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# 1.0 INTRODUCTION

The procedures contained in this manual include all the specifications, instructions, and graphics needed to diagnose 2004 Chrysler and Dodge Neon Mark 20e Antilock Braking System (ABS) problems. The diagnostics in this manual are based on the failure condition or symptom being present at time of diagnosis.

Follow the recommendations below when choosing your diagnostic path.

1. First make sure the DRBIII® is communicating with the CAB. If the DRBIII® displays a "No Response" condition, you must diagnose that first.
2. Read and record DTC's (diagnostic trouble codes) and Freeze Frame information with the DRBIII®.
3. If no DTC's are present, identify the customer complaint.
4. Once the DTC or customer complaint is identified, locate the matching test in the Table of Contents and begin to diagnose the symptom.

All component location views are in Section 8.0. All connector pinouts are in Section 9.0. All schematics are in Section 10.0.

An * placed before the symptom description indicated a customer complaint.

When repairs are required, refer to the appropriate service manual for the proper removal and repair procedure.

Diagnostic procedures change every year. New diagnostic systems may be added; carry over systems may be enhanced. READ THIS MANUAL BEFORE TRYING TO DIAGNOSE A VEHICLE CODE. It is recommended that you review the entire manual to become familiar with all new and changed diagnostic procedures.

After using this book, if you have any comments or recommendations, please fill out the form at the back of the book and mail it back to us.

## 1.1 SYSTEM COVERAGE

This diagnostic procedure manual covers the Teves Mark 20e Antilock Braking System (ABS) on the Neon.

## 1.2 SIX-STEP TROUBLESHOOTING PROCEDURE

Diagnosis of the antilock brake system is done in six basic steps:

- verification of complaint
- verification of any related symptoms
- symptom analysis
- problem isolation
- repair of isolated problem
- verification of proper operation

# 2.0 IDENTIFICATION OF SYSTEM

Vehicles equipped with the Teves Mark 20e antilock brake system can be identified by the presence of the hydraulic control unit located with the controller antilock brake (CAB) under the hood near the air cleaner housing, or by observing the ABS lamp illumination during the bulb check.

# 3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

## 3.1 TEVES MARK 20e SYSTEM DESCRIPTION

This section covers the physical and operational descriptions, and the diagnostic service procedures for the Teves Mark 20e Antilock Brake System. It is the only antilock brake system (ABS) available on this vehicle.

The purpose of the antilock brake system is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

All vehicles equipped with ABS use Electronic Variable Brake Proportioning (EVBP) to balance front-to-rear braking when the brakes are applied in the partial braking range.

A Controller Antilock Brake (CAB) module is used to monitor wheel speeds and to modulate (control) hydraulic pressure in each brake channel when ABS is actuated. The CAB also provides a vehicle speed signal (VSS) to the powertrain control module via PCI BUS.

During a non-ABS stop, the system functions as a standard diagonally split configuration. The primary hydraulic system supplies brake fluid pressure to the right front and left rear brakes, and the secondary hydraulic system supplies the right rear and left front brakes. A conventional proportioning valve is not used. This system uses the existing ABS solenoids to replace and perform the same functions that the proportioning valves do. The CAB has a special software program that monitors the wheel speeds and when certain criteria are met the soft-

ware will enable the solenoids to perform the same brake fluid management control as the proportioning valves.

During an ABS stop, the system still uses the diagonal hydraulic split; however, the brake system pressure is further split into four control channels. During ABS operation, all wheels are controlled independently and are on four separate control channels.

During an antilock stop, "wheel lock-up" does not necessarily mean that the wheel has locked, it means only that the wheel is turning slower than the vehicle speed. This is called "wheel slip" and is indicated as a percentage. 0% slip means that the wheel is rolling free and 100% slip means that the wheel is locked. The antilock system maintains an average of approximately 20% wheel slip.

It is important to remember that the antilock brake system does not shorten the vehicle stopping distance under all driving conditions, but provides improved control of the vehicle while stopping. Vehicle stopping distance is still dependent on vehicle speed, weight, tires, road surface, and other factors.

### 3.1.1 PEDAL FEEL/VEHICLES CHARACTERISTICS

There are several pedal feel/vehicle characteristics that are considered normal for antilock braking that may require further explanation.

When stopping conditions activate the antilock brakes, the driver may feel some vibrations/pulsations in the brake pedal and may hear the solenoid valves clicking and the pump motor running. The vibrations/pulsations are caused by the isolating, building and decaying of brake fluid pressure within the brake lines. The ABS system prevents complete wheel lock-up, but some wheel slip is required for the best braking performance. This slip may result in some tire chirping, depending on the road surface. This chirping should not be interpreted as total wheel lock-up. Total wheel lock-up leaves black tire marks on dry pavement. Antilock braking may leave some light marks.

At the end of an ABS stop, the ABS may function all the way down to near 0 km/h (0 mph). There may be a slight brake pedal drop anytime the ABS is deactivated.

In case of braking on a bumpy surface, the ABS system may detect wheel locking tendencies due to wheel hop and cycle the ABS. In that event the brake pedal may pulsate with a perceived loss of deceleration. ABS braking may also be activated at times while on dry pavement with sand, gravel, or other loose debris on the road.

It should be noted that the pulsating pedal feel characteristic will not illuminate the brake warning lamps or set a trouble code that is stored in the Controller Antilock Brake (CAB). When investigating a hard pedal feel, inspect the sensor and tone wheel teeth for chips/broken teeth, damaged sensor pole tips, excessive runout of the tone wheel, or excessive air gap.

### 3.1.2 SYSTEM COMPONENTS

ANTILOCK BRAKE SYSTEM

- controller antilock brake (CAB)
- vacuum booster
- master cylinder (w/center valves)
- hydraulic control unit (HCU)
- valve block assembly: 8 valve solenoids (4 inlet valves, 4 outlet valves)
- pump/motor assembly:
  1 motor
  2 pumps
- 4 wheel speed sensor/tone wheel assemblies
- ABS warning indicator
- fuses and wiring harness
- fluid reservoir (integral part of master cylinder assembly)

### 3.1.3 ABS AND RED BRAKE WARNING INDICATOR

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 due to a system malfunction. The CAB controls the lamp indirectly. The CAB monitors its own functions. If the CAB determines that the ABS warning indicator should be on, the CAB sends a message via the PCI BUS to the instrument cluster and the cluster turns on the indicator. The indicator will remain lit during every key cycle until the 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 Indicators.

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

The red brake warning indicator is located in the instrument cluster. It can be activated by application of the parking brake, a leak in the front or rear wheel brake hydraulic circuit which causes the master cylinder reservoir to be low on fluid, or by turning the ignition switch to the start position. The red brake warning indicator can also be turned on if the CAB indicates an Electronic Brake Distribution (EBD) failure.

### 3.1.4 CONTROLLER ANTILOCK BRAKE (CAB)

The antilock brake controller (CAB) is a microprocessor-based device that monitors wheel speeds and controls the antilock functions.

The primary functions of the CAB are:

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

The CAB continously 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 with the use of 3 accumulators. 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 antilock warning lamp. If the antilock function is disabled, the system will revert to standard base brake system operation.

The CAB inputs include the following:

- four wheel speed sensors
- brake lamp switch
- ignition switch
- battery voltage
- diagnostic communication (PCI BUS)

The CAB outputs include the following:

- eight valve/solenoid drivers
- pump/motor actuation
- ABS warning indicator actuation (PCI BUS)
- red brake warning indicator actuation (PCI BUS)
- diagnostic communication (PCI BUS)

### 3.1.5 HYDRAULIC CONTROL UNIT

The hydraulic control unit (HCU) contains the valve block assembly and the pump/motor assembly.

**Valve Block Assembly:** The valve block assembly contains inlet valves, outlet valves, and shuttle 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 channel. If a wheel locks, the inlet valve is closed to prevent any 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), both valves will close to hold the pressure constant.

**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 motor when an antilock stop is detected. The pump continues to run during the antilock stop and is turned off approximately 3-5 seconds after the stop is complete. The CAB monitors the pump motor operation internally.

### 3.1.6 SENSORS

**Wheel Speed Sensors and Tone Wheels:** One wheel speed sensor (WSS) is located at each wheel. The sensor has internal circuitry powered by 12 volts from the controller antilock brake (CAB). The sensor generates and sends a DC voltage signal back to the CAB. The signal is toggled in proportion to the speed of the toothed tone wheel as it passes the sensor pole. The CAB uses the signal to activate ABS functions as required.

**Because of the internal circuitry, correct sensor function cannot be determined by a resistance check across the pins of the sensor.**

The front wheel sensors are attached to a boss in the steering knuckle. The tone wheels are an integral part of the front axle shaft. The rear speed sensors are mounted in the caliper adapter plate and the rear tone wheels are an integral part of the rear rotor hubs. **The wheel speed sensor air gap is NOT adjustable.**

Correct antilock system operation is dependent on 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 pressures for optimum system operation. Variations 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.

## 3.2 ABS DIAGNOSTIC TROUBLE CODES

The Teves Mark 20e Antilock Brake System (ABS) module may report any of the following diagnostic trouble codes:

- BUS System Communication Failure
- CAB Internal Failure
- Cluster Lamp Failure
- Left Front Sensor Circuit Failure
- Left Front Wheel Speed Signal Failure
- Left Rear Sensor Circuit Failure
- Left Rear Wheel Speed Signal Failure
- Pump Circuit Failure
- Right Front Sensor Circuit Failure
- Right Front Wheel Speed Signal Failure
- Right Rear Sensor Circuit Failure
- Right Rear Wheel Speed Signal Failure
- System Over Voltage
- System Under Voltage
- Valve Power Feed Failure

Diagnostic trouble codes are retained in memory until erased using the DRBIII®, or automatically erased after 255 key cycles or 3500 miles.

### 3.2.1 SYSTEM 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 brake systems. The ABS and brake warning lamps will illuminate for 4 seconds with ignition on.

At 20 km/h (12 mph) a dynamic test is performed. This will momentarily run the pump/motor. If during the dynamic test, the brake pedal is depressed, the driver may feel the test through brake pedal pulsations. This is a normal condition.

If any component sets a trouble code during system initialization or dynamic check, the CAB will illuminate the ABS warning lamp.

### 3.2.2 DIAGNOSTIC MODE

For a Mark 20e system to enter diagnostic mode, 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 and red brake warning indicator will blink rapidly. If a hard trouble code is present, such as a CAB Power Feed Circuit diagnostic trouble code, the indicator will be illuminated without blinking until the diagnostic trouble condition is corrected.
- Antilock operation is disabled.

### 3.2.3 INTERMITTENT DIAGNOSTIC TROUBLE CODES

If the malfunction is not present while performing a test procedure, the diagnostic procedures will not locate the problem. In this case, the code can only suggest an area to inspect. Check for the following:

- loose or corroded conditions
- damaged components (sensors, tone wheels)
- damaged wiring
- excessive axle shaft runout
- hydraulic system leaks
- foundation (non-ABS) brake system problems

If no obvious problems are found, erase diagnostic trouble codes and, with the key on, wiggle the wire harness and connectors. Recheck for codes periodically while working through the system. This procedure may uncover a difficult to locate malfunction.

## 3.3 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.

## 3.4 USING THE DRBIII®

Refer to the DRBIII® user’s guide for instructions and assistance with reading diagnostic trouble codes, erasing diagnostic trouble codes and other DRBIII® functions.

## 3.5 DRBIII® ERROR MESSAGES

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.
```

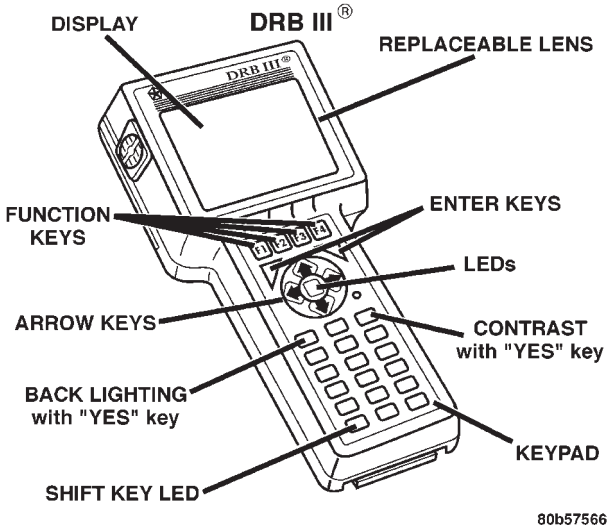
### 3.5.1 DRBIII® DOES NOT POWER UP (BLANK SCREEN)

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 16-way connector cavity 16). A minimum of 11 volts is required to adequately power the DRBIII®. Also check for a good ground at the DLC.

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

### 3.5.2 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 the vehicle; the parking brake does not hold the front drive wheels.

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

When diagnosing an antilock brake or speed proportional steering system 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 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 it does not, false diagnostic codes or error messages may occur.

#### 4.2.3 SERVICING SUB—ASSEMBLIES

Some components of the antilock brake or speed proportional steering system are intended to be serviced in assembly only. Attempting to remove or repair certain sub-components 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 function 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<br>0 — 500 volts DC |
| Ohms (resistance)* | 0 — 1.12 megohms |
| Frequency Measured<br>Frequency Generated | 0 — 10 kHz |
| Temperature | -58 — 1100° F<br>-50 — 600° C |

* Ohms cannot be measured if voltage is present. Ohm 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 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 WARNING

### 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.

Use care 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.

**CAUTION: Before road testing a vehicle, be sure that all components are reassembled. During the test drive, do not try to read the DRBIII® 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 ABS system for damaged components or disconnected connectors. The brake lamps must be operational, and if they are not, repair them prior to continuing.
2. Connect the DRBIII® to the data link connector 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. Select "Antilock Brakes". Turn the ignition on. If the DRBIII® displays "No Response", perform the proper test.
4. Read and record all ABS diagnostic trouble codes and Freeze Frame information. 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 codes are present, proceed to the appropriate test.
5. If there are no diagnostic trouble codes present, 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. If a problem with the amber "ABS" warning indicator exists, refer to the proper test.

6. If no other problems are found, it will be necessary to road test the vehicle. **THE DRBIII® MUST NOT BE CONNECTED TO THE DATA LINK CONNECTOR WHEN ROAD TESTING FOR PROPER ANTILOCK OPERATION. THE SYSTEM IS DISABLED WHILE IN DIAGNOSTIC MODE.** Perform several antilock stops from above 50 Km/h (30 mph) and then repeat steps 2, 3, and 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 10 Km/h (6 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 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 lamp

## 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 |
| **EVBP** | electronic variable brake proportioning |
| **HCU** | hydraulic control unit |
| **HZ** | Hertz |
| **LF** | left front |
| **LR** | left rear |
| **PCI** | Programmable Communication Interference |
| **PCM** | Powertrain Control Module |
| **PDC** | power distribution center |
| **P/M** | pump motor |
| **RF** | right front |
| **RR** | right rear |
| **SOL** | solenoid |
| **WSS** | wheel speed sensor |

## NOTES

# 7.0

# DIAGNOSTIC INFORMATION AND PROCEDURES

## 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.<br>With the DRBIII®, read DTCs.<br>With the DRBIII®, read Freeze Frame information.<br>With the DRBIII®, erase DTCs.<br>Turn the ignition off.<br>Turn the ignition on.<br>With the DRBIII®, read DTCs.<br>Does the DRBIII® display BUS SYSTEM COMMUNICATION FAILURE?<br>Yes → Go To 2<br>No → Go To 4 | All |
| 2 | Turn the ignition on.<br>With the DRBIII®, read EMIC DTCs.<br>Does the DRBIII® display ABS MESSAGE NOT RECEIVED?<br>Yes → Refer to symptom ABS MESSAGE NOT RECEIVED in the BODY/INSTRUMENT CLUSTER category. Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 3 | All |

## BUS SYSTEM COMMUNICATION FAILURE — Continued

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

## Symptom:
## CAB INTERNAL FAILURE

**When Monitored and Set Condition:**

**CAB INTERNAL FAILURE**

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

Set Condition: If the Fused B(+) voltage is missing when the CAB detects that an internal main driver is not ″on″, the Diagnostic Trouble Code (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.<br>With the DRBIII®, read DTCs.<br>With the DRBIII®, erase DTCs.<br>Turn the ignition off.<br>Turn the ignition on.<br>With the DRBIII®, read DTCs.<br>Does the DRBIII® display CAB INTERNAL FAILURE?<br>Yes → Go To 2<br>No → Go To 6 | All |
| 2 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Inspect the CAB/CAB harness connector for damage.<br>Is there any broken, bent, pushed out, corroded or spread terminals?<br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 3 | All |

## CAB INTERNAL FAILURE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 3 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Using a 12-volt test light connected to 12-volts, probe the CAB harness connector ground circuits.<br>Did the test light illuminate?<br><br>Yes → Go To 4<br><br>No → Repair the CAB Ground circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 4 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Using a 12-volt test light connected to ground, probe the ABS Valve Fused B(+) circuit at the CAB harness connector.<br>Did the test light illuminate?<br><br>Yes → Go To 5<br><br>No → Repair the ABS Valve Fused B(+) circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 5 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Using a 12-volt test light connected to ground, probe the ABS Pump Fused B(+) circuit at the CAB harness connector.<br>Did the test light illuminate?<br><br>Yes → Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>No → Repair the ABS Pump Fused B(+) circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 6 | Turn the ignition off.<br>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.<br>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.<br>Refer to any Hotline letters or Technical Service Bulletins that may apply.<br>Were any problems found?<br><br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>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.<br>With the DRBIII®, read DTCs.<br>Are there any Instrument Cluster or ABS DTCs present?<br><br>Yes → Refer to the appropriate category for the related symptom(s).<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>No → Go To 2 | All |
| 2 | Turn the ignition off.<br>Perform the Key-on Bulb Check.<br>Does the ABS Warning Indicator light and then go out after a few seconds?<br><br>Yes → Go To 3<br><br>No. Light remains after bulb check.<br>Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>No. Indicator never comes on.<br>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.**<br>Turn the ignition off.<br>Remove ABS Valve fuse.<br>Perform the Key-on Bulb Check.<br>Does the ABS Indicator remain on after the bulb check?<br>Yes → Test Complete.<br>No → Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 4 | **NOTE: The following steps will initiate the Instrument Cluster self test.**<br>Turn the ignition off.<br>Press and hold the odometer reset button.<br>Turn the ignition to RUN.<br>Observe the Instrument Cluster indicators.<br>Release the odometer reset button.<br>Did the ABS Indicator illuminate during the Instrument Cluster self test?<br>Yes → Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1.<br>No → Replace the Instrument Cluster in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1. | All |

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

## LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

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

## LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

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

## LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 13 | Turn the ignition off.<br>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.<br>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.<br>Refer to any Hotline letters or Technical Service Bulletins that may apply.<br>Were any problems found?<br><br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>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 comparison is 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 comparison is 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 comparison is 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 comparison is 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.<br>With the DRBIII®, read DTCs.<br>With the DRBIII®, read Freeze Frame information.<br>**NOTE: The CAB must sense ALL 4 wheels at 25 km/h (15 mph) before it will extinguish the ABS indicators.**<br>Does the DRBIII® display WHEEL SPEED SIGNAL FAILURE and SENSOR CIRCUIT FAILURE?<br>Yes → Refer to the affected Wheel Speed SENSOR CIRCUIT FAILURE for the related symptom(s). Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 2 | All |
| 2 | Turn the ignition on.<br>With the DRBIII® in Sensors, monitor ALL the Wheel Speed Sensor Signals while an assistant drives the vehicle.<br>Slowly accelerate as straight as possible from a stop to 24 km/h (15 mph).<br>Is the affected Wheel Speed Signal showing 0 km/h (0 mph)?<br>Yes → Go To 3<br>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.<br>Inspect the CAB connector, affected Wheel Speed Sensor, and affected Wheel Speed Sensor connector.<br>Is the Wheel Speed Sensor or any connector damaged?<br>Yes → Repair as necessary. Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 4 | All |

## LEFT FRONT WHEEL SPEED SIGNAL FAILURE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 4 | Turn ignition off.<br>Inspect the affected Tone Wheel for damaged, missing teeth, cracks, or looseness.<br>**NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.**<br>Is the affected Tone Wheel OK?<br>Yes → Go To 5<br>No → Replace the Tone Wheel in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 5 | Turn the ignition off.<br>Using a Feeler Gauge, measure the affected Wheel Speed Sensor Air Gap.<br>**NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.**<br>Is the Air Gap OK?<br>Yes → Go To 6<br>No → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 6 | Turn the ignition off.<br>Inspect the wheel bearings for excessive runout or clearance.<br>**NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications.**<br>Is the bearing clearance OK ?<br>Yes → Go To 7<br>No → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 7 | Turn the ignition off.<br>Visually inspect brakes for locking up due to lining contamination or overheating.<br>Inspect all components for defects which may cause a Signal DTC to set.<br>Is any component damaged?<br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br>No → Refer to symptom SENSOR CIRCUIT FAILURE for further diagnostics.<br>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.<br>Turn the ignition on.<br>Monitor the ABS Pump Motor for continuous operation.<br>**NOTE: The CAB must sense ALL wheels at 25 km/h (15 mph) before it will extinguish the ABS indicators.**<br>Is the ABS Pump Motor running continuously?<br>Yes → Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 2 | All |

## PUMP CIRCUIT FAILURE — Continued

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

## PUMP CIRCUIT FAILURE — Continued

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

## PUMP CIRCUIT FAILURE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 11 | Turn the ignition off.<br>Disconnect the ABS Pump Motor connector.<br>Check connectors - Clean/repair as necessary.<br>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.<br>Connect a 10 gauge jumper wire between the ABS Pump Motor connector BLACK wired terminal and ground.<br>Did the ABS Pump Motor operate?<br><br>Yes → Repair the ABS Pump Motor Fused B(+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.<br><br>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, 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.<br>With the DRBIII®, read DTC's.<br>With the DRBIII®, erase DTC's.<br>Turn the ignition off.<br>Turn the ignition on.<br>Start the engine.<br>With the DRBIII®, read DTC's.<br>Does the DRBIII® display SYSTEM OVER VOLTAGE?<br>Yes → Go To 2<br>No → Go To 7 | All |
| 2 | Is a battery charger connected to the vehicle?<br>Yes → Ensure the battery is fully charged. Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 3 | All |

## SYSTEM OVER VOLTAGE — Continued

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

## SYSTEM OVER VOLTAGE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 7 | Turn the ignition off.<br>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.<br>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.<br>Refer to any Hotline letters or Technical Service Bulletins that may apply.<br>Ensure the battery is fully charged.<br>Inspect the vehicle for aftermarket accessories that may exceed the Generator System output.<br>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors.<br>Were any problems found?<br><br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>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.<br>With the DRBIII®, read DTC's.<br>With the DRBIII®, erase DTC's.<br>Turn the ignition off.<br>Turn the ignition on.<br>Start the engine.<br>Drive the vehicle above 16 km/h (10 mph) for at least 20 seconds.<br>Stop the vehicle<br>With the DRBIII®, read DTC's.<br>Does the DRBIII® display SYSTEM UNDER VOLTAGE ?<br>Yes → Go To 2<br>No → Go To 6 | All |
| 2 | Engine Running.<br>Measure the battery voltage.<br>Is the battery voltage below 10 volts?<br>Yes → Refer to appropriate service information for charging system testing and repair.<br>Perform ABS VERIFICATION TEST - VER 1.<br>No → Go To 3 | All |

## SYSTEM UNDER VOLTAGE — Continued

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

## Symptom:
## VALVE POWER FEED FAILURE

**When Monitored and Set Condition:**

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

## VALVE POWER FEED FAILURE — Continued

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

## VALVE POWER FEED FAILURE — Continued

| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 8 | Reinstall the ABS Valve fuse.<br>Disconnect the CAB harness connector.<br>Using a 12-volt test light connected to ground, probe the ABS Valve Fused B(+) circuit at the CAB harness connector.<br>Did the test light illuminate?<br><br>Yes → Go To 9<br><br>No → Repair the ABS Valve Fused B(+) circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 9 | Turn the ignition off.<br>Using a 12-volt test light connected to 12-volts, probe the ground circuits at the CAB harness connector.<br>Did the test light illuminate?<br><br>Yes → Replace the Controller Antilock Brake in accordance with the Service Information.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>No → Repair the CAB Ground circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 10 | Turn the ignition off.<br>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.<br>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.<br>Refer to any Hotline letters or Technical Service Bulletins that may apply.<br>Were any problems found?<br><br>Yes → Repair as necessary.<br>Perform ABS VERIFICATION TEST - VER 1.<br><br>No → Test Complete. | 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.<br>**Note: As soon as one or more module communicates with the DRB, answer the question.**<br>With the DRB, attempt to communicate with the Airbag Control Module (ACM).<br>With the DRB, attempt to communicate with the Instrument Cluster (MIC).<br>Was the DRB able to I/D or establish communications with either of the modules?<br>Yes → Go To 2<br>No → Refer to the Communications category and perform the symptom PCI Bus Communication Failure.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 2 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Using a 12-volt test light connected to 12-volts, probe both ground circuits.<br>Is the test light illuminated for both circuits?<br>Yes → Go To 3<br>No → Repair the ground circuit(s) for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |
| 3 | Turn the ignition off.<br>Disconnect the CAB harness connector.<br>Turn the ignition on.<br>Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output circuit.<br>Is the test light illuminated?<br>Yes → Go To 4<br>No → Repair the Fused Ignition Switch Output circuit for an open.<br>Perform ABS VERIFICATION TEST - VER 1. | All |

## *NO RESPONSE FROM CONTROLLER ANTILOCK BRAKE — Continued

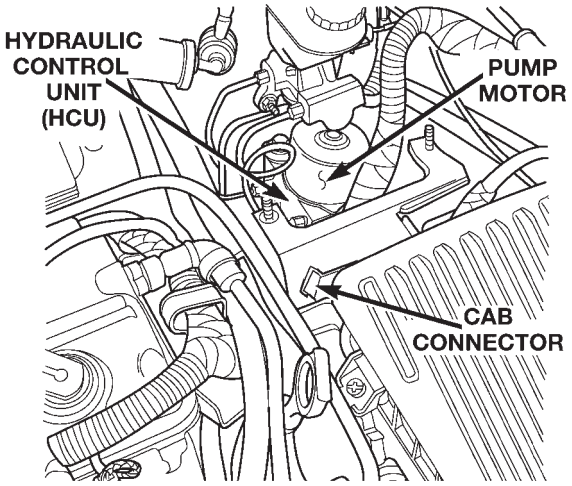
| TEST | ACTION | APPLICABILITY |
|---|---|---|
| 4 | **Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.**<br>Disconnect the CAB harness connector.<br>Use Scope input cable CH7058,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

## Verification Tests

| ABS VERIFICATION TEST - VER 1 | APPLICABILITY |
|---|---|
| 1. Turn the ignition off.<br>2. Connect all previously disconnected components and connectors.<br>3. Ensure all accessories are turned off and the battery is fully charged.<br>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.<br>5. Turn the ignition off and wait 5 seconds. Turn the ignition on and using the DRBIII, read DTC's from ALL modules.<br>6. If any Diagnostic Trouble Codes are present, return to Symptom list and troubleshoot new or recurring symptom.<br>**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.**<br>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.<br>**9. Caution: Ensure braking capability is available before road testing.**<br>10. Again, with the DRBIII® read DTC's. If any DTC's are present, return to Symptom list.<br>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.<br>Are any DTC's present or is the original concern still present?<br>Yes → Repair is not complete, refer to appropriate symptom.<br>No → Repair is complete. | All |

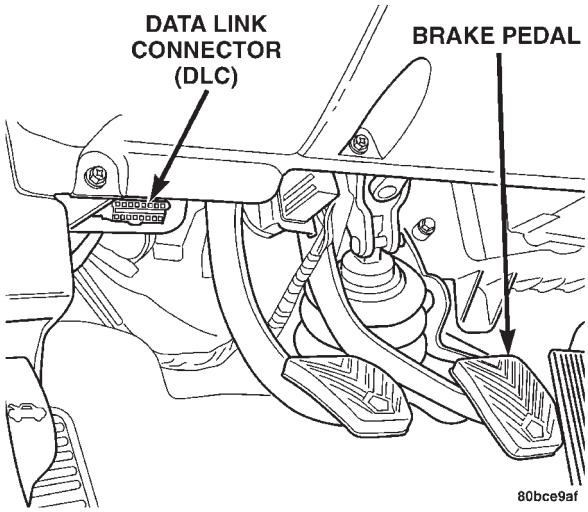
# 8.0 COMPONENT LOCATIONS

## 8.1 CONTROLLER ANTILOCK BRAKE

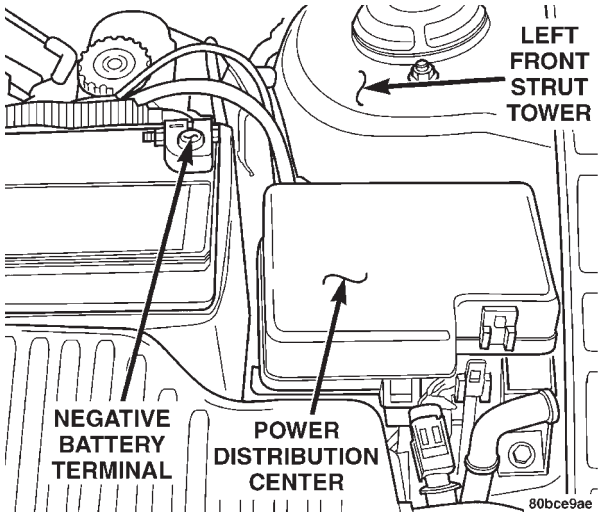


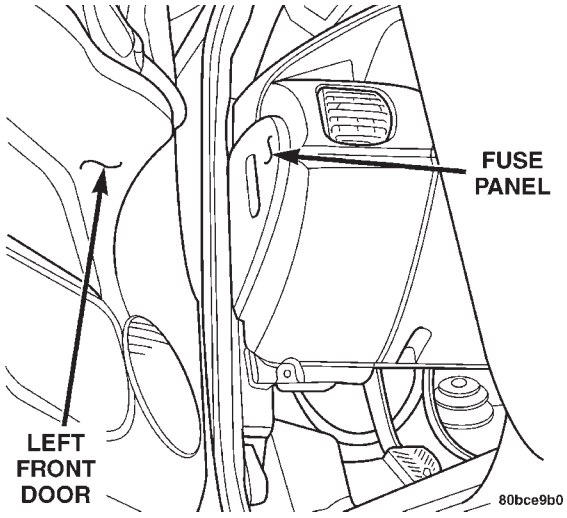

NOTE: SHOWN WITH BATTERY AND TRAY REMOVED 80bbc3da

## 8.2 DATA LINK CONNECTOR

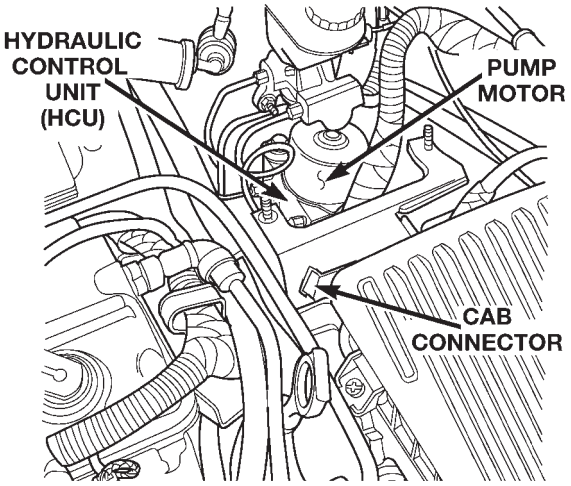



## 8.3 FUSES



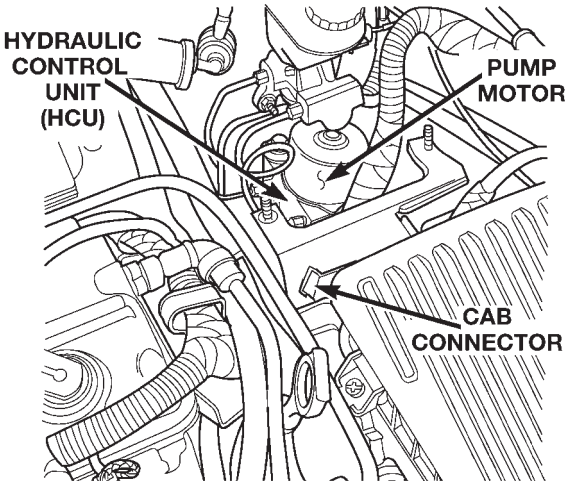



## 8.4 HYDRAULIC CONTROL UNIT




NOTE: SHOWN WITH BATTERY AND TRAY REMOVED 80bbc3da

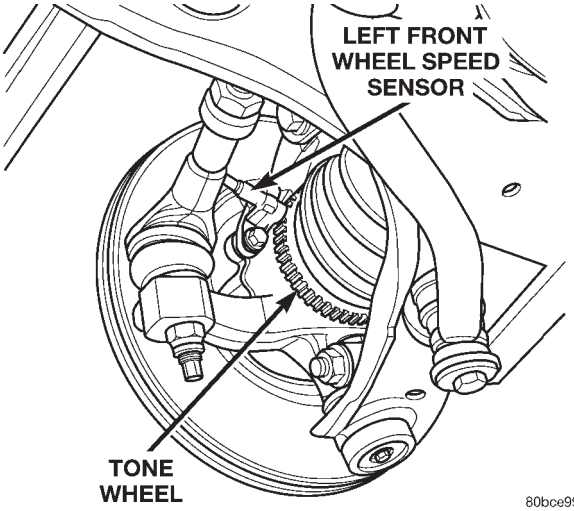
## 8.5 PUMP MOTOR




NOTE: SHOWN WITH BATTERY AND TRAY REMOVED 80bbc3da

## 8.6 TONE WHEELS

**FRONT**

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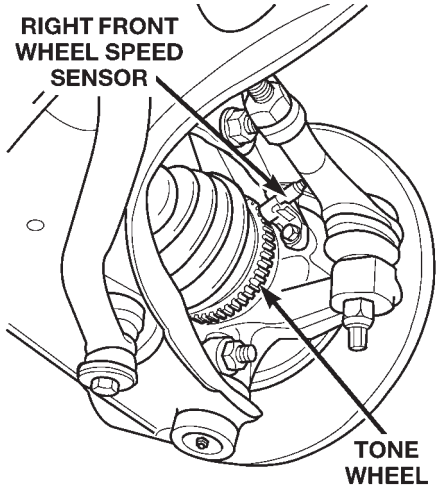


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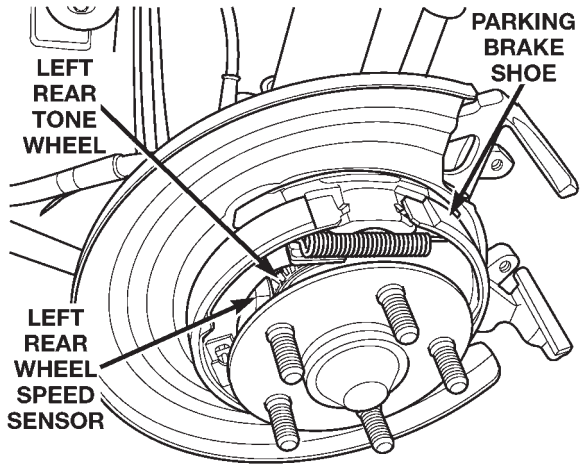
**REAR**

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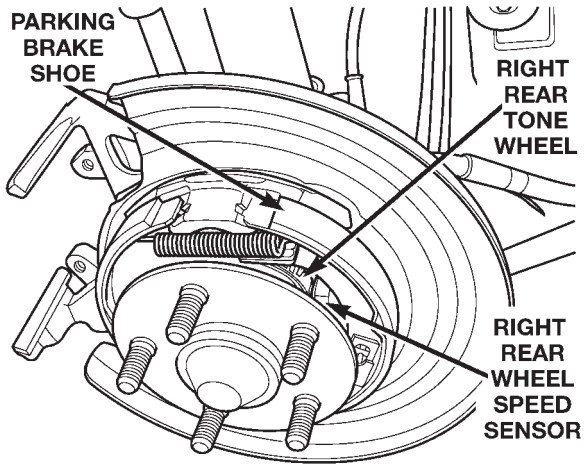
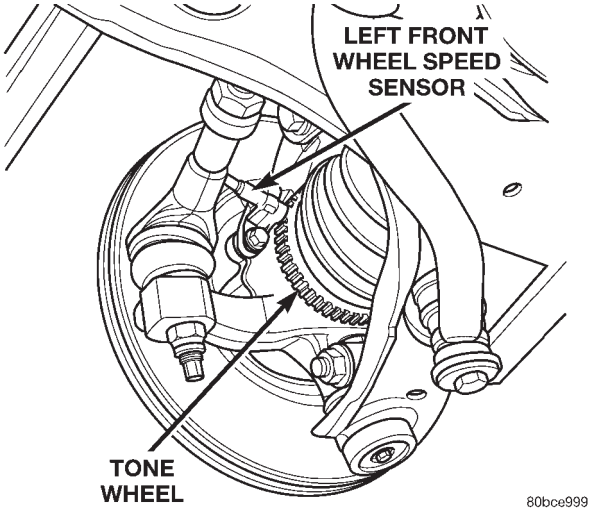



80bc4d08

## 8.7 WHEEL SPEED SENSORS

**FRONT**

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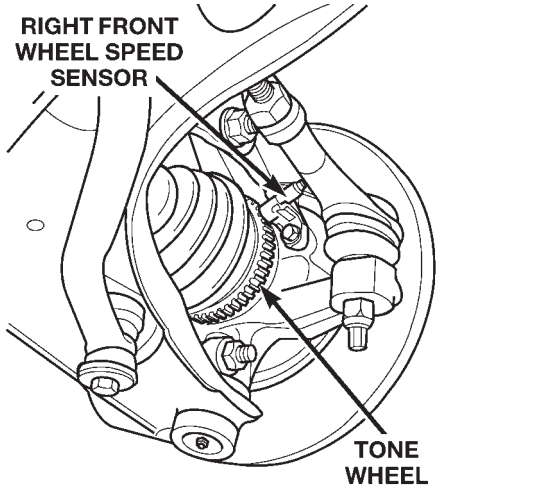


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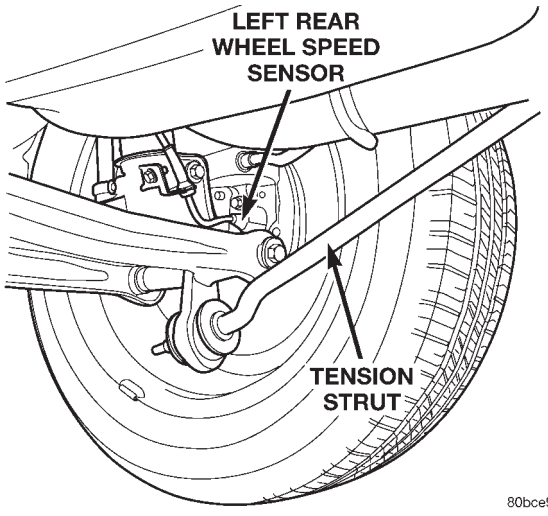
**REAR**

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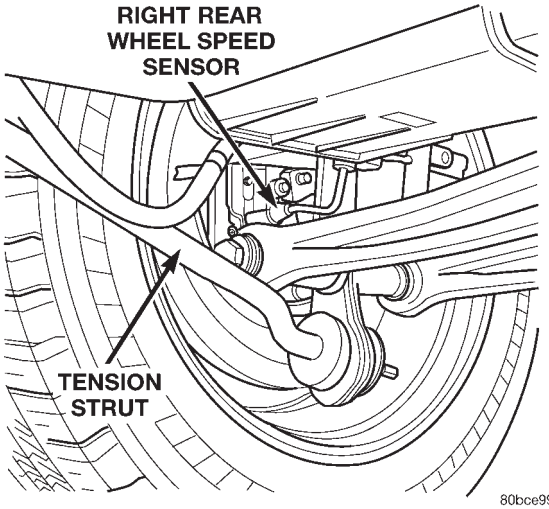
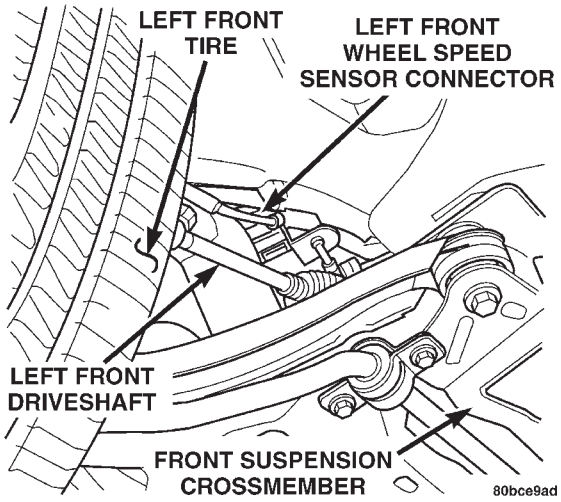
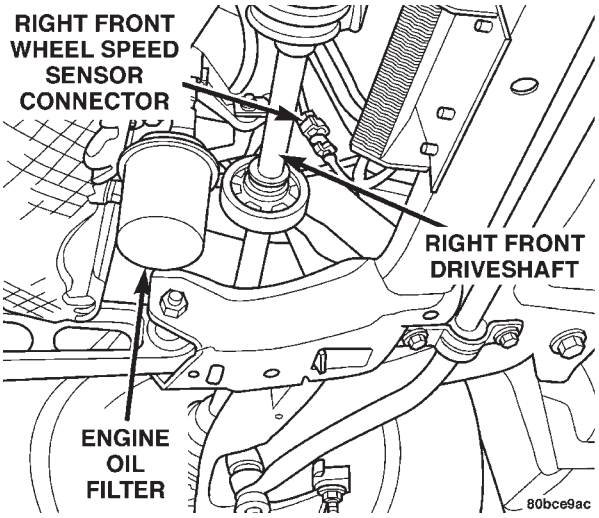



80bce99c

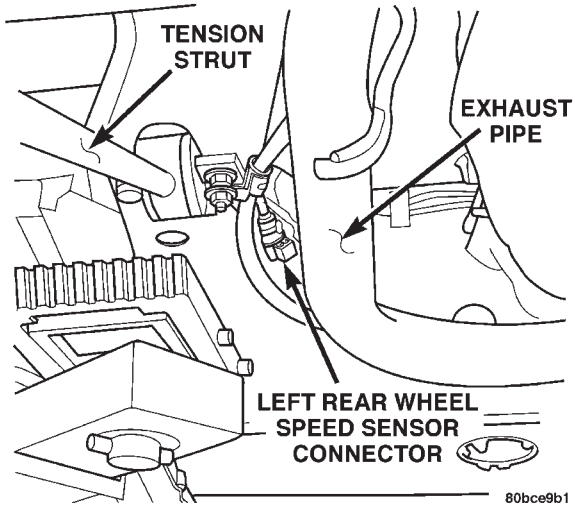
## 8.8 WHEEL SPEED SENSOR CONNECTORS

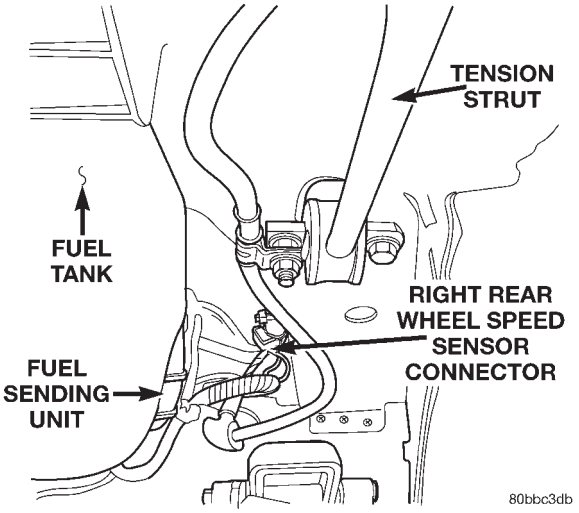
### FRONT



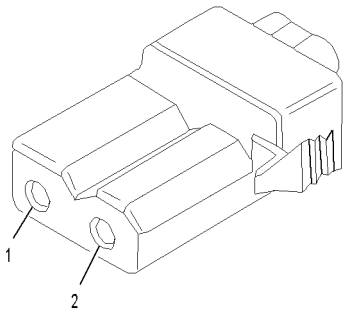




### REAR



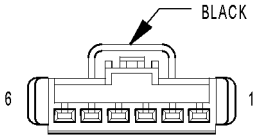
# 9.0 CONNECTOR PINOUTS




ABS PUMP MOTOR

**ABS PUMP MOTOR - 2 WAY**

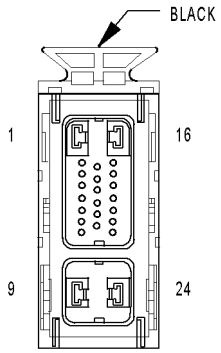
| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | TN | GROUND |
| 2 | RD | PUMP MOTOR RELAY OUTPUT |




BRAKE LAMP SWITCH

**BRAKE LAMP SWITCH - BLACK 6 WAY**

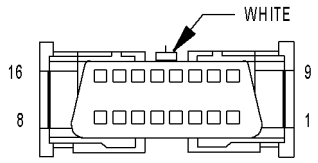
| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | F32 18PK/DB | FUSED B(+) |
| 2 | L50 18WT/TN | BRAKE LAMP SWITCH OUTPUT |
| 2 | L50 18WT/TN | BRAKE LAMP SWITCH OUTPUT |
| 3 | V30 20DB/RD (2.0L) | SPEED CONTROL BRAKE LAMP SWITCH OUTPUT |
| 4 | V32 20YL/RD (2.0L) | S/C SUPPLY |
| 5 | Z1 20BK (2.0L) | GROUND |
| 5 | Z1 18BK (2.4L TURBO) | GROUND |
| 6 | K29 20WT/PK | BRAKE SWITCH SIGNAL |
| 6 | K29 20WT/PK (2.0L) | BRAKE SWITCH SIGNAL |




CONTROLLER ANTILOCK BRAKE

**CONTROLLER ANTILOCK BRAKE - BLACK 24 WAY**

| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | Z1 12BK | GROUND |
| 2 | B1 18YL/DB | RIGHT REAR WHEEL SPEED SENSOR SIGNAL |
| 3 | B2 18YL | RIGHT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 4 | - | - |
| 5 | D25 18VT/YL | PCI BUS |
| 6 | B6 18WT/DB | RIGHT FRONT WHEEL SPEED SENSOR SIGNAL |
| 7 | B7 18WT | RIGHT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 8 | - | - |
| 9 | A20 12RD/DB | FUSED B(+) |
| 10 | F12 18DB/WT (2.0L) | FUSED IGNITION SWITCH OUTPUT (RUN-START) |
| 10 | F12 18DB/RD (2.4L TURBO) | FUSED IGNITION SWITCH OUTPUT (RUN-START) |
| 11 | - | - |
| 12 | - | - |
| 13 | - | - |
| 14 | - | - |
| 15 | - | - |
| 16 | Z1 12BK | GROUND |
| 17 | - | - |
| 18 | L50 18WT/TN | BRAKE LAMP SWITCH OUTPUT |
| 19 | B3 18LG/DB | LEFT REAR WHEEL SPEED SENSOR SIGNAL |
| 20 | B4 18LG | LEFT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 21 | - | - |
| 22 | B8 18RD/DB | LEFT FRONT WHEEL SPEED SENSOR SIGNAL |
| 23 | B9 18RD | LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 24 | A10 12RD/DG | FUSED B(+) |

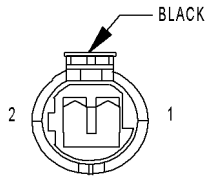



DATA LINK CONNECTOR

**DATA LINK CONNECTOR - WHITE 16 WAY**

| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | - | - |
| 2 | D25 20VT/YL | PCI BUS (PCM) |
| 3 | - | - |
| 4 | Z12 20BK/TN | GROUND |
| 5 | Z12 20BK/TN | GROUND |
| 6 | - | - |
| 7 | D21 20PK | SCI TRANSMIT (PCM) |
| 8 | - | - |
| 9 | D6 20PK/LB (2.0L) | SCI RECEIVE (TCM) |
| 10 | - | - |
| 11 | - | - |
| 12 | D20 20LG | SCI RECEIVE (PCM) |
| 13 | - | - |
| 14 | - | - |
| 15 | D15 20WT/DG (2.0L) | SCI TRANSMIT (TCM) |
| 16 | A14 18RD/WT | FUSED B(+) |

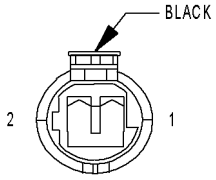





LEFT FRONT WHEEL SPEED SENSOR

**LEFT FRONT WHEEL SPEED SENSOR - BLACK 2 WAY**

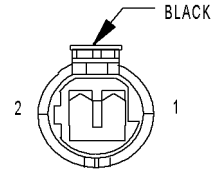
| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | B9 18RD | LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 2 | B8 18RD/DB | LEFT FRONT WHEEL SPEED SENSOR SIGNAL |




LEFT REAR WHEEL SPEED SENSOR

**LEFT REAR WHEEL SPEED SENSOR - BLACK 2 WAY**

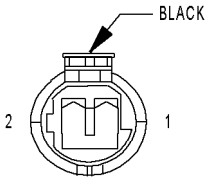
| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | B4 20LG | LEFT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 2 | B3 20LG/DB | LEFT REAR WHEEL SPEED SENSOR SIGNAL |




RIGHT FRONT WHEEL SPEED SENSOR

**RIGHT FRONT WHEEL SPEED SENSOR - BLACK 2 WAY**

| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | B7 18WT | RIGHT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 2 | B6 18WT/DB | RIGHT FRONT WHEEL SPEED SENSOR SIGNAL |




RIGHT REAR
WHEEL SPEED
SENSOR

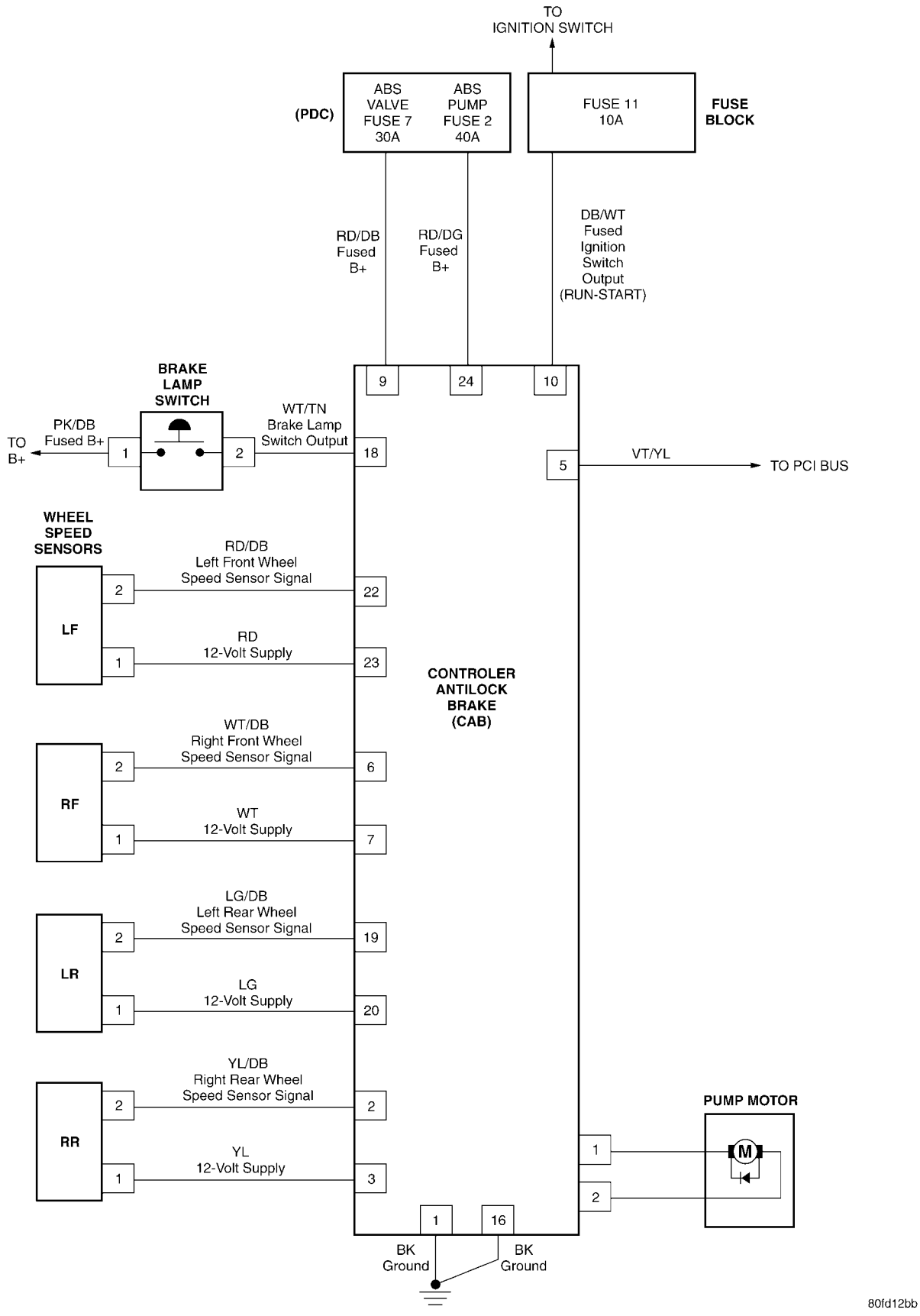
**RIGHT REAR WHEEL SPEED SENSOR - BLACK 2 WAY**

| CAV | CIRCUIT | FUNCTION |
|---|---|---|
| 1 | B2 20YL | RIGHT REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY |
| 2 | B1 20YL/DB | RIGHT REAR WHEEL SPEED SENSOR SIGNAL |

## NOTES

# 10.0 SCHEMATIC DIAGRAMS

## 10.1 TEVES MARK 20e CONTROLLER ANTILOCK BRAKE – ABS




80fd12bb

## NOTES

# DIAGNOSTIC TEST PROCEDURES — TELL US!

DaimlerChrysler Corporation is constantly working to provide the technician the best diagnostic manuals possible. Your comments and recommendations regarding the diagnostic manuals and procedures are appreciated.

To best understand your suggestion, please complete the form giving us as much detail as possible.

---

**Model** _____ **Year** _____ **Body Type** _____ **Engine** _____

**Transmission** _____ **Vehicle Mileage** _____ **MDH** _____

**Diagnostic Procedure** _____ **Book No.** _____ **Page** _____

Comments/recommendations (if necessary, draw sketch)

Name _____

_____

Submitted by: _____

Address _____

City/State/Zip _____

Business Phone # _____

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**CIMS 486-02-76**
**Auburn Hills, MI 48326-2757**

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