ANTI-LOCK BRAKE SYSTEM

1993 Jeep Cherokee

1993 BRAKES
Chrysler Corp. Anti-Lock - Teves

Jeep; Cherokee, Grand Cherokee, Grand Wagoneer, Wrangler

DESCRIPTION

The Teves Mark IV Anti-Lock Brake System (ABS) consists of acceleration switch, Controller Anti-Lock Brake (CAB), ANTI-LOCK warning light, Hydraulic Control Unit (HCU), main relay, master cylinder, pedal travel sensor, pump motor relay, pump motor sensor, vacuum booster, 4 wheel speed sensors and axle shaft tone (pulse) rings.

During ABS operation, front wheels are controlled individually and rear wheels are controlled together. ABS modulates brake fluid pressure during high pedal pressure and high vehicle deceleration to prevent wheel lock-up.

NOTE: For more information on brake system, see BRAKE SYSTEM article in this section.

OPERATION

The Teves Mark IV Anti-Lock Brake System (ABS) is activated during hard braking to prevent wheel lock-up. Wheel lock-up does not mean wheel has stopped, but wheel is turning slower than vehicle speed. When ignition is on, before vehicle is moved, Controller Anti-Lock Brake (CAB) performs a static system initialization. When vehicle speed reaches approximately 6 MPH, CAB briefly cycles pump to verify operation. Hydraulic Control Unit (HCU) solenoids are checked continuously.

When ABS is activated, vibrations and pulsations may be felt in brake pedal and solenoid valves clicking and pump motor running may be heard. Some wheel slip is required for best braking performance. This wheel slip may be heard as tire chirping. Do not confuse tire chirping with tire skidding. When vehicle is braked heavily, wheels will lock-up below 3 MPH. When braking on rough road surfaces, ABS may activate, detecting wheel lock-up tendencies from wheel hop.

CAUTION: See ANTI-LOCK BRAKE SAFETY PRECAUTIONS article in GENERAL INFORMATION.

BLEEDING BRAKE SYSTEM

NOTE: Use only DOT 3 brake fluid from a sealed container. DO NOT use DOT 5 silicone brake fluid.

1) Ensure ignition is off. Clean master cylinder reservoir cover and surrounding area. Ensure reservoir is full. Bleeding sequence is master cylinder, Hydraulic Control Unit (HCU) valve body (at fluid lines), right rear wheel, left rear wheel, right front wheel and left front wheel.

2) After bleeding master cylinder, position shop towel below 4 hydraulic control unit brakelines. Using flare wrench, slightly open hydraulic control unit brakeline fittings individually.

3) DO NOT allow brake fluid to contact paint or electrical connectors. Slowly depress brake pedal. Close hydraulic control unit brake pipe fitting and release brake pedal. Repeat process until no

air escapes from brake pipe fitting. Repeat procedure for remaining 3 brakelines.

4) Ensure master cylinder reservoir is full. Raise and support vehicle. Bleed all 4 wheel calipers. Attach a clear hose to right rear caliper bleeder valve and submerge other end of hose in container of brake fluid.

NOTE: DO NOT pump brake pedal while bleeding brakes. Pumping brake pedal compresses air into tiny bubbles throughout system making bleeding more difficult.

5) Open bleeder valve. Slowly depress brake pedal. Close bleeder valve and release brake pedal. Wait 5 seconds. Repeat process until no air bubbles are seen from hose. Tap lightly on cylinder/caliper housing to free trapped air. Close bleeder valve. Repeat process until no air bubbles are seen from hose. Repeat procedure on left rear, right front and left front bleeder valves. Ensure reservoir is full.

6) Using DRB-II, follow prompts and perform BLEED BRAKES procedure. After performing BLEED BRAKES procedure using DRB-II, repeat steps 1)-5). Ensure master cylinder reservoir is full.

ADJUSTMENTS

REAR WHEEL SPEED SENSOR

See REAR WHEEL SPEED SENSOR under REMOVAL & INSTALLATION.

REMOVAL & INSTALLATION

ABS MAIN SYSTEM RELAY

Removal & Installation

ABS main system relay is located on right side of engine compartment in Power Distribution Center (PDC). Turn ignition off. Remove cover from PDC. Locate and remove ABS main system relay from PDC. See Fig. 1. To install, reverse removal procedure.

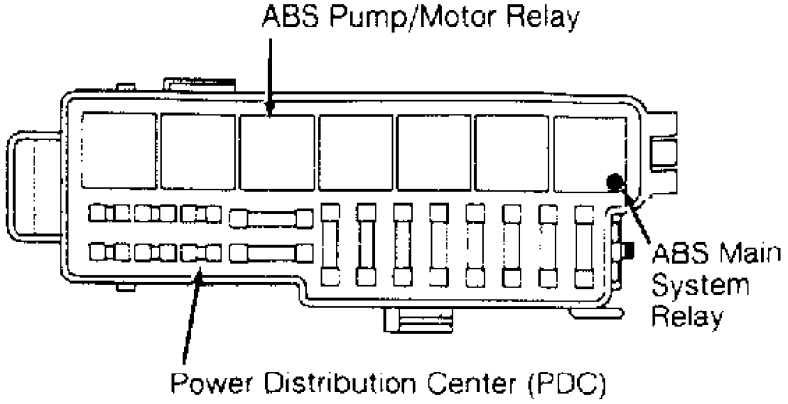

Fig. 1: Locating ABS System Relays
Courtesy of Chrysler Corp.

ABS PUMP/MOTOR RELAY

Removal & Installation

ABS pump/motor relay is located on right side of engine compartment in Power Distribution Center (PDC). Turn ignition off. Remove cover from PDC. Locate and remove ABS pump/motor relay from PDC. See Fig. 1. To install, reverse removal procedure.

CONTROLLER ANTI-LOCK BRAKE (CAB)

Removal & Installation (Cherokee)

Turn ignition off. CAB is located under instrument panel to right of steering column. Remove screws attaching CAB mounting bracket to vehicle. Disconnect CAB electrical connector. Disconnect security alarm module electrical connector. Security alarm module is mounted on opposite side of mounting bracket. Remove CAB and mounting bracket. See Fig. 2. To install, reverse removal procedure. If installing a new CAB, transfer mounting bracket to new CAB.

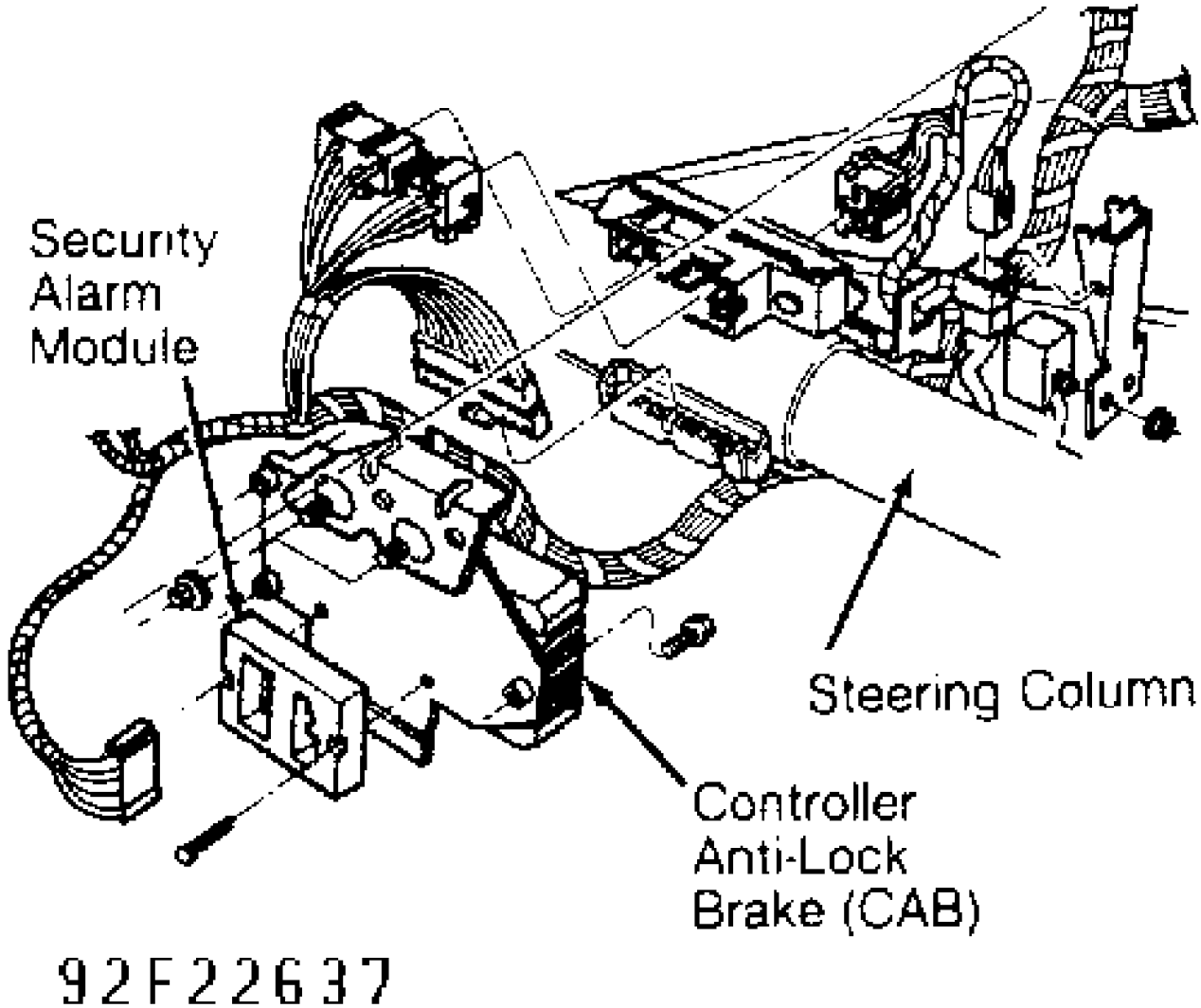

Fig. 2: Locating Controller Anti-Lock Brake (CAB)
Courtesy of Chrysler Corp.

CAUTION: DO NOT force CAB electrical connector onto CAB. CAB pins are easily damaged.

Removal & Installation (Grand Cherokee & Grand Wagoneer)

Turn ignition off. Disconnect negative battery cable. CAB is located on driver-side inner fender panel. Remove screws attaching CAB to fender panel bracket. Remove CAB from bracket for access to CAB electrical connector. Release strap securing harness connector to CAB. Tilt CAB electrical connector upward to disengage. Slide CAB electrical connector from retaining tangs. Remove CAB from vehicle. To install, reverse removal procedure.

Removal & Installation (Wrangler)

1) Turn ignition off. Disconnect negative battery cable. CAB is located above heater/air conditioning plenum housing in line with the glove box. Remove bolts and nuts securing CAB to dash panel. Bolts and nuts are accessible from the engine compartment and are located to the right of the battery.

2) On models with air conditioning, remove air conditioning fascia panel and ducts to access CAB harness connector. Release strap securing harness connector to CAB. Tilt CAB electrical connector outward to disengage. Slide CAB electrical connector from retaining tangs. Remove CAB from vehicle. To install, reverse removal procedure.

FRONT WHEEL SPEED SENSOR

Removal & Installation

1) Turn ignition off. Raise and support vehicle. Remove wheel and tire assembly. Clean area surrounding wheel speed sensor prior to removal. Remove bolt attaching wheel speed sensor to steering knuckle.

2) Unseat grommet retaining wheel speed sensor wire in wheel well panel. Disconnect wheel speed sensor electrical connector in engine compartment. Disconnect wheel speed sensor wire harness from clips on body, chassis, and steering knuckle. Remove wheel speed sensor from vehicle.

3) To install, reverse removal procedure. Remove all kinks and twists from wheel speed sensor wire harness. Ensure wheel speed sensor wire harness is installed in clips on body, chassis and steering knuckle. Use Loctite on wheel speed sensor mounting bolt.

4) Tighten wheel speed sensor bolt to specification. See TORQUE SPECIFICATIONS table. Air gap is not adjustable. Air gap should be .040" (1.3 mm). If air gap is not to specification, replacement of wheel speed sensor and/or tone wheel may be necessary.

"G" SWITCH

Removal & Installation (Except Wrangler)

Turn ignition off. Disconnect negative battery cable. Tilt rear seat assembly forward to access "G" switch. Disconnect "G" switch electrical connector. Remove "G" switch mounting bolts. Remove "G" switch. See Fig. 3. To install, reverse removal procedure. Ensure arrow on top of "G" switch is facing toward front of vehicle.

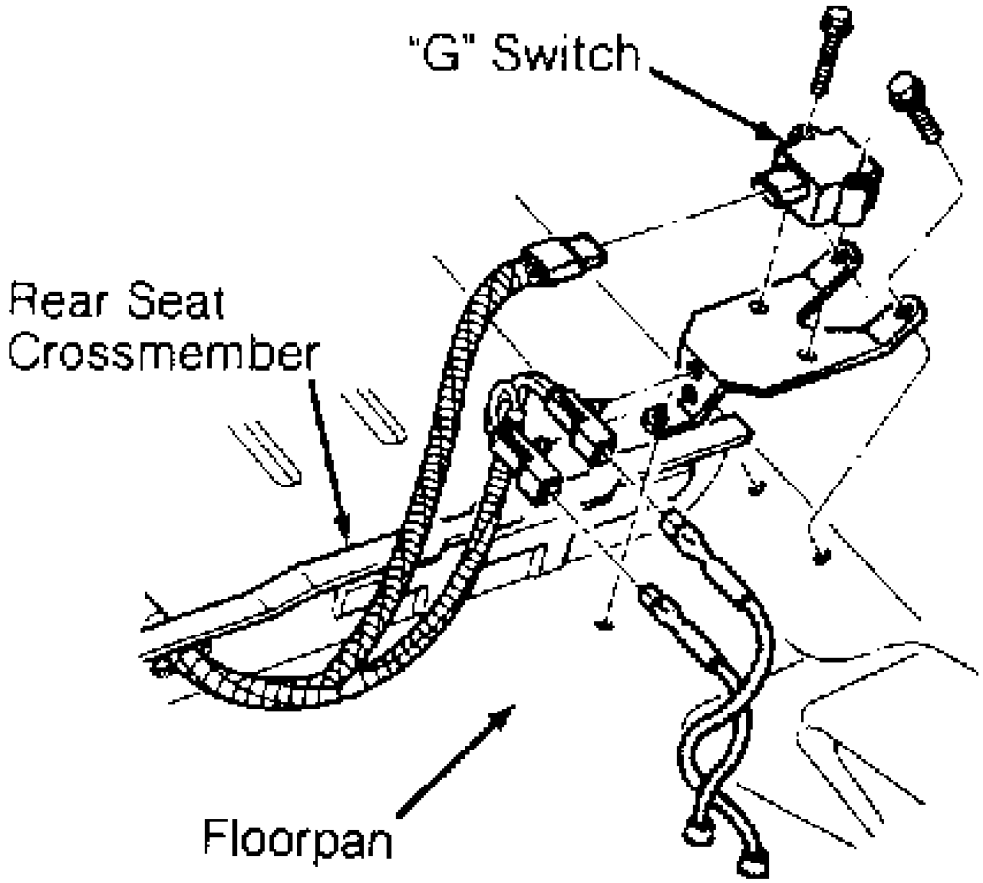

Fig. 3: Locating "G" Switch (Typical Except Wrangler)
Courtesy of Chrysler Corp.

Removal & Installation (Wrangler)

Turn ignition off. Disconnect negative battery cable. Move driver's seat assembly forward or rearward to access "G" switch. Disconnect "G" switch electrical connector. Remove "G" switch mounting bracket-to-floorpan screws. Remove "G" switch from mounting bracket. See Fig. 4. To install, reverse removal procedure. Ensure arrow on top of "G" switch is facing toward front of vehicle.

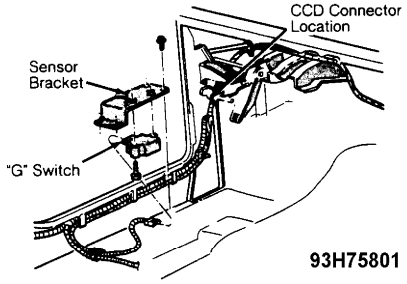

Fig. 4: Locating "G" Switch & CCD Connector (Wrangler)
Courtesy of Chrysler Corp.

HYDRAULIC CONTROL UNIT (HCU)

Removal & Installation

1) Turn ignition off. Disconnect negative battery cable. Disconnect pedal travel sensor electrical connector. Remove air cleaner and hoses. On Grand Cherokee and Grand Wagoneer, remove windshield washer reservoir. On all models, position a small drain container under master cylinder reservoir hoses. Disconnect master cylinder reservoir hoses at HCU and drain fluid into container. See Fig. 5. Discard fluid. Disconnect HCU electrical connectors.

2) On Grand Cherokee and Grand Wagoneer, remove combination valve. On all models, identify HCU brakelines for reassembly reference. Disconnect brakelines from HCU. Remove bolt and nuts attaching HCU mounting bracket to inner fender panel. Remove HCU from vehicle. To install, reverse removal procedure. Bleed brake system. See BLEEDING BRAKE SYSTEM.

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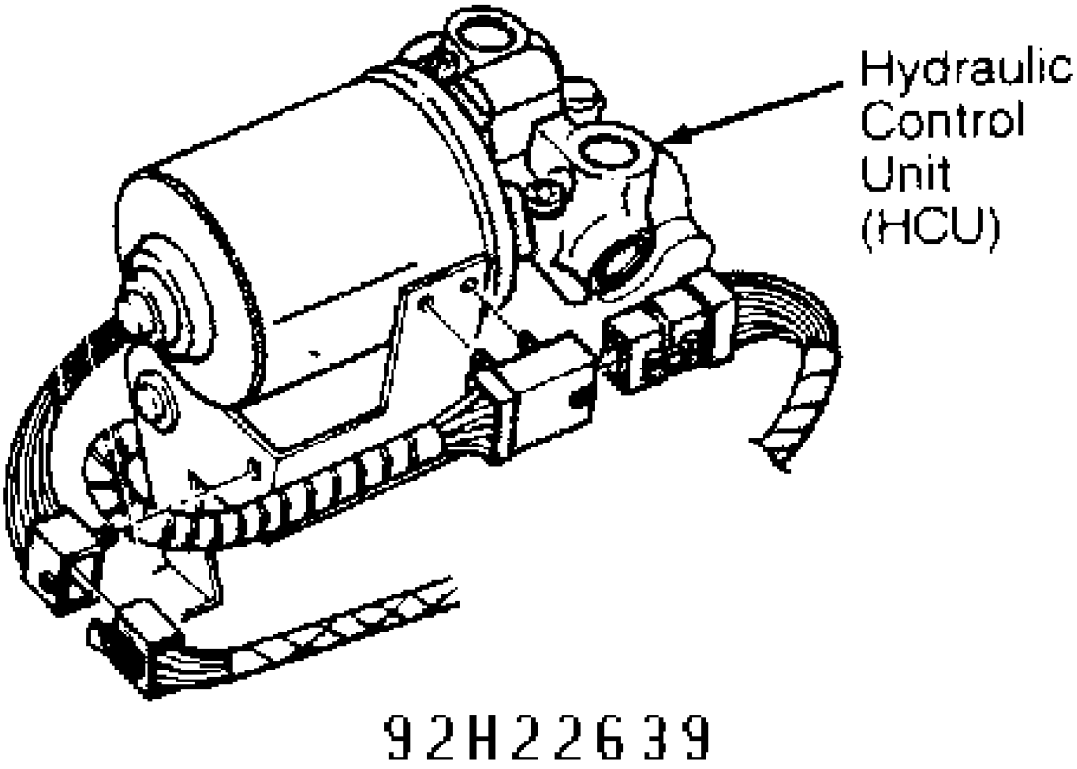

Fig. 5: Locating Hydraulic Control Unit (HCU)
Courtesy of Chrysler Corp.

PEDAL TRAVEL SENSOR

Removal & Installation

Turn ignition off. Disconnect pedal travel sensor electrical connector. Pump brake pedal to exhaust all vacuum from vacuum booster. Unseat pedal travel sensor retaining ring. Remove pedal travel sensor from vacuum booster. See Fig. 6. To install, reverse removal procedure. Ensure color dot on face of vacuum booster matches color of plunger tip. If colors are different, replace plunger tip to match color dot on vacuum booster.

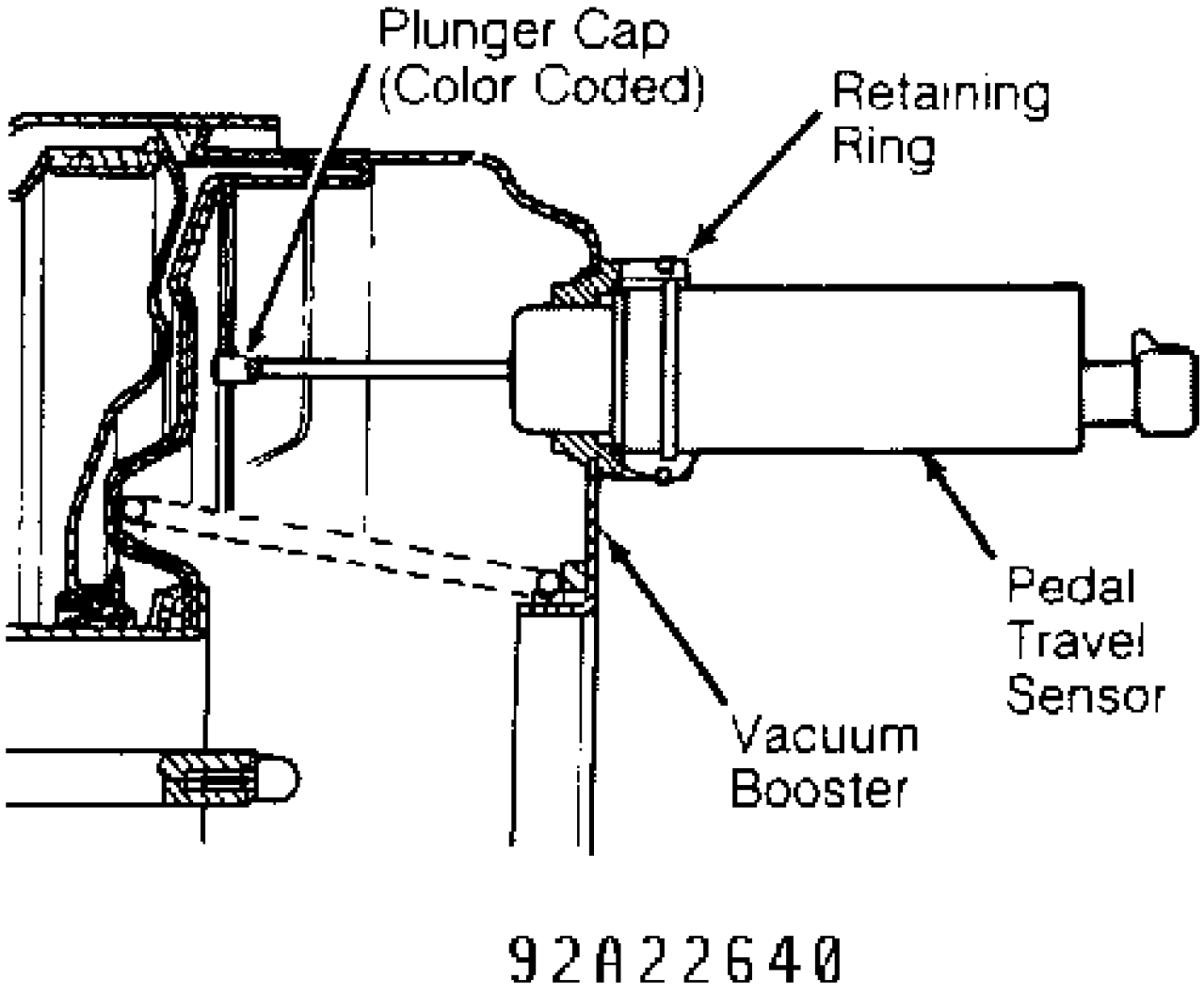

Fig. 6: Locating Pedal Travel Sensor
Courtesy of Chrysler Corp.

REAR WHEEL SPEED SENSOR

Removal

1) Turn ignition off. Raise and fold rear seat to access rear wheel speed sensor connectors. Disconnect rear wheel speed sensor electrical connector. Push rear wheel speed sensor grommet and wire harness through floorpan on vehicle.

2) Raise and support vehicle. Remove wheel and brake drum. Remove clips attaching rear wheel speed sensor wire harness to brakelines. Unseat rear wheel speed sensor grommet from brake backing plate. Remove rear wheel speed sensor mounting bolt. Push rear wheel speed sensor through grommet opening in backing plate. Remove rear wheel speed sensor from vehicle.

Installation

1) If original wheel speed sensor is being installed, go to step 3). If a NEW wheel speed sensor is being installed, position wheel speed sensor until cardboard spacer contacts tone wheel.

2) Use Loctite on the wheel speed sensor mounting bolt. Tighten wheel speed sensor mounting bolt to specification. Refer to

TORQUE SPECIFICATIONS. Spin rear axle by hand until cardboard spacer is peeled from sensor face. Air gap adjustment should be correct. Using a brass feeler gauge, check air gap adjustment. Air gap should be .043" (1.1 mm). If air gap is not correct, adjust as necessary. Go to step 4).

3) Remove any remaining pieces of cardboard from sensor face. Install wheel speed sensor. Using a brass feeler gauge, adjust air gap. Air gap should be .043" (1.1 mm). Use Loctite on wheel speed sensor mounting bolt. Tighten wheel speed sensor mounting bolt to specification. See TORQUE SPECIFICATIONS.

4) Remove all kinks and twists from wheel speed sensor wire harness. Ensure wheel speed sensor wire harness is installed in clips on brakelines. To complete installation, reverse removal procedure.

DIAGNOSIS & TESTING

NOTE: DRB-II and appropriate cartridge are necessary for diagnosing ABS.

WARNING LIGHTS

Amber ABS Warning Light

After engine start-up, ABS warning light glows as part of a self-check feature. ABS warning light normally will light for 2-3 seconds and then go out. If ABS warning light remains illuminated after engine start-up, diagnosis will be necessary to determine which component or circuit is malfunctioning.

Red BRAKE Warning Light

With ignition on, Red BRAKE warning light will glow when low brake fluid level is detected or parking brake switch is closed. BRAKE warning light normally indicates a hydraulic or mechanical failure is present.

PRE-DIAGNOSTIC INSPECTION

1) Check master cylinder reservoir for correct fluid level. Inspect Hydraulic Control Unit (HCU) for leakage and wiring damage. Check caliper piston for activation and release. Check all brakes to verify no drag exists.

2) Check speed sensors for correct mounting and alignment. Inspect wire harness for correct routing. Ensure connectors are not damaged and have good contact.

3) Verify all wheel bearings are not worn or causing wheel wobble. Ensure all tires are in good condition and properly inflated. After performing pre-diagnostic inspection, perform TEST-1A under SELF-DIAGNOSTIC TESTS using DRB-II. See Figs. 4, 7 and 8.

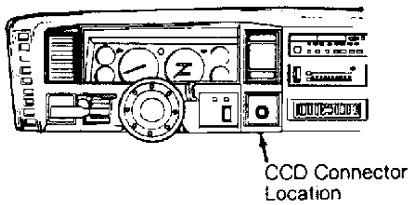

Fig. 7: Locating CCD Connector (Cherokee)
Courtesy of Chrysler Corp.

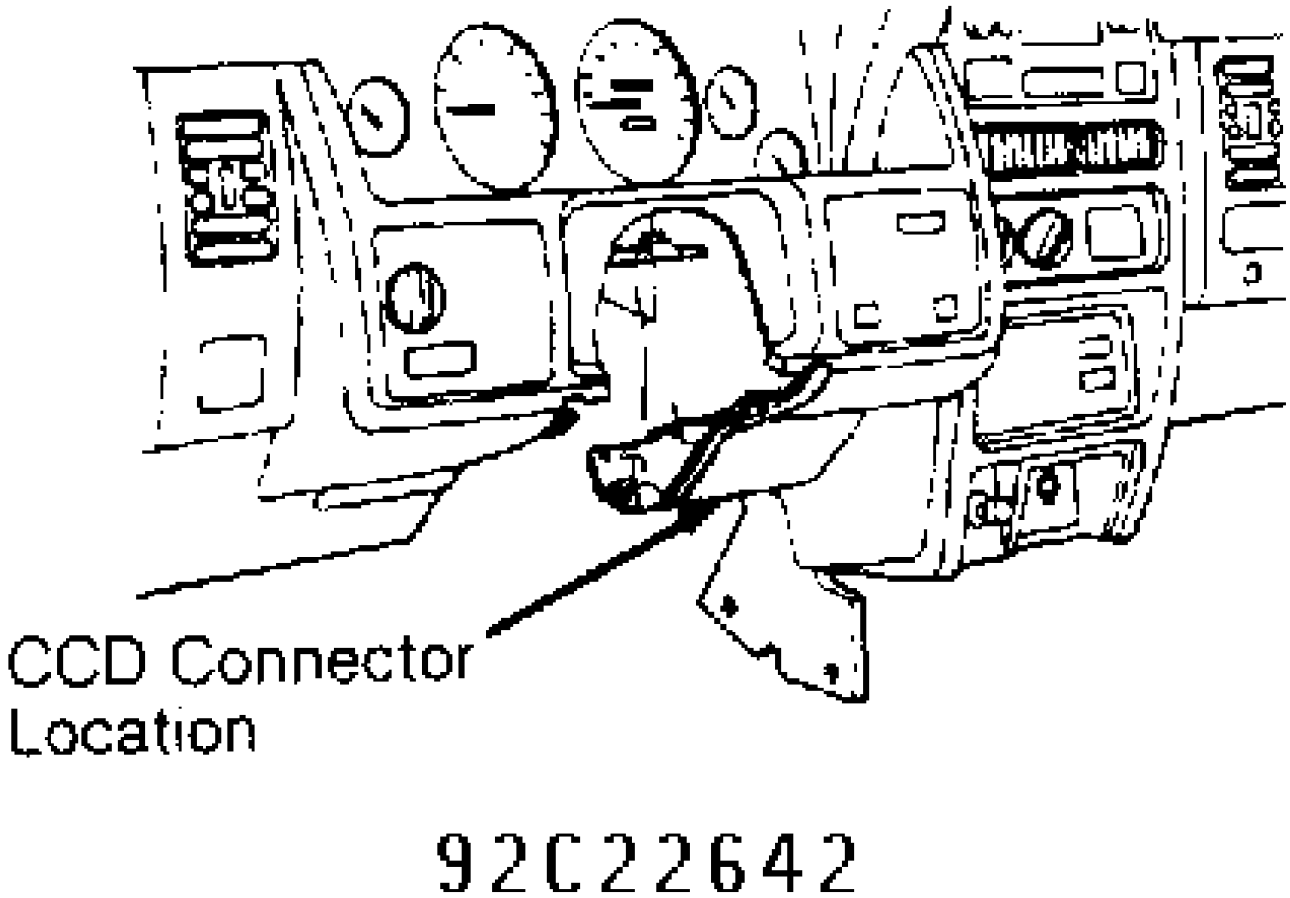

Fig. 8: Locating CCD Connector (Grand Cherokee & Grand Wagoneer) Courtesy of Chrysler Corp.

INTERMITTENTS

Most intermittent problems are caused by faulty electrical connections or wiring; however, a sticking relay or solenoid can cause a failure.

When intermittent failure is encountered, check for fault messages stored in CAB. If fault messages are found, inspect related components and circuitry for poor connections. If no trouble codes are found, inspect suspect circuits as follows:

* Check for poor mating of connector halves, or terminals not fully seated in connector body (backed-out).
* Check for improperly formed or damaged terminals. Carefully reform all connector terminals of problem circuit to increase contact tension.
* Check for poor terminal-to-wire connection.
* Check for hydraulic system leaks.

CLEARING FAULT MESSAGES

DRB-II

Using DRB-II, select ADJUSTMENTS. Press "1" (ERASE FAULTS key). Press ENTER key. DRB-II will display ERASE FAULTS ARE YOU SURE? (ENTER TO ERASE). Press ENTER key. DRB-II will display ERASE FAULTS TURN KEY OFF. Turn ignition off. Turn ignition on. DRB-II will display

ERASE FAULTS FAULTS ERASED. Faults are now erased.

Ignition Cycle Default

If no fault codes occur for 50 driving cycles, any existing fault messages will be cleared from CAB memory. A drive cycle occurs when ignition is turned on and vehicle is driven faster than 10 MPH.

CONNECTOR IDENTIFICATION

CONNECTOR IDENTIFICATION DIRECTORY TABLE

Connector	Figure
ABS Disconnect Connector	9
ABS Main System Relay Socket Connector	10
ABS Pump/Motor Relay Socket Connector	11
Controller Anti-Lock Brake (CAB) Connector	12
"G" Switch Connector	13
Hydraulic Control Unit (HCU) Connector	14
Pump/Motor Connector	15

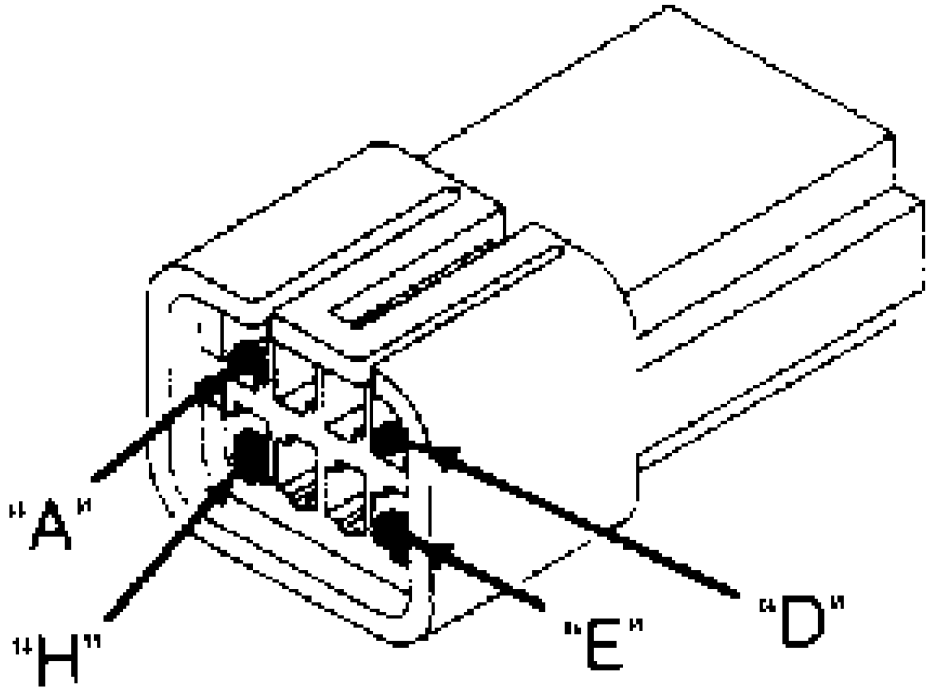

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Fig. 9: Identifying ABS Disconnect Connector Terminals
Courtesy of Chrysler Corp.

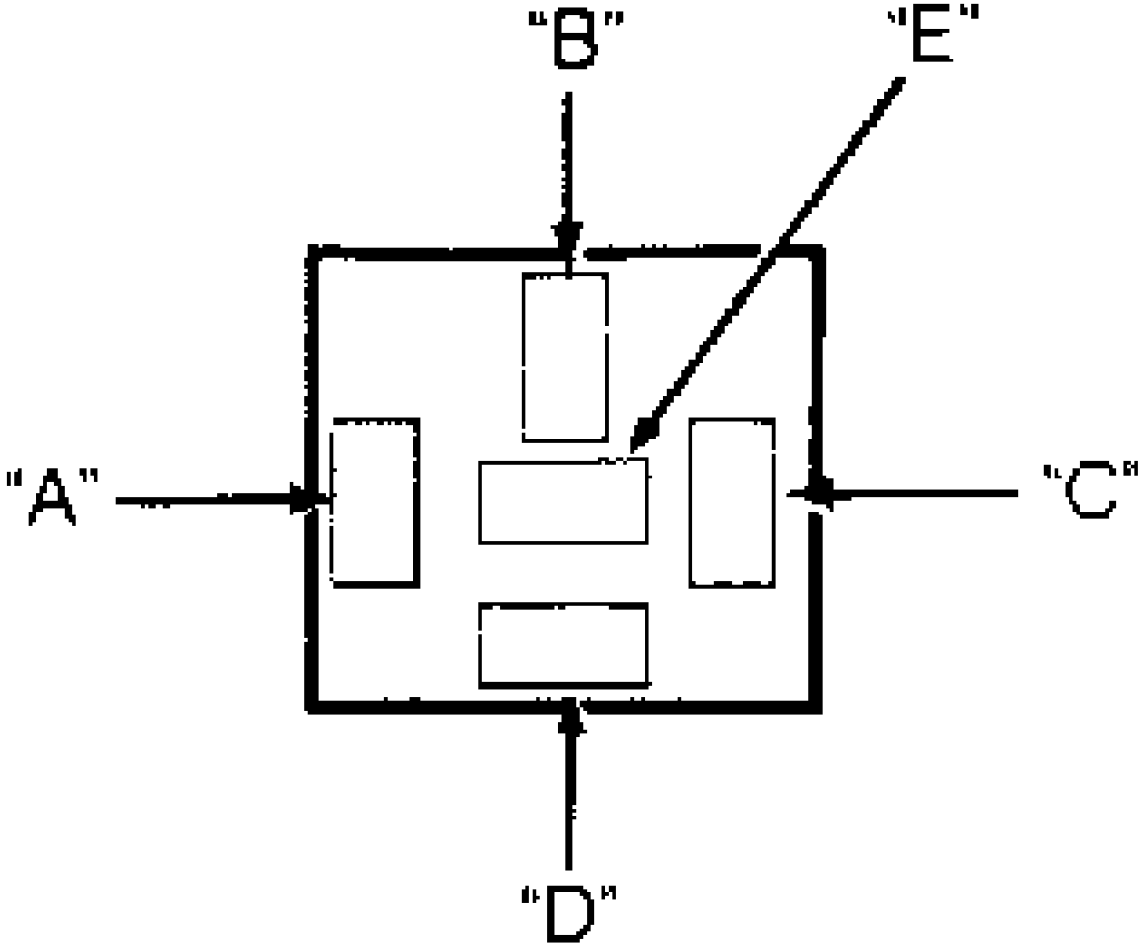

Fig. 10: Identifying ABS Main System Relay Connector Terminals
Courtesy of Chrysler Corp.

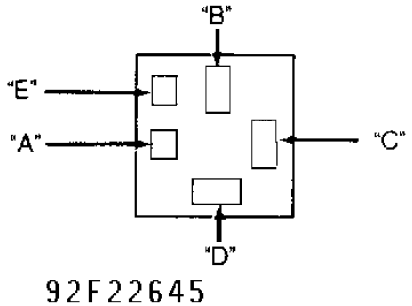

Fig. 11: Identifying ABS Pump/Motor Relay Connector Terminals
Courtesy of Chrysler Corp.

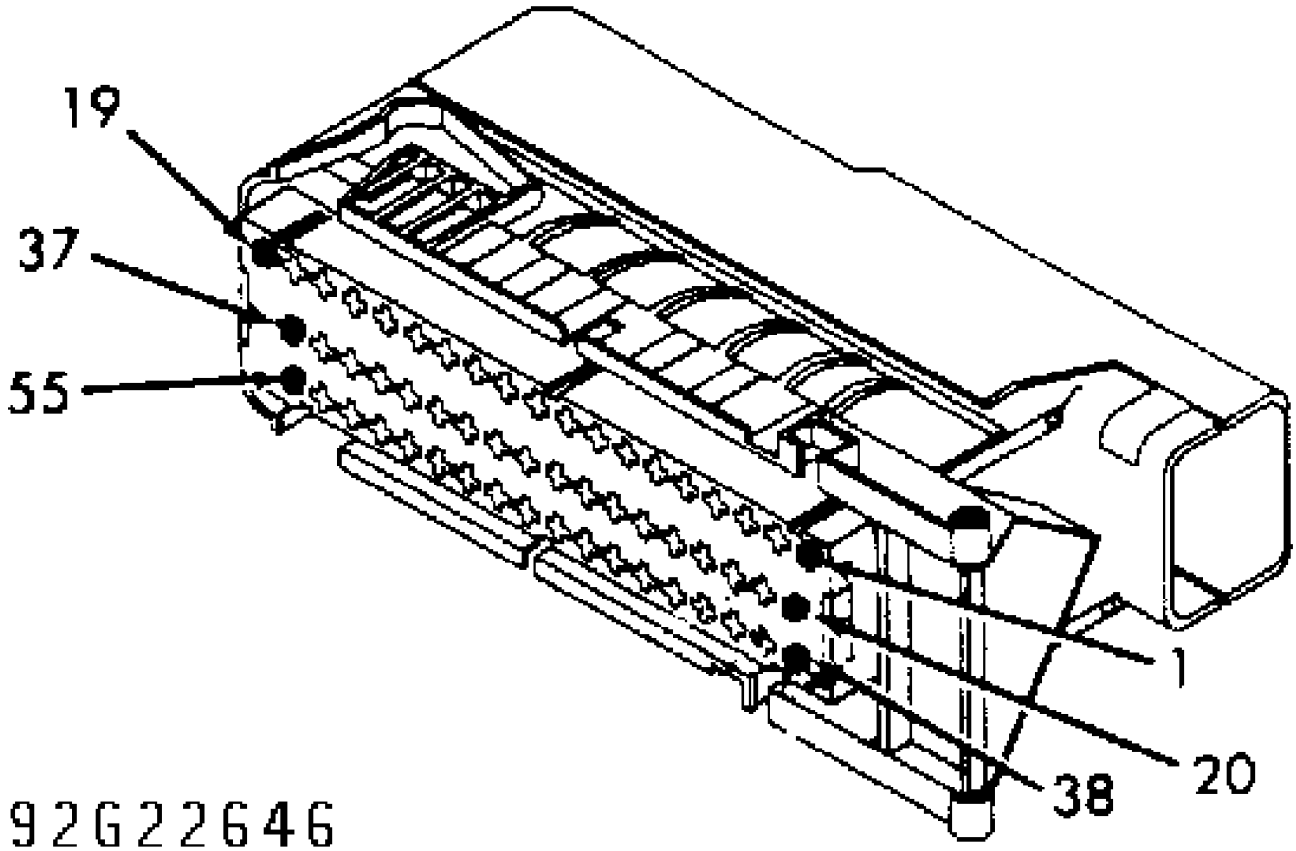

Fig. 12: Controller Anti-Lock Brake (CAB) Connector Terminal ID
Courtesy of Chrysler Corp.

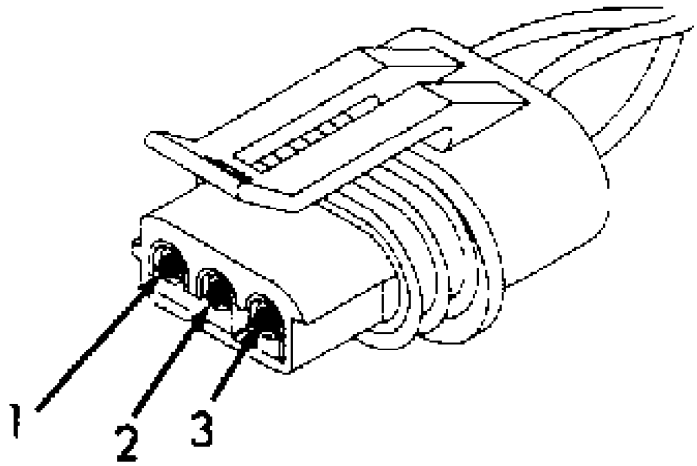

Fig. 13: Identifying "G" Switch Connector Terminals
Courtesy of Chrysler Corp.

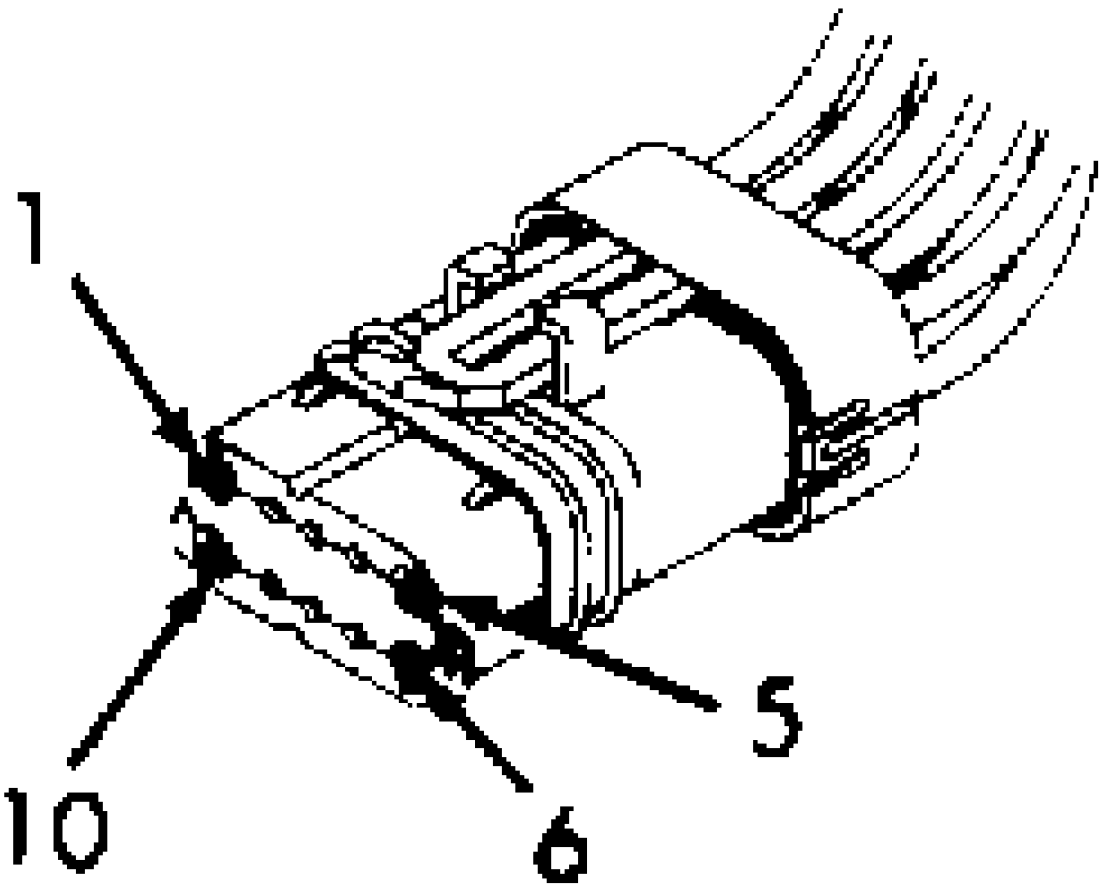

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Fig. 14: Hydraulic Control Unit (HCU) Connector Terminal ID
Courtesy of Chrysler Corp.

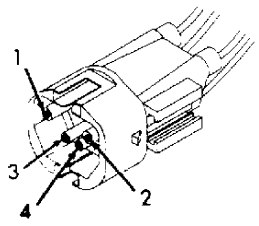

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Fig. 15: Identifying Pump/Motor Connector Terminals
Courtesy of Chrysler Corp.

SELF-DIAGNOSTIC TESTS

NOTE: Connector and terminal identification illustrations in following tests are provided courtesy of Chrysler Corp.

NOTE: For connector terminal identification in following tests, see CONNECTOR IDENTIFICATION under DIAGNOSIS & TESTING. For wire color and terminal identification, see WIRING DIAGRAMS.

TEST 1A

READING FAULT MESSAGES

Using DRB-II, read fault messages and perform appropriate test listed in FAULT MESSAGES table. If DRB-II displays NO RESPONSE message, perform TEST 23A. If other DRB-II related communication problems exist, see VEHICLE COMMUNICATIONS article in ENGINE PERFORMANCE. If multiple fault messages are present, fault repairs must be performed in order in which they are displayed. If no fault messages are present, perform VERIFICATION TEST VER-1A.

FAULT MESSAGES TABLE

Fault Message	Perform Test
CONTROLLER FAILURE	2A
"G" SWITCH NOT PROCESSABLE	3A
HYDRAULIC FAILURE	4A
LEFT FRONT INLET VALVE	5A
LEFT FRONT OUTLET VALVE	6A
LEFT FRONT SENSOR CIRCUIT FAILURE	7A
LEFT FRONT SENSOR CONTINUITYK25 MPH	7A
LEFT FRONT SENSOR CONTINUITYJ25 MPH	7A
LEFT FRONT SENSOR SIGNAL MISSING	7A
LEFT FRONT WHEEL SPEED COMPARISON	7A
REAR INLET VALVE	9A
REAR OUTLET VALVE	10A
LEFT REAR SENSOR CIRCUIT FAILURE	11A
LEFT REAR SENSOR CONTINUITYK25 MPH	11A
LEFT REAR SENSOR CONTINUITYJ25 MPH	11A
LEFT REAR SENSOR SIGNAL MISSING	11A
LEFT REAR WHEEL SPEED COMPARISON	11A
MAIN RELAY/POWER CIRCUIT FAILURE	13A
PEDAL TRAVEL SENSOR CIRCUIT	14A
PUMP MOTOR CIRCUIT NOT WORKING PROPERLY	15A
RIGHT FRONT INLET VALVE	16A
RIGHT FRONT OUTLET VALVE	17A
RIGHT FRONT CIRCUIT FAILURE	18A
RIGHT FRONT SENSOR CONTINUITYK25 MPH	18A
RIGHT FRONT SENSOR CONTINUITYJ25 MPH	18A
RIGHT FRONT REAR SENSOR SIGNAL MISSING	18A
RIGHT FRONT WHEEL SPEED COMPARISON	18A
RIGHT REAR SENSOR CIRCUIT FAILURE	20A
RIGHT REAR SENSOR CONTINUITYK25 MPH	20A
RIGHT REAR SENSOR CONTINUITYJ25 MPH	20A
RIGHT REAR SENSOR SIGNAL MISSING	20A
RIGHT REAR WHEEL SPEED COMPARISON	20A
ABS WARNING LAMP ILLUMINATION PROBLEM	22A
NO RESPONSE	23A

TEST 2A

CONTROLLER FAILURE

If DRB-II displays CONTROLLER FAILURE, replace Controller Anti-Lock Brake (CAB). Perform VERIFICATION TEST VER-1A.

TEST 3A

"G" SWITCH NOT PROCESSABLE

1) Ensure "G" switch sensor assembly is properly installed. If not properly installed, repair as necessary and perform VERIFICATION TEST VER-1A. If "G" switch is properly installed, turn ignition off. Disconnect and inspect CAB 55-pin connector and "G" switch sensor 3-pin connector. Repair connectors as necessary.

2) Turn ignition on. With DRB-II in voltmeter mode, probe "G" switch connector terminals individually. If voltage is present, repair short to voltage in that "G" switch circuit. Perform VERIFICATION TEST VER-1A. If voltage is not present at any terminals, go to next step.

3) Turn ignition off. With DRB-II in ohmmeter mode, probe "G" switch connector terminals individually with remaining lead connected to chassis ground. If resistance at any terminal is less than 5 ohms, repair short to ground in that circuit. Perform VERIFICATION TEST VER-1A.

4) If resistance at each terminal is more than 5 ohms, connect jumper wire between ground and "G" switch terminals No. 1-3. Check for continuity to ground on CAB terminals No. 25, 26 and 43. If continuity to ground does not exist, repair open in that circuit. Perform VERIFICATION TEST VER-1A. If continuity to ground exists, replace CAB. Perform VERIFICATION TEST VER-1A.

TEST 4A

HYDRAULIC FAILURE

1) Inspect brake system for hydraulic leaks, and repair as necessary. If brake system is okay, using DRB-II, read fault messages. If DRB-II displays PUMP/MOTOR NOT WORKING PROPERLY, perform TEST 15A. If DRB-II displays PEDAL TRAVEL SENSOR CIRCUIT, perform TEST 14A. If DRB-II does not display PUMP/MOTOR NOT WORKING PROPERLY or PEDAL TRAVEL SENSOR CIRCUIT, using DRB-II, erase fault messages.

2) Using DRB-II, monitor read faults display for 4 minutes. If any fault messages are displayed, perform TEST 1A. If no fault messages are displayed, depress brake pedal and hold down until instructed to release it. Using DRB-II, actuate hydraulic valve test. Release brake pedal.

3) If brake pedal came back up, perform TEST 14A. If brake pedal dropped all the way to the floor or there were not 3 slight drops in the brake pedal, perform TEST 4B. If the brake pedal did not come back up at end of test, replace pump/motor assembly. If the brake pedal did come back up at end of test, replace CAB. If CAB has already been replaced, replace HCU. Perform VERIFICATION TEST VER-1A.

TEST 4B

HYDRAULIC FAILURE

Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Disconnect and inspect hydraulic unit 10-pin connector. Repair connector as necessary. If terminals of both connectors are not

pushed out, damaged or improperly wired, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

TEST 5A

LEFT FRONT INLET VALVE

1) Disconnect and inspect hydraulic unit 10-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 4 (White/Light Green wire) of hydraulic unit connector. If voltage is present, repair short to voltage in White/Light Green wire. Perform VERIFICATION TEST VER-1A.

2) If voltage is not present, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe terminal No. 4 (White/Light Green wire) of hydraulic unit connector. If resistance is less than 5 ohms, repair short to ground in White/Light Green wire.

3) If resistance is more than 5 ohms, check resistance of White/Light Green wire between terminals No. 20 of CAB connector and No. 4 of hydraulic unit connector using an external ohmmeter. If resistance is more than 5 ohms, repair open in White/Light Green wire. Perform VERIFICATION TEST VER-1A.

4) If resistance is less than 5 ohms, measure resistance of left front inlet valve. If resistance is 5-8 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 5-8 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

TEST 6A

LEFT FRONT OUTLET VALVE

1) Disconnect and inspect hydraulic unit 10-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 9 (Dark Green/Black wire) of hydraulic unit connector. If voltage is present, repair short to voltage in Dark Green/Black wire. Perform VERIFICATION TEST VER-1A.

2) If voltage is not present, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe terminal No. 9 (Dark Green/Black wire) of hydraulic unit connector. If resistance is less than 5 ohms, repair short to ground in Dark Green/Black wire.

3) If resistance is more than 5 ohms, check resistance of Dark Green/Black wire between terminals No. 2 of CAB connector and No. 9 of hydraulic unit connector using an external ohmmeter. If resistance is more than 5 ohms, repair open in Dark Green/Black wire. Perform VERIFICATION TEST VER-1A.

4) If resistance is less than 5 ohms, measure resistance of left front outlet valve. If resistance is not 3-5 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A. If resistance is 3-5 ohms, replace CAB. Perform VERIFICATION TEST VER-1A.

TEST 7A

LEFT FRONT SENSOR CIRCUIT FAILURE

1) Using DRB-II, read and record all speed sensor fault messages. If DRB-II does not display LEFT FRONT SENSOR CIRCUIT FAILURE, perform TEST 8A. If DRB-II displays LEFT FRONT SENSOR CIRCUIT FAILURE, inspect left front wheel speed sensor for damage. If sensor is damaged, repair or replace sensor as necessary. Perform

VERIFICATION TEST VER-1A. If sensor is okay, turn ignition off.

2) Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 48 (Red wire) of CAB connector. If voltage is present, repair short to battery in Red wire. Perform VERIFICATION TEST VER-1A.

3) If voltage is not present, turn ignition off. With DRB-II in ohmmeter mode, probe terminal No. 48 (Red wire) of CAB connector. If resistance is less than 5 ohms, repair short to ground in Red wire. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

4) Using an external ohmmeter, check resistance between terminal No. 48 (Red wire) and No. 30 (Red/Dark Blue wire) of CAB connector. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, disconnect and inspect left front wheel speed sensor connector.

5) Using an external ohmmeter, check resistance between left wheel speed sensor connector terminals. If resistance is not 900-1300 ohms, replace wheel speed sensor. Perform VERIFICATION TEST VER-1A. If resistance is 900-1300 ohms, check resistance of Red wire between terminal No. 48 of CAB connector and No. 1 of left front wheel speed sensor connector using an external ohmmeter.

6) If resistance is more than 5 ohms, repair open Red wire. Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, repair open Red/Dark Blue wire. Perform VERIFICATION TEST VER-1A.

TEST 8A

LEFT FRONT SENSOR

1) Inspect left front wheel speed sensor for damage. Repair or replace sensor as necessary. Perform VERIFICATION TEST VER-1A. If sensor is okay, check left front sensor tone (pulse) ring for damage. Repair or replace tone ring as necessary. Perform VERIFICATION TEST VER-1A. If tone ring is okay, inspect left front wheel speed sensor wiring harness for damage.

2) Repair or replace wiring as necessary. Perform VERIFICATION TEST VER-1A. If wiring harness is okay, disconnect and inspect left front wheel speed sensor connector. Repair connector as necessary. Using an external ohmmeter, check resistance between left front wheel speed sensor connector terminals.

3) If resistance is not 900-1300 ohms, replace wheel speed sensor. Perform VERIFICATION TEST VER-1A. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A.

NOTE: If excessive axle deflection occurs on extremely bumpy surfaces or during off road use, it is possible for a wheel speed sensor to set a code.

TEST 9A

REAR INLET VALVE

1) Disconnect and inspect hydraulic unit 10-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 4 (White/Black wire on Cherokee and Wrangler or White/Red wire on Grand Cherokee and Grand Wagoneer) of hydraulic unit connector. If voltage is present, repair short to voltage in White/Black or White/Red wire. Perform VERIFICATION TEST VER-1A.

2) If voltage is not present, turn ignition off. Disconnect

and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe terminal No. 4 of hydraulic unit connector. If resistance is less than 5 ohms, repair short to ground in White/Black or White/Red wire. Perform VERIFICATION TEST VER-1A.

3) If resistance is less than 5 ohms, check resistance of between terminal No. 54 of CAB connector and No. 4 of hydraulic unit connector using an external ohmmeter. If resistance is more than 5 ohms, repair open in White/Black or White/Red wire. Perform VERIFICATION TEST VER-1A.

4) Using an external ohmmeter, check resistance between terminals No. 4 and 5 of hydraulic control unit pigtail connector. If resistance is not 5-8 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A. If resistance is 5-8 ohms, replace CAB. Perform VERIFICATION TEST VER-1A.

TEST 10A

REAR OUTLET VALVE

1) Disconnect and inspect hydraulic unit 10-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 7 (Dark Green/Orange wire) of hydraulic unit connector. If voltage is present, repair short to voltage in Dark Green/Orange wire. Perform VERIFICATION TEST VER-1A.

2) If voltage is not present, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe terminal No. 7 (Dark Green/Orange wire) of hydraulic unit connector. If resistance is less than 5 ohms, repair short to ground in Dark Green/Orange wire.

3) If resistance is more than 5 ohms, check resistance of Dark Green/Orange wire between terminal No. 36 of CAB connector and No. 7 of hydraulic unit connector using an external ohmmeter. If resistance is more than 5 ohms, repair open Dark Green/Orange wire. Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, go to next step.

4) Using an external ohmmeter, check resistance between terminals No. 7 and 10 of hydraulic control unit connector. If resistance is not 3-5 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A. If resistance is 3-5 ohms, replace CAB. Perform VERIFICATION TEST VER-1A.

TEST 11A

LEFT REAR SENSOR CIRCUIT FAILURE

1) Using DRB-II, read and record all speed sensor fault messages. If DRB-II does not display LEFT REAR SENSOR CIRCUIT FAILURE, perform TEST 12A. If DRB-II displays LEFT REAR SENSOR CIRCUIT FAILURE, inspect left rear wheel speed sensor for damage. If sensor is damaged, repair or replace sensor as necessary. Perform VERIFICATION TEST VER-1A. If sensor is okay, turn ignition off.

2) Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 46 (Light Green wire) of CAB connector. If voltage is present, perform TEST 11B.

3) If voltage is not present, turn ignition off. With DRB-II in ohmmeter mode, probe terminal No. 46 (Light Green wire) of CAB connector. If resistance is less than 5 ohms, perform TEST 11C. If resistance is more than 5 ohms, using an external ohmmeter, check resistance between terminal No. 46 (Light Green wire) and No. 28 (Light Green/Dark Blue wire) of CAB connector.

4) If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, disconnect and inspect left rear wheel speed sensor connector. Using an external ohmmeter, check resistance between left rear wheel speed sensor connector terminals. If resistance is not 900-1300 ohms, replace wheel speed sensor. Perform VERIFICATION TEST VER-1A.

5) If resistance is 900-1300 ohms, connect a jumper wire between terminal No. 46 (Light Green wire) of CAB connector and ground. With DRB-II in ohmmeter mode, probe Light Green wire of left rear wheel speed sensor connector. If resistance is more than 5 ohms, perform TEST 11D. If resistance is less than 5 ohms, perform TEST 11E.

TEST 11B

LEFT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee and Wrangler, repair short to battery voltage in Light Green wire. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black ABS 8-pin disconnect connector. Connector is located behind left side kick panel. Repair connector as necessary. With DRB-II in voltmeter mode, probe Light Green wire of ABS disconnect connector.

2) If voltage is not present, repair short to battery voltage in Light Green wire between wheel speed sensor and CAB disconnect connector. Perform VERIFICATION TEST VER-1A. If voltage is present, repair short to battery voltage in Light Green wire between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 11C

LEFT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee and Wrangler, repair short to ground in Light Green wire. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black CAB 8-pin disconnect connector. Connector is located behind left side kick panel. Repair connector as necessary. With DRB-II in ohmmeter mode, probe Light Green wire of ABS disconnect connector.

2) If resistance is more than 5 ohms, repair short to ground in Light Green wire between wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, repair short to ground in Light Green wire between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 11D

LEFT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee and Wrangler, repair open in Light Green wire. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black CAB 8-pin disconnect connector. Connector is located behind left side kick panel. Repair connector as necessary. With DRB-II in ohmmeter mode, probe Light Green wire of ABS disconnect connector.

2) If resistance is less than 5 ohms, repair open in Light Green wire between wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open in Light Green wire between ABS disconnect connector and

CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 11E

LEFT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee and Wrangler, repair open in Light Green/Dark Blue wire. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black ABS 8-pin disconnect connector. Connector is located behind left side kick panel. Repair connector as necessary. Connect a jumper wire between terminal No. 28 (Light Green/Dark Blue wire) of CAB connector and ground. With DRB-II in ohmmeter mode, probe Light Green/Dark Blue wire of ABS disconnect connector.

2) If resistance is less than 5 ohms, repair open in Light Green/Dark Blue wire between wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open in Light Green/Dark Blue wire between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 12A

LEFT REAR SENSOR

1) Inspect left rear wheel speed sensor. If speed sensor is damaged, contaminated or loose, repair or replace speed sensor as necessary. Perform VERIFICATION TEST VER-1A. If speed sensor is okay, inspect left rear tone (pulse) ring for damaged teeth or excessive runout. Runout should not exceed .003" (.08 mm). Repair or replace tone ring as necessary. Perform VERIFICATION TEST VER-1A.

2) If tone ring is okay, using a feeler gauge, check left rear wheel sensor-to-tone ring clearance. If clearance is not .036-.050" (.91-1.27 mm), repair as necessary. If clearance is .036-.050" (.91-1.27 mm), inspect left rear wheel speed sensor inspect left front wheel speed sensor wiring harness for damage.

3) Repair or replace wiring as necessary. If wiring harness is okay, disconnect and inspect left rear wheel speed sensor connector. Repair connector as necessary. Using an external ohmmeter, check resistance between left rear wheel speed sensor connector terminals.

4) If resistance is not 900-1300 ohms, replace wheel speed sensor. Perform VERIFICATION TEST VER-1A. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A.

NOTE: If excessive axle deflection occurs on extremely bumpy surfaces or during off road use, it is possible for a wheel speed sensor to set a code.

TEST 13A

MAIN RELAY/POWER CIRCUIT FAILURE

1) Check ABS system fuse in Power Distribution Center (PDC). If fuse is not okay, perform TEST 13B. If fuse is okay, go to next step.

2) Check if charging system is overcharging. If charging system is operating properly, go to next step. If charging system is not operating properly, repair as necessary. Perform VERIFICATION TEST VER-1A.

3) Temporarily replace ABS main relay with another 5-terminal relay from PDC. Using DRB-II, erase ABS fault messages. Cycle ignition off and on. Using DRB-II, read ABS fault messages. If MAIN RELAY/POWER CIRCUIT FAILURE message is displayed, go to next step. If fault is not displayed, replace ABS main relay. Perform VERIFICATION TEST VER-1A.

4) Install replacement 5-terminal relay back into PDC, leaving ABS main relay disconnected (removed). With DRB-II in voltmeter mode, probe fused battery feed Red/Dark Green wire (Red/Light Green wire on Grand Cherokee and Grand Wagoneer) at ABS main relay socket. If voltage is more than 9 volts, go to next step. If voltage is less than 9 volts, repair open Red/Dark Green wire (Red/Light Green on Grand Cherokee and Grand Wagoneer) wire to ABS fuse in PDC. Perform VERIFICATION TEST VER-1A.

5) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Ensure ABS main relay is still disconnected. Using an external ohmmeter, check continuity of Pink (Pink/Dark Blue on Grand Cherokee and Grand Wagoneer) wire between CAB connector terminal No. 34 and ABS main relay socket terminal "C". If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Pink (Pink/Dark Blue on Grand Cherokee and Grand Wagoneer) wire to ABS main relay. Perform VERIFICATION TEST VER-1A.

6) Check continuity of Gray/Yellow wire between CAB connector terminal No. 3 and ABS main relay socket terminal "B". If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Gray/Yellow wire to ABS main relay. Perform VERIFICATION TEST VER-1A.

7) Check continuity of Gray/Yellow wire between CAB connector terminal No. 33 and ABS main relay socket terminal "B". If resistance is less than 5 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open Gray/Yellow wire to ABS main relay. Perform VERIFICATION TEST VER-1A.

TEST 13B

MAIN RELAY/POWER CIRCUIT FAILURE

1) Remove ABS system fuse from Power Distribution Center (PDC). Remove ABS main relay from PDC, and inspect connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe fused battery feed Red/Dark Green wire (Red/Light Green wire on Grand Cherokee and Grand Wagoneer or Red/Dark Blue wire on Wrangler) at ABS main relay socket. If resistance is less than 5 ohms, repair Red/Dark Green wire (Red/Light Green wire on Grand Cherokee and Grand Wagoneer or Red/Dark Blue wire on Wrangler) for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

2) Remove ABS pump/motor relay from PDC, and inspect connector. Repair connector as necessary. Using an external ohmmeter, measure resistance of ABS pump/motor relay coil. See Fig. 16. If resistance is 35-65 ohms, go to next step. If resistance is not 35-65 ohms, replace ABS pump/motor relay. Perform VERIFICATION TEST VER-1A.

3) Disconnect hydraulic control unit 10-pin connector. With DRB-II in ohmmeter mode, probe Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) at ABS main relay socket terminal "B". If resistance is less than 5 ohms, repair Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

4) Reconnect all disconnected components. Install a new ABS fuse in PDC and cycle ignition off and on. Inspect ABS fuse in PDC. If fuse is okay (does not blow), perform TEST 13C. If fuse is not okay

(blows), replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

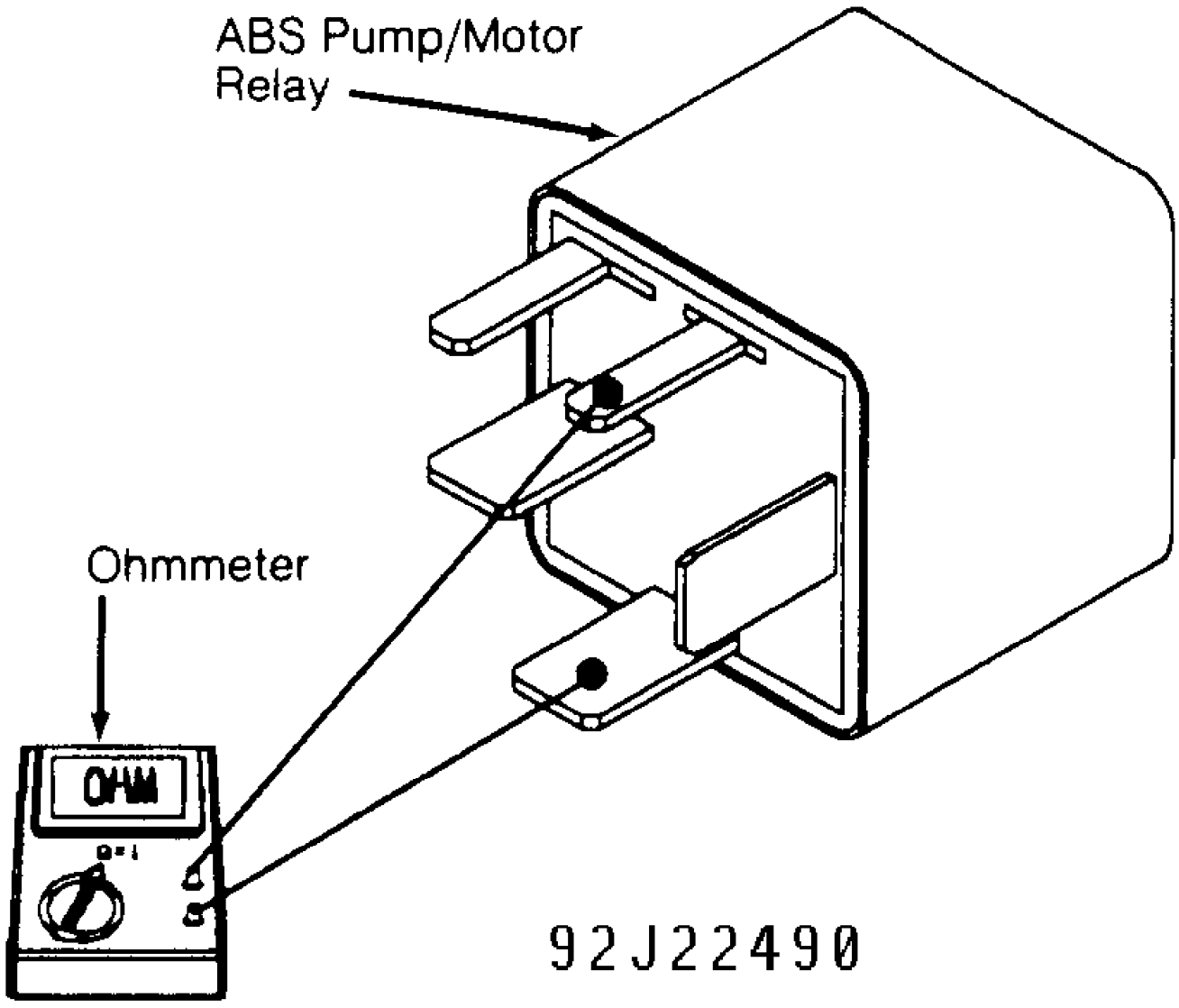

Fig. 16: Measuring ABS Pump/Motor Relay Resistance

TEST 13C

MAIN RELAY/POWER CIRCUIT FAILURE

1) Ensure DRB-II is NOT in TEVES ABS DIAGNOSTIC MODE. Road test vehicle, making several ABS stops. Inspect ABS fuse in PDC. If fuse is okay (does not blow), ABS system is operating properly at this time. Perform VERIFICATION TEST VER-1A.

2) If fuse is not okay (blows), inspect ABS wiring harness for damage and repair as necessary. Perform VERIFICATION TEST VER-1A. If wiring harness is okay, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

TEST 14A

PEDAL TRAVEL SENSOR CIRCUIT

1) Inspect pedal travel sensor connector. Sensor is located on right side of brake booster. If connector is disconnected and/or damaged, repair connector as necessary and perform VERIFICATION TEST VER-1A. If connector is properly connected and NOT damaged, go to next step.

2) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. Disconnect and inspect pedal travel sensor connector. Repair connector as necessary. With DRB-II in voltmeter mode, probe Gray/Light Blue wire at sensor connector. If no voltage is present, go to next step. If voltage is present, repair Gray/Light Blue wire for a short to battery voltage. Perform VERIFICATION TEST VER-1A.

3) Turn ignition off. With DRB-II in ohmmeter mode, probe Gray/Light Blue wire at pedal travel sensor connector. If resistance is less than 5 ohms, repair Gray/Light Blue wire for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

4) Using an external ohmmeter, measure resistance between CAB connector terminal No. 16 and pedal travel sensor connector Gray/Light Blue wire. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Gray/Light Blue wire to pedal travel sensor. Perform VERIFICATION TEST VER-1A.

5) Using an external ohmmeter, measure resistance between CAB connector terminal No. 41 and pedal travel sensor connector Red/Black wire. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Red/Black wire to pedal travel sensor. Perform VERIFICATION TEST VER-1A.

6) Remove pedal travel sensor from brake booster. Check if sensor plunger cap color matches color dot on booster (near sensor). If colors match, go to next step. If colors do not match, replace pedal travel sensor. Perform VERIFICATION TEST VER-1A.

7) Using an external ohmmeter, measure resistance of pedal travel sensor while slowly depressing sensor plunger. If sensor resistance is as specified, replace CAB. See PEDAL TRAVEL SENSOR RESISTANCE table. Perform VERIFICATION TEST VER-1A. If sensor resistance is not as specified, replace pedal travel sensor. Perform VERIFICATION TEST VER-1A.

PEDAL TRAVEL SENSOR RESISTANCE TABLE

Plunger Position	Ohms
Step 1 (Rest)	236-262
Step 2	414-458
Step 3	534-592
Step 4	655-725
Step 5	776-858
Step 6	980-1084
Step 7	Infinity

TEST 15A

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY

1) Inspect ABS pump/motor fuse from Power Distribution Center (PDC). If fuse is okay, go to next step. If fuse is not okay (blown), perform TEST 15B.

2) Remove ABS pump/motor relay from PDC, and inspect

connector. Repair connector as necessary. With DRB-II in voltmeter mode, probe Red/Dark Green wire (Red/Dark Blue wire on Grand Cherokee and Grand Wagoneer or Red/Brown wire on Wrangler) at ABS pump/motor relay socket terminal "B". If voltage is more than 9 volts, go to next step. If voltage is less than 9 volts, repair open Red/Dark Green wire (Red/Dark Blue wire on Grand Cherokee and Grand Wagoneer or Red/Brown wire on Wrangler) to ABS pump/motor relay.

3) Connect a jumper wire between Red/Dark Green wire and Tan/Black wire (Brown/White wire and Red/Dark Blue wire on Grand Cherokee and Grand Wagoneer or Tan wire and Red/Brown wire on Wrangler) at ABS pump/motor relay socket terminals "B" and "D". Turn ignition on. Inspect ABS pump/motor fuse. If fuse is okay (does not blow), go to next step. If fuse is not okay (blows), perform TEST 15B.

4) Listen for ABS pump/motor operation. If ABS pump/motor is running, go to next step. If ABS pump/motor is not running, perform TEST 15C.

5) Turn ignition off. Remove jumper wire. With DRB-II in ohmmeter mode, probe Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) at ABS pump/motor relay socket. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) wire between ABS pump/motor relay socket and ABS main relay. Perform VERIFICATION TEST VER-1A.

6) Using an external ohmmeter, measure resistance of ABS pump/motor relay coil terminals No. 85 and 86. See Fig. 16. If resistance is 35-65 ohms, go to next step. If resistance is not 35-65 ohms, replace ABS pump/motor relay. Perform VERIFICATION TEST VER-1A.

7) Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe Gray wire at ABS pump/motor relay socket. If no voltage is present, go to next step. If any voltage is present, repair Gray wire for a short to battery voltage. Perform VERIFICATION TEST VER-1A.

8) Turn ignition off. With DRB-II in ohmmeter mode, probe Gray wire at ABS pump/motor relay socket. If resistance is less than 5 ohms, repair Gray wire for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

9) Using an external ohmmeter, measure resistance between CAB connector terminal No. 15 and ABS pump/motor relay socket Gray wire. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Gray wire to relay socket. Perform VERIFICATION TEST VER-1A.

10) Turn ignition off. Reinstall ABS pump/motor relay in PDC. Apply battery voltage to CAB connector terminal No. 15, and go to next step.

11) Ensure ignition is off. With DRB-II in voltmeter mode, probe Tan/Black wire (Brown/White wire on Grand Cherokee and Grand Wagoneer or Tan wire on Wrangler) at ABS pump/motor 4-pin harness connector. If voltage is more than 9 volts, perform TEST 15D. If voltage is less than 9 volts, replace ABS pump/motor relay. Perform VERIFICATION TEST VER-1A.

TEST 15B

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY

1) Remove ABS pump/motor relay (if installed) from Power Distribution Center (PDC). Remove jumper wire from ABS pump/motor relay socket (if installed). Turn ignition off, and go to next step.

2) With DRB-II in ohmmeter mode, probe Tan/Black wire (Brown/White wire on Grand Cherokee and Grand Wagoneer or Tan wire on Wrangler) at ABS pump/motor relay socket. If resistance is less than 5 ohms, repair Tan/Black wire (Brown/White wire on Grand Cherokee and

Grand Wagoneer or Tan wire on Wrangler) for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

3) Using an external ohmmeter, check ABS pump/motor relay diode. Attach ohmmeter positive and negative leads as shown. See Fig. 17. If continuity exists, replace ABS pump/motor relay. Perform VERIFICATION TEST VER-1A. If no continuity exists, replace ABS pump/motor assembly. Perform VERIFICATION TEST VER-1A.

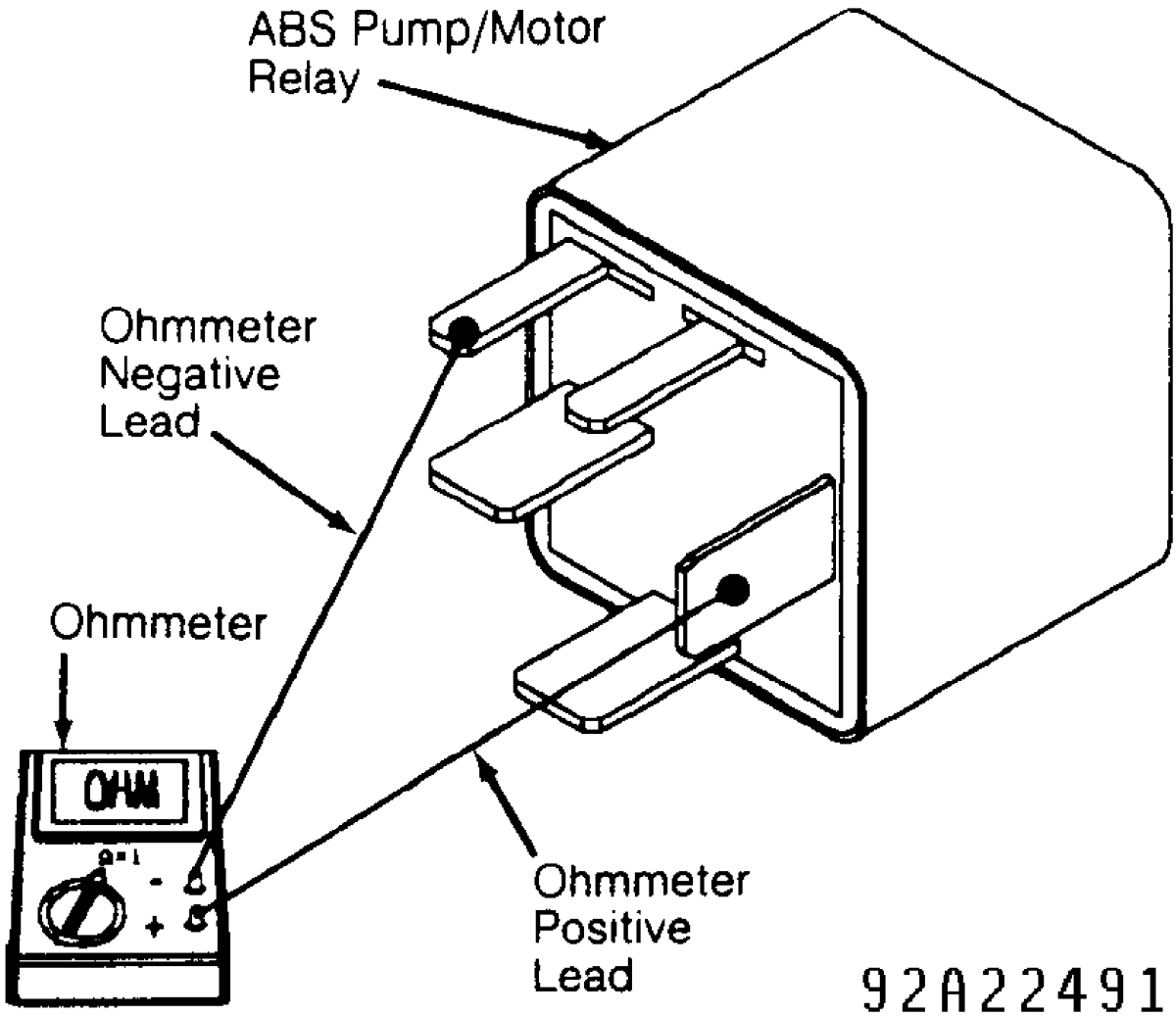

Fig. 17: Checking ABS Pump/Motor Relay Diode

TEST 15C

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY

1) Disconnect ABS pump/motor 4-pin connector at hydraulic control unit. Ensure jumper wire is still connected between Red/Dark Green wire and Tan/Black wire (Brown/White wire and Red/Dark Blue wire on Grand Cherokee and Grand Wagoneer or Tan wire and Red/Brown wire on Wrangler) at ABS pump/motor relay socket.

2) With DRB-II in voltmeter mode, probe Tan/Black wire (Brown/White wire on Grand Cherokee and Grand Wagoneer or Tan wire on

Wrangler) at ABS pump/motor 4-pin harness connector. If voltage is more than 9 volts, go to next step. If voltage is less than 9 volts, repair open Tan/Black wire (Brown/White wire on Grand Cherokee and Grand Wagoneer or Tan wire on Wrangler) to 4-pin harness connector. Perform VERIFICATION TEST VER-1A.

3) Turn ignition off. With DRB-II in ohmmeter mode, probe Black/Tan ground wire (Black ground wire on Grand Cherokee and Grand Wagoneer) at ABS pump/motor 4-pin harness connector. If resistance is less than 5 ohms, replace ABS pump/motor assembly. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open in Black/Tan ground wire (Black ground wire on Grand Cherokee and Grand Wagoneer). Perform VERIFICATION TEST VER-1A.

TEST 15D

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY

1) Using an external ohmmeter, measure resistance of ABS pump/motor speed sensor. See Fig. 18. If sensor resistance is 10-35 ohms, go to next step. If resistance is not 10-35 ohms, replace ABS pump/motor assembly. Perform VERIFICATION TEST VER-1A.

2) Turn ignition on. With DRB-II in voltmeter mode, probe Tan wire (Light Green/Brown wire on Wrangler) at ABS pump/motor 4-pin harness connector. If any voltage is present, repair ABS pump/motor speed sensor Tan wire (Light Green wire on Wrangler) for a short to battery voltage. Perform VERIFICATION TEST VER-1A. If no voltage is present, go to next step.

3) With DRB-II in voltmeter mode, probe Dark Blue wire (Brown wire on Wrangler) at ABS pump/motor 4-pin harness connector. If any voltage is present, repair ABS pump/motor speed sensor Dark Blue wire (Brown wire on Wrangler) for a short to battery voltage. Perform VERIFICATION TEST VER-1A. If no voltage is present, go to next step.

4) With DRB-II in ohmmeter mode, probe Tan wire (Light Green/Brown wire on Wrangler) at ABS pump/motor 4-pin harness connector. If resistance is less than 5 ohms, repair ABS pump/motor speed sensor Tan wire (Light Green/Brown wire on Wrangler) for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

5) With DRB-II in ohmmeter mode, probe Dark Blue wire (Brown wire on Wrangler) at ABS pump/motor 4-pin harness connector. If resistance is less than 5 ohms, repair ABS pump/motor speed sensor Dark Blue wire (Brown wire on Wrangler) for a short to ground. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, go to next step.

6) Using an external ohmmeter, measure resistance of Tan wire (Light Green/Brown wire on Wrangler) between CAB connector terminal No. 49 and ABS pump/motor 4-pin harness connector. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open ABS pump/motor speed sensor Tan wire (Light Green/Brown wire on Wrangler). Perform VERIFICATION TEST VER-1A.

7) Using an external ohmmeter, measure resistance of Dark Blue wire (Brown wire on Wrangler) between CAB connector terminal No. 31 and ABS pump/motor 4-pin harness connector. If resistance is less than 5 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open ABS pump/motor speed sensor Dark Blue wire (Brown wire on Wrangler). Perform VERIFICATION TEST VER-1A.

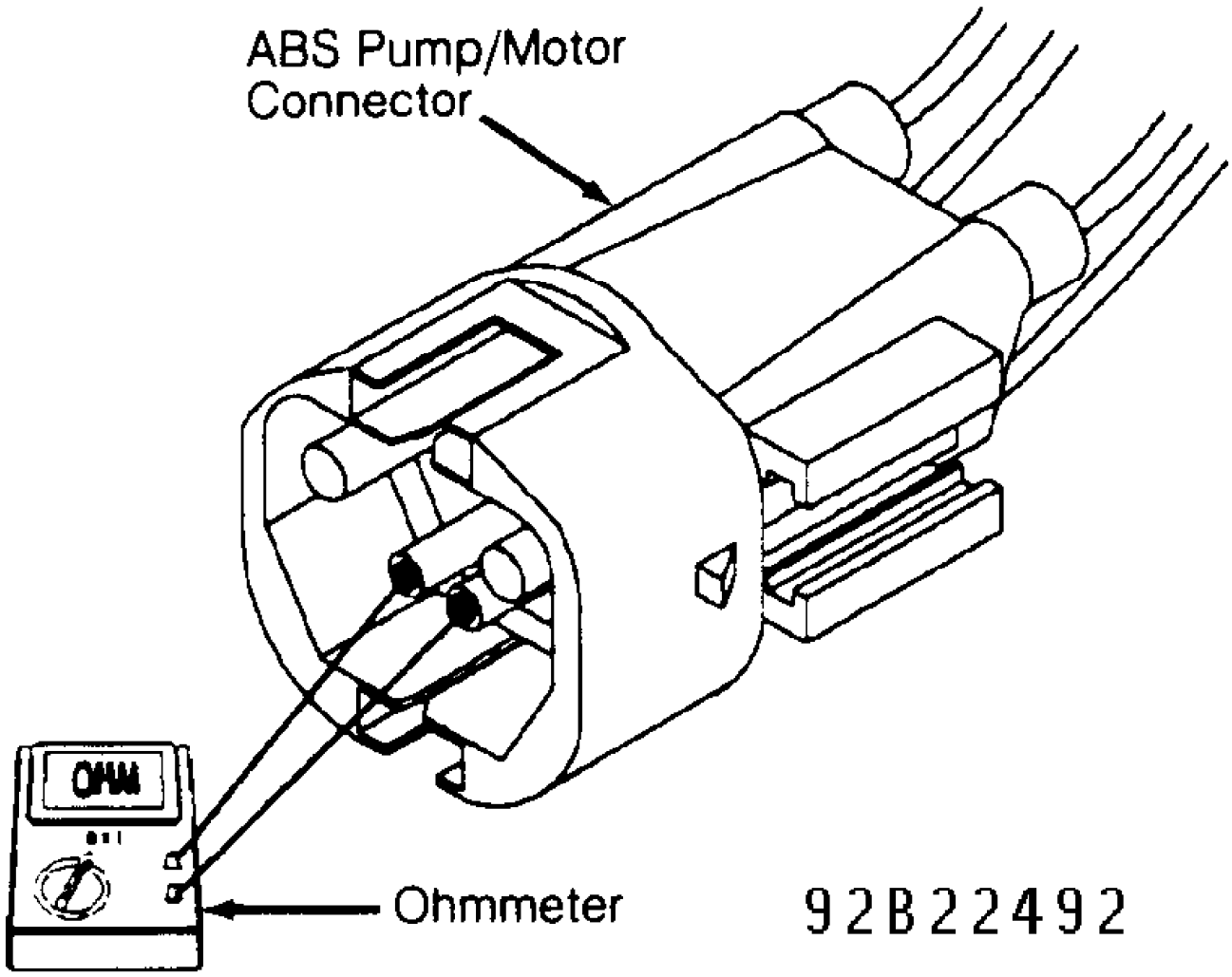

Fig. 18: Checking ABS Pump/Motor Sensor Resistance

TEST 16A

RIGHT FRONT INLET VALVE

1) Disconnect and inspect Hydraulic Control Unit (HCU) 10-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler) at HCU 10-pin harness connector. If no voltage is present, go to next step. If any voltage is present, repair White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler) for a short to battery power. Perform VERIFICATION TEST VER-1A.

2) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler) at HCU 10-pin harness connector. If resistance is more than 5 ohms, go to next step. If resistance is less than 5 ohms, repair White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler) for a short to ground. Perform VERIFICATION TEST VER-1A.

3) Using an external ohmmeter, measure resistance of

White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler) between CAB connector terminal No. 38 and HCU 10-pin harness connector. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open White/Tan wire (White/Orange wire on Grand Cherokee and Grand Wagoneer or White/Yellow wire on Wrangler). Perform VERIFICATION TEST VER-1A.

4) Using an external ohmmeter, measure resistance of right front inlet valve between terminals No. 3 and 5 at HCU pigtail connector. See Fig. 19. If resistance is 5-8 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 5-8 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

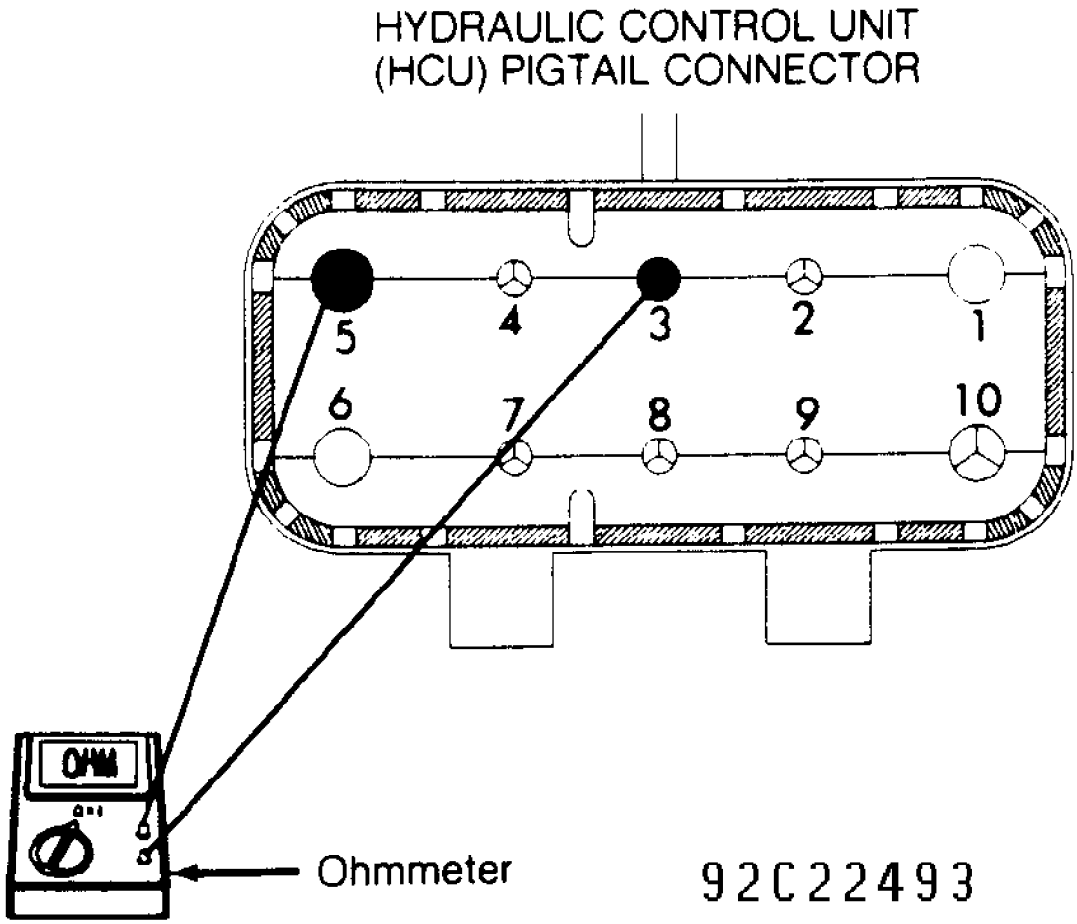

Fig. 19: Checking HCU Right Front Inlet Valve Resistance

TEST 17A

RIGHT FRONT OUTLET VALVE

1) Disconnect and inspect Hydraulic Control Unit (HCU) 10-pin

connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe Dark Green/White wire at HCU 10-pin harness connector. If no voltage is present, go to next step. If any voltage is present, repair Dark Green/White wire for a short to battery power. Perform VERIFICATION TEST VER-1A.

2) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in ohmmeter mode, probe Dark Green/White wire at HCU 10-pin harness connector. If resistance is more than 5 ohms, go to next step. If resistance is less than 5 ohms, repair Dark Green/White wire for a short to ground. Perform VERIFICATION TEST VER-1A.

3) Using an external ohmmeter, measure resistance of Dark Green/White wire between CAB connector terminal No. 21 and HCU 10-pin harness connector. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Dark Green/White wire. Perform VERIFICATION TEST VER-1A.

4) Using an external ohmmeter, measure resistance of right front outlet valve between terminals No. 8 and 10 at HCU connector. See Fig. 19. If resistance is 3-5 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 3-5 ohms, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A.

TEST 18A

RIGHT FRONT SENSOR CIRCUIT FAILURE

1) Using DRB-II, read and record all wheel speed sensor faults. If RIGHT FRONT SENSOR CIRCUIT FAILURE message is displayed, go to next step. If message is not displayed, perform TEST 19A.

2) Inspect right front wheel speed sensor for damage. If sensor is okay, go to next step. If sensor is damaged, repair or replace as necessary. Perform VERIFICATION TEST VER-1A.

3) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe White wire at CAB connector terminal No. 47. If no voltage is present, go to next step. If any voltage is present, repair White wire for a short to battery power. Perform VERIFICATION TEST VER-1A.

4) Turn ignition off. With DRB-II in ohmmeter mode, probe White wire at CAB connector terminal No. 47. If resistance is more than 5 ohms, go to next step. If resistance is less than 5 ohms, repair White wire for a short to ground. Perform VERIFICATION TEST VER-1A.

5) Using an external ohmmeter, measure resistance of right front wheel speed sensor between White/Dark Blue wire and White wire at CAB connector terminals No. 29 and 47. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, go to next step.

6) Disconnect right front wheel speed sensor harness connector. Connector is located on right rear corner of engine compartment. Using an external ohmmeter, measure resistance of right front wheel speed sensor at harness connector terminals. If resistance is 900-1300 ohms, go to next step. If resistance is not 900-1300 ohms, replace sensor. Perform VERIFICATION TEST VER-1A.

7) Using an external ohmmeter, measure resistance of White wire between CAB connector terminal No. 47 and right front wheel speed sensor harness connector. If resistance is less than 5 ohms, repair open White/Dark Blue wire. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open White wire. Perform VERIFICATION TEST VER-1A.

TEST 19A

RIGHT FRONT SENSOR

1) Inspect right front wheel speed sensor for damage. If sensor is okay, go to next step. If sensor is damaged, repair or replace as necessary. Perform VERIFICATION TEST VER-1A.
2) Inspect right front wheel speed sensor tone (pulse) ring for damaged teeth or excessive runout. Runout should not exceed .003" (.08 mm). Repair or replace tone ring as necessary. Perform VERIFICATION TEST VER-1A. If tone ring is okay, go to next step.
3) Using a feeler gauge, check right front wheel sensor-to-tone ring clearance. If clearance is .036-.050" (.91-1.27 mm), go to next step. If clearance is not .036-.050" (.91-1.27 mm), repair as necessary. Perform VERIFICATION TEST VER-1A.
4) Inspect right front wheel speed sensor wiring harness for damage. If wiring harness is okay, go to next step. If wiring harness is damaged, repair wiring harness as necessary. Perform VERIFICATION TEST VER-1A.
5) Disconnect right front wheel speed sensor harness connector. Connector is located on right rear corner of engine compartment. Using an external ohmmeter, measure resistance of right front wheel speed sensor at harness connector terminals. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, replace sensor. Perform VERIFICATION TEST VER-1A.

NOTE: If excessive axle deflection occurs on extremely bumpy surfaces or during off road use, it is possible for a wheel speed sensor to set a code.

TEST 20A

RIGHT REAR SENSOR CIRCUIT FAILURE

1) Using DRB-II, read and record all wheel speed sensor faults. If RIGHT REAR SENSOR CIRCUIT FAILURE message is displayed, go to next step. If message is not displayed, perform TEST 21A.
2) Inspect right rear wheel speed sensor for damage. If sensor is okay, go to next step. If sensor is damaged, repair or replace as necessary. Perform VERIFICATION TEST VER-1A.
3) Turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. Using DRB-II in voltmeter mode, probe Yellow wire (Yellow/Dark Blue wire on Wrangler) at CAB connector terminal No. 27. If no voltage is present, go to next step. If any voltage is present, perform TEST 20B.
4) Using DRB-II in ohmmeter mode, probe Yellow wire (Yellow/Dark Blue wire on Wrangler) at CAB connector terminal No. 27. If resistance is more than 5 ohms, go to next step. If resistance is less than 5 ohms, perform TEST 20C.
5) Using an external ohmmeter, measure resistance of right rear wheel speed sensor between Yellow wire and Yellow/Dark Blue wire at CAB connector terminals No. 27 and 45. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, go to next step.
6) Disconnect right rear wheel speed sensor. Using an external ohmmeter, measure resistance of right rear wheel speed sensor. If resistance is 900-1300 ohms, go to next step. If resistance is not 900-1300 ohms, replace sensor. Perform VERIFICATION TEST VER-1A.
7) Connect a jumper wire between ground and Yellow/Dark Blue

wire (Yellow wire on Wrangler) at CAB connector terminal No. 45. With DRB-II in ohmmeter mode, measure resistance of Yellow wire (Yellow/Dark Blue wire on Wrangler) at right rear wheel speed sensor harness connector. If resistance is less than 5 ohms, perform TEST 20E. If resistance is more than 5 ohms, perform TEST 20D.

TEST 20B

RIGHT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee, repair Yellow wire for a short to battery power. Perform VERIFICATION TEST VER-1A. On Wrangler, repair Yellow/Dark Blue wire for a short to battery power. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black ABS 8-pin disconnect connector. Connector is located behind left kick panel. Repair connector as necessary. With DRB-II in voltmeter mode, probe Yellow wire of ABS disconnect connector.

2) If no voltage is present, repair Yellow wire for a short to battery power between right rear wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If any voltage is present, repair Yellow wire for a short to battery power between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 20C

RIGHT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee, repair Yellow wire for a short to ground. Perform VERIFICATION TEST VER-1A. On Wrangler, repair Yellow/Dark Blue wire for a short to ground. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black ABS 8-pin disconnect connector. Connector is located behind left side kick panel. Repair connector as necessary. With DRB-II in ohmmeter mode, probe Yellow wire of ABS disconnect connector.

2) If resistance is less than 5 ohms, repair Yellow wire for a short to ground between right rear wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair Yellow wire for a short to ground between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 20D

RIGHT REAR SENSOR CIRCUIT FAILURE

1) On Cherokee, repair open Yellow/Dark Blue wire to right rear wheel speed sensor. Perform VERIFICATION TEST VER-1A. On Wrangler, repair open Yellow wire to right rear wheel speed sensor. Perform VERIFICATION TEST VER-1A. On Grand Cherokee and Grand Wagoneer, disconnect and inspect Black ABS 8-pin disconnect connector. Connector is located behind left kick panel. Repair connector as necessary. With DRB-II in ohmmeter mode, probe Yellow/Dark Blue wire of ABS disconnect connector.

2) If resistance is less than 5 ohms, repair open Yellow/Dark Blue wire between right rear wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open Yellow/Dark Blue wire between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 20E

RIGHT REAR SENSOR CIRCUIT FAILURE

1) On Wrangler, repair open Yellow/Dark Blue wire to right rear wheel speed sensor. Perform VERIFICATION TEST VER-1A. On all others, disconnect and inspect Black ABS 8-pin disconnect connector. On Cherokee, connector is located on transmission hump near firewall. On Grand Cherokee and Grand Wagoneer, connector is located behind left side kick panel. Repair connector as necessary. Connect a jumper wire between ground and Yellow wire at CAB connector terminal No. 27. With DRB-II in ohmmeter mode, probe Yellow wire of ABS disconnect connector.

2) If resistance is less than 5 ohms, repair open Yellow wire between right rear wheel speed sensor and ABS disconnect connector. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open Yellow wire between ABS disconnect connector and CAB 55-pin connector. Perform VERIFICATION TEST VER-1A.

TEST 21A

RIGHT REAR SENSOR

1) Inspect right rear wheel speed sensor for damage. If sensor is okay, go to next step. If sensor is damaged, repair or replace as necessary. Perform VERIFICATION TEST VER-1A.

2) Inspect right rear wheel speed sensor tone (pulse) ring for damaged teeth and excessive runout. Runout should not exceed .003" (.08 mm). Repair or replace tone ring as necessary. Perform VERIFICATION TEST VER-1A. If tone ring is okay, go to next step.

3) Using a feeler gauge, check right rear wheel sensor-to-tone ring clearance. If clearance is .036-.050" (.91-1.27 mm), go to next step. If clearance is not .036-.050" (.91-1.27 mm), repair as necessary. Perform VERIFICATION TEST VER-1A.

4) Inspect right rear wheel speed sensor wiring harness for damage. If wiring harness is okay, go to next step. If wiring harness is damaged, repair wiring harness as necessary. Perform VERIFICATION TEST VER-1A.

5) Disconnect right rear wheel speed sensor. Using an external ohmmeter, measure resistance of right rear wheel speed sensor. If resistance is 900-1300 ohms, replace CAB. Perform VERIFICATION TEST VER-1A. If resistance is not 900-1300 ohms, replace sensor. Perform VERIFICATION TEST VER-1A.

NOTE: If excessive axle deflection occurs on extremely bumpy surfaces or during off road use, it is possible for a wheel speed sensor to set a code.

TEST 22A

ABS WARNING LIGHT ILLUMINATION PROBLEM

1) Using DRB-II, read ABS fault codes. If any fault codes are present, perform TEST 1A. Turn ignition off. Remove ABS main relay from PDC, and inspect connector. Repair connector as necessary. Turn ignition on. If ABS warning light comes on, go to next step. If warning light does not come on, perform VERIFICATION TEST VER-1C.

NOTE: A main relay/power circuit failure fault will set with ABS

main relay removed.

2) Turn ignition off. With DRB-II in ohmmeter mode, probe Black/Tan ground wire (Black ground wire on Grand Cherokee and Grand Wagoneer) at ABS main relay socket. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Black/Tan ground wire (Black ground wire on Grand Cherokee and Grand Wagoneer). Perform VERIFICATION TEST VER-1A.

3) Ensure ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. With DRB-II in voltmeter mode, probe Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) at ABS main relay socket. If no voltage is present, go to next step. If any voltage is present, replace ABS main relay. Perform VERIFICATION TEST VER-1A.

4) Remove ABS diode. Diode is taped to wiring harness, near CAB (near ABS 8-pin disconnect connector on Grand Cherokee and Grand Wagoneer). Connect a jumper wire between Gray/Yellow wire (Gray/Pink wire on Grand Cherokee and Grand Wagoneer) and Black/Tan wire (Black wire on Grand Cherokee and Grand Wagoneer) at ABS main relay socket terminals "B" and "E".

5) Using DRB-II in ohmmeter mode, probe Gray/Yellow wire at ABS diode connector. If resistance is less than 5 ohms, go to next step. If resistance is more than 5 ohms, repair open Gray/Yellow wire between relay splice and diode. Perform VERIFICATION TEST VER-1A.

6) Remove jumper wire used in step 4). Turn ignition on. If ABS warning light does not come on, go to next step. If ABS warning light comes on, repair Violet wire (Violet/White wire on Grand Cherokee and Grand Wagoneer or Light Green/Orange on Wrangler) for a short circuit to ground between CAB connector terminal No. 52 and ABS diode.

7) Turn ignition off. Connect a jumper wire between ground and Violet wire (Violet/White wire on Grand Cherokee and Grand Wagoneer or Light Green/Orange wire on Wrangler) at CAB connector terminal No. 52. Using DRB-II in ohmmeter mode, probe Violet wire (Violet/White wire on Grand Cherokee and Grand Wagoneer or Light Green/Orange wire on Wrangler) at ABS diode connector. If resistance is less than 5 ohms, replace ABS diode. Perform VERIFICATION TEST VER-1A. If resistance is more than 5 ohms, repair open Violet wire (Violet/White wire on Grand Cherokee and Grand Wagoneer or Light Green/Orange wire on Wrangler) between ABS warning light and diode. Perform VERIFICATION TEST VER-1A.

TEST 23A

NO RESPONSE MESSAGE

1) On Cherokee, remove and inspect fuse No. 7. If fuse is blown, check for possible short to ground in Light Green/Yellow wire between ignition switch and terminal No. 53 of CAB connector. If fuse is okay, go to next step. On Grand Cherokee and Grand Wagoneer, remove and inspect fuse No. 15. If fuse is blown, check for possible short to ground in Light Green/Yellow wire between ignition switch and terminal No. 53 of CAB connector. If fuse is okay, go to next step. On Wrangler, remove and inspect fuse No. 13. If fuse is blown, check for possible short to ground in Yellow/Dark Green wire between ignition switch and terminal No. 53 of CAB connector. If fuse is okay, go to next step.

2) On all models, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary. Turn ignition on. With DRB-II in voltmeter mode, probe terminal No. 53 (Light Green/Yellow wire on Cherokee and Grand Cherokee and Grand Wagoneer or Yellow/Dark Green wire on Wrangler) of CAB connector.

3) If voltage is less than 9 volts, repair open in Light Green/Yellow wire (Cherokee and Grand Cherokee and Grand Wagoneer) or Yellow/Dark Green wire (Wrangler). Perform VERIFICATION TEST VER-1A. If voltage is more than 9 volts, turn ignition off. With DRB-II in ohmmeter mode, probe terminal No. 1 (Black wire) of CAB connector. If resistance is more than 5 ohms, repair open Black wire. Perform VERIFICATION TEST VER-1A.

4) If resistance is less than 5 ohms, probe terminal No. 19 (Black wire) of CAB connector. If resistance is more than 5 ohms, repair open Black wire. Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, check resistance of Violet/Brown wire (White/Violet wire on Wrangler) between terminals No. 4 of CCD bus diagnostic connector and No. 23 of CAB connector using an external ohmmeter.

5) If resistance is more than 5 ohms, repair open in Violet/Brown wire (White/Violet wire on Wrangler). Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, using an external ohmmeter, check resistance of White/Black wire on Cherokee, White/Gray wire on Grand Cherokee and Grand Wagoneer or Orange wire on Wrangler between terminal No. 3 of CCD bus diagnostic connector and No. 42 of CAB connector.

6) If resistance is more than 54 ohms, repair open in White/Black wire (Cherokee), White/Gray wire (Grand Cherokee and Grand Wagoneer) or Orange wire (Wrangler). Perform VERIFICATION TEST VER-1A. If resistance is less than 5 ohms, turn ignition off. Reconnect CAB 55-pin connector. Using DRB-II, try to access ABS TEVES diagnostics. If DRB-II does not display NO RESPONSE, system is functioning properly. If DRB-II displays NO RESPONSE, replace CAB. Perform VERIFICATION TEST VER-1A.

VERIFICATION TEST VER-1A

SYSTEM VERIFICATION TEST

1) Disconnect all previously connected jumper wires. Reconnect all previously disconnected connectors. Reinstall all previously removed relays. Replace any blown fuses. Using DRB-II, erase fault messages. Cycle ignition off and then on. Using DRB-II, monitor read faults display for 3 minutes. If DRB-II displays any faults, perform TEST 1A.

2) If DRB-II does not display any faults, using DRB-II, read brakelight switch input. Depress brake pedal. If DRB-II does not display PRESSED, perform VERIFICATION TEST VER-1B. If DRB-II displays PRESSED, using DRB-II, read "G" SWITCH input. If DRB-II does not display "G" SWITCH #1 CLOSED, "G" SWITCH #2 CLOSED, perform TEST 3A.

3) If DRB-II displays No. 1 and 2 "G" switch CLOSED, with DRB-II in ABS TEVES diagnostic mode, check ANTI-LOCK warning light. If warning light is off, perform, VERIFICATION TEST VER-1C. If warning light is flashing, depress brake pedal. Using DRB-II, actuate left front outlet valve.

4) If brake pedal "drop" was not felt when valve was actuated, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A. If brake pedal "drop" was felt when valve was actuated, release brake pedal. Depress brake pedal. Using DRB-II, actuate right front outlet valve.

5) If brake pedal "drop" was not felt when valve was actuated, replace hydraulic control unit. Perform VERIFICATION TEST VER-1A. If brake pedal "drop" was felt when valve was actuated, release brake pedal. Depress brake pedal. Using DRB-II, actuate rear outlet valve.

6) If brake pedal "drop" was not felt when valve was actuated, replace hydraulic control unit. Perform VERIFICATION TEST

VER-1A. If brake pedal "drop" was felt when valve was actuated, road test vehicle for a minimum of 5 minutes and perform several anti-lock braking stops.

7) Using DRB-II, read fault messages. If DRB-II displays any faults, perform TEST 1A. If DRB-II displays no faults, system is operating properly.

VERIFICATION TEST VER-1B

BRAKELIGHT SWITCH SENSOR CIRCUIT

1) Check brakelight operation. If brakelights are not operating properly, repair as necessary. Perform VERIFICATION TEST VER-1A. If brakelights are operating properly, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary.

2) Depress brake pedal. With DRB-II in voltmeter mode, probe terminal No. 32 (White/Tan wire) of CAB connector. If voltage is less than 9 volts, repair open White/Tan wire. Perform VERIFICATION TEST VER-1A. If voltage is more than 9 volts, replace CAB. Perform VERIFICATION TEST VER-1A.

VERIFICATION TEST VER-1C

ANTI-LOCK WARNING LIGHT CIRCUIT

1) Set parking brake. Turn ignition on. If Red BRAKE warning light is off, repair fused ignition feed circuit to warning lights. Perform VERIFICATION TEST VER-1A. If Red BRAKE warning light is on, turn ignition off. Disconnect and inspect CAB 55-pin connector. Repair connector as necessary.

2) Turn ignition on. Connect a jumper wire between terminal No. 52 (Violet wire on Cherokee or Violet/White wire on Grand Cherokee and Grand Wagoneer or Light Green/Orange wire on Wrangler) and ground. Check ANTI-LOCK warning light. If ANTI-LOCK warning light is on, replace CAB. Perform VERIFICATION TEST VER-1A.

3) If ANTI-LOCK warning light is off, inspect ANTI-LOCK warning light bulb. Replace bulb as necessary. Perform VERIFICATION TEST VER-1A. If bulb is okay, repair open Violet wire (Cherokee) or Violet/White wire (Grand Cherokee and Grand Wagoneer) or Light Green/Orange wire (Wrangler). Perform VERIFICATION TEST VER-1A.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Combination Valve Brakeline Fittings	13-18 (18-24)
Front Speed Sensor Bolt	11 (15)
HCU Brakeline Fittings	10-12 (14-16)
Master Cylinder Brakeline Fittings	11-13 (15-18)
Rear Speed Sensor Bolt	11 (15)
Wheel Lug Nuts	88 (119)
	INCH Lbs. (N.m)
CAB Mounting Bolts	75-115 (9-13)
"G" Switch Bolt	17-32 (2-4)
HCU Bracket Mounting Bolts	92-112 (10-13)

WIRING DIAGRAMS

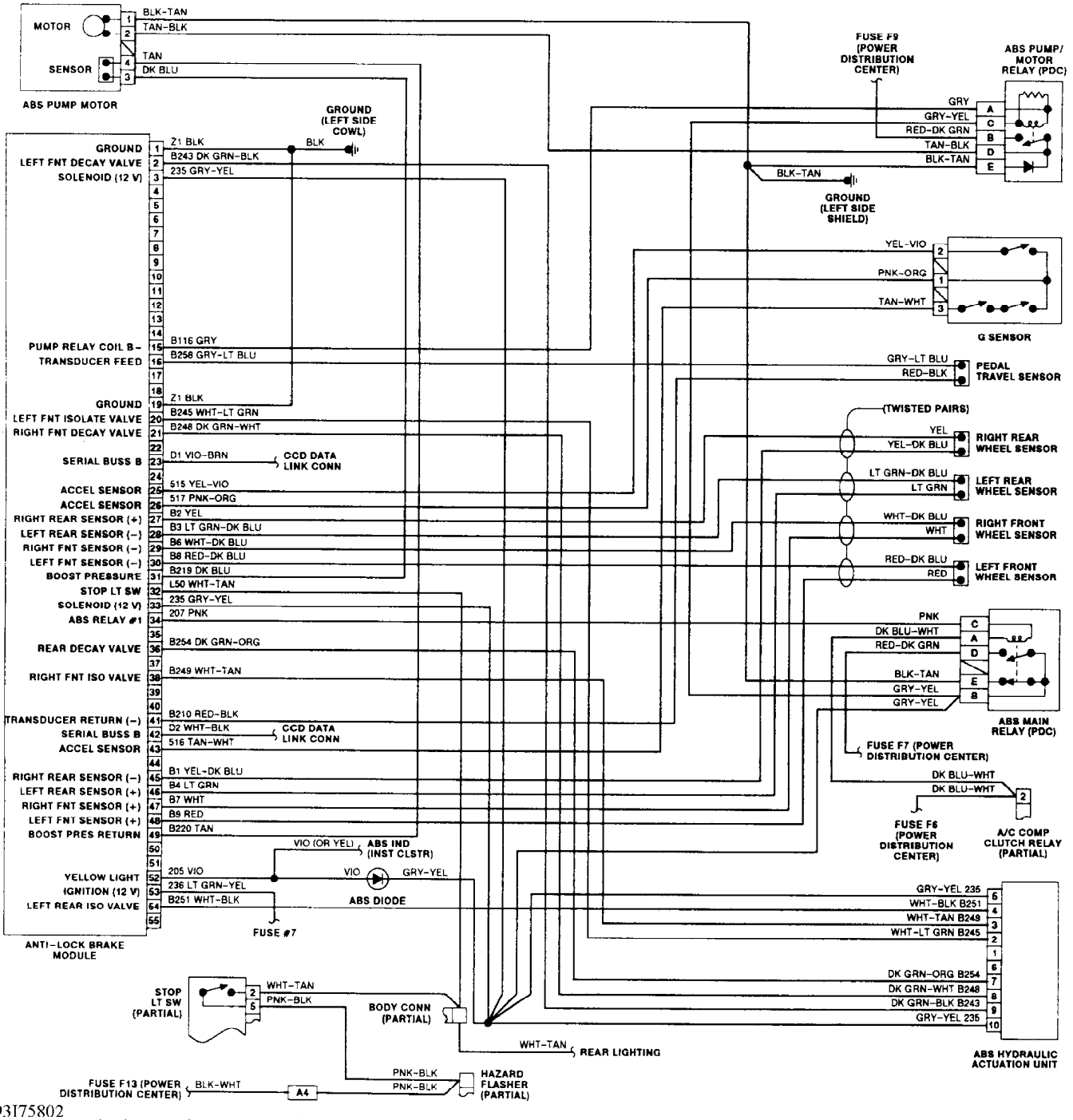

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Fig. 20: ABS Wiring Diagram (Cherokee)

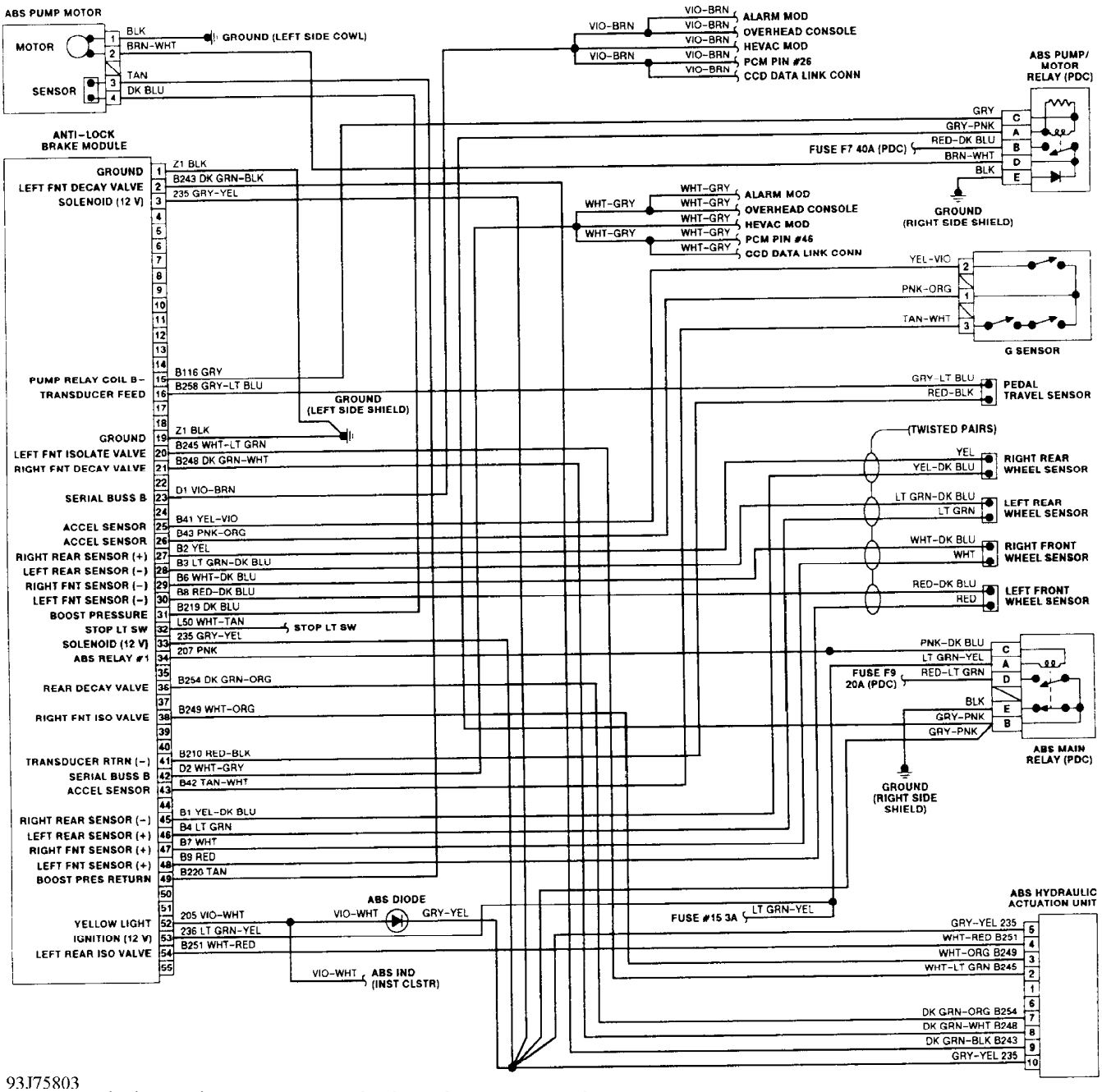

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Fig. 21: ABS Wiring Diagram (Grand Cherokee & Grand Wagoneer)

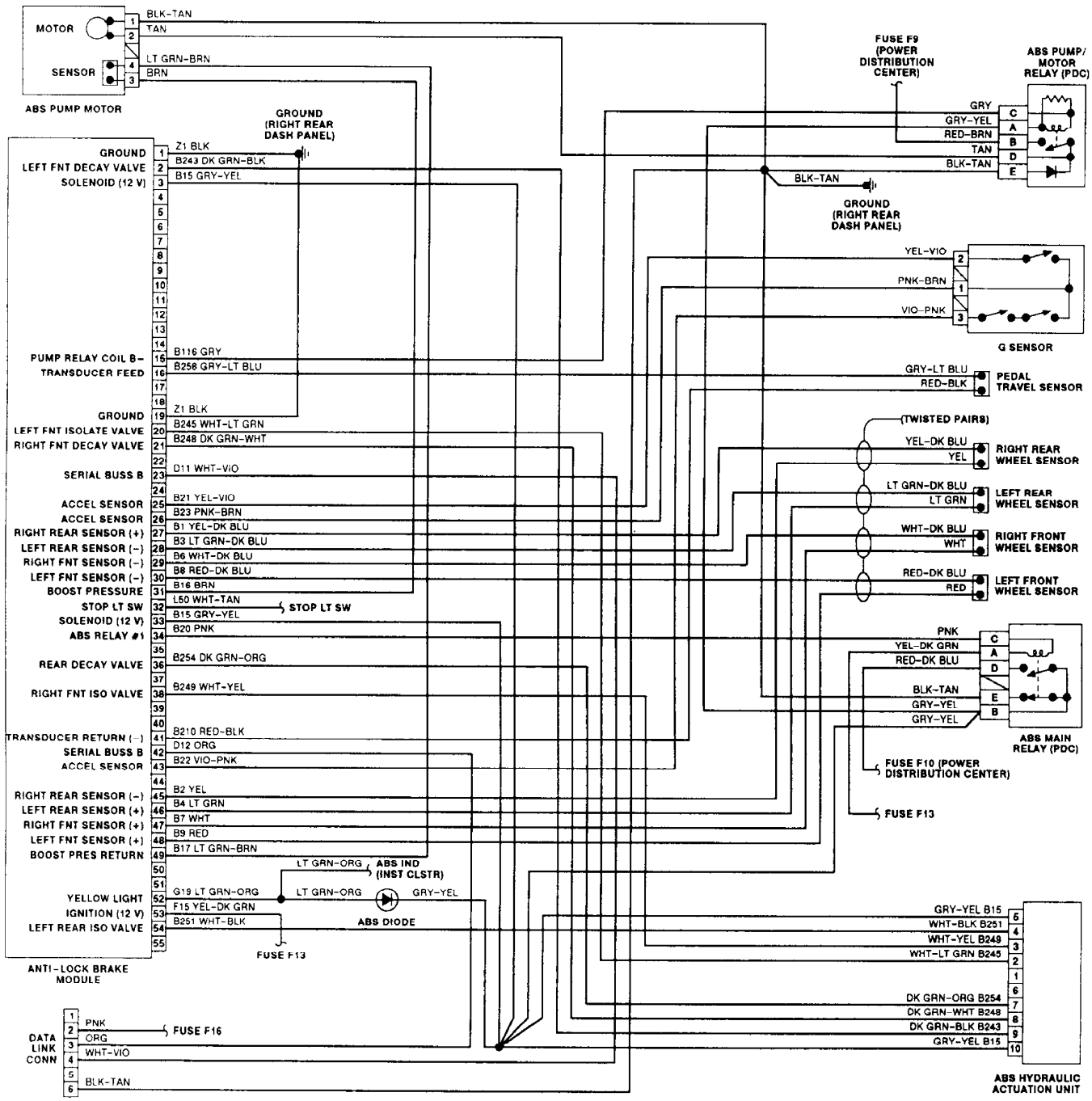

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Fig. 22: ABS Wiring Diagram (Wrangler)