turn ignition off. Disconnect Light Driver Module (LDM) connector. Turn ignition on, with engine off. Using DVOM, measure voltage at terminal "B" (Pink wire) of LDM connector (harness side). If battery voltage is present, go to next step. If battery voltage is not present, go to step 17).

7) Using DVOM, measure voltage at terminal "E" (Light Green/Black wire) of LDM connector (harness side). If battery voltage is present, go to step 10). If battery voltage is not present, go to step 11).

8) Repair short to ground in Pink wire between instrument panel fuse block and LDM.

9) Replace 15-amp fuse D1. Reconnect LDM connector. Turn ignition on, with engine off. Recheck 15-amp fuse D1 in instrument panel fuse block. If fuse is blown, go to step 12). If fuse is okay, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

10) Turn ignition off. Using DVOM, measure resistance between terminal "D" (Black wire) of LDM connector (harness side) and ground. If resistance is 0-2 ohms, go to step 12). If resistance is not 0-2 ohms, go to step 13).

11) Turn ignition off. Disconnect Instrument Panel Cluster (IPC) connector C1. Connect a fused jumper between ANTI-LOCK indicator terminal (Light Green/Black wire) of IPC connector (harness side) and ground. Using DVOM, measure resistance between terminal "E" (Light Green/Black wire) of LDM connector (harness side) and ground. If resistance is 0-2 ohms, go to step 14). If resistance is not 0-2 ohms, go to step 15).

12) Replace LDM.

13) Repair open in Black wire between LDM and ground connection.

14) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT. Check ANTI-LOCK indicator bulb.

15) Repair open or high resistance in Light Green/Black wire between instrument panel cluster and LDM.

16) Replace EBCM/EBTCM.

17) Repair open or high resistance in Pink wire between instrument panel fuse block and LDM.

### **TEST C: NO COMMUNICATION WITH EBCM/EBTCM ("C", "E" & "K"**

**BODIES) & TEST G: NO COMMUNICATION WITH EBCM/EBTCM ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If scan tool is able to communicate with any other control module on serial data line such as PCM, go to next step. If scan tool is not able to communicate with any other control module on serial data line such as PCM, diagnose serial data line. See appropriate diagram in DATA LINK CONNECTORS article in WIRING DIAGRAMS.

3) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminal "B" and ground. If resistance is 0-2 ohms, go to step 5). If resistance is not 0-2 ohms, go to next step.

4) Repair ground circuit (Black wire) between EBCM/EBTCM and ground connection.

5) Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals "A" and "B". If battery voltage is present, go to step 7). If battery voltage is not present, go to next step.

6) Repair open or short to ground in ignition power circuit (Brown wire on "C" and "H" bodies; Pink wire on "E" and "K" bodies)

between fuse block and EBCM/EBTCM.

7) Using DVOM, measure voltage between breakout box terminals "D" and "B". If battery voltage is present, go to step 9). If battery voltage is not present, go to next step.

8) Repair open or short to ground in solenoid power input circuit (Red wire) between fuse block and EBCM/EBTCM.

9) Using DVOM, measure voltage between breakout box terminals "E" and "B". If battery voltage is present, go to step 11). If battery voltage is not present, go to next step.

10) Repair open or short to ground in motor power input (Red wire) between fuse block and EBCM/EBTCM.

11) On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminal No. 26 and terminal No. 2 (Purple wire) of DLC. On "H" body, using DVOM, measure resistance between breakout box terminal No. 15 and terminal No. 9 (Tan wire) of DLC. On all models, if resistance is 0-2 ohms, go to step 13). If resistance is not 0-2 ohms, go to next step.

12) Repair open in Purple wire on "C", "E" and "K" bodies, or Tan wire on "H" body between DLC and EBCM/EBTCM.

13) Replace EBCM/EBTCM.

### TEST C: TRACTION OFF INDICATOR ON WITH NO DTCS SET ("H" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If vehicle has instrument cluster equipped with trip odometer, coolant temperature indicator and/or tachometer, go to next step. If vehicle does not have instrument cluster equipped with trip odometer, coolant temperature indicator and/or tachometer, go to step 8).

3) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to step 6). If switch status does not change when switch is pressed and released, go to next step.

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 2 and "B". If resistance is infinite, go to step 10). If resistance is not infinite, go to next step.

5) Repair short to ground in Brown/White wire between TCS on/off switch and EBTCM.

6) Turn ignition on, with engine off. Using scan tool, select ABS/TCS SPECIAL TESTS. Using scan tool, command TRACTION OFF indicator off. If TRACTION OFF indicator goes out, go to step 10). If TRACTION OFF indicator remains illuminated, go to next step.

7) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

8) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to next step. If switch status does not change when switch is pressed and released, go to step 4).

9) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable between EBTCM and harness connector. Connect a fused jumper between breakout box terminals No. 7 and "B". Turn ignition on, with engine off. If TRACTION OFF indicator goes out, go to next step. If TRACTION OFF indicator remains illuminated, go to step 11).

10) Replace EBTCM.

11) Turn ignition off. Disconnect Light Driver Module (LDM) connector. Leave fused jumper connected between breakout box terminals No. 7 and "B". Using DVOM, measure resistance between terminal "F" (Purple/White wire) and ground. If resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 15).

12) Turn ignition on, with engine off. If TRACTION OFF indicator illuminates, go to next step. If TRACTION OFF indicator does not illuminate, go to step 14).

13) Repair short to ground in Dark Blue wire between instrument panel cluster and LDM.

14) Replace LDM.

15) Repair open in Purple/White wire between LDM and EBTCM.

### TEST D: TRACTION OFF INDICATOR INOPERATIVE WITH NO DTCS

SET ("H" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If vehicle has instrument cluster equipped with trip odometer, coolant temperature indicator and/or tachometer, go to next step. If vehicle does not have instrument cluster equipped with trip odometer, coolant temperature indicator and/or tachometer, go to step 8).

3) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to next step. If switch status does not change when switch is pressed and released, go to step 28).

4) Using scan tool, select ABS/TCS SPECIAL TESTS. Using scan tool, command TRACTION OFF indicator on. If TRACTION OFF indicator illuminates, go to next step. If TRACTION OFF indicator does not illuminate, go to step 6).

5) Replace EBTCM.

6) Check TRACTION OFF indicator bulb. If bulb is okay, go to next step. If bulb is blown, go to step 8).

7) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

8) Replace TRACTION OFF indicator bulb.

9) Turn ignition on, with engine off. Using scan tool, select ABS DATA LIST. While monitoring TCS on/off switch status, press and release TCS on/off switch. Observe if switch status on scan tool changes accordingly as switch is pressed and released. If switch status changes when switch is pressed and released, go to next step. If switch status does not change when switch is pressed and released, go to step 28).

10) Turn ignition off. Disconnect EBTCM connector. Turn ignition on, with engine off. If TRACTION OFF indicator illuminates, go to step 26). If TRACTION OFF indicator does not illuminate, go to next step.

11) Turn ignition off. Check 15-amp fuse D1 in instrument panel fuse block. If fuse is blown, go to step 13). If fuse is okay, go to next step.

12) Reinstall 15-amp fuse D1 if removed. Turn ignition on, with engine off. Using DVOM, measure voltage probing between 15-amp fuse 1 test terminals and ground. If battery voltage is present, go to step 14). If battery voltage is not present, diagnose power distribution circuit. See appropriate diagram in POWER DISTRIBUTION article in WIRING DIAGRAMS.

13) Turn ignition off. Remove 15-amp fuse D1 in instrument panel fuse block. Disconnect Light Driver Module (LDM) connector.

Using DVOM, measure resistance between terminal "B" (Pink wire) of LDM connector (harness side) and ground. If resistance is infinite, go to step 17). If resistance is not infinite, go to step 16).

14) Turn ignition off. Disconnect Light Driver Module (LDM) connector. Turn ignition on, with engine off. Using DVOM, measure voltage at terminal "B" (Pink wire) of LDM connector (harness side). If battery voltage is present, go to next step. If battery voltage is not present, go to step 27).

15) Using DVOM, measure voltage at terminal "A" (Dark Blue wire) of LDM connector (harness side). If battery voltage is present, go to step 18). If battery voltage is not present, go to step 19).

16) Repair short to ground in Pink wire between instrument panel fuse block and LDM.

17) Replace 15-amp fuse D1. Reconnect LDM connector. Turn ignition on, with engine off. Recheck 15-amp fuse D1 in instrument panel fuse block. If fuse is blown, go to step 21). If fuse is okay, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

18) Turn ignition off. Using DVOM, measure resistance between terminal "D" (Black wire) of LDM connector (harness side) and ground. If resistance is 0-2 ohms, go to step 20). If resistance is not 0-2 ohms, go to step 23).

19) Turn ignition off. Disconnect Instrument Panel Cluster (IPC) connector C1. Connect a fused jumper between TRACTION OFF indicator terminal (Dark Blue wire) of IPC connector (harness side) and ground. Using DVOM, measure resistance between terminal "A" (Dark Blue wire) of LDM connector (harness side) and ground. If resistance is 0-2 ohms, go to step 24). If resistance is not 0-2 ohms, go to step 25).

20) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 7 and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 22).

21) Replace LDM.

22) Repair short to ground in Purple/White wire between EBTCM and LDM.

23) Repair open in Black wire between LDM and ground connection.

24) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT. Check TRACTION OFF indicator bulb.

25) Repair open or high resistance in Dark Blue wire between instrument panel cluster and LDM.

26) Replace EBTCM.

27) Repair open or high resistance in Pink wire between instrument panel fuse block and LDM.

28) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Have an assistant hold TCS on/off switch closed. Using DVOM, measure resistance between breakout box terminals No. 2 and "B". If resistance is 0-5 ohms, go to step 5). If resistance is not 0-5 ohms, go to next step.

29) Repair open in Brown/White wire between EBTCM and TCS on/off switch, or in Black/White wire between TCS on/off switch and ground connection. Also, check for short in TCS on/off switch.

## TEST E: TRACTION ACTIVE INDICATOR ON WITH NO DTCS SET

("H" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, select ABS/TCS SPECIAL TESTS. Using scan tool, command TRACTION ACTIVE indicator off. If TRACTION ACTIVE indicator goes out, go to next step.



If TRACTION ACTIVE indicator remains illuminated, go to step 4).

3) Replace EBTCM.

4) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

## TEST F: TRACTION ACTIVE INDICATOR INOPERATIVE WITH NO

DTCS SET ("H" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, select ABS/TCS SPECIAL TESTS. Using scan tool, command TRACTION ACTIVE indicator on. If TRACTION ACTIVE indicator illuminates, go to next step. If TRACTION ACTIVE indicator does not illuminate, go to step 4).

3) Replace EBTCM.

4) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

## DIAGNOSTIC TESTS

NOTE: To diagnose ABS/TCS, manufacturer recommends using Tech 2 scan tool, DVOM, Breakout Box (J-39700 and J-41247) and Adapter Cable (J-39700-25). To identify circuits and wire colors referenced in testing, see WIRING DIAGRAMS. After each repair, recheck system operation. see DIAGNOSTIC SYSTEM CHECK.

## DTC C1211: ABS INDICATOR LIGHT CIRCUIT MALFUNCTION ("C" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS and IPC DTCs. If DTC U1255, U1300 or U1301 is set, diagnose serial data line. See appropriate diagram in DATA LINK CONNECTORS article in WIRING DIAGRAMS. If DTC U1255, U1300 or U1301 is not set, go to next step.

3) Using scan tool, select Standard Body Module (SBM) SPECIAL FUNCTIONS and then run Instrument Panel Cluster (IPC) indicator light test. If ANTI-LOCK indicator illuminates and then goes out, go to next step. If ANTI-LOCK indicator does not illuminate, go to step 10).

4) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Disconnect Instrument Panel Cluster (IPC) connector. Using DVOM, measure resistance between breakout box terminals No. 3 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

5) Repair short to ground in White wire between instrument panel cluster and EBCM/EBTCM.

6) Turn ignition on, with engine off. Using DVOM, measure voltage at breakout box terminal No. 3. If voltage is greater than one volt, go to step 8). If voltage is less than one volt, go to next step.

7) Turn ignition off. Connect a fused jumper between terminal B13 (White wire) of IPC connector and ground. Using DVOM, measure resistance between breakout box terminals No. 3 and "B". If resistance is 0-5 ohms, go to step 12). If resistance is not 0-5 ohms, go to step 9).

8) Repair short to voltage in White wire between instrument panel cluster and EBCM/EBTCM.

9) Repair open in White wire between instrument panel cluster and EBCM/EBTCM.

10) Check ANTI-LOCK indicator bulb. If bulb is okay, go to

step 13). If bulb is blown, go to next step.

11) Replace ANTI-LOCK indicator bulb.

12) Replace EBCM/EBTCM.

13) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT.

### **DTC C1211: ABS INDICATOR LIGHT CIRCUIT MALFUNCTION ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS/ICCS DTCs. If any "U" (loss of communication) DTCs are set, go to appropriate DTC for diagnosis. See appropriate BODY CONTROL MODULES article in ACCESSORIES/SAFETY EQUIPMENT. If no "U" (loss of communication) DTCs are set, go to next step.

3) Enter on-board diagnostics while observing ANTI-LOCK indicator light. If ANTI-LOCK indicator light illuminates and then goes out, go to next step. If ANTI-LOCK indicator light does not illuminate and then go out, go to step 10).

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Disconnect Instrument Panel Cluster (IPC) connector. Using DVOM, measure resistance between breakout box terminals No. 3 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

5) Repair short to ground in White wire between instrument panel cluster and EBTCM.

6) Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 3 and "B". If voltage is greater than one volt, go to step 8). If voltage is less than one volt, go to next step.

7) Turn ignition off. Connect a fused jumper between terminal C1 (White wire) of IPC connector C3 and ground. Using DVOM, measure resistance between breakout box terminals No. 3 and "B". If resistance is 0-5 ohms, go to step 11). If resistance is not 0-5 ohms, go to step 9).

8) Repair short to voltage in White wire between instrument panel cluster and EBTCM.

9) Repair open in White wire between instrument panel cluster and EBTCM.

10) Diagnose and repair Instrument Panel Cluster (IPC). See appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT. Check ANTI-LOCK indicator bulb.

11) Replace EBTCM.

### **DTC C1211: ABS INDICATOR LIGHT CIRCUIT MALFUNCTION ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Disconnect Light Driver Module (LDM) connector. Turn ignition on, with engine off. Using DVOM, measure voltage at breakout box terminal No. 13. If battery voltage is present, go to next step. If battery voltage is not present, go to step 4).

3) Repair open in White wire between LDM and EBCM/EBTCM.

4) Turn ignition off. Using DVOM, measure resistance between breakout box terminals No. 13 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

5) Repair short to ground in White wire between LDM and EBCM/EBTCM.

6) Connect a fused jumper between breakout box terminals No.

13 and "B". Using DVOM, check resistance between terminal "C" (White wire) of LDM connector and ground. If resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 8).

7) Replace EBCM/EBTCM.

8) Repair open or high resistance in White wire between LDM and EBCM/EBTCM.

#### **DTC C1214: SOLENOID VALVE RELAY CONTACT OR COIL CIRCUIT**

OPEN ("C", "E" & "K" BODIES) OR DTC C1214: SOLENOID VALVE RELAY CONTACT CIRCUIT OPEN ("H" BODY)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) On "C" and "H" bodies, check ABS solenoid fuse in engine compartment fuse block. On "E" and "K" bodies, check BRAKE fuse in right maxifuse fuse block. On all models, if fuse is blown, go to next step. If fuse is okay, go to step 7).

3) Install new fuse. Turn ignition on, with engine off. Check new fuse. If fuse is blown, go to next step. If fuse is okay, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

4) Turn ignition off. Remove fuse. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals "D" and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 10).

5) Separate EBCM/EBTCM from BPMV assembly. Connect breakout box to BPMV connector. Measure resistance between breakout box terminal No. 7 and BPMV case. If resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

6) Replace BPMV assembly.

7) Reinstall fuse, if removed. Using DVOM, measure voltage probing between fuse test terminals and ground. If battery voltage is present, go to next step. If battery voltage is not present, diagnose power distribution circuit. See appropriate diagram in POWER DISTRIBUTION article in WIRING DIAGRAMS.

8) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure voltage at breakout box terminal "D". If battery voltage is present, go to next step. If battery voltage is not present, go to step 11).

9) Replace EBCM/EBTCM.

10) Repair short to ground in Red wire between fuse block and EBCM/EBTCM.

11) Repair open or high resistance in Red wire between fuse block and EBCM/EBTCM.

#### **DTC C1216: SOLENOID VALVE RELAY COIL CIRCUIT OPEN ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Replace EBCM/EBTCM.

#### **DTC C1217: BPMV PUMP MOTOR RELAY CONTACT CIRCUIT OPEN**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) On "C" and "H" bodies, check ABS motor fuse in engine compartment fuse block. On "E" and "K" bodies, check BRAKE fuse in right maxifuse fuse block. On all models, if fuse is blown, go to next step. If fuse is okay, go to step 7).

3) Install new fuse. Cycle ignition from off to on, with engine off. With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. Recheck fuse. If fuse is blown, go to next step. If fuse is okay, see

INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

4) Turn ignition off. Remove fuse. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals "E" and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 10).

5) Separate EBCM/EBTCM from BPMV assembly. Connect breakout box to BPMV connector. Measure resistance between breakout box terminal No. 8 and BPMV case. If resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

6) Replace BPMV assembly.

7) Reinstall fuse, if removed. Using DVOM, measure voltage probing between fuse test terminals and ground. If battery voltage is present, go to next step. If battery voltage is not present, diagnose power distribution circuit. See appropriate diagram in POWER DISTRIBUTION article in WIRING DIAGRAMS.

8) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure voltage at breakout box terminal "E". If battery voltage is present, go to next step. If battery voltage is not present, go to step 11).

9) Replace EBCM/EBTCM.

10) Repair short to ground in Red wire between fuse block and EBCM/EBTCM.

11) Repair open or high resistance in Red wire between fuse block and EBCM/EBTCM.

### **DTC C1221: LEFT FRONT WHEEL SPEED SENSOR INPUT SIGNAL**

EQUALS ZERO OR DTC C1225: LEFT FRONT EXCESSIVE WHEEL SPEED VARIATION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check left front wheel speed sensor connector and wiring for damage. Check left front wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to step 7). If sensor, connector or wiring is okay, go to next step.

3) Disconnect left front wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 8).

4) With DVOM still connected, select millivolt AC scale. Spin wheel by hand as fast as possible while monitoring AC output. If voltage is greater than 100 millivolts, go to next step. If voltage is less than 100 millivolts, go to step 8).

5) Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 15 and 31. On "H" body, using DVOM, measure resistance between breakout box terminals No. 8 and 24. On all models, if resistance is infinite, go to next step. If resistance is not infinite, go to step 9).

6) Reconnect all connectors. Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 10). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

7) Repair damaged sensor. Drive vehicle faster than 15 MPH while monitoring scan tool to ensure DTC does not reset. If DTC sets as current, go to step 3). If DTC does not set as current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace left front wheel speed sensor. After repairs, go to step 11).

9) Repair short between Yellow wire and Light Blue wire. After repairs, go to step 11).

10) Replace EBCM/EBTCM. After repairs, go to next step.

11) Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 2). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

### **DTC C1222: RIGHT FRONT WHEEL SPEED SENSOR INPUT SIGNAL**

EQUALS ZERO OR DTC C1226: RIGHT FRONT EXCESSIVE WHEEL SPEED VARIATION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check right front wheel speed sensor connector and wiring for damage. Check right front wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to step 7). If sensor, connector or wiring is okay, go to next step.

3) Disconnect right front wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 8).

4) With DVOM still connected, select millivolt AC scale. Spin wheel by hand as fast as possible while monitoring AC output. If voltage is greater than 100 millivolts, go to next step. If voltage is less than 100 millivolts, go to step 8).

5) Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 14 and 30. On "H" body, using DVOM, measure resistance between breakout box terminals No. 9 and 25. On all models, if resistance is infinite, go to next step. If resistance is not infinite, go to step 9).

6) Reconnect all connectors. Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 10). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

7) Repair damaged sensor. Drive vehicle faster than 15 MPH while monitoring scan tool to ensure DTC does not reset. If DTC sets as current, go to step 3). If DTC does not set as current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace right front wheel speed sensor. After repairs, go to step 11).

9) Repair short between Tan wire and Dark Green wire. After repairs, go to step 11).

10) Replace EBCM/EBTCM. After repairs, go to next step.

11) Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 2). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

### **DTC C1223: LEFT REAR WHEEL SPEED SENSOR INPUT SIGNAL**

EQUALS ZERO OR DTC C1227: LEFT REAR EXCESSIVE WHEEL SPEED VARIATION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check left rear wheel speed sensor connector and wiring for damage. Check left rear wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to step 7). If sensor, connector or wiring is okay, go to next step.

3) Disconnect left rear wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 8).

4) With DVOM still connected, select millivolt AC scale. Spin wheel by hand as fast as possible while monitoring AC output. If voltage is greater than 100 millivolts, go to next step. If voltage is less than 100 millivolts, go to step 8).

5) Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 12 and 28. On "H" body, using DVOM, measure resistance between breakout box terminals No. 10 and 26. On all models, if resistance is infinite, go to next step. If resistance is not infinite, go to step 9).

6) Reconnect all connectors. Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 10). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

7) Repair damaged sensor. Drive vehicle faster than 15 MPH while monitoring scan tool to ensure DTC does not reset. If DTC sets as current, go to step 3). If DTC does not set as current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace left rear wheel speed sensor. After repairs, go to step 11).

9) Repair short between Black wire and Red wire. After repairs, go to step 11).

10) Replace EBCM/EBTCM. After repairs, go to next step.

11) Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 2). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

#### **DTC C1224: RIGHT REAR WHEEL SPEED SENSOR INPUT SIGNAL**

EQUALS ZERO OR DTC C1228: RIGHT REAR EXCESSIVE WHEEL SPEED VARIATION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check right rear wheel speed sensor connector and wiring for damage. Check right rear wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to step 7). If sensor, connector or wiring is okay, go to next step.

3) Disconnect right rear wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 8).

4) With DVOM still connected, select millivolt AC scale. Spin wheel by hand as fast as possible while monitoring AC output. If voltage is greater than 100 millivolts, go to next step. If voltage is less than 100 millivolts, go to step 8).

5) Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 13 and 29. On "H" body, using DVOM, measure resistance between breakout box terminals No. 11 and 27. On all models, if resistance is infinite, go to next step. If resistance is not infinite, go to step 9).

6) Reconnect all connectors. Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 10). If no current DTCs are set, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

7) Repair damaged sensor. Drive vehicle faster than 15 MPH while monitoring scan tool to ensure DTC does not reset. If DTC sets as current, go to step 3). If DTC does not set as current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace right rear wheel speed sensor. After repairs, go to step 11).

9) Repair short between Brown wire and White wire. After repairs, go to step 11).

10) Replace EBCM/EBTCM. After repairs, go to next step.

11) Drive vehicle faster than 15 MPH for at least 30 seconds while monitoring scan tool for ABS/TCS DTCs. If any current DTCs are set, go to step 2). If no current DTCs are set, see INTERMITTENTS &

POOR CONNECTIONS under DIAGNOSIS & TESTING.

### DTC C1232: LEFT FRONT WHEEL SPEED SENSOR CIRCUIT OPEN OR SHORTED

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Check left front wheel speed sensor connector and wiring for damage. Check left front wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to next step. If sensor, connector or wiring is okay, go to step 4).
- 3) Repair as necessary.
- 4) Disconnect left front wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 6).
- 5) Using DVOM, measure resistance between terminal "A" (White wire on "C" and "H" bodies; Yellow wire on "E" and "K" bodies) of wheel speed sensor and ground. Also, using DVOM, measure resistance between terminal "B" (Black wire on "C" and "H" bodies; Light Blue wire on "E" and "K" bodies) of wheel speed sensor and ground. If resistance is infinite for both measurements, go to step 7). If resistance is not infinite for both measurements, go to next step.
- 6) Replace left front wheel speed sensor.
- 7) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 15 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 8 and "B". On all models, if resistance is infinite, go to step 9). If resistance is not infinite, go to next step.
- 8) Repair short to ground in White wire on "C" and "H" bodies, or Yellow wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.
- 9) On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 31 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 24 and "B". On all models, if resistance is infinite, go to step 11). If resistance is not infinite, go to next step.
- 10) Repair short to ground in Black wire on "C" and "H" bodies, or Light Blue wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.
- 11) Reconnect left front wheel speed sensor connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 15 and 31. On "H" body, using DVOM, measure resistance between breakout box terminals No. 8 and 24. On all models, if resistance is 850-1350 ohms, go to step 15). If resistance is not 850-1350 ohms, go to next step.
- 12) On "C", "E" and "K" bodies, connect a fused jumper between breakout box terminals No. 31 and "B". On "H" body, connect a fused jumper between breakout box terminals No. 24 and "B". On all models, disconnect left front wheel speed sensor connector. Using DVOM, measure resistance between terminal "B" (Black wire on "C" and "H" bodies; Light Blue wire on "E" and "K" bodies) of wheel speed sensor and ground. If resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 14).
- 13) Repair open in White wire on "C" and "H" bodies, or Yellow wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.
- 14) Repair open in Black wire on "C" and "H" bodies, or Light Blue wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.
- 15) Turn ignition on, with engine off. On "C", "E" and "K"

bodies, using DVOM, measure voltage at breakout box terminal No. 15. On "H" body, using DVOM, measure voltage at breakout box terminal No. 8. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 17).

16) Repair short to voltage in White wire on "C" and "H" bodies, or Yellow wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.

17) On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 31. On "H" body, using DVOM, measure voltage at breakout box terminal No. 24. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 19).

18) Repair short to voltage in Black wire on "C" and "H" bodies, or Light Blue wire on "E" and "K" bodies between left front wheel speed sensor and EBCM/EBTCM.

19) Replace EBCM/EBTCM.

### **DTC C1233: RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT OPEN OR**

**SHORTED**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check right front wheel speed sensor connector and wiring for damage. Check right front wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to next step. If sensor, connector or wiring is okay, go to step 4).

3) Repair as necessary.

4) Disconnect right front wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 6).

5) Using DVOM, measure resistance between terminal "A" (White wire on "C" and "H" bodies; Dark Green wire on "E" and "K" bodies) of wheel speed sensor and ground. Also, using DVOM, measure resistance between terminal "B" (Black wire on "C" and "H" bodies; Tan wire on "E" and "K" bodies) of wheel speed sensor and ground. If resistance is infinite for both measurements, go to step 7). If resistance is not infinite for both measurements, go to next step.

6) Replace right front wheel speed sensor.

7) Turn ignition off. Disconnect EBCM/EBTCM connector.

Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 14 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 9 and "B". On all models, if resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in Tan wire on "C", "E" and "K" bodies, or Dark Green wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

9) On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 30 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 25 and "B". On all models, if resistance is infinite, go to step 11). If resistance is not infinite, go to next step.

10) Repair short to ground in Dark Green wire on "C", "E" and "K" bodies, or Tan wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

11) Reconnect right front wheel speed sensor connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 14 and 30. On "H" body, using DVOM, measure resistance between breakout box terminals No. 9 and 25. On all models, if resistance is 850-1350 ohms, go to step 15). If resistance is not 850-1350 ohms, go to next step.



12) On "C", "E" and "K" bodies, connect a fused jumper between breakout box terminals No. 30 and "B". On "H" body, connect a fused jumper between breakout box terminals No. 25 and "B". On all models, disconnect right front wheel speed sensor connector. On "C" body, using DVOM, measure resistance between terminal "B" (Black wire) of wheel speed sensor and ground. On "E", "H" and "K" bodies, using DVOM, measure resistance between terminal "A" (Dark Green wire on "E" and "K" bodies; White wire on "H" body) of wheel speed sensor and ground. On all models, if resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 14).

13) Repair open in White wire on "C" body, Tan wire on "E" and "K" bodies or Black wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

14) Repair open in Black wire on "C" body, Dark Green wire on "E" and "K" bodies, or White wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

15) Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 14. On "H" body, using DVOM, measure voltage at breakout box terminal No. 9. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 17).

16) Repair short to voltage in Tan wire on "C", "E" and "K" bodies, or Dark Green wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

17) On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 30. On "H" body, using DVOM, measure voltage at breakout box terminal No. 25. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 19).

18) Repair short to voltage in Dark Green wire on "C", "E" and "K" bodies, or Tan wire on "H" body between right front wheel speed sensor and EBCM/EBTCM.

19) Replace EBCM/EBTCM.

#### **DTC C1234: LEFT REAR WHEEL SPEED SENSOR CIRCUIT OPEN OR SHORTED**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check left rear wheel speed sensor connector and wiring for damage. Check left rear wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to next step. If sensor, connector or wiring is okay, go to step 4).

3) Repair as necessary.

4) Disconnect left rear wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 6).

5) Using DVOM, measure resistance between terminal "A" (White wire) of wheel speed sensor and ground. Also, using DVOM, measure resistance between terminal "B" (Black wire) of wheel speed sensor and ground. If resistance is infinite for both measurements, go to step 7). If resistance is not infinite for both measurements, go to next step.

6) Replace left rear wheel speed sensor.

7) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 12 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 10 and "B". On all models, if resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in Black wire between left rear

wheel speed sensor and EBCM/EBTCM.

9) On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 28 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 26 and "B". On all models, if resistance is infinite, go to step 11). If resistance is not infinite, go to next step.

10) Repair short to ground in Red wire between left rear wheel speed sensor and EBCM/EBTCM.

11) Reconnect left rear wheel speed sensor connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 12 and 28. On "H" body, using DVOM, measure resistance between breakout box terminals No. 10 and 26. On all models, if resistance is 850-1350 ohms, go to step 15). If resistance is not 850-1350 ohms, go to next step.

12) On "C", "E" and "K" bodies, connect a fused jumper between breakout box terminals No. 28 and "B". On "H" body, connect a fused jumper between breakout box terminals No. 26 and "B". On all models, disconnect left rear wheel speed sensor connector. Using DVOM, measure resistance between terminal "B" (Black wire) of wheel speed sensor and ground. If resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 14).

13) Repair open in Black wire between left rear wheel speed sensor and EBCM/EBTCM.

14) Repair open in White wire between left rear wheel speed sensor and EBCM/EBTCM.

15) Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 12. On "H" body, using DVOM, measure voltage at breakout box terminal No. 10. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 17).

16) Repair short to voltage in Black wire between left rear wheel speed sensor and EBCM/EBTCM.

17) On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 28. On "H" body, using DVOM, measure voltage at breakout box terminal No. 26. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 19).

18) Repair short to voltage in White wire between left rear wheel speed sensor and EBCM/EBTCM.

19) Replace EBCM/EBTCM.

#### **DTC C1235: RIGHT REAR WHEEL SPEED SENSOR CIRCUIT OPEN OR SHORTED**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check right rear wheel speed sensor connector and wiring for damage. Check right rear wheel speed sensor for damage or looseness. If sensor, connector or wiring is faulty, go to next step. If sensor, connector or wiring is okay, go to step 4).

3) Repair as necessary.

4) Disconnect right rear wheel speed sensor connector directly at sensor. Using DVOM, measure resistance between terminals of wheel speed sensor. If resistance is 850-1350 ohms, go to next step. If resistance is not 850-1350 ohms, go to step 6).

5) Using DVOM, measure resistance between terminal "A" (White wire) of wheel speed sensor and ground. Also, using DVOM, measure resistance between terminal "B" (Black wire) of wheel speed sensor and ground. If resistance is infinite for both measurements, go to step 7). If resistance is not infinite for both measurements, go to next step.

6) Replace right rear wheel speed sensor.

7) Turn ignition off. Disconnect EBCM/EBTCM connector.

Connect breakout box and adapter cable to harness connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 13 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 11 and "B". On all models, if resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in White wire on "C", "E" and "K" bodies, or Brown wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

9) On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 29 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 27 and "B". On all models, if resistance is infinite, go to step 11). If resistance is not infinite, go to next step.

10) Repair short to ground in Brown wire on "C", "E" and "K" bodies, or White wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

11) Reconnect right rear wheel speed sensor connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 13 and 29. On "H" body, using DVOM, measure resistance between breakout box terminals No. 11 and 27. On all models, if resistance is 850-1350 ohms, go to step 15). If resistance is not 850-1350 ohms, go to next step.

12) On "C", "E" and "K" bodies, connect a fused jumper between breakout box terminals No. 29 and "B". On "H" body, connect a fused jumper between breakout box terminals No. 27 and "B". On all models, disconnect right rear wheel speed sensor connector. On "C", "E" and "K" bodies, using DVOM, measure resistance between terminal "B" (Black wire) of wheel speed sensor and ground. On "H" body, using DVOM, measure resistance between terminal "A" (White wire) of wheel speed sensor and ground. On all models, if resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 14).

13) Repair open in White wire on "C", "E" and "K" bodies, or Black wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

14) Repair open in Black wire on "C", "E" and "K" bodies, or White wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

15) Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 13. On "H" body, using DVOM, measure voltage at breakout box terminal No. 11. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 17).

16) Repair short to voltage in White wire on "C", "E" and "K" bodies, or Brown wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

17) On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 29. On "H" body, using DVOM, measure voltage at breakout box terminal No. 27. On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 19).

18) Repair short to voltage in Brown wire on "C", "E" and "K" bodies, or White wire on "H" body between right rear wheel speed sensor and EBCM/EBTCM.

19) Replace EBCM/EBTCM.

## DTC C1236: LOW SYSTEM VOLTAGE

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect and check EBCM/EBTCM connector and harness connector for corrosion or damage. If connector(s) is faulty, go to step 6). If connector(s) is okay, go to

next step.

3) Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminal "B" and ground. If resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 7).

4) Measure voltage between breakout box terminals "D" and "B". If voltage is greater than 10.5 volts, go to next step. If voltage is less than 10.5 volts, diagnose charging system. See appropriate GENERATORS & REGULATORS article in STARTING & CHARGING SYSTEMS.

5) Turn ignition on, with engine off. Measure voltage between breakout box terminals "A" and "B". If voltage is greater than 10.5 volts, go to step 8). If voltage is less than 10.5 volts, diagnose charging system. See appropriate GENERATORS & REGULATORS article in STARTING & CHARGING SYSTEMS.

6) Repair as necessary.

7) Repair open in Black wire between EBCM/EBTCM and ground connection.

8) Replace EBCM/EBTCM.

### **DTC C1237: HIGH SYSTEM VOLTAGE**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn all accessories off. Start engine. Using scan tool, select ABS/TCS DATA LIST. Monitor battery voltage while running engine at about 2000 RPM. If voltage is less than 17 volts, go to step 4). If voltage is greater than 17 volts, go to next step.

3) Using DVOM, check actual battery voltage while running engine at about 2000 RPM. If voltage is less than 17 volts, go to next step. If voltage is greater than 17 volts, diagnose charging system. See appropriate GENERATORS & REGULATORS article in STARTING & CHARGING SYSTEMS.

4) Test drive vehicle faster than 5 MPH. If DTC C1237 resets, go to next step. If DTC C1237 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

5) Replace EBCM/EBTCM.

### **DTC C1238: BRAKE THERMAL MODEL LIMIT EXCEEDED**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS DTCs. If any other DTC is set, go to appropriate DTC for diagnosis. If no other DTC is set, go to next step.

3) Allow vehicle to cool for 30 minutes after being driven. Using scan tool, select ABS/TCS DATA LIST and read TCS STATUS. If brake thermal model is exceeded, go to next step. If brake thermal model is not exceeded, go to step 5).

4) Replace EBCM/EBTCM.

5) Check brake switch adjustment. Switch is located on brake pedal. See appropriate DISC & DRUM article. If switch is properly adjusted, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING. If switch is not properly adjusted, adjust brake switch.

### **DTC C1241: MAGNASTEER CIRCUIT MALFUNCTION**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check Magnasteer actuator connector and EBCM/EBTCM connector and wiring for damage. If connector or wiring is damaged, go to next step. If connector or wiring is okay, go to step 4).

3) Repair as necessary.

4) Disconnect Magnasteer actuator connector. Using DVOM, measure resistance between terminals of Magnasteer actuator. Actuator is located on power steering rack. If resistance is 1.6-3.1 ohms, go to next step. If resistance is not 1.6-3.1 ohms, go to step 6).

5) Using DVOM, measure resistance between terminal "A" (Gray wire) of Magnasteer actuator and ground. Also, using DVOM, measure resistance between terminal "B" (White wire) of Magnasteer actuator and ground. If resistance is infinite for both measurements, go to next step. If resistance is not infinite for both measurements, go to step 7).

6) Replace Magnasteer actuator.

7) Turn ignition off. Disconnect EBCM/EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals "C" and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 9).

8) Repair short to ground in Gray wire between actuator and EBCM/EBTCM.

9) Using DVOM, measure resistance between breakout box terminals "F" and "B". If resistance is infinite, go to next step. If resistance is not infinite, go to step 11).

10) Repair short to ground in White wire between actuator and EBCM/EBTCM.

11) Reconnect Magnasteer actuator connector. Using DVOM, measure resistance between breakout box terminals "C" and "F". If resistance is 1.6-3.1 ohms, go to step 17). If resistance is not 1.6-3.1 ohms, go to next step.

12) If resistance is less than 1.6-3.1 ohms, go to next step. If resistance is greater than 1.6-3.1 ohms, go to step 14).

13) Repair short between White wire and Gray wire.

14) Connect a fused jumper between breakout box terminals "C" and "B". Disconnect Magnasteer actuator connector. Using DVOM, measure resistance between terminal "A" (Gray wire) of Magnasteer actuator connector and ground. If resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 16).

15) Repair open in White wire between actuator and EBCM/EBTCM.

16) Repair open in Gray wire between actuator and EBCM/EBTCM.

17) Turn ignition on, with engine off. Using DVOM, measure voltage at breakout box terminal "C". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 19).

18) Repair short to voltage in Gray wire between actuator and EBCM/EBTCM.

19) Turn ignition on, with engine off. Using DVOM, measure voltage at breakout box terminal "F". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 21).

20) Repair short to voltage in White wire between actuator and EBCM/EBTCM.

21) Replace EBCM/EBTCM.

## DTC C1242: BPMV PUMP MOTOR GROUND CIRCUIT OPEN

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect battery. Using DVOM, measure resistance between BPMV pump motor ground stud and ground. If resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 8).

3) Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is

okay, go to next step. If connection is faulty, go to step 5).

4) Using DVOM, measure resistance between terminal No. 8 (motor power output) of BPMV internal connector and BPMV pump motor ground stud. If resistance is .2-10 ohms, go to step 6). If resistance is not .2-10 ohms, go to step 7).

5) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

6) Replace EBCM/EBTCM.

7) Replace BPMV assembly.

8) Repair open or high resistance in Black wire (motor power output) between BPMV and ground connection.

### DTC C1243: BPMV PUMP MOTOR STALLED

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If DTC C1217 is also set as a current DTC, go to DTC C1217. If DTC C1217 is not set as a current DTC, go to next step.

3) Turn ignition off. Disconnect battery. Using DVOM, measure resistance between BPMV pump motor ground stud and ground. If resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 9).

4) Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

5) Using DVOM, measure resistance between terminal No. 8 (motor power output) of BPMV internal connector and BPMV pump motor ground stud. If resistance is .2-10 ohms, go to step 7). If resistance is not .2-10 ohms, go to step 8).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV assembly as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) Replace EBCM/EBTCM.

8) Replace BPMV assembly.

9) Repair open in Black wire (motor power output) between BPMV and ground connection.

### DTC C1252: ICCS2 DATA LINK LEFT MALFUNCTION ("E" & "K"

BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If any Continuously Variable Road Sensing Suspension (CVRSS) DTCs are set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If any CVRSS DTCs are not set, go to next step.

3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to EBTCM and harness connector. Turn ignition on, with engine off. Using DVOM, measure DC duty cycle between breakout box terminals No. 18 and "B". If duty cycle is 10-90 percent, go to next step. If duty cycle is not 10-90 percent, go to step 5).

4) Replace EBTCM.

5) Turn ignition off. Disconnect CVRSS module connector C1. Disconnect adapter cable from EBTCM leaving adapter cable connected to harness connector. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 18 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 7).

6) Repair short to voltage in White wire or Grey wire between CVRSS module and EBTCM.

7) Turn ignition off. Using DVOM, measure resistance between breakout box terminals No. 18 and "B". If resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in White wire or Grey wire between CVRSS module and EBTCM.

9) Using DVOM, measure resistance between breakout box terminal No. 18 and terminal D15 (White wire) of CVRSS module connector C1. If resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 11).

10) Replace CVRSS module.

11) Repair open in White wire or Grey wire between CVRSS module and EBTCM.

### **DTC C1253: ICCS2 DATA LINK RIGHT MALFUNCTION ("E" & "K"**

**BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If any Continuously Variable Road Sensing Suspension (CVRSS) DTCs are set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If any CVRSS DTCs are not set, go to next step.

3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to EBTCM and harness connector. Turn ignition on, with engine off. Using DVOM, measure DC duty cycle between breakout box terminals No. 2 and "B". If duty cycle is 10-90 percent, go to next step. If duty cycle is not 10-90 percent, go to step 5).

4) Replace EBTCM.

5) Turn ignition off. Disconnect CVRSS module connector C1. Disconnect adapter cable from EBTCM leaving adapter cable connected to harness connector. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 2 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 7).

6) Repair short to voltage in Gray wire or White wire between CVRSS module and EBTCM.

7) Turn ignition off. Using DVOM, measure resistance between breakout box terminals No. 2 and "B". If resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in Gray wire or White wire between CVRSS module and EBTCM.

9) Using DVOM, measure resistance between breakout box terminal No. 2 and terminal D14 (Gray wire) of CVRSS module connector C1. If resistance is 0-5 ohms, go to next step. If resistance is not 0-5 ohms, go to step 11).

10) Replace CVRSS module.

11) Repair open in Gray wire or White wire between CVRSS module and EBTCM.

### **DTC C1255xx: EBTCM INTERNAL MALFUNCTION (ABS/TCS DISABLED)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If any other DTC than C1255xx is set, go to appropriate DTC for diagnosis. If no other DTC than C1255xx is set, go to next step.

3) Turn ignition off. Disconnect EBCM/EBTCM connector. Check for damaged, pushed out, or miswired terminals. If damage is found, go to next step. If no damage is found, go to step 5).

4) Repair as necessary.

- 5) Replace EBCM/EBTCM.

### **DTC C1256xx: EBTCM INTERNAL MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) If DTC(s) C1261-C1274 are also set, go to appropriate DTC for diagnosis. If DTC(s) C1261-C1274 are not set, go to next step.
- 3) Turn ignition off. Disconnect EBCM/EBTCM connector. Check for damaged, pushed out, or miswired terminals. If damage is found, go to next step. If no damage is found, go to step 5).
- 4) Repair as necessary.
- 5) Replace EBCM/EBTCM.

### **DTC C1261: LEFT FRONT HOLD VALVE SOLENOID MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).
- 3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 14 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).
- 4) Using DVOM, measure resistance between breakout box terminal No. 14 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).
- 5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1261 resets as current, go to step 9). If DTC C1261 does not reset, go to step 7).
- 6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.
- 7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1261 resets as current, go to next step. If DTC C1261 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.
- 8) Replace BPMV assembly.
- 9) Replace EBCM/EBTCM.

### **DTC C1262: LEFT FRONT RELEASE VALVE SOLENOID MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).
- 3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 9 and 7. If resistance is 4-7 ohms, go to next step. If resistance is not 4-7 ohms, go to step 8).
- 4) Using DVOM, measure resistance between breakout box terminal No. 9 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).
- 5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1262 resets as current, go to step 9). If DTC



C1262 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1262 resets as current, go to next step. If DTC C1262 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBCM/EBTCM.

### DTC C1263: RIGHT FRONT HOLD VALVE SOLENOID MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 1 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 1 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1263 resets as current, go to step 9). If DTC C1263 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1263 resets as current, go to next step. If DTC C1263 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBCM/EBTCM.

### DTC C1264: RIGHT FRONT RELEASE VALVE SOLENOID MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 6 and 7. If resistance is 4-7 ohms, go to next step. If resistance is not 4-7 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 6 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1264 resets as current, go to step 9). If DTC C1264 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as

necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1264 resets as current, go to next step. If DTC C1264 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBCM/EBTCM.

### **DTC C1265: LEFT REAR HOLD VALVE SOLENOID MALFUNCTION**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 2 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 2 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1265 resets as current, go to step 9). If DTC C1265 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1265 resets as current, go to next step. If DTC C1265 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBCM/EBTCM.

### **DTC C1266: LEFT REAR RELEASE VALVE SOLENOID MALFUNCTION**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 5 and 7. If resistance is 4-7 ohms, go to next step. If resistance is not 4-7 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 5 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1266 resets as current, go to step 9). If DTC C1266 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If

DTC C1266 resets as current, go to next step. If DTC C1266 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

- 8) Replace BPMV assembly.
- 9) Replace EBCM/EBTCM.

### DTC C1267: RIGHT REAR HOLD VALVE SOLENOID MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 13 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 13 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1267 resets as current, go to step 9). If DTC C1267 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1267 resets as current, go to next step. If DTC C1267 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

- 8) Replace BPMV assembly.
- 9) Replace EBCM/EBTCM.

### DTC C1268: RIGHT REAR RELEASE VALVE SOLENOID MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBCM/EBTCM connector. Separate EBCM/EBTCM from BPMV assembly. Check EBCM/EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 10 and 7. If resistance is 4-7 ohms, go to next step. If resistance is not 4-7 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 10 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBCM/EBTCM to BPMV assembly. Reconnect EBCM/EBTCM connector. Turn ignition on, with engine off. If DTC C1268 resets as current, go to step 9). If DTC C1268 does not reset, go to step 7).

6) If EBCM/EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBCM/EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBCM/EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1268 resets as current, go to next step. If DTC C1268 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

- 8) Replace BPMV assembly.

- 9) Replace EBCM/EBTCM.

### **DTC C1271: LEFT FRONT MASTER CYLINDER ISOLATION VALVE**

#### **MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Turn ignition off. Disconnect EBTCM connector. Separate EBTCM from BPMV assembly. Check EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).
- 3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 12 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).
- 4) Using DVOM, measure resistance between breakout box terminal No. 12 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).
- 5) Disconnect breakout box. Reattach EBTCM to BPMV assembly. Reconnect EBTCM connector. Turn ignition on, with engine off. If DTC C1271 resets as current, go to step 9). If DTC C1271 does not reset, go to step 7).
- 6) If EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBTCM and BPMV assembly.
- 7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1271 resets as current, go to next step. If DTC C1271 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.
- 8) Replace BPMV assembly.
- 9) Replace EBTCM.

### **DTC C1272: LEFT FRONT TCS PRIME VALVE MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.
- 2) Turn ignition off. Disconnect EBTCM connector. Separate EBTCM from BPMV assembly. Check EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).
- 3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 11 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).
- 4) Using DVOM, measure resistance between breakout box terminal No. 11 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).
- 5) Disconnect breakout box. Reattach EBTCM to BPMV assembly. Reconnect EBTCM connector. Turn ignition on, with engine off. If DTC C1272 resets as current, go to step 9). If DTC C1272 does not reset, go to step 7).
- 6) If EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBTCM and BPMV assembly.
- 7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1272 resets as current, go to next step. If DTC C1272 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.
- 8) Replace BPMV assembly.
- 9) Replace EBTCM.

### **DTC C1273: RIGHT FRONT TCS MASTER CYLINDER ISOLATION**

#### **VALVE MALFUNCTION**

- 1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM

CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBTCM connector. Separate EBTCM from BPMV assembly. Check EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 3 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 3 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBTCM to BPMV assembly. Reconnect EBTCM connector. Turn ignition on, with engine off. If DTC C1273 resets as current, go to step 9). If DTC C1273 does not reset, go to step 7).

6) If EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1273 resets as current, go to next step. If DTC C1273 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBTCM.

#### **DTC C1274: RIGHT FRONT TCS PRIME VALVE MALFUNCTION**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBTCM connector. Separate EBTCM from BPMV assembly. Check EBTCM-to-BPMV connection for damage, corrosion, poor terminal contact, or for brake fluid. If connection is okay, go to next step. If connection is faulty, go to step 6).

3) Connect breakout box to BPMV connector. Using DVOM, measure resistance between breakout box terminals No. 4 and 7. If resistance is 8-12 ohms, go to next step. If resistance is not 8-12 ohms, go to step 8).

4) Using DVOM, measure resistance between breakout box terminal No. 4 and BPMV case. If resistance is infinite, go to next step. If resistance is not infinite, go to step 8).

5) Disconnect breakout box. Reattach EBTCM to BPMV assembly. Reconnect EBTCM connector. Turn ignition on, with engine off. If DTC C1274 resets as current, go to step 9). If DTC C1274 does not reset, go to step 7).

6) If EBTCM-to-BPMV connection is damaged, corroded or has poor terminal contact, replace EBTCM and/or BPMV as necessary. If brake fluid is present, replace EBTCM and BPMV assembly.

7) With scan tool in ABS/TCS SPECIAL TESTS, run AUTO TEST. If DTC C1274 resets as current, go to next step. If DTC C1274 does not reset, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

8) Replace BPMV assembly.

9) Replace EBTCM.

#### **DTC C1275: PCM SERIAL DATA MALFUNCTION ("H" BODY)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If DTC C1276 is set as current, go to DTC C1276. If DTC C1276 is not set as a current DTC, go to next step.

3) Check if ground connections G101 and G106 are damaged, loose or corroded. See GROUND DISTRIBUTION article in WIRING DIAGRAMS. If connections are faulty, go to next step. If connections are okay, go to step 5).

4) Repair ground connection as necessary.

5) Disconnect battery. Disconnect EBCM/EBTCM connector.

Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 15 and "B". If resistance is infinite, go to step 7). If resistance is not infinite, go to next step.

6) Repair short to ground in Tan wire between HVAC Programmer, EBCM/EBTCM and Sensing and Diagnostic Module (SDM).

7) Disconnect PCM connector C1. Using DVOM, measure resistance between breakout box terminal No. 15 and terminal No. 15 (Tan wire) of PCM connector C1. If resistance is 5 ohms, go to step 9). If resistance is not 5 ohms, go to next step.

8) Repair short to ground in Tan wire between HVAC Programmer and EBCM/EBTCM.

9) Using DVOM, measure resistance between breakout box terminal No. 30 and terminal No. 15 (Tan wire) of PCM connector C1. If resistance is 5 ohms, go to step 11). If resistance is not 5 ohms, go to next step.

10) Repair short to ground in Tan wire between HVAC Programmer, Sensing and Diagnostic Module (SDM) and PCM.

11) Reconnect battery. Turn ignition on, with engine off. Using DVOM, measure voltage at breakout box terminal No. 15. If battery voltage is present, go to next step. If battery voltage is not present, diagnose Powertrain Control Module (PCM). See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section.

12) Repair short to voltage in Tan wire between HVAC Programmer, Sensing and Diagnostic Module (SDM) and PCM.

## DTC C1276: DELIVERED TORQUE SIGNAL CIRCUIT MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check if ground connections G101, G102, G103, G104, G105, G106, G107 and/or G110 are damaged, loose or corroded. See appropriate diagram in GROUND DISTRIBUTION article in WIRING DIAGRAMS. If connections are faulty, go to next step. If connections are okay, go to step 4).

3) Repair ground connection as necessary.

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to EBTCM and harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure DC duty cycle between breakout box terminals No. 6 and "B". On "H" body, using DVOM, measure DC duty cycle between breakout box terminals No. 14 and "B". On all models, if duty cycle is 5-15 percent, go to next step. If duty cycle is not 5-15 percent, go to step 7).

5) On "C", "E" and "K" bodies, using DVOM set on Hz scale, measure delivered torque input between breakout box terminals No. 6 and "B". On "H" body, using DVOM set on Hz scale, measure delivered torque input between breakout box terminals No. 14 and "B". On all models, if frequency is 121-134 Hz, go to next step. If frequency is 121-134 Hz, go to step 13).

6) Replace EBTCM.

7) Turn ignition off. On "C" and "H" bodies, disconnect PCM connector C1. On "E" and "K" bodies, disconnect PCM connector C2. On all models, turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage between breakout box terminals No. 6 and "B". On "H" body, using DVOM, measure voltage between breakout box terminals No. 14 and "B". On all models, if battery voltage is present, go to next step. If battery voltage is not present, go to step 10).

8) Turn ignition off. Disconnect adapter cable from EBTCM leaving adapter cable connected to harness connector. Turn ignition

on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage between breakout box terminals No. 6 and "B". On "H" body, using DVOM, measure voltage between breakout box terminals No. 14 and "B". On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 12).

9) Repair short to voltage in Tan/Black wire between PCM and EBTCM.

10) Turn ignition off. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 6 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 14 and "B". On all models, if resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

11) Repair short to ground in Tan/Black wire between PCM and EBTCM.

12) On "C" body, using DVOM, measure resistance between breakout box terminal No. 6 and terminal No. 9 (Tan/Black wire) of PCM connector C2. On "E" and "K" bodies, using DVOM, measure resistance between breakout box terminal No. 6 and terminal No. 27 (Tan/Black wire) of PCM connector C2. On "H" body, using DVOM, measure resistance between breakout box terminal No. 14 and terminal No. 6 (Tan/Black wire) of PCM connector C2. On all models, if resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 14).

13) Check PCM. See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section.

14) Repair open in Tan/Black wire between PCM and EBTCM.

## DTC C1277: REQUESTED TORQUE SIGNAL CIRCUIT MALFUNCTION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check if ground connections G101, G102, G103, G104, G105, G106 and/or G110 are damaged, loose or corroded. See appropriate diagram in GROUND DISTRIBUTION article in WIRING DIAGRAMS. If connections are faulty, go to next step. If connections are okay, go to step 4).

3) Repair ground connection as necessary.

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to EBTCM and harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure DC duty cycle between breakout box terminals No. 25 and "B". On "H" body, using DVOM, measure DC duty cycle between breakout box terminals No. 1 and "B". On all models, if duty cycle is 85-95 percent, go to next step. If duty cycle is not 85-95 percent, go to step 6).

5) On "C", "E" and "K" bodies, using DVOM set on Hz scale, measure requested torque input between breakout box terminals No. 25 and "B". On "H" body, using DVOM set on Hz scale, measure requested torque input between breakout box terminals No. 1 and "B". On all models, if frequency is 121-134 Hz, go to step 13). If frequency is not 121-134 Hz, go to step 7).

6) Turn ignition off. Disconnect adapter cable from EBTCM leaving adapter cable connected to harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage between breakout box terminals No. 25 and "B". On "H" body, using DVOM, measure voltage between breakout box terminals No. 1 and "B". On all models, if voltage is 4.5-5.5 volts, go to next step. If voltage is not 4.5-5.5 volts, go to step 8).

7) Replace EBTCM.

8) Turn ignition off. On "C" and "H" bodies, disconnect PCM connector C1. On "E" and "K" bodies, disconnect PCM connector C2. On all models, turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage between breakout box terminals No. 25 and "B". On "H" body, using DVOM, measure voltage between breakout

box terminals No. 1 and "B". On all models, if voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 10).

9) Repair short to voltage in Orange/Black wire between PCM and EBTCM.

10) Turn ignition off. On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 25 and "B". On "C", "E" and "K" bodies, using DVOM, measure resistance between breakout box terminals No. 25 and "B". On "H" body, using DVOM, measure resistance between breakout box terminals No. 1 and "B". On all models, if resistance is infinite, go to step 12). If resistance is not infinite, go to next step.

11) Repair short to ground in Orange/Black wire between PCM and EBTCM.

12) On "C" body, using DVOM, measure resistance between breakout box terminal No. 25 and terminal No. 71 (Orange/Black wire) of PCM connector C1. On "E" and "K" bodies, using DVOM, measure resistance between breakout box terminal No. 25 and terminal No. 46 (Orange/Black wire) of PCM connector C2. On "H" body, using DVOM, measure resistance between breakout box terminal No. 1 and terminal No. 71 (Orange/Black wire) of PCM connector C1. On all models, if resistance is 0-2 ohms, go to next step. If resistance is not 0-2 ohms, go to step 14).

13) Check PCM. See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section.

14) Repair open in Orange/Black wire between PCM and EBTCM.

### **DTC C1278: TCS TEMPORARILY INHIBITED BY PCM**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Using scan tool, display ABS/TCS DTCs. If any other DTCs are set, go to appropriate DTC for diagnosis. If no other DTCs are set, go to next step.

3) If DTC C1278 is set as current, go to step 5). If DTC C1278 is not set as current, go to next step.

4) Start engine and test drive vehicle faster than 10 MPH while monitoring scan tool for ABS/TCS DTCs. Repeat drive cycle sequence 2 more times. If DTC C1278 set during last 3 drive cycles, go to next step. If DTC C1278 does not reset during last 3 drive cycles, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

5) Perform PCM ON-BOARD DIAGNOSTIC SYSTEM CHECK. See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section. If on-board diagnostic system check passes, ABS/TCS are okay. If on-board diagnostic system check does not pass, perform necessary repairs as indicated in self-diagnostics article.

### **DTC C1281: ABC SENSORS UNCORRELATED ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS/ICCS DTCs. If DTCs C1221-C1235 or C1282-C1288 are set, go to appropriate DTC for diagnosis. If DTCs C1221-C1235 or C1282-C1288 are not set, go to next step.

3) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

4) Start engine. Ensure front wheels are straight. Turn ignition off. Restart engine. Slowly turn steering wheel in both directions while monitoring STEERING POSITION SENSOR TEST using scan tool. If scan tool display moves uniformly through fully range of



steering wheel rotation and analog/digital display is within 20 percent of each other, go to step 6). If scan tool display does not move uniformly through fully range of steering wheel rotation and analog/digital display is not within 20 percent of each other, go to next step.

5) Replace steering wheel position sensor. After repairs, go to step 8).

6) Carefully drive vehicle faster than 15 MPH for 45 seconds in a straight line while monitoring yaw rate sensor output in degrees/second using scan tool. If degrees/second are zero plus/minus 5, go to step 8). If degrees/second are not zero plus/minus 5, go to next step.

7) Replace yaw rate sensor. After repairs, go to next step.

8) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1281 is set as current while driving vehicle, go to next step. If DTC C1281 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

9) Replace EBTCM.

#### **DTC C1282: YAW RATE SENSOR BIAS CIRCUIT MALFUNCTION ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 21 and "B". If resistance is infinite, go to step 4). If resistance is not infinite, go to next step.

3) Repair short to ground in Orange wire between yaw rate sensor and EBTCM.

4) Using DVOM, measure resistance between breakout box terminals No. 11 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

5) Repair short to ground in Gray/Black wire between yaw rate sensor and EBTCM.

6) Using DVOM, measure resistance between breakout box terminals No. 27 and "B". If resistance is infinite, go to step 8). If resistance is not infinite, go to next step.

7) Repair short to ground in Light Green/Black wire between yaw rate sensor and EBTCM.

8) Using DVOM, measure resistance between breakout box terminals No. 11 and 27. If resistance is infinite, go to step 10). If resistance is not infinite, go to next step.

9) Repair short between Gray/Black wire and Light Green/Black wire.

10) Using DVOM, measure resistance between breakout box terminals No. 11 and 21. If resistance is infinite, go to step 12). If resistance is not infinite, go to next step.

11) Repair short between Gray/Black wire and Orange wire.

12) Using DVOM, measure resistance between breakout box terminals No. 27 and 21. If resistance is infinite, go to step 14). If resistance is not infinite, go to next step.

13) Repair short between Light Green/Black wire and Orange wire.

14) Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 21 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 16).

15) Repair short to voltage in Orange wire between yaw rate sensor and EBTCM.

16) Using DVOM, measure voltage between breakout box terminals No. 11 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 18).

17) Repair short to voltage in Gray/Black wire between yaw rate sensor and EBTCM.

18) Using DVOM, measure voltage between breakout box terminals No. 27 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 20).

19) Repair short to voltage in Light Green/Black wire between yaw rate sensor and EBTCM.

20) Turn ignition off. Connect a fused jumper between breakout box terminals No. 21 and "B". Disconnect yaw rate sensor connector. Using DVOM, measure resistance between terminal "C" (Dark Blue wire) of yaw rate sensor connector and ground. If resistance is 0-2 ohms, go to step 22). If resistance is not 0-2 ohms, go to next step.

21) Repair open in Dark Blue wire between yaw rate sensor and EBTCM.

22) Connect a fused jumper between breakout box terminals No. 27 and "B". Using DVOM, measure resistance between terminal "B" (Light Green/Black wire) of yaw rate sensor connector and ground. If resistance is 0-2 ohms, go to step 24). If resistance is not 0-2 ohms, go to next step.

23) Repair open in Light Green/Black wire between yaw rate sensor and EBTCM.

24) Connect a fused jumper between breakout box terminals No. 11 and "B". Using DVOM, measure resistance between terminal "A" (Gray/Black wire) of yaw rate sensor connector and ground. If resistance is 0-2 ohms, go to step 26). If resistance is not 0-2 ohms, go to next step.

25) Repair open in Gray/Black wire between yaw rate sensor and EBTCM.

26) Turn ignition off. Connect breakout box and adapter cable to EBTCM and harness connector. Reconnect yaw rate sensor connector. Remove fused jumper from breakout box. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 11 and 27. If voltage is 4.5-5.5 volts, go to next step. If voltage is not 4.5-5.5 volts, go to step 33).

27) Using DVOM, measure voltage between breakout box terminals No. 21 and "B". If voltage is 2.35-2.65 volts, go to step 29). If voltage is not 2.35-2.65 volts, go to next step.

28) Replace yaw rate sensor.

29) Using DVOM, measure voltage between breakout box terminals No. 21 and 27. If voltage is 2.35-2.65 volts, go to next step. If voltage is not 2.35-2.65 volts, go to step 28).

30) Using scan tool, display yaw rate sensor value in volts. If voltage is 2-3 volts, go to next step. If voltage is not 2-3 volts, go to step 33).

31) Replace yaw rate sensor. After repairs, go to next step.

32) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1282 is set as current while driving vehicle, go to next step. If DTC C1282 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

33) Replace EBTCM.

### **DTC C1283: EXCESSIVE TIME TO CENTER STEERING ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool,

display ABS/TCS/ICCS DTCs. If DTC C1251, C1282, C1284 or C1285 is set, go to appropriate DTC for diagnosis. If DTC C1251, C1282, C1284 or C1285 is not set, go to next step.

3) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to EBTCM and harness connector. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 22 and "B". If voltage is 2.3-2.7 volts, go to step 6). If voltage is not 2.3-2.7 volts, go to next step.

5) Replace lateral accelerometer sensor.

6) Using DVOM, measure voltage between breakout box terminals No. 21 and "B". If voltage is 2.3-2.7 volts, go to step 8). If voltage is not 2.3-2.7 volts, go to next step.

7) Replace yaw rate sensor.

8) Cycle ignition from off to start. Drive vehicle faster than 25 MPH for 10 minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1283 is set as current while driving vehicle, go to next step. If DTC C1283 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

9) Replace EBTCM.

#### **DTC C1284: LATERAL ACCELEROMETER SENSOR SELF TEST**

MALFUNCTION ("E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS/ICCS DTCs. If DTC C1232-C1235, C1251, C1282 or C1285 is set, go to appropriate DTC for diagnosis. If DTC C1232-C1235, C1251, C1282 or C1285 is not set, go to next step.

3) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

4) Replace lateral accelerometer sensor. After repairs, go to next step.

5) Cycle ignition from off to start. With scan tool in ABS/TCS/ICCS SPECIAL TESTS, run AUTO TEST. Using scan tool, display ABS/TCS/ICCS DTCs. If DTC C1284 reset as current, go to next step. If DTC C1284 did not reset as current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

6) Replace EBTCM.

#### **DTC C1285: LATERAL ACCELEROMETER SENSOR CIRCUIT**

MALFUNCTION ("E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Using DVOM, measure resistance between breakout box terminals No. 22 and "B". If resistance is infinite, go to step 4). If resistance is not infinite, go to next step.

3) Repair short to ground in White wire between lateral accelerometer sensor and EBTCM.

4) Using DVOM, measure resistance between breakout box terminals No. 11 and "B". If resistance is infinite, go to step 6). If resistance is not infinite, go to next step.

5) Repair short to ground in Gray/Black wire between lateral accelerometer sensor and EBTCM.

6) Using DVOM, measure resistance between breakout box terminals No. 27 and "B". If resistance is infinite, go to step 8). If resistance is not infinite, go to next step.

7) Repair short to ground in Light Green/Black wire between lateral accelerometer sensor and EBTCM.

8) Using DVOM, measure resistance between breakout box terminals No. 11 and 27. If resistance is infinite, go to step 10). If resistance is not infinite, go to next step.

9) Repair short between Gray/Black wire and Light Green/Black wire.

10) Using DVOM, measure resistance between breakout box terminals No. 11 and 21. If resistance is infinite, go to step 12). If resistance is not infinite, go to next step.

11) Repair short between Gray/Black wire and White wire.

12) Using DVOM, measure resistance between breakout box terminals No. 27 and 22. If resistance is infinite, go to step 14). If resistance is not infinite, go to next step.

13) Repair short between Light Green/Black wire and White wire.

14) Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 22 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 16).

15) Repair short to voltage in White wire between lateral accelerometer sensor and EBTCM.

16) Using DVOM, measure voltage between breakout box terminals No. 11 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 18).

17) Repair short to voltage in Gray/Black wire between lateral accelerometer sensor and EBTCM.

18) Using DVOM, measure voltage between breakout box terminals No. 27 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 20).

19) Repair short to voltage in Light Green/Black wire between lateral accelerometer sensor and EBTCM.

20) Turn ignition off. Connect a fused jumper between breakout box terminals No. 22 and "B". Disconnect lateral accelerometer sensor connector. Using DVOM, measure resistance between terminal "B" (Light Blue wire) of lateral accelerometer sensor connector and ground. If resistance is 0-2 ohms, go to step 22). If resistance is not 0-2 ohms, go to next step.

21) Repair open in Light Blue wire between lateral accelerometer sensor and EBTCM.

22) Connect a fused jumper between breakout box terminals No. 27 and "B". Using DVOM, measure resistance between terminal "C" (Light Green/Black wire) of lateral accelerometer sensor connector and ground. If resistance is 0-2 ohms, go to step 24). If resistance is not 0-2 ohms, go to next step.

23) Repair open in Light Green/Black wire between lateral accelerometer sensor and EBTCM.

24) Connect a fused jumper between breakout box terminals No. 11 and "B". Using DVOM, measure resistance between terminal "A" (Gray/Black wire) of lateral accelerometer sensor connector and ground. If resistance is 0-2 ohms, go to step 26). If resistance is not 0-2 ohms, go to next step.

25) Repair open in Gray/Black wire between lateral accelerometer sensor and EBTCM.

26) Turn ignition off. Connect breakout box and adapter cable to EBTCM and harness connector. Reconnect lateral accelerometer sensor connector. Remove fused jumper from breakout box. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 11 and 27. If voltage is 4.5-5.5 volts, go to next step. If voltage is not 4.5-5.5 volts, go to step 33).

27) Using DVOM, measure voltage between breakout box terminals No. 22 and "B". If voltage is 2.35-2.65 volts, go to step 29). If voltage is not 2.35-2.65 volts, go to next step.

28) Replace lateral accelerometer sensor.

29) Using DVOM, measure voltage between breakout box terminals No. 22 and 27. If voltage is 2.35-2.65 volts, go to next step. If voltage is not 2.35-2.65 volts, go to step 28).

30) Using scan tool, display lateral accelerometer sensor value in volts. If voltage is 2-3 volts, go to next step. If voltage is not 2-3 volts, go to step 33).

31) Replace lateral accelerometer sensor. After repairs, go to next step.

32) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1285 is set as current while driving vehicle, go to next step. If DTC C1285 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

33) Replace EBTCM.

### **DTC C1286: STEERING/LATERAL ACCELEROMETER SENSOR BIAS**

MALFUNCTION ("E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS/ICCS DTCs. If DTC C1251 or C1282-C1285 is set, go to appropriate DTC for diagnosis. If DTC C1251 or C1282-C1285 is not set, go to next step.

3) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

4) Start engine. Ensure front wheels are straight. Turn ignition off. Restart engine. Jerk steering wheel 90 degrees in both directions and then return to original position while monitoring steering wheel position sensor using scan tool. If value displayed on scan tool returns to original value before jerking steering wheel, go to step 6). If value displayed on scan tool does not return to original value before jerking steering wheel, go to next step.

5) Replace steering wheel position sensor. After repairs, go to step 12).

6) Slowly rotate steering wheel to left while monitoring phase "A" and phase "B" of steering wheel position sensor using scan tool. As steering wheel is rotated left, phase "A" and phase "B" will change states. If phase "A" and phase "B" changes states, go to next step. If phase "A" and phase "B" do not change states, go to step 5).

7) Slowly rotate steering wheel to right while monitoring phase "A" and phase "B" of steering wheel position sensor using scan tool. As steering wheel is rotated right, phase "B" and phase "A" will change states. If phase "B" and phase "A" changes states, go to next step. If phase "B" and phase "A" do not change states, go to step 5).

8) While monitoring STEERING POSITION SENSOR TESTS using scan tool, turn steering wheel fully to left and then fully to right (lock to lock) 3 times. Observe scan tool display each time steering wheel is at full left position. All readings should be the same. If all readings are the same, go to next step. If all readings are not the same, go to step 5).

9) While monitoring STEERING POSITION SENSOR TESTS using scan tool, turn steering wheel fully to right and then fully to left (lock to lock) 3 times. Observe scan tool display each time steering wheel is at full right position. All readings should be the same. If all readings are the same, go to next step. If all readings are not the

same, go to step 5).

10) Carefully drive vehicle faster than 15 MPH for 45 seconds in a straight line while monitoring yaw rate sensor output in degrees/second using scan tool. If degrees/second are zero plus/minus 5, go to step 12). If degrees/second are not zero plus/minus 5, go to next step.

11) Replace yaw rate sensor. After repairs, go to step 14).

12) Carefully drive vehicle faster than 15 MPH for 45 seconds in a straight line while monitoring lateral accelerometer sensor output voltage using scan tool. If voltage is 2.3-2.7 volts, go to step 14). If voltage is not 2.3-2.7 volts, go to next step.

13) Replace lateral accelerometer sensor. After repairs, go to next step.

14) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1286 is set as current while driving vehicle, go to next step. If DTC C1286 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

15) Replace EBTCM.

### **DTC C1287: STEERING SENSOR RATE MALFUNCTION ("E" & "K"**

BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS/ICCS DTCs. If DTC C1251 or C1282-C1285 is set, go to appropriate DTC for diagnosis. If DTC C1251 or C1282-C1285 is not set, go to next step.

3) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

4) Start engine. Ensure front wheels are straight. Turn ignition off. Restart engine. Jerk steering wheel 90 degrees in both directions and then return to original position while monitoring steering wheel position sensor using scan tool. If value displayed on scan tool returns to original value before jerking steering wheel, go to next step. If value displayed on scan tool does not return to original value before jerking steering wheel, go to step 10).

5) Slowly rotate steering wheel to left while monitoring phase "A" and phase "B" of steering wheel position sensor using scan tool. As steering wheel is rotated left, phase "A" and phase "B" will change states. If phase "A" and phase "B" changes states, go to next step. If phase "A" and phase "B" do not change states, go to step 10).

6) Slowly rotate steering wheel to right while monitoring phase "A" and phase "B" of steering wheel position sensor using scan tool. As steering wheel is rotated right, phase "B" and phase "A" will change states. If phase "B" and phase "A" changes states, go to next step. If phase "B" and phase "A" do not change states, go to step 10).

7) Slowly turn steering wheel in both directions while monitoring STEERING POSITION SENSOR TEST using scan tool. If scan tool display moves uniformly through fully range of steering wheel rotation and analog/digital display is within 20 percent of each other, go to next step. If scan tool display does not move uniformly through fully range of steering wheel rotation and analog/digital display is not within 20 percent of each other, go to step 10).

8) While monitoring STEERING POSITION SENSOR TESTS using scan tool, turn steering wheel fully to left and then fully to right (lock to lock) 3 times. Observe scan tool display each time steering wheel is at full left position. All readings should be the same. If all readings are the same, go to next step. If all readings are not the

same, go to step 10).

9) While monitoring STEERING POSITION SENSOR TESTS using scan tool, turn steering wheel fully to right and then fully to left (lock to lock) 3 times. Observe scan tool display each time steering wheel is at full right position. All readings should be the same. If all readings are the same, go to step 11). If all readings are not the same, go to next step.

10) Replace steering wheel position sensor. After repairs, go to next step.

11) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1287 is set as current while driving vehicle, go to next step. If DTC C1287 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

12) Replace EBTTCM.

### **DTC C1288: STEERING SENSOR CIRCUIT MALFUNCTION ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Using scan tool, display Continuously Variable Road Sensing Suspension (CVRSS) DTCs. If DTC C1780 or C1781 is set, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC C1780 or C1781 is not set, go to next step.

3) Turn ignition off. Disconnect steering wheel position sensor connector. Disconnect EBTTCM connector. Connect breakout box and adapter cable to harness connector. Turn ignition on, with engine off. Using DVOM, measure voltage between breakout box terminals No. 20 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 5).

4) Repair short to voltage in Light Green wire between steering wheel position sensor and EBTTCM.

5) Using DVOM, measure voltage between breakout box terminals No. 4 and "B". If voltage is greater than one volt, go to next step. If voltage is less than one volt, go to step 7).

6) Repair short to voltage in Light Blue wire between steering wheel position sensor and EBTTCM.

7) Turn ignition off. Using DVOM, measure resistance between breakout box terminals No. 20 and "B". If resistance is infinite, go to step 9). If resistance is not infinite, go to next step.

8) Repair short to ground in Light Green wire between steering wheel position sensor and EBTTCM.

9) Using DVOM, measure resistance between breakout box terminals No. 4 and "B". If resistance is infinite, go to step 11). If resistance is not infinite, go to next step.

10) Repair short to ground in Light Blue wire between steering wheel position sensor and EBTTCM.

11) Using DVOM, measure resistance between breakout box terminals No. 20 and 4. If resistance is infinite, go to step 13). If resistance is not infinite, go to next step.

12) Repair short between Light Green wire and Light Blue wire.

13) Connect a fused jumper between breakout box terminals No. 20 and "B". Using DVOM, measure resistance between terminal No. 3 (Light Green wire) of steering wheel position sensor connector and ground. If resistance is 0-2 ohms, go to step 15). If resistance is not 0-2 ohms, go to next step.

14) Repair open in Light Green wire between steering wheel position sensor and EBTTCM.

15) Connect a fused jumper between breakout box terminals No. 4 and "B". Using DVOM, measure resistance between terminal No. 4

(Light Blue wire) of steering wheel position sensor connector and ground. If resistance is 0-2 ohms, go to step 17). If resistance is not 0-2 ohms, go to next step.

16) Repair open in Light Blue wire between steering wheel position sensor and EBTCM.

17) Replace steering wheel position sensor. After repairs, go to next step.

18) Cycle ignition from off to start. Drive vehicle faster than 15 MPH for several minutes while monitoring scan tool for ABS/TCS/ICCS DTCs. If DTC C1288 is set as current while driving vehicle, go to next step. If DTC C1288 is not set as current while driving vehicle, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

19) Replace EBTCM.

### DTC C1291: OPEN BRAKELIGHT SWITCH DURING DECELERATION

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) If any wheel speed sensor DTCs are set, go to appropriate DTC for diagnosis. If any wheel speed sensor DTCs are not set, go to next step.

3) Press brake pedal. If brake lights illuminate, go to next step. If brake lights do not illuminate, go to step 7).

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 9 while an assistant presses brake pedal. On "H" body, using DVOM, measure voltage at breakout box terminal No. 3 while an assistant presses brake pedal. On all models, if battery voltage is present, go to next step. If battery voltage is not present, go to step 6).

5) Replace EBTCM.

6) Repair open in Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM.

7) On "C" body, check 20-amp BRAKE fuse in underhood bussed electrical center. On "E" and "K" bodies, check 20-amp FUSE 85-STOP fuse in engine compartment fuse/relay center. On "H" body, check 20-amp FUSE B6 BRAKE LPS/HAZARD fuse in instrument panel fuse block. On all models, if fuse is blown, go to step 12). If fuse is okay, go to next step.

8) Disconnect brakelight switch connector. Using DVOM, measure voltage at terminal "A" (Orange wire) of brakelight switch connector. If battery voltage is present, go to step 10). If battery voltage is not present, go to next step.

9) Repair open in Orange wire between fuse and brakelight switch.

10) Connect a fused jumper between terminals of brakelight switch connector. If brake lights illuminate, go to next step. If brake lights do not illuminate, go to step 6).

11) Adjust or repair brakelight switch as necessary. See appropriate DISC & DRUM article.

12) Install new fuse. Do not press brake pedal. Check new fuse. If fuse is blown, go to next step. If fuse is okay, go to step 14).

13) Repair short to ground in Orange wire between fuse and brakelight switch.

14) Press brake pedal. Check fuse. If fuse is blown, go to next step. If fuse is okay, perform DIAGNOSTIC SYSTEM CHECK.

15) Turn ignition off. Install new fuse. Disconnect EBTCM connector. Turn ignition on, with engine off. Press brake pedal. Check new fuse. If fuse is blown, go to next step. If fuse is okay, go to step 5).



16) Repair short to ground in Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM.

#### **DTC C1293: DTC C1291 SET IN CURRENT OR PREVIOUS IGNITION CYCLE**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Turn ignition on, with engine off. Using scan tool, display ABS/TCS DTCs. If DTC C1291 is set as history or current, go to DTC C1291. If DTC C1291 is not set as history or current, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

#### **DTC C1294: BRAKELIGHT SWITCH CIRCUIT ALWAYS ACTIVE**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Observe brake lights. If brake lights illuminate, go to next step. If brake lights do not illuminate, go to step 4).

3) Disconnect brakelight switch connector. If brake lights illuminate, go to step 6). If brake lights do not illuminate, go to step 7).

4) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage between breakout box terminals No. 9 and ground. On "H" body, using DVOM, measure voltage between breakout box terminals No. 3 and ground. On all models, if voltage is greater than one volt, go to step 6). If voltage is less than one volt, go to next step.

5) Turn ignition off. Check Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM, and EBTCM connector for damage resulting in short to voltage with all other connectors connected. Reconnect all connectors. Start engine and test drive vehicle faster than 25 MPH and then turn ignition off. Repeat drive cycle sequence 2 more times. If DTC C1294 set during last 3 drive cycles, go to step 8). If DTC C1294 does not reset during last 3 drive cycles, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

6) Repair short to voltage in Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM.

7) Adjust or replace brakelight switch as necessary. See appropriate DISC & DRUM article.

8) Replace EBTCM.

#### **DTC C1295: BRAKELIGHT SWITCH CIRCUIT OPEN**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Press brake pedal. If brake lights illuminate, go to next step. If brake lights do not illuminate, go to step 6).

3) Turn ignition off. Disconnect EBTCM connector. Connect breakout box and adapter cable to harness connector. Turn ignition on, with engine off. On "C", "E" and "K" bodies, using DVOM, measure voltage at breakout box terminal No. 9 while an assistant presses brake pedal. On "H" body, using DVOM, measure voltage at breakout box terminal No. 3 while an assistant presses brake pedal. On all models, if battery voltage is present, go to next step. If battery voltage is not present, go to step 5).

4) Replace EBTCM.

5) Repair open in Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM.

6) On "C" body, check 20-amp BRAKE fuse in underhood bussed electrical center. On "E" and "K" bodies, check 20-amp FUSE 85-STOP fuse in engine compartment fuse/relay center. On "H" body, check 20-amp FUSE B6 BRAKE LPS/HAZARD fuse in instrument panel fuse block. On all models, if fuse is blown, go to step 11). If fuse is okay, go to next step.

7) Disconnect brakelight switch connector. Using DVOM, measure voltage at terminal "A" (Orange wire) of brakelight switch connector. If battery voltage is present, go to step 9). If battery voltage is not present, go to next step.

8) Repair open in Orange wire between fuse and brakelight switch.

9) Connect a fused jumper between terminals of brakelight switch connector. If brake lights illuminate, go to next step. If brake lights do not illuminate, go to step 5).

10) Adjust or repair brakelight switch as necessary. See appropriate DISC & DRUM article.

11) Install new fuse. Do not press brake pedal. Check new fuse. If fuse is blown, go to next step. If fuse is okay, go to step 13).

12) Repair short to ground in Orange wire between fuse and brakelight switch.

13) Press brake pedal. Check fuse. If fuse is blown, go to next step. If fuse is okay, perform DIAGNOSTIC SYSTEM CHECK.

14) Turn ignition off. Disconnect EBTCM connector. Turn ignition on, with engine off. Press brake pedal. Check fuse. If fuse is blown, go to next step. If fuse is okay, go to step 4).

15) Repair short to ground in Light Blue wire on "C", "E" and "K" bodies, or White wire on "H" body between brakelight switch and EBTCM.

### **DTC C1297: PCM INDICATED EXTENDED TRAVEL BRAKE SWITCH**

FAILURE ("E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Press and release brake pedal while monitoring extended travel brake switch output on scan tool. Scan tool will indicate applied or released. If scan tool accurately indicates applied and released as brake pedal is applied and released, go to step 4). If scan tool does not accurately indicate applied and released as brake pedal is applied and released, go to next step.

3) Turn ignition on, with engine off. Using scan tool, display PCM DTCs. If DTC P1575 is set, see appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section. If DTC P1575 is not set, go to next step.

4) Check and adjust extended travel brake switch as necessary. See appropriate DISC & DRUM article. If switch did not require service, go to next step.

5) Replace EBTCM.

### **DTC C1298: PCM INDICATED CLASS 2 SERIAL DATA LINK**

MALFUNCTION ("C", "E" & "K" BODIES)

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Check if ground connections G101, G102, G103, G104 and/or G110 are damaged, loose or corroded. See appropriate diagram in GROUND DISTRIBUTION article in WIRING DIAGRAMS. If connections are faulty, go to next step. If connections are okay, go to step 4).

3) Repair ground connection as necessary.

4) Turn ignition on, with engine off. Using scan tool, display ABS/TCS DTCs. If DTC U1300, U1301, U1016, U1056 or U1255 is

set, go to appropriate DTC for diagnosis. If DTC U1300, U1301, U1016, U1056 or U1255 is not set, go to next step.

5) Using scan tool, select ABS/TCS DATA LIST and read POWER MODE POSITION. While observing scan tool, turn ignition switch to following positions: OFF, UNLOCK, RUN and CRANK. If scan tool indicates proper power mode position, go to next step. If scan tool does not indicate proper power mode position, diagnose Body Control Module (BCM). See appropriate BODY CONTROL MODULES article in ACCESSORIES/SAFETY EQUIPMENT.

6) Using scan tool, select APPLICATIONS MENU and read CLASS 2 NORMAL MODE MESSAGE MONITOR. If EBCM/EBTCM is sending a class 2 normal mode message, go to next step. If EBCM/EBTCM is not sending a class 2 normal mode message, go to step 8).

7) Check Powertrain Control Module (PCM). See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section.

8) Replace EBCM/EBTCM.

### **DTC U1016: LOSS OF PCM COMMUNICATIONS ("C", "E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Using scan tool, display Instrument Panel Cluster (IPC) DTCs. If DTC U1016 is set in IPC, see appropriate INSTRUMENT PANEL article in ACCESSORIES/SAFETY EQUIPMENT. If DTC U1016 is not set in IPC, go to next step.

3) If DTC U1016 is set as current ABS/TCS DTC, go to next step. If DTC U1016 is not set as current ABS/TCS DTC, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

4) Replace EBCM/EBTCM.

### **DTC U1056: LOSS OF CVRSS COMMUNICATIONS ("E" & "K" BODIES)**

1) Perform diagnostic system check. See DIAGNOSTIC SYSTEM CHECK. After performing diagnostic system check, go to next step.

2) Using scan tool, display Powertrain Control Module (PCM) DTCs. If DTC P1611 is set in PCM, proceed to appropriate ELECTRONIC article in SUSPENSION for diagnosis. If DTC P1611 is not set in PCM, go to next step.

3) If DTC U1056 is set as current ABS/TCS/ICCS DTC, go to next step. If DTC U1056 is not set as current ABS/TCS/ICCS DTC, see INTERMITTENTS & POOR CONNECTIONS under DIAGNOSIS & TESTING.

4) Replace EBTTCM.

### **DTC U1255: GENERIC LOSS OF COMMUNICATIONS ("C", "E" & "K" BODIES)**

The Body Control Module (BCM) requests information from other control modules on the class 2 serial data line when vehicle is started. DTC U1255 will set when BCM requests information from a control module that is not properly functioning (on-line).

If DTC U1255 is set, clear DTCs and cycle ignition. If DTC U1255 is still set as current, ensure all control modules are properly functioning by establishing communications with each module on class 2 data bus. If communication can be established and other control modules are properly functioning, check for intermittent open in Purple wire between control modules. See appropriate diagram in DATA LINK CONNECTORS article in WIRING DIAGRAMS. If Purple wire is okay, replace BCM.

### **DTC U1300: CLASS 2 CIRCUIT SHORTED TO GROUND ("C", "E" & "K" BODIES)**

When Body Control Module (BCM) is awake, it monitors class 2 serial data line for a short to ground. DTC U1300 will set when BCM determines class 2 serial data line is shorted to ground for about 10 or more seconds.

DTC U1300 will always be set as history because for any DTC to set as current, control modules on class 2 serial data line must be able to communicate with one another and other diagnostic equipment. Check for intermittent short to ground in Purple wire between control modules. See appropriate diagram in DATA LINK CONNECTORS article in WIRING DIAGRAMS.

### **DTC U1301: CLASS 2 CIRCUIT SHORTED TO VOLTAGE ("C", "E" & "K" BODIES)**

When Body Control Module (BCM) is awake, it monitors class 2 serial data line for a short to battery. DTC U1301 will set when BCM determines class 2 serial data line is shorted to battery for about 10 or more seconds.

DTC U1301 will always be set as history because for any DTC to set as current, control modules on class 2 serial data line must be able to communicate with one another and other diagnostic equipment. Check for intermittent short to battery in Purple wire between control modules. See appropriate diagram in DATA LINK CONNECTORS article in WIRING DIAGRAMS.

## **REMOVAL & INSTALLATION**

**CAUTION:** When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

### **ELECTRONIC BRAKE CONTROL MODULE/ ELECTRONIC BRAKE & TRACTION CONTROL MODULE (EBCM/EBTCM) & BRAKE PRESSURE MODULATOR VALVE (BPMV) ASSEMBLY**

**NOTE:** BPMV can only be serviced as a complete assembly. Only exception is replacement of EBCM/EBTCM.

#### Removal

1) BPMV assembly is located on left front side of engine frame rail. EBCM/EBTCM is located on left front side of engine frame rail, mounted to BPMV assembly. Disconnect negative battery cable. Remove air cleaner assembly. On "C" and "H" bodies, remove PCM cover. On all models, remove EBCM/EBTCM and BPMV assembly-to-bracket nuts.

2) Disconnect EBCM/EBTCM electrical connector ensuring connector tab is released. Disconnect BPMV pump motor ground cable. Label brakelines for installation reference and remove brakelines from BPMV. See Fig. 1.

3) Remove EBCM/EBTCM and BPMV assembly from vehicle. Remove front insulator and insulator mounting bolt. See Fig. 2. Remove EBCM/EBTCM-to-BPMV bolts. Separate EBCM/EBTCM from BPMV by gently pulling forward. DO NOT pry EBCM/EBTCM from BPMV, if seal is damaged EBCM/EBTCM must be replaced.

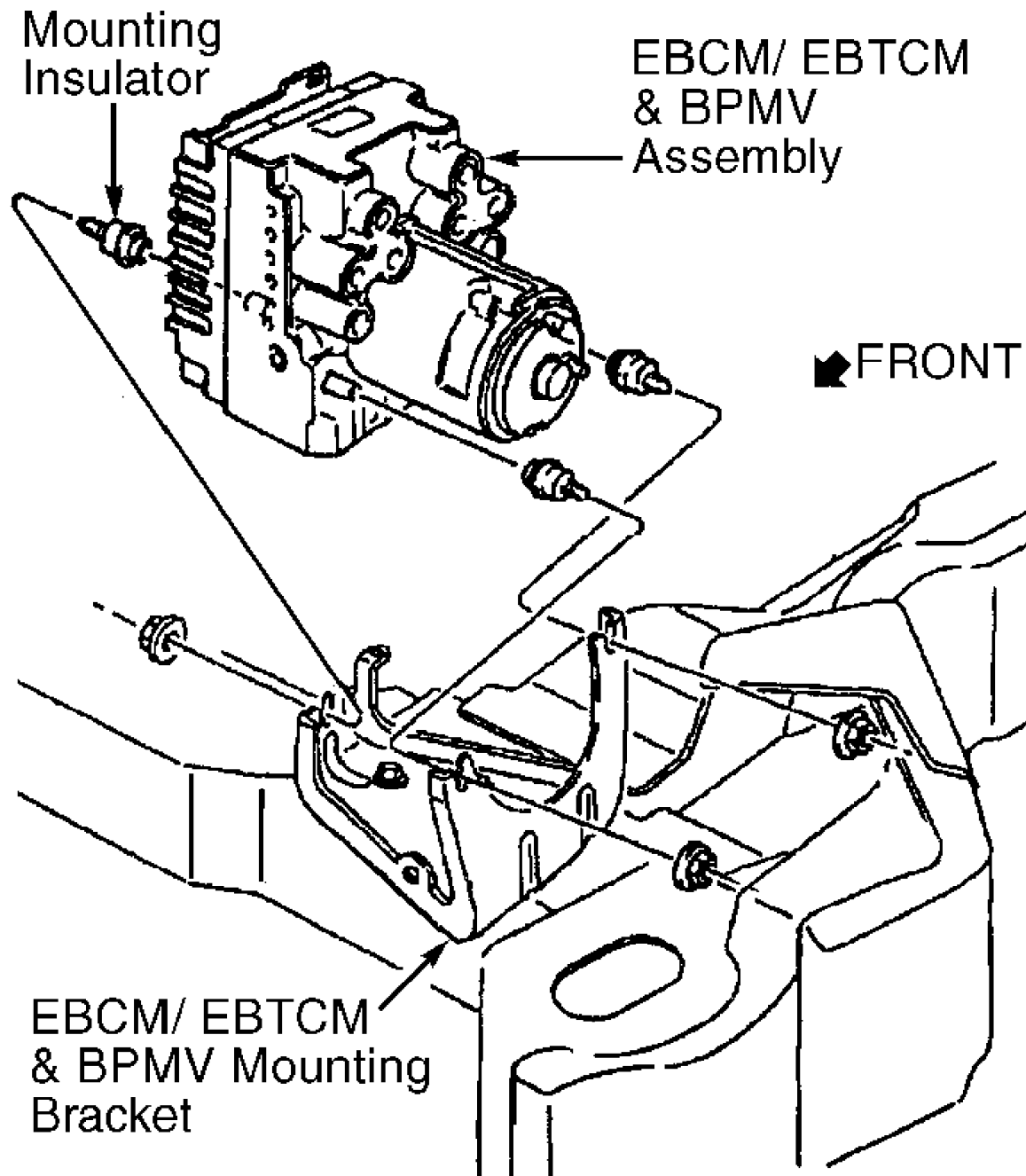
#### Installation

1) To install, reverse removal procedure. Ensure brakelines are installed in original locations. Ensure EBCM/EBTCM electrical connector tab is locked down. Tighten bolts, nuts and brakelines to specification. See TORQUE SPECIFICATIONS.

2) If NEW BPMV assembly is being installed, ensure shipping

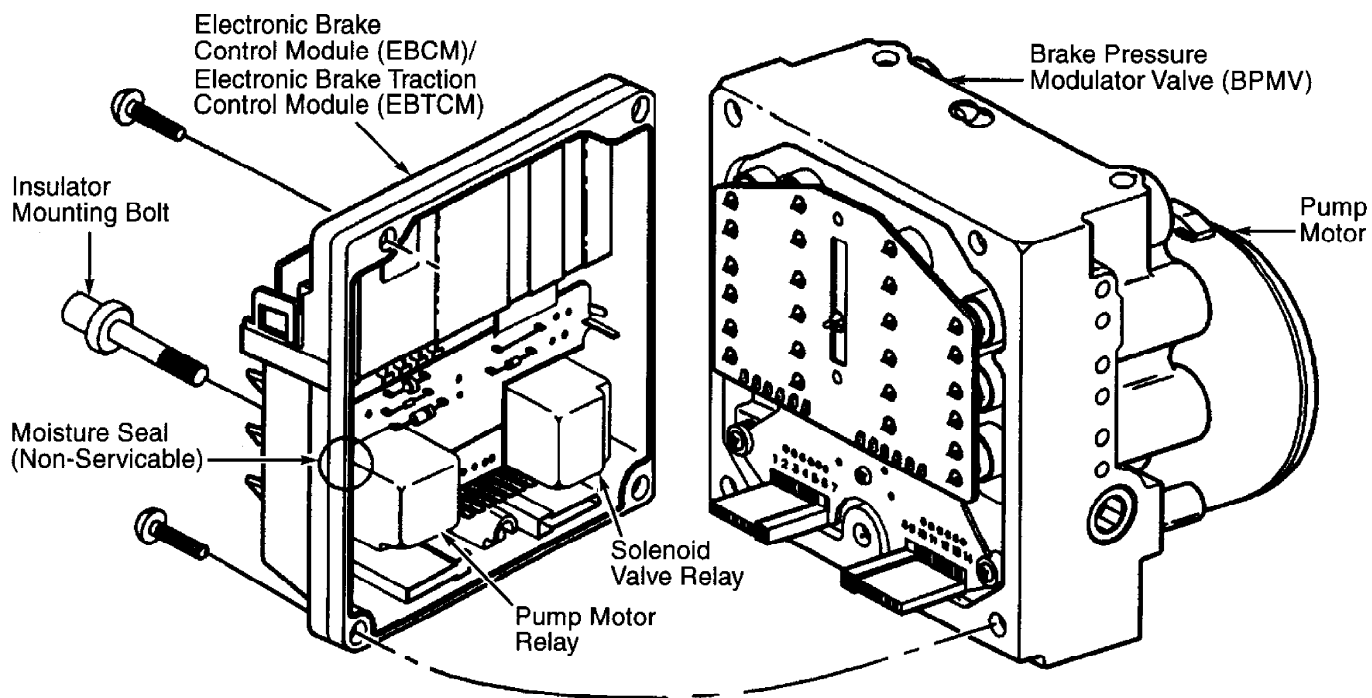
plugs are removed from valve openings. Refill brake master cylinder reservoir, bleed brakes and check for leaks. See AUTO BLEED PROCEDURE under BLEEDING BRAKE SYSTEM.

3) Using scan tool, perform DIAGNOSTIC SYSTEM CHECK and check if any Diagnostic Trouble Codes (DTCs) have been set. Diagnose and repair as necessary.



97103502

Fig. 1: Removing EBCM/EBTCM & BPMV assembly  
Courtesy of General Motors Corp.



97A03503

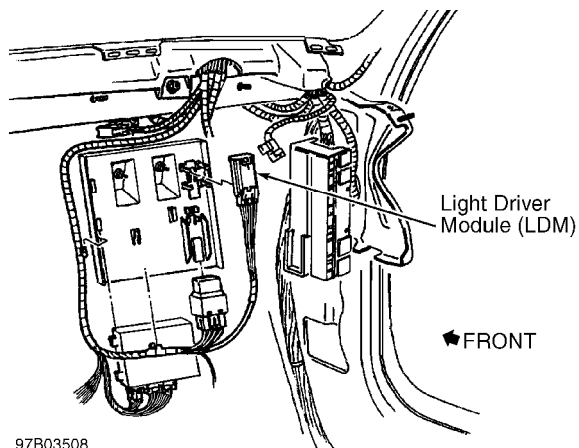
Fig. 2: Separating EBCM/EBTCM from BPMV assembly  
 Courtesy of General Motors Corp.

### LIGHT DRIVER MODULE ("H" BODY)

NOTE: Light Driver Module (LDM) terminals and housing are integral of wiring harness. Only LDM printed circuit board is replaceable.

#### Removal & Installation

Light Driver Module (LDM) is located behind right side of instrument panel, attached to bracket. See Fig. 3. Remove LDM from bracket. Open LDM endcap and pull printed circuit board out of LDM. To install, reverse removal procedure.



97B03508

Fig. 3: Locating Light Driver Module ("H" Body)  
 Courtesy of General Motors Corp.

### PUMP MOTOR RELAY & SOLENOID VALVE RELAY

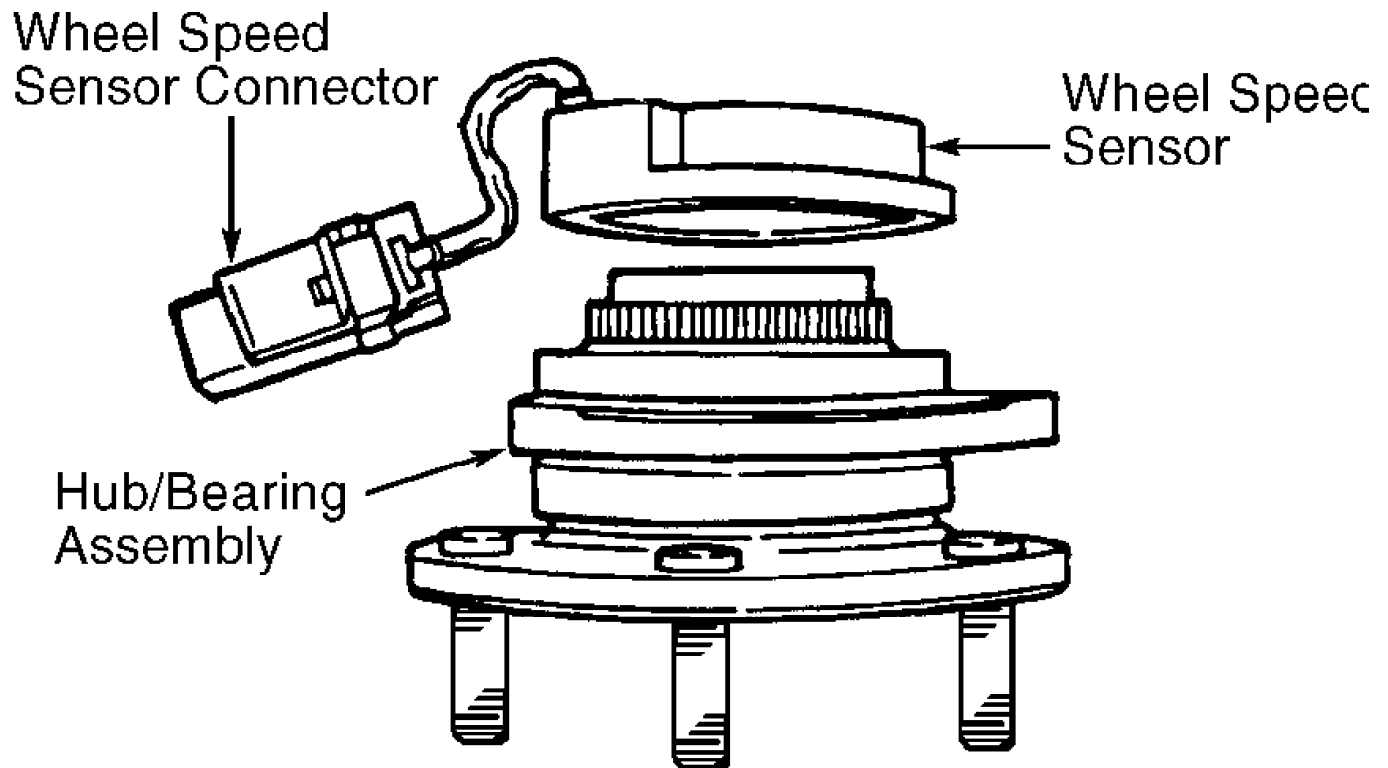
Pump motor relay and solenoid valve relay are mounted on EBCM/EBTCM and are not serviceable. Relays must be replaced as an assembly with EBCM/EBTCM. See ELECTRONIC BRAKE CONTROL MODULE/ELECTRONIC BRAKE TRACTION CONTROL MODULE (EBCM/EBTCM) & BRAKE PRESSURE MODULATOR VALVE (BPMV) ASSEMBLY.

## WHEEL SPEED SENSOR

**NOTE:** Wheel speed sensor must be replaced when removed from hub and bearing assembly.

### Removal & Installation (Front)

Disconnect wheel speed sensor electrical connector. Remove front hub and bearing assembly. See appropriate article in SUSPENSION. Using Split Plate Puller (J-22912-01), gently pry wheel speed sensor slinger and speed sensor off of hub and bearing assembly. See Fig. 4. To install, reverse removal procedure. Apply Loctite No. 620 to outer diameter groove of bearing hub.



93J42126

Fig. 4: Removing Front Wheel Speed Sensor  
Courtesy of General Motors Corp.

**NOTE:** DO NOT allow debris to enter bearing when sensor is removed. DO NOT add lubricant to bearing through sensor housing opening. Bearing is lubricated for life of vehicle. DO NOT clean grease from toothed sensor ring. Grease does not affect sensor operation.

### Removal & Installation (Rear)

Rear wheel speed sensor is an integral part of rear hub and bearing assembly, and cannot be serviced separately. If wheel speed sensor replacement is necessary, hub and bearing assembly must be

replaced.

## TOOTHED SENSOR RING

### Removal & Installation (Front)

Front toothed sensor ring is an integral part of front hub and bearing assembly, and is not serviced separately. Sensor ring is accessible for inspection by removing wheel speed sensor. See WHEEL SPEED SENSOR. If ring replacement is necessary, hub and bearing assembly must be replaced.

### Removal & Installation (Rear)

Rear toothed sensor ring is an integral part of rear hub and bearing assembly, and is not serviced separately. If sensor ring requires replacement, hub and bearing assembly must be replaced.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Brakeline Fitting	
"C" & "H" Bodies .....	11 (15)
"E" & "K" Bodies .....	24 (32)
Brakeline-To-BPMV	
"C", "E" & "K" Bodies .....	13 (18)
"H" Body .....	12 (16)
EBCM/EBTCM Insulator Mounting Bolt	
"C" & "H" Bodies .....	10 (14)
"E" & "K" Bodies .....	11 (15)
Wheel Lug Nuts .....	100 (136)
	INCH Lbs. (N.m)
EBCM/EBTCM & BPMV Assembly-To-Bracket Bolts/Nuts	
"C" & "H" Bodies .....	106 (12)
"E" & "K" Bodies .....	89 (10)
EBCM/EBTCM-To-BPMV Bolts	
"C" & "H" Bodies .....	53 (6)
"E" & "K" Bodies .....	53 (6)
Wheel Cylinder Bleeder Valves .....	115 (13)

## WIRING DIAGRAMS



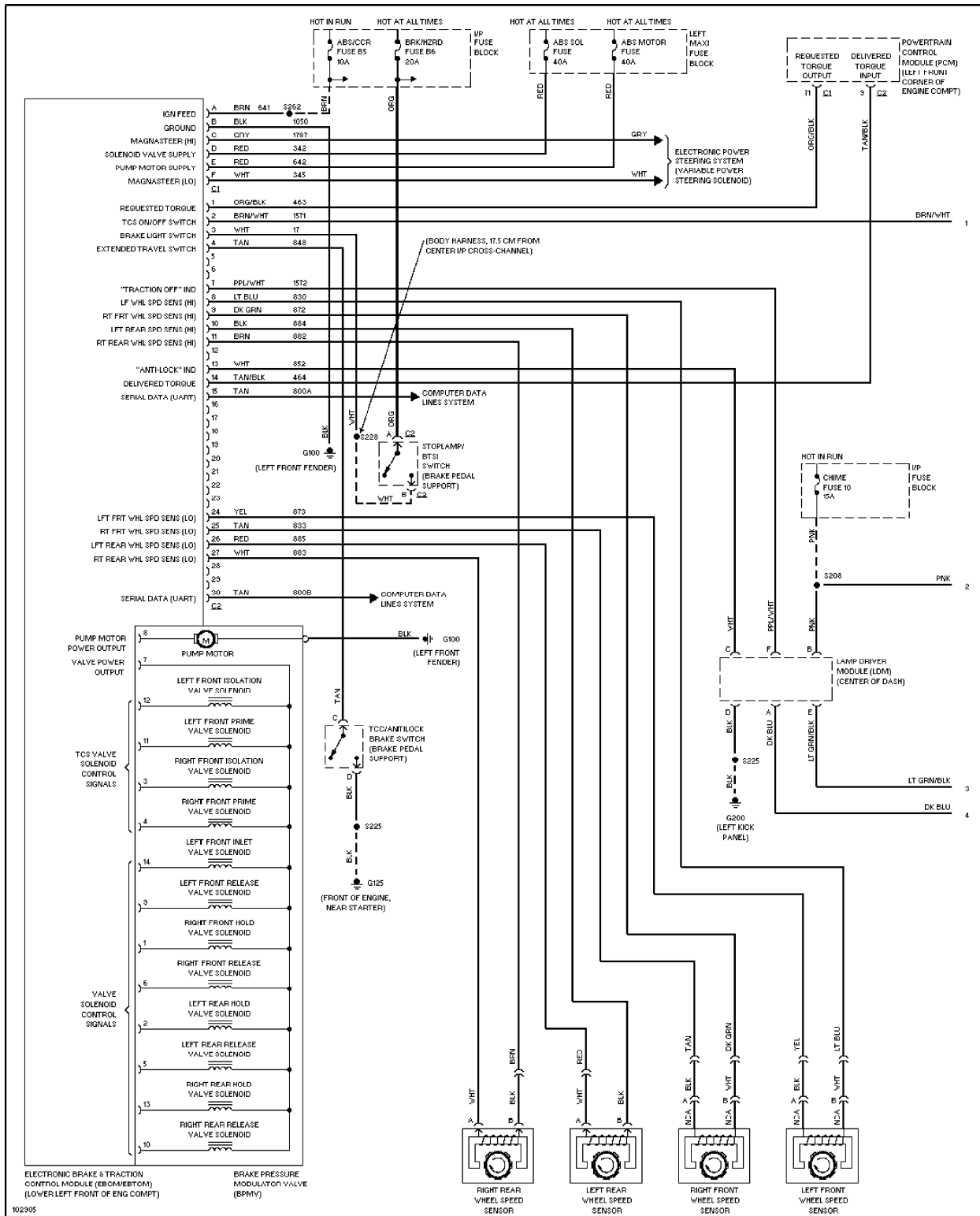


Fig. 5: Anti-Lock Brake/Traction Control System Wiring Diagram (1998 Bonneville, Eighty Eight, LeSabre, LSS & Regency - 1 Of 2)

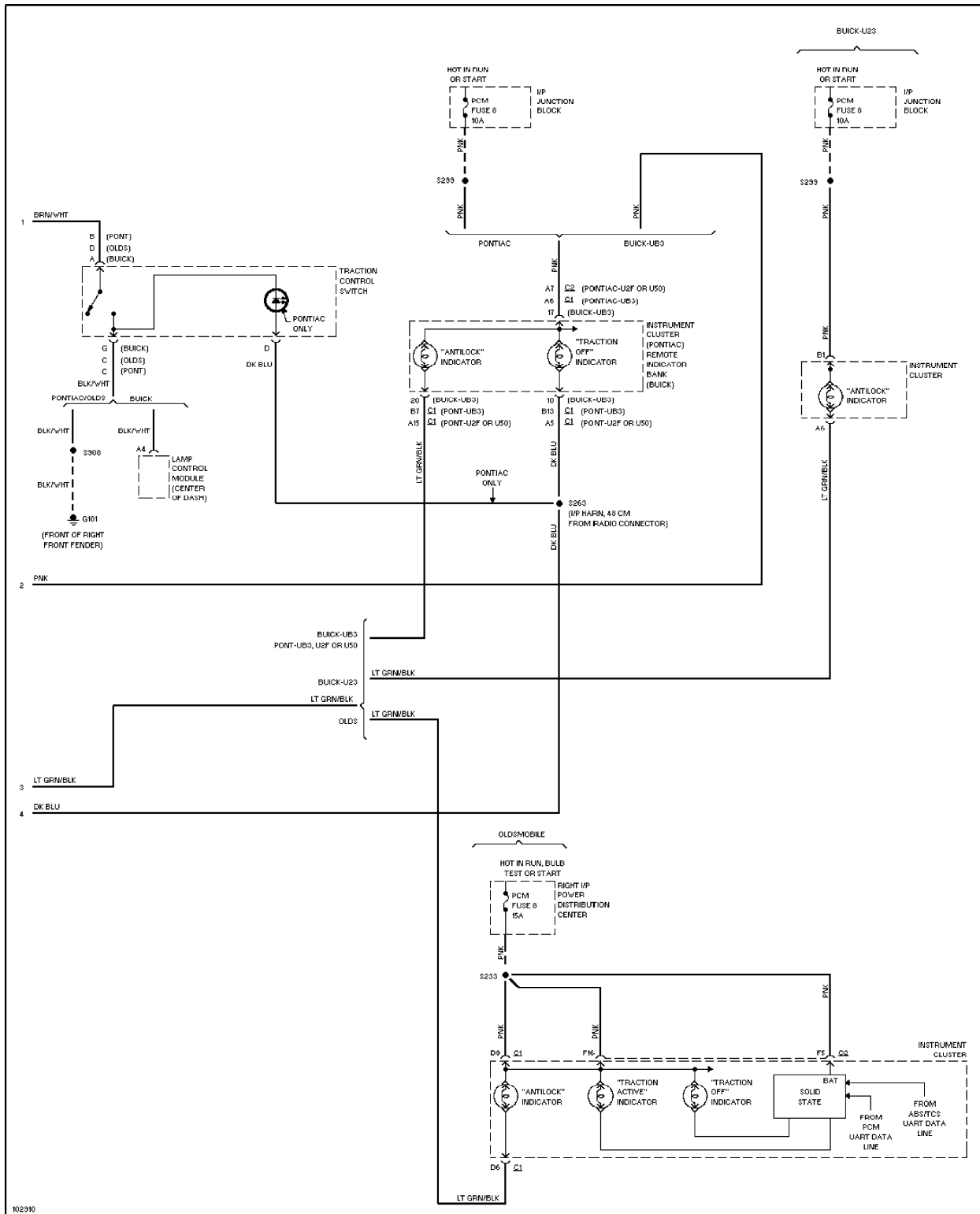


Fig. 6: Anti-Lock Brake/Traction Control System Wiring Diagram (1998 Bonneville, Eighty Eight, LeSabre, LSS & Regency - 2 Of 2)

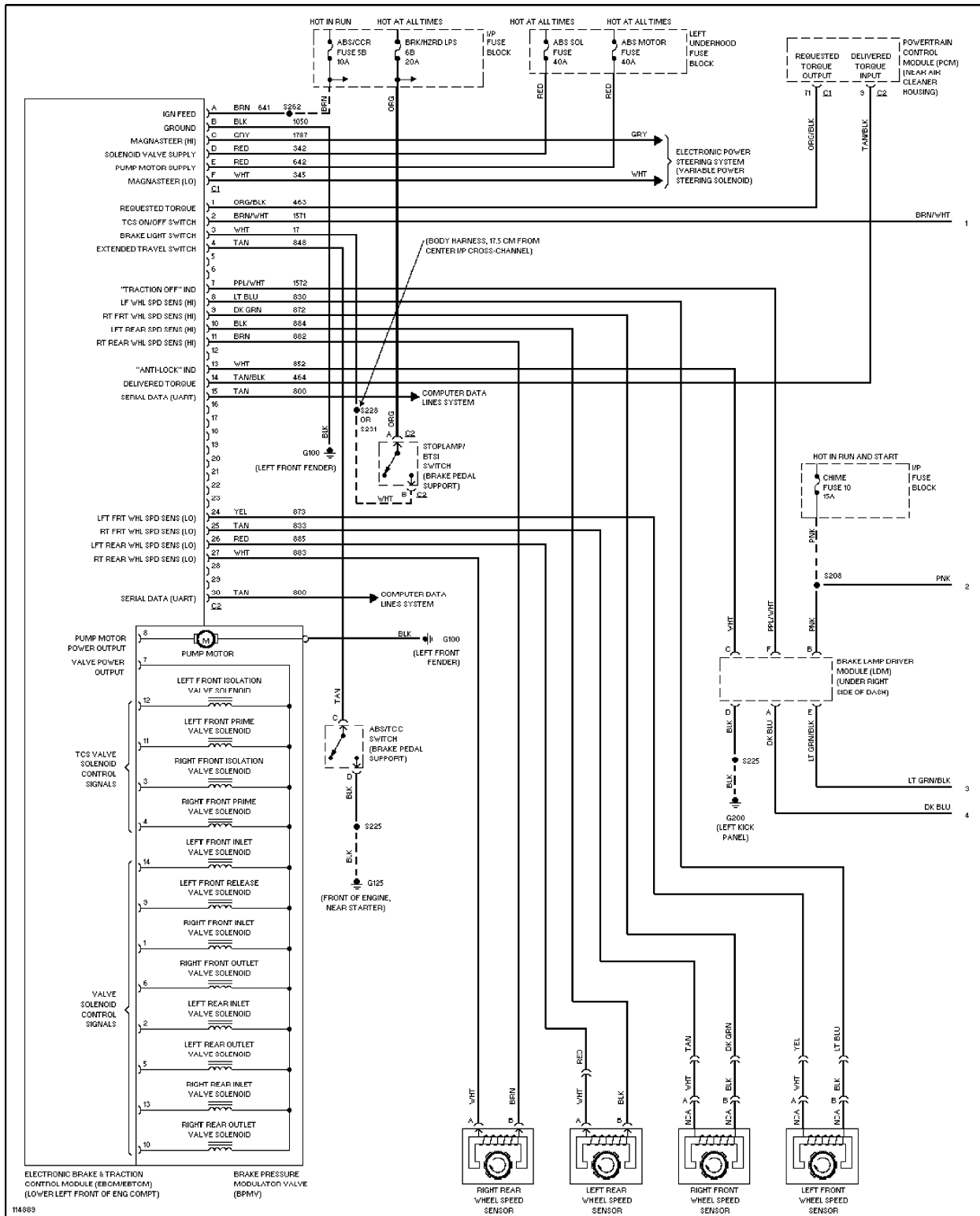


Fig. 7: Anti-Lock Brake/Traction Control System Wiring Diagram (1999 Bonneville, Eighty Eight, LeSabre, LSS & Regency - 1 Of 2)

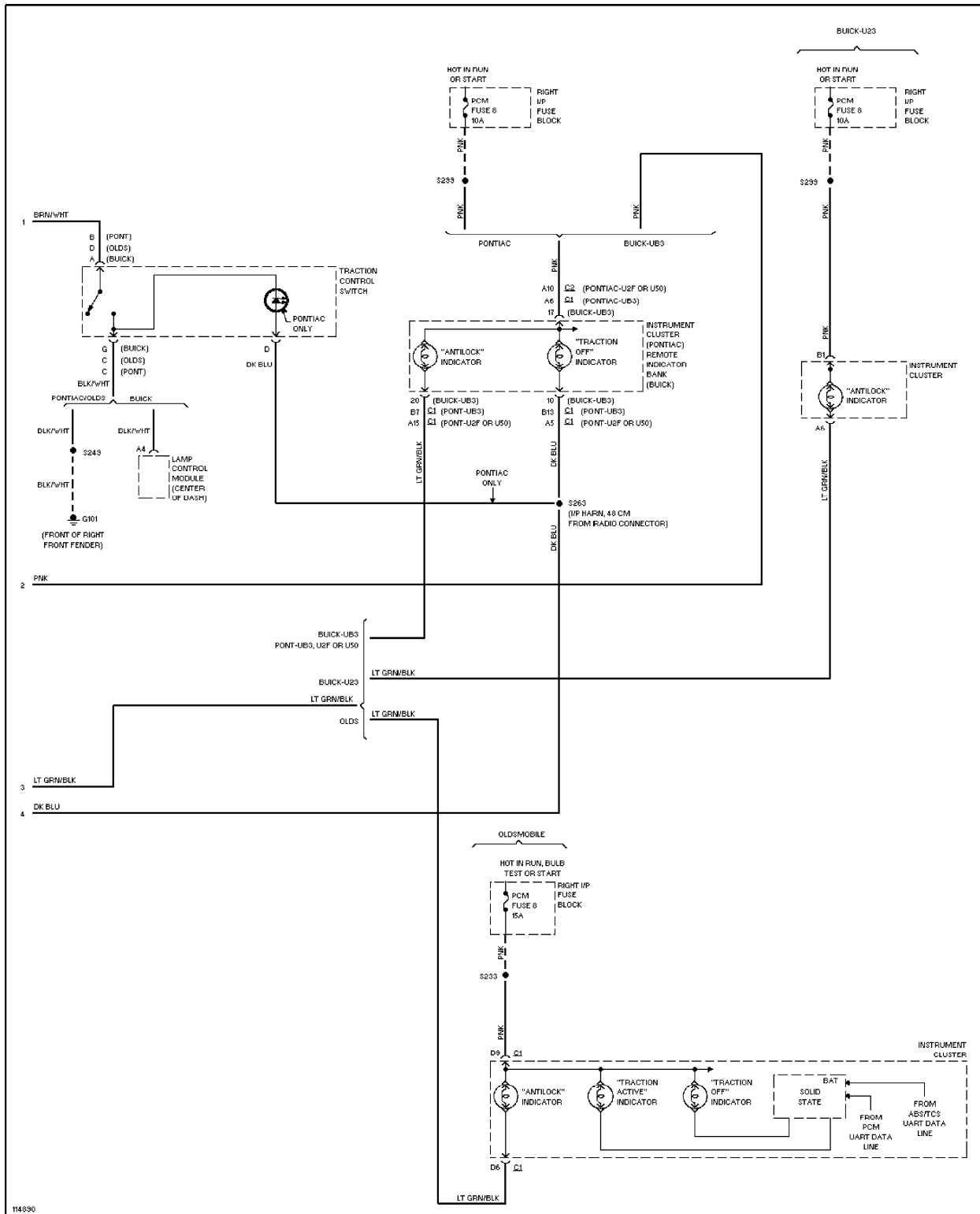


Fig. 8: Anti-Lock Brake/Traction Control System Wiring Diagram (1999 Bonneville, Eighty Eight, LeSabre, LSS & Regency - 2 Of 2)

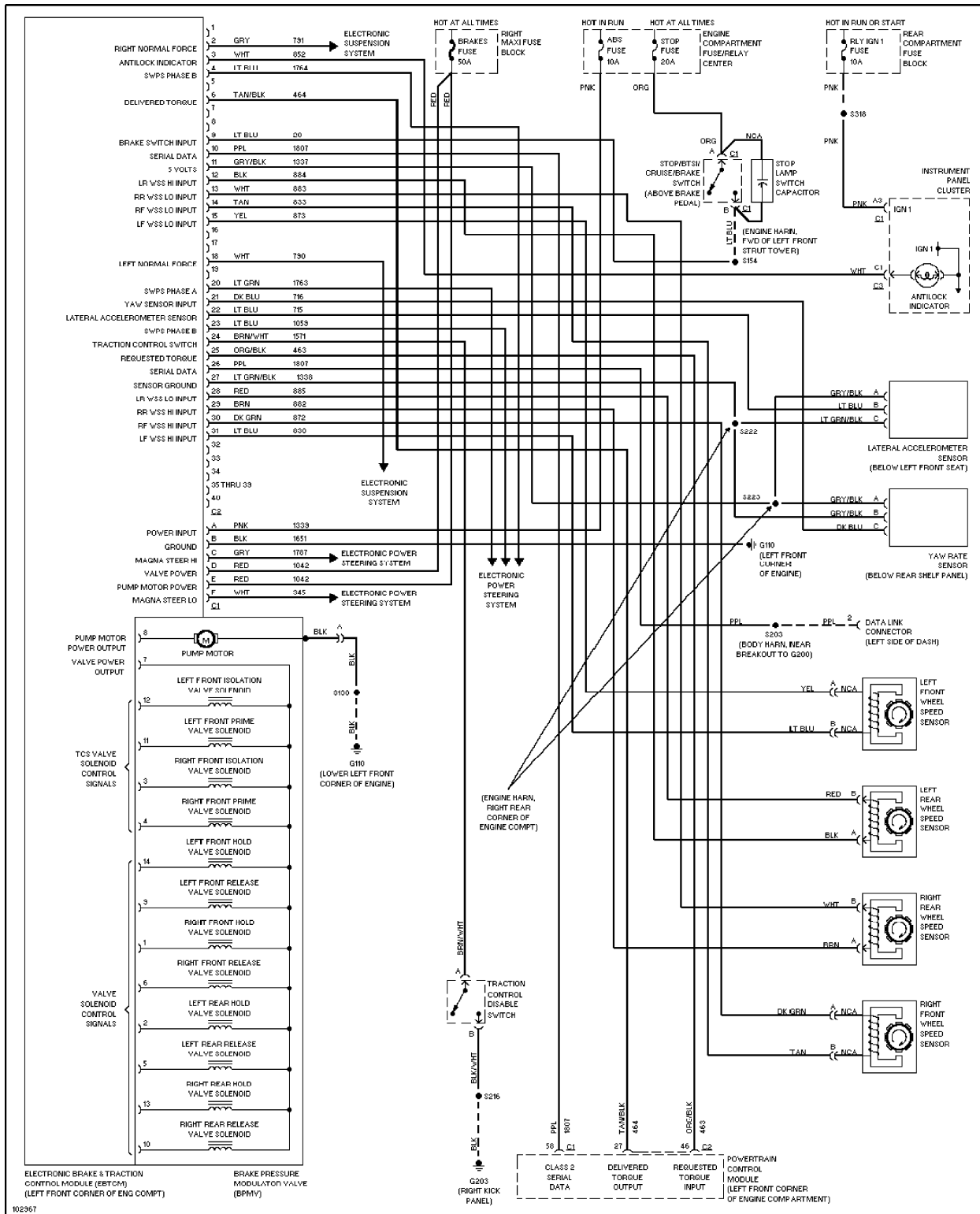


Fig. 9: Anti-Lock Brake/Traction Control System Wiring Diagram (1998 99 Concours, DeVille & Eldorado)

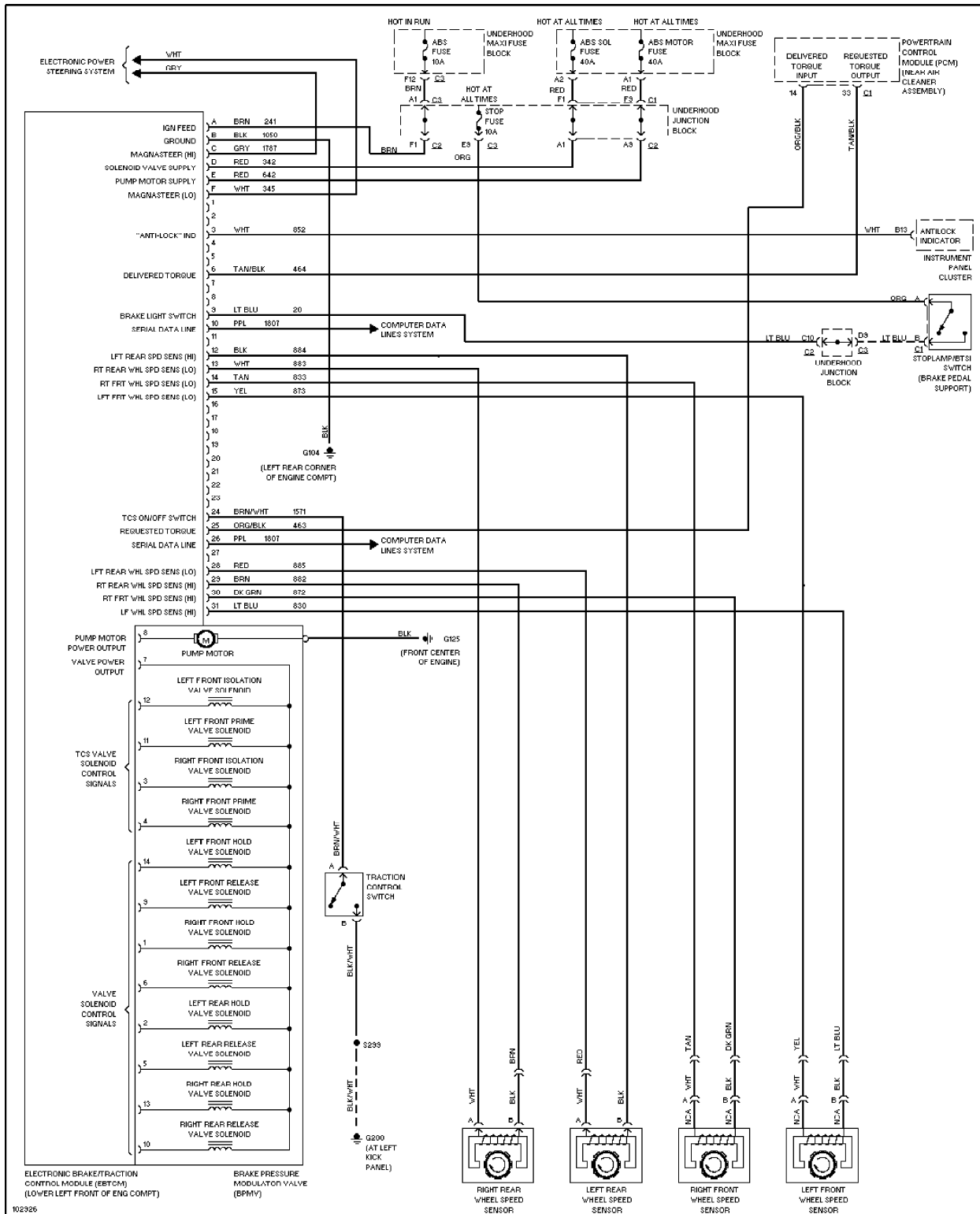


Fig. 10: Anti-Lock Brake/Traction Control System Wiring Diagram (1998 Park Avenue)

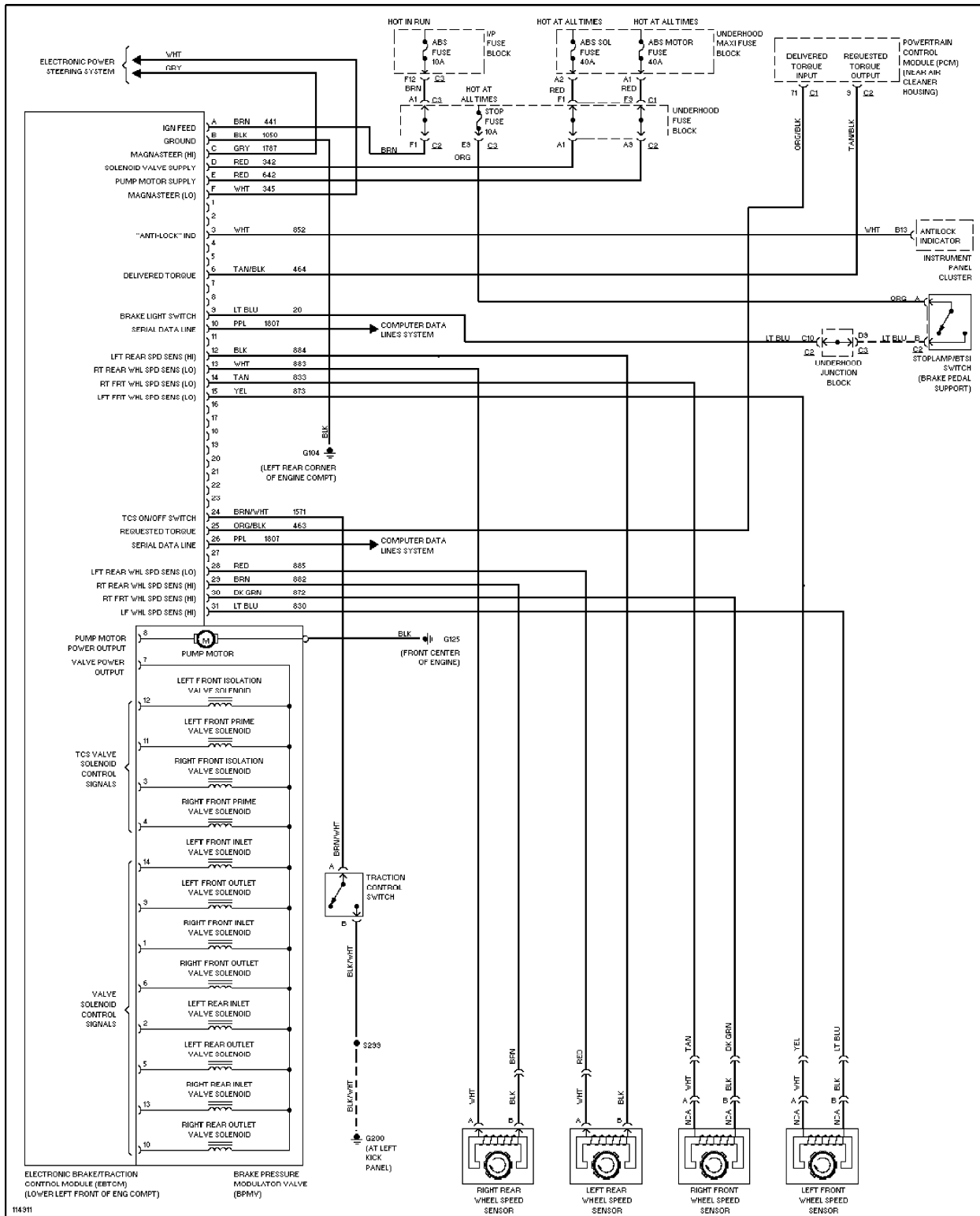


Fig. 11: Anti-Lock Brake/Traction Control System Wiring Diagram (1999 Park Avenue)

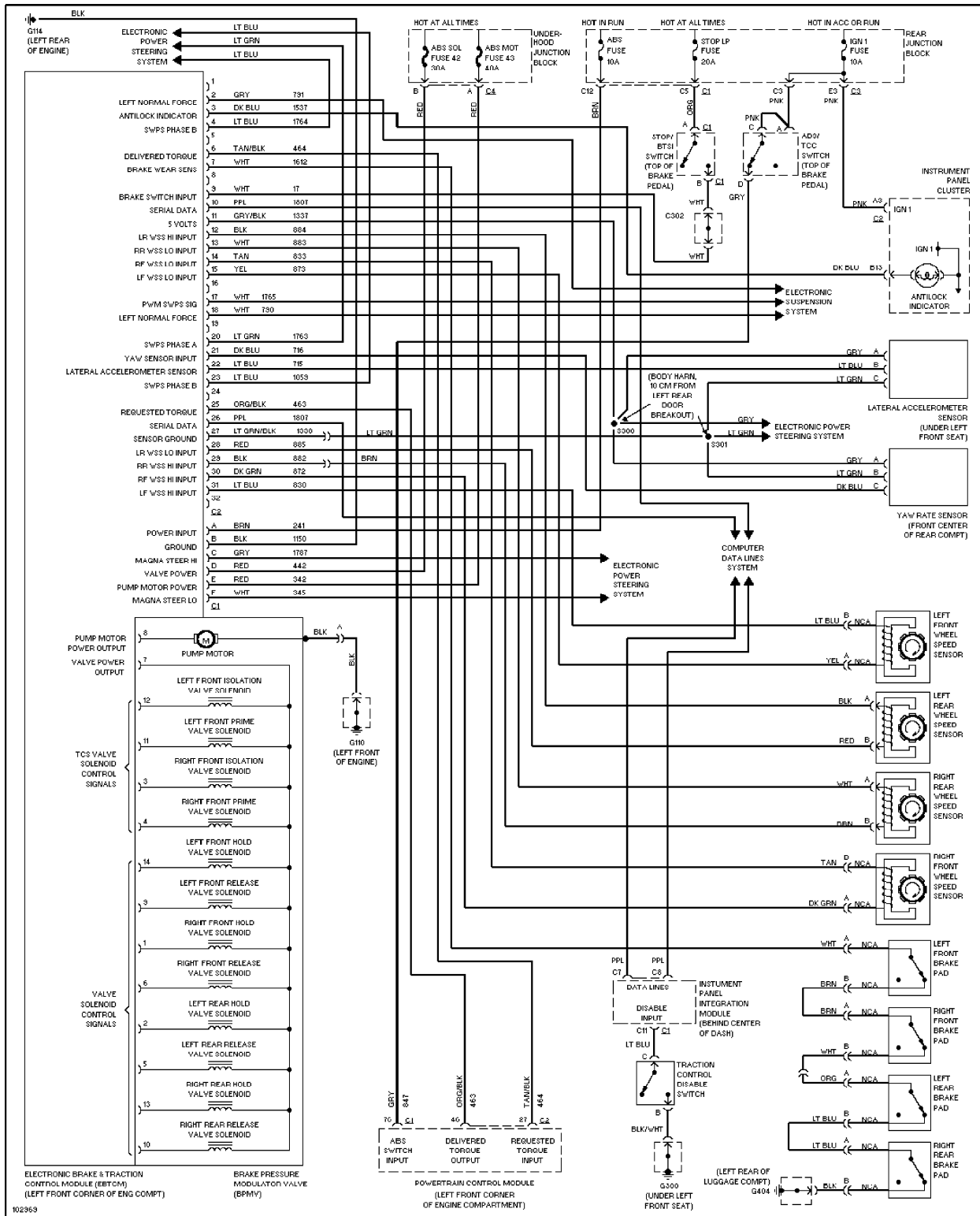


Fig. 12: Anti-Lock Brake/Traction Control System Wiring Diagram (1998 Seville)



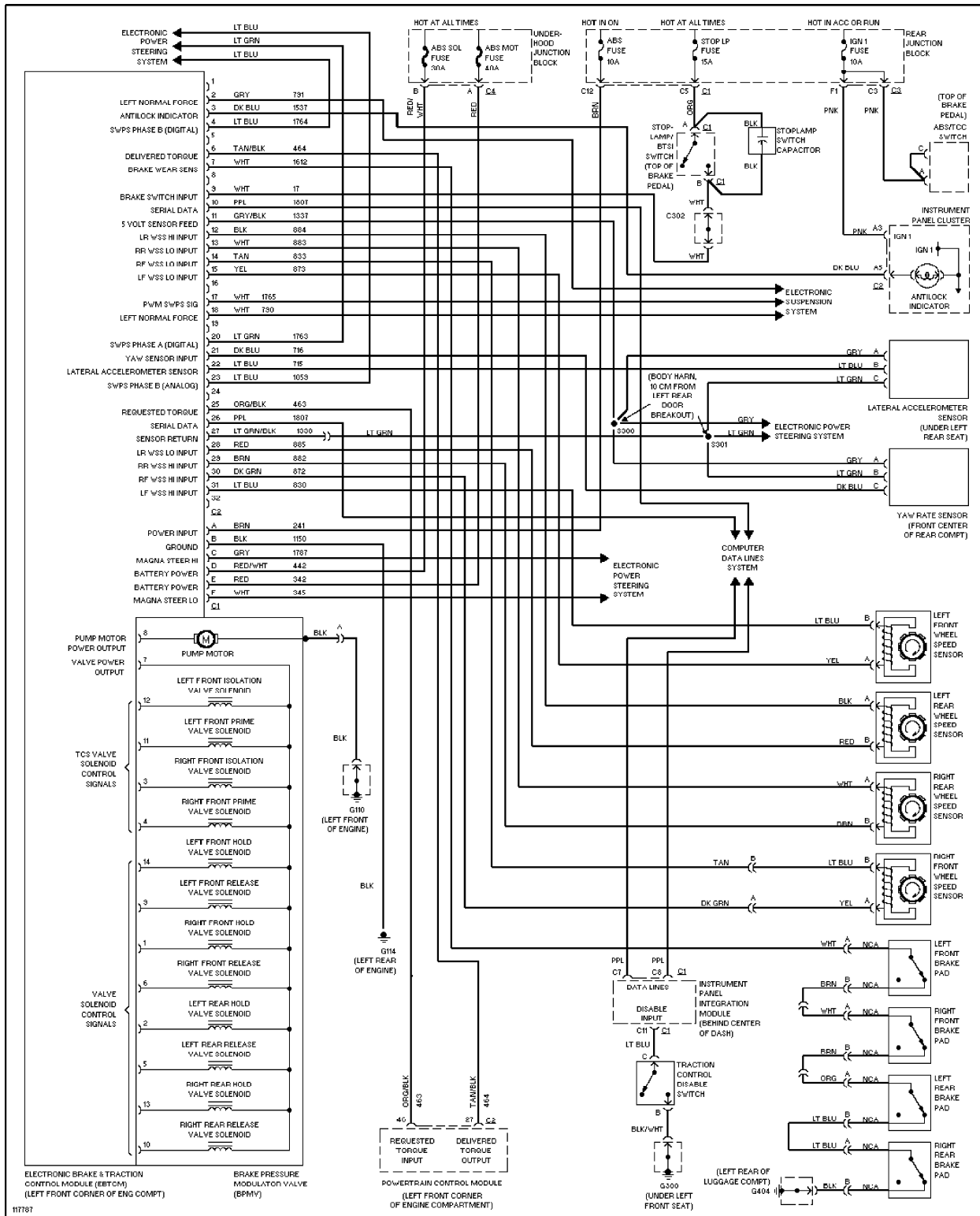


Fig. 13: Anti-Lock Brake/Traction Control System Wiring Diagram (1999 Seville)