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3.3 SYSTEM COMPONENTS

ABS

- controller antilock brake (CAB)
- vacuum booster
- master cylinder
- ABS integrated electronic control module/ hydraulic control unit (HCU), valve block assembly: 8 valve solenoids (4 inlet valves, 4 outlet valves, 2 accumulators) 1 pump.
- 4 wheel speed sensor/tone wheel assemblies
- ABS warning indicator
- fuses and wiring harness
- fluid reservoir

ABS With Traction Control

- CAB with Traction Control programming
- HCU with two additional control valves
- TRAC ON/OFF Switch
- TRAC/TRAC OFF indicators

3.3.1 ABS AND BRAKE WARNING INDICATORS

The amber ABS warning indicator is located in the instrument cluster. It is used to inform the driver that the antilock function has been turned off. The ABS warning indicator is controlled by the CAB. The CAB controls the lamp with a command over the PCI bus.

The ABS Warning Indicator will remain lit during every key cycle until a circuit or component fault is repaired and the CAB no longer detects the fault. After repair of a sensor signal fault or a pump motor fault, the CAB must sense all four wheels at 25 km/h (15 mph) before it will extinguish the ABS and TRAC OFF Indicators.

The Instrument Cluster will illuminate the ABS Warning Indicator if it loses communication with the CAB.

The red BRAKE warning indicator is also located in the instrument cluster. It can be activated in several ways. Application of the parking brake or a low fluid signal from the fluid level switch located in the master cylinder reservoir will cause the indicator to come on.

3.3.2 CONTROLLER ANTILOCK BRAKE (CAB)

The Controller Antilock Brake (CAB) is a microprocessor-based device that monitors wheel speeds and controls the antilock functions. The CAB contains two microprocessors that receive identical sensor signals and then independently process the information. The results are then compared to make sure that they agree. Otherwise, the CAB will turn off the antilock and turn on the ABS amber warning indicator.

The primary functions of the CAB are to:

- detect wheel locking tendencies
- control fluid pressure modulation to the brakes during antilock stop
- monitor the system for proper operation
- manage traction control functions
- provide communication to the DRBIII® while in diagnostic mode
- store diagnostic information in non-volatile memory

The CAB continuously monitors the speed of each wheel. When a wheel locking tendency is detected, the CAB will command the appropriate valve to modulate brake fluid pressure in its hydraulic unit. Brake pedal position is maintained during an antilock stop by being a closed system. The CAB continues to control pressure in individual hydraulic circuits until a wheel locking tendency is no longer present. The CAB turns on the pump motor during an antilock stop.

The antilock brake system is constantly monitored by the CAB for proper operation. If the CAB detects a system malfunction, it can disable the antilock system and turn on the ABS warning indicator. If the antilock function is disabled, the system will revert to standard base brake system operation.

The CAB inputs include the following:

- diagnostic communication
- four wheel speed sensors
- three power feeds: valve, pump, and microprocessor
- brake switch
- traction control switch

The CAB outputs include the following:

- ABS warning indicator actuation
- 12 volts power to wheel speed sensors
- eight valves
- ten valves with traction control
- diagnostic communication
- PCI bus communication
- traction control lamp illumination

3.3.3 HYDRAULIC CONTROL UNIT

The hydraulic control unit (HCU) contains the valve block assembly, and pump/motor assembly. The HCU is attached to the CAB.

Valve Block Assembly: The valve block assembly contains valves with four inlet valves and four

outlet valves. The inlet valves are spring-loaded in the open position and the outlet valves are spring loaded in the closed position. During an antilock stop, these valves are cycled to maintain the proper slip ratio for each wheel. If a wheel detects slip, the inlet valve is closed to prevent and further pressure increase. Then the outlet valve is opened to release the pressure to the accumulators until the wheel is no longer slipping. Once the wheel is no longer slipping, the outlet valve is closed and the inlet valve is opened to reapply pressure. If the wheel is decelerating within its predetermined limits (proper slip ratio), the inlet valve will close to hold the pressure constant. On vehicles which are equipped with a traction control system, there are two additional valves that isolate the master cylinder and rear wheels. During a traction control event the brakes are applied to reduce wheel slippage.

Pump Motor Assembly: The pump motor assembly provides the extra amount of fluid needed during antilock braking. The pump is supplied fluid that is released to the accumulators when the outlet valve is opened during an antilock stop. The pump is also used to drain the accumulator circuits after the antilock stop is complete. The pump is operated by an integral electric motor. This motor is controlled by the CAB. The CAB may turn on the pump motor when an antilock stop is detected. The pump continues to run during the antilock stop and is turned off after the stop is complete. Under some conditions, the pump motor will run to drain the accumulators during the next drive off. The CAB monitors the pump motor operation internally.

3.3.4 ABS SWITCHES/SENSORS

Master Cylinder: The master cylinder is a standard tandem compensating port design for ABS and non ABS systems. Traction control vehicles use a dual center port master cylinder. For proper traction control operation the standard master cylinder must not be used.

A fluid level switch is located in the master cylinder fluid reservoir. The switch closes when a low fluid level is detected. The fluid level switch turns on the brake warning indicator by grounding the indicator circuit. This switch does not disable the ABS system.

Wheel Speed Sensors and Tone Wheels: One active wheel speed sensor (WSS) is located at each wheel and sends a small DC signal to the control module (CAB). This signal is generated when a toothed sensor ring (tone wheel) passes by a stationary wheel speed sensor. The CAB converts the signals for each wheel.

Because of internal circuitry, correct wheel speed sensor function cannot be determined by a continuity or resistance check through the sensor.

The front wheel speed sensor is attached to a boss in the steering knuckle. The tone wheel is an integral part of the front axle shaft. The rear speed sensor is mounted though the bearing cover and the rear tone wheel is an integral part of the rear bearing hub. The wheel speed sensor air gap is not adjustable. Refer to the service manual for wheel speed sensor air gap and resistance specifications.

The four wheel speed sensors are serviced individually. The front tone wheels are serviced as an assembly with the outer constant velocity (C.V.) joint housing. The rear tone wheels are serviced as an assembly.

Correct antilock system operation is dependent on tone wheel speed signals from the wheel speed sensors. The vehicle's wheels and tires should all be the same size and type to generate accurate signals. In addition, the tires should be inflated to the recommended pressure for optimum system operation. Variation in wheel and tire size or significant variations in inflation pressure can produce inaccurate wheel speed signals; however, the system will continue to function when using the correct factory mini-spare.

3.3.5 ABS INITIALIZATION

System initialization starts when the key is turned to "run". At this point, the CAB performs a complete self-check of all electrical components in the antilock systems.

Between 8-17 km/h (5-10 mph), a dynamic test is performed. This will momentarily cycle the inlet and outlet valves, check wheel speed sensor circuitry, and run the pump motor at 25 km/h (15 mph). The CAB will try to test the pump motor. If the brake pedal is applied the test will be run at 40 km/h (24 mph) regardless of brake switch state. If, during the dynamic test, the brake pedal is applied, the driver may feel the test through brake pedal pulsations. This is a normal condition.

If any component exhibits a trouble condition during system initialization or dynamic check, the CAB will illuminate the ABS warning indicator and TRAC OFF lamp if equipped.

3.3.6 ABS DIAGNOSTIC MODE

To enter diagnostic mode, a vehicle speed must be below 10 km/h (6 mph) and no ABS condition present. If vehicle speed is not below 10 km/h (6 mph), a "No Response" message could be displayed by the DRBIII®. The following are characteristics of diagnostic mode:

– The amber ABS warning indicator will blink rapidly. If a hard trouble code, such as Valve Power Feed Failure code is present, the indicator will be illuminated without blinking until the trouble condition is cleared.

– Antilock operation is disabled.
– The HCU valves cannot be actuated when the vehicle speed is above 8 km/h (5 mph). If valve actuation is attempted above 8 km/h (5 mph), a "No Response" message will be displayed on the DRBIII®.

3.3.7 TRACTION CONTROL OPERATION (IF EQUIPPED)

The Controller Antilock Brake (CAB) monitors wheel speeds. If, during acceleration, the module detects front (drive) wheel slip and the brakes are not applied, the CAB will enter traction control mode. Traction control works in the following order when drive wheel slip is detected.

1. Close the (normally open) isolation valves.
2. Start pump/motor and supply volume/pressure to front hydraulic circuits (pump runs continuously during traction control).
3. Open and close build and decay valves to maintain minimum wheel slip and maximum traction.

The cycling of the build and decay valves is similar to the ABS except that they work to control wheel spin by applying brakes. ABS function is to control wheel skid by releasing brakes.

Two pressure relief valves allow excess fluid volume to return to the reservoir when not used by the build/decay cycles. These are required because the pump supplies more volume than the traction control system requires.

If at any time the brake pedal is applied during a traction control cycle, the brake lamp switch will trigger the CAB to switch off the traction control.

The traction control system will be enabled at each ignition cycle. It may be turned off by depressing the Traction Control Switch. The traction control system function lamp will illuminate "TRAC OFF" immediately upon depressing the traction control switch button. Only the "TRAC" portion of the "TRAC OFF" indicator will illuminate during a traction control event.

If the CAB calculates that the brake temperatures are high, the traction control system will become inoperative until a time-out period has elapsed. When in this thermal protection mode, the traction control "TRAC OFF" lamp will illuminate; however, a fault will not be registered.

3.4 DIAGNOSTIC TROUBLE CODES

The Controller Antilock Brake may report any of several Diagnostic Trouble Codes (DTC)s. For a list of the DTCs diagnosed in this manual, refer to the Table of Contents.

3.5 FREEZE FRAME

Freeze Frame takes a "snapshot" of specific vehicle information the instant an ABS failure is recognized and stores this information into the CAB memory. This information can be accessed using the DRBIII® to help diagnose the fault. Freeze Frame will capture the first time failure or only a new failure that occurs during the current ignition cycle.

3.6 DRBIII® ERROR MESSAGES AND BLANK SCREEN

Under normal operation, the DRBIII® will display one of only two error messages:

– User-Requested WARM Boot or User-Requested COLD Boot.

If the DRBIII® should display any other error message, record the entire display and call the STAR Center. This is a sample of such an error message display:

```
ver: 2.14
date: 26 Jul93
file: key_itf.cc
date: Jul 26 1993
line: 548
err. 0x1
User-Requested COLD boot Press MORE to
switch between this display
  and the application screen.
Press F4 when done noting information.
```

3.6.1 DRBIII® DOES NOT POWER UP

If the LED's do not light or no sound is emitted at start up, check for loose cable connections or a bad cable. Check the vehicle battery voltage (data link connector cavity 16). A minimum of 11 volts is required to adequately power the DRBIII®.

If all connections are proper and the vehicle battery is fully charged, an inoperative DRBIII® may be the result of faulty cable or vehicle wiring.

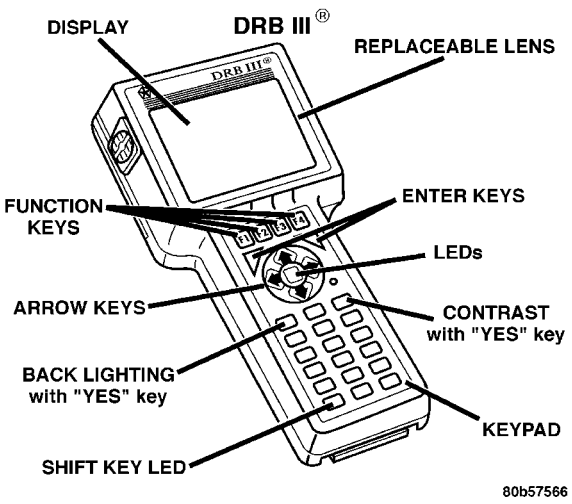
3.6.2 DISPLAY IS NOT VISIBLE

Low temperatures will affect the visibility of the display. Adjust the contrast to compensate for this condition.

4.0 DISCLAIMERS, SAFETY, WARNINGS

4.1 DISCLAIMERS

All information, illustrations, and specifications contained in this manual are based on the latest



information available at the time of publication. The right is reserved to make changes at any time without notice.

4.2 SAFETY

4.2.1 TECHNICIAN SAFETY INFORMATION

WARNING: ENGINES PRODUCE CARBON MONOXIDE THAT IS ODORLESS, CAUSES SLOWER REACTION TIME, AND CAN LEAD TO SERIOUS INJURY. WHEN THE ENGINE IS OPERATING, KEEP SERVICE AREAS WELL VENTILATED OR ATTACH THE VEHICLE EXHAUST SYSTEM TO THE SHOP EXHAUST REMOVAL SYSTEM.

Set the parking brake and block the wheels before testing or repairing the vehicle. It is especially important to block the wheels on front-wheel drive vehicles; the parking brake does not hold the drive wheels.

When servicing a vehicle, always wear eye protection, and remove any metal jewelry such as rings, watchbands or bracelets that might make an inadvertent electrical contact.

When diagnosing a chassis problem, it is important to follow approved procedures where applicable. These procedures can be found in the service manual. Following these procedures is very important to the safety of individuals performing diagnostic tests.

4.2.2 VEHICLE PREPARATION FOR TESTING

Make sure the vehicle being tested has a fully charged battery. If is does not, false diagnostic codes or error messages may occur.

4.2.3 SERVICING SUB-ASSEMBLIES

Some components of the chassis system are intended to be serviced as an assembly only. Attempting to remove or repair certain system subcomponents may result in personal injury and/or improper system operation. Only those components with approved repair and installation procedures in the service manual should be serviced.

4.2.4 DRBIII® SAFETY INFORMATION

WARNING: EXCEEDING THE LIMITS OF THE DRBIII® MULTIMETER IS DANGEROUS. IT CAN EXPOSE YOU TO SERIOUS OR POSSIBLY FATAL INJURY. CAREFULLY READ AND UNDERSTAND THE CAUTIONS AND THE SPECIFICATION LIMITS.

- Follow the vehicle manufacturer's service specifications at all times.
- Do not use the DRBIII® if it has been damaged.
- Do not use the test leads if the insulation is damaged or if metal is exposed.
- To avoid electrical shock, do not touch the test leads, tips, or the circuit being tested.
- Choose the proper range and functions for the measurement. Do not try voltage or current measurements that may exceed the rated capacity.
- Do not exceed the limits shown in the table below:

FUNCTION	INPUT LIMIT
Volts	0 - 500 peak volts AC 0 - 500 volts DC
Ohms (resistance)*	0 -1.12 megohms
Frequency Measured Frequency Generated	0 - 10 kHz
Temperature	-58 - 1100°F -50 - 600°C

* Ohms cannot be measured if voltage is present. Ohms can be measured only in a non-powered circuit.

- Voltage between any terminal and ground must not exceed 500v DC or 500v peak AC.
- Use caution when measuring voltage above 25v DC or 25v AC.
- Use the low current shunt to measure circuits up to 10A. Use the high current clamp to measure circuits exceeding 10A.
- When testing for the presence of voltage or current, make sure the meter is functioning correctly. Take a reading of a known voltage or current before accepting a zero reading.

- When measuring current, connect the meter in series with the load.
- Disconnect the live test lead before disconnecting the common test lead.
- When using the meter function, keep the DRBIII® away from spark plug or coil wires to avoid measuring error from outside interference.

4.3 WARNINGS

4.3.1 VEHICLE DAMAGE WARNINGS

Before disconnecting any control module, make sure the ignition is "off". Failure to do so could damage the module.

When testing voltage or continuity at any control module, use the terminal side (not the wire end) of the connector. Do not probe a wire through the insulation, this will damage it and eventually cause it to fail because of corrosion.

Be careful when performing electrical tests so as to prevent accidental shorting of terminals. Such mistakes can damage fuses or components. Also, a second code could be set, making diagnosis of the original problem more difficult.

4.3.2 ROAD TESTING A COMPLAINT VEHICLE

Some complaints will require a test drive as part of the repair verification procedure. The purpose of the test drive is to try to duplicate the diagnostic code or symptom condition.

WARNING: BEFORE ROAD TESTING A VEHICLE, BE SURE THAT ALL COMPONENTS ARE REASSEMBLED. DURING THE TEST DRIVE, DO NOT TRY TO READ THE DRB SCREEN WHILE IN MOTION. DO NOT HANG THE DRBIII® FROM THE REAR VIEW MIRROR OR OPERATE IT YOURSELF. HAVE AN ASSISTANT AVAILABLE TO OPERATE THE DRBIII®.

4.4 DIAGNOSIS

1. Your diagnostic test procedure must begin with a thorough visual inspection of the system in question for damaged components or disconnected connectors. For ABS the brake lamps must be operational prior to continuing.
2. Connect the DRBIII® to the data link connector, which is located under the dash to the left of the steering column. If the DRBIII® does not power up, check the power and ground supplies to the connector.
3. Turn the ignition on. Select the system in question. If the DRBIII® displays "No Response" condition you must diagnose that first.
4. Read and record all diagnostic trouble codes. For ABS if the "Valve Power Feed Circuit" diagnostic trouble code is present, it must be repaired prior to addressing any other DTC's. If any additional DTC's are present, proceed to the appropriate test by locating the matching test in the Table of Contents and begin to diagnose the symptom.
5. For ABS if there are no diagnostic trouble codes present, identify the customer complaint. Select "Inputs/Outputs" and read the brake switch input as you press and release the brake pedal. If the display does not match the state of the pedal, perform the proper test by locating the matching test in the Table of Contents and begin to diagnose the symptom. If a problem exists with the yellow "ABS" warning indicator or the red "Brake" indicator exists, refer to the proper tests by locating the matching test in the Table of Contents and begin to diagnose the symptom. Read the traction control switch input as you press and release the switch. If the display does not match the state of the indicator perform the proper test by locating the matching test in the Table of Contents and begin to diagnose the symptom.
6. If no other problems are found, it will be necessary to road test the vehicle. Perform several antilock stops from above 50 Km/h (30 mph) and then repeat step 4. If any diagnostic trouble codes are present, proceed to the appropriate test.
7. The following conditions should be considered "NORMAL" operation, and no repairs should be attempted to correct them.
   - Brake pedal feedback during an ABS stop (clicking, vibrating).
   - Clicking, groaning or buzzing at 25 Km/h (15 mph) or 40 Km/h (24 mph) (drive off self test).
   - Groaning noise during an ABS stop.
   - Slight brake pedal drop and pop noise when ignition is initially turned on.
   - Brake pedal ratcheting down at the end of an ABS stop.
8. If the complaint is ABS "cycling" at the end of a stop at low speeds, it may be caused by a marginal wheel speed sensor signal. The sensor air gap, tone wheel condition, and/or brakes hanging up are possible causes of this condition.
9. After a road test in which no problems were found, refer to any Technical Service Bulletins that may apply.

5.0 REQUIRED TOOLS AND EQUIPMENT

DRBIII® (diagnostic read-out box)
jumper wires
ohmmeter
voltmeter
test light

6.0 GLOSSARY OF TERMS

ABS	antilock brake system
CAB	controller antilock brake
DC	direct current
DLC	data link connector
DRB	diagnostic read-out box
DTC	diagnostic test code
EVBP	electronic variable brake proportioning
HCU	hydraulic control unit
ICU	integrated control unit
IPM	integrated power module
JBLK	junction block
PCI	programmable communication interface
P/M	pump motor
WSS	wheel speed sensor

NOTES

7.0

DIAGNOSTIC INFORMATION AND PROCEDURES

Symptom:
INTERNAL CONTROLLER ERROR

When Monitored and Set Condition:

INTERNAL CONTROLLER ERROR

When Monitored: Any time that the module is awake.

Set Condition: When the APM detects an internal fault, the DTC is set.

POSSIBLE CAUSES
INTERMITTENT DTC
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Set the memory positions according to the owner's preferences. Recall the memory positions. With the DRBIII®, erase DTC's. With the DRBIII®, read DTC's. Does the DRBIII® display INTERNAL CONTROLLER ERROR DTC active? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

PEDAL SENSOR OPEN/SHORTED TO GROUND

When Monitored and Set Condition:

PEDAL SENSOR OPEN/SHORTED TO GROUND

When Monitored: Continuously.

Set Condition: When the Adjustable Pedals Module detects a ground condition on the Adjustable Pedal Sensor Signal circuit.

POSSIBLE CAUSES
INTERMITTENT DTC
ADJUSTABLE PEDALS SENSOR FEED CIRCUIT OPEN
ADJUSTABLE PEDALS SENSOR RETURN CIRCUIT OPEN
ADJUSTABLE PEDALS SENSOR SIGNAL CIRCUIT OPEN
ADJUSTABLE PEDALS SENSOR FAULT
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase DTC's. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SENSOR OPEN/SHORTED TO GROUND DTC active? Yes → Go To 2 No → Go To 8	All
2	Turn the ignition off. Ensure the Adjustable Pedals Sensor is fully seated and locked. Turn the ignition on. With the DRBIII®, read the active DTC's. Does the DRBIII® display PEDAL SENSOR OPEN/SHORTED TO GROUND DTC active? Yes → Go To 3 No → Go To 8	All
3	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Turn the ignition on. Measure the voltage between the Adjustable Pedals Sensor Feed circuit and the Adjustable Pedals Sensor Return circuit. Is the voltage between 4 and 5.2 volts? Yes → Go To 4 No → Go To 6	All

PEDAL SENSOR OPEN/SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Disconnect the Adjustable Pedals Module harness connector. Measure the resistance of the Adjustable Pedals Sensor Signal circuit between the Adjustable Pedals Sensor connector and the Adjustable Pedals Module connector. Is the resistance below 1.0 ohm? Yes → Go To 5 No → Repair the Adjustable Pedals Sensor Signal circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
5	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Measure the resistance between the Adjustable Pedals Sensor Signal circuit and the Adjustable Pedals Sensor Return circuit at the Adjustable Pedals Sensor harness connector. Is the resistance below 100.0 ohms? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information.. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Replace the Adjustable Pedals Sensor in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Disconnect the Adjustable Pedals Module harness connector. Measure the resistance of the Adjustable Pedals Sensor Feed circuit between the Adjustable Pedals Sensor connector and the Adjustable Pedals Module connector. Is the resistance below 1.0 ohm? Yes → Go To 7 No → Repair the Adjustable Pedals Sensor Feed circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
7	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Disconnect the Adjustable Pedals Module harness connector. Measure the resistance of the Adjustable Pedals Sensor Return circuit between the Adjustable Pedals Sensor connector and the Adjustable Pedals Module connector. Is the resistance below 1.0 ohm? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information.. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Sensor Return circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

PEDAL SENSOR OPEN/SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
8	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

PEDAL SENSOR SHORTED TO BATTERY

When Monitored and Set Condition:

PEDAL SENSOR SHORTED TO BATTERY

When Monitored: Continuously.

Set Condition: When the Adjustable Pedals Module detects the voltage on the Adjustable Pedal Sensor Signal circuit is too high.

POSSIBLE CAUSES
INTERMITTENT DTC
ADJUSTABLE PEDALS SENSOR FAULT
ADJUSTABLE PEDALS SENSOR SIGNAL CIRCUIT SHORTED TO BATTERY
ADJUSTABLE PEDALS SENSOR RETURN CIRCUIT OPEN
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase DTC's. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SENSOR SHORTED TO BATTERY DTC active? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Ensure the Adjustable Pedals Sensor is fully seated and locked. Turn the ignition on. With the DRBIII®, read the active DTC's. Does the DRBIII® display PEDAL SENSOR SHORTED TO BATTERY DTC active? Yes → Go To 3 No → Go To 6	All
3	Disconnect the Adjustable Pedals Sensor harness connector. Turn the ignition on. With the DRBIII®, read the active DTC's. Does the DRBIII® display PEDAL SENSOR SHORTED TO BATTERY active? Yes → Go To 4 No → Replace the Adjustable Pedals Sensor in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

PEDAL SENSOR SHORTED TO BATTERY — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Disconnect the Adjustable Pedals Module harness connector. **Note: Check connector - Clean/repair as necessary.** Turn the ignition on. Measure the voltage of the Adjustable Pedals Sensor Signal circuit. Is there any voltage present? Yes → Repair the Adjustable Pedals Sensor Signal circuit for a short to voltage. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 5	All
5	Turn the ignition off. Disconnect the Adjustable Pedals Sensor harness connector. Disconnect the Adjustable Pedals Module harness connector. **Note: Check connector - Clean/repair as necessary.** Measure the resistance of the Adjustable Pedals Sensor Return circuit between the Adjustable Pedals Sensor connector and the APM connector. Is the resistance below 1 ohm? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information.. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Sensor Return circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Move the pedals all the way forward and rearward to see if the DTC is related to position. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

PEDAL SW STUCK FORWARD

When Monitored and Set Condition:

PEDAL SW STUCK FORWARD

When Monitored: Continuously.

Set Condition: When the Adjustable Pedals Module detects battery voltage on the Adjustable Pedals Switch Forward circuit for more than 20 seconds.

POSSIBLE CAUSES
INTERMITTENT DTC
ADJUSTABLE PEDALS SWITCH FAULT
ADJUSTABLE PEDALS SWITCH FORWARD CIRCUIT SHORTED TO BATTERY
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase DTC's. Turn the ignition on. Wait 30 seconds. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SW STUCK FORWARD DTC active? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. Disconnect the Adjustable Pedals Switch connector. Turn the ignition on. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SW STUCK FORWARD DTC active? Yes → Go To 3 No → Replace the Adjustable Pedals Switch in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

PEDAL SW STUCK FORWARD — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Adjustable Pedals Module harness connector. Disconnect the Adjustable Pedals Switch connector. Turn the ignition ON. Measure the voltage of the Adjustable Pedals Switch Forward circuit. Is there any voltage present? Yes → Repair the Adjustable Pedals Switch Forward circuit for a short to voltage. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
4	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

PEDAL SW STUCK REARWARD

When Monitored and Set Condition:

PEDAL SW STUCK REARWARD

When Monitored: Continuously.

Set Condition: When the Adjustable Pedals Module detects battery voltage on the Adjustable Pedals Switch Rearward circuit for more than 20 seconds.

POSSIBLE CAUSES
INTERMITTENT DTC
ADJUSTABLE PEDALS SWITCH FAULT
ADJUSTABLE PEDALS SWITCH REARWARD CIRCUIT SHORTED TO BATTERY
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase DTC's. Turn the ignition on. Wait 30 seconds. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SW STUCK REARWARD DTC active? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. Disconnect the Adjustable Pedals Switch connector. Turn the ignition on. With the DRBIII®, read DTC's. Does the DRBIII® display PEDAL SW STUCK REARWARD DTC active? Yes → Go To 3 No → Replace the Adjustable Pedals Switch in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

PEDAL SW STUCK REARWARD — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Adjustable Pedals Module harness connector. Disconnect the Adjustable Pedals Switch connector. Turn the ignition ON. Measure the voltage of the Adjustable Pedals Switch Rearward circuit. Is there any voltage present? Yes → Repair the Adjustable Pedals Switch Rearward circuit for a short to voltage. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
4	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
SYSTEM OVER VOLTAGE

When Monitored and Set Condition:

SYSTEM OVER VOLTAGE

When Monitored: Any time that the module is awake.

Set Condition: When the Adjustable Pedals Module detects 3 consecutive J1850 Bus messages indicating vehicle voltage over 15.9 VDC.

POSSIBLE CAUSES
INTERMITTENT DTC
VEHICLE CHARGING SYSTEM FAULT
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read the vehicle voltage status. Does the DRBIII® display a high voltage concern? Yes → Refer to Charging information for the related symptom(s). Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition off. Turn the ignition on. With the DRBIII®, erase DTC's. Turn the ignition off. Turn the ignition on. Wait 10 seconds. With the DRBIII®, read DTC's. Does the DRBIII® display SYSTEM OVER VOLTAGE DTC active? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 3	All

SYSTEM OVER VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. **NOTE: Ensure the battery is fully charged.** Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Inspect the vehicle for aftermarket accessories that may exceed the Generator System output. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
SYSTEM UNDER VOLTAGE

When Monitored and Set Condition:

SYSTEM UNDER VOLTAGE

When Monitored: Any time that the module is awake.

Set Condition: When the Adjustable Pedals Module detects 3 consecutive J1850 Vehicle Battery Voltage messages indicating a battery voltage less than 9 VDC.

POSSIBLE CAUSES
INTERMITTENT DTC
VEHICLE CHARGING SYSTEM FAULT
ADJUSTABLE PEDALS MODULE HIGH RESISTANCE FUSE B+ CIRCUIT
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read the vehicle voltage status. Does the DRBIII® display a low voltage concern? Yes → Refer to Charging information for the related symptom(s). Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition off. Turn the ignition on. With the DRBIII®, erase DTC's. Turn the ignition off. Turn the ignition on. Wait 10 seconds. With the DRBIII®, read DTC's. Does the DRBIII® display SYSTEM UNDER VOLTAGE DTC active? Yes → Go To 3 No → Go To 4	All

SYSTEM UNDER VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Adjustable Pedals Module harness connector. Measure the voltage of the Adjustable Pedals Module Fused B+ circuit in the Adjustable Pedals Module connector. Is there battery voltage present? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Module Fused B+ circuit for high resistance. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
4	Turn the ignition off. **NOTE: Ensure the battery is fully charged.** Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Inspect the vehicle for aftermarket accessories that may exceed the Generator System output. Were any problems found? Yes → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

***CAN'T ADJUST PEDALS**

POSSIBLE CAUSES
VEHICLE IN REVERSE OR CRUISE CONTROL ACTIVATED
BODY STYLE FAULT
IN-PLANT MODE ENABLED
ACTIVE DTC'S
ADJUSTABLE PEDALS SENSOR CONNECTOR NOT FULLY SEATED
ADJUSTABLE PEDALS MOTOR FAULT
ADJUSTABLE PEDALS MOTOR CIRCUITS OPEN
BUS COMMUNICATION FAULT
ADJUSTABLE PEDALS MODULE FUSED B+ CIRCUIT OPEN
ADJUSTABLE PEDALS MODULE GROUND CIRCUIT OPEN
IOD FUSE OPEN
ADJUSTABLE PEDALS SWITCH FUSED B+ CIRCUIT OPEN
ADJUSTABLE PEDALS SWITCH GROUND CIRCUIT OPEN
ADJUSTABLE PEDALS SWITCH FAULT
ADJUSTABLE PEDALS SWITCH REARWARD CIRCUIT OPEN
ADJUSTABLE PEDALS SWITCH FORWARD CIRCUIT OPEN
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	**NOTE: Adjustable Pedals are disabled when the vehicle is in Reverse or when the Speed Control is activated.** Check whether vehicle is(was) in Reverse and whether Speed Control is(was) activated. Is(was) the vehicle in Reverse or is(was) Speed Control activated? Yes → Correct as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, try to read Adjustable Pedals Module information. Can the Adjustable Pedals Module be detected by the DRBIII®? Yes → Go To 3 No → Go To 19	All

*CAN'T ADJUST PEDALS — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition on. With the DRBIII®, go to Module Display. Does the DRBIII® display RS BODY STYLE? Yes → Go To 4 No → Replace the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
4	With the DRBIII®, read the status of the In-Plant Mode. Is the In-Plant Mode Enabled? Yes → Disable the In-Plant mode. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 5	All
5	Turn the ignition on. With the DRBIII®, erase DTC's. With the DRBIII®, read DTC's. Does the DRBIII® display any DTC's active? Yes → Refer to symptom list for problems related to the active DTC's. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 6	All
6	Turn the ignition on. With the DRBIII® in Inputs/Outputs, read the forward and rearward switches. Actuate the Adjustable Pedals Switch in the forward and rearward positions. Does the DRBIII® display FORWARD/REARWARD SW CLOSED when switch is activated? Yes → Go To 7 No → Go To 11	All
7	Turn the ignition on. With the DRBIII®, actuate the pedal forward and pedal rearward. Do the Adjustable Pedals move? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 8	All
8	Turn the ignition off. Ensure the Adjustable Pedals Sensor is fully seated and locked. Inspect Adjustable Pedals Module connector and the Adjustable Pedals Motor connector. Are the connectors FULLY seated and properly plugged in? Yes → Go To 9 No → Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

*CAN'T ADJUST PEDALS — Continued

TEST	ACTION	APPLICABILITY
9	Turn the ignition off. Disconnect the Adjustable Pedals Motor harness connector. Using a 12-volt test light, connect it between the Adjustable Pedals Motor Forward and Adjustable Pedals Motor Rearward circuits at the Adjustable Pedals Motor harness connector. With the DRBIII®, actuate the pedal forward and pedal rearward. Does the test light illuminate brightly for both directions? Yes → Replace the Adjustable Pedals Assembly in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 10	All
10	Turn the ignition on. Using a 12-volt test light, back-probe between the Adjustable Pedals Motor Forward and Adjustable Pedals Motor Rearward circuits at the Adjustable Pedals Module harness connector. With the DRBIII®, actuate the pedal forward and pedal rearward. Does the test light illuminate brightly for both directions? Yes → Repair the Adjustable Pedals Motor Forward/Rearward circuit(s) for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
11	Turn the ignition off. Inspect for an open IOD fuse in the IPM. Is the IOD fuse open? Yes → Replace the fuse. If the fuse is open make sure to check for a short to ground. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 12	All
12	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Measure the voltage between the Adjustable Pedals Switch Fused B+ and Ground circuits (cavities 1 & 2). Is there battery voltage present? Yes → Go To 13 No → Go To 17	All

*CAN'T ADJUST PEDALS — Continued

TEST	ACTION	APPLICABILITY
13	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Turn the ignition on. With the DRBIII® in Inputs/Outputs, monitor the FORWARD SW state. Connect a jumper wire between the Adjustable Pedals Switch Fused B+ circuit and the Adjustable Pedals Switch Forward circuit. Does the DRBIII® display FORWARD SW CLOSED? Yes → Go To 14 No → Go To 16	All
14	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Turn the ignition on. With the DRBIII® in Inputs/Outputs, monitor the REARWARD SW state. Connect a jumper wire between the Adjustable Pedals Switch Fused B+ circuit and the Adjustable Pedals Switch Rearward circuit. Does the DRBIII® display REARWARD SW CLOSED? Yes → Replace the Adjustable Pedals Switch in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 15	All
15	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Disconnect the Adjustable Pedals Module harness connector. Measure the resistance of the Adjustable Pedals Switch Rearward circuit between the Adjustable Pedals Switch connector and the Adjustable Pedals Module connector. Is the resistance below 1.0 ohm? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Switch Rearward circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
16	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Disconnect the Adjustable Pedals Module harness connector. Measure the resistance of the Adjustable Pedals Switch Forward circuit between the Adjustable Pedals Switch connector and the Adjustable Pedals Module connector. Is the resistance below 1.0 ohm? Yes → Replace and program the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Switch Forward circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

*CAN'T ADJUST PEDALS — Continued

TEST	ACTION	APPLICABILITY
17	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Measure the voltage between Adjustable Pedals Switch Fused B+ circuit and vehicle body ground. Is there battery voltage present? Yes → Go To 18 No → Repair the Adjustable Pedals Switch Fused B+ circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
18	Turn the ignition off. Disconnect the Adjustable Pedals Switch harness connector. Measure the resistance between the Adjustable Pedals Switch Ground circuit and vehicle body ground. Is the resistance below 1.0 ohm? Yes → Replace the Adjustable Pedals Switch in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Switch Ground circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
19	Turn the ignition off. Disconnect the Adjustable Pedals Module harness connector. Measure the voltage between the Adjustable Pedals Module Fused B+ circuit and the Ground circuit at the Adjustable Pedals Module harness connector. Is there battery voltage present? Yes → Refer to symptom *NO RESPONSE FROM ADJUSTABLE PEDALS ASSEMBLY in the BODY COMMUNICATION category. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 20	All
20	Turn the ignition off. Disconnect the Adjustable Pedals Module harness connector. Measure the voltage between the Adjustable Pedals Module Fused B+ circuit and vehicle body ground. Is there battery voltage present? Yes → Repair the Adjustable Pedals Module Ground circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the Adjustable Pedals Module Fused B+ circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

Symptom:

*CAN'T SET/RECALL MEMORY POSITIONS

POSSIBLE CAUSES
DTC OR IN-PLANT MODE ACTIVE
PEDALS OPERATION
BCM OPERATION FAULT
ADJUSTABLE PEDALS SENSOR
ADJUSTABLE PEDALS SENSOR VOLTAGE FAULT
BCM COMMUNICATION FAULT
APM - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase DTC's. With the DRBIII®, read the active DTC's. With the DRBIII®, read the In-Plant state. Any active DTC's or is the In-Plant mode activated? Yes → Disable the In-Plant mode or refer to symptom list for problems related to the active DTC. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Attempt to adjust the pedals using the Adjustable Pedals Switch. Do the pedals adjust? Yes → Go To 3 No → Refer to *CAN'T ADJUST PEDALS information for the related symptom(s). Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
3	Attempt to set and recall other memory functions in the vehicle. Can other vehicle memory functions be set and recalled OK? Yes → Go To 4 No → Check DTC's in the BCM and refer to BODY information for the related symptom(s). Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

*CAN'T SET/RECALL MEMORY POSITIONS — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Turn the ignition on. With the DRBIII® in Sensors, read the pedal position voltage. Monitor the pedal position voltage while adjusting pedals forward and rearward. Is there any change of voltage? Yes → Go To 5 No → Check for proper Adjustable Pedals Sensor installation and alignment. Check wiring and connectors. Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
5	Does the pedal position voltage increase when moving forward and decrease when moving rearward? Yes → Go To 6 No → Check Adjustable Pedals Sensor and APM pinouts. Repair as necessary. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
6	Can the DRBIII® communicate with the BCM? Yes → Replace the Adjustable Pedals Module in accordance with the Service Information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Refer to BODY information for the related symptom(s). Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

Symptom:
BUS SYSTEM COMMUNICATION FAILURE

When Monitored and Set Condition:

BUS SYSTEM COMMUNICATION FAILURE

When Monitored: Ignition ON, continuously.

Set Condition: When the CAB does not receive a message from the instrument cluster for 10 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ELECTRO-MECHANICAL INSTRUMENT CLUSTER DTC PRESENT
BUS CIRCUIT OPEN
CAB - INTERNAL FAILURE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. With the DRBIII®, read Freeze Frame information. With the DRBIII®, erase DTCs. Turn the ignition off. Turn the ignition on. With the DRBIII®, read DTCs. Does the DRBIII® display BUS SYSTEM COMMUNICATION FAILURE? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition on. With the DRBIII®, read EMIC DTCs. Does the DRBIII® display NO ABS MESSAGE RECEIVED? Yes → Refer to symptom NO ABS MESSAGE RECEIVED in the BODY/INSTRUMENT CLUSTER category. Perform ABS VERIFICATION TEST - VER 1. No → Go To 3	All

BUS SYSTEM COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the negative (-) battery cable. Disconnect the CAB harness connector. **NOTE: check connector - Clean/repair as necessary.** Measure the resistance of the Bus circuit between the CAB connector and the Data Link Connector (DLC). Is the resistance below 5.0 ohms? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Repair the Bus circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
4	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
CAB INTERNAL FAILURE

When Monitored and Set Condition:

CAB INTERNAL FAILURE

When Monitored: Ignition on. The CAB monitors its internal microprocessors for correct operation.

Set Condition: If the CAB detects an internal fault, the DTC is set.

POSSIBLE CAUSES
INTERMITTENT DTC
DAMAGED CAB/CAB HARNESS CONNECTOR
CAB - GROUND CIRCUIT OPEN
ABS VALVE FUSED B(+) CIRCUIT OPEN
ABS PUMP FUSED B(+) CIRCUIT OPEN
CAB - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. With the DRBIII®, erase DTCs. Turn the ignition off. Turn the ignition on. With the DRBIII®, read DTCs. Does the DRBIII® display CAB INTERNAL FAILURE? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the CAB harness connector. Inspect the CAB/CAB harness connector for damage. Is there any broken, bent, pushed out, corroded or spread terminals? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 3	All
3	Turn the ignition off. Disconnect the CAB harness connector. Using a 12-volt test light connected to 12-volts, probe the CAB harness connector ground circuits. Did the test light illuminate? Yes → Go To 4 No → Repair the CAB Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

CAB INTERNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the CAB harness connector. Using a 12-volt test light connected to ground, probe the ABS Valve Fused B(+) circuit at the CAB harness connector. Did the test light illuminate? Yes → Go To 5 No → Repair the ABS Valve Fused B(+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
5	Turn the ignition off. Disconnect the CAB harness connector. Using a 12-volt test light connected to ground, probe the ABS Pump Fused B(+) circuit at the CAB harness connector. Did the test light illuminate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Repair the ABS Pump Fused B(+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
CLUSTER LAMP FAILURE

When Monitored and Set Condition:

CLUSTER LAMP FAILURE

When Monitored: Key ON. After Key-ON bulb check.

Set Condition: When the instrument cluster informs the CAB that the cluster cannot turn on the ABS Lamp.

POSSIBLE CAUSES
INSTRUMENT CLUSTER OR ABS DTC PRESENT
INSTRUMENT CLUSTER
CAB - NO DTC SIGNAL TO THE INSTRUMENT CLUSTER
CAB - NO KEY-ON BULB CHECK SIGNAL
CAB - PERMANENT FAULT SIGNAL

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. Are there any Instrument Cluster or ABS DTCs present? Yes → Refer to the appropriate category for the related symptom(s). Perform ABS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition off. Perform the Key-on Bulb Check. Does the ABS Warning Indicator light and then go out after a few seconds? Yes → Go To 3 No. Light remains after bulb check. Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No. Indicator never comes on. Go To 4	All

CLUSTER LAMP FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	**NOTE: The DRBIII® communication with the CAB must be operational for the result of this test to be valid.** Turn the ignition off. Remove ABS Valve fuse. Perform the Key-on Bulb Check. Does the ABS Indicator remain on after the bulb check? Yes → Test Complete. No → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
4	**NOTE: The following steps will initiate the Instrument Cluster self test.** Turn the ignition off. Press and hold the odometer reset button. Turn the ignition to RUN. Observe the Instrument Cluster indicators. Release the odometer reset button. Did the ABS Indicator illuminate during the Instrument Cluster self test? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Instrument Cluster in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:

INCORRECT TONE WHEEL FAILURE

When Monitored and Set Condition:

INCORRECT TONE WHEEL FAILURE

When Monitored: Ignition ON. Vehicle speed above 40 km/h (25 mph) for 2 minutes.

Set Condition: When the CAB detects an unexpected wheel speed condition caused by a tire size that does not meet vehicle specification.

Symptom List:

LEFT FRONT SENSOR CIRCUIT FAILURE
LEFT REAR SENSOR CIRCUIT FAILURE
RIGHT FRONT SENSOR CIRCUIT FAILURE
RIGHT REAR SENSOR CIRCUIT FAILURE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be LEFT FRONT SENSOR CIRCUIT FAILURE.

When Monitored and Set Condition:

LEFT FRONT SENSOR CIRCUIT FAILURE

When Monitored: Ignition on. The CAB monitors the wheel speed circuit continuously.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the Diagnostic Trouble Code (DTC) will set.

LEFT REAR SENSOR CIRCUIT FAILURE

When Monitored: Ignition on. The CAB monitors the wheel speed circuit continuously.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the Diagnostic Trouble Code (DTC) will set.

RIGHT FRONT SENSOR CIRCUIT FAILURE

When Monitored: Ignition on. The CAB monitors the wheel speed circuit continuously.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the Diagnostic Trouble Code (DTC) will set.

RIGHT REAR SENSOR CIRCUIT FAILURE

When Monitored: Ignition on. The CAB monitors the wheel speed circuit continuously.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the Diagnostic Trouble Code (DTC) will set.

POSSIBLE CAUSES
INTERMITTENT CONDITION
WHEEL SPEED SENSOR OR CONNECTOR DAMAGE
WHEEL SPEED SENSOR SIGNAL CIRCUIT FAULT
WHEEL SPEED SENSOR 12 VOLT SUPPLY CIRCUIT SHORT TO GROUND
WHEEL SPEED SENSOR 12 VOLT SUPPLY CIRCUIT OPEN
WHEEL SPEED SENSOR SIGNAL CIRCUIT SHORT TO GROUND
WHEEL SPEED SENSOR SIGNAL CIRCUIT OPEN

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

POSSIBLE CAUSES
CAB - 12 VOLT SUPPLY CIRCUIT FAULT
CAB - SIGNAL CIRCUIT FAULT
WHEEL SPEED SENSOR 12 VOLT SUPPLY SHORT TO GROUND
WHEEL SPEED SENSOR SIGNAL CIRCUIT INOPERATIVE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. With the DRBIII®, read the Freeze Frame information. With the DRBIII®, erase DTCs. Turn the ignition off. Turn the ignition on. With the DRBIII®, read DTCs. **NOTE: The CAB must sense all four wheels at 25km/h (15 mph) before it will extinguish the ABS indicators.** Does the DRBIII® display SENSOR CIRCUIT FAILURE? Yes → Go To 2 No → Go To 13	All
2	Turn the ignition off. Inspect the CAB connector, affected Wheel Speed Sensor, and affected Wheel Speed Sensor connector. Is the affected Wheel Speed Sensor or any of the connectors damaged? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 3	All
3	Turn the ignition off. Disconnect the affected Wheel Speed Sensor connector. **Note: Check connector - Clean/repair as necessary.** Turn the ignition on. Measure the voltage between affected Wheel Speed Sensor 12 Volt Supply circuit and ground. Is the voltage above 10 volts? Yes → Go To 6 No → Go To 4	All
4	Turn the ignition off. Disconnect the CAB harness connector. Disconnect the affected Wheel Speed Sensor connector. Using a 12-volt test light connected to 12-volts, probe the affected Wheel Speed Sensor 12 Volt Supply circuit. Does the test light illuminate? Yes → Repair the affected Wheel Speed Sensor 12 Volt Supply circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1. No → Go To 5	All

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the CAB harness connector. Disconnect the affected Wheel Speed Sensor connector. Connect a jumper wire between affected Wheel Speed Sensor 12 Volt Supply circuit and ground. Using a 12-volt test light connected to 12-volts, probe the affected Wheel Speed Sensor 12 Volt Supply circuit. Does the test light illuminate? Yes → Go To 6 No → Repair the affected Wheel Speed Sensor 12 Volt Supply circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Disconnect the affected Wheel Speed Sensor connector. **NOTE: Check connector - Clean/repair as necessary.** Turn the ignition on. Measure the voltage between affected Wheel Speed Sensor Signal circuit and ground. Is the voltage above 1 volt? Yes → Repair the affected Wheel Speed Sensor Signal circuit for a short to voltage. Perform ABS VERIFICATION TEST - VER 1. No → Go To 7	All
7	Turn the ignition off. Disconnect the CAB harness connector. Disconnect the affected Wheel Speed Sensor connector. Using a 12-volt test light connected to 12-volts, probe the affected Wheel Speed Sensor Signal circuit. Does the test light illuminate? Yes → Repair the affected Wheel Speed Sensor Signal circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1. No → Go To 8	All
8	Turn the ignition off. Disconnect the CAB harness connector. Disconnect the affected Wheel Speed Sensor connector. Connect a jumper wire between affected Wheel Speed Sensor Signal circuit and ground. Using a 12-volt test light connected to 12-volts, probe the affected Wheel Speed Sensor Signal circuit. Does the test light illuminate? Yes → Go To 9 No → Repair the affected Wheel Speed Sensor Signal circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
9	Turn the ignition off. Remove the CAB harness strain relief to access wires. Reconnect the CAB harness connector. Turn the ignition on. Measure the voltage between affected Wheel Speed Sensor 12 Volt Supply circuit and ground. Is the voltage above 10 volts? Yes → Go To 10 No → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
10	Turn the ignition off. Remove the CAB harness strain relief to access wires. Reconnect the CAB harness connector. Turn the ignition on. Measure the voltage between affected Wheel Speed Sensor 12 Volt Supply circuit and affected Wheel Speed Sensor Signal circuit. Is the voltage above 10 volts? Yes → Go To 11 No → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
11	Turn the ignition off. Reconnect ALL affected Wheel Speed Sensor circuit connectors. Disconnect the affected Wheel Speed Sensor connector. Turn the ignition on. Measure the voltage of the affected Wheel Speed Sensor 12 Volt Supply circuit in the affected Wheel Speed Sensor connector while reconnecting the sensor connector. Did the affected Wheel Speed Sensor 12 Volt Supply circuit drop voltage to 0 DC volts? Yes → Replace the affected Wheel Speed Sensor in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Go To 12	All
12	Turn the ignition off. Reconnect ALL affected Wheel Speed Sensor circuit connectors. Turn the ignition on. Measure the DC voltage of the Wheel Speed Sensor Signal circuit in the affected Wheel Speed Sensor connector. Slowly rotate the wheel. Does the DC voltage toggle between 1.6 volts to .8 volts? Yes → Go To 13 No → Replace the affected Wheel Speed Sensor in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
13	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom List:

LEFT FRONT WHEEL SPEED SIGNAL FAILURE
LEFT REAR WHEEL SPEED SIGNAL FAILURE
RIGHT FRONT WHEEL SPEED SIGNAL FAILURE
RIGHT REAR WHEEL SPEED SIGNAL FAILURE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be LEFT FRONT WHEEL SPEED SIGNAL FAILURE.

When Monitored and Set Condition:

LEFT FRONT WHEEL SPEED SIGNAL FAILURE

When Monitored: Wheel speed are checked and verified at drive off and continuously thereafter.

Set Condition: If, during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the Diagnostic Trouble Code (DTC) is set. The DTC can also set if the signal is missing or erratic.

LEFT REAR WHEEL SPEED SIGNAL FAILURE

When Monitored: Wheel speed are checked and verified at drive off and continuously thereafter.

Set Condition: If, during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the Diagnostic Trouble Code (DTC) is set. The DTC can also set if the signal is missing or erratic.

RIGHT FRONT WHEEL SPEED SIGNAL FAILURE

When Monitored: Wheel speed are checked and verified at drive off and continuously thereafter.

Set Condition: If, during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the Diagnostic Trouble Code (DTC) is set. The DTC can also set if the signal is missing or erratic.

RIGHT REAR WHEEL SPEED SIGNAL FAILURE

When Monitored: Wheel speed are checked and verified at drive off and continuously thereafter.

Set Condition: If, during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the Diagnostic Trouble Code (DTC) is set. The DTC can also set if the signal is missing or erratic.

LEFT FRONT WHEEL SPEED SIGNAL FAILURE — Continued

POSSIBLE CAUSES
WHEEL SPEED SIGNAL FAILURE DTC PRESENT
AFFECTED WHEEL SPEED SENSOR SIGNAL INOPERATIVE
AFFECTED WHEEL SPEED SENSOR CONNECTOR DAMAGED
AFFECTED WHEEL SPEED SENSOR TONE WHEEL DAMAGED
AFFECTED WHEEL SPEED SENSOR AIR GAP FAULT
WHEEL BEARING FAULT
BRAKE LINING FAULT
AFFECTED WHEEL SPEED SENSOR CIRCUIT ELECTRICAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. With the DRBIII®, read Freeze Frame information. **NOTE: The CAB must sense ALL 4 wheels at 25 km/h (15 mph) before it will extinguish the ABS indicators.** Does the DRBIII® display WHEEL SPEED SIGNAL FAILURE and SENSOR CIRCUIT FAILURE? Yes → Refer to the affected Wheel Speed SENSOR CIRCUIT FAILURE for the related symptom(s). Perform ABS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Turn the ignition on. With the DRBIII® in Sensors, monitor ALL the Wheel Speed Sensor Signals while an assistant drives the vehicle. Slowly accelerate as straight as possible from a stop to 24 km/h (15 mph). Is the affected Wheel Speed Signal showing 0 km/h (0 mph)? Yes → Go To 3 No → The condition is not present at this time. Monitor DRBIII® parameters while wiggling the related wiring harness. Refer to any Technical Service Bulletins(TSB) that may apply. Visually inspect the related wiring harness and connector terminals. Perform ABS VERIFICATION TEST - VER 1.	All
3	Turn the ignition off. Inspect the CAB connector, affected Wheel Speed Sensor, and affected Wheel Speed Sensor connector. Is the Wheel Speed Sensor or any connector damaged? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 4	All

LEFT FRONT WHEEL SPEED SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	Turn ignition off. Inspect the affected Tone Wheel for damaged, missing teeth, cracks, or looseness. **NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.** Is the affected Tone Wheel OK? Yes → Go To 5 No → Replace the Tone Wheel in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
5	Turn the ignition off. Using a Feeler Gauge, measure the affected Wheel Speed Sensor Air Gap. **NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.** Is the Air Gap OK? Yes → Go To 6 No → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Inspect the wheel bearings for excessive runout or clearance. **NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.** Is the bearing clearance OK ? Yes → Go To 7 No → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1.	All
7	Turn the ignition off. Visually inspect brakes for locking up due to lining contamination or overheating. Inspect all components for defects which may cause a Signal DTC to set. Is any component damaged? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Refer to symptom SENSOR CIRCUIT FAILURE for further diagnostics. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:
PUMP CIRCUIT FAILURE

When Monitored and Set Condition:

PUMP CIRCUIT FAILURE

When Monitored: Ignition on. The CAB commands the pump on at 20 km/h (12 mph) to check its operation, if the brake switch is not applied. If the brake is applied, the test will run at 40 km/h (25 mph).

Set Condition: The DTC is stored when the CAB detects: 1) Improper voltage decay after the pump was turned off. 2) Pump not energized by the CAB, but voltage is present for 3.5 seconds. 3) Pump is turned on by the CAB, but without sufficient voltage to operate it.

POSSIBLE CAUSES
CAB - PUMP MOTOR RUNNING CONTINUOUSLY
ABS PUMP FUSE
ABS PUMP MOTOR INTERMITTENT DTC
DAMAGED CAB/CAB HARNESS CONNECTOR
ABS PUMP FUSED B(+) CIRCUIT INTERMITTENT SHORT TO GROUND
ABS PUMP FUSED B(+) CIRCUIT SHORT TO GROUND
CAB - INTERNAL FAULT
ABS PUMP MOTOR INOPERATIVE
ABS PUMP MOTOR OPEN
ABS PUMP MOTOR B(+) CIRCUIT OPEN
ABS PUMP MOTOR GROUND CIRCUIT OPEN
CAB - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Turn the ignition on. Monitor the ABS Pump Motor for continuous operation. **NOTE: The CAB must sense ALL wheels at 25 km/h (15 mph) before it will extinguish the ABS indicators.** Is the ABS Pump Motor running continuously? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Go To 2	All

PUMP CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Turn the ignition on. With the DRBIII®, read DTCs. With the DRBIII®, erase DTCs. Turn the ignition off. Turn the ignition on. With the DRBIII®, actuate the ABS Pump Motor. Did the ABS Pump Motor operate? Yes → Go To 3 No → Go To 4	All
3	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Make sure the Pump Motor connecter is secure. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All
4	Turn the ignition off. Remove and inspect the ABS Pump fuse. Is the ABS Pump fuse open? Yes → Go To 5 No → Go To 8	All
5	Turn the ignition off. Visually inspect the ABS Pump Fused B(+) circuit in the wiring harness. Look for any sign of an intermittent short to ground. Is the wiring harness OK? Yes → Go To 6 No → Repair the ABS Pump Fused B(+) circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Disconnect the CAB harness connector. Check connectors - Clean/repair as necessary. Using a 12-volt test light connected to 12-volts, probe the ABS Pump Fused B(+) circuit fuse terminal. Does the test light illuminate? Yes → Repair the ABS Pump Fused B(+) circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1. No → Go To 7	All

PUMP CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition off. Reconnect the CAB harness connector. Using a 12-volt test light connected to 12-volts, probe the ABS Pump Fused B(+) circuit fuse terminal. Does the test light illuminate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Replace the ABS Pump fuse. If the fuse is open make sure to check for a short to ground. Perform ABS VERIFICATION TEST - VER 1.	All
8	Turn the ignition off. Disconnect the CAB harness connector. Inspect the CAB and CAB harness connector for damage. Is there any broken, bent, pushed out, corroded, or spread terminals? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 9	All
9	Turn the ignition off. Reinstall the ABS Pump fuse. Disconnect the ABS Pump Motor connector. Check connectors - Clean/repair as necessary. Connect a 10 gauge 40 amp fused jumper wire between the ABS Pump Fused B(+) terminal in the CAB harness connector to the ABS Pump Motor connector RED wired terminal. Connect a 10 gauge jumper wire between the Ground circuit terminal in the CAB harness connector to the ABS Pump Motor connector BLACK wired terminal. Did the ABS Pump Motor operate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Go To 10	All
10	Turn the ignition off. Disconnect the ABS Pump Motor connector. Check connectors - Clean/repair as necessary. Connect a 10 gauge 40 amp fused jumper wire between the ABS Pump Motor connector RED wired terminal and an alternate 40 amp capable B(+) source. Connect a 10 gauge jumper wire between the ABS Pump Motor connector BLACK wired terminal and ground Did the ABS Pump Motor operate? Yes → Go To 11 No → Replace the Hydraulic Control Unit in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

PUMP CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
11	Turn the ignition off. Disconnect the ABS Pump Motor connector. Check connectors - Clean/repair as necessary. Connect a 10 gauge 40 amp fused jumper wire between the ABS Pump Fused B(+) terminal in the CAB harness connector to the ABS Pump Motor connector RED wired terminal. Connect a 10 gauge jumper wire between the ABS Pump Motor connector BLACK wired terminal and ground. Did the ABS Pump Motor operate? Yes → Repair the ABS Pump Motor Fused B(+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1. No → Repair the ABS Pump Motor Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:
SYSTEM OVER VOLTAGE

When Monitored and Set Condition:

SYSTEM OVER VOLTAGE

When Monitored: Ignition on. The CAB monitors the Fused B(+) circuit at all times for proper system voltage.

Set Condition: If the voltage is above 16.5 volts for greater than 420 milliseconds (ms), the Diagnostic Trouble Code (DTC) is set.

POSSIBLE CAUSES
INTERMITTENT DTC
BATTERY CHARGER CONNECTED
FUSED IGNITION SWITCH OUTPUT (RUN) CIRCUIT HIGH
DAMAGED CAB/CAB HARNESS CONNECTOR
CAB - GROUND CIRCUIT OPEN
CAB - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTC's. With the DRBIII®, erase DTC's. Turn the ignition off. Turn the ignition on. Start the engine. With the DRBIII®, read DTC's. Does the DRBIII® display SYSTEM OVER VOLTAGE? Yes → Go To 2 No → Go To 7	All
2	Is a battery charger connected to the vehicle? Yes → Ensure the battery is fully charged. Perform ABS VERIFICATION TEST - VER 1. No → Go To 3	All

SYSTEM OVER VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the CAB connector. **Note: Check connector - Clean/repair as necessary.** Start the engine. Raise engine speed above 1,800 RPM's Measure the voltage between Fused Ignition Switch Output (RUN) circuit and ground. Is the voltage above 16.5 volts ? Yes → Refer to appropriate service information for Charging System testing and repair. Perform ABS VERIFICATION TEST - VER 1. No → Go To 4	All
4	Turn the ignition off. Disconnect the CAB connector. **Note: Check connector - Clean/repair as necessary.** Inspect the CAB and CAB harness connector for damage. Is there any broken, bent, pushed out, corroded, or spread terminals? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 5	All
5	Turn the ignition off. Disconnect the CAB connector. **Note: Check connector - Clean/repair as necessary.** Using a 12-volt test light connected to 12-volts, probe the Ground circuits. Does the test light illuminate? Yes → Go To 6 No → Repair the Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Reconnect the CAB harness connector. Turn the ignition on. With the DRBIII® in Sensors, read the ignition voltage. Does the DRBIII® display ignition voltage above 16 volts? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Go To 7	All

SYSTEM OVER VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Ensure the battery is fully charged. Inspect the vehicle for aftermarket accessories that may exceed the Generator System output. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
SYSTEM UNDER VOLTAGE

When Monitored and Set Condition:

SYSTEM UNDER VOLTAGE

When Monitored: Ignition on. The CAB monitors the Fused Ignition Switch Output circuit voltage above 10 km/h (6 mph) for proper system voltage.

Set Condition: If the voltage is below 9.5 volts, the Diagnostic Trouble Code (DTC) is set.

POSSIBLE CAUSES
INTERMITTENT DTC
DAMAGED CAB/CAB HARNESS CONNECTOR
RUNNING BATTERY VOLTAGE LOW
CAB - GROUND CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT (RUN) CIRCUIT OPEN
CAB - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTC's. With the DRBIII®, erase DTC's. Turn the ignition off. Turn the ignition on. Start the engine. Drive the vehicle above 16 km/h (10 mph) for at least 20 seconds. Stop the vehicle With the DRBIII®, read DTC's. Does the DRBIII® display SYSTEM UNDER VOLTAGE ? Yes → Go To 2 No → Go To 6	All
2	Engine Running. Measure the battery voltage. Is the battery voltage below 10 volts? Yes → Refer to appropriate service information for charging system testing and repair. Perform ABS VERIFICATION TEST - VER 1. No → Go To 3	All

SYSTEM UNDER VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the CAB harness connector. Inspect the CAB and CAB harness connector for damage. Is there any broken, bent, pushed out, corroded, or spread terminals? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 4	All
4	Turn the ignition off. Disconnect the CAB harness connector. Using a 12-volt test light connected to 12-volts, probe the Ground circuits. Does the test light illuminate? Yes → Go To 5 No → Repair the Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
5	Turn the ignition on. Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output (RUN) circuit. Does the test light illuminate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Repair the Fused Ignition Switch Output (RUN) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Ensure the battery is fully charged. Inspect the vehicle for aftermarket accessories that may exceed the Generator System output. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
VALVE POWER FEED FAILURE

When Monitored and Set Condition:

VALVE POWER FEED FAILURE

When Monitored: Ignition ON. ABS Power Relay closed. Valve command for a particular solenoid not present.

Set Condition: Low feedback voltage from the low side of all the solenoids.

POSSIBLE CAUSES
INTERMITTENT DTC
ABS VALVE FUSE
ABS VALVE FUSED B(+) SUPPLY CIRCUIT OPEN
ABS VALVE FUSED B(+) CIRCUIT OPEN
ABS VALVE FUSED B(+) CIRCUIT INTERMITTENT SHORT TO GROUND
ABS VALVE FUSED B(+) CIRCUIT SHORT TO GROUND
DAMAGED CAB/CAB HARNESS CONNECTOR
CAB - GROUND CIRCUIT OPEN
CAB - INTERNAL FAULT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTC's. With the DRBIII®, erase DTC's. Turn the ignition off. Turn the ignition on. With the DRBIII®, read DTC's. Does the DRBIII® display VALVE POWER FEED FAILURE? Yes → Go To 2 No → Go To 10	All
2	Turn the ignition off. Remove and Inspect the ABS Valve fuse. Is the ABS Valve fuse open? Yes → Go To 3 No → Go To 6	All

VALVE POWER FEED FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Visually inspect the ABS Valve Fused B(+) circuit in the wiring harness. Look for any sign of an intermittent short to ground. Is the wiring harness OK? Yes → Go To 4 No → Repair the ABS Valve Fused B(+) circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1.	All
4	Turn the ignition off. Disconnect the CAB harness connector. **Note: Check connector - Clean/repair as necessary.** Using a test light connected to 12 volts, probe the ABS Valve Fused B(+) circuit fuse terminal. Did the test light illuminate? Yes → Repair the ABS Valve Fused B(+) circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1. No → Go To 5	All
5	Turn the ignition off. Reconnect the CAB harness connector. **NOTE: The CAB harness connector must be reconnected for the results of this test to be valid.** Using a test light connected to 12 volts, probe the ABS Valve Fused B(+) circuit fuse terminal. Did the test light illuminate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Replace the ABS Valve Fused B(+) fuse. If the fuse is open make sure to check for a short to ground. Perform ABS VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Disconnect the CAB harness connector. Inspect the CAB and CAB harness connector for damage. Is there any broken, bent, pushed out, corroded or spread terminals? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Go To 7	All
7	Turn the ignition off. Using a 12-volt test light connected to ground, probe the B(+) supply at the ABS Valve fuse terminal. Did the test light illuminate? Yes → Go To 8 No → Repair the ABS Valve Fused B(+) supply circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

VALVE POWER FEED FAILURE — Continued

TEST	ACTION	APPLICABILITY
8	Reinstall the ABS Valve fuse. Disconnect the CAB harness connector. Using a 12-volt test light connected to ground, probe the ABS Valve Fused B(+) circuit at the CAB harness connector. Did the test light illuminate? Yes → Go To 9 No → Repair the ABS Valve Fused B(+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
9	Turn the ignition off. Using a 12-volt test light connected to 12-volts, probe the ground circuits at the CAB harness connector. Did the test light illuminate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Repair the CAB Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
10	Turn the ignition off. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Hotline letters or Technical Service Bulletins that may apply. Were any problems found? Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

*BRAKE LAMP SWITCH INOPERATIVE

POSSIBLE CAUSES
CHECK BRAKE LAMP SWITCH OUTPUT
BRAKE LAMP SWITCH B+ OPEN
BRAKE LAMP SWITCH OPEN
BRAKE LAMP SWITCH OUTPUT CIRCUIT SHORT OR OPEN
CAB -- INTERNAL OPEN

TEST	ACTION	APPLICABILITY
1	With the DRBIII® in Inputs/Outputs, read the Brake Lamp Switch state. Press and release the brake pedal. Does the DRBIII® display PRESSED and RELEASED? Yes → The Brake Lamp Switch is OK. Perform ABS VERIFICATION TEST - VER 1. No → Go To 2	All
2	Disconnect the Brake Lamp Switch harness connector. Using a 12-volt test light connected to ground, check the Brake Lamp Switch Fused B+ circuit. Does the test light illuminate brightly ? Yes → Go To 3 No → Repair the Brake Lamp Switch Fused B+ circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
3	Disconnect the Brake Lamp Switch harness connector. Connect a jumper wire between the Brake Lamp Switch B+ and Brake Lamp Switch Output circuits. With the DRBIII® in Inputs/Outputs, read the Brake Lamp Switch state. Does the DRBIII® display PRESSED? Yes → Replace the Brake Lamp Switch in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Go To 4	All
4	Disconnect the CAB harness connector. Disconnect the Brake Lamp Switch harness connector. Check the Brake Lamp Switch Output circuit for a short to voltage and for an open. Is the Brake Lamp Switch Output circuit shorted or open? Yes → Repair the Brake Lamp Switch Output circuit for a short to voltage or an open. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:

*TRAC OFF INDICATOR NEVER/ALWAYS ON

POSSIBLE CAUSES
TRAC OFF SW GROUND OPEN
TRAC OFF SWITCH OPEN
TRAC OFF SWITCH SENSE CIRCUIT SHORT TO B+ OR OPEN
BCM -- NO TRAC OFF MESSAGE
CLUSTER INTERNAL FAULT-- TRAC OFF INDICATOR INOPERATIVE
CLUSTER-PERMANENT TRAC OFF INDICATOR
TRAC OFF SWITCH INTERNAL SHORT
TRAC OFF SWITCH SENSE CIRCUIT SHORT TO GROUND
BCM -- PERMANENT TRAC OFF MESSAGE

TEST	ACTION	APPLICABILITY
1	**Note: If any DTC's are present, they must be repaired prior to performing this test.** Turn the ignition off. Turn the ignition on. Observe the TRAC OFF indicator. Did the TRAC OFF indicator come on for several seconds then go out? Yes → Go To 2 No. TRAC OFF Indicator does not come on. Go To 5 No. TRAC OFF Indicator does not go out. Go To 6	All
2	Disconnect the TRAC OFF Switch harness connector. Using a 12-volt test light connected to 12-volts, check the TRAC OFF Switch Ground circuit. Does the test light illuminate? Yes → Go To 3 No → Repair the TRAC OFF Switch Ground circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
3	Turn the ignition off. Disconnect the TRAC OFF Switch harness connector. Turn the ignition on. Connect and disconnect a jumper wire between TRAC OFF Switch Ground and TRAC OFF Switch Sense circuits. Does the TRAC OFF Indicator light and then go out? Yes → Replace the TRAC OFF switch. Perform ABS VERIFICATION TEST - VER 1. No → Go To 4	All

*TRAC OFF INDICATOR NEVER/ALWAYS ON — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the TRAC OFF Switch harness connector. Disconnect the CAB harness connector. Turn the ignition on. Check the TRAC OFF Switch Sense circuit for short to B+ and for an open. Is the Sense circuit shorted or open? Yes → Repair the TRAC OFF Switch Sense circuit for a short to battery or for an open. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Body Control Module in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
5	Turn the ignition off. **NOTE: The purpose of this test is to perform the Instrument Cluster self test.** Depress and hold the Odometer Reset Button. Turn the Key from OFF to ON and then back to OFF. Release the Odometer Reset Button. Do the Instrument Cluster Indicators and Gauges activate and deactivate? Yes → Replace the Body Control Module in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Instrument Cluster in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
6	**NOTE: The purpose of this test is to perform the Instrument Cluster self test.** Depress and hold the Odometer Reset Button. Turn the Key from OFF to ON and then back to OFF. Release the Odometer Reset Button. Do the Instrument Cluster Indicators and Gauges activate and deactivate? Yes → Go To 7 No → Replace the Instrument Cluster in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
7	Turn the ignition off. Disconnect the TRAC OFF Switch harness connector. Turn the ignition on. Does the TRAC OFF Indicator light and then go out? Yes → Replace the TRAC OFF switch. Perform ABS VERIFICATION TEST - VER 1. No → Go To 8	All

*TRAC OFF INDICATOR NEVER/ALWAYS ON — Continued

TEST	ACTION	APPLICABILITY
8	Turn the ignition off. Disconnect the TRAC OFF Switch harness connector. Disconnect the BCM C4 harness connector. Check the TRAC OFF Switch Sense circuit for short to ground. Is the Sense circuit shorted to ground? Yes → Repair the TRAC OFF Switch Sense circuit for a short to ground. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Body Control Module in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:
*TRAC ON INDICATOR NEVER/ALWAYS ON

POSSIBLE CAUSES
CAB -- INTERNAL FAULT
CHECK TRACTION CONTROL SYSTEM
CLUSTER FAILS SELF TEST
CAB - NO TRAC MESSAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: The DRBIII® must be able to communicate with the CAB prior to performing this test.** **NOTE: Note: If any CAB DTC's are present, they must be repaired prior to performing this test.** Perform the KEY-ON bulb test. Did the TRAC Indicator illuminate and then go out? Yes → Go To 2 No → Go To 3	All
2	Make sure the Traction Control system has not been deactivated with the TRAC OFF switch. **NOTE: The purpose of this test is to determine if the Traction Control system is operating.** With the DRBIII® in Inputs/Outputs, read the ABS Pump Motor voltage state. Accelerate sufficient to cause drive wheel slip. Does the TRAC Indicator illuminate and the DRBIII® display approximately 9 volts? Yes → The traction control system is functioning normally. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All
3	**NOTE: The purpose of this test is to perform the Instrument Cluster self test.** Depress and hold the Odometer Reset Button. Turn the Key from OFF to ON and then back to OFF. Release the Odometer Reset Button. Do the Instrument Cluster Indicators and Gauges activate and deactivate? Yes → Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1. No → Replace the Instrument Cluster in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:

***NO RESPONSE FROM ADJUSTABLE PEDALS ASSEMBLY**

POSSIBLE CAUSES
FUSED B(+) CKT OPEN
OPEN GROUND CIRCUIT
OPEN PCI BUS CIRCUIT
ADJUSTABLE PEDAL ASSEMBLY

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Adjustable Pedals Assembly harness connector. Using a 12-volt test light connected to ground, probe each Fused B+ circuit. Is the test light illuminated for each circuit? Yes → Go To 2 No → Repair the Fused B+ circuit for an open or short. Refer to the wiring diagrams in the service information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All
2	Turn the ignition off. Disconnect the Adjustable Pedals Assembly harness connector. Using a 12-volt test light connected to 12-volts, probe the ground circuit. Is the test light illuminated? Yes → Go To 3 No → Repair the Ground circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

*NO RESPONSE FROM ADJUSTABLE PEDALS ASSEMBLY — Continued

TEST	ACTION	APPLICABILITY
3	**Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.** Disconnect the Adjustable Pedals Assembly harness connector. Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes. Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable. With the DRBIII® select Pep Module Tools. Select lab scope. Select Live Data. Select 12 volt square wave. Press F2 for Scope. Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete. Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the Adjustable Pedals Assembly connector. Turn the ignition on. Observe the voltage display on the DRB Lab Scope. Does the voltage pulse from 0 to approximately 7.5 volts? Yes → Replace the Adjustable Pedals Assembly in accordance with the service information. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1. No → Repair the PCI Bus circuit for an open. Perform ADJUSTABLE PEDALS VERIFICATION TEST - VER 1.	All

Symptom:

*NO RESPONSE FROM CONTROLLER ANTILOCK BRAKE

POSSIBLE CAUSES
NO RESPONSE FROM CAB
GROUND CIRCUIT OPEN
OPEN FUSED IGNITION SWITCH OUTPUT CIRCUIT
OPEN PCI BUS CIRCUIT
CONTROLLER ANTILOCK BRAKE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. **Note: As soon as one or more module communicates with the DRB, answer the question.** With the DRB, attempt to communicate with the Airbag Control Module (ACM). With the DRB, attempt to communicate with the Body Control Module (BCM). Was the DRB able to I/D or establish communications with either of the modules? Yes → Go To 2 No → Refer to the Communications category and perform the symptom PCI Bus Communication Failure. Perform ABS VERIFICATION TEST - VER 1.	All
2	Turn the ignition off. Disconnect the CAB harness connector. Using a 12-volt test light connected to 12-volts, probe both ground circuits. Is the test light illuminated for each circuit? Yes → Go To 3 No → Repair the ground circuit(s) for an open. Perform ABS VERIFICATION TEST - VER 1.	All
3	Turn the ignition off. Disconnect the CAB harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output circuit. Is the test light illuminated? Yes → Go To 4 No → Repair the Fused Ignition Switch Output circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

*NO RESPONSE FROM CONTROLLER ANTILOCK BRAKE — Continued

TEST	ACTION	APPLICABILITY
4	**Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.** Disconnect the CAB harness connector. Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes. Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable. With the DRBIII® select Pep Module Tools. Select lab scope. Select Live Data. Select 12 volt square wave. Press F2 for Scope. Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete. Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the CAB connector. Turn the ignition on. Observe the voltage display on the DRB Lab Scope. Does the voltage pulse from 0 to approximately 7.5 volts? Yes → Go To 5 No → Repair the PCI Bus circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All
5	If there are no possible causes remaining, view repair. Repair Replace the Controller Antilock Brake in accordance with the Service Information. Perform ABS VERIFICATION TEST - VER 1.	All

Verification Tests

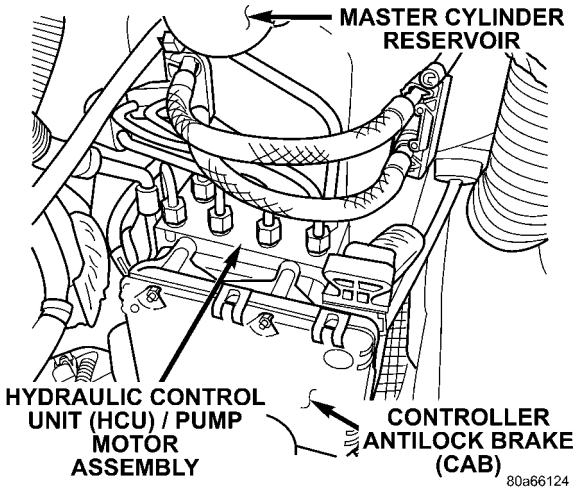
ABS VERIFICATION TEST - VER 1	APPLICABILITY
1. Turn the ignition off. 2. Connect all previously disconnected components and connectors. 3. Ensure all accessories are turned off and the battery is fully charged. 4. Ensure that the Ignition is on, and with the DRBIII, erase all Diagnostic Trouble Codes from ALL modules. Start the engine and allow it to run for 2 minutes and fully operate the system that was malfunctioning. 5. Turn the ignition off and wait 5 seconds. Turn the ignition on and using the DRBIII, read DTC's from ALL modules. 6. If any Diagnostic Trouble Codes are present, return to Symptom list and troubleshoot new or recurring symptom. **7. NOTE: For Sensor Signal and Pump Motor faults, the CAB must sense all 4 wheels at 25 km/h (15 mph) before it will extinguish the ABS Indicator.** 8. If there are no DTC's present after turning ignition on, road test the vehicle for at least 5 minutes. Perform several antilock braking stops. **9. Caution: Ensure braking capability is available before road testing.** 10. Again, with the DRBIII® read DTC's. If any DTC's are present, return to Symptom list. 11. If there are no Diagnostic Trouble Codes (DTC's) present, and the customer's concern can no longer be duplicated, the repair is complete. Are any DTC's present or is the original concern still present? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

ADJUSTABLE PEDALS VERIFICATION TEST - VER 1	APPLICABILITY
1. If the Adjustable Pedals Module was replaced, program two pedal positions if equipped with memory function. 2. Activate the Adjustable Pedals through the full range of movement. 3. Verify that the Adjustable Pedals system is disabled with the vehicle in Reverse. 4. Verify that the Adjustable Pedals system is disabled with Speed Control activated. 5. With the DRBIII®, erase DTCs. 6. With the DRBIII®, read DTCs. Are any DTC's present or is the original complaint still present? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

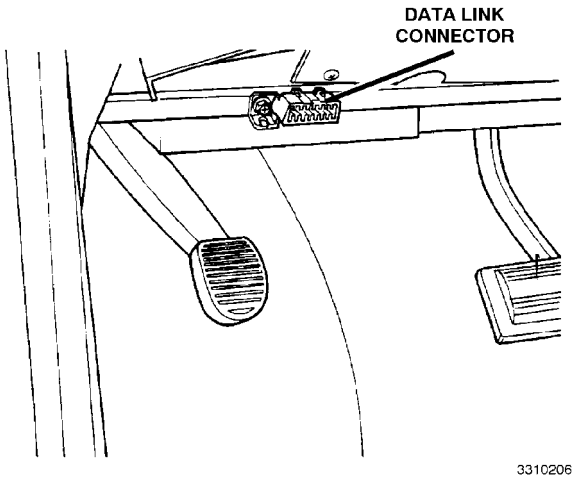
NOTES

8.0 COMPONENT LOCATIONS

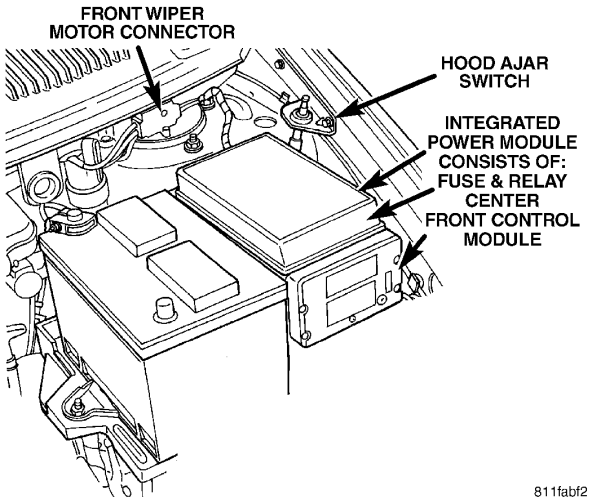
8.1 CONTROLLER ANTILOCK BRAKE (CAB)



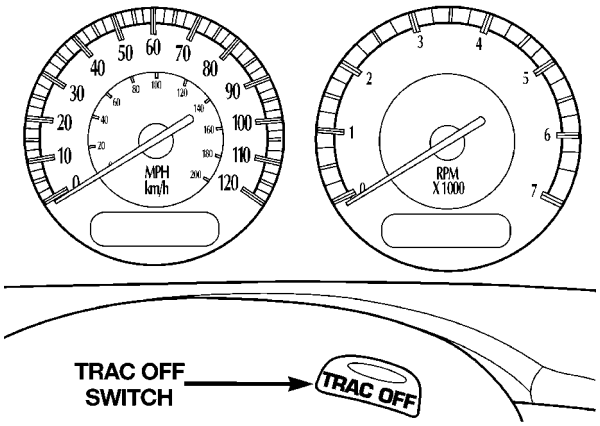
8.2 DATA LINK CONNECTOR



8.3 FUSES

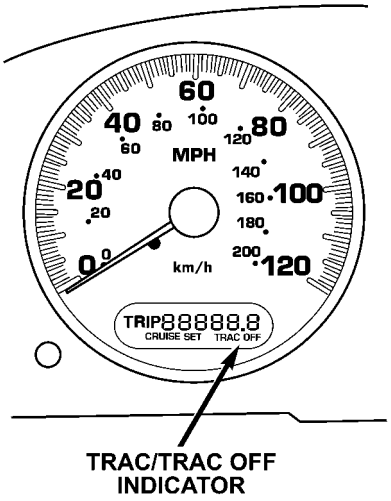


8.4 TRACTION CONTROL SWITCH



80a66201

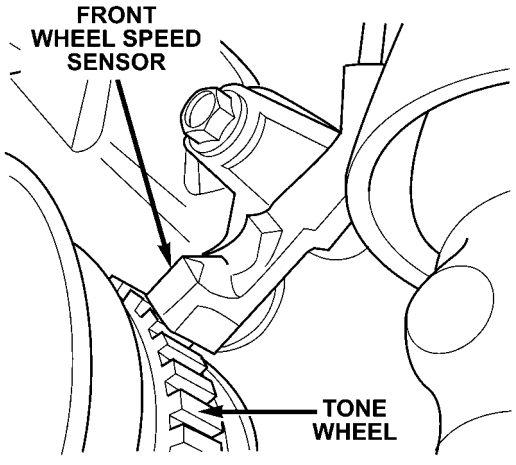
8.4.1 TRACTION CONTROL INDICATORS



80a655a5

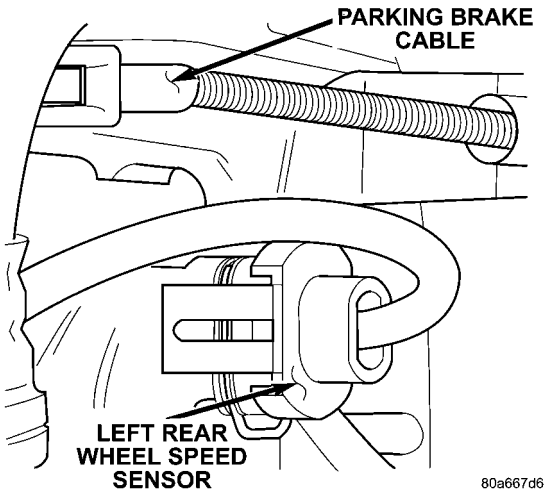
8.5 WHEEL SPEED SENSORS

8.5.1 FRONT



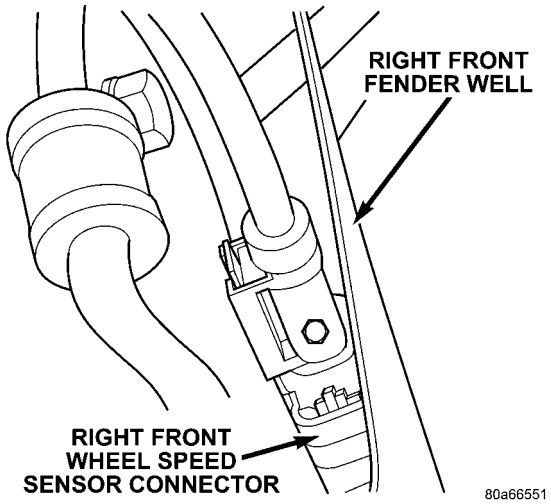
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8.5.2 REAR

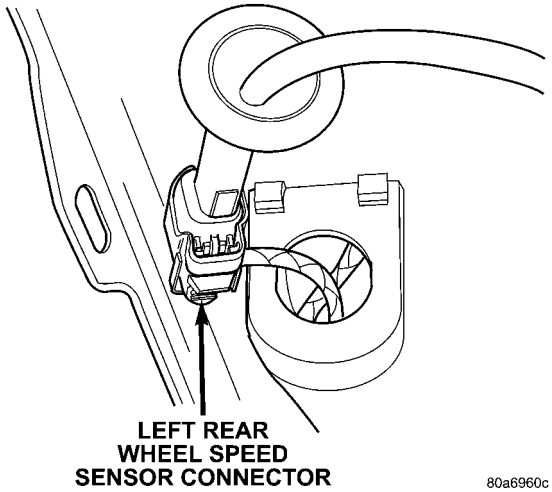


8.5A WHEEL SPEED SENSOR CONNECTORS

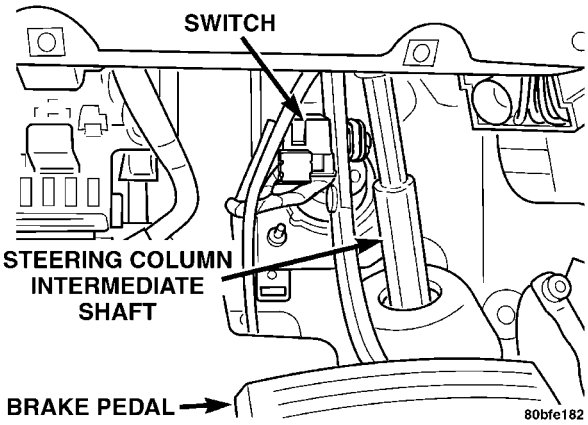
8.5A.1 FRONT



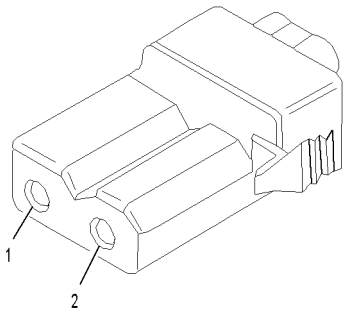
8.5A.2 REAR



8.6 BRAKE LAMP SWITCH



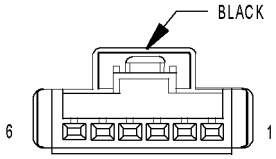
9.0 CONNECTOR PINOUTS



ABS PUMP MOTOR (COMPONENT SIDE)

ABS PUMP MOTOR (COMPONENT SIDE) - 2 WAY

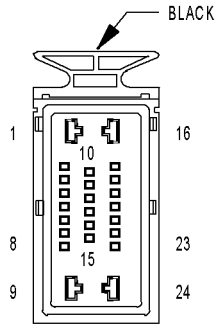
CAV	CIRCUIT	FUNCTION
1	-	GROUND
2	-	PUMP/MOTOR RELAY OUTPUT



BRAKE LAMP SWITCH

BRAKE LAMP SWITCH - BLACK 6 WAY

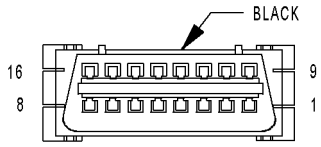
CAV	CIRCUIT	FUNCTION
1	A103 18GY/RD	FUSED B(+)
2	L50 18WT/TN (DIESEL)	PRIMARY BRAKE SWITCH SIGNAL
2	L50 18WT/TN (GAS)	BRAKE LAMP SWITCH OUTPUT
3	V30 20VT/WT (GAS)	S/C BRAKE SWITCH OUTPUT
4	V32 20VT/YL (GAS)	SPEED CONTROL SUPPLY
5	Z429 20BK/OR	GROUND
6	B29 20DG/WT	SECONDARY BRAKE SWITCH SIGNAL



CONTROLLER ANTILOCK BRAKE

CONTROLLER ANTILOCK BRAKE - BLACK 24 WAY

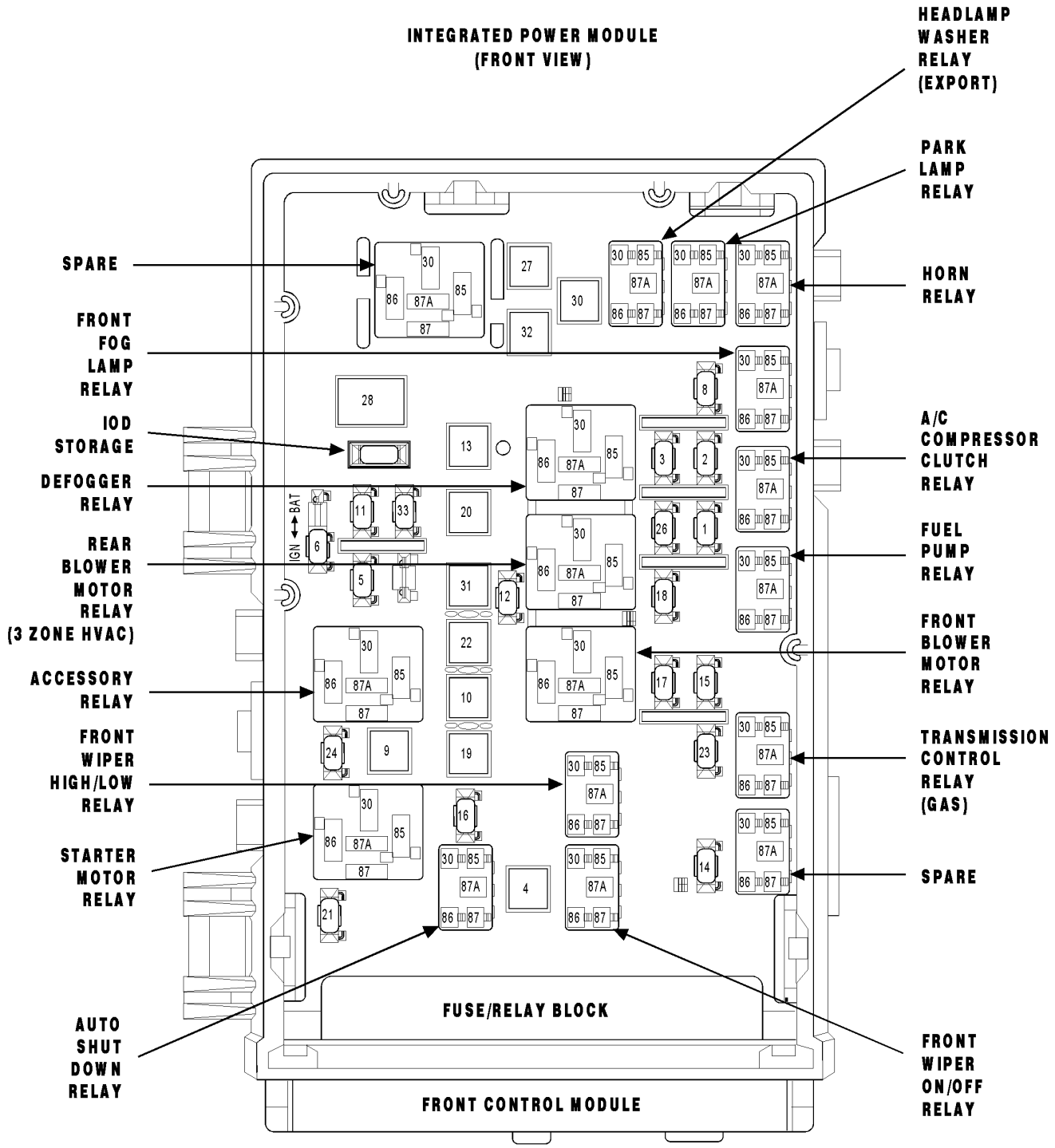
CAV	CIRCUIT	FUNCTION
1	Z107 12BK/DG	GROUND
2	B1 18DG/OR	RIGHT REAR WHEEL SPEED SENSOR SIGNAL
3	B2 18DG/LB	RIGHT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY
4	-	-
5	D25 18WT/VT	PCI BUS
6	B6 18DG/WT	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL
7	B7 18DG/VT	RIGHT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
8	-	-
9	A111 12DG/RD	FUSED B(+)
10	F500 18DG/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-
16	Z127 12BK/DG	GROUND
17	-	-
18	L50 18WT/TN (DIESEL)	PRIMARY BRAKE SWITCH SIGNAL
18	L50 18WT/TN (GAS)	BRAKE LAMP SWITCH OUTPUT
19	B3 18DG/YL	LEFT REAR WHEEL SPEED SENSOR SIGNAL
20	B4 18DG/GY	LEFT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY
21	-	-
22	B8 18DG/TN	LEFT FRONT WHEEL SPEED SENSOR SIGNAL
23	B9 18DG/WT (3.3L/3.8L)	LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
23	B9 18DG/LG (EXCEPT 3.3L/3.8L)	LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
24	A107 12TN/RD	FUSED B(+)



DATA LINK CONNECTOR

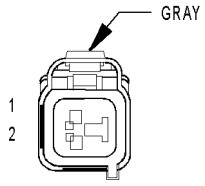
DATA LINK CONNECTOR - BLACK 16 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20WT/VT	PCI BUS
3	-	-
4	Z11 20BK/LG	GROUND
5	Z111 20BK/WT	GROUND
6	-	-
7	D21 20WT/DG (DIESEL)	SCI TRANSMIT (ECM)
7	D21 20WT/DG (GAS)	SCI TRANSMIT (PCM)
8	-	-
9	D123 20WT/BR	FLASH PROGRAM ENABLE
10	-	-
11	-	-
12	D20 20WT/LG (GAS)	SCI RECEIVE (PCM)
13	-	-
14	-	-
15	D15 20DG/YL (EATX)	SCI TRANSMIT (TCM)
16	A105 20DB/RD	FUSED B(+)


INTEGRATED POWER MODULE
(FRONT VIEW)
HEADLAMP WASHER RELAY (EXPORT)
PARK LAMP RELAY
HORN RELAY
A/C COMPRESSOR CLUTCH RELAY
FUEL PUMP RELAY
FRONT BLOWER MOTOR RELAY
TRANSMISSION CONTROL RELAY (GAS)
SPARE
FRONT WIPER ON/OFF RELAY
SPARE
FRONT FOG LAMP RELAY
IOD STORAGE
DEFOGGER RELAY
REAR BLOWER MOTOR RELAY (3 ZONE HVAC)
ACCESSORY RELAY
FRONT WIPER HIGH/LOW RELAY
STARTER MOTOR RELAY
AUTO SHUT DOWN RELAY
IGN
BAT
FUSE/RELAY BLOCK
FRONT CONTROL MODULE

FUSES (IPM)

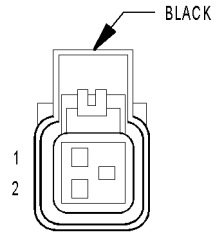
FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTION
1	20A	INTERNAL	FUSED B(+)
2	15A	INTERNAL	FUSED PARK LAMP RELAY OUTPUT
3	15A	INTERNAL	FUSED PARK LAMP RELAY OUTPUT
4	30A	INTERNAL	FUSED B(+)
5	20A	F306 16DB/PK	FUSED ACCESSORY RELAY OUTPUT
6	20A	F307 16LB/PK (ACCESSORY RELAY POSITION)	FUSED ACCESSORY RELAY OUTPUT
6	20A	F307 16LB/PK (BATTERY POSITION)	FUSED B(+)
8	20A	INTERNAL	FUSED B(+)
9	40A	INTERNAL	FUSED B(+)
10	40A	C7 12DB	FUSED FRONT BLOWER MOTOR RELAY OUTPUT
11	20A	F302 18GY/PK	FUSED ACCESSORY RELAY OUTPUT
12	25A	C51 12LB/BR	FUSED REAR BLOWER MOTOR RELAY OUTPUT
13	40A	C15 12DB/WT	FUSED DEFOGGER RELAY OUTPUT
14	20A	INTERNAL	FUSED B(+) (I.O.D.)
15	20A	INTERNAL (DIESEL)	FUSED B(+)
15	20A	INTERNAL (EATX)	FUSED B(+)
16	25A	INTERNAL	FUSED B(+)
17	20A	INTERNAL	FUSED B(+)
18	15A	INTERNAL	FUSED B(+)
19	40A	A101 12VT/RD	FUSED B(+)
20	30A	A102 12WT/RD	FUSED B(+)
21	25A	A111 12DG/RD	FUSED B(+)
22	40A	A110 12OR/RD	FUSED B(+)
23	10A	A106 20LB/RD	FUSED B(+)
24	20A	A701 16BR/RD	FUSED B(+) (HAZARD)
26	20A	A103 18GY/RD	FUSED B(+)
27	40A	A112 12OR/RD	FUSED B(+)
28	40A	F30 12PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
30	40A	INTERNAL (EXPORT)	FUSED B(+)
31	40A	A113 12WT/RD	FUSED B(+)
32	40A	A115 12YL/RD	FUSED B(+)
33	15A	INTERNAL	FUSED ACCESSORY RELAY OUTPUT



LEFT FRONT WHEEL SPEED SENSOR

LEFT FRONT WHEEL SPEED SENSOR - GRAY 2 WAY

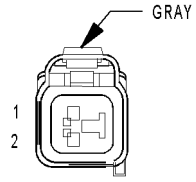
CAV	CIRCUIT	FUNCTION
1	B9 18DG/WT (3.3L/3.8L)	LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
1	B9 18DG/LG (EXCEPT 3.3L/3.8L)	LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
2	B8 18DG/TN	LEFT FRONT WHEEL SPEED SENSOR SIGNAL



LEFT REAR WHEEL SPEED SENSOR

LEFT REAR WHEEL SPEED SENSOR - BLACK 2 WAY

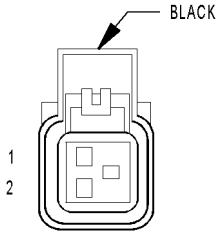
CAV	CIRCUIT	FUNCTION
1	B4 18DG/GY	LEFT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY
2	B3 18DG/YL	LEFT REAR WHEEL SPEED SENSOR SIGNAL



RIGHT FRONT WHEEL SPEED SENSOR

RIGHT FRONT WHEEL SPEED SENSOR - GRAY 2 WAY

CAV	CIRCUIT	FUNCTION
1	B7 18DG/VT	RIGHT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
2	B6 18DG/WT	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL



RIGHT REAR WHEEL SPEED SENSOR

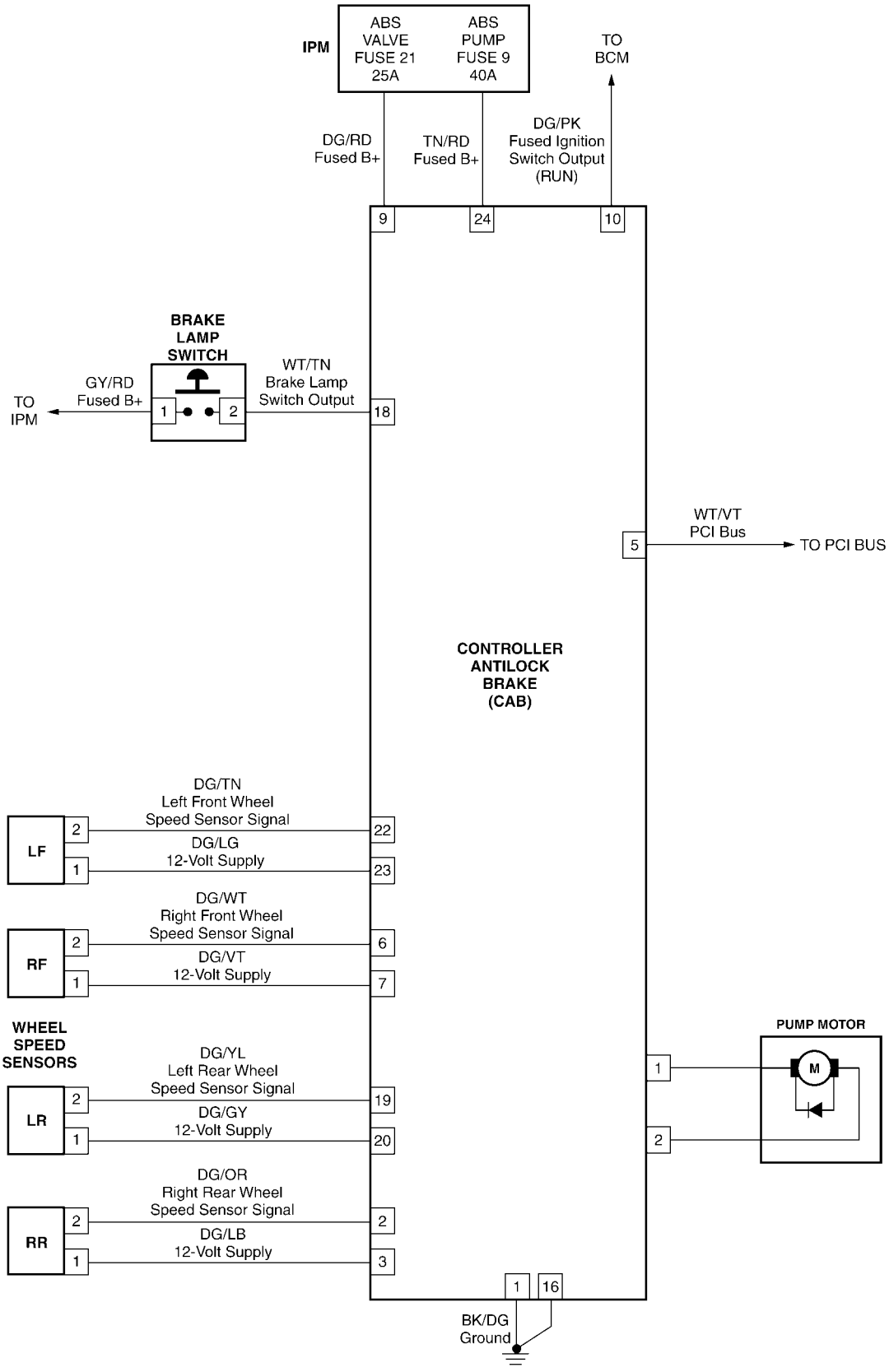
RIGHT REAR WHEEL SPEED SENSOR - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	B2 18DG/LB	RIGHT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY
2	B1 18DG/OR	RIGHT REAR WHEEL SPEED SENSOR SIGNAL

NOTES

10.0 SCHEMATIC DIAGRAMS

10.1 TEVES MARK 20E ANTILOCK BRAKE SYSTEM – ABS



NOTES