STARTING SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

STARTING SYSTEM

DESCRIPTION

An electrically operated engine starting system is standard factory-installed equipment on this model. The starting system is designed to provide the vehicle operator with a convenient, efficient and reliable means of cranking and starting the internal combustion engine used to power the vehicle and all of its accessory systems from within the safe and secure confines of the passenger compartment. See the owner's manual in the vehicle glove box for more information and instructions on the recommended use and operation of the factory-installed starting system.

The starting system consists of the following components:

- Battery
- Starter relay
- Starter motor (including an integral starter solenoid)
- Ignition switch
- Clutch pedal position switch (manual transmission)
- Park/neutral position switch (automatic transmission)
- Wire harnesses and connections (including the battery cables).

This group provides complete service information for the starter motor and the starter relay. Complete service information for the other starting system components can be located as follows:

- Refer to **Battery** in the proper section of Group 8A - Battery for complete service information for the battery.
- Refer to **Ignition Switch and Key Lock Cylinder** in the proper section of Group 8D - Ignition System for complete service information for the ignition switch.
- Refer to **Clutch Pedal Position Switch** in the proper section of Group 6 - Clutch for complete service information for the clutch pedal position switch.
- Refer to **Park/Neutral Position Switch** in the proper section of Group 21 - Transmission for complete service information for the park/neutral position switch.
- Refer to the proper section of **Group 8W - Wiring Diagrams** for complete service information and circuit diagrams for the starting system wiring components.

Group 8A covers the Battery, Group 8B covers the Starting Systems, and Group 8C covers the Charging System. We have separated these systems to make it easier to locate the information you are seeking within this Service Manual. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The battery, starting, and charging systems in the vehicle operate with one another, and must be tested as a complete system. In order for the vehicle to start and charge properly, all of the components that are used in these systems must perform within specifications.

The diagnostic procedures used in each of these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt/ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **On-Board Diagnostic Test For Charging System**

DESCRIPTION AND OPERATION (Continued)

in the Diagnosis and Testing section of Group 8C - Charging System for more information.

OPERATION

The starting system components form two separate circuits. A high-amperage feed circuit that feeds the starter motor between 150 and 350 amperes, and a low-amperage control circuit that operates on less than 20 amperes. The high-amperage feed circuit components include the battery, the battery cables, the contact disc portion of the starter solenoid, and the starter motor. The low-amperage control circuit components include the ignition switch, the clutch pedal position switch (manual transmission), the park/neutral position switch (automatic transmission), the starter relay, the electromagnetic windings of the starter solenoid, and the connecting wire harness components.

If the vehicle is equipped with a manual transmission, it has a clutch pedal position switch installed in series between the ignition switch and the coil battery terminal of the starter relay. This normally open switch prevents the starter relay from being energized when the ignition switch is turned to the momentary Start position, unless the clutch pedal is depressed. This feature prevents starter motor operation while the clutch disc and the flywheel are engaged. The starter relay coil ground terminal is always grounded on vehicles with a manual transmission.

If the vehicle is equipped with an automatic transmission, battery voltage is supplied through the low-amperage control circuit to the coil battery terminal of the starter relay when the ignition switch is turned to the momentary Start position. The park/neutral position switch is installed in series between the starter relay coil ground terminal and ground. This normally open switch prevents the starter relay from being energized and the starter motor from operating unless the automatic transmission gear selector is in the Neutral or Park positions.

When the starter relay coil is energized, the normally open relay contacts close. The relay contacts connect the relay common feed terminal to the relay normally open terminal. The closed relay contacts energize the starter solenoid coil windings.

The energized solenoid pull-in coil pulls in the solenoid plunger. The solenoid plunger pulls the shift lever in the starter motor. This engages the starter overrunning clutch and pinion gear with the starter ring gear on the manual transmission flywheel or on the automatic transmission torque converter drive plate.

As the solenoid plunger reaches the end of its travel, the solenoid contact disc completes the high-amperage starter feed circuit and energizes the solenoid plunger hold-in coil. Current now flows between the solenoid battery terminal and the starter motor, energizing the starter.

Once the engine starts, the overrunning clutch protects the starter motor from damage by allowing the starter pinion gear to spin faster than the pinion shaft. When the driver releases the ignition switch to the On position, the starter relay coil is de-energized. This causes the relay contacts to open. When the relay contacts open, the starter solenoid plunger hold-in coil is de-energized.

When the solenoid plunger hold-in coil is de-energized, the solenoid plunger return spring returns the plunger to its relaxed position. This causes the contact disc to open the starter feed circuit, and the shift lever to disengage the overrunning clutch and pinion gear from the starter ring gear.

Following are general descriptions of the major components in the starting system.

STARTER MOTOR

DESCRIPTION

The starter motors used for both the 2.5L and the 4.0L engines available in this model are not interchangeable. Both starter motors are mounted with two screws, but the 2.5L starter motor is mounted to the right rear corner of the engine block, while the 4.0L starter motor is mounted to the manual transmission clutch housing or automatic transmission torque converter housing on the right side of the engine.

Each of these starter motors incorporates several of the same features to create a reliable, efficient, compact, lightweight and powerful unit. The electric motors of both starters have four brushes contacting the motor commutator. The 2.5L starter motor uses four permanent magnets for the field poles, while the 4.0L starter motor features four electromagnetic field coils wound around four pole shoes. The 2.5L starter motor is rated at 1.2 kilowatts (about 1.6 horsepower) output at 12 volts, while the 4.0L starter motor is rated at 1.4 kilowatts (about 1.9 horsepower) output at 12 volts.

Both of these starter motors are serviced only as a unit with their starter solenoids, and cannot be repaired. If either component is faulty or damaged, the entire starter motor and starter solenoid unit must be replaced.

OPERATION

These starter motors are equipped with a planetary gear reduction (intermediate transmission) system. The planetary gear reduction system consists of a gear that is integral to the output end of the electric motor armature shaft that is in continual

DESCRIPTION AND OPERATION (Continued)

engagement with a larger gear that is splined to the input end of the starter pinion gear shaft. This feature makes it possible to reduce the dimensions of the starter. At the same time, it allows higher armature rotational speed and delivers increased torque through the starter pinion gear to the starter ring gear.

The starter motors for both engines are activated by an integral heavy duty starter solenoid switch mounted to the overrunning clutch housing. This electromechanical switch connects and disconnects the feed of battery voltage to the starter motor and actuates a shift fork that engages and disengages the starter pinion gear with the starter ring gear.

Both starter motors use an overrunning clutch and starter pinion gear unit to engage and drive a starter ring gear that is integral to the flywheel (manual transmission) or torque converter drive plate (automatic transmission) mounted on the rear crankshaft flange. Shims are available and can be used to adjust the 2.5L starter motor mounting position to correct for improper starter pinion gear to starter ring gear engagement.

STARTER RELAY

DESCRIPTION

The starter relay is an electromechanical device that switches battery current to the pull-in coil of the starter solenoid when the ignition switch is turned to the Start position. The starter relay is located in the Power Distribution Center (PDC), in the engine compartment. See the fuse and relay layout label affixed to the inside surface of the PDC cover for starter relay identification and location.

The starter relay is a International Standards Organization (ISO) relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions.

The starter relay cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The ISO relay consists of an electromagnetic coil, a resistor or diode, and three (two fixed and one movable) electrical contacts. The movable (common feed) relay contact is held against one of the fixed contacts (normally closed) by spring pressure. When the electromagnetic coil is energized, it draws the movable contact away from the normally closed fixed contact, and holds it against the other (normally open) fixed contact.

When the electromagnetic coil is de-energized, spring pressure returns the movable contact to the normally closed position. The resistor or diode is connected in parallel with the electromagnetic coil in the relay, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

DIAGNOSIS AND TESTING

STARTING SYSTEM

DIAGNOSIS

The battery, starting, and charging systems operate with one another, and must be tested as a complete system. In order for the vehicle to start and charge properly, all of the components involved in these systems must perform within specifications.

Group 8A covers the Battery, Group 8B covers the Starting Systems, and Group 8C covers the Charging System. We have separated these systems to make it easier to locate the information you are seeking within this Service Manual. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used in these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt/ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **On-Board Diagnostic Test For Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for more information.

DIAGNOSIS AND TESTING (Continued)

Starting System Diagnosis		
CONDITION	POSSIBLE CAUSE	CORRECTION
STARTER FAILS TO OPERATE.	1. Battery discharged or faulty. 2. Starting circuit wiring faulty. 3. Starter relay faulty. 4. Ignition switch faulty. 5. Clutch pedal position switch faulty. 6. Park/Neutral position switch faulty or misadjusted. 7. Starter solenoid faulty. 8. Starter motor faulty.	1. Refer to Battery in the Diagnosis and Testing section of Group 8A - Battery. Charge or replace the battery, if required. 2. Refer to Starting System in Group 8W - Wiring Diagrams. Test and repair the starter feed and/or control circuits, if required. 3. Refer to Starter Relay in the Diagnosis and Testing section of this group. Replace the starter relay, if required. 4. Refer to Ignition Switch and Key Lock Cylinder in the Diagnosis and Testing section of Group 8D - Ignition System. Replace the ignition switch, if required. 5. Refer to Clutch Pedal Position Switch in the Diagnosis and Testing section of Group 6 - Clutch. 6. Refer to Park/Neutral Position Switch in the Diagnosis and Testing section of Group 21 - Transmission. Replace the park/neutral position switch, if required. 7. Refer to Starter Motor in the Diagnosis and Testing section of this group. Replace the starter motor assembly, if required. 8. If all other starting system components and circuits test OK, replace the starter motor assembly.
STARTER ENGAGES, FAILS TO TURN ENGINE.	1. Battery discharged or faulty. 2. Starting circuit wiring faulty. 3. Starter motor faulty. 4. Engine seized.	1. Refer to Battery in the Diagnosis and Testing section of Group 8A - Battery. Charge or replace the battery, if required. 2. Refer to Starting System in Group 8W - Wiring Diagrams. Test and repair the starter feed and/or control circuits, if required. 3. If all other starting system components and circuits test OK, replace the starter motor assembly. 4. Refer to Engine Diagnosis in the Diagnosis and Testing section of Group 9 - Engine.
STARTER ENGAGES, SPINS OUT BEFORE ENGINE STARTS.	1. Starter ring gear faulty. 2. Starter motor faulty.	1. Refer to Starter Motor in the Removal and Installation section of this group. Remove the starter motor to inspect the starter ring gear. Replace the starter ring gear, if required. 2. If all other starting system components and circuits test OK, replace the starter motor assembly.
STARTER DOES NOT DISENGAGE.	1. Starter motor improperly installed. 2. Starter relay faulty. 3. Ignition switch faulty. 4. Starter motor faulty.	1. Refer to Starter Motor in the Removal and Installation section of this group. Tighten the starter mounting hardware to the correct tightness specifications. 2. Refer to Starter Relay in the Diagnosis and Testing section of this group. Replace the starter relay, if required. 3. Refer to Ignition Switch and Key Lock Cylinder in the Diagnosis and Testing section of Group 8D - Ignition System. Replace the ignition switch, if required. 4. If all other starting system components and circuits test OK, replace the starter motor assembly.

DIAGNOSIS AND TESTING (Continued)

INSPECTION

For complete circuit diagrams, refer to **Starting System** in the Contents of Group 8W - Wiring Diagrams. Before removing any unit from the starting system for repair or diagnosis, perform the following inspections:

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- **Battery** - Visually inspect the battery for indications of physical damage and loose or corroded cable connections. Determine the state-of-charge and cranking capacity of the battery. Charge or replace the battery, if required. Refer to **Battery** in the proper section of Group 8A - Battery for complete service information for the battery.
- **Ignition Switch** - Visually inspect the ignition switch for indications of physical damage and loose or corroded wire harness connections. Refer to **Ignition Switch and Key Lock Cylinder** in the proper section of Group 8D - Ignition System for complete service information for the ignition switch.
- **Clutch Pedal Position Switch** - If the vehicle is equipped with a manual transmission, visually inspect the clutch pedal position switch for indications of physical damage and loose or corroded wire harness connections. Refer to **Clutch Pedal Position Switch** in the proper section of Group 6 - Clutch for complete service information for the clutch pedal position switch.
- **Park/Neutral Position Switch** - If the vehicle is equipped with an automatic transmission, visually inspect the park/neutral position switch for indications of physical damage and loose or corroded wire harness connections. Refer to **Park/Neutral Position Switch** in the proper section of Group 21 - Transmission for complete service information for the park/neutral position switch.
- **Starter Relay** - Visually inspect the starter relay for indications of physical damage and loose or corroded wire harness connections.
- **Starter Motor** - Visually inspect the starter motor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Solenoid** - Visually inspect the starter solenoid for indications of physical damage and loose or corroded wire harness connections.
- **Wiring** - Visually inspect the wire harnesses for damage. Repair or replace any faulty wiring, as required. Refer to the proper section of **Group 8W - Wiring Diagrams** for complete service information and circuit diagrams for the starting system wiring components.

TESTING

COLD CRANKING TEST

For complete circuit diagrams, refer to **Starting System** in the Contents of Group 8W - Wiring Diagrams. The battery must be fully-charged and load-tested before proceeding. Refer to **Battery** in the Diagnosis and Testing section of Group 8A - Battery for the procedures.

(1) Connect a suitable volt-ampere tester to the battery terminals (Fig. 1). See the instructions provided by the manufacturer of the volt-ampere tester being used.

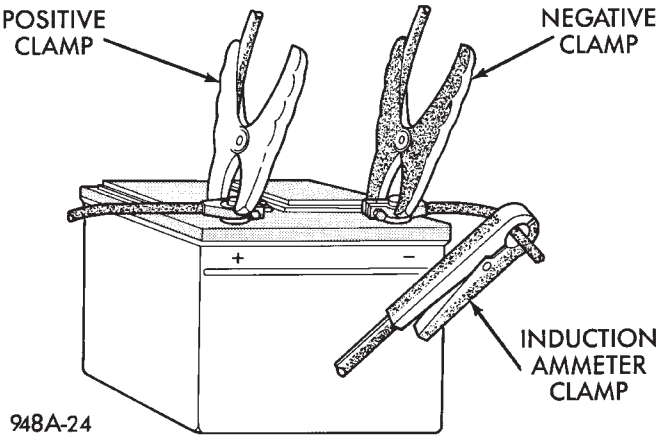

Fig. 1 Volts-Amps Tester Connections - Typical

(2) Fully engage the parking brake.

(3) If the vehicle is equipped with a manual transmission, place the gearshift selector lever in the Neutral position and block the clutch pedal in the fully depressed position. If the vehicle is equipped with an automatic transmission, place the gearshift selector lever in the Park position.

(4) Verify that all lamps and accessories are turned off.

(5) To prevent the engine from starting, remove the Automatic ShutDown (ASD) relay. The ASD relay is located in the Power Distribution Center (PDC), in the engine compartment. Refer to the fuse and relay layout label affixed to the underside of the PDC cover for ASD relay identification and location.

(6) Rotate and hold the ignition switch in the Start position. Note the cranking voltage and current (amperage) draw readings shown on the volt-ampere tester.

(a) If the voltage reads below 9.6 volts, refer to **Starter Motor** in the Diagnosis and Testing section of this group. If the starter motor is OK, refer

DIAGNOSIS AND TESTING (Continued)

to **Engine Diagnosis** in the Diagnosis and Testing section of Group 9 - Engine for further testing of the engine. If the starter motor is not OK, replace the faulty starter motor.

(b) If the voltage reads above 9.6 volts and the current (amperage) draw reads below specifications, refer to **Feed Circuit Test** in this section.

(c) If the voltage reads 12.5 volts or greater and the starter motor does not turn, refer to **Control Circuit Testing** in this section.

(d) If the voltage reads 12.5 volts or greater and the starter motor turns very slowly, refer to **Feed Circuit Test** in this section.

NOTE: A cold engine will increase the starter current (amperage) draw reading, and reduce the battery voltage reading.

FEED CIRCUIT TEST

The starter feed circuit test (voltage drop method) will determine if there is excessive resistance in the high-amperage feed circuit. For complete circuit diagrams, refer to **Starting System** in the Contents of Group 8W - Wiring Diagrams.

When performing these tests, it is important to remember that the voltage drop is giving an indication of the resistance between the two points at which the voltmeter probes are attached.

Example: When testing the resistance of the battery positive cable, touch the voltmeter leads to the battery positive cable clamp and the cable connector at the starter solenoid. If you probe the battery positive terminal post and the cable connector at the starter solenoid, you are reading the combined voltage drop in the battery positive cable clamp-to-terminal post connection and the battery positive cable.

The following operation will require a voltmeter accurate to 1/10 (0.10) volt. Before performing the tests, be certain that the following procedures are accomplished:

- Battery is fully-charged and load-tested. Refer to **Battery** in the Diagnosis and Testing section of Group 8A - Battery for the procedures.
- Fully engage the parking brake.
- If the vehicle is equipped with a manual transmission, place the gearshift selector lever in the Neutral position and block the clutch pedal in the fully depressed position. If the vehicle is equipped with an automatic transmission, place the gearshift selector lever in the Park position.
- Verify that all lamps and accessories are turned off.
- To prevent the engine from starting, remove the Automatic ShutDown (ASD) relay. The ASD relay is located in the Power Distribution Center (PDC), in the engine compartment. Refer to the fuse and relay layout label affixed to the underside of the PDC cover for ASD relay identification and location.

(1) Connect the positive lead of the voltmeter to the battery negative terminal post. Connect the negative lead of the voltmeter to the battery negative cable clamp (Fig. 2). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor contact between the cable clamp and the terminal post.

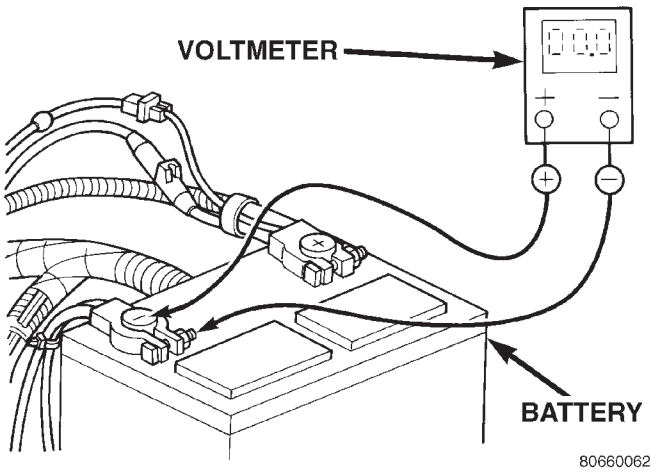

Fig. 2 Test Battery Negative Connection Resistance - Typical

(2) Connect the positive lead of the voltmeter to the battery positive terminal post. Connect the negative lead of the voltmeter to the battery positive cable clamp (Fig. 3). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor contact between the cable clamp and the terminal post.

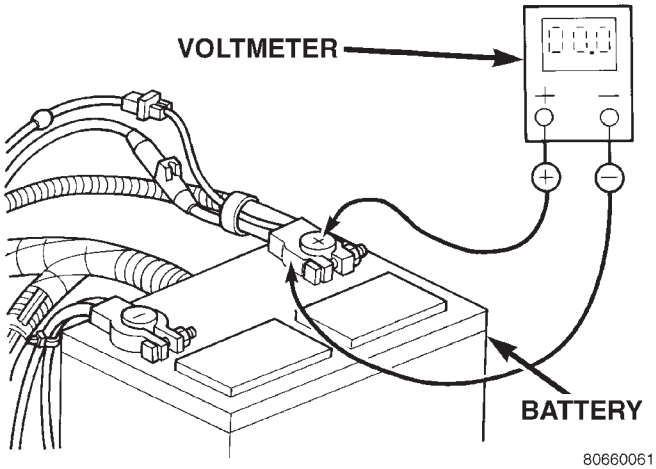

Fig. 3 Test Battery Positive Connection Resistance - Typical

(3) Connect the voltmeter to measure between the battery positive terminal post and the starter solenoid battery terminal stud (Fig. 4). Rotate and hold

DIAGNOSIS AND TESTING (Continued)

the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery cable connection at the solenoid. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery positive cable.

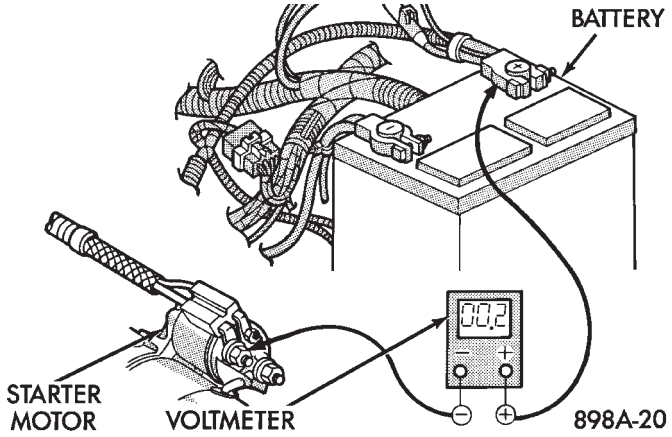

Fig. 4 Test Battery Positive Cable Resistance - Typical

(4) Connect the voltmeter to measure between the battery negative terminal post and a good clean ground on the engine block (Fig. 5). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable attachment on the engine block. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery negative cable.

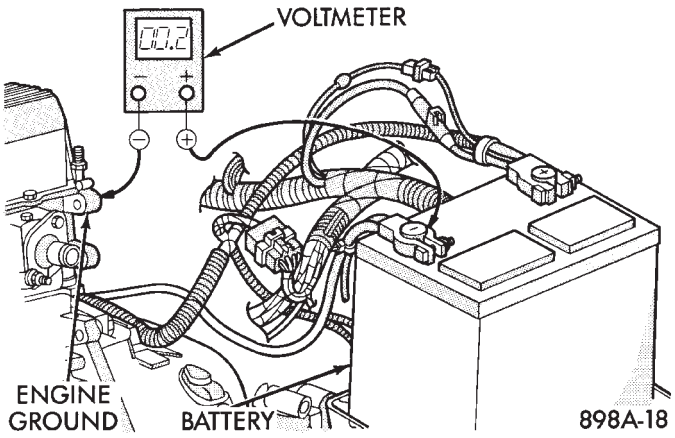

Fig. 5 Test Ground Circuit Resistance - Typical

(5) Connect the positive lead of the voltmeter to the starter housing. Connect the negative lead of the voltmeter to the battery negative terminal post (Fig. 6). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, correct the poor starter to engine block ground contact.

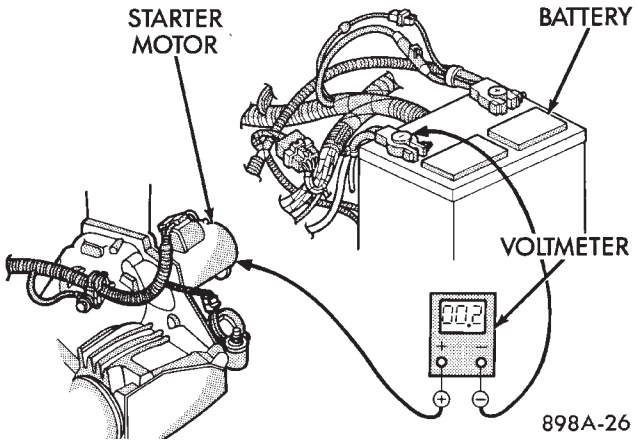

Fig. 6 Test Starter Ground - Typical

If the resistance tests detect no feed circuit problems, refer to **Starter Motor** in the Diagnosis and Testing section of this group.

CONTROL CIRCUIT TESTING

The starter control circuit components should be tested in the order in which they are listed, as follows:

- **Starter Relay** - Refer to **Starter Relay** in the Diagnosis and Testing section of this group for the procedures.
- **Starter Solenoid** - Refer to **Starter Motor** in the Diagnosis and Testing section of this group for the procedures.
- **Ignition Switch** - Refer to **Ignition Switch and Key Lock Cylinder** in the Diagnosis and Testing section of Group 8D - Ignition System for the procedures.
- **Clutch Pedal Position Switch** - If the vehicle is equipped with a manual transmission, refer to **Clutch Pedal Position Switch** in the Diagnosis and Testing section of Group 6 - Clutch for the procedures.
- **Park/Neutral Position Switch** - If the vehicle is equipped with an automatic transmission, refer to **Park/Neutral Position Switch** in the Diagnosis and Testing section of Group 21 - Transmission for the procedures.
- **Wire harnesses and connections** - Refer to **Starting System** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams.

STARTER MOTOR NOISE - 2.5L ENGINE

See the Starter Motor Noise Diagnosis chart (Fig. 7). If the complaint is similar to Conditions 1 and 2 in the chart, correction can be made by placing shims between the starter motor and the engine block using the following procedures:

(1) If the complaint is similar to Condition 1, the starter motor must be moved toward the starter ring

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
1. VERY HIGH FREQUENCY WHINE BEFORE ENGINE STARTS; ENGINE STARTS OK.	1. Excessive distance between pinion gear and flywheel/drive plate gear.	1. Move starter motor toward flywheel/drive plate by removing shim(s), if possible.
2. VERY HIGH FREQUENCY WHINE AFTER ENGINE STARTS WITH IGNITION KEY RELEASED. ENGINE STARTS OK.	2. Insufficient distance between starter motor pinion gear and flywheel/drive plate runout can cause noise to be intermittent.	2. Shim starter motor away from flywheel/drive plate. Inspect flywheel/drive plate for damage; bent, unusual wear, and excessive runout. Replace flywheel/drive plate as necessary.
3. A LOUD "WHOOP" AFTER ENGINE STARTS WHILE STARTER MOTOR IS ENGAGED.	3. Most probably cause is defective overrunning clutch.	3. Replace starter motor.
4. A "RUMBLE," "GROWL," OR "KNOCK" AS STARTER MOTOR COASTS TO STOP AFTER ENGINE STARTS.	4. Most probable cause is bent or unbalanced starter motor armature.	4. Replace starter motor.

NOTE: A high frequency whine during cranking is normal for this starter motor.

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Fig. 7 Starter Motor Noise Diagnosis

gear by removing shims from both starter mounting pads on the engine block (Fig. 8). Refer to **Starter Motor** in the Removal and Installation section of this group for the procedures.

NOTE: The shim thickness is 0.381 mm (0.015 in.). These shims may be stacked if additional thickness is required.

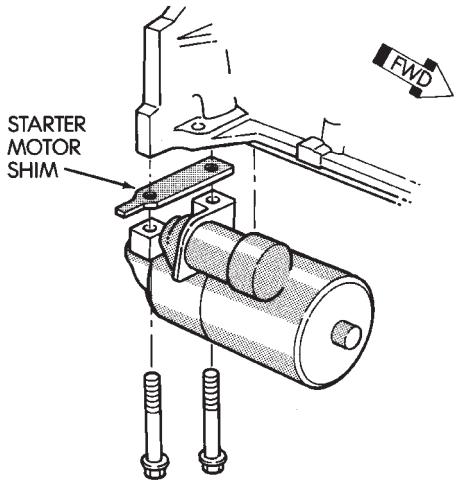

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Fig. 8 Starter Motor Shim

(2) If the complaint is similar to Condition 2, the starter motor must be moved away from the starter ring gear. This is done by installing shim(s) across both starter mounting pads on the engine block. More than one shim may be required. Refer to **Starter Motor** in the Removal and Installation section of this group for the procedures.

NOTE: This is a condition that will generally cause broken starter (flywheel/torque converter drive plate) ring gear teeth or broken starter motor housings.

STARTER MOTOR

Correct starter motor operation can be confirmed by performing the following free running bench test. This test can only be performed with the starter motor removed from the vehicle. Refer to **Starting System** in the Specifications section of this group for the starter motor specifications.

CAUTION: The 2.5L engine uses a permanent magnet starter. Permanent magnet starters are highly sensitive to hammering, shocks, external pressure and reverse polarity. This starter motor must never be clamped in a vise by the starter field frame. The starter should only be clamped by the mounting flange. Do not reverse the battery cable connections to this starter motor when testing. The permanent magnets may be damaged and the starter rendered unserviceable if it is subjected to any of these conditions.

(1) Remove the starter motor from the vehicle. Refer to **Starter Motor** in the Removal and Installation section of this group for the procedures.

(2) Mount the starter motor securely in a soft-jawed bench vise. The vise jaws should be clamped on the mounting flange of the starter motor. Never clamp on the starter motor by the field frame.

DIAGNOSIS AND TESTING (Continued)

(3) Connect a suitable volt-ampere tester and a 12-volt battery to the starter motor in series, and set the ammeter to the 100 ampere scale. See the instructions provided by the manufacturer of the volt-ampere tester being used.

(4) Install a jumper wire from the solenoid terminal to the solenoid battery terminal. The starter motor should operate. If the starter motor fails to operate, replace the faulty starter motor assembly.

(5) Adjust the carbon pile load of the tester to obtain the free running test voltage. Refer to **Starting System** in the Specifications section of this group for the starter motor free running test voltage specifications.

(6) Note the reading on the ammeter and compare this reading to the free running test maximum amperage draw. Refer to **Starting System** in the Specifications section of this group for the starter motor free running test maximum amperage draw specifications.

(7) If the ammeter reading exceeds the maximum amperage draw specification, replace the faulty starter motor assembly.

STARTER SOLENOID

This test can only be performed with the starter motor removed from the vehicle.

(1) Remove the starter motor from the vehicle. Refer to **Starter Motor** in the Removal and Installation section of this group for the procedures.

(2) Disconnect the wire from the solenoid field coil terminal.

(3) Check for continuity between the solenoid terminal and the solenoid field coil terminal with a continuity tester (Fig. 9). There should be continuity. If OK, go to Step 4. If not OK, replace the faulty starter motor assembly.

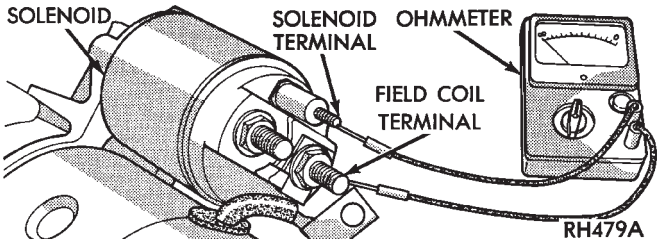


Fig. 9 Continuity Test Between Solenoid Terminal and Field Coil Terminal - Typical

(4) Check for continuity between the solenoid terminal and the solenoid case (Fig. 10). There should be continuity. If not OK, replace the faulty starter motor assembly.

STARTER RELAY

The starter relay (Fig. 11) is located in the Power Distribution Center (PDC), in the engine compartment. Refer to the fuse and relay layout label affixed to the underside of the PDC cover for starter relay identification and location. For complete circuit diagrams, refer to **Starting System** in the Contents of Group 8W - Wiring Diagrams.

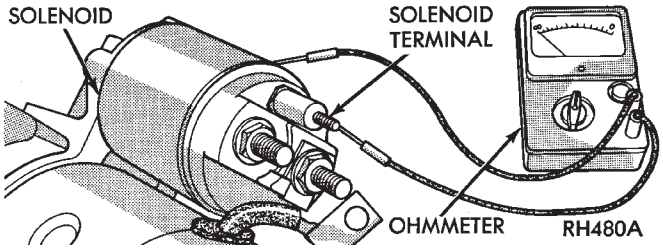


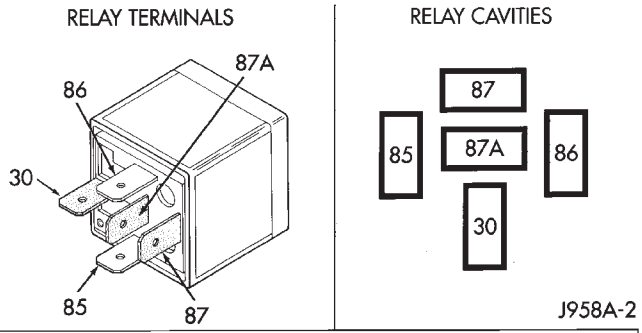
Fig. 10 Continuity Test Between Solenoid Terminal and Solenoid Case - Typical

(1) Remove the starter relay from the PDC. Refer to **Starter Relay** in the Removal and Installation section of this group for the procedures.

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 5 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, perform the Relay Circuit Test that follows. If not OK, replace the faulty relay.



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

Fig. 11 Starter Relay

RELAY CIRCUIT TEST

(1) The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to Step 2. If not OK, repair the open circuit to the fuse in the PDC as required.

DIAGNOSIS AND TESTING (Continued)

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the starter solenoid field coils. There should be continuity between the cavity for relay terminal 87 and the starter solenoid terminal at all times. If OK, go to Step 4. If not OK, repair the open circuit to the starter solenoid as required.

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. It is energized when the ignition switch is held in the Start position. On vehicles with a manual transmission, the clutch pedal must be fully depressed for this test. Check for battery voltage at the cavity for relay terminal 86 with the ignition switch in the Start position, and no voltage when the ignition switch is released to the On position. If OK, go to Step 5. If not OK with an automatic transmission, check for an open or short circuit to the ignition switch and repair, if required. If the circuit to the ignition switch is OK, refer to **Ignition Switch and Key Lock Cylinder** in the Diagnosis and Testing section of Group 8D - Ignition System for testing of the ignition switch. If not OK with a manual transmission, check the circuit between the relay and the clutch pedal position switch for an open or a short. If the circuit is OK, refer to **Clutch Pedal Position Switch** in the Diagnosis and Testing section of Group 6 - Clutch for testing of the switch.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. On vehicles with a manual transmission, it is grounded at all times. On vehicles with an automatic transmission, it is grounded through the park/neutral position switch only when the gearshift selector lever is in the Park or Neutral positions. Check for continuity to ground at the cavity for relay terminal 85. If not OK with a manual transmission, repair the circuit to ground as required. If not OK with an automatic transmission, check for an open or short circuit to the park/neutral position switch and repair, if required. If the circuit to the park/neutral position switch is OK, refer to **Park/Neutral Position Switch** in the Diagnosis and Testing section of Group 21 - Transmission for testing of the park/neutral position switch.

REMOVAL AND INSTALLATION

STARTER MOTOR

REMOVAL

2.5L ENGINE

(1) Disconnect and isolate the battery negative cable.

(2) Raise and support the vehicle.

(3) While supporting the starter motor with one hand, use the other hand to remove the two screws that secure the starter motor to the engine block (Fig. 12).

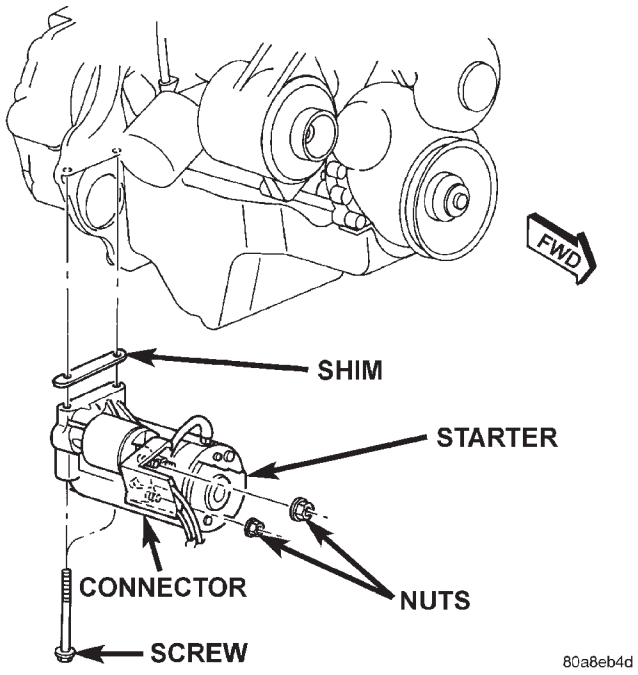


Fig. 12 Starter Motor Remove/Install - 2.5L Engine

(4) Lower the starter motor from the engine block far enough to access and remove the nut that secures the solenoid wire harness connector eyelet to the solenoid terminal stud. Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(5) Remove the nut that secures the battery cable harness connector eyelet to the solenoid battery terminal stud. Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(6) Remove the battery cable and solenoid wire connector eyelets from the solenoid terminal studs.

(7) Remove the starter motor and any starter motor shims (if used) from the engine compartment.

REMOVAL AND INSTALLATION (Continued)

4.0L ENGINE

(1) Disconnect and isolate the battery negative cable.

(2) Raise and support the vehicle.

(3) Remove the lower (forward facing) mounting screw from the starter motor (Fig. 13).

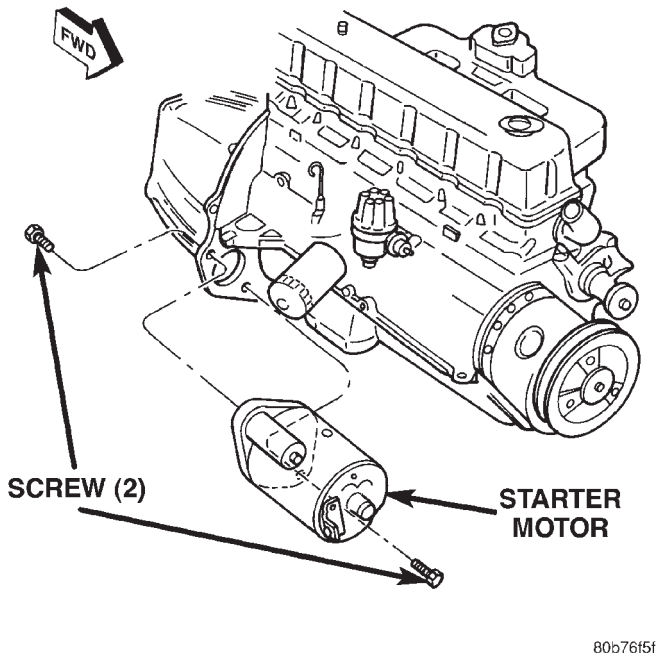


Fig. 13 Starter Motor Remove/Install - 4.0L Engine

(4) While supporting the starter motor with one hand, use the other hand to remove the upper (rear facing) mounting screw from the starter motor.

(5) Lower the starter motor from the front of the transmission clutch housing or torque converter housing far enough to access and remove the nut that secures the battery cable eyelet to the solenoid battery terminal (Fig. 14). Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(6) Remove the battery cable eyelet from the solenoid battery terminal. Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(7) Disconnect the solenoid terminal wire harness connector from the connector receptacle on the starter solenoid. Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(8) Remove the starter motor from the engine compartment.

INSTALLATION

2.5L ENGINE

(1) Position the starter motor in the engine compartment.

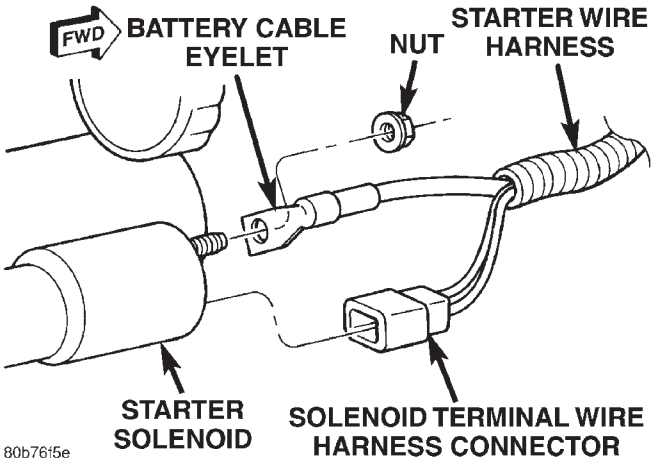


Fig. 14 Starter Wire Harness Remove/Install - 4.0L Engine

(2) Install the battery cable and solenoid wire connector eyelets onto the solenoid terminal studs.

(3) Install and tighten the nut that secures the battery cable harness connector eyelet to the solenoid battery terminal stud. Tighten the nut to 10 N·m (90 in. lbs.). Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(4) Install and tighten the nut that secures the solenoid wire harness connector eyelet to the solenoid terminal stud. Tighten the nut to 6 N·m (55 in. lbs.). Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(5) Position the starter motor and any starter motor shims that were removed to the engine block and loosely install both of the mounting screws.

NOTE: Shim thickness available is 0.381 mm (0.015 in.). Refer to Starter Motor Noise - 2.5L Engine in the Diagnosis and Testing section of this group for more information.

(6) Tighten both of the starter motor mounting screws. Tighten the screws to 45 N·m (33 ft. lbs.).

(7) Lower the vehicle.

(8) Reconnect the battery negative cable.

4.0L ENGINE

(1) Position the starter motor in the engine compartment.

(2) Reconnect the solenoid terminal wire harness connector to the connector receptacle on the starter solenoid. Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(3) Install the battery cable eyelet onto the solenoid battery terminal. Always support the starter

REMOVAL AND INSTALLATION (Continued)

motor during this process, do not let the starter motor hang from the wire harness.

(4) Install and tighten the nut that secures the battery cable eyelet to the solenoid battery terminal. Tighten the nut to 10 N·m (90 in. lbs.). Always support the starter motor during this process, do not let the starter motor hang from the wire harness.

(5) Position the starter motor to the front of the transmission clutch housing or torque converter housing and loosely install both the upper and lower mounting screws.

(6) Tighten the lower (forward facing) starter motor mounting screw. Tighten the screw to 41 N·m (30 ft. lbs.).

(7) Tighten the upper (rearward facing) starter motor mounting screw. Tighten the screw to 54 N·m (40 ft. lbs.).

(8) Lower the vehicle.

(9) Reconnect the battery negative cable.

STARTER RELAY

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC) (Fig. 15).

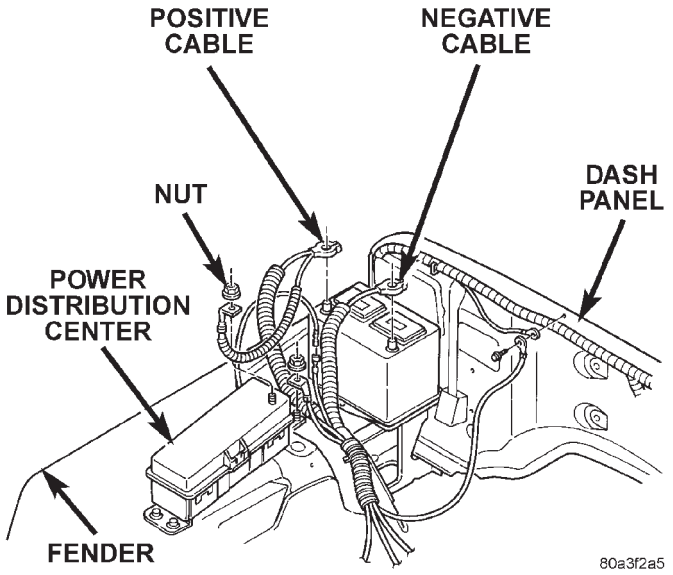


Fig. 15 Power Distribution Center

(3) See the fuse and relay layout label affixed to the underside of the PDC cover for starter relay identification and location.

(4) Remove the starter relay from the PDC.

INSTALLATION

(1) See the fuse and relay layout label affixed to the underside of the PDC cover for the proper starter relay location.

(2) Position the starter relay in the proper receptacle in the PDC.

(3) Align the starter relay terminals with the terminal cavities in the PDC receptacle.

(4) Push down firmly on the starter relay until the terminals are fully seated in the terminal cavities in the PDC receptacle.

(5) Install the cover onto the PDC.

(6) Reconnect the battery negative cable.

SPECIFICATIONS

STARTING SYSTEM

Starter Motor and Solenoid	
Manufacturer	Mitsubishi
Engine Application	2.5L, 4.0L
Power Rating	2.5L - 1.2 Kilowatt (1.6 Horsepower) 4.0L - 1.4 Kilowatt (1.9 Horsepower)
Voltage	12 Volts
Number of Fields	4
Number of Poles	4
Number of Brushes	4
Drive Type	Planetary Gear Reduction
Free Running Test Voltage	11.2 Volts
Free Running Test Maximum Amperage Draw	90 Amperes
Free Running Test Minimum Speed	2.5L - 2600 rpm 4.0L - 2500 rpm
Solenoid Closing Maximum Voltage Required	7.8 Volts
*Cranking Amperage Draw Test	2.5L - 130 Amperes 4.0L - 160 Amperes
*Test at operating temperature. Cold engine, tight (new) engine, or heavy oil will increase starter amperage draw.	

CHARGING SYSTEM

CONTENTS

DESCRIPTION AND OPERATION

CHARGING SYSTEM OPERATION

The charging system consists of:

- Generator
- Electronic Voltage Regulator (EVR) circuitry within the Powertrain Control Module (PCM)
- Ignition switch (refer to Group 8D, Ignition System for information)
- Battery (refer to Group 8A, Battery for information)
- Battery temperature sensor
- Generator Lamp (if equipped)
- Check Gauges Lamp (if equipped)
- Voltmeter (refer to Group 8E, Instrument Panel and Gauges for information)
- Wiring harness and connections (refer to Group 8W, Wiring for information)

The charging system is turned on and off with the ignition switch. The system is on when the engine is running and the ASD relay is energized. When the ASD relay is on, voltage is supplied to the ASD relay sense circuit at the PCM. This voltage is connected through the PCM and supplied to one of the generator field terminals (Gen. Source +) at the back of the generator.

The amount of DC current produced by the generator is controlled by the EVR (field control) circuitry contained within the PCM. This circuitry is connected in series with the second rotor field terminal and ground.

A battery temperature sensor, located in the battery tray housing, is used to sense battery temperature. This temperature data, along with data from monitored line voltage, is used by the PCM to vary the battery charging rate. This is done by cycling the ground path to control the strength of the rotor magnetic field. The PCM then compensates and regulates generator current output accordingly.

All vehicles are equipped with On-Board Diagnostics (OBD). All OBD-sensed systems, including EVR (field control) circuitry, are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects. Refer to On-Board Diagnostics in Group 25, Emission Control System for more DTC information.

The Check Gauges Lamp (if equipped) monitors: **charging system voltage,** engine coolant temperature and engine oil pressure. If an extreme condition is indicated, the lamp will be illuminated. This is done as reminder to check the three gauges. The signal to activate the lamp is sent via the CCD bus circuits. The lamp is located on the instrument panel. Refer to Group 8E, Instrument Panel and Gauges for additional information.

GENERATOR

The generator is belt-driven by the engine using a serpentine type drive belt. It is serviced only as a complete assembly. If the generator fails for any reason, the entire assembly must be replaced.

As the energized rotor begins to rotate within the generator, the spinning magnetic field induces a current into the windings of the stator coil. Once the generator begins producing sufficient current, it also provides the current needed to energize the rotor.

The Y type stator winding connections deliver the induced AC current to 3 positive and 3 negative diodes for rectification. From the diodes, rectified DC current is delivered to the vehicle electrical system through the generator battery terminal.

DESCRIPTION AND OPERATION (Continued)

Although the generators appear the same externally, different generators with different output ratings are used on this vehicle. Be certain that the replacement generator has the same output rating and part number as the original unit. Refer to Generator Ratings in the Specifications section at the back of this group for amperage ratings and part numbers.

Noise emitting from the generator may be caused by: worn, loose or defective bearings; a loose or defective drive pulley; incorrect, worn, damaged or misadjusted fan drive belt; loose mounting bolts; a misaligned drive pulley or a defective stator or diode.

BATTERY TEMPERATURE SENSOR

The battery temperature sensor is used to determine the battery temperature and control battery charging rate. This temperature data, along with data from monitored line voltage, is used by the PCM to vary the battery charging rate. System voltage will be higher at colder temperatures and is gradually reduced at warmer temperatures.

ELECTRONIC VOLTAGE REGULATOR

DESCRIPTION

The Electronic Voltage Regulator (EVR) is not a separate component. It is actually a voltage regulating circuit located within the Powertrain Control Module (PCM). The EVR is not serviced separately. If replacement is necessary, the PCM must be replaced.

OPERATION

The amount of DC current produced by the generator is controlled by EVR circuitry contained within the PCM. This circuitry is connected in series with the generators second rotor field terminal and its ground.

Voltage is regulated by cycling the ground path to control the strength of the rotor magnetic field. The EVR circuitry monitors system line voltage and battery temperature (refer to Battery Temperature Sensor for more information). It then compensates and regulates generator current output accordingly. Also refer to Charging System Operation for additional information.

DIAGNOSIS AND TESTING

CHARGING SYSTEM

The following procedures may be used to diagnose the charging system if:

- the generator lamp (if equipped) is illuminated with the engine running
- the voltmeter (if equipped) does not register properly
- an undercharged or overcharged battery condition occurs.

Remember that an undercharged battery is often caused by:

- accessories being left on with the engine not running
- a faulty or improperly adjusted switch that allows a lamp to stay on. See Ignition-Off Draw Test in Group 8A, Battery for more information.

INSPECTION

To perform a complete test of the charging system, refer to the appropriate Powertrain Diagnostic Procedures service manual and the DRB scan tool. Perform the following inspections before attaching the scan tool.

(1) Inspect the battery condition. Refer to Group 8A, Battery for procedures.

(2) Inspect condition of battery cable terminals, battery posts, connections at engine block, starter solenoid and relay. They should be clean and tight. Repair as required.

(3) Inspect all fuses in both the fuseblock and Power Distribution Center (PDC) for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.

(4) Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. Refer to the Generator Removal/Installation section of this group for torque specifications.

(5) Inspect generator drive belt condition and tension. Tighten or replace belt as required. Refer to Belt Tension Specifications in Group 7, Cooling System.

(6) Inspect automatic belt tensioner (if equipped). Refer to Group 7, Cooling System for information.

(7) Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

BATTERY TEMPERATURE SENSOR

To perform a complete test of this sensor and its circuitry, refer to the appropriate Powertrain Diagnostic Procedures manual. To test the sensor only, refer to the following:

(1) The sensor is located under the battery and is attached to the battery tray (Fig. 1). A two-wire pigtail harness is attached directly to the sensor. The opposite end of this harness connects the sensor to the engine wiring harness.

(2) Disconnect the two-wire pigtail harness from the engine harness.

(3) Attach ohmmeter leads to the wire terminals of the pigtail harness.

DIAGNOSIS AND TESTING (Continued)

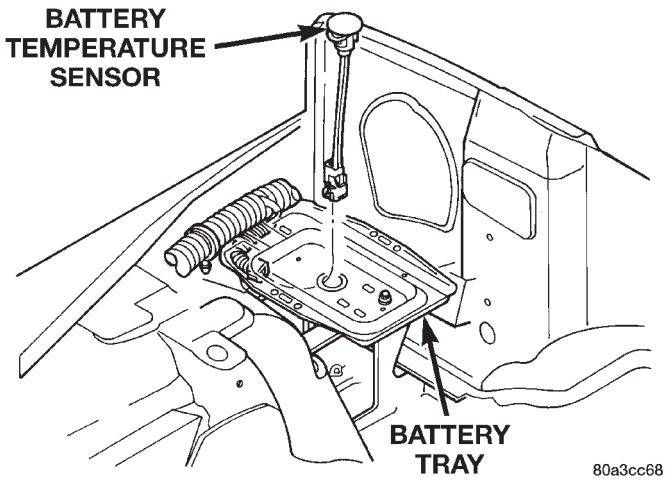


Fig. 1 Battery Temperature Sensor Location

(4) At room temperature of 25° C (75–80° F), an ohmmeter reading of 9,000 (9K) to 11,000 (11K) ohms should be observed.

(5) If reading is above or below the specification, replace the sensor.

(6) Refer to the Removal and Installation section for procedures.

ON-BOARD DIAGNOSTIC TEST FOR CHARGING SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some circuits are checked continuously and some are checked only under certain conditions.

For DTC information, refer to Diagnostic Trouble Codes in Group 25, Emission Control System. This will include a complete list of DTC's including DTC's for the charging system.

REMOVAL AND INSTALLATION

GENERATOR

REMOVAL

WARNING: DISCONNECT NEGATIVE CABLE FROM BATTERY BEFORE REMOVING BATTERY OUTPUT WIRE (B+ WIRE) FROM GENERATOR. FAILURE TO DO SO CAN RESULT IN INJURY OR DAMAGE TO ELECTRICAL SYSTEM.

(1) Disconnect negative battery cable at battery.

(2) Remove generator drive belt. Refer to Group 7, Cooling System for procedure.

(3) Remove generator pivot and mounting bolts/nut (Fig. 2). Position generator for access to wire connectors.

(4) If equipped, unsnap plastic cover from B+ terminal.

(5) Remove B+ terminal mounting nut at rear of generator (Fig. 3). Disconnect terminal from generator.

(6) Disconnect field wire connector at rear of generator by pushing on connector tab.

(7) Remove generator from vehicle.

INSTALLATION

(1) Position generator to engine and snap field wire connector into rear of generator.

(2) Install B+ terminal to generator mounting stud. Tighten mounting nut to 8.5 N·m (75 in. lbs.) torque.

(3) If equipped, snap plastic cover to B+ terminal.

(4) Install generator mounting fasteners and tighten as follows:

- Generator mounting bolt—55 N·m (41 ft. lbs.) torque.
- Generator pivot bolt/nut—55 N·m (41 ft. lbs.) torque.

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to Belt Schematics in Group 7, Cooling System.

(5) Install generator drive belt. Refer to Group 7, Cooling System for procedure.

(6) Install negative battery cable to battery.

BATTERY TEMPERATURE SENSOR

The battery temperature sensor is located under the vehicle battery and is attached to a mounting hole on battery tray.

REMOVAL

(1) Remove battery. Refer to Group 8A, Battery for procedures.

(2) Disconnect sensor pigtail harness from engine wire harness.

(3) Pry sensor straight up from battery tray mounting hole.

REMOVAL AND INSTALLATION (Continued)

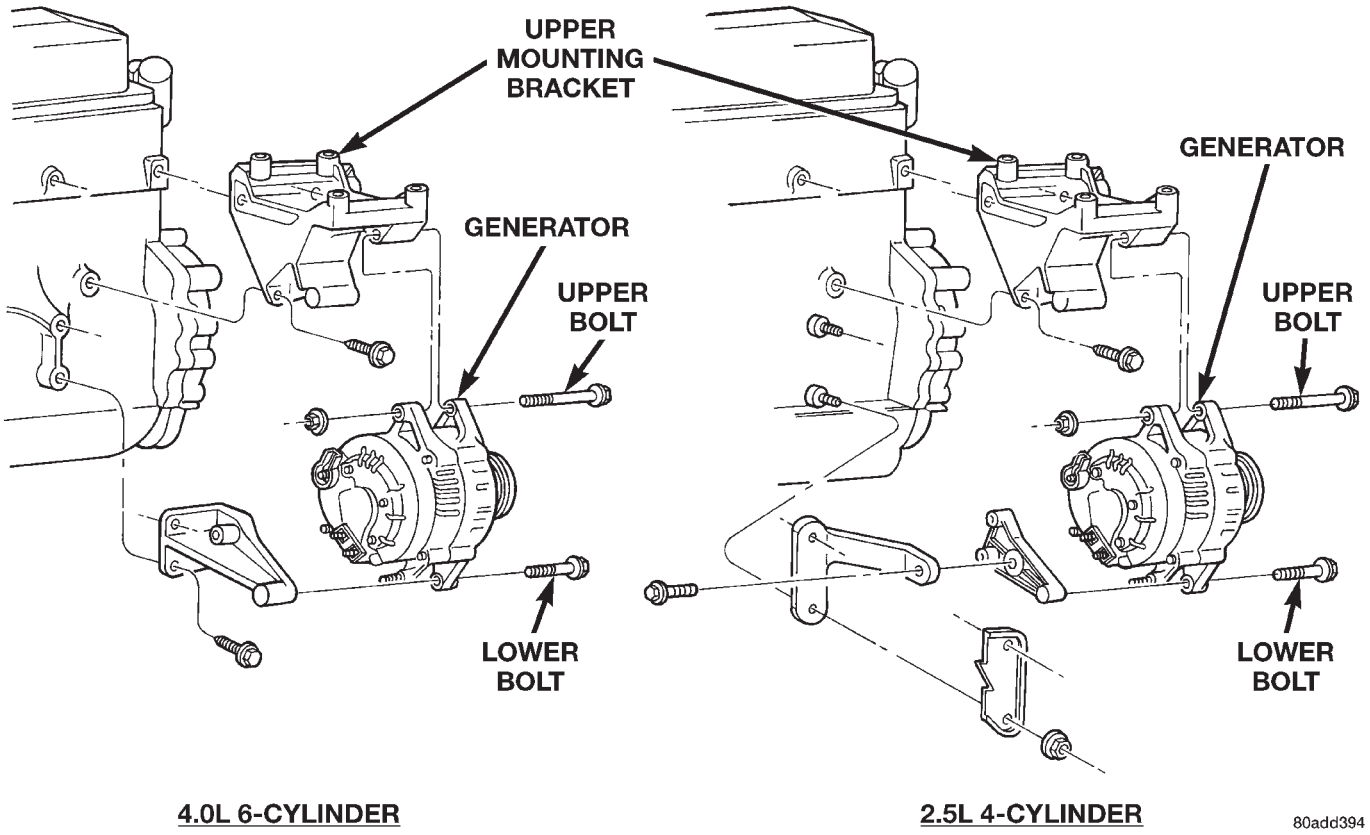


Fig. 2 Generator Remove/Install

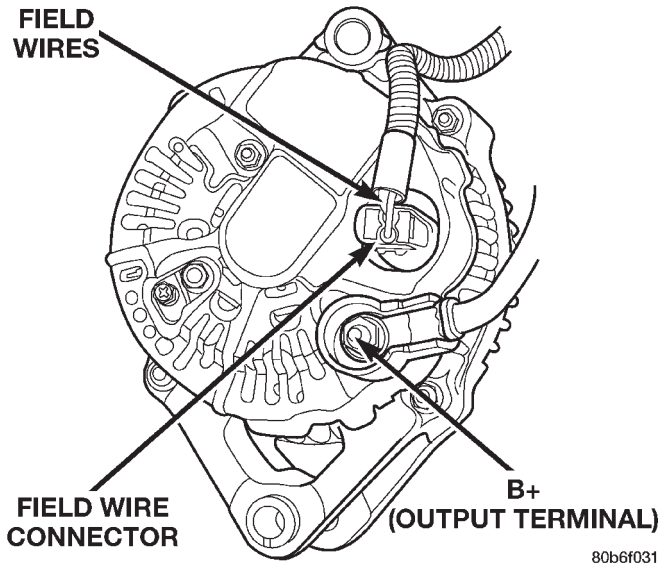


Fig. 3 Generator Connectors (Typical)

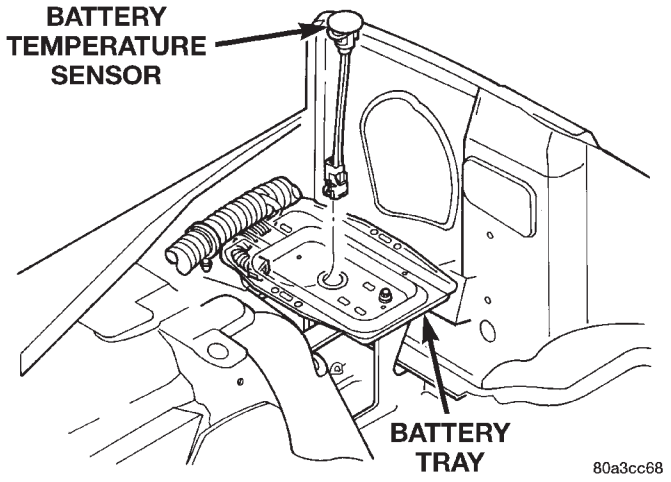


Fig. 4 Battery Temperature Sensor Remove/Install

INSTALLATION

(1) Feed pigtail harness through hole in top of battery tray and press sensor into top of battery tray.

(2) Connect pigtail harness.

(3) Install battery. Refer to Group 8A, Battery for procedures.

SPECIFICATIONS

GENERATOR RATINGS

TYPE	PART NUMBER	RATED SAE AMPS	ENGINES	MINIMUM TEST AMPS
DENSO	56005684AB	81	2.5L/4.0L	57
DENSO	56005685AB	117	2.5L/4.0L	88

TORQUE CHART

Description	Torque
Generator Upper Mounting Bolt/Nut—	
2.5L/4.0L Engine	55 N·m (41 ft. lbs.)
Generator Lower Mounting Bolt—	
2.5L/4.0L Engine	55 N·m (41 ft. lbs.)
Battery Terminal Nut	8.5 N·m (75 in. lbs.)
Ground Terminal Nut	8.5 N·m (75 in. lbs.)
Harness Hold-down Nut	8.5 N·m (75 in. lbs.)
Field Terminal Nuts	2.8 N·m (25 in. lbs.)

IGNITION SYSTEM

CONTENTS

DESCRIPTION AND OPERATION

IGNITION SYSTEM

The ignition systems used on the 2.5L 4–cylinder and the 4.0L 6–cylinder engine are basically identical. Similarities and differences between the systems will be discussed.

The ignition system is controlled by the powertrain control module (PCM) on all engines.

The ignition system consists of:

- Spark Plugs
- Ignition Coil
- Secondary Ignition Cables
- Distributor (contains rotor and camshaft position sensor)
- Powertrain Control Module (PCM)
- Crankshaft Position, Camshaft Position, Throttle Position and MAP Sensors

POWERTRAIN CONTROL MODULE

The Powertrain Control Module (PCM) is located in the engine compartment (Fig. 1).

The ignition system is controlled by the PCM.

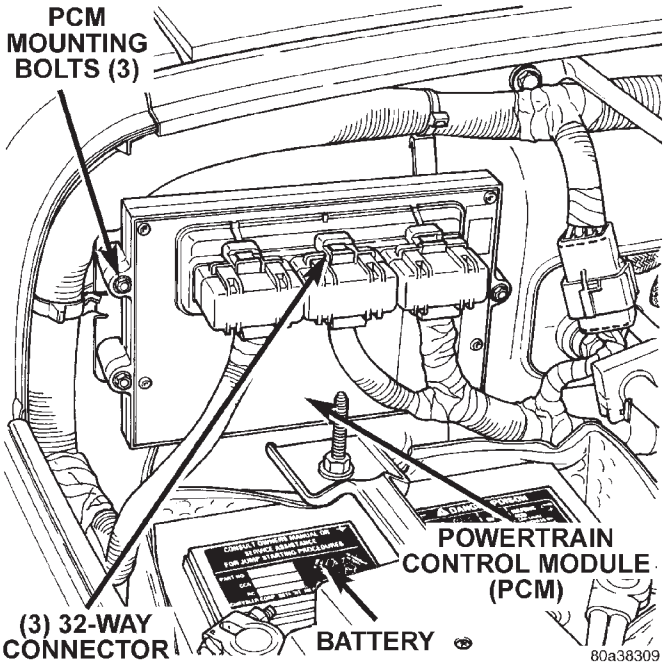


Fig. 1 Powertrain Control Module (PCM) Location

DESCRIPTION AND OPERATION (Continued)

NOTE: Base ignition timing by rotation of distributor is not adjustable.

The PCM opens and closes the ignition coil ground circuit to operate the ignition coil. This is done to adjust ignition timing, both initial (base) and advance, and for changing engine operating conditions.

The amount of electronic spark advance provided by the PCM is determined by five input factors: engine coolant temperature, engine rpm, intake manifold temperature, manifold absolute pressure and throttle position.

DISTRIBUTOR

All engines are equipped with a camshaft driven mechanical distributor containing a shaft driven distributor rotor. All distributors are equipped with an internal camshaft position (fuel sync) sensor (Fig. 2). This sensor provides fuel injection synchronization and cylinder identification.

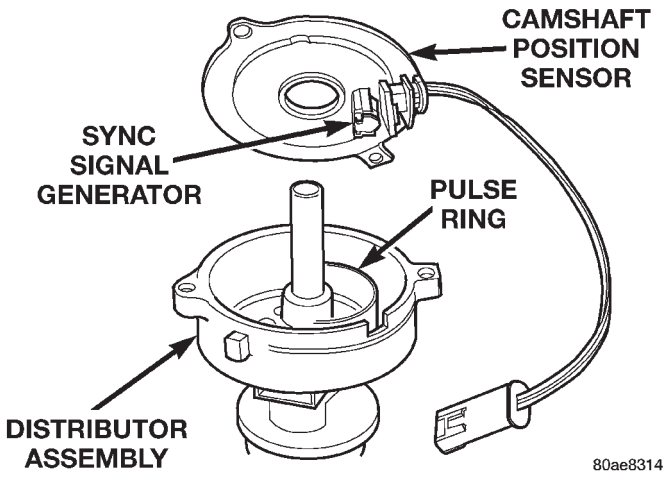


Fig. 2 Distributor and Camshaft Position Sensor-Typical

The distributors on both the 2.5L 4-cylinder and the 4.0L-6 cylinder engines do not have built in centrifugal or vacuum assisted advance. Base ignition timing and all timing advance is controlled by the powertrain control module (PCM). Because ignition timing is controlled by the PCM, **base ignition timing is not adjustable on any of these engines.**

The distributor is locked in place by a fork with a slot located on the distributor housing base. The distributor holddown clamp bolt passes through this slot when installed. Because the distributor position is locked when installed, its rotational position can not be changed. **Do not attempt to modify the distributor housing to get distributor rotation. Distributor position will have no effect on ignition timing. The position of the distributor will determine fuel synchronization only.**

All distributors contain an internal oil seal that prevents oil from entering the distributor housing. The seal is not serviceable.

SPARK PLUGS

All engines use resistor type spark plugs. Remove the spark plugs and examine them for burned electrodes and fouled, cracked or broken porcelain insulators. Keep plugs arranged in the order in which they were removed from the engine. A single plug displaying an abnormal condition indicates that a problem exists in the corresponding cylinder. Replace spark plugs at the intervals recommended in Group O, Lubrication and Maintenance.

Spark plugs that have low milage may be cleaned and reused if not otherwise defective, carbon or oil fouled. Refer to the Spark Plug Condition section of this group.

SPARK PLUG CABLES

Spark plug cables are sometimes referred to as secondary ignition wires. These cables transfer electrical current from the ignition coil(s) and/or distributor, to individual spark plugs at each cylinder. The resistive spark plug cables are of nonmetallic construction. The cables provide suppression of radio frequency emissions from the ignition system.

IGNITION COIL

Battery voltage is supplied to the ignition coil positive terminal from the ASD relay.

The Powertrain Control Module (PCM) opens and closes the ignition coil ground circuit for ignition coil operation.

Base ignition timing is not adjustable on any engine. By controlling the coil ground circuit, the PCM is able to set the base timing and adjust the ignition timing advance. This is done to meet changing engine operating conditions.

The ignition coil is not oil filled. The windings are embedded in an epoxy compound. This provides heat and vibration resistance that allows the ignition coil to be mounted on the engine.

AUTOMATIC SHUTDOWN (ASD) RELAY

As one of its functions, the ASD relay will supply battery voltage to the ignition coil. The ground circuit for the ASD relay is controlled by the Powertrain Control Module (PCM). The PCM regulates ASD relay operation by switching the ground circuit on-and-off.

DESCRIPTION AND OPERATION (Continued)

CRANKSHAFT POSITION SENSOR

The crankshaft position sensor is mounted to the transmission bellhousing at the left/rear side of the engine block (Fig. 3), (Fig. 4), or (Fig. 5).

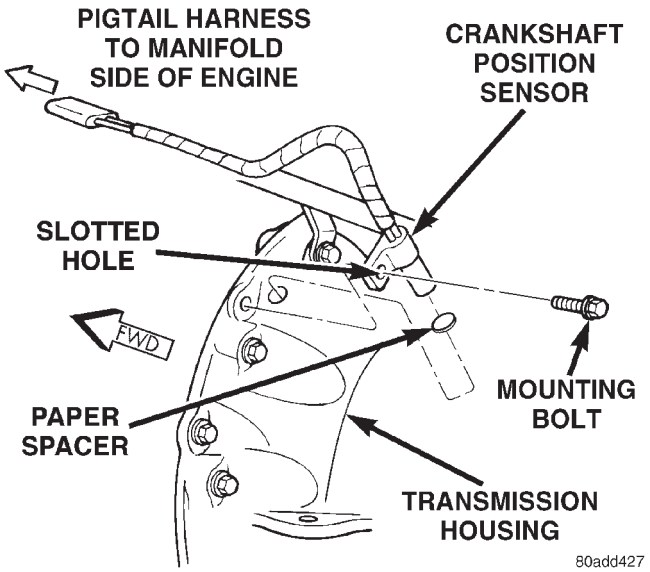


Fig. 3 Crankshaft Position Sensor—4.0L 6-Cyl. Engine—Auto. Trans.

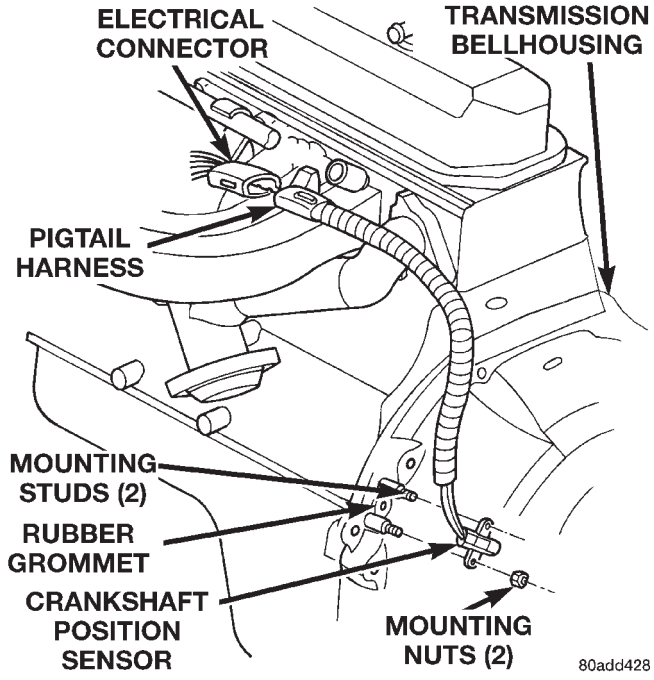


Fig. 4 Crankshaft Position Sensor—2.5L 4-Cyl. Engine—Auto. Trans.

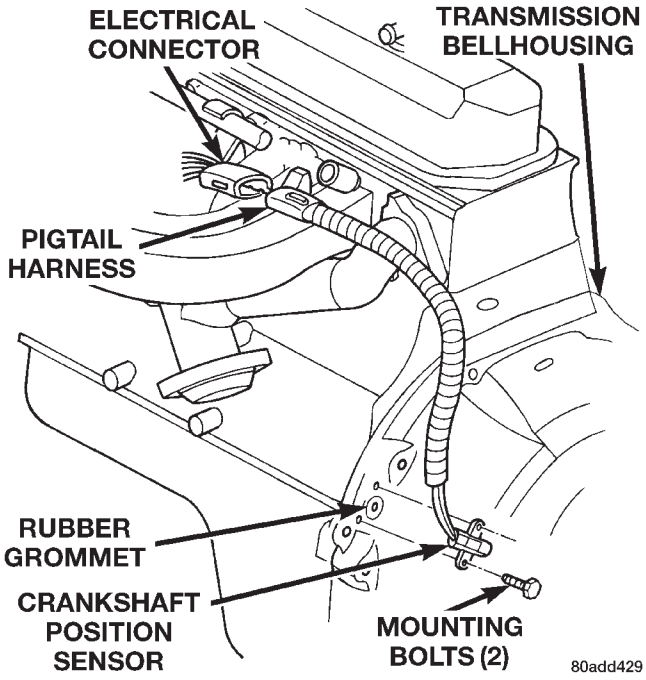


Fig. 5 Crankshaft Position Sensor—Manual Transmission (Typical)

Engine speed and crankshaft position are provided through the crankshaft position sensor. The sensor generates pulses that are the input sent to the powertrain control module (PCM). The PCM interprets the sensor input to determine the crankshaft position. The PCM then uses this position, along with other inputs, to determine injector sequence and ignition timing.

The sensor is a hall effect device combined with an internal magnet. It is also sensitive to steel within a certain distance from it.

SENSOR OPERATION

The flywheel/drive plate has groups of four notches at its outer edge. On 4.0L 6-cylinder engines there are three sets of notches (Fig. 7) or (Fig. 8). On 2.5L 4-cylinder engines there are two sets of notches (Fig. 6).

The notches cause a pulse to be generated when they pass under the sensor. The pulses are the input to the PCM. For each engine revolution there are two groups of four pulses generated on 2.5L 4-cylinder engines. There are 3 groups of four pulses generated on 4.0L 6-cylinder engines.

The trailing edge of the fourth notch, which causes the pulse, is four degrees before top dead center (TDC) of the corresponding piston.

The engine will not operate if the PCM does not receive a crankshaft position sensor input.

DESCRIPTION AND OPERATION (Continued)

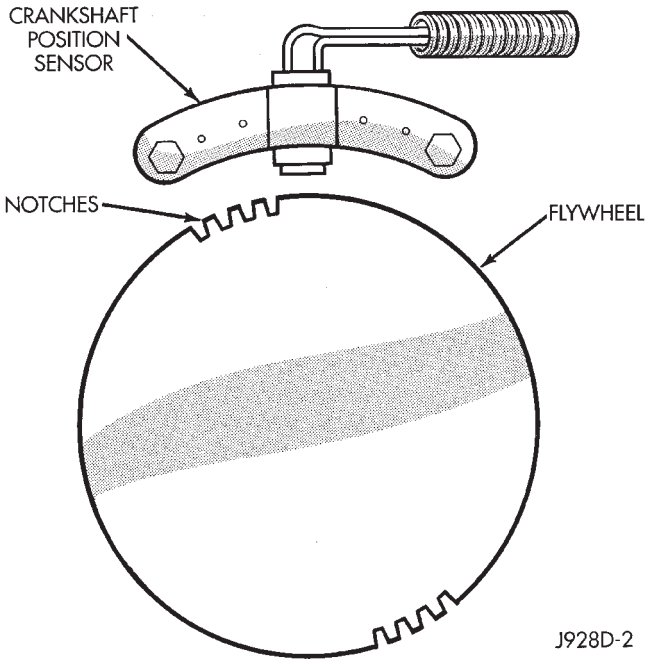


Fig. 6 Sensor Operation—2.5L 4-Cyl. Engine

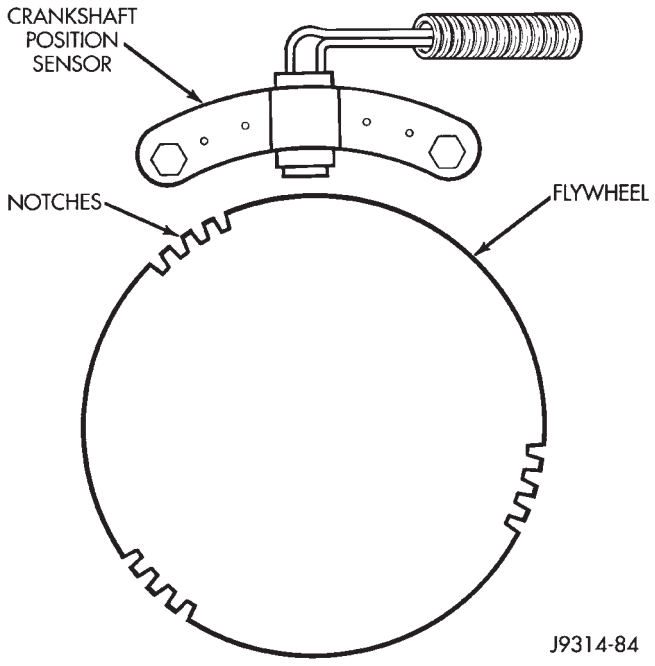


Fig. 7 Sensor Operation—4.0L 6-Cyl. Engine—Manual Transmission

CAMSHAFT POSITION SENSOR

The camshaft position sensor is located in the distributor on all engines.

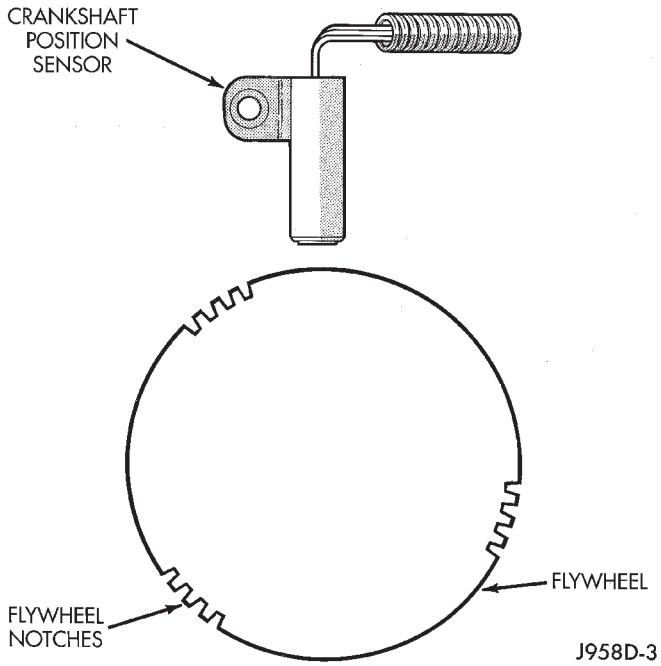


Fig. 8 Sensor Operation—4.0L 6-Cyl. Engine—Automatic Transmission

The sensor contains a hall effect device called a sync signal generator to generate a fuel sync signal. This sync signal generator detects a rotating pulse ring (shutter) on the distributor shaft. The pulse ring rotates 180 degrees through the sync signal generator. Its signal is used in conjunction with the crankshaft position sensor to differentiate between fuel injection and spark events. It is also used to synchronize the fuel injectors with their respective cylinders.

When the leading edge of the pulse ring (shutter) enters the sync signal generator, the following occurs: The interruption of magnetic field causes the voltage to switch high resulting in a sync signal of approximately 5 volts.

When the trailing edge of the pulse ring (shutter) leaves the sync signal generator, the following occurs: The change of the magnetic field causes the sync signal voltage to switch low to 0 volts.

IGNITION SWITCH AND KEY LOCK CYLINDER

The ignition switch is located on the steering column. The Key-In-Switch is located in the ignition switch module. For electrical diagnosis of the Key-In-Switch, refer to Group 8U, Chime/Buzzer Warning Systems. For removal/installation of either the key lock cylinder or ignition switch, refer to Ignition Switch and Key Cylinder in this group.

DESCRIPTION AND OPERATION (Continued)

On vehicles equipped with an automatic transmission, a cable connects an interlock device within the steering column assembly to the transmission floor shift lever. This interlock device is used to lock the transmission shifter in the PARK position when the key is in the LOCKED or ACCESSORY position. The interlock device is not serviceable. If repair is necessary, the steering column assembly must be replaced. Refer to Group 19, Steering for procedures. The shifter interlock cable can be adjusted or replaced. Refer to Group 21, Transmissions for procedures.

On vehicles equipped with a manual transmission, a lever is located on the steering column behind the ignition key lock cylinder. The lever must be operated to allow rotation of the ignition key lock cylinder. The lever mechanism is not serviced separately. If repair is necessary, the steering column assembly must be replaced. Refer to Group 19, Steering for procedures.

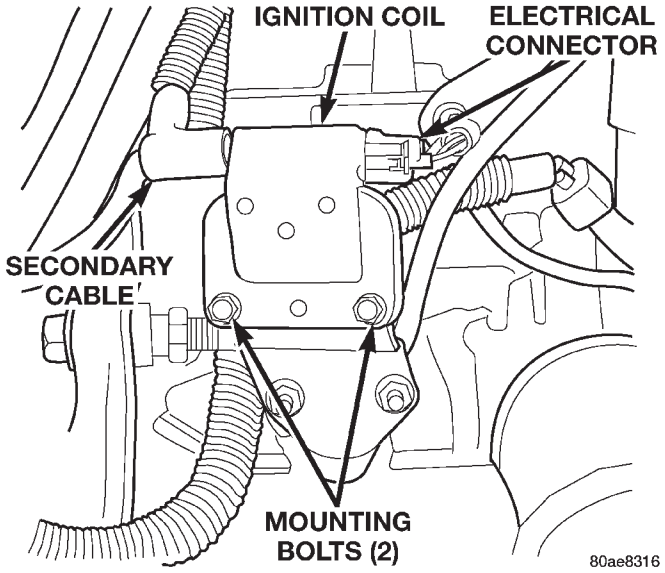


Fig. 9 Ignition Coil—2.5L Engine

DIAGNOSIS AND TESTING

AUTOMATIC SHUTDOWN (ASD) RELAY TEST

To perform a complete test of this relay and its circuitry, refer to the DRB scan tool. Also refer to the appropriate Powertrain Diagnostics Procedures manual. To test the relay only, refer to Relays—Operation/Testing in the Group 14, Fuel Systems section.

IGNITION COIL TEST

To perform a complete test of the ignition coil and its circuitry, refer to the DRB scan tool. Also refer to the appropriate Powertrain Diagnostics Procedures manual. To test the coil only, refer to the following:

The ignition coil (Fig. 9) or (Fig. 10) is designed to operate without an external ballast resistor.

Inspect the ignition coil for arcing. Test the coil according to coil tester manufacturer's instructions. Test the coil primary and secondary resistance. Replace any coil that does not meet specifications. Refer to the IGNITION COIL RESISTANCE chart.

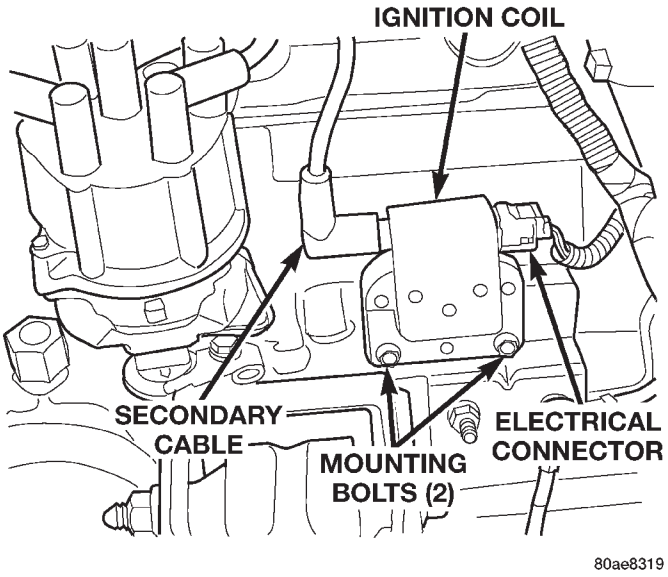


Fig. 10 Ignition Coil—4.0L Engine

IGNITION COIL RESISTANCE

COIL MANUFACTURER	PRIMARY RESISTANCE 21-27°C (70-80°F)	SECONDARY RESISTANCE 21-27°C (70-80°F)
Diamond	0.97 - 1.18 Ohms	11,300 - 15,300 Ohms
Toyodenso	0.95 - 1.20 Ohms	11,300 - 13,300 Ohms

DIAGNOSIS AND TESTING (Continued)

If the ignition coil is being replaced, the secondary spark plug cable must also be checked. Replace cable if it has been burned or damaged.

Arcing at the tower will carbonize the cable boot, which if it is connected to a new ignition coil, will cause the coil to fail.

If the secondary coil cable shows any signs of damage, it should be replaced with a new cable and new terminal. Carbon tracking on the old cable can cause arcing and the failure of a new ignition coil.

DISTRIBUTOR CAP

Remove the distributor cap and wipe it clean with a dry lint free cloth. Visually inspect the cap for cracks, carbon paths, broken towers or damaged rotor button (Fig. 11) or (Fig. 12). Also check for white deposits on the inside (caused by condensation entering the cap through cracks). Replace any cap that displays charred or eroded terminals. The machined surface of a terminal end (faces toward rotor) will indicate some evidence of erosion from normal operation. Examine the terminal ends for evidence of mechanical interference with the rotor tip.

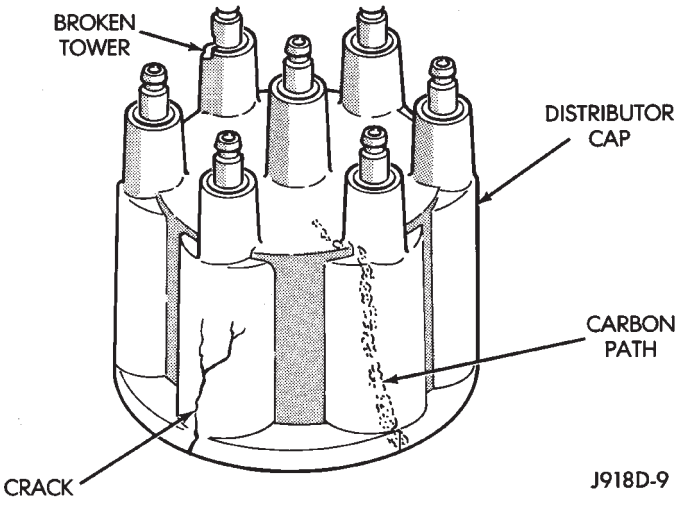


Fig. 11 Cap Inspection—External—Typical

DISTRIBUTOR ROTOR

Visually inspect the rotor (Fig. 13) for cracks, evidence of corrosion or the effects of arcing on the metal tip. Also check for evidence of mechanical interference with the cap. Some charring is normal on the end of the metal tip. The silicone-dielectric-varnish-compound applied to the rotor tip for radio interference noise suppression, will appear charred. This is normal. **Do not remove the charred compound.** Test the spring for insufficient tension. Replace a rotor that displays any of these adverse conditions.

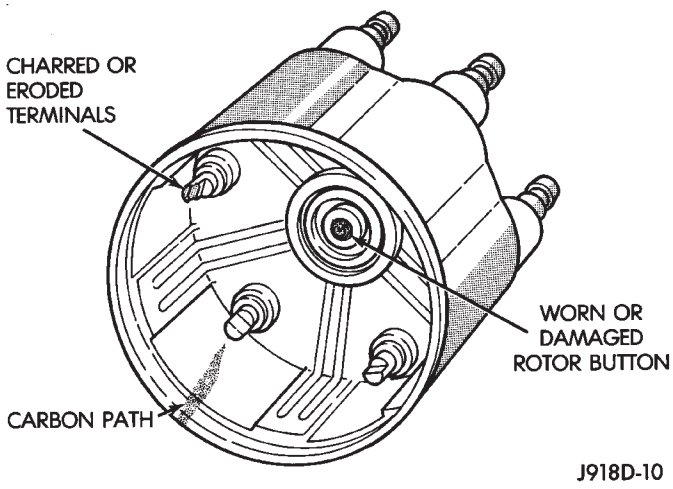


Fig. 12 Cap Inspection—Internal—Typical

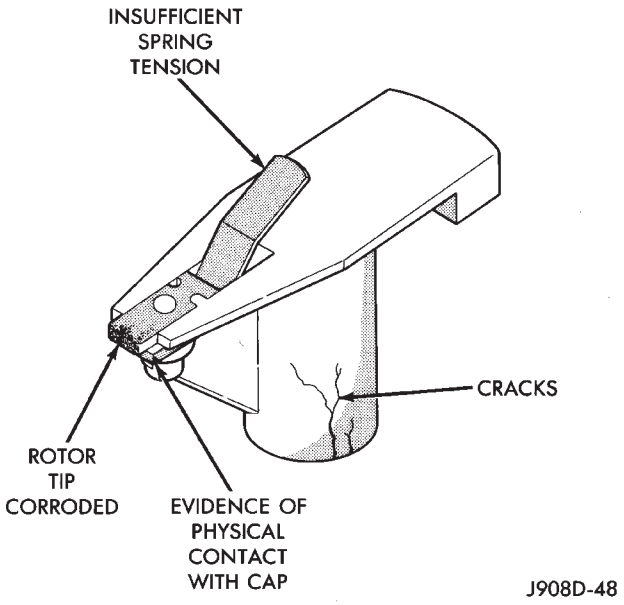


Fig. 13 Rotor Inspection—Typical

IGNITION TIMING

NOTE: Base (initial) ignition timing is NOT adjustable on any 2.5L 4-cylinder or 4.0L 6-cylinder engine. Do not attempt to adjust ignition timing by rotating the distributor.

NOTE: Do not attempt to modify the distributor housing to get distributor rotation. Distributor position will have no effect on ignition timing.

All ignition timing functions are controlled by the powertrain control module (PCM). For additional information, refer to the appropriate Powertrain Diagnostics Procedures service manual for operation of the DRB Scan Tool.

DIAGNOSIS AND TESTING (Continued)

CRANKSHAFT POSITION SENSOR

To perform a complete test of this sensor and its circuitry, refer to the DRB scan tool. Also refer to the appropriate Powertrain Diagnostics Procedures manual.

CAMSHAFT POSITION SENSOR

The camshaft position sensor is located in the distributor (Fig. 14) on all engines.

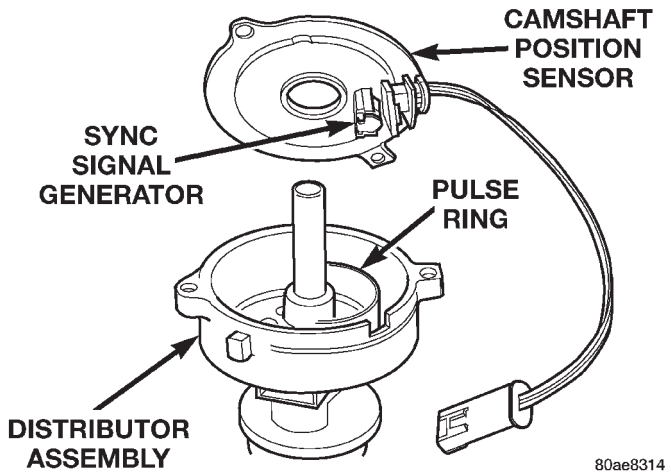


Fig. 14 Camshaft Position Sensor—Typical

To perform a complete test of this sensor and its circuitry, refer to the appropriate Powertrain Diagnostics Procedures service manual. To test the sensor only, refer to the following:

For this test, an analog (non-digital) voltmeter is needed. Do not remove the distributor connector from the distributor. Using small paper clips, insert them into the backside of the distributor wire harness connector to make contact with the terminals. Be sure that the connector is not damaged when inserting the paper clips. Attach voltmeter leads to these paper clips.

(1) Connect the positive (+) voltmeter lead into the sensor output wire. This is at done the distributor wire harness connector. For wire identification, refer to Group 8W, Wiring Diagrams.

(2) Connect the negative (-) voltmeter lead into the ground wire. For wire identification, refer to Group 8W, Wiring Diagrams.

(3) Set the voltmeter to the 15 Volt DC scale.

(4) Remove distributor cap from distributor (two screws). Rotate (crank) the engine until the distributor rotor is approximately in the 11 o'clock position. The movable pulse ring should now be within the sensor pickup.

(5) Turn ignition key to ON position. Voltmeter should read approximately 5.0 volts.

(6) If voltage is not present, check the voltmeter leads for a good connection.

(7) If voltage is still not present, check for voltage at the supply wire. For wire identification, refer to Group 8W, Wiring Diagrams.

(8) If 5 volts is not present at supply wire, check for voltage at PCM 32-way connector (cavity A-17). Refer to Group 8W, Wiring for location of connector/terminal. Leave the PCM connector connected for this test.

(9) If voltage is still not present, perform vehicle test using the DRB scan tool.

(10) If voltage is present at cavity A-17, but not at the supply wire:

(a) Check continuity between the supply wire. This is checked between the distributor connector and cavity A-17 at the PCM. If continuity is not present, repair the harness as necessary.

(b) Check for continuity between the camshaft position sensor output wire and cavity A-18 at the PCM. If continuity is not present, repair the harness as necessary.

(c) Check for continuity between the ground circuit wire at the distributor connector and ground. If continuity is not present, repair the harness as necessary.

(11) While observing the voltmeter, crank the engine with ignition switch. The voltmeter needle should fluctuate between 0 and 5 volts while the engine is cranking. This verifies that the camshaft position sensor in the distributor is operating properly and a sync pulse signal is being generated.

If sync pulse signal is not present, replacement of the camshaft position sensor is necessary

SPARK PLUG CABLES

Check the spark plug cable connections for good contact at the coil(s), distributor cap towers, and spark plugs. Terminals should be fully seated. The insulators should be in good condition and should fit tightly on the coil, distributor and spark plugs. Spark plug cables with insulators that are cracked or torn must be replaced.

Clean high voltage ignition cables with a cloth moistened with a non-flammable solvent. Wipe the cables dry. Check for brittle or cracked insulation.

TESTING

When testing secondary cables for damage with an oscilloscope, follow the instructions of the equipment manufacturer.

If an oscilloscope is not available, spark plug cables may be tested as follows:

CAUTION: Do not leave any one spark plug cable disconnected for longer than necessary during testing. This may cause possible heat damage to the catalytic converter. Total test time must not exceed ten minutes.

DIAGNOSIS AND TESTING (Continued)

With the engine running, remove spark plug cable from spark plug (one at a time) and hold next to a good engine ground. If the cable and spark plug are in good condition, the engine rpm should drop and the engine will run poorly. If engine rpm does not drop, the cable and/or spark plug may not be operating properly and should be replaced. Also check engine cylinder compression.

With the engine not running, connect one end of a test probe to a good ground. Start the engine and run the other end of the test probe along the entire length of all spark plug cables. If cables are cracked or punctured, there will be a noticeable spark jump from the damaged area to the test probe. The cable running from the ignition coil to the distributor cap can be checked in the same manner. Cracked, damaged or faulty cables should be replaced with resistance type cable. This can be identified by the words ELECTRONIC SUPPRESSION printed on the cable jacket.

Use an ohmmeter to test for open circuits, excessive resistance or loose terminals. Remove the distributor cap from the distributor. **Do not remove cables from cap.** Remove cable from spark plug. Connect ohmmeter to spark plug terminal end of cable and to corresponding electrode in distributor cap. Resistance should be 250 to 1000 Ohms per inch of cable. If not, remove cable from distributor cap tower and connect ohmmeter to the terminal ends of cable. If resistance is not within specifications as found in the SPARK PLUG CABLE RESISTANCE chart, replace the cable. Test all spark plug cables in this manner.

SPARK PLUG CABLE RESISTANCE

MINIMUM	MAXIMUM
250 Ohms Per Inch	1000 Ohms Per Inch
3000 Ohms Per Foot	12,000 Ohms Per Foot

To test ignition coil-to-distributor cap cable, do not remove the cable from the cap. Connect ohmmeter to rotor button (center contact) of distributor cap and terminal at ignition coil end of cable. If resistance is not within specifications as found in the Spark Plug Cable Resistance chart, remove the cable from the distributor cap. Connect the ohmmeter to the terminal ends of the cable. If resistance is not within specifications as found in the Spark Plug Cable Resistance chart, replace the cable. Inspect the ignition coil tower for cracks, burns or corrosion.

SPARK PLUG CONDITIONS

NORMAL OPERATING

The few deposits present on the spark plug will probably be light tan or slightly gray in color. This is evident with most grades of commercial gasoline (Fig. 15). There will not be evidence of electrode burning. Gap growth will not average more than approximately 0.025 mm (.001 in) per 3200 km (2000 miles) of operation. Spark plugs that have normal wear can usually be cleaned, have the electrodes filed, have the gap set and then be installed.

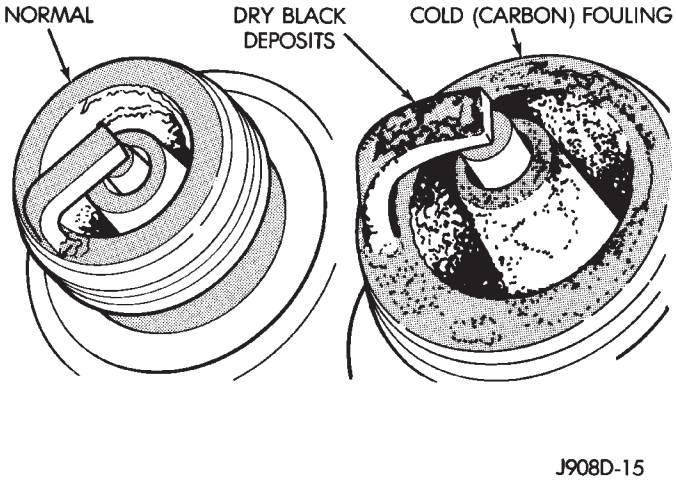


Fig. 15 Normal Operation and Cold (Carbon) Fouling

Some fuel refiners in several areas of the United States have introduced a manganese additive (MMT) for unleaded fuel. During combustion, fuel with MMT causes the entire tip of the spark plug to be coated with a rust colored deposit. This rust color can be misdiagnosed as being caused by coolant in the combustion chamber. Spark plug performance may be affected by MMT deposits.

COLD FOULING/CARBON FOULING

Cold fouling is sometimes referred to as carbon fouling. The deposits that cause cold fouling are basically carbon (Fig. 15). A dry, black deposit on one or two plugs in a set may be caused by sticking valves or defective spark plug cables. Cold (carbon) fouling of the entire set of spark plugs may be caused by a clogged air cleaner element or repeated short operating times (short trips).

DIAGNOSIS AND TESTING (Continued)

WET FOULING OR GAS FOULING

A spark plug coated with excessive wet fuel or oil is wet fouled. In older engines, worn piston rings, leaking valve guide seals or excessive cylinder wear can cause wet fouling. In new or recently overhauled engines, wet fouling may occur before break-in (normal oil control) is achieved. This condition can usually be resolved by cleaning and reinstalling the fouled plugs.

OIL OR ASH ENCRUSTED

If one or more spark plugs are oil or oil ash encrusted (Fig. 16), evaluate engine condition for the cause of oil entry into that particular combustion chamber.

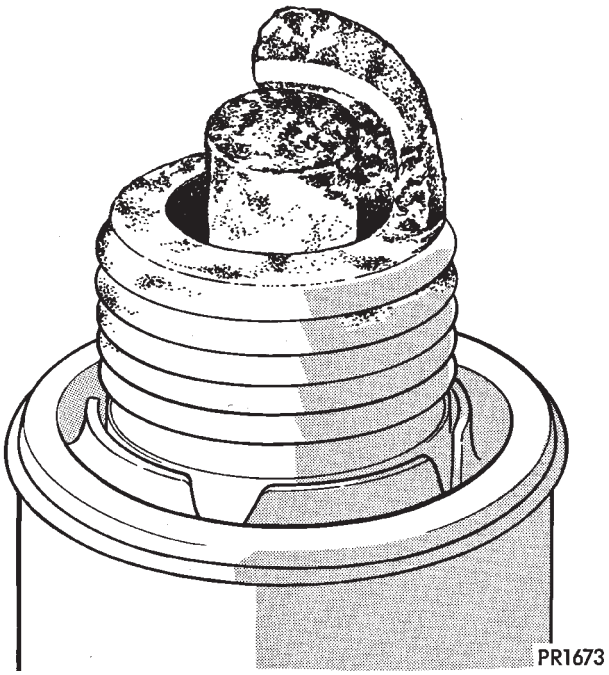


Fig. 16 Oil or Ash Encrusted

ELECTRODE GAP BRIDGING

Electrode gap bridging may be traced to loose deposits in the combustion chamber. These deposits accumulate on the spark plugs during continuous stop-and-go driving. When the engine is suddenly subjected to a high torque load, deposits partially liquefy and bridge the gap between electrodes (Fig. 17). This short circuits the electrodes. Spark plugs with electrode gap bridging can be cleaned using standard procedures.

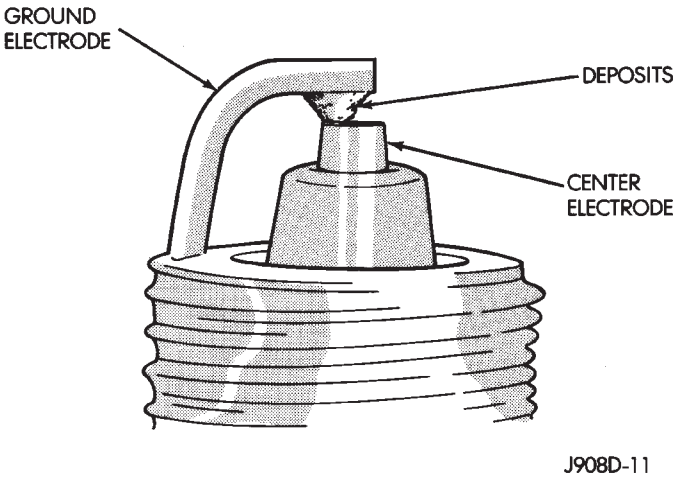


Fig. 17 Electrode Gap Bridging

SCAVENGER DEPOSITS

Fuel scavenger deposits may be either white or yellow (Fig. 18). They may appear to be harmful, but this is a normal condition caused by chemical additives in certain fuels. These additives are designed to change the chemical nature of deposits and decrease spark plug misfire tendencies. Notice that accumulation on the ground electrode and shell area may be heavy, but the deposits are easily removed. Spark plugs with scavenger deposits can be considered normal in condition and can be cleaned using standard procedures.

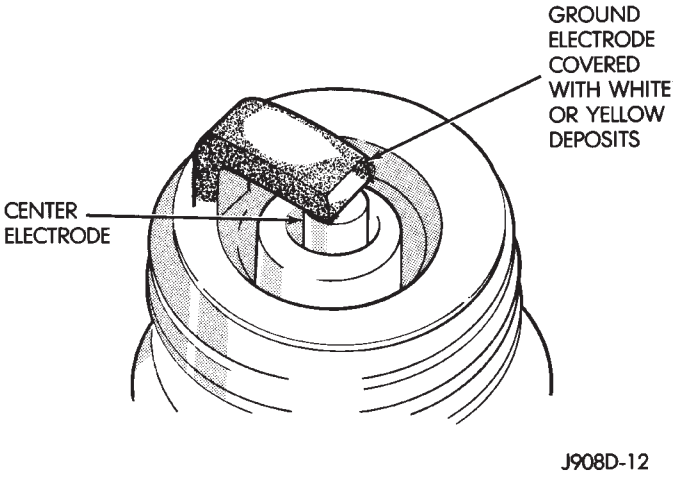


Fig. 18 Scavenger Deposits

DIAGNOSIS AND TESTING (Continued)

CHIPPED ELECTRODE INSULATOR

A chipped electrode insulator usually results from bending the center electrode while adjusting the spark plug electrode gap. Under certain conditions, severe detonation can also separate the insulator from the center electrode (Fig. 19). Spark plugs with this condition must be replaced.

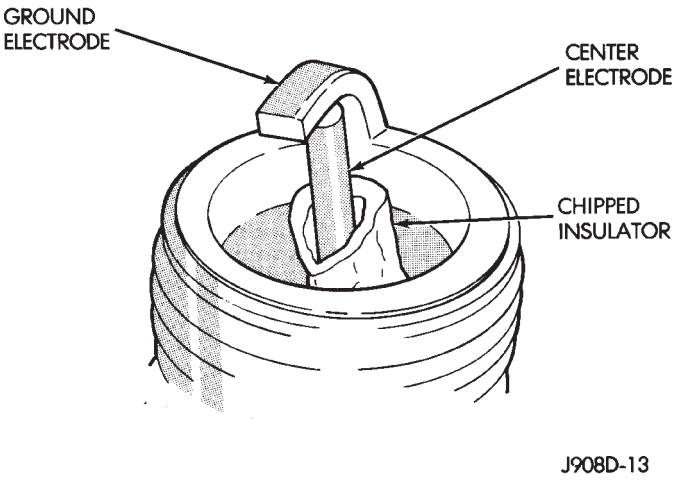


Fig. 19 Chipped Electrode Insulator

PREIGNITION DAMAGE

Preignition damage is usually caused by excessive combustion chamber temperature. The center electrode dissolves first and the ground electrode dissolves somewhat latter (Fig. 20). Insulators appear relatively deposit free. Determine if the spark plug has the correct heat range rating for the engine. Determine if ignition timing is over advanced or if other operating conditions are causing engine overheating. (The heat range rating refers to the operating temperature of a particular type spark plug. Spark plugs are designed to operate within specific temperature ranges. This depends upon the thickness and length of the center electrodes porcelain insulator.)

SPARK PLUG OVERHEATING

Overheating is indicated by a white or gray center electrode insulator that also appears blistered (Fig. 21). The increase in electrode gap will be considerably in excess of 0.001 inch per 2000 miles of operation. This suggests that a plug with a cooler heat range rating should be used. Over advanced ignition timing, detonation and cooling system malfunctions can also cause spark plug overheating.

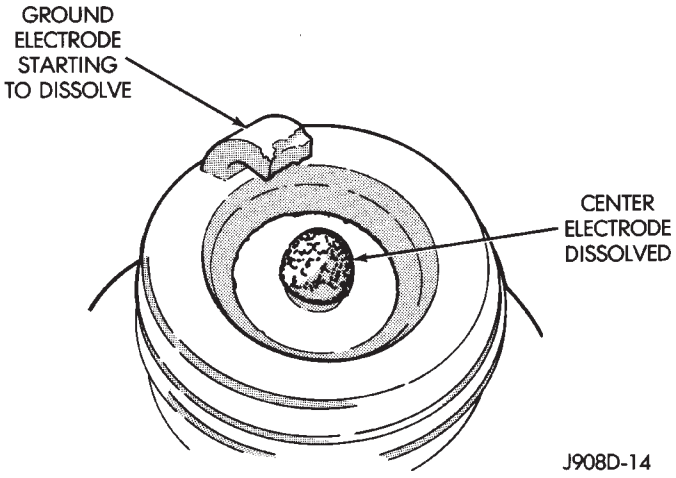


Fig. 20 Preignition Damage

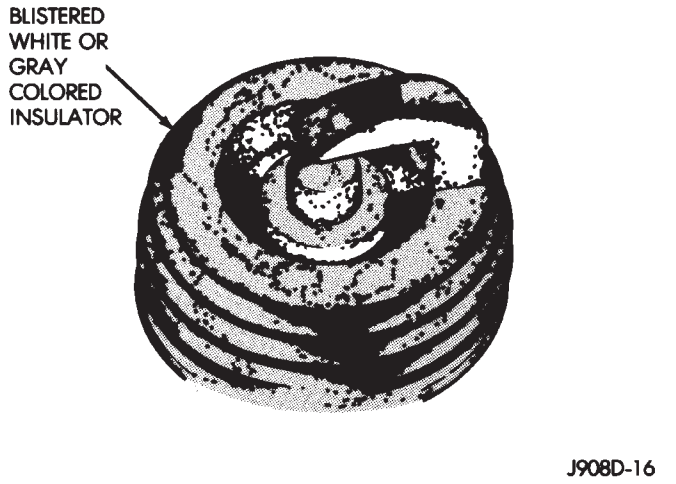


Fig. 21 Spark Plug Overheating

REMOVAL AND INSTALLATION

SPARK PLUG CABLE REMOVAL

CAUTION: When disconnecting a high voltage cable from a spark plug or from the distributor cap, twist the rubber boot slightly (1/2 turn) to break it loose (Fig. 22). Grasp the boot (not the cable) and pull it off with a steady, even force.

SPARK PLUGS

PLUG REMOVAL

(1) Always remove spark plug or ignition coil cables by grasping at the cable boot (Fig. 22). Turn the cable boot 1/2 turn and pull straight back in a steady motion. Never pull directly on the cable. Internal damage to cable will result.

REMOVAL AND INSTALLATION (Continued)

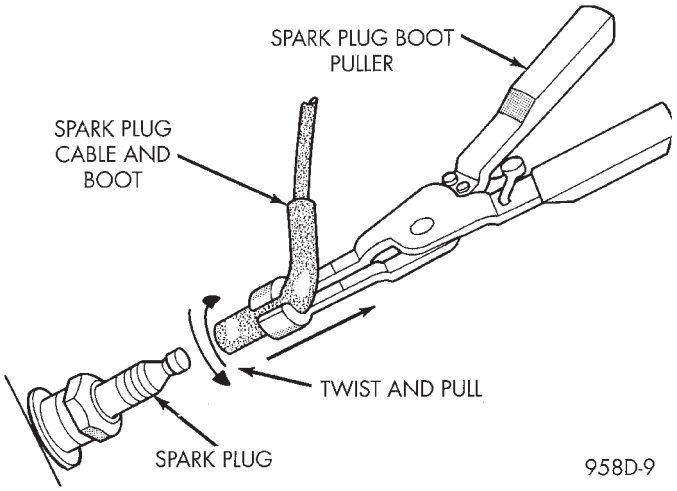


Fig. 22 Cable Removal

(2) Prior to removing the spark plug, spray compressed air around the spark plug hole and the area around the spark plug. This will help prevent foreign material from entering the combustion chamber.

(3) Remove the spark plug using a quality socket with a rubber or foam insert.

(4) Inspect the spark plug condition. Refer to Spark Plugs in the Diagnostics/Service Procedures section of this group.

PLUG CLEANING

The plugs may be cleaned using commercially available spark plug cleaning equipment. After cleaning, file the center electrode flat with a small point file or jewelers file before adjusting gap.

CAUTION: Never use a motorized wire wheel brush to clean the spark plugs. Metallic deposits will remain on the spark plug insulator and will cause plug misfire.

PLUG GAP ADJUSTMENT

Check the spark plug gap with a gap gauge tool. If the gap is not correct, adjust it by bending the ground electrode (Fig. 23). **Never attempt to adjust the gap by bending the center electrode.**

SPARK PLUG GAP

- 2.5L 4-Cylinder Engine Spark Plug Gap: .89 mm (.035 in).
- 4.0L 6-Cylinder Engine Spark Plug Gap: .89 mm (.035 in).

PLUG INSTALLATION

Always tighten spark plugs to the specified torque. Over tightening can cause distortion. This may result in a change in the spark plug gap, or a cracked porcelain insulator.

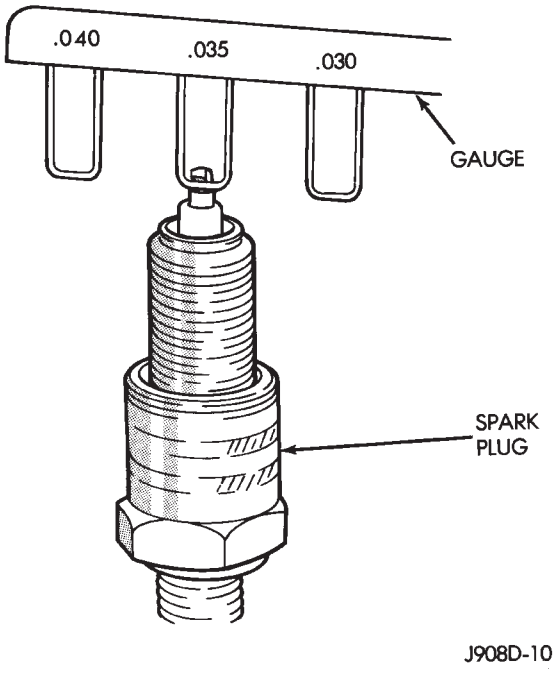


Fig. 23 Setting Spark Plug Gap—Typical

When replacing the spark plug and ignition coil cables, route the cables correctly and secure them in the appropriate retainers. Failure to route the cables properly can cause the radio to reproduce ignition noise. It could cause cross ignition of the spark plugs, or short circuit the cables to ground.

(1) Start the spark plug into the cylinder head by hand to avoid cross threading.

(2) Tighten the spark plugs to 35-41 N·m (26-30 ft. lbs.) torque.

(3) Install spark plug cables over spark plugs.

IGNITION COIL

The ignition coil is an epoxy filled type. If the coil is replaced, it must be replaced with the same type.

REMOVAL

On the 2.5L 4-cylinder engine, the ignition coil is mounted to a bracket on side of engine (to rear of distributor) (Fig. 24).

On the 4.0L 6-cylinder engine, the ignition coil is mounted to a bracket on side of engine (to front of distributor) (Fig. 25).

(1) Disconnect ignition coil secondary cable from ignition coil.

(2) Disconnect engine harness connector from ignition coil.

(3) Remove ignition coil mounting bolts (nuts are used on back side of bracket on some coils).

(4) Remove coil from vehicle.

REMOVAL AND INSTALLATION (Continued)

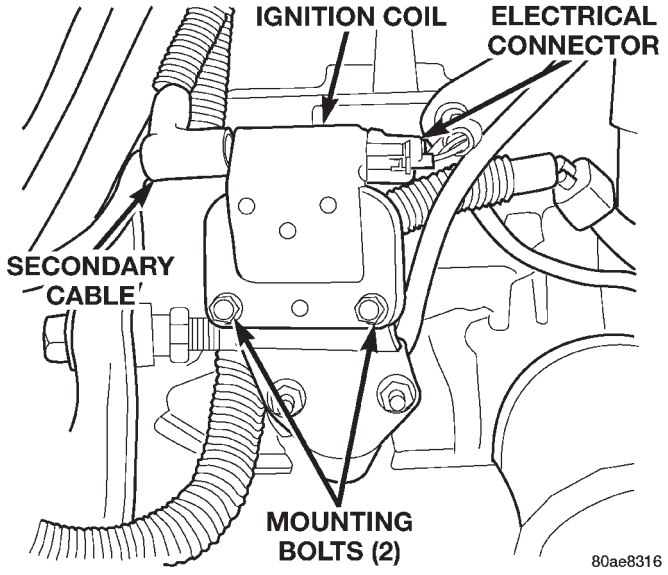


Fig. 24 Ignition Coil—2.5L Engine

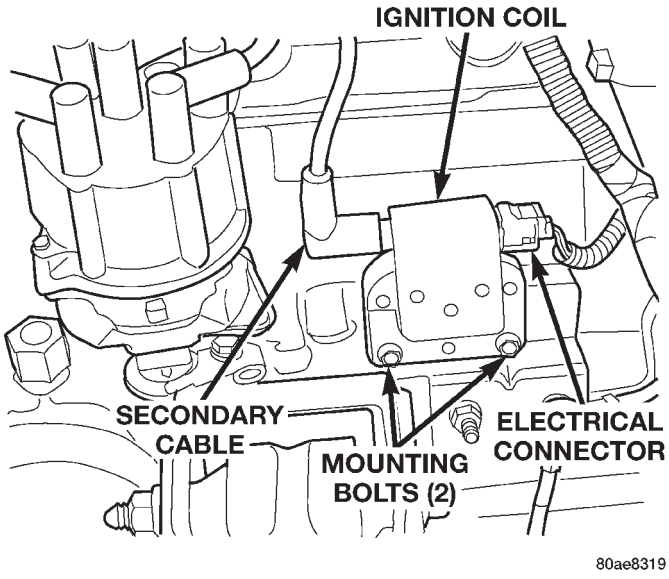


Fig. 25 Ignition Coil—4.0L Engine

INSTALLATION

(1) Install ignition coil to bracket on cylinder block with mounting bolts (and nuts if equipped). If equipped with nuts and bolts, tighten to 11 N·m (100 in. lbs.) torque. If equipped with bolts only, tighten to 5 N·m (50 in. lbs.) torque.

(2) Connect engine harness connector to coil.

(3) Connect ignition coil cable to ignition coil.

CRANKSHAFT POSITION SENSOR

The crankshaft position sensor is mounted to the transmission bellhousing at the left/rear side of the engine block (Fig. 26), (Fig. 27), or (Fig. 28).

On 2.5L 4-cylinder and 4.0L 6-cylinder engines with manual transmissions, the sensor is attached with two bolts. On 2.5L engines with automatic transmissions, the sensor is attached with two nuts. On 4.0L engines with automatic transmissions, **the sensor is adjustable** and is attached with one bolt.

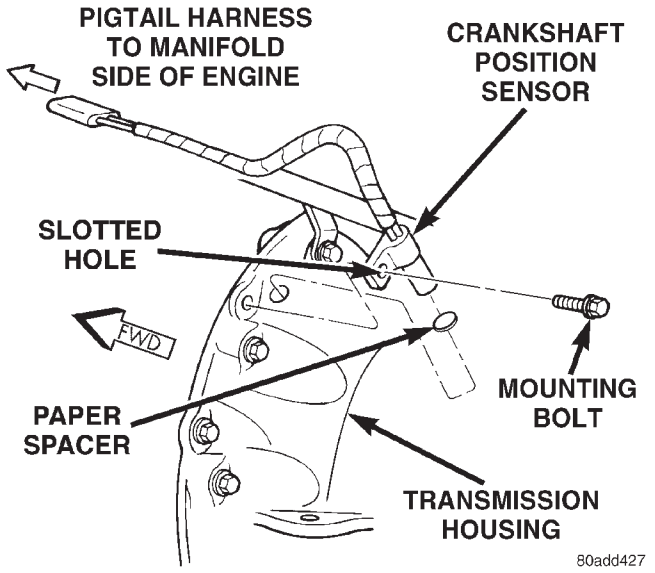


Fig. 26 Crankshaft Position Sensor—4.0L 6-Cyl. Engine—Auto. Trans.

REMOVAL

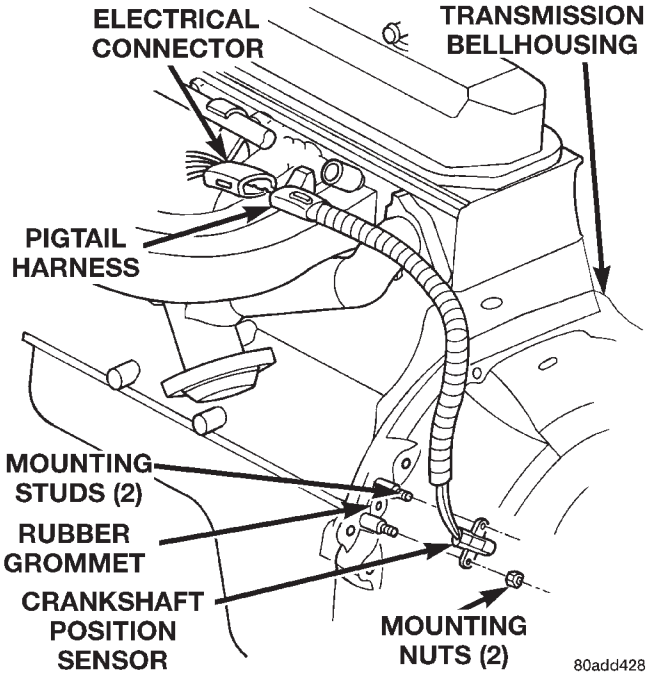


Fig. 27 Crankshaft Position Sensor—2.5L 4-Cyl. Engine—Auto. Trans.

REMOVAL AND INSTALLATION (Continued)

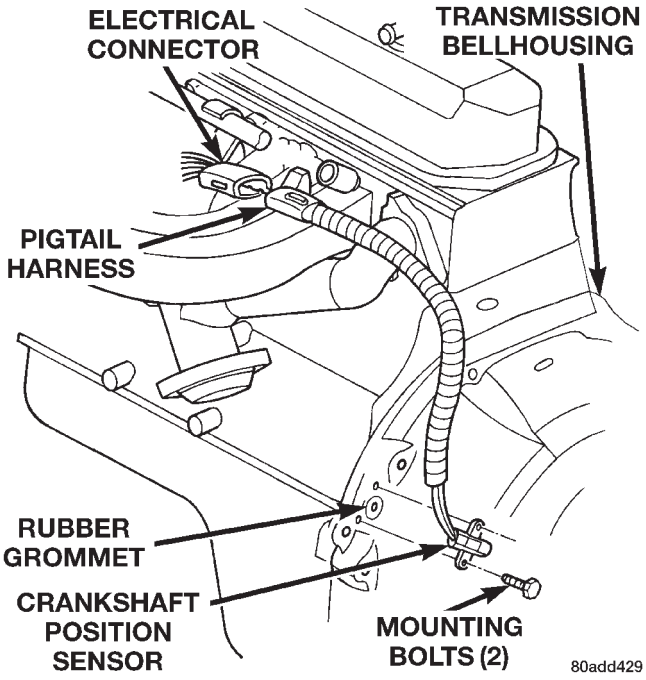


Fig. 28 Crankshaft Position Sensor—Manual Transmission (Typical)

(1) Near rear of intake manifold, disconnect pigtail harness (electrical connector) from main electrical harness.

(2) Depending upon application, remove either sensor mounting bolt(s) or nuts.

(3) Remove sensor from engine.

INSTALLATION

2.5L and 4.0L engines with manual transmission:

(1) Install sensor flush against opening in transmission housing.

(2) Install and tighten two sensor mounting bolts to 19 N·m (14 ft. lbs.) torque. The two sensor mounting bolts are specially machined to correctly space unit to flywheel. Do not attempt to install any other bolts.

2.5L engines with automatic transmission:

(3) Install and tighten two sensor mounting nuts to 19 N·m (14 ft. lbs.) torque.

4.0L engines with automatic transmission:

New replacement sensors will be equipped with a paper spacer glued to bottom of sensor. If installing (returning) a **used** sensor to vehicle, a new paper spacer must be installed to bottom of sensor. This spacer will be ground off the first time engine is started. If spacer is not used, sensor will be broken the first time engine is started.

(4) New Sensors: Be sure paper spacer is installed to bottom of sensor. If not, obtain spacer PN05252229.

(5) Used Sensors: Clean bottom of sensor and install spacer PN05252229.

(6) Install sensor into transmission bellhousing hole.

(7) Push sensor against flywheel/drive plate. With sensor pushed against flywheel/drive plate, tighten mounting bolt to 7 N·m (60 in. lbs.) torque.

(8) Connect sensor pigtail harness electrical connector to main wiring harness.

CAMSHAFT POSITION SENSOR

The camshaft position sensor is located in the distributor (Fig. 29).

REMOVAL

Distributor removal is not necessary to remove camshaft position sensor.

(1) Disconnect negative battery cable at battery.

(2) Remove distributor cap from distributor (two screws).

(3) Disconnect camshaft position sensor wiring harness from main engine wiring harness.

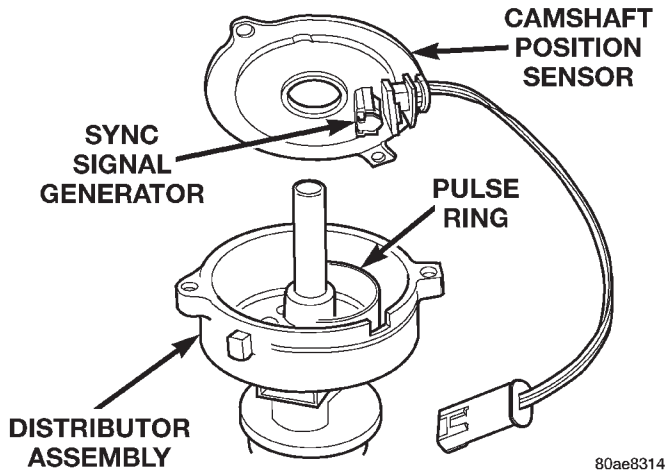


Fig. 29 Camshaft Position Sensor

(4) Remove distributor rotor from distributor shaft.

(5) Lift camshaft position sensor assembly from distributor housing (Fig. 29).

INSTALLATION

(1) Install camshaft position sensor to distributor. Align sensor into notch on distributor housing.

(2) Connect wiring harness.

(3) Install rotor.

(4) Install distributor cap. Tighten mounting screws.

DISTRIBUTOR

All distributors contain an internal oil seal that prevents oil from entering the distributor housing. The seal is not serviceable.

REMOVAL AND INSTALLATION (Continued)

Factory replacement distributors are equipped with a plastic alignment pin already installed. The pin is located in an access hole on the bottom of the distributor housing (Fig. 30). It is used to temporarily lock the rotor to the cylinder number 1 position during installation. The pin must be removed after installing the distributor.

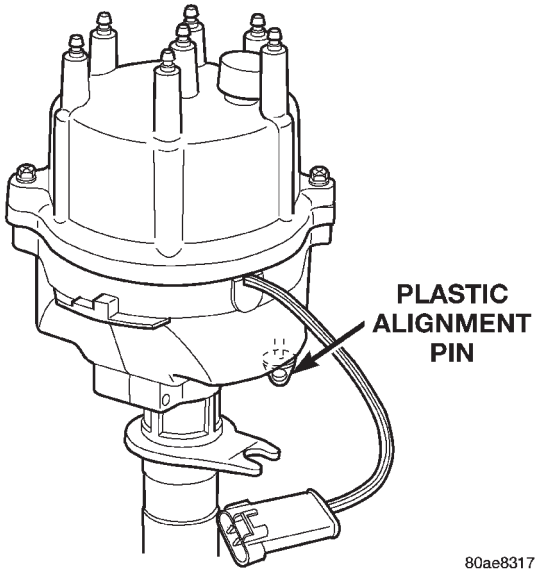


Fig. 30 Plastic Alignment Pin

The camshaft position sensor is located in the distributor on all engines (Fig. 31). For removal/installation procedures, refer to Camshaft Position Sensor. Distributor removal is not necessary for sensor removal.

Refer to (Fig. 31) for an exploded view of the distributor.

A fork with a slot is supplied on the bottom of the distributor housing where the housing base seats against the engine block (Fig. 31). The centerline of the slot aligns with the distributor holddown bolt hole in the engine block. Because of the fork, the distributor cannot be rotated. Distributor rotation is not necessary as all ignition timing requirements are handled by the powertrain control module (PCM).

The position of the distributor determines fuel synchronization only. It does not determine ignition timing.

NOTE: Do not attempt to modify this fork to attain ignition timing.

REMOVAL—2.5L OR 4.0L ENGINE

(1) Disconnect negative battery cable at battery.

(2) Disconnect coil secondary cable at coil.

(3) Remove distributor cap from distributor (2 screws). Do not remove cables from cap. Do not remove rotor.

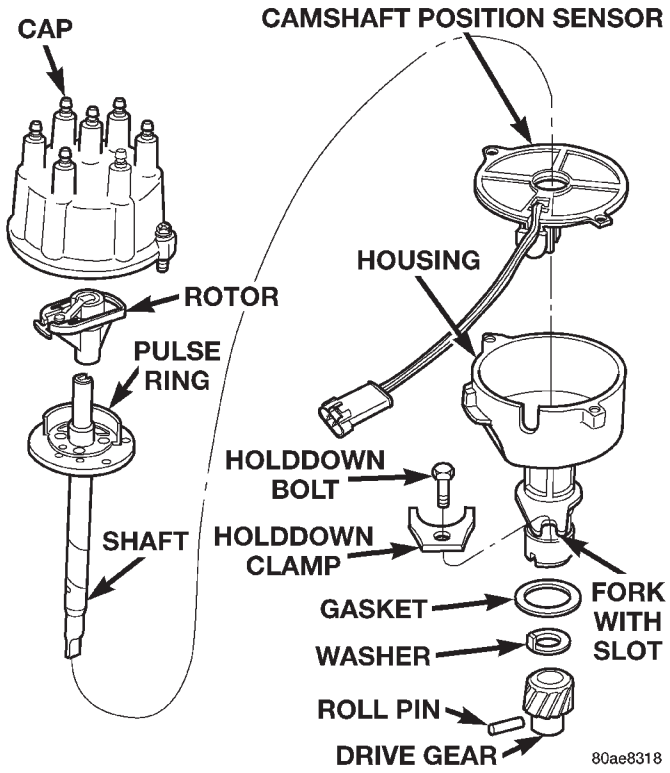


Fig. 31 Distributor—2.5L Or 4.0L Engines—Typical

(4) Disconnect distributor wiring harness from main engine harness.

(5) Remove cylinder number 1 spark plug.

(6) Hold a finger over open spark plug hole. Rotate engine at vibration dampener bolt until compression (pressure) is felt.

(7) Slowly continue to rotate engine. Do this until timing index mark on vibration damper pulley aligns with top dead center (TDC) mark (0 degree) on timing degree scale (Fig. 32). Always rotate engine in direction of normal rotation. Do not rotate engine backward to align timing marks.

(8) On models equipped with A/C, remove electrical cooling fan and shroud assembly from radiator. Refer to Group 7, Cooling System for procedures.

(9) This will provide room to turn engine crankshaft with a socket and ratchet using vibration damper bolt.

(10) Remove distributor holddown bolt and clamp.

(11) Remove distributor from engine by slowly lifting straight up.

(12) Note that rotor will rotate slightly in a counterclockwise direction while lifting up distributor. The oil pump gear will also rotate slightly in a counterclockwise direction while lifting up distributor. This is due to the helical cut gears on distributor and camshaft.

(13) Note removed position of rotor during distributor removal. During installation, this will be referred to as the Pre-position.

REMOVAL AND INSTALLATION (Continued)

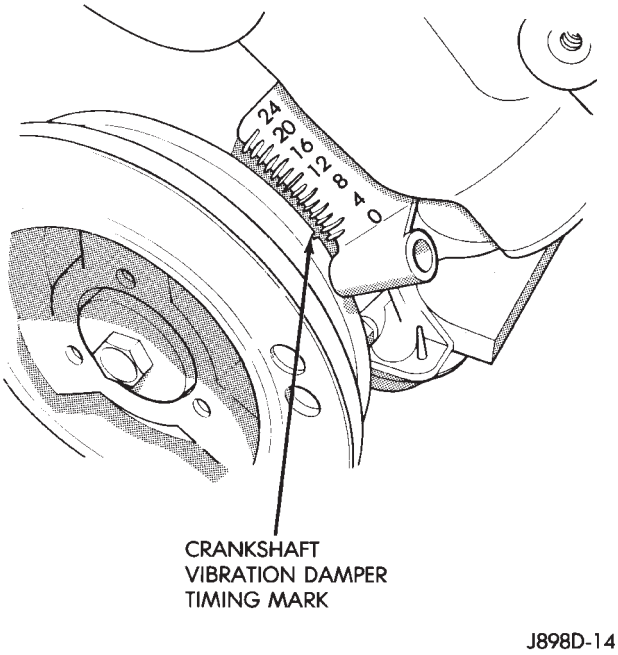


Fig. 32 Align Timing Marks

(14) **2.5L 4-Cylinder Engine:** Observe slot in oil pump gear through hole on side of engine. It should be slightly before (counterclockwise of) 10 o'clock position (Fig. 33).

(15) **4.0L 6-Cylinder Engine:** Observe slot in oil pump gear through hole on side of engine. It should be slightly before (counterclockwise of) 11 o'clock position (Fig. 34).

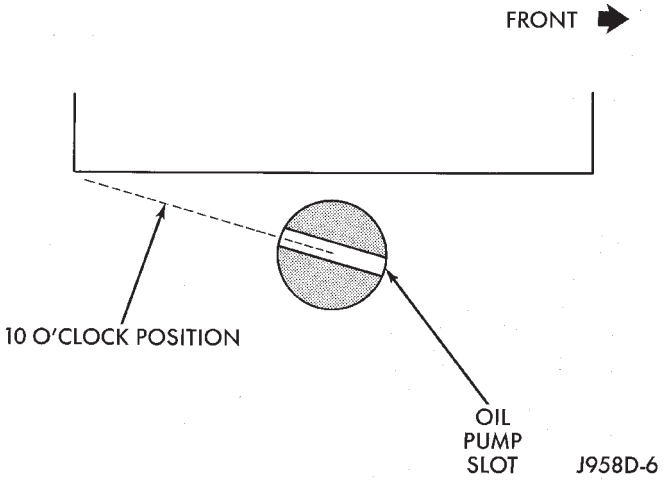


Fig. 33 Slot At 10 O'clock Position—2.5L Engine

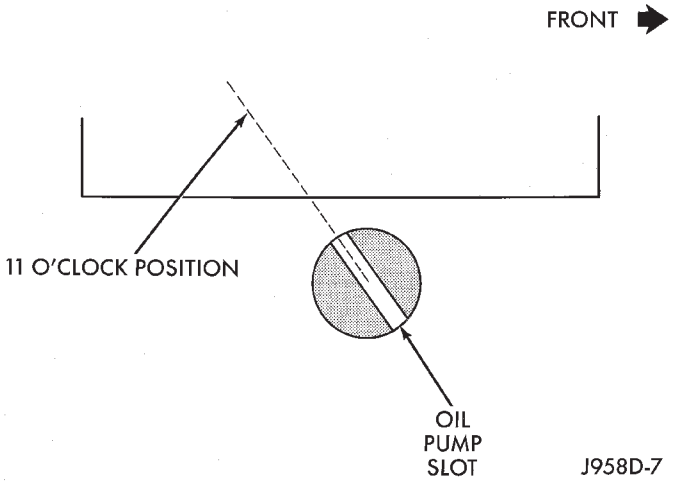


Fig. 34 Slot At 11 O'clock Position—4.0L Engine

(16) Remove and discard the old distributor-to-engine block gasket.

INSTALLATION

(1) If engine crankshaft has been rotated after distributor removal, cylinder number 1 must be returned to its proper firing stroke. Refer to previous REMOVAL Step 5 and Step 6. These steps must be done before installing distributor.

(2) Check position of slot on oil pump gear. On the 2.5L engine, it should be just slightly before (counterclockwise of) 10 o'clock position (Fig. 33). On the 4.0L engine, it should be just slightly before (counterclockwise of) 11 o'clock position (Fig. 34). If not, place a flat blade screwdriver into oil pump gear and rotate it into proper position.

(3) Factory replacement distributors are equipped with a plastic alignment pin already installed (Fig. 30). This pin is used to temporarily hold rotor to cylinder number 1 firing position during distributor installation. If pin is in place, proceed to Step 8. If not, proceed to next step.

(4) If original distributor is to be reinstalled, such as during engine overhaul, the plastic pin will not be available. A 3/16 inch drift pin punch tool may be substituted for plastic pin.

(5) Remove camshaft position sensor from distributor housing. Lift straight up.

(6) Four different alignment holes are provided on plastic ring (Fig. 35). **Note that 2.5L and 4.0L engines have different alignment holes (Fig. 35).**

REMOVAL AND INSTALLATION (Continued)

(7) Rotate distributor shaft and install pin punch tool through proper alignment hole in plastic ring (Fig. 35) and into mating access hole in distributor housing. This will prevent distributor shaft and rotor from rotating.

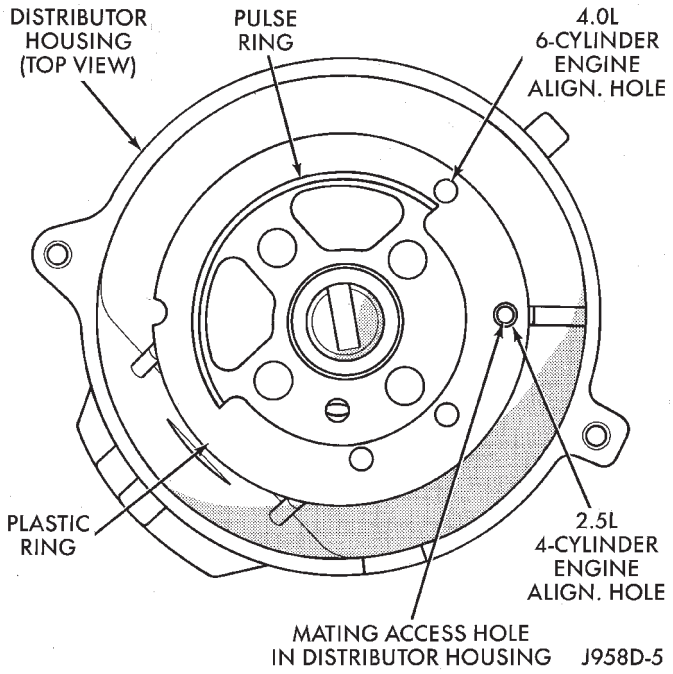


Fig. 35 Pin Alignment Holes

(8) Clean distributor mounting hole area of engine block.

(9) Install new distributor-to-engine block gasket (Fig. 31).

(10) Install rotor to distributor shaft.

(11) **2.5L 4-Cylinder Engine:** Pre-position distributor into engine while holding centerline of base slot in 1 o'clock position (Fig. 36). Continue to engage distributor into engine. The rotor and distributor will rotate clockwise during installation. This is due to the helical cut gears on distributor and camshaft. When distributor is fully seated to engine block, the centerline of base slot should be aligned to clamp bolt mounting hole on engine (Fig. 37). The rotor should also be pointed slightly past (clockwise of) 3 o'clock position.

4.0L 6-Cylinder Engine: Pre-position distributor into engine while holding centerline of base slot in 1 o'clock position (Fig. 36). Continue to engage distributor into engine. The rotor and distributor will rotate clockwise during installation. This is due to the helical cut gears on distributor and camshaft. When distributor is fully seated to engine block, the centerline of base slot should be aligned to clamp bolt mounting hole on engine (Fig. 38). The rotor should also be pointed at 5 o'clock position.

It may be necessary to rotate rotor and distributor shaft (very slightly) to engage distributor shaft with slot in oil pump gear. The same may have to be done to engage distributor gear with camshaft gear.

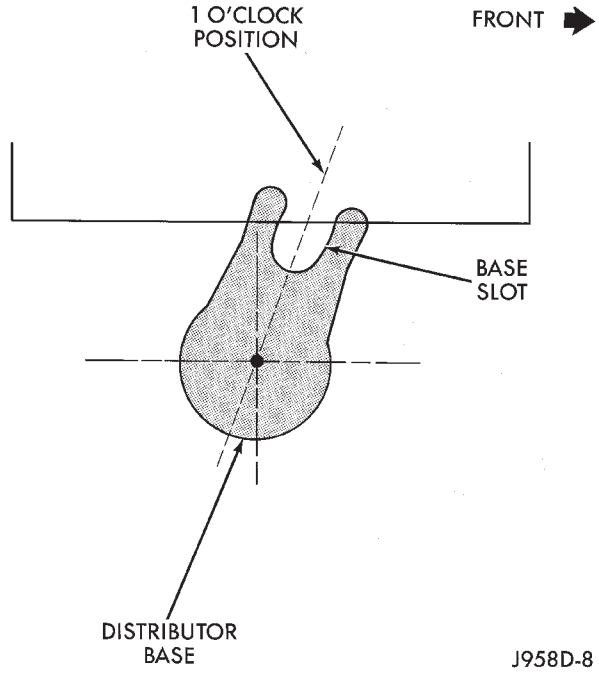


Fig. 36 Distributor Pre-position—All Engines

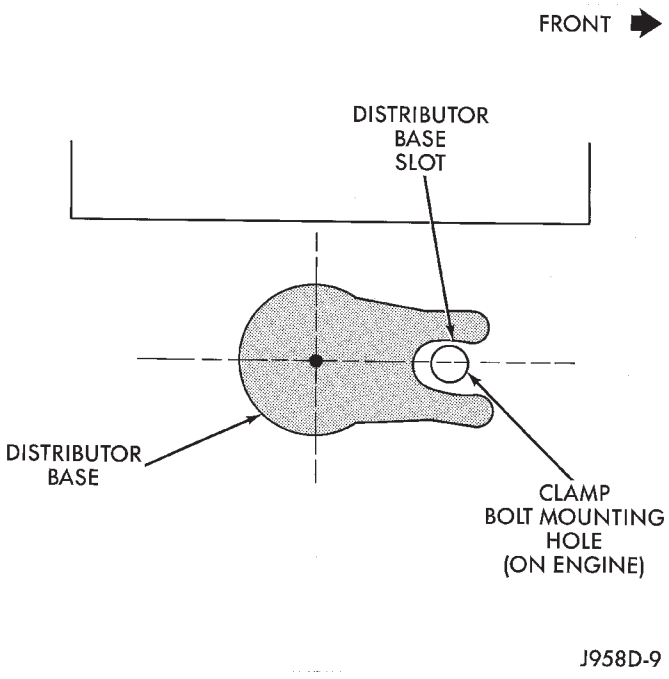


Fig. 37 Distributor Engaged Position—2.5L 4-Cylinder Engine

The distributor is correctly installed when:

- rotor is pointed at 3 o'clock position (2.5L engine), or at 5 o'clock position (4.0L engine).
- plastic alignment pin (or pin punch tool) is still installed to distributor.

REMOVAL AND INSTALLATION (Continued)

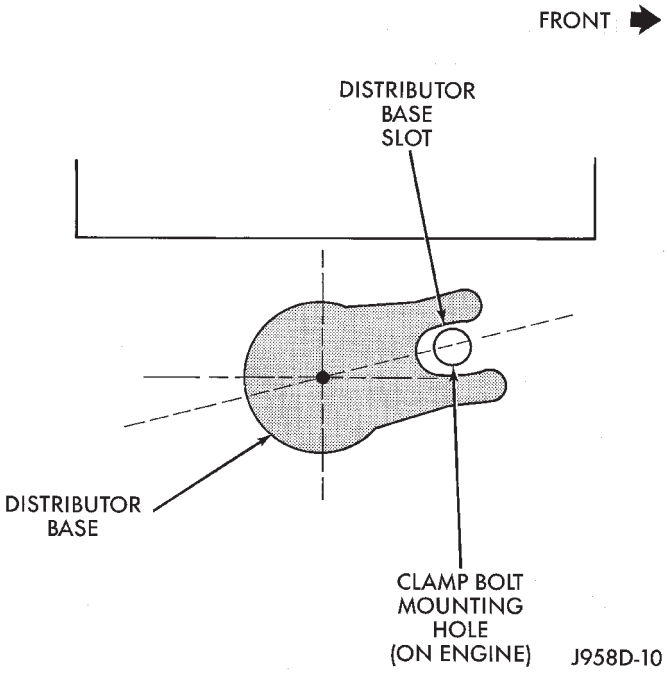


Fig. 38 Distributor Engaged Position—4.0L 6-Cylinder Engine

- number 1 cylinder piston is set at top dead center (TDC) (compression stroke).
- centerline of slot at base of distributor is aligned to centerline of distributor holddown bolt hole on engine. In this position, the holddown bolt should easily pass through slot and into engine.

No adjustments are necessary. Proceed to next step.

(12) Install distributor holddown clamp and bolt. Tighten bolt to 23 N·m (17 ft. lbs.) torque.

(13) Remove pin punch tool from distributor. Or, if plastic alignment pin was used, remove it straight down from bottom of distributor. Discard plastic pin.

(14) If removed, install camshaft position sensor to distributor. Align wiring harness grommet to notch in distributor housing.

(15) Install rotor.

CAUTION: If the distributor cap is incorrectly positioned on distributor housing, cap or rotor may be damaged when engine is started.

(16) Install distributor cap. Tighten distributor cap holddown screws to 3 N·m (26 in. lbs.) torque.

(17) If removed, install spark plug cables to distributor cap. For proper firing order, refer to Specifications section at the end of this group. See Engine Firing Order.

(18) Connect distributor wiring harness to main engine harness.

(19) Connect battery cable to battery.

IGNITION SWITCH AND KEY CYLINDER

The ignition key must be in the key cylinder for cylinder removal. The key cylinder must be removed first before removing ignition switch.

KEY CYLINDER REMOVAL

(1) Disconnect negative battery cable at battery.

(2) If equipped with an automatic transmission, place shifter in PARK position.

(3) Rotate key to ON position.

(4) A release tang is located on bottom of key cylinder (Fig. 39).

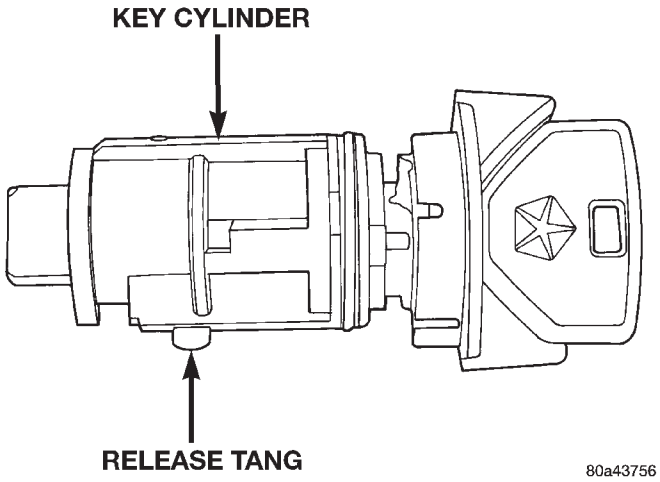


Fig. 39 Key Cylinder Release Tang

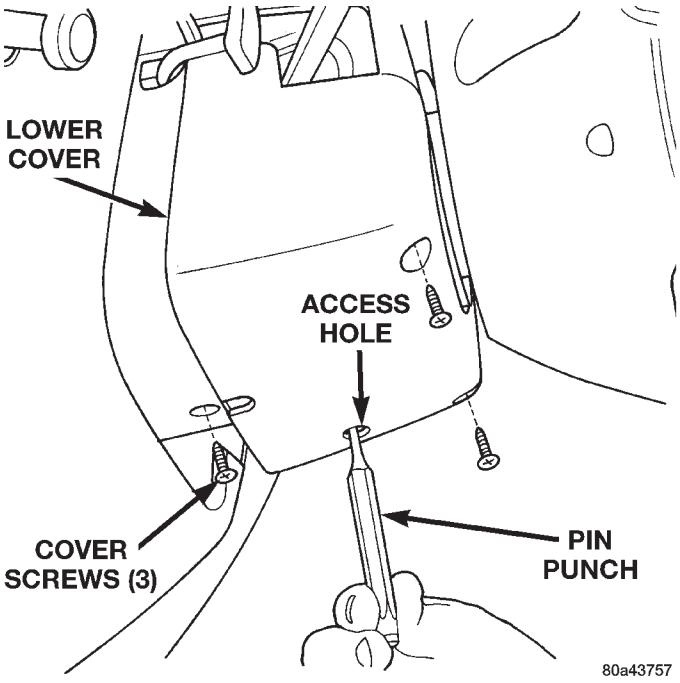


Fig. 40 Key Cylinder and Cover Removal

(5) Position a small screwdriver or pin punch into tang access hole on bottom of steering column lower cover (Fig. 40).

REMOVAL AND INSTALLATION (Continued)

(6) Push the pin punch up while pulling key cylinder from steering column.

IGNITION SWITCH REMOVAL

(1) Remove key cylinder. Refer to previous steps.

(2) Remove lower steering column cover screws and remove cover (Fig. 40).

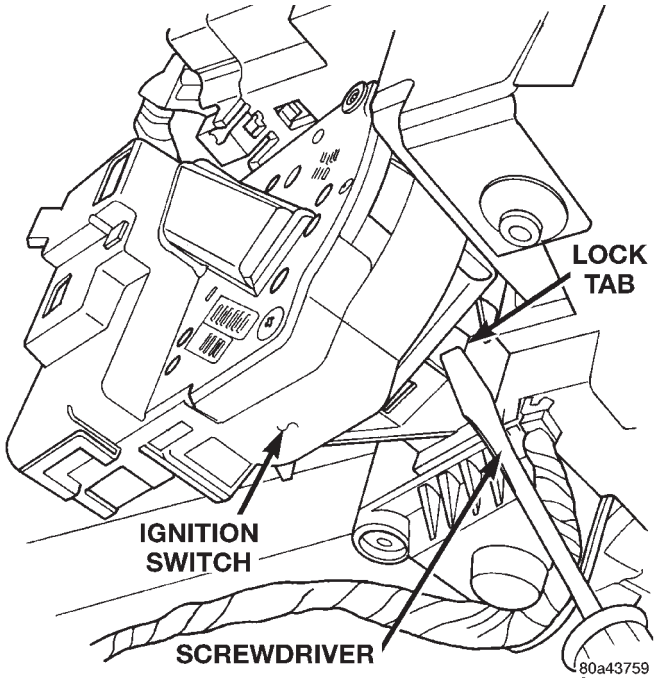


Fig. 41 Ignition Switch Lock Tab

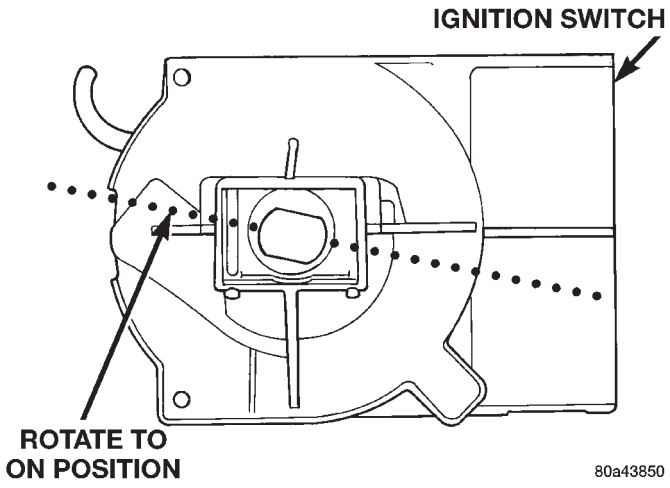


Fig. 42 Switch In ON Position

(3) Remove ignition switch mounting screw (Fig. 43). Use tamper proof torx bit (Snap-On® SDMTR10 or equivalent) to remove the screw.

(4) Using a small screwdriver, push on locking tab (Fig. 41) and remove switch from steering column.

(5) Disconnect two electrical connectors at rear of ignition switch (Fig. 43).

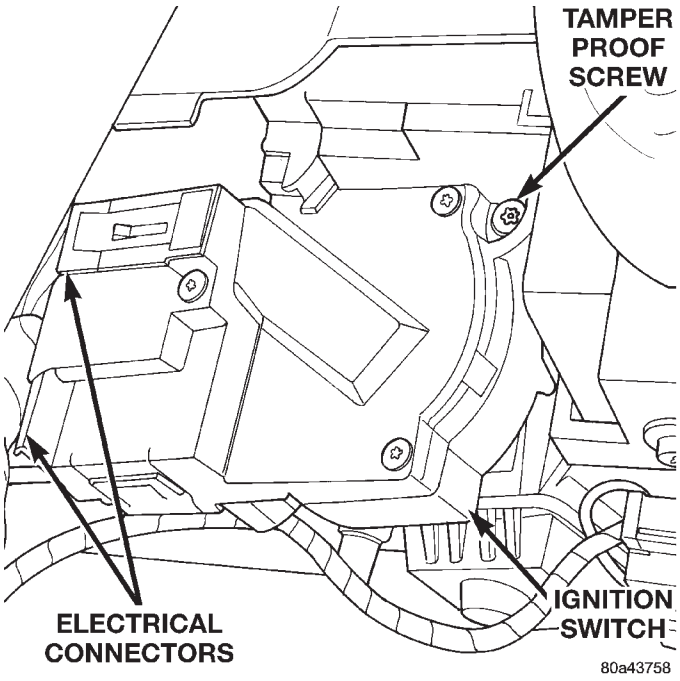


Fig. 43 Ignition Switch Removal/Installation

IGNITION SWITCH INSTALLATION

(1) Before installing ignition switch, rotate the slot in the switch to the ON position (Fig. 42).

(2) Connect two electrical connectors to rear of ignition switch. Make sure that locking tabs are fully seated into wiring connectors.

(3) Position switch to column and install tamper proof screw. Tighten screw to 3 N·m (26 in. lbs.).

(4) Install steering column lower cover.

KEY CYLINDER INSTALLATION

(1) If equipped with an automatic transmission, place shifter in PARK position.

(2) Position key cylinder into steering column as it would normally be in the ON position.

(3) Press key cylinder into column until it snaps into position.

(4) Check mechanical operation of switch. **Automatic Transmission:** Be sure transmission lever is locked in PARK position after key removal. If key is difficult to rotate or is difficult to remove, the shift lever-to-steering column cable may be out of adjustment or defective. Refer to Group 21, Transmission for procedures. **Manual Transmission:** Be sure key cannot be removed until release lever is operated. If key can be removed, release lever mechanism may be defective. Release lever mechanism is not serviced separately. If repair is necessary, the steering column must be replaced. Refer to Group 19, Steering for procedures.

(5) Connect negative cable to battery.

(6) Check electrical operation of switch.

REMOVAL AND INSTALLATION (Continued)

SHIFTER/IGNITION INTERLOCK

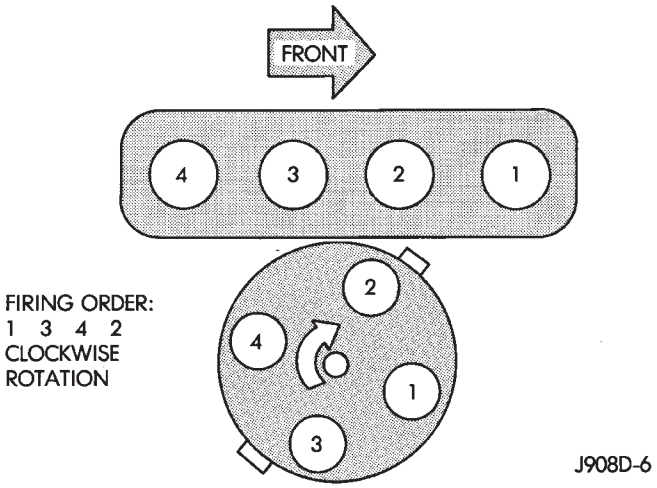
On models equipped with an automatic transmission, a cable connects the ignition switch with the floor shift lever. The shifter will be locked in the PARK position when the ignition key is in the LOCK or ACCESSORY positions. The cable can be adjusted or replaced. Refer to Group 21, Transmissions for procedures. The ignition interlock device within the steering column is not serviceable. If service is necessary, the steering column must be replaced. Refer to Group 19, Steering for procedures.

SPECIFICATIONS

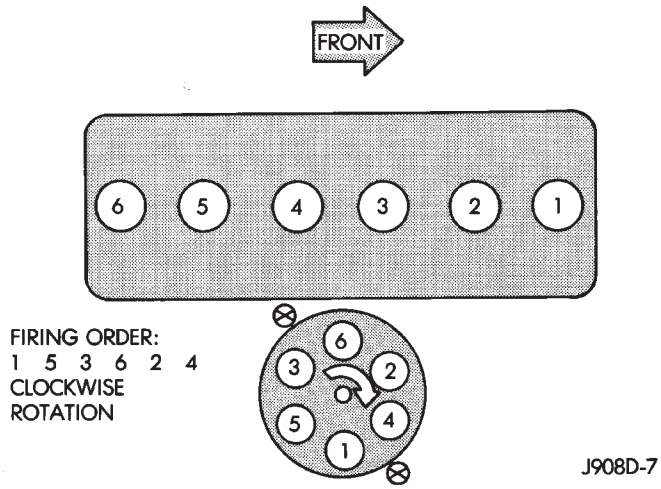
IGNITION TIMING

Ignition timing is not adjustable on any engine. Refer to Ignition Timing in the Diagnostics/Service Procedures section of this group for more information.

ENGINE FIRING ORDER—2.5L 4-CYLINDER ENGINE



ENGINE FIRING ORDER—4.0L 6-CYLINDER ENGINE



SPECIFICATIONS (Continued)

SPARK PLUGS

ENGINE	PLUG TYPE	ELECTRODE GAP
2.5L/4.0L	RC12ECC	0.89 mm (0.035 in.)

SPARK PLUG CABLE RESISTANCE

MINIMUM	MAXIMUM
250 Ohms Per Inch	1000 Ohms Per Inch
3000 Ohms Per Foot	12,000 Ohms Per Foot

IGNITION COIL RESISTANCE

COIL MANUFACTURER	PRIMARY RESISTANCE 21-27°C (70-80°F)	SECONDARY RESISTANCE 21-27°C (70-80°F)
Diamond	0.97 - 1.18 Ohms	11,300 - 15,300 Ohms
Toyodenso	0.95 - 1.20 Ohms	11,300 - 13,300 Ohms

TORQUE CHART

DESCRIPTION	TORQUE
Crankshaft Position Sensor Bolts—With Manual Transmission	19 N·m(14 ft. lbs.)
Crankshaft Position Sensor Nuts—2.5L With Automatic Transmission	19 N·m (14 ft. lbs.)
Crankshaft Position Sensor Bolt—4.0L With Automatic Transmission	7 N·m (60 in. lbs.)
Distributor Hold Down Bolt	23 N·m (17 ft. lbs.)
Distributor Cap Screws	3 N·m (26 in. lbs.)
Ignition Coil Mounting (if tapped bolts are used)	5 N·m (50 in. lbs.)
Ignition Coil Mounting (if nuts/bolts are used)	11 N·m (100 in. lbs.)
Spark Plugs (all engines)	41 N·m (30 ft. lbs.)

INSTRUMENT PANEL SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

INSTRUMENT PANEL SYSTEM

DESCRIPTION

The instrument panel serves as the command center of the vehicle, which necessarily makes it a very complex unit. The instrument panel is designed to house the controls and monitors for standard and optional powertrains, climate control systems, audio systems, lighting systems, safety systems and many other comfort or convenience items. The instrument panel is also designed so that all of the various controls can be safely reached and the monitors can be easily viewed by the vehicle operator when driving, while still allowing relative ease of access to each of these items for service. See the owner's manual in the vehicle glove box for more information on the features, use and operation of all of the instrument panel components and systems.

This group is responsible for covering service information for the vehicle instrument panel systems. However, complete service information coverage for all of the systems and components housed in the instrument panel in a single section of the service manual would not be practical. Therefore, the service information for any component will be found in the group designated to cover the vehicle system that the component belongs to, even though the component is mounted on or in the instrument panel. If you cannot locate a listing for the component or system you are servicing in the table of contents for this group, or if you are uncertain as to which vehicle system a component belongs to, it is suggested that you refer to the alphabetical **Component and System Index** found at the back of this service manual.

INSTRUMENT PANEL

DESCRIPTION

Modular instrument panel construction allows all of the gauges and controls to be serviced from the front of the panel. In addition, most of the instrument panel electrical or heating and air conditioning components can be accessed without complete instrument panel removal. If necessary, the instrument panel can be removed from the vehicle as an assembly.

Removal of the steering column opening cover and the knee blocker provides access to the steering column mounts, the steering column wiring, the gearshift interlock mechanism, the headlamp switch, and much of the instrument panel wiring. Removal of the glove box provides access to the fuseblock module, additional instrument panel wiring, and many of the heating and air conditioning components.

Removal of the instrument cluster bezel allows access to the cluster assembly. Removal of the cluster

DESCRIPTION AND OPERATION (Continued)

assembly allows access to the cluster illumination and indicator lamp bulbs, and more of the instrument panel wiring.

Removal of the instrument panel center bezel allows access to the radio, the heating and air conditioning controls, the power outlet or cigar lighter, and the accessory switches. The power outlet/cigar lighter is serviced only as a unit with the accessory switch bezel.

A bezel on each outboard end of the lower instrument panel is removed to service the instrument panel speakers. Removal of the complete instrument panel is required for service of the passenger side airbag module and most internal components of the heating and air conditioning system housing.

INSTRUMENT CLUSTER

DESCRIPTION

A single instrument cluster is offered on this model. This cluster is an electromechanical unit that utilizes integrated circuitry and information carried on the Chrysler Collision Detection (CCD) data bus network for control of all gauges and many of the indicator lamps. This cluster also incorporates a digital Vacuum Fluorescent Display (VFD) for the odometer/trip odometer display functions. Some variations of this cluster exist due to optional equipment and regulatory requirements.

The cluster includes the following analog gauges:

- Coolant temperature gauge
- Fuel gauge
- Oil pressure gauge
- Speedometer
- Tachometer
- Voltmeter.

This cluster also includes provisions for the following indicator lamps:

- Airbag indicator lamp
- Anti-lock Brake System (ABS) lamp
- Brake warning lamp
- Check gauges lamp
- Cruise-on indicator lamp
- Four-wheel drive indicator lamp
- Headlamp high beam indicator lamp
- Low fuel warning lamp
- Malfunction indicator (Check Engine) lamp
- Seat belt reminder lamp
- Sentry Key Immobilizer System (SKIS) indicator lamp
- Turn signal indicator lamps
- Upshift indicator lamp (manual transmission).

The instrument cluster circuitry has a self-diagnostic actuator test capability, which will test each of the CCD bus message-controlled functions of the cluster by lighting the appropriate indicator lamps and positioning the gauge needles at several predetermined locations on the gauge faces in a prescribed sequence. For more information on this function, refer to **Instrument Cluster** in the Diagnosis and Testing section of this group.

The instrument cluster circuitry also integrates a chime tone generator and a timer circuit. These items replace the chime or buzzer module, and the separate timer circuit for the rear window defogger system. Refer to **Chime Warning System** in the Description and Operation section of Group 8U - Chime/Buzzer Warning Systems for more information on the chime functions of the instrument cluster. Refer to **Rear Window Defogger System** in the Description and Operation section of Group 8N - Electrically Heated Systems for more information on the timer function of the instrument cluster.

The instrument cluster for this model is serviced only as a complete unit. If a cluster gauge or the cluster circuit board are faulty, the entire cluster must be replaced. The cluster lens, the cluster hood and mask, the rear cluster housing cover, the odometer reset knob boot and the incandescent lamp bulbs and holders are available for service replacement.

OPERATION

GAUGE

With the ignition switch in the On or Start positions, voltage is supplied to all gauges through the instrument cluster electronic circuit board. With the ignition switch in the Off position, voltage is not supplied to the gauges. The gauges do not accurately indicate any vehicle condition unless the ignition switch is in the On or Start positions.

All of the instrument cluster gauges, except the odometer, are air core magnetic units. Two fixed electromagnetic coils are located within the gauge. These coils are wrapped at right angles to each other around a movable permanent magnet. The movable magnet is suspended within the coils on one end of a shaft. The gauge needle is attached to the other end of the shaft.

One of the coils has a fixed current flowing through it to maintain a constant magnetic field strength. Current flow through the second coil changes, which causes changes in its magnetic field strength. The current flowing through the second coil is changed by the instrument cluster electronic circuitry in response to messages received on the Chrysler Collision Detection (CCD) data bus network.

The gauge needle moves as the movable permanent magnet aligns itself to the changing magnetic fields created around it by the electromagnets. The instrument cluster circuitry is programmed to move all of the gauge needles back to the low end of their respec-

DESCRIPTION AND OPERATION (Continued)

tive scales after the ignition switch is turned to the Off position.

INDICATOR LAMP

Indicator lamps are located in the instrument cluster and are served by the cluster circuit board and connectors. Many of the indicator lamps in the instrument cluster are controlled by the instrument cluster circuitry in response to messages received over the Chrysler Collision Detection (CCD) data bus network.

The anti-lock brake system lamp, brake warning lamp, four-wheel drive indicator lamp, headlamp high beam indicator lamp, and turn signal indicator lamps are hard wired. The seat belt reminder lamp is controlled by the instrument cluster programming. The instrument cluster circuitry uses CCD data bus messages from the Powertrain Control Module (PCM), Airbag Control Module (ACM), and the Sentry Key Immobilizer Module (SKIM) to control all of the remaining indicator lamps.

Each of the indicator lamps in the instrument cluster uses incandescent bulbs and holders, which are available for service replacement.

CLUSTER ILLUMINATION LAMP

The cluster illumination lamps are hard wired in the instrument cluster. When the park or head lamps are turned on, the cluster illumination lamps light. Illumination brightness is adjusted by rotating the headlamp switch knob (clockwise to dim, counterclockwise to brighten). The instrument cluster illumination lamps receive battery feed from the panel dimmer rheostat in the headlamp switch through a fuse in the fuseblock module.

The instrument cluster electronic circuitry also monitors the cluster illumination lamp dimming level whenever the park or head lamps are turned on. The instrument cluster electronic circuitry responds by adjusting the dimming level of the odometer Vacuum Fluorescent Display (VFD), and sending dimming level messages over the Chrysler Collision Detection (CCD) data bus network. When the park lamps or headlamps are turned off, the VFD is illuminated at full brightness for improved daylight visibility.

Each of the cluster illumination lamps is located on the instrument cluster circuit board. Each cluster illumination lamp has a replaceable bulb and bulb holder.

INSTRUMENT PANEL CIGAR LIGHTER AND POWER OUTLET

DESCRIPTION

An accessory power outlet is standard equipment on this model. The power outlet is installed in the instrument panel accessory switch bezel, which is located near the bottom of the instrument panel center bezel area, next to the ash receiver. A plastic cap snaps into the power outlet base when the power outlet is not in use. A cigar lighter that fits into the power outlet is a dealer-installed option.

The cigar lighter/power outlet base is serviced only as a part of the accessory switch bezel unit. If the base is faulty or damaged, the accessory switch bezel unit must be replaced. The cigar lighter knob and heating element unit is available for service. This component cannot be repaired and, if faulty or damaged, it must be replaced.

OPERATION

The cigar lighter/power outlet base or receptacle shell is connected to ground, and an insulated contact in the bottom of the shell is connected to battery current. The power outlet receives battery voltage from a fuse in the Power Distribution Center (PDC) through the accessory relay only when the ignition switch is in the Accessory or On positions. Refer to **Accessory Relay** in the Description and Operation section of this group for more information on this component.

The cigar lighter knob and heating element are encased within a spring-loaded housing, which also features a sliding protective heat shield. When the knob and heating element are inserted in the receptacle shell, the heating element resistor coil is grounded through its housing to the receptacle shell. If the cigar lighter knob is pushed inward, the heat shield slides up toward the knob exposing the heating element, and the heating element extends from the housing toward the insulated contact in the bottom of the receptacle shell.

Two small spring-clip retainers are located on either side of the insulated contact inside the bottom of the receptacle shell. These clips engage and hold the heating element of the dealer-installed cigar lighter against the insulated contact long enough for the resistor coil to heat up. When the heating element is engaged with the contact, battery current can flow through the resistor coil to ground, causing the resistor coil to heat.

When the resistor coil becomes sufficiently heated, excess heat radiates from the heating element causing the spring-clips to expand. Once the spring-clips expand far enough to release the heating element, the spring-loaded housing forces the knob and heating element to pop back outward to their relaxed position. When the cigar lighter knob and element are pulled out of the receptacle shell, the protective heat shield slides downward on the housing so that the heating element is recessed and shielded around its circumference for safety.

DESCRIPTION AND OPERATION (Continued)

ACCESSORY RELAY

DESCRIPTION

The accessory relay is an electromechanical device that switches fused battery current to the standard accessory power outlet or optional cigar lighter when the ignition switch is turned to the Accessory or On positions. The accessory relay is located in a wire harness connector that is secured to the 100-way connector bracket under the driver side of the instrument panel, near the cowl side inner panel in the passenger compartment.

The accessory relay is a International Standards Organization (ISO) relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions.

The accessory relay cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The ISO relay consists of an electromagnetic coil, a resistor or diode, and three (two fixed and one movable) electrical contacts. The movable (common feed) relay contact is held against one of the fixed contacts (normally closed) by spring pressure. When the electromagnetic coil is energized, it draws the movable contact away from the normally closed fixed contact, and holds it against the other (normally open) fixed contact.

When the electromagnetic coil is de-energized, spring pressure returns the movable contact to the normally closed position. The resistor or diode is connected in parallel with the electromagnetic coil in the relay, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

DIAGNOSIS AND TESTING

INSTRUMENT CLUSTER

If all of the gauges and/or indicator lamps are inoperative, perform the Preliminary Diagnosis. If an individual gauge or Chrysler Collision Detection (CCD) data bus message-controlled indicator lamp is inoperative, go directly to the Actuator Test. If an individual hard wired indicator lamp is inoperative, refer to **Instrument Cluster - Hard Wired Lamp Diagnosis** in the Diagnosis and Testing section of this group for the procedures to diagnosis that lamp. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

PRELIMINARY DIAGNOSIS

(1) If the indicator lamps operate, but none of the gauges operate, go to Step 2. If all of the gauges and the CCD data bus message-controlled indicator lamps are inoperative, go to Step 5.

(2) Check the fused B(+) fuse in the Power Distribution Center (PDC). If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(3) Check for battery voltage at the fused B(+) fuse in the PDC. If OK, go to Step 4. If not OK, repair the open fused B(+) circuit to the battery as required.

(4) Disconnect and isolate the battery negative cable. Remove the instrument cluster. Connect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the instrument cluster wire harness connector A. If OK, refer to **Instrument Cluster - Actuator Test** in the Diagnosis and Testing section of this group. If not OK, repair the open fused B(+) circuit to the fuse in the PDC as required.

(5) Check the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 6. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(6) Turn the ignition switch to the On position and check for battery voltage at the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 7. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(7) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Install the instrument cluster. Connect the battery negative cable. Turn the ignition switch to the On position. Set the park brake. The red brake warning lamp should light. If OK, go to Step 8. If not OK, go to Step 9.

(8) Turn the ignition switch to the Off position. Turn on the park lamps and adjust the panel lamps dimmer rheostat in the headlamp switch to the full bright position. The cluster illumination lamps should light. If OK, refer to **Instrument Cluster - Actuator Test** in the Diagnosis and Testing section of this group. If not OK, go to Step 10.

(9) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument cluster. Connect the battery

DIAGNOSIS AND TESTING (Continued)

negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) circuit cavity of the instrument cluster wire harness connector A. If OK, refer to **Instrument Cluster - Actuator Test** in the Diagnosis and Testing section of this group. If not OK, repair the open fused ignition switch output (run/start) circuit to the fuse in the fuseblock module as required.

(10) Disconnect and isolate the battery negative cable. Remove the instrument cluster. Check for continuity between the ground circuit cavity of the instrument cluster wire harness connector A and a good ground. There should be continuity. If OK, refer to **Instrument Cluster - Actuator Test** in the Diagnosis and Testing section of this group. If not OK, repair the open ground circuit to ground as required.

ACTUATOR TEST

The instrument cluster actuator test will put the instrument cluster into its self-diagnostic mode. In this mode the instrument cluster can perform a self-diagnostic test that will confirm that the instrument cluster circuitry, the gauges, and the CCD data bus message controlled indicator lamps are capable of operating as designed. During the actuator test the instrument cluster circuitry will position each of the gauge needles at various specified calibration points, and turn all of the CCD data bus message-controlled lamps on and off at specified time intervals (Fig. 1).

Successful completion of the actuator test will confirm that the instrument cluster is operational. However, there may still be a problem with the CCD data bus, the Powertrain Control Module (PCM), the Airbag Control Module (ACM), the Sentry Key Immobilizer Module (SKIM) or the inputs to one of these electronic control modules. Use a DRB scan tool and the proper Diagnostic Procedures manual for testing of these components.

If an individual gauge does not respond properly, or does not respond at all during the actuator test, the instrument cluster should be removed. However, check that the gauge mounting screws on the instrument cluster electronic circuit board for proper tightness before considering instrument cluster replacement. If the gauge mounting screws check OK, replace the faulty cluster.

If an individual indicator lamp does not illuminate during the actuator test, the instrument cluster should be removed. However, check that the incandescent lamp bulb is not faulty and that the bulb holder is properly installed on the instrument cluster electronic circuit board before considering instrument cluster replacement. If the bulb and bulb holder check OK, replace the faulty instrument cluster.

(1) Begin the test with the ignition switch in the Off position.

(2) Depress the trip odometer reset button.

(3) While holding the trip odometer reset button depressed, turn the ignition switch to the On position, but do not start the engine.

(4) Release the trip odometer reset button.

(5) Compare the operation of the suspect gauge(s) and/or indicator lamp(s) with the Instrument Cluster Actuator Test chart (Fig. 1).

(6) The instrument cluster will automatically exit the self-diagnostic mode and return to normal operation at the completion of the test, if the ignition switch is turned to the Off position during the test, or if a vehicle speed message indicating that the vehicle is moving is received from the PCM on the CCD data bus during the test.

(7) Go back to Step 1 to repeat the test, if required.

HARD WIRED LAMP DIAGNOSIS

Each of the lamps found in this section depends upon a hard wired circuit input to the instrument cluster for proper operation. The following procedures will help to diagnose conditions that may cause an inoperative hard wired lamp circuit condition.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

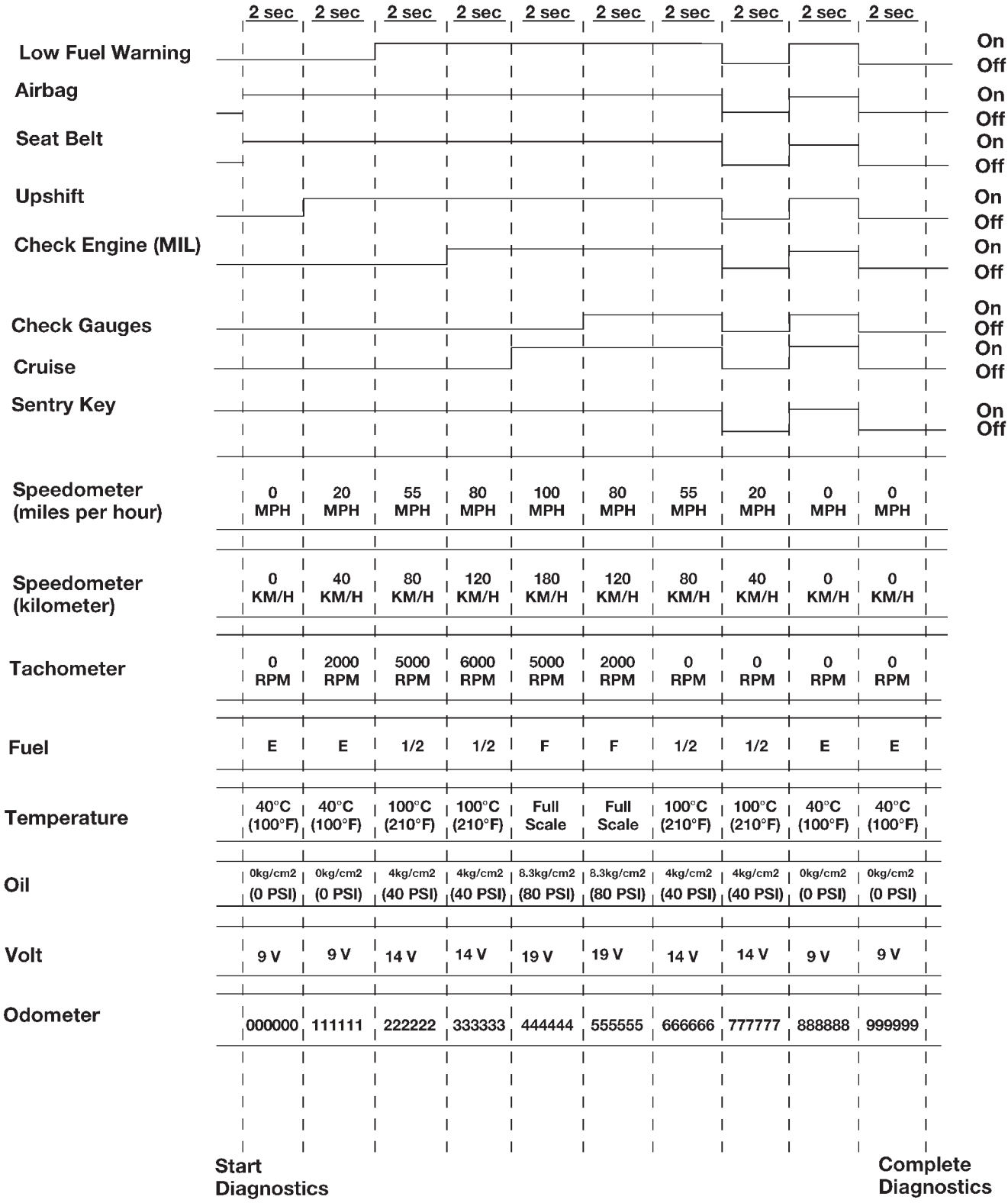
ANTI-LOCK BRAKE SYSTEM LAMP

The diagnosis found here addresses an inoperative Anti-lock Brake System (ABS) lamp condition. If the ABS lamp stays on with the ignition switch in the On position, or comes on and stays on while driving, refer to **Antilock Brakes** in the Diagnosis and Testing section of Group 5 - Brakes for diagnosis. If no ABS problem is found, the following procedure will help locate a short or open in the ABS lamp circuit. For complete circuit descriptions, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Check the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the fuseblock module. If

DIAGNOSIS AND TESTING (Continued)



Note: 1.5 seconds after completing test, all pointers should return to pointer stops and odometer should be turned off.

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Fig. 1 Instrument Cluster Actuator Test

DIAGNOSIS AND TESTING (Continued)

OK, go to Step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument cluster. Connect the battery negative cable. Turn the ignition switch to the On position and within five seconds check for continuity between the ABS warning indicator driver circuit cavity of the instrument cluster wire harness connector A and a good ground. There should be continuity for five seconds after ignition On, and then an open circuit. If OK, replace the faulty bulb. If not OK, go to Step 4.

(4) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Disconnect the Controller Anti-lock Brake (CAB) wire harness connector. Check for continuity between the ABS warning indicator driver circuit cavity of the instrument cluster wire harness connector A and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted ABS warning indicator driver circuit as required.

(5) Check for continuity between the ABS warning indicator driver circuit cavities of the instrument cluster wire harness connector A and the CAB wire harness connector. There should be continuity. If OK, refer to **Antilock Brakes** in the Diagnosis and Testing section of Group 5 - Brakes for diagnosis of the CAB. If not OK, repair the open ABS warning indicator driver circuit as required.

BRAKE WARNING LAMP

The diagnosis found here addresses an inoperative brake warning lamp condition. If the brake warning lamp stays on with the ignition switch in the On position and the park brake released, or comes on while driving, refer to **Base Brake System** for vehicles not equipped with the four wheel anti-lock brake system, or refer to **Antilock Brakes** for vehicles equipped with the four wheel anti-lock brake system in the Diagnosis and Testing section of Group 5 - Brakes for further diagnosis. If no brake system problem is found, the following procedure will help locate a short or open circuit, or a faulty switch. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Check the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Disconnect the wire harness connector at the park brake switch. With the park brake released, check for continuity between the park brake switch terminal and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, adjust or replace the faulty park brake switch.

(4) Disconnect the wire harness connector at the brake warning switch. Check for continuity between the two terminals of the brake warning switch. There should be continuity. If OK, go to Step 5. If not OK, replace the faulty brake warning switch.

(5) Check for continuity between each of the two brake warning switch terminals and a good ground. In each case, there should be no continuity. If OK, go to Step 6. If not OK, replace the faulty brake warning switch.

(6) With both the park brake switch and the brake warning switch wire harness connectors still disconnected, check for continuity between the red brake warning indicator driver circuit cavity of the park brake switch wire harness connector and a good ground. There should be no continuity. If OK, go to Step 7. If not OK, repair the shorted red brake warning indicator driver circuit as required.

(7) With the ignition switch held in the Start position, check for continuity between the red brake warning indicator driver circuit cavity of the park brake switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 8. If not OK, repair the open red brake warning indicator driver circuit to the ignition switch as required.

(8) Turn the ignition switch to the Off position. Remove the instrument cluster. Check for continuity between the red brake warning indicator driver circuit cavity of the instrument cluster wire harness connector A and a good ground. There should be no continuity. If OK, go to Step 9. If not OK, repair the shorted red brake warning indicator driver circuit as required.

(9) Check for continuity between the red brake warning indicator driver circuit cavities of the instrument cluster wire harness connector A and the brake warning switch wire harness connector. There should be continuity. If OK, replace the faulty bulb. If not OK, repair the open red brake warning indicator driver circuit as required.

CLUSTER ILLUMINATION LAMP

The diagnosis found here addresses an inoperative instrument cluster illumination lamp condition. If the problem being diagnosed includes inoperative exterior lighting controlled by the headlamp switch,

DIAGNOSIS AND TESTING (Continued)

that system needs to be repaired first. If the exterior lamps controlled by the headlamp switch are inoperative, refer to **Headlamp Diagnosis** in the Diagnosis and Testing section of Group 8L - Lamps for diagnosis. If no exterior lighting system problems are found, the following procedure will help locate a short or open in the cluster illumination lamp circuit. If the problem being diagnosed involves a lack of dimming control for the odometer/trip odometer Vacuum Fluorescent Display (VFD), but all of the other cluster illumination lamps can be dimmed, repair the open headlamp switch output circuit input to the instrument cluster. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Check the panel lamps dimmer fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the park lamps on with the headlamp switch. Rotate the headlamp switch knob counterclockwise to just before the interior lamps detent. Check for battery voltage at the panel lamps dimmer fuse in the fuseblock module. Rotate the headlamp switch knob clockwise while observing the test voltmeter. The reading should go from battery voltage to zero volts. If OK, go to Step 3. If not OK, repair the open panel lamps dimmer switch signal circuit to the headlamp switch as required. If the circuit tests OK, refer to **Headlamp Diagnosis** in the Diagnosis and Testing section of Group 8L - Lamps to diagnose the headlamp switch.

(3) Disconnect and isolate the battery negative cable. Remove the instrument cluster. Turn the headlamp switch off. Remove the panel lamps dimmer fuse from the fuseblock module. Probe the fused panel lamps dimmer switch signal circuit cavity of the instrument cluster wire harness connector A. Check for continuity to a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the shorted fused panel lamps dimmer switch signal circuit as required.

(4) Install the panel lamps dimmer fuse in the fuseblock module. Connect the battery negative cable. Turn the park lamps on with the headlamp switch. Rotate the headlamp switch knob counterclockwise to just before the interior lamps detent. Check for battery voltage at the fused panel lamps dimmer switch signal circuit cavity of the instrument cluster wire harness connector A. If OK, replace the faulty cluster illumination lamp bulb(s) and bulb holder(s). If not OK, repair the open fused panel lamps dimmer switch signal circuit as required.

FOUR-WHEEL DRIVE INDICATOR LAMP

The diagnosis found here addresses an inoperative four-wheel drive indicator lamp condition. If the problem being diagnosed is related to lamp accuracy, be certain to confirm that the problem is with the lamp or switch and not with a damaged or inoperative transfer case or transfer case linkage. Refer to **NV231 Diagnosis** in the Diagnosis and Testing section of Group 21 - Transmission for more information. If no transfer case problem is found, the following procedure will help locate a short or open in the indicator lamp circuit. For complete circuit diagrams, refer to **Instrument Cluster** in Group 8W - Wiring Diagrams.

(1) Check the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the fuseblock module. If OK, go to Step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Disconnect the transfer case switch wire harness connector. Check for continuity between the ground circuit cavity of the transfer case switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open ground circuit to ground as required.

(4) Connect the battery negative cable. Turn the ignition switch to the On position. Install a jumper wire between the part time four wheel drive indicator lamp driver circuit cavity of the transfer case switch wire harness connector and a good ground. The four-wheel drive indicator lamp should light. If OK, replace the faulty transfer case switch. If not OK, go to Step 5.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument cluster. With the transfer case switch wire harness connector still disconnected, check for continuity between the part time four wheel drive indicator lamp driver circuit cavity of the instrument cluster wire harness connector B and a good ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the shorted part time four wheel drive indicator lamp driver circuit as required.

(6) Check for continuity between the part time four wheel drive indicator lamp driver circuit cavities of the instrument cluster wire harness connector B and the transfer case switch wire harness connector. There should be continuity. If OK, replace the faulty

DIAGNOSIS AND TESTING (Continued)

bulb. If not OK, repair the open part time four wheel drive indicator lamp driver circuit as required.

HEADLAMP HIGH BEAM INDICATOR LAMP

The diagnosis found here addresses an inoperative headlamp high beam indicator lamp condition. If the problem being diagnosed is related to inoperative headlamp high beams, refer to **Headlamp Diagnosis** in the Diagnosis and Testing section of Group 8L - Lamps for diagnosis of the headlamp system. If no headlamp system problems are found, the following procedure will help locate an open in the high beam indicator lamp circuit. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Disconnect and isolate the battery negative cable. Remove the instrument cluster.

(2) Connect the battery negative cable. Turn the headlamps on and select the high beams with the multi-function switch stalk. Check for battery voltage at the high beam indicator driver circuit cavity of the instrument cluster wire harness connector A. If OK, replace the faulty bulb. If not OK, repair the open high beam indicator driver circuit to the headlamp dimmer (multi-function) switch as required.

TURN SIGNAL INDICATOR LAMP

The diagnosis found here addresses an inoperative turn signal indicator lamp condition. For any other turn signal problem, refer to **Turn Signal and Hazard Warning Systems** in the Diagnosis and Testing section of Group 8J - Turn Signal and Hazard Warning Systems for further diagnosis. If no turn signal or hazard warning system problem is found, the following procedure will help locate a short or open in the indicator lamp circuit. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Disconnect and isolate the battery negative cable. Remove the instrument cluster.

(2) Connect the battery negative cable. Activate the hazard warning system by moving the hazard warning switch button to the On position. Check for battery voltage at the inoperative (right or left) turn signal circuit cavity of the instrument cluster wire harness connector (connector A - left, or connector B - right). There should be a switching (on and off) battery voltage signal. If OK, replace the faulty (right or left) indicator lamp bulb. If not OK, repair the open (right or left) turn signal circuit to the turn signal/hazard warning (multi-function) switch as required.

ACCESSORY RELAY

The accessory relay (Fig. 2) is located in a wire harness connector that is secured to the 100-way connector bracket under the driver side of the instrument panel, near the cowl side inner panel in the passenger compartment. For complete circuit diagrams, refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams.

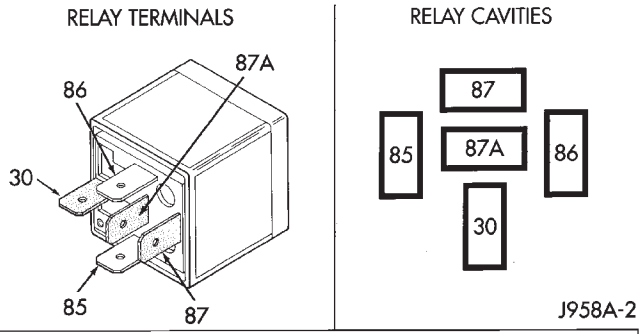
WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the accessory relay from its wire harness connector. Refer to **Accessory Relay** in the Removal and Installation section of this group for the procedures.

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 5 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, perform the Relay Circuit Test that follows. If not OK, replace the faulty relay.



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

Fig. 2 Accessory Relay

RELAY CIRCUIT TEST

(1) The relay common feed terminal (30) is connected to battery voltage and should be hot at all times. Check for battery voltage at the fused B(+) circuit cavity of the accessory relay wire harness connector. If OK, go to Step 2. If not OK, repair the fused B(+) circuit to the fuse in the Power Distribution Center (PDC) as required.

DIAGNOSIS AND TESTING (Continued)

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the cigar lighter or power outlet when the relay is energized by the ignition switch. There should be continuity between the accessory relay wire harness connector cavity for relay terminal 87 and the accessory relay output circuit cavity in the cigar lighter or power outlet wire harness connector at all times. If OK, go to Step 4. If not OK, repair the open accessory relay output circuit to the cigar lighter or power outlet wire harness connector as required.

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. The accessory relay wire harness connector cavity for this terminal should have continuity to ground at all times. If OK, go to Step 5. If not OK, repair the open ground circuit to ground as required.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. It receives battery feed to energize the accessory relay when the ignition switch is in the Accessory or On positions. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (acc/run) circuit cavity of the accessory relay wire harness connector. If not OK, repair the open fused ignition switch output (acc/run) circuit to the ignition switch as required.

INSTRUMENT PANEL CIGAR LIGHTER AND POWER OUTLET

For complete circuit diagrams, refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the protective cap or the cigar lighter knob and element from the cigar lighter/power outlet receptacle shell. Check for continuity between the inside circumference of the cigar lighter/power outlet receptacle shell and a good ground. there should be continuity. If OK, go to Step 2. If not OK, go to Step 3.

(2) Turn the ignition switch to the On position. Check for battery voltage at the insulated contact located at the back of the cigar lighter/power outlet receptacle shell. If OK, replace the faulty cigar lighter knob and element. If not OK, go to Step 3.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument panel accessory switch bezel. Check for continuity between the ground circuit cavity of the cigar lighter/power outlet wire harness connector and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open ground circuit to ground as required.

(4) Connect the battery negative cable. Turn the ignition switch to the Accessory or On positions. Check for battery voltage at the accessory relay output circuit cavity of the cigar lighter/power outlet wire harness connector. If OK, replace the faulty accessory switch bezel unit. If not OK, refer to **Accessory Relay** in the Diagnosis and Testing section of this group for further diagnosis.

REMOVAL AND INSTALLATION

STEERING COLUMN OPENING COVER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) If the vehicle is so equipped, move the tilt steering column to the fully raised position.

(3) Remove the knob and shaft from the headlamp switch. Refer to **Headlamp Switch** in the Removal and Installation section of this group for the procedures.

(4) Remove the two screws that secure the steering column opening cover to the instrument panel (Fig. 3).

(5) Pull the upper edge of the steering column opening cover straight back and down away from the instrument panel as far as possible.

(6) Rock the lower edge of the steering column opening cover rearward to disengage the hinge hook formations on the lower edge of the cover from the hinge pins on the lower edge of the instrument panel.

REMOVAL AND INSTALLATION (Continued)

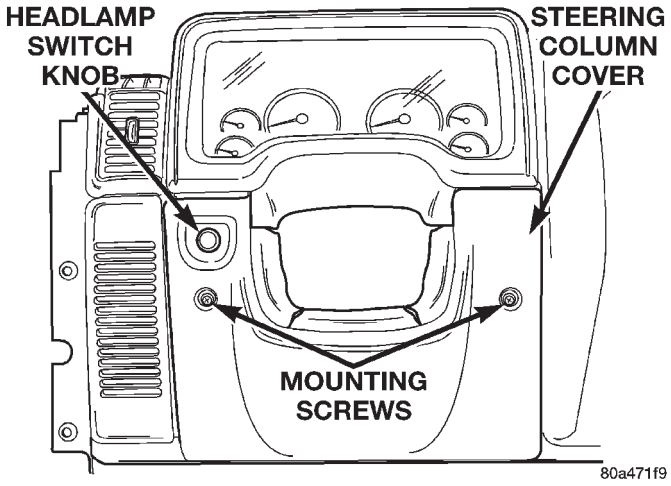


Fig. 3 Steering Column Opening Cover Remove/ Install

(7) Remove the steering column opening cover from the instrument panel.

INSTALLATION

(1) Position the steering column opening cover to the instrument panel.

(2) Engage the hinge hook formations on the lower edge of the steering column opening cover with the hinge pins on the lower edge of the instrument panel.

(3) Tilt the upper edge of the steering column opening cover up into position onto the instrument panel.

(4) Install and tighten the two screws that secure the steering column opening cover to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(5) Reconnect the battery negative cable.

KNEE BLOCKER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the steering column opening cover from the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of this group for the procedures.

(3) Remove the four screws that secure the knee blocker to the instrument panel (Fig. 4).

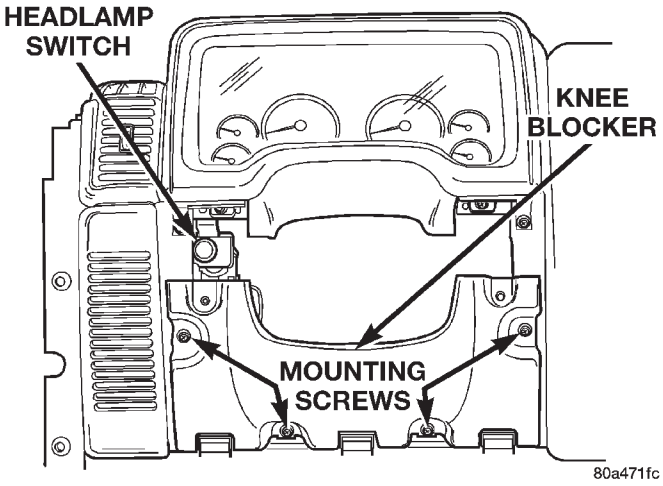


Fig. 4 Knee Blocker Remove/Install

(4) Remove the knee blocker from the instrument panel.

INSTALLATION

(1) Position the knee blocker to the instrument panel.

(2) Install and tighten the four screws that secure the knee blocker to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the steering column opening cover onto the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

HEADLAMP SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: IF THE HEADLAMP SWITCH WAS ON, WAIT FIVE MINUTES TO ALLOW THE CERAMIC DIMMER RESISTOR TO COOL. IF THE CERAMIC DIMMER RESISTOR IS NOT ALLOWED TO COOL, IT CAN BURN YOUR FINGERS.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Pull the headlamp switch control knob out to the On position stop.

(3) Reach up under the instrument panel outboard of the steering column to access and depress the headlamp switch control knob and shaft release button on the top of the switch body (Fig. 5).

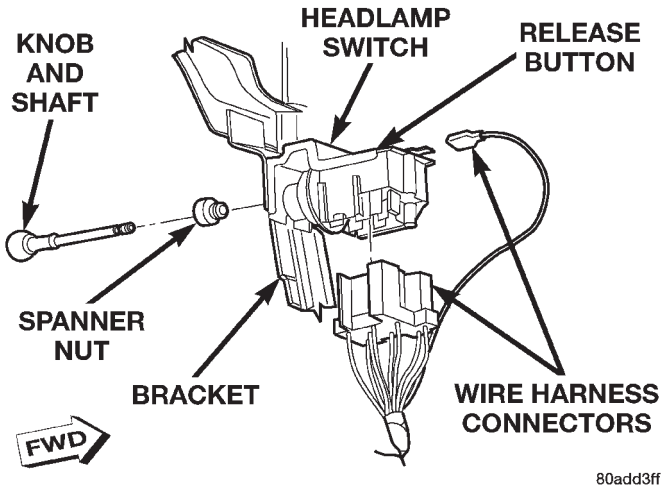


Fig. 5 Headlamp Switch Remove/Install

(4) While holding the release button depressed, pull the headlamp switch control knob and shaft unit out of the headlamp switch.

(5) Remove the knee blocker from the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of this group for the procedures.

(6) Remove the spanner nut that secures the headlamp switch to the instrument panel mounting bracket.

(7) Pull the headlamp switch away from the instrument panel mounting bracket far enough to access the instrument panel wire harness connectors.

(8) Disconnect the two instrument panel wire harness connectors from the headlamp switch.

(9) Remove the headlamp switch from the instrument panel.

INSTALLATION

(1) Position the headlamp switch to the instrument panel.

(2) Reconnect the two instrument panel wire harness connectors to the headlamp switch.

(3) Position the headlamp switch behind the mounting bracket on the instrument panel.

(4) Install and tighten the spanner nut that secures the headlamp switch to the instrument panel mounting bracket. Tighten the nut to 2.7 N·m (24 in. lbs.).

(5) Install the knee blocker onto the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of this group for the procedures.

(6) Insert the shaft of the headlamp switch control knob and shaft unit through the opening in the steering column opening cover and into the headlamp switch.

(7) Push the headlamp switch control knob and shaft unit all the way into the headlamp switch body.

(8) Reconnect the battery negative cable.

INSTRUMENT PANEL TOP COVER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Using a trim stick or another suitable wide flat-bladed tool, gently pry the instrument panel top cover up and away from the instrument panel far enough to disengage the five snap clip retainers from their receptacles in the instrument panel (Fig. 6).

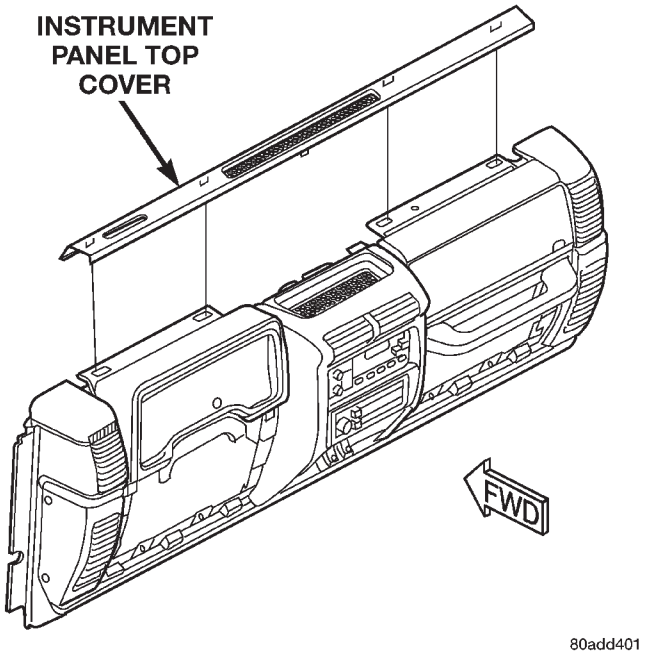


Fig. 6 Instrument Panel Top Cover Remove/Install

REMOVAL AND INSTALLATION (Continued)

(3) Remove the top cover from the instrument panel.

INSTALLATION

(1) Position the top cover onto the instrument panel.

(2) Align the snap clips on the top cover with the snap clip receptacles in the instrument panel.

(3) Press firmly downward on the top cover over each of the snap clip locations until each of the snap clips is fully seated in their receptacles in the instrument panel.

(4) Reconnect the battery negative cable.

CLUSTER BEZEL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the steering column opening cover from the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of this group for the procedures.

(3) Remove the top cover from the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(4) Remove the two screws that secure the lower mounting tabs of the cluster bezel to the instrument panel (Fig. 7).

(5) Remove the three screws that secure the upper mounting flange of the cluster bezel to the instrument panel (Fig. 8).

(6) Remove the cluster bezel from the instrument panel.

INSTALLATION

(1) Position the cluster bezel to the instrument panel.

(2) Install and tighten the three screws that secure the upper mounting flange of the cluster bezel to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install and tighten the two screws that secure the lower mounting tabs of the cluster bezel to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

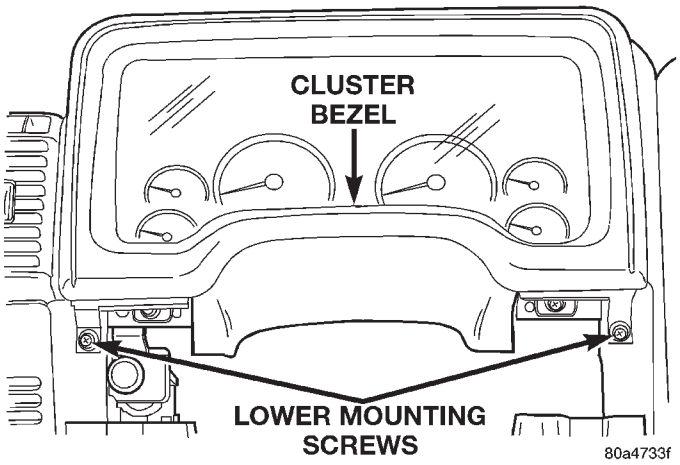


Fig. 7 Cluster Bezel Lower Screws Remove/Install

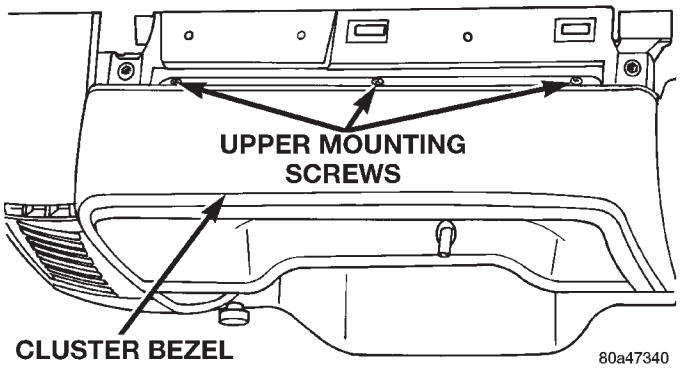


Fig. 8 Cluster Bezel Upper Screws Remove/Install

(4) Install the top cover onto the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(5) Install the steering column opening cover onto the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of this group for the procedures.

(6) Reconnect the battery negative cable.

INSTRUMENT CLUSTER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cluster bezel from the instrument panel. Refer to **Cluster Bezel** in the Removal and Installation section of this group for the procedures.

(3) Remove the four screws that secure the instrument cluster to the instrument panel (Fig. 9).

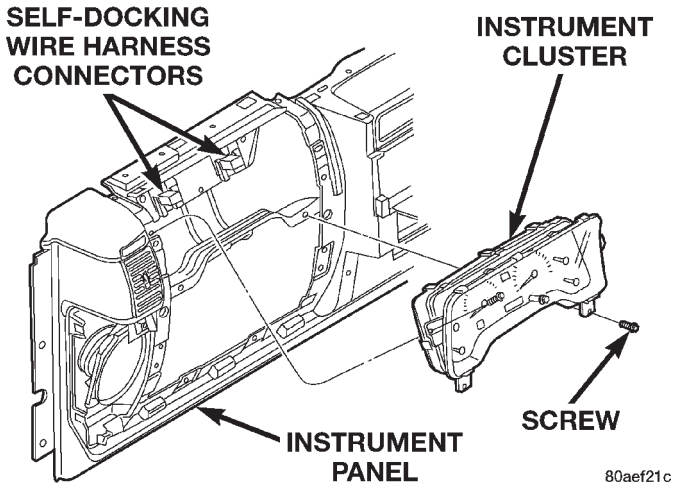


Fig. 9 Instrument Cluster Remove/Install

(4) Pull the instrument cluster rearward far enough to disengage the two self-docking instrument panel wire harness connectors from the connector receptacles on the back of the cluster housing.

(5) Remove the instrument cluster from the instrument panel.

INSTALLATION

(1) Position the instrument cluster to the instrument panel.

(2) Align the instrument cluster with the cluster opening in the instrument panel and push the cluster firmly and evenly into place. The instrument panel has two self-docking wire harness connectors that will be automatically aligned with, and connected to the cluster connector receptacles when the cluster is installed in the instrument panel.

(3) Install and tighten the four screws that secure the instrument cluster to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(4) Install the cluster bezel onto the instrument panel. Refer to **Cluster Bezel** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

INSTRUMENT CLUSTER COMPONENTS

Some of the components for the instrument cluster used in this vehicle are serviced individually. The serviced components include: the incandescent instrument cluster indicator lamp and illumination lamp bulbs (including the integral bulb holders), the odometer reset knob boot, the cluster lens, the cluster hood and mask unit, the instrument cluster housing rear cover, and the instrument cluster housing (including the odometer reset knob, the gauge mask, the gauges and the instrument cluster electronic circuit board). Following are the service procedures for the instrument cluster components.

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REMOVAL

CLUSTER BULB

This procedure applies to each of the incandescent cluster illumination lamp or indicator lamp bulb and bulb holder units. However, the illumination lamps and the indicator lamps use different bulb and bulb holder unit sizes. They must never be interchanged. Be certain that any bulb and bulb holder unit removed from the cluster electronic circuit board is reinstalled in the correct position. Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the instrument cluster, the electronic circuit board and/or the gauges.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Turn the bulb holder counterclockwise about sixty degrees on the cluster electronic circuit board.

(4) Pull the bulb and bulb holder unit straight back to remove it from the bulb mounting hole in the cluster electronic circuit board (Fig. 10).

CLUSTER LENS

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Work around the perimeter of the cluster housing to disengage each of the latches that secure the cluster lens to the cluster housing (Fig. 11).

REMOVAL AND INSTALLATION (Continued)

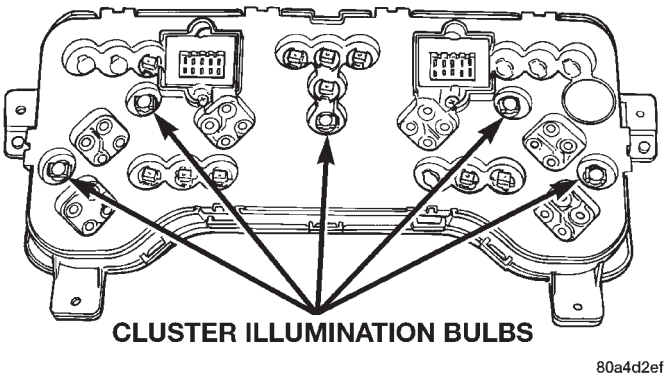

Fig. 10 Cluster Bulb Locations

(4) Gently pull the cluster lens away from the cluster housing.

ODOMETER RESET KNOB BOOT

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Remove the cluster lens from the cluster housing. Refer to **Instrument Cluster Components - Cluster Lens** in the Removal and Installation section of this group for the procedures.

(4) Remove the odometer reset knob boot by pulling it out of the cluster lens.

CLUSTER HOOD AND MASK

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Remove the cluster lens from the cluster housing. Refer to **Instrument Cluster Components - Cluster Lens** in the Removal and Installation section of this group for the procedures.

(4) Work around the perimeter of the cluster housing to disengage each of the latches that secure the cluster hood and mask unit to the cluster housing (Fig. 11).

(5) Gently pull the cluster hood and mask unit away from the cluster housing.

CLUSTER HOUSING REAR COVER

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Work around the perimeter of the cluster housing to disengage each of the latches that secure the rear cover to the cluster housing (Fig. 11).

(4) Gently pull the rear cover away from the back of the cluster housing.

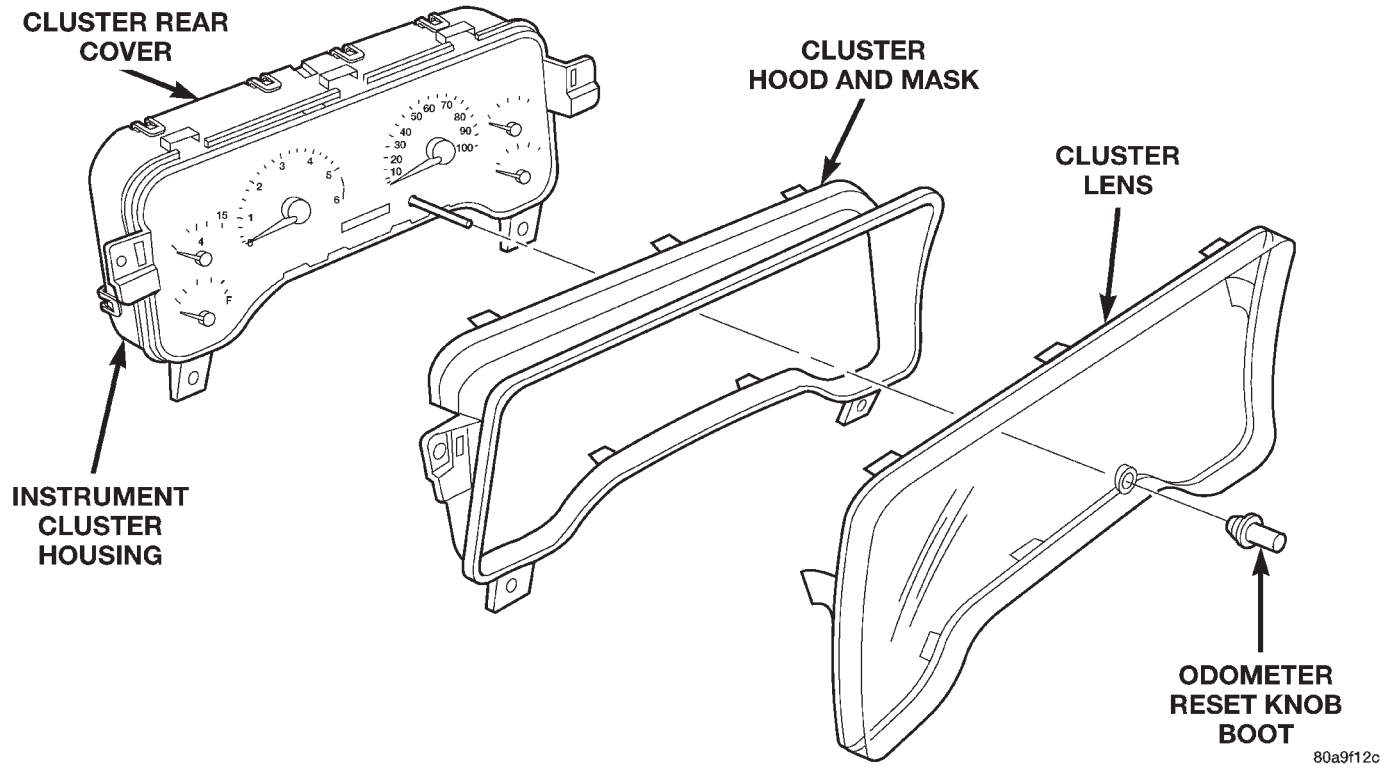

Fig. 11 Instrument Cluster Components

REMOVAL AND INSTALLATION (Continued)

CLUSTER HOUSING

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Remove all of the cluster illumination lamp and indicator lamp bulb and bulb holder units from the electronic circuit board. Refer to **Instrument Cluster Components - Cluster Bulbs** in the Removal and Installation section of this group for the procedures.

(4) Remove the cluster hood and mask unit from the cluster housing. Refer to **Instrument Cluster Components - Cluster Hood and Mask** in the Removal and Installation section of this group for the procedures.

(5) Remove the rear cover from the cluster housing. Refer to **Instrument Cluster Components - Cluster Housing Rear Cover** in the Removal and Installation section of this group for the procedures.

INSTALLATION

CLUSTER BULB

This procedure applies to each of the incandescent cluster illumination lamp or indicator lamp bulb and bulb holder units. However, the illumination lamps and the indicator lamps use different bulb and bulb holder unit sizes. They must never be interchanged. Be certain that any bulb and bulb holder unit removed from the cluster electronic circuit board is reinstalled in the correct position.

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the instrument cluster, the electronic circuit board and/or the gauges.

(1) Insert the bulb and bulb holder unit straight into the correct bulb mounting hole in the cluster electronic circuit board.

(2) With the bulb holder fully seated against the cluster electronic circuit board, turn the bulb holder clockwise about sixty degrees to lock it into place.

(3) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

CLUSTER LENS

(1) Align the cluster lens with the cluster hood and mask unit.

(2) Press firmly and evenly on the cluster lens to install it onto the cluster housing.

(3) Work around the perimeter of the cluster housing to be certain that each of the latches that secure the cluster lens to the cluster housing is fully engaged.

(4) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

ODOMETER RESET KNOB BOOT

(1) Position the odometer reset knob to the mounting hole from the back of the cluster lens.

(2) Pull the odometer reset knob into the mounting hole from the face of the cluster lens.

(3) Install the cluster lens onto the cluster housing. Refer to **Instrument Cluster Components - Cluster Lens** in the Removal and Installation section of this group for the procedures.

(4) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

CLUSTER HOOD AND MASK

(1) Align the hood and mask unit with the cluster housing.

(2) Press firmly and evenly on the hood and mask unit to install it onto the cluster housing.

(3) Work around the perimeter of the cluster housing to be certain that each of the latches that secure the hood and mask unit to the cluster housing is fully engaged.

(4) Install the cluster lens onto the cluster housing. Refer to **Instrument Cluster Components - Cluster Lens** in the Removal and Installation section of this group for the procedures.

(5) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(6) Reconnect the battery negative cable.

CLUSTER HOUSING REAR COVER

(1) Position the rear cover to the back of the cluster housing.

(2) Press firmly and evenly on the rear cover until each of the latches that secure the rear cover to the cluster housing is fully engaged.

(3) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

CLUSTER HOUSING

(1) Install the rear cover onto the cluster housing. Refer to **Instrument Cluster Components - Cluster Housing Rear Cover** in the Removal and Installation section of this group for the procedures.

(2) Install the cluster hood and mask unit onto the cluster housing. Refer to **Instrument Cluster Components - Cluster Hood and Mask** in the Removal and Installation section of this group for the procedures.

(3) Install all of the cluster illumination lamp and indicator lamp bulb and bulb holder units into the electronic circuit board. Refer to **Instrument Cluster Components - Cluster Bulbs** in the Removal and Installation section of this group for the procedures.

(4) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

INSTRUMENT PANEL CENTER BEZEL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the top cover from the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(3) Remove the ash receiver from the ash receiver housing in the lower portion of the instrument panel center bezel.

(4) Remove the one screw from the back of the ash receiver housing that secures the lower portion of the center bezel to the instrument panel (Fig. 12).

(5) Remove the two screws that secure the top of the center bezel to the top of the instrument panel.

(6) Using a trim stick or another suitable wide flat-bladed tool, gently pry the lower edge of the center bezel away from the instrument panel.

(7) Pull the lower edge of the center bezel away from the instrument panel far enough to disengage the four snap clip retainers that secure it from the receptacles in the instrument panel.

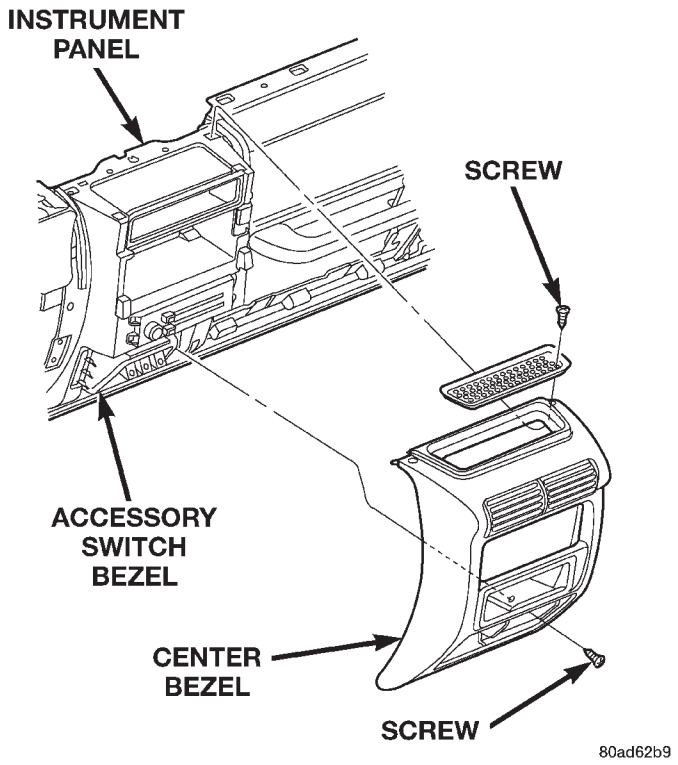

Fig. 12 Instrument Panel Center Bezel Remove/ Install

(8) Remove the center bezel from the instrument panel.

INSTALLATION

(1) Position the center bezel to the instrument panel.

(2) Align the snap clips on the center bezel with the receptacles in the instrument panel.

(3) Press firmly on the center bezel over each of the snap clip locations until each of the snap clips is fully engaged in its receptacle on the instrument panel.

(4) Install and tighten the two screws that secure the top of the center bezel to the top of the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

Install and tighten the one screw into the back of the ash receiver housing that secures the lower portion of the center bezel to the instrument panel. Tighten the screw to 2.2 N·m (20 in. lbs.).

(5) Install the ash receiver into the ash receiver housing in the lower portion of the instrument panel center bezel.

(6) Install the top cover onto the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(7) Reconnect the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

INSTRUMENT PANEL ACCESSORY SWITCH BEZEL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the center bezel from the instrument panel. Refer to **Instrument Panel Center Bezel** in the Removal and Installation section of this group for the procedures.

(3) Remove the four screws that secure the accessory switch bezel to the instrument panel (Fig. 13).

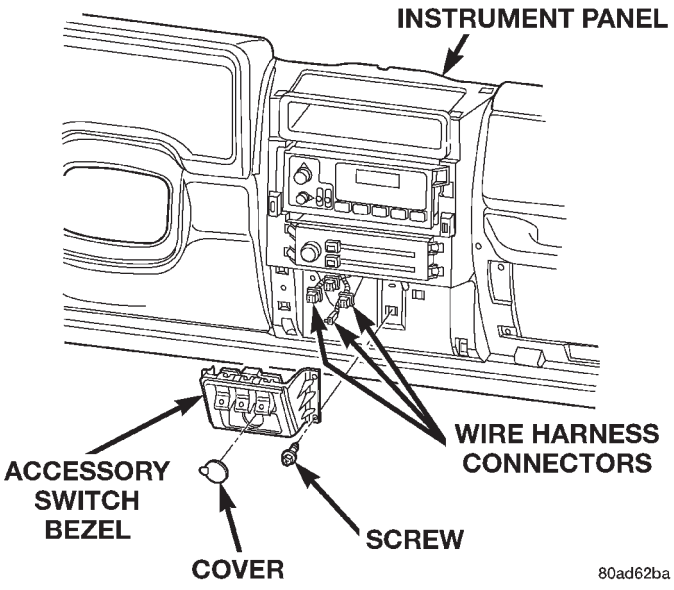

Fig. 13 Instrument Panel Accessory Switch Bezel Remove/Install

(4) Pull the accessory switch bezel away from the instrument panel far enough to access the instrument panel wire harness connectors.

(5) Disconnect the instrument panel wire harness connectors from the connector receptacles, the accessory switches and the cigar lighter/power outlet on the back of the accessory switch bezel.

(6) Remove the accessory switch bezel from the instrument panel.

INSTALLATION

(1) Position the accessory switch bezel to the instrument panel.

(2) Reconnect the instrument panel wire harness connectors to the connector receptacles, the accessory switches and the cigar lighter/power outlet on the back of the accessory switch bezel.

(3) Position the accessory switch bezel onto the instrument panel.

(4) Install and tighten the four screws that secure the accessory switch bezel to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(5) Install the center bezel onto the instrument panel. Refer to **Instrument Panel Center Bezel** in the Removal and Installation section of this group for the procedures.

(6) Reconnect the battery negative cable.

ACCESSORY RELAY

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Reach up under the instrument panel outboard of the steering column to access the accessory relay and the accessory relay wire harness connector, which is secured to the 100-way wire harness connector mounting bracket (Fig. 14).

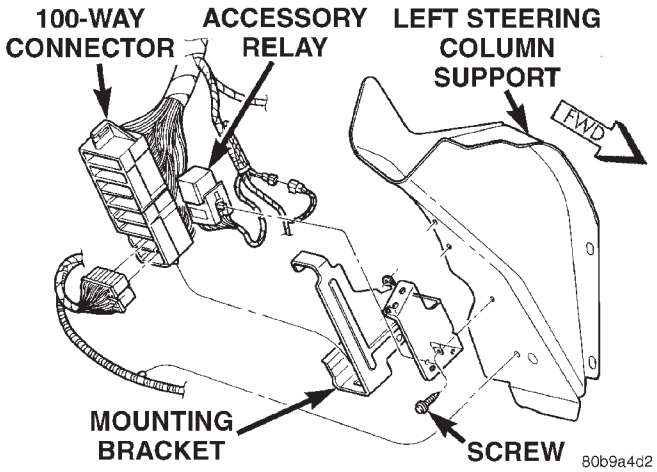

Fig. 14 Accessory Relay Remove/Install

REMOVAL AND INSTALLATION (Continued)

(3) Disconnect the accessory relay from the accessory relay wire harness connector.

(4) Remove the accessory relay from under the instrument panel.

INSTALLATION

(1) Position the accessory relay to the accessory relay wire harness connector under the instrument panel.

(2) Align the terminals of the accessory relay with the cavities in the accessory relay wire harness connector.

(3) Push on the accessory relay case firmly and evenly until all of the relay terminals are fully seated within the cavities of the accessory relay wire harness connector.

(4) Reconnect the battery negative cable.

GLOVE BOX

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Release the glove box latch and open the glove box door.

(3) While supporting the glove box door with one hand, grasp the check strap as close to the glove box door as possible and slide the rolled end of the check strap out of the slot in the edge of the door (Fig. 15).

(4) Lower the glove box door far enough to disengage the hinge hook formations on the lower edge of the door from the hinge pins on the lower edge of the instrument panel.

(5) Remove the glove box from the instrument panel.

INSTALLATION

(1) Position the glove box to the instrument panel.

(2) Engage the hinge hook formations on the lower edge of the glove box door with the hinge pins on the lower edge of the instrument panel.

(3) Tilt the upper edge of the glove box door up toward the instrument panel far enough to engage the check strap with the door.

(4) While supporting the glove box door with one hand, grasp the check strap as close to the glove box door as possible and slide the rolled end of the check strap into the slot in the edge of the door.

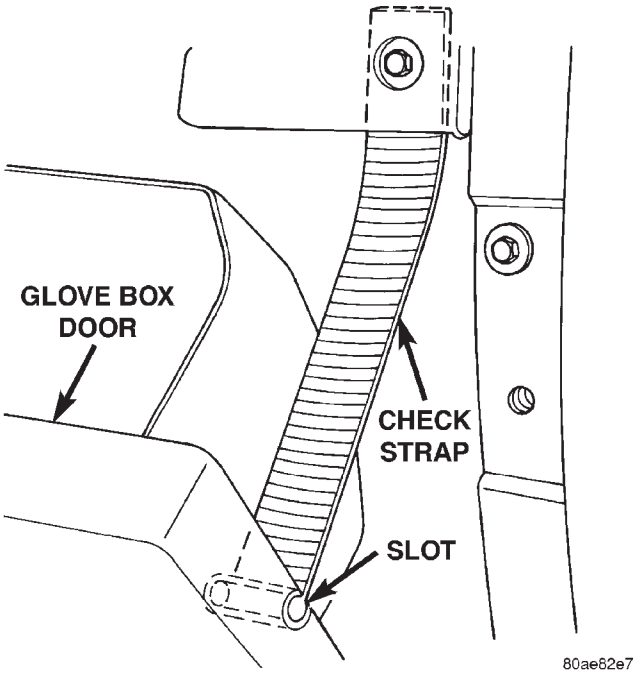

Fig. 15 Glove Box Remove/Install

(5) Close the glove box door.

(6) Reconnect the battery negative cable.

GLOVE BOX COMPONENTS

Service of all of the glove box components (Fig. 16) must be performed with the glove box removed from the instrument panel.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

GLOVE BOX DOOR AND BIN

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(3) Remove the screws that secure the glove box latch and handle to the glove box door.

(4) Remove the screws that secure the inner door and bin unit to the outer glove box door.

REMOVAL AND INSTALLATION (Continued)

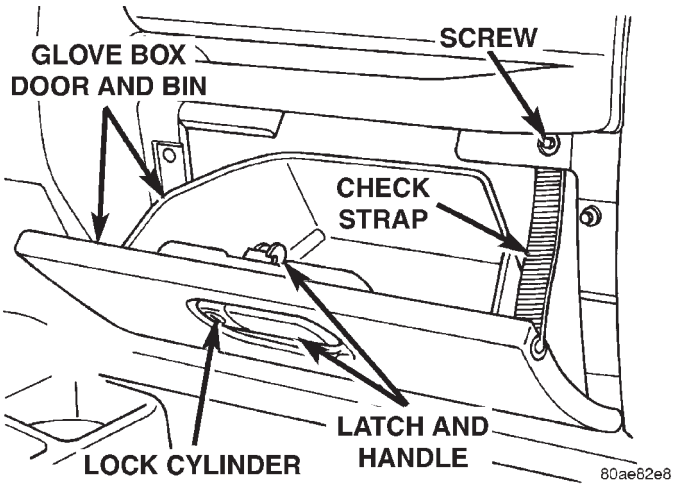

Fig. 16 Glove Box Components

(5) Remove the inner door and bin unit from the outer glove box door.

GLOVE BOX CHECK STRAP

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(3) Remove the screw that secures the glove box check strap to the instrument panel above the glove box opening.

(4) Remove the check strap from the instrument panel.

GLOVE BOX LATCH AND HANDLE

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(3) Remove the four screws that secure the glove box latch and handle to the glove box door from the inside of the glove box.

(4) Remove the latch and handle from the glove box door.

GLOVE BOX LOCK CYLINDER

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(3) Remove the glove box latch and handle from the glove box. Refer to **Glove Box Components - Glove Box Latch and Handle** in the Removal and Installation section of this group for the procedures.

(4) Insert the key into the glove box lock cylinder.

(5) Insert a small screwdriver into the retaining tumbler release slot and depress the retaining tumbler (Fig. 17).

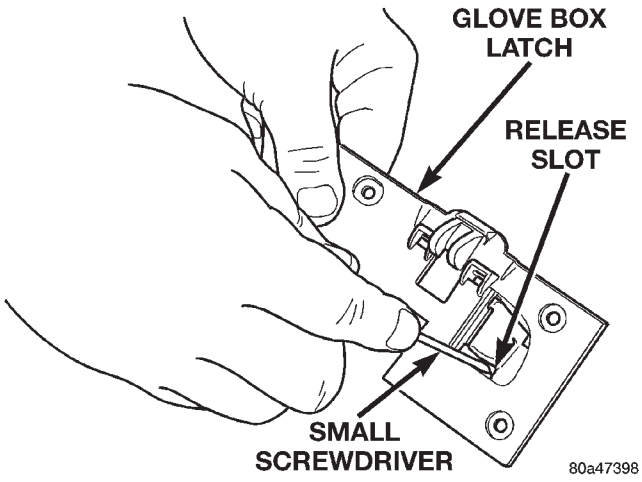

Fig. 17 Glove Box Lock Cylinder Remove/Install

(6) Pull the lock cylinder out of the glove box latch handle by using a gentle twisting and pulling action on the key.

INSTALLATION

GLOVE BOX DOOR AND BIN

(1) Position the inner door and bin unit onto the outer glove box door.

(2) Install and tighten the screws that secure the inner door and bin unit to the outer glove box door. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install and tighten the screws that secure the glove box latch and handle to the glove box door. Tighten the screws to 2.2 N·m (20 in. lbs.).

(4) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(5) Reconnect and isolate the battery negative cable.

GLOVE BOX CHECK STRAP

(1) Position the check strap to the instrument panel.

(2) Install and tighten the screw that secures the glove box check strap to the instrument panel above the glove box opening. Tighten the screw to 2.2 N·m (20 in. lbs.).

(3) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

GLOVE BOX LATCH AND HANDLE

(1) Position the latch and handle onto the glove box door.

REMOVAL AND INSTALLATION (Continued)

(2) Install and tighten the four screws that secure the glove box latch and handle to the glove box door from the inside of the glove box. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

GLOVE BOX LOCK CYLINDER

(1) Insert the key into the glove box lock cylinder.

(2) Push the lock cylinder into the glove box latch handle by using a gentle twisting and pushing action on the key.

(3) Install the glove box latch and handle onto the glove box. Refer to **Glove Box Components - Glove Box Latch and Handle** in the Removal and Installation section of this group for the procedures.

(4) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

GLOVE BOX LATCH STRIKER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(3) Remove the two screws that secure the latch striker to the grab handle bezel at the top of the instrument panel glove box opening (Fig. 18).

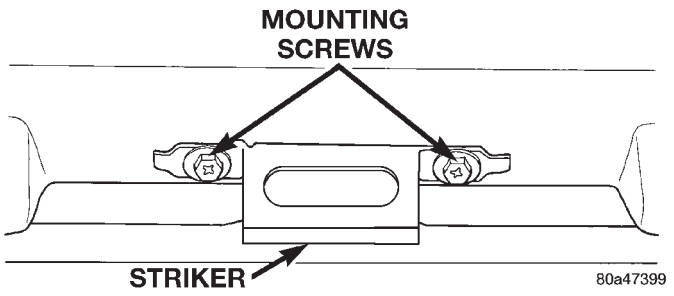

Fig. 18 Glove Box Latch Striker Remove/Install

(4) Remove the latch striker from the instrument panel.

INSTALLATION

(1) Position the latch striker onto the instrument panel.

(2) Install and tighten the two screws that secure the latch striker to the grab handle bezel at the top of the instrument panel glove box opening. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

INSTRUMENT PANEL GRAB HANDLE

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in Removal and Installation section of this group for the procedures.

(3) Reach through and above the glove box opening to access and remove the two nuts that secure the stud on each end of the grab handle to the instrument panel (Fig. 19). Discard the used grab handle mounting nuts.

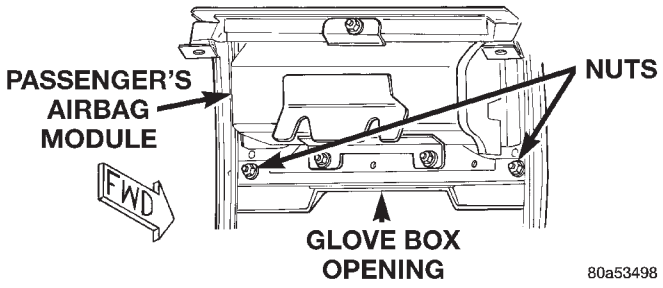

Fig. 19 Instrument Panel Grab Handle Remove/Install

(4) Remove the grab handle from the instrument panel.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position the grab handle onto the instrument panel.

(2) Reach through and above the glove box opening to install and tighten the two nuts that secure the stud on each end of the grab handle to the instrument panel. Tighten the nuts to 5.6 N·m (50 in. lbs.).

(3) Install the glove box onto the instrument panel. Refer to **Glove Box** in Removal and Installation section of this group for the procedures.

(4) Reconnect the battery negative cable.

INSTRUMENT PANEL GRAB HANDLE BEZEL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the grab handle from the instrument panel. Refer to **Instrument Panel Grab Handle** in the Removal and Installation section of this group for the procedures.

(3) Remove the glove box latch striker from the instrument panel. Refer to **Glove Box Latch Striker** in the Removal and Installation section of this group for the procedures.

(4) Remove the two screws that secure the grab handle bezel to the instrument panel (Fig. 20).

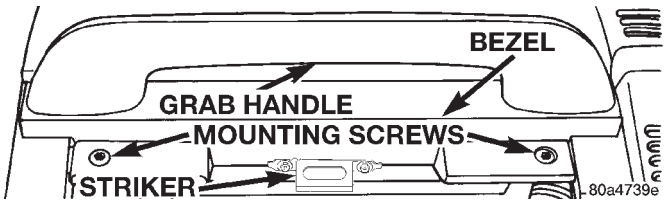

Fig. 20 Instrument Panel Grab Handle Bezel Remove/Install

(5) Remove the grab handle bezel from the instrument panel.

INSTALLATION

(1) Position the grab handle bezel onto the instrument panel.

(2) Install and tighten the two screws that secure the grab handle bezel to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the glove box latch striker onto the instrument panel. Refer to **Glove Box Latch Striker** in the Removal and Installation section of this group for the procedures.

(4) Install the grab handle onto the instrument panel. Refer to **Instrument Panel Grab Handle** in the Removal and Installation section of this group for the procedures.

(5) Reconnect the battery negative cable.

INSTRUMENT PANEL ASSEMBLY

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

NOTE: Before starting this procedure, be certain to turn the steering wheel until the front wheels are in the straight-ahead position.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of this group for the procedures.

(3) Remove the steering column from the vehicle, but do not remove the driver side airbag module, the steering wheel, or the switches from the steering column. Be certain that the steering wheel is locked and secured from rotation to prevent the loss of clockspring centering. Refer to **Steering Column** in the Removal and Installation section of Group 19 - Steering for the procedures.

(4) From under the driver side of the instrument panel, perform the following:

(a) Disconnect the instrument panel wire harness connectors from the 100-way wire harness connector near the left cowl side inner panel.

(b) Disconnect the side window demister hose at the heater-A/C housing demister/defroster duct (driver side).

(5) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(6) Reach through the instrument panel glove box opening to perform the following:

(a) Disconnect the two halves of the heater-A/C system vacuum harness connector.

REMOVAL AND INSTALLATION (Continued)

(b) Disconnect the instrument panel wire harness connector from the heater-A/C system wire harness connector.

(c) Disconnect the instrument panel wire harness connector from the passenger side airbag module wire harness connector.

(d) Disconnect the side window demister hose at the heater-A/C housing demister/defroster duct (passenger side).

(e) Disconnect the two halves of the radio antenna coaxial cable connector.

(f) Disconnect the two instrument panel wire harness connectors from the passenger airbag on/off switch wire harness connectors.

(g) Disengage the passenger side airbag on/off switch wire harness from the retainer clip on the plenum bracket that supports the heater-A/C housing just inboard of the fuseblock module.

(h) Remove the two nuts that secure the lower passenger side airbag module bracket to the studs on the dash panel (Fig. 21).

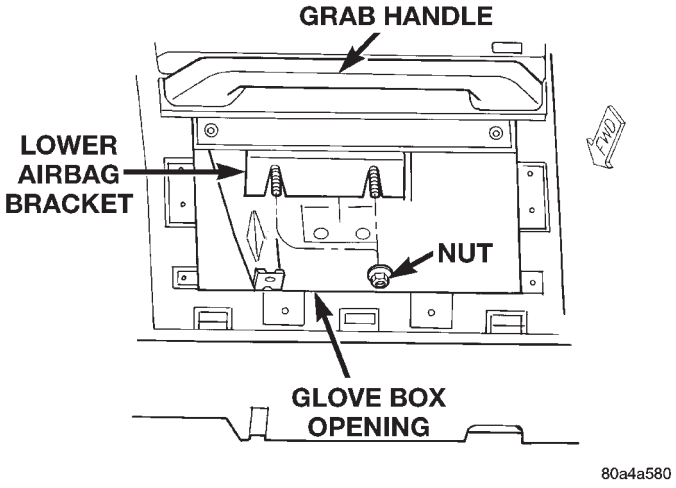

Fig. 21 Passenger Airbag Module Lower Bracket Nuts Remove/Install

(7) Remove the top cover from the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(8) Remove the three screws that secure each end of the instrument panel to the door hinge pillars (Fig. 22).

(9) Remove the four nuts that secure the top of the instrument panel to the studs on the top of the dash panel.

(10) With the aid of an assistant, lift the instrument panel assembly off of the dash panel studs and remove it from the vehicle.

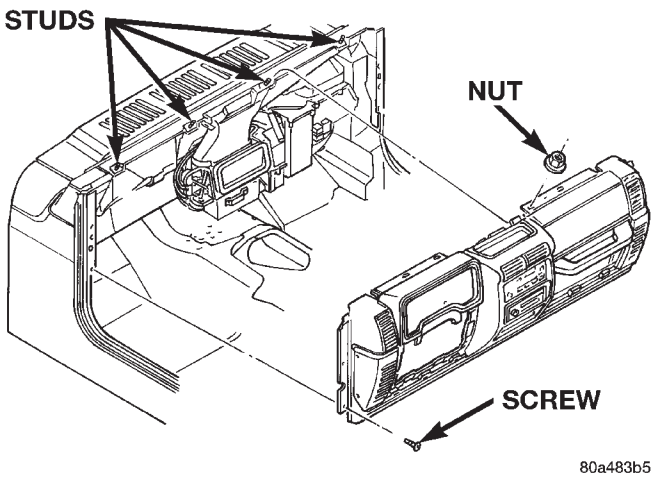

Fig. 22 Instrument Panel Assembly Remove/Install

INSTALLATION

(1) With the aid of an assistant, install the instrument panel assembly onto the dash panel studs in the vehicle.

(2) Install and tighten the four nuts that secure the top of the instrument panel to the studs on the top of the dash panel. Tighten the nuts to 12 N·m (105 in. lbs.).

(3) Install and tighten the three screws that secure each end of the instrument panel to the door hinge pillars. Tighten the screws to 12 N·m (105 in. lbs.).

(4) Install the top cover onto the instrument panel. Refer to **Instrument Panel Top Cover** in the Removal and Installation section of this group for the procedures.

(5) Reach through the instrument panel glove box opening to perform the following:

(a) Install and tighten the two nuts that secure the lower passenger side airbag module bracket to the studs on the dash panel. Tighten the nuts to 28 N·m (250 in. lbs.).

(b) Engage the passenger side airbag on/off switch wire harness in the retainer clip on the plenum bracket that supports the heater-A/C housing just inboard of the fuseblock module.

(c) Reconnect the two instrument panel wire harness connectors to the passenger airbag on/off switch wire harness connectors.

(d) Reconnect the two halves of the radio antenna coaxial cable connector.

(e) Reconnect the side window demister hose to the heater-A/C housing demister/defroster duct (passenger side).

(f) Reconnect the instrument panel wire harness connector to the passenger side airbag module wire harness connector.

(g) Reconnect the instrument panel wire harness connector to the heater-A/C system wire harness connector.

REMOVAL AND INSTALLATION (Continued)

(h) Reconnect the two halves of the heater-A/C system vacuum harness connector.

(6) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of this group for the procedures.

(7) From under the driver side of the instrument panel, perform the following:

(a) Reconnect the side window demister hose to the heater-A/C housing demister/defroster duct (driver side).

(b) Reconnect the instrument panel wire harness connectors to the 100-way wire harness connector near the left cowl side inner panel.

(8) Install the steering column into the vehicle. Be certain that the steering wheel is locked and secured from rotation to prevent the loss of clockspring centering. Refer to **Steering Column** in the Removal and Installation section of Group 19 - Steering for the procedures.

(9) Install the knee blocker onto the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of this group for the procedures.

(10) Reconnect the battery negative cable.

INSTRUMENT PANEL BASE TRIM

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(3) Remove the accessory switch bezel from the instrument panel. Refer to **Instrument Panel Accessory Switch Bezel** in the Removal and Installation section of this group for the procedures.

(4) Remove the grab handle bezel from the instrument panel. Refer to **Instrument Panel Grab Handle Bezel** in the Removal and Installation section of this group for the procedures.

(5) Remove the speaker bezels from the instrument panel. Refer to **Instrument Panel Speakers** in the Removal and Installation section of Group 8F - Audio Systems for the procedures.

(6) Remove the radio from the instrument panel. Refer to **Radio** in the Removal and Installation section of Group 8F - Audio Systems for the procedures.

(7) Remove the heater-A/C control from the instrument panel. Refer to **Heater-A/C Control** in the Removal and Installation section of Group 24 - Heating and Air Conditioning Systems for the procedures.

(8) Remove the outboard heater-A/C panel outlets from the instrument panel. Refer to **Ducts and Outlets** in the Removal and Installation section of Group 24 - Heating and Air Conditioning Systems for the procedures.

(9) Remove the instrument panel assembly from the vehicle. Refer to **Instrument Panel Assembly** in the Removal and Installation section of this group for the procedures.

(10) Place the instrument panel on a suitable work surface. Be certain to take the proper precautions to protect the instrument panel from any possible cosmetic damage.

(11) Remove the passenger side airbag door from the instrument panel. Refer to **Passenger Side Airbag Door** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

(12) Remove the two screws that secure the 16-way data link wire harness connector to the instrument panel.

(13) Remove the screws around the perimeter that secure the base trim to the instrument panel.

(14) Remove the base trim from the instrument panel.

INSTALLATION

(1) Position the base trim onto the instrument panel.

(2) Install and tighten the screws around the perimeter that secure the base trim to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install and tighten the two screws that secure the 16-way data link wire harness connector to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(4) Install the passenger side airbag door onto the instrument panel. Refer to **Passenger Side Airbag Door** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

(5) Install the instrument panel assembly into the vehicle. Refer to **Instrument Panel Assembly** in the Removal and Installation section of this group for the procedures.

(6) Install the outboard heater-A/C panel outlets onto the instrument panel. Refer to **Ducts and Outlets** in the Removal and Installation section of Group

REMOVAL AND INSTALLATION (Continued)

24 - Heating and Air Conditioning Systems for the procedures.

(7) Install the heater-A/C control onto the instrument panel. Refer to **Heater-A/C Control** in the Removal and Installation section of Group 24 - Heating and Air Conditioning Systems for the procedures.

(8) Install the radio onto the instrument panel. Refer to **Radio** in the Removal and Installation section of Group 8F - Audio Systems for the procedures.

(9) Install the speaker bezels onto the instrument panel. Refer to **Instrument Panel Speakers** in the Removal and Installation section of Group 8F - Audio Systems for the procedures.

(10) Install the grab handle bezel onto the instrument panel. Refer to **Instrument Panel Grab Handle Bezel** in the Removal and Installation section of this group for the procedures.

(11) Install the accessory switch bezel onto the instrument panel. Refer to **Instrument Panel Accessory Switch Bezel** in the Removal and Installation section of this group for the procedures.

(12) Install the instrument cluster onto the instrument panel. Refer to **Instrument Cluster** in the Removal and Installation section of this group for the procedures.

(13) Reconnect the battery negative cable.

INSTRUMENT PANEL SYSTEMS

CONTENTS

REMOVAL AND INSTALLATION

HEADLAMP LEVELING SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Using a flat blade screwdriver or similar tool between the headlamp leveling switch and the steering column cover (Fig. 1). Gently pry the headlamp leveling switch out of the steering column cover.

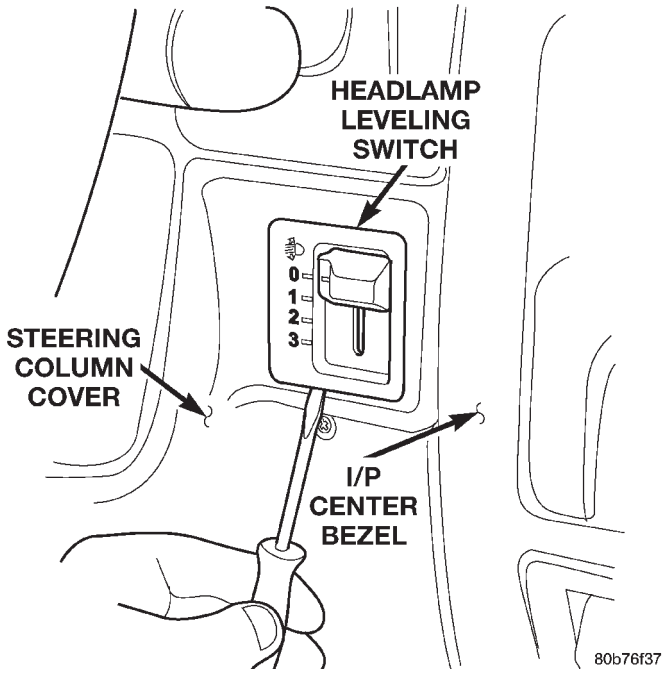

Fig. 1 Headlamp Leveling Switch

(2) Disconnect the headlamp leveling switch electrical connector (Fig. 2) and remove the headlamp leveling switch.

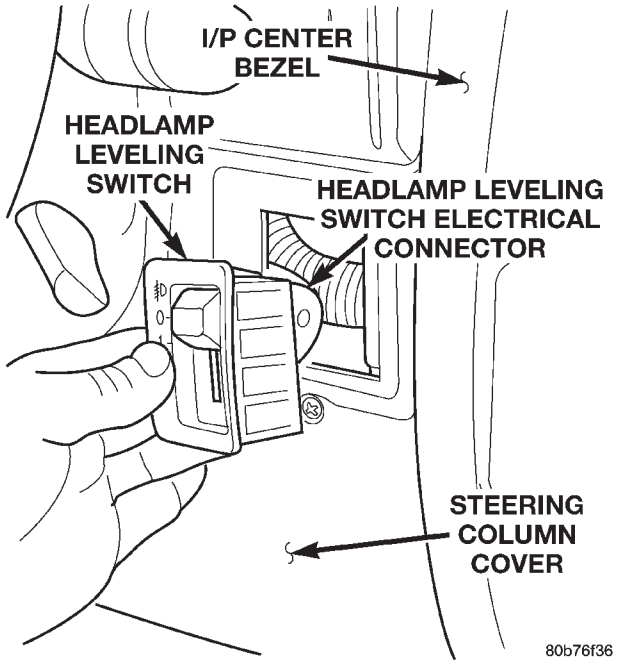

Fig. 2 Headlamp Leveling Switch Electrical Connector

INSTALLATION

(1) Connect the headlamp leveling switch electrical connector.

(2) Install the headlamp leveling switch into the steering column cover.

REMOVAL AND INSTALLATION (Continued)

REAR FOGLAMP SWITCH

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Using a flat blade screwdriver or similar flat-bladed tool, gently pry the instrument panel top cover up and away from the instrument panel to release the snap clip retainers (Fig. 3).

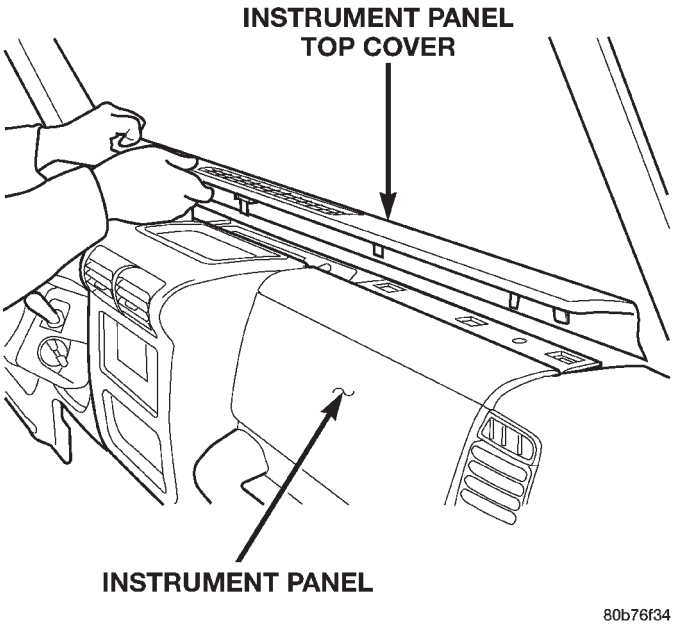

Fig. 3 Instrument Panel Top Cover

(2) Remove the instrument panel top cover from the vehicle.

(3) Remove the ash receiver from the center bezel.

(4) Remove the screw located in back of the ash receiver housing that secures the center bezel to the lower instrument panel (Fig. 4).

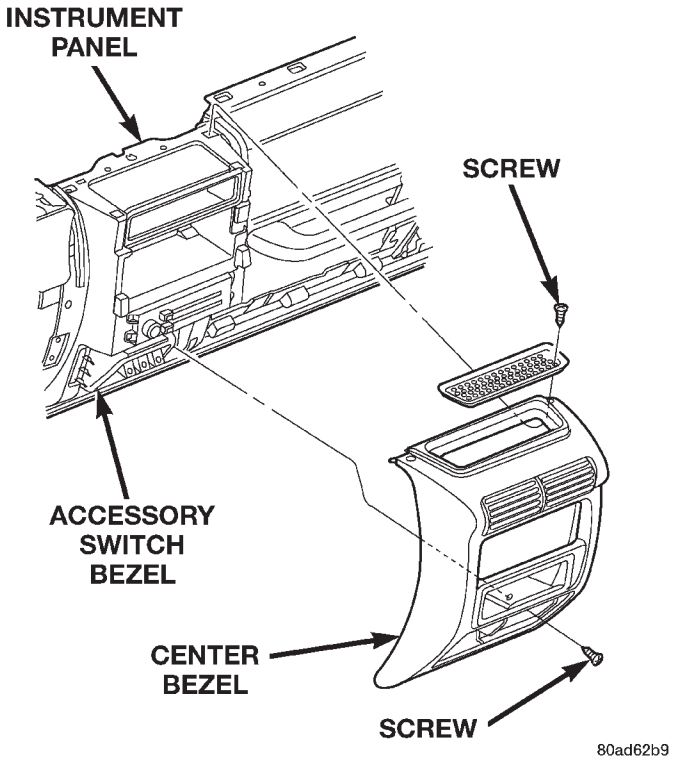

Fig. 4 Center Bezel Lower Screw

(5) Remove the screws that secure the center bezel to the top of the instrument panel (Fig. 5).

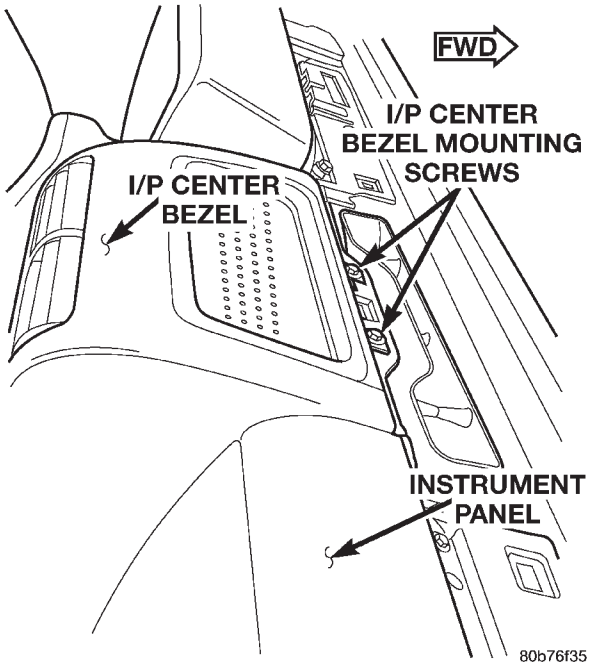

Fig. 5 Center Bezel Mounting Screws

REMOVAL AND INSTALLATION (Continued)

(6) Remove the instrument panel center bezel.
(7) Remove the screws attaching the accessory switch bezel to the instrument panel (Fig. 6).
(8) Disconnect the rear foglamp switch electrical connector.
(9) Remove the rear foglamp switch from the accessory switch bezel.

INSTALLATION

(1) Install the rear foglamp switch to the accessory switch bezel.
(2) Connect the rear foglamp switch electrical connector to the switch.
(3) Install the screws attaching the accessory switch bezel to the instrument panel (Fig. 6).
(4) Install the instrument panel center bezel and attaching screws.
(5) Install the ash receiver.
(6) Install the instrument panel top cover.

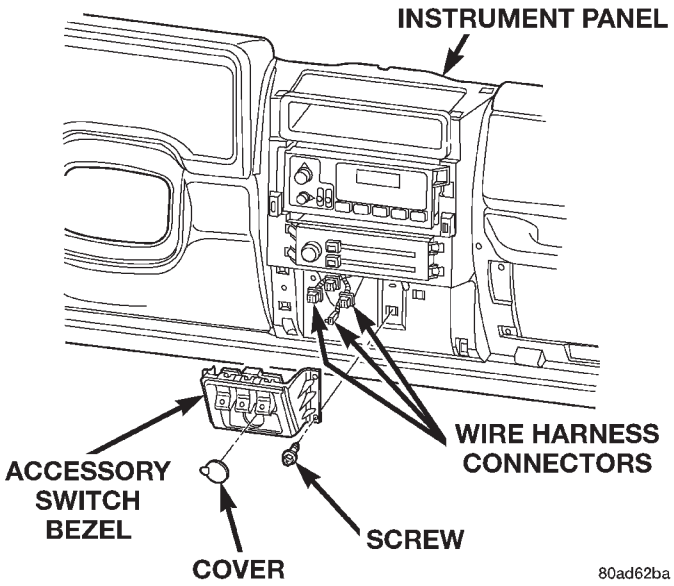

Fig. 6 Accessory Switch Bezel

AUDIO SYSTEMS

CONTENTS

GENERAL INFORMATION

INTRODUCTION

An audio system is standard factory-installed equipment on this model, unless the vehicle is ordered with an available radio delete option. Refer to 8W-47 - Audio System in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

RADIO

Available factory-installed radio receivers for this model include an AM/FM (RAL sales code), and an AM/FM/cassette (RAS sales code). All factory-installed radio receivers are stereo Electronically Tuned Radios (ETR), and include an electronic digital clock function.

The radio can only be serviced by an authorized radio repair station. Refer to the latest Warranty Policies and Procedures manual for a current listing of authorized radio repair stations.

For more information on radio features, setting procedures, and control functions refer to the owner's manual in the vehicle glove box.

IGNITION-OFF DRAW FUSE

All vehicles are equipped with an Ignition-Off Draw (IOD) fuse that is removed when the vehicle is shipped from the factory. This fuse feeds various accessories that require battery current when the ignition switch is in the Off position, including the clock and radio station preset memory functions. The fuse is removed to prevent battery discharge during vehicle storage.

When removing or installing the IOD fuse, it is important that the ignition switch be in the Off position. Failure to place the ignition switch in the Off position can cause the radio display to become scrambled when the IOD fuse is removed and replaced. Removing and replacing the IOD fuse again, with the ignition switch in the Off position, will correct the scrambled display condition.

The IOD fuse should be checked if the radio is inoperative. The IOD fuse is located in the Power Distribution Center (PDC). Refer to the PDC label for IOD fuse identification and location.

SPEAKER

The standard equipment speaker system includes two full-range speakers. Each speaker is mounted behind a removable bezel located on the outboard ends of the lower instrument panel.

The sound bar option adds two full-range speakers to the standard speaker system, for a total of four speakers. Each of the additional speakers is mounted behind a grille located on the outboard ends of the sound bar, which is attached from side-to-side to the sport bar above the rear seating area of the vehicle.

ANTENNA

All models use a fixed-length stainless steel rod-type antenna mast, installed on the right front cowl side panel of the vehicle. The antenna mast is connected to the center wire of the coaxial antenna cable, and is not grounded to any part of the vehicle.

To eliminate static, the antenna base must have a good ground. The antenna coaxial cable shield (the

DESCRIPTION AND OPERATION (Continued)

outer wire mesh of the cable) is grounded to the antenna base and the radio chassis.

The antenna coaxial cable has an additional disconnect, located behind the right end of the instrument panel between the radio and the right cowl side panel. This additional disconnect allows the instrument panel assembly to be removed and installed without removing the radio.

The factory-installed Electronically Tuned Radios (ETRs) automatically compensate for radio antenna trim. Therefore, no antenna trimmer adjustment is required or possible when replacing the receiver or the antenna.

RADIO NOISE SUPPRESSION

DESCRIPTION

Radio Frequency Interference (RFI) and Electro-Magnetic Interference (EMI) noise suppression is accomplished primarily through circuitry internal to the radio receivers. These internal suppression devices are only serviced as part of the radio receiver.

External suppression devices that are used on this vehicle to control RFI or EMI noise include the following:

- Radio antenna base ground
- Radio receiver chassis ground wire or strap
- Engine-to-body ground strap
- Engine-to-frame ground strap
- Resistor-type spark plugs
- Radio suppression-type secondary ignition wiring.

For more information on the spark plugs and secondary ignition components, refer to **Ignition System** in the Description and Operation section of Group 8D - Ignition System.

DIAGNOSIS AND TESTING

AUDIO SYSTEM

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

DIAGNOSIS AND TESTING (Continued)

Audio System Diagnosis		
CONDITION	POSSIBLE CAUSE	CORRECTION
NO AUDIO.	1. Fuse faulty.	1. Check radio fuses in Power Distribution Center. Replace fuses, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. Check for battery voltage at radio connector. Repair wiring, if required.
	4. Ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Radio faulty.	5. Exchange or replace radio, if required.
	6. Speakers faulty.	6. See speaker diagnosis, in this group.
NO DISPLAY.	1. Fuse faulty.	1. Check radio fuses in Power Distribution Center. Replace fuses, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. Check for battery voltage at radio connector. Repair wiring, if required.
	4. Ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Radio faulty.	5. Exchange or replace radio, if required.
CLOCK WILL NOT KEEP SET TIME.	1. Fuse faulty.	1. Check ignition-off draw fuse. Replace fuse, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. Check for battery voltage at radio connector. Repair wiring, if required.
	4. Ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Radio faulty.	5. Exchange or replace radio, if required.
POOR RADIO RECEPTION.	1. Antenna faulty.	1. See antenna diagnosis, in this group. Repair or replace antenna, if required.
	2. Ground faulty.	2. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	3. Radio faulty.	3. Exchange or replace radio, if required.
NO/POOR TAPE OPERATION.	1. Faulty tape.	1. Insert known good tape and test operation.
	2. Foreign objects behind tape door.	2. Remove foreign objects and test operation.
	3. Dirty cassette tape head.	3. Clean head with Mopar Cassette Head Cleaner.
	4. Faulty tape deck.	4. Exchange or replace radio, if required.
NO COMPACT DISC OPERATION	1. Faulty CD.	1. Insert known good CD and test operation.
	2. Foreign material on CD.	2. Clean CD and test operation.
	3. Condensation on CD or optics.	3. Allow temperature of vehicle interior to stabilize and test operation.
	4. Faulty CD player.	4. Exchange or replace radio, if required.

RADIO

For circuit descriptions and diagrams, refer to 8W-47 - Audio System in Group 8W - Wiring Diagrams.

DIAGNOSIS AND TESTING (Continued)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CAUTION: The speaker output of the radio is a "floating ground" system. Do not allow any speaker lead to short to ground, as damage to the radio may result.

(1) Check the fuse(s) in the Power Distribution Center (PDC). If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse(s).

(2) Check for battery voltage at the fuse(s) in the PDC. If OK, go to Step 3. If not OK, repair the open circuit to the battery and/or the ignition switch as required.

(3) Disconnect and isolate the battery negative cable. Remove the radio, but do not unplug the radio wire harness connectors. Check for continuity between the radio chassis and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open radio chassis ground circuit as required.

(4) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (accessory/run) circuit cavity of the left (gray) radio wire harness connector. If OK, go to Step 5. If not OK, repair the open circuit as required.

(5) Turn the ignition switch to the Off position. Check for battery voltage at the fused B(+) circuit cavity of the left (gray) radio wire harness connector. If OK, replace the faulty radio. If not OK, repair the open circuit to the Ignition-Off Draw (IOD) fuse as required.

SPEAKER

For circuit descriptions and diagrams, refer to 8W-47 - Audio System in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CAUTION: The speaker output of the radio is a "floating ground" system. Do not allow any speaker lead to short to ground, as damage to the radio may result.

(1) Turn the ignition switch to the On position. Turn the radio on. Adjust the balance and fader controls to check the performance of each individual speaker. Note the speaker locations that are not performing correctly. Go to Step 2.

(2) Turn the radio off. Disconnect and isolate the battery negative cable. Remove the radio. Unplug the wire harness connectors at the radio. Check both the speaker feed (+) circuit and return (–) circuit cavities for the inoperative speaker location(s) at the radio wire harness connectors for continuity to ground. In each case, there should be no continuity. If OK, go to Step 4. If not OK, go to Step 3.

(3) Leave the radio wire harness connectors unplugged. Unplug the wire harness connector at the inoperative speaker. Check both the speaker feed (+) circuit and return (–) circuit cavities of the speaker wire harness connector for continuity to ground. In each case, there should be no continuity. If OK, replace the shorted speaker. If not OK, repair the shorted circuit as required.

(4) Plug in the speaker wire harness connector. Check the resistance between the speaker feed (+) circuit and return (–) circuit cavities of the radio wire harness connectors for the inoperative speaker location(s). The meter should read between 3 and 8 ohms (speaker resistance). If OK, go to Step 5. If not OK, go to Step 6.

(5) Install a known good radio. Connect the battery negative cable. Turn the ignition switch to the On position. Turn on the radio and test the speaker operation. If OK, replace the faulty radio. If not OK, replace the faulty speaker.

(6) Turn the radio off. Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the test radio. Unplug the speaker wire harness connector at the inoperative speaker. Check the resistance between the speaker feed (+) circuit cavities of the radio wire harness connector and the speaker wire harness connector. Repeat the check between the speaker return (–) circuit cavities of the radio wire harness connector and the speaker wire harness connector. In each case, there should be no measurable resistance. If OK, replace the faulty speaker. If not OK, repair the speaker wire harness circuit(s) as required.

DIAGNOSIS AND TESTING (Continued)

ANTENNA

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

The following four tests are used to diagnose the antenna with an ohmmeter:

- **Test 1** - Mast to ground test
- **Test 2** - Tip-of-mast to tip-of-conductor test
- **Test 3** - Body ground to battery ground test
- **Test 4** - Body ground to coaxial shield test.

The ohmmeter test lead connections for each test are shown in Antenna Tests (Fig. 1).

NOTE: This model has a two-piece antenna coaxial cable. Tests 2 and 4 must be conducted in two steps to isolate a coaxial cable problem; from the coaxial cable connection under the right end of the instrument panel near the right cowl side inner panel to the antenna base, and then from the coaxial cable connection to the radio chassis connection.

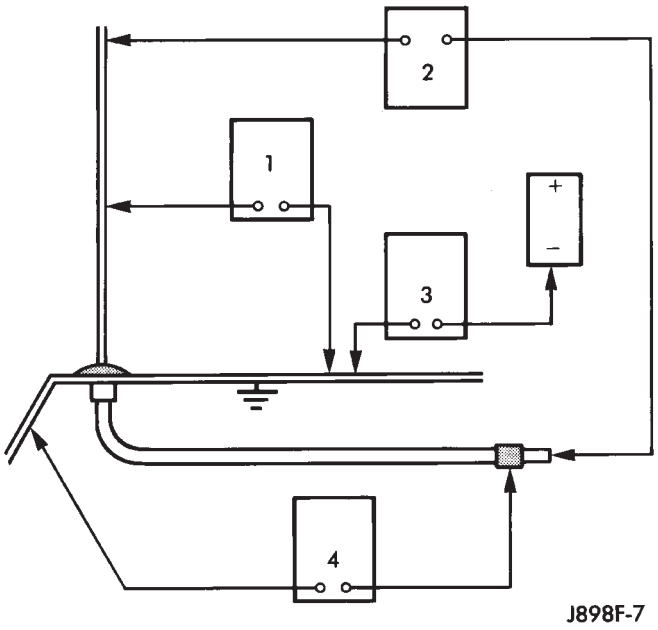

Fig. 1 Antenna Tests

TEST 1

Test 1 determines if the antenna mast is insulated from the base. Proceed as follows:

(1) Unplug the antenna coaxial cable connector from the radio chassis and isolate.

(2) Connect one ohmmeter test lead to the tip of the antenna mast. Connect the other test lead to the antenna base. Check for continuity.

(3) There should be no continuity. If continuity is found, replace the faulty or damaged antenna base and cable assembly.

TEST 2

Test 2 checks the antenna for an open circuit as follows:

(1) Unplug the antenna coaxial cable connector from the radio chassis.

(2) Connect one ohmmeter test lead to the tip of the antenna mast. Connect the other test lead to the center pin of the antenna coaxial cable connector.

(3) Continuity should exist (the ohmmeter should only register a fraction of an ohm). High or infinite resistance indicates damage to the base and cable assembly. Replace the faulty base and cable, if required.

TEST 3

Test 3 checks the condition of the vehicle body ground connection. This test should be performed with the battery positive cable removed from the battery. Disconnect both battery cables, the negative cable first. Reconnect the battery negative cable and perform the test as follows:

(1) Connect one ohmmeter test lead to the vehicle fender. Connect the other test lead to the battery negative post.

(2) The resistance should be less than one ohm.

(3) If the resistance is more than one ohm, check the braided ground strap connected to the engine and the vehicle body for being loose, corroded, or damaged. Repair the ground strap connection, if required.

TEST 4

Test 4 checks the condition of the ground between the antenna base and the vehicle body as follows:

(1) Connect one ohmmeter test lead to the vehicle fender. Connect the other test lead to the outer crimp on the antenna coaxial cable connector.

(2) The resistance should be less then one ohm.

(3) If the resistance is more then one ohm, clean and/or tighten the antenna base to fender mounting hardware.

DIAGNOSIS AND TESTING (Continued)

RADIO FREQUENCY INTERFERENCE

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For complete circuit diagrams, see Group 8W - Wiring Diagrams. Inspect the ground paths and connections at the following locations:

- Blower motor
- Electric fuel pump
- Engine-to-body ground strap
- Engine-to-frame ground strap
- Generator
- Ignition module
- Radio antenna base ground
- Radio receiver chassis ground wire or strap
- Wiper motor.

If the source of RFI or EMI noise is identified as a component on the vehicle (i.e., generator, blower motor, etc.), the ground path for that component should be checked. If excessive resistance is found in any ground circuit, clean, tighten, or repair the ground circuits or connections to ground as required before considering any component replacement.

For service and inspection of secondary ignition components, refer to the Diagnosis and Testing section of Group 8D - Ignition Systems. Inspect the following secondary ignition system components:

- Distributor cap and rotor
- Ignition coil
- Spark plugs
- Spark plug wire routing and condition.

Reroute the spark plug wires or replace the faulty components as required.

If the source of the RFI or EMI noise is identified as two-way mobile radio or telephone equipment, check the equipment installation for the following:

- Power connections should be made directly to the battery, and fused as closely to the battery as possible.
- The antenna should be mounted on the roof or toward the rear of the vehicle. Remember that magnetic antenna mounts on the roof panel can adversely affect the operation of an overhead console compass, if the vehicle is so equipped.
- The antenna cable should be fully shielded coaxial cable, should be as short as is practical, and should be routed away from the factory-installed vehicle wire harnesses whenever possible.
- The antenna and cable must be carefully matched to ensure a low Standing Wave Ratio (SWR).

Fleet vehicles are available with an extra-cost RFI-suppressed Powertrain Control Module (PCM). This unit reduces interference generated by the PCM on some radio frequencies used in two-way radio communications. However, this unit will not resolve complaints of RFI in the commercial AM or FM radio frequency ranges.

REMOVAL AND INSTALLATION

RADIO

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(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument panel top cover from the instrument panel. Refer to Instrument Panel Top Cover in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the ash receiver from the ash receiver housing in the lower instrument panel center bezel.

(4) Remove the one screw located in the back of the ash receiver housing that secures the center bezel to the lower instrument panel (Fig. 2).

(5) Remove the two screws that secure the center bezel to the top of the instrument panel.

(6) Using a trim stick or another suitable wide flat-bladed tool, gently pry the lower edge of the center bezel away from the instrument panel.

(7) Lift the lower edge of the center bezel upwards to release the four snap clip retainers that secure it to the instrument panel.

(8) Remove the center bezel from the instrument panel.

(9) Remove the two screws that secure the radio to the instrument panel (Fig. 3).

(10) Pull the radio out from the instrument panel far enough to access the wire harness connectors and the antenna coaxial cable connector (Fig. 4).

(11) Unplug the wire harness connectors and the antenna coaxial cable connector from the rear of the radio.

(12) Remove the screw that secures the ground strap to the radio chassis.

(13) Remove the radio from the instrument panel.

REMOVAL AND INSTALLATION (Continued)

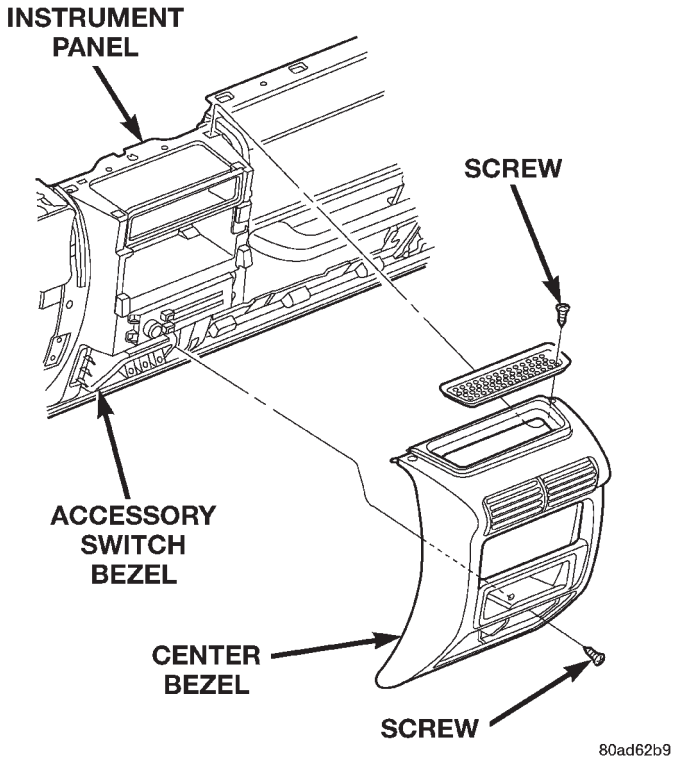

Fig. 2 Center Bezel Remove/Install

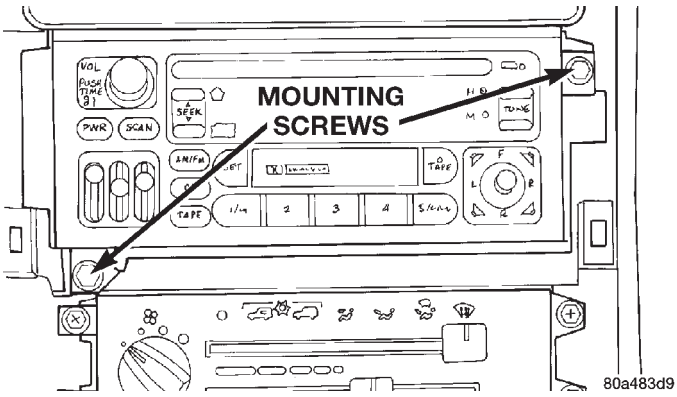

Fig. 3 Radio Remove/Install

(14) Reverse the removal procedures to install. Tighten the radio mounting screws to 5 N·m (45 in. lbs.). Tighten the instrument panel center bezel mounting screws to 2.2 N·m (20 in. lbs.).

SPEAKER

INSTRUMENT PANEL

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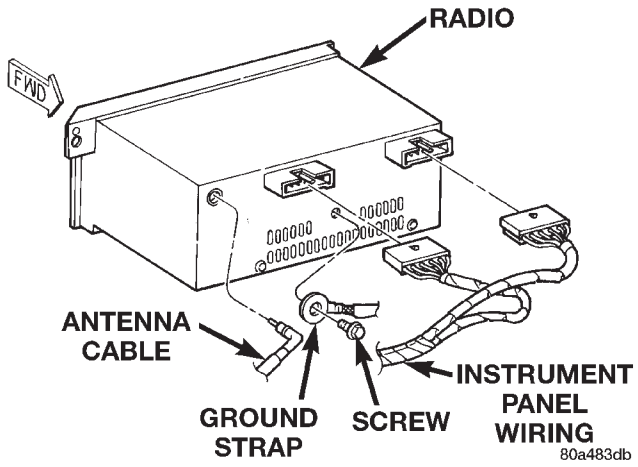

Fig. 4 Radio Connections - Typical

(1) Disconnect and isolate the battery negative cable.

(2) Remove the two screws that secure the outboard end of the speaker bezel to the instrument panel (Fig. 5).

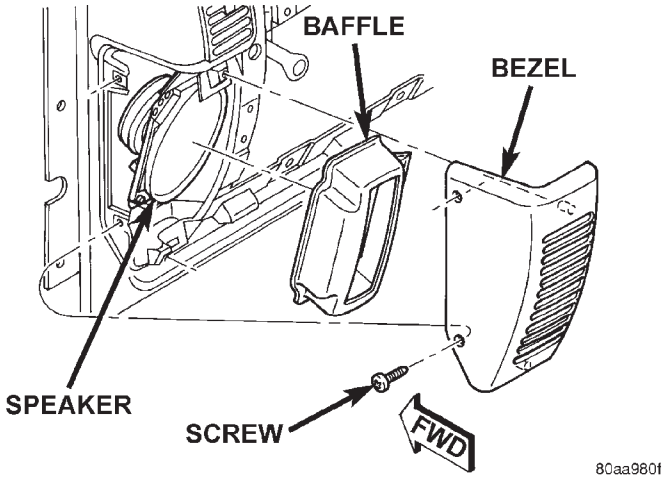

Fig. 5 Instrument Panel Speaker Bezel Remove/Install

(3) Using a trim stick or another suitable wide flat-bladed tool, gently pry at the top and bottom edges of the speaker bezel to release the two snap clip retainers that secure the bezel to the instrument panel.

(4) Remove the speaker bezel from the instrument panel.

(5) Remove the foam rubber speaker baffle from the speaker.

(6) Remove the four screws that secure the speaker to the instrument panel armature (Fig. 6).

(7) Pull the speaker away from the instrument panel far enough to access the speaker wire harness connector.

REMOVAL AND INSTALLATION (Continued)

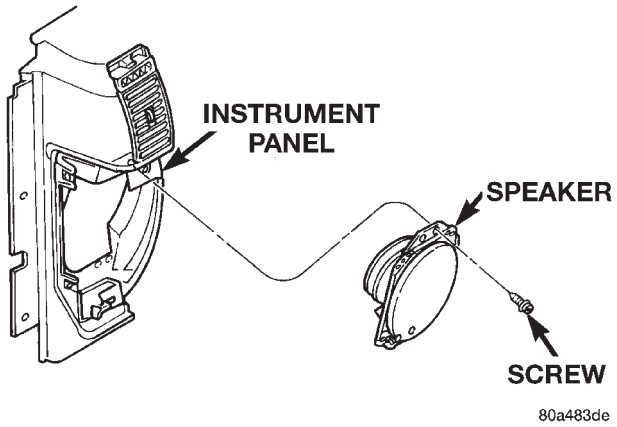

Fig. 6 Instrument Panel Speaker Remove/Install

(8) Unplug the wire harness connector from the speaker.

(9) Remove the speaker from the instrument panel.

(10) Reverse the removal procedures to install. Tighten the speaker mounting screws to 1.1 N·m (10 in. lbs.). Tighten the speaker bezel mounting screws to 2.2 N·m (20 in. lbs.).

SOUND BAR

(1) Disconnect and isolate the battery negative cable.

(2) Remove the four screws that secure the speaker grille and speaker to the sound bar.

(3) Lower the speaker and grille from the sound bar far enough to access the speaker wire harness connector.

(4) Unplug the wire harness connector from the speaker.

(5) Remove the speaker and grille from the sound bar.

(6) Remove the speaker grille from the speaker.

(7) Reverse the removal procedures to install. Tighten the mounting screws to 1.1 N·m (10 in. lbs.).

SOUND BAR

(1) Disconnect and isolate the battery negative cable.

(2) If the vehicle is equipped with the optional hard top, remove the hard top from the vehicle. Refer to Hard Top in Group 23 - Body for the procedures.

(3) If the vehicle is equipped with the standard soft top, lower the soft top. Refer to Folding Down the Fabric Top in the Owner's Manual for the procedures.

(4) Release the hook and loop closure on each outboard end flap of the sound bar trim cover.

(5) Lift the left outboard end flap of the sound bar trim cover over the top of the sport bar far enough to access the wire harness connector (Fig. 7).

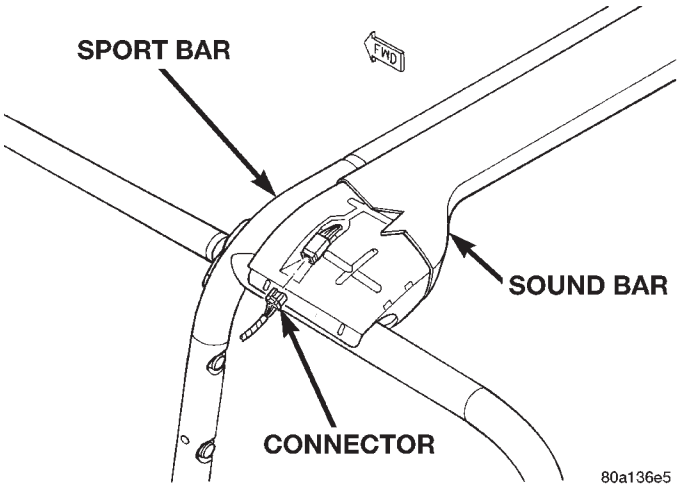

Fig. 7 Sound Bar Wire Harness Connector Remove/Install

(6) Unplug the sound bar wire harness connector.

(7) Lift each outboard end flap of the sound bar cover over the top of the sport bar far enough to access the mounting screws (Fig. 8).

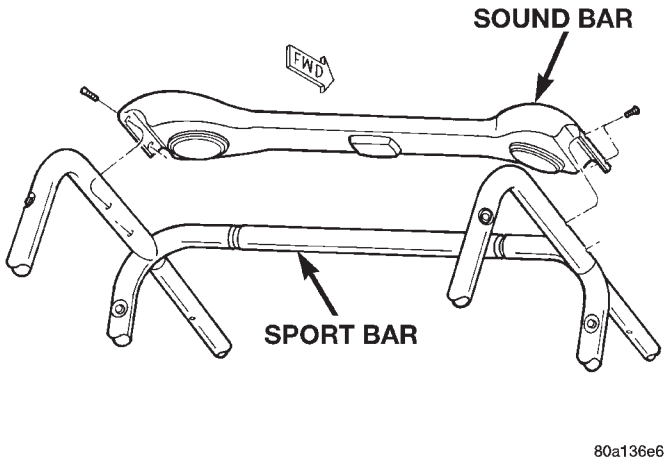

Fig. 8 Sound Bar Remove/Install

(8) Remove the two screws that secure each end of the sound bar to the sport bar.

(9) Lift the sound bar up off of the sport bar to remove it from the vehicle.

(10) Reverse the removal procedures to install. Tighten the sound bar mounting screws to 11 N·m (100 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

ANTENNA

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the glove box from the instrument panel. Refer to Glove Box in Group 8E - Instrument Panel Systems for the procedures.

(3) Reach through the instrument panel glove box opening to unplug the antenna coaxial cable connector. Unplug the connector by pulling it apart while twisting the metal connector halves. Do not pull on the cable.

(4) From inside the passenger compartment, push the coaxial cable grommet on the antenna body half of the coaxial cable out through the hole in the right inner cowl side panel (Fig. 9).

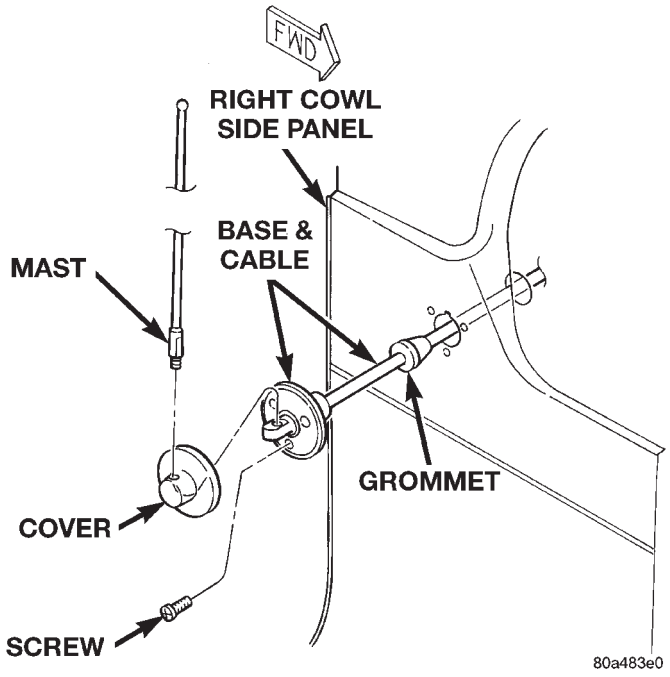

Fig. 9 Antenna Remove/Install

(5) Unscrew the antenna mast from the antenna body base on the right outer cowl side panel.

(6) Using a trim stick or another suitable wide flat-bladed tool, gently pry the edge of the antenna base trim cover to unsnap it from the antenna body base.

(7) Remove the three screws that secure the antenna body base to the right outer cowl side panel.

(8) From the outside of the vehicle, pull the antenna body base and cable assembly out through the hole in the right outer cowl side panel.

(9) Reverse the removal procedures to install. Tighten the antenna body base mounting screws to 2 N·m (17 in. lbs.). Tighten the antenna mast to 3.3 N·m (30 in. lbs.).

RADIO NOISE SUPPRESSION COMPONENTS

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REMOVAL

ENGINE-TO-BODY GROUND STRAP

(1) Remove the screw that secures the engine-to-body ground strap eyelet to the hood panel center reinforcement (Fig. 10).

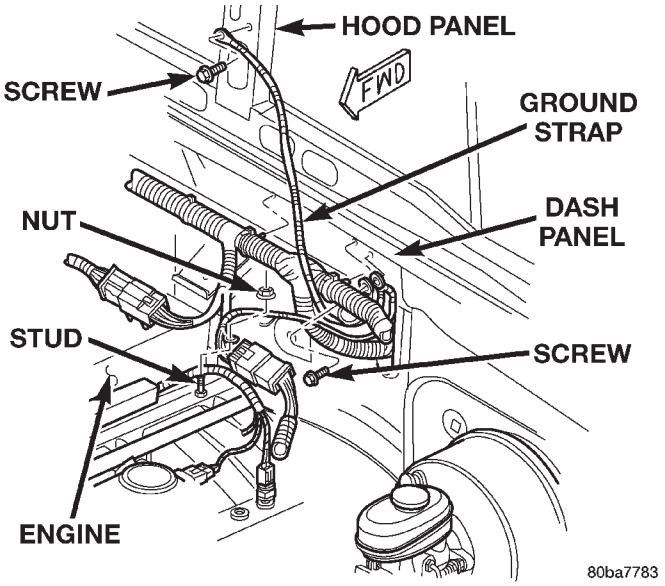


Fig. 10 Engine-To-Body Ground Strap Remove/Install

(2) Remove the screw that secures the engine-to-body ground strap eyelet to the dash panel.

(3) Remove the nut that secures the engine-to-body ground strap eyelet to the stud on the left upper rear corner of the engine cylinder head.

REMOVAL AND INSTALLATION (Continued)

(4) Remove the engine-to-body ground strap eyelet from the stud on the left upper rear corner of the engine cylinder head.

(5) Remove the engine-to-body ground strap from the engine compartment.

ENGINE-TO-FRAME GROUND STRAP

(1) Remove the nut that secures the engine-to-frame ground strap eyelet to the forward ignition coil mounting stud on the right side of the engine (Fig. 11) or (Fig. 12).

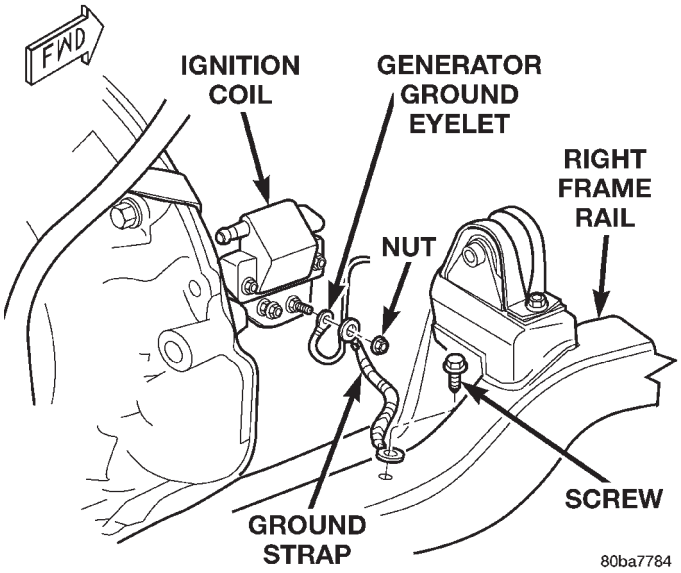


Fig. 11 Engine-To-Frame Ground Strap Remove/ Install - 2.5L Engine

(2) Remove the engine-to-frame ground strap eyelet from the forward ignition coil mounting stud on the right side of the engine.

(3) Remove the screw that secures the engine-to-frame ground strap eyelet to the top of the right frame rail.

(4) Remove the engine-to-frame ground strap from the engine compartment.

INSTALLATION

ENGINE-TO-BODY GROUND STRAP

(1) Position the engine-to-body ground strap in the engine compartment.

(2) Position the engine-to-body ground strap eyelet over the stud on the left upper rear corner of the engine cylinder head.

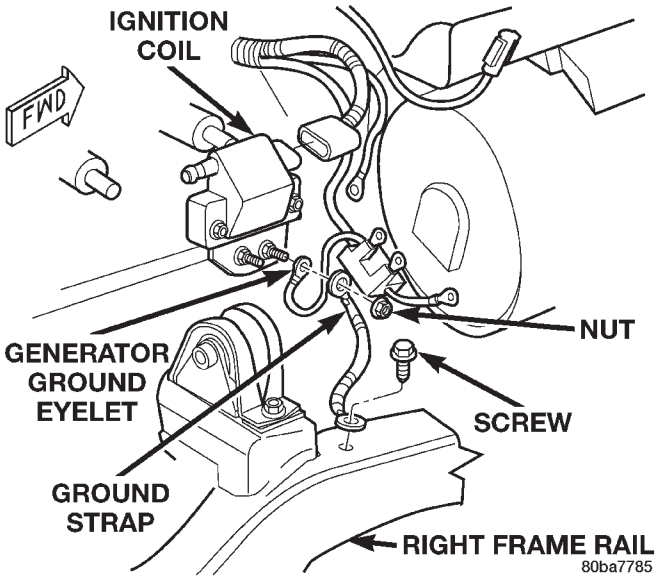


Fig. 12 Engine-To-Frame Ground Strap Remove/ Install - 4.0L Engine

(3) Install and tighten the nut that secures the engine-to-body ground strap eyelet to the stud on the left upper rear corner of the engine cylinder head. Tighten the nut to 5.6 N·m (50 in. lbs.).

(4) Install and tighten the screw that secures the engine-to-body ground strap eyelet to the dash panel. Tighten the screw to 48.5 N·m (430 in. lbs.).

(5) Install and tighten the screw that secures the engine-to-body ground strap eyelet to the hood panel center reinforcement. Tighten the screw to 1.9 N·m (17 in. lbs.).

ENGINE-TO-FRAME GROUND STRAP

(1) Position the engine-to-frame ground strap into the engine compartment. The ground strap eyelet with a 45 degree bend in it is to be mounted on the right frame rail.

(2) Install and tighten the screw that secures the engine-to-frame ground strap eyelet to the top of the right frame rail. Tighten the screw to 22.6 N·m (200 in. lbs.).

(3) Install the engine-to-frame ground strap eyelet over the forward ignition coil mounting stud on the right side of the engine.

(4) Install and tighten the nut that secures the engine-to-frame ground strap eyelet to the forward ignition coil mounting stud on the right side of the engine. Tighten the nut to 22.6 N·m (200 in. lbs.).

HORN SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

HORN SYSTEM

DESCRIPTION

A dual-note electric horn system is standard factory-installed equipment on this model. The standard equipment horn system features a one low-note horn unit and one high-note horn unit. The horn system uses a non-switched source of battery current so that the system will remain functional, regardless of the ignition switch position. The horn system includes the following components:

- Clockspring
- Horn(s)
- Horn relay
- Horn switch

Refer to **Clockspring** in the Description and Operation section of Group 8M - Passive Restraint Systems for more information on this component. Refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams. Following are general descriptions of the remaining major components in the horn system.

OPERATION

The horn system is activated by a horn switch concealed beneath the driver side airbag module trim cover in the center of the steering wheel. Depressing the center of the driver side airbag module trim cover closes the horn switch. Closing the horn switch activates the horn relay. The activated horn relay then switches the battery current needed to energize the horns.

Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the horn system.

HORN

DESCRIPTION

The dual electromagnetic diaphragm-type horns are standard equipment on this model. Each horn is secured with a bracket to the left front inner fender shield just ahead of the left front wheel house in the engine compartment. The two horn brackets are mounted in the same location, one on top of the other. The high-note horn for the optional dual-note horn system is connected in parallel with and secured with a bracket just forward of the low-note horn.

The two horns are connected in parallel. Each horn is grounded through its wire harness connector and circuit to an eyelet secured to the engine compartment side of the grille/headlamp mounting panel near the left headlamp, and receives battery feed through the closed contacts of the horn relay.

The horns cannot be repaired or adjusted and, if faulty or damaged, they must be individually replaced.

OPERATION

Within the two halves of the molded plastic horn housing are a flexible diaphragm, a plunger, an electromagnetic coil and a set of contact points. The diaphragm is secured in suspension around its perimeter by the mating surfaces of the horn housing. The plunger is secured to the center of the diaphragm and extends into the center of the electromagnet. The contact points control the current flow through the electromagnet.

When the horn is energized, electrical current flows through the closed contact points to the electromagnet. The resulting electromagnetic field draws the plunger and diaphragm toward it until that movement mechanically opens the contact points. When the contact points open, the electromagnetic

DESCRIPTION AND OPERATION (Continued)

field collapses allowing the plunger and diaphragm to return to their relaxed positions and closing the contact points again. This cycle continues repeating at a very rapid rate producing the vibration and movement of air that creates the sound that is directed through the horn outlet.

HORN RELAY

DESCRIPTION

The horn relay is a electromechanical device that switches battery current to the horn when the horn switch grounds the relay coil. The horn relay is located in the Power Distribution Center (PDC) in the engine compartment. If a problem is encountered with a continuously sounding horn, it can usually be quickly resolved by removing the horn relay from the PDC until further diagnosis is completed. See the fuse and relay layout label affixed to the inside surface of the PDC cover for horn relay identification and location.

The horn relay is a International Standards Organization (ISO) micro-relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. The ISO micro-relay terminal functions are the same as a conventional ISO relay. However, the ISO micro-relay terminal pattern (or footprint) is different, the current capacity is lower, and the physical dimensions are smaller than those of the conventional ISO relay.

The horn relay cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The ISO relay consists of an electromagnetic coil, a resistor or diode, and three (two fixed and one movable) electrical contacts. The movable (common feed) relay contact is held against one of the fixed contacts (normally closed) by spring pressure. When the electromagnetic coil is energized, it draws the movable contact away from the normally closed fixed contact, and holds it against the other (normally open) fixed contact.

When the electromagnetic coil is de-energized, spring pressure returns the movable contact to the normally closed position. The resistor or diode is connected in parallel with the electromagnetic coil in the relay, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

HORN SWITCH

DESCRIPTION

A center-blow, normally open, resistive membrane-type horn switch is secured with heat stakes to the back side of the driver side airbag module trim cover in the center of the steering wheel (Fig. 1). The switch consists of two plastic membranes, one that is flat and one that is slightly convex. These two membranes are secured to each other around the perimeter. Inside the switch, the centers of the facing surfaces of these membranes each has a grid made with an electrically conductive material applied to it. One of the grids is connected to a circuit that provides it with continuity to ground at all times. The grid of the other membrane is connected to the horn relay control circuit.

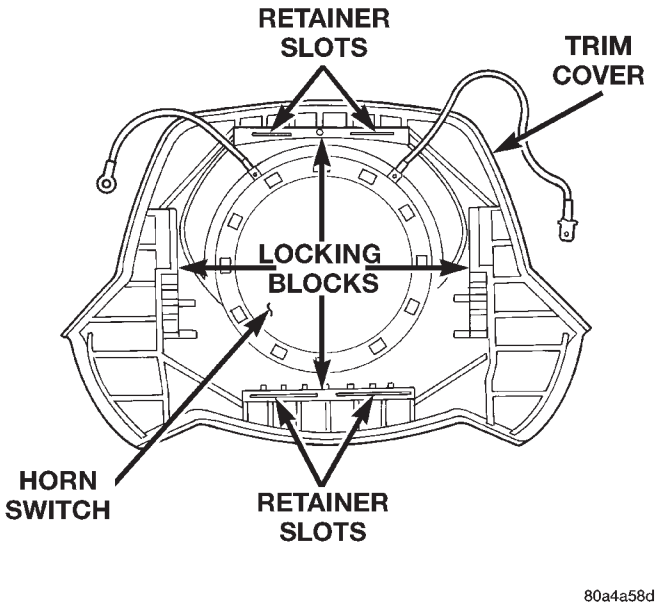


Fig. 1 Driver Side Airbag Module Trim Cover and Horn Switch - Typical

The steering wheel and steering column must be properly grounded in order for the horn switch to function properly. The horn switch is only serviced as a part of the driver side airbag module trim cover. If the horn switch is damaged or faulty, or if the driver side airbag is deployed, the driver side airbag module trim cover and horn switch must be replaced as a unit.

OPERATION

When the center area of the driver side airbag trim cover is depressed, the electrically conductive grids on the facing surfaces of the horn switch membranes contact each other, closing the switch circuit. The completed horn switch circuit provides a ground for the control coil side of the horn relay, which activates the relay. When the horn switch is released, the resistive tension of the convex membrane separates the two electrically conductive grids and opens the switch circuit.

DIAGNOSIS AND TESTING

HORN RELAY

The horn relay (Fig. 2) is located in the Power Distribution Center (PDC) behind the battery on the driver side of the engine compartment. If a problem is encountered with a continuously sounding horn, it can usually be quickly resolved by removing the horn relay from the PDC until further diagnosis is completed. See the fuse and relay layout label affixed to the inside surface of the PDC cover for horn relay identification and location. For complete circuit diagrams, refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the horn relay from the PDC. Refer to **Horn Relay** in the Removal and Installation section of this group for the procedures.

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 5 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

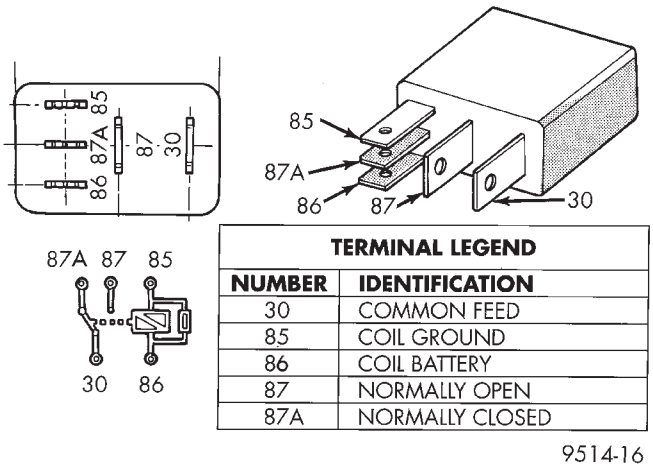
(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, perform the Relay Circuit Test that follows. If not OK, replace the faulty relay.

RELAY CIRCUIT TEST

(1) The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to Step 2. If not OK, repair the open circuit to the fuse in the PDC as required.

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the horn(s). There should be continuity between the cavity for relay terminal 87 and the horn relay output circuit cavity of each horn wire harness connector at all times. If OK, go to Step 4. If not OK, repair the open circuit to the horn(s) as required.



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

9514-16

Fig. 2 Horn Relay

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. It is connected to battery voltage and should be hot at all times. Check for battery voltage at the cavity for relay terminal 86. If OK, go to Step 5. If not OK, repair the open circuit to the fuse in the PDC as required.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. It is grounded through the horn switch when the horn switch is depressed. Check for continuity to ground at the cavity for relay terminal 85. There should be continuity with the horn switch depressed, and no continuity with the horn switch released. If not OK, refer to **Horn Switch** in the Diagnosis and Testing section of this group.

HORN SWITCH

For complete circuit diagrams, refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the knee blocker from the instrument panel.

(2) Check for continuity between the metal steering column jacket and a good ground. There should be continuity. If OK, go to Step 3. If not OK, refer to

DIAGNOSIS AND TESTING (Continued)

Steering Column in the Removal and Installation section of Group 19 - Steering for proper installation of the steering column.

(3) Remove the driver side airbag module from the steering wheel. Disconnect the horn switch wire harness connectors from the driver side airbag module.

(4) Remove the horn relay from the Power Distribution Center (PDC). Check for continuity between the steering column half of the horn switch feed wire harness connector and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted horn relay control circuit to the horn relay in the PDC as required.

(5) Check for continuity between the steering column half of the horn switch feed wire harness connector and the horn relay control circuit cavity for the horn relay in the PDC. There should be continuity. If OK, go to Step 6. If not OK, repair the open horn relay control circuit to the horn relay in the PDC as required.

(6) Check for continuity between the horn switch feed wire and the horn switch ground wire on the driver side airbag module. There should be no continuity. If OK, go to Step 7. If not OK, replace the faulty horn switch.

(7) Depress the center of the driver side airbag module trim cover and check for continuity between the horn switch feed wire and the horn switch ground wire on the driver side airbag module. There should now be continuity. If not OK, replace the faulty horn switch.

HORN

For complete circuit descriptions, refer to **Horn/Cigar Lighter** in the Contents of Group 8W - Wiring Diagrams.

(1) Disconnect the wire harness connectors from the horn connector receptacles. Measure the resistance between the ground circuit cavity of the horns wire harness connectors and a good ground. There should be no measurable resistance. If OK, go to Step 2. If not OK, repair the open ground circuit to ground as required.

(2) Check for battery voltage at the horn relay output circuit cavity of the horns wire harness connectors. There should be zero volts. If OK, go to Step 3. If not OK, repair the shorted horn relay output circuit or replace the faulty horn relay as required.

(3) Depress the horn switch. There should now be battery voltage at the horn relay output circuit cavity of the horns wire harness connectors. If OK, replace the faulty horns. If not OK, repair the open horn relay output circuit to the horn relay as required.

REMOVAL AND INSTALLATION

HORN RELAY

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC) (Fig. 3).

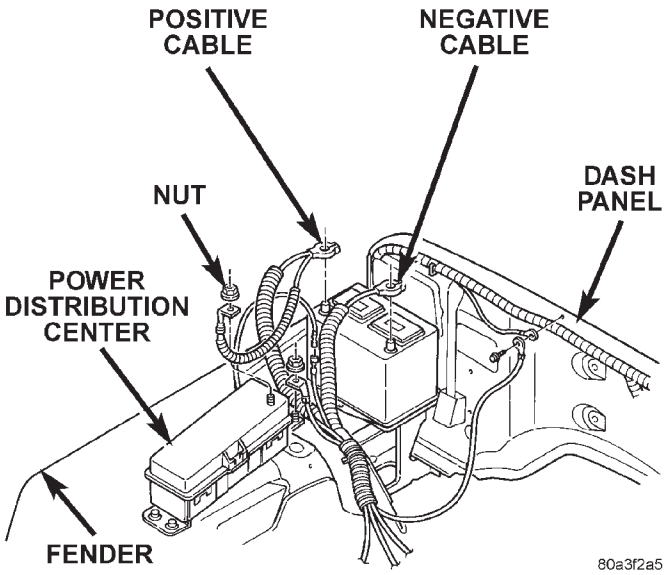


Fig. 3 Power Distribution Center

(3) See the fuse and relay layout label affixed to the underside of the PDC cover for horn relay identification and location.

(4) Remove the horn relay from the PDC.

INSTALLATION

(1) See the fuse and relay layout label affixed to the underside of the PDC cover for the proper horn relay location.

(2) Position the horn relay in the proper receptacle in the PDC.

(3) Align the horn relay terminals with the terminal cavities in the PDC receptacle.

(4) Push down firmly on the horn relay until the terminals are fully seated in the terminal cavities in the PDC receptacle.

(5) Install the cover onto the PDC.

(6) Reconnect the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

HORN

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Disconnect the wire harness connectors from the horn connector receptacles (Fig. 4).

(3) Remove the two screws that secure the horn and mounting bracket units to the left front inner fender shield.

(4) Remove the horn and mounting bracket units from the left front inner fender shield.

INSTALLATION

(1) Position the horn and mounting bracket units onto the left front inner fender shield.

(2) Install and tighten the screw that secures the horn and mounting bracket units to the left front inner fender shield. Tighten the screw to 6.8 N·m (5 ft. lbs.).

(3) Reconnect the wire harness connectors to the horn connector receptacles.

(4) Reconnect the battery negative cable.

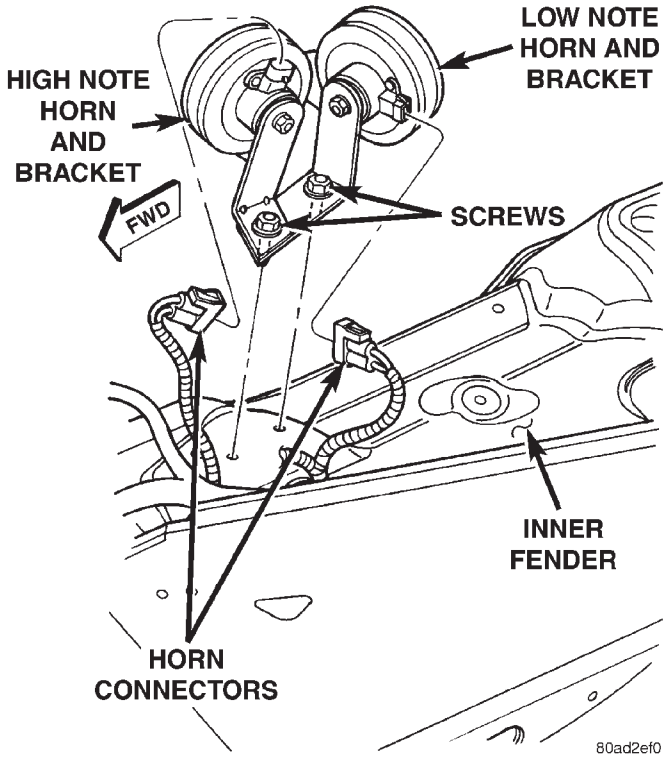


Fig. 4 Horns Remove/Install

SPEED CONTROL SYSTEM

CONTENTS

DESCRIPTION AND OPERATION

SPEED CONTROL SERVO

The servo unit consists of a solenoid valve body, a vacuum servo and the mounting bracket. The Powertrain Control Module (PCM) controls the solenoid valve body. The solenoid valve body controls the application and release of vacuum to the diaphragm of the vacuum servo. A cable connects the servo with the throttle linkage. The servo unit cannot be repaired and is serviced only as a complete assembly.

SPEED CONTROL SOLENOID CIRCUITS

When all of the speed control parameters are met, and the SET button is pressed, the PCM actuates the vent solenoid and “duty-cycles” the vacuum solenoid to open the throttle and bring the vehicle up to target speed. When the vehicle is at target speed, it will actuate the vent solenoid with the vacuum solenoid de-activated to maintain the vehicle at target speed. When the vehicle is above target speed, the PCM will “duty-cycle” the vent solenoid with the vacuum solenoid still de-activated to close the throttle to return to target speed.

SPEED CONTROL SWITCHES

Two separate speed control switch modules are mounted on the steering wheel to the left and right side of the driver’s airbag module. Within the two switch modules, five **momentary** contact switches, supporting seven different speed control functions are used. The outputs from these switches are filtered into one input. The Powertrain Control Module (PCM) determines which output has been applied through **resistive multiplexing.** The input circuit voltage is measured by the PCM to determine which switch function has been selected.

A speed control indicator lamp, located on the instrument panel cluster is energized by the PCM via the CCD Bus. This occurs when speed control system power has been turned ON, and the engine is running.

The two switch modules are labeled: ON/OFF, SET, RESUME/ACCEL, CANCEL and COAST. Refer to the owner’s manual for more information on speed control switch functions and setting procedures. The individual switches cannot be repaired. If one individual switch fails, the switch module must be replaced.

STOP LAMP SWITCH

Vehicles equipped with the speed control option use a dual function stop lamp switch. The switch is mounted on the brake pedal mounting bracket under the instrument panel. The PCM monitors the state of the dual function stop lamp switch. Refer to the Brake section for more information on stop lamp switch service and adjustment procedures.

SERVO CABLE

The speed control servo cable is connected between the speed control vacuum servo diaphragm and the throttle body control linkage. This cable causes the

DESCRIPTION AND OPERATION (Continued)

throttle control linkage to open or close the throttle valve in response to movement of the vacuum servo diaphragm.

POWERTRAIN CONTROL MODULE

The speed control electronic control circuitry is integrated into the Powertrain Control Module (PCM). The PCM is located in the engine compartment. The PCM speed control functions are monitored by the On-Board Diagnostics (OBD). All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects. See On-Board Diagnostic Test For Speed Control System in this group for more information. The PCM cannot be repaired and must be replaced if faulty.

VACUUM RESERVOIR

A vacuum reservoir is used to supply the vacuum needed to maintain proper speed control operation when engine vacuum drops, such as in climbing a grade while driving. A one-way check valve is used in the vacuum line between the reservoir and the vacuum source. This check valve is used to trap engine vacuum in the reservoir. On certain vehicle applications, this reservoir is shared with the heating/air-conditioning system. The vacuum reservoir cannot be repaired and must be replaced if faulty.

VEHICLE SPEED SENSOR

The Vehicle Speed Sensor (VSS) is a pulse generator mounted to an adapter near the transmission output shaft. The sensor is driven through the adapter by a speedometer pinion gear. The VSS pulse signal to the speedometer/odometer is monitored by the PCM speed control circuitry to determine vehicle speed and to maintain speed control set speed.

DIAGNOSIS AND TESTING

ROAD TEST

Perform a vehicle road test to verify reports of speed control system malfunction. The road test should include attention to the speedometer. Speedometer operation should be smooth and without flutter at all speeds.

Flutter in the speedometer indicates a problem which might cause surging in the speed control system. The cause of any speedometer problems should be corrected before proceeding. Refer to Group 8E, Instrument Panel and Gauges for speedometer diagnosis.

If a road test verifies a system problem and the speedometer operates properly, check for:

- A Diagnostic Trouble Code (DTC). If a DTC exists, conduct tests per the Powertrain Diagnostic Procedures service manual.
- A misadjusted brake (stop) lamp switch. This could also cause an intermittent problem.
- Loose, damaged or corroded electrical connections at the servo. Corrosion should be removed from electrical terminals and a light coating of Mopar MultiPurpose Grease, or equivalent, applied.
- Leaking vacuum reservoir.
- Loose or leaking vacuum hoses or connections.
- Defective one-way vacuum check valve.
- Secure attachment of both ends of the speed control servo cable.
- Smooth operation of throttle linkage and throttle body air valve.
- Failed speed control servo. Do the servo vacuum test.

CAUTION: When test probing for voltage or continuity at electrical connectors, care must be taken not to damage connector, terminals or seals. If these components are damaged, intermittent or complete system failure may occur.

ON-BOARD DIAGNOSTIC TEST FOR SPEED CONTROL SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the speed control system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some circuits are checked continuously and some are checked only under certain conditions.

For DTC information, refer to Diagnostic Trouble Codes in Group 25, Emission Control System. This will include a complete list of DTC's including DTC's for the speed control system.

VEHICLE SPEED SIGNAL

For diagnosis and testing of the Vehicle Speed Signal (VSS), refer to the appropriate Powertrain Diagnostic Procedures service manual. Also refer to the DRB scan tool.

SPEED CONTROL SWITCHES

To perform a complete test of the speed control switch circuits, refer to the appropriate Powertrain Diagnostic Procedures manual.

STOP LAMP SWITCH

For continuity checks and switch adjustment, refer to Group 5, Brakes.

DIAGNOSIS AND TESTING (Continued)

VACUUM SUPPLY TEST

(1) Disconnect vacuum hose at speed control servo and install a vacuum gauge into the disconnected hose.

(2) Start engine and observe gauge at idle. Vacuum gauge should read at least ten inches of mercury.

(3) If vacuum is less than ten inches of mercury, determine source of leak. Check vacuum line to engine for leaks. Also check actual engine intake manifold vacuum. If manifold vacuum does not meet this requirement, check for poor engine performance and repair as necessary.

(4) If vacuum line to engine is not leaking, check for leak at vacuum reservoir. To locate and gain access to reservoir, refer to Vacuum Reservoir Removal/Installation in this group. Disconnect vacuum line at reservoir and connect a hand-operated vacuum pump to reservoir fitting. Apply vacuum. Reservoir vacuum should not bleed off. If vacuum is being lost, replace reservoir.

(5) Verify operation of one-way check valve and check it for leaks.

(a) Locate one-way check valve. The valve is located in vacuum line between vacuum reservoir and engine vacuum source. Disconnect vacuum hoses (lines) at each end of valve.

(b) Connect a hand-operated vacuum pump to reservoir end of check valve. Apply vacuum. Vacuum should not bleed off. If vacuum is being lost, replace one-way check valve.

(c) Connect a hand-operated vacuum pump to vacuum source end of check valve. Apply vacuum. Vacuum should flow through valve. If vacuum is not flowing, replace one-way check valve. Seal the fitting at opposite end of valve with a finger and apply vacuum. If vacuum will not hold, diaphragm within check valve has ruptured. Replace valve.

SPEED CONTROL SERVO

For complete speed control system diagnosis, refer to the appropriate Powertrain Diagnostic Procedures manual. To test the speed control servo only, refer to the following:

The engine must be started and running for the following voltage tests.

(1) Start engine.

(2) Disconnect 4–way electrical connector at servo.

(3) Turn speed control switch to ON position.

(4) Check for battery voltage at pin–3 of wiring harness 4–way connector (Fig. 1). This is the 12 volt feed from the stoplamp switch. When the brake pedal is depressed, voltage should not be present at pin–3. If voltage is not present with brake pedal **not** depressed, check for continuity between servo and stop lamp switch. Also check stop lamp switch adjustment. Refer to Group 5, Brakes for procedures.

(5) Connect a small gauge jumper wire between the disconnected servo harness 4–way connector pin–3, and pin–3 on the servo. Check for battery voltage at pins–1, 2 and 4 of the servo. If battery voltage is not at these pins, replace the servo.

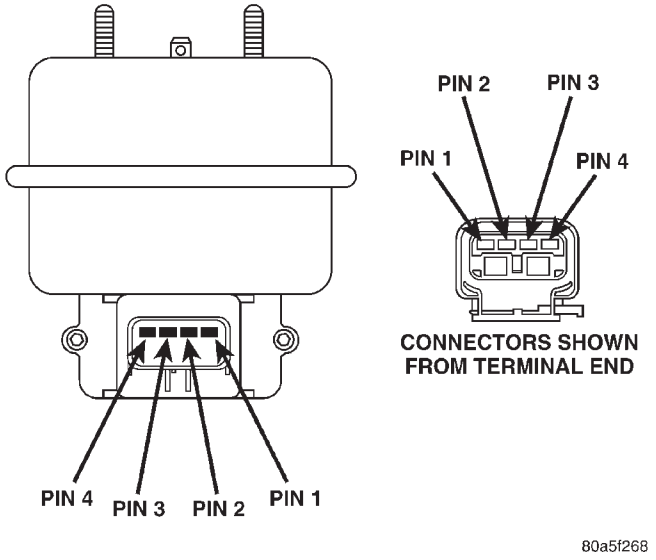


Fig. 1 Servo 4–Way Harness Connector

(6) Turn ignition switch to OFF position. Check for continuity between disconnected servo harness 4–way connector pin–4 and a good ground. There should be continuity. If not OK, repair open circuit to ground as required.

OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET

If the operator repeatedly presses and releases the set button with their foot off of the accelerator (a “lift foot set” to begin speed control operation), the vehicle may accelerate and exceed the desired set speed by up to 5 MPH (8 km/h) and then decelerate to less than the desired set speed before finally achieving the desired set speed.

The Speed Control has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths. When the speed control is set with the vehicle operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts. If the lift foot sets are continually used, the speed control overshoot/undershoot condition will develop.

To “unlearn” the overshoot/undershoot condition, the vehicle operator has to press and release the set button while maintaining the desired set speed with the accelerator pedal (not decelerating or accelerating), and then turn the cruise control switch to the

DIAGNOSIS AND TESTING (Continued)

OFF position (or press the CANCEL button if equipped) after waiting 10 seconds. This procedure must be performed approximately 10–15 times to completely unlearn the overshoot/undershoot condition.

REMOVAL AND INSTALLATION

SPEED CONTROL SERVO

REMOVAL

(1) Disconnect negative battery cable at battery.
(2) Disconnect vacuum line at servo (Fig. 2).
(3) Disconnect electrical connector at servo.
(4) Disconnect servo cable at throttle body. Refer to Servo Cable Removal/Installation in this group.
(5) Remove 2 mounting nuts holding servo cable sleeve to bracket (Fig. 2) or (Fig. 3).
(6) Pull speed control cable sleeve and servo away from servo mounting bracket to expose cable retaining clip (Fig. 3) and remove clip. Note: The servo mounting bracket displayed in (Fig. 3) is a typical bracket and may/may not be applicable to this model vehicle.

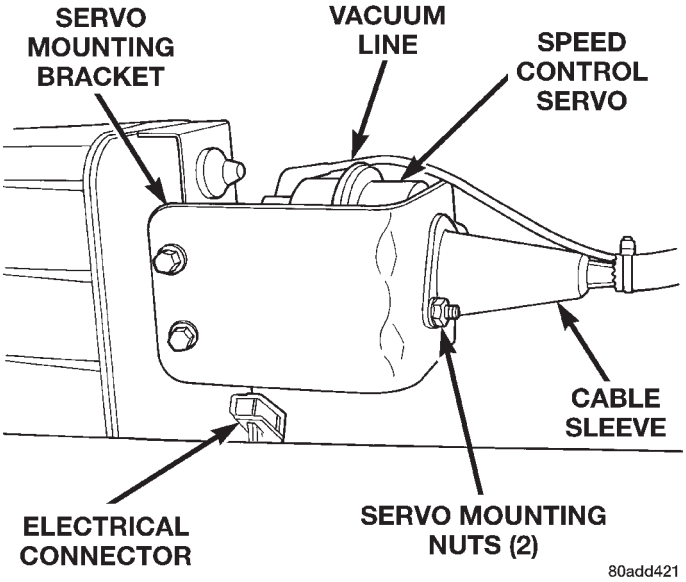


Fig. 2 Speed Control Servo Location

(7) Remove servo from mounting bracket. While removing, note orientation of servo to bracket.

INSTALLATION

(1) Position servo to mounting bracket.
(2) Align hole in cable connector with hole in servo pin. Install cable-to-servo retaining clip.
(3) Insert servo mounting studs through holes in servo mounting bracket.
(4) Install servo mounting nuts and tighten to 8.5 N·m (75 in. lbs.).

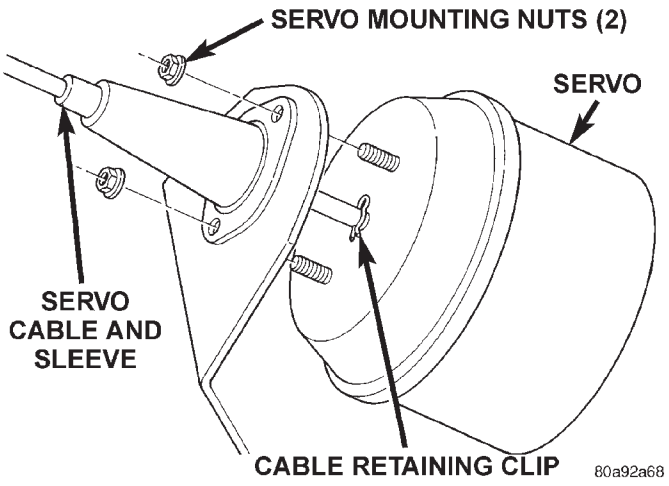


Fig. 3 Servo Cable Clip Remove/Install—Typical

(5) Connect vacuum line at servo.
(6) Connect electrical connector at servo.
(7) Connect servo cable to throttle body. Refer to Servo Cable Removal/Installation in this group.
(8) Connect negative battery cable to battery.
(9) Before starting engine, operate accelerator pedal to check for any binding.

SPEED CONTROL SWITCH

WARNING: BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL AND STEERING COLUMN COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. WAIT 2 MINUTES FOR SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate negative battery cable from battery.
(2) Remove airbag module. Refer to Group 8M, Passive Restraint Systems for procedures.
(3) From underside of steering wheel, remove speed control switch mounting screw (Fig. 4).
(4) Remove switch from steering wheel and unplug electrical connector.

INSTALLATION

(1) Plug electrical connector into switch.
(2) Position switch to steering wheel.
(3) Install switch mounting screw and tighten to 1.5 N·m (14 in. lbs.) torque.
(4) Install airbag module. Refer to Group 8M, Passive Restraint Systems for procedures.

REMOVAL AND INSTALLATION (Continued)

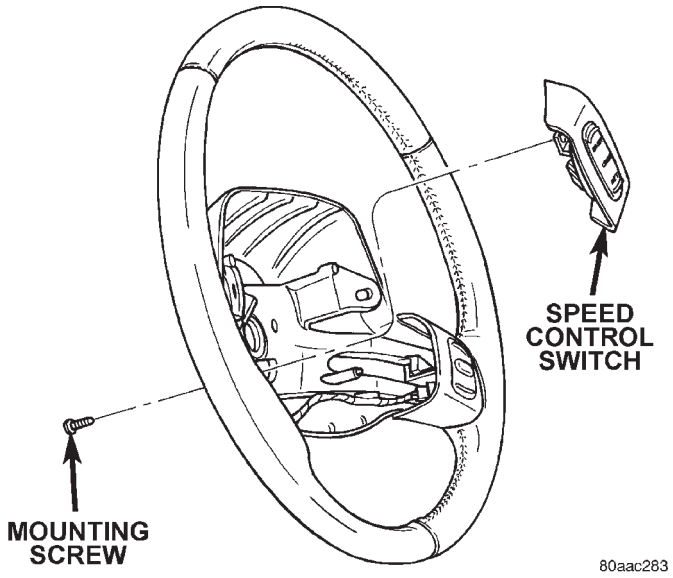


Fig. 4 Speed Control Switch Remove/Install

(5) Connect negative battery cable to battery.

STOP LAMP SWITCH

Refer to Stop Lamp Switch in Group 5, Brakes for removal/installation and adjustment procedures.

SERVO CABLE

REMOVAL

(1) Disconnect negative battery cable at battery.

(2) Using finger pressure only, remove cable connector by pushing connector off the throttle body bellcrank pin (Fig. 5). **DO NOT try to pull cable connector off perpendicular to the bellcrank pin. Connector will be broken.**

(3) Two squeeze tabs are located on sides of speed control cable at cable locking plate (Fig. 6). Squeeze the tabs together and push cable out of cable locking plate.

(4) Unclip cable from cable guide at valve cover (Fig. 6).

(5) Disconnect servo cable at servo. Refer to Speed Control Servo—Removal/Installation.

INSTALLATION

(1) Attach end of cable to speed control servo. Refer to Speed Control Servo Removal/Installation.

(2) Install cable into cable locking plate (snaps in).

(3) Install cable connector at throttle body bellcrank pin (snaps on).

(4) Clip cable to cable guide at valve cover.

(5) Connect negative battery cable to battery.

(6) Before starting engine, operate accelerator pedal to check for any binding.

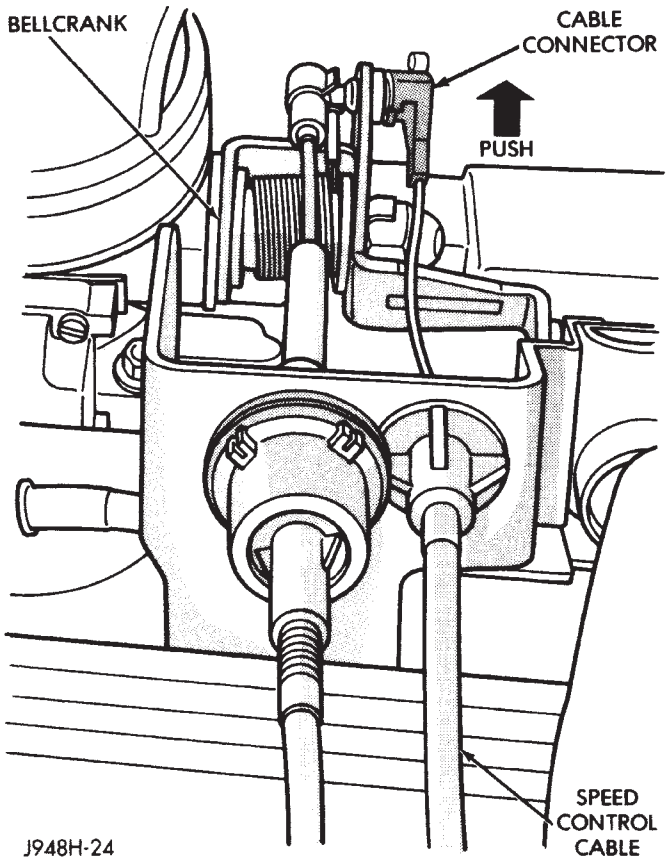


Fig. 5 Servo Cable to Bellcrank—Remove/Install

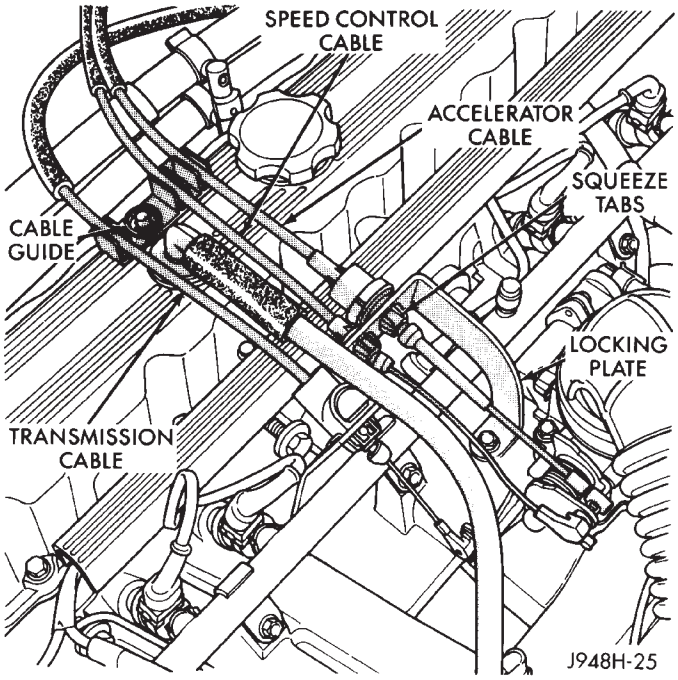


Fig. 6 Squeeze Tabs at Cable Locking Plate

REMOVAL AND INSTALLATION (Continued)

VACUUM RESERVOIR

The vacuum reservoir is located under the vehicle battery tray (Fig. 7).

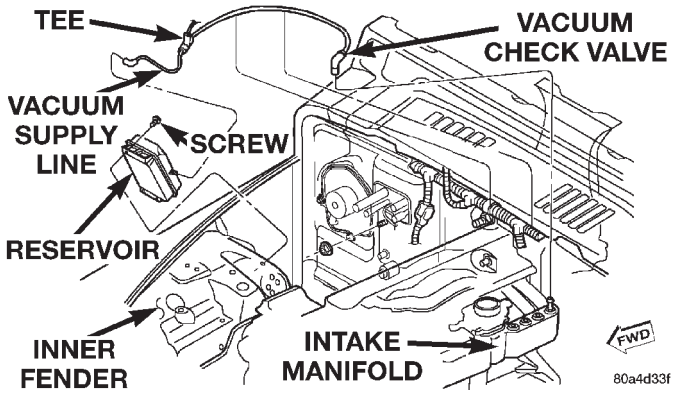


Fig. 7 Vacuum Reservoir Removal/Installation

REMOVAL

(1) Remove battery and battery tray. Refer to Group 8A, Battery for procedure.

(2) Disconnect vacuum supply line at reservoir (Fig. 7).

(3) Remove screw securing reservoir to inner fender.

(4) Remove reservoir from vehicle.

INSTALLATION

(1) Position reservoir to vehicle and install mounting screw.

(2) Tighten screw to 1.2 N·m (10 in. lbs.) torque.

(3) Connect vacuum line to reservoir.

(4) Install battery and battery tray. Refer to Group 8A, Battery.

SPECIFICATIONS

TORQUE CHART

Description	Torque
Servo Mounting Bracket-to-Servo Nuts	8.5 N·m (75 in. lbs.)
Speed Control Switch Mounting Screws	1.5 N·m (14 in. lbs.)
Vacuum Reservoir Mounting Screw	1.2 N·m (10 in. lbs.)

TURN SIGNAL AND HAZARD WARNING SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

TURN SIGNAL SYSTEM

DESCRIPTION

A turn signal system is standard factory-installed safety equipment on this model. The turn signal system uses ignition switched battery current, and will operate only when the ignition switch is in the On or Accessory positions. The turn signal system includes the following components:

- Combination flasher
- Front side marker lamps
- Turn signal cancelling cam
- Turn signal indicator lamps
- Turn signal lamps
- Turn signal switch.

Refer to **Lamp** in the proper section of Group 8L - Lamps for more information on the exterior turn signal lamps. Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for more information on the turn signal indicator lamps. Following are general descriptions of the major components in the turn signal system. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

OPERATION

With the ignition switch in the On or Accessory position, and the turn signal (multi-function) switch control stalk moved up (right turn) or down (left turn), the turn signal system is activated. When the turn signal system is activated, the circuitry of the turn signal switch and the combination flasher will cause the selected (right or left) turn signal indicator lamp, front park/turn signal lamp, front side marker lamp and rear tail/stop/turn signal lamp to flash on and off. If the exterior lamps are turned off, the front park/turn signal lamp and the front side marker lamp will flash in unison. If the exterior lamps are turned on, the front park/turn signal lamp and the front side marker lamp will flash alternately.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the turn signal system.

HAZARD WARNING SYSTEM

DESCRIPTION

A hazard warning system is standard factory-installed safety equipment on this model. Unlike the turn signal system, the hazard warning system uses a non-switched source of battery current so that the system will operate regardless of the ignition switch position. The hazard warning system includes the following components:

- Combination flasher
- Front side marker lamps
- Hazard warning switch
- Turn signal indicator lamps
- Turn signal lamps.

Refer to **Lamp** in the proper section of Group 8L - Lamps for more information on the exterior turn signal lamps. Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for more information on the turn signal indicator lamps. Following are general descriptions of the major components in the hazard warning system. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

OPERATION

With the hazard warning switch in the On position, the hazard warning system is activated. When

DESCRIPTION AND OPERATION (Continued)

the hazard warning system is activated, the circuitry of the hazard warning switch and the combination flasher will cause both the right side and the left side turn signal indicator lamps, front park/turn signal lamps, front side marker lamps and rear tail/stop/turn signal lamps to flash on and off. If the exterior lamps are turned off, the front park/turn signal lamps and the front side marker lamps will flash in unison. If the exterior lamps are turned on, the front park/turn signal lamps and the front side marker lamps will flash alternately.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the hazard warning system.

TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH

DESCRIPTION

The turn signal and hazard warning switches are integral to the multi-function switch unit, which is secured to the left side of the steering column (Fig. 1). The only visible parts of the multi-function switch are the control stalk that extends from the left side of the steering column, and the hazard warning switch button that protrudes from the top of the steering column. The multi-function switch control stalk has international control symbols on it, which identify its functions. The hazard warning switch button is identified with a double triangle, which is the international control symbol for hazard warning. The remainder of the multi-function switch is concealed beneath the steering column shrouds.

The multi-function switch also contains circuitry for the following functions:

- Headlamp beam selection
- Headlamp optical horn

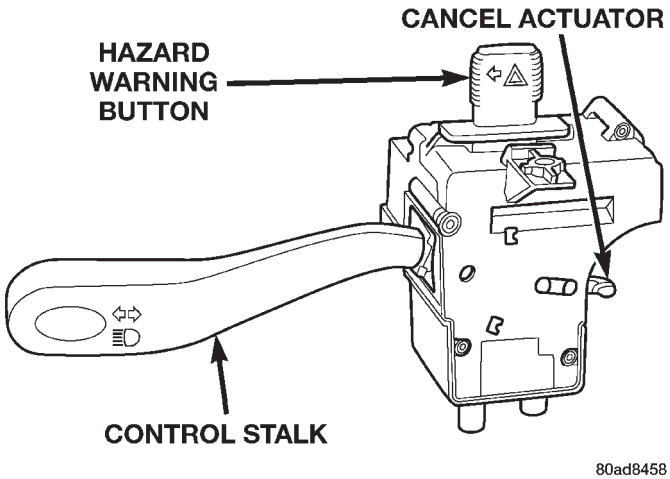


Fig. 1 Multi-Function Switch

The information contained in this group addresses only the multi-function switch turn signal and hazard warning functions. For information relative to the other systems that are controlled by and circuits that are integral to the multi-function switch, see the group in this service manual that covers that system. However, the turn signal and hazard warning switches cannot be repaired. If these switches or any other circuit or component of the multi-function switch unit is faulty or damaged, the entire multi-function switch unit must be replaced.

OPERATION

TURN SIGNAL SWITCH

The multi-function switch control stalk that extends from the left side of the steering column just below the steering wheel is moved up or down to activate the turn signal switch. When the control stalk is moved in the upward direction, the right turn signal switch circuitry is activated; and, when the control stalk is moved in the downward direction, the left turn signal switch circuitry is activated. The turn signal switch has a detent position in each direction that provides turn signals with automatic cancellation, and an intermediate momentary position in each direction that provides turn signals only until the multi-function switch control stalk is released.

When the turn signal switch is in a detent position, it is turned off by one of two turn signal cancelling cam lobes that are integral to the rotor of the clockspring mechanism. Turning the steering wheel causes the turn signal cancelling cam lobes to contact a cancel actuator in the multi-function switch, and the turn signal switch automatically returns to the off position.

HAZARD WARNING SWITCH

The hazard warning switch is controlled by the hazard warning switch button. Slide the switch button to the left to turn the switch on and activate the hazard warning system, and slide the button to the right again to turn the switch and the hazard warning system off.

TURN SIGNAL CANCELLING CAM

DESCRIPTION

The turn signal cancelling cam is concealed within the steering column below the steering wheel. The turn signal cancelling cam consists of two lobes that are integral to the lower surface of the clockspring rotor. The clockspring mechanism provides turn signal cancellation as well as a constant electrical connection between the horn switch, driver side airbag

DESCRIPTION AND OPERATION (Continued)

module and speed control switches on the steering wheel and the instrument panel wire harness on the steering column. The housing of the clockspring is secured to the steering column and remains stationary. The rotor of the clockspring, including the turn signal cancelling cam lobes rotate with the steering wheel.

The turn signal cancelling cam is integral to the clockspring and cannot be repaired. If faulty or damaged, the entire clockspring assembly must be replaced. Refer to **Clockspring** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the clockspring service procedures.

OPERATION

The turn signal cancelling cam has two lobes molded into the lower surface of the clockspring rotor. When the turn signals are activated by moving the multi-function switch control stalk to a detent position, a turn signal cancel actuator is extended from the inside surface of the multi-function switch housing toward the clockspring rotor. When the steering wheel is rotated during the turn, one of the two turn signal cancelling cam lobes will contact the turn signal cancel actuator, releasing the multi-function switch control stalk from its detent and cancelling the turn signal event.

COMBINATION FLASHER

DESCRIPTION

The combination flasher is a smart relay that functions as both the turn signal system and the hazard warning system flasher. The combination flasher contains active electronic Integrated Circuitry (IC) elements. This flasher is designed to handle the current flow requirements of the factory-installed lighting. If supplemental lighting is added to the turn signal lamp circuits, such as when towing a trailer with lights, the combination flasher will automatically try to compensate to keep the flash rate the same.

While the combination flasher has a International Standards Organization (ISO)-type relay terminal configuration or footprint, the internal circuitry is much different. The combination flasher does not use standard ISO-relay inputs or provide ISO-relay type outputs or functions. The combination flasher should never be substituted for an ISO-relay or replaced with an ISO-relay, or else component and vehicle damage may occur.

Because of the active electronic elements within the combination flasher, it cannot be tested with conventional automotive electrical test equipment. If the combination flasher is believed to be faulty, test the turn signal system and hazard warning system circuits as described in this group. Then replace the combination flasher with a known good unit to confirm system operation.

The combination flasher has five blade-type terminals intended for the following inputs and outputs: fused B(+), fused ignition switch output, ground, turn signal circuit, and hazard warning circuit. Constant battery voltage and ground are supplied to the flasher so that it can perform the hazard warning function, and ignition switched battery voltage is supplied for the turn signal function. Refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams.

The combination flasher is located in a bracket secured with a screw to the underside of the upper steering column support bracket, to the right of the steering column under the instrument panel. The combination flasher cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The IC within the combination flasher (Fig. 2) contains the logic that controls the flasher operation and the flash rate. Pin 6 of the IC receives a sense voltage from the hazard warning circuit of the multi-function switch. When the hazard warning switch is turned on, the ″hazard on sense″ voltage will become low due to the circuit being grounded through the turn signal bulbs. This low voltage sense signals the IC to energize the flash control Positive-Negative-Positive (PNP) transistor at a pre-calibrated flash rate or frequency. Each time the PNP transistor energizes the hazard warning circuit, the pin 6 ″hazard on sense″ voltage will become high and the IC signals the PNP transistor to de-energize the circuit. This cycling will continue until the hazard warning switch is turned off.

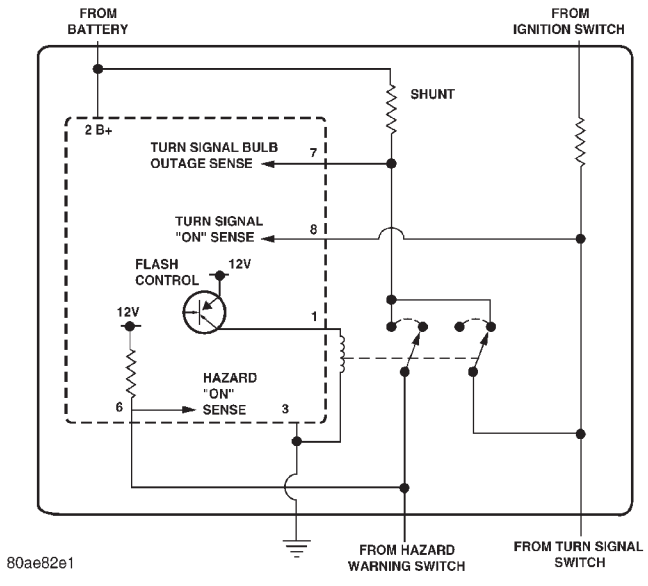


Fig. 2 Combination Flasher - Typical

DESCRIPTION AND OPERATION (Continued)

Likewise, pin 8 of the IC receives a sense voltage from the turn signal circuits of the multi-function switch. When the left or right turn signal switch is turned on, the ″turn signal on sense″ voltage will become low due to the circuit being grounded through the turn signal bulbs. This low voltage sense signals the IC to energize the flash control PNP transistor at a pre-calibrated flash rate or frequency. Each time the PNP transistor energizes the turn signal circuit, the pin 8 ″turn signal on sense″ voltage will become high and the IC signals the PNP transistor to de-energize the circuit. This cycling will continue until the right or left turn signal switch is turned off.

A special design feature of the combination flasher allows it to ″sense″ that a turn signal circuit or bulb is not operating, and provide the driver an indication of the condition by flashing the remaining bulbs in the affected circuit at a higher rate (120 flashes-per-minute or higher). Conventional flashers either continue flashing at their typical rate (heavy-duty type), or discontinue flashing the affected circuit entirely (standard-duty type). During turn signal operation, the combination flasher IC compares normal battery voltage input on pin 2 with the shunt resistor voltage input on pin 7. If the IC ″senses″ that the voltage difference between pin 2 and pin 7 is different than the pre-calibrated value of the IC, it will increase the rate at which it signals the PNP transistor to energize the pin 1 output. Thus, the inoperative half (left or right side) of the turn signal circuit will flash faster.

DIAGNOSIS AND TESTING

TURN SIGNAL AND HAZARD WARNING SYSTEMS

When diagnosing the turn signal or hazard warning circuits, remember that high generator output can burn out bulbs rapidly and repeatedly. If this is a problem on the vehicle being diagnosed, refer to **Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for further diagnosis of a possible generator overcharging condition.

If the problem being diagnosed is related to a failure of the turn signals to automatically cancel following completion of a turn, inspect the multi-function switch for a faulty or damaged cancel actuator and inspect the turn signal cancelling cam lobes on the clockspring mechanism for damage or improper installation. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Turn the ignition switch to the On position. Actuate the turn signal switch or the hazard warning switch. Observe the turn signal indicator lamp(s) in the instrument cluster. If the flash rate is very high, check for a turn signal bulb that is not lit or is very dimly lit. Repair the circuits to that lamp or replace the faulty bulb, as required. If the turn signal indicator(s) fail to light, go to Step 2.

(2) Turn the ignition switch to the Off position. Check the turn signal fuse in the fuseblock module and/or the hazard warning fuse in the Power Distribution Center (PDC). If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse(s).

(3) Check for battery voltage at the hazard warning fuse in the PDC. If OK, go to Step 4. If not OK, repair the open fused B(+) circuit to the battery as required.

(4) Turn the ignition switch to the On position. Check for battery voltage at the turn signal fuse in the fuseblock module. If OK, go to Step 5. If not OK, repair the open fused ignition switch output (accessory/run) circuit to the ignition switch as required.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the combination flasher from its wire harness connector and replace it with a known good unit. Connect the battery negative cable. Test the operation of the turn signal and hazard warning systems. If OK, discard the faulty combination flasher. If not OK, remove the test flasher and go to Step 6.

(6) Turn the ignition switch to the On position. Check for battery voltage at the combo flasher input circuit cavity in the combination flasher wire harness connector. If OK, go to Step 7. If not OK, go to Step 9.

(7) Turn the ignition switch to the Off position. Place the hazard warning switch in the On position. Check for battery voltage again at the combo flasher input circuit cavity in the combination flasher wire harness connector. If OK, go to Step 8. If not OK, go to Step 9.

(8) Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity of the combination flasher wire harness connector and a good ground. There should be conti-

DIAGNOSIS AND TESTING (Continued)

nuity. If OK, go to Step 9. If not OK, repair the open ground circuit to ground as required.

(9) Disconnect the instrument panel wire harness connector from the multi-function switch connector receptacle. Check for continuity between the combo flasher input circuit cavities in the combination flasher wire harness connector and in the instrument panel wire harness connector for the multi-function switch. There should be continuity. If OK, go to Step 10. If not OK, repair the open combo flasher input circuit as required.

(10) Check for continuity between the combo flasher output circuit cavities in the combination flasher wire harness connector and in the instrument panel wire harness connector for the multi-function switch. There should be continuity. If OK, refer to **Turn Signal Switch and Hazard Warning Switch** in the Diagnosis and Testing section of this group. If not OK, repair the open combo flasher output circuit as required.

SWITCH POSITION		CONTINUITY BETWEEN
TURN SIGNAL	HAZARD WARNING	
NEUTRAL	OFF	F and H F and K A and E
LEFT	OFF	F and H C and K C and I A and E
RIGHT	OFF	F and K C and H C and J A and E
NEUTRAL	ON	B and E C and H C and K C and I C and J

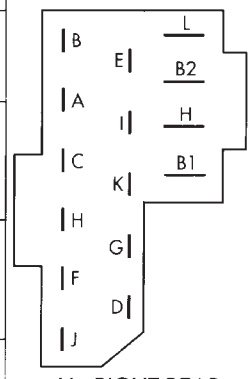


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Fig. 3 Multi-Function Switch Continuity

TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH

The turn signal switch and the hazard warning switch are integral to the multi-function switch. Refer to **Turn Signal and Hazard Warning Systems** in the Diagnosis and Testing section of this group before testing the multi-function switch. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Disconnect the instrument panel wire harness connector from the multi-function switch connector receptacle.

(2) Using an ohmmeter, perform the switch continuity checks at the connector receptacle terminals as shown in the Multi-Function Switch Continuity chart (Fig. 3).

(3) If the turn signal switch or hazard warning switch fails any of the continuity checks, replace the faulty multi-function switch assembly as required. If the switch circuits are OK, repair the lighting circuits as required.

REMOVAL AND INSTALLATION

COMBINATION FLASHER

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

NOTE: The combination flasher and flasher bracket are serviced only as a unit.

(3) Reach through the inboard side of the instrument panel steering column opening to access and remove the screw that secures the combination flasher bracket to the upper steering column mounting bracket to the right of the steering column (Fig. 4).

REMOVAL AND INSTALLATION (Continued)

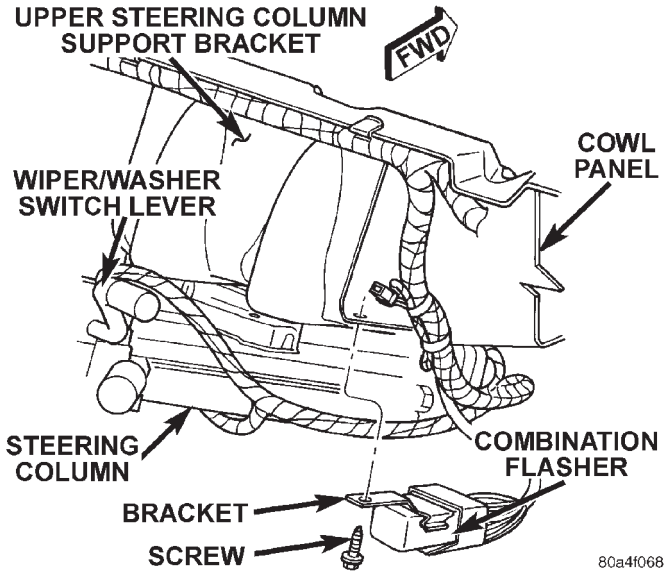


Fig. 4 Combination Flasher Remove/Install

(4) Lower the combination flasher and bracket far enough to access the wire harness connector.

(5) Remove the combination flasher from the wire harness connector.

(6) Remove the combination flasher and bracket from under the instrument panel as a unit.

INSTALLATION

(1) Position the combination flasher and bracket under the instrument panel as a unit.

(2) Align the combination flasher terminals with the terminal cavities in the wire harness connector.

(3) Push in firmly on the combination flasher until the terminals are fully seated in the terminal cavities in the wire harness connector.

(4) Position the combination flasher and bracket to the upper steering column mounting bracket to the right of the steering column under the instrument panel.

(5) Install and tighten the screw that secures the combination flasher and bracket to the upper steering column mounting bracket. Tighten the screw to 4 N·m (35 in. lbs.).

(6) Install the knee blocker onto the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(7) Reconnect the battery negative cable.

TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the three screws that secure the lower steering column shroud to the upper shroud (Fig. 5).

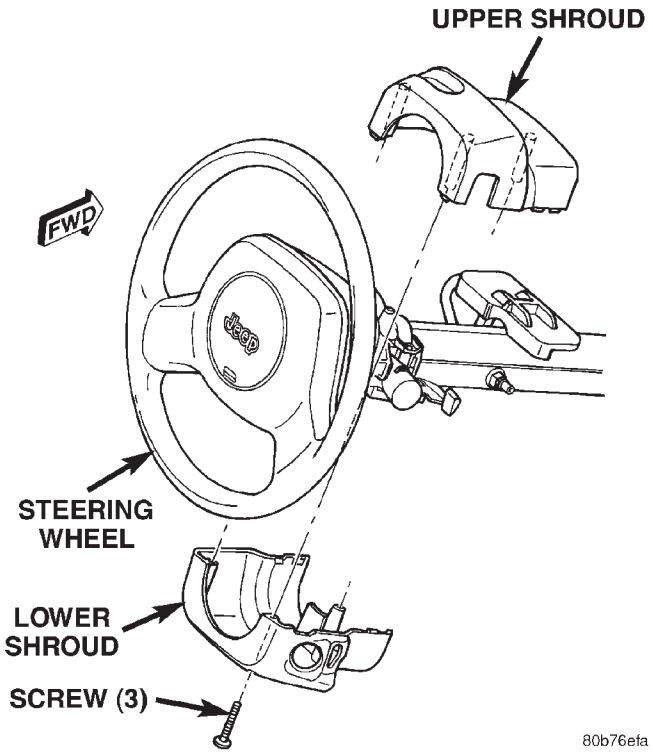


Fig. 5 Steering Column Shrouds Remove/Install

(4) If the vehicle is equipped with a standard non-tilt steering column, loosen the two upper steering column mounting nuts. If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully lowered position.

REMOVAL AND INSTALLATION (Continued)

(5) Remove both the upper and lower shrouds from the steering column.

(6) Remove the two screws that secure the multi-function switch water shield and bracket to the top of the steering column (Fig. 6).

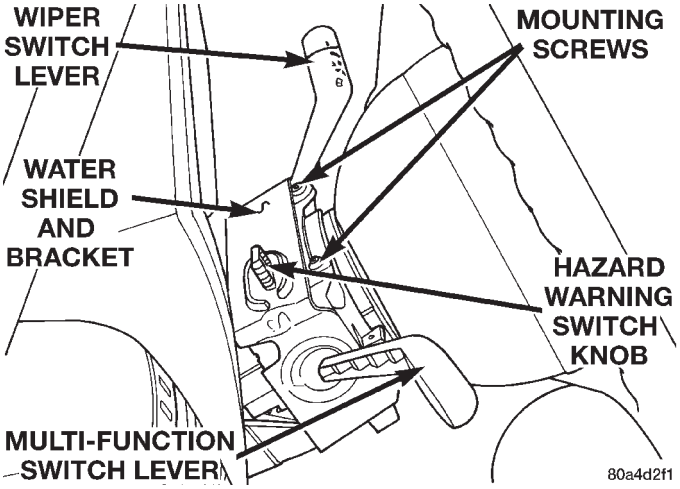


Fig. 6 Water Shield Upper Screws Remove/Install

(7) Remove the one screw located below the multi-function switch control stalk that secures the multi-function switch water shield and bracket to the steering column (Fig. 7).

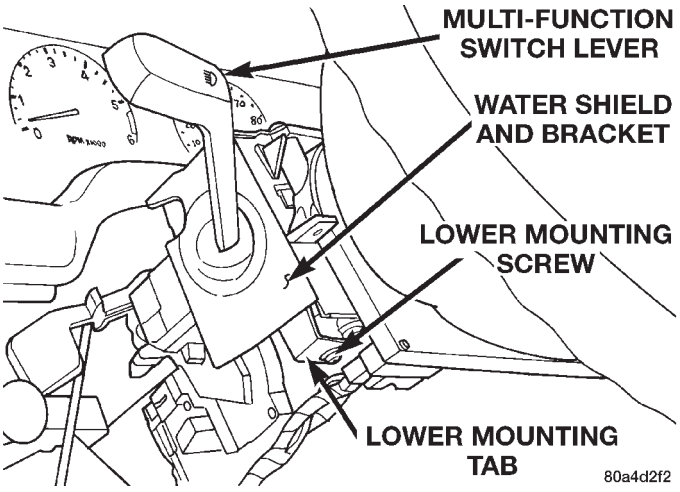


Fig. 7 Water Shield Lower Screw Remove/Install

(8) Gently pull the lower mounting tab of the multi-function switch water shield bracket away from the steering column far enough to clear the screw boss below the multi-function switch control stalk.

(9) Lift the water shield and bracket with the multi-function switch off of the left side of the steering column far enough to access the two multi-function switch wire harness connectors. If the vehicle is equipped with the optional tilt steering column, lifting gently upward on the tilt release lever will provide additional clearance to ease multi-function switch removal.

(10) Disconnect the two instrument panel wire harness connectors from the multi-function switch connector receptacles.

(11) Remove the multi-function switch and water shield from the steering column as a unit.

(12) Gently and carefully remove the water shield from the switch by pulling it over the hazard warning switch button and the multi-function switch control stalk.

INSTALLATION

(1) Gently and carefully install the water shield onto the switch by pulling it over the hazard warning switch button and the multi-function switch control stalk.

(2) Position the multi-function switch and water shield near its mounts on the steering column as a unit.

(3) Reconnect the two instrument panel wire harness connectors to the multi-function switch connector receptacles.

(4) Position the multi-function switch onto its mounts on the left side of the steering column. If the vehicle is equipped with the optional tilt steering column, lifting gently upward on the tilt release lever will provide additional clearance to ease multi-function switch installation.

(5) Position the lower mounting tab of the multi-function switch water shield bracket to the steering column screw boss below the multi-function switch control stalk.

(6) Install and tighten the one screw located below the multi-function switch control stalk that secures the multi-function switch water shield and bracket to the steering column. Tighten the screw to 1.1 N·m (10 in. lbs.).

(7) Install and tighten the two screws that secure the multi-function switch water shield and bracket to the top of the steering column. Tighten the screws to 2.2 N·m (20 in. lbs.).

(8) Position both the upper and lower shrouds onto the steering column.

(9) Install and tighten the three screws that secure the lower steering column shroud to the upper shroud. Tighten the screws to 2 N·m (18 in. lbs.).

(10) If the vehicle is so equipped, tighten the two nuts that secure the non-tilt steering column upper mounting bracket to the dash panel steering column support bracket studs. Tighten the nuts to 22 N·m (200 in. lbs.).

(11) Install the knee blocker onto the instrument panel. Refer to **Knee Blocker** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(12) Reconnect the battery negative cable.

WIPER AND WASHER SYSTEMS

CONTENTS

GENERAL INFORMATION

INTRODUCTION

Following are general descriptions of the major components in the wiper and washer systems. Refer to 8W-53 - Wipers in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

WINDSHIELD WIPER SYSTEM

A two-speed windshield wiper system is standard equipment on this model. An intermittent windshield wiper system is optional. The standard system lets the driver select from two wiper speeds, low or high. The intermittent wiper system adds an intermittent wipe delay feature.

On models equipped with the intermittent wiper system, the intermittent wipe mode delay times are driver adjustable from about one second to about fifteen seconds. The intermittent wipe mode is provided by delay logic and relay control circuitry contained within the intermittent wiper/washer switch. The intermittent wipe relay is also contained within the switch.

The windshield wipers will operate only when the ignition switch is in the Accessory or On positions. A fuse located in the fuseblock module protects the circuitry of either windshield wiper system. Refer to the owner's manual for more information on the windshield wiper system controls and operation.

WINDSHIELD WASHER SYSTEM

An electrically operated windshield washer system is standard equipment. A washer reservoir in the engine compartment holds the washer fluid, which is pressurized by a pump when the windshield washer switch lever is actuated. The windshield washer pump feeds the pressurized washer fluid through the washer system plumbing to the windshield washer nozzles.

If the vehicle is equipped with the two-speed wiper system and the wipers are not already turned on when the washers are activated, the wiper switch will be turned on to the low speed position automatically. The wipers must be turned off manually following a washer switch activation. If the vehicle is equipped with the intermittent wipe system and the wipers are not turned on when the washers are activated, the wipers will be automatically cycled for one or two wipes, then be turned off.

The washers will operate only when the ignition switch is in the Accessory or On positions. A fuse located in the fuseblock module protects the circuitry of the washer system. Refer to the owner's manual for more information on the windshield washer system controls and operation.

REAR WIPER AND WASHER SYSTEM

A rear wiper and washer system is standard equipment on models equipped with the optional hardtop. The rear wiper system provides the following operating modes:

- Continuous fixed-cycle wipe.
- A rear washer mode.

DESCRIPTION AND OPERATION (Continued)

- A park mode that operates the wiper motor until the blade reaches its park position when the rear wiper switch is placed in the Off position.

A single switch in the instrument panel accessory switch bezel controls both the rear wiper and washer functions. The rear washer system shares the reservoir of the windshield washer system, but has its own dedicated washer pump and plumbing.

The rear wiper and washer systems will operate only when the ignition switch is in the On position. A fuse in the fuseblock module protects the circuitry of both the rear wiper and washer systems.

Refer to the owner's manual for more information on the rear wiper and washer system controls and operation.

WIPER ARM AND BLADE

All models have two 33.02-centimeter (13-inch) windshield wiper blades with non-replaceable rubber elements (squeegees). The rear wiper uses a single 45.72-centimeter (18-inch) wiper blade with a non-replaceable rubber element (squeegee).

Caution should be exercised to protect the rubber squeegees from any petroleum-based cleaners or contaminants, which will rapidly deteriorate the rubber. If the squeegees are damaged, worn, or contaminated, the entire wiper blade assembly must be replaced.

Wiper squeegees exposed to the elements for a long time tend to lose their wiping effectiveness. Periodic cleaning of the squeegees is suggested to remove deposits of salt and road film. The wiper blades, arms, and windshield or rear liftglass should be cleaned with a sponge or cloth and windshield washer fluid, a mild detergent, or a non-abrasive cleaner. If the squeegees continue to streak or smear, the wiper blades should be replaced.

The blades are mounted to spring-loaded wiper arms. The spring tension of the wiper arms controls the pressure applied to the blades on the glass. The windshield wiper arms are secured by an integral latch to the two wiper pivots on the cowl plenum cover/grille panel at the base of the windshield. The rear wiper arm is secured by an integral latch directly to the rear wiper motor output shaft on the liftglass.

The wiper arms and blades cannot be adjusted or repaired. If faulty or damaged, they must be replaced.

WIPER LINKAGE AND PIVOT

The wiper linkage and pivot module is secured with screws to the cowl plenum panel beneath the cowl plenum cover/grille panel. The wiper motor is secured with screws to the center of the linkage and pivot module bracket. The wiper pivots are secured to the ends of the module bracket.

The driver side wiper pivot crank arm and the wiper motor crank arm each have ball studs on their ends. The passenger side crank arm has two ball studs. A drive link is connected from the motor crank arm ball stud to one ball stud on the passenger side pivot crank arm. A connecting link is connected from the other ball stud on the passenger side pivot crank arm to the driver side pivot crank arm ball stud.

Both the drive link and the connector link have a plastic socket-type bushing on each end. Each of the socket-type bushings are snap-fit over their respective ball studs.

The wiper linkage, pivots, bushings, motor, crank arm, and mounting bracket are only serviced as a complete unit. If any part of this assembly except the motor is faulty or damaged, the entire unit must be replaced. The wiper motor is also available as a separate service item.

WIPER MOTOR

FRONT

The two-speed permanent magnet wiper motor has an integral transmission and park switch. The motor also contains an internal automatic resetting circuit breaker to protect the motor from overloads. The motor is secured to the wiper linkage and pivot module bracket with three screws and is protected by a rubber boot. The wiper motor output shaft passes through a hole in the module bracket, where a nut secures the wiper motor crank arm to the motor output shaft.

Wiper speed is controlled by current flow to the proper set of brushes. The wiper motor completes its wipe cycle when the windshield wiper switch stalk is moved to the Off position, and parks the blades in the lowest portion of the wipe pattern.

The windshield wiper motor cannot be repaired. If faulty or damaged, the entire wiper motor and boot assembly must be replaced. The wiper linkage and pivots module, which includes the wiper motor, is also available for service.

REAR

The rear wiper motor is secured on the inside of the liftglass with a slotted bracket that fits onto a grommet under the right liftglass hinge mounting nut. The motor output shaft passes through the liftglass, where a rubber gasket and a plastic bezel and nut unit seal and secure the output shaft to the outside of the liftglass. The rear wiper arm is secured directly to the motor output shaft.

The rear wiper motor unit contains an internal park switch. The motor also contains an automatic resetting thermal switch for overload protection.

DESCRIPTION AND OPERATION (Continued)

The rear wiper motor cannot be repaired. If faulty or damaged, the entire rear wiper motor assembly must be replaced.

WIPER SWITCH AND WASHER SWITCH

FRONT

The windshield wiper and washer switches are mounted on the right side of the steering column (Fig. 1). The switch stalk is moved up or down to select the wiper switch mode, and pulled towards the steering wheel to activate the washer system. Models with the intermittent wiper system also have a knob on the end of the switch stalk, which is rotated to select the desired delay interval. The windshield wiper and washer switch contains circuitry for the following functions:

- Windshield wipers
- Intermittent wiper delay relay control and logic (if the vehicle is so equipped)
- Intermittent wipe relay (if the vehicle is so equipped)
- Windshield washers.

The windshield wiper and washer switch cannot be repaired. If any function of the switch is faulty, or if the switch is damaged, the entire switch unit must be replaced.

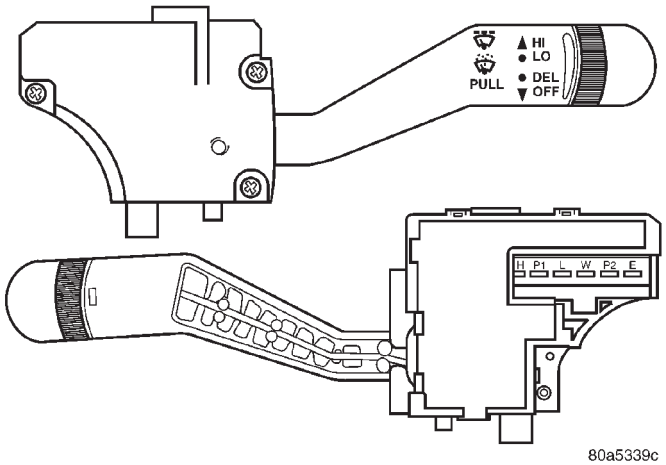


Fig. 1 Windshield Wiper Switch and Washer Switch

REAR

The single two-function rear wiper and washer switch is installed in the instrument panel accessory switch bezel, which is located near the bottom of the instrument panel center bezel area, next to the ash receiver. The rear wiper and washer switch controls the rear wiper and washer functions.

The toggle-type switch features a detent in the On position, and a momentary Wash position. The rear wiper and washer switch also has an integral illumination lamp with a serviceable bulb. The switch knob is pushed down to its detent to activate the rear wiper system, and down again to the momentary position to activate the rear washer system. Both the rear wiper and rear washer motors will operate continuously for as long as the switch is held in the momentary Wash position.

The rear wiper and washer switch cannot be repaired and, if faulty or damaged, the entire switch unit must be replaced.

WASHER RESERVOIR

A single washer fluid reservoir is used for both the front and rear washer systems. The washer fluid reservoir is secured to the inner fender shield, over the left front wheel house in the engine compartment.

Each washer pump and motor unit has a barbed nipple, which is installed through a rubber grommet seal inserted in a hole near the bottom of the reservoir. The washer pumps are retained by an interference fit between the barbed nipple and the grommet seal, which is a light press fit.

The washer reservoir has a snap-fit filler cap with a rubber gasket. The cap hinges on and is secured to a molded-in hook formation on the reservoir behind the filler neck.

The washer reservoir and filler cap are each available for service.

WASHER PUMP

The washer pumps and motors are mounted near the bottom of the washer reservoir. A barbed nipple on the pump housing passes through a rubber grommet seal installed in a hole near the bottom of the reservoir. The washer pump is retained by an interference fit between the barbed pump nipple and the grommet seal, which is a light press fit.

A permanently lubricated and sealed motor is coupled to a rotor-type pump. Washer fluid is gravity-fed from the reservoir to the pump. When the motor is energized, the pump pressurizes the washer fluid and forces it through the plumbing to the nozzles.

The washer pump and motor unit cannot be repaired. If faulty, the entire washer pump and motor unit must be replaced.

WASHER NOZZLE AND PLUMBING

FRONT

Pressurized washer fluid is fed through a single hose, attached to a barbed nipple on the front washer pump. The hose is routed to a tee fitting located near the rear inner hood panel reinforcement. Hoses from the tee fitting are routed to the two nozzles.

A check valve is located in the washer supply line near each of the two front nozzles, which prevents washer fluid drain-back or siphoning from occurring.

DESCRIPTION AND OPERATION (Continued)

The nozzles are snapped into openings in the hood panel below the windshield

The two washer nozzles each emit two streams of washer fluid into the wipe pattern (Fig. 2). If the aim of the washer fluid streams is unacceptable, each stream can be adjusted using a pin inserted in the nozzle orifice to rotate the nozzle ball.

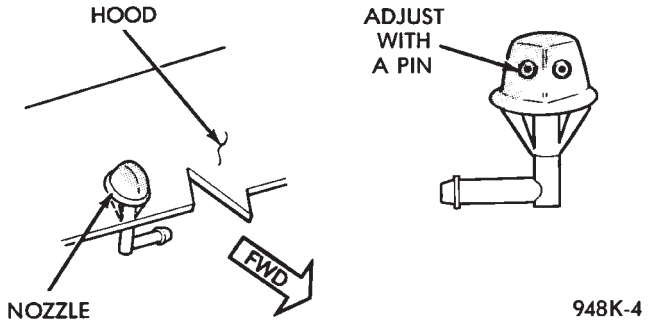


Fig. 2 Windshield Washer Nozzles

The nozzles, check valves and hose fittings cannot be repaired and, if faulty or damaged, they must be replaced.

REAR

Pressurized washer fluid is fed through a single hose, attached to a barbed nipple on the rear washer pump. The hose is routed from the front of the vehicle to the liftglass with the left body wire harness. At the left rear corner of the hardtop, the hose connects to a check valve, which prevents washer fluid drainback or siphoning from occurring.

There is also a washer hose cap attached to the hose below the check valve (Fig. 3). When the hardtop is removed from the vehicle, the body half of the washer hose must be disconnected from the check valve. The washer hose cap is used to plug the body half of the washer hose after it is disconnected from the check valve.

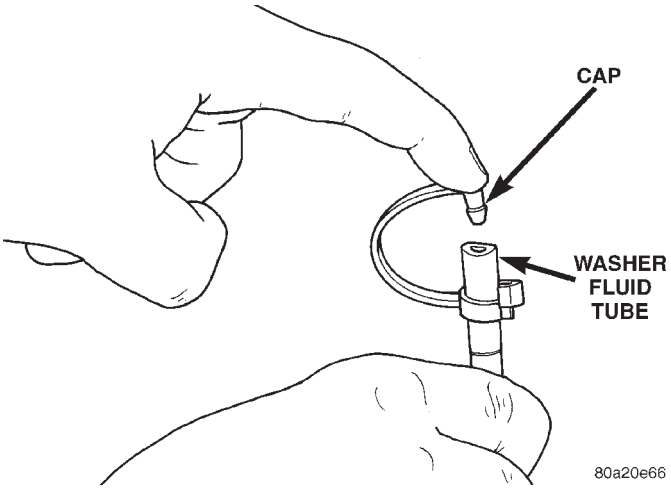


Fig. 3 Rear Washer Hose Cap

From the check valve, another single hose is routed through the rear liftglass opening reinforcements of the hardtop to the rear wiper motor cover. Behind the rear wiper motor cover, the hose attaches to the rear washer nozzle nipple.

The fluidic rear washer nozzle and a seal are installed from the outside through a hole in the liftglass near the rear wiper motor output shaft. The nozzle is secured on the inside of the glass by a plastic hex nut.

The rear washer nozzle cannot be adjusted. The nozzle, check valve, and hose fittings cannot be repaired and, if faulty or damaged, they must be replaced.

DIAGNOSIS AND TESTING

WIPER SYSTEM

FRONT

For circuit descriptions and diagrams, refer to 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Check the fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Disconnect and isolate the battery negative cable. Unplug the windshield wiper switch wire harness connector. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/acc) circuit cavity of the wiper switch wire harness connector. If OK, go to Step 3. If not OK, repair the open circuit to the fuseblock module as required.

(3) If the vehicle is equipped with the optional intermittent wiper system and the problem being diagnosed involves only the pulse wipe, wipe-after-wash, or intermittent wipe modes, go to Step 4. If not, go to Step 5.

(4) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity of the wiper switch wire harness connector and a good ground. There should be continuity. If OK,

DIAGNOSIS AND TESTING (Continued)

replace the faulty switch. If not OK, repair the open circuit to ground as required.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the windshield wiper and washer switch and check the switch continuity. See Wiper Switch and Washer Switch in the Diagnosis and Testing section of this group for the procedures. If OK, go to Step 6. If not OK, replace the faulty switch.

(6) Unplug the windshield wiper motor wire harness connector. Check for continuity between the ground circuit cavity in the body half of the wiper motor wire harness connector and a good ground. There should be continuity. If OK, go to Step 7. If not OK, repair the open circuit to ground as required.

(7) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/acc) circuit cavity in the body half of the wiper motor wire harness connector. If OK, go to Step 8. If not OK, repair the open circuit to the fuseblock module as required.

(8) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. With the windshield wiper and washer switch wire harness connector still unplugged, check the cavities for each of the following circuits in the body half of the wiper motor wire harness connector for continuity to ground. In each case, there should be no continuity. If OK, go to Step 9. If not OK, repair the short circuit as required.

- Wiper park switch sense
- Wiper switch low speed output
- Wiper switch high speed output.

(9) Check for continuity between the cavities in the body half of the wiper motor wire harness connector and the cavities in the windshield wiper and washer switch wire harness connector for each of the following circuits. In each case, there should be continuity. If OK, replace the faulty wiper motor. If not OK, repair the open circuit as required.

- Wiper park switch sense
- Wiper switch low speed output
- Wiper switch high speed output.

REAR

For circuit descriptions and diagrams, refer to 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Check the fuse in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Disconnect and isolate the battery negative cable. Remove the accessory switch bezel and unplug the wire harness connector from the rear wiper and washer switch. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the rear washer switch output circuit cavity of the rear wiper and washer switch wire harness connector. If OK, go to Step 3. If not OK, repair the open circuit to the fuseblock module as required.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity of the rear wiper and washer switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open circuit to ground as required.

(4) Test the rear wiper and washer switch continuity. See Wiper Switch and Washer Switch in the Diagnosis and Testing section of this group for the procedures. If OK, go to Step 5. If not OK, replace the faulty switch.

(5) Remove the rear wiper motor cover and unplug the rear wiper motor wire harness connector. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity of the rear wiper motor wire harness connector. If OK, go to Step 6. If not OK, repair the open circuit to the fuseblock module as required.

(6) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity of the rear wiper motor wire harness connector and a good ground. There should be continuity. If OK, go to Step 7. If not OK, repair the open circuit to ground as required.

(7) Check for continuity between the rear wiper motor control circuit cavity of the rear wiper motor wire harness connector and a good ground. There should be no continuity. If OK, go to Step 8. If not OK, repair the short circuit as required.

(8) Check for continuity between the rear wiper motor control circuit cavities of the rear wiper motor wire harness connector and the rear wiper and washer switch wire harness connector. There should be continuity. If OK, replace the faulty rear wiper motor. If not OK, repair the open circuit as required.

DIAGNOSIS AND TESTING (Continued)

WASHER SYSTEM

FRONT

The diagnosis found here addresses an inoperative front washer pump. If the washer pump operates, but no washer fluid is emitted from the washer nozzles, be certain to check the fluid level in the reservoir. Check for ice or other foreign material in the reservoir, and for pinched, disconnected, broken, or incorrectly routed washer system plumbing. For circuit descriptions and diagrams, refer to 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Turn the ignition switch to the On position. Turn the wiper switch to the Low or High speed position. Check whether the wipers operate. If OK, go to Step 2. If not OK, see the Wiper System diagnosis in this group.

(2) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the front washer pump wire harness connector. Check for continuity between the ground circuit cavity of the front washer pump wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit to ground as required.

(3) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the front washer switch output circuit cavity of the front washer pump wire harness connector while actuating the washer switch. If OK, replace the faulty washer pump. If not OK, go to Step 4.

(4) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the windshield wiper/washer switch wire harness connector. Check for continuity between the front washer switch output circuit cavity of the front washer pump wire harness connector and a good ground. There should be no continuity. If OK, go to Step 5 If not OK, repair the short circuit as required.

(5) Check for continuity between the front washer switch output circuit cavities of the front washer pump wire harness connector and the wiper/washer switch wire harness connector. There should be continuity. If OK, replace the faulty switch. If not OK, repair the open circuit as required.

REAR

The diagnosis found here addresses an inoperative rear washer pump. If the washer pump operates, but no washer fluid is emitted from the washer nozzle, be certain to check the fluid level in the reservoir. Check for ice or other foreign material in the reservoir, and for pinched, disconnected, broken, or incorrectly routed washer system plumbing. For circuit descriptions and diagrams, refer to 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Turn the ignition switch to the On position. Place the rear wiper/washer switch in the Wipe position. Check whether the rear wiper is operating. If OK, go to Step 2. If not OK, see the Wiper System diagnosis in this group.

(2) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the rear washer pump wire harness connector. Check for continuity between the ground circuit cavity of the rear washer pump wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit to ground as required.

(3) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the rear washer motor control circuit cavity of the rear washer pump wire harness connector while the rear washer switch is actuated. If OK, replace the faulty pump. If not OK, go to Step 4.

(4) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the rear wiper/washer switch wire harness connector. Check for continuity between the rear washer motor control circuit cavity of the rear washer pump wire harness connector and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the short circuit as required.

(5) Check for continuity between the rear washer motor control circuit cavities of the rear washer pump wire harness connector and the rear wiper/washer switch wire harness connector. There should be continuity. If OK, replace the faulty switch. If not OK, repair the open circuit as required.

DIAGNOSIS AND TESTING (Continued)

WIPER SWITCH AND WASHER SWITCH

FRONT

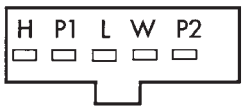
Perform the diagnosis for the front wiper system and/or washer system as described in this group before testing the front wiper and washer switch. For circuit descriptions and diagrams, see 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

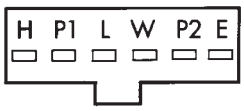
(1) Disconnect and isolate the battery negative cable.

(2) Remove the front wiper and washer switch from the steering column and unplug the wire harness connector from the switch.

(3) Using an ohmmeter, perform the switch continuity checks at the switch terminals as shown in the Windshield Wiper Switch and Washer Switch Continuity chart (Fig. 4).



TWO SPEED WIPER SWITCH PINS



INTERMITTENT WIPER SWITCH PINS

SWITCH POSITION	CONTINUITY BETWEEN
OFF	PIN P2 and PIN L
LOW	PIN P1 and PIN L
HIGH	PIN P1 and PIN H
WASH	PIN P1 and PIN W
INTERMITTENT	CANNOT BE CHECKED

948K-38

Fig. 4 Windshield Wiper Switch and Washer Switch Continuity

(4) If the switch fails any of the continuity checks, replace the faulty switch. If the switch is OK, repair the wiper system and/or washer system wire harness circuits as required.

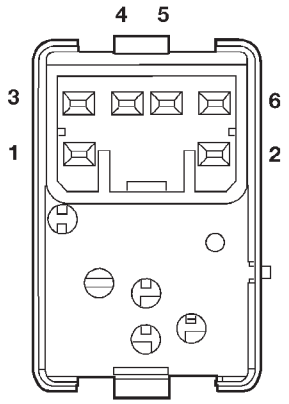
REAR

Perform the diagnosis for the rear wiper system and/or washer system as described in this group before testing the rear wiper and washer switch. For circuit descriptions and diagrams, see 8W-53 - Wipers in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the accessory switch bezel from the instrument panel and unplug the rear wiper and washer switch wire harness connector.

(2) Using an ohmmeter, check the rear wiper and washer switch continuity at the switch terminals as shown in the Rear Wiper Switch and Washer Switch Continuity chart (Fig. 5).



SWITCH POSITION	CONTINUITY BETWEEN
OFF	1 AND 4
WIPE	4 AND 5
WASH	2 AND 5, 4 AND 5
ILLUMINATION LAMP	1 AND 3

80a5035e

Fig. 5 Rear Wiper Switch and Washer Switch Continuity

(3) If the switch fails any of the continuity checks, replace the faulty switch. If the switch is OK, repair the rear wiper system and/or washer system wire harness circuits as required.

REMOVAL AND INSTALLATION

WIPER BLADE

FRONT

NOTE: The notched retainer end of the wiper element should always be oriented towards the end of the wiper blade that is nearest to the wiper pivot.

(1) Lift the wiper arm to raise the wiper blade and element off of the windshield glass.

(2) To remove the wiper blade from the wiper arm, push the release tab under the arm tip and slide the blade away from the tip towards the pivot end of the arm (Fig. 6).

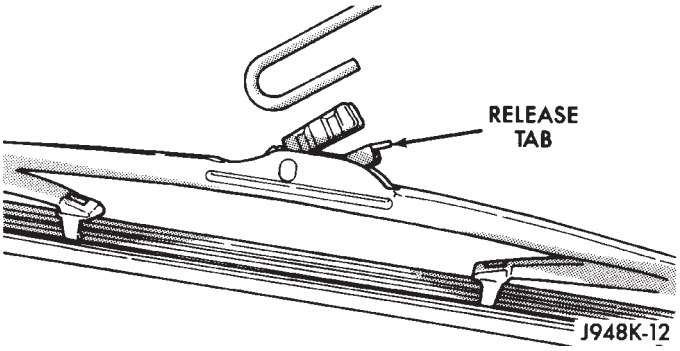


Fig. 6 Wiper Blade Remove/Install - Typical

(3) To install the wiper blade on the wiper arm, slide the blade retainer into the U-shaped formation on the tip of the wiper arm until the release tab snaps into its locked position. Be certain that the notched retainer for the wiper element is oriented towards the end of the wiper blade that is nearest to the wiper pivot.

REAR

NOTE: The notched retainer end of the wiper element should always be oriented towards the end of the wiper blade that is nearest to the wiper pivot.

(1) Lift the rear wiper arm to raise the wiper blade and element off of the rear liftglass.

(2) To remove the wiper blade from the wiper arm, push the release tab under the arm tip and slide the blade away from the tip towards the rear wiper motor output shaft end of the arm (Fig. 6).

(3) To install the wiper blade on the wiper arm, slide the blade retainer into the U-shaped formation on the tip of the wiper arm until the release tab snaps into its locked position. Be certain that the notched retainer for the wiper element is oriented towards the end of the wiper blade that is nearest to the rear wiper motor output shaft.

WIPER ARM

CAUTION: The use of a screwdriver or other prying tool to remove a wiper arm may distort it. This distortion could allow the arm to come off of the pivot shaft, regardless of how carefully it is installed.

FRONT

(1) Lift the wiper arm to permit the latch to be pulled out to its holding position, then release the arm (Fig. 7). The arm will remain off the windshield with the latch in this position.

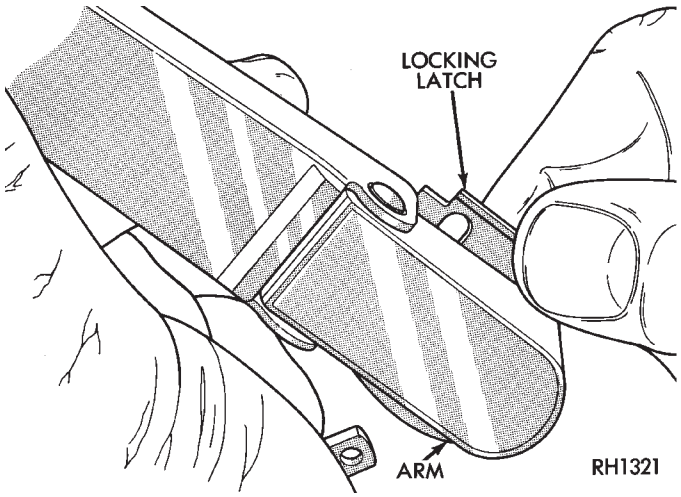


Fig. 7 Wiper Arm Remove/Install

(2) Remove the arm from the pivot using a rocking motion.

(3) Install the arm and blade with the wiper motor in the Park position. See the Front Wiper Arm Installation illustration (Fig. 8).

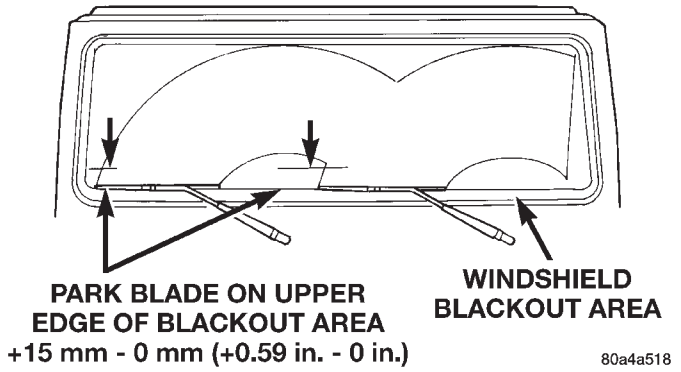


Fig. 8 Front Wiper Arm Installation

(4) Mount the arms on the pivot shafts so that the tip of the wiper blade is on the upper edge of the lower windshield blackout area, + 15 mm/ – 0 mm (+ 0.59 in./ – 0 in.).

(5) Lift the wiper arm away from the windshield slightly to relieve the spring tension on the latch.

REMOVAL AND INSTALLATION (Continued)

Push the latch into the locked position and slowly release the arm until the wiper blade rests on the windshield.

(6) Operate the wipers with the windshield glass wet, then turn the wiper switch to the Off position. Check for the correct wiper arm positioning and readjust if required.

REAR

(1) Lift the wiper arm to permit the latch to be pulled out to its holding position, then release the arm (Fig. 7). The arm will remain off the liftglass with the latch in this position.

(2) Remove the wiper arm from the motor output shaft using a rocking motion.

(3) Install the rear wiper arm with the wiper motor in the Park position. Place the rear wiper blade on the liftglass so that it is parallel to or tipped down from the upper edge of the liftglass a maximum of 80 mm (3.14 in.) (Fig. 9).

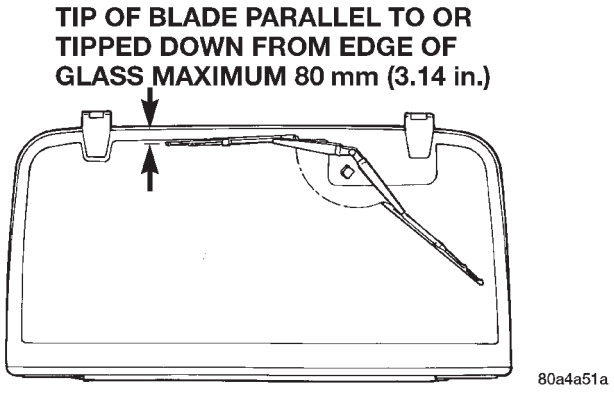


Fig. 9 Rear Wiper Arm Installation

(4) Lift the wiper arm away from the liftglass slightly to relieve the spring tension on the latch. Push the latch into the locked position and slowly release the arm until the wiper blade rests on the liftglass.

(5) Operate the wiper with the liftglass wet, then turn the wiper switch to the Off position. Check for the correct wiper arm positioning and readjust if required.

WIPER LINKAGE AND PIVOT

The wiper linkage and pivots can only be removed from or installed in the vehicle as a unit with the wiper motor. See Wiper Motor in this group for the service procedures.

WIPER MOTOR

FRONT

(1) Disconnect and isolate the battery negative cable.

(2) Remove the wiper arms from the wiper pivots. See Wiper Arm in this group for the procedures.

(3) Remove the one screw that secures the center of the cowl plenum cover/grille panel to the cowl plenum panel.

(4) Remove the four screws that secure the cowl plenum cover/grille panel to the cowl panel near the base of the windshield.

(5) Open and support the hood

(6) Pull each end of the cowl to hood seal away from the metal flange where the dash panel and cowl plenum panel meet far enough to access the one screw that secures each outboard end of the cowl plenum cover/grille panel to the cowl plenum panel (Fig. 10).

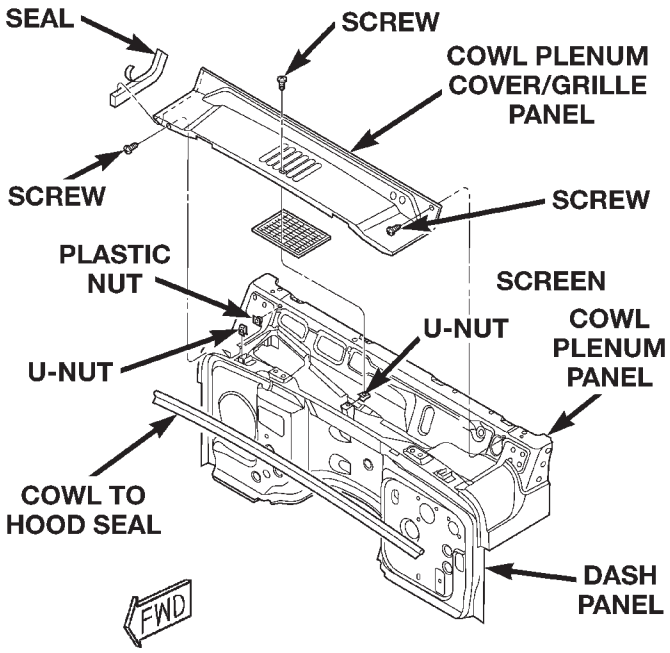


Fig. 10 Cowl Plenum Cover/Grille Panel Remove/ Install

(7) Remove the one screw that secures each outboard end of the cowl plenum cover/grille panel to the cowl plenum panel.

(8) Carefully remove the cowl plenum cover/grille panel from the vehicle, so as not to damage the paint around the pivot openings of the panel.

(9) Reach into the cowl plenum and unplug the wiper motor wire harness connector.

(10) Remove the three screws that secure the wiper module mounting bracket to the cowl plenum panel (Fig. 11).

(11) Remove the wiper module from the cowl plenum as a unit.

(12) Release the retainer that secures the wiper motor wire harness connector to the wiper module bracket.

REMOVAL AND INSTALLATION (Continued)

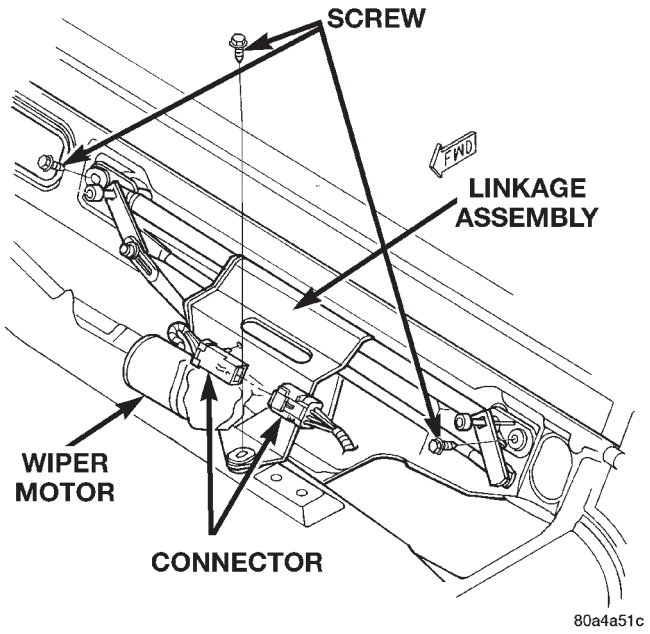


Fig. 11 Wiper Module Assembly Remove/Install

(13) Turn the wiper module over and remove the nut that secures the wiper linkage crank arm to the wiper motor output shaft.

(14) Remove the three screws that secure the wiper motor to the wiper module mounting bracket.

(15) Remove the wiper motor from the wiper module bracket.

(16) Reverse the removal procedures to install. Tighten the mounting hardware as follows:

- Wiper motor screws - 6 N·m (53 in. lbs.)
- Crank arm nut - 11.5 N·m (101 in. lbs.)
- Wiper module bracket screws - 7.9 N·m (70 in. lbs.)
- Cowl plenum cover/grille panel screws - 1.7 N·m (15 in. lbs.).

REAR

(1) Disconnect and isolate the battery negative cable.

(2) From the outside of the liftglass, remove the rear wiper arm from the rear wiper motor output shaft. See Wiper Arm in this group for the procedures.

(3) From the outside of the liftglass, remove the rear wiper motor output shaft nut and bezel unit (Fig. 12).

(4) From the outside of the liftglass, remove the rear wiper motor output shaft rubber gasket.

(5) From the inside of the liftglass, remove the three screws that secure the rear wiper motor cover to the motor.

(6) Unplug the rear wiper motor wire harness connector.

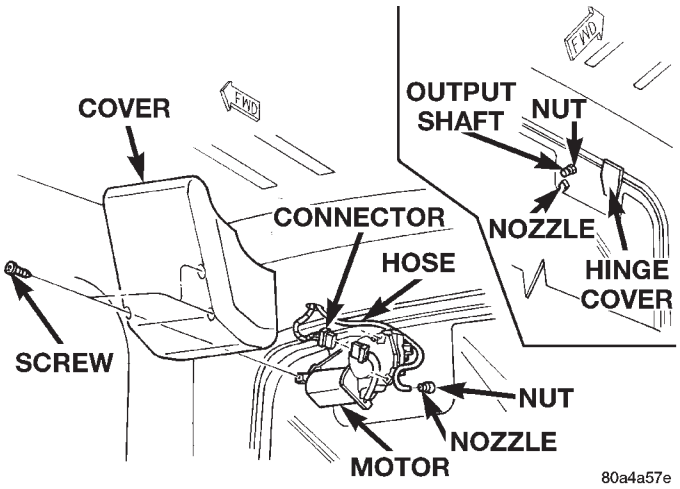


Fig. 12 Rear Wiper and Washer System

(7) Loosen, but do not remove, the right liftglass hinge nut.

(8) From the inside of the liftglass, gently pull the rear wiper motor away from the liftglass until the output shaft clears the hole in the liftglass.

(9) Move the motor towards the right side of the vehicle until the slotted hole in the motor mounting bracket clears the grommet under the right liftglass hinge nut.

(10) Remove the rear wiper motor from the vehicle.

(11) Reverse the removal procedures to install. Tighten the mounting hardware as follows:

- Wiper motor output shaft nut - 3.3 N·m (30 in. lbs.)
- Liftglass hinge nut - 6 N·m (53 in. lbs.)
- Wiper motor cover screws - 1.1 N·m (10 in. lbs.).

WIPER SWITCH AND WASHER SWITCH

FRONT

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. See Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the three screws that secure the lower steering column shroud to the upper shroud (Fig. 13).

REMOVAL AND INSTALLATION (Continued)

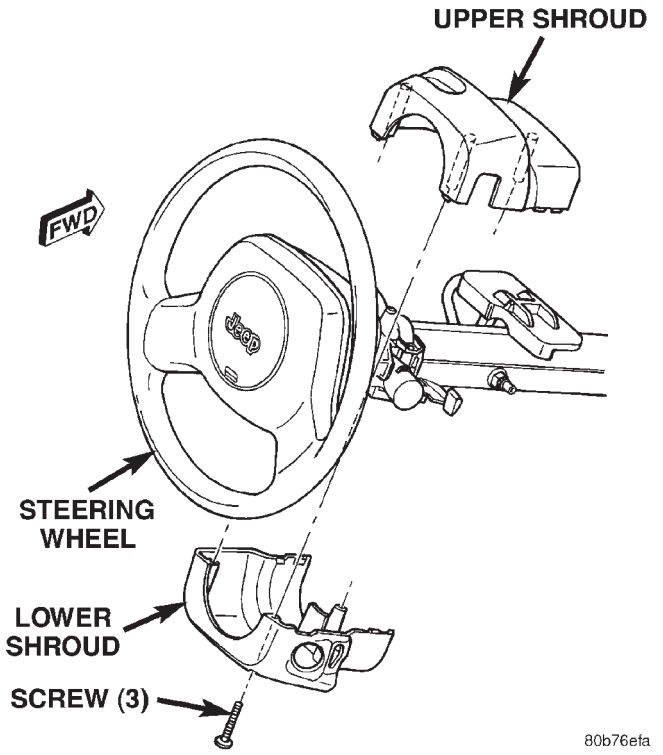


Fig. 13 Steering Column Shrouds Remove/Install

(4) If the vehicle is equipped with a standard non-tilt steering column, loosen the two upper steering column mounting nuts. If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully lowered position.

(5) Remove both the upper and lower shrouds from the steering column.

(6) Remove the two screws that secure the switch water shield and bracket to the top of the steering column (Fig. 14).

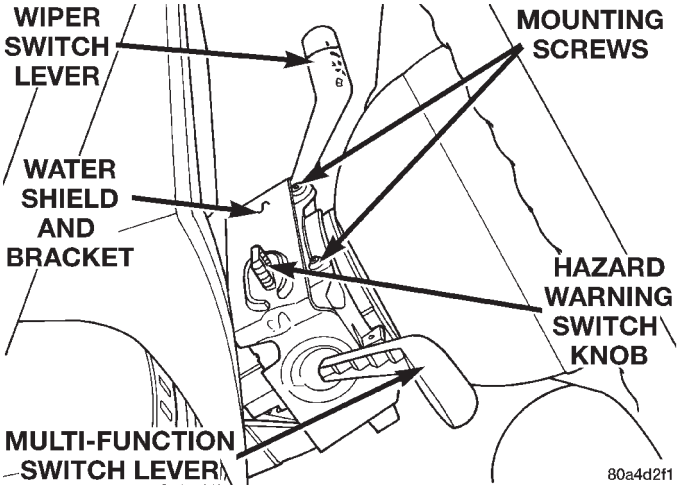


Fig. 14 Water Shield Upper Screws Remove/Install

(7) Remove the one screw located below the multi-function switch lever that secures the switch water shield and bracket to the steering column (Fig. 15).

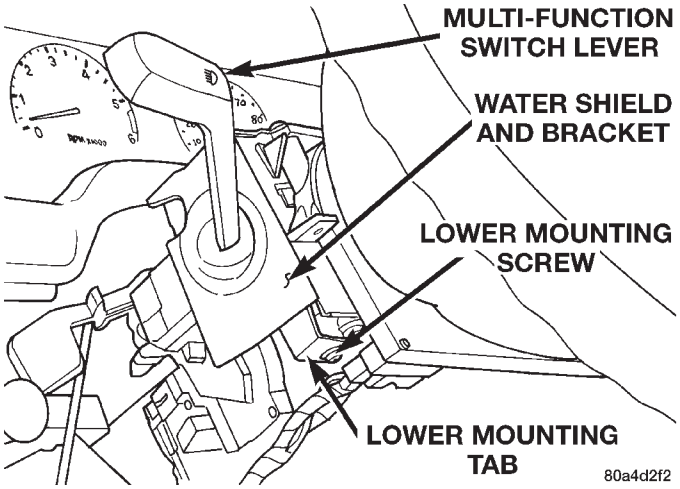


Fig. 15 Water Shield Lower Screw Remove/Install

(8) Gently pull the lower mounting tab of the switch water shield bracket away from the steering column far enough to clear the screw boss below the multi-function switch lever.

(9) Lift the water shield and bracket with the multi-function switch off of the left side of the steering column as a unit and move it out of the way. If the vehicle is equipped with the optional tilt steering column, lifting gently upward on the tilt release lever will provide additional clearance to ease multi-function switch removal.

(10) Gently pull the windshield wiper and washer switch up and away from the right side of the steering column far enough to access the wire harness connector.

(11) Unplug the wire harness connector from the windshield wiper and washer switch.

(12) Remove the windshield wiper and washer switch from the steering column.

(13) Reverse the removal procedures to install. Tighten the upper switch mounting screws to 2.2 N·m (20 in. lbs.). Tighten the lower switch water shield and bracket screw to 1.1 N·m (10 in. lbs.). Tighten the non-tilt steering column mounting nuts to 22 N·m (200 in. lbs.) and the steering column shroud mounting screws to 2 N·m (18 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

REAR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the center bezel from the instrument panel. See Instrument Panel Center Bezel in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the four screws that secure the accessory switch bezel to the instrument panel (Fig. 16).

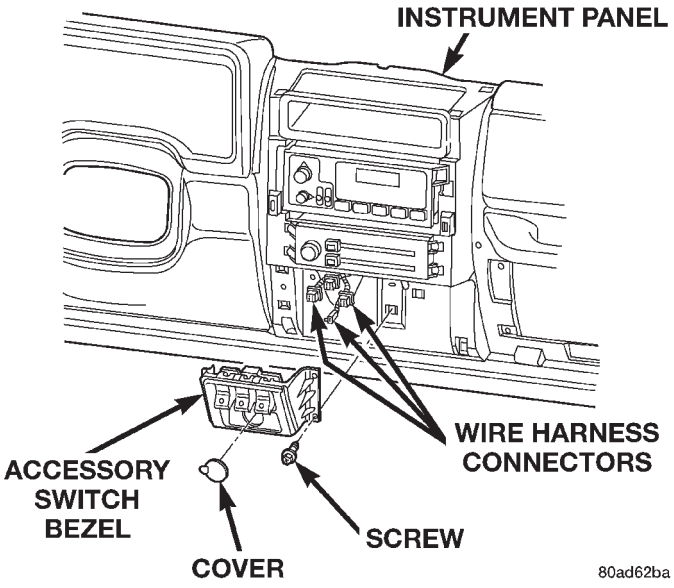


Fig. 16 Accessory Switch Bezel Remove/Install

(4) Pull the accessory switch bezel out from the instrument panel far enough to access the wire harness connectors.

(5) Unplug the wire harness connectors from the rear of the accessory switches and the cigar lighter/power outlet.

(6) Remove the accessory switch bezel from the instrument panel.

(7) With a small thin-bladed screwdriver, gently pry the snap clips at the top and bottom of the rear wiper and washer switch receptacle on the back of the accessory switch bezel and pull the switch out of the bezel.

(8) Reverse the removal procedures to install. Be certain that both of the switch snap clip retainers in the receptacle on the back of the accessory switch bezel are fully engaged. Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

WASHER SYSTEM

WASHER RESERVOIR

(1) Disconnect and isolate the battery negative cable.

(2) Remove the three screws that secure the washer reservoir to the inner fender (Fig. 17).

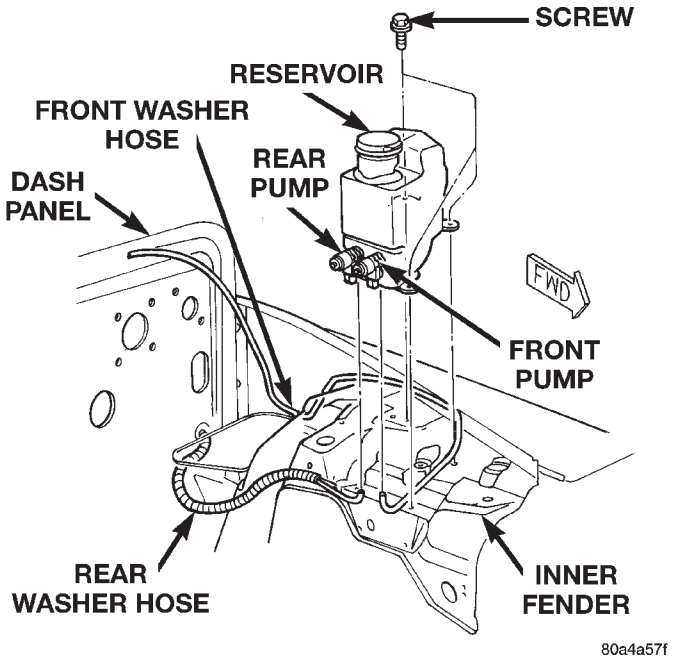


Fig. 17 Washer Reservoir Remove/Install

(3) Lift the reservoir far enough to access the washer pump(s).

(4) Remove the washer supply hose(s) from the washer pump(s) and drain the washer fluid from the reservoir into a clean container for reuse.

(5) Unplug the wire harness connector(s) from the washer pump(s).

(6) Remove the washer reservoir from the vehicle.

(7) Reverse the removal procedures to install. Tighten the reservoir mounting screws to 4 N·m (35 in. lbs.).

WASHER PUMP

(1) Disconnect and isolate the battery negative cable.

(2) Remove the washer supply hose(s) from the barbed outlet nipple of the washer pump(s) and drain the washer fluid from the reservoir into a clean container for reuse.

(3) Unplug the wire harness connector(s) from the washer pump(s).

(4) Using a trim stick or another suitable wide flat-bladed tool, gently pry the barbed inlet nipple of

REMOVAL AND INSTALLATION (Continued)

the washer pump out of the rubber grommet seal in the reservoir. Care must be taken not to damage the reservoir.

(5) Remove the rubber grommet seal from the reservoir and discard.

(6) Reverse the removal procedures to install. Always use a new rubber grommet seal on the reservoir.

WASHER NOZZLE

FRONT

(1) Open and support the hood.

(2) From under the rear of the hood, disconnect the washer supply hose from the barbed nipple of the washer nozzle (Fig. 18).

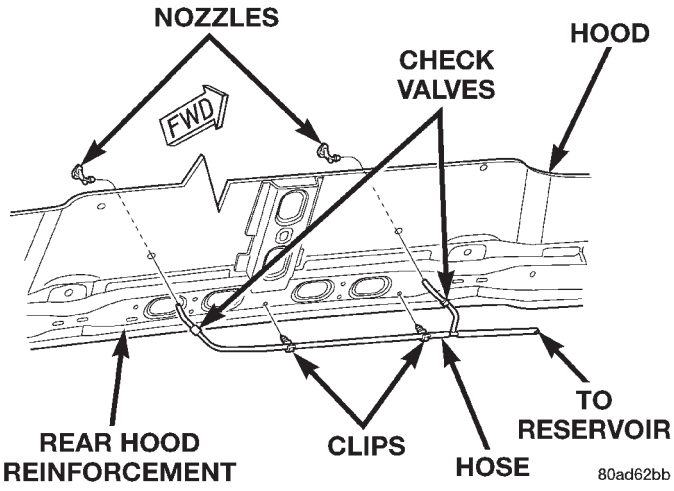


Fig. 18 Front Washer Nozzles Remove/Install

(3) From under the rear of the hood, gently squeeze the nozzle retainers and push the nozzle out through the top of the hood panel.

(4) Reverse the removal procedures to install. See Washer Nozzles and Plumbing in this group for the nozzle adjustment procedures.

REAR

(1) Disconnect and isolate the battery negative cable.

(2) From the inside of the liftglass, remove the three screws that secure the rear wiper motor cover to the motor (Fig. 19).

(3) Remove the rear wiper motor cover.

(4) Disconnect the washer supply hose from the barbed rear washer nozzle nipple.

(5) While holding the nozzle securely from the outside of the liftglass, remove the plastic nut that

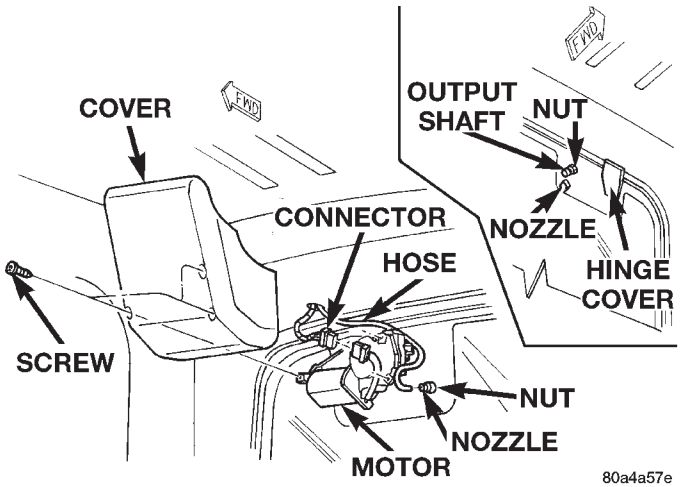


Fig. 19 Rear Washer Nozzle Remove/Install

secures the threaded nozzle nipple from the inside of the liftglass.

(6) Push the nozzle and seal out through the liftglass from the inside.

(7) Reverse the removal procedures to install. Tighten the washer nozzle nut to 0.9 N·m (8 in. lbs.).

CHECK VALVE

A check valve is located under the hood in the washer supply line near each of the front washer nozzles. Models with the optional rear washer system also have a check valve in the washer supply line in the left rear pillar of the hardtop, near where the hardtop joins the vehicle body.

(1) Disconnect the washer supply hoses from the barbed nipples on each end of the front or rear washer system check valve.

(2) Remove the check valve from the vehicle.

(3) When reinstalling the check valve, be certain the valve is properly oriented within the system flow (Fig. 20).

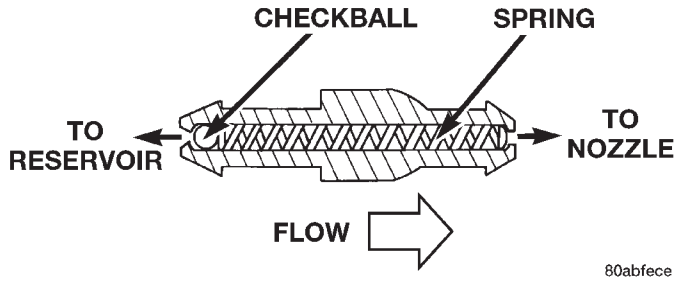


Fig. 20 Washer System Check Valve

(4) Reverse the remaining removal procedures to complete the installation.

LAMPS

CONTENTS

LAMP DIAGNOSIS

INDEX

GENERAL INFORMATION

GENERAL INFORMATION

Each vehicle is equipped with various lamp assemblies. A good ground is necessary for proper lighting operation. Grounding is provided by the lamp socket when it comes in contact with the metal body, or through a separate ground wire.

When changing lamp bulbs check the socket for corrosion. If corrosion is present, clean it with a wire brush and coat the inside of the socket lightly with Mopar Multi-Purpose Grease or equivalent.

SAFETY PRECAUTIONS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

Do not use bulbs with higher candle power than indicated in the Bulb Application table at the end of this group. Damage to lamp and/or Daytime Running Lamp Module can result.

Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

When a vehicle experiences problems with the headlamp system, verify the condition of the battery connections, fuses, charging system, headlamp bulbs, wire connectors, relay, high beam dimmer switch and headlamp switch. Refer to Group 8W, Wiring Diagrams for component locations and circuit information.

DIAGNOSIS AND TESTING (Continued)

HEADLAMP

HEADLAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn generator drive belt.	2. Adjust or replace generator drive belt.
	3. Charging system output too low.	3. Test and repair charging system, refer to Group 8A,
	4. Battery has insufficient charge.	4. Test battery state-of -charge , refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery, refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations, refer to Group 8W.
	7. Both headlamp bulbs defective.	7. Replace both headlamp bulbs.
HEADLAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system, refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices, refer to Group 8W.
HEADLAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE*	1. Charging system output too low.	1. Test and repair charging system, refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations, refer to Group 8W.
	3. High resistance in headlamp circuit.	3. Test amperage draw of headlamp circuit.
	4. Both headlamp bulbs defective.	4. Replace both headlamp bulbs.
HEADLAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations, refer to Group 8W.
	2. High resistance in headlamp circuit.	2. Test amperage draw of headlamp circuit. Should not exceed 30 amps.
	3. Faulty headlamps switch circuit breaker.	3. Replace headlamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices, refer to Group 8W.
HEADLAMPS DO NOT ILLUMINATE	1. No voltage to headlamps.	1. Repair open headlamp circuit, refer to Group 8W.
	2. No Z1-ground at headlamps.	2. Repair circuit ground, refer to Group 8W.
	3. Faulty headlamp switch.	3. Replace headlamp switch.
	4. Faulty headlamp dimmer (multi-function) switch.	4. Replace multi-function switch.
	5. Broken connector terminal or wire splice in headlamp circuit.	5. Repair connector terminal or wire splice.
	6. Both headlamp bulbs defective.	6. Replace both headlamp bulbs.
*Canada vehicles must have lamps ON.		

DIAGNOSIS AND TESTING (Continued)

FOG LAMP

FOG LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF.	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn generator drive belt.	2. Adjust or replace generator drive belt.
	3. Charging system output too low.	3. Test and repair charging system. Refer to Group 8A,
	4. Battery has insufficient charge.	4. Test battery state-of -charge. Refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery. Refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
FOG LAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system. Refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system. Refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	3. High resistance in fog lamp circuit.	3. Test amperage draw of fog lamp circuit.
FOG LAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	2. High resistance in fog lamp circuit.	2. Test amperage draw of fog lamp circuit.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS DO NOT ILLUMINATE	1. Blown fuse for fog lamp.	1. Replace fuse. Refer to Group 8W.
	2. No Z1-ground at fog lamps.	2. Repair circuit ground. Refer to Group 8W.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Broken connector terminal or wire splice in fog lamp circuit.	4. Repair connector terminal or wire splice.
	5. Defective or burned out bulb.	5. Replace bulb.

DIAGNOSIS AND TESTING (Continued)

DAYTIME RUNNING LAMP

DAYTIME RUNNING LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
DAYTIME RUNNING LAMPS DO NOT WORK	1. Poor connection at DRL module. 2. Parking brake engaged. 3. Parking brake circuit shorted to ground. 4. Headlamp circuit shorted to ground. 5. Defective DRL module.	1. Secure connector on DRL module. 2. Disengage parking brake. 3. Check voltage on pin 3 of module, refer to Group 8W. 4. Check L3 circuit, refer to Group 8W. 5. Replace DRL module.

HEADLAMP ALIGNMENT

INDEX

GENERAL INFORMATION

HEADLAMP ALIGNMENT

Headlamps can be aligned using the screen method provided in this section. Alignment Tool C-4466-A or equivalent can also be used. Refer to instructions provided with the tool for proper procedures.

SERVICE PROCEDURES

LAMP ALIGNMENT SCREEN PREPARATION

(1) Position vehicle on a level surface perpendicular to a flat wall 7.62 meters (25 ft) away from front of headlamp lens (Fig. 1).

(2) If necessary, tape a line on the floor 7.62 meters (25 ft) away from and parallel to the wall.

(3) Measure from the floor up 1.27 meters (5 ft) and tape a line on the wall at the centerline of the vehicle. Sight along the centerline of the vehicle (from rear of vehicle forward) to verify accuracy of the line placement.

(4) Rock vehicle side-to-side three times to allow suspension to stabilize.

(5) Jounce front suspension three times by pushing downward on front bumper and releasing.

(6) Measure the distance from the center of headlamp lens to the floor. Transfer measurement to the alignment screen (with tape). Use this line for up/down adjustment reference.

(7) Measure distance from the centerline of the vehicle to the center of each headlamp being aligned. Transfer measurements to screen (with tape) to each side of vehicle centerline. Use these lines for left/right adjustment reference.

SERVICE PROCEDURES (Continued)

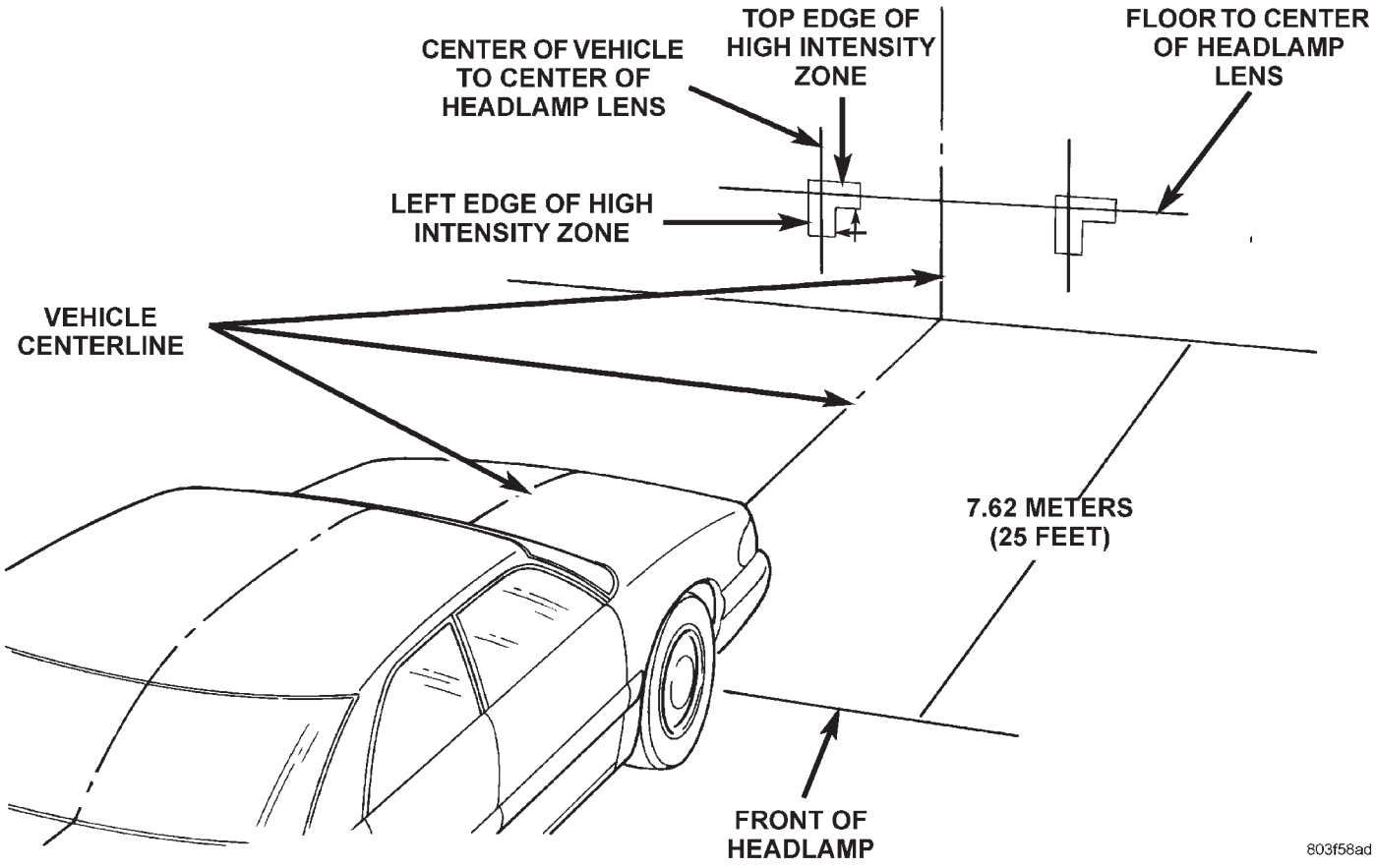


Fig. 1 Headlamp Alignment Screen—Typical

VEHICLE PREPARATION FOR HEADLAMP ALIGNMENT

(1) Verify headlamp dimmer switch and high beam indicator operation.

(2) Correct defective components that could hinder proper headlamp alignment.

(3) Verify proper tire inflation.

(4) Clean headlamp lenses.

(5) Verify that luggage area is not heavily loaded.

(6) Fuel tank should be FULL. Add 2.94 kg (6.5 lbs.) of weight over the fuel tank for each estimated gallon of missing fuel.

HEADLAMP ADJUSTMENT

(1) Place headlamps on LOW beam.

(2) Cover front of the headlamp that is not being adjusted.

(3) Turn the upper, outboard (up/down) adjustment screw (Fig. 2) until the headlamp beam pattern on screen/wall is similar to the pattern depicted in (Fig. 1).

NOTE: When using a headlamp aiming screen:

- Adjust the headlamps so that the beam horizontal position is at 0.
- Adjust the beam vertical position is 25 mm (1 in) downward from the lamp horizontal centerline.

(4) Rotate the lower, inboard (left/right) adjustment screw (Fig. 2) until the headlamp beam pattern on the aiming screen/wall similar to the pattern in (Fig. 1).

(5) Cover front of the headlamp that has been adjusted and adjust the other headlamp beam as instructed above.

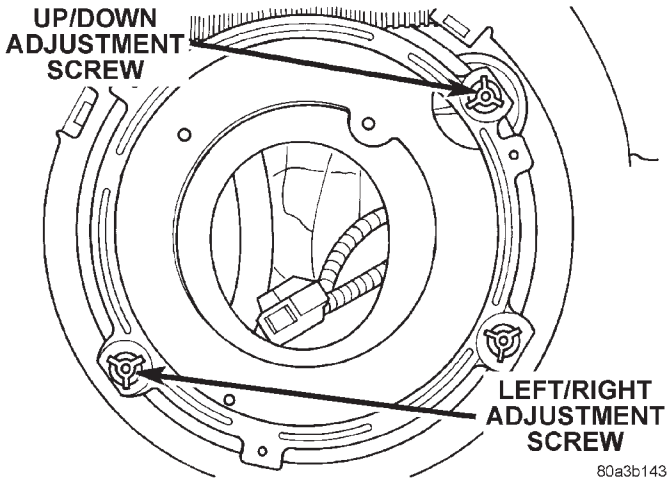


Fig. 2 Headlamp Adjustment Screws

SERVICE PROCEDURES (Continued)

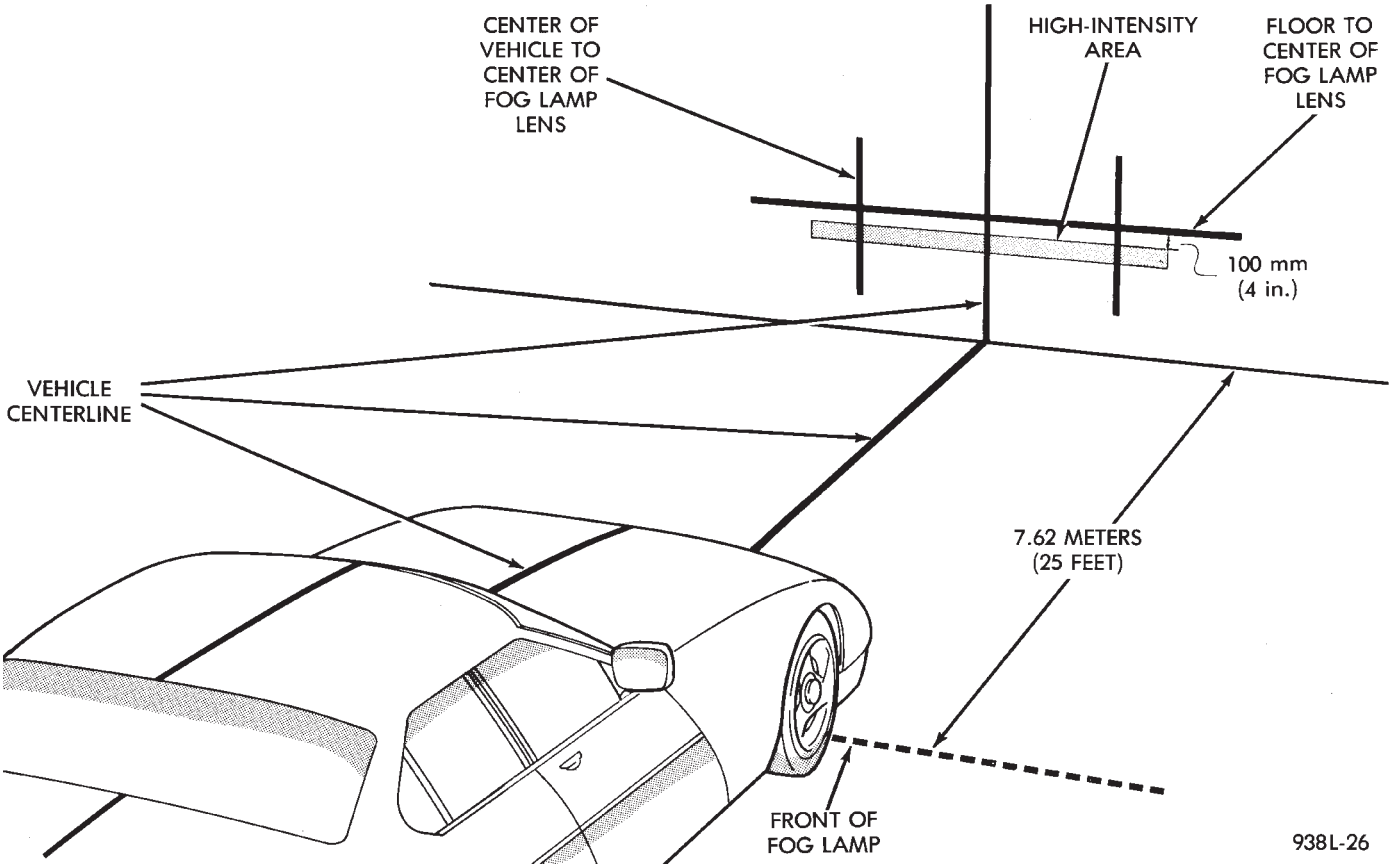


Fig. 3 Fog Lamp Alignment —Typical

FOG LAMP ADJUSTMENT

Prepare an alignment screen. A properly aligned fog lamp will project a pattern on the alignment screen 100 mm (4 in.) below the fog lamp centerline and straight ahead (Fig. 3).

(1) Loosen the nut attaching the fog lamp to the mounting bracket (Fig. 4).

(2) Move the fog lamp to adjust beam height.

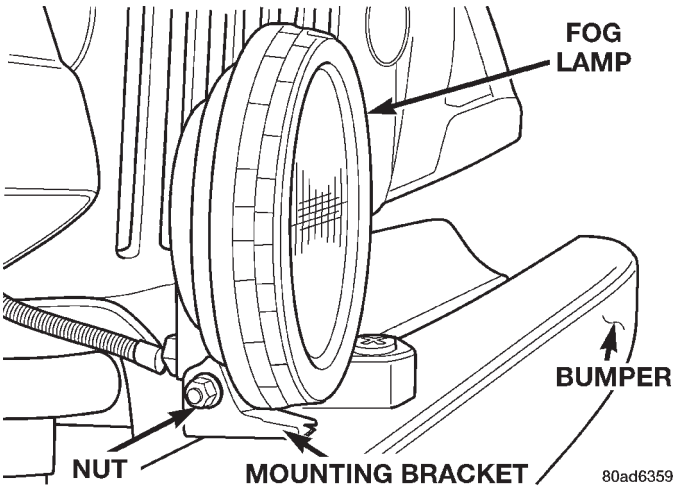
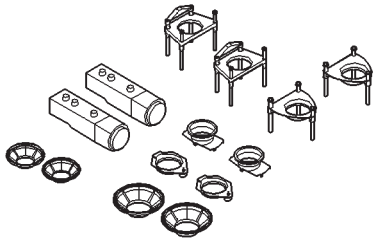


Fig. 4 Fog Lamp Adjustment

(3) Tighten the nut attaching the fog lamp to the mounting bracket.

SPECIAL TOOLS

HEADLAMP ALIGNMENT



Headlamp Aiming Kit C-4466–A

LAMP BULB SERVICE

INDEX

REMOVAL AND INSTALLATION

HEADLAMP BULB

The headlamp is a sealed unit. Refer to the Headlamp Removal/Installation procedure located in the Lamp Service section of this group.

FOG LAMP BULB

REMOVAL

(1) Remove the screws that attach the reflector to the lamp housing.
(2) Separate the reflector from the lamp housing.
(3) Squeeze the bulb retainer together to disengage it from the reflector.
(4) Remove the bulb/element from the reflector (Fig. 1).
(5) Disconnect the electrical connector.

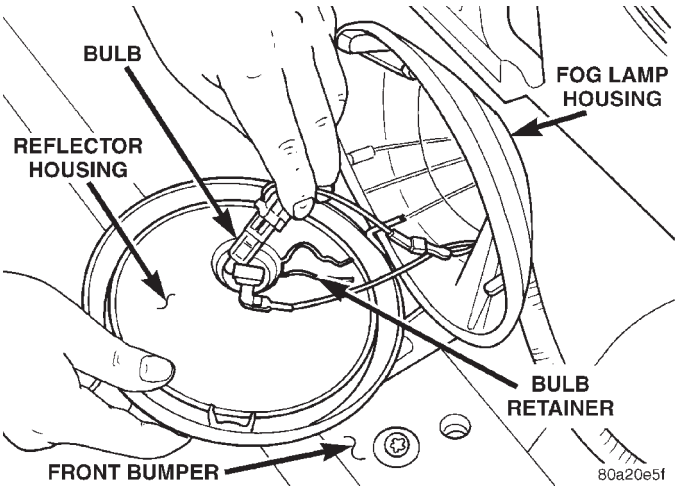


Fig. 1 Fog Lamp Bulb

INSTALLATION

CAUTION: Do not touch the bulb glass with fingers or other oily surfaces. Reduced bulb life will result.
(1) Connect the electrical connector.
(2) Position the bulb/element in the reflector.
(3) Engage the bulb retainer.
(4) Position the reflector in the lamp housing.
(5) Install the screws that attach the reflector to the lamp housing.

FRONT PARK/TURN SIGNAL LAMP BULB

REMOVAL

(1) Remove the park/turn signal lamp bulb socket via the underside of the fender.
(2) Rotate the bulb socket one-third turn counterclockwise and separate it from the lamp housing.
(3) Pull the bulb straight out of the socket.

INSTALLATION

(1) Install the bulb in the socket.
(2) Install the bulb and socket in the lamp housing.

SIDE MARKER LAMP BULB

REMOVAL

(1) Remove side marker bulb socket via the underside of the fender. Rotate it one-third turn counterclockwise and separate it from the side marker lamp housing.
(2) Remove the bulb from the socket by pulling it straight outward.

INSTALLATION

(1) Install a replacement bulb in the socket.
(2) Install the bulb and socket in the side marker lamp housing.

TAIL/TURN SIGNAL/BACK-UP LAMP BULB

REMOVAL

(1) Remove the screws attaching the lens to the tail lamp housing (Fig. 2).
(2) Separate the lens from the tail lamp housing.

REMOVAL AND INSTALLATION (Continued)

(3) Push the bulb inward and rotate counter-clockwise.

(4) Remove the bulb from the lamp socket.

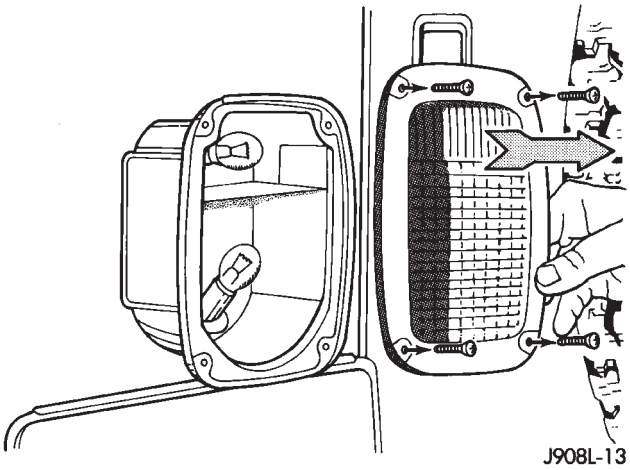


Fig. 2 Lens Removal

INSTALLATION

(1) Install a replacement bulb in the lamp socket.

(2) Position the lens on the lamp housing.

(3) Install the screws. Tighten the screws securely.

BACK-UP LAMP BULB

The back-up lamp bulb is located with-in the tail lamp. Refer to the Tail Lamp Bulb Removal/Installation procedure.

CENTER HIGH MOUNTED STOP LAMP (CHMSL) BULB

REMOVAL

(1) Remove the screws attaching the CHMSL lens to the CHMSL (Fig. 3).

(2) Rotate the bulb socket one third turn counter-clockwise and separate from lamp housing.

(3) Pull the bulb straight out of the socket.

INSTALLATION

(1) Install the bulb.

(2) Position the lens on the CHMSL and install the screws.

UNDERHOOD LAMP BULB

REMOVAL

(1) Insert a small flat blade in the access slot between the lamp base and lamp lens.

(2) Pry the lamp lens upward and remove the lamp lens (Fig. 4).

(3) Depress the bulb terminal inward (Fig. 5) to release the bulb.

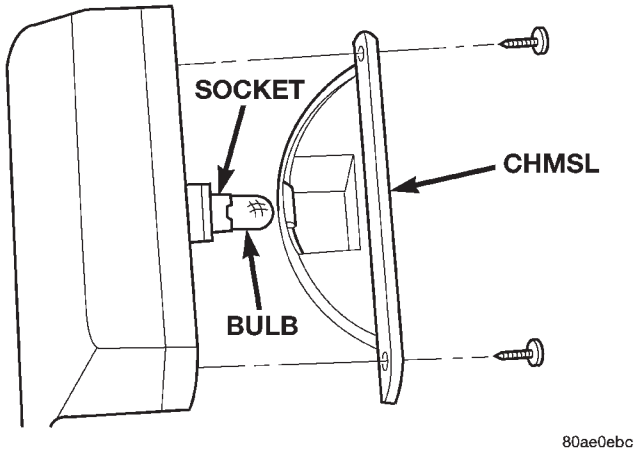


Fig. 3 CHMSL Bulb

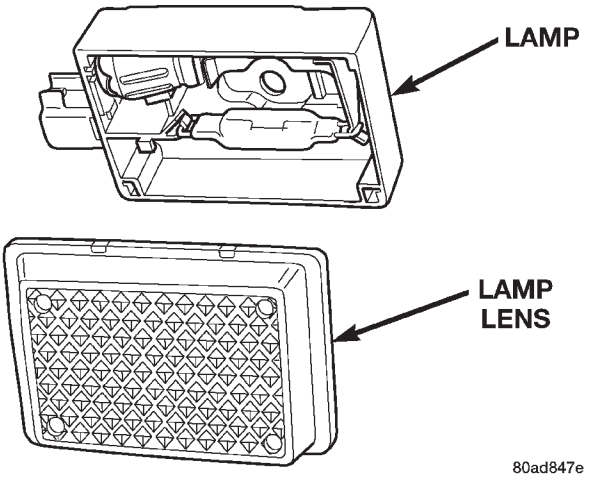


Fig. 4 Underhood Lamp Lens

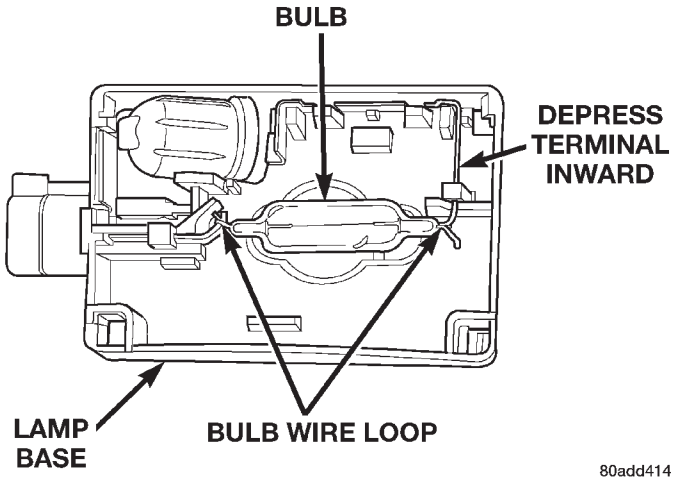


Fig. 5 Underhood Lamp Bulb

INSTALLATION

(1) Engage the replacement bulb wire loop to the terminal closest to the lamp base wire connector.

REMOVAL AND INSTALLATION (Continued)

(2) Depress the opposite terminal inward and engage the remaining bulb wire loop.

(3) Position the lamp lens on the lamp base and press into place.

DOME LAMP

SOUND BAR DOME LAMP BULB REMOVAL

(1) Insert a small flat blade between the lamp housing and lamp lens. Carefully pry lamp lens to disengage lens retaining tabs.

(2) Separate lens from lamp housing.

(3) Grasp bulb and pull from lamp.

SOUND BAR DOME LAMP BULB INSTALLATION

(1) Position bulb in lamp socket and press into place.

(2) Position lamp lens on lamp housing and press into place.

CARGO AREA DOME LAMP BULB REMOVAL

(1) Remove the dome/cargo lamp lens by squeezing it at the lens at the top and bottom (Fig. 6). This will separate the lens retaining tabs from the lamp housing shoulders.

(2) Remove the lens from the lamp housing.

(3) Pull the bulb straight out to remove from the bulb holder.

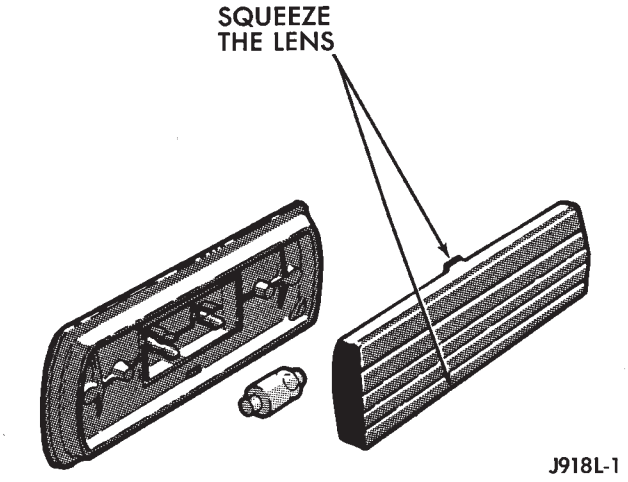


Fig. 6 Cargo Area Dome Lamp

CARGO AREA DOME LAMP BULB INSTALLATION

(1) Insert the replacement bulb in the bulb holder.

(2) Position lens at the lamp housing and press into the housing until the retainer tabs are seated.

LAMP SERVICE

INDEX

REMOVAL AND INSTALLATION

HEADLAMP

REMOVAL

(1) Remove the screws that attach the headlamp bezel (Fig. 1).

(2) Remove the screws that attach the headlamp retaining ring (Fig. 2).

(3) Disconnect the headlamp wire harness connector and remove the bulb from the bucket (Fig. 3).

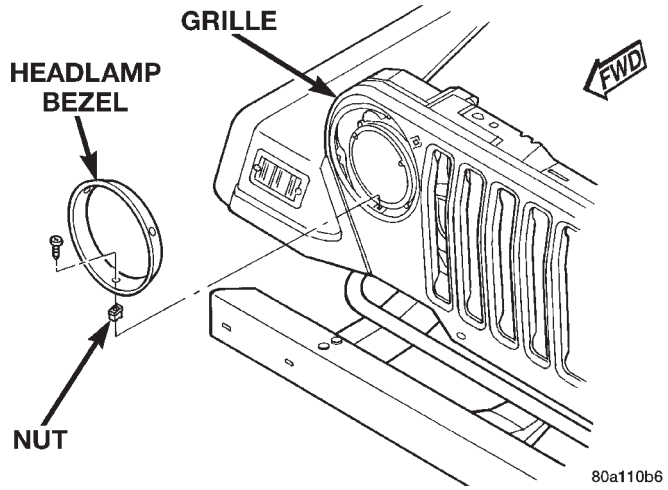


Fig. 1 Headlamp Bezel

INSTALLATION

(1) Connect the wire harness connector and position the bulb in the bucket.

(2) Position retaining ring on the headlamp bulb and install screws.

(3) Install the headlamp bezel. Tighten the screws securely.

FOG LAMP

REMOVAL

(1) Disconnect the fog lamp wire harness connector.

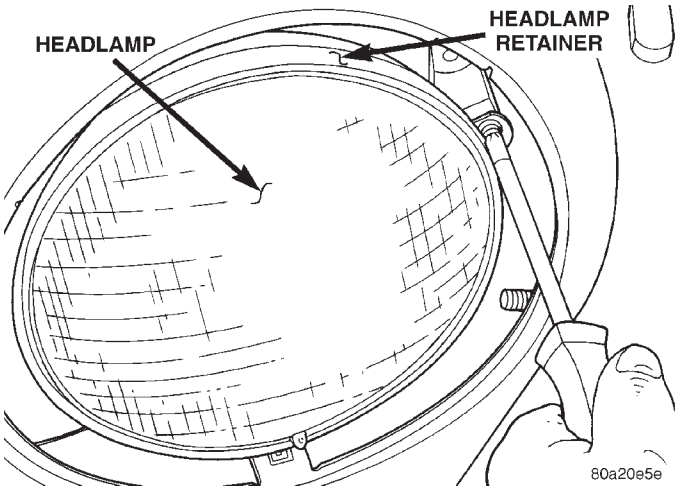


Fig. 2 Headlamp Retaining Ring

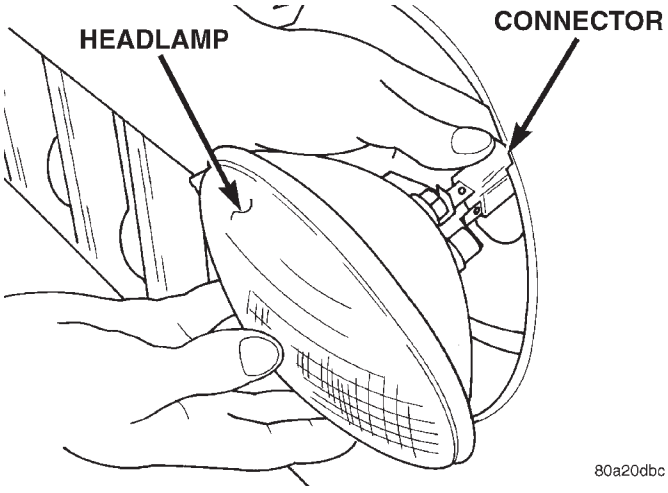


Fig. 3 Headlamp Connector

(2) Remove the nut attaching the fog lamp to the front bumper.

(3) Separate the fog lamp from the bumper.

INSTALLATION

(1) Position the fog lamp on the bumper.

(2) Install the nut attaching the fog lamp to the front bumper.

REMOVAL AND INSTALLATION (Continued)

(3) Connect the fog lamp wire harness connector.

FRONT PARK/TURN SIGNAL LAMP

REMOVAL

(1) Remove the park/turn signal lamp housing screws (Fig. 4).

(2) Separate the park/turn signal lamp housing from the fender.

(3) Rotate bulb socket one third turn counter-clockwise and separate bulb socket from lamp.

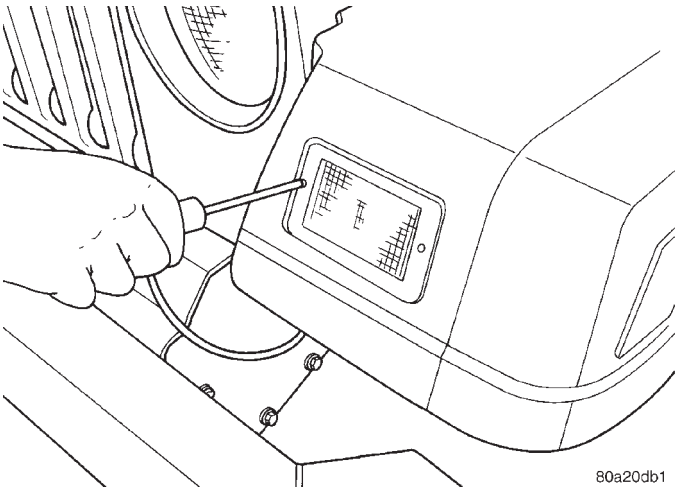


Fig. 4 Park/Turn Signal Lamp

INSTALLATION

(1) Install the bulb socket in the lamp housing.

(2) Position the park/turn signal lamp housing in the fender.

(3) Install the park/turn signal lamp housing screws.

SIDE MARKER LAMP

REMOVAL

(1) From underside of the fender, remove nut attaching marker lamp to fender.

(2) Separate lamp from fender.

(3) Rotate bulb socket one-third turn counter-clockwise and separate socket from lamp housing.

INSTALLATION

(1) Position bulb socket in lamp housing and rotate bulb socket one-third turn clockwise.

(2) Position lamp in fender.

(3) Install nut attaching marker lamp to fender.

TAIL/STOP/TURN SIGNAL/BACK-UP LAMP

REMOVAL

(1) From the underside of the vehicle, remove the push-in fastener attaching the bottom rear edge of the rear wheelhouse splash shield to the body.

(2) Pull the rear of the wheelhouse splash shield away from the body and reach upward to disengage the tail lamp electrical connector.

(3) Remove the screws attaching the lens to the tail lamp housing.

(4) Remove the bolts attaching the tail lamp housing to the body (Fig. 5).

(5) Separate the lamp housing from the body.

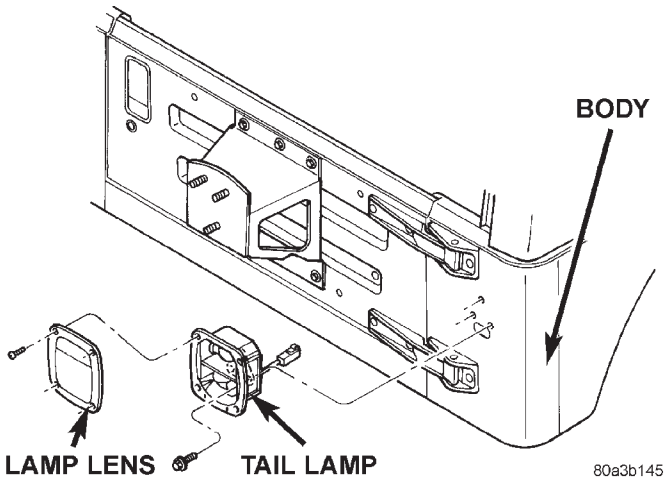


Fig. 5 Tail Lamp Housing

INSTALLATION

(1) Engage the electrical connector.

(2) Install the push-in fastener attaching the bottom rear edge of the rear wheelhouse splash shield to the body.

(3) Position the lamp housing on the body.

(4) Install the bolts attaching the tail lamp housing to the body.

(5) Install the screws attaching the lens to the tail lamp housing.

CENTER HIGH MOUNTED STOP LAMP (CHMSL)

REMOVAL

NOTE: It may be necessary to remove spare tire.

(1) Remove screws attaching CHMSL lamp/bracket to spare tire carrier bracket.

(2) Disengage CHMSL wire harness from retaining clips.

(3) Remove cover from CHMSL contact buttons.

REMOVAL AND INSTALLATION (Continued)

(4) Carefully pull wire harness terminal ends from contact buttons (Fig. 6).

(5) Route wire harness through tailgate and separate CHMSL from vehicle.

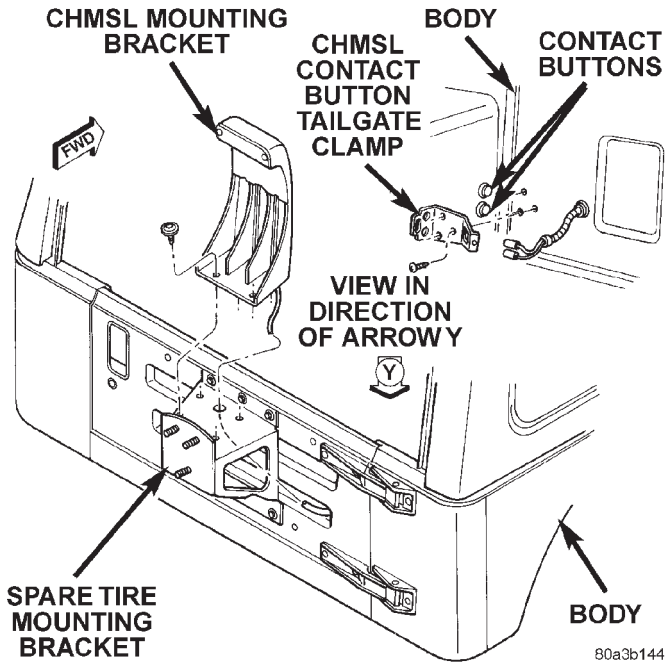


Fig. 6 CHMSL Contact Buttons

INSTALLATION

(1) Position CHMSL lamp/bracket on spare tire carrier bracket and install screws.

(2) Route wire harness through tailgate.

(3) Install wire harness terminal ends onto contact buttons.

(4) Install cover over CHMSL contact buttons.

(5) Position CHMSL wire harness into CHMSL bracket retaining clips and engage clips.

UNDERHOOD LAMP

REMOVAL

(1) Disconnect the wire harness connector from the lamp.

(2) Remove lamp lens.

(3) Remove bulb.

(4) Remove screw attaching underhood lamp to the inner hood panel.

(5) Separate underhood lamp from vehicle.

INSTALLATION

(1) Install bulb.

(2) Install lamp lens.

(3) Position the underhood lamp flange on the hood inner panel.

(4) Install the attaching screw through the lamp flange and into the hood panel (Fig. 7). Tighten the screw securely.

(5) Fold lamp housing over and firmly press onto base to snap into place.

(6) Connect the wire harness connector to the lamp.

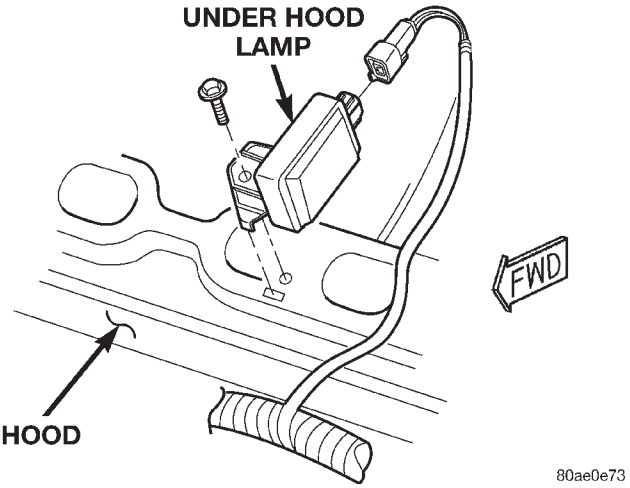


Fig. 7 Underhood Lamp

DOME LAMP

SOUND BAR DOME LAMP REMOVAL

(1) Insert a small flat blade between the lamp housing and lamp lens. Carefully pry lamp lens from the lamp housing.

(2) Separate lens from lamp.

(3) Remove the screws attaching the lamp to the sound bar (Fig. 8).

(4) Disengage lamp electrical connector.

SOUND BAR DOME LAMP INSTALLATION

(1) Engage lamp electrical connector.

(2) Position lamp in sound bar.

(3) Install the screws attaching the lamp to the sound bar.

(4) Position lamp lens on lamp housing and press into place.

CARGO AREA DOME LAMP REMOVAL

Vehicles equipped with a hardtop have a dome lamp located above the rear window lift glass.

(1) Remove the dome/cargo lamp lens by squeezing it at the top and bottom. This will separate the lens retaining tabs from the lamp housing shoulders.

(2) Remove the lens from the lamp housing.

(3) Remove the bulb.

(4) Remove the screws that attach the lamp to the hardtop.

(5) Separate the lamp from the hardtop.

REMOVAL AND INSTALLATION (Continued)

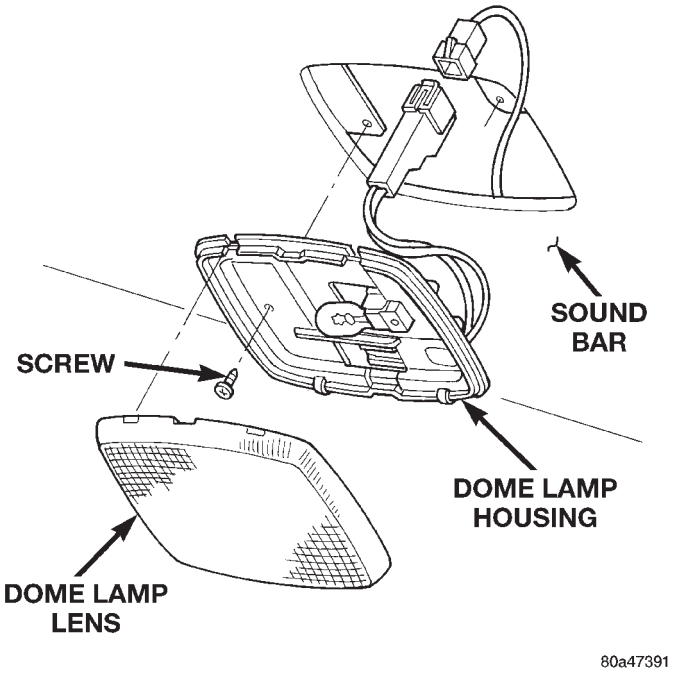


Fig. 8 Sound Bar Dome Lamp

(6) Disconnect the lamp wire connector.

CARGO AREA DOME LAMP INSTALLATION

(1) Connect the lamp wire connector.
(2) Position the lamp in the hardtop.
(3) Install the screws that attach the lamp to the hardtop.
(4) Install the bulb.
(5) Position the lens on the lamp housing and press into place.

LAMP SYSTEMS

INDEX

GENERAL INFORMATION

DAYTIME RUNNING LIGHTS (CANADA ONLY)

The Daytime Running Lights (Headlamps) System is installed on vehicles manufactured for sale in Canada only. The headlamps are illuminated when the ignition switch is turned to the ON position. The DRL module receives a vehicle-moving signal from the vehicle speed sensor. This provides a constant **headlamps-on** condition as long as the vehicle is moving. The lamps are illuminated at less than 50 percent of normal intensity.

REMOVAL AND INSTALLATION

DAYTIME RUNNING LAMP (DRL) MODULE

REMOVAL

(1) Disconnect the wire harness connector from the module.

(2) Remove the screws that attach the module to the cowl (Fig. 1).

(3) Separate the module from the vehicle.

INSTALLATION

(1) Position the DRL module on the cowl.

(2) Install the screws.

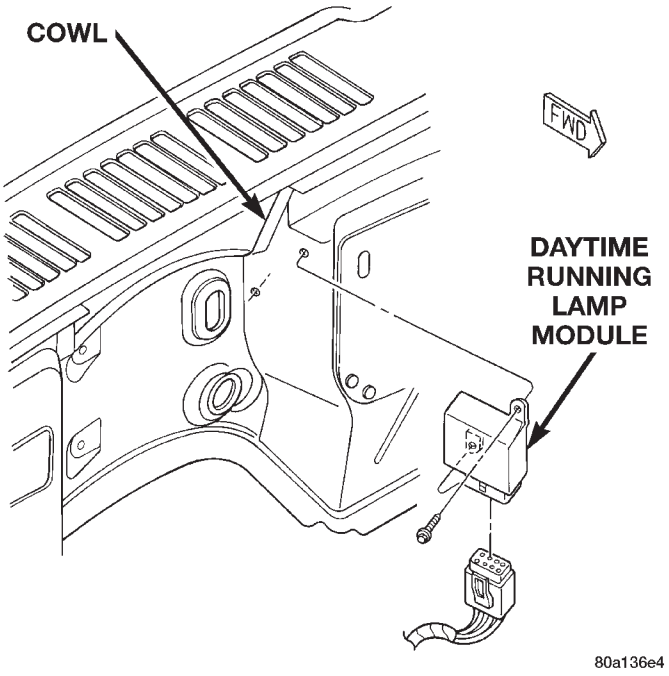


Fig. 1 DRL Module

(3) Connect the wire harness connector to the module.

BULB APPLICATION

INDEX

SPECIFICATIONS

EXTERIOR LAMPS

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result. Do not touch halogen bulbs with fingers or other oily surfaces. Bulb life will be reduced.

The following Bulb Application Table lists the lamp title on the left side of the column and trade number or part number on the right.

LAMP	BULB
Back-up	1156
Center High Mounted Stoplamp	921 or W16W
Fog lamp	H3
Front Side Marker	168 or W3W
Headlamp/Sealed Beam	H6024
Park/Turn Signal	3157
Tail/Stop	1157

INTERIOR LAMPS

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result.

Service procedures for most of the lamps in the instrument panel, Instrument cluster and switches are located in Group 8E, Instrument Panel and Gauges. Some components have lamps that can only be serviced by an Authorized Service Center (ASC) after the component is removed from the vehicle.

The following Bulb Application Table lists the lamp title on the left side of the column and trade number or part number on the right.

LAMP	BULB
Dome/Cargo (Hard Top)	212–2
Dome (Sound Bar)	912
Under Hood	561
Underpanel Courtesy	906

LAMPS

CONTENTS

LAMP DIAGNOSIS

INDEX

GENERAL INFORMATION

GENERAL INFORMATION

Each vehicle is equipped with varies lamp assemblies. A good ground is necessary for proper lighting operation. Grounding is provided by the lamp socket when it comes in contact with the metal body, or through a separate ground wire.

When changing lamp bulbs check the sockets for corrosion. If corrosion is present, clean it with a wire brush and coat the inside of the socket lightly with Mopar Multi-Purpose Grease or equivalent.

SAFETY PRECAUTIONS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surfaces, reduced bulb life can result.

Do not use bulbs with higher candle power than indicated in the Bulb Application Table at the end of this group. Damage to lamp can result.

Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When it necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

HEADLAMP LEVELING MOTOR

This vehicle is equipped with a remote headlamp leveling system. This system allows the driver to adjust the vertical headlamp aim from the interior of the vehicle to compensate for passenger or cargo load. A headlamp leveling switch is located in the instrument panel and controls the headlamp leveling motor found on the back of the head lamp assembly.

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

When a vehicle experiences problems with the headlamp system, verify the condition of the battery connections, charging system, headlamp bulbs, wire connectors, relay, high beam dimmer switch and headlamp switch. Refer to Group 8W, Wiring Diagrams, for component locations and circuit information.

HEADLAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn alternator drive belt.	2. Adjust or replace alternator drive belt.
	3. Charging system output too low.	3. Test and repair charging system. Refer to Group 8A.
	4. Battery has insufficient charge.	4. Test battery state-of -charge. Refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery. Refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
HEADLAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system. Refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices. Refer to Group 8W.
HEADLAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system. Refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	3. High resistance in headlamp circuit.	3. Test amperage draw of headlamp circuit.
HEADLAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations, refer to Group 8W.
	2. High resistance in headlamp circuit.	2. Test amperage draw of headlamp circuit.
	3. Loose or corroded terminals or splices in circuit.	3. Inspect and repair all connectors and splices. Refer to Group 8W.
HEADLAMPS DO NOT ILLUMINATE	1. No voltage to headlamps.	1. Repair open headlamp circuit. Refer to Group 8W.
	2. No Z1-ground at headlamps.	2. Repair circuit ground. Refer to Group 8W.
	3. Faulty headlamp switch.	3. Replace headlamp switch.
	4. Faulty headlamp dimmer (multi-function) switch.	4. Replace multi-function switch.
	5. Broken connector terminal or wire splice in headlamp circuit.	5. Repair connector terminal or wire splice.
	6. Defective or burned out bulb.	6. Replace bulb.
	7. Body controller malfunction.	7. Refer to appropriate body controller diagnostics.

DIAGNOSIS AND TESTING (Continued)

FOG LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF.	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn alternator drive belt.	2. Adjust or replace alternator drive belt.
	3. Charging system output too low.	3. Test and repair charging system. Refer to Group 8A.
	4. Battery has insufficient charge.	4. Test battery state-of -charge. Refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery. Refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
FOG LAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system. Refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system. Refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	3. High resistance in fog lamp circuit.	3. Test amperage draw of fog lamp circuit.
FOG LAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	2. High resistance in fog lamp circuit.	2. Test amperage draw of fog lamp circuit.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS DO NOT ILLUMINATE	1. Blown fuse for fog lamp.	1. Replace fuse. Refer to Group 8W.
	2. No Z1-ground at fog lamps.	2. Repair circuit ground. Refer to Group 8W.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Broken connector terminal or wire splice in fog lamp circuit.	4. Repair connector terminal or wire splice.
	5. Defective or burned out bulb.	5. Replace bulb.

DIAGNOSIS AND TESTING (Continued)

HEADLAMP LEVELING MOTOR DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE MOTOR DOES NOT OPERATE	1. Poor connection at motor.	1. Secure connector on motor.
	2. No voltage at motor.	2. Repair circuit. Refer to Group 8W, Wiring.
	3. Defective motor.	3. Replace motor.
BOTH MOTORS DO NOT OPERATE	1. No voltage at headlamp leveling switch.	1. Repair circuit or replace fuse. Refer to Group 8W, Wiring.
	2. No voltage at both motors.	2. Repair circuit or replace fuse. Refer to Group 8W, Wiring.
	3. Poor connection at motors.	3. Secure connectors on motors.
	4. Both motors defective.	4. Replace motors.

LAMP BULB SERVICE

INDEX

REMOVAL AND INSTALLATION

HEADLAMP BULB

REMOVAL

(1) Release the hood latches and open hood.
(2) Disconnect the headlamp wire harness connectors.
(3) Remove the headlamp bezel retaining screws and bezel (Fig. 1).
(4) Remove the headlamp retaining ring screws and retaining ring (Fig. 2).
(5) Remove the headlamp from vehicle.
(6) Remove rubber seal boot (Fig. 3).
(7) Disengage wire retaining ring from headlamp (Fig. 4).
(8) Pull the headlamp bulb from back of headlamp assembly (Fig. 5).

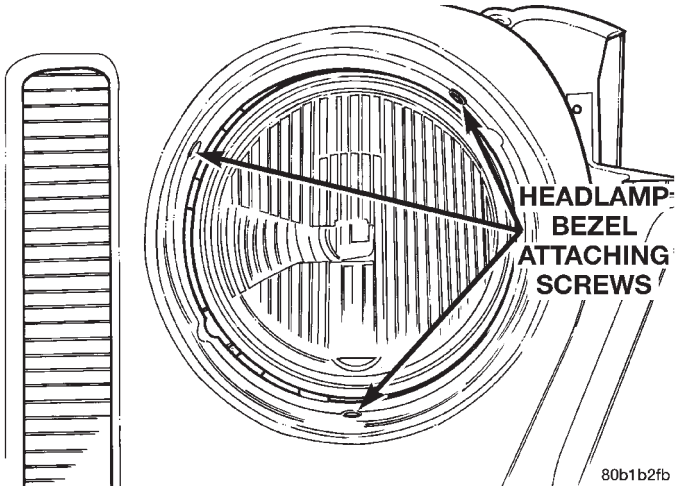


Fig. 1 Headlamp Bezel

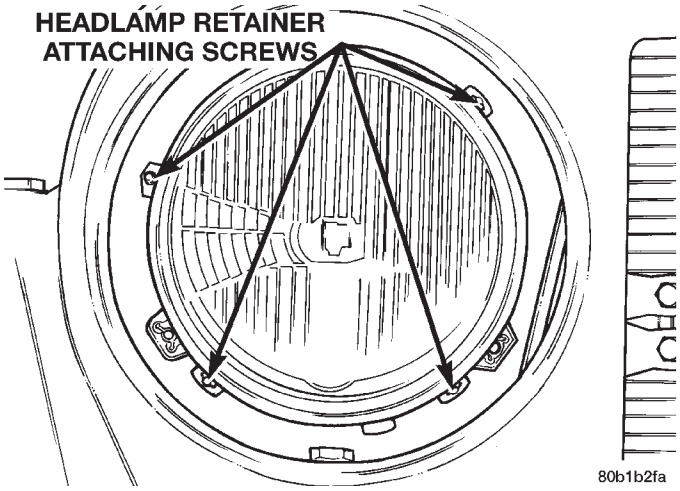


Fig. 2 Headlamp Retaining Ring

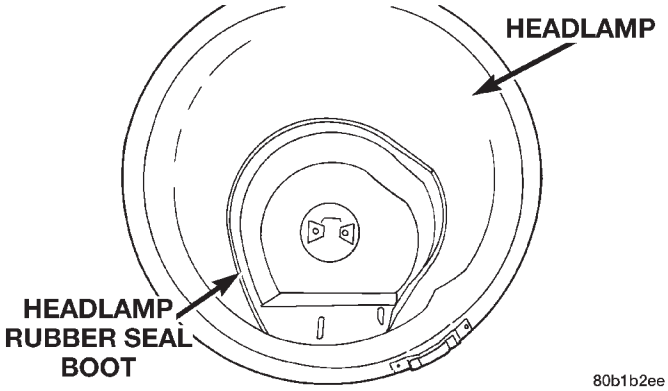


Fig. 3 Headlamp Rubber Seal Boot

REMOVAL AND INSTALLATION (Continued)

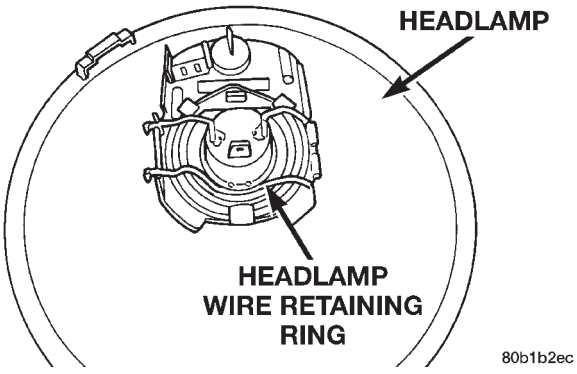


Fig. 4 Headlamp Bulb Retaining Ring

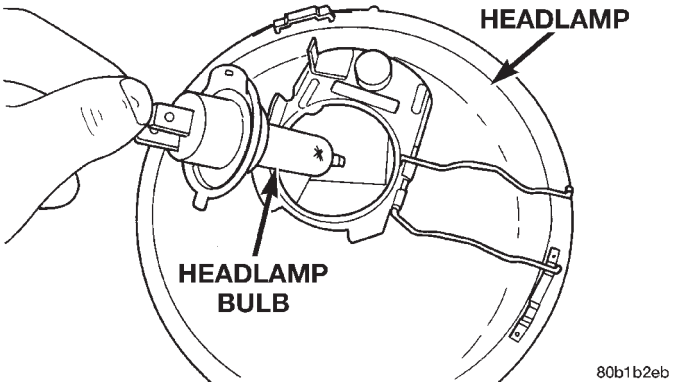


Fig. 5 Headlamp Bulb

INSTALLATION

(1) Perform the removal procedure in reverse order.

CITYLIGHT LAMP BULB

REMOVAL

(1) Remove the headlamp from the vehicle. Refer to the headlamp Removal/Installation procedure located in this group.

(2) Remove rubber seal boot.

(3) Remove citylight lamp bulb housing from the headlamp (Fig. 6).

(4) Remove citylight bulb from housing.

Installation

(1) Perform the removal procedure in reverse order.

TAIL LAMP BULB

REMOVAL

(1) Remove the tail lamp lense retaining screws (Fig. 8).

(2) Separate the tail lamp lense from the tail lamp housing.

(3) Remove the tail lamp bulb from the bulb socket (Fig. 9).

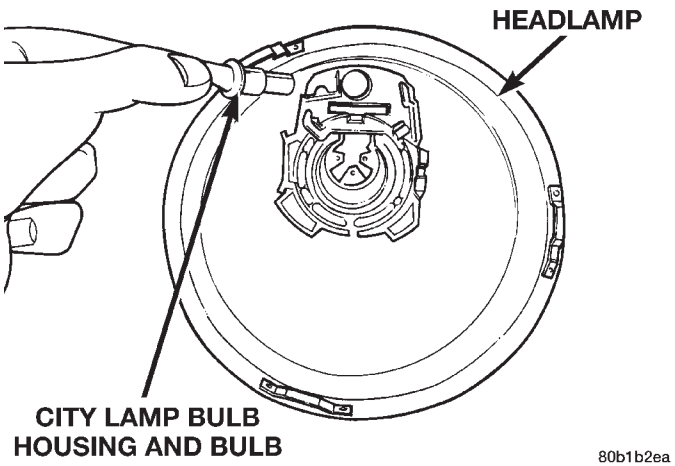


Fig. 6 Citylight Lamp Bulb Housing

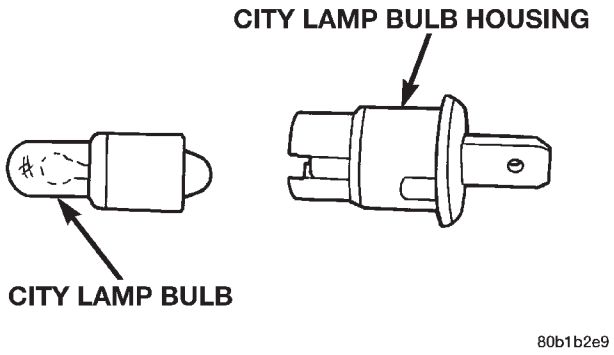


Fig. 7 Citylight Lamp Bulb

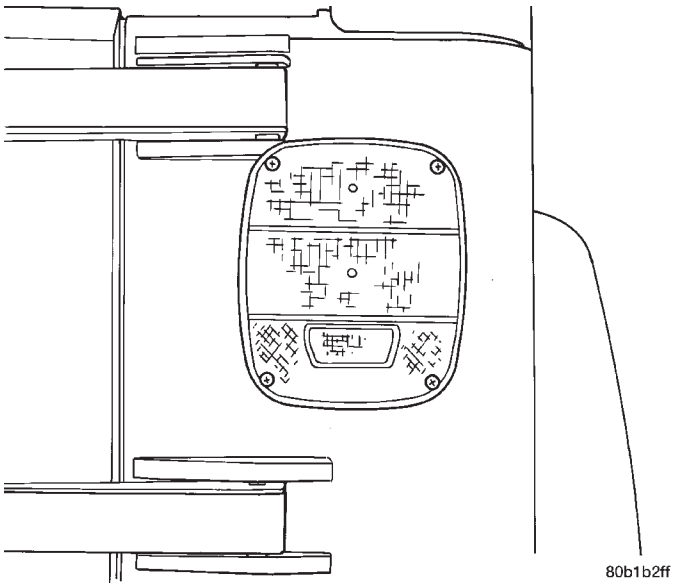


Fig. 8 Tail Lamp Lense

INSTALLATION

(1) Perform the removal procedure in reverse order.

REMOVAL AND INSTALLATION (Continued)

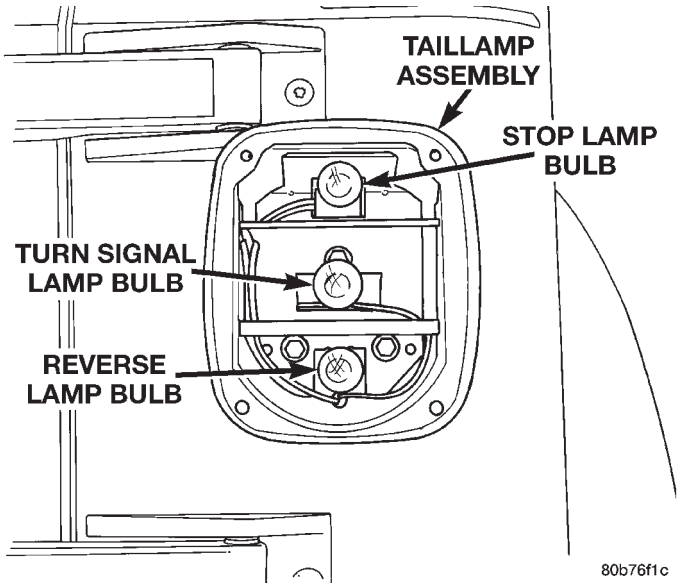


Fig. 9 Tail Lamp Bulbs

REAR FOG LAMP BULB

REMOVAL

(1) Remove the rear fog lamp lense attaching screws and lense (Fig. 10).

(2) Remove the bulb from the fog lamp socket (Fig. 11).

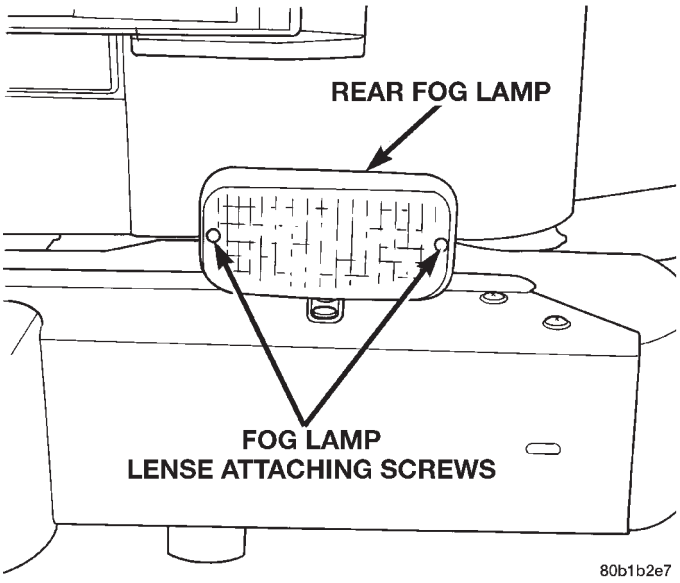


Fig. 10 REAR FOG LAMP LENSE

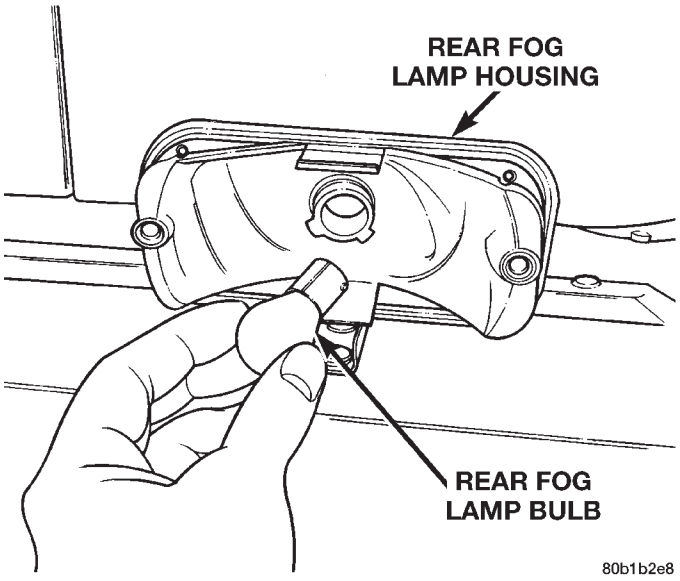


Fig. 11 REAR FOG LAMP BULB

INSTALLATION

(1) Perform the removal procedure in reverse order.

LICENSE PLATE LAMP BULB

REMOVAL

(1) Remove the license plate lamp lense attaching screws and lense.

(2) Remove the bulb from the socket.

INSTALLATION

(1) Perform the removal procedure in reverse order.

CENTER HIGH MOUNTED STOP LAMP (CHMSL) BULB

REMOVAL

(1) Remove the screws attaching the center high mounted stop lamp (CHMSL) lense assembly to the housing.

(2) Separate the CHMSL lense assembly from the housing.

INSTALLATION

(1) Perform the removal procedure in reverse order.

LAMP SERVICE

INDEX

REMOVAL AND INSTALLATION

HEADLAMP ASSEMBLY

REMOVAL

(1) Remove the headlamp bezel attaching screws (Fig. 1).

(2) Remove the headlamp assembly retaining ring attaching screws (Fig. 2).

(3) Disconnect the headlamp assembly electrical connectors and remove the headlamp assembly from the bucket.

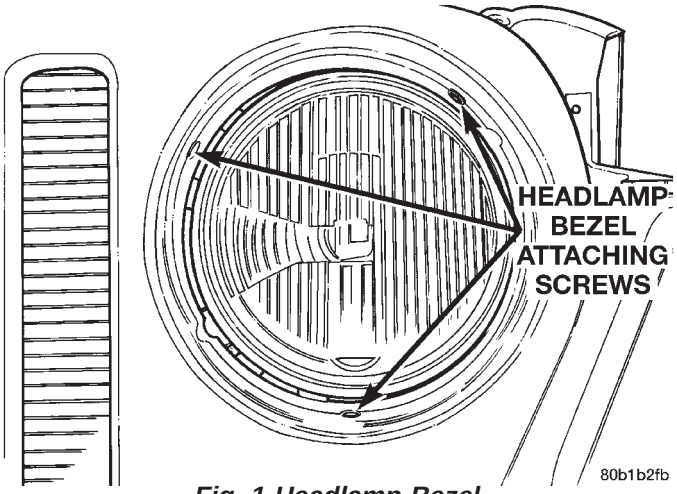


Fig. 1 Headlamp Bezel

Installation

(1) Perform the removal procedure in reverse order.

HEADLAMP LEVELING MOTOR

REMOVAL

(1) Remove the headlamp bezel attaching screws and bezel (Fig. 3).

(2) Disconnect the headlamp and headlamp leveling motor electrical connectors.

(3) Remove the headlamp housing attaching screws (Fig. 4).

(4) Rotate leveling motor one quarter turn counterclockwise.

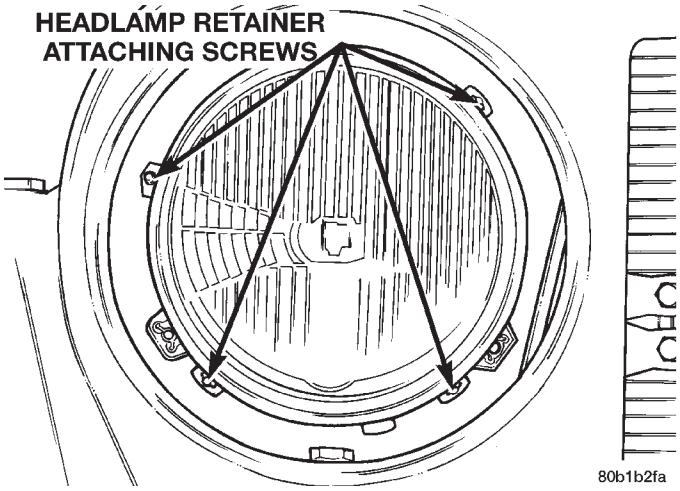


Fig. 2 Headlamp Retaining Ring

(5) Pull the leveling motor from the headlamp housing.

(6) Separate the leveling motor from the headlamp housing (Fig. 5).

NOTE: The headlamp leveling motor arm is snapped into the headlamp housing very securely. Use a firm, steady pull to disengage motor arm from the headlamp housing.

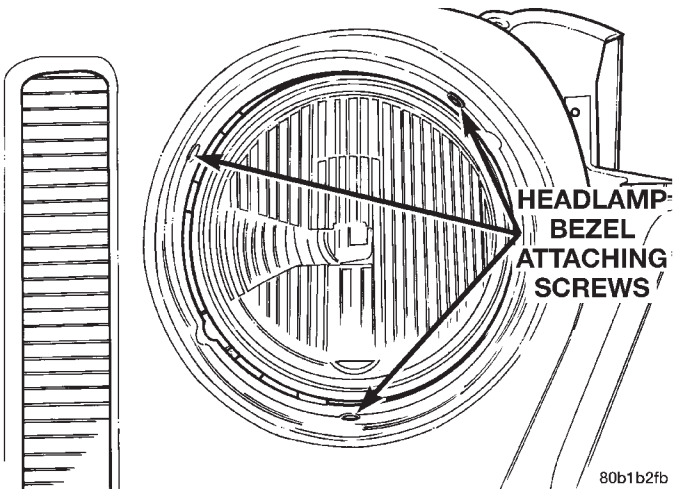


Fig. 3 Headlamp Bezel

REMOVAL AND INSTALLATION (Continued)

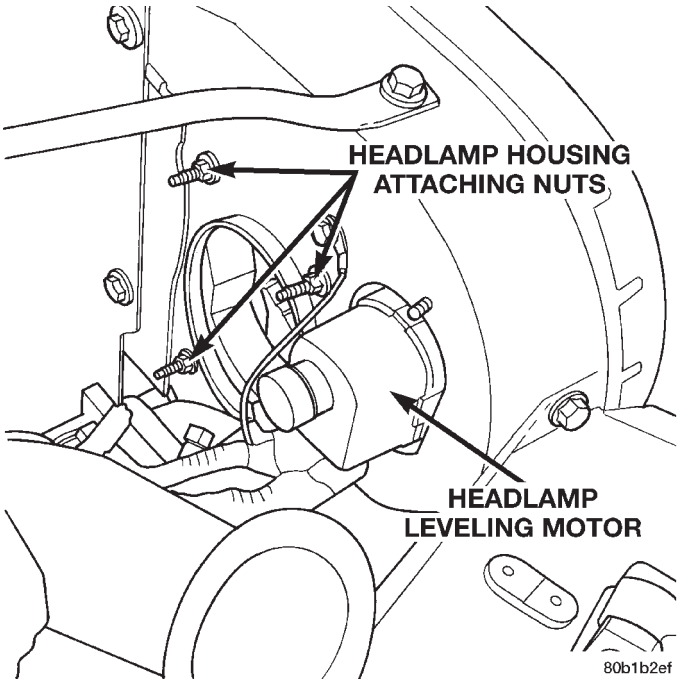


Fig. 4 Headlamp Housing

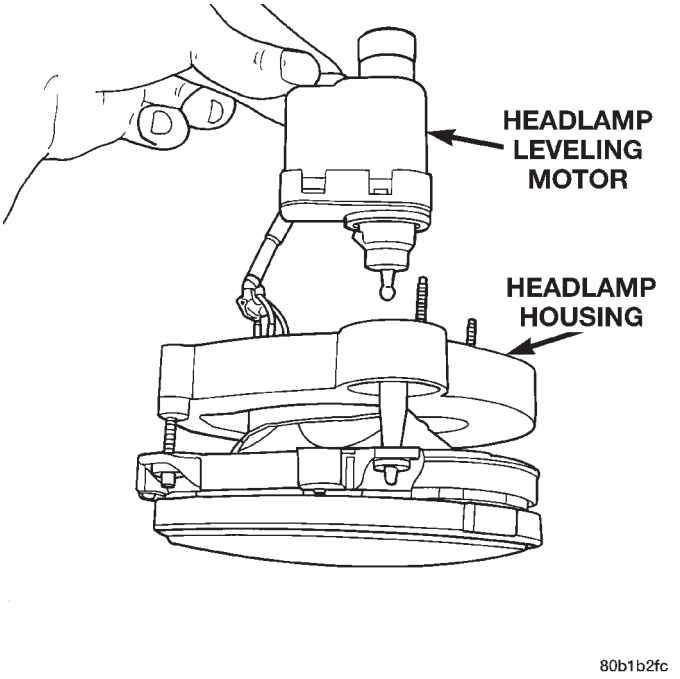


Fig. 5 Headlamp Leveling Motor

INSTALLATION

(1) Perform the removal procedure in reverse order.

TAIL LAMP

REMOVAL

(1) Remove the tail lamp lense attaching screws and lense (Fig. 6).

(2) Remove the tail lamp housing attaching bolts (Fig. 7).

(3) Separate the lamp housing from the body.

(4) Disconnect the tail lamp electrical connector and remove tail lamp housing.

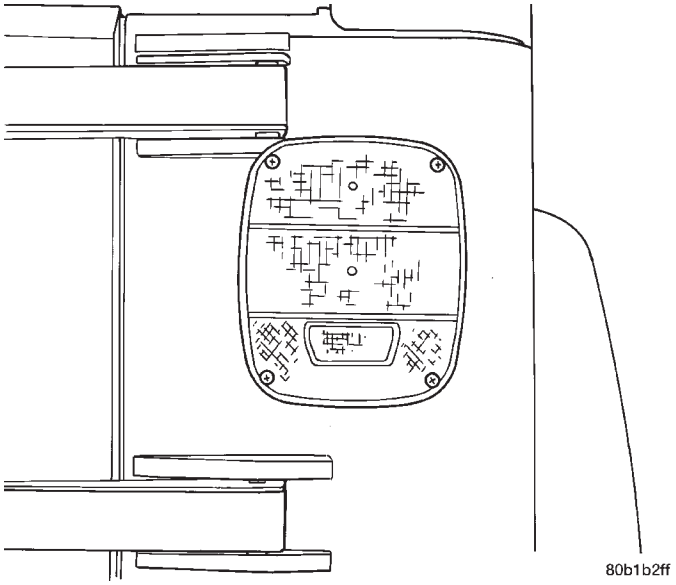


Fig. 6 Tail Lamp Lense

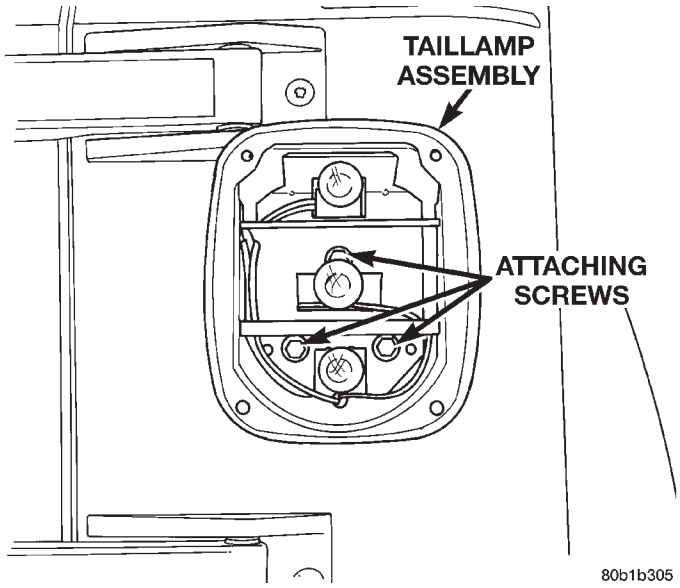


Fig. 7 Tail Lamp Housing

INSTALLATION

(1) Perform the removal procedure in reverse order.

REMOVAL AND INSTALLATION (Continued)

CENTER HIGH MOUNTED STOP LAMP (CHMSL)

REMOVAL

NOTE: It may be necessary to remove the spare tire.

(1) Remove the CHMSL housing to CHMSL bracket attaching screws.
(2) Disconnect the CHMSL wire harness from the retaining clips.
(3) Remove the cover from the CHMSL contact buttons.
(4) Carefully pull the wire harness terminal ends from the contact buttons (Fig. 8).
(5) Route wire harness through tailgate and separate CHMSL from vehicle.

INSTALLATION

(1) Perform the removal procedure in reverse order.

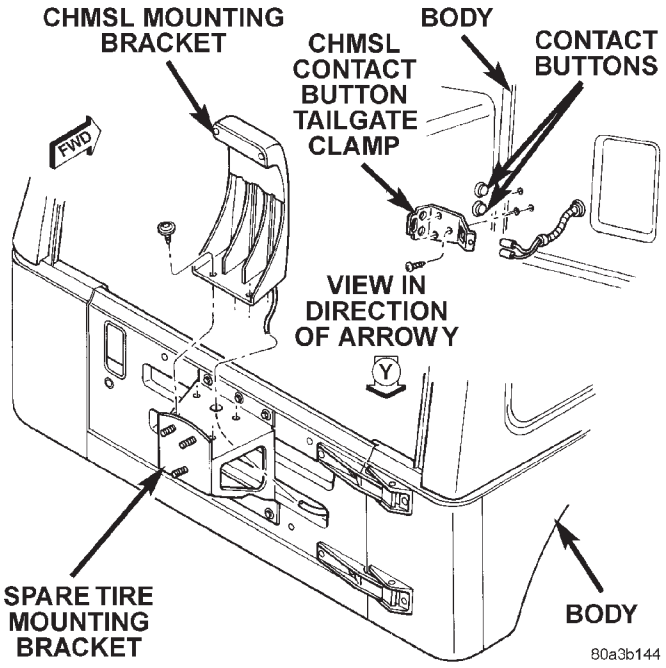


Fig. 8 CHMSL Assembly

REAR FOG LAMP

REMOVAL

(1) Remove the rear fog lamp attaching screw (Fig. 9).
(2) Disconnect the rear fog lamp electrical connector.

INSTALLATION

(1) Perform the removal procedure in reverse order.

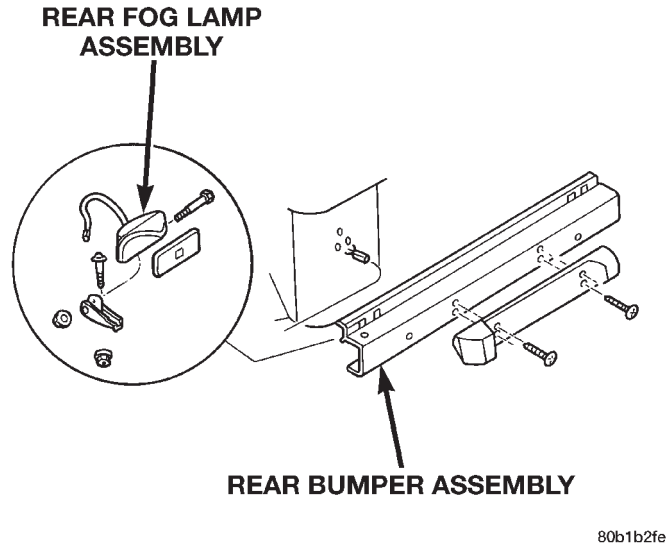


Fig. 9 Rear Fog Lamp

BULB APPLICATION

INDEX

GENERAL INFORMATION

GENERAL INFORMATION

(1) The following bulb Application tables lists the lamp title on the left side of the column and trade number on the right.

CAUTION: Do not use bulbs that have a higher candle power the bulb listed in the Bulb Application Table. Damage to lamp can result. Do not touch halogen bulbs with fingers or other oily surfaces. Bulb life will be reduced.

SPECIFICATIONS

EXTERIOR LAMPS

LAMP	BULB
Back-up	P21W
Center High Mounted Stop	W16W
Headlamp	H-4
License Plate	W5W
Front Turn Signal	P27/7W
Tail/Stop	P21/5W
Rear Turn Signal	P21W
Rear Fog Lamp	P21W
Citylight	T4W
Side Repeater	W5W

INTERIOR LAMPS

Service procedures for most of the lamps in the instrument panel, Instrument cluster and switches are located in Group 8E, Instrument panel and Gauges. Some components have lamps than can only be serviced by an Authorized Service Center (ASC) after the component is removed from the vehicle. Contact a local dealer for location of nearest ASC.

LAMP	BULB
ABS	PC74
Airbag	PC194
Brake Warning System Indicator	PC194
Cigar Lighter	203
Climate Controls	203
Console Gear Selector	161
Dome Light	912
High Beam Indicator	PC194
Rear Cargo	912
Seat Belt Indicator	PC74
Service Engine Soon	PC194
Turn Signal Indicator	PC194
Underhood	105

PASSIVE RESTRAINT SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

AIRBAG SYSTEM

DESCRIPTION

A dual front airbag system is standard factory-installed safety equipment on this model. The primary passenger restraints in this vehicle are the standard equipment factory-installed seat belts, which require active use by the vehicle occupants. The airbag system is a supplemental passive restraint that was designed and is intended to enhance the protection for the front seat occupants of the vehicle **only** when used in conjunction with the seat belts. See the owner's manual in the vehicle glove box for more information on the features, use and operation of all of the factory-installed passenger restraints, including the airbag system.

The dual front airbag system consists of the following components:

- Airbag Control Module (ACM)
- Airbag indicator lamp
- Clockspring
- Driver and passenger side airbag modules (including the airbag inflators)
- Driver and passenger side knee blockers
- Passenger side airbag on/off switch
- Wire harness and connections.

This group provides complete service information for the ACM, both airbag modules, the clockspring, and the passenger side airbag on/off switch. Complete service information for the other airbag system components can be located as follows:

- Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for complete service information for the airbag indicator lamp.
- Refer to **Knee Blocker** in the Removal and Installation section of Group 8E - Instrument Panel Systems for complete service information on the driver side knee blocker.
- Refer to **Glove Box** in the Removal and Installation section of Group 8E - Instrument Panel Systems for complete service information on the passenger side knee blocker.
- Refer to **Airbag System** in the Contents of Group 8W - Wiring Diagrams for complete service information and circuit diagrams for the airbag system wiring components.

See the proper Diagnostic Procedures manual to test or diagnose a problem with any component of the airbag system.

OPERATION

The airbag system electrical circuits are continuously monitored and controlled by a microprocessor and software contained within the Airbag Control Module (ACM). The ACM also contains an impact sensor and a safing sensor, which are monitored by the ACM to determine when an impact occurs that is severe enough to require airbag system protection. When a frontal impact is severe enough, the ACM

DESCRIPTION AND OPERATION (Continued)

signals the inflator units of both airbag modules to deploy the airbags.

An airbag indicator lamp in the instrument cluster lights for about seven seconds as a bulb test, each time the ignition switch is turned to the On or Start positions. Following the bulb test, the airbag indicator lamp is turned on or off by the ACM to indicate the status of the airbag system. If the airbag indicator lamp comes on at any time other than during the bulb test, it indicates that there is a problem in the airbag system circuits. Such a problem may cause the airbags not to deploy when required, or to deploy when not required.

The driver side airbag module includes an inflatable airbag and an inflator unit behind a trim cover in the hub area of the steering wheel. The passenger side airbag module includes a second inflatable airbag and an inflator unit behind an airbag door in the instrument panel above the glove box.

During a frontal vehicle impact, the knee blockers work in concert with properly adjusted seat belts to restrain the driver and front seat passenger in the proper position for an airbag deployment. The knee blockers also work to absorb and distribute the crash energy from the driver and front seat passenger to the structure of the instrument panel. The driver side knee blocker is a stamped metal reinforcement located behind the instrument panel steering column opening cover. The passenger side knee blocker is integral to the glove box door.

Following are general descriptions of the major components in the airbag system.

WARNING:

• THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• THE DRIVER SIDE AIRBAG MODULE INFLATOR ASSEMBLY CONTAINS SODIUM AZIDE AND POTASSIUM NITRATE. THESE MATERIALS ARE POISONOUS AND EXTREMELY FLAMMABLE. CONTACT WITH ACID, WATER, OR HEAVY METALS MAY PRODUCE HARMFUL AND IRRITATING GASES (SODIUM HYDROXIDE IS FORMED IN THE PRESENCE OF MOISTURE) OR COMBUSTIBLE COMPOUNDS. THE PASSENGER AIRBAG MODULE CONTAINS ARGON GAS PRESSURIZED TO OVER 2500 PSI. DO NOT ATTEMPT TO DISMANTLE AN AIRBAG MODULE OR TAMPER WITH ITS INFLATOR. DO NOT PUNCTURE, INCINERATE, OR BRING INTO CONTACT WITH ELECTRICITY. DO NOT STORE AT TEMPERATURES EXCEEDING 93° C (200° F).

• REPLACE AIRBAG SYSTEM COMPONENTS ONLY WITH PARTS SPECIFIED IN THE CHRYSLER MOPAR PARTS CATALOG. SUBSTITUTE PARTS MAY APPEAR INTERCHANGEABLE, BUT INTERNAL DIFFERENCES MAY RESULT IN INFERIOR OCCUPANT PROTECTION.

• THE FASTENERS, SCREWS, AND BOLTS ORIGINALLY USED FOR THE AIRBAG SYSTEM COMPONENTS HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIRBAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANY TIME A NEW FASTENER IS NEEDED, REPLACE IT WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR SPECIFIED IN THE CHRYSLER MOPAR PARTS CATALOG.

• WHEN A STEERING COLUMN HAS AN AIRBAG MODULE ATTACHED, NEVER PLACE THE COLUMN ON THE FLOOR OR ANY OTHER SURFACE WITH THE STEERING WHEEL OR AIRBAG MODULE FACE DOWN.

DRIVER SIDE AIRBAG MODULE

DESCRIPTION

The driver side airbag module protective trim cover is the most visible part of the driver side airbag system. The driver side airbag module is mounted directly to the steering wheel. Located under the airbag module trim cover are the horn switch, the folded airbag cushion, and the airbag cushion supporting components. The resistive membrane-type horn switch is secured with heat stakes to the inside surface of the airbag module trim cover, between the trim cover and the folded airbag cushion.

The driver side airbag module cannot be repaired, and must be replaced if deployed or in any way damaged. The driver side airbag module trim cover and the horn switch are available as a unit for service replacement.

OPERATION

The driver side airbag module includes a stamped metal housing to which the cushion and an inflator unit are attached and sealed. The conventional pyrotechnic-type inflator assembly is mounted to studs on the back of the airbag module housing. The inflator seals the hole in the airbag cushion so it can discharge the gas it produces directly into the cushion

DESCRIPTION AND OPERATION (Continued)

when supplied with the proper electrical signal. Following an airbag deployment, the airbag cushion quickly deflates by venting this gas towards the instrument panel through the porous fabric material used on the steering wheel side of the airbag cushion.

The protective trim cover is fitted to the front of the airbag module and forms a decorative cover in the center of the steering wheel. The inside of the trim cover has locking blocks molded into it that engage a lip on the airbag module metal housing. Two stamped metal retainers then fit over the inflator mounting studs on the back of the airbag module housing and are engaged in slots on the inside of the cover, securely locking the trim cover into place. The trim cover will split at predetermined breakout lines, then fold back out of the way along with the horn switch upon airbag deployment.

PASSENGER SIDE AIRBAG MODULE

DESCRIPTION

The passenger side airbag door on the instrument panel above the glove box is the most visible part of the passenger side airbag system. Located under the airbag door are the passenger side airbag cushion and the airbag cushion supporting components.

The passenger side airbag module includes a stamped metal housing within which the cushion and inflator are mounted and sealed. The airbag housing has three stamped metal mounting brackets spot welded to it. The mounting brackets at the top and at the lower rear of the airbag module secure the module to the instrument panel armature. The stamped metal mounting bracket at the lower front of the housing secures the passenger side airbag module to two studs on the dash panel, behind the glove box. A plastic end bracket encloses the inboard end of the housing and retains the wire harness connector for the inflator.

Following a passenger side airbag deployment, the passenger side airbag module, the passenger side airbag door and the instrument panel assembly must be replaced. The passenger side airbag module cannot be repaired, and must be replaced if deployed or in any way damaged. The passenger side airbag door is available as a separate service item.

OPERATION

The hybrid-type inflator assembly includes a small canister of highly compressed argon gas. The inflator seals the hole in the airbag cushion so it can discharge the gas it produces directly into the cushion when supplied with the proper electrical signal. Following an airbag deployment, the airbag cushion quickly deflates by venting this gas through the porous fabric material used on each end panel of the airbag cushion.

The molded plastic passenger side airbag door is secured to the instrument panel at the upper and lower flanges with screws. A stamped metal bracket located on the back side of the airbag door is secured to the instrument panel armature with one screw on each end, and serves as the hinge for the door upon an airbag deployment. The airbag door has predetermined breakout lines concealed beneath its decorative cover. Upon airbag deployment, the airbag door will split at the breakout lines and the door will fold back over the top of the instrument panel, out of the way.

PASSENGER SIDE AIRBAG ON/OFF SWITCH

DESCRIPTION

A passenger side airbag on/off switch, which is located on the forward end of the floor console (both full and mini versions), allows the passenger side airbag system to be disabled when certain child restraint devices are being used in the right front seating position. The passenger side airbag on/off switch is equipped with a key actuator so that the switch position can only be changed using an ignition key. When the ignition switch is in the On position and the passenger side airbag system is disabled, a Light-Emitting Diode (LED) illuminates an **Off** indicator lamp on the face plate of the switch.

The passenger side airbag on/off switch cannot be adjusted or repaired and, if faulty or damaged, the switch assembly must be replaced. The switch bezel is available for service replacement.

OPERATION

To actuate the passenger side airbag on/off switch, insert the ignition key in the switch key actuator. The switch key actuator is then rotated with the ignition key to its clockwise stop (the key actuator slot will be aligned with the Off indicator lamp) to disable the passenger side airbag system. When the switch key actuator is rotated with the ignition key to its counterclockwise stop (the key actuator slot will be in a vertical position), the Off indicator lamp will be extinguished and the passenger side airbag system will be enabled.

WARNING: THE KEY MUST ALWAYS BE REMOVED FROM THE PASSENGER SIDE AIRBAG ON/OFF SWITCH KEY ACTUATOR AFTER THE SWITCH HAS BEEN USED. NEVER LEAVE A KEY IN THE SWITCH KEY ACTUATOR. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ACCIDENTAL, INCOMPLETE OR IMPROPER AIRBAG DEPLOYMENT AND POSSIBLE OCCUPANT INJURIES.

DESCRIPTION AND OPERATION (Continued)

AIRBAG CONTROL MODULE

DESCRIPTION

The Airbag Control Module (ACM) is secured with screws to a mounting bracket that is secured with four screws onto the floor panel transmission tunnel below the instrument panel and forward of the center floor console in the passenger compartment of the vehicle. The ACM contains an electronic microprocessor, an electronic impact sensor, an electromechanical safing sensor, and an energy storage capacitor.

The ACM is serviced as a unit with the mounting bracket. The ACM cannot be repaired or adjusted and, if damaged or faulty, the ACM and mounting bracket unit must be replaced.

OPERATION

The microprocessor in the ACM contains the airbag system logic. The airbag system logic includes On-Board Diagnostics (OBD), and the ability to communicate with the instrument cluster circuitry over the Chrysler Collision Detection (CCD) data bus to control the airbag indicator lamp. The microprocessor continuously monitors all of the airbag system electrical circuits to determine the system readiness. If the ACM detects a monitored system fault, it sends messages to the instrument cluster over the CCD data bus to turn on the airbag indicator lamp. Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for more information on the airbag indicator lamp.

One electronic impact sensor is used in this airbag system. The impact sensor is an accelerometer that senses the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. The impact sensor is calibrated for the specific vehicle, and is only serviced as a unit with the ACM. A pre-programmed decision algorithm in the ACM microprocessor determines when the deceleration rate as signaled by the impact sensor indicates an impact that is severe enough to require airbag system protection. When the programmed conditions are met, the ACM sends an electrical signal to deploy the airbags.

In addition to the electronic impact sensor, there is an electromechanical sensor within the ACM called a safing sensor. The safing sensor is a normally open series switch located in the airbag deployment circuit of the ACM. This sensor detects impact energy of a lesser magnitude than the electronic impact sensor, and must be closed in order for the airbags to deploy.

The ACM also contains an energy-storage capacitor. This capacitor stores enough electrical energy to deploy the airbags for up to one second following a battery disconnect or failure during an impact. The purpose of the capacitor is to provide airbag system protection in a severe secondary impact, if the initial impact has damaged or disconnected the battery, but was not severe enough to deploy the airbags.

CLOCKSPRING

DESCRIPTION

The clockspring assembly is secured with two integral plastic latches onto the steering column lock housing near the top of the steering column behind the steering wheel. The clockspring is used to maintain a continuous electrical circuit between the fixed clockspring wire harness on the steering column and several electrical components that rotate with the steering wheel. The rotating components include the driver side airbag module, the horn switch and, if the vehicle is so equipped, the vehicle speed control switches.

The clockspring cannot be repaired. If the clockspring is faulty, damaged, or if the driver side airbag has been deployed, the clockspring must be replaced.

OPERATION

The clockspring assembly consists of a plastic case which contains a flat, ribbon-like, electrically conductive tape that winds and unwinds like a clockspring with the steering wheel rotation. The electrically conductive tape consists of several fine gauge copper wire leads sandwiched between two narrow strips of plastic film.

Like the clockspring in a timepiece, the clockspring tape has travel limits and can be damaged by being wound too tightly. To prevent this from occurring, the clockspring is centered when it is installed on the steering column. Centering the clockspring indexes the clockspring tape to other steering components so that it can operate within its designed travel limits. However, if the clockspring is removed for service or if the steering column is disconnected from the steering gear allowing the clockspring tape to change position relative to the other steering components, it must be re-centered following completion of the service or it may be damaged. Refer to **Clockspring Centering** in the Adjustments section of this group for the proper centering procedures.

Service replacement clocksprings are shipped precentered and with a locking pin installed. This locking pin should not be removed until the clockspring has been installed on the steering column. If the locking pin is removed before the clockspring is installed on a steering column, the clockspring centering procedure must be performed.

DIAGNOSIS AND TESTING

AIRBAG SYSTEM

A DRB scan tool is required for diagnosis of the airbag system. See the proper Diagnostic Procedures manual for more information.

(1) Connect the DRB scan tool to the 16-way data link wire harness connector. The connector is located on the driver side lower edge of the instrument panel, outboard of the steering column (Fig. 1).

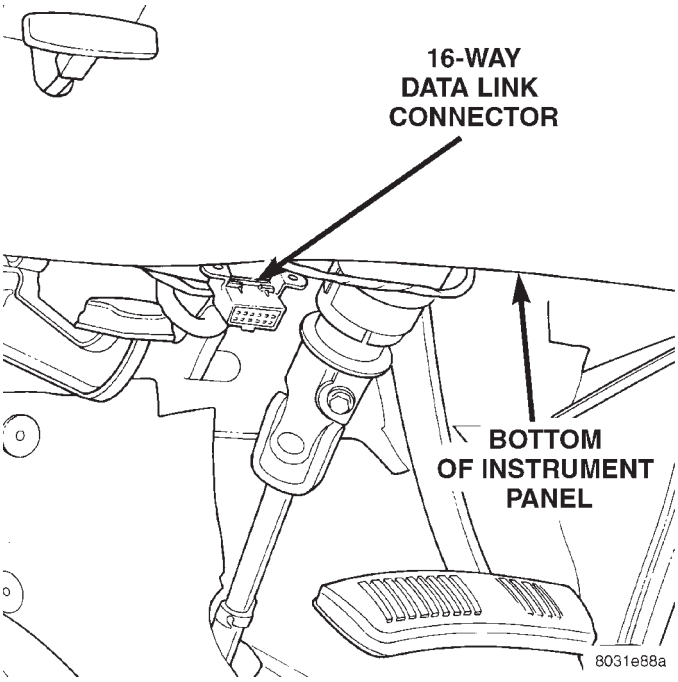


Fig. 1 16-Way Data Link Connector - Typical

(2) Turn the ignition switch to the On position. Exit the vehicle with the DRB. Be certain that the DRB contains the latest version of the proper DRB software.

(3) Using the DRB, read and record the active Diagnostic Trouble Code (DTC) data.

(4) Read and record any stored DTC data.

(5) See the proper Diagnostic Procedures manual if any DTC is found in Step 3 or Step 4.

(6) After completing the necessary repairs, try to erase the stored DTC data. If any problems remain, the stored DTC data will not erase. See the proper Diagnostic Procedures manual for the procedures to diagnose any stored DTC that will not erase.

(7) With the ignition switch still in the On position, check to be certain that nobody is in the vehicle.

(8) From outside of the vehicle (away from the airbags in case of an accidental deployment) turn the ignition switch to the Off position for about ten seconds, and then back to the On position. Observe the airbag indicator lamp in the instrument cluster. It should light for six to eight seconds, and then go out. This indicates that the airbag system is functioning normally.

NOTE: If the airbag indicator lamp fails to light, or lights and stays on, there is an airbag system malfunction. See the proper Diagnostic Procedures manual to diagnose the problem.

SERVICE PROCEDURES

AIRBAG SYSTEM

NON-DEPLOYED

At no time should any source of electricity be permitted near the inflator on the back of an airbag module. When carrying a non-deployed airbag module, the trim cover or airbag side of the module should be pointed away from the body to minimize injury in the event of an accidental deployment. If the module is placed on a bench or any other surface, the trim cover or airbag side of the module should be face up to minimize movement in the event of an accidental deployment.

In addition, the airbag system should be disarmed whenever any steering wheel, steering column, or instrument panel components require diagnosis or service. Failure to observe this warning could result in accidental airbag deployment and possible personal injury. Refer to **Group 8E - Instrument Panel Systems** for additional service procedures on the instrument panel components. Refer to **Group 19 - Steering** for additional service procedures on the steering wheel and steering column components.

DISPOSAL OF NON-DEPLOYED AIRBAG MODULES

All damaged or faulty and non-deployed driver side or passenger side airbag modules which are replaced on vehicles are to be returned. If an airbag module assembly is faulty or damaged and non-deployed, refer to the parts return list in the current Chrysler Corporation Warranty Policies and Procedures manual for the proper handling and disposal procedures.

DEPLOYED

Any vehicle which is to be returned to use after an airbag deployment, must have both airbag modules, the instrument panel assembly, the passenger side airbag module door and the clockspring replaced. These components will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection, and are not intended for reuse.

Other vehicle components should be closely inspected, but are to be replaced only as required by the extent of the visible damage incurred.

SERVICE PROCEDURES (Continued)

STORAGE

An airbag module must be stored in its original, special container until used for service. Also, it must be stored in a clean, dry environment; away from sources of extreme heat, sparks, and high electrical energy. Always place or store an airbag module on a surface with its trim cover or airbag side facing up, to minimize movement in case of an accidental deployment.

CLEANUP PROCEDURE

Following an airbag system deployment, the vehicle interior will contain a powdery residue. This residue consists primarily of harmless particulate by-products of the small pyrotechnic charge used to initiate the airbag deployment propellant. However, this residue will also contain traces of sodium hydroxide powder, a chemical by-product of the propellant material that is used to generate the nitrogen gas that inflates the airbag. Since sodium hydroxide powder can irritate the skin, eyes, nose, or throat, be sure to wear safety glasses, rubber gloves, and a long-sleeved shirt during cleanup (Fig. 2).

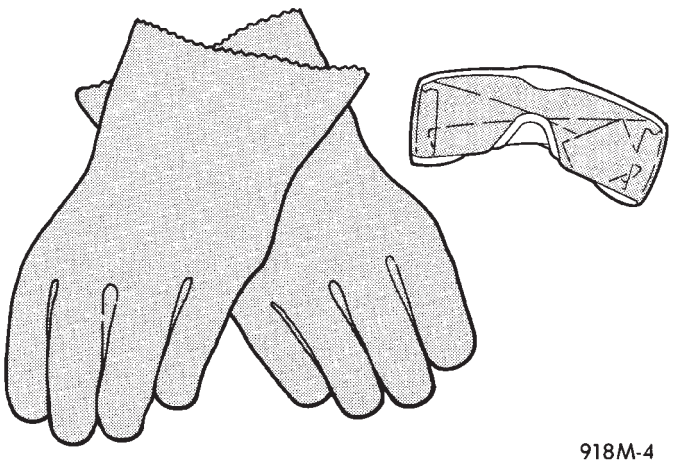


Fig. 2 Wear Safety Glasses and Rubber Gloves - Typical

WARNING: IF YOU EXPERIENCE SKIN IRRITATION DURING CLEANUP, RUN COOL WATER OVER THE AFFECTED AREA. ALSO, IF YOU EXPERIENCE IRRITATION OF THE NOSE OR THROAT, EXIT THE VEHICLE FOR FRESH AIR UNTIL THE IRRITATION CEASES. IF IRRITATION CONTINUES, SEE A PHYSICIAN.

Begin the cleanup by removing the airbag modules from the vehicle. Refer to **Driver Side Airbag Module** and **Passenger Side Airbag Module** in the Removal and Installation section of this group for the procedures.

Use a vacuum cleaner to remove any residual powder from the vehicle interior. Clean from outside the vehicle and work your way inside, so that you avoid kneeling or sitting on a non-cleaned area.

Be sure to vacuum the heater and air conditioning outlets as well (Fig. 3). Run the heater and air conditioner blower on the lowest speed setting and vacuum any powder expelled from the outlets. You may need to vacuum the interior of the vehicle a second time to recover all of the powder.

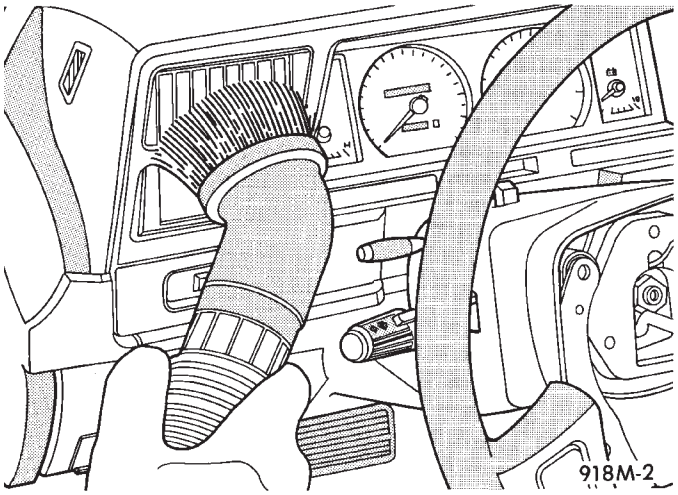


Fig. 3 Vacuum Heater and A/C Outlets - Typical

Place the deployed airbag modules in your vehicular scrap pile.

REMOVAL AND INSTALLATION

DRIVER SIDE AIRBAG MODULE

The following procedure is for replacement of a faulty or damaged driver side airbag module. If the driver side airbag has been deployed, the clockspring must also be replaced. Refer to **Clockspring** in the Removal and Installation section of this group for the additional service procedures for the clockspring.

REMOVAL AND INSTALLATION (Continued)

WARNING:

• THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• WHEN REMOVING A DEPLOYED AIRBAG MODULE, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG MODULE AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.

REMOVAL

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

(2) From the underside of the steering wheel, remove the two screws that secure the driver side airbag module to the steering wheel (Fig. 4).

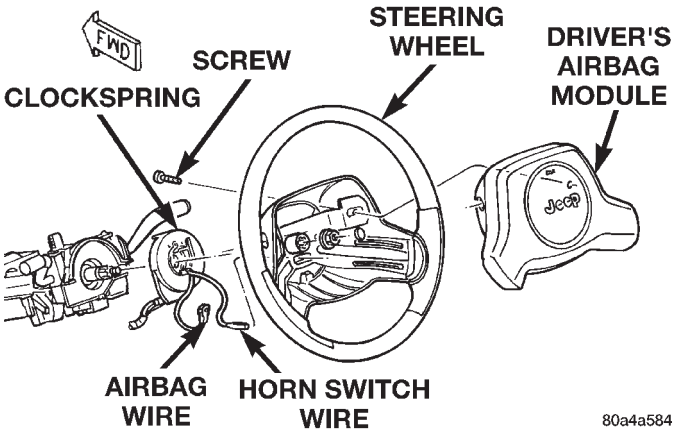


Fig. 4 Driver Side Airbag Module Remove/Install

(3) Pull the airbag module away from the steering wheel far enough to access the two wire harness connectors on the back of the airbag module.

(4) Disconnect the clockspring horn switch wire harness connector from the horn switch feed wire connector, which is located on the back of the airbag module.

(5) The clockspring airbag wire harness connector is a tight snap-fit into the airbag module connector receptacle, which is located on the airbag inflator on the back of the airbag module. Firmly grasp and pull or gently pry on the clockspring airbag wire harness connector to disconnect it from the airbag module. **Do not pull on the clockspring wire harness to disengage the connector from the airbag module connector receptacle.**

(6) Remove the driver side airbag module from the steering wheel.

(7) If the driver side airbag has been deployed, the clockspring must be replaced. Refer to **Clockspring** in the Removal and Installation section of this group for the clockspring service procedures.

INSTALLATION

WARNING:

• USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE DRIVER SIDE AIRBAG MODULE, OR BECOMING ENTRAPPED BETWEEN THE AIRBAG CUSHION AND THE DRIVER SIDE AIRBAG TRIM COVER. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

• THE DRIVER SIDE AIRBAG MODULE TRIM COVER MUST NEVER BE PAINTED. REPLACEMENT TRIM COVERS ARE SERVICED IN THE ORIGINAL COLORS. PAINT MAY CHANGE THE WAY IN WHICH THE MATERIAL OF THE TRIM COVER RESPONDS TO AN AIRBAG DEPLOYMENT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

(1) When installing the driver side airbag module, reconnect the clockspring airbag wire harness connector to the airbag module connector receptacle by pressing straight in on the connector. You can be certain that the connector is fully engaged by listening carefully for a distinct audible click as the connector snaps into place.

(2) Reconnect the clockspring horn switch wire harness connector to the horn switch feed wire connector, which is located on the back of the airbag module.

(3) Carefully position the driver side airbag module in the steering wheel. Be certain that the clockspring wire harnesses in the steering wheel hub area are not pinched between the airbag module and the steering wheel.

(4) From the underside of the steering wheel, install and tighten the two driver side airbag module mounting screws. Tighten the screws to 10.2 N·m (90 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

(5) Do not reconnect the battery negative cable at this time. Refer to **Airbag System** in the Diagnosis and Testing section of this group for the proper procedures.

DRIVER SIDE AIRBAG MODULE TRIM COVER

The horn switch is integral to the driver side airbag module trim cover. If either component is faulty or damaged, the entire driver side airbag module trim cover and horn switch unit must be replaced.

WARNING:

• THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• THE HORN SWITCH IS INTEGRAL TO THE AIRBAG MODULE TRIM COVER. SERVICE OF THIS COMPONENT SHOULD BE PERFORMED ONLY BY CHRYSLER-TRAINED AND AUTHORIZED DEALER SERVICE TECHNICIANS. FAILURE TO TAKE THE PROPER PRECAUTIONS OR TO FOLLOW THE PROPER PROCEDURES COULD RESULT IN ACCIDENTAL, INCOMPLETE, OR IMPROPER AIRBAG DEPLOYMENT AND POSSIBLE OCCUPANT INJURIES.

REMOVAL

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

(2) Remove the driver side airbag module from the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of this group for the procedures.

(3) Remove the plastic horn switch feed wire retainer(s) from the stud(s) on the back of the driver side airbag housing (Fig. 5) or (Fig. 6).

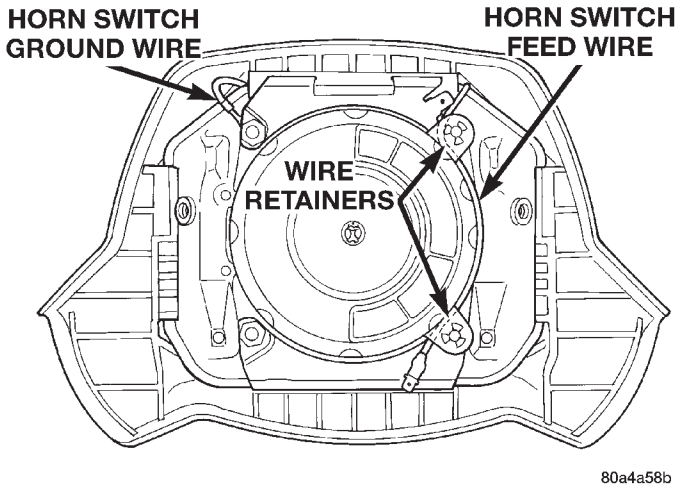


Fig. 5 Horn Switch Feed Wire Remove/Install - w/o Speed Control

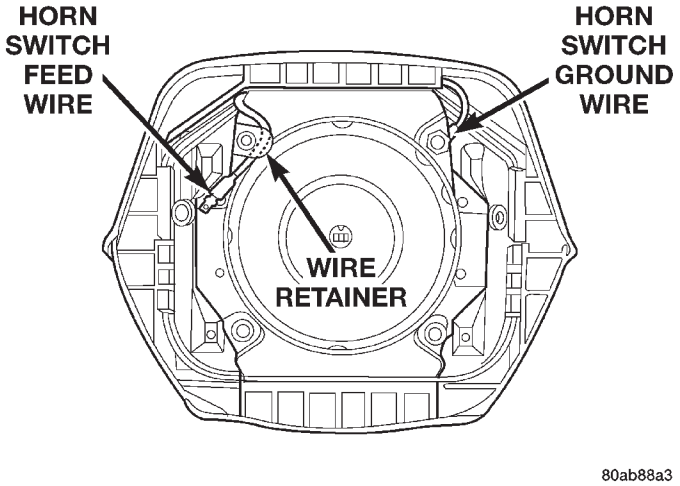


Fig. 6 Horn Switch Feed Wire Remove/Install - w/Speed Control

(4) Remove the four nuts that secure the upper and lower trim cover retainers to the studs on the back of the driver side airbag housing (Fig. 7) or (Fig. 8).

(5) Remove the upper and lower trim cover retainers from the airbag housing studs.

(6) Remove the horn switch ground wire eyelet from the upper airbag housing stud.

(7) Disengage the four trim cover locking blocks from the lip around the outside edge of the driver side airbag housing and remove the housing from the cover (Fig. 9) or (Fig. 10).

REMOVAL AND INSTALLATION (Continued)

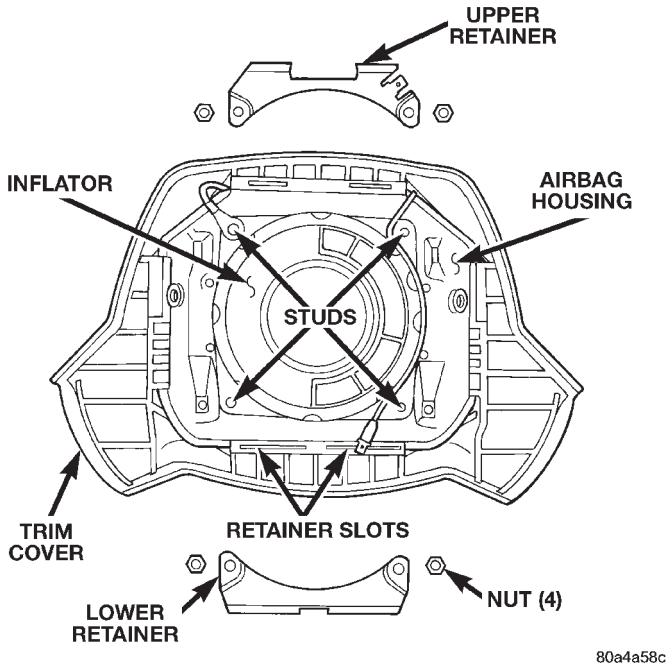


Fig. 7 Driver Side Airbag Trim Cover Retainers Remove/Install - w/o Speed Control

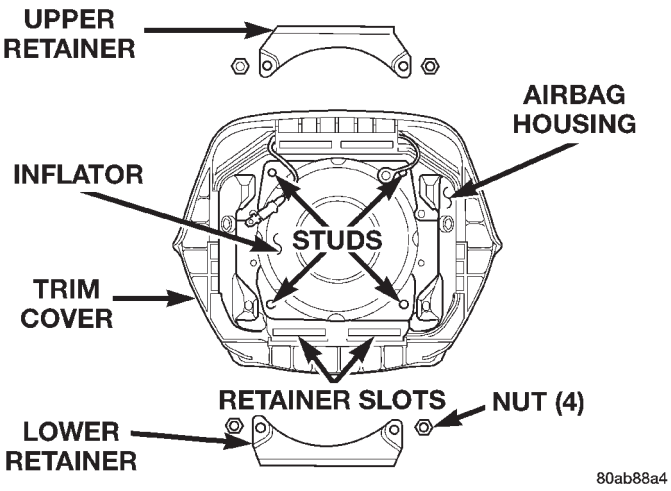


Fig. 8 Driver Side Airbag Trim Cover Retainers Remove/Install - w/Speed Control

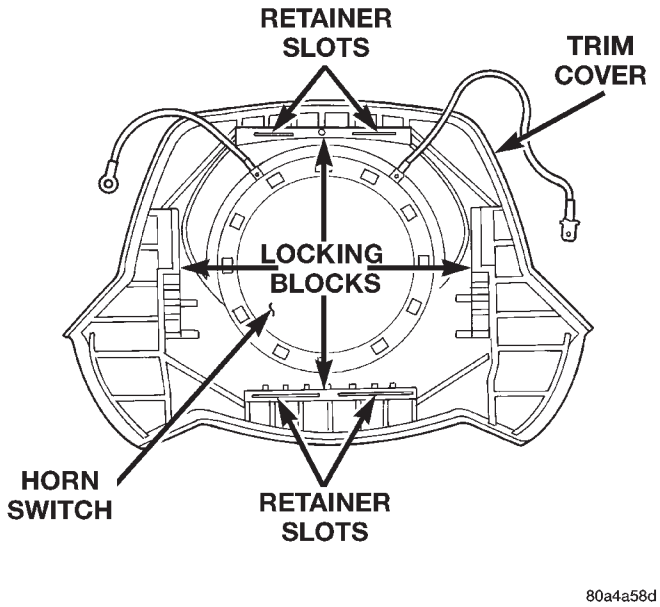


Fig. 9 Driver Side Airbag Trim Cover Remove/Install - w/o Speed Control

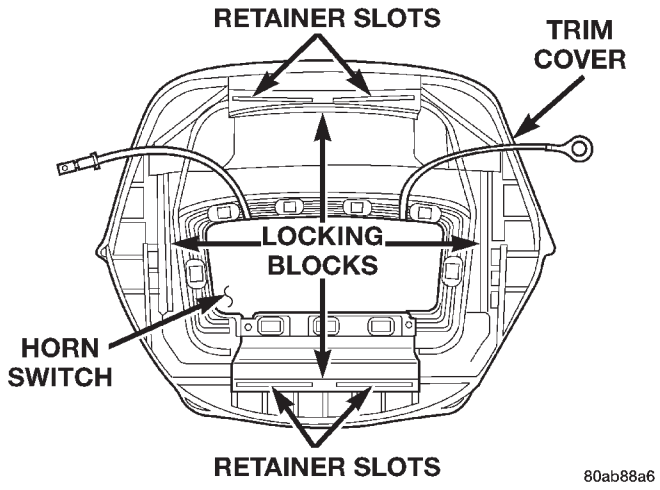


Fig. 10 Driver Side Airbag Trim Cover Remove/ Install - w/Speed Control

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

WARNING:

• USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE DRIVER SIDE AIRBAG MODULE, OR BECOMING ENTRAPPED BETWEEN THE AIRBAG CUSHION AND THE DRIVER SIDE AIRBAG TRIM COVER. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

• THE DRIVER SIDE AIRBAG MODULE TRIM COVER MUST NEVER BE PAINTED. REPLACEMENT TRIM COVERS ARE SERVICED IN THE ORIGINAL COLORS. PAINT MAY CHANGE THE WAY IN WHICH THE MATERIAL OF THE TRIM COVER RESPONDS TO AN AIRBAG DEPLOYMENT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

(1) Carefully position the driver side airbag module in the trim cover. Be certain that the horn switch feed and ground wires are not pinched between the airbag housing and the trim cover locking blocks.

(2) Engage the upper and lower trim cover locking blocks with the lip of the driver side airbag housing, then engage the locking blocks on each side of the trim cover with the lip of the housing. Be certain that each of the locking blocks is fully engaged on the lip of the airbag housing (Fig. 11).

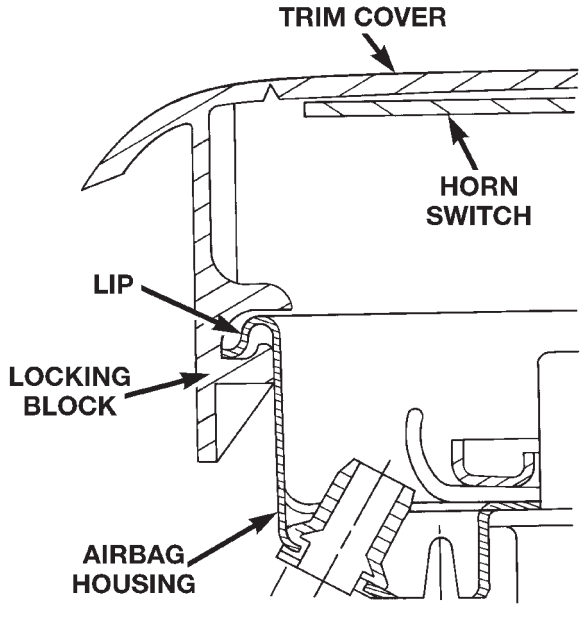


Fig. 11 Driver Side Airbag Trim Cover Locking Blocks Engaged

(3) Install the horn switch ground wire eyelet over the upper airbag housing stud.

(4) Install the upper and lower airbag trim cover retainers over the airbag housing studs. Be certain that the tabs on each retainer are engaged in the retainer slots of the upper and lower trim cover locking blocks (Fig. 9) or (Fig. 10).

(5) Install and tighten the trim cover retainer mounting nuts on the airbag housing studs. Tighten the nuts to 10 N·m (90 in. lbs.).

(6) Install the driver side airbag module onto the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of this group for the procedures.

PASSENGER SIDE AIRBAG MODULE

The following procedure is for replacement of a faulty or damaged passenger side airbag module. If the passenger side airbag module has been deployed, the instrument panel assembly must be replaced. The instrument panel assembly includes the passenger side airbag module and the passenger side airbag door. Refer to **Instrument Panel Assembly** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the instrument panel assembly service procedures.

WARNING:

• THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• WHEN REMOVING A DEPLOYED AIRBAG MODULE, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG MODULE AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.

REMOVAL

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

REMOVAL AND INSTALLATION (Continued)

(2) Remove the instrument panel assembly from the passenger compartment of the vehicle. Refer to **Instrument Panel Assembly** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(3) Place the instrument panel on a suitable work surface. Be certain to take the proper precautions to protect the instrument panel from any possible cosmetic damage.

(4) Remove the three nuts that secure the passenger side airbag module to the studs on the instrument panel armature (Fig. 12).

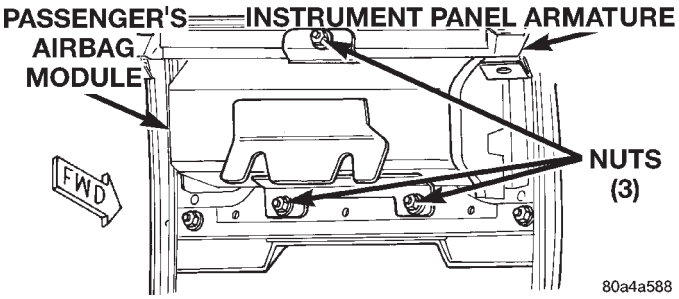


Fig. 12 Passenger Side Airbag Module Remove/ Install

(5) Remove the passenger side airbag module from the instrument panel.

INSTALLATION

WARNING: USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE PASSENGER SIDE AIRBAG MODULE, OR BECOMING ENTRAPPED BETWEEN THE AIRBAG CUSHION AND THE PASSENGER SIDE AIRBAG DOOR. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

(1) Carefully position the passenger side airbag module in the instrument panel.

(2) Install and tighten the three nuts that secure the passenger side airbag module upper and lower mounting brackets to the studs on the instrument panel armature. Tighten the nuts to 12 N·m (105 in. lbs.).

(3) Install the instrument panel assembly into the passenger compartment of the vehicle. Refer to **Instrument Panel Assembly** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures. When installing the instrument panel, be certain to reconnect the passenger side airbag module wire harness to the cross-body wire harness, and that the connector is fully engaged and latched.

(4) Do not reconnect the battery negative cable at this time. Refer to **Airbag System** in the Diagnosis and Testing section of this group for the proper procedures.

PASSENGER SIDE AIRBAG DOOR

WARNING:

- **THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**
- **WHEN REMOVING A DEPLOYED AIRBAG MODULE, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG MODULE AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.**

REMOVAL

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

(2) Remove the passenger side airbag module from the instrument panel. Refer to **Passenger Side Airbag Module** in the Removal and Installation section of this group for the procedures.

(3) Remove the five screws that secure the passenger side airbag door upper flange to the top of the instrument panel (Fig. 13).

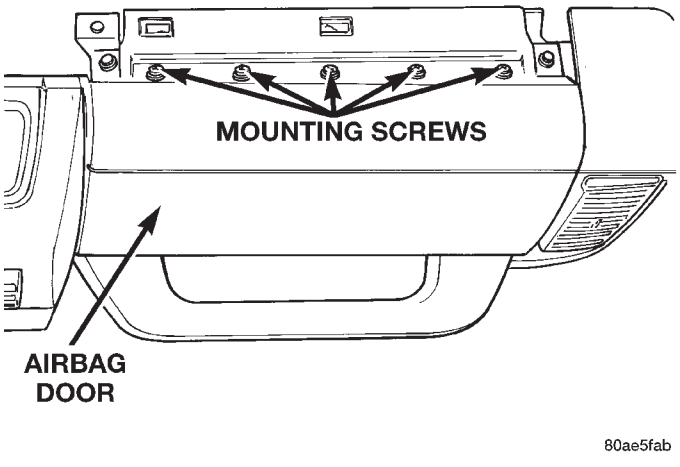


Fig. 13 Passenger Side Airbag Door Upper Screws Remove/Install

REMOVAL AND INSTALLATION (Continued)

(4) Remove the grab handle bezel from the instrument panel. Refer to **Instrument Panel Grab Handle Bezel** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(5) Remove the five screws that secure the passenger side airbag door lower flange to the instrument panel above the glove box opening.

(6) Remove the two screws that secure the ends of the passenger side airbag door bracket to the instrument panel armature (Fig. 14).

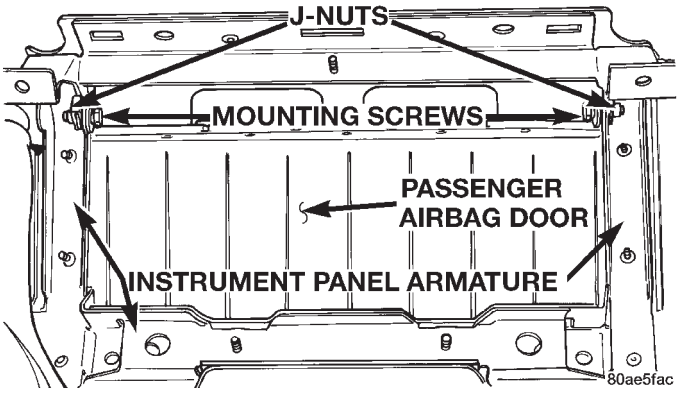


Fig. 14 Passenger Side Airbag Door Remove/Install

(7) Remove and discard the two passenger side airbag door bracket J-nuts from the instrument panel armature. These J-nuts must be replaced with new parts whenever the passenger side airbag door bracket screws are removed.

(8) Remove the passenger side airbag door from the instrument panel.

INSTALLATION

WARNING:

• USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE PASSENGER SIDE AIRBAG MODULE, OR BECOMING ENTRAPPED BETWEEN THE AIRBAG CUSHION AND THE PASSENGER SIDE AIRBAG DOOR. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

• THE PASSENGER SIDE AIRBAG DOOR MUST NEVER BE PAINTED. REPLACEMENT AIRBAG DOORS ARE SERVICED IN THE ORIGINAL COLORS. PAINT MAY CHANGE THE WAY IN WHICH THE MATERIAL OF THE AIRBAG DOOR RESPONDS TO AN AIRBAG DEPLOYMENT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

(1) Install two new passenger airbag door bracket J-nuts onto the instrument panel armature. These J-nuts must be replaced with new parts whenever the passenger side airbag door bracket screws are removed.

(2) Position the passenger side airbag door to the instrument panel and align the mounting holes in each end of the airbag door bracket with the J-nuts on the instrument panel armature.

(3) Install and tighten the two screws that secure the passenger side airbag door bracket to the instrument panel armature. Tighten the screws to 12 N·m (105 in. lbs.).

(4) Install and tighten the five screws that secure the passenger side airbag door lower flange to the instrument panel above the glove box opening. Tighten the screws to 2.2 N·m (20 in. lbs.).

(5) Install the grab handle bezel onto the instrument panel. Refer to **Instrument Panel Grab Handle Bezel** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(6) Install and tighten the five screws that secure the passenger side airbag door upper flange to the top of the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(7) Install the passenger side airbag module onto the instrument panel. Refer to **Passenger Side Airbag Module** in the Removal and Installation section of this group for the procedures.

PASSENGER SIDE AIRBAG ON/OFF SWITCH

WARNING: THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTROMECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

PASSENGER SIDE AIRBAG ON/OFF SWITCH

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

(2) Remove the glove box from the instrument panel. Refer to **Glove Box** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

REMOVAL AND INSTALLATION (Continued)

(3) Reach through the glove box opening to access and disconnect the two passenger side airbag on/off switch wire harness connectors from the instrument panel wire harness. These connectors are retained on a bracket located on the outboard glove box opening reinforcement (Fig. 15).

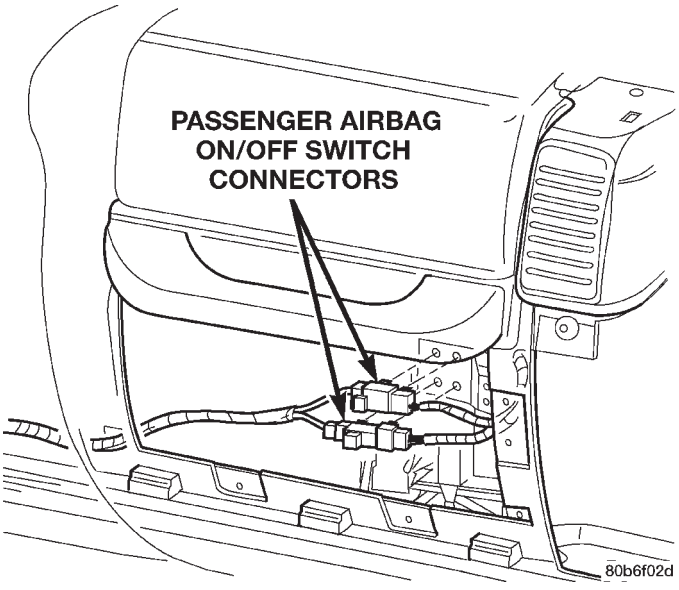


Fig. 15 Passenger Side Airbag On/Off Switch Wire Harness Connectors

(4) Still reaching through the glove box opening, disengage the passenger side airbag on/off switch wire harness from the retainer clip on the plenum bracket that supports the heater-A/C housing just inboard of the fuseblock module.

(5) Remove the full floor console or mini-floor console from the floor panel transmission tunnel. Refer to **Full Floor Console** or **Mini Floor Console** in the Removal and Installation section of Group 23 - Body for the procedures.

(6) From the underside of the console, remove the three screws that secure the passenger side airbag on/off switch to the back of the switch bezel (Fig. 16).

(7) Remove the passenger side airbag on/off switch from the switch bezel.

PASSENGER SIDE AIRBAG ON/OFF SWITCH BEZEL

The passenger side airbag on/off switch can be serviced without removing the switch bezel from the floor console. If the passenger side airbag on/off switch bezel is removed from the floor console, it must be replaced. The latch tabs that secure the bezel to the console will be damaged during the removal process.

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

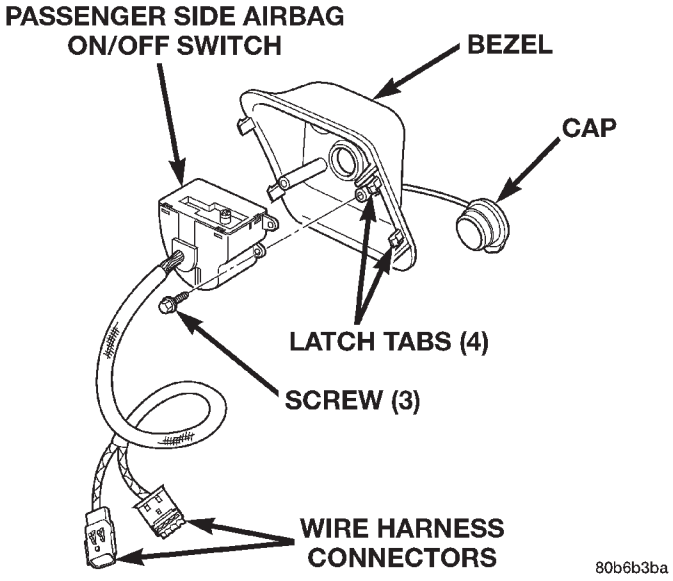


Fig. 16 Passenger Side Airbag On/Off Switch Remove/Install

(2) Remove the passenger side airbag on/off switch from the bezel. Refer to **Passenger Side Airbag On/Off Switch** in the Removal and Installation section of this group for the procedures.

(3) From the underside of the console, release the four latch tabs that secure the passenger side airbag on/off switch bezel to the mounting hole in the front of the full floor console or mini floor console.

(4) Remove the passenger side airbag on/off switch bezel from the top of the full floor console or mini floor console.

INSTALLATION

PASSENGER SIDE AIRBAG ON/OFF SWITCH

(1) From the underside of the console, position the passenger side airbag on/off switch to the back of the switch bezel.

(2) Install and tighten the three screws that secure the passenger side airbag on/off switch to the switch bezel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the full floor console or mini floor console onto the floor panel transmission tunnel. Refer to **Full Floor Console** or **Mini Floor Console** in the Removal and Installation section of Group 23 - Body for the procedures.

(4) Reach through the glove box opening to engage the passenger side airbag on/off switch wire harness in the retainer clip on the plenum bracket that supports the heater-A/C housing just inboard of the fuseblock module.

(5) Still reaching through the glove box opening, access and reconnect the two passenger side airbag on/off switch wire harness connectors to the instrument panel wire harness. These connectors are

REMOVAL AND INSTALLATION (Continued)

retained on a bracket located on the outboard glove box opening reinforcement. Be certain that both connectors are fully engaged and latched.

(6) Install the glove box onto the instrument panel. Refer to **Glove Box** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(7) Do not reconnect the battery negative cable at this time. Refer to **Airbag System** in the Diagnosis and Testing section of this group for the proper procedures.

PASSENGER SIDE AIRBAG ON/OFF SWITCH BEZEL

(1) Position the passenger side airbag on/off switch bezel to the mounting hole at the front of the full floor console or mini floor console.

(2) Press down firmly and evenly on the passenger side airbag on/off switch bezel until each of the four latch tabs on the bezel is fully engaged with the mounting hole of the full floor console or mini floor console.

(3) Install the passenger side airbag on/off switch onto the bezel. Refer to **Passenger Side Airbag On/Off Switch** in the Removal and Installation section of this group for the procedures.

(4) Do not reconnect the battery negative cable at this time. Refer to **Airbag System** in the Diagnosis and Testing section of this group for the proper procedures.

AIRBAG CONTROL MODULE

WARNING:

• THE AIRBAG CONTROL MODULE CONTAINS THE IMPACT SENSOR, WHICH ENABLES THE SYSTEM TO DEPLOY THE AIRBAG. BEFORE ATTEMPTING TO DIAGNOSE OR SERVICE ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

• NEVER STRIKE OR KICK THE AIRBAG CONTROL MODULE, AS IT CAN DAMAGE THE IMPACT SENSOR OR AFFECT ITS CALIBRATION. IF AN AIRBAG CONTROL MODULE IS ACCIDENTALLY DROPPED DURING SERVICE, THE MODULE MUST BE SCRAPPED AND REPLACED WITH A NEW UNIT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ACCIDENTAL, INCOMPLETE, OR IMPROPER AIRBAG DEPLOYMENT AND POSSIBLE OCCUPANT INJURIES.

REMOVAL

(1) Disconnect and isolate the battery negative cable. If either of the airbags has not been deployed, wait two minutes for the system capacitor to discharge before further service.

(2) Pull back the carpet from the floor panel transmission tunnel area under the heater-A/C housing floor duct and forward of the full floor console or mini floor console.

(3) If the vehicle is equipped with the optional Anti-lock Brake System (ABS), remove the acceleration switch and mounting bracket from the floor panel transmission tunnel (Fig. 17). Refer to **Acceleration Switch** in the Removal and Installation section of Group 5 - Brakes for the procedures.

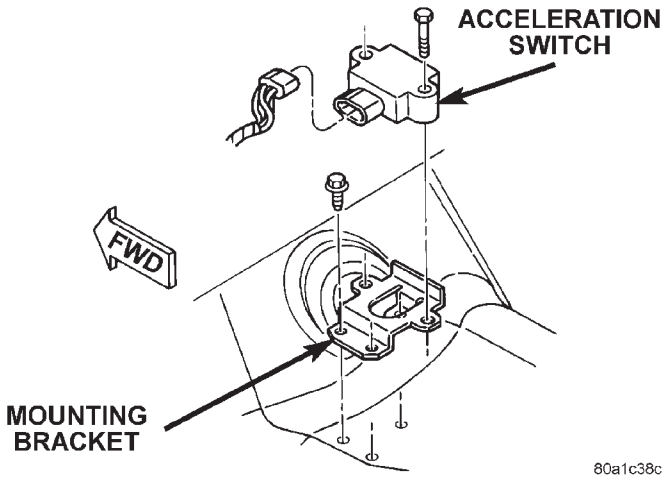


Fig. 17 Acceleration Switch Remove/Install

NOTE: Always remove and replace the airbag control module and its mounting bracket as a unit. Replacement modules include a replacement mounting bracket. Do not transfer the module to another mounting bracket.

(4) Remove the four screws that secure the Airbag Control Module (ACM) mounting bracket to the floor panel transmission tunnel (Fig. 18).

(5) Slide the ACM and mounting bracket out from under the heater-A/C housing floor duct far enough to access the ACM wire harness connector.

(6) Disconnect the cross-body wire harness connector from the ACM. To disconnect the cross-body wire harness connector from the ACM (Fig. 19):

(a) Pull the two white locks out about 3 millimeters (0.125 in.) from each side of the connector.

(b) Squeeze the two connector latch tabs between the thumb and forefinger and pull the connector straight away from the ACM connector receptacle.

REMOVAL AND INSTALLATION (Continued)

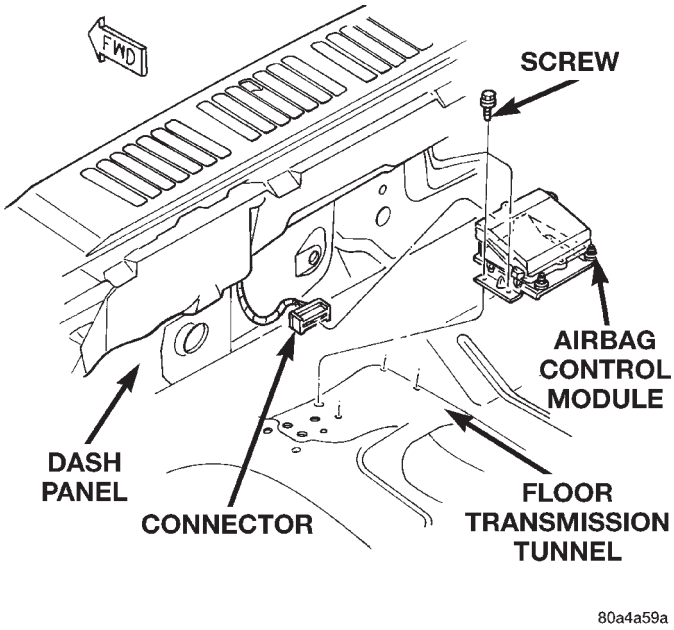


Fig. 18 Airbag Control Module Remove/Install

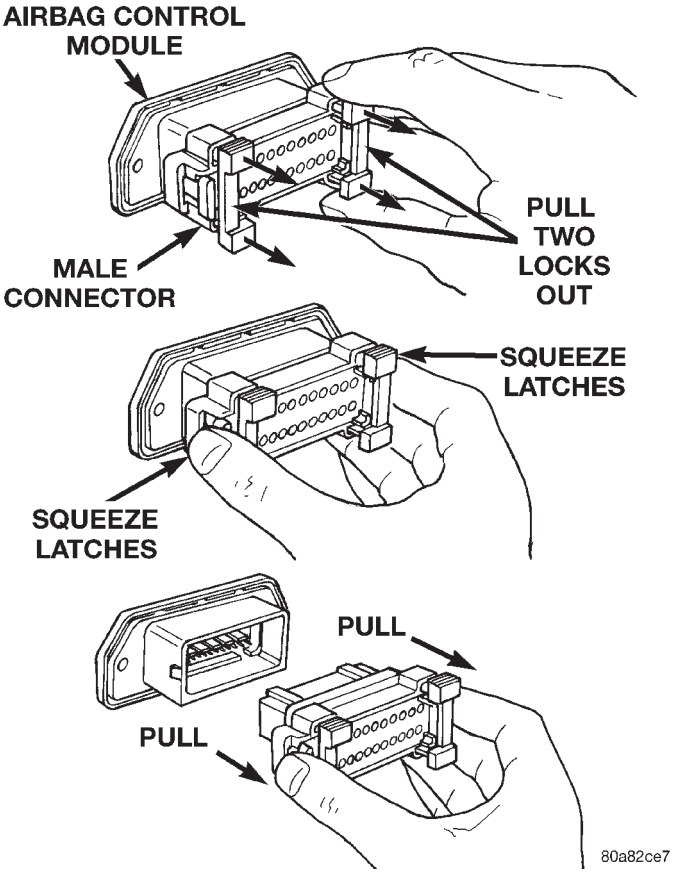


Fig. 19 Airbag Control Module Connector Removal

(7) Remove the ACM and mounting bracket from the floor panel transmission tunnel as a unit.

INSTALLATION

(1) Reconnect the cross-body wire harness connector to the ACM connector receptacle. Be certain that the connector latches are fully engaged and that the white connector locks are pushed in.

(2) Carefully position the ACM and mounting bracket unit to the floor panel transmission tunnel. When the ACM is correctly positioned the arrow on the ACM label will be pointed forward in the vehicle.

(3) Install and tighten the four screws that secure the ACM mounting bracket to the floor panel transmission tunnel. Tighten the screws to 10.7 N·m (95 in. lbs.).

(4) If the vehicle is equipped with the optional ABS brakes, install the acceleration switch and mounting bracket onto the floor panel transmission tunnel. Refer to **Acceleration Switch** in the Removal and Installation section of Group 5 - Brakes for the procedures.

(5) Do not reconnect the battery negative cable at this time. Refer to **Airbag System** in the Diagnosis and Testing section of this group for the proper procedures.

CLOCKSPRING

The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver side airbag has been deployed.

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REMOVAL

NOTE: Before starting this procedure, be certain to turn the steering wheel until the front wheels are in the straight-ahead position.

(1) Place the front wheels in the straight-ahead position.

REMOVAL AND INSTALLATION (Continued)

(2) Remove the driver side airbag module from the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of this group for the procedures.

(3) If the vehicle is so equipped, disconnect the upper clockspring wire harness connector from the steering wheel wire harness for the vehicle speed control switches located within the hub cavity of the steering wheel.

(4) Remove the nut that secures the steering wheel armature to the steering column upper shaft, which is located within the hub cavity of the steering wheel.

(5) Pull the steering wheel off of the steering column upper shaft spline using a steering wheel puller (Special Tool C-3428-B).

(6) Remove the steering column opening cover from the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(7) If the vehicle is so equipped, move the tilt steering column to the fully raised position.

(8) Remove the three screws that secure the lower steering column shroud to the upper shroud (Fig. 20).

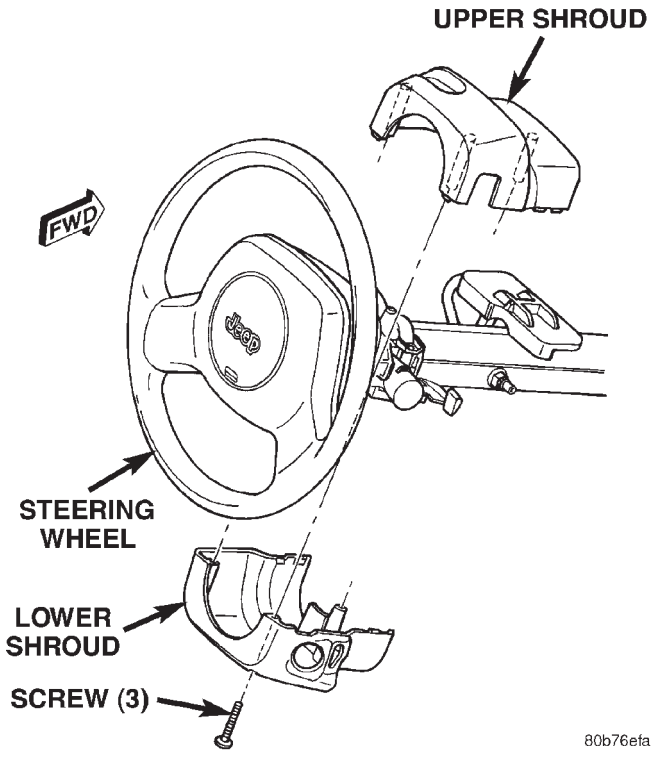

Fig. 20 Steering Column Shrouds Remove/Install

(9) If the vehicle is equipped with a standard non-tilt steering column, loosen the two upper steering column mounting nuts. If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully lowered position.

(10) Remove both the upper and lower shrouds from the steering column.

(11) Disconnect the two instrument panel wire harness connectors from the lower clockspring connector receptacles (Fig. 21).

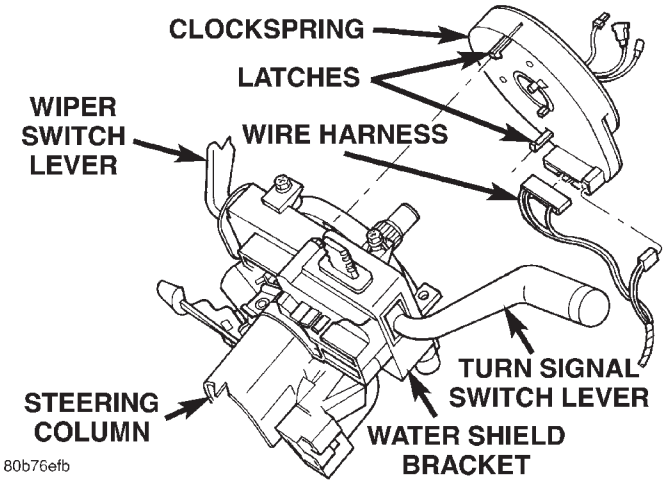

Fig. 21 Clockspring Remove/Install

(12) The multi-function switch water shield bracket on the top of the steering column has a small access window which allows access to the upper clockspring latch with a small screwdriver (Fig. 22). Gently pry both plastic latches of the clockspring assembly to release them from the steering column upper housing.

NOTE: If the clockspring plastic latches are broken, be certain to remove the broken pieces from the steering column upper housing.

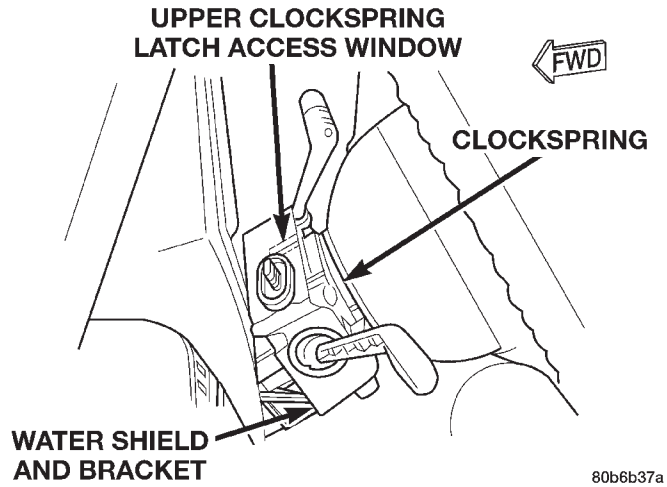

Fig. 22 Upper Clockspring Latch Access Window

(13) Remove the clockspring from the steering column. The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver side airbag has been deployed.

REMOVAL AND INSTALLATION (Continued)

(14) If the removed clockspring is to be reused, lock the clockspring rotor to the clockspring case to maintain clockspring centering until it is reinstalled on the steering column. This can be done by inserting a stiff wire through the small index hole located at about the 11 o'clock position in the centered clockspring rotor and case. Refer to **Clockspring Centering** in the Adjustments section of this group for an illustration of the clockspring index hole. Bend the wire over after it has been inserted through the index hole to prevent it from falling out.

INSTALLATION

If the clockspring is not properly centered in relation to the steering wheel, steering shaft and steering gear, it may be damaged. Refer to **Clockspring Centering** in the Adjustments section of this group before installing or reinstalling a clockspring.

Service replacement clocksprings are shipped precentered and with a locking pin installed. This locking pin should not be removed until the clockspring has been installed on the steering column. If the locking pin is removed before the clockspring is installed on a steering column, the clockspring centering procedure must be performed.

NOTE: Before starting this procedure, be certain that the front wheels are still in the straight-ahead position.

(1) If the removed clockspring is being reused, remove the wire from the index hole that is locking the clockspring rotor to the clockspring case to maintain clockspring centering.

(2) Be certain that the turn signal switch control stalk is in the neutral position, then carefully slide the centered clockspring down over the steering column upper shaft until the clockspring latches engage the steering column upper housing.

(3) If a new clockspring has been installed, remove the locking pin that is securing the clockspring rotor to the clockspring case and maintaining clockspring centering.

(4) Reconnect the two instrument panel wire harness connectors to the lower clockspring connector receptacles. Be certain that the connector latches are fully engaged.

(5) Position both the upper and lower shrouds onto the steering column.

(6) Install and tighten the three screws that secure the lower steering column shroud to the upper shroud. Tighten the screws to 2 N·m (18 in. lbs.).

(7) Install the steering column opening cover onto the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(8) Install the steering wheel onto the steering column upper shaft. Be certain to index the flats on the hub of the steering wheel with the formations on the inside of the clockspring rotor. Pull the upper clockspring wire harnesses through the lower hole in the steering wheel armature.

(9) Install and tighten the steering wheel mounting nut. Tighten the nut to 61 N·m (45 ft. lbs.). Be certain not to pinch the wire harnesses between the steering wheel and the nut.

(10) If the vehicle is so equipped, reconnect the upper clockspring wire harness connector to the steering wheel wire harness for the vehicle speed control switches.

(11) Install the driver side airbag module onto the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of this group for the procedures.

ADJUSTMENTS

CLOCKSPRING CENTERING

The clockspring is designed to wind and unwind when the steering wheel is rotated, but is only designed to rotate the same number of turns (about five complete rotations) as the steering wheel can be turned from stop to stop. Centering the clockspring indexes the clockspring tape to other steering components so that it can operate within its designed travel limits. The rotor of a centered clockspring can be rotated two and one-half turns in either direction from the centered position, without damaging the clockspring tape.

However, if the clockspring is removed for service or if the steering column is disconnected from the steering gear, the clockspring tape can change position relative to the other steering components. The clockspring must then be re-centered following completion of the service or the clockspring tape may be damaged.

Service replacement clocksprings are shipped precentered and with a locking pin installed. This locking pin should not be removed until the clockspring has been installed on the steering column. If the locking pin is removed before the clockspring is installed on a steering column, the clockspring centering procedure must be performed.

ADJUSTMENTS (Continued)

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NOTE: Before starting this procedure, be certain to turn the steering wheel until the front wheels are in the straight-ahead position.

(1) Place the front wheels in the straight-ahead position.

(2) Remove the clockspring from the steering column. Refer to **Clockspring** in the Removal and Installation section of this group for the procedures.

(3) Hold the clockspring case in one hand so that it is oriented as it would be when it is installed on the steering column (Fig. 23).

(4) Use your other hand to rotate the clockspring rotor clockwise to the end of its travel. **Do not apply excessive torque.**

(5) From the end of the clockwise travel, rotate the rotor about two and one-half turns counterclockwise, until the rotor flats are horizontal. If the upper clockspring wire harnesses are not oriented towards the bottom of the clockspring, rotate the rotor another one-half turn in the counterclockwise direction.

(6) The clockspring is now centered. Lock the clockspring rotor to the clockspring case to maintain clockspring centering until it is reinstalled on the steering column. This can be done by inserting a stiff wire through the small index hole located at about the 11 o'clock position in the centered clockspring rotor and case. Bend the wire over after it has been inserted through the index hole to prevent it from falling out.

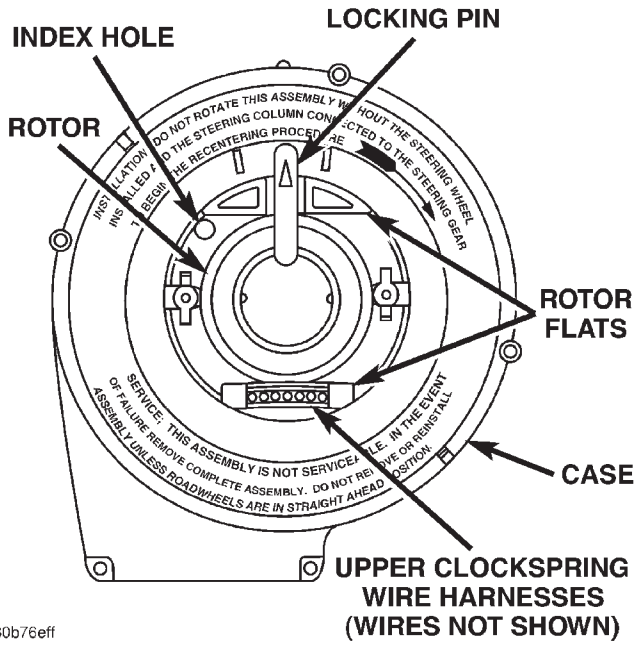
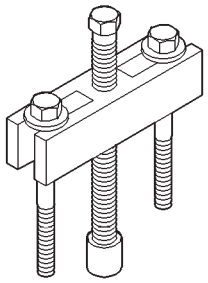


Fig. 23 Clockspring

(7) The front wheels should still be in the straight-ahead position. Install the clockspring onto the steering column. Refer to **Clockspring** in the Removal and Installation section of this group for the procedures.

SPECIAL TOOLS

PASSIVE RESTRAINT SYSTEMS



Puller C-3428-B

ELECTRICALLY HEATED SYSTEMS

CONTENTS

GENERAL INFORMATION

INTRODUCTION

An electrically heated rear window defogger is available as factory-installed equipment on models equipped with the hardtop option. The defogger will only operate when the ignition switch is in the On position. When the defogger switch is in the On position, an electric heater grid on the rear window glass is energized. This grid produces heat to help clear the rear window glass of ice, snow, or fog.

The defogger system is controlled by a switch located in the accessory switch bezel, which is near the bottom of the instrument panel center bezel and next to the ash receiver. An amber indicator lamp in the switch button will light to indicate when the defogger system is turned on. The instrument cluster circuitry, which contains the defogger system timer logic, monitors the state of the defogger switch through a hard-wired input. The instrument cluster circuitry controls the defogger system through a hard-wired control output to the defogger relay.

The defogger system will be automatically turned off after a programmed time interval of about ten minutes. After the initial time interval has expired, if the defogger switch is turned on again during the same ignition cycle, the defogger system will automatically turn off after about five minutes.

The defogger system will automatically shut off if the ignition switch is turned to the Off position, or it can be turned off manually by depressing the instrument panel switch. Refer to the owner's manual for more information on the defogger system controls and operation.

Following are general descriptions of the major components in the defogger system. Refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

REAR GLASS HEATING GRID

The heated rear window glass has two electrically conductive vertical bus bars and a series of horizontal grid lines made of a silver-ceramic material, which is baked on and bonded to the inside surface of the glass. The grid lines and bus bars comprise a parallel electrical circuit.

When the rear window defogger switch is placed in the On position, electrical current is directed to the rear window grid lines through the bus bars. The grid lines heat the rear window to clear the surface of fog or snow. Protection for the heated grid circuit is provided by a fuse in the Power Distribution Center (PDC).

The grid lines and bus bars are highly resistant to abrasion. However, it is possible for an open circuit to occur in an individual grid line, resulting in no current flow through the line.

The grid lines can be damaged or scraped off with sharp instruments. Care should be taken when cleaning the glass or removing foreign materials, decals, or stickers from the glass. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

A repair kit is available to repair the grid lines and bus bars, or to reinstall the heated glass pigtail wires.

DESCRIPTION AND OPERATION (Continued)

DEFOGGER SWITCH

The rear window defogger switch is installed in the instrument panel accessory switch bezel, which is located near the bottom of the instrument panel center bezel area, next to the ash receiver. The momentary-type switch provides a hard-wired ground signal to the instrument cluster each time it is depressed. The instrument cluster rear window defogger timer and logic circuitry responds by energizing or de-energizing the rear window defogger relay.

Energizing the rear window defogger relay provides electrical current to the rear window defogger grid. An amber indicator lamp in the defogger switch, which lights to indicate when the defogger system is turned On, is also powered by the defogger relay output.

The defogger switch illumination lamp and indicator lamp bulbs are serviceable. The defogger switch cannot be repaired and, if faulty or damaged, it must be replaced.

INSTRUMENT CLUSTER

The instrument cluster is an electromechanical unit that contains integrated circuitry and internal programming to perform a variety of functions. The instrument cluster circuitry monitors hard-wired switch inputs, as well as message inputs received from other vehicle electronic control modules on the Chrysler Collision Detection (CCD) data bus network.

The instrument cluster uses these many inputs along with its internal programming and integral timer and logic circuitry to perform the functions of the rear window defogger timer on this model. The instrument cluster circuitry also has a self-diagnostic capability. Refer to Instrument Cluster in Group 8E - Instrument Panel Systems for more information on this feature.

However, there are no diagnostics available for the rear window defogger timer and logic circuitry. Therefore, the diagnosis for this system consists of confirming the presence of a rear window defogger switch input signal at the instrument cluster connector, and the resulting rear window defogger relay control output signal at the defogger relay. For diagnosis of the CCD data bus and the data bus message inputs, a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

Refer to Instrument Cluster in Group 8E - Instrument Panel Systems for the service procedures for the instrument cluster. The rear window defogger timer and logic circuitry cannot be adjusted or repaired and, if faulty or damaged, the instrument cluster assembly must be replaced.

DEFOGGER RELAY

The rear window defogger relay is a International Standards Organization (ISO)-type relay. The rear window defogger relay is a electromechanical device that switches fused battery current to the rear glass heating grid and the indicator lamp of the defogger switch, when the instrument cluster rear window defogger timer and logic circuitry grounds the relay coil. See Defogger Relay in the Diagnosis and Testing section of this group for more information.

The rear window defogger relay is located in the Power Distribution Center (PDC) in the engine compartment. Refer to the PDC label for relay identification and location.

The rear window defogger relay cannot be repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

DEFOGGER SYSTEM

For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams. The operation of the electrically heated rear window defogger system can be confirmed in one of the following manners:

1. Turn the ignition switch to the On position. While monitoring the instrument panel voltmeter, set the defogger switch in the On position. When the defogger switch is turned On, a distinct voltmeter needle deflection should be noted.

2. Turn the ignition switch to the On position. Set the defogger switch in the On position. The rear window defogger operation can be checked by feeling the rear window glass. A distinct difference in temperature between the grid lines and the adjacent clear glass can be detected within three to four minutes of operation.

3. Using a 12-volt DC voltmeter, contact the rear glass heating grid terminal A (right side) with the negative lead, and terminal B (left side) with the positive lead (Fig. 1). The voltmeter should read battery voltage.

The above checks will confirm system operation. Illumination of the defogger switch indicator lamp means that there is electrical current available at the output of the defogger relay, but does not confirm that the electrical current is reaching the rear glass heating grid lines.

If the defogger system does not operate, the problem should be isolated in the following manner:

(1) Confirm that the ignition switch is in the On position.

(2) Ensure that the rear glass heating grid feed and ground wires are connected to the glass. Confirm that the ground wire has continuity to ground.

DIAGNOSIS AND TESTING (Continued)

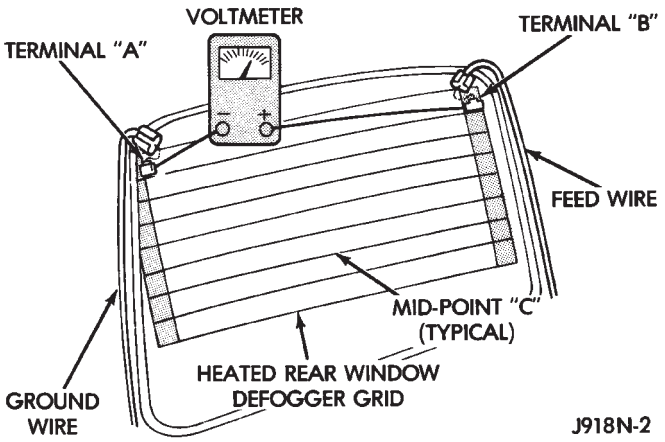


Fig. 1 Rear Window Glass Grid Test

(3) Check the fuses in the Power Distribution Center (PDC) and in the fuseblock module. The fuses must be tight in their receptacles and all electrical connections must be secure.

When the above steps have been completed and the rear glass heating grid is still inoperative, one or more of the following is faulty:

- Defogger switch
- Defogger relay
- Instrument cluster circuitry
- Rear window grid lines (all grid lines would have to be broken or one of the feed wires disconnected for the entire system to be inoperative).

If setting the defogger switch to the On position produces a severe voltmeter deflection, check for a short circuit between the defogger relay output and the rear glass heating grid.

REAR GLASS HEATING GRID

For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams. To detect breaks in the grid lines, the following procedure is required:

(1) Turn the ignition switch to the On position. Set the defogger switch in the On position. The indicator lamp should light. If OK, go to Step 2. If not OK, see the Defogger Relay diagnosis in this group.

(2) Using a 12-volt DC voltmeter, contact the vertical bus bar on the right side of the vehicle with the negative lead. With the positive lead, contact the vertical bus bar on the left side of the vehicle. The voltmeter should read battery voltage. If OK, go to Step 3. If not OK, repair the open circuit to the defogger relay as required.

(3) With the negative lead of the voltmeter, contact a good body ground point. The voltage reading should not change. If OK, go to Step 4. If not OK, repair the circuit to ground as required.

(4) Connect the negative lead of the voltmeter to the right side bus bar and touch each grid line at midpoint C with the positive lead. A reading of approximately six volts indicates a line is good. A reading of zero volts indicates a break in the grid line between midpoint C and the left side bus bar. A reading of ten to fourteen volts indicates a break between midpoint C and the right side bus bar. Move the positive lead on the grid line towards the break and the voltage reading will change as soon as the break is crossed.

DEFOGGER SWITCH

For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the accessory switch bezel from the instrument panel and unplug the defogger switch wire harness connector.

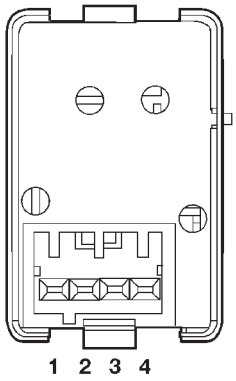
(2) Check for continuity between the ground circuit cavity of the defogger switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit as required.

(3) Check for continuity between the ground circuit terminal and the rear window defogger switch sense circuit terminal on the back of the defogger switch housing (Fig. 2). There should be momentary continuity as the defogger switch button is depressed, and then no continuity. If OK, see the diagnosis for the Instrument Cluster in this group. If not OK, replace the faulty switch.

DEFOGGER RELAY

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

DIAGNOSIS AND TESTING (Continued)



SWITCH POSITION	CONTINUITY BETWEEN
OFF	LAMPS
ON	MOMENTARY 1 AND 2
ILLUMINATION LAMP	1 AND 4
INDICATOR LAMP	1 AND 3

80a5035f

Fig. 2 Defogger Switch Continuity

RELAY TEST

The defogger relay (Fig. 3) is located in the Power Distribution Center (PDC), in the engine compartment. Remove the defogger relay from the PDC to perform the following tests:

(1) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 2. If not OK, replace the faulty relay.

(2) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 10 ohms. If OK, go to Step 3. If not OK, replace the faulty relay.

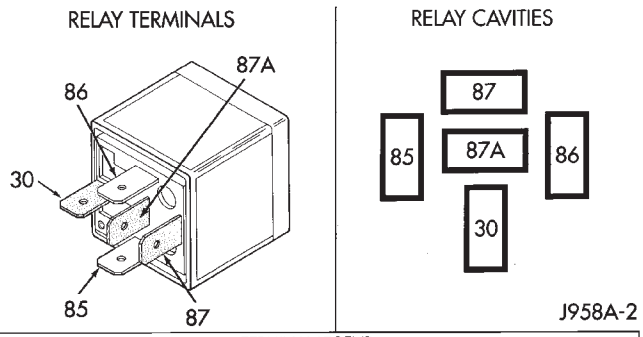
(3) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, see the Relay Circuit Test in this group. If not OK, replace the faulty relay.

RELAY CIRCUIT TEST

(1) The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to Step 2. If not OK, repair the open circuit to the PDC fuse as required.

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the rear glass heating grid and the defogger switch indicator lamp. There should be continuity between the cavity for relay terminal 87 and the rear window defogger relay output circuit cavities of the



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

Fig. 3 Defogger Relay

rear glass heating grid and defogger switch connectors at all times. If OK, go to Step 4. If not OK, repair the open circuit(s) as required.

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. This terminal is provided with ground by the instrument cluster rear window defogger timer and logic circuitry to energize the defogger relay. There should be continuity to ground at the cavity for relay terminal 86 when the defogger switch is turned On. However, with the defogger relay removed, the defogger switch indicator lamp will not light to show that the defogger system is turned On. Be certain that you depress the defogger switch at least twice to confirm that the system is turned on during this test. If OK, go to Step 5. If not OK, repair the open circuit to the instrument cluster as required.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. It is connected to fused ignition switch output voltage and should be hot when the ignition switch is in the On position. Check for battery voltage at the cavity for relay terminal 85 with the ignition switch in the On position. If OK, see the diagnosis for Instrument Cluster in this group. If not OK, repair the open circuit to the fuse in the fuseblock module as required.

INSTRUMENT CLUSTER

Before performing this test, complete the Defogger Switch and the Defogger Relay tests as described in this group. For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams.

DIAGNOSIS AND TESTING (Continued)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the defogger relay from the Power Distribution Center (PDC) and unplug the defogger switch wire harness connector.

(2) Remove the instrument cluster from the instrument panel. Refer to Instrument Cluster in Group 8E - Instrument Panel Systems for the procedures.

(3) Check for continuity between the rear window defogger switch sense circuit cavity of the right instrument cluster wire harness connector (connector B) and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the short circuit as required.

(4) Check for continuity between the rear window defogger switch sense circuit cavities of the right instrument cluster wire harness connector (connector B) and the defogger switch wire harness connector. There should be continuity. If OK, go to Step 5. If not OK, repair the open circuit as required.

(5) Check for continuity between the rear window defogger relay control circuit cavity of the right instrument cluster wire harness connector (connector B) and a good ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the short circuit as required.

(6) Check for continuity between the rear window defogger relay control circuit cavities of the right instrument cluster wire harness connector (connector B) and the defogger relay receptacle (the cavity for ISO relay terminal 86) in the PDC. There should be continuity. If OK, replace the faulty instrument cluster. If not OK, repair the open circuit as required.

SERVICE PROCEDURES

REAR GLASS HEATING GRID REPAIR

Repair of the rear glass heating grid lines, bus bars, terminals or pigtail wires can be accomplished using a Mopar Rear Window Defogger Repair Kit (Part Number 4267922) or equivalent.

WARNING: MATERIALS CONTAINED IN THE REPAIR KIT MAY CAUSE SKIN OR EYE IRRITATION. THE KIT CONTAINS EPOXY RESIN AND AMINE TYPE HARDENER, WHICH ARE HARMFUL IF SWALLOWED. AVOID CONTACT WITH THE SKIN AND EYES. FOR SKIN CONTACT, WASH THE AFFECTED AREAS WITH SOAP AND WATER. FOR CONTACT WITH THE EYES, FLUSH WITH PLENTY OF WATER. DO NOT TAKE INTERNALLY. IF TAKEN INTERNALLY, INDUCE VOMITING AND CALL A PHYSICIAN IMMEDIATELY. USE WITH ADEQUATE VENTILATION. DO NOT USE NEAR FIRE OR FLAME. CONTAINS FLAMMABLE SOLVENTS. KEEP OUT OF THE REACH OF CHILDREN.

(1) Mask the repair area so that the conductive epoxy can be applied neatly. Extend the epoxy application onto the grid line or the bus bar on each side of the break (Fig. 4).

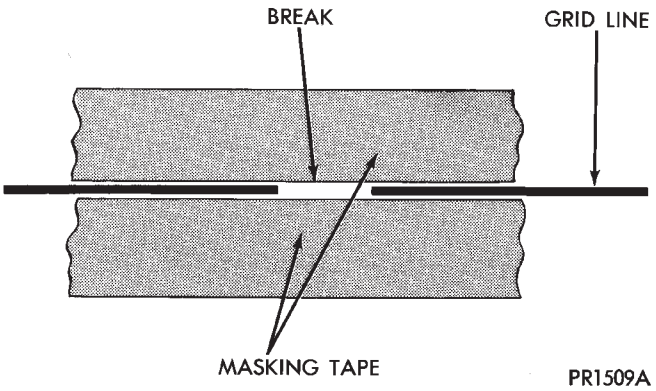


Fig. 4 Grid Line Repair - Typical

(2) Follow the instructions in the repair kit for preparing the damaged area.

(3) Remove the package separator clamp and mix the two conductive epoxy components thoroughly within the packaging. Fold the package in half and cut the center corner to dispense the epoxy.

(4) For grid line repairs, mask the area to be repaired with masking tape or a template.

(5) Apply the epoxy through the slit in the masking tape or template. Overlap both ends of the break by at least 19 millimeters (0.75 inch).

(6) For a terminal or pigtail wire replacement, mask the adjacent areas so the epoxy can be extended onto the adjacent grid line as well as the bus bar. Apply a thin layer of epoxy to the area where the terminal or pigtail wire was fastened and onto the adjacent grid line.

(7) Apply a thin layer of conductive epoxy to the terminal or bare wire end of the pigtail and place it in the proper location on the bus bar. To prevent the terminal or pigtail wire from moving while the epoxy is curing, it must be wedged or clamped.

(8) Carefully remove the masking tape or template.

CAUTION: Do not allow the glass surface to exceed 204° C (400° F) or the glass may fracture.

SERVICE PROCEDURES (Continued)

(9) Allow the epoxy to cure 24 hours at room temperature, or use a heat gun with a 260° to 371° C (500° to 700° F) range for fifteen minutes. Hold the heat gun approximately 25.4 centimeters (10 inches) from the repair.

(10) After the conductive epoxy is properly cured, remove the wedge or clamp from the terminal or pigtail wire. Do not attach the wire harness connectors until the curing process is complete.

(11) Check the operation of the rear window defogger glass heating grid.

REMOVAL AND INSTALLATION

DEFOGGER SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the center bezel from the instrument panel. See Instrument Panel Center Bezel in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the four screws that secure the accessory switch bezel to the instrument panel (Fig. 5).

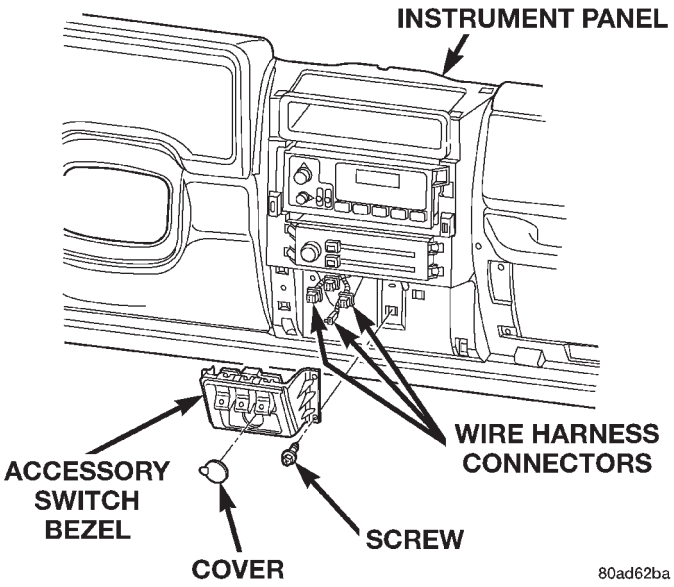


Fig. 5 Accessory Switch Bezel Remove/Install

(4) Pull the accessory switch bezel out from the instrument panel far enough to access the wire harness connectors.

(5) Unplug the wire harness connectors from the rear of the accessory switches and the cigar lighter/power outlet.

(6) Remove the accessory switch bezel from the instrument panel.

(7) With a small thin-bladed screwdriver, gently pry the snap clips at the top and bottom of the rear window defogger switch receptacle on the back of the accessory switch bezel and pull the switch out of the bezel.

(8) Reverse the removal procedures to install. Be certain that both of the switch snap clip retainers in the receptacle on the back of the accessory switch bezel are fully engaged. Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

DEFOGGER RELAY

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC) (Fig. 6).

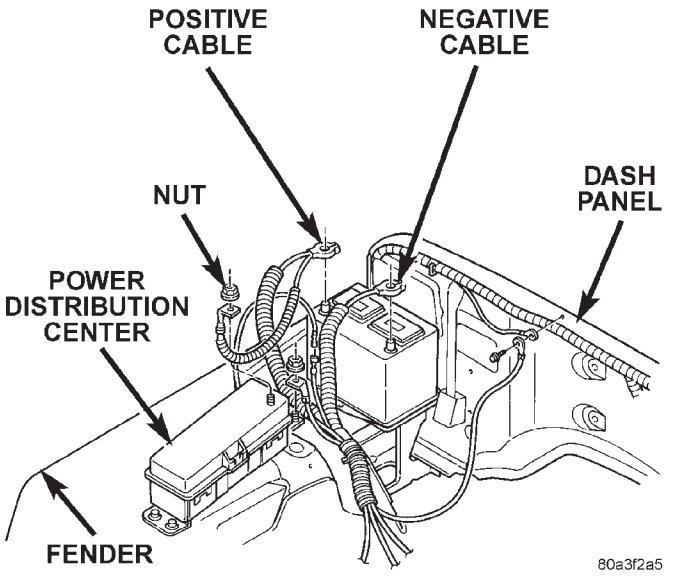


Fig. 6 Power Distribution Center

(3) Refer to the label on the PDC for defogger relay identification and location.

(4) Unplug the defogger relay from the PDC.

(5) Install the defogger relay by aligning the relay terminals with the cavities in the PDC and pushing the relay firmly into place.

(6) Install the PDC cover.

(7) Connect the battery negative cable.

(8) Test the relay operation.

POWER DISTRIBUTION SYSTEMS

CONTENTS

DESCRIPTION AND OPERATION

POWER DISTRIBUTION SYSTEM

DESCRIPTION

This group covers the various standard and optional power distribution components used on this model. Refer to Group 8W - Wiring Diagrams for complete circuit diagrams of the various power distribution components.

The power distribution system for this vehicle is designed to provide safe, reliable, and centralized distribution of the electrical current required to operate all of the many standard and optional factory-installed electrical and electronic powertrain, chassis, safety, comfort and convenience systems. At the same time, these systems were designed to provide convenient to access centralized locations for conducting diagnosis of faulty circuits, and for sourcing the additional current requirements of many aftermarket vehicle accessory and convenience items.

These power distribution systems also incorporate various types of circuit control and protection features, including:

- Fuses
- Maxi fuse-type fusible links
- Relays.

The power distribution system for this vehicle consists of the following components:

- Power Distribution Center (PDC)
- Fuseblock Module

Following are general descriptions of the major components in the power distribution system. See the owner's manual in the vehicle glove box for more information on the features, use and operation of all of the power distribution system components.

POWER DISTRIBUTION CENTER

DESCRIPTION

All of the electrical current distributed throughout this vehicle is directed through the standard equipment Power Distribution Center (PDC) (Fig. 1). The molded plastic PDC housing is located on the right side of the engine compartment, just forward of the battery. The PDC housing has a molded plastic cover that includes two integral pivot hooks on the outboard side, and an integral latch on the inboard side. The PDC cover is easily removed for service access and has a convenient adhesive-backed fuse and relay layout label affixed to the inside surface of the cover to ensure proper component identification.

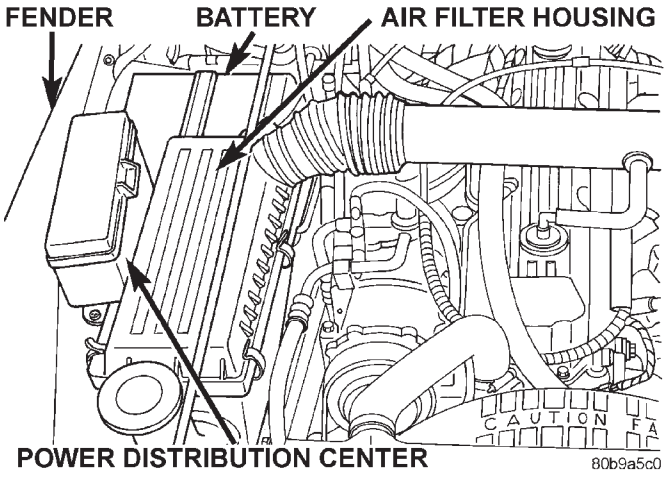


Fig. 1 Power Distribution Center

The PDC housing is secured to a stamped sheet metal bracket in the engine compartment by mounting slots and tabs that are integral to the PDC housing. The PDC mounting bracket is secured with three screws to the right front inner fender shield above the right front wheel house. A separate cover that is secured by an integral bail strap to the rear of the PDC housing is unlatched and removed to access the battery/generator cable connection stud. The PDC is integral to the dash wire harness, which exits from the rearward end of the PDC housing.

The PDC houses up to fourteen blade-type maxi fuses, which replace all in-line fusible links. The PDC also houses up to six blade-type mini fuses, the ABS relay, and up to nine International Standards Organization (ISO) relays (three standard-type and six

DESCRIPTION AND OPERATION (Continued)

micro-type). Internal connection of all of the PDC circuits is accomplished by an intricate combination of hard wiring and bus bars. Refer to **Power Distribution** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams.

The maxi fuses, mini fuses and relays are available for service replacement. The PDC unit cannot be repaired and is only serviced as a unit with the dash wire harness. If the PDC internal circuits or housing are faulty or damaged, the PDC and dash wire harness unit must be replaced.

FUSEBLOCK MODULE

DESCRIPTION

An electrical module is mounted on the dash panel in the passenger compartment of the vehicle. The molded plastic fuseblock module housing has an integral mounting bracket that is secured with two screws to a bracket welded on the dash panel just above the heater and air conditioner housing. The glove box is rolled down from the instrument panel for service access of the fuseblock module fuses (Fig. 2). An adhesive-backed fuse layout label is located on the heater and air conditioner housing below the fuseblock module to ensure proper fuse identification.

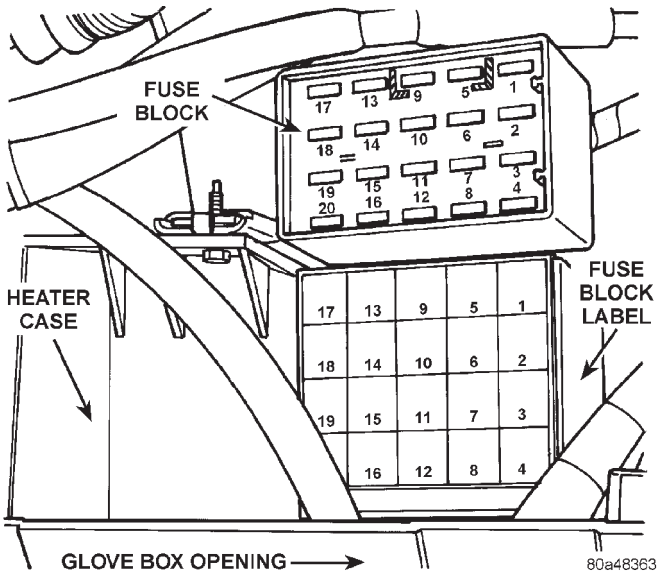


Fig. 2 Fuseblock Module

The fuseblock module serves to distribute electrical current to many of the accessory systems in the vehicle. All of the current entering and leaving the fuseblock module does so through the cross body wire harness. The fuseblock module houses up to twenty blade-type mini fuses. Internal connection of all of the fuseblock module circuits is accomplished by an intricate combination of hard wiring and bus bars. Refer to **Fuse/Fuse Block** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams.

The fuses used in the fuseblock module are available for service replacement. The fuseblock module is integral to the cross body wire harness. If any internal circuit or if the fuseblock module housing is faulty or damaged, the entire fuseblock module and cross body harness unit must be replaced.

REMOVAL AND INSTALLATION

POWER DISTRIBUTION CENTER

The Power Distribution Center (PDC) is serviced as a unit with the dash wire harness. If any internal circuit of the PDC or if the PDC housing is faulty or damaged, the entire PDC and the dash wire harness unit must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Disconnect each of the dash wire harness connectors. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the locations of the affected connectors.

(3) Remove all of the fasteners that secure each of the dash wire harness ground eyelets to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the ground eyelet locations.

(4) Disengage each of the retainers that secure the dash wire harness to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the retainer locations.

(5) Unlatch and remove the terminal stud cover from the rearward end of the PDC (Fig. 3).

(6) Remove the nut that secures the eyelets of the battery positive cable take out and the engine wire harness take out to the stud on the PDC.

(7) Remove the battery positive cable take out and the engine wire harness take out eyelets from the PDC stud.

(8) Disengage the latches on the PDC mounting bracket from the tabs on the PDC housing, and pull the PDC housing upward to disengage the mounting slots from the stanchions of the mounting bracket (Fig. 4).

(9) Remove the PDC and the dash wire harness from the engine compartment as a unit.

(10) Remove the three screws that secure the PDC mounting bracket to the right front inner fender (Fig. 5).

(11) Remove the PDC mounting bracket from the right front inner fender.

REMOVAL AND INSTALLATION (Continued)

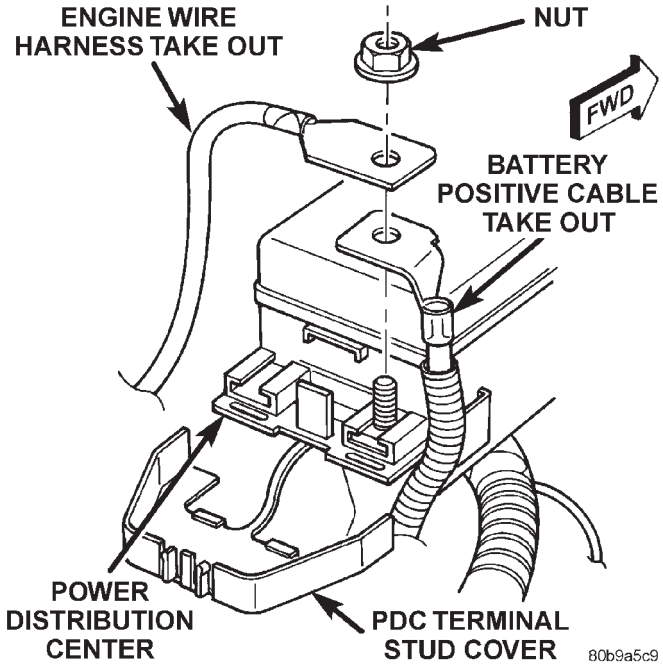


Fig. 3 Power Distribution Center Connections

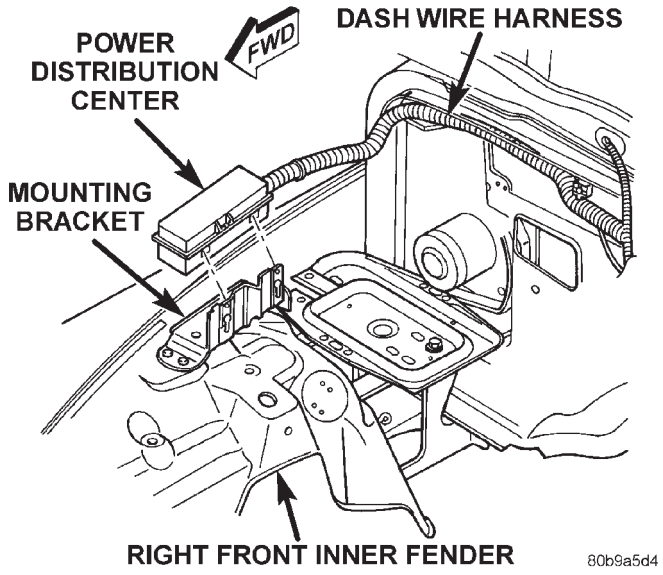


Fig. 4 Power Distribution Center Remove/Install

INSTALLATION

NOTE: If the PDC is being replaced with a new unit, be certain to transfer each of the fuses and relays from the old PDC to the proper cavities of the new PDC. Refer to Power Distribution in the Contents of Group 8W - Wiring Diagrams for the proper PDC cavity assignments.

(1) Position the PDC mounting bracket onto the right front inner fender.

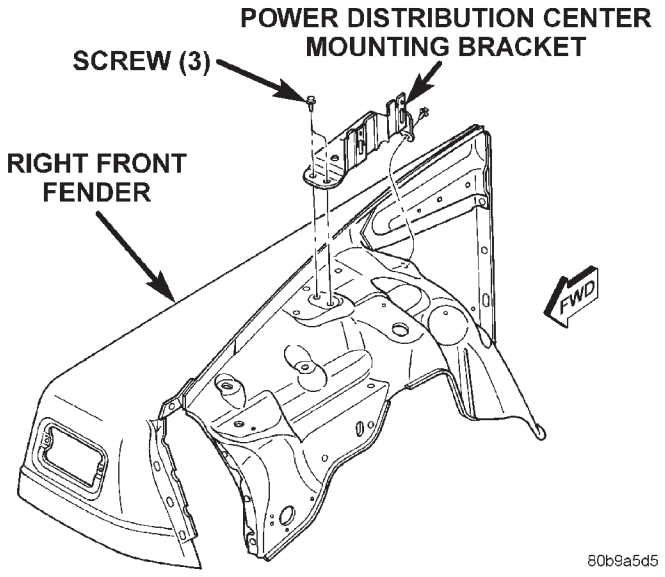


Fig. 5 PDC Mounting Bracket Remove/Install

(2) Install and tighten the three screws that secure the PDC mounting bracket to the right front inner fender. Tighten the screws to 3.9 N·m (35 in. lbs.).

(3) Position the PDC and the dash wire harness unit in the engine compartment.

(4) Engage the mounting slots on the PDC housing with the stanchions of the PDC mounting bracket and push the unit downward until the mounting bracket latches engage the mounting tabs on the PDC housing.

(5) Install the eyelets of the battery positive cable take out and the engine wire harness take out onto the PDC stud.

(6) Install and tighten the nut that secures the eyelet of the battery positive cable take out and the engine wire harness take out onto the PDC stud. Tighten the nut to 8.4 N·m (75 in. lbs.).

(7) Engage the tabs on the lower edge of the terminal stud cover in the slots on the back of the PDC housing, then engage the latch on the top of the cover with the latch tabs on the PDC housing.

(8) Engage each of the retainers that secure the dash wire harness to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the retainer locations.

(9) Install all of the fasteners that secure each of the dash wire harness ground eyelets to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the ground eyelet locations.

(10) Reconnect each of the dash wire harness connectors. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more

REMOVAL AND INSTALLATION (Continued)

information on the locations of the affected connectors.

(11) Reconnect the battery negative cable.

FUSEBLOCK MODULE

The fuseblock module is serviced as a unit with the cross body wire harness. If any internal circuit of the fuseblock module if the fuseblock module housing is faulty or damaged, the entire fuseblock module and the cross body wire harness unit must be replaced.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument panel assembly from the dash panel. Refer to **Instrument Panel Assembly** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(3) Disconnect each of the cross body wire harness connectors. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the locations of the affected connectors.

(4) Remove all of the fasteners that secure each of the cross body wire harness ground eyelets to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the ground eyelet locations.

(5) Disengage each of the retainers that secure the cross body wire harness to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the retainer locations.

(6) Remove the two screws that secure the fuseblock module to the bracket on the dash panel (Fig. 6).

(7) Remove the fuseblock module and the cross body wire harness from the dash panel as a unit.

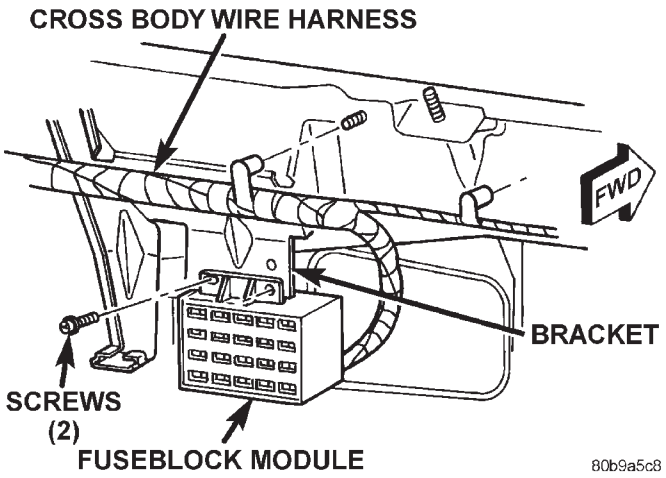


Fig. 6 Fuseblock Module Remove/Install

INSTALLATION

NOTE: If the fuseblock module is being replaced with a new unit, be certain to transfer each of the fuses from the old fuseblock module to the proper cavities of the new fuseblock module. Refer to Fuse/Fuse Block in the Contents of Group 8W - Wiring Diagrams for the proper fuseblock module cavity assignments.

(1) Position the fuseblock module and the cross body wire harness onto the dash panel as a unit.

(2) Install and tighten the two screws that secure the fuseblock module to the bracket on the dash panel. Tighten the screws to 3.3 N·m (30 in. lbs.).

(3) Engage each of the retainers that secure the cross body wire harness to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the retainer locations.

(4) Install all of the fasteners that secure each of the cross body wire harness ground eyelets to the vehicle body and chassis components. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the ground eyelet locations.

(5) Reconnect each of the cross body wire harness connectors. Refer to **Connector Locations** in the Contents of Group 8W - Wiring Diagrams for more information on the locations of the affected connectors.

(6) Install the instrument panel assembly onto the dash panel. Refer to **Instrument Panel Assembly** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(7) Reconnect the battery negative cable.

VEHICLE THEFT/SECURITY SYSTEMS

CONTENTS

GENERAL INFORMATION

INTRODUCTION

The Sentry Key Immobilizer System (SKIS) is available factory-installed optional equipment for this model. Following are some general descriptions of the features and components of the SKIS. Refer to the vehicle owner's manual for more information on the use and operation of the SKIS. Refer to 8W-30 - Fuel/ Ignition System in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is designed to provide passive protection against unauthorized vehicle use by preventing the engine from operating while the system is armed. The primary components of this system are the Sentry Key Immobilizer Module (SKIM), the Sentry Key transponder, the SKIS indicator lamp, and the Powertrain Control Module (PCM).

The SKIM is installed on the steering column near the ignition lock cylinder. The transponder is located under the molded rubber cap on the head of the ignition key. The SKIS indicator lamp is located in the instrument cluster.

The SKIS includes two valid Sentry Key transponders from the factory. If the customer wishes, additional non-coded blank Sentry Keys are available. These blank keys can be cut to match a valid ignition key, but the engine will not start unless the key transponder is also programmed to the vehicle. The SKIS will recognize no more than eight valid Sentry Key transponders at any one time.

The SKIS performs a self-test each time the ignition switch is turned to the On position, and will store Diagnostic Trouble Codes (DTCs) if a system malfunction is detected. The SKIS can be diagnosed, and any stored DTC can be retrieved using a DRB scan tool as described in the proper Diagnostic Procedures manual.

DESCRIPTION AND OPERATION

SENTRY KEY IMMOBILIZER MODULE

The Sentry Key Immobilizer Module (SKIM) contains a Radio Frequency (RF) transceiver and a central processing unit, which includes the Sentry Key Immobilizer System (SKIS) program logic. The SKIS programming enables the SKIM to program and retain in memory the codes of at least two, but no more than eight electronically coded Sentry Key transponders. The SKIS programming also enables the SKIM to communicate over the Chrysler Collision Detection (CCD) data bus network with the Powertrain Control Module (PCM), the instrument cluster and/or the DRB scan tool.

The SKIM transmits and receives RF signals through a tuned antenna enclosed within a molded plastic ring formation that is integral to the SKIM housing. When the SKIM is properly installed on the steering column, the antenna ring is oriented around the circumference of the ignition lock cylinder housing. This antenna ring must be located within eight millimeters (0.31 inches) of the Sentry Key in order to ensure proper RF communication between the SKIM and the Sentry Key transponder.

For added system security, each SKIM is programmed with a unique "Secret Key" code and a security code. The SKIM keeps the "Secret Key" code in memory and sends the code over the CCD data bus to the PCM, which also keeps this code in its memory. The SKIM also sends the "Secret Key" code to each of the programmed Sentry Key transponders. The security code is used by the assembly plant to access the SKIS for initialization, or by the dealer

DESCRIPTION AND OPERATION (Continued)

technician to access the system for service. The SKIM also stores in its memory the Vehicle Identification Number (VIN), which it learns through a CCD data bus message from the PCM during initialization.

The SKIM and the PCM both use software that includes a rolling code algorithm strategy, which helps to reduce the possibility of unauthorized SKIS disarming. The rolling code algorithm ensures security by preventing an override of the SKIS through the unauthorized substitution of the SKIM or the PCM. However, the use of this strategy also means that replacement of either the SKIM or the PCM units will require a system initialization procedure to restore system operation.

When the ignition switch is turned to the On or Start positions, the SKIM transmits an RF signal to excite the Sentry Key transponder. The SKIM then listens for a return RF signal from the transponder of the Sentry Key that is inserted in the ignition lock cylinder. If the SKIM receives an RF signal with valid "Secret Key" and transponder identification codes, the SKIM sends a "valid key" message to the PCM over the CCD data bus. If the SKIM receives an invalid RF signal or no response, it sends "invalid key" messages to the PCM. The PCM will enable or disable engine operation based upon the status of the SKIM messages.

The SKIM also sends messages to the instrument cluster over the CCD data bus network to control the SKIS indicator lamp. The SKIM sends messages to the instrument cluster to turn the lamp on for about three seconds when the ignition switch is turned to the On position as a bulb test. After completion of the bulb test, the SKIM sends bus messages to keep the lamp off for a duration of about one second. Then the SKIM sends messages to turn the lamp on or off based upon the results of the SKIS self-tests. If the SKIS indicator lamp comes on and stays on after the bulb test, it indicates that the SKIM has detected a system malfunction and/or that the SKIS has become inoperative.

If the SKIM detects an invalid key when the ignition switch is turned to the On position, it sends messages to the instrument cluster to flash the SKIS indicator lamp. The SKIM can also send messages to the instrument cluster to flash the lamp and to generate a single audible chime tone. These functions serve as an indication to the customer that the SKIS has been placed in its "Customer Learn" programming mode. See Sentry Key Immobilizer System Transponder Programming in this group for more information on the "Customer Learn" programming mode.

For diagnosis or initialization of the SKIM and the PCM, a DRB scan tool and the proper Diagnostic Procedures manual are required. The SKIM cannot be repaired and, if faulty or damaged, the unit must be replaced.

SENTRY KEY IMMOBILIZER TRANSPONDER

The Sentry Key Immobilizer System (SKIS) uses a transponder that is integral to each of the two ignition keys that are supplied with the vehicle when it is shipped from the factory. The transponder chip is insulated within a nylon mount inserted in the head of the key, and invisible beneath a molded rubber cap (Fig. 1).

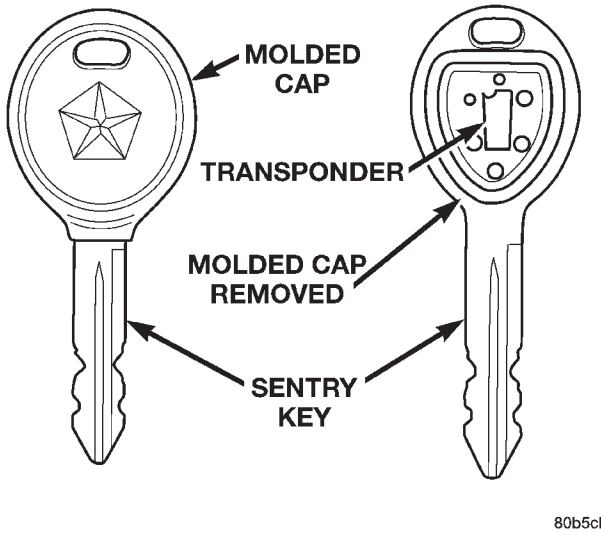


Fig. 1 Sentry Key Immobilizer Transponder

Each Sentry Key transponder has a unique transponder identification code programmed into it by the manufacturer. The Sentry Key Immobilizer Module (SKIM) has a unique "Secret Key" code programmed into it by the manufacturer. When a Sentry Key transponder is programmed into the memory of the SKIM, the SKIM learns the transponder identification code from the transponder, and the transponder learns the "Secret Key" code from the SKIM. Each of these codes is stored within the transponder and in the nonvolatile memory of the SKIM. Therefore, blank keys for the SKIS must be programmed by and into the SKIM, in addition to being cut to match the mechanical coding of the ignition lock cylinder. See Sentry Key Immobilizer System Transponder Programming in this group for more information.

The Sentry Key transponder is within the range of the SKIM transceiver antenna ring when it is inserted in the ignition lock cylinder. When the ignition switch is turned to the Start or On positions, the SKIM transceiver issues a Radio Frequency (RF) signal that excites the transponder chip. The transponder chip responds by issuing an RF signal containing its transponder identification code and the "Secret

DESCRIPTION AND OPERATION (Continued)

Key" code. The SKIM transceiver compares the transponder codes with the codes stored in its memory to determine whether a valid key is in the ignition lock cylinder.

The Sentry Key transponder cannot be repaired and, if faulty or damaged, it must be replaced.

SENTRY KEY IMMOBILIZER SYSTEM INDICATOR LAMP

The Sentry Key Immobilizer System (SKIS) indicator lamp gives an indication when the SKIS is faulty or when the vehicle has been immobilized due to the use of an invalid ignition key. The lamp is controlled by the instrument cluster circuitry based upon messages received from the Sentry Key Immobilizer Module (SKIM) on the Chrysler Collision Detection (CCD) data bus.

The SKIM sends messages to the instrument cluster to turn the lamp on for about three seconds when the ignition switch is turned to the On position as a bulb test. After completion of the bulb test, the SKIM sends bus messages to keep the lamp off for a duration of about one second. Then the SKIM sends messages to the instrument cluster circuitry to turn the lamp on or off based upon the results of the SKIS self-tests. If the SKIS indicator lamp comes on and stays on after the bulb test, it indicates that the SKIM has detected a system malfunction and/or that the SKIS has become inoperative.

If the SKIM detects an invalid key when the ignition switch is turned to the On position, it sends messages to the instrument cluster to flash the SKIS indicator lamp. The SKIM can also send messages to the instrument cluster to flash the lamp and to generate a single audible chime tone. These functions serve as an indication to the customer that the SKIS has been placed in its "Customer Learn" programming mode. See Sentry Key Immobilizer System Transponder Programming in this group for more information on the "Customer Learn" programming mode.

The SKIS indicator lamp uses a replaceable incandescent bulb and bulb holder on the instrument cluster electronic circuit board. Refer to Group 8E - Instrument Panel Systems for diagnosis and service of a faulty SKIS indicator lamp. If the SKIS indicator lamp comes on and stays on after the bulb test function, diagnosis of the SKIS should be performed with a DRB scan tool and the proper Diagnostic Procedures manual.

DIAGNOSIS AND TESTING

SENTRY KEY IMMOBILIZER SYSTEM

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

NOTE: The following tests may not prove conclusive in the diagnosis of this system. The most reliable, efficient, and accurate means to diagnose the Sentry Key Immobilizer System involves the use of a DRB scan tool. Refer to the proper Diagnostic Procedures manual for the procedures.

The Sentry Key Immobilizer System (SKIS) and the Chrysler Collision Detection (CCD) data bus network should be diagnosed using a DRB scan tool. The DRB will allow confirmation that the CCD data bus is functional, that the Sentry Key Immobilizer Module (SKIM) is placing the proper messages on the CCD data bus, and that the Powertrain Control Module (PCM) and the instrument cluster are receiving the CCD data bus messages. Refer to the proper Diagnostic Procedures manual for the procedures. Refer to 8W-39 - Vehicle Theft Security System in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

(1) Check the fuses in the fuseblock module. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Disconnect and isolate the battery negative cable. Unplug the wire harness connector at the SKIM. Check for continuity between the ground circuit cavity of the SKIM wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit to ground as required.

(3) Connect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the SKIM wire harness connector. If OK, go to Step 4. If not OK, repair the open circuit to the fuse in the fuseblock module as required.

(4) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) circuit cavity of the SKIM wire harness connector. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to complete the diagnosis of the SKIS. If not OK, repair the open circuit to the fuse in the fuseblock module as required.

SERVICE PROCEDURES

SENTRY KEY IMMOBILIZER SYSTEM TRANSPONDER PROGRAMMING

Two programmed Sentry Key transponders are included with the Sentry Key Immobilizer System (SKIS) when it is shipped from the factory. The Sentry Key Immobilizer Module (SKIM) can be programmed to recognize up to six additional transponders, for a total of eight Sentry Keys. The following "Customer Learn" programming procedure for the programming of additional transponders requires access to at least two of the valid Sentry Keys. If two valid Sentry Keys are not available, Sentry Key programming will require the use of a DRB scan tool and the proper Diagnostic Procedures manual.

CUSTOMER LEARN

(1) Obtain the additional Sentry Key transponder blank(s) that are to be programmed for the vehicle. Cut the additional Sentry Key transponder blanks to match the ignition lock cylinder mechanical key codes.

(2) Insert one of the two valid Sentry Key transponders into the ignition switch and turn the ignition switch to the On position.

(3) After the ignition switch has been in the On position for about three seconds, but no more than fifteen seconds later, cycle the ignition switch back to the Off position. Replace the first valid Sentry Key in the ignition lock cylinder with the second valid Sentry Key and turn the ignition switch back to the On position.

(4) About ten seconds after the completion of Step 3, the SKIS indicator lamp will start to flash and a single audible chime tone will sound to indicate that the system has entered the "Customer Learn" programming mode.

(5) Within about fifty seconds of entering the "Customer Learn" programming mode, turn the ignition switch to the Off position, replace the valid Sentry Key with a blank Sentry Key transponder, and turn the ignition switch back to the On position.

(6) About ten seconds after the completion of Step 5, a single audible chime tone will sound and the SKIS indicator lamp will stop flashing and stay on solid for about three seconds to indicate that the blank Sentry Key transponder has been successfully programmed. The SKIS will immediately return to normal system operation following exit from the "Customer Learn" programming mode.

(7) Go back to Step 2 and repeat this process for each additional Sentry Key transponder blank to be programmed.

If any of the above steps is not completed in the proper sequence, or within the allotted time, the SKIS will automatically exit the "Customer Learn" programming mode. The SKIS will also automatically exit the "Customer Learn" programming mode if it sees a non-blank Sentry Key transponder when it should see a blank, if it has already programmed eight valid Sentry Keys, or if the ignition switch is turned to the Off position for more than about fifty seconds.

REMOVAL AND INSTALLATION

SENTRY KEY IMMOBILIZER MODULE

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. See Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the three screws that secure the lower steering column shroud to the upper shroud (Fig. 2).

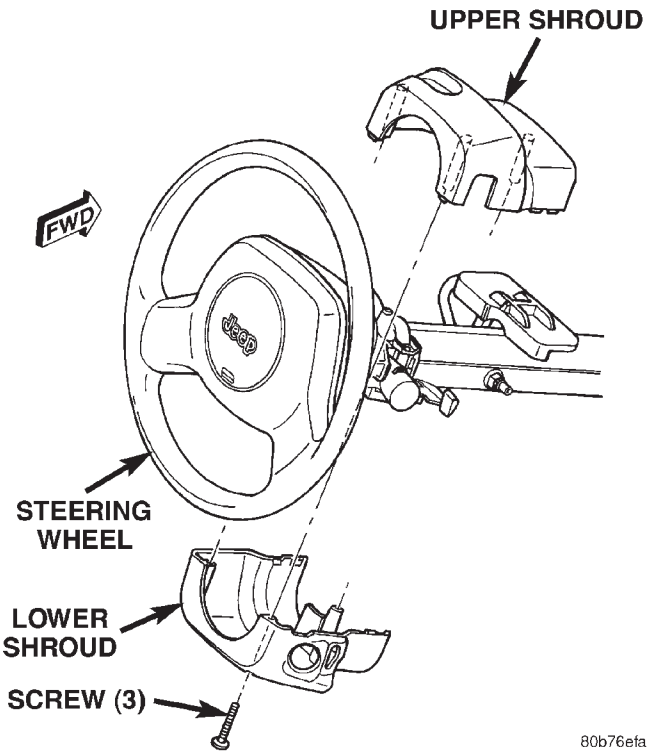


Fig. 2 Steering Column Shrouds Remove/Install

REMOVAL AND INSTALLATION (Continued)

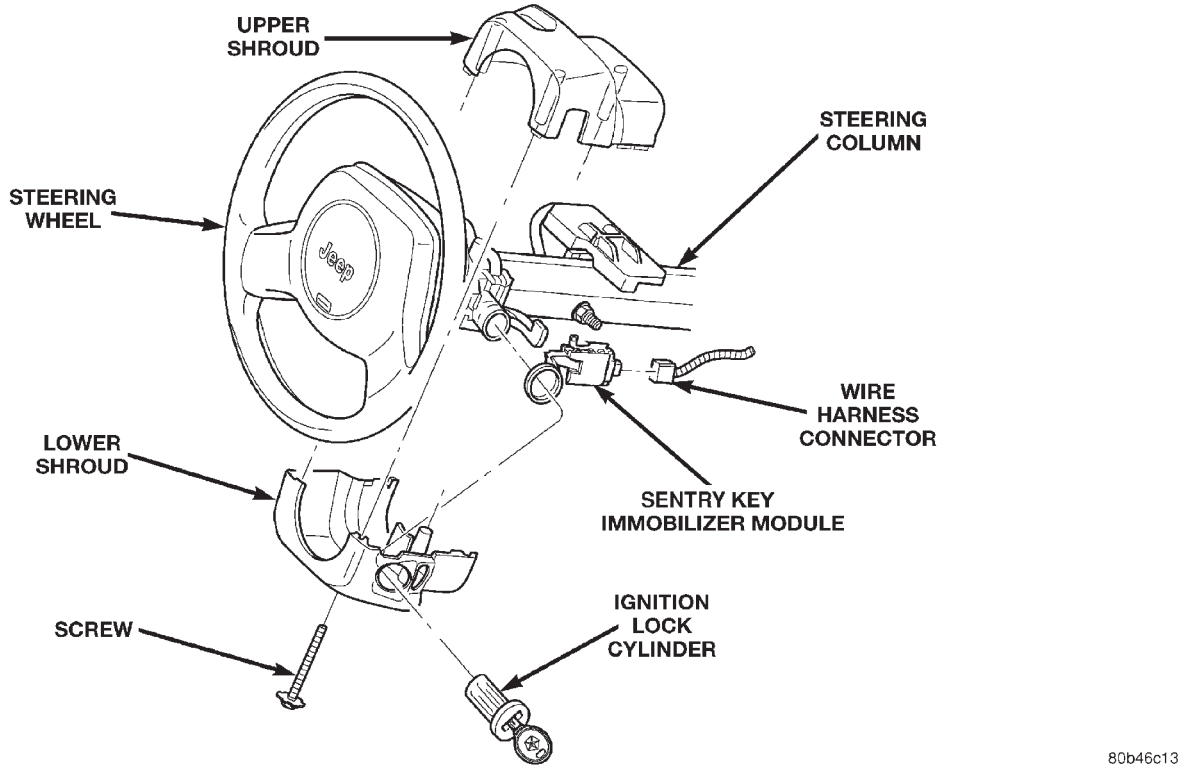


Fig. 3 Sentry Key Immobilizer Module Remove/Install

(4) If the vehicle is equipped with a standard non-tilt steering column, loosen the two upper steering column mounting nuts. If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully lowered position.

(5) Remove both the upper and lower shrouds from the steering column.

(6) Disengage the steering column wire harness retainer from the tab on the top of the Sentry Key Immobilizer Module (SKIM) mounting bracket (Fig. 3).

(7) Unplug the wire harness connector from the SKIM receptacle.

(8) The SKIM mounting bracket features a clip formation that secures the SKIM to the inboard lower flange of the steering column jacket. Pull downward on the connector end of the SKIM mounting bracket to release this clip from the steering column jacket.

(9) Rotate the SKIM and its mounting bracket downwards and then to the side away from the steering column to slide the SKIM antenna ring from around the ignition switch lock cylinder housing.

(10) Remove the SKIM from the vehicle.

(11) Reverse the removal procedures to install. Tighten the non-tilt steering column mounting nuts to 22 N·m (200 in. lbs.) and the steering column shroud mounting screws to 2 N·m (18 in. lbs.).

(12) If the SKIM is replaced with a new unit, a DRB scan tool and the proper Diagnostic Procedures manual MUST be used to initialize the new SKIM and to program at least two Sentry Key transponders.

CHIME/BUZZER WARNING SYSTEMS

CONTENTS

GENERAL INFORMATION

INTRODUCTION

This group covers the chime warning system, which is standard factory-installed equipment on this model. The chime warning system provides an audible warning to the driver under the following conditions:

- Check gauges lamp illumination
- Driver side seat belt is not fastened with the ignition switch in the On position
- Head or park lamps are turned on with the ignition switch Off and the driver side front door open
- Key is in the ignition switch with the ignition switch Off and the driver side front door open
- Low fuel warning lamp illumination - less than about one-eighth tank of fuel remaining
- The optional Sentry Key Immobilizer System (SKIS) is in the “customer programming” mode.

Following are general descriptions of the major components in the chime warning system. Refer to 8W-40 Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

INSTRUMENT CLUSTER

The instrument cluster is an electromechanical unit that contains integrated circuitry and internal programming to perform a variety of functions. The instrument cluster circuitry monitors hard-wired switch inputs, as well as message inputs received from other vehicle electronic modules on the Chrysler Collision Detection (CCD) data bus network.

The instrument cluster uses these many inputs along with its internal programming and an integral chime tone generator to perform the functions of the chime warning module on this model. The instrument cluster circuitry also has a self-diagnostic capability. Refer to Group 8E - Instrument Panel Systems for more information on this feature.

Hard-wired chime warning system inputs to the instrument cluster include the following:

- Driver door jamb switch
- Driver seat belt switch
- Headlamp switch
- Key-in ignition switch.

The only instrument cluster diagnosis found in this group consists of confirming the viability of the hard-wired chime request inputs to the instrument cluster circuitry. For diagnosis of the CCD data bus and the data bus message inputs, a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

Refer to Group 8E - Instrument Panel Systems for the instrument cluster service procedures. The instrument cluster chime warning circuitry and chime tone generator cannot be repaired and, if faulty or damaged, the instrument cluster assembly must be replaced.

DRIVER DOOR JAMB SWITCH

The driver door jamb switch is mounted to the driver side door hinge pillar. The switch closes a path to ground for the instrument cluster chime warning circuitry through the key-in ignition switch and/or the headlamp switch when the driver door is opened, and opens the ground path when the driver door is closed.

The driver door jamb switch cannot be repaired and, if faulty or damaged, it must be replaced. Refer to Group 8L - Lamps for the service procedures.

DESCRIPTION AND OPERATION (Continued)

DRIVER SEAT BELT SWITCH

The driver seat belt switch is integral to the driver seat belt buckle-half assembly. The switch is normally closed, providing a ground path to the instrument panel chime warning circuitry. When the tip-half of the seat belt is inserted into the seat belt buckle, the switch opens the ground path.

The driver seat belt switch cannot be repaired and, if faulty or damaged, the entire driver seat belt buckle-half unit must be replaced. Refer to Group 23 - Body for the service procedures.

KEY-IN IGNITION SWITCH

The key-in ignition switch is integral to the ignition switch, which is mounted on the left side of the steering column, opposite the ignition lock cylinder. It closes a path to ground for the instrument cluster chime warning circuitry when the ignition key is inserted in the ignition lock cylinder and the driver door jamb switch is closed (driver door is open). The key-in ignition switch opens the ground path when the key is removed from the ignition lock cylinder.

The key-in ignition switch cannot be repaired and, if faulty or damaged, the entire ignition switch must be replaced. Refer to Group 8D - Ignition Systems for the service procedures.

HEADLAMP SWITCH

The headlamp switch is located in the instrument panel, outboard of the steering column. It closes a path to ground for the instrument cluster chime warning circuitry when the park or head lamps are on and the driver door jamb switch is closed (driver door is open). The headlamp switch opens the ground path when the headlamp switch is turned off.

The headlamp switch cannot be repaired and, if faulty or damaged, it must be replaced. Refer to Group 8E - Instrument Panel Systems for the service procedures.

DIAGNOSIS AND TESTING

DRIVER DOOR JAMB SWITCH

For circuit descriptions and diagrams, refer to 8W-40 - Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Rotate the headlamp switch knob counterclockwise to ensure that the dome lamps are not switched off. Open the driver door and note whether the interior lamps light. They should light. If OK, see the diagnosis for the Key-In Ignition Switch or the Headlamp Switch in this group. If not OK, go to Step 2.

(2) Disconnect and isolate the battery negative cable. Unplug the driver door jamb switch from its wire harness connector. Check for continuity between the door jamb switch output circuit cavity of the driver door jamb switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the circuit to ground as required.

(3) Check for continuity between the door jamb switch output circuit terminal and the left front door jamb switch sense terminal of the door jamb switch. There should be continuity with the switch plunger released, and no continuity with the switch plunger depressed. If not OK, replace the faulty switch.

DRIVER SEAT BELT SWITCH

For circuit descriptions and diagrams, refer to 8W-40 - Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Unplug the driver seat belt switch wire harness connector on the floor under the driver seat near the seat belt buckle-half anchor. Check for continuity between the seat belt switch sense circuit and the ground circuit cavities of the seat belt half of the driver seat belt switch wire harness connector. There should be continuity with the seat belt unbuckled, and no continuity with the seat belt buckled. If OK, go to Step 2. If not OK, replace the faulty seat belt buckle-half assembly.

(2) Check for continuity between the ground circuit cavity in the body half of the driver seat belt switch wire harness connector and a good ground. There should be continuity. If OK, see the Instrument Cluster diagnosis in this group. If not OK, repair the circuit to ground as required.

DIAGNOSIS AND TESTING (Continued)

KEY-IN IGNITION SWITCH

For circuit descriptions and diagrams, refer to 8W-40 - Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the steering column shrouds. Refer to Group 8D - Ignition Systems for the procedures. Unplug the key-in ignition switch wire harness connector from the ignition switch.

(2) Check for continuity between the key-in switch sense circuit and the left front door jamb switch sense circuit terminals of the key-in ignition switch. There should be continuity with the key in the ignition lock cylinder, and no continuity with the key removed from the ignition lock cylinder. If OK, go to Step 3. If not OK, replace the faulty ignition switch assembly.

(3) Check for continuity between the left front door jamb switch sense circuit cavity of the key-in ignition switch wire harness connector and a good ground. There should be continuity with the driver door open, and no continuity with the driver door closed. If OK, see the diagnosis for Instrument Cluster in this group. If not OK, repair the circuit to the driver door jamb switch as required.

HEADLAMP SWITCH

For circuit descriptions and diagrams, refer to 8W-40 - Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the headlamp switch from the instrument panel. Refer to Group 8E - Instrument Panel Systems for the procedures. Unplug the headlamp switch wire harness connectors. Check for continuity between the left front door jamb switch sense circuit cavity of the headlamp switch wire harness connector and a good ground. There should be no continuity with the driver door closed, and continuity with the driver door open. If OK, go to Step 2. If not OK, repair the circuit to the driver door jamb switch as required.

(2) Check for continuity between the key-in switch sense circuit terminal and the left front door jamb switch sense terminal of the headlamp switch. There should be no continuity with the switch in the Off position, and continuity with the switch in the park or head lamps On position. If OK, see the diagnosis for the Instrument Cluster in this group. If not OK, replace the faulty headlamp switch.

INSTRUMENT CLUSTER

Before performing this test, complete the testing of the hard-wired chime warning system switches as described in this group. For circuit descriptions and diagrams, refer to 8W-40 - Instrument Cluster or 8W-44 - Interior Lighting in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the instrument cluster from the instrument panel. Refer to Group 8E - Instrument Panel Systems for the procedures.

(2) Unplug the headlamp switch and the key-in ignition switch wire harness connectors. Check for continuity between the key-in switch sense circuit cavity of the right instrument cluster wire harness connector (connector B) and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the short circuit as required.

(3) Check for continuity between the key-in switch sense circuit cavities of the right instrument cluster wire harness connector (connector B) and the headlamp switch wire harness connector. There should be continuity. If OK, go to Step 4. If not OK, repair the open circuit as required.

(4) Unplug the driver seat belt switch wire harness connector. Check for continuity between the seat belt switch sense circuit cavity of the right instrument cluster wire harness connector (connector B) and a good ground. There should be no continuity. If

DIAGNOSIS AND TESTING (Continued)

OK, go to Step 5. If not OK, repair the short circuit as required.

(5) Check for continuity between the seat belt switch sense circuit cavities of the right instrument cluster wire harness connector (connector B) and the driver seat belt switch wire harness connector. There should be continuity. If OK, test the instrument cluster as described in Group 8E - Instrument Panel Systems. If not OK, repair the open circuit as required.

REMOVAL AND INSTALLATION

CHIME WARNING SYSTEM SWITCHES

Service procedures for the various hard-wired switches used in the chime warning system can be found in the proper group as follows:

- Driver door jamb switch - refer to Group 8L - Lamps
- Driver seat belt switch - refer to Group 23 - Body
- Headlamp switch - refer to Group 8E - Instrument Panel Systems
- Key-in ignition switch - refer to Group 8D - Ignition Systems.

WIRING DIAGRAMS

CONTENTS

8W-01 GENERAL INFORMATION

INDEX

DESCRIPTION AND OPERATION

INTRODUCTION

Chrysler wiring diagrams are designed to provide information regarding the vehicles wiring content. In order to effectively use Chrysler wiring diagrams to diagnose and repair a Chrysler vehicle, it is important to understand all of their features and characteristics.

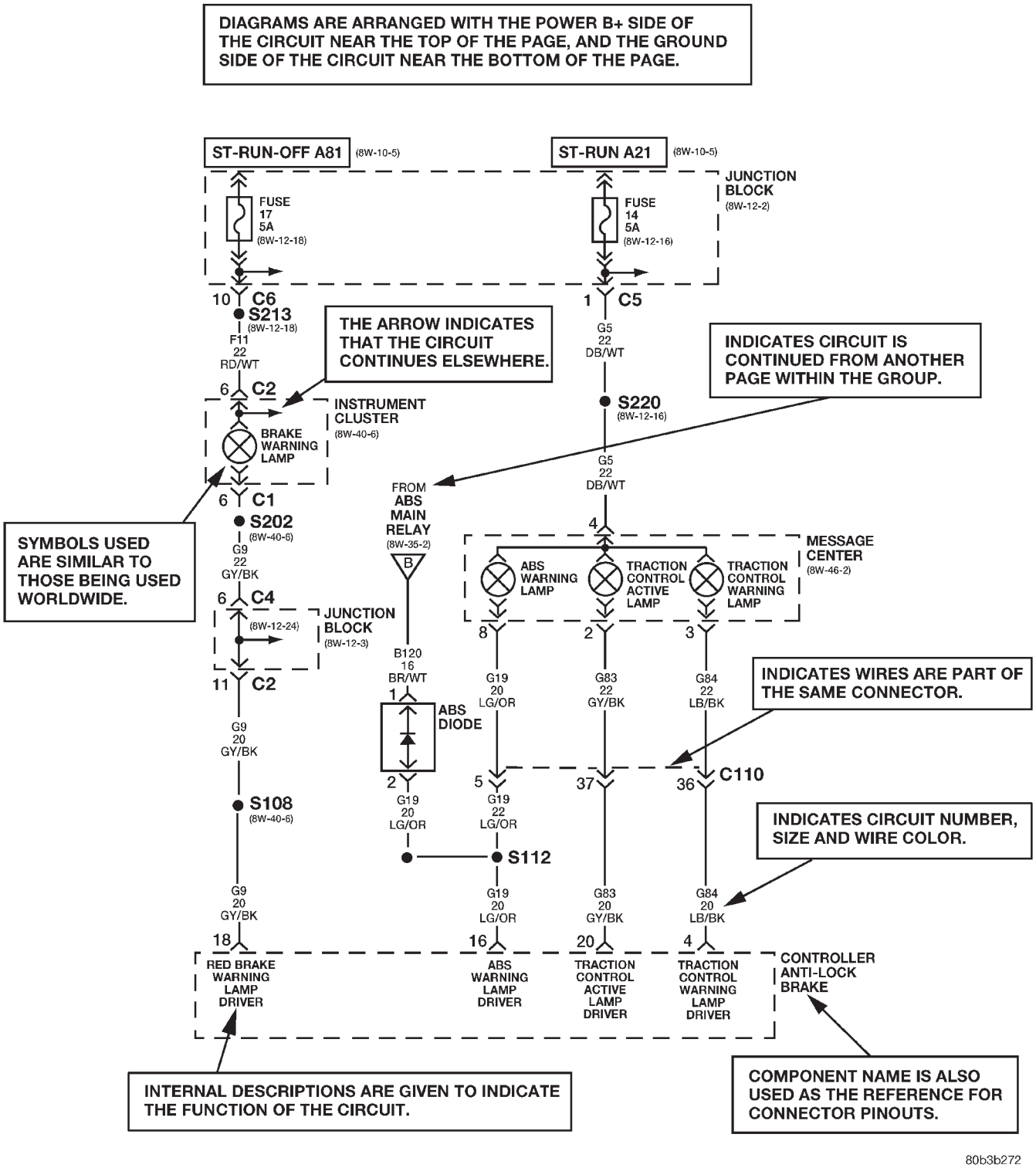
Diagrams are arranged such that the power (B+) side of the circuit is placed near the top of the page, and the ground (B-) side of the circuit is placed near the bottom of the page.

All switches, components, and modules are shown in the at rest position with the doors closed and the key removed from the ignition.

Components are shown two ways. A solid line around a component indicates that the component is complete. A dashed line around a component indicates that the component being shown is not complete. Incomplete components have a reference number to indicate the page where the component is shown complete.

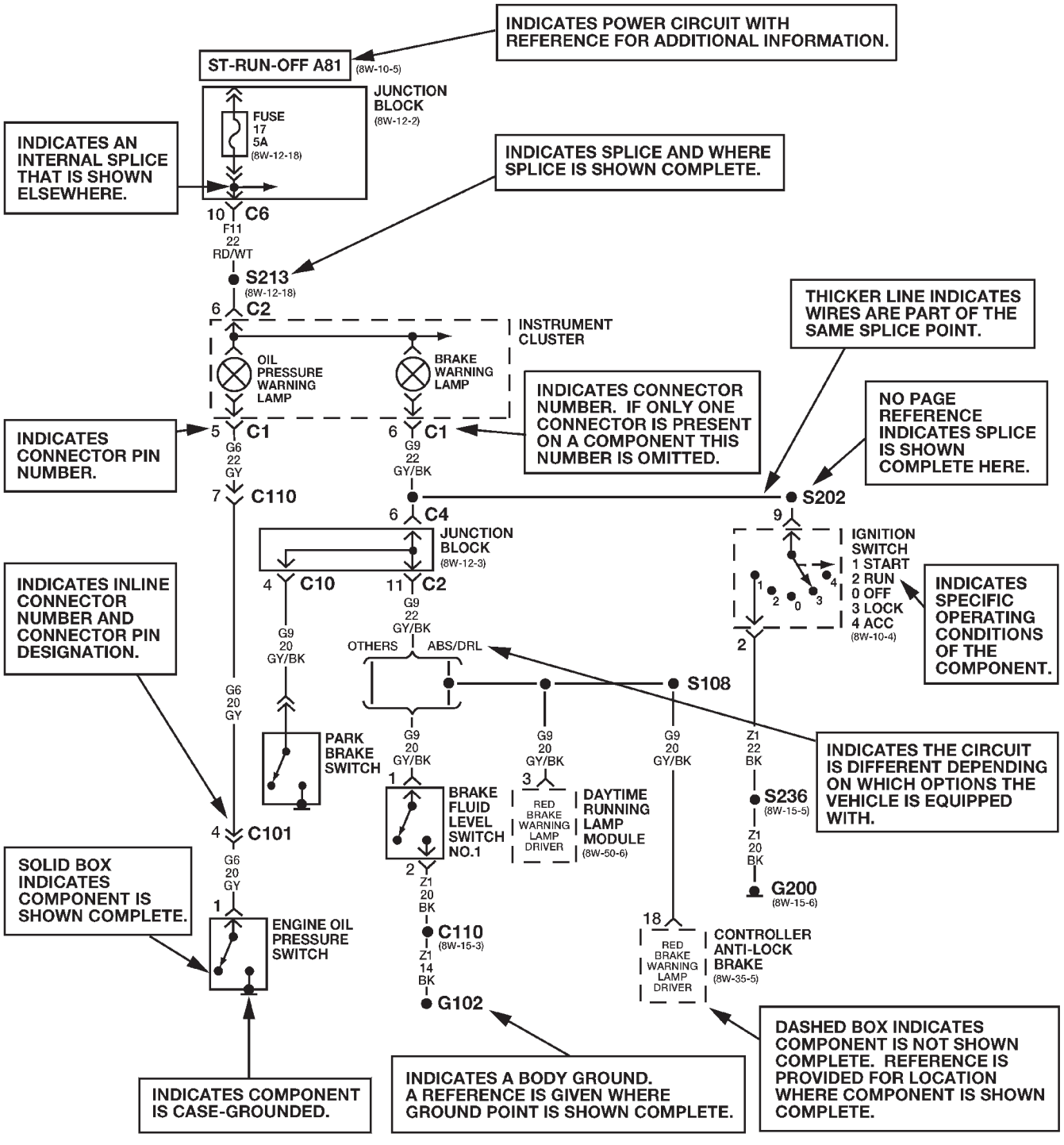
It is important to realize that no attempt is made on the diagrams to represent components and wiring as they appear on the vehicle. For example, a short piece of wire is treated the same as a long one. In addition, switches and other components are shown as simply as possible, with regard to function only.

DESCRIPTION AND OPERATION (Continued)



The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

DESCRIPTION AND OPERATION (Continued)



The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

DESCRIPTION AND OPERATION (Continued)

CIRCUIT INFORMATION

Each wire shown in the diagrams contains a code which identifies the main circuit, part of the main circuit, gage of wire, and color (Fig. 1).

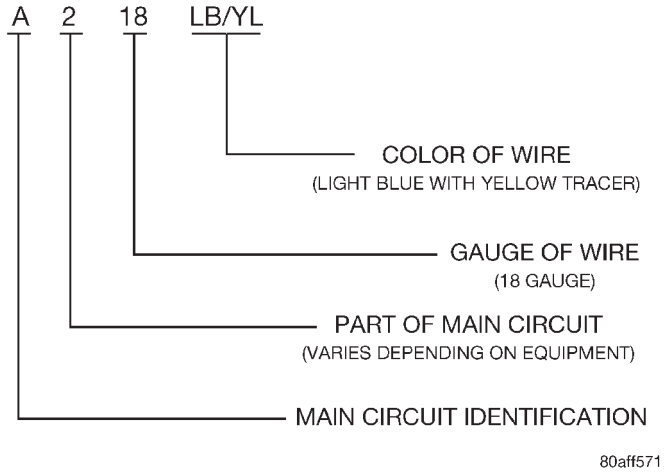


Fig. 1 Wire Code Identification

WIRE COLOR CODE CHART

COLOR CODE	COLOR	STANDARD TRACER COLOR
BL	BLUE	WT
BK	BLACK	WT
BR	BROWN	WT
DB	DARK BLUE	WT
DG	DARK GREEN	WT
GY	GRAY	BK
LB	LIGHT BLUE	BK
LG	LIGHT GREEN	BK
OR	ORANGE	BK
PK	PINK	BK or WT
RD	RED	WT
TN	TAN	WT
VT	VIOLET	WT
WT	WHITE	BK
YL	YELLOW	BK
*	WITH TRACER	

CIRCUIT FUNCTIONS

All circuits in the diagrams use an alpha/numeric code to identify the wire and its function. To identify which circuit code applies to a system, refer to the Circuit Identification Code Chart. This chart shows the main circuits only and does not show the secondary codes that may apply to some models.

CIRCUIT IDENTIFICATION CODE CHART

CIRCUIT	FUNCTION
A	BATTERY FEED
B	BRAKE CONTROLS
C	CLIMATE CONTROLS
D	DIAGNOSTIC CIRCUITS
E	DIMMING ILLUMINATION CIRCUITS
F	FUSED CIRCUITS
G	MONITORING CIRCUITS (GAUGES)
H	OPEN
I	NOT USED
J	OPEN
K	POWERTRAIN CONTROL MODULE
L	EXTERIOR LIGHTING
M	INTERIOR LIGHTING
N	NOT USED
O	NOT USED
P	POWER OPTION (BATTERY FEED)
Q	POWER OPTIONS (IGNITION FEED)
R	PASSIVE RESTRAINT
S	SUSPENSION/STEERING
T	TRANSMISSION/TRANSAXLE/ TRANSFER CASE
U	OPEN
V	SPEED CONTROL, WIPER/WASHER
W	OPEN
X	AUDIO SYSTEMS
Y	OPEN
Z	GROUNDS

DESCRIPTION AND OPERATION (Continued)

SECTION IDENTIFICATION

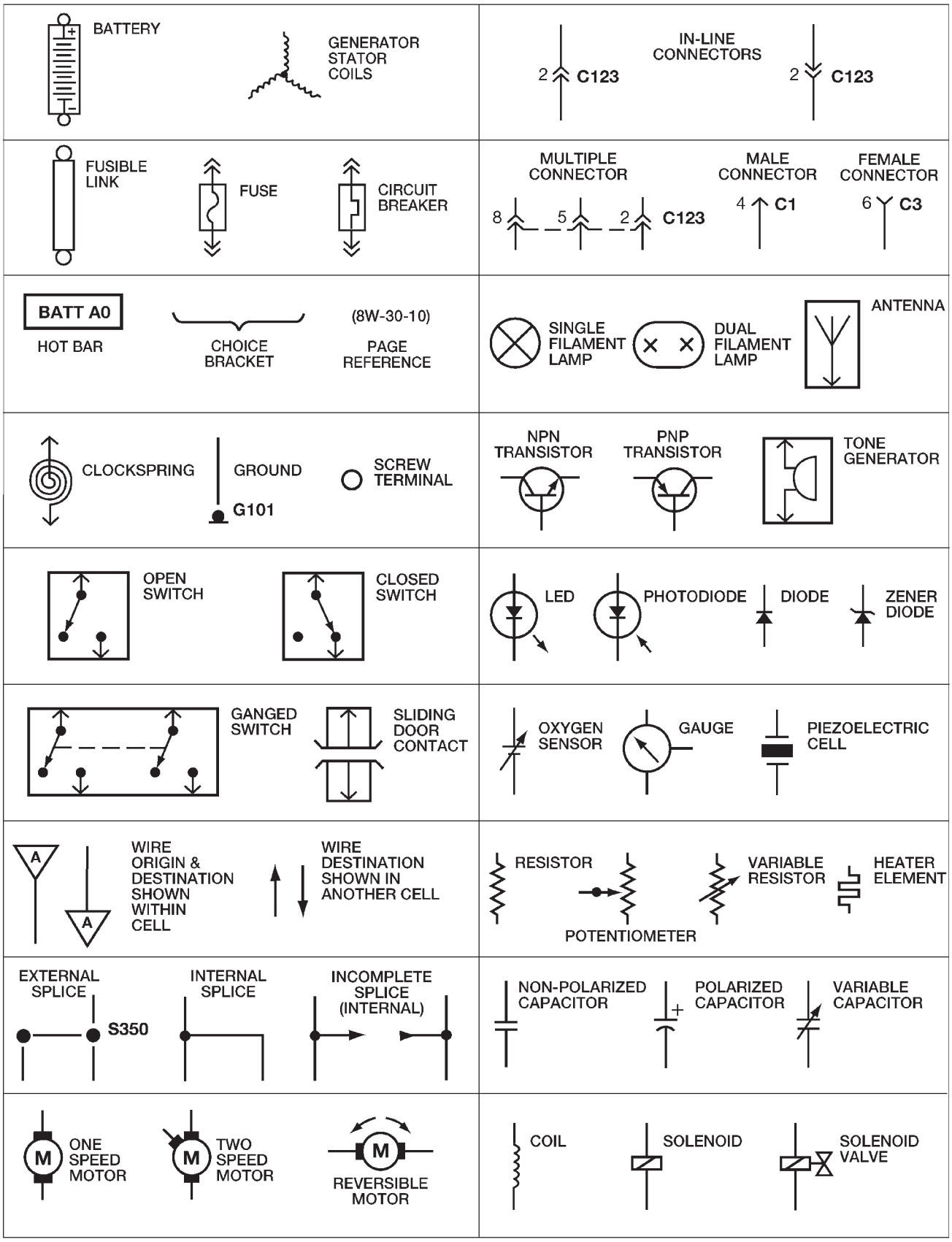
The wiring diagrams are grouped into individual sections. If a component is most likely found in a particular group, it will be shown complete (all wires, connectors, and pins) within that group. For example, the Auto Shutdown Relay is most likely to be found in Group 30, so it is shown there complete. It can, however, be shown partially in another group if it contains some associated wiring.

GROUP	TOPIC
8W-01 thru 8W-09	General Information and Diagram Overview
8W-10 thru 8W-19	Main Sources of Power and Vehicle Grounding
8W-20 thru 8W-29	Starting and Charging
8W-30 thru 8W-39	Powertrain/Drivetrain Systems
8W-40 thru 8W-49	Body Electrical items and A/C
8W-50 thru 8W-59	Exterior Lighting, Wipers, and Trailer Tow
8W-60 thru 8W-69	Power Accessories
8W-70	Splice Information
8W-80	Connector Pin Outs
8W-90	Connector Locations (including grounds)
8W-95	Splice Locations

SYMBOLS

International symbols are used throughout the wiring diagrams. These symbols are consistent with those being used around the world

DESCRIPTION AND OPERATION (Continued)



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Wiring Diagram Symbols

DESCRIPTION AND OPERATION (Continued)

TERMINOLOGY

This a list of terms with there definitions used in the wiring diagrams.

Built-Up-Export . . . . . Vehicles Built For Sale In Markets Other Than North America
Except-Built-Up-Export . . Vehicles Built For Sale In North America
LHD . . . . . Left Hand Drive Vehicles
RHD . . . . . Right Hand Drive Vehicles
ATX . . . Automatic Transmission-Front Wheel Drive
MTX . . . . Manual Transmission-Front Wheel Drive
AT . . . . . Automatic Transmission-Rear Wheel Drive
MT . . . . . Manual Transmission-Rear Wheel Drive
SOHC . . . . . Single Over Head Cam Engine
DOHC . . . . . Dual Over Head Cam Engine

CONNECTOR INFORMATION

CAUTION: Not all connectors are serviced. Some connectors are serviced only with a harness. A typical example might be the Supplemental Restraint System connectors. Always check parts availability before attempting a repair.

IDENTIFICATION

In-line connectors are identified by a number, as follows:

- In-line connectors located on the **engine compartment harness** are **C100** series numbers.
- Connectors located on the **instrument panel harness** are **C200** series numbers.
- Connectors located on the **body harness** are **C300** series numbers.
- **Jumper harness connectors** are **C400** series numbers.
- **Grounds and ground connectors** are identified with a **"G"** and follow the same series numbering as the in-line connector.

Component connectors are identified by the component name instead of a number (Fig. 2). Multiple connectors on a component use a C1, C2, etc. identifier (Fig. 3).

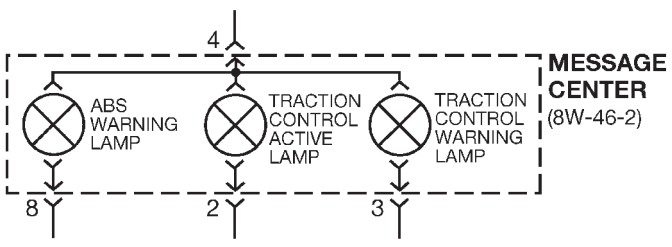


Fig. 2 Component Identification

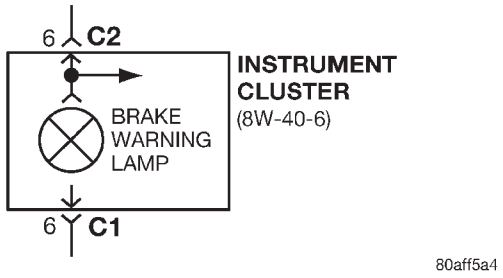


Fig. 3 Connector Identification

LOCATIONS

Section 8W-90 contains connector/ground location illustrations. The illustrations contain the connector name (or number)/ground number and component identification. Connector/ground location charts in Section 8W-90 reference the illustration number for components and connectors.

Section 8W-80 shows each connector and the circuits involved with that connector. The connectors are identified using the name/number on the Diagram pages.

SPLICE LOCATIONS

Splice Location charts in Section 8W-70 show the entire splice, and provide references to other sections the splice serves.

Section 8W-95 contains illustrations that show the general location of the splices in each harness. The illustrations show the splice by number, and provide a written location.

NOTES, CAUTIONS, and WARNINGS

Throughout this group additional important information is presented in three ways; Notes, Cautions, and Warnings.

NOTES are used to help describe how switches or components operate to complete a particular circuit. They are also used to indicate different conditions that may appear on the vehicle. For example, an up-to and after condition.

CAUTIONS are used to indicate information that could prevent making an error that may damage the vehicle.

WARNINGS provide information to prevent personal injury and vehicle damage. Below is a list of general warnings that should be followed any time a vehicle is being serviced.

WARNING: ALWAYS WEAR SAFETY GLASSES FOR EYE PROTECTION.

WARNING: USE SAFETY STANDS ANYTIME A PROCEDURE REQUIRES BEING UNDER A VEHICLE.

DESCRIPTION AND OPERATION (Continued)

WARNING: BE SURE THAT THE IGNITION SWITCH ALWAYS IS IN THE OFF POSITION, UNLESS THE PROCEDURE REQUIRES IT TO BE ON.

WARNING: SET THE PARKING BRAKE WHEN WORKING ON ANY VEHICLE. AN AUTOMATIC TRANSMISSION SHOULD BE IN PARK. A MANUAL TRANSMISSION SHOULD BE IN NEUTRAL.

WARNING: OPERATE THE ENGINE ONLY IN A WELL-VENTILATED AREA.

WARNING: KEEP AWAY FROM MOVING PARTS WHEN THE ENGINE IS RUNNING, ESPECIALLY THE FAN AND BELTS.

WARNING: TO PREVENT SERIOUS BURNS, AVOID CONTACT WITH HOT PARTS SUCH AS THE RADIATOR, EXHAUST MANIFOLD(S), TAIL PIPE, CATALYTIC CONVERTER, AND MUFFLER.

WARNING: DO NOT ALLOW FLAME OR SPARKS NEAR THE BATTERY. GASES ARE ALWAYS PRESENT IN AND AROUND THE BATTERY.

WARNING: ALWAYS REMOVE RINGS, WATCHES, LOOSE HANGING JEWELRY, AND LOOSE CLOTHING.

TAKE OUTS

The abbreviation T/O is used in the component location section to indicate a point in which the wiring harness branches out to a component.

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES

All ESD sensitive components are solid state and a symbol (Fig. 4) is used to indicate this. When handling any component with this symbol comply with the following procedures to reduce the possibility of electrostatic charge build up on the body and inadvertent discharge into the component. If it is not known whether the part is ESD sensitive, assume that it is.

(1) Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position, or walking a distance.

(2) Avoid touching electrical terminals of the part, unless instructed to do so by a written procedure.

(3) When using a voltmeter, be sure to connect the ground lead first.

(4) Do not remove the part from its protective packing until it is time to install the part.

(5) Before removing the part from its package, ground the package to a known good ground on the vehicle.

948W-193

Fig. 4 Electrostatic Discharge Symbol

DIAGNOSIS AND TESTING

TROUBLESHOOTING TOOLS

When diagnosing a problem in an electrical circuit there are several common tools necessary. These tools are listed and explained below.

- Jumper Wire - This is a test wire used to connect two points of a circuit. It can be used to bypass an open in a circuit.

WARNING: NEVER USE A JUMPER WIRE ACROSS A LOAD, SUCH AS A MOTOR, CONNECTED BETWEEN A BATTERY FEED AND GROUND.

- Voltmeter - Used to check for voltage on a circuit. Always connect the black lead to a known good ground and the red lead to the positive side of the circuit.

CAUTION: Most of the electrical components used in today's vehicle are solid state. When checking voltages in these circuits use a meter with a 10-megohm or greater impedance rating.

- Ohmmeter - Used to check the resistance between two points of a circuit. Low or no resistance in a circuit means good continuity.

CAUTION: - Most of the electrical components used in today's vehicle are Solid State. When checking resistance in these circuits use a meter with a 10-megohm or greater impedance rating. In addition, make sure the power is disconnected from the circuit. Circuits that are powered up by the vehicle electrical system can cause damage to the equipment and provide false readings.

DIAGNOSIS AND TESTING (Continued)

• Probing Tools - These tools are used for probing terminals in connectors (Fig. 5). Select the proper size tool from Special Tool Package 6807, and insert it into the terminal being tested. Use the other end of the tool to insert the meter probe.

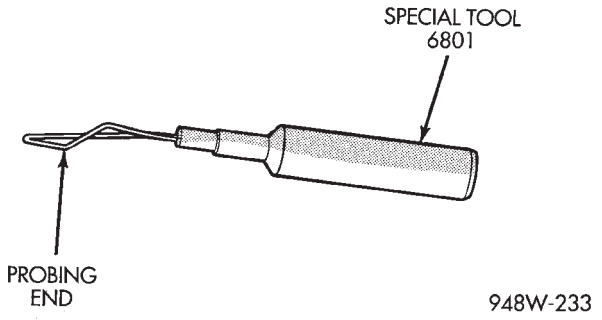


Fig. 5 Probing Tool

INTERMITTENT AND POOR CONNECTIONS

Most intermittent electrical problems are caused by faulty electrical connections or wiring. It is also possible for a sticking component or relay to cause a problem. Before condemning a component or wiring assembly check the following items.

- Connectors are fully seated
- Spread terminals, or terminal push out
- Terminals in the wiring assembly are fully seated into the connector/component and locked in position
- Dirt or corrosion on the terminals. Any amount of corrosion or dirt could cause an intermittent problem
- Damaged connector/component casing exposing the item to dirt and moisture
- Wire insulation that has rubbed through causing a short to ground
- Some or all of the wiring strands broken inside of the insulation covering.
- Wiring broken inside of the insulation

TROUBLESHOOTING TESTS

Before beginning any tests on a vehicles electrical system use the Wiring Diagrams and study the circuit. Also refer to the Troubleshooting Wiring Problems in this section.

TESTING FOR VOLTAGE POTENTIAL

(1) Connect the ground lead of a voltmeter to a known good ground (Fig. 6).

(2) Connect the other lead of the voltmeter to the selected test point. The vehicle ignition may need to be turned ON to check voltage. Refer to the appropriate test procedure.

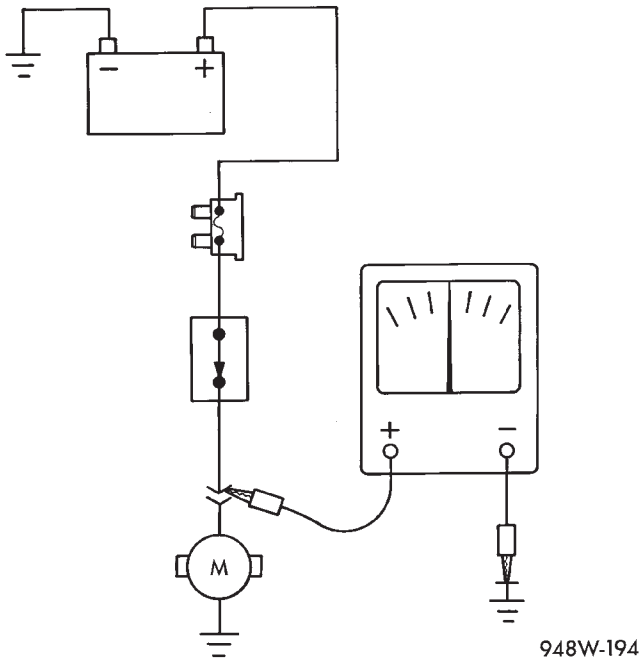


Fig. 6 Testing for Voltage Potential

TESTING FOR CONTINUITY

(1) Remove the fuse for the circuit being checked or, disconnect the battery.

(2) Connect one lead of the ohmmeter to one side of the circuit being tested (Fig. 7).

(3) Connect the other lead to the other end of the circuit being tested. Low or no resistance means good continuity.

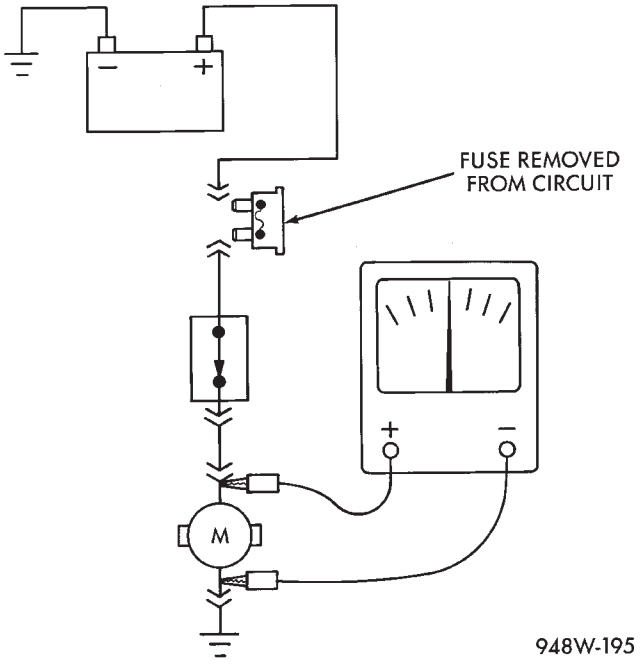


Fig. 7 Testing for Continuity

DIAGNOSIS AND TESTING (Continued)

TESTING FOR A SHORT TO GROUND

(1) Remove the fuse and disconnect all items involved with the fuse.

(2) Connect a test light or a voltmeter across the terminals of the fuse.

(3) Starting at the fuse block, wiggle the wiring harness about six to eight inches apart and watch the voltmeter/test lamp.

(4) If the voltmeter registers voltage or the test lamp glows, there is a short to ground in that general area of the wiring harness.

TESTING FOR A SHORT TO GROUND ON FUSES POWERING SEVERAL LOADS

(1) Refer to the wiring diagrams and disconnect or isolate all items on the suspected fused circuits.

(2) Replace the blown fuse.

(3) Supply power to the fuse by turning ON the ignition switch or re-connecting the battery.

(4) Start connecting the items in the fuse circuit one at a time. When the fuse blows the circuit with the short to ground has been isolated.

TESTING FOR A VOLTAGE DROP

(1) Connect the positive lead of the voltmeter to the side of the circuit closest to the battery (Fig. 8).

(2) Connect the other lead of the voltmeter to the other side of the switch or component.

(3) Operate the item.

(4) The voltmeter will show the difference in voltage between the two points.

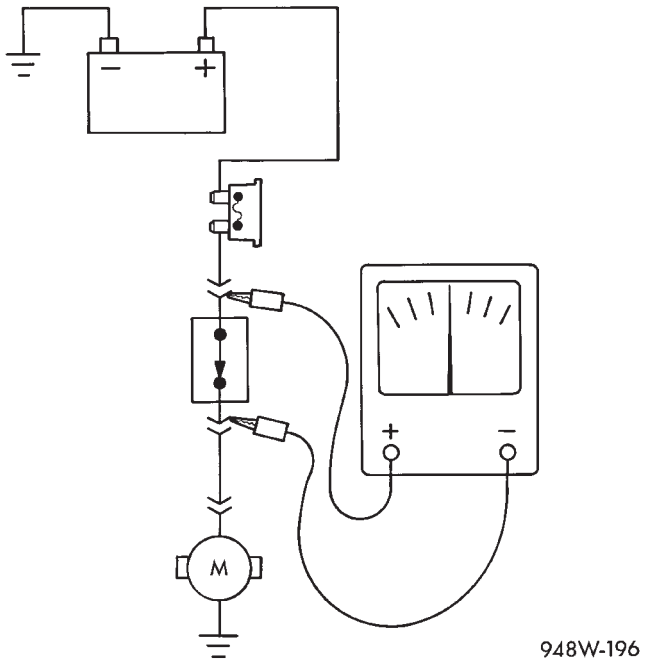


Fig. 8 Testing for Voltage Drop

TROUBLESHOOTING WIRING PROBLEMS

When troubleshooting wiring problems there are six steps which can aid in the procedure. The steps are listed and explained below. Always check for non-factory items added to the vehicle before doing any diagnosis. If the vehicle is equipped with these items, disconnect them to verify these add-on items are not the cause of the problem.

(1) Verify the problem.

(2) Verify any related symptoms. Do this by performing operational checks on components that are in the same circuit. Refer to the wiring diagrams.

(3) Analyze the symptoms. Use the wiring diagrams to determine what the circuit is doing, where the problem most likely is occurring and where the diagnosis will continue.

(4) Isolate the problem area.

(5) Repair the problem.

(6) Verify proper operation. For this step check for proper operation of all items on the repaired circuit. Refer to the wiring diagrams.

SERVICE PROCEDURES

WIRING REPAIR

When replacing or repairing a wire, it is important that the correct gage be used as shown in the wiring diagrams. The wires must also be held securely in place to prevent damage to the insulation.

(1) Disconnect battery negative cable.

(2) Remove 1 inch of insulation from each end of the wire.

(3) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(4) Spread the strands of the wire apart on each part of the exposed wire (example 1) (Fig. 9).

(5) Push the two ends of wire together until the strands of wire are close to the insulation (example 2) (Fig. 9).

(6) Twist the wires together (example 3) (Fig. 9).

(7) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(8) Center the heat shrink tubing over the joint, and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(9) Secure the wire to the existing ones to prevent chafing or damage to the insulation.

(10) Connect battery and test all affected systems.

TERMINAL/CONNECTOR REPAIR-MOLEX CONNECTORS

(1) Disconnect battery.

SERVICE PROCEDURES (Continued)

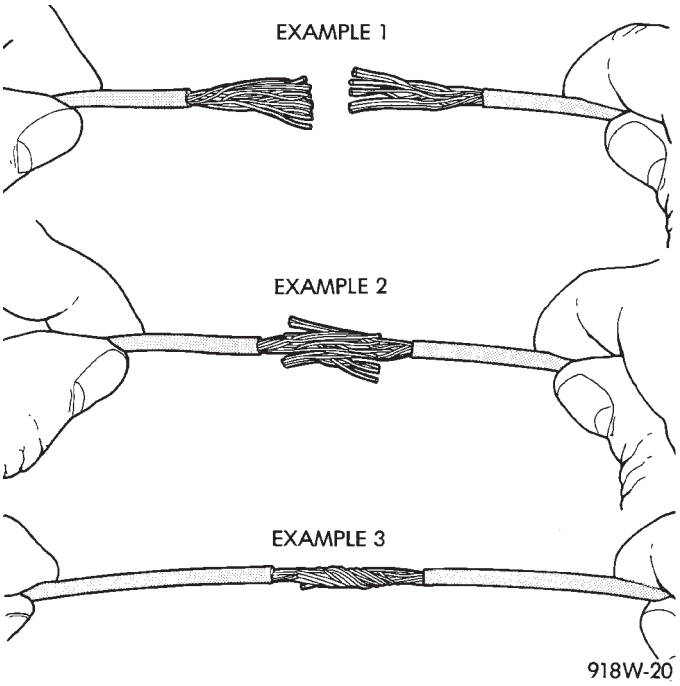


Fig. 9 Wire Repair

(2) Disconnect the connector from its mating half/component.

(3) Insert the terminal releasing special tool 6742 into the terminal end of the connector (Fig. 10).

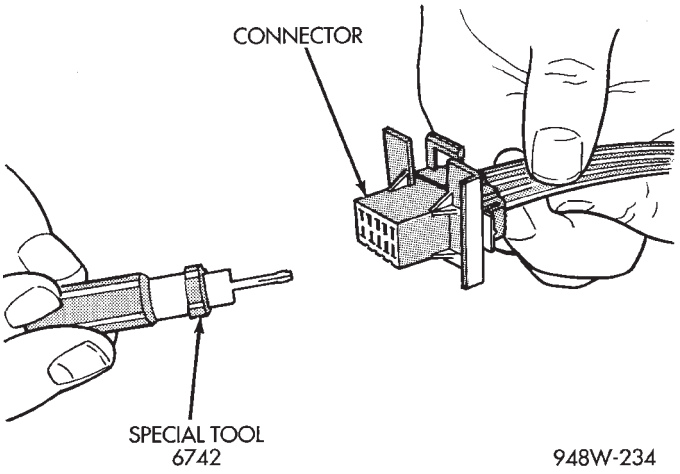


Fig. 10 Molex Connector Repair

(4) Using special tool 6742 release the locking fingers on the terminal (Fig. 11).

(5) Pull on the wire to remove it from the connector.

(6) Repair or replace the connector or terminal, as necessary.

TERMINAL/CONNECTOR REPAIR—THOMAS AND BETTS CONNECTORS

(1) Disconnect battery.

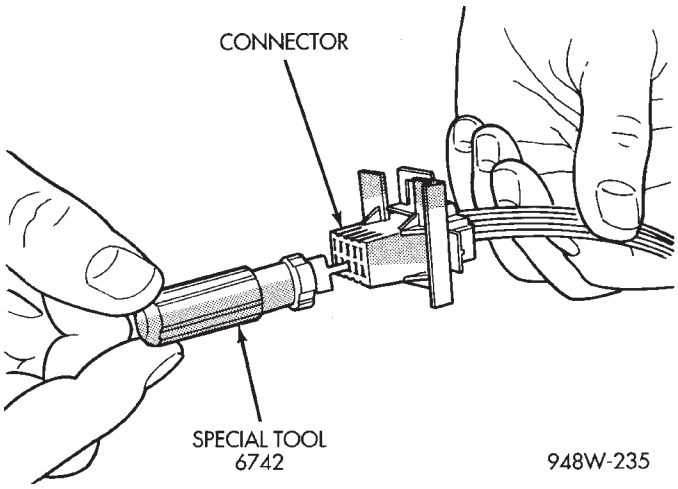


Fig. 11 Using Special Tool 6742

(2) Disconnect the connector from its mating half/component.

(3) Push in the two lock tabs on the side of the connector (Fig. 12).

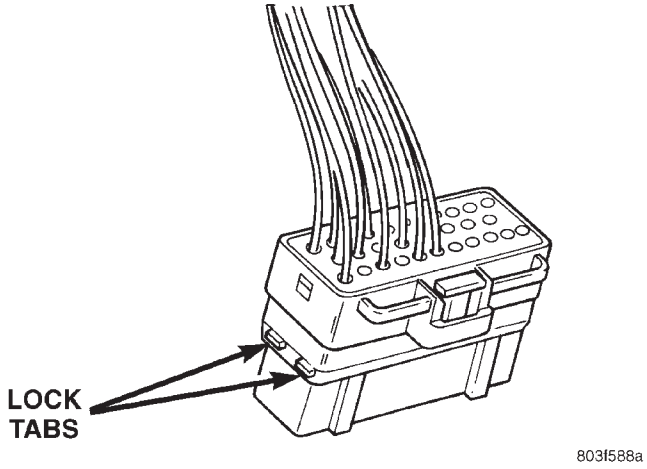


Fig. 12 Thomas and Betts Connector Lock Release Tabs

(4) Insert the probe end of special tool 6934 into the back of the connector cavity (Fig. 13).

(5) Grasp the wire and tool 6934 and slowly remove the wire and terminal from the connector.

(6) Repair or replace the terminal.

(7) Install the wire and terminal in the connector. Fully seat the terminal in the connector.

(8) Push in the single lock tab on the side of the connector (Fig. 14).

CONNECTOR REPLACEMENT

(1) Disconnect battery.

(2) Disconnect the connector that is to be repaired from its mating half/component.

(3) Remove the connector locking wedge, if required (Fig. 15).

SERVICE PROCEDURES (Continued)

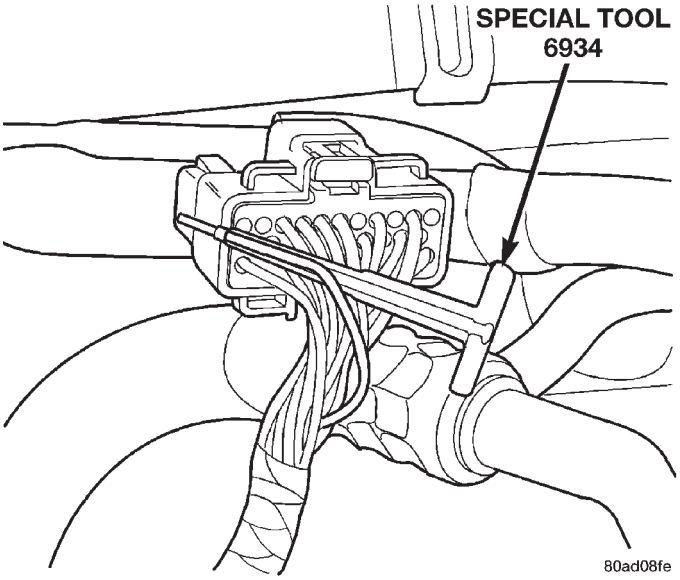


Fig. 13 Removing Wire Terminal

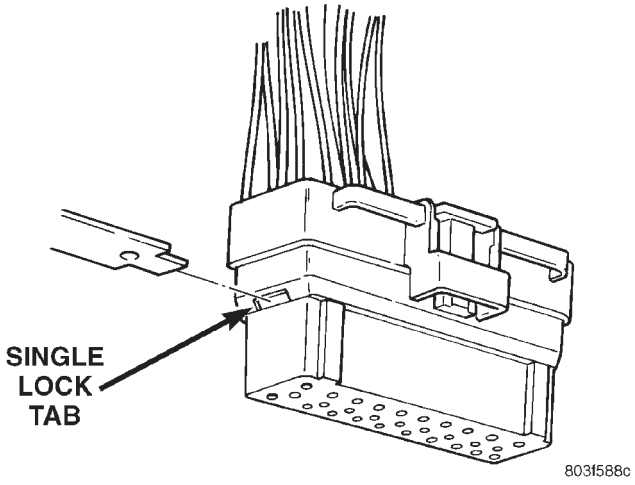


Fig. 14 Single Lock Tab

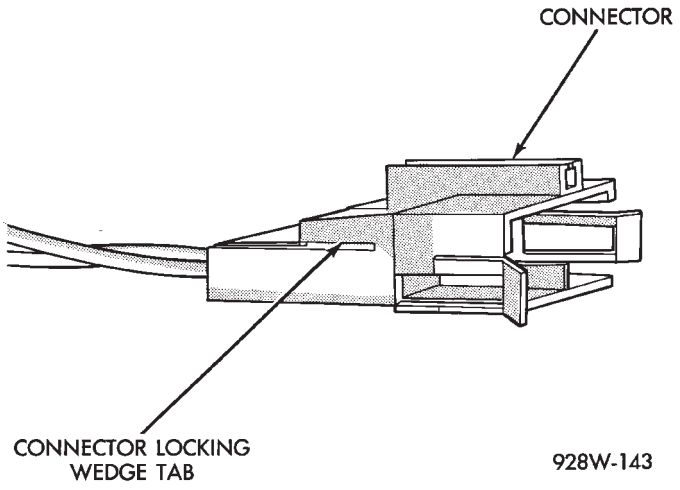


Fig. 15 Connector Locking Wedge

(4) Position the connector locking finger away from the terminal using the proper pick from special tool kit 6680. Pull on the wire to remove the terminal from the connector (Fig. 16) (Fig. 17).

(5) Reset the terminal locking tang, if it has one.

(6) Insert the removed wire in the same cavity on the repair connector.

(7) Repeat steps four through six for each wire in the connector, being sure that all wires are inserted into the proper cavities. For additional connector pin-out identification, refer to the wiring diagrams.

(8) Insert the connector locking wedge into the repaired connector, if required.

(9) Connect connector to its mating half/component.

(10) Connect battery and test all affected systems.

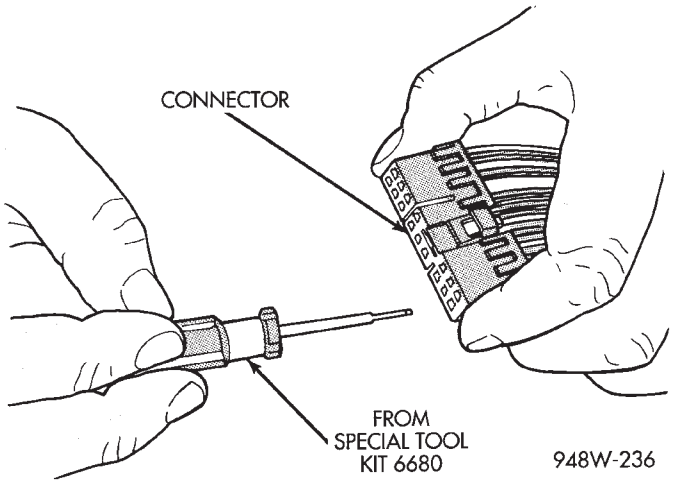


Fig. 16 Terminal Removal

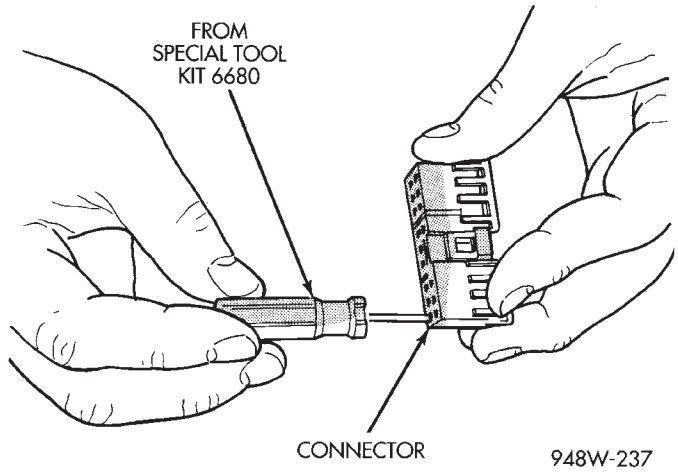


Fig. 17 Terminal Removal Using Special Tool

CONNECTOR AND TERMINAL REPLACEMENT

(1) Disconnect battery.

(2) Disconnect the connector (that is to be repaired) from its mating half/component.

SERVICE PROCEDURES (Continued)

(3) Cut off the existing wire connector directly behind the insulator. Remove six inches of tape from the harness.

(4) Stagger cut all wires on the harness side at 1/2 inch intervals (Fig. 18).

(5) Remove 1 inch of insulation from each wire on the harness side.

(6) Stagger cut the matching wires on the repair connector assembly in the opposite order as was done on the harness side of the repair. Allow extra length for soldered connections. Check that the overall length is the same as the original (Fig. 18).

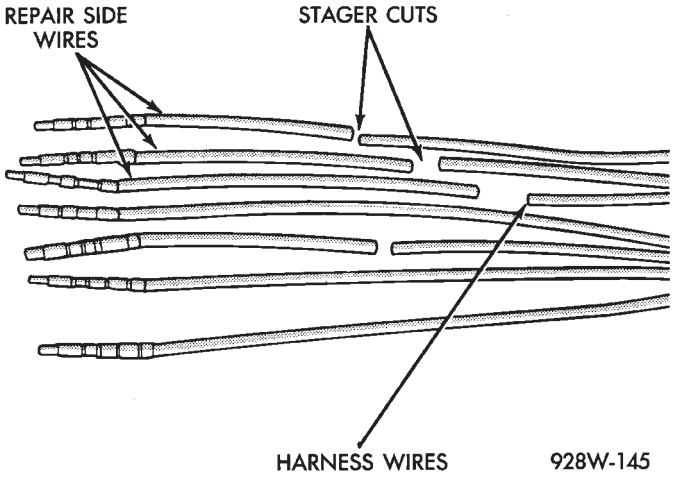


Fig. 18 Stagger Cutting Wires

(7) Remove 1 inch of insulation from each wire.

(8) Place a piece of heat shrink tubing over one side of the wire. Be sure the tubing will be long enough to cover and seal the entire repair area.

(9) Spread the strands of the wire apart on each part of the exposed wires.

(10) Push the two ends of wire together until the strands of wire are close to the insulation.

(11) Twist the wires together.

(12) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(13) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(14) Repeat steps 8 through 13 for each wire.

(15) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.

(16) Re-connect the repaired connector.

(17) Connect the battery, and test all affected systems.

TERMINAL REPLACEMENT

(1) Disconnect battery.

(2) Disconnect the connector being repaired from its mating half. Remove connector locking wedge, if required (Fig. 19).

(3) Remove connector locking wedge, if required (Fig. 19).

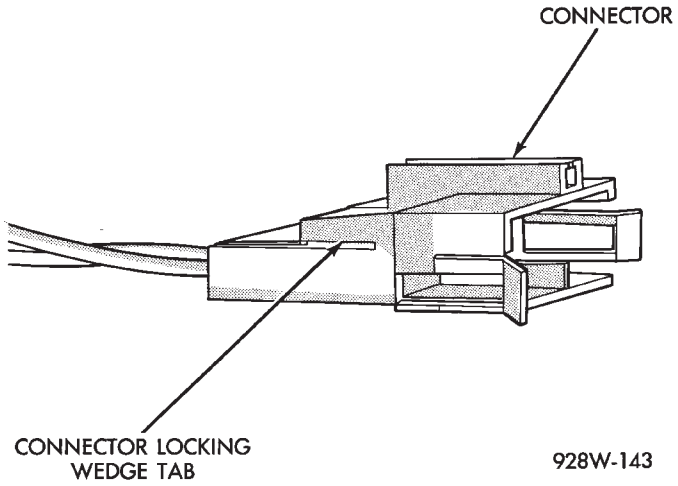


Fig. 19 Connector Locking Wedge Tab (Typical)

(4) Position the connector locking finger away from the terminal using the proper pick from special tool kit 6680. Pull on the wire to remove the terminal from the connector (Fig. 20) (Fig. 21).

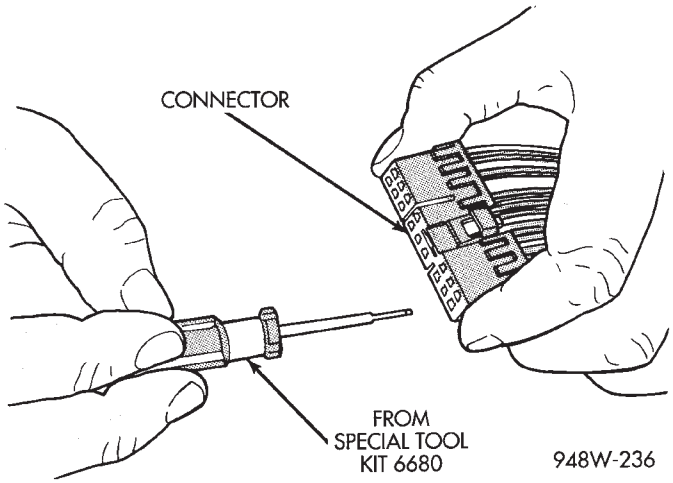


Fig. 20 Terminal Removal

(5) Cut the wire 6 inches from the back of the connector.

(6) Remove 1 inch of insulation from the wire on the harness side.

(7) Select a wire from the terminal repair assembly that best matches the color wire being repaired.

(8) Cut the repair wire to the proper length and remove 1 inch of insulation.

(9) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(10) Spread the strands of the wire apart on each part of the exposed wires.

(11) Push the two ends of wire together until the strands of wire are close to the insulation.

SERVICE PROCEDURES (Continued)

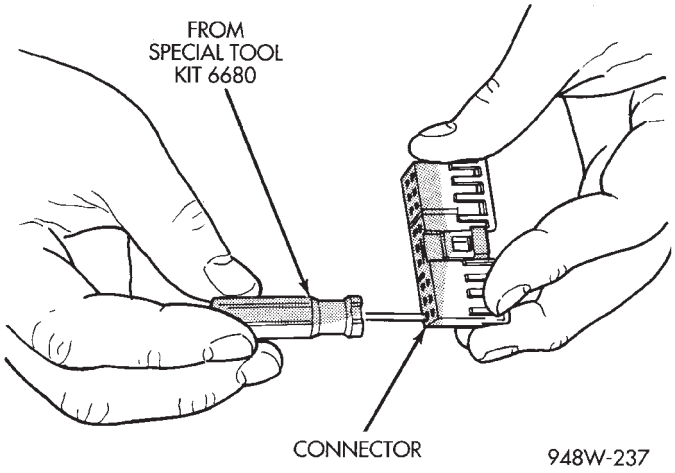


Fig. 21 Terminal Removal Using Special Tool

(12) Twist the wires together.

(13) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(14) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(15) Insert the repaired wire into the connector.

(16) Install the connector locking wedge, if required, and reconnect the connector to its mating half/component.

(17) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.

(18) Connect battery, and test all affected systems.

DIODE REPLACEMENT

(1) Disconnect the battery.

(2) Locate the diode in the harness, and remove the protective covering.

(3) Remove the diode from the harness, pay attention to the current flow direction (Fig. 22).

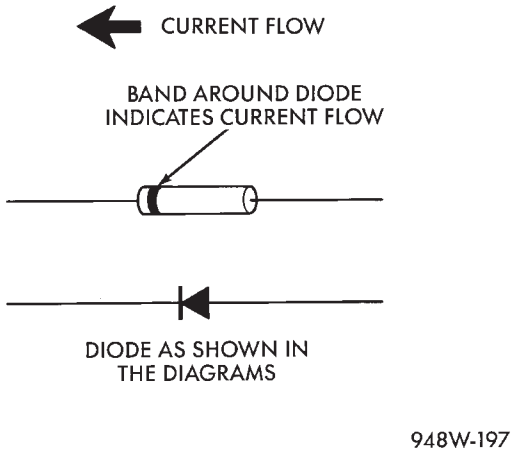


Fig. 22 Diode Identification

(4) Remove the insulation from the wires in the harness. Only remove enough insulation to solder in the new diode.

(5) Install the new diode in the harness, making sure current flow is correct. If necessary refer to the appropriate wiring diagram for current flow.

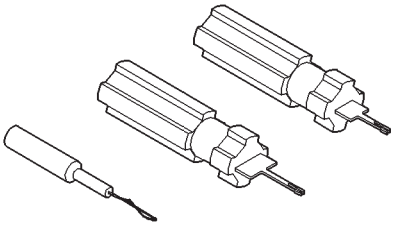
(6) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(7) Tape the diode to the harness using electrical tape making, sure the diode is completely sealed from the elements.

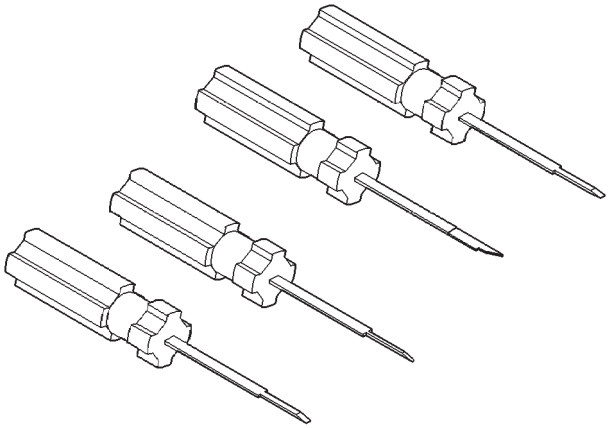
(8) Re-connect the battery, and test affected systems.

SPECIAL TOOLS

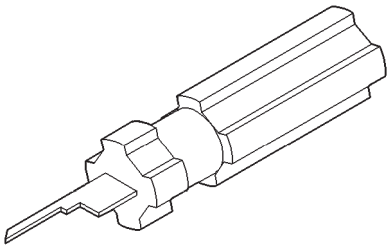
WIRING/TERMINAL



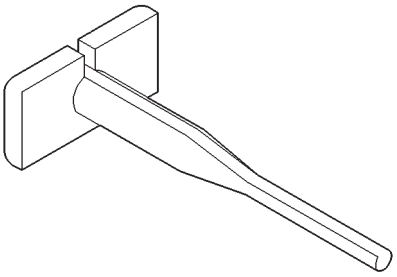
Probing Tool Package 6807



Terminal Pick 6680



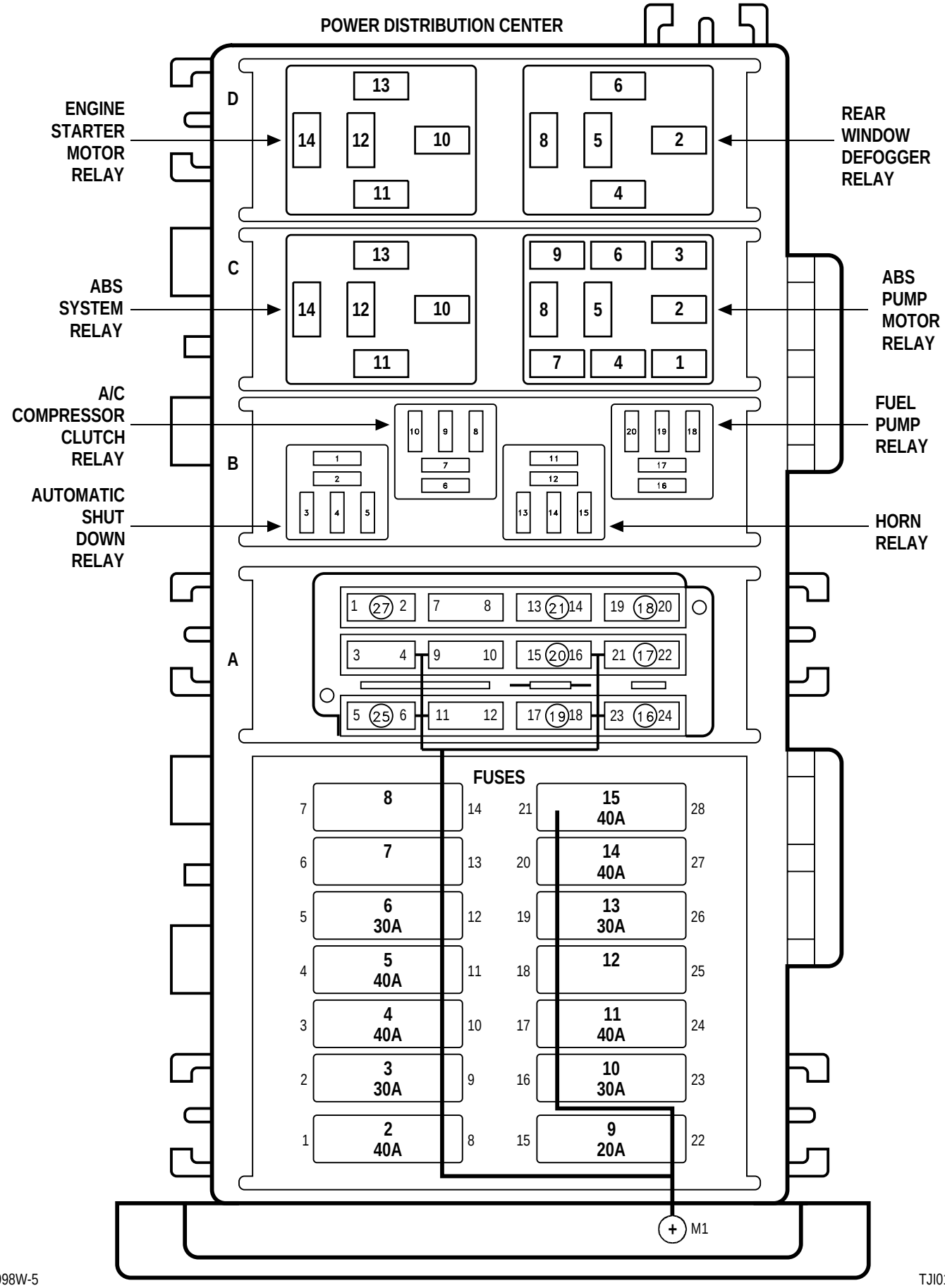
Terminal Removing Tool 6932



Terminal Removing Tool 6934

8W-02 COMPONENT INDEX

8W-10 POWER DISTRIBUTION


POWER DISTRIBUTION CENTER
ENGINE STARTER MOTOR RELAY
ABS SYSTEM RELAY
A/C COMPRESSOR CLUTCH RELAY
AUTOMATIC SHUT DOWN RELAY
REAR WINDOW DEFOGGER RELAY
ABS PUMP MOTOR RELAY
FUEL PUMP RELAY
HORN RELAY
D
C
B
A
FUSES
8
7
6 30A
5 40A
4 40A
3 30A
2 40A
15 40A
14 40A
13 30A
12
11 40A
10 30A
9 20A
M1

FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
2	40A	A2 12PK/BK	A0 6RD
		A2 12PK/BK	
3	30A	A1 14RD	A0 6RD
4	40A	A6 12RD/BK	A0 6RD
5	40A	F30 12RD/PK	A0 6RD
6	30A	A14 14RD/WT	A0 6RD
		A14 14RD/WT	
7	-	-	A0 6RD
8	-	-	A0 6RD
9	20A	L9 16BK/WT	A0 6RD
10	30A	A3 14RD/WT	A0 6RD
11	40A	A111 12RD/LB	A0 6RD
12	-	-	A0 6RD
13	30A	A20 14RD/DB	A0 6RD
14	40A	A10 12RD/DG	A0 6RD
15	40A	A4 12BK/PK	A0 6RD
16	10A	A17 20RD/GY	A0 6RD
17	20A	F31 18VT	A0 6RD
		F31 18VT	
18	20A	F42 18DG/LG	A142 14DG/PK
19	20A	A61 18DG/BK	A0 6RD
20	10A	M1 20PK/WT	A0 6RD
21	10A	B47 14RD/LB	B48 20RD/YL
22	-	-	
23	-	-	
24	-	-	
25	20A	F61 18WT/OR	A0 6RD
26	-	-	
27	10A	F142 20OR/DG	A142 14DG/PK

ABS PUMP MOTOR RELAY

CAVITY	CIRCUIT	FUNCTION
C1	-	-
C2	A10 12RD/DG	FUSED B (+)
C3	Z1 14BK	GROUND
C4	B47 14RD/LB	ABS SYSTEM RELAY OUTPUT
	B47 14RD/LB	ABS SYSTEM RELAY OUTPUT
C5	-	-
C6	B116 20GY	ABS PUMP MOTOR RELAY CONTROL
C7	-	-
C8	B120 12BR/WT	ABS PUMP MOTOR RELAY OUTPUT
C9	-	-

ABS SYSTEM RELAY

CAVITY	CIRCUIT	FUNCTION
C10	B47 14RD/LB	ABS SYSTEM RELAY OUTPUT
C11	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
C12	Z1 14BK	GROUND
C13	B58 20GY/LB	ABS SYSTEM RELAY CONTROL
C14	A20 14RD/DB	FUSED B(+)

A/C COMPRESSOR CLUTCH RELAY

CAVITY	CIRCUIT	FUNCTION
B6	A17 20RD/GY	FUSED B (+)
B7	C3 20DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
B8	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
B9	-	-
B10	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL

AUTOMATIC SHUT DOWN RELAY

CAVITY	CIRCUIT	FUNCTION
B1	A14 14RD/WT	FUSED B (+)
B2	A142 14DG/PK	AUTOMATIC SHUT DOWN RELAY OUTPUT SENSE
B3	F15 20DB	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B4	-	-
B5	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL

ENGINE STARTER MOTOR RELAY

CAVITY	CIRCUIT	FUNCTION
D10	A2 12PK/BK	FUSED B (+)
D11	T141 14YL/RD	FUSED IGNITION SWITCH OUTPUT (ST)
D12	-	-
D13	T41 20BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
D14	T40 12BR	ENGINE STARTER MOTOR RELAY OUTPUT

FUEL PUMP RELAY

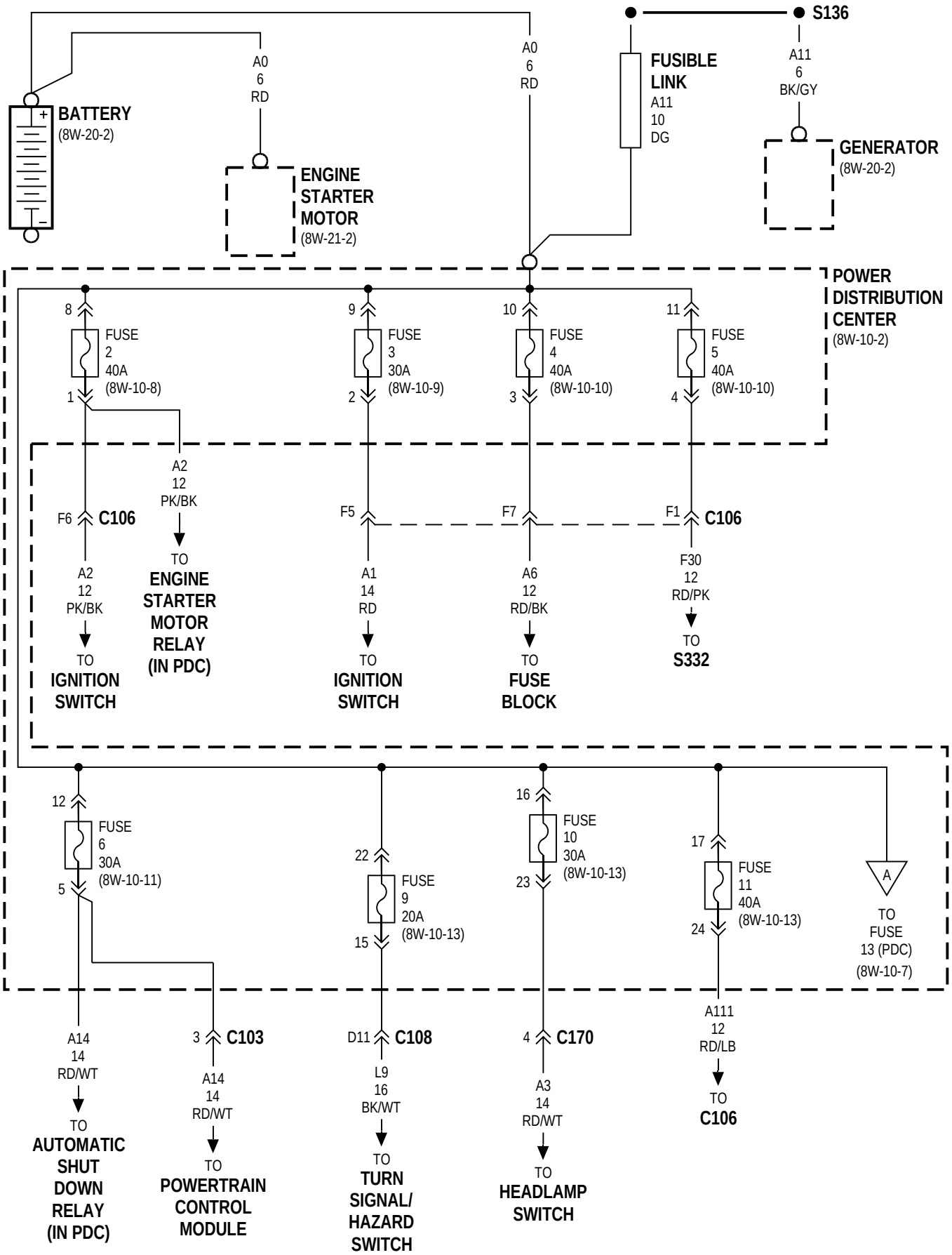
CAVITY	CIRCUIT	FUNCTION
B16	A61 18DG/BK	FUSED B (+)
B17	A141 18DG/WT	FUEL PUMP RELAY OUTPUT
B18	F15 20DB	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B19	-	-
B20	K31 18BR	FUEL PUMP RELAY CONTROL

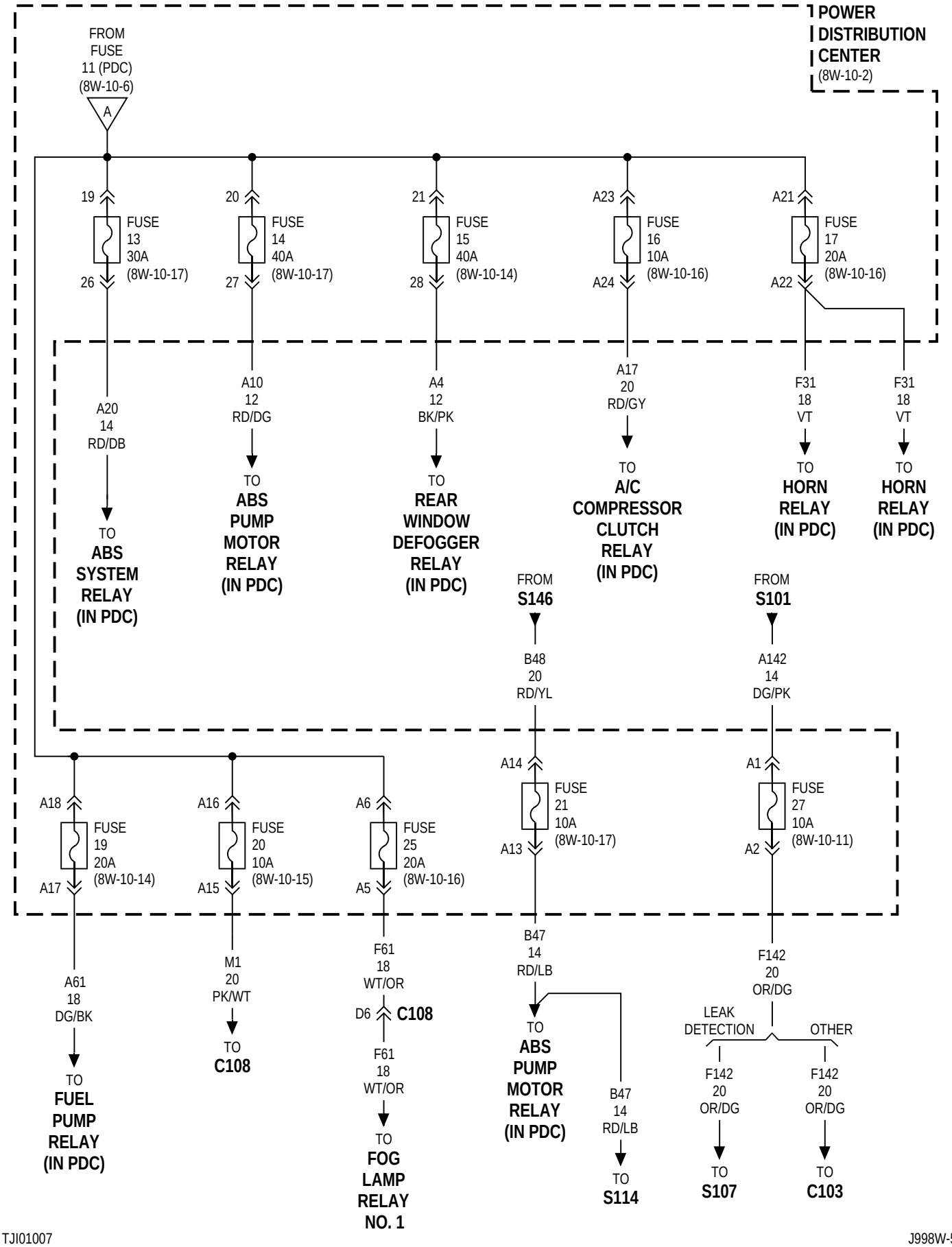
HORN RELAY

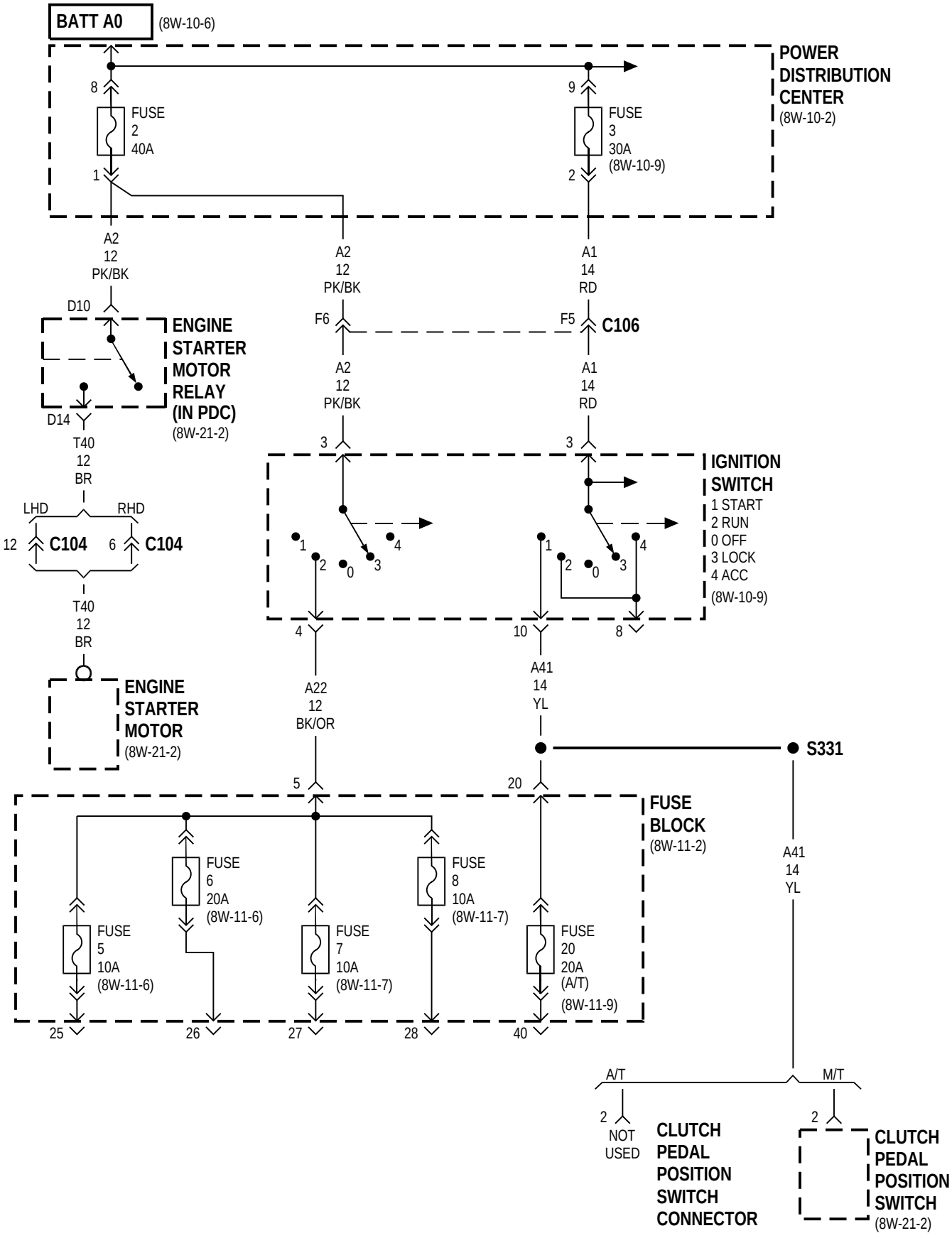
CAVITY	CIRCUIT	FUNCTION
B11	F31 18VT	FUSED B (+)
B12	X2 18WT/RD	HORN RELAY OUTPUT
B13	F31 18VT	FUSED B (+)
B14	-	-
B15	X3 20RD/YL	HORN RELAY CONTROL

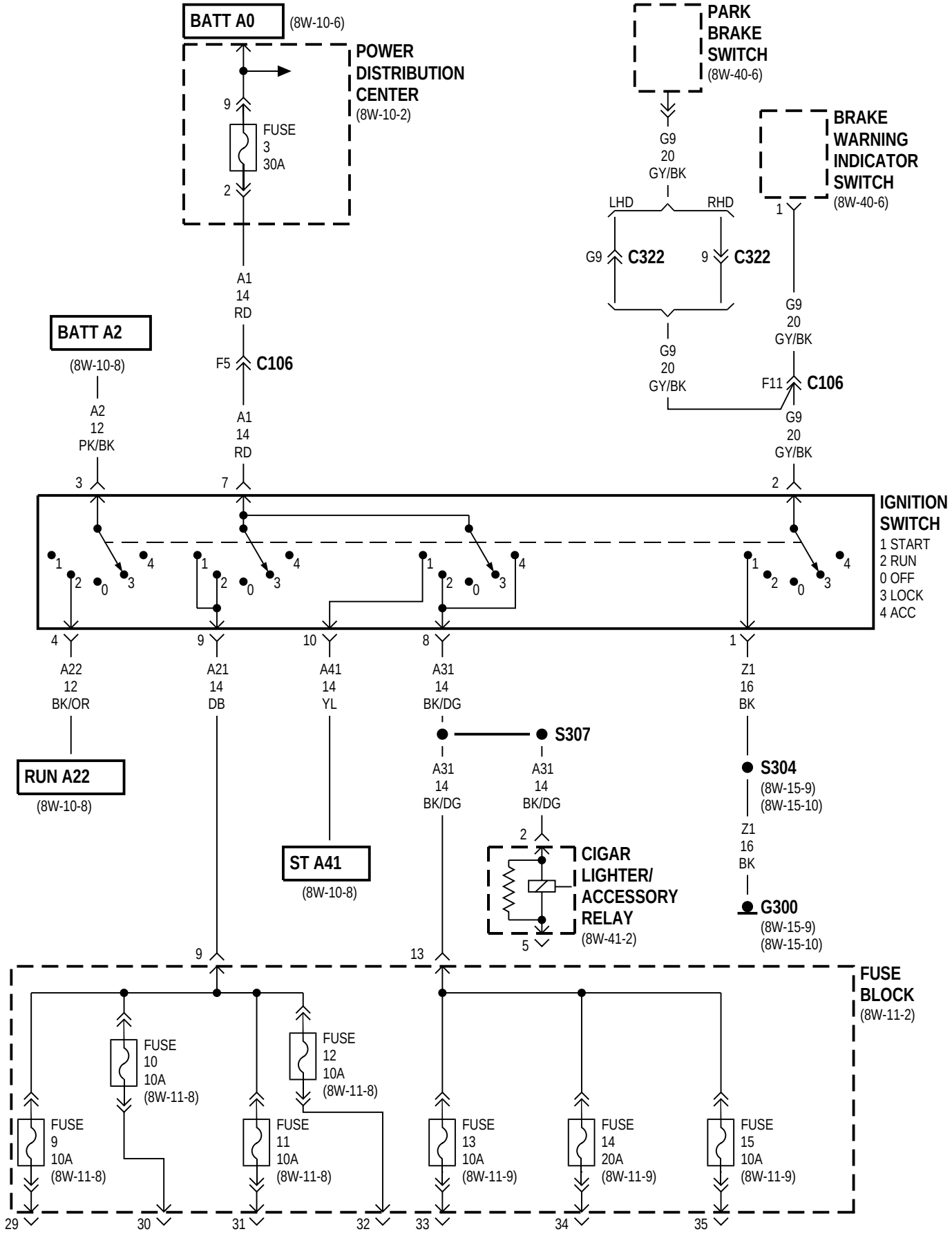
REAR WINDOW DEFOGGER RELAY

CAVITY	CIRCUIT	FUNCTION
D2	A4 12BK/PK	FUSED B (+)
D4	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
D5	-	-
D6	C81 20LB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
D8	C15 12BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT


BATTERY
(8W-20-2)
A0
6
RD
ENGINE
STARTER
MOTOR
(8W-21-2)
A0
6
RD
FUSIBLE
LINK
A11
10
DG
S136
A11
6
BK/GY
GENERATOR
(8W-20-2)
POWER
DISTRIBUTION
CENTER
(8W-10-2)
8
FUSE
2
40A
(8W-10-8)
1
9
FUSE
3
30A
(8W-10-9)
2
10
FUSE
4
40A
(8W-10-10)
3
11
FUSE
5
40A
(8W-10-10)
4
A2
12
PK/BK
F6
C106
A2
12
PK/BK
TO
IGNITION
SWITCH
TO
ENGINE
STARTER
MOTOR
RELAY
(IN PDC)
F5
A1
14
RD
TO
IGNITION
SWITCH
F7
A6
12
RD/BK
TO
FUSE
BLOCK
F1
C106
F30
12
RD/PK
TO
S332
12
FUSE
6
30A
(8W-10-11)
5
22
FUSE
9
20A
(8W-10-13)
15
16
FUSE
10
30A
(8W-10-13)
23
17
FUSE
11
40A
(8W-10-13)
24
A
TO
FUSE
13 (PDC)
(8W-10-7)
A14
14
RD/WT
TO
AUTOMATIC
SHUT
DOWN
RELAY
(IN PDC)
3
C103
A14
14
RD/WT
TO
POWERTRAIN
CONTROL
MODULE
D11
C108
L9
16
BK/WT
TO
TURN
SIGNAL/
HAZARD
SWITCH
4
C170
A3
14
RD/WT
TO
HEADLAMP
SWITCH
A111
12
RD/LB
TO
C106


POWER DISTRIBUTION CENTER
(8W-10-2)
FROM FUSE 11 (PDC) (8W-10-6)
A
19
FUSE 13 30A (8W-10-17)
26
20
FUSE 14 40A (8W-10-17)
27
21
FUSE 15 40A (8W-10-14)
28
A23
FUSE 16 10A (8W-10-16)
A24
A21
FUSE 17 20A (8W-10-16)
A22
A20 14 RD/DB
TO ABS SYSTEM RELAY (IN PDC)
A10 12 RD/DG
TO ABS PUMP MOTOR RELAY (IN PDC)
A4 12 BK/PK
TO REAR WINDOW DEFOGGER RELAY (IN PDC)
A17 20 RD/GY
TO A/C COMPRESSOR CLUTCH RELAY (IN PDC)
F31 18 VT
TO HORN RELAY (IN PDC)
F31 18 VT
TO HORN RELAY (IN PDC)
FROM S146
B48 20 RD/YL
FROM S101
A142 14 DG/PK
A18
FUSE 19 20A (8W-10-14)
A17
A16
FUSE 20 10A (8W-10-15)
A15
A6
FUSE 25 20A (8W-10-16)
A5
A14
FUSE 21 10A (8W-10-17)
A13
A1
FUSE 27 10A (8W-10-11)
A2
A61 18 DG/BK
TO FUEL PUMP RELAY (IN PDC)
M1 20 PK/WT
TO C108
F61 18 WT/OR
D6 C108
F61 18 WT/OR
TO FOG LAMP RELAY NO. 1
B47 14 RD/LB
TO ABS PUMP MOTOR RELAY (IN PDC)
B47 14 RD/LB
TO S114
F142 20 OR/DG
LEAK DETECTION
OTHER
F142 20 OR/DG
TO S107
F142 20 OR/DG
TO C103


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
8
FUSE 2 40A
1
9
FUSE 3 30A
(8W-10-9)
2
A2 12 PK/BK
A2 12 PK/BK
A1 14 RD
D10
ENGINE STARTER MOTOR RELAY (IN PDC)
(8W-21-2)
D14
F6
F5
C106
A2 12 PK/BK
A1 14 RD
3
3
T40 12 BR
LHD
RHD
12
C104
6
C104
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-9)
T40 12 BR
4
10
8
A41 14 YL
ENGINE STARTER MOTOR
(8W-21-2)
A22 12 BK/OR
S331
5
20
FUSE BLOCK
(8W-11-2)
FUSE 6 20A (8W-11-6)
FUSE 8 10A (8W-11-7)
A41 14 YL
FUSE 5 10A (8W-11-6)
FUSE 7 10A (8W-11-7)
FUSE 20 20A (A/T) (8W-11-9)
25
26
27
28
40
A/T
M/T
2
NOT USED
CLUTCH PEDAL POSITION SWITCH CONNECTOR
2
CLUTCH PEDAL POSITION SWITCH
(8W-21-2)



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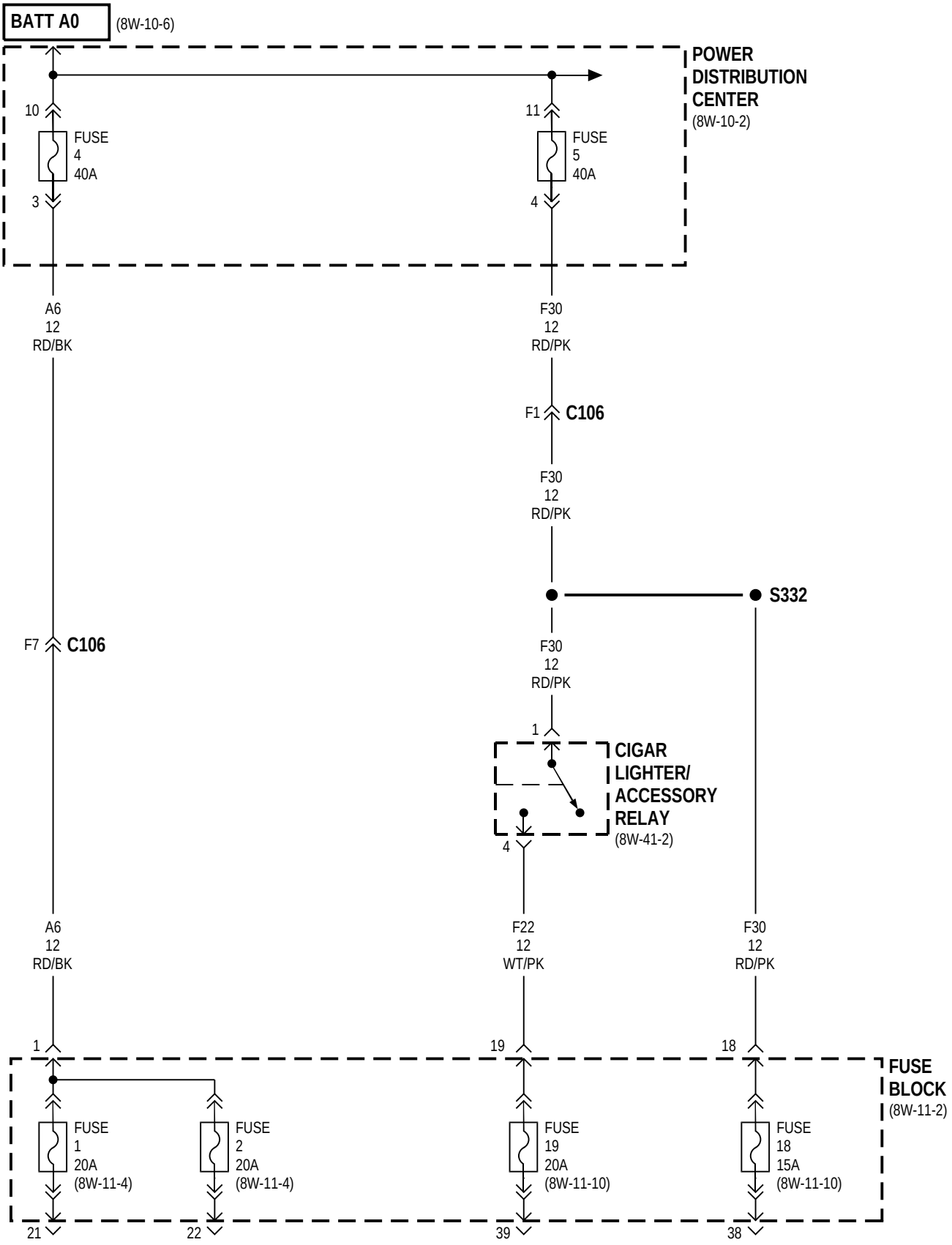
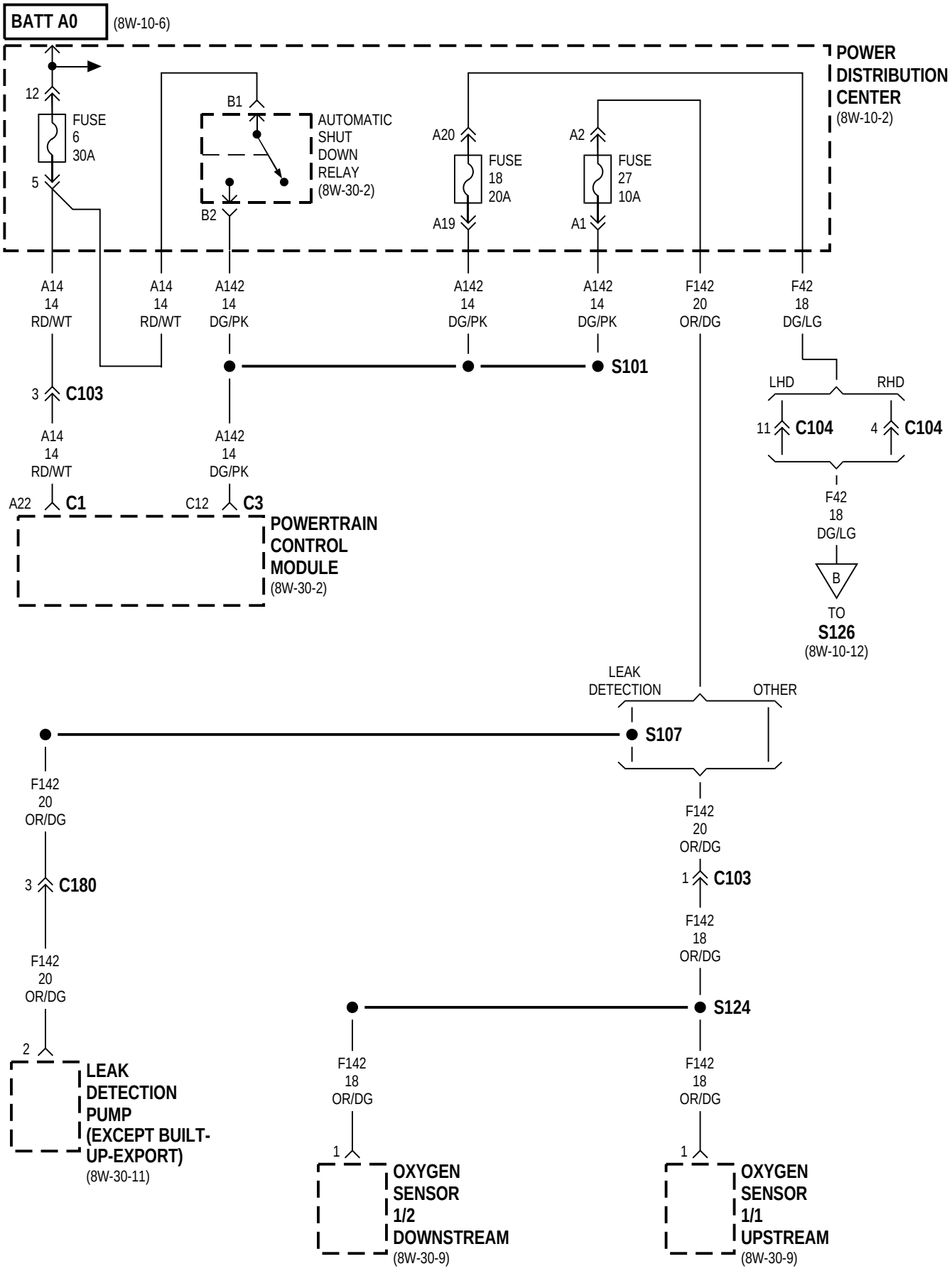
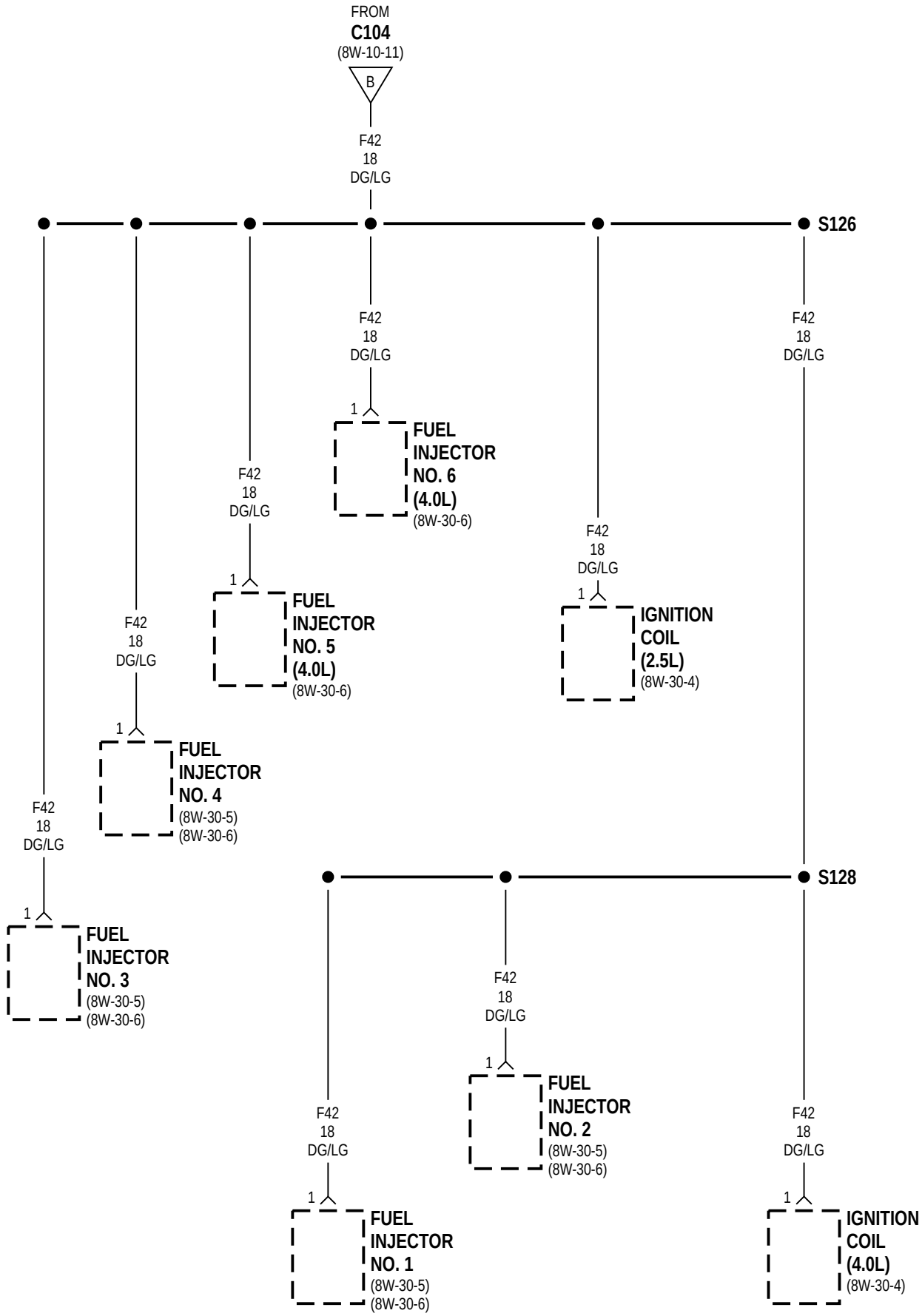
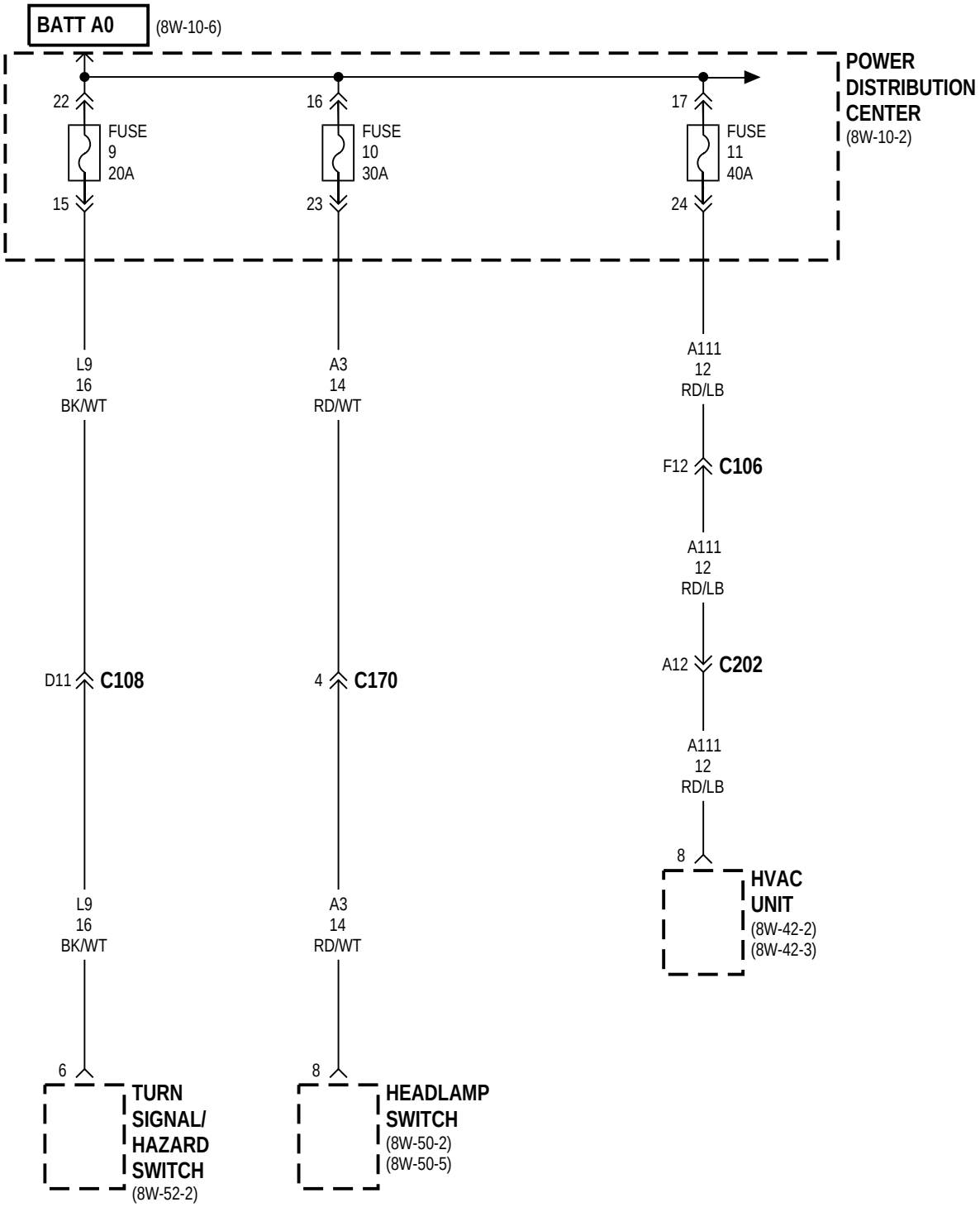
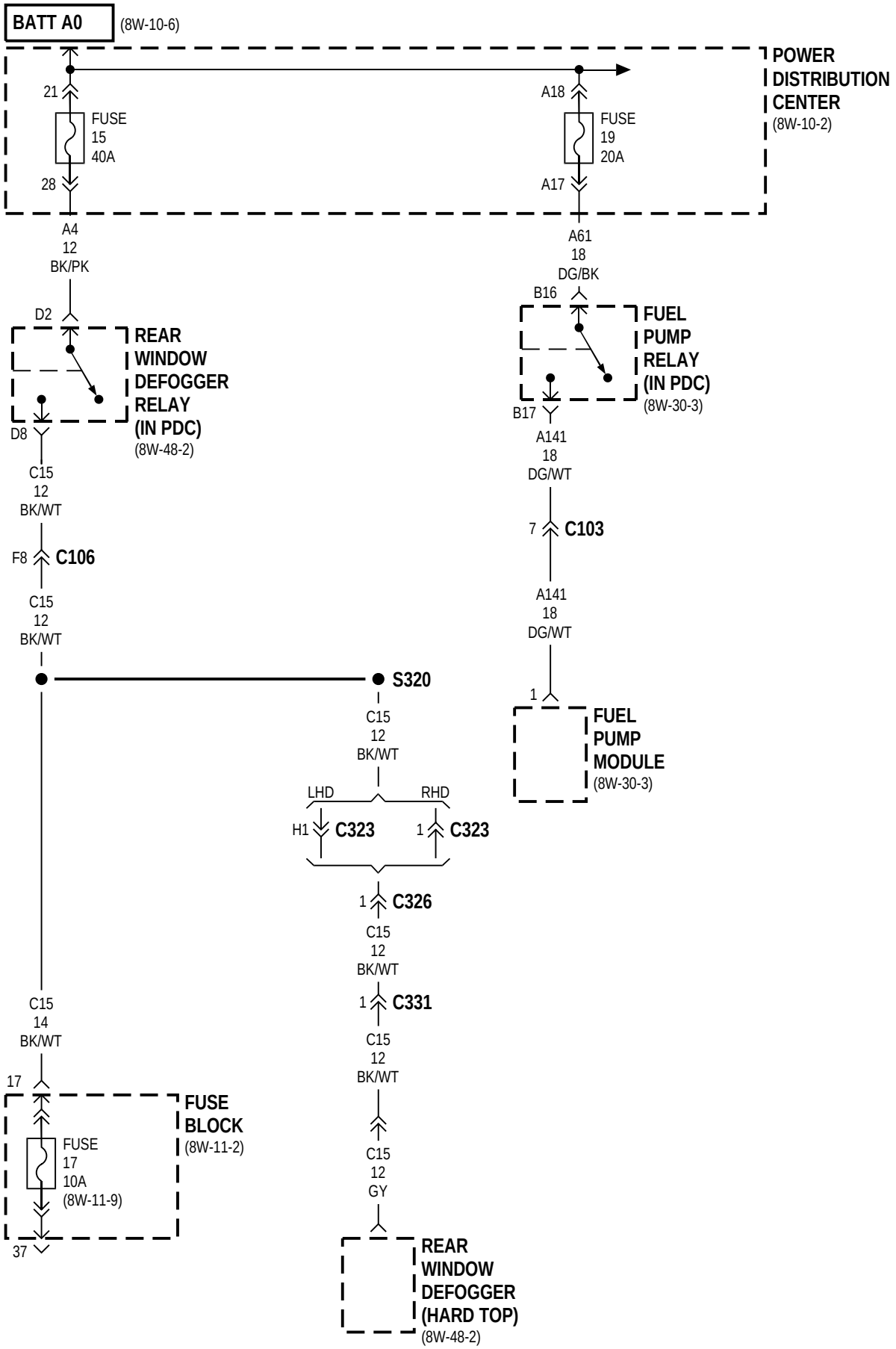
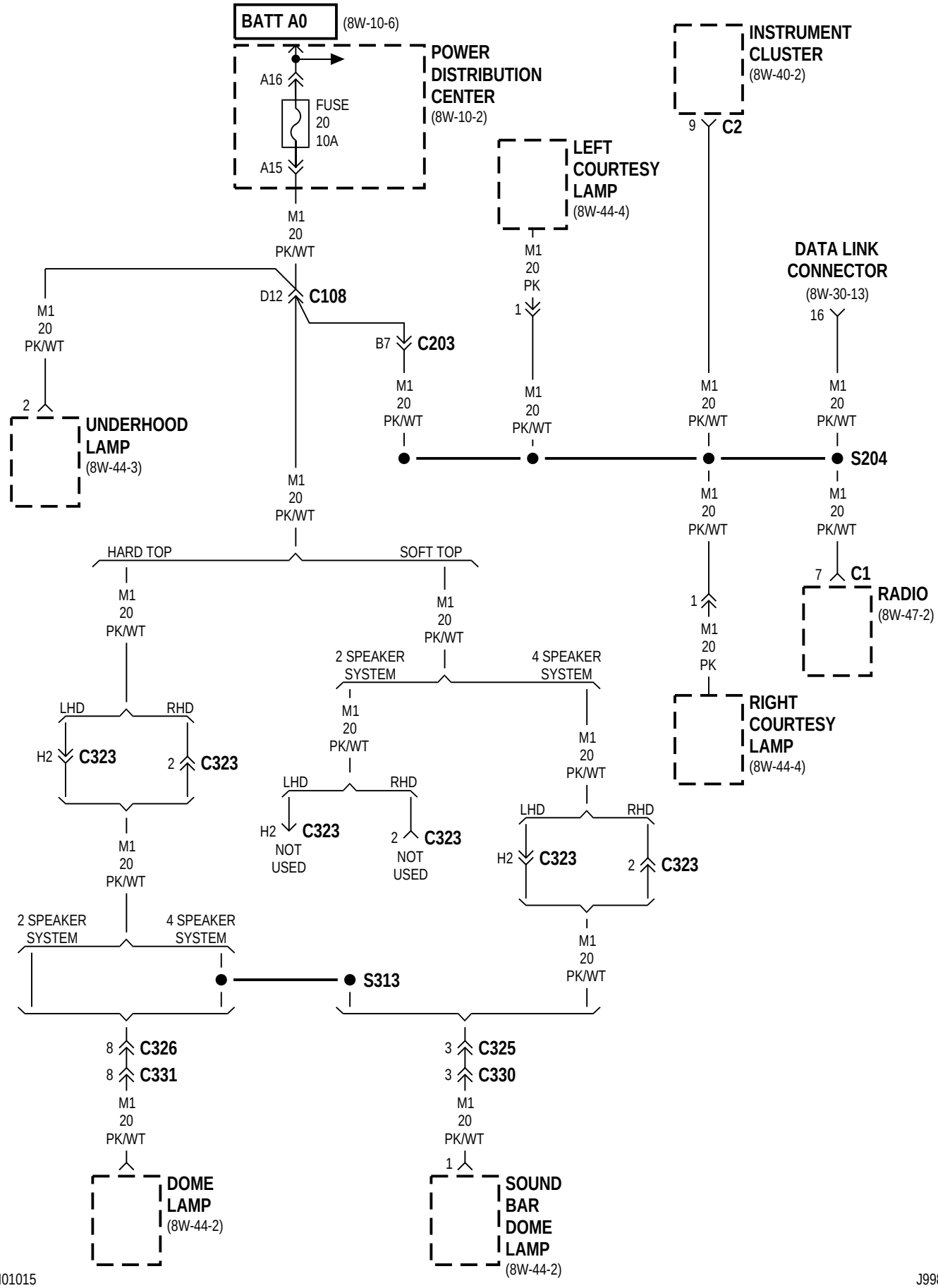

BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
10
FUSE 4 40A
3
11
FUSE 5 40A
4
A6 12 RD/BK
F30 12 RD/PK
F1 C106
F30 12 RD/PK
S332
F7 C106
F30 12 RD/PK
1
CIGAR LIGHTER/ ACCESSORY RELAY
(8W-41-2)
4
A6 12 RD/BK
F22 12 WT/PK
F30 12 RD/PK
1
19
18
FUSE BLOCK
(8W-11-2)
FUSE 1 20A (8W-11-4)
FUSE 2 20A (8W-11-4)
FUSE 19 20A (8W-11-10)
FUSE 18 15A (8W-11-10)
21
22
39
38


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
12
FUSE 6 30A
5
B1
B2
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
A20
FUSE 18 20A
A19
A2
FUSE 27 10A
A1
A14 14 RD/WT
A14 14 RD/WT
A142 14 DG/PK
A142 14 DG/PK
A142 14 DG/PK
F142 20 OR/DG
F42 18 DG/LG
S101
3 C103
A14 14 RD/WT
A22 C1
A142 14 DG/PK
C12 C3
POWERTRAIN CONTROL MODULE
(8W-30-2)
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
B
TO S126
(8W-10-12)
LEAK DETECTION
OTHER
S107
F142 20 OR/DG
3 C180
F142 20 OR/DG
2
LEAK DETECTION PUMP (EXCEPT BUILT-UP-EXPORT)
(8W-30-11)
F142 20 OR/DG
1 C103
F142 18 OR/DG
S124
F142 18 OR/DG
1
OXYGEN SENSOR 1/2 DOWNSTREAM
(8W-30-9)
F142 18 OR/DG
1
OXYGEN SENSOR 1/1 UPSTREAM
(8W-30-9)


FROM
C104
(8W-10-11)
B
F42
18
DG/LG
S126
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 6
(4.0L)
(8W-30-6)
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 5
(4.0L)
(8W-30-6)
F42
18
DG/LG
1
IGNITION
COIL
(2.5L)
(8W-30-4)
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 4
(8W-30-5)
(8W-30-6)
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 3
(8W-30-5)
(8W-30-6)
S128
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 2
(8W-30-5)
(8W-30-6)
F42
18
DG/LG
1
FUEL
INJECTOR
NO. 1
(8W-30-5)
(8W-30-6)
F42
18
DG/LG
1
IGNITION
COIL
(4.0L)
(8W-30-4)


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
22
FUSE 9 20A
15
16
FUSE 10 30A
23
17
FUSE 11 40A
24
L9 16 BK/WT
A3 14 RD/WT
A111 12 RD/LB
F12 C106
A111 12 RD/LB
A12 C202
A111 12 RD/LB
8
HVAC UNIT
(8W-42-2)
(8W-42-3)
D11 C108
4 C170
L9 16 BK/WT
A3 14 RD/WT
6
TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
8
HEADLAMP SWITCH
(8W-50-2)
(8W-50-5)


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
21
FUSE 15 40A
28
A18
FUSE 19 20A
A17
A4 12 BK/PK
A61 18 DG/BK
D2
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8W-48-2)
D8
B16
FUEL PUMP RELAY (IN PDC)
(8W-30-3)
B17
A141 18 DG/WT
C15 12 BK/WT
F8 C106
7 C103
A141 18 DG/WT
S320
1
FUEL PUMP MODULE
(8W-30-3)
C15 12 BK/WT
LHD
RHD
H1 C323
1 C323
1 C326
C15 12 BK/WT
1 C331
C15 12 BK/WT
C15 14 BK/WT
C15 12 GY
17
FUSE BLOCK
(8W-11-2)
FUSE 17 10A
(8W-11-9)
37
REAR WINDOW DEFOGGER (HARD TOP)
(8W-48-2)



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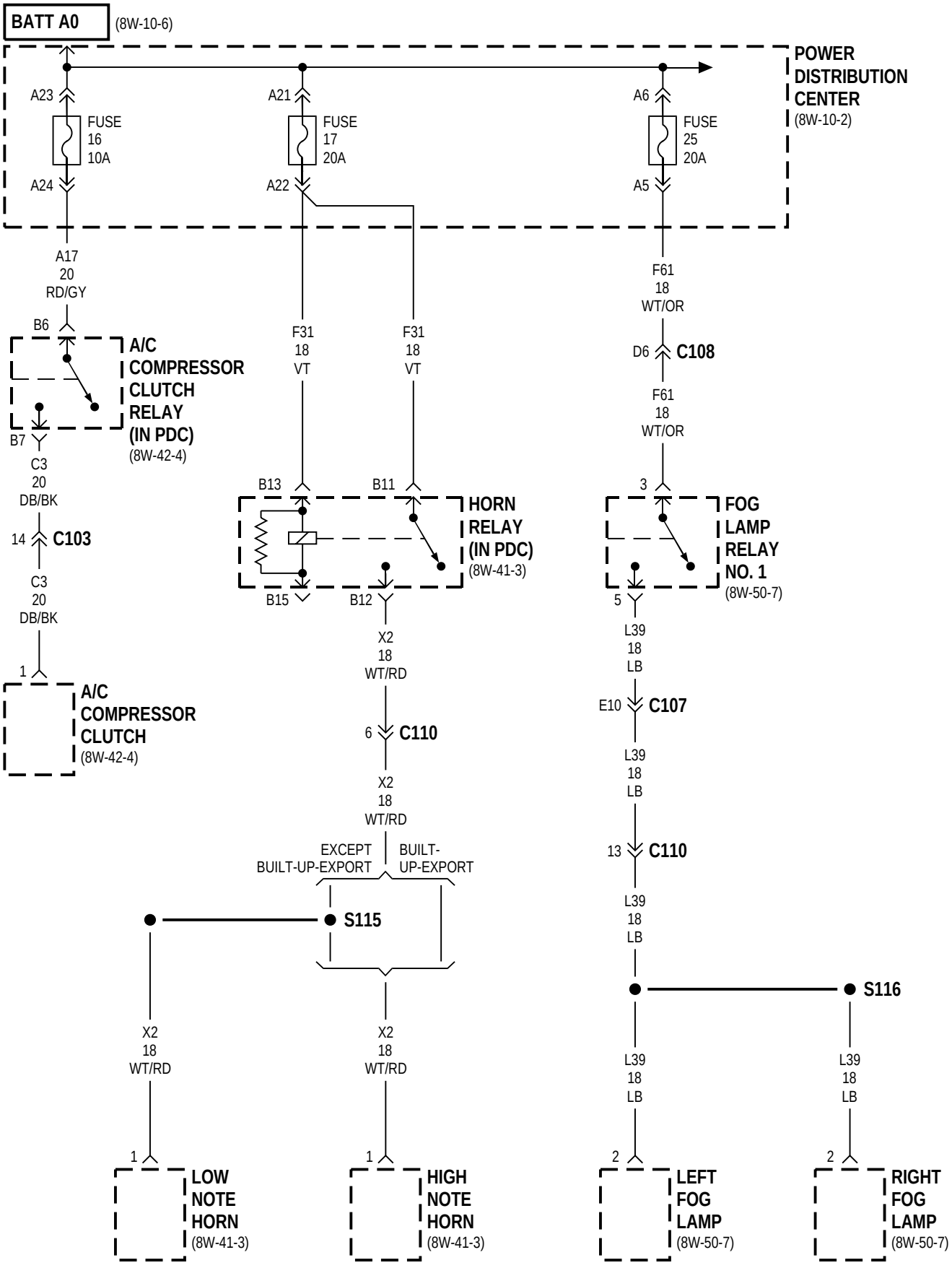
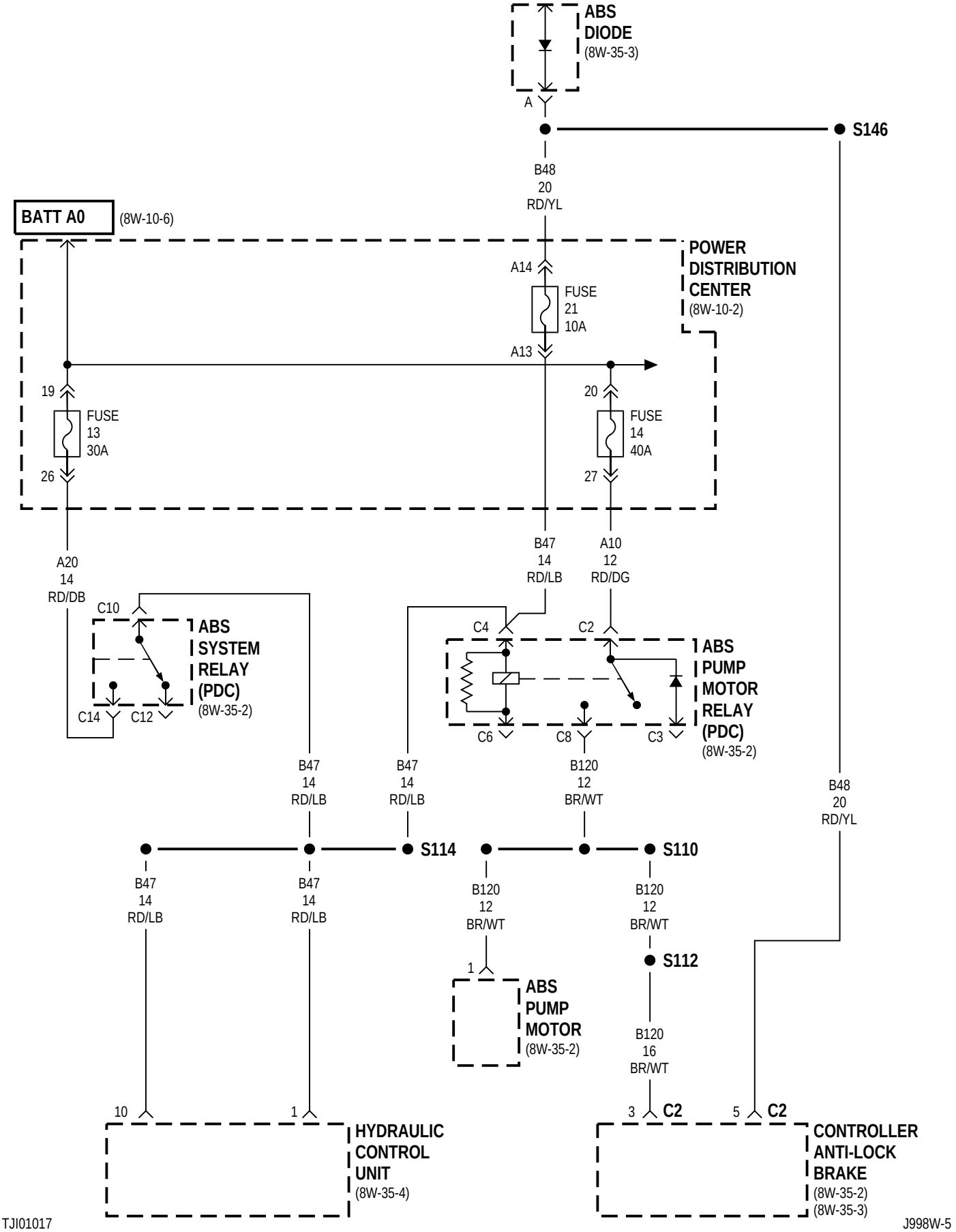
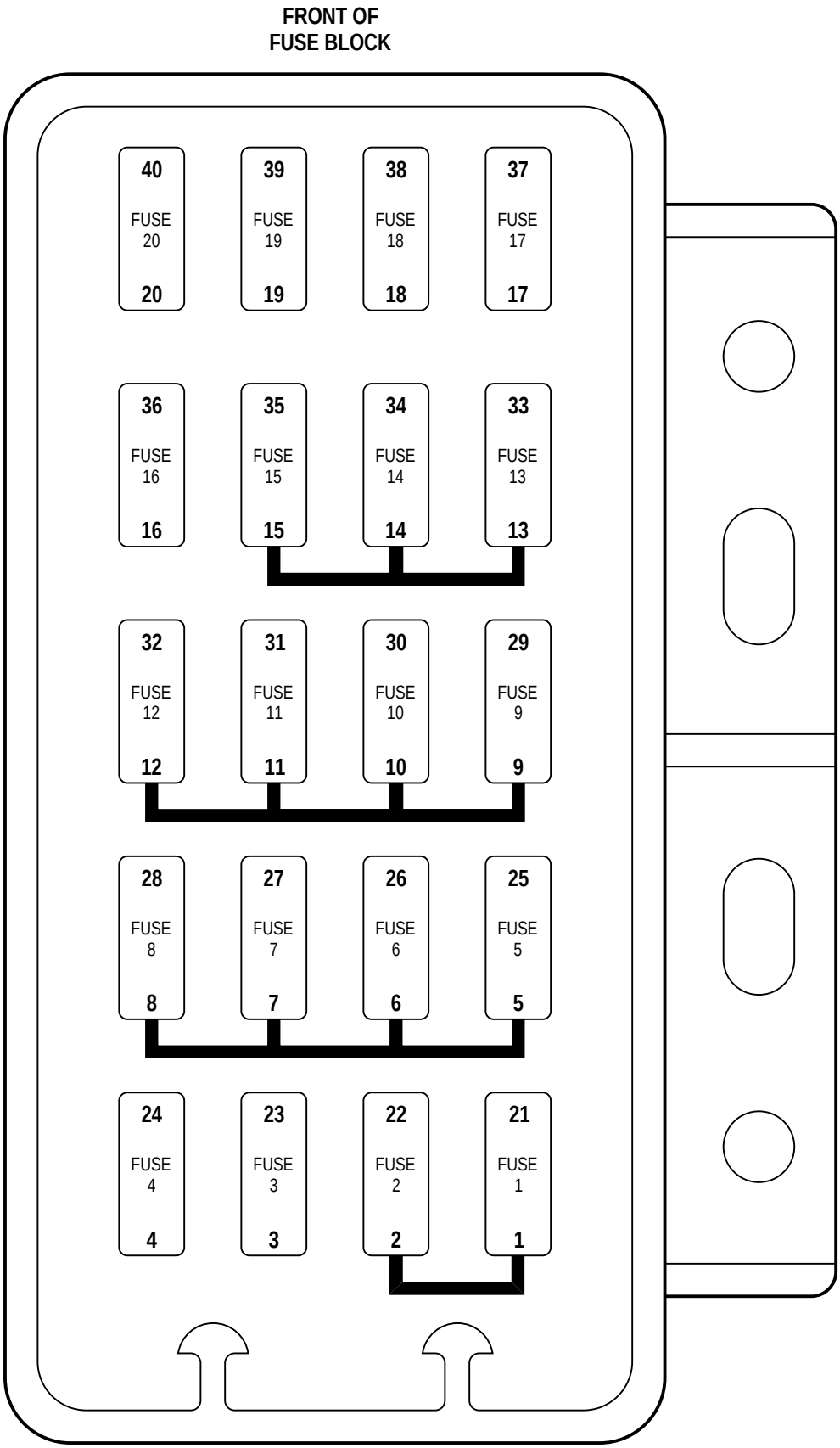

BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A23
FUSE 16 10A
A24
A21
FUSE 17 20A
A22
A6
FUSE 25 20A
A5
A17
20
RD/GY
B6
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8W-42-4)
B7
C3
20
DB/BK
14
C103
C3
20
DB/BK
1
A/C COMPRESSOR CLUTCH
(8W-42-4)
F31
18
VT
F31
18
VT
B13
B11
HORN RELAY (IN PDC)
(8W-41-3)
B15
B12
X2
18
WT/RD
6
C110
X2
18
WT/RD
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S115
X2
18
WT/RD
1
LOW NOTE HORN
(8W-41-3)
X2
18
WT/RD
1
HIGH NOTE HORN
(8W-41-3)
F61
18
WT/OR
D6
C108
F61
18
WT/OR
3
FOG LAMP RELAY NO. 1
(8W-50-7)
5
L39
18
LB
E10
C107
L39
18
LB
13
C110
L39
18
LB
S116
L39
18
LB
2
LEFT FOG LAMP
(8W-50-7)
L39
18
LB
2
RIGHT FOG LAMP
(8W-50-7)



TJI01017

J998W-5

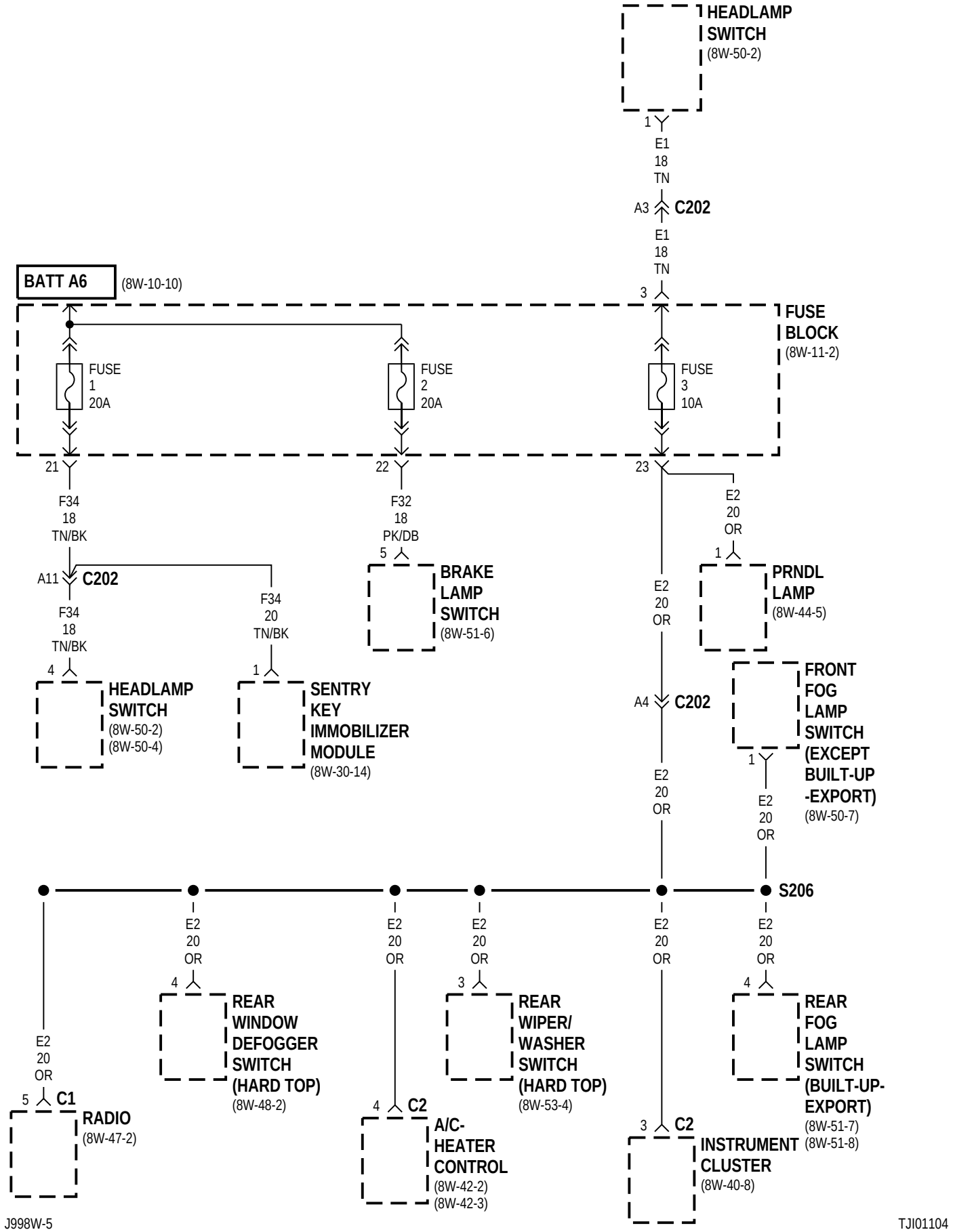
8W-11 FUSE/FUSE BLOCK


FRONT OF
FUSE BLOCK
40
FUSE
20
20
39
FUSE
19
19
38
FUSE
18
18
37
FUSE
17
17
36
FUSE
16
16
35
FUSE
15
15
34
FUSE
14
14
33
FUSE
13
13
32
FUSE
12
12
31
FUSE
11
11
30
FUSE
10
10
29
FUSE
9
9
28
FUSE
8
8
27
FUSE
7
7
26
FUSE
6
6
25
FUSE
5
5
24
FUSE
4
4
23
FUSE
3
3
22
FUSE
2
2
21
FUSE
1
1

FUSES

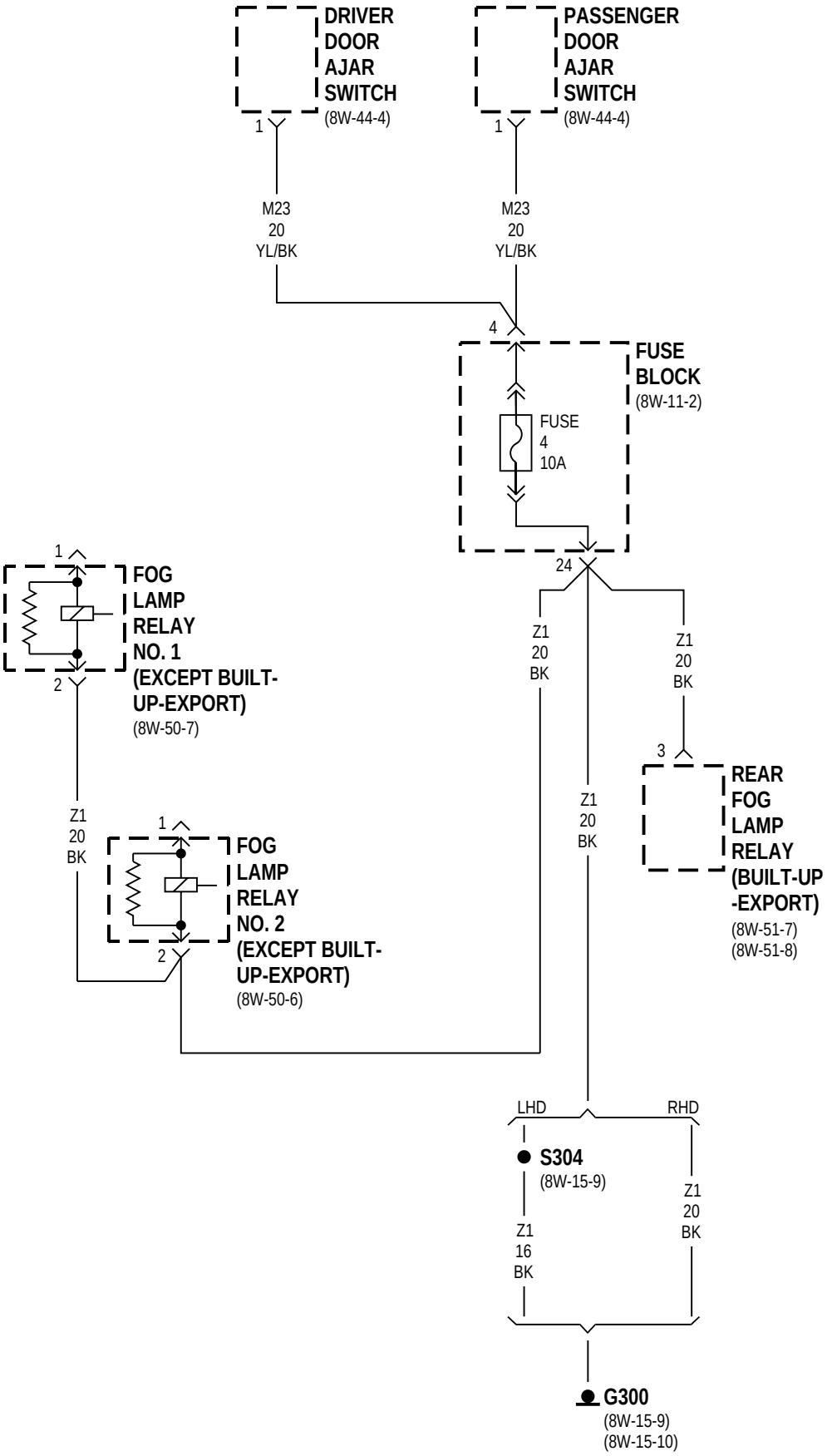
FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	20A	F34 18TN/BK	A6 12RD/BK
2	20A	F32 18PK/DB	
3	10A	E2 20OR	E1 18TN
		E2 20OR	
4	10A	Z1 20BK	M23 20YL/BK
		Z1 20BK ● ■	M23 20YL/BK
5	10A	F23 18DB/YL	A22 12BK/OR
6	20A	V23 18BR/PK	
7	10A	F20 20VT/WT	
8	10A	F24 20RD/DG	
9	10A	F14 18LG/YL	A21 14DB
		F14 18LG/YL	
10	10A	G5 20DB/WT	
		G5 20DB/WT	
11	10A	F12 20RD/LG	
12	10A	F15 20DB	
		F15 20DB	
13	10A	L5 20BK/GY	A31 14BK/DG
14	20A	V6 18PK/BK	
15	10A	X12 20PK	
16 ●	10A	L22 20LG/DG	L2 16LG
17	10A	F81 20DB/RD	C15 14BK/WT
18	15A	A18 16RD/BK	F30 12RD/PK
19	20A	F38 16LB	F22 12WT/PK
		F38 16LB	
20 ▲	20A	T141 14YL/RD	A41 14YL

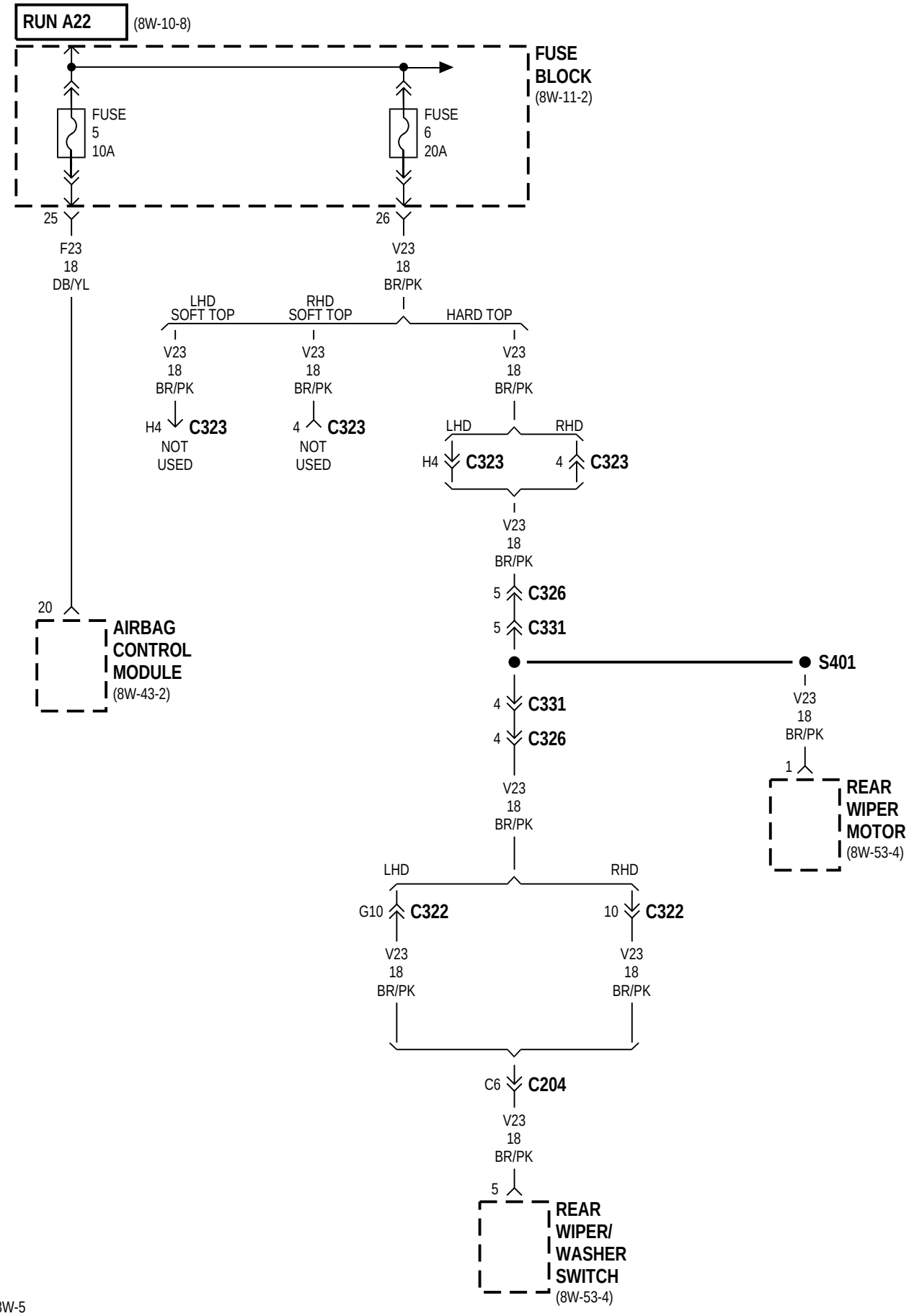
■ FRONT FOG LAMPS
● REAR FOG LAMPS
▲ A/T

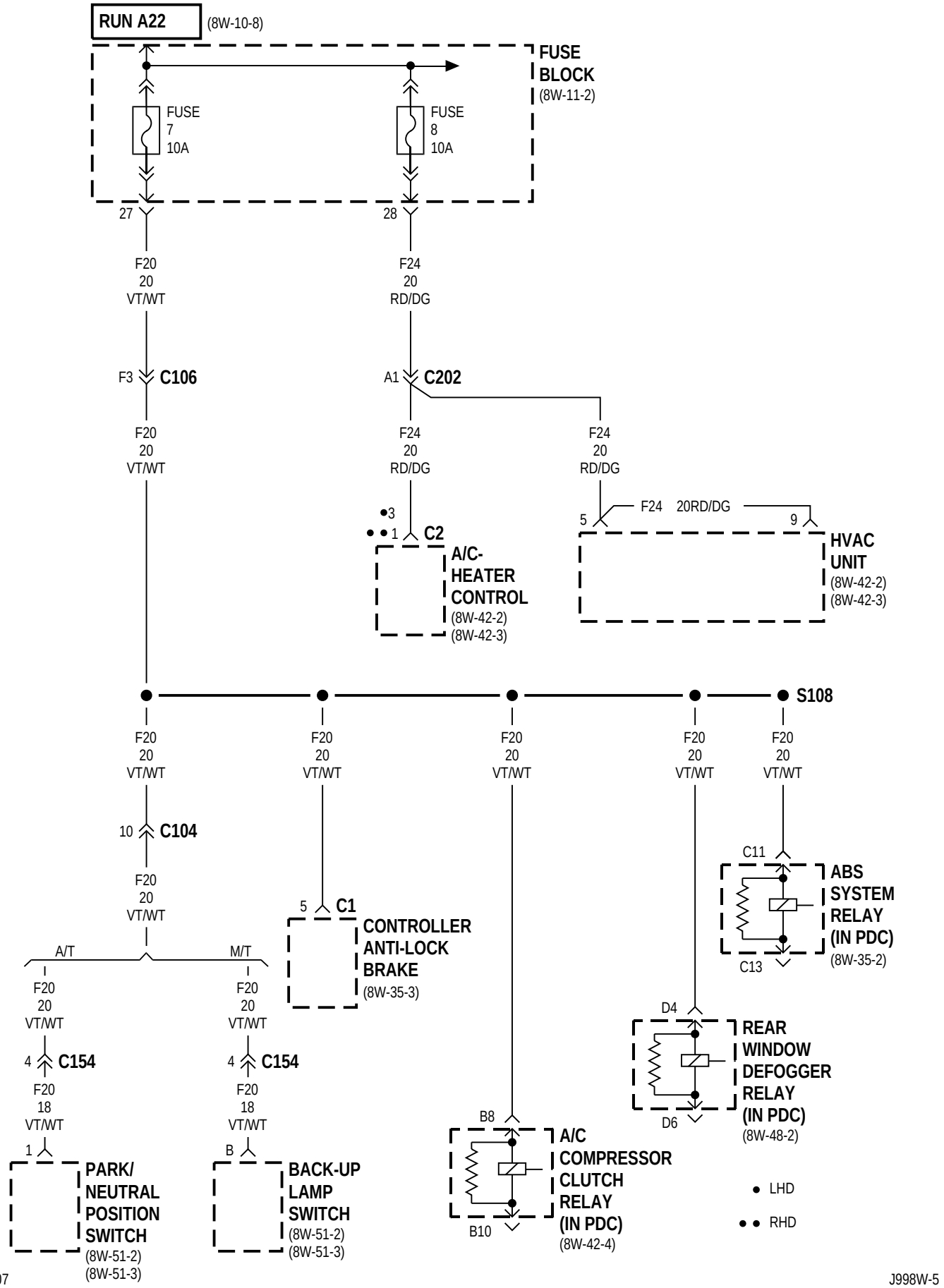


J998W-5

TJI01104

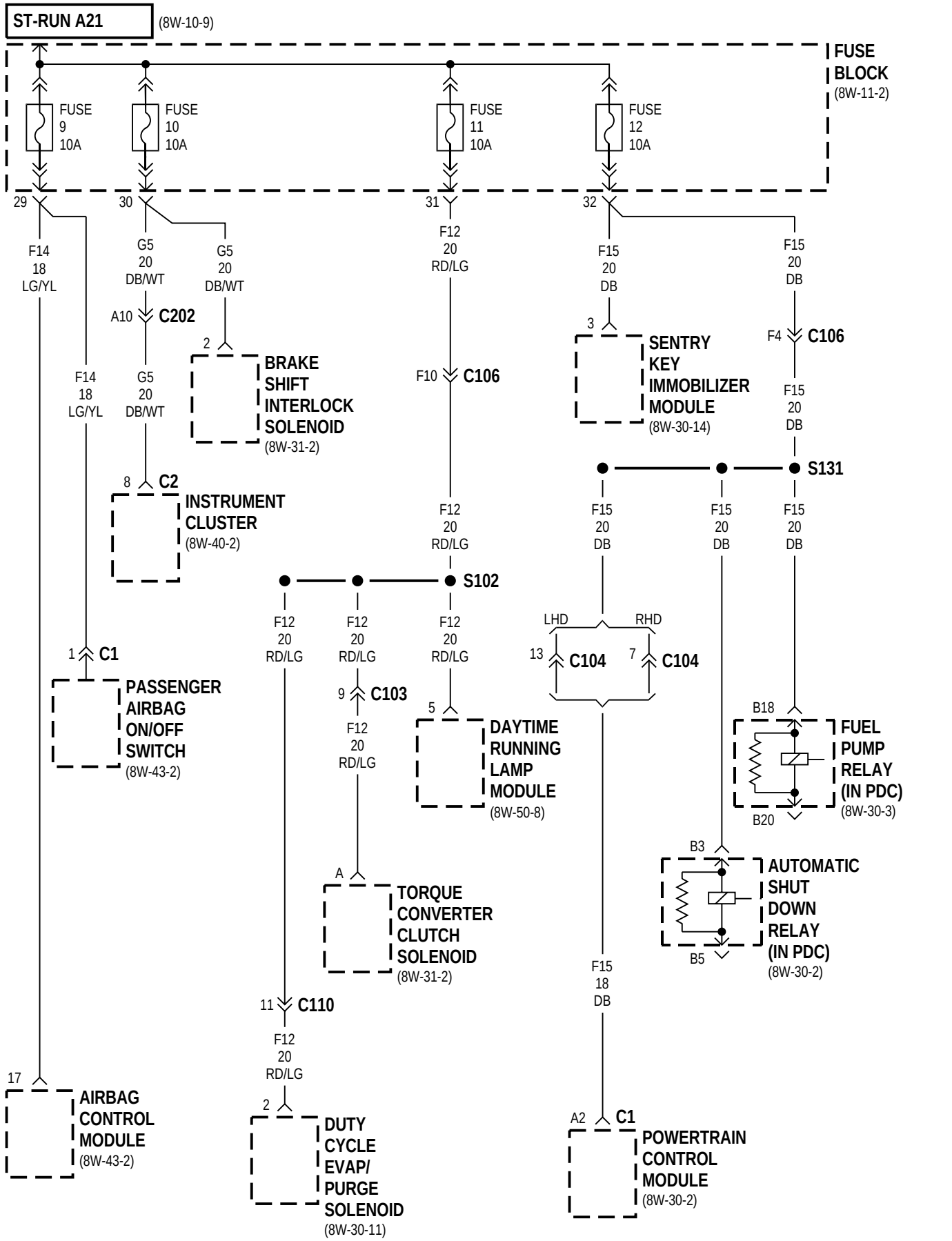

DRIVER DOOR AJAR SWITCH
(8W-44-4)
1
M23
20
YL/BK
PASSENGER DOOR AJAR SWITCH
(8W-44-4)
1
M23
20
YL/BK
4
FUSE BLOCK
(8W-11-2)
FUSE
4
10A
24
1
FOG LAMP RELAY NO. 1 (EXCEPT BUILT-UP-EXPORT)
(8W-50-7)
2
Z1
20
BK
Z1
20
BK
Z1
20
BK
3
REAR FOG LAMP RELAY (BUILT-UP -EXPORT)
(8W-51-7)
(8W-51-8)
1
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP-EXPORT)
(8W-50-6)
2
LHD
RHD
S304
(8W-15-9)
Z1
16
BK
Z1
20
BK
G300
(8W-15-9)
(8W-15-10)

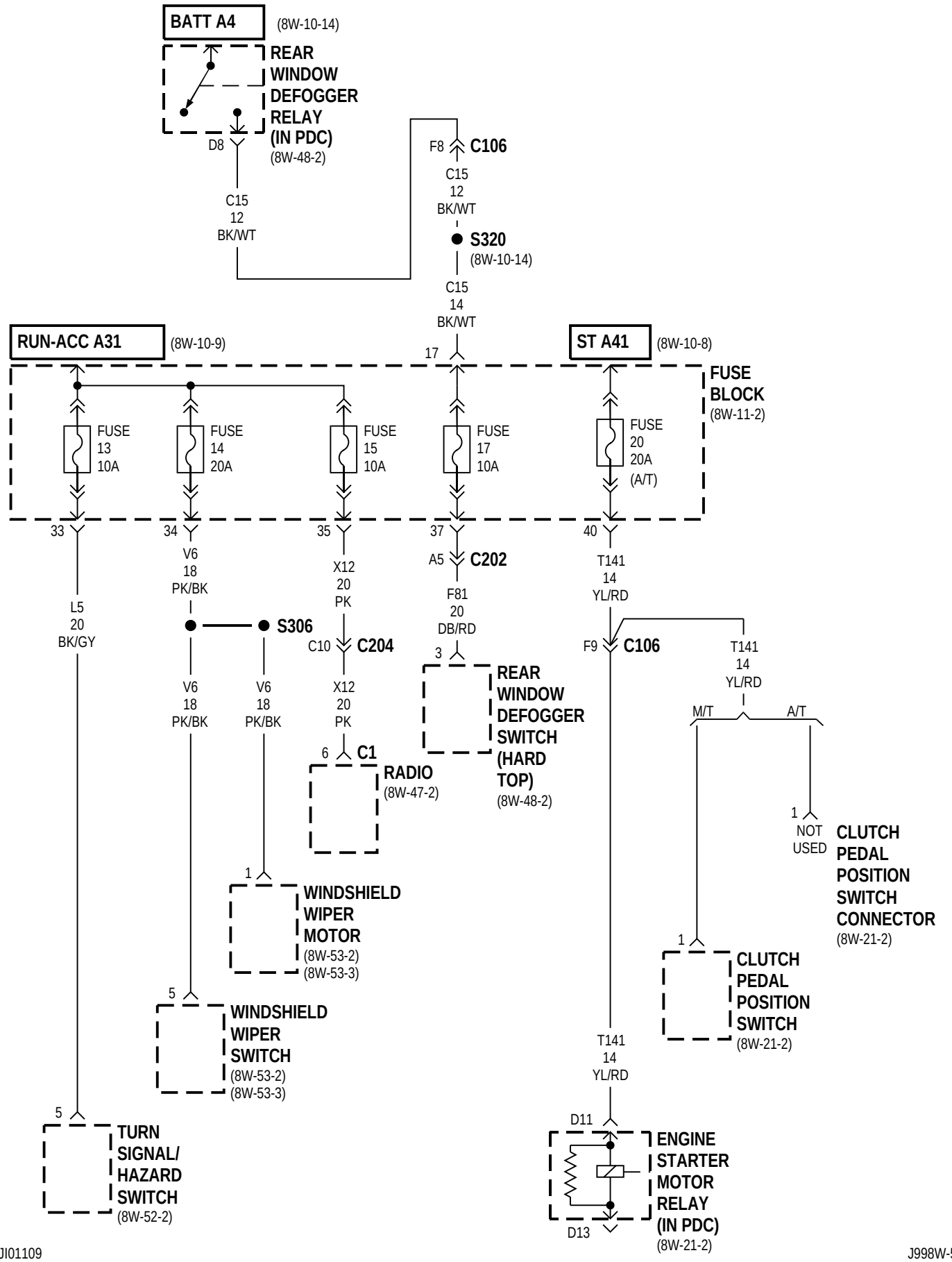

RUN A22
(8W-10-8)
FUSE BLOCK
(8W-11-2)
FUSE 5 10A
FUSE 6 20A
25
26
F23 18 DB/YL
V23 18 BR/PK
LHD SOFT TOP
RHD SOFT TOP
HARD TOP
V23 18 BR/PK
V23 18 BR/PK
V23 18 BR/PK
H4 C323 NOT USED
4 C323 NOT USED
LHD
RHD
H4 C323
4 C323
V23 18 BR/PK
5 C326
5 C331
20
AIRBAG CONTROL MODULE
(8W-43-2)
S401
4 C331
4 C326
V23 18 BR/PK
V23 18 BR/PK
1
REAR WIPER MOTOR
(8W-53-4)
LHD
RHD
G10 C322
10 C322
V23 18 BR/PK
V23 18 BR/PK
C6 C204
V23 18 BR/PK
5
REAR WIPER/ WASHER SWITCH
(8W-53-4)

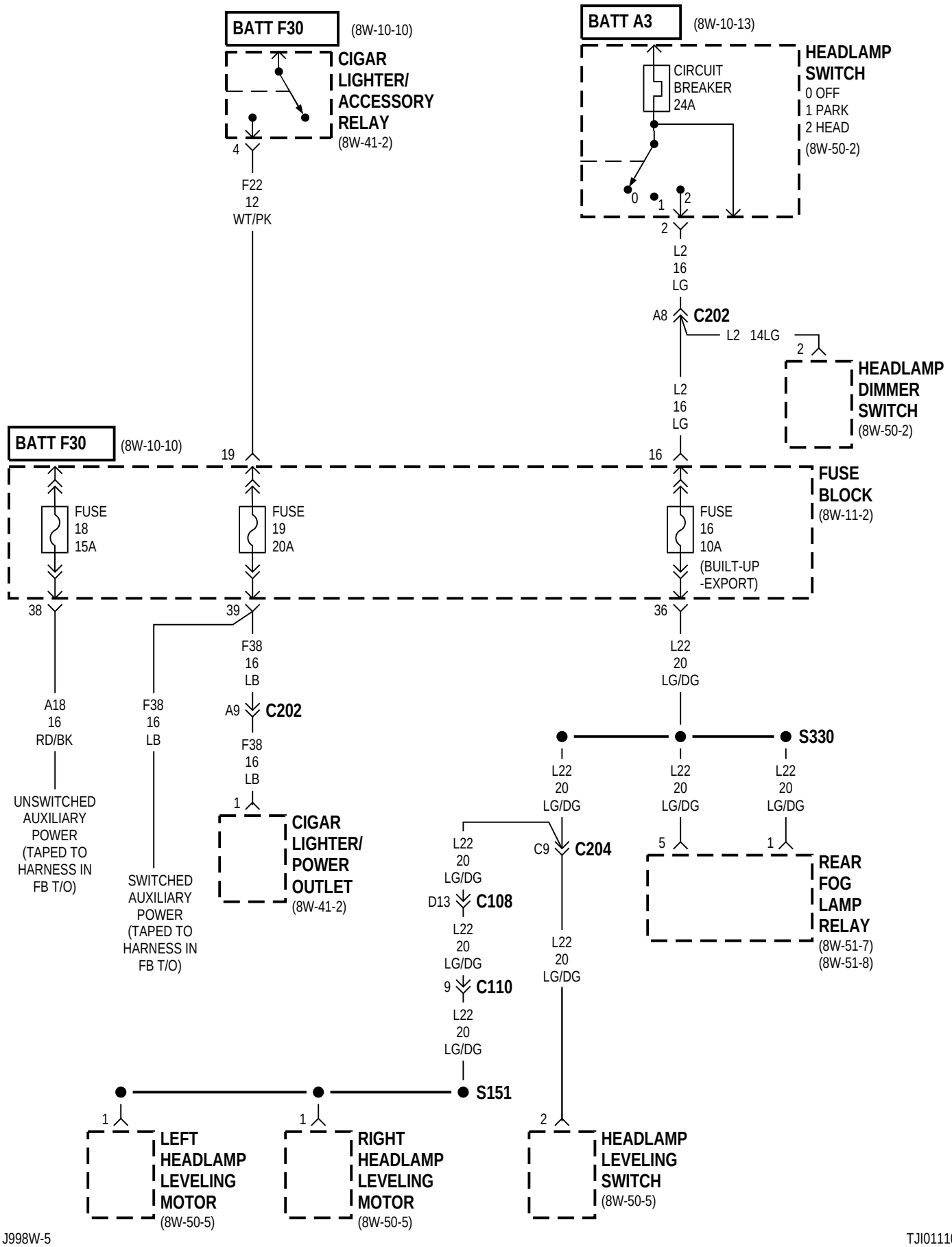


TJI01107

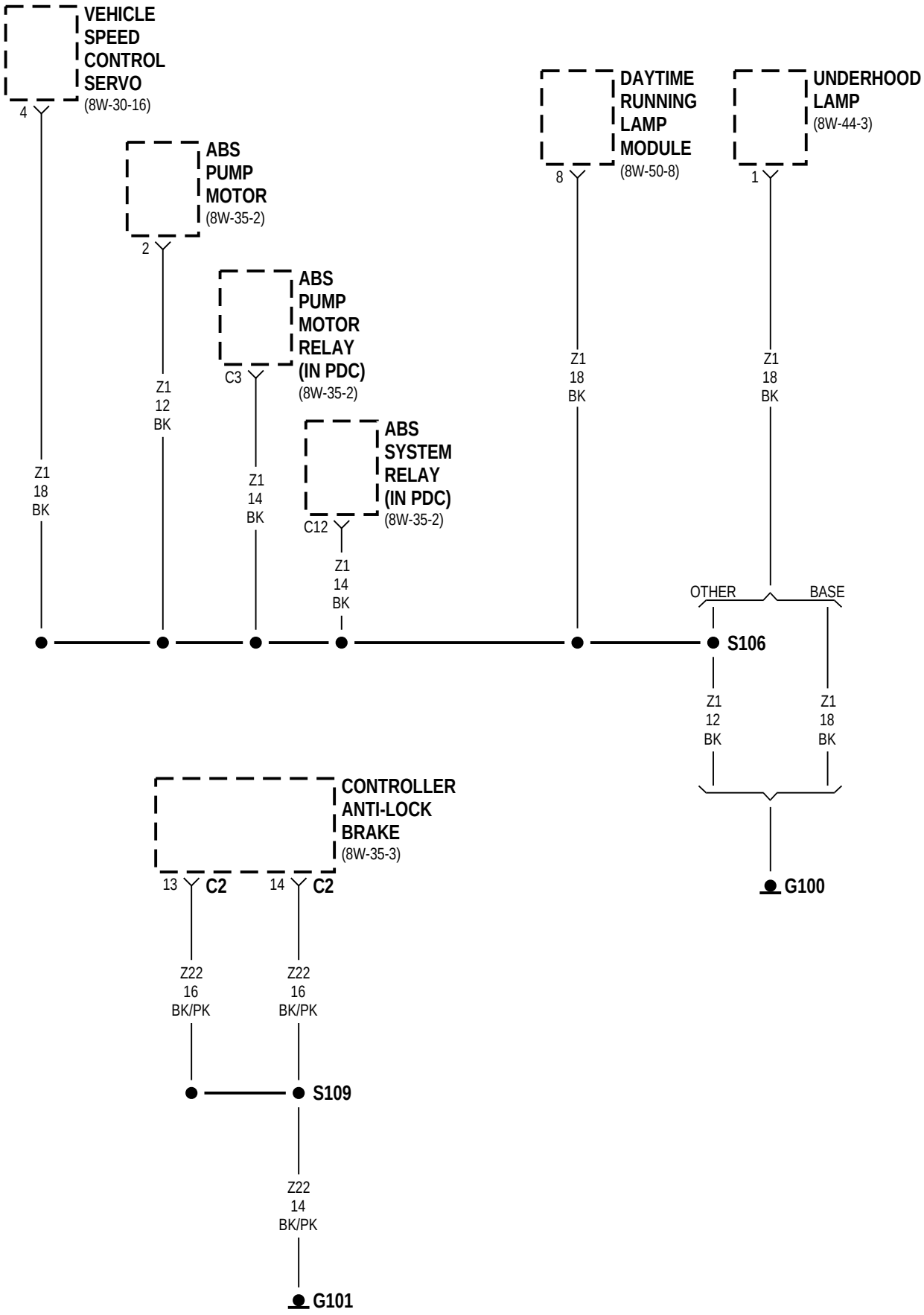
J998W-5

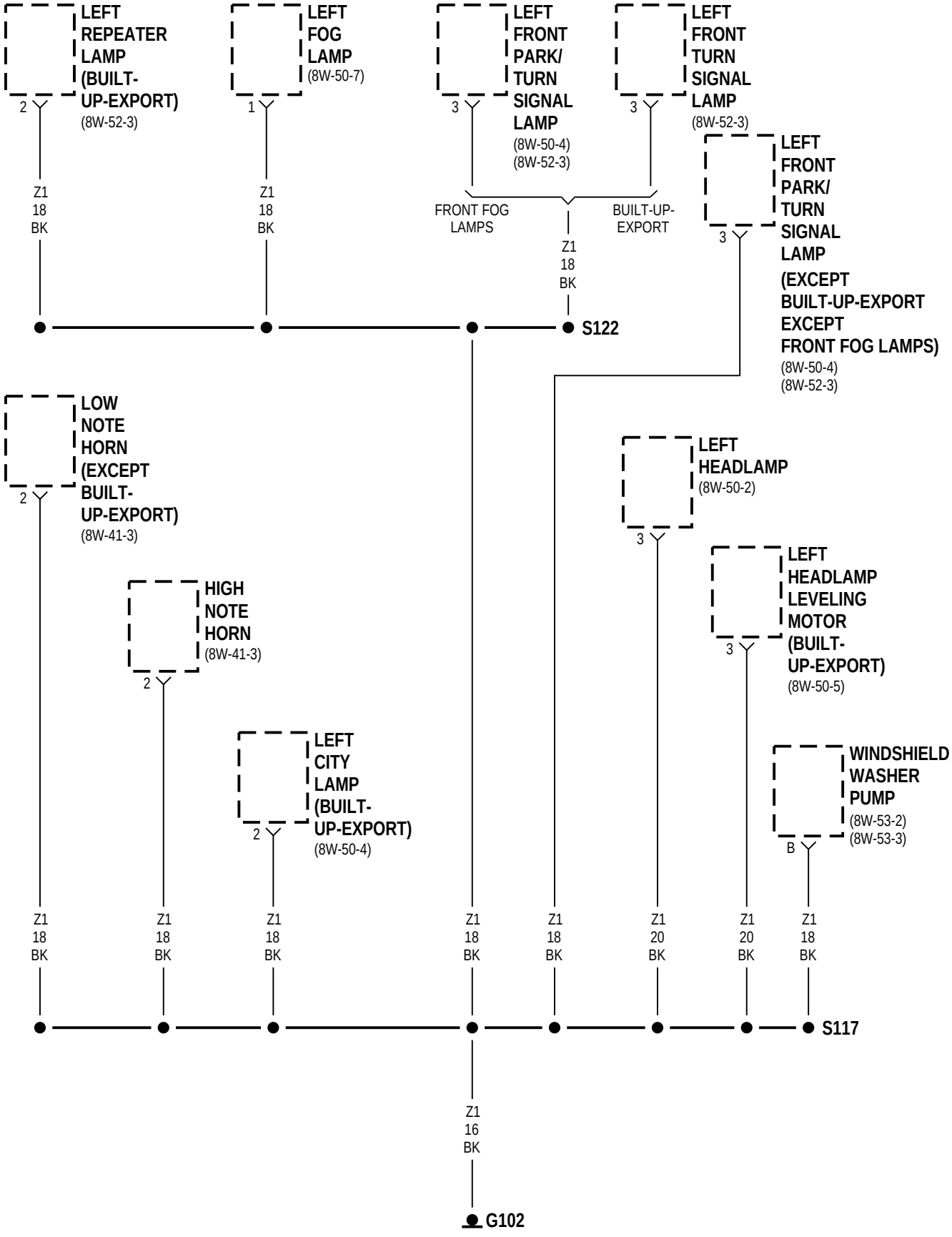

ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 9 10A
FUSE 10 10A
FUSE 11 10A
FUSE 12 10A
29
30
31
32
F14 18 LG/YL
G5 20 DB/WT
G5 20 DB/WT
F12 20 RD/LG
F15 20 DB
F15 20 DB
A10 C202
2
BRAKE SHIFT INTERLOCK SOLENOID
(8W-31-2)
F10 C106
3
SENTRY KEY IMMOBILIZER MODULE
(8W-30-14)
F4 C106
F14 18 LG/YL
G5 20 DB/WT
F15 20 DB
8 C2
INSTRUMENT CLUSTER
(8W-40-2)
S131
F12 20 RD/LG
F15 20 DB
F15 20 DB
F15 20 DB
S102
F12 20 RD/LG
F12 20 RD/LG
F12 20 RD/LG
LHD
RHD
13 C104
7 C104
1 C1
PASSENGER AIRBAG ON/OFF SWITCH
(8W-43-2)
9 C103
F12 20 RD/LG
5
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
B18
FUEL PUMP RELAY (IN PDC)
(8W-30-3)
B20
B3
A
TORQUE CONVERTER CLUTCH SOLENOID
(8W-31-2)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
B5
11 C110
F12 20 RD/LG
F15 18 DB
17
AIRBAG CONTROL MODULE
(8W-43-2)
2
DUTY CYCLE EVAP/ PURGE SOLENOID
(8W-30-11)
A2 C1
POWERTRAIN CONTROL MODULE
(8W-30-2)

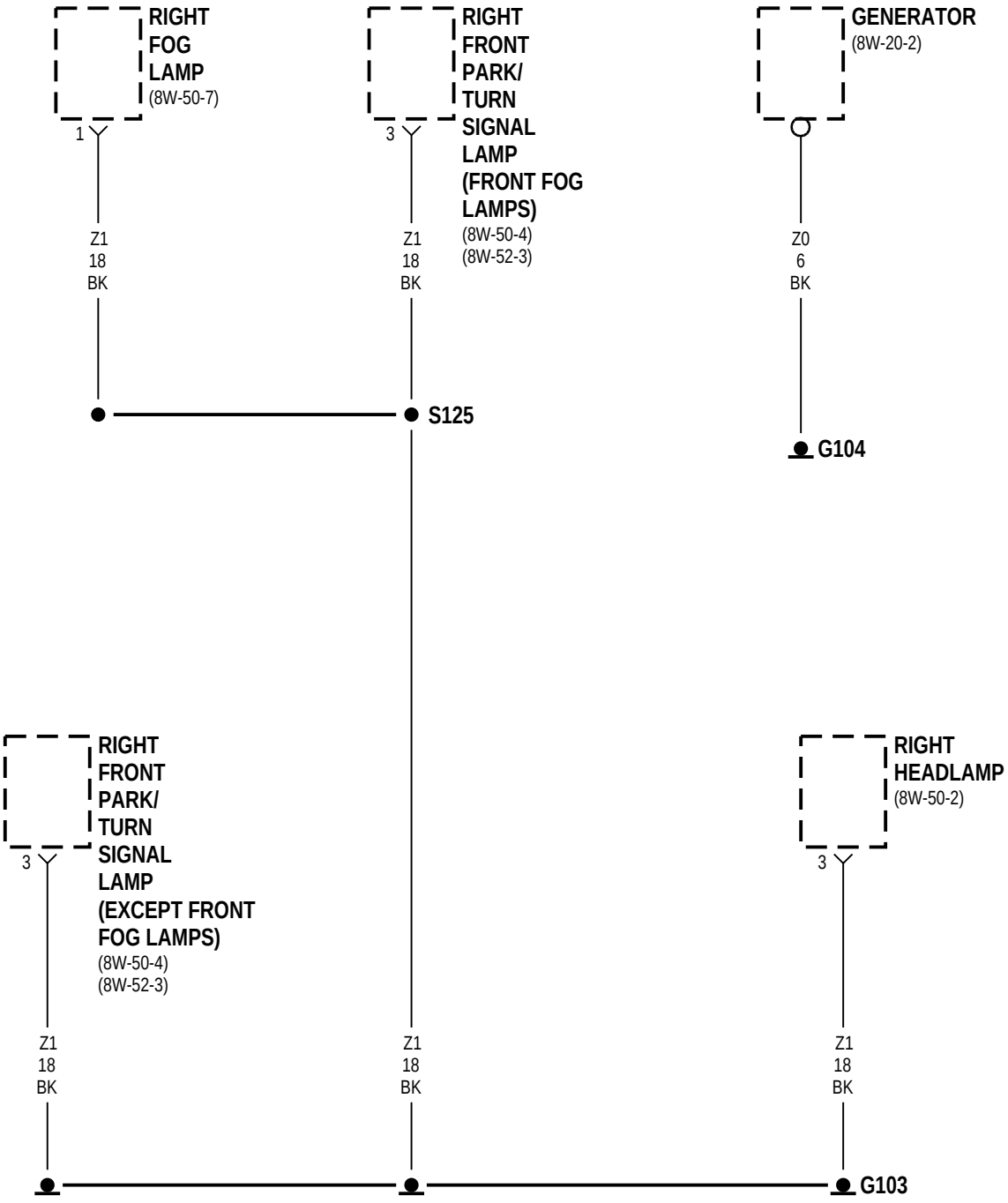

BATT A4
(8W-10-14)
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8W-48-2)
D8
C15 12 BK/WT
F8 C106
C15 12 BK/WT
S320
(8W-10-14)
C15 14 BK/WT
RUN-ACC A31
(8W-10-9)
ST A41
(8W-10-8)
17
FUSE BLOCK
(8W-11-2)
FUSE 13 10A
FUSE 14 20A
FUSE 15 10A
FUSE 17 10A
FUSE 20 20A (A/T)
33
34
35
37
40
L5 20 BK/GY
V6 18 PK/BK
X12 20 PK
A5 C202
F81 20 DB/RD
T141 14 YL/RD
S306
C10 C204
F9 C106
T141 14 YL/RD
M/T
A/T
3
REAR WINDOW DEFOGGER SWITCH (HARD TOP)
(8W-48-2)
6 C1
RADIO
(8W-47-2)
1
NOT USED
CLUTCH PEDAL POSITION SWITCH CONNECTOR
(8W-21-2)
1
WINDSHIELD WIPER MOTOR
(8W-53-2)
(8W-53-3)
1
CLUTCH PEDAL POSITION SWITCH
(8W-21-2)
5
WINDSHIELD WIPER SWITCH
(8W-53-2)
(8W-53-3)
T141 14 YL/RD
5
TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
D11
ENGINE STARTER MOTOR RELAY (IN PDC)
(8W-21-2)
D13

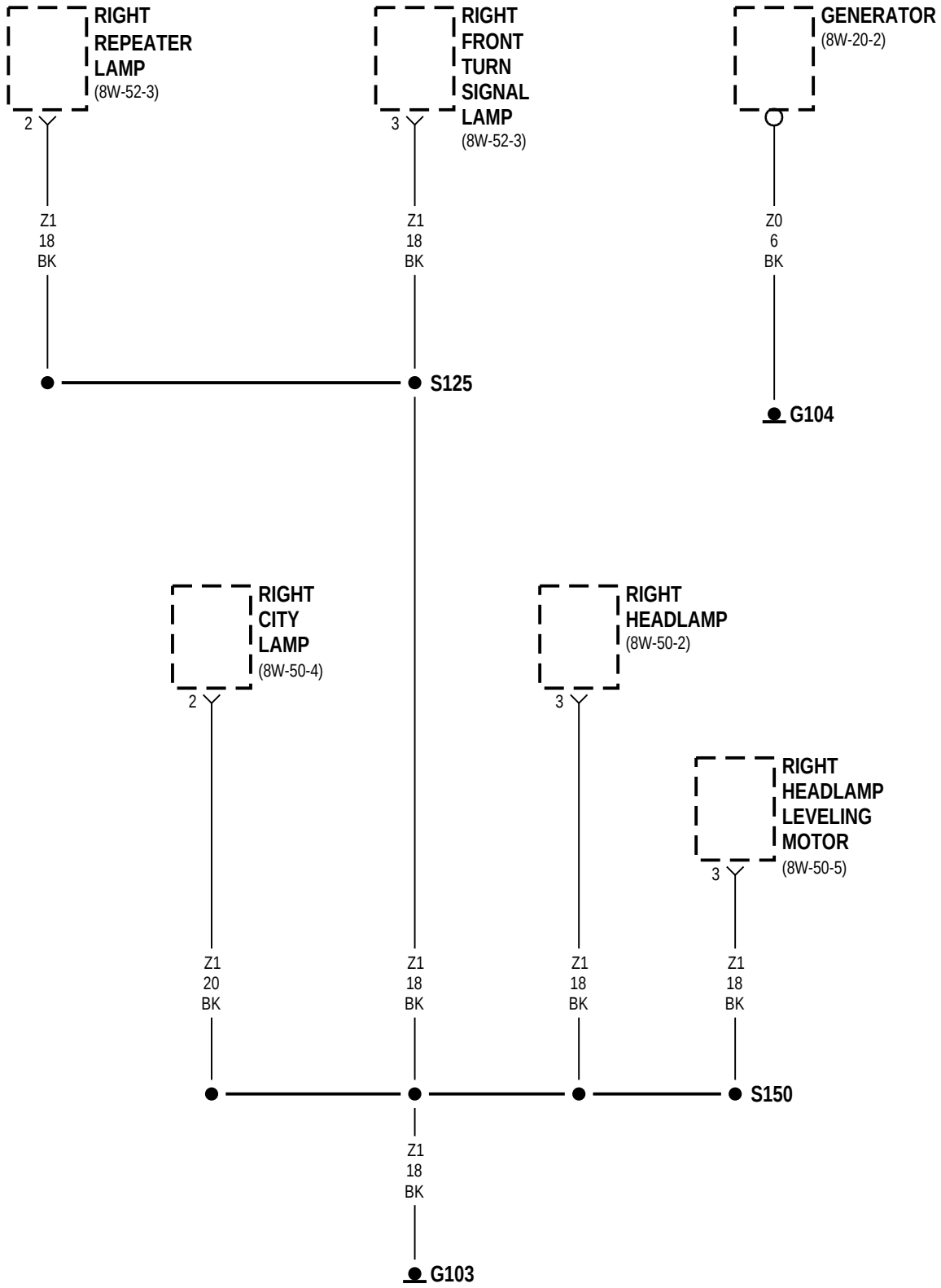

BATT F30
(8W-10-10)
CIGAR LIGHTER/ ACCESSORY RELAY
(8W-41-2)
4
F22
12
WT/PK
BATT A3
(8W-10-13)
CIRCUIT BREAKER 24A
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
(8W-50-2)
0
1
2
2
L2
16
LG
A8
C202
L2 14LG
2
HEADLAMP DIMMER SWITCH
(8W-50-2)
L2
16
LG
16
BATT F30
(8W-10-10)
19
FUSE BLOCK
(8W-11-2)
FUSE 18 15A
FUSE 19 20A
FUSE 16 10A
(BUILT-UP -EXPORT)
38
39
36
A18
16
RD/BK
UNSWITCHED AUXILIARY POWER (TAPED TO HARNESS IN FB T/O)
F38
16
LB
SWITCHED AUXILIARY POWER (TAPED TO HARNESS IN FB T/O)
F38
16
LB
A9
C202
F38
16
LB
1
CIGAR LIGHTER/ POWER OUTLET
(8W-41-2)
L22
20
LG/DG
S330
L22
20
LG/DG
L22
20
LG/DG
L22
20
LG/DG
C9
C204
5
1
REAR FOG LAMP RELAY
(8W-51-7)
(8W-51-8)
L22
20
LG/DG
D13
C108
L22
20
LG/DG
9
C110
L22
20
LG/DG
L22
20
LG/DG
S151
1
1
2
LEFT HEADLAMP LEVELING MOTOR
(8W-50-5)
RIGHT HEADLAMP LEVELING MOTOR
(8W-50-5)
HEADLAMP LEVELING SWITCH
(8W-50-5)

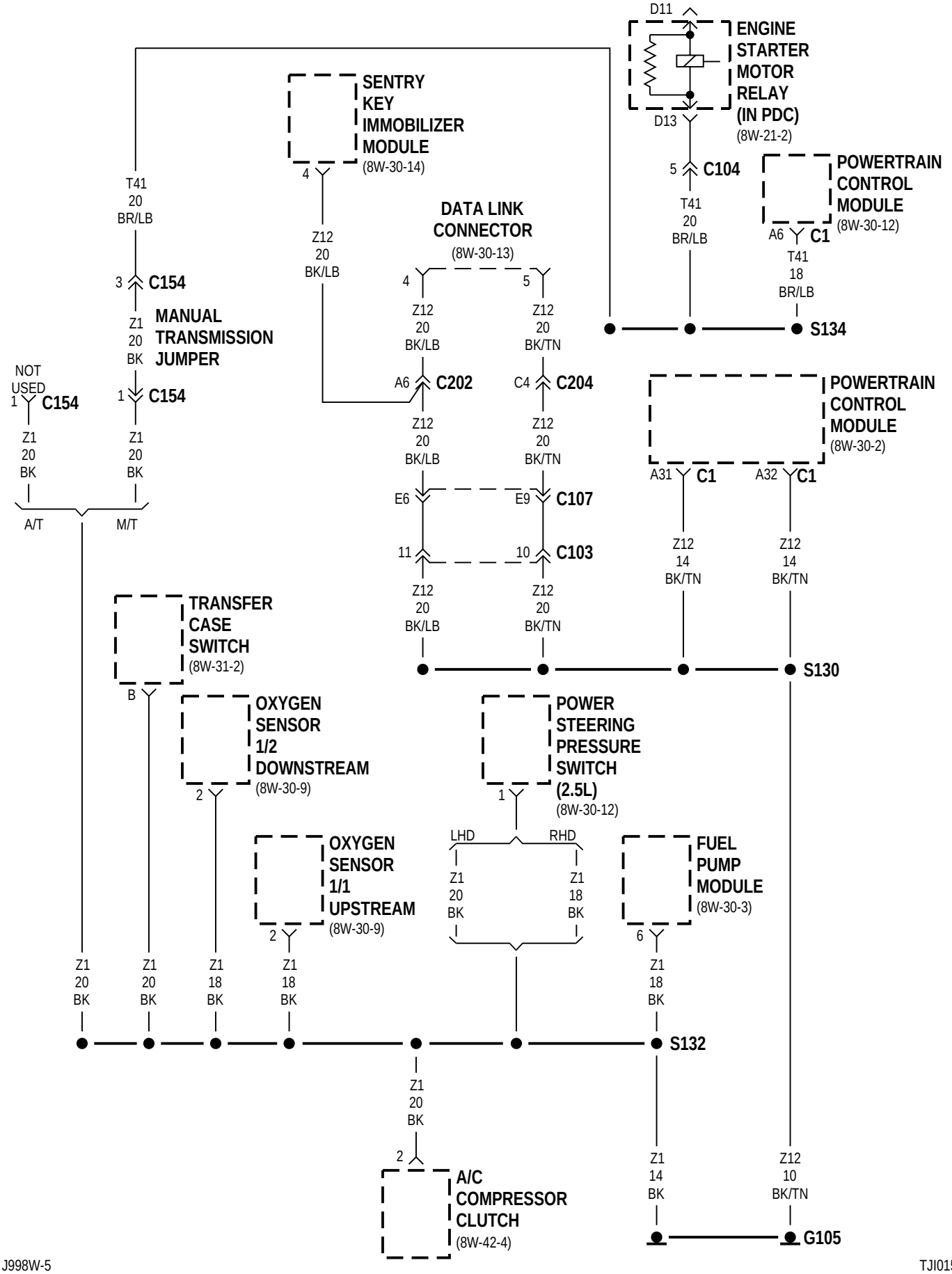
8W-15 GROUND DISTRIBUTION


VEHICLE SPEED CONTROL SERVO
(8W-30-16)
4
ABS PUMP MOTOR
(8W-35-2)
2
ABS PUMP MOTOR RELAY (IN PDC)
(8W-35-2)
C3
ABS SYSTEM RELAY (IN PDC)
(8W-35-2)
C12
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
8
UNDERHOOD LAMP
(8W-44-3)
1
Z1 18 BK
Z1 12 BK
Z1 14 BK
Z1 14 BK
Z1 18 BK
Z1 18 BK
OTHER
BASE
S106
Z1 12 BK
Z1 18 BK
G100
CONTROLLER ANTI-LOCK BRAKE
(8W-35-3)
13 C2
14 C2
Z22 16 BK/PK
Z22 16 BK/PK
S109
Z22 14 BK/PK
G101

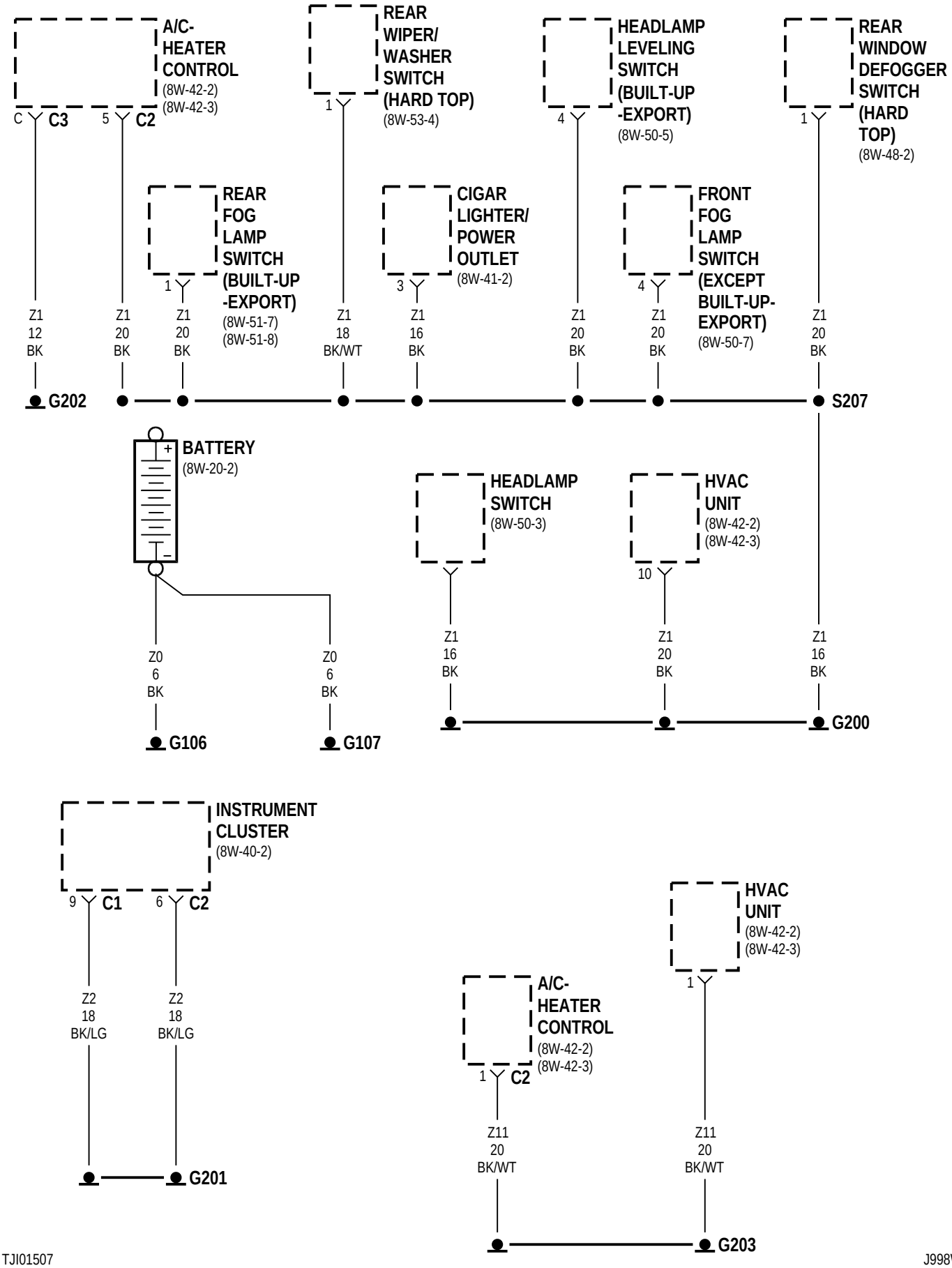

LEFT REPEATER LAMP (BUILT-UP-EXPORT)
(8W-52-3)
2
Z1
18
BK
LEFT FOG LAMP
(8W-50-7)
1
Z1
18
BK
LEFT FRONT PARK/ TURN SIGNAL LAMP
(8W-50-4)
(8W-52-3)
3
LEFT FRONT TURN SIGNAL LAMP
(8W-52-3)
3
FRONT FOG LAMPS
BUILT-UP-EXPORT
Z1
18
BK
S122
LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT EXCEPT FRONT FOG LAMPS)
(8W-50-4)
(8W-52-3)
3
LOW NOTE HORN (EXCEPT BUILT-UP-EXPORT)
(8W-41-3)
2
LEFT HEADLAMP
(8W-50-2)
3
HIGH NOTE HORN
(8W-41-3)
2
LEFT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)
(8W-50-5)
3
LEFT CITY LAMP (BUILT-UP-EXPORT)
(8W-50-4)
2
WINDSHIELD WASHER PUMP
(8W-53-2)
(8W-53-3)
B
Z1
18
BK
Z1
18
BK
Z1
18
BK
Z1
18
BK
Z1
18
BK
Z1
20
BK
Z1
20
BK
Z1
18
BK
S117
Z1
16
BK
G102


RIGHT FOG LAMP
(8W-50-7)
1
Z1
18
BK
RIGHT FRONT PARK/ TURN SIGNAL LAMP (FRONT FOG LAMPS)
(8W-50-4)
(8W-52-3)
3
Z1
18
BK
GENERATOR
(8W-20-2)
Z0
6
BK
S125
G104
RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT FRONT FOG LAMPS)
(8W-50-4)
(8W-52-3)
3
Z1
18
BK
RIGHT HEADLAMP
(8W-50-2)
3
Z1
18
BK
Z1
18
BK
G103

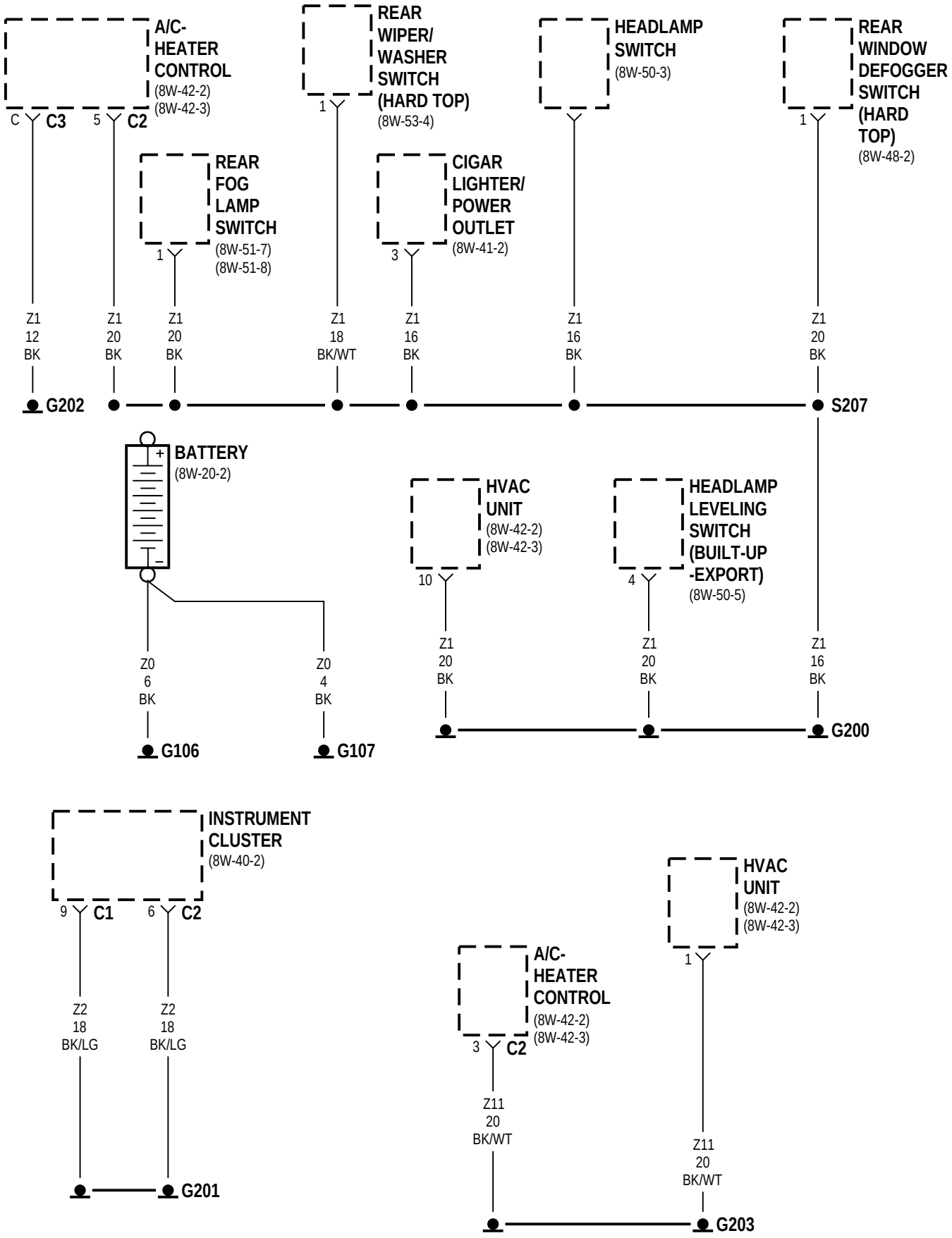

RIGHT REPEATER LAMP
(8W-52-3)
2
Z1
18
BK
RIGHT FRONT TURN SIGNAL LAMP
(8W-52-3)
3
Z1
18
BK
GENERATOR
(8W-20-2)
Z0
6
BK
G104
S125
RIGHT CITY LAMP
(8W-50-4)
2
Z1
20
BK
RIGHT HEADLAMP
(8W-50-2)
3
Z1
18
BK
RIGHT HEADLAMP LEVELING MOTOR
(8W-50-5)
3
Z1
18
BK
S150
Z1
18
BK
G103


D11
ENGINE STARTER MOTOR RELAY (IN PDC)
(8W-21-2)
D13
5 C104
T41
20
BR/LB
POWERTRAIN CONTROL MODULE
(8W-30-12)
A6 C1
T41
18
BR/LB
S134
SENTRY KEY IMMOBILIZER MODULE
(8W-30-14)
4
Z12
20
BK/LB
DATA LINK CONNECTOR
(8W-30-13)
4
Z12
20
BK/LB
5
Z12
20
BK/TN
T41
20
BR/LB
3 C154
Z1
20
BK
MANUAL TRANSMISSION JUMPER
1 C154
Z1
20
BK
NOT USED
1 C154
Z1
20
BK
A/T
M/T
A6 C202
C4 C204
Z12
20
BK/LB
Z12
20
BK/TN
POWERTRAIN CONTROL MODULE
(8W-30-2)
A31 C1
A32 C1
E6 C107
E9
11 C103
10
Z12
20
BK/LB
Z12
20
BK/TN
Z12
14
BK/TN
Z12
14
BK/TN
S130
TRANSFER CASE SWITCH
(8W-31-2)
B
OXYGEN SENSOR 1/2 DOWNSTREAM
(8W-30-9)
2
POWER STEERING PRESSURE SWITCH (2.5L)
(8W-30-12)
1
LHD
RHD
Z1
20
BK
Z1
18
BK
OXYGEN SENSOR 1/1 UPSTREAM
(8W-30-9)
2
FUEL PUMP MODULE
(8W-30-3)
6
Z1
20
BK
Z1
20
BK
Z1
18
BK
Z1
18
BK
Z1
18
BK
S132
Z1
20
BK
2
A/C COMPRESSOR CLUTCH
(8W-42-4)
Z1
14
BK
Z12
10
BK/TN
G105

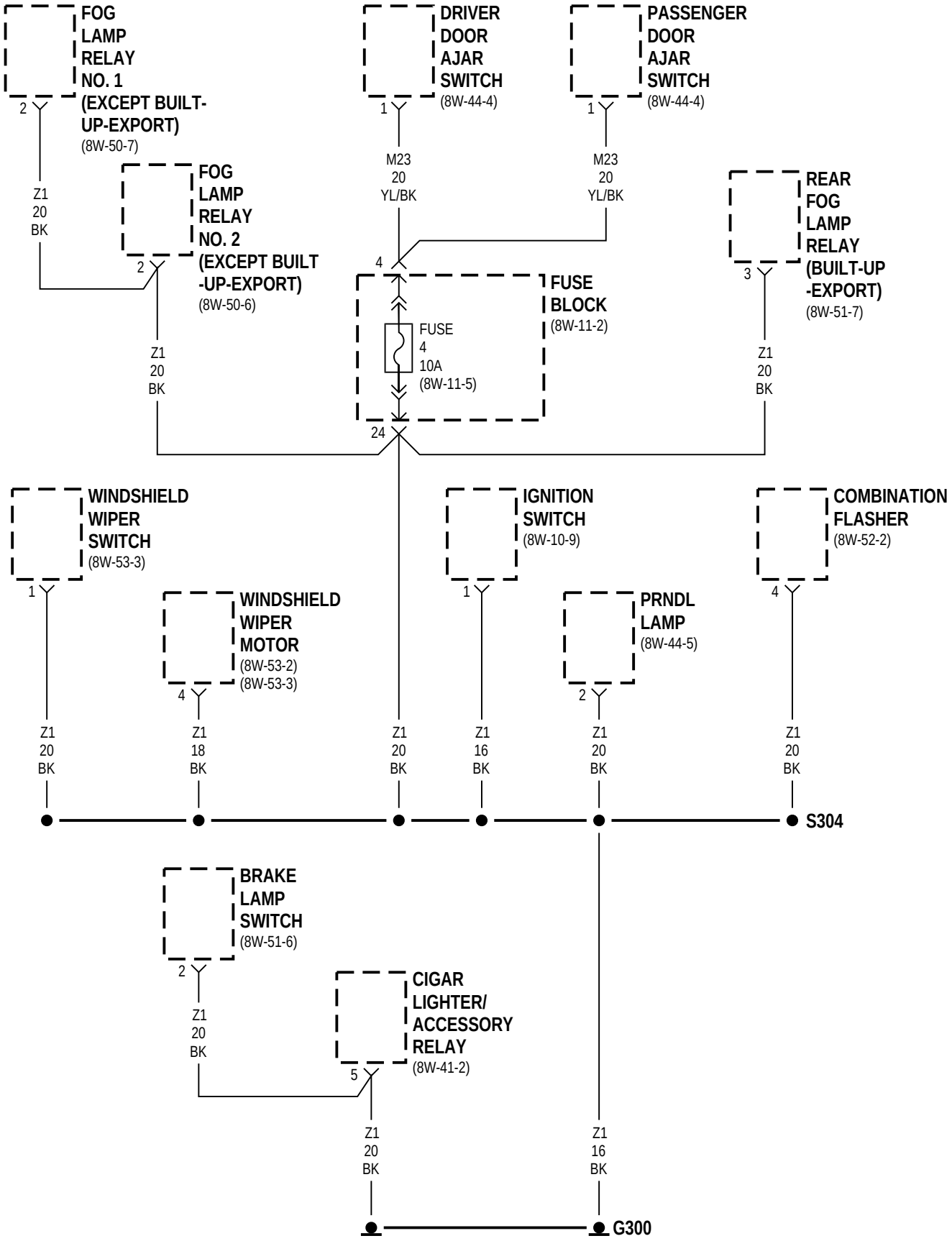
LHD


A/C-
HEATER
CONTROL
(8W-42-2)
(8W-42-3)
C
C3
5
C2
REAR
WIPER/
WASHER
SWITCH
(HARD TOP)
(8W-53-4)
1
HEADLAMP
LEVELING
SWITCH
(BUILT-UP
-EXPORT)
(8W-50-5)
4
REAR
WINDOW
DEFOGGER
SWITCH
(HARD
TOP)
(8W-48-2)
1
REAR
FOG
LAMP
SWITCH
(BUILT-UP
-EXPORT)
(8W-51-7)
(8W-51-8)
1
CIGAR
LIGHTER/
POWER
OUTLET
(8W-41-2)
3
FRONT
FOG
LAMP
SWITCH
(EXCEPT
BUILT-UP-
EXPORT)
(8W-50-7)
4
Z1
12
BK
Z1
20
BK
Z1
20
BK
Z1
18
BK/WT
Z1
16
BK
Z1
20
BK
Z1
20
BK
Z1
20
BK
G202
S207
BATTERY
(8W-20-2)
+
–
HEADLAMP
SWITCH
(8W-50-3)
HVAC
UNIT
(8W-42-2)
(8W-42-3)
10
Z0
6
BK
Z0
6
BK
Z1
16
BK
Z1
20
BK
Z1
16
BK
G106
G107
G200
INSTRUMENT
CLUSTER
(8W-40-2)
9
C1
6
C2
HVAC
UNIT
(8W-42-2)
(8W-42-3)
1
A/C-
HEATER
CONTROL
(8W-42-2)
(8W-42-3)
1
C2
Z2
18
BK/LG
Z2
18
BK/LG
Z11
20
BK/WT
Z11
20
BK/WT
G201
G203

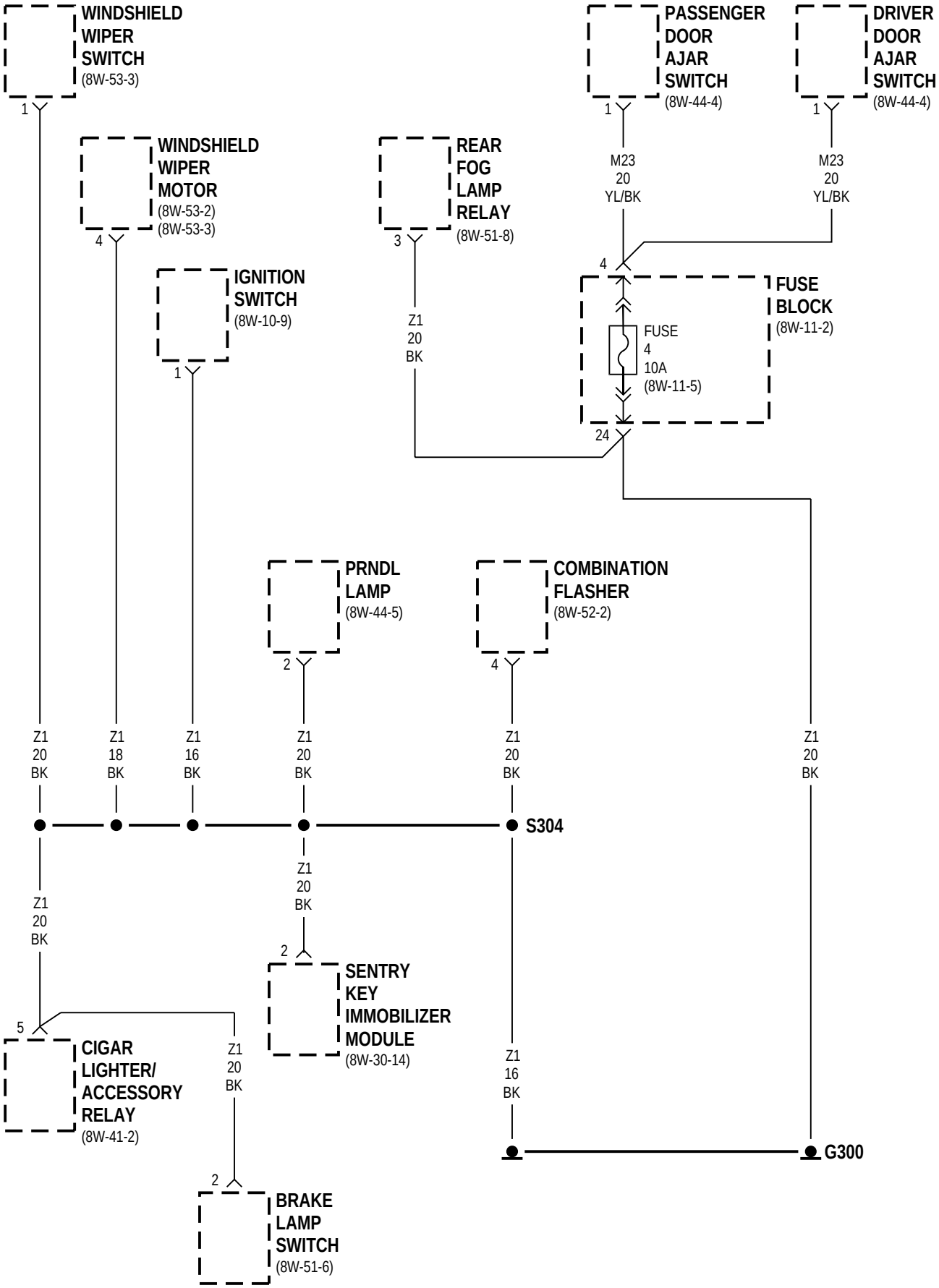
RHD

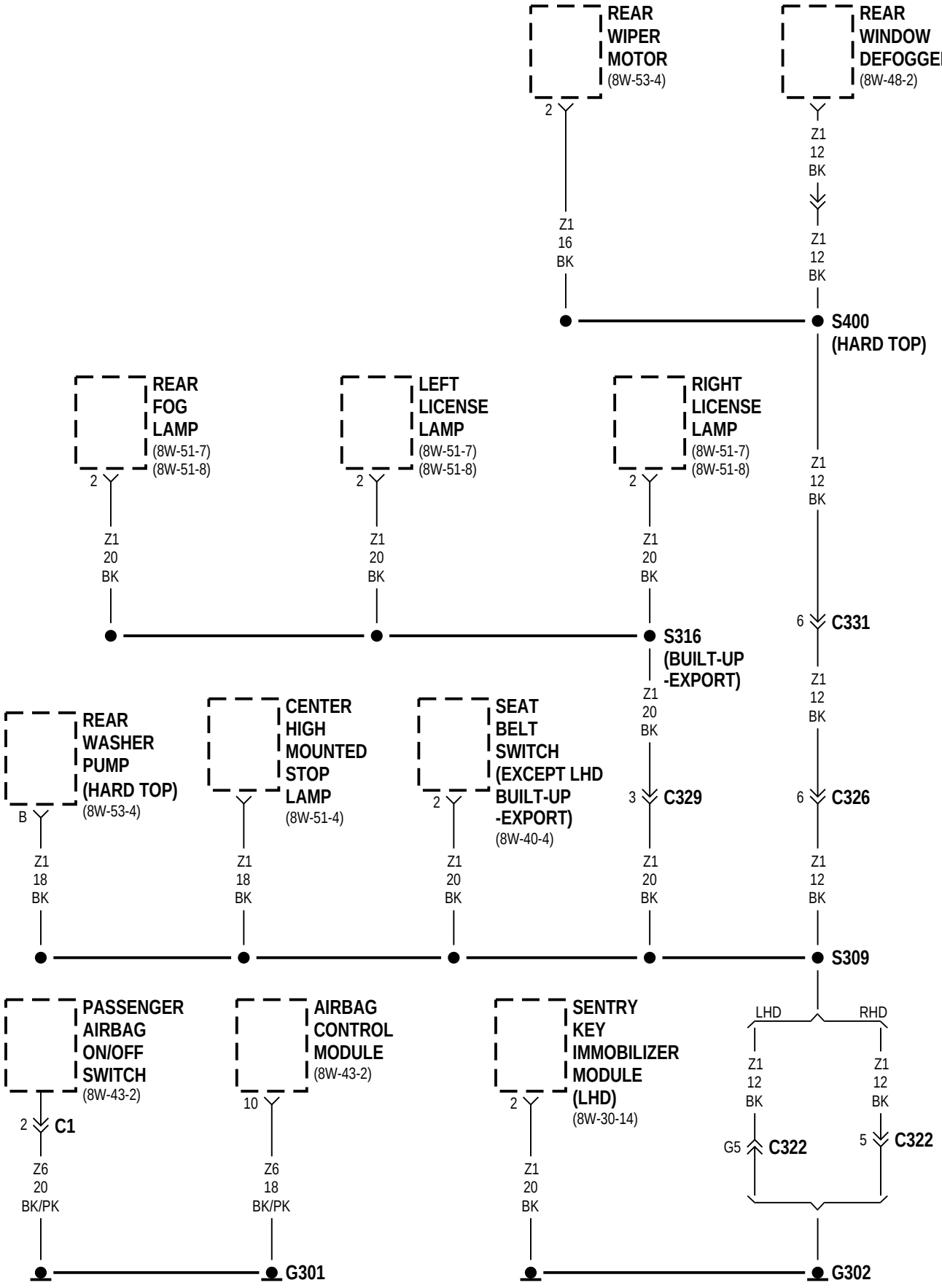

A/C-
HEATER
CONTROL
(8W-42-2)
(8W-42-3)
C
C3
5
C2
REAR
WIPER/
WASHER
SWITCH
(HARD TOP)
(8W-53-4)
1
HEADLAMP
SWITCH
(8W-50-3)
REAR
WINDOW
DEFOGGER
SWITCH
(HARD
TOP)
(8W-48-2)
1
REAR
FOG
LAMP
SWITCH
(8W-51-7)
(8W-51-8)
1
CIGAR
LIGHTER/
POWER
OUTLET
(8W-41-2)
3
Z1
12
BK
Z1
20
BK
Z1
20
BK
Z1
18
BK/WT
Z1
16
BK
Z1
16
BK
Z1
20
BK
G202
S207
BATTERY
(8W-20-2)
HVAC
UNIT
(8W-42-2)
(8W-42-3)
10
HEADLAMP
LEVELING
SWITCH
(BUILT-UP
-EXPORT)
(8W-50-5)
4
Z0
6
BK
Z0
4
BK
Z1
20
BK
Z1
20
BK
Z1
16
BK
G106
G107
G200
INSTRUMENT
CLUSTER
(8W-40-2)
9
C1
6
C2
HVAC
UNIT
(8W-42-2)
(8W-42-3)
1
A/C-
HEATER
CONTROL
(8W-42-2)
(8W-42-3)
3
C2
Z2
18
BK/LG
Z2
18
BK/LG
Z11
20
BK/WT
Z11
20
BK/WT
G201
G203

LHD

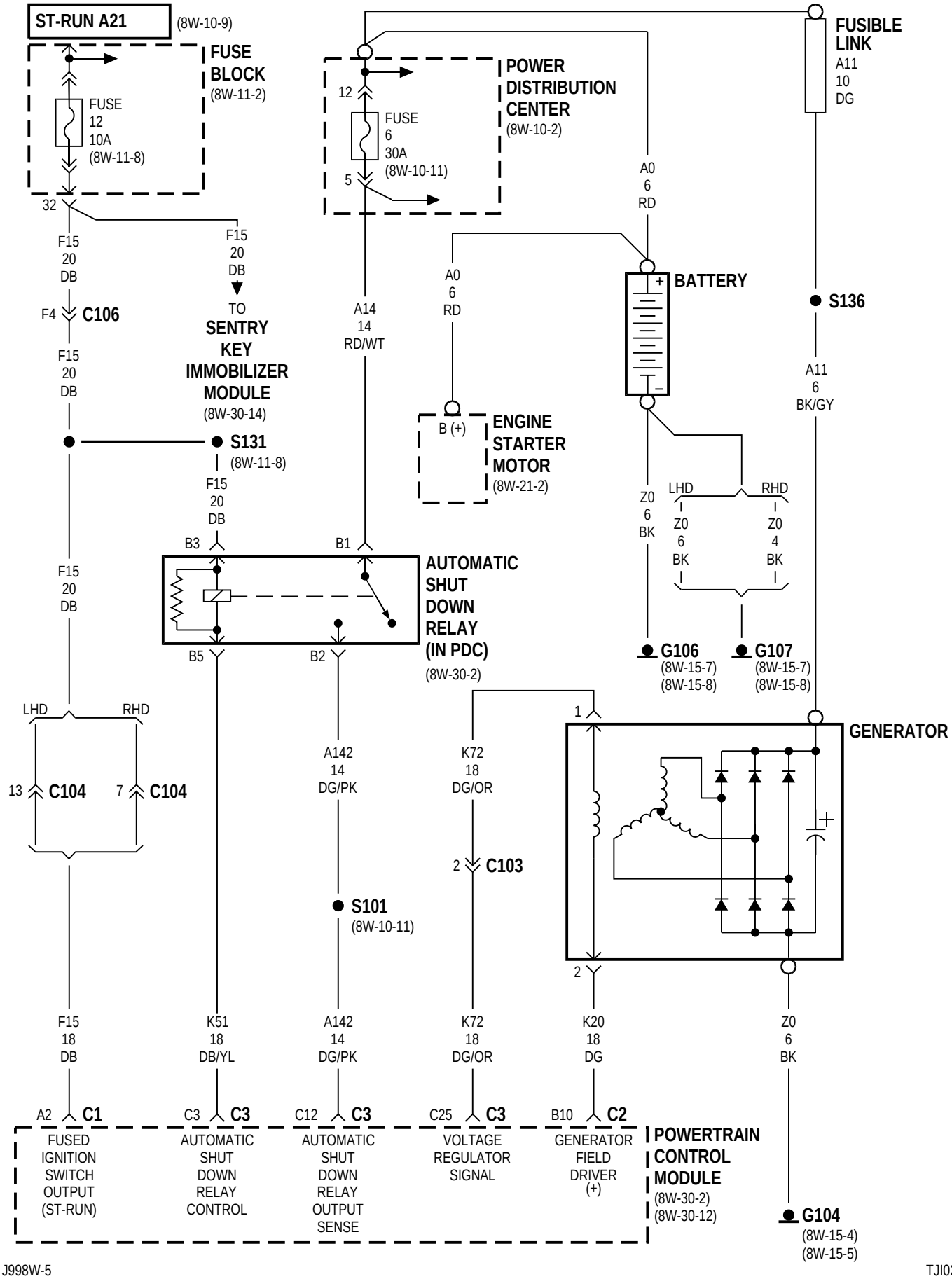

FOG LAMP RELAY NO. 1 (EXCEPT BUILT-UP-EXPORT) (8W-50-7)
2
Z1 20 BK
FOG LAMP RELAY NO. 2 (EXCEPT BUILT -UP-EXPORT) (8W-50-6)
2
Z1 20 BK
DRIVER DOOR AJAR SWITCH (8W-44-4)
1
M23 20 YL/BK
PASSENGER DOOR AJAR SWITCH (8W-44-4)
1
M23 20 YL/BK
4
FUSE BLOCK (8W-11-2)
FUSE 4 10A (8W-11-5)
24
REAR FOG LAMP RELAY (BUILT-UP -EXPORT) (8W-51-7)
3
Z1 20 BK
WINDSHIELD WIPER SWITCH (8W-53-3)
1
Z1 20 BK
WINDSHIELD WIPER MOTOR (8W-53-2) (8W-53-3)
4
Z1 18 BK
Z1 20 BK
IGNITION SWITCH (8W-10-9)
1
Z1 16 BK
PRNDL LAMP (8W-44-5)
2
Z1 20 BK
COMBINATION FLASHER (8W-52-2)
4
Z1 20 BK
S304
BRAKE LAMP SWITCH (8W-51-6)
2
Z1 20 BK
CIGAR LIGHTER/ ACCESSORY RELAY (8W-41-2)
5
Z1 20 BK
Z1 16 BK
G300

RHD

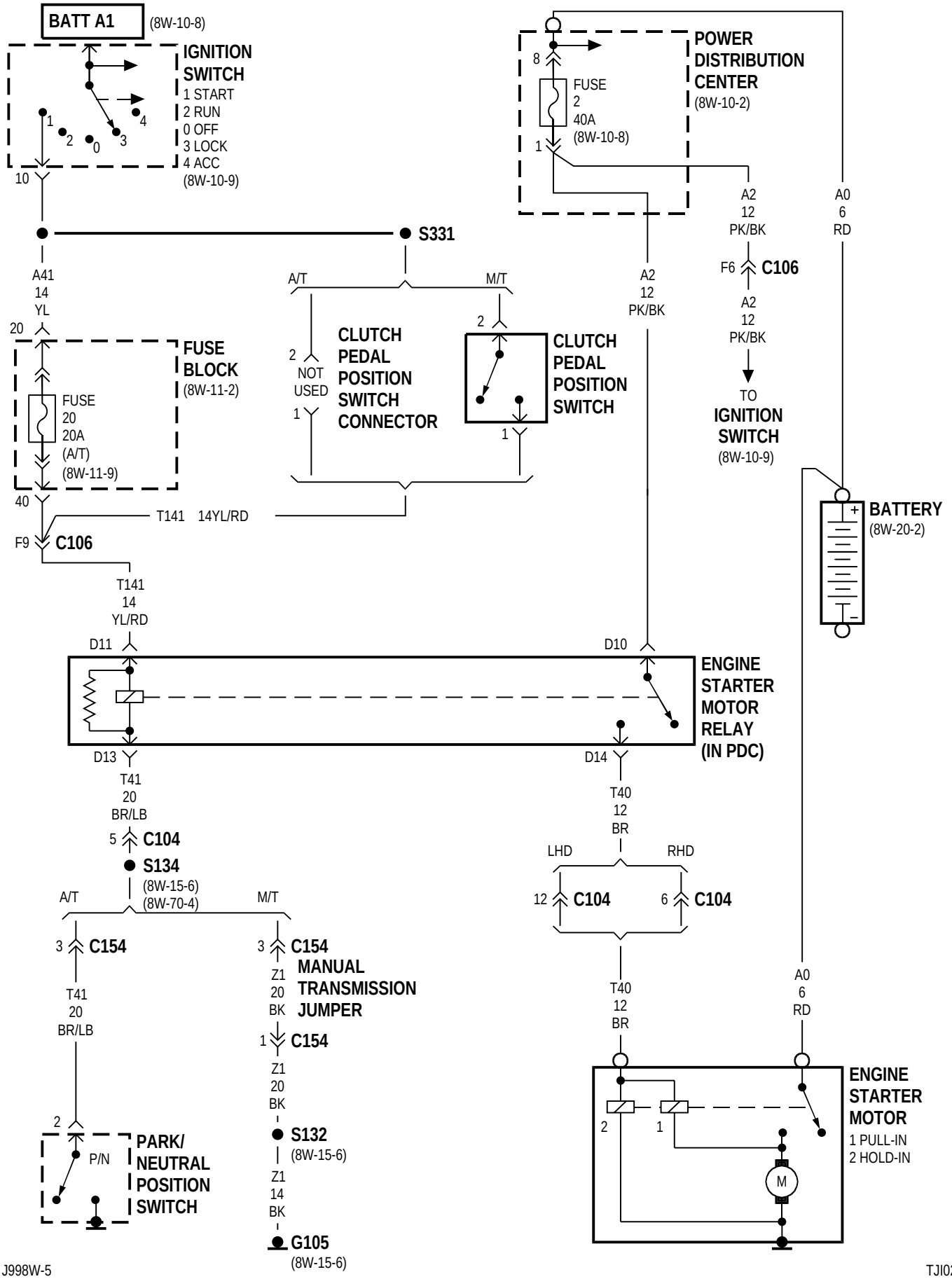

WINDSHIELD WIPER SWITCH (8W-53-3)
1
WINDSHIELD WIPER MOTOR (8W-53-2) (8W-53-3)
4
IGNITION SWITCH (8W-10-9)
1
REAR FOG LAMP RELAY (8W-51-8)
3
Z1 20 BK
PASSENGER DOOR AJAR SWITCH (8W-44-4)
1
DRIVER DOOR AJAR SWITCH (8W-44-4)
1
M23 20 YL/BK
M23 20 YL/BK
4
FUSE BLOCK (8W-11-2)
FUSE 4 10A (8W-11-5)
24
PRNDL LAMP (8W-44-5)
2
COMBINATION FLASHER (8W-52-2)
4
Z1 20 BK
Z1 18 BK
Z1 16 BK
Z1 20 BK
Z1 20 BK
Z1 20 BK
S304
Z1 20 BK
Z1 20 BK
2
SENTRY KEY IMMOBILIZER MODULE (8W-30-14)
5
CIGAR LIGHTER/ ACCESSORY RELAY (8W-41-2)
Z1 20 BK
2
BRAKE LAMP SWITCH (8W-51-6)
Z1 16 BK
G300


REAR WIPER MOTOR (8W-53-4)
2
Z1 16 BK
REAR WINDOW DEFOGGER (8W-48-2)
Z1 12 BK
Z1 12 BK
S400 (HARD TOP)
REAR FOG LAMP (8W-51-7) (8W-51-8)
2
Z1 20 BK
LEFT LICENSE LAMP (8W-51-7) (8W-51-8)
2
Z1 20 BK
RIGHT LICENSE LAMP (8W-51-7) (8W-51-8)
2
Z1 20 BK
Z1 12 BK
6 C331
S316 (BUILT-UP -EXPORT)
Z1 20 BK
3 C329
Z1 12 BK
6 C326
REAR WASHER PUMP (HARD TOP) (8W-53-4)
B
Z1 18 BK
CENTER HIGH MOUNTED STOP LAMP (8W-51-4)
Z1 18 BK
SEAT BELT SWITCH (EXCEPT LHD BUILT-UP -EXPORT) (8W-40-4)
2
Z1 20 BK
Z1 20 BK
Z1 12 BK
S309
PASSENGER AIRBAG ON/OFF SWITCH (8W-43-2)
2 C1
Z6 20 BK/PK
AIRBAG CONTROL MODULE (8W-43-2)
10
Z6 18 BK/PK
SENTRY KEY IMMOBILIZER MODULE (LHD) (8W-30-14)
2
Z1 20 BK
LHD
RHD
Z1 12 BK
G5 C322
Z1 12 BK
5 C322
G301
G302

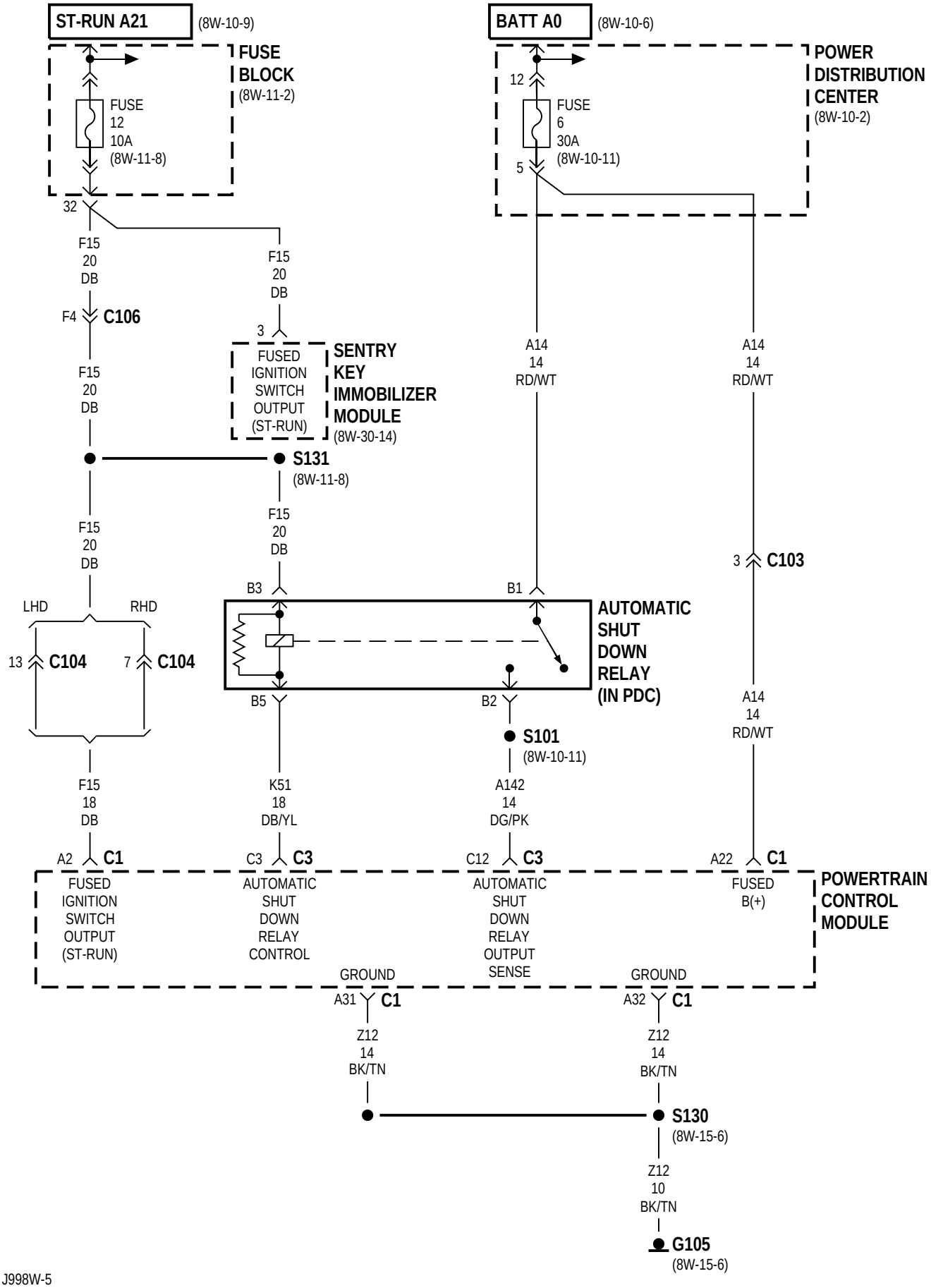
8W-20 CHARGING SYSTEM

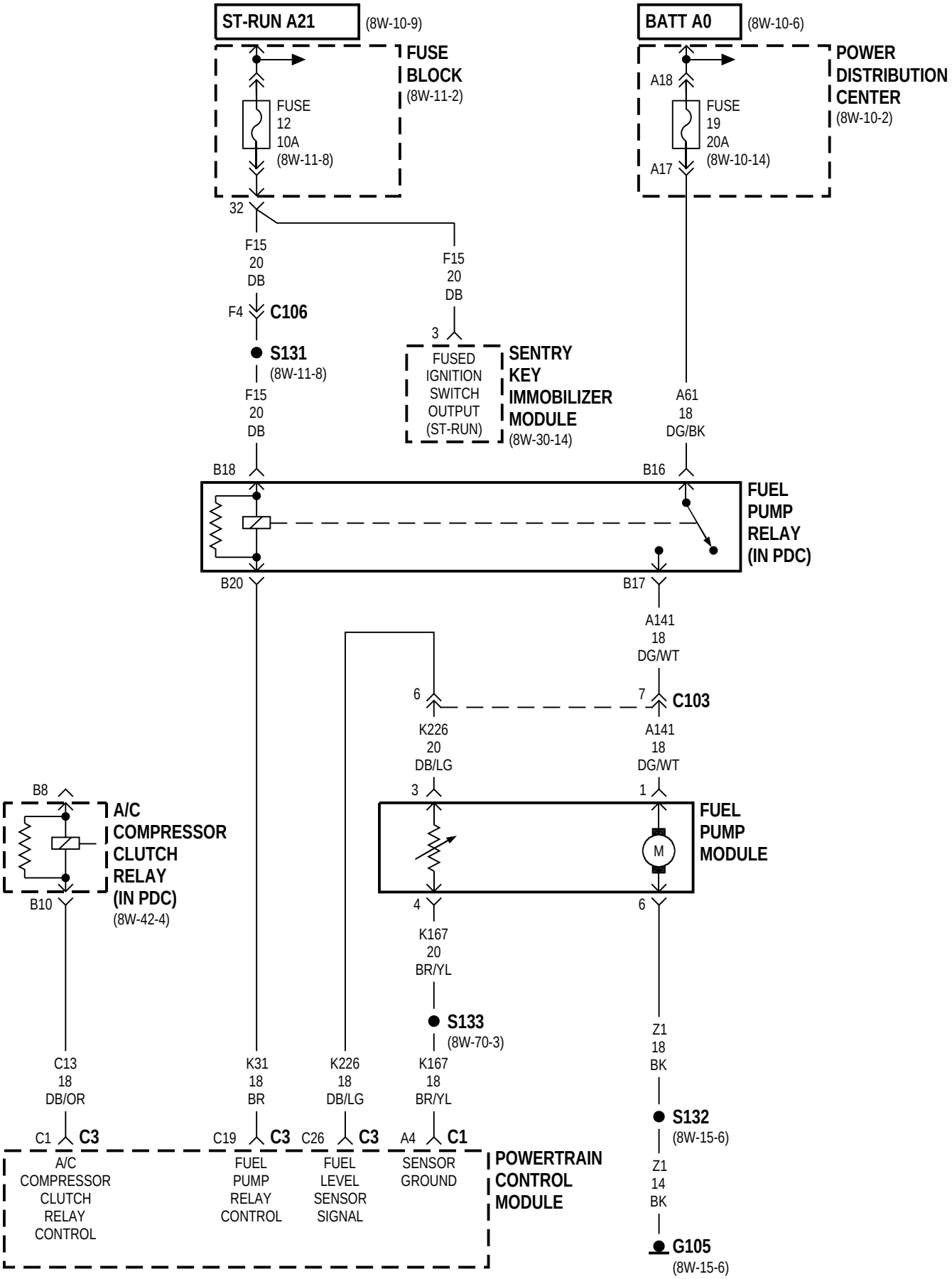

ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 12 10A (8W-11-8)
32
F15 20 DB
F4 C106
F15 20 DB
F15 20 DB
TO SENTRY KEY IMMOBILIZER MODULE
(8W-30-14)
S131
(8W-11-8)
F15 20 DB
F15 20 DB
LHD RHD
13 C104 7 C104
F15 18 DB
A2 C1
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
POWER DISTRIBUTION CENTER
(8W-10-2)
12
FUSE 6 30A (8W-10-11)
5
A14 14 RD/WT
B3 B1
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
B5 B2
K51 18 DB/YL
C3 C3
AUTOMATIC SHUT DOWN RELAY CONTROL
A142 14 DG/PK
C12 C3
AUTOMATIC SHUT DOWN RELAY OUTPUT SENSE
S101
(8W-10-11)
A0 6 RD
A0 6 RD
B (+)
ENGINE STARTER MOTOR
(8W-21-2)
K72 18 DG/OR
2 C103
K72 18 DG/OR
C25 C3
VOLTAGE REGULATOR SIGNAL
FUSIBLE LINK
A11 10 DG
BATTERY
S136
A11 6 BK/GY
Z0 6 BK
LHD RHD
Z0 6 BK
Z0 4 BK
G106
(8W-15-7)
(8W-15-8)
G107
(8W-15-7)
(8W-15-8)
1
GENERATOR
2
K20 18 DG
B10 C2
GENERATOR FIELD DRIVER (+)
Z0 6 BK
POWERTRAIN CONTROL MODULE
(8W-30-2)
(8W-30-12)
G104
(8W-15-4)
(8W-15-5)

8W-21 STARTING SYSTEM


BATT A1
(8W-10-8)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-9)
10
S331
A41
14
YL
20
FUSE BLOCK
(8W-11-2)
FUSE
20
20A
(A/T)
(8W-11-9)
40
T141 14YL/RD
F9
C106
A/T
M/T
2
NOT USED
1
CLUTCH PEDAL POSITION SWITCH CONNECTOR
2
1
CLUTCH PEDAL POSITION SWITCH
8
FUSE
2
40A
(8W-10-8)
1
POWER DISTRIBUTION CENTER
(8W-10-2)
A2
12
PK/BK
F6
C106
A2
12
PK/BK
TO IGNITION SWITCH
(8W-10-9)
A0
6
RD
BATTERY
(8W-20-2)
A2
12
PK/BK
T141
14
YL/RD
D11
D10
D13
D14
ENGINE STARTER MOTOR RELAY (IN PDC)
T41
20
BR/LB
5
C104
S134
(8W-15-6)
(8W-70-4)
T40
12
BR
LHD
RHD
12
C104
6
C104
A/T
M/T
3
C154
T41
20
BR/LB
2
P/N
PARK/ NEUTRAL POSITION SWITCH
3
C154
Z1
20
BK
MANUAL TRANSMISSION JUMPER
1
C154
Z1
20
BK
S132
(8W-15-6)
Z1
14
BK
G105
(8W-15-6)
T40
12
BR
A0
6
RD
2
1
M
ENGINE STARTER MOTOR
1 PULL-IN
2 HOLD-IN

8W-30 FUEL/IGNITION SYSTEMS


ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 12 10A
(8W-11-8)
32
F15 20 DB
F4
C106
F15 20 DB
F15 20 DB
3
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
SENTRY KEY IMMOBILIZER MODULE
(8W-30-14)
S131
(8W-11-8)
F15 20 DB
F15 20 DB
LHD
RHD
13
C104
7
C104
B3
B1
AUTOMATIC SHUT DOWN RELAY (IN PDC)
B5
B2
S101
(8W-10-11)
F15 18 DB
K51 18 DB/YL
A142 14 DG/PK
A2
C1
C3
C3
C12
C3
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
AUTOMATIC SHUT DOWN RELAY CONTROL
AUTOMATIC SHUT DOWN RELAY OUTPUT SENSE
GROUND
A31
C1
Z12 14 BK/TN
BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
12
FUSE 6 30A
(8W-10-11)
5
A14 14 RD/WT
A14 14 RD/WT
3
C103
A14 14 RD/WT
A22
C1
FUSED B(+)
POWERTRAIN CONTROL MODULE
GROUND
A32
C1
Z12 14 BK/TN
S130
(8W-15-6)
Z12 10 BK/TN
G105
(8W-15-6)



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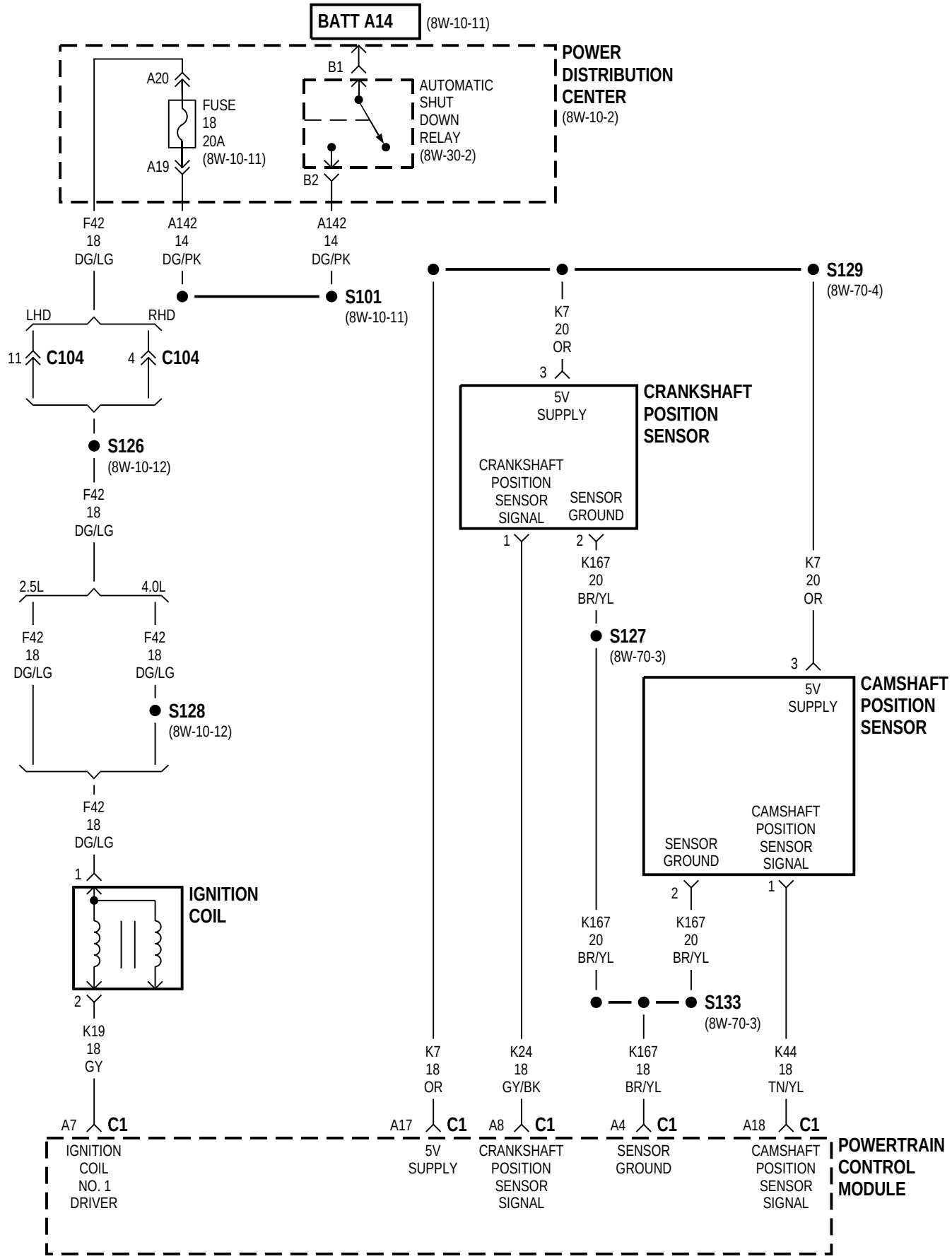
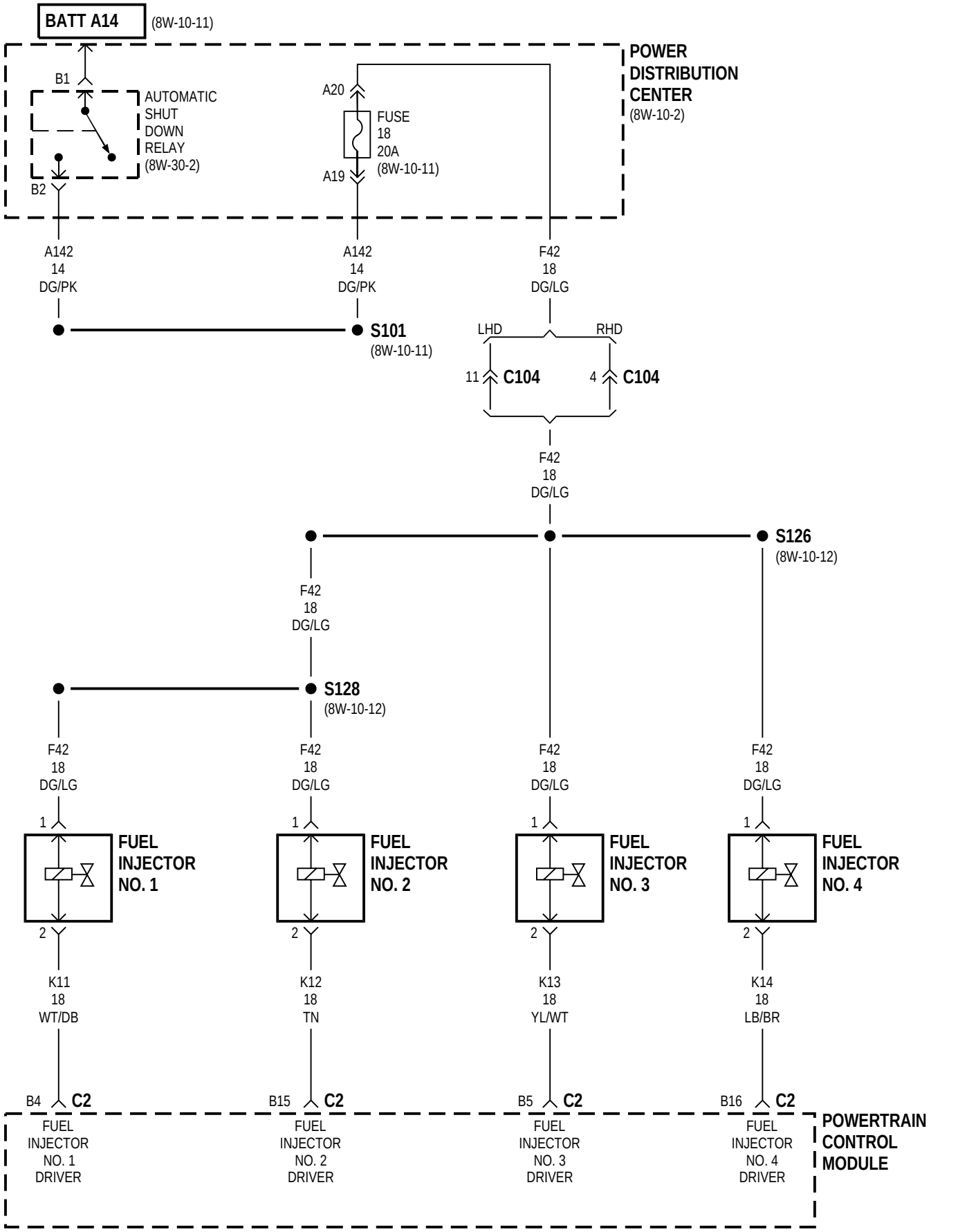
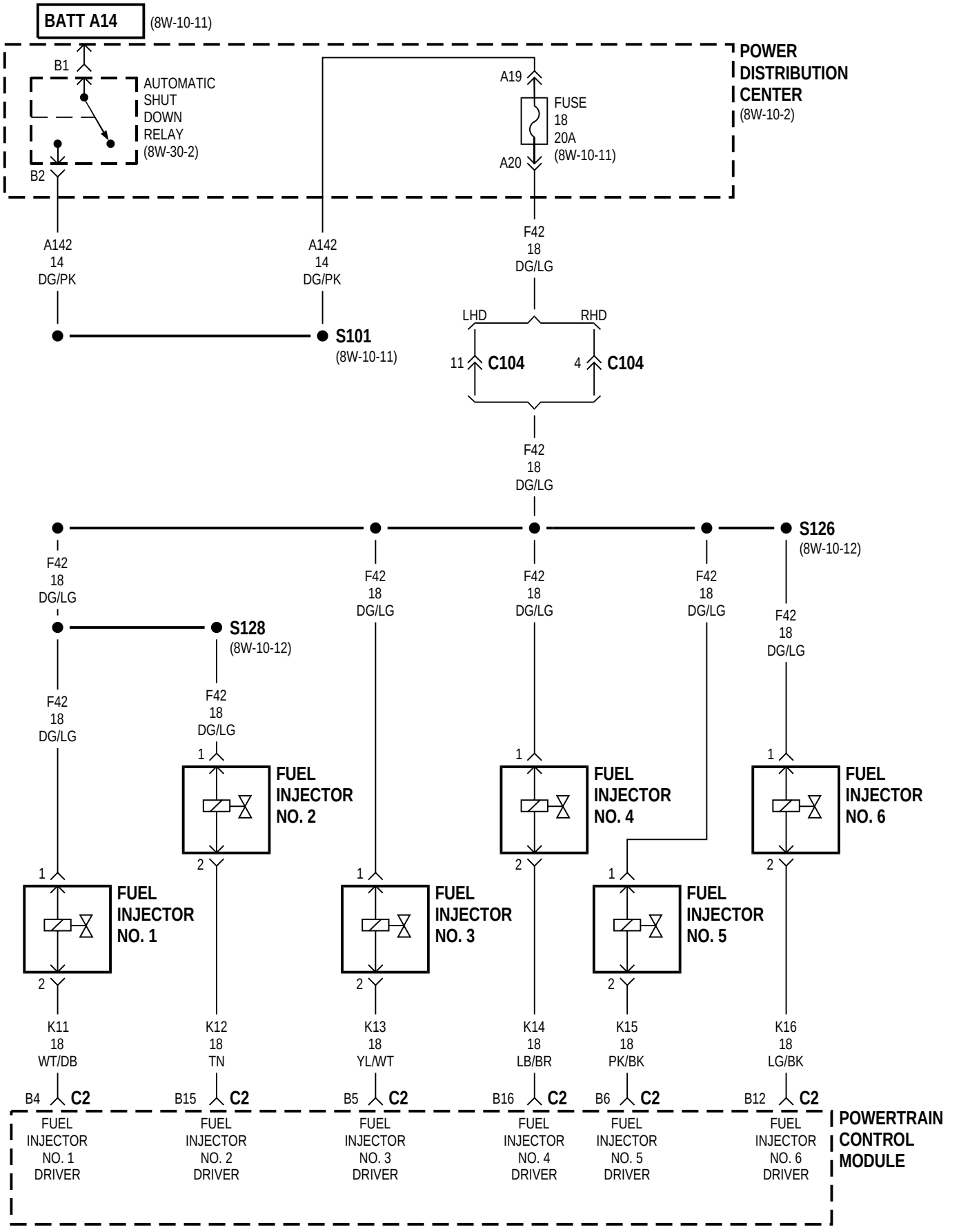
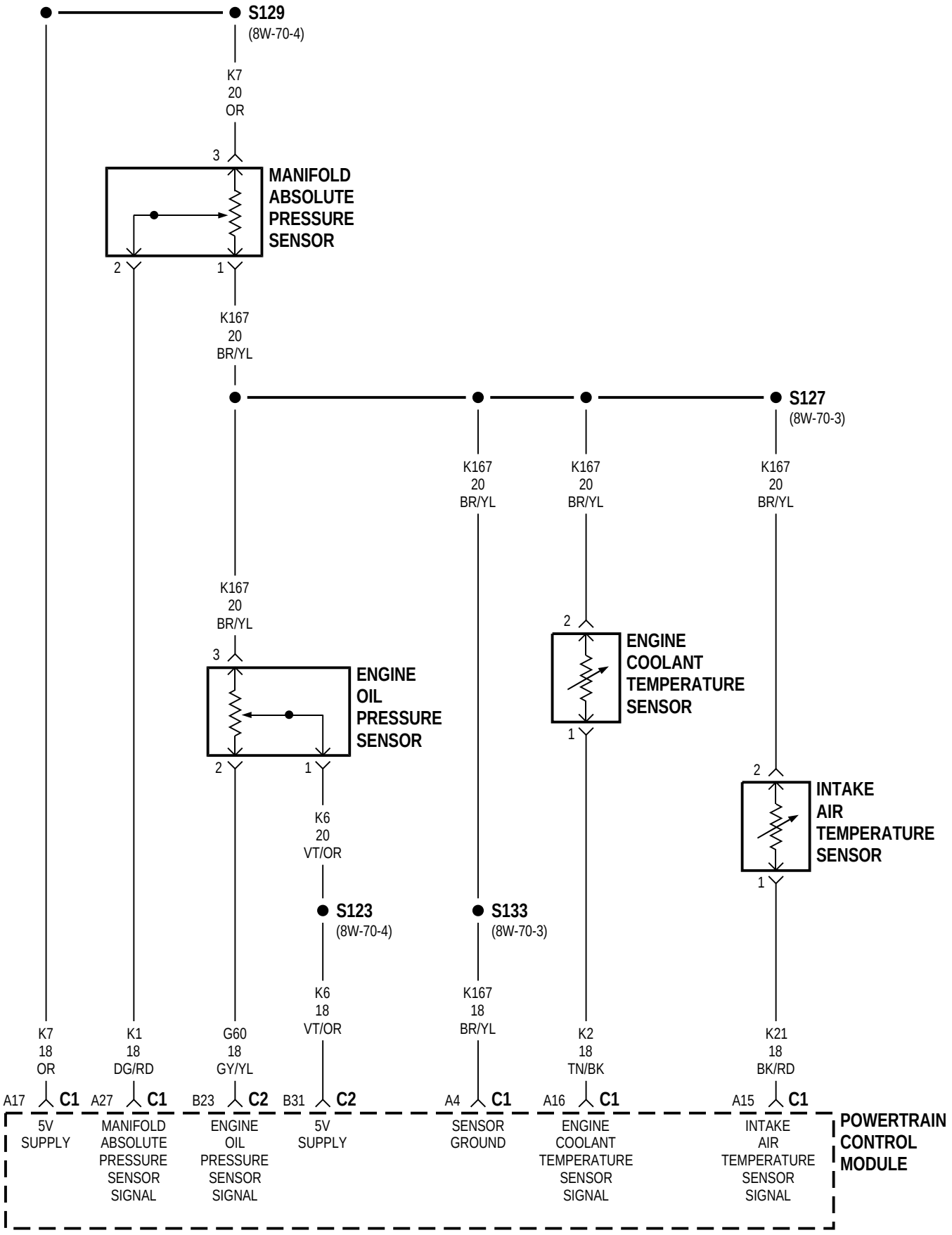
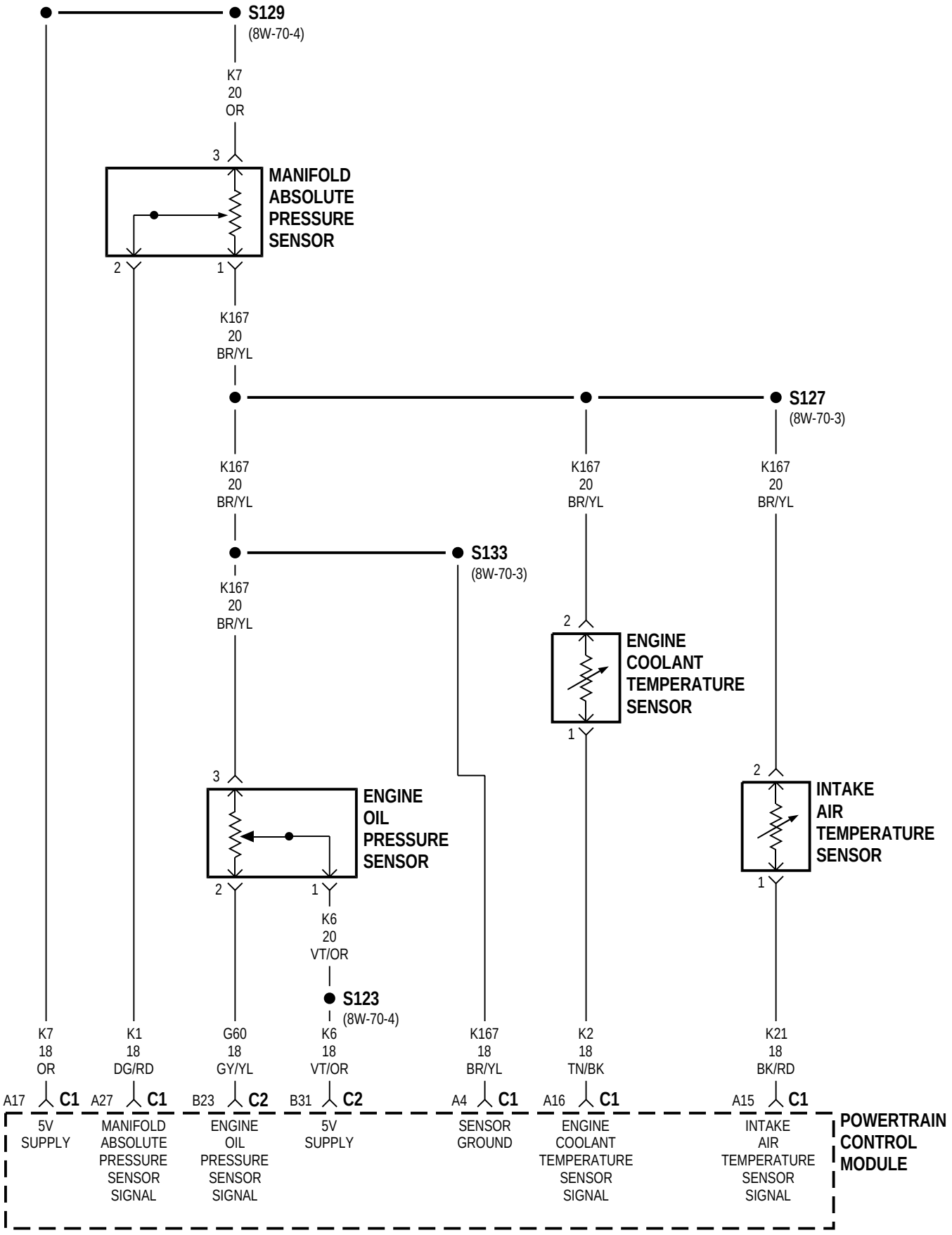

BATT A14
(8W-10-11)
POWER DISTRIBUTION CENTER
(8W-10-2)
A20
FUSE 18 20A
(8W-10-11)
A19
B1
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
B2
F42 18 DG/LG
A142 14 DG/PK
A142 14 DG/PK
S101
(8W-10-11)
S129
(8W-70-4)
LHD
RHD
11 C104
4 C104
S126
(8W-10-12)
K7 20 OR
3
5V SUPPLY
CRANKSHAFT POSITION SENSOR
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
1
2
K167 20 BR/YL
S127
(8W-70-3)
K7 20 OR
3
5V SUPPLY
CAMSHAFT POSITION SENSOR
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
2
1
F42 18 DG/LG
2.5L
4.0L
F42 18 DG/LG
F42 18 DG/LG
S128
(8W-10-12)
F42 18 DG/LG
1
IGNITION COIL
2
K19 18 GY
K167 20 BR/YL
K167 20 BR/YL
S133
(8W-70-3)
K7 18 OR
K24 18 GY/BK
K167 18 BR/YL
K44 18 TN/YL
A7 C1
A17 C1
A8 C1
A4 C1
A18 C1
IGNITION COIL NO. 1 DRIVER
5V SUPPLY
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
POWERTRAIN CONTROL MODULE

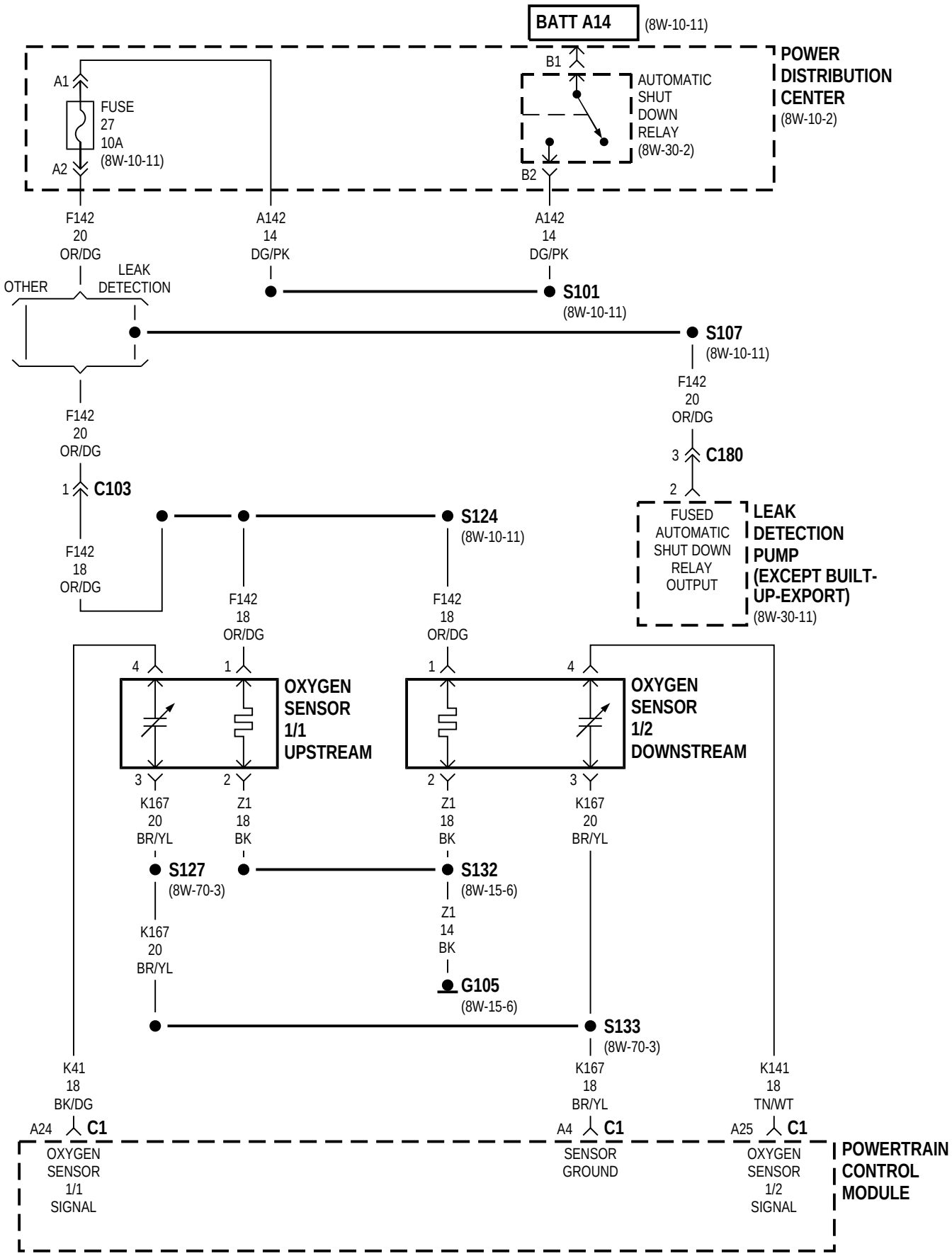
2.5L

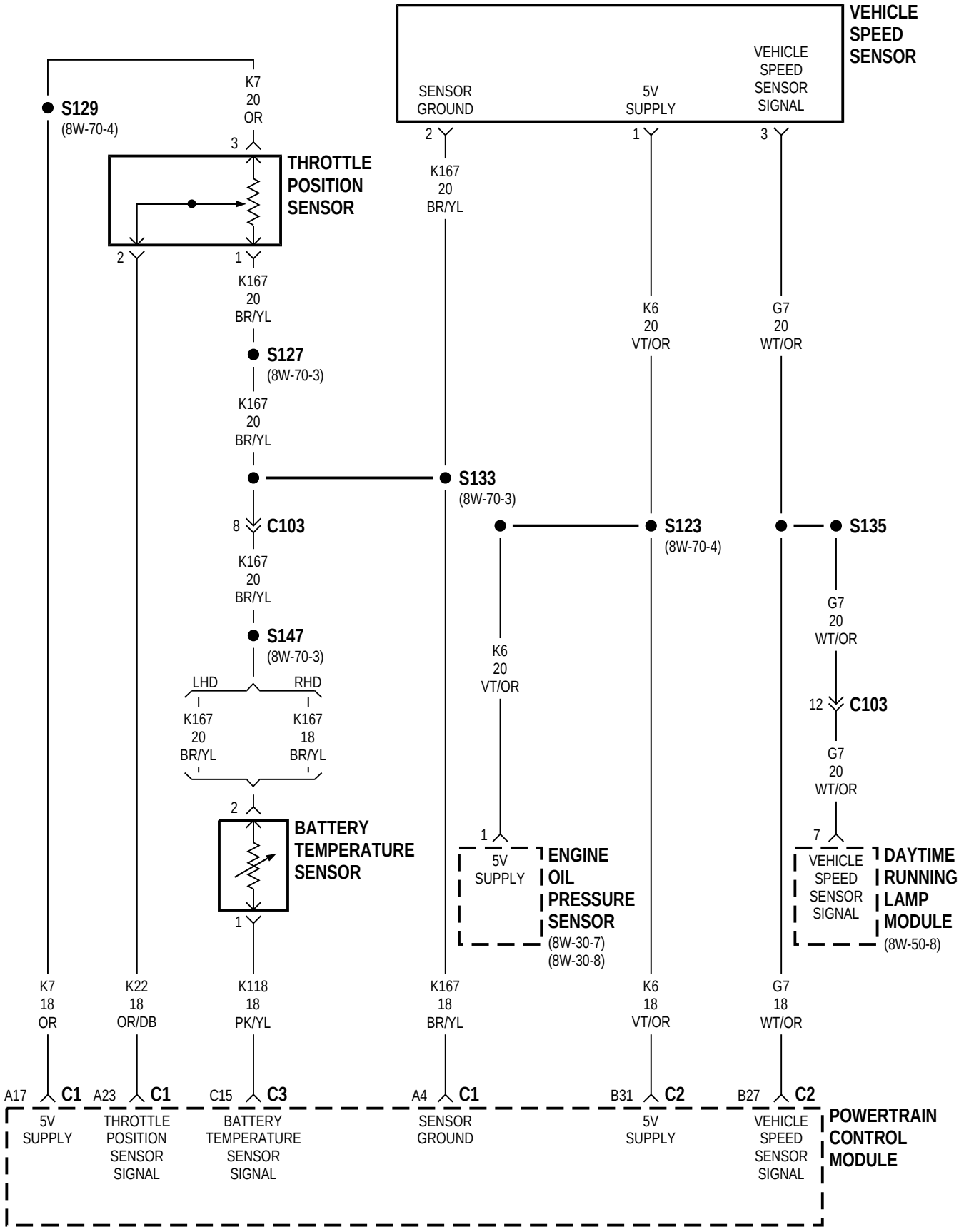

BATT A14
(8W-10-11)
B1
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
B2
A20
FUSE 18 20A
(8W-10-11)
A19
POWER DISTRIBUTION CENTER
(8W-10-2)
A142 14 DG/PK
A142 14 DG/PK
F42 18 DG/LG
S101
(8W-10-11)
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
S126
(8W-10-12)
F42 18 DG/LG
S128
(8W-10-12)
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
1
2
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 4
K11 18 WT/DB
K12 18 TN
K13 18 YL/WT
K14 18 LB/BR
B4 C2
B15 C2
B5 C2
B16 C2
FUEL INJECTOR NO. 1 DRIVER
FUEL INJECTOR NO. 2 DRIVER
FUEL INJECTOR NO. 3 DRIVER
FUEL INJECTOR NO. 4 DRIVER
POWERTRAIN CONTROL MODULE

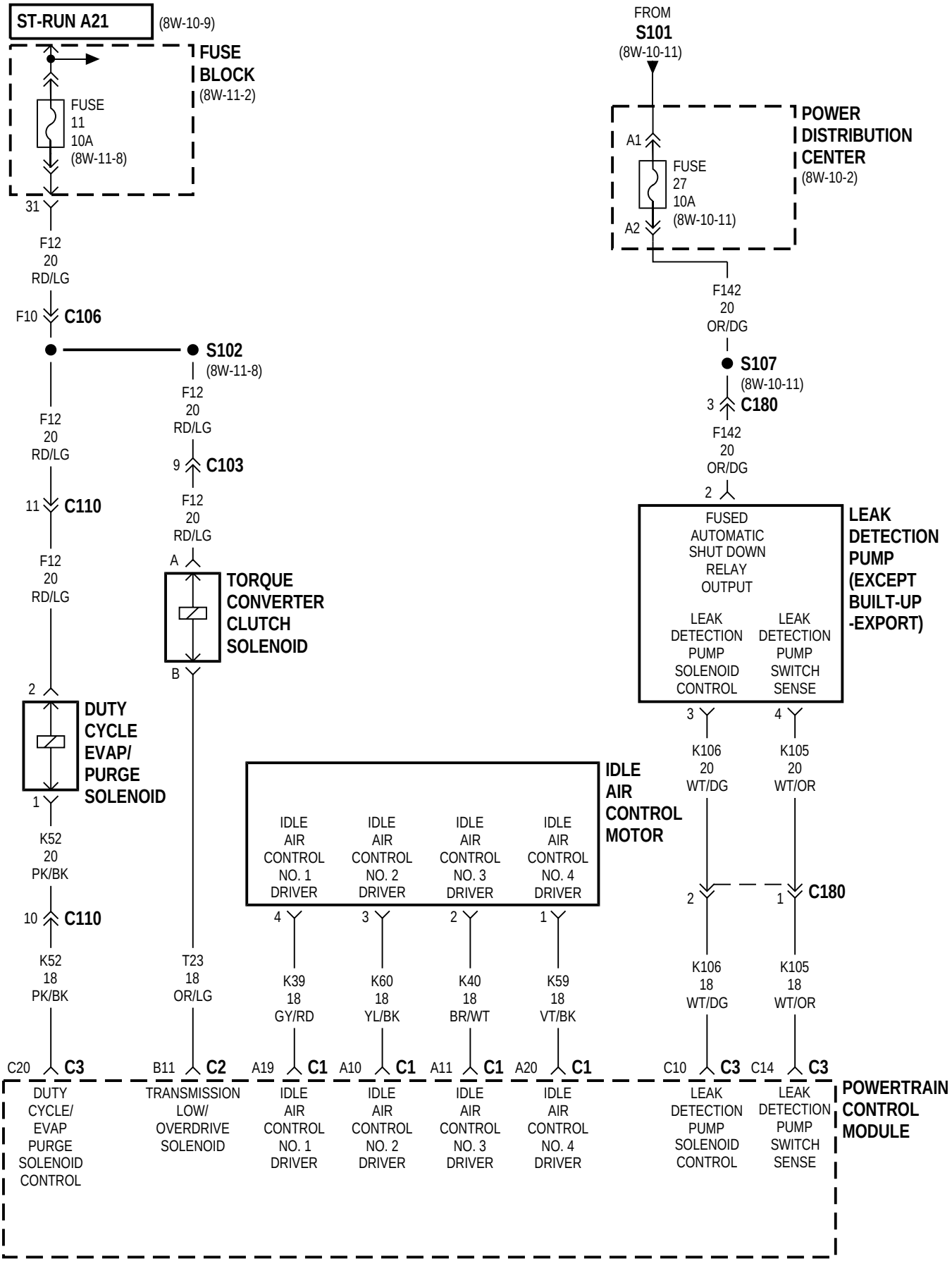

BATT A14
(8W-10-11)
B1
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
B2
A19
FUSE 18 20A
(8W-10-11)
A20
POWER DISTRIBUTION CENTER
(8W-10-2)
A142 14 DG/PK
A142 14 DG/PK
F42 18 DG/LG
S101
(8W-10-11)
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
S126
(8W-10-12)
F42 18 DG/LG
S128
(8W-10-12)
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
1
2
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 4
FUEL INJECTOR NO. 5
FUEL INJECTOR NO. 6
K11 18 WT/DB
K12 18 TN
K13 18 YL/WT
K14 18 LB/BR
K15 18 PK/BK
K16 18 LG/BK
B4 C2
B15 C2
B5 C2
B16 C2
B6 C2
B12 C2
FUEL INJECTOR NO. 1 DRIVER
FUEL INJECTOR NO. 2 DRIVER
FUEL INJECTOR NO. 3 DRIVER
FUEL INJECTOR NO. 4 DRIVER
FUEL INJECTOR NO. 5 DRIVER
FUEL INJECTOR NO. 6 DRIVER
POWERTRAIN CONTROL MODULE

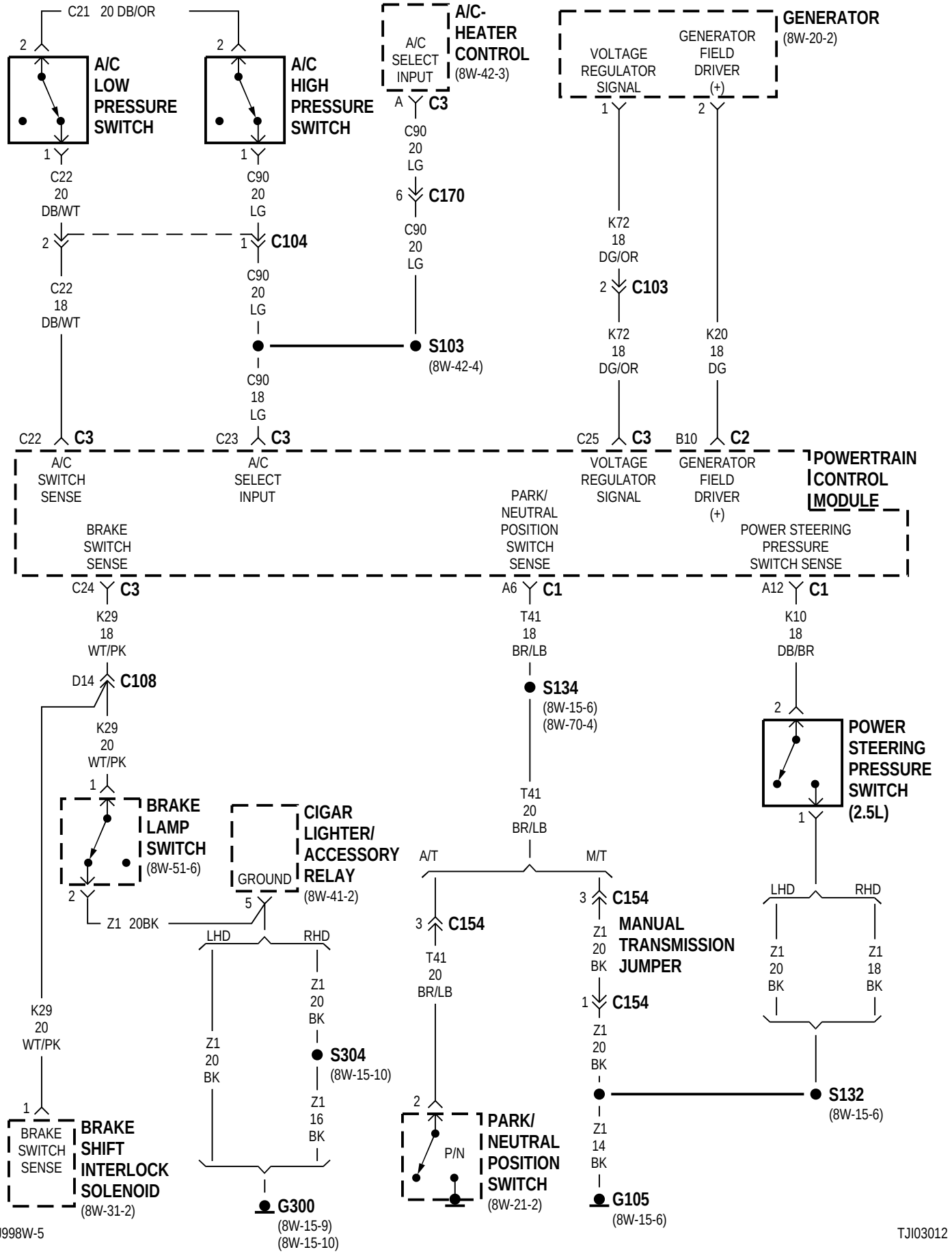

S129
(8W-70-4)
K7
20
OR
3
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
2
1
K167
20
BR/YL
S127
(8W-70-3)
K167
20
BR/YL
K167
20
BR/YL
K167
20
BR/YL
K167
20
BR/YL
3
ENGINE
OIL
PRESSURE
SENSOR
2
1
2
ENGINE
COOLANT
TEMPERATURE
SENSOR
1
2
INTAKE
AIR
TEMPERATURE
SENSOR
1
K6
20
VT/OR
S123
(8W-70-4)
S133
(8W-70-3)
K7
18
OR
K1
18
DG/RD
G60
18
GY/YL
K6
18
VT/OR
K167
18
BR/YL
K2
18
TN/BK
K21
18
BK/RD
A17
C1
5V
SUPPLY
A27
C1
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
SIGNAL
B23
C2
ENGINE
OIL
PRESSURE
SENSOR
SIGNAL
B31
C2
5V
SUPPLY
A4
C1
SENSOR
GROUND
A16
C1
ENGINE
COOLANT
TEMPERATURE
SENSOR
SIGNAL
A15
C1
INTAKE
AIR
TEMPERATURE
SENSOR
SIGNAL
POWERTRAIN
CONTROL
MODULE


S129
(8W-70-4)
K7
20
OR
3
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
2
1
K167
20
BR/YL
S127
(8W-70-3)
K167
20
BR/YL
K167
20
BR/YL
S133
(8W-70-3)
K167
20
BR/YL
2
ENGINE
COOLANT
TEMPERATURE
SENSOR
1
3
ENGINE
OIL
PRESSURE
SENSOR
2
1
2
INTAKE
AIR
TEMPERATURE
SENSOR
1
K6
20
VT/OR
S123
(8W-70-4)
K7
18
OR
K1
18
DG/RD
G60
18
GY/YL
K6
18
VT/OR
K167
18
BR/YL
K2
18
TN/BK
K21
18
BK/RD
A17 C1
5V
SUPPLY
A27 C1
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
SIGNAL
B23 C2
ENGINE
OIL
PRESSURE
SENSOR
SIGNAL
B31 C2
5V
SUPPLY
A4 C1
SENSOR
GROUND
A16 C1
ENGINE
COOLANT
TEMPERATURE
SENSOR
SIGNAL
A15 C1
INTAKE
AIR
TEMPERATURE
SENSOR
SIGNAL
POWERTRAIN
CONTROL
MODULE


BATT A14
(8W-10-11)
POWER DISTRIBUTION CENTER
(8W-10-2)
A1
FUSE 27 10A
(8W-10-11)
A2
B1
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
B2
F142 20 OR/DG
A142 14 DG/PK
A142 14 DG/PK
OTHER
LEAK DETECTION
S101
(8W-10-11)
S107
(8W-10-11)
F142 20 OR/DG
3 C180
2
F142 20 OR/DG
1 C103
FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
LEAK DETECTION PUMP (EXCEPT BUILT-UP-EXPORT)
(8W-30-11)
S124
(8W-10-11)
F142 18 OR/DG
F142 18 OR/DG
F142 18 OR/DG
4
1
1
4
OXYGEN SENSOR 1/1 UPSTREAM
OXYGEN SENSOR 1/2 DOWNSTREAM
3
2
2
3
K167 20 BR/YL
Z1 18 BK
Z1 18 BK
K167 20 BR/YL
S127
(8W-70-3)
S132
(8W-15-6)
K167 20 BR/YL
Z1 14 BK
G105
(8W-15-6)
S133
(8W-70-3)
K41 18 BK/DG
K167 18 BR/YL
K141 18 TN/WT
A24 C1
A4 C1
A25 C1
OXYGEN SENSOR 1/1 SIGNAL
SENSOR GROUND
OXYGEN SENSOR 1/2 SIGNAL
POWERTRAIN CONTROL MODULE

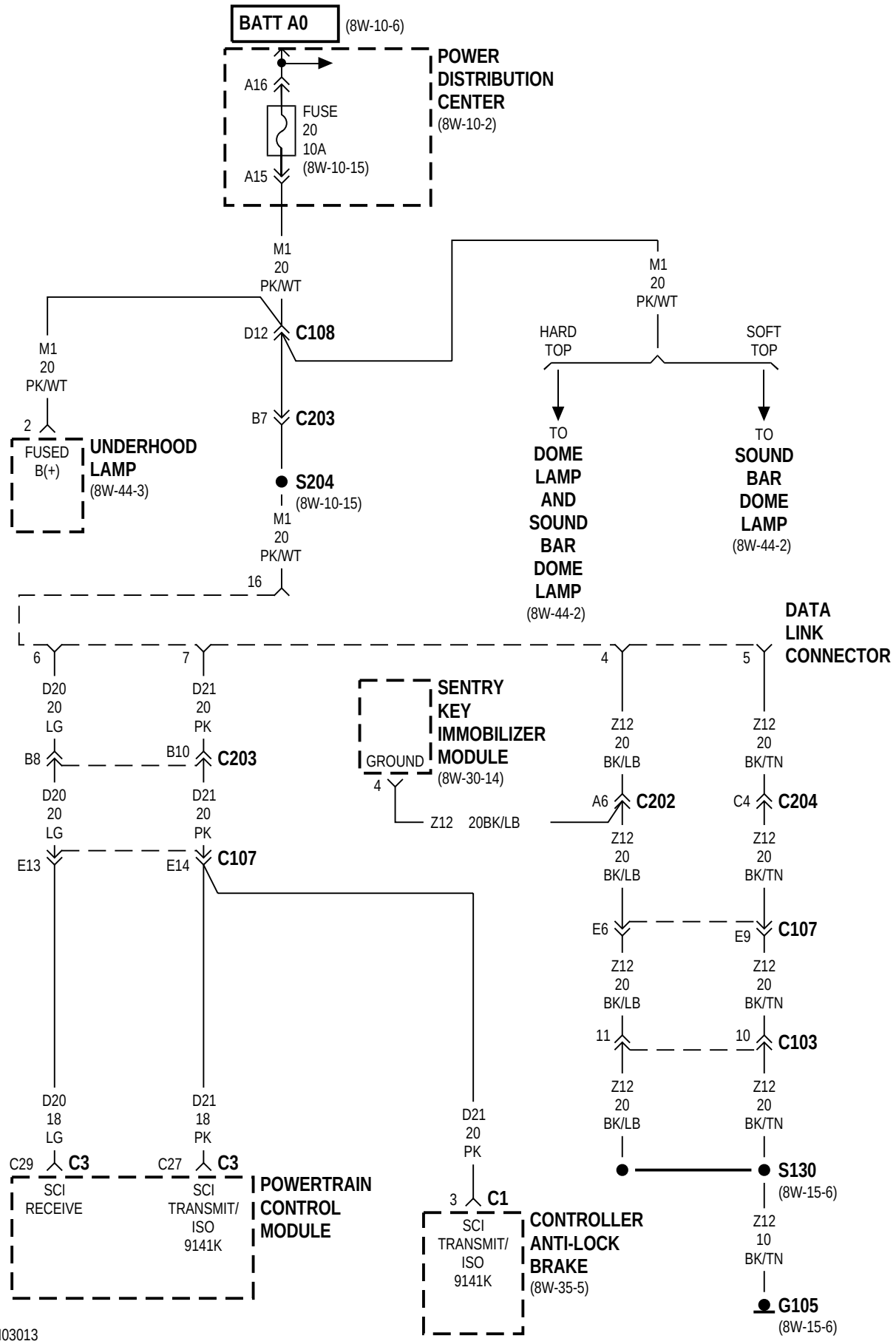

VEHICLE SPEED SENSOR
SENSOR GROUND
5V SUPPLY
VEHICLE SPEED SENSOR SIGNAL
2
1
3
K167 20 BR/YL
K6 20 VT/OR
G7 20 WT/OR
S129
(8W-70-4)
K7 20 OR
3
THROTTLE POSITION SENSOR
2
1
K167 20 BR/YL
S127
(8W-70-3)
K167 20 BR/YL
S133
(8W-70-3)
8
C103
K167 20 BR/YL
S147
(8W-70-3)
S123
(8W-70-4)
S135
G7 20 WT/OR
12
C103
G7 20 WT/OR
LHD
RHD
K167 20 BR/YL
K167 18 BR/YL
K6 20 VT/OR
2
1
BATTERY TEMPERATURE SENSOR
1
5V SUPPLY
ENGINE OIL PRESSURE SENSOR
(8W-30-7)
(8W-30-8)
7
VEHICLE SPEED SENSOR SIGNAL
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
K7 18 OR
K22 18 OR/DB
K118 18 PK/YL
K167 18 BR/YL
K6 18 VT/OR
G7 18 WT/OR
A17
C1
5V SUPPLY
A23
C1
THROTTLE POSITION SENSOR SIGNAL
C15
C3
BATTERY TEMPERATURE SENSOR SIGNAL
A4
C1
SENSOR GROUND
B31
C2
5V SUPPLY
B27
C2
VEHICLE SPEED SENSOR SIGNAL
POWERTRAIN CONTROL MODULE


ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 11 10A (8W-11-8)
31
F12 20 RD/LG
F10 C106
F12 20 RD/LG
11 C110
F12 20 RD/LG
2
DUTY CYCLE EVAP/ PURGE SOLENOID
1
K52 20 PK/BK
10 C110
K52 18 PK/BK
C20 C3
DUTY CYCLE/ EVAP PURGE SOLENOID CONTROL
S102
(8W-11-8)
F12 20 RD/LG
9 C103
F12 20 RD/LG
A
TORQUE CONVERTER CLUTCH SOLENOID
B
T23 18 OR/LG
B11 C2
TRANSMISSION LOW/ OVERDRIVE SOLENOID
IDLE AIR CONTROL MOTOR
IDLE AIR CONTROL NO. 1 DRIVER
IDLE AIR CONTROL NO. 2 DRIVER
IDLE AIR CONTROL NO. 3 DRIVER
IDLE AIR CONTROL NO. 4 DRIVER
4
3
2
1
K39 18 GY/RD
K60 18 YL/BK
K40 18 BR/WT
K59 18 VT/BK
A19 C1
A10 C1
A11 C1
A20 C1
IDLE AIR CONTROL NO. 1 DRIVER
IDLE AIR CONTROL NO. 2 DRIVER
IDLE AIR CONTROL NO. 3 DRIVER
IDLE AIR CONTROL NO. 4 DRIVER
FROM S101
(8W-10-11)
POWER DISTRIBUTION CENTER
(8W-10-2)
A1
FUSE 27 10A (8W-10-11)
A2
F142 20 OR/DG
S107
(8W-10-11)
3 C180
F142 20 OR/DG
2
LEAK DETECTION PUMP (EXCEPT BUILT-UP -EXPORT)
FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
3
4
K106 20 WT/DG
K105 20 WT/OR
2
1
C180
K106 18 WT/DG
K105 18 WT/OR
C10 C3
C14 C3
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
POWERTRAIN CONTROL MODULE



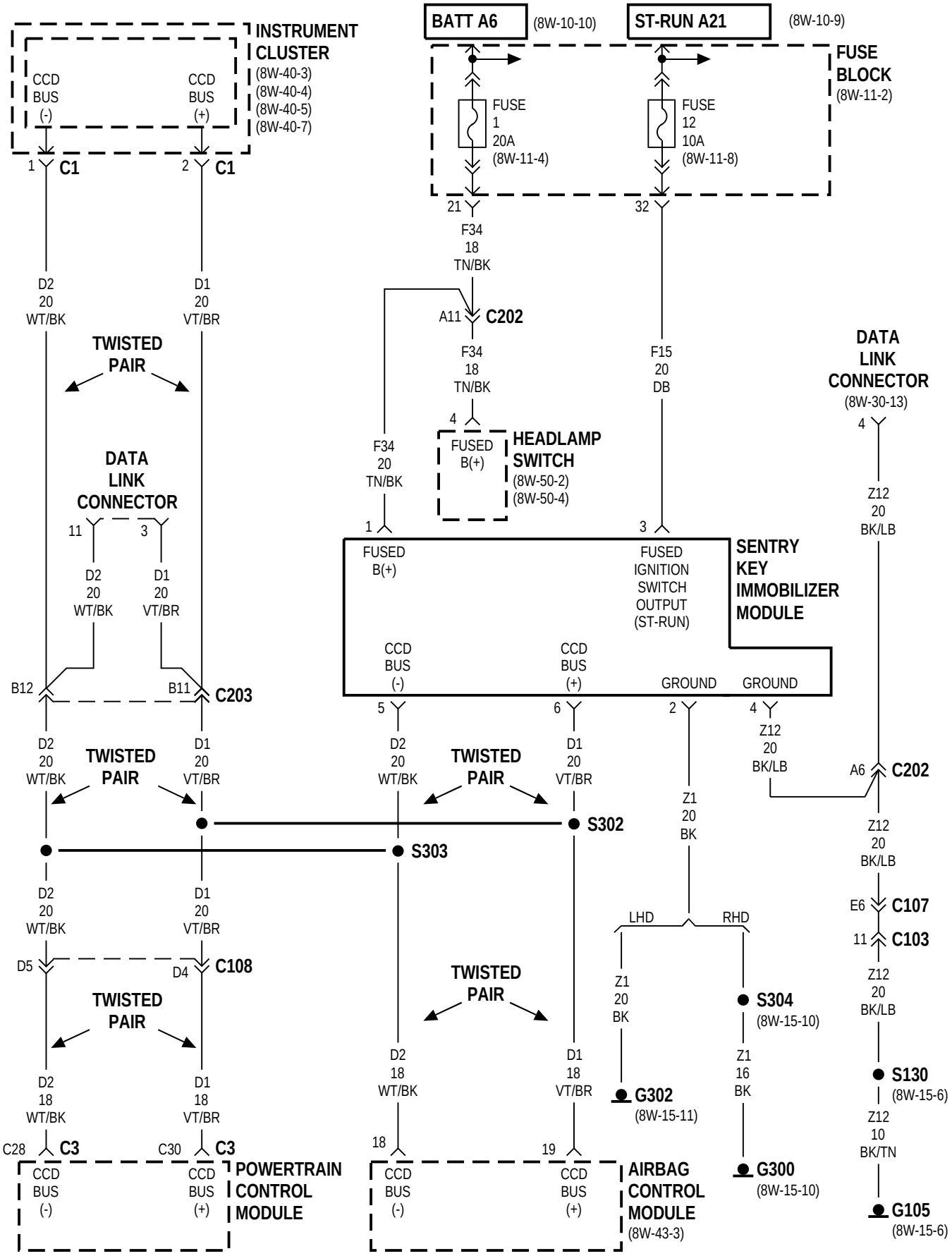
J998W-5

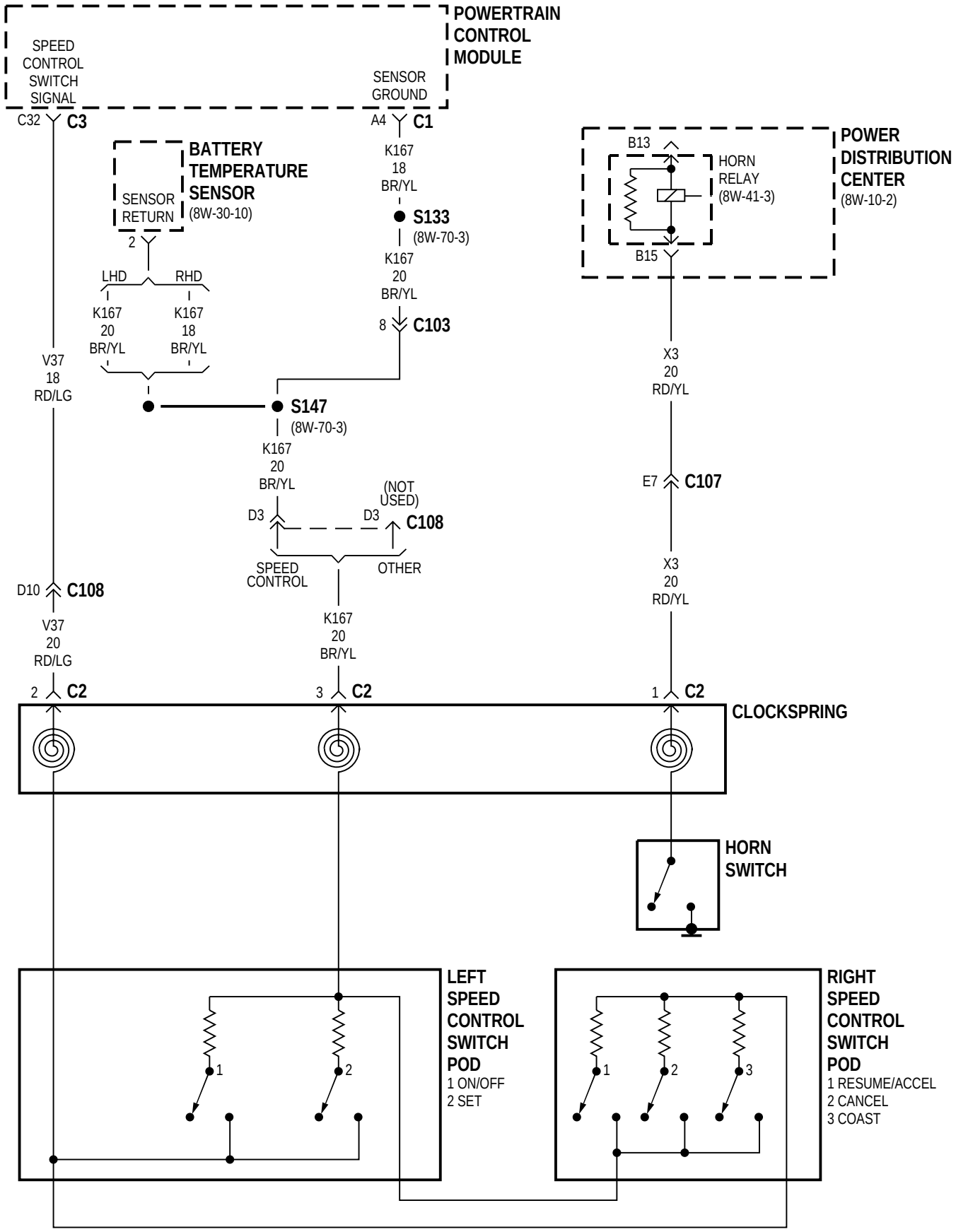
TJI03012

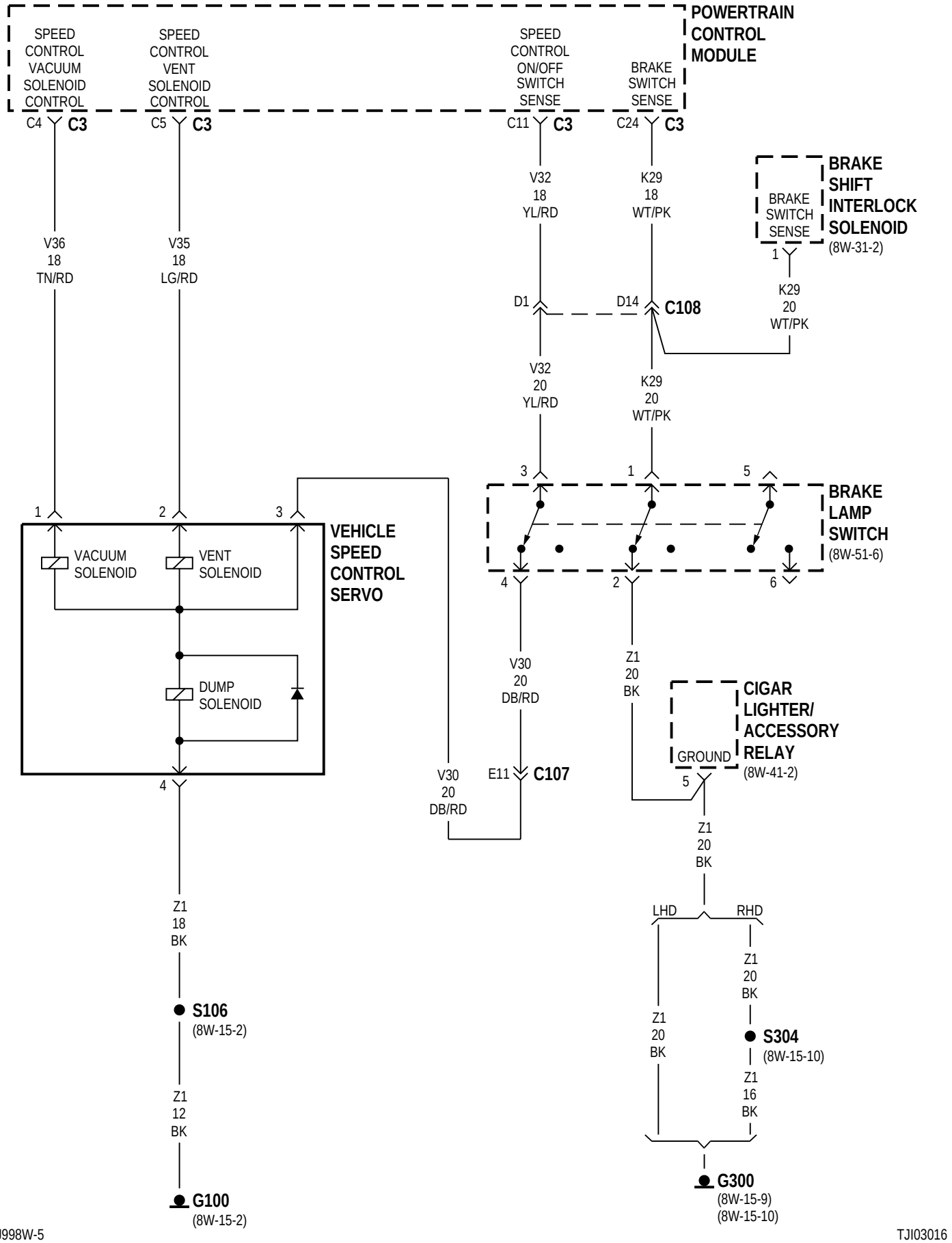


TJI03013

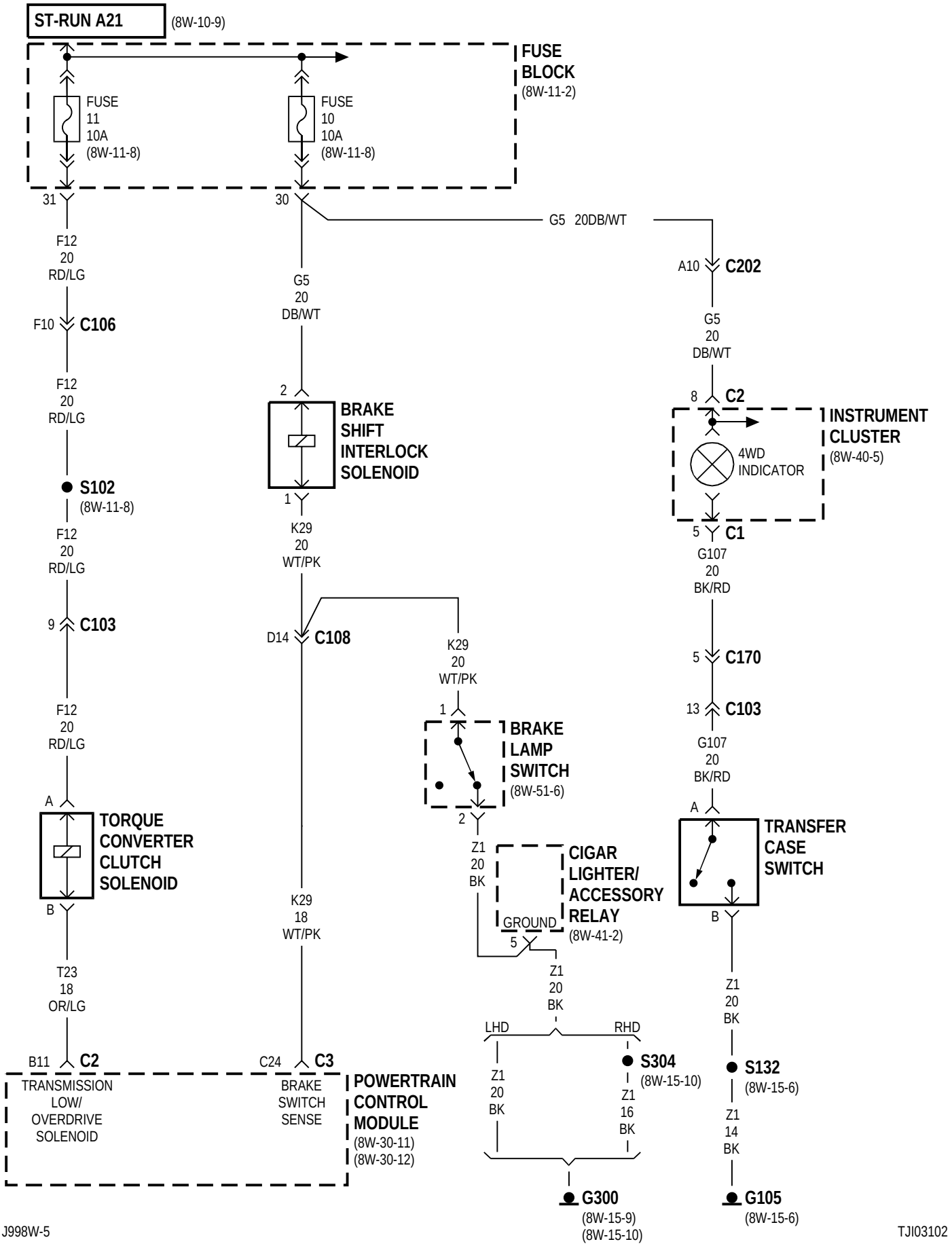
J998W-5


INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-4)
(8W-40-5)
(8W-40-7)
CCD BUS (-)
CCD BUS (+)
1 C1
2 C1
BATT A6
(8W-10-10)
ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 1 20A
(8W-11-4)
FUSE 12 10A
(8W-11-8)
21
32
F34 18 TN/BK
A11 C202
F34 18 TN/BK
4
FUSED B(+)
HEADLAMP SWITCH
(8W-50-2)
(8W-50-4)
F34 20 TN/BK
F15 20 DB
1
3
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
SENTRY KEY IMMOBILIZER MODULE
CCD BUS (-)
CCD BUS (+)
GROUND
GROUND
5
6
2
4
Z12 20 BK/LB
DATA LINK CONNECTOR
(8W-30-13)
4
Z12 20 BK/LB
A6 C202
D2 20 WT/BK
D1 20 VT/BR
TWISTED PAIR
DATA LINK CONNECTOR
11
3
B12
B11 C203
Z1 20 BK
LHD
RHD
Z12 20 BK/LB
E6 C107
11 C103
Z12 20 BK/LB
S302
S303
D5
D4 C108
S304
(8W-15-10)
Z1 20 BK
Z1 16 BK
G302
(8W-15-11)
G300
(8W-15-10)
S130
(8W-15-6)
Z12 10 BK/TN
G105
(8W-15-6)
D2 18 WT/BK
D1 18 VT/BR
C28 C3
C30 C3
18
19
POWERTRAIN CONTROL MODULE
AIRBAG CONTROL MODULE
(8W-43-3)

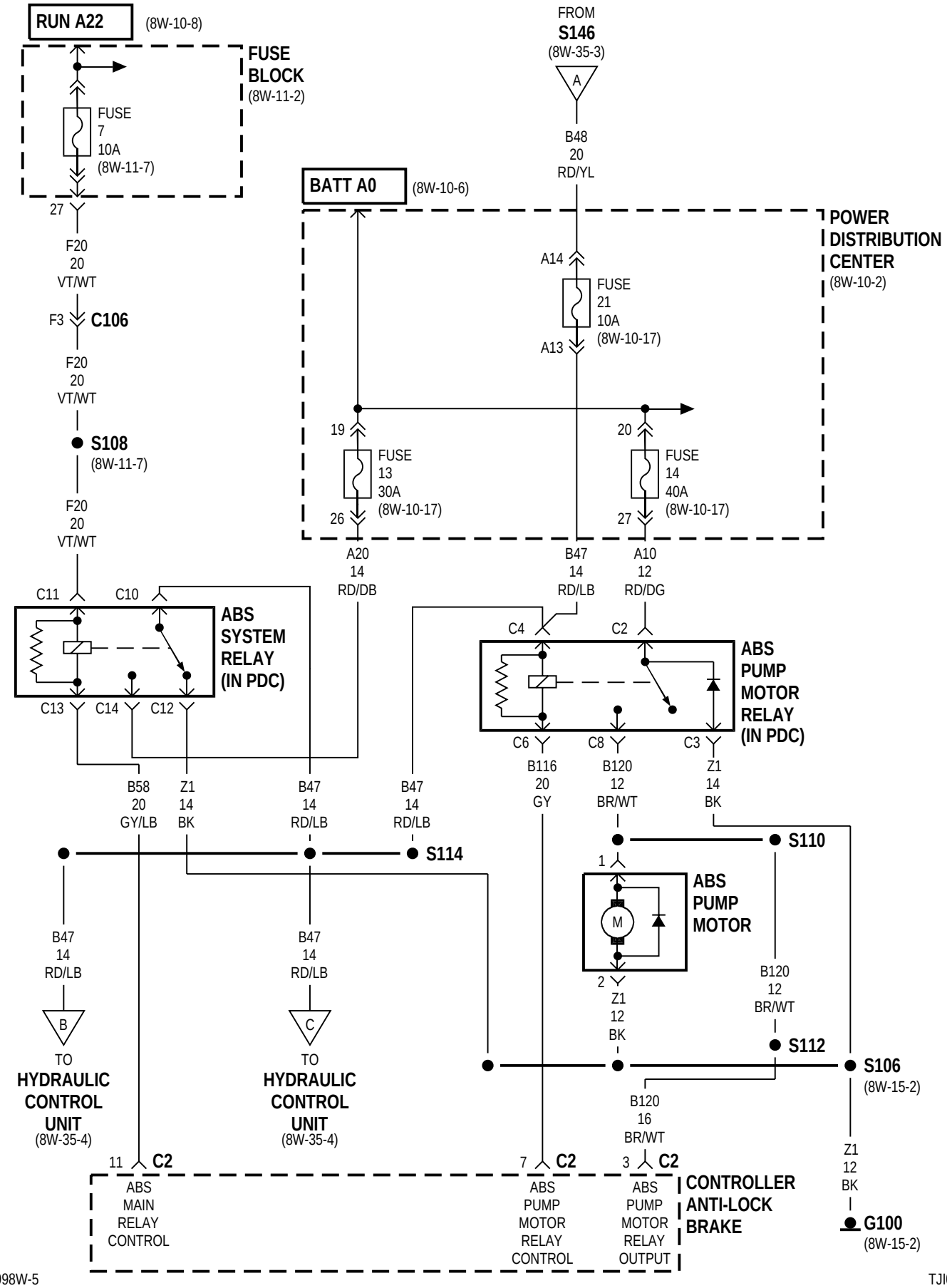

POWERTRAIN CONTROL MODULE
SPEED CONTROL SWITCH SIGNAL
C32
C3
SENSOR GROUND
A4
C1
BATTERY TEMPERATURE SENSOR
(8W-30-10)
SENSOR RETURN
2
K167 18 BR/YL
S133
(8W-70-3)
K167 20 BR/YL
8
C103
LHD
RHD
K167 20 BR/YL
K167 18 BR/YL
V37 18 RD/LG
S147
(8W-70-3)
K167 20 BR/YL
(NOT USED)
D3
D3
C108
SPEED CONTROL
OTHER
D10
C108
V37 20 RD/LG
K167 20 BR/YL
2
C2
3
C2
B13
HORN RELAY (8W-41-3)
B15
POWER DISTRIBUTION CENTER
(8W-10-2)
X3 20 RD/YL
E7
C107
X3 20 RD/YL
1
C2
CLOCKSPRING
HORN SWITCH
LEFT SPEED CONTROL SWITCH POD
1 ON/OFF
2 SET
RIGHT SPEED CONTROL SWITCH POD
1 RESUME/ACCEL
2 CANCEL
3 COAST


POWERTRAIN CONTROL MODULE
SPEED CONTROL VACUUM SOLENOID CONTROL
SPEED CONTROL VENT SOLENOID CONTROL
SPEED CONTROL ON/OFF SWITCH SENSE
BRAKE SWITCH SENSE
C4 C3
C5 C3
C11 C3
C24 C3
V36 18 TN/RD
V35 18 LG/RD
V32 18 YL/RD
K29 18 WT/PK
BRAKE SHIFT INTERLOCK SOLENOID (8W-31-2)
BRAKE SWITCH SENSE
K29 20 WT/PK
D1
D14 C108
V32 20 YL/RD
K29 20 WT/PK
BRAKE LAMP SWITCH (8W-51-6)
VEHICLE SPEED CONTROL SERVO
VACUUM SOLENOID
VENT SOLENOID
DUMP SOLENOID
V30 20 DB/RD
E11 C107
V30 20 DB/RD
Z1 20 BK
CIGAR LIGHTER/ ACCESSORY RELAY (8W-41-2)
GROUND
Z1 20 BK
LHD
RHD
Z1 18 BK
S106 (8W-15-2)
Z1 12 BK
G100 (8W-15-2)
Z1 20 BK
Z1 20 BK
S304 (8W-15-10)
Z1 16 BK
G300 (8W-15-9) (8W-15-10)

8W-31 TRANSMISSION CONTROL SYSTEM


ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 11 10A (8W-11-8)
FUSE 10 10A (8W-11-8)
31
30
G5 20DB/WT
F12 20 RD/LG
F10 C106
F12 20 RD/LG
S102
(8W-11-8)
F12 20 RD/LG
9 C103
F12 20 RD/LG
A
TORQUE CONVERTER CLUTCH SOLENOID
B
T23 18 OR/LG
B11 C2
TRANSMISSION LOW/ OVERDRIVE SOLENOID
G5 20 DB/WT
2
BRAKE SHIFT INTERLOCK SOLENOID
1
K29 20 WT/PK
D14 C108
K29 18 WT/PK
C24 C3
BRAKE SWITCH SENSE
POWERTRAIN CONTROL MODULE
(8W-30-11)
(8W-30-12)
K29 20 WT/PK
1
BRAKE LAMP SWITCH
(8W-51-6)
2
Z1 20 BK
CIGAR LIGHTER/ ACCESSORY RELAY
(8W-41-2)
GROUND
5
Z1 20 BK
LHD
RHD
Z1 20 BK
S304
(8W-15-10)
Z1 16 BK
G300
(8W-15-9)
(8W-15-10)
A10 C202
G5 20 DB/WT
8 C2
INSTRUMENT CLUSTER
(8W-40-5)
4WD INDICATOR
5 C1
G107 20 BK/RD
5 C170
13 C103
G107 20 BK/RD
A
TRANSFER CASE SWITCH
B
Z1 20 BK
S132
(8W-15-6)
Z1 14 BK
G105
(8W-15-6)

8W-35 ANTI-LOCK BRAKES



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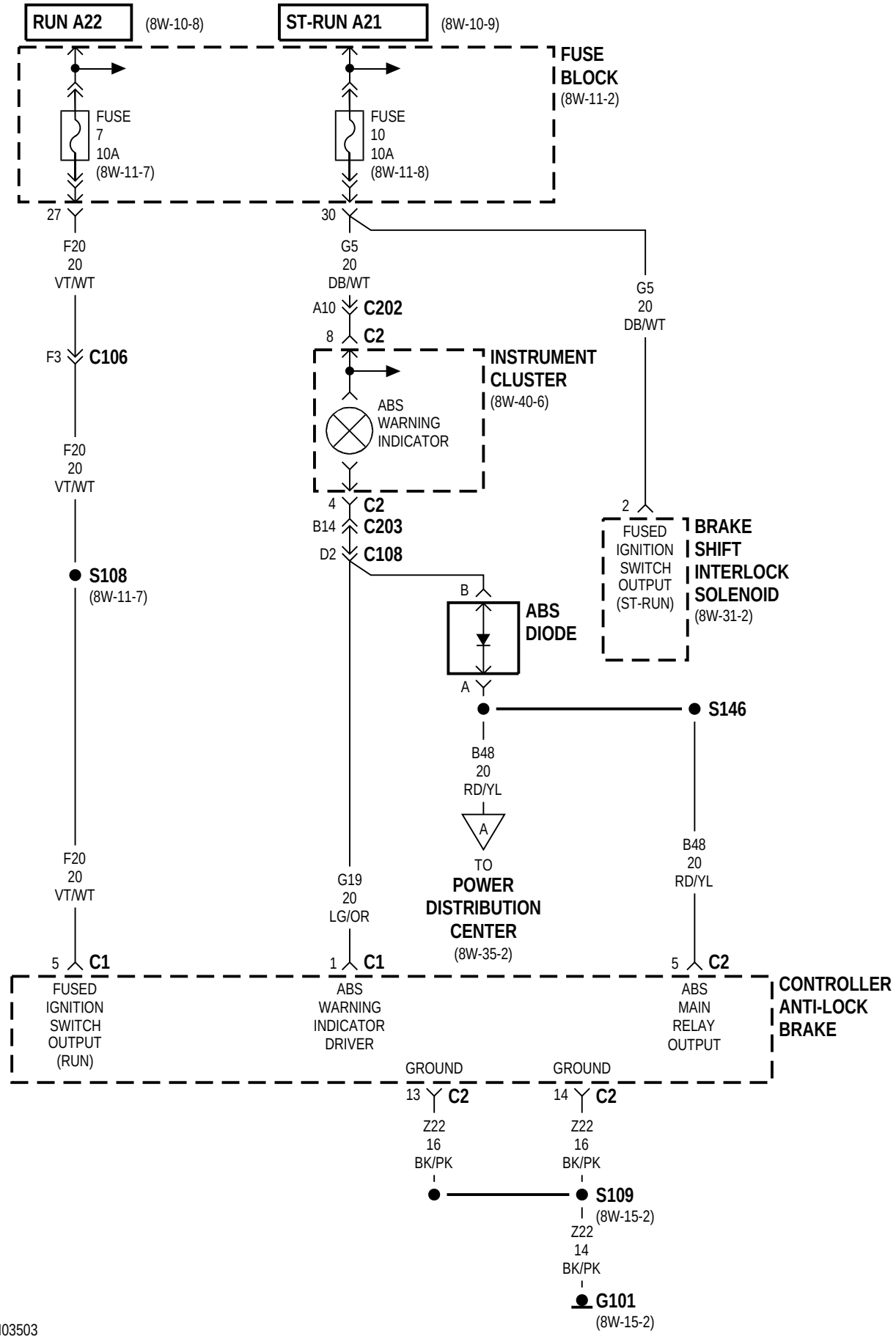
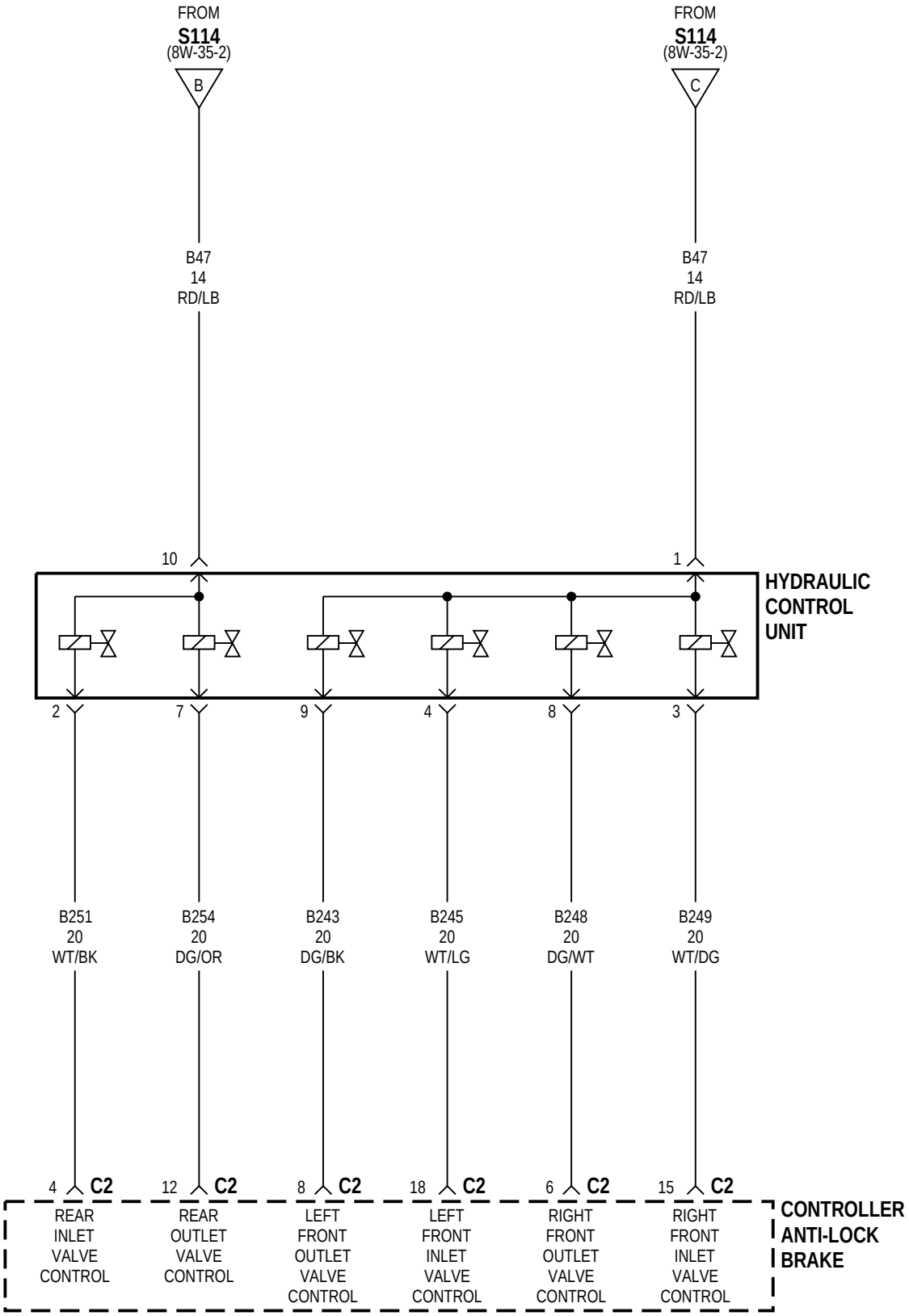
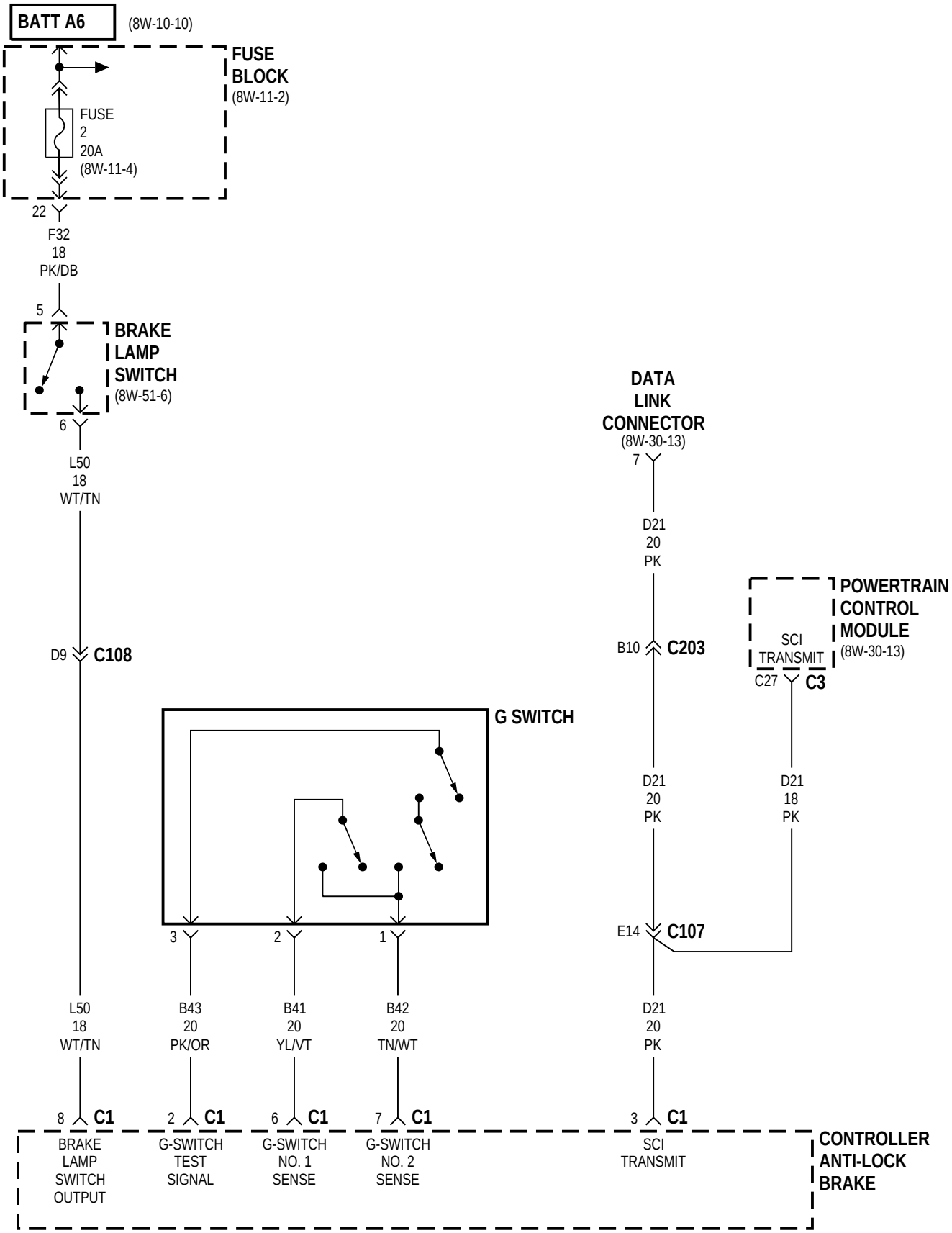
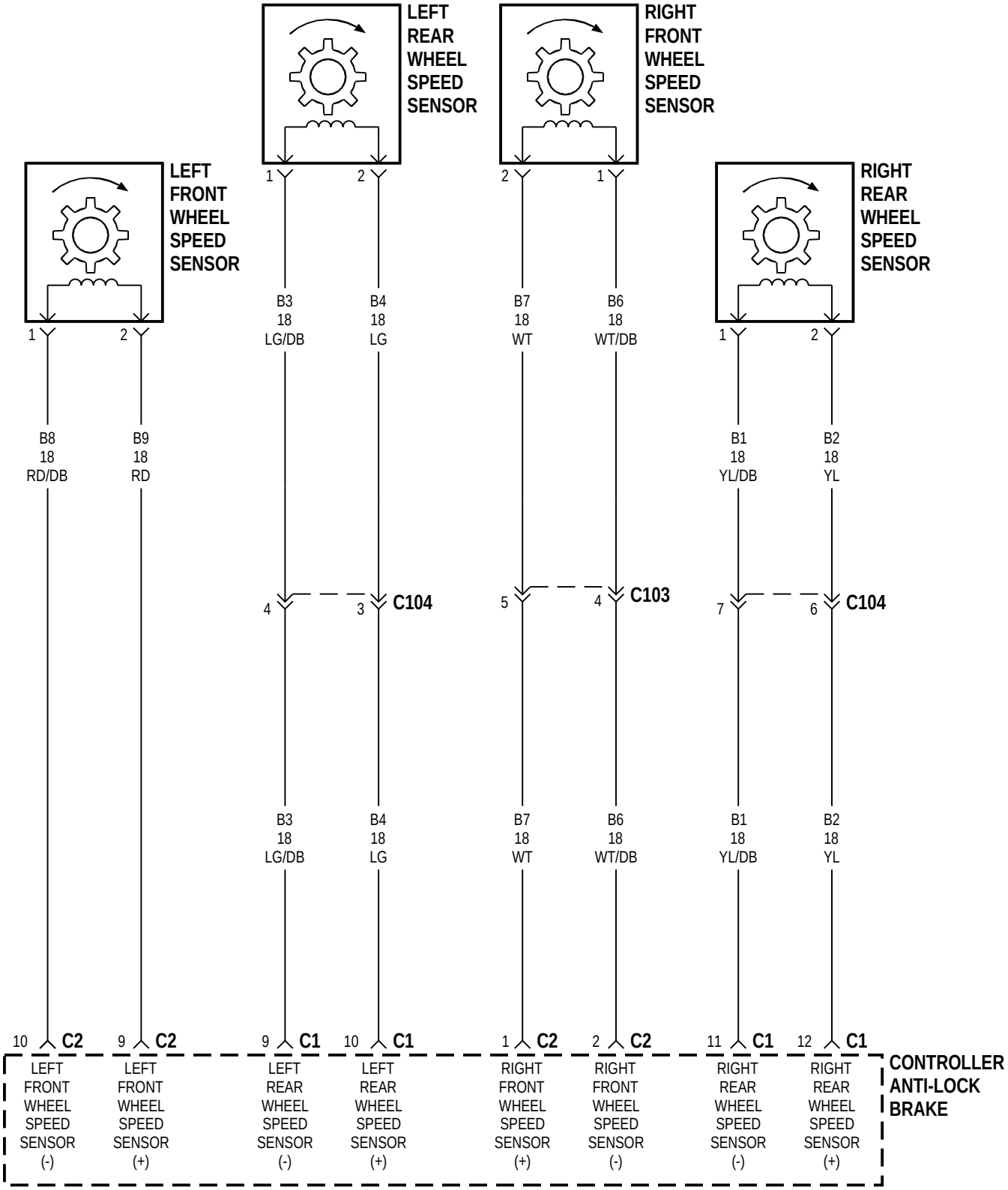


TJI03503

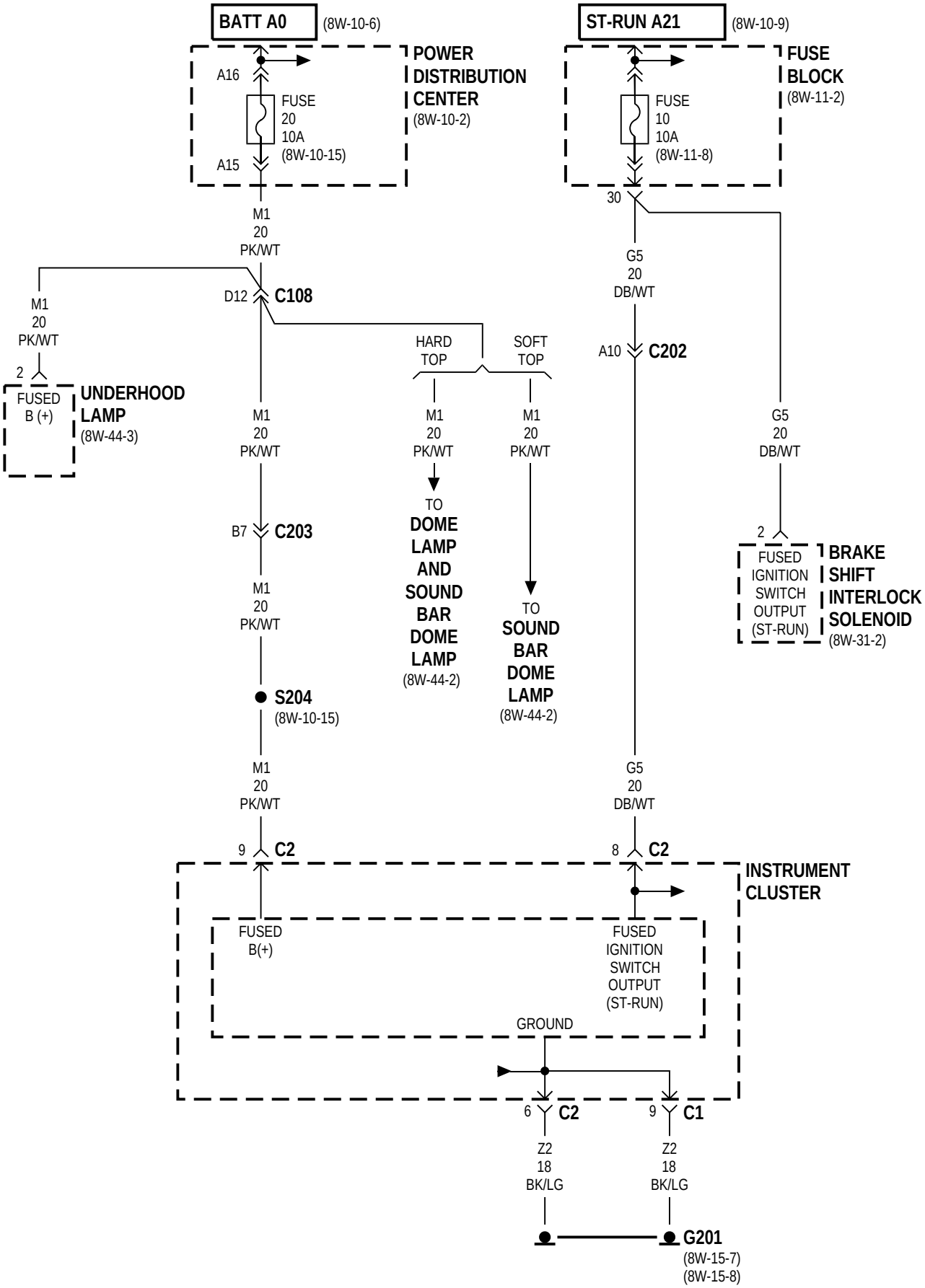
J998W-5

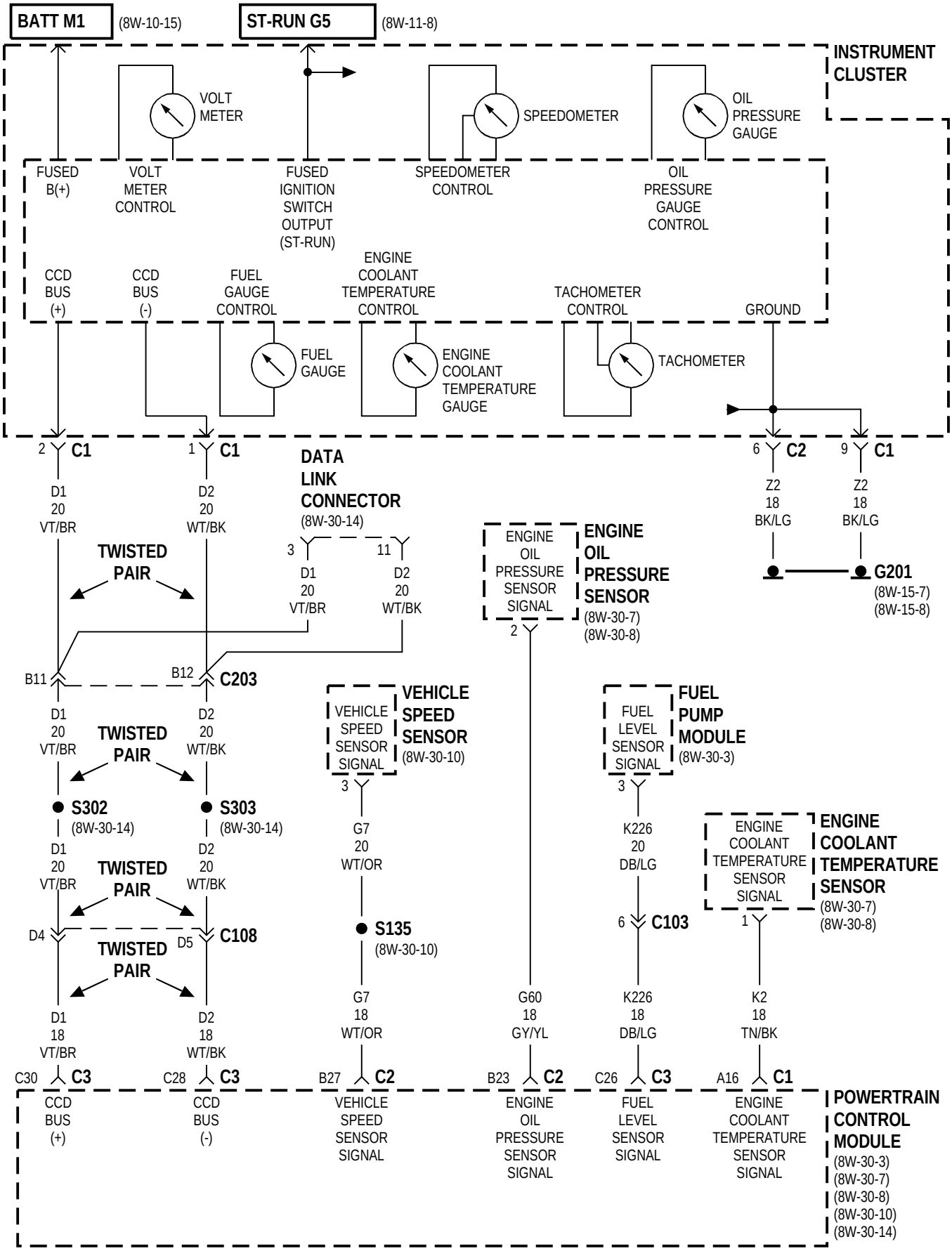

FROM
S114
(8W-35-2)
B
FROM
S114
(8W-35-2)
C
B47
14
RD/LB
B47
14
RD/LB
10
1
HYDRAULIC
CONTROL
UNIT
2
7
9
4
8
3
B251
20
WT/BK
B254
20
DG/OR
B243
20
DG/BK
B245
20
WT/LG
B248
20
DG/WT
B249
20
WT/DG
4 C2
12 C2
8 C2
18 C2
6 C2
15 C2
REAR
INLET
VALVE
CONTROL
REAR
OUTLET
VALVE
CONTROL
LEFT
FRONT
OUTLET
VALVE
CONTROL
LEFT
FRONT
INLET
VALVE
CONTROL
RIGHT
FRONT
OUTLET
VALVE
CONTROL
RIGHT
FRONT
INLET
VALVE
CONTROL
CONTROLLER
ANTI-LOCK
BRAKE

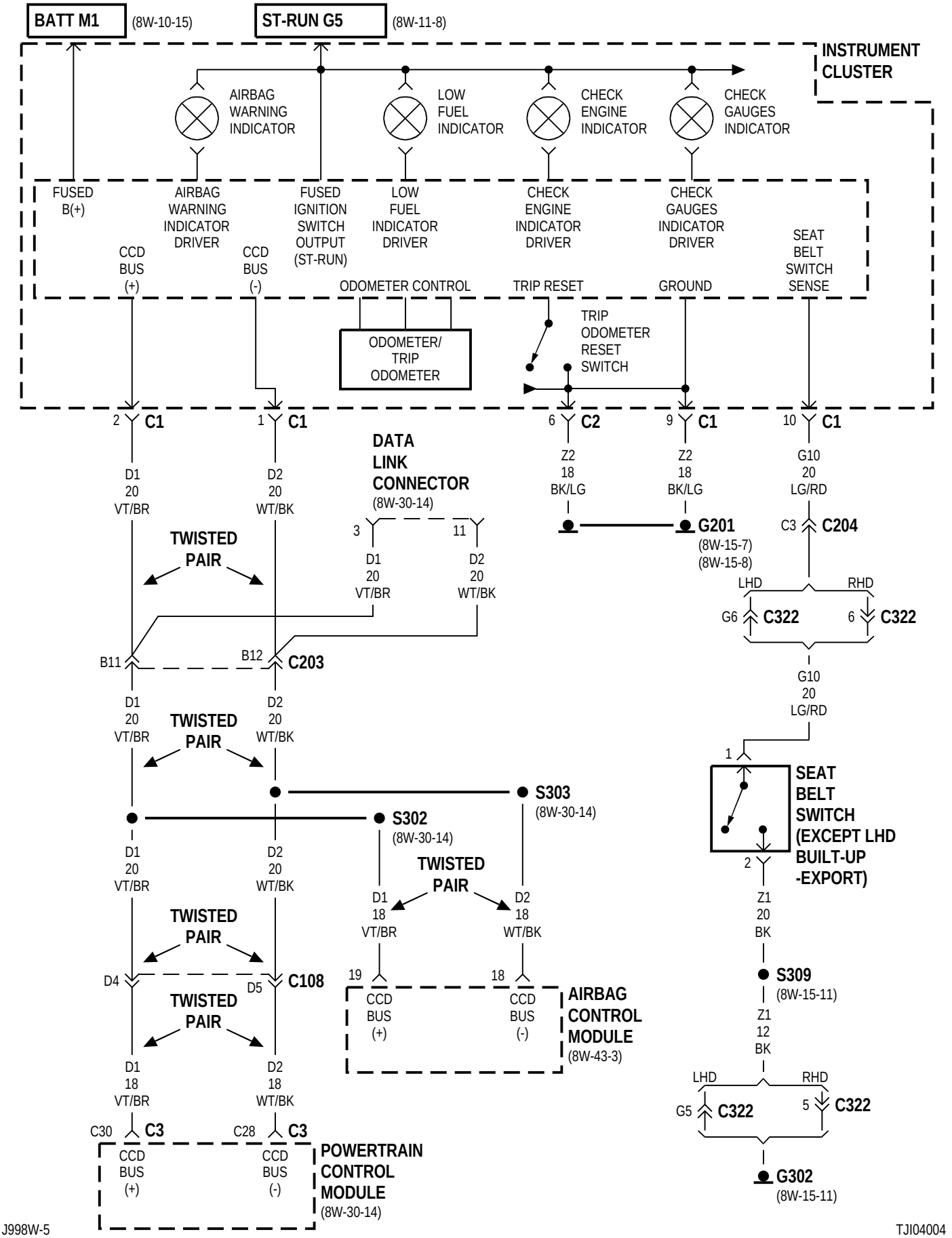

BATT A6
(8W-10-10)
FUSE BLOCK
(8W-11-2)
FUSE
2
20A
(8W-11-4)
22
F32
18
PK/DB
5
BRAKE LAMP SWITCH
(8W-51-6)
6
L50
18
WT/TN
D9
C108
L50
18
WT/TN
8
C1
BRAKE LAMP SWITCH OUTPUT
G SWITCH
3
2
1
B43
20
PK/OR
B41
20
YL/VT
B42
20
TN/WT
2
C1
6
C1
7
C1
G-SWITCH TEST SIGNAL
G-SWITCH NO. 1 SENSE
G-SWITCH NO. 2 SENSE
DATA LINK CONNECTOR
(8W-30-13)
7
D21
20
PK
B10
C203
D21
20
PK
E14
C107
D21
20
PK
3
C1
SCI TRANSMIT
POWERTRAIN CONTROL MODULE
(8W-30-13)
SCI TRANSMIT
C27
C3
D21
18
PK
CONTROLLER ANTI-LOCK BRAKE

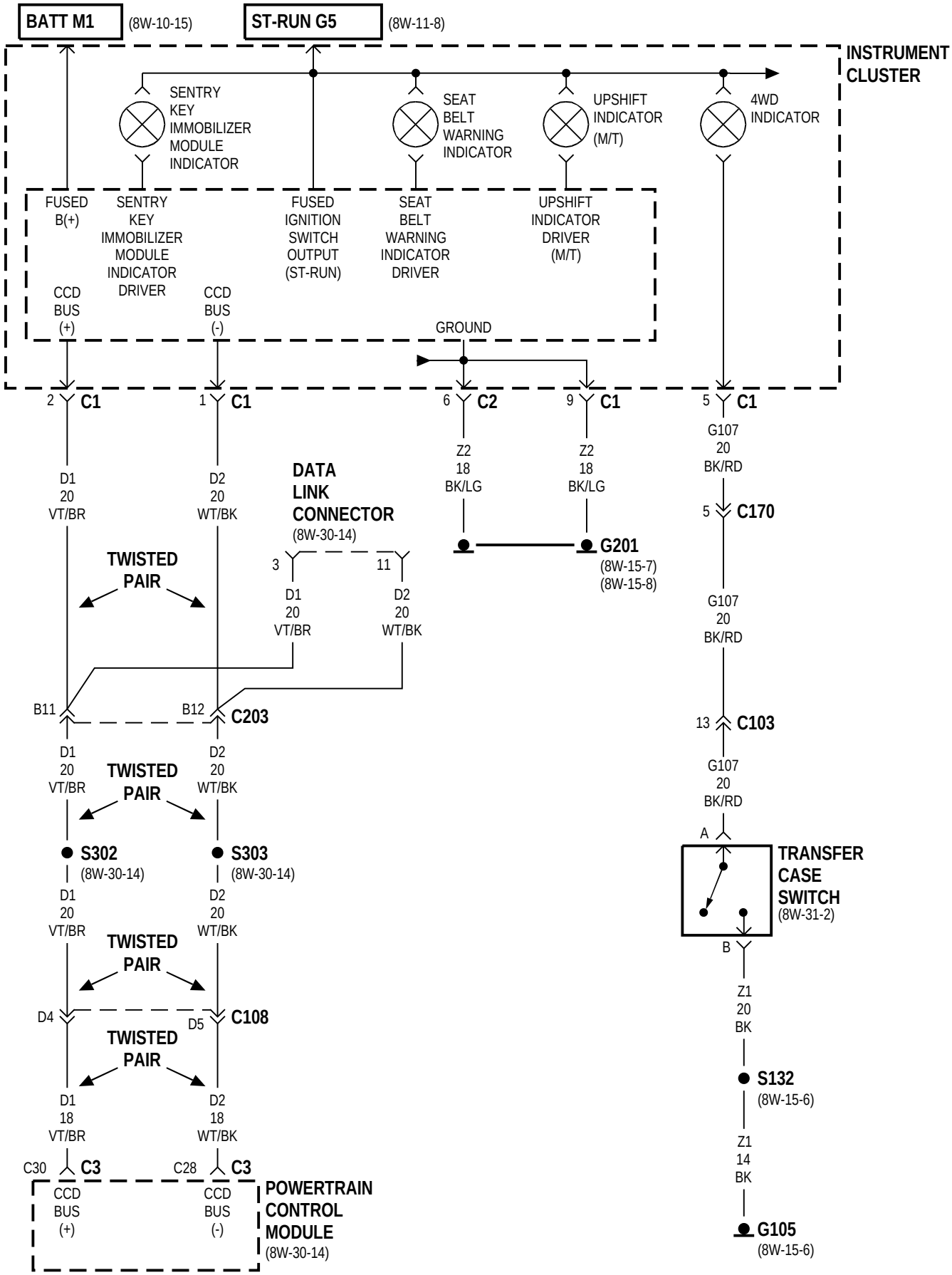

LEFT FRONT WHEEL SPEED SENSOR
LEFT REAR WHEEL SPEED SENSOR
RIGHT FRONT WHEEL SPEED SENSOR
RIGHT REAR WHEEL SPEED SENSOR
1
2
B8 18 RD/DB
B9 18 RD
B3 18 LG/DB
B4 18 LG
B7 18 WT
B6 18 WT/DB
B1 18 YL/DB
B2 18 YL
4
3
C104
5
4
C103
7
6
C104
10 C2
9 C2
9 C1
10 C1
1 C2
2 C2
11 C1
12 C1
LEFT FRONT WHEEL SPEED SENSOR (-)
LEFT FRONT WHEEL SPEED SENSOR (+)
LEFT REAR WHEEL SPEED SENSOR (-)
LEFT REAR WHEEL SPEED SENSOR (+)
RIGHT FRONT WHEEL SPEED SENSOR (+)
RIGHT FRONT WHEEL SPEED SENSOR (-)
RIGHT REAR WHEEL SPEED SENSOR (-)
RIGHT REAR WHEEL SPEED SENSOR (+)
CONTROLLER ANTI-LOCK BRAKE

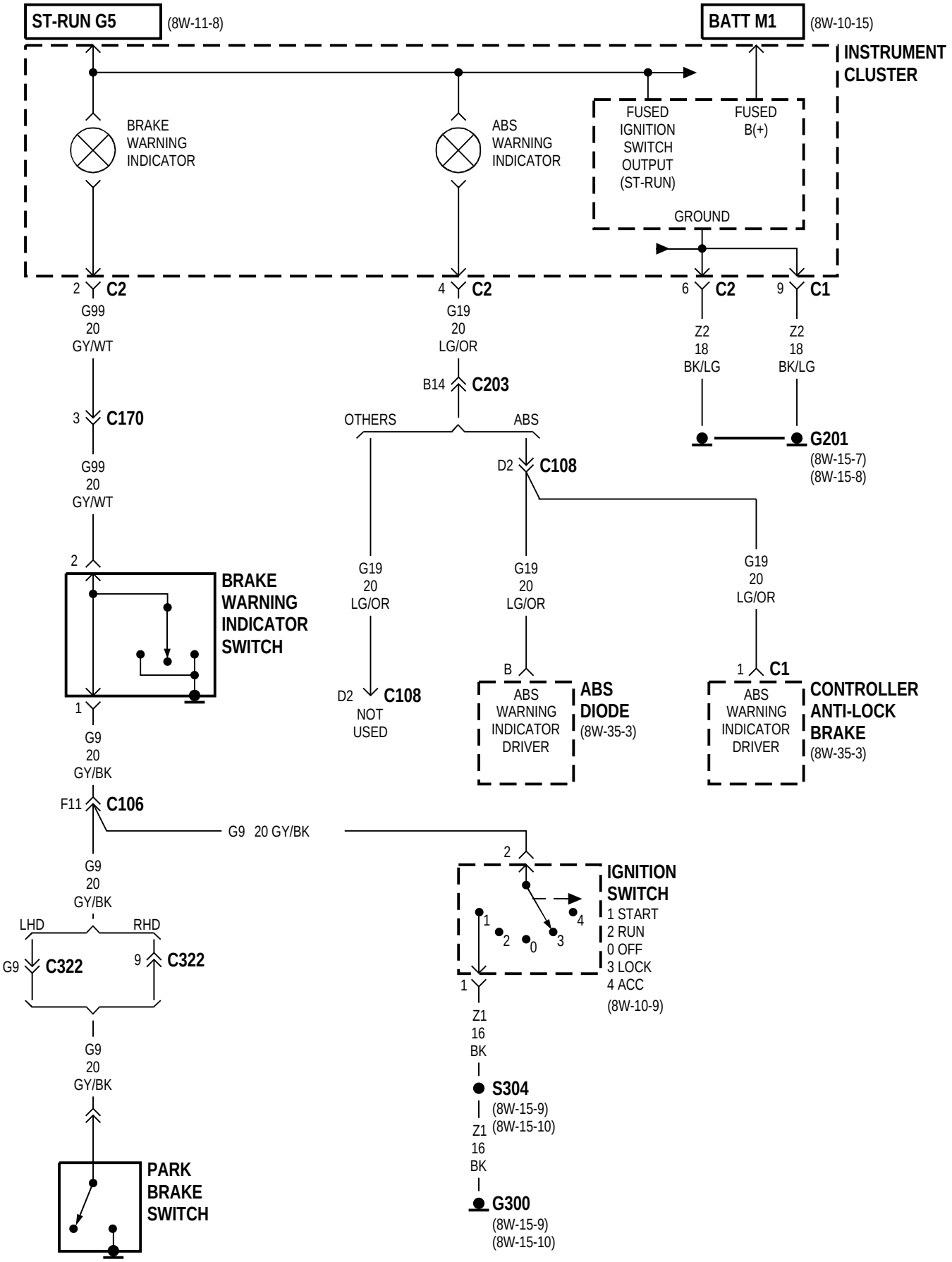
8W-40 INSTRUMENT CLUSTER

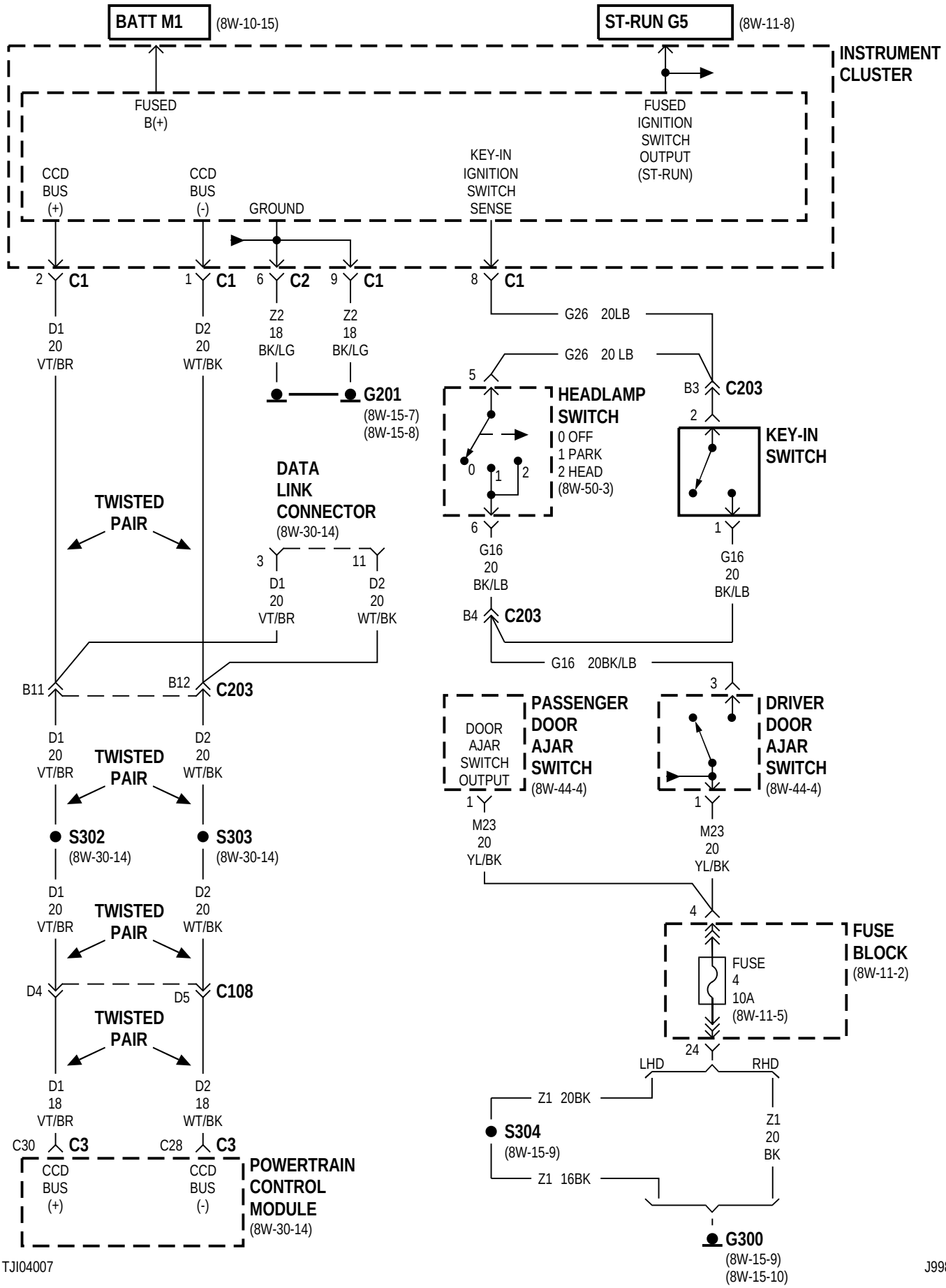

BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A16
FUSE 20 10A
(8W-10-15)
A15
M1 20 PK/WT
D12
C108
ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 10 10A
(8W-11-8)
30
G5 20 DB/WT
A10
C202
M1 20 PK/WT
2
FUSED B (+)
UNDERHOOD LAMP
(8W-44-3)
HARD TOP
SOFT TOP
M1 20 PK/WT
TO DOME LAMP AND SOUND BAR DOME LAMP
(8W-44-2)
M1 20 PK/WT
TO SOUND BAR DOME LAMP
(8W-44-2)
G5 20 DB/WT
2
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
BRAKE SHIFT INTERLOCK SOLENOID
(8W-31-2)
B7
C203
M1 20 PK/WT
S204
(8W-10-15)
M1 20 PK/WT
9
C2
G5 20 DB/WT
8
C2
INSTRUMENT CLUSTER
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
GROUND
6
C2
9
C1
Z2 18 BK/LG
Z2 18 BK/LG
G201
(8W-15-7)
(8W-15-8)


BATT M1
(8W-10-15)
ST-RUN G5
(8W-11-8)
INSTRUMENT CLUSTER
VOLT METER
SPEEDOMETER
OIL PRESSURE GAUGE
FUSED B(+)
VOLT METER CONTROL
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
SPEEDOMETER CONTROL
OIL PRESSURE GAUGE CONTROL
CCD BUS (+)
CCD BUS (-)
FUEL GAUGE CONTROL
ENGINE COOLANT TEMPERATURE CONTROL
TACHOMETER CONTROL
GROUND
FUEL GAUGE
ENGINE COOLANT TEMPERATURE GAUGE
TACHOMETER
2 C1
1 C1
6 C2
9 C1
D1 20 VT/BR
D2 20 WT/BK
Z2 18 BK/LG
DATA LINK CONNECTOR
(8W-30-14)
TWISTED PAIR
3
11
ENGINE OIL PRESSURE SENSOR SIGNAL
ENGINE OIL PRESSURE SENSOR
(8W-30-7)
(8W-30-8)
G201
(8W-15-7)
(8W-15-8)
B11
B12
C203
VEHICLE SPEED SENSOR SIGNAL
VEHICLE SPEED SENSOR
(8W-30-10)
FUEL LEVEL SENSOR SIGNAL
FUEL PUMP MODULE
(8W-30-3)
S302
(8W-30-14)
S303
(8W-30-14)
G7 20 WT/OR
K226 20 DB/LG
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
ENGINE COOLANT TEMPERATURE SENSOR
(8W-30-7)
(8W-30-8)
D4
D5
C108
S135
(8W-30-10)
D1 18 VT/BR
D2 18 WT/BK
G7 18 WT/OR
G60 18 GY/YL
K226 18 DB/LG
K2 18 TN/BK
C30 C3
C28 C3
B27 C2
B23 C2
C26 C3
A16 C1
CCD BUS (+)
CCD BUS (-)
VEHICLE SPEED SENSOR SIGNAL
ENGINE OIL PRESSURE SENSOR SIGNAL
FUEL LEVEL SENSOR SIGNAL
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
POWERTRAIN CONTROL MODULE
(8W-30-3)
(8W-30-7)
(8W-30-8)
(8W-30-10)
(8W-30-14)


BATT M1
(8W-10-15)
ST-RUN G5
(8W-11-8)
INSTRUMENT CLUSTER
AIRBAG WARNING INDICATOR
LOW FUEL INDICATOR
CHECK ENGINE INDICATOR
CHECK GAUGES INDICATOR
FUSED B(+)
AIRBAG WARNING INDICATOR DRIVER
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
LOW FUEL INDICATOR DRIVER
CHECK ENGINE INDICATOR DRIVER
CHECK GAUGES INDICATOR DRIVER
SEAT BELT SWITCH SENSE
CCD BUS (+)
CCD BUS (-)
ODOMETER CONTROL
TRIP RESET
GROUND
ODOMETER/ TRIP ODOMETER
TRIP ODOMETER RESET SWITCH
2 C1
1 C1
6 C2
9 C1
10 C1
DATA LINK CONNECTOR
(8W-30-14)
Z2 18 BK/LG
Z2 18 BK/LG
G10 20 LG/RD
G201
(8W-15-7)
(8W-15-8)
C3 C204
LHD
RHD
G6 C322
6 C322
D1 20 VT/BR
D2 20 WT/BK
TWISTED PAIR
3
11
B11
B12 C203
G10 20 LG/RD
1
SEAT BELT SWITCH (EXCEPT LHD BUILT-UP -EXPORT)
2
Z1 20 BK
S303
(8W-30-14)
S302
(8W-30-14)
S309
(8W-15-11)
Z1 12 BK
D1 18 VT/BR
D2 18 WT/BK
D4
D5 C108
19
18
CCD BUS (+)
CCD BUS (-)
AIRBAG CONTROL MODULE
(8W-43-3)
G5 C322
5 C322
G302
(8W-15-11)
C30 C3
C28 C3
POWERTRAIN CONTROL MODULE
(8W-30-14)


BATT M1
(8W-10-15)
ST-RUN G5
(8W-11-8)
INSTRUMENT CLUSTER
SENTRY KEY IMMOBILIZER MODULE INDICATOR
SEAT BELT WARNING INDICATOR
UPSHIFT INDICATOR (M/T)
4WD INDICATOR
FUSED B(+)
SENTRY KEY IMMOBILIZER MODULE INDICATOR DRIVER
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
SEAT BELT WARNING INDICATOR DRIVER
UPSHIFT INDICATOR DRIVER (M/T)
CCD BUS (+)
CCD BUS (-)
GROUND
2 C1
1 C1
6 C2
9 C1
5 C1
D1 20 VT/BR
D2 20 WT/BK
Z2 18 BK/LG
Z2 18 BK/LG
G107 20 BK/RD
5 C170
G107 20 BK/RD
13 C103
G107 20 BK/RD
DATA LINK CONNECTOR
(8W-30-14)
3
11
D1 20 VT/BR
D2 20 WT/BK
G201
(8W-15-7)
(8W-15-8)
TWISTED PAIR
B11
B12
C203
D1 20 VT/BR
D2 20 WT/BK
TWISTED PAIR
S302
(8W-30-14)
S303
(8W-30-14)
D1 20 VT/BR
D2 20 WT/BK
TWISTED PAIR
D4
D5
C108
TWISTED PAIR
D1 18 VT/BR
D2 18 WT/BK
C30 C3
C28 C3
CCD BUS (+)
CCD BUS (-)
POWERTRAIN CONTROL MODULE
(8W-30-14)
A
TRANSFER CASE SWITCH
(8W-31-2)
B
Z1 20 BK
S132
(8W-15-6)
Z1 14 BK
G105
(8W-15-6)


ST-RUN G5
(8W-11-8)
BATT M1
(8W-10-15)
INSTRUMENT CLUSTER
BRAKE WARNING INDICATOR
ABS WARNING INDICATOR
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED B(+)
GROUND
2 C2
4 C2
6 C2
9 C1
G99 20 GY/WT
G19 20 LG/OR
Z2 18 BK/LG
Z2 18 BK/LG
B14 C203
OTHERS
ABS
G201
(8W-15-7)
(8W-15-8)
3 C170
D2 C108
G99 20 GY/WT
2
BRAKE WARNING INDICATOR SWITCH
G19 20 LG/OR
G19 20 LG/OR
G19 20 LG/OR
B
1 C1
D2 C108
NOT USED
ABS WARNING INDICATOR DRIVER
ABS DIODE
(8W-35-3)
ABS WARNING INDICATOR DRIVER
CONTROLLER ANTI-LOCK BRAKE
(8W-35-3)
1
G9 20 GY/BK
F11 C106
G9 20 GY/BK
G9 20 GY/BK
2
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-9)
LHD
RHD
G9 C322
9 C322
1
Z1 16 BK
G9 20 GY/BK
S304
(8W-15-9)
(8W-15-10)
Z1 16 BK
G300
(8W-15-9)
(8W-15-10)
PARK BRAKE SWITCH



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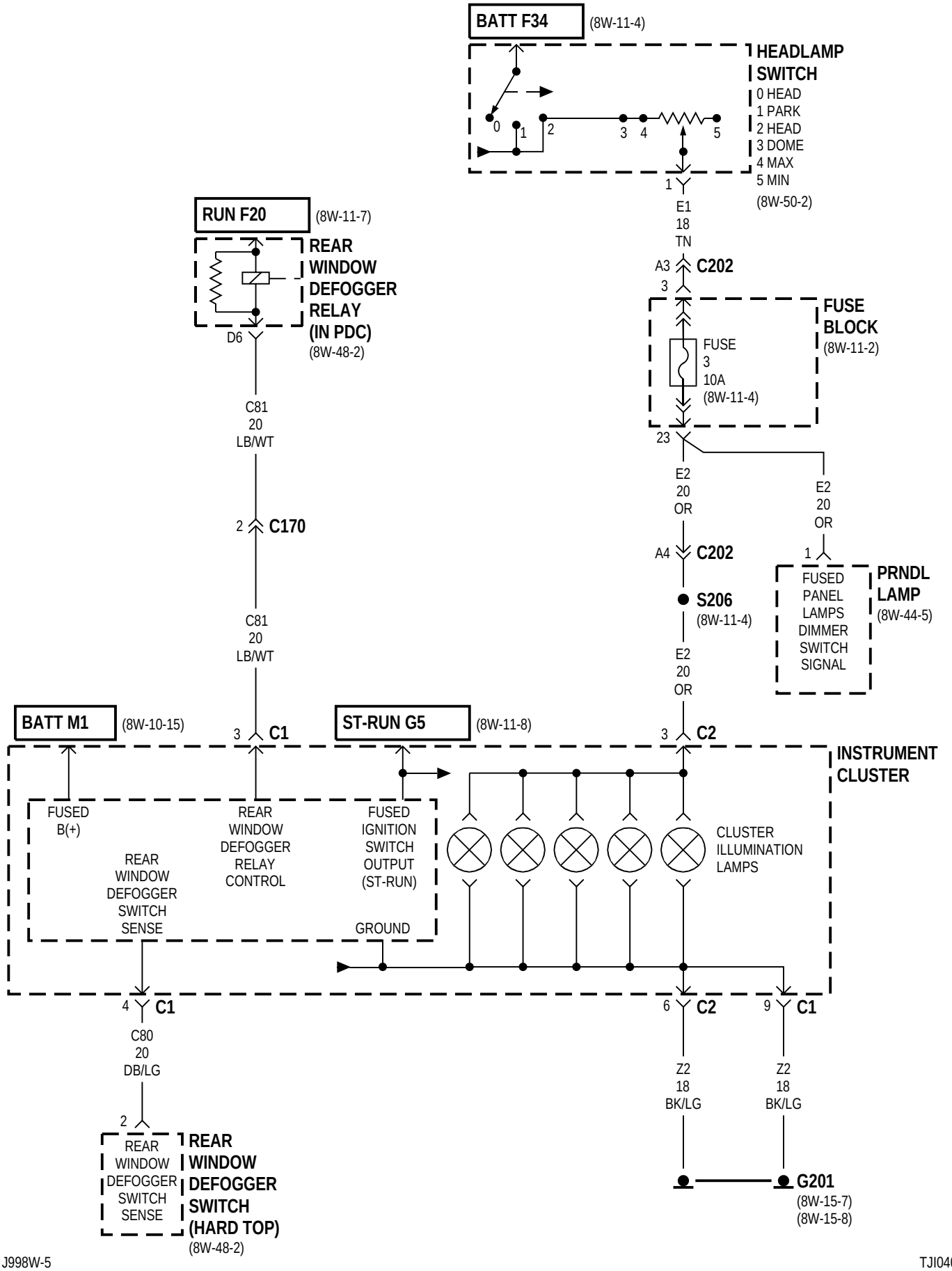
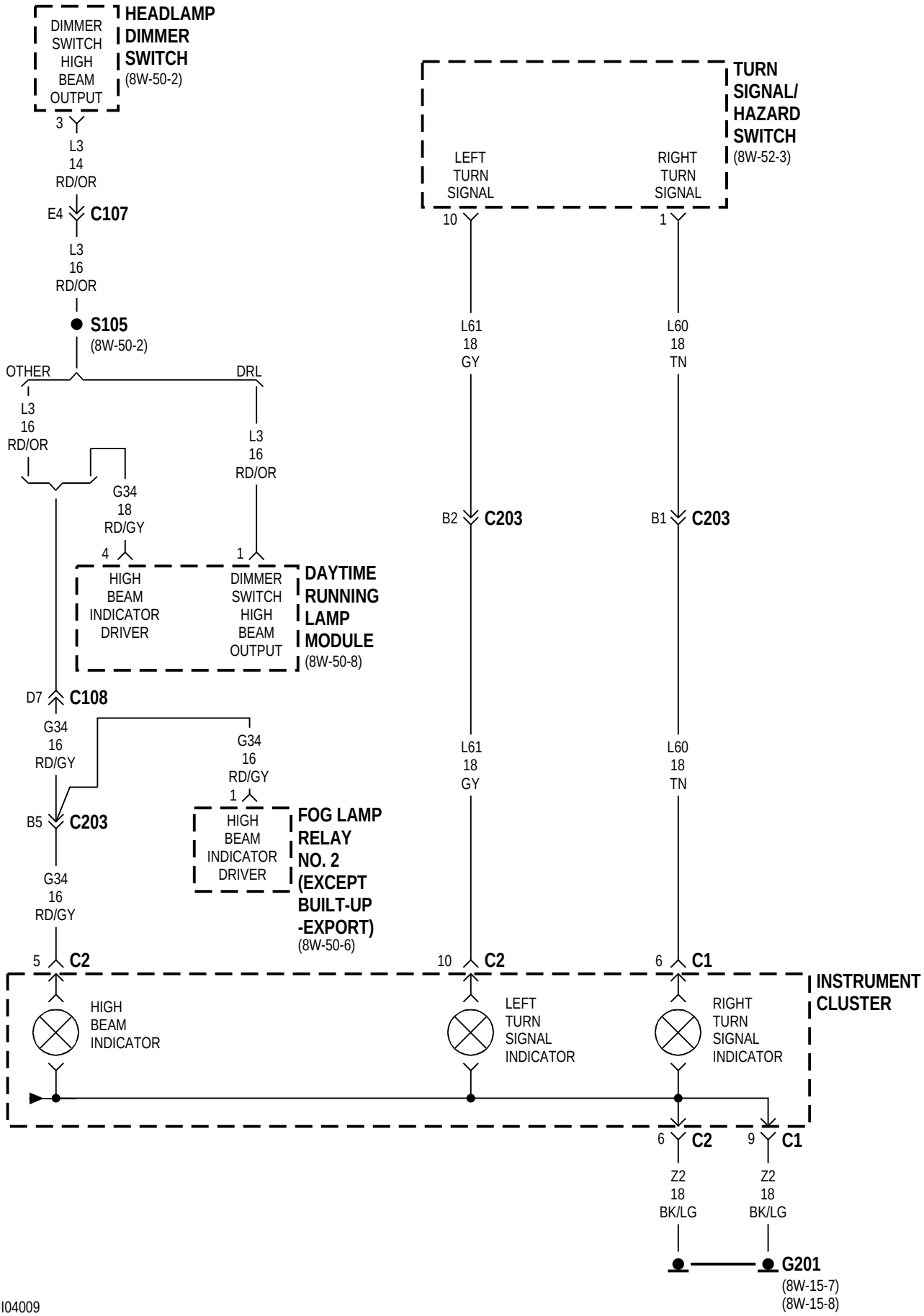
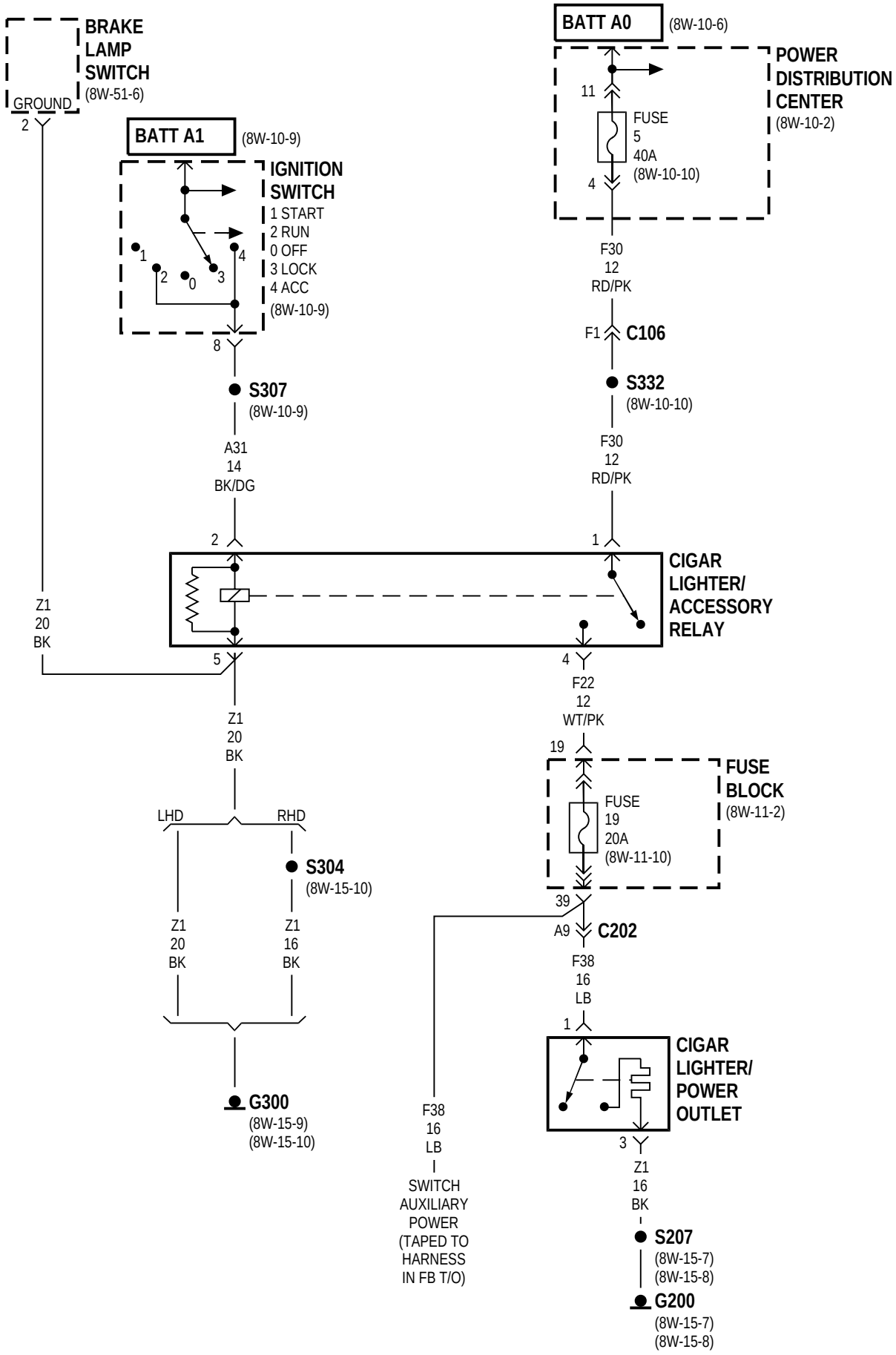
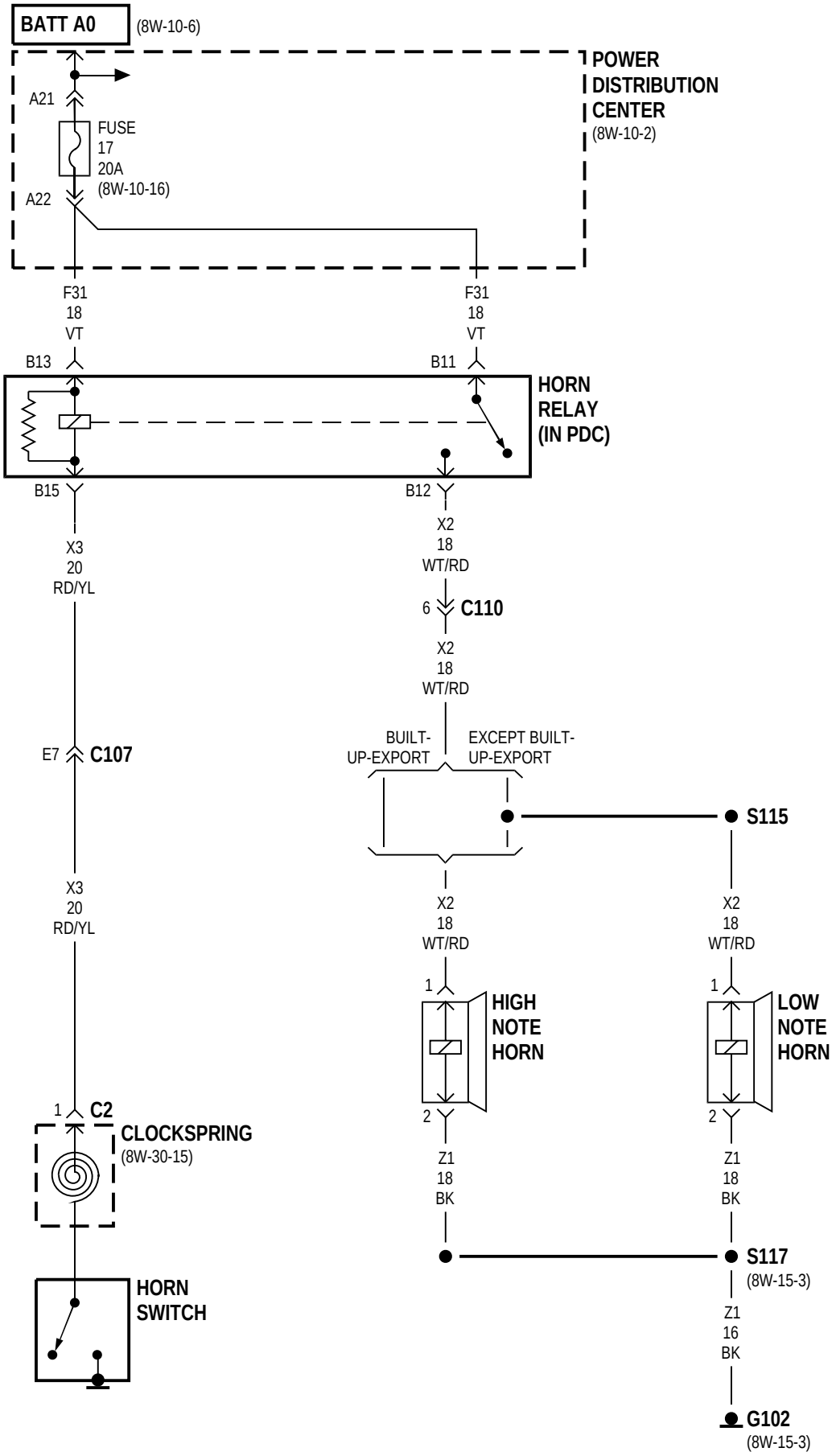

BATT F34
(8W-11-4)
HEADLAMP SWITCH
0 HEAD
1 PARK
2 HEAD
3 DOME
4 MAX
5 MIN
(8W-50-2)
0 1 2 3 4 5
1
E1
18
TN
A3 C202
3
RUN F20
(8W-11-7)
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8W-48-2)
D6
FUSE BLOCK
(8W-11-2)
FUSE
3
10A
(8W-11-4)
23
C81
20
LB/WT
2 C170
C81
20
LB/WT
E2
20
OR
A4 C202
S206
(8W-11-4)
E2
20
OR
1
PRNDL LAMP
(8W-44-5)
FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
BATT M1
(8W-10-15)
3 C1
ST-RUN G5
(8W-11-8)
3 C2
INSTRUMENT CLUSTER
FUSED B(+)
REAR WINDOW DEFOGGER SWITCH SENSE
REAR WINDOW DEFOGGER RELAY CONTROL
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
GROUND
CLUSTER ILLUMINATION LAMPS
4 C1
6 C2
9 C1
C80
20
DB/LG
Z2
18
BK/LG
Z2
18
BK/LG
2
REAR WINDOW DEFOGGER SWITCH SENSE
REAR WINDOW DEFOGGER SWITCH (HARD TOP)
(8W-48-2)
G201
(8W-15-7)
(8W-15-8)


DIMMER SWITCH HIGH BEAM OUTPUT
HEADLAMP DIMMER SWITCH
(8W-50-2)
3
L3
14
RD/OR
E4
C107
L3
16
RD/OR
S105
(8W-50-2)
OTHER
DRL
L3
16
RD/OR
G34
18
RD/GY
L3
16
RD/OR
4
1
HIGH BEAM INDICATOR DRIVER
DIMMER SWITCH HIGH BEAM OUTPUT
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
D7
C108
G34
16
RD/GY
G34
16
RD/GY
1
B5
C203
HIGH BEAM INDICATOR DRIVER
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP -EXPORT)
(8W-50-6)
G34
16
RD/GY
5
C2
TURN SIGNAL/ HAZARD SWITCH
(8W-52-3)
LEFT TURN SIGNAL
RIGHT TURN SIGNAL
10
1
L61
18
GY
L60
18
TN
B2
C203
B1
C203
L61
18
GY
L60
18
TN
10
C2
6
C1
INSTRUMENT CLUSTER
HIGH BEAM INDICATOR
LEFT TURN SIGNAL INDICATOR
RIGHT TURN SIGNAL INDICATOR
6
C2
9
C1
Z2
18
BK/LG
Z2
18
BK/LG
G201
(8W-15-7)
(8W-15-8)

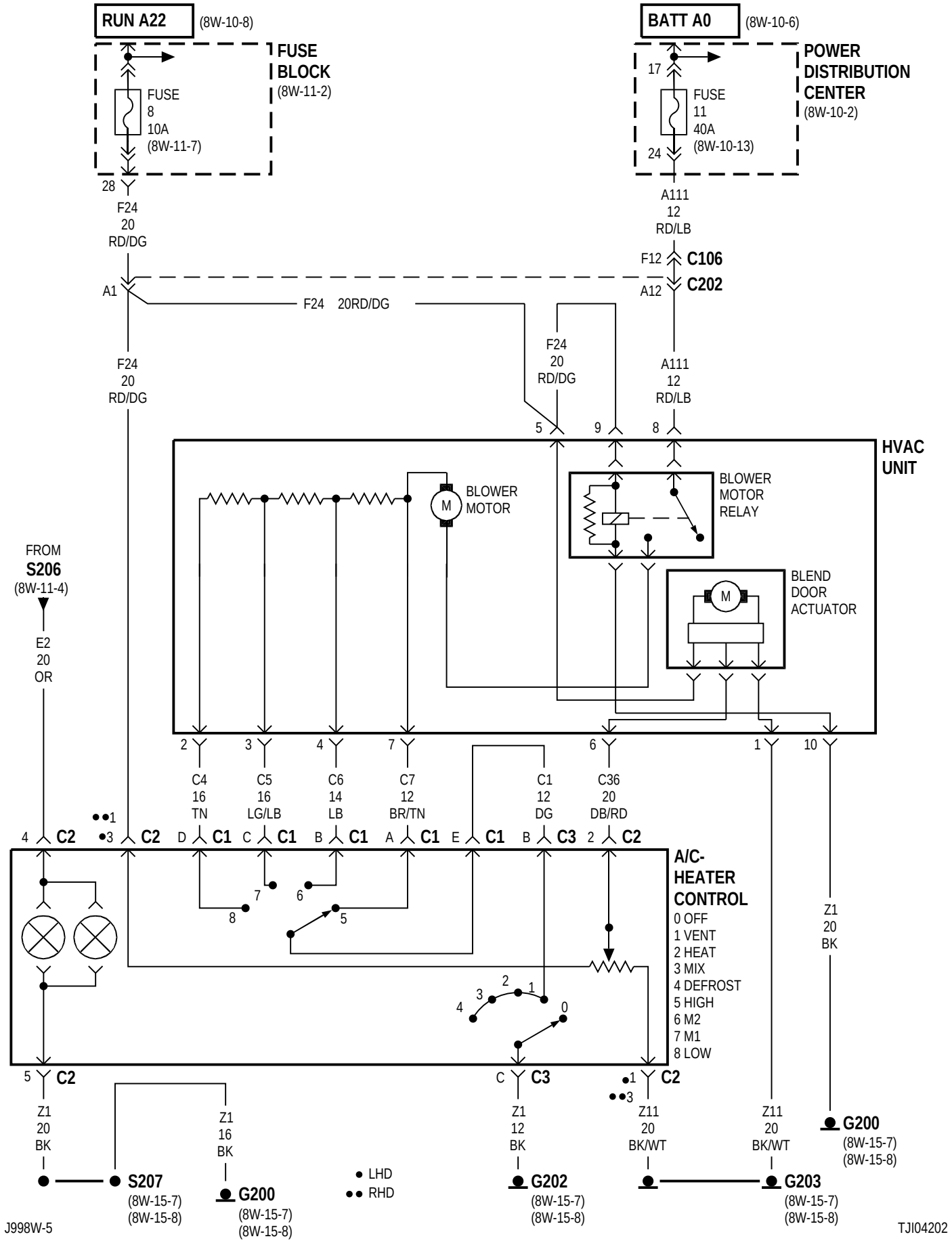
8W-41 HORN/CIGAR LIGHTER/POWER OUTLET

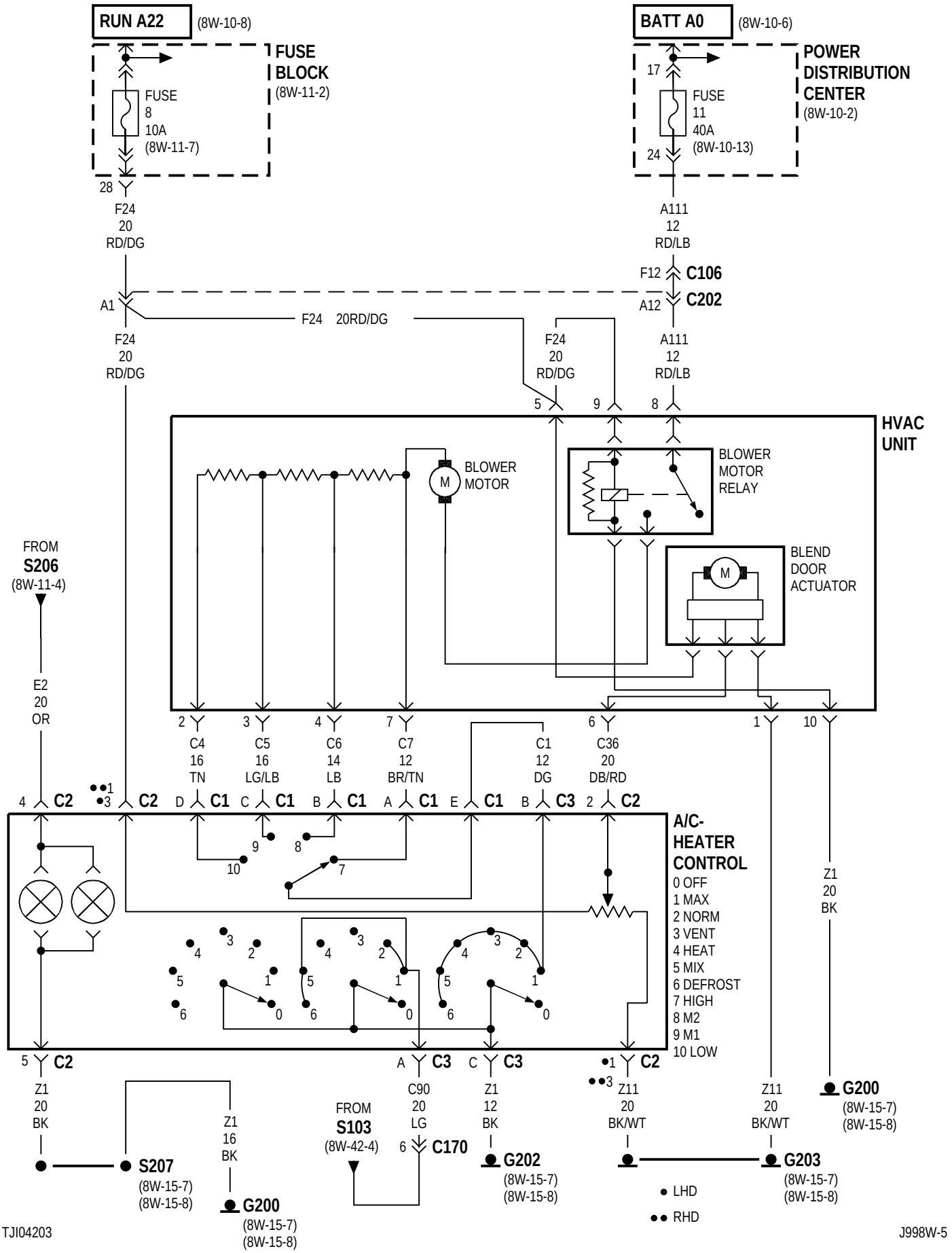

BRAKE LAMP SWITCH
(8W-51-6)
GROUND
2
BATT A1
(8W-10-9)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-9)
1
2
0
3
4
8
S307
(8W-10-9)
A31
14
BK/DG
2
Z1
20
BK
5
Z1
20
BK
LHD
RHD
S304
(8W-15-10)
Z1
20
BK
Z1
16
BK
G300
(8W-15-9)
(8W-15-10)
BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
11
FUSE
5
40A
(8W-10-10)
4
F30
12
RD/PK
F1
C106
S332
(8W-10-10)
F30
12
RD/PK
1
CIGAR LIGHTER/ ACCESSORY RELAY
4
F22
12
WT/PK
19
FUSE BLOCK
(8W-11-2)
FUSE
19
20A
(8W-11-10)
39
A9
C202
F38
16
LB
1
CIGAR LIGHTER/ POWER OUTLET
3
Z1
16
BK
S207
(8W-15-7)
(8W-15-8)
G200
(8W-15-7)
(8W-15-8)
F38
16
LB
SWITCH AUXILIARY POWER
(TAPED TO HARNESS IN FB T/O)

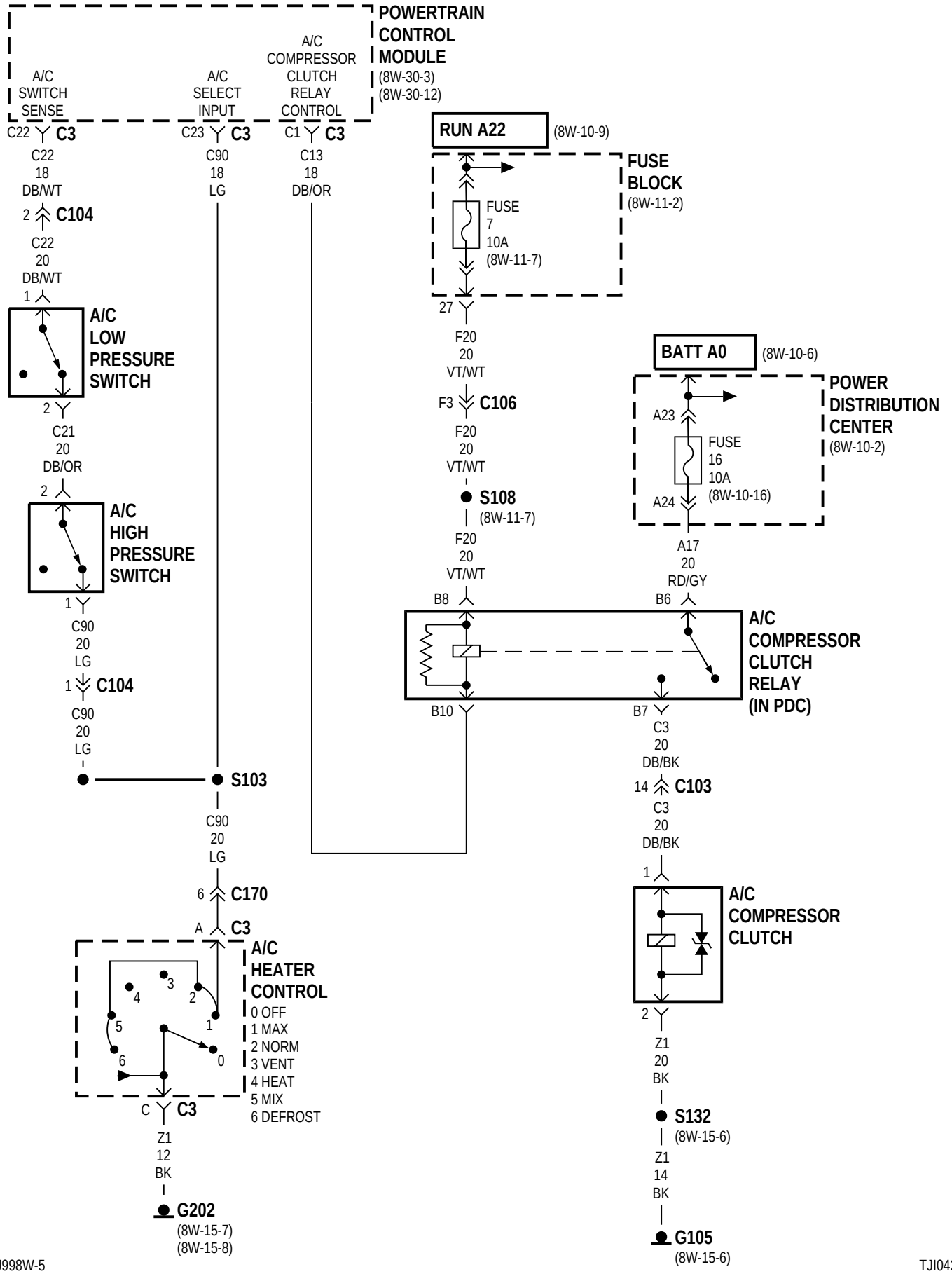

BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A21
FUSE 17 20A
(8W-10-16)
A22
F31 18 VT
B13
F31 18 VT
B11
HORN RELAY (IN PDC)
B15
B12
X3 20 RD/YL
X2 18 WT/RD
6 C110
X2 18 WT/RD
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
S115
E7 C107
X3 20 RD/YL
X2 18 WT/RD
X2 18 WT/RD
1
HIGH NOTE HORN
1
LOW NOTE HORN
2
2
1 C2
CLOCKSPRING
(8W-30-15)
Z1 18 BK
Z1 18 BK
S117
(8W-15-3)
Z1 16 BK
HORN SWITCH
G102
(8W-15-3)

8W-42 AIR CONDITIONING-HEATER

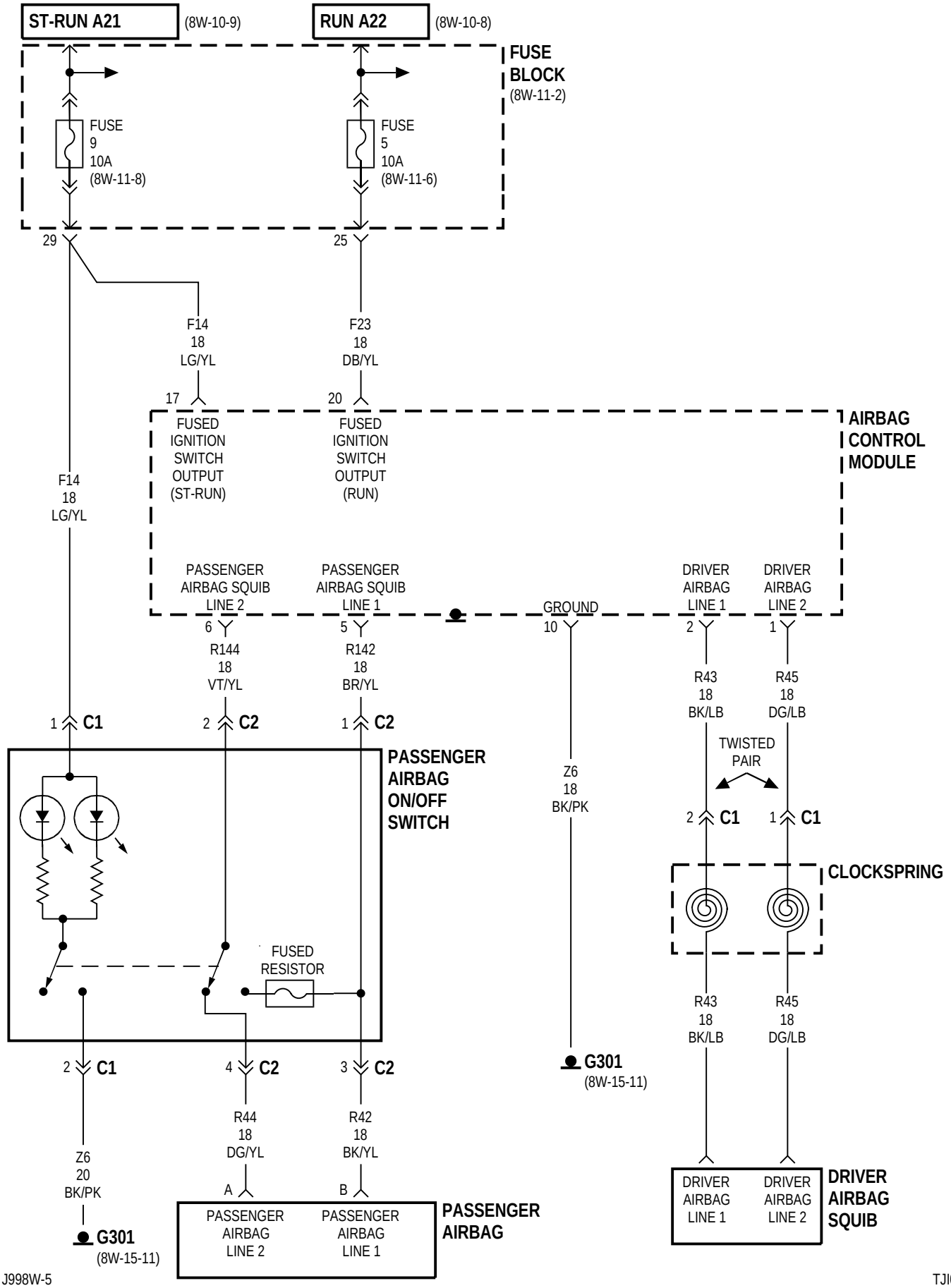
HEATER ONLY

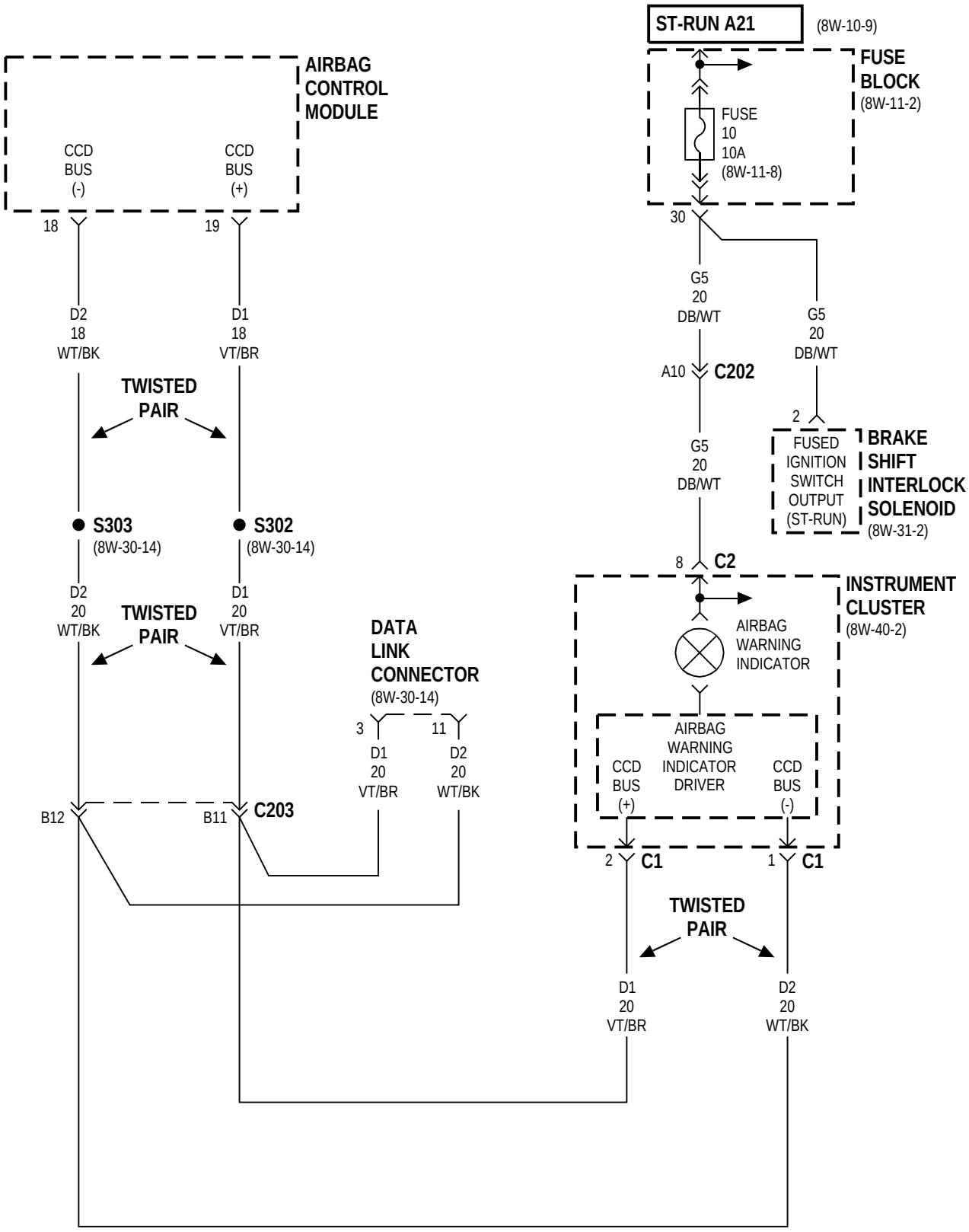

RUN A22
(8W-10-8)
FUSE BLOCK
(8W-11-2)
FUSE 8 10A
(8W-11-7)
28
F24 20 RD/DG
A1
BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
17
FUSE 11 40A
(8W-10-13)
24
A111 12 RD/LB
F12 C106
A12 C202
F24 20RD/DG
F24 20 RD/DG
F24 20 RD/DG
A111 12 RD/LB
5
9
8
HVAC UNIT
BLOWER MOTOR
M
BLOWER MOTOR RELAY
BLEND DOOR ACTUATOR
M
FROM S206
(8W-11-4)
E2 20 OR
2
3
4
7
6
1
10
C4 16 TN
C5 16 LG/LB
C6 14 LB
C7 12 BR/TN
C1 12 DG
C36 20 DB/RD
4 C2
3 C2
D C1
C C1
B C1
A C1
E C1
B C3
2 C2
A/C-HEATER CONTROL
0 OFF
1 VENT
2 HEAT
3 MIX
4 DEFROST
5 HIGH
6 M2
7 M1
8 LOW
Z1 20 BK
5 C2
C C3
C2
Z1 20 BK
Z1 16 BK
Z1 12 BK
Z11 20 BK/WT
Z11 20 BK/WT
G200
(8W-15-7)
(8W-15-8)
S207
(8W-15-7)
(8W-15-8)
G200
(8W-15-7)
(8W-15-8)
LHD
RHD
G202
(8W-15-7)
(8W-15-8)
G203
(8W-15-7)
(8W-15-8)
J998W-5
TJI04202


RUN A22
(8W-10-8)
FUSE BLOCK
(8W-11-2)
FUSE 8 10A
(8W-11-7)
28
F24 20 RD/DG
BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
17
FUSE 11 40A
(8W-10-13)
24
A111 12 RD/LB
F12 C106
A12 C202
A1
F24 20RD/DG
F24 20 RD/DG
A111 12 RD/LB
5
9
8
HVAC UNIT
BLOWER MOTOR
BLOWER MOTOR RELAY
BLEND DOOR ACTUATOR
FROM S206
(8W-11-4)
E2 20 OR
2 C4 16 TN
3 C5 16 LG/LB
4 C6 14 LB
7 C7 12 BR/TN
C1 12 DG
6 C36 20 DB/RD
1
10
4 C2
1
3 C2
D C1
C C1
B C1
A C1
E C1
B C3
2 C2
A/C-HEATER CONTROL
0 OFF
1 MAX
2 NORM
3 VENT
4 HEAT
5 MIX
6 DEFROST
7 HIGH
8 M2
9 M1
10 LOW
Z1 20 BK
5 C2
A C3
C C3
1
3 C2
Z1 20 BK
Z1 16 BK
FROM S103
(8W-42-4)
C90 20 LG
6 C170
Z1 12 BK
Z11 20 BK/WT
Z11 20 BK/WT
G200
(8W-15-7)
(8W-15-8)
S207
(8W-15-7)
(8W-15-8)
G200
(8W-15-7)
(8W-15-8)
G202
(8W-15-7)
(8W-15-8)
G203
(8W-15-7)
(8W-15-8)
LHD
RHD
TJI04203
J998W-5

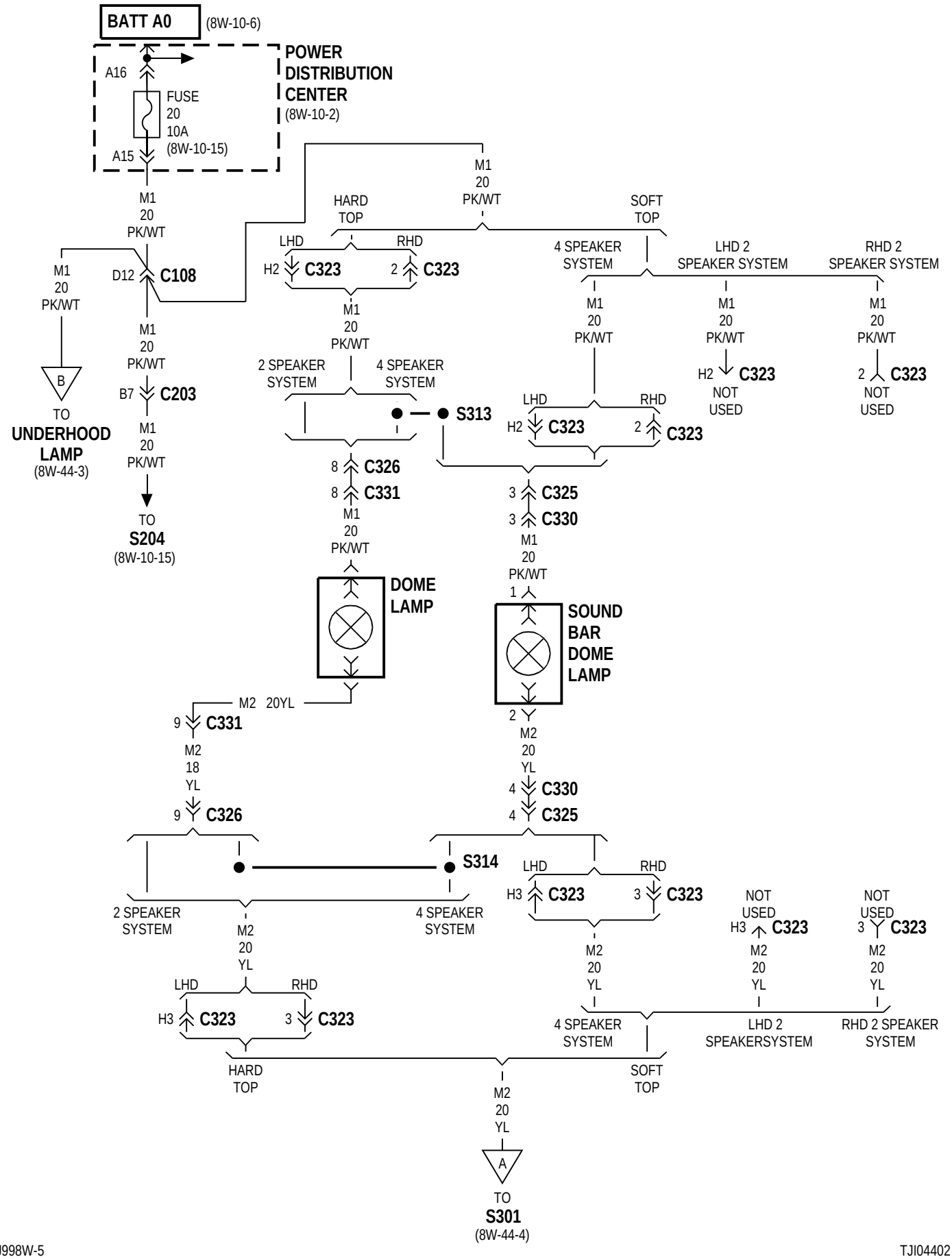

POWERTRAIN CONTROL MODULE
(8W-30-3)
(8W-30-12)
A/C SWITCH SENSE
A/C SELECT INPUT
A/C COMPRESSOR CLUTCH RELAY CONTROL
C22 C3
C23 C3
C1 C3
C22 18 DB/WT
C90 18 LG
C13 18 DB/OR
2 C104
C22 20 DB/WT
1
A/C LOW PRESSURE SWITCH
2
C21 20 DB/OR
2
A/C HIGH PRESSURE SWITCH
1
C90 20 LG
1 C104
C90 20 LG
S103
C90 20 LG
6 C170
A C3
A/C HEATER CONTROL
0 OFF
1 MAX
2 NORM
3 VENT
4 HEAT
5 MIX
6 DEFROST
C C3
Z1 12 BK
G202
(8W-15-7)
(8W-15-8)
RUN A22
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 7 10A
(8W-11-7)
27
F20 20 VT/WT
F3 C106
F20 20 VT/WT
S108
(8W-11-7)
F20 20 VT/WT
B8
B10
BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A23
FUSE 16 10A
(8W-10-16)
A24
A17 20 RD/GY
B6
B7
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
C3 20 DB/BK
14 C103
C3 20 DB/BK
1
A/C COMPRESSOR CLUTCH
2
Z1 20 BK
S132
(8W-15-6)
Z1 14 BK
G105
(8W-15-6)

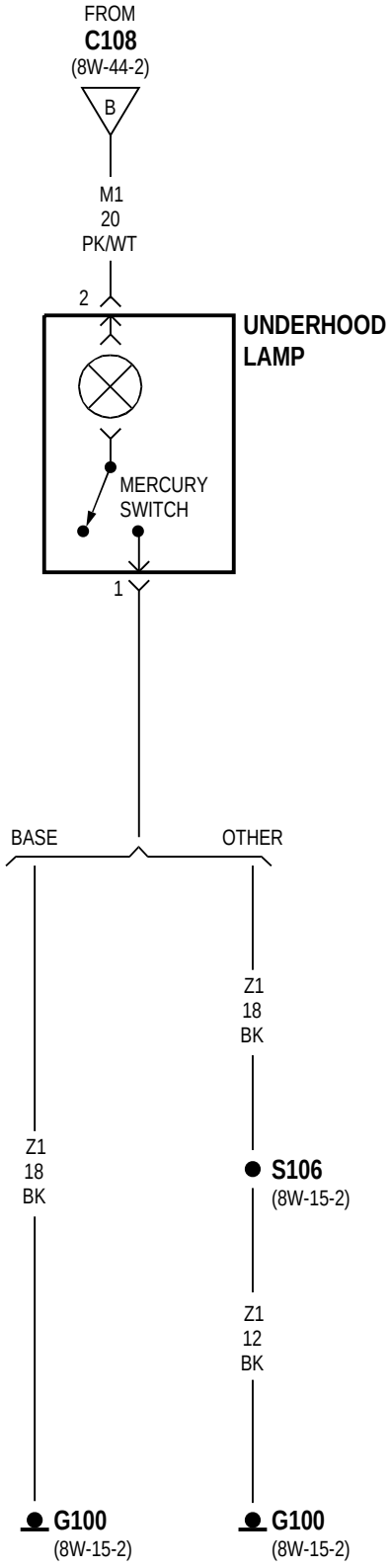
8W-43 AIRBAG SYSTEM

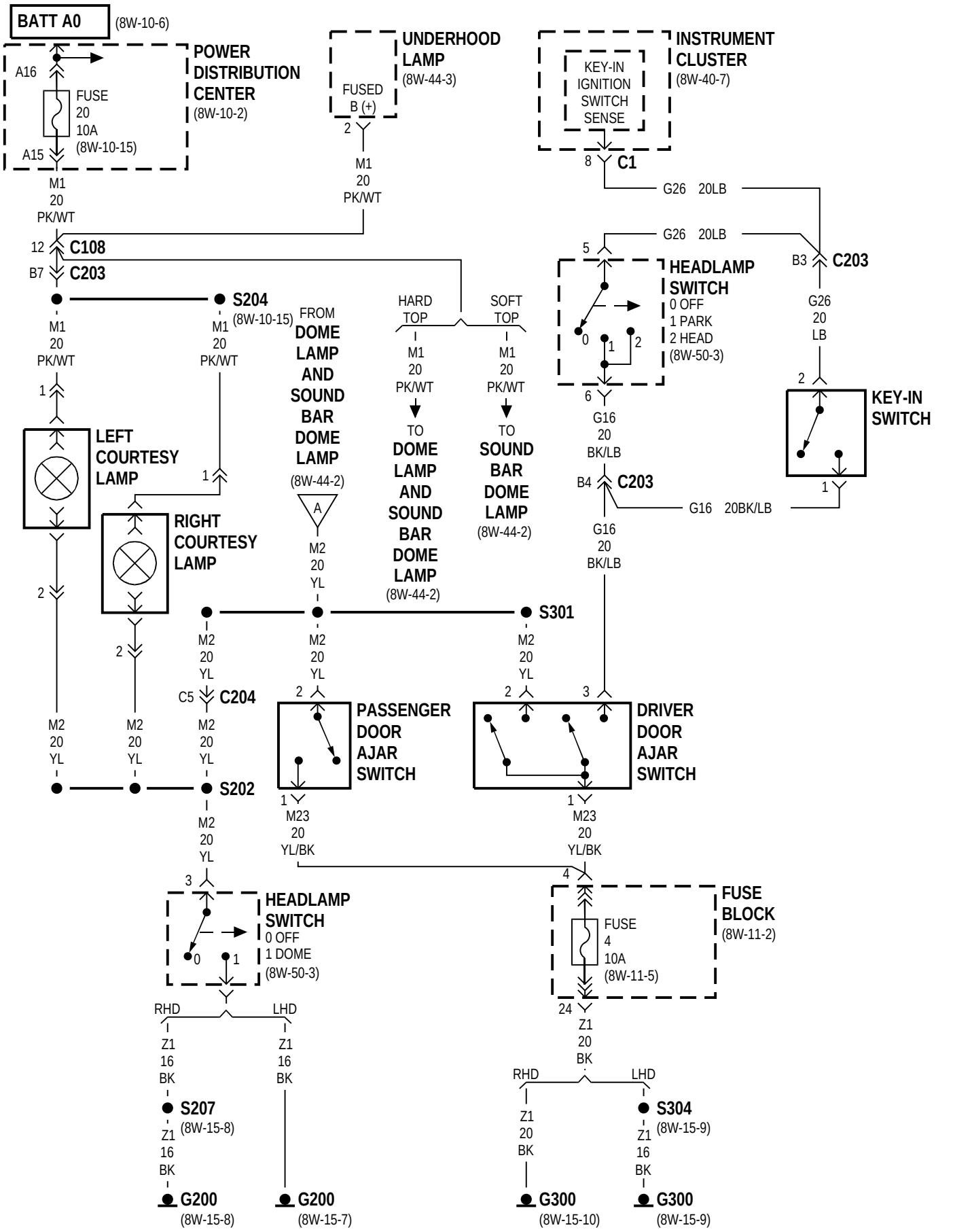

ST-RUN A21
(8W-10-9)
RUN A22
(8W-10-8)
FUSE BLOCK
(8W-11-2)
FUSE 9 10A (8W-11-8)
FUSE 5 10A (8W-11-6)
29
25
F14 18 LG/YL
F23 18 DB/YL
17
20
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED IGNITION SWITCH OUTPUT (RUN)
AIRBAG CONTROL MODULE
F14 18 LG/YL
PASSENGER AIRBAG SQUIB LINE 2
PASSENGER AIRBAG SQUIB LINE 1
GROUND
DRIVER AIRBAG LINE 1
DRIVER AIRBAG LINE 2
6
5
10
2
1
R144 18 VT/YL
R142 18 BR/YL
R43 18 BK/LB
R45 18 DG/LB
1 C1
2 C2
1 C2
TWISTED PAIR
PASSENGER AIRBAG ON/OFF SWITCH
Z6 18 BK/PK
2 C1
1 C1
CLOCKSPRING
FUSED RESISTOR
R43 18 BK/LB
R45 18 DG/LB
2 C1
4 C2
3 C2
G301
(8W-15-11)
R44 18 DG/YL
R42 18 BK/YL
Z6 20 BK/PK
A
B
DRIVER AIRBAG LINE 1
DRIVER AIRBAG LINE 2
DRIVER AIRBAG SQUIB
PASSENGER AIRBAG LINE 2
PASSENGER AIRBAG LINE 1
PASSENGER AIRBAG
G301
(8W-15-11)

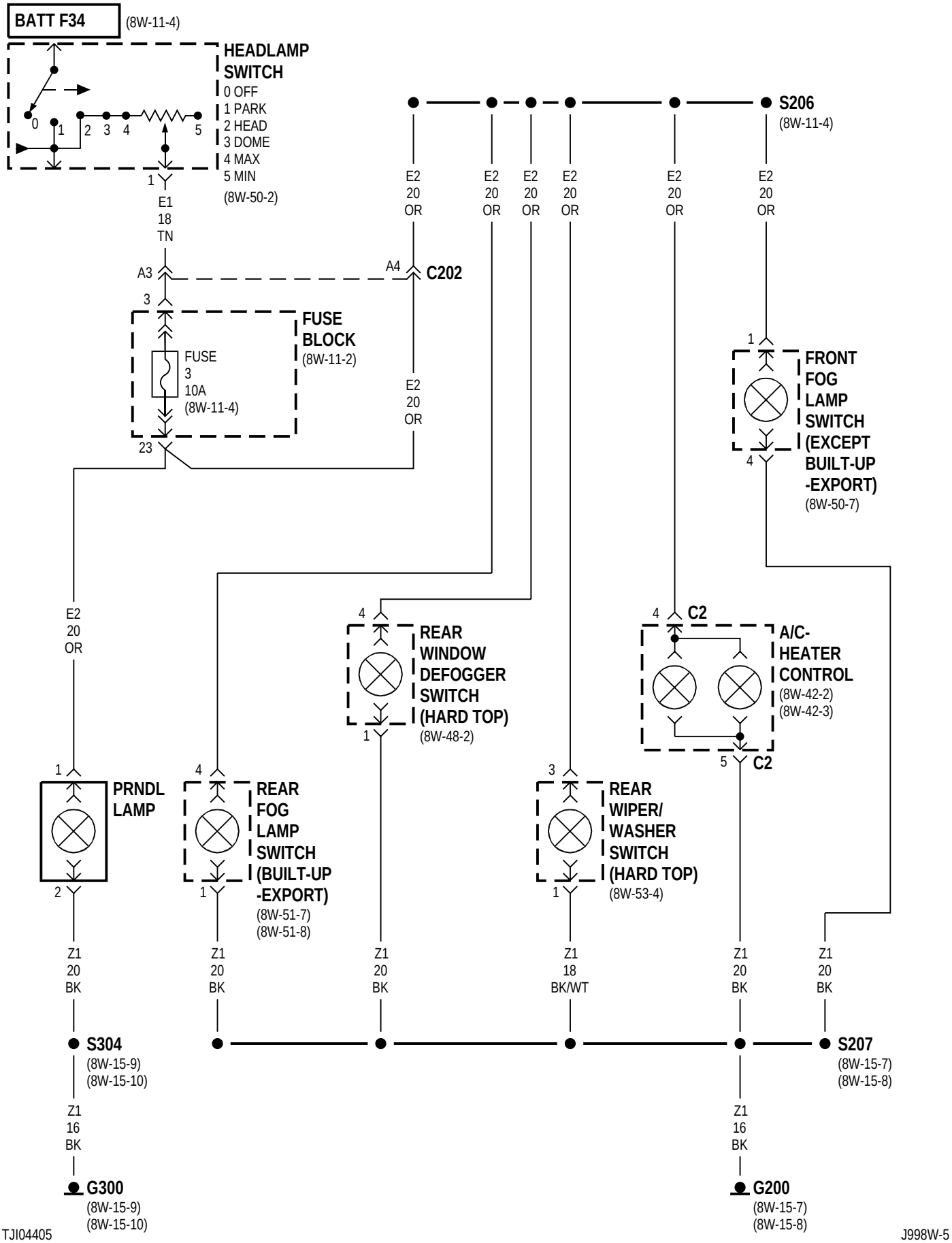

ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 10 10A
(8W-11-8)
30
AIRBAG CONTROL MODULE
CCD BUS (-)
CCD BUS (+)
18
19
G5 20 DB/WT
G5 20 DB/WT
A10
C202
2
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
BRAKE SHIFT INTERLOCK SOLENOID
(8W-31-2)
D2 18 WT/BK
D1 18 VT/BR
TWISTED PAIR
G5 20 DB/WT
8
C2
INSTRUMENT CLUSTER
(8W-40-2)
S303
(8W-30-14)
S302
(8W-30-14)
AIRBAG WARNING INDICATOR
D2 20 WT/BK
TWISTED PAIR
D1 20 VT/BR
DATA LINK CONNECTOR
(8W-30-14)
AIRBAG WARNING INDICATOR DRIVER
CCD BUS (+)
CCD BUS (-)
3
11
D1 20 VT/BR
D2 20 WT/BK
B12
B11
C203
2
C1
1
C1
TWISTED PAIR
D1 20 VT/BR
D2 20 WT/BK

8W-44 INTERIOR LIGHTING


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A16
FUSE 20 10A
(8W-10-15)
A15
M1 20 PK/WT
D12 C108
B7 C203
TO UNDERHOOD LAMP
(8W-44-3)
TO S204
(8W-10-15)
HARD TOP
SOFT TOP
LHD
RHD
H2 C323
2 C323
2 SPEAKER SYSTEM
4 SPEAKER SYSTEM
S313
8 C326
8 C331
3 C325
3 C330
4 SPEAKER SYSTEM
LHD 2 SPEAKER SYSTEM
RHD 2 SPEAKER SYSTEM
NOT USED
DOME LAMP
SOUND BAR DOME LAMP
M2 20YL
9 C331
M2 18 YL
9 C326
1
2
M2 20 YL
4 C330
4 C325
S314
H3 C323
3 C323
TO S301
(8W-44-4)
A
B

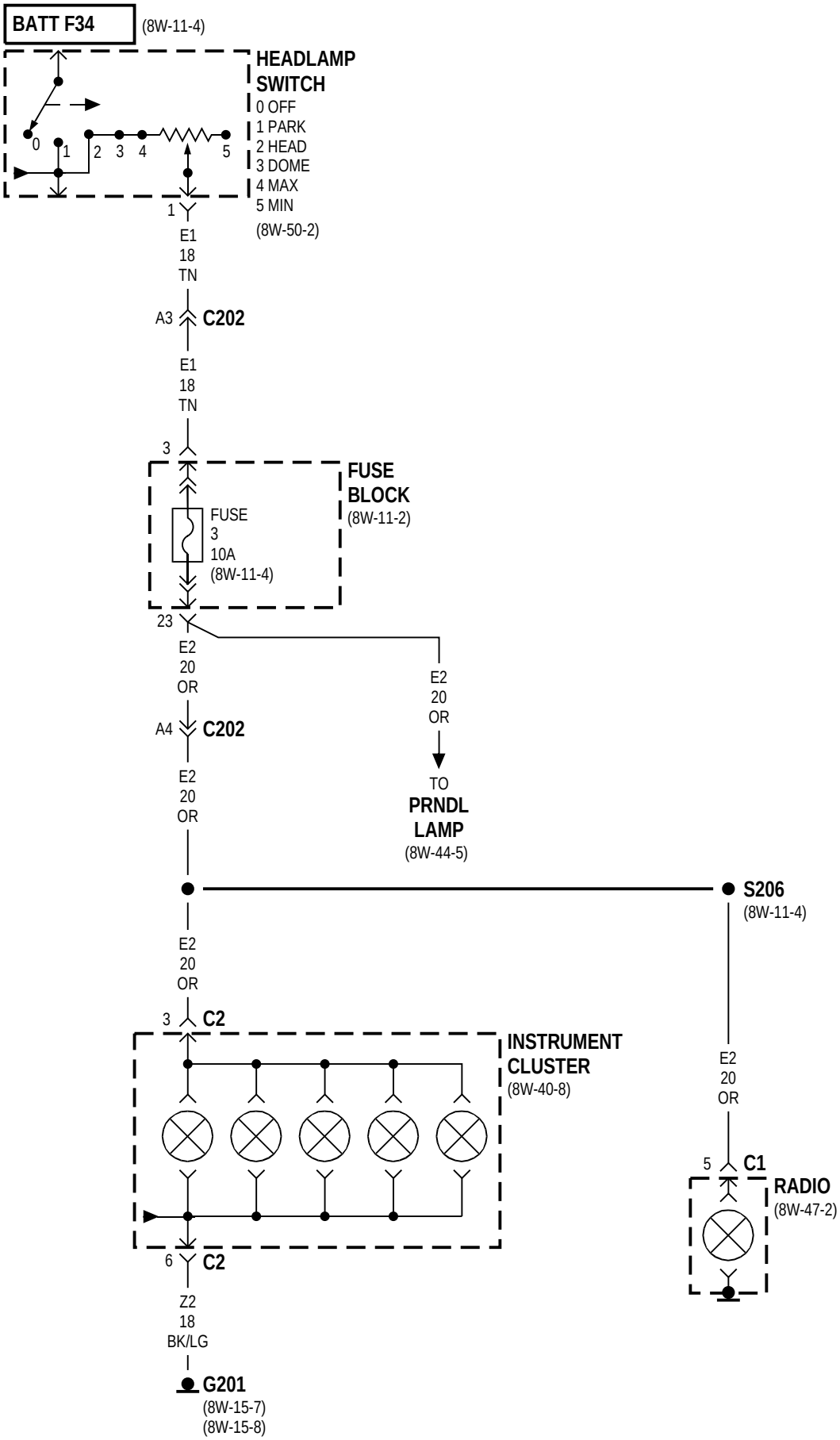

FROM
C108
(8W-44-2)
B
M1
20
PK/WT
2
UNDERHOOD
LAMP
MERCURY
SWITCH
1
BASE
OTHER
Z1
18
BK
Z1
18
BK
S106
(8W-15-2)
Z1
12
BK
G100
(8W-15-2)
G100
(8W-15-2)


BATT A0
(8W-10-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
A16
FUSE 20 10A
(8W-10-15)
A15
M1 20 PK/WT
UNDERHOOD LAMP
(8W-44-3)
FUSED B (+)
2
M1 20 PK/WT
INSTRUMENT CLUSTER
(8W-40-7)
KEY-IN IGNITION SWITCH SENSE
8
C1
G26 20LB
12
C108
B7
C203
S204
(8W-10-15)
FROM DOME LAMP AND SOUND BAR DOME LAMP
(8W-44-2)
HARD TOP
SOFT TOP
TO DOME LAMP AND SOUND BAR DOME LAMP
(8W-44-2)
TO SOUND BAR DOME LAMP
(8W-44-2)
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
(8W-50-3)
5
6
G16 20 BK/LB
B4
C203
G16 20BK/LB
B3
C203
G26 20 LB
KEY-IN SWITCH
LEFT COURTESY LAMP
RIGHT COURTESY LAMP
M2 20 YL
S301
C5
C204
S202
PASSENGER DOOR AJAR SWITCH
DRIVER DOOR AJAR SWITCH
M23 20 YL/BK
HEADLAMP SWITCH
0 OFF
1 DOME
(8W-50-3)
FUSE BLOCK
(8W-11-2)
FUSE 4 10A
(8W-11-5)
24
Z1 20 BK
RHD
LHD
Z1 16 BK
S207
(8W-15-8)
S304
(8W-15-9)
G200
(8W-15-8)
G200
(8W-15-7)
G300
(8W-15-10)
G300
(8W-15-9)

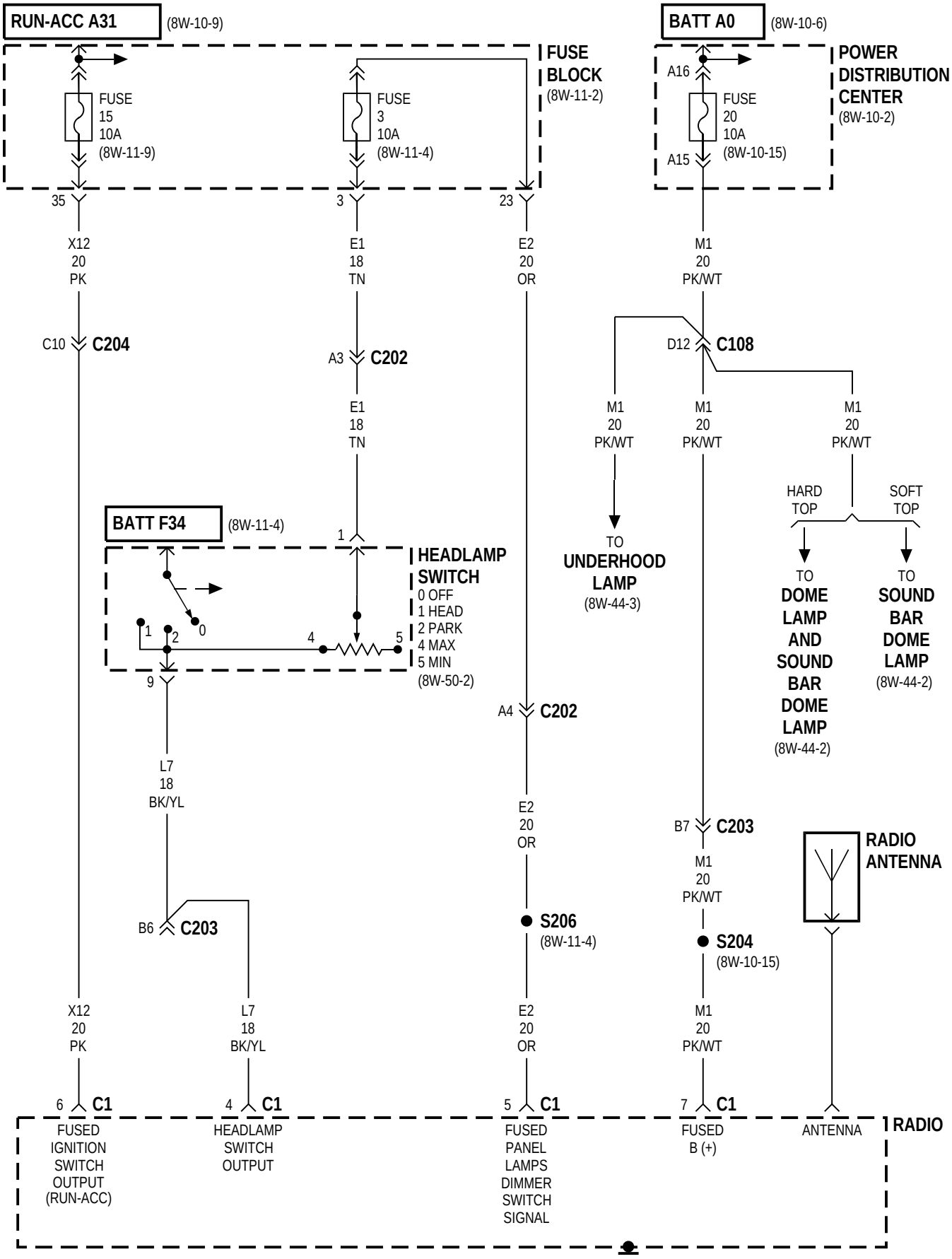


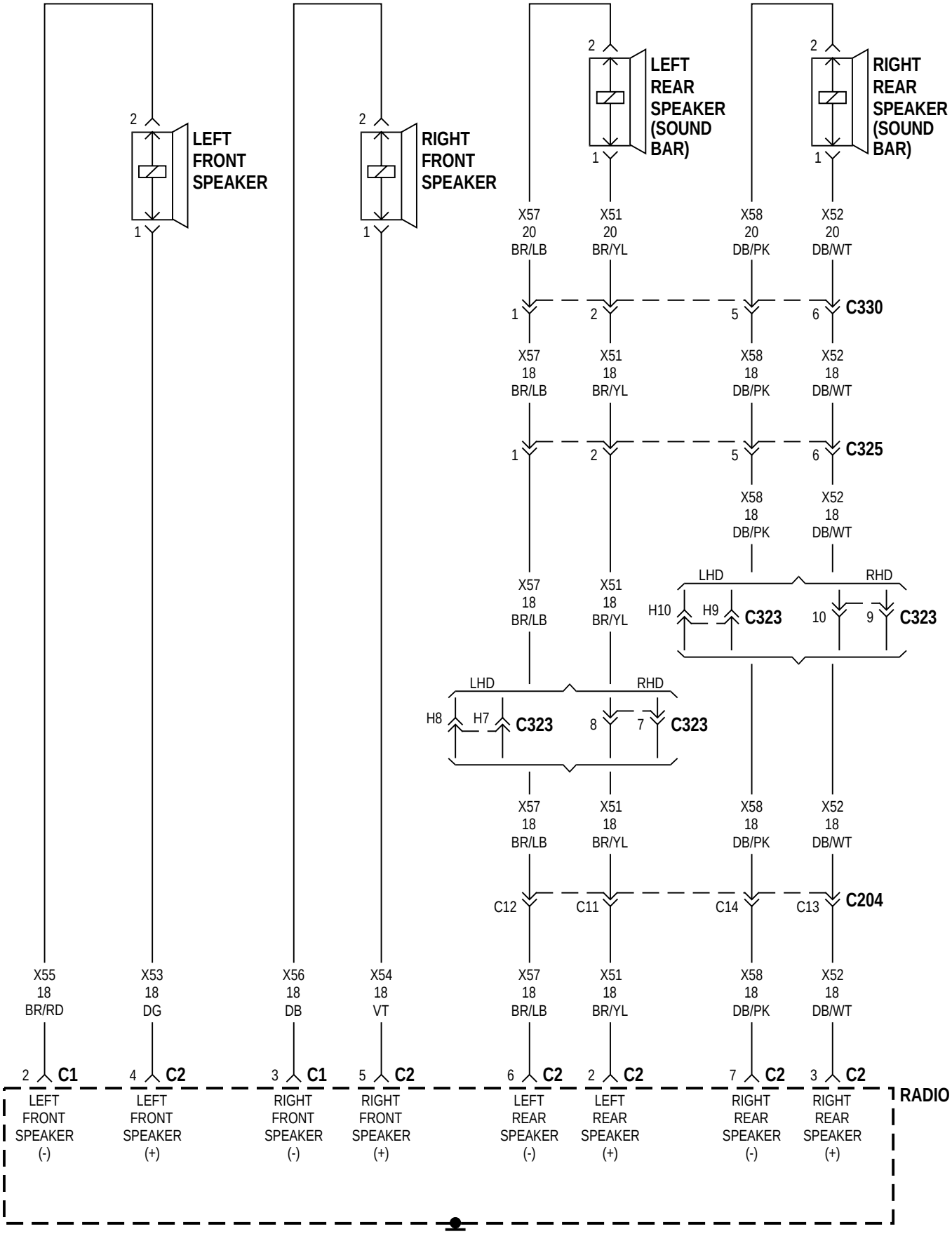
TJI04405

J998W-5

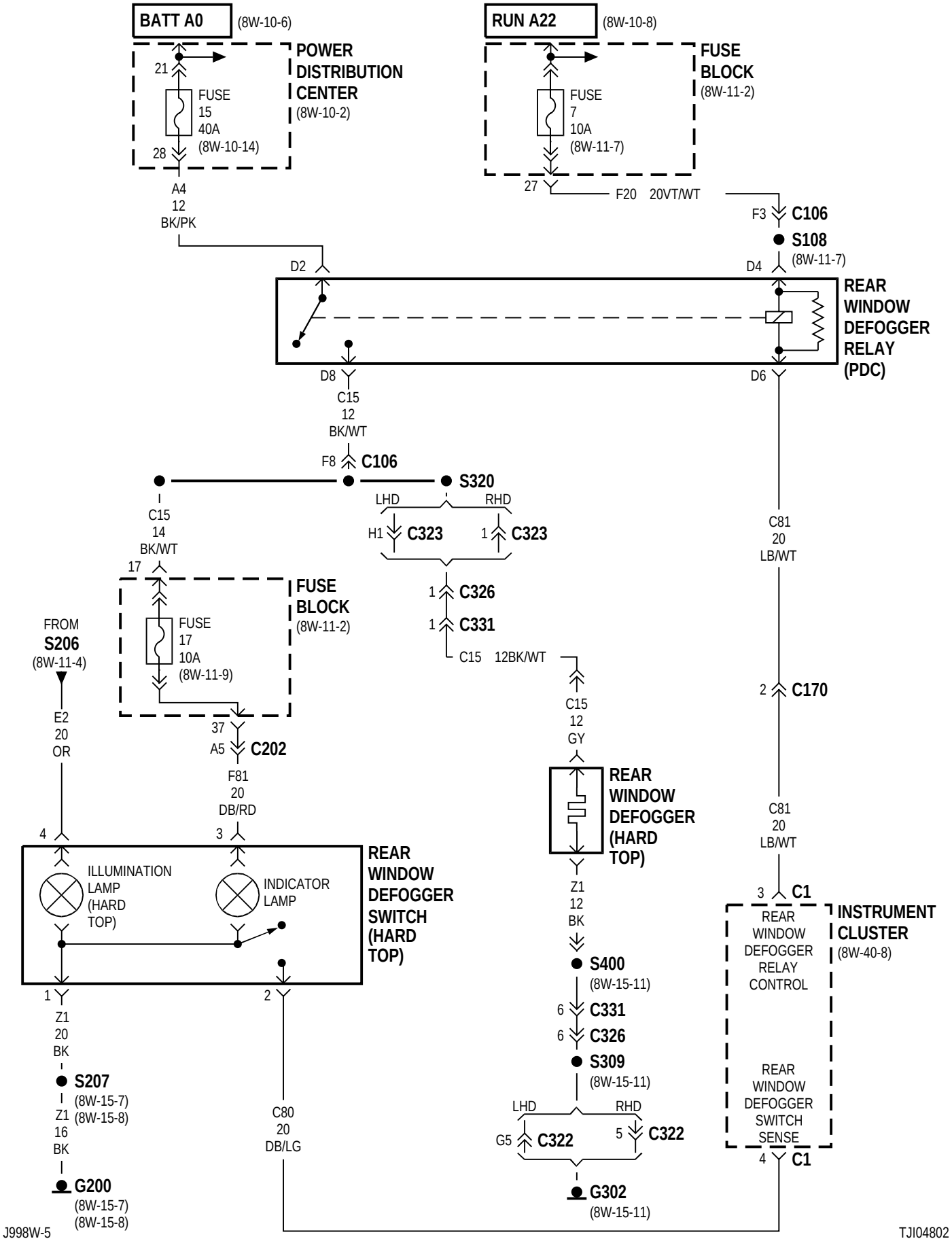

BATT F34
(8W-11-4)
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
3 DOME
4 MAX
5 MIN
(8W-50-2)
0
1
2
3
4
5
1
E1
18
TN
A3
C202
E1
18
TN
3
FUSE BLOCK
(8W-11-2)
FUSE
3
10A
(8W-11-4)
23
E2
20
OR
A4
C202
E2
20
OR
E2
20
OR
TO
PRNDL LAMP
(8W-44-5)
S206
(8W-11-4)
E2
20
OR
3
C2
INSTRUMENT CLUSTER
(8W-40-8)
E2
20
OR
5
C1
RADIO
(8W-47-2)
6
C2
Z2
18
BK/LG
G201
(8W-15-7)
(8W-15-8)

8W-47 AUDIO SYSTEM


RUN-ACC A31
(8W-10-9)
BATT A0
(8W-10-6)
FUSE BLOCK
(8W-11-2)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE 15 10A (8W-11-9)
FUSE 3 10A (8W-11-4)
FUSE 20 10A (8W-10-15)
A16
A15
35
3
23
X12 20 PK
E1 18 TN
E2 20 OR
M1 20 PK/WT
C10 C204
A3 C202
D12 C108
E1 18 TN
M1 20 PK/WT
M1 20 PK/WT
M1 20 PK/WT
HARD TOP
SOFT TOP
BATT F34
(8W-11-4)
HEADLAMP SWITCH
0 OFF
1 HEAD
2 PARK
4 MAX
5 MIN
(8W-50-2)
TO UNDERHOOD LAMP
(8W-44-3)
TO DOME LAMP AND SOUND BAR DOME LAMP
(8W-44-2)
TO SOUND BAR DOME LAMP
(8W-44-2)
A4 C202
L7 18 BK/YL
E2 20 OR
B7 C203
M1 20 PK/WT
RADIO ANTENNA
B6 C203
S206
(8W-11-4)
S204
(8W-10-15)
X12 20 PK
L7 18 BK/YL
E2 20 OR
M1 20 PK/WT
6 C1
4 C1
5 C1
7 C1
FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
HEADLAMP SWITCH OUTPUT
FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
FUSED B (+)
ANTENNA
RADIO


LEFT FRONT SPEAKER
RIGHT FRONT SPEAKER
LEFT REAR SPEAKER (SOUND BAR)
RIGHT REAR SPEAKER (SOUND BAR)
X57 20 BR/LB
X51 20 BR/YL
X58 20 DB/PK
X52 20 DB/WT
C330
X57 18 BR/LB
X51 18 BR/YL
X58 18 DB/PK
X52 18 DB/WT
C325
X58 18 DB/PK
X52 18 DB/WT
LHD
RHD
H10
H9
C323
10
9
C323
X57 18 BR/LB
X51 18 BR/YL
LHD
RHD
H8
H7
C323
8
7
C323
X57 18 BR/LB
X51 18 BR/YL
X58 18 DB/PK
X52 18 DB/WT
C12
C11
C14
C13
C204
X55 18 BR/RD
X53 18 DG
X56 18 DB
X54 18 VT
X57 18 BR/LB
X51 18 BR/YL
X58 18 DB/PK
X52 18 DB/WT
C1
C2
C1
C2
C2
C2
C2
C2
RADIO
LEFT FRONT SPEAKER (-)
LEFT FRONT SPEAKER (+)
RIGHT FRONT SPEAKER (-)
RIGHT FRONT SPEAKER (+)
LEFT REAR SPEAKER (-)
LEFT REAR SPEAKER (+)
RIGHT REAR SPEAKER (-)
RIGHT REAR SPEAKER (+)

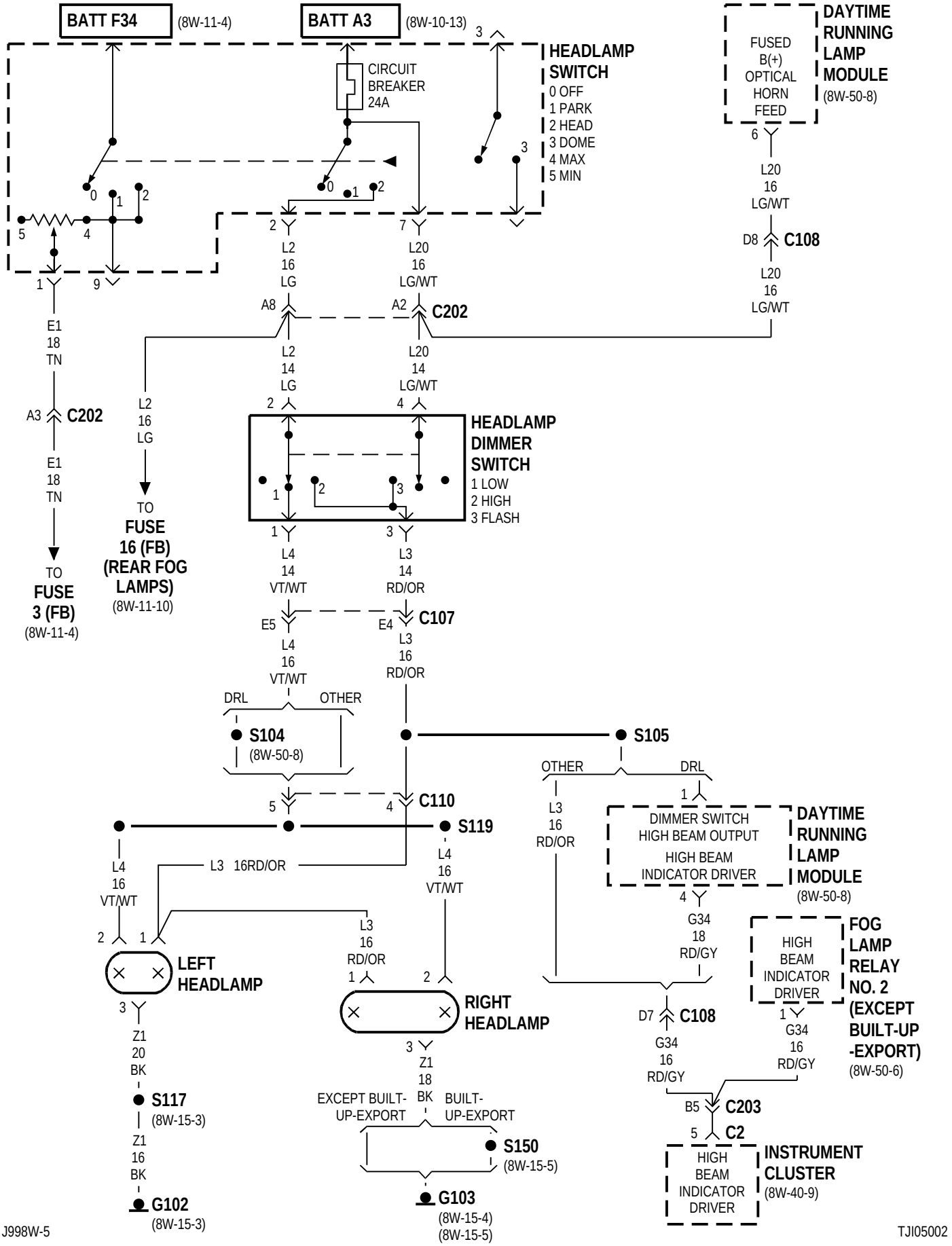
8W-48 REAR WINDOW DEFOGGER

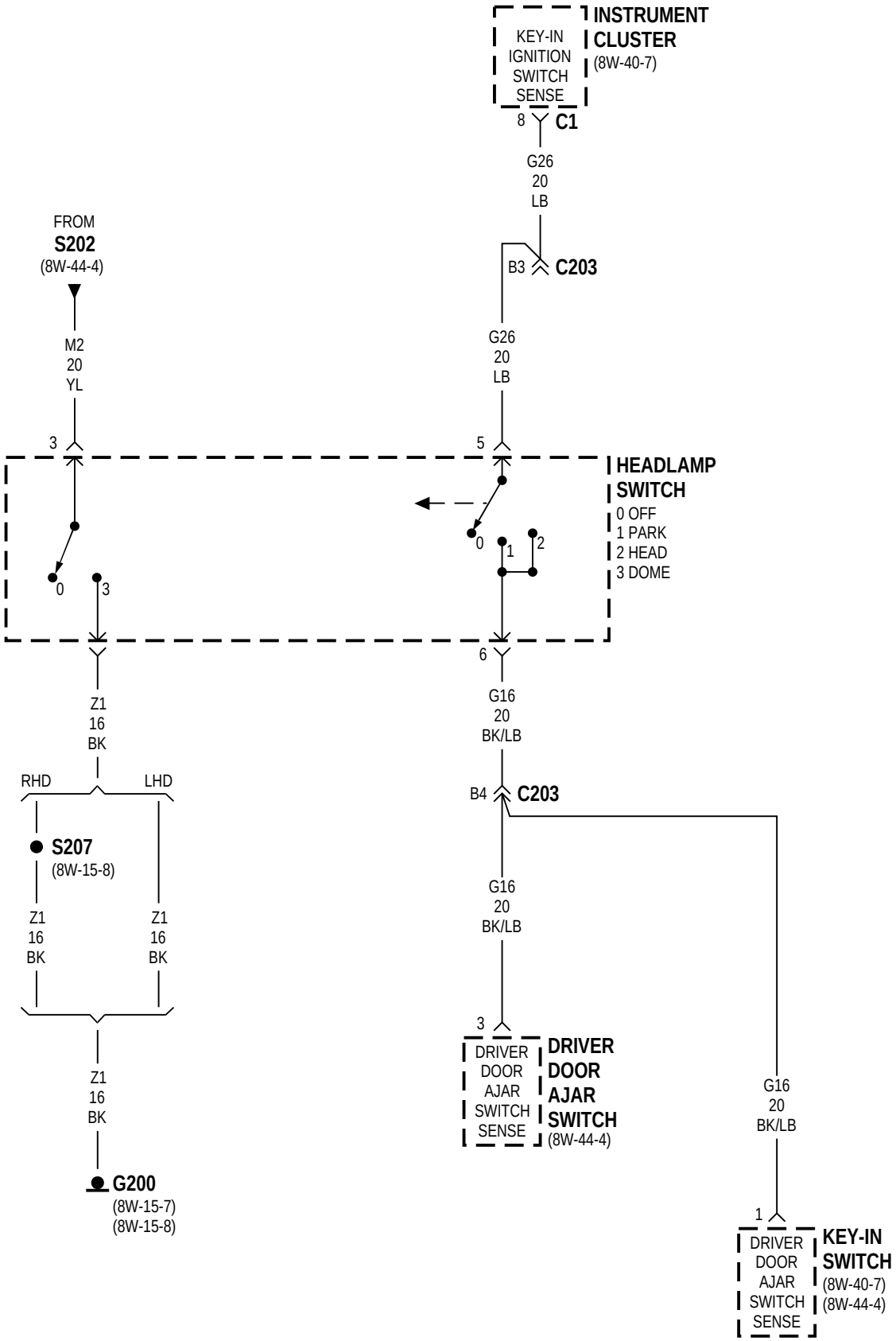


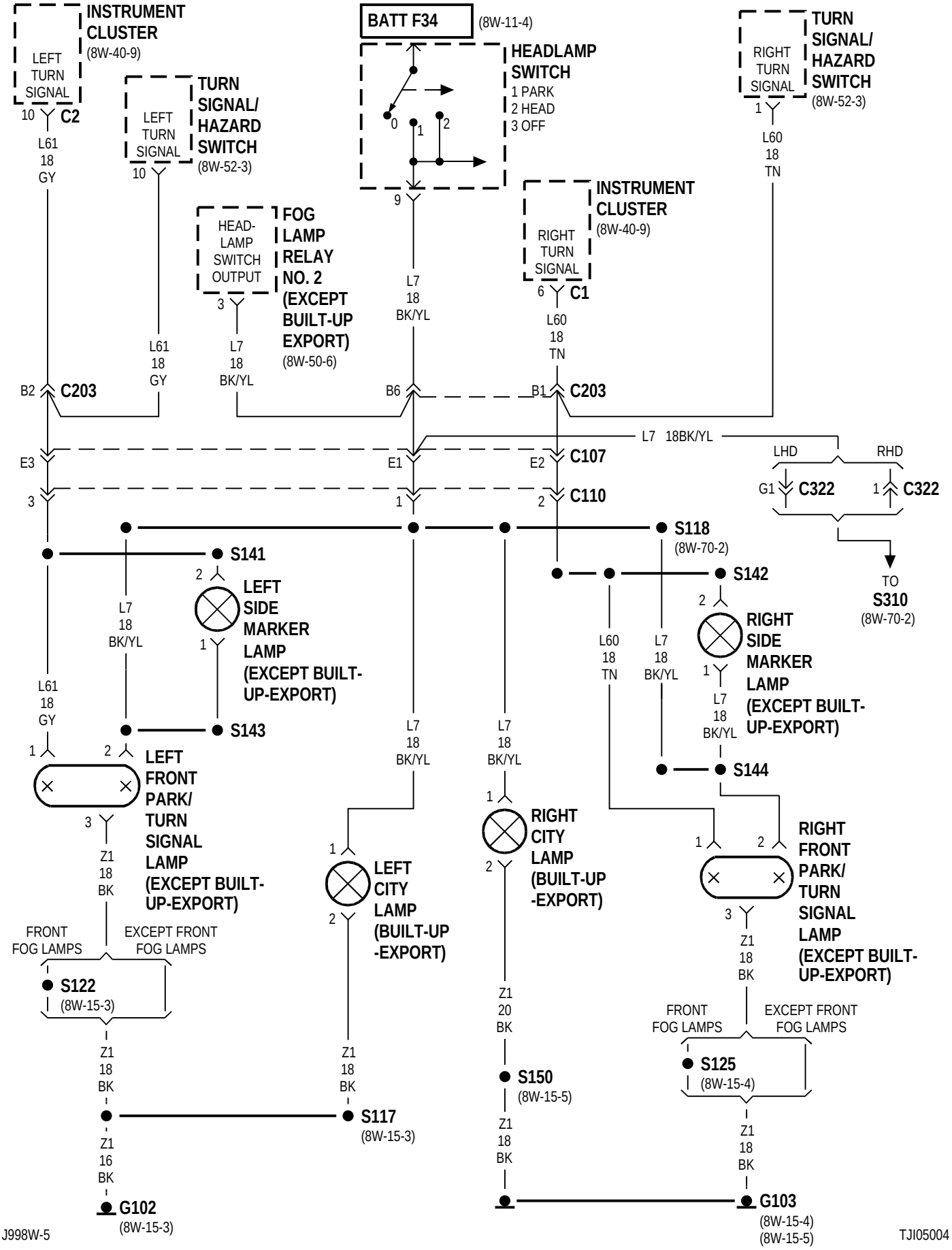
J998W-5

TJI04802

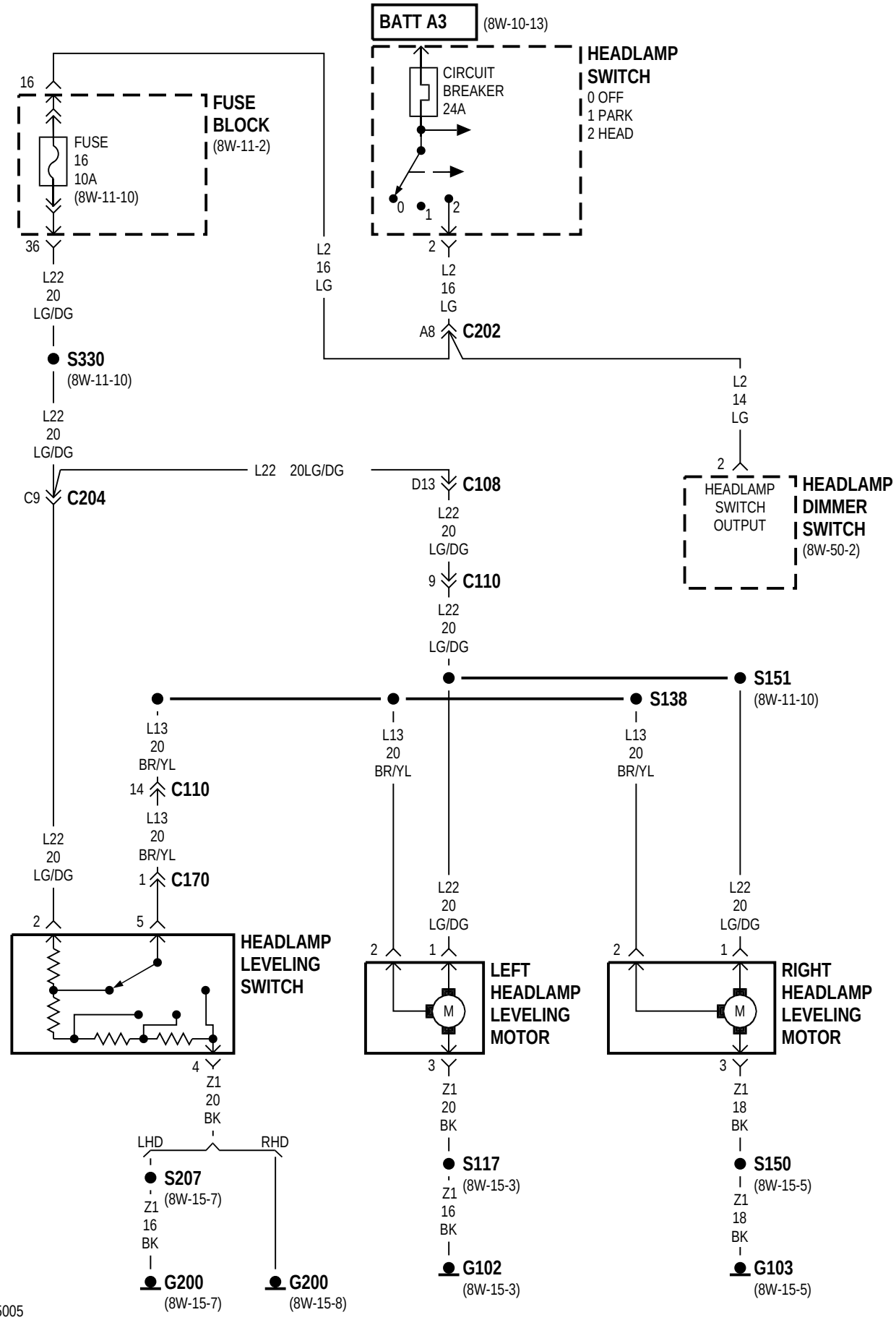
8W-50 FRONT LIGHTING


BATT F34
(8W-11-4)
BATT A3
(8W-10-13)
CIRCUIT BREAKER 24A
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
3 DOME
4 MAX
5 MIN
FUSED B(+) OPTICAL HORN FEED
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
L20 16 LG/WT
D8 C108
L2 16 LG
L20 16 LG/WT
A8 A2 C202
E1 18 TN
A3 C202
TO FUSE 3 (FB)
(8W-11-4)
L2 16 LG
TO FUSE 16 (FB) (REAR FOG LAMPS)
(8W-11-10)
L2 14 LG
L20 14 LG/WT
HEADLAMP DIMMER SWITCH
1 LOW
2 HIGH
3 FLASH
L4 14 VT/WT
L3 14 RD/OR
E5 E4 C107
L4 16 VT/WT
L3 16 RD/OR
DRL
OTHER
S104
(8W-50-8)
S105
C110
S119
L4 16 VT/WT
L3 16RD/OR
L3 16 RD/OR
L4 16 VT/WT
LEFT HEADLAMP
RIGHT HEADLAMP
Z1 20 BK
S117
(8W-15-3)
Z1 16 BK
G102
(8W-15-3)
Z1 18 BK
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S150
(8W-15-5)
G103
(8W-15-4)
(8W-15-5)
OTHER
DRL
L3 16 RD/OR
DIMMER SWITCH HIGH BEAM OUTPUT
HIGH BEAM INDICATOR DRIVER
DAYTIME RUNNING LAMP MODULE
(8W-50-8)
G34 18 RD/GY
D7 C108
G34 16 RD/GY
HIGH BEAM INDICATOR DRIVER
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP-EXPORT)
(8W-50-6)
G34 16 RD/GY
B5 C203
5 C2
HIGH BEAM INDICATOR DRIVER
INSTRUMENT CLUSTER
(8W-40-9)

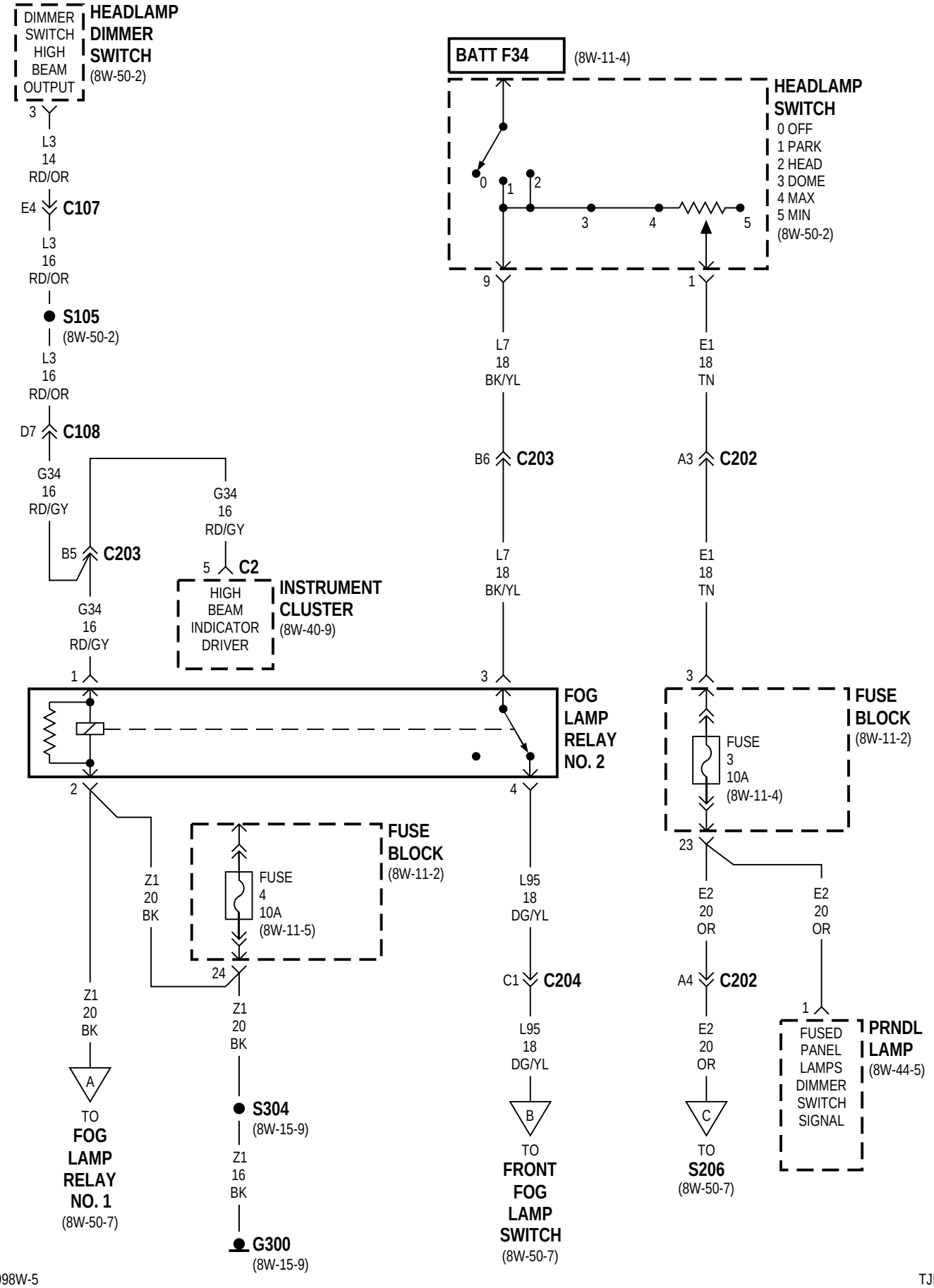

INSTRUMENT CLUSTER
(8W-40-7)
KEY-IN IGNITION SWITCH SENSE
8
C1
G26
20
LB
B3
C203
FROM
S202
(8W-44-4)
M2
20
YL
3
G26
20
LB
5
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
3 DOME
0
3
0
1
2
6
Z1
16
BK
G16
20
BK/LB
RHD
LHD
B4
C203
S207
(8W-15-8)
Z1
16
BK
Z1
16
BK
G16
20
BK/LB
3
DRIVER DOOR AJAR SWITCH SENSE
DRIVER DOOR AJAR SWITCH
(8W-44-4)
Z1
16
BK
G16
20
BK/LB
G200
(8W-15-7)
(8W-15-8)
1
DRIVER DOOR AJAR SWITCH SENSE
KEY-IN SWITCH
(8W-40-7)
(8W-44-4)


INSTRUMENT CLUSTER
(8W-40-9)
LEFT TURN SIGNAL
10
C2
L61
18
GY
TURN SIGNAL/ HAZARD SWITCH
(8W-52-3)
LEFT TURN SIGNAL
10
HEAD-LAMP SWITCH OUTPUT
3
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP EXPORT)
(8W-50-6)
L7
18
BK/YL
BATT F34
(8W-11-4)
HEADLAMP SWITCH
1 PARK
2 HEAD
3 OFF
0
1
2
9
INSTRUMENT CLUSTER
(8W-40-9)
RIGHT TURN SIGNAL
6
C1
L60
18
TN
TURN SIGNAL/ HAZARD SWITCH
(8W-52-3)
RIGHT TURN SIGNAL
1
L60
18
TN
B2
C203
B6
B1
C203
L7 18BK/YL
E3
E1
E2
C107
3
1
2
C110
LHD
RHD
G1
C322
1
C322
TO S310
(8W-70-2)
S118
(8W-70-2)
S141
S142
S143
S144
LEFT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)
RIGHT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)
L61
18
GY
L7
18
BK/YL
L60
18
TN
LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)
Z1
18
BK
LEFT CITY LAMP (BUILT-UP -EXPORT)
RIGHT CITY LAMP (BUILT-UP -EXPORT)
RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)
Z1
20
BK
FRONT FOG LAMPS
EXCEPT FRONT FOG LAMPS
S122
(8W-15-3)
S125
(8W-15-4)
S150
(8W-15-5)
S117
(8W-15-3)
Z1
16
BK
G102
(8W-15-3)
G103
(8W-15-4)
(8W-15-5)

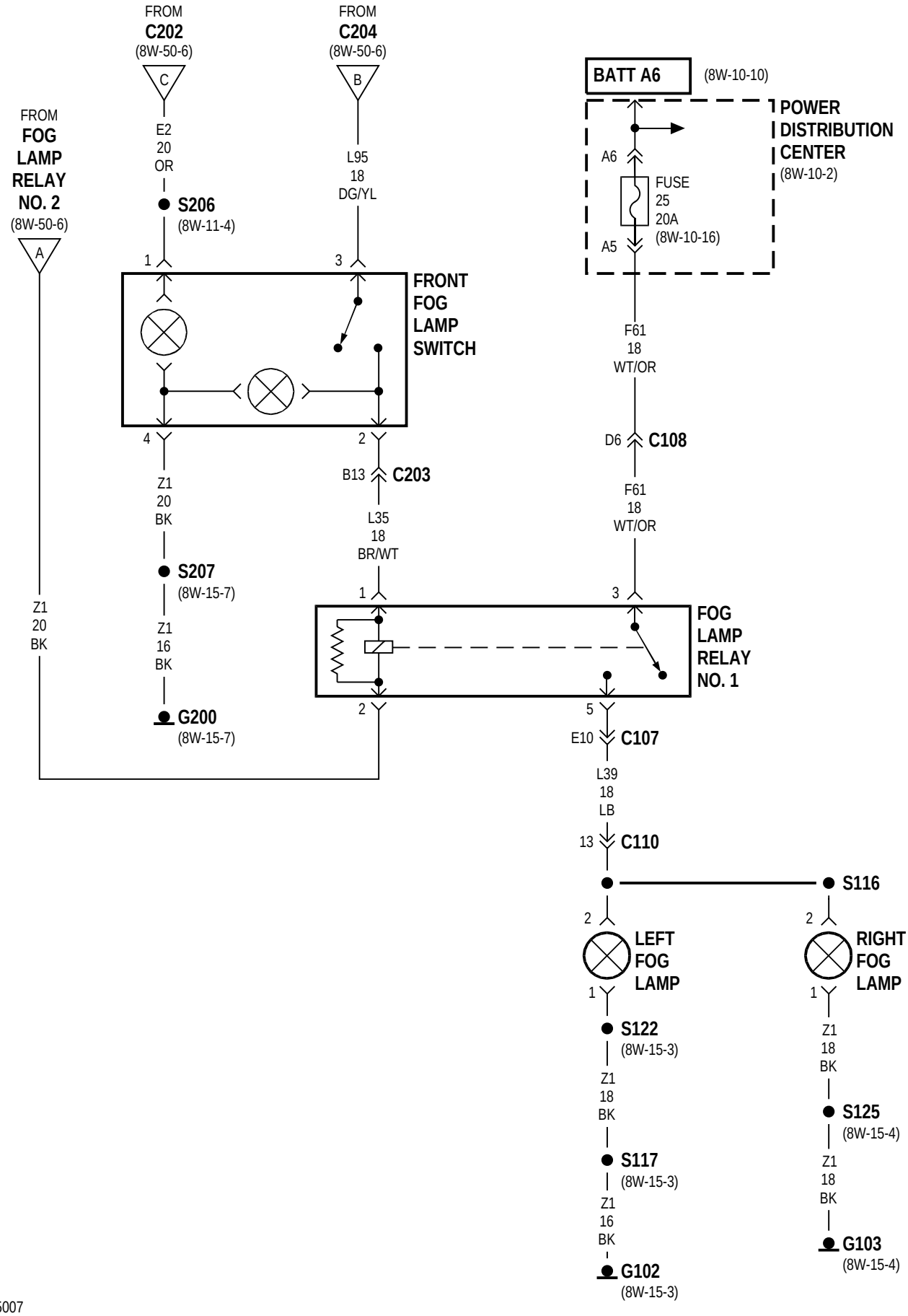
BUILT-UP-EXPORT



FOG LAMPS


DIMMER SWITCH HIGH BEAM OUTPUT
HEADLAMP DIMMER SWITCH
(8W-50-2)
3
L3
14
RD/OR
E4
C107
L3
16
RD/OR
S105
(8W-50-2)
L3
16
RD/OR
D7
C108
G34
16
RD/GY
B5
C203
G34
16
RD/GY
5
C2
HIGH BEAM INDICATOR DRIVER
INSTRUMENT CLUSTER
(8W-40-9)
G34
16
RD/GY
1
2
FOG LAMP RELAY NO. 2
Z1
20
BK
FUSE
4
10A
(8W-11-5)
FUSE BLOCK
(8W-11-2)
24
Z1
20
BK
A
TO
FOG LAMP RELAY NO. 1
(8W-50-7)
Z1
20
BK
S304
(8W-15-9)
Z1
16
BK
G300
(8W-15-9)
BATT F34
(8W-11-4)
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
3 DOME
4 MAX
5 MIN
(8W-50-2)
0
1
2
3
4
5
9
1
L7
18
BK/YL
B6
C203
L7
18
BK/YL
3
4
L95
18
DG/YL
C1
C204
L95
18
DG/YL
B
TO
FRONT FOG LAMP SWITCH
(8W-50-7)
E1
18
TN
A3
C202
E1
18
TN
3
FUSE
3
10A
(8W-11-4)
FUSE BLOCK
(8W-11-2)
23
E2
20
OR
A4
C202
E2
20
OR
C
TO
S206
(8W-50-7)
E2
20
OR
1
FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
PRNDL LAMP
(8W-44-5)

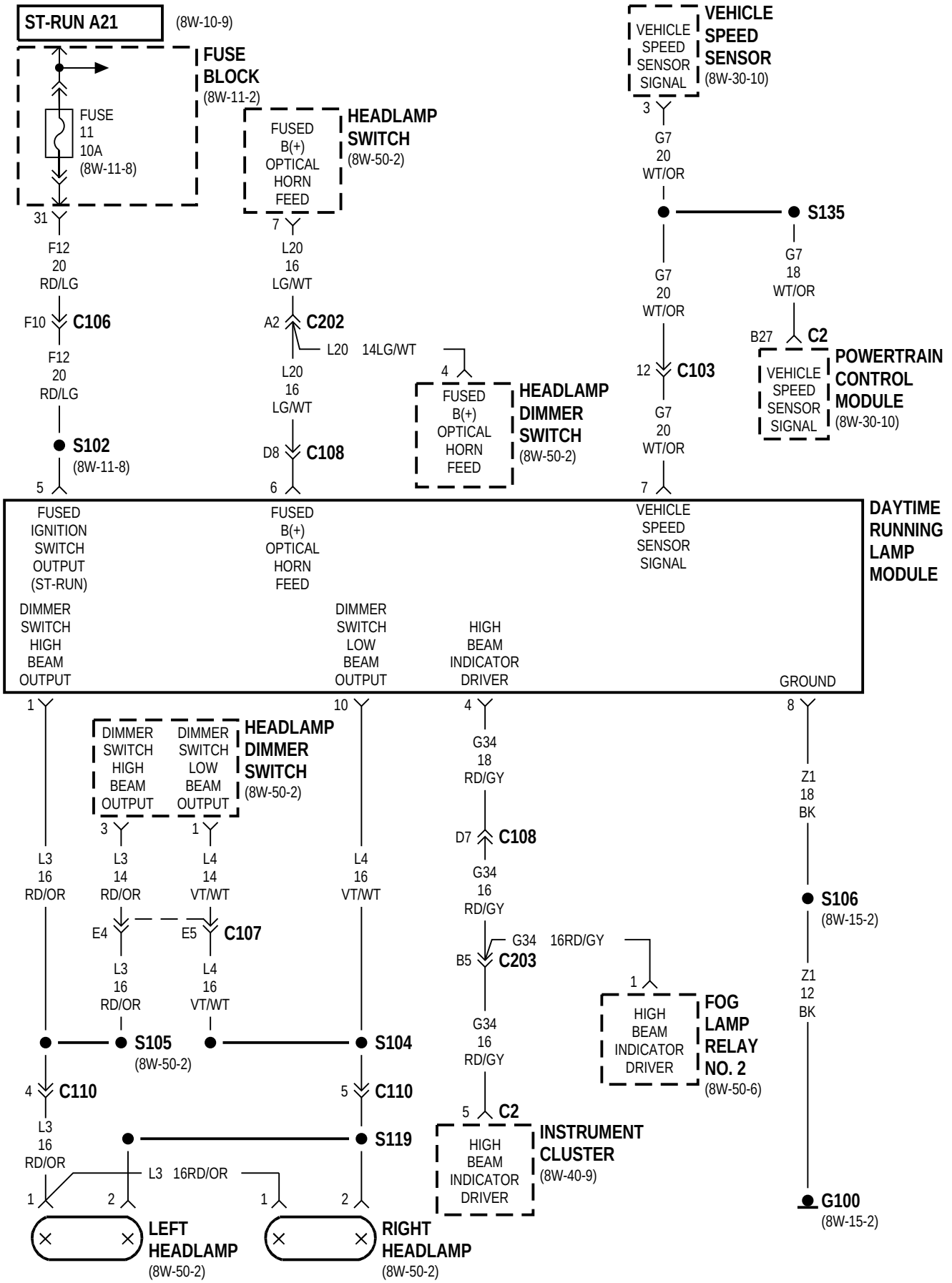
FOG LAMPS



TJI05007

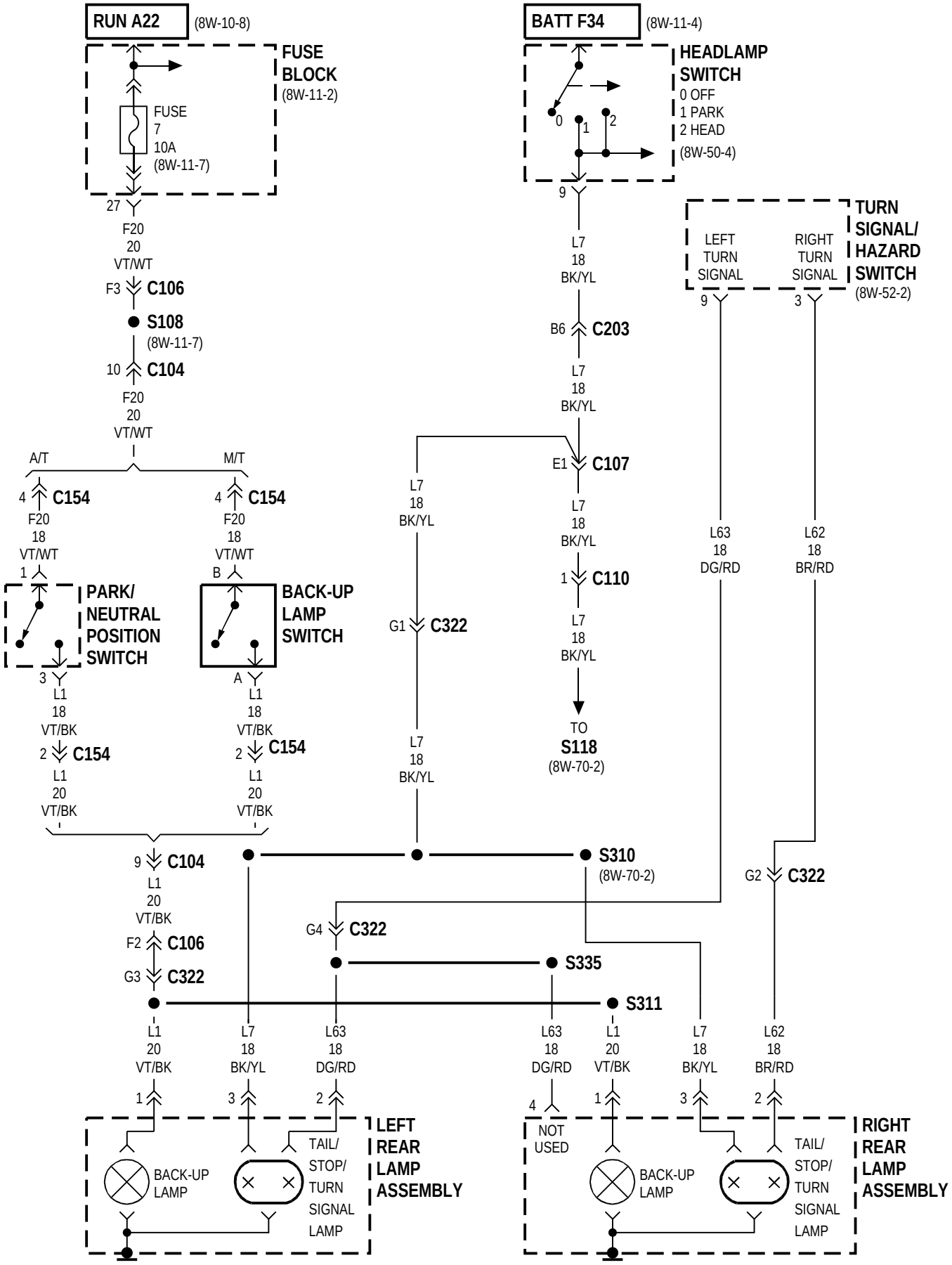
J998W-5

DRL

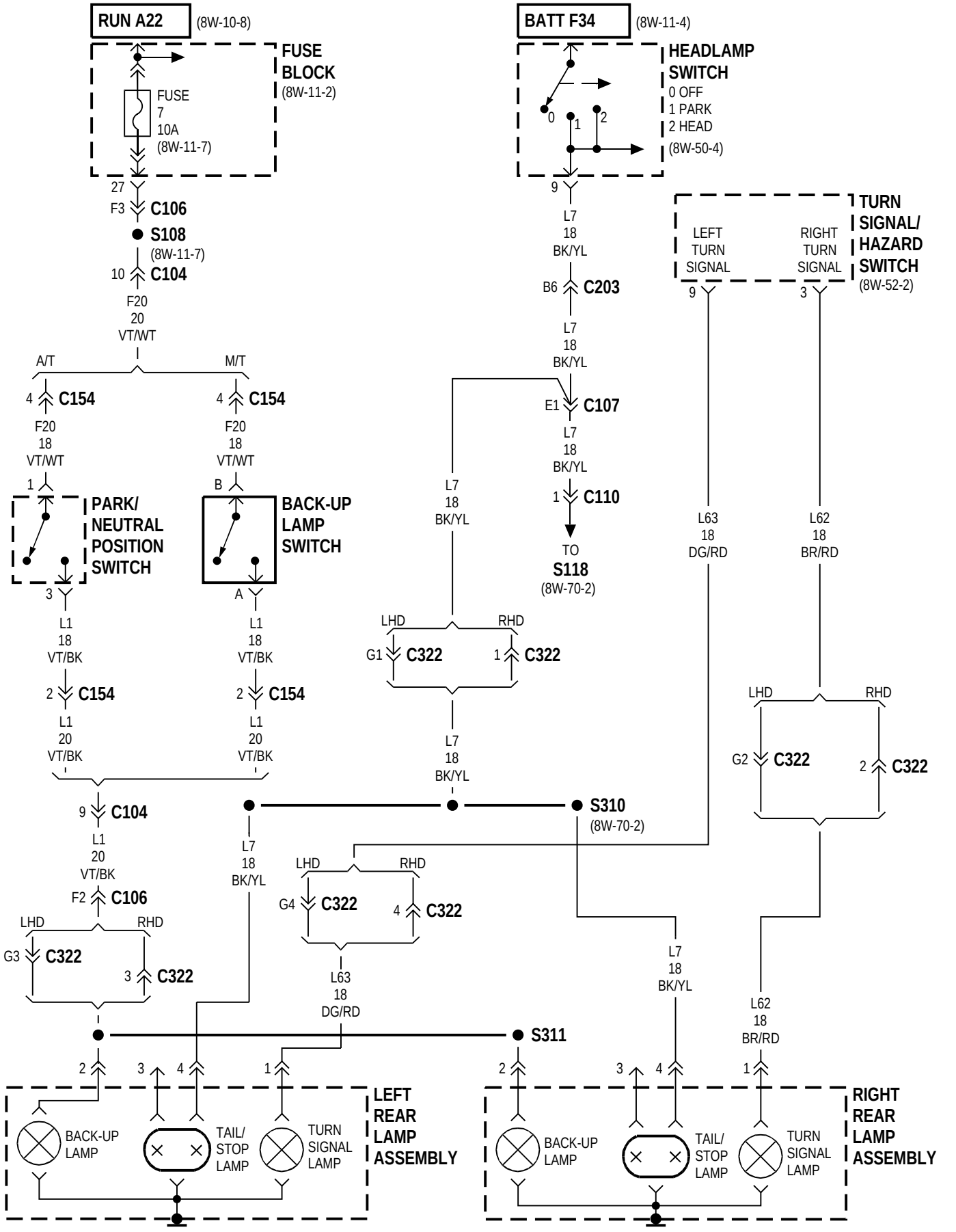

ST-RUN A21
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 11 10A
(8W-11-8)
31
F12 20 RD/LG
F10 C106
F12 20 RD/LG
S102
(8W-11-8)
5
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
HEADLAMP SWITCH
(8W-50-2)
FUSED B(+) OPTICAL HORN FEED
7
L20 16 LG/WT
A2 C202
L20 14LG/WT
L20 16 LG/WT
D8 C108
6
FUSED B(+) OPTICAL HORN FEED
HEADLAMP DIMMER SWITCH
(8W-50-2)
4
FUSED B(+) OPTICAL HORN FEED
VEHICLE SPEED SENSOR
(8W-30-10)
VEHICLE SPEED SENSOR SIGNAL
3
G7 20 WT/OR
S135
G7 20 WT/OR
12 C103
G7 20 WT/OR
7
VEHICLE SPEED SENSOR SIGNAL
G7 18 WT/OR
B27 C2
POWERTRAIN CONTROL MODULE
(8W-30-10)
VEHICLE SPEED SENSOR SIGNAL
DAYTIME RUNNING LAMP MODULE
DIMMER SWITCH HIGH BEAM OUTPUT
DIMMER SWITCH LOW BEAM OUTPUT
HIGH BEAM INDICATOR DRIVER
GROUND
1
10
4
8
HEADLAMP DIMMER SWITCH
(8W-50-2)
DIMMER SWITCH HIGH BEAM OUTPUT
DIMMER SWITCH LOW BEAM OUTPUT
3
1
L3 16 RD/OR
L3 14 RD/OR
L4 14 VT/WT
L4 16 VT/WT
E4 E5 C107
L3 16 RD/OR
L4 16 VT/WT
S105
(8W-50-2)
S104
4 C110
5 C110
L3 16 RD/OR
S119
L3 16RD/OR
1
2
1
2
LEFT HEADLAMP
(8W-50-2)
RIGHT HEADLAMP
(8W-50-2)
G34 18 RD/GY
D7 C108
G34 16 RD/GY
G34 16RD/GY
B5 C203
G34 16 RD/GY
5 C2
HIGH BEAM INDICATOR DRIVER
INSTRUMENT CLUSTER
(8W-40-9)
1
HIGH BEAM INDICATOR DRIVER
FOG LAMP RELAY NO. 2
(8W-50-6)
Z1 18 BK
S106
(8W-15-2)
Z1 12 BK
G100
(8W-15-2)

8W-51 REAR LIGHTING

EXCEPT BUILT-UP-EXPORT

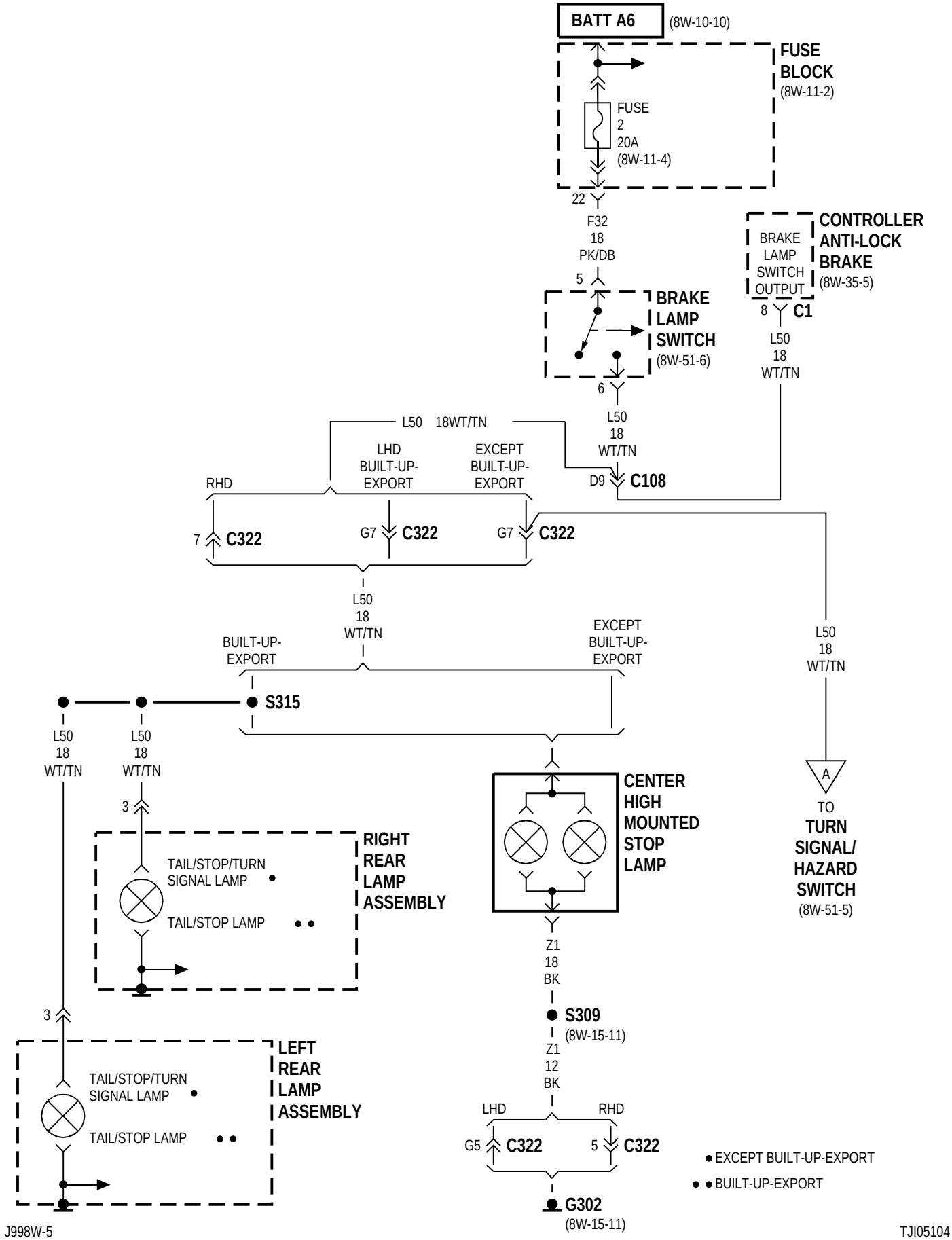


BUILT-UP-EXPORT



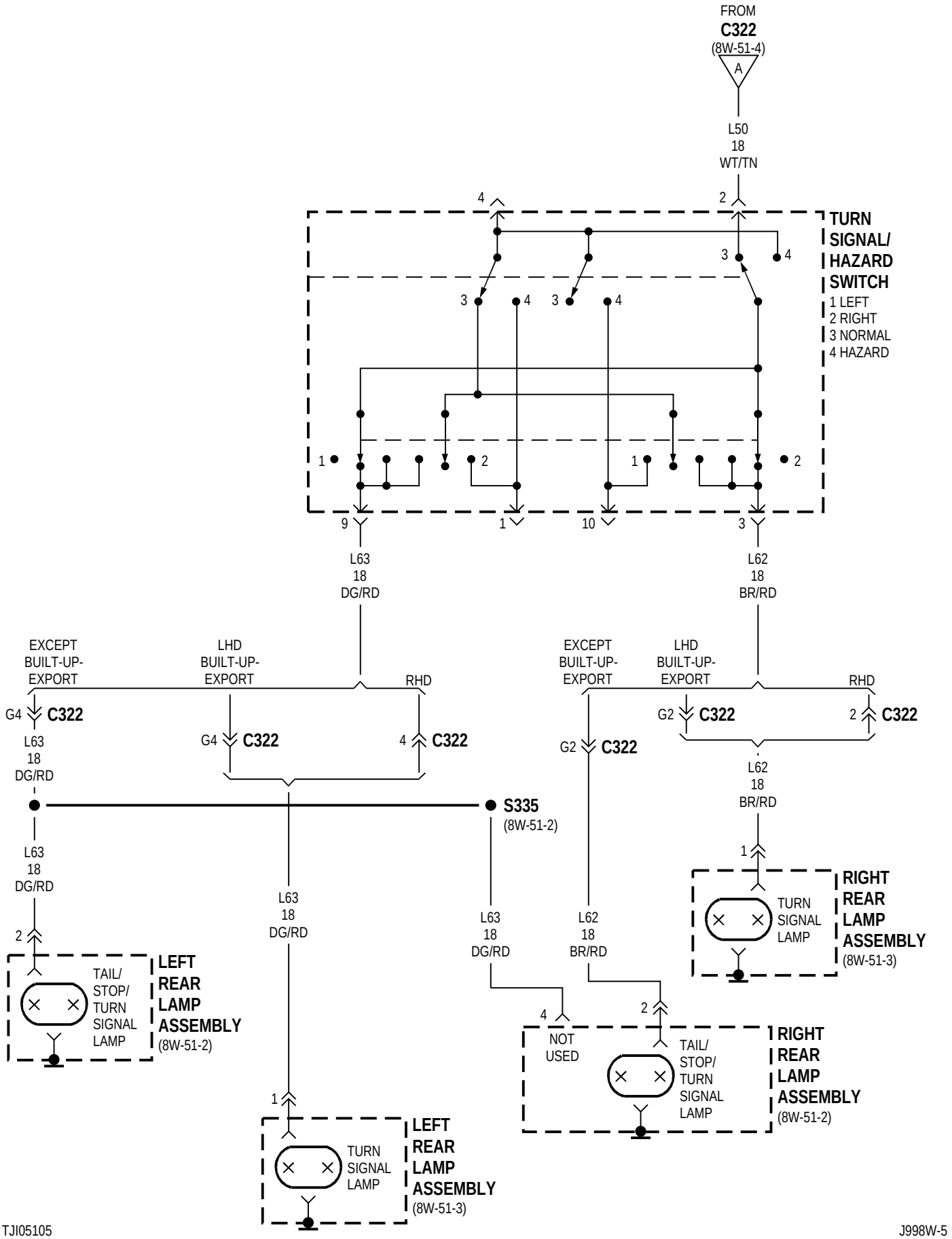
TJI05103

J998W-5



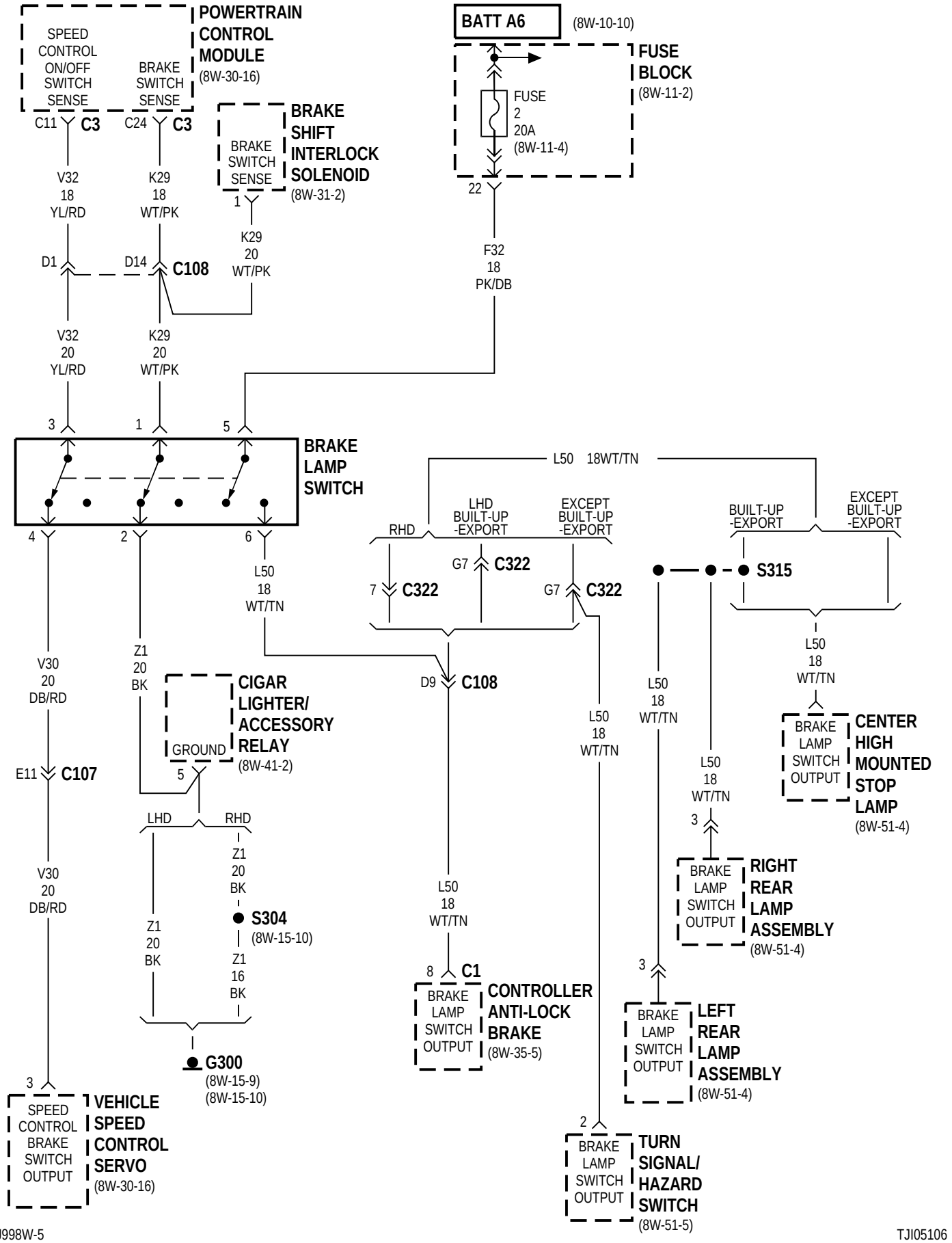
J998W-5

TJI05104

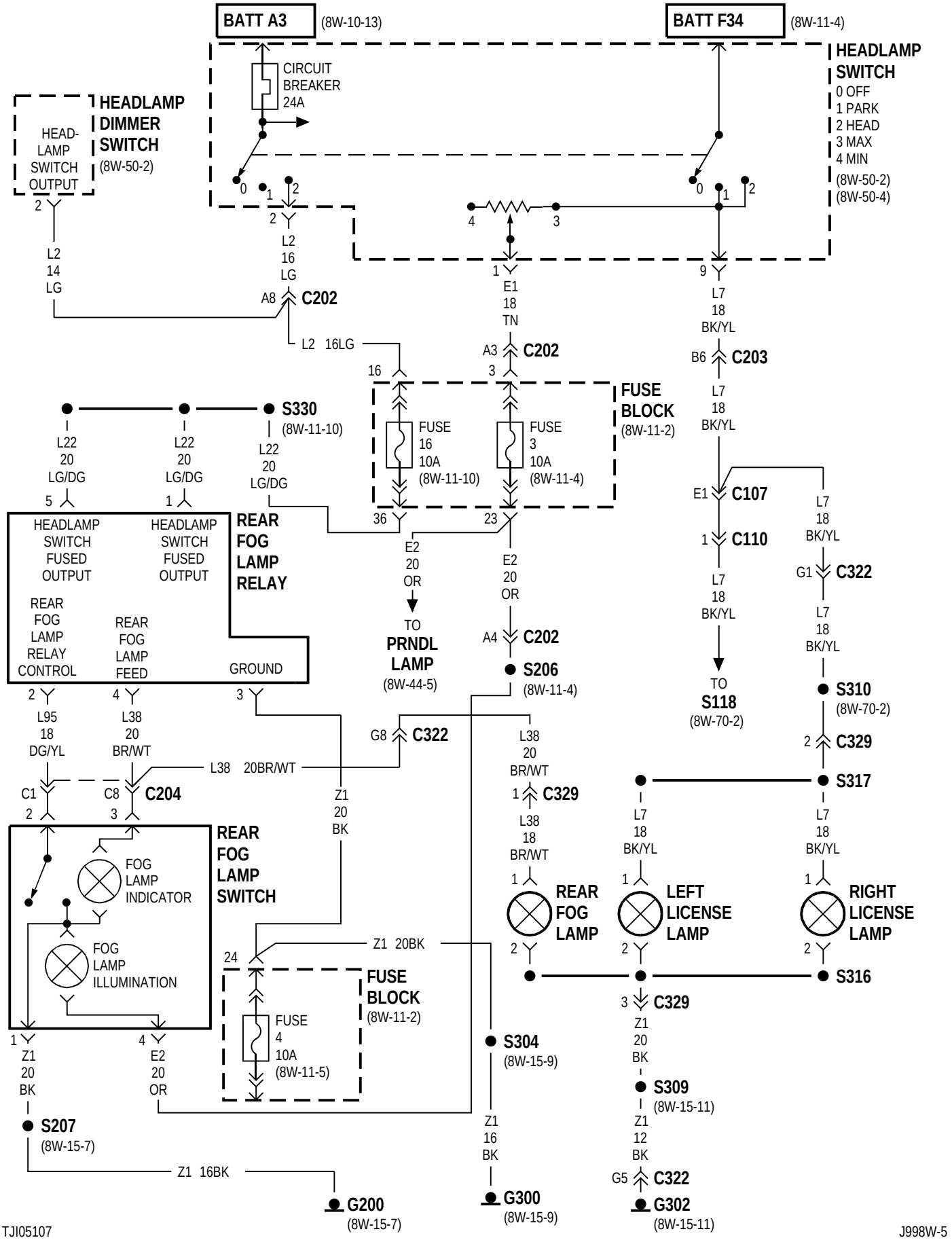


TJI05105

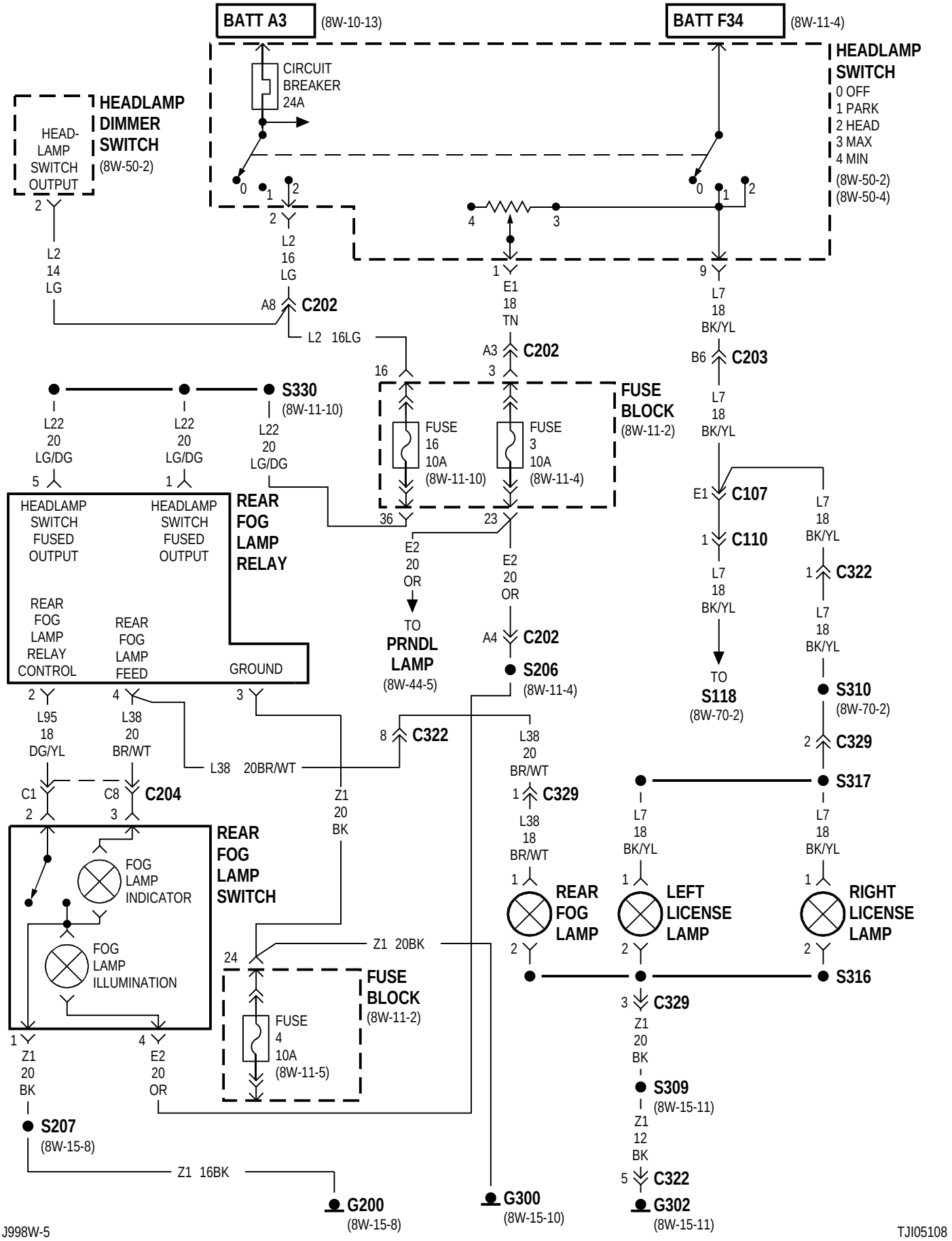
J998W-5


POWERTRAIN CONTROL MODULE
(8W-30-16)
SPEED CONTROL ON/OFF SWITCH SENSE
BRAKE SWITCH SENSE
C11 C3
C24 C3
V32 18 YL/RD
K29 18 WT/PK
D1
D14 C108
V32 20 YL/RD
K29 20 WT/PK
BRAKE SHIFT INTERLOCK SOLENOID
(8W-31-2)
BRAKE SWITCH SENSE
1
K29 20 WT/PK
BATT A6
(8W-10-10)
FUSE BLOCK
(8W-11-2)
FUSE 2 20A
(8W-11-4)
22
F32 18 PK/DB
BRAKE LAMP SWITCH
3
1
5
4
2
6
L50 18WT/TN
RHD
LHD BUILT-UP -EXPORT
EXCEPT BUILT-UP -EXPORT
G7 C322
7 C322
G7 C322
BUILT-UP -EXPORT
EXCEPT BUILT-UP -EXPORT
S315
L50 18 WT/TN
V30 20 DB/RD
Z1 20 BK
CIGAR LIGHTER/ ACCESSORY RELAY
(8W-41-2)
GROUND
5
D9 C108
L50 18 WT/TN
L50 18 WT/TN
L50 18 WT/TN
BRAKE LAMP SWITCH OUTPUT
CENTER HIGH MOUNTED STOP LAMP
(8W-51-4)
E11 C107
V30 20 DB/RD
LHD
RHD
Z1 20 BK
S304
(8W-15-10)
Z1 16 BK
Z1 20 BK
G300
(8W-15-9)
(8W-15-10)
L50 18 WT/TN
3
BRAKE LAMP SWITCH OUTPUT
RIGHT REAR LAMP ASSEMBLY
(8W-51-4)
8
C1
BRAKE LAMP SWITCH OUTPUT
CONTROLLER ANTI-LOCK BRAKE
(8W-35-5)
3
BRAKE LAMP SWITCH OUTPUT
LEFT REAR LAMP ASSEMBLY
(8W-51-4)
3
SPEED CONTROL BRAKE SWITCH OUTPUT
VEHICLE SPEED CONTROL SERVO
(8W-30-16)
2
BRAKE LAMP SWITCH OUTPUT
TURN SIGNAL/ HAZARD SWITCH
(8W-51-5)

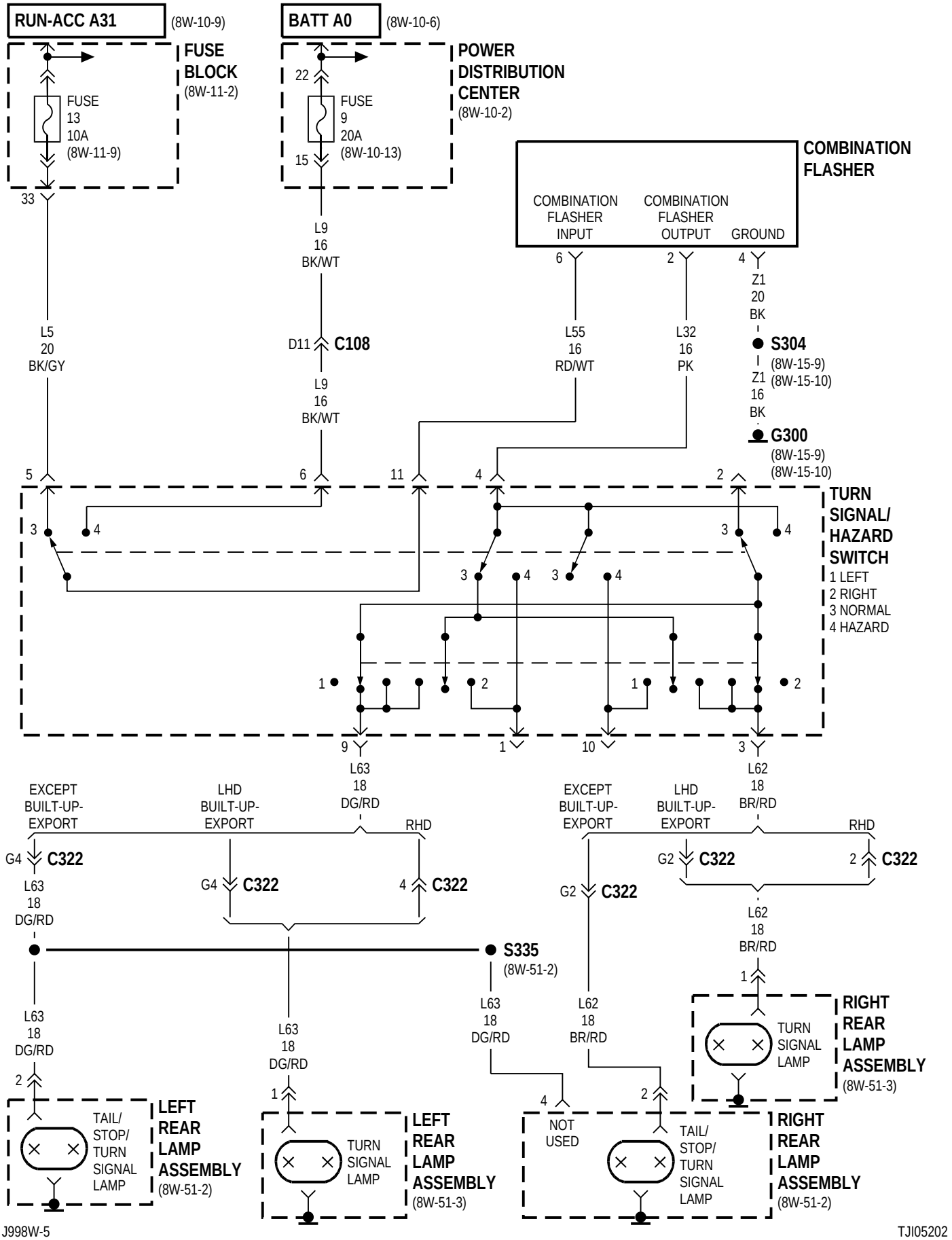
LHD BUILT-UP-EXPORT

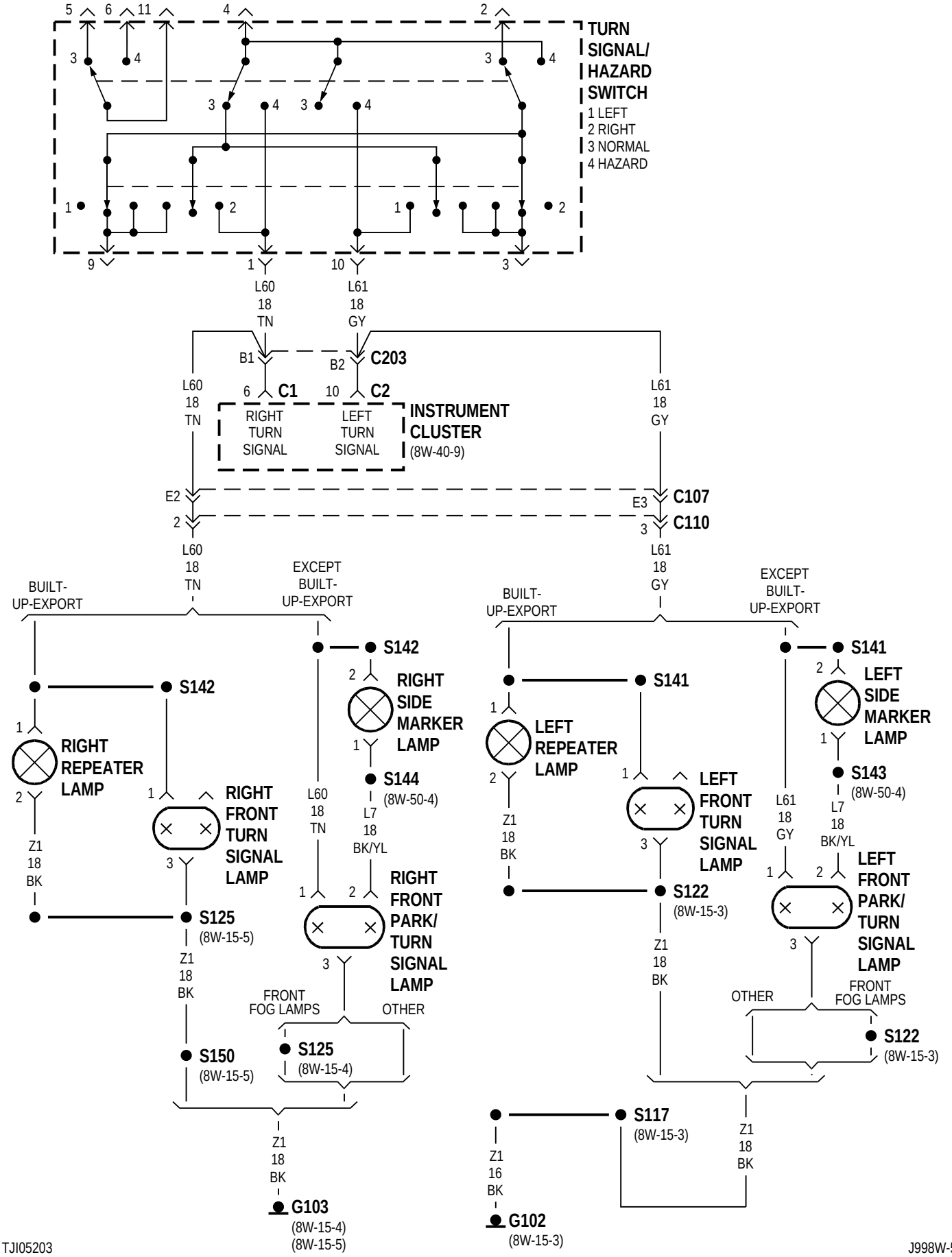


RHD BUILT-UP-EXPORT



8W-52 TURN SIGNALS

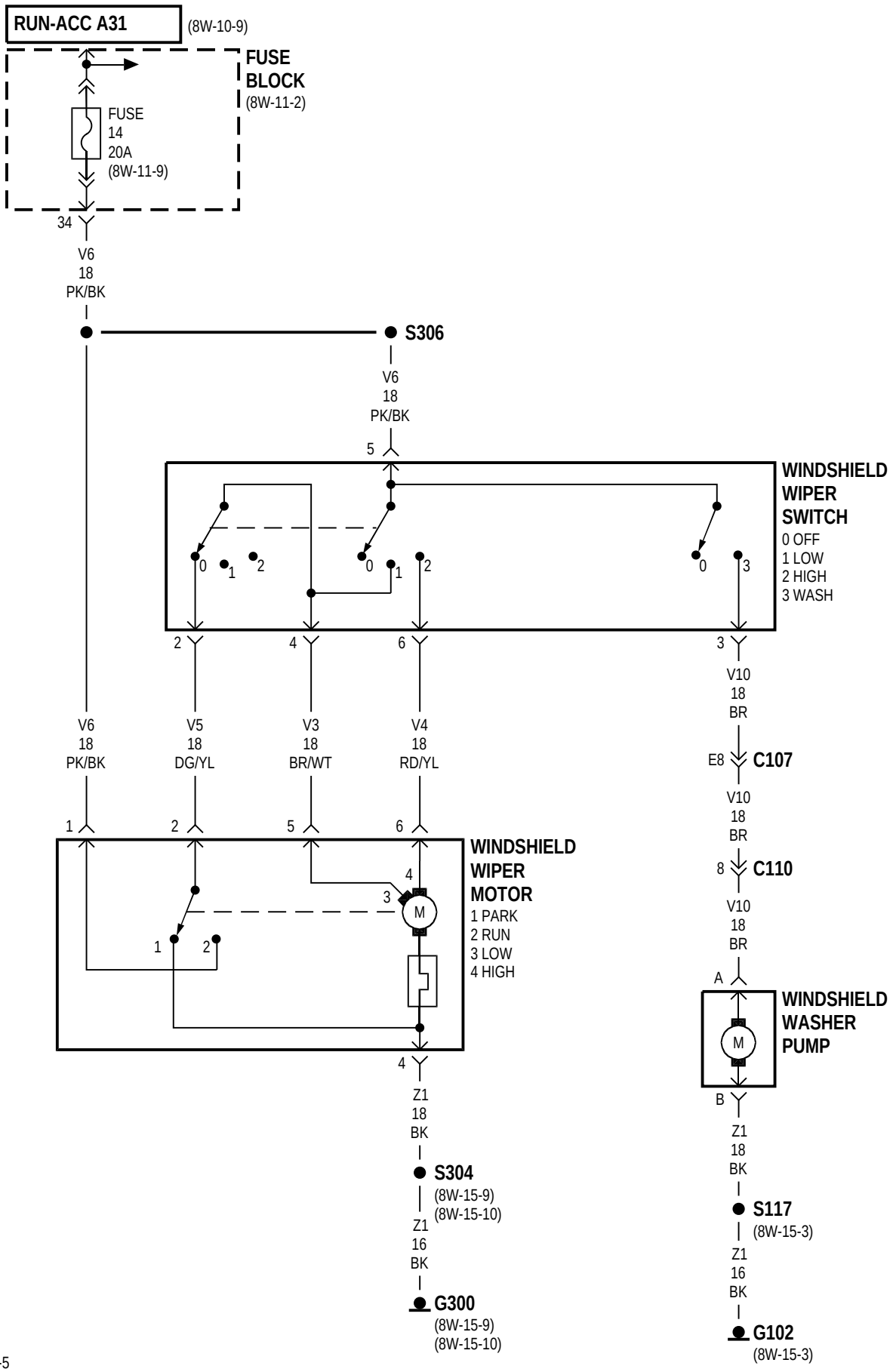

RUN-ACC A31
(8W-10-9)
BATT A0
(8W-10-6)
FUSE BLOCK
(8W-11-2)
FUSE 13 10A (8W-11-9)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE 9 20A (8W-10-13)
COMBINATION FLASHER
COMBINATION FLASHER INPUT
COMBINATION FLASHER OUTPUT
GROUND
L5 20 BK/GY
L9 16 BK/WT
D11 C108
L9 16 BK/WT
L55 16 RD/WT
L32 16 PK
Z1 20 BK
S304
(8W-15-9) (8W-15-10)
Z1 16 BK
G300
(8W-15-9) (8W-15-10)
TURN SIGNAL/ HAZARD SWITCH
1 LEFT
2 RIGHT
3 NORMAL
4 HAZARD
L63 18 DG/RD
L62 18 BR/RD
EXCEPT BUILT-UP-EXPORT
LHD BUILT-UP-EXPORT
RHD
C322
S335
(8W-51-2)
LEFT REAR LAMP ASSEMBLY
(8W-51-2)
TAIL/ STOP/ TURN SIGNAL LAMP
LEFT REAR LAMP ASSEMBLY
(8W-51-3)
TURN SIGNAL LAMP
NOT USED
RIGHT REAR LAMP ASSEMBLY
(8W-51-2)
RIGHT REAR LAMP ASSEMBLY
(8W-51-3)



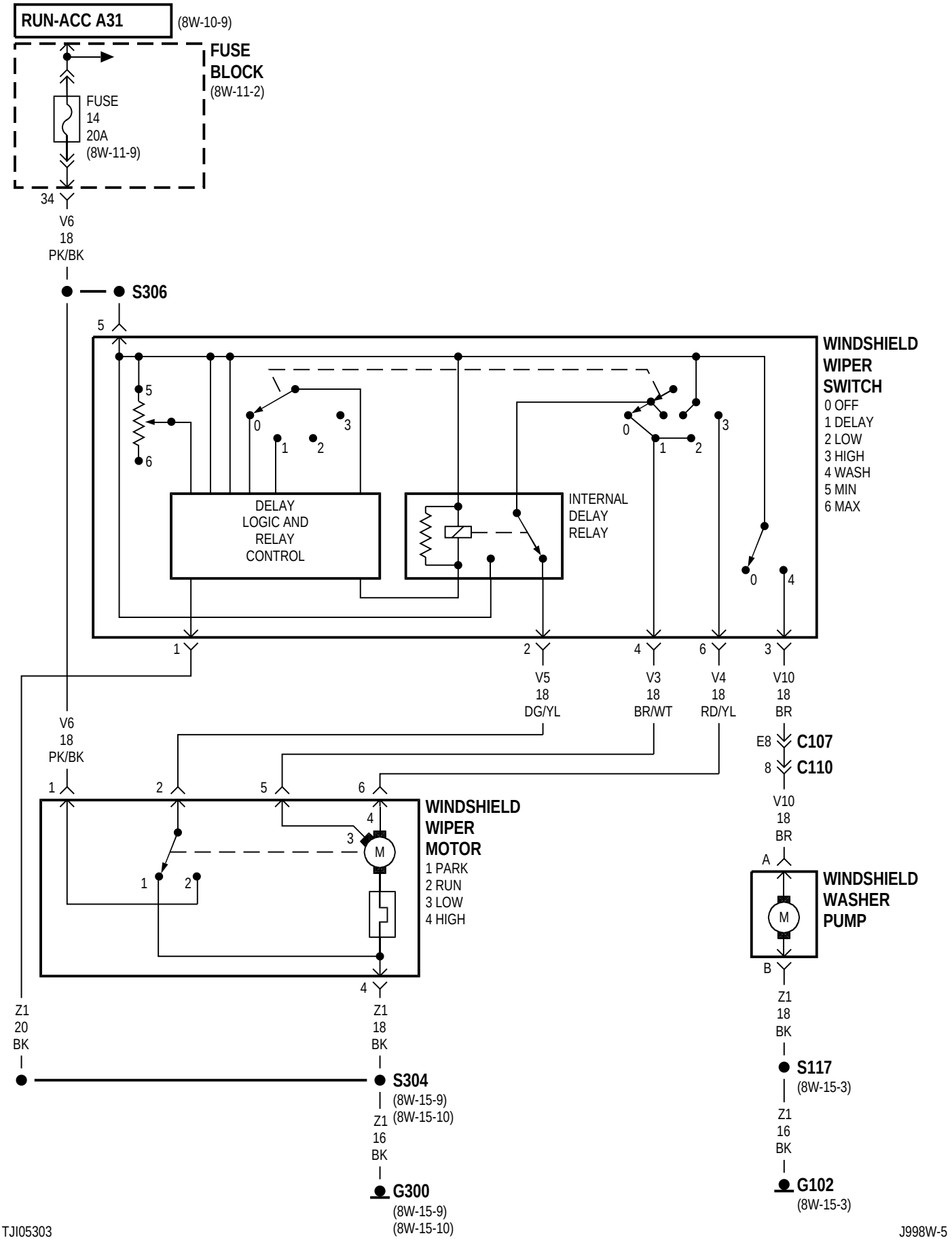
TJI05203

J998W-5

8W-53 WIPERS

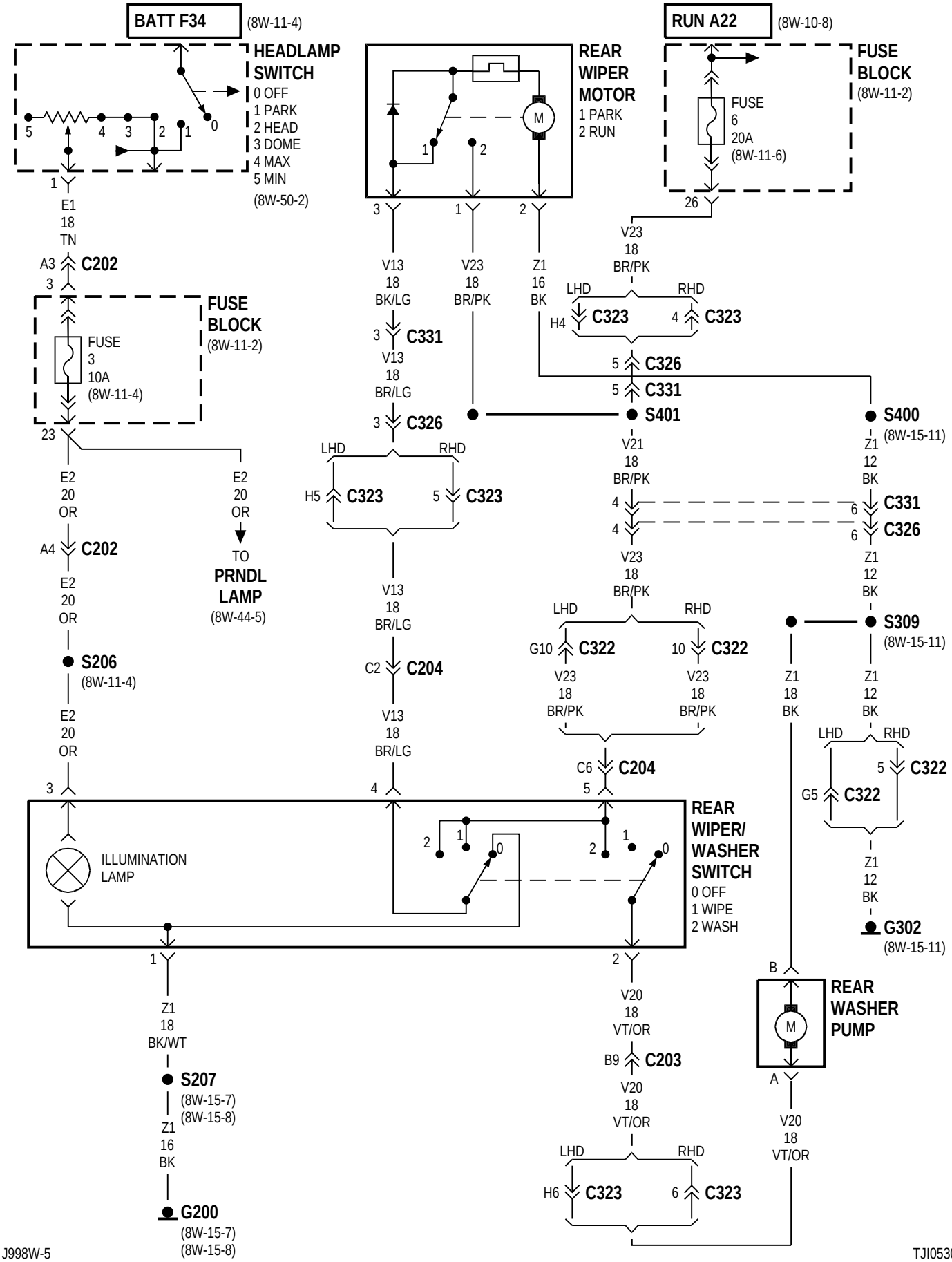

RUN-ACC A31
(8W-10-9)
FUSE BLOCK
(8W-11-2)
FUSE 14 20A
(8W-11-9)
34
V6 18 PK/BK
S306
V6 18 PK/BK
5
WINDSHIELD WIPER SWITCH
0 OFF
1 LOW
2 HIGH
3 WASH
2
4
6
3
V6 18 PK/BK
V5 18 DG/YL
V3 18 BR/WT
V4 18 RD/YL
V10 18 BR
E8 C107
V10 18 BR
8 C110
V10 18 BR
A
1
2
5
6
WINDSHIELD WIPER MOTOR
1 PARK
2 RUN
3 LOW
4 HIGH
M
4
Z1 18 BK
S304
(8W-15-9)
(8W-15-10)
Z1 16 BK
G300
(8W-15-9)
(8W-15-10)
WINDSHIELD WASHER PUMP
B
Z1 18 BK
S117
(8W-15-3)
Z1 16 BK
G102
(8W-15-3)

INTERMITTENT

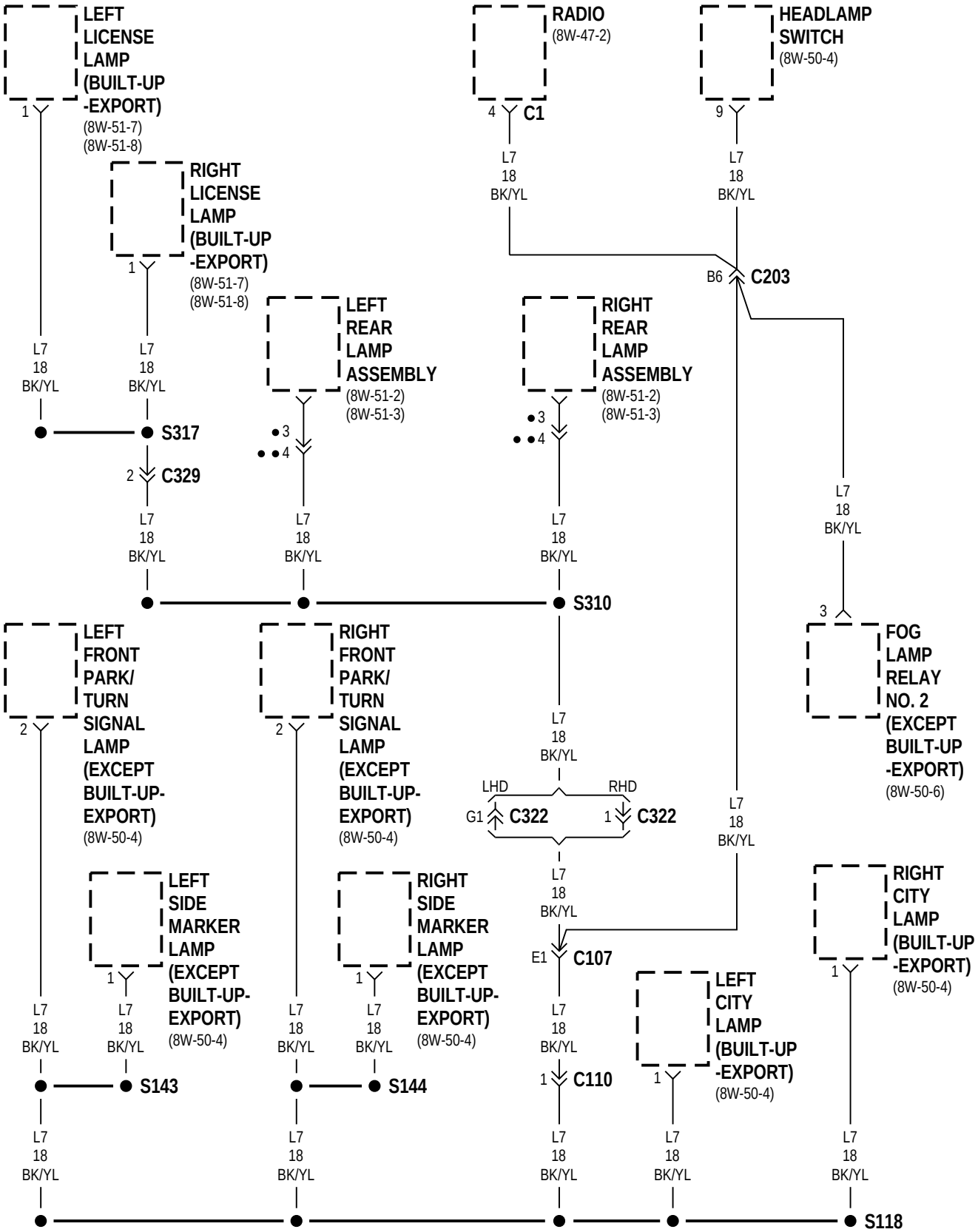


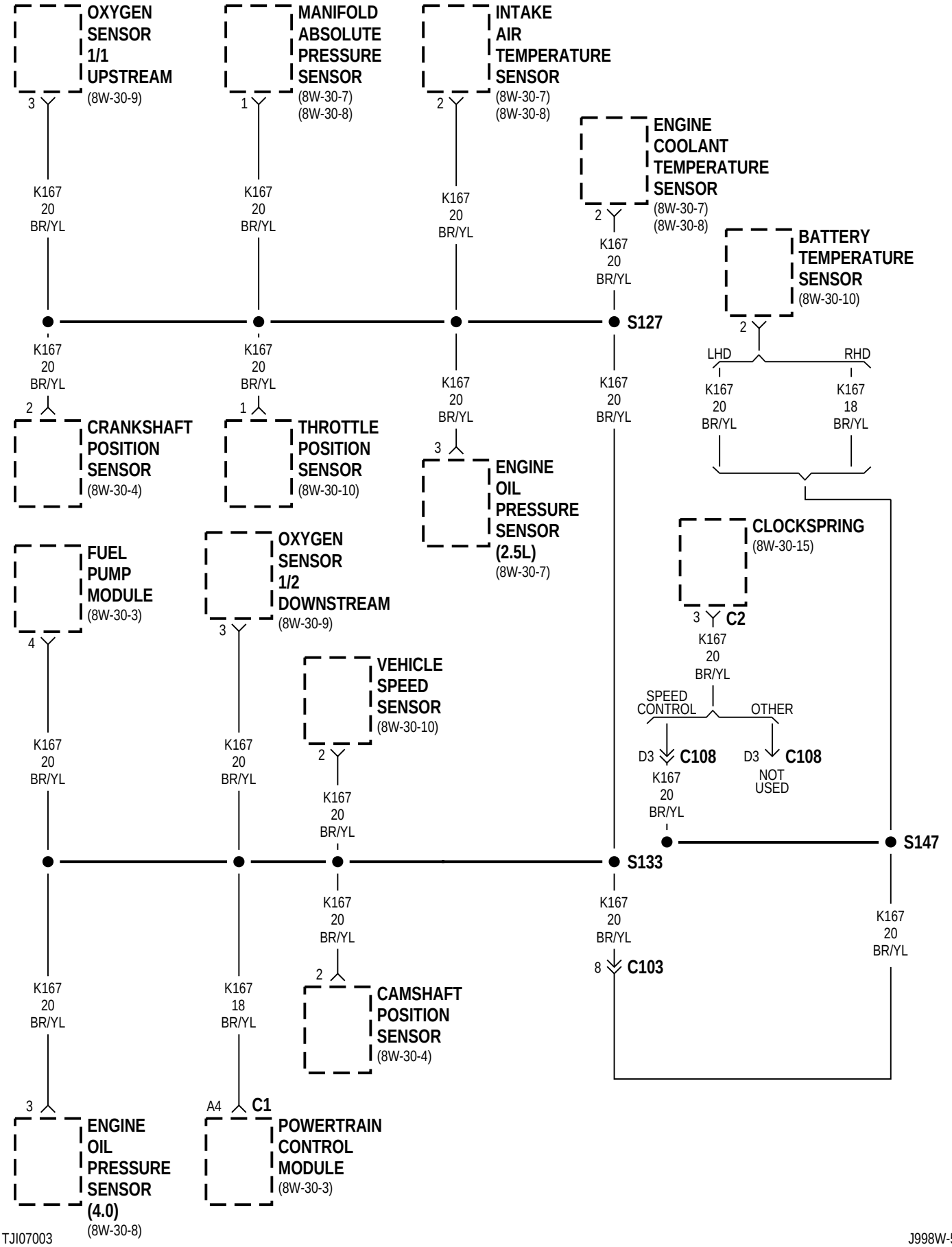
TJI05303

J998W-5


BATT F34
(8W-11-4)
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
3 DOME
4 MAX
5 MIN
(8W-50-2)
E1
18
TN
A3
C202
3
FUSE BLOCK
(8W-11-2)
FUSE
3
10A
(8W-11-4)
23
E2
20
OR
A4
C202
E2
20
OR
S206
(8W-11-4)
E2
20
OR
3
TO
PRNDL LAMP
(8W-44-5)
REAR WIPER MOTOR
1 PARK
2 RUN
V13
18
BK/LG
3
C331
V13
18
BR/LG
3
C326
LHD
RHD
H5
C323
5
C323
V13
18
BR/LG
C2
C204
V13
18
BR/LG
4
V23
18
BR/PK
Z1
16
BK
RUN A22
(8W-10-8)
FUSE BLOCK
(8W-11-2)
FUSE
6
20A
(8W-11-6)
26
V23
18
BR/PK
LHD
RHD
H4
C323
4
C323
5
C326
5
C331
S401
V21
18
BR/PK
4
4
V23
18
BR/PK
LHD
RHD
G10
C322
10
C322
V23
18
BR/PK
V23
18
BR/PK
C6
C204
5
S400
(8W-15-11)
Z1
12
BK
6
C331
6
C326
Z1
12
BK
S309
(8W-15-11)
Z1
18
BK
Z1
12
BK
LHD
RHD
5
C322
G5
C322
Z1
12
BK
G302
(8W-15-11)
ILLUMINATION LAMP
REAR WIPER/ WASHER SWITCH
0 OFF
1 WIPE
2 WASH
1
Z1
18
BK/WT
S207
(8W-15-7)
(8W-15-8)
Z1
16
BK
G200
(8W-15-7)
(8W-15-8)
2
V20
18
VT/OR
B9
C203
V20
18
VT/OR
LHD
RHD
H6
C323
6
C323
B
REAR WASHER PUMP
A
V20
18
VT/OR

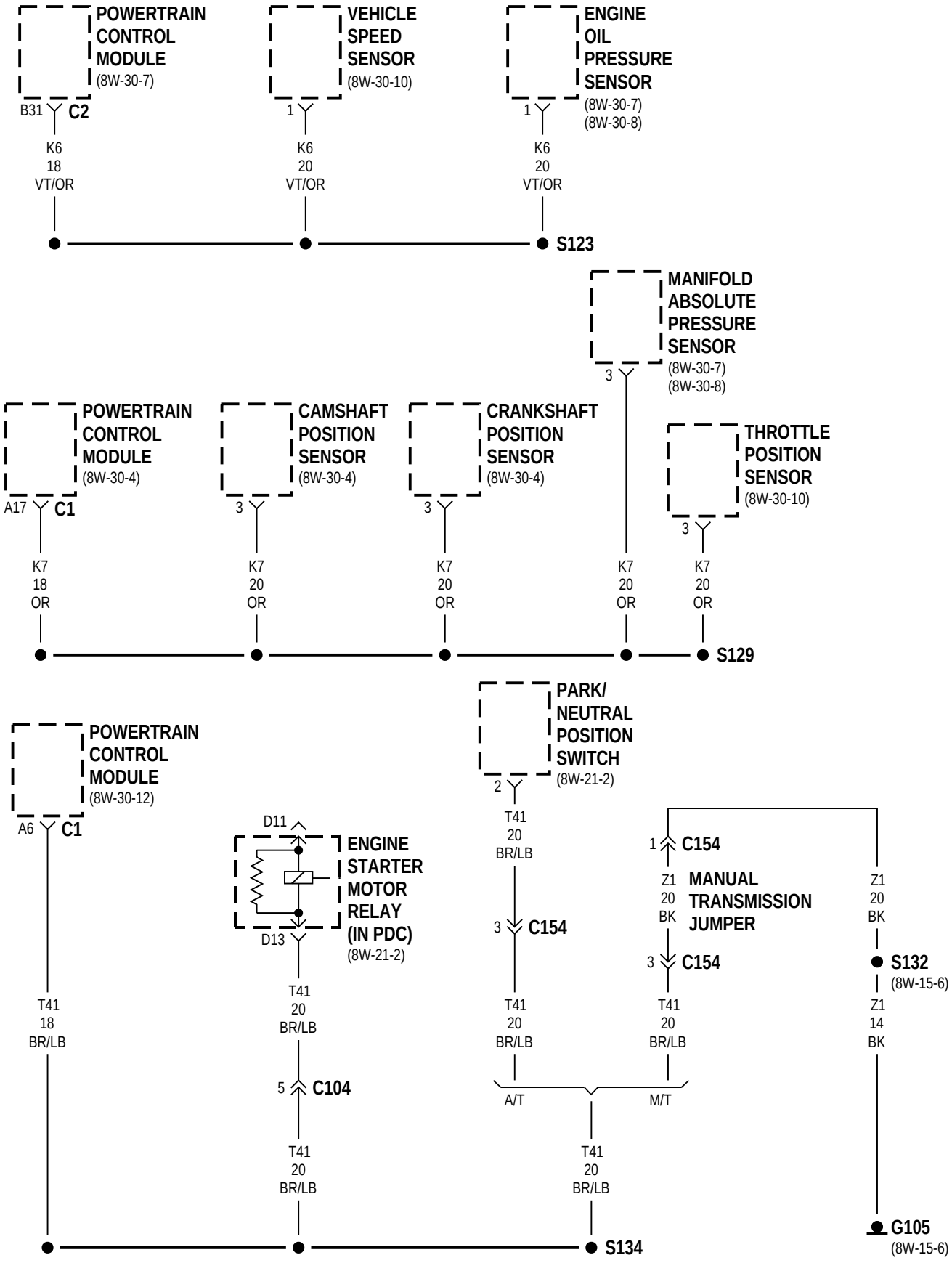
8W-70 SPLICE INFORMATION


LEFT LICENSE LAMP (BUILT-UP -EXPORT)
(8W-51-7)
(8W-51-8)
RIGHT LICENSE LAMP (BUILT-UP -EXPORT)
(8W-51-7)
(8W-51-8)
RADIO
(8W-47-2)
HEADLAMP SWITCH
(8W-50-4)
C1
C203
LEFT REAR LAMP ASSEMBLY
(8W-51-2)
(8W-51-3)
RIGHT REAR LAMP ASSEMBLY
(8W-51-2)
(8W-51-3)
S317
C329
S310
LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)
(8W-50-4)
RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)
(8W-50-4)
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP -EXPORT)
(8W-50-6)
LHD
RHD
C322
C322
LEFT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)
(8W-50-4)
RIGHT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)
(8W-50-4)
C107
RIGHT CITY LAMP (BUILT-UP -EXPORT)
(8W-50-4)
LEFT CITY LAMP (BUILT-UP -EXPORT)
(8W-50-4)
S143
S144
C110
S118
L7
18
BK/YL
● EXCEPT BUILT-UP-EXPORT
● ● BUILT-UP-EXPORT

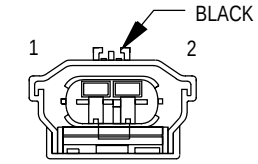


TJI07003

J998W-5

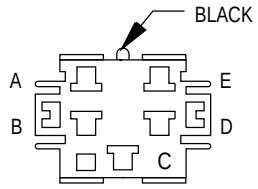

POWERTRAIN CONTROL MODULE
(8W-30-7)
B31 C2
K6 18 VT/OR
VEHICLE SPEED SENSOR
(8W-30-10)
1
K6 20 VT/OR
ENGINE OIL PRESSURE SENSOR
(8W-30-7)
(8W-30-8)
1
K6 20 VT/OR
S123
MANIFOLD ABSOLUTE PRESSURE SENSOR
(8W-30-7)
(8W-30-8)
3
K7 20 OR
POWERTRAIN CONTROL MODULE
(8W-30-4)
A17 C1
K7 18 OR
CAMSHAFT POSITION SENSOR
(8W-30-4)
3
K7 20 OR
CRANKSHAFT POSITION SENSOR
(8W-30-4)
3
K7 20 OR
THROTTLE POSITION SENSOR
(8W-30-10)
3
K7 20 OR
S129
POWERTRAIN CONTROL MODULE
(8W-30-12)
A6 C1
T41 18 BR/LB
D11
ENGINE STARTER MOTOR RELAY (IN PDC)
(8W-21-2)
D13
T41 20 BR/LB
5 C104
T41 20 BR/LB
PARK/ NEUTRAL POSITION SWITCH
(8W-21-2)
2
T41 20 BR/LB
3 C154
T41 20 BR/LB
A/T
1 C154
Z1 20 BK MANUAL TRANSMISSION JUMPER
3 C154
T41 20 BR/LB
M/T
T41 20 BR/LB
Z1 20 BK
S132
(8W-15-6)
Z1 14 BK
G105
(8W-15-6)
S134

8W-80 CONNECTOR PIN-OUTS



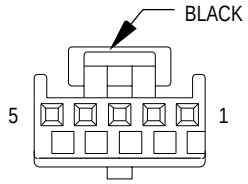
A/C COMPRESSOR CLUTCH

CAV	CIRCUIT	FUNCTION
1	C3 20DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
2	Z1 20BK	GROUND



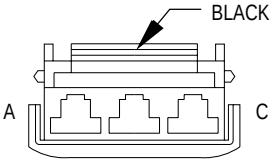
A/C-HEATER CONTROL - C1

CAV	CIRCUIT	FUNCTION
A	C7 12BR/TN	HIGH SPEED BLOWER MOTOR
B	C6 14LB	M2 SPEED BLOWER MOTOR
C	C5 16LG/LB	M1 SPEED BLOWER MOTOR
D	C4 16TN	LOW SPEED BLOWER MOTOR
E	C1 12DG	BLOWER MOTOR FEED



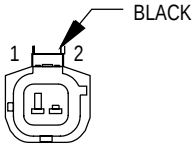
A/C-HEATER CONTROL - C2

CAV	CIRCUIT		FUNCTION
1	Z11 20BK/WT	•	GROUND
1	F24 20RD/DG	••	FUSED IGNITION SWITCH OUTPUT (RUN)
2	C36 20DB/RD		BLEND DOOR FEEDBACK SIGNAL
3	F24 20RD/DG	•	FUSED IGNITION SWITCH OUTPUT (RUN)
3	Z11 20BK/WT	••	GROUND
4	E2 20OR		FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
5	Z1 20BK		GROUND



A/C-HEATER CONTROL - C3

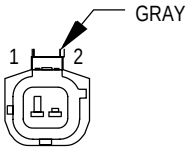
CAV	CIRCUIT	FUNCTION
A	C90 20LG	A/C SELECT INPUT
B	C1 12DG	BLOWER MOTOR FEED
C	Z1 12BK	GROUND



A/C HIGH PRESSURE SWITCH

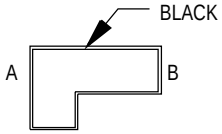
CAV	CIRCUIT	FUNCTION
1	C90 20LG	A/C SELECT INPUT
2	C21 20DB/OR	A/C SWITCH SENSE

• LHD
•• RHD



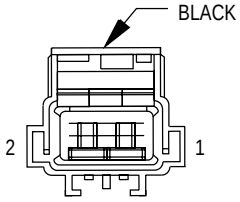
A/C LOW PRESSURE SWITCH

CAV	CIRCUIT	FUNCTION
1	C22 20DB/WT	A/C SWITCH SENSE
2	C21 20DB/OR	A/C SWITCH SENSE



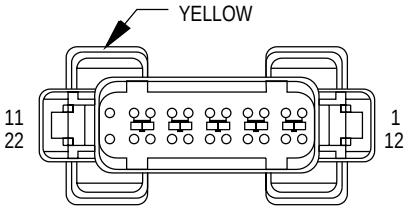
ABS DIODE

CAV	CIRCUIT	FUNCTION
A	B48 20RD/YL	ABS MAIN RELAY OUTPUT
B	G19 20LG/OR	ABS WARNING INDICATOR DRIVER



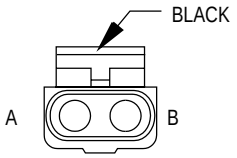
ABS PUMP MOTOR

CAV	CIRCUIT	FUNCTION
1	B120 12BR/WT	ABS PUMP MOTOR RELAY OUTPUT
2	Z1 12BK	GROUND



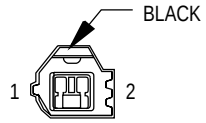
AIRBAG CONTROL MODULE

CAV	CIRCUIT	FUNCTION
1	R45 18DG/LB	DRIVER AIRBAG LINE 2
2	R43 18BK/LB	DRIVER AIRBAG LINE 1
3	-	-
4	-	-
5	R142 18BR/YL	PASSENGER AIRBAG SQUIB LINE 1
6	R144 18VT/YL	PASSENGER AIRBAG SQUIB LINE 2
7	-	-
8	-	-
9	-	-
10	Z6 18BK/PK	GROUND
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-
16	-	-
17	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
18	D2 18WT/BK	CCD BUS(-)
19	D1 18VT/BR	CCD BUS(+)
20	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
21	-	-
22	-	-



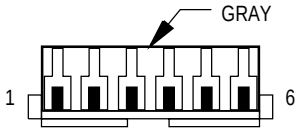
BACK-UP LAMP SWITCH (M/T)

CAV	CIRCUIT	FUNCTION
A	L1 18VT/BK	BACK-UP LAMP FEED
B	F20 18VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)



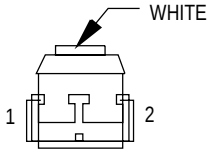
BATTERY TEMPERATURE SENSOR

CAV	CIRCUIT	FUNCTION
1	K118 18PK/YL	BATTERY TEMPERATURE SENSOR SIGNAL
2	K167 20BR/YL ●	SENSOR GROUND
2	K167 18BR/YL ●●	SENSOR GROUND



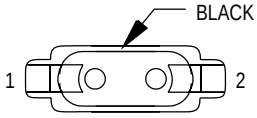
BRAKE LAMP SWITCH

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE SWITCH SENSE
2	Z1 20BK	GROUND
3	V32 20YL/RD	SPEED CONTROL ON/OFF SWITCH SENSE
4	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
5	F32 18PK/DB	FUSED B(+)
6	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT



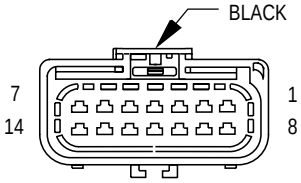
BRAKE SHIFT INTERLOCK SOLENOID

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE SWITCH SENSE
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



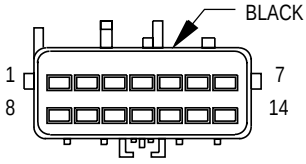
BRAKE WARNING INDICATOR SWITCH

CAV	CIRCUIT	FUNCTION
1	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER
2	G99 20GY/WT	RED BRAKE WARNING INDICATOR DRIVER



C103

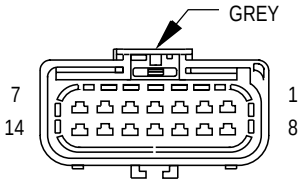
CAV	CIRCUIT
1	F142 20OR/DG
2	K72 18DG/OR
3	A14 14RD/WT
4	B6 18WT/DB ▲
5	B7 18WT ▲
6	K226 18DB/LG
7	A141 18DG/WT
8	K167 20BR/YL
9	F12 20RD/LG
10	Z12 20BK/TN
11	Z12 20BK/LB
12	G7 20WT/OR ▲▲
13	G107 20BK/RD
14	C3 20DB/BK



C103

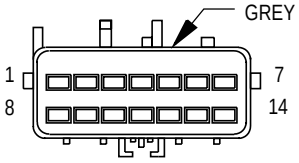
CAV	CIRCUIT
1	F142 18OR/DG
2	K72 18DG/OR
3	A14 14RD/WT
4	B6 18WT/DB ▲
5	B7 18WT ▲
6	K226 20DB/LG
7	A141 18DG/WT
8	K167 20BR/YL
9	F12 20RD/LG
10	Z12 20BK/TN
11	Z12 20BK/LB
12	G7 20WT/OR
13	G107 20BK/RD
14	C3 20DB/BK

▲ ABS
▲▲ DRL
● LHD
●● RHD



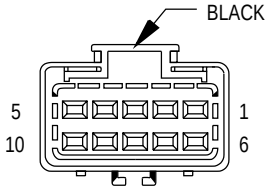
C104
(LHD)

CAV	CIRCUIT
1	C90 20LG
2	C22 18DB/WT
3	B4 18LG ●
4	B3 18LG/DB ●
5	T41 20BR/LB
6	B2 18YL ●
7	B1 18YL/DB ●
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 20DB
14	-



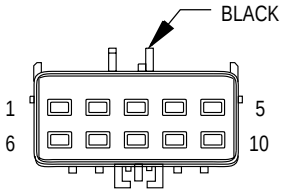
C104
(LHD)

CAV	CIRCUIT
1	C90 20LG
2	C22 20DB/WT
3	B4 18LG ●
4	B3 18LG/DB ●
5	T41 20BR/LB
6	B2 18YL ●
7	B1 18YL/DB ●
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 18DB
14	-



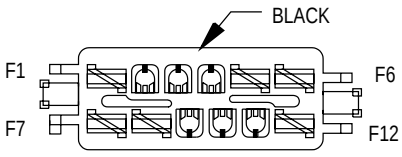
C104
(RHD)

CAV	CIRCUIT
1	C90 20LG
2	C22 18DB/WT
3	-
4	F42 18DG/LG
5	T41 20BR/LB
6	T40 12BR
7	F15 20DB
8	-
9	L1 20VT/BK
10	F20 20VT/WT



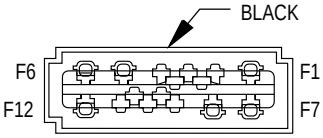
C104
(RHD)

CAV	CIRCUIT
1	C90 20LG
2	C22 20DB/WT
3	-
4	F42 18DG/LG
5	T41 20BR/LB
6	T40 12BR
7	F15 18DB
8	-
9	L1 20VT/BK
10	F20 20VT/WT



C106

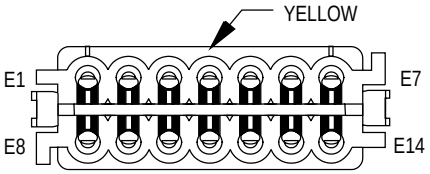
CAV	CIRCUIT
F1	F30 12RD/PK
F2	L1 20VT/BK
F3	F20 20VT/WT
F4	F15 20DB
F5	A1 14RD
F6	A2 12PK/BK
F7	A6 12RD/BK
F8	C15 12BK/WT
F9	T141 14YL/RD
F10	F12 20RD/LG
F11	G9 20GY/BK
F12	A111 12RD/LB



C106

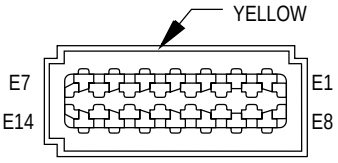
CAV	CIRCUIT
F1	F30 12RD/PK
F2	L1 20VT/BK
F3	F20 20VT/WT
F4	F15 20DB
F5	A1 14RD
F6	A2 12PK/BK
F7	A6 12RD/BK
F8	C15 12BK/WT
F9	T141 14YL/RD
	T141 14YL/RD
F10	F12 20RD/LG
F11	G9 20GY/BK
	G9 20GY/BK
F12	A111 12RD/LB

● ABS



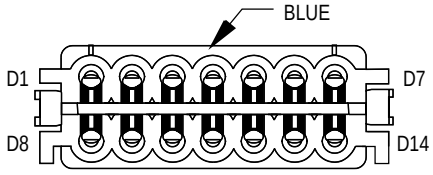
C107

CAV	CIRCUIT
E1	L7 18BK/YL
E2	L60 18TN
E3	L61 18GY
E4	L3 16RD/OR
E5	L4 16VT/WT
E6	Z12 20BK/LB
E7	X3 20RD/YL
E8	V10 18BR
E9	Z12 20BK/TN
E10	L39 18LB ▲
E11	V30 20DB/RD ■■
E12	-
E13	D20 18LG
E14	D21 18PK
	D21 20PK ◄►



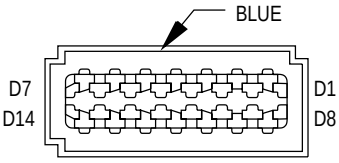
C107

CAV	CIRCUIT
E1	L7 18BK/YL
	L7 18BK/YL
E2	L60 18TN
E3	L61 18GY
E4	L3 14RD/OR
E5	L4 14VT/WT
E6	Z12 20BK/LB
E7	X3 20RD/YL
E8	V10 18BR
E9	Z12 20BK/TN
E10	L39 18LB ▲
E11	V30 20DB/RD
E12	-
E13	D20 20LG
E14	D21 20PK



C108

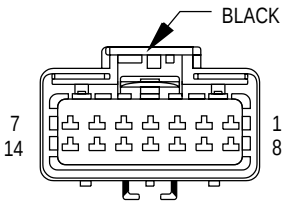
CAV	CIRCUIT
D1	V32 18YL/RD
D2	G19 20LG/OR ◄►
	G19 20LG/OR ◄►
D3	K167 20BR/YL ■■
D4	D1 18VT/BR
D5	D2 18WT/BK
D6	F61 18WT/OR ▲
D7	G34 18RD/GY ●
	L3 16RD/OR ●●
D8	L20 16LG/WT ●
D9	L50 18WT/TN ◄►
D10	V37 18RD/LG ■■
D11	L9 16BK/WT
D12	M1 20PK/WT
	M1 20PK/WT
D13	L22 20LG/DG ▲▲
D14	K29 18WT/PK



C108

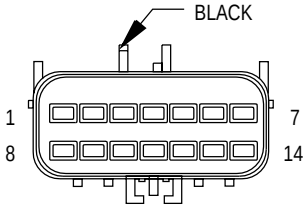
CAV	CIRCUIT
D1	V32 20YL/RD
D2	G19 20 LG/OR
D3	K167 20BR/YL
D4	D1 20VT/BR
D5	D2 20WT/BK
D6	F61 18WT/OR ▲
D7	G34 16RD/GY
D8	L20 16LG/WT ●
D9	L50 18WT/TN
	L50 18WT/TN
D10	V37 20RD/LG
D11	L9 16BK/WT
D12	M1 20PK/WT
	M1 20PK/WT
D13	L22 20LG/DG ▲▲
D14	K29 20WT/PK
	K29 20WT/PK

● DRL
●● EXCEPT DRL
■ LHD
■■ SPEED CONTROL
▲ FRONT FOG LAMPS
▲▲ BUILT-UP-EXPORT
◄► ABS



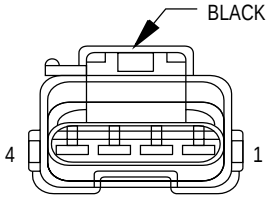
C110

CAV	CIRCUIT
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 16RD/OR
5	L4 16VT/WT
6	X2 18WT/RD
7	-
8	V10 18BR
9	L22 20LG/DG ■
10	K52 20PK/BK
11	F12 20RD/LG
12	-
13	L39 18LB ■■
14	L13 20BR/YL ■



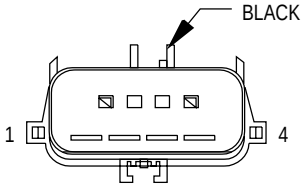
C110

CAV	CIRCUIT
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 16RD/OR
5	L4 16VT/WT
6	X2 18WT/RD
7	-
8	V10 18BR
9	L22 20LG/DG ■
10	K52 18PK/BK
11	F12 20RD/LG
12	-
13	L39 18LB ■■
14	L13 20BR/YL ■



C154

CAV	CIRCUIT
1	Z1 20BK
2	L1 20VT/BK
3	T41 20BR/LB
4	F20 20VT/WT



C154

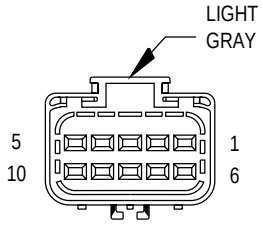
CAV	CIRCUIT
1	Z1 20BK ▲
2	L1 18VT/BK
3	T41 20BR/LB ▲▲
3	Z1 20BK ▲
4	F20 18VT/WT

▲ M/T

▲▲ A/T

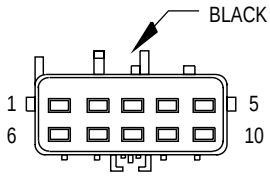
■ BUILT-UP-EXPORT

■■ FRONT FOG LAMPS



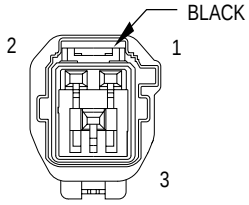
C170

CAV	CIRCUIT
1	L13 20BR/YL ■
2	C81 20LB/WT
3	G99 20GY/WT
4	A3 14RD/WT
5	G107 20BK/RD
6	C90 20LG
7	-
8	-
9	-
10	-



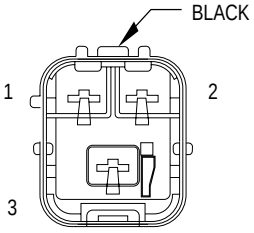
C170

CAV	CIRCUIT
1	L13 20BR/YL ■
2	C81 20LB/WT ■■
3	G99 20GY/WT
4	A3 14RD/WT
5	G107 20BK/RD
6	C90 20LG
7	-
8	-
9	-
10	-



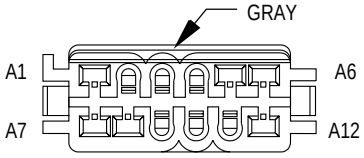
C180

CAV	CIRCUIT
1	K105 18WT/OR
2	K106 18WT/DG
3	F142 20OR/DG



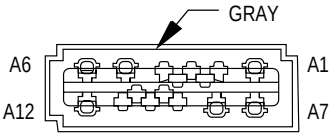
C180

CAV	CIRCUIT
1	K105 20WT/OR
2	K106 20WT/DG
3	F142 20OR/DG



C202

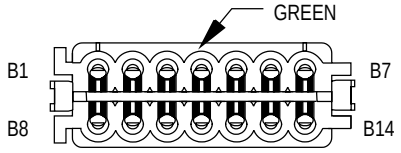
CAV	CIRCUIT
A1	F24 20RD/DG
	F24 20RD/DG
A2	L20 16LG/WT
A3	E1 18TN
A4	E2 20OR
A5	F81 20DB/RD ■■
A6	Z12 20BK/LB
A7	-
A8	L2 16LG
A9	F38 16LB
A10	G5 20DB/WT
A11	F34 18TN/BK
A12	A111 12RD/LB



C202

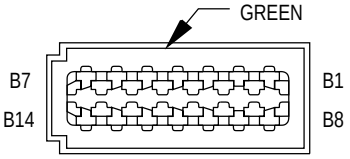
CAV	CIRCUIT
A1	F24 20RD/DG
A2	L20 16LG/WT ●●
	L20 14LG/WT
A3	E1 18TN
A4	E2 20OR
A5	F81 20DB/RD
A6	Z12 20BK/LB
	Z12 20BK/LB
A7	-
A8	L2 14LG
	L2 16LG ●
A9	F38 16LB
A10	G5 20DB/WT
A11	F34 18TN/BK
	F34 20TN/BK
A12	A111 12RD/LB

▲ EXCEPT DRL
● REAR FOG LAMP
●● DRL
■ BUILT-UP-EXPORT
■■ HARDTOP



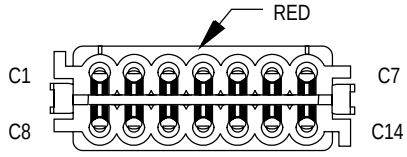
C203

CAV	CIRCUIT
B1	L60 18TN
B2	L61 18GY
B3	G26 20LB
	G26 20LB
B4	G16 20BK/LB
B5	G34 16RD/GY
B6	L7 18BK/YL
	L7 18BK/YL
B7	M1 20PK/WT
B8	D20 20LG
B9	V20 18VT/OR ▲
B10	D21 20PK
B11	D1 20VT/BR
	D1 20VT/BR
B12	D2 20WT/BK
	D2 20WT/BK
B13	L35 18BR/WT ▲▲
B14	G19 20LG/OR



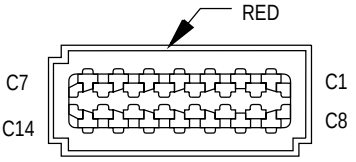
C203

CAV	CIRCUIT
B1	L60 18TN
	L60 18TN
B2	L61 18GY
	L61 18GY
B3	G26 20LB
B4	G16 20BK/LB
	G16 20BK/LB
B5	G34 16RD/GY
	G34 16RD/GY ▲▲
B6	L7 18BK/YL
	L7 18BK/YL ●●▲▲
B7	M1 20PK/WT
B8	D20 20LG
B9	V20 18VT/OR
B10	D21 20PK
B11	D1 20VT/BR
B12	D2 20WT/BK
B13	L35 18BR/WT ▲▲
B14	G19 20LG/OR



C204

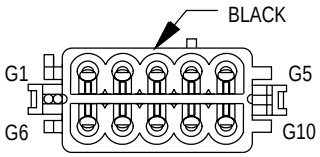
CAV	CIRCUIT
C1	L95 18DG/YL
C2	V13 18BR/LG ▲
C3	G10 20LG/RD
C4	Z12 20BK/TN
C5	M2 20YL
C6	V23 18BR/PK
C7	-
C8	L38 20BR/WT ■
C9	L22 20LG/DG ●
C10	X12 20PK
C11	X51 18BR/YL
C12	X57 18BR/LB
C13	X52 18DB/WT
C14	X58 18DB/PK



C204

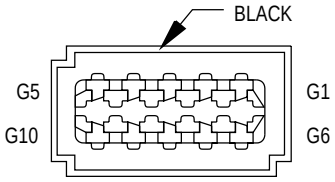
CAV	CIRCUIT
C1	L95 18DG/YL ■
C2	V13 18BR/LG
C3	G10 20LG/RD
C4	Z12 20BK/TN
C5	M2 20YL
C6	V23 18BR/PK
C7	-
C8	L38 20BR/WT ■
	L38 20BR/WT ■ ▼
C9	L22 20LG/DG ●
	L22 20LG/DG ●
C10	X12 20PK
C11	X51 18BR/YL
C12	X57 18BR/LB
C13	X52 18DB/WT
C14	X58 18DB/PK

■ REAR FOG LAMPS
▲ HARD TOP
▲▲ FRONT FOG LAMPS
● BUILT-UP-EXPORT
●● EXCEPT BUILT-UP-EXPORT
▼ LHD BUILT-UP-EXPORT



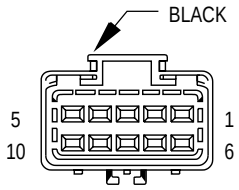
C322
(LHD)

CAV	CIRCUIT
G1	L7 18BK/YL
G2	L62 18BR/RD
G3	L1 20VT/BK
G4	L63 18DG/RD
G5	Z1 12BK
G6	G10 20LG/RD ▲▲
G7	L50 18WT/TN
G8	L38 20BR/WT ●
G9	G9 20GY/BK
G10	V23 18BR/PK ▲



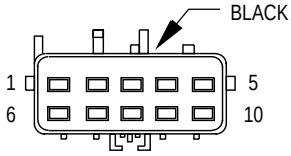
C322
(LHD)

CAV	CIRCUIT
G1	L7 18BK/YL
G2	L62 18BR/RD
G3	L1 20VT/BK
G4	L63 18DG/RD
G5	Z1 12BK
G6	G10 20LG/RD ▲▲
G7	L50 18WT/TN
	L50 18WT/TN ▲▲
G8	L38 20BR/WT ●
G9	G9 20GY/BK
G10	V23 18BR/PK



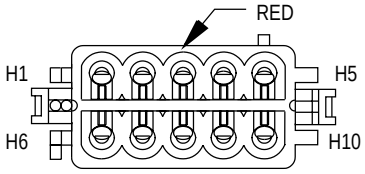
C322
(RHD)

CAV	CIRCUIT
1	L7 18BK/YL
2	L62 18BR/RD
3	L1 20VT/BK
4	L63 18DG/RD
5	Z1 12BK
6	G10 20LG/RD
7	L50 18WT/TN
8	L38 20BR/WT
9	G9 20GY/BK
10	V23 18BR/PK



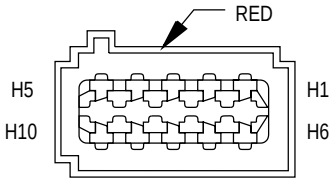
C322
(RHD)

CAV	CIRCUIT
1	L7 18BK/YL
2	L62 18BR/RD
3	L1 20VT/BK
4	L63 18DG/RD
5	Z1 12BK
6	G10 20LG/RD
7	L50 18WT/TN
8	L38 20BR/WT
9	G9 20GY/BK
10	V23 18BR/PK ▲



C323 ■■
(LHD)

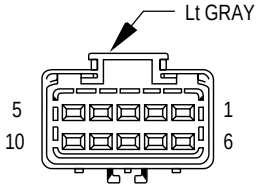
CAV	CIRCUIT
H1	C15 12BK/WT ▲
H2	M1 20PK/WT
H3	M2 20YL
H4	V23 18BR/PK ▲
H5	V13 18BR/LG ▲
H6	V20 18VT/OR ▲
H7	X51 18BR/YL ■
H8	X57 18BR/LB ■
H9	X52 18DB/WT ■
H10	X58 18DB/PK ■



C323
(LHD)

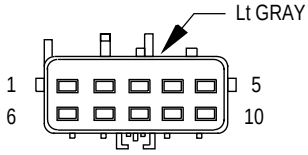
CAV	CIRCUIT
H1	C15 12BK/WT
H2	M1 20PK/WT
H3	M2 20YL
H4	V23 18BR/PK
H5	V13 18BR/LG
H6	V20 18VT/OR
H7	X51 18BR/YL
H8	X57 18BR/LB
H9	X52 18DB/WT
H10	X58 18DB/PK

▲ HARD TOP
▲▲ EXCEPT BUILT-UP-EXPORT
● REAR FOG LAMP
■ 4 SPEAKER SYSTEM
■■ THE FEMALE SIDE OF C323 IS NOT PRESENT IN SOFT-TOP 2 - SPEAKER SYSTEM VEHICLES



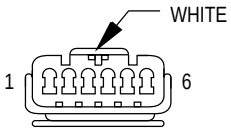
C323
(RHD)

CAV	CIRCUIT
1	C15 12BK/WT ■■
2	M1 20PK/WT
3	M2 20YL
4	V23 18BR/PK ■■
5	V13 18BR/LG ■■
6	V20 18VT/OR ■■
7	X51 18BR/YL ■
8	X57 18BR/LB ■
9	X52 18DB/WT ■
10	X58 18DB/PK ■



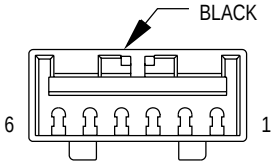
C323 ●
(RHD)

CAV	CIRCUIT
1	C15 12BK/WT
2	M1 20PK/WT
3	M2 20YL
4	V23 18BR/PK
5	V13 18BR/LG
6	V20 18VT/OR
7	X51 18BR/YL
8	X57 18BR/LB
9	X52 18DB/WT
10	X58 18DB/PK



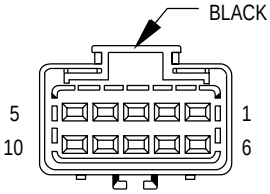
C325
(4 SPKR SYS)

CAV	CIRCUIT
1	X57 18BR/LB
2	X51 18BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 18DB/PK
6	X52 18DB/WT



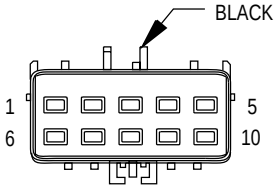
C325
(4 SPKR SYS)

CAV	CIRCUIT
1	X57 18BR/LB
2	X51 18BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 18DB/PK
6	X52 18DB/WT



C326
(HARD TOP)

CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BR/LG
4	V23 18BR/PK
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 20PK/WT
9	M2 20YL
10	-

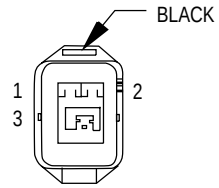


C326
(HARD TOP)

CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BR/LG
4	V23 18BR/PK
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 20PK/WT
9	M2 18YL
10	-

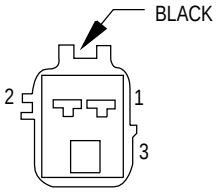
■ 4 SPEAKER SYSTEM
■ ■ HARD TOP

● THE MALE SIDE OF C323 IS NOT PRESENT IN SOFT-TOP 2 - SPEAKER SYSTEM VEHICLES



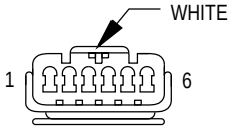
C329

CAV	CIRCUIT
1	L38 20BR/WT
2	L7 18BK/YL
3	Z1 20BK



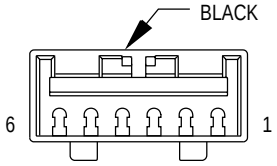
C329

CAV	CIRCUIT
1	L38 18BR/WT
2	L7 18BK/YL
3	Z1 20BK



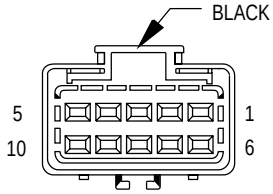
C330
(4 SPKR SYS)

CAV	CIRCUIT
1	X57 18BR/LB
2	X51 18BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 18DB/PK
6	X52 18DB/WT



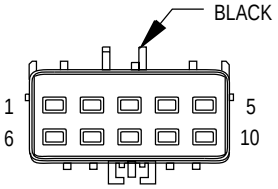
C330
(4 SPKR SYS)

CAV	CIRCUIT
1	X57 20BR/LB
2	X51 20BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 20DB/PK
6	X52 20DB/WT



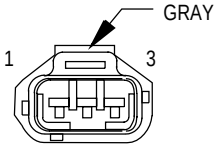
C331
(HARD TOP)

CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BR/LG
4	V23 18BR/PK
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 20PK/WT
9	M2 18YL
10	-



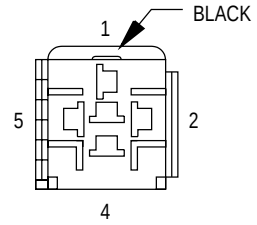
C331
(HARD TOP)

CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BK/LG
4	V23 18BR/PK
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 20PK/WT
9	M2 20YL
10	-



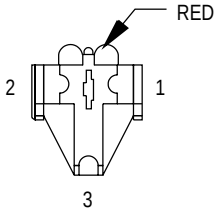
CAMSHAFT POSITION
SENSOR

CAV	CIRCUIT	FUNCTION
1	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
2	K167 20BR/YL	SENSOR GROUND
3	K7 20OR	5V SUPPLY



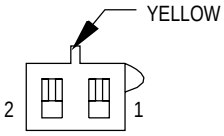
CIGAR LIGHTER/ ACCESSORY RELAY

CAV	CIRCUIT	FUNCTION
1	F30 12RD/PK	FUSED B(+)
2	A31 14BK/DG	IGNITION SWITCH OUTPUT (RUN-ACC)
3	-	-
4	F22 12WT/PK	CIGAR LIGHTER/ACCESSORY RELAY OUTPUT
5	Z1 20BK	GROUND
	Z1 20BK	GROUND



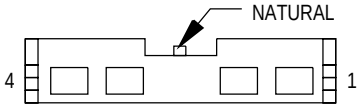
CIGAR LIGHTER/ POWER OUTLET

CAV	CIRCUIT	FUNCTION
1	F38 16LB	FUSED B (+)
2	-	-
3	Z1 16BK	GROUND



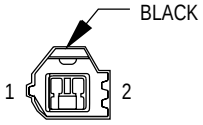
CLOCKSPRING - C1

CAV	CIRCUIT	FUNCTION
1	R45 18DG/LB	DRIVER AIRBAG LINE 2
2	R43 18BK/LB	DRIVER AIRBAG LINE 1



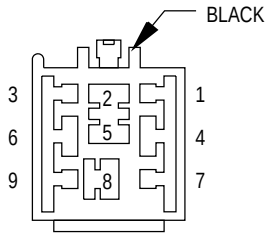
CLOCKSPRING - C2

CAV	CIRCUIT	FUNCTION
1	X3 20RD/YL	HORN RELAY CONTROL
2	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL
3	K167 20BR/YL	SENSOR GROUND
4	-	-



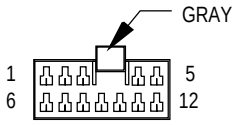
CLUTCH PEDAL POSITION SWITCH (M/T)

CAV	CIRCUIT	FUNCTION
1	T141 14YL/RD	FUSED IGNITION SWITCH OUTPUT (ST)
2	A41 14YL	FUSED IGNITION SWITCH OUTPUT (ST)



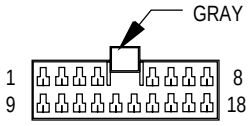
COMBINATION FLASHER

CAV	CIRCUIT	FUNCTION
1	-	-
2	L32 16PK	COMBINATION FLASHER OUTPUT
3	-	-
4	Z1 20BK	GROUND
5	-	-
6	L55 16RD/WT	COMBINATION FLASHER INPUT
7	-	-
8	-	-
9	-	-



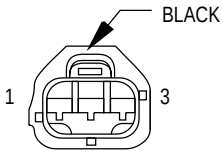
CONTROLLER ANTI-LOCK BRAKE - C1

CAV	CIRCUIT	FUNCTION
1	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
2	B43 20PK/OR	G-SWITCH TEST SIGNAL
3	D21 20PK	SCI TRANSMIT/ISO 9141K
4	-	-
5	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
6	B41 20YL/VT	G-SWITCH NO. 1 SENSE
7	B42 20TN/WT	G-SWITCH NO. 2 SENSE
8	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
9	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
10	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)
11	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
12	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)



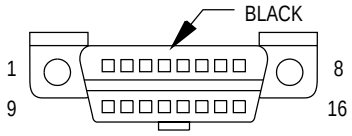
CONTROLLER ANTI-LOCK BRAKE - C2

CAV	CIRCUIT	FUNCTION
1	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)
2	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
3	B120 16BR/WT	ABS PUMP MOTOR RELAY OUTPUT
4	B251 20WT/BK	REAR INLET VALVE CONTROL
5	B48 20RD/YL	ABS MAIN RELAY OUTPUT
6	B248 20DG/WT	RIGHT FRONT OUTLET VALVE CONTROL
7	B116 20GY	ABS PUMP MOTOR RELAY CONTROL
8	B243 20DG/BK	LEFT FRONT OUTLET VALVE CONTROL
9	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)
10	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
11	B58 20GY/LB	ABS MAIN RELAY CONTROL
12	B254 20DG/OR	REAR OUTLET VALVE CONTROL
13	Z22 16BK/PK	GROUND
14	Z22 16BK/PK	GROUND
15	B249 20WT/DG	RIGHT FRONT INLET VALVE CONTROL
16	-	-
17	-	-
18	B245 20WT/LG	LEFT FRONT INLET VALVE CONTROL



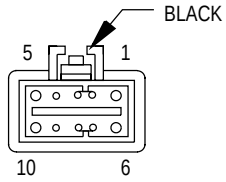
CRANKSHAFT POSITION SENSOR

CAV	CIRCUIT	FUNCTION
1	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
2	K167 20BR/YL	SENSOR GROUND
3	K7 20OR	5V SUPPLY



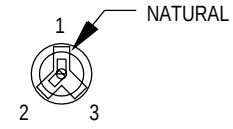
DATA LINK CONNECTOR

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	D1 20VT/BR	CCD BUS(+)
4	Z12 20BK/LB	GROUND
5	Z12 20BK/TN	GROUND
6	D20 20LG	SCI RECEIVE
7	D21 20PK	SCI TRANSMIT/ISO 9141K
8	-	-
9	-	-
10	-	-
11	D2 20WT/BK	CCD BUS(-)
12	-	-
13	-	-
14	-	-
15	-	-
16	M1 20PK/WT	FUSED B(+)



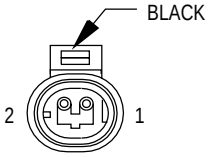
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L3 16RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	-	-
3	-	-
4	G34 18RD/GY	HIGH BEAM INDICATOR DRIVER
5	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
6	L20 16LG/WT	FUSED B(+) OPTICAL HORN FEED
7	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL
8	Z1 18BK	GROUND
9	-	-
10	L4 16VT/WT	DIMMER SWITCH LOW BEAM OUTPUT



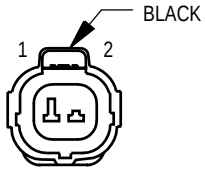
DRIVER DOOR AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	M23 20YL/BK	DOOR AJAR SWITCH OUTPUT
2	M2 20YL	COURTESY LAMPS DRIVER
3	G16 20BK/LB	DRIVER DOOR AJAR SWITCH SENSE



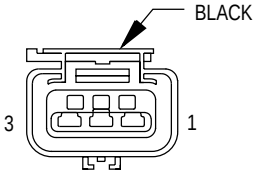
DUTY CYCLE EVAP/PURGE SOLENOID

CAV	CIRCUIT	FUNCTION
1	K52 20PK/BK	DUTY CYCLE EVAP/PURGE SOLENOID CONTROL
2	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



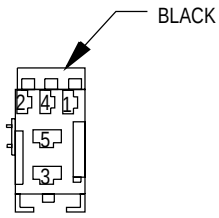
ENGINE COOLANT TEMPERATURE SENSOR

CAV	CIRCUIT	FUNCTION
1	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
2	K167 20BR/YL	SENSOR GROUND



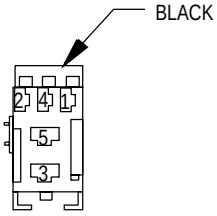
ENGINE OIL PRESSURE SENSOR

CAV	CIRCUIT	FUNCTION
1	K6 20VT/OR	5V SUPPLY
2	G60 18GY/YL	ENGINE OIL PRESSURE SENSOR SIGNAL
3	K167 20BR/YL	SENSOR GROUND



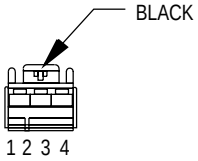
FOG LAMP RELAY NO. 1 (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L35 18BR/WT	FOG LAMP SWITCH OUTPUT
2	Z1 20BK	GROUND
3	F61 18WT/OR	FUSED B(+)
4	-	-
5	L39 18LB	FOG LAMP RELAY NO. 1 OUTPUT



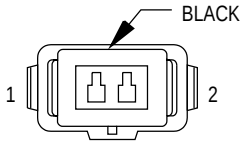
FOG LAMP RELAY NO. 2 (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER
2	Z1 20BK	GROUND
	Z1 20BK	GROUND
3	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
4	L95 18DG/YL	FOG LAMP RELAY OUTPUT
5	-	-



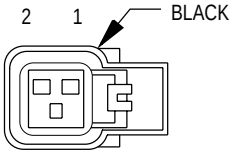
FRONT FOG LAMP SWITCH (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
2	L35 18BR/WT	FOG LAMP SWITCH OUTPUT
3	L95 18DG/YL	FOG LAMP RELAY OUTPUT
4	Z1 20BK	GROUND



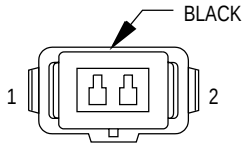
FUEL INJECTOR NO. 1 (2.5L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER



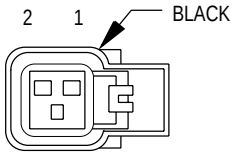
FUEL INJECTOR NO. 1 (4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER



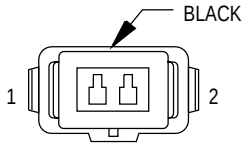
FUEL INJECTOR NO. 2
(2.5L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K12 18TN	FUEL INJECTOR NO. 2 DRIVER



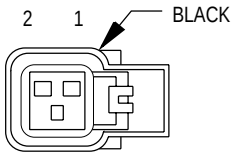
FUEL INJECTOR NO. 2
(4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K12 18TN	FUEL INJECTOR NO. 2 DRIVER



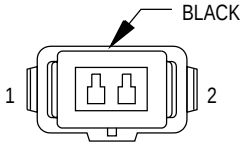
FUEL INJECTOR NO. 3
(2.5L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER



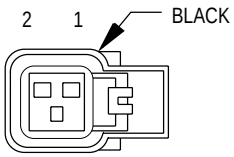
FUEL INJECTOR NO. 3
(4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER



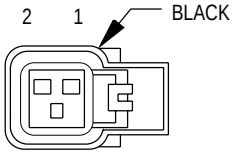
FUEL INJECTOR NO. 4
(2.5L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER



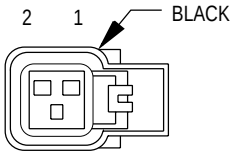
FUEL INJECTOR NO. 4 (4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER



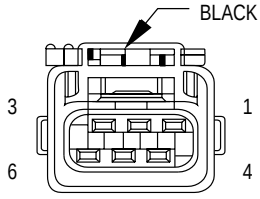
FUEL INJECTOR NO. 5 (4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K15 18PK/BK	FUEL INJECTOR NO. 5 DRIVER



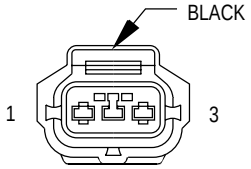
FUEL INJECTOR NO. 6 (4.0L)

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K16 18LG/BK	FUEL INJECTOR NO. 6 DRIVER



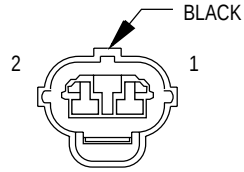
FUEL PUMP MODULE

CAV	CIRCUIT	FUNCTION
1	A141 18DG/WT	FUEL PUMP RELAY OUTPUT
2	-	-
3	K226 20DB/LG	FUEL LEVEL SENSOR SIGNAL
4	K167 20BR/YL	SENSOR GROUND
5	-	-
6	Z1 18BK	GROUND



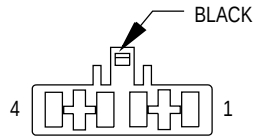
G SWITCH

CAV	CIRCUIT	FUNCTION
1	B42 20TN/WT	G-SWITCH NO.2 SENSE
2	B41 20YL/VT	G-SWITCH NO.1 SENSE
3	B43 20PK/OR	G-SWITCH TEST SIGNAL



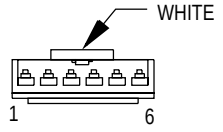
GENERATOR

CAV	CIRCUIT	FUNCTION
1	K72 18DG/OR	VOLTAGE REGULATOR SIGNAL
2	K20 18DG	GENERATOR FIELD DRIVER (+)



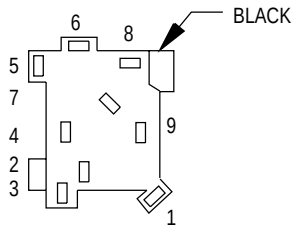
HEADLAMP DIMMER SWITCH

CAV	CIRCUIT	FUNCTION
1	L4 14VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
2	L2 14LG	HEADLAMP SWITCH OUTPUT
3	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
4	L20 14LG/WT	FUSED B(+) OPTICAL HORN FEED



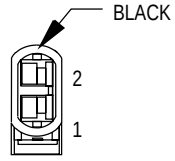
HEADLAMP LEVELING SWITCH (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	-	-
2	L22 20LG/DG	HEADLAMP SWITCH FUSED OUTPUT
3	-	-
4	Z1 20BK	GROUND
5	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
6	-	-



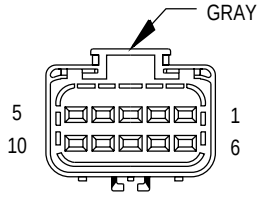
HEADLAMP SWITCH

CAV	CIRCUIT	FUNCTION
1	E1 18TN	PANEL LAMPS DIMMER SWITCH SIGNAL
2	L2 16LG	HEADLAMP SWITCH OUTPUT
3	M2 20YL	COURTESY LAMPS DRIVER
4	F34 18TN/BK	FUSED B(+)
5	G26 20LB	KEY-IN IGNITION SWITCH SENSE
6	G16 20BK/LB	DRIVER AJAR SWITCH SENSE
7	L20 16LG/WT	FUSED B(+) OPTICAL HORN FEED
8	A3 14RD/WT	FUSED B(+)
9	L7 18BK/YL	HEADLAMP SWITCH OUTPUT



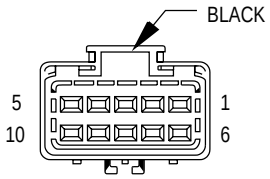
HIGH NOTE HORN

CAV	CIRCUIT	FUNCTION
1	X2 18WT/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND



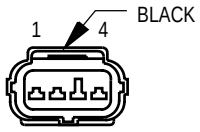
HVAC UNIT

CAV	CIRCUIT	FUNCTION
1	Z11 20BK/WT	GROUND
2	C4 16TN	LOW SPEED BLOWER MOTOR
3	C5 16LG/LB	M1 SPEED BLOWER MOTOR
4	C6 14LB	M2 SPEED BLOWER MOTOR
5	F24 20RD/DG	FUSED IGNITION SWITCH OUTPUT (RUN)
	F24 20RD/DG	FUSED IGNITION SWITCH OUTPUT (RUN)
6	C36 20DB/RD	BLEND DOOR FEEDBACK SIGNAL
7	C7 12BR/TN	HIGH SPEED BLOWER MOTOR
8	A111 12RD/LB	FUSED B(+)
9	F24 20RD/DG	FUSED IGNITION SWITCH OUTPUT (RUN)
10	Z1 20BK	GROUND



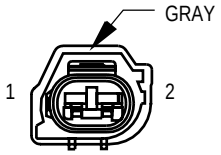
HYDRAULIC CONTROL UNIT

CAV	CIRCUIT	FUNCTION
1	B47 14RD/LB	ABS SYSTEM RELAY OUTPUT
2	B251 20WT/BK	REAR INLET VALVE CONTROL
3	B249 20WT/DG	RIGHT FRONT INLET VALVE CONTROL
4	B245 20WT/LG	LEFT FRONT INLET VALVE CONTROL
5	-	-
6	-	-
7	B254 20DG/OR	REAR OUTLET VALVE CONTROL
8	B248 20DG/WT	RIGHT FRONT OUTLET VALVE CONTROL
9	B243 20DG/BK	LEFT FRONT OUTLET VALVE CONTROL
10	B47 14RD/LB	ABS SYSTEM RELAY OUTPUT



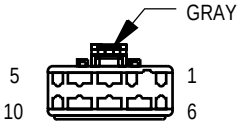
IDLE AIR CONTROL MOTOR

CAV	CIRCUIT	FUNCTION
1	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
2	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
3	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
4	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER



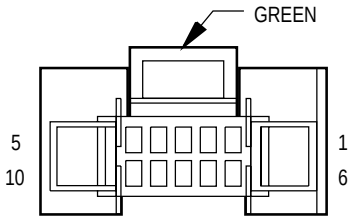
IGNITION COIL

CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K19 18GY	IGNITION COIL NO. 1 DRIVER



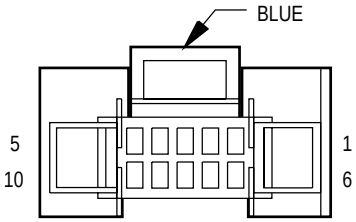
IGNITION SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 16BK	GROUND
2	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER
3	A2 12PK/BK	FUSED B(+)
4	A22 12BK/OR	IGNITION SWITCH OUTPUT (RUN)
5	-	-
6	-	-
7	A1 14RD	FUSED B(+)
8	A31 14BK/DG	IGNITION SWITCH OUTPUT (RUN-ACC)
9	A21 14DB	IGNITION SWITCH OUTPUT (ST-RUN)
10	A41 14YL	IGNITION SWITCH OUTPUT (ST)



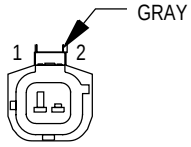
INSTRUMENT CLUSTER - C1

CAV	CIRCUIT	FUNCTION
1	D2 20WT/BK	CCD BUS(-)
2	D1 20VT/BR	CCD BUS(+)
3	C81 20LB/WT ●	REAR WINDOW DEFOGGER RELAY CONTROL
4	C80 20DB/LG ●	REAR WINDOW DEFOGGER SWITCH SENSE
5	G107 20BK/RD	4WD SENSE
6	L60 18TN	RIGHT TURN SIGNAL
7	-	-
8	G26 20LB	KEY-IN IGNITION SWITCH SENSE
9	Z2 18BK/LG	GROUND
10	G10 20LG/RD	SEAT BELT SWITCH SENSE



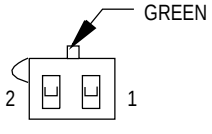
INSTRUMENT CLUSTER - C2

CAV	CIRCUIT	FUNCTION
1	-	-
2	G99 20GY/WT	RED BRAKE WARNING INDICATOR DRIVER
3	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
4	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
5	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER
6	Z2 18BK/LG	GROUND
7	-	-
8	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
9	M1 20PK/WT	FUSED B(+)
10	L61 18GY	LEFT TURN SIGNAL



INTAKE AIR TEMPERATURE SENSOR

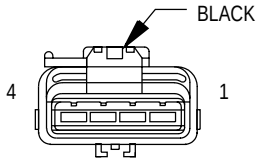
CAV	CIRCUIT	FUNCTION
1	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
2	K167 20BR/YL	SENSOR GROUND



KEY-IN SWITCH

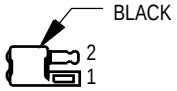
CAV	CIRCUIT	FUNCTION
1	G16 20BK/LB	DRIVER AJAR SWITCH SENSE
2	G26 20LB	KEY-IN IGNITION SWITCH SENSE

●HARD TOP



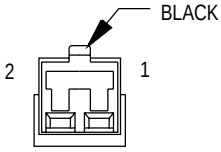
LEAK DETECTION PUMP (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	-	-
2	F142 20OR/DG	FUSED AUTOMATIC SHUTDOWN RELAY OUTPUT
3	K106 20WT/DG	LEAK DETECTION PUMP SOLENOID CONTROL
4	K105 20WT/OR	LEAK DETECTION PUMP SWITCH SENSE



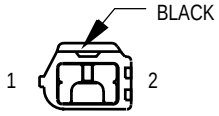
LEFT CITY LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 18BK	GROUND



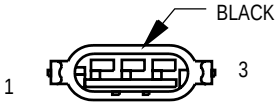
LEFT COURTESY LAMP

CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



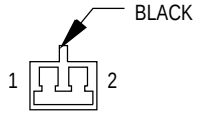
LEFT FOG LAMP (EXCEPT BUILT-UP -EXPORT)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L39 18LB	FOG LAMP RELAY NO. 1 OUTPUT



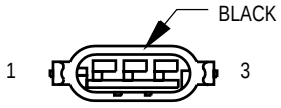
LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP -EXPORT)

CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
3	Z1 18BK	GROUND



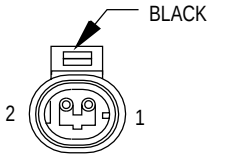
LEFT FRONT SPEAKER

CAV	CIRCUIT	FUNCTION
1	X53 18DG	LEFT FRONT SPEAKER (+)
2	X55 18BR/RD	LEFT FRONT SPEAKER (-)



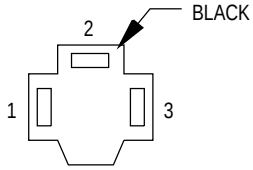
LEFT FRONT TURN SIGNAL LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	-	-
3	Z1 18BK	GROUND



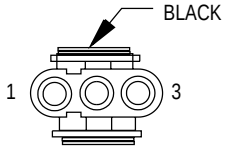
LEFT FRONT WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
2	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)



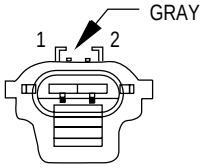
LEFT HEADLAMP

CAV	CIRCUIT	FUNCTION
1	L3 16RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
	L3 16RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	L4 16VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
3	Z1 20BK	GROUND



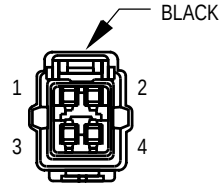
LEFT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L22 20LG/DG	HEADLAMP SWITCH FUSED OUTPUT
2	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
3	Z1 20BK	GROUND



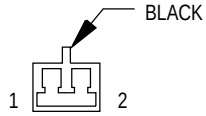
LEFT LICENSE LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



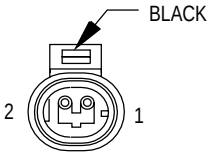
LEFT REAR LAMP ASSEMBLY

CAV	CIRCUIT		FUNCTION
1	L1 20VT/BK	●	BACK-UP LAMP FEED
	L63 18DG/RD	●●	LEFT TURN SIGNAL
2	L63 18DG/RD	●	LEFT TURN SIGNAL
	L1 20VT/BK	●●	BACK-UP LAMP FEED
3	L7 18BK/YL	●	HEADLAMP SWITCH OUTPUT
	L50 18WT/TN	●●	BRAKE LAMP SWITCH OUTPUT
4	L7 18BK/YL	●●	HEADLAMP SWITCH OUTPUT



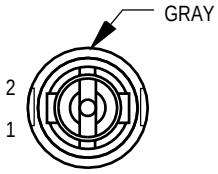
LEFT REAR SPEAKER (SOUND BAR)

CAV	CIRCUIT	FUNCTION
1	X51 20BR/YL	LEFT REAR SPEAKER (+)
2	X57 20BR/LB	LEFT REAR SPEAKER (-)



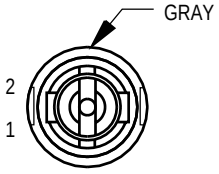
LEFT REAR WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
2	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)



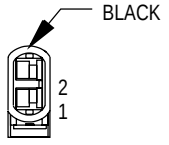
LEFT REPEATER LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	Z1 18BK	GROUND



LEFT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	L61 18GY	LEFT TURN SIGNAL

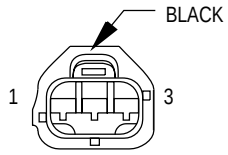


LOW NOTE HORN (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	X2 18WT/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND

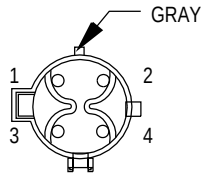
● EXCEPT BUILT-UP-EXPORT

●● BUILT-UP-EXPORT



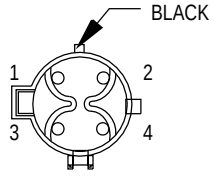
MANIFOLD ABSOLUTE PRESSURE SENSOR

CAV	CIRCUIT	FUNCTION
1	K167 20BR/YL	SENSOR GROUND
2	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
3	K7 20OR	5V SUPPLY



OXYGEN SENSOR 1/1 UPSTREAM

CAV	CIRCUIT	FUNCTION
1	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	Z1 18BK	GROUND
3	K167 20BR/YL	SENSOR GROUND
4	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL

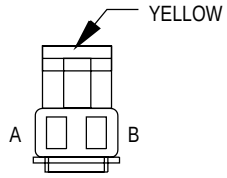


OXYGEN SENSOR 1/2 DOWNSTREAM

CAV	CIRCUIT	FUNCTION
1	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	Z1 18BK	GROUND
3	K167 20BR/YL	SENSOR GROUND
4	K141 18TN/WT	OXYGEN SENSOR 1/2 SIGNAL

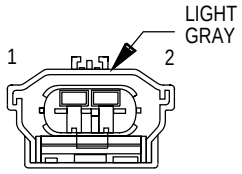
PARK/NEUTRAL POSITION SWITCH (A/T)

CAV	CIRCUIT	FUNCTION
1	F20 18VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
2	T41 20BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
3	L1 18VT/BK	BACK-UP LAMP FEED



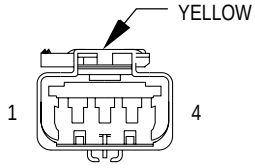
PASSENGER AIRBAG

CAV	CIRCUIT	FUNCTION
A	R44 18DG/YL	PASSENGER AIRBAG LINE 2
B	R42 18BK/YL	PASSENGER AIRBAG LINE 1



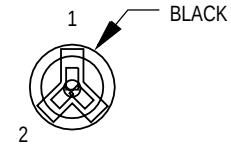
PASSENGER AIRBAG ON/OFF SWITCH - C1

CAV	CIRCUIT	FUNCTION
1	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
2	Z6 20BK/PK	GROUND



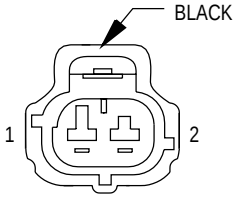
PASSENGER AIRBAG ON/OFF SWITCH - C2

CAV	CIRCUIT	FUNCTION
1	R142 18BR/YL	PASSENGER AIRBAG SQUIB LINE 1
2	R144 18VT/YL	PASSENGER AIRBAG SQUIB LINE 2
3	R42 18BK/YL	PASSENGER AIRBAG LINE 1
4	R44 18DG/YL	PASSENGER AIRBAG LINE 2



PASSENGER DOOR AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	M23 20YL/BK	DOOR AJAR SWITCH OUTPUT
2	M2 20YL	COURTESY LAMPS DRIVER

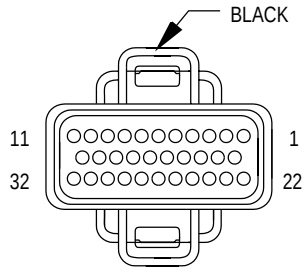


POWER STEERING PRESSURE SWITCH (2.5L)

CAV	CIRCUIT		FUNCTION
1	Z1 20BK	•	GROUND
1	Z1 18BK	• •	GROUND
2	K10 18DB/BR		POWER STEERING PRESSURE SWITCH SENSE

• LHD

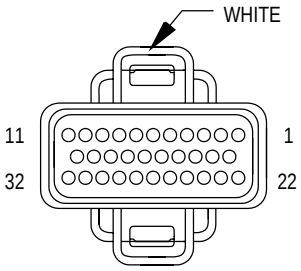
• • RHD



POWERTRAIN CONTROL MODULE - C1

CAV	CIRCUIT	FUNCTION
A1	-	-
A2	F15 18DB	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
A3	-	-
A4	K167 18BR/YL	SENSOR GROUND
A5	-	-
A6	T41 18BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
A7	K19 18GY	IGNITION COIL NO. 1 DRIVER
A8	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
A9	-	-
A10	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
A11	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
A12	K10 18DB/BR ●	POWER STEERING PRESSURE SWITCH SENSE
A13	-	-
A14	-	-
A15	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
A16	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
A17	K7 18OR	5V SUPPLY
A18	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
A19	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER
A20	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
A21	-	-
A22	A14 14RD/WT	FUSED B(+)
A23	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
A24	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL
A25	K141 18TN/WT	OXYGEN SENSOR 1/2 SIGNAL
A26	-	-
A27	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
A28	-	-
A29	-	-
A30	-	-
A31	Z12 14BK/TN	GROUND
A32	Z12 14BK/TN	GROUND

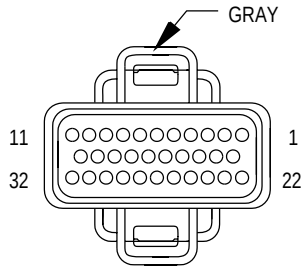
● 2.5L



POWERTRAIN CONTROL MODULE - C2

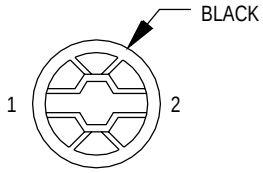
CAV	CIRCUIT	FUNCTION
B1	-	-
B2	-	-
B3	-	-
B4	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
B5	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
B6	K15 18PK/BK ●	FUEL INJECTOR NO. 5 DRIVER
B7	-	-
B8	-	-
B9	-	-
B10	K20 18DG	GENERATOR FIELD DRIVER (+)
B11	T23 18OR/LG	TRANSMISSION LOW/OVERDRIVE SOLENOID
B12	K16 18LG/BK ●	FUEL INJECTOR NO. 6 DRIVER
B13	-	-
B14	-	-
B15	K12 18TN	FUEL INJECTOR NO. 2 DRIVER
B16	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
B17	-	-
B18	-	-
B19	-	-
B20	-	-
B21	-	-
B22	-	-
B23	G60 18GY/YL	ENGINE OIL PRESSURE SENSOR SIGNAL
B24	-	-
B25	-	-
B26	-	-
B27	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL
B28	-	-
B29	-	-
B30	-	-
B31	K6 18VT/OR	5V SUPPLY
B32	-	-

● 4.0L



POWERTRAIN CONTROL MODULE - C3

CAV	CIRCUIT		FUNCTION
C1	C13 18DB/OR		A/C COMPRESSOR CLUTCH RELAY CONTROL
C2	-		-
C3	K51 18DB/YL		AUTOMATIC SHUT DOWN RELAY CONTROL
C4	V36 18TN/RD	●	SPEED CONTROL VACUUM SOLENOID CONTROL
C5	V35 18LG/RD	●	SPEED CONTROL VENT SOLENOID CONTROL
C6	-		-
C7	-		-
C8	-		-
C9	-		-
C10	K106 18WT/DG	▼	LEAK DETECTION PUMP SOLENOID CONTROL
C11	V32 18YL/RD	●	SPEED CONTROL ON/OFF SWITCH SENSE
C12	A142 14DG/PK		AUTOMATIC SHUT DOWN RELAY OUTPUT SENSE
C13	-		-
C14	K105 18WT/OR	▼	LEAK DETECTION PUMP SWITCH SENSE
C15	K118 18PK/YL		BATTERY TEMPERATURE SENSOR SIGNAL
C16	-		-
C17	-		-
C18	-		-
C19	K31 18BR		FUEL PUMP RELAY CONTROL
C20	K52 18PK/BK		DUTY CYCLE EVAP/PURGE SOLENOID CONTROL
C21	-		-
C22	C22 18DB/WT		A/C SWITCH SENSE
C23	C90 18LG		A/C SELECT INPUT
C24	K29 18WT/PK		BRAKE SWITCH SENSE
C25	K72 18DG/OR		VOLTAGE REGULATOR SIGNAL
C26	K226 18DB/LG		FUEL LEVEL SENSOR SIGNAL
C27	D21 18PK		SCI TRANSMIT/ISO 9141K
C28	D2 18WT/BK		CCD BUS(-)
C29	D20 18LG		SCI RECEIVE
C30	D1 18VT/BR		CCD BUS(+)
C31	-		-
C32	V37 18RD/LG	●	SPEED CONTROL SWITCH SIGNAL

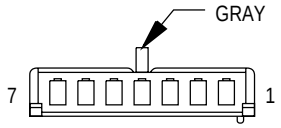


PRNDL LAMP

CAV	CIRCUIT	FUNCTION
1	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
2	Z1 20BK	GROUND

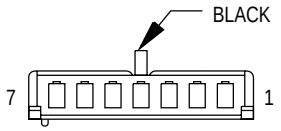
● SPEED CONTROL

▼ LEAK DETECTION



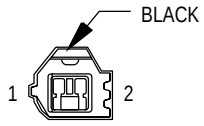
RADIO - C1

CAV	CIRCUIT	FUNCTION
1	-	-
2	X55 18BR/RD	LEFT FRONT SPEAKER(-)
3	X56 18DB	RIGHT FRONT SPEAKER(-)
4	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
5	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
6	X12 20PK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
7	M1 20PK/WT	FUSED B(+)



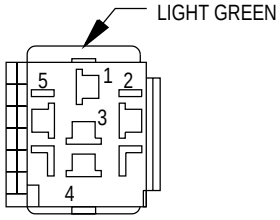
RADIO - C2

CAV	CIRCUIT	FUNCTION
1	-	-
2	X51 18BR/YL	LEFT REAR SPEAKER(+)
3	X52 18DB/WT	RIGHT REAR SPEAKER(+)
4	X53 18DG	LEFT FRONT SPEAKER(+)
5	X54 18VT	RIGHT FRONT SPEAKER(+)
6	X57 18BR/LB	LEFT REAR SPEAKER(-)
7	X58 18DB/PK	RIGHT REAR SPEAKER(-)



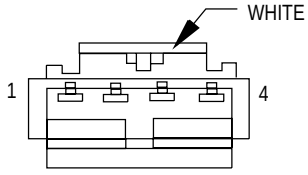
REAR FOG LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L38 18BR/WT	REAR FOG LAMP FEED -
2	Z1 20BK	GROUND



REAR FOG LAMP RELAY (BUILT-UP-EXPORT)

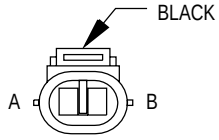
CAV	CIRCUIT	FUNCTION
1	L22 20LG/DG	HEADLAMP SWITCH FUSED OUTPUT
2	L95 18DG/YL	REAR FOG LAMP RELAY CONTROL
3	Z1 20BK	GROUND
4	L38 20BR/WT	REAR FOG LAMP FEED
	L38 20BR/WT •	REAR FOG LAMP FEED
5	L22 20LG/DG	HEADLAMP SWITCH FUSED OUTPUT



REAR FOG LAMP SWITCH (BUILT-UP-EXPORT)

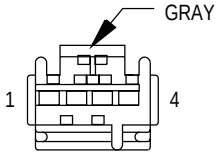
CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	L95 18DG/YL	REAR FOG LAMP RELAY CONTROL
3	L38 20BR/WT	REAR FOG LAMP FEED
4	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL

• RHD



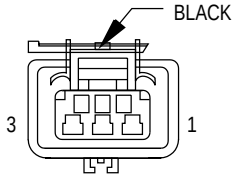
REAR WASHER PUMP (HARD TOP)

CAV	CIRCUIT	FUNCTION
A	V20 18VT/OR	REAR WASHER MOTOR CONTROL
B	Z1 18BK	GROUND



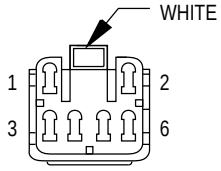
REAR WINDOW DEFOGGER SWITCH (HARD TOP)

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	C80 20DB/LG	REAR WINDOW DEFOGGER SWITCH SENSE
3	F81 20DB/RD	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
4	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL



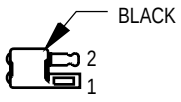
REAR WIPER MOTOR (HARD TOP)

CAV	CIRCUIT	FUNCTION
1	V23 18BR/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
2	Z1 16BK	GROUND
3	V13 18BK/LG	REAR WIPER MOTOR CONTROL



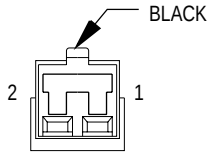
REAR WIPER/ WASHER SWITCH (HARD TOP)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK/WT	GROUND
2	V20 18VT/OR	REAR WASHER MOTOR CONTROL
3	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
4	V13 18BR/LG	REAR WIPER MOTOR CONTROL
5	V23 18BR/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
6	-	-



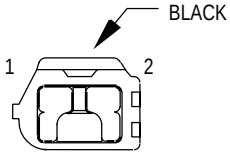
RIGHT CITY LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



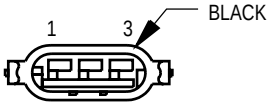
RIGHT COURTESY LAMP

CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



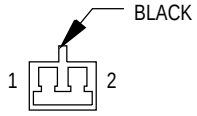
RIGHT FOG LAMP (EXCEPT BUILT-UP -EXPORT)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L39 18LB	FOG LAMP RELAY NO. 1 OUTPUT



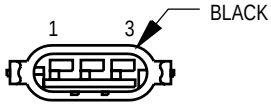
RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP -EXPORT)

CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
3	Z1 18BK	GROUND



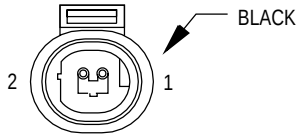
RIGHT FRONT SPEAKER

CAV	CIRCUIT	FUNCTION
1	X54 18VT	RIGHT FRONT SPEAKER (+)
2	X56 18DB	RIGHT FRONT SPEAKER (-)



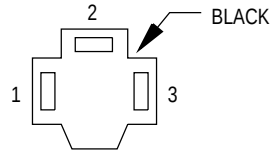
RIGHT FRONT TURN SIGNAL LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	-	-
3	Z1 18BK	GROUND



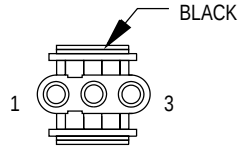
RIGHT FRONT WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
2	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)



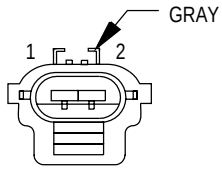
RIGHT HEADLAMP

CAV	CIRCUIT	FUNCTION
1	L3 16RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	L4 16VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
3	Z1 18BK	GROUND



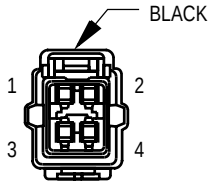
RIGHT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L22 20LG/DG	HEADLAMP SWITCH FUSED OUTPUT
2	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
3	Z1 18BK	GROUND



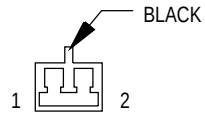
RIGHT LICENSE LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



RIGHT REAR LAMP ASSEMBLY

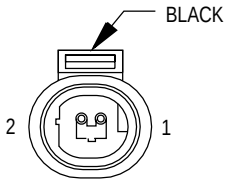
CAV	CIRCUIT		FUNCTION
1	L1 20VT/BK	●	BACK-UP LAMP FEED
	L62 18BR/RD	●●	RIGHT TURN SIGNAL
2	L62 18BR/RD	●	RIGHT TURN SIGNAL
	L1 20VT/BK	●●	BACK-UP LAMP FEED
3	L7 18BK/YL	●	HEADLAMP SWITCH OUTPUT
	L50 18WT/TN	●●	BRAKE LAMP SWITCH OUTPUT
4	L63 18DG/RD	●	LEFT TURN SIGNAL
	L7 18BK/YL	●●	HEADLAMP SWITCH OUTPUT



RIGHT REAR SPEAKER (SOUND BAR)

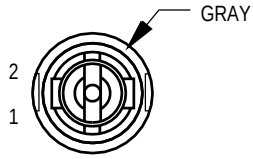
CAV	CIRCUIT	FUNCTION
1	X52 20DB/WT	RIGHT REAR SPEAKER (+)
2	X58 20DB/PK	RIGHT REAR SPEAKER (-)

● EXCEPT BUILT-UP-EXPORT
●● BUILT-UP-EXPORT



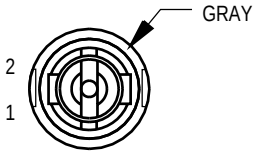
RIGHT REAR WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)



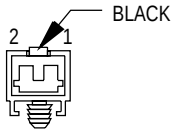
RIGHT REPEATER LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	Z1 18BK	GROUND



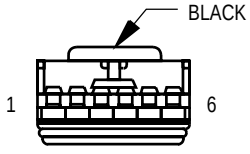
RIGHT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	L60 18TN	RIGHT TURN SIGNAL



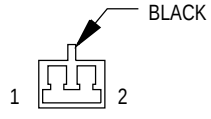
SEAT BELT SWITCH (EXCEPT LHD BUILT--UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	G10 20LG/RD	SEAT BELT SWITCH SENSE
2	Z1 20BK	GROUND



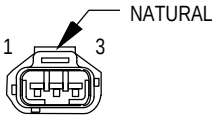
SENTRY KEY IMMOBILIZER MODULE

CAV	CIRCUIT	FUNCTION
1	F34 20TN/BK	FUSED B(+)
2	Z1 20BK	GROUND
3	F15 20DB	FUSED IGNITION OUTPUT (ST-RUN)
4	Z12 20BK/LB	GROUND
5	D2 20WT/BK	CCD BUS(-)
6	D1 20VT/BR	CCD BUS(+)



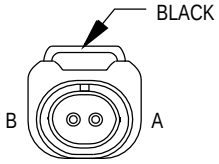
SOUND BAR DOME LAMP

CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



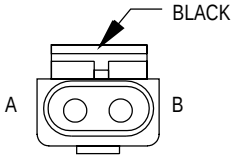
THROTTLE POSITION SENSOR

CAV	CIRCUIT	FUNCTION
1	K167 20BR/YL	SENSOR GROUND
2	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K7 20OR	5V SUPPLY



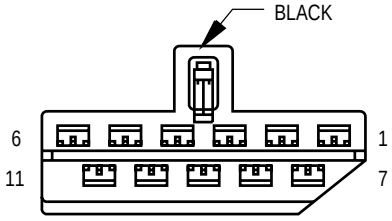
TORQUE CONVERTOR CLUTCH SOLENOID

CAV	CIRCUIT	FUNCTION
A	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B	T23 18OR/LG	TRANSMISSION LOW/OVERDRIVE SOLENOID



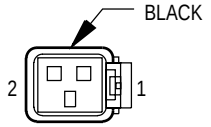
TRANSFER CASE SWITCH

CAV	CIRCUIT	FUNCTION
A	G107 20BK/RD	4WD SENSE
B	Z1 20BK	GROUND



TURN SIGNAL/ HAZARD SWITCH

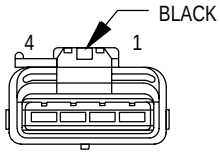
CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	L50 18WT/TN ▼	BRAKE LAMP SWITCH OUTPUT
3	L62 18BR/RD	RIGHT TURN SIGNAL
4	L32 16PK	COMBINATION FLASHER OUTPUT
5	L5 20BK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
6	L9 16BK/WT	FUSED FLASHER FEED
7	-	-
8	-	-
9	L63 18DG/RD	LEFT TURN SIGNAL
10	L61 18GY	LEFT TURN SIGNAL
11	L55 16RD/WT	COMBINATION FLASHER INPUT



UNDERHOOD LAMP

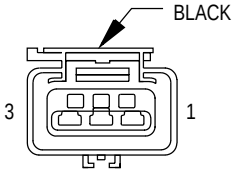
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	M1 20PK/WT	FUSED B(+)

▼ EXCEPT BUILT-UP-EXPORT



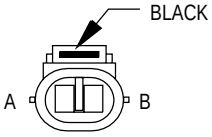
VEHICLE SPEED CONTROL SERVO

CAV	CIRCUIT	FUNCTION
1	V36 18TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
2	V35 18LG/RD	SPEED CONTROL VENT SOLENOID CONTROL
3	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
4	Z1 18BK	GROUND



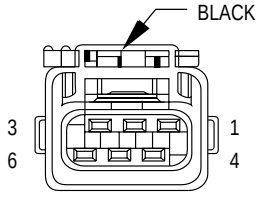
VEHICLE SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	K6 20VT/OR	5V SUPPLY
2	K167 20BR/YL	SENSOR GROUND
3	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL



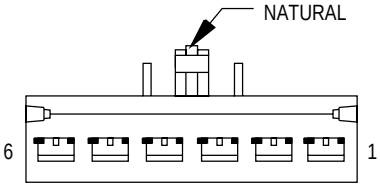
WINDSHIELD WASHER PUMP

CAV	CIRCUIT	FUNCTION
A	V10 18BR	WASHER PUMP CONTROL SWITCH OUTPUT
B	Z1 18BK	GROUND



WINDSHIELD WIPER MOTOR

CAV	CIRCUIT	FUNCTION
1	V6 18PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
2	V5 18DG/YL	WIPER PARK SWITCH SENSE
3	-	-
4	Z1 18BK	GROUND
5	V3 18BR/WT	LOW SPEED WIPER SWITCH OUTPUT
6	V4 18RD/YL	WIPER SWITCH HIGH SPEED OUTPUT



WINDSHIELD WIPER SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	V5 18DG/YL	WIPER PARK SWITCH SENSE
3	V10 18BR	WASHER PUMP CONTROL SWITCH OUTPUT
4	V3 18BR/WT	LOW SPEED WIPER SWITCH OUTPUT
5	V6 18PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
6	V4 18RD/YL	WIPER SWITCH HIGH SPEED OUTPUT

8W-90 CONNECTOR/GROUND LOCATIONS

DESCRIPTION AND OPERATION

INTRODUCTION

This section provides illustrations identifying component and connector locations in the vehicle. A connector index is provided. Use the wiring diagrams in each section for connector number identification. Refer to the index for the proper figure number.

CONNECTOR/GROUND LOCATIONS

For items that are not shown in this section a N/S is placed in the Fig. column.

Connector Name/Number	Color	Location	Fig.
A/C Compressor Clutch	BK	At A/C Compressor Clutch	12
A/C Heater Control - C1	BK	Rear of Blower Motor Switch	17, 18
A/C Heater Control - C2	BK	Rear of Lamp	17, 18
A/C Heater Control - C3	BK	Rear of A/C Heater Control Switch	17, 18
A/C High Pressure Switch	BK	On A/C Compressor	12
A/C Low Pressure Switch	GY	Near T/O for Powertrain Control Module	N/S
ABS Diode	BK	Near T/O for Controller Anti-Lock Brake	2
ABS Pump Motor	BK	Left Side of Engine Compartment Near Grommet	6
Airbag Control Module	YL	Front of Floor Pan Tunnel	15, 16, 19
Back-up Lamp Switch (M/T)	BK	Right Side of Transmission	14
Battery Temperature Sensor	BK	Under Battery Tray	3, 4
Brake Lamp Switch	GY	Top of Brake Pedal Bracket	15, 16
Brake Shift Interlock Solenoid	WT	Near Steering Column	20
Brake Warning Indicator Switch	BK	On Brake Master Cylinder	2, 3

Connector Name/Number	Color	Location	Fig.
C103	BK	Near T/O for Fuel Injector NO. 6	2, 3
C104 (LHD)	GY	Rear of Engine	2
C104 (RHD)	BK	Rear of Engine	3
C106 (LHD)	BK	Left Kick Panel	2, 15
C106 (RHD)	BK	Right Kick Panel	16
C107 (LHD)	YL	Left Kick Panel	2, 15
C107 (RHD)	YL	Right Kick Panel	16
C108 (LHD)	BL	Left Kick Panel	2, 15
C108 (RHD)	BL	Right Kick Panel	16
C110	BK	Left Fender Side Shield	3, 5
C154	BK	Top Right Side of Transmission	11, 14
C170	LT GY/ BK	Right Kick Panel	2, 17, 18
C180	BK	Engine Compartment Left Side	N/S
C202 (LHD)	GY	Left Kick Panel	15, 17
C202 (RHD)	GY	Right Kick Panel	16, 18
C203 (LHD)	GN	Left Kick Panel	15, 17
C203 (RHD)	GN	Right Kick Panel	16, 18
C204 (LHD)	RD	Left Kick Panel	15, 17
C204 (RHD)	RD	Right Kick Panel	16, 18
C322	BK	Left Kick Panel	15, 16, 22
C323 (LHD)	RD	Left Kick Panel	15, 22

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
C323 (RHD)	LT GY	Left Kick Panel	16
C325 (4 Spkr Sys)	WT/ BK	Left Side of Sound Bar	22, 23
C326 (Hard Top)	BK	Left Rear Quarter Panel	22, 23
C329 (LHD)	BK	Left Side of Rear Bumper	24
C329 (RHD)	BK	Right Side of Rear Bumper	25
C330 (4 Spkr Sys)	WT/ BK	Left Side of Sound Bar	22, 23
C331 (Hard Top)	BK	Left Rear Quarter Panel	22, 23
Camshaft Position Sensor	GY	Below Distributor	11
Cigar Lighter/ Accessory Relay (LHD)	BK	Bottom of Instrument Panel Near Steering Column	15, 22
Cigar Lighter/ Accessory Relay (RHD)	BK	Bottom of Instrument Panel Near Steering Column	N/S
Cigar Lighter/ Power Outlet	RD	Rear of Cigar Lighter	17, 18
Clockspring - C1	YL	Rear of Clockspring	20
Clockspring - C2	NAT	Rear of Clockspring	20
Clutch Pedal Position Switch (M/T)	BK	Top of Clutch Pedal Bracket	15, 16
Combination Flasher	BK	Bottom of Instrument Panel Near Steering Column	20
Controller Anti-Lock Brake - C1	GY	Near Grommet Rear Left Side of Dash Panel	2, 19
Controller Anti-Lock Brake - C2	GY	Near Grommet Rear Left Side of Dash Panel	2, 19
Crankshaft Position Sensor	BK	At Rear of Intake Manifold	9, 10, 13

Connector Name/Number	Color	Location	Fig.
Data Link Connector (LHD)	BK	Bottom Left of Instrument Panel	17
Data Link Connector (RHD)	BK	Bottom Right of Instrument Panel	18
Daytime Running Lamp Module (Except Built-Up-Export)	BK	Left Side of Engine Compartment	4
Driver Door Ajar Switch	NAT	At ″A″ Pillar	15, 16
Duty Cycle Evap/Purge solenoid	BK	Left Fender Side Shield	5
Engine Coolant Temperature Sensor	BK	On Thermostat Housing	9, 10
Engine Oil Pressure Sensor	BK	Right Side of Engine Block	11
Fog Lamp Relay NO.1 (Except Built-Up-Export)	BK	Near Fuse Block T/O	15
Fog Lamp Relay NO.2 (Except Built-Up-Export)	BK	Near Fuse Block T/O	15
Front Fog Lamp Switch (Except Built-Up-Export)	BK	At Switch	17
Fuel Injector NO.1	BK	At Injector	9, 10
Fuel Injector NO.2	BK	At Injector	9, 10
Fuel Injector NO.3	BK	At Injector	9, 10
Fuel Injector NO.4	BK	At Injector	9, 10
Fuel Injector NO.5	BK	At Injector	10
Fuel Injector NO.6	BK	At Injector	10
Fuel Pump Module	BK	Above Fuel Tank	1

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
G100		Rear Center of Engine Compartment	2, 3
G101		Rear Center of Engine Compartment	2
G102		Left Radiator Closure Panel	5
G103		Right Radiator Closure Panel	1
G104		Rear of Generator	12
G105		Right Rear of Engine Block	12
G106		Right Rear of Engine Block	12
G107		Right Rear of Engine Block	12
G200		Right Rear of Instrument Panel	17, 18
G201		Right Rear of Instrument Panel	17, 18
G202 (LHD)		Right Rear of Instrument Panel	21
G202 (RHD)		Left Rear of Instrument Panel	18
G203 (LHD)		Right Rear of Instrument Panel	21
G203 (RHD)		Left Rear of Instrument Panel	18
G300 (LHD)		Left Kick Panel	15
G300 (RHD)		Right Kick Panel	16
G301 (LHD)		Right Kick Panel	15
G301 (RHD)		Left Kick Panel	16
G302 (LHD)		Left Kick Panel	15
G302 (RHD)		Right Kick Panel	16

Connector Name/Number	Color	Location	Fig.
G Switch	BK	Near T/O for Controller Anti-Lock Brake	19
Generator	BK	Rear of Generator	12
Headlamp Dimmer Switch	BK	At Steering Column Part of Multifunction Switch	20
Headlamp Leveling Switch (Built-Up-Export)	BK	Right Side of Instrument Panel	17, 18
Headlamp Switch	BK	Rear of Switch	17, 18
High Note Horn	BK	Left Front Fender Side Shield	5
HVAC Unit (LHD)	GY	Bottom Right of Instrument Panel	21
HVAC Unit (RHD)	GY	Bottom Left of Instrument Panel	18
Hydraulic Control Unit	BK	Left Side of Engine Compartment	6
Idle Air Control Motor	BK	Side of Throttle Body	9, 10
Ignition Coil	GY	Near Generator	12
Ignition Switch	GY	Rear of Ignition Switch	20
Instrument Cluster - C1	GN	Rear of Cluster	17, 18
Instrument Cluster - C2	BL	Rear of Cluster	17, 18
Intake Air Temperature Sensor	GY	Rear of Intake Manifold	9, 10
Key-In Switch	GN	At Key-In Switch	20
Leak Detection Pump (Except Built-Up-Export)	BK	Engine Compartment Left Side	N/S
Left City Lamp (Built-Up-Export)	BK	At Lamp	5

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Left Courtesy Lamp	BK	Left Side of Instrument Panel	17, 18
Left Fog Lamp (Except Built-Up-Export)	BK	At Lamp	N/S
Left Front Park/Turn Signal Lamp (Except Built-Up-Export)	BK	At Lamp	N/S
Left Front Speaker	BK	At Speaker	17, 18
Left Front Turn Signal Lamp (Built-Up-Export)	BK	At Lamp	N/S
Left Front Wheel Speed Sensor	BK	Left Side of Engine Compartment Near Hydraulic Control Unit	6
Left Headlamp	BK	Rear of Lamp	5
Left Headlamp Leveling Motor (Built-Up-Export)	BK	At Lamp	5
Left License Lamp (Built-Up-Export)	GY	At Lamp	24, 25
Left Rear Lamp Assembly	BK	At Lamp	24, 25
Left Rear Speaker (Sound Bar)	BK	At Sound Bar	N/S
Left Rear Wheel Speed Sensor	BK	Near Vehicle Speed Sensor T/O	1
Left Repeater Lamp (Built-Up-Export)	GY	At Lamp	N/S
Left Side Marker Lamp (Except Built-Up-Export)	GY	At Lamp	N/S
Low Note Horn (Except Built-Up-Export)	BK	Left Front Fender Side Shield	5
Manifold Absolute Pressure Sensor	BK	Side of Throttle Body	9, 10
Oxygen Sensor 1/1 Upstream	GY	On Front Exhaust Pipe	9, 10
Oxygen Sensor 1/2 Downstream	BK	Rear of Catalytic Converter	14
Park/Neutral Position Switch (A/T)	BK	Left of Transmission	11
Passenger Airbag	YL	Rear of Airbag	15, 16, 18, 21
Passenger Airbag On/Off Switch - C1	LT GY	Near Fuse Block T/O	15, 16
Passenger Airbag On/Off Switch - C2	YL	Near Fuse Block T/O	15, 16
Passenger Door Ajar Switch	BK	Near T/O for G301	15, 16
Power Steering Pressure Switch (2.5L)	BK	Near Power Steering Pump	9
Powertrain Control Module - C1	BK	Left Rear of Engine Compartment	3, 4
Powertrain Control Module - C2	WT	Left Rear of Engine Compartment	3, 4
Powertrain Control Module - C3	GY	Left Rear of Engine Compartment	3, 4
PRNDL Lamp	BK	Rear of Lamp	15, 16
Radio - C1	GY	Rear of Radio	17, 18
Radio - C2	BK	Rear of Radio	17, 18
Rear Fog Lamp (Built-Up-Export)	BK	At Lamp	24, 25
Rear Fog Lamp Relay (Built-Up-Export) (LHD)	LT GN	Near Fuse Block T/O	N/S

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Rear Fog Lamp Relay (Built-Up-Export) (RHD)	LT GN	Near Fuse Block T/O	16
Rear Fog Lamp Switch (Built-Up-Export)	WT	At Switch	17, 18
Rear Washer Pump (Hard Top)	BK	Under Washer Fluid Reservoir	5
Rear Window Defogger Switch (Hard Top)	GY	Behind Rear Window Defogger Switch	17, 18
Rear Wiper Motor (Hard Top)	BK	At Rear Wiper Motor	N/S
Rear Wiper/ Washer Switch (Hard Top)	WT	Behind Rear Wiper/Washer Switch	17, 18
Right City Lamp (Built-Up-Export)	BK	At Lamp	1
Right Courtesy Lamp	BK	Right Side of Instrument Panel	18, 21
Right Fog Lamp (Except Built-Up-Export)	BK	At Lamp	1
Right Front Park/Turn Signal Lamp (Except Built-Up-Export)	BK	At Lamp	1
Right Front Speaker	BK	At Speaker	18, 21
Right Front Turn Signal Lamp (Built-Up-Export)	BK	At Lamp	1
Right Front Wheel Speed Sensor	BK	Rear of Engine	13
Right Headlamp	BK	Rear of Lamp	1
Right Headlamp Leveling Motor (Built-Up-Export)	BK	Near Lamp at Motor	1
Right License Lamp (Built-Up-Export)	GY	At Lamp	24, 25
Right Rear Lamp Assembly	BK	At Lamp	24, 25
Right Rear Speaker (Sound Bar)	BK	At Sound Bar	N/S
Right Rear Wheel Speed Sensor	BK	Near Vehicle Speed Sensor T/O	1
Right Repeater Lamp (Built-Up-Export)	GY	At Lamp	1
Right Side Marker Lamp (Except Built-Up-Export)	GY	At Lamp	1
Seat Belt Switch (Except LHD Built-Up-Export)	BK	Near Park Brake Switch T/O	22, 23
Sentry Key Immobilizer Module	BK	At Immobilizer	15, 16
Sound Bar Dome Lamp	BK	At Sound Bar	N/S
Throttle Position Sensor	NAT	Side of Throttle Body	9, 10
Torque Converter Clutch Solenoid	BK	Left Side of Transmission	N/S
Transfer Case Switch	BK	Left Side of Transfer Case	14
Turn Signal/ Hazard Switch	BK	At Steering Column Part of Multifunction Switch	20
Underhood Lamp	BK	Under Hood	2, 3
Vehicle Speed Control Servo (LHD)	BK	Left Side of Engine Compartment	N/S
Vehicle Speed Control Servo (RHD)	BK	Right Side of Engine Compartment	N/S
Vehicle Speed Sensor	BK	Left Rear of Transfer Case	14

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Windshield Washer Pump	BK	Under Washer Fluid Reservoir	5
Windshield Wiper Motor	BK	Center of Cowl Panel	7, 8

Connector Name/Number	Color	Location	Fig.
Windshield Wiper Switch	NAT	At Steering Column	20

DESCRIPTION AND OPERATION (Continued)

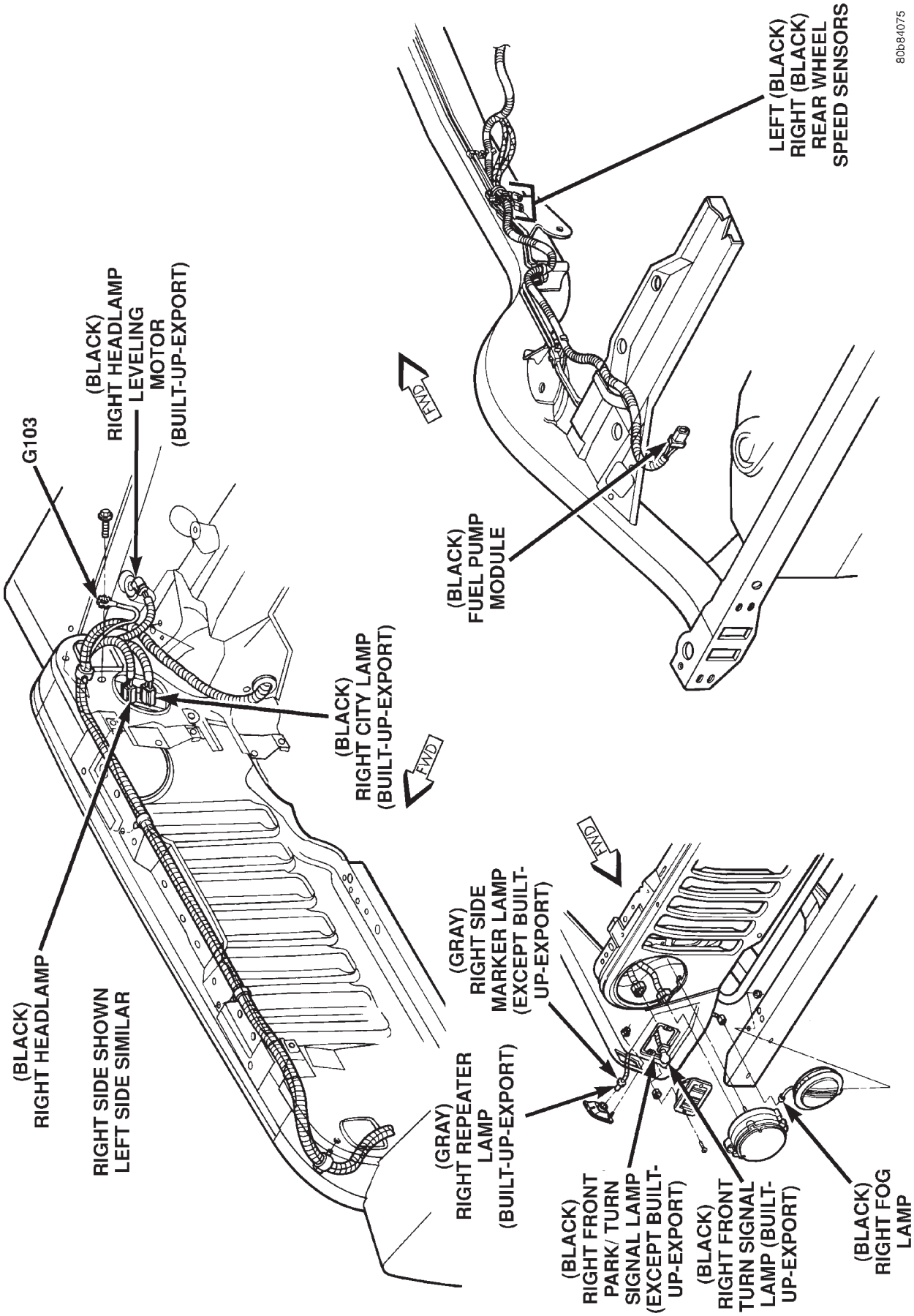


Fig. 1 Front End Wiring Connectors

DESCRIPTION AND OPERATION (Continued)

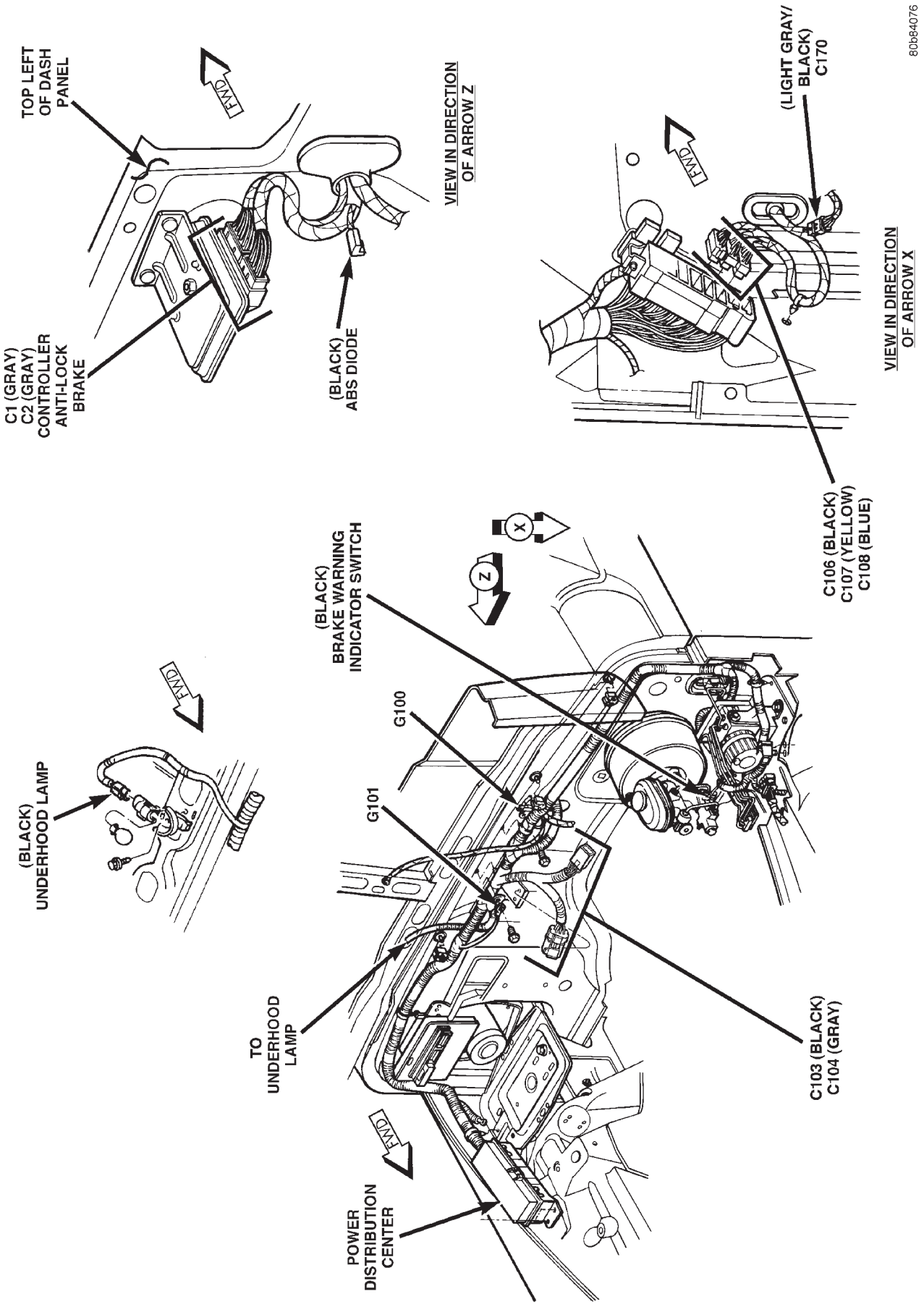


Fig. 2 Engine Compartment Connectors — Rear, LHD

DESCRIPTION AND OPERATION (Continued)

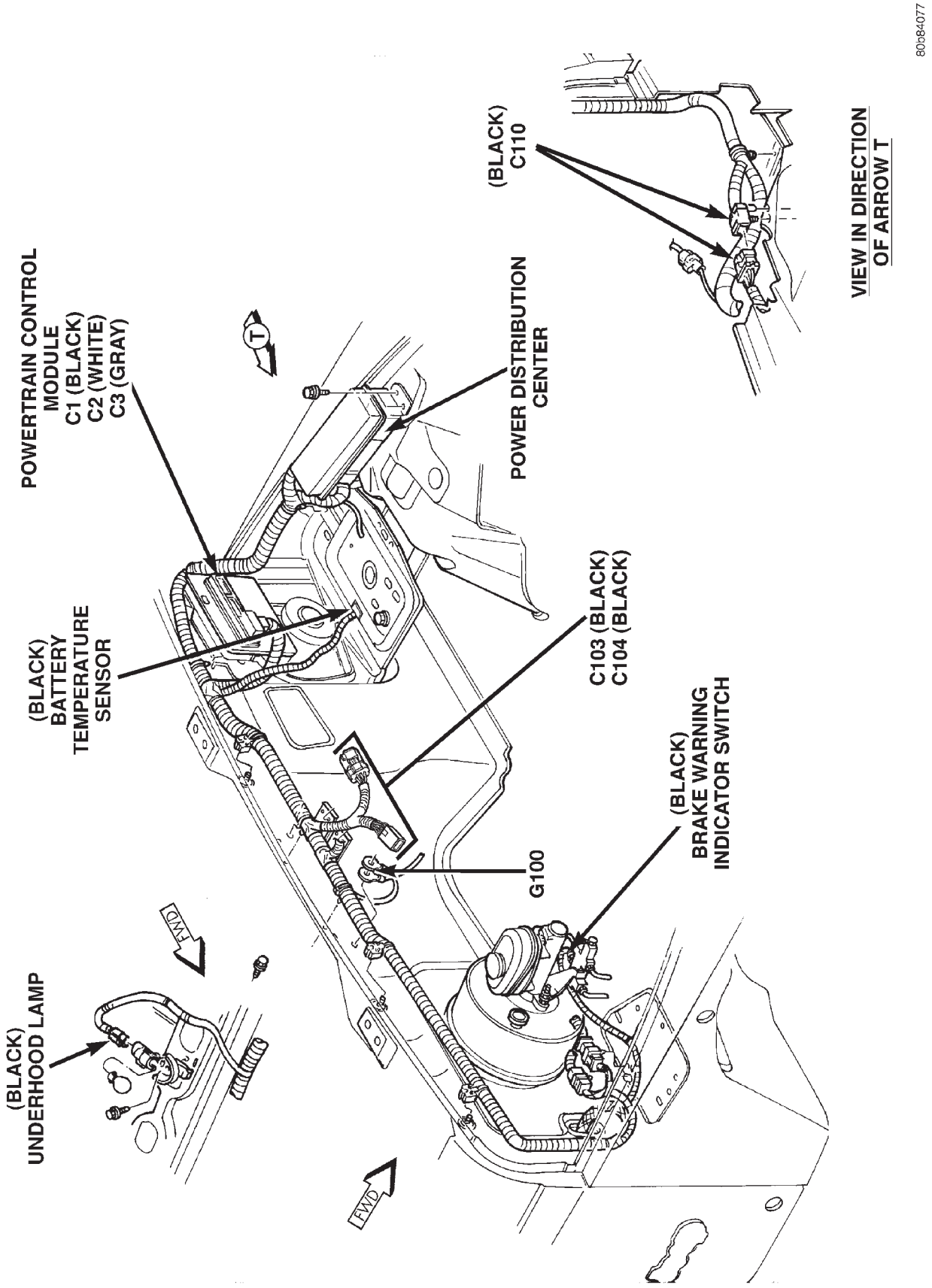


Fig. 3 Engine Compartment Connectors — Rear, RHD

DESCRIPTION AND OPERATION (Continued)

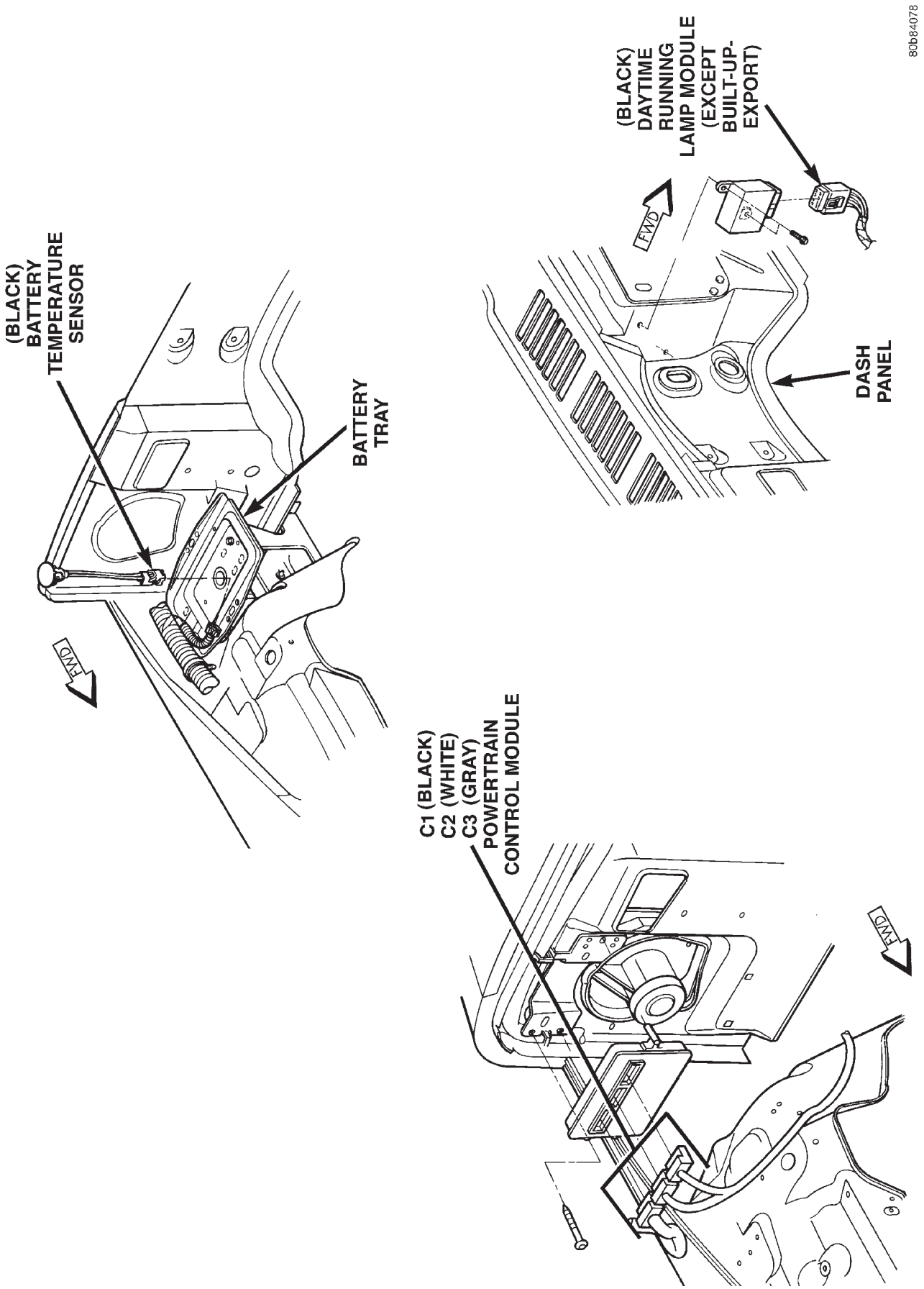


Fig. 4 Engine Compartment Connectors—LHD

DESCRIPTION AND OPERATION (Continued)

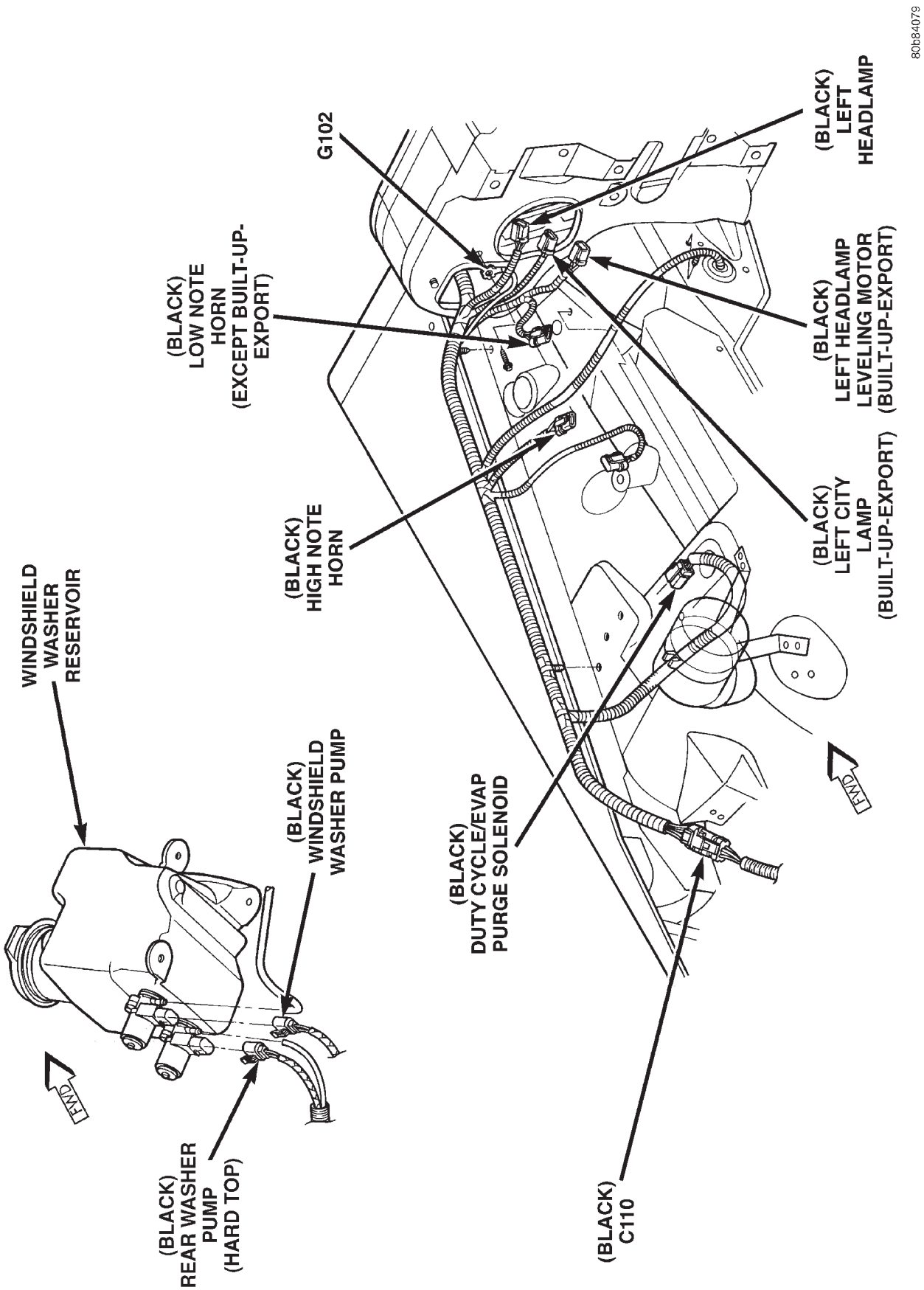


Fig. 5 Engine Compartment Connectors—Front Side

DESCRIPTION AND OPERATION (Continued)

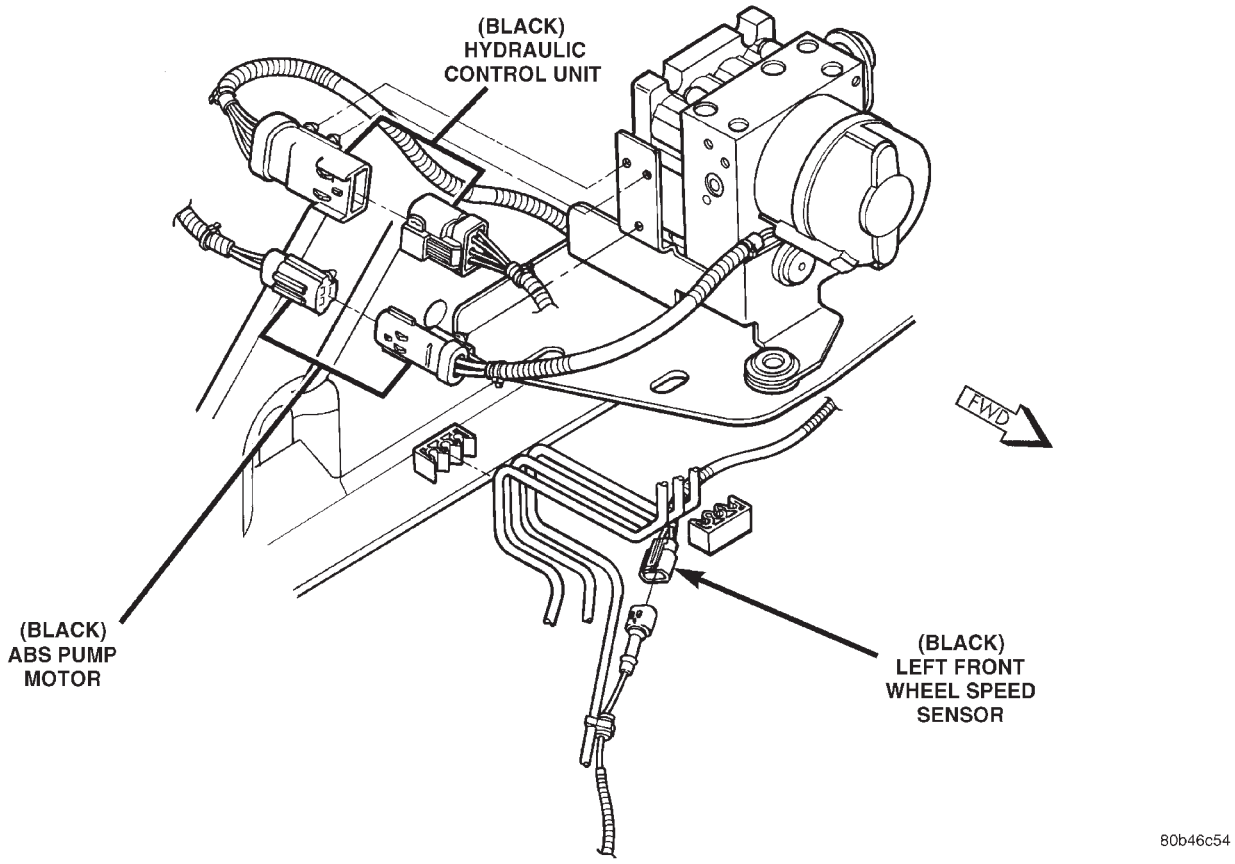


Fig. 6 ABS Hydraulic Control Unit

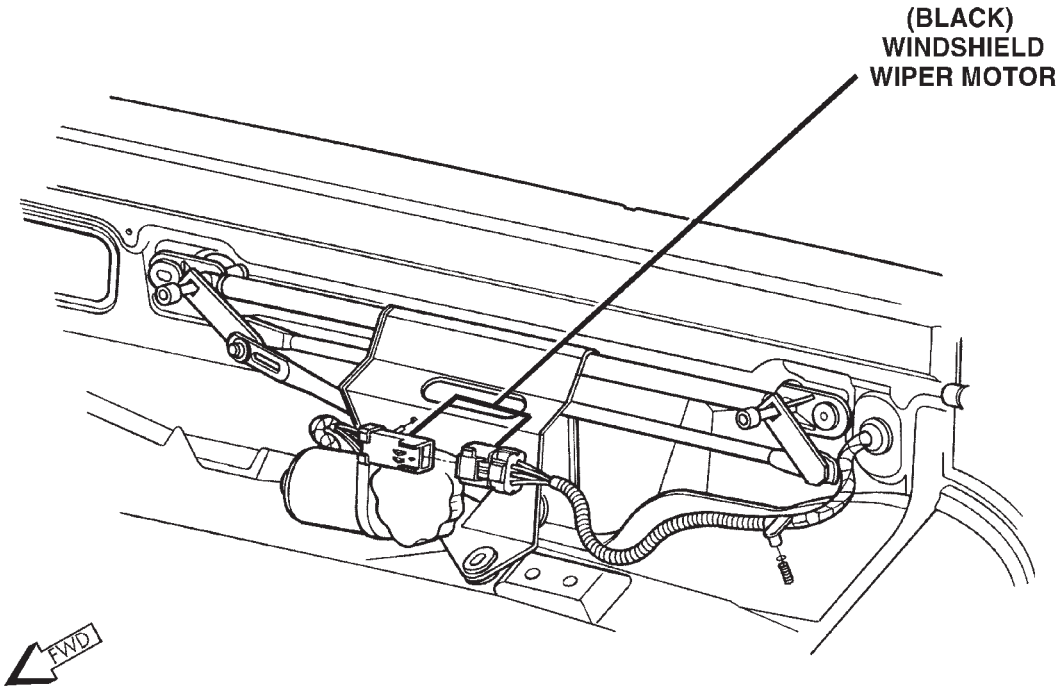


Fig. 7 Windshield Wiper Motor—LHD

DESCRIPTION AND OPERATION (Continued)

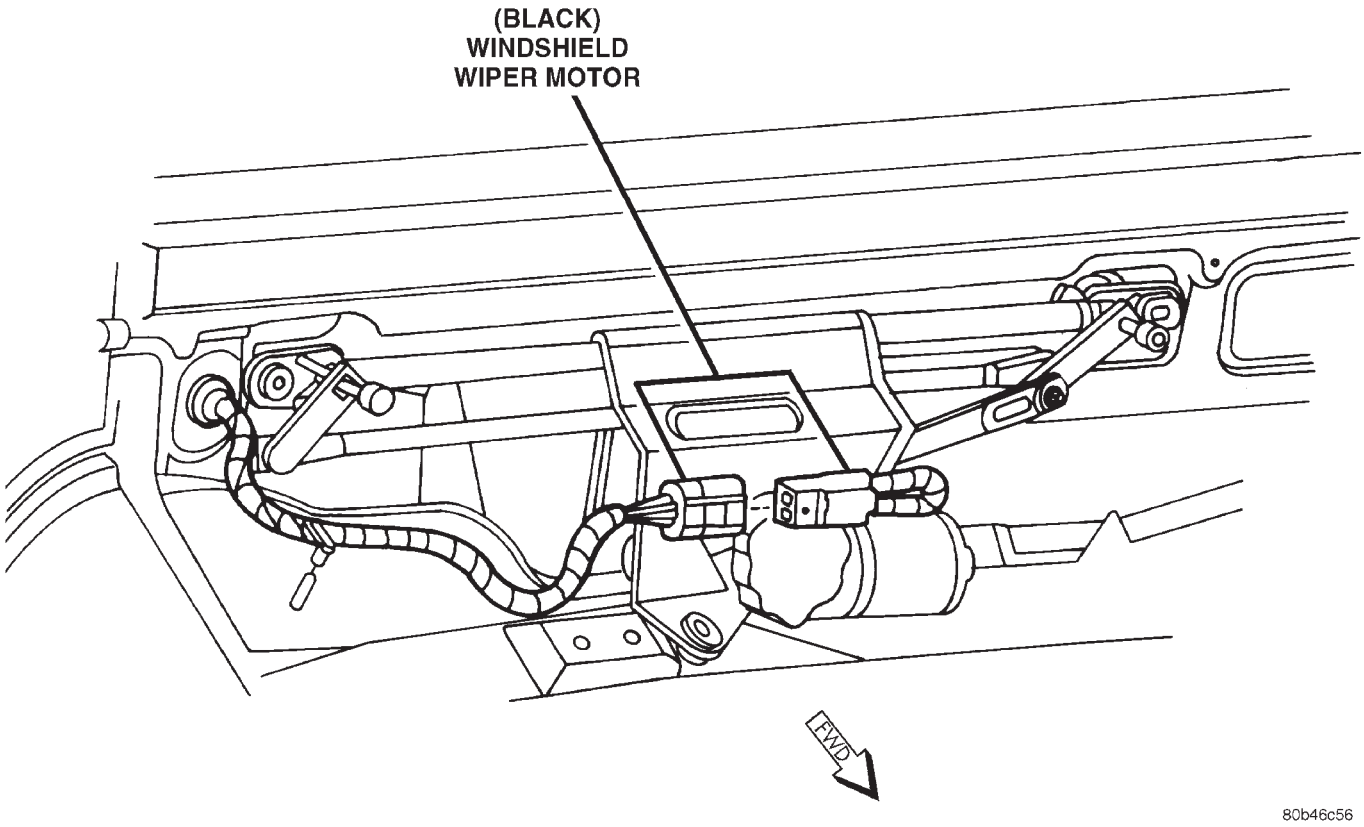


Fig. 8 Windshield Wiper Motor—RHD

DESCRIPTION AND OPERATION (Continued)

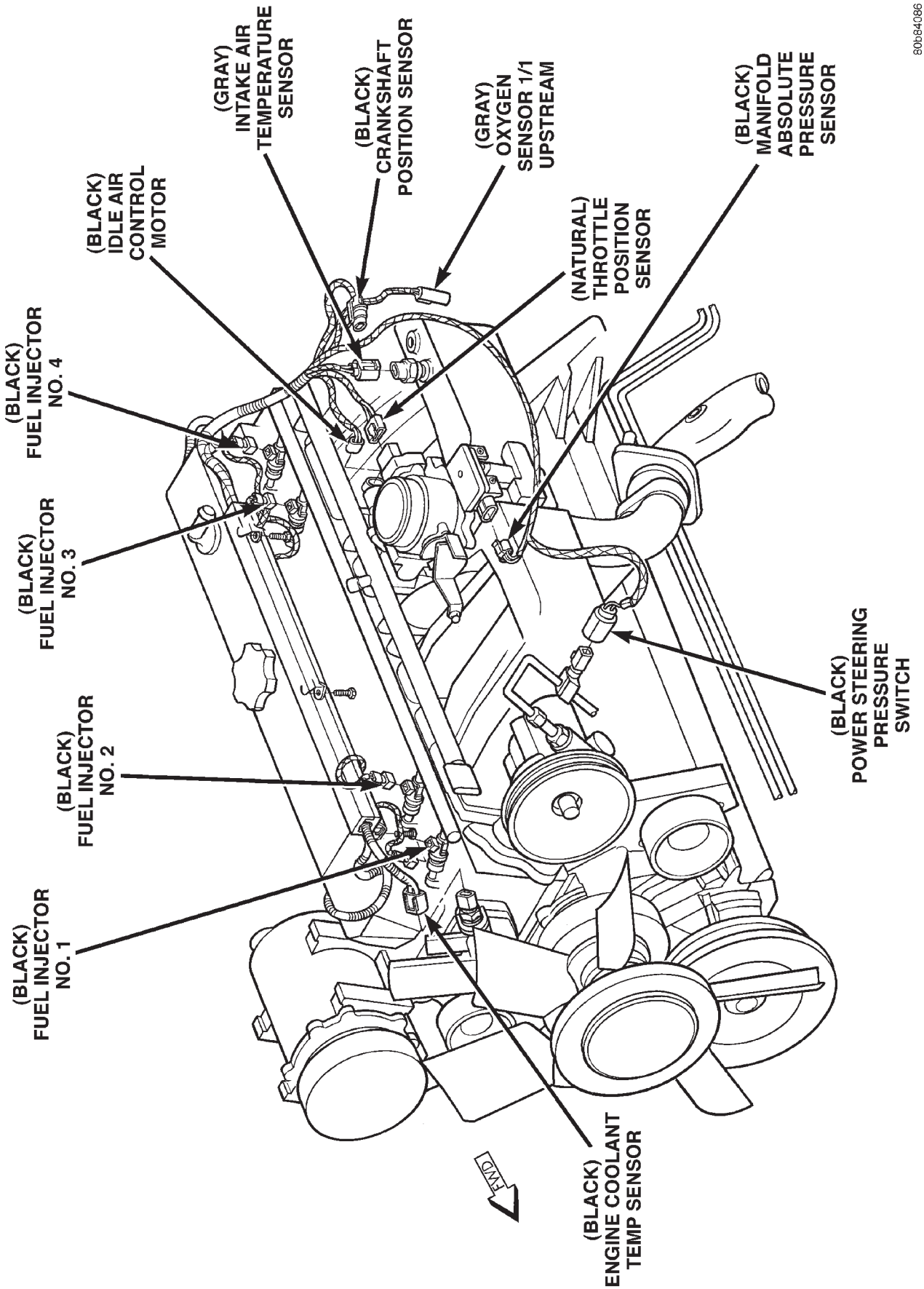


Fig. 9 Engine Harness Connectors—2.5L Engine

DESCRIPTION AND OPERATION (Continued)

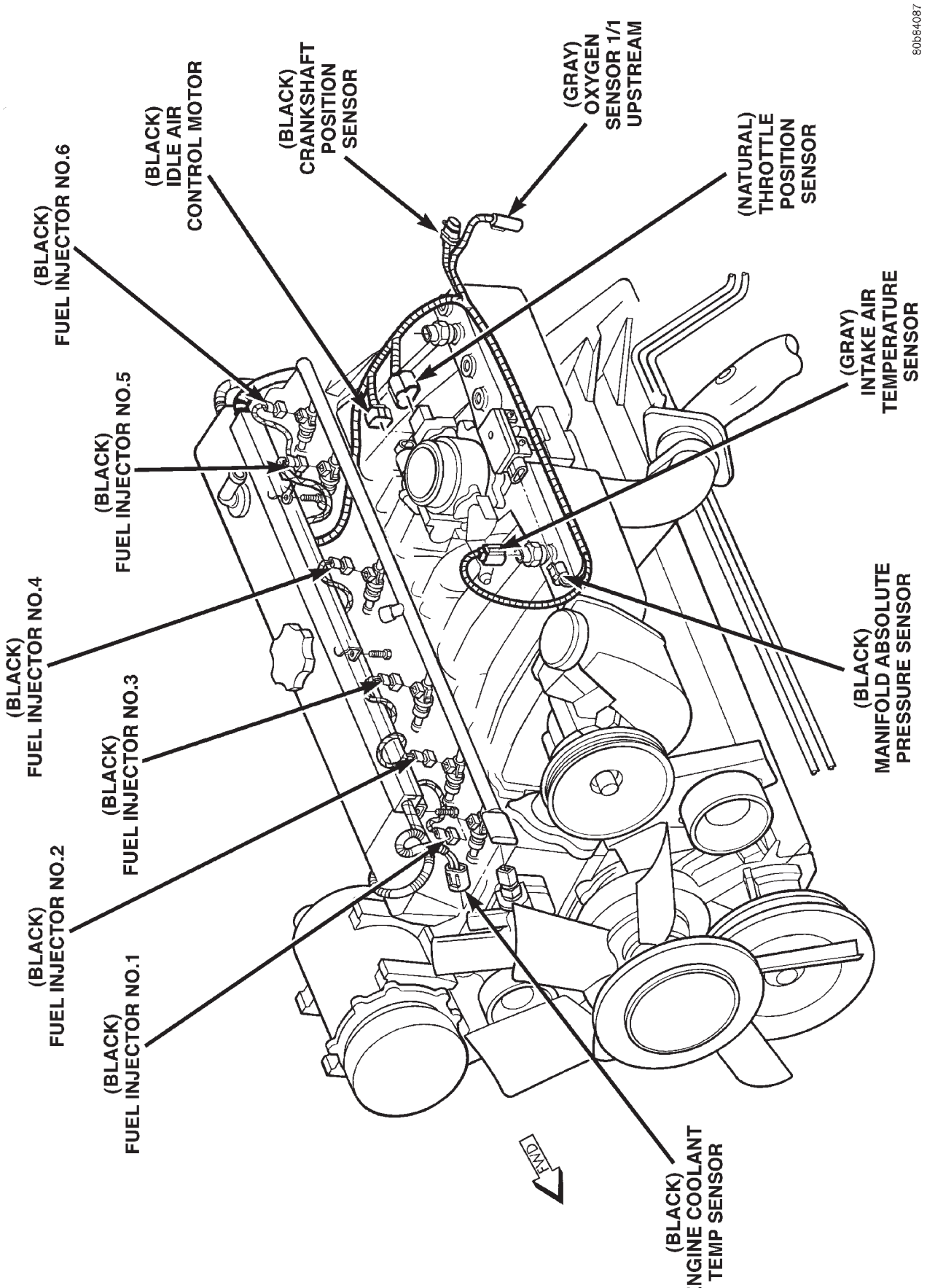


Fig. 10 Engine Harness Connectors—4.0L Engine

DESCRIPTION AND OPERATION (Continued)

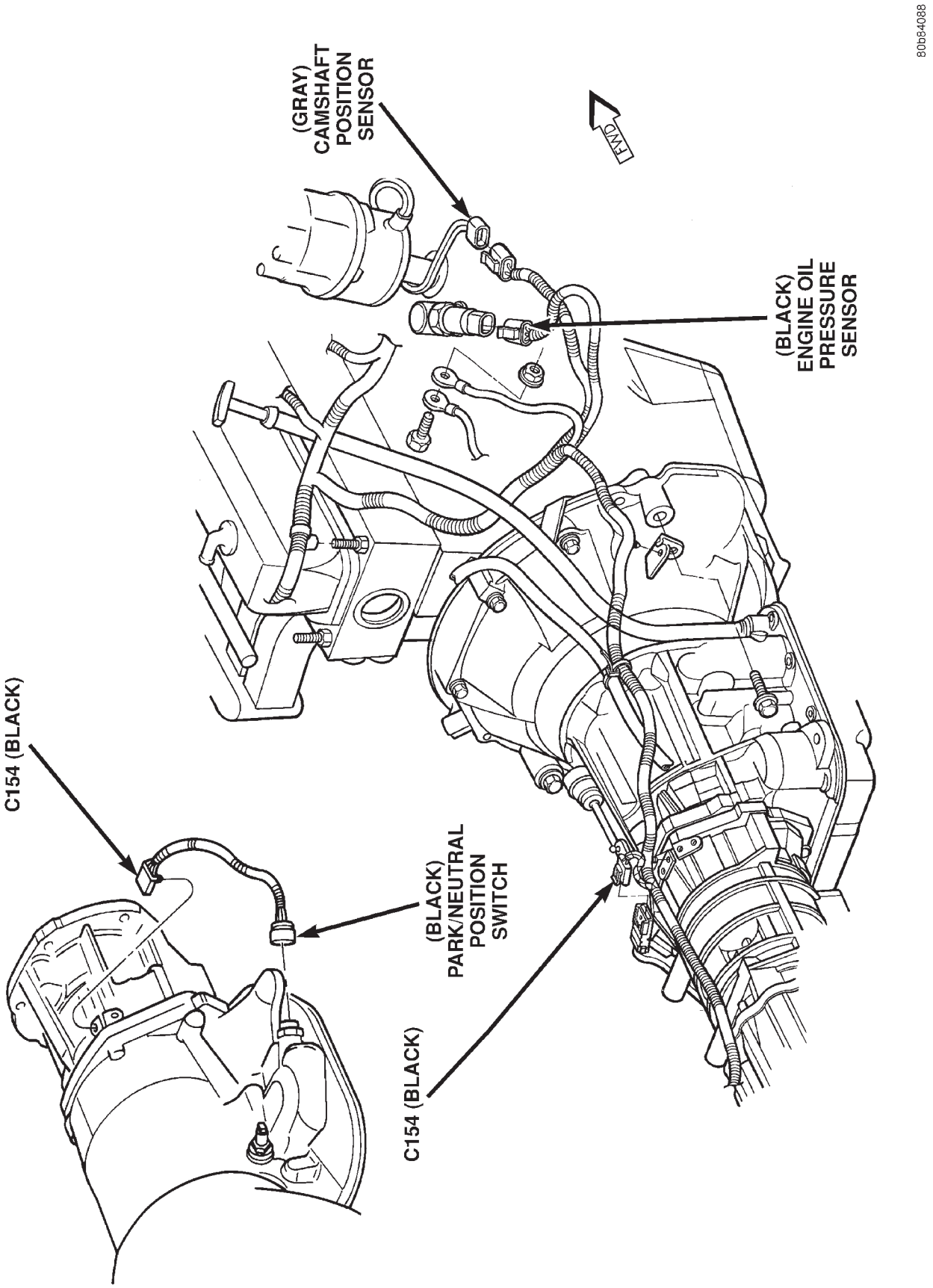


Fig. 11 Engine and Automatic Transmission Connectors

DESCRIPTION AND OPERATION (Continued)

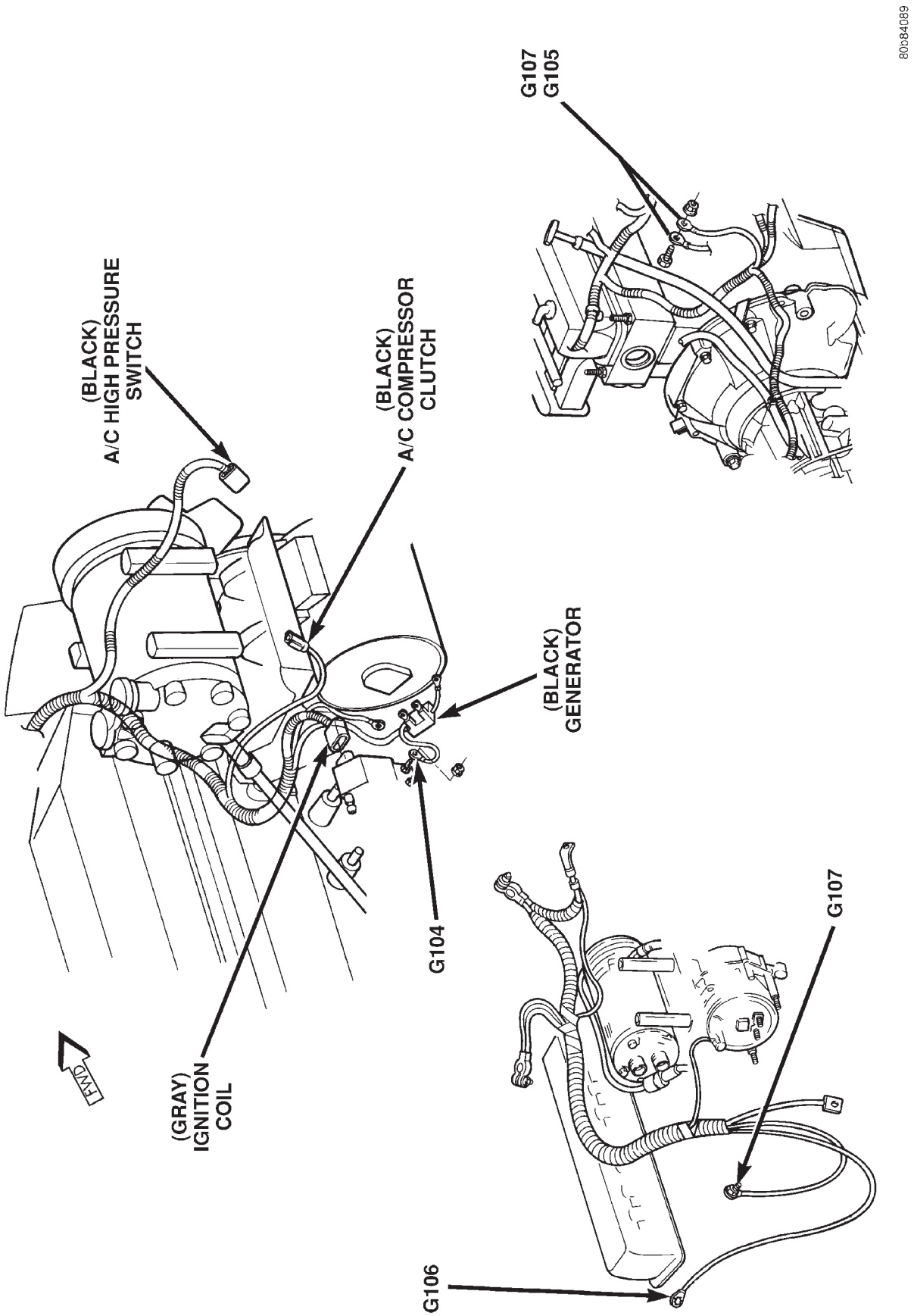


Fig. 12 Engine Grounds

DESCRIPTION AND OPERATION (Continued)

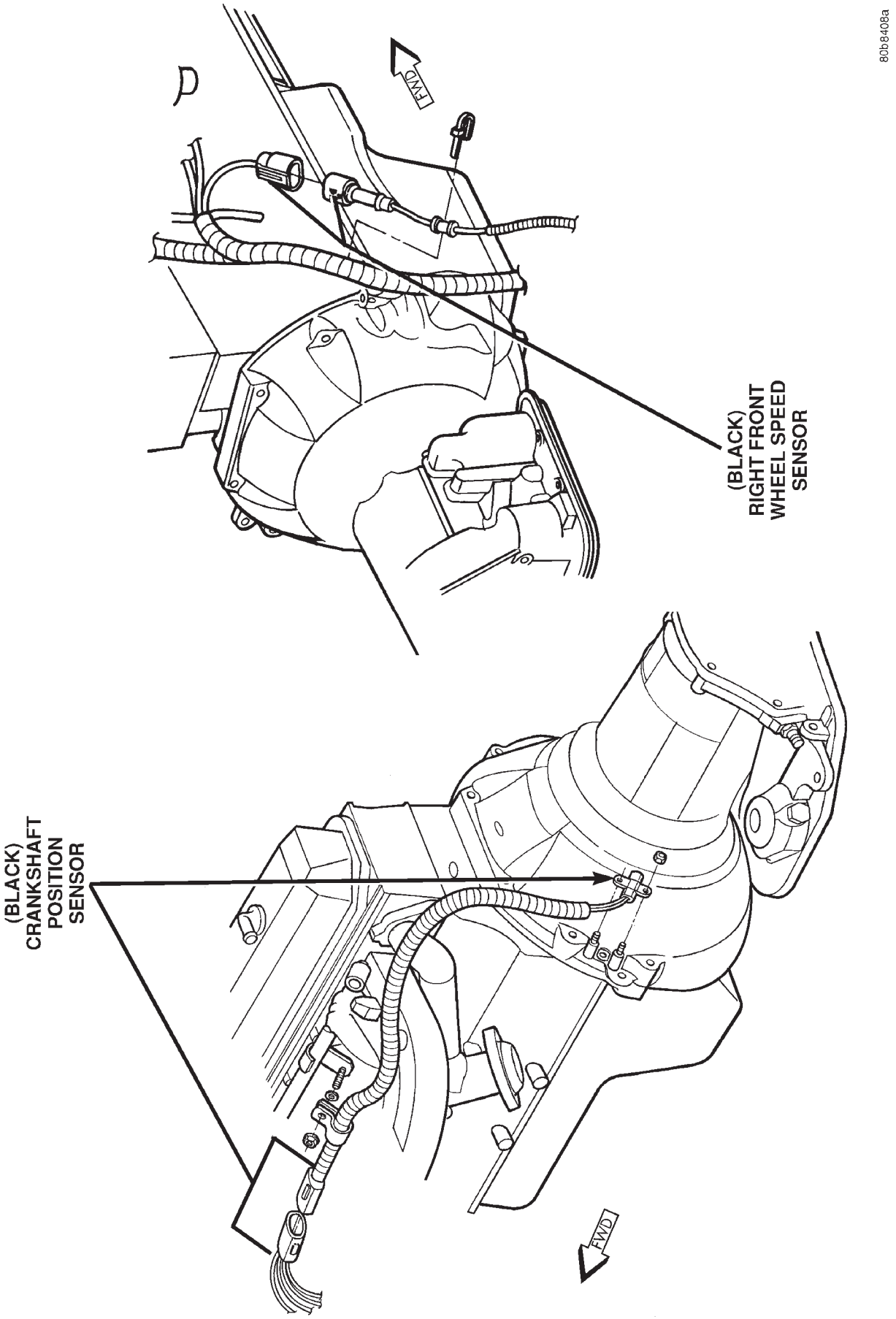


Fig. 13 Crankshaft Position Sensor and Right Front Wheel Speed Sensor

DESCRIPTION AND OPERATION (Continued)

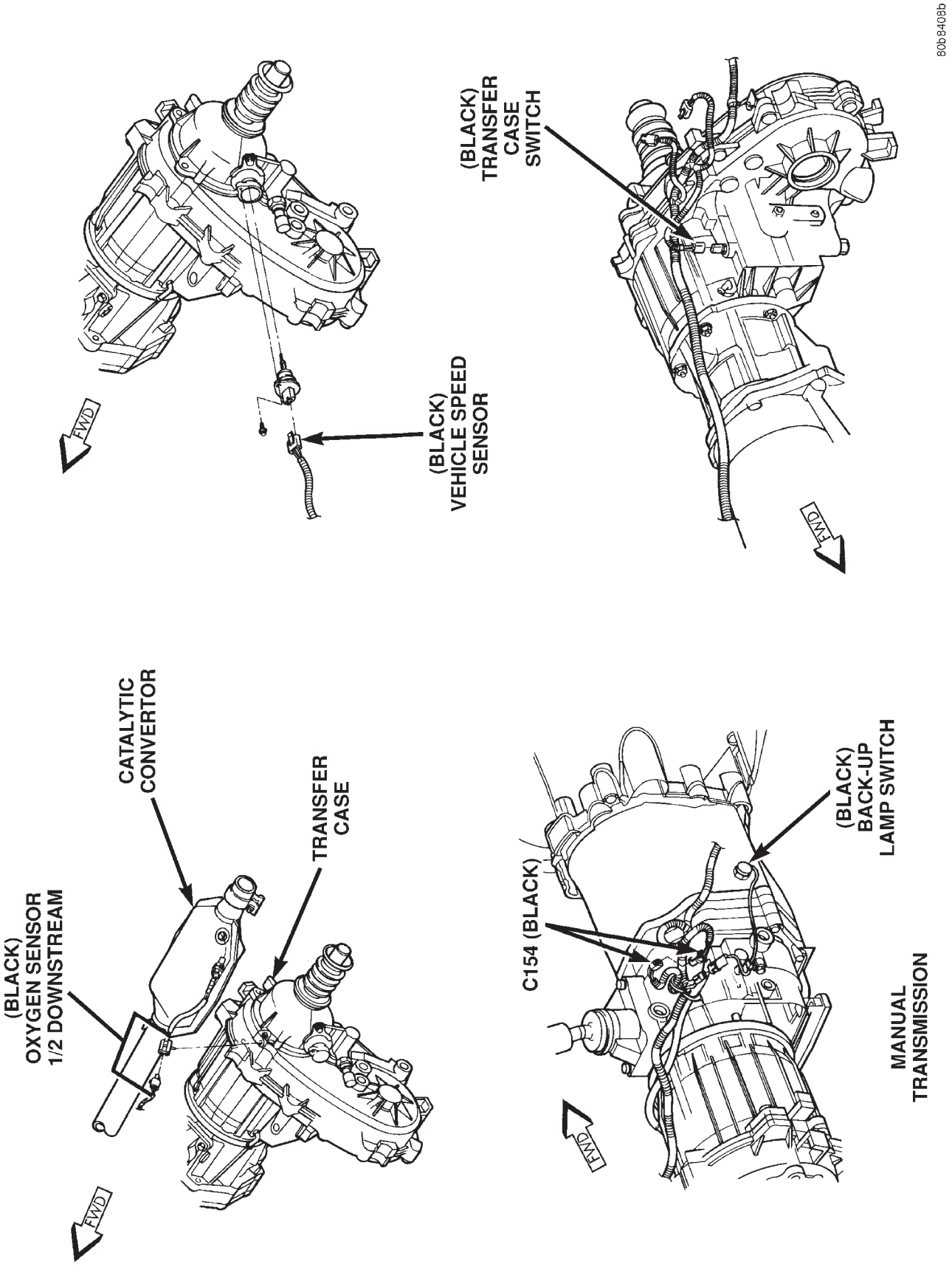


Fig. 14 Transmission and Transfer Case Connectors

DESCRIPTION AND OPERATION (Continued)

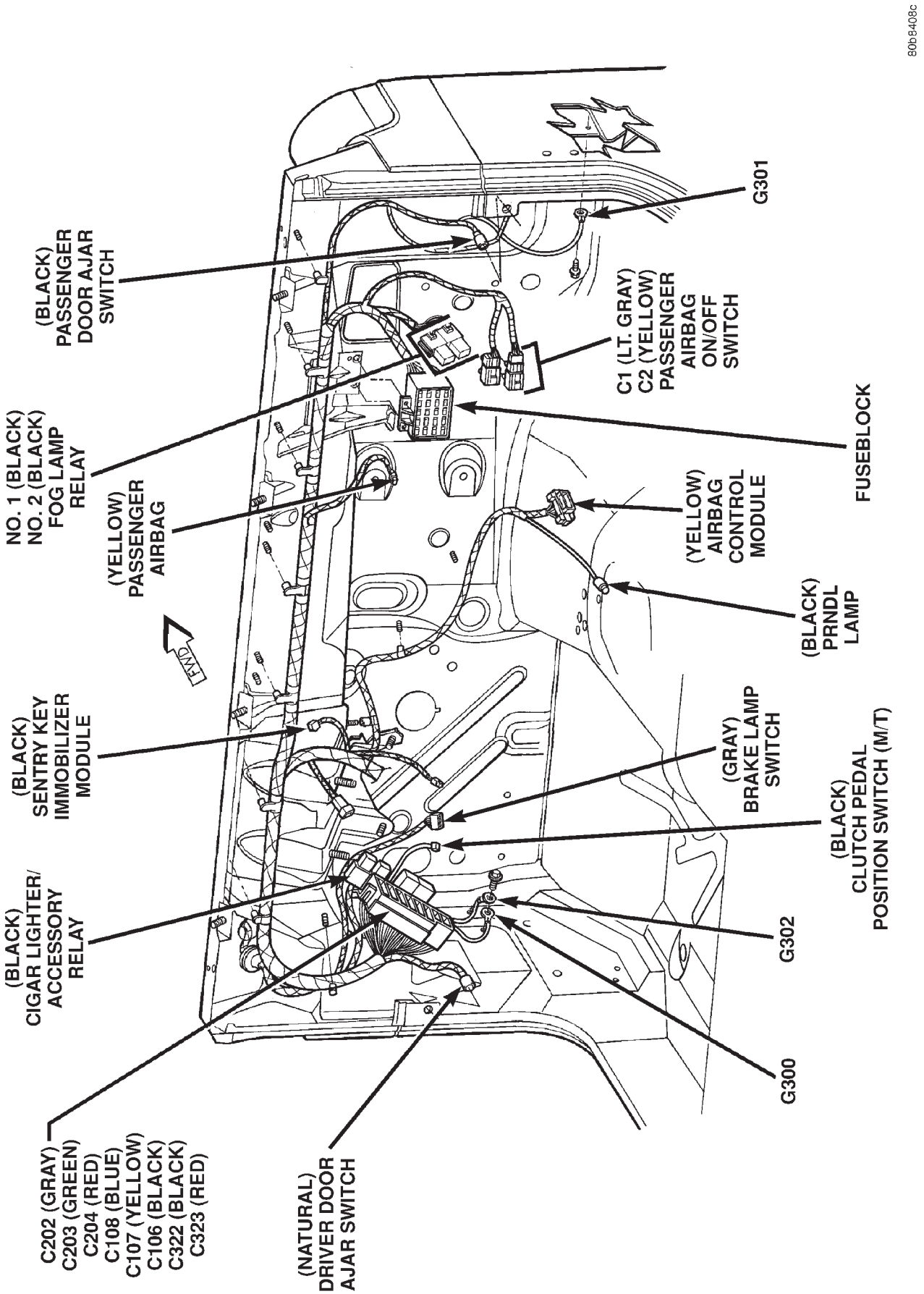


Fig. 15 Dash Panel Connectors—LHD

DESCRIPTION AND OPERATION (Continued)

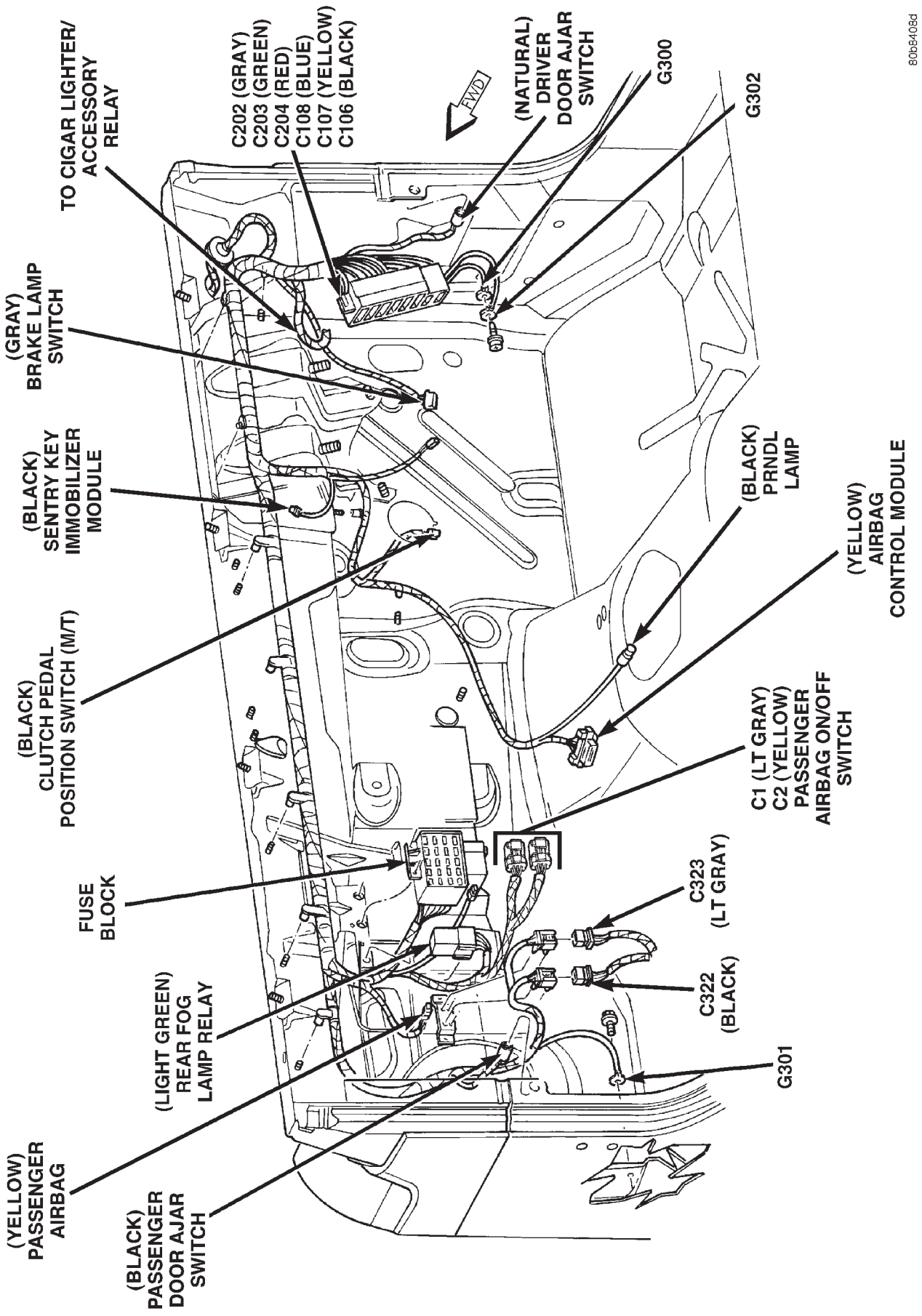


Fig. 16 Dash Panel Connectors—RHD

DESCRIPTION AND OPERATION (Continued)

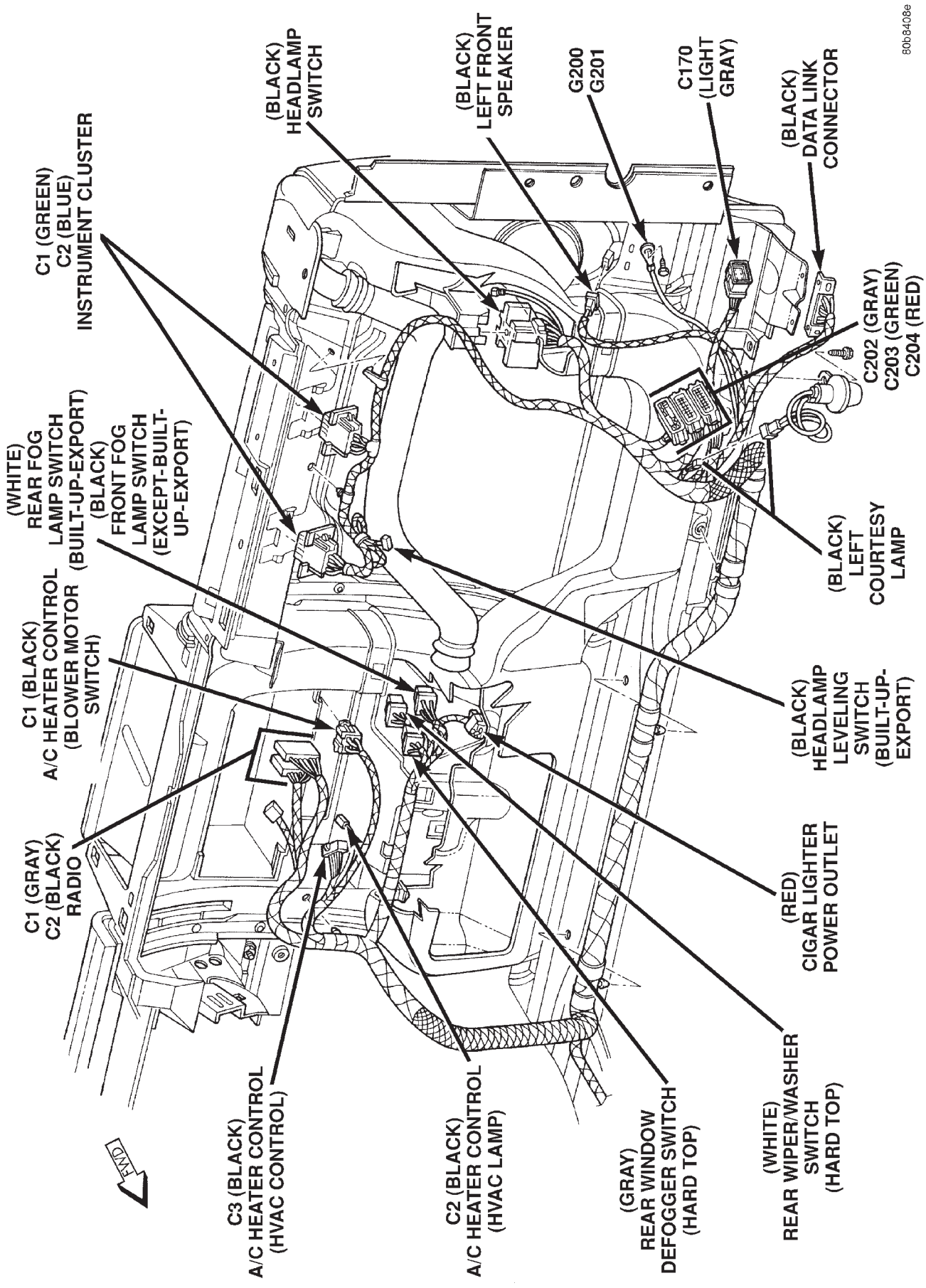


Fig. 17 Instrument Panel Wiring Connectors—LHD

DESCRIPTION AND OPERATION (Continued)

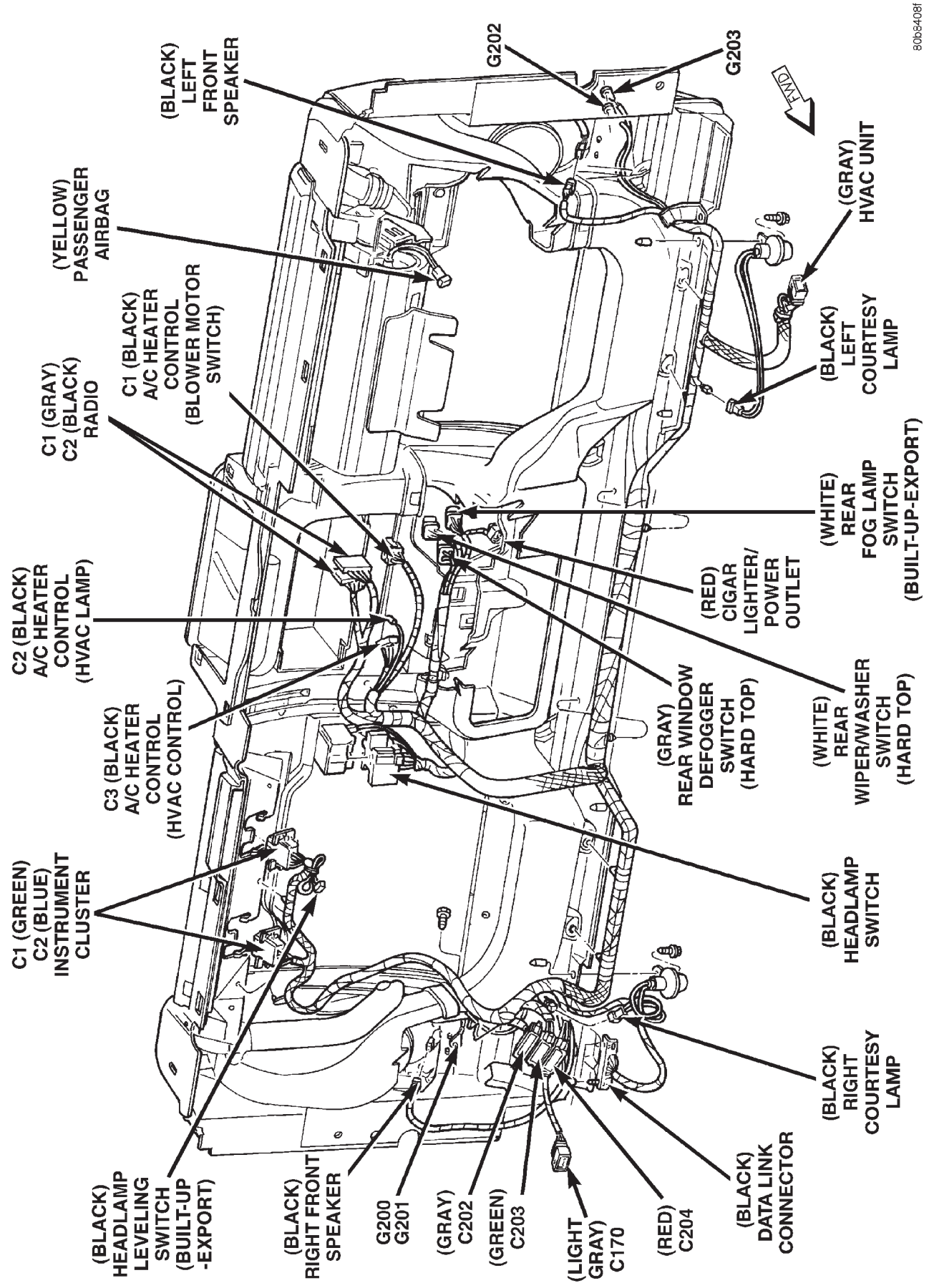


Fig. 18 Instrument Panel Wiring Connectors—RHD

DESCRIPTION AND OPERATION (Continued)

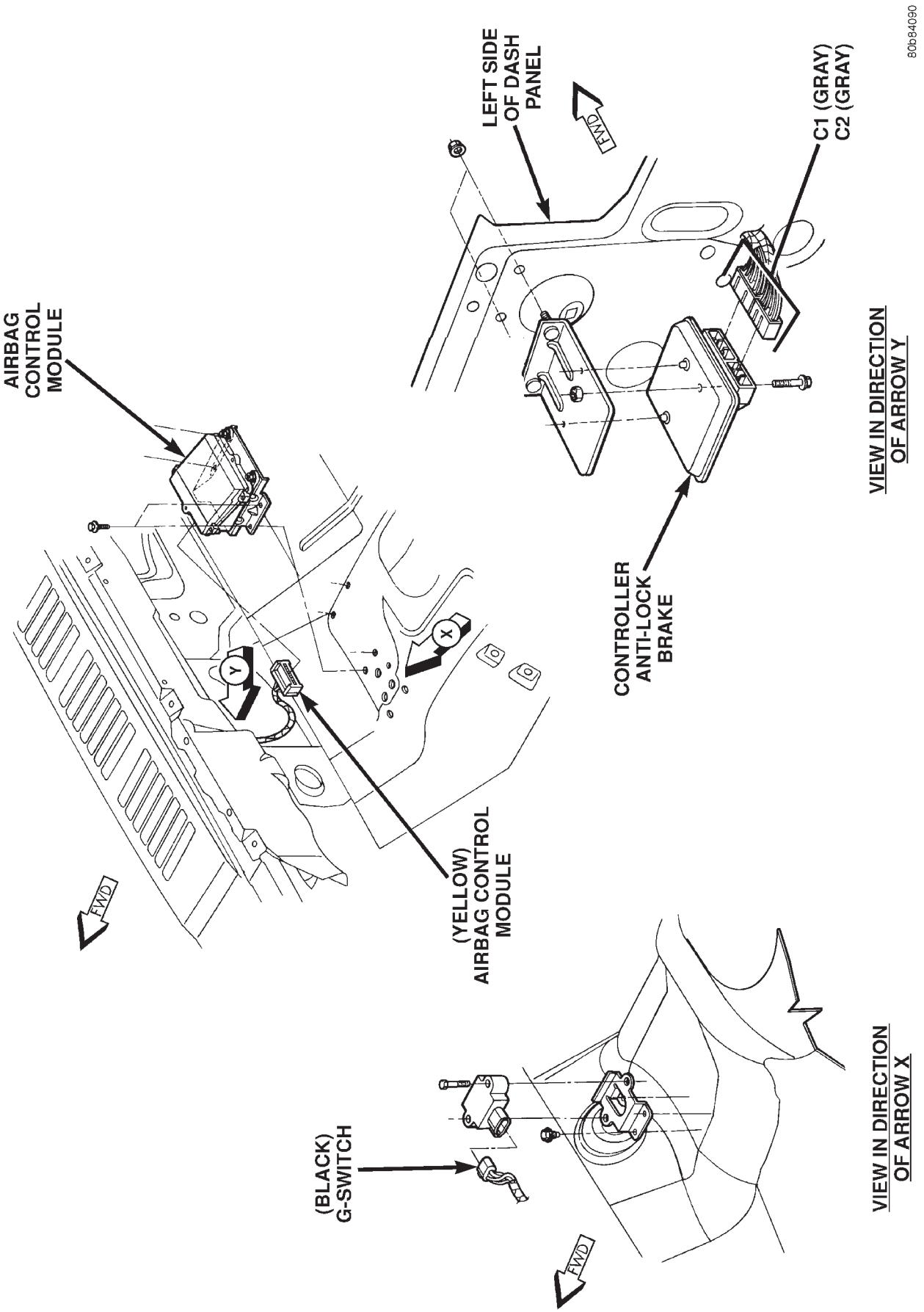


Fig. 19 Airbag Control Module and Controller, Antilock Brakes—LHD

DESCRIPTION AND OPERATION (Continued)

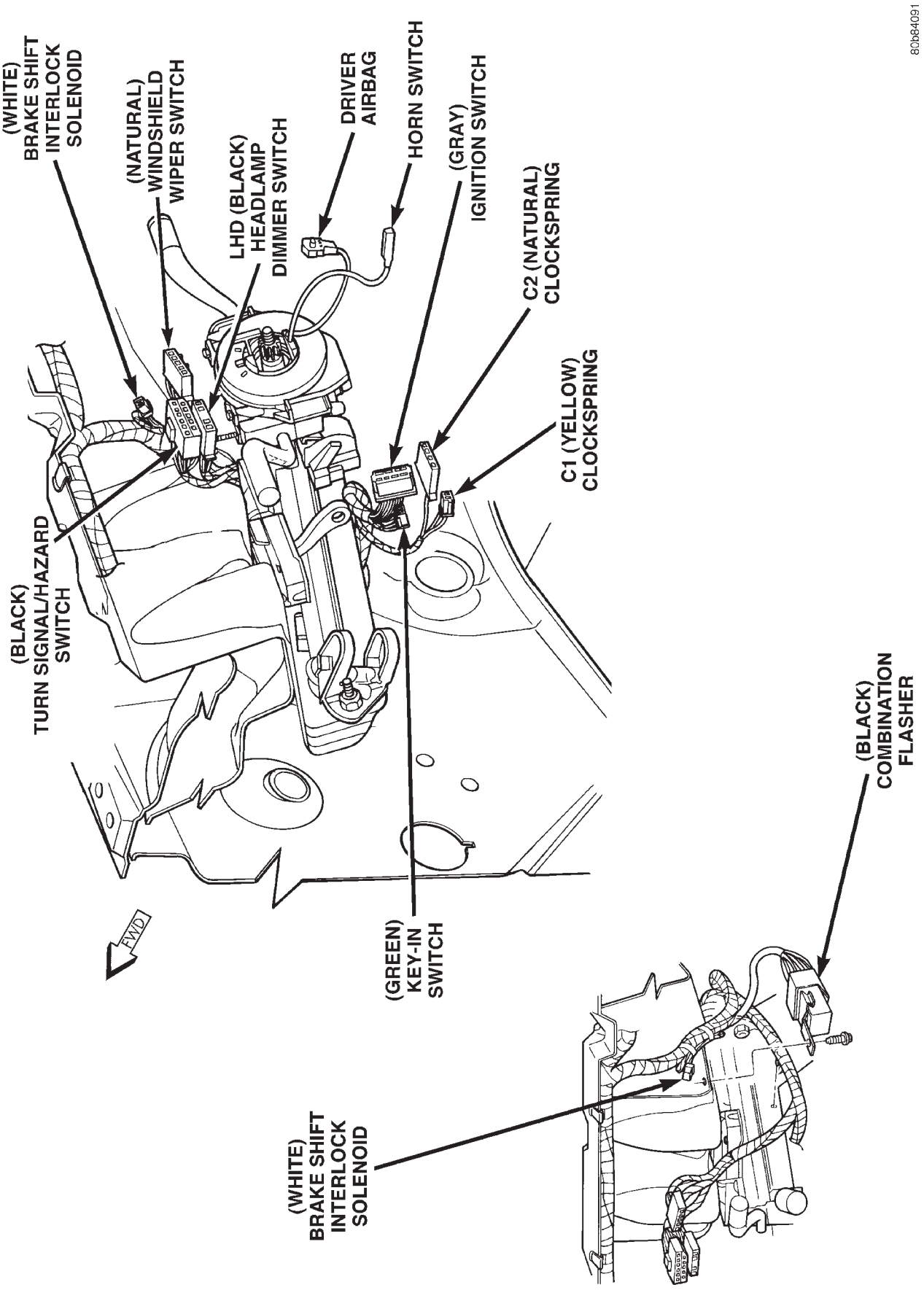


Fig. 20 Steering Column Connectors

DESCRIPTION AND OPERATION (Continued)

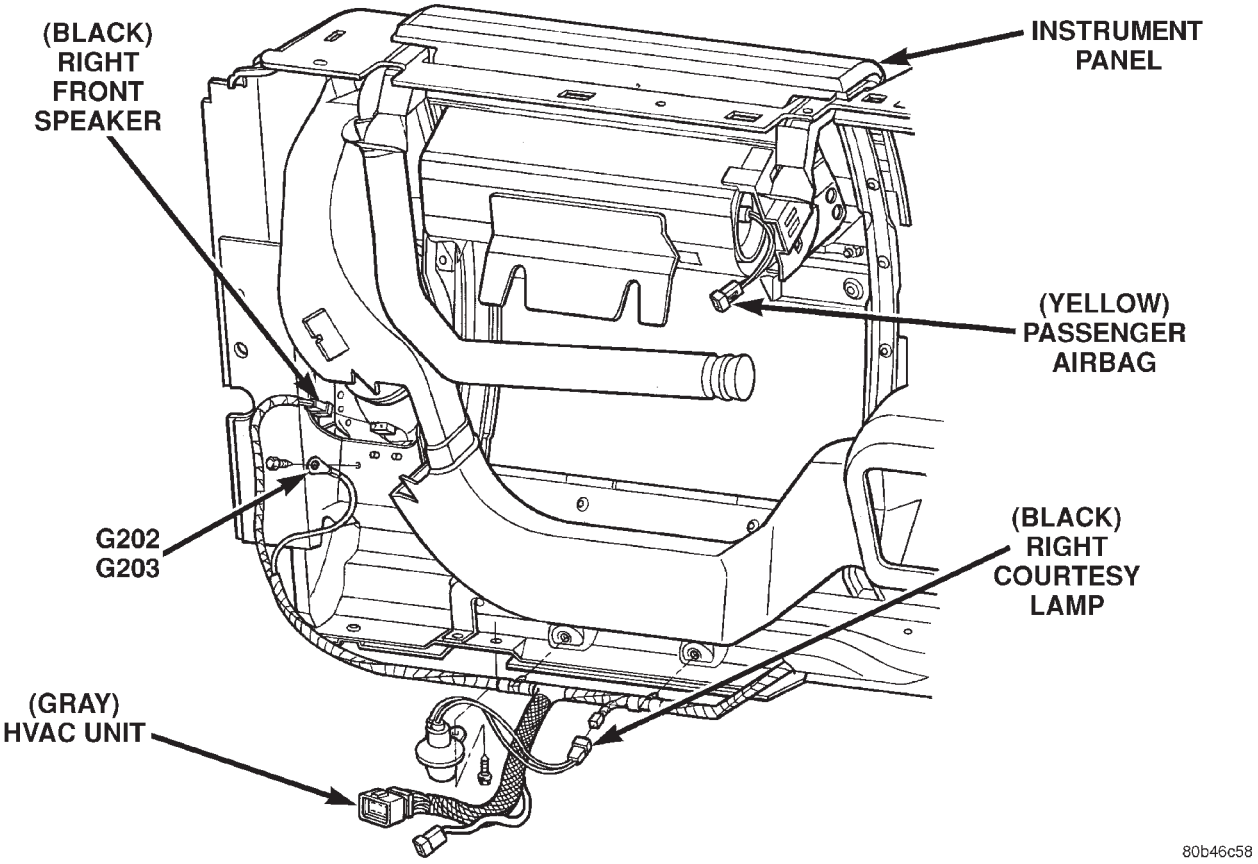


Fig. 21 Instrument Panel Connectors—Right Side, LHD

DESCRIPTION AND OPERATION (Continued)

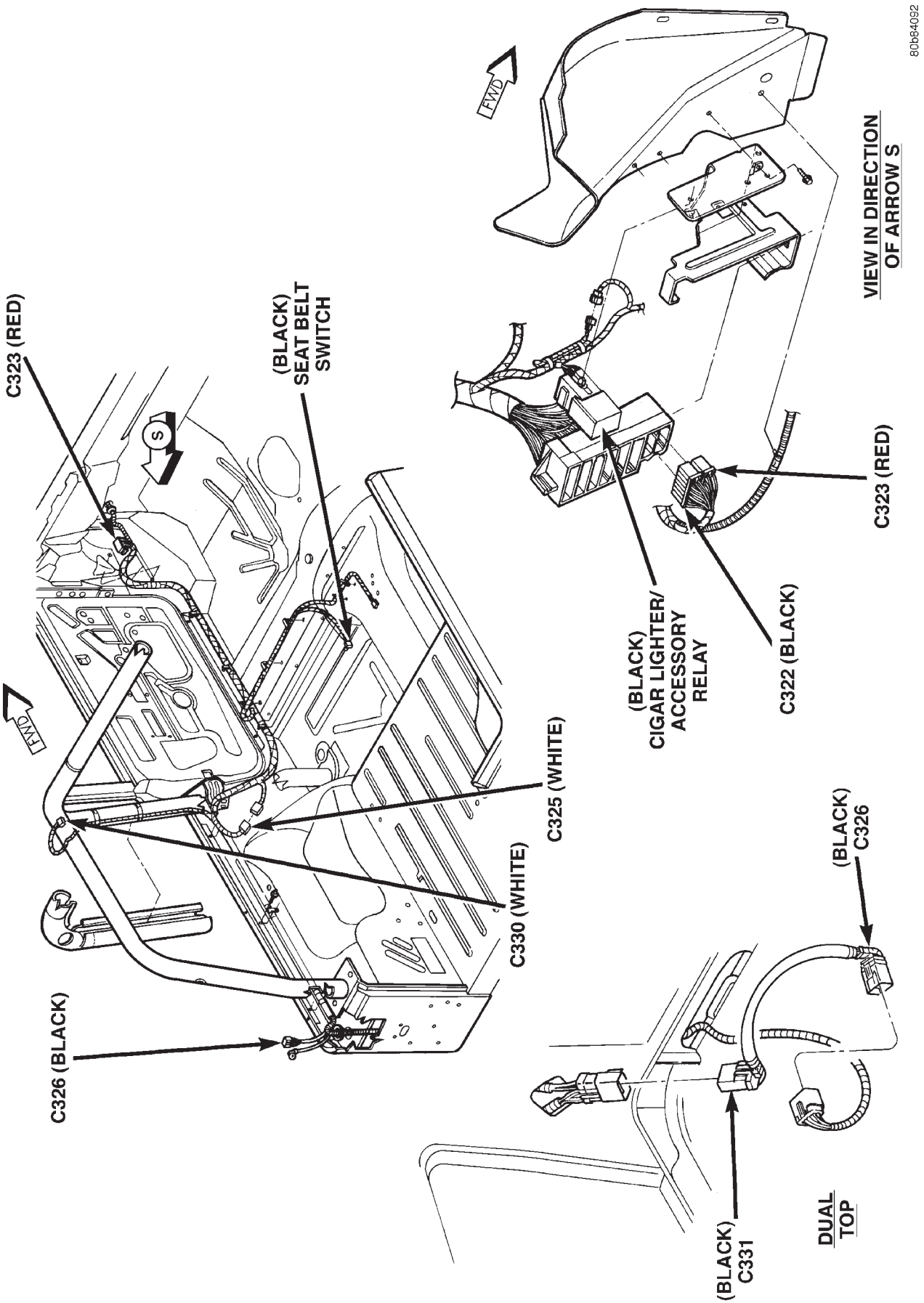


Fig. 22 Body Connectors—LHD

DESCRIPTION AND OPERATION (Continued)

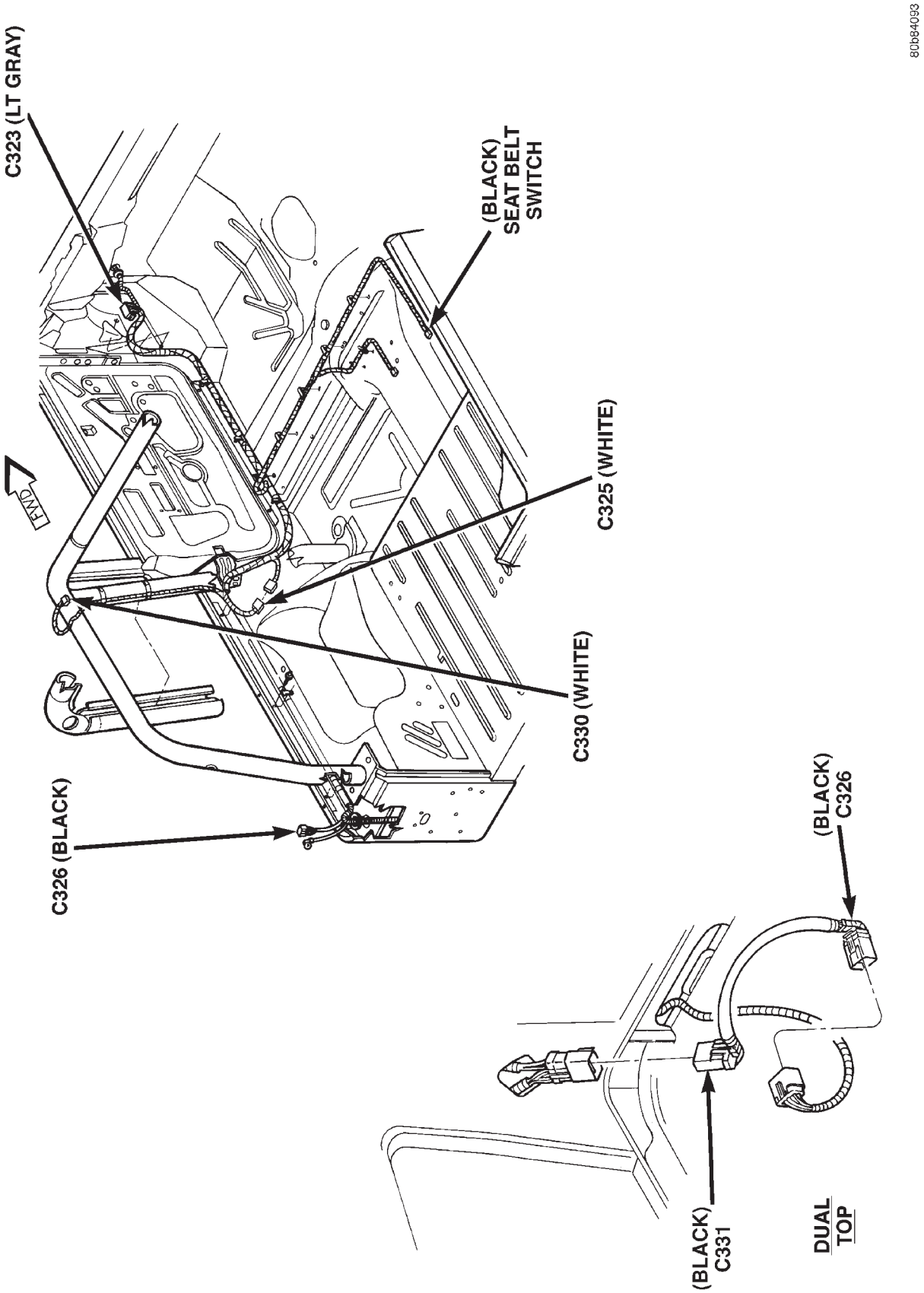


Fig. 23 Rear Body Wiring Connectors—RHD

DESCRIPTION AND OPERATION (Continued)

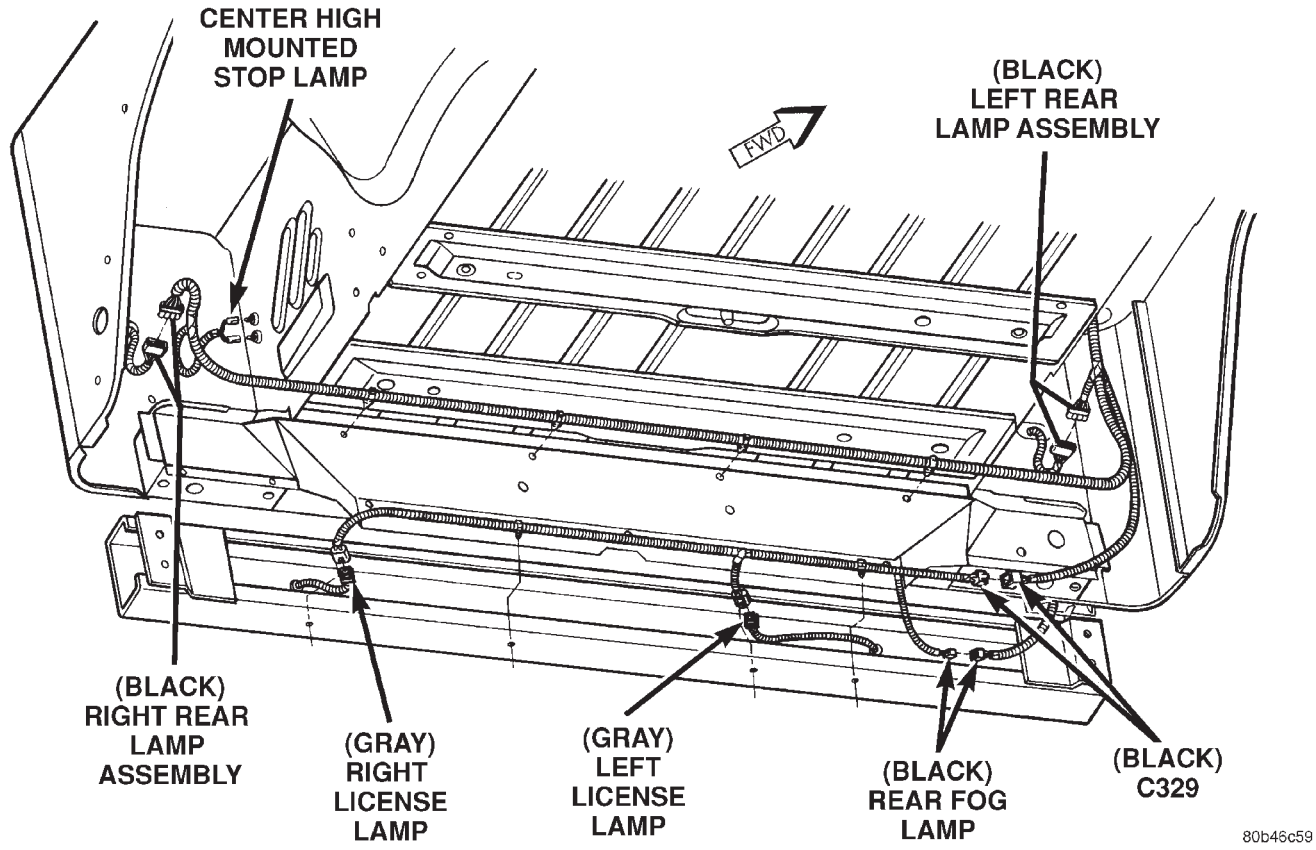


Fig. 24 Rear Under Body Wiring Connectors—LHD

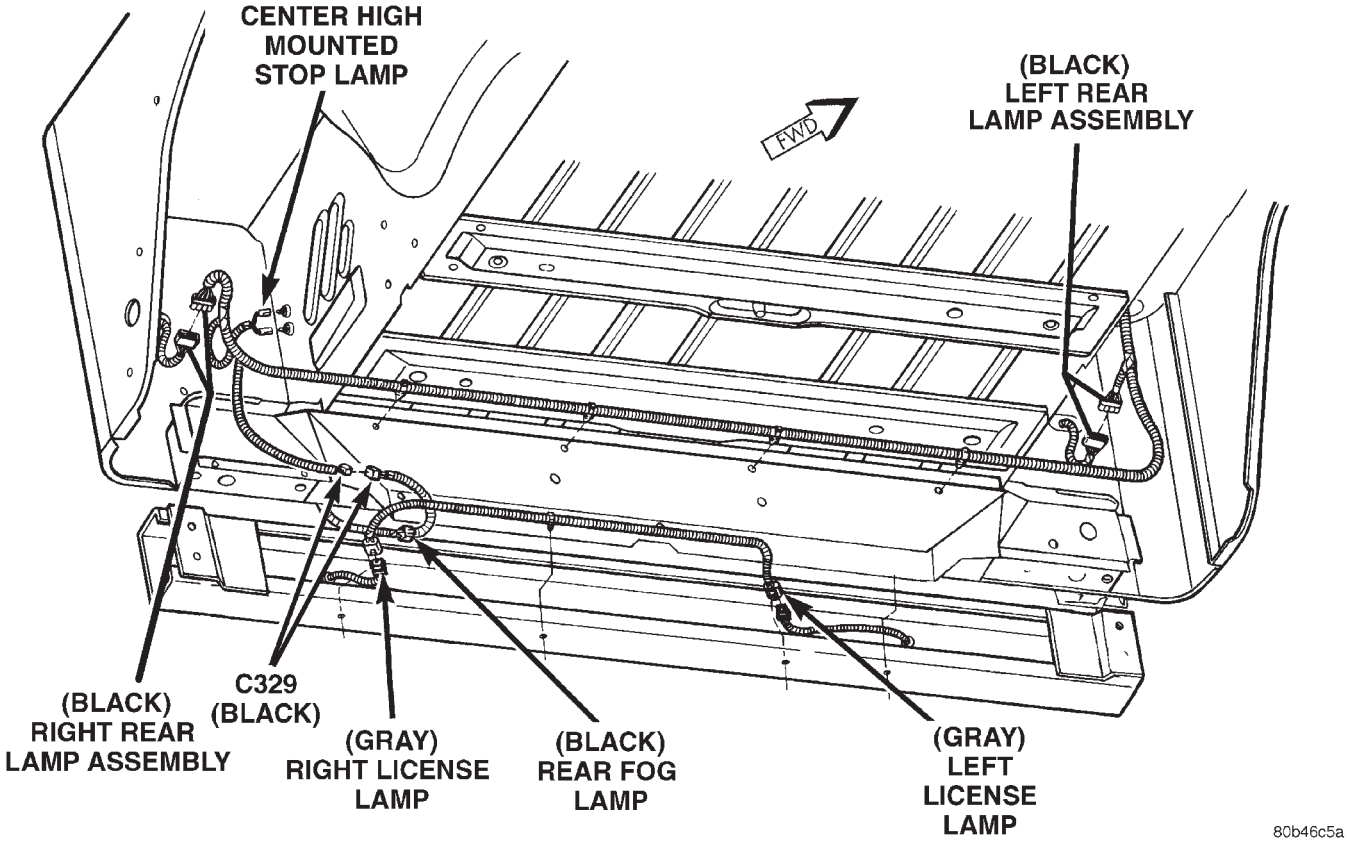


Fig. 25 Rear Under Body Wiring Connectors—RHD

8W-95 SPLICE LOCATIONS

DESCRIPTION AND OPERATION

INTRODUCTION

This section provides illustrations identifying the general location of the splices in this vehicle. A splice index is provided. Use the wiring diagrams in each section for splice number identification. Refer to the index for proper splice number.

SPLICE LOCATIONS

For splices that are not shown in the figures in this section, an N/S is placed in the Fig. column.

Splice Number	Location	Fig.
S101 (LHD)	Near T/O for Powertrain Control Module	2
S101 (RHD)	Near T/O for Power Distribution Center	3
S102	Near T/O for G100	2, 3
S103 (LHD)	Near T/O for G101	2
S103 (RHD)	Near T/O for Battery Temperature Sensor	3
S104	Near T/O for C110	2
S105 (LHD)	Near Grommet on Left Side of Dash Panel	2
S105 (RHD)	Near T/O for C110	3
S106	Near T/O for Ground G100	2
S107	Near T/O for G101	2
S108 (LHD)	Near T/O for Underhood Lamp	2
S108 (RHD)	Near T/O for C110	3
S109	Near T/O for C103 and C104	2
S110	Near T/O for C103 and C104	2
S112	Near Controller Antilock Brake	2
S114	Near ABS Pump Motor T/O	2
S115 (Except Built-Up-Export)	Near T/O for Duty Cycle Evap/Purge Solenoid	1
S116 (Except Built-Up-Export)	Near T/O for High Note Horn	1
S117	Near T/O for Windshield Washer Pump Motor	1
S118	Near Left Headlamp T/O	1
S119	Left Side Radiator Closure Panel	1
S122 (Built-Up-Export)	Near T/O for Left Front Turn Signal Lamp At Grommet	N/S
S122 (Except Built-Up-Export)	Near T/O for Left Front Park/Turn Signal Lamp	N/S
S123 (LHD)	Near T/O for G105	6
S123 (2.5L) (RHD)	Near T/O for C103	N/S
S123 (4.0L) (RHD)	Near T/O for Fuel Injector NO. 6	7
S124 (LHD)	Near T/O for G105	6
S124 (RHD)	Near T/O for C103	N/S
S125 (Built-Up-Export)	Near T/O for Right Front Turn Signal Lamp At Grommet	N/S
S125 (Except Built-Up-Export)	Near T/O for Right Front Park/Turn Signal Lamp At Grommet	N/S
S126 (LHD)	Near T/Os for Fuel Injectors	6
S126 (2.5L) (RHD)	Near T/O for Fuel Injector NO. 4	7
S126 (4.0L) (RHD)	Near T/O for Fuel Injector NO. 6	7
S127	Near T/O for Idle Air Control Motor	4, 5

DESCRIPTION AND OPERATION (Continued)

Splice Number	Location	Fig.
S127 (2.5L) (RHD)	Between Fuel Injector NO. 2 and Fuel Injector NO. 3	5
S128	Between Fuel Injector NO. 2 and Fuel Injector NO. 3	4, 5
S129 (LHD)	Near T/O for Fuel Injectors	6
S129 (RHD)	Near T/O for C104	7
S130 (LHD)	Near T/O for Fuel Injectors	6
S130 (RHD)	Near T/O for C103	N/S
S131 (LHD)	Near T/O for ABS Pump Motor	2
S131 (RHD)	Near T/O for C110	3
S132	Near T/O for Oxygen Sensor 1/2 Downstream	6, 7
S133 (LHD)	Near T/O for G105	6
S133 (RHD)	Near T/O For C104	7
S134	Near T/O for Oxygen Sensor 1/2 Downstream	6, 7
S135	Near T/O for Oxygen Sensor 1/2 Downstream	6, 7
S136	In Battery Harness Near PDC	N/S
S138 (Built-Up-Export)	Near T/O for Right Headlamp Leveling Motor	1
S141 (Built-Up-Export)	Near T/O for Left Front Turn Signal Lamp	N/S
S141 (Except Built-Up-Export)	Near T/O for Left Front Park/Turn Signal Lamp	N/S
S142 (Built-Up-Export)	Near T/O for Right Front Turn Signal Lamp At Grommet	N/S
S142 (Except Built-Up-Export)	Near T/O for Right Front Park/Turn Signal Lamp at Grommet	N/S
S143	Near T/O for Left Front Park/Turn Signal Lamp	N/S
S144	Near T/O for Right Front Park/Turn Signal Lamp	N/S
S146	Near T/O for Powertrain Control Module	2
S147 (LHD)	Near T/O for Powertrain Control Module	2
S147 (RHD)	Right Side of Engine Compartment Near Grommet	3
S150 (Built-Up-Export)	Near T/O for Right Headlamp Leveling Motor	1
S151 (Built-Up-Export)	Near T/O for Left Headlamp Ground	1
S202	Center Rear of Instrument Panel	10, 11
S204	Center Rear of Instrument Panel	10, 11
S206	Center Rear of Instrument Panel	10, 11
S207	Near Cigar Lighter T/O	10, 11
S301 (LHD)	Near Grommeted T/O to Windshield Wiper Motor	8
S301 (RHD)	Near T/O for Passenger Airbag	9
S302	Near Grommeted T/O for Windshield Wiper Motor	8, 9
S303	Near Grommeted T/O for Windshield Wiper Motor	8, 9
S304	Near Grommeted T/O for Windshield Wiper Motor	8, 9
S306	Near T/O for Airbag Control Module	8, 9
S307	Near T/O for Airbag Control Module	8, 9
S309	Front of Left Rear Wheel Well	12, 13
S310	Left Rear Quarter Panel, Near Body Grommet	12, 13
S311	Near Left Tail Lamp Connector	12, 13
S313	Front of Left Rear Wheel Well	12, 13
S314	Front of Left Rear Wheel Well	12, 13
S315	Near Right Tail Lamp Connetor	12, 13

DESCRIPTION AND OPERATION (Continued)

Splice Number	Location	Fig.
S316	In T/O for Rear Fog Lamp	12, 13
S317	Near T/O for Left License Lamp	12, 13
S320 (LHD)	Near T/O for 100 way Connector	8
S320 (RHD)	Near Passenger Airbag On/Off Switch	9
S330 (LHD)	In T/O for Fuse Block	8
S330 (RHD)	Near Passenger Airbag On/Off Switch	9
S331	Near T/O for Airbag Control Module	8, 9
S332	Near T/O for Cigar Lighter/Accessory Relay	8, 9
S335	Near Left Tail Lamp Connector	12
S400	Near T/O for Rear Window Defogger Feed	N/S
S401	Near T/O for Rear Window Defogger Feed	N/S

DESCRIPTION AND OPERATION (Continued)

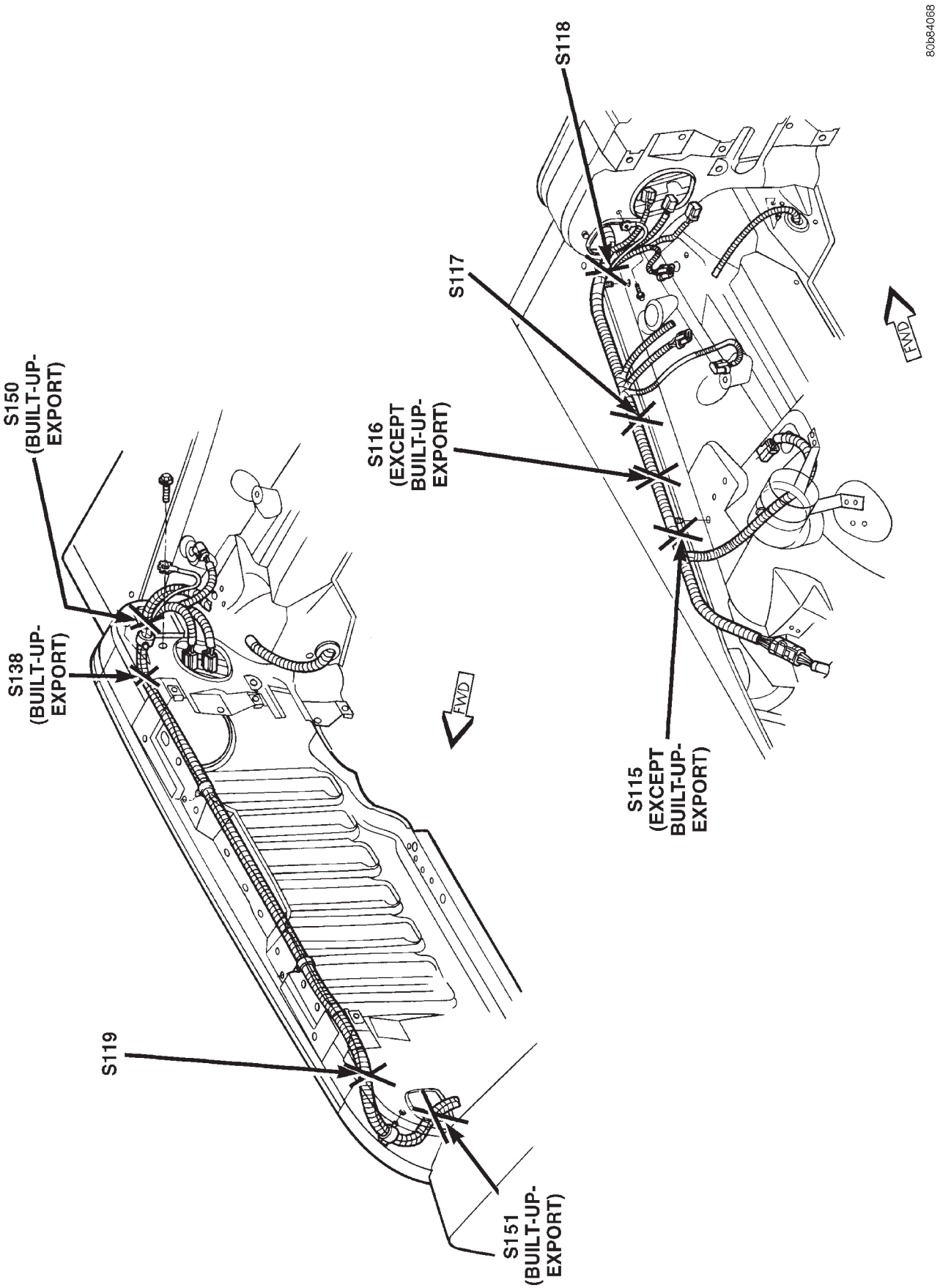


Fig. 1 Engine Compartment Splices—Front

DESCRIPTION AND OPERATION (Continued)

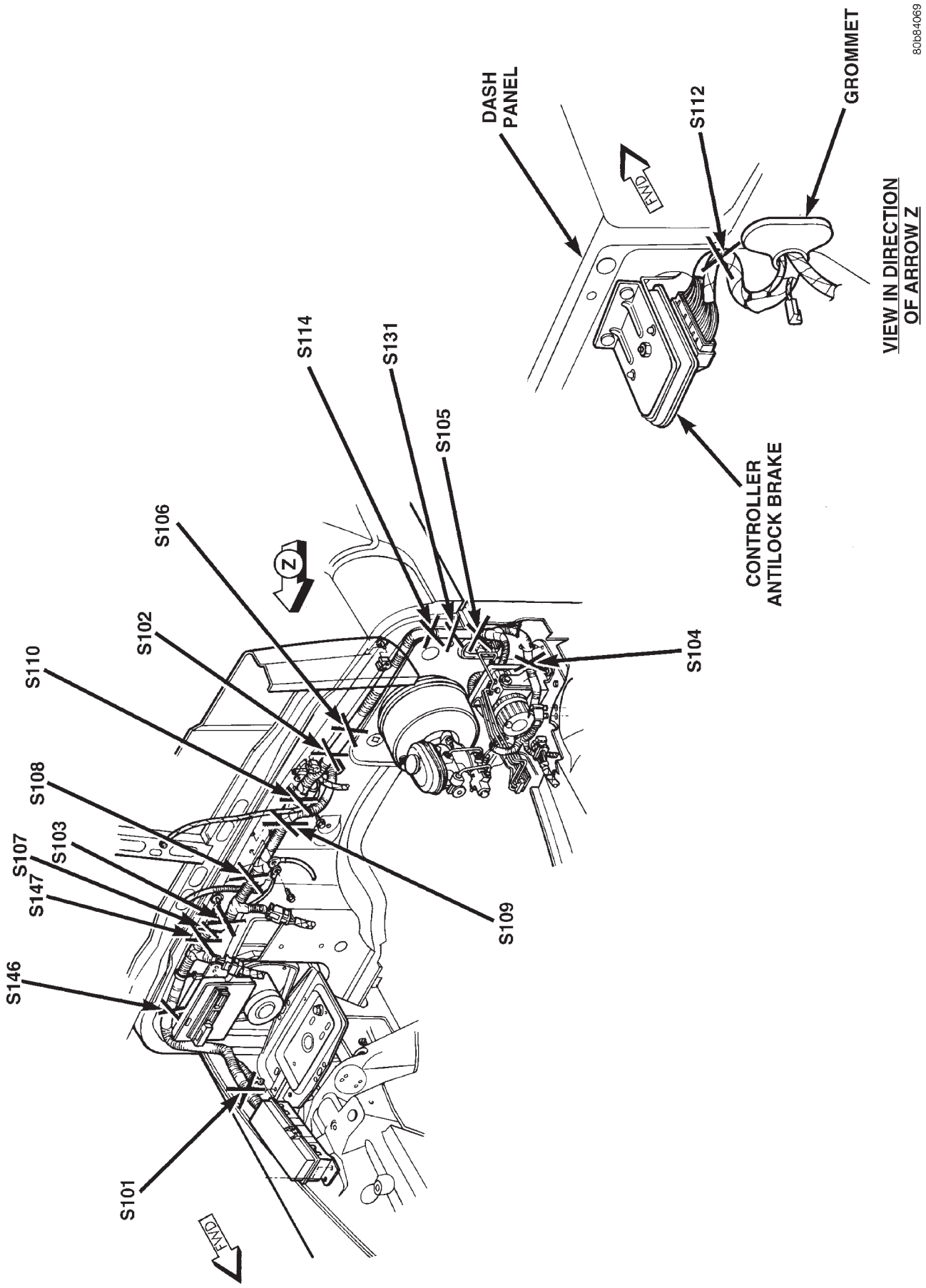


Fig. 2 Engine Compartment Splices—Rear,LHD

DESCRIPTION AND OPERATION (Continued)

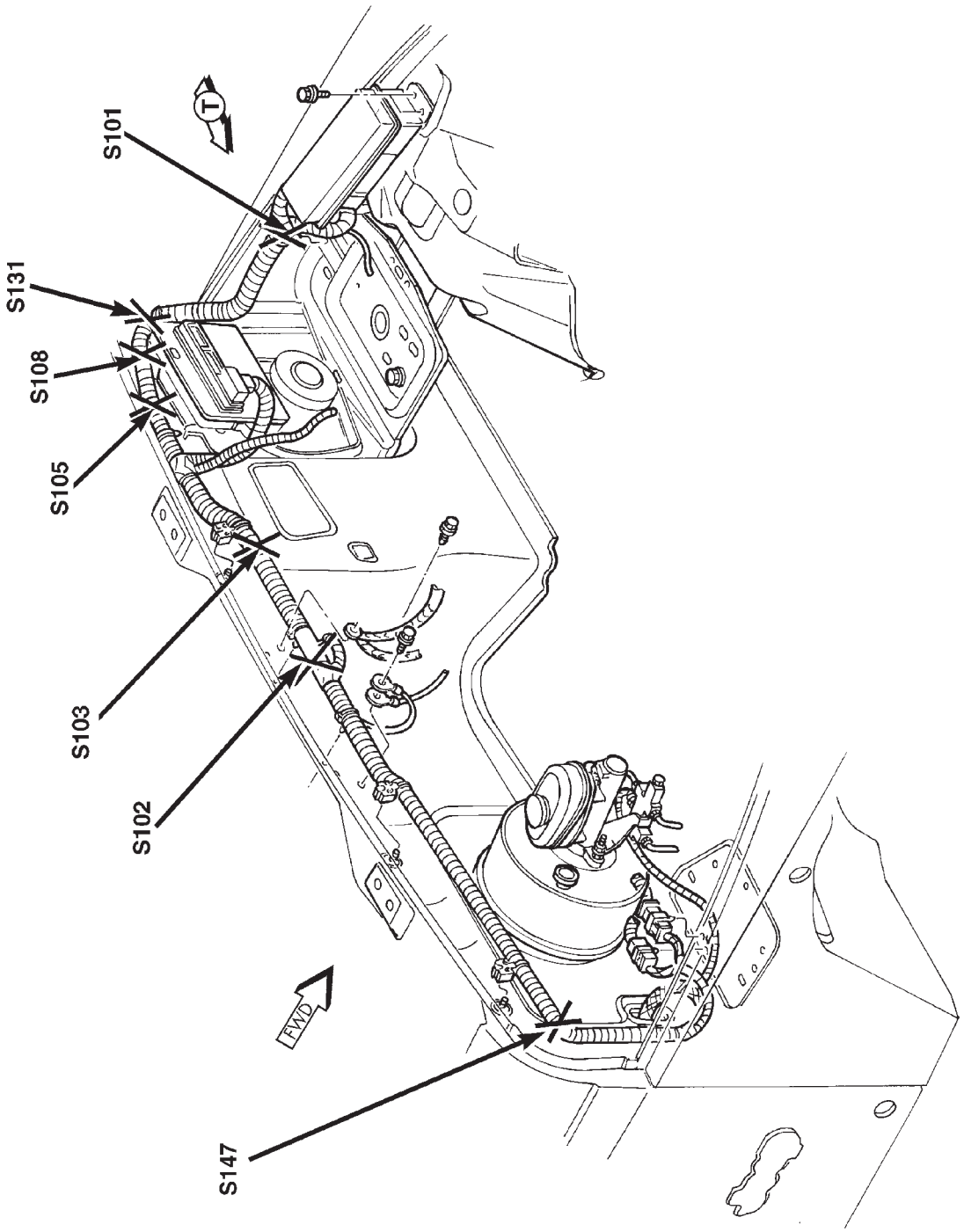


Fig. 3 Engine Compartment Splices—Rear,RHD

DESCRIPTION AND OPERATION (Continued)

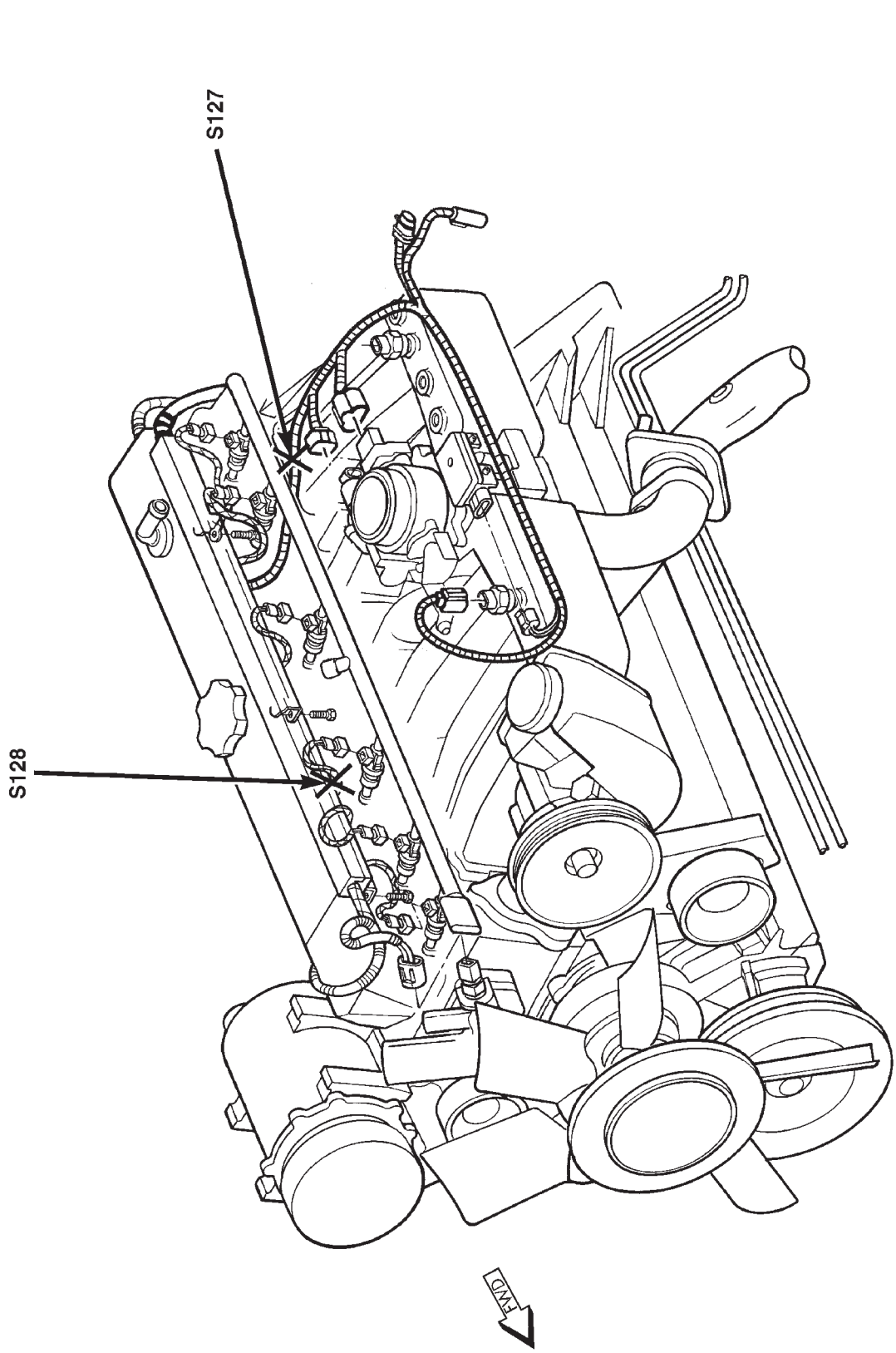


Fig. 4 Engine Wiring Splices—LHD

DESCRIPTION AND OPERATION (Continued)

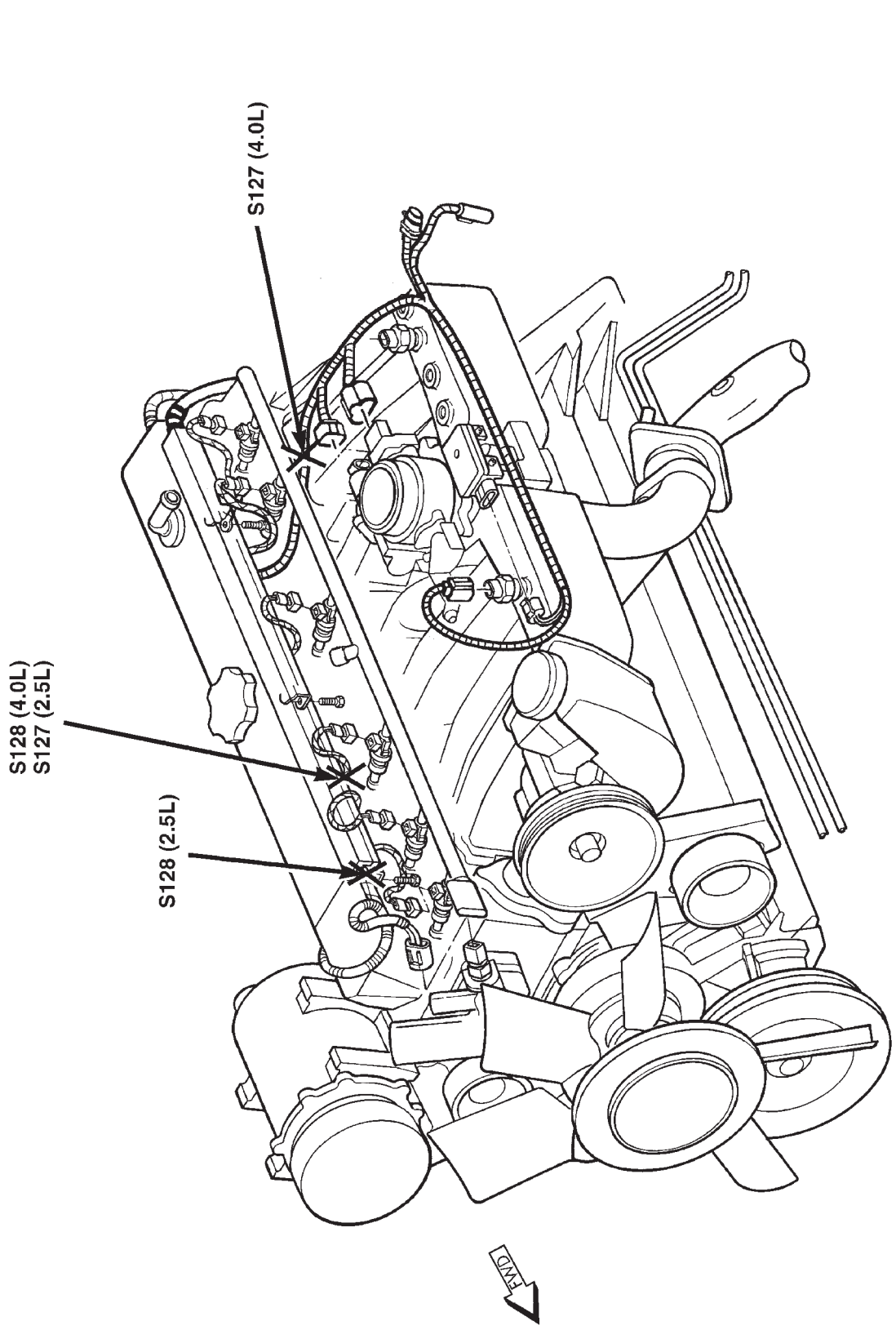


Fig. 5 Engine Wiring Splices—RHD

DESCRIPTION AND OPERATION (Continued)

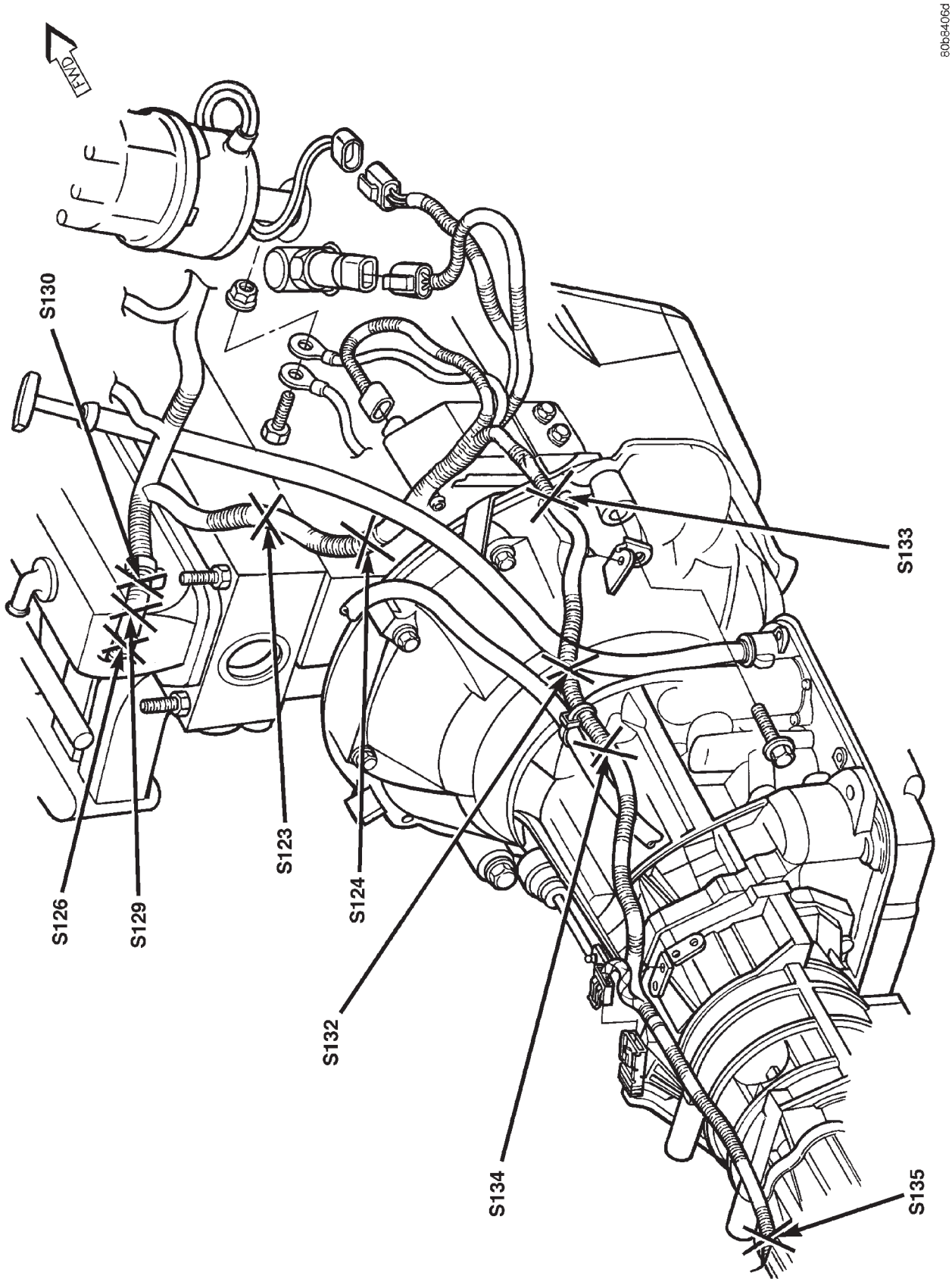


Fig. 6 Engine Wiring Splices—LHD

DESCRIPTION AND OPERATION (Continued)

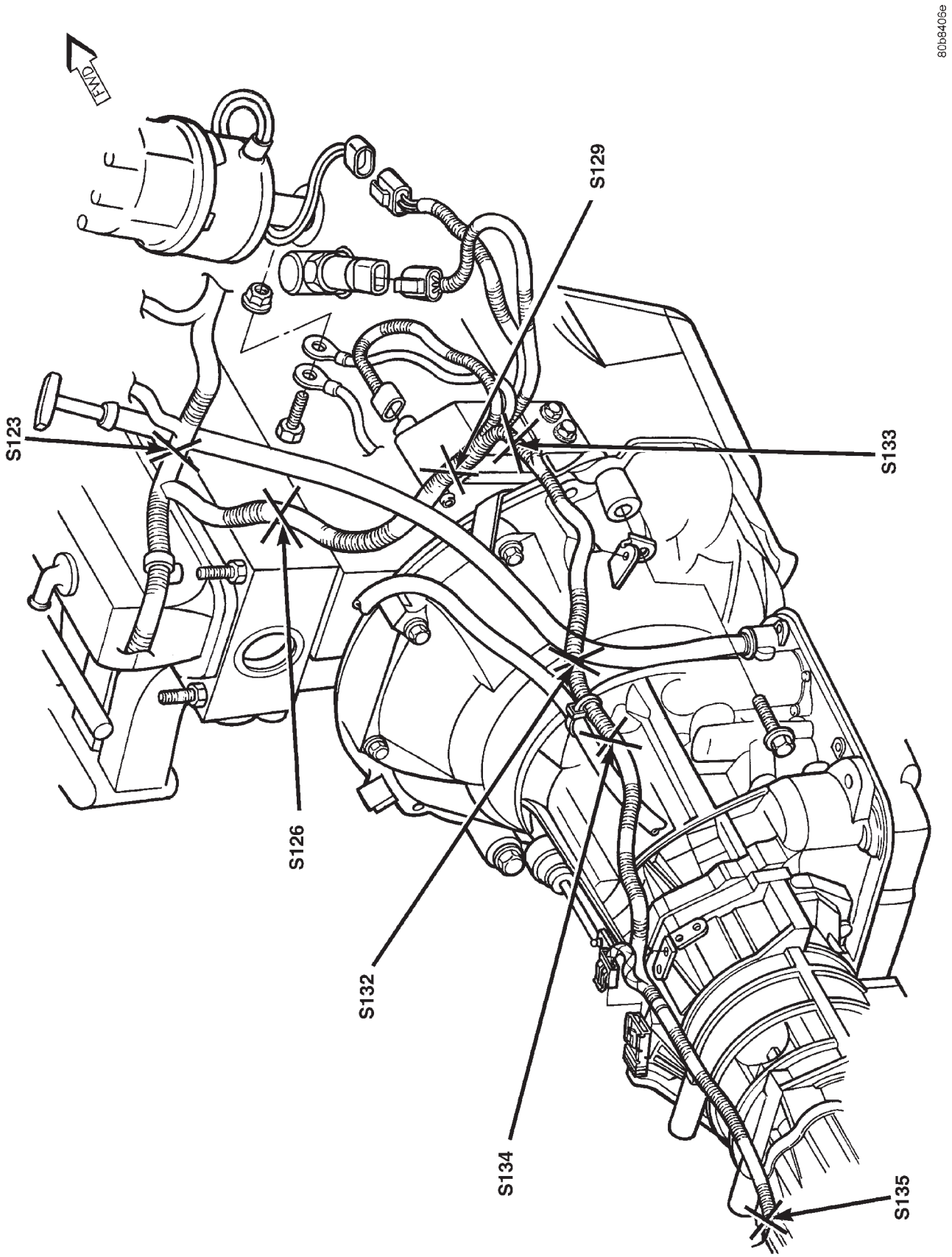


Fig. 7 Engine Wiring Splices—RHD

DESCRIPTION AND OPERATION (Continued)

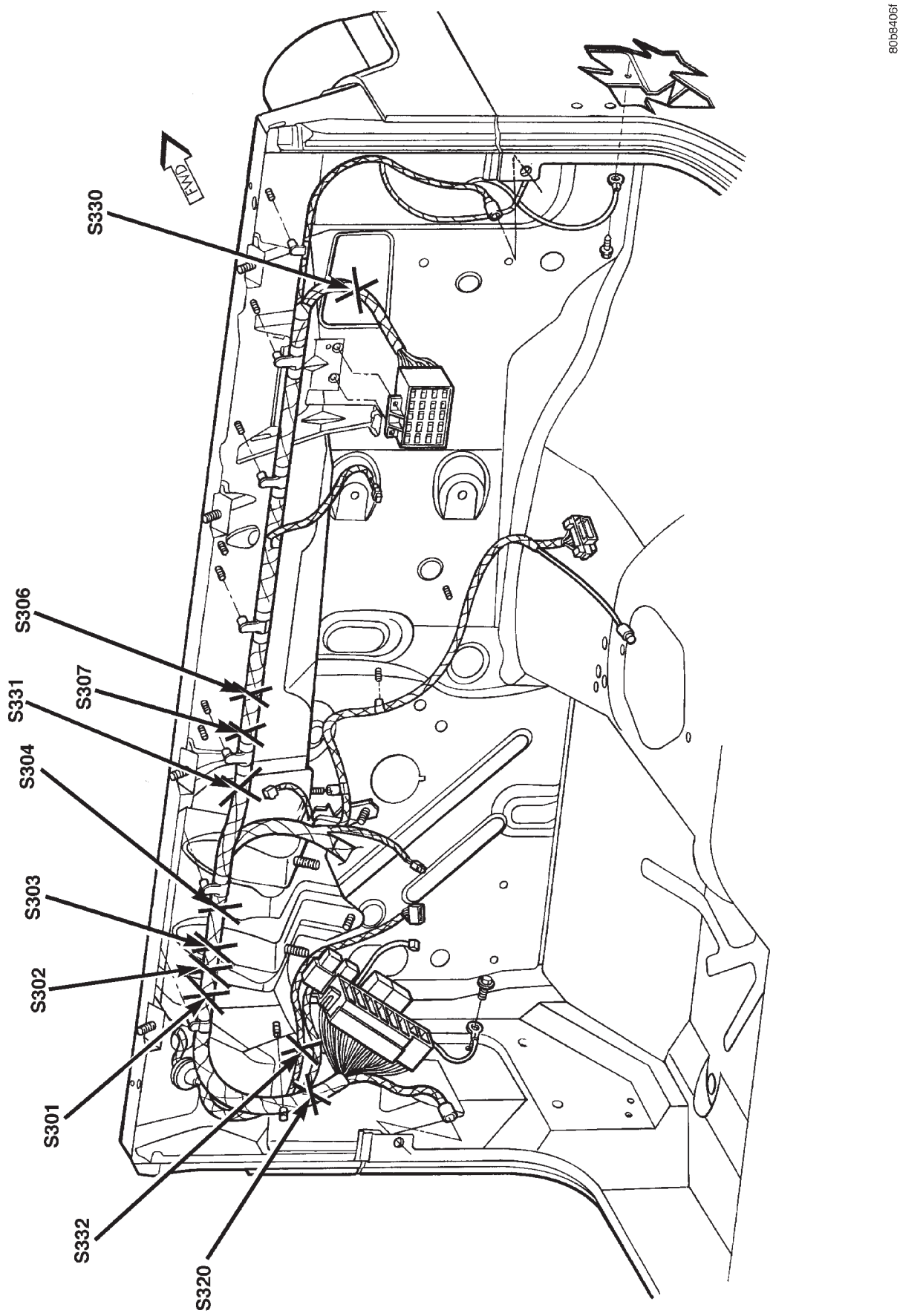


Fig. 8 Dash Panel Wiring Splices—LHD

DESCRIPTION AND OPERATION (Continued)

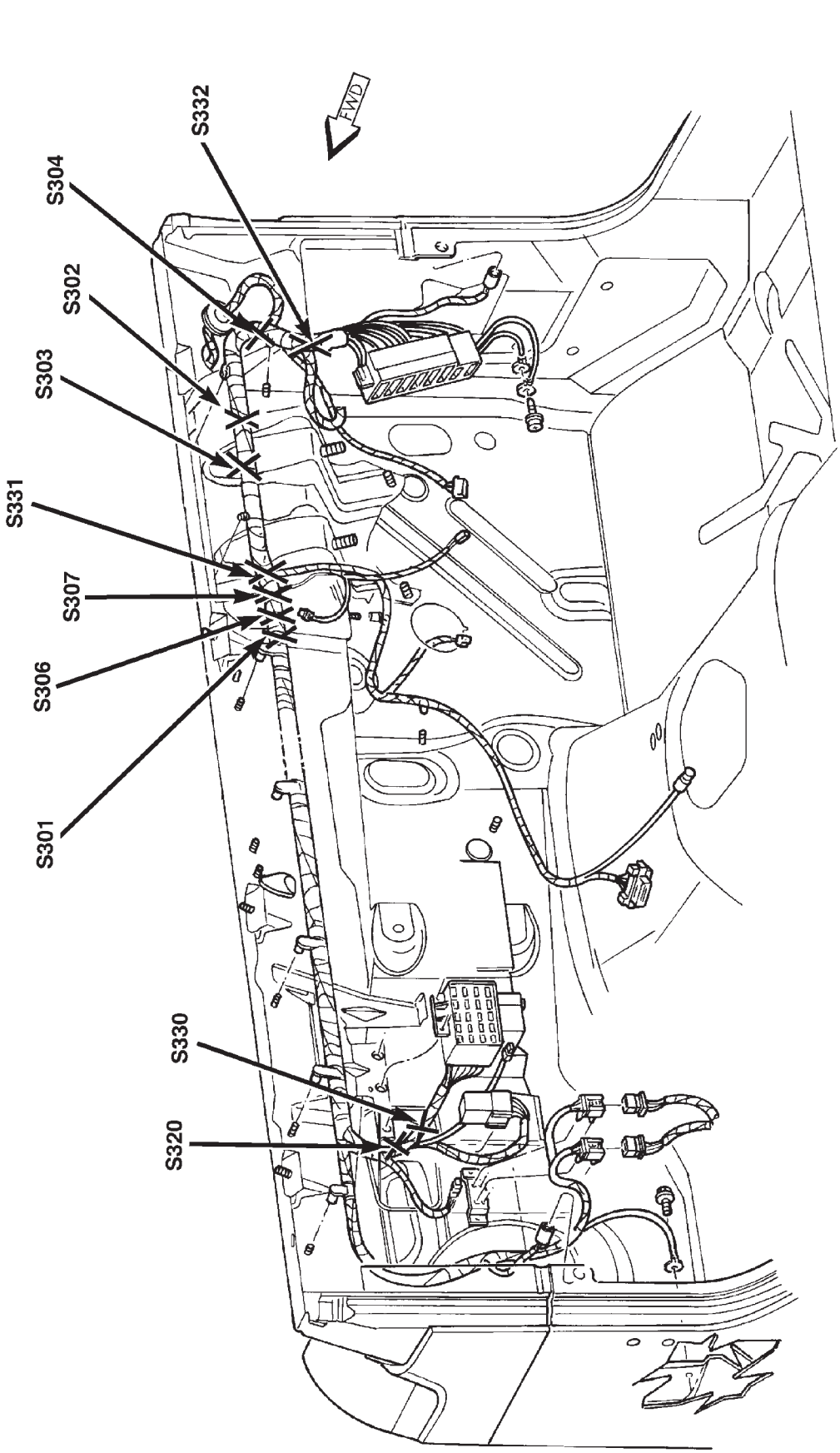


Fig. 9 Dash Panel Wiring Splices—RHD

DESCRIPTION AND OPERATION (Continued)

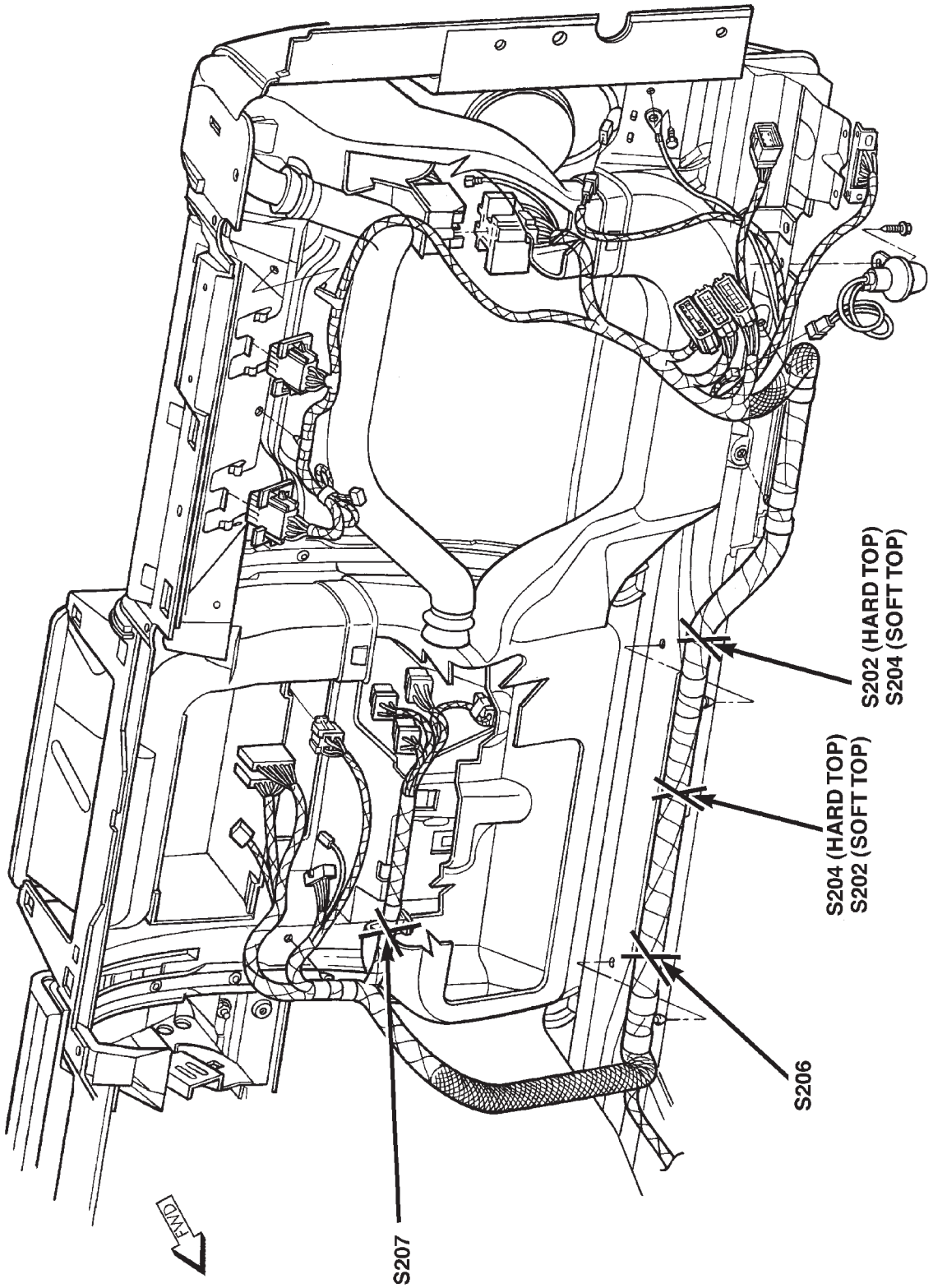


Fig. 10 Instrument Panel Wiring Splices—LHD

DESCRIPTION AND OPERATION (Continued)

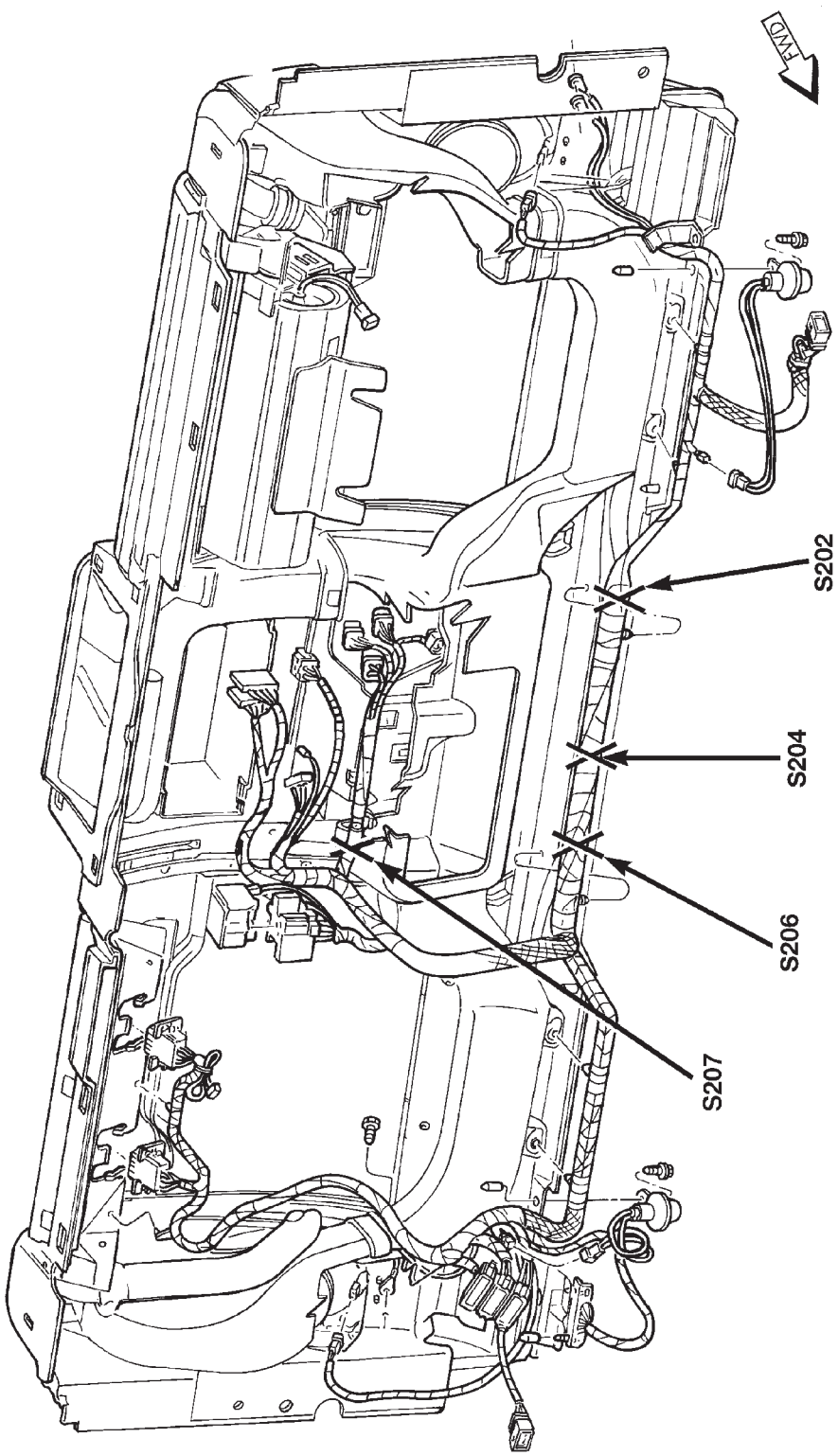


Fig. 11 Instrument Panel Wiring Splices—RHD

DESCRIPTION AND OPERATION (Continued)

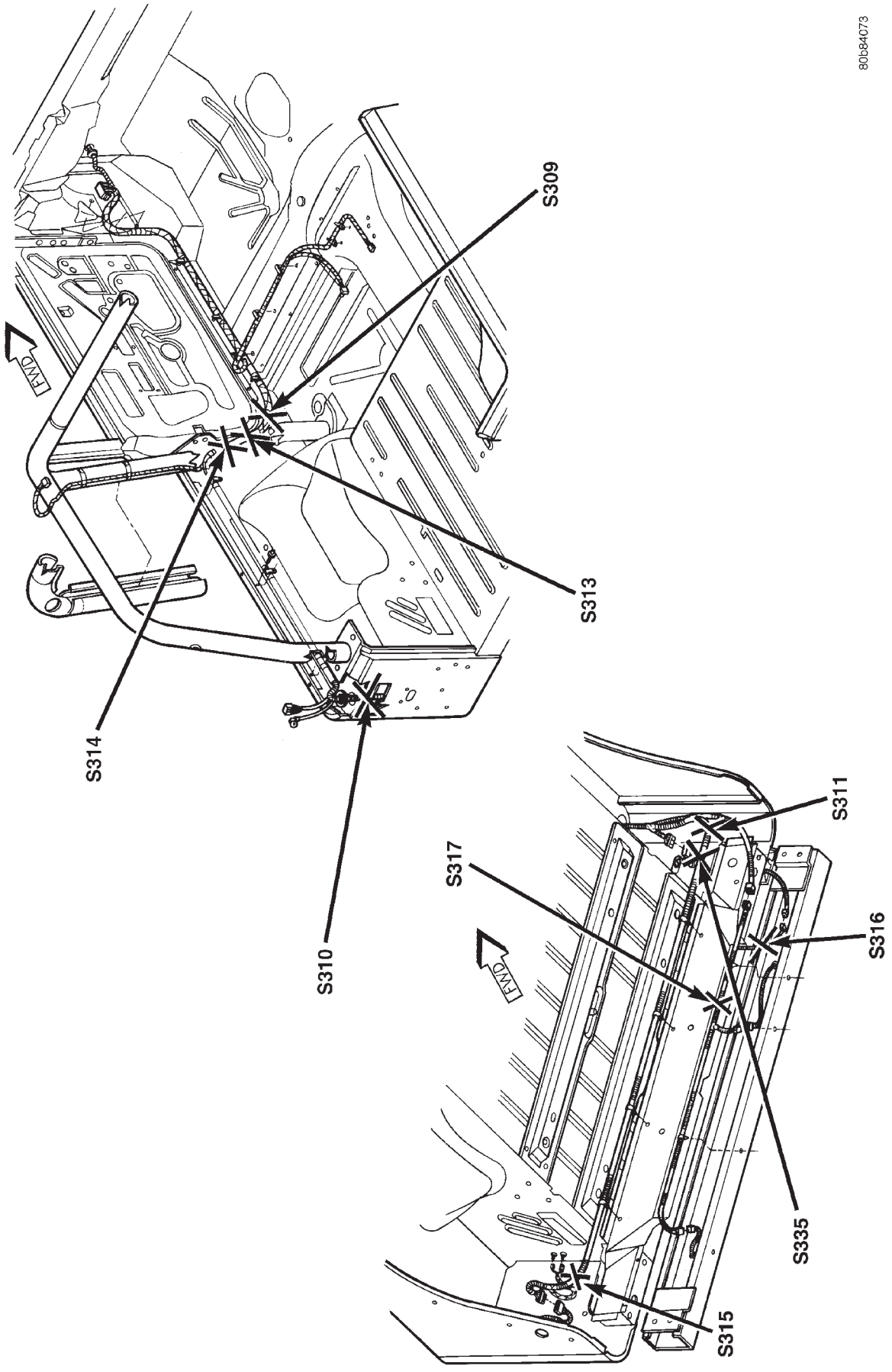


Fig. 12 Body Wiring Splices—LHD

DESCRIPTION AND OPERATION (Continued)

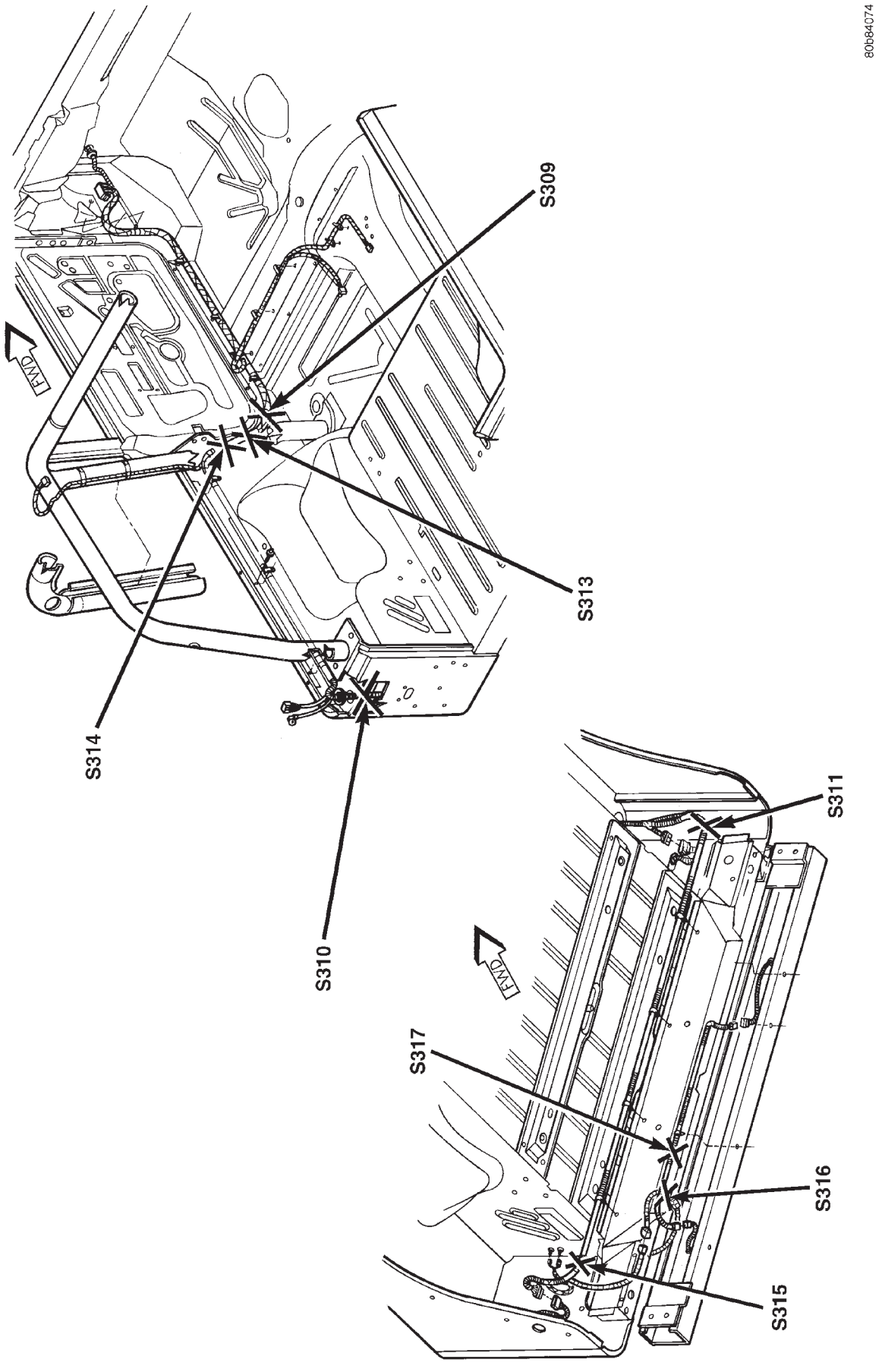


Fig. 13 Body Wiring Splices—RHD

BATTERY

CONTENTS

DESCRIPTION AND OPERATION

BATTERY

DESCRIPTION

A large capacity, low-maintenance storage battery is standard factory-installed equipment on this model. This battery is designed to provide a safe, efficient and reliable means of storing electrical energy in a chemical form. This means of energy storage allows the battery to produce the electrical energy required to operate the engine starting system, as well as to operate many of the other vehicle accessory systems for limited durations while the engine and/or the charging system are not operating.

The factory-installed low-maintenance battery has removable battery cell caps. Water can be added to this battery. The battery is not sealed and has vent holes in the cell caps (Fig. 1). The chemical composition within the low-maintenance battery reduces battery gassing and water loss, at normal charge and discharge rates.

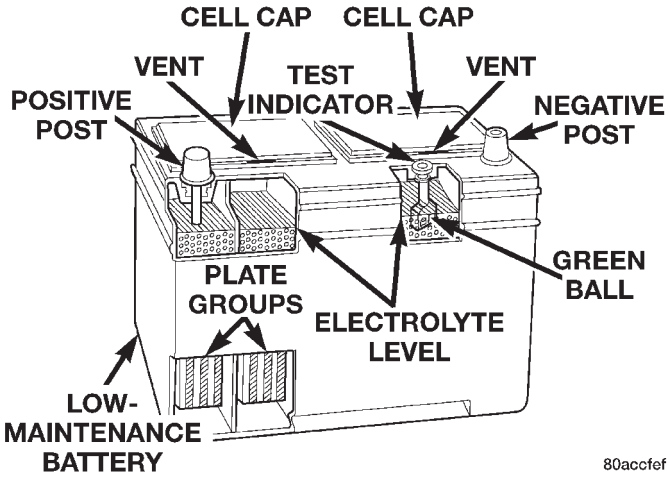


Fig. 1 Low-Maintenance Battery - Typical

Rapid loss of electrolyte can be caused by an overcharging condition. Be certain to diagnose the charging system before returning the vehicle to service. Refer to **Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for more information.

The factory-installed battery also has a built-in test indicator (hydrometer). The color visible in the sight glass of the indicator will reveal the battery condition. Refer to **Built-In Test Indicator** in the Diagnosis and Testing section of this group for more information.

This group covers only the battery diagnostic and service procedures. For battery maintenance schedules and jump starting procedures, see the owner's manual in the vehicle glove box, or refer to **Maintenance Schedules** and **Jump Starting, Towing and Hoisting** in Group 0 - Lubrication and Maintenance. While battery charging can be considered a maintenance procedure, battery charging information is located in this group. This was done because the battery must be fully-charged before any diagnosis can be performed.

Group 8A covers the Battery, Group 8B covers the Starting Systems, and Group 8C covers the Charging System. We have separated these systems to make it easier to locate the information you are seeking within this Service Manual. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The battery, starting, and charging systems in the vehicle operate with one another, and must be tested as a complete system. In order for the vehicle to start and charge properly, all of the components that are used in these systems must perform within specifications. It is important that the battery, starting, and charging systems be thoroughly tested and inspected any time a battery needs to be charged or replaced. The cause of abnormal discharge, overcharging, or early battery failure must be diagnosed and corrected before a battery is replaced or returned to service.

DESCRIPTION AND OPERATION (Continued)

The diagnostic procedures used in each of these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt/ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **On-Board Diagnostic Test For Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for more information.

OPERATION

The storage battery is a device used to store electrical energy potential in a chemical form. When an electrical load is applied to the battery terminals, an electrochemical reaction occurs within the battery. This reaction causes the battery to discharge electrical current.

The battery is made up of six individual cells that are connected in series. Each cell contains positively charged plate groups made of lead oxide, and negatively charged plate groups made of sponge lead. These dissimilar metal plates are submerged in a sulfuric acid and water solution called an electrolyte.

As the battery discharges, a gradual chemical change takes place within each cell. The sulfuric acid in the electrolyte combines with the plate materials, causing both plates to slowly change to lead sulfate. At the same time, oxygen from the positive plate material combines with hydrogen from the sulfuric acid, causing the electrolyte to become mainly water.

The chemical changes within the battery are caused by the movement of excess or free electrons between the positive and negative plate groups. This movement of electrons produces a flow of electrical current through the load device attached to the battery terminals.

As the plate materials become more similar chemically, and the electrolyte becomes less acid, the voltage potential of each cell is reduced. However, by charging the battery with a voltage higher than that of the battery, the battery discharging process is reversed.

Charging the battery gradually changes the sulfated lead plates back into sponge lead and lead oxide, and the water back into sulfuric acid. This action restores the difference in the electron charges deposited on the plates, and the voltage potential of the battery cells.

For a battery to remain useful, it must be able to produce high-amperage current over an extended period. A battery must also be able to accept a charge, so that its voltage potential may be restored.

In addition to producing and storing electrical energy, the battery serves as a capacitor, or voltage stabilizer, for the electrical system of the vehicle. It absorbs most abnormal or transient voltages caused by the switching of any of the electrical components in the vehicle.

The battery is vented to release excess hydrogen gas that is created when the battery is being charged or discharged. However, even with these vents, the hydrogen gas can collect in or around the battery. If hydrogen gas is exposed to flame or sparks, it may ignite.

If the electrolyte level is low, the battery may arc internally and explode. If the battery is equipped with removable cell caps, add distilled water whenever the electrolyte level is below the top of the plates. If the battery cell caps cannot be removed, the battery must be replaced if the electrolyte level becomes low.

BATTERY SIZE AND RATINGS

The battery Group Size number, the Cold Cranking Amperage (CCA) rating, and the Reserve Capacity (RC) rating or Ampere-Hours (AH) rating can be found on the original equipment battery label. Be certain that a replacement battery has the correct Group Size number, as well as CCA, and RC or AH ratings that equal or exceed the original equipment specification for the vehicle being serviced.

Refer to **Battery Classifications and Ratings** in the Specifications section of this group for more information. Battery sizes and ratings are discussed in more detail below.

GROUP SIZE

The outside dimensions and terminal placement of the battery conform to standards established by the Battery Council International (BCI). Each battery is assigned a BCI Group Size number to help identify a correctly-sized replacement.

COLD CRANKING AMPERAGE

The Cold Cranking Amperage (CCA) rating specifies how much current (in amperes) the battery can deliver for thirty seconds at -18° C (0° F). Terminal voltage must not fall below 7.2 volts during or after the thirty second discharge period. The CCA required is generally higher as engine displacement increases, depending also upon the starter current draw requirements.

RESERVE CAPACITY

The Reserve Capacity (RC) rating specifies the time (in minutes) it takes for battery terminal voltage to fall below 10.5 volts, at a discharge rate of 25

DESCRIPTION AND OPERATION (Continued)

amperes. RC is determined with the battery fully-charged at 26.7° C (80° F). This rating estimates how long the battery might last after a charging system failure, under minimum electrical load.

AMPERE-HOURS

The Ampere-Hours (AH) rating specifies the current (in amperes) that a battery can deliver steadily for twenty hours, with the voltage in the battery not falling below 10.5 volts. This rating is also sometimes identified as the twenty-hour discharge rating.

MOUNTING

The battery is mounted in a stamped steel located in the passenger side rear corner of the engine compartment. A J-bolt is hooked through in the front and rear edges of the tray. A hold down strap fits across the top of the battery case. The J-bolts pass through the hold down strap on each side of the battery, and a nut secures the hold down strap to each of the J-bolts.

A plastic bubble-wrap style thermoguard slides over the battery case to enclose the sides of the battery. The thermoguard protects the battery from engine compartment temperature extremes.

The battery tray is secured with four screws to a support bracket mounted between the front fender inner wheelhouse and the dash panel, rearward of the passenger side front wheel.

A hole in the bottom of the battery tray is fitted with a battery temperature sensor. Refer to **Battery Temperature Sensor** in the Description and Operation section of Group 8C - Charging System for more information on this component.

When installing a battery, be certain that the hold down fasteners are tightened to the proper specifications. Improper hold down fastener tightness, whether too loose or too tight, can result in damage to the battery. Refer to **Battery** in the Removal and Installation section of this group for the correct battery hold down fastener tightness specifications.

DIAGNOSIS AND TESTING

BATTERY

DIAGNOSIS

The battery, starting, and charging systems operate with one another, and must be tested as a complete system. In order for the vehicle to start and charge properly, all of the components involved in these systems must perform within specifications.

Group 8A covers the Battery, Group 8B covers the Starting Systems, and Group 8C covers the Charging System. We have separated these systems to make it easier to locate the information you are seeking within this Service Manual. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used in these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt/ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **On-Board Diagnostic Test For Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for more information.

The battery must be completely charged and the top, posts, and terminal clamps should be properly cleaned and inspected before diagnostic procedures are performed. Refer to **Battery** in the Removal and Installation section of this group for the proper battery cleaning and inspection procedures. Refer to **Battery Charging** in the Service Procedures section of this group for the proper charging procedures.

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

The condition of a battery is determined by two criteria:

1. **State-Of-Charge** - This can be determined by checking the specific gravity of the battery electrolyte (built-in test indicator or hydrometer test), or by

DIAGNOSIS AND TESTING (Continued)

checking the battery voltage (open-circuit voltage test).

2. **Cranking Capacity** - This can be determined by performing a battery load test, which measures the ability of the battery to supply high-amperage current.

First, determine the battery state-of-charge. This can be done in one of three ways. If the battery has a built-in test indicator, view the test indicator to determine the state-of-charge. If the battery has no test indicator, but has removable cell caps, perform the hydrometer test to determine the state-of-charge. If the cell caps are not removable, or a hydrometer is not available, perform the open-circuit voltage test to determine the state-of-charge.

The battery must be charged before proceeding with a load test if:

- The battery built-in test indicator has a black or dark color visible.
- The temperature corrected specific gravity of the battery electrolyte is less than 1.235.
- The battery open-circuit voltage is less than 12.4 volts.

A battery that will not accept a charge is faulty, and must be replaced. Further testing is not required. A fully-charged battery must be load tested to determine its cranking capacity. A battery that is fully-charged, but does not pass the load test, is faulty and must be replaced.

NOTE: Completely discharged batteries may take several hours to accept a charge. Refer to Battery Charging - Charging A Completely Discharged Battery in the Service Procedures section of this group for more information.

A battery is fully-charged when:

- All cells are gassing freely during charging.
- A green color is visible in the sight glass of the built-in test indicator.
- Three corrected specific gravity tests, taken at one-hour intervals, indicate no increase in the specific gravity.
- Open-circuit voltage is 12.4 volts or greater.

DIAGNOSIS AND TESTING (Continued)

Battery Diagnosis		
Condition	Possible Causes	Correction
The battery seems weak or dead when attempting to start the engine.	1. The battery has an incorrect size or rating for this vehicle. 2. The battery is physically damaged. 3. The battery terminal connections are loose or corroded. 4. The battery is discharged. 5. The electrical system ignition-off draw is excessive. 6. The battery is faulty. 7. The starting system is faulty. 8. The charging system is faulty.	1. Refer to Battery in the Specifications section of this group. Replace an incorrect battery with the correct battery. 2. Inspect the battery for loose terminal posts or a cracked and leaking case. Replace the battery, if damaged. 3. Refer to Voltage Drop Test in the Diagnosis and Testing section of this group. Clean and tighten the battery terminal connections, if required. 4. Determine the battery state-of-charge. Refer to Built-In Test Indicator, Hydrometer Test, or Open-Circuit Voltage Test in the Diagnosis and Testing section of this group. Charge the battery, if required. 5. Refer to Ignition-Off Draw Test in the Diagnosis and Testing section of this group. Repair the electrical system, if required. 6. Determine the battery cranking capacity. Refer to Load Test in the Diagnosis and Testing section of this group. Replace the battery, if required. 7. Determine if the starting system is performing to specifications. Refer to Starting System in the Diagnosis and Testing section of Group 8B - Starting Systems for more information. Repair the starting system, if required. 8. Determine if the charging system is performing to specifications. Refer to Charging System in the Diagnosis and Testing section of Group 8C - Charging System for more information. Repair the charging system, if required.

DIAGNOSIS AND TESTING (Continued)

Battery Diagnosis		
Condition	Possible Causes	Correction
The battery state-of-charge cannot be maintained.	1. The battery has an incorrect size or rating for this vehicle. 2. The battery terminal connections are loose or corroded. 3. The generator drive belt is slipping. 4. The electrical system ignition-off draw is excessive. 5. The battery is faulty. 6. The starting system is faulty. 7. The charging system is faulty. 8. Electrical loads exceed the output of the charging system. 9. Slow driving or prolonged idling with high-amperage draw systems in use.	1. Refer to Battery in the Specifications section of this group. Replace an incorrect battery with the correct battery. 2. Refer to Voltage Drop Test in the Diagnosis and Testing section of this group. Clean and tighten the battery terminal connections, if required. 3. Refer to Accessory Drive Belt Diagnosis in the Diagnosis and Testing section of Group 7 - Cooling System for more information. Replace or adjust the generator drive belt, if required. 4. Refer to Ignition-Off Draw Test in the Diagnosis and Testing section of this group. Repair the electrical system, if required. 5. Determine the battery cranking capacity. Refer to Load Test in the Diagnosis and Testing section of this group. Replace the battery, if required. 6. Determine if the starting system is performing to specifications. Refer to Starting System in the Diagnosis and Testing section of Group 8B - Starting Systems for more information. Repair the starting system, if required. 7. Determine if the charging system is performing to specifications. Refer to Charging System in the Diagnosis and Testing section of Group 8C - Charging System for more information. Repair the charging system, if required. 8. Inspect the vehicle for aftermarket electrical equipment which might cause excessive electrical loads. 9. Advise the vehicle operator, as required.
The battery will not accept a charge.	1. The battery is faulty.	1. Refer to Battery Charging in the Service Procedures section of this group. Replace the faulty battery, if required.

ABNORMAL BATTERY DISCHARGING

Any of the following conditions can result in abnormal battery discharging:

1. Corroded or loose battery posts and terminal clamps.
2. A loose or worn generator drive belt.
3. Electrical loads that exceed the output of the charging system. This can be due to equipment installed after manufacture, or repeated short trip use.
4. Slow driving speeds (heavy traffic conditions) or prolonged idling, with high-amperage draw systems in use.
5. A faulty circuit or component causing excessive ignition-off draw. Refer to **Ignition-Off Draw Test** in the Diagnosis and Testing section of this group for more information.
6. A faulty or incorrect charging system component. Refer to **Charging System** in the Diagnosis and Testing section of Group 8C - Charging System for more information.
7. A faulty or incorrect battery.

TESTING

BUILT-IN TEST INDICATOR

A test indicator (hydrometer) built into the top of the battery case provides visual information for battery testing (Fig. 2). Like a hydrometer, the built-in test indicator measures the specific gravity of the electrolyte. The test indicator reveals the battery state-of-charge; however, it will not reveal the cranking capacity of the battery. A load test must be performed to determine the battery cranking capacity.

DIAGNOSIS AND TESTING (Continued)

Refer to **Load Test** in the Diagnosis and Testing section of this group for more information.

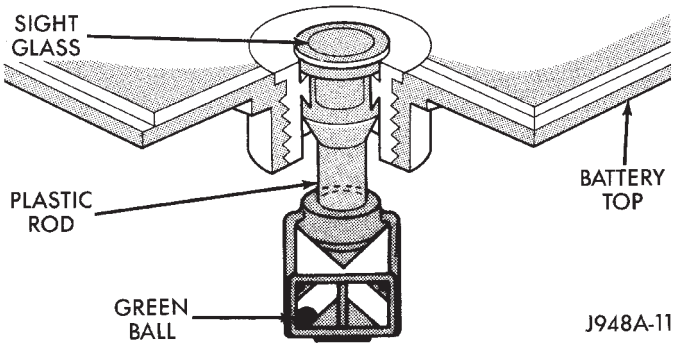


Fig. 2 Built-In Test Indicator

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

Before testing, visually inspect the battery for any damage (a cracked case or cover, loose posts, etc.) that would cause the battery to be faulty. In order to obtain correct indications from the built-in test indicator, it is important that the battery be level and have a clean sight glass. Additional light may be required to view the indicator. **Do not use open flame as a source of additional light.**

To read the built-in test indicator, look into the sight glass and note the color of the indicator (Fig. 3). The battery condition that each color indicates is described in the following list:

- **Green** - indicates 75% to 100% state-of-charge. The battery is adequately charged for further testing or return to use. If the starter will not crank for a minimum of fifteen seconds with a fully-charged battery, the battery must be load tested. Refer to **Load Test** in the Diagnosis and Testing section of this group for more information.
- **Black or Dark** - indicates 0% to 75% state-of-charge. The battery is inadequately charged and must be charged until a green indication is visible in the sight glass (12.4 volts or more), before the battery is tested further or returned to service. Refer to **Battery Charging** in the Service Procedures section of this group for more information. Also refer to **Abnormal Battery Discharging** in the Diagnosis and Testing section of this group for possible causes of the discharged condition.
- **Clear or Bright** - indicates a low electrolyte level. The electrolyte level in the battery is below the test indicator. A maintenance-free battery with non-removable cell caps must be replaced if the electrolyte level is low. Water must be added to a low-maintenance battery with removable cell caps before it is charged. Refer to **Battery Charging** in the Service Procedures section of this group for more information. A low electrolyte level may be caused by an overcharging condition. Refer to **Charging System** in the Diagnosis and Testing section of Group 8C - Charging System to diagnose an overcharging condition.

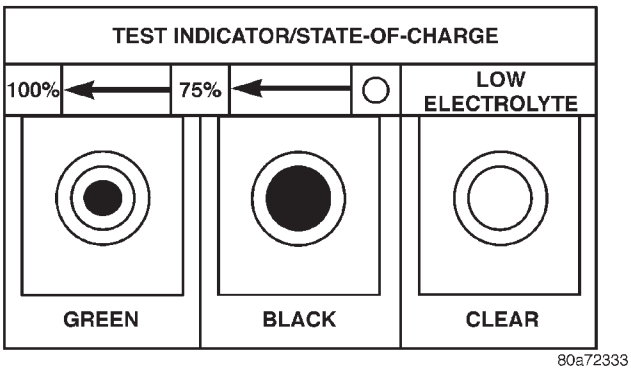


Fig. 3 Built-In Test Indicator Sight Glass

HYDROMETER TEST

The hydrometer test reveals the battery state-of-charge by measuring the specific gravity of the electrolyte. **This test cannot be performed on maintenance-free batteries with non-removable cell caps.** If the battery has non-removable cell caps, refer to **Built-In Test Indicator** or **Open-Circuit Voltage Test** in the Diagnosis and Testing section of this group.

Specific gravity is a comparison of the density of the electrolyte to the density of pure water. Pure water has a specific gravity of 1.000, and sulfuric acid has a specific gravity of 1.835. Sulfuric acid makes up approximately 35% of the electrolyte by weight, or 24% by volume.

DIAGNOSIS AND TESTING (Continued)

In a fully-charged battery the electrolyte will have a temperature-corrected specific gravity of 1.260 to 1.290. However, a specific gravity of 1.235 or above is satisfactory for battery load testing and/or return to service.

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

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• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

Before testing, visually inspect the battery for any damage (a cracked case or cover, loose posts, etc.) that would cause the battery to be faulty. Then remove the cell caps and check the electrolyte level. Add distilled water if the electrolyte level is below the top of the battery plates.

See the instructions provided by the manufacturer of the hydrometer for recommendations on the correct use of the hydrometer that you are using. Remove only enough electrolyte from the battery cell so that the float is off the bottom of the hydrometer barrel with pressure on the bulb released.

CAUTION: Exercise care when inserting the tip of the hydrometer into a cell to avoid damaging the plate separators. Damaged plate separators can cause early battery failure.

To read the hydrometer correctly, hold it with the top surface of the electrolyte at eye level (Fig. 4). Hydrometer floats are generally calibrated to indicate the specific gravity correctly only at 26.7° C (80° F). When testing the specific gravity at any other temperature, a correction factor is required.

The correction factor is approximately a specific gravity value of 0.004, which may also be identified

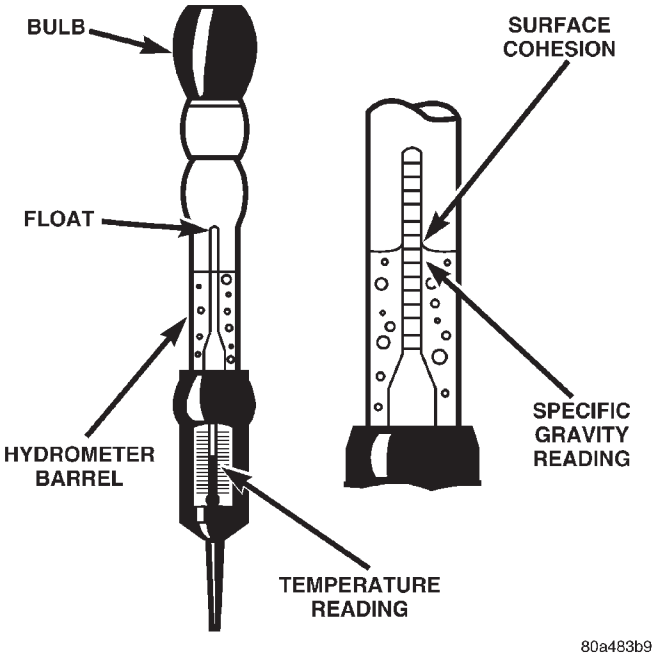

Fig. 4 Hydrometer - Typical

as four points of specific gravity. For each 5.5° C above 26.7° C (10° F above 80° F), add four points. For each 5.5° C below 26.7° C (10° F below 80° F), subtract four points. Always correct the specific gravity for temperature variation. Test the specific gravity of the electrolyte in each battery cell.

EXAMPLE: A battery is tested at -12.2° C (10° F) and has a specific gravity of 1.240. Determine the actual specific gravity as follows:

(1) Determine the number of degrees above or below 26.7° C (80° F):26.6° C - -12.2° C = 38.8° C (80° F - 10° F = 70° F)

(2) Divide the result from Step 1 by 5.5 (10):38.8° C ÷ 5.5 = 7 (70° F ÷ 10 = 7)

(3) Multiply the result from Step 2 by the temperature correction factor (0.004):7 X 0.004 = 0.028

(4) The temperature at testing was below 26.7° C (80° F); therefore, the temperature correction factor is subtracted:1.240 - 0.028 = 1.212

The corrected specific gravity of the battery cell in this example is 1.212.

If the specific gravity of all cells is above 1.235, but the variation between cells is more than fifty points (0.050), the battery should be replaced. If the specific gravity of one or more cells is less than 1.235, charge the battery at a rate of approximately five amperes.

Continue charging the battery until three consecutive specific gravity tests, taken at one-hour intervals, are constant. If the cell specific gravity variation is more than fifty points (0.050) at the end of the charge period, replace the battery.

When the specific gravity of all cells is above 1.235, and the cell variation is less than fifty points (0.050),

DIAGNOSIS AND TESTING (Continued)

the battery may be load tested to determine its cranking capacity. Refer to **Load Test** in the Diagnosis and Testing section of this group for more information.

OPEN-CIRCUIT VOLTAGE TEST

A battery open-circuit voltage (no load) test will show the state-of-charge of a battery. This test can be used in place of the hydrometer test when a hydrometer is not available, or for maintenance-free batteries with non-removable cell caps.

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

Before proceeding with this test, completely charge the battery. Refer to **Battery Charging** in the Service Procedures section of this group for the proper battery charging procedures.

(1) Before measuring the open-circuit voltage, the surface charge must be removed from the battery. Turn on the head lamps for fifteen seconds, then allow up to five minutes for the battery voltage to stabilize.

(2) Disconnect and isolate both battery cables, negative cable first.

(3) Using a voltmeter connected to the battery posts (see the instructions provided by the manufacturer of the voltmeter), measure the open-circuit voltage (Fig. 5).

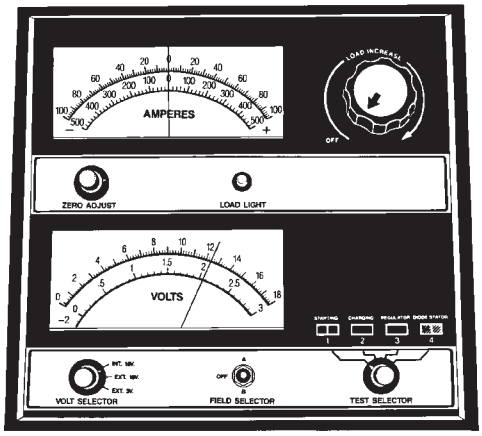

Fig. 5 Testing Open-Circuit Voltage - Typical

See the Open-Circuit Voltage chart. This voltage reading will indicate the battery state-of-charge, but will not reveal its cranking capacity. If a battery has an open-circuit voltage reading of 12.4 volts or greater, it may be load tested to reveal its cranking capacity. Refer to **Load Test** in the Diagnosis and Testing section of this group for more information.

Open Circuit Voltage	
Open Circuit Volts	Charge Percentage
11.7 volts or less	0%
12.0 volts	25%
12.2 volts	50%
12.4 volts	75%
12.6 volts or more	100%

LOAD TEST

A battery load test will verify the battery cranking capacity. The test is based on the Cold Cranking Amperage (CCA) rating of the battery. See the label affixed to the battery case, or refer to **Battery Classifications and Ratings** in the Specifications section of this group for the CCA rating of the factory-installed battery.

DIAGNOSIS AND TESTING (Continued)

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

Before proceeding with this test, completely charge the battery. Refer to **Battery Charging** in the Service Procedures section of this group for the proper battery charging procedures.

(1) Disconnect and isolate both battery cables, negative cable first. The battery top and posts should be clean.

(2) Connect a suitable volt-ammeter-load tester (Fig. 6) to the battery posts (Fig. 7). See the instructions provided by the manufacturer of the tester you are using. Check the open-circuit voltage (no load) of the battery. Refer to **Open-Circuit Voltage Test** in the Diagnosis and Testing section of this group for the test procedures. The battery open-circuit voltage must be 12.4 volts or greater.

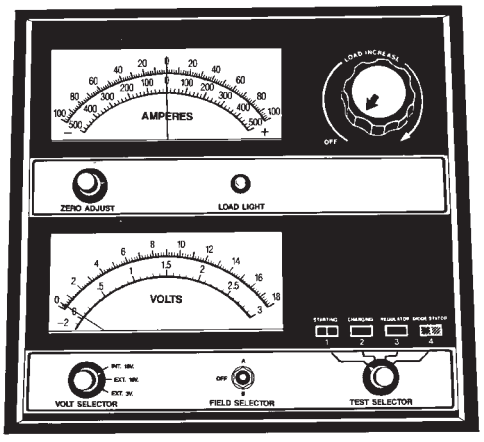

Fig. 6 Volt-Ammeter-Load Tester - Typical

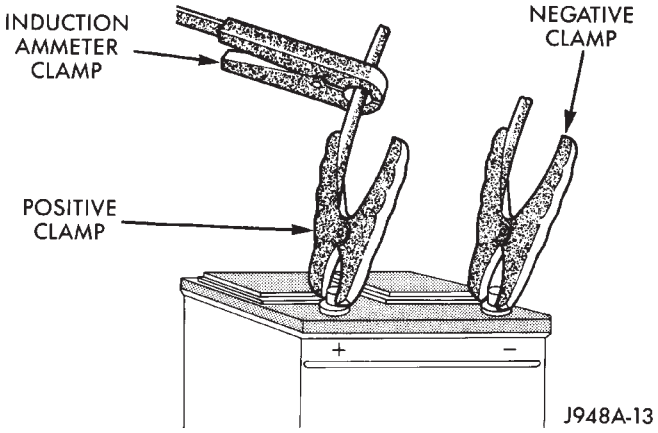

Fig. 7 Volt-Ammeter-Load Tester Connections - Typical

(3) Rotate the load control knob (carbon pile rheostat) to apply a 300 ampere load to the battery for fifteen seconds, then return the control knob to the Off position (Fig. 8). This will remove the surface charge from the battery.

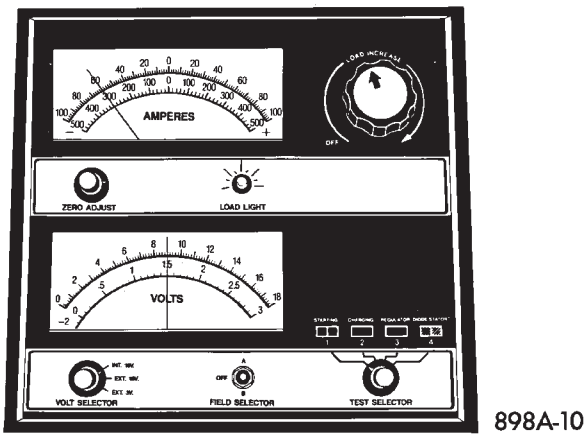

Fig. 8 Remove Surface Charge from Battery - Typical

(4) Allow the battery to stabilize to open-circuit voltage. It may take up to five minutes for the battery voltage to stabilize.

(5) Rotate the load control knob to maintain a load equal to 50% of the CCA rating of the battery (Fig. 9). After fifteen seconds, record the loaded voltage reading, then return the load control knob to the Off position.

(6) The voltage drop will vary with the battery temperature at the time of the load test. The battery temperature can be estimated by using the ambient temperature during the past several hours. If the battery has been charged, boosted, or loaded a few minutes prior to the test, the battery will be somewhat warmer. See the Load Test Temperature chart for the proper loaded voltage reading.

DIAGNOSIS AND TESTING (Continued)

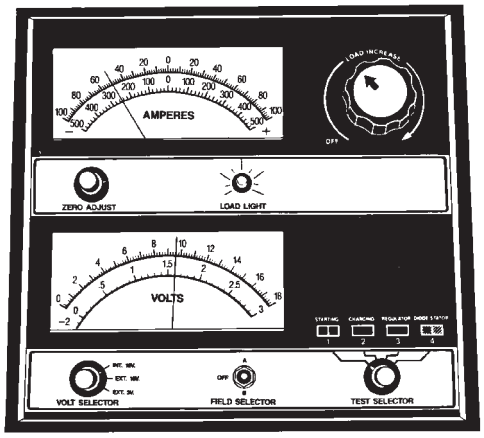

Fig. 9 Load 50% CCA Rating - Note Voltage - Typical

Load Test Temperature		
Minimum Voltage	Temperature	
	°F	°C
9.6 volts	70° and above	21° and above
9.5 volts	60°	16°
9.4 volts	50°	10°
9.3 volts	40°	4°
9.1 volts	30°	-1°
8.9 volts	20°	-7°
8.7 volts	10°	-12°
8.5 volts	0°	-18°

(7) If the voltmeter reading falls below 9.6 volts, at a minimum battery temperature of 21° C (70° F), the battery is faulty and must be replaced.

VOLTAGE DROP TEST

The voltage drop test will determine if there is excessive resistance in the battery terminal connections or the battery cables. When performing these tests, it is important to remember that the voltage drop is giving an indication of the resistance between the two points at which the voltmeter probes are attached.

Example: When testing the resistance of the battery positive cable, touch the voltmeter leads to the battery positive cable clamp and the cable connector at the starter solenoid. If you probe the battery positive terminal post and the cable connector at the starter solenoid, you are reading the combined voltage drop in the battery positive cable clamp-to-terminal post connection and the battery positive cable.

WARNING:

• IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

• THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.

• IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.

The following operation will require a voltmeter accurate to 1/10 (0.10) volt. Before performing the tests, be certain the following procedures are accomplished:

• The battery is fully-charged. Refer to **Battery Charging** in the Service Procedures section of this group for more information.

• Fully engage the parking brake.

• If the vehicle is equipped with an automatic transmission, place the gearshift selector lever in the Park position. If the vehicle is equipped with a manual transmission, place the gearshift selector lever in the Neutral position and fully depress the clutch pedal.

• Unplug the Automatic ShutDown (ASD) relay to prevent the engine from starting. The ASD relay is located in the Power Distribution Center (PDC). See the label on the PDC for ASD relay identification and location.

(1) Connect the positive lead of the voltmeter to the battery negative terminal post. Connect the negative lead of the voltmeter to the battery negative cable clamp (Fig. 10). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor contact between the cable clamp and the terminal post.

(2) Connect the positive lead of the voltmeter to the battery positive terminal post. Connect the negative lead of the voltmeter to the battery positive cable clamp (Fig. 11). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor contact between the cable clamp and the terminal post.

(3) Connect the voltmeter to measure between the battery positive terminal post and the starter solenoid battery terminal stud (Fig. 12). Rotate and hold

DIAGNOSIS AND TESTING (Continued)

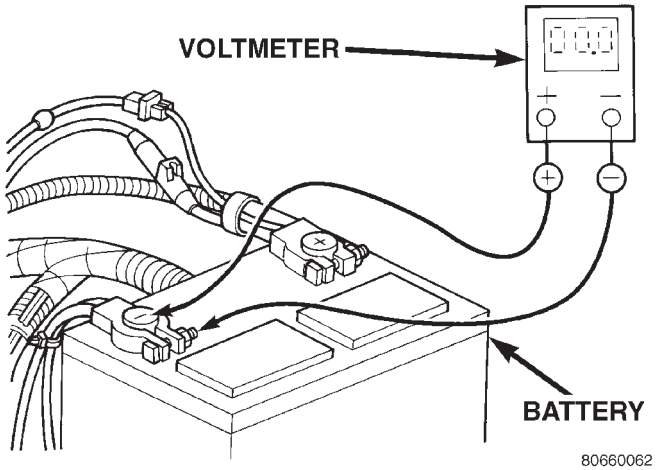

Fig. 10 Test Battery Negative Connection Resistance - Typical

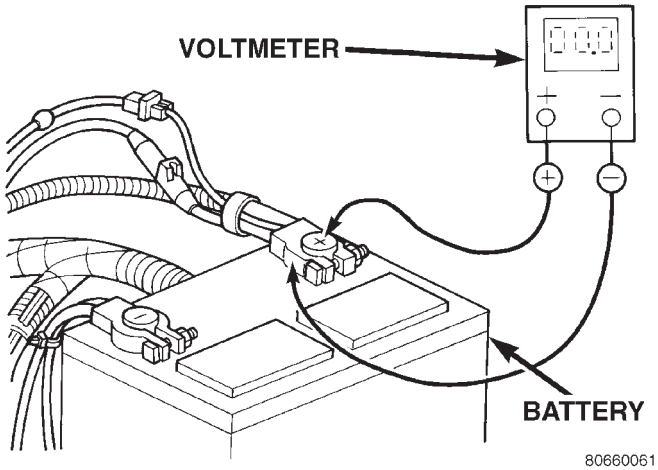

Fig. 11 Test Battery Positive Connection Resistance - Typical

the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery cable connection at the solenoid. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery positive cable.

(4) Connect the voltmeter to measure between the battery negative terminal post and a good clean ground on the engine block (Fig. 13). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable attachment on the engine block. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery negative cable.

IGNITION-OFF DRAW TEST

The term Ignition-Off Draw (IOD) identifies a normal condition where power is being drained from the battery with the ignition switch in the Off position. A normal vehicle electrical system will draw from five

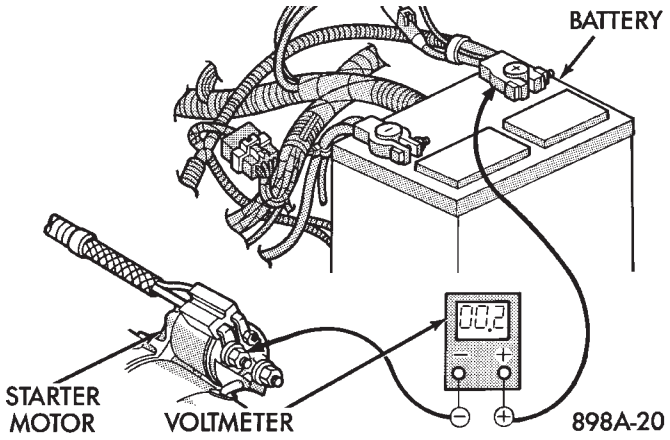

Fig. 12 Test Battery Positive Cable Resistance - Typical

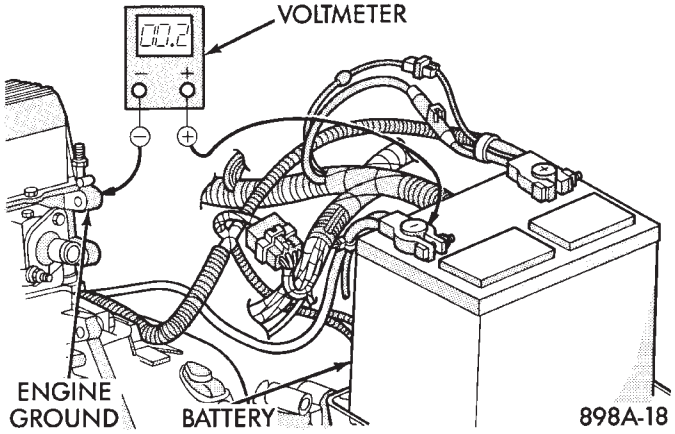

Fig. 13 Test Ground Circuit Resistance - Typical

to twenty-five milliamperes (0.005 to 0.025 ampere) with the ignition switch in the Off position, and all non-ignition controlled circuits in proper working order. The twenty-five milliamperes are needed to enable the memory functions for the Powertrain Control Module (PCM), digital clock, electronically tuned radio, and other modules which may vary with the vehicle equipment.

A vehicle that has not been operated for approximately twenty days, may discharge the battery to an inadequate level. When a vehicle will not be used for twenty days or more (stored), remove the IOD fuse from the Power Distribution Center (PDC). This will reduce battery discharging.

Excessive IOD can be caused by:

- Electrical items left on
- Faulty or improperly adjusted switches
- Faulty or shorted electronic modules and components
- An internally shorted generator
- Intermittent shorts in the wiring.

If the IOD is over twenty-five milliamperes, the problem must be found and corrected before replac-

DIAGNOSIS AND TESTING (Continued)

ing a battery. In most cases, the battery can be charged and returned to service after the excessive IOD condition has been corrected.

(1) Verify that all electrical accessories are off. Turn off all lamps, remove the ignition key, and close all doors. If the vehicle is equipped with an illuminated entry system or an electronically tuned radio, allow the electronic timer function of these systems to automatically shut off (time out). This may take up to three minutes.

(2) Determine that the under-hood lamp is operating properly, then disconnect the lamp wire harness connector or remove the lamp bulb.

(3) Disconnect the battery negative cable.

(4) Set an electronic digital multi-meter to its highest amperage scale. Connect the multi-meter between the disconnected battery negative cable clamp and the battery negative terminal post. Make sure that the doors remain closed so that the illuminated entry system is not activated. The multi-meter amperage reading may remain high for up to three minutes, or may not give any reading at all while set in the highest amperage scale, depending upon the electrical equipment on the vehicle. The multi-meter leads must be securely clamped to the battery negative cable clamp and the battery negative terminal post. If continuity between the battery negative terminal post and the negative cable clamp is lost during any part of the IOD test, the electronic timer function will be activated and all of the tests will have to be repeated.

(5) After about three minutes, the high-amperage IOD reading on the multi-meter should become very low or nonexistent, depending upon the electrical equipment on the vehicle. If the amperage reading remains high, remove and replace each fuse or circuit breaker in the Power Distribution Center (PDC) and then in the fuseblock module (refer to **Power Distribution Center** and **Fuse Block** in the Component Index of Group 8W - Wiring Diagrams for fuse and circuit breaker identification) one at a time until the amperage reading becomes very low, or nonexistent. This will isolate each circuit and identify the source of the high-amperage IOD. If the amperage reading remains high after removing and replacing each fuse and circuit breaker, disconnect the wire harness from the generator. If the amperage reading now becomes very low or nonexistent, refer to **Charging System** in the Diagnosis and Testing section of Group 8C - Charging System to diagnose the condition. After the high-amperage IOD has been corrected, switch the multi-meter to progressively lower amperage scales and, if necessary, repeat the fuse and circuit breaker remove-and-replace process to identify and correct all sources of excessive IOD. It is now safe to select the lowest milliampere scale of the multi-meter to check the low-amperage IOD.

CAUTION: Do not open any doors, or turn on any electrical accessories with the lowest milliampere scale selected, or the multi-meter may be damaged.

(6) Observe the multi-meter reading. The low-amperage IOD should not exceed twenty-five milliamperes (0.025 ampere). If the draw exceeds twenty-five milliamperes, isolate each circuit using the fuse and circuit breaker remove-and-replace process. The multi-meter reading will drop to within the acceptable limit when the source of the excessive draw is disconnected. Repair this circuit as required; whether a wiring short, incorrect switch adjustment, or a component failure is at fault.

SERVICE PROCEDURES

BATTERY CHARGING

A battery is fully-charged when:

- All cells are gassing freely during battery charging.
- A green color is visible in the sight glass of the built-in test indicator.
- Three hydrometer tests, taken at one-hour intervals, indicate no increase in the temperature-corrected specific gravity.
- Open-circuit voltage is 12.4 volts or above.

WARNING:

- **IF THE BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR LOW ELECTROLYTE LEVEL, DO NOT TEST, ASSIST-BOOST, OR CHARGE. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.**
- **EXPLOSIVE HYDROGEN GAS FORMS IN AND AROUND THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR THE BATTERY. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.**
- **THE BATTERY CONTAINS SULFURIC ACID, WHICH IS POISONOUS AND CAUSTIC. AVOID CONTACT WITH THE SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF THE REACH OF CHILDREN.**
- **IF THE BATTERY IS EQUIPPED WITH REMOVABLE CELL CAPS, BE CERTAIN THAT EACH OF THE CELL CAPS IS IN PLACE AND TIGHT BEFORE THE BATTERY IS RETURNED TO SERVICE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT FROM LOOSE OR MISSING CELL CAPS.**

SERVICE PROCEDURES (Continued)

CAUTION:

- **Always disconnect and isolate the battery negative cable before charging a battery. Do not exceed sixteen volts while charging a battery. Damage to the vehicle electrical system components may result.**
- **Battery electrolyte will bubble inside the battery case during normal battery charging. Electrolyte boiling or being discharged from the battery vents indicates a battery overcharging condition. Immediately reduce the charging rate or turn off the charger to evaluate the battery condition. Damage to the battery may result from overcharging.**
- **The battery should not be hot to the touch. If the battery feels hot to the touch, turn off the charger and let the battery cool before continuing the charging operation. Damage to the battery may result.**

Some battery chargers are equipped with polarity-sensing circuitry. This circuitry protects the charger and/or the battery from being damaged if they are improperly connected. If the battery state-of-charge is too low for the polarity-sensing circuitry to detect, the charger will not operate. This makes it appear that the battery will not accept charging current. See the instructions provided by the manufacturer of the battery charger for details on how to bypass the polarity-sensing circuitry.

After the battery has been charged to 12.4 volts or greater, perform a load test to determine the battery cranking capacity. Refer to **Load Test** in the Diagnosis and Testing section of this group for the procedures. If the battery will endure a load test, return the battery to use. If the battery will not endure a load test, it is faulty and must be replaced.

Clean and inspect the battery hold downs, tray, terminals, posts, and top before completing service. Refer to **Battery** in the Removal and Installation section of this group for the proper cleaning and inspection procedures.

CHARGING A COMPLETELY DISCHARGED BATTERY

The following procedure should be used to recharge a completely discharged battery. Unless this procedure is properly followed, a good battery may be needlessly replaced.

(1) Measure the voltage at the battery posts with a voltmeter, accurate to 1/10 (0.10) volt (Fig. 14). If the reading is below ten volts, the charge current will be low. It could take some time before the battery accepts a current greater than a few milliamperes. Such low current may not be detectable on the ammeters built into many battery chargers.

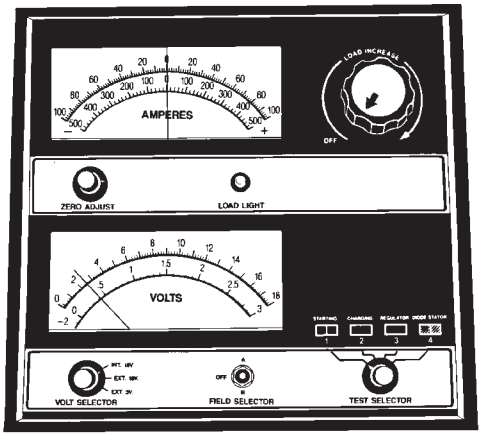

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Fig. 14 Voltmeter Accurate to 1/10 Volt Connected - Typical

(2) Disconnect and isolate the battery negative cable. Connect the battery charger leads. Some battery chargers are equipped with polarity-sensing circuitry. This circuitry protects the charger and/or the battery from being damaged if they are improperly connected. If the battery state-of-charge is too low for the polarity-sensing circuitry to detect, the charger will not operate. This makes it appear that the battery will not accept charging current. See the instructions provided by the manufacturer of the battery charger for details on how to bypass the polarity-sensing circuitry.

(3) Battery chargers vary in the amount of voltage and current they provide. The amount of time required for a battery to accept measurable charger current at various voltages is shown in the Charge Rate chart. If the charge current is still not measurable at the end of the charging time, the battery is faulty and must be replaced. If the charge current is measurable during the charging time, the battery may be good and the charging should be completed in the normal manner.

Charge Rate	
Voltage	Hours
16.0 volts maximum	up to 4 hours
14.0 to 15.9 volts	up to 8 hours
13.9 volts or less	up to 16 hours

CHARGING TIME REQUIRED

The time required to charge a battery will vary, depending upon the following factors:

- **Battery Capacity** - A completely discharged heavy-duty battery requires twice the charging time of a small capacity battery.
- **Temperature** - A longer time will be needed to charge a battery at -18° C (0° F) than at 27° C (80° F). When a fast charger is connected to a cold bat-

SERVICE PROCEDURES (Continued)

tery, the current accepted by the battery will be very low at first. As the battery warms, it will accept a higher charging current rate (amperage).

- **Charger Capacity** - A battery charger that supplies only five amperes will require a longer charging time. A battery charger that supplies twenty amperes or more will require a shorter charging time.
- **State-Of-Charge** - A completely discharged battery requires more charging time than a partially discharged battery. Electrolyte is nearly pure water in a completely discharged battery. At first, the charging current (amperage) will be low. As the battery charges, the specific gravity of the electrolyte will gradually rise.

WARNING: NEVER EXCEED TWENTY AMPERES WHEN CHARGING A COLD (-1° C or 30° F) BATTERY. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

Battery Charging Timetable			
Charging Amperage	5 Amperes	10 Amperes	20 Amperes
Open Circuit Voltage	Hours Charging at 21° C (70° F)		
12.25 to 12.49	6 hours	3 hours	1.5 hours
12.00 to 12.24	10 hours	5 hours	2.5 hours
10.00 to 11.99	14 hours	7 hours	3.5 hours
*Below 10.00	18 hours	9 hours	4.5 hours
*Refer to Charging A Completely Discharged Battery			

REMOVAL AND INSTALLATION

BATTERY

REMOVAL

(1) Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.

(2) Loosen the battery cable terminal clamps and disconnect both battery cables, negative cable first. If necessary, use a puller to remove the terminal clamps from the battery posts (Fig. 15).

(3) Inspect the battery cable terminal clamps for corrosion and damage. Remove any corrosion using a wire brush or a post and terminal cleaning tool, and a sodium bicarbonate (baking soda) and warm water cleaning solution (Fig. 16). Replace any battery cable that has damaged or deformed terminal clamps.

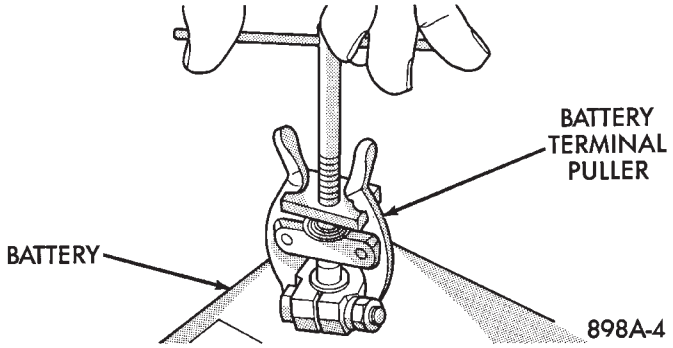

Fig. 15 Remove Battery Cable Terminal Clamp - Typical

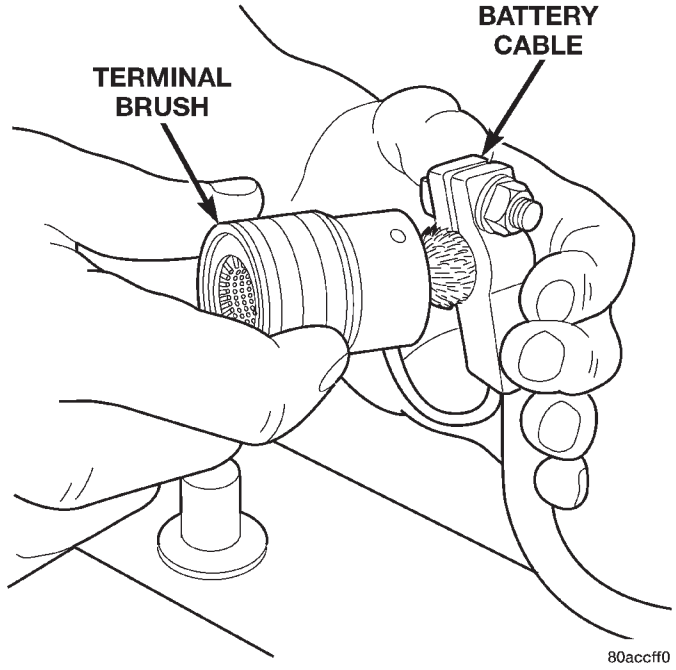

Fig. 16 Clean Battery Cable Terminal Clamp - Typical

WARNING: WEAR A SUITABLE PAIR OF RUBBER GLOVES (NOT THE HOUSEHOLD TYPE) WHEN REMOVING A BATTERY BY HAND. SAFETY GLASSES SHOULD ALSO BE WORN. IF THE BATTERY IS CRACKED OR LEAKING, THE ELECTROLYTE CAN BURN THE SKIN AND EYES.

(4) Remove the battery hold downs and remove the battery from the battery tray (Fig. 17).

(5) Inspect the battery tray and hold downs for corrosion or damage. Remove any corrosion using a wire brush and a sodium bicarbonate (baking soda) and warm water cleaning solution. Paint any exposed bare metal and replace any damaged parts.

(6) Slide the thermoguard off of the battery case. Inspect the battery case for cracks or other damage

REMOVAL AND INSTALLATION (Continued)

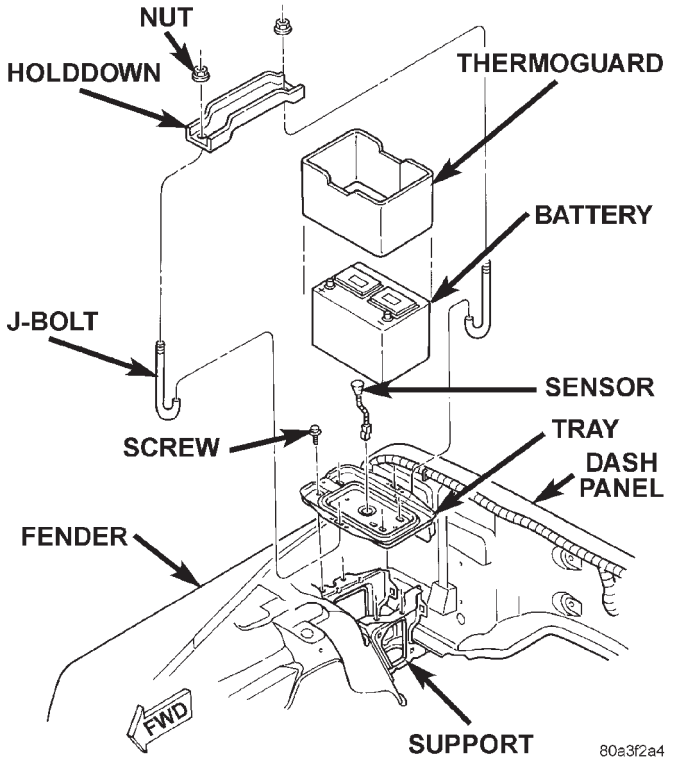

Fig. 17 Battery Hold Downs

that could result in electrolyte leaks. Also, check the battery terminal posts for looseness. Batteries with damaged cases or loose posts must be replaced.

(7) Check the electrolyte level in the battery. Use a putty knife or another suitable wide flat-bladed tool to pry the cell caps off (Fig. 18). Do not use a screwdriver. Add distilled water to each cell until the liquid reaches the bottom of the vent well. **DO NOT OVERFILL.**

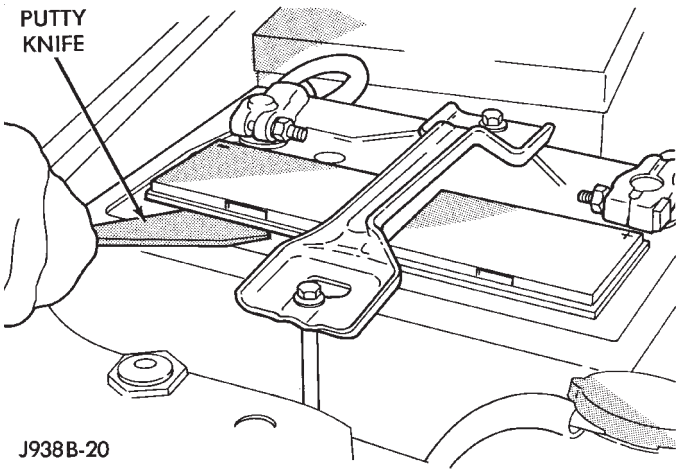

Fig. 18 Removing Cell Caps - Typical

(8) Inspect the battery built-in test indicator sight glass for an indication of the battery condition. If the battery is discharged, charge as required. Refer to **Built-In Test Indicator** in the Diagnosis and Testing section of this group for more information. Also refer to **Battery Charging** in the Service Procedures section of this group for more information.

(9) If the battery is to be reinstalled, clean the outside of the battery case and the top cover with a sodium bicarbonate (baking soda) and warm water cleaning solution to remove any acid film (Fig. 19). Rinse the battery with clean water. Ensure that the cleaning solution does not enter the battery cells through the vent holes. If the battery is being replaced, refer to **Battery Ratings and Classifications** in the Specifications section of this group. Confirm that the replacement battery is the correct size and has the correct ratings for the vehicle.

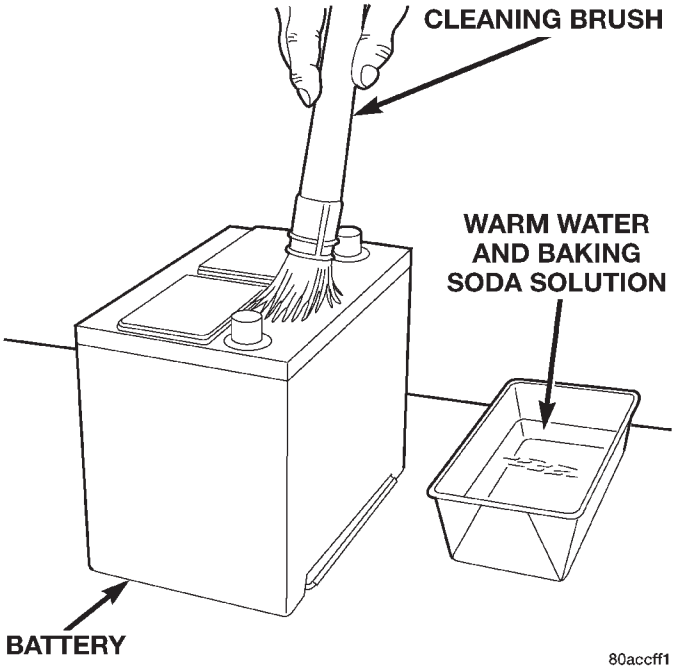

Fig. 19 Clean Battery - Typical

(10) Clean any corrosion from the battery terminal posts with a wire brush or a post and terminal cleaner, and a sodium bicarbonate (baking soda) and warm water cleaning solution (Fig. 20).

INSTALLATION

(1) Reinstall the battery thermoguard by sliding it over the battery case.

(2) Position the battery in the tray. Ensure that the positive and negative terminal posts are correctly positioned. The cable terminal clamps must reach the correct battery terminal post without stretching the cables (Fig. 21).

(3) Loosely install the battery hold down hardware. Ensure that the battery base is correctly positioned in the tray, then tighten the hold downs to 4 N·m (35 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

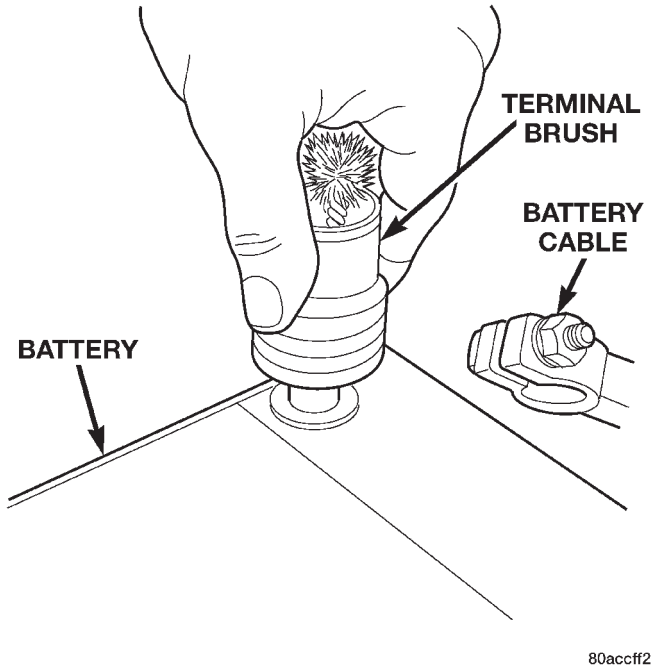

Fig. 20 Clean Battery Terminal Post - Typical

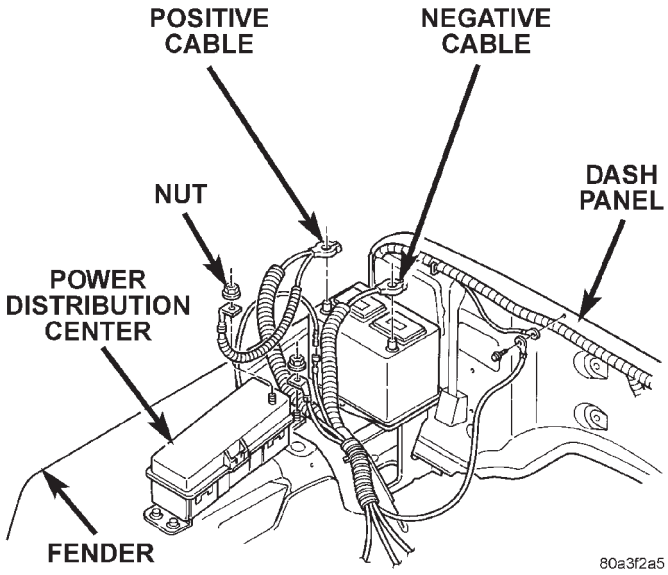

Fig. 21 Battery Cables

CAUTION: Be certain that the battery cables are connected to the correct battery terminals. Reverse polarity may damage electrical components.

(4) Connect and tighten the battery positive cable terminal clamp. Then connect and tighten the battery negative cable terminal clamp. Tighten both battery cable terminal clamp bolts to 6.2 N·m (55 in. lbs.).

(5) Apply a thin coating of petroleum jelly or chassis grease to the exposed surfaces of the battery cable terminal clamps and battery terminal posts.

SPECIFICATIONS

BATTERY

Battery Classifications and Ratings					
Part Number	BCI Group Size Classification	Cold Cranking Amperage	Reserve Capacity	Ampere-Hours	Load Test Amperage
56027960	34	500	110 Minutes	60	250
56041003	34	600	120 Minutes	66	300