GROUP TAB LOCATOR

INs	Introduction
0s	Lubrication & Maintenance
7s	Cooling
8As	Audio
8Js	Instrument Cluster
8Os	Restraints
8Wa	Wiring
14s	Fuel System
21s	Transmission/Transaxle

Service Manual Comment Forms (Rear of Manual)

INTRODUCTION

TABLE OF CONTENTS

page

VEHICLE DATA-SUPPLEMENT
DESCRIPTION 1
VECI LABEL
DESCRIPTION 1

page

BODY CODE PLATE
DESCRIPTION 1
VEHICLE IDENTIFICATION NUMBER
DESCRIPTION 3

VEHICLE DATA-SUPPLEMENT

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The refer to is written differently than in prior years.

VECI LABEL

DESCRIPTION

All models have a Vehicle Emission Control Information (VECI) Label. DaimlerChrysler permanently attaches the label in the engine compartment (Fig. 1). It cannot be removed without defacing information and destroying the label.

The label contains the vehicle's emission specifications and vacuum hose routings. All hoses must be connected and routed according to the label.

The VECI label contains the following:

- Engine family and displacement
- Evaporative family
- Emission control system schematic
- Certification application
- Engine timing specifications (if adjustable)
- Idle speeds (if adjustable)
- Spark plug and gap

The label also contains an engine vacuum schematic. There are unique labels for vehicles built for sale in the state of California and the country of Canada. Canadian labels are written in both the English and French languages. These labels are permanently attached and cannot be removed without defacing information and destroying label.

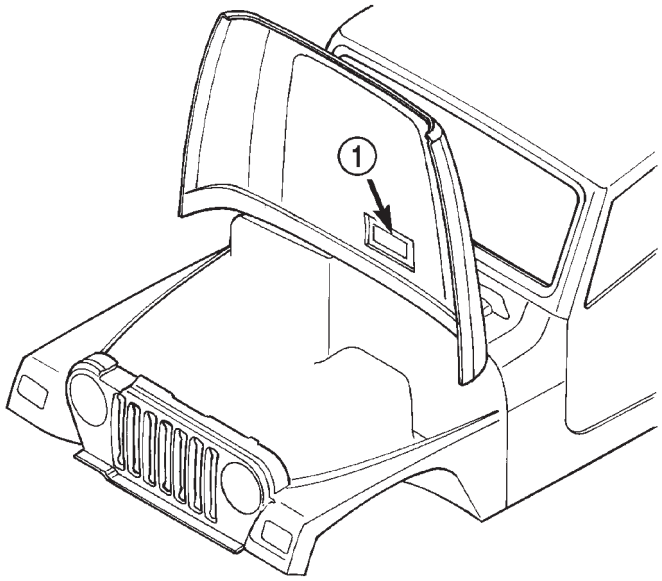


Fig. 1 VECI Label Location

1 - VECI LABEL

BODY CODE PLATE

BODY CODE PLATE

A metal body code plate is attached to the floor pan under the drivers seat (Fig. 2). Disengage the snaps attaching the carpet to the floor pan to read the information. There are seven lines of information on the body code plate. Lines 4, 5, 6, and 7 are not used to define service information. Information reads from left to right, starting with line 3 in the center of the plate to line 1 at the bottom of the plate (Fig. 3).

The last code imprinted on a vehicle code plate will be followed by the imprinted word END. When two vehicle code plates are required, the last available spaces on the first plate will be imprinted with the letters CTD (for continued).

BODY CODE PLATE (Continued)

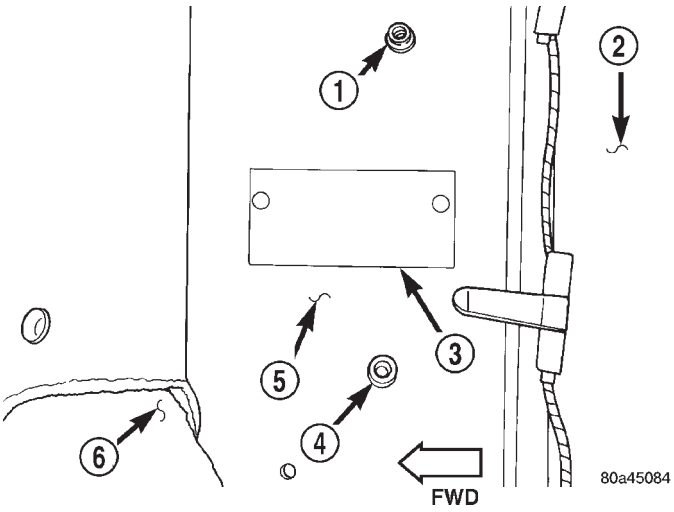


Fig. 2 Body Code Plate Location

1 - SNAP
2 - REAR CARPET
3 - BODY CODE PLATE
4 - SNAP
5 - FLOOR PAN
6 - FRONT CARPET

When a second vehicle code plate is necessary, the first four spaces on each row will not be used because of the plate overlap.

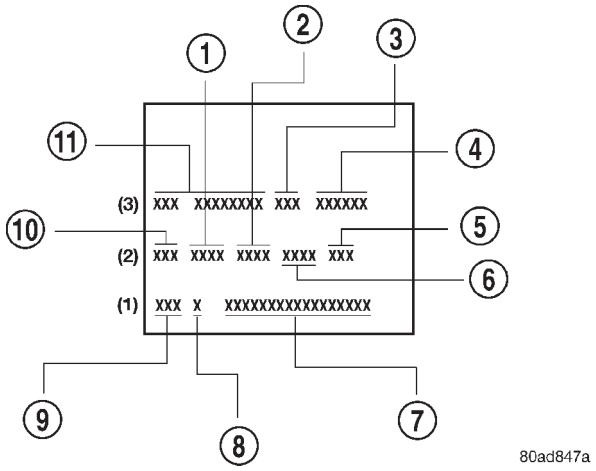


Fig. 3 Body Code Plate Decoding

1 - PRIMARY PAINT
2 - SECONDARY PAINT
3 - ROOF
4 - CAR LINE SHELL
5 - ENGINE
6 - TRIM
7 - VIN
8 - MARKET
9 - TRANSMISSION
10 - PAINT PROCEDURE
11 - VEHICLE ORDER NUMBER

BODY CODE PLATE—LINE 3

DIGITS 1 THROUGH 12
Vehicle Order Number

DIGITS 13, 14, AND 15
Roof
- VJN = Soft Top White
- VJU = Soft Top Spice
- VJX = Soft Top Black
- VKN = Hard Top White
- VKU = Hard Top Spice
- VKX = Hard Top Black

DIGITS 16, 17, AND 18
Car Line Shell
- TJJ = Wrangler (LHD)
- TJU = Wrangler (RHD)

DIGIT 19
Price Class
- L = Wrangler (All)

DIGITS 20 AND 21
Body Type
- 77 = Wheel Base (93.4 in.)

BODY CODE PLATE—LINE 2

DIGITS 1,2, AND 3
Paint Procedure

DIGIT 4
Open Space

DIGITS 5 THROUGH 8
Primary Paint
Refer to Group 23, Body for color codes.

DIGIT 9
Open Space

DIGITS 10 THROUGH 13
Secondary Paint

DIGIT 14
Open Space

DIGITS 15 THROUGH 18
Interior Trim Code

DIGIT 19
Open Space

DIGITS 20, 21, AND 22
Engine Code
- EPE = 2.5 L 4 cyl. MPI Gasoline

BODY CODE PLATE (Continued)

- ERH = 4.0L 6 cyl. MPI Gasoline

BODY CODE PLATE—LINE 1

DIGITS 1, 2, AND 3

Transmission Codes
- DDQ = AX5 5–speed Manual
- DDO = AX15 5–speed Manual
- DGD = 30RH 3–speed Automatic
- DGG = 32RH 3–speed Automatic

DIGIT 4

Open Space

DIGIT 5

Market Code
- B = International

DIGIT 6

Open Space

DIGITS 7 THROUGH 23

Vehicle Identification Number (VIN)

Refer to Vehicle Identification Number (VIN) paragraph for proper breakdown of VIN code.

VEHICLE IDENTIFICATION NUMBER

DESCRIPTION

The Vehicle Identification Number (VIN) plate is located on the lower windshield fence near the left A-pillar. The VIN contains 17 characters that provide data concerning the vehicle. Refer to the VIN decoding chart to determine the identification of a vehicle.

The Vehicle Identification Number is also imprinted on the:
- Vehicle Safety Certification Label.
- Frame rail.

To protect the consumer from theft and possible fraud the manufacturer is required to include a Check Digit at the ninth position of the Vehicle Identification Number. The check digit is used by the manufacturer and government agencies to verify the authenticity of the vehicle and official documentation. The formula to use the check digit is not released to the general public.

VEHICLE IDENTIFICATION NUMBER DECODING CHART

POSITION	INTERPRETATION	CODE = DESCRIPTION
1	Country of Origin	1 = United States
2	Make	J = Jeep
3	Vehicle Type	4 = MPV
4	Gross Vehicle Weight Rating	E = 3001-4000 lbs. F = 4001-5000 lbs.
5	Vehicle Line	Y = Wrangler 4X4
6	Series	1 = Sport 2 = SE 4 = Sahara
7	Body Style	9 = Open Body
8	Engine	P = 2.5L Unleaded-Gasoline S = 4.0L Unleaded-Gasoline
9	Check Digit	0 through 9 or X
10	Model Year	1=2001
11	Assembly Plant	P = Toledo #2
12 thru 17	Vehicle Build Sequence	

LUBRICATION & MAINTENANCE

TABLE OF CONTENTS

page

LUBRICATION & MAINTENANCE
DESCRIPTION 1
SPECIFICATIONS 2
FLUID TYPES
DESCRIPTION 3

page

MAINTENANCE SCHEDULES
DESCRIPTION 4

LUBRICATION & MAINTENANCE

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The refer to is written differently than in prior years.

DESCRIPTION - FUEL REQUIREMENTS

Your engine is designed to meet all emissions regulations and provide excellent fuel economy and performance when using high quality unleaded "regular" gasoline having an octane rating of 87. The routine use of premium gasoline is not recommended. Under normal conditions the use of premium fuel will not provide a benefit over high quality regular gasolines and in some circumstances may result in poorer performance.

Light spark knock at low engine speeds is not harmful to your engine. However, continued heavy spark knock at high speeds can cause damage and immediate service is required. Engine damage resulting from operation with a heavy spark knock may not be covered by the new vehicle warranty.

Poor quality gasoline can cause problems such as hard starting, stalling and hesitations. If you experience these symptoms, try another brand of gasoline before considering service for the vehicle.

Over 40 auto manufacturers world-wide have issued and endorsed consistent gasoline specifications (the Worldwide Fuel Charter, WWFC) to define fuel properties necessary to deliver enhanced emissions, performance and durability for your vehicle. We recommend the use of gasolines that meet the WWFC specifications if they are available.

REFORMULATED GASOLINE

Many areas of the country require the use of cleaner burning gasoline referred to as "reformulated" gasoline. Reformulated gasoline contain oxygenates, and are specifically blended to reduce vehicle emissions and improve air quality.

We strongly support the use of reformulated gasoline. Properly blended reformulated gasoline will provide excellent performance and durability for the engine and fuel system components.

GASOLINE/OXYGENATE BLENDS

Some fuel suppliers blend unleaded gasoline with oxygenates such as 10% ethanol, MTBE, and ETBE. Oxygenates are required in some areas of the country during the winter months to reduce carbon monoxide emissions. Fuels blended with these oxygenates may be used in your vehicle.

CAUTION: DO NOT use gasoline containing METHANOL. Gasoline containing methanol may damage critical fuel system components.

MMT IN GASOLINE

MMT is a manganese-containing metallic additive that is blended into some gasoline to increase octane. Gasoline blended with MMT provide no performance advantage beyond gasoline of the same octane number without MMT. Gasoline blended with MMT reduce spark plug life and reduce emission system performance in some vehicles. We recommend that gasolines free of MMT be used in your vehicle. The MMT content of gasoline may not be indicated on the gasoline pump; therefore, you should ask your gasoline retailer whether or not his/her gasoline contains MMT.

It is even more important to look for gasoline without MMT in Canada because MMT can be used at levels higher than allowed in the United States. MMT is prohibited in Federal and California reformulated gasoline.

LUBRICATION & MAINTENANCE (Continued)

SULFUR IN GASOLINE

If you live in the northeast United States, your vehicle may have been designed to meet California low emission standards with Cleaner-Burning California reformulated gasoline with low sulfur. If such fuels are not available in states adopting California emission standards, your vehicles will operate satisfactorily on fuels meeting federal specifications, but emission control system performance may be adversely affected. Gasoline sold outside of California is permitted to have higher sulfur levels which may affect the performance of the vehicle's catalytic converter. This may cause the Malfunction Indicator Lamp (MIL), Check Engine or Service Engine Soon light to illuminate. We recommend that you try a different brand of unleaded gasoline having lower sulfur to determine if the problem is fuel related prior to returning your vehicle to an authorized dealer for service.

CAUTION: If the Malfunction Indicator Lamp (MIL), Check Engine or Service Engine Soon light is flashing, immediate service is required; see on-board diagnostics system section.

MATERIALS ADDED TO FUEL

All gasoline sold in the United States and Canada are required to contain effective detergent additives. Use of additional detergents or other additives is not needed under normal conditions.

FUEL SYSTEM CAUTIONS

CAUTION: Follow these guidelines to maintain your vehicle's performance:

- The use of leaded gas is prohibited by Federal law. Using leaded gasoline can impair engine performance, damage the emission control system, and could result in loss of warranty coverage.
- An out-of-tune engine, or certain fuel or ignition malfunctions, can cause the catalytic converter to overheat. If you notice a pungent burning odor or some light smoke, your engine may be out of tune or malfunctioning and may require immediate service. Contact your dealer for service assistance.
- When pulling a heavy load or driving a fully loaded vehicle when the humidity is low and the temperature is high, use a premium unleaded fuel to help prevent spark knock. If spark knock persists, lighten the load, or engine piston damage may result.
- The use of fuel additives which are now being sold as octane enhancers is not recommended. Most of these products contain high concentrations of methanol. Fuel system damage or vehicle performance problems resulting from the use of such fuels or additives is not the responsibility of DaimlerChrysler Corporation and may not be covered under the new vehicle warranty.

NOTE: Intentional tampering with emissions control systems can result in civil penalties being assessed against you.

SPECIFICATIONS

SPECIFICATIONS - FLUID CAPACITIES

DESCRIPTION	SPECIFICATION
FUEL TANK	19 U.S. Gallons (71.9 Liters)****
ENGINE OIL	
Engine Oil - with Filter - 2.5L	3.8L (4.0 qts.)
Engine Oil - with Filter - 4.0L	5.7L (6.0 qts.)
ENGINE COOLANT	
Cooling System - 2.5L	8.5L (9.0 qts.)
Cooling System - 4.0L	9.9L (10.5 qts.)
AUTOMATIC TRANSMISSION	
Service Fill - 30RH	3.8L (4.0 qts)
O-haul Fill - 30RH	4.67L (9.86 pts.)
Service Fill - 32RH	3.8L (4.0 qts)
O-haul Fill - 32RH	6.31L (13.33 pts.)
Dry fill capacity Depending on type and size of internal cooler, length and inside diameter of cooler lines, or use of an auxiliary cooler, these figures may vary. (Refer to 21 - TRANSMISSION/TRANSAXLE/ AUTOMATIC/FLUID - STANDARD PROCEDURE)	
TRANSFER CASE	
NV231	1.0L (2.2 pts.)
MANUAL TRANSMISSION	
AX5 (Approximate dry fill or fill to bottom edge of the fill plug hole.)	3.3L (3.49 qts.)
NV3550 (Approximate dry fill or fill to bottom edge of fill plug hole.)	2.28L (2.41 qts.)
FRONT AXLE	
Model 181 FBI	1.2L (2.5 pts.)
REAR AXLE	
Model 194 RBI	1.66L (3.5 pts.)*
Model 216 RBI	1.89L (4.0 pts.)*
* When equipped with Trac-lok®, include 4.0 ounces of Friction Modifier.	
****Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.	

FLUID TYPES

DESCRIPTION - ENGINE COOLANT

WARNING: ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASE COOLANT PROPERLY, CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE, PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED, PERSONAL INJURY CAN RESULT.

CAUTION: Use of Propylene Glycol based coolants is not recommended, as they provide less freeze protection and less corrosion protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769), or the equivalent ethylene glycol base coolant with organic corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% Ethylene Glycol and 50% distilled water to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

CAUTION: Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769) may not be mixed with any other type of antifreeze. Mixing of coolants other than specified (non-HOAT or other HOAT), may result in engine damage that may not be covered under the new vehicle warranty, and decreased corrosion protection.

COOLANT PERFORMANCE

The required ethylene-glycol (antifreeze) and water mixture depends upon climate and vehicle operating conditions. The coolant performance of various mixtures follows:

Pure Water-Water can absorb more heat than a mixture of water and ethylene-glycol. This is for purpose of heat transfer only. Water also freezes at a higher temperature and allows corrosion.

100 percent Ethylene-Glycol-The corrosion inhibiting additives in ethylene-glycol need the presence of water to dissolve. Without water, additives form deposits in system. These act as insulation causing temperature to rise to as high as 149°C (300°F). This temperature is hot enough to melt plastic and soften solder. The increased temperature can result in engine detonation. In addition, 100 percent ethylene-glycol freezes at -22°C (-8°F).

50/50 Ethylene-Glycol and Water-Is the recommended mixture, it provides protection against freezing to -37°C (-34°F). The antifreeze concentration **must always** be a minimum of 44 percent, year-round in all climates. If percentage is lower, engine parts may be eroded by cavitation. Maximum protection against freezing is provided with a 68 percent antifreeze concentration, which prevents freezing down to -67.7°C (-90°F). A higher percentage will freeze at a warmer temperature. Also, a higher percentage of antifreeze can cause the engine to overheat because specific heat of antifreeze is lower than that of water.

CAUTION: Richer antifreeze mixtures cannot be measured with normal field equipment and can cause problems associated with 100 percent ethylene-glycol.

COOLANT SELECTION AND ADDITIVES

The use of aluminum cylinder blocks, cylinder heads and water pumps requires special corrosion protection. Only Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (glycol base coolant with corrosion inhibitors called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% distilled water to obtain to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

CAUTION: Do not use coolant additives that are claimed to improve engine cooling.

FLUID TYPES (Continued)

DESCRIPTION - ENGINE OIL

WARNING: NEW OR USED ENGINE OIL CAN BE IRRITATING TO THE SKIN. AVOID PROLONGED OR REPEATED SKIN CONTACT WITH ENGINE OIL. CONTAMINANTS IN USED ENGINE OIL, CAUSED BY INTERNAL COMBUSTION, CAN BE HAZARDOUS TO YOUR HEALTH. THOROUGHLY WASH EXPOSED SKIN WITH SOAP AND WATER. DO NOT WASH SKIN WITH GASOLINE, DIESEL FUEL, THINNER, OR SOLVENTS, HEALTH PROBLEMS CAN RESULT. DO NOT POLLUTE, DISPOSE OF USED ENGINE OIL PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA.

API SERVICE GRADE CERTIFIED

Use an engine oil that is API Service Grade Certified. MOPAR® provides engine oils that conform to this service grade.

SAE VISCOSITY

An SAE viscosity grade is used to specify the viscosity of engine oil. Use only engine oils with multiple viscosities such as 5W-30 or 10W-30. These oils are specified with a dual SAE viscosity grade which indicates the cold-to-hot temperature viscosity range. Select an engine oil that is best suited to your particular temperature range and variation. (Fig. 1)

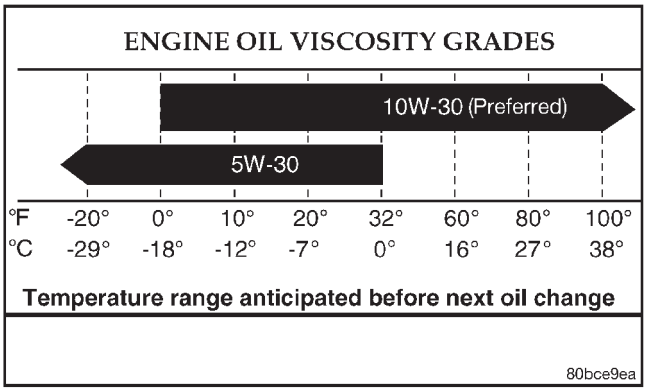


Fig. 1 Temperature/Engine Oil Viscosity

ENERGY CONSERVING OIL

An Energy Conserving type oil is recommended for gasoline engines. The designation of ENERGY CONSERVING is located on the label of an engine oil container.

CONTAINER IDENTIFICATION

Standard engine oil identification notations have been adopted to aid in the proper selection of engine oil. The identifying notations are located on the label of engine oil plastic bottles and the top of engine oil cans (Fig. 2).



9400-9

Fig. 2 API Symbol

MAINTENANCE SCHEDULES

MAINTENANCE SCHEDULES

There are two maintenance schedules that show proper service for the vehicle.

First is Schedule **"A"**. It lists all the scheduled maintenance to be performed under "normal" operating conditions.

Second is Schedule **"B"**. It is a schedule for vehicles that are operated under the conditions listed at the beginning of that schedule.

Use the schedule that best describes the driving conditions.

Where time and mileage are listed, follow the interval that occurs first.

At Each Stop For Fuel

- Check engine oil level, add as required.
- Check windshield washer solvent and add if required.

Once A Month

- Check tire pressure and look for unusual wear or damage.
- Inspect battery and clean and tighten terminals as required. Check electrolyte level and add water as needed.
- Check fluid levels of coolant reservoir, power steering, brake master cylinder, and transmission and add as needed.
- Check all lights and all other electrical items for correct operation.

At Each Oil Change

- Inspect exhaust system.
- Inspect brake hoses.
- Rotate tires.
- Check coolant level, hoses, and clamps.

MAINTENANCE SCHEDULES (Continued)

- Inspect manual transmission fluid level (if equipped).
- After completion of off-road operation, the underside of the vehicle should be thoroughly inspected. Examine threaded fasteners for looseness.

Schedule "A"

7,500 Miles (12 000 km) or at 6 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.

15,000 Miles (24 000 km) or at 12 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.
- Lubricate steering and suspension ball joints.

22,500 Miles (36 000 km) or at 18 months

- Change engine oil.
- Replace engine oil filter.
- Inspect brake linings.
- Lubricate steering linkage joints and outer tie rod ends.

30,000 Miles (48 000 km) or at 24 months

- Change engine oil.
- Replace engine oil filter.
- **Replace engine air cleaner element.**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Lubricate steering linkage joints and outer tie rod ends.
- Drain and refill transfer case fluid.
- Lubricate steering and suspension ball joints.

37,500 Miles (60 000 km) or at 30 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.

45,000 Miles (72 000 km) or at 36 months

- Change engine oil.
- Replace engine oil filter.
- Inspect brake linings.
- Lubricate steering linkage joints and outer tie rod ends.
- Lubricate steering and suspension ball joints.

52,500 Miles (84 000 km) or at 42 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.

60,000 Miles (96 000 km) or at 48 months

- Change engine oil.
- Replace engine oil filter.
- **Replace engine air cleaner element.**
- **Replace ignition cables (2.5L only).**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Inspect drive belt and replace as needed (4.0L only).
- Lubricate steering linkage joints and outer tie rod ends.
- Drain and refill transfer case fluid.
- Lubricate steering and suspension ball joints.

67,500 Miles (108 000 km) or at 54 months

- Change engine oil.
- Replace engine oil filter.
- Inspect brake linings.
- Lubricate steering linkage joints and outer tie rod ends.

75,000 Miles (120 000 km) or at 60 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.
- Flush and replace engine coolant at 60 months, regardless of mileage.
- Lubricate steering and suspension ball joints.
- Inspect drive belt and replace as needed (4.0L only). Not required if previously replaced.

82,500 Miles (133 000 km) or at 66 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.

90,000 Miles (144 000 km) or at 72 months

- Change engine oil.
- Replace engine oil filter.
- **Replace engine air cleaner element.**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Inspect drive belt and replace as needed (4.0L only). Not required if previously replaced.
- Lubricate steering linkage joints and outer tie rod ends.
- Drain and refill transfer case fluid.
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

MAINTENANCE SCHEDULES (Continued)

97,500 Miles (156 000 km) or at 78 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.

100,000 Miles (160 000 km)

- Drain and refill automatic transmission fluid, change filter, and adjust bands.
- Flush and replace engine coolant if not done at 60 months.

105,000 Miles (168 000 km) or at 84 months

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage joints and outer tie rod ends.
- Lubricate steering and suspension ball joints.
- Inspect drive belt and replace as needed (4.0L only). Not required if previously replaced.

112,500 Miles (180 000 km) or at 90 months

- Change engine oil.
- Replace engine oil filter.
- Inspect brake linings.
- Lubricate steering linkage joints and outer tie rod ends.

120,000 Miles (192 000 km) or at 96 months

- Change engine oil.
- Replace engine oil filter.
- **Replace engine air cleaner element.**
- **Replace ignition cables (2.5L only).**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Lubricate steering linkage joints and outer tie rod ends.
- Drain and refill transfer case fluid.
- Inspect drive belt and replace as needed (4.0L only). Not required if previously replaced.
- Lubricate steering and suspension ball joints.

Important: Inspection and service should also be performed any time a malfunction is observed or suspected.

Schedule "B"

Follow this schedule if the vehicle is operated under one or more of the following conditions:

- Day or night temperatures are below 32°F (0°C)
- Stop and go driving
- Extensive engine idling
- Driving in dusty conditions
- Short trips of less than 10 miles (16.2 km)
- More than 50% of driving is at sustained high speeds during hot weather, above 90°F (32°C)
- Trailer towing
- Taxi, Police, or delivery service (commercial service)
- Off-road or desert driving
- If equipped for and operating with E-85 (ethanol) fuel.

3,000 Miles (5 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

6,000 Miles (10 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

9,000 Miles (14 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

12,000 Miles (19 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

15,000 Miles (24 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace if necessary.**
- Lubricate steering linkage tie rod ends.

18,000 Miles (29 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

21,000 Miles (34 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

24,000 Miles (38 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

MAINTENANCE SCHEDULES (Continued)

27,000 Miles (43 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

30,000 Miles (48 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace if necessary.**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Lubricate steering linkage tie rod ends.
- Drain and refill automatic transmission fluid, change filter and adjust bands.
- Drain and refill transfer case fluid.
- Lubricate steering and suspension ball joints.

33,000 Miles (53 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

36,000 Miles (58 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

39,000 Miles (62 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

42,000 Miles (67 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

45,000 Miles (72 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace if necessary.**
- Lubricate steering linkage tie rod ends.
- Inspect drive belt and replace as needed (4.0L only).

48,000 Miles (77 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

51,000 Miles (82 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

54,000 Miles (86 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

57,000 Miles (91 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

60,000 Miles (96 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace as necessary.**
- **Replace ignition cables (2.5L only).**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Inspect drive belt and replace as needed (4.0L only). Not required if belt was previously replaced.
- Lubricate steering linkage tie rod ends.
- Drain and refill transfer case fluid.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.
- Drain and refill automatic transmission fluid, change filter and adjust bands.

63,000 Miles (101 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

66,000 Miles (106 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

69,000 Miles (110 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

72,000 Miles (115 000 km)

- Change engine oil.
- Replace engine oil filter.

MAINTENANCE SCHEDULES (Continued)

- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

75,000 Miles (120 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace as necessary.**
- Lubricate steering linkage tie rod ends.
- Inspect drive belt and replace as needed (4.0L only). Not required if belt was previously replaced.

78,000 Miles (125 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

81,000 Miles (134 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

84,000 Miles (134 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

87,000 Miles (139 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

90,000 Miles (144 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace as necessary.**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Inspect drive belt and replace as needed (4.0L only). Not required if belt was previously replaced.
- Lubricate steering linkage tie rod ends.
- Drain and refill automatic transmission fluid, change filter and adjust bands.
- Drain and refill transfer case fluid.
- Lubricate steering and suspension ball joints.

93,000 Miles (149 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

96,000 Miles (154 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

99,000 Miles (158 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Flush and replace engine coolant.

102,000 Miles (163 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

105,000 Miles (168 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace as necessary.**
- Lubricate steering linkage tie rod ends.
- Inspect drive belt and replace as needed (4.0L only). Not required if belt was previously replaced.

108,000 Miles (173 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

111,000 Miles (178 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

114,000 Miles (182 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.
- Lubricate steering and suspension ball joints.

117,000 Miles (187 000 km)

- Change engine oil.
- Replace engine oil filter.
- Lubricate steering linkage tie rod ends.

MAINTENANCE SCHEDULES (Continued)

120,000 Miles (192 000 km)

- Change engine oil.
- Replace engine oil filter.
- **Inspect engine air cleaner element, replace as necessary.**
- **Replace ignition cables (2.5L only).**
- **Replace spark plugs.**
- Inspect drive belt, adjust tension as necessary (2.5L only).
- Inspect drive belt and replace as needed (4.0L only). Not required if previously replaced.
- Lubricate steering linkage tie rod ends.
- Drain and refill automatic transmission fluid, change filter and adjust bands.
- Drain and refill transfer case fluid.
- Drain and refill front and rear axles.‡
- Inspect brake linings.
- Lubricate steering and suspension ball joints.

‡Off-highway operation, trailer towing, taxi, limousine, bus, snow plowing, or other types of commercial service or prolonged operation with heavy loading, especially in hot weather, require front and rear axle service indicated with a ‡ in Schedule “B”. Perform these services if the vehicle is usually operated under these conditions.

COOLING

TABLE OF CONTENTS

	page
COOLING	
DESCRIPTION	1
OPERATION	2
DIAGNOSIS AND TESTING	2
ON-BOARD DIAGNOSTICS (OBD)	2
PRELIMINARY CHECKS	2
STANDARD PROCEDURE	8
COOLING SYSTEM - REVERSE FLUSHING	8
ACCESSORY DRIVE	10
ENGINE	12
TRANSMISSION	14

COOLING

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The "Refer to" is written differently than in prior years.

DESCRIPTION - 4.0L ENGINE

The cooling system (Fig. 1) is designed to maintain engine temperature at an efficient level during all engine operating conditions.

The components of the cooling system are:

- A heavy duty radiator
- Cooling fan (mechanical)
- Thermal viscous fan drive
- Fan shroud
- Radiator pressure cap
- Thermostat
- Coolant reserve/overflow system
- Automatic transmission oil cooler (internal to radiator)
- Coolant
- Water pump
- Coolant hoses and clamps

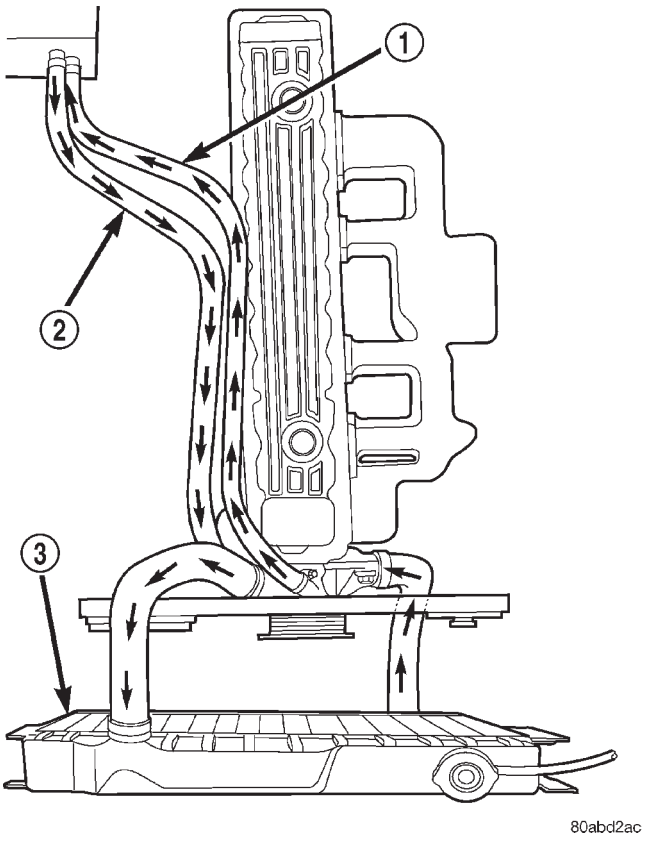


Fig. 1 Coolant Circulation - 4.0L Engine

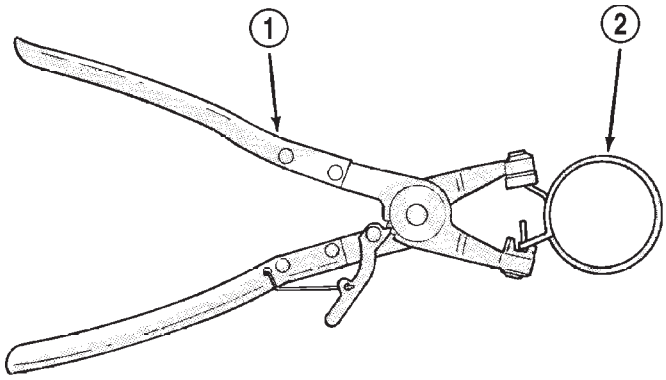
1 - FROM THERMOSTAT
2 - TO WATER PUMP
3 - RADIATOR

COOLING (Continued)

OPERATION - HOSE CLAMPS

The worm type hose clamp uses a specified torque value to maintain proper tension on a hose connection.

The spring type hose clamp applies constant tension on a hose connection. To remove a spring type hose clamp, use Special Tool 6094 or equivalent, constant tension clamp pliers (Fig. 2) to compress the hose clamp.



J9207-36

Fig. 2 Hose Clamp Tool

1 - HOSE CLAMP TOOL 6094
2 - HOSE CLAMP

DIAGNOSIS AND TESTING - ON-BOARD DIAGNOSTICS (OBD)

COOLING SYSTEM RELATED DIAGNOSTICS

The Powertrain Control Module (PCM) has been programmed to monitor the certain following cooling system components:

- If the engine has remained cool for too long a period, such as with a stuck open thermostat, a Diagnostic Trouble Code (DTC) can be set.
- If an open or shorted condition has developed in the relay circuit controlling the electric radiator fan, a Diagnostic Trouble Code (DTC) can be set.

If the problem is sensed in a monitored circuit often enough to indicate an actual problem, a DTC is stored. The DTC will be stored in the PCM memory for eventual display to the service technician.

ACCESSING DIAGNOSTIC TROUBLE CODES

To read DTC's and to obtain cooling system data, (Refer to 25 - EMISSIONS CONTROL - DESCRIPTION)

DIAGNOSIS AND TESTING - PRELIMINARY CHECKS

ENGINE COOLING SYSTEM OVERHEATING

Establish what driving conditions caused the complaint. Abnormal loads on the cooling system such as the following may be the cause:

- PROLONGED IDLE
- VERY HIGH AMBIENT TEMPERATURE
- SLIGHT TAIL WIND AT IDLE
- SLOW TRAFFIC
- TRAFFIC JAMS
- HIGH SPEED OR STEEP GRADES

Driving techniques that avoid overheating are:

- Idle with A/C off when temperature gauge is at end of normal range.
- Increasing engine speed for more air flow is recommended.

TRAILER TOWING:

Consult Trailer Towing section of owners manual. Do not exceed limits.

AIR CONDITIONING; ADD-ON OR AFTER MARKET:

A maximum cooling package should have been ordered with vehicle if add-on or after market A/C is installed. If not, maximum cooling system components should be installed for model involved per manufacturer's specifications.

RECENT SERVICE OR ACCIDENT REPAIR:

Determine if any recent service has been performed on vehicle that may effect cooling system. This may be:

- Engine adjustments (incorrect timing)
- Slipping engine accessory drive belt(s)
- Brakes (possibly dragging)
- Changed parts. Incorrect water pump or pump rotating in wrong direction due to belt not correctly routed
- Reconditioned radiator or cooling system refilling (possibly under filled or air trapped in system).

NOTE: If investigation reveals none of the previous items as a cause for an engine overheating complaint, refer to COOLING SYSTEM DIAGNOSIS CHART BELOW.

These charts are to be used as a quick-reference only. Refer to COOLING SYSTEM DIAGNOSIS CHART

COOLING (Continued)

COOLING SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
TEMPERATURE GAUGE READS LOW	1. Has a Diagnostic Trouble Code (DTC) been set indicating a stuck open thermostat?	1. (Refer to 25 - EMISSIONS CONTROL - DESCRIPTION) for On-Board Diagnostics and DTC information. Replace thermostat if necessary.
	2. Is the temperature sending unit connected?	2. Check the temperature sensor connector. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - SCHEMATIC - ELECTRICAL) Repair connector if necessary.
	3. Is the temperature gauge operating OK?	3. Check gauge operation. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER/ENGINE TEMPERATURE GAUGE - DESCRIPTION) . Repair as necessary.
	4. Coolant level low in cold ambient temperatures accompanied with poor heater performance.	4. Check coolant level in the coolant reserve/overflow tank and the radiator. Inspect system for leaks. Repair leaks as necessary. Refer to the Coolant section of the manual text for WARNINGS and CAUTIONS associated with removing the radiator cap.
	5. Improper operation of internal heater doors or heater controls.	5. Inspect heater and repair as necessary. (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING) for procedures.
TEMPERATURE GAUGE READS HIGH OR THE COOLANT WARNING LAMP ILLUMINATES. COOLANT MAY OR MAY NOT BE LOST OR LEAKING FROM THE COOLING SYSTEM	1. Trailer is being towed, a steep hill is being climbed, vehicle is operated in slow moving traffic, or engine is being idled with very high ambient (outside) temperatures and the air conditioning is on. Higher altitudes could aggravate these conditions.	1. This may be a temporary condition and repair is not necessary. Turn off the air conditioning and attempt to drive the vehicle without any of the previous conditions. Observe the temperature gauge. The gauge should return to the normal range. If the gauge does not return to the normal range, determine the cause for overheating and repair. Refer to Possible Causes (2-20).
	2. Is the temperature gauge reading correctly?	2. Check gauge. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - SCHEMATIC - ELECTRICAL). Repair as necessary.

COOLING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Is the temperature warning illuminating unnecessarily?	3. (Refer to 8 - ELECTRICAL/ INSTRUMENT CLUSTER - SCHEMATIC - ELECTRICAL).
	4. Coolant low in coolant reserve/ overflow tank and radiator?	4. Check for coolant leaks and repair as necessary. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING).
	5. Pressure cap not installed tightly. If cap is loose, boiling point of coolant will be lowered. Also refer to the following Step 6.	5. Tighten cap
	6. Poor seals at the radiator cap.	6. (a) Check condition of cap and cap seals. Refer to Radiator Cap. Replace cap if necessary.
		(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.
	7. Coolant level low in radiator but not in coolant reserve/overflow tank. This means the radiator is not drawing coolant from the coolant reserve/overflow tank as the engine cools	7. (a) Check condition of radiator cap and cap seals. Refer to Radiator Cap in this Group. Replace cap if necessary.
		(b) Check condition of radiator filler neck. If neck is bent or damaged, replace radiator.
		(c) Check condition of the hose from the radiator to the coolant tank. It should fit tight at both ends without any kinks or tears. Replace hose if necessary.
		(d) Check coolant reserve/overflow tank and tanks hoses for blockage. Repair as necessary.
	8. Incorrect coolant concentration	8. Check coolant. (Refer to LUBRICATION & MAINTENANCE/ FLUID TYPES - DESCRIPTION).
	9. Coolant not flowing through system	9. Check for coolant flow at radiator filler neck with some coolant removed, engine warm and thermostat open. Coolant should be observed flowing through radiator. If flow is not observed, determine area of obstruction and repair as necessary.
	10. Radiator or A/C condenser fins are dirty or clogged.	10. Remove insects and debris. (Refer to 7 - COOLING - STANDARD PROCEDURE).
	11. Radiator core is corroded or plugged.	11. Have radiator re-cored or replaced.
	12. Aftermarket A/C installed without proper radiator.	12. Install proper radiator.

COOLING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	13. Fuel or ignition system problems.	13. Refer to 14 - Fuel System or 8 - Electrical for diagnosis and testing procedures.
	14. Dragging brakes.	14. Check and correct as necessary. (Refer to 5 - BRAKES - DIAGNOSIS AND TESTING) for correct procedures.
	15. Bug screen or cardboard is being used, reducing airflow.	15. Remove bug screen or cardboard.
	16. Thermostat partially or completely shut.	16. Check thermostat operation and replace as necessary. (Refer to 7 - COOLING/ENGINE/ENGINE COOLANT THERMOSTAT - REMOVAL).
	17. Viscous fan drive not operating properly.	17. Check fan drive operation and replace as necessary. (Refer to 7 - COOLING/ENGINE/FAN DRIVE VISCOUS CLUTCH - REMOVAL).
	18. Cylinder head gasket leaking.	18. Check for cylinder head gasket leaks. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING).
	19. Heater core leaking.	19. Check heater core for leaks. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING). Repair as necessary.
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC)	1. During cold weather operation, with the heater blower in the high position, the gauge reading may drop slightly.	1. A normal condition. No correction is necessary.
	2. Temperature gauge or engine mounted gauge sensor defective or shorted. Also, corroded or loose wiring in this circuit.	2. Check operation of gauge and repair if necessary. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING).
	3. Gauge reading rises when vehicle is brought to a stop after heavy use (engine still running)	3. A normal condition. No correction is necessary. Gauge should return to normal range after vehicle is driven.
	4. Gauge reading high after re-starting a warmed up (hot) engine.	4. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation.
	5. Coolant level low in radiator (air will build up in the cooling system causing the thermostat to open late).	5. Check and correct coolant leaks. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING).

COOLING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	6. Cylinder head gasket leaking allowing exhaust gas to enter cooling system causing a thermostat to open late.	6. (a) Check for cylinder head gasket leaks. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING). (b) Check for coolant in the engine oil. Inspect for white steam emitting from the exhaust system. Repair as necessary.
	7. Water pump impeller loose on shaft.	7. Check water pump and replace as necessary. (Refer to 7 - COOLING/ENGINE/WATER PUMP - REMOVAL).
	8. Loose accessory drive belt. (water pump slipping)	8. (Refer to 7 - COOLING/ ACCESSORY DRIVE/DRIVE BELTS - DIAGNOSIS AND TESTING). Check and correct as necessary.
	9. Air leak on the suction side of the water pump allows air to build up in cooling system causing thermostat to open late.	9. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT TO COOLANT TANK. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN COOLANT RESERVE/ OVERFLOW TANK	1. Pressure relief valve in radiator cap is defective.	1. Check condition of radiator cap and cap seals. (Refer to 7 - COOLING/ENGINE/RADIATOR PRESSURE CAP - DIAGNOSIS AND TESTING). Replace cap as necessary.
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE READING HIGH OR HOT	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING).
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM). GAUGE MAY OR MAY NOT BE READING HIGH	1. Engine overheating.	1. Check reason for overheating and repair as necessary.
	2. Freeze point of coolant not correct. Mixture is too rich or too lean.	2. Check coolant concentration. (Refer to LUBRICATION & MAINTENANCE/FLUID TYPES - DESCRIPTION).
HOSE OR HOSES COLLAPSE WHILE ENGINE IS RUNNING	1. Vacuum created in cooling system on engine cool-down is not being relieved through coolant reserve/overflow system.	1. (a) Radiator cap relief valve stuck. (Refer to 7 - COOLING/ ENGINE/RADIATOR PRESSURE CAP - DIAGNOSIS AND TESTING). Replace if necessary (b) Hose between coolant reserve/overflow tank and radiator is kinked. Repair as necessary.

COOLING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
		(c) Vent at coolant reserve/overflow tank is plugged. Clean vent and repair as necessary. (d) Reserve/overflow tank is internally blocked or plugged. Check for blockage and repair as necessary.
NOISY VISCOUS FAN/DRIVE	1. Fan blades loose.	1. Replace fan blade assembly. (Refer to 7 - COOLING/ENGINE/ RADIATOR FAN - REMOVAL)
	2. Fan blades striking a surrounding object.	2. Locate point of fan blade contact and repair as necessary.
	3. Air obstructions at radiator or air conditioning condenser.	3. Remove obstructions and/or clean debris or insects from radiator or A/C condenser.
	4. Thermal viscous fan drive has defective bearing.	4. Replace fan drive. Bearing is not serviceable. (Refer to 7 - COOLING/ ENGINE/FAN DRIVE VISCOUS CLUTCH - REMOVAL).
	5. A certain amount of fan noise may be evident on models equipped with a thermal viscous fan drive. Some of this noise is normal.	5. (Refer to 7 - COOLING/ENGINE/ FAN DRIVE VISCOUS CLUTCH - DESCRIPTION) for an explanation of normal fan noise.
INADEQUATE HEATER PERFORMANCE. THERMOSTAT FAILED IN OPEN POSITION	1. Has a Diagnostic trouble Code (DTC) been set?	1. (Refer to 25 - EMISSIONS CONTROL - DESCRIPTION) for correct procedures and replace thermostat if necessary
	2. Coolant level low	2. (Refer to 7 - COOLING - DIAGNOSIS AND TESTING).
	3. Obstructions in heater hose/ fittings	3. Remove heater hoses at both ends and check for obstructions
	4. Heater hose kinked	4. Locate kinked area and repair as necessary
	5. Water pump is not pumping water to/through the heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch. If only one of the hoses is hot, the water pump may not be operating correctly or the heater core may be plugged. Accessory drive belt may be slipping causing poor water pump operation.	5. (Refer to 7 - COOLING/ENGINE/ WATER PUMP - REMOVAL). If a slipping belt is detected, (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - DIAGNOSIS AND TESTING). If heater core obstruction is detected, (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING/HEATER CORE - REMOVAL).

COOLING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
STEAM IS COMING FROM THE FRONT OF VEHICLE NEAR THE GRILL AREA WHEN WEATHER IS WET, ENGINE IS WARMED UP AND RUNNING, AND VEHICLE IS STATIONARY. TEMPERATURE GAUGE IS IN NORMAL RANGE	1. During wet weather, moisture (snow, ice or rain condensation) on the radiator will evaporate when the thermostat opens. This opening allows heated water into the radiator. When the moisture contacts the hot radiator, steam may be emitted. This usually occurs in cold weather with no fan or airflow to blow it away.	1. Occasional steam emitting from this area is normal. No repair is necessary.
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. (Refer to LUBRICATION & MAINTENANCE/FLUID TYPES - DESCRIPTION). Adjust coolant mixture as necessary.
COOLANT LEVEL CHANGES IN COOLANT RESERVE/OVERFLOW TANK. TEMPERATURE GAUGE IS IN NORMAL RANGE	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. If the level in the tank was between the FULL and ADD marks at normal operating temperature, the level should return to within that range after operation at elevated temperatures.	1. A normal condition. No repair is necessary.

STANDARD PROCEDURE - COOLING SYSTEM - REVERSE FLUSHING

CAUTION: The cooling system normally operates at 97-to-124 kPa (14- to-18 psi) pressure. Exceeding this pressure may damage the radiator or hoses.

Reverse flushing of the cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

CHEMICAL CLEANING

If visual inspection indicates the formation of sludge or scaly deposits, use a radiator cleaner (Mopar Radiator Kleen or equivalent) before flushing. This will soften scale and other deposits and aid the flushing operation.

CAUTION: Be sure instructions on the container are followed.

REVERSE FLUSHING RADIATOR

Disconnect the radiator hoses from the radiator fittings. Attach a section of radiator hose to the radiator bottom outlet fitting and insert the flushing gun. Connect a water supply hose and air supply hose to the flushing gun.

CAUTION: The cooling system normally operates at 97-to-124 kPa (14- to-18 psi) pressure. Exceeding this pressure may damage the radiator or hoses.

Allow the radiator to fill with water. When radiator is filled, apply air in short blasts allowing radiator to refill between blasts. Continue this reverse flushing until clean water flows out through rear of radiator cooling tube passages. For more information, refer to operating instructions supplied with flushing equipment. Have radiator cleaned more extensively by a radiator repair shop.

REVERSE FLUSHING ENGINE

Drain the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE). Remove the thermostat housing and thermostat. Install the thermostat housing. Disconnect the radiator upper hose from the radiator and attach the flushing gun to the hose. Disconnect the radiator lower hose from the water pump. Attach a lead away hose to the water pump inlet fitting.

COOLING (Continued)

CAUTION: Be sure that the heater control valve is closed (heat off). This is done to prevent coolant flow with scale and other deposits from entering the heater core.

Connect the water supply hose and air supply hose to the flushing gun. Allow the engine to fill with water. When the engine is filled, apply air in short blasts, allowing the system to fill between air blasts. Continue until clean water flows through the lead away hose. For more information, refer to operating instructions supplied with flushing equipment.

Remove the lead away hose, flushing gun, water supply hose and air supply hose. Remove the thermostat housing (Refer to 7 - COOLING/ENGINE/ENGINE COOLANT THERMOSTAT - REMOVAL). Install the thermostat and housing with a replacement gasket (Refer to 7 - COOLING/ENGINE/ENGINE COOLANT THERMOSTAT - INSTALLATION). Connect the radiator hoses. Refill the cooling system with the correct antifreeze/water mixture (Refer to 7 - COOLING - STANDARD PROCEDURE).

ACCESSORY DRIVE

TABLE OF CONTENTS

page

BELT TENSIONERS - 2.5L
REMOVAL 10
INSTALLATION 10
BELT TENSIONERS - 4.0L
DESCRIPTION 10
REMOVAL 11
INSTALLATION 11

BELT TENSIONERS - 2.5L

REMOVAL

(1) Remove accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).

(2) Remove the pulley bolt, bushing, pulley and spacer (Fig. 1).

(3) Remove the tensioner adjustment bolt and tensioner collar (Fig. 1).

INSTALLATION

(1) Position tensioner collar and install the tensioner adjustment bolt.

(2) Position the spacer, idler pulley, bushing and bolt.

(3) Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

BELT TENSIONERS - 4.0L

DESCRIPTION

The automatic belt tensioner (Fig. 2) is a spring loaded arm and pulley assembly. The tensioner assembly is designed to apply constant pressure on the accessory drive belt to maintain proper belt tension. There are three marks on the tensioner body, these marks are there to indicate belt wear and belt tension.

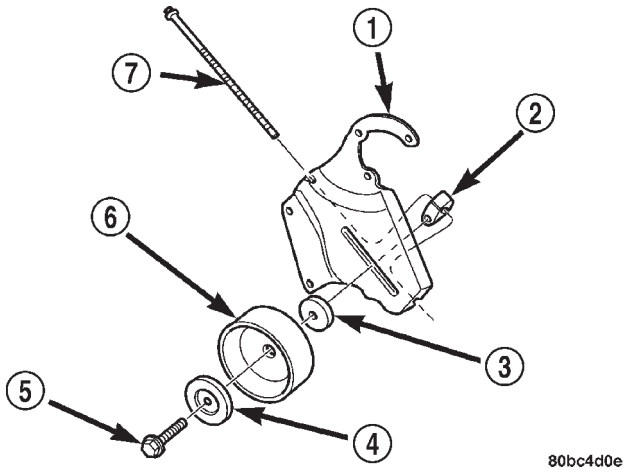


Fig. 1 Accessory Drive Belt Tensioner - 2.5L Engine

1 - TENSIONER BRACKET
2 - TENSIONER COLLAR
3 - SPACER
4 - BUSHING
5 - BOLT
6 - IDLER PULLEY
7 - TENSIONER ADJUSTMENT BOLT

NOTE: On 4.0L engines, the tensioner arm has three marks. Upon installation of a new belt, the double line marks close to each other should be very close to the mark on the base. The belt should be replaced if the single line mark lines up with the mark on the base.

BELT TENSIONERS - 4.0L (Continued)

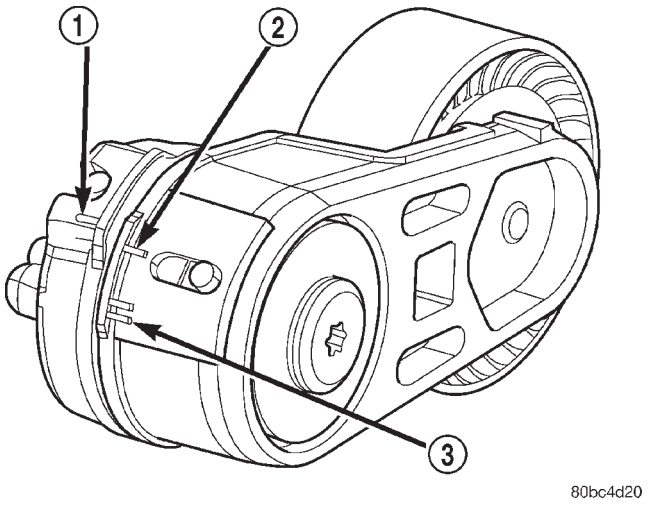


Fig. 2 Accessory Drive Belt Wear Indicator - 4.0L Engine

1 - INDICATOR MARK
2 - MINIMUM TENSION MARK
3 - MAXIMUM TENSION MARK

REMOVAL

On 4.0L engines, the tensioner arm has three marks. Upon installation of a new belt, the double line marks close to each other should be very close to the mark on the base. The belt should be replaced if the single line mark lines up with the mark on the base.

If the above specification cannot be met, check for:

- The wrong belt being installed (incorrect length/ width)
- Worn bearings on an engine accessory (A/C compressor, power steering pump, water pump, idler pulley or generator)
- A pulley on an engine accessory being loose
- Misalignment of an engine accessory
- Belt incorrectly routed.

NOTE: A used belt should be replaced if tensioner indexing arrow has moved to the minmum travel indicator. Tensioner travel stops at this point.

(1) Remove accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).

(2) Remove tensioner assembly from mounting bracket (Fig. 3).

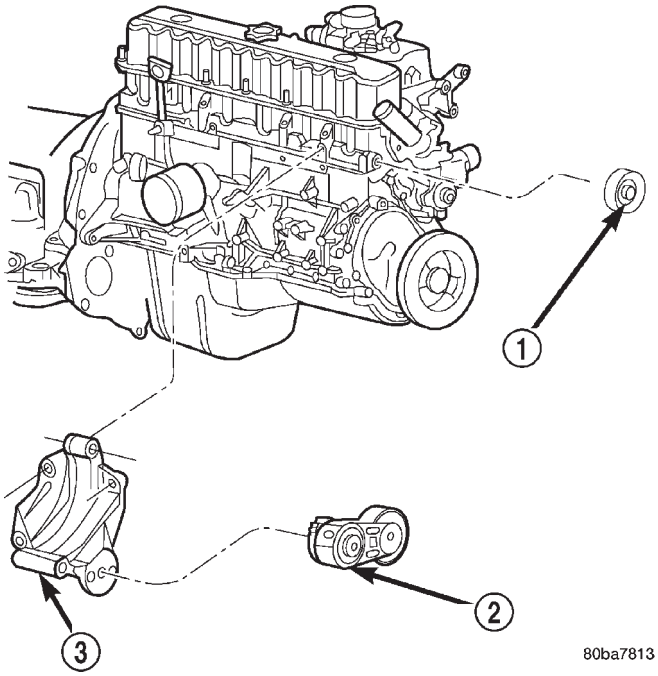


Fig. 3 Automatic Belt Tensioner - 4.0L Engine

1 - IDLER PULLEY TIGHTEN TO 47 N·m (35 FT. LBS.)
2 - AUTOMATIC BELT TENSIONER
3 - GENERATOR MOUNTING BRACKET

WARNING: BECAUSE OF HIGH SPRING TENSION, DO NOT ATTEMPT TO DISASSEMBLE AUTOMATIC TENSIONER. UNIT IS SERVICED AS AN ASSEMBLY.

INSTALLATION

(1) Install tensioner assembly to mounting bracket, align the two dowels on the tensioner with the mounting bracket and hand start the bolt. Tighten bolt to 28 N·m (250 in. lbs.).

(2) Install accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

(3) Check belt indexing marks.

ENGINE

TABLE OF CONTENTS

page

COOLANT RECOVERY CONTAINER
REMOVAL 12
INSTALLATION. 12
ENGINE COOLANT TEMP SENSOR
DESCRIPTION 12
OPERATION. 12
REMOVAL 13
INSTALLATION. 13

COOLANT RECOVERY CONTAINER

REMOVAL

(1) Disconnect the hose from radiator filler neck.
(2) Remove coolant recovery bottle (Fig. 1).

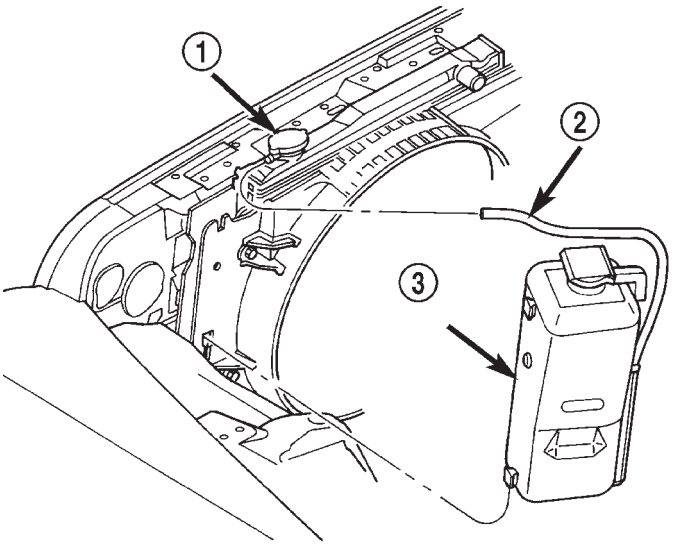


Fig. 1 Coolant Reserve/Overflow Bottle

1 - RADIATOR PRESSURE CAP
2 - HOSE
3 - COOLANT RECOVERY BOTTLE

INSTALLATION

(1) Position the tabs on the overflow bottle into the slots on the fan shroud.
(2) Reconnect the overflow hose onto the radiator filler neck.
(3) Fill resrevoir/overflow bottle.

ENGINE COOLANT TEMP SENSOR

DESCRIPTION

The Engine Coolant Temperature (ECT) sensor is used to sense engine coolant temperature. The sensor protrudes into an engine water jacket.

The ECT sensor is a two-wire Negative Thermal Coefficient (NTC) sensor. Meaning, as engine coolant temperature increases, resistance (voltage) in the sensor decreases. As temperature decreases, resistance (voltage) in the sensor increases.

OPERATION

At key-on, the Powertrain Control Module (PCM) sends out a regulated 5 volt signal to the ECT sensor. The PCM then monitors the signal as it passes through the ECT sensor to the sensor ground (sensor return).

When the engine is cold, the PCM will operate in Open Loop cycle. It will demand slightly richer air-fuel mixtures and higher idle speeds. This is done until normal operating temperatures are reached.

The PCM uses inputs from the ECT sensor for the following calculations:

- For engine coolant temperature gauge operation through CCD or PCI (J1850) communications
- Injector pulse-width
- Spark-advance curves
- ASD relay shut-down times
- Idle Air Control (IAC) motor key-on steps
- Pulse-width prime-shot during cranking
- O2 sensor closed loop times
- Purge solenoid on/off times
- EGR solenoid on/off times (if equipped)
- Leak Detection Pump operation (if equipped)
- Radiator fan relay on/off times (if equipped)
- Target idle speed

ENGINE COOLANT TEMP SENSOR (Continued)

REMOVAL

WARNING: HOT, PRESSURIZED COOLANT CAN CAUSE INJURY BY SCALDING. COOLING SYSTEM MUST BE PARTIALLY DRAINED BEFORE REMOVING THE COOLANT TEMPERATURE SENSOR.

The coolant temperature sensor is installed in the thermostat housing (Fig. 2).

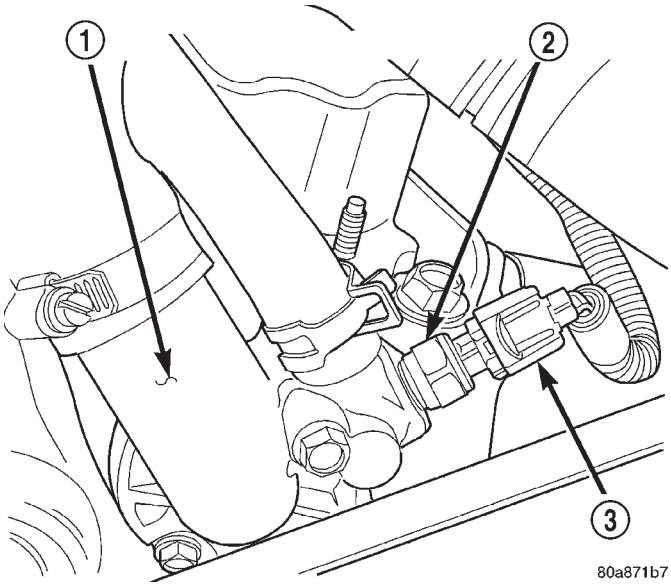


Fig. 2 Engine Coolant Temperature Sensor - Typical

1 - THERMOSTAT HOUSING
2 - ENGINE COOLANT TEMPERATURE SENSOR
3 - ELECTRICAL CONNECTOR

(1) Partially drain cooling system until coolant level is below cylinder head. (Refer to 7 - COOLING - STANDARD PROCEDURE).
(2) Disconnect coolant temperature sensor wire connector.
(3) Remove sensor from thermostat housing.

INSTALLATION

(1) Apply sealant to sensor threads (new replacement sensors will have sealant already applied).
(2) Install coolant temperature sensor into thermostat housing. Tighten to 11 N·m (8 ft. lbs.) torque.
(3) Connect wire connector.
(4) Fill cooling system. (Refer to 7 - COOLING - STANDARD PROCEDURE).

TRANSMISSION

TABLE OF CONTENTS

page

TRANS COOLER
STANDARD PROCEDURE 14

page

FLUSHING COOLERS AND TUBES 14

TRANS COOLER

STANDARD PROCEDURE - FLUSHING COOLERS AND TUBES

When a transmission failure has contaminated the fluid, the oil cooler(s) must be flushed. The torque converter must also be replaced. This will insure that metal particles or sludged oil are not later transferred back into the reconditioned (or replaced) transmission.

The only recommended procedure for flushing coolers and lines is to use Tool 6906-B Cooler Flusher.

WARNING:
WEAR PROTECTIVE EYEWEAR THAT MEETS THE REQUIREMENTS OF OSHA AND ANSI Z87.1–1968. WEAR STANDARD INDUSTRIAL RUBBER GLOVES. KEEP LIGHTED CIGARETTES, SPARKS, FLAMES, AND OTHER IGNITION SOURCES AWAY FROM THE AREA TO PREVENT THE IGNITION OF COMBUSTIBLE LIQUIDS AND GASES. KEEP A CLASS (B) FIRE EXTINGUISHER IN THE AREA WHERE THE FLUSHER WILL BE USED.
KEEP THE AREA WELL VENTILATED.
DO NOT LET FLUSHING SOLVENT COME IN CONTACT WITH YOUR EYES OR SKIN: IF EYE CONTAMINATION OCCURS, FLUSH EYES WITH WATER FOR 15 TO 20 SECONDS. REMOVE CONTAMINATED CLOTHING AND WASH AFFECTED SKIN WITH SOAP AND WATER. SEEK MEDICAL ATTENTION.

(1) Remove cover plate filler plug on Tool 6906-B. Fill reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. **DO NOT** use solvents containing acids, water, gasoline, or any other corrosive liquids.

(2) Reinstall filler plug on Tool 6906-B.

(3) Verify pump power switch is turned OFF. Connect red alligator clip to positive (+) battery post. Connect black (-) alligator clip to a good ground.

(4) Disconnect the cooler lines at the transmission.

NOTE: When flushing transmission cooler and lines, ALWAYS reverse flush.

NOTE: The converter drainback valve must be removed and an appropriate replacement hose installed to bridge the space between the transmission cooler line and the cooler fitting. Failure to remove the drainback valve will prevent reverse flushing the system. A suitable replacement hose can be found in the adapter kit supplied with the flushing tool.

(5) Connect the BLUE pressure line to the OUTLET (From) cooler line.

(6) Connect the CLEAR return line to the INLET (To) cooler line

(7) Turn pump ON for two to three minutes to flush cooler(s) and lines.

(8) Turn pump OFF.

(9) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.

(10) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.

(11) Place CLEAR suction line into a one quart container of Mopar® ATF +4, type 9602, Automatic Transmission Fluid.

(12) Turn pump ON until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler and lines. Turn pump OFF.

(13) Disconnect alligator clips from battery. Reconnect flusher lines to cover plate, and remove flushing adapters from cooler lines.

AUDIO

TABLE OF CONTENTS

page

AUDIO
DESCRIPTION 1
AMPLIFIED SUBWOOFER
DESCRIPTION 1
OPERATION 1
DIAGNOSIS AND TESTING 1
AMPLIFIED SUBWOOFER 1
REMOVAL 2
INSTALLATION. 2
ANTENNA BODY & CABLE
REMOVAL 2
INSTALLATION. 2
RADIO
REMOVAL 3
INSTALLATION. 4
SPEAKER
REMOVAL 4
INSTALLATION. 5
SOUND BAR
REMOVAL 5
INSTALLATION. 6

AUDIO

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The "Refer to" is written differently than in prior years.

AMPLIFIED SUBWOOFER

DESCRIPTION

The available amplified subwoofer is mounted within the center console. The amplified subwoofer is rated at 40 watts per channel. The amplified subwoofer should be checked if there is no bass output noted from the rear speakers. The amplified subwoofer can not be repaired or adjusted, and if faulty or damaged, the unit must be replaced.

OPERATION

The amplified subwoofer receives fused current from the Radio Choke Relay. The amplified subwoofer provides low frequency bass and receives inputs from the rear speaker circuits.

DIAGNOSIS AND TESTING - AMPLIFIED SUBWOOFER

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO ELECTRICAL, RESTRAINTS 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 receiver on. Adjust the balance and fader controls to check the performance of each individual speaker. Note the speaker locations that are not performing correctly.

(2) Disconnect the wire harness connector from the amplified subwoofer. Turn the ignition switch to the ON position. Turn the radio ON. Check the battery feed and ground cavities in the wire harness connector. Check the radio choke relay wire harness connector. If not OK, repair shorted or open wires as necessary. If OK, go to (STEP #3).

(3) Turn the radio receiver off. Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the radio receiver and the amplified subwoofer. Check both the speaker feed (+) circuit and return (–) circuit cavities for the

AMPLIFIED SUBWOOFER (Continued)

inoperative speaker location(s) from the radio receiver wire harness connectors and to the amplified subwoofer for continuity. In each case, there should be continuity. If not OK, repair the shorted speaker feed (+) and/or return (–) circuit(s) to the speaker as required. If OK, replace the amplified subwoofer.

REMOVAL

(1) Disconnect and isolate the battery negative cable.
(2) Remove the center console (Refer to 23 - BODY/INTERIOR/CENTER CONSOLE - REMOVAL).
(3) Disconnect wire harness retainer.
(4) Disconnect wire harness connector.
(5) Remove the mounting screws from the side of the console.
(6) Open console lid and remove the retaining fasteners from the console.
(7) Remove amplified subwoofer from console.

INSTALLATION

(1) Install amplified subwoofer to console.
(2) Install retaining fasteners to the top of the console.
(3) Install the mounting screws to the side of the console.
(4) Connect wire harness connector and retainer.
(5) Install the center console (Refer to 23 - BODY/INTERIOR/CENTER CONSOLE - INSTALLATION).
(6) Connect the battery negative cable.

ANTENNA BODY & CABLE

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, (REFER TO ELECTRICAL/RESTRAINTS) 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 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - REMOVAL).
(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) Unscrew the antenna mast from the antenna body base on the right outer cowl side panel (Fig. 1).

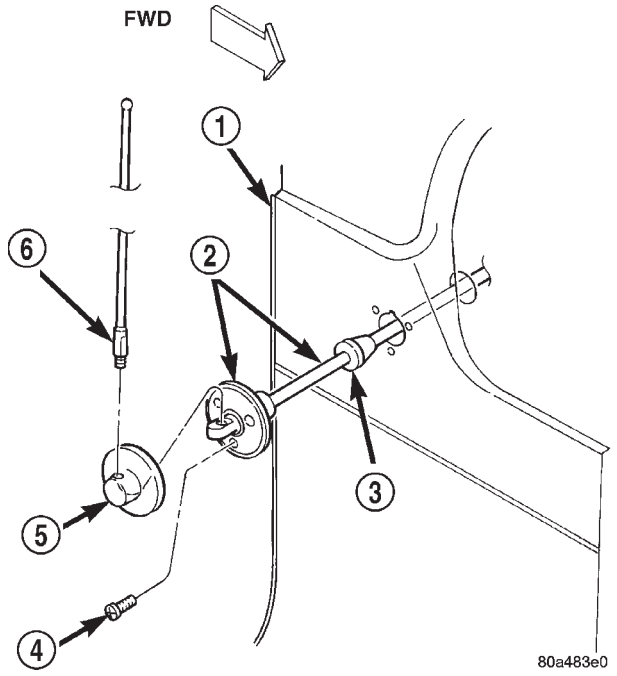


Fig. 1 Antenna Remove/Install

1 - RIGHT COWL SIDE PANEL
2 - BASE & CABLE
3 - GROMMET
4 - SCREW
5 - COVER
6 - MAST

(5) 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.
(6) Remove the three screws that secure the antenna body base to the right outer cowl side panel.
(7) 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.
(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.

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, (REFER TO ELECTRICAL/RESTRAINTS) 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.

ANTENNA BODY & CABLE (Continued)

(1) From outside the vehicle, feed the antenna cable and base assembly through the outer cowl side panel.

(2) From inside the passenger compartment, pull the cable and grommet into the hole in the inside cowl side panel until the grommet is seated.

(3) Install the three screws retaining the antenna body base to right outer cowl side panel. Tighten the screws to 3.3 N·m (30 in. lbs.).

(4) Screw the antenna mast to the antenna body base.

(5) Reach through the glove box opening and secure the antenna coaxial cable the radio antenna port.

(6) Install the glove box to the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - INSTALLATION).

(7) Connect the battery negative cable.

RADIO

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, (REFER TO ELECTRICAL/RESTRAINTS) 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 instrument panel top cover from the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL TOP COVER - REMOVAL).

(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).

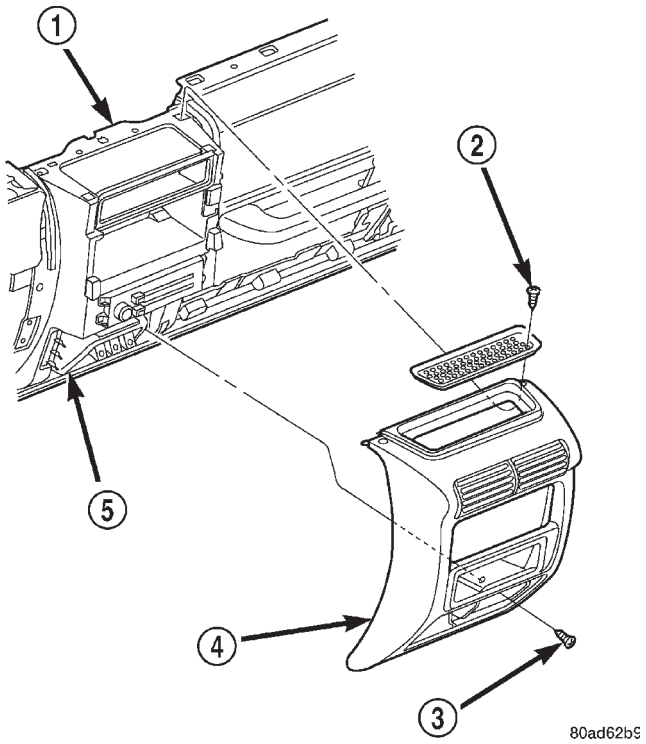


Fig. 2 Center Bezel Remove/Install

1 - INSTRUMENT PANEL
2 - SCREW (2)
3 - SCREW
4 - CENTER BEZEL
5 - ACCESSORY SWITCH BEZEL

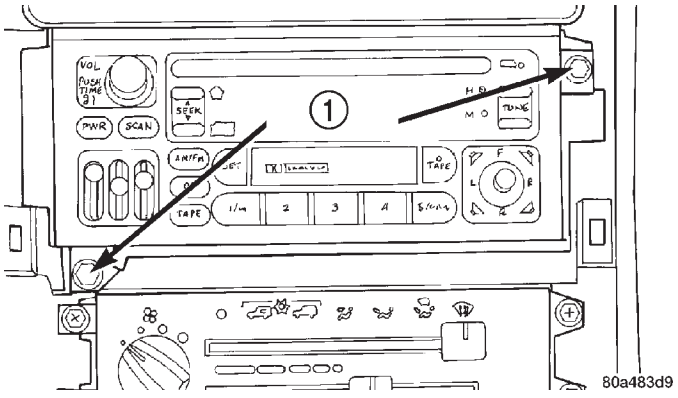


Fig. 3 Radio Remove/Install

1 - MOUNTING SCREWS

(10) If the vehicle is equipped with the CD radio receiver, go to Step 11. If the vehicle is not equipped with the CD radio receiver, go to Step 13.

(11) Remove the glove box from the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - REMOVAL).

RADIO (Continued)

(12) Reach through the instrument panel glove box opening to access and remove the screw that secures the CD radio bracket and the ground strap to the back of the radio receiver chassis (Fig. 4).

(13) Pull the radio out from the instrument panel far enough to access the wire harness connectors and the antenna coaxial cable connector (Fig. 4).

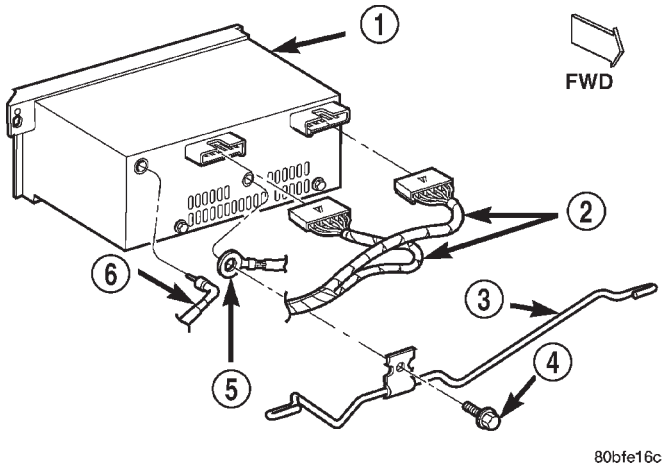


Fig. 4 Radio Connections - Typical

1 - RADIO RECEIVER
2 - INSTRUMENT PANEL WIRE HARNESS
3 - CD RADIO BRACKET
4 - SCREW
5 - GROUND STRAP
6 - ANTENNA CABLE

(14) Unplug the wire harness connectors and the antenna coaxial cable connector from the rear of the radio.

(15) If the vehicle is not equipped with the CD radio receiver, remove the screw that secures the ground strap to the back of the radio receiver chassis.

(16) Remove the radio from the instrument panel.

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, (REFER TO ELECTRICAL/RESTRAINTS) 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) Position the radio into the instrument panel.

(2) Install the screw that secures the ground strap to the back of the radio receiver chassis.

(3) Connect the coaxial antenna cable at the rear of the radio chassis.

(4) Connect the radio wire harness connectors to the rear of the radio.

(5) Install the two radio retaining screws. Tighten the screws to 5 N·m (20 in. lbs).

(6) Install the center bezel to the instrument panel. Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

(7) Install the one screw located at the back of the ash receiver housing that secures the center bezel to the lower instrument panel.

(8) Install the ash receiver.

(9) Connect the battery negative cable.

SPEAKER

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 two screws that secure the outboard end of the speaker bezel to the instrument panel (Fig. 5).

(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 four screws that secure the speaker to the instrument panel armature (Fig. 6).

(6) Pull the speaker away from the instrument panel far enough to access the speaker wire harness connector.

(7) Unplug the wire harness connector from the speaker.

(8) Remove the speaker from the instrument panel.

SPEAKER (Continued)

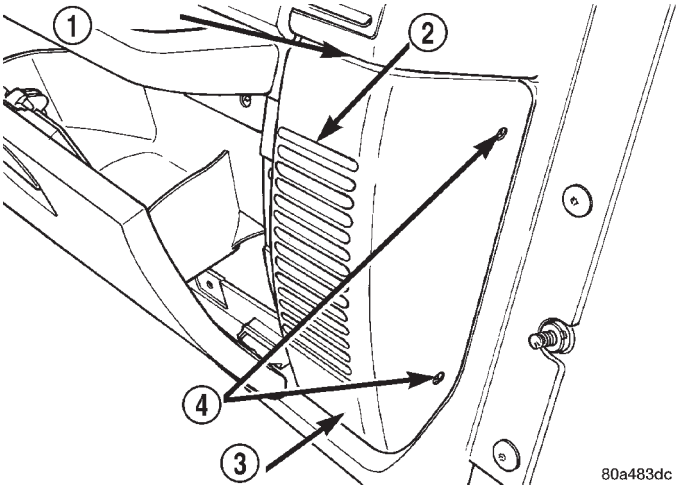


Fig. 5 Instrument Panel Speaker Bezel Remove/ Install

1 - PRY HERE
2 - SPEAKER BEZEL
3 - PRY HERE
4 - MOUNTING SCREWS

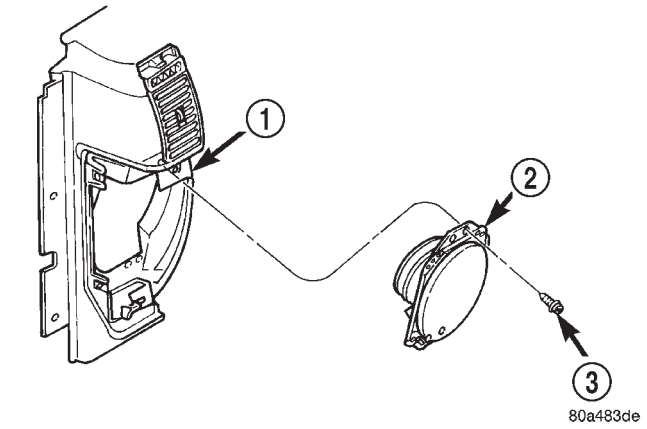


Fig. 6 Instrument Panel Speaker Remove/Install

1 - INSTRUMENT PANEL
2 - SPEAKER
3 - SCREW

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, (REFER TO ELECTRICAL/RESTRAINTS) 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) Connect the speaker wire connector to the speaker.
(2) Position the speaker to the instrument panel.
(3) Install the four speaker retaining screws. Tighten the screws to 1.1 N·m (10.in.lbs).
(4) Install the speaker bezel to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).
(5) Connect the battery negative cable.

SOUND BAR

REMOVAL

(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 23 - BODY/REMOVEABLE TOP/TOP - REMOVAL).
(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).

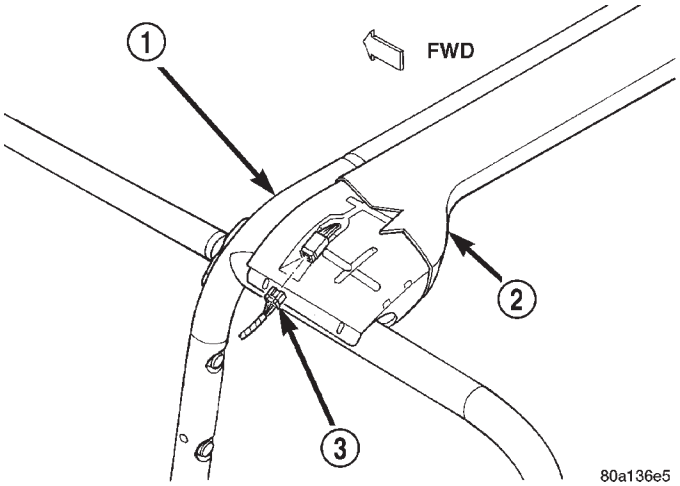


Fig. 7 Sound Bar Wire Harness Connector Remove/ Install

1 - SPORT BAR
2 - SOUND BAR
3 - CONNECTOR

SOUND BAR (Continued)

(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).
(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.

INSTALLATION

(1) Position the sound bar onto the sport bar.
(2) Install the two screws retaining the sound bar to the sport bar.
(3) Connect the sound bar wire harness connector.
(4) Position the sound bar trim cover and attach the hook and loop.
(5) If the vehicle is equipped with the standard soft top, raise the soft top.
(6) If the vehicle is equipped with the optional hard top, install the hard top (Refer to 23 - BODY/ REMOVEABLE TOP/TOP - INSTALLATION).
(7) Connect the battery negative cable.

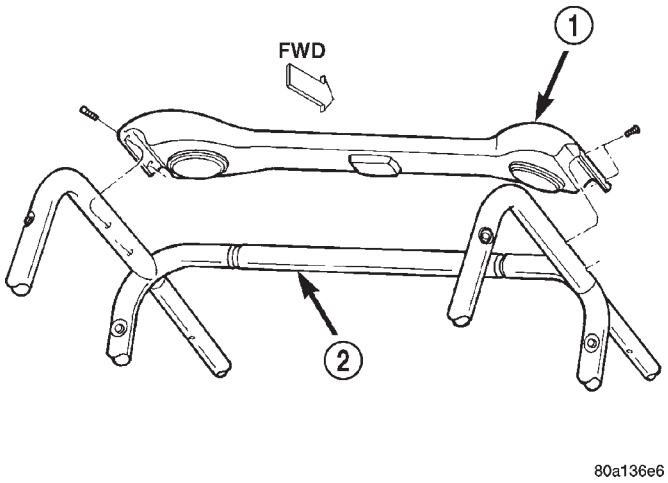


Fig. 8 Sound Bar Remove/Install

1 - SOUND BAR
2 - SPORT BAR

INSTRUMENT CLUSTER

TABLE OF CONTENTS

page

INSTRUMENT CLUSTER
DESCRIPTION . . . 1
OPERATION . . . 3
DIAGNOSIS AND TESTING . . . 6
INSTRUMENT CLUSTER . . . 6
REMOVAL . . . 12
DISASSEMBLY . . . 12
ASSEMBLY . . . 14
INSTALLATION . . . 15
ABS INDICATOR
DESCRIPTION . . . 15
OPERATION . . . 15
DIAGNOSIS AND TESTING . . . 15
ABS INDICATOR . . . 15
AIRBAG INDICATOR
DESCRIPTION . . . 16
OPERATION . . . 16
BRAKE/PARK BRAKE INDICATOR
DESCRIPTION . . . 17
OPERATION . . . 17
DIAGNOSIS AND TESTING . . . 18
BRAKE INDICATOR . . . 18
CHECK GAUGES INDICATOR
DESCRIPTION . . . 19
OPERATION . . . 19
CRUISE INDICATOR
DESCRIPTION . . . 20
OPERATION . . . 20
ENGINE TEMPERATURE GAUGE
DESCRIPTION . . . 20
OPERATION . . . 21
FOG LAMP INDICATOR
DESCRIPTION . . . 22
OPERATION . . . 22
DIAGNOSIS AND TESTING . . . 22
FRONT/REAR FOG LAMP INDICATOR . . . 22
FUEL GAUGE
DESCRIPTION . . . 23
OPERATION . . . 23
HIGH BEAM INDICATOR
DESCRIPTION . . . 24

page

OPERATION . . . 24
DIAGNOSIS AND TESTING . . . 24
HIGH BEAM INDICATOR . . . 24
LOW FUEL INDICATOR
DESCRIPTION . . . 25
OPERATION . . . 25
MALFUNCTION INDICATOR LAMP MIL
DESCRIPTION . . . 26
OPERATION . . . 26
ODOMETER
DESCRIPTION . . . 27
OPERATION . . . 27
OIL PRESSURE GAUGE
DESCRIPTION . . . 28
OPERATION . . . 28
SEATBELT WARNING INDICATOR
DESCRIPTION . . . 29
OPERATION . . . 29
SHIFT INDICATOR (TRANSFER CASE)
DESCRIPTION . . . 29
OPERATION . . . 30
DIAGNOSIS AND TESTING . . . 31
PART TIME INDICATOR . . . 31
FULL TIME INDICATOR . . . 31
SPEEDOMETER
DESCRIPTION . . . 32
OPERATION . . . 33
TACHOMETER
DESCRIPTION . . . 33
OPERATION . . . 33
TURN SIGNAL INDICATORS
DESCRIPTION . . . 34
OPERATION . . . 34
DIAGNOSIS AND TESTING . . . 34
TURN SIGNAL INDICATOR . . . 34
UPSHIFT INDICATOR
DESCRIPTION . . . 35
OPERATION . . . 35
VOLTAGE GAUGE
DESCRIPTION . . . 36
OPERATION . . . 36

INSTRUMENT CLUSTER

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The "Refer to" is written differently than in prior years.

INSTRUMENT CLUSTER (Continued)

DESCRIPTION

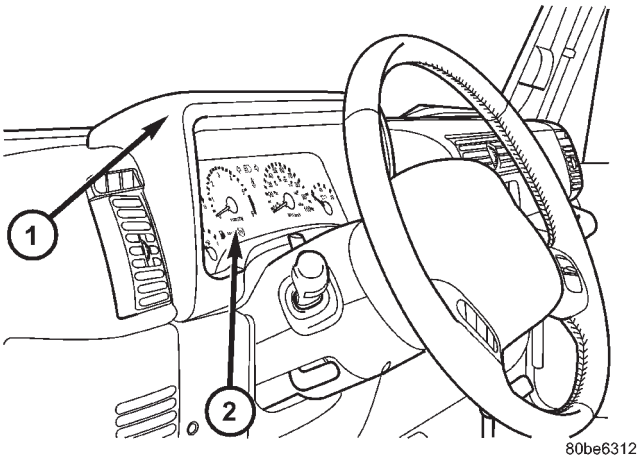


Fig. 1 Instrument Cluster

1 - CLUSTER BEZEL
2 - INSTRUMENT CLUSTER

The instrument cluster for this model is an ElectroMechanical Instrument Cluster (EMIC) module that is located in the instrument panel above the steering column opening, directly in front of the driver (Fig. 1). The EMIC gauges and indicators are protected by an integral clear plastic cluster lens, and are visible through a dedicated opening in the cluster bezel on the instrument panel. Just behind the cluster lens is the cluster hood and integral cluster mask, which are constructed of molded black plastic. The cluster hood serves as a visor and shields the face of the cluster from ambient light and reflections to reduce glare, while the cluster mask trims the outside perimeter of the cluster overlay. Behind the cluster hood and mask is the cluster overlay and gauges. The overlay is a laminated plastic unit. The dark, visible, outer surface of the overlay is marked with all of the gauge identification and graduations, but this layer is also translucent. The darkness of this outer layer prevents the cluster from appearing cluttered or busy by concealing the cluster indicators that are not illuminated, while the translucence of this layer allows those indicators and icons that are illuminated to be readily visible. The underlying layer of the overlay is opaque and allows light from the various indicators and illumination lamps behind it to be visible through the outer layer of the mask only through predetermined stencil-like cutouts. On the lower edge of the cluster lens just right of center, a small molded rubber odometer/trip odometer switch knob boot covers the switch knob and seals the hole in the lens through which the knob protrudes. The remainder of the EMIC, including the mounts and the electrical connections, are concealed behind the cluster bezel. The molded plastic EMIC housing has four integral mounting tabs, two on the lower edge of the housing and one on each side. The EMIC is secured to the instrument panel structural support with four screws. All electrical connections to the EMIC are made at the back of the cluster housing through two color-coded connector receptacles that connect the cluster to the vehicle electrical system through two take outs and connectors of the instrument panel wire harness.

A single EMIC module is offered on this model; however, some variations of this module exist due to optional equipment and regulatory requirements. This module utilizes integrated circuitry and information carried on the Programmable Communications Interface (PCI) data bus network for control of all gauges and many of the indicators. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES/COMMUNICATION - DESCRIPTION). The EMIC also uses several hard wired inputs in order to perform its many functions. In addition to instrumentation and indicators, the EMIC has hardware and/or software to support the following functions:

- **Chime Warning Service** - The EMIC performs the functions necessary to provide audible alerts to the vehicle operator and eliminates the need for a separate chime module. (Refer to 8 - ELECTRICAL/CHIME/BUZZER - DESCRIPTION).
- **Interior Lighting Control Service** - The EMIC performs the functions necessary to provide control of the interior lighting. This control includes providing illuminated entry, fade-to-off (theater) dimming, and battery saver (load shedding) features for all interior courtesy lighting.
- **Rear Window Defogger Control and Timer Service** - The EMIC performs the functions necessary to control and time the output to the rear window defogger on vehicles so equipped and eliminates the need for a separate control and timer module for the rear window defogger system. (Refer to 8 - ELECTRICAL/WINDOW DEFOGGER - DESCRIPTION).
- **Vacuum Fluorescent Display (VFD) and Panel Lamps Dimming Service** - The EMIC performs the functions necessary to eliminate the need for a separate dimming module. The cluster converts an analog input signal from the headlamp and panel lamps dimmer switches to the appropriate digital, pulse-width modulated outputs to control the dimming levels of both the instrument cluster and radio VFDs as well as the incandescent cluster and panel illumination lighting. This includes providing features such as VFD illumination when a door is ajar, radio illumination control, a parade mode, and dimmable cruise, four-wheel drive, and upshift indicators.

INSTRUMENT CLUSTER (Continued)

The EMIC module incorporates a blue-green electronic digital VFD for displaying odometer, trip odometer, and diagnostic information. The EMIC includes the following analog gauges:

- **Coolant Temperature Gauge**
- **Fuel Gauge**
- **Oil Pressure Gauge**
- **Speedometer**
- **Tachometer**
- **Voltage Gauge**

The EMIC also includes provisions for the following indicators:

- **Airbag Indicator**
- **Antilock Brake System (ABS) Indicator**
- **Brake Indicator**
- **Check Gauges Indicator**
- **Cruise Indicator**
- **Fog Lamp (Front or Rear) Indicator**
- **Four-Wheel Drive (Part Time and/or Full Time) Indicator**
- **High Beam Indicator**
- **Low Fuel Indicator**
- **Malfunction Indicator Lamp (MIL)**
- **Seatbelt Indicator**
- **Sentry Key Immobilizer System (SKIS) Indicator**
- **Turn Signal (Right and Left) Indicators**
- **Upshift Indicator (Manual Transmission)**

Some of these indicators are automatically configured when the EMIC is connected to the vehicle electrical system. This feature allows those indicators to be activated or deactivated for compatibility with certain optional equipment. The EMIC uses electronic messages received over the PCI data bus from the Airbag Control Module (ACM), the Sentry Key Immobilizer Module (SKIM), and the Powertrain Control Module (PCM) to learn whether the vehicle is equipped with airbags, the Sentry Key Immobilizer System (SKIS), or cruise control; then, configures the appropriate indicators accordingly. Once the EMIC learns that a vehicle has these equipment options installed, these indicators will function accordingly for the remainder of the cluster life.

Cluster illumination is accomplished by adjustable incandescent back lighting, which illuminates the gauges for visibility when the exterior lighting is turned on. The EMIC high beam indicator is illuminated by a dedicated incandescent bulb. The remaining indicators in the EMIC are each illuminated by a dedicated Light Emitting Diode (LED) that is soldered onto the electronic circuit board. Each of the incandescent bulbs is secured by an integral bulb holder to the electronic circuit board from the back of the cluster housing.

Hard wired circuitry connects the EMIC to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the EMIC through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The EMIC modules for this model are serviced only as complete units. The EMIC module cannot be adjusted or repaired. If a gauge, an LED indicator, the VFD, the electronic circuit board, the circuit board hardware, the cluster overlay, or the EMIC housing are damaged or faulty, the entire EMIC module must be replaced. The cluster lens, the cluster hood and mask unit, the rear cluster housing cover, the odometer/trip odometer switch knob boot, and the incandescent lamp bulbs with holders are available for individual service replacement.

OPERATION

The ElectroMechanical Instrument Cluster (EMIC) is designed to allow the vehicle operator to monitor the conditions of many of the vehicle components and operating systems. The gauges and indicators in the EMIC provide valuable information about the various standard and optional powertrains, fuel and emissions systems, cooling systems, lighting systems, safety systems, and many other convenience items. The EMIC is installed in the instrument panel so that all of these monitors can be easily viewed by the vehicle operator when driving, while still allowing relative ease of access for service. The microprocessor-based EMIC hardware and software uses various inputs to control the gauges and indicators visible on the face of the cluster. Some of these inputs are hard wired, but most are in the form of electronic messages that are transmitted by other electronic modules over the Programmable Commutations Interface (PCI) data bus network. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES/COMMUNICATION - OPERATION).

The EMIC microprocessor smooths the input data using algorithms to provide gauge readings that are accurate, stable, and responsive to operating conditions. These algorithms are designed to provide gauge readings during normal operation that are consistent with customer expectations. However, when abnormal conditions exist, such as low/high battery voltage, low oil pressure, or high coolant temperature, the algorithm drives the gauge pointer to an

extreme position and the microprocessor turns on the Check Gauges indicator to provide a distinct visual indication of a problem to the vehicle operator. The instrument cluster circuitry may also generate a chime tone when it monitors certain conditions or inputs to provide the vehicle operator with an audible alert.

The EMIC circuitry operates on battery current received through the Ignition-Off Draw (IOD) fuse in the Power Distribution Center (PDC) on a non-switched fused B(+) circuit, and on battery current received through a fuse in the fuse block on a fused ignition switch output (run-start) circuit. This arrangement allows the EMIC to provide chime service and interior lighting control regardless of the ignition switch position, while other features will operate only with the ignition switch in the On or Start positions. The EMIC circuitry is grounded by a single ground circuit through one of the instrument cluster connectors and take outs of the instrument panel wire harness. This ground circuit receives ground through a single wire take out with an eyelet terminal connector that is secured under a ground screw to the back of the instrument panel structural support near the lower left corner of the instrument panel, just inboard of the left instrument panel end bracket.

The EMIC also has a self-diagnostic actuator test capability, which will test each of the PCI 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. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). See the owner's manual in the vehicle glove box for more information on the features, use and operation of the EMIC.

GAUGES

All gauges receive battery current through the EMIC circuitry when the ignition switch is in the On or Start positions. With the ignition switch in the Off position battery current is not supplied to any gauges, and the EMIC circuitry is programmed to move all of the gauge needles back to the low end of their respective scales. Therefore, the gauges do not accurately indicate any vehicle condition unless the ignition switch is in the On or Start positions. All of the EMIC gauges, except the odometer, are air core magnetic units. Two fixed electromagnetic coils are located within each 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 pivot shaft, while 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 EMIC circuitry in response to messages received over the PCI data bus. The gauge needle moves as the movable permanent magnet aligns itself to the changing magnetic fields created around it by the electromagnets.

The gauges are diagnosed using the EMIC self-diagnostic actuator test. (Refer to 8 - ELECTRICAL/ INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). Proper testing of the PCI data bus and the data bus message inputs to the EMIC that control each gauge require the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information. Specific operation details for each gauge may be found elsewhere in this service information.

VACUUM-FLUORESCENT DISPLAY

The Vacuum-Fluorescent Display (VFD) module is soldered to the EMIC electronic circuit board. The display is active when either door is opened or with the ignition switch in the On or Start positions, and inactive about twenty seconds after both doors are closed when the ignition switch is in any other position. If a door is left open with ignition switch in any position except On or Start, the VFD will remain illuminated until the interior lights control battery saver (load shedding) timer expires after about twenty minutes. The VFD has several display capabilities including: odometer, trip odometer, software version display, and can display various diagnostic information. An odometer/trip odometer switch on the EMIC circuit board is used to control several of the display modes. This switch is actuated manually by depressing the odometer/trip odometer switch knob that extends through the lower edge of the cluster lens, just right of center. Actuating this switch momentarily with the VFD illuminated will toggle the display between the odometer and trip odometer modes. Depressing the switch button for about two seconds while the VFD is in the trip odometer mode will reset the trip odometer value to zero. Holding this switch depressed while turning the ignition switch from the Off position to the On position will activate the EMIC self-diagnostic actuator test. When illuminated, the VFD will automatically display the message “no BuS” in place of the odometer or trip odometer information if there is a loss of PCI data bus communication, and will display the message “noFuSE” if the instrument cluster is not receiving battery current through the fused B(+) circuit from the Ignition-Off Draw (IOD) fuse. The VFD will also display various information used in several diagnostic procedures. Refer to the appropriate diagnostic

information for additional details on these VFD functions.

The VFD is diagnosed using the EMIC self-diagnostic actuator test. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). Proper testing of the PCI data bus and the data bus message inputs to the EMIC that control some of the VFD functions requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information. Specific operation details for the odometer and trip odometer functions of the VFD may be found elsewhere in this service information.

INDICATORS

Indicators are located in various positions within the EMIC and are all connected to the EMIC electronic circuit board. The antilock brake system indicator, four-wheel drive indicators, headlamp high beam indicator, front/rear fog lamp indicator, and turn signal indicators are hard wired. The brake indicator is controlled by the hard wired park brake/brake warning indicator switch input to the EMIC and the EMIC programming. The seatbelt indicator is controlled by the hard wired seat belt switch input to the EMIC and the EMIC programming. The Malfunction Indicator Lamp (MIL) is normally controlled by PCI data bus messages from the Powertrain Control Module (PCM); however, if the EMIC loses PCI data bus communications, the EMIC circuitry will automatically turn the MIL on and display the message “no BuS” in the odometer VFD until PCI data bus communication is restored. The EMIC uses PCI data bus messages from the PCM, Airbag Control Module (ACM), and the Sentry Key Immobilizer Module (SKIM) to control all of the remaining indicators. Different indicators are controlled by different strategies; some receive fused ignition switch output from the EMIC circuitry and have a switched ground, while others are grounded through the EMIC circuitry and have a switched battery feed.

In addition, certain indicators in this instrument cluster are configurable. This feature allows these indicators to be automatically enabled or disabled by the EMIC circuitry for compatibility with certain optional equipment. The airbag indicator, cruise indicator, and the Sentry Key Immobilizer System (SKIS) indicator are automatically configured. Once a configurable indicator is enabled by the EMIC, it is learned and stored in cluster memory for the remainder of the cluster life.

The hard wired indicators are diagnosed using conventional diagnostic methods. The EMIC and PCI bus message controlled indicators are diagnosed using the EMIC self-diagnostic actuator test. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). Proper testing of the PCI data bus and the data bus message inputs to the EMIC that control each indicator requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information. Specific operation details for each indicator may be found elsewhere in this service information.

CLUSTER ILLUMINATION

The EMIC has several illumination lamps that are illuminated when the exterior lighting is turned on with the headlamp switch circuitry of the left multi-function switch. The illumination brightness of these lamps is adjusted by the panel lamps dimmer rheostat when the control ring on the left multi-function switch control stalk is rotated (downward to dim, upward to brighten). An analog/digital (A/D) converter in the EMIC converts the analog panel lamps dimmer rheostat input from the left multi-function switch to a digital dimming level pulse-width modulated signal for controlling the lighting levels of the EMIC VFD and cluster illumination lamps. The EMIC also controls and synchronizes the radio and other instrument panel lighting levels through a hard wired panel lamp feed output circuit.

The hard wired cluster illumination inputs and outputs are diagnosed using conventional diagnostic methods. Proper testing of the VFD dimming level and the EMIC A/D converter function require the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

CHIME SERVICE

The EMIC is equipped with hardware and software to provide chime service for all available features in the chime warning system. Upon receiving the proper chime inputs, the EMIC activates an integral chime tone generator to provide the audible chime tone to the vehicle operator. The chime tone generator in the EMIC is capable of producing single chime tones or repeated chime tones at two different rates: a slow rate of about fifty chime tones per minute, and a fast rate of about 180 chime tones per minute. The internal programming of the EMIC determines the priority of each chime tone request input that is received, as well as the rate and duration of each chime tone that is to be generated.

The EMIC relies upon hard wired inputs from the door ajar switches, the left multi-function switch, the ignition switch, and the park brake/brake warning indicator switches to provide chime service for the driver/passenger door ajar warning, the head/park lights-on reminder, and the key-in ignition reminder. For the remaining chime warning functions the EMIC uses a combination of hard wired inputs, electronic message inputs received from other modules over the PCI data bus, and internal programming.

(Refer to 8 - ELECTRICAL/CHIME/BUZZER - OPERATION). The hard wired chime inputs to the EMIC are diagnosed using conventional diagnostic methods. Proper testing of the EMIC, its programming, and the PCI data bus chime request message functions requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

INTERIOR LIGHTING CONTROL

The EMIC contains an integral timer and logic circuit to perform both timer and control functions for the interior courtesy lamps. The EMIC uses hard wired inputs from the ignition switch, both door ajar switches on separate driver and passenger door ajar switch sense circuits, from the resistor multiplexed panel lamps dimmer circuitry of the left multi-function switch on the panel lamps dimmer signal circuit and its control logic to provide a battery current output to the courtesy lamps on a courtesy lamp feed circuit. The EMIC control provides a theater-type fade-to-off feature that will slowly dim the courtesy lamps about five seconds after both doors are closed. The EMIC also provides an illuminated entry/exit feature by monitoring the door ajar and ignition switch inputs. When a door is opened with the ignition switch in the Off position, the EMIC turns on the courtesy lamps. When the ignition switch is turned to the On or Start positions, the EMIC turns the courtesy lamps off immediately with no theater dimming. When the ignition switch is turned from the On position to the Off position, the EMIC turns on the interior lights for about ten seconds or until the ignition switch is again turned to the On or Start positions, whichever occurs first. The EMIC also provides a battery saver feature (load shedding) for the interior lighting. Unless the engine is running, the instrument cluster will automatically turn off the interior lights if they are left on for more than about twenty minutes, regardless of the status of the ignition switch, door ajar switch, or left multi-function switch inputs to the cluster.

The hard wired inputs and output of the EMIC interior lighting control can be diagnosed using conventional diagnostic methods; however, there are no other diagnostic tools available for the EMIC timer and logic circuitry. If the input and output components and circuits of the interior lighting system test OK, but the system fails to operate, the EMIC must be replaced.

REAR WINDOW DEFOGGER CONTROL

The EMIC contains an integral timer and logic circuit to perform the rear window defogger timer and control functions for the optional rear window defogger system. The EMIC uses a hard wired input from the rear window defogger switch on the rear window defogger switch sense circuit and its control logic to determine the correct output to the rear window defogger relay. The EMIC controls the ground path of the rear window defogger relay control coil through an output on the rear window defogger relay control circuit. The EMIC is programmed to interpret each momentary ground signal it receives on the rear window defogger switch sense circuit as a request to change the current state of the output on the rear window defogger relay control circuit. Therefore, with the ignition switch in the On position, the first ground input on the rear window defogger switch sense circuit turns the system On, the second ground input turns the system Off, and so forth. Once the rear window defogger system has been turned On, it can be turned off manually by depressing the rear window defogger switch a second time or by turning the ignition switch to the Off position. The timer function of the EMIC will also automatically turn the rear window defogger system Off. The timer turns the system Off after about ten minutes of operation; however, after the first timed interval has expired, each time the system is turned On again during that same ignition cycle, the timer will automatically turn it Off after about five minutes of operation.

The hard wired input and output of the EMIC rear window defogger control can be diagnosed using conventional diagnostic methods; however, there are no other diagnostic tools available for the EMIC rear window defogger timer and logic circuitry. If the input and output components and circuits of the rear window defogger system test OK, but the system fails to operate, the EMIC must be replaced.

DIAGNOSIS AND TESTING - INSTRUMENT CLUSTER

If all of the instrument cluster gauges and/or indicators are inoperative, refer to PRELIMINARY DIAGNOSIS . If an individual gauge or Programmable Communications Interface (PCI) data bus message-controlled indicator is inoperative, refer to ACTUATOR TEST . If an individual hard wired indicator is inoperative, refer to the diagnosis and testing information for that specific indicator. If the instrument cluster chime service is inoperative, refer to CHIME SERVICE DIAGNOSIS . If the instrument cluster illumination lighting is inoperative, refer to CLUSTER ILLUMINATION DIAGNOSIS . If the instrument cluster interior lighting control function is inoperative, refer to INTERIOR LIGHTING CONTROL DIAGNOSIS . If the instrument cluster rear window defogger control function is inoperative, refer to REAR WINDOW DEFOGGER CONTROL DIAGNOSIS . Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details

INSTRUMENT CLUSTER (Continued)

of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

NOTE: Certain indicators in this instrument cluster are automatically configured. This feature allows those indicators to be activated for compatibility with certain optional equipment. If the problem being diagnosed involves illumination of the airbag indicator, the cruise indicator, or the SKIM indicator when the vehicle does not have this equipment, the instrument cluster must be replaced with a new unit.

PRELIMINARY DIAGNOSIS

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

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

(2) Check the fused B(+) fuse (Fuse 24 - 10 ampere) 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 (Fuse 24 - 10 ampere) in the PDC. If OK, go to Step 4. If not OK, repair the open B(+) circuit between the PDC and the battery as required.

(4) Disconnect and isolate the battery negative cable. Remove the instrument cluster. Reconnect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the instrument panel wire harness connector (Connector C1) for the instrument cluster. If OK, refer to ACTUATOR TEST . If not OK, repair the open fused B(+) circuit between the instrument cluster and the PDC as required.

(5) Check the fused ignition switch output (run-start) fuse (Fuse 10 - 10 ampere) in the fuse block. 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. Check for battery voltage at the fused ignition switch output (run-start) fuse (Fuse 10 - 10 ampere) in the fuse block. If OK, go to Step 7. If not OK, repair the open fused ignition switch output (run-start) circuit between the fuse block and the ignition switch as required.

(7) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Reinstall the instrument cluster. Reconnect the battery negative cable. Turn the ignition switch to the On position. Set the park brake. The brake indicator in the instrument cluster 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 control ring on the left multi-function switch to the full bright position. The cluster illumination lamps should light. If OK, refer to ACTUATOR TEST . 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. Reconnect the battery 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 panel wire harness connector (Connector C1) for the instrument cluster. If OK, refer to ACTUATOR TEST . If not OK, repair the open fused ignition switch output (run-start) circuit between the instrument cluster and the fuse block 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 panel wire harness connector (Connector C1) for the instrument cluster and a good ground. There should be continuity. If OK, refer to ACTUATOR TEST . If not OK, repair the open ground circuit to ground (G201) as required.

ACTUATOR TEST

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

INSTRUMENT CLUSTER (Continued)

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, the PCI data bus message controlled indicator lamps, and the chime tone generator are capable of operating as designed. During the actuator test the instrument cluster circuitry will sound the chime tone generator, position each of the gauge needles at various specified calibration points, illuminate each of the segments in the Vacuum-Fluorescent Display (VFD), and turn all of the PCI data bus message-controlled indicators on and off again.

Successful completion of the actuator test will confirm that the instrument cluster is operational. However, there may still be a problem with the PCI 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 DRBIII® scan tool to diagnose these components. Refer to the appropriate diagnostic information.

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 screws securing the inoperative gauge to the instrument cluster electronic circuit board are properly tightened before considering instrument cluster replacement. If the gauge mounting screws check OK, replace the faulty instrument cluster.

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

(2) Depress the odometer/trip odometer switch button.

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

(4) Release the odometer/trip odometer switch button.

(5) The instrument cluster will automatically begin the actuator test sequence, as follows:

(a) The cluster will generate a single chime tone to confirm the functionality of the chime tone generator and the chime control circuitry.

(b) The cluster will scroll the number “8” across the odometer/trip odometer VFD to confirm the functionality of all VFD segments and their control circuitry.

(c) The cluster will illuminate the decimal point in the odometer/trip odometer VFD to confirm the functionality of this VFD segment and its control circuitry.

(d) The cluster will display the EMIC software level in the odometer/trip odometer VFD (example: “SOF 8.9”).

(e) The cluster will display the last six digits (sequence number) of the Vehicle Identification Number (VIN) in the odometer/trip odometer VFD.

(f) If any faults have been set by the cluster, the cluster will display the fault information in the odometer/trip odometer VFD INSTRUMENT CLUSTER FAILURE MESSAGE . If no faults have been set, the cluster will scroll “no FAULtS” across the odometer/trip odometer VFD.

(g) The cluster will turn on, then off again each of the following indicators, one at a time, in sequence to confirm the functionality of the indicator and the cluster control circuitry:

- High Beam
- Brake
- Seatbelt
- MIL
- Check Gauges
- Low Fuel
- Full Time
- Part Time
- SKIS
- Cruise
- Upshift

(h) The cluster will sweep the needles for each of the following gauges, one at a time, to several calibration points in sequence to confirm the functionality of the gauge and the cluster control circuitry:

- Speedometer
- Fuel
- Temperature
- Tachometer
- Voltage
- Oil Pressure

INSTRUMENT CLUSTER (Continued)

INSTRUMENT CLUSTER FAILURE MESSAGE

VFD Message	Description	Correction
″buS b0″	PCM - MIL Message	The cluster is not receiving a MIL lamp message from the PCM. A DRBIII® scan tool is required for further diagnosis. Refer to the appropriate diagnostic information.
″buS b1″	SKIM - SKIM Message	The cluster is not receiving a SKIS lamp message from the SKIM. A DRBIII® scan tool is required for further diagnosis. Refer to the appropriate diagnostic information.
″buS b8″	ACM - Airbag Message	The cluster is not receiving an Airbag lamp message from the ACM. A DRBIII® scan tool is required for further diagnosis. Refer to the appropriate diagnostic information.
″PanEL OPEn″	Panel Sense - Open Circuit	The cluster is not receiving an input from the the panel lamps dimmer circuitry of the left multi-function switch on the panel lamps dimmer signal circuit. Repair the open circuit or replace the faulty switch as required.
″Airbag″	Telltale Open/Shorted	The EMIC airbag indicator is open or shorted. Replace the faulty cluster.

(6) The actuator test is now completed. 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 over the PCI data bus during the test.

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

CHIME SERVICE DIAGNOSIS

Before performing this test, complete the testing of each of the hard wired chime warning system switches. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 Chime Service function of the instrument cluster requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

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

(2) Disconnect the cross body wire harness connector for the ignition switch from the switch connector receptacle. Check for continuity between the key-in switch sense circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the shorted key-in switch sense circuit as required.

(3) Check for continuity between the key-in switch sense circuit cavities of the instrument panel wire harness connector for the instrument cluster (Connector C2) and the cross body wire harness connector for the ignition switch. There should be continuity. If OK, go to Step 4. If not OK, repair the open key-in ignition switch sense circuit between the instrument cluster and the ignition switch as required.

INSTRUMENT CLUSTER (Continued)

(4) Disconnect the floor wire harness connector from the seat belt switch pigtail wire connector. Check for continuity between the seat belt switch sense circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted seat belt switch sense circuit between the instrument cluster and the seat belt switch as required.

(5) Check for continuity between the seat belt switch sense circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the floor wire harness connector for the seat belt switch. There should be continuity. If OK, refer to PRELIMINARY DIAGNOSIS . If not OK, repair the open seat belt switch sense circuit between the instrument cluster and the seat belt switch as required.

INTERIOR LIGHTING CONTROL DIAGNOSIS

Before performing this test, complete the testing of each of the hard wired interior lighting switches. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 Interior Lighting Control function of the instrument cluster requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

(1) Check the door ajar switch output fuse (Fuse 4 - 10 ampere) in the fuse block. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Check for continuity between the door ajar switch output fuse (Fuse 4 - 10 ampere) in the fuse block and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open ground circuit between the fuse block and ground (G300) as required.

(3) Disconnect and isolate the battery negative cable. Disconnect the cross body wire harness connector for the driver and/or passenger door ajar switch from the switch connector receptacle. Check for continuity between the door ajar switch output circuit cavity of the driver or passenger door ajar switch and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open door ajar switch output circuit between the driver or passenger door ajar switch and the fuse block as required.

(4) Remove the instrument cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the cluster connector receptacle. Check for continuity between the driver and/or passenger door ajar switch sense circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted driver and/or passenger door ajar switch sense circuits between the instrument cluster and the driver and/or passenger door ajar switches as required.

(5) Check for continuity between the driver and/or passenger door ajar switch sense circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the cross body wire harness connector for the driver and/or passenger door ajar switches. There should be continuity. If OK, use a DRBIII® scan tool to complete the diagnosis of the instrument cluster interior lighting control. Refer to the appropriate diagnostic information. If not OK, repair the open driver and/or passenger door ajar switch sense circuits between the instrument cluster and the driver and/or passenger door ajar switches as required.

REAR WINDOW DEFOGGER CONTROL DIAGNOSIS

Before performing this test, complete the testing of the rear window defogger switch and the rear window defogger relay. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

INSTRUMENT CLUSTER (Continued)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 rear window defogger relay from the receptacle in the Power Distribution Center (PDC). Disconnect the instrument panel wire harness connector for the rear window defogger switch from the switch connector receptacle. Remove the instrument cluster from the instrument panel.

(2) Check for continuity between the rear window defogger switch sense circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the shorted rear window defogger switch sense circuit between the instrument cluster and the rear window defogger switch as required.

(3) Check for continuity between the rear window defogger switch sense circuit cavities of the instrument panel wire harness connectors for the instrument cluster (Connector C2) and the rear window defogger switch. There should be continuity. If OK, go to Step 4. If not OK, repair the open rear window defogger switch sense circuit between the instrument cluster and the rear window defogger switch as required.

(4) Check for continuity between the rear window defogger relay control circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 5. If not OK, repair the shorted rear window defogger relay control circuit between the instrument cluster and the PDC as required.

(5) Check for continuity between the rear window defogger relay control circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the rear window defogger relay receptacle in the PDC. There should be continuity. If OK, replace the faulty instrument cluster. If not OK, repair the open rear window defogger relay control circuit between the instrument cluster and the PDC as required.

CLUSTER ILLUMINATION DIAGNOSIS

The diagnosis found here addresses an inoperative instrument cluster illumination lamp condition. If the problem being diagnosed is a single inoperative illumination lamp, be certain that the bulb and bulb holder unit are properly installed in the instrument cluster electronic circuit board. If no installation problems are found replace the faulty bulb and bulb holder unit. If all of the cluster illumination lamps are inoperative and the problem being diagnosed includes inoperative exterior lighting controlled by the left multi-function switch, that system needs to be repaired first. If the exterior lamps controlled by the left multi-function switch are inoperative, (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/HEADLAMP - DIAGNOSIS AND TESTING). If no exterior lighting system problems are found, the following procedure will help locate a short or open in the cluster illumination lamp circuit. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 cross body wire harness connector for the left multi-function switch from the switch connector receptacle. Check for continuity between the ground circuit cavity of the cross body wire harness connector for the left multi-function switch and a good ground. There should be continuity. If OK, go to Step 2. If not OK, repair the open ground circuit to ground (G300) as required.

(2) Remove the instrument cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the cluster connector receptacle. Check for continuity between the panel lamp dimmer signal circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster

and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the shorted panel lamp dimmer signal circuit between the instrument cluster and the left multi-function switch as required.

(3) Check for continuity between the panel lamp dimmer signal circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the cross body wire harness connector for the left multi-function switch. There should be continuity. If OK, use a DRBIII® scan tool to complete the diagnosis of the instrument cluster illumination lighting. Refer to the appropriate diagnostic information. If not OK, repair the open panel lamp dimmer signal circuit between the instrument cluster and the left multi-function switch as required.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 cluster bezel from the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/CLUSTER BEZEL - REMOVAL).

(3) Remove the four screws that secure the instrument cluster to the instrument panel structural support (Fig. 2).

(4) Pull the instrument cluster forward far enough to access and disconnect the two instrument panel wire harness connectors for the instrument cluster from the connector receptacles on the back of the cluster housing.

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

DISASSEMBLY

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

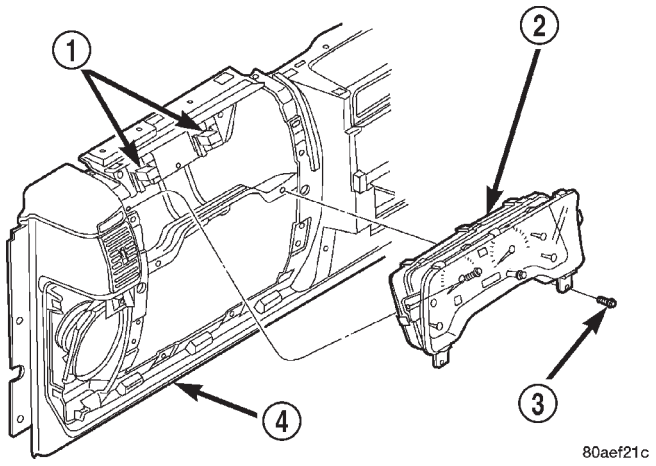


Fig. 2 Instrument Cluster Remove/Install

1 - WIRE HARNESS CONNECTORS
2 - INSTRUMENT CLUSTER
3 - SCREW (4)
4 - INSTRUMENT PANEL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CLUSTER BULB

This procedure applies to each of the incandescent cluster illumination lamp or indicator bulb and bulb holder units. However, the illumination lamps and the indicators use different bulb and bulb holder unit sizes. They must never be interchanged.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

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

INSTRUMENT CLUSTER (Continued)

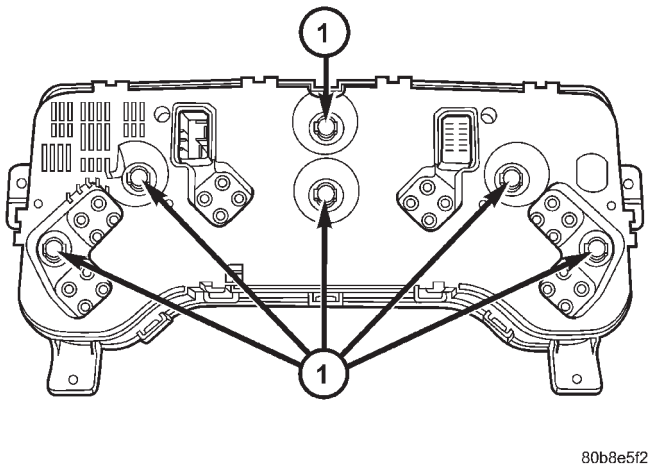


Fig. 3 Cluster Bulb Locations

1 - CLUSTER INCANDESCENT BULBS

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

CLUSTER LENS

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

(3) Work around the perimeter of the cluster lens and disengage each of the latches that secure the lens to the cluster housing (Fig. 4).

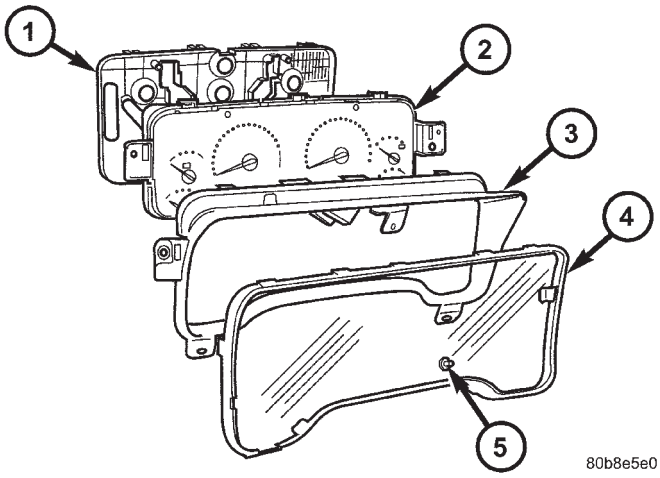


Fig. 4 Instrument Cluster Components

1 - CLUSTER HOUSING REAR COVER
2 - CLUSTER HOUSING
3 - CLUSTER HOOD & MASK
4 - CLUSTER LENS
5 - RESET KNOB BOOT

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

TRIP ODOMETER RESET KNOB BOOT

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

(3) Remove the cluster lens from the cluster housing. Refer to CLUSTER LENS for the proper cluster lens removal procedures.

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

CLUSTER HOOD AND MASK

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument cluster from the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

(3) Remove the cluster lens from the cluster housing. Refer to CLUSTER LENS for the proper cluster lens removal procedures.

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

(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 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

(3) Remove the two screws that secure the rear cover to the cluster housing.

(4) Work around the perimeter of the cluster housing rear cover and disengage each of the latches that secure the cover to the outside of the cluster housing (Fig. 4).

(5) Disengage the one inboard latch located near the lower edge of the rear cover just right of center that secures the rear cover to the cluster housing.

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

INSTRUMENT CLUSTER (Continued)

ASSEMBLY

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CLUSTER BULB

This procedure applies to each of the incandescent cluster illumination lamp or indicator bulb and bulb holder units. However, the illumination lamps and the indicators use different bulb and bulb holder unit sizes. They must never be interchanged.

CAUTION: 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) Insert the bulb and bulb holder unit straight into the correct bulb mounting hole in the cluster electronic circuit board (Fig. 3).

(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) Reinstall the instrument cluster onto the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(4) Reconnect the battery negative cable.

CLUSTER LENS

(1) Align the cluster lens with the cluster hood and mask unit (Fig. 4). Be certain that the trip odometer reset knob boot is aligned with the reset switch knob.

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

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

(4) Reinstall the instrument cluster onto the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(5) Reconnect the battery negative cable.

TRIP ODOMETER RESET KNOB BOOT

(1) Position the trip odometer reset knob boot to the mounting hole from the back of the cluster lens (Fig. 4).

(2) Gently pull the trip odometer reset knob boot into the mounting hole from the face of the cluster lens.

(3) Reinstall the cluster lens onto the cluster housing. Refer to CLUSTER LENS for the proper cluster lens installation procedures.

(4) Reinstall the instrument cluster onto the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(5) Reconnect the battery negative cable.

CLUSTER HOOD AND MASK

(1) Align the cluster hood and mask unit with the cluster housing (Fig. 4).

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

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

(4) Reinstall the cluster lens onto the cluster housing. Refer to CLUSTER LENS for the proper cluster lens installation procedures.

(5) Reinstall the instrument cluster onto the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(6) Reconnect the battery negative cable.

CLUSTER HOUSING REAR COVER

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

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

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

(4) Install and tighten the two screws that secure the rear cover to the cluster housing. Tighten the screws to 2 N·m (20 in. lbs.).

(5) Reinstall the instrument cluster onto the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(6) Reconnect the battery negative cable.

INSTRUMENT CLUSTER (Continued)

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

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

(2) Reconnect the two instrument panel wire harness connectors for the instrument cluster to the connector to the connector receptacles on the back of the cluster housing (Fig. 2).

(3) Position the instrument cluster to the instrument panel structural support.

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

(5) Reinstall the cluster bezel onto the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/ CLUSTER BEZEL - INSTALLATION).

(6) Reconnect the battery negative cable.

NOTE: Some of the indicators in a new instrument cluster are automatically configured (airbag, cruise, and Sentry Key Immobilizer System indicators) when the cluster is connected to the vehicle electrical system. This feature allows those indicators to be automatically enabled for compatibility with certain optional equipment.

ABS INDICATOR

DESCRIPTION

An Antilock Brake System (ABS) indicator is standard equipment on all instrument clusters, but is only functional on vehicles equipped with the ABS option. The ABS indicator is located near the lower edge of the instrument cluster overlay, to the left of the odometer/trip odometer Vacuum-Fluorescent Display (VFD). The ABS indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “Failure of Anti-lock Braking System” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. An amber lens behind the cutout in the opaque layer of the overlay causes the icon to appear in amber through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The ABS indicator is serviced as a unit with the instrument cluster.

OPERATION

The ABS indicator gives an indication to the vehicle operator when the ABS system is faulty or inoperative. This indicator is hard wired on the instrument cluster electronic circuit board, and is completely controlled by the Controller Antilock Brake (CAB). The ABS indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the CAB through the CAB relay in the Power Distribution Center (PDC). The CAB continually monitors the ABS circuits and sensors to decide whether the system is in good operating condition. The indicator is turned on by the CAB for about two seconds after the ignition switch is turned to the On position as a bulb test. After the bulb test, the CAB turns the indicator on or off based upon the results of the ABS self-tests. If the CAB turns the indicator on after the bulb test, it indicates that the CAB has detected a system malfunction and/or that the ABS system has become inoperative. (Refer to 5 - BRAKES - DESCRIPTION). The ABS indicator can be diagnosed using conventional diagnostic tools and methods.

DIAGNOSIS AND TESTING - ABS INDICATOR

The diagnosis found here addresses an inoperative Antilock Brake System (ABS) indicator condition. If there are problems with several indicators in the instrument cluster, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the ABS indicator stays on with the ignition switch in the On position or comes on and stays on while driving, (Refer to 5 - BRAKES - DIAGNOSIS AND TESTING). If no ABS problem is found, the following procedure will help to locate a short or open in the ABS indicator lamp circuit. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing

ABS INDICATOR (Continued)

and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Reconnect the battery negative cable. Turn the ignition switch to the On position and within about two seconds check for continuity between the ABS warning indicator driver circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be continuity for about two seconds after ignition On, and then an open circuit. If OK, proceed to the diagnosis for the ABS brake system. (Refer to 5 - BRAKES - DIAGNOSIS AND TESTING). If not OK, go to Step 2.

(2) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the Controller Antilock Brake (CAB) relay from the receptacle in the Power Distribution Center (PDC). Check for continuity between the ABS warning indicator driver circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the shorted ABS warning indicator driver circuit between the instrument cluster and the PDC as required.

(3) Check for continuity between the ABS warning indicator driver circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the CAB relay receptacle in the PDC. There should be continuity. If OK, proceed to the diagnosis for the ABS brake system. (Refer to 5 - BRAKES - DIAGNOSIS AND TESTING). If not OK, repair the open ABS warning indicator driver circuit between the instrument cluster and the PDC as required.

AIRBAG INDICATOR

DESCRIPTION

An airbag indicator is standard equipment on all instrument clusters. However, on vehicles not equipped with airbags, this indicator is electronically disabled. The airbag indicator is located near the lower edge of the instrument cluster overlay, to the right of the odometer/trip odometer Vacuum-Fluorescent Display (VFD). The airbag indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “Airbag” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when the it is not illuminated. A red lens behind the cutout in the opaque layer of the overlay causes the icon to appear in red through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The airbag indicator is serviced as a unit with the instrument cluster.

OPERATION

The airbag indicator gives an indication to the vehicle operator when the airbag system is faulty or inoperative. The airbag indicator is controlled by a transistor on the instrument cluster circuit board based upon cluster programming and electronic messages received by the cluster from the Airbag Control Module (ACM) over the Programmable Communications Interface (PCI) data bus. The airbag indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the indicator will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the airbag indicator for the following reasons:

- **Bulb Test** - Each time the ignition switch is turned to the On position the airbag indicator is illuminated for about seven seconds. The first two seconds is the cluster bulb test function, and the remainder is the ACM bulb test function.
- **ACM Lamp-On Message** - Each time the cluster receives a lamp-on message from the ACM, the airbag indicator will be illuminated. The indicator remains illuminated for about twelve seconds or until the cluster receives a lamp-off message from the ACM, whichever is longer.
- **Communication Error** - If the cluster receives no airbag messages for five consecutive seconds, the airbag indicator is illuminated. The indicator

AIRBAG INDICATOR (Continued)

remains illuminated for about twelve seconds or until the cluster receives a single lamp-off message from the ACM, whichever is longer.

- **Actuator Test** - Each time the cluster is put through the actuator test, the airbag indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The ACM continually monitors the airbag system circuits and sensors to decide whether the system is in good operating condition. The ACM then sends the proper lamp-on or lamp-off messages to the instrument cluster. If the ACM sends a lamp-on message after the bulb test, it indicates that the ACM has detected a system malfunction and/or that the airbags may not deploy when required, or may deploy when not required. The ACM will store a Diagnostic Trouble Code (DTC) for any malfunction it detects. Each time the airbag indicator fails to illuminate due to an open or short in the cluster airbag indicator circuit, the cluster sends a message notifying the ACM of the condition and stores a DTC. For further diagnosis of the airbag indicator or the instrument cluster circuitry that controls the indicator, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the airbag system, the ACM, the PCI data bus, or the message inputs to the instrument cluster that control the airbag indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

BRAKE/PARK BRAKE INDICATOR

DESCRIPTION

A brake indicator is standard equipment on all instrument clusters. The brake indicator is located near the lower edge of the instrument cluster overlay, to the left of the odometer/trip odometer Vacuum-Fluorescent Display (VFD). The brake indicator consists of a stencil-like cutout of the word “BRAKE” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A red lens behind the cutout in the opaque layer of the overlay causes the “BRAKE” text to appear in red through the translucent outer layer of the overlay when the indicator is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The brake indicator is serviced as a unit with the instrument cluster.

OPERATION

The brake indicator gives an indication to the vehicle operator when the parking brake is applied, or when there are certain brake hydraulic system malfunctions. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming, electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus, and hard wired inputs to the instrument cluster from the park brake switch and the brake warning indicator switch. The brake indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the brake indicator for the following reasons:

- **Bulb Test** - Each time the ignition switch is turned to the On or Start positions the brake indicator is illuminated for about four seconds as a bulb test.
- **Park Brake Switch Input** - Each time the cluster detects ground on the red brake warning indicator driver circuit (park brake switch closed = park brake applied or not fully released) the brake indicator is illuminated solid. If a vehicle speed message is received by the cluster from the PCM over the PCI data bus indicating the vehicle is moving while the red brake warning indicator driver input is ground, the brake indicator is flashed on and off repeatedly. Whether illuminated solid or flashing, the indicator remains illuminated until the red brake warning indicator driver input to the cluster is an open circuit (park brake switch open = park brake fully released), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Brake Hydraulic System Malfunction** - Each time the cluster detects ground on the red brake warning indicator driver circuit (brake warning indicator switch closed = pressures in the two halves of the split brake hydraulic system are unequal) the brake indicator is illuminated solid. The indicator remains illuminated until the red brake warning indicator driver input to the cluster is an open circuit (brake warning indicator switch open = brake hydraulic system pressures are equal), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the instrument cluster is put through the actuator test, the brake indicator will be turned on, then off again during the

BRAKE/PARK BRAKE INDICATOR (Continued)

bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The park brake switch and the brake warning pressure switch are each connected in parallel between ground and the red brake warning indicator driver input to the instrument cluster so that each of their inputs will illuminate the indicator independently of the other. The park brake switch and brake warning indicator switch inputs to the instrument cluster can be diagnosed using conventional diagnostic tools and methods. (Refer to 5 - BRAKES/PARKING BRAKE - OPERATION). (Refer to 5 - BRAKES/ELECTRICAL/BRAKE PRESSURE SWITCH - OPERATION). For further diagnosis of the brake indicator or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the brake indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING - BRAKE INDICATOR

The diagnosis found here addresses an inoperative brake indicator condition. If there are problems with several indicators in the instrument cluster, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the brake indicator lamp stays on with the ignition switch in the On position and the park brake released, or comes on while driving, (Refer to 5 - BRAKES - DIAGNOSIS AND TESTING). If no brake system problem is found, the following procedures will help to locate a shorted or open circuit, or a faulty switch input. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

INDICATOR ILLUMINATES DURING BULB TEST, BUT DOES NOT WHEN PARK BRAKE APPLIED

(1) Disconnect and isolate the battery negative cable. Disconnect the floor wire harness connector for the park brake switch from the switch terminal. Apply the parking brake. Check for continuity between the park brake switch terminal and a good ground. There should be continuity. If OK, go to Step 2. If not OK, replace the faulty park brake switch.

(2) Disconnect the headlamp and dash wire harness connector for the brake warning indicator switch from the switch terminals. Check for continuity between the red brake warning indicator driver (G9) circuit cavities of the floor wire harness connector for the park brake switch and the headlamp and dash wire harness connector for the brake warning indicator switch. There should be continuity. If not OK, repair the open red brake warning indicator driver (G9) circuit between the park brake switch and the brake warning indicator switch as required.

INDICATOR REMAINS ILLUMINATED - BRAKE SYSTEM CHECKS OK

(1) Disconnect and isolate the battery negative cable. Remove the instrument cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Disconnect the headlamp and dash wire harness connector for the brake warning indicator switch from the switch terminals. Check for continuity between the red brake warning indicator driver circuit (G99) cavity of the headlamp and dash wire harness connector for the brake warning indicator switch and a good ground. There should be no continuity. If OK, go to Step 2. If not OK, repair the shorted red brake warning indicator driver circuit (G99) between the brake warning indicator switch and the instrument cluster as required.

(2) Disconnect the floor wire harness connector for the park brake switch from the switch terminals. Check for continuity between the red brake warning indicator driver circuit (G9) cavity of the headlamp and dash wire harness connector for the brake warning indicator switch and a good ground. There should be no continuity. If OK, go to Step 3. If not OK, repair the shorted red brake warning indicator driver circuit (G9) between the brake warning indicator switch and the park brake switch as required.

(3) Check for continuity between each of the two terminals of the brake warning indicator switch and a good ground. In each case, there should be no continuity. If OK, go to Step 4. If not OK, replace the faulty brake warning indicator switch.

BRAKE/PARK BRAKE INDICATOR (Continued)

(4) Check for continuity between the terminal of the park brake switch and a good ground. There should be no continuity with the park brake released, and continuity with the park brake applied. If not OK, replace the faulty park brake switch.

CHECK GAUGES INDICATOR

DESCRIPTION

A check gauges indicator is standard equipment on all instrument clusters. The check gauges indicator is located on the lower edge of the instrument cluster overlay, to the right of the odometer/trip odometer Vacuum-Fluorescent Display (VFD). The check gauges indicator consists of a stencil-like cutout of the words “CHECK GAUGES” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A red lens behind the cutout in the opaque layer of the overlay causes the “CHECK GAUGES” text to appear in red through the translucent outer layer of the overlay when the indicator is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The check gauges indicator is serviced as a unit with the instrument cluster.

OPERATION

The check gauges indicator gives an indication to the vehicle operator when certain instrument cluster gauge readings reflect a condition requiring immediate attention. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The check gauges indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a ground path by the instrument cluster transistor. The instrument cluster will turn on the check gauges indicator for the following reasons:

- **Bulb Test** - Each time the ignition switch is turned to the On position the check gauges indicator is illuminated for about two seconds as a bulb test.
- **Engine Temperature High Message** - Each time the cluster receives a message from the PCM indicating the engine coolant temperature is about 127° C or higher (about 261° F or higher), the check gauges indicator will be illuminated. The indicator remains illuminated until the cluster receives a message from the PCM indicating that the engine temperature is about 124° C or lower (about 255° F or lower), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Oil Pressure Low Message** - Each time the cluster receives a message from the PCM indicating the engine oil pressure is about 0.3 kg/cm or lower (about 4 psi or lower), the check gauges indicator will be illuminated. The indicator remains illuminated until the cluster receives a message from the PCM indicating that the engine oil pressure is about 0.6 kg/cm or higher (about 8 psi or higher), or until the ignition switch is turned to the Off position, whichever occurs first. The cluster will only turn the indicator on in response to an engine oil pressure low message if the engine speed is 300 rpm or greater.
- **Charge Fail Message** - Each time the cluster receives a message from the PCM indicating a charge fail condition (system voltage is nine volts or lower), the check gauges indicator will be illuminated. The indicator remains illuminated until the cluster receives a message from the PCM indicating there is no charge fail condition (system voltage twelve volts or higher, but lower than sixteen volts) or until the ignition switch is turned to the Off position, whichever occurs first.
- **Voltage High Message** - Each time the cluster receives a message from the PCM indicating a voltage high condition (system voltage is sixteen volts or higher), the check gauges indicator will be illuminated. The indicator remains illuminated until the cluster receives a message from the PCM indicating there is no voltage high condition (system voltage is sixteen volts or lower, but higher than nine volts) or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the check gauges indicator will be turned on, then off again during the bulb check portion of the test in order to confirm the functionality of the LED and the cluster control circuitry.

The PCM continually monitors the engine temperature, oil pressure, and electrical system voltage, then sends the proper messages to the instrument cluster. For further diagnosis of the check gauges indicator or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the check gauges indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

CRUISE INDICATOR

DESCRIPTION

A cruise indicator is standard equipment on all instrument clusters, but is only functional on vehicles equipped with the optional speed control system. The cruise indicator is located near the upper edge of the instrument cluster overlay, in the upper left quadrant of the cluster. The cruise indicator consists of a stencil-like cutout of the word “CRUISE” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when the it is not illuminated. A green lens behind the cutout in the opaque layer of the overlay causes the “CRUISE” text to appear in green through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. When the exterior lighting is turned On, the illumination intensity of the cruise indicator is one-step dimmable, which is adjusted using the panel lamps dimmer control ring on the left multi-function switch control stalk. The cruise indicator is serviced as a unit with the instrument cluster.

OPERATION

The cruise indicator gives an indication to the vehicle operator when the speed control system is turned On, regardless of whether the speed control is engaged. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon the cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The cruise indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the indicator will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided with a path to ground by the instrument cluster transistor. The instrument cluster will turn on the cruise indicator for the following reasons:

- **Cruise Lamp-On Message** - Each time the cluster receives a cruise lamp-on message from the PCM indicating the speed control system has been turned On, the cruise indicator is illuminated. The indicator remains illuminated until the cluster receives a cruise lamp-off message from the PCM or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the cruise indicator will be turned on, then off again during the bulb check portion of the test in order to confirm the functionality of the LED and the cluster control circuitry.

The PCM continually monitors the speed control switches to determine the proper outputs to the speed control servo. The PCM then sends the proper cruise indicator lamp-on and lamp-off messages to the instrument cluster. For further diagnosis of the cruise indicator or the instrument cluster circuitry that controls the indicator, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the speed control system, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the cruise indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

ENGINE TEMPERATURE GAUGE

DESCRIPTION

An engine coolant temperature gauge is standard equipment on all instrument clusters. The engine coolant temperature gauge is located in the lower right quadrant of the instrument cluster, below the oil pressure gauge. The engine coolant temperature gauge consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 90 degree scale on the cluster overlay that reads left-to-right from 40° C (or 100° F) to 125° C (or 260° F). An International Control and Display Symbol icon for “Engine Coolant Temperature” is located on the cluster overlay, in the center of the gauge directly above the hub of the gauge needle. The engine coolant temperature gauge graphics are white and blue against a black field except for a single red graduation at the high end of the gauge scale, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white, the blue graphics appear blue, and the red graphics appear red. The orange gauge needle is internally illuminated. Gauge illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The engine coolant temperature gauge is serviced as a unit with the instrument cluster.

ENGINE TEMPERATURE GAUGE (Continued)

OPERATION

The engine coolant temperature gauge gives an indication to the vehicle operator of the engine coolant temperature. This gauge is controlled by the instrument cluster electronic circuit board based upon the cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The engine coolant temperature gauge is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster circuitry controls the gauge needle position and provides the following features:

- **Engine Temperature Message** - Each time the cluster receives a message from the PCM indicating the engine coolant temperature is between about 40° C (100° F) and 124° C (255° F), the gauge needle is moved to the appropriate linear position on the gauge scale to represent the actual engine temperature. The gauge needle will continue to be positioned at the actual temperature position on the gauge scale until the cluster receives a message from the PCM that indicates the engine temperature is low, high, or critical, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Temperature Low Message** - Each time the cluster receives a message from the PCM indicating the engine coolant temperature is at or below about 40° C (100° F), the gauge needle is held at the 40° C (100° F) graduation at the far left end of the gauge scale. The gauge needle remains at the far left end of the scale until the cluster receives a message from the PCM indicating that the engine temperature is above about 40° C (100° F), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Temperature High Message** - Each time the cluster receives a message from the PCM indicating the engine coolant temperature is about 127° C or higher (about 261° F or higher), the gauge needle is moved to the center of the red zone on the gauge scale, the check gauges indicator is illuminated, and a single chime tone is sounded. The chime tone feature will occur only once per ignition cycle. The gauge needle remains in the center of the red zone and the check gauges indicator remains illuminated until the cluster receives a message from the PCM indicating that the engine temperature is about 124° C or lower (about 255° F or lower), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Temperature Critical Message** - Each time the cluster receives a message from the PCM indicating the engine coolant temperature is about 129° C or higher (about 264° F or higher), the gauge needle is moved to the far right end of the red zone on the gauge scale. The gauge needle remains at the far right end of the red zone until the cluster receives a message from the PCM indicating that the engine temperature is about 127° C or lower (about 261° F or lower), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Message Failure** - If the cluster fails to receive an engine temperature message for more than about twelve seconds, it will move the gauge needle to the minimum graduation of the gauge scale until a new message is received, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence to confirm the functionality of the gauge and the cluster control circuitry.

The PCM continually monitors the engine coolant temperature sensor to determine the engine operating temperature. The PCM then sends the proper engine coolant temperature messages to the instrument cluster. For further diagnosis of the engine coolant temperature gauge or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the instrument cluster turns on the check gauges indicator due to a high or critical engine temperature gauge reading, it may indicate that the engine or the engine cooling system requires service. For proper diagnosis of the engine coolant temperature sensor, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the engine coolant temperature gauge, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

FOG LAMP INDICATOR

DESCRIPTION

A fog lamp indicator is standard equipment on all instrument clusters, but is only functional on vehicles equipped with the optional front and/or rear fog lamps. The fog lamp indicator is located near the upper edge of the instrument cluster overlay, in the upper left quadrant of the cluster. The fog lamp indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for "Fog Lamps" in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A green lens behind the cutout in the opaque layer of the overlay causes the indicator to appear in green through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The fog lamp indicator is serviced as a unit with the instrument cluster.

OPERATION

The fog lamp indicator gives an indication to the vehicle operator when the optional front and/or rear fog lamps are turned On. The availability of the front fog lamps, or rear fog lamps options varies by the market for which the vehicle is manufactured. This indicator is controlled by a hard wired input from the fog lamp switch circuitry of the left multi-function switch to the cluster. The fog lamp indicator Light Emitting Diode (LED) is grounded on the instrument cluster electronic circuit board at all times; therefore, the LED will be on anytime the front or rear fog lamps are turned on, regardless of the ignition switch position. The LED only illuminates when it is provided battery current by the fog lamp switch circuitry of the left multi-function switch.

The fog lamp switch circuitry of the left multi-function switch is connected in series between a fused B(+) fuse in the Power Distribution Center (PDC) and the front or rear fog lamp feed input to the instrument cluster through the fog lamp relay, which is also in the PDC. The fog lamp switch input to the instrument cluster can be diagnosed using conventional diagnostic tools and methods. (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/ LEFT MULTI-FUNCTION SWITCH - OPERATION) for more information on the fog lamp switch.

DIAGNOSIS AND TESTING - FRONT/REAR FOG LAMP INDICATOR

The diagnosis found here addresses an inoperative front/rear fog lamp indicator condition. Before beginning this test, confirm the functionality of the front or rear fog lamp system. If no fog lamp system problem is found, the following procedure will help to locate an open in the front or rear fog lamp feed circuit between the fog lamp relay and the instrument cluster. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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. Disconnect the instrument panel wire harness connector (Connector C1) for the instrument cluster from the connector receptacle on the back of the cluster housing.

(2) Reconnect the battery negative cable. Turn the fog lamps on by pulling out the control knob on the end of the left-multi-function switch control stalk. Check for battery voltage at the front or rear fog lamp feed circuit cavity of the instrument panel wire harness connector (Connector C1) for the instrument cluster. If OK, replace the faulty instrument cluster. If not OK, repair the open front or rear fog lamp feed circuit between the fog lamp relay and the instrument cluster as required.

FUEL GAUGE

DESCRIPTION

A fuel gauge is standard equipment on all instrument clusters. The fuel gauge is located in the lower left quadrant of the instrument cluster, below the voltage gauge. The fuel gauge consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 90 degree scale on the cluster overlay that reads left-to-right from E (or Empty) to F (or Full). An International Control and Display Symbol icon for "Fuel" is located on the cluster overlay, in the center of the gauge directly above the hub of the gauge needle. An arrowhead icon pointed toward the left side of the vehicle is imprinted on the cluster overlay next to the "Fuel" icon in the fuel gauge to provide the driver with a reminder as to the location of the fuel filler access. The fuel gauge graphics are white and blue against a black field except for a single red graduation at the low end of the gauge scale, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white, the blue graphics appear blue, and the red graphics appear red. The orange gauge needle is internally illuminated. Cluster illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The fuel gauge is serviced as a unit with the instrument cluster.

OPERATION

The fuel gauge gives an indication to the vehicle operator of the level of fuel in the fuel tank. This gauge is controlled by the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The fuel gauge is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster circuitry controls the gauge needle position and provides the following features:

- **Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating the percent tank full, the cluster programming applies an algorithm to calculate the proper gauge needle position, then moves the gauge needle to the proper position on the gauge scale. The algorithm is used to dampen gauge needle movement against the negative effect that fuel sloshing within the fuel tank can have on accurate inputs from the fuel tank sending unit to the PCM. The gauge needle will continue to be positioned at the proper position on the gauge scale until the cluster receives a message from the PCM that indicates the percent tank full is less than empty, more than full, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Less Than 12.5 Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating that the percent tank full is less than 12.5 (one-eighth), the gauge needle is moved to the proper position on the gauge scale, the low fuel indicator is illuminated, and a single chime tone is sounded. The low fuel indicator remains illuminated until the cluster receives messages from the PCM for a continuous twenty seconds indicating that the percent tank full has increased by more than 0.625 gallons or until the ignition switch is turned to the Off position, whichever occurs first. This strategy is intended to reduce the effect that fuel sloshing within the fuel tank can have on reliable indications. The chime tone feature will occur only once per ignition cycle.
- **Less Than Empty Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating that the percent tank full is less than empty, the gauge needle is moved to the far left (low) end of the gauge scale and the low fuel indicator is illuminated immediately. This message would indicate that the fuel tank sender input to the PCM is a short circuit.
- **More Than Full Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating the percent tank full is more than full, the gauge needle is moved to the far left (low) end of the gauge scale and the low fuel indicator is illuminated immediately. This message would indicate that the fuel tank sender input to the PCM is an open circuit.
- **Message Failure** - If the cluster fails to receive a percent tank full message, it will hold the gauge needle at the last indication for about twelve seconds, until a new message is received, or until the ignition switch is turned to the Off position, whichever occurs first. After about twelve seconds, the gauge needle is moved to the far left (low) end of the gauge scale and the low fuel indicator is illuminated immediately.
- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence to confirm the functionality of the gauge and the cluster control circuitry.

FUEL GAUGE (Continued)

The PCM continually monitors the fuel tank sending unit, then sends the proper messages to the instrument cluster. For further diagnosis of the fuel gauge or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the fuel tank sending unit, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the fuel gauge, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

HIGH BEAM INDICATOR

DESCRIPTION

A high beam indicator is standard equipment on all instrument clusters. The high beam indicator is located near the upper edge of the instrument cluster overlay, between the tachometer and the speedometer. The high beam indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “High Beam” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A blue lens behind the cutout in the opaque layer of the overlay causes the icon to appear in blue through the translucent outer layer of the overlay when it is illuminated from behind by a replaceable incandescent bulb and bulb holder unit located on the instrument cluster electronic circuit board. The high beam indicator is serviced as a unit with the instrument cluster.

OPERATION

The high beam indicator gives an indication to the vehicle operator when the headlamp high beams are illuminated, or when the exterior lamps are inadvertently left On. This indicator is controlled by a hard wired input from the headlamp beam select switch circuitry of the left multi-function switch to the cluster, and by the instrument cluster electronic circuit board based upon cluster programming and hard wired inputs from the head/park/fog lamp switch circuitry of the left multi-function switch, the driver door ajar switch, and the ignition switch. The high beam indicator bulb is grounded on the instrument cluster electronic circuit board at all times; therefore, the bulb will be illuminated anytime the headlamp high beams are turned on, regardless of the ignition switch position. The bulb only illuminates when it is provided battery current by the beam select switch circuitry of the left multi-function switch, or by the instrument cluster electronic circuit board. The instrument cluster will turn on the high beam indicator for the following reasons:

- **Beam Select Switch Input** - Each time the cluster detects battery current on the beam select switch sense circuit (beam select switch closed = high beams selected or optical horn feature activated) the high beam indicator will be illuminated solid. This input can occur when the headlamp high beams are selected or when the optical horn feature is activated. The indicator remains illuminated until the beam select switch sense input to the cluster is an open circuit (beam select switch open = high beams not selected and optical horn feature not activated), or until the exterior lighting is turned off, whichever occurs first.
- **Exterior Lamps-On Optical Warning** - Each time the cluster detects battery current on the headlamp switch output circuit (park or head lamp switch closed = exterior lighting is On), ground on the driver door ajar switch sense circuit (driver door ajar switch closed = driver door is open), and the fused ignition switch output (run-start) input is an open circuit (ignition switch is in a position other than On or Start), the high beam indicator will be flashed On and Off repeatedly. The indicator will continue to flash until the exterior lighting is turned Off, the driver door is closed, or the ignition switch is turned to the On or Start positions, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the high beam indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the bulb and the cluster control circuitry.

The headlamp beam select switch and circuitry is integral to the left multi-function switch on the steering column, and is connected in series between fused B(+) and the high beam indicator driver circuit input to the instrument cluster. The left multi-function switch inputs to the instrument cluster circuitry can be diagnosed using conventional diagnostic tools and methods.(Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/LEFT MULTI-FUNCTION SWITCH - OPERATION). For further diagnosis of the high beam indicator or the instrument cluster circuitry that controls the indicator bulb, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING).

DIAGNOSIS AND TESTING - HIGH BEAM INDICATOR

The diagnosis found here addresses an inoperative high beam indicator condition. Before beginning this test, confirm the functionality of the high beam indicator bulb and the cluster control circuitry by performing the instrument cluster actuator test. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the high beam indicator fails to illuminate during the actuator test,

HIGH BEAM INDICATOR (Continued)

replace the indicator bulb and bulb holder with a known good unit and repeat the test. If the indicator still fails to illuminate, replace the faulty instrument cluster. If the problem being diagnosed is related to inoperative headlamp high beams, be certain to repair the headlamp system circuits and switches before attempting to diagnose or repair the high beam indicator. If no headlamp system problems are found and the high beam indicator illuminates during the instrument cluster actuator test, the following procedure will help locate an open in the high beam indicator driver circuit. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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. Disconnect the instrument panel wire harness connector (Connector C1) for the instrument cluster from the connector receptacle on the back of the cluster housing.

(2) Reconnect the battery negative cable. Turn the headlamps On and select the headlamp high beams with the left multi-function switch control stalk. Check for battery voltage at the high beam indicator driver circuit cavity of the instrument panel wire harness connector (Connector C1) for the instrument cluster. If OK, replace the faulty instrument cluster. If not OK, repair the open high beam indicator driver circuit between the instrument cluster and the left multi-function switch as required.

LOW FUEL INDICATOR

DESCRIPTION

A low fuel indicator is standard equipment on all instrument clusters. The low fuel indicator is located near the lower edge of the instrument cluster overlay, to the left of the odometer/trip odometer Vacuum Fluorescent Display (VFD). The low fuel indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “Fuel” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. An amber lens behind the cutout in the opaque layer of the overlay causes the icon to appear in amber through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The low fuel indicator is serviced as a unit with the instrument cluster.

OPERATION

The low fuel indicator gives an indication to the vehicle operator when the level of fuel in the fuel tank becomes low. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The low fuel indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the low fuel indicator for the following reasons:

- **Bulb Test** - Each time the ignition switch is turned to the On position the low fuel indicator is illuminated for about two seconds as a bulb test.
- **Less Than 12.5 Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating that the percent tank full is less than 12.5 (one-eighth), the low fuel indicator is illuminated and a single chime tone is sounded. The low fuel indicator remains illuminated until the cluster receives messages from the PCM for a continuous twenty seconds indicating that the percent tank full has increased by more than 0.625 gallons or until the ignition switch is turned to the Off position, whichever occurs first. This strategy is intended to reduce the effect that fuel sloshing within the fuel tank can have on reliable indications. The chime tone feature will occur only once per ignition cycle.

LOW FUEL INDICATOR (Continued)

- **Less Than Empty Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating the percent tank full is less than empty, the low fuel indicator is illuminated immediately. This message would indicate that the fuel tank sender input to the PCM is a short circuit.
- **More Than Full Percent Tank Full Message** - Each time the cluster receives a message from the PCM indicating the percent tank full is more than full, the low fuel indicator is illuminated immediately. This message would indicate that the fuel tank sender input to the PCM is an open circuit.
- **Actuator Test** - Each time the cluster is put through the actuator test, the low fuel indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The PCM continually monitors the fuel tank sending unit, then sends the proper messages to the instrument cluster. For further diagnosis of the low fuel indicator lamp or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the fuel tank sending unit, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the low fuel indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

MALFUNCTION INDICATOR LAMP MIL

DESCRIPTION

A Malfunction Indicator Lamp (MIL) is standard equipment on all instrument clusters. The MIL is located near the lower edge of the instrument cluster overlay, to the right of the odometer/trip odometer Vacuum-Fluorescent Display (VFD). The MIL consists of a stencil-like cutout of the International Control and Display Symbol icon for “Engine” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. An amber lens behind the cutout in the opaque layer of the overlay causes the icon to appear in amber through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The MIL is serviced as a unit with the instrument cluster.

OPERATION

The Malfunction Indicator Lamp (MIL) gives an indication to the vehicle operator when the Powertrain Control Module (PCM) has recorded a Diagnostic Trouble Code (DTC) for an On-Board Diagnostics II (OBDII) emissions-related circuit or component malfunction. The MIL is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the PCM over the Programmable Communications Interface (PCI) data bus. The MIL Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the MIL for the following reasons:

- **Bulb Test** - Each time the ignition switch is turned to the On position the indicator is illuminated for about seven seconds as a bulb test.
- **PCM Lamp-On Message** - Each time the cluster receives a lamp-on message from the PCM, the indicator will be illuminated. The indicator can be flashed on and off, or illuminated solid, as dictated by the PCM message. For some DTC’s, if a problem does not recur, the PCM will send a lamp-off message automatically. Other DTC’s may require that a fault be repaired and the PCM be reset before a lamp-off message will be sent. For more information on the PCM and the DTC set and reset parameters, (Refer to 25 - EMISSIONS CONTROL - OPERATION).
- **Communication Error** - If the cluster receives no lamp-on or lamp-off message from the PCM for twenty seconds, the MIL is illuminated by the instrument cluster and a “no BuS” message will appear in the odometer/trip odometer Vacuum Fluorescent Display (VFD) to indicate a loss of bus communication. The indicator remains controlled and illuminated by the cluster until a valid lamp-on or lamp-off message is received from the PCM.
- **Actuator Test** - Each time the cluster is put through the actuator test, the MIL will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The PCM continually monitors the fuel and emissions system circuits and sensors to decide whether the system is in good operating condition. The PCM then sends the proper lamp-on or lamp-off messages to the instrument cluster. For further diagnosis of the MIL or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the instrument cluster turns on the MIL after the bulb test, it may indicate that a malfunction has occurred and that the fuel and emissions system may

MALFUNCTION INDICATOR LAMP MIL (Continued)

require service. For proper diagnosis of the fuel and emissions systems, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the MIL, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

ODOMETER

DESCRIPTION

An odometer and trip odometer are standard equipment in all instrument clusters. The odometer and trip odometer information are displayed in a common electronic Vacuum Fluorescent Display (VFD), which is centered on the lower edge of the instrument cluster and visible through a small window cutout on the instrument cluster overlay. However, the odometer and trip odometer information are not displayed simultaneously. The trip odometer reset switch on the instrument cluster electronic circuit board toggles the display between odometer and trip odometer modes by depressing the odometer/trip odometer switch knob that extends through the lower edge of the cluster lens, just right of the odometer VFD. Both the odometer and trip odometer information is stored in the instrument cluster memory.

The odometer can display values up to 999,999 kilometers (999,999 miles). The odometer will not roll over, but will latch at the maximum value. The trip odometer can display values up to 9999.9 kilometers (9999.9 miles) before it rolls over to zero. The odometer display does not have a decimal point and will not show values less than a full unit (kilometer or mile), the trip odometer display does have a decimal point and will show tenths of a unit (kilometer or mile). The unit of measure for the odometer and trip odometer display is not shown in the VFD. If the instrument cluster has a speedometer with a primary scale in kilometers-per-hour, the letters “KM” are printed on the cluster mask next to the VFD window to indicate the odometer unit of measure. During daylight hours (exterior lamps Off) the VFD is illuminated at full brightness for clear visibility. At night (exterior lamps are On) an analog/digital (A/D) converter on the instrument cluster electronic circuit board converts the analog panel lamps dimmer input from the left multi-function switch to a digital dimming level signal for controlling the lighting level of the VFD. However, a “Parade” mode position of the panel lamps dimmer control ring of the left multi-function switch control stalk allows the VFD to be illuminated at full brightness while the exterior lamps are turned On during daylight hours.

The VFD, the trip odometer switch, and the trip odometer switch button are serviced as a unit with the instrument cluster. The rubber trip odometer reset knob boot on the outside of the cluster lens is available for separate service replacement.

OPERATION

The odometer and trip odometer give an indication to the vehicle operator of the distance the vehicle has traveled. This gauge is controlled by the instrument cluster electronic circuitry based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The odometer and trip odometer information is displayed by the instrument cluster Vacuum Fluorescent Display (VFD), and the VFD will display odometer or trip odometer cluster information whenever the driver door is opened or the ignition switch is turned to the On or Start positions. The instrument cluster circuitry controls the VFD and provides the following features:

- **Odometer/Trip Odometer Display Toggling** - Actuating the trip odometer reset switch momentarily with the VFD illuminated will toggle the display between the odometer and trip odometer information. Each time the VFD is illuminated the display will automatically return to the last mode previously selected (odometer or trip odometer).
- **Trip Odometer Reset** - When the trip odometer reset switch is pressed and held for longer than about two seconds, trip odometer will be reset to 0.0 kilometers (miles). The VFD must be displaying the trip odometer information in order for the trip odometer information to be reset.
- **Message Failure** - If the cluster fails to receive a distance message during normal operation, it will hold and display the last data received until the ignition switch is turned to the Off position. If the cluster does not receive a distance message within one second after the ignition switch is turned to the On position, it will display the last distance message stored in the cluster memory. If the cluster is unable to display distance information due to an error internal to the cluster, either “888888”will be displayed in the VFD or the VFD will be blank.
- **Actuator Test** - Each time the cluster is put through the actuator test, the VFD will scroll the number “8” from right-to-left across the display, then illuminate the trip odometer decimal point “.” in order to confirm the functionality of the VFD and the cluster control circuitry.

The PCM continually monitors the vehicle speed sensor, then sends the proper distance messages to the instrument cluster. For further diagnosis of the odometer/trip odometer or the instrument cluster circuitry that controls these functions, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the

ODOMETER (Continued)

vehicle speed sensor, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the odometer/trip odometer, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

OIL PRESSURE GAUGE

DESCRIPTION

An oil pressure gauge is standard equipment on all instrument clusters. The oil pressure gauge is located in the upper right quadrant of the instrument cluster, above the engine coolant temperature gauge. The oil pressure gauge consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 90 degree scale on the cluster overlay that reads left-to-right from 0 kg/cm (or 0 psi) to 5.4 kg/cm (or 80 psi). An International Control and Display Symbol icon for “Engine Oil” is located on the cluster overlay, in the center of the gauge directly above the hub of the gauge needle. The oil pressure gauge graphics are white and blue against a black field, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white, and the blue graphics appear blue. The orange gauge needle is internally illuminated. Gauge illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The oil pressure gauge is serviced as a unit with the instrument cluster.

OPERATION

The oil pressure gauge gives an indication to the vehicle operator of the engine oil pressure. This gauge is controlled by the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The oil pressure gauge is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster electronic circuitry controls the gauge needle position and provides the following features:

- **Engine Oil Pressure Message** - Each time the cluster receives a message from the PCM indicating the engine oil pressure is between about 0.3 kg/cm (4 psi) and about 6.7 kg/cm (95 psi), the cluster moves the gauge needle to the appropriate linear position on the gauge scale to represent the actual engine oil pressure. The gauge needle will continue to be positioned at the actual engine oil pressure position on the gauge scale until the cluster receives a message from the PCM that indicates the engine oil pressure is low, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Engine Oil Pressure Low Message** - Each time the cluster receives a message from the PCM indicating the engine oil pressure is below about 0.3 kg/cm (4 psi), the gauge needle is moved to the minimum increment on the far left (low) end of the gauge scale, the check gauges indicator is illuminated, and a single chime tone is generated. The gauge needle remains at the low end of the scale and the check gauges indicator remains illuminated until the cluster receives a message from the PCM indicating that the engine oil pressure is about 0.6 kg/cm (8 psi) or higher, or until the ignition switch is turned to the Off position, whichever occurs first. The cluster will only turn the check gauges indicator on in response to an engine oil pressure low message if the engine speed is 300 rpm or greater for more than about five seconds.
- **Message Failure** - If the cluster fails to receive an engine oil pressure message for more than about twelve seconds, it will move the gauge needle to the minimum graduation of the gauge scale until a new message is received, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence to confirm the functionality of the gauge and the cluster control circuitry.

The PCM continually monitors the engine oil pressure sensor to determine the engine oil pressure. The PCM then sends the proper engine oil pressure messages to the instrument cluster. For further diagnosis of the oil pressure gauge or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the instrument cluster turns on the check gauges indicator due to a low oil pressure gauge reading, it may indicate that the engine or the engine oiling system requires service. For proper diagnosis of the engine oil pressure sensor, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the oil pressure gauge, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

SEATBELT WARNING INDICATOR

DESCRIPTION

A seatbelt indicator is standard equipment on all instrument clusters. The seatbelt indicator is located near the center of the instrument cluster overlay, directly below the high beam indicator and above the odometer/trip odometer Vacuum Fluorescent Display (VFD). The seatbelt indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “Seat Belt” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A red lens behind the cutout in the opaque layer of the overlay causes the icon to appear in red through the translucent outer layer of the overlay when the indicator is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The seatbelt indicator is serviced as a unit with the instrument cluster.

OPERATION

The seatbelt indicator gives an indication to the vehicle operator of the status of the driver side front seatbelt. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming and a hard wired input from the seatbelt switch in the driver side front seatbelt buckle unit through the seat belt indicator driver circuit. The seatbelt indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the indicator will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the seatbelt indicator for the following reasons:

- **Seatbelt Reminder Function** - Each time the cluster receives a battery current input on the fused ignition switch output (run-start) circuit, the indicator will be illuminated as a seatbelt reminder for about seven seconds, or until the ignition switch is turned to the Off position, whichever occurs first. This reminder function will occur regardless of the status of the seatbelt switch input to the cluster.
- **Driver Side Front Seatbelt Not Buckled** - Following the seatbelt reminder function, each time the cluster detects a ground on the seat belt switch sense circuit (seatbelt switch closed = seatbelt unbuckled) with the ignition switch in the Start or On positions, the seatbelt indicator will be illuminated. The seatbelt indicator remains illuminated until the seat belt switch sense input to the cluster is an open circuit (seatbelt switch open = seatbelt buckled), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the seatbelt indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The seatbelt switch is connected in series between ground and the seat belt switch sense input to the instrument cluster. The seatbelt switch input to the instrument cluster circuitry can be diagnosed using conventional diagnostic tools and methods. For further diagnosis of the seatbelt indicator or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING).

SHIFT INDICATOR (TRANSFER CASE)

DESCRIPTION - PART TIME INDICATOR

A part time indicator is standard equipment on all instrument clusters. The part time indicator is located near the upper edge of the instrument cluster overlay, in the upper right quadrant of the cluster. The part time indicator consists of a stencil-like cutout of the words “PART TIME” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. An amber lens behind the cutout in the opaque layer of the overlay causes the “PART TIME” text to appear in amber through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. When the exterior lighting is turned On, the illumination intensity of the part time indicator is one-step dimmable, which is adjusted using the panel lamps dimmer control ring on the left multi-function switch control stalk. The part time indicator is serviced as a unit with the instrument cluster.

DESCRIPTION - FULL TIME INDICATOR

A full time indicator is standard equipment on all instrument clusters, but is only functional on vehicles in some markets where the Selec-Trac four-wheel drive system is an available option. The full time indicator is located near the upper edge of the instrument cluster overlay, in the upper right quadrant of the cluster. The full time indicator consists of a sten-

SHIFT INDICATOR (TRANSFER CASE) (Continued)

cil-like cutout of the words “FULL TIME” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents the indicator from being clearly visible when it is not illuminated. A green lens behind the cutout in the opaque layer of the cluster overlay causes the “FULL TIME” text to appear in green through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. When the exterior lighting is turned On, the illumination intensity of the full time indicator is one-step dimmable, which is adjusted using the panel lamps dimmer control ring on the left multi-function switch control stalk. The full time indicator is serviced as a unit with the instrument cluster.

OPERATION - PART TIME INDICATOR

The part time indicator gives an indication to the vehicle operator that a part time operating mode of the four-wheel drive transfer case is selected. On vehicles equipped with the standard Command-Trac four-wheel drive system, the part time indicator lights when the transfer case is engaged in the 4H or 4L positions. On vehicles in some markets where the Selec-Trac four-wheel drive system is an available option, the part time indicator lights when the transfer case is engaged in the 4 X 4 Part Time or 4 Lo positions. This indicator is controlled by a transistor on the instrument cluster electronic circuit board, and is controlled by a hard wired transfer case switch input to the cluster. The part time indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the part time indicator for the following reasons:

- **Transfer Case Switch Input** - Each time the cluster detects a ground on the 4WD switch sense (part time) circuit (transfer case switch closed = part time 4WD selected) the part time indicator will be illuminated. The indicator remains illuminated until the 4WD switch sense (part time) input to the cluster is an open circuit (transfer case switch open = part time 4WD not selected), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the part time indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The transfer case switch is connected in series between ground and the 4WD switch sense (part-time) input to the instrument cluster. The transfer case switch input to the instrument cluster circuitry can be diagnosed using conventional diagnostic tools and methods. (Refer to 21 - TRANSMISSION/ TRANSAXLE/TRANSFER CASE - DESCRIPTION) for more information on the transfer case switch. For further diagnosis of the part time indicator or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING).

OPERATION - FULL TIME INDICATOR

The full time indicator gives an indication to the vehicle operator that a full time operating mode of the four-wheel drive transfer case is selected. On vehicles in some markets where the Selec-Trac four-wheel drive system is an available option, the full time indicator lights when the transfer case is engaged in the 4 X 4 Full Time position. This indicator is controlled by a transistor on the instrument cluster electronic circuit board, and is controlled by a hard wired transfer case switch input to the cluster. The full time indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the LED will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the full time indicator for the following reasons:

- **Transfer Case Switch Input** - Each time the cluster detects a ground on the 4WD switch sense (full time) circuit (transfer case switch closed = full time 4WD selected) the full time indicator will be illuminated. The indicator remains illuminated until the 4WD switch sense (full time) input to the cluster is an open circuit (transfer case switch open = full time 4WD not selected), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Actuator Test** - Each time the cluster is put through the actuator test, the full time indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The transfer case switch is connected in series between ground and the 4WD switch sense (full-time) input to the instrument cluster. The transfer case switch input to the instrument cluster circuitry can be diagnosed using conventional diagnostic tools and methods. (Refer to 21 - TRANSMISSION/TRANSAXLE/TRANSFER CASE - DESCRIPTION) for more

SHIFT INDICATOR (TRANSFER CASE) (Continued)

information on the transfer case switch. For further diagnosis of the part time indicator or the instrument cluster circuitry that controls the LED, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING).

DIAGNOSIS AND TESTING - PART TIME INDICATOR

The diagnosis found here addresses an inoperative part time indicator condition. Before beginning this test, confirm the functionality of the part time indicator Light Emitting Diode (LED) and the cluster control circuitry by performing the instrument cluster actuator test. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the part time indicator fails to illuminate during the actuator test, replace the faulty instrument cluster. If the problem being diagnosed is related to indicator accuracy, be certain to confirm that the problem is with the indicator or transfer case switch and not a mechanical malfunction of the transfer case or transfer case shift linkage. (Refer to 21 - TRANSMISSION/TRANSAXLE/TRANSFER CASE - DIAGNOSIS AND TESTING). If no transfer case problem is found, the following procedure will help to locate a short or open in the 4WD switch sense (part time) circuit. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

INDICATOR DOES NOT ILLUMINATE WITH PART TIME MODE SELECTED

(1) Disconnect and isolate the battery negative cable. Disconnect the engine wire harness connector for the transfer case switch from the transfer case switch connector receptacle. Check for continuity between the ground circuit cavity of the engine wire harness connector for the transfer case switch and a good ground. There should be continuity. If OK, go to Step 2. If not OK, repair the open ground circuit to ground (G105) as required.

(2) Reconnect the battery negative cable. Turn the ignition switch to the On position. Install a jumper wire between the 4WD switch sense (part-time) circuit cavity of the engine wire harness connector for the transfer case switch and a good ground. The part time indicator should light. If OK, replace the faulty transfer case switch. 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 cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Check for continuity between the 4WD switch sense (part-time) circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the engine wire harness connector for the transfer case switch. There should be continuity. If OK, replace the faulty instrument cluster. If not OK, repair the open 4WD switch sense (part-time) circuit between the instrument cluster and the transfer case switch as required.

INDICATOR STAYS ILLUMINATED WITH PART TIME MODE NOT SELECTED

(1) Disconnect and isolate the battery negative cable. Disconnect the engine wire harness connector for the transfer case switch from the transfer case switch connector receptacle. Check for continuity between the ground circuit and the 4WD switch sense (part-time) circuit terminals in the transfer case switch connector receptacle. There should be no continuity. If OK, go to Step 2. If not OK, replace the faulty transfer case switch.

(2) Remove the instrument cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Check for continuity between the 4WD switch sense (part-time) circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, replace the faulty instrument cluster. If not OK, repair the shorted 4WD switch sense (part-time) circuit between the transfer case switch and the instrument cluster as required.

DIAGNOSIS AND TESTING - FULL TIME INDICATOR

The diagnosis found here addresses an inoperative full time indicator condition. Before beginning this

SHIFT INDICATOR (TRANSFER CASE) (Continued)

test, confirm the functionality of the full time indicator Light Emitting Diode (LED) and the cluster control circuitry by performing the instrument cluster actuator test. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the full time indicator fails to illuminate during the actuator test, replace the faulty instrument cluster. If the problem being diagnosed is related to indicator accuracy, be certain to confirm that the problem is with the indicator or transfer case switch and not a mechanical malfunction of the transfer case or transfer case shift linkage. (Refer to 21 - TRANSMISSION/TRANSAXLE/TRANSFER CASE - DIAGNOSIS AND TESTING). If no transfer case problem is found, the following procedure will help to locate a short or open in the 4WD switch sense (full time) circuit. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

INDICATOR DOES NOT ILLUMINATE WITH FULL TIME MODE SELECTED

(1) Disconnect and isolate the battery negative cable. Disconnect the engine wire harness connector for the transfer case switch from the transfer case switch connector receptacle. Check for continuity between the ground circuit cavity of the engine wire harness connector for the transfer case switch and a good ground. There should be continuity. If OK, go to Step 2. If not OK, repair the open ground circuit to ground (G105) as required.

(2) Reconnect the battery negative cable. Turn the ignition switch to the On position. Install a jumper wire between the 4WD switch sense (full-time) circuit cavity of the engine wire harness connector for the transfer case switch and a good ground. The full time indicator should light. If OK, replace the faulty transfer case switch. 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 cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Check for continuity between the 4WD switch sense (full-time) circuit cavities of the instrument panel wire harness connector (Connector C2) for the instrument cluster and the engine wire harness connector for the transfer case switch. There should be continuity. If OK, replace the faulty instrument cluster. If not OK, repair the open 4WD switch sense (full-time) circuit between the instrument cluster and the transfer case switch as required.

INDICATOR STAYS ILLUMINATED WITH FULL TIME MODE NOT SELECTED

(1) Disconnect and isolate the battery negative cable. Disconnect the engine wire harness connector for the transfer case switch from the transfer case switch connector receptacle. Check for continuity between the ground circuit and the 4WD switch sense (full-time) circuit terminals in the transfer case switch connector receptacle. There should be no continuity. If OK, Step 2. If not OK, replace the faulty transfer case switch.

(2) Remove the instrument cluster from the instrument panel. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the connector receptacle on the back of the cluster housing. Check for continuity between the 4WD switch sense (full-time) circuit cavity of the instrument panel wire harness connector (Connector C2) for the instrument cluster and a good ground. There should be no continuity. If OK, replace the faulty instrument cluster. If not OK, repair the shorted 4WD switch sense (full-time) circuit between the transfer case switch and the instrument cluster as required.

SPEEDOMETER

DESCRIPTION

A speedometer is standard equipment in all instrument clusters. The speedometer is located next to the tachometer, just to the right of center in the instrument cluster. The speedometer consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 210 degree primary outer scale on the cluster overlay that reads left-to-right either from 0 to 100 mph, from 0 to 110 mph, or from 0 to 180 km/h, depending upon the requirements of the market for which the vehicle was manufactured. Each version also has a secondary inner scale on the cluster overlay that provides the

SPEEDOMETER (Continued)

equivalent opposite units from the primary scale. A label on the cluster overlay beneath the hub of the speedometer pointer abbreviates the unit of measure for the primary scale in all upper case letters (i.e.: MPH or KM/H), followed by the unit of measure for the secondary scale in all lower case letters (i.e.: mph or km/h). The speedometer graphics are white (primary scale) and blue (secondary scale) against a black field, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white and the blue graphics appear blue. The orange gauge needle is internally illuminated. Gauge illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The speedometer is serviced as a unit with the instrument cluster.

OPERATION

The speedometer gives an indication to the vehicle operator of the vehicle road speed. This gauge is controlled by the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The speedometer is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster circuitry controls the gauge needle position and provides the following features:

- **Vehicle Speed Message** - Each time the cluster receives a vehicle speed message from the PCM it will calculate the correct vehicle speed reading and position the gauge needle at that speed position on the gauge scale. The cluster will receive a new vehicle speed message and reposition the gauge pointer accordingly about every 86 milliseconds. The gauge needle will continue to be positioned at the actual vehicle speed position on the gauge scale until the ignition switch is turned to the Off position.
- **Message Failure** - If the cluster fails to receive a speedometer message, it will hold the gauge needle at the last indication for about six seconds, or until the ignition switch is turned to the Off position, whichever occurs first. If a new speedometer message is not received after about six seconds, the gauge needle will return to the far left (low) end of the scale.
- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence in order to confirm the functionality of the gauge and the cluster control circuitry.

The PCM continually monitors the vehicle speed sensor to determine the vehicle road speed, then sends the proper vehicle speed messages to the instrument cluster. For further diagnosis of the speedometer or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the vehicle speed sensor, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the speedometer, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

TACHOMETER

DESCRIPTION

A tachometer is standard equipment on all instrument clusters. The tachometer is located next to the speedometer, just to the left of center in the instrument cluster. The tachometer consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 210 degree scale on the cluster overlay that reads left-to-right from 0 to 6. The text “X 1000 RPM” imprinted on the cluster overlay directly below the hub of the tachometer needle identifies that each number on the tachometer scale is to be multiplied by 1000 rpm. A red line on the high end of the gauge scale designates the engine overspeed area of the gauge. The tachometer graphics are white against a black field, except for the single red line, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white and the red graphics appear red. The orange gauge needle is internally illuminated. Gauge illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The tachometer is serviced as a unit with the instrument cluster.

OPERATION

The tachometer gives an indication to the vehicle operator of the engine speed. This gauge is controlled by the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Com-

TACHOMETER (Continued)

munications Interface (PCI) data bus. The tachometer is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster electronic circuitry controls the gauge needle position and provides the following features:

- **Engine Speed Message** - Each time the cluster receives an engine speed message from the PCM it will calculate the correct engine speed reading and position the gauge needle at that speed position on the gauge scale. The cluster will receive a new engine speed message and reposition the gauge pointer accordingly about every 86 milliseconds. The gauge needle will continue to be positioned at the actual engine speed position on the gauge scale until the ignition switch is turned to the Off position.
- **Message Failure** - If the cluster fails to receive an engine speed message, it will hold the gauge needle at the last indication for about six seconds, or until the ignition switch is turned to the Off position, whichever occurs first. If a new engine speed message is not received after about six seconds, the gauge needle will return to the far left (low) end of the scale.
- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence to confirm the functionality of the gauge and the cluster control circuitry.

The PCM continually monitors the crankshaft position sensor to determine the engine speed, then sends the proper engine speed messages to the instrument cluster. For further diagnosis of the tachometer or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the crankshaft position sensor, the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the tachometer, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

TURN SIGNAL INDICATORS

DESCRIPTION

Two turn signal indicators, one right and one left, are standard equipment on all instrument clusters. The turn signal indicators are located near the upper edge of the instrument cluster overlay, between the speedometer and the tachometer. Each turn signal indicator consists of a stencil-like cutout of the International Control and Display Symbol icon for “Turn Warning” in the opaque layer of the instrument cluster overlay. The dark outer layer of the overlay prevents these icons from being clearly visible when they are not illuminated. A green lens behind each cutout in the opaque layer of the cluster overlay causes the indicator to appear in green through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. The turn signal indicators are serviced as a unit with the instrument cluster.

OPERATION

The turn signal indicators give an indication to the vehicle operator that the turn signal (left or right indicator flashing) or hazard warning (both left and right indicators flashing) have been selected. These indicators are controlled by two individual hard wired inputs from the turn signal switch and hazard warning switch circuitry of the left multi-function switch to the cluster. Each turn signal indicator Light Emitting Diode (LED) is grounded on the instrument cluster electronic circuit board at all times; therefore, the LED can be on anytime the turn signal or hazard warning systems are turned on, regardless of the ignition switch position. Each LED will only illuminate when it is provided battery current by the turn signal switch or hazard warning switch circuitry of the left multi-function switch.

The turn signal switch and hazard warning switch circuitry of the left multi-function switch are connected in series between the output of the combination flasher on the left multi-function switch and the left or right turn signal inputs to the instrument cluster, but in parallel with the other turn signal circuits. This arrangement allows the turn signal indicators to remain functional, regardless of the condition of the other circuits in the turn signal and hazard warning systems. The turn signal switch and hazard warning switch inputs to the instrument cluster can be diagnosed using conventional diagnostic tools and methods. (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/LEFT MULTI-FUNCTION SWITCH - OPERATION) for more information on the turn signal switch and hazard warning switch.

DIAGNOSIS AND TESTING - TURN SIGNAL INDICATOR

The diagnosis found here addresses an inoperative turn signal indicator condition. If the problem being diagnosed is related to inoperative turn signal or hazard warning lamps, be certain to repair the turn signal and hazard warning system before attempting

TURN SIGNAL INDICATORS (Continued)

to diagnose or repair the turn signal indicators. (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR - DIAGNOSIS AND TESTING - TURN SIGNAL & HAZARD WARNING SYSTEM). If no turn signal and hazard warning system problem is found, the following procedure will help locate an open in the right or left turn signal circuits. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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. Disconnect the instrument panel wire harness connector (Connector C1) for the instrument cluster from the connector receptacle on the back of the cluster housing.

(2) Reconnect the battery negative cable. Activate the hazard warning system by moving the hazard warning switch button on the left multi-function switch to the On position. Check for battery voltage at the inoperative (right or left) turn signal circuit cavity of the instrument panel wire harness connector (Connector C1) for the instrument cluster. There should be a switching (on and off) battery voltage signal present. If OK, replace the faulty instrument cluster. If not OK, repair the open (right or left) turn signal circuit between the instrument cluster and the left multi-function switch as required.

UPSHIFT INDICATOR

DESCRIPTION

An upshift indicator is standard equipment on all instrument clusters, however, on vehicles not built for the United States or Canadian markets and those not equipped with a manual transmission, this indicator is electronically disabled. The upshift indicator is located near the right upper edge of the instrument cluster overlay, just above the oil pressure gauge. The upshift indicator consists of an upward pointed arrow icon that is a stencil-like cutout in the opaque layer of the instrument cluster overlay. The dark outer layer of the cluster overlay prevents the icon from being clearly visible when the lamp is not illuminated. An amber lens behind the cutout in the opaque layer of the cluster overlay causes the icon to appear in amber through the translucent outer layer of the overlay when it is illuminated from behind by a Light Emitting Diode (LED) soldered onto the instrument cluster electronic circuit board. When the exterior lighting is turned On, the illumination intensity of the part time indicator is one-step dimmable, which is adjusted using the panel lamps dimmer control ring on the left multi-function switch control stalk. The upshift indicator is serviced as a unit with the instrument cluster.

OPERATION

The upshift indicator gives an indication to the vehicle operator when the manual transmission should be shifted to the next highest gear in order to achieve the best fuel economy. This indicator is controlled by a transistor on the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The upshift indicator function of the instrument cluster is electronically enabled or disabled by a PCI data bus message received by the cluster from the PCM. The upshift indicator Light Emitting Diode (LED) receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions; therefore, the indicator will always be off when the ignition switch is in any position except On or Start. The LED only illuminates when it is provided a path to ground by the instrument cluster transistor. The instrument cluster will turn on the upshift indicator for the following reasons:

- **Upshift Lamp-On Message** - Each time the cluster receives an upshift lamp-on message from the PCM indicating the engine speed and load conditions are right for a transmission upshift to occur, the upshift indicator is illuminated. The indicator remains illuminated until the cluster receives an upshift lamp-off message from the PCM or until the ignition switch is turned to the Off position, whichever occurs first. The PCM will normally send an upshift lamp-off message three to five seconds after a lamp-on message, if an upshift is not performed. The indicator will then remain off until the vehicle stops

UPSHIFT INDICATOR (Continued)

accelerating and is brought back into the range of indicator operation, or until the transmission is shifted into another gear.

- **Actuator Test** - Each time the cluster is put through the actuator test, the upshift indicator will be turned on, then off again during the bulb check portion of the test to confirm the functionality of the LED and the cluster control circuitry.

The PCM continually monitors the engine speed and load conditions to determine the proper fuel and ignition requirements. The PCM then sends the proper upshift indicator messages to the instrument cluster. For further diagnosis of the upshift indicator or the instrument cluster circuitry that controls the indicator, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the PCM, the PCI data bus, or the message inputs to the instrument cluster that control the upshift indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

VOLTAGE GAUGE

DESCRIPTION

A voltage gauge is standard equipment on all instrument clusters. The voltage gauge is located in the upper left quadrant of the instrument cluster, above the fuel gauge. The voltage gauge consists of a movable gauge needle or pointer controlled by the instrument cluster electronic circuitry and a fixed 90 degree scale on the cluster overlay that reads left-to-right from 9 volts to 19 volts. An International Control and Display Symbol icon for “Battery Charging Condition” is located on the cluster overlay, in the center of the gauge directly above the hub of the gauge needle. The voltage gauge graphics are white and blue against a black field except for a single red graduation at each end of the gauge scale, making them clearly visible within the instrument cluster in daylight. When illuminated from behind by the panel lamps dimmer controlled cluster illumination lighting with the exterior lamps turned On, the white graphics appear white, the blue graphics appear blue, and the red graphics appear red. The orange gauge needle is internally illuminated. Gauge illumination is provided by replaceable incandescent bulb and bulb holder units located on the instrument cluster electronic circuit board. The voltage gauge is serviced as a unit with the instrument cluster.

OPERATION

The voltage gauge gives an indication to the vehicle operator of the electrical system voltage. This gauge is controlled by the instrument cluster electronic circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) over the Programmable Communications Interface (PCI) data bus. The voltage gauge is an air core magnetic unit that receives battery current on the instrument cluster electronic circuit board through the fused ignition switch output (run-start) circuit whenever the ignition switch is in the On or Start positions. The cluster is programmed to move the gauge needle back to the low end of the scale after the ignition switch is turned to the Off position. The instrument cluster circuitry controls the gauge needle position and provides the following features:

- **System Voltage Message** - Each time the cluster receives a message from the PCM indicating the system voltage, the gauge needle is moved to the actual system voltage position on the gauge scale. The gauge needle will continue to be positioned at the actual system voltage position on the gauge scale until the cluster receives a message from the PCM that indicates the system voltage is low (charge fail), high, or until the ignition switch is turned to the Off position, whichever occurs first.
- **Charge Fail Message** - Each time the cluster receives a message from the PCM indicating a charge fail condition (system voltage is nine volts or lower), the gauge needle is moved to the 9 volt graduation on the gauge scale and the check gauges indicator is illuminated. The gauge needle remains on the 9 volt graduation and the check gauges indicator remains illuminated until the cluster receives a message from the PCM indicating there is no charge fail condition (system voltage is twelve volts or higher, but lower than sixteen volts), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Voltage High Message** - Each time the cluster receives a message from the PCM indicating a voltage high condition (system voltage is nineteen volts or higher), the gauge needle is moved to the 19 volt graduation on the gauge scale and the check gauges indicator is illuminated. The gauge needle remains on the 19 volt graduation and the check gauges indicator remains illuminated until the cluster receives a message from the PCM indicating there is no voltage high condition (system voltage is sixteen volts or lower, but higher than nine volts), or until the ignition switch is turned to the Off position, whichever occurs first.
- **Message Failure** - If the cluster fails to receive a system voltage message for more than about twelve seconds, it will move the gauge needle to the minimum graduation of the gauge scale until a new message is received, or until the ignition switch is turned to the Off position, whichever occurs first.

VOLTAGE GAUGE (Continued)

- **Actuator Test** - Each time the cluster is put through the actuator test, the gauge needle will be swept to several calibration points on the gauge scale in a prescribed sequence to confirm the functionality of the gauge and the cluster control circuitry.

The PCM continually monitors the system voltage to control the generator output. The PCM then sends the proper system voltage messages to the instrument cluster. For further diagnosis of the voltage gauge or the instrument cluster circuitry that controls the gauge, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). If the instrument cluster turns on the check gauges indicator due to a charge fail or voltage high condition, it may indicate that the charging system requires service. For proper diagnosis of the charging system, the PCI data bus, or the message inputs to the instrument cluster that control the voltage gauge, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

RESTRAINTS

TABLE OF CONTENTS

page

RESTRAINTS
DESCRIPTION . . . 1
OPERATION . . . 2
WARNING . . . 3
DIAGNOSIS AND TESTING . . . 4
AIRBAG SYSTEM . . . 4
STANDARD PROCEDURE . . . 4
HANDLING OF NON-DEPLOYED AIRBAGS . . . 4
SERVICE AFTER AN AIRBAG DEPLOYMENT . . . 4
VERIFICATION TEST . . . 5
SPECIAL TOOLS . . . 6
AIRBAG CONTROL MODULE
DESCRIPTION . . . 6
OPERATION . . . 6
REMOVAL . . . 7
INSTALLATION . . . 8
CLOCKSPRING
DESCRIPTION . . . 9
OPERATION . . . 10
STANDARD PROCEDURE . . . 10
CLOCKSPRING CENTERING . . . 10
REMOVAL . . . 11
INSTALLATION . . . 12
DRIVER AIRBAG
DESCRIPTION . . . 13
OPERATION . . . 14
REMOVAL . . . 14
DISASSEMBLY . . . 15
ASSEMBLY . . . 16
INSTALLATION . . . 17

page

FRONT SEAT BELT & RETRACTOR
REMOVAL . . . 18
INSTALLATION . . . 18
FRONT SEAT BELT BUCKLE
REMOVAL . . . 19
INSTALLATION . . . 19
PASSENGER AIRBAG
DESCRIPTION . . . 19
OPERATION . . . 20
REMOVAL . . . 20
INSTALLATION . . . 21
PASSENGER AIRBAG ON / OFF SWITCH
DESCRIPTION . . . 22
OPERATION . . . 22
REMOVAL . . . 23
INSTALLATION . . . 23
REAR SEAT BELT & RETRACTOR
REMOVAL . . . 24
INSTALLATION . . . 25
REAR SEAT BELT BUCKLE
REMOVAL . . . 25
INSTALLATION . . . 26
SEAT BELT SWITCH
DESCRIPTION . . . 26
OPERATION . . . 26
DIAGNOSIS AND TESTING . . . 26
SEAT BELT SWITCH . . . 26
SEAT BELT TURNING LOOP ADJUSTER
REMOVAL . . . 27
INSTALLATION . . . 27

RESTRAINTS

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The refer to is written differently than in prior years.

RESTRAINTS (Continued)

DESCRIPTION

A dual front airbag system is standard factory-installed safety equipment on this model. The airbag system is a passive, inflatable, Supplemental Restraint System (SRS) and vehicles with this equipment can be readily identified by the “SRS - AIRBAG” logo molded into the driver airbag trim cover in the center of the steering wheel and also into the passenger airbag door on the instrument panel above the glove box (Fig. 1). Vehicles with the airbag system can also be identified by the airbag indicator, which will illuminate in the instrument cluster for about seven seconds as a bulb test each time the ignition switch is turned to the On position.



8098029e

Fig. 1 SRS Logo

The dual front airbag system consists of the following major components, which are described in further detail elsewhere in this service information:

- **Airbag Control Module** - The Airbag Control Module (ACM) is located on a mount on the floor panel transmission tunnel, below the center of the instrument panel.
- **Airbag Indicator** - The airbag indicator is integral to the ElectroMechanical Instrument Cluster (EMIC), which is located on the instrument panel in front of the driver.
- **Clockspring** - The clockspring is located near the top of the steering column, directly beneath the steering wheel.
- **Driver Airbag** - The driver airbag is located in the center of the steering wheel, beneath the driver airbag trim cover.
- **Driver Knee Blocker** - The driver knee blocker is a molded plastic structural unit secured to the back side of and integral to the instrument panel steering column opening cover.
- **Passenger Airbag** - The passenger airbag is located on the instrument panel, beneath the passenger airbag door on the instrument panel above the glove box on the passenger side of the vehicle.
- **Passenger Airbag On/Off Switch** - The passenger airbag on/off switch is located in a dedicated opening in the forward end of the center console on the floor panel transmission tunnel.
- **Passenger Knee Blocker** - The passenger knee blocker is a structural reinforcement that is integral to and concealed within the glove box door.

The ACM and the EMIC each contain a central processing unit and programming that allow them to communicate with each other using the Programmable Communications Interface (PCI) data bus network. This method of communication is used for control of the airbag indicator on all models. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES/COMMUNICATION - DESCRIPTION).

Hard wired circuitry connects the airbag system components to each other through the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the airbag system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

The airbag system is referred to as a supplemental restraint system because it 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. It is referred to as a passive system because the vehicle occupants are not required to do anything to make it work. The primary passenger restraints in this or any other vehicle are the standard equipment factory-installed seat belts. Seat belts are referred to as an active restraint because the vehicle occupants are required to physically fasten and properly adjust these restraints in order to benefit from them. The vehicle occupants must be wearing their seat belts in order to obtain the maximum safety benefit from the factory-installed airbag system.

The airbag system electrical circuits are continuously monitored and controlled by a microprocessor and software contained within the Airbag Control Module (ACM). An airbag indicator in the ElectroMe-

RESTRAINTS (Continued)

chanical Instrument Cluster (EMIC) 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 is turned on or off by the ACM to indicate the status of the airbag system. If the airbag indicator comes on at any time other than during the bulb test, it indicates that there is a problem in the airbag system electrical circuits. Such a problem may cause the airbags not to deploy when required, or to deploy when not required.

The clockspring on the top of the steering column allows a continuous electrical circuit to be maintained between the stationary steering column and the driver airbag inflator, which rotates with the steering wheel. The passenger airbag on/off switch allows the passenger side airbag to be disabled when circumstances necessitate that a child, or an adult with certain medical conditions be placed in the front passenger seating position. Refer to the owner's manual in the vehicle glove box for recommendations concerning the specific circumstances where the passenger airbag on/off switch should be used to disable the passenger airbag.

Deployment of the airbags depends upon the angle and severity of the impact. The airbag system is designed to deploy upon a frontal impact within a thirty degree angle from either side of the vehicle center line. Deployment is not based upon vehicle speed; rather, deployment is based upon the rate of deceleration as measured by the forces of gravity (G force) upon the airbag system impact sensor, which is integral to the ACM. When a frontal impact is severe enough, the microprocessor in the ACM signals the inflator units of both airbag modules to deploy the airbags. During a frontal vehicle impact, the knee blockers work in concert with properly fastened and adjusted seat belts to restrain both the driver and the front seat passenger in the proper position for an airbag deployment. The knee blockers also absorb and distribute the crash energy from the driver and the front seat passenger to the structure of the instrument panel.

Typically, the driver and front seat passenger recall more about the events preceding and following a collision than they have of the airbag deployment itself. This is because the airbag deployment and deflation occur so rapidly. In a typical 48 kilometer-per-hour (30 mile-per-hour) barrier impact, from the moment of impact until both airbags are fully inflated takes about 40 milliseconds. Within one to two seconds from the moment of impact, both airbags are almost entirely deflated. The times cited for these events are approximations, which apply only to a barrier impact at the given speed. Actual times will vary somewhat, depending upon the vehicle speed, impact angle, severity of the impact, and the type of collision.

When the ACM monitors a problem in any of the airbag system circuits or components, it stores a fault code or Diagnostic Trouble Code (DTC) in its memory circuit and sends an electronic message to the EMIC to turn on the airbag indicator. Proper testing of the airbag system components, the Programmable Communications Interface (PCI) data bus, the data bus message inputs to and outputs from the EMIC or the ACM, as well as the retrieval or erasure of a DTC from the ACM requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

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.

WARNING

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.

WARNING: THE DRIVER AIRBAG INFLATOR UNIT 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 UNIT CONTAINS ARGON GAS PRESSURIZED TO OVER 2500 PSI. DO NOT ATTEMPT TO DISMANTLE AN AIRBAG UNIT 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).

RESTRAINTS (Continued)

WARNING: REPLACE AIRBAG SYSTEM COMPONENTS ONLY WITH PARTS SPECIFIED IN THE DAIMLERCHRYSLER MOPAR PARTS CATALOG. SUBSTITUTE PARTS MAY APPEAR INTERCHANGEABLE, BUT INTERNAL DIFFERENCES MAY RESULT IN INFERIOR OCCUPANT PROTECTION.

WARNING: 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 DAIMLERCHRYSLER MOPAR PARTS CATALOG.

WARNING: WHEN A STEERING COLUMN HAS AN AIRBAG UNIT ATTACHED, NEVER PLACE THE COLUMN ON THE FLOOR OR ANY OTHER SURFACE WITH THE STEERING WHEEL OR AIRBAG UNIT FACE DOWN.

DIAGNOSIS AND TESTING - AIRBAG SYSTEM

Proper diagnosis and testing of the airbag system components, the PCI data bus, the data bus message inputs to and outputs from the ElectroMechanical Instrument Cluster (EMIC) or the Airbag Control Module (ACM), as well as the retrieval or erasure of a Diagnostic Trouble Code (DTC) from the ACM requires the use of a DRBIII® scan tool. Refer to the appropriate diagnostic information.

\WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

STANDARD PROCEDURE - HANDLING OF NON-DEPLOYED AIRBAGS

At no time should any source of electricity be permitted near the inflator on the back of a non-deployed airbag. When carrying a non-deployed airbag, the trim cover or airbag cushion side of the unit should be pointed away from the body to minimize injury in the event of an accidental deployment. If the airbag unit is placed on a bench or any other surface, the trim cover or airbag cushion side of the unit 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.

All damaged, faulty, or non-deployed driver or passenger airbags which are replaced on vehicles are to be returned. If an airbag unit is faulty or damaged and non-deployed, follow the instructions in the current Mopar Hazardous Material Awareness Manual or the current DaimlerChrysler Corporation Warranty Policies and Procedures manual for the proper handling and disposal procedures.

AIRBAG STORAGE

Airbags must be stored in their original, special container until they are used for service. Also, they must be stored in a clean, dry environment; away from sources of extreme heat, sparks, and high electrical energy. Always place or store any airbag on a surface with its trim cover or airbag cushion side facing up, to minimize movement in case of an accidental deployment.

STANDARD PROCEDURE - SERVICE AFTER AN AIRBAG DEPLOYMENT

Any vehicle which is to be returned to use following an airbag deployment, must have both airbags, the driver airbag trim cover, the horn switch, the clockspring, and the passenger airbag door replaced. These components are not intended for reuse and will be damaged or weakened as a result of an airbag deployment, which may or may not be obvious during a visual inspection. Other vehicle components should be closely inspected, but are to be replaced only as required by the extent of the visible damage incurred.

RESTRAINTS (Continued)

CLEANUP PROCEDURE

Following an airbag 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 propellant used to deploy the airbags. However, this residue may 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).

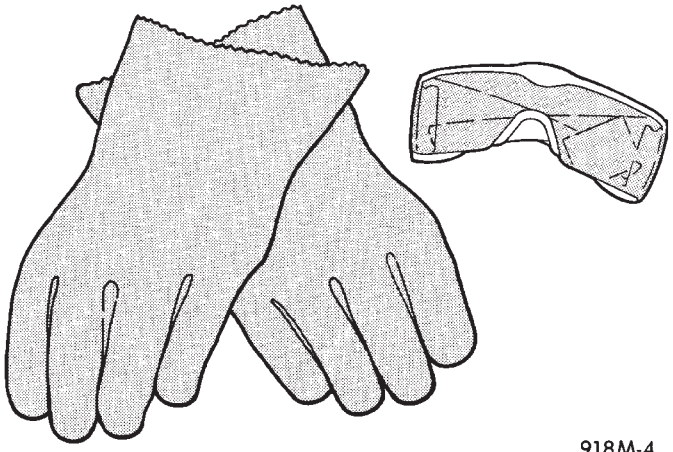


Fig. 2 Wear Safety Glasses and Rubber Gloves - Typical

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 both airbags from the vehicle. Refer to the appropriate service removal procedures. Place the deployed airbags in your vehicular scrap pile.

Next, 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 certain 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.

STANDARD PROCEDURE - VERIFICATION TEST

The following procedure should be performed using a DRBIII® scan tool to verify proper airbag system operation following the service or replacement of any airbag system component.

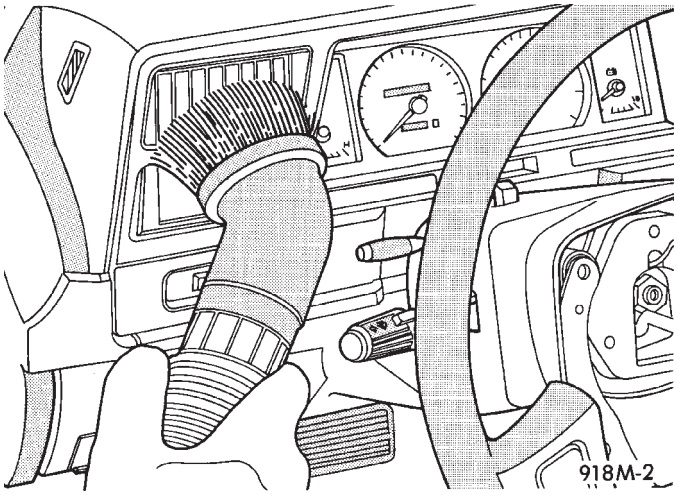


Fig. 3 Vacuum Heater and A/C Outlets - Typical

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) During the following test, the battery negative cable remains disconnected and isolated, as it was during the airbag component removal and installation procedures.

(2) Be certain that the DRBIII® scan tool contains the latest version of the proper DRBIII® software. Connect the DRBIII® to the 16-way Data Link Connector (DLC). The DLC is located on the driver side lower edge of the instrument panel, outboard of the steering column (Fig. 4).

(3) Turn the ignition switch to the On position and exit the vehicle with the DRBIII®.

(4) Check to be certain that nobody is in the vehicle, then reconnect the battery negative cable.

(5) Using the DRBIII®, read and record the active (current) Diagnostic Trouble Code (DTC) data.

(6) Next, use the DRBIII® to read and record any stored (historical) DTC data.

(7) If any DTC is found in Step 5 or Step 6, refer to the appropriate diagnostic information.

(8) Use the DRBIII® to erase the stored DTC data. If any problems remain, the stored DTC data will not erase. Refer to the appropriate diagnostic information to diagnose any stored DTC that will not erase. If the stored DTC information is successfully erased, go to Step 9.

RESTRAINTS (Continued)

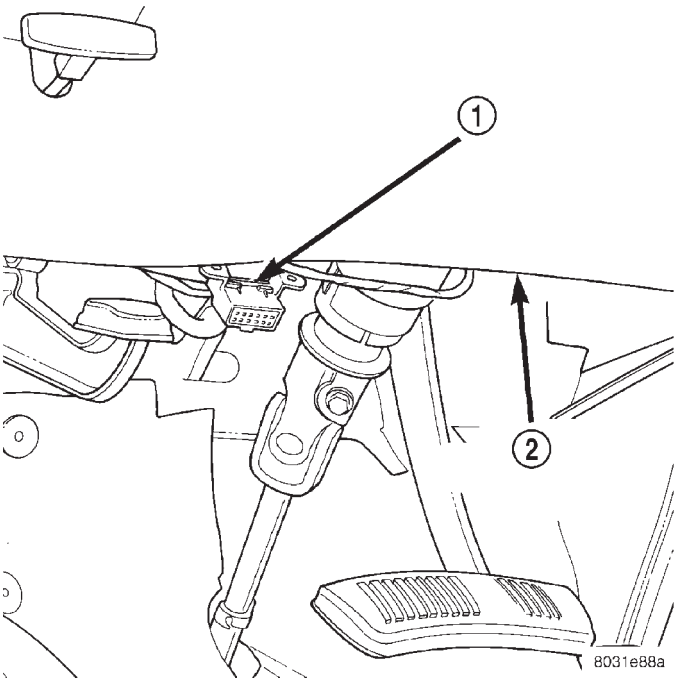


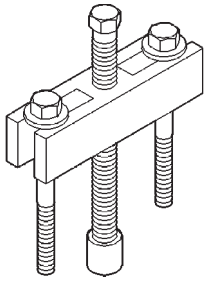
Fig. 4 16-Way Data Link Connector - Typical

1 - 16–WAY DATA LINK CONNECTOR
2 - LOWER EDGE OF INSTRUMENT PANEL

(9) Turn the ignition switch to the Off position for about fifteen seconds, and then back to the On position. Observe the airbag indicator 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 and that the repairs are complete. If the airbag indicator fails to light, or lights and stays on, there is still an active airbag system fault or malfunction. Refer to the appropriate diagnostic information to diagnose the problem.

SPECIAL TOOLS

AIRBAG SYSTEM



Puller C-3428-B

AIRBAG CONTROL MODULE

DESCRIPTION

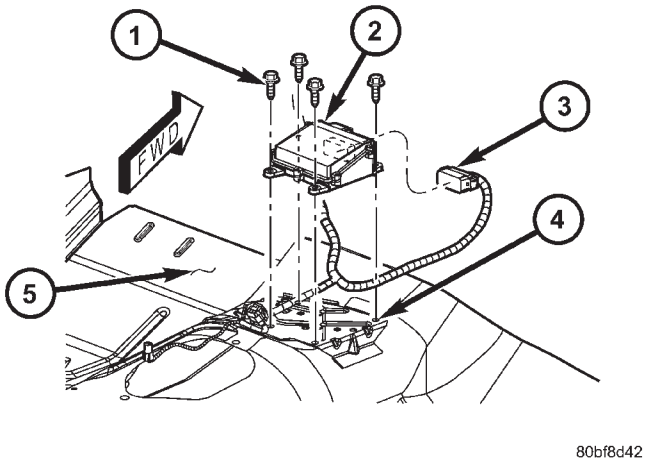


Fig. 5 Airbag Control Module

1 - SCREW (4)
2 - AIRBAG CONTROL MODULE
3 - WIRE HARNESS CONNECTOR
4 - MOUNTING BRACKET
5 - FRONT FLOOR PANEL

The Airbag Control Module (ACM) is secured with four screws to a mounting bracket that is welded onto the top of the floor panel transmission tunnel below the instrument panel and forward of the center floor console in the passenger compartment of the vehicle (Fig. 5). The ACM contains an electronic microprocessor, an electronic impact sensor, an electromechanical safing sensor, and an energy storage capacitor. The ACM is connected to the vehicle electrical system through a dedicated take out and connector of the cross body wire harness.

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

OPERATION

The microprocessor in the ACM contains the airbag system logic circuits, and it monitors and controls all of the airbag system components. The ACM also uses On-Board Diagnostics (OBD) and can communicate with other electronic modules in the vehicle as well as with the DRBIII® scan tool using the Programmable Communications Interface (PCI) data bus network. This method of communication is used for control of the airbag indicator in the ElectroMechanical Instrument Cluster (EMIC) and for airbag system diagnosis and testing through the 16-way data link connector located on the lower left edge of the instrument panel. (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER/AIRBAG INDICATOR -

AIRBAG CONTROL MODULE (Continued)

OPERATION). The ACM microprocessor continuously monitors all of the airbag system electrical circuits to determine the system readiness. If the ACM detects a monitored system fault, it sets an active Diagnostic Trouble Code (DTC) and sends messages to the EMIC over the PCI data bus to turn on the airbag indicator. If the airbag system fault is still present when the ignition switch is turned to the Off position, the DTC is stored in memory by the ACM. However, if a fault does not recur for a number of ignition cycles, the ACM will automatically erase the stored DTC.

The ACM also receives a resistor multiplexed input from the passenger airbag on/off switch and provides a control output for the Off indicator in the switch through a passenger airbag indicator driver circuit. If the passenger airbag on/off switch is set to the Off position, the ACM turns on the passenger airbag on/off switch Off indicator and will internally disable the passenger airbag from being deployed if an impact is detected that is sufficient for an airbag deployment. The ACM also turns on the on/off switch Off indicator for about seven seconds each time the ignition switch is turned to the On position as a bulb test. Following the bulb test, the ACM controls the status of the Off indicator based upon the resistance of the input from the on/off switch. The ACM will also set and/or store a DTC for faults it detects in the passenger airbag on/off switch circuits, and will turn on the airbag indicator in the EMIC if a fault has been detected.

The ACM receives battery current through two circuits, on a fused ignition switch output (run) circuit through a fuse in the fuse block, and on a fused ignition switch output (run-start) circuit through a second fuse in the fuse block. The ACM is grounded through a ground circuit and take out of the cross body wire harness. This take out has a single eyelet terminal connector secured by a ground screw to the right cowl side inner panel below the instrument panel in the passenger compartment. Therefore, the ACM is operational whenever the ignition switch is in the Start or On positions. The ACM also contains an energy-storage capacitor. When the ignition switch is in the Start or On positions, this capacitor is continually being charged with enough electrical energy to deploy the airbags for up to one second following a battery disconnect or failure. The purpose of the capacitor is to provide backup airbag system protection in case there is a loss of battery current supply to the ACM during an impact. The capacitor is only serviced as a unit with the ACM.

Two sensors are contained within the ACM, an electronic impact sensor and a safing sensor. The electronic impact sensor is an accelerometer that senses the rate of vehicle deceleration, which provides verification of the direction and severity of an impact. 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 and, on quad cab models, the seat belt tensioners. The safing sensor is an electromechanical sensor within the ACM that is connected in series between the ACM microprocessor deployment circuit and the airbags/seat belt tensioners. The safing sensor is a normally open switch that is used to verify or confirm the need for an airbag deployment by detecting impact energy of a lesser magnitude than that of the electronic impact sensor, and must be closed in order for the airbags to deploy. The impact sensor and safing sensor are calibrated for the specific vehicle, and are only serviced as a unit with the ACM.

REMOVAL

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: THE AIRBAG CONTROL MODULE CONTAINS THE IMPACT SENSOR, WHICH ENABLES THE SYSTEM TO DEPLOY THE AIRBAGS. 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.

(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 the carpet on the right and left sides of the floor panel transmission tunnel rearward far

AIRBAG CONTROL MODULE (Continued)

enough to access the Airbag Control Module (ACM), which is forward of the floor console.

(3) If the vehicle is equipped with the optional Anti-lock Brake System (ABS), remove the acceleration switch from the left side of the mounting bracket on the floor panel transmission tunnel. (Refer to 5 - BRAKES/ELECTRICAL/G-SWITCH - REMOVAL).

(4) Remove the four screws that secure the Airbag Control Module (ACM) to the mounting bracket that is welded onto the floor panel transmission tunnel (Fig. 6).

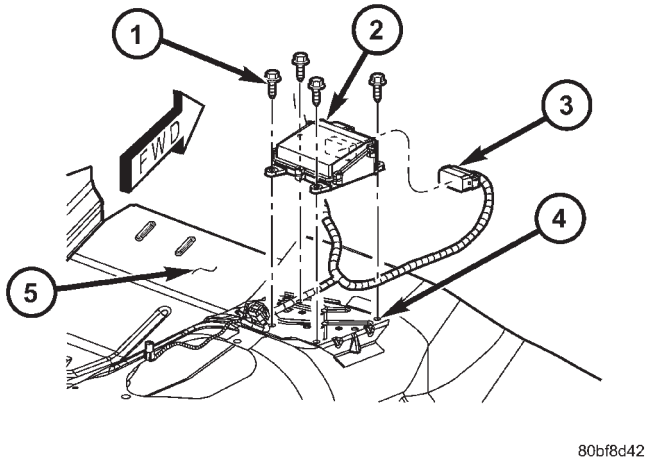


Fig. 6 Airbag Control Module Remove/Install

1 - SCREW (4)
2 - AIRBAG CONTROL MODULE
3 - WIRE HARNESS CONNECTOR
4 - MOUNTING BRACKET
5 - FRONT FLOOR PANEL

(5) Lift the ACM upward from the mounting bracket far enough to disengage the locator pins on the ACM housing from the locator holes in the mounting bracket, then pull the ACM out from under the instrument panel far enough to access the wire harness connector.

(6) Disconnect the cross body wire harness connector for the ACM from the ACM connector receptacle. To disconnect the cross body wire harness connector from the ACM (Fig. 7):

(a) Pull the white Connector Positive Assurance (CPA) locks on each side of the connector out about 3 millimeters (0.125 in.).

(b) Squeeze the latch tabs on each side of the connector between the thumb and forefinger and pull the connector straight away from the ACM connector receptacle.

(7) Remove the ACM from beneath the instrument panel.

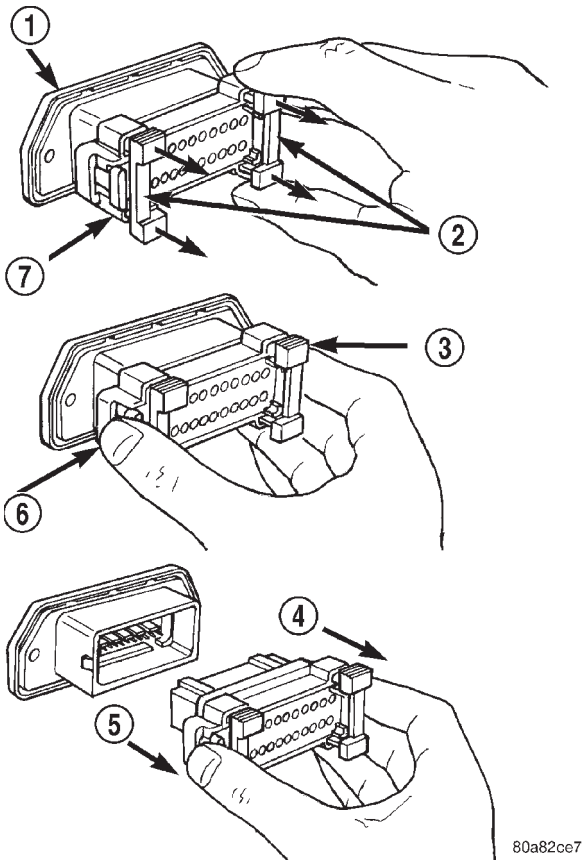


Fig. 7 Airbag Control Module Connector Removal

1 - AIRBAG CONTROL MODULE
2 - PULL TWO LOCKS OUT
3 - SQUEEZE LATCHES
4 - PULL
5 - PULL
6 - SQUEEZE LATCHES
7 - WIRE HARNESS CONNECTOR

INSTALLATION

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

AIRBAG CONTROL MODULE (Continued)

WARNING: THE AIRBAG CONTROL MODULE CONTAINS THE IMPACT SENSOR, WHICH ENABLES THE SYSTEM TO DEPLOY THE AIRBAGS. 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.

(1) Position the Airbag Control Module (ACM) beneath the instrument panel.

(2) Reconnect the cross body wire harness connector for the ACM to the ACM connector receptacle (Fig. 7). Be certain that the connector latches and the white Connector Positive Assurance (CPA) locks are fully engaged.

(3) Carefully position the ACM to the mounting bracket that is welded onto the floor panel transmission tunnel (Fig. 6). When the ACM is correctly positioned, the locator pins on the ACM housing will be engaged in the locator holes in the mounting bracket, and the arrow on the ACM label will be pointed forward in the vehicle.

(4) Install and tighten the four screws that secure the ACM to the mounting bracket welded onto the floor panel transmission tunnel. Tighten the screws to 14 N·m (125 in. lbs.).

(5) If the vehicle is equipped with the optional ABS brakes, reinstall the acceleration switch onto the left side of the mounting bracket on the floor panel transmission tunnel. (Refer to 5 - BRAKES/ELECTRICAL/G-SWITCH - INSTALLATION).

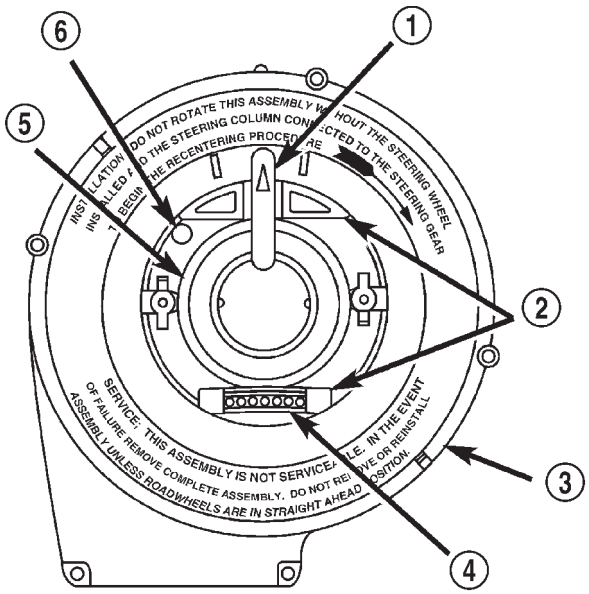
(6) Restore the carpet on the right and left sides of the floor panel transmission tunnel to its proper position beneath the instrument panel.

(7) Do not reconnect the battery negative cable at this time. The airbag system verification test procedure should be performed following service of any airbag system component (Refer to 8 - ELECTRICAL/RESTRAINTS - STANDARD PROCEDURE - VERIFICATION TEST).

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 (Fig. 8). The clockspring consists of a flat, round molded plastic case with a stubby tail that hangs below the steering column and contains



80b76eff

Fig. 8 Clockspring

1 - LOCKING PIN
2 - ROTOR FLATS
3 - CASE
4 - UPPER CLOCKSPRING PIGTAIL WIRES (WIRES NOT SHOWN)
5 - ROTOR
6 - INDEX HOLE

two connector receptacles that face toward the instrument panel. Within the plastic housing is a spool-like molded plastic rotor with a large exposed hub. The upper surface of the rotor hub has a large center hole, two large flats, and two or three short pigtail wires with connectors. The third pigtail wire is used on vehicles equipped with the optional speed control system. The lower surface of the rotor hub has a molded plastic turn signal cancel cam consisting of two lobes that are molded into the rotor. Within the plastic case and wound around the rotor spool is a long ribbon-like tape that consists of several thin copper wire leads sandwiched between two thin plastic membranes. The outer end of the tape terminates at the connector receptacles that face the instrument panel, while the inner end of the tape terminates at the pigtail wires on the hub of the clockspring rotor that face the steering wheel.

Service replacement clocksprings are shipped precentered and with a locking pin that snaps into a receptacle on the rotor and is engaged between two tabs on the upper surface of the rotor case. The locking pin secures the centered clockspring rotor to the clockspring case during shipment, but the locking pin must be removed from the clockspring after it is installed on the steering column. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - STAN-

CLOCKSPRING (Continued)

DARD PROCEDURE - CLOCKSPRING CENTERING).

The clockspring cannot be repaired. If the clockspring is faulty, damaged, or if the driver airbag has been deployed, the clockspring must be replaced.

OPERATION

The clockspring is a mechanical electrical circuit component that is used to provide continuous electrical continuity between the fixed cross body wire harness on the steering column and the electrical components mounted on or in the rotating steering wheel. On this model the rotating electrical components include the driver airbag, the horn switch, and the speed control switches if the vehicle is so equipped. The clockspring case is positioned and secured to the upper steering column housing near the top of the steering column. The connector receptacles on the tail of the fixed clockspring case connect the clockspring to the vehicle electrical system through two take outs with connectors from the cross body wire harness. The clockspring rotor is movable and is keyed by two flats molded into the rotor hub to two flats that are cast into the lower surface of the steering wheel armature. The two lobes on the turn signal cancel cam on the lower surface of the clockspring rotor hub contact a turn signal cancel actuator of the multi-function switch to provide automatic turn signal cancellation. The pigtail wires on the upper surface of the clockspring rotor connect the clockspring to the driver airbag, the horn switch, and the steering wheel wire harness for the two speed control switches if the vehicle is so equipped.

Like the clockspring in a timepiece, the clockspring tape has travel limits and can be damaged by being wound too tightly during full stop-to-stop steering wheel rotation. 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 the movable steering components so that the tape can operate within its designed travel limits. However, if the clockspring is removed from the steering column or if the steering shaft is disconnected from the steering gear, the clockspring spool can change position relative to the movable steering components and must be re-centered following completion of the service or the tape may be damaged. Service replacement clocksprings are shipped pre-centered and with a plastic locking pin installed. This locking pin should not be disengaged until the clockspring has been installed on the steering column. If the locking pin is removed or damaged before the clockspring is installed on a steering column, the clockspring centering procedure must be performed. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - STANDARD PROCEDURE - CLOCKSPRING CENTERING).

STANDARD PROCEDURE - 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 such service or the clockspring tape may be damaged. Service replacement clocksprings are shipped pre-centered and with a plastic locking pin installed (Fig. 9). 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.

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

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 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - REMOVAL).

(3) Rotate the clockspring rotor clockwise to the end of its travel. **Do not apply excessive torque.**

CLOCKSPRING (Continued)

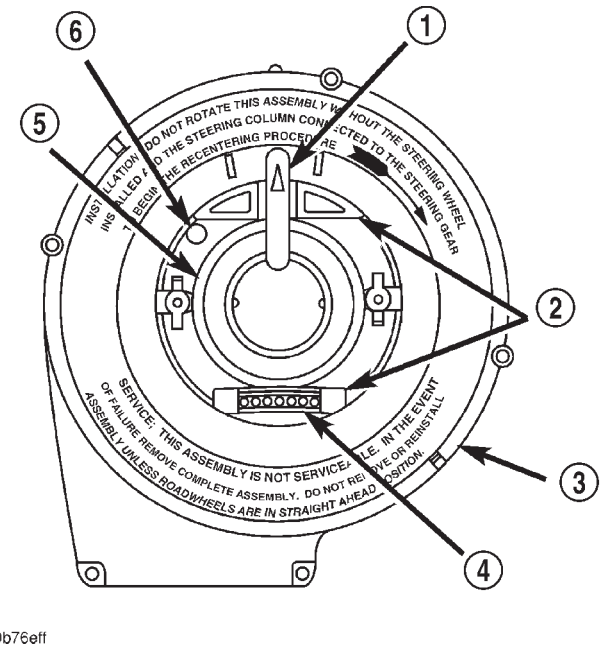


Fig. 9 Clockspring

1 - LOCKING PIN
2 - ROTOR FLATS
3 - CASE
4 - UPPER CLOCKSPRING PIGTAIL WIRES (WIRES NOT SHOWN)
5 - ROTOR
6 - INDEX HOLE

(4) 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 clockspring pigtail wires are not oriented towards the bottom of the clockspring, rotate the rotor another one-half turn in the counterclockwise direction.

(5) 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.

(6) The front wheels should still be in the straight-ahead position. Reinstall the clockspring onto the steering column. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - INSTALLATION).

REMOVAL

The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver airbag has been deployed.

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

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 driver airbag from the steering wheel. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - REMOVAL).

(3) If the vehicle is so equipped, disconnect the upper clockspring pigtail wire connector from the steering wheel wire harness for the speed control switches located within the hub cavity of the steering wheel.

(4) Remove the screw that secures the steering wheel armature to the steering column upper shaft, which is located within the hub cavity of the steering wheel.

CAUTION: Be certain that the screws that secure the steering wheel puller to the steering wheel are fully engaged in the steering wheel armature without passing through the steering wheel and damaging the clockspring.

(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 23 - BODY/INSTRUMENT PANEL/STEERING COLUMN OPENING COVER - REMOVAL).

(7) Remove the two screws that secure the lower steering column shroud to the upper shroud (Fig. 10).

(8) If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully lowered position and leave the tilt release lever in the released (down) position.

(9) Remove both the upper and lower shrouds from the steering column.

(10) Disconnect the two cross body wire harness connectors from the lower clockspring connector receptacles (Fig. 11).

CLOCKSPRING (Continued)

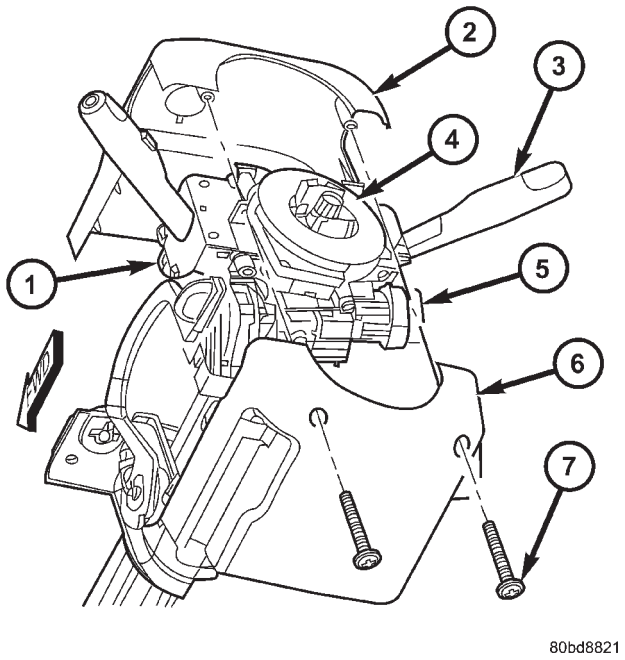


Fig. 10 Steering Column Shrouds Remove/Install

1 - LEFT MULTI-FUNCTION SWITCH
2 - UPPER SHROUD
3 - RIGHT MULTI-FUNCTION SWITCH
4 - CLOCKSPRING
5 - IGNITION LOCK CYLINDER HOUSING
6 - LOWER SHROUD
7 - SCREW (2)

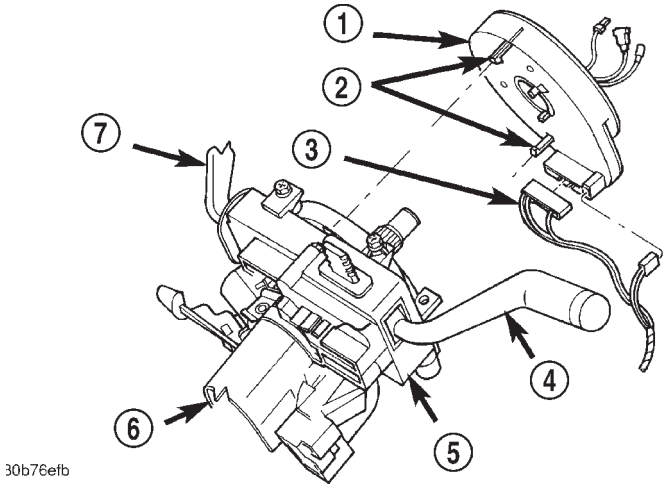


Fig. 11 Clockspring Remove/Install - Typical

1 - CLOCKSPRING
2 - LATCHES
3 - CROSS BODY WIRE HARNESS
4 - LEFT MULTI-FUNCTION SWITCH
5 - SWITCH HOUSING
6 - STEERING COLUMN
7 - RIGHT MULTI-FUNCTION SWITCH

(11) Using a small screwdriver, 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.

(12) Remove the clockspring from the steering column. The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver airbag has been deployed.

(13) 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. Bend the wire over after it has been inserted through the index hole to prevent it from falling out. If clockspring centering is not maintained, the clockspring must be centered again before it is reinstalled. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - STANDARD PROCEDURE - CLOCKSPRING CENTERING).

INSTALLATION

The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver airbag has been deployed.

If the clockspring is not properly centered in relation to the steering wheel, steering shaft and steering gear, it may be damaged. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - STANDARD PROCEDURE - CLOCKSPRING CENTERING). Service replacement clocksprings are shipped pre-centered and with a plastic 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.

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CLOCKSPRING (Continued)

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 reinstalled, 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 left multi-function switch control stalk is in the neutral position, then carefully slide the centered clockspring down over the steering column upper shaft until both the upper and lower clockspring latches engage the steering column upper housing (Fig. 11).

(3) Reconnect the two cross body wire harness connectors to the lower clockspring connector receptacles.

(4) Position both the upper and lower shrouds onto the steering column (Fig. 10). Be certain that the locating tabs for the left and right multi-function switch control stalk watershields are properly engaged in the openings of both the upper and lower shrouds.

(5) Install and tighten the two screws that secure the lower steering column shroud to the upper shroud. Tighten the screws to 2 N·m (18 in. lbs.).

(6) If the vehicle is equipped with the optional tilt steering column, move the tilt steering column to the fully raised position and secure it in place by moving the tilt release lever back to the locked (up) position.

(7) Reinstall the steering column opening cover onto the instrument panel. (Refer to 23 - BODY/INSTRUMENT PANEL/STEERING COLUMN OPENING COVER - INSTALLATION).

(8) If a new clockspring has been installed, remove the locking pin that is securing the clockspring rotor to the clockspring case to maintain clockspring centering.

(9) Reinstall 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 pigtail wires through the lower hole in the steering wheel armature.

(10) Install and tighten the screw that secures the steering wheel to the steering column upper shaft. Tighten the screw to 54 N·m (40 ft. lbs.). Be certain not to pinch the clockspring pigtail wires or the steering wheel wire harness between the steering wheel and the screw.

(11) If the vehicle is so equipped, reconnect the upper clockspring pigtail wire connector to the steering wheel wire harness for the speed control switches.

(12) Reinstall the driver airbag onto the steering wheel. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - INSTALLATION).

DRIVER AIRBAG

DESCRIPTION

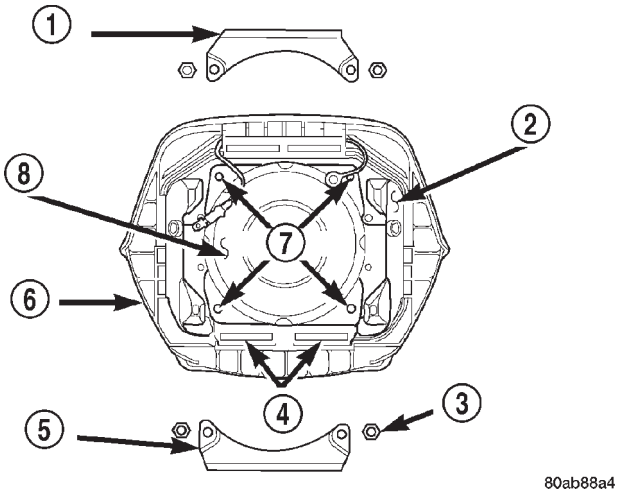


Fig. 12 Driver Airbag - Typical

1 - UPPER RETAINER
2 - AIRBAG HOUSING
3 - NUT (4)
4 - RETAINER SLOTS
5 - LOWER RETAINER
6 - TRIM COVER
7 - STUDS (4)
8 - INFLATOR

The driver airbag protective trim cover is the most visible part of the driver airbag (Fig. 12). The airbag used in this model is a Next Generation-type that complies with revised federal airbag standards to deploy with less force than those used in some prior models. The driver airbag is located in the center of the steering wheel, where it is secured with two screws to the steering wheel armature. Concealed beneath the driver airbag trim cover are the horn switch, the folded airbag cushion, the airbag retainer or housing, the airbag inflator, and the retainers that secure the trim cover to the airbag housing. The resistive membrane-type horn switch is secured with heat stakes to the inside surface of the driver airbag trim cover, between the trim cover and the folded airbag cushion. The airbag inflator is a conventional pyrotechnic-type unit that is secured with nuts to four studs on the back of the stamped metal airbag housing.

The driver airbag trim cover has locking blocks molded into the back side of it that engage a lip formed around the perimeter of the airbag housing. Two stamped metal retainers then fit over the inflator mounting studs on the back of the airbag housing and are engaged in slots on the inside of the trim cover, securely locking the cover into place. One horn switch pigtail wire has an eyelet terminal connector

DRIVER AIRBAG (Continued)

that is captured on the upper left inflator mounting stud between the inflator and the upper trim cover retainer. The other horn switch pigtail wire is routed between the upper right inflator stud and the inflator, then secured with a small nylon retainer that is pressed onto the inflator stud. The driver airbag cannot be repaired, and must be replaced if deployed or in any way damaged. The driver airbag trim cover and the horn switch are available as a unit and may be disassembled from the driver airbag for service replacement.

OPERATION

The driver airbag is deployed by an electrical signal generated by the Airbag Control Module (ACM) through the driver airbag line 1 and line 2 (or squib) circuits. When the ACM sends the proper electrical signal to the airbag inflator, the electrical energy generates enough heat to initiate a small pyrotechnic charge which, in turn, ignites chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce a large quantity of nitrogen gas. The inflator is sealed to the back of the airbag housing and a diffuser in the inflator directs all of the nitrogen gas into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the driver airbag trim cover will split at predetermined breakout lines, then fold back out of the way along with the horn switch. Following an airbag deployment, the airbag cushion quickly deflates by venting the nitrogen gas towards the instrument panel through the porous fabric material used on the steering wheel side of the airbag cushion.

Some of the chemicals used to create the nitrogen gas are considered hazardous in their solid state, before they are burned, but they are securely sealed within the airbag inflator. However, the nitrogen gas that is produced when the chemicals are burned is harmless. A small amount of residue from the burned chemicals may cause some temporary discomfort if it contacts the skin, eyes, or breathing passages. If skin or eye irritation is noticed, rinse the affected area with plenty of cool, clean water. If breathing passages are irritated, move to another area where there is plenty of clean, fresh air to breath. If the irritation is not alleviated by these actions, contact a physician.

REMOVAL

The following procedure is for replacement of a faulty or damaged driver airbag. If the driver airbag has been deployed, the clockspring must also be replaced. (Refer to 8 - ELECTRICAL/RESTRAINTS/ CLOCKSPRING - REMOVAL).

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: WHEN REMOVING A DEPLOYED AIRBAG, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG CUSHION AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.

(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 airbag to the steering wheel armature (Fig. 13).

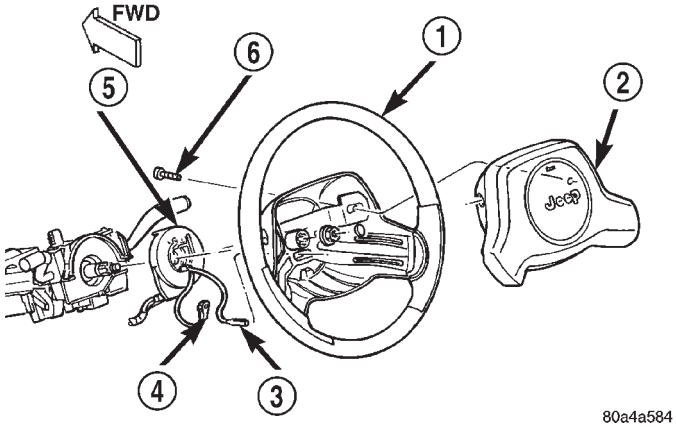


Fig. 13 Driver Airbag Remove/Install - Typical

1 - STEERING WHEEL
2 - DRIVER AIRBAG
3 - CLOCKSPRING PIGTAIL WIRE (HORN SWITCH)
4 - CLOCKSPRING PIGTAIL WIRE (AIRBAG)
5 - CLOCKSPRING
6 - SCREW (2)

(3) Pull the driver airbag away from the steering wheel far enough to access the two wire harness connectors on the back of the airbag.

(4) Disconnect the clockspring horn switch pigtail wire connector for the horn switch from the switch feed pigtail wire connector, which is located on the back of the driver airbag.

DRIVER AIRBAG (Continued)

CAUTION: Do not pull on the clockspring wire harness to disengage the connector from the driver airbag inflator connector receptacle.

(5) The clockspring driver airbag pigtail wire connector is a tight snap fit into the airbag inflator connector receptacle, which is located on the back of the driver airbag. Firmly grasp and pull or gently pry on the clockspring driver airbag pigtail wire connector to disconnect it from the airbag inflator connector receptacle.

(6) Remove the driver airbag from the steering wheel.

(7) If the driver airbag has been deployed, the clockspring must be replaced. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - REMOVAL).

DISASSEMBLY

The horn switch is integral to the driver airbag trim cover. If either component is faulty or damaged, the entire driver airbag trim cover and horn switch unit must be replaced.

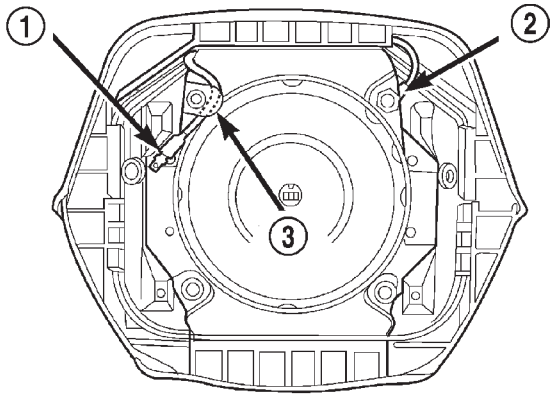
WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: THE HORN SWITCH IS INTEGRAL TO THE DRIVER AIRBAG UNIT. SERVICE OF THIS UNIT SHOULD BE PERFORMED ONLY BY DAIMLERCHRYSLER-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.

(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 airbag from the steering wheel. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - REMOVAL).

(3) Remove the plastic horn switch pigtail wire retainer from the stud on the back of the driver airbag housing (Fig. 14).

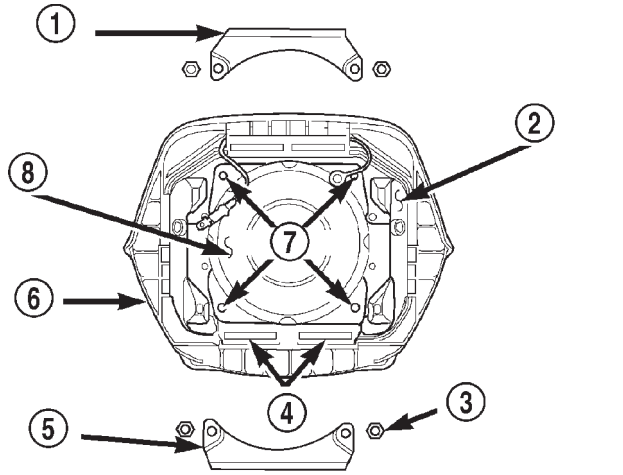


80ab88a3

Fig. 14 Horn Switch Feed Wire Remove/Install

1 - HORN SWITCH FEED PIGTAIL WIRE
2 - HORN SWITCH GROUND PIGTAIL WIRE
3 - RETAINER

(4) Remove the four nuts that secure the upper and lower trim cover retainers to the studs on the back of the driver airbag housing (Fig. 15).



80ab88a4

Fig. 15 Driver Airbag Trim Cover

1 - UPPER RETAINER
2 - AIRBAG HOUSING
3 - NUT (4)
4 - RETAINER SLOTS
5 - LOWER RETAINER
6 - TRIM COVER
7 - STUDS (4)
8 - INFLATOR

(5) Remove the upper and lower trim cover retainers from the airbag housing studs.

DRIVER AIRBAG (Continued)

(6) Remove the horn switch ground pigtail wire eyelet terminal connector from the upper left airbag housing stud.

(7) Disengage the four trim cover locking blocks from the lip around the outside edge of the driver airbag housing and remove the housing from the cover (Fig. 16).

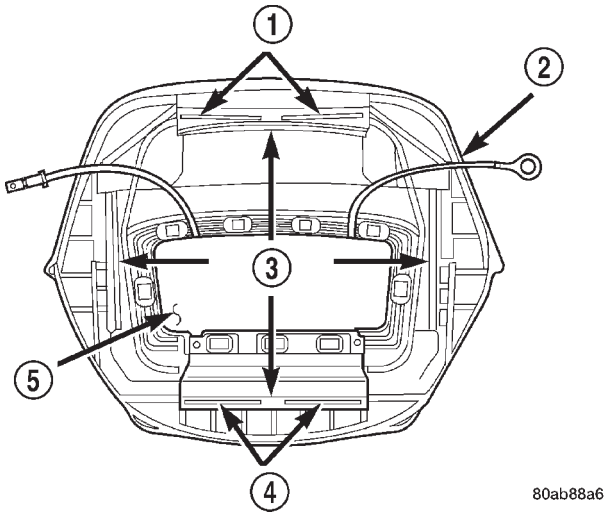


Fig. 16 Driver Airbag Trim Cover Remove/Install

1 - RETAINER SLOTS
2 - TRIM COVER
3 - LOCKING BLOCKS
4 - RETAINER SLOTS
5 - HORN SWITCH

ASSEMBLY

The horn switch is integral to the driver airbag trim cover. If either component is faulty or damaged, the entire driver airbag trim cover and horn switch unit must be replaced.

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: THE HORN SWITCH IS INTEGRAL TO THE DRIVER AIRBAG UNIT. SERVICE OF THIS UNIT SHOULD BE PERFORMED ONLY BY DAIMLERCHRYSLER-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.

WARNING: USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE DRIVER AIRBAG, OR BECOMING ENTRAPPED BETWEEN THE DRIVER AIRBAG CUSHION AND THE DRIVER AIRBAG TRIM COVER. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

WARNING: THE DRIVER AIRBAG 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 airbag in the trim cover. Be certain that the horn switch feed and ground pigtail 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 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. 17).

(3) Reinstall the horn switch ground pigtail wire eyelet terminal connector over the left upper airbag housing stud.

(4) Reinstall 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. 16).

(5) Install and tighten the nuts that secure the trim cover retainers to the airbag housing studs. Tighten the nuts to 10 N·m (90 in. lbs.).

(6) Reinstall the driver airbag onto the steering wheel. (Refer to 8 - ELECTRICAL/RESTRAINTS/ DRIVER AIRBAG - INSTALLATION).

DRIVER AIRBAG (Continued)

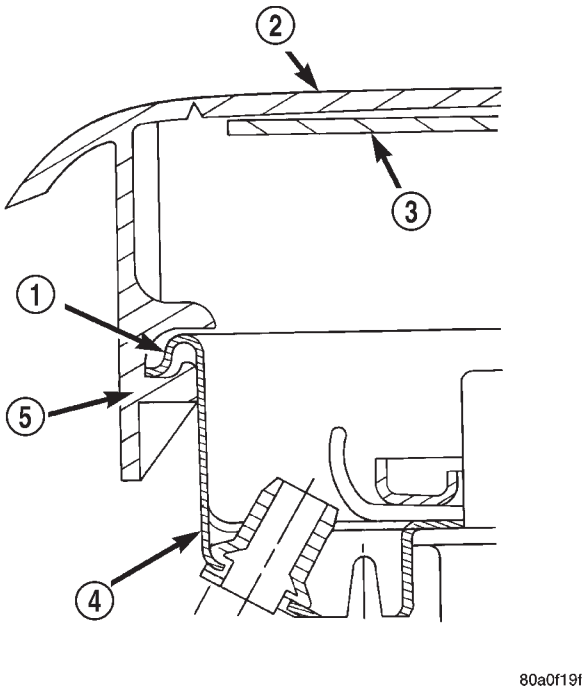


Fig. 17 Driver Airbag Trim Cover Locking Blocks Engaged

1 - LIP
2 - TRIM COVER
3 - HORN SWITCH
4 - AIRBAG HOUSING
5 - LOCKING BLOCK

INSTALLATION

The following procedure is for replacement of a faulty or damaged driver airbag. If the driver airbag has been deployed, the clockspring must also be replaced. (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - INSTALLATION).

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE DRIVER AIRBAG, OR BECOMING ENTRAPPED BETWEEN THE DRIVER AIRBAG CUSHION AND THE DRIVER AIRBAG TRIM COVER. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

WARNING: THE DRIVER AIRBAG 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) Assemble the driver airbag trim cover onto the airbag housing. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - ASSEMBLY).

(2) When installing the driver airbag, reconnect the clockspring driver airbag pigtail wire connector to the airbag module connector receptacle by pressing straight in on the connector (Fig. 13). You can be certain that the connector is fully engaged by listening carefully for a distinct, audible click as the connector snaps into place.

(3) Reconnect the clockspring pigtail wire connector for the horn switch to the switch feed pigtail wire connector, which is located on the back of the driver airbag.

(4) Carefully position the driver airbag in the steering wheel. Be certain that the clockspring and steering wheel wire harnesses in the steering wheel hub area are not pinched between the driver airbag and the steering wheel.

(5) From the underside of the steering wheel, install and tighten the two screws that secure the driver airbag to the steering wheel armature. Tighten the screws to 10 N·m (90 in. lbs.).

(6) Do not reconnect the battery negative cable at this time. The airbag system verification test procedure should be performed following service of any airbag system component. (Refer to 8 - ELECTRICAL/RESTRAINTS - STANDARD PROCEDURE - VERIFICATION TEST).

FRONT SEAT BELT & RETRACTOR

REMOVAL

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Move the front seats to their most forward position for easiest access to the front shoulder belt lower anchor screw, the belt retractor and the sport bar.

(2) Unsnap and lift the front shoulder belt turning loop cover to access the screw that secures the turning loop to the height adjuster near the top of the sport bar (Fig. 18).

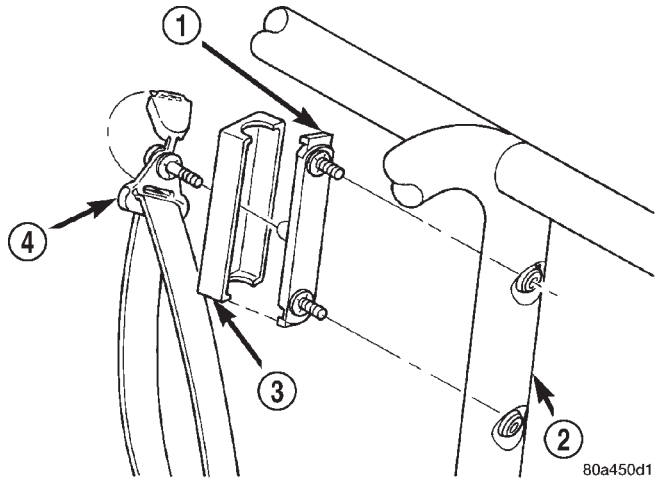


Fig. 18 Front Shoulder Belt Turning Loop

1 - HEIGHT ADJUSTER
2 - SPORT BAR
3 - TRIM COVER
4 - TURNING LOOP

(3) Remove the screw that secures the shoulder belt turning loop to the adjuster.

(4) Remove the shoulder belt turning loop and the support/guide washer from the adjuster.

(5) Remove the screw that secures the retractor and lower seat belt anchor plate to the sport bar near its base (Fig. 19).

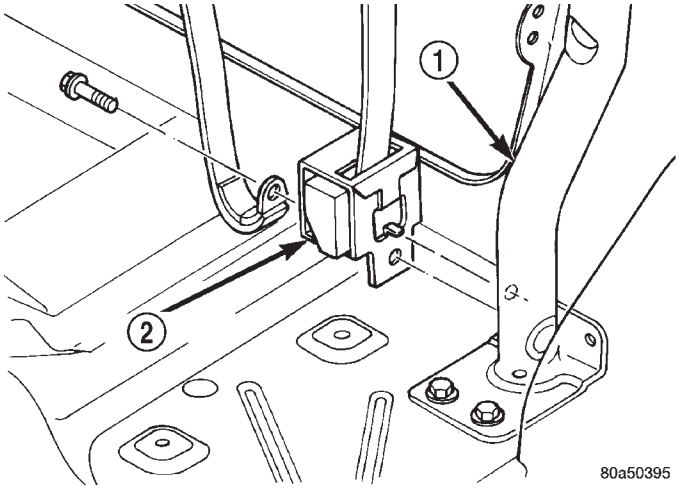


Fig. 19 Front Shoulder Belt and Retractor - Typical

1 - SPORT BAR
2 - RETRACTOR

(6) Remove the front seat shoulder belt and retractor from the sport bar.

INSTALLATION

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Position the front seat shoulder belt and retractor near the base of the sport bar (Fig. 19). Be certain to engage the locator tab on the retractor in the locator hole on the sport bar.

(2) Install and tighten the screw that secures the retractor and lower seat belt anchor plate to the sport bar. Tighten the screw to 43 N·m (32 ft. lbs.).

FRONT SEAT BELT & RETRACTOR (Continued)

(3) Position the support/guide washer and the shoulder belt turning loop onto the height adjuster near the top of the sport bar (Fig. 18).

(4) Install and tighten the screw that secures the shoulder belt turning loop to the adjuster. Tighten the screw to 43 N·m (32 ft. lbs.).

(5) Fold and snap the shoulder belt turning loop cover back into place over the screw that secures the turning loop to the adjuster.

FRONT SEAT BELT BUCKLE

REMOVAL

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) On the driver side only, disconnect the seat belt switch pigtail wire connector from the body wire harness connector for the seat belt switch (Fig. 20).

(2) Remove the screw that secures the seat belt buckle to the bracket on the rear of the upper inner front seat track (Fig. 21).

(3) Remove the seat belt buckle from the seat track bracket.

INSTALLATION

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

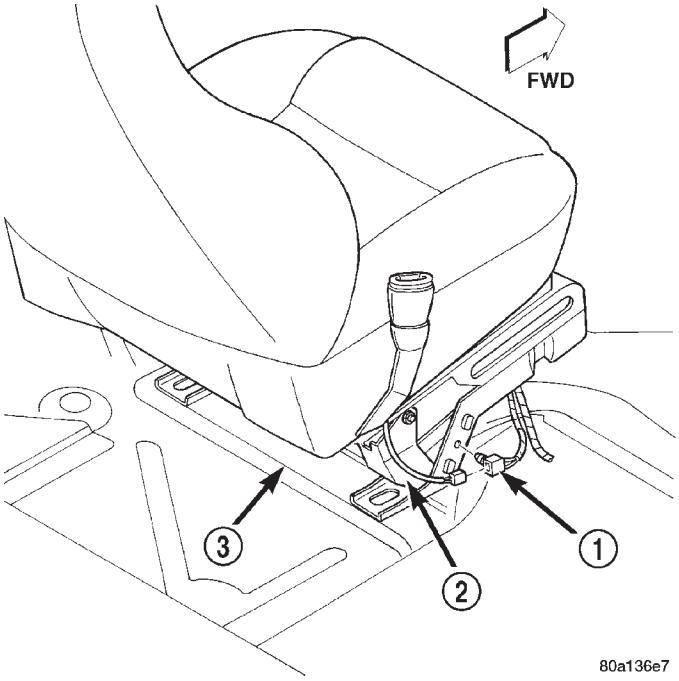


Fig. 20 Seat Belt Switch

1 - WIRE HARNESS CONNECTOR
2 - DRIVER SEAT RISER
4 - FLOOR PANEL

(1) Position the seat belt buckle to the bracket on the rear of the upper inner front seat track.

(2) Install and tighten the screw that secures the seat belt buckle to the seat track bracket (Fig. 21). Tighten the screw to 43 N·m (32 ft. lbs.).

(3) On the driver side only, reconnect the seat belt switch pigtail wire connector to the body wire harness connector for the seat belt switch (Fig. 20).

PASSENGER AIRBAG

DESCRIPTION

The passenger airbag door on the instrument panel above the glove box is the most visible part of the passenger airbag. The airbag used in this model is a Next Generation-type that complies with revised federal airbag standards to deploy with less force than those used in some prior models. The passenger airbag is located in the instrument panel in front of the front seat passenger seating position, where it is secured with nuts to three weld studs on the instrument panel structural support and two weld studs on the dash panel. Concealed beneath the passenger airbag door are the folded airbag cushion, the airbag retainer or housing, and the airbag inflator. The airbag inflator is a hybrid-type unit that is secured to

PASSENGER AIRBAG (Continued)

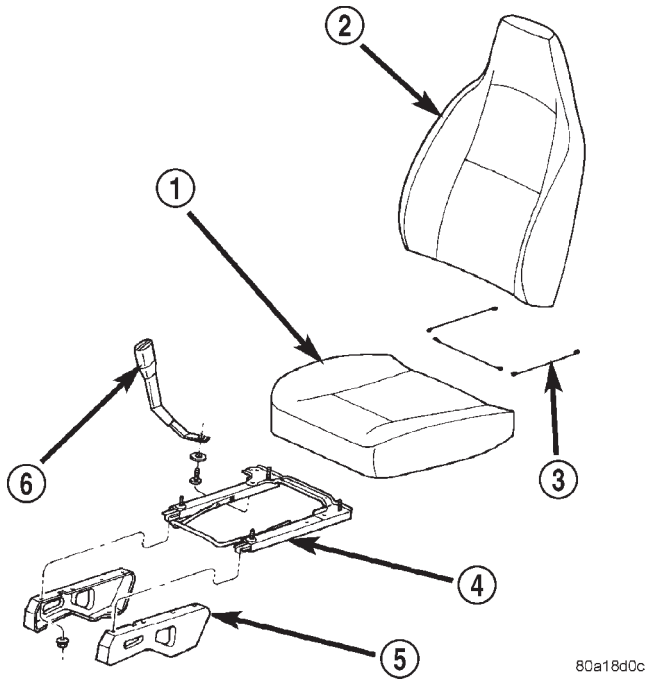


Fig. 21 Seat Belt Buckle

1 - SEAT CUSHION
2 - SEAT BACK
3 - TRIM ATTACHMENT WIRES
4 - SEAT TRACK
5 - SEAT RISER
6 - SEATBELT BUCKLE

and sealed within the stamped metal airbag housing along with the folded airbag cushion. A yellow connector on the end of a short, two-wire pigtail harness connects the passenger airbag inflator to the vehicle electrical system.

The molded plastic passenger airbag door also serves as a trim cover and has two flanges and a stamped metal bracket that secure it in place. The two flanges are secured with screws to the top of the instrument panel structural support and the upper glove box opening reinforcement. The stamped metal bracket is secured to the back of the instrument panel structural support with two screws, and also serves as the passenger airbag door hinge. Following a passenger airbag deployment, the passenger airbag and the passenger airbag door must be replaced. The passenger airbag cannot be repaired, and must be replaced if faulty or in any way damaged. The passenger airbag door can be disassembled from the instrument panel and replaced as a separate service item.

OPERATION

The passenger airbag is deployed by an electrical signal generated by the Airbag Control Module (ACM) through the passenger airbag line 1 and line 2 (or squib) circuits. The hybrid-type inflator assembly includes a small canister of highly compressed argon gas. When the ACM sends the proper electrical signal to the airbag inflator, the electrical energy generates enough heat to ignite chemical pellets within the inflator. Once ignited, these chemical pellets burn rapidly and produce the pressure necessary to rupture a containment disk in the argon gas canister. The inflator and argon gas canister are sealed to the airbag cushion so that all of the released argon gas is directed into the airbag cushion, causing the cushion to inflate. As the cushion inflates, the passenger airbag door will split at predetermined breakout lines, then fold back over the top of the instrument panel and out of the way. Following an airbag deployment, the airbag cushion quickly deflates by venting the argon gas through the porous fabric material used on each end panel of the airbag cushion.

Some of the chemicals used to create the pressure to burst the argon gas containment disk are considered hazardous in their solid state, before they are burned, but they are securely sealed within the airbag inflator. However, the gas that is produced when the chemicals are burned is harmless. A small amount of residue from the burned chemicals may cause some temporary discomfort if it contacts the skin, eyes, or breathing passages. If skin or eye irritation is noticed, rinse the affected area with plenty of cool, clean water. If breathing passages are irritated, move to another area where there is plenty of clean, fresh air to breath. If the irritation is not alleviated by these actions, contact a physician immediately.

REMOVAL

The following procedure is for replacement of a faulty or damaged passenger airbag. If the passenger airbag has been deployed, the instrument panel assembly must be replaced. Replacement instrument panels include the passenger airbag and the passenger airbag door. (Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

PASSENGER AIRBAG (Continued)

WARNING: WHEN REMOVING A DEPLOYED AIRBAG, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG UNIT AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.

(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 instrument panel from the passenger compartment of the vehicle. (Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).

(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 airbag to the weld studs on the instrument panel structural support (Fig. 22).

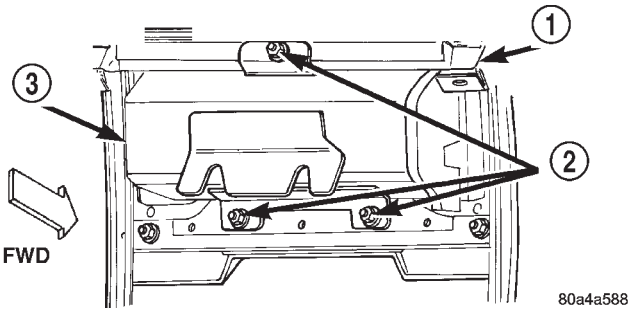


Fig. 22 Passenger Airbag Remove/Install

1 - STRUCTURAL SUPPORT
2 - NUT (3)
3 - PASSENGER AIRBAG

(5) Remove the passenger airbag from the instrument panel structural support.

INSTALLATION

The following procedure is for replacement of a faulty or damaged passenger airbag. If the passenger airbag has been deployed, the instrument panel assembly must be replaced. Replacement instrument panels include the passenger airbag and the passenger airbag door. (Refer to 23 - BODY/INSTRUMENT PANEL - INSTALLATION).

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: WHEN REMOVING A DEPLOYED AIRBAG, RUBBER GLOVES, EYE PROTECTION, AND A LONG-SLEEVED SHIRT SHOULD BE WORN. THERE MAY BE DEPOSITS ON THE AIRBAG UNIT AND OTHER INTERIOR SURFACES. IN LARGE DOSES, THESE DEPOSITS MAY CAUSE IRRITATION TO THE SKIN AND EYES.

WARNING: USE EXTREME CARE TO PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE PASSENGER AIRBAG, OR BECOMING ENTRAPPED BETWEEN THE PASSENGER AIRBAG CUSHION AND THE PASSENGER AIRBAG DOOR. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN OCCUPANT INJURIES UPON AIRBAG DEPLOYMENT.

WARNING: THE PASSENGER 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) Carefully position the passenger airbag onto the weld studs on the instrument panel structural support (Fig. 22).

(2) Install and tighten the three nuts that secure the passenger airbag upper and lower mounting brackets to the weld studs on the instrument panel structural support. Tighten the nuts to 12 N·m (105 in. lbs.).

(3) Reinstall the instrument panel into the passenger compartment of the vehicle. (Refer to 23 - BODY/INSTRUMENT PANEL - INSTALLATION). When installing the instrument panel, be certain to reconnect the passenger airbag pigtail wire connector 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. The airbag system verification test procedure should be performed following service of any airbag system component. (Refer to 8 - ELECTRICAL/RESTRAINTS - STANDARD PROCEDURE - VERIFICATION TEST).

PASSENGER AIRBAG ON / OFF SWITCH

DESCRIPTION

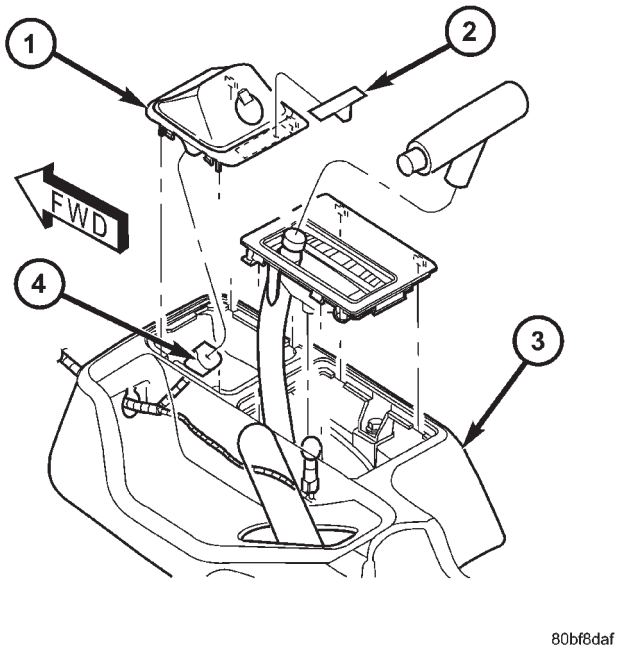


Fig. 23 Passenger Airbag On/Off Switch

1 - PASSENGER AIRBAG ON/OFF SWITCH
2 - LABEL
3 - FLOOR CONSOLE
4 - WIRE HARNESS CONNECTOR

The passenger airbag on-off switch is standard equipment on all versions of this model (Fig. 23). This switch is a two-position, resistor multiplexed switch with a single integral red Light-Emitting Diode (LED), and a non-coded key cylinder-type actuator. The switch is located on the forward end of the floor console (both full and mini versions) to make the Off indicator visible to all front seat occupants. When the switch is in its installed position, the only components visible through the dedicated opening of the console switch bezel is the key cylinder actuator. A small, tethered, molded plastic cap fits into the key cylinder actuator hole when the switch is not being used. The switch nomenclature and a lens are integral to the console switch bezel. When the switch ″Off″ position is selected with the ignition switch in the On position, the LED illuminates the text “Off” in amber in the console switch bezel. The “On” position of the switch is designated by text imprinted upon the console switch bezel, but is not illuminated. The remainder of the switch is concealed behind the console switch bezel.

The passenger airbag on-off switch housing is constructed of molded plastic and has three integral mounting tabs. These mounting tabs are used to secure the switch to the back of the molded plastic console switch bezel with three small screws. The console switch bezel has four molded plastic snap features that are used to secure the switch and bezel unit to the floor console. A molded plastic connector receptacle on the back of the switch housing connects the switch to the vehicle electrical system through a dedicated take out of the cross body wire harness. The harness take out is equipped with a molded plastic connector insulator that is keyed and latched to ensure proper and secure switch electrical connections. The passenger airbag on/off switch cannot be adjusted or repaired and, if faulty or damaged, the switch must be replaced.

OPERATION

The passenger airbag on-off switch allows the customer to turn the passenger airbag function On or Off to accommodate certain uses of the right front seating position where airbag protection may not be desired. See the owner's manual in the vehicle glove box for specific recommendations on when to enable or disable the passenger airbag. The Off indicator of the switch will be illuminated whenever the switch is turned to the Off position and the ignition switch is in the On position. The ignition key is the only key or object that should ever be inserted into the key cylinder actuator of the switch. The on-off switch requires only a partial key insertion to fully depress a spring-loaded locking plunger. The spring-loaded locking plunger prevents the user from leaving the key in the switch. The key will be automatically ejected when force is not applied. To actuate the passenger side airbag on/off switch, insert the ignition key into the switch key actuator far enough to fully depress the plunger, and rotate the actuator to the desired switch position. When the switch key actuator is rotated to its clockwise stop (the key actuator slot will be aligned with the Off indicator), the Off indicator is illuminated and the passenger airbag is disabled. When the switch is rotated to its counterclockwise stop (the key actuator slot will be in a vertical position), the Off indicator will be extinguished and the passenger airbag is enabled.

The passenger airbag on/off switch is connects one of two internal resistors in series between the passenger airbag mux switch sense and passenger airbag mux switch return circuits of the Airbag Control Module (ACM). The ACM continually monitors the resistance in these circuits to determine the switch position that has been selected. When the switch is in the Off position, the ACM provides a ground input to the switch through the passenger airbag indicator

PASSENGER AIRBAG ON / OFF SWITCH (Continued)

driver circuit, which energizes the Light-Emitting Diode (LED) that illuminates the Off indicator of the switch. The ACM will also illuminate the Off indicator of the switch for about seven seconds each time the ignition switch is turned to the On position as a bulb test. The ACM will store a Diagnostic Trouble Code (DTC) for any fault it detects in the passenger airbag on/off switch or Off indicator circuits, and will illuminate the airbag indicator in the instrument cluster if a fault is detected. For proper diagnosis of the passenger airbag on/off switch or the ACM, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

REMOVAL

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(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) Using a trim stick or another suitable wide flat-bladed tool, gently pry the console switch bezel away from the floor console far enough to release the four snap features that secure the bezel to the console (Fig. 24).

(3) Lift the console switch bezel away from the console far enough to access and disconnect the cross body wire harness connector for the passenger airbag on/off switch from the switch connector receptacle.

(4) Remove the passenger airbag on/off switch and console switch bezel unit from the floor console.

(5) From the underside of the console switch bezel, remove the three screws that secure the passenger airbag on/off switch to the back of the bezel.

(6) Remove the passenger airbag on/off switch from the console switch bezel.

INSTALLATION

(1) Position the passenger airbag on/off switch to the underside of the console switch bezel.

(2) Install and tighten the three screws that secure the passenger airbag on/off switch to the back of the console switch bezel. Tighten the screws to 2 N·m (20 in. lbs.).

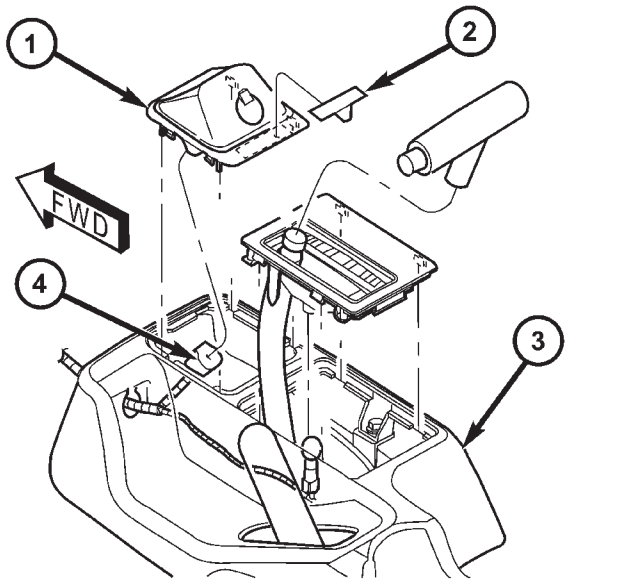


Fig. 24 Passenger Airbag On/Off Switch Remove/ Install

1 - PASSENGER AIRBAG ON/OFF SWITCH
2 - LABEL
3 - FLOOR CONSOLE
4 - WIRE HARNESS CONNECTOR

(3) Position the passenger airbag on/off switch and console switch bezel unit to the mounting hole at the front of the floor console (Fig. 24).

(4) Reconnect the cross body wire harness connector for the passenger airbag on/off switch to the switch connector receptacle.

(5) Align the four snap features on the console switch bezel with the slots on either side of the mounting hole in the floor console.

(6) Using hand pressure, press down firmly and evenly on the console switch bezel until each of the four snap features is fully engaged in the slots on either side of the mounting hole in the floor console.

(7) Do not reconnect the battery negative cable at this time. The airbag system verification test procedure should be performed following service of any airbag system component. (Refer to 8 - ELECTRICAL/RESTRAINTS - STANDARD PROCEDURE - VERIFICATION TEST).

REAR SEAT BELT & RETRACTOR

REMOVAL

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Slide both rear seat belt buckle units between the seat cushion and seat back into the cargo area.

(2) Lift the rear seat back release lever and fold the rear seat back forward, then tumble the folded rear seat cushion and back unit forward against the backs of the two front bucket seats.

(3) Remove the screw that secures the lower anchor plate of the rear seat shoulder belt to the inner rear wheel house panel (Fig. 25).

(4) Remove the rear seat shoulder belt lower anchor plate from the inner rear wheel house panel.

(5) Unsnap and lift the rear shoulder belt turning loop cover to access the screw that secures the turning loop anchor plate to the sport bar near the top of the bar (Fig. 26).

(6) Remove the screw that secures the shoulder belt turning loop anchor plate to the sport bar.

(7) Remove the shoulder belt turning loop anchor plate from the sport bar.

(8) Remove the screw that secures the retractor to the sport bar near the top of the inner rear wheel house panel.

(9) Remove the rear seat shoulder belt and retractor from the sport bar.

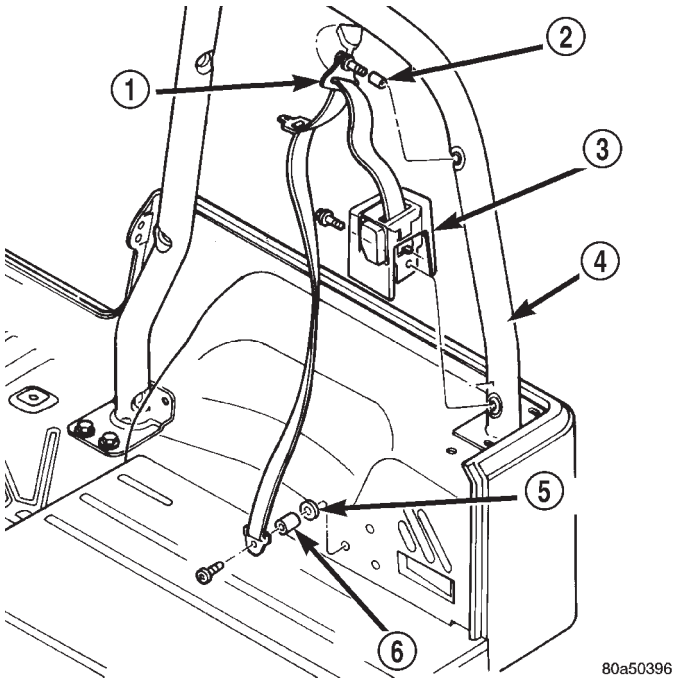


Fig. 25 Rear Seat Shoulder Belt & Retractor Remove/Install

1 - TURNING LOOP
2 - SPACER
3 - BELT & RETRACTOR
4 - SPORT BAR
5 - WASHER
6 - SPACER

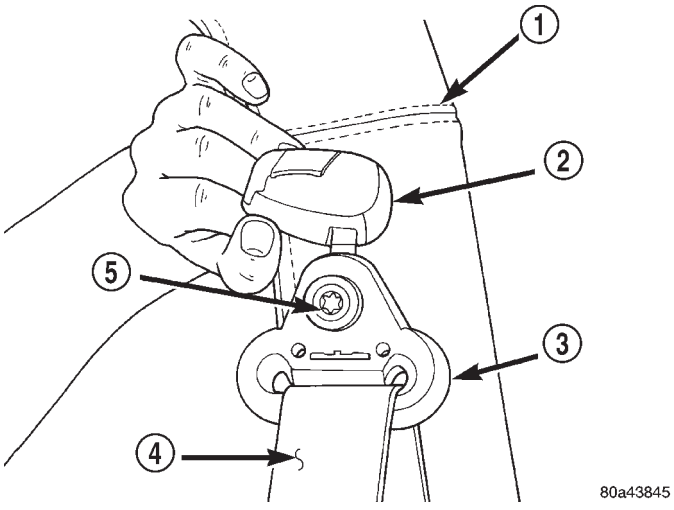


Fig. 26 Turning Loop

1 - SPORT BAR
2 - TURNING LOOP COVER
3 - TURNING LOOP
4 - REAR SHOULDER BELT
5 - SCREW

REAR SEAT BELT & RETRACTOR (Continued)

INSTALLATION

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Position the rear seat shoulder belt and retractor to the sport bar near the top of the inner rear wheel house panel (Fig. 25). Be certain to engage the locator tab on the retractor in the locator hole on the sport bar.

(2) Install and tighten the screw that secures the retractor to the sport bar. Tighten the screw to 43 N·m (32 ft. lbs.).

(3) Position the rear shoulder belt turning loop anchor plate to the sport bar near the top of the bar (Fig. 26).

(4) Install and tighten the screw that secures the turning loop anchor plate to the sport bar. Tighten the screw to 43 N·m (32 ft. lbs.).

(5) Fold and snap the shoulder belt turning loop cover back into place over the screw that secures the turning loop to the sport bar.

(6) Position the rear seat shoulder belt lower anchor plate to the inner rear wheel house panel.

(7) Install and tighten the screw that secures the rear seat shoulder belt lower anchor plate to the inner rear wheel house panel. Tighten the screw to 43 N·m (32 ft. lbs.).

(8) Tumble the folded rear seat cushion and back unit rearward onto the rear floor panel.

(9) Slide both rear seat belt buckle units between the seat cushion and the seat back.

(10) Unfold the rear seat back from the seat cushion until the seat back latch is fully engaged.

REAR SEAT BELT BUCKLE

REMOVAL

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Slide both rear seat belt buckle units between the seat cushion and seat back into the cargo area.

(2) Lift the rear seat back release lever and fold the rear seat back forward, then tumble the folded rear seat cushion and back unit forward against the backs of the two front bucket seats.

(3) Lift the cargo area carpet between the two rear seat belt buckle units far enough to access and remove the screw that secures the anchor plate of the buckle units to the rear floor panel through one of the clearance slots in the carpet (Fig. 27).

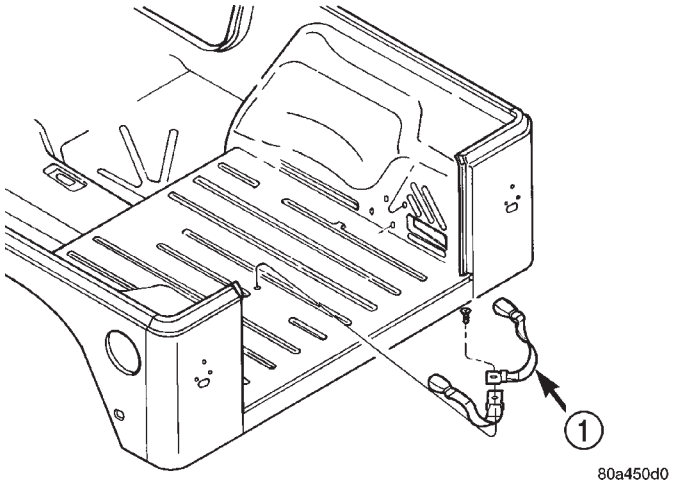


Fig. 27 Rear Seat Belt Buckles Remove/Install

1 - REAR SEAT BELT BUCKLE UNIT

(4) Remove the rear seat belt buckle unit from the rear floor panel through one of the clearance slots in the cargo area carpet.

REAR SEAT BELT BUCKLE (Continued)

INSTALLATION

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Lift the cargo area carpet far enough to position the rear seat belt buckle unit onto the rear floor panel through one of the clearance slots in the carpet.

(2) Working through one of the clearance slots in the cargo area carpet, install and tighten the screw that secures the anchor plate of the rear seat belt buckle unit to the rear floor panel (Fig. 27). Tighten the screw to 43 N·m (32 ft. lbs.).

(3) Tumble the folded rear seat cushion and back unit rearward onto the rear floor panel.

(4) Slide both rear seat belt buckle units between the seat cushion and the seat back.

(5) Unfold the rear seat back from the seat cushion until the seat back latch is fully engaged.

SEAT BELT SWITCH

DESCRIPTION

The seat belt switch is a small, normally closed, single pole, single throw, leaf contact, momentary switch. Only one seat belt switch is installed in the vehicle, and it is integral to the buckle of the driver seat belt buckle-half, located between the inboard side of the driver side front seat and the floor panel transmission tunnel (Fig. 28). The seat belt switch is connected to the vehicle electrical system through a two-wire pigtail wire and connector on the seat belt buckle-half, which is connected to a wire harness connector and take out of the body wire harness routed along the left side of the body sill in the passenger compartment.

The seat belt switch cannot be adjusted or repaired and, if faulty or damaged, the entire driver seat belt buckle-half unit must be replaced.

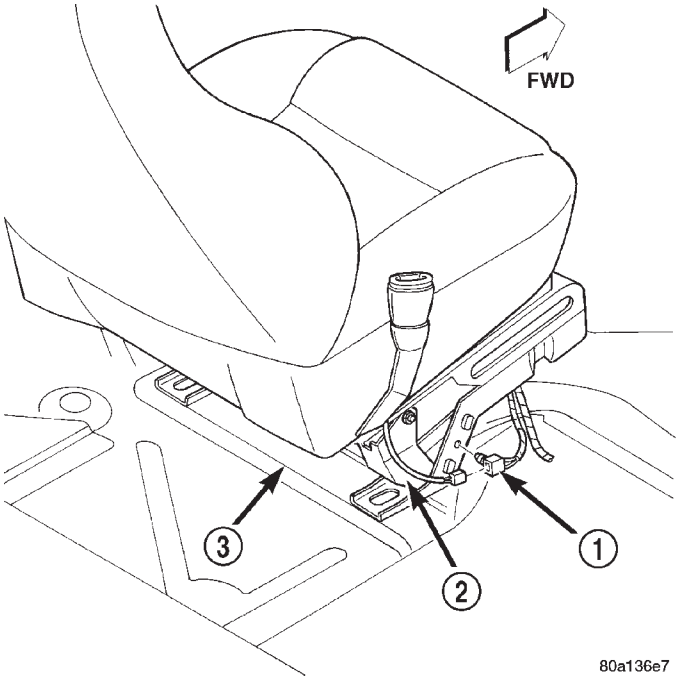


Fig. 28 Seat Belt Switch

1 - WIRE HARNESS CONNECTOR
2 - DRIVER SEAT RISER
4 - FLOOR PANEL

OPERATION

The seat belt switch is designed to control a path to ground for the seat belt switch sense input of the instrument cluster. When the driver side seat belt tip-half is inserted in the seat belt buckle, the switch opens the path to ground; and, when the driver side seat belt tip-half is removed from the seat belt buckle, the switch closes the ground path. The switch is actuated by the latch mechanism within the seat belt buckle.

The seat belt switch receives ground through its pigtail wire connection to the body wire harness from another take out of the body wire harness. An eyelet terminal connector on that ground take out is secured under a ground screw on the left cowl side inner panel, beneath the instrument panel. The seat belt switch is connected in series between ground and the seat belt switch sense input of the instrument cluster.

DIAGNOSIS AND TESTING - SEAT BELT SWITCH

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

SEAT BELT SWITCH (Continued)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. 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 seat belt switch pigtail wire connector from the body wire harness connector for the seat belt switch on the floor near the driver side seat belt buckle-half anchor. Check for continuity between the seat belt switch sense circuit and the ground circuit cavities of the seat belt switch pigtail wire 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 wire harness connector for the seat belt switch and a good ground. There should be continuity. If OK, refer to for further diagnosis of the instrument cluster chime service input from the seat belt switch. If not OK, repair the open ground circuit to ground (G302) as required.

SEAT BELT TURNING LOOP ADJUSTER

REMOVAL

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

(1) Unsnap and lift the shoulder belt turning loop cover to access the screw that secures the turning loop to the adjuster (Fig. 29).

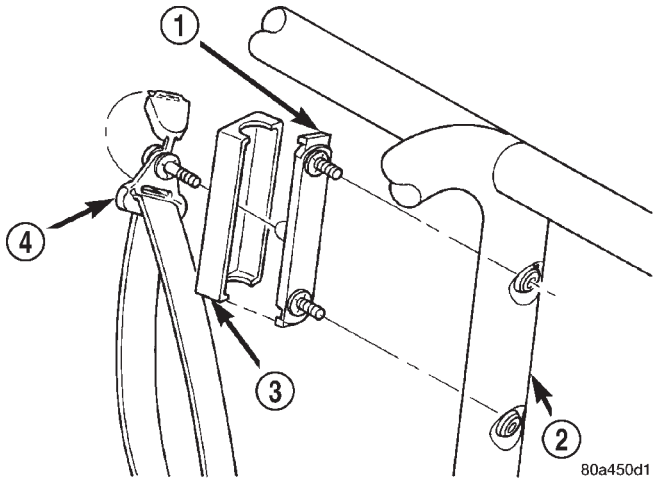


Fig. 29 Front Turning Loop Height Adjuster

1 - HEIGHT ADJUSTER
2 - SPORT BAR
3 - TRIM COVER
4 - TURNING LOOP

(2) Remove the screw that secures the shoulder belt turning loop to the adjuster.

(3) Remove the shoulder belt turning loop and the support/guide washer from the adjuster.

(4) Unsnap and remove the trim cover from the height adjuster.

(5) Remove the two screws that secure the turning loop adjuster to the sport bar.

(6) Remove the turning loop adjuster from the sport bar.

INSTALLATION

WARNING: DURING AND FOLLOWING ANY SEAT BELT SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, AND RETRACTORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. NEVER ATTEMPT TO REPAIR A SEAT BELT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE MOPAR PARTS CATALOG.

SEAT BELT TURNING LOOP ADJUSTER (Continued)

(1) Position the turning loop adjuster onto the sport bar (Fig. 29). Be certain that the word “Up” stamped on the adjuster is properly oriented.

(2) Install and tighten the two screws that secure the turning loop adjuster to the sport bar. Tighten the screws to 43 N·m (32 ft. lbs.).

(3) Align the trim cover over the height adjuster and, using hand pressure, press firmly and evenly on the cover until it snaps into place.

(4) Position the support/guide washer and the shoulder belt turning loop onto the adjuster.

(5) Install and tighten the screw that secures the shoulder belt turning loop to the adjuster. Tighten the screw to 43 N·m (32 ft. lbs.).

(6) Fold and snap the shoulder belt turning loop cover back into place over the screw that secures the turning loop to the adjuster.

WIRING

TABLE OF CONTENTS

	page		page
WIRING DIAGRAM INFORMATION	8Wa-01-1	AIR CONDITIONING-HEATER	8Wa-42-1
COMPONENT INDEX	8Wa-02-1	AIRBAG SYSTEM	8Wa-43-1
POWER DISTRIBUTION	8Wa-10-1	INTERIOR LIGHTING	8Wa-44-1
FUSE BLOCK	8Wa-11-1	AUDIO SYSTEM	8Wa-47-1
GROUND DISTRIBUTION	8Wa-15-1	REAR WINDOW DEFOGGER	8Wa-48-1
BUS COMMUNICATION	8Wa-18-1	FRONT LIGHTING	8Wa-50-1
CHARGING SYSTEM	8Wa-20-1	REAR LIGHTING	8Wa-51-1
STARTING SYSTEM	8Wa-21-1	TURN SIGNALS	8Wa-52-1
FUEL/IGNITION SYSTEM	8Wa-30-1	WIPERS	8Wa-53-1
TRANSMISSION CONTROL SYSTEM	8Wa-31-1	SPLICE INFORMATION	8Wa-70-1
ANTILOCK BRAKES	8Wa-35-1	CONNECTOR PINOUTS	8Wa-80-1
INSTRUMENT CLUSTER	8Wa-40-1	CONNECTOR/GROUND LOCATIONS	8Wa-90-1
HORN/CIGAR LIGHTER/POWER OUTLET	8Wa-41-1	SPLICE LOCATIONS	8Wa-95-1

8W-01 WIRING DIAGRAM INFORMATION

TABLE OF CONTENTS

page

WIRING DIAGRAM INFORMATION
DESCRIPTION 1
WARNING 5
DIAGNOSIS AND TESTING 5
WIRING HARNESS 5
STANDARD PROCEDURE 6
TESTING OF VOLTAGE POTENTIAL 6
TESTING FOR CONTINUITY 7
TESTING FOR SHORT TO GROUND 7
TESTING FOR A SHORT TO GROUND ON FUSES POWERING SEVERAL LOADS 7
TESTING FOR VOLTAGE DROP 7
SPECIAL TOOLS 8
CONNECTOR - AUGAT
REMOVAL 8
INSTALLATION. 9

page

CONNECTOR - MOLEX
REMOVAL 9
INSTALLATION. 9
CONNECTOR - THOMAS AND BETTS
REMOVAL 9
INSTALLATION. 10
DIODE
REMOVAL 10
INSTALLATION. 10
TERMINAL
REMOVAL 11
INSTALLATION 11
WIRE
STANDARD PROCEDURE 12
STANDARD PROCEDURE - WIRE SPLICING . . 12

WIRING DIAGRAM INFORMATION

DESCRIPTION - HOW TO USE WIRING DIAGRAMS

DaimlerChrysler Corporation wiring diagrams are designed to provide information regarding the vehicles wiring content. In order to effectively use the wiring diagrams to diagnose and repair DaimlerChrysler Corporation vehicles, 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 (Fig. 1).

All switches, components, and modules are shown in the at rest position with the doors closed and the key removed from the ignition (Fig. 2).

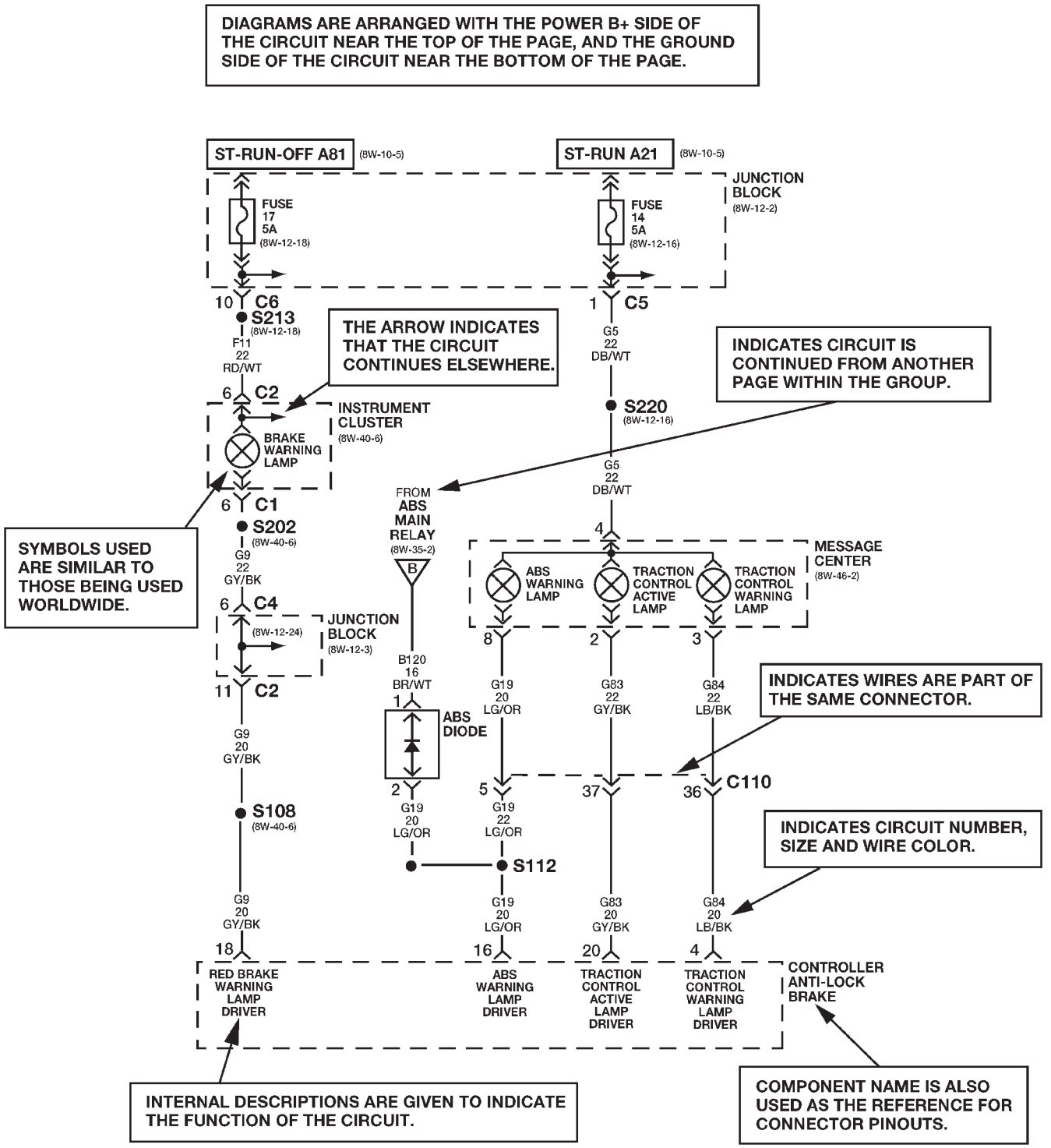
Components are shown two ways. A solid line around a component indicates that the component is complete. A dashed line around the component indicates that the component is being shown is not complete. Incomplete components have a reference number to indicate the page where the component is shown complete.

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.

SYMBOLS

International symbols are used throughout the wiring diagrams. These symbols are consistent with those being used around the world (Fig. 3).

WIRING DIAGRAM INFORMATION (Continued)

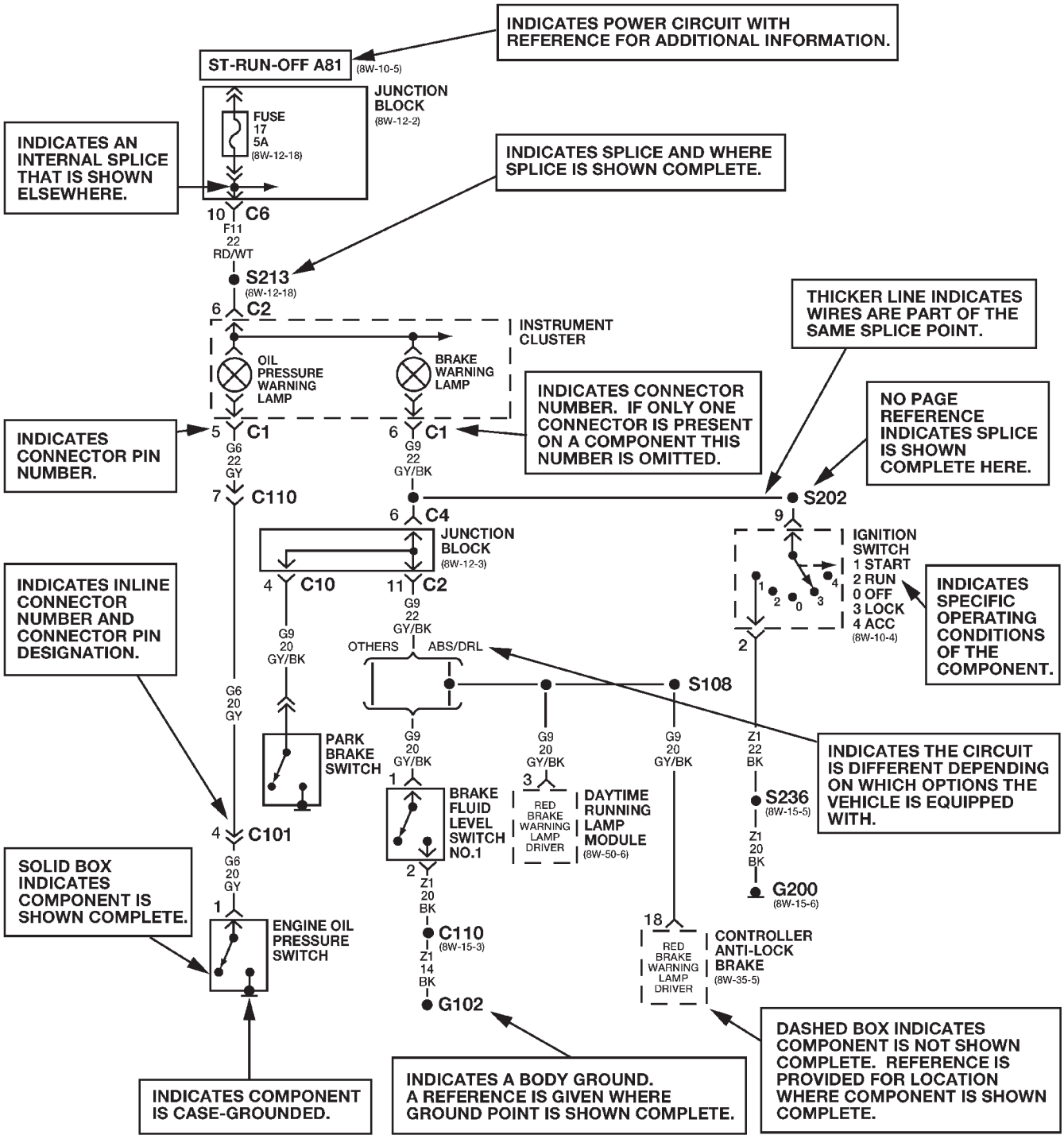


The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

80c06d01

Fig. 1 WIRING DIAGRAM EXAMPLE 1

WIRING DIAGRAM INFORMATION (Continued)



The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

80c06d02

Fig. 2 WIRING DIAGRAM EXAMPLE 2

WIRING DIAGRAM INFORMATION (Continued)

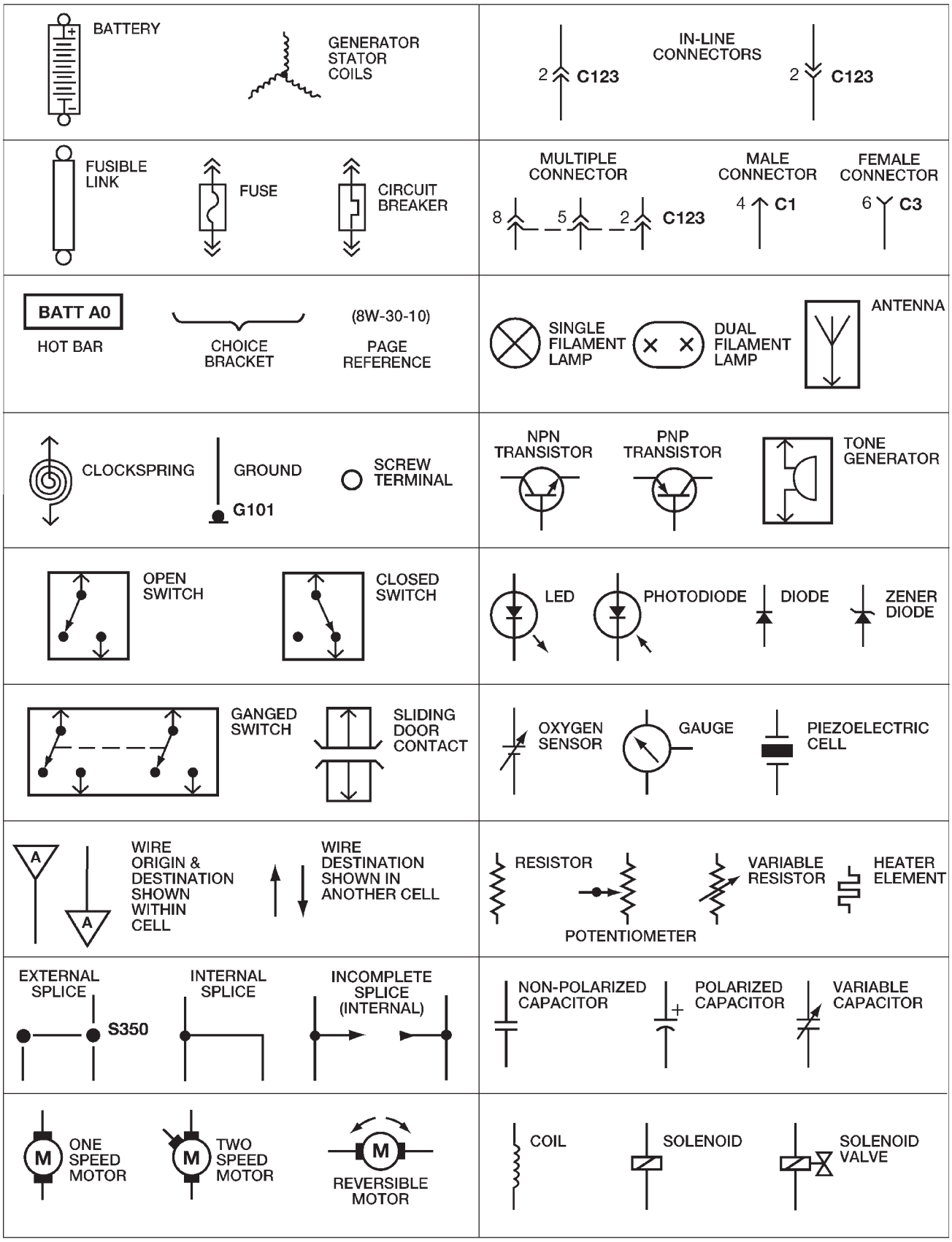


Fig. 3 WIRING DIAGRAM SYMBOLS

WIRING DIAGRAM INFORMATION (Continued)

TERMINOLOGY

This is a list of terms and definitions used in the wiring diagrams.

LHD . . . . . Left Hand Drive Vehicles
RHD . . . . . Right Hand Drive Vehicles
ATX . . Automatic Transmissions-Front Wheel Drive
MTX . . . . Manual Transmissions-Front Wheel Drive
AT . . . . Automatic Transmissions-Rear Wheel Drive
MT . . . . . Manual Transmissions-Rear Wheel Drive
SOHC . . . . . Single Over Head Cam Engine
DOHC . . . . . Double Over Head Cam Engine
Built-Up-Export . . . . . Vehicles Built For Sale In Markets Other Than North America
Except-Built-Up-Export . . Vehicles Built For Sale In North America

WARNINGS - GENERAL

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.

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.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - WIRING HARNESS

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 vehicles 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 vehicles 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's electrical system can cause damage to the equipment and provide false readings.

WIRING DIAGRAM INFORMATION (Continued)

• Probing Tools - These tools are used for probing terminals in connectors (Fig. 4)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.

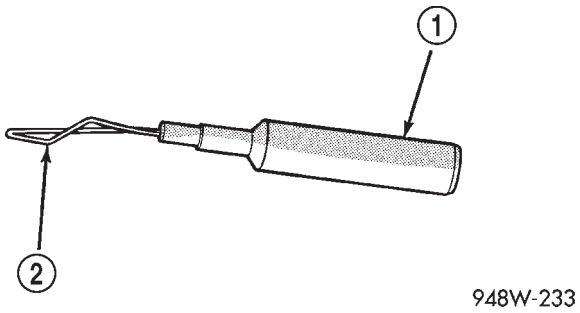


Fig. 4 PROBING TOOL

1 - SPECIAL TOOL 6801
2 - PROBING END

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 into 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 or moisture
- Wire insulation that has rubbed through causing a short to ground
- Some or all of the wiring strands broken inside of the insulation
- Wiring broken inside of the insulation

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 area.

(6) Verify the proper operation. For this step, check for proper operation of all items on the repaired circuit. Refer to the wiring diagrams.

STANDARD PROCEDURE

STANDARD PROCEDURE - TESTING FOR VOLTAGE POTENTIAL

(1) Connect the ground lead of a voltmeter to a known good ground (Fig. 5).

(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.

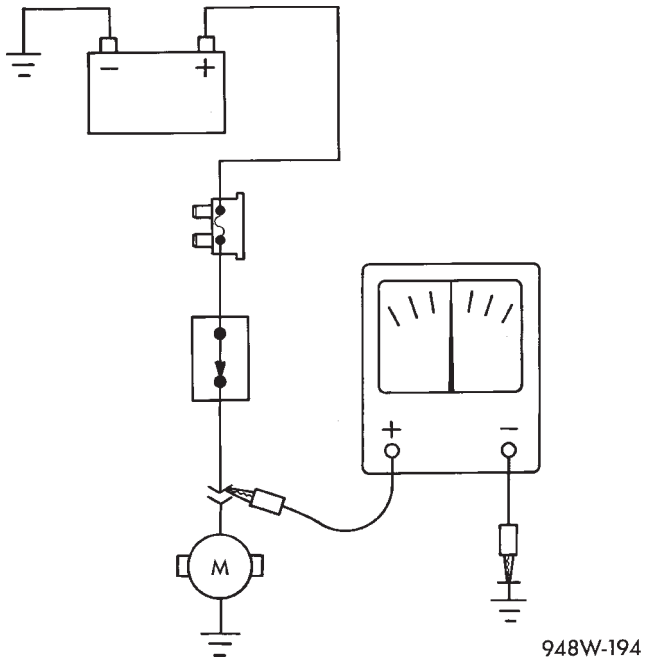


Fig. 5 Testing for Voltage Potential

WIRING DIAGRAM INFORMATION (Continued)

STANDARD PROCEDURE - 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. 6)

(3) Connect the other lead to the other end of the circuit being tested. Low or no resistance means good continuity.

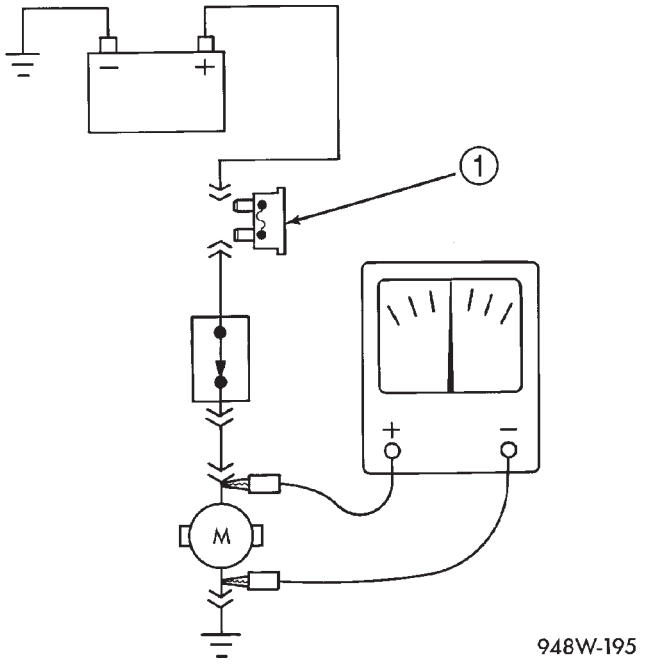


Fig. 6 Testing for Continuity

1 - FUSE REMOVED FROM CIRCUIT

STANDARD PROCEDURE - 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.

STANDARD PROCEDURE - TESTING FOR 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.

STANDARD PROCEDURE - TESTING FOR A VOLTAGE DROP

(1) Connect the positive lead of the voltmeter to the side of the circuit closest to the battery (Fig. 7).

(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.

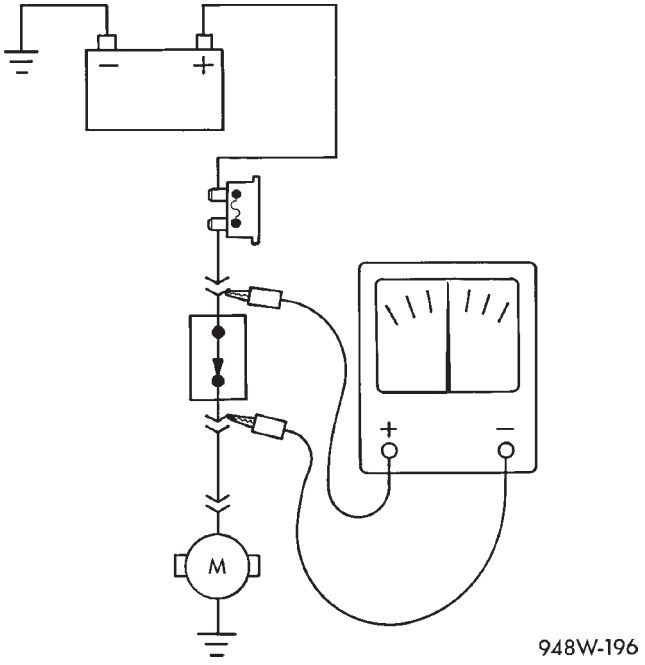
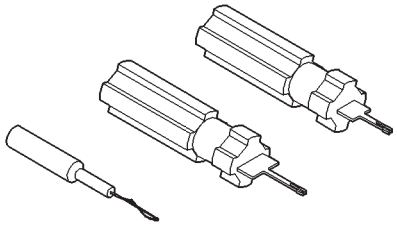


Fig. 7 Testing for Voltage Drop

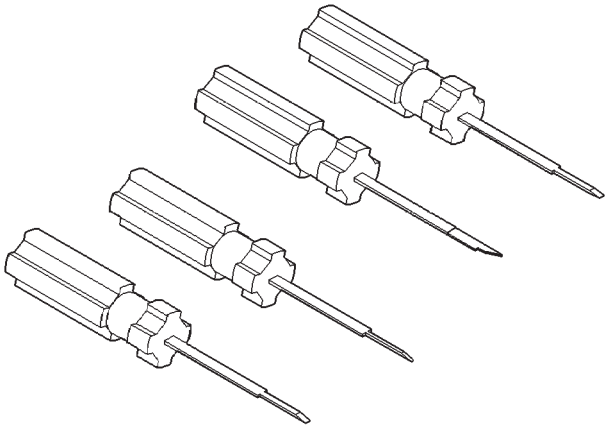
WIRING DIAGRAM INFORMATION (Continued)

SPECIAL TOOLS

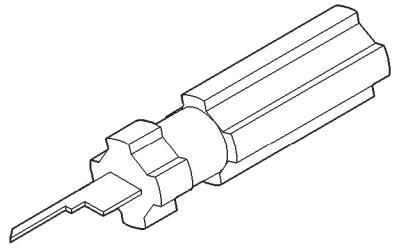
SPECIAL TOOLS - WIRING/TERMINAL



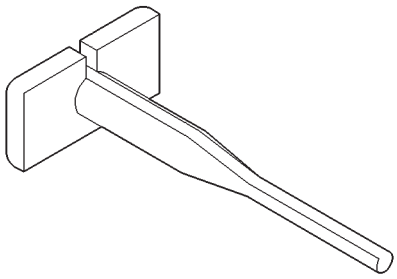
PROBING TOOL PACKAGE 6807



TERMINAL PICK 6680



TERMINAL REMOVING TOOL 6932



TERMINAL REMOVING TOOL 6934

CONNECTOR - AUGAT

REMOVAL

(1) Disconnect battery.

(2) Disconnect the connector from its mating half/component.

(3) Push down on the yellow connector locking tab to release the terminals (Fig. 8).

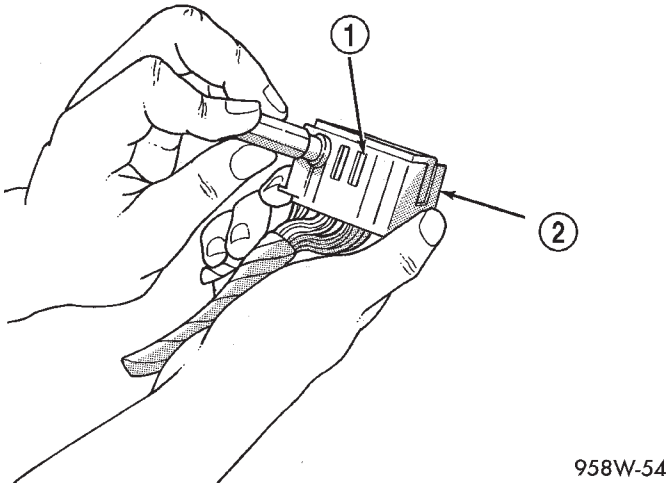


Fig. 8 AUGAT CONNECTOR REPAIR

1 - LOCKING TAB
2 - CONNECTOR

(4) Using special tool 6932, push the terminal to remove it from the connector (Fig. 9).

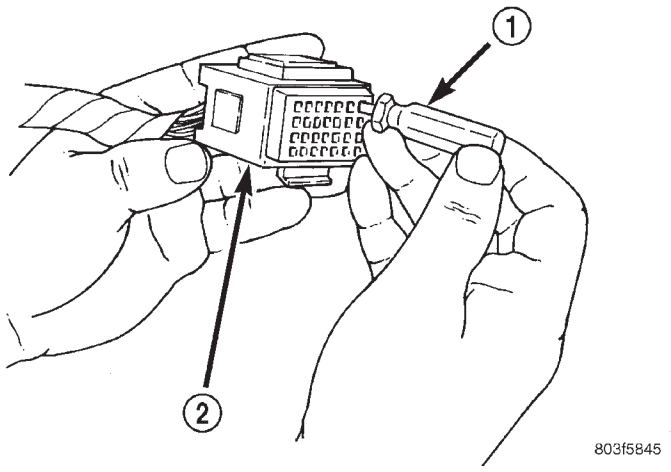


Fig. 9 USING

1 - SPECIAL TOOL 6932
2 - CONNECTOR

(5) Repair or replace the terminal as necessary.

CONNECTOR - AUGAT (Continued)

INSTALLATION

(1) Reset the terminal locking tang.
(2) Insert the removed wire in the same cavity on the repair connector.
(3) Repeat steps 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.
(4) When the connector is re-assembled, the locking tab must be placed in the locked position to prevent terminal push out.
(5) Connect connector to its mating half/component.
(6) Connect battery and test all affected systems.

CONNECTOR - MOLEX

REMOVAL

(1) Disconnect battery.
(2) Disconnect the connector from its mating half/component.
(3) Insert special tool 6742 into the terminal end of the connector (Fig. 10).

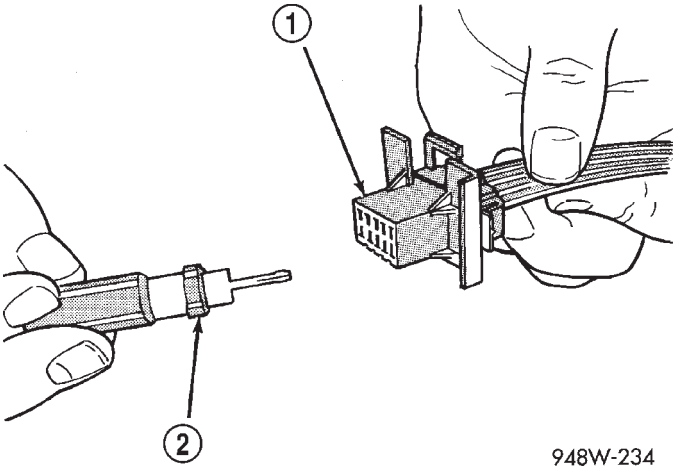


Fig. 10 MOLEX CONNECTOR REPAIR

1 - CONNECTOR
2 - SPECIAL TOOL 6742

(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 terminal as necessary.

INSTALLATION

(1) Reset the terminal locking tang.
(2) Insert the removed wire in the same cavity on the repair connector.
(3) Repeat steps 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.

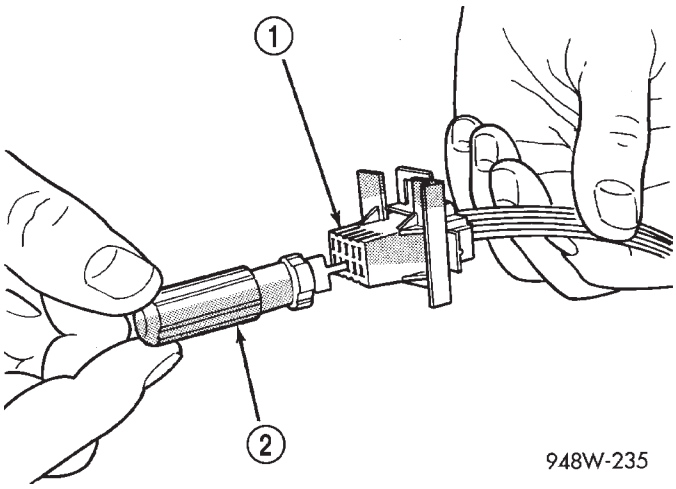


Fig. 11 USING SPECIAL TOOL 6742

1 - CONNECTOR
2 - SPECIAL TOOL 6742

(4) Connect connector to its mating half/component.
(5) Connect battery and test all affected systems.

CONNECTOR - THOMAS AND BETTS

REMOVAL

(1) Disconnect battery.
(2) Disconnect the connector from its mating half/component.
(3) Push in the two lock tabs on the side of the connector (Fig. 12).

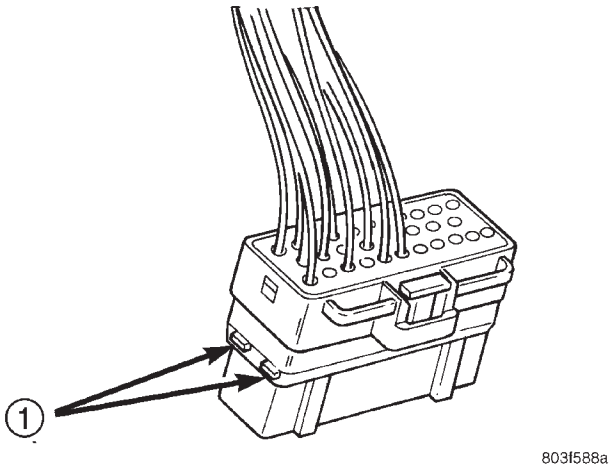


Fig. 12 THOMAS AND BETTS CONNECTOR LOCK RELEASE TABS

1 - LOCK TABS

CONNECTOR - THOMAS AND BETTS (Continued)

(4) Insert the probe end of special tool 6934 into the back of the connector cavity (Fig. 13).

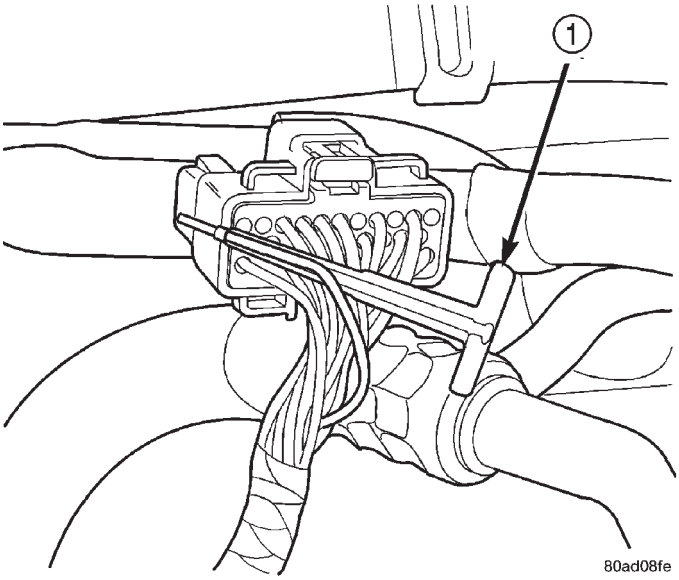


Fig. 13 REMOVING WIRE TERMINAL

1 - SPECIAL TOOL 6934

(5) Grasp the wire and tool 6934, then slowly remove the wire and terminal from the connector.

(6) Repair or replace the terminal as necessary.

INSTALLATION

(1) Reset the terminal locking tang.

(2) Insert the removed wire in the same cavity on the repair connector.

(3) Repeat steps for each wire in the connector, being sure that all wires are fully seated into the proper cavities. For additional connector pin-out identification, refer to the wiring diagrams.

(4) Push in the single lock tab on the side of the connector (Fig. 14).

(5) Connect connector to its mating half/component.

(6) Connect battery and test all affected systems.

DIODE

REMOVAL

(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. 15).

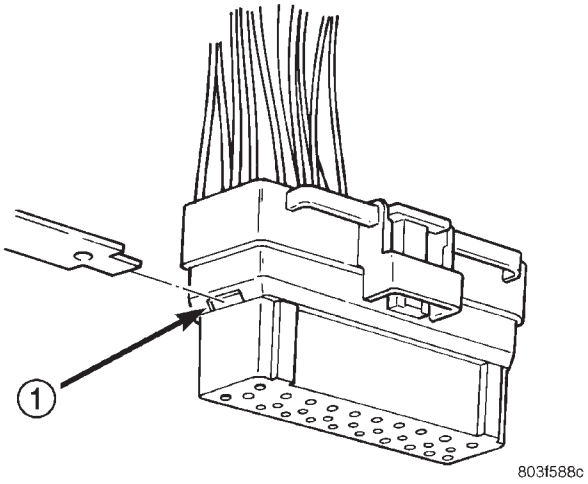


Fig. 14 SINGLE LOCK TAB

1 - SINGLE LOCK TAB

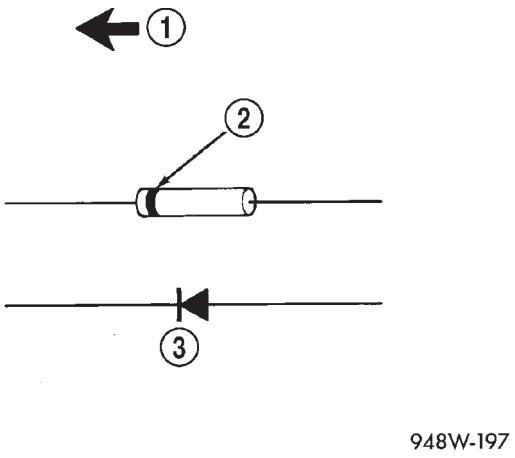


Fig. 15 DIODE IDENTIFICATION

1 - CURRENT FLOW
2 - BAND AROUND DIODE INDICATES CURRENT FLOW
3 - DIODE AS SHOWN IN THE DIAGRAMS

INSTALLATION

(1) Remove the insulation from the wires in the harness. Only remove enough insulation to solder in the new diode.

(2) Install the new diode in the harness, making sure current flow is correct. If necessary, refer to the appropriate wiring diagram for current flow (Fig. 15).

(3) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(4) Tape the diode to the harness using electrical tape. Make sure the diode is completely sealed from the elements.

(5) Re-connect the battery and test affected systems.

TERMINAL

REMOVAL

(1) Disconnect battery.
(2) Disconnect the connector being repaired from its mating half/component.
(3) Remove the connector locking wedge, if required (Fig. 16).

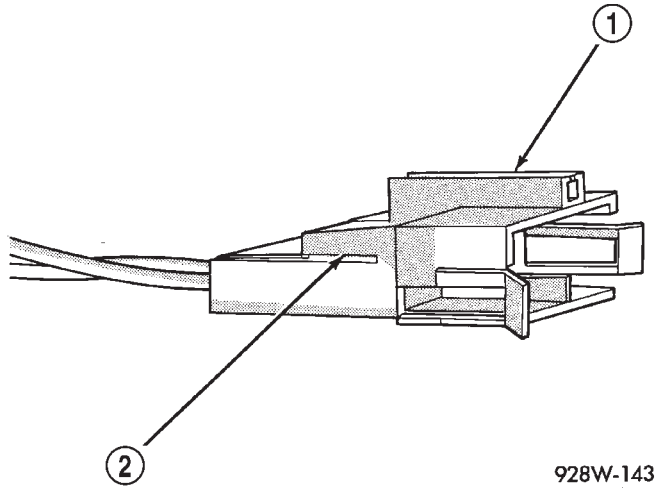


Fig. 16 CONNECTOR LOCKING WEDGE TAB (TYPICAL)

1 - CONNECTOR
2 - CONNECTOR LOCKING WEDGE TAB

(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. 17) (Fig. 18).

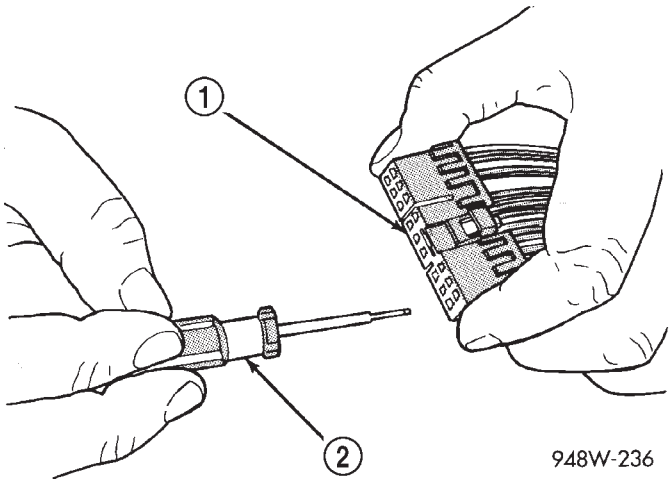


Fig. 17 TERMINAL REMOVAL

1 - CONNECTOR
2 - FROM SPECIAL TOOL KIT 6680

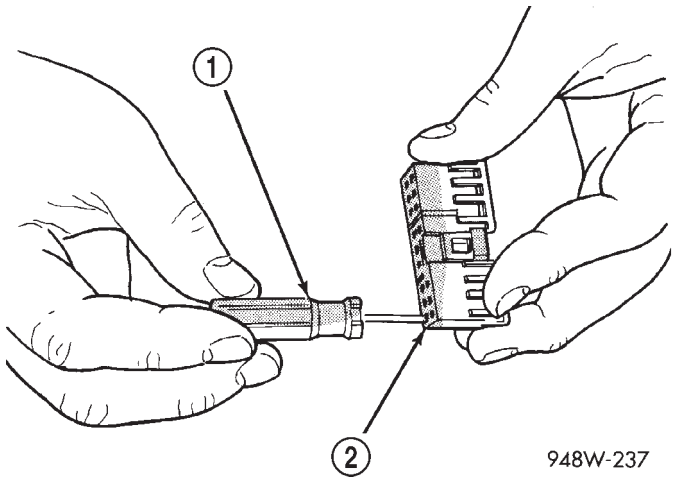


Fig. 18 TERMINAL REMOVAL USING SPECIAL TOOL

1 - FROM SPECIAL TOOL KIT 6680
2 - CONNECTOR

(5) Cut the wire 6 inches from the back of the connector.

INSTALLATION

(1) Select a wire from the terminal repair assembly that best matches the color wire being repaired.
(2) Cut the repair wire to the proper length and remove one–half (1/2) inch of insulation.
(3) Splice the repair wire to the wire harness .
(4) Insert the repaired wire into the connector.
(5) Install the connector locking wedge, if required, and reconnect the connector to its mating half/component.
(6) Re-tape the wire harness starting at 1–1/2 inches behind the connector and 2 inches past the repair.
(7) Connect battery and test all affected systems.

WIRE

STANDARD PROCEDURE

STANDARD PROCEDURE - WIRE SPLICING

When splicing a wire, it is important that the correct gage be used as shown in the wiring diagrams.

(1) Remove one-half (1/2) inch of insulation from each wire that needs to be spliced.

(2) Place a piece of adhesive lined heat shrink tubing on one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(3) Place the strands of wire overlapping each other inside of the splice clip (Fig. 19).

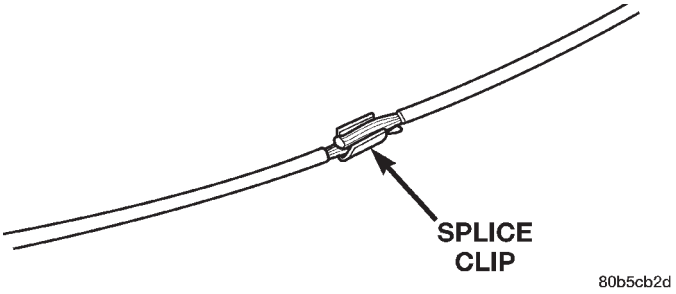


Fig. 19 SPLICE CLIP

(4) Using crimping tool, Miller p/n 8272, crimp the splice clip and wires together (Fig. 20)

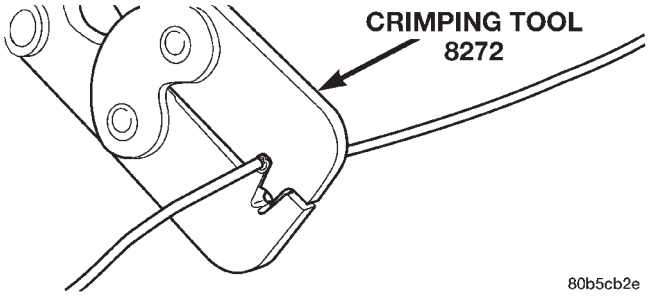


Fig. 20 CRIMPING TOOL

(5) Solder the connection together using rosin core type solder only (Fig. 21).

CAUTION: DO NOT USE ACID CORE SOLDER.

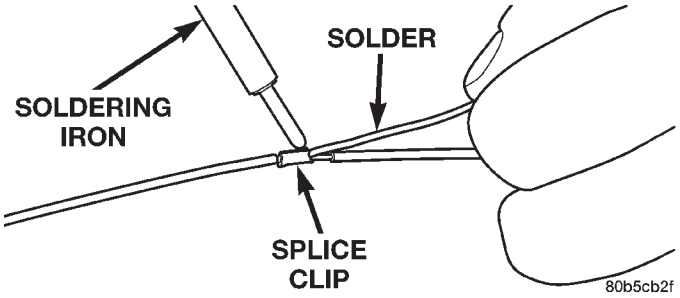


Fig. 21 SOLDER

(6) 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 (Fig. 22).

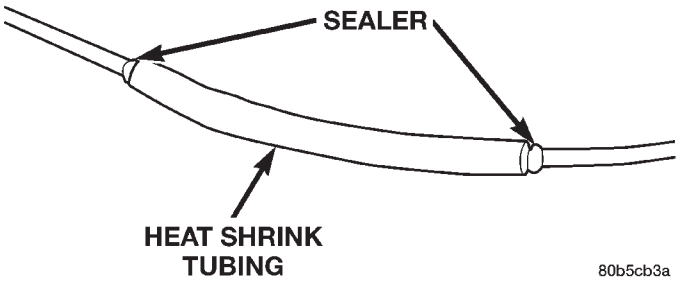


Fig. 22 HEAT SHRINK TUBING

8W-02 COMPONENT INDEX

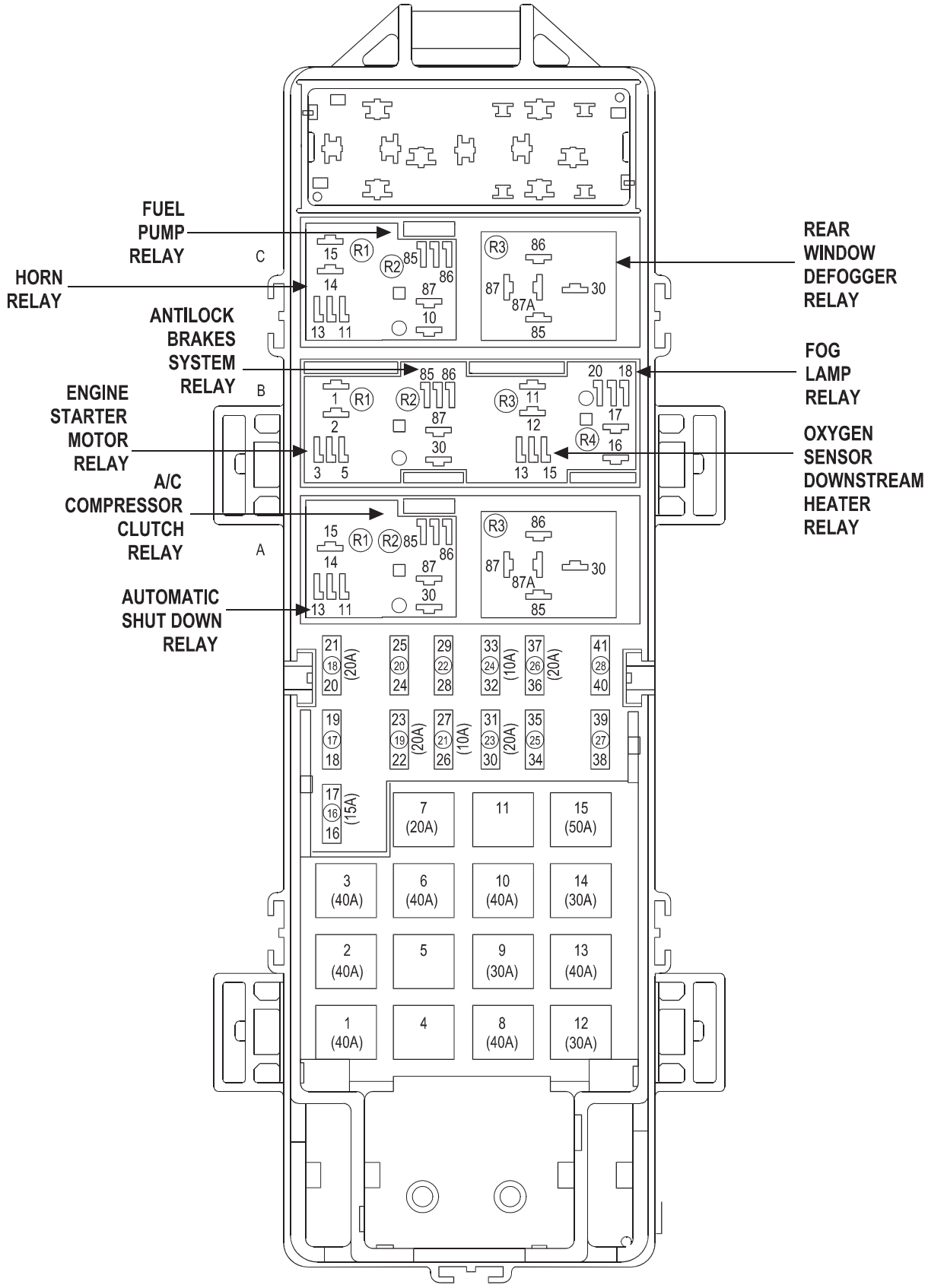
Component	Page
4WD Indicator	8Wa-31
A/C Compressor Clutch Relay	8Wa-42
A/C Compressor Clutch	8Wa-42
A/C-Heater Control	8Wa-42
A/C High Pressure Switch	8Wa-42
A/C Low Pressure Switch	8Wa-42
Airbag Control Module	8Wa-43
Antilock Brake Relay	8Wa-35
Automatic Shut Down Relay	8Wa-30
Back-Up Lamp Switch	8Wa-51
Battery Temperature Sensor	8Wa-30
Battery	8Wa-20
Beam Select Switch	8Wa-50
Blend Door Actuator	8Wa-42
Blower Motor Relay	8Wa-42
Blower Motor Resistor Block	8Wa-42
Blower Motor	8Wa-42
Brake Lamp Switch	8Wa-51
Brake Transmission Shift Interlock Solenoid	8Wa-31
Brake Warning Indicator Switch	8Wa-40
Camshaft Position Sensor	8Wa-30
Center High Mounted Stop Lamp	8Wa-51
Cigar Lighter/Power Outlet	8Wa-41
Circuit Breaker	8Wa-50
Clockspring	8Wa-30, 0 43
Clutch Pedal Position Switch Connector	8Wa-21
Clutch Pedal Position Switch	8Wa-21
Controller Antilock Brake	8Wa-35
Courtesy Lamp	8Wa-44
Crankshaft Position Sensor	8Wa-30
Data Link Connector	8Wa-18
Daytime Running Lamp Module	8Wa-50
Dome Lamp	8Wa-44
Driver Airbag Squib	8Wa-43
Driver Door Ajar Switch	8Wa-44
Engine Coolant Temperature Sensor	8Wa-30
Engine Oil Pressure Sensor	8Wa-30
Engine Starter Motor Relay	8Wa-21
Engine Starter Motor	8Wa-21
EVAP/Purge Solenoid	8Wa-30
Fog Lamp Relay	8Wa-50
Fog Lamp	8Wa-50
Front Washer Pump	8Wa-53
Front Wiper Motor	8Wa-53
Fuel Injectors	8Wa-30
Fuel Pump Module	8Wa-30
Fuel Pump Relay	8Wa-30
Fuses FB	8Wa-11
Fuses PDC	8Wa-10
Fuse Block	8Wa-11
Fusible Links	8Wa-10, 20
Grounds	8Wa-15
Generator	8Wa-20
G-Switch	8Wa-35
Headlamp Leveling Motor	8Wa-50
Headlamp Leveling Switch	8Wa-50
Headlamp	8Wa-50
High Note Horn	8Wa-41
Horn Relay	8Wa-41
Horn Switch	8Wa-30, 41
Idle Air Control Motor	8Wa-30
Ignition Coil Pack	8Wa-30
Ignition Coil	8Wa-30
Ignition Switch	8Wa-10
Instrument Cluster	8Wa-40
Intake Air Temperature Sensor	8Wa-30
Lamp Assembly	8Wa-51
Leak Detection Pump	8Wa-30
License Lamp	8Wa-51
Low Note Horn	8Wa-41
Manifold Absolute Pressure Sensor	8Wa-30
Manual Transmission Jumper	8Wa-21, 30
Multi-Function Switch	8Wa-40, 44, 50, 51, 52
Oxygen Sensors	8Wa-30
Oxygen Sensor Downstream Heater Relay	8Wa-30
Park Brake Switch	8Wa-40
Park/Neutral Position Switch	8Wa-51
Park/Turn Signal Lamp	8Wa-52
Passenger Airbag On/Off Switch	8Wa-43
Passenger Airbag	8Wa-43
Passenger Door Ajar Switch	8Wa-44
Position Lamp	8Wa-50
Power Distribution Center	8Wa-10
Power Steering Pressure Switch	8Wa-30
Powertrain Control Module	8Wa-30
Radio Antenna	8Wa-47
Radio Choke And Relay	8Wa-47
Radio	8Wa-47
Rear Fog Lamp	8Wa-51
Rear Washer Pump	8Wa-53
Rear Window Defogger Relay	8Wa-48
Rear Window Defogger Switch	8Wa-48
Rear Window Defogger	8Wa-48
Rear Wiper Motor	8Wa-53
Rear Wiper/Washer Switch	8Wa-53
Splices	8Wa-10, 11, 15, 18, 21, 30, 40, 41, 42, 44, 50, 51, 52, 70
Seat Belt Switch	8Wa-40
Sentry Key Immobilizer Module	8Wa-30
Side Marker Lamp	8Wa-52
Side Repeater Lamp	8Wa-50, 52
Sound Bar Dome Lamp	8Wa-44
Speaker	8Wa-47

Component	Page
Speed Control Servo	8Wa-30
Speed Control Switch Pod	8Wa-30
Subwoofer	8Wa-47
Throttle Position Sensor	8Wa-30
Torque Converter Clutch Solenoid	8Wa-31
Transfer Case Switch	8Wa-31
Transmission Range Indicator Illumination	8Wa-44
Turn Signal Lamp	8Wa-52
Underhood Lamp	8Wa-44
Vehicle Speed Sensor	8Wa-30
Wheel Speed Sensor	8Wa-35

8W-10 POWER DISTRIBUTION

Component	Page
A/C Compressor Clutch	8Wa-10-16
A/C Compressor Clutch Relay	8Wa-10-8, 16
Automatic Shut Down Relay	8Wa-10-7, 13, 14
Battery	8Wa-10-7
Blower Motor Relay	8Wa-10-7, 9
Circuit Breaker	8Wa-10-10
Clutch Pedal Position Switch	8Wa-10-11
Clutch Pedal Position Switch Connector	8Wa-10-11
Controller Antilock Brake	8Wa-10-7, 10
Data Link Connector	8Wa-10-17
Dome Lamp	8Wa-10-17
Engine Starter Motor	8Wa-10-7, 11
Fog Lamp Relay	8Wa-10-16
Fuel Injector No. 1	8Wa-10-15
Fuel Injector No. 2	8Wa-10-15
Fuel Injector No. 3	8Wa-10-15
Fuel Injector No. 4	8Wa-10-15
Fuel Injector No. 5	8Wa-10-15
Fuel Injector No. 6	8Wa-10-15
Fuel Pump Module	8Wa-10-16
Fuel Pump Relay	8Wa-10-8, 16
Fuse 1 (FB)	8Wa-10-10
Fuse 2 (FB)	8Wa-10-10
Fuse 3 (FB)	8Wa-10-10
Fuse 5 (FB)	8Wa-10-11
Fuse 6 (FB)	8Wa-10-11
Fuse 7 (FB)	8Wa-10-11
Fuse 8 (FB)	8Wa-10-11
Fuse 9 (FB)	8Wa-10-12
Fuse 10 (FB)	8Wa-10-12
Fuse 11 (FB)	8Wa-10-12
Fuse 12 (FB)	8Wa-10-12
Fuse 13 (FB)	8Wa-10-12
Fuse 14 (FB)	8Wa-10-12
Fuse 15 (FB)	8Wa-10-12
Fuse 17 (FB)	8Wa-10-9
Fuse 18 (FB)	8Wa-10-13
Fuse 19 (FB)	8Wa-10-13
Fuse 20 (FB)	8Wa-10-11
Fuse 1 (PDC)	8Wa-10-7, 9
Fuse 2 (PDC)	8Wa-10-7, 9
Fuse 3 (PDC)	8Wa-10-7, 10
Fuse 6 (PDC)	8Wa-10-7, 11
Fuse 7 (PDC)	8Wa-10-7, 10
Fuse 8 (PDC)	8Wa-10-7, 10
Fuse 9 (PDC)	8Wa-10-7, 14
Fuse 10 (PDC)	8Wa-10-7, 8, 10
Fuse 12 (PDC)	8Wa-10-7, 10
Fuse 13 (PDC)	8Wa-10-7, 8, 13
Fuse 14 (PDC)	8Wa-10-8, 11, 12
Fuse 15 (PDC)	8Wa-10-8, 17
Fuse 16 (PDC)	8Wa-10-8, 13, 14
Fuse 18 (PDC)	8Wa-10-8, 16
Fuse 19 (PDC)	8Wa-10-8, 16
Fuse 21 (PDC)	8Wa-10-8, 16
Fuse 23 (PDC)	8Wa-10-8, 16
Fuse 24 (PDC)	8Wa-10-8, 17
Fuse 26 (PDC)	8Wa-10-8, 14
Fuse Block	8Wa-10-7, 9, 10, 11, 12, 13
Fusible Link A11	8Wa-10-7
G300	8Wa-10-12
Generator	8Wa-10-7
High Note Horn	8Wa-10-16
Horn Relay	8Wa-10-8, 16
Ignition Coil	8Wa-10-15
Ignition Coil Pack	8Wa-10-15
Ignition Switch	8Wa-10-8, 11, 12, 13
Instrument Cluster	8Wa-10-12, 17
Left Courtesy Lamp	8Wa-10-17
Left Fog Lamp	8Wa-10-16
Low Note Horn	8Wa-10-16
Multi-Function Switch	8Wa-10-7, 8, 10, 16
Oxygen Sensor 1/1 Upstream	8Wa-10-14
Oxygen Sensor 1/2 Downstream	8Wa-10-13, 14
Oxygen Sensor 2/2 Downstream	8Wa-10-13
Oxygen Sensor Downstream Heater Relay	8Wa-10-8, 13, 14
Power Distribution Center	8Wa-10-2, 7, 8, 9, 10, 11, 12, 12, 13, 16, 17
Powertrain Control Module	8Wa-10-7, 14
Radio	8Wa-10-17
Rear Window Defogger	8Wa-10-9
Rear Window Defogger Relay	8Wa-10-7, 9
Right Courtesy Lamp	8Wa-10-17
Right Fog Lamp	8Wa-10-16
Sound Bar	8Wa-10-17
Underhood Lamp	8Wa-10-17

POWER DISTRIBUTION CENTER



FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTION
1	40A	A111 12RD/LB	FUSED B(+)
2	40A	A4 12BK/PK	FUSED B(+)
3	40A	A6 12RD/BK	FUSED B(+)
4	-	-	-
5	-	-	-
6 ▽▽	40A	A2 12PK/BK	FUSED B(+)
7 ▽▽	20A	L9 16BK/WT	FUSED B(+)
8	40A	A10 12RD/DG	FUSED B(+)
9	30A	A14 14RD/WT	FUSED B(+)
		A14 14RD/WT	FUSED B(+)
10	40A	A3 12RD/WT	FUSED B(+)
11	-	-	-
12	30A	A20 12RD/DB	FUSED B(+)
13	40A	F30 12RD/PK	FUSED B(+)
14	30A	A1 14RD	FUSED B(+)
15	50A	M1 16PK/WT	FUSED B(+)
16	15A	F142 18OR/DG	AUTOMATIC SHUT DOWN RELAY OUTPUT
17	-	-	-
18	20A	F31 18VT	FUSED B(+)
		F31 18VT	FUSED B(+)
19	20A	F39 16PK/LG	FUSED B(+)
20	-	-	-
21	10A	A17 20RD/GY	FUSED B(+)
22	-	-	-
23	20A	A61 18DG/BK	FUSED B(+)
24	10A	M1 20PK/WT	FUSED B(+)
25	-	-	-
26	20A	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
27	-	-	-
28	-	-	-

▽▽ ABS

A/C COMPRESSOR CLUTCH RELAY

CAVITY	CIRCUIT	FUNCTION
A6	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
A7	-	-
A8	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
A9	C3 20DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
A10	A17 20RD/GY	FUSED B(+)

ANTILOCK BRAKE RELAY

CAVITY	CIRCUIT	FUNCTION
B6	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
B7	-	-
B8	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
B9	Z1 18BK	GROUND
B10	G83 18GY/BK	ABS SYSTEM RELAY CONTROL

AUTOMATIC SHUT DOWN RELAY

CAVITY	CIRCUIT	FUNCTION
A11	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
A12	-	-
A13	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
A14	A142 14DG/PK	AUTOMATIC SHUT DOWN RELAY OUTPUT
A15	A14 14RD/WT	FUSED B(+)

ENGINE STARTER MOTOR RELAY

CAVITY	CIRCUIT	FUNCTION
B1	A2 12PK/BK	FUSED B(+)
B2	T40 12BR	ENGINE STARTER MOTOR RELAY OUTPUT
B3	T41 20BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
B4	-	-
B5	T141 14YL/RD	FUSED IGNITION SWITCH OUTPUT (START)

FOG LAMP RELAY

CAVITY	CIRCUIT	FUNCTION
B16	F61 16WT/OR	FUSED B(+)
B17	-	-
B18	G34 14RD/GY ●	HIGH BEAM INDICATOR
B18	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
B19	L39 16LB	FOG LAMP LAMP NO. 1 OUTPUT
B20	Z1 18BK	GROUND

FUEL PUMP RELAY

CAVITY	CIRCUIT	FUNCTION
C6	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
C7	-	-
C8	K31 18BR	FUEL PUMP RELAY CONTROL
C9	A141 18DG/WT	FUEL PUMP RELAY OUTPUT
C10	A61 18DG/BK	FUSED B(+)

● DRL

HORN RELAY

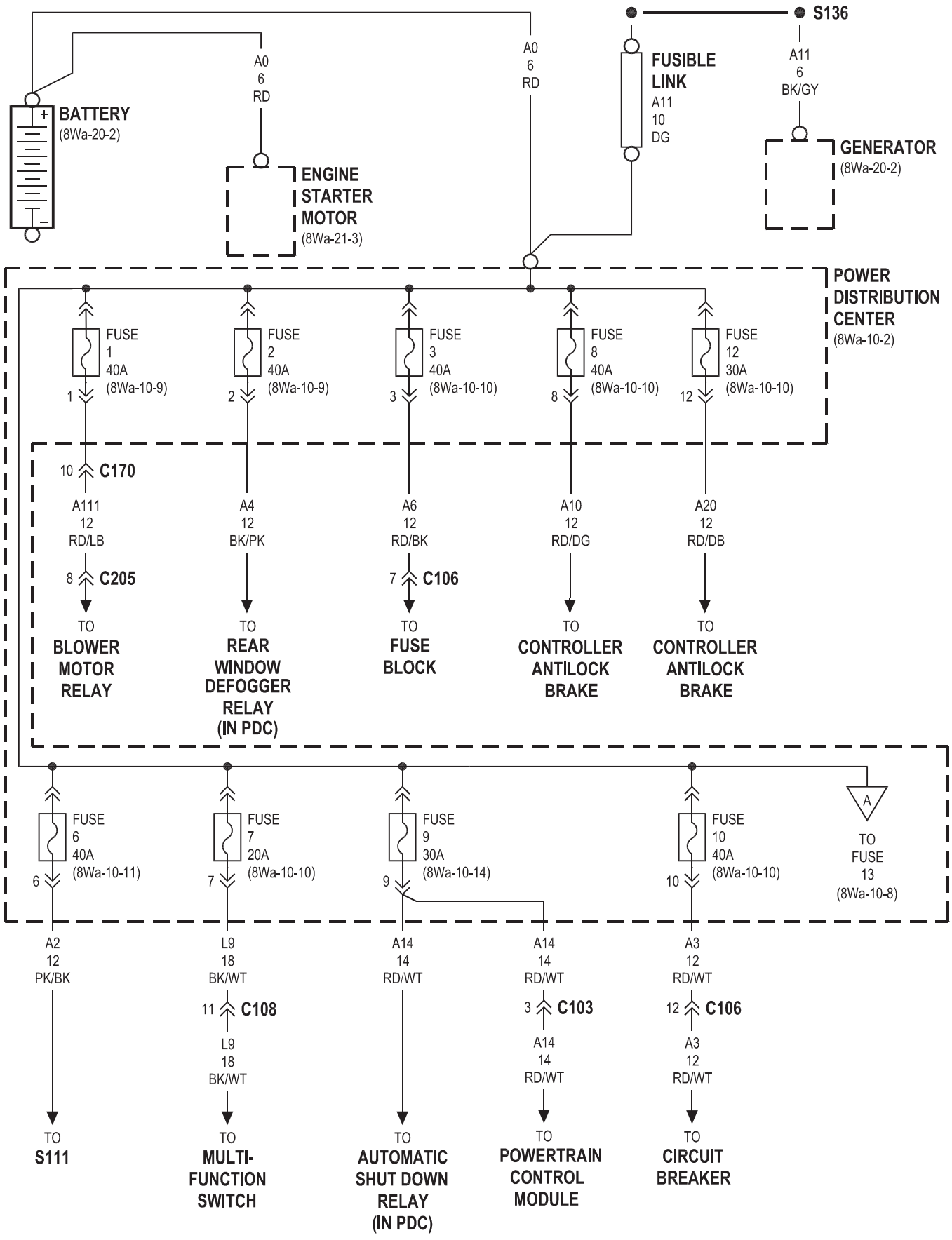
CAVITY	CIRCUIT	FUNCTION
C11	F31 18VT	FUSED B(+)
C12	-	-
C13	X3 20RD/YL	HORN RELAY CONTROL
C14	X2 18WT/RD	HORN RELAY OUTPUT
C15	F31 18VT	FUSED B(+)

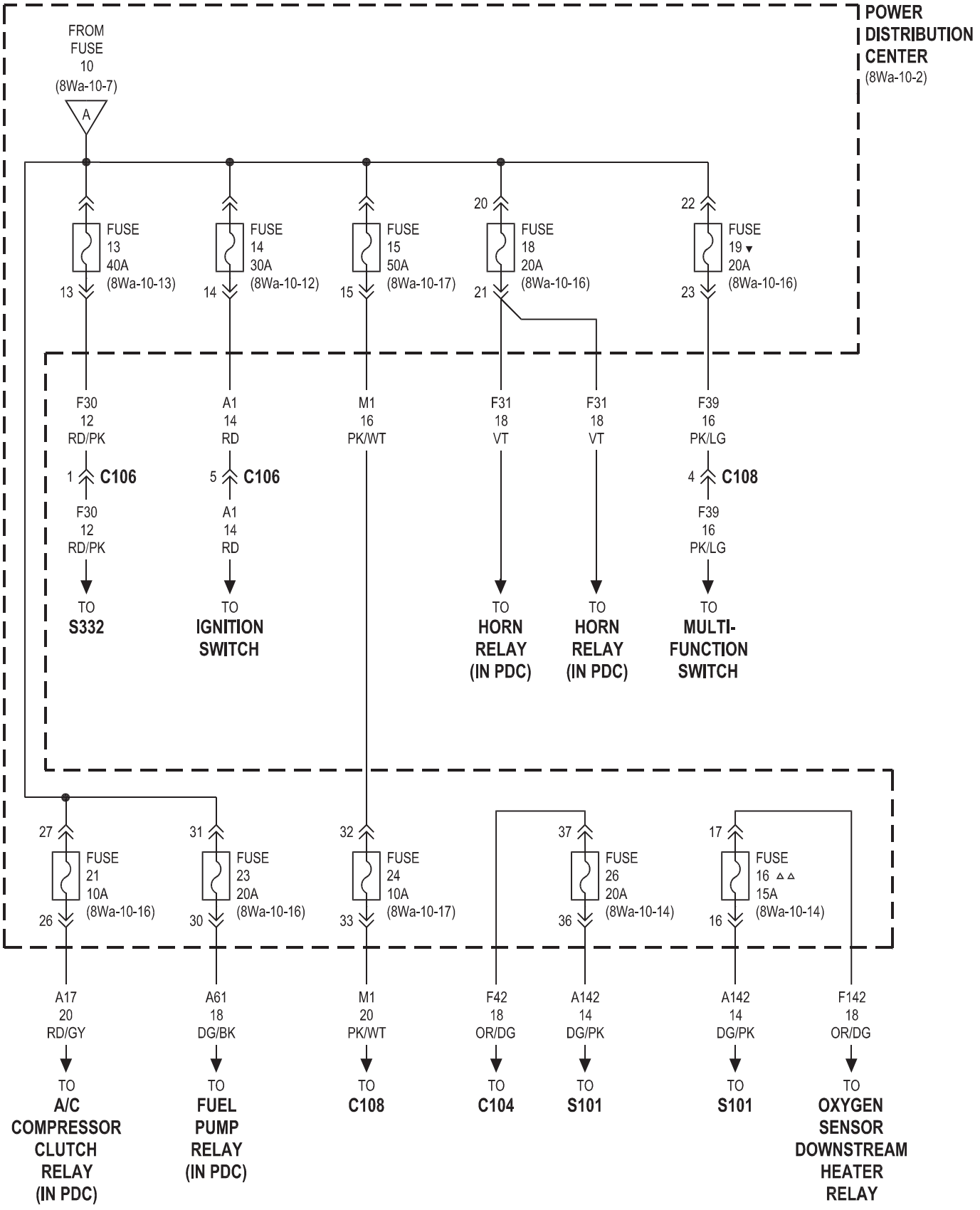
OXYGEN SENSOR DOWNSTREAM HEATER RELAY

CAVITY	CIRCUIT	FUNCTION
B11	A142 18OR/DG	FUSED B(+)
	A142 18OR/DG	FUSED B(+)
B12	A242 18VT/OR	OXYGEN SENSOR DOWNSTREAM HEATER RELAY OUTPUT
B13	142 18 OR/DG	FUSED B(+)
	142 18 OR/DG	FUSED B(+)
B14	-	-
B15	K512 18RD/YL	OXYGEN SENSOR DOWNSTREAM HEATER RELAY OUTPUT

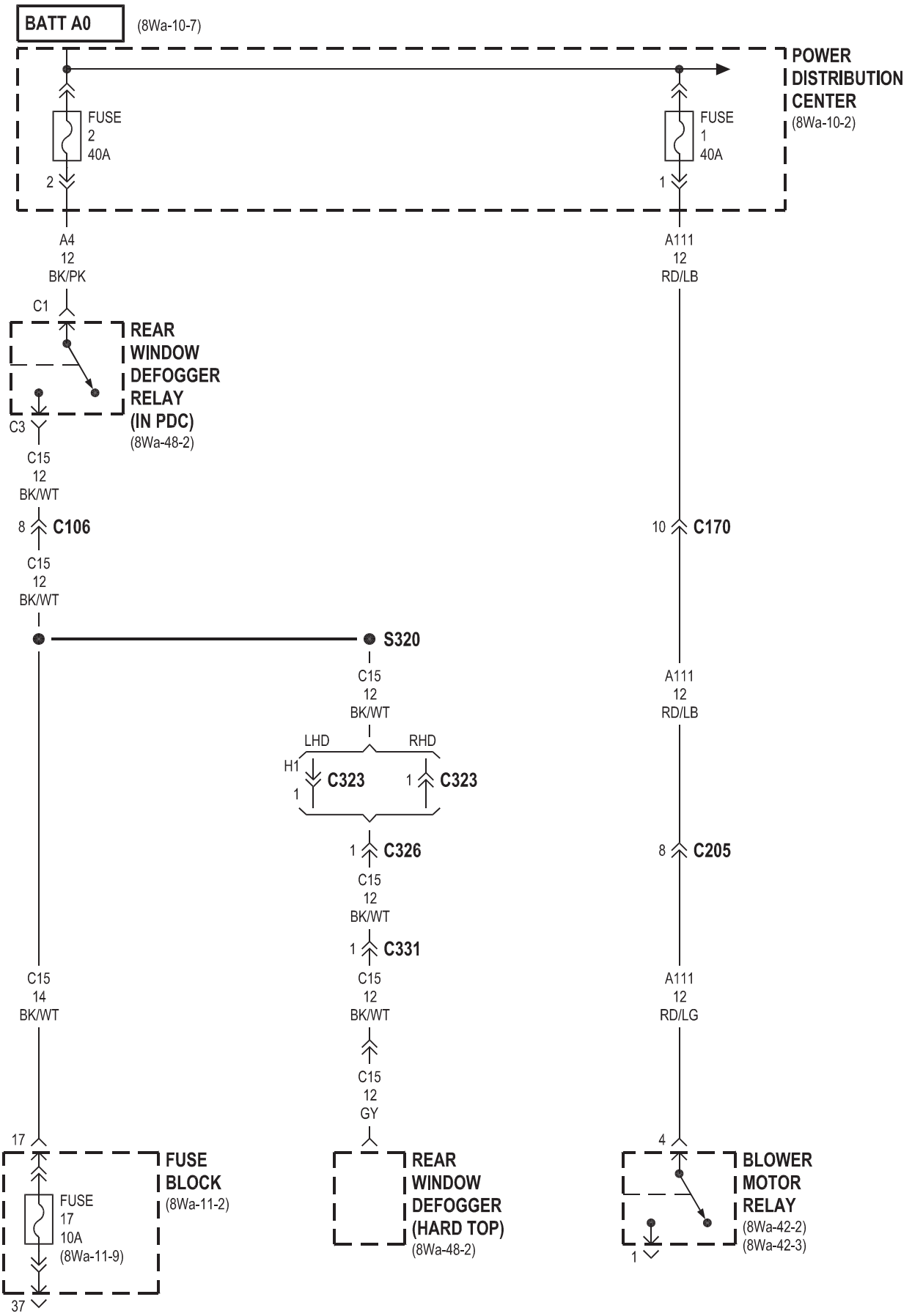
REAR WINDOW DEFOGGER RELAY

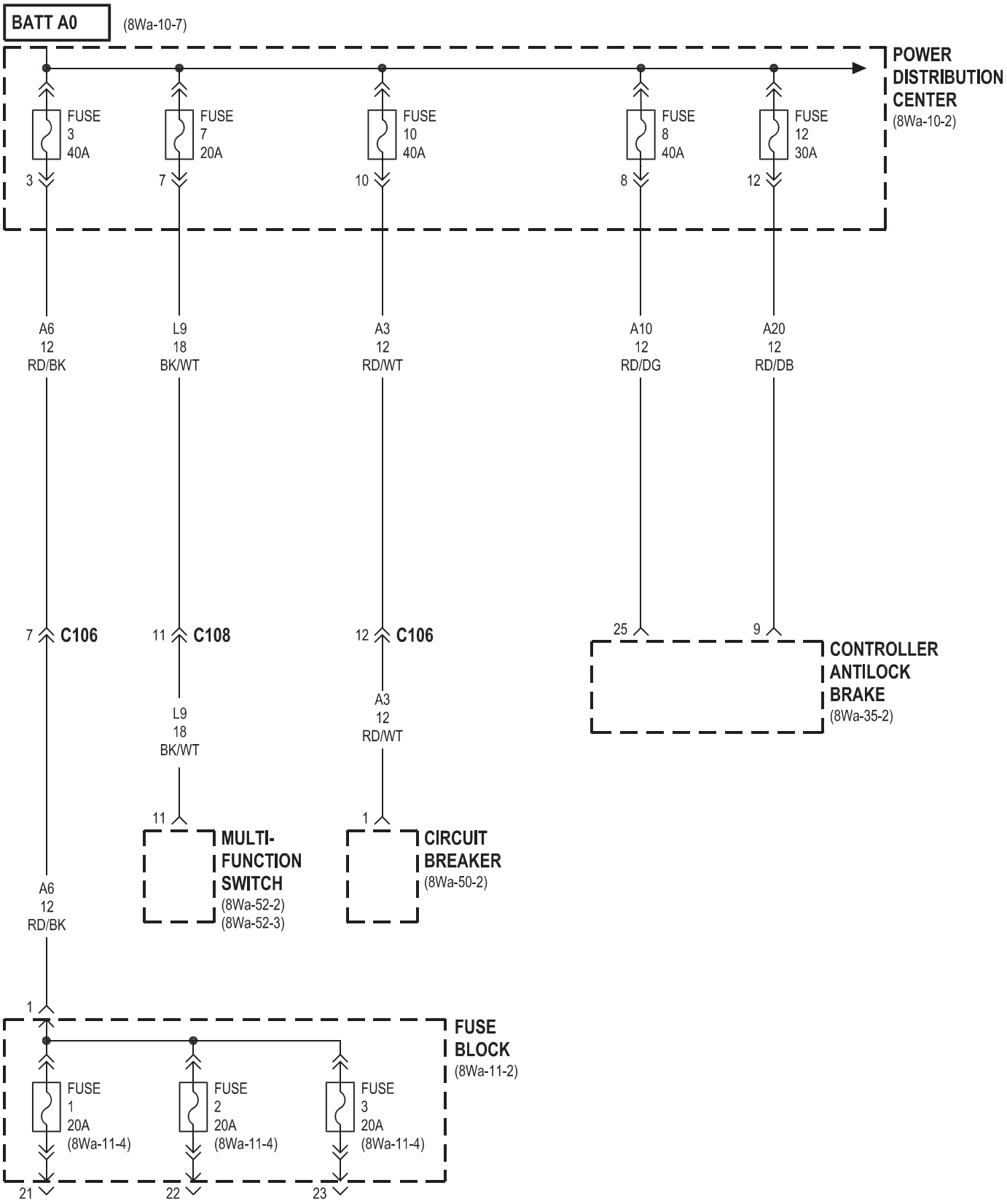
CAVITY	CIRCUIT	FUNCTION
C1	A4 12BK/PK	FUSED B(+)
C2	C81 20LB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
C3	C15 12BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT
C4	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
C5	-	-

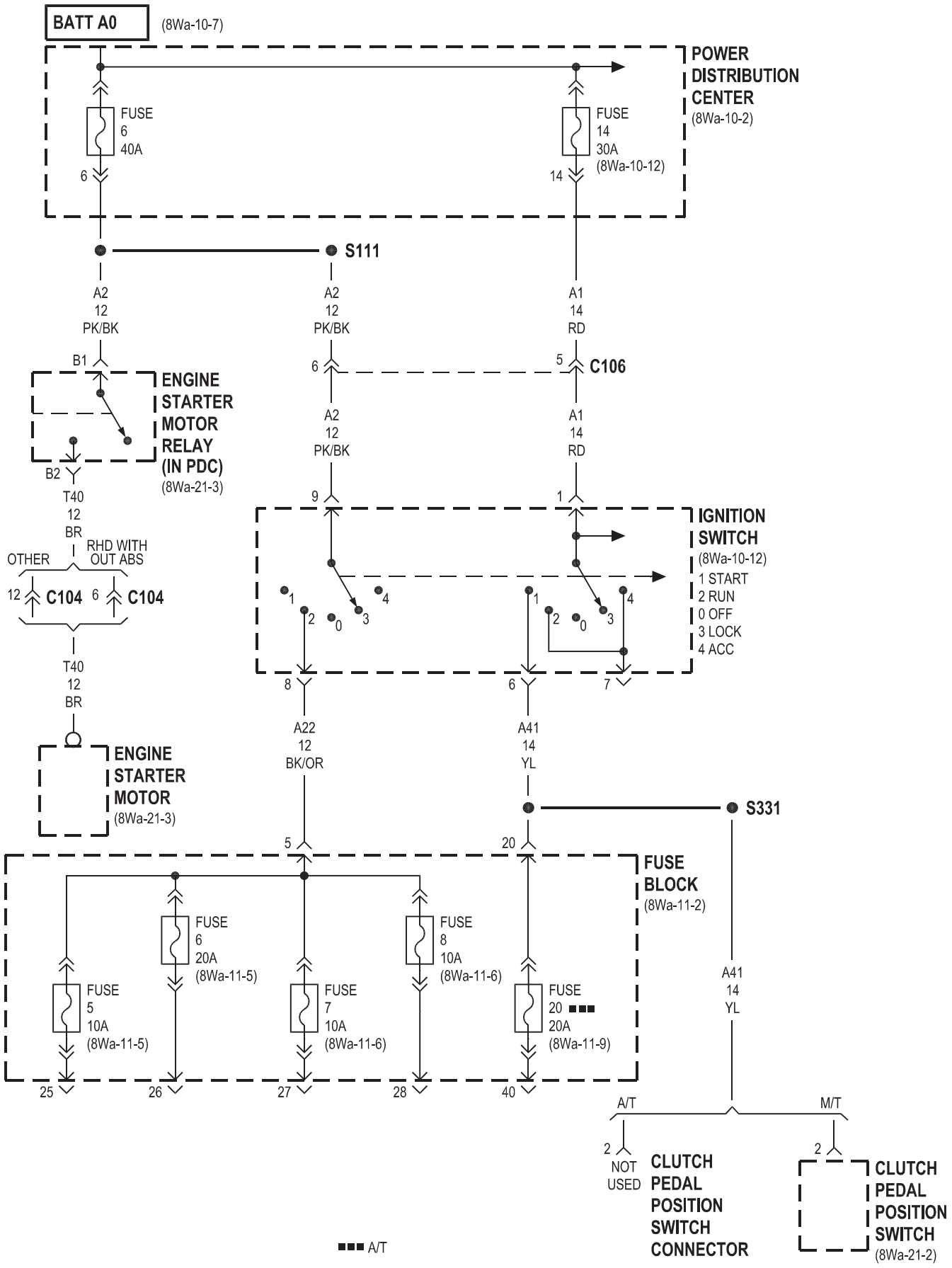

BATTERY
(8Wa-20-2)
A0
6
RD
ENGINE
STARTER
MOTOR
(8Wa-21-3)
A0
6
RD
FUSIBLE
LINK
A11
10
DG
S136
A11
6
BK/GY
GENERATOR
(8Wa-20-2)
POWER
DISTRIBUTION
CENTER
(8Wa-10-2)
FUSE
1
40A
(8Wa-10-9)
FUSE
2
40A
(8Wa-10-9)
FUSE
3
40A
(8Wa-10-10)
FUSE
8
40A
(8Wa-10-10)
FUSE
12
30A
(8Wa-10-10)
10 C170
A111
12
RD/LB
8 C205
TO
BLOWER
MOTOR
RELAY
A4
12
BK/PK
TO
REAR
WINDOW
DEFOGGER
RELAY
(IN PDC)
A6
12
RD/BK
7 C106
TO
FUSE
BLOCK
A10
12
RD/DG
TO
CONTROLLER
ANTILOCK
BRAKE
A20
12
RD/DB
TO
CONTROLLER
ANTILOCK
BRAKE
FUSE
6
40A
(8Wa-10-11)
FUSE
7
20A
(8Wa-10-10)
FUSE
9
30A
(8Wa-10-14)
FUSE
10
40A
(8Wa-10-10)
A
TO
FUSE
13
(8Wa-10-8)
A2
12
PK/BK
TO
S111
L9
18
BK/WT
11 C108
L9
18
BK/WT
TO
MULTI-
FUNCTION
SWITCH
A14
14
RD/WT
TO
AUTOMATIC
SHUT DOWN
RELAY
(IN PDC)
A14
14
RD/WT
3 C103
A14
14
RD/WT
TO
POWERTRAIN
CONTROL
MODULE
A3
12
RD/WT
12 C106
A3
12
RD/WT
TO
CIRCUIT
BREAKER

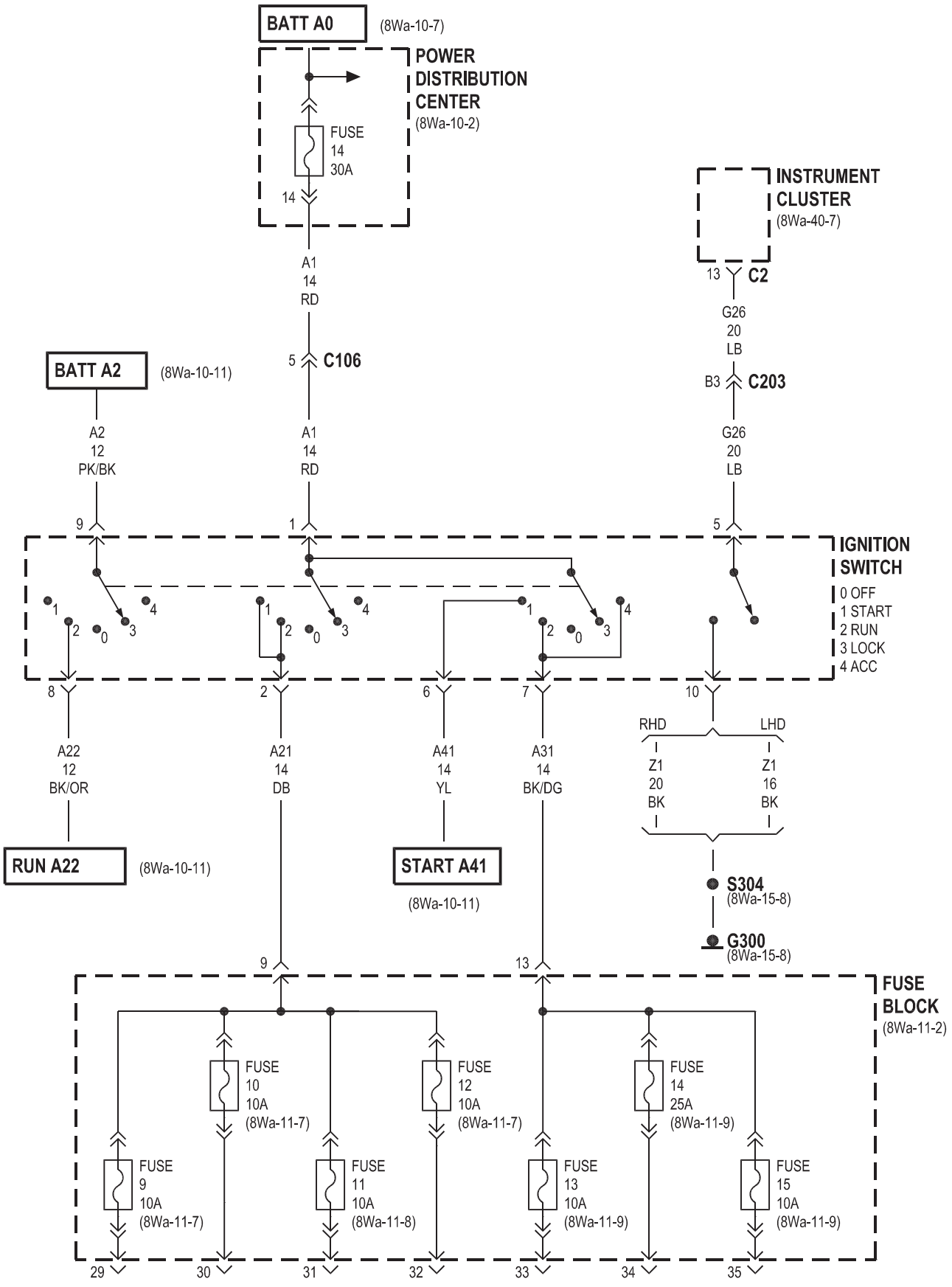


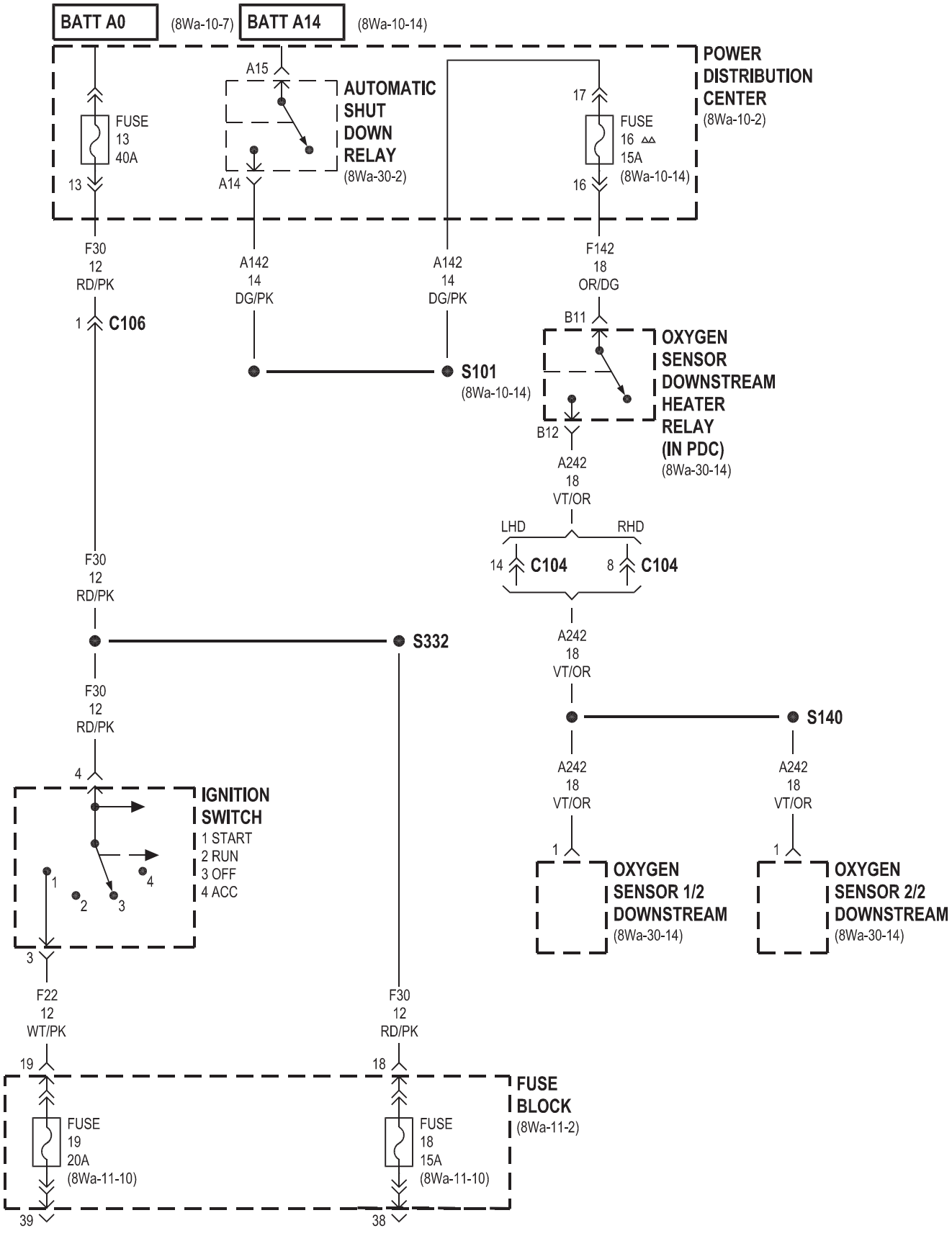
▼ FRONT FOG LAMPS
△△ EXCEPT CALIFORNIA/EUROPEAN III


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 2 40A
FUSE 1 40A
2
1
A4 12 BK/PK
A111 12 RD/LB
C1
C3
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8Wa-48-2)
C15 12 BK/WT
8 C106
10 C170
S320
LHD
RHD
H1
1 C323
1 C323
1 C326
1 C331
A111 12 RD/LB
8 C205
C15 14 BK/WT
C15 12 BK/WT
C15 12 GY
A111 12 RD/LG
17
4
FUSE BLOCK
(8Wa-11-2)
FUSE 17 10A
(8Wa-11-9)
37
REAR WINDOW DEFOGGER (HARD TOP)
(8Wa-48-2)
BLOWER MOTOR RELAY
(8Wa-42-2)
(8Wa-42-3)
1

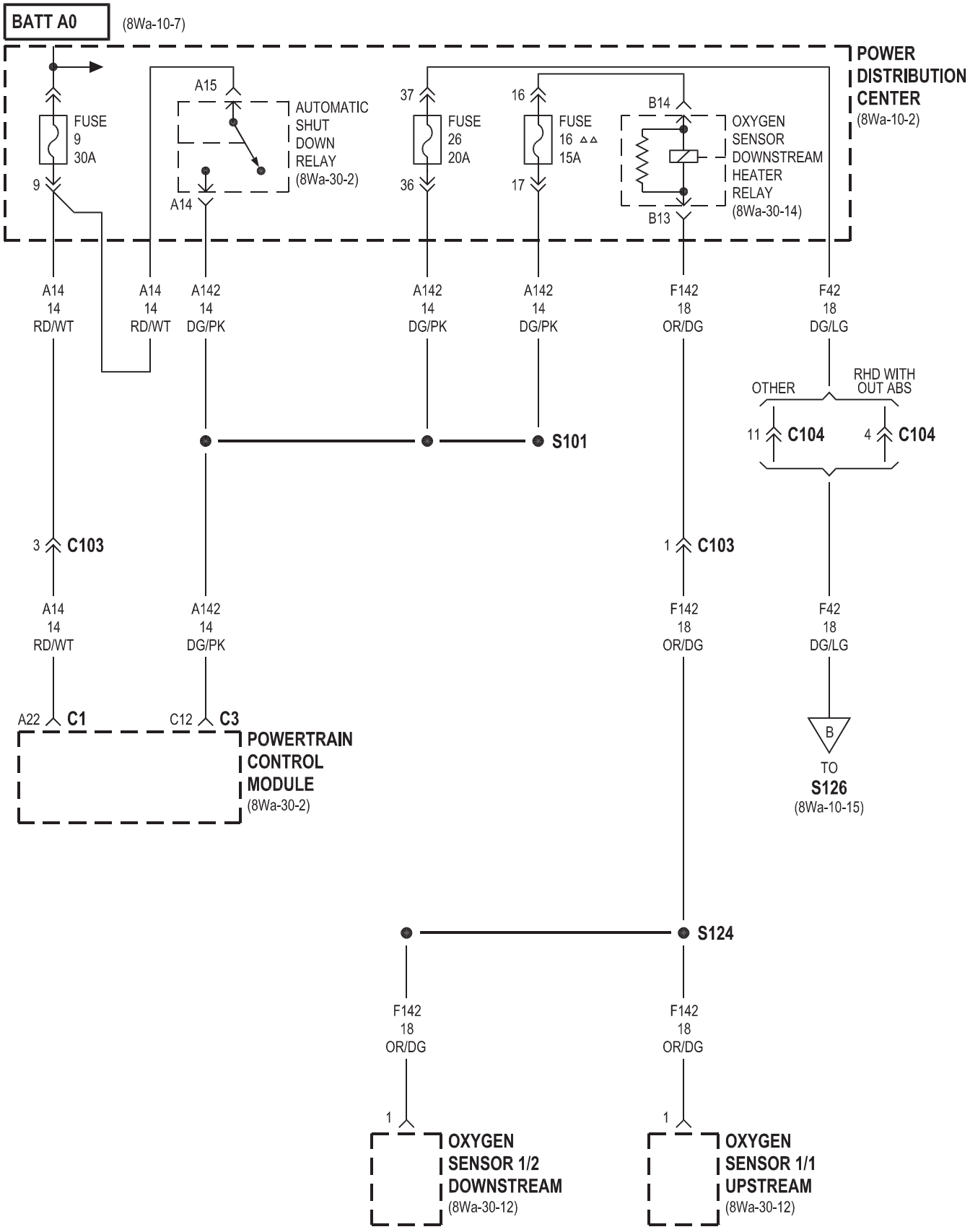

BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 3 40A
FUSE 7 20A
FUSE 10 40A
FUSE 8 40A
FUSE 12 30A
3
7
10
8
12
A6 12 RD/BK
L9 18 BK/WT
A3 12 RD/WT
A10 12 RD/DG
A20 12 RD/DB
7 C106
11 C108
12 C106
25
9
CONTROLLER ANTILOCK BRAKE
(8Wa-35-2)
L9 18 BK/WT
A3 12 RD/WT
11
1
MULTI-FUNCTION SWITCH
(8Wa-52-2)
(8Wa-52-3)
CIRCUIT BREAKER
(8Wa-50-2)
A6 12 RD/BK
1
FUSE BLOCK
(8Wa-11-2)
FUSE 1 20A (8Wa-11-4)
FUSE 2 20A (8Wa-11-4)
FUSE 3 20A (8Wa-11-4)
21
22
23


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 6 40A
FUSE 14 30A
(8Wa-10-12)
S111
A2 12 PK/BK
A1 14 RD
C106
ENGINE STARTER MOTOR RELAY (IN PDC)
(8Wa-21-3)
T40 12 BR
OTHER
RHD WITH OUT ABS
C104
IGNITION SWITCH
(8Wa-10-12)
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
A22 12 BK/OR
A41 14 YL
ENGINE STARTER MOTOR
(8Wa-21-3)
S331
FUSE BLOCK
(8Wa-11-2)
FUSE 5 10A
(8Wa-11-5)
FUSE 6 20A
(8Wa-11-5)
FUSE 7 10A
(8Wa-11-6)
FUSE 8 10A
(8Wa-11-6)
FUSE 20 20A
(8Wa-11-9)
A/T
M/T
NOT USED
CLUTCH PEDAL POSITION SWITCH CONNECTOR
CLUTCH PEDAL POSITION SWITCH
(8Wa-21-2)
A/T

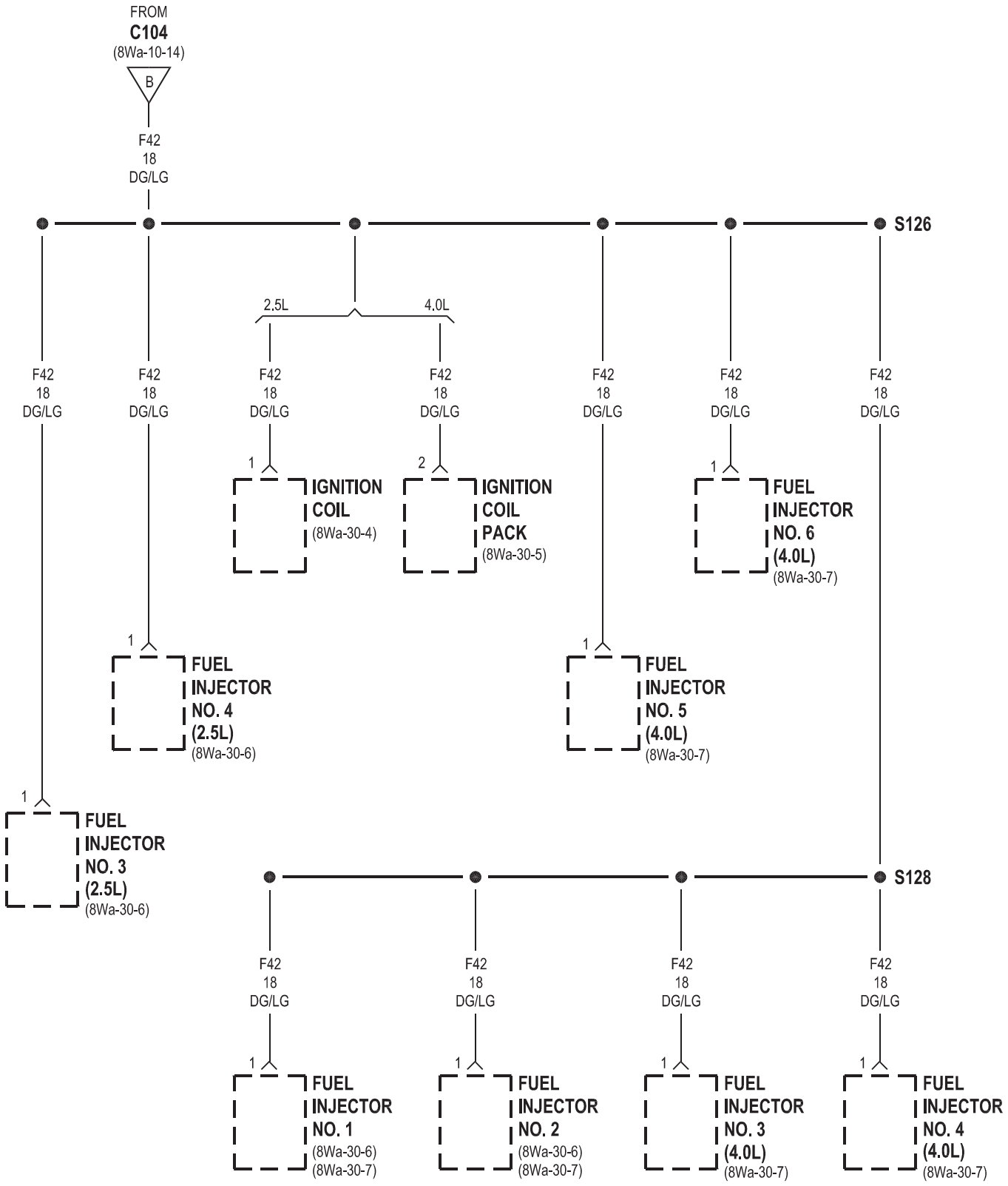

BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 14 30A
14
A1 14 RD
5
C106
INSTRUMENT CLUSTER
(8Wa-40-7)
13
C2
G26 20 LB
B3
C203
G26 20 LB
BATT A2
(8Wa-10-11)
A2 12 PK/BK
9
1
5
IGNITION SWITCH
0 OFF
1 START
2 RUN
3 LOCK
4 ACC
8
2
6
7
10
RHD
LHD
A22 12 BK/OR
A21 14 DB
A41 14 YL
A31 14 BK/DG
Z1 20 BK
Z1 16 BK
RUN A22
(8Wa-10-11)
START A41
(8Wa-10-11)
S304
(8Wa-15-8)
G300
(8Wa-15-8)
9
13
FUSE BLOCK
(8Wa-11-2)
FUSE 10 10A
(8Wa-11-7)
FUSE 12 10A
(8Wa-11-7)
FUSE 14 25A
(8Wa-11-9)
FUSE 9 10A
(8Wa-11-7)
FUSE 11 10A
(8Wa-11-8)
FUSE 13 10A
(8Wa-11-9)
FUSE 15 10A
(8Wa-11-9)
29
30
31
32
33
34
35

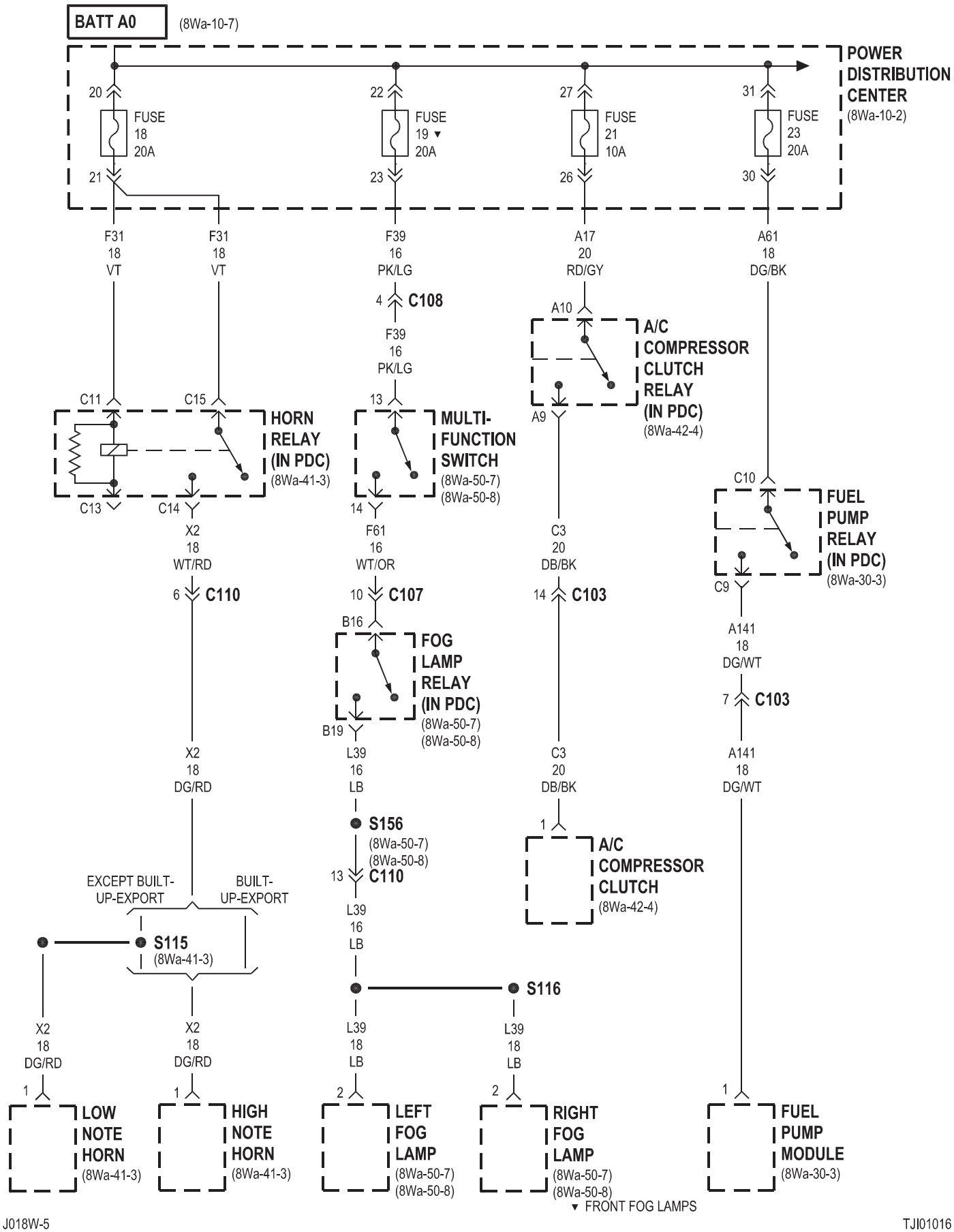


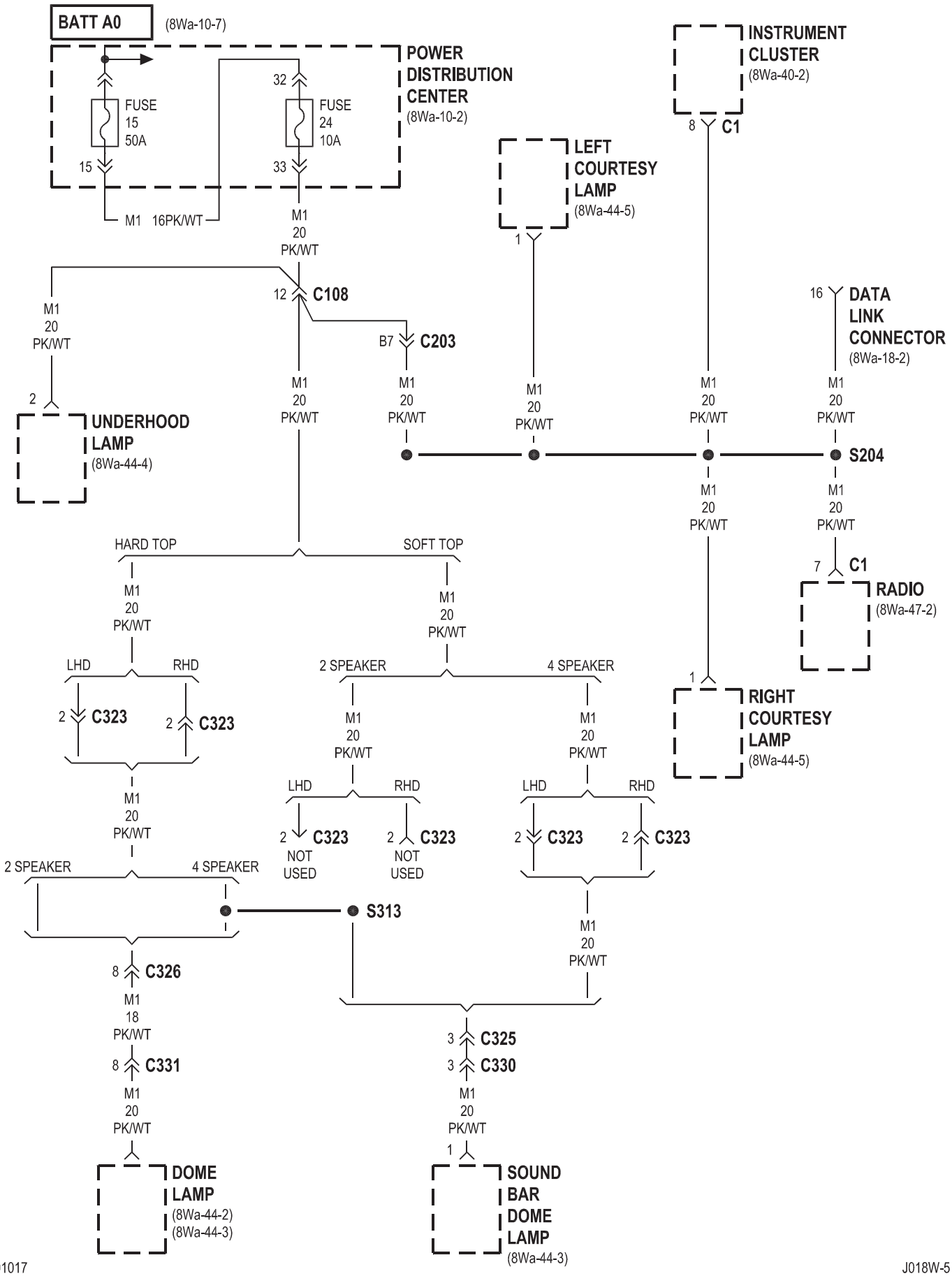
ΔΔ CALIFORNIA/EUROPEAN III



△△ EXCEPT CALIFORNIA/EUROPEAN III

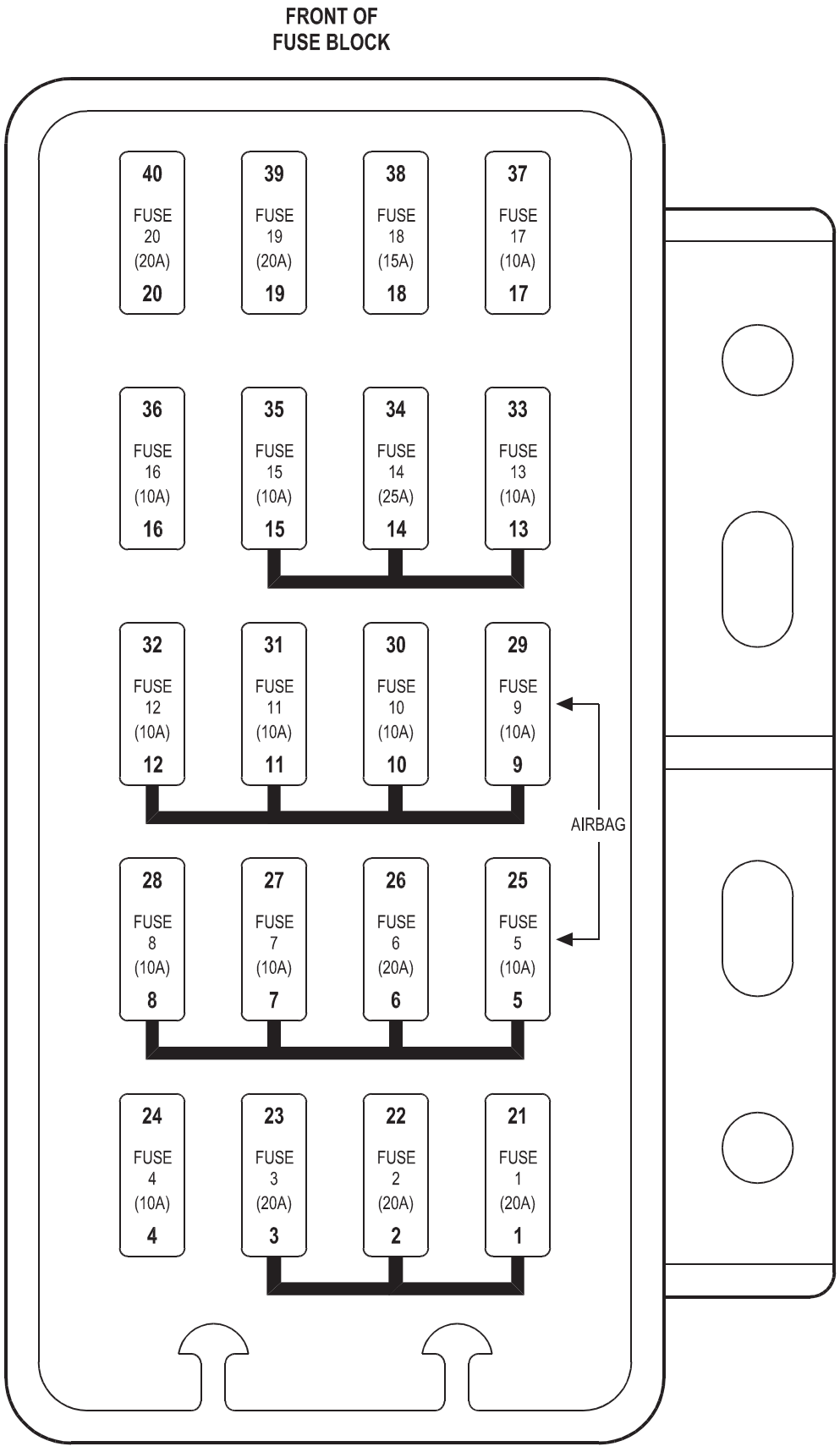

FROM
C104
(8Wa-10-14)
B
F42
18
DG/LG
S126
2.5L
4.0L
F42
18
DG/LG
1
IGNITION
COIL
(8Wa-30-4)
2
IGNITION
COIL
PACK
(8Wa-30-5)
FUEL
INJECTOR
NO. 6
(4.0L)
(8Wa-30-7)
FUEL
INJECTOR
NO. 4
(2.5L)
(8Wa-30-6)
FUEL
INJECTOR
NO. 5
(4.0L)
(8Wa-30-7)
FUEL
INJECTOR
NO. 3
(2.5L)
(8Wa-30-6)
S128
FUEL
INJECTOR
NO. 1
(8Wa-30-6)
(8Wa-30-7)
FUEL
INJECTOR
NO. 2
(8Wa-30-6)
(8Wa-30-7)
FUEL
INJECTOR
NO. 3
(4.0L)
(8Wa-30-7)
FUEL
INJECTOR
NO. 4
(4.0L)
(8Wa-30-7)


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
20
FUSE 18 20A
21
22
FUSE 19 ▼ 20A
23
27
FUSE 21 10A
26
31
FUSE 23 20A
30
F31 18 VT
F31 18 VT
F39 16 PK/LG
A17 20 RD/GY
A61 18 DG/BK
4 C108
F39 16 PK/LG
13
A10
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8Wa-42-4)
A9
C11
C15
HORN RELAY (IN PDC)
(8Wa-41-3)
C13
C14
MULTI-FUNCTION SWITCH
(8Wa-50-7)
(8Wa-50-8)
14
C10
FUEL PUMP RELAY (IN PDC)
(8Wa-30-3)
C9
X2 18 WT/RD
6 C110
F61 16 WT/OR
10 C107
C3 20 DB/BK
14 C103
A141 18 DG/WT
7 C103
B16
FOG LAMP RELAY (IN PDC)
(8Wa-50-7)
(8Wa-50-8)
B19
X2 18 DG/RD
L39 16 LB
C3 20 DB/BK
A141 18 DG/WT
S156
(8Wa-50-7)
(8Wa-50-8)
13 C110
1
A/C COMPRESSOR CLUTCH
(8Wa-42-4)
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S115
(8Wa-41-3)
L39 16 LB
S116
X2 18 DG/RD
X2 18 DG/RD
L39 18 LB
L39 18 LB
1
LOW NOTE HORN
(8Wa-41-3)
1
HIGH NOTE HORN
(8Wa-41-3)
2
LEFT FOG LAMP
(8Wa-50-7)
(8Wa-50-8)
2
RIGHT FOG LAMP
(8Wa-50-7)
(8Wa-50-8)
1
FUEL PUMP MODULE
(8Wa-30-3)
▼ FRONT FOG LAMPS


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 15 50A
FUSE 24 10A
15
32
33
M1 16PK/WT
M1 20 PK/WT
INSTRUMENT CLUSTER
(8Wa-40-2)
8 C1
LEFT COURTESY LAMP
(8Wa-44-5)
1
12 C108
B7 C203
16 DATA LINK CONNECTOR
(8Wa-18-2)
2
UNDERHOOD LAMP
(8Wa-44-4)
S204
HARD TOP
SOFT TOP
7 C1
RADIO
(8Wa-47-2)
LHD
RHD
2 C323
2 C323
2 SPEAKER
4 SPEAKER
1
RIGHT COURTESY LAMP
(8Wa-44-5)
NOT USED
NOT USED
S313
8 C326
M1 18 PK/WT
8 C331
3 C325
3 C330
DOME LAMP
(8Wa-44-2)
(8Wa-44-3)
SOUND BAR DOME LAMP
(8Wa-44-3)

8W-11 FUSE BLOCK

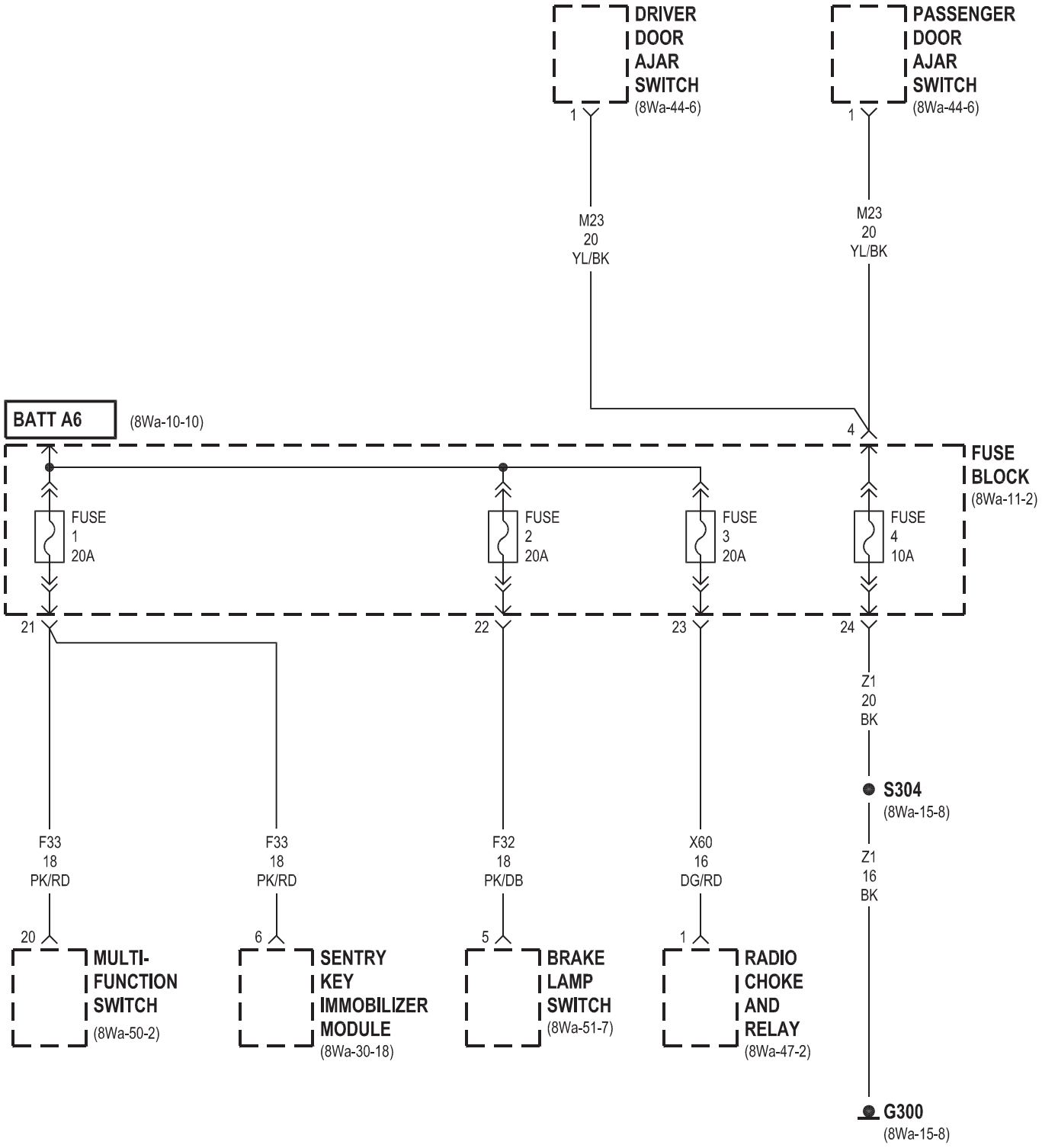
Component	Page
A/C Compressor Clutch Relay	8Wa-11-8
A/C-Heater Control	8Wa-11-6
Airbag Control Module	8Wa-11-5, 7
Antilock Brake Relay	8Wa-11-6
Automatic Shut Down Relay	8Wa-11-7
Back-Up Lamp Switch	8Wa-11-6
Blend Door Actuator	8Wa-11-6
Blower Motor Relay	8Wa-11-6
Brake Lamp Switch	8Wa-11-4
Brake Transmission Shift Interlock Solenoid	8Wa-11-7
Cigar Lighter/Power Outlet	8Wa-11-10
Clutch Pedal Position Switch	8Wa-11-9
Clutch Pedal Position Switch Connector	8Wa-11-9
Controller Antilock Brake	8Wa-11-6
Daytime Running Lamp Module	8Wa-11-8
Driver Door Ajar Switch	8Wa-11-4
Engine Starter Motor Relay	8Wa-11-9
EVAP/Purge Solenoid	8Wa-11-8
Front Wiper Motor	8Wa-11-9
Fuel Pump Relay	8Wa-11-7
Fuse 1 (FB)	8Wa-11-4
Fuse 2 (FB)	8Wa-11-4
Fuse 3 (FB)	8Wa-11-4
Fuse 4 (FB)	8Wa-11-4
Fuse 5 (FB)	8Wa-11-5
Fuse 6 (FB)	8Wa-11-5
Fuse 7 (FB)	8Wa-11-6
Fuse 8 (FB)	8Wa-11-6
Fuse 9 (FB)	8Wa-11-7
Fuse 10 (FB)	8Wa-11-7
Fuse 11 (FB)	8Wa-11-8
Fuse 12 (FB)	8Wa-11-7
Fuse 13 (FB)	8Wa-11-9
Fuse 14 (FB)	8Wa-11-9
Fuse 15 (FB)	8Wa-11-9
Fuse 16 (FB)	8Wa-11-10
Fuse 17 (FB)	8Wa-11-9
Fuse 18 (FB)	8Wa-11-10
Fuse 19 (FB)	8Wa-11-10
Fuse 20 (FB)	8Wa-11-9
Fuse Block	8Wa-11-2, 4, 5, 6, 7, 8, 9, 10
G300	8Wa-11-4
Headlamp Leveling Switch	8Wa-11-10
Ignition Switch	8Wa-11-10
Instrument Cluster	8Wa-11-7
Left Headlamp	8Wa-11-10
Left Headlamp Leveling Motor	8Wa-11-10
Multi-Function Switch	8Wa-11-4, 9, 10
Park/Neutral Position Switch	8Wa-11-6
Passenger Airbag On/Off Switch	8Wa-11-7
Passenger Door Ajar Switch	8Wa-11-4
Powertrain Control Module	8Wa-11-7
Radio	8Wa-11-9
Radio Choke And Relay	8Wa-11-4
Rear Window Defogger Relay	8Wa-11-6, 9
Rear Window Defogger Switch	8Wa-11-9
Rear Wiper Motor	8Wa-11-5
Rear Wiper/Washer Switch	8Wa-11-5
Right Headlamp	8Wa-11-10
Right Headlamp Leveling Motor	8Wa-11-10
Sentry Key Immobilizer Module	8Wa-11-4, 7
Torque Converter Clutch Solenoid	8Wa-11-8
Windshield Wiper Switch	8Wa-11-9

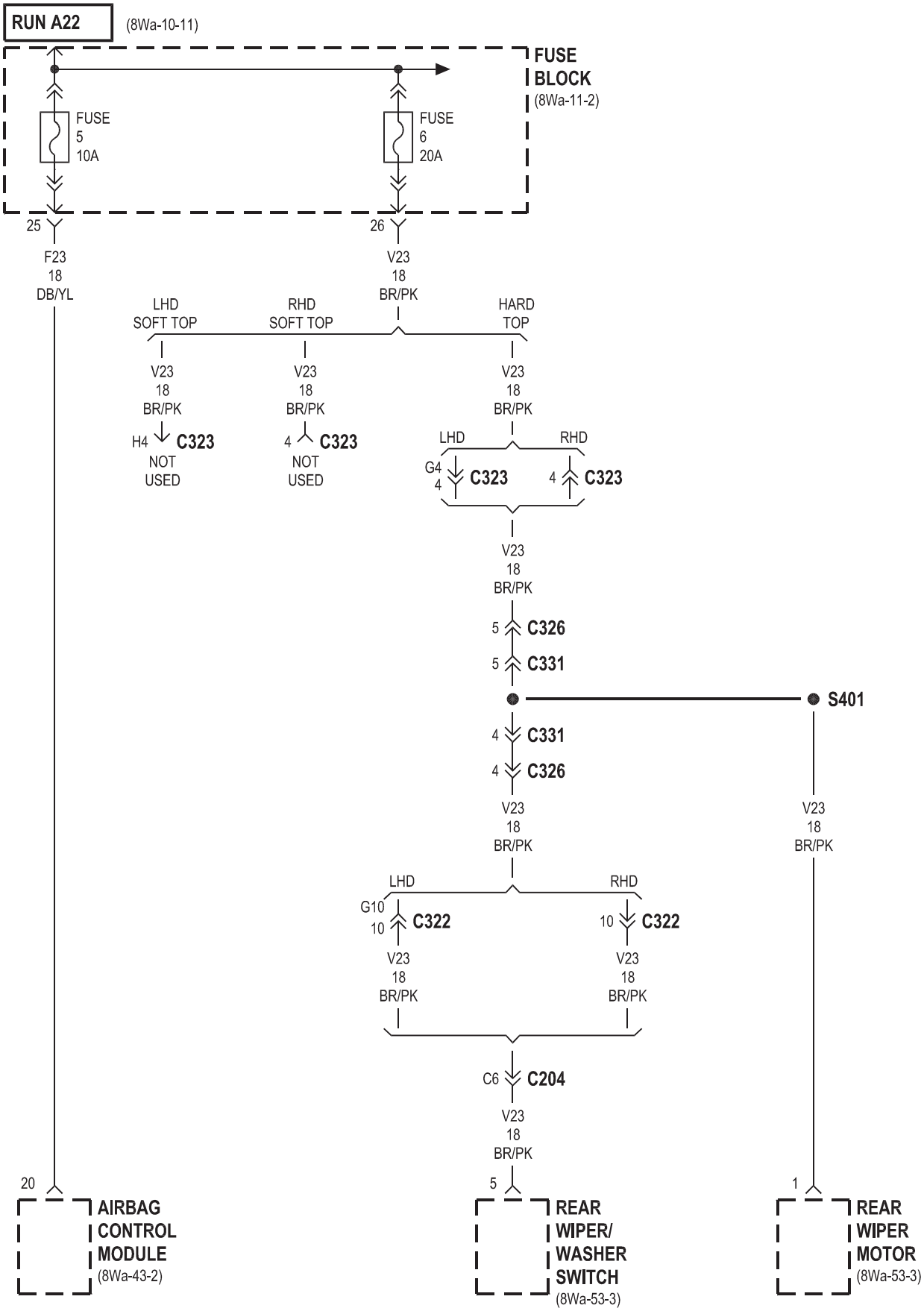

FRONT OF
FUSE BLOCK
40
FUSE
20
(20A)
20
39
FUSE
19
(20A)
19
38
FUSE
18
(15A)
18
37
FUSE
17
(10A)
17
36
FUSE
16
(10A)
16
35
FUSE
15
(10A)
15
34
FUSE
14
(25A)
14
33
FUSE
13
(10A)
13
32
FUSE
12
(10A)
12
31
FUSE
11
(10A)
11
30
FUSE
10
(10A)
10
29
FUSE
9
(10A)
9
AIRBAG
28
FUSE
8
(10A)
8
27
FUSE
7
(10A)
7
26
FUSE
6
(20A)
6
25
FUSE
5
(10A)
5
24
FUSE
4
(10A)
4
23
FUSE
3
(20A)
3
22
FUSE
2
(20A)
2
21
FUSE
1
(20A)
1

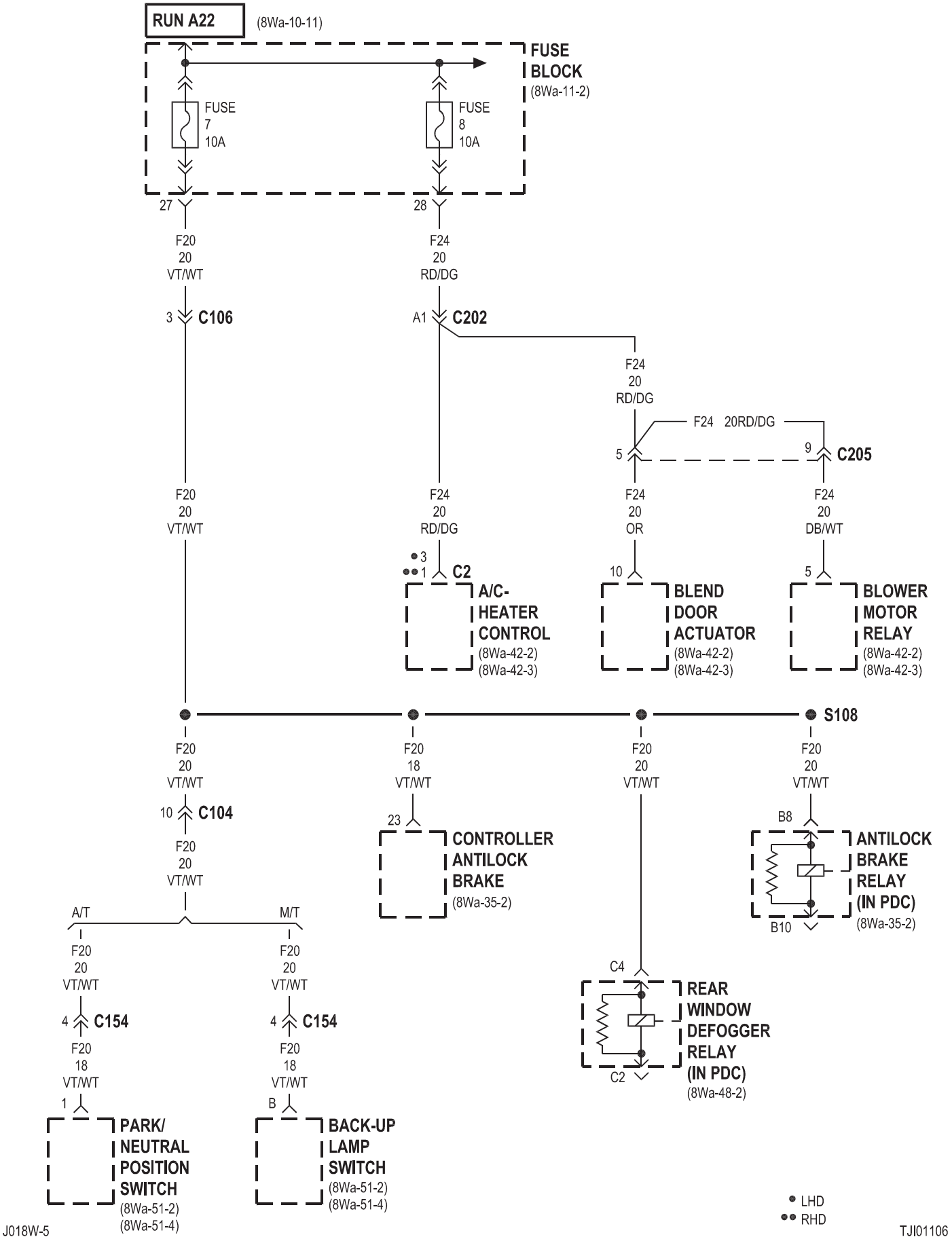
FUSES

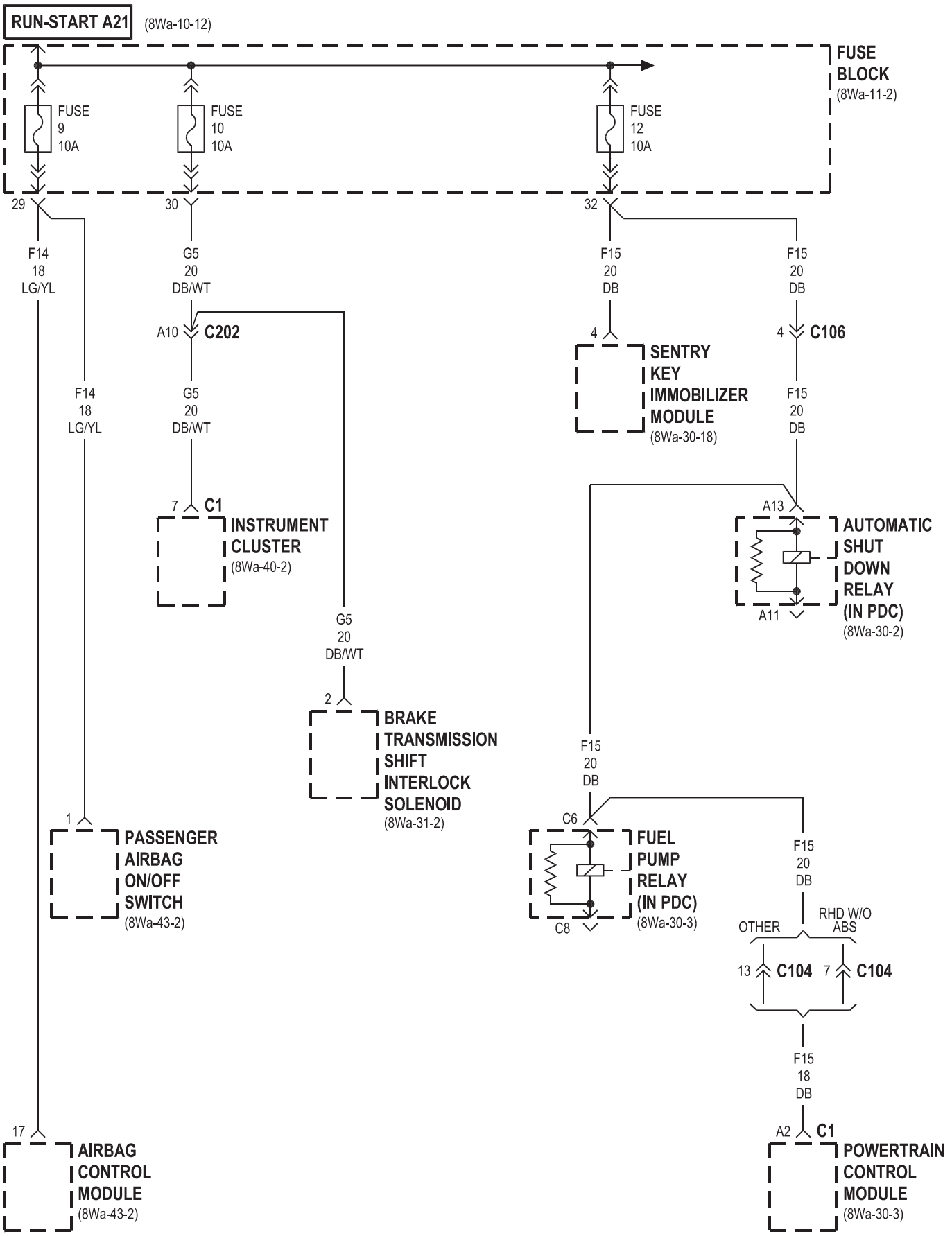
FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTION
1	20A	F33 18PK/RD	FUSED B(+)
		F33 20PK/RD	FUSED B(+)
2	20A	F32 18PK/DB	FUSED B(+)
3	20A	X60 16DG/RD	FUSED B(+)
4	10A	Z1 20BK	DOOR AJAR SWITCH OUTPUT
5	10A	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
6	20A	V23 18BR/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
7	10A	F20 20VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
8	10A	F24 20RD/DG	FUSED IGNITION SWITCH OUTPUT (RUN)
9	10A	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
		F14 18LG/YL ●●	FUSED IGNITION SWITCH OUTPUT (RUN-START)
10	10A	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
		G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
11	10A	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	10A	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
		F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
13	10A	L5 20BK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
14	25A	V6 16PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-START)
		V6 16PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-START)
15	10A	X12 16PK	FUSED IGNITION SWITCH OUTPUT (RUN-START)
16	10A	L22 20LG/DG	DIMMER SWITCH LOW BEAM OUTPUT
17	10A	F81 20DB/RD	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
18		A18 16RD/BK	FUSED B(+)
19	20A	F38 16LB	FUSED IGNITION SWITCH OUTPUT (RUN)
		F38 16LB	FUSED IGNITION SWITCH OUTPUT (RUN)
20	20A	T141 14YL/RD ■■■	FUSED IGNITION SWITCH OUTPUT (START)

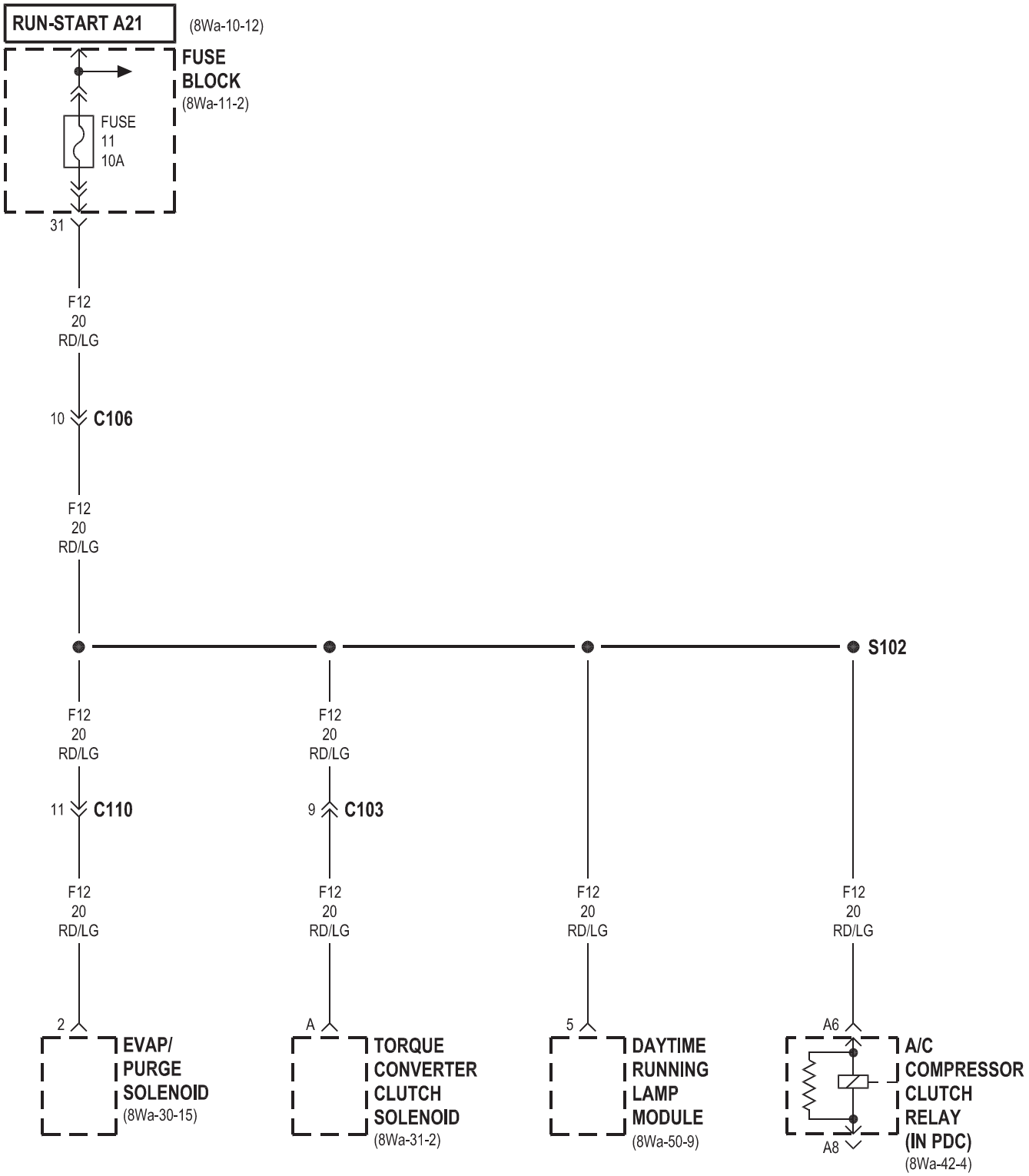
●● RHD
■■■ ATX

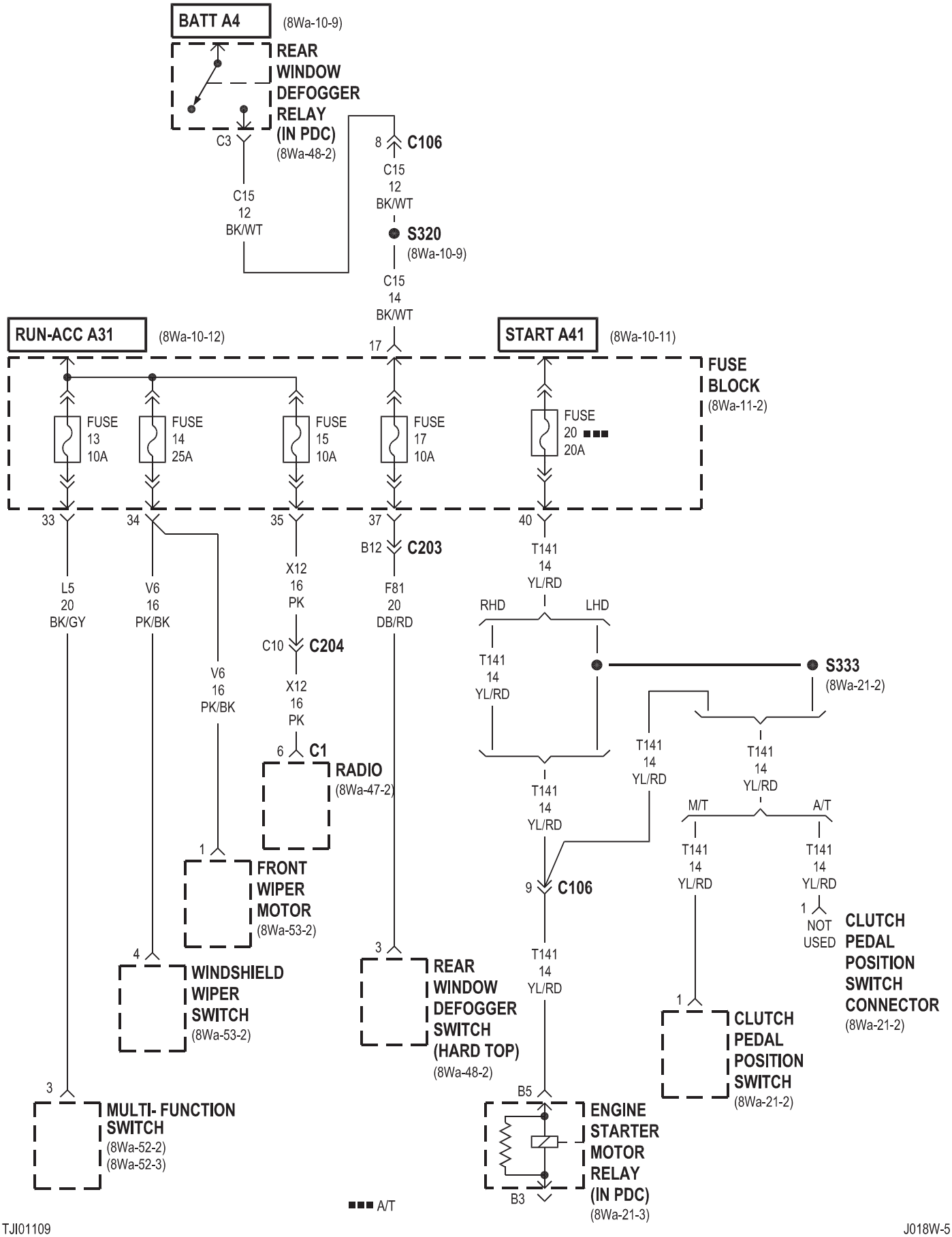

DRIVER DOOR AJAR SWITCH
(8Wa-44-6)
1
PASSENGER DOOR AJAR SWITCH
(8Wa-44-6)
1
M23
20
YL/BK
M23
20
YL/BK
BATT A6
(8Wa-10-10)
4
FUSE BLOCK
(8Wa-11-2)
FUSE 1 20A
FUSE 2 20A
FUSE 3 20A
FUSE 4 10A
21
22
23
24
Z1
20
BK
S304
(8Wa-15-8)
Z1
16
BK
F33
18
PK/RD
F33
18
PK/RD
F32
18
PK/DB
X60
16
DG/RD
20
6
5
1
MULTI-FUNCTION SWITCH
(8Wa-50-2)
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
BRAKE LAMP SWITCH
(8Wa-51-7)
RADIO CHOKE AND RELAY
(8Wa-47-2)
G300
(8Wa-15-8)

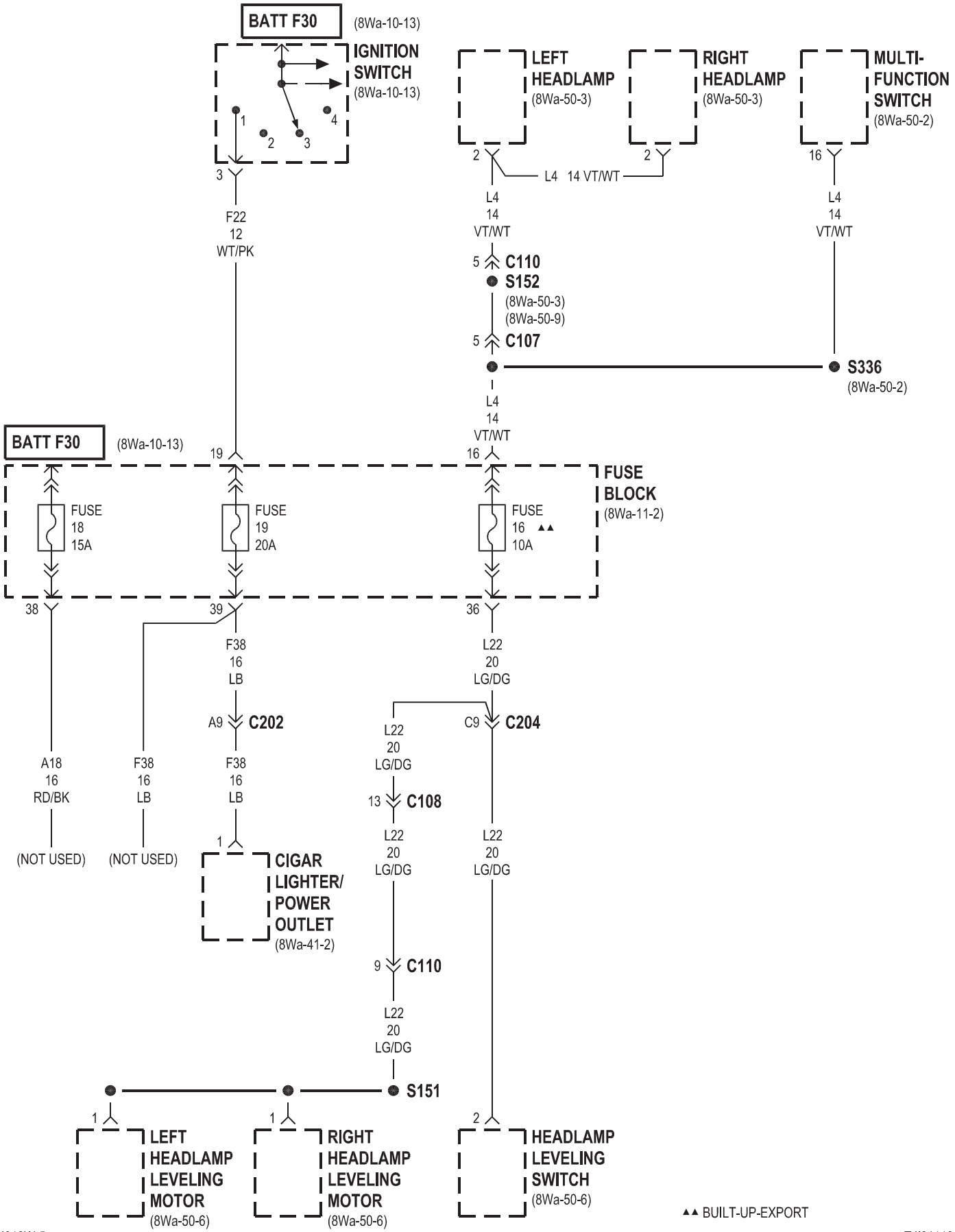

RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 5 10A
FUSE 6 20A
25
26
F23 18 DB/YL
V23 18 BR/PK
LHD SOFT TOP
RHD SOFT TOP
HARD TOP
V23 18 BR/PK
H4 C323 NOT USED
4 C323 NOT USED
LHD
RHD
G4 4 C323
4 C323
5 C326
5 C331
S401
4 C331
4 C326
G10 10 C322
10 C322
C6 C204
20
5
1
AIRBAG CONTROL MODULE
(8Wa-43-2)
REAR WIPER/ WASHER SWITCH
(8Wa-53-3)
REAR WIPER MOTOR
(8Wa-53-3)


RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 7 10A
FUSE 8 10A
27
28
F20 20 VT/WT
F24 20 RD/DG
3 C106
A1 C202
F24 20 RD/DG
F24 20RD/DG
5
9 C205
F20 20 VT/WT
F24 20 RD/DG
F24 20 OR
F24 20 DB/WT
3
1 C2
A/C-HEATER CONTROL
(8Wa-42-2)
(8Wa-42-3)
10
BLEND DOOR ACTUATOR
(8Wa-42-2)
(8Wa-42-3)
5
BLOWER MOTOR RELAY
(8Wa-42-2)
(8Wa-42-3)
S108
F20 20 VT/WT
F20 18 VT/WT
F20 20 VT/WT
F20 20 VT/WT
10 C104
23
CONTROLLER ANTILOCK BRAKE
(8Wa-35-2)
B8
ANTILOCK BRAKE RELAY (IN PDC)
(8Wa-35-2)
B10
F20 20 VT/WT
A/T
M/T
C4
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8Wa-48-2)
C2
4 C154
4 C154
F20 18 VT/WT
F20 18 VT/WT
1
B
PARK/NEUTRAL POSITION SWITCH
(8Wa-51-2)
(8Wa-51-4)
BACK-UP LAMP SWITCH
(8Wa-51-2)
(8Wa-51-4)
LHD
RHD
J018W-5
TJI01106


RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 9 10A
FUSE 10 10A
FUSE 12 10A
29
30
32
F14 18 LG/YL
G5 20 DB/WT
F15 20 DB
F15 20 DB
A10
C202
4
C106
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
F14 18 LG/YL
G5 20 DB/WT
F15 20 DB
7
C1
INSTRUMENT CLUSTER
(8Wa-40-2)
A13
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8Wa-30-2)
A11
G5 20 DB/WT
2
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID
(8Wa-31-2)
F15 20 DB
C6
1
PASSENGER AIRBAG ON/OFF SWITCH
(8Wa-43-2)
FUEL PUMP RELAY (IN PDC)
(8Wa-30-3)
C8
F15 20 DB
OTHER
RHD W/O ABS
13
C104
7
C104
F15 18 DB
17
AIRBAG CONTROL MODULE
(8Wa-43-2)
A2
C1
POWERTRAIN CONTROL MODULE
(8Wa-30-3)

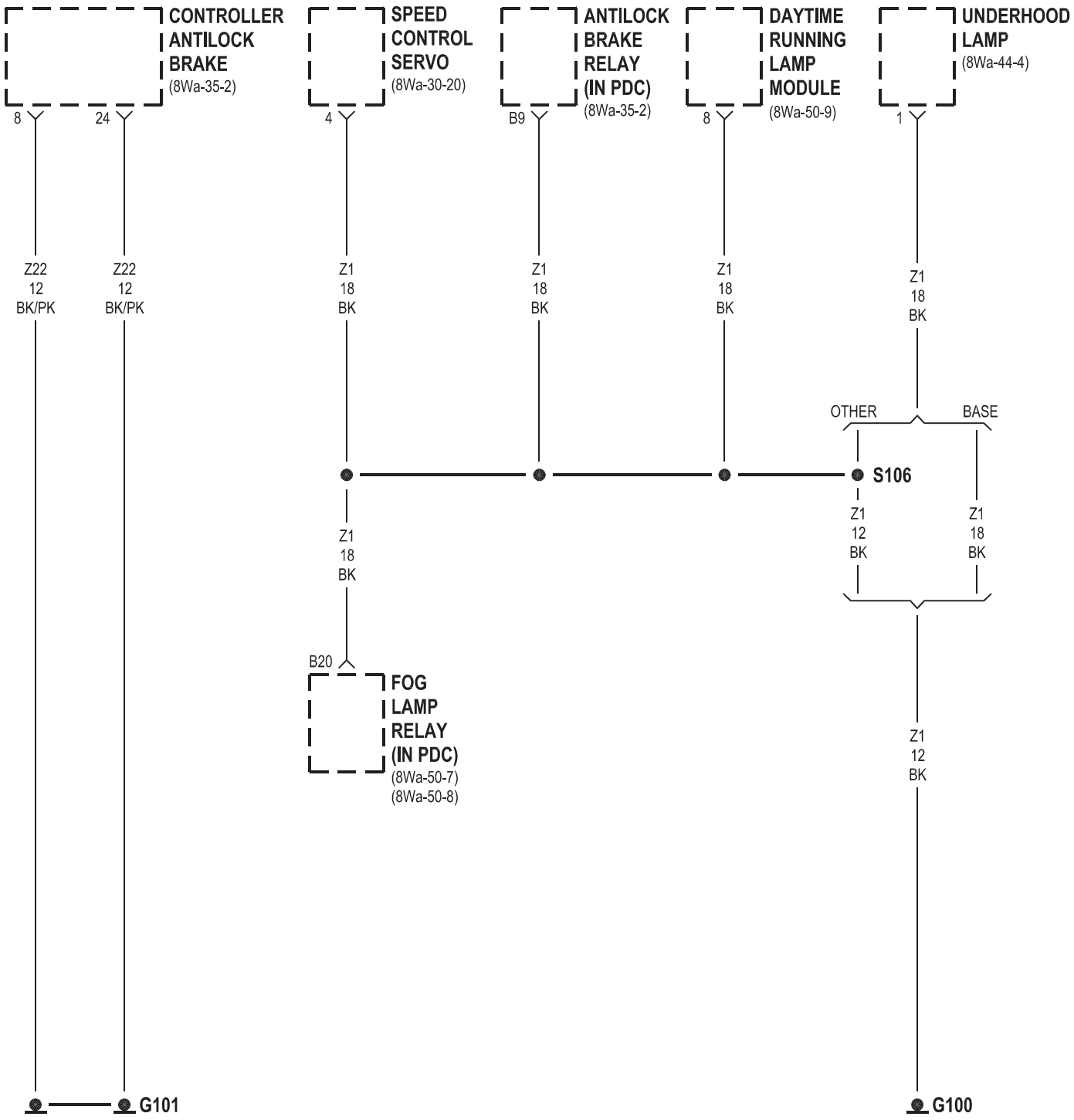

RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 11 10A
31
F12 20 RD/LG
10 C106
F12 20 RD/LG
S102
F12 20 RD/LG
11 C110
F12 20 RD/LG
9 C103
F12 20 RD/LG
F12 20 RD/LG
F12 20 RD/LG
2
EVAP/ PURGE SOLENOID
(8Wa-30-15)
A
TORQUE CONVERTER CLUTCH SOLENOID
(8Wa-31-2)
5
DAYTIME RUNNING LAMP MODULE
(8Wa-50-9)
A6
A8
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8Wa-42-4)


BATT A4
(8Wa-10-9)
REAR WINDOW DEFOGGER RELAY (IN PDC)
(8Wa-48-2)
C3
C15 12 BK/WT
8 C106
C15 12 BK/WT
S320
(8Wa-10-9)
C15 14 BK/WT
17
RUN-ACC A31
(8Wa-10-12)
START A41
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 13 10A
FUSE 14 25A
FUSE 15 10A
FUSE 17 10A
FUSE 20 20A
33
34
35
37
40
L5 20 BK/GY
V6 16 PK/BK
X12 16 PK
B12 C203
F81 20 DB/RD
T141 14 YL/RD
RHD
LHD
S333
(8Wa-21-2)
C10 C204
X12 16 PK
6 C1
RADIO
(8Wa-47-2)
1
FRONT WIPER MOTOR
(8Wa-53-2)
4
WINDSHIELD WIPER SWITCH
(8Wa-53-2)
3
REAR WINDOW DEFOGGER SWITCH (HARD TOP)
(8Wa-48-2)
9 C106
M/T
A/T
1
NOT USED
CLUTCH PEDAL POSITION SWITCH CONNECTOR
(8Wa-21-2)
CLUTCH PEDAL POSITION SWITCH
(8Wa-21-2)
3
MULTI- FUNCTION SWITCH
(8Wa-52-2)
(8Wa-52-3)
B5
B3
ENGINE STARTER MOTOR RELAY (IN PDC)
(8Wa-21-3)
■■■ A/T

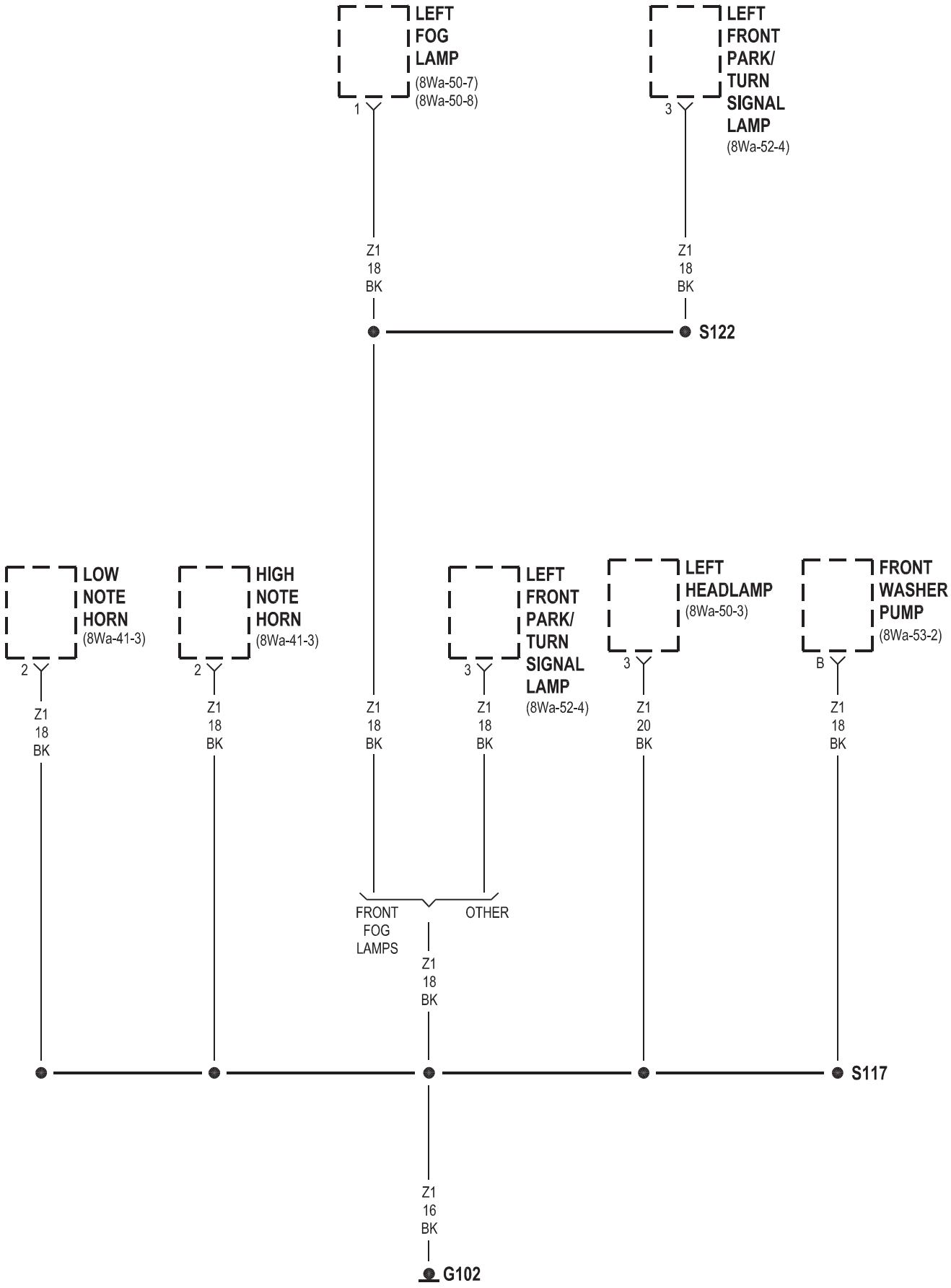

BATT F30
(8Wa-10-13)
IGNITION SWITCH
(8Wa-10-13)
1
2
3
4
3
F22
12
WT/PK
LEFT HEADLAMP
(8Wa-50-3)
RIGHT HEADLAMP
(8Wa-50-3)
MULTI-FUNCTION SWITCH
(8Wa-50-2)
2
L4 14 VT/WT
2
16
L4
14
VT/WT
5
C110
S152
(8Wa-50-3)
(8Wa-50-9)
5
C107
S336
(8Wa-50-2)
L4
14
VT/WT
16
BATT F30
(8Wa-10-13)
19
FUSE BLOCK
(8Wa-11-2)
FUSE 18 15A
FUSE 19 20A
FUSE 16 ▲▲ 10A
38
39
36
F38
16
LB
L22
20
LG/DG
A9
C202
C9
C204
A18
16
RD/BK
F38
16
LB
F38
16
LB
L22
20
LG/DG
13
C108
(NOT USED)
(NOT USED)
1
CIGAR LIGHTER/ POWER OUTLET
(8Wa-41-2)
L22
20
LG/DG
L22
20
LG/DG
9
C110
L22
20
LG/DG
S151
1
1
2
LEFT HEADLAMP LEVELING MOTOR
(8Wa-50-6)
RIGHT HEADLAMP LEVELING MOTOR
(8Wa-50-6)
HEADLAMP LEVELING SWITCH
(8Wa-50-6)
▲▲ BUILT-UP-EXPORT

8W-15 GROUND DISTRIBUTION

Component	Page
A/C Compressor Clutch	8Wa-15-11, 12, 13
A/C-Heater Control	8Wa-15-6, 7
Airbag Control Module	8Wa-15-9
Antilock Brake Relay	8Wa-15-2
Battery	8Wa-15-6, 7
Blend Door Actuator	8Wa-15-6, 7
Blower Motor Relay	8Wa-15-6, 7
Brake Lamp Switch	8Wa-15-8
Center High Mounted Stop Lamp	8Wa-15-9
Cigar Lighter/Power Outlet	8Wa-15-6, 7
Controller Antilock Brake	8Wa-15-2
Data Link Connector	8Wa-15-10
Daytime Running Lamp Module	8Wa-15-2
Driver Door Ajar Switch	8Wa-15-8
Engine Starter Motor Relay	8Wa-15-11, 12, 13
Fog Lamp Relay	8Wa-15-2
Front Washer Pump	8Wa-15-3, 4
Front Wiper Motor	8Wa-15-8
Fuel Pump Module	8Wa-15-11, 12, 13
Fuse 4 (FB)	8Wa-15-8
Fuse Block	8Wa-15-8
G100	8Wa-15-2
G101	8Wa-15-2
G102	8Wa-15-3, 4
G103	8Wa-15-5
G104	8Wa-15-5
G105	8Wa-15-10, 11, 12, 13
G106	8Wa-15-6, 7
G107	8Wa-15-6, 7
G200	8Wa-15-6, 7
G201	8Wa-15-6, 7
G202	8Wa-15-6
G202	8Wa-15-7
G203	8Wa-15-6, 7
G300	8Wa-15-8
G301	8Wa-15-9
G302	8Wa-15-9
Generator	8Wa-15-5
Headlamp Leveling Switch	8Wa-15-6, 7
High Note Horn	8Wa-15-3, 4
Ignition Switch	8Wa-15-8
Instrument Cluster	8Wa-15-6, 7
Left Fog Lamp	8Wa-15-3, 4
Left Front Park/Turn Signal Lamp	8Wa-15-3
Left Front Position Lamp	8Wa-15-4
Left Front Turn Signal Lamp	8Wa-15-4
Left Headlamp	8Wa-15-3, 4
Left Headlamp Leveling Motor	8Wa-15-4
Left License Lamp	8Wa-15-9
Left Rear Lamp Assembly	8Wa-15-9
Left Side Repeater Lamp	8Wa-15-4
Low Note Horn	8Wa-15-3
Manual Transmission Jumper	8Wa-15-11, 12, 13
Oxygen Sensor 1/2 Downstream	8Wa-15-12
Oxygen Sensor 2/2 Downstream	8Wa-15-12
Park/Neutral Position Switch	8Wa-15-11, 12, 13
Passenger Door Ajar Switch	8Wa-15-8
Power Steering Pressure Switch	8Wa-15-13
Powertrain Control Module	8Wa-15-10, 11, 12, 13
Rear Fog Lamp	8Wa-15-9
Rear Washer Pump	8Wa-15-9
Rear Window Defogger	8Wa-15-9
Rear Window Defogger Switch	8Wa-15-6, 7
Rear Wiper Motor	8Wa-15-9
Rear Wiper/Washer Switch	8Wa-15-6, 7
Right Fog Lamp	8Wa-15-5
Right Front Park/Turn Signal Lamp	8Wa-15-5
Right Front Position Lamp	8Wa-15-5
Right Front Turn Signal Lamp	8Wa-15-5
Right Headlamp	8Wa-15-5
Right Headlamp Leveling Motor	8Wa-15-5
Right License Lamp	8Wa-15-9
Right Rear Lamp Assembly	8Wa-15-9
Right Side Repeater Lamp	8Wa-15-5
Seat Belt Switch	8Wa-15-9
Sentry Key Immobilizer Module	8Wa-15-9, 10
Speed Control Servo	8Wa-15-2
Transfer Case Switch	8Wa-15-11, 12, 13
Transmission Range Indicator Illumination	8Wa-15-8
Underhood Lamp	8Wa-15-2
Windshield Wiper Switch	8Wa-15-8


CONTROLLER ANTILOCK BRAKE
(8Wa-35-2)
8
24
Z22
12
BK/PK
Z22
12
BK/PK
G101
SPEED CONTROL SERVO
(8Wa-30-20)
4
Z1
18
BK
ANTILOCK BRAKE RELAY (IN PDC)
(8Wa-35-2)
B9
Z1
18
BK
DAYTIME RUNNING LAMP MODULE
(8Wa-50-9)
8
Z1
18
BK
UNDERHOOD LAMP
(8Wa-44-4)
1
Z1
18
BK
OTHER
BASE
S106
Z1
12
BK
Z1
18
BK
Z1
18
BK
B20
FOG LAMP RELAY (IN PDC)
(8Wa-50-7)
(8Wa-50-8)
Z1
12
BK
G100

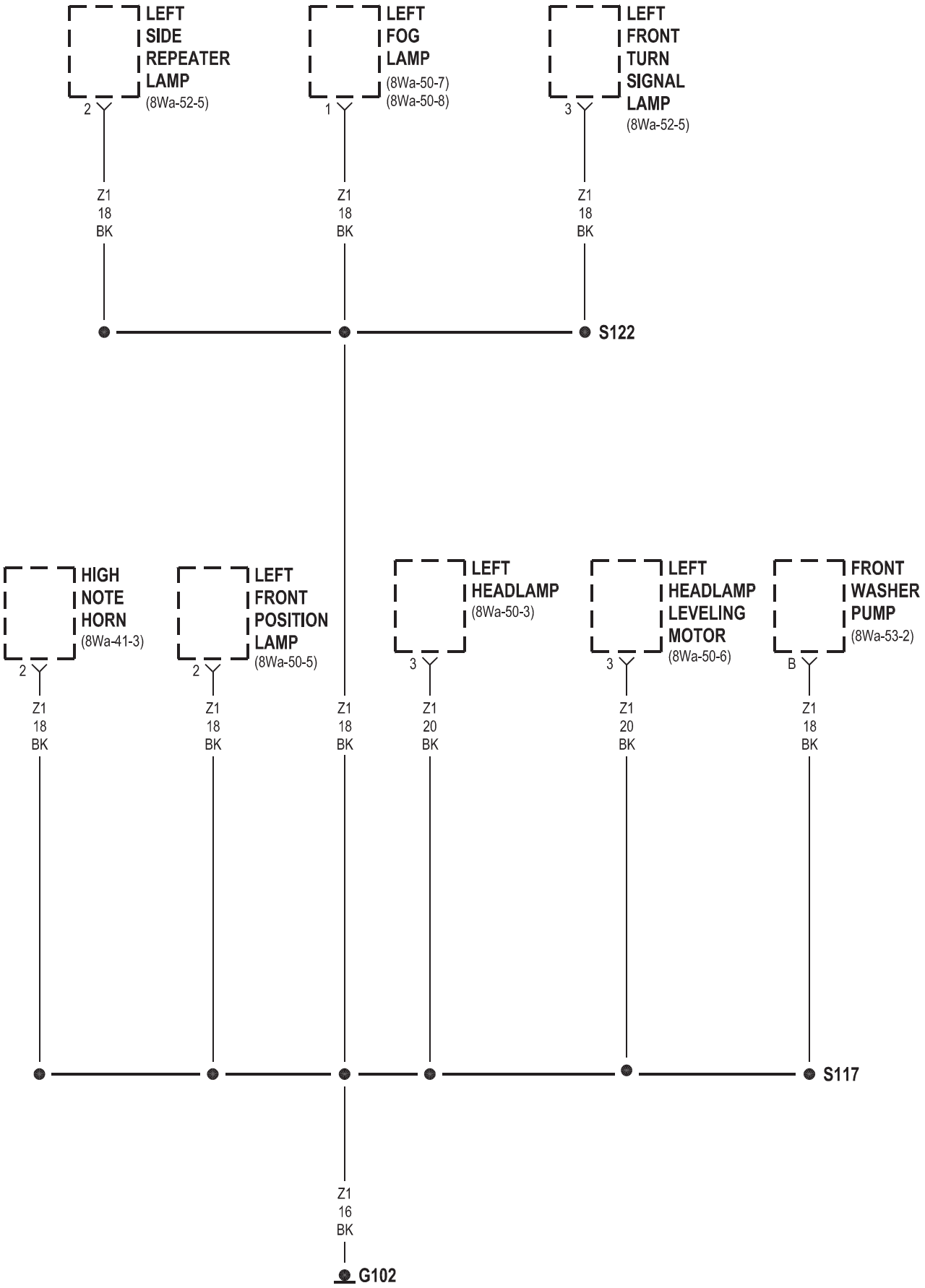
EXCEPT BUILT-UP-EXPORT

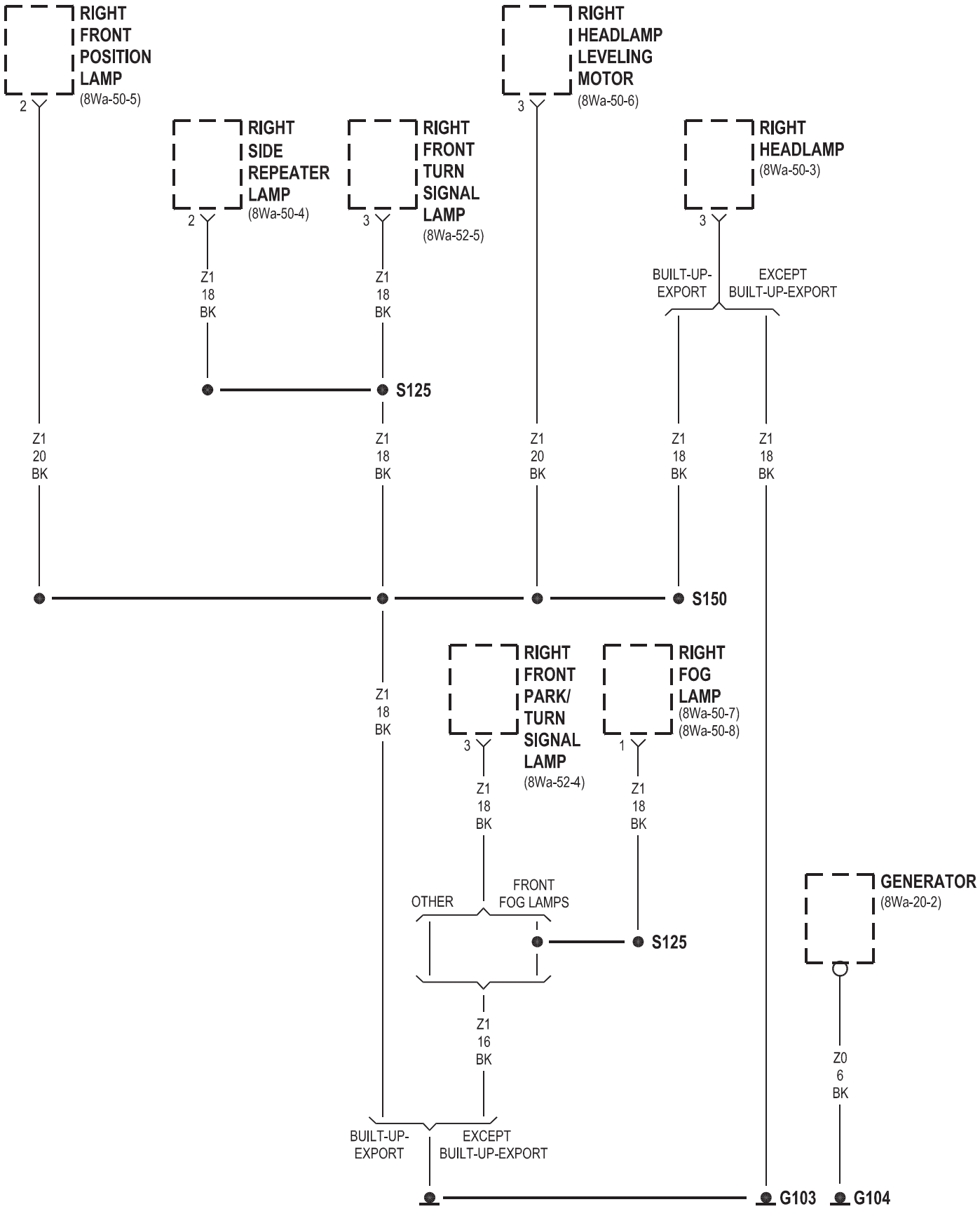


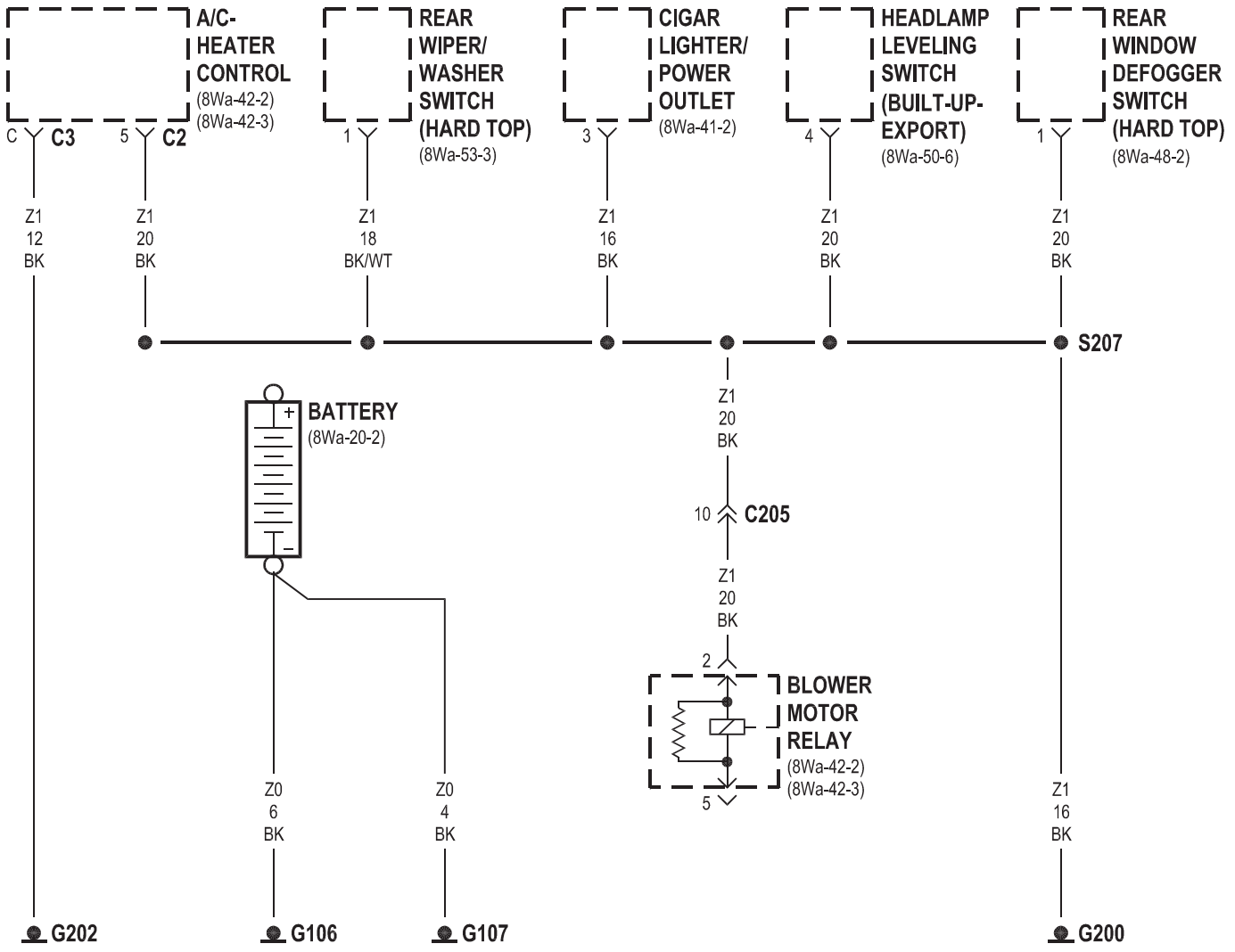
TJI01503

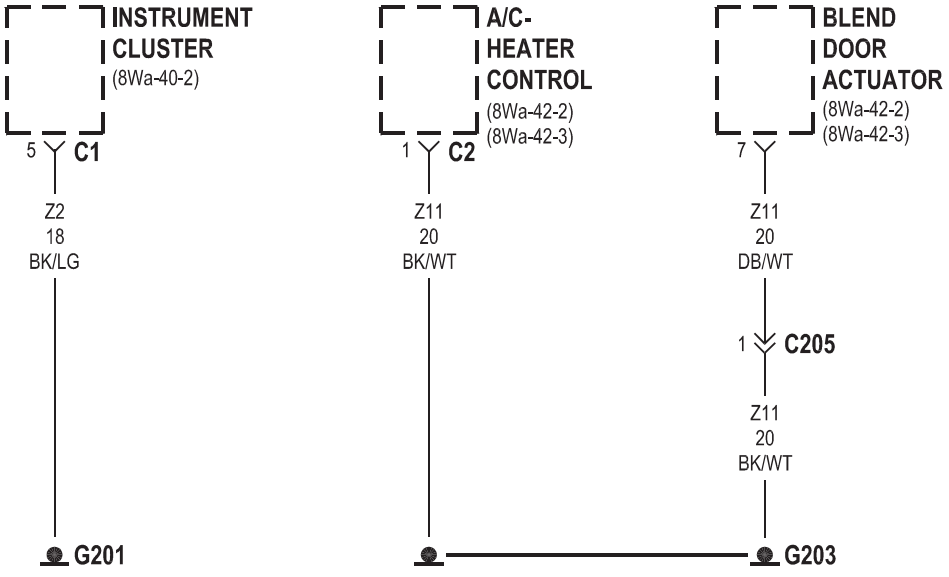
J018W-5

BUILT-UP-EXPORT

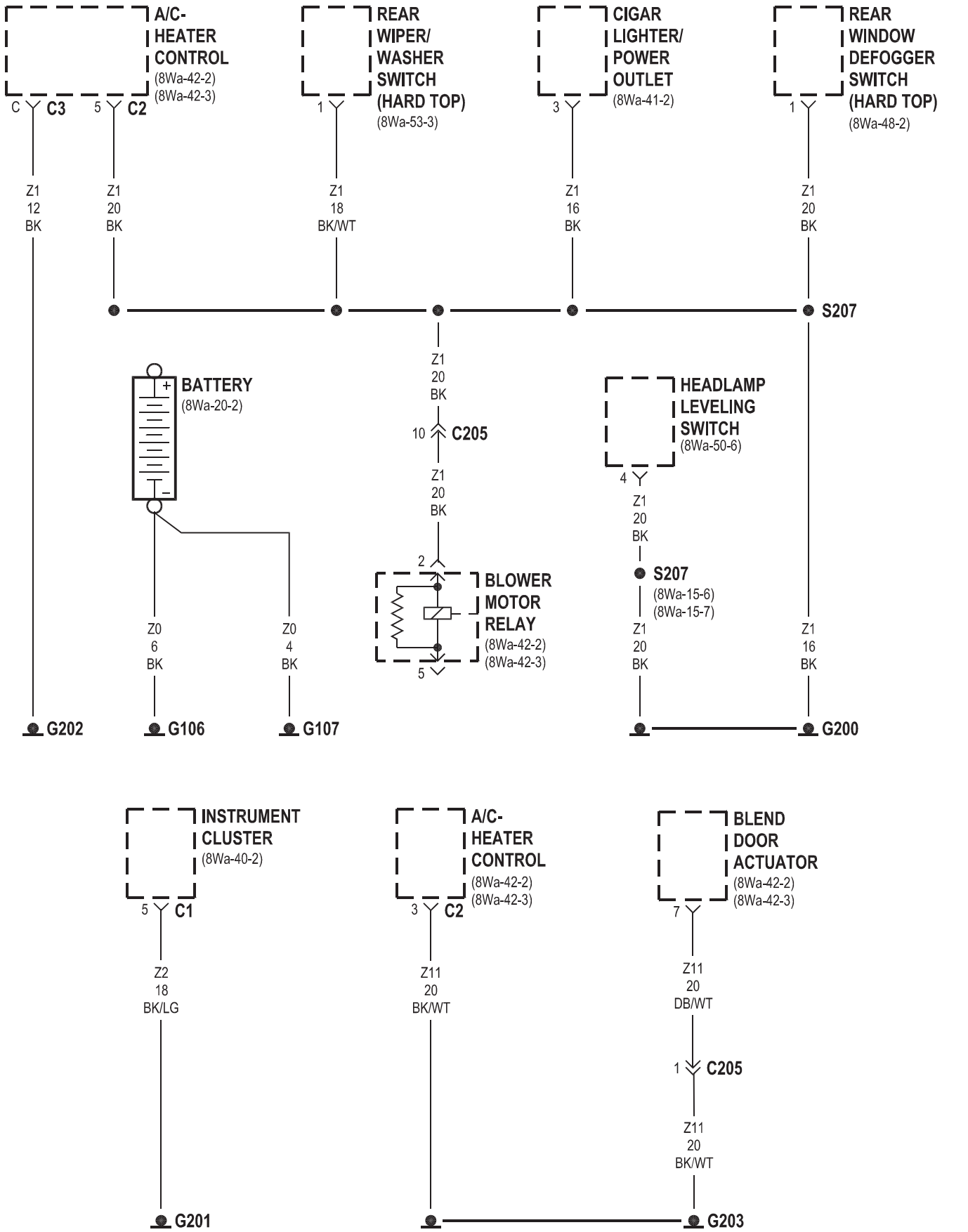


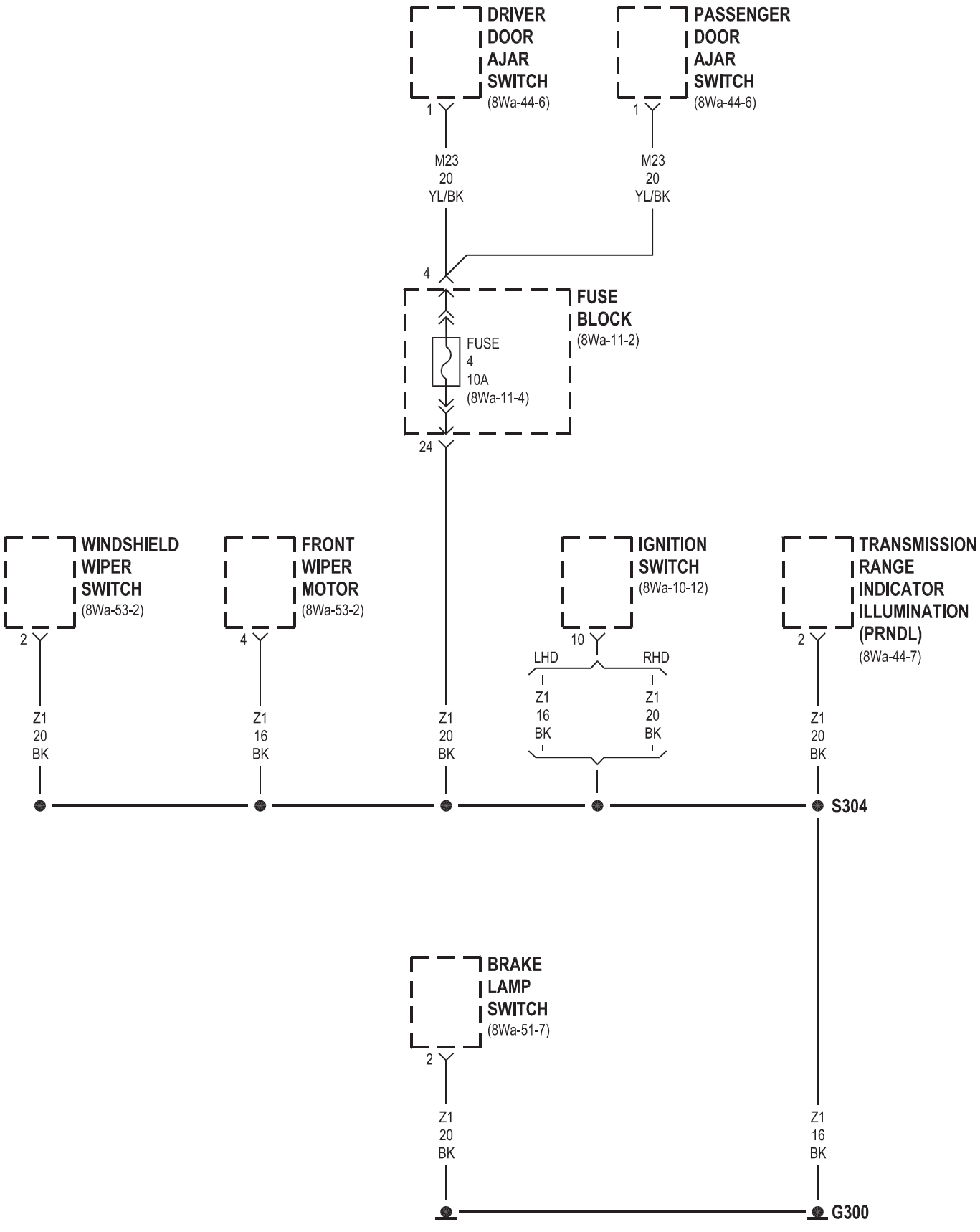

RIGHT FRONT POSITION LAMP
(8Wa-50-5)
2
RIGHT HEADLAMP LEVELING MOTOR
(8Wa-50-6)
3
RIGHT SIDE REPEATER LAMP
(8Wa-50-4)
2
RIGHT FRONT TURN SIGNAL LAMP
(8Wa-52-5)
3
RIGHT HEADLAMP
(8Wa-50-3)
3
Z1 18 BK
Z1 18 BK
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
S125
Z1 20 BK
Z1 18 BK
Z1 20 BK
Z1 18 BK
Z1 18 BK
S150
Z1 18 BK
RIGHT FRONT PARK/ TURN SIGNAL LAMP
(8Wa-52-4)
3
RIGHT FOG LAMP
(8Wa-50-7)
(8Wa-50-8)
1
Z1 18 BK
Z1 18 BK
OTHER
FRONT FOG LAMPS
S125
GENERATOR
(8Wa-20-2)
Z1 16 BK
Z0 6 BK
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
G103
G104

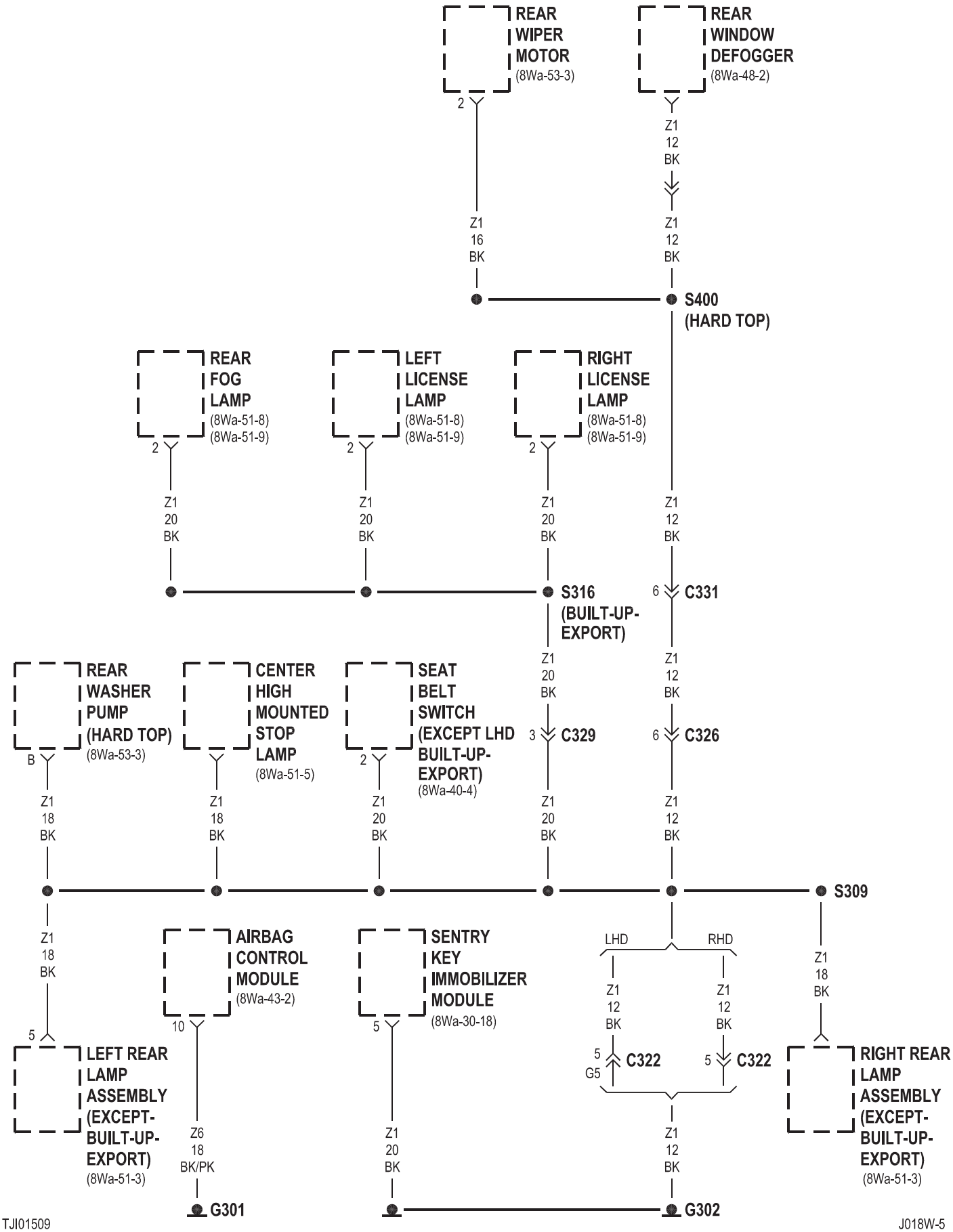

A/C-
HEATER
CONTROL
(8Wa-42-2)
(8Wa-42-3)
C
C3
5
C2
REAR
WIPER/
WASHER
SWITCH
(HARD TOP)
(8Wa-53-3)
1
CIGAR
LIGHTER/
POWER
OUTLET
(8Wa-41-2)
3
HEADLAMP
LEVELING
SWITCH
(BUILT-UP-
EXPORT)
(8Wa-50-6)
4
REAR
WINDOW
DEFOGGER
SWITCH
(HARD TOP)
(8Wa-48-2)
1
Z1
12
BK
Z1
20
BK
Z1
18
BK/WT
Z1
16
BK
Z1
20
BK
Z1
20
BK
S207
BATTERY
(8Wa-20-2)
+
–
Z1
20
BK
10
C205
Z1
20
BK
2
BLOWER
MOTOR
RELAY
(8Wa-42-2)
(8Wa-42-3)
5
Z0
6
BK
Z0
4
BK
Z1
16
BK
G202
G106
G107
G200


INSTRUMENT
CLUSTER
(8Wa-40-2)
5
C1
A/C-
HEATER
CONTROL
(8Wa-42-2)
(8Wa-42-3)
1
C2
BLEND
DOOR
ACTUATOR
(8Wa-42-2)
(8Wa-42-3)
7
Z2
18
BK/LG
Z11
20
BK/WT
Z11
20
DB/WT
1
C205
Z11
20
BK/WT
G201
G203

RHD

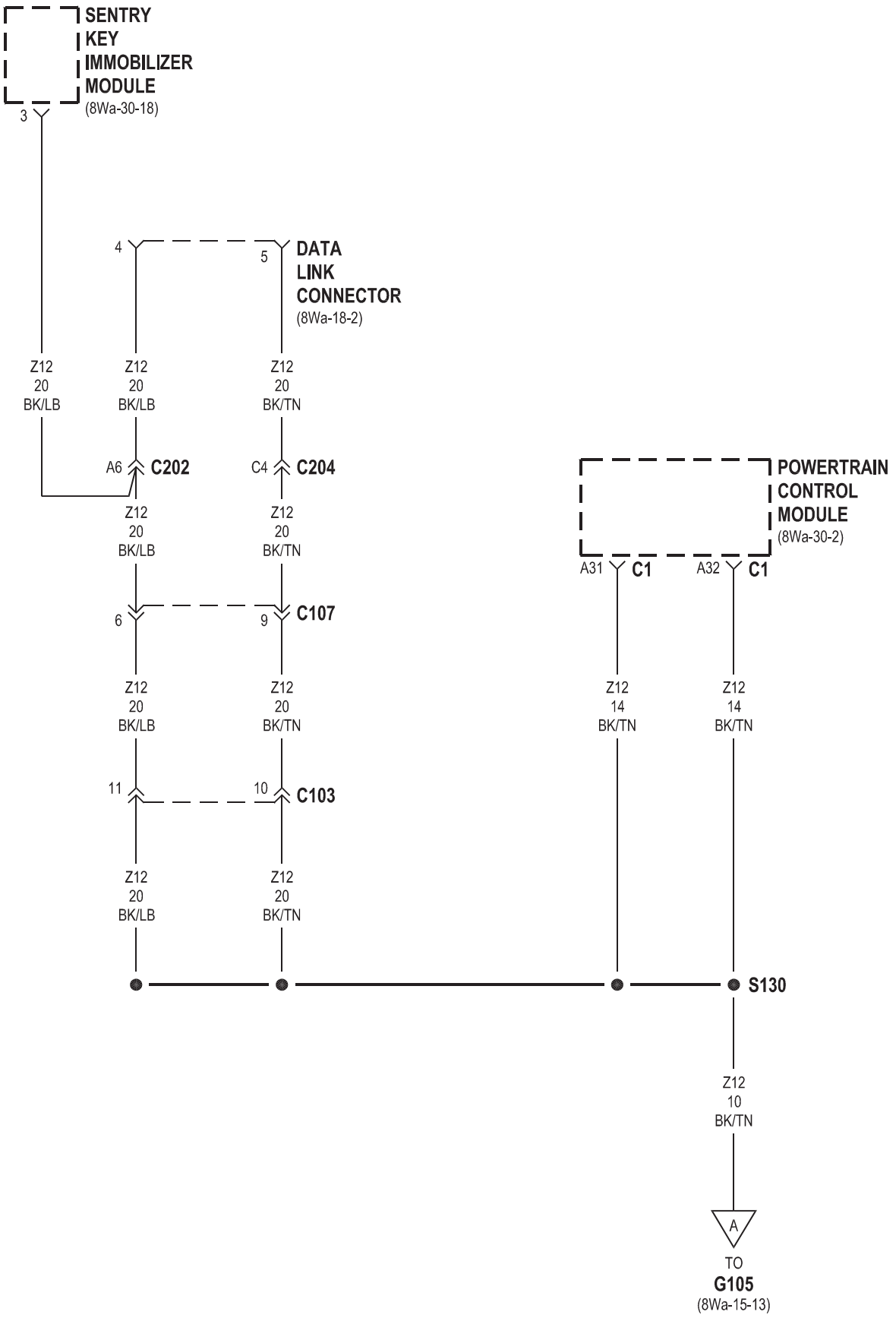

A/C-
HEATER
CONTROL
(8Wa-42-2)
(8Wa-42-3)
C
C3
5
C2
REAR
WIPER/
WASHER
SWITCH
(HARD TOP)
(8Wa-53-3)
1
CIGAR
LIGHTER/
POWER
OUTLET
(8Wa-41-2)
3
REAR
WINDOW
DEFOGGER
SWITCH
(HARD TOP)
(8Wa-48-2)
1
Z1
12
BK
Z1
20
BK
Z1
18
BK/WT
Z1
16
BK
Z1
20
BK
S207
BATTERY
(8Wa-20-2)
Z1
20
BK
10
C205
Z1
20
BK
2
BLOWER
MOTOR
RELAY
(8Wa-42-2)
(8Wa-42-3)
5
HEADLAMP
LEVELING
SWITCH
(8Wa-50-6)
4
Z1
20
BK
S207
(8Wa-15-6)
(8Wa-15-7)
Z0
6
BK
Z0
4
BK
Z1
20
BK
Z1
16
BK
G202
G106
G107
G200
INSTRUMENT
CLUSTER
(8Wa-40-2)
5
C1
A/C-
HEATER
CONTROL
(8Wa-42-2)
(8Wa-42-3)
3
C2
BLEND
DOOR
ACTUATOR
(8Wa-42-2)
(8Wa-42-3)
7
Z2
18
BK/LG
Z11
20
BK/WT
Z11
20
DB/WT
1
C205
Z11
20
BK/WT
G201
G203


DRIVER DOOR AJAR SWITCH
(8Wa-44-6)
1
M23
20
YL/BK
PASSENGER DOOR AJAR SWITCH
(8Wa-44-6)
1
M23
20
YL/BK
4
FUSE BLOCK
(8Wa-11-2)
FUSE
4
10A
(8Wa-11-4)
24
WINDSHIELD WIPER SWITCH
(8Wa-53-2)
2
Z1
20
BK
FRONT WIPER MOTOR
(8Wa-53-2)
4
Z1
16
BK
Z1
20
BK
IGNITION SWITCH
(8Wa-10-12)
10
LHD
RHD
Z1
16
BK
Z1
20
BK
TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL)
(8Wa-44-7)
2
Z1
20
BK
S304
BRAKE LAMP SWITCH
(8Wa-51-7)
2
Z1
20
BK
Z1
16
BK
G300

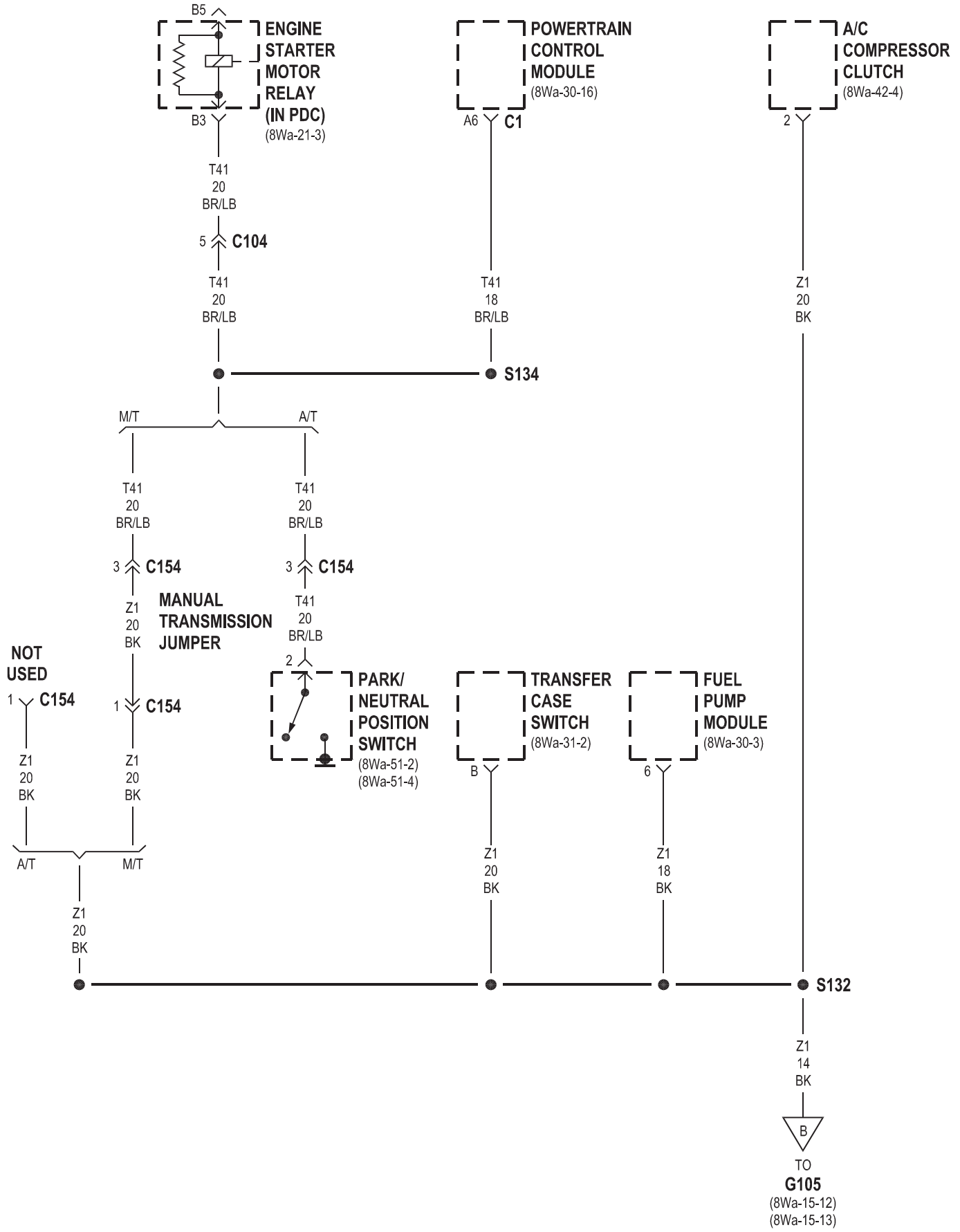


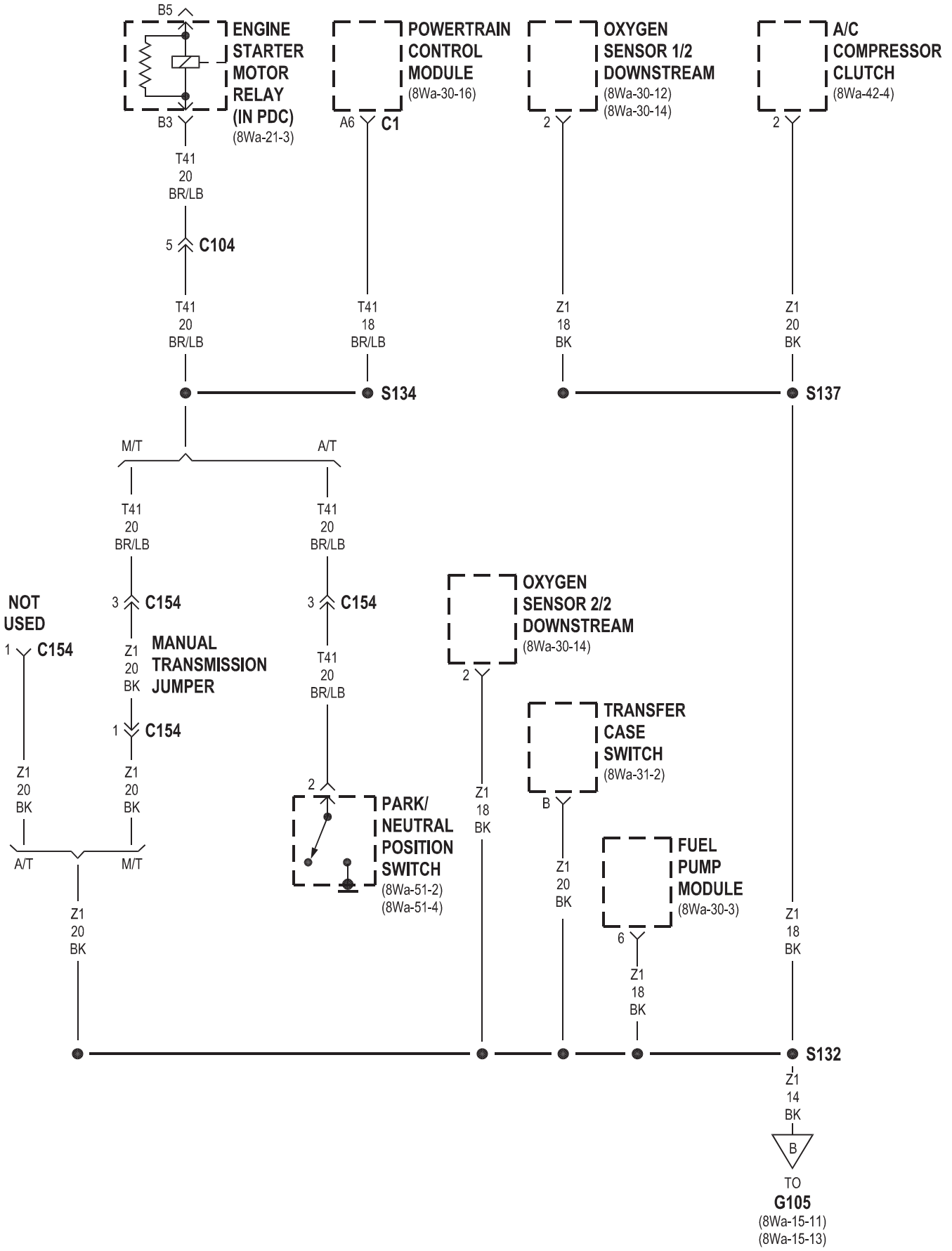
TJI01509

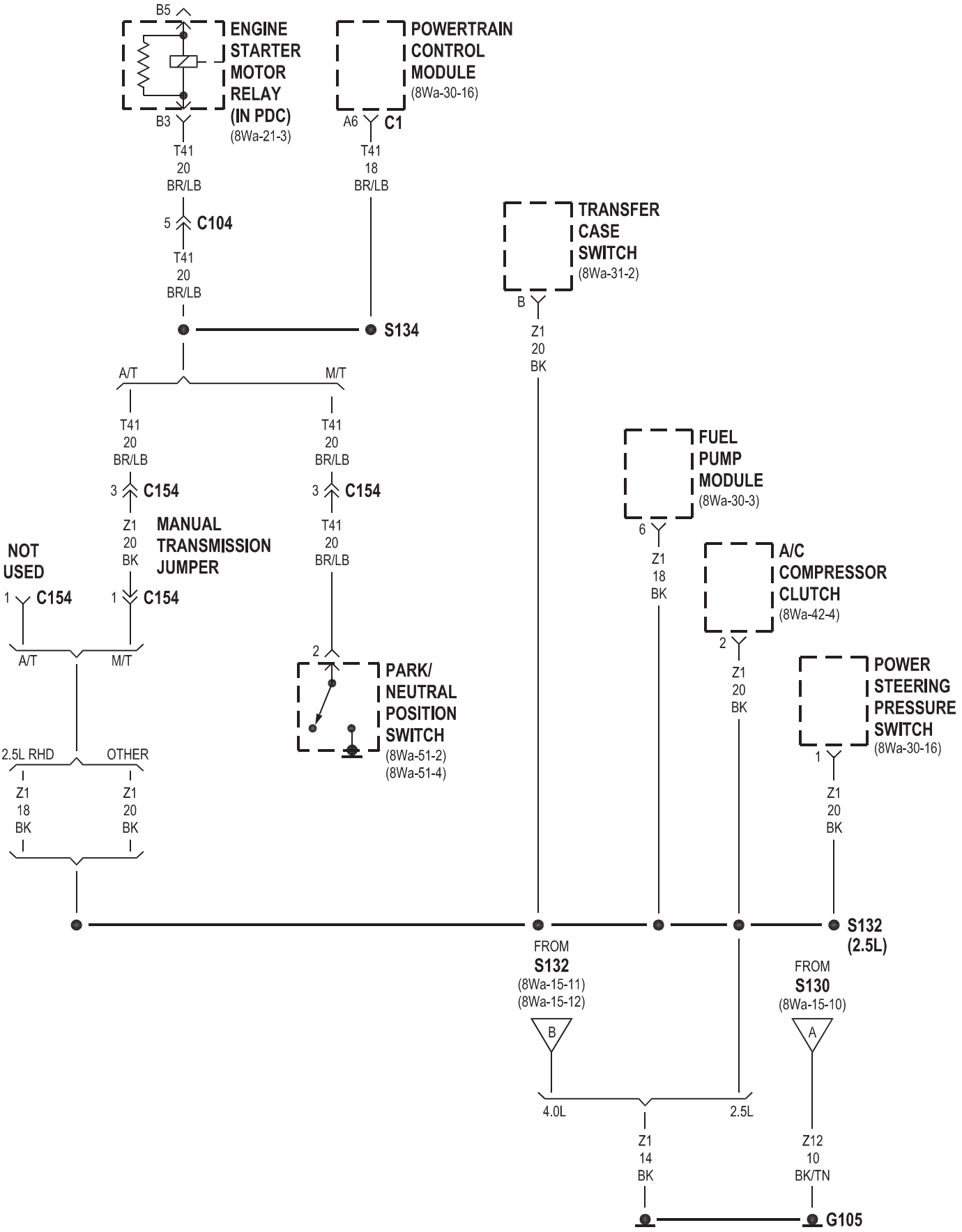
J018W-5


SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
3
4
5
DATA LINK CONNECTOR
(8Wa-18-2)
Z12 20 BK/LB
Z12 20 BK/LB
Z12 20 BK/TN
A6
C202
C4
C204
Z12 20 BK/LB
Z12 20 BK/TN
POWERTRAIN CONTROL MODULE
(8Wa-30-2)
A31
C1
A32
C1
6
9
C107
Z12 20 BK/LB
Z12 20 BK/TN
Z12 14 BK/TN
Z12 14 BK/TN
11
10
C103
Z12 20 BK/LB
Z12 20 BK/TN
S130
Z12 10 BK/TN
A
TO
G105
(8Wa-15-13)

4.0L EXCEPT CALIFORNIA/EUROPEAN III

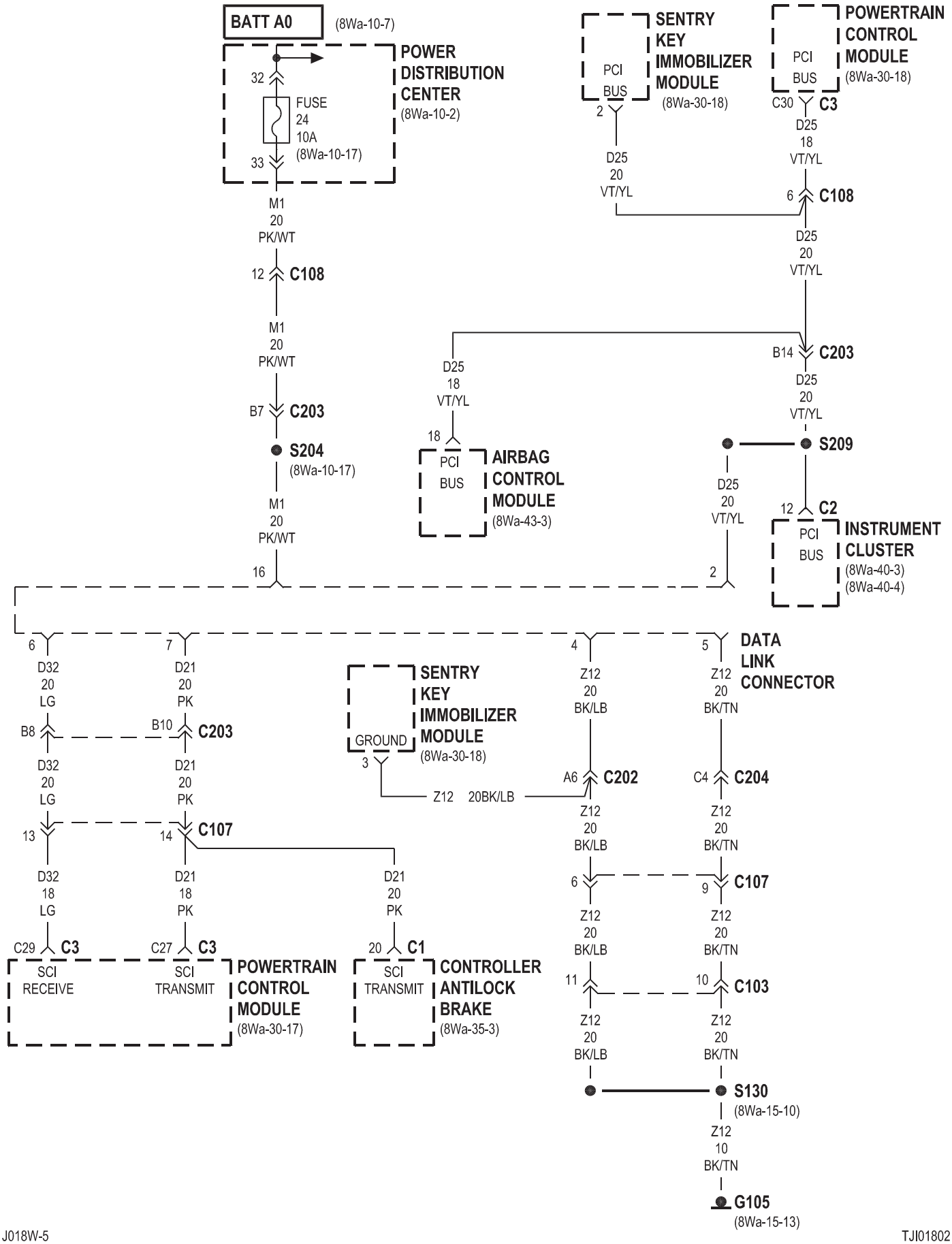



B5
ENGINE STARTER MOTOR RELAY (IN PDC) (8Wa-21-3)
B3
T41 20 BR/LB
5 C104
T41 20 BR/LB
POWERTRAIN CONTROL MODULE (8Wa-30-16)
A6 C1
T41 18 BR/LB
OXYGEN SENSOR 1/2 DOWNSTREAM (8Wa-30-12) (8Wa-30-14)
2
Z1 18 BK
A/C COMPRESSOR CLUTCH (8Wa-42-4)
2
Z1 20 BK
S134
S137
M/T
A/T
T41 20 BR/LB
T41 20 BR/LB
NOT USED
1 C154
3 C154
Z1 20 BK
MANUAL TRANSMISSION JUMPER
1 C154
3 C154
T41 20 BR/LB
OXYGEN SENSOR 2/2 DOWNSTREAM (8Wa-30-14)
2
TRANSFER CASE SWITCH (8Wa-31-2)
B
Z1 20 BK
Z1 20 BK
A/T
M/T
2
PARK/ NEUTRAL POSITION SWITCH (8Wa-51-2) (8Wa-51-4)
Z1 18 BK
FUEL PUMP MODULE (8Wa-30-3)
6
Z1 18 BK
Z1 20 BK
Z1 18 BK
S132
Z1 14 BK
B
TO
G105
(8Wa-15-11)
(8Wa-15-13)


B5
ENGINE STARTER MOTOR RELAY (IN PDC)
(8Wa-21-3)
B3
T41
20
BR/LB
5
C104
T41
20
BR/LB
POWERTRAIN CONTROL MODULE
(8Wa-30-16)
A6
C1
T41
18
BR/LB
S134
TRANSFER CASE SWITCH
(8Wa-31-2)
B
Z1
20
BK
A/T
M/T
T41
20
BR/LB
3
C154
Z1
20
BK
MANUAL TRANSMISSION JUMPER
NOT USED
1
C154
1
C154
A/T
M/T
T41
20
BR/LB
3
C154
T41
20
BR/LB
2
PARK/ NEUTRAL POSITION SWITCH
(8Wa-51-2)
(8Wa-51-4)
FUEL PUMP MODULE
(8Wa-30-3)
6
Z1
18
BK
A/C COMPRESSOR CLUTCH
(8Wa-42-4)
2
Z1
20
BK
POWER STEERING PRESSURE SWITCH
(8Wa-30-16)
1
Z1
20
BK
2.5L RHD
OTHER
Z1
18
BK
Z1
20
BK
S132
(2.5L)
FROM
S132
(8Wa-15-11)
(8Wa-15-12)
B
4.0L
2.5L
Z1
14
BK
FROM
S130
(8Wa-15-10)
A
Z12
10
BK/TN
G105

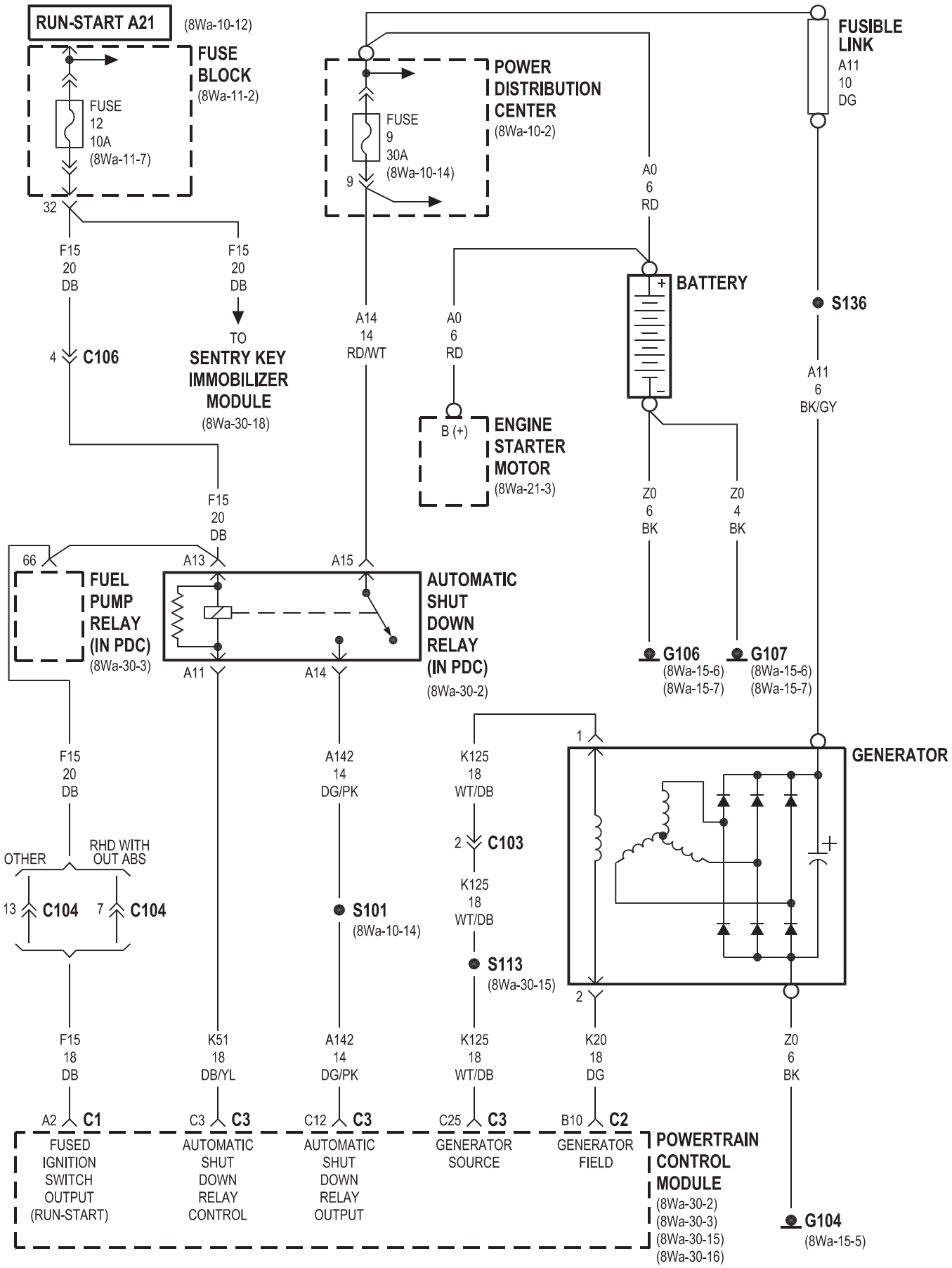
8W-18 BUS COMMUNICATION

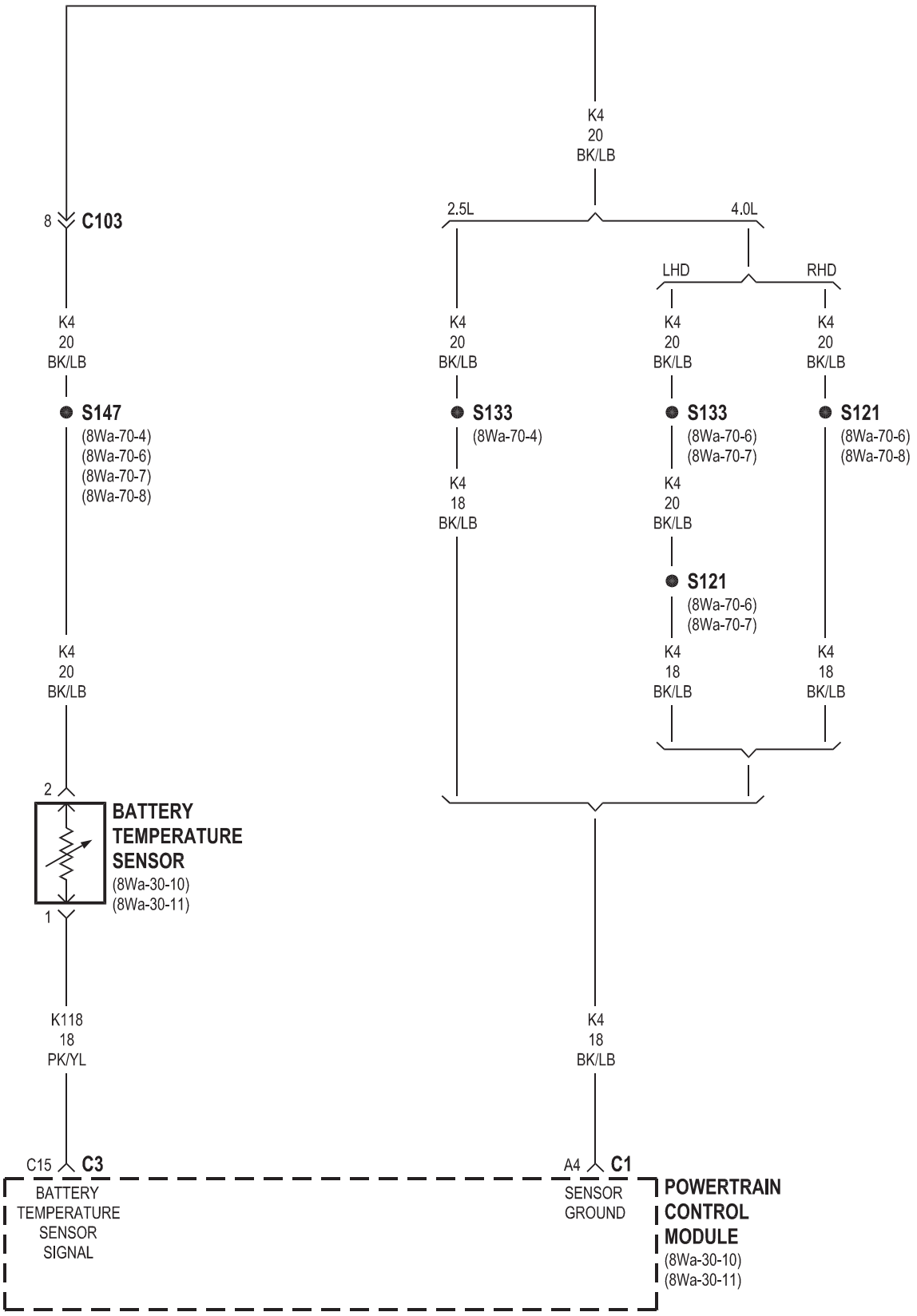
Component	Page
Airbag Control Module	8Wa-18-2
Controller Antilock Brake	8Wa-18-2
Data Link Connector	8Wa-18-2
Fuse 24 (PDC)	8Wa-18-2
G105	8Wa-18-2
Instrument Cluster	8Wa-18-2
Power Distribution Center	8Wa-18-2
Powertrain Control Module	8Wa-18-2
Sentry Key Immobilizer Module	8Wa-18-2


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
32
FUSE 24 10A
(8Wa-10-17)
33
M1 20 PK/WT
12 C108
M1 20 PK/WT
B7 C203
S204
(8Wa-10-17)
M1 20 PK/WT
16
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
PCI BUS
2
D25 20 VT/YL
POWERTRAIN CONTROL MODULE
(8Wa-30-18)
PCI BUS
C30 C3
D25 18 VT/YL
6 C108
D25 20 VT/YL
B14 C203
D25 20 VT/YL
S209
D25 18 VT/YL
18
PCI BUS
AIRBAG CONTROL MODULE
(8Wa-43-3)
D25 20 VT/YL
2
12 C2
PCI BUS
INSTRUMENT CLUSTER
(8Wa-40-3)
(8Wa-40-4)
6 D32 20 LG
B8 C203
D32 20 LG
13
D32 18 LG
C29 C3
SCI RECEIVE
7 D21 20 PK
B10 C203
D21 20 PK
14 C107
D21 18 PK
C27 C3
SCI TRANSMIT
D21 20 PK
20 C1
SCI TRANSMIT
POWERTRAIN CONTROL MODULE
(8Wa-30-17)
CONTROLLER ANTILOCK BRAKE
(8Wa-35-3)
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
GROUND
3
Z12 20BK/LB
4 Z12 20 BK/LB
A6 C202
Z12 20 BK/LB
6
Z12 20 BK/LB
11
Z12 20 BK/LB
5 Z12 20 BK/TN
DATA LINK CONNECTOR
C4 C204
Z12 20 BK/TN
9 C107
Z12 20 BK/TN
10 C103
Z12 20 BK/TN
S130
(8Wa-15-10)
Z12 10 BK/TN
G105
(8Wa-15-13)

8W-20 CHARGING SYSTEM

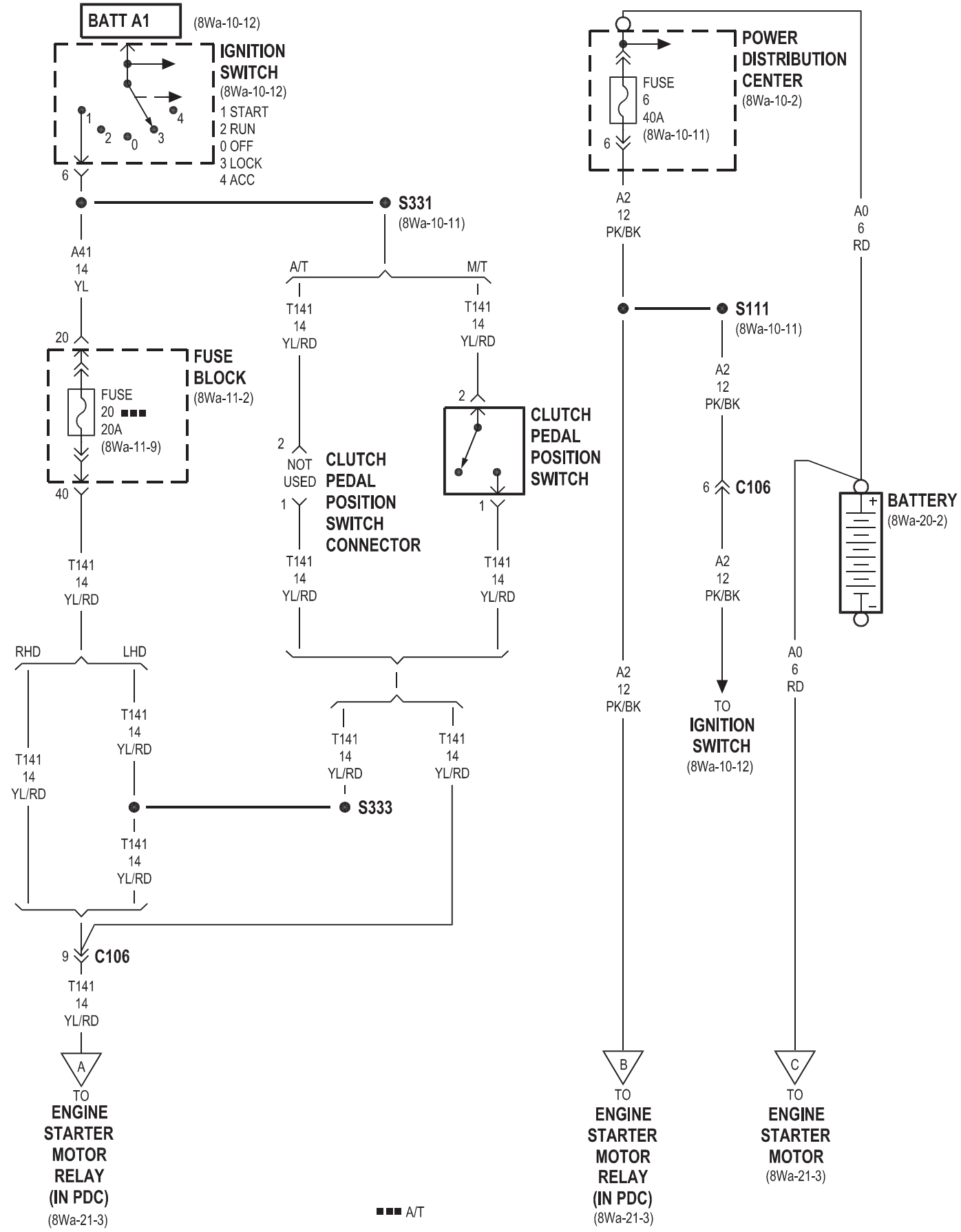
Component	Page	Component	Page
Automatic Shut Down Relay	8Wa-20-2	Fusible Link	8Wa-20-2
Battery	8Wa-20-2	G104	8Wa-20-2
Battery Temperature Sensor	8Wa-20-3	G106	8Wa-20-2
Engine Starter Motor	8Wa-20-2	G107	8Wa-20-2
Fuel Pump Relay	8Wa-20-2	Generator	8Wa-20-2
Fuse 12 (FB)	8Wa-20-2	Power Distribution Center	8Wa-20-2
Fuse 9 (PDC)	8Wa-20-2	Powertrain Control Module	8Wa-20-2, 3
Fuse Block	8Wa-20-2	Sentry Key Immobilizer Module	8Wa-20-2

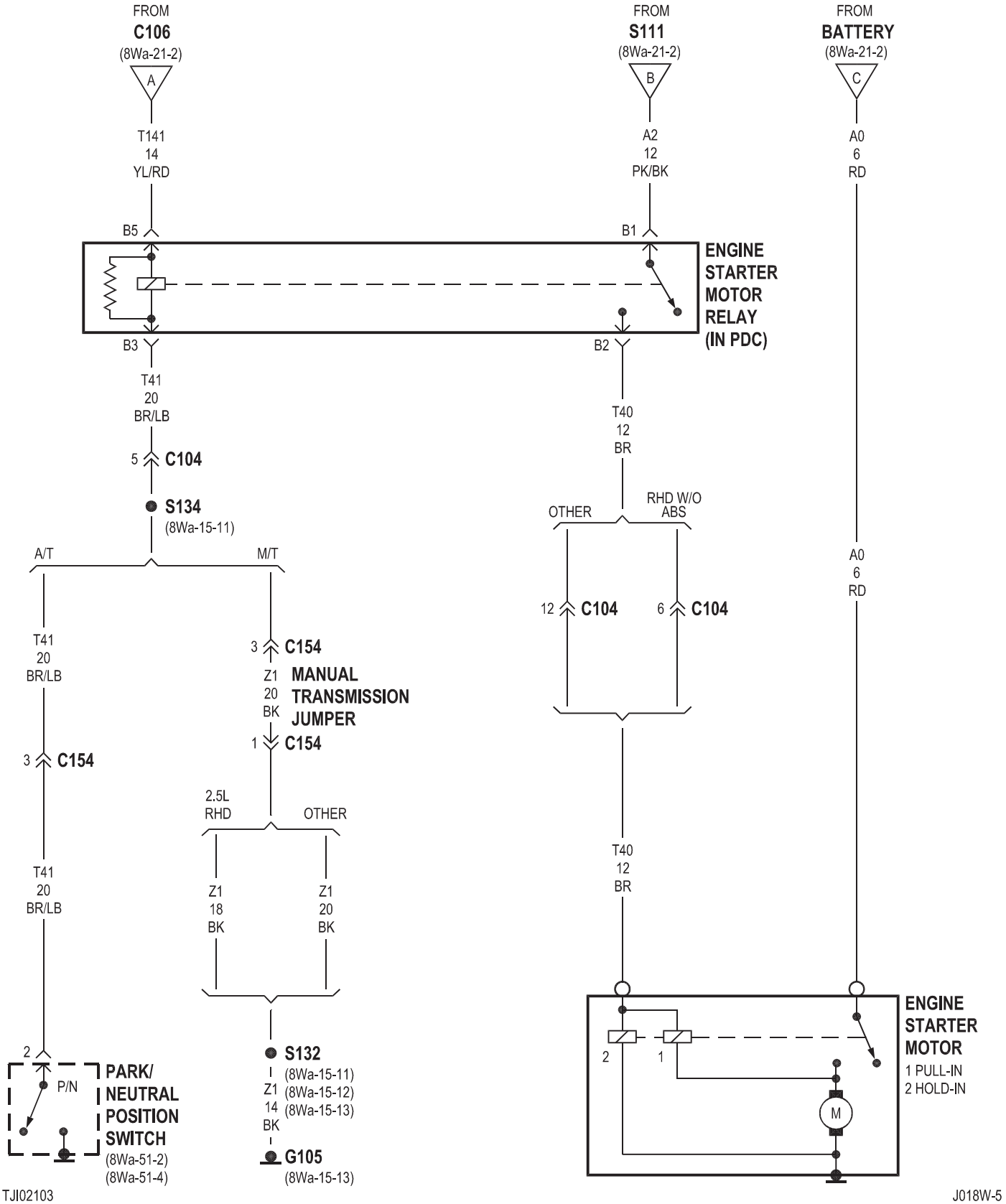

RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 12 10A
(8Wa-11-7)
32
F15 20 DB
F15 20 DB
4 C106
TO SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 9 30A
(8Wa-10-14)
9
A14 14 RD/WT
A0 6 RD
A0 6 RD
B (+)
ENGINE STARTER MOTOR
(8Wa-21-3)
BATTERY
+
–
FUSIBLE LINK A11 10 DG
S136
A11 6 BK/GY
Z0 6 BK
Z0 4 BK
G106
(8Wa-15-6)
(8Wa-15-7)
G107
(8Wa-15-6)
(8Wa-15-7)
F15 20 DB
66
A13
A15
FUEL PUMP RELAY (IN PDC)
(8Wa-30-3)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8Wa-30-2)
A11
A14
F15 20 DB
A142 14 DG/PK
K125 18 WT/DB
1
GENERATOR
OTHER
RHD WITH OUT ABS
13 C104
7 C104
S101
(8Wa-10-14)
2 C103
K125 18 WT/DB
S113
(8Wa-30-15)
2
F15 18 DB
K51 18 DB/YL
A142 14 DG/PK
K125 18 WT/DB
K20 18 DG
Z0 6 BK
A2 C1
C3 C3
C12 C3
C25 C3
B10 C2
FUSED IGNITION SWITCH OUTPUT (RUN-START)
AUTOMATIC SHUT DOWN RELAY CONTROL
AUTOMATIC SHUT DOWN RELAY OUTPUT
GENERATOR SOURCE
GENERATOR FIELD
POWERTRAIN CONTROL MODULE
(8Wa-30-2)
(8Wa-30-3)
(8Wa-30-15)
(8Wa-30-16)
G104
(8Wa-15-5)


K4
20
BK/LB
8
C103
2.5L
4.0L
LHD
RHD
K4
20
BK/LB
S147
(8Wa-70-4)
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
S133
(8Wa-70-4)
S133
(8Wa-70-6)
(8Wa-70-7)
S121
(8Wa-70-6)
(8Wa-70-8)
K4
18
BK/LB
S121
(8Wa-70-6)
(8Wa-70-7)
2
BATTERY
TEMPERATURE
SENSOR
(8Wa-30-10)
(8Wa-30-11)
1
K118
18
PK/YL
C15
C3
BATTERY
TEMPERATURE
SENSOR
SIGNAL
A4
C1
SENSOR
GROUND
POWERTRAIN
CONTROL
MODULE
(8Wa-30-10)
(8Wa-30-11)

8W-21 STARTING SYSTEM

Component	Page
Battery	8Wa-21-2, 3
Clutch Pedal Position Switch	8Wa-21-2
Clutch Pedal Position Switch Connector	8Wa-21-2
Engine Starter Motor	8Wa-21-2, 3
Engine Starter Motor Relay	8Wa-21-2, 3
Fuse 20 (FB)	8Wa-21-2
Fuse 6 (PDC)	8Wa-21-2
Fuse Block	8Wa-21-2
G105	8Wa-21-3
Ignition Switch	8Wa-21-2
Manual Transmission Jumper	8Wa-21-3
Park/Neutral Position Switch	8Wa-21-3
Power Distribution Center	8Wa-21-2


BATT A1
(8Wa-10-12)
IGNITION SWITCH
(8Wa-10-12)
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
S331
(8Wa-10-11)
A41
14
YL
FUSE BLOCK
(8Wa-11-2)
FUSE
20
20A
(8Wa-11-9)
T141
14
YL/RD
A/T
M/T
NOT USED
CLUTCH PEDAL POSITION SWITCH CONNECTOR
CLUTCH PEDAL POSITION SWITCH
RHD
LHD
S333
C106
TO ENGINE STARTER MOTOR RELAY (IN PDC)
(8Wa-21-3)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE
6
40A
(8Wa-10-11)
A2
12
PK/BK
S111
(8Wa-10-11)
TO IGNITION SWITCH
(8Wa-10-12)
A0
6
RD
BATTERY
(8Wa-20-2)
TO ENGINE STARTER MOTOR
(8Wa-21-3)
A/T

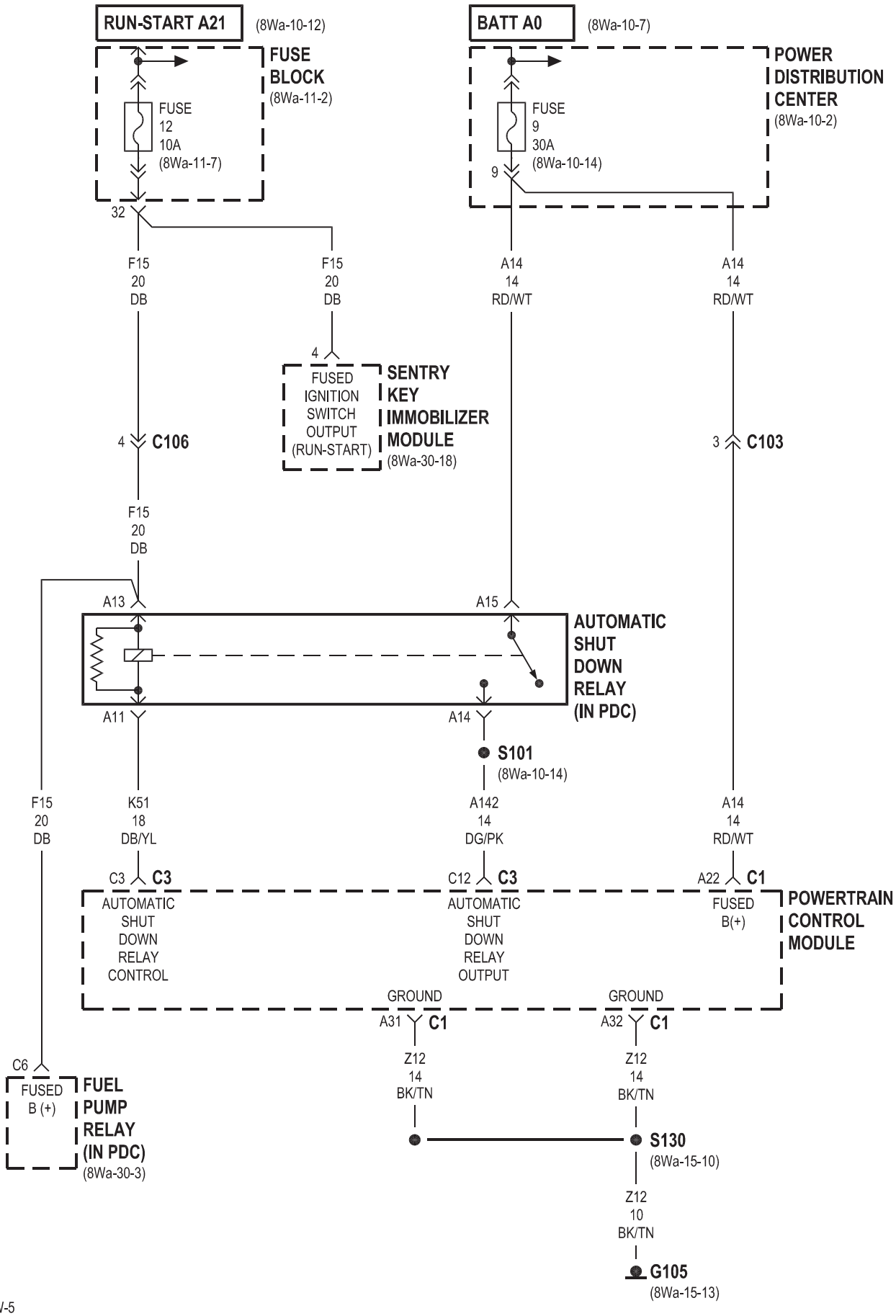


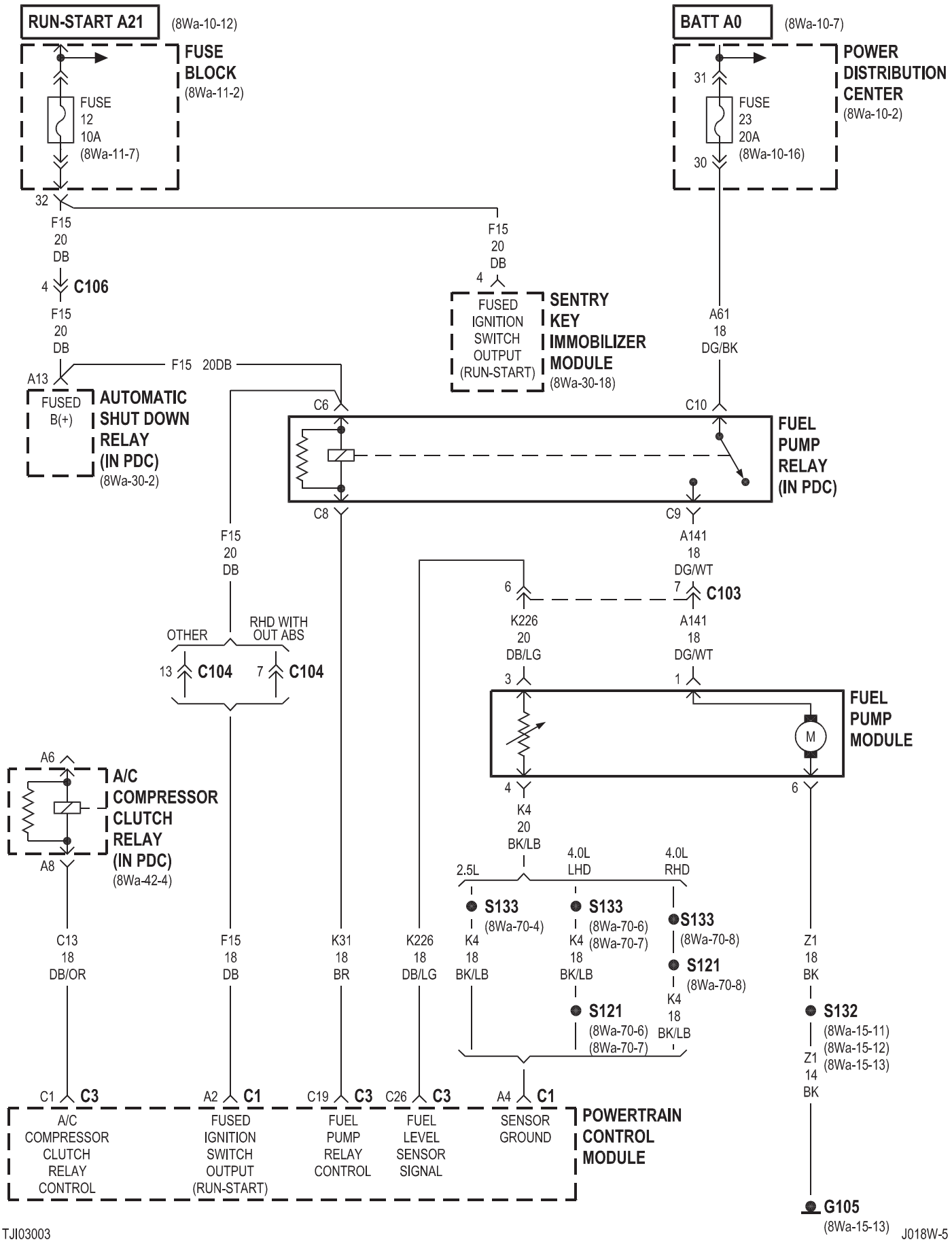
TJI02103

J018W-5

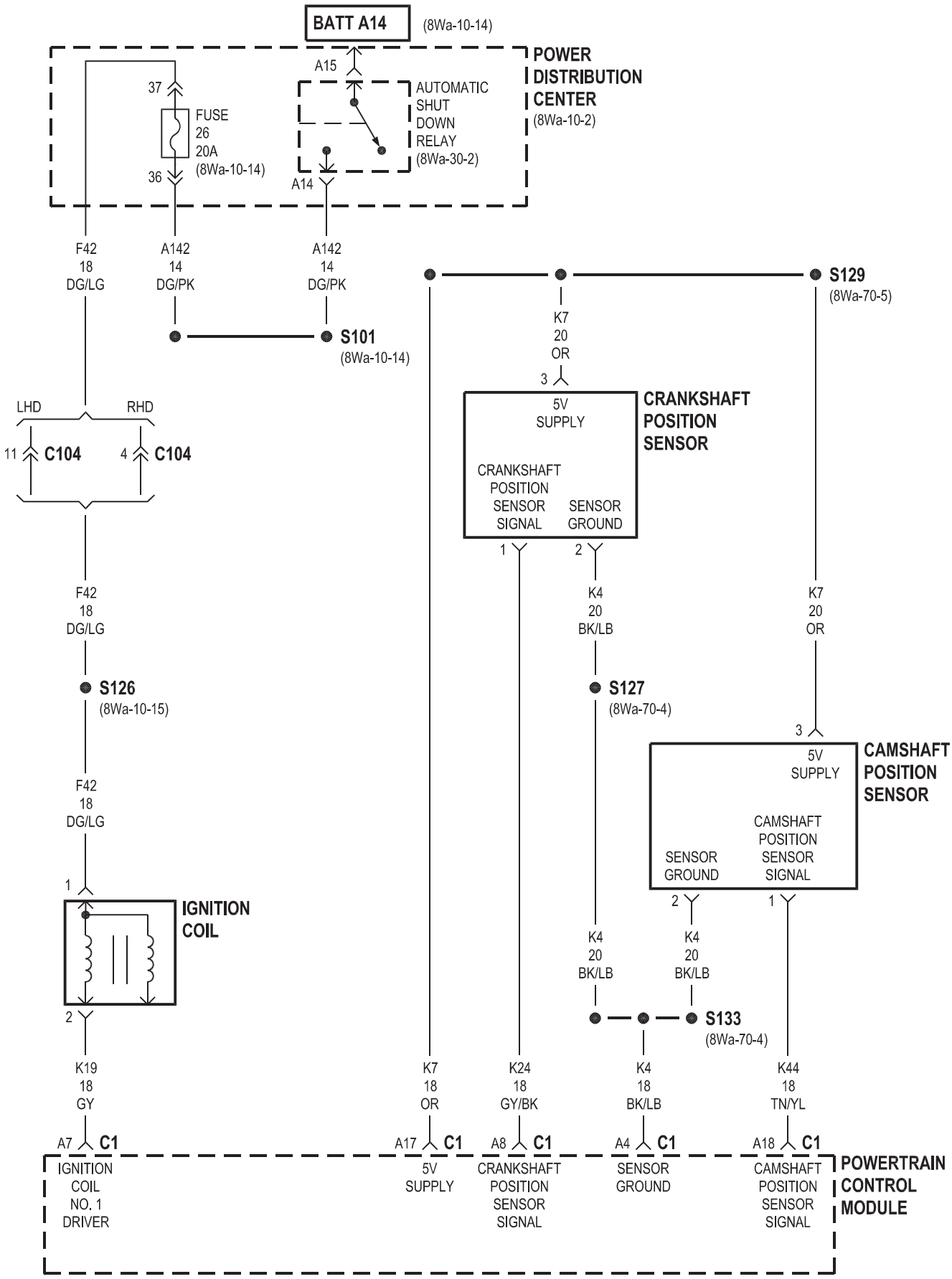
8W-30 FUEL/IGNITION SYSTEM

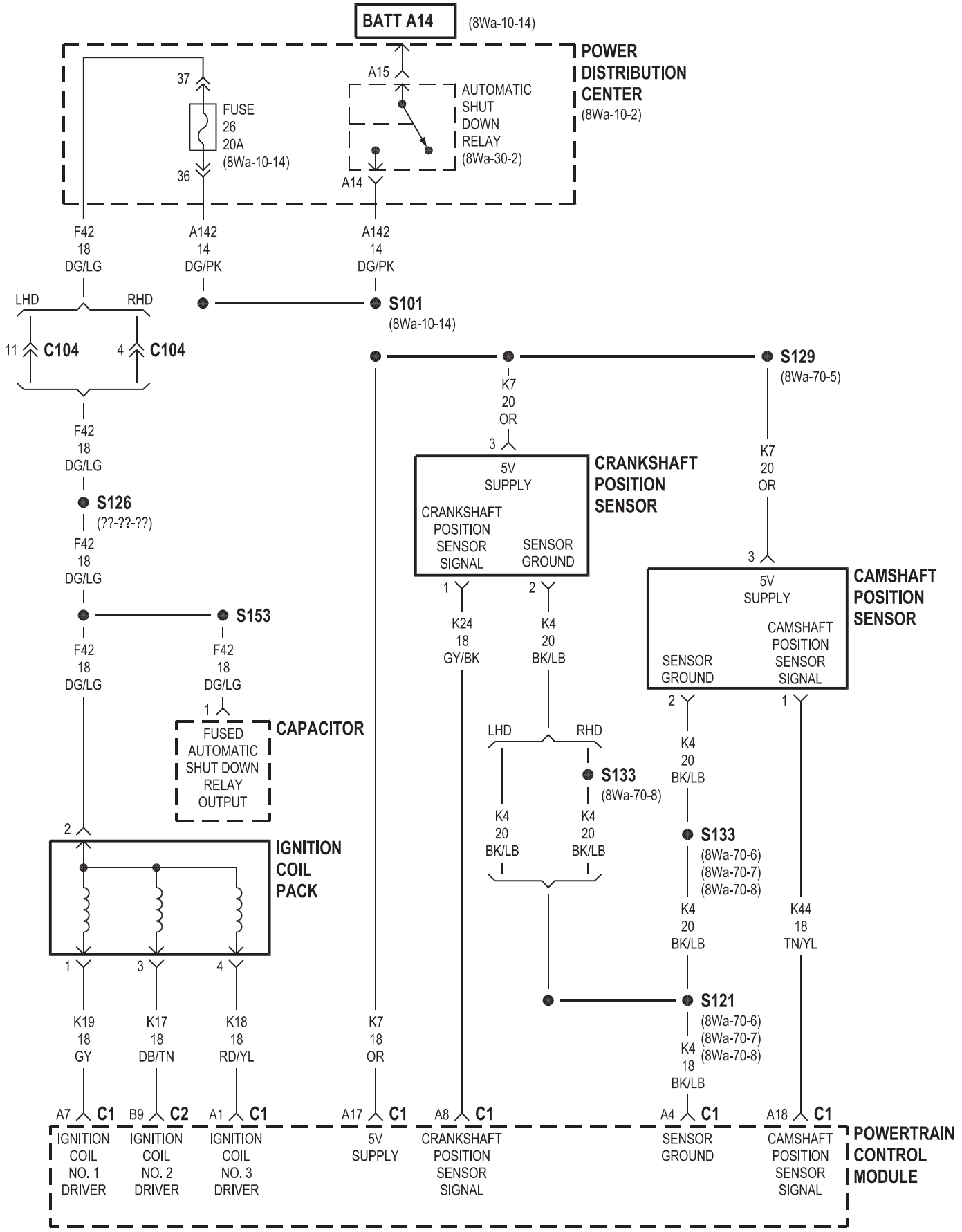
Component	Page
A/C Compressor Clutch Relay	8Wa-30-3
A/C High Pressure Switch	8Wa-30-16
A/C Low Pressure Switch	8Wa-30-16
A/C-Heater Control	8Wa-30-16
Airbag Control Module	8Wa-30-17, 18
Automatic Shut Down Relay	8Wa-30-2, 3, 4, 6, 5, 7, 12, 13, 14
Battery Temperature Sensor	8Wa-30-10, 11, 19
Brake Lamp Switch	8Wa-30-16, 20
Brake Transmission Shift Interlock Solenoid	8Wa-30-16, 20
Camshaft Position Sensor	8Wa-30-4, 5
Clockspring	8Wa-30-19
Controller Antilock Brake	8Wa-30-17
Crankshaft Position Sensor	8Wa-30-4, 5
Data Link Connector	8Wa-30-17, 18
Daytime Running Lamp Module	8Wa-30-10, 11
Dome Lamp	8Wa-30-17
Engine Coolant Temperature Sensor	8Wa-30-8, 9
Engine Oil Pressure Sensor	8Wa-30-8, 9, 10, 11
EVAP/Purge Solenoid	8Wa-30-15
Fuel Injector No. 1	8Wa-30-6, 7
Fuel Injector No. 2	8Wa-30-6, 7
Fuel Injector No. 3	8Wa-30-6, 7
Fuel Injector No. 4	8Wa-30-6, 7
Fuel Injector No. 5	8Wa-30-7
Fuel Injector No. 6	8Wa-30-7
Fuel Pump Module	8Wa-30-3
Fuel Pump Relay	8Wa-30-2, 3
Fuse 1 (FB)	8Wa-30-18
Fuse 11 (FB)	8Wa-30-15
Fuse 12 (FB)	8Wa-30-2, 3, 18
Fuse 9 (PDC)	8Wa-30-2
Fuse 16 (PDC)	8Wa-30-12, 13, 14
Fuse 23 (PDC)	8Wa-30-3
Fuse 24 (PDC)	8Wa-30-17
Fuse 26 (PDC)	8Wa-30-4, 5, 7
Fuse Block	8Wa-30-2, 3, 15, 18
G100	8Wa-30-20
G105	8Wa-30-2, 3, 14, 16, 17, 18
G300	8Wa-30-16, 20
G302	8Wa-30-18
Generator	8Wa-30-15, 16
Horn Relay	8Wa-30-19
Horn Switch	8Wa-30-19
Idle Air Control Motor	8Wa-30-15
Ignition Coil	8Wa-30-4
Ignition Coil Pack	8Wa-30-5
Instrument Cluster	8Wa-30-17, 18
Intake Air Temperature Sensor	8Wa-30-8, 9
Leak Detection Pump	8Wa-30-15
Left Speed Control Switch Pod	8Wa-30-19
Manifold Absolute Pressure Sensor	8Wa-30-8, 9
Manual Transmission Jumper	8Wa-30-16
Multi- Function Switch	8Wa-30-18
Oxygen Sensor 1/1 Upstream	8Wa-30-12, 13, 14
Oxygen Sensor 1/2 Downstream	8Wa-30-12, 14
Oxygen Sensor 2/1 Upstream	8Wa-30-13
Oxygen Sensor 2/2 Downstream	8Wa-30-14
Oxygen Sensor Downstream Heater Relay	8Wa-30-12, 13, 14
Park/Neutral Position Switch	8Wa-30-16
Power Distribution Center	8Wa-30-2, 3, 4, 5, 6, 7, 12, 13, 17, 19
Power Steering Pressure Switch	8Wa-30-16
Powertrain Control Module	8Wa-30-2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 , 14, 15, 16, 16, 17, 18, 19, 20
Right Speed Control Switch Pod	8Wa-30-19
Sentry Key Immobilizer Module	8Wa-30-2, 3, 17, 18
Speed Control Servo	8Wa-30-20
Throttle Position Sensor	8Wa-30-10, 11
Torque Converter Clutch Solenoid	8Wa-30-15
Underhood Lamp	8Wa-30-17
Vehicle Speed Sensor	8Wa-30-10, 11

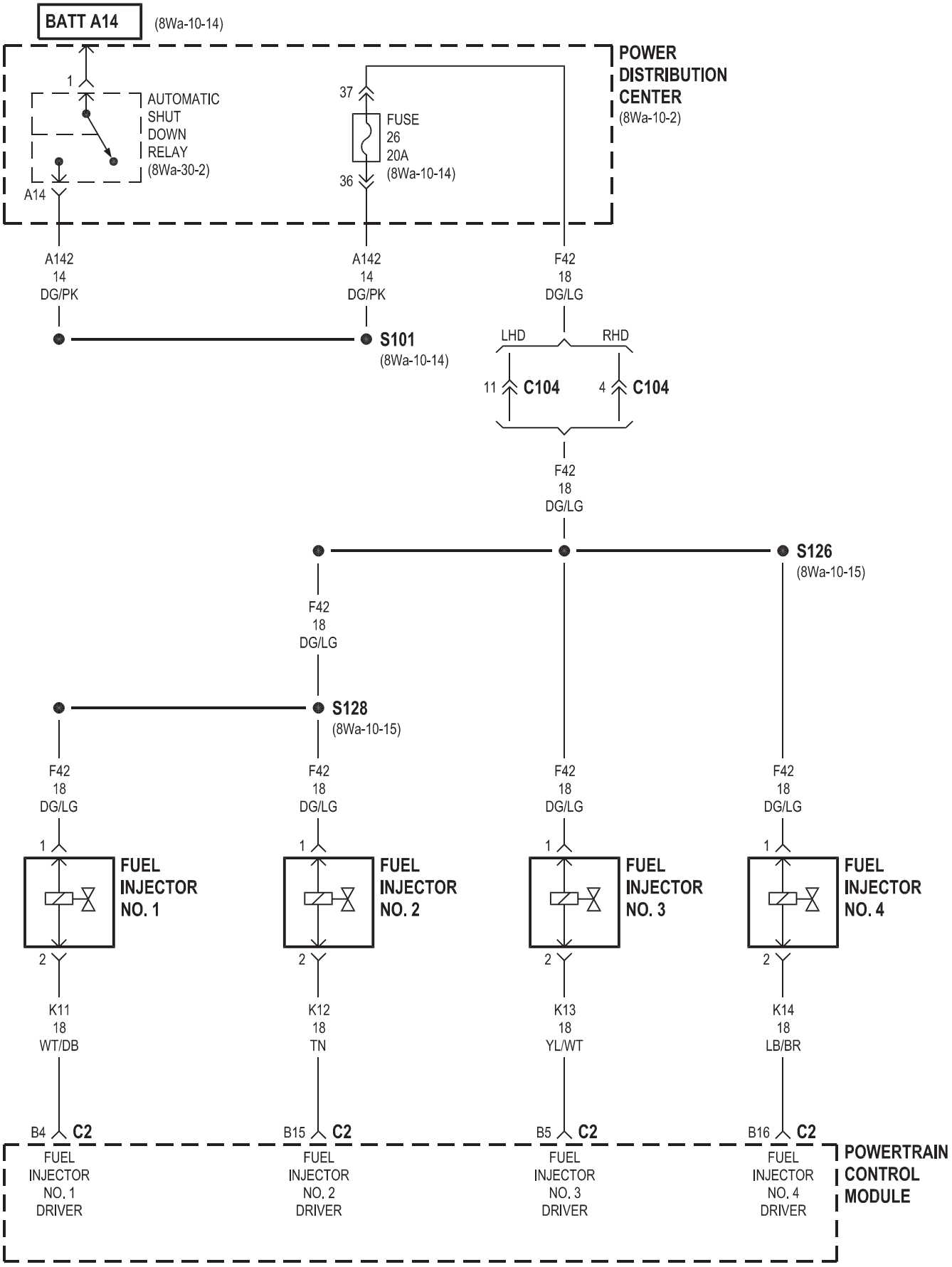

RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 12 10A
(8Wa-11-7)
32
BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 9 30A
(8Wa-10-14)
9
F15 20 DB
F15 20 DB
A14 14 RD/WT
A14 14 RD/WT
4
FUSED IGNITION SWITCH OUTPUT (RUN-START)
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
4 C106
3 C103
F15 20 DB
A13
A15
AUTOMATIC SHUT DOWN RELAY (IN PDC)
A11
A14
S101
(8Wa-10-14)
F15 20 DB
K51 18 DB/YL
A142 14 DG/PK
A14 14 RD/WT
C3 C3
C12 C3
A22 C1
AUTOMATIC SHUT DOWN RELAY CONTROL
AUTOMATIC SHUT DOWN RELAY OUTPUT
FUSED B(+)
POWERTRAIN CONTROL MODULE
GROUND
GROUND
A31 C1
A32 C1
Z12 14 BK/TN
Z12 14 BK/TN
C6
FUSED B (+)
FUEL PUMP RELAY (IN PDC)
(8Wa-30-3)
S130
(8Wa-15-10)
Z12 10 BK/TN
G105
(8Wa-15-13)

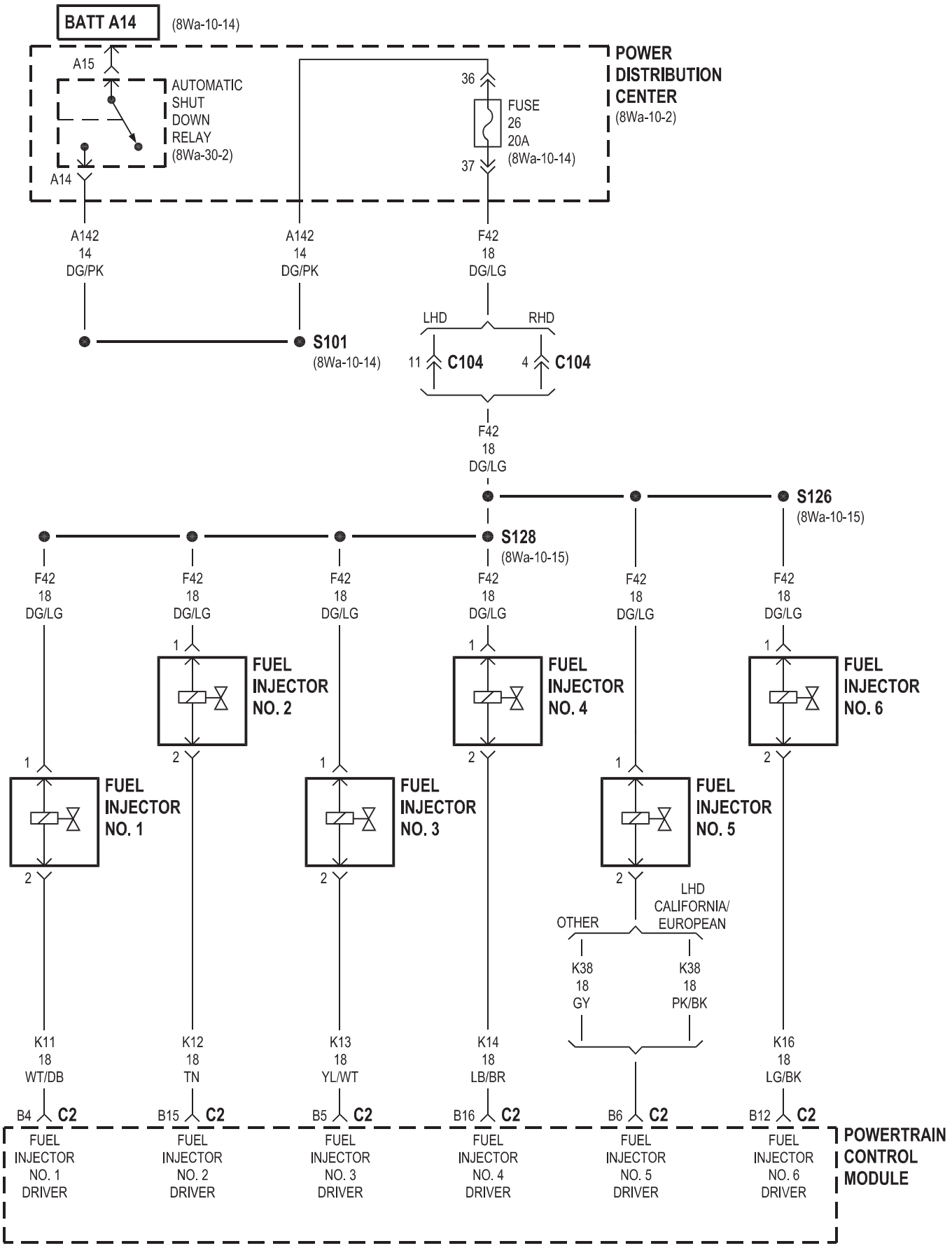


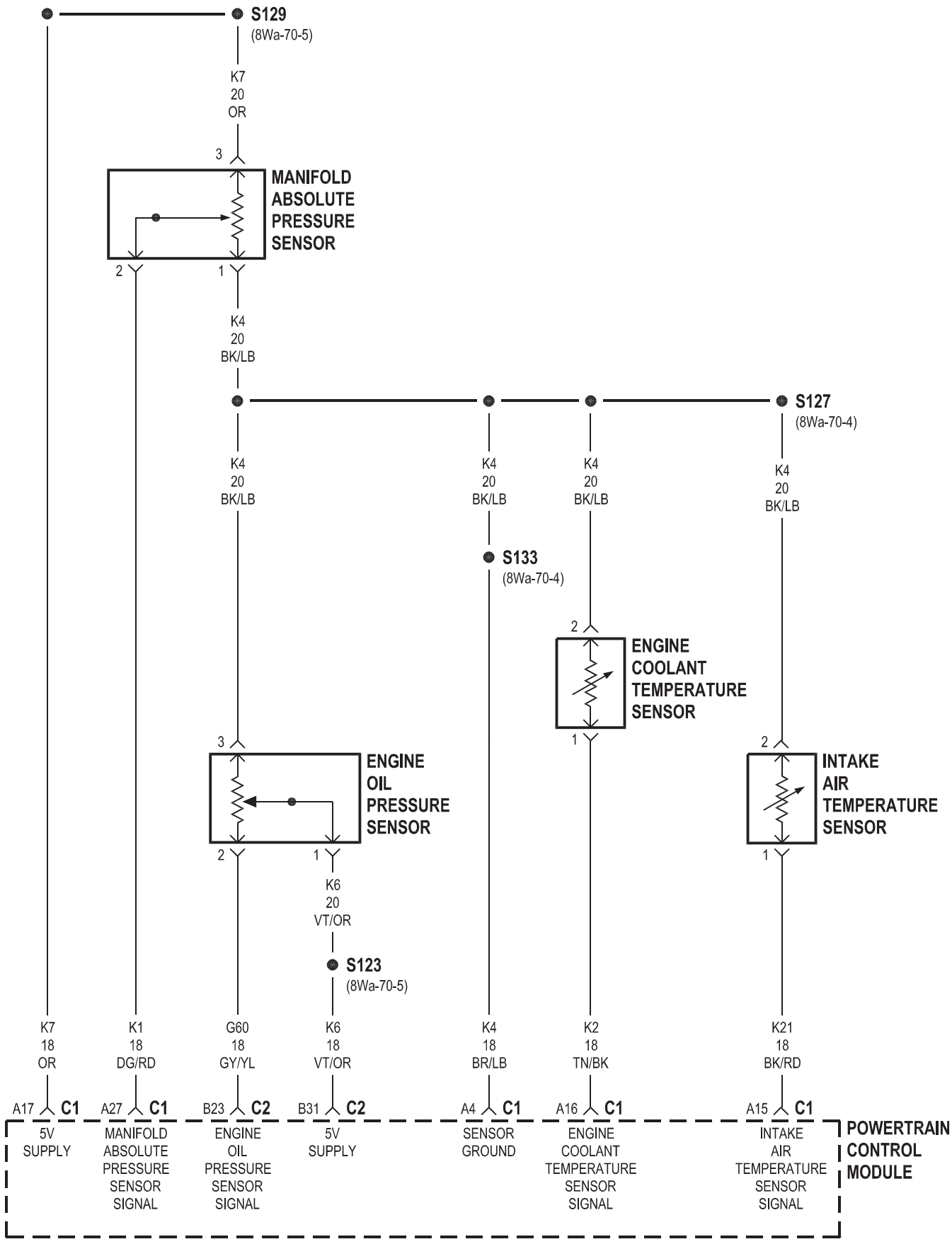
TJI03003 J018W-5

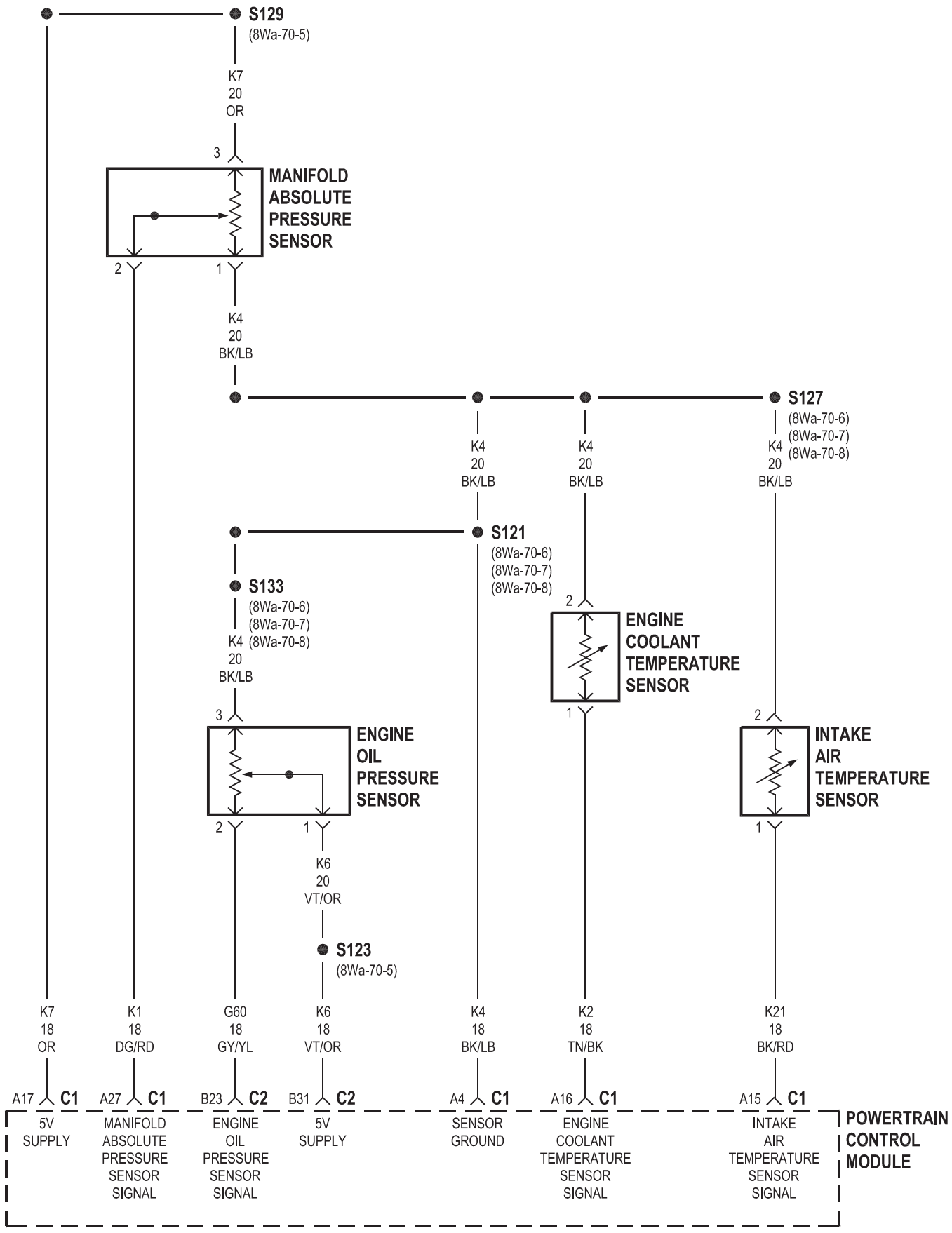

BATT A14
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
A15
37
FUSE 26 20A
(8Wa-10-14)
36
AUTOMATIC SHUT DOWN RELAY
(8Wa-30-2)
A14
F42 18 DG/LG
A142 14 DG/PK
A142 14 DG/PK
S101
(8Wa-10-14)
S129
(8Wa-70-5)
K7 20 OR
3
CRANKSHAFT POSITION SENSOR
5V SUPPLY
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
1
2
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
K4 20 BK/LB
K7 20 OR
S126
(8Wa-10-15)
S127
(8Wa-70-4)
3
CAMSHAFT POSITION SENSOR
5V SUPPLY
CAMSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
2
1
F42 18 DG/LG
1
IGNITION COIL
2
K4 20 BK/LB
K4 20 BK/LB
S133
(8Wa-70-4)
K19 18 GY
K7 18 OR
K24 18 GY/BK
K4 18 BK/LB
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

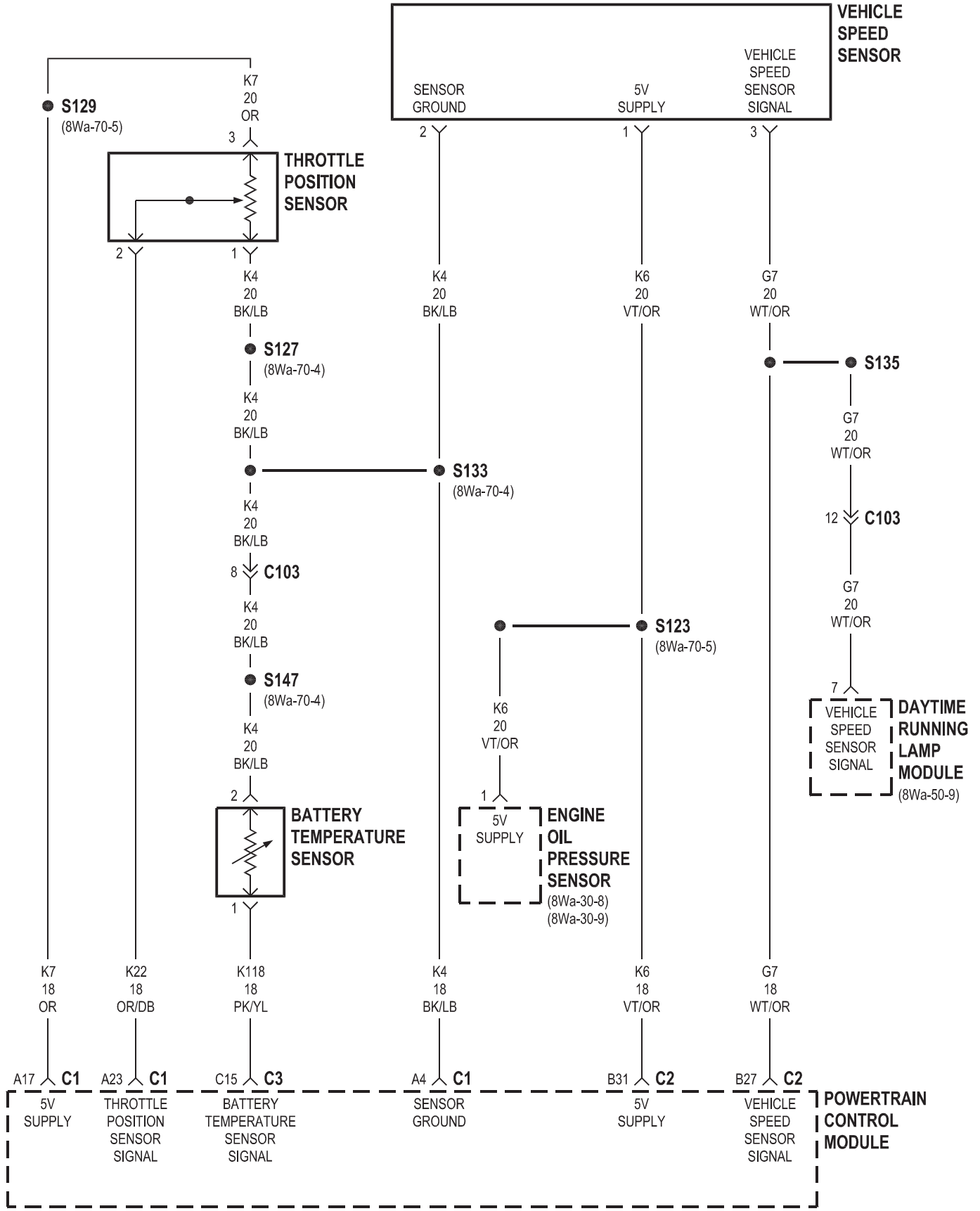

BATT A14
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
37
FUSE 26 20A
(8Wa-10-14)
36
A15
AUTOMATIC SHUT DOWN RELAY
(8Wa-30-2)
A14
F42 18 DG/LG
A142 14 DG/PK
A142 14 DG/PK
LHD
RHD
S101
(8Wa-10-14)
11 C104
4 C104
F42 18 DG/LG
S126
(??-??-??)
F42 18 DG/LG
S153
F42 18 DG/LG
F42 18 DG/LG
1
FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
CAPACITOR
2
IGNITION COIL PACK
1
3
4
K19 18 GY
K17 18 DB/TN
K18 18 RD/YL
K7 18 OR
K7 20 OR
3
5V SUPPLY
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
CRANKSHAFT POSITION SENSOR
1
2
K24 18 GY/BK
K4 20 BK/LB
S129
(8Wa-70-5)
K7 20 OR
3
5V SUPPLY
CAMSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
CAMSHAFT POSITION SENSOR
2
1
K4 20 BK/LB
K44 18 TN/YL
LHD
RHD
S133
(8Wa-70-8)
K4 20 BK/LB
K4 20 BK/LB
S133
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
K4 20 BK/LB
S121
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
K4 18 BK/LB
A7 C1
B9 C2
A1 C1
A17 C1
A8 C1
A4 C1
A18 C1
IGNITION COIL NO. 1 DRIVER
IGNITION COIL NO. 2 DRIVER
IGNITION COIL NO. 3 DRIVER
5V SUPPLY
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
POWERTRAIN CONTROL MODULE

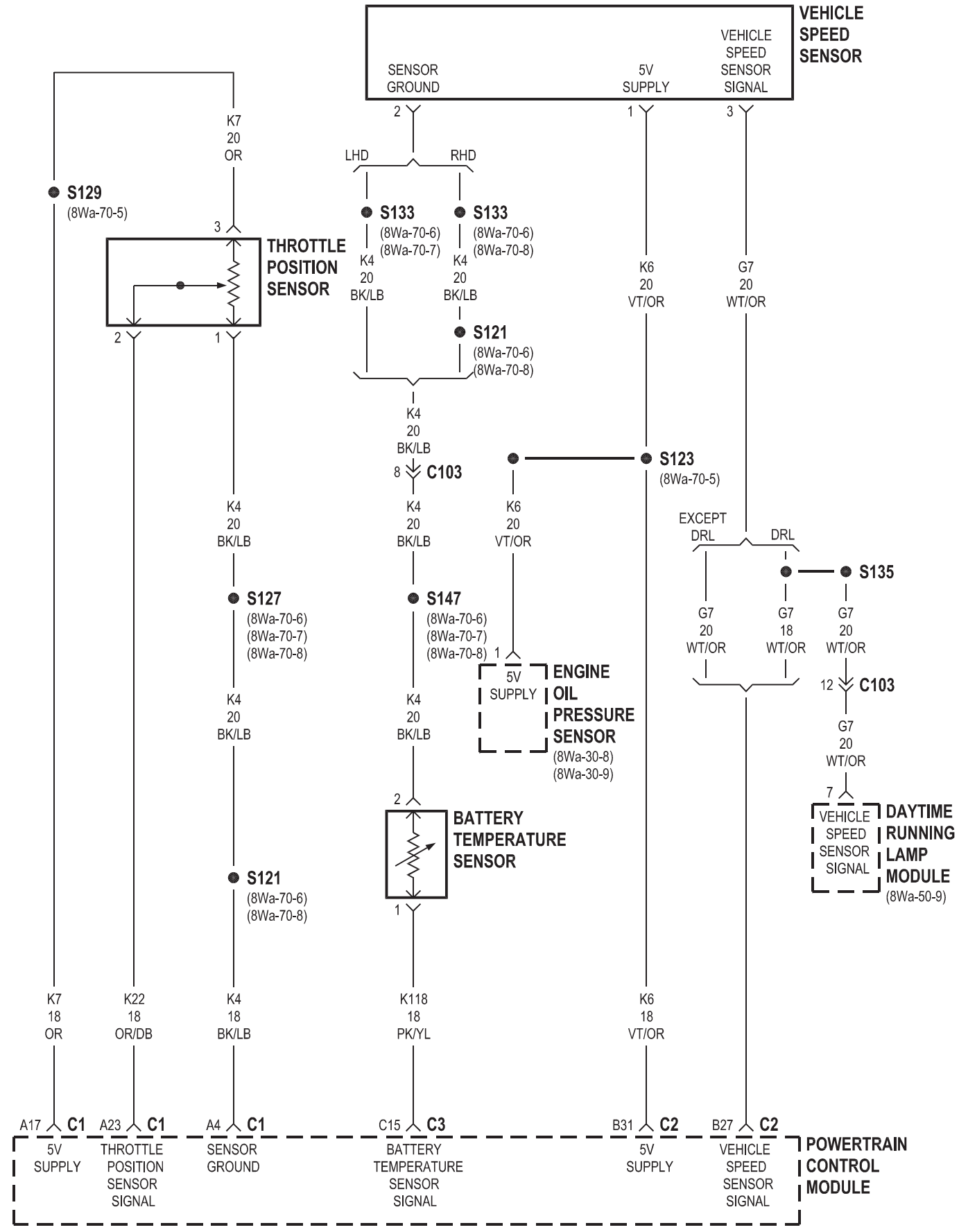

BATT A14
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
1
AUTOMATIC SHUT DOWN RELAY
(8Wa-30-2)
A14
37
FUSE 26 20A
(8Wa-10-14)
36
A142 14 DG/PK
A142 14 DG/PK
F42 18 DG/LG
S101
(8Wa-10-14)
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
S126
(8Wa-10-15)
F42 18 DG/LG
S128
(8Wa-10-15)
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
F42 18 DG/LG
1
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 4
2
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

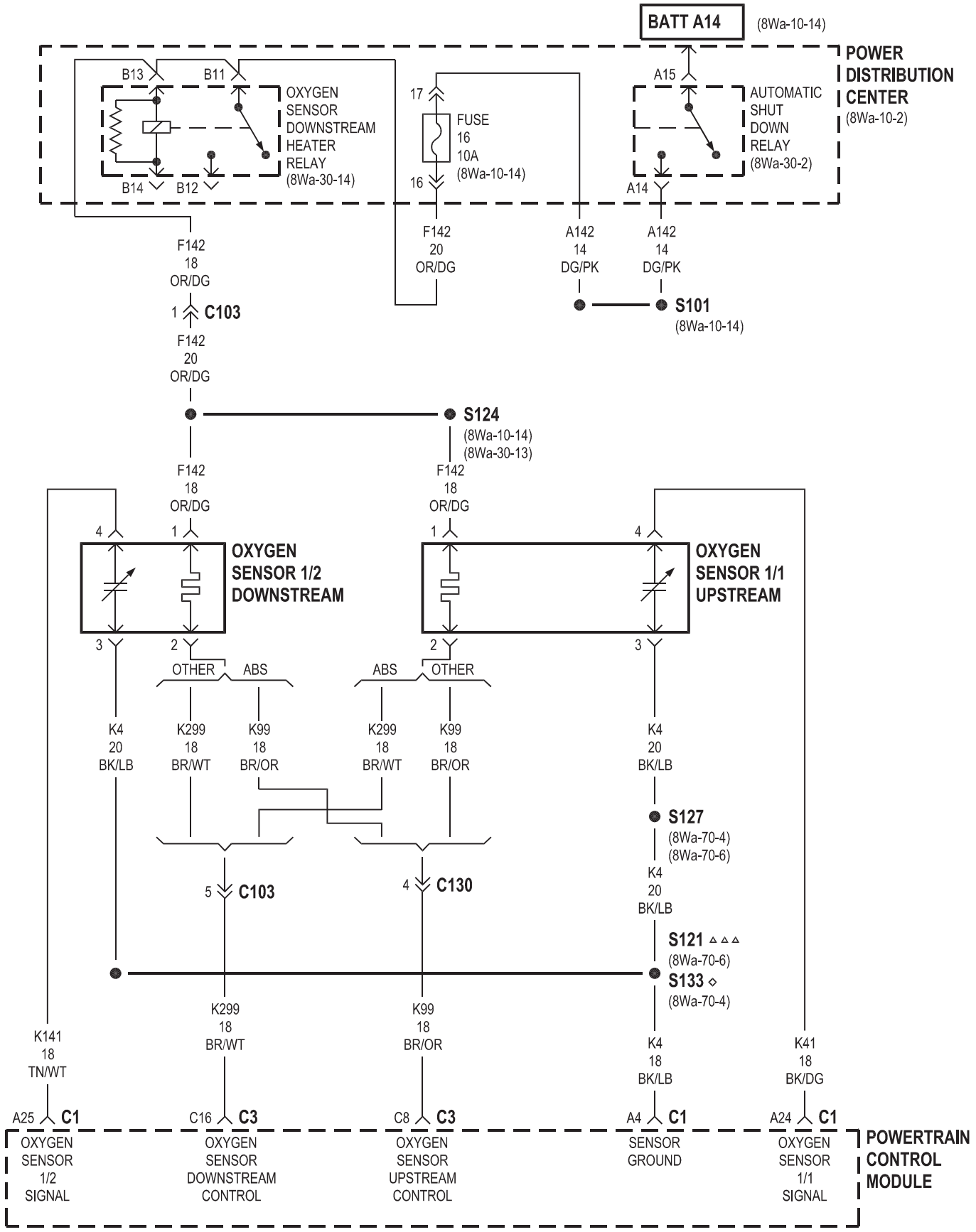

BATT A14
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
A15
AUTOMATIC SHUT DOWN RELAY
(8Wa-30-2)
A14
36
FUSE 26 20A
(8Wa-10-14)
37
A142 14 DG/PK
A142 14 DG/PK
F42 18 DG/LG
S101
(8Wa-10-14)
LHD
RHD
11 C104
4 C104
F42 18 DG/LG
S126
(8Wa-10-15)
S128
(8Wa-10-15)
F42 18 DG/LG
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 4
FUEL INJECTOR NO. 5
FUEL INJECTOR NO. 6
OTHER
LHD CALIFORNIA/ EUROPEAN
K38 18 GY
K38 18 PK/BK
K11 18 WT/DB
K12 18 TN
K13 18 YL/WT
K14 18 LB/BR
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

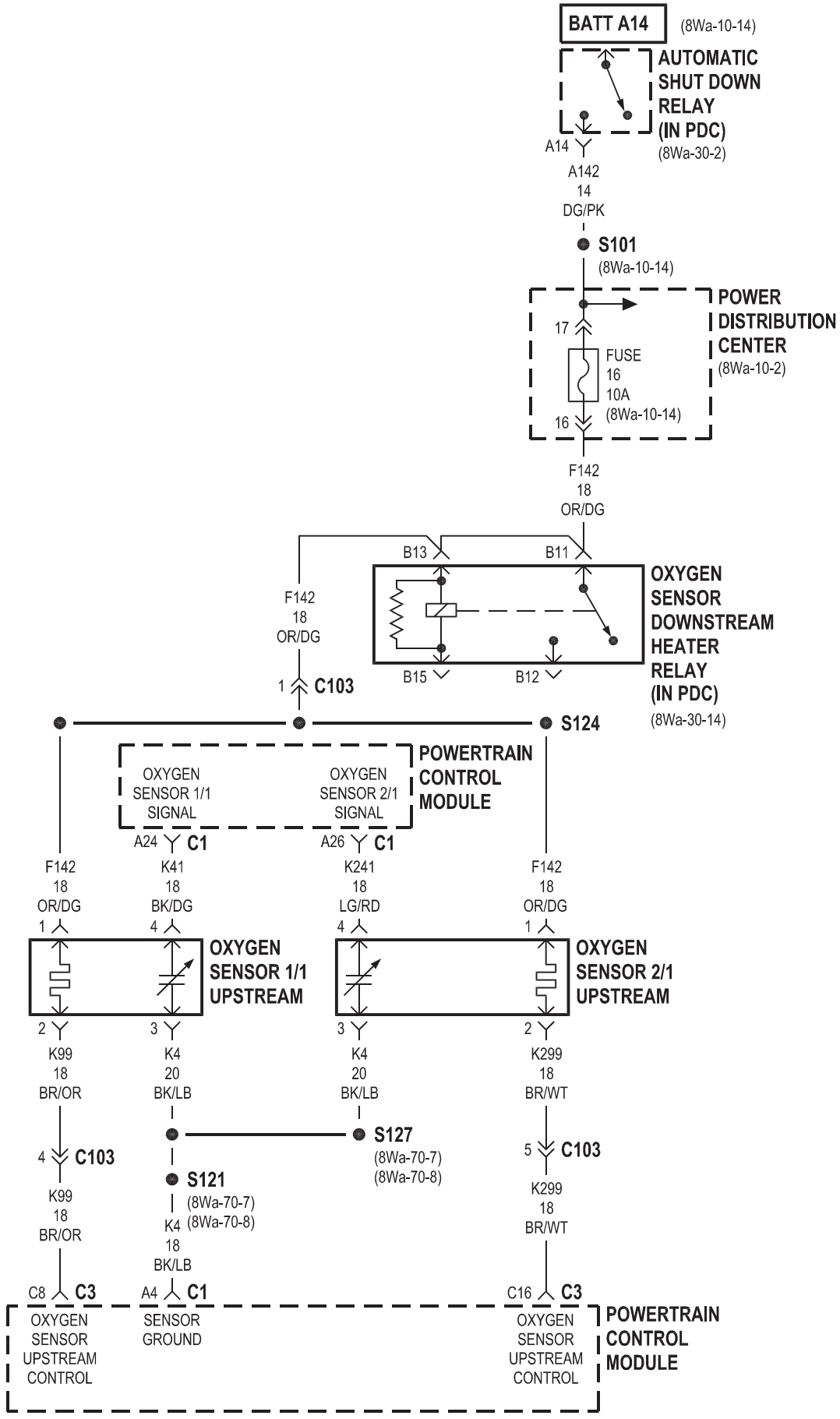

S129
(8Wa-70-5)
K7
20
OR
3
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
2
1
K4
20
BK/LB
S127
(8Wa-70-4)
K4
20
BK/LB
K4
20
BK/LB
K4
20
BK/LB
K4
20
BK/LB
S133
(8Wa-70-4)
2
ENGINE
COOLANT
TEMPERATURE
SENSOR
1
3
ENGINE
OIL
PRESSURE
SENSOR
2
1
2
INTAKE
AIR
TEMPERATURE
SENSOR
1
K6
20
VT/OR
S123
(8Wa-70-5)
K7
18
OR
K1
18
DG/RD
G60
18
GY/YL
K6
18
VT/OR
K4
18
BR/LB
K2
18
TN/BK
K21
18
BK/RD
A17 C1
A27 C1
B23 C2
B31 C2
A4 C1
A16 C1
A15 C1
5V
SUPPLY
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
SIGNAL
ENGINE
OIL
PRESSURE
SENSOR
SIGNAL
5V
SUPPLY
SENSOR
GROUND
ENGINE
COOLANT
TEMPERATURE
SENSOR
SIGNAL
INTAKE
AIR
TEMPERATURE
SENSOR
SIGNAL
POWERTRAIN
CONTROL
MODULE

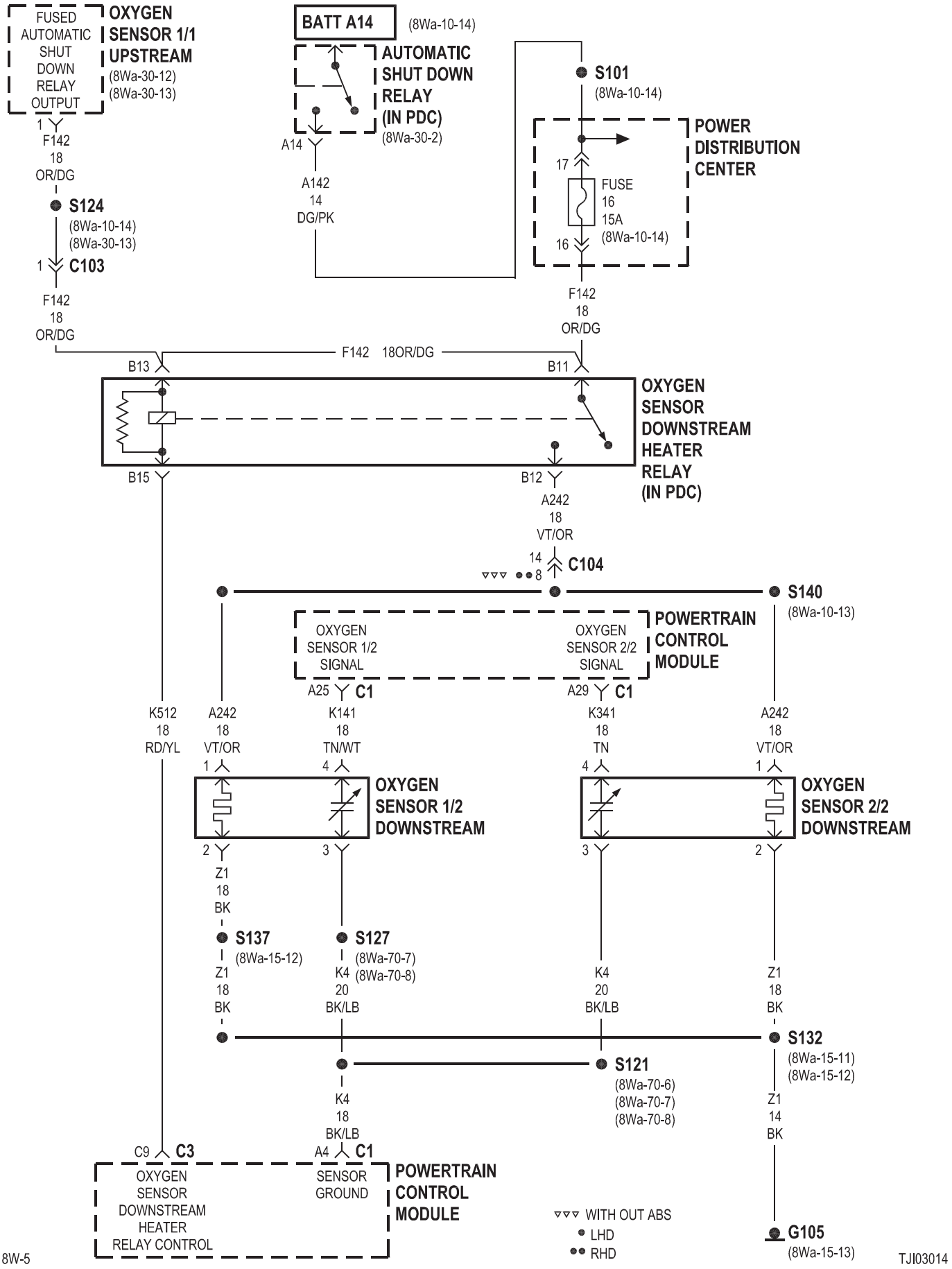

S129
(8Wa-70-5)
K7
20
OR
3
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
2
1
K4
20
BK/LB
S127
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
K4
20
BK/LB
K4
20
BK/LB
K4
20
BK/LB
S121
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
S133
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
K4
20
BK/LB
2
ENGINE
COOLANT
TEMPERATURE
SENSOR
1
3
ENGINE
OIL
PRESSURE
SENSOR
2
1
2
INTAKE
AIR
TEMPERATURE
SENSOR
1
K6
20
VT/OR
S123
(8Wa-70-5)
K7
18
OR
K1
18
DG/RD
G60
18
GY/YL
K6
18
VT/OR
K4
18
BK/LB
K2
18
TN/BK
K21
18
BK/RD
A17 C1
A27 C1
B23 C2
B31 C2
A4 C1
A16 C1
A15 C1
5V
SUPPLY
MANIFOLD
ABSOLUTE
PRESSURE
SENSOR
SIGNAL
ENGINE
OIL
PRESSURE
SENSOR
SIGNAL
5V
SUPPLY
SENSOR
GROUND
ENGINE
COOLANT
TEMPERATURE
SENSOR
SIGNAL
INTAKE
AIR
TEMPERATURE
SENSOR
SIGNAL
POWERTRAIN
CONTROL
MODULE

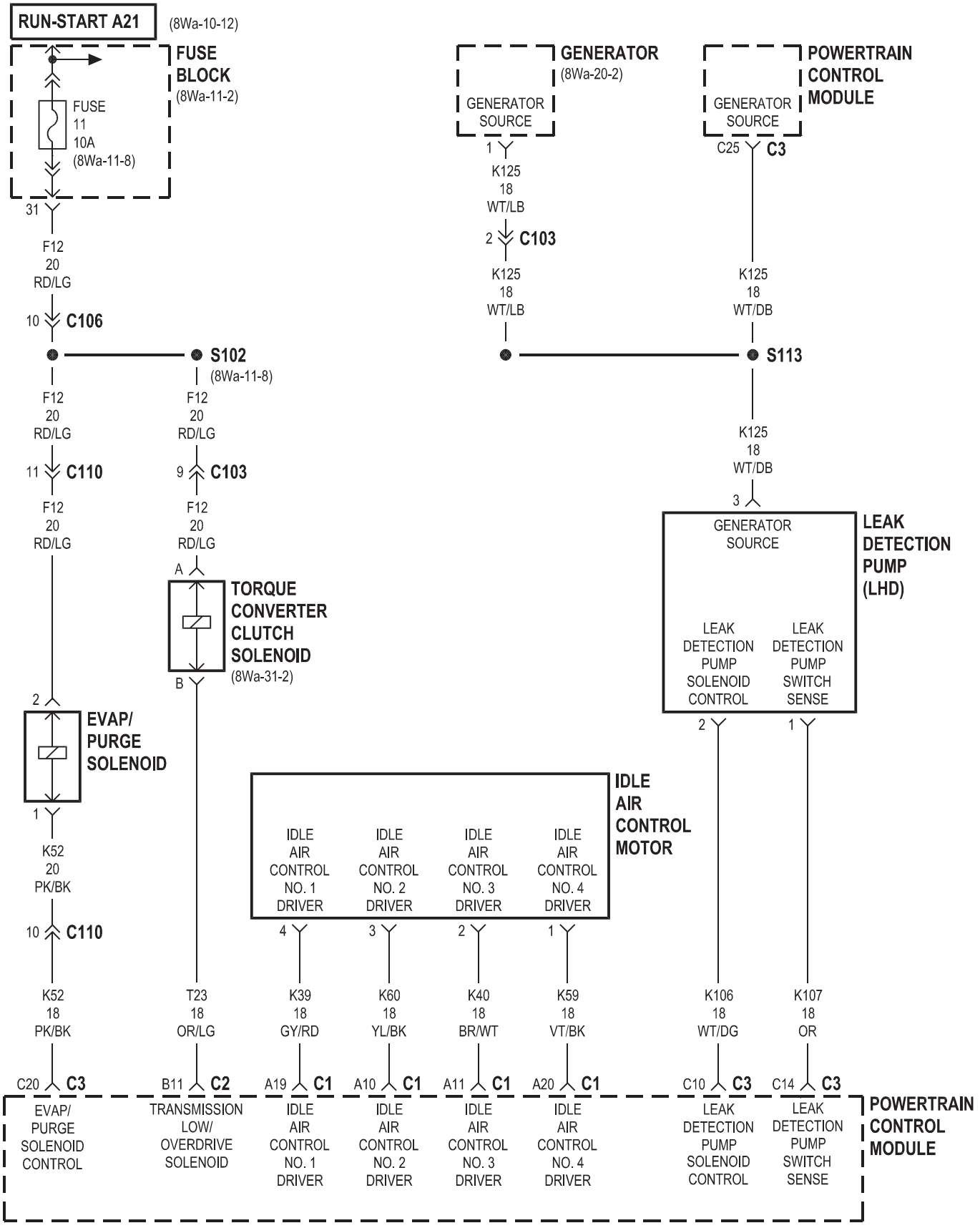

VEHICLE SPEED SENSOR
SENSOR GROUND
5V SUPPLY
VEHICLE SPEED SENSOR SIGNAL
2
1
3
S129
(8Wa-70-5)
K7
20
OR
3
THROTTLE POSITION SENSOR
2
1
K4
20
BK/LB
K4
20
BK/LB
K6
20
VT/OR
G7
20
WT/OR
S127
(8Wa-70-4)
S135
K4
20
BK/LB
S133
(8Wa-70-4)
G7
20
WT/OR
12
C103
K4
20
BK/LB
8
C103
K4
20
BK/LB
S123
(8Wa-70-5)
G7
20
WT/OR
S147
(8Wa-70-4)
7
VEHICLE SPEED SENSOR SIGNAL
DAYTIME RUNNING LAMP MODULE
(8Wa-50-9)
K4
20
BK/LB
K6
20
VT/OR
2
1
BATTERY TEMPERATURE SENSOR
5V SUPPLY
ENGINE OIL PRESSURE SENSOR
(8Wa-30-8)
(8Wa-30-9)
1
K7
18
OR
K22
18
OR/DB
K118
18
PK/YL
K4
18
BK/LB
K6
18
VT/OR
G7
18
WT/OR
A17
C1
A23
C1
C15
C3
A4
C1
B31
C2
B27
C2
5V SUPPLY
THROTTLE POSITION SENSOR SIGNAL
BATTERY TEMPERATURE SENSOR SIGNAL
SENSOR GROUND
5V SUPPLY
VEHICLE SPEED SENSOR SIGNAL
POWERTRAIN CONTROL MODULE

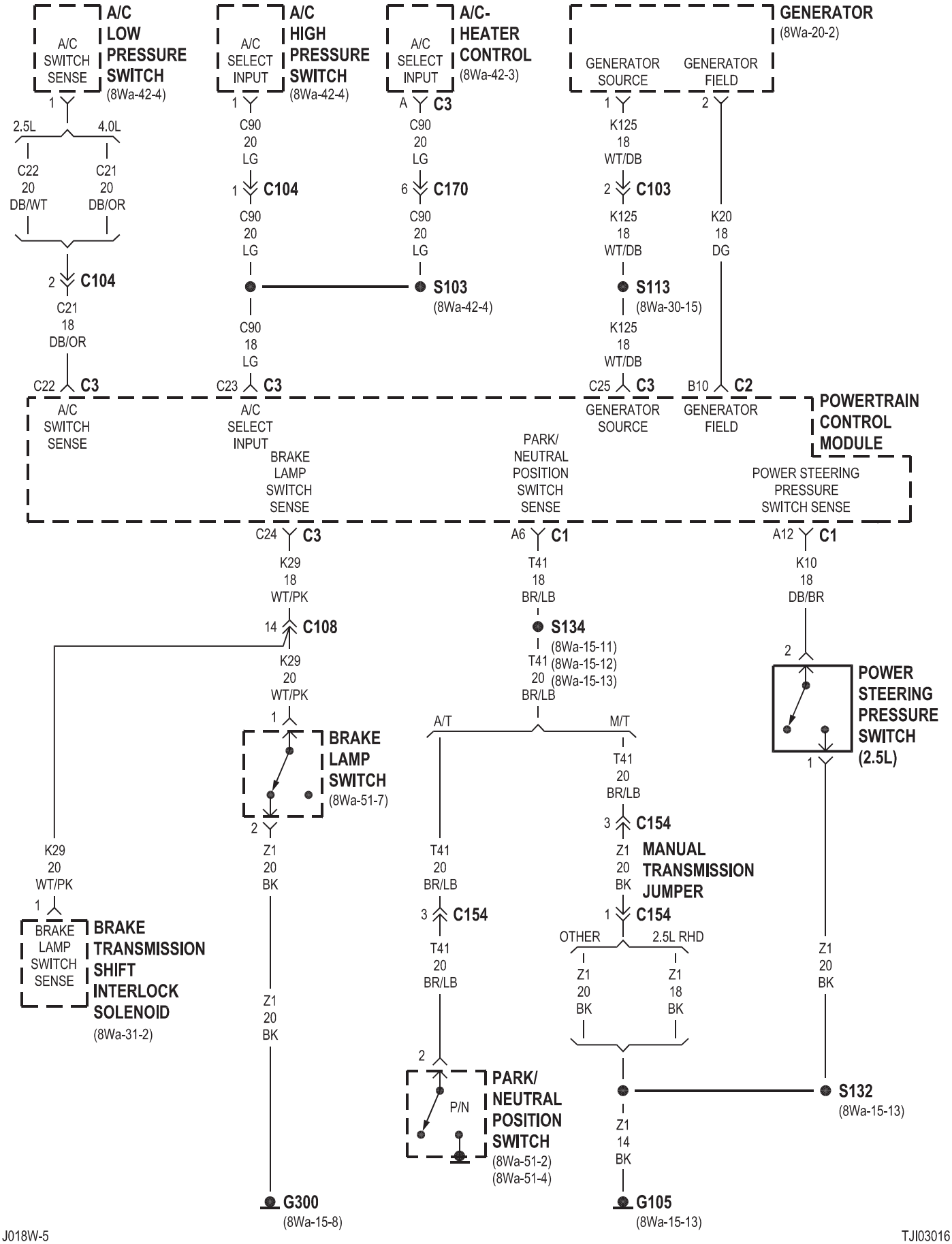

VEHICLE SPEED SENSOR
SENSOR GROUND
5V SUPPLY
VEHICLE SPEED SENSOR SIGNAL
2
1
3
LHD
RHD
K7 20 OR
S129 (8Wa-70-5)
S133 (8Wa-70-6) (8Wa-70-7)
S133 (8Wa-70-6) (8Wa-70-8)
K4 20 BK/LB
K4 20 BK/LB
K6 20 VT/OR
G7 20 WT/OR
THROTTLE POSITION SENSOR
S121 (8Wa-70-6) (8Wa-70-8)
K4 20 BK/LB
8 C103
S123 (8Wa-70-5)
K4 20 BK/LB
K6 20 VT/OR
EXCEPT DRL
DRL
S135
S127 (8Wa-70-6) (8Wa-70-7) (8Wa-70-8)
S147 (8Wa-70-6) (8Wa-70-7) (8Wa-70-8)
G7 20 WT/OR
G7 18 WT/OR
G7 20 WT/OR
12 C103
5V SUPPLY
ENGINE OIL PRESSURE SENSOR (8Wa-30-8) (8Wa-30-9)
K4 20 BK/LB
K4 20 BK/LB
G7 20 WT/OR
7
VEHICLE SPEED SENSOR SIGNAL
DAYTIME RUNNING LAMP MODULE (8Wa-50-9)
BATTERY TEMPERATURE SENSOR
S121 (8Wa-70-6) (8Wa-70-8)
K7 18 OR
K22 18 OR/DB
K4 18 BK/LB
K118 18 PK/YL
K6 18 VT/OR
A17 C1
A23 C1
A4 C1
C15 C3
B31 C2
B27 C2
5V SUPPLY
THROTTLE POSITION SENSOR SIGNAL
SENSOR GROUND
BATTERY TEMPERATURE SENSOR SIGNAL
5V SUPPLY
VEHICLE SPEED SENSOR SIGNAL
POWERTRAIN CONTROL MODULE

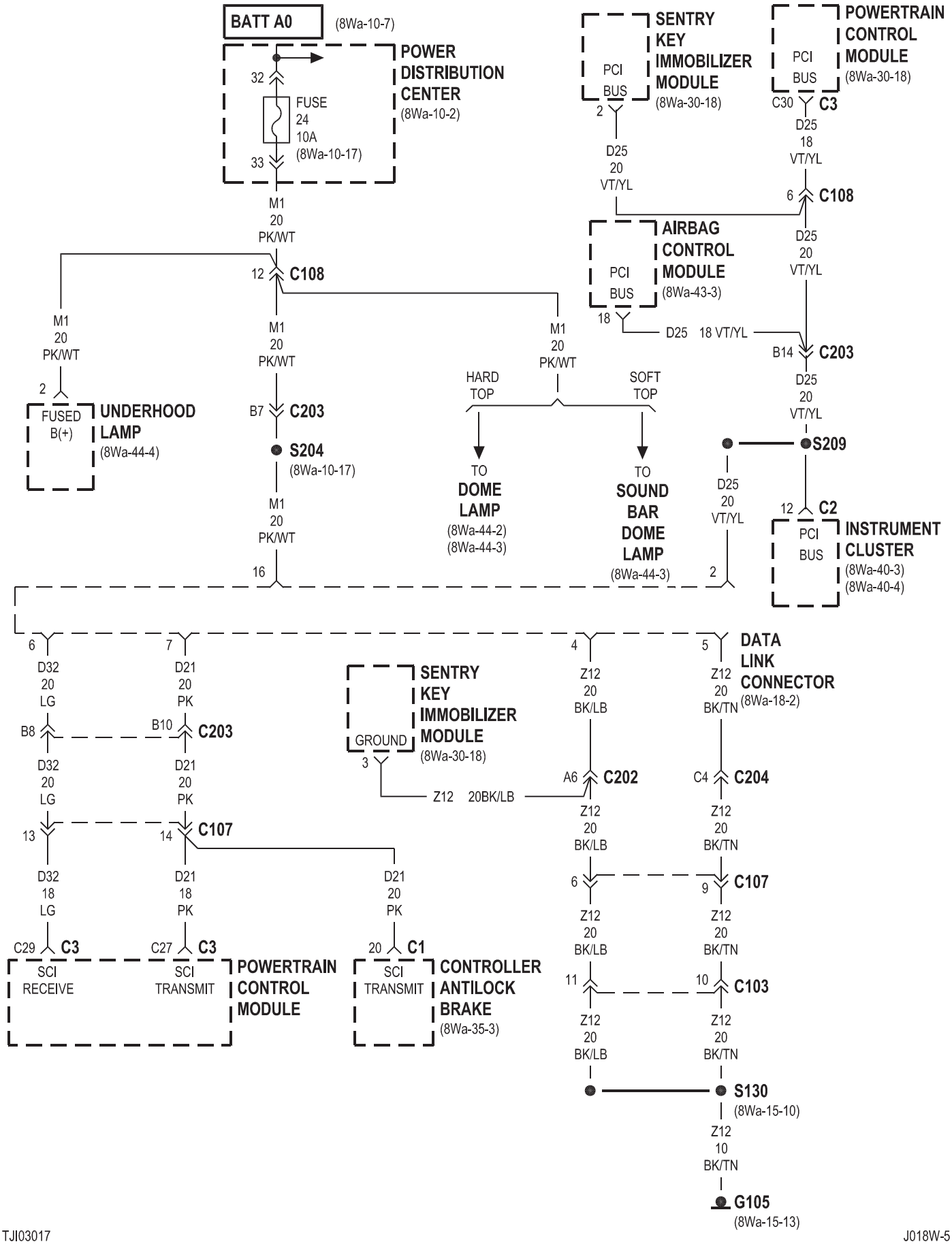

BATT A14
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
B13
B11
OXYGEN SENSOR DOWNSTREAM HEATER RELAY
(8Wa-30-14)
B14
B12
17
FUSE 16 10A
(8Wa-10-14)
16
A15
AUTOMATIC SHUT DOWN RELAY
(8Wa-30-2)
A14
F142 18 OR/DG
1 C103
F142 20 OR/DG
F142 20 OR/DG
A142 14 DG/PK
A142 14 DG/PK
S101
(8Wa-10-14)
S124
(8Wa-10-14)
(8Wa-30-13)
F142 18 OR/DG
F142 18 OR/DG
OXYGEN SENSOR 1/2 DOWNSTREAM
OXYGEN SENSOR 1/1 UPSTREAM
OTHER
ABS
ABS
OTHER
K4 20 BK/LB
K299 18 BR/WT
K99 18 BR/OR
K299 18 BR/WT
K99 18 BR/OR
K4 20 BK/LB
S127
(8Wa-70-4)
(8Wa-70-6)
5 C103
4 C130
K4 20 BK/LB
S121 △△△
(8Wa-70-6)
S133 ◇
(8Wa-70-4)
K141 18 TN/WT
K299 18 BR/WT
K99 18 BR/OR
K4 18 BK/LB
K41 18 BK/DG
A25 C1
C16 C3
C8 C3
A4 C1
A24 C1
OXYGEN SENSOR 1/2 SIGNAL
OXYGEN SENSOR DOWNSTREAM CONTROL
OXYGEN SENSOR UPSTREAM CONTROL
SENSOR GROUND
OXYGEN SENSOR 1/1 SIGNAL
POWERTRAIN CONTROL MODULE
△△△ 4.0L
◇ 2.5L

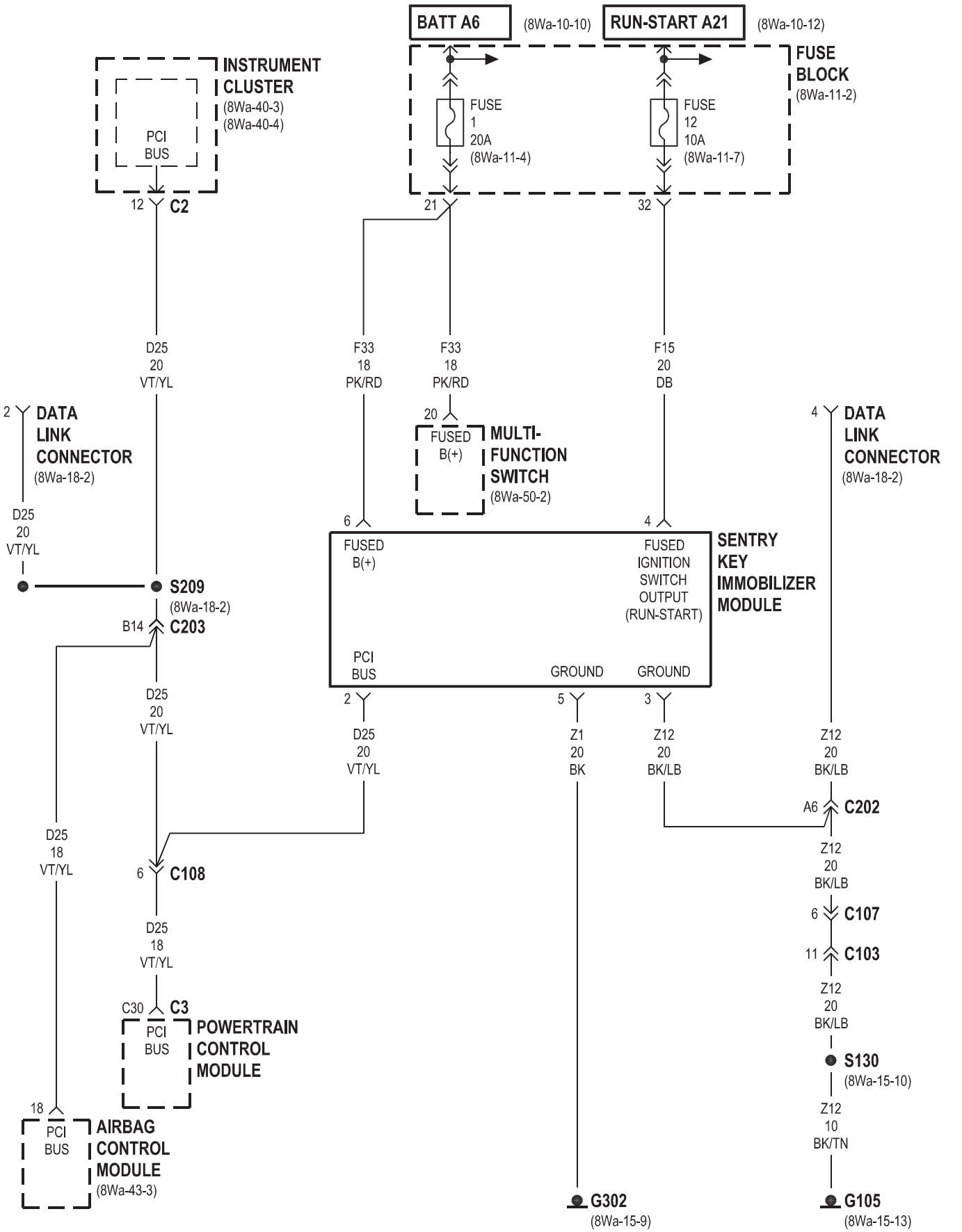

BATT A14
(8Wa-10-14)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8Wa-30-2)
A14
A142
14
DG/PK
S101
(8Wa-10-14)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
17
FUSE
16
10A
(8Wa-10-14)
16
F142
18
OR/DG
B13
B11
OXYGEN SENSOR DOWNSTREAM HEATER RELAY (IN PDC)
(8Wa-30-14)
B15
B12
F142
18
OR/DG
1
C103
S124
POWERTRAIN CONTROL MODULE
OXYGEN SENSOR 1/1 SIGNAL
OXYGEN SENSOR 2/1 SIGNAL
A24
C1
A26
C1
F142
18
OR/DG
1
K41
18
BK/DG
4
K241
18
LG/RD
4
F142
18
OR/DG
1
OXYGEN SENSOR 1/1 UPSTREAM
OXYGEN SENSOR 2/1 UPSTREAM
2
3
3
2
K99
18
BR/OR
K4
20
BK/LB
K4
20
BK/LB
K299
18
BR/WT
4
C103
S127
(8Wa-70-7)
(8Wa-70-8)
5
C103
K99
18
BR/OR
S121
(8Wa-70-7)
(8Wa-70-8)
K4
18
BK/LB
K299
18
BR/WT
C8
C3
A4
C1
C16
C3
OXYGEN SENSOR UPSTREAM CONTROL
SENSOR GROUND
OXYGEN SENSOR UPSTREAM CONTROL
POWERTRAIN CONTROL MODULE

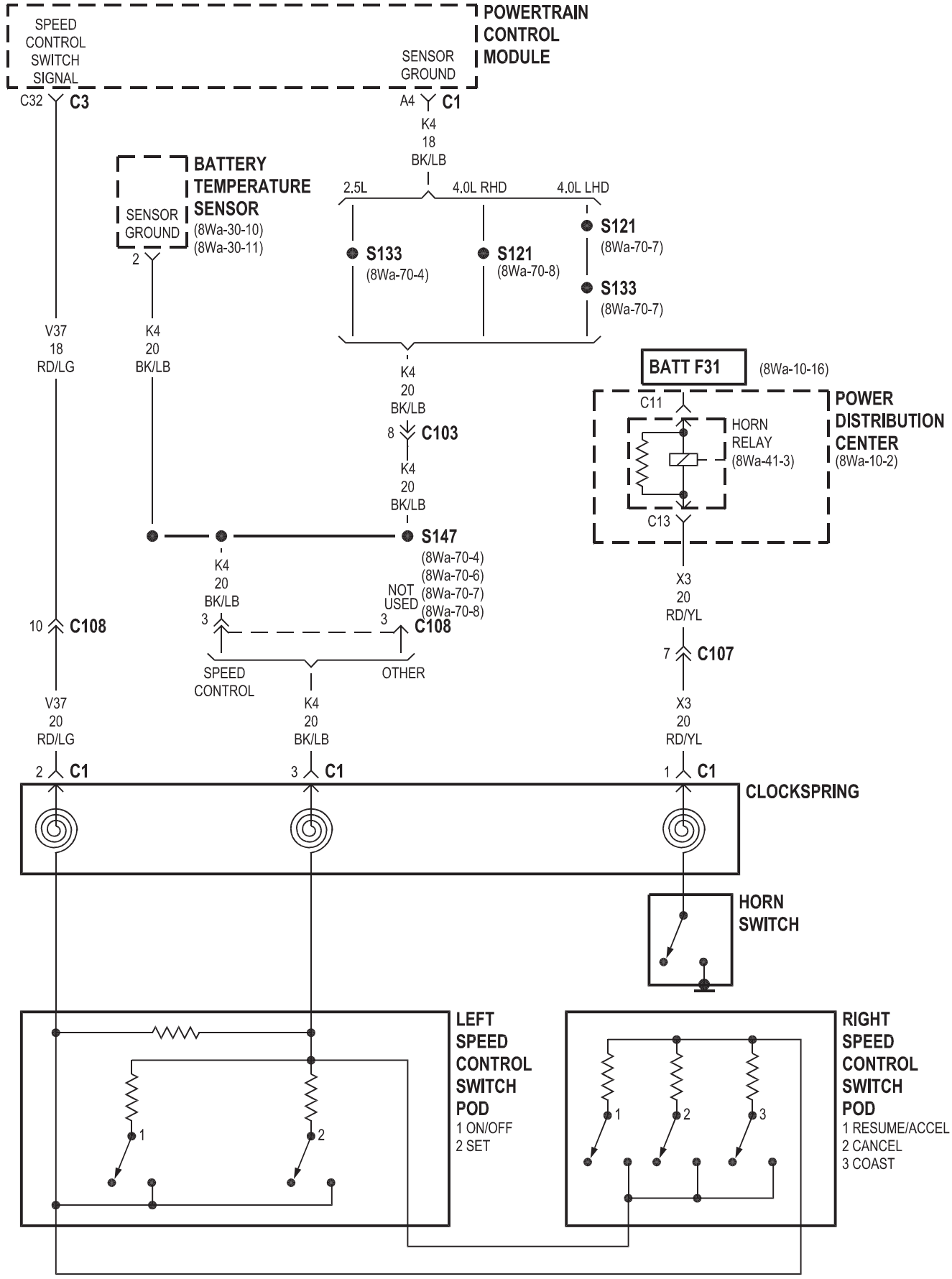

FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
OXYGEN SENSOR 1/1 UPSTREAM
(8Wa-30-12)
(8Wa-30-13)
1
F142
18
OR/DG
S124
(8Wa-10-14)
(8Wa-30-13)
1
C103
F142
18
OR/DG
BATT A14
(8Wa-10-14)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8Wa-30-2)
A14
A142
14
DG/PK
S101
(8Wa-10-14)
POWER DISTRIBUTION CENTER
17
FUSE
16
15A
(8Wa-10-14)
16
F142
18
OR/DG
F142 18OR/DG
B13
B11
OXYGEN SENSOR DOWNSTREAM HEATER RELAY (IN PDC)
B15
B12
A242
18
VT/OR
14
C104
8
S140
(8Wa-10-13)
POWERTRAIN CONTROL MODULE
OXYGEN SENSOR 1/2 SIGNAL
OXYGEN SENSOR 2/2 SIGNAL
A25
C1
A29
C1
K512
18
RD/YL
A242
18
VT/OR
K141
18
TN/WT
K341
18
TN
A242
18
VT/OR
1
4
4
1
OXYGEN SENSOR 1/2 DOWNSTREAM
OXYGEN SENSOR 2/2 DOWNSTREAM
2
3
3
2
Z1
18
BK
S137
(8Wa-15-12)
S127
(8Wa-70-7)
(8Wa-70-8)
Z1
18
BK
K4
20
BK/LB
K4
20
BK/LB
Z1
18
BK
S132
(8Wa-15-11)
(8Wa-15-12)
S121
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
K4
18
BK/LB
Z1
14
BK
C9
C3
A4
C1
OXYGEN SENSOR DOWNSTREAM HEATER RELAY CONTROL
SENSOR GROUND
POWERTRAIN CONTROL MODULE
WITH OUT ABS
LHD
RHD
G105
(8Wa-15-13)

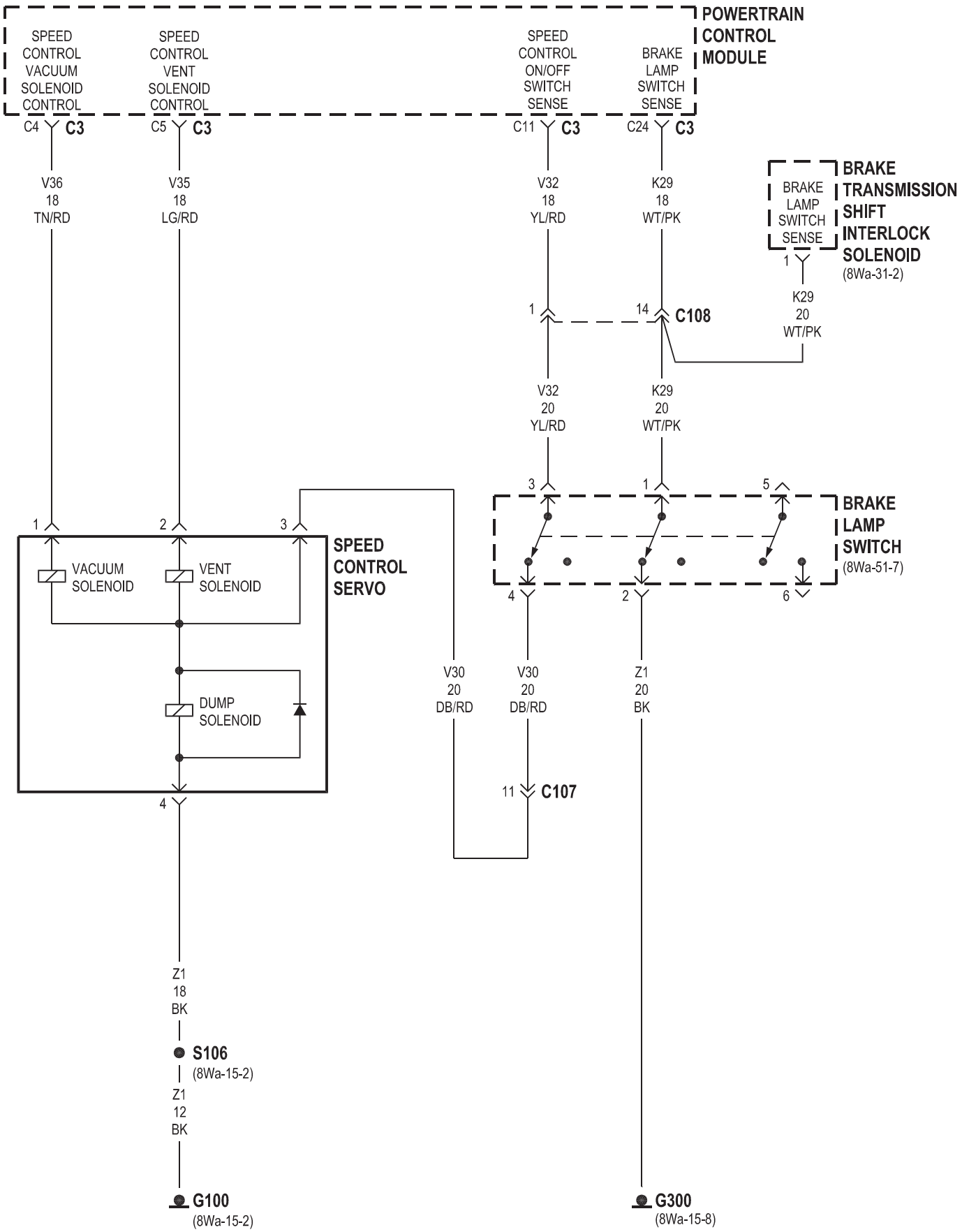

RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 11 10A
(8Wa-11-8)
31
F12 20 RD/LG
10 C106
S102
(8Wa-11-8)
F12 20 RD/LG
11 C110
F12 20 RD/LG
2
EVAP/ PURGE SOLENOID
1
K52 20 PK/BK
10 C110
K52 18 PK/BK
C20 C3
EVAP/ PURGE SOLENOID CONTROL
F12 20 RD/LG
9 C103
F12 20 RD/LG
A
TORQUE CONVERTER CLUTCH SOLENOID
(8Wa-31-2)
B
T23 18 OR/LG
B11 C2
TRANSMISSION LOW/ OVERDRIVE SOLENOID
GENERATOR
(8Wa-20-2)
GENERATOR SOURCE
1
K125 18 WT/LB
2 C103
K125 18 WT/LB
POWERTRAIN CONTROL MODULE
GENERATOR SOURCE
C25 C3
K125 18 WT/DB
S113
K125 18 WT/DB
3
GENERATOR SOURCE
LEAK DETECTION PUMP (LHD)
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
2
1
K106 18 WT/DG
C10 C3
LEAK DETECTION PUMP SOLENOID CONTROL
K107 18 OR
C14 C3
LEAK DETECTION PUMP SWITCH SENSE
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
A19 C1
IDLE AIR CONTROL NO. 1 DRIVER
K60 18 YL/BK
A10 C1
IDLE AIR CONTROL NO. 2 DRIVER
K40 18 BR/WT
A11 C1
IDLE AIR CONTROL NO. 3 DRIVER
K59 18 VT/BK
A20 C1
IDLE AIR CONTROL NO. 4 DRIVER
POWERTRAIN CONTROL MODULE


A/C LOW PRESSURE SWITCH (8Wa-42-4)
A/C SWITCH SENSE
1
2.5L
4.0L
C22 20 DB/WT
C21 20 DB/OR
2 C104
C21 18 DB/OR
C22 C3
A/C SWITCH SENSE
A/C HIGH PRESSURE SWITCH (8Wa-42-4)
A/C SELECT INPUT
1
C90 20 LG
1 C104
C90 20 LG
C90 18 LG
C23 C3
A/C SELECT INPUT
A/C-HEATER CONTROL (8Wa-42-3)
A/C SELECT INPUT
A C3
C90 20 LG
6 C170
C90 20 LG
S103 (8Wa-42-4)
GENERATOR (8Wa-20-2)
GENERATOR SOURCE
GENERATOR FIELD
1
2
K125 18 WT/DB
2 C103
K125 18 WT/DB
S113 (8Wa-30-15)
K125 18 WT/DB
C25 C3
GENERATOR SOURCE
K20 18 DG
B10 C2
GENERATOR FIELD
POWERTRAIN CONTROL MODULE
A/C SWITCH SENSE
A/C SELECT INPUT
BRAKE LAMP SWITCH SENSE
PARK/ NEUTRAL POSITION SWITCH SENSE
POWER STEERING PRESSURE SWITCH SENSE
C24 C3
K29 18 WT/PK
14 C108
K29 20 WT/PK
1
BRAKE LAMP SWITCH (8Wa-51-7)
2
Z1 20 BK
A6 C1
T41 18 BR/LB
S134 (8Wa-15-11) (8Wa-15-12) (8Wa-15-13)
T41 20 BR/LB
A/T
M/T
T41 20 BR/LB
3 C154
T41 20 BR/LB
3 C154
Z1 20 BK MANUAL TRANSMISSION JUMPER
1 C154
OTHER
2.5L RHD
Z1 20 BK
Z1 18 BK
A12 C1
K10 18 DB/BR
2
POWER STEERING PRESSURE SWITCH (2.5L)
1
Z1 20 BK
K29 20 WT/PK
1
BRAKE LAMP SWITCH SENSE
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID (8Wa-31-2)
2
P/N
PARK/ NEUTRAL POSITION SWITCH (8Wa-51-2) (8Wa-51-4)
Z1 20 BK
G300 (8Wa-15-8)
Z1 14 BK
G105 (8Wa-15-13)
S132 (8Wa-15-13)


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
32
FUSE 24 10A
(8Wa-10-17)
33
M1 20 PK/WT
12 C108
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
PCI BUS
2
D25 20 VT/YL
POWERTRAIN CONTROL MODULE
(8Wa-30-18)
C30 C3
D25 18 VT/YL
6 C108
AIRBAG CONTROL MODULE
(8Wa-43-3)
18
D25 18 VT/YL
B14 C203
D25 20 VT/YL
S209
M1 20 PK/WT
2
FUSED B(+)
UNDERHOOD LAMP
(8Wa-44-4)
B7 C203
S204
(8Wa-10-17)
HARD TOP
SOFT TOP
TO DOME LAMP
(8Wa-44-2)
(8Wa-44-3)
TO SOUND BAR DOME LAMP
(8Wa-44-3)
D25 20 VT/YL
12 C2
INSTRUMENT CLUSTER
(8Wa-40-3)
(8Wa-40-4)
16
2
6 D32 20 LG
7 D21 20 PK
B8 C203
B10
13 D32 18 LG
14 D21 18 PK
C107
C29 C3
C27 C3
SCI RECEIVE
SCI TRANSMIT
POWERTRAIN CONTROL MODULE
SENTRY KEY IMMOBILIZER MODULE
(8Wa-30-18)
GROUND
3
Z12 20BK/LB
20 C1
SCI TRANSMIT
CONTROLLER ANTILOCK BRAKE
(8Wa-35-3)
D21 20 PK
4 Z12 20 BK/LB
5 Z12 20 BK/TN
DATA LINK CONNECTOR
(8Wa-18-2)
A6 C202
C4 C204
Z12 20 BK/LB
Z12 20 BK/TN
6 C107
9 C107
11 C103
10 C103
S130
(8Wa-15-10)
Z12 10 BK/TN
G105
(8Wa-15-13)

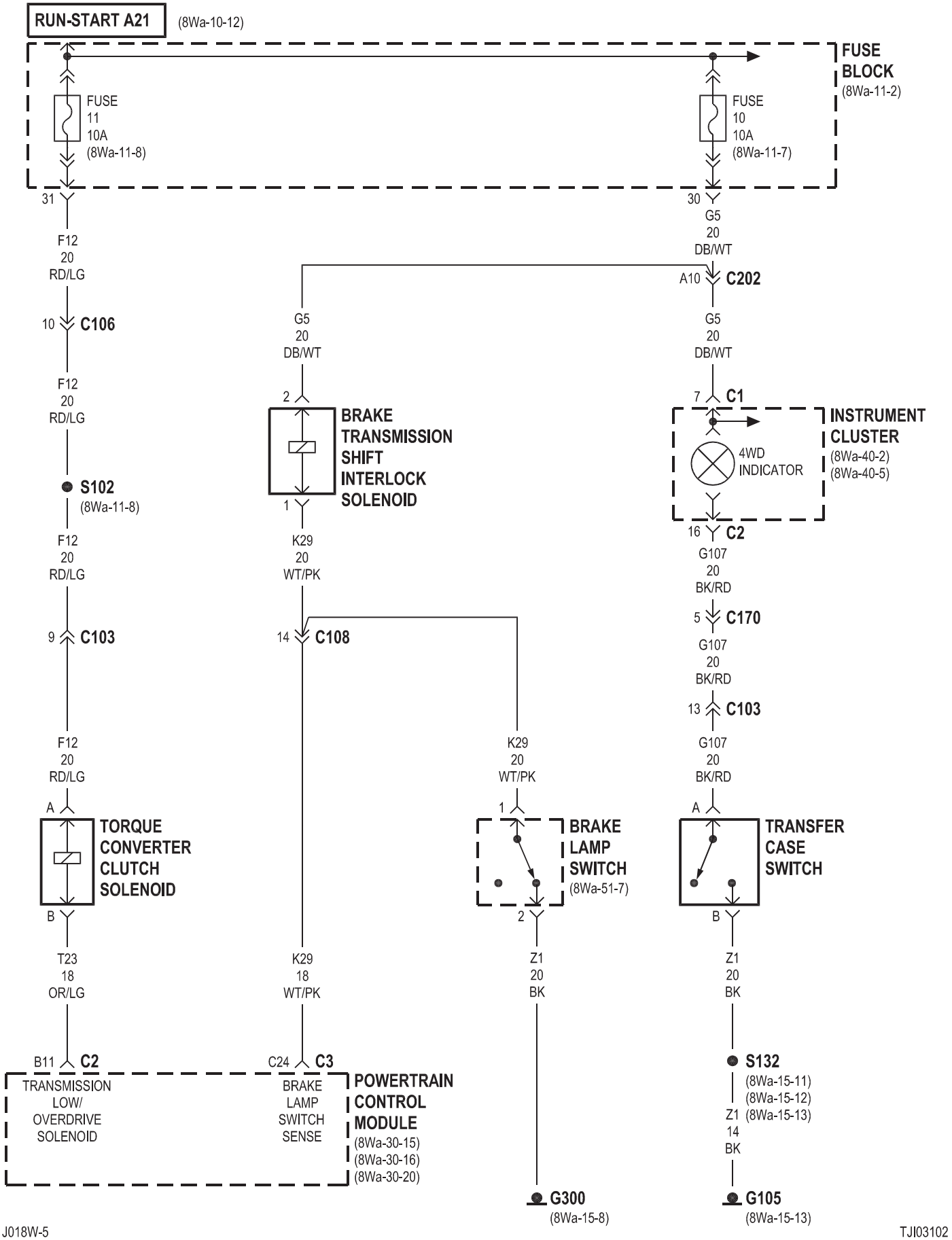

BATT A6
(8Wa-10-10)
RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 1 20A
(8Wa-11-4)
FUSE 12 10A
(8Wa-11-7)
INSTRUMENT CLUSTER
(8Wa-40-3)
(8Wa-40-4)
PCI BUS
12 C2
21
32
D25 20 VT/YL
F33 18 PK/RD
F33 18 PK/RD
F15 20 DB
2 DATA LINK CONNECTOR
(8Wa-18-2)
20 FUSED B(+)
MULTI-FUNCTION SWITCH
(8Wa-50-2)
4 DATA LINK CONNECTOR
(8Wa-18-2)
6
4
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN-START)
SENTRY KEY IMMOBILIZER MODULE
S209
(8Wa-18-2)
B14 C203
PCI BUS
GROUND
GROUND
2
5
3
D25 18 VT/YL
Z1 20 BK
Z12 20 BK/LB
Z12 20 BK/LB
A6 C202
6 C108
Z12 20 BK/LB
6 C107
11 C103
Z12 20 BK/LB
S130
(8Wa-15-10)
Z12 10 BK/TN
C30 C3
POWERTRAIN CONTROL MODULE
18
AIRBAG CONTROL MODULE
(8Wa-43-3)
G302
(8Wa-15-9)
G105
(8Wa-15-13)


POWERTRAIN CONTROL MODULE
SPEED CONTROL SWITCH SIGNAL
C32
C3
SENSOR GROUND
A4
C1
K4
18
BK/LB
BATTERY TEMPERATURE SENSOR
(8Wa-30-10)
(8Wa-30-11)
SENSOR GROUND
2
2.5L
4.0L RHD
4.0L LHD
S133
(8Wa-70-4)
S121
(8Wa-70-8)
S121
(8Wa-70-7)
S133
(8Wa-70-7)
V37
18
RD/LG
K4
20
BK/LB
K4
20
BK/LB
8
C103
K4
20
BK/LB
S147
(8Wa-70-4)
(8Wa-70-6)
(8Wa-70-7)
(8Wa-70-8)
BATT F31
(8Wa-10-16)
C11
HORN RELAY
(8Wa-41-3)
C13
POWER DISTRIBUTION CENTER
(8Wa-10-2)
X3
20
RD/YL
7
C107
10
C108
K4
20
BK/LB
3
NOT USED
3
C108
SPEED CONTROL
OTHER
V37
20
RD/LG
2
C1
K4
20
BK/LB
3
C1
X3
20
RD/YL
1
C1
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 LAMP 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 TRANSMISSION SHIFT INTERLOCK SOLENOID
(8Wa-31-2)
BRAKE LAMP SWITCH SENSE
K29 20 WT/PK
C108
V32 20 YL/RD
K29 20 WT/PK
BRAKE LAMP SWITCH
(8Wa-51-7)
SPEED CONTROL SERVO
VACUUM SOLENOID
VENT SOLENOID
DUMP SOLENOID
V30 20 DB/RD
V30 20 DB/RD
Z1 20 BK
C107
Z1 18 BK
S106
(8Wa-15-2)
Z1 12 BK
G100
(8Wa-15-2)
G300
(8Wa-15-8)

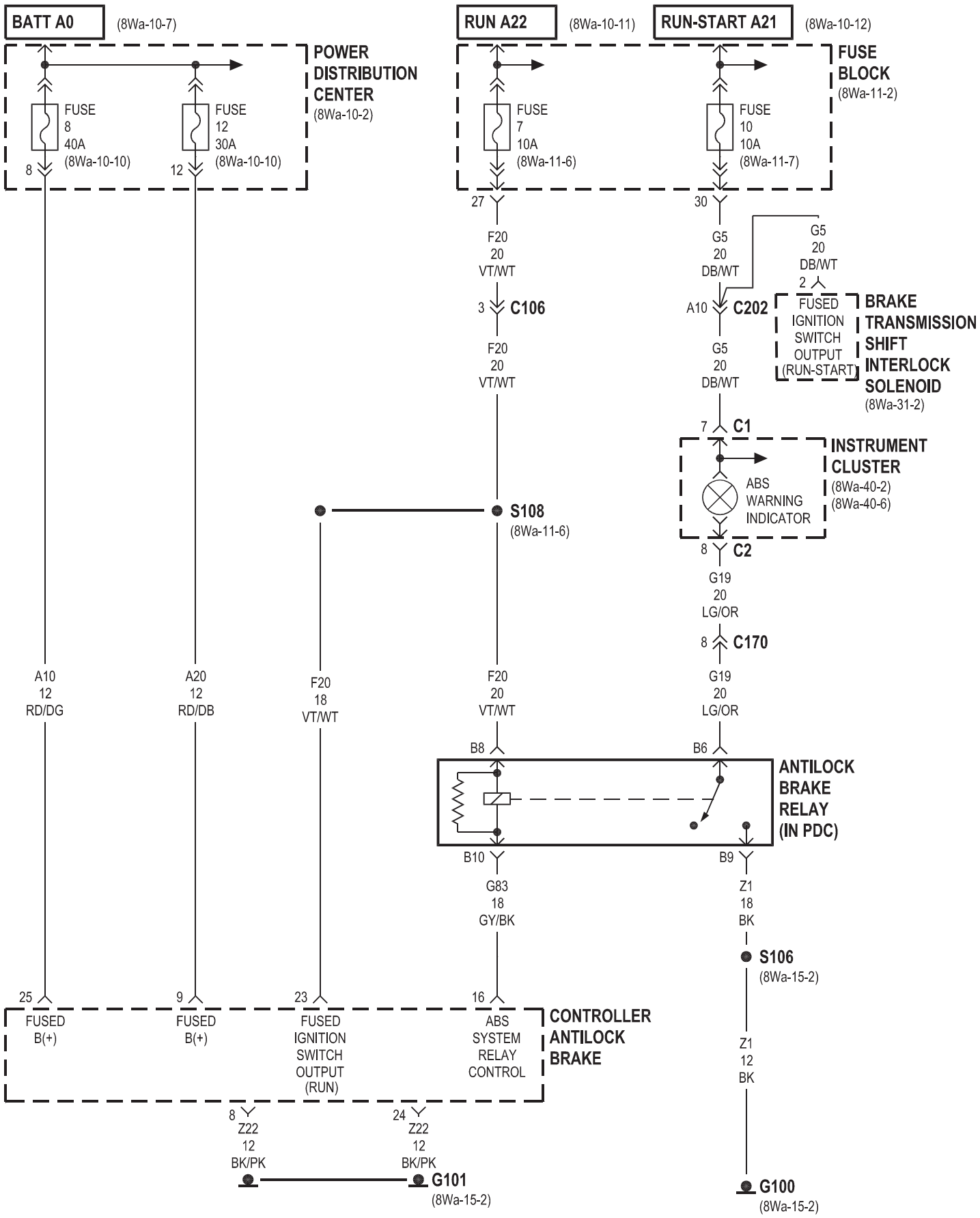
8W-31 TRANSMISSION CONTROL SYSTEM

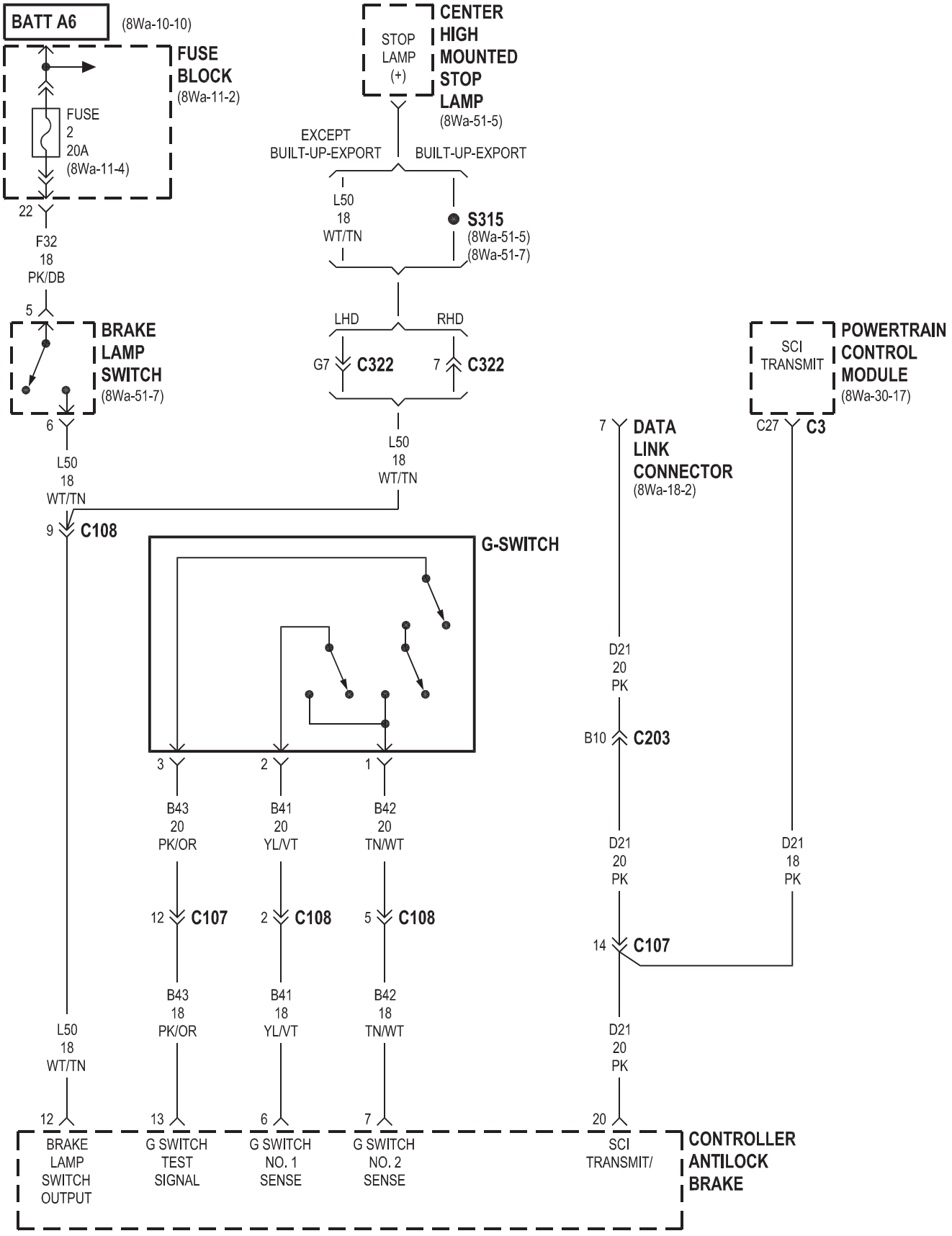
Component	Page
Brake Lamp Switch	8Wa-31-2
Brake Transmission Shift Interlock Solenoid	8Wa-31-2
Fuse 10 (FB)	8Wa-31-2
Fuse 11 (FB)	8Wa-31-2
Fuse Block	8Wa-31-2
G105	8Wa-31-2
G300	8Wa-31-2
Instrument Cluster	8Wa-31-2
Powertrain Control Module	8Wa-31-2
Torque Converter Clutch Solenoid	8Wa-31-2
Transfer Case Switch	8Wa-31-2

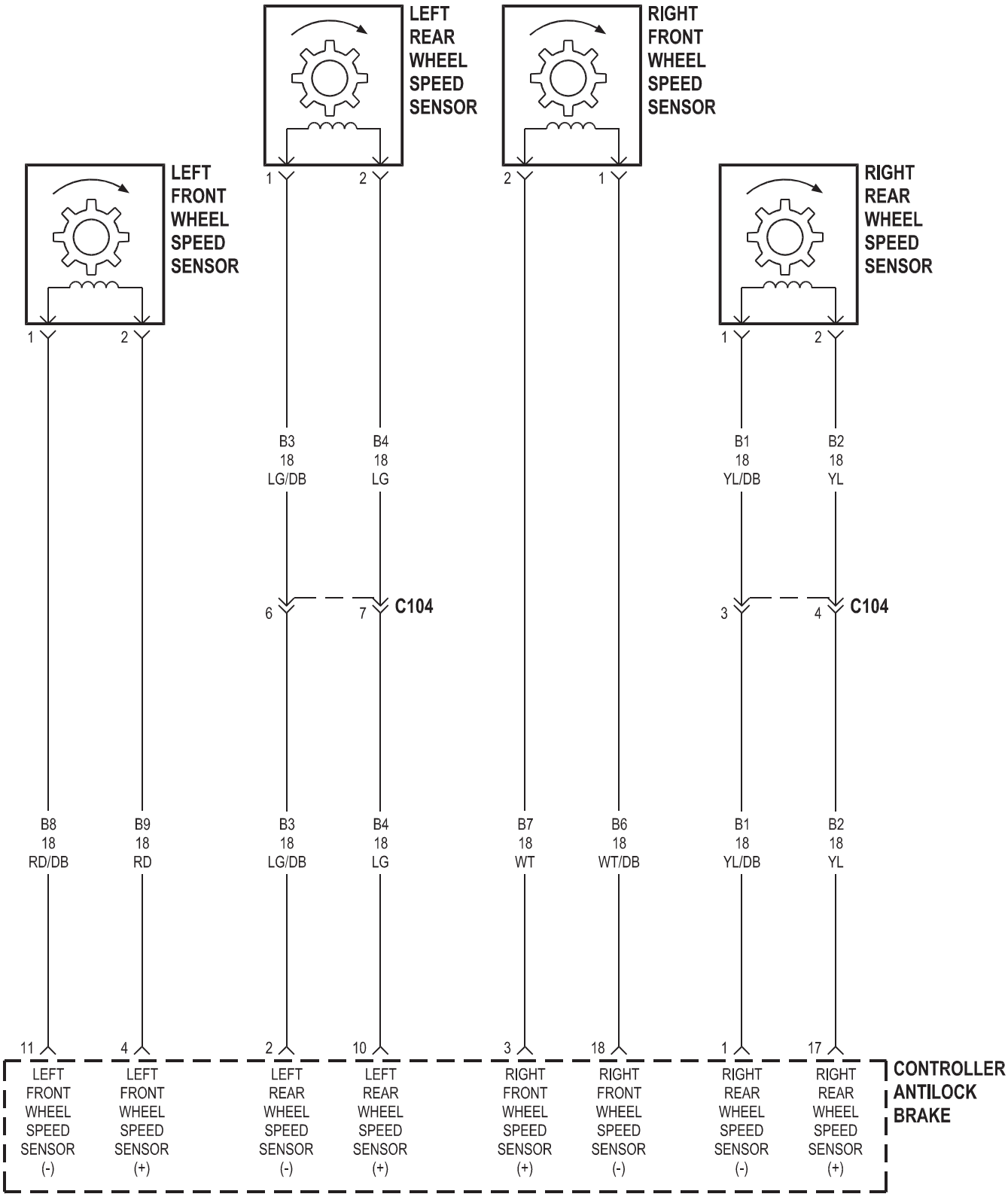

RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 11 10A
(8Wa-11-8)
FUSE 10 10A
(8Wa-11-7)
31
30
F12 20 RD/LG
G5 20 DB/WT
A10 C202
10 C106
G5 20 DB/WT
G5 20 DB/WT
2
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID
1
7 C1
INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-5)
4WD INDICATOR
S102
(8Wa-11-8)
16 C2
K29 20 WT/PK
G107 20 BK/RD
5 C170
G107 20 BK/RD
9 C103
14 C108
13 C103
F12 20 RD/LG
K29 20 WT/PK
G107 20 BK/RD
A
1
A
TORQUE CONVERTER CLUTCH SOLENOID
BRAKE LAMP SWITCH
(8Wa-51-7)
TRANSFER CASE SWITCH
B
2
B
T23 18 OR/LG
K29 18 WT/PK
Z1 20 BK
Z1 20 BK
B11 C2
C24 C3
S132
(8Wa-15-11)
(8Wa-15-12)
(8Wa-15-13)
TRANSMISSION LOW/ OVERDRIVE SOLENOID
BRAKE LAMP SWITCH SENSE
POWERTRAIN CONTROL MODULE
(8Wa-30-15)
(8Wa-30-16)
(8Wa-30-20)
Z1 14 BK
G300
(8Wa-15-8)
G105
(8Wa-15-13)

8W-35 ANTILOCK BRAKES

Component	Page
Antilock Brake Relay	8Wa-35-2
Brake Lamp Switch	8Wa-35-3
Brake Transmission Shift Interlock Solenoid	8Wa-35-2
Center High Mounted Stop Lamp	8Wa-35-3
Controller Antilock Brake	8Wa-35-2, 3, 4
Data Link Connector	8Wa-35-3
Fuse 2 (FB)	8Wa-35-3
Fuse 7 (FB)	8Wa-35-2
Fuse 10 (FB)	8Wa-35-2
Fuse 8 (PDC)	8Wa-35-2
Fuse 12 (PDC)	8Wa-35-2
Fuse Block	8Wa-35-2, 3
G-Switch	8Wa-35-3
G100	8Wa-35-2
G101	8Wa-35-2
Instrument Cluster	8Wa-35-2
Left Front Wheel Speed Sensor	8Wa-35-4
Left Rear Wheel Speed Sensor	8Wa-35-4
Power Distribution Center	8Wa-35-2
Powertrain Control Module	8Wa-35-3
Right Front Wheel Speed Sensor	8Wa-35-4
Right Rear Wheel Speed Sensor	8Wa-35-4

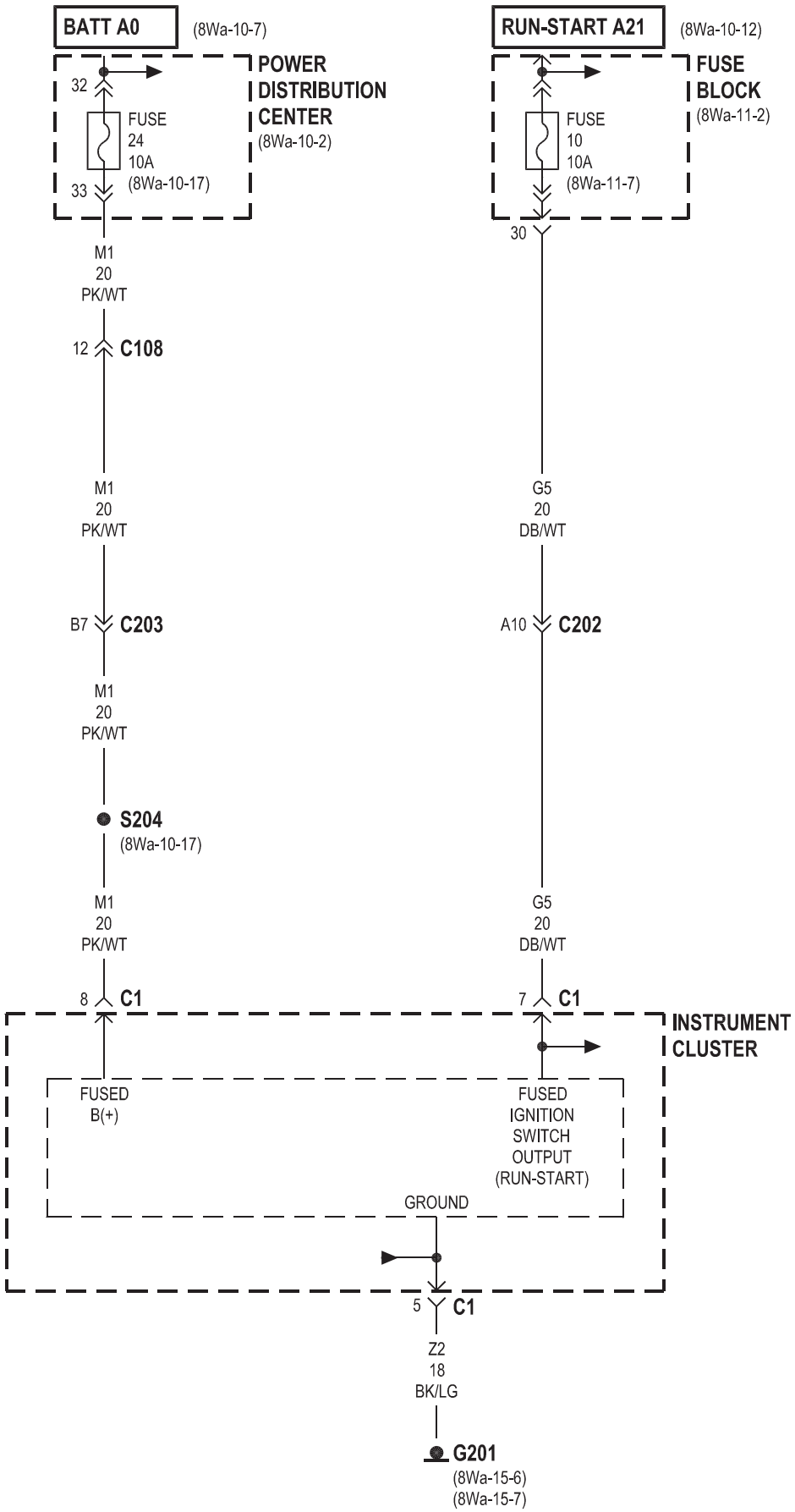

BATT A0
(8Wa-10-7)
RUN A22
(8Wa-10-11)
RUN-START A21
(8Wa-10-12)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE BLOCK
(8Wa-11-2)
FUSE 8 40A (8Wa-10-10)
FUSE 12 30A (8Wa-10-10)
FUSE 7 10A (8Wa-11-6)
FUSE 10 10A (8Wa-11-7)
8
12
27
30
F20 20 VT/WT
G5 20 DB/WT
G5 20 DB/WT
2
3 C106
A10 C202
FUSED IGNITION SWITCH OUTPUT (RUN-START)
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID
(8Wa-31-2)
F20 20 VT/WT
G5 20 DB/WT
7 C1
INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-6)
ABS WARNING INDICATOR
S108
(8Wa-11-6)
8 C2
G19 20 LG/OR
8 C170
A10 12 RD/DG
A20 12 RD/DB
F20 18 VT/WT
F20 20 VT/WT
G19 20 LG/OR
B8
B6
ANTILOCK BRAKE RELAY (IN PDC)
B10
B9
G83 18 GY/BK
Z1 18 BK
S106
(8Wa-15-2)
25
9
23
16
FUSED B(+)
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN)
ABS SYSTEM RELAY CONTROL
CONTROLLER ANTILOCK BRAKE
Z1 12 BK
8 Z22 12 BK/PK
24 Z22 12 BK/PK
G101
(8Wa-15-2)
G100
(8Wa-15-2)

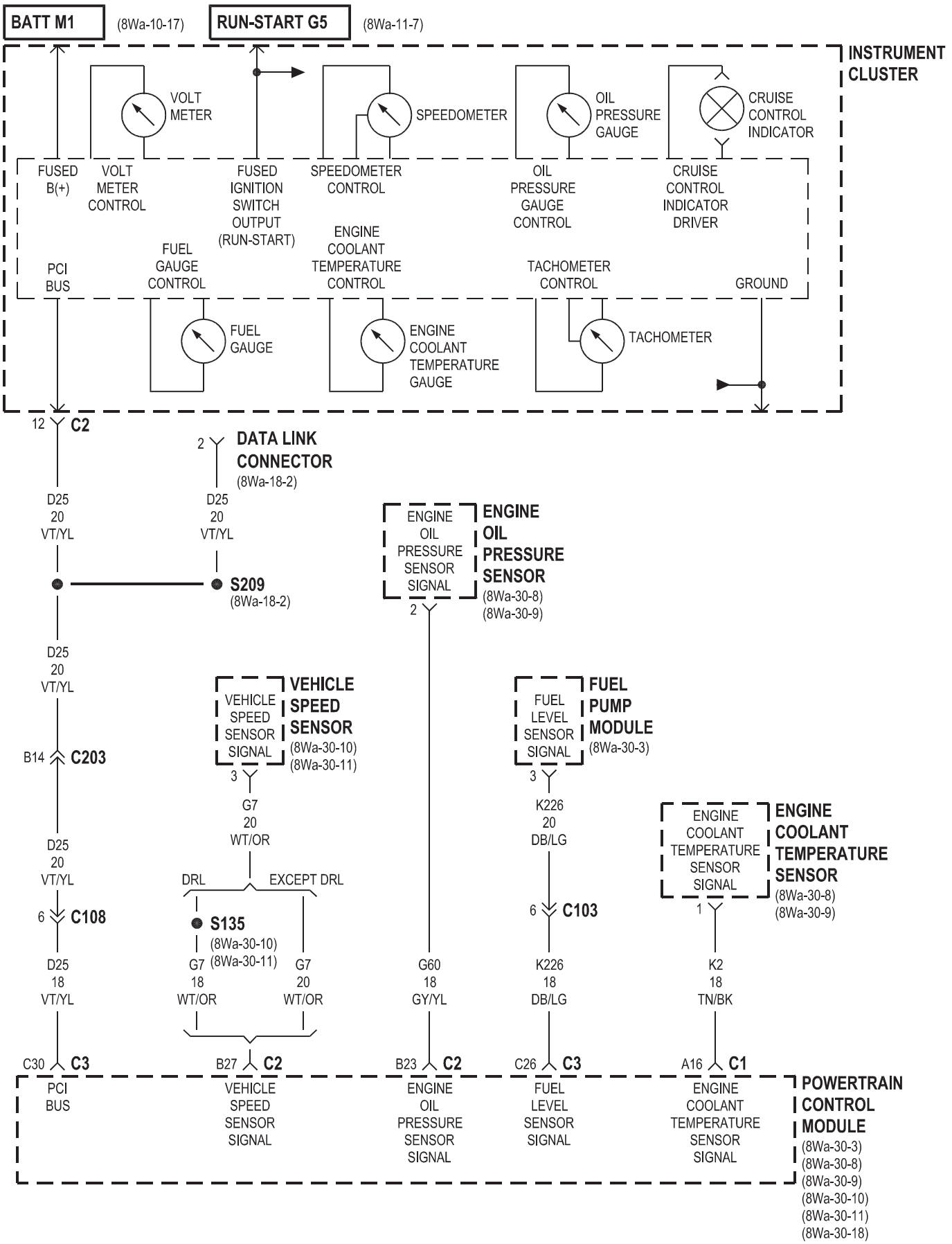

BATT A6
(8Wa-10-10)
FUSE BLOCK
(8Wa-11-2)
FUSE 2 20A
(8Wa-11-4)
22
F32 18 PK/DB
5
BRAKE LAMP SWITCH
(8Wa-51-7)
6
L50 18 WT/TN
9 C108
STOP LAMP (+)
CENTER HIGH MOUNTED STOP LAMP
(8Wa-51-5)
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
L50 18 WT/TN
S315
(8Wa-51-5)
(8Wa-51-7)
LHD
RHD
G7 C322
7 C322
L50 18 WT/TN
SCI TRANSMIT
POWERTRAIN CONTROL MODULE
(8Wa-30-17)
C27 C3
7 DATA LINK CONNECTOR
(8Wa-18-2)
G-SWITCH
3
2
1
B43 20 PK/OR
B41 20 YL/VT
B42 20 TN/WT
12 C107
2 C108
5 C108
B43 18 PK/OR
B41 18 YL/VT
B42 18 TN/WT
D21 20 PK
B10 C203
D21 20 PK
D21 18 PK
14 C107
D21 20 PK
L50 18 WT/TN
12
13
6
7
20
BRAKE LAMP SWITCH OUTPUT
G SWITCH TEST SIGNAL
G SWITCH NO. 1 SENSE
G SWITCH NO. 2 SENSE
SCI TRANSMIT/
CONTROLLER ANTILOCK BRAKE

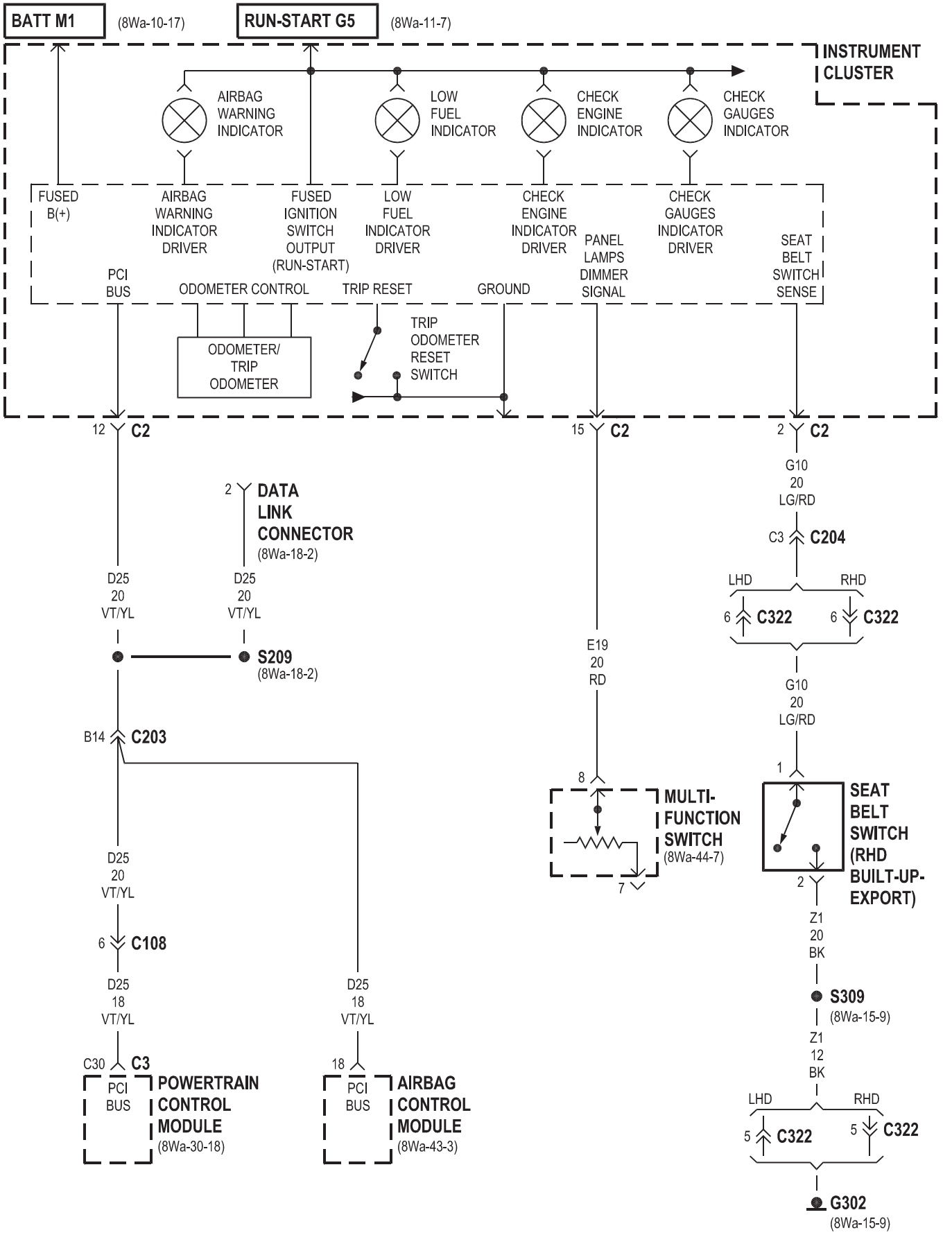

LEFT REAR WHEEL SPEED SENSOR
RIGHT FRONT WHEEL SPEED SENSOR
LEFT FRONT WHEEL SPEED SENSOR
RIGHT REAR WHEEL SPEED SENSOR
1
2
B3 18 LG/DB
B4 18 LG
B1 18 YL/DB
B2 18 YL
6
7
C104
3
4
C104
B8 18 RD/DB
B9 18 RD
B3 18 LG/DB
B4 18 LG
B7 18 WT
B6 18 WT/DB
B1 18 YL/DB
B2 18 YL
11
4
2
10
3
18
1
17
LEFT FRONT WHEEL 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 ANTILOCK BRAKE

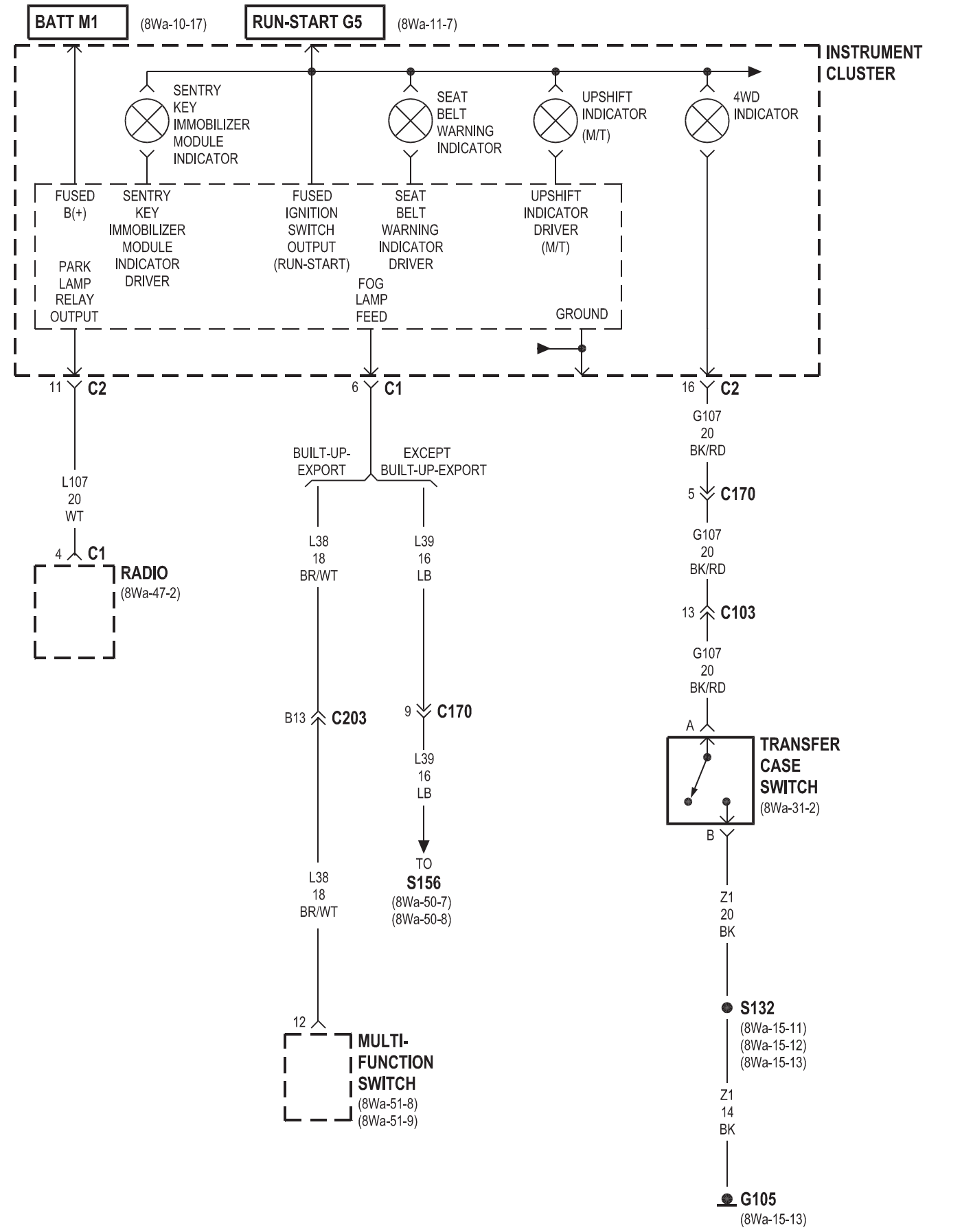
8W-40 INSTRUMENT CLUSTER

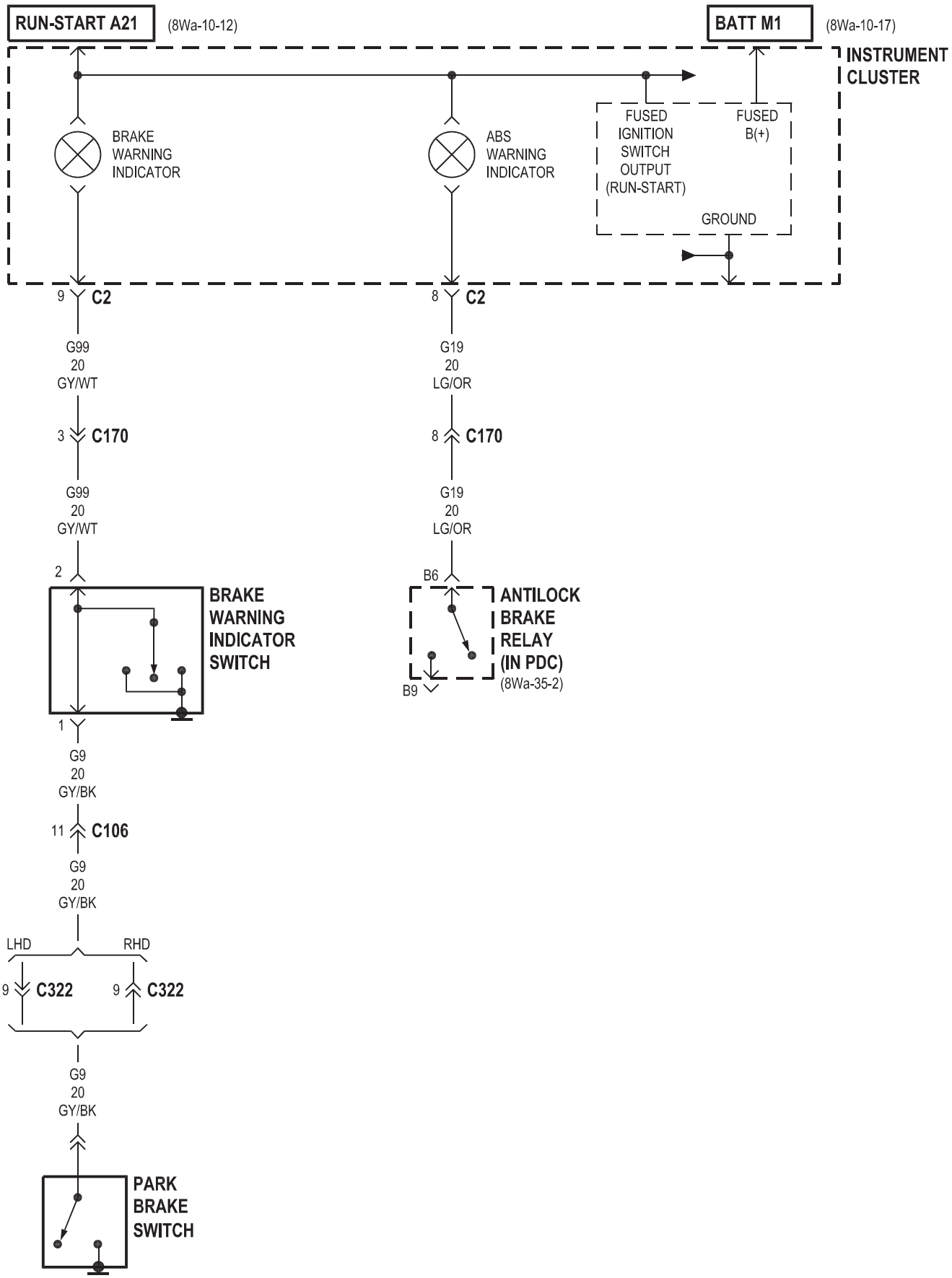
Component	Page
Airbag Control Module	8Wa-40-4
Antilock Brake Relay	8Wa-40-6
Brake Warning Indicator Switch	8Wa-40-6
Data Link Connector	8Wa-40-3, 4
Daytime Running Lamp Module	8Wa-40-9
Driver Door Ajar Switch	8Wa-40-7
Engine Coolant Temperature Sensor	8Wa-40-3
Engine Oil Pressure Sensor	8Wa-40-3
Fog Lamp Relay	8Wa-40-9
Fuel Pump Module	8Wa-40-3
Fuse 4 (FB)	8Wa-40-7
Fuse 10 (FB)	8Wa-40-2
Fuse 24 (PDC)	8Wa-40-2
Fuse Block	8Wa-40-2, 7
G105	8Wa-40-5
G201	8Wa-40-2
G300	8Wa-40-7
G302	8Wa-40-4
Ignition Switch	8Wa-40-7
Instrument Cluster	8Wa-40-2, 3, 4, 5, 6, 7, 8, 9
Multi-Function Switch	8Wa-40-4, 5, 7, 9
Park Brake Switch	8Wa-40-6
Passenger Door Ajar Switch	8Wa-40-7
Power Distribution Center	8Wa-40-2
Powertrain Control Module	8Wa-40-3, 4
Radio	8Wa-40-5
Rear Window Defogger Relay	8Wa-40-8
Rear Window Defogger Switch	8Wa-40-8
Seat Belt Switch	8Wa-40-4
Transfer Case Switch	8Wa-40-5
Vehicle Speed Sensor	8Wa-40-3

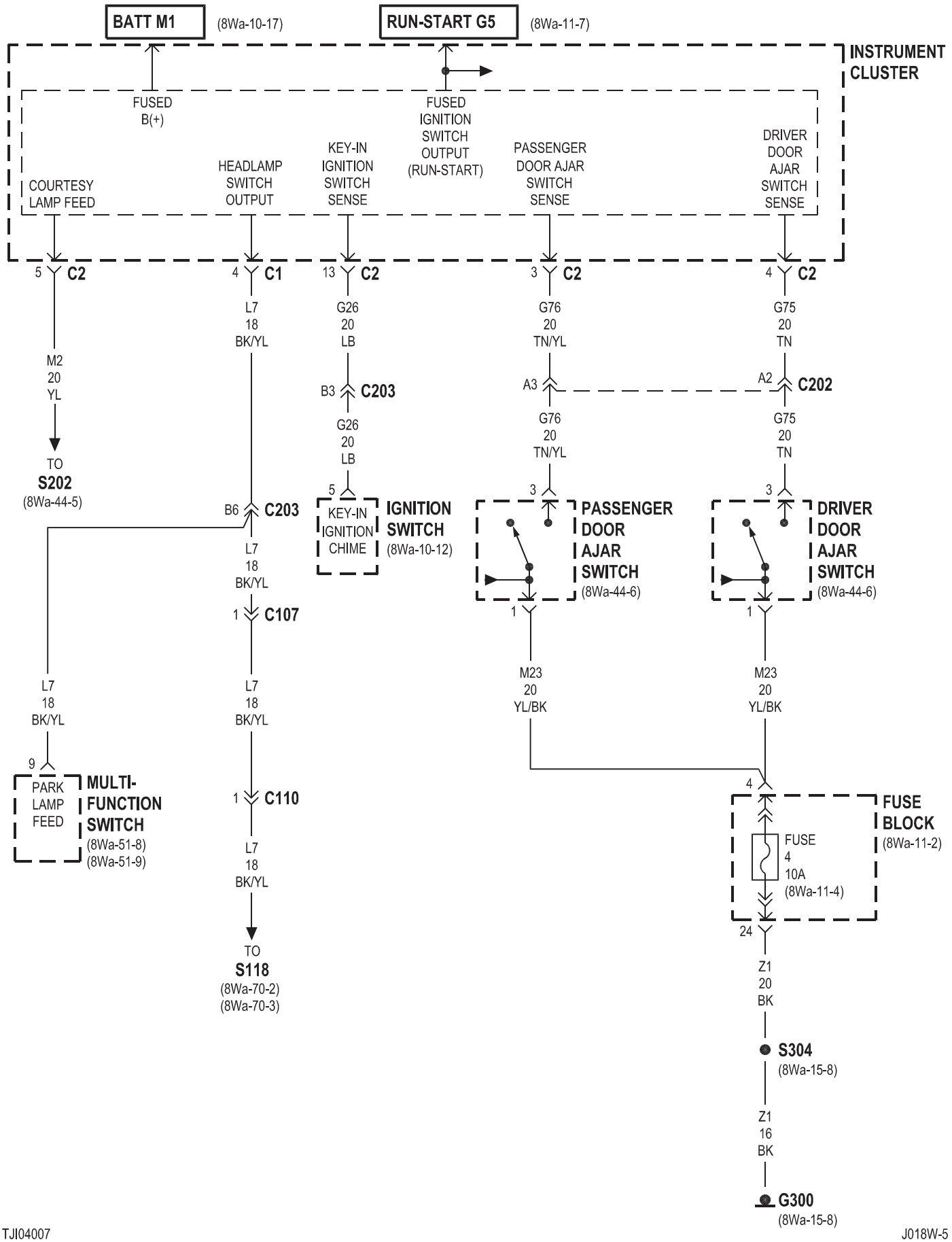

BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
32
FUSE 24 10A
(8Wa-10-17)
33
M1 20 PK/WT
12 C108
M1 20 PK/WT
B7 C203
M1 20 PK/WT
S204
(8Wa-10-17)
M1 20 PK/WT
8 C1
RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 10 10A
(8Wa-11-7)
30
G5 20 DB/WT
A10 C202
G5 20 DB/WT
7 C1
INSTRUMENT CLUSTER
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN-START)
GROUND
5 C1
Z2 18 BK/LG
G201
(8Wa-15-6)
(8Wa-15-7)

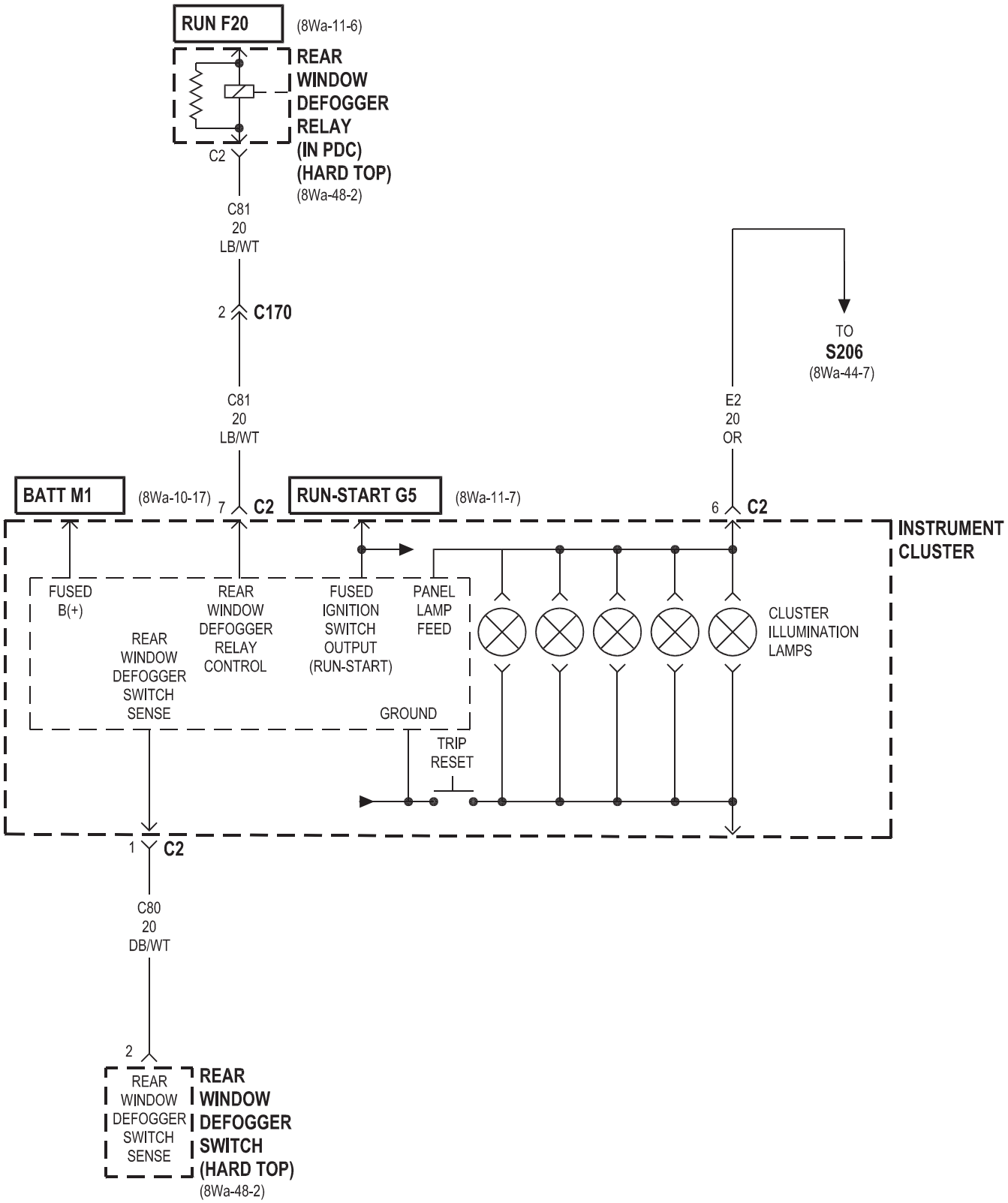

BATT M1
(8Wa-10-17)
RUN-START G5
(8Wa-11-7)
INSTRUMENT CLUSTER
VOLT METER
SPEEDOMETER
OIL PRESSURE GAUGE
CRUISE CONTROL INDICATOR
FUSED B(+)
VOLT METER CONTROL
FUSED IGNITION SWITCH OUTPUT (RUN-START)
SPEEDOMETER CONTROL
OIL PRESSURE GAUGE CONTROL
CRUISE CONTROL INDICATOR DRIVER
PCI BUS
FUEL GAUGE CONTROL
ENGINE COOLANT TEMPERATURE CONTROL
TACHOMETER CONTROL
GROUND
FUEL GAUGE
ENGINE COOLANT TEMPERATURE GAUGE
TACHOMETER
12 C2
2 DATA LINK CONNECTOR
(8Wa-18-2)
D25 20 VT/YL
S209
(8Wa-18-2)
ENGINE OIL PRESSURE SENSOR SIGNAL
ENGINE OIL PRESSURE SENSOR
(8Wa-30-8)
(8Wa-30-9)
B14 C203
VEHICLE SPEED SENSOR SIGNAL
VEHICLE SPEED SENSOR
(8Wa-30-10)
(8Wa-30-11)
FUEL LEVEL SENSOR SIGNAL
FUEL PUMP MODULE
(8Wa-30-3)
G7 20 WT/OR
DRL
EXCEPT DRL
S135
(8Wa-30-10)
(8Wa-30-11)
K226 20 DB/LG
6 C108
6 C103
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
ENGINE COOLANT TEMPERATURE SENSOR
(8Wa-30-8)
(8Wa-30-9)
D25 18 VT/YL
G7 18 WT/OR
G60 18 GY/YL
K226 18 DB/LG
K2 18 TN/BK
C30 C3
B27 C2
B23 C2
C26 C3
A16 C1
PCI BUS
VEHICLE SPEED SENSOR SIGNAL
ENGINE OIL PRESSURE SENSOR SIGNAL
FUEL LEVEL SENSOR SIGNAL
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
POWERTRAIN CONTROL MODULE
(8Wa-30-3)
(8Wa-30-8)
(8Wa-30-9)
(8Wa-30-10)
(8Wa-30-11)
(8Wa-30-18)

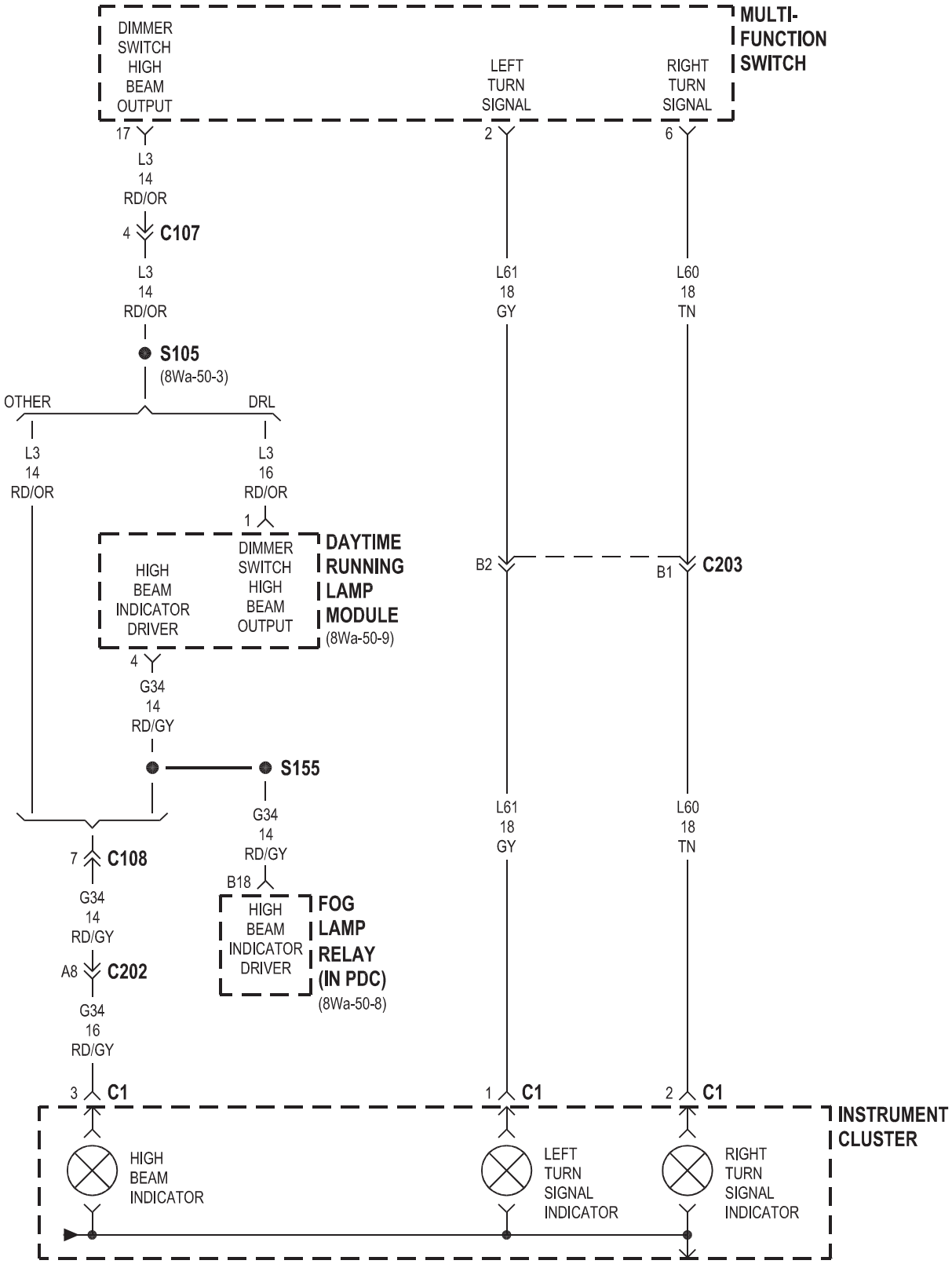

BATT M1
(8Wa-10-17)
RUN-START G5
(8Wa-11-7)
INSTRUMENT CLUSTER
AIRBAG WARNING INDICATOR
LOW FUEL INDICATOR
CHECK ENGINE INDICATOR
CHECK GAUGES INDICATOR
FUSED B(+)
AIRBAG WARNING INDICATOR DRIVER
FUSED IGNITION SWITCH OUTPUT (RUN-START)
LOW FUEL INDICATOR DRIVER
CHECK ENGINE INDICATOR DRIVER
PANEL LAMPS DIMMER SIGNAL
CHECK GAUGES INDICATOR DRIVER
SEAT BELT SWITCH SENSE
PCI BUS
ODOMETER CONTROL
TRIP RESET
GROUND
ODOMETER/ TRIP ODOMETER
TRIP ODOMETER RESET SWITCH
12 C2
15 C2
2 C2
2 DATA LINK CONNECTOR
(8Wa-18-2)
D25 20 VT/YL
D25 20 VT/YL
S209
(8Wa-18-2)
B14 C203
D25 20 VT/YL
6 C108
D25 18 VT/YL
C30 C3
PCI BUS
POWERTRAIN CONTROL MODULE
(8Wa-30-18)
D25 18 VT/YL
18
PCI BUS
AIRBAG CONTROL MODULE
(8Wa-43-3)
E19 20 RD
8
7
MULTI-FUNCTION SWITCH
(8Wa-44-7)
G10 20 LG/RD
C3 C204
LHD
RHD
6 C322
6 C322
G10 20 LG/RD
1
2
SEAT BELT SWITCH (RHD BUILT-UP-EXPORT)
Z1 20 BK
S309
(8Wa-15-9)
Z1 12 BK
LHD
RHD
5 C322
5 C322
G302
(8Wa-15-9)


BATT M1
(8Wa-10-17)
RUN-START G5
(8Wa-11-7)
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 (RUN-START)
SEAT BELT WARNING INDICATOR DRIVER
UPSHIFT INDICATOR DRIVER (M/T)
PARK LAMP RELAY OUTPUT
FOG LAMP FEED
GROUND
11 C2
6 C1
16 C2
L107 20 WT
4 C1
RADIO
(8Wa-47-2)
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
L38 18 BR/WT
L39 16 LB
G107 20 BK/RD
5 C170
G107 20 BK/RD
13 C103
G107 20 BK/RD
A
TRANSFER CASE SWITCH
(8Wa-31-2)
B
B13 C203
9 C170
L39 16 LB
TO S156
(8Wa-50-7)
(8Wa-50-8)
Z1 20 BK
L38 18 BR/WT
12
MULTI-FUNCTION SWITCH
(8Wa-51-8)
(8Wa-51-9)
S132
(8Wa-15-11)
(8Wa-15-12)
(8Wa-15-13)
Z1 14 BK
G105
(8Wa-15-13)


RUN-START A21
(8Wa-10-12)
BATT M1
(8Wa-10-17)
INSTRUMENT CLUSTER
BRAKE WARNING INDICATOR
ABS WARNING INDICATOR
FUSED IGNITION SWITCH OUTPUT (RUN-START)
FUSED B(+)
GROUND
9 C2
8 C2
G99 20 GY/WT
G19 20 LG/OR
3 C170
8 C170
G99 20 GY/WT
G19 20 LG/OR
2
B6
BRAKE WARNING INDICATOR SWITCH
ANTILOCK BRAKE RELAY (IN PDC)
(8Wa-35-2)
B9
1
G9 20 GY/BK
11 C106
G9 20 GY/BK
LHD
RHD
9 C322
9 C322
G9 20 GY/BK
PARK BRAKE SWITCH

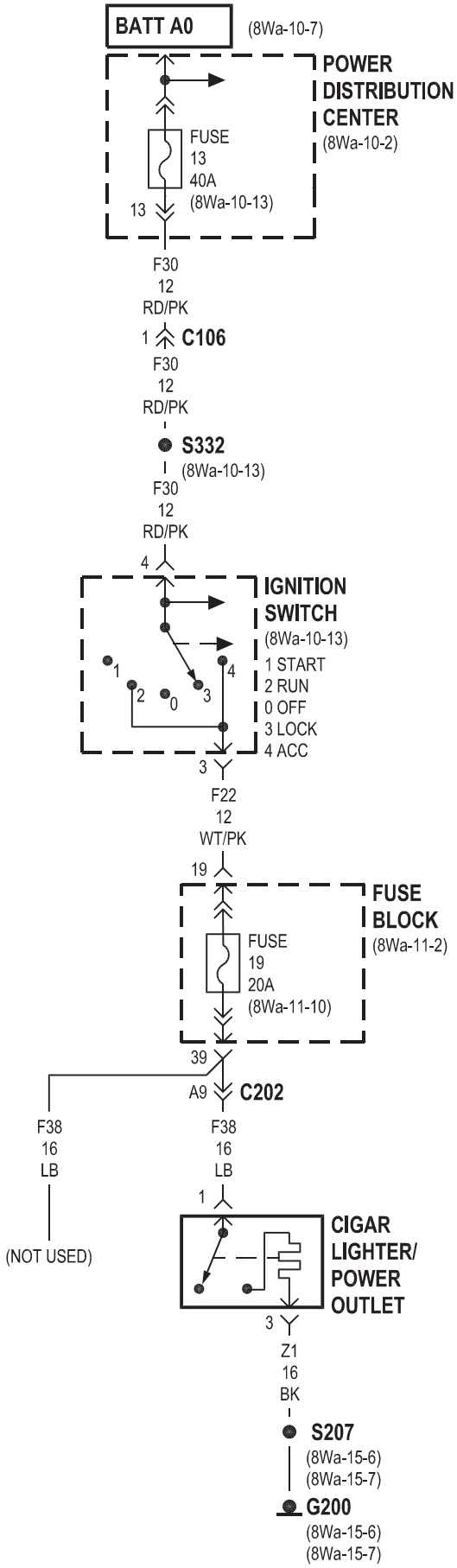

BATT M1
(8Wa-10-17)
RUN-START G5
(8Wa-11-7)
INSTRUMENT CLUSTER
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN-START)
COURTESY LAMP FEED
HEADLAMP SWITCH OUTPUT
KEY-IN IGNITION SWITCH SENSE
PASSENGER DOOR AJAR SWITCH SENSE
DRIVER DOOR AJAR SWITCH SENSE
5 C2
4 C1
13 C2
3 C2
4 C2
M2 20 YL
TO S202
(8Wa-44-5)
L7 18 BK/YL
G26 20 LB
B3 C203
G26 20 LB
5
KEY-IN IGNITION CHIME
IGNITION SWITCH
(8Wa-10-12)
G76 20 TN/YL
A3
G75 20 TN
A2 C202
B6 C203
L7 18 BK/YL
1 C107
L7 18 BK/YL
1 C110
L7 18 BK/YL
TO S118
(8Wa-70-2)
(8Wa-70-3)
G76 20 TN/YL
3
PASSENGER DOOR AJAR SWITCH
(8Wa-44-6)
1
M23 20 YL/BK
G75 20 TN
3
DRIVER DOOR AJAR SWITCH
(8Wa-44-6)
1
M23 20 YL/BK
L7 18 BK/YL
9
PARK LAMP FEED
MULTI-FUNCTION SWITCH
(8Wa-51-8)
(8Wa-51-9)
4
FUSE 4 10A
(8Wa-11-4)
FUSE BLOCK
(8Wa-11-2)
24
Z1 20 BK
S304
(8Wa-15-8)
Z1 16 BK
G300
(8Wa-15-8)

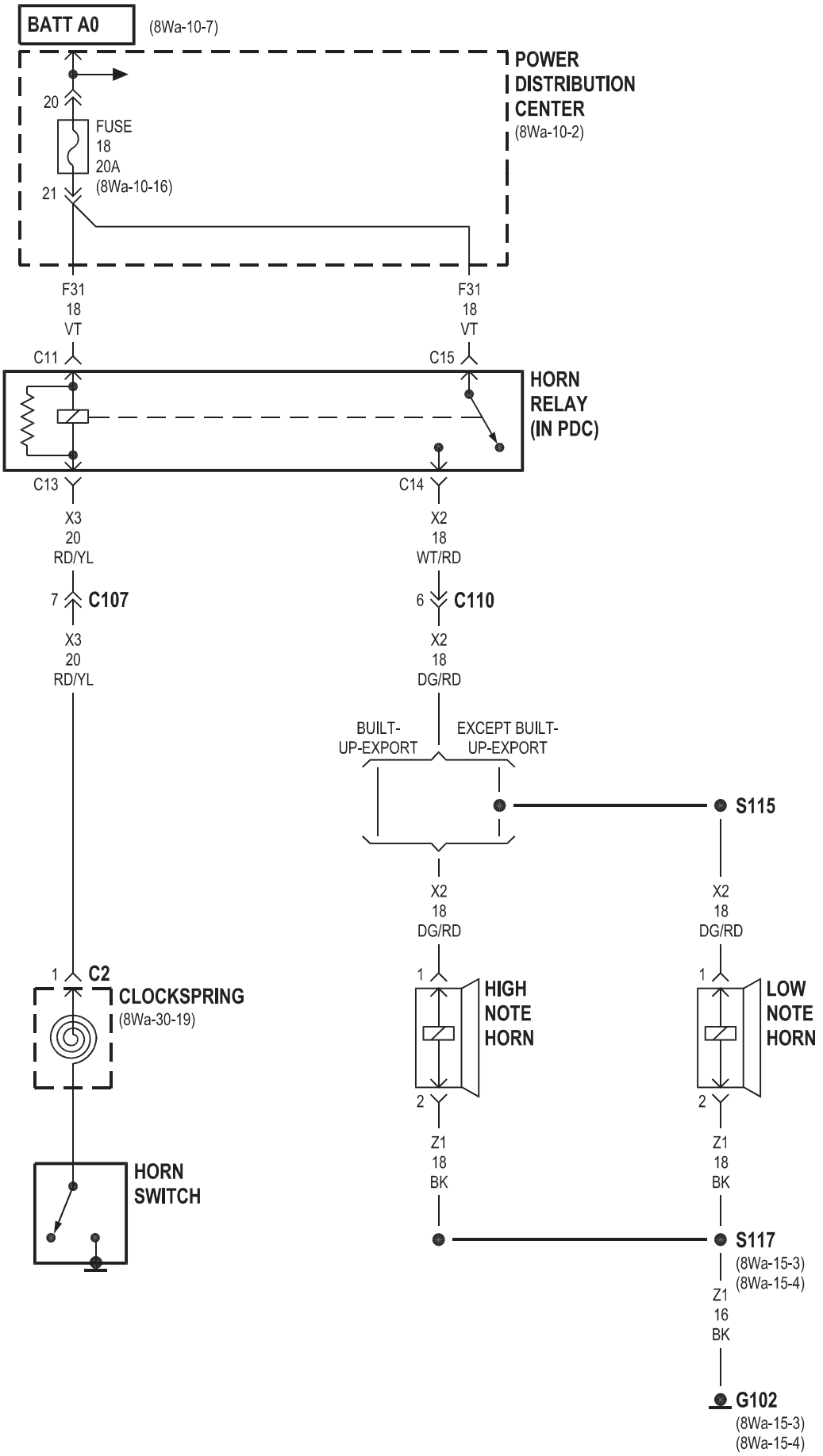

RUN F20
(8Wa-11-6)
REAR WINDOW DEFOGGER RELAY (IN PDC) (HARD TOP)
(8Wa-48-2)
C2
C81
20
LB/WT
2 C170
C81
20
LB/WT
BATT M1
(8Wa-10-17)
7 C2
RUN-START G5
(8Wa-11-7)
TO S206
(8Wa-44-7)
E2
20
OR
6 C2
INSTRUMENT CLUSTER
FUSED B(+)
REAR WINDOW DEFOGGER SWITCH SENSE
REAR WINDOW DEFOGGER RELAY CONTROL
FUSED IGNITION SWITCH OUTPUT (RUN-START)
PANEL LAMP FEED
CLUSTER ILLUMINATION LAMPS
GROUND
TRIP RESET
1 C2
C80
20
DB/WT
2
REAR WINDOW DEFOGGER SWITCH SENSE
REAR WINDOW DEFOGGER SWITCH (HARD TOP)
(8Wa-48-2)


MULTI-
FUNCTION
SWITCH
DIMMER
SWITCH
HIGH
BEAM
OUTPUT
LEFT
TURN
SIGNAL
RIGHT
TURN
SIGNAL
17
2
6
L3
14
RD/OR
4
C107
L3
14
RD/OR
L61
18
GY
L60
18
TN
S105
(8Wa-50-3)
OTHER
DRL
L3
14
RD/OR
L3
16
RD/OR
1
HIGH
BEAM
INDICATOR
DRIVER
DIMMER
SWITCH
HIGH
BEAM
OUTPUT
DAYTIME
RUNNING
LAMP
MODULE
(8Wa-50-9)
B2
B1
C203
4
G34
14
RD/GY
S155
G34
14
RD/GY
L61
18
GY
L60
18
TN
7
C108
B18
HIGH
BEAM
INDICATOR
DRIVER
FOG
LAMP
RELAY
(IN PDC)
(8Wa-50-8)
G34
14
RD/GY
A8
C202
G34
16
RD/GY
3
C1
1
C1
2
C1
INSTRUMENT
CLUSTER
HIGH
BEAM
INDICATOR
LEFT
TURN
SIGNAL
INDICATOR
RIGHT
TURN
SIGNAL
INDICATOR

8W-41 HORN/CIGAR LIGHTER/POWER OUTLET

Component	Page
Cigar Lighter/Power Outlet	8Wa-41-2
Clockspring	8Wa-41-3
Fuse 19 (FB)	8Wa-41-2
Fuse 13 (PDC)	8Wa-41-2
Fuse 18 (PDC)	8Wa-41-3
Fuse Block	8Wa-41-2
G102	8Wa-41-3
G200	8Wa-41-2
High Note Horn	8Wa-41-3
Horn Relay	8Wa-41-3
Horn Switch	8Wa-41-3
Ignition Switch	8Wa-41-2
Low Note Horn	8Wa-41-3
Power Distribution Center	8Wa-41-2, 3

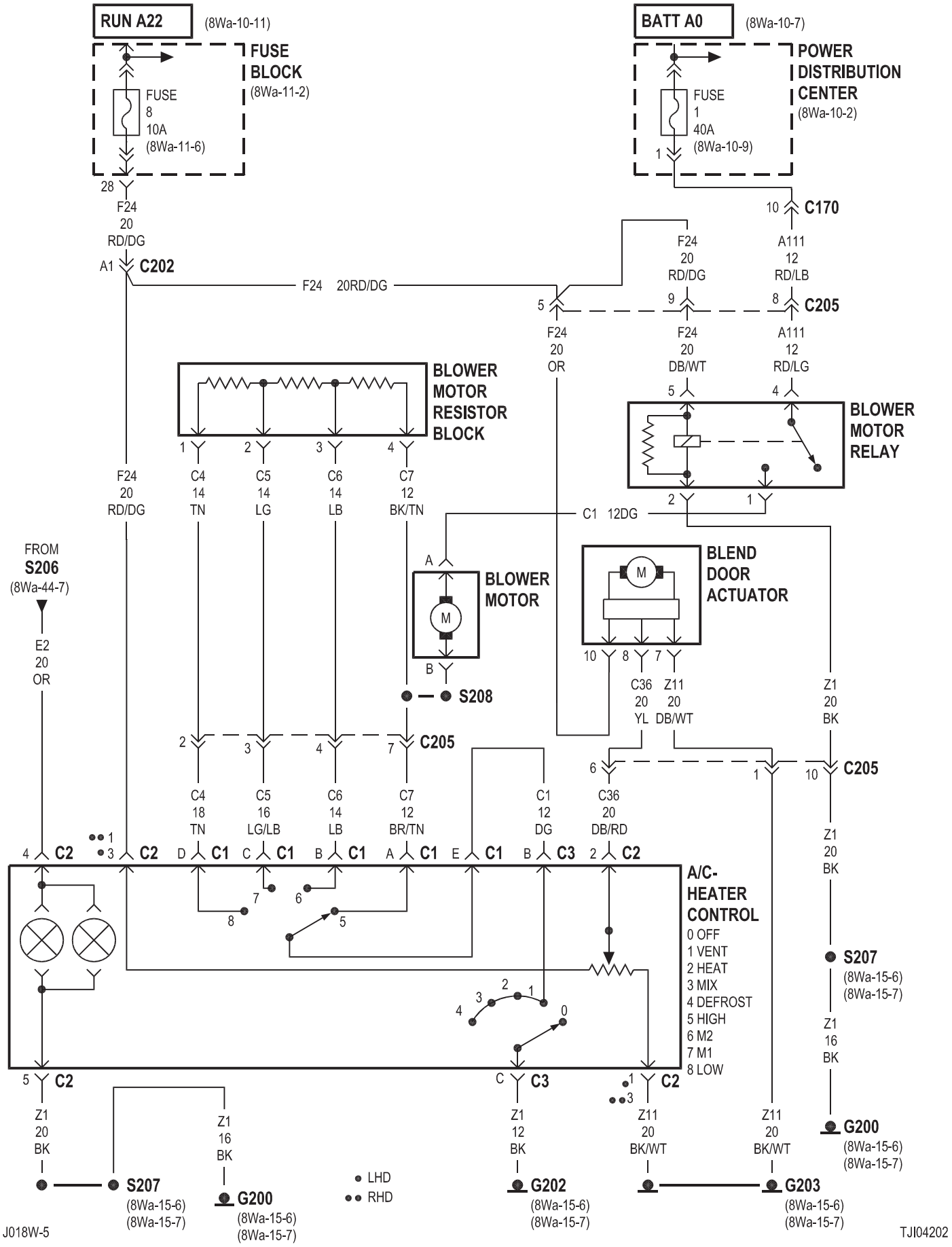

BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 13 40A
(8Wa-10-13)
13
F30 12 RD/PK
1
C106
F30 12 RD/PK
S332
(8Wa-10-13)
F30 12 RD/PK
4
IGNITION SWITCH
(8Wa-10-13)
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
3
F22 12 WT/PK
19
FUSE BLOCK
(8Wa-11-2)
FUSE 19 20A
(8Wa-11-10)
39
A9
C202
F38 16 LB
(NOT USED)
F38 16 LB
1
CIGAR LIGHTER/ POWER OUTLET
3
Z1 16 BK
S207
(8Wa-15-6)
(8Wa-15-7)
G200
(8Wa-15-6)
(8Wa-15-7)


BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
20
FUSE
18
20A
(8Wa-10-16)
21
F31
18
VT
C11
F31
18
VT
C15
HORN RELAY (IN PDC)
C13
C14
X3
20
RD/YL
7
C107
X2
18
WT/RD
6
C110
X3
20
RD/YL
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
S115
X2
18
DG/RD
X2
18
DG/RD
1
C2
CLOCKSPRING
(8Wa-30-19)
1
HIGH NOTE HORN
1
LOW NOTE HORN
2
2
Z1
18
BK
Z1
18
BK
HORN SWITCH
S117
(8Wa-15-3)
(8Wa-15-4)
Z1
16
BK
G102
(8Wa-15-3)
(8Wa-15-4)

8W-42 AIR CONDITIONING-HEATER

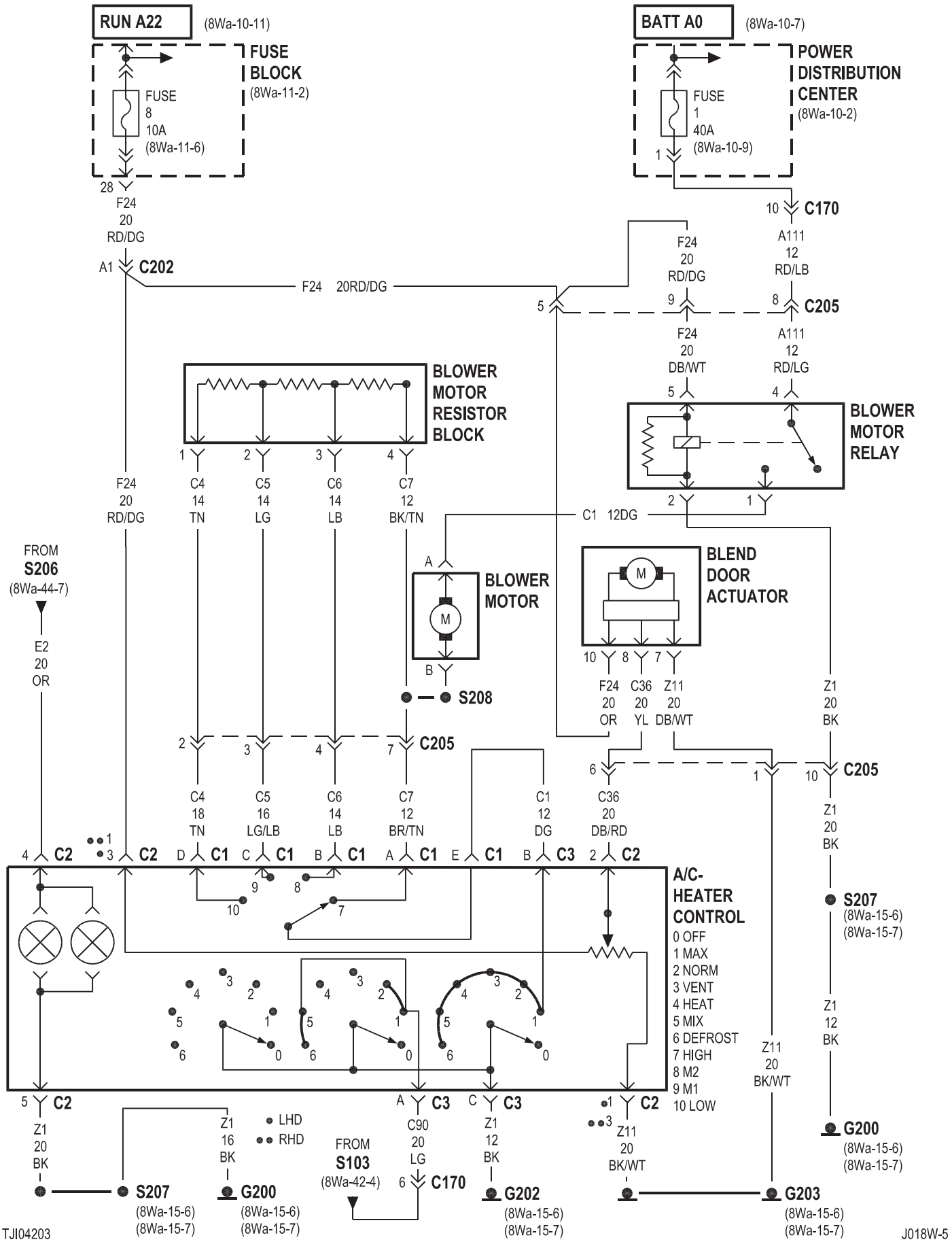
Component	Page
A/C Compressor Clutch	8Wa-42-4
A/C Compressor Clutch Relay	8Wa-42-4
A/C High Pressure Switch	8Wa-42-4
A/C Low Pressure Switch	8Wa-42-4
A/C-Heater Control	8Wa-42-2, 3, 4
Blend Door Actuator	8Wa-42-2, 3
Blower Motor	8Wa-42-2, 3
Blower Motor Relay	8Wa-42-2, 3
Blower Motor Resistor Block	8Wa-42-2, 3
Fuse 8 (FB)	8Wa-42-2, 3
Fuse 11 (FB)	8Wa-42-4
Fuse 1 (PDC)	8Wa-42-2, 3
Fuse 21 (PDC)	8Wa-42-4
Fuse Block	8Wa-42-2, 3, 4
G105	8Wa-42-4
G200	8Wa-42-2, 3
G202	8Wa-42-2, 3, 4
G203	8Wa-42-2, 3
Power Distribution Center	8Wa-42-2, 3, 4
Powertrain Control Module	8Wa-42-4

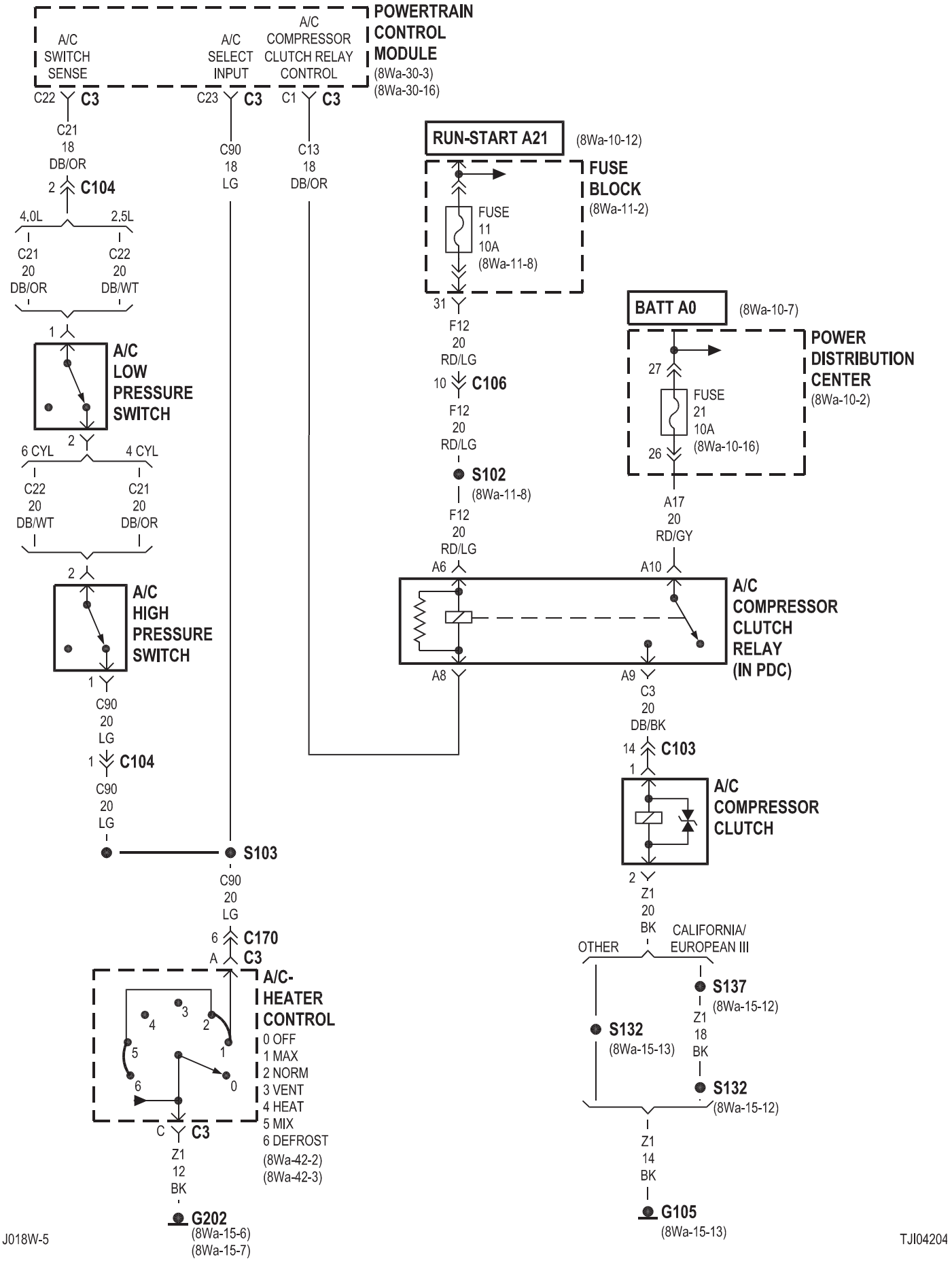
HEATER ONLY



J018W-5

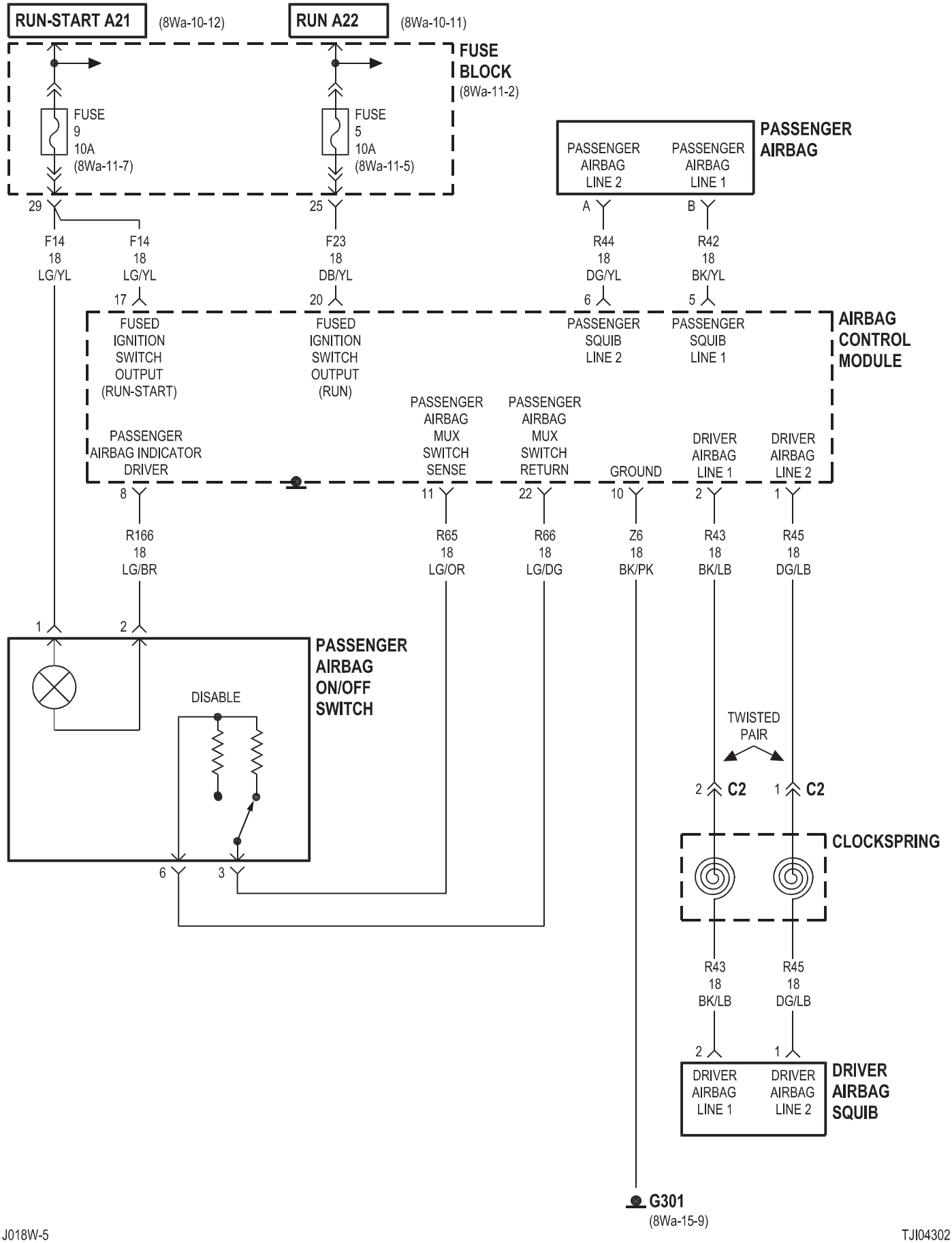
TJI04202

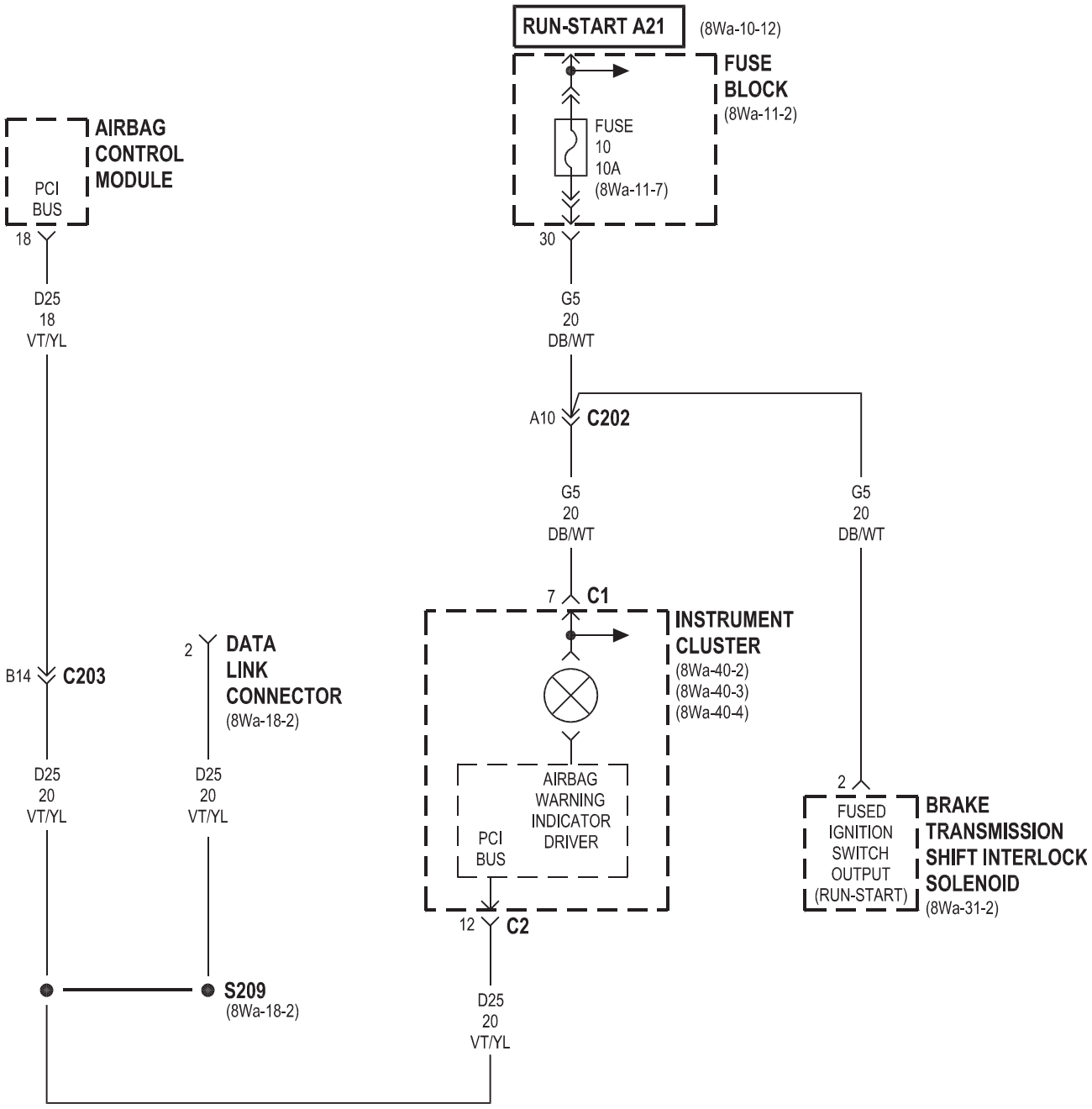

RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 8 10A
(8Wa-11-6)
28
F24 20 RD/DG
A1 C202
BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 1 40A
(8Wa-10-9)
1
10 C170
A111 12 RD/LB
F24 20 RD/DG
F24 20RD/DG
5
9
8 C205
F24 20 DB/WT
A111 12 RD/LG
5
4
BLOWER MOTOR RESISTOR BLOCK
BLOWER MOTOR RELAY
1 2 3 4
2 1
F24 20 RD/DG
C4 14 TN
C5 14 LG
C6 14 LB
C7 12 BK/TN
C1 12DG
FROM S206
(8Wa-44-7)
E2 20 OR
A
BLOWER MOTOR
M
B
S208
BLEND DOOR ACTUATOR
10 8 7
F24 20 OR
C36 20 YL
Z11 20 DB/WT
Z1 20 BK
2 3 4 7 C205
6 1 10 C205
C4 18 TN
C5 16 LG/LB
C6 14 LB
C7 12 BR/TN
C1 12 DG
C36 20 DB/RD
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
S207
(8Wa-15-6)
(8Wa-15-7)
Z1 12 BK
Z11 20 BK/WT
5 C2 A C3 C C3 1 3 C2
Z1 20 BK
Z1 16 BK
LHD
RHD
FROM S103
(8Wa-42-4)
C90 20 LG
6 C170
Z1 12 BK
Z11 20 BK/WT
S207
(8Wa-15-6)
(8Wa-15-7)
G200
(8Wa-15-6)
(8Wa-15-7)
G202
(8Wa-15-6)
(8Wa-15-7)
G203
(8Wa-15-6)
(8Wa-15-7)
G200
(8Wa-15-6)
(8Wa-15-7)
TJI04203
J018W-5


POWERTRAIN CONTROL MODULE
(8Wa-30-3)
(8Wa-30-16)
A/C SWITCH SENSE
A/C SELECT INPUT
A/C COMPRESSOR CLUTCH RELAY CONTROL
C22 C3
C23 C3
C1 C3
C21 18 DB/OR
C90 18 LG
C13 18 DB/OR
2 C104
4.0L
2.5L
C21 20 DB/OR
C22 20 DB/WT
1
A/C LOW PRESSURE SWITCH
2
6 CYL
4 CYL
C22 20 DB/WT
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
(8Wa-42-2)
(8Wa-42-3)
C C3
Z1 12 BK
G202
(8Wa-15-6)
(8Wa-15-7)
RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 11 10A
(8Wa-11-8)
31
F12 20 RD/LG
10 C106
F12 20 RD/LG
S102
(8Wa-11-8)
F12 20 RD/LG
A6
A8
BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
27
FUSE 21 10A
(8Wa-10-16)
26
A17 20 RD/GY
A10
A9
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
C3 20 DB/BK
14 C103
1
A/C COMPRESSOR CLUTCH
2
Z1 20 BK
OTHER
CALIFORNIA/ EUROPEAN III
S132
(8Wa-15-13)
S137
(8Wa-15-12)
Z1 18 BK
S132
(8Wa-15-12)
Z1 14 BK
G105
(8Wa-15-13)

8W-43 AIRBAG SYSTEM

Component	Page
Airbag Control Module	8Wa-43-2, 3
Brake Transmission Shift Interlock Solenoid	8Wa-43-3
Clockspring	8Wa-43-2
Data Link Connector	8Wa-43-3
Driver Airbag Squib	8Wa-43-2
Fuse 5 (FB)	8Wa-43-2
Fuse 9 (FB)	8Wa-43-2
Fuse 10 (FB)	8Wa-43-3
Fuse Block	8Wa-43-2, 3
G301	8Wa-43-2
Instrument Cluster	8Wa-43-3
Passenger Airbag	8Wa-43-2
Passenger Airbag On/Off Switch	8Wa-43-2

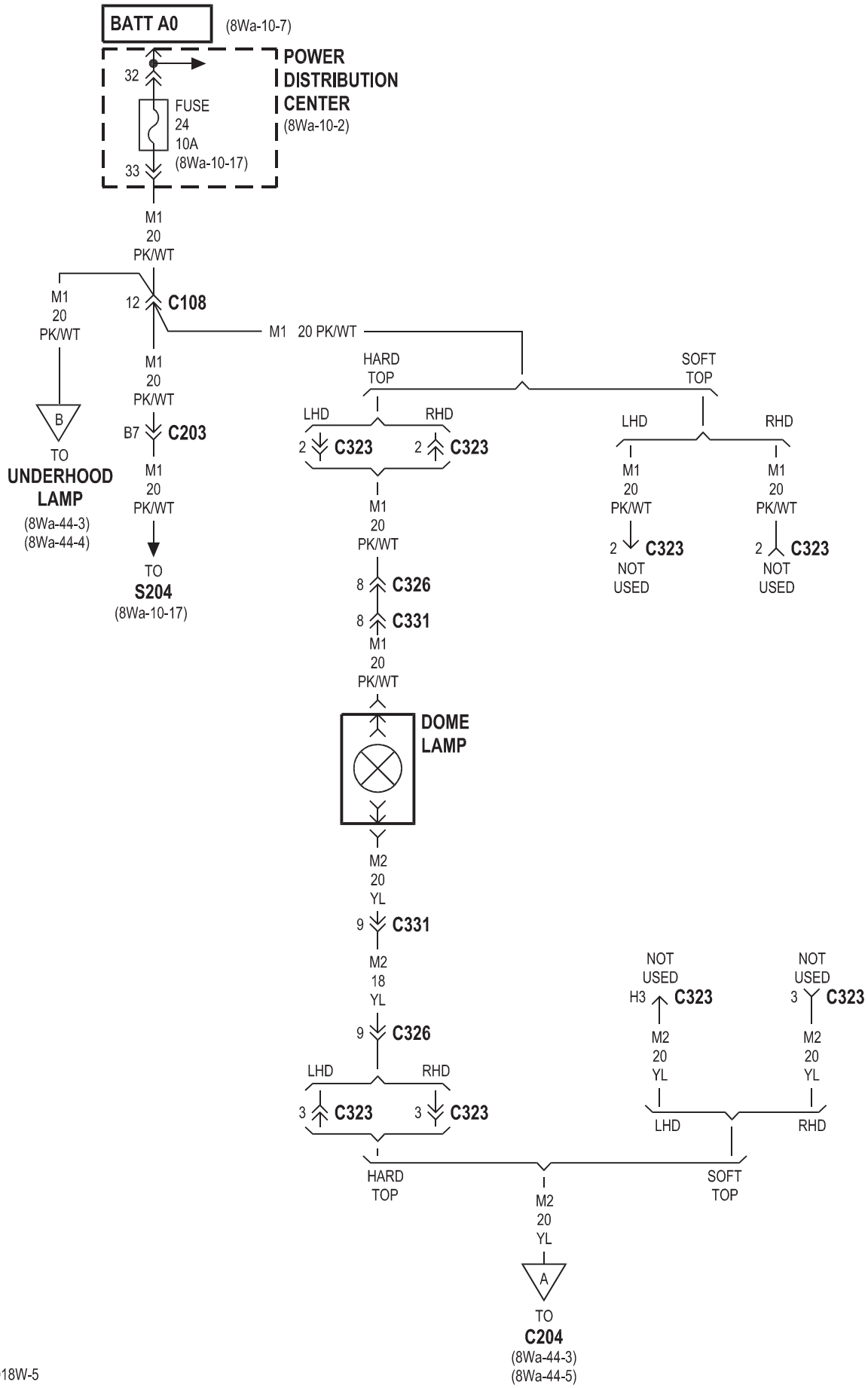

RUN-START A21
(8Wa-10-12)
RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 9 10A
(8Wa-11-7)
FUSE 5 10A
(8Wa-11-5)
PASSENGER AIRBAG
PASSENGER AIRBAG LINE 2
PASSENGER AIRBAG LINE 1
29
25
A
B
F14 18 LG/YL
F14 18 LG/YL
F23 18 DB/YL
R44 18 DG/YL
R42 18 BK/YL
17
20
6
5
AIRBAG CONTROL MODULE
FUSED IGNITION SWITCH OUTPUT (RUN-START)
FUSED IGNITION SWITCH OUTPUT (RUN)
PASSENGER SQUIB LINE 2
PASSENGER SQUIB LINE 1
PASSENGER AIRBAG INDICATOR DRIVER
PASSENGER AIRBAG MUX SWITCH SENSE
PASSENGER AIRBAG MUX SWITCH RETURN
GROUND
DRIVER AIRBAG LINE 1
DRIVER AIRBAG LINE 2
8
11
22
10
2
1
R166 18 LG/BR
R65 18 LG/OR
R66 18 LG/DG
Z6 18 BK/PK
R43 18 BK/LB
R45 18 DG/LB
1
2
PASSENGER AIRBAG ON/OFF SWITCH
DISABLE
TWISTED PAIR
2 C2
1 C2
CLOCKSPRING
6
3
R43 18 BK/LB
R45 18 DG/LB
2
1
DRIVER AIRBAG LINE 1
DRIVER AIRBAG LINE 2
DRIVER AIRBAG SQUIB
G301
(8Wa-15-9)


RUN-START A21
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 10 10A
(8Wa-11-7)
30
G5 20 DB/WT
A10
C202
G5 20 DB/WT
G5 20 DB/WT
AIRBAG CONTROL MODULE
PCI BUS
18
D25 18 VT/YL
B14
C203
D25 20 VT/YL
2
DATA LINK CONNECTOR
(8Wa-18-2)
D25 20 VT/YL
7
C1
INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-3)
(8Wa-40-4)
AIRBAG WARNING INDICATOR DRIVER
PCI BUS
12
C2
D25 20 VT/YL
S209
(8Wa-18-2)
2
FUSED IGNITION SWITCH OUTPUT (RUN-START)
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID
(8Wa-31-2)

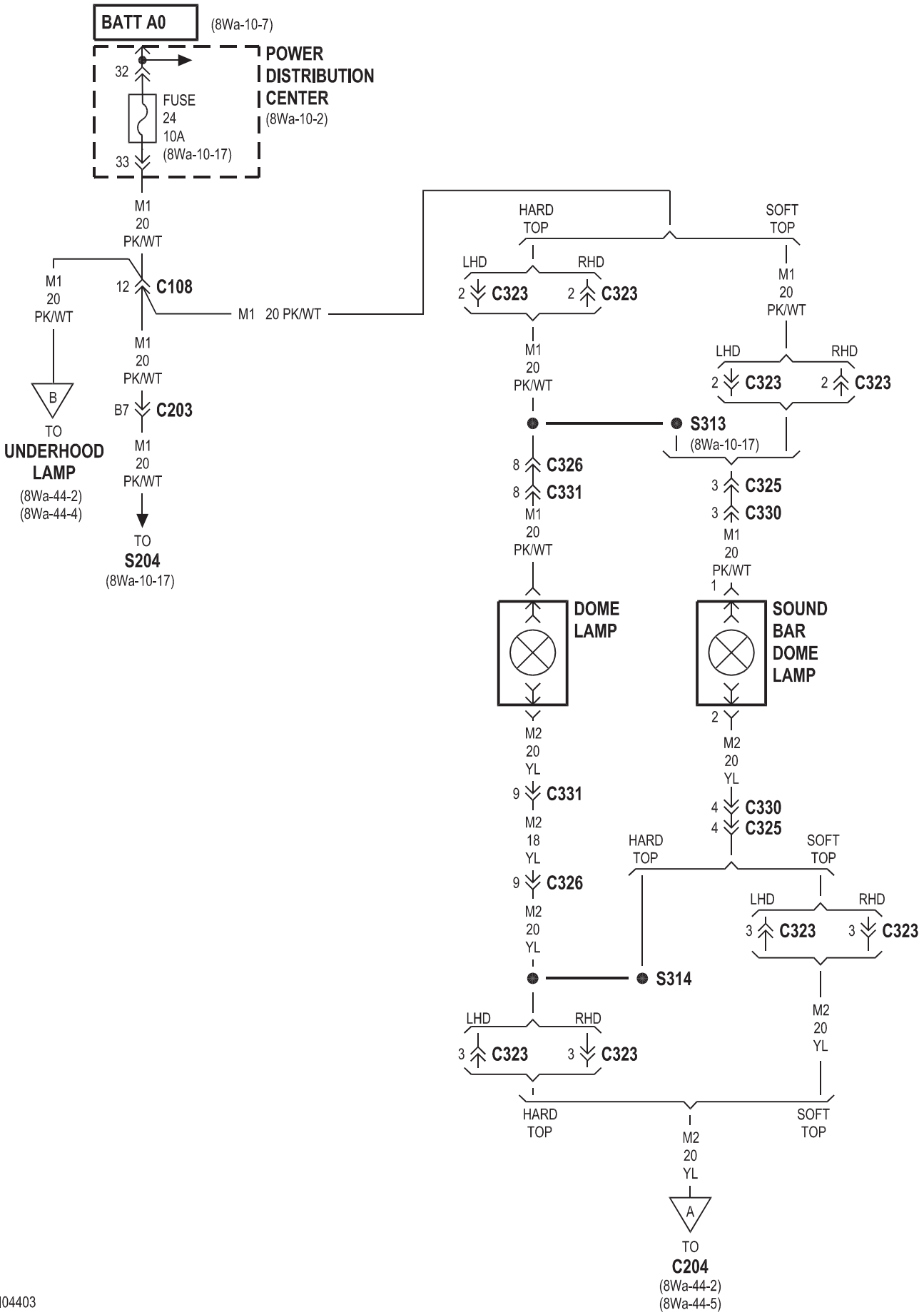
8W-44 INTERIOR LIGHTING

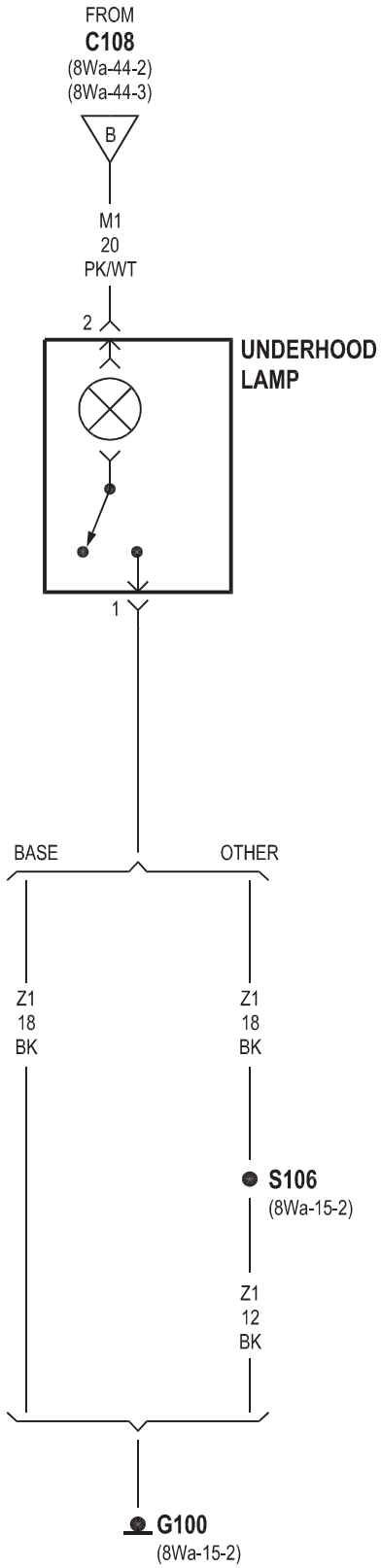
Component	Page
A/C-Heater Control	8Wa-44-7
Dome Lamp	8Wa-44-2, 3
Driver Door Ajar Switch	8Wa-44-6
Fuse 4 (FB)	8Wa-44-6
Fuse 24 (PDC)	8Wa-44-2
Fuse 24 (PDC)	8Wa-44-3, 5
Fuse Block	8Wa-44-6
G100	8Wa-44-4
G200	8Wa-44-7
G201	8Wa-44-7
G300	8Wa-44-6, 7
Ignition Switch	8Wa-44-6
Instrument Cluster	8Wa-44-5, 6, 7
Left Courtesy Lamp	8Wa-44-5
Multi-Function Switch	8Wa-44-7
Passenger Door Ajar Switch	8Wa-44-6
Power Distribution Center	8Wa-44-2, 3, 5
Radio	8Wa-44-7
Rear Window Defogger Switch	8Wa-44-7
Rear Wiper/Washer Switch	8Wa-44-7
Right Courtesy Lamp	8Wa-44-3, 5
Transmission Range Indicator Illumination	8Wa-44-7
Underhood Lamp	8Wa-44-2, 3, 4, 5

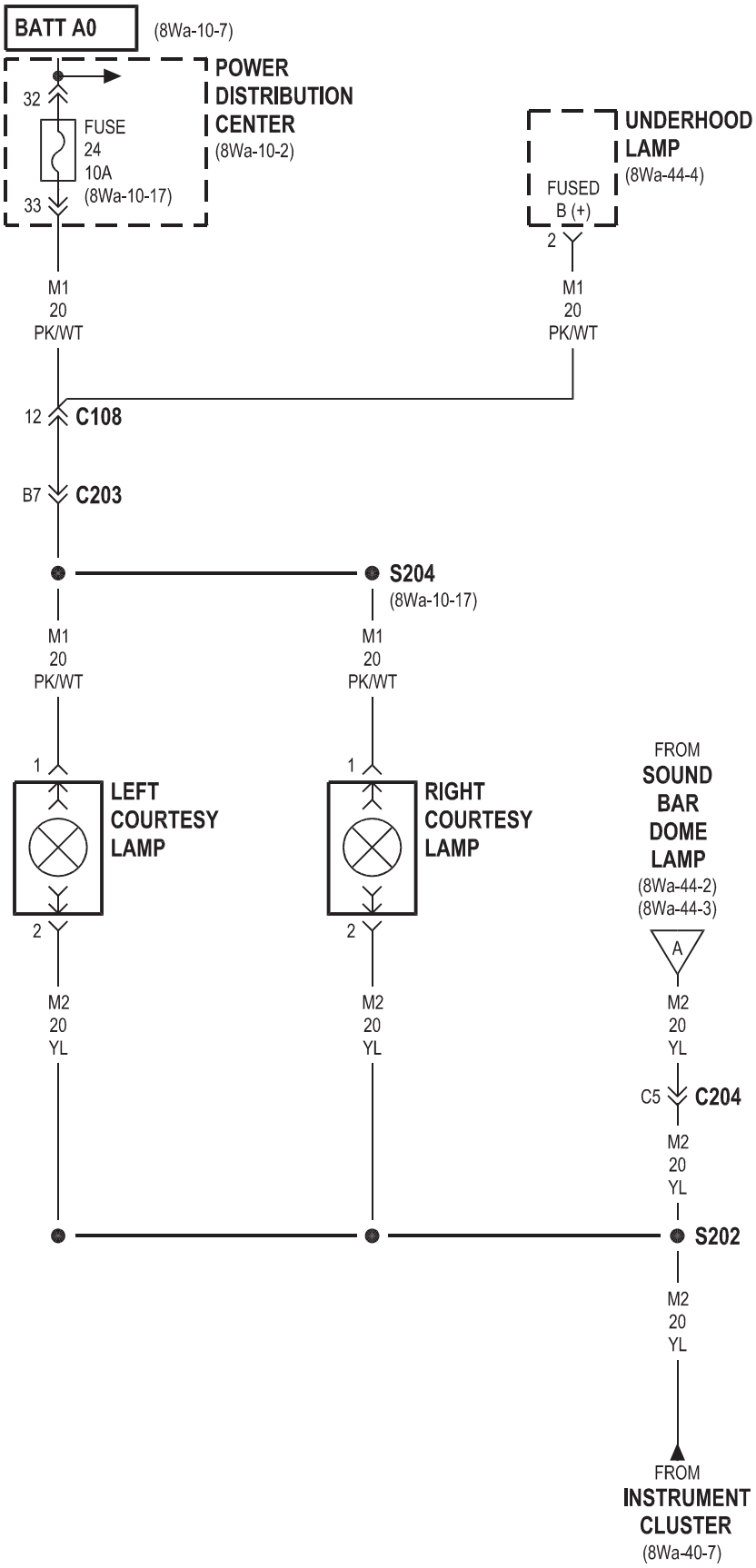
2 SPEAKER SYSTEM

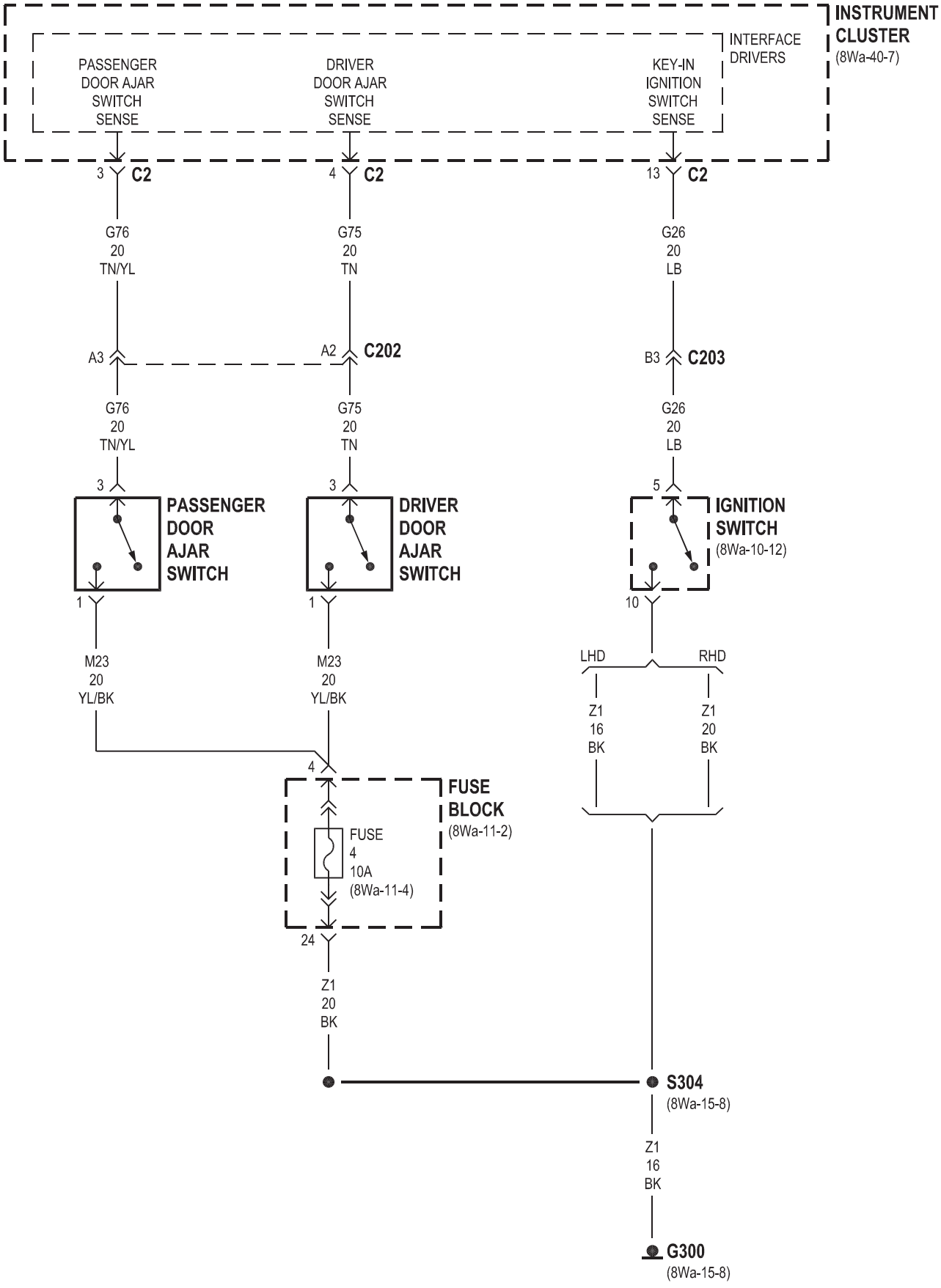


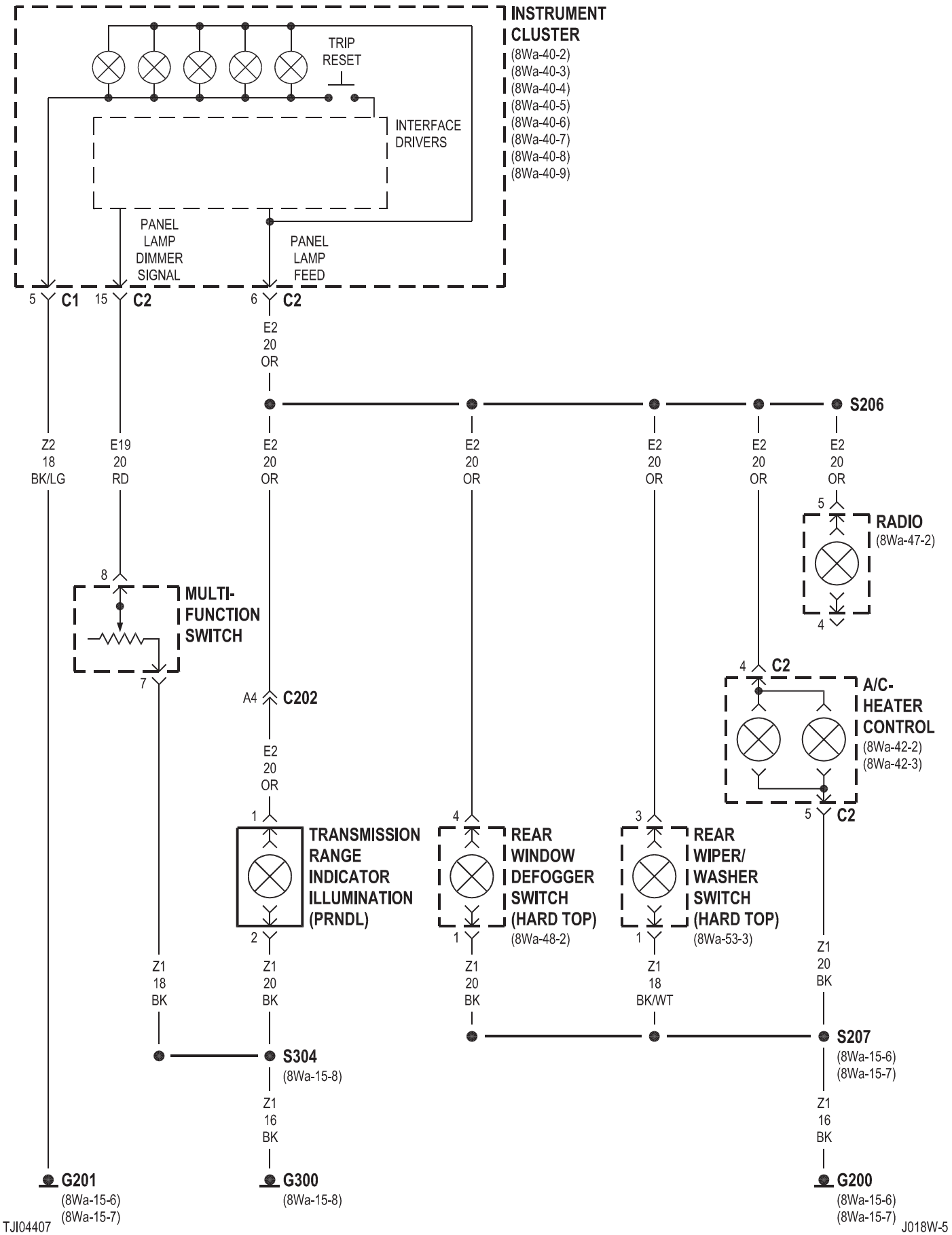
4 SPEAKER SYSTEM




FROM
C108
(8Wa-44-2)
(8Wa-44-3)
B
M1
20
PK/WT
2
UNDERHOOD
LAMP
1
BASE
OTHER
Z1
18
BK
Z1
18
BK
S106
(8Wa-15-2)
Z1
12
BK
G100
(8Wa-15-2)

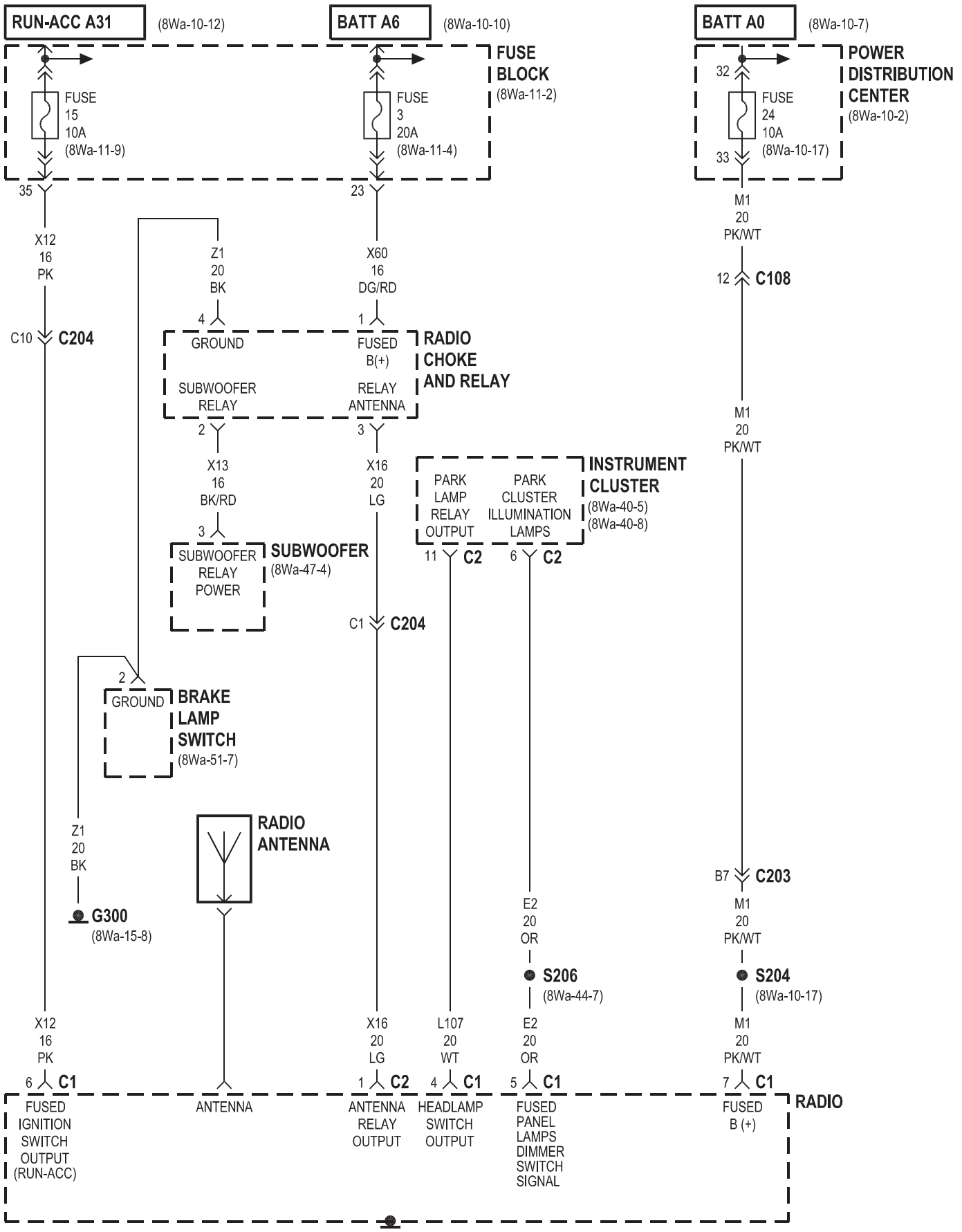

BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
32
FUSE 24 10A
(8Wa-10-17)
33
UNDERHOOD LAMP
(8Wa-44-4)
FUSED B (+)
2
M1 20 PK/WT
M1 20 PK/WT
12 C108
B7 C203
S204
(8Wa-10-17)
M1 20 PK/WT
M1 20 PK/WT
1
LEFT COURTESY LAMP
2
1
RIGHT COURTESY LAMP
2
FROM SOUND BAR DOME LAMP
(8Wa-44-2)
(8Wa-44-3)
A
M2 20 YL
M2 20 YL
M2 20 YL
C5 C204
M2 20 YL
S202
M2 20 YL
FROM INSTRUMENT CLUSTER
(8Wa-40-7)

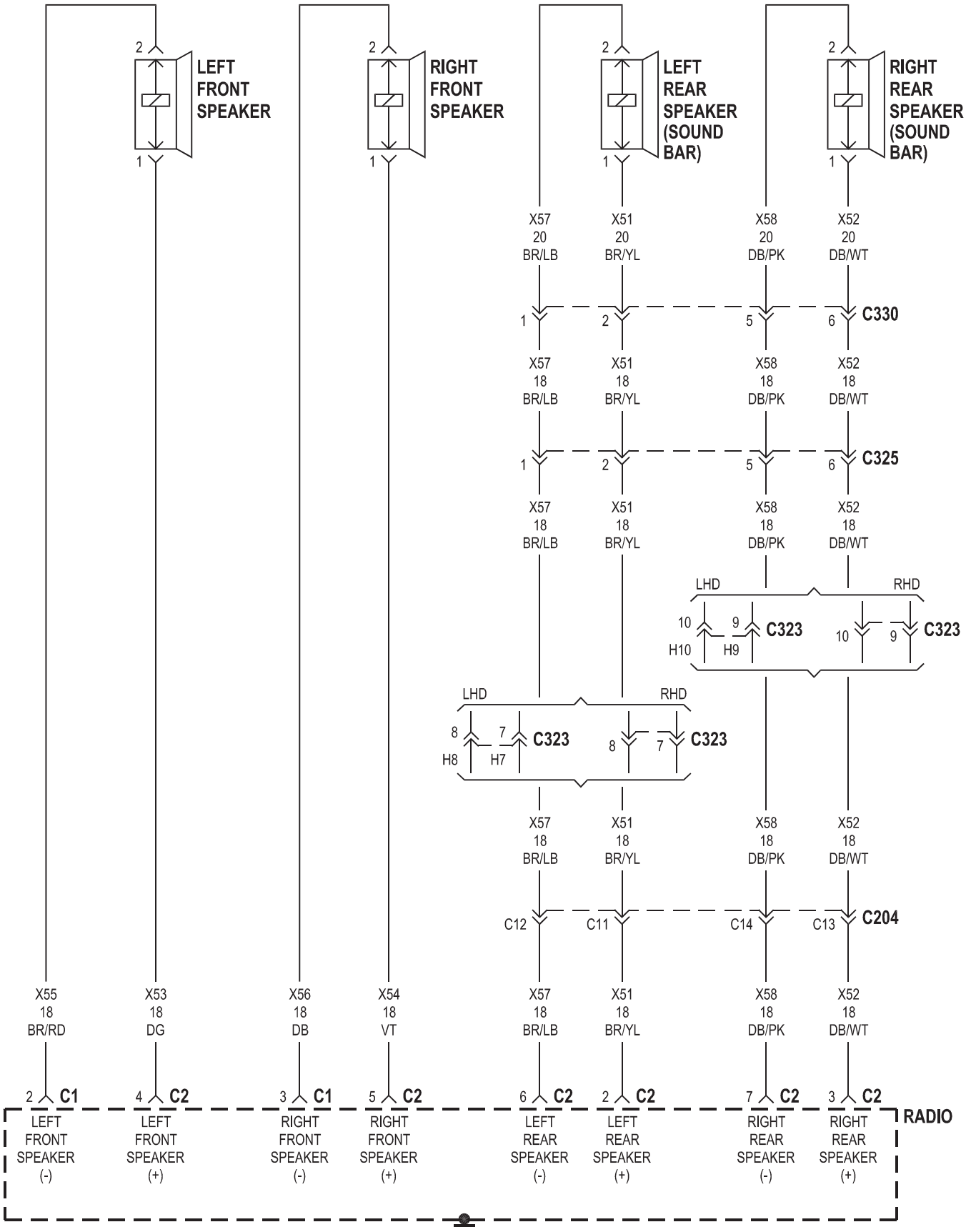

INSTRUMENT CLUSTER
(8Wa-40-7)
INTERFACE DRIVERS
PASSENGER DOOR AJAR SWITCH SENSE
DRIVER DOOR AJAR SWITCH SENSE
KEY-IN IGNITION SWITCH SENSE
3 C2
4 C2
13 C2
G76 20 TN/YL
G75 20 TN
G26 20 LB
A3
A2 C202
B3 C203
G76 20 TN/YL
G75 20 TN
G26 20 LB
3
3
5
PASSENGER DOOR AJAR SWITCH
DRIVER DOOR AJAR SWITCH
IGNITION SWITCH
(8Wa-10-12)
1
1
10
M23 20 YL/BK
M23 20 YL/BK
LHD
RHD
Z1 16 BK
Z1 20 BK
4
FUSE BLOCK
(8Wa-11-2)
FUSE 4 10A
(8Wa-11-4)
24
Z1 20 BK
S304
(8Wa-15-8)
Z1 16 BK
G300
(8Wa-15-8)

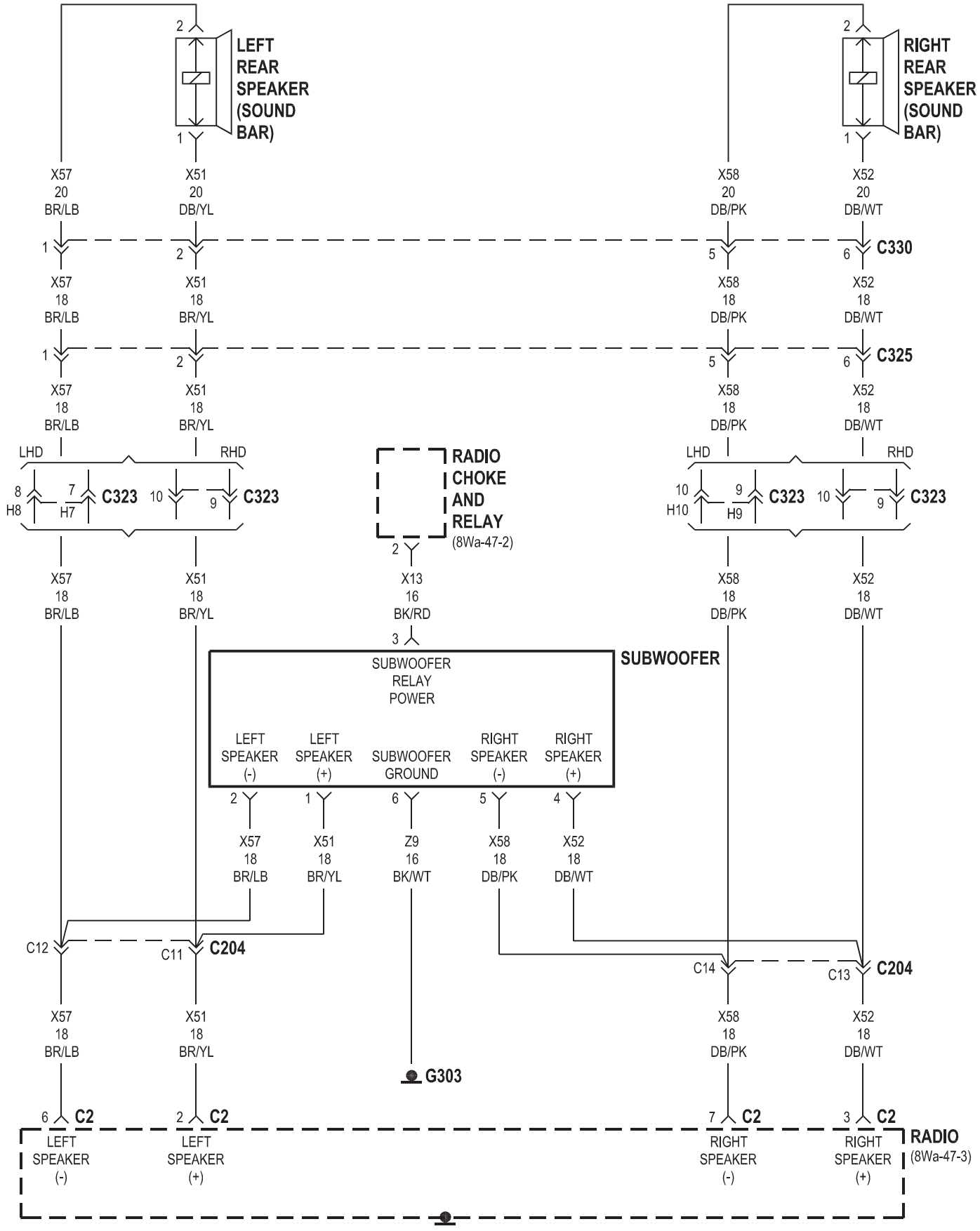

INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-3)
(8Wa-40-4)
(8Wa-40-5)
(8Wa-40-6)
(8Wa-40-7)
(8Wa-40-8)
(8Wa-40-9)
TRIP RESET
INTERFACE DRIVERS
PANEL LAMP DIMMER SIGNAL
PANEL LAMP FEED
5 C1
15 C2
6 C2
E2 20 OR
S206
Z2 18 BK/LG
E19 20 RD
E2 20 OR
E2 20 OR
E2 20 OR
E2 20 OR
E2 20 OR
5
RADIO
(8Wa-47-2)
4
8
MULTI-FUNCTION SWITCH
7
4 C2
A/C-HEATER CONTROL
(8Wa-42-2)
(8Wa-42-3)
5 C2
A4 C202
E2 20 OR
1
TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL)
2
4
REAR WINDOW DEFOGGER SWITCH (HARD TOP)
(8Wa-48-2)
1
3
REAR WIPER/ WASHER SWITCH (HARD TOP)
(8Wa-53-3)
1
Z1 18 BK
Z1 20 BK
Z1 20 BK
Z1 18 BK/WT
Z1 20 BK
S304
(8Wa-15-8)
S207
(8Wa-15-6)
(8Wa-15-7)
Z1 16 BK
Z1 16 BK
G201
(8Wa-15-6)
(8Wa-15-7)
G300
(8Wa-15-8)
G200
(8Wa-15-6)
(8Wa-15-7)
TJI04407
J018W-5

8W-47 AUDIO SYSTEM

Component	Page
Brake Lamp Switch	8Wa-47-2
Fuse 3 (FB)	8Wa-47-2
Fuse 15 (FB)	8Wa-47-2
Fuse 24 (PDC)	8Wa-47-2
Fuse Block	8Wa-47-2
G300	8Wa-47-2
G303	8Wa-47-4
Instrument Cluster	8Wa-47-2
Left Front Speaker	8Wa-47-3
Left Rear Speaker	8Wa-47-3, 4
Power Distribution Center	8Wa-47-2
Radio	8Wa-47-2, 3, 4
Radio Antenna	8Wa-47-2
Radio Choke And Relay	8Wa-47-2, 4
Right Front Speaker	8Wa-47-3
Right Rear Speaker	8Wa-47-3, 4
Subwoofer	8Wa-47-2, 4

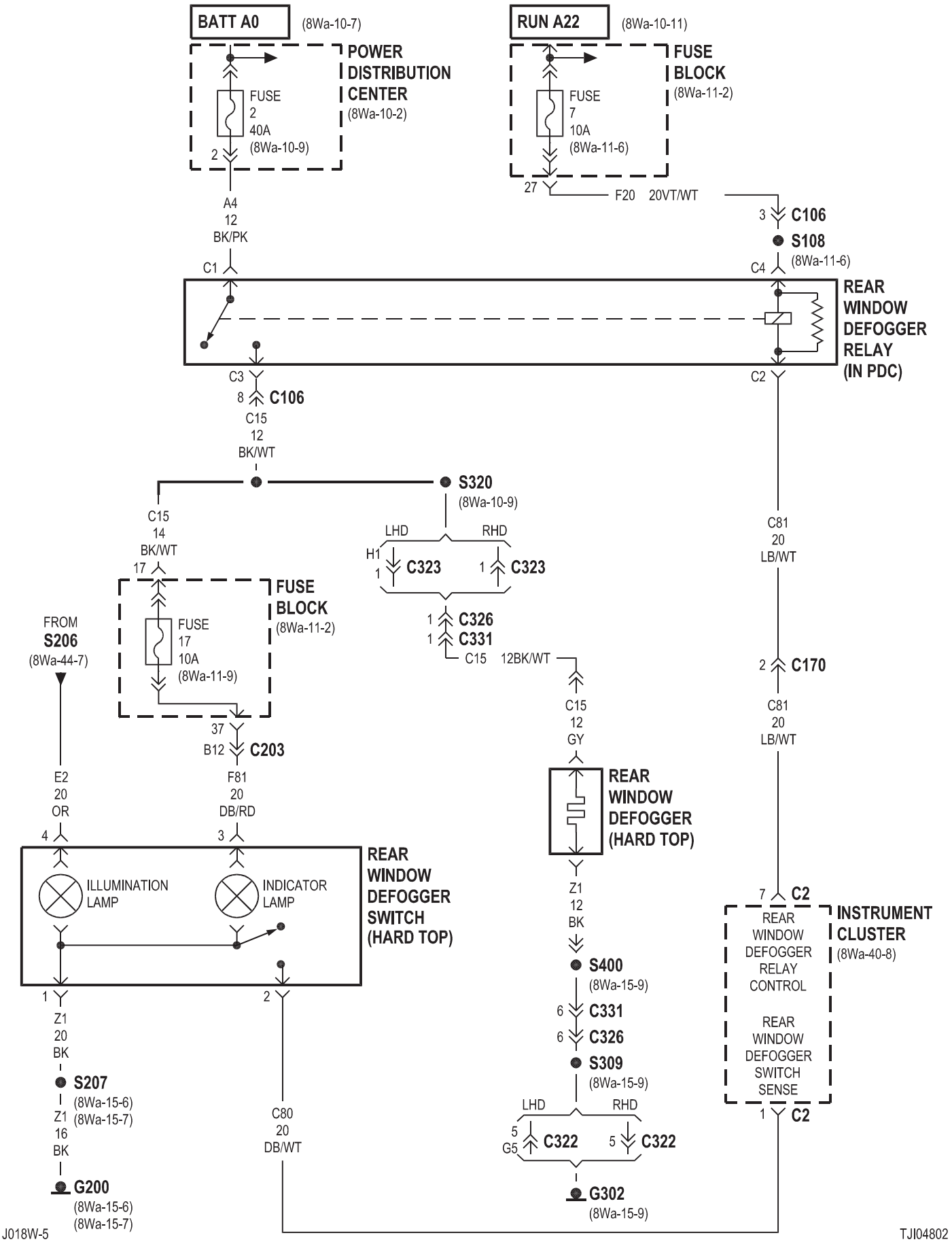

RUN-ACC A31
(8Wa-10-12)
BATT A6
(8Wa-10-10)
BATT A0
(8Wa-10-7)
FUSE BLOCK
(8Wa-11-2)
FUSE 15 10A
(8Wa-11-9)
FUSE 3 20A
(8Wa-11-4)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 24 10A
(8Wa-10-17)
35
23
32
33
X12 16 PK
C10 C204
Z1 20 BK
4
GROUND
X60 16 DG/RD
1
FUSED B(+)
RADIO CHOKE AND RELAY
SUBWOOFER RELAY
RELAY ANTENNA
2
3
M1 20 PK/WT
12 C108
X13 16 BK/RD
3
SUBWOOFER RELAY POWER
SUBWOOFER
(8Wa-47-4)
X16 20 LG
C1 C204
PARK LAMP RELAY OUTPUT
PARK CLUSTER ILLUMINATION LAMPS
INSTRUMENT CLUSTER
(8Wa-40-5)
(8Wa-40-8)
11 C2
6 C2
2
GROUND
BRAKE LAMP SWITCH
(8Wa-51-7)
Z1 20 BK
G300
(8Wa-15-8)
RADIO ANTENNA
B7 C203
M1 20 PK/WT
E2 20 OR
S206
(8Wa-44-7)
S204
(8Wa-10-17)
X12 16 PK
6 C1
L107 20 WT
4 C1
E2 20 OR
5 C1
7 C1
FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
ANTENNA
ANTENNA RELAY OUTPUT
HEADLAMP SWITCH OUTPUT
FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
FUSED B (+)
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
LHD
RHD
C323
H10
H9
H8
H7
C12
C11
C14
C13
C204
X55 18 BR/RD
X53 18 DG
X56 18 DB
X54 18 VT
C1
C2
LEFT FRONT SPEAKER (-)
LEFT FRONT SPEAKER (+)
RIGHT FRONT SPEAKER (-)
RIGHT FRONT SPEAKER (+)
LEFT REAR SPEAKER (-)
LEFT REAR SPEAKER (+)
RIGHT REAR SPEAKER (-)
RIGHT REAR SPEAKER (+)
RADIO


LEFT REAR SPEAKER (SOUND BAR)
RIGHT REAR SPEAKER (SOUND BAR)
X57 20 BR/LB
X51 20 DB/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
LHD
RHD
C323
RADIO CHOKE AND RELAY
(8Wa-47-2)
X13 16 BK/RD
SUBWOOFER
SUBWOOFER RELAY POWER
LEFT SPEAKER (-)
LEFT SPEAKER (+)
SUBWOOFER GROUND
RIGHT SPEAKER (-)
RIGHT SPEAKER (+)
Z9 16 BK/WT
C12
C11
C204
C14
C13
G303
C2
RADIO
(8Wa-47-3)

8W-48 REAR WINDOW DEFOGGER

Component	Page
Fuse 7 (FB)	8Wa-48-2
Fuse 17 (FB)	8Wa-48-2
Fuse 2 (PDC)	8Wa-48-2
Fuse Block	8Wa-48-2
G200	8Wa-48-2
G302	8Wa-48-2
Instrument Cluster	8Wa-48-2
Power Distribution Center	8Wa-48-2
Rear Window Defogger	8Wa-48-2
Rear Window Defogger Relay	8Wa-48-2
Rear Window Defogger Switch	8Wa-48-2

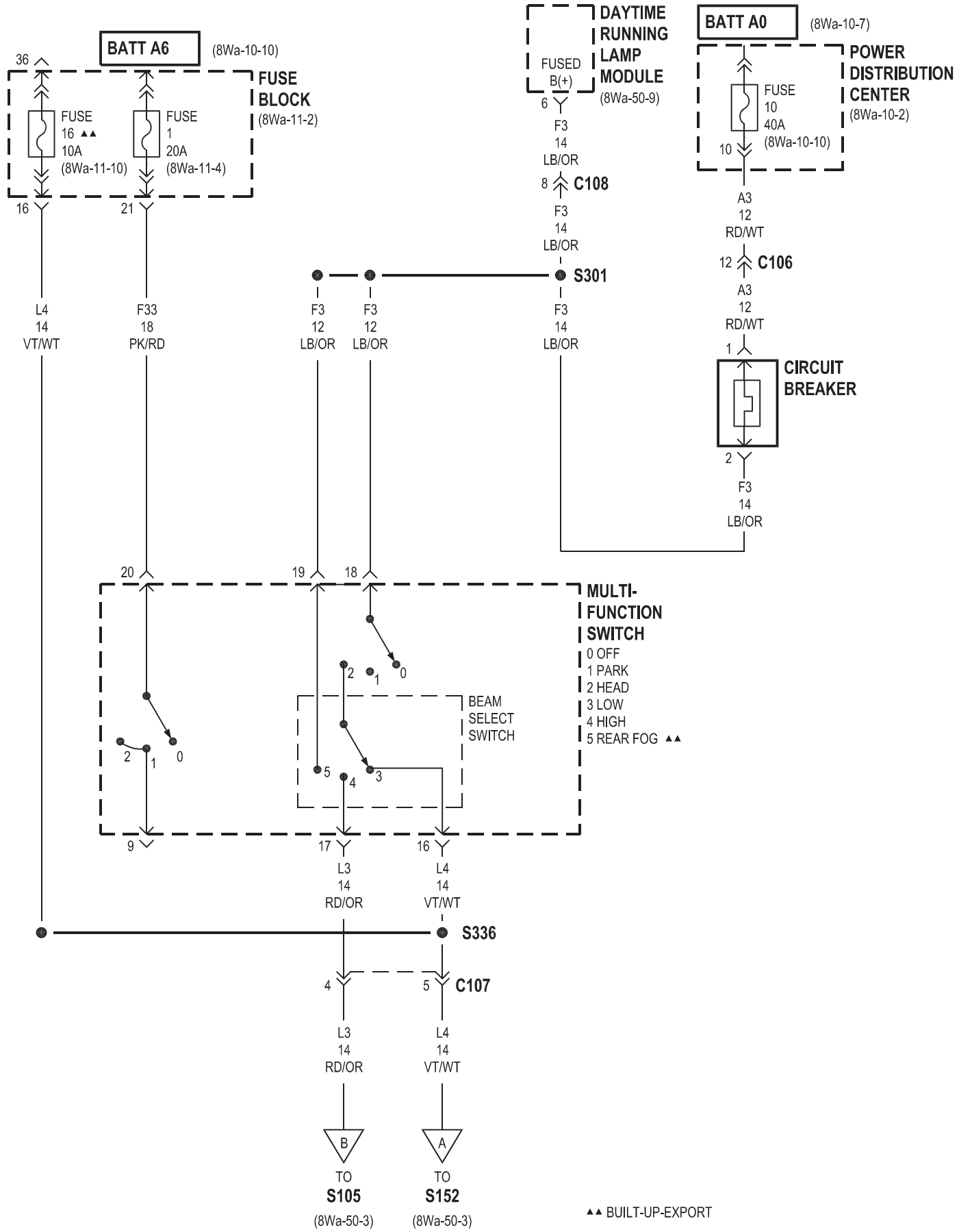


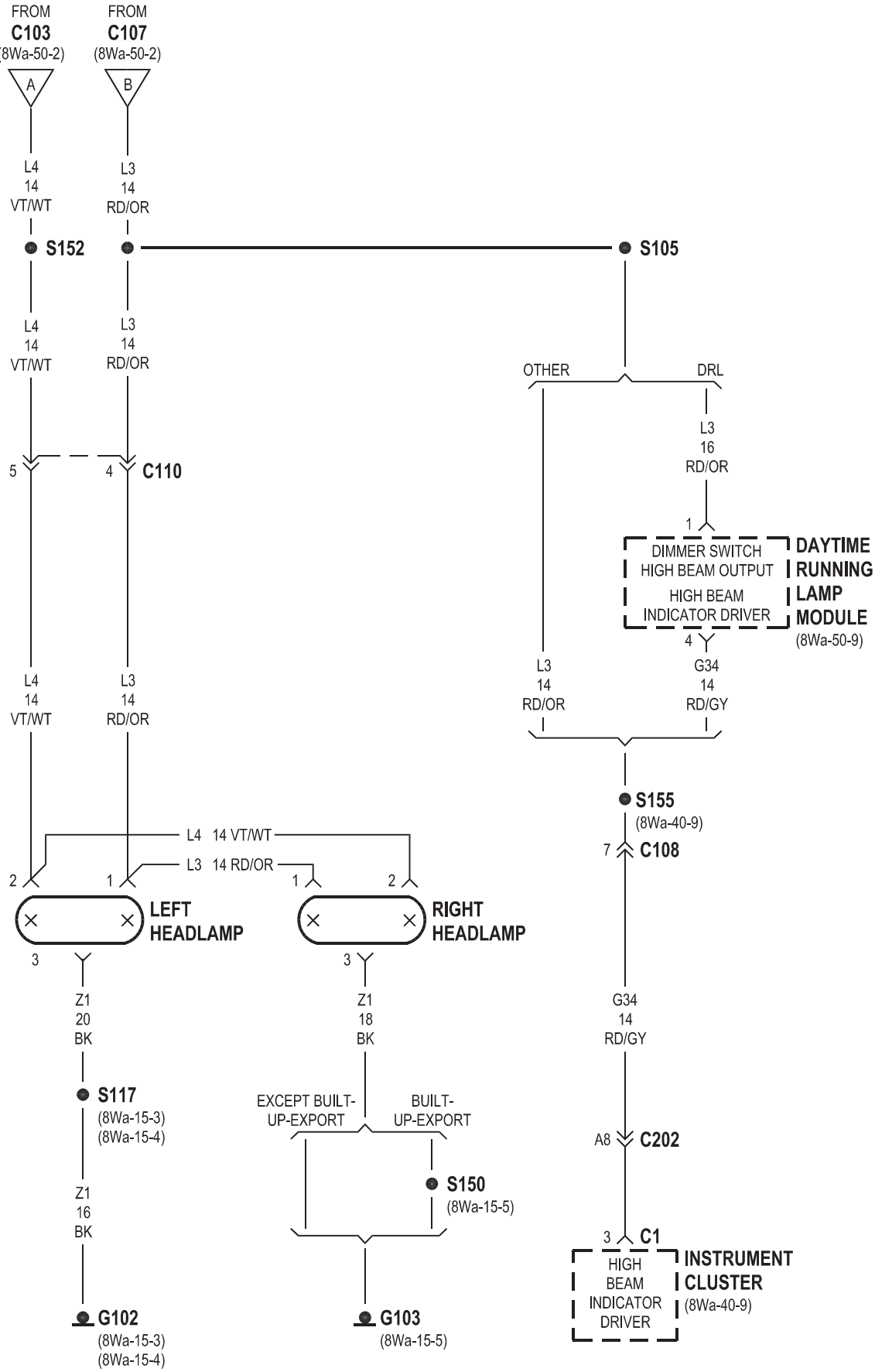
J018W-5

TJI04802

8W-50 FRONT LIGHTING

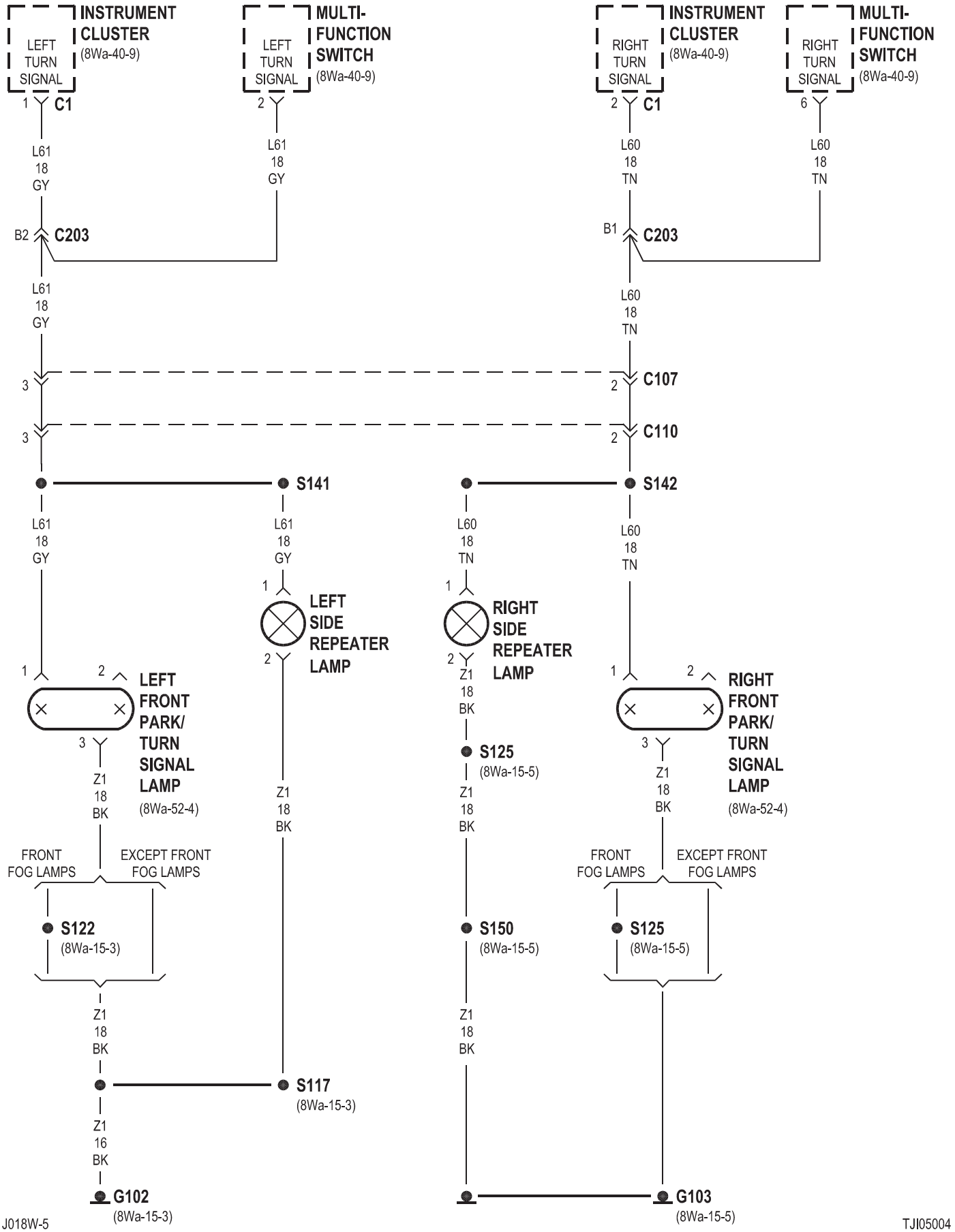
Component	Page
Beam Select Switch	8Wa-50-2
Circuit Breaker	8Wa-50-2
Daytime Running Lamp Module	8Wa-50-2, 3, 8, 9
Fog Lamp Relay	8Wa-50-7, 8
Fuse 1 (FB)	8Wa-50-2
Fuse 11 (FB)	8Wa-50-9
Fuse 16 (FB)	8Wa-50-2, 6
Fuse 10 (PDC)	8Wa-50-2
Fuse 19 (PDC)	8Wa-50-7, 8
Fuse Block	8Wa-50-2, 6, 9
G100	8Wa-50-7, 8, 9
G102	8Wa-50-3, 4, 5, 6, 7, 8
G103	8Wa-50-3, 4, 5, 6, 7, 8
G200	8Wa-50-6
Headlamp Leveling Switch	8Wa-50-6
Instrument Cluster	8Wa-50-3, 4, 5, 7, 8, 9
Left Fog Lamp	8Wa-50-7, 8
Left Front Park/Turn Signal Lamp	8Wa-50-4
Left Front Position Lamp	8Wa-50-5
Left Headlamp	8Wa-50-3, 9
Left Headlamp Leveling Motor	8Wa-50-6
Left Side Repeater Lamp	8Wa-50-4
Multi- Function Switch	8Wa-50-2, 4, 6, 7, 8, 9
Power Distribution Center	8Wa-50-2, 7, 8
Powertrain Control Module	8Wa-50-9
Right Fog Lamp	8Wa-50-7, 8
Right Front Park/Turn Signal Lamp	8Wa-50-4
Right Front Position Lamp	8Wa-50-5
Right Headlamp	8Wa-50-3, 9
Right Headlamp Leveling Motor	8Wa-50-6
Right Side Repeater Lamp	8Wa-50-4
Vehicle Speed Sensor	8Wa-50-9


BATT A6
(8Wa-10-10)
36
FUSE BLOCK
(8Wa-11-2)
FUSE 16 ▲▲ 10A (8Wa-11-10)
FUSE 1 20A (8Wa-11-4)
16
21
L4 14 VT/WT
F33 18 PK/RD
DAYTIME RUNNING LAMP MODULE
(8Wa-50-9)
FUSED B(+)
6
F3 14 LB/OR
8
C108
F3 14 LB/OR
S301
F3 12 LB/OR
F3 12 LB/OR
F3 14 LB/OR
BATT A0
(8Wa-10-7)
POWER DISTRIBUTION CENTER
(8Wa-10-2)
FUSE 10 40A (8Wa-10-10)
10
A3 12 RD/WT
12
C106
A3 12 RD/WT
1
CIRCUIT BREAKER
2
F3 14 LB/OR
20
19
18
MULTI-FUNCTION SWITCH
0 OFF
1 PARK
2 HEAD
3 LOW
4 HIGH
5 REAR FOG ▲▲
BEAM SELECT SWITCH
9
17
16
L3 14 RD/OR
L4 14 VT/WT
S336
4
5
C107
L3 14 RD/OR
L4 14 VT/WT
B
A
TO S105
(8Wa-50-3)
TO S152
(8Wa-50-3)
▲▲ BUILT-UP-EXPORT



TJI05003

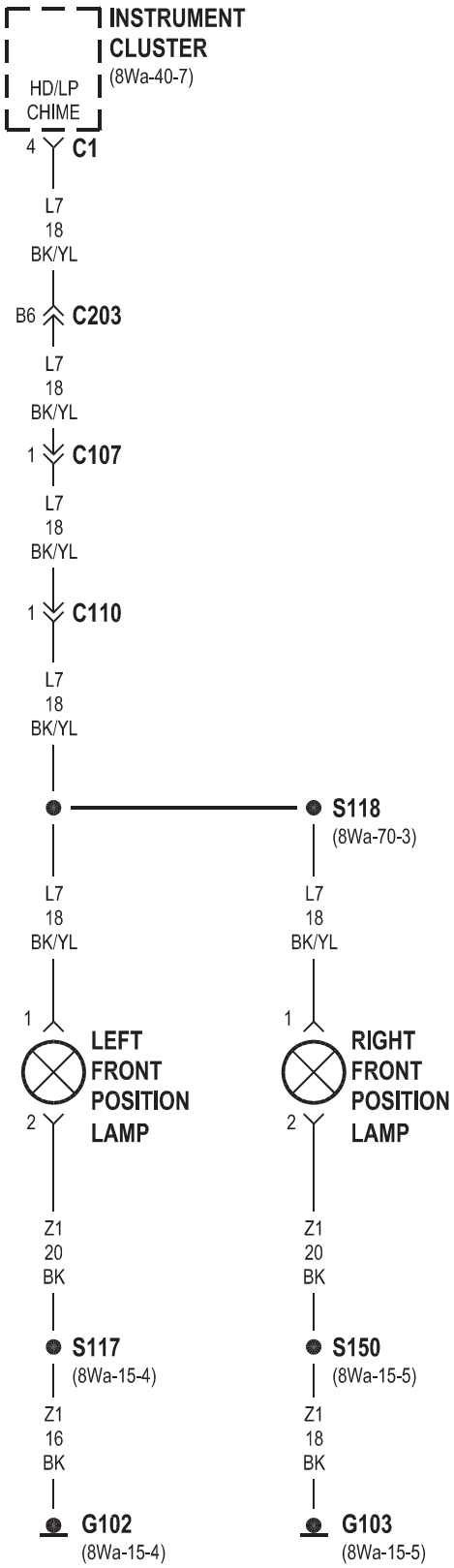
J018W-5

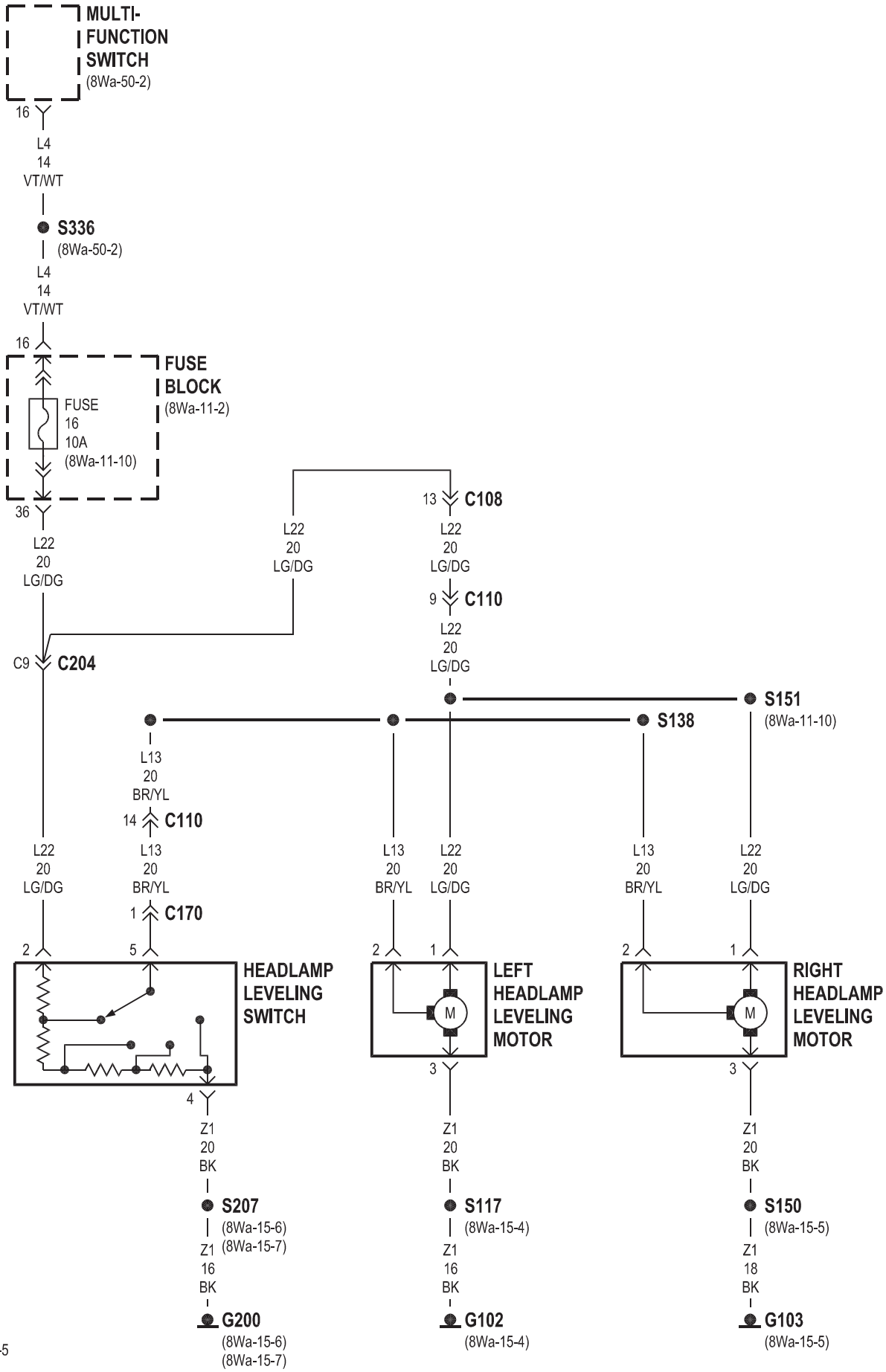


J018W-5

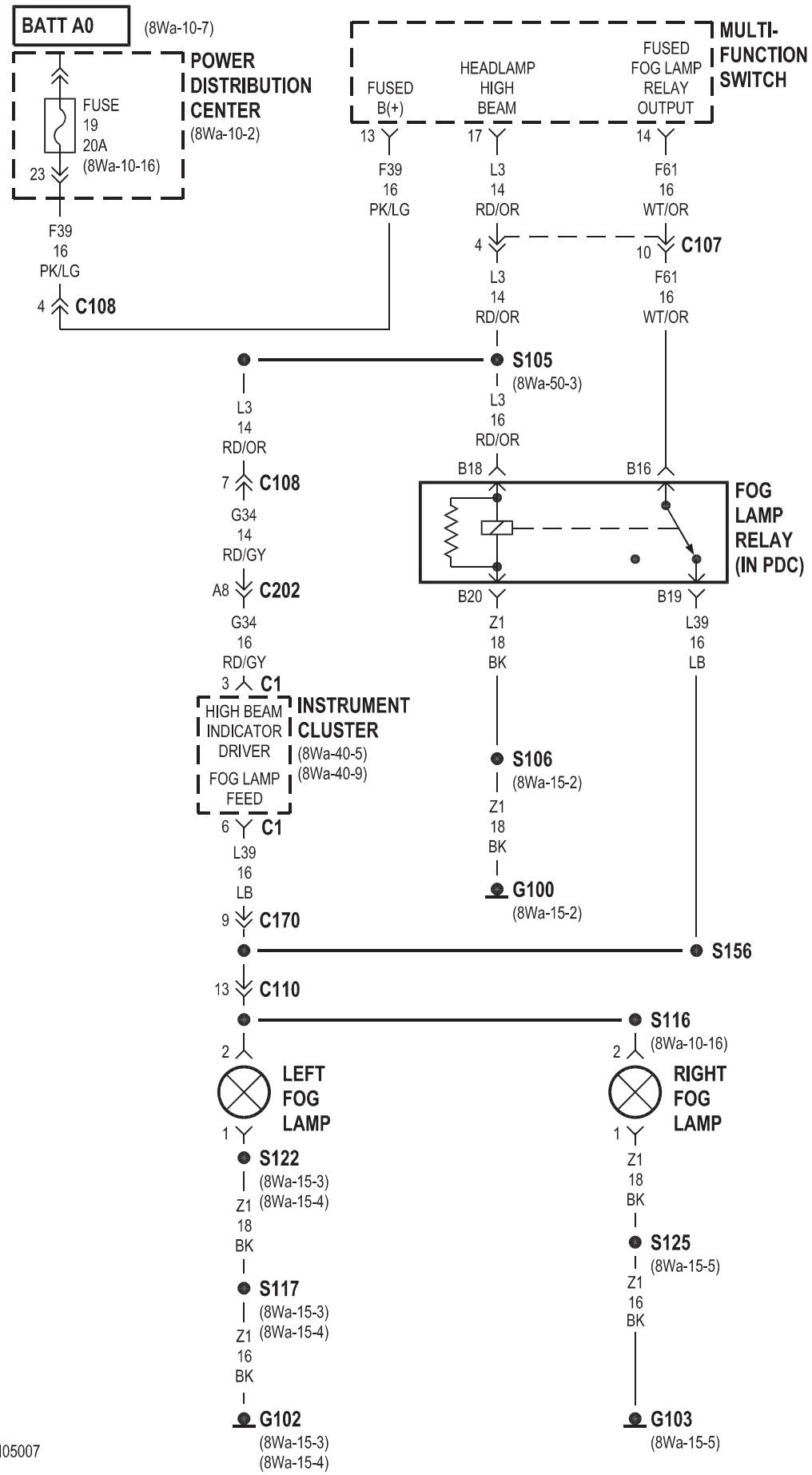
TJI05004

BUILT-UP-EXPORT




MULTI-
FUNCTION
SWITCH
(8Wa-50-2)
16
L4
14
VT/WT
S336
(8Wa-50-2)
L4
14
VT/WT
16
FUSE
BLOCK
(8Wa-11-2)
FUSE
16
10A
(8Wa-11-10)
36
L22
20
LG/DG
L22
20
LG/DG
13
C108
L22
20
LG/DG
9
C110
L22
20
LG/DG
C9
C204
S151
(8Wa-11-10)
S138
L13
20
BR/YL
14
C110
L22
20
LG/DG
L13
20
BR/YL
1
C170
2
5
HEADLAMP
LEVELING
SWITCH
4
L13
20
BR/YL
L22
20
LG/DG
2
1
M
LEFT
HEADLAMP
LEVELING
MOTOR
3
L13
20
BR/YL
L22
20
LG/DG
2
1
M
RIGHT
HEADLAMP
LEVELING
MOTOR
3
Z1
20
BK
S207
(8Wa-15-6)
(8Wa-15-7)
Z1
16
BK
G200
(8Wa-15-6)
(8Wa-15-7)
Z1
20
BK
S117
(8Wa-15-4)
Z1
16
BK
G102
(8Wa-15-4)
Z1
20
BK
S150
(8Wa-15-5)
Z1
18
BK
G103
(8Wa-15-5)

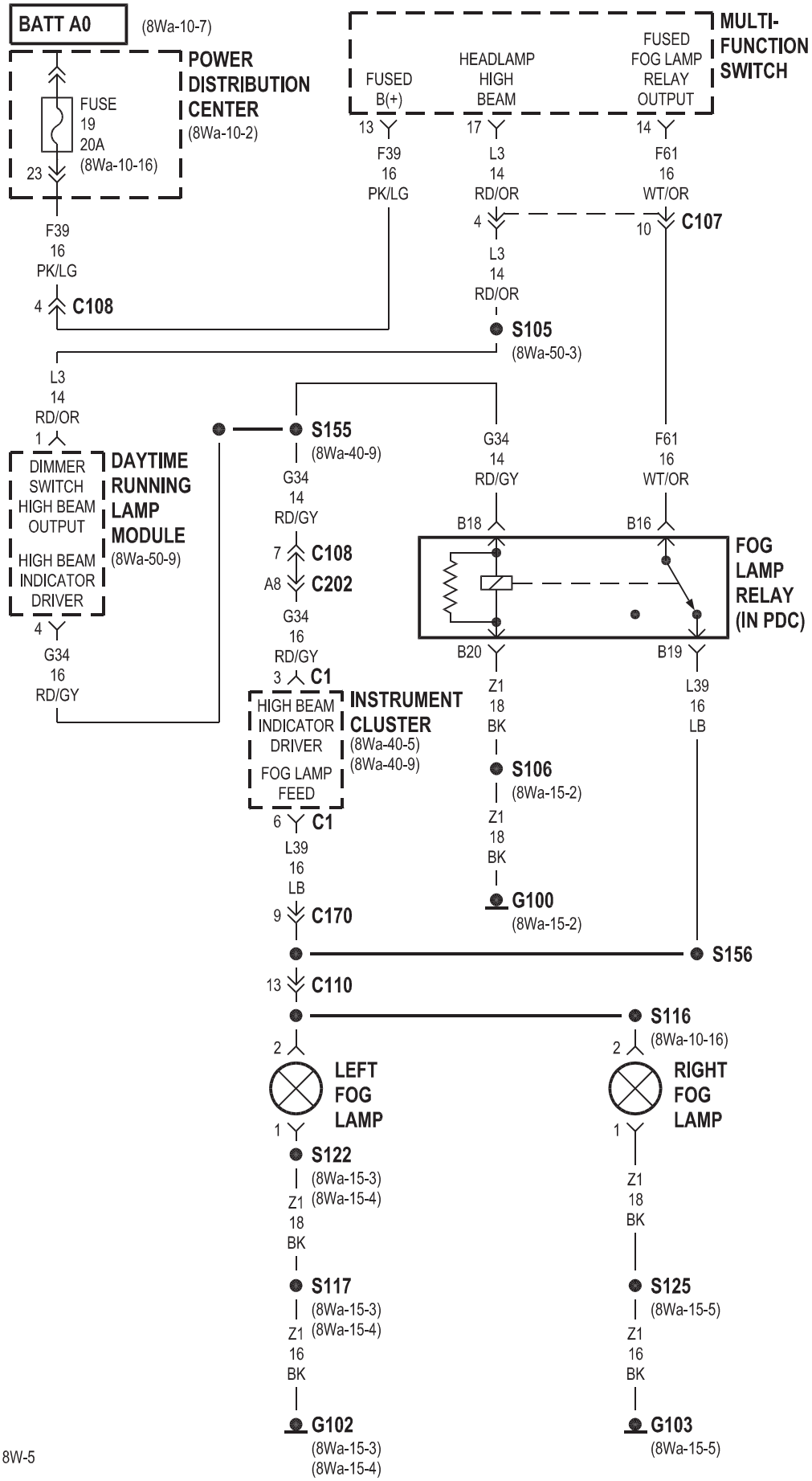
FOG LAMPS



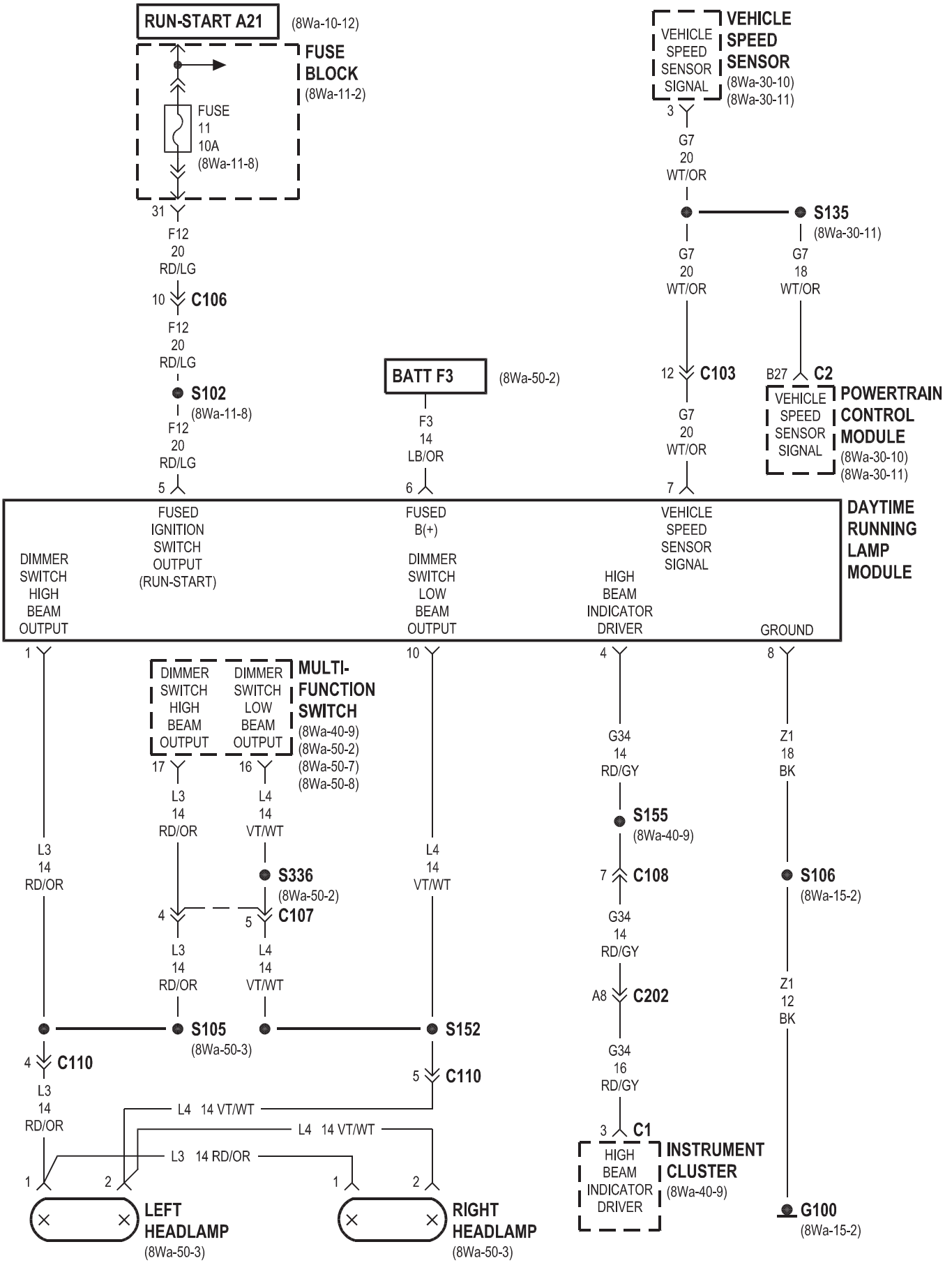
TJI05007

J018W-5

FOG LAMPS WITH DRL



DRL

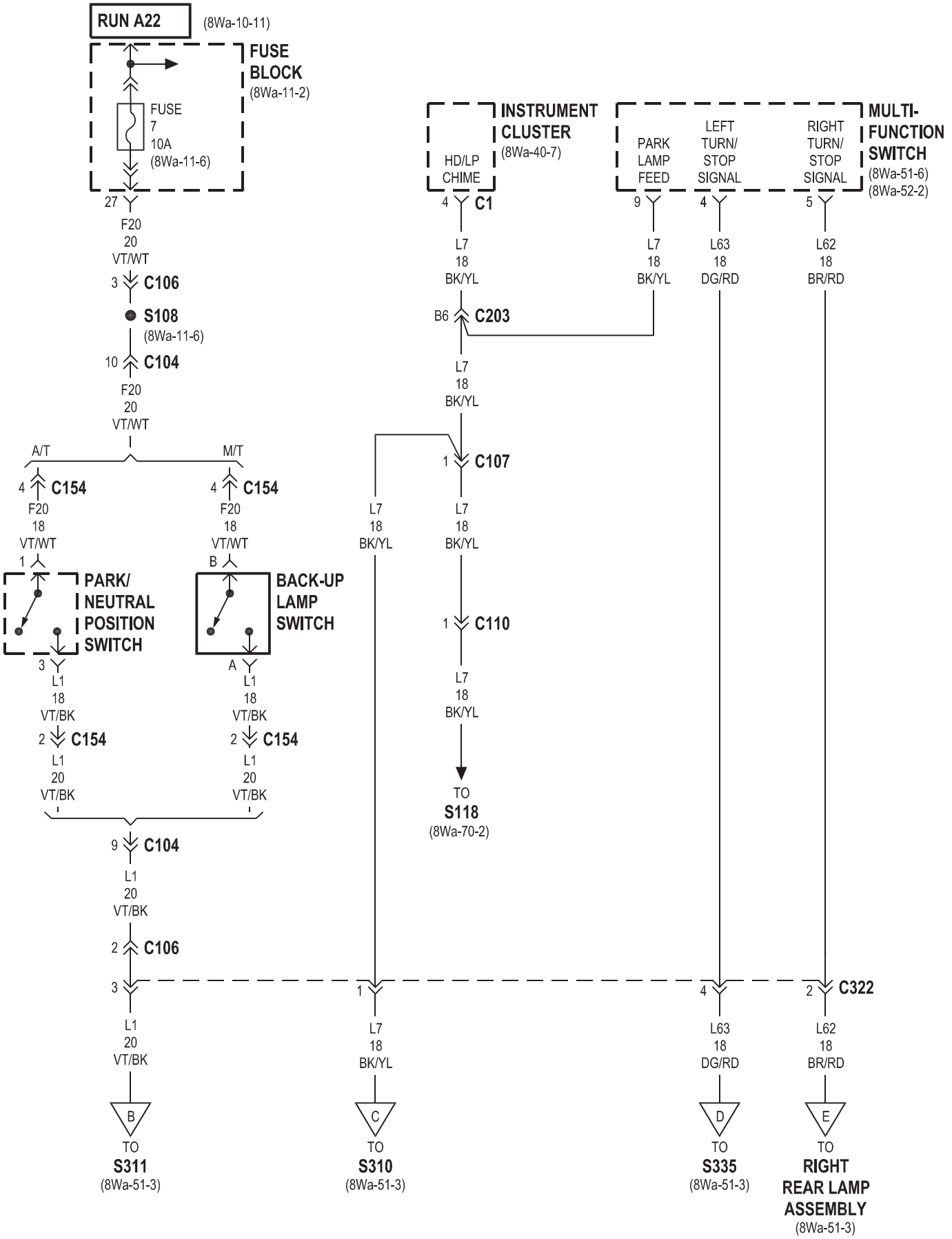


TJI05009

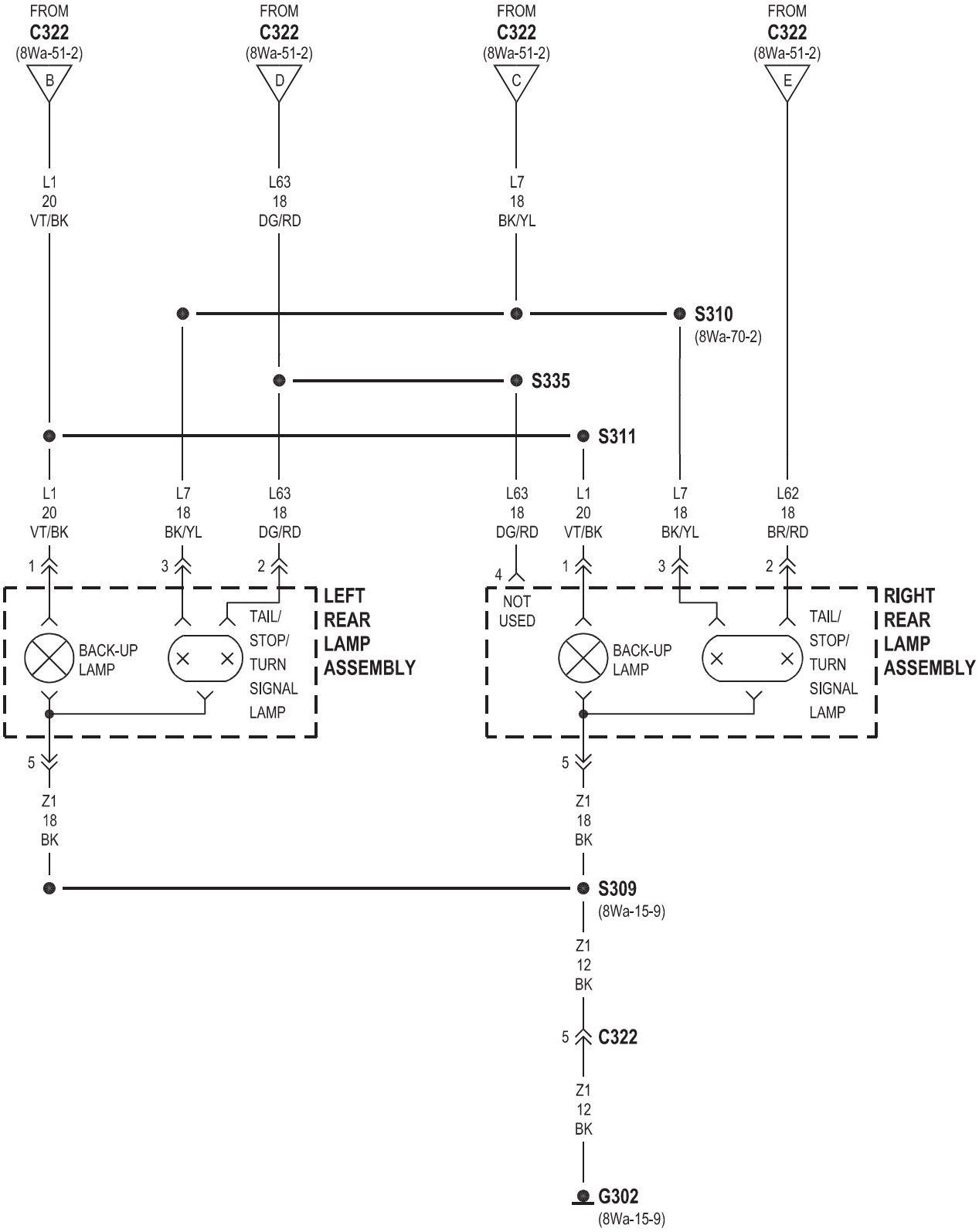
J018W-5

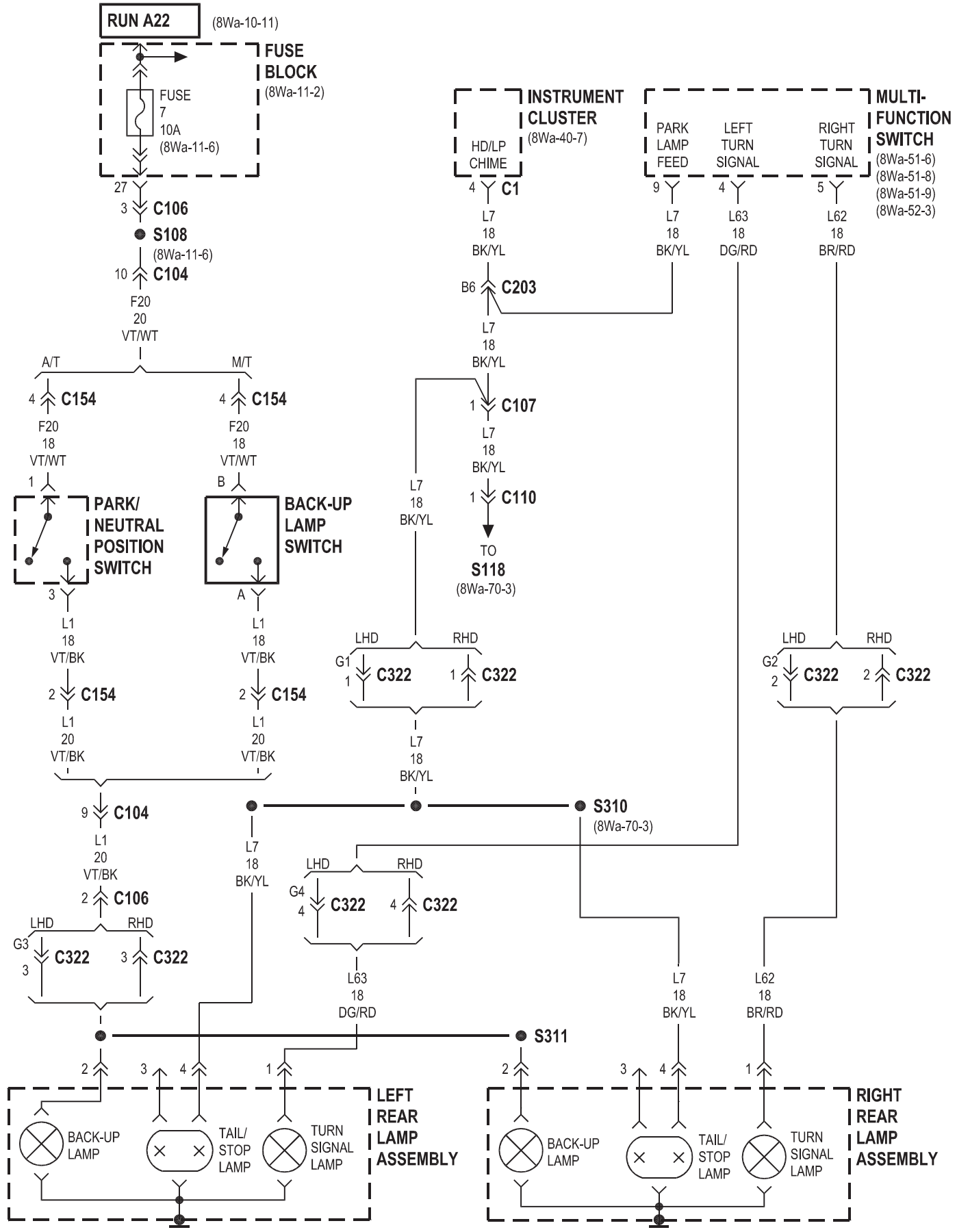
8W-51 REAR LIGHTING

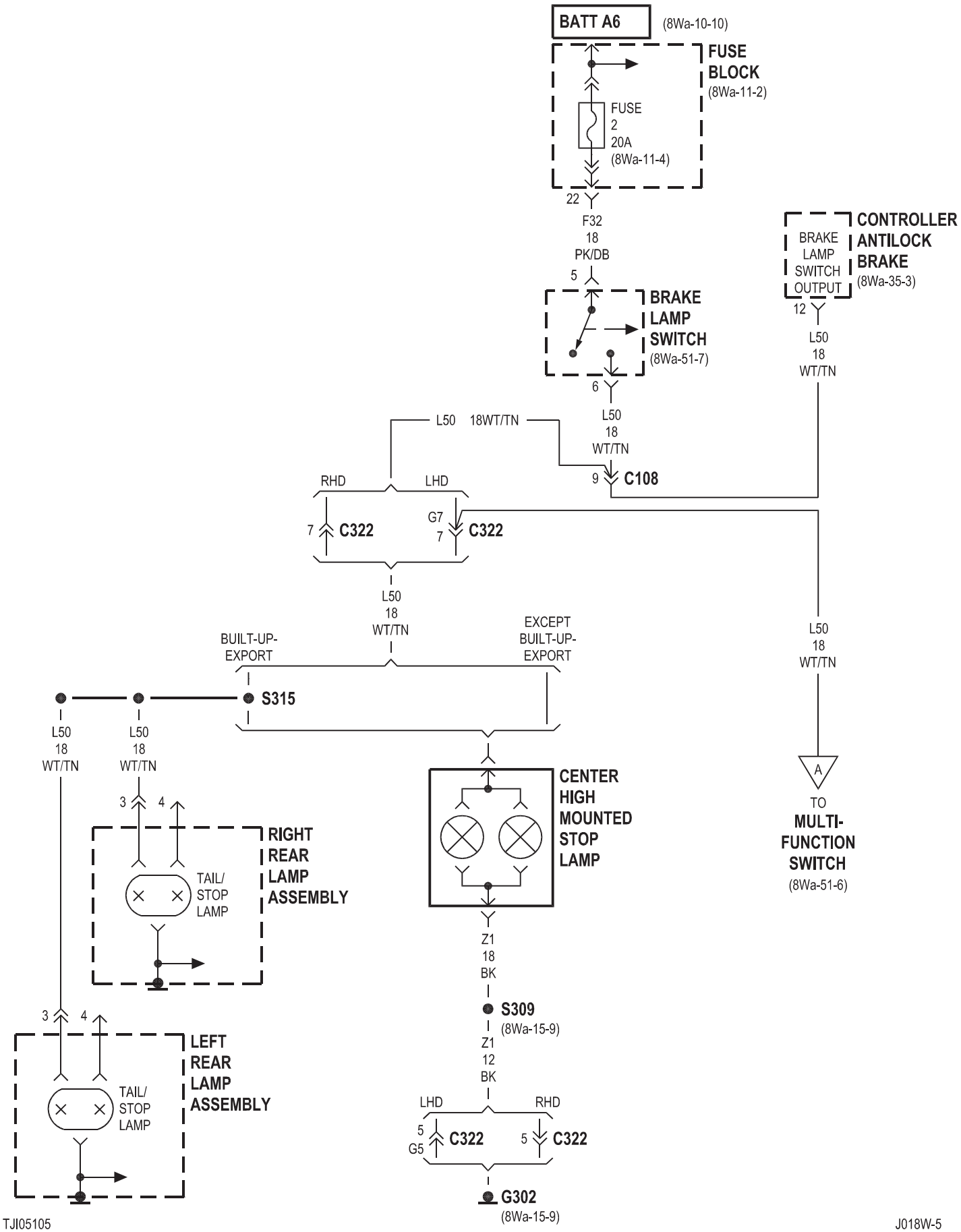
Component	Page
Back-Up Lamp Switch	8Wa-51-2, 4
Brake Lamp Switch	8Wa-51-5, 7
Brake Transmission Shift Interlock Solenoid	8Wa-51-7
Center High Mounted Stop Lamp	8Wa-51-5, 7
Controller Antilock Brake	8Wa-51-5, 7
Fuse 2 (FB)	8Wa-51-5, 7
Fuse 7 (FB)	8Wa-51-2, 4
Fuse Block	8Wa-51-2, 4, 5, 7
G201	8Wa-51-8, 9
G300	8Wa-51-7
G302	8Wa-51-3, 5, 8, 9
Instrument Cluster	8Wa-51-2, 4, 8, 9
Left License Lamp	8Wa-51-8, 9
Left Rear Lamp Assembly	8Wa-51-3, 4, 5, 6, 7
Multi- Function Switch	8Wa-51-2, 4, 5, 6, 7, 8, 9
Park/Neutral Position Switch	8Wa-51-2, 4
Powertrain Control Module	8Wa-51-7
Radio Choke And Relay	8Wa-51-7
Rear Fog Lamp	8Wa-51-8, 9
Right License Lamp	8Wa-51-8, 9
Right Rear Lamp Assembly	8Wa-51-2, 3, 4, 5, 6, 7
Speed Control Servo	8Wa-51-7
Transmission Range Indicator Illumination	8Wa-51-8, 9


RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 7 10A
(8Wa-11-6)
27
F20 20 VT/WT
3 C106
S108
(8Wa-11-6)
10 C104
F20 20 VT/WT
A/T
M/T
4 C154
F20 18 VT/WT
1
PARK/ NEUTRAL POSITION SWITCH
3
L1 18 VT/BK
2 C154
L1 20 VT/BK
4 C154
F20 18 VT/WT
B
BACK-UP LAMP SWITCH
A
L1 18 VT/BK
2 C154
L1 20 VT/BK
9 C104
L1 20 VT/BK
2 C106
3
L1 20 VT/BK
B
TO S311
(8Wa-51-3)
INSTRUMENT CLUSTER
(8Wa-40-7)
HD/LP CHIME
4 C1
L7 18 BK/YL
B6 C203
L7 18 BK/YL
1 C107
L7 18 BK/YL
1 C110
L7 18 BK/YL
TO S118
(8Wa-70-2)
L7 18 BK/YL
1
L7 18 BK/YL
C
TO S310
(8Wa-51-3)
MULTI-FUNCTION SWITCH
(8Wa-51-6)
(8Wa-52-2)
PARK LAMP FEED
9
L7 18 BK/YL
LEFT TURN/ STOP SIGNAL
4
L63 18 DG/RD
RIGHT TURN/ STOP SIGNAL
5
L62 18 BR/RD
4
L63 18 DG/RD
D
TO S335
(8Wa-51-3)
2 C322
L62 18 BR/RD
E
TO RIGHT REAR LAMP ASSEMBLY
(8Wa-51-3)

EXCEPT BUILT-UP-EXPORT

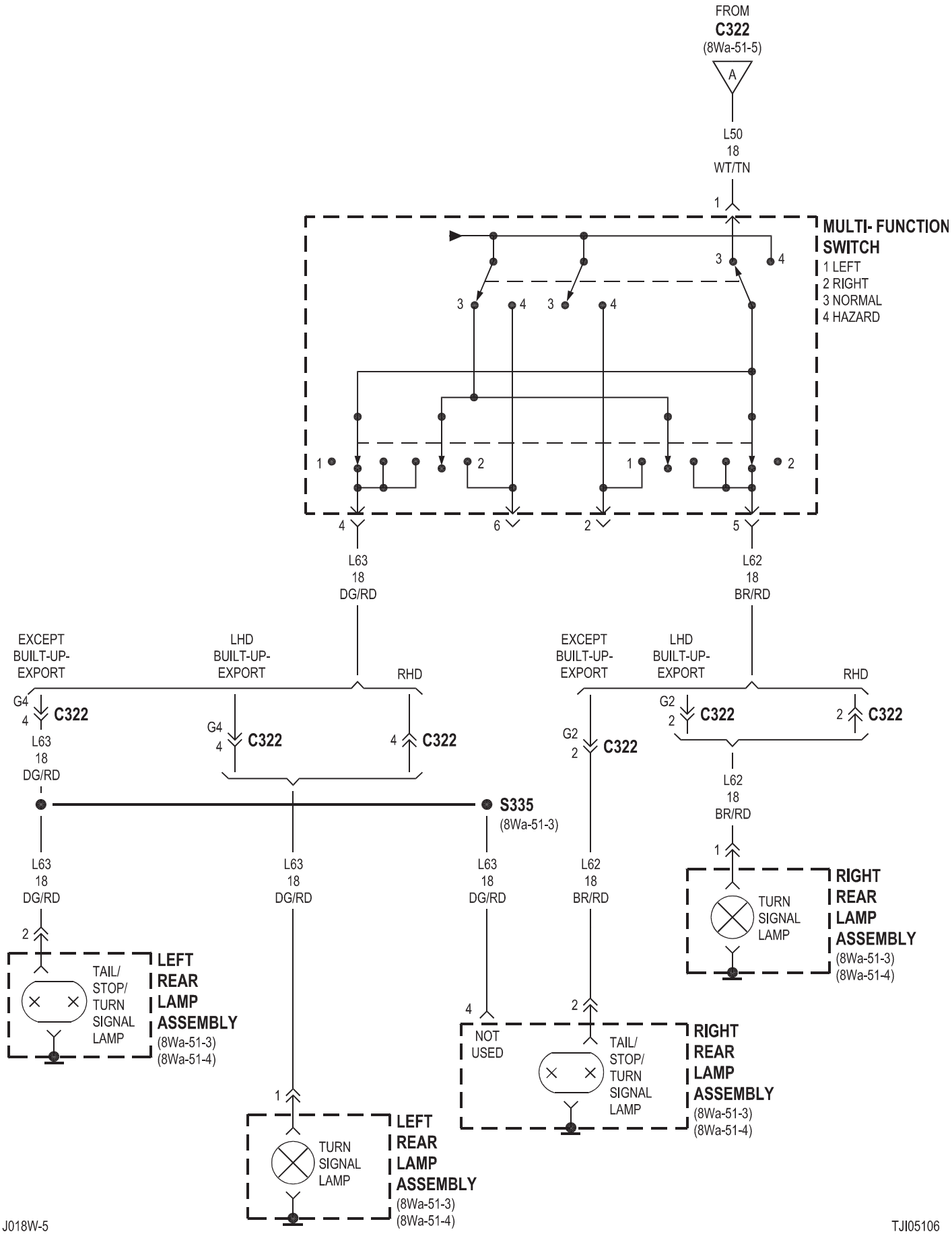


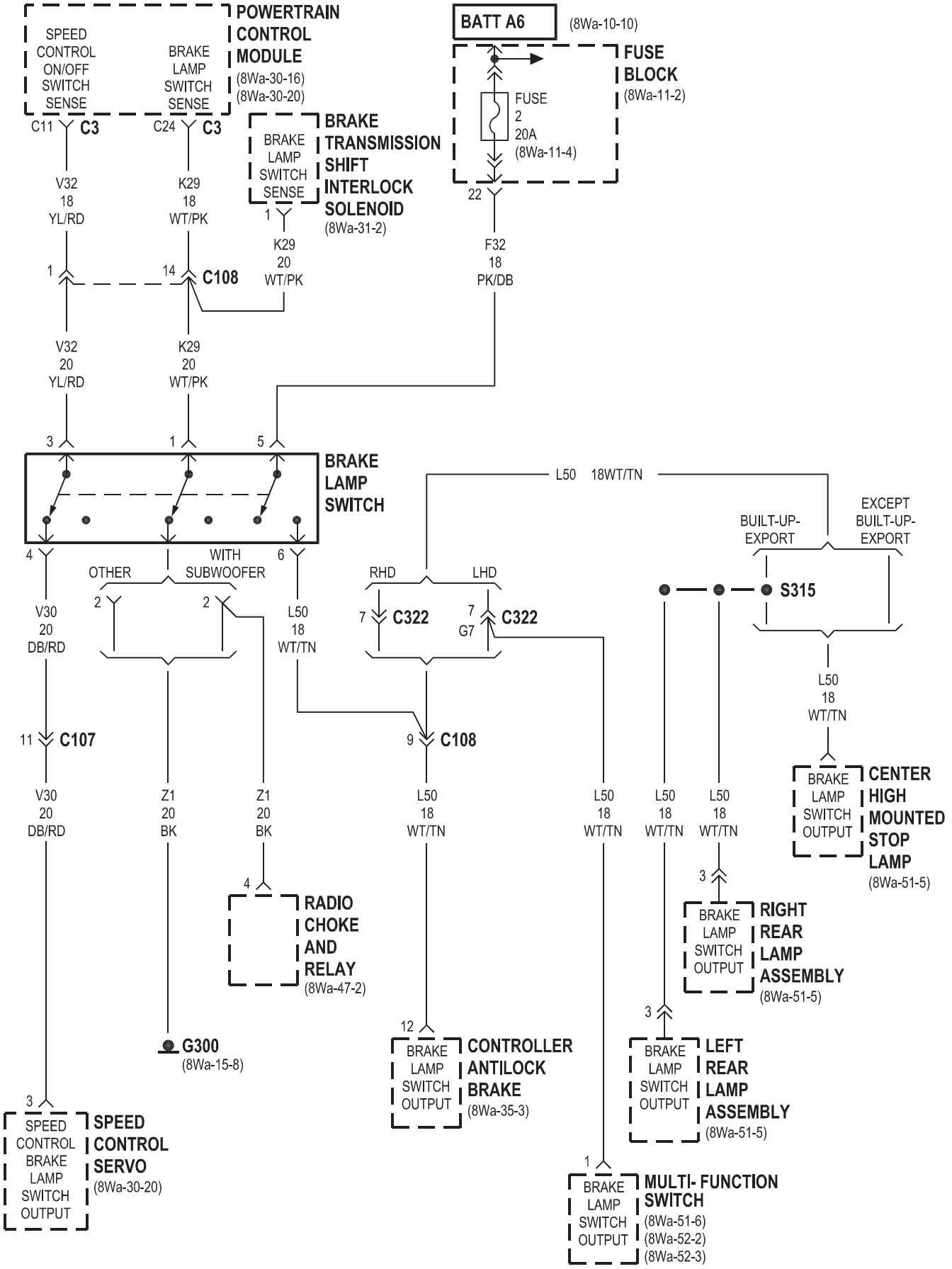

RUN A22
(8Wa-10-11)
FUSE BLOCK
(8Wa-11-2)
FUSE 7 10A
(8Wa-11-6)
27
3 C106
S108
(8Wa-11-6)
10 C104
F20 20 VT/WT
A/T
M/T
4 C154
4 C154
F20 18 VT/WT
F20 18 VT/WT
1
B
PARK/ NEUTRAL POSITION SWITCH
BACK-UP LAMP SWITCH
3
A
L1 18 VT/BK
L1 18 VT/BK
2 C154
2 C154
L1 20 VT/BK
L1 20 VT/BK
9 C104
L1 20 VT/BK
2 C106
LHD
RHD
G3
3 C322
3 C322
3
INSTRUMENT CLUSTER
(8Wa-40-7)
HD/LP CHIME
4 C1
L7 18 BK/YL
B6 C203
L7 18 BK/YL
1 C107
L7 18 BK/YL
1 C110
TO S118
(8Wa-70-3)
MULTI-FUNCTION SWITCH
(8Wa-51-6)
(8Wa-51-8)
(8Wa-51-9)
(8Wa-52-3)
PARK LAMP FEED
LEFT TURN SIGNAL
RIGHT TURN SIGNAL
9
4
5
L7 18 BK/YL
L63 18 DG/RD
L62 18 BR/RD
L7 18 BK/YL
LHD
RHD
G1
1 C322
1 C322
L7 18 BK/YL
LHD
RHD
G2
2 C322
2 C322
S310
(8Wa-70-3)
L7 18 BK/YL
LHD
RHD
G4
4 C322
4 C322
L63 18 DG/RD
L7 18 BK/YL
L62 18 BR/RD
S311
2
3
4
1
2
3
4
1
BACK-UP LAMP
TAIL/ STOP LAMP
TURN SIGNAL LAMP
LEFT REAR LAMP ASSEMBLY
BACK-UP LAMP
TAIL/ STOP LAMP
TURN SIGNAL LAMP
RIGHT REAR LAMP ASSEMBLY

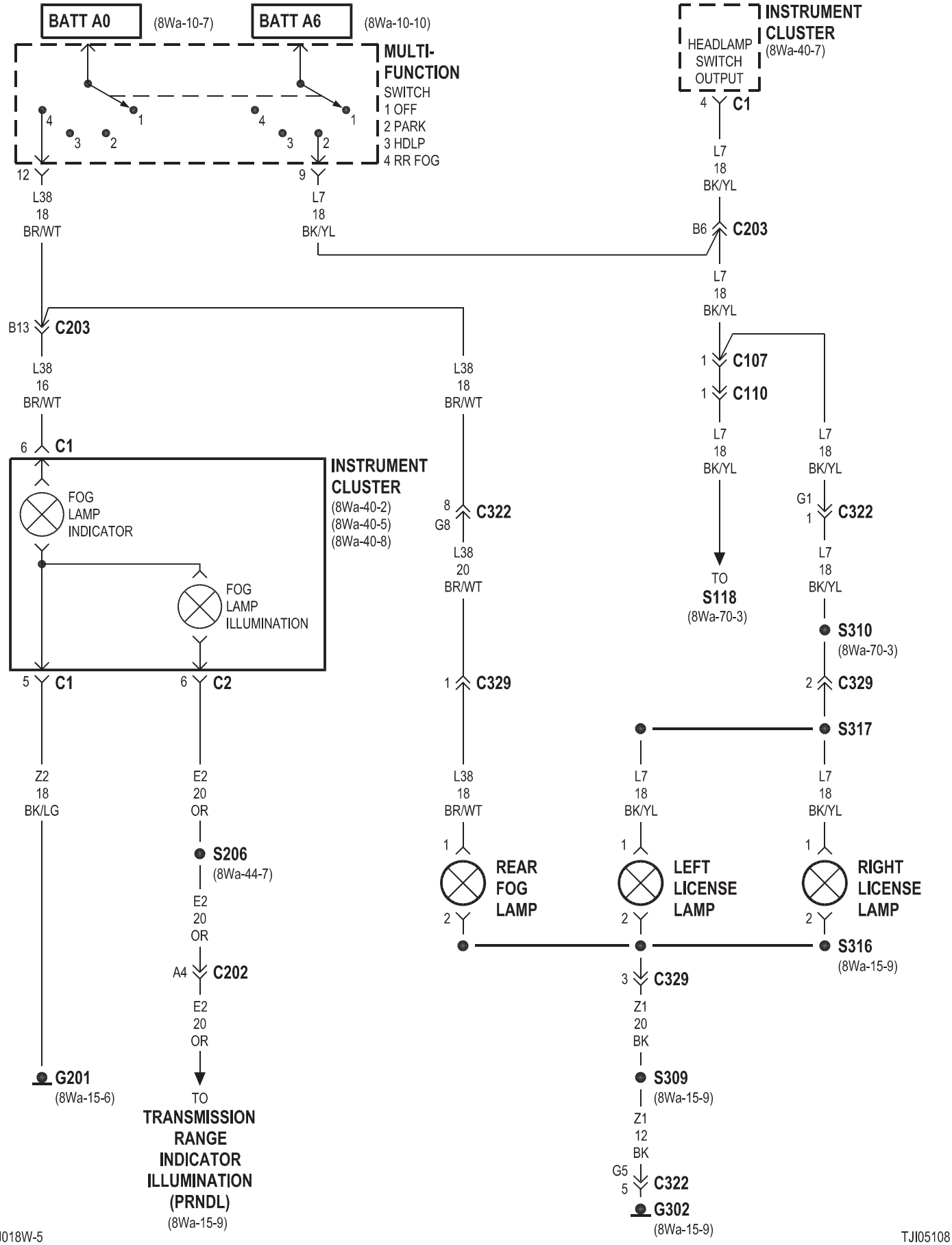


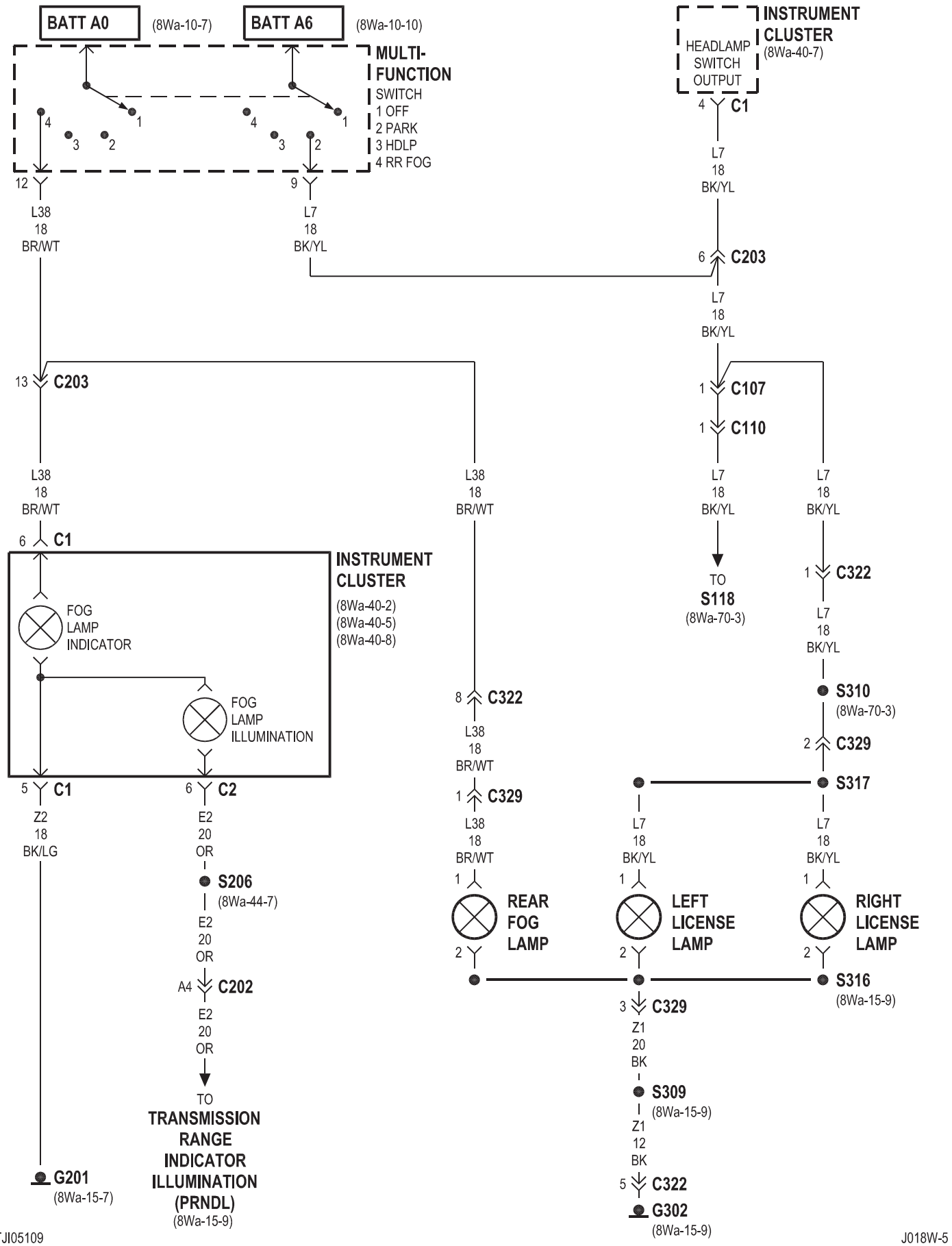
TJI05105

J018W-5


FROM
C322
(8Wa-51-5)
A
L50
18
WT/TN
MULTI- FUNCTION
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
(8Wa-51-3)
TAIL/
STOP/
TURN
SIGNAL
LAMP
LEFT
REAR
LAMP
ASSEMBLY
(8Wa-51-3)
(8Wa-51-4)
TURN
SIGNAL
LAMP
RIGHT
REAR
LAMP
ASSEMBLY
(8Wa-51-3)
(8Wa-51-4)
NOT
USED


POWERTRAIN CONTROL MODULE
(8Wa-30-16)
(8Wa-30-20)
SPEED CONTROL ON/OFF SWITCH SENSE
BRAKE LAMP SWITCH SENSE
C11 C3
C24 C3
BATT A6
(8Wa-10-10)
FUSE BLOCK
(8Wa-11-2)
FUSE 2 20A
(8Wa-11-4)
22
BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID
(8Wa-31-2)
BRAKE LAMP SWITCH SENSE
1
V32 18 YL/RD
K29 18 WT/PK
K29 20 WT/PK
F32 18 PK/DB
1
14 C108
V32 20 YL/RD
K29 20 WT/PK
3
1
5
BRAKE LAMP SWITCH
4
6
L50 18WT/TN
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S315
OTHER
WITH SUBWOOFER
2
2
RHD
LHD
7 C322
7 C322
G7
V30 20 DB/RD
L50 18 WT/TN
11 C107
9 C108
L50 18WT/TN
V30 20 DB/RD
Z1 20 BK
Z1 20 BK
L50 18 WT/TN
L50 18 WT/TN
L50 18 WT/TN
4
RADIO CHOKE AND RELAY
(8Wa-47-2)
3
BRAKE LAMP SWITCH OUTPUT
RIGHT REAR LAMP ASSEMBLY
(8Wa-51-5)
BRAKE LAMP SWITCH OUTPUT
CENTER HIGH MOUNTED STOP LAMP
(8Wa-51-5)
G300
(8Wa-15-8)
12
BRAKE LAMP SWITCH OUTPUT
CONTROLLER ANTILOCK BRAKE
(8Wa-35-3)
3
BRAKE LAMP SWITCH OUTPUT
LEFT REAR LAMP ASSEMBLY
(8Wa-51-5)
3
SPEED CONTROL BRAKE LAMP SWITCH OUTPUT
SPEED CONTROL SERVO
(8Wa-30-20)
1
BRAKE LAMP SWITCH OUTPUT
MULTI- FUNCTION SWITCH
(8Wa-51-6)
(8Wa-52-2)
(8Wa-52-3)

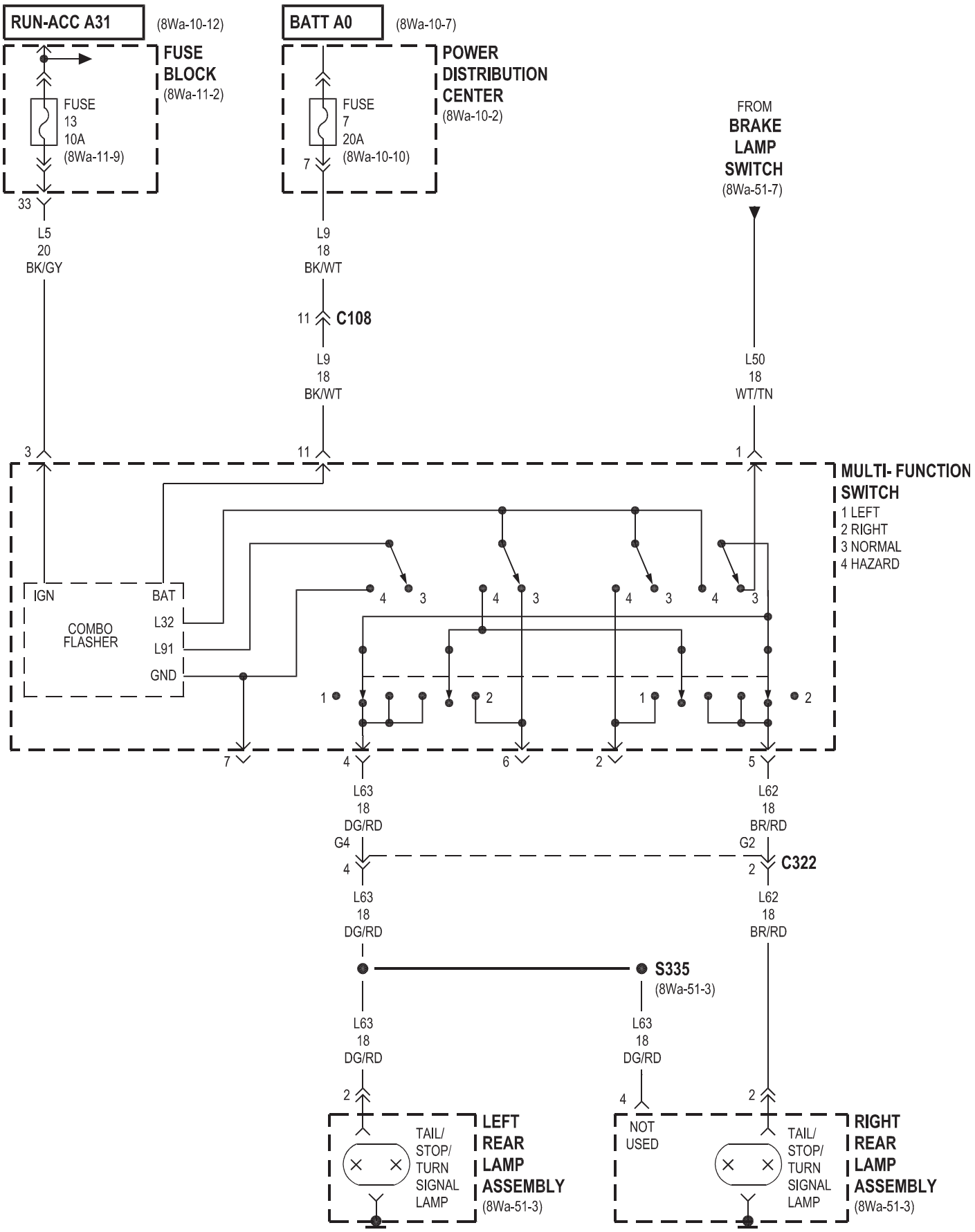

BATT A0
(8Wa-10-7)
BATT A6
(8Wa-10-10)
MULTI-FUNCTION SWITCH
1 OFF
2 PARK
3 HDLP
4 RR FOG
INSTRUMENT CLUSTER
(8Wa-40-7)
HEADLAMP SWITCH OUTPUT
4 C1
L7 18 BK/YL
B6 C203
L7 18 BK/YL
12 L38 18 BR/WT
9 L7 18 BK/YL
B13 C203
L38 16 BR/WT
6 C1
INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-5)
(8Wa-40-8)
FOG LAMP INDICATOR
FOG LAMP ILLUMINATION
5 C1
6 C2
Z2 18 BK/LG
G201
(8Wa-15-6)
E2 20 OR
S206
(8Wa-44-7)
E2 20 OR
A4 C202
E2 20 OR
TO TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL)
(8Wa-15-9)
L38 18 BR/WT
8 G8 C322
L38 20 BR/WT
1 C329
L38 18 BR/WT
1 REAR FOG LAMP 2
1 C107
1 C110
L7 18 BK/YL
TO S118
(8Wa-70-3)
L7 18 BK/YL
G1 1 C322
L7 18 BK/YL
S310
(8Wa-70-3)
2 C329
S317
L7 18 BK/YL
1 LEFT LICENSE LAMP 2
3 C329
Z1 20 BK
S309
(8Wa-15-9)
Z1 12 BK
G5 5 C322
G302
(8Wa-15-9)
L7 18 BK/YL
1 RIGHT LICENSE LAMP 2
S316
(8Wa-15-9)


BATT A0
(8Wa-10-7)
BATT A6
(8Wa-10-10)
MULTI-FUNCTION SWITCH
1 OFF
2 PARK
3 HDLP
4 RR FOG
INSTRUMENT CLUSTER
(8Wa-40-7)
HEADLAMP SWITCH OUTPUT
4 C1
L7 18 BK/YL
12
L38 18 BR/WT
9
L7 18 BK/YL
6 C203
L7 18 BK/YL
13 C203
1 C107
1 C110
L38 18 BR/WT
L38 18 BR/WT
L7 18 BK/YL
L7 18 BK/YL
6 C1
INSTRUMENT CLUSTER
(8Wa-40-2)
(8Wa-40-5)
(8Wa-40-8)
FOG LAMP INDICATOR
FOG LAMP ILLUMINATION
TO S118
(8Wa-70-3)
1 C322
L7 18 BK/YL
S310
(8Wa-70-3)
2 C329
S317
8 C322
L38 18 BR/WT
1 C329
L38 18 BR/WT
L7 18 BK/YL
L7 18 BK/YL
5 C1
6 C2
Z2 18 BK/LG
E2 20 OR
S206
(8Wa-44-7)
E2 20 OR
A4 C202
E2 20 OR
TO TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL)
(8Wa-15-9)
REAR FOG LAMP
LEFT LICENSE LAMP
RIGHT LICENSE LAMP
S316
(8Wa-15-9)
3 C329
Z1 20 BK
S309
(8Wa-15-9)
Z1 12 BK
5 C322
G302
(8Wa-15-9)
G201
(8Wa-15-7)

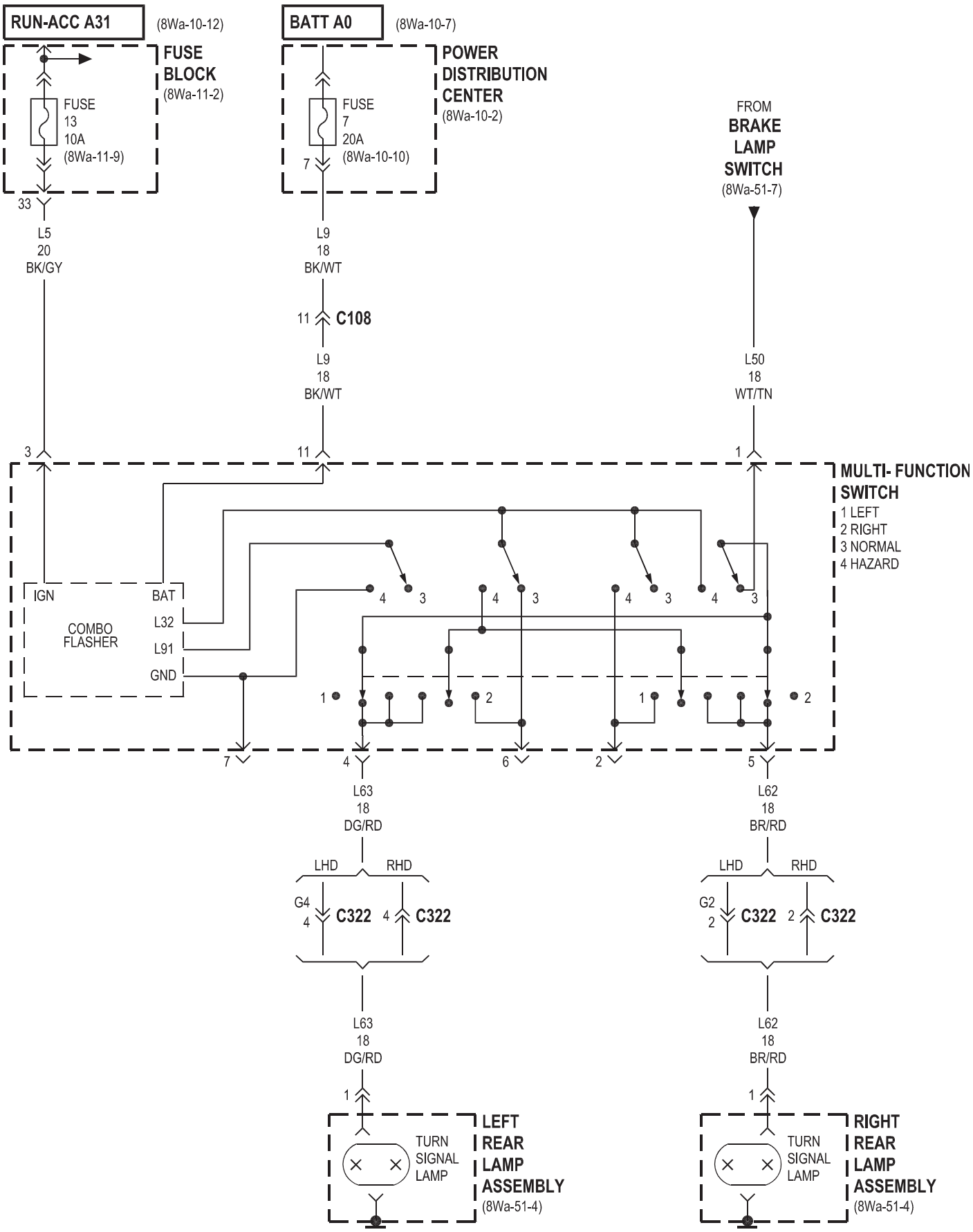
8W-52 TURN SIGNALS

Component	Page
Brake Lamp Switch	8Wa-52-2, 3
Fuse 13 (FB)	8Wa-52-2, 3
Fuse 7 (PDC)	8Wa-52-2, 3
Fuse Block	8Wa-52-2, 3
G102	8Wa-52-4, 5
G103	8Wa-52-4, 5
Instrument Cluster	8Wa-52-4, 5
Left Front Park/Turn Signal Lamp	8Wa-52-4
Left Front Turn Signal Lamp	8Wa-52-5
Left Rear Lamp Assembly	8Wa-52-2, 3
Left Side Marker Lamp	8Wa-52-4
Left Side Repeater Lamp	8Wa-52-5
Multi-Function Switch	8Wa-52-2, 3, 4, 5
Power Distribution Center	8Wa-52-2, 3
Right Front Park/Turn Signal Lamp	8Wa-52-4
Right Front Turn Signal Lamp	8Wa-52-5
Right Rear Lamp Assembly	8Wa-52-2, 3
Right Side Marker Lamp	8Wa-52-4
Right Side Repeater Lamp	8Wa-52-5

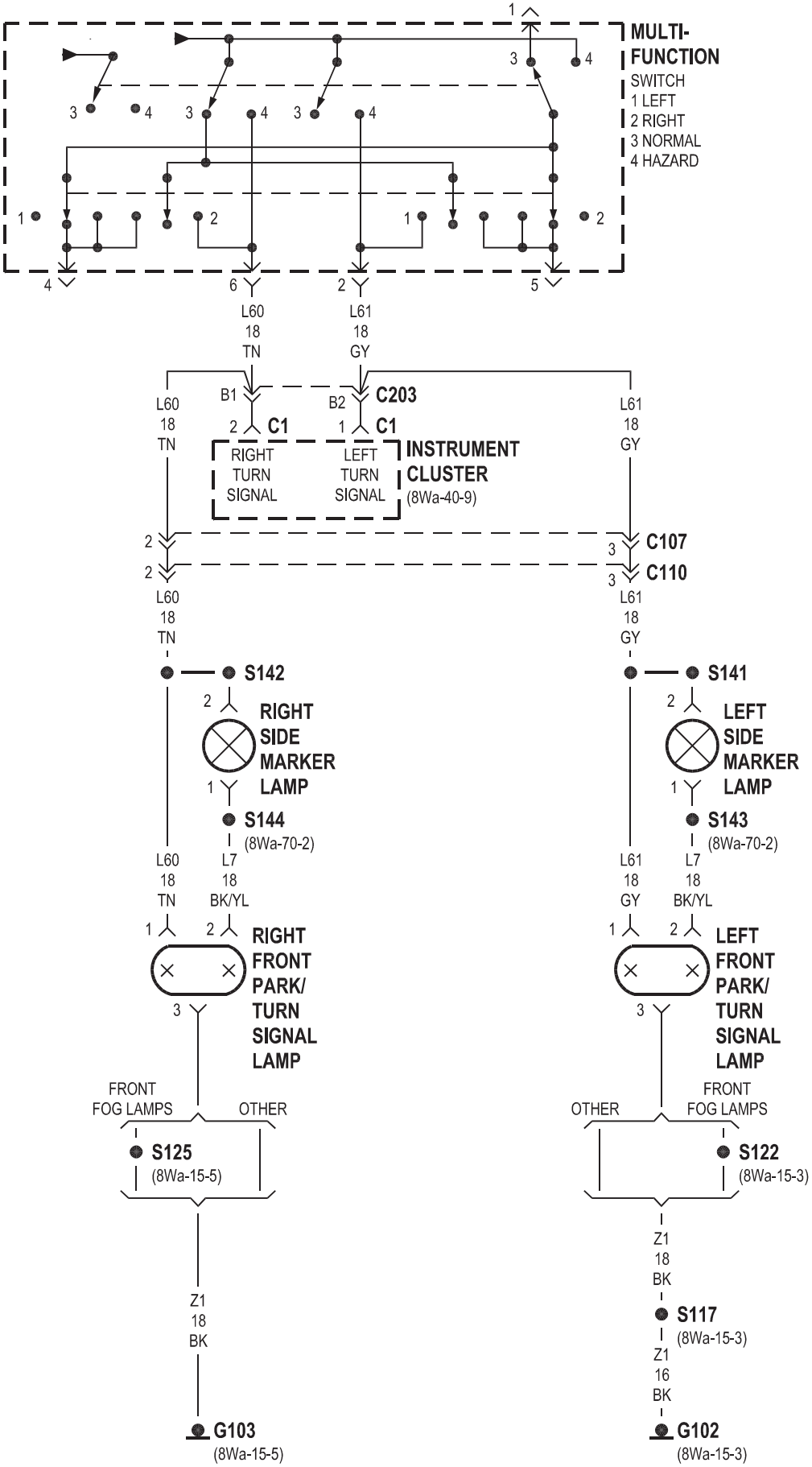
EXCEPT BUILT-UP-EXPORT



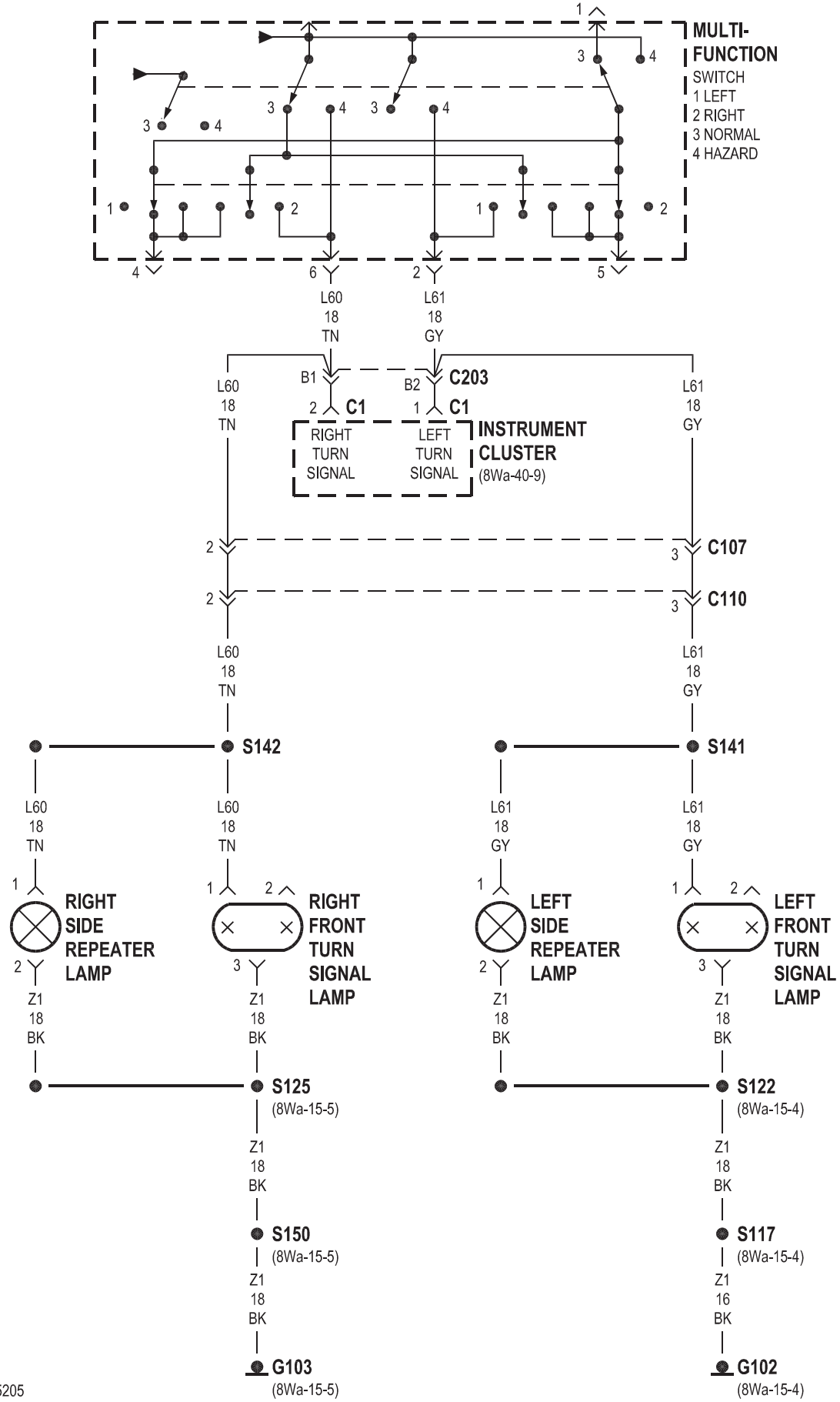
BUILT-UP-EXPORT



EXCEPT BUILT-UP-EXPORT



BUILT-UP-EXPORT

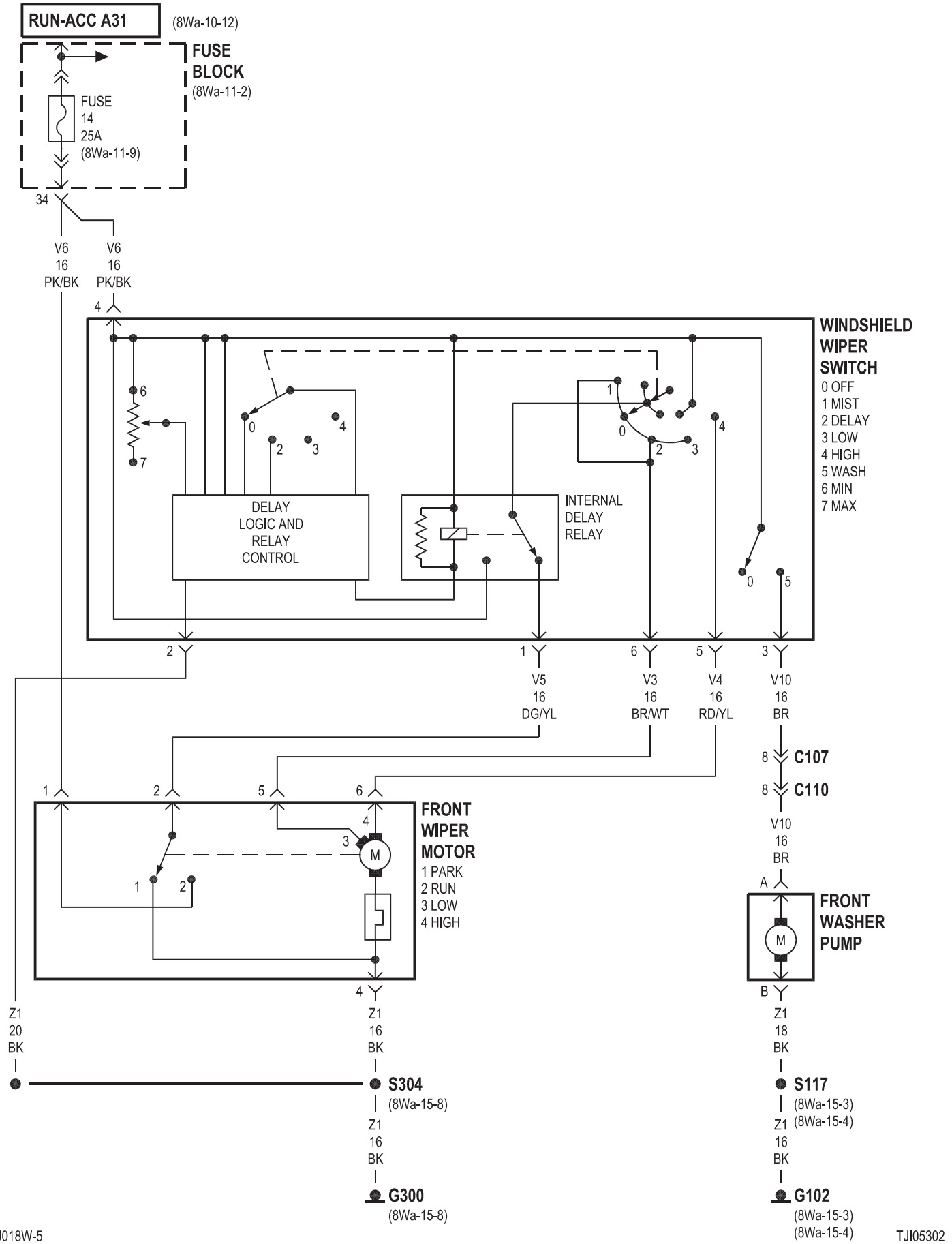


TJI05205

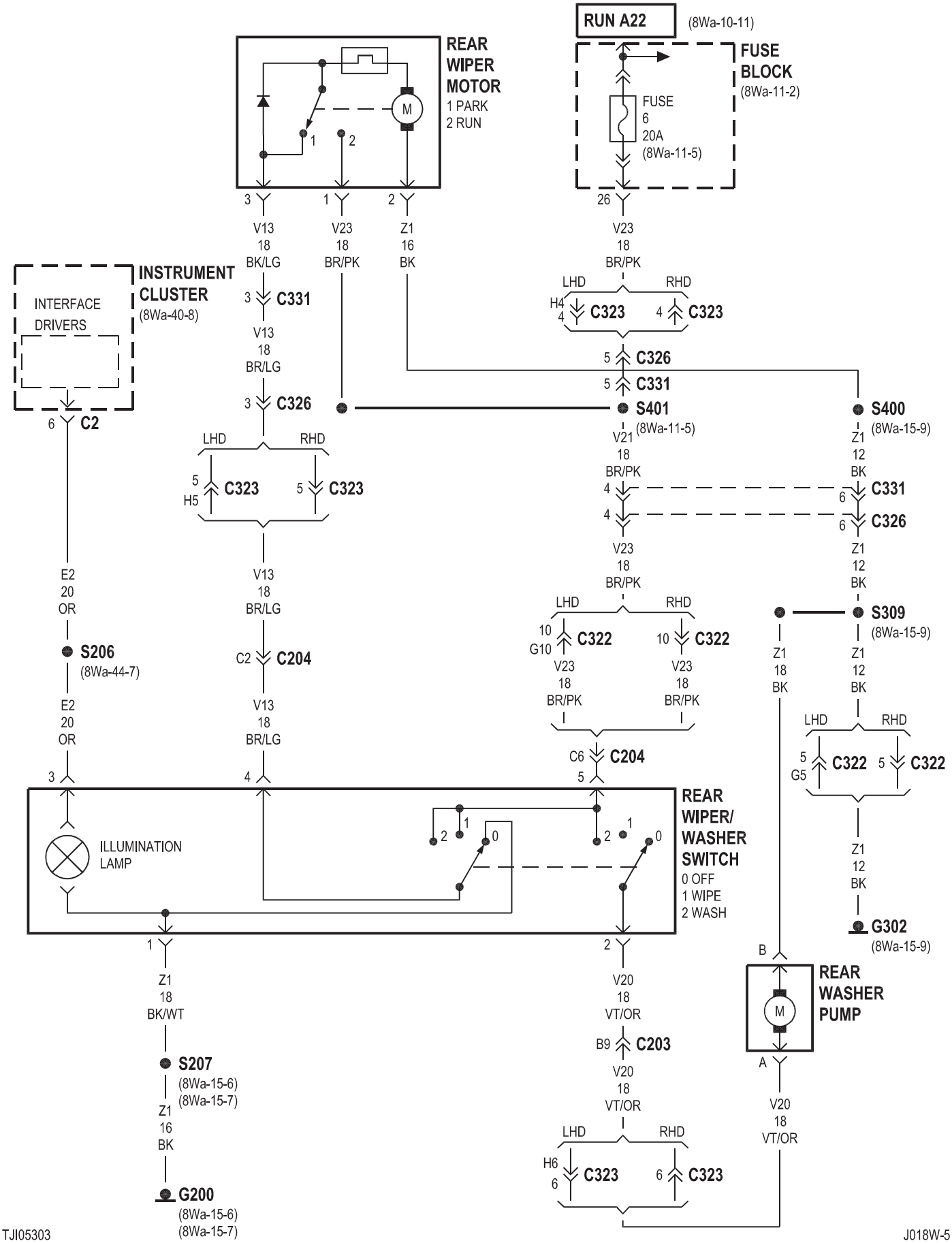
J018W-5

8W-53 WIPERS

Component	Page
Front Washer Pump	8Wa-53-2
Front Wiper Motor	8Wa-53-2
Fuse 14 (FB)	8Wa-53-2
Fuse 6 (FB)	8Wa-53-3
Fuse Block	8Wa-53-2, 3
G102	8Wa-53-2
G200	8Wa-53-3
G300	8Wa-53-2
G302	8Wa-53-3
Instrument Cluster	8Wa-53-3
Rear Washer Pump	8Wa-53-3
Rear Wiper Motor	8Wa-53-3
Rear Wiper/Washer Switch	8Wa-53-3
Windshield Wiper Switch	8Wa-53-2


RUN-ACC A31
(8Wa-10-12)
FUSE BLOCK
(8Wa-11-2)
FUSE 14 25A
(8Wa-11-9)
34
V6 16 PK/BK
V6 16 PK/BK
4
WINDSHIELD WIPER SWITCH
0 OFF
1 MIST
2 DELAY
3 LOW
4 HIGH
5 WASH
6 MIN
7 MAX
DELAY LOGIC AND RELAY CONTROL
INTERNAL DELAY RELAY
2
1
6
5
3
V5 16 DG/YL
V3 16 BR/WT
V4 16 RD/YL
V10 16 BR
8
C107
8
C110
V10 16 BR
A
FRONT WASHER PUMP
B
Z1 18 BK
S117
(8Wa-15-3)
(8Wa-15-4)
Z1 16 BK
G102
(8Wa-15-3)
(8Wa-15-4)
1
2
5
6
FRONT WIPER MOTOR
1 PARK
2 RUN
3 LOW
4 HIGH
4
Z1 20 BK
Z1 16 BK
S304
(8Wa-15-8)
Z1 16 BK
G300
(8Wa-15-8)

HARD TOP

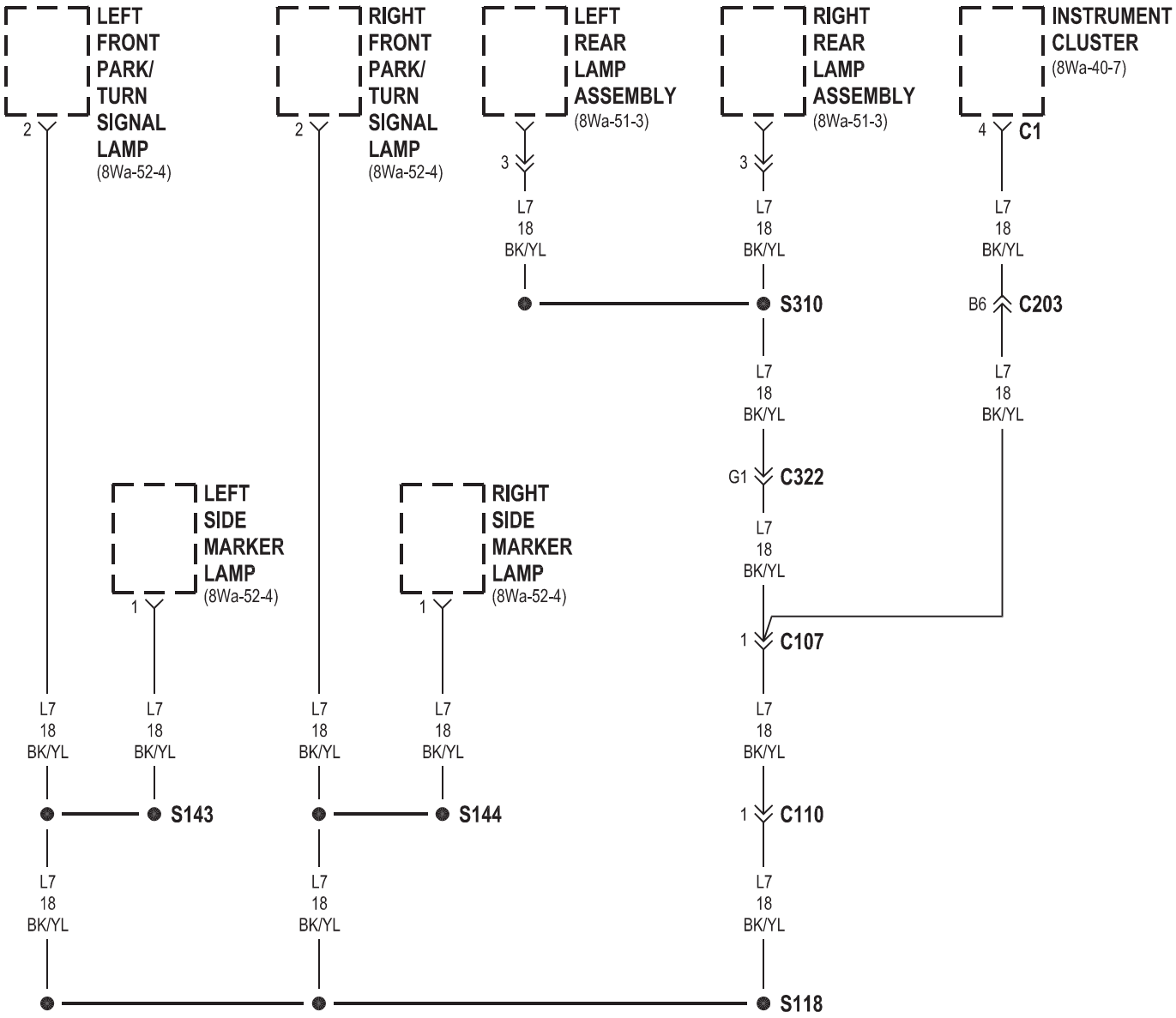


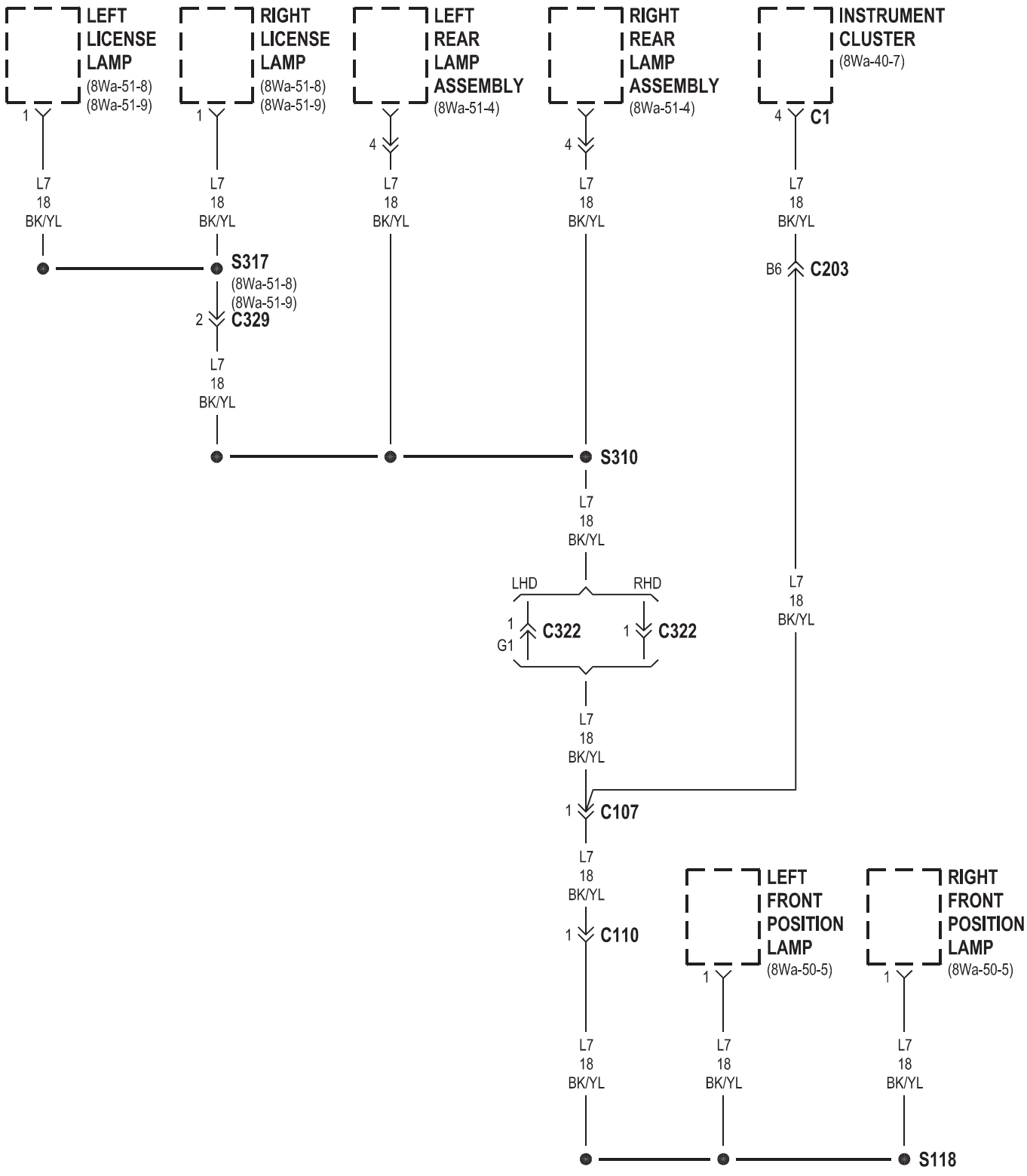
TJI05303

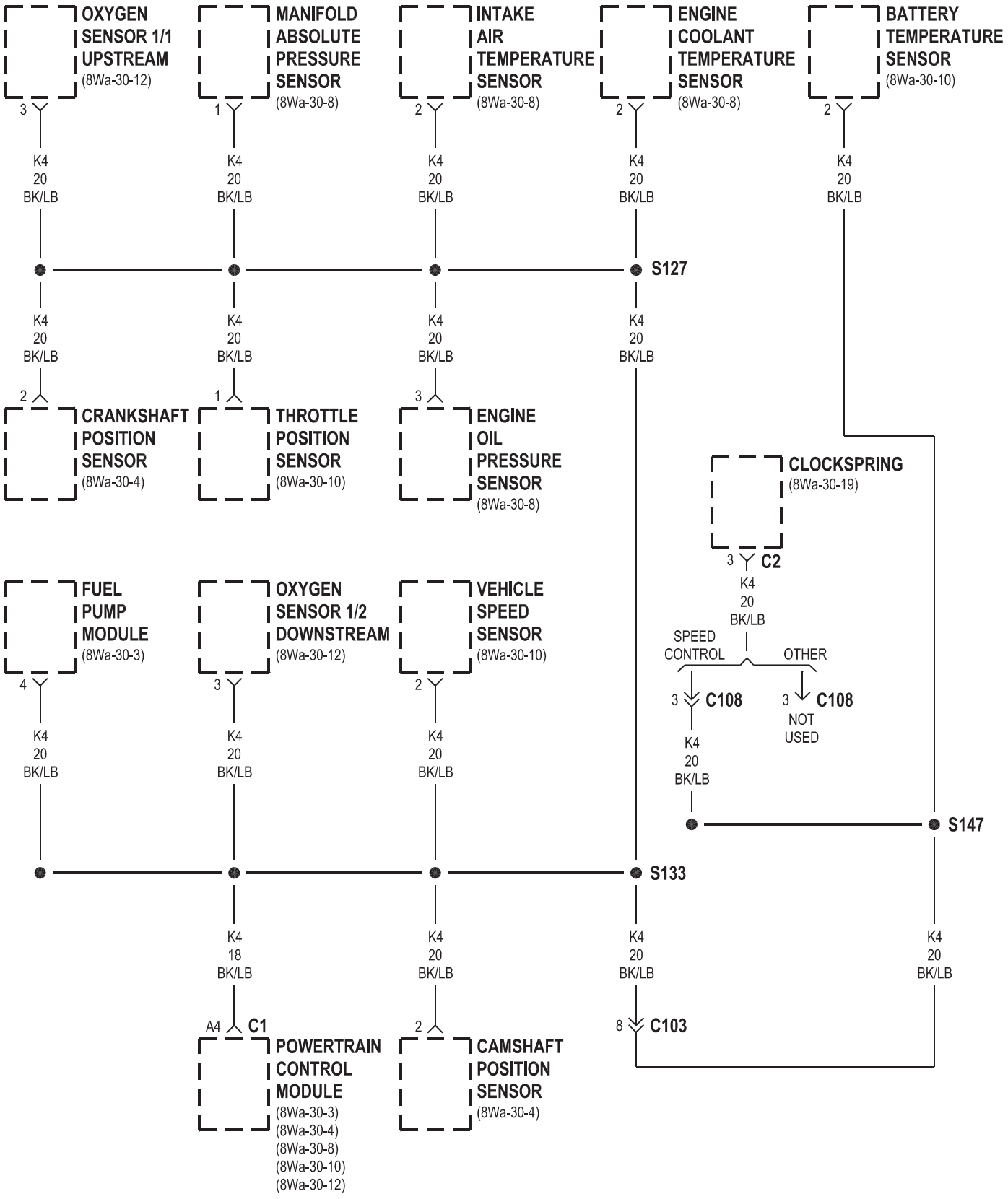
J018W-5

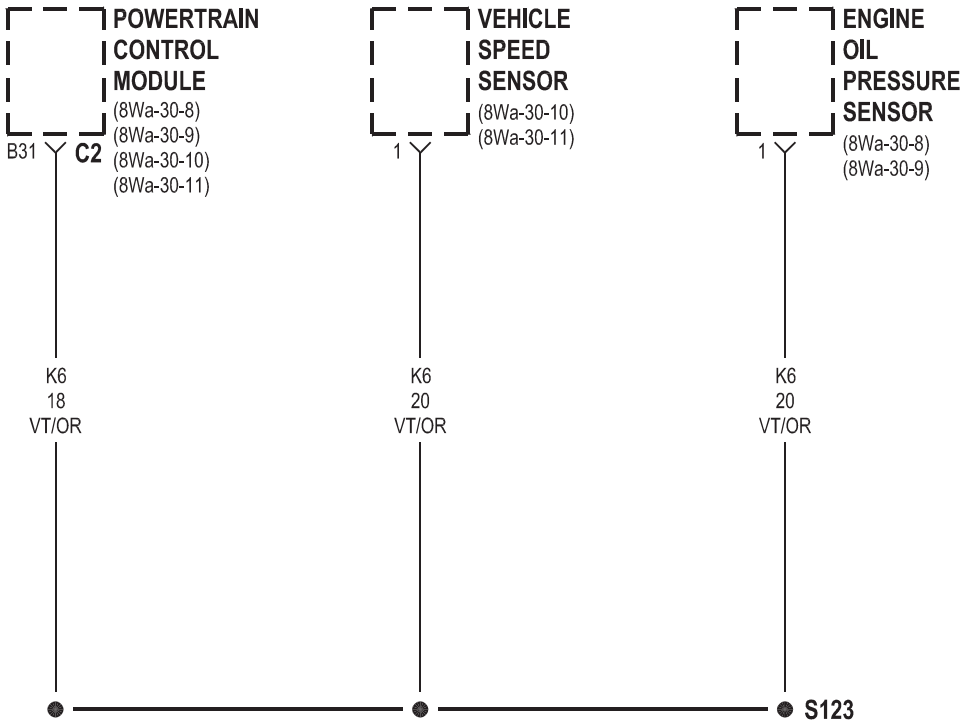
8W-70 SPLICE INFORMATION

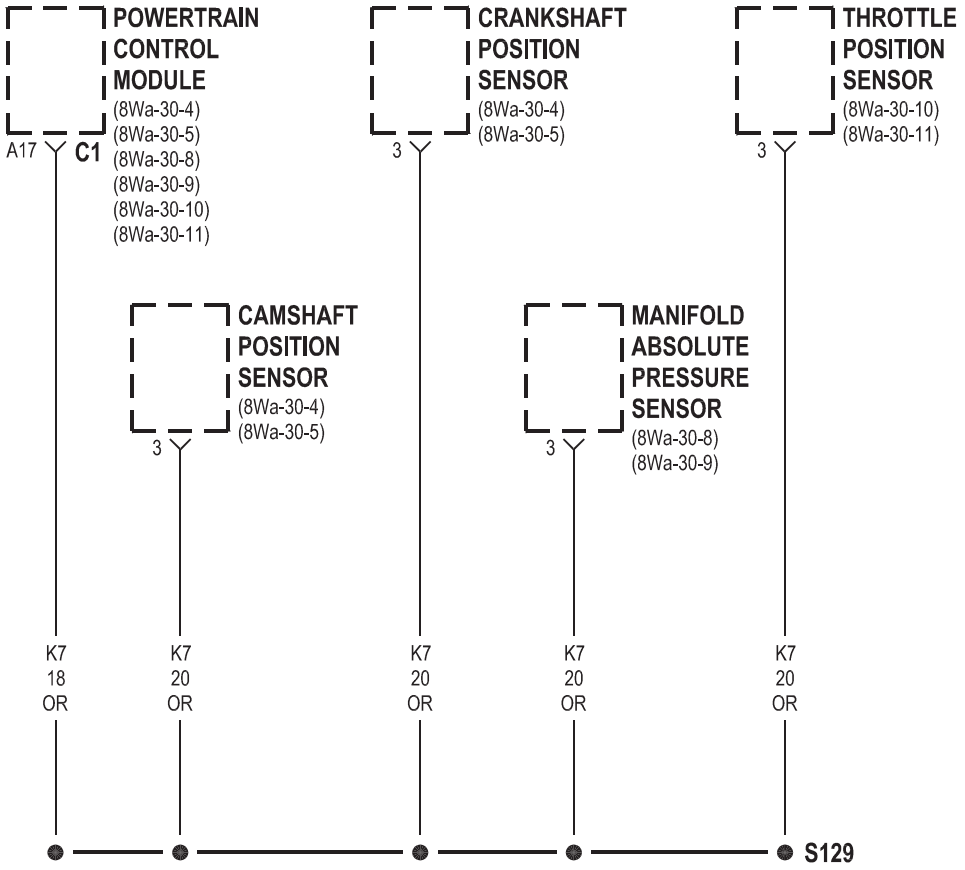
Component	Page
S101	8Wa-10-14
S102	8Wa-11-8
S103	8Wa-42-4
S105	8Wa-50-3
S106	8Wa-15-2
S108	8Wa-11-6
S111	8Wa-10-11
S113	8Wa-30-15
S115	8Wa-41-3
S116	8Wa-10-16
S117	8Wa-15-3, 4
S118	8Wa-70-2, 3
S121	8Wa-70-6, 7, 8
S122	8Wa-15-3, 4
S123	8Wa-70-5
S124	8Wa-10-14
S124	8Wa-30-13
S125	8Wa-15-5
S126	8Wa-10-15
S127	8Wa-70-4, 6, 7, 8
S128	8Wa-10-15
S129	8Wa-70-5
S130	8Wa-15-10
S132	8Wa-15-11, 12, 13
S133	8Wa-70-4, 6, 7, 8
S134	8Wa-15-11, 12, 13
S135	8Wa-30-10, 11
S136	8Wa-10-7
S136	8Wa-20-2
S137	8Wa-15-12
S138	8Wa-50-6
S140	8Wa-10-13
S141	8Wa-50-4
S141	8Wa-52-4, 5
S142	8Wa-50-4
S142	8Wa-52-4, 5
S143	8Wa-70-2
S144	8Wa-70-2
S147	8Wa-70-4, 6, 7, 8
S150	8Wa-15-5
S151	8Wa-11-10
S152	8Wa-50-3, 9
S155	8Wa-40-9
S156	8Wa-50-7, 8
S202	8Wa-44-5
S204	8Wa-10-17
S206	8Wa-44-7
S207	8Wa-15-6, 7
S208	8Wa-42-2, 3
S209	8Wa-18-2
S301	8Wa-50-2
S304	8Wa-15-8
S309	8Wa-15-9
S310	8Wa-70-2, 3
S311	8Wa-51-3, 4
S313	8Wa-10-17
S314	8Wa-44-3
S315	8Wa-51-5, 7
S316	8Wa-15-9
S317	8Wa-51-8, 9
S320	8Wa-10-9
S331	8Wa-10-11
S332	8Wa-10-13
S333	8Wa-21-2
S335	8Wa-51-3
S336	8Wa-50-2
S400	8Wa-15-9
S401	8Wa-11-5


LEFT FRONT PARK/ TURN SIGNAL LAMP
(8Wa-52-4)
2
RIGHT FRONT PARK/ TURN SIGNAL LAMP
(8Wa-52-4)
2
LEFT REAR LAMP ASSEMBLY
(8Wa-51-3)
3
RIGHT REAR LAMP ASSEMBLY
(8Wa-51-3)
3
INSTRUMENT CLUSTER
(8Wa-40-7)
4
C1
L7
18
BK/YL
B6
C203
S310
G1
C322
1
C107
1
C110
LEFT SIDE MARKER LAMP
(8Wa-52-4)
1
RIGHT SIDE MARKER LAMP
(8Wa-52-4)
1
S143
S144
S118

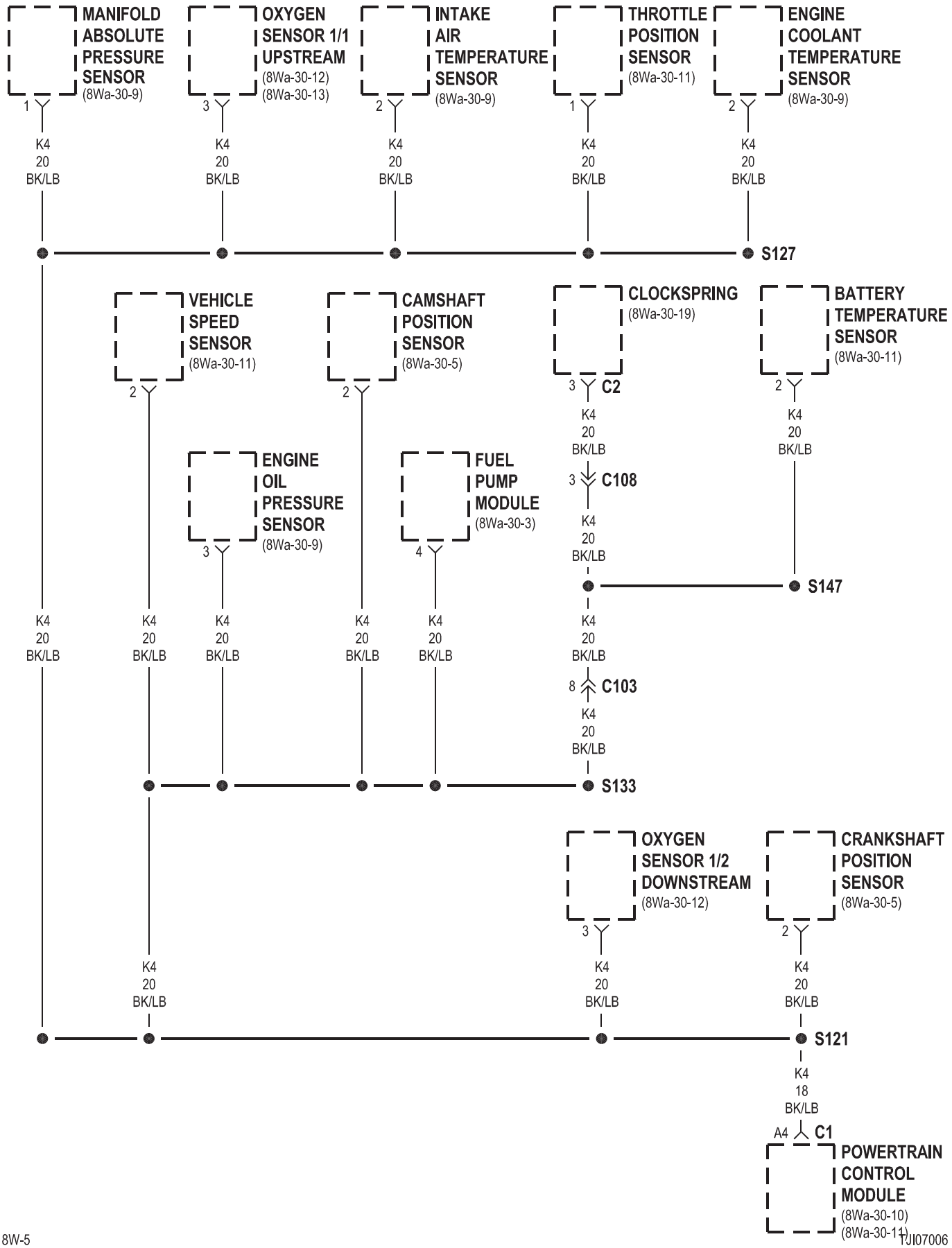

LEFT LICENSE LAMP
(8Wa-51-8)
(8Wa-51-9)
1
L7
18
BK/YL
RIGHT LICENSE LAMP
(8Wa-51-8)
(8Wa-51-9)
1
L7
18
BK/YL
LEFT REAR LAMP ASSEMBLY
(8Wa-51-4)
4
L7
18
BK/YL
RIGHT REAR LAMP ASSEMBLY
(8Wa-51-4)
4
L7
18
BK/YL
INSTRUMENT CLUSTER
(8Wa-40-7)
4 C1
L7
18
BK/YL
B6 C203
S317
(8Wa-51-8)
(8Wa-51-9)
2 C329
L7
18
BK/YL
S310
L7
18
BK/YL
LHD
RHD
1 C322
G1
1 C322
L7
18
BK/YL
L7
18
BK/YL
1 C107
L7
18
BK/YL
1 C110
LEFT FRONT POSITION LAMP
(8Wa-50-5)
1
L7
18
BK/YL
RIGHT FRONT POSITION LAMP
(8Wa-50-5)
1
L7
18
BK/YL
S118


OXYGEN SENSOR 1/1 UPSTREAM (8Wa-30-12)
MANIFOLD ABSOLUTE PRESSURE SENSOR (8Wa-30-8)
INTAKE AIR TEMPERATURE SENSOR (8Wa-30-8)
ENGINE COOLANT TEMPERATURE SENSOR (8Wa-30-8)
BATTERY TEMPERATURE SENSOR (8Wa-30-10)
K4 20 BK/LB
S127
CRANKSHAFT POSITION SENSOR (8Wa-30-4)
THROTTLE POSITION SENSOR (8Wa-30-10)
ENGINE OIL PRESSURE SENSOR (8Wa-30-8)
CLOCKSPRING (8Wa-30-19)
C2
SPEED CONTROL
OTHER
C108
NOT USED
S147
FUEL PUMP MODULE (8Wa-30-3)
OXYGEN SENSOR 1/2 DOWNSTREAM (8Wa-30-12)
VEHICLE SPEED SENSOR (8Wa-30-10)
S133
K4 18 BK/LB
C1
POWERTRAIN CONTROL MODULE
(8Wa-30-3)
(8Wa-30-4)
(8Wa-30-8)
(8Wa-30-10)
(8Wa-30-12)
CAMSHAFT POSITION SENSOR (8Wa-30-4)
C103


POWERTRAIN CONTROL MODULE
(8Wa-30-8)
(8Wa-30-9)
(8Wa-30-10)
(8Wa-30-11)
B31
C2
K6
18
VT/OR
VEHICLE SPEED SENSOR
(8Wa-30-10)
(8Wa-30-11)
1
K6
20
VT/OR
ENGINE OIL PRESSURE SENSOR
(8Wa-30-8)
(8Wa-30-9)
1
K6
20
VT/OR
S123

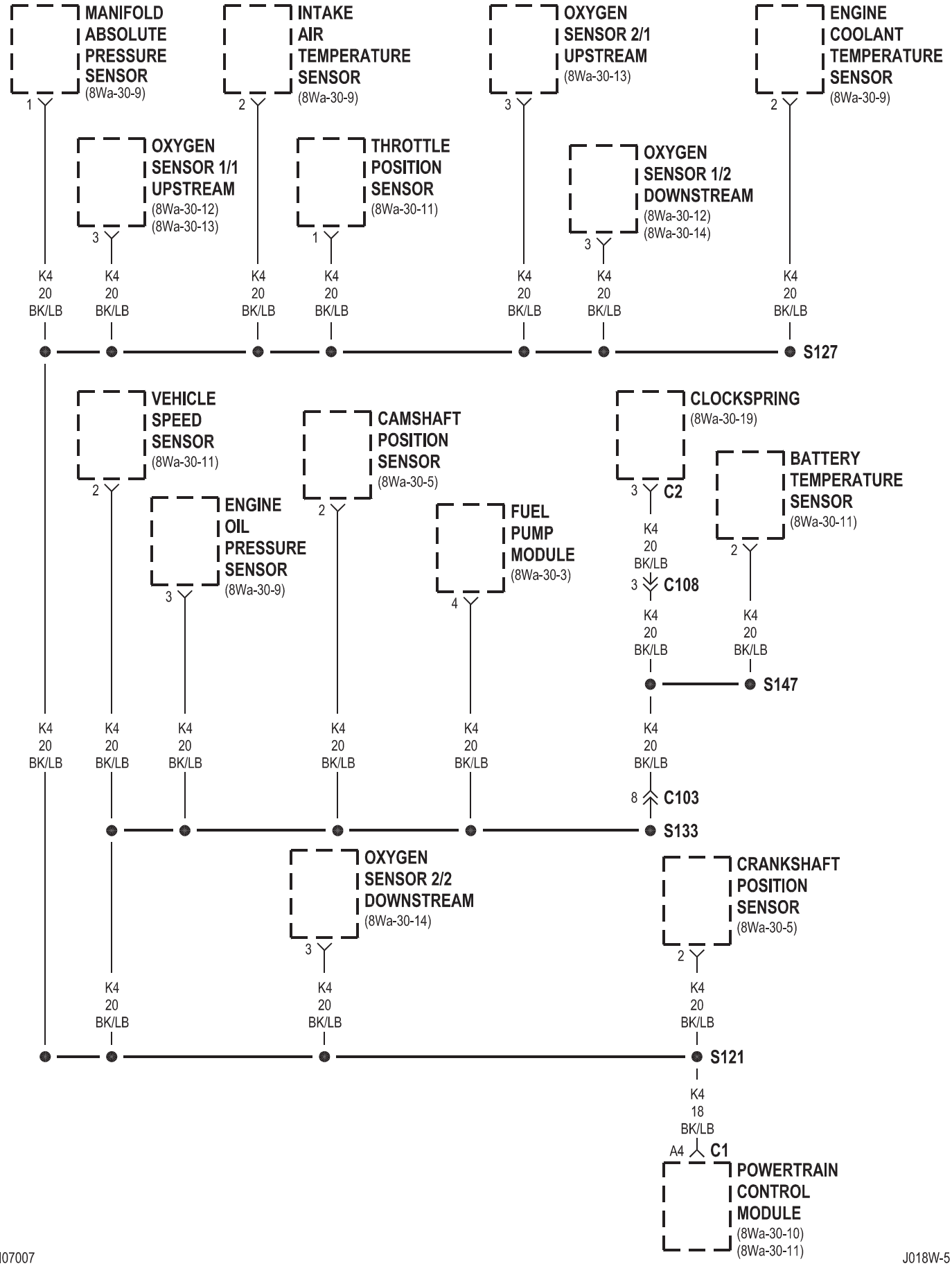

POWERTRAIN CONTROL MODULE
(8Wa-30-4)
(8Wa-30-5)
(8Wa-30-8)
(8Wa-30-9)
(8Wa-30-10)
(8Wa-30-11)
A17
C1
K7
18
OR
CAMSHAFT POSITION SENSOR
(8Wa-30-4)
(8Wa-30-5)
3
K7
20
OR
CRANKSHAFT POSITION SENSOR
(8Wa-30-4)
(8Wa-30-5)
3
K7
20
OR
MANIFOLD ABSOLUTE PRESSURE SENSOR
(8Wa-30-8)
(8Wa-30-9)
3
K7
20
OR
THROTTLE POSITION SENSOR
(8Wa-30-10)
(8Wa-30-11)
3
K7
20
OR
S129

4.0L EXCEPT CALIFORNIA/EUROPEAN III

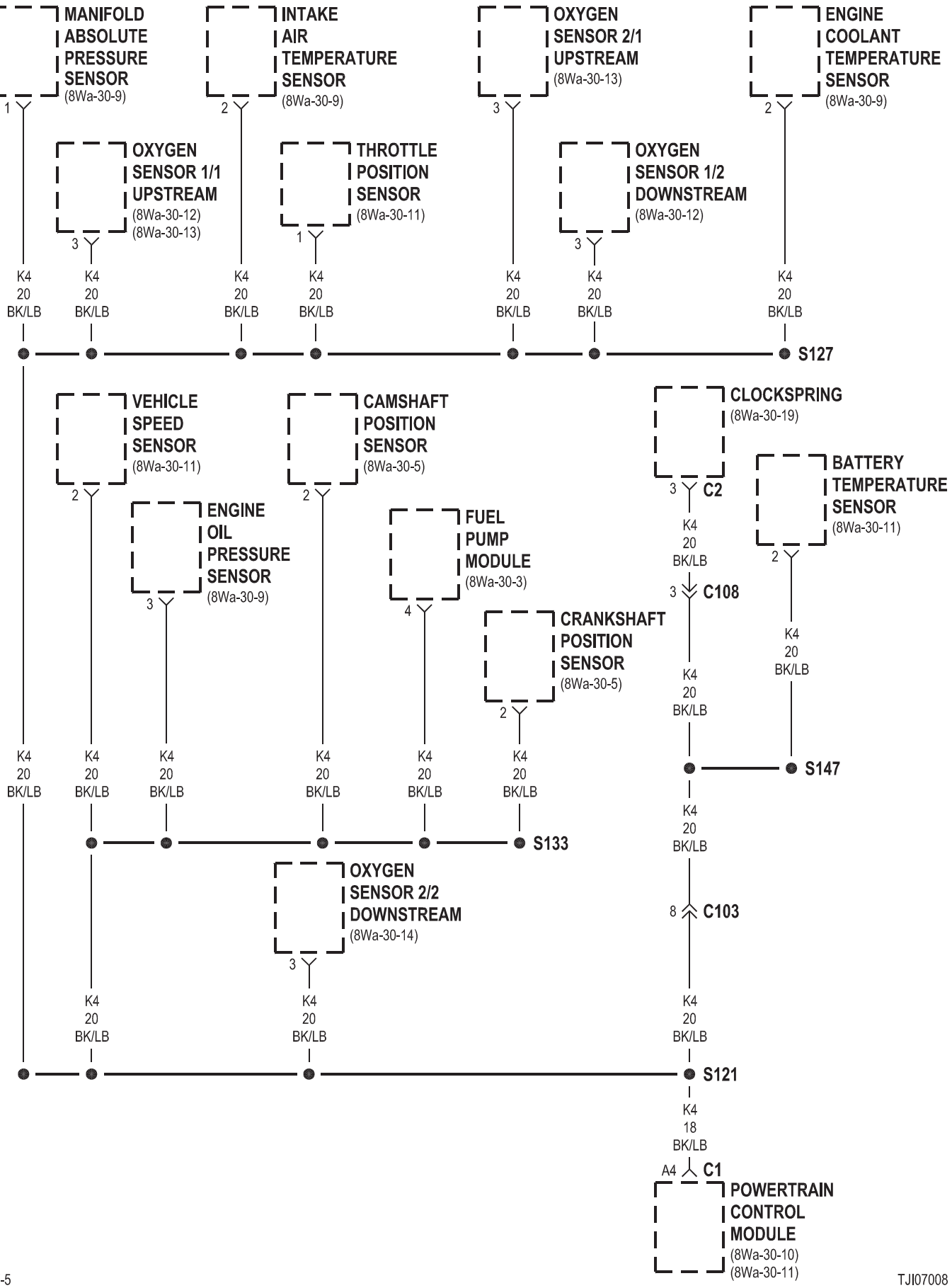


TJI07006

4.0L CALIFORNIA/EUROPEAN III



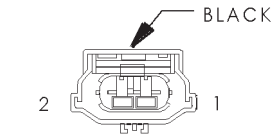
RHD 4.0L BUILT-UP-EXPORT



8W-80 CONNECTOR PINOUTS

Component	Page
A/C Compressor Clutch	8Wa-80-3
A/C-Heater Control C1	8Wa-80-3
A/C-Heater Control C2	8Wa-80-3
A/C-Heater Control C3	8Wa-80-3
A/C High Pressure Switch	8Wa-80-3
A/C Low Pressure Switch	8Wa-80-4
Airbag Control Module	8Wa-80-4
Back-Up Lamp Switch (M/T)	8Wa-80-4
Battery Temperature Sensor	8Wa-80-4
Blend Door Actuator	8Wa-80-5
Blower Motor	8Wa-80-5
Blower Motor Relay	8Wa-80-5
Blower Motor Resistor Block	8Wa-80-5
Brake Lamp Switch	8Wa-80-5
Brake Transmission Shift Interlock Solenoid	8Wa-80-6
Brake Warning Indicator Switch	8Wa-80-6
C103	8Wa-80-6
C103	8Wa-80-6
C104 (LHD)	8Wa-80-7
C104 (LHD)	8Wa-80-7
C104 (RHD)	8Wa-80-8
C104 (RHD)	8Wa-80-8
C104 (RHD ABS)	8Wa-80-8
C104 (RHD ABS)	8Wa-80-9
C106	8Wa-80-9
C106	8Wa-80-9
C107	8Wa-80-10
C107	8Wa-80-10
C108	8Wa-80-10
C108	8Wa-80-11
C110	8Wa-80-11
C110	8Wa-80-12
C154	8Wa-80-12
C154	8Wa-80-12
C170	8Wa-80-12
C170	8Wa-80-13
C202	8Wa-80-13
C202	8Wa-80-13
C203	8Wa-80-14
C203	8Wa-80-14
C204	8Wa-80-15
C204	8Wa-80-15
C205	8Wa-80-16
C205	8Wa-80-16
C322 (LHD)	8Wa-80-16
C322 (LHD)	8Wa-80-17
C322 (RHD)	8Wa-80-17
C322 (RHD)	8Wa-80-17
C323 (LHD) (Except 2 Speaker Soft Top)	8Wa-80-18
C323 (LHD)	8Wa-80-18
C323 (RHD)	8Wa-80-18
C323 (RHD) (Except 2 Speaker Soft Top)	8Wa-80-19
C325 (4 Spkr Sys)	8Wa-80-19
C325 (4 Spkr Sys)	8Wa-80-19
C326 (Hard Top)	8Wa-80-19
C326 (Hard Top)	8Wa-80-20
C329 (Built-Up-Export)	8Wa-80-20
C329 (Built-Up-Export)	8Wa-80-20
C330 (4 Spkr Sys)	8Wa-80-21
C330 (4 Spkr Sys)	8Wa-80-21
C331 (Hard Top)	8Wa-80-21
C331 (Hard Top)	8Wa-80-21
Camshaft Position Sensor	8Wa-80-22
Cigar Lighter/Power Outlet	8Wa-80-22
Circuit Breaker	8Wa-80-22
Clockspring	8Wa-80-22
Clockspring C2	8Wa-80-22
Clutch Pedal Position Switch (M/T)	8Wa-80-23
Controller Antilock Brake	8Wa-80-23
Crankshaft Position Sensor	8Wa-80-23
Data Link Connector	8Wa-80-23
Daytime Running Lamp Module (Except Built-Up-Export)	8Wa-80-24
Driver Airbag	8Wa-80-24
Driver Door Ajar Switch	8Wa-80-24
Engine Coolant Temperature Sensor	8Wa-80-25
Engine Oil Pressure Sensor	8Wa-80-25
EVAP/Purge Solenoid	8Wa-80-25
Front Washer Pump	8Wa-80-25
Front Wiper Motor	8Wa-80-25
Fuel Injector No. 1 (2.5L)	8Wa-80-26
Fuel Injector No. 1 (4.0L)	8Wa-80-26
Fuel Injector No. 2 (2.5L)	8Wa-80-26
Fuel Injector No. 2 (4.0L)	8Wa-80-26
Fuel Injector No. 3 (2.5L)	8Wa-80-26
Fuel Injector No. 3 (4.0L)	8Wa-80-26
Fuel Injector No. 4 (2.5L)	8Wa-80-27
Fuel Injector No. 4 (4.0L)	8Wa-80-27
Fuel Injector No. 5 (4.0L)	8Wa-80-27
Fuel Injector No. 6 (4.0L)	8Wa-80-27
Fuel Pump Module	8Wa-80-27
G-Switch	8Wa-80-27
Generator	8Wa-80-28
Headlamp Leveling Switch (Built-Up-Export)	8Wa-80-28
High Note Horn	8Wa-80-28
Idle Air Control Motor	8Wa-80-28
Ignition Coil (2.5L)	8Wa-80-28
Ignition Coil Pack (4.0L)	8Wa-80-29
Ignition Switch	8Wa-80-29
Instrument Cluster	8Wa-80-29
Instrument Cluster	8Wa-80-29

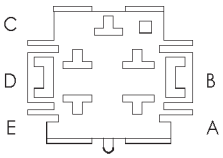
Component	Page
Intake Air Temperature Sensor	8Wa-80-30
Leak Detection Pump (LHD)	8Wa-80-30
Left Courtesy Lamp	8Wa-80-30
Left Fog Lamp (Except Built-Up-Export)	8Wa-80-30
Left Front Park/ Turn Signal Lamp (Except Built-Up-Export)	8Wa-80-31
Left Front Position Lamp (Built-Up-Export)	8Wa-80-31
Left Front Speaker	8Wa-80-31
Left Front Turn Signal Lamp (Built-Up-Export)	8Wa-80-31
Left Front Wheel Speed Sensor	8Wa-80-31
Left Headlamp	8Wa-80-31
Left Headlamp Leveling Motor (Built-Up-Export)	8Wa-80-32
Left License Lamp (Built-Up-Export)	8Wa-80-32
Left Rear Lamp Assembly (Built-Up-Export)	8Wa-80-32
Left Rear Lamp Assembly (Except Built-Up-Export)	8Wa-80-32
Left Rear Speaker (Sound Bar)	8Wa-80-32
Left Rear Wheel Speed Sensor	8Wa-80-33
Left Side Marker Lamp (Except Built-Up-Export)	8Wa-80-33
Left Side Repeater Lamp (Built-Up-Export)	8Wa-80-33
Low Note Horn (Except Built-Up-Expert)	8Wa-80-33
Manifold Absolute Pressure Sensor	8Wa-80-33
Multi-Function Switch	8Wa-80-34
Oxygen Sensor 1/1 Upstream	8Wa-80-34
Oxygen Sensor 1/2 Downstream	8Wa-80-34
Oxygen Sensor 2/1 Upstream (4.0l California/European III)	8Wa-80-35
Oxygen Sensor 2/2 Downstream (4.0l California/European III)	8Wa-80-35
Park/Neutral Position Switch (A/T)	8Wa-80-35
Passenger Airbag	8Wa-80-35
Passenger Airbag On/Off Switch	8Wa-80-35
Passenger Door Ajar Switch	8Wa-80-36
Power Steering Pressure Switch (2.5L)	8Wa-80-36
Powertrain Control Module C1	8Wa-80-36
Powertrain Control Module C2	8Wa-80-37
Powertrain Control Module C3	8Wa-80-37
Radio C1	8Wa-80-38
Radio C2	8Wa-80-38
Radio Choke And Relay	8Wa-80-39
Rear Fog Lamp (Built-Up-Export)	8Wa-80-39
Rear Washer Pump (Hard Top)	8Wa-80-39
Rear Window Defogger Switch (Hard Top)	8Wa-80-39
Rear Wiper Motor (Hard Top)	8Wa-80-39
Rear Wiper/Washer Switch (Hard Top)	8Wa-80-40
Right Courtesy Lamp	8Wa-80-40
Right Fog Lamp (Except Built-Up-Export)	8Wa-80-40
Right Front Park/ Turn Signal Lamp (Except Built-Up-Export)	8Wa-80-40
Right Front Position Lamp (Built-Up-Export)	8Wa-80-40
Right Front Speaker	8Wa-80-40
Right Front Turn Signal Lamp (Built-Up-Export)	8Wa-80-41
Right Front Wheel Speed Sensor	8Wa-80-41
Right Headlamp	8Wa-80-41
Right Headlamp Leveling Motor (Built-Up-Export)	8Wa-80-41
Right License Lamp	8Wa-80-41
Right Rear Lamp Assembly (Built-Up-Export)	8Wa-80-42
Right Rear Lamp Assembly (Except Built-Up-Export)	8Wa-80-42
Right Rear Speaker (Sound Bar)	8Wa-80-42
Right Rear Wheel Speed Sensor	8Wa-80-42
Right Side Marker Lamp (Except Built-Up-Export)	8Wa-80-42
Right Side Repeater Lamp (Built-Up-Export)	8Wa-80-43
Seat Belt Switch (RHD Built-Up-Export)	8Wa-80-43
Sentry Key Immobilizer Module	8Wa-80-43
Sound Bar Dome Lamp	8Wa-80-43
Speed Control Servo	8Wa-80-43
Subwoofer	8Wa-80-44
Throttle Position Sensor	8Wa-80-44
Torque Converter Clutch Solenoid	8Wa-80-44
Transfer Case Switch	8Wa-80-44
Transmission Range Indicator Illumination (PRNDL)	8Wa-80-44
Underhood Lamp	8Wa-80-45
Vehicle Speed Sensor	8Wa-80-45
Windshield Wiper Switch	8Wa-80-45



A/C COMPRESSOR CLUTCH

A/C COMPRESSOR CLUTCH - BLACK 2 WAY

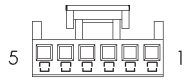
CAV	CIRCUIT	FUNCTION
1	C3 20DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
2	Z1 20BK	GROUND



A/C-HEATER CONTROL C1

A/C-HEATER CONTROL C1 - 5 WAY

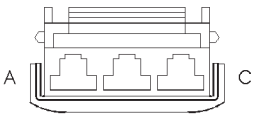
CAV	CIRCUIT	FUNCTION
A	C7 12BR/TN	BLOWER MOTOR HIGH SPEED
B	C6 14LB	BLOWER MOTOR M2 SPEED
C	C5 16LG/LB	BLOWER MOTOR M1 SPEED
D	C4 18TN	BLOWER MOTOR LOW SPEED
E	C1 12DG	BLOWER MOTOR FEED



A/C-HEATER CONTROL C2

A/C-HEATER CONTROL C2 - 5 WAY

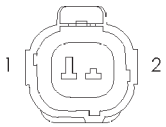
CAV	CIRCUIT	FUNCTION
1	F24 20RD/DG (RHD)	GROUND
1	Z11 20BK/WT (LHD)	GROUND
2	C36 20DB/RD	BLEND DOOR FEED BACK SIGNAL
3	F24 20RD/DG (LHD)	FUSED IGNITION SWITCH OUTPUT (RUN)
3	Z11 20BK/WT (RHD)	FUSED IGNITION SWITCH OUTPUT (RUN)
4	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
5	Z1 20BK	GROUND



A/C-HEATER CONTROL C3

A/C-HEATER CONTROL C3 - 3 WAY

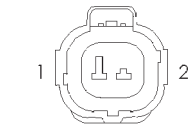
CAV	CIRCUIT	FUNCTION
A	C90 20LG	A/C SELECT INPUT
B	C1 12DG	BLOWER MOTOR FEED
C	Z1 12BK	GROUND



A/C HIGH PRESSURE SWITCH

A/C HIGH PRESSURE SWITCH - 2 WAY

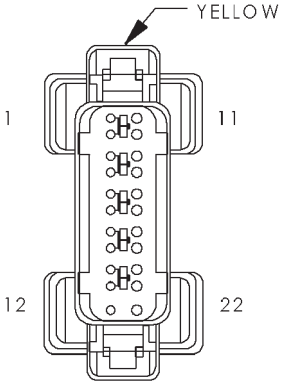
CAV	CIRCUIT	FUNCTION
1	C90 20LG	A/C HIGH PRESSURE SWITCH OUTPUT
2	C21 20DB/OR (4 CYL)	A/C HIGH PRESSURE SWITCH SENSE
2	C22 20DB/WT (6 CYL)	A/C SWITCH SENSE



A/C LOW PRESSURE SWITCH

A/C LOW PRESSURE SWITCH - 2 WAY

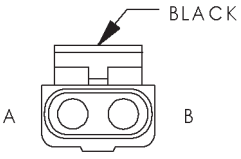
CAV	CIRCUIT	FUNCTION
1	C22 20DB/WT (4 CYL)	A/C LOW PRESSURE SWITCH SENSE
1	C21 20DB/OR (4 CYL)	A/C SWITCH SENSE
2	C21 20DB/OR (6 CYL)	A/C SWITCH SENSE
2	C22 20DB/WT (6 CYL)	A/C LOW PRESSURE SWITCH SENSE



AIRBAG CONTROL MODULE

AIRBAG CONTROL MODULE - YELLOW 22 WAY

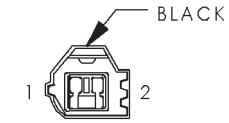
CAV	CIRCUIT	FUNCTION
1	R45 18DG/LB	DRIVER AIRBAG LINE 2
2	R43 18BK/LB	DRIVER AIRBAG LINE 1
3	-	-
4	-	-
5	R42 18BK/YL	PASSENGER AIRBAG LINE 1
6	R44 18DG/YL	PASSENGER AIRBAG LINE 2
7	-	-
8	R166 18LG/BR (LHD)	PASSENGER AIRBAG INDICATOR DRIVER
9	-	-
10	Z6 18BK/PK	GROUND
11	R65 18LG/OR	PASSENGER AIRBAG MUX SWITCH SENSE
12	-	-
13	-	-
14	-	-
15	-	-
16	-	-
17	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
18	D25 18VT/YL	PCI BUS
19	-	-
20	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
21	-	-
22	R66 18LG/DG (LHD)	PASSENGER AIRBAG MUX SWITCH RETURN



BACK-UP LAMP SWITCH (MT)

BACK-UP LAMP SWITCH (M/T) - BLACK 2 WAY

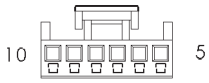
CAV	CIRCUIT	FUNCTION
A	L1 18VT/BK	BACK-UP LAMP FEED
B	F20 18VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)



BATTERY TEMPERATURE SENSOR

BATTERY TEMPERATURE SENSOR - BLACK 2 WAY

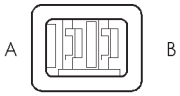
CAV	CIRCUIT	FUNCTION
1	K118 18PK/YL	BATTERY TEMPERATURE SENSOR SIGNAL
2	K167 20BK/LB	SENSOR GROUND



BLEND DOOR ACTUATOR

BLEND DOOR ACTUATOR - 6 WAY

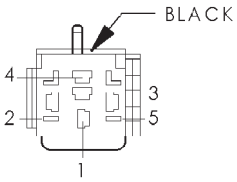
CAV	CIRCUIT	FUNCTION
5	-	-
6	-	-
7	Z11 20DB/WT	GROUND
8	C36 20YL	BLEND DOOR FEED BACK SIGNAL
9	-	-
10	F24 20OR	FUSED IGNITION SWITCH OUTPUT (RUN)



BLOWER MOTOR

BLOWER MOTOR - 2 WAY

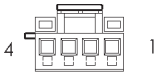
CAV	CIRCUIT	FUNCTION
A	C1 12DG	BLOWER MOTOR RELAY OUTPUT
B	C7 12BK/TN	BLOWER MOTOR HIGH DRIVER



BLOWER MOTOR RELAY

BLOWER MOTOR RELAY - BLACK 5 WAY

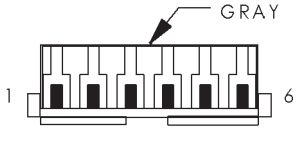
CAV	CIRCUIT	FUNCTION
1	C1 12DG	BLOWER MOTOR RELAY OUTPUT
2	Z1 20BK	GROUND
3	-	-
4	A111 12RD/LG	FUSED B(+)
5	F24 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN)



BLOWER MOTOR RESISTOR BLOCK

BLOWER MOTOR RESISTOR BLOCK - 4 WAY

CAV	CIRCUIT	FUNCTION
1	C4 14TN	BLOWER MOTOR LOW DRIVER
2	C5 14LG	BLOWER MOTOR M1 DRIVER
3	C6 14LB	BLOWER MOTOR M2 DRIVER
4	C7 12BK/TN	BLOWER MOTOR HIGH DRIVER



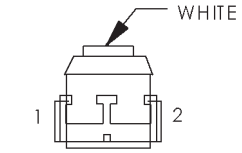
BRAKE LAMP SWITCH

BRAKE LAMP SWITCH - GRAY 6 WAY

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE LAMP SWITCH SENSE
2	Z1 20 BK (SUBWOOFER	GROUND
2	Z1 20BK	GROUND
3	V32 20YL/RD	SPEED CONTROL ON/OFF SWITCH SENSE
4	V30 20DB/RD	SPEED CONTROL BRAKE LAMP SWITCH OUTPUT

BRAKE LAMP SWITCH - GRAY 6 WAY

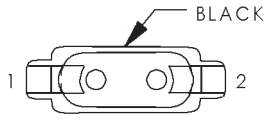
CAV	CIRCUIT	FUNCTION
5	F32 19PK/DB	FUSED B(+)
6	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT



BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID

BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID - WHITE 2 WAY

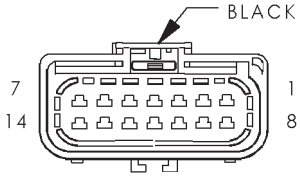
CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE LAMP SWITCH SENSE
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)



BRAKE WARNING INDICATOR SWITCH

BRAKE WARNING INDICATOR SWITCH - BLACK 2 WAY

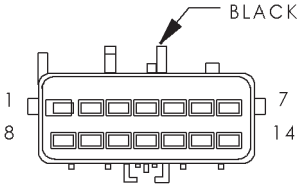
CAV	CIRCUIT	FUNCTION
1	G9 20GY/BK	BRAKE WARNING INDICATOR DRIVER
2	G99 20GY/WT	BRAKE WARNING INDICATOR DRIVER



C103

C103 - BLACK (DASH SIDE)

CAV	CIRCUIT
1	F142 18OR/DG
2	K125 18WT/DB
3	A14 14RD/WT
4	K99 18BR/OR
5	K299 18BR/WT
6	K226 18DB/LG
7	A141 18DG/WT
8	K4 20BK/LB
9	F12 20RD/LG
10	Z12 20BK/TN
11	Z12 20BK/LB
12	G7 20WT/OR (DRL) (CANADA)
13	G107 20BK/RD
14	C3 20DB/BK



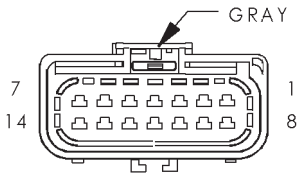
C103

C103 - BLACK (ENGINE SIDE)

CAV	CIRCUIT
1	F142 18OR/DG
2	K125 18WT/DB
3	A14 14RD/WT
4	K99 18BR/OR
5	K299 18BR/WT
6	K226 20DB/LG

C103 - BLACK (ENGINE SIDE)

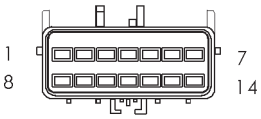
CAV	CIRCUIT
7	A141 18DG/WT
8	K4 20BK/LB
9	F12 20RD/LG
10	Z12 20BK/TN
11	Z12 20BK/LB
12	G7 20WT/OR (DRL)
13	G107 20BK/RD
14	C3 20DB/BK



C104
(LHD)

C104 (LHD) - GRAY (DASH SIDE)

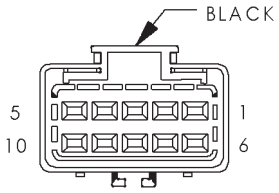
CAV	CIRCUIT
1	C90 20LG
2	C21 20DB/OR
3	B1 18YL/DB (ABS)
4	B2 18YL (ABS)
5	T41 20BR/LB
6	B3 18LG/DB (ABS)
7	B4 18LG (ABS)
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 20DB
14	A242 18VT/OR (4.0L CALIFORNIA)



C104
(LHD)

C104 (LHD) - (ENGINE SIDE)

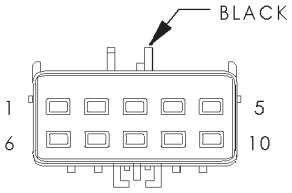
CAV	CIRCUIT
1	C90 20LG
2	C22 20DB/WT (4CYL)
2	C21 20DB/OR (6 CYL)
2	C21 20DB/OR (6 CYL)
3	B1 18YL/DB (ABS)
4	B2 18YL (ABS)
5	T41 20BR/LB
6	B3 18LG/DB (ABS)
7	B4 18LG (ABS)
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 18DB
14	A242 18VT/OR (4.0L CALIFORNIA)



C104
(RHD)

C104 (RHD) - BLACK (DASH SIDE)

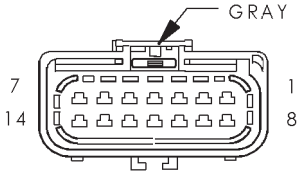
CAV	CIRCUIT
1	C90 20LG
2	C21 18DB/OR
3	A42 18DG
4	F42 18DG/LG
5	T41 20BR/LB
6	T40 20BR
7	F15 18DB
8	A242 18VT/OR
9	L1 20VT/BK
10	F20 20VT/WT



C104
(RHD)

C104 (RHD) - BLACK (ENGINE SIDE)

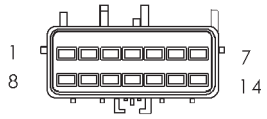
CAV	CIRCUIT
1	C90 20LG
2	C21 20DB/OR (6 CYL)
2	C22 20DB/WT (4 CYL)
3	A42 18DG
4	F42 18DG/LG
5	T41 20BR/LB
6	T40 12BR
7	F15 18DB
8	A242 18VT/OR
9	L1 20VT/BK
10	F20 20VT/WT



C104
(RHD ABS)

C104 (RHD ABS) - GRAY (DASH SIDE)

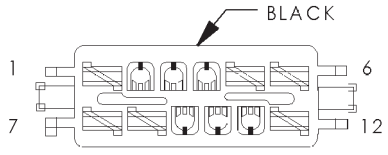
CAV	CIRCUIT
1	C90 20LG
2	C21 18DB/OR
3	B1 18YL/DB
4	B2 18YL
5	T41 20BR/LB
6	B3 18LG/DB
7	B4 18LG
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 20DB
14	A242 18VT/OR



C104
(RHD ABS)

C104 (RHD ABS) - (ENGINE SIDE)

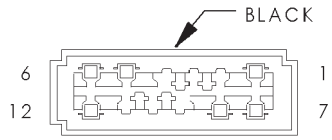
CAV	CIRCUIT
1	C90 20LG
2	C21 20DB/OR
3	B1 18YL/DB
4	B2 18YL
5	T41 20BR/LB
6	B3 18LG/DB
7	B4 18LG
8	-
9	L1 20VT/BK
10	F20 20VT/WT
11	F42 18DG/LG
12	T40 12BR
13	F15 18DB
14	-



C106

C106 - BLACK (DASH SIDE)

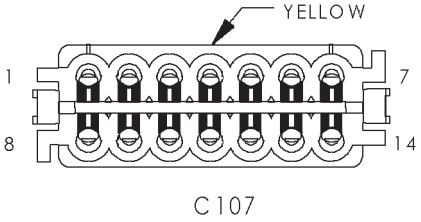
CAV	CIRCUIT
1	F30 12RD/PK
2	L1 20VT/BK
3	F20 20VT/WT
4	F15 20DB
5	A1 14RD
6	A2 12PK/BK
7	A6 12RD/BK
8	C15 12BK/WT
9	T141 14YL/RD
10	F12 20RD/LG
11	G9 20GY/BK
12	A3 12RD/WT



C106

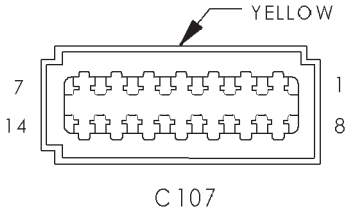
C106 - BLACK (CROSSBODY SIDE)

CAV	CIRCUIT
1	F30 12RD/PK
2	L1 20VT/BK
3	F20 20VT/WT
4	F15 20DB
4	F15 20DB
5	A1 14RD
6	A2 12PK/BK
7	A6 12RD/BK
8	C15 12BK/WT
9	T141 14YL/RD
10	F12 20RD/LG
11	G9 20GY/BK
12	A3 12RD/WT



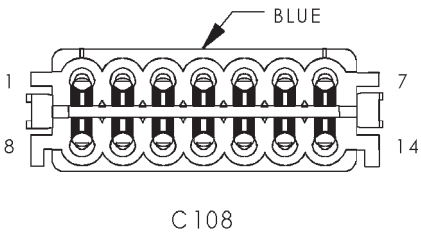
C107 - YELLOW (DASH SIDE)

CAV	CIRCUIT
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 14RD/OR
5	L4 14VT/WT
6	Z12 20BK/LB
7	X3 20RD/YL
8	V10 16BR
9	Z12 20BK/TN
10	F61 16WT/OR
11	V30 20DB/RD (RHD)
12	B43 18PK/OR (ABS)
13	D32 18LG
14	D21 20PK (ABS)
14	D21 18PK



C107 - YELLOW (CROSSBODY SIDE)

CAV	CIRCUIT
1	L7 18BK/YL
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 14RD/OR
5	L4 14VT/WT
6	Z12 20BK/LB
7	X3 20RD/YL
8	V10 16BR
9	Z12 20BK/TN
10	F61 16WT/OR (LHD)
11	V30 20DB/RD
12	B43 20PK/OR (LHD)
13	D32 20LG
14	D21 20PK

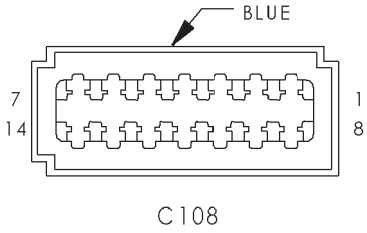


C108 - BLUE (DASH SIDE)

CAV	CIRCUIT
1	V32 18YL/RD
2	B41 18YL/VT
3	K4 20BK/LB
4	F39 16PK/LG
5	B42 18TN/WT
6	D25 18VT/YL
7	L3 14RD/OR (EXCEPT DRL)

C108 - BLUE (DASH SIDE)

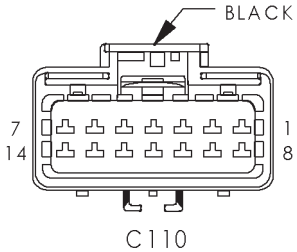
CAV	CIRCUIT
7	G34 14RD/GY (DRL)
8	F3 14LB/OR
9	L50 18WT/TN (ABS)
10	V37 18RD/LG (SPEED CONTROL)
11	L9 18BK/WT
12	M1 20PK/WT
12	M1 20PK/WT
13	L22 20LG/DG (EXCEPT CANADA)
14	K29 18WT/PK



C108

C108 - BLUE (CROSSBODY SIDE)

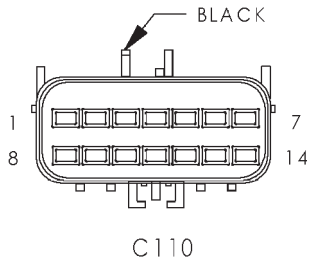
CAV	CIRCUIT
1	V32 20YL/RD
2	B41 20YL/VT (LHD)
3	K4 20BK/LB
4	F39 16PK/LG
5	B42 20TN/WT (LHD)
6	D25 20VT/YL
6	D25 20VT/YL
7	G34 14RD/GY
8	F3 14LB/OR (DRL)
9	L50 18WT/TN (LHD)
9	L50 18WT/TN (LHD)
10	V37 20RD/LG
11	L9 18BK/WT
12	M1 20PK/WT
12	M1 20PK/WT
13	L22 20LG/DG (EXCEPT CANADA)
14	K29 20WT/PK
14	K29 20WT/PK



C110

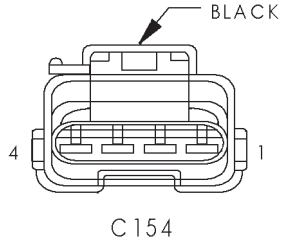
C110 - BLACK (HEADLAMP SIDE)

CAV	CIRCUIT
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 14RD/OR
5	L4 14VT/WT
6	X2 18DG/RD
7	-
8	V10 16BR
9	L22 20LG/DG (BUILT-UP-EXPORT)
10	K52 20PK/BK
11	F12 20DG/OR
12	-
13	L39 16LB (FRONT FOG LAMPS)
14	L13 20BR/YL (BUILT-UP-EXPORT)



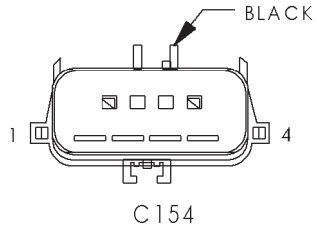
C110 - BLACK (DASH SIDE)

CAV	CIRCUIT
1	L7 18BK/YL
2	L60 18TN
3	L61 18GY
4	L3 14RD/OR
5	L4 14VT/WT
6	X2 18WT/RD
7	-
8	V10 16BR
9	L22 10LG/DG (EXCEPT CANADA)
10	K52 18PK/BK
11	F12 20RD/LG
12	-
13	L39 16LB (FRONT FOG LAMPS)
14	L13 20BR/YL (BUILT-UP-EXPORT)



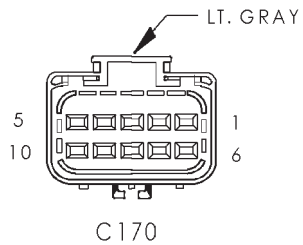
C154 - BLACK (ENGINE SIDE)

CAV	CIRCUIT
1	Z1 18BK (RHD)
1	Z1 20BK (LHD)
2	L1 20VT/BK
3	T41 20BR/LB (EXCEPT 4.0L RHD)
4	F20 20VT/WT



C154 - BLACK (TRANSMISSION SIDE)

CAV	CIRCUIT
1	Z1 20BK (4.0L RHD)
2	L1 18VT/BK
3	T41 20BR/LB (EXCEPT 4.0L RHD)
3	Z1 20BK (4.0L RHD)
4	F20 18VT/WT

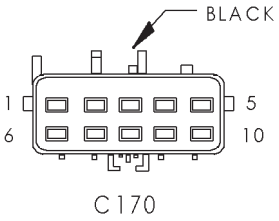


C170 - LT. GRAY (DASH SIDE)

CAV	CIRCUIT
1	L13 20BR/YL (BUILT-UP-EXPORT)
2	C81 20LB/WT
3	G99 20GY/WT
4	-
5	G107 20BK/RD

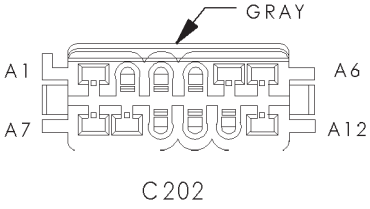
C170 - LT. GRAY (DASH SIDE)

CAV	CIRCUIT
6	C90 20LG
7	-
8	G19 20LG/OR (ABS)
9	L39 16LB (EXCEPT BUILT-UP-EXPORT)
10	A111 12RD/LB



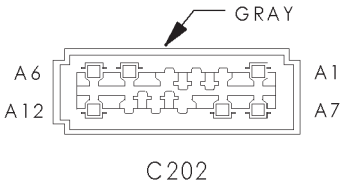
C170 - BLACK (I/P SIDE)

CAV	CIRCUIT
1	L13 20BR/YL (BUILT-UP-EXPORT)
2	C81 20LB/WT (HARD TOP)
3	G99 20GY/WT
4	-
5	G107 20BK/RD
6	C90 20LG
7	-
8	G19 20LG/OR
9	L39 16LB (EXCEPT BUILT-UP-EXPORT)
10	A111 12RD/LB



C202 - GRAY (I/P SIDE)

CAV	CIRCUIT
A1	F24 20RD/DG
A1	F24 20RD/DG
A2	G75 20TN
A3	G76 20TN/YL
A4	E2 20OR
A5	-
A6	Z12 20BK/LB
A7	-
A8	G34 16RD/GY
A9	F38 16LB
A10	G5 20DB/WT
A11	-
A12	-

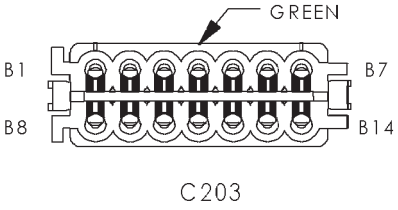


C202 - GRAY (CROSSBODY SIDE)

CAV	CIRCUIT
A1	F24 20RD/DG
A2	G75 20TN
A3	G76 20TN/YL
A4	E2 20OR
A5	-

C202 - GRAY (CROSSBODY SIDE)

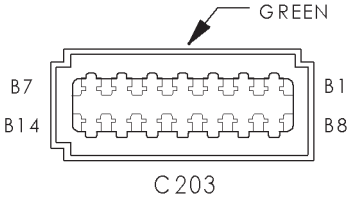
CAV	CIRCUIT
A6	Z12 20BK/LB
A6	Z12 20BK/LB
A7	-
A8	G34 14RD/GY
A9	F38 16LB
A10	G5 20DB/WT
A10	G5 20DB/WT
A11	-
A12	-



C203

C203 - GREEN (I/P SIDE)

CAV	CIRCUIT
B1	L60 18TN
B2	L61 18GY
B3	G26 20LB
B3	G26 20LB
B4	L50 18WT/TN (LHD)
B5	-
B6	L7 18BK/YL
B7	M1 20PK/WT
B8	D32 20LG
B9	V20 18VT/OR
B10	D21 20PK
B11	-
B12	F81 20DB/RD
B13	L38 18BR/WT (BUILT-UP-EXPORT)
B14	D25 20VT/YL



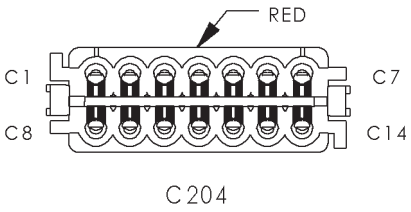
C203

C203 - GREEN (CROSSBODY SIDE)

CAV	CIRCUIT
B1	L60 18TN
B1	L60 18TN
B2	L61 18GY
B2	L61 18GY
B3	G26 20LB
B4	L50 18WT/TN (LHD)
B5	-
B6	L7 18BK/YL
B6	L7 18BK/YL
B7	M1 20PK/WT
B8	D32 20LG
B9	V20 18VT/OR
B10	D21 20PK
B11	-
B12	F81 20DB/RD
B13	L38 18BR/WT
B13	L38 18BR/WT

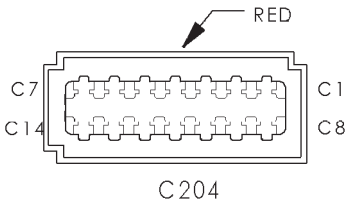
C203 - GREEN (CROSSBODY SIDE)

CAV	CIRCUIT
B14	D25 2OVT/YL
B14	D25 18VT/YL



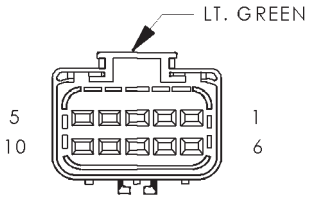
C204 - RED (I/P SIDE)

CAV	CIRCUIT
C1	X16 20LG
C2	V13 18BR/LG (HARD TOP)
C3	G10 20LG/RD
C4	Z12 20BK/TN
C5	M2 20YL
C6	V23 18BR/PK
C7	E19 20RD
C8	L50 18 WT/TN (LHD)
C9	L22 20LG/DG (BUILT-UP-EXPORT)
C10	X12 16PK
C11	X51 18BR/YL
C12	X57 18BR/LB
C13	X52 18DB/WT
C14	X58 18DB/PK



C204 - RED (CROSSBODY SIDE)

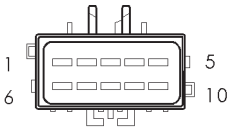
CAV	CIRCUIT
C1	X16 20LG
C2	V13 18BR/LG (HARD TOP)
C3	G10 20LG/RD
C4	Z12 20BK/TN
C5	M2 20YL
C6	V23 18BR/PK
C7	E19 20RD
C8	L50 18WT/TN (LHD)
C9	L22 20LG/DG
C10	X12 16PK
C11	X51 18BR/YL
C11	X51 18BR/YL
C12	X52 18BK/LB
C12	X57 18BR/LB
C13	X52 18DB/WT
C13	X52 18DB/WT
C14	X58 18DB/PK
C14	X58 18DB/PK



C205

C205 - LT. GREEN (I/P SIDE)

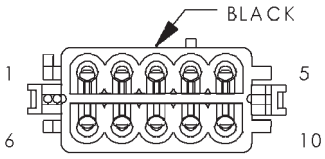
CAV	CIRCUIT
1	Z11 20BK/WT
2	C4 18TN
3	C5 16LG/LB
4	C6 14LB
5	F24 20RD/DG
5	F24 20RD/DG
6	C36 20DB/RD
7	C7 12BR/TN
8	A111 12RD/LB
9	F24 20RD/DG
10	Z1 20BK



C205

C205 - (HVAC SIDE)

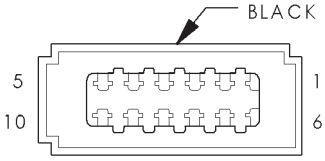
CAV	CIRCUIT
1	Z11 20DB/WT
2	C4 14TN
3	C5 14LG
4	C6 14LB
5	F24 20OR
6	C36 20YL
7	C7 12BK/TN
8	A111 12RD/LG
9	F24 20DB/WT
10	Z1 20BK



C322
(LHD)

C322 (LHD) - BLACK (REAR BODY SIDE)

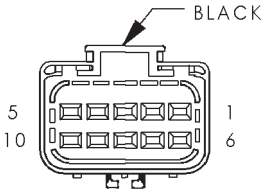
CAV	CIRCUIT
G1	L7 18BK/YL
G2	L62 18BR/RD
G3	L1 20VT/BK
G4	L63 18DG/RD
G5	Z1 12BK
G6	G10 20LG/RD
G7	L50 18WT/TN
G8	-
G9	G9 20GY/BK
G10	V23 18BR/PK (HARD TOP)



C322
(LHD)

C322 (LHD) - BLACK (CROSSBODY SIDE)

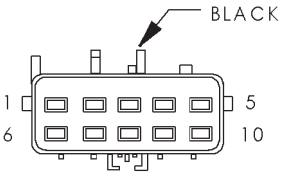
CAV	CIRCUIT
G1	L7 18BK/YL
G2	L62 18BR/RD
G3	L1 20VT/BK
G4	L63 18DG/RD
G5	Z1 12BK
G6	G10 20LG/RD
G7	L50 18WT/TN
G7	L50 18WT/TN
G8	-
G9	G9 20GY/BK
G10	V23 18BR/PK



C322
(RHD)

C322 (RHD) - BLACK (REAR BODY SIDE)

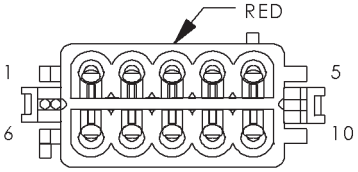
CAV	CIRCUIT
1	L7 18BK/YL
2	L62 18BR/RD
3	L1 20VT/BK
4	L63 18DG/RD
5	Z1 12BK
6	G10 20LG/RD
7	L50 18WT/TN
8	L38 18BR/WT
9	G9 20GY/BK
10	V23 18BR/PK (HARD TOP)



C322
(RHD)

C322 (RHD) - BLACK (CROSSBODY SIDE)

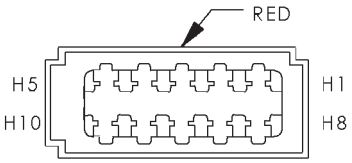
CAV	CIRCUIT
1	L7 18BK/YL
2	L62 18BR/RD
3	L1 20VT/BK
4	L63 18DG/RD
5	Z1 12BK
6	G10 20LG/RD
7	L50 18WT/TN
8	L38 18BR/WT
9	G9 20GY/BK
10	V23 18BR/PK (HARD TOP)



C323
(LHD)
(EXCEPT 2 SPEAKER
SOFT TOP)

C323 (LHD) (EXCEPT 2 SPEAKER SOFT TOP) - RED (REAR BODY SIDE)

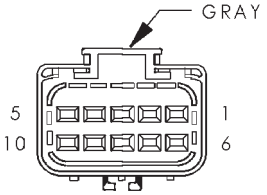
CAV	CIRCUIT
H1	C15 12BK/WT (HARD TOP)
H2	M1 20PK/WT
H3	M2 20YL
H4	V23 18BR/PK (HARD TOP)
H5	V13 18BR/LG (HARD TOP)
H6	V20 18VT/OR (HARD TOP)
H7	X51 18BR/YL (4 SPEAKER SYSTEM)
H8	C57 18BR/LB (4 SPEAKER SYSTEM)
H9	X52 18DB/WT (4 SPEAKER SYSTEM)
H10	X58 18DB/PK (4 SPEAKER SYSTEM)



C323
(LHD)

C323 (LHD) - RED (CROSSBODY SIDE)

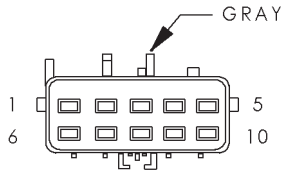
CAV	CIRCUIT
H1	C15 12BK/WT
H2	M1 20PK/WT
H3	M2 20YL
H4	V23 18BR/PK
H5	V13 18BR/LG
H6	V20 18VT/OR
H7	X51 18BR/YL
H8	C57 18BR/LB
H9	X52 18DB/WT
H10	X58 18DB/PK



C323
(RHD)

C323 (RHD) - GRAY (REAR BODY SIDE)

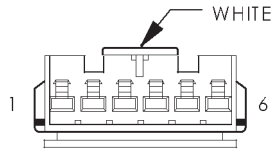
CAV	CIRCUIT
1	C15 12BK/WT (HARD TOP)
2	M1 20PK/WT
3	M2 20YL
4	V23 18BR/PK (HARD TOP)
5	V13 18BR/LG (HARD TOP)
6	V20 18VT/OR (HARD TOP)
7	X51 18BR/YL (4 SPEAKER SYSTEM)
8	X57 18BR/YL (4 SPEAKER SYSTEM)
9	X52 18DB/WT (4 SPEAKER SYSTEM)
10	X58 18DB/PK (4 SPEAKER SYSTEM)



C323
(RHD)
(EXCEPT 2 SPEAKER
SOFT TOP)

C323 (RHD) (EXCEPT 2 SPEAKER SOFT TOP) - GRAY (CROSSBODY SIDE)

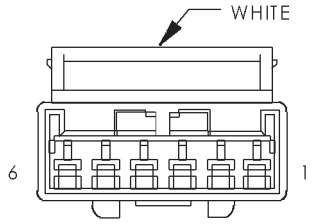
CAV	CIRCUIT
1	C15 12BK/WT (HARD TOP)
2	M1 20PK/WT
3	M2 20YL
4	V23 18BR/PK (HARD TOP)
5	V13 18BR/LG (HARD TOP)
6	V20 18VT/OR (HARD TOP)
7	X51 18BR/YL (4 SPEAKER SYSTEM)
8	X57 18BR/LB (4 SPEAKER SYSTEM)
9	X52 18DB/WT (4SPEAKER SYSTEM)
10	X58 18DB/PK (4 SPEAKER SYSTEM)



C325
(4 SPKR SYS)

C325 (4 SPKR SYS) - WHITE (REAR BODY)

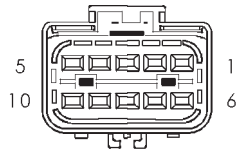
CAV	CIRCUIT
1	X57 18BR/LB
2	X51 18BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 18DB/PK
6	X52 18DB/WT



C325
(4 SPKR SYS)

C325 (4 SPKR SYS) - WHITE (SOUND BAR SIDE)

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



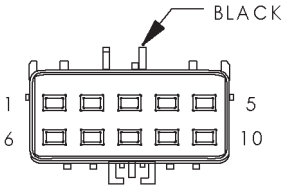
C326
(HARD TOP)

C326 (HARD TOP) - (REAR BODY SIDE)

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

C326 (HARD TOP) - (REAR BODY SIDE)

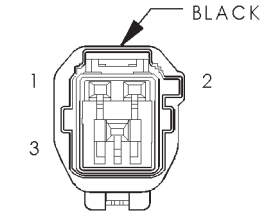
CAV	CIRCUIT
9	M2 20YL
10	-



C326
(HARD TOP)

C326 (HARD TOP) - BLACK (HARD TOP SIDE)

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 18PK/WT
9	M2 18YL
10	-



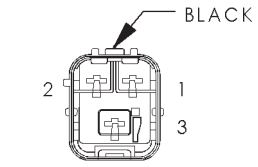
C329
(BUILT-UP-EXPORT)

CIGAR LIGHTER/ACCESSORY RELAY - BLACK 5 WAY

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
5	Z1 20BK	GROUND

C329 (BUILT-UP-EXPORT) - BLACK (REAR BODY SIDE)

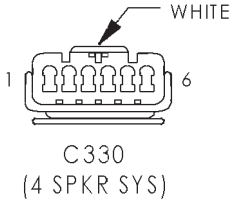
CAV	CIRCUIT
1	L38 18BR/WT
2	L7 18BK/YL
3	Z1 20BK



C329
(BUILT-UP-EXPORT)

C329 (BUILT-UP-EXPORT) - BLACK (BUMPER SIDE)

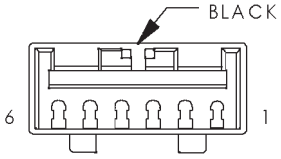
CAV	CIRCUIT
1	L38 18BR/WT
2	L7 18BK/YL
3	Z1 20BK



C330
(4 SPKR SYS)

C330 (4 SPKR SYS) - WHITE (SOUND BAR JUMPER SIDE)

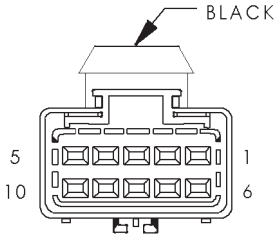
CAV	CIRCUIT
1	X57 18BR/LB
2	X51 18BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 18DB/PK
6	X52 18DB/WT



C330
(4 SPKR SYS)

C330 (4 SPKR SYS) - BLACK (SOUND BAR SIDE)

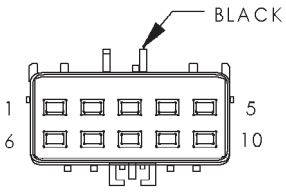
CAV	CIRCUIT
1	X57 20BR/LB
2	X51 20BR/YL
3	M1 20PK/WT
4	M2 20YL
5	X58 20DB/PK
6	X52 20DB/WT



C331
(HARD TOP)

C331 (HARD TOP) - BLACK (HARD TOP JUMPER SIDE)

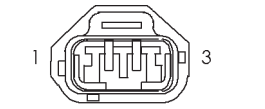
CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BK/LG
4	V23 18BR/PK
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 18PK/WT
9	M2 18YL
10	-



C331
(HARD TOP)

C331 (HARD TOP) - BLACK (HARD TOP SIDE)

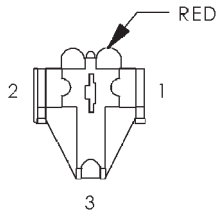
CAV	CIRCUIT
1	C15 12BK/WT
2	-
3	V13 18BK/LG
4	V23 18DB/RD
5	V23 18BR/PK
6	Z1 12BK
7	-
8	M1 20PK/WT
9	M2 20YL
10	-



CAMSHAFT POSITION SENSOR

CAMSHAFT POSITION SENSOR - 3 WAY

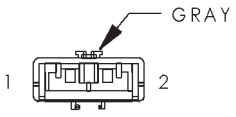
CAV	CIRCUIT	FUNCTION
1	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
2	K4 20BK/LB	SENSOR GROUND
3	K7 20OR	5V SUPPLY



CIGAR LIGHTER/ POWER OUTLET

CIGAR LIGHTER/POWER OUTLET - RED 3 WAY

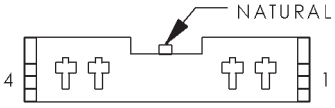
CAV	CIRCUIT	FUNCTION
1	F38 16LB	FUSED CIGAR LIGHTER/ACCESSORY RELAY OUTPUT
2	-	-
3	Z1 16BK	GROUND



CIRCUIT BREAKER

CIRCUIT BREAKER - GRAY 2 WAY

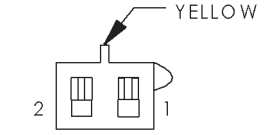
CAV	CIRCUIT	FUNCTION
1	A3 12RD/WT	HEADLAMP SWITCH RELAY FEED
2	F3 14LB/OR	DAYTIME RUNNING LAMP MODULE



CLOCKSPRING C1

CLOCKSPRING C1 - NATURAL 4 WAY

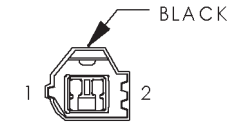
CAV	CIRCUIT	FUNCTION
1	X3 20RD/YL	HORN RELAY CONTROL
2	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL
3	K4 20BK/LB	SENSOR GROUND
4	-	-



CLOCKSPRING C2

CLOCKSPRING C2 - YELLOW 2 WAY

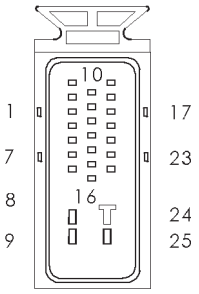
CAV	CIRCUIT	FUNCTION
1	R45 18DG/LB	DRIVER AIRBAG LINE 2
2	R43 18BK/LB	DRIVER AIRBAG LINE 1



CLUTCH PEDAL POSITION SWITCH (M/T)

CLUTCH PEDAL POSITION SWITCH (M/T) - BLACK 2 WAY

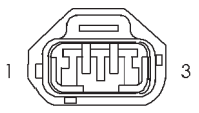
CAV	CIRCUIT	FUNCTION
1	T141 14YL/RD	FUSED IGNITION SWITCH OUTPUT (START)
2	A41 14YL	FUSED IGNITION SWITCH OUTPUT (START)



CONTROLLER ANTILOCK BRAKE

CONTROLLER ANTILOCK BRAKE - 25 WAY

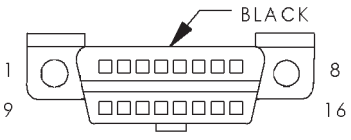
CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
3	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)
4	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)
5	-	-
6	B41 18YL/VT	G-SWITCH NO. 1 SENSE
7	B42 18TN/WT	G-SWITCH NO. 2 SENSE
8	Z22 12BK/PK	GROUND
9	A20 12RD/DB	FUSED B(+)
10	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)
11	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
12	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
13	B43 18PK/OR	G-SWITCH TEST SIGNAL
14	-	-
15	-	-
16	G83 18GY/BK	ABS RELAY CONTROL
17	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)
18	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
19	-	-
20	D21 18PK	SCI TRANSMIT
21	-	-
22	-	-
23	F20 18VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
24	Z22 12BK/PK	GROUND
25	A10 12RD/DG	FUSED B(+)



CRANKSHAFT POSITION SENSOR

CRANKSHAFT POSITION SENSOR - 3 WAY

CAV	CIRCUIT	FUNCTION
1	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
2	K4 20BK/LB	SENSOR GROUND
3	K7 20OR	5V SUPPLY



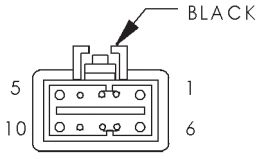
DATA LINK CONNECTOR

DATA LINK CONNECTOR - BLACK 16 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20VT/YL	PCI BUS

DATA LINK CONNECTOR - BLACK 16 WAY

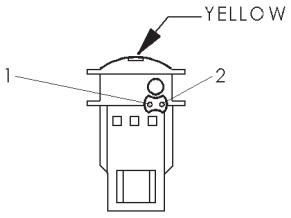
CAV	CIRCUIT	FUNCTION
3	-	-
4	Z12 20BK/LB	GROUND
5	Z12 20BK/TN	GROUND
6	D32 20LG	SCI RECEIVE
7	D21 20PK	SCI TRANSMIT
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-
16	M1 20PK/WT	FUSED B(+)



DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)

DAYTIME RUNNING LAMP MODULE - BLACK 10 WAY

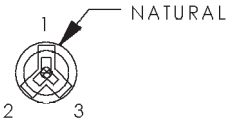
CAV	CIRCUIT	FUNCTION
1	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	-	-
3	-	-
4	G34 14RD/GY	HIGH BEAM INDICATOR DRIVER
5	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
6	F3 14LB/OR	FUSED B(+)
7	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL
8	Z1 18BK	GROUND
9	-	-
10	L4 14VT/WT	DIMMER SWITCH LOW BEAM OUTPUT



DRIVER AIRBAG

DRIVER AIRBAG - YELLOW 2 WAY

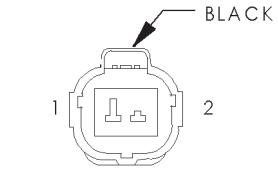
CAV	CIRCUIT	FUNCTION
1	R45 DG/LB	DRIVER AIRBAG LINE 2
2	R43 BK/LB	DRIVER AIRBAG LINE 1



DRIVER DOOR AJAR SWITCH

DRIVER DOOR AJAR SWITCH - NATURAL 3 WAY

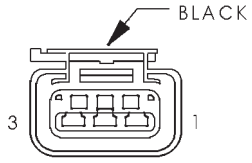
CAV	CIRCUIT	FUNCTION
1	M23 20YL/BK	DOOR AJAR SWITCH OUTPUT
2	-	-
3	G75 20TN	DRIVER DOOR AJAR SWITCH SENSE



ENGINE COOLANT TEMPERATURE SENSOR

ENGINE COOLANT TEMPERATURE SENSOR - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
2	K4 20BK/LB	SENSOR GROUND



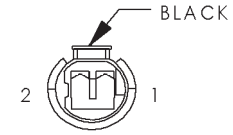
ENGINE OIL PRESSURE SENSOR

FRONT FOG LAMP SWITCH - BLACK 4 WAY

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 NO. 2 OUTPUT
4	Z1 20BK	GROUND

ENGINE OIL PRESSURE SENSOR - BLACK 3 WAY

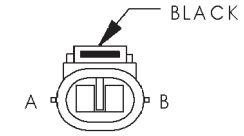
CAV	CIRCUIT	FUNCTION
1	K6 20VT/OR	5V SUPPLY
2	G60 18GY/YL	ENGINE OIL PRESSURE SENSOR SIGNAL
3	K4 20BK/LB	SENSOR GROUND



EVAP/PURGE SOLENOID

EVAP/PURGE SOLENOID - BLACK 2 WAY

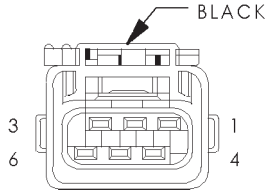
CAV	CIRCUIT	FUNCTION
1	K52 20PK/BK	EVAP/PURGE SOLENOID CONTROL
2	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)



FRONT WASHER PUMP

FRONT WASHER PUMP - BLACK 2 WAY

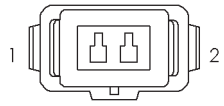
CAV	CIRCUIT	FUNCTION
A	V10 18BR	WASHER PUMP CONTROL SWITCH OUTPUT
B	Z1 18BK	GROUND



FRONT WIPER MOTOR

FRONT WIPER MOTOR - BLACK 6 WAY

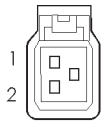
CAV	CIRCUIT	FUNCTION
1	V6 16PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
2	V5 16DG/YL	WIPER PARK SWITCH SENSE
3	-	-
4	Z1 16BK	GROUND
5	V3 16BR/WT	LOW SPEED WIPER SWITCH OUTPUT
6	V4 16RD/YL	WIPER SWITCH HIGH SPEED OUTPUT



FUEL INJECTOR NO. 1
(2.5L)

FUEL INJECTOR NO. 1 (2.5L) - 2 WAY

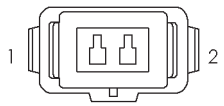
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER



FUEL INJECTOR NO. 1
(4.0L)

FUEL INJECTOR NO. 1 (4.0L) - 2 WAY

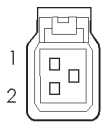
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER



FUEL INJECTOR NO. 2
(2.5L)

FUEL INJECTOR NO. 2 (2.5L) - 2 WAY

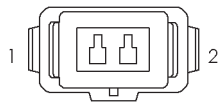
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K12 18TN	FUEL INJECTOR NO. 2 DRIVER



FUEL INJECTOR NO. 2
(4.0L)

FUEL INJECTOR NO. 2 (4.0L) - 2 WAY

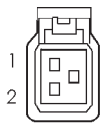
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K12 18TN	FUEL INJECTOR NO. 2 DRIVER



FUEL INJECTOR NO. 3
(2.5L)

FUEL INJECTOR NO. 3 (2.5L) - 2 WAY

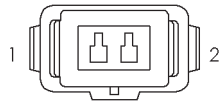
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER



FUEL INJECTOR NO. 3
(4.0L)

FUEL INJECTOR NO. 3 (4.0L) - 2 WAY

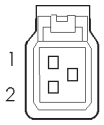
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER



FUEL INJECTOR NO. 4
(2.5L)

FUEL INJECTOR NO. 4 (2.5L) - 2 WAY

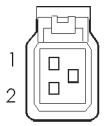
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER



FUEL INJECTOR NO. 4
(4.0L)

FUEL INJECTOR NO. 4 (4.0L) - 2 WAY

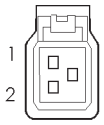
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER



FUEL INJECTOR NO. 5
(4.0L)

FUEL INJECTOR NO. 5 (4.0L) - 2 WAY

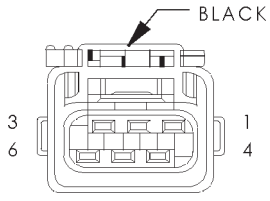
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K15 18PK/BK	FUEL INJECTOR NO. 5 DRIVER



FUEL INJECTOR NO. 6
(4.0L)

FUEL INJECTOR NO. 6 (4.0L) - 2 WAY

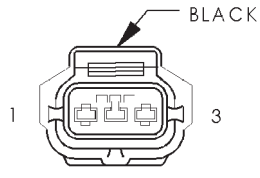
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K16 18LG/BK	FUEL INJECTOR NO. 6 DRIVER



FUEL PUMP
MODULE

FUEL PUMP MODULE - BLACK 6 WAY

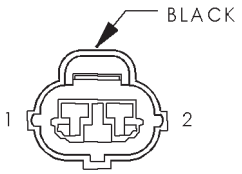
CAV	CIRCUIT	FUNCTION
1	A141 18DG/WT	FUEL PUMP RELAY OUTPUT
2	-	-
3	K226 20DB/LG	FUEL LEVEL SENSOR SIGNAL
4	K4 20BK/LB	SENSOR GROUND
5	-	-
6	Z1 18BK	GROUND



G-SWITCH

G-SWITCH - BLACK 3 WAY

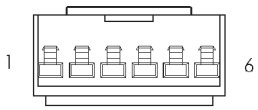
CAV	CIRCUIT	FUNCTION
1	B42 20TN/WT	G-SWITCH NO. 2 SENSE
2	B41 20YL/VT	G-SWITCH NO. 1 SENSE
3	B43 20PK/OR	G-SWITCH TEST SIGNAL



GENERATOR

GENERATOR - BLACK 2 WAY

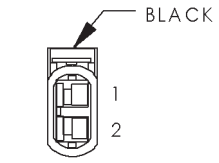
CAV	CIRCUIT	FUNCTION
1	K125 18WT/DB	GENERATOR SOURCE
2	K20 18DG	GENERATOR FIELD



HEADLAMP LEVELING SWITCH (BUILT-UP-EXPORT)

HEADLAMP LEVELING SWITCH (BUILT-UP-EXPORT) - 6 WAY

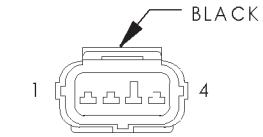
CAV	CIRCUIT	FUNCTION
1	-	-
2	L22 20LG/DG	FUSED HEADLAMP SWITCH OUTPUT
3	-	-
4	Z1 20BK	GROUND
5	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
6	-	-



HIGH NOTE HORN

HIGH NOTE HORN - BLACK 2 WAY

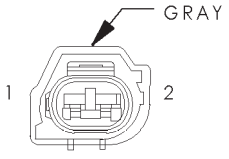
CAV	CIRCUIT	FUNCTION
1	X2 18DG/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND



IDLE AIR CONTROL MOTOR

IDLE AIR CONTROL MOTOR - BLACK 4 WAY

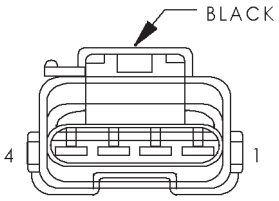
CAV	CIRCUIT	FUNCTION
1	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
2	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
3	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
4	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER



IGNITION COIL (2.5L)

IGNITION COIL (2.5L) - GRAY 2 WAY

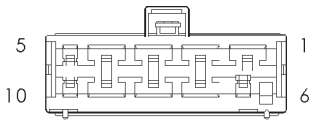
CAV	CIRCUIT	FUNCTION
1	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K19 18GY	IGNITION COIL NO. 1 DRIVER



IGNITION COIL PACK (4.0L)

IGNITION COIL PACK - BLACK 4 WAY

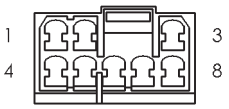
CAV	CIRCUIT	FUNCTION
1	K19 18GY	IGNITION COIL NO.1 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K17 18DB/TN	IGNITION COIL NO.2 DRIVER
4	K18 18RD/YL	IGNITION COIL NO.3 DRIVER



IGNITION SWITCH

IGNITION SWITCH - 10 WAY

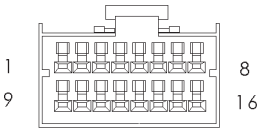
CAV	CIRCUIT	FUNCTION
1	A1 14RD	FUSED B(+)
2	A21 14DB	IGNITION SWITCH OUTPUT (RUN-START)
3	F22 12WT/PK	IGNITION SWITCH OUTPUT (RUN-ACC)
4	F30 12RD/PK	FUSED B(+)
5	G26 20LB	KEY-IN IGNITION CHIME
6	A41 14YL	-IGNITION SWITCH OUTPUT (START)
7	A31 14BK/DG	IGNITION SWITCH OUTPUT (RUN-ACC)
8	A22 12BK/OR	IGNITION SWITCH OUTPUT (RUN)
9	A2 12PK/BK	FUSED B(+)
10	Z1 20BK (RHD)	GROUND
10	Z1 16BK (LHD)	GROUND



INSTRUMENT CLUSTER C1

INSTRUMENT CLUSTER C1 - 8 WAY

CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	L60 18TN	RIGHT TURN SIGNAL
3	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER
4	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
5	Z2 18BK/LG	GROUND
6	L38 18BR/WT (BUILT-UP-EXPORT)	REAR FOG LAMP FEED
6	L39 16LB (EXCEPT BUILT-UP-EXPORT)	REAR FOG LAMP FEED
7	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
8	M1 20PK/WT	FUSED B(+)



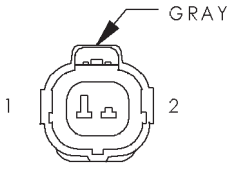
INSTRUMENT CLUSTER C2

INSTRUMENT CLUSTER C2 - 16 WAY

CAV	CIRCUIT	FUNCTION
1	C80 20DB/WT (EXCEPT LHD EXCEPT BUILT-UP-EXPORT)	REAR WINDOW DEFOGGER SENSE SWITCH
2	G10 20LG/RD	SEAT BELT SWITCH SENSE
3	G76 20TN/YL	PASSENGER DOOR AJAR SWITCH SENSE
4	G75 20TN	DRIVER DOOR AJAR SWITCH SENSE
5	M2 20YL	COURTESY LAMP FEED
6	E2 20OR	CLUSTER ILLUMINATION LAMPS

INSTRUMENT CLUSTER C2 - 16 WAY

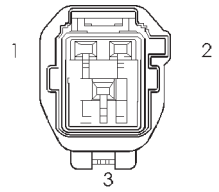
CAV	CIRCUIT	FUNCTION
7	C81 20LB/WT (EXCEPT LHD EXCEPT BUILT-UP-EXPORT)	REAR WINDOW DEFFOGER RELAY CONTROL
8	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
9	G99 20GY/WT	BRAKE WARNING INDICATOR DRIVER
10	-	-
11	L107 20WT	PARK LMAP RELAY OUTPUT
12	D25 20VT/YL	PCI BUS
13	G26 20LB	KEY-IN IGNITION SWITCH SENSE
14	-	-
15	E19 20RD	PANEL LAMPS DIMMER SIGNAL
16	G107 20BK/RD	4WD INDICATOR



INTAKE AIR TEMPERATURE SENSOR

INTAKE AIR TEMPERATURE SENSOR - GRAY 2 WAY

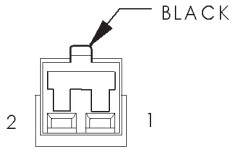
CAV	CIRCUIT	FUNCTION
1	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
2	K4 20BK/LB	SENSOR GROUND



LEAK DETECTION PUMP (LHD)

LEAK DETECTION PUMP (LHD) - 3 WAY

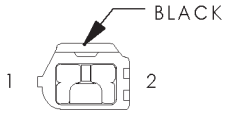
CAV	CIRCUIT	FUNCTION
1	K107 18OR	LEAK DETECTION PUMP SWITCH SENSE
2	K106 20WT/DG	LEAK DETECTION PUMP SOLENOID CONTROL
3	K125 18WT/DB	GENERATOR SOURCE



LEFT COURTESY LAMP

LEFT COURTESY LAMP - BLACK 2 WAY

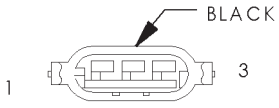
CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



LEFT FOG LAMP (EXCEPT BUILT-UP-EXPORT)

LEFT FOG LAMP (EXCEPT BUILT-UP-EXPORT) - BLACK 2 WAY

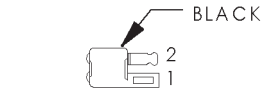
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L39 16LB	FOG LAMP RELAY NO. 1 OUTPUT



LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)

LEFT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT) - BLACK 3 W

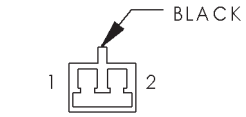
CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
3	Z1 18BK	GROUND



LEFT FRONT POSITION LAMP (BUILT-UP-EXPORT)

LEFT FRONT POSITION LAMP (BUILT-UP-EXPORT) - BLACK 2 WAY

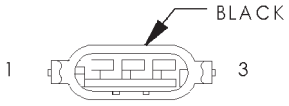
CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



LEFT FRONT SPEAKER

LEFT FRONT SPEAKER - BLACK 2 WAY

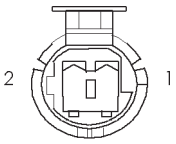
CAV	CIRCUIT	FUNCTION
1	X53 18DG	LEFT FRONT SPEAKER (+)
2	X55 18BR/RD	LEFT FRONT SPEAKER (-)



LEFT FRONT TURN SIGNAL LAMP (BUILT-UP-EXPORT)

LEFT FRONT TURN SIGNAL LAMP (BUILT-UP-EXPORT) - BLACK 3 WAY

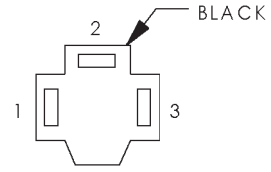
CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	-	-
3	Z1 18BK	GROUND



LEFT FRONT WHEEL SPEED SENSOR

LEFT FRONT WHEEL SPEED SENSOR - 2 WAY

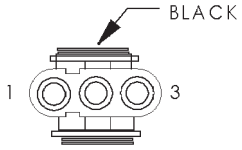
CAV	CIRCUIT	FUNCTION
1	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
2	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)



LEFT HEADLAMP

LEFT HEADLAMP - BLACK 3 WAY

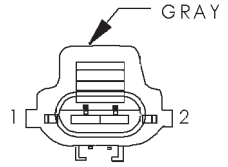
CAV	CIRCUIT	FUNCTION
1	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
1	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	L4 14VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
2	L4 14VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
3	Z1 20BK	GROUND



LEFT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

LEFT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT) - BLACK 3 WAY

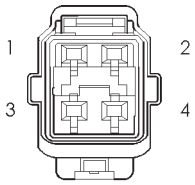
CAV	CIRCUIT	FUNCTION
1	L22 20LG/DG	FUSED HEADLAMP SWITCH OUTPUT
2	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
3	Z1 20BK	GROUND



LEFT LICENSE LAMP (BUILT-UP-EXPORT)

LEFT LICENSE LAMP (BUILT-UP-EXPORT) - GRAY 2 WAY

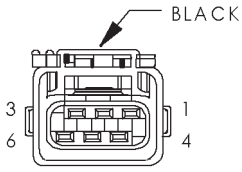
CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



LEFT REAR LAMP ASSEMBLY (BUILT-UP-EXPORT)

LEFT REAR LAMP ASSEMBLY (BUILT-UP-EXPORT) - 4 WAY

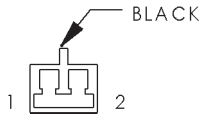
CAV	CIRCUIT	FUNCTION
1	L63 18DG/RD	LEFT TURN/STOP SIGNAL
2	L1 20VT/BK	BACK-UP LAMP FEED
3	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
4	L7 18BK/YL	HEADLAMP SWITCH OUTPUT



LEFT REAR LAMP ASSEMBLY (EXCEPT BUILT-UP-EXPORT)

LEFT REAR LAMP ASSEMBLY (EXCEPT BUILT-UP-EXPORT) - BLACK 6 WAY

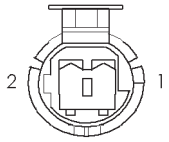
CAV	CIRCUIT	FUNCTION
1	L1 20VT/BK	BACK-UP LAMP FEED
2	L63 18DG/RD	LEFT TURN/STOP SIGNAL
3	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
4	-	-
5	Z16 18BK	GROUND
6	-	-



LEFT REAR SPEAKER (SOUND BAR)

LEFT REAR SPEAKER (SOUND BAR) - BLACK 2 WAY

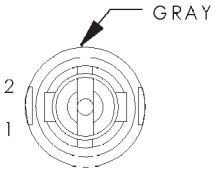
CAV	CIRCUIT	FUNCTION
1	X51 20BR/YL	LEFT REAR SPEAKER (+)
2	X57 20BR/LB	LEFT REAR SPEAKER (-)



LEFT REAR WHEEL SPEED SENSOR

LEFT REAR WHEEL SPEED SENSOR - 2 WAY

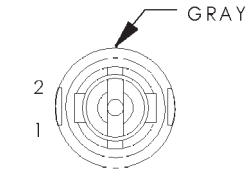
CAV	CIRCUIT	FUNCTION
1	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
2	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)



LEFT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)

LEFT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT) - GRAY 2 WAY

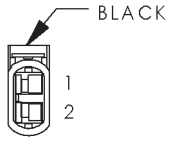
CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	Z1 18BK	GROUND



LEFT SIDE REPEATER LAMP (BUILT-UP-EXPORT)

LEFT SIDE REPEATER LAMP (BUILT-UP-EXPORT) - GRAY 2 WAY

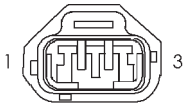
CAV	CIRCUIT	FUNCTION
1	L61 18GY	LEFT TURN SIGNAL
2	Z1 18BK	GROUND



LOW NOTE HORN (EXCEPT BUILT-UP-EXPERT)

LOW NOTE HORN - BLACK 2 WAY

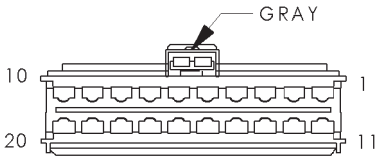
CAV	CIRCUIT	FUNCTION
1	X2 18WT/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND



MANIFOLD ABSOLUTE PRESSURE SENSOR

MANIFOLD ABSOLUTE PRESSURE SENSOR - 3 WAY

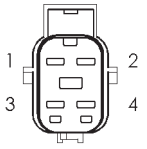
CAV	CIRCUIT	FUNCTION
1	K4 20BK/LB	SENSOR GROUND
2	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
3	K7 20OR	5V SUPPLY



MULTI-FUNCTION SWITCH

MULTI-FUNCTION SWITCH - GRAY 20 WAY

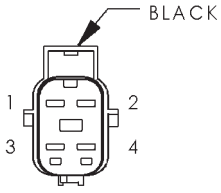
CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L61 18GY	LEFT TURN SIGNAL
3	L5 20BK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
4	L63 18DG/RD	LEFT TURN/STOP SIGNAL
5	L62 18BR/RD	RIGHT TURN/STOP SIGNAL
6	L60 18TN	RIGHT TURN SIGNAL
7	Z1 18BK	BODY GROUND
8	E19 20RD	PANEL LAMPS DIMMER SIGNAL
9	L7 18BK/YL	PARK LAMP FEED
10	-	-
11	L9 18BK/WT	HAZARD FLASHER FEED
12	L38 18BR/WT	HEADLAMP SWITCH OUTPUT
13	F39 16PK/LG	FUSED HEADLAMP RELAY OUTPUT
14	F61 16WT/OR	FUSED FOG LAMP RELAY OUTPUT
15	-	-
16	L4 14VT/WT	HEADLAMP (LOW BEAM)
17	L3 14RD/OR	HEADLAMP (HI BEAM)
18	F3 12LB/OR	FUSED B(+)
19	F3 12LB/OR	FUSED B(+)
20	F33 18PK/RD	FUSED B(+)



OXYGEN SENSOR 1/1 UPSTREAM

OXYGEN SENSOR 1/1 UPSTREAM - 4 WAY

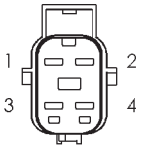
CAV	CIRCUIT	FUNCTION
1	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K99 18BR/OR	GROUND
2	K299 18BR/WT (EXCEPT 4.0L CALIFORNIA)	GROUND
3	K4 20BK/LB	SENSOR GROUND
4	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL



OXYGEN SENSOR 1/2 DOWNSTREAM

OXYGEN SENSOR 1/2 DOWNSTREAM - BLACK 4 WAY

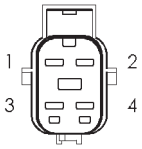
CAV	CIRCUIT	FUNCTION
1	F142 18OR/DG (EXCEPT 4.0L CALIFORNIA)	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
1	A242 18VT/OR (4.0L CALIFORNIA)	OXYGEN SENSOR DOWNSTREAM HEATER RELAY OUTPUT
2	K99 18BR/OR	GROUND
2	K299 18BR/WT (EXCEPT 4.0L CALIFORNIA)	GROUND
3	K4 10BK/LB	SENSOR GROUND
4	K141 18TN/WT	OXYGEN SENSOR 1/2 SIGNAL



OXYGEN SENSOR
2/1 UPSTREAM
(4.0L CALIFORNIA/EUROPEAN III)

OXYGEN SENSOR 2/1 UPSTREAM (4.0L CALIFORNIA/EUROPEAN III) - 4 WAY

CAV	CIRCUIT	FUNCTION
1	F142 18OR/DG	OXYGEN SENSOR UPSTREAM HEATER RELAY OUTPUT
2	K299 18BR/WT	GROUND
3	K4 20BK/LB	SENSOR GROUND
4	K241 18LG/RD	OXYGEN SENSOR 2/1 SIGNAL



OXYGEN SENSOR
2/2 DOWNSTREAM
(4.0L CALIFORNIA/EUROPEAN III)

OXYGEN SENSOR 2/2 DOWNSTREAM (4.0L CALIFORNIA/EUROPEAN III) - 4 WAY

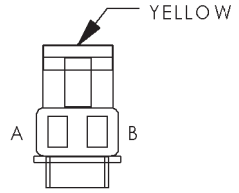
CAV	CIRCUIT	FUNCTION
1	A242 18VT/OR	OXYGEN SENSOR DOWNSTREAM HEATER RELAY OUTPUT
2	Z1 18BK	GROUND
3	K4 20BK/LB	SENSOR GROUND
4	K341 18TN	OXYGEN SENSOR 2/2 SIGNAL



PARK/NEUTRAL
POSITION SWITCH
(A/T)

PARK/NEUTRAL POSITION SWITCH (A/T) - 3 WAY

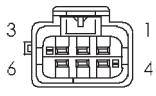
CAV	CIRCUIT	FUNCTION
1	F20 18VT/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
2	T41 20BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
3	L1 18VT/BK	BACK-UP LAMP FEED



PASSENGER
AIRBAG

PASSENGER AIRBAG - YELLOW 2 WAY

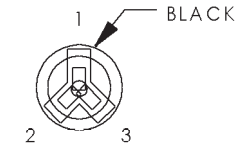
CAV	CIRCUIT	FUNCTION
A	R44 18DG/YL	PASSENGER AIRBAG LINE 2
B	R42 18BK/YL	PASSENGER AIRBAG LINE 1



PASSENGER AIRBAG
ON/OFF SWITCH

PASSENGER AIRBAG ON/OFF SWITCH - 6 WAY

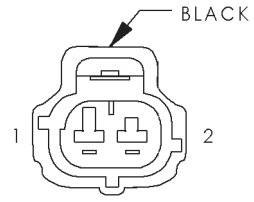
CAV	CIRCUIT	FUNCTION
1	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
2	R166 18LG/BR	PASSENGER AIRBAG INDICATOR DRIVER
3	R65 18LG/OR	PASSENGER AIRBAG MUX SWITCH SENSE
4	-	-
5	-	-
6	R66 18LG/DG	PASSENGER AIRBAG MUX SWITCH RETURN



PASSENGER DOOR AJAR SWITCH

PASSENGER DOOR AJAR SWITCH - BLACK 3 WAY

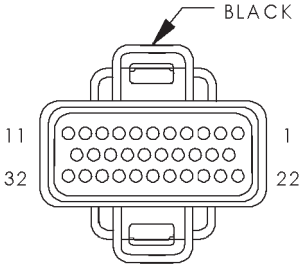
CAV	CIRCUIT	FUNCTION
1	M23 20YL/BK	DOOR AJAR SWITCH OUTPUT
2	-	-
3	G76 20TN/YL	DRIVER DOOR AJAR SWITCH SENSE



POWER STEERING PRESSURE SWITCH (2.5L)

POWER STEERING PRESSURE SWITCH (2.5L) - BLACK 2 WAY

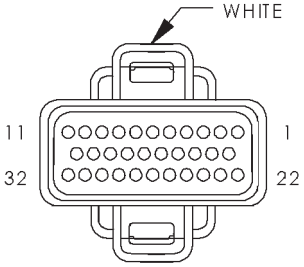
CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	K10 18DB/BR	POWER STEERING PRESSURE SWITCH SENSE



POWERTRAIN CONTROL MODULE C1

POWERTRAIN CONTROL MODULE C1 - BLACK 32 WAY

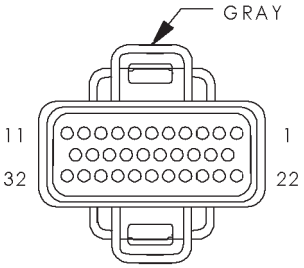
CAV	CIRCUIT	FUNCTION
A1	K18 18RD/YL (4.0L)	IGNITION COIL NO.3 DRIVER
A2	F15 18DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
A3	-	-
A4	K4 18BK/LB	SENSOR GROUND
A5	-	-
A6	T41 18BR/LB	PARK/NEUTRAL POSITION SWITCH SENSE
A7	K19 18GY	IGNITION COIL NO. 1 DRIVER
A8	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
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 (2.5L)	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	A4 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	K241 18LG/RD (4.0L CALIFORNIA)	OXYGEN SENSOR 2/1 SIGNAL
A27	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
A28	-	-
A29	K341 18TN (4.0L CALIFORNIA)	OXYGEN SENSOR 2/2 SIGNAL
A30	-	-
A31	Z12 14BK/TN	GROUND
A32	Z12 14BK/TN	GROUND



POWERTRAIN CONTROL MODULE C2

POWERTRAIN CONTROL MODULE C2 - WHITE 32 WAY

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	K38 18GY (4.0L)	FUEL INJECTOR NO. 5 DRIVER
B6	K15 18PK/BK (LHD 4.0L CALIFORNIA)	FUEL INJECTOR NO. 5 DRIVER
B7	-	-
B8	-	-
B9	K17 18DB/TN (4.0L)	IGNITION COIL NO.2 DRIVER
B10	K20 18DG	GENERATOR FIELD
B11	T23 18OR/LG	TRANSMISSION LOW/OVERDRIVE SOLENOID
B12	K16 18LG/BK (4.0L)	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 20WT/OR (4.0L RHD EXCEPT DRL)	VEHICLE SPEED SENSOR SIGNAL
B27	G7 18WT/OR (EXCEPT 4.0L RHD)	VEHICLE SPEED SENSOR SIGNAL
B28	-	-
B29	-	-
B30	-	-
B31	K6 18VT/OR	5V SUPPLY
B32	-	-



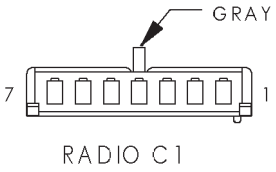
POWERTRAIN CONTROL MODULE C3

POWERTRAIN CONTROL MODULE C3 - GRAY 32 WAY

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)	SPEED CONTROL VACUUM SOLENOID CONTROL
C5	V35 18LG/RD (SPEED CONTROL)	SPEED CONTROL VENT SOLENOID CONTROL
C6	-	-
C7	-	-
C8	K99 18BR/OR (4.0L CALIFORNIA)	OXYGEN SENSOR UPSTREAM CONTROL
C8	K299 18BR/WT (EXCEPT 4.0L CALIFORNIA)	OXYGEN SENSOR UPSTREAM CONTROL
C9	K512 18RD/YL (4.0L CALIFORNIA)	OXYGEN SENSOR DOWNSTREAM HEATER RELAY CONTROL
C10	K106 18WT/DG (CANADA)	LEAK DETECTION PUMP SOLENOID CONTROL

POWERTRAIN CONTROL MODULE C3 - GRAY 32 WAY

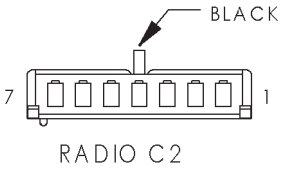
CAV	CIRCUIT	FUNCTION
C11	V32 18YL/RD (SPEED CONTROL)	SPEED CONTROL ON/OFF SWITCH SENSE
C12	A142 14DG/PK	AUTOMATIC SHUT DOWN RELAY OUTPUT
C13	-	-
C14	K107 18OR (CANADA)	LEAK DETECTION PUMP SWITCH SENSE
C15	K118 18PK/YL	BATTERY TEMPERATURE SENSOR SIGNAL
C16	K299 18BR/WT	OXYGEN SENSOR UPSTREAM CONTROL
C17	-	-
C18	-	-
C19	K31 18BR	FUEL PUMP RELAY CONTROL
C20	K52 18PK/BK	EVAP/PURGE SOLENOID CONTROL
C21	-	-
C22	C21 18DB/OR	A/C SWITCH SENSE
C23	C90 18LG	A/C SELECT INPUT
C24	K29 18WT/PK	BRAKE LAMP SWITCH SENSE
C25	K125 18WT/DB	GENERATOR SOURCE
C26	K226 18DB/LG	FUEL LEVEL SENSOR SIGNAL
C27	D21 18PK	SCI TRANSMIT
C28	-	-
C29	D32 18LG	SCI RECEIVE
C30	D25 18VT/YL	PCI BUS
C31	-	-
C32	V37 18RD/LG (SPEED CONTROL)	SPEED CONTROL SWITCH SIGNAL



RADIO C1

RADIO C1 - GRAY 7 WAY

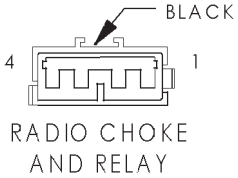
CAV	CIRCUIT	FUNCTION
1	-	-
2	K55 18BR/RD	LEFT FRONT SPEAKER (-)
3	X56 18DB	RIGHT FRONT SPEAKER (-)
4	L107 20WT	HEADLAMP SWITCH OUTPUT
5	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
6	X12 16PK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
7	M1 20PK/WT	FUSED B(+)



RADIO C2

RADIO C2 - BLACK 7 WAY

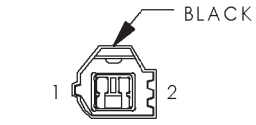
CAV	CIRCUIT	FUNCTION
1	X16 20LG	ANTENNA RELAY OUTPUT
2	X51 18BR/YL	LEFT REAR SPEAKER (+)
3	X52 18DB/WT	RIGHT REAR SPEAKER (+)
4	X53 18DG	LEFT FRONT SPEAKER (+)
5	X54 18VT	RIGHT FRONT SPEAKER (+)
6	X57 18BR/LB	LEFT REAR SPEAKER (-)
7	X58 18DB/PK	RIGHT REAR SPEAKER (-)



RADIO CHOKE AND RELAY

RADIO CHOKE AND RELAY - BLACK 4 WAY

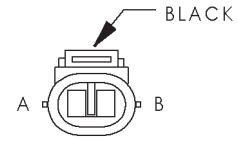
CAV	CIRCUIT	FUNCTION
1	X60 16DG/RD	FUSED B(+)
2	X13 16BK/RD	SUBWOOFER RELAY
3	X16 20LG	ANTENNA
4	Z1 20BK	GROUND



REAR FOG LAMP (BUILT-UP-EXPORT)

REAR FOG LAMP (BUILT-UP-EXPORT) - BLACK 2 WAY

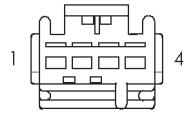
CAV	CIRCUIT	FUNCTION
1	L38 18BR/WT	REAR FOG LAMP FEED
2	Z1 20BK	GROUND



REAR WASHER PUMP (HARD TOP)

REAR WASHER PUMP (HARD TOP) - BLACK 2 WAY

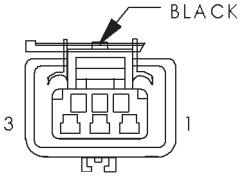
CAV	CIRCUIT	FUNCTION
A	V20 18VT/OR	REAR WASHER MOTOR CONTROL
B	Z1 18BK	GROUND



REAR WINDOW DEFOGGER SWITCH (HARD TOP)

REAR WINDOW DEFOGGER SWITCH (HARD TOP) - 4 WAY

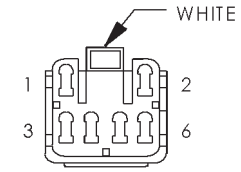
CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	C80 20DB/WT	REAR WINDOW DEFOGGER SWITCH SENSE
3	F81 20DB/RD	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
4	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL



REAR WIPER MOTOR (HARD TOP)

REAR WIPER MOTOR (HARD TOP) - BLACK 3 WAY

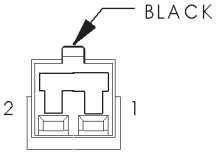
CAV	CIRCUIT	FUNCTION
1	V23 18BR/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
2	Z1 16BK	GROUND
3	V13 18BK/LG	REAR WIPER MOTOR CONTROL



REAR WIPER/ WASHER SWITCH (HARD TOP)

REAR WIPER/WASHER SWITCH (HARD TOP) - WHITE 6 WAY

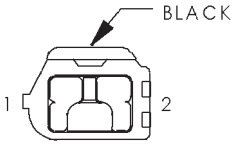
CAV	CIRCUIT	FUNCTION
1	Z1 18BK/WT	GROUND
2	V20 18VT/OR	REAR WASHER MOTOR CONTROL
3	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
4	V13 18BR/LG	REAR WIPER MOTOR CONTROL
5	V23 18BR/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
6	-	-



RIGHT COURTESY LAMP

RIGHT COURTESY LAMP - BLACK 2 WAY

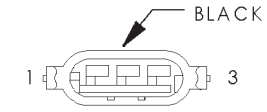
CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



RIGHT FOG LAMP (EXCEPT BUILT-UP-EXPORT)

RIGHT FOG LAMP (EXCEPT BUILT-UP-EXPORT) - BLACK 2 WAY

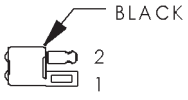
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L39 18LB	FOG LAMP RELAY NO. 1 OUTPUT



RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT)

RIGHT FRONT PARK/ TURN SIGNAL LAMP (EXCEPT BUILT-UP-EXPORT) - BLACK 3

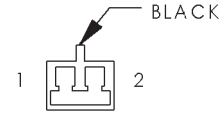
CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
3	Z1 18BK	GROUND



RIGHT FRONT POSITION LAMP (BUILT-UP-EXPORT)

RIGHT FRONT POSITION LAMP (BUILT-UP-EXPORT) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



RIGHT FRONT SPEAKER

RIGHT FRONT SPEAKER - BLACK 2 WAY

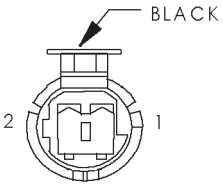
CAV	CIRCUIT	FUNCTION
1	X54 18VT	RIGHT FRONT SPEAKER (+)
2	X56 18DB	RIGHT FRONT SPEAKER (-)



RIGHT FRONT TURN SIGNAL LAMP (BUILT-UP-EXPORT)

RIGHT FRONT TURN SIGNAL LAMP - BLACK 3 WAY

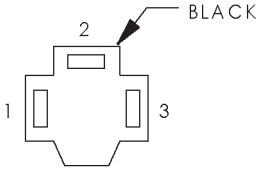
CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	-	-
3	Z1 18BK	GROUND



RIGHT FRONT WHEEL SPEED SENSOR

RIGHT FRONT WHEEL SPEED SENSOR - BLACK 2 WAY

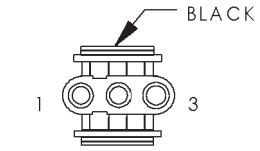
CAV	CIRCUIT	FUNCTION
1	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
2	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)



RIGHT HEADLAMP

RIGHT HEADLAMP - BLACK 3 WAY

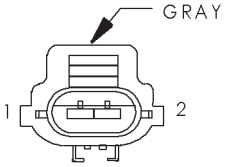
CAV	CIRCUIT	FUNCTION
1	L3 14RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
2	L4 14VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
3	Z1 18BK	GROUND



RIGHT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

RIGHT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT) - BLACK 3 WAY

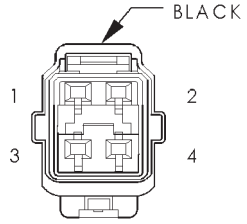
CAV	CIRCUIT	FUNCTION
1	L22 20LG/DG	FUSED HEADLAMP SWITCH OUTPUT
2	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
3	Z1 20BK	GROUND



RIGHT LICENSE LAMP

RIGHT LICENSE LAMP - GRAY 2 WAY

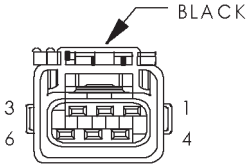
CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



RIGHT REAR LAMP ASSEMBLY (BUILT-UP-EXPORT)

RIGHT REAR LAMP ASSEMBLY - BLACK 4 WAY

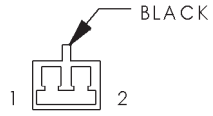
CAV	CIRCUIT	FUNCTION
1	L62 18BR/RD	RIGHT TURN/STOP SIGNAL
2	L1 20BR/RD	BACK-UP LAMP FEED
3	L50 18WT/TN	BRAKE LAMP SWITCH FEED
4	L7 18BK/YL	HEADLAMP SWITCH OUTPUT



RIGHT REAR LAMP ASSEMBLY (EXCEPT BUILT-UP-EXPORT)

RIGHT REAR LAMP ASSEMBLY (EXCEPT BUILT-UP-EXPORT) - BLACK 6 WAY

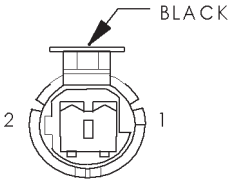
CAV	CIRCUIT	FUNCTION
1	L1 20VT/BK	BACK-UP LAMP FEED
2	L62 18BR/RD	RIGHT TURN/STOP SIGNAL
3	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
4	L63 18DG/RD	LEFT TURN/STOP SIGNAL
5	Z1 18BK	GROUND
6	-	-



RIGHT REAR SPEAKER (SOUND BAR)

RIGHT REAR SPEAKER (SOUND BAR) - BLACK 2 WAY

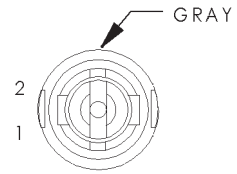
CAV	CIRCUIT	FUNCTION
1	X52 20DB/WT	RIGHT REAR SPEAKER (+)
2	X58 20DB/PK	RIGHT REAR SPEAKER (-)



RIGHT REAR WHEEL SPEED SENSOR

RIGHT REAR WHEEL SPEED SENSOR - BLACK 2 WAY

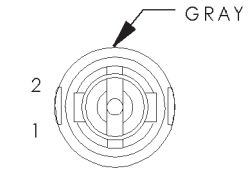
CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)



RIGHT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT)

RIGHT SIDE MARKER LAMP (EXCEPT BUILT-UP-EXPORT) - GRAY 2 WAY

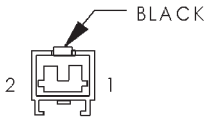
CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	L60 18TN	RIGHT TURN SIGNAL



RIGHT SIDE REPEATER LAMP (BUILT-UP-EXPORT)

RIGHT SIDE REPEATER LAMP (BUILT-UP-EXPORT) - GRAY 2 WAY

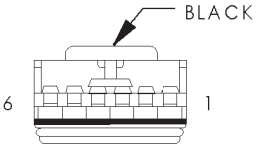
CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	Z1 18BK	GROUND



SEAT BELT SWITCH (RHD BUILT-UP-EXPORT)

SEAT BELT SWITCH (RHD BUILT- -UP-EXPORT) - BLACK 2 WAY

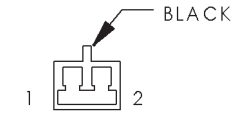
CAV	CIRCUIT	FUNCTION
1	G10 20LG/RD	SEAT BELT SWITCH SENSE
2	Z1 20BK	GROUND



SENTRY KEY IMMOBILIZER MODULE

SENTRY KEY IMMOBILIZER MODULE - BLACK 6 WAY

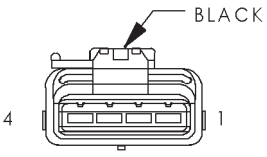
CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20VT/YL	PCI BUS
3	Z12 20BK/LB	GROUND
4	F15 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-START)
5	Z1 20BK	GROUND
6	F33 20PK/RD	FUSED B(+)



SOUND BAR DOME LAMP

SOUND BAR DOME LAMP - BLACK 2 WAY

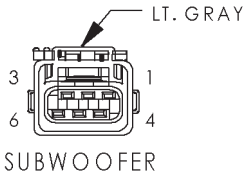
CAV	CIRCUIT	FUNCTION
1	M1 20PK/WT	FUSED B(+)
2	M2 20YL	COURTESY LAMPS DRIVER



SPEED CONTROL SERVO

SPEED CONTROL SERVO - BLACK 4 WAY

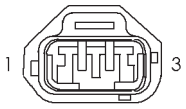
CAV	CIRCUIT	FUNCTION
1	V36 18TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
2	V35 18LG/RD	SPEED CONTROL VENT SOLENOID CONTROL
3	V30 20DB/RD	SPEED CONTROL BRAKE LAMP SWITCH OUTPUT
4	Z1 18BK	GROUND



SUBWOOFER

SUBWOOFER - LT. GRAY 6 WAY

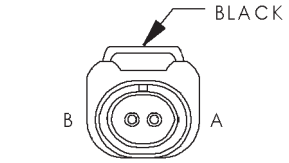
CAV	CIRCUIT	FUNCTION
1	X51 18BR/YL	LEFT REAR SPEAKER (+)
2	X57 18BR/LB	LEFT REAR SPEAKER (-)
3	X13 16BK/RD	SUBWOOFER RELAY POWER
4	X52 18DB/WT	RIGHT REAR SPEAKER (+)
5	X58 18DB/PK	RIGHT REAR SPEAKER (-)
6	Z9 16BK/WT	GROUND



THROTTLE POSITION SENSOR

THROTTLE POSITION SENSOR - 3 WAY

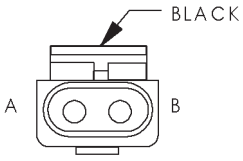
CAV	CIRCUIT	FUNCTION
1	K4 20BK/LB	SENSOR GROUND
2	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K7 20OR	5V SUPPLY



TORQUE CONVERTER CLUTCH SOLENOID

TORQUE CONVERTER CLUTCH SOLENOID - BLACK 2 WAY

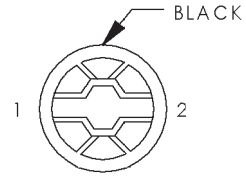
CAV	CIRCUIT	FUNCTION
A	F12 20RD/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
B	T23 18OR/LG	TRANSMISSION LOW/OVERDRIVE SOLENOID



TRANSFER CASE SWITCH

TRANSFER CASE SWITCH - BLACK 2 WAY

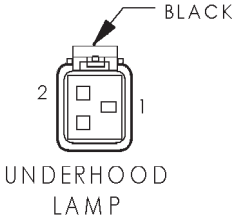
CAV	CIRCUIT	FUNCTION
A	G107 20BK/RD	4WD SENSE
B	Z1 20BK	GROUND



TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL)

TRANSMISSION RANGE INDICATOR ILLUMINATION (PRNDL) - BLACK 2 WAY

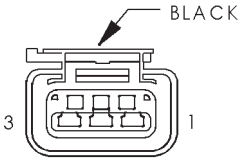
CAV	CIRCUIT	FUNCTION
1	E2 20OR	FUSED PANEL LAMPS DIMMER SWITCH SIGNAL
2	Z1 20BK	GROUND



UNDERHOOD LAMP

UNDERHOOD LAMP - BLACK 2 WAY

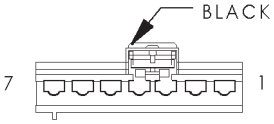
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	M1 20PK/WT	FUSED B(+)



VEHICLE SPEED SENSOR

VEHICLE SPEED SENSOR - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K6 20VT/OR	5V SUPPLY
2	K4 20BK/LB	SENSOR GROUND
3	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL



WINDSHIELD WIPER SWITCH

WINDSHIELD WIPER SWITCH - BLACK 7 WAY

CAV	CIRCUIT	FUNCTION
1	V5 16DG/YL	WIPER PARK SWITCH SENSE
2	Z1 20BK	GROUND
3	V10 16BR	WASHER PUMP CONTROL SWITCH OUTPUT
4	V6 16PK/BK	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
5	V4 16RD/YL	WIPER SWITCH HIGH SPEED OUTPUT
6	V3 16BR/WT	LOW SPEED WIPER SWITCH OUTPUT
7	-	-

8W-90 CONNECTOR/GROUND LOCATIONS

TABLE OF CONTENTS

page

CONNECTOR/GROUND LOCATIONS
DESCRIPTION 1

CONNECTOR/GROUND LOCATIONS

DESCRIPTION

This section provides illustrations identifying connector and ground locations in the vehicle. A connector and ground index is provided. Use the wiring diagrams in each section for connector and ground identification. Refer to the index for the proper figure number. For items that are not shown in this section N/S is placed in the Fig. column.

Connector Name/Number	Color	Location	Fig.
A/C Compressor Clutch	BK	At A/C Compressor Clutch	17
A/C Heater Control - C1		Center of Instrument Panel	10, 12
A/C Heater Control - C2		Center of Instrument Panel	10, 12
A/C Heater Control - C3		Center of Instrument Panel	10, 12
A/C High Pressure Switch		Left Side of Engine	17
A/C Low Pressure Switch		Near Powertrain Control Module	5
Airbag Control Module	YL	Front of Floor Pan Tunnel	8, 9
Back-up Lamp Switch (M/T)	BK	Right Side of Transmission	20, 21
Battery Temperature Sensor	BK	Under Battery Tray	3, 4
Blend Door Actuator		On HVAC Harness	N/S
Blower Motor		On HVAC Harness	N/S
Blower Motor Relay	BK	On HVAC Harness	N/S
Blower Motor Resistor Block		On HVAC Harness	N/S
Brake Lamp Switch	GY	Top of Brake Pedal Bracket	8, 9
Brake Transmission Shift Interlock Solenoid	WT	Near Steering Column	9
Brake Warning Indicator Switch	BK	On Brake Master Cylinder	N/S
C103	BK	Rear of Engine Compartment	3, 4, 5
C104 (LHD)	GY	Rear of Engine Compartment	3, 5
C104 (RHD)	BK	Rear of Engine Compartment	4, 5
C104 (RHD ABS)	GY	Rear of Engine Compartment	N/S
C106 (LHD)	BK	Left Kick Panel	8, 14
C106 (RHD)	BK	Right Kick Panel	9
C107 (LHD)	YL	Left Kick Panel	8, 14
C107 (RHD)	YL	Right Kick Panel	9
C108 (LHD)	BL	Left Kick Panel	8, 14
C108 (RHD)	BL	Right Kick Panel	9

CONNECTOR/GROUND LOCATIONS (Continued)

Connector Name/Number	Color	Location	Fig.
C110	BK	Left Fender Side Shield	1, 3, 4
C154	BK	Top Right Side of Transmission	20, 21, 22, 23, 24
C170 (LHD)	LT GY	Left Kick Panel	10, 14
C170 (RHD)	LT GY	Right Kick Panel	12
C202 (LHD)	GY	Left Kick Panel	8, 10, 14
C202 (RHD)	GY	Right Kick Panel	9, 12
C203 (LHD)	GN	Left Kick Panel	8, 10, 14
C203 (RHD)	GN	Right Kick Panel	9, 12
C204 (LHD)	RD	Left Kick Panel	8, 10, 14
C204 (RHD)	RD	Right Kick Panel	9, 12
C205	LT GN	Left Kick Panel	11, 12
C322	BK	Left Kick Panel	8, 9, 13, 25
C323 (LHD)	RD	Left Kick Panel	8, 13, 25
C323 (RHD)	GY	Left Kick Panel	9
C325 (4 Spkr Sys)	WT	Left Side of Sound Bar	25
C326 (Hard Top)	BK	Left Rear Quarter Panel	25
C329 (LHD)	BK	Left Side of Rear Bumper	27
C329 (Built-up-Export)	BK	Left Rear of Rear Bumper	27
C330 (4 Spkr Sys)	WT	Left Side of Sound Bar	25
C331 (Hard Top)	BK	Left Rear Quarter Panel	25
Camshaft Position Sensor	GY	Right Side of Engine	16, 24
Cigar Lighter/Power Outlet	RD	Rear of Cigar Lighter	10, 12
Circuit Breaker	GY	Near Day Time Running Lamp Module	N/S
Clockspring - C1	NAT	Rear of Clockspring	15
Clockspring - C2	YL	Rear of Clockspring	15
Clutch Pedal Position Switch (M/T)	BK	Top of Clutch Pedal Bracket	8, 9, 13
Controller Anti-Lock Brake		Rear Left Side of Dash Panel	N/S
Crankshaft Position Sensor		At Rear of Intake Manifold	16, 18
Data Link Connector	BK	Bottom Driver Side of Instrument Panel	10, 12
Daytime Running Lamp Module (Except Built-Up-Export)	BK	Left Side of Engine Compartment	N/S
Driver Door Ajar Switch	NAT	At ″A″ Pillar	8, 9
Engine Coolant Temperature Sensor	BK	On Thermostat Housing	17
Engine Oil Pressure Sensor	BK	Right Side of Engine Block	16, 23
Evap/Purge Solenoid	BK	Left Fender Side Shield	1
Front Washer Pump	BK	Under Washer Fluid Reservoir	1
Front Wiper Motor	BK	At Motor	6
Fuel Injector NO.1	BK	At Injector	17, 18
Fuel Injector NO.2	BK	At Injector	17, 18
Fuel Injector NO.3	BK	At Injector	17, 18

CONNECTOR/GROUND LOCATIONS (Continued)

Connector Name/Number	Color	Location	Fig.
Fuel Injector NO.4	BK	At Injector	17, 18
Fuel Injector NO.5	BK	At Injector	17
Fuel Injector NO.6	BK	At Injector	17
Fuel Pump Module	BK	Above Fuel Tank	26
G100		Rear Center of Engine Compartment	3, 4
G101		Rear Center of Engine Compartment	3, 4
G102		Left Radiator Closure Panel	1
G103		Right Radiator Closure Panel	2
G104		Near Generator	N/S
G105		Right Rear of Engine Block	16, 23, 24
G106		Right Rear of Engine Block	N/S
G107		Right Rear of Engine Block	N/S
G200 (LHD)		Left Rear of Instrument Panel	10
G200 (RHD)		Right Rear of Instrument Panel	12
G201 (LHD)		Left Rear of Instrument Panel	10
G201 (RHD)		Right Rear of Instrument Panel	12
G202 (LHD)		Right Rear of Instrument Panel	11
G202 (RHD)		Left Rear of Instrument Panel	12
G203 (LHD)		Right Rear of Instrument Panel	11
G203 (RHD)		Left Rear of Instrument Panel	12
G300 (LHD)		Left Kick Panel	8
G300 (RHD)		Right Kick Panel	9
G301 (LHD)		Between Front Seats	8
G301 (RHD)		Left Kick Panel	9
G302 (LHD)		Left Kick Panel	8
G302 (RHD)		Right Kick Panel	9
G Switch	BK	Near T/O for Controller Anti-Lock Brake	N/S
Generator	BK	Rear of Generator	16
Headlamp Leveling Switch (Built-Up-Export)	WT	At Switch	10, 12
High Note Horn	BK	Left Front Fender Side Shield	1
Idle Air Control Motor	BK	Side of Throttle Body	17, 18
Ignition Coil (2.5L)	GY	Right Side of Engine	N/S
Ignition Coil Pack (4.0L)	BK	Right Rear of Engine	16
Ignition Switch		On Steering Column	15
Instrument Cluster - C1		Rear of Cluster	10, 12
Instrument Cluster - C2		Rear of Cluster	10, 12
Intake Air Temperature Sensor	GY	Rear of Intake Manifold	17, 18
Leak Detection Pump (Except Built-Up-Export)	BK	Engine Compartment Left Side	7
Left Courtesy Lamp	BK	Left Side of Instrument Panel	10, 12

CONNECTOR/GROUND LOCATIONS (Continued)

Connector Name/Number	Color	Location	Fig.
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 Position Lamp (Built-Up-Export)	BK	At Lamp	1
Left Front Speaker	BK	At Speaker	10, 12
Left Front Turn Signal Lamp (Built-Up-Export)	BK	At Lamp	N/S
Left Front Wheel Speed Sensor		Left Side of Engine Compartment Near Hydraulic Control Unit	N/S
Left Headlamp	BK	Rear of Lamp	1
Left Headlamp Leveling Motor (Built-Up-Export)	BK	Near Headlamp at Motor	1
Left License Lamp (Built-Up-Export)	GY	At Lamp	27
Left Rear Lamp Assembly(Built-Up-Export)	BK	At Lamp	27
Left Rear Lamp Assembly(Except Built-Up-Export)	BK	At Lamp	27
Left Rear Speaker (Sound Bar)	BK	At Sound Bar	N/S
Left Rear Wheel Speed Sensor		Near Vehicle Speed Sensor T/O	26
Left Side Repeater Lamp (Built-Up-Export)	GY	At Lamp	N/S
Low Note Horn (Except Built-Up-Export)	BK	Left Front Fender Side Shield	1
Manifold Absolute Pressure Sensor	BK	Side of Throttle Body	17, 18
Multi-Function Switch	GY	Steering Column	15
Oxygen Sensor 1/1 Upstream		On Front Exhaust Pipe	17
Oxygen Sensor 1/2 Downstream	BK	Rear of Catalytic Converter	17, 19
Oxygen Sensor 2/1 Upstream California/European III)		Near Idle Air Control Motor T/O	16, 18
Oxygen Sensor 2/2 Downstream (4.0L California/ European III)	GY	T/O near Ignition Coil Pack T/O	24
Park/Neutral Position Switch (A/T)		Left Side of Transmission	22
Passenger Airbag	YL	Rear of Airbag	8, 9
Passenger Airbag On/Off Switch		Lower Center of Instrument Panel	8
Passenger Door Ajar Switch	BK	Near Top Hinge of Passenger Door	8, 9

CONNECTOR/GROUND LOCATIONS (Continued)

Connector Name/Number	Color	Location	Fig.
Power Steering Pressure Switch (2.5L)	BK	Near Power Steering Pump	18
Powertrain Control Module - C1 (LHD)	BK	Right Rear of Engine Compartment	5
Powertrain Control Module - C1 (RHD)	BK	Left Rear of Engine Compartment	
Powertrain Control Module - C2 (LHD)	WT	Right Rear of Engine Compartment	5
Powertrain Control Module - C2 (RHD)	WT	Left Rear of Engine Compartment	N/S
Powertrain Control Module - C3 (LHD)	GY	Right Rear of Engine Compartment	3
Powertrain Control Module - C3 (RHD)	GY	Left Rear of Engine Compartment	4
Radio - C1	GY	Rear of Radio	10, 12
Radio - C2	BK	Rear of Radio	10, 12
Radio Choke and Relay	BK	Center Lower Instrument Panel	N/S
Rear Fog Lamp (Built-Up-Export)	BK	At Lamp	27
Rear Washer Pump (Hard Top)	BK	Under Washer Fluid Reservoir	1
Rear Window Defogger Switch (Hard Top)	GY	Behind Rear Window Defogger Switch	10, 12
Rear Wiper Motor (Hard Top)	BK	At Rear Wiper Motor	N/S
Rear Wiper/Washer Switch (Hard Top)	WT	Behind Rear Wiper/Washer Switch	10, 12
Right Courtesy Lamp	BK	Right Side of Instrument Panel	11, 12
Right Fog Lamp (Except Built-Up-Export)	BK	At Lamp	2
Right Front Park/Turn Signal Lamp (Except Built-Up-Export)	BK	At Lamp	2
Right Front Position Lamp (Built-Up- Export	BK	At Lamp	2
Right Front Speaker	BK	At Speaker	11, 12
Right Front Turn Signal Lamp (Built-Up-Export)	BK	At Lamp	2
Right Front Wheel Speed Sensor	BK	Rear of Engine	N/S
Right Headlamp	BK	Rear of Lamp	2
Right Headlamp Leveling Motor (Built-Up-Export)	BK	Near Headlamp at Motor	2
Right License Lamp	GY	At Lamp	27
Right Rear Lamp Assembly	BK	At Lamp	27
Right Rear Speaker (Sound Bar)	BK	At Sound Bar	N/S

CONNECTOR/GROUND LOCATIONS (Continued)

Connector Name/Number	Color	Location	Fig.
Right Rear Wheel Speed Sensor	BK	Near Vehicle Speed Sensor T/O	26
Right Side Marker Lamp (Except Built-Up-Export)	GY	At Lamp	N/S
Right Side Repeater Lamp	GY	At Lamp	2
Seat Belt Switch	BK	Near Park Brake Switch	25
Sentry Key Immobilizer Module	BK	At Immobilizer	9, 15
Sound Bar Dome Lamp	BK	At Sound Bar	N/S
Speed Control Servo	BK	Left Side Engine Compartment	7
Subwoofer	LTGY	Floor Pan	8, 9
Throttle Position Sensor	WT	Side of Throttle Body	17, 18, 24
Torque Converter Clutch Solenoid	BK	Left Side of Transmission	N/S
Transfer Case Switch	BK	Left Side of Transfer Case	19
Transmission Range Indicator Illumination (PRNDL)	BK	Between Seats	8, 9
Underhood Lamp	BK	Under Hood	3
Vehicle Speed Sensor	BK	Left Rear of Transfer Case	19
Windshield Wiper Switch	NAT	At Steering Column	N/S

CONNECTOR/GROUND LOCATIONS (Continued)

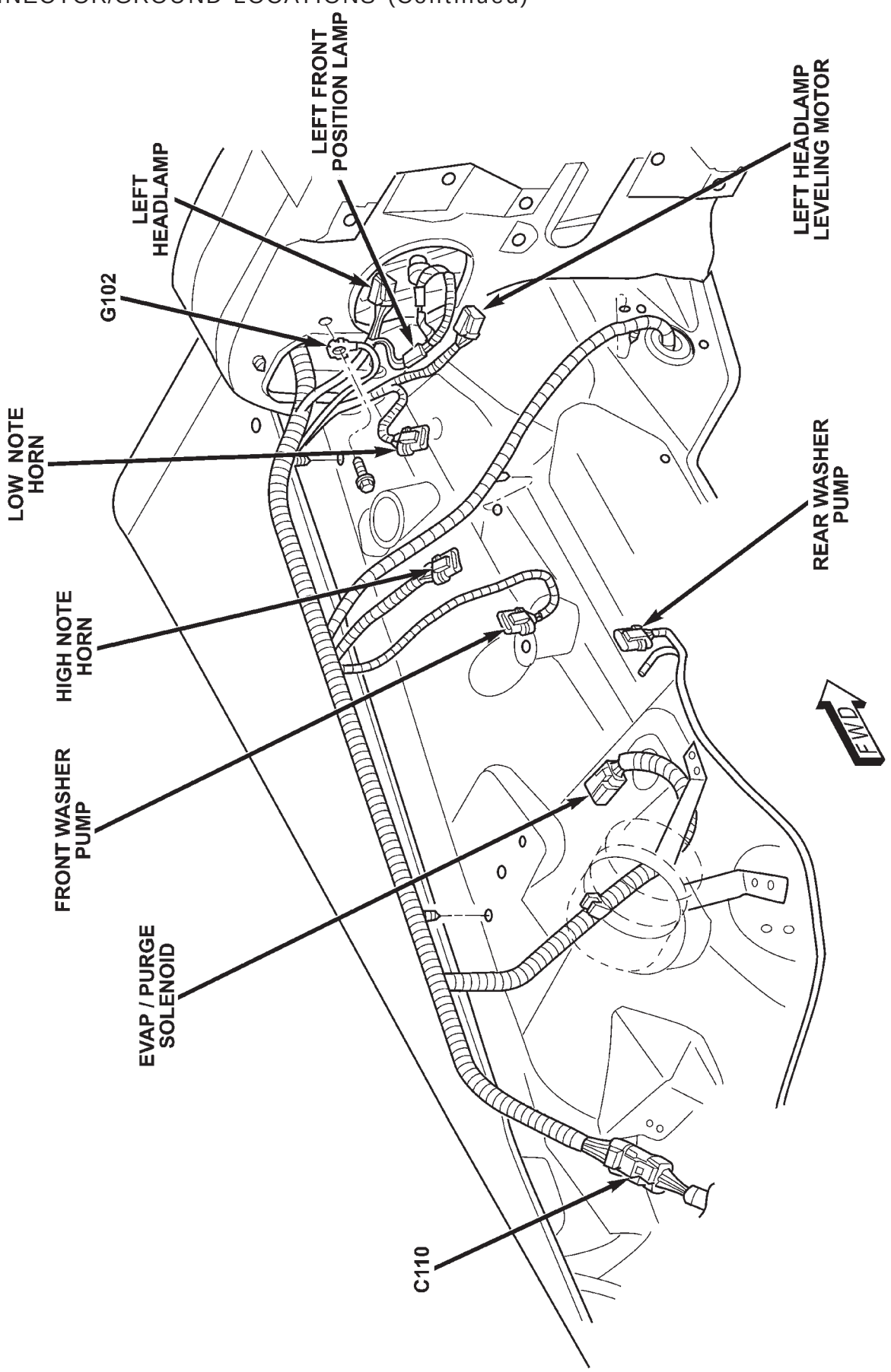


Fig. 1 LEFT HEADLAMP

CONNECTOR/GROUND LOCATIONS (Continued)

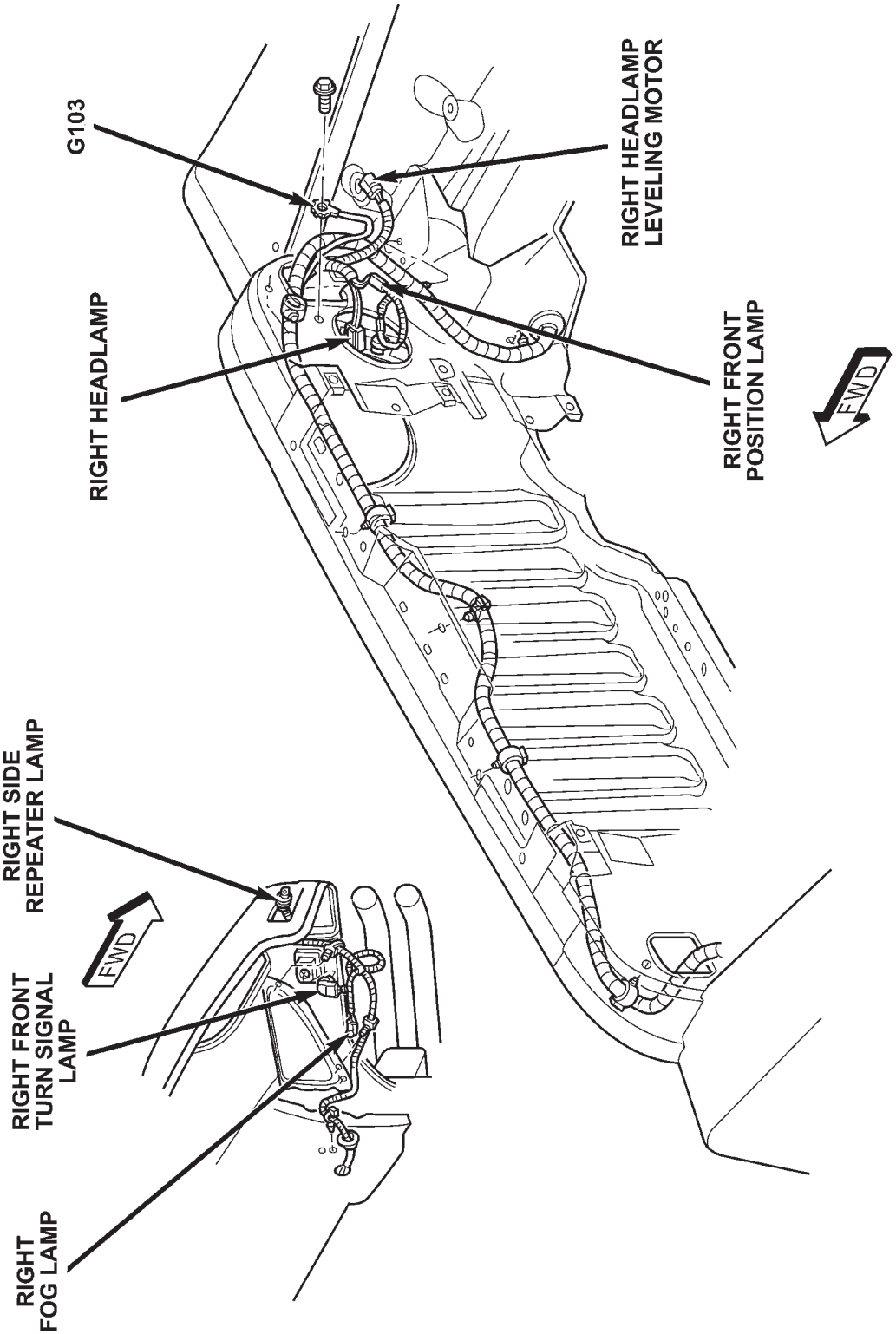


Fig. 2 RIGHT HEADLAMP

CONNECTOR/GROUND LOCATIONS (Continued)

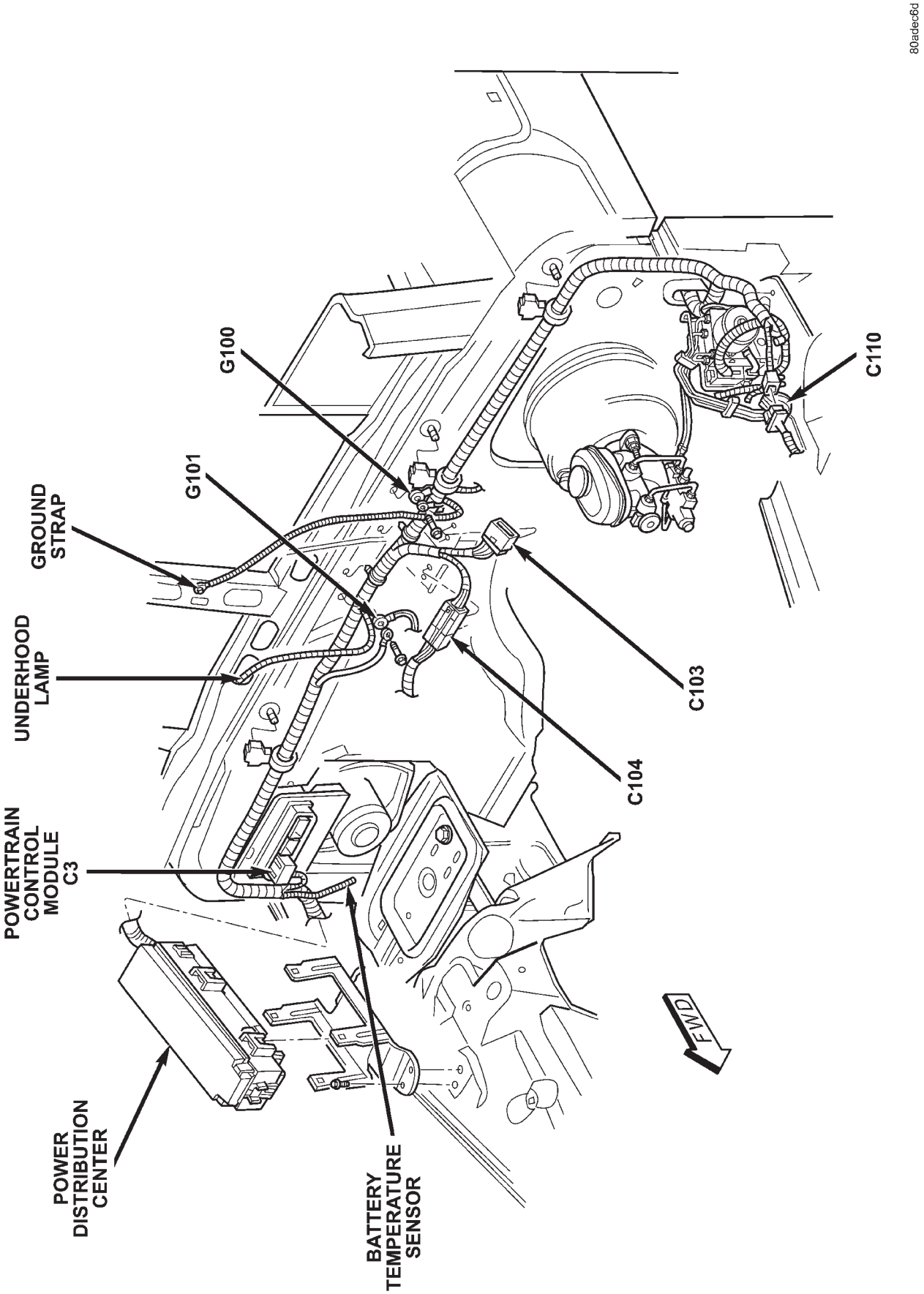


Fig. 3 ENGINE COMPARTMENT REAR LHD

CONNECTOR/GROUND LOCATIONS (Continued)

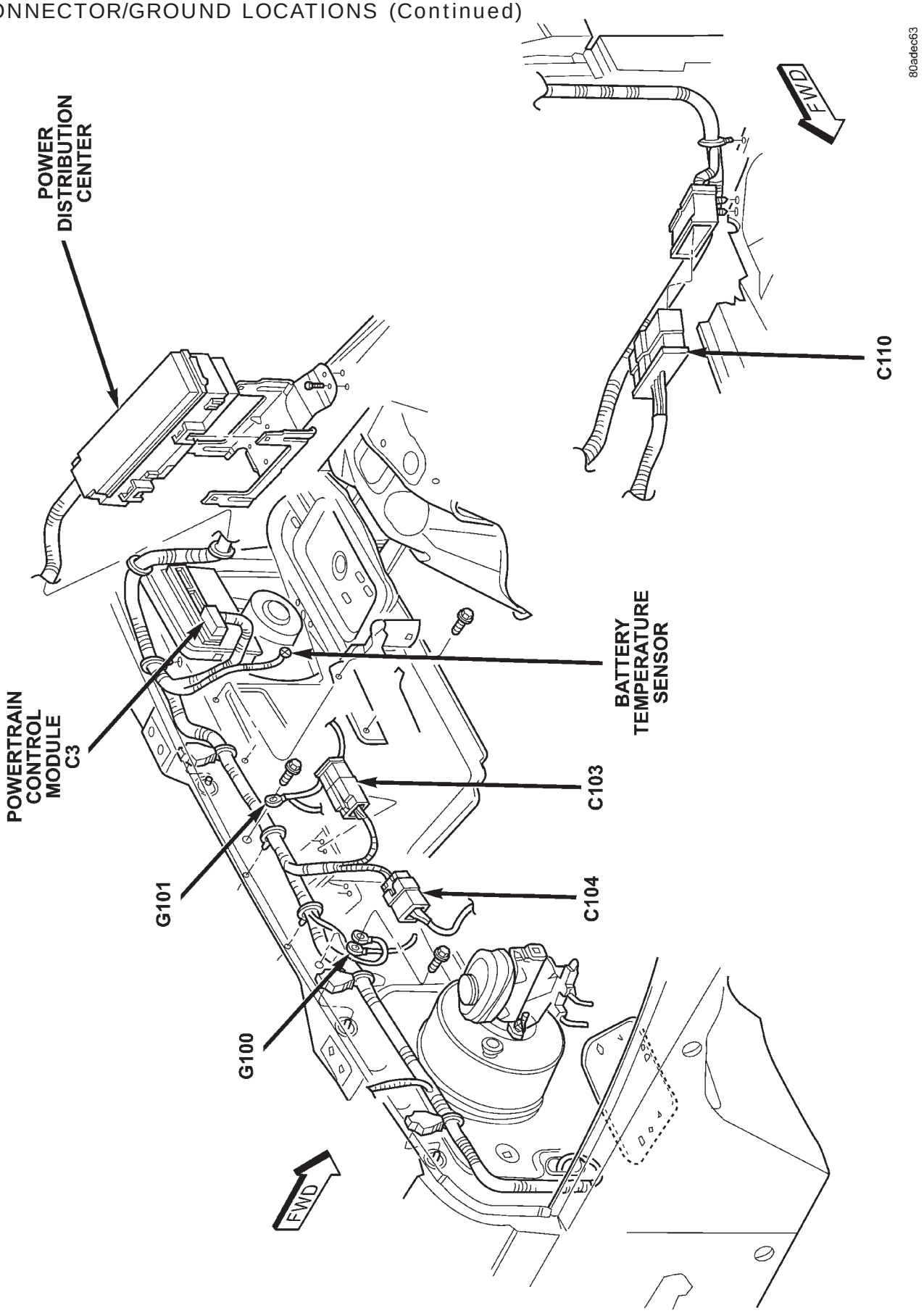


Fig. 4 ENGINE COMPARTMENT REAR RHD

CONNECTOR/GROUND LOCATIONS (Continued)

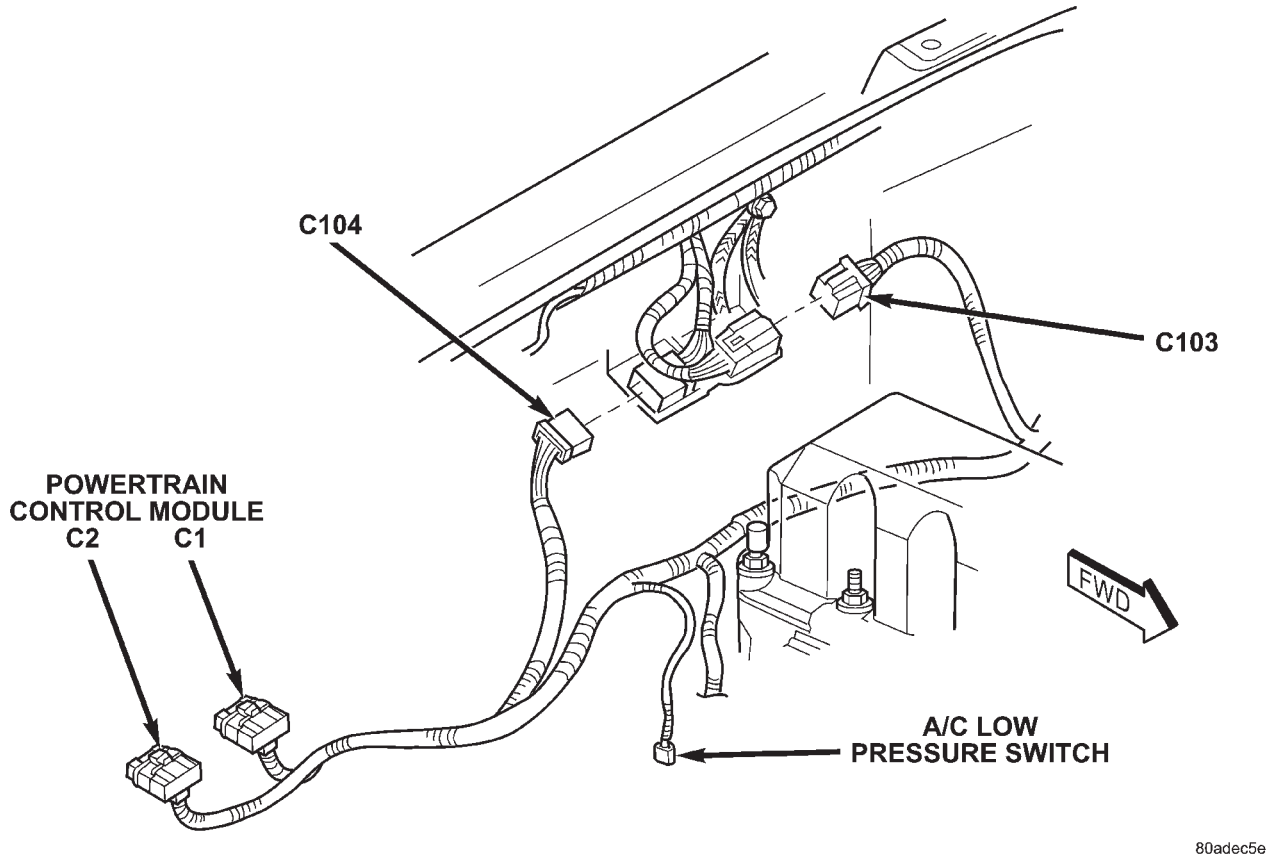


Fig. 5 POWERTRAIN CONTROL MODULE

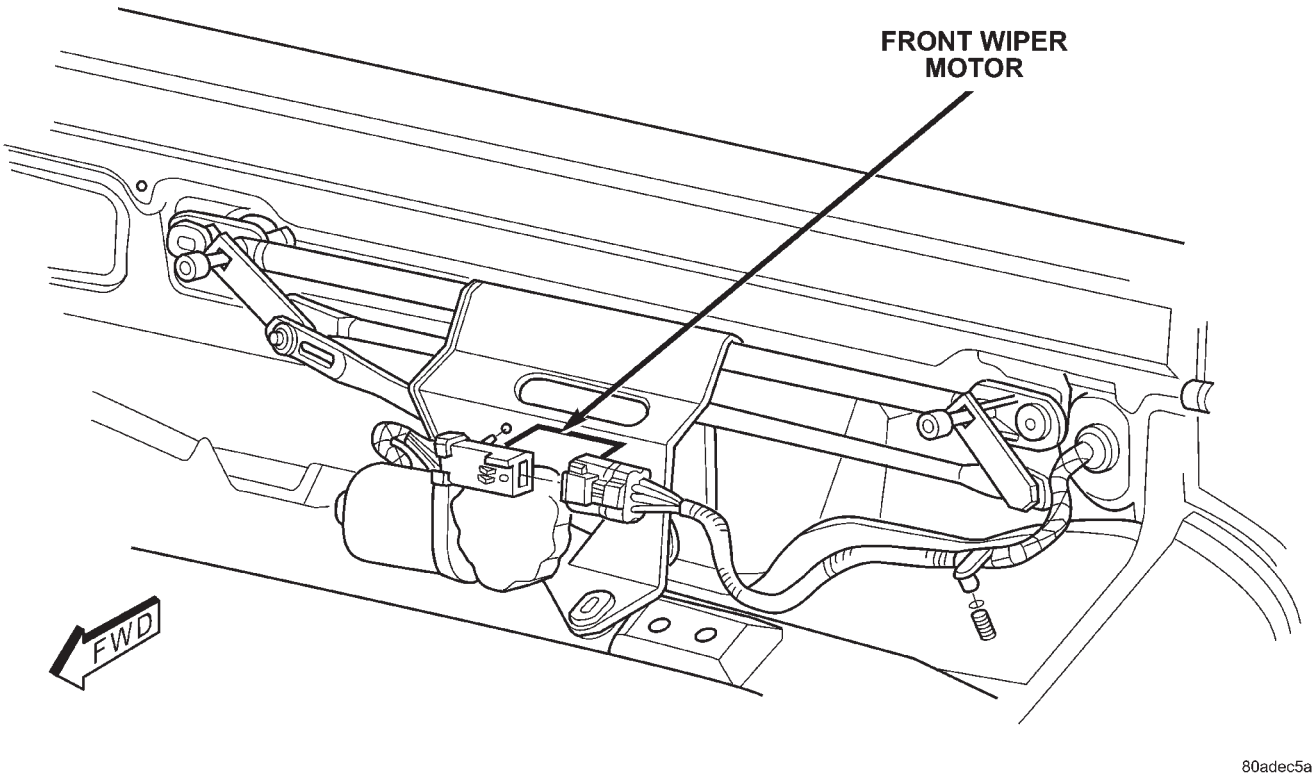


Fig. 6 FRONT WIPER MOTOR

CONNECTOR/GROUND LOCATIONS (Continued)

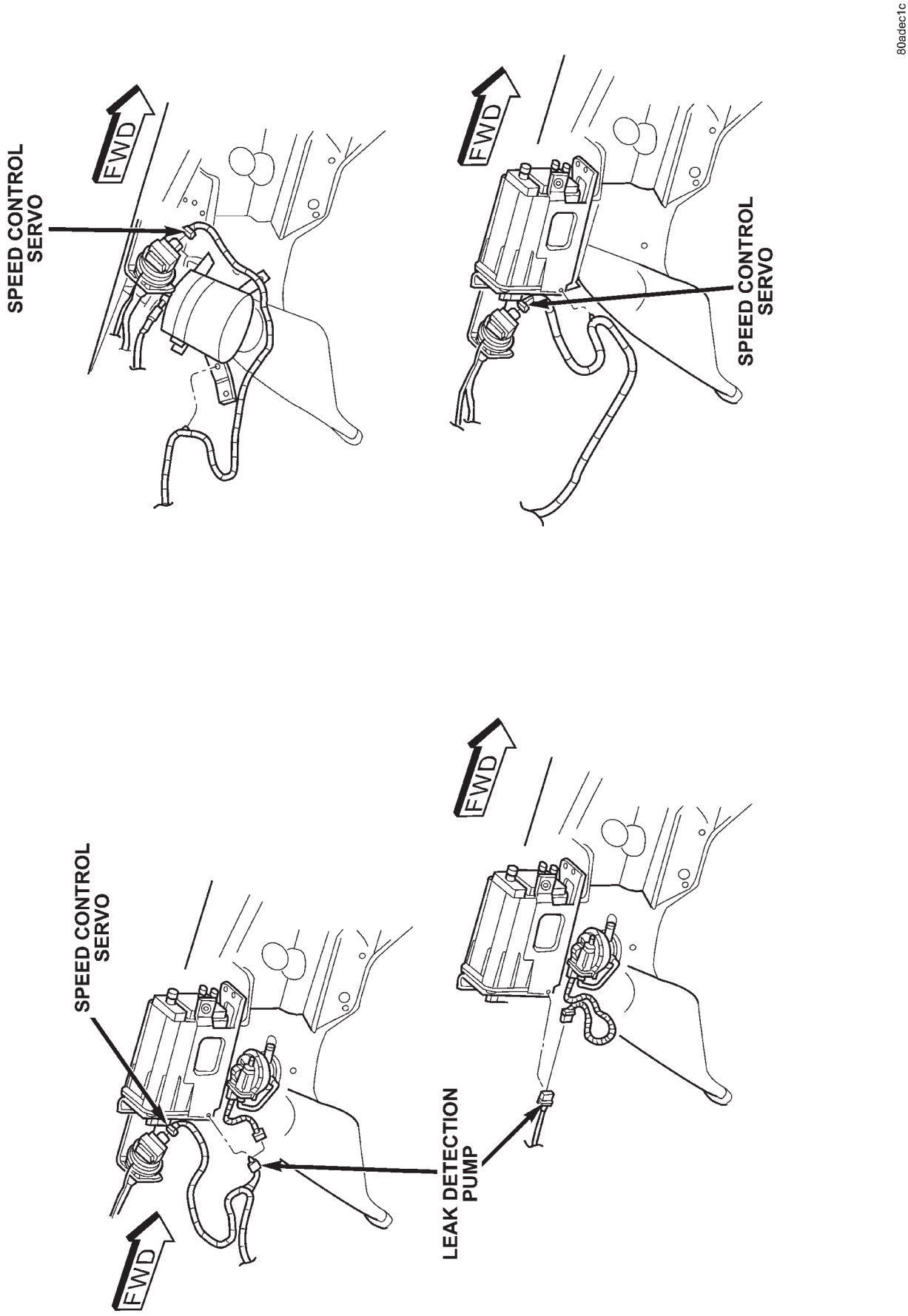


Fig. 7 SPEED CONTROL SERVO

CONNECTOR/GROUND LOCATIONS (Continued)

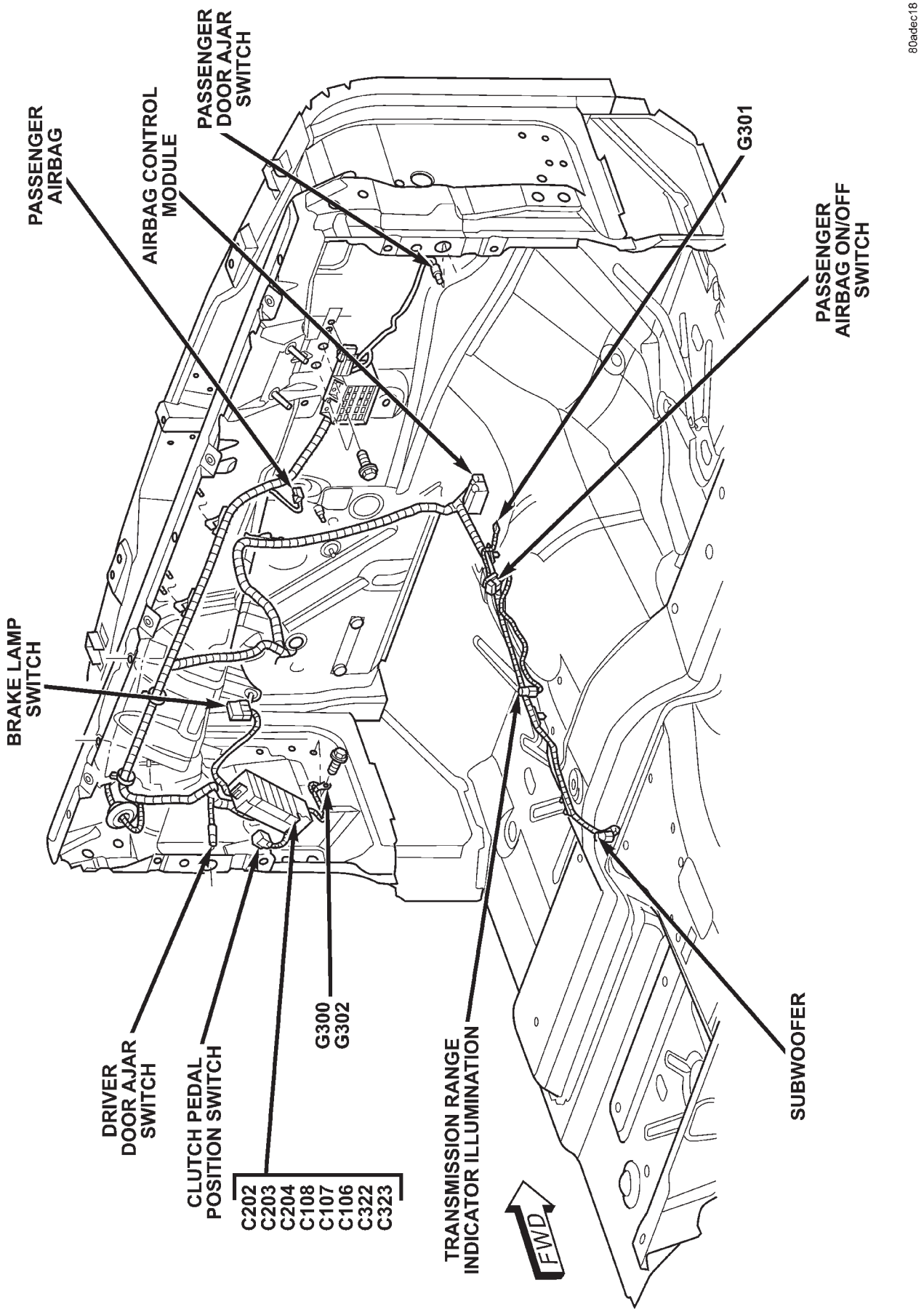


Fig. 8 DASH PANEL LHD

CONNECTOR/GROUND LOCATIONS (Continued)

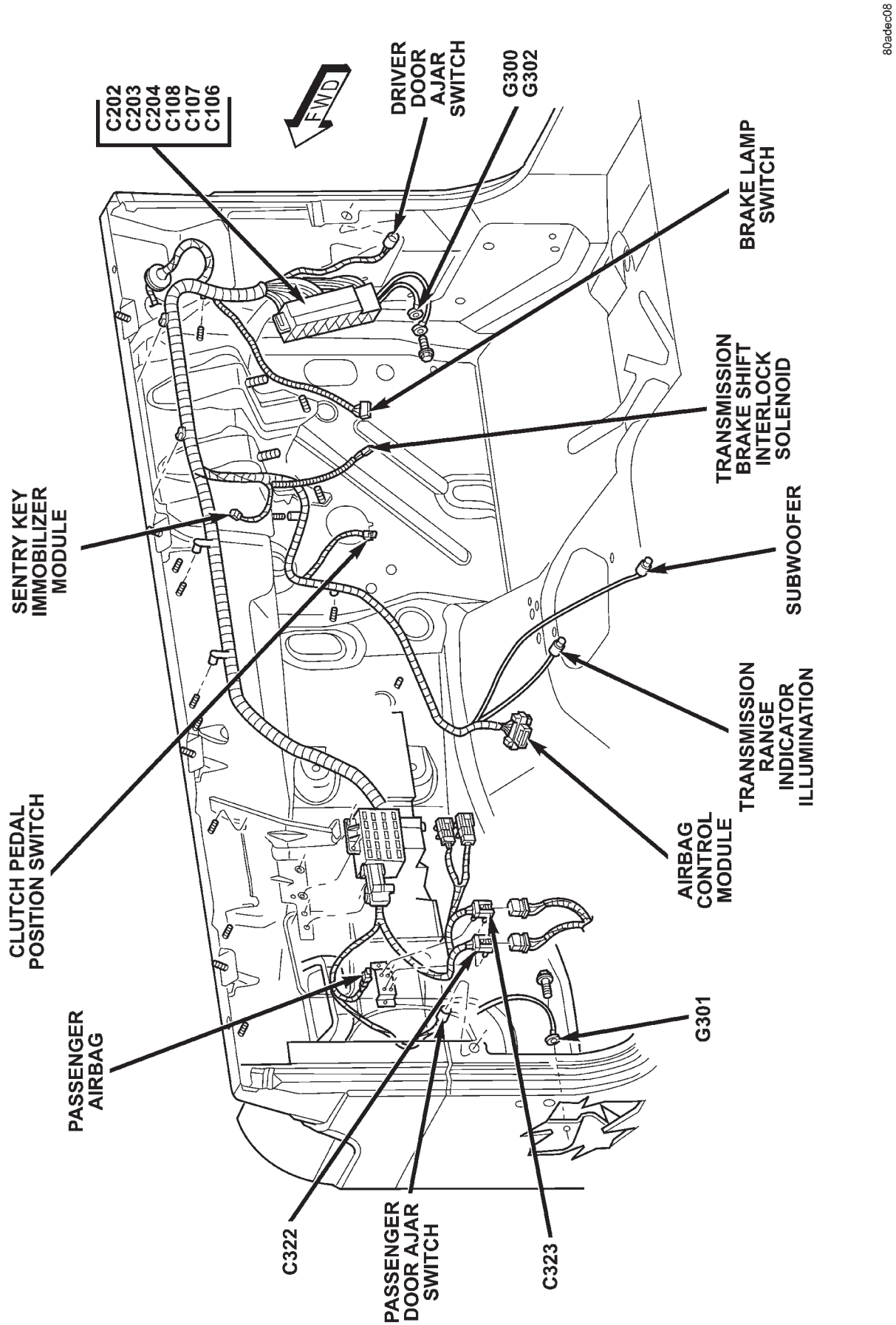


Fig. 9 DASH PANEL RHD

CONNECTOR/GROUND LOCATIONS (Continued)

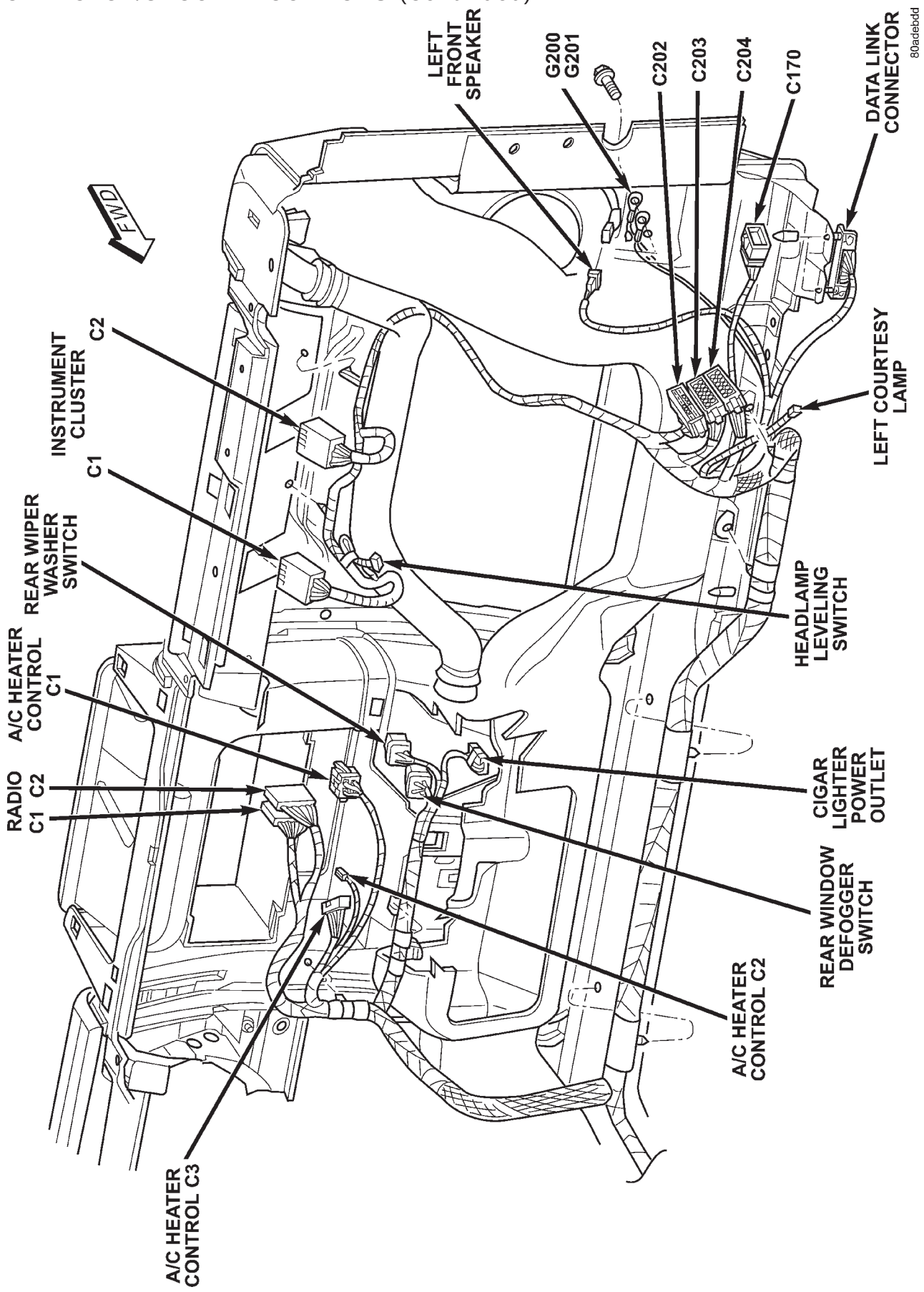


Fig. 10 LEFT SIDE INSTRUMENT PANEL BUX

CONNECTOR/GROUND LOCATIONS (Continued)

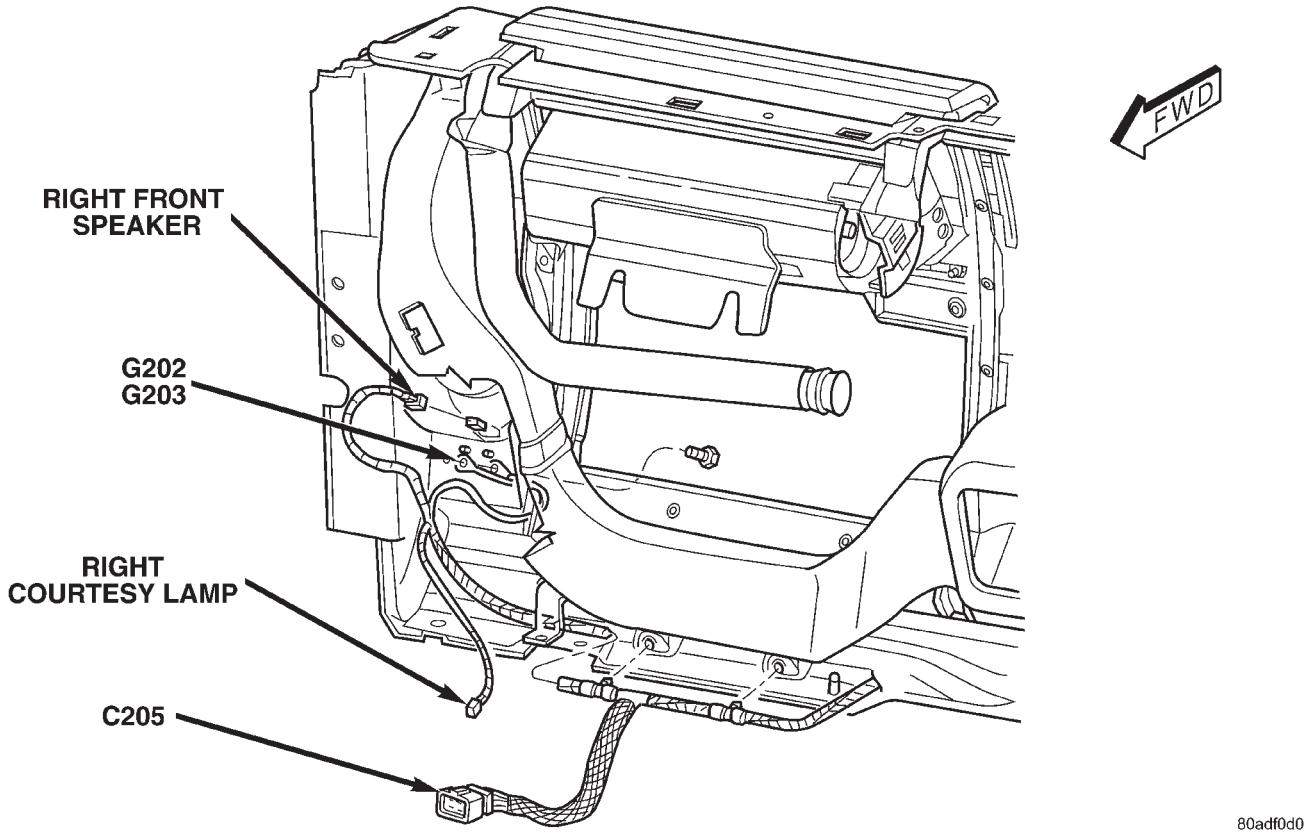


Fig. 11 RIGHT SIDE INSTRUMENT PANEL LHD

CONNECTOR/GROUND LOCATIONS (Continued)

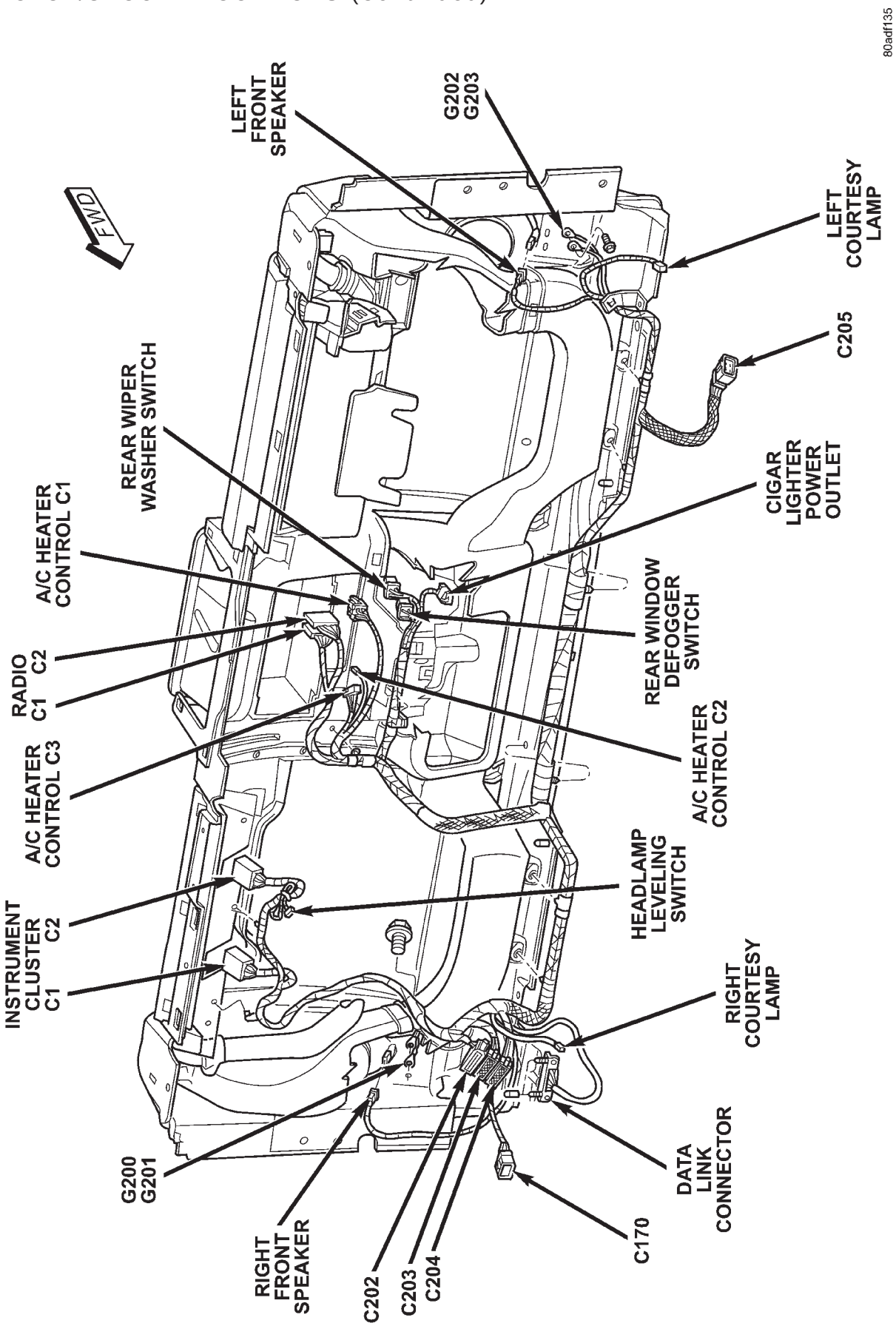


Fig. 12 INSTRUMENT PANEL RHD

CONNECTOR/GROUND LOCATIONS (Continued)

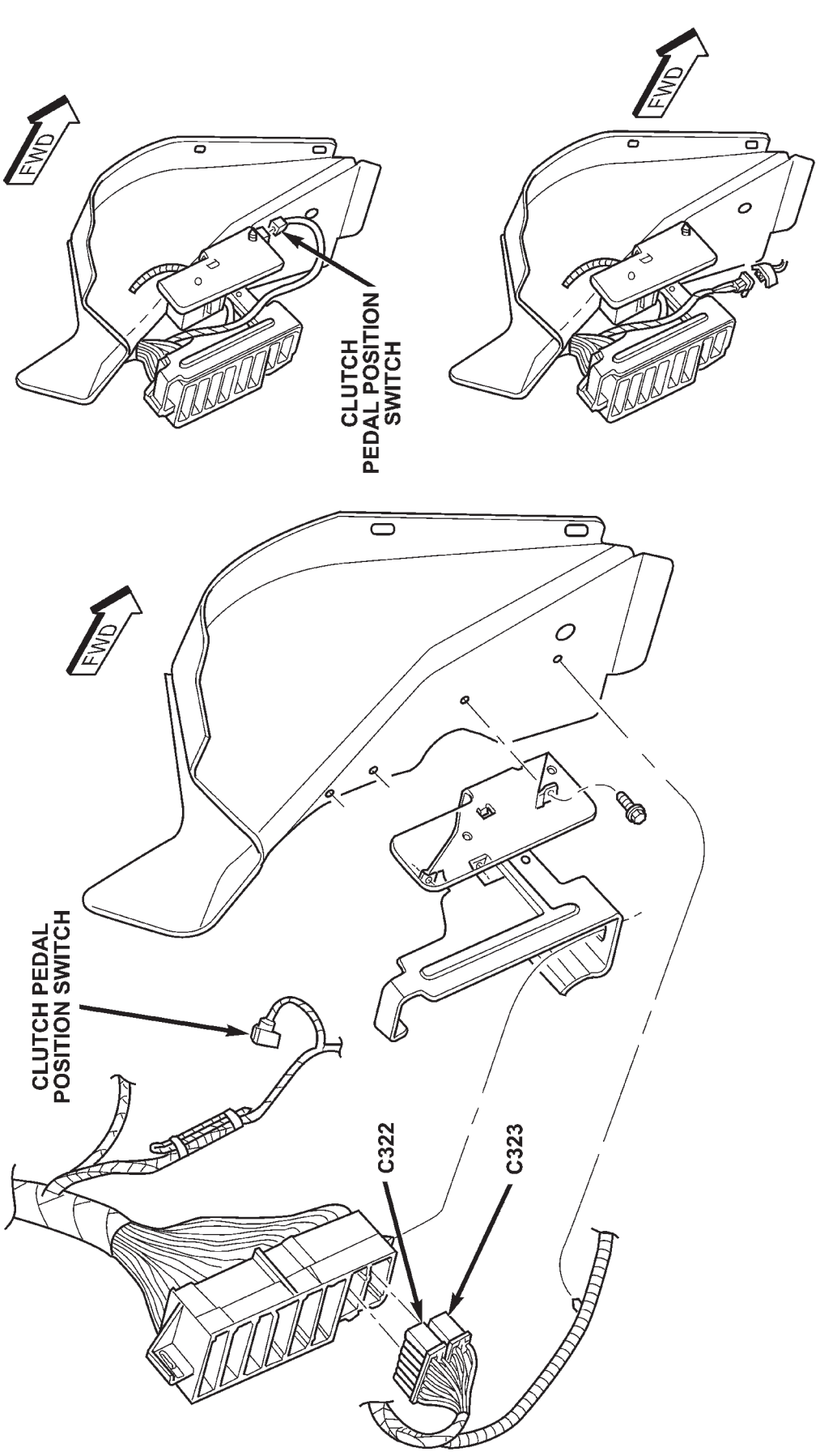


Fig. 13 LEFT COWL MANUAL TRANSMISSION LHD

CONNECTOR/GROUND LOCATIONS (Continued)

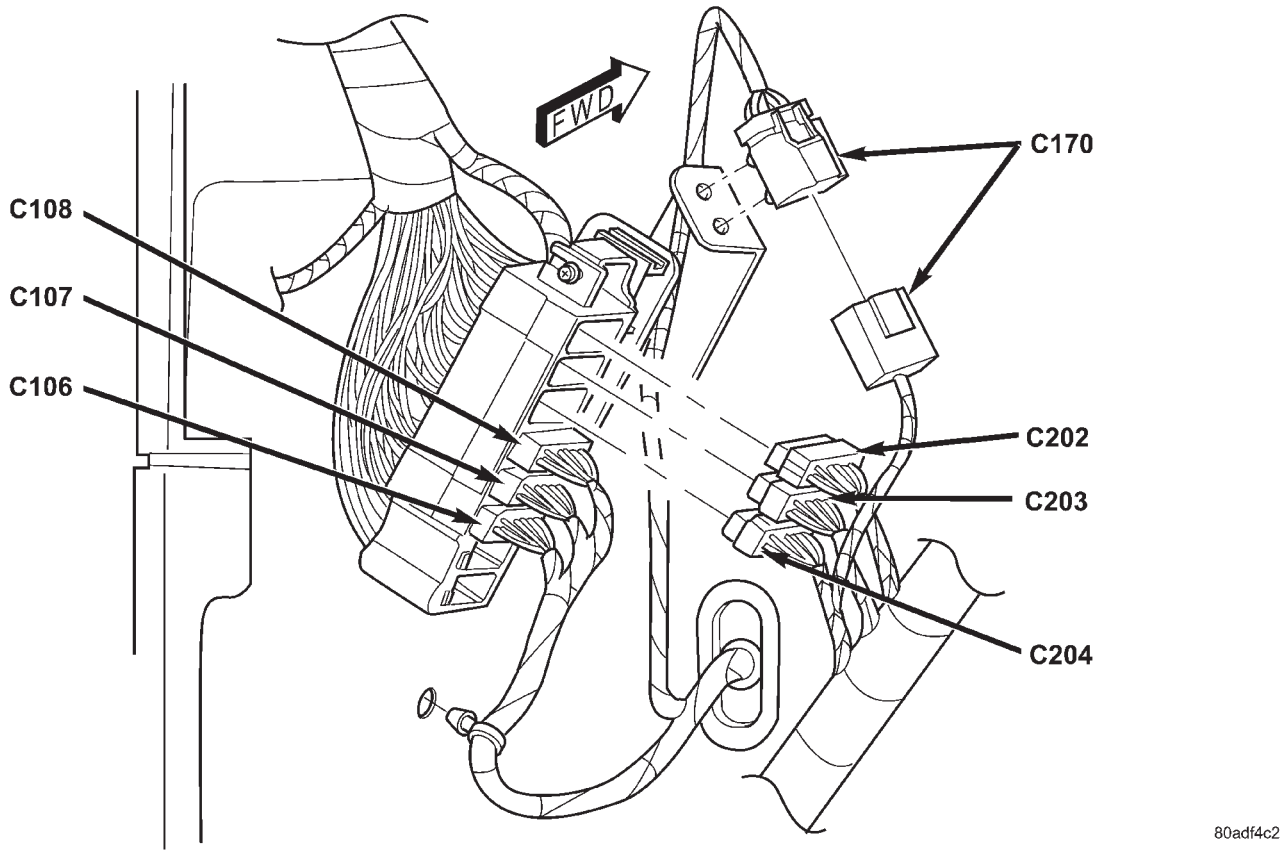


Fig. 14 LEFT COWL PANEL LHD

CONNECTOR/GROUND LOCATIONS (Continued)

80adf680

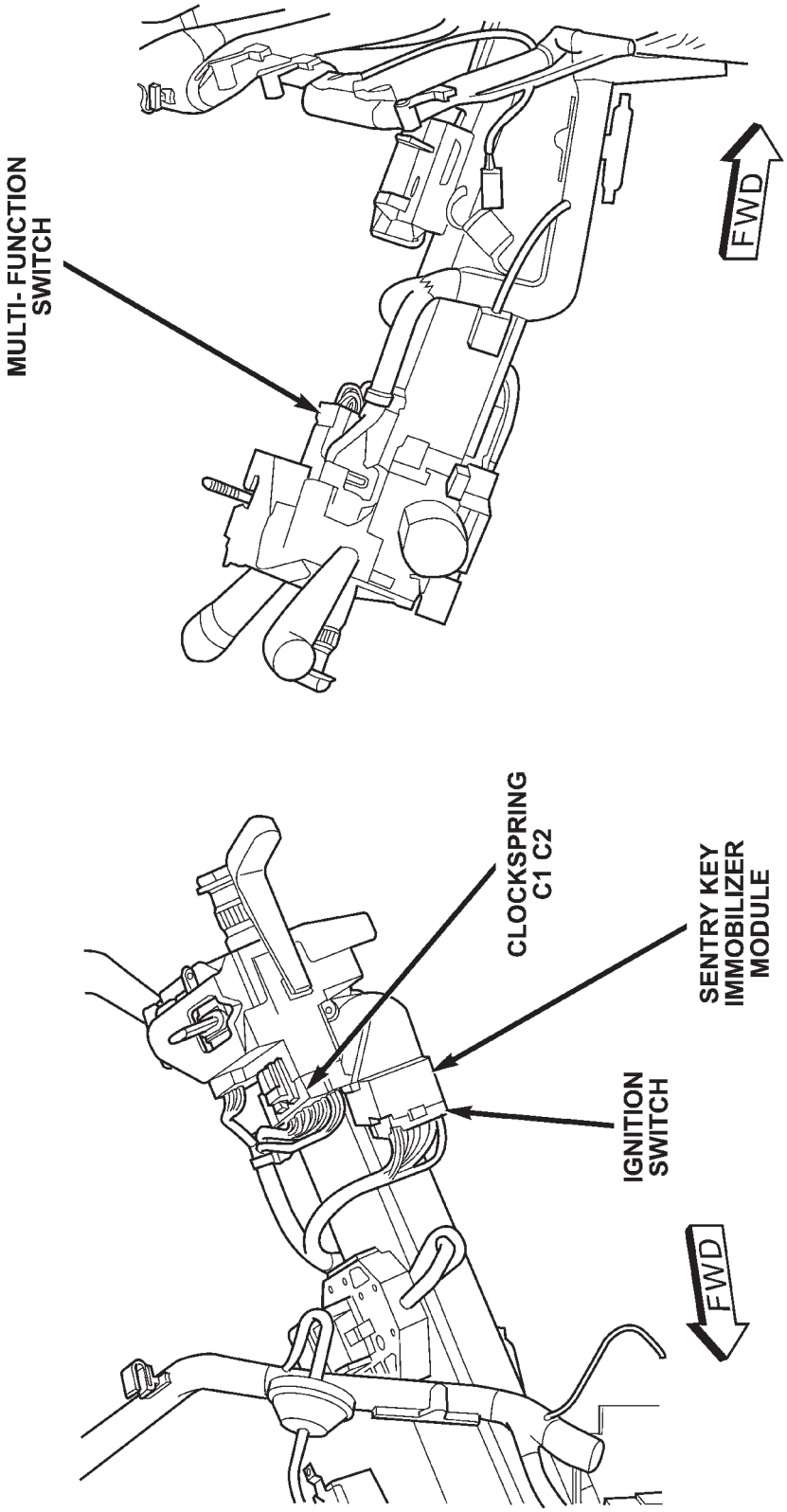


Fig. 15 STEERING COLUMN

CONNECTOR/GROUND LOCATIONS (Continued)

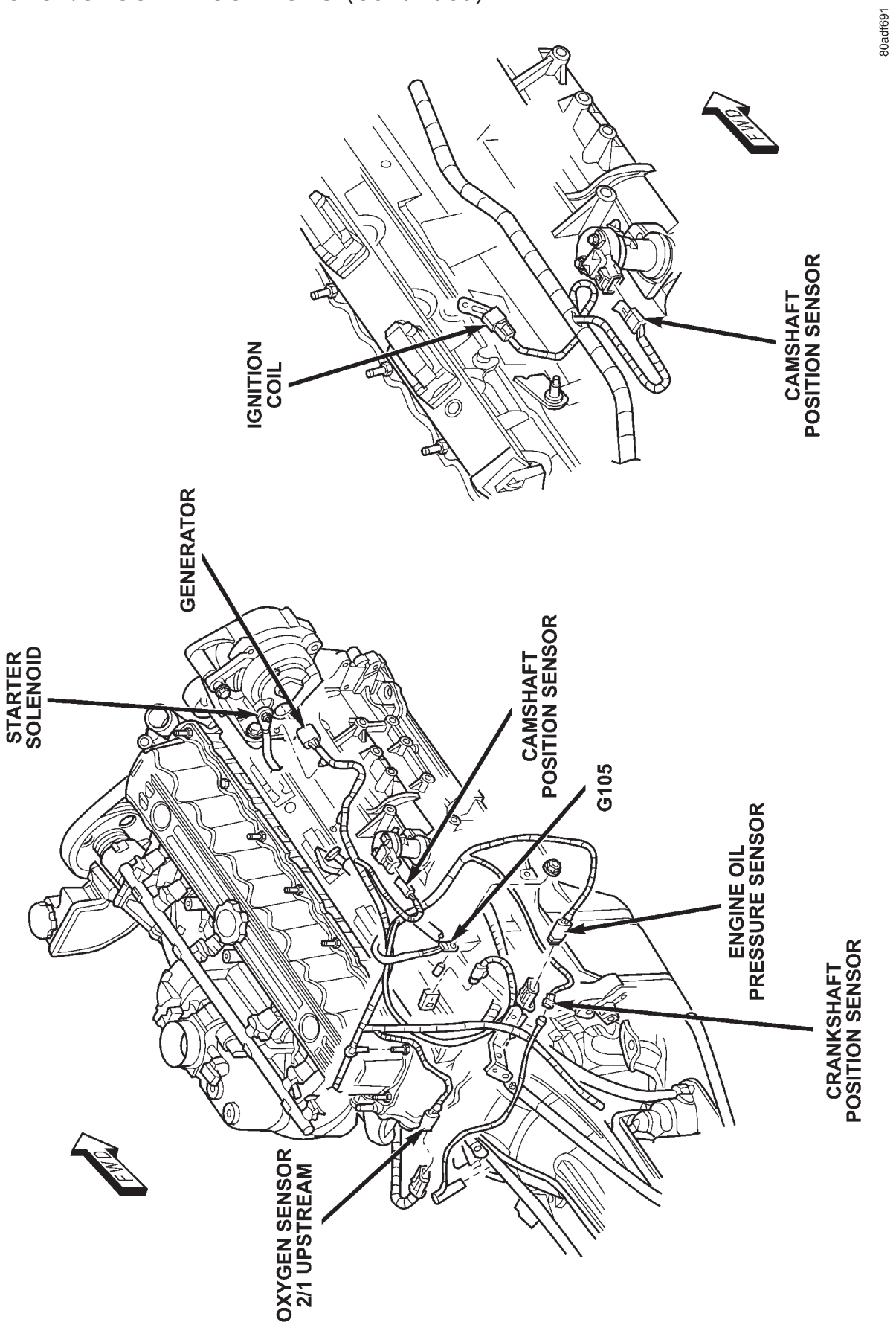


Fig. 16 4.0 LITER ENGINE RIGHT SIDE

CONNECTOR/GROUND LOCATIONS (Continued)

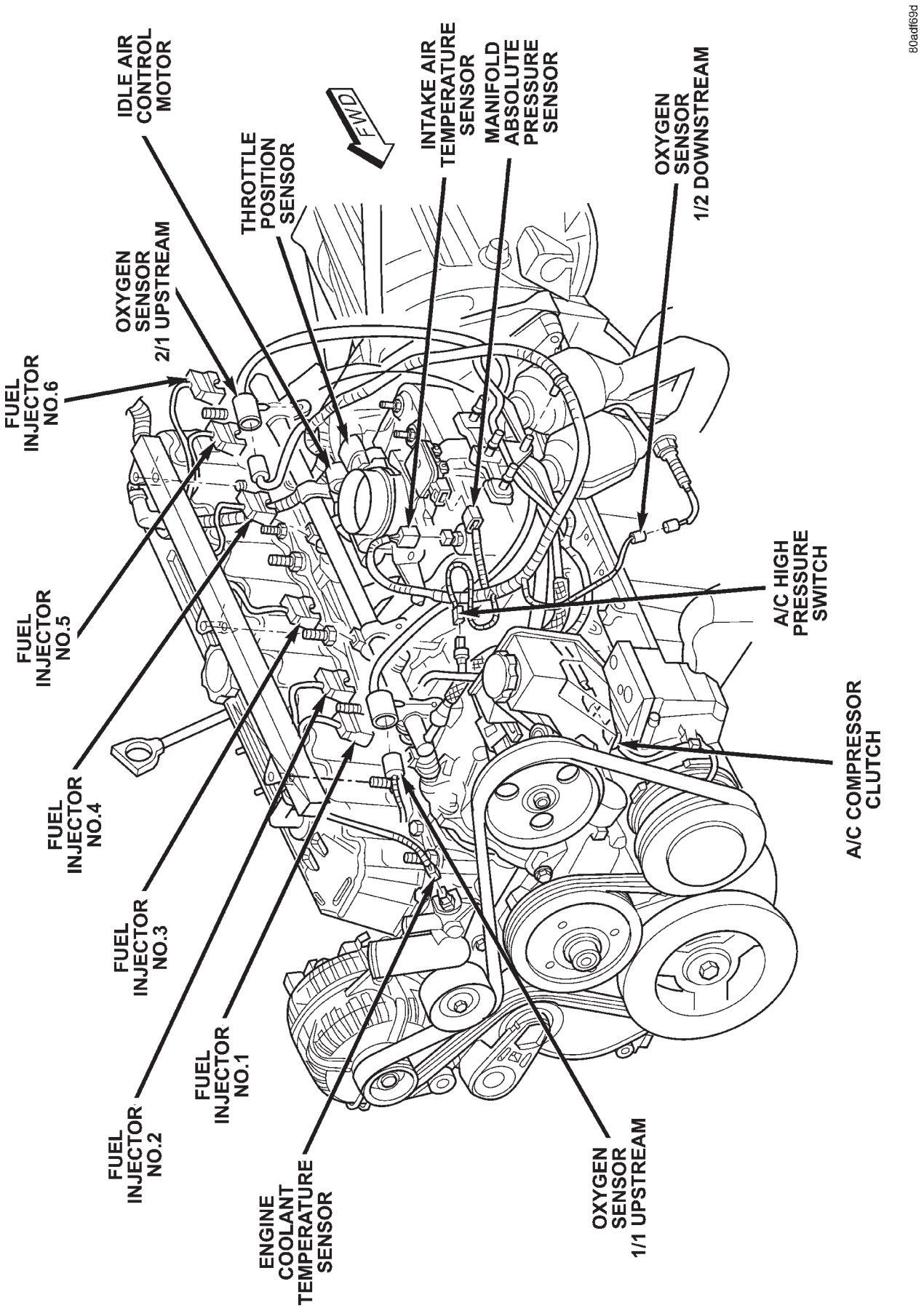


Fig. 17 4.0 LITER ENGINE LEFT SIDE

CONNECTOR/GROUND LOCATIONS (Continued)

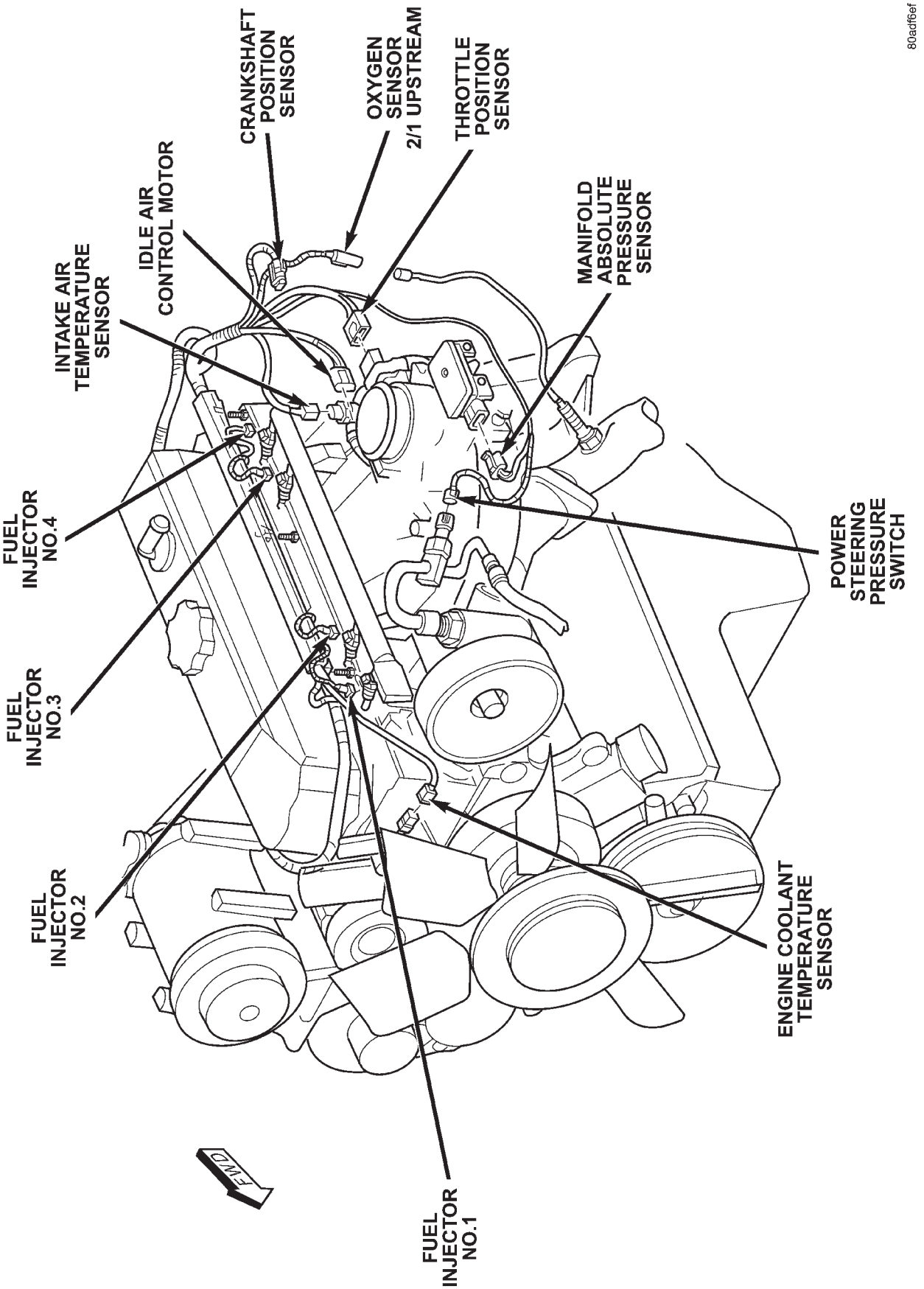


Fig. 18 2.5 LITER ENGINE LEFT SIDE

CONNECTOR/GROUND LOCATIONS (Continued)

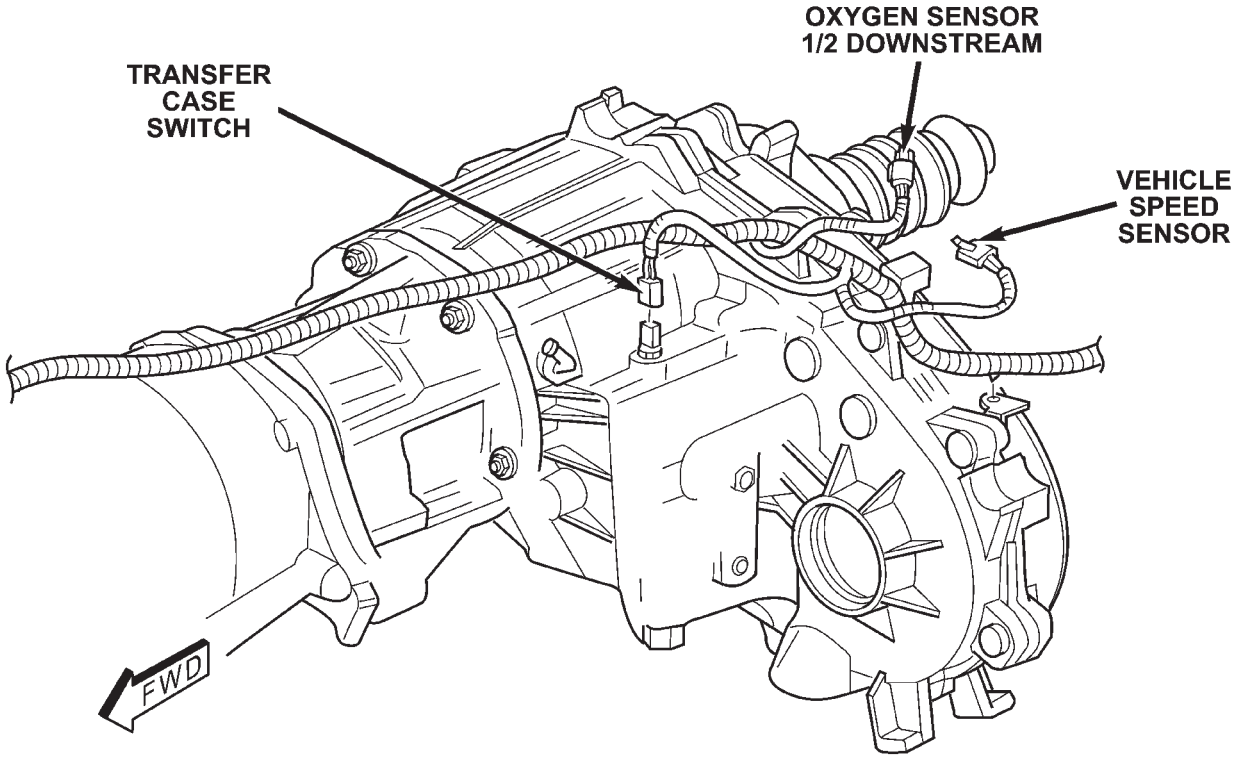


Fig. 19 TRANSFER CASE

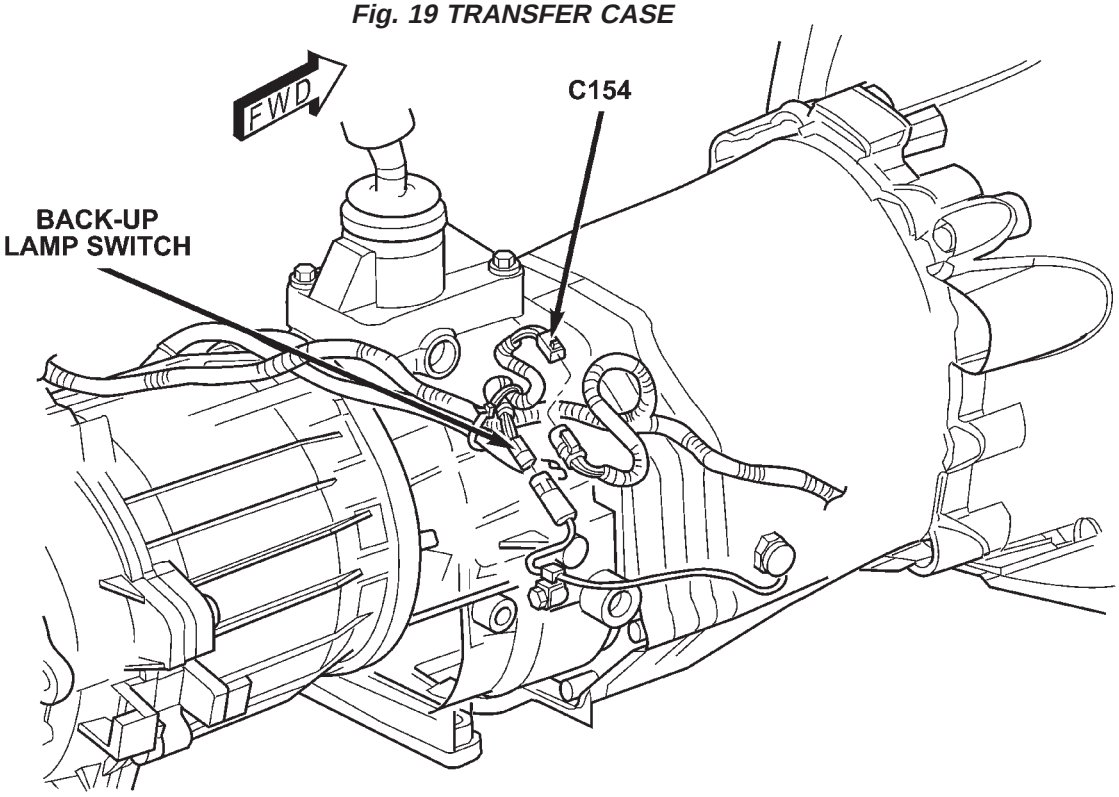


Fig. 20 MANUAL TRANSMISSION BUX

CONNECTOR/GROUND LOCATIONS (Continued)

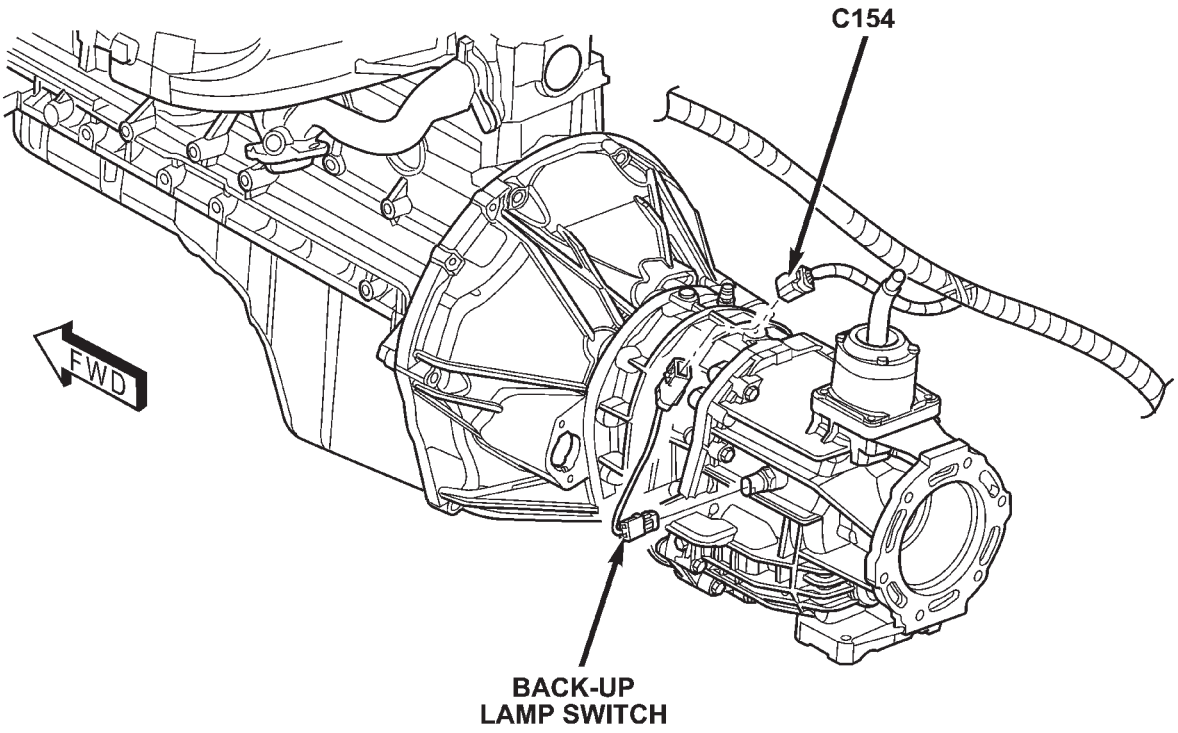


Fig. 21 MANUAL TRANSMISSION

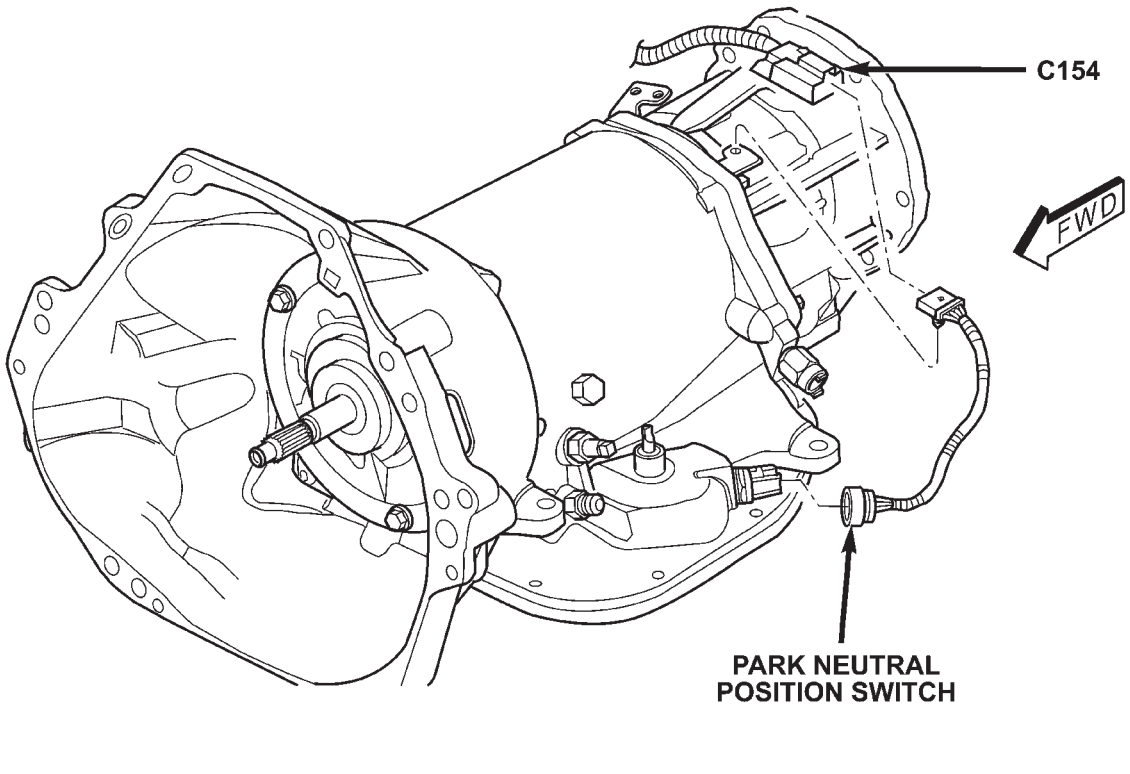


Fig. 22 AUTOMATIC TRANSMISSION BUX

CONNECTOR/GROUND LOCATIONS (Continued)

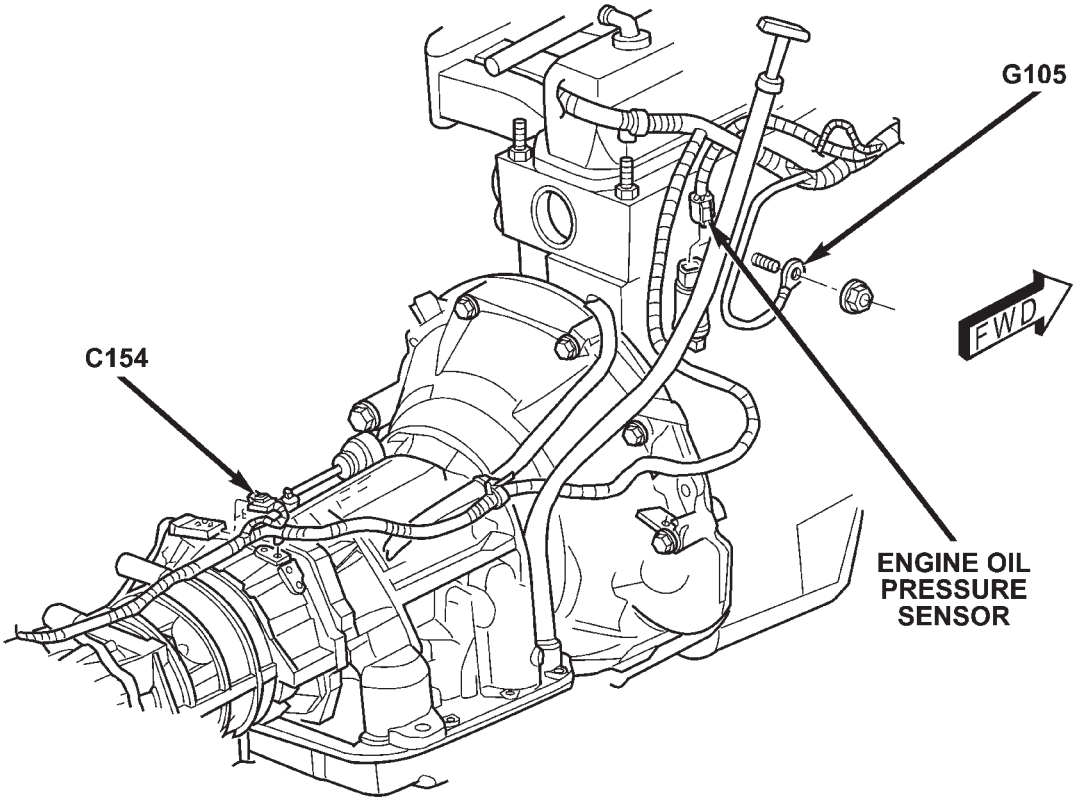


Fig. 23 4.0 LITER ENGINE AND TRANSMISSION RHD

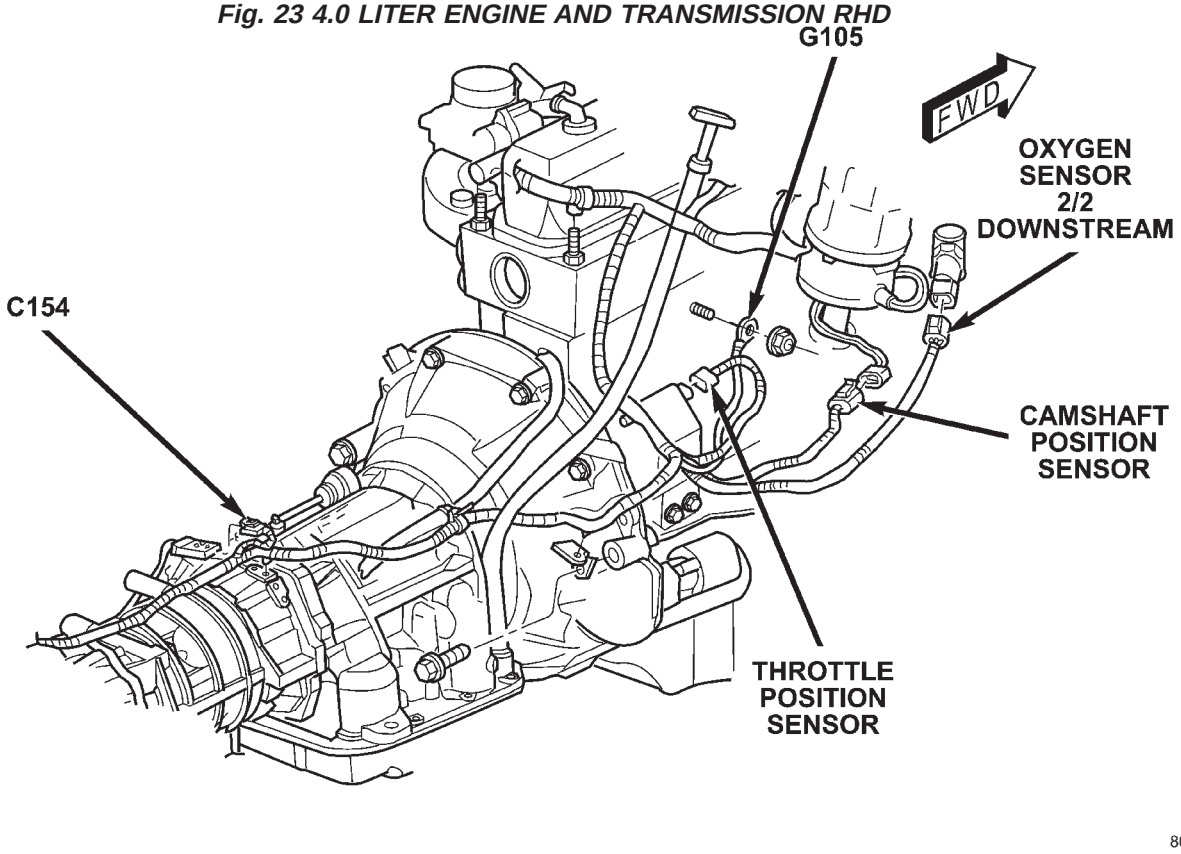


Fig. 24 2.5 LITER ENGINE AND TRANSMISSION

CONNECTOR/GROUND LOCATIONS (Continued)

80ae178e

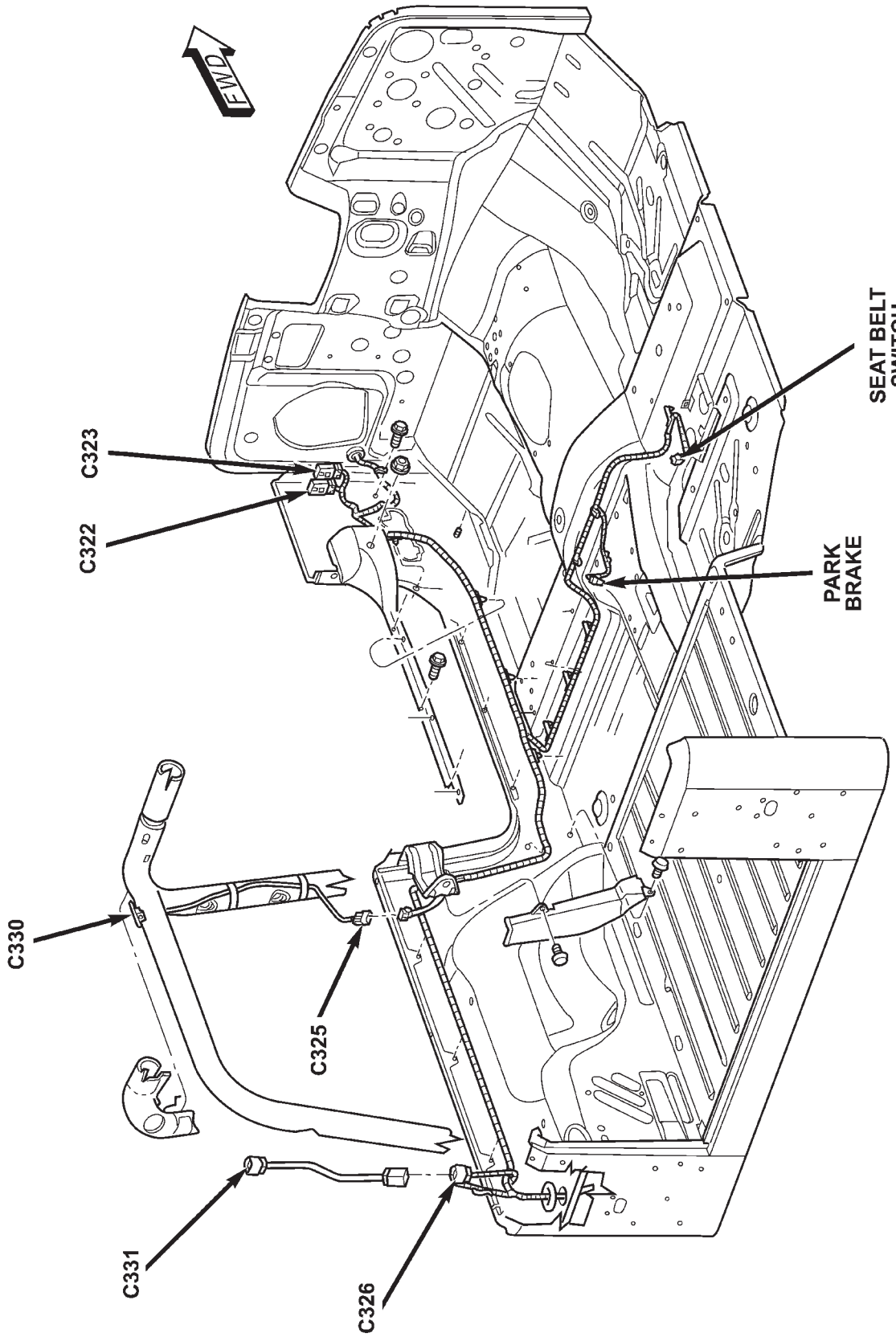


Fig. 25 BODY CONNECTORS

CONNECTOR/GROUND LOCATIONS (Continued)

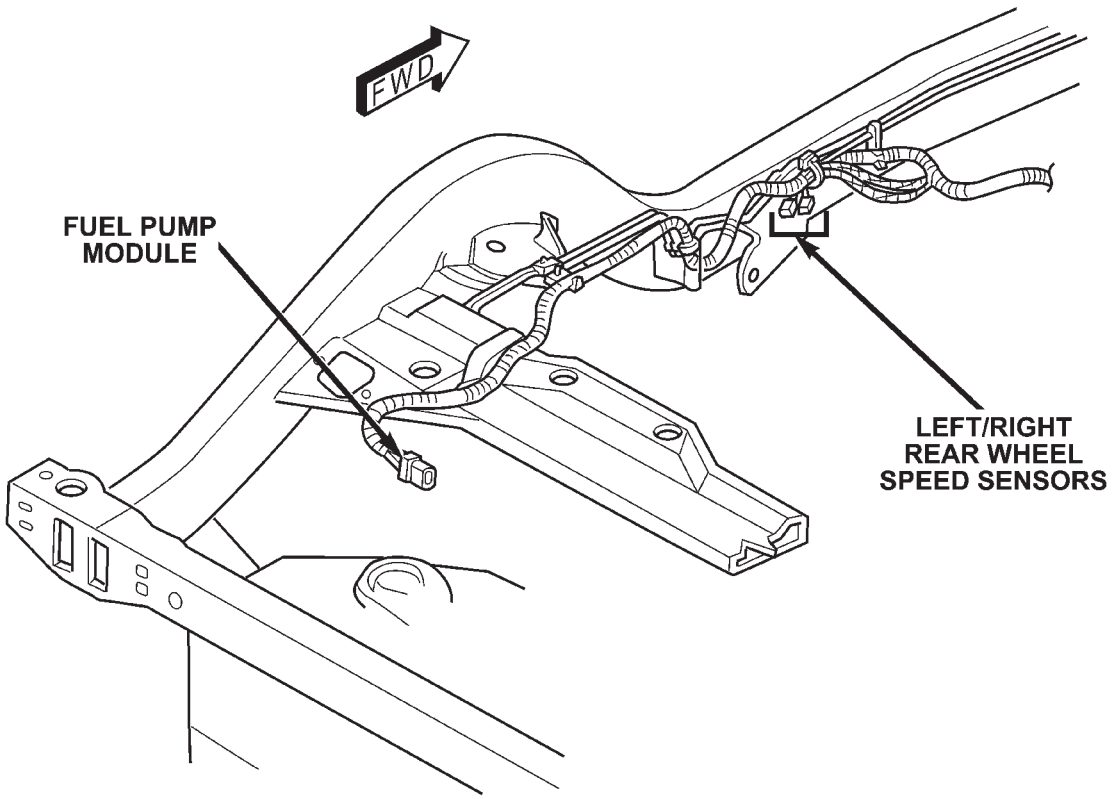


Fig. 26 FUEL PUMP

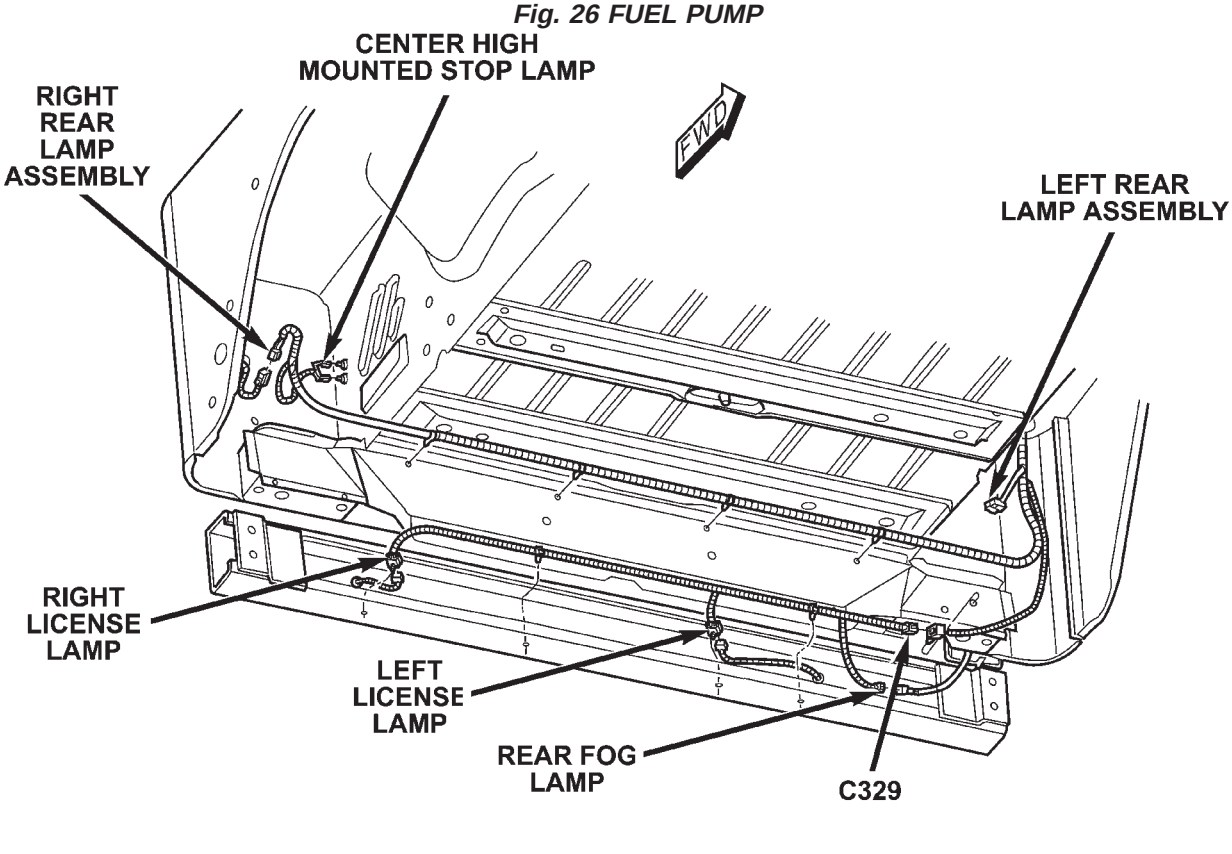


Fig. 27 REAR LAMPS BUX

8W-95 SPLICE LOCATIONS

TABLE OF CONTENTS

page

SPLICE LOCATIONS
DESCRIPTION 1

SPLICE LOCATIONS

DESCRIPTION

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. For splices that are not shown in the figures N/S appears in the Fig. column.

Splice Number	Location	Fig.
S101	Near T/O for Power Distribution Center	3, 4
S102	Near T/O for G100 or Daytime Running Lamp Module	3, 4
S103	Near T/O for G101	3, 4
S105	Near T/O for Daytime Running Lamp Module	N/S
S106	Near T/O for G100	3, 4
S108	Near T/O for Power Distribution Center	3, 4
S111	Near T/O for Battery Temperature Sensor or Power Distribution Center	3, 4
S113	Near T/O for G100	3, 4
S115 (Except Built-Up-Export)	Near T/O for Evap/Purge Solenoid	1
S116 (Except Built-Up-Export)	Near T/O for High Note Horn	1
S117	Near T/O for High Note Horn	1
S118	Near Left Headlamp T/O	1
S121	Near T/O for Powertrain Control Module - C2	6
S122	Near Grommet for Left Front Turn Signal Lamp	N/S
S123	Near T/O for G105	5, 9, 11
S124	Near T/O for G105	5, 11
S125 (Built-Up-Export)	Near Grommet for Right Front Turn Signal Lamp	1
S126	Near T/O for C104	5, 6, 11
S127	Near T/O for Idle Air Control Motor	7, 10
S128	Between Fuel Injector NO. 2 and Fuel Injector NO. 3	7, 10
S129	Near T/O for C104	5, 6, 11
S130	Near T/O for C104	5, 6, 11
S132	Near T/O for C154	8, 9, 11
S133	Near T/O for C154	8, 9, 11
S134	Near T/O for C154	6, 11
S135	Near T/O for Oxygen Sensor 1/2 Downstream	6, 11
S136	In Battery Harness Near PDC	N/S

SPLICE LOCATIONS (Continued)

Splice Number	Location	Fig.
S137	Near T/O for Throttle Position Sensor	7
S138	Middle of Radiator Closure Panel	2
S140	Near T/O for C104	N/S
S141	Near T/O for Left Front Turn Signal Lamp	N/S
S142	Near T/O for Right Front Turn Signal Lamp	1
S143	Near T/O for Left Front Park/Turn Signal Lamp	N/S
S144	Near T/O for Right Front Park/Turn Signal Lamp	1
S147	Between T/O's for Underhood Lamp and C103, C104	3, 4
S150	Right Headlamp T/O	2
S151	Left Headlamp T/O	2
S152	Near Left Headlamp T/O	N/S
S153	Near T/O for Camshaft Position Sensor	8
S155 (Day Time Running Lamps)	Near T/O for Day Time Running Lamp Module	3
S156	Near T/O for ABS Pump Motor	3
S202 (LHD)	Center of Instrument Panel	12
S202 (RHD)	Center Rear of Instrument Panel	13
S204	Center Rear of Instrument Panel	12, 13
S206	Center Rear of Instrument Panel	12, 13
S207	Near Cigar Lighter T/O	12, 13
S208	Near Blower Motor	N/S
S209	Near T/O for C202, C203, and C204	12, 13
S301 (LHD)	Center Rear of Dash Panel	14
S301 (RHD)	Near T/O for Sentry Key Immobilizer	15
S304 (LHD)	Center Rear of Dash Panel	14
S304 (RHD)	Near T/O for C202, C203, C204, C106, C107, and C108	15
S309	Front of Left Door Opening	16
S310	Left Rear Quarter Panel, Near Body Grommet	16
S311	Near Left Rear Lamp Assembly Connector	17
S313	Front of Left Rear Wheel Well	16
S314	Top of Left Rear Wheel Well	16
S315	Back of Right Rear Wheel Well	17
S316	In T/O for Rear Fog Lamp	17
S317	Near T/O for Left License Lamp	17
S320 (LHD)	Near T/O for 100 way Connector	14
S320 (RHD)	Near T/O for Fuse Block	15
S331 (LHD)	Near T/O for 100 way Connector	14
S331 (RHD)	Near T/O for Fuse Block	15
S332	Near T/O for Airbag Control Module	14
S333 (LHD)	Near T/O for 100 way Connector	14
S333 (RHD)	Near T/O for Airbag Control Module	15
S335 (Except Built-Up-Export)	Near Left Rear Lamp Assembly Connector	17

SPLICE LOCATIONS (Continued)

Splice Number	Location	Fig.
S336 (LHD)	Near T/O for Airbag Control Module	14
S336 (RHD)	Near T/O for 100 way Connector	15
S400	Near T/O for Rear Window Defogger Feed	N/S
S401	Near T/O for Rear Window Defogger Feed	N/S

SPLICE LOCATIONS (Continued)

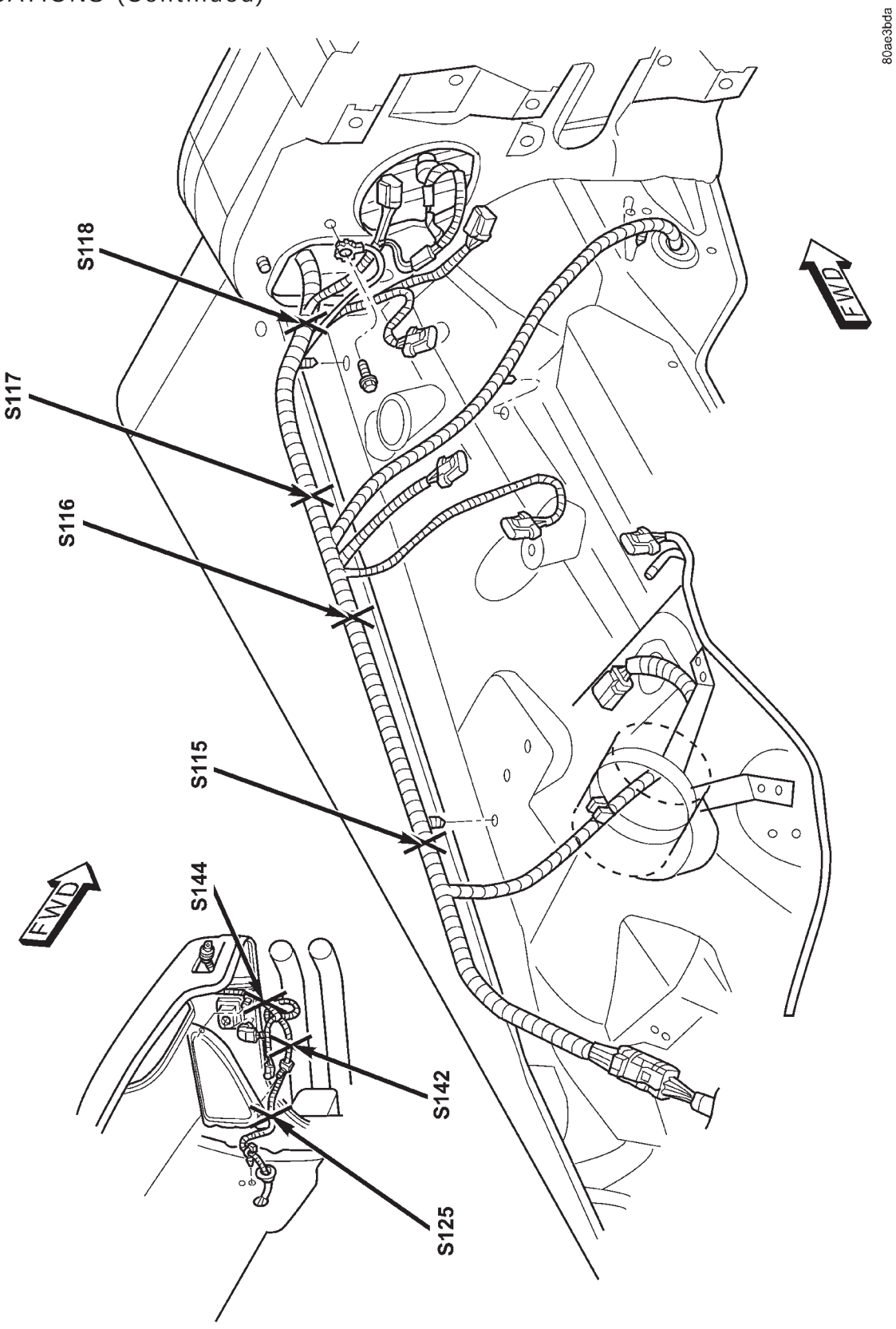


Fig. 1 HEADLAMP SPLICES

SPLICE LOCATIONS (Continued)

80ae3c88

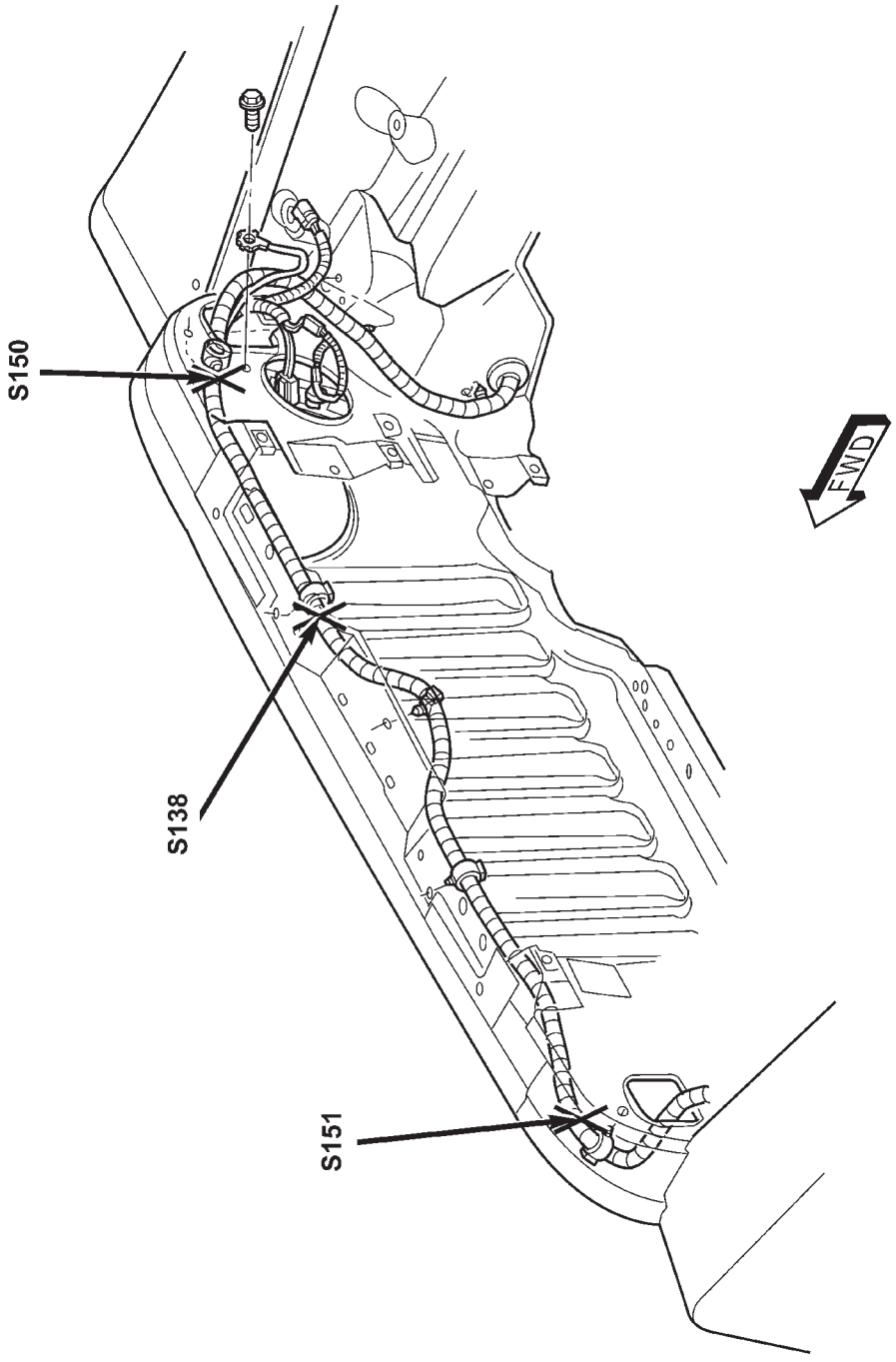


Fig. 2 RIGHT HEADLAMP SPLICES

SPLICE LOCATIONS (Continued)

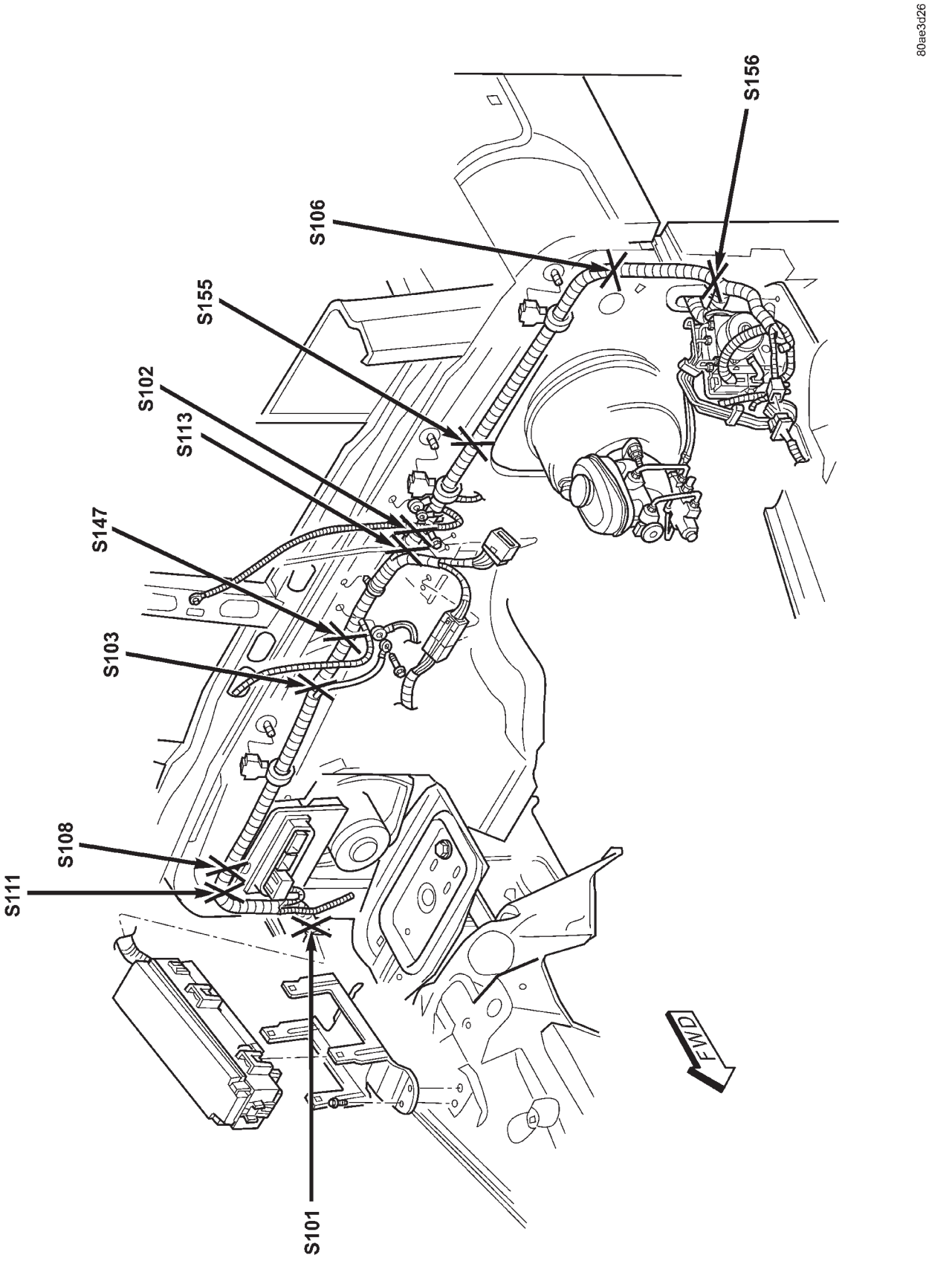


Fig. 3 REAR ENGINE COMPARTMENT LHD

SPLICE LOCATIONS (Continued)

80ae3dc0

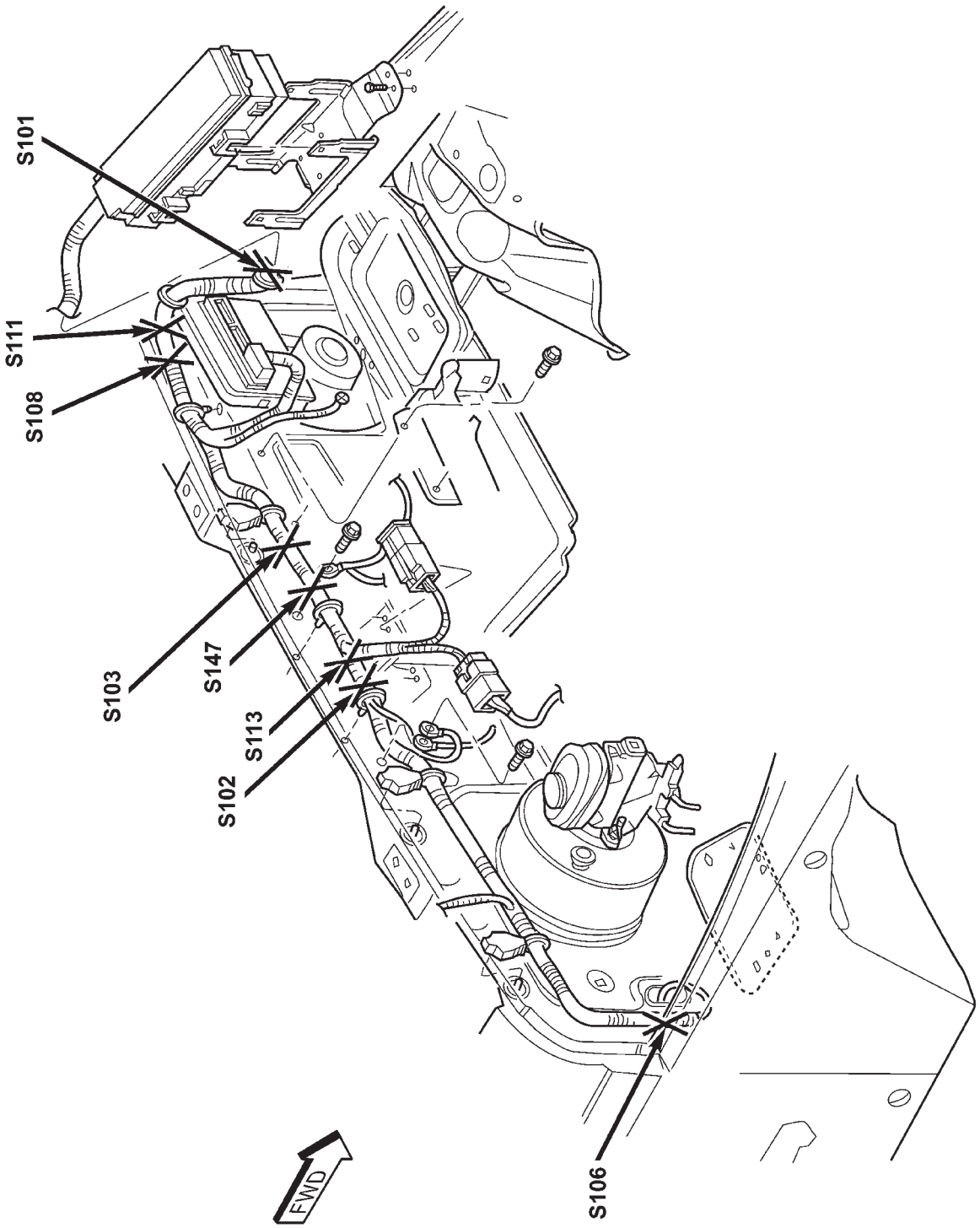


Fig. 4 REAR ENGINE COMPARTMENT RHD

SPLICE LOCATIONS (Continued)

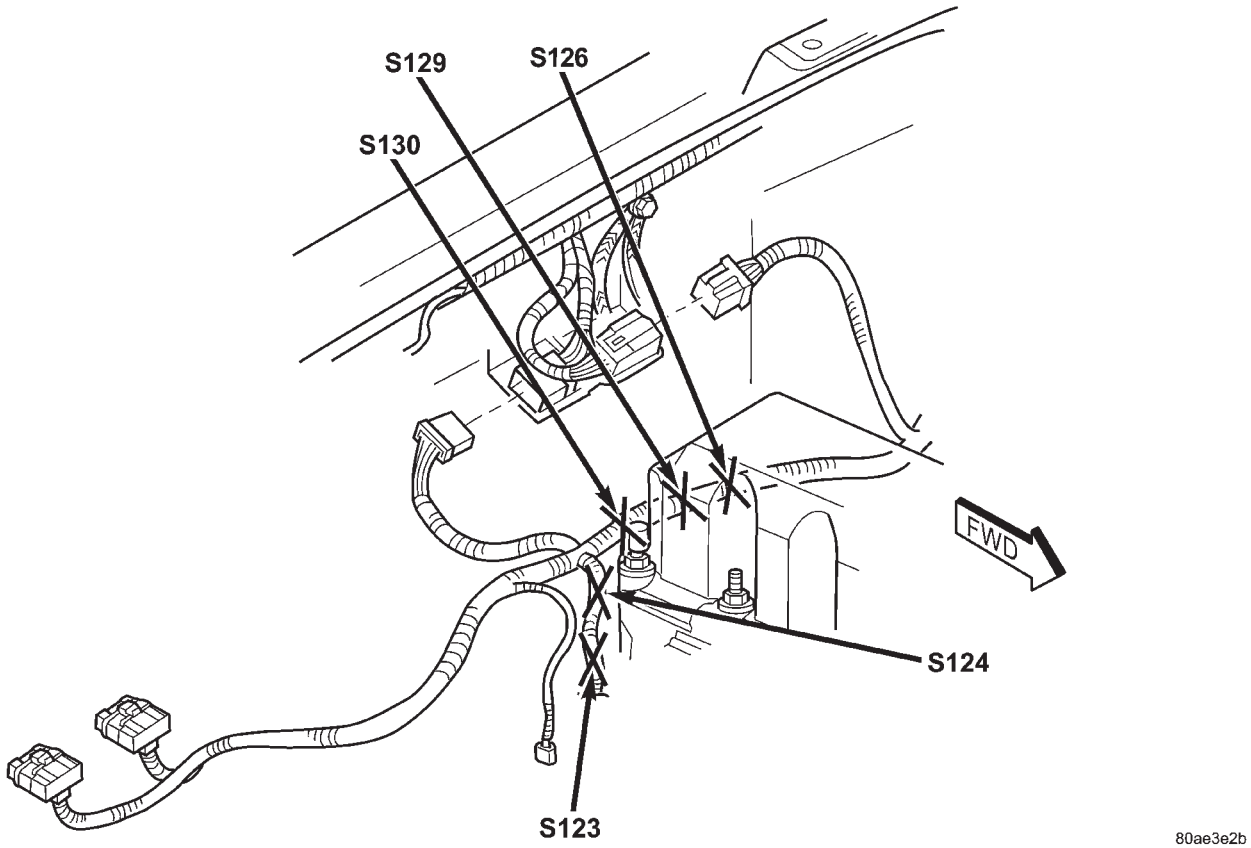


Fig. 5 2.5 LITER ENGINE REAR

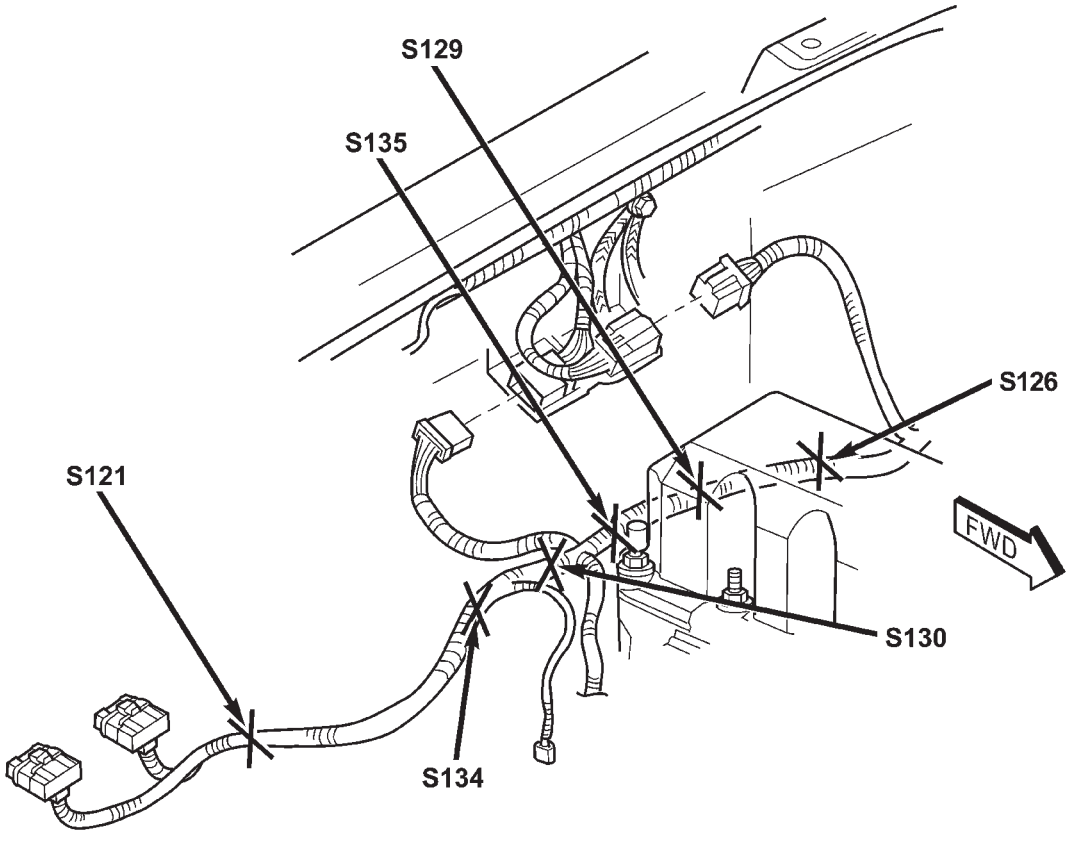


Fig. 6 4.0 LITER ENGINE REAR

SPLICE LOCATIONS (Continued)

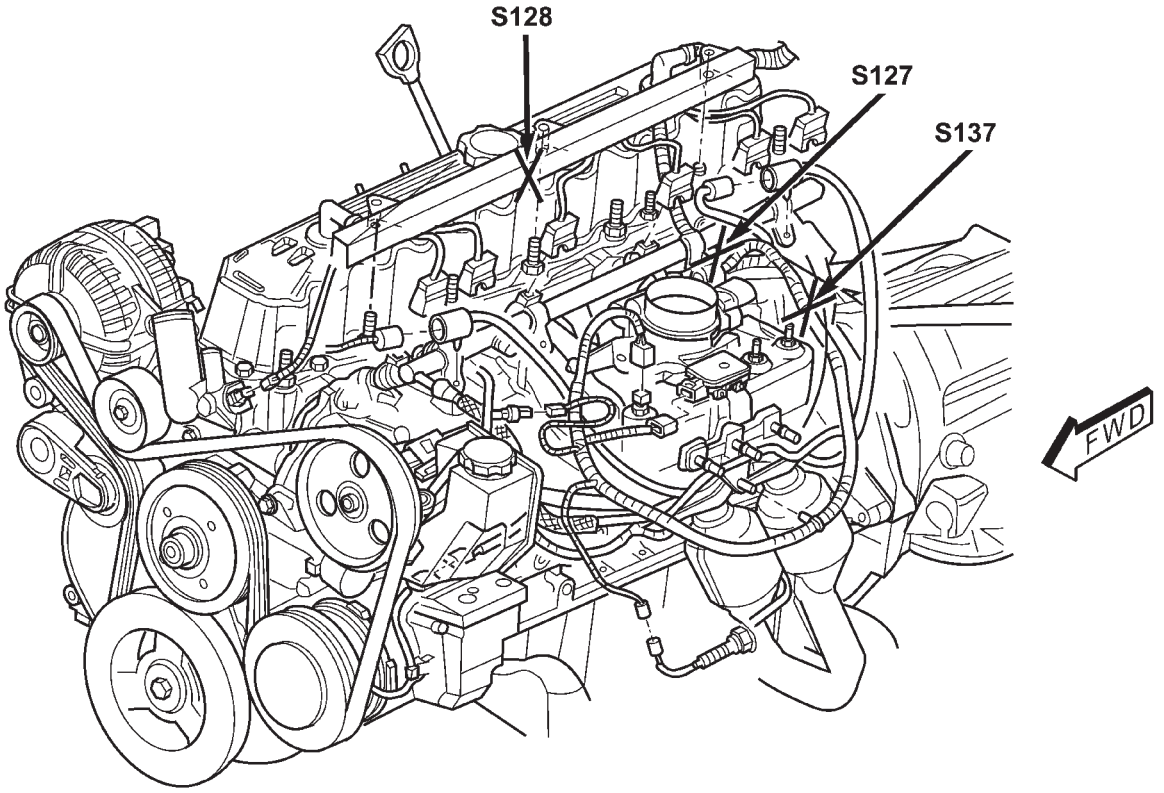


Fig. 7 4.0 LITER ENGINE

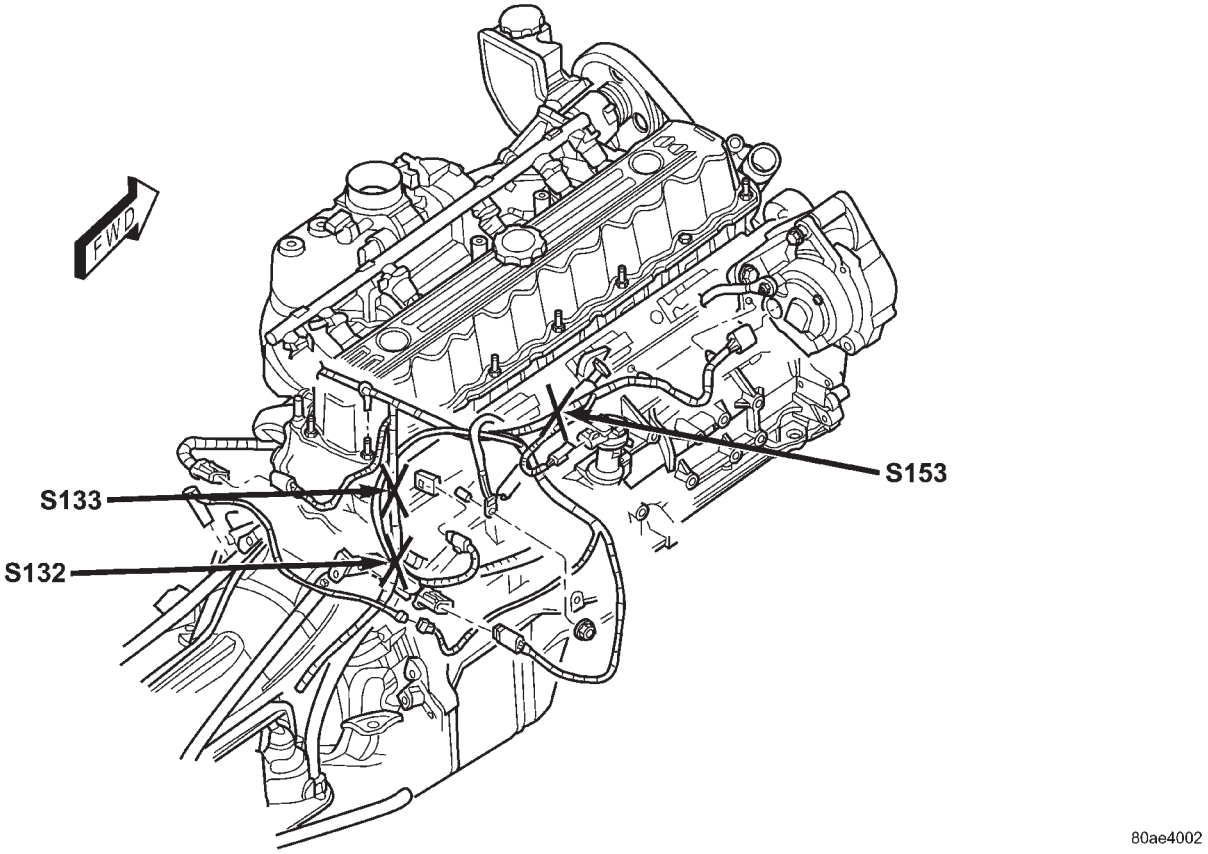


Fig. 8 4.0 LITER ENGINE RIGHT SIDE

SPLICE LOCATIONS (Continued)

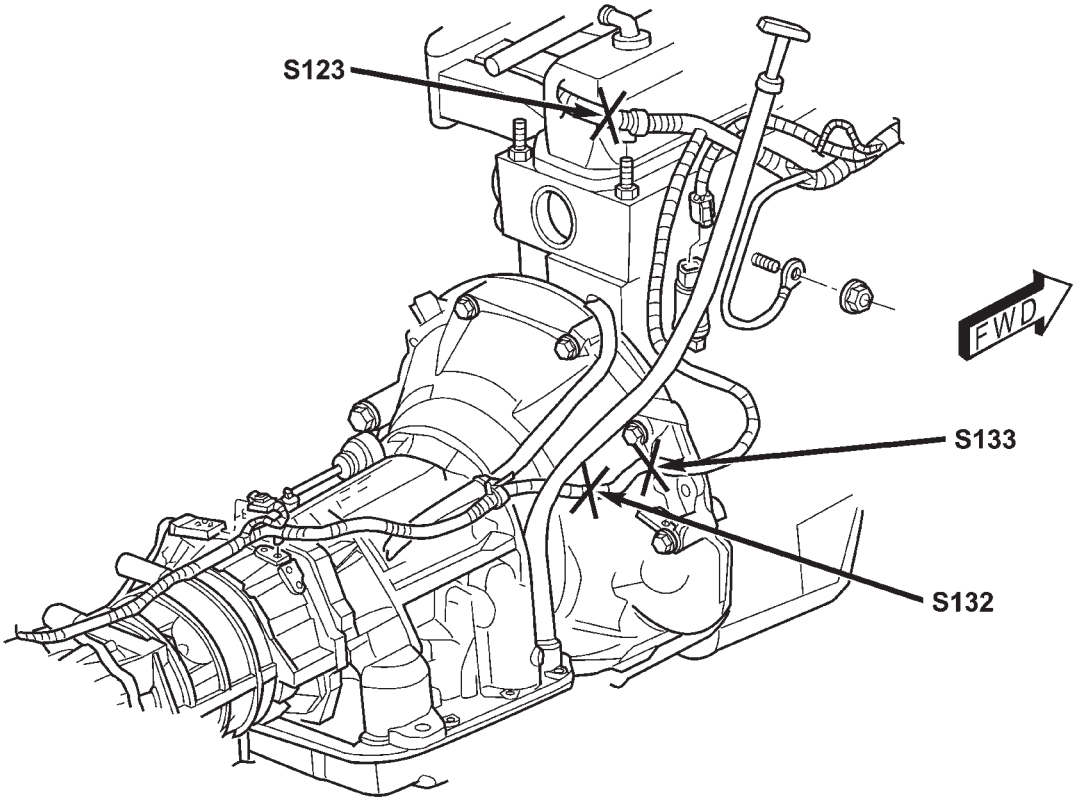


Fig. 9 4.0 LITER ENGINE AND TRANSMISSION

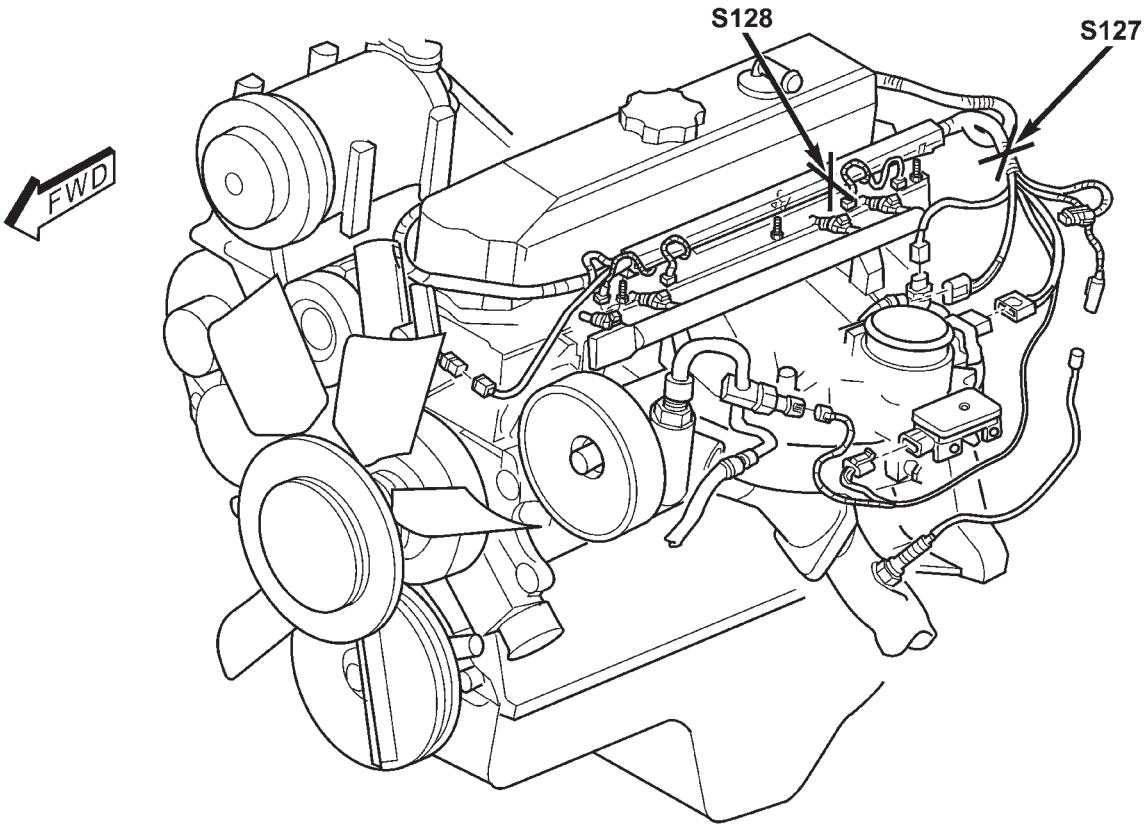


Fig. 10 2.5 LITER ENGINE

SPLICE LOCATIONS (Continued)

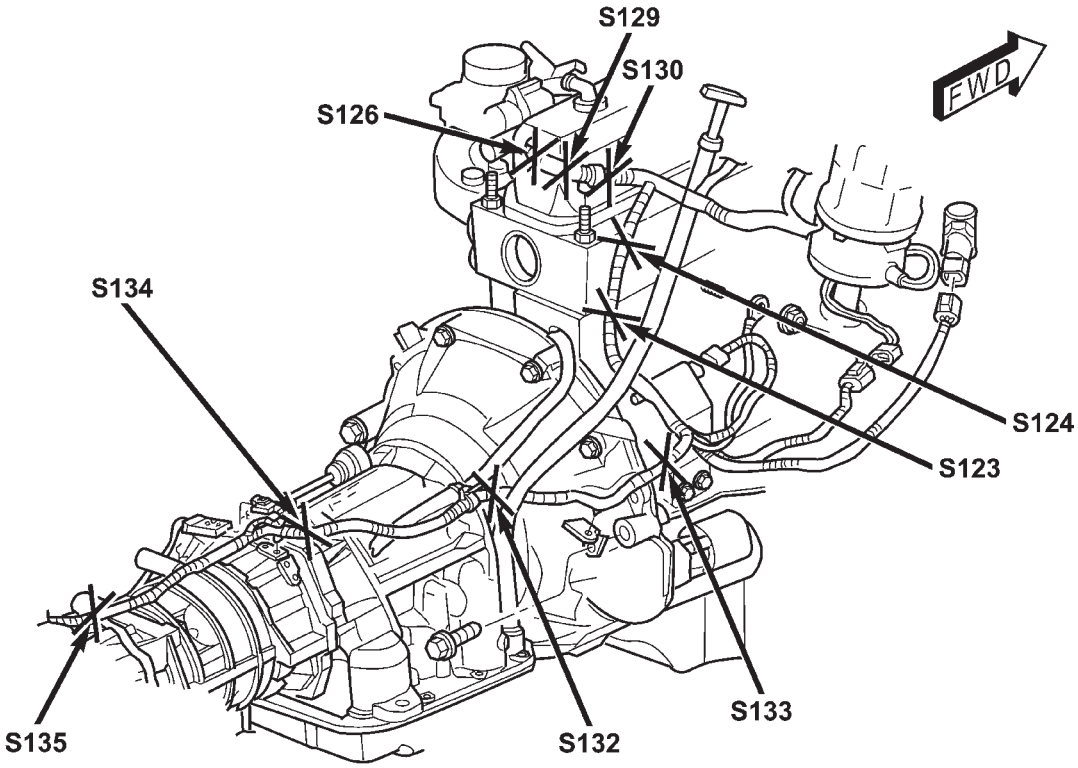


Fig. 11 2.5 LITER ENGINE AND TRANSMISSION

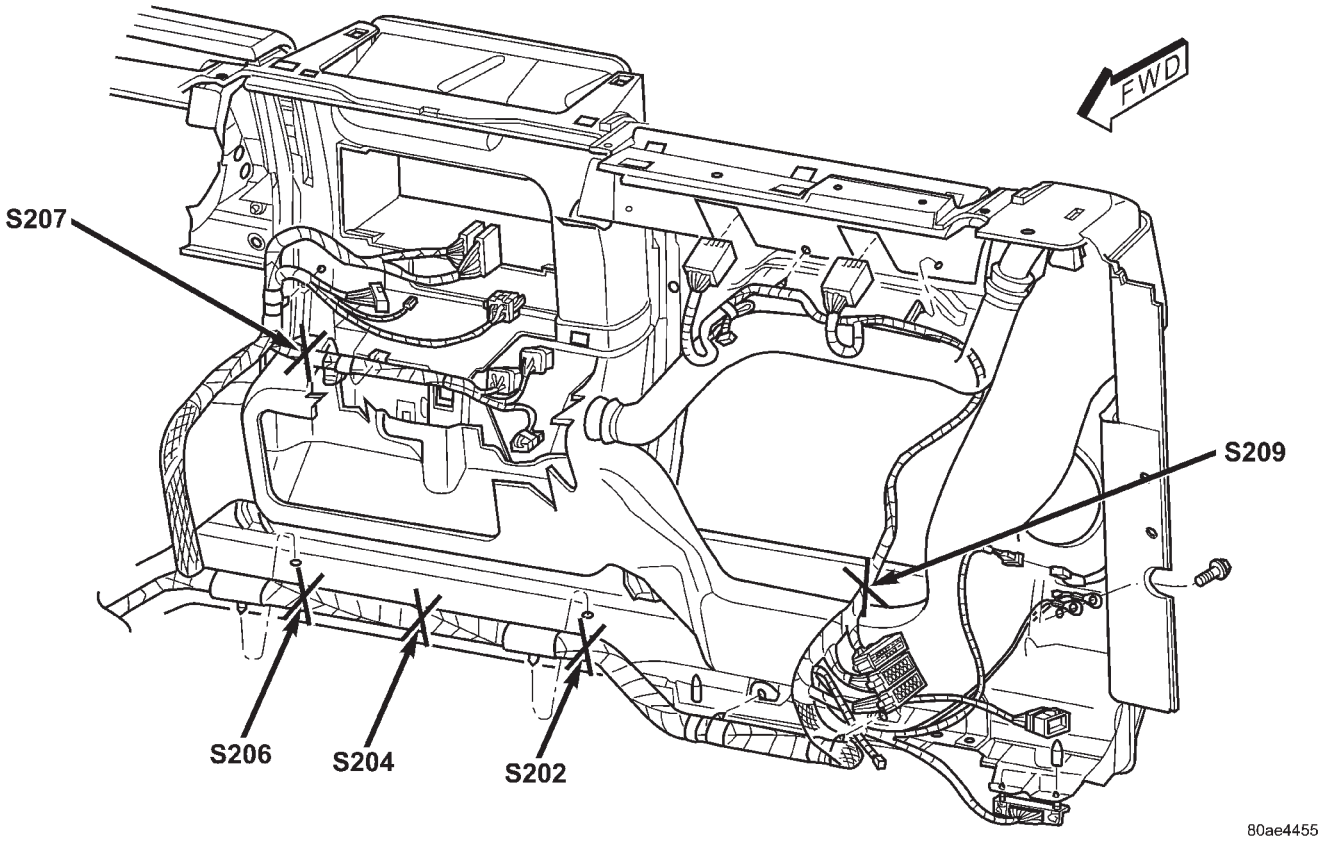


Fig. 12 INSTRUMENT PANEL LHD

SPLICE LOCATIONS (Continued)

80ae44a3

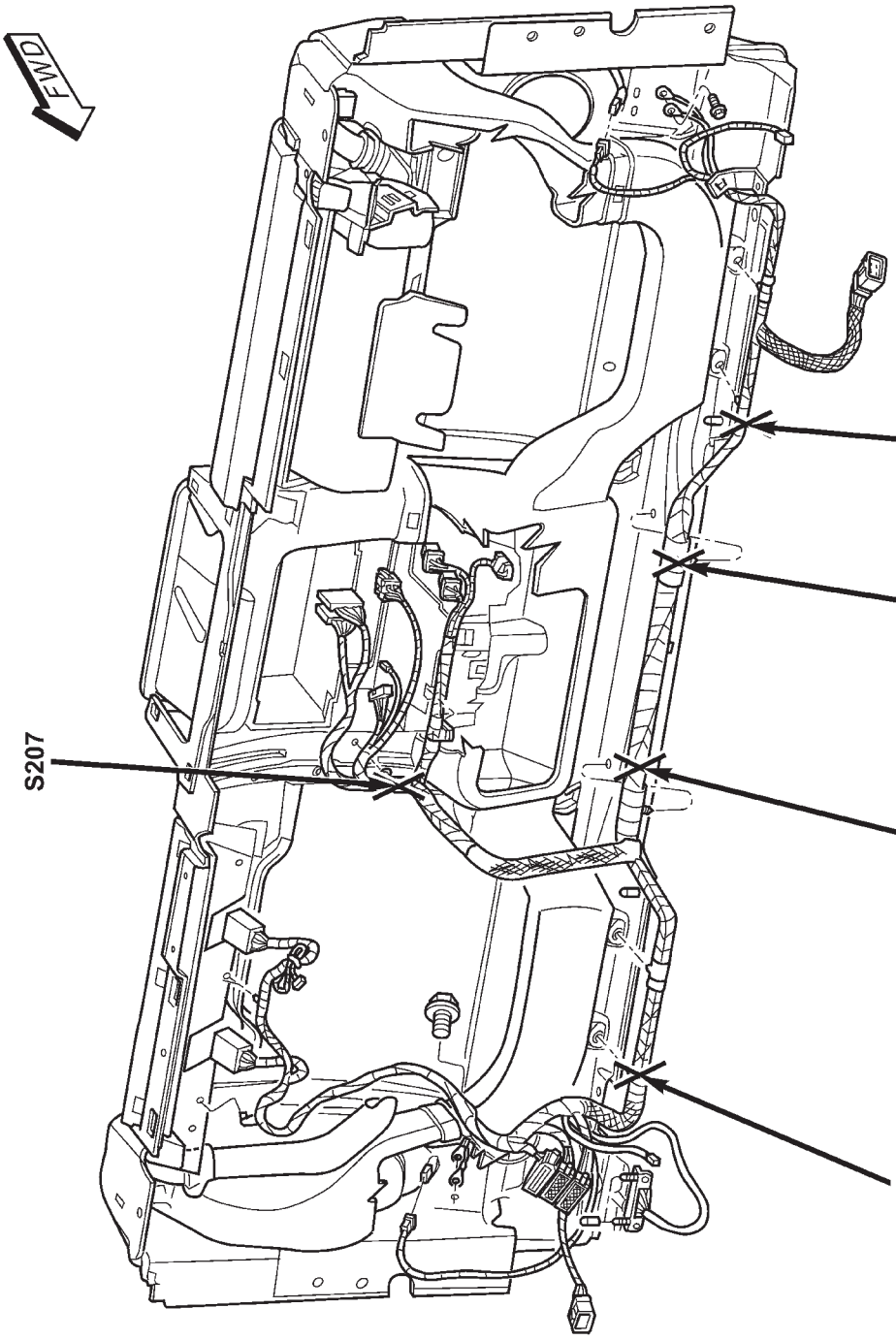


Fig. 13 INSTRUMENT PANEL RHD

SPLICE LOCATIONS (Continued)

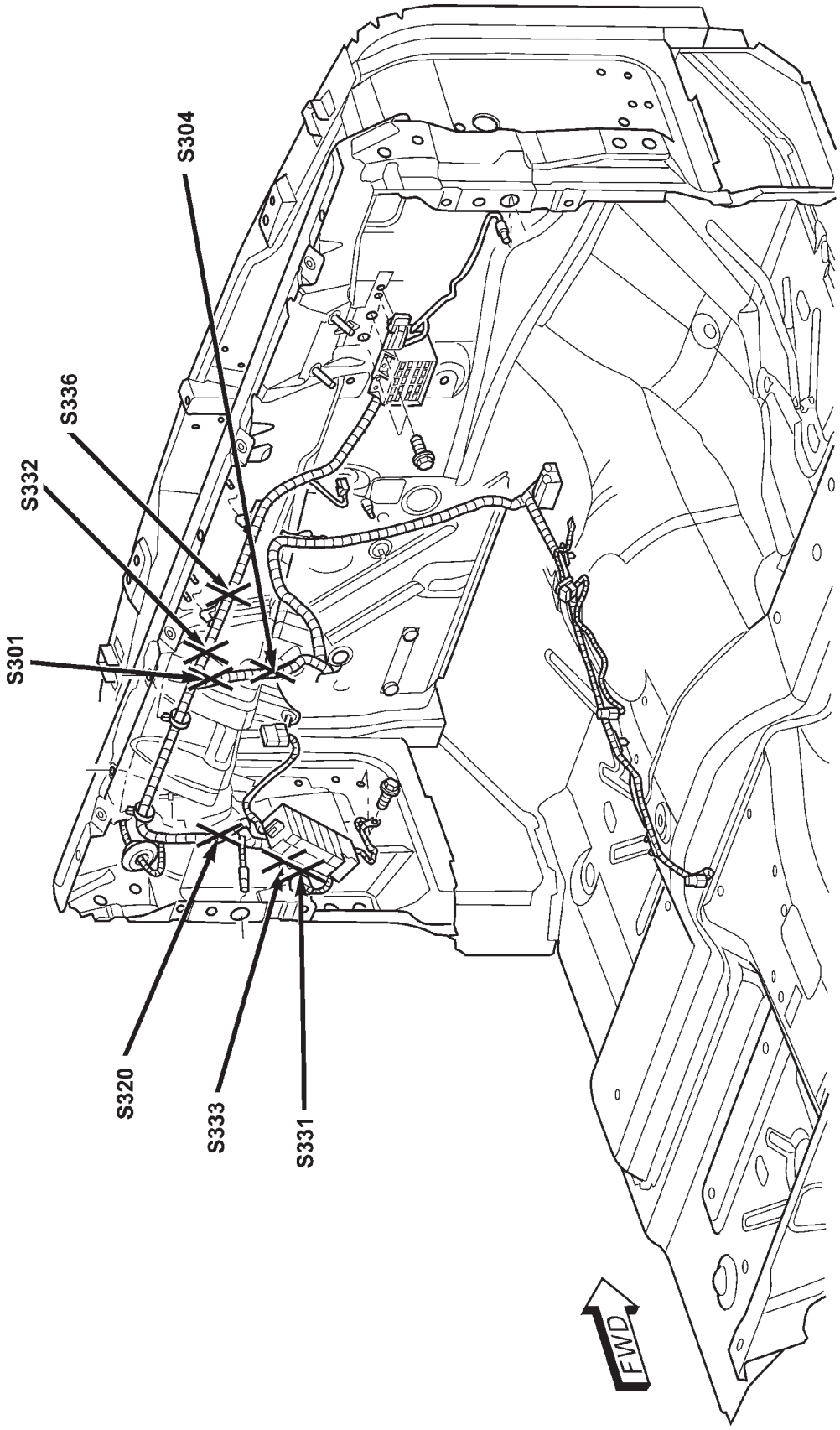


Fig. 14 DASH PANEL LHD

SPLICE LOCATIONS (Continued)

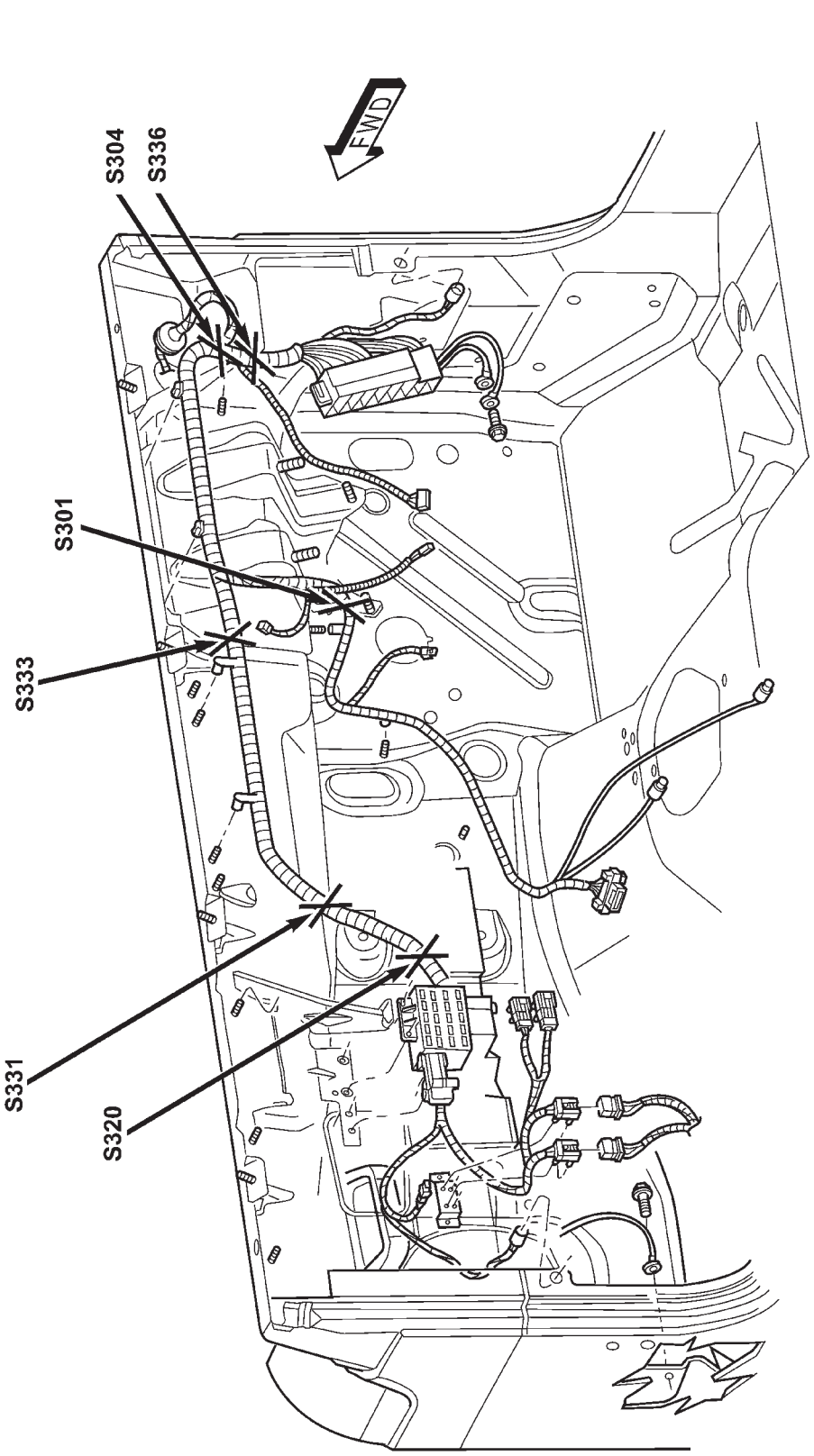


Fig. 15 DASH PANEL RHD

SPLICE LOCATIONS (Continued)

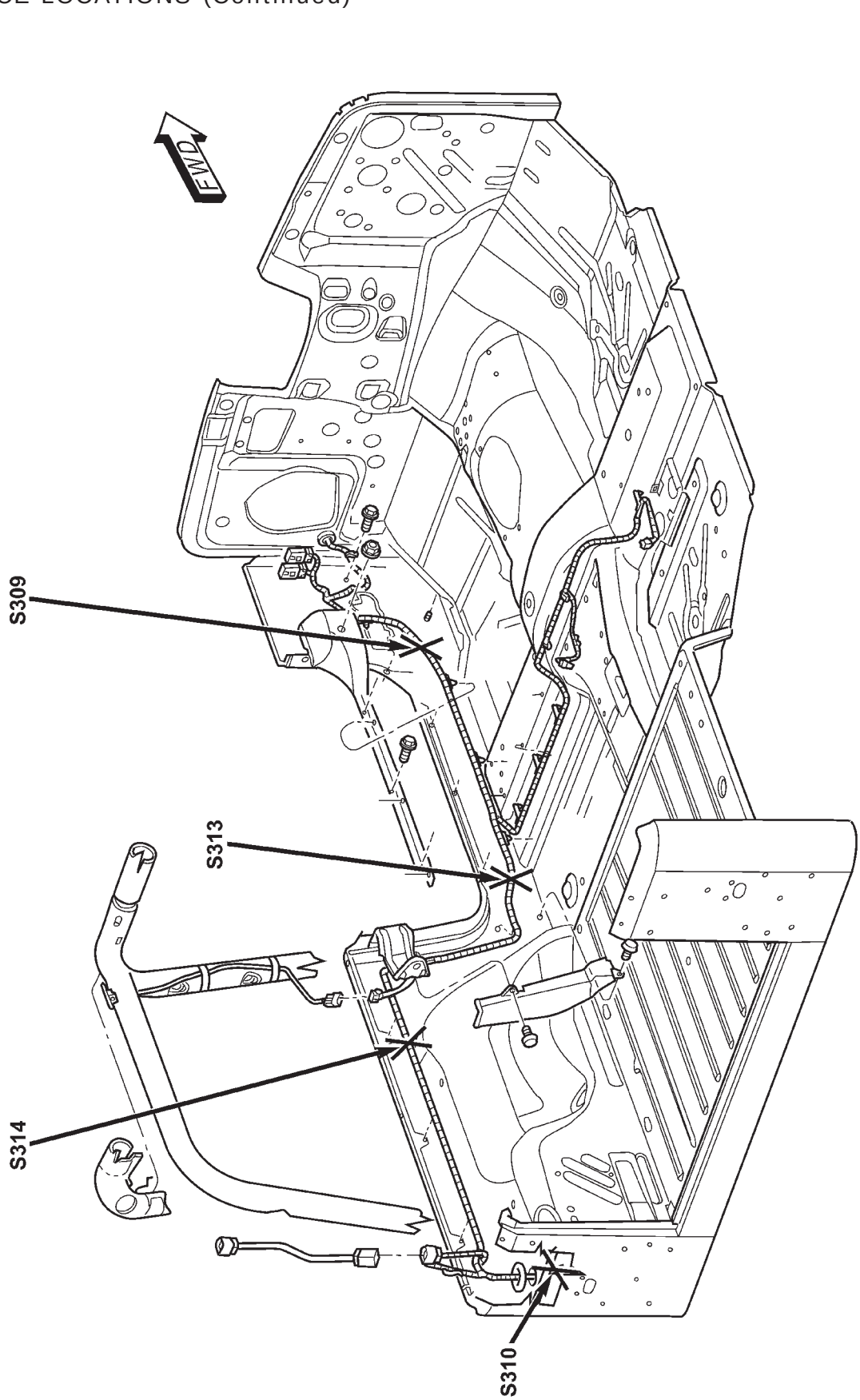


Fig. 16 BODY WIRING SPLICES

SPLICE LOCATIONS (Continued)

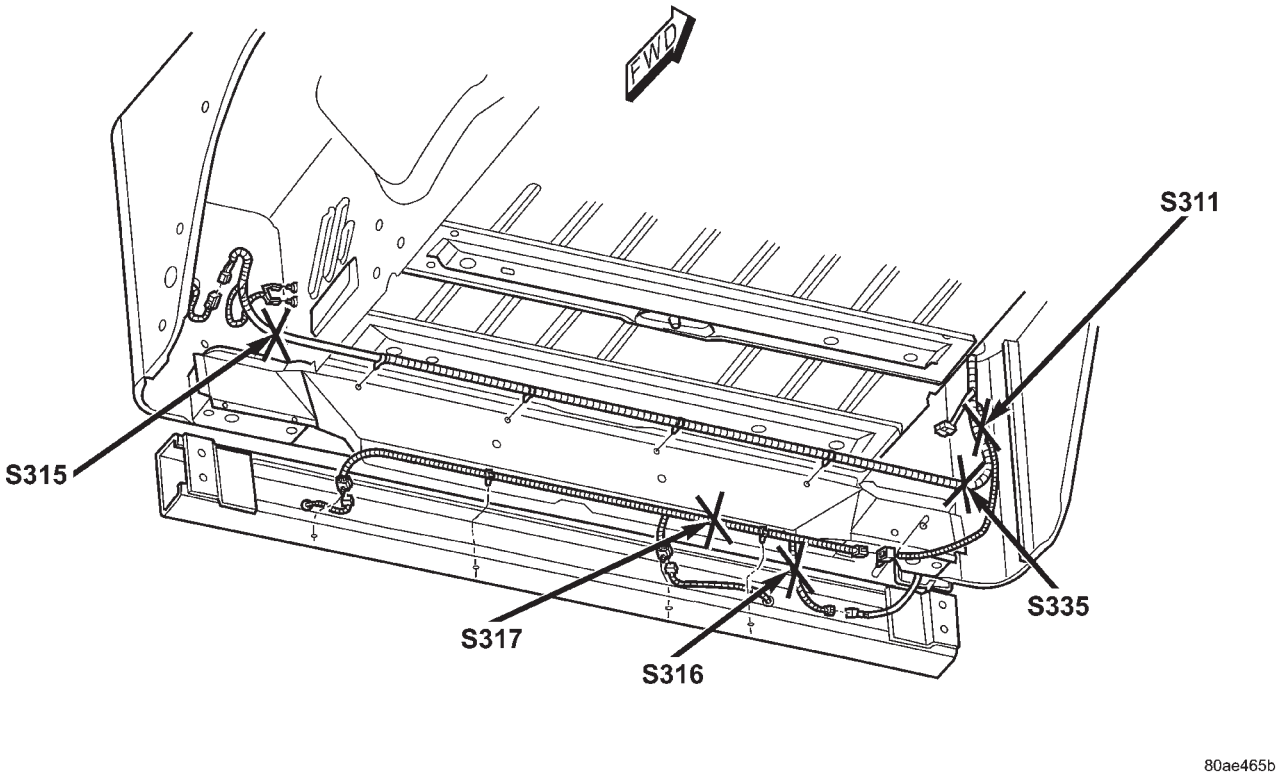


Fig. 17 REAR LAMPS

FUEL SYSTEM

TABLE OF CONTENTS

page

FUEL DELIVERY 1
FUEL INJECTION 3

FUEL DELIVERY

TABLE OF CONTENTS

page

FUEL DELIVERY
SPECIFICATIONS 1
ROLLOVER VALVE
DESCRIPTION 2
OPERATION 2

FUEL DELIVERY

SPECIFICATIONS

TORQUE - FUEL DELIVERY

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Accelerator Pedal Bracket Mounting Nuts	8.5	-	75
Fuel Hose Clamps	3	-	25
Fuel Rail Mounting Bolts or Nuts	11	-	100
Fuel Tank Mounting Strap Bolts	Refer to service manual text.	-	-
Fuel Pump Module Locknut	74	55	-
Fuel Tank Skidplate Bolts	16	-	141

ROLLOVER VALVE

DESCRIPTION

The fuel tank is equipped with 2 rollover valves. The valves are located on the top of the fuel tank (Fig. 1) .

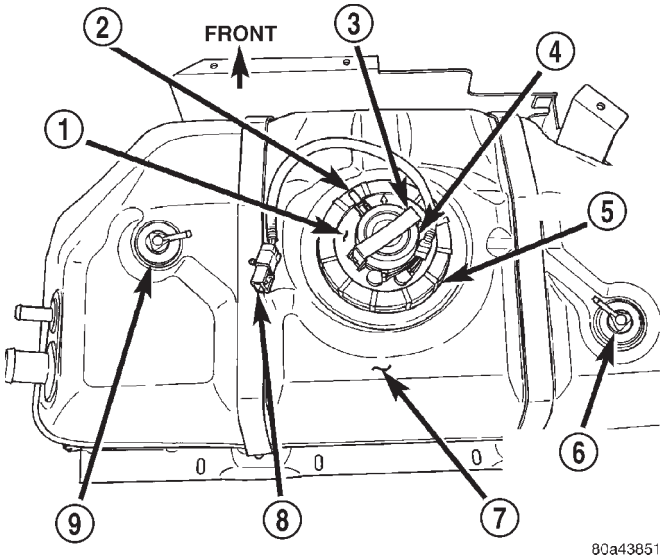


Fig. 1 Rollover Valve Location

1 - FUEL PUMP MODULE
2 - FUEL SUPPLY TUBE
3 - RETAINER CLAMP
4 - FUEL FILTER/FUEL PRESSURE REGULATOR
5 - LOCKNUT
6 - ROLLOVER VALVE
7 - TOP OF FUEL TANK
8 - ELECTRICAL CONNECTOR
9 - ROLLOVER VALVE

OPERATION

The rollover valves will prevent fuel flow through the fuel tank vent (EVAP) hoses in the event of an accidental vehicle rollover. The EVAP canister draws fuel vapors from the fuel tank through these valves.

The valves are not serviceable. If replacement is necessary, the fuel tank must be replaced.

FUEL INJECTION

TABLE OF CONTENTS

page

FUEL INJECTION
SPECIFICATIONS 3
CRANKSHAFT POSITION SENSOR
REMOVAL 4
INSTALLATION. 4
FUEL INJECTOR
DESCRIPTION 5
OPERATION 5

page

O2 HEATER RELAY
DESCRIPTION 6
OPERATION 6
REMOVAL 6
INSTALLATION. 6
O2 SENSOR
DESCRIPTION 6
OPERATION 6

FUEL INJECTION

SPECIFICATIONS

TORQUE - FUEL INJECTION

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Accelerator Pedal Bracket Mounting Nuts	8.5	-	75
Engine Coolant Temperature Sensor	11	-	96
IAC Motor-To-Throttle Body Bolts	7	-	60
Intake Manifold Air Temp. Sensor	28	20	-
MAP Sensor Mounting Screws	3	-	25
Oxygen Sensor	30	22	-
PCM Mounting Screws	4	-	35
Power Steering Pressure Switch	14-22	-	124-195
Throttle Body Mounting Bolts	11	-	100
Throttle Position Sensor Mounting Screws	7	-	60
Vehicle Speed Sensor Mounting Bolt	2.2	-	20

CRANKSHAFT POSITION SENSOR

REMOVAL

The crankshaft position (CKP) sensor is mounted to the transmission bellhousing at the left/rear side of the engine block.

The sensor may be mounted to the transmission with one of the following three different configurations:

- with one bolt (Fig. 1). If sensor is equipped with one mounting bolt, **it is adjustable.**.
- with two nuts (Fig. 2).
- with two bolts (Fig. 3).

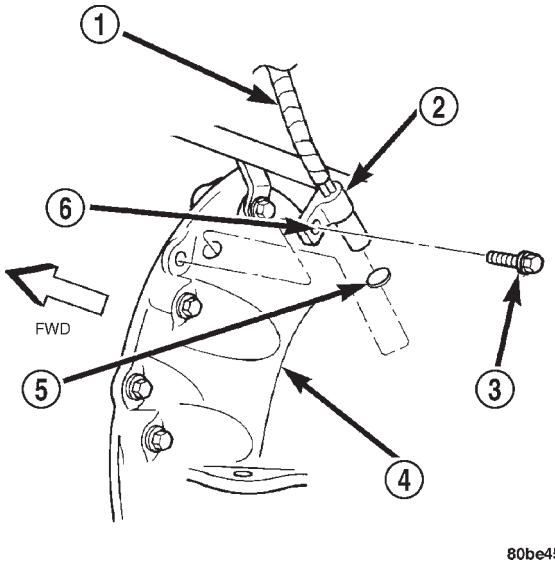


Fig. 1 Crankshaft Position Sensor—One-Bolt Mounting

1 - SENSOR PIGTAIL
2 - CRANKSHAFT POSITION SENSOR
3 - MOUNTING BOLT
4 - TRANSMISSION HOUSING
5 - PAPER SPACER
6 - SLOTTED HOLE

(1) Near right-rear side of engine, disconnect sensor 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

Sensor With 2–Bolt Mounting:

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

(2) Install and tighten two sensor mounting bolts to 12 N·m (9 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.

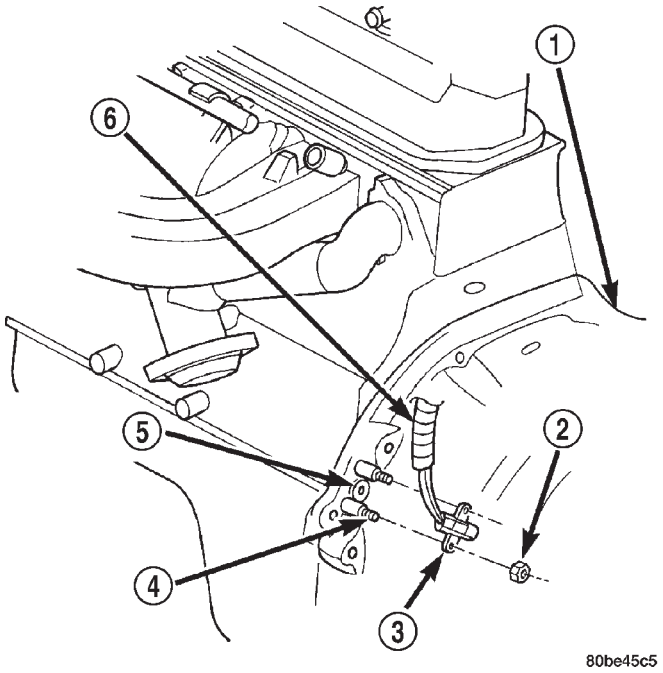


Fig. 2 Crankshaft Position Sensor—Two-Nut Mounting

1 - TRANSMISSION BELLHOUSING
2 - MOUNTING NUTS (2)
3 - CRANKSHAFT POSITION SENSOR
4 - MOUNTING STUDS (2)
5 - RUBBER GROMMET
6 - SENSOR PIGTAIL

Sensor With 2–Nut Mounting:

(3) Install and tighten two sensor mounting nuts to 12 N·m (9 ft. lbs.) torque.

Sensor With One-Bolt Mounting:

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.

CRANKSHAFT POSITION SENSOR (Continued)

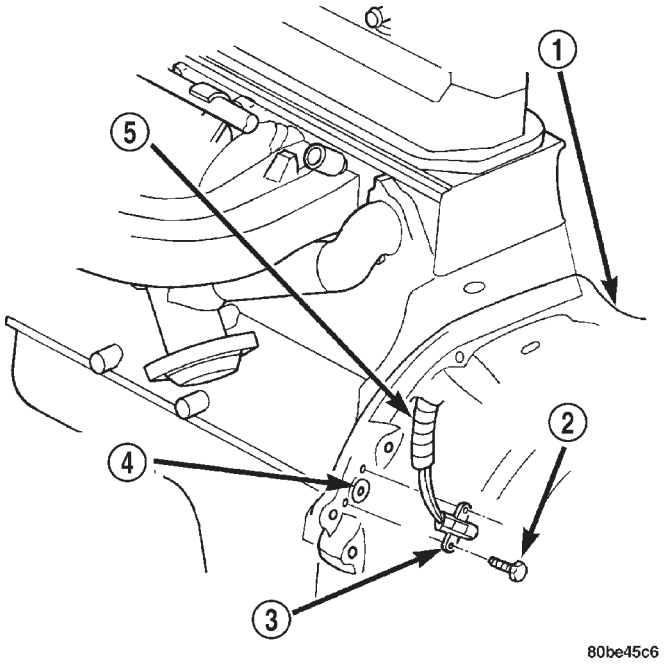


Fig. 3 Crankshaft Position Sensor—Two-Bolt Mounting

1 - TRANSMISSION BELLHOUSING
2 - MOUNTING BOLTS (2)
3 - CRANKSHAFT POSITION SENSOR
4 - RUBBER GROMMET
5 - SENSOR PIGTAIL

FUEL INJECTOR

DESCRIPTION

An individual fuel injector (Fig. 4) is used for each individual cylinder.

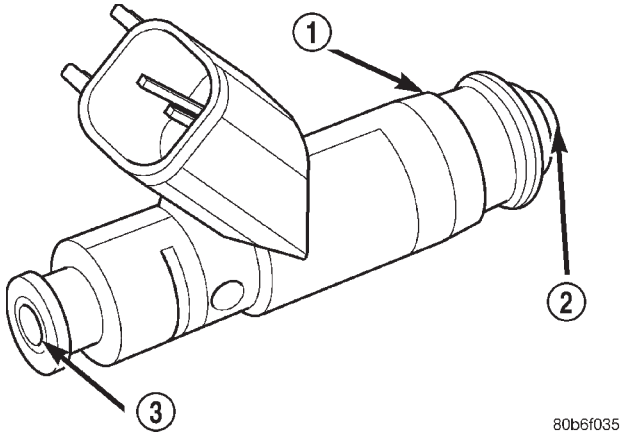


Fig. 4 Fuel Injector—Typical

1 - FUEL INJECTOR
2 - NOZZLE
3 - TOP (FUEL ENTRY)

OPERATION - PCM OUTPUT

The nozzle ends of the injectors are positioned into openings in the intake manifold just above the intake valve ports of the cylinder head. The engine wiring harness connector for each fuel injector is equipped with an attached numerical tag (INJ 1, INJ 2 etc.). This is used to identify each fuel injector with its respective cylinder number.

The injectors are energized individually in a sequential order by the Powertrain Control Module (PCM). The PCM will adjust injector pulse width by switching the ground path to each individual injector on and off. Injector pulse width is the period of time that the injector is energized. The PCM will adjust injector pulse width based on various inputs it receives.

Battery voltage (12 volts +) is supplied to the injectors through the ASD relay. The ASD relay will shutdown the 12 volt power source to the fuel injectors if the PCM senses the ignition is on, but the engine is not running. This occurs after the engine has not been running for approximately 1.8 seconds.

The PCM determines injector on-time (pulse width) based on various inputs.

OPERATION - FUEL INJECTOR

The top (fuel entry) end of the injector (Fig. 4) is attached into an opening on the fuel rail.

The fuel injectors are electrical solenoids. The injector contains a pintle that closes off an orifice at the nozzle end. When electric current is supplied to the injector, the armature and needle move a short distance against a spring, allowing fuel to flow out the orifice. Because the fuel is under high pressure, a fine spray is developed in the shape of a pencil stream. The spraying action atomizes the fuel, adding it to the air entering the combustion chamber.

The nozzle (outlet) ends of the injectors are positioned into openings in the intake manifold just above the intake valve ports of the cylinder head. The engine wiring harness connector for each fuel injector is equipped with an attached numerical tag (INJ 1, INJ 2 etc.). This is used to identify each fuel injector.

The injectors are energized individually in a sequential order by the powertrain control module (PCM). The PCM will adjust injector pulse width by switching the ground path to each individual injector on and off. Injector pulse width is the period of time that the injector is energized. The PCM will adjust injector pulse width based on various inputs it receives.

Battery voltage is supplied to the injectors through the ASD relay.

The PCM determines injector pulse width based on various inputs.

O2 HEATER RELAY

DESCRIPTION

The oxygen (O2) sensor heater relay is located in the Powertrain Distribution Center (PDC).

OPERATION

Refer to Oxygen Sensor for oxygen sensor relay information.

REMOVAL

The oxygen sensor heater relay is located in the Power Distribution Center (PDC). Refer to label on PDC cover for relay location.

(1) Remove PDC cover.

(2) Remove relay from PDC.

(3) Check condition of relay terminals and PDC connector terminals for damage or corrosion. Repair if necessary before installing relay.

(4) Check for pin height (pin height should be the same for all terminals within the PDC connector). Repair if necessary before installing relay.

INSTALLATION

The oxygen sensor heater relay is located in the Power Distribution Center (PDC). Refer to label on PDC cover for relay location.

(1) Install relay to PDC.

(2) Install cover to PDC.

O2 SENSOR

DESCRIPTION

The Oxygen Sensors (O2S) are attached to, and protrude into the vehicle exhaust system. Four different sensors are used: 2 upstream (referred to as 1/1 and 2/1) and 2 downstream (referred to as 1/2 and 2/2).

OPERATION

An O2 sensor is a galvanic battery that provides the PCM with a voltage signal (0-1 volt) inversely proportional to the amount of oxygen in the exhaust. In other words, if the oxygen content is low, the voltage output is high; if the oxygen content is high the output voltage is low. The PCM uses this information to adjust injector pulse-width to achieve the 14.7–to–1 air/fuel ratio necessary for proper engine operation and to control emissions.

The O2 sensor must have a source of oxygen from outside of the exhaust stream for comparison. Current O2 sensors receive their fresh oxygen (outside air) supply through the wire harness. This is why it is important to never solder an O2 sensor connector, or pack the connector with grease.

Four wires (circuits) are used on each O2 sensor: a 12–volt feed circuit for the sensor heating element; a ground circuit for the heater element; a low-noise sensor return circuit to the PCM, and an input circuit from the sensor back to the PCM to detect sensor operation.

Oxygen Sensor Heater Relay: If the vehicle is equipped with 4 oxygen sensors, a separate oxygen sensor relay is used to supply voltage to the sensor heating elements. This particular relay is used only for the 1/2 and 2/2 downstream sensors. Voltage for the other 2 sensor heating elements is supplied directly from the ASD relay. Refer to 8, Wiring Diagrams to determine which relay is used.

To avoid the large simultaneous current surge needed to operate all 4 sensors, power is delayed to the 2 downstream heater elements by the PCM for approximately 2 seconds.

Oxygen Sensor Heater Elements:

The O2 sensor uses a Positive Thermal Co-efficient (PTC) heater element. As temperature increases, resistance increases. At ambient temperatures around 70°F, the resistance of the heating element is approximately 4.5 ohms. As the sensor's temperature increases, resistance in the heater element increases. This allows the heater to maintain the optimum operating temperature of approximately 930°-1100°F (500°-600° C). Although the sensors operate the same, there are physical differences, due to the environment that they operate in, that keep them from being interchangeable.

Maintaining correct sensor temperature at all times allows the system to enter into closed loop operation sooner. Also, it allows the system to remain in closed loop operation during periods of extended idle.

In Closed Loop operation, the PCM monitors certain O2 sensor input(s) along with other inputs, and adjusts the injector pulse width accordingly. During Open Loop operation, the PCM ignores the O2 sensor input. The PCM adjusts injector pulse width based on preprogrammed (fixed) values and inputs from other sensors.

Upstream Sensor - Engine Equipped With 2 Sensors: The upstream sensor (1/1) provides an input voltage to the PCM. The input tells the PCM the oxygen content of the exhaust gas. The PCM uses this information to fine tune fuel delivery to maintain the correct oxygen content at the downstream oxygen sensor. The PCM will change the air/fuel ratio until the upstream sensor inputs a voltage that the PCM has determined will make the downstream sensor output (oxygen content) correct.

The upstream oxygen sensor also provides an input to determine catalytic convertor efficiency.

O2 SENSOR (Continued)

Downstream Sensor - Engine Equipped With 2 Sensors: The downstream oxygen sensor (1/2) is also used to determine the correct air-fuel ratio. As the oxygen content changes at the downstream sensor, the PCM calculates how much air-fuel ratio change is required. The PCM then looks at the upstream oxygen sensor voltage and changes fuel delivery until the upstream sensor voltage changes enough to correct the downstream sensor voltage (oxygen content).

The downstream oxygen sensor also provides an input to determine catalytic convertor efficiency.

Upstream Sensors - Engine Equipped With 4 Sensors: Two upstream sensors are used (1/1 and 2/1). The 1/1 sensor is the first sensor to receive exhaust gases from the #1 cylinder. They provide an input voltage to the PCM. The input tells the PCM the oxygen content of the exhaust gas. The PCM uses this information to fine tune fuel delivery to maintain the correct oxygen content at the downstream oxygen sensors. The PCM will change the air/fuel ratio until the upstream sensors input a voltage that the PCM has determined will make the downstream sensors output (oxygen content) correct.

The upstream oxygen sensors also provide an input to determine mini-catalyst efficiency. Main catalytic convertor efficiency is not calculated with this package.

Downstream Sensors - Engine Equipped With 4 Sensors: Two downstream sensors are used (1/2 and 2/2). The downstream sensors are used to determine the correct air-fuel ratio. As the oxygen content changes at the downstream sensor, the PCM calculates how much air-fuel ratio change is required. The PCM then looks at the upstream oxygen sensor voltage, and changes fuel delivery until the upstream sensor voltage changes enough to correct the downstream sensor voltage (oxygen content).

The downstream oxygen sensors also provide an input to determine mini-catalyst efficiency. Main catalytic convertor efficiency is not calculated with this package.

Engines equipped with either a downstream sensor(s), or a post-catalytic sensor, will monitor catalytic convertor efficiency. If efficiency is below emission standards, the Malfunction Indicator Lamp (MIL) will be illuminated and a Diagnostic Trouble Code (DTC) will be set. Refer to Monitored Systems in Emission Control Systems for additional information.

TRANSMISSION/TRANSAXLE

TABLE OF CONTENTS

page

TRANSMISSION/TRANSAXLE
DESCRIPTION 1
MANUAL-AX5 1
MANUAL-NV3550 34
AUTOMATIC - 30RH 77
AUTOMATIC - 32RH 83
TRANSFER CASE-NV231 119

TRANSMISSION/TRANSAXLE

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The refer to is written differently than in prior years.

MANUAL-AX5

TABLE OF CONTENTS

page

MANUAL-AX5
DISASSEMBLY 2
ASSEMBLY 13
SPECIFICATIONS 24
SPECIAL TOOLS 25
BEARING RETAINER
REMOVAL 26
INSTALLATION 26
INPUT SHAFT
DISASSEMBLY 26
ASSEMBLY 27
OUTPUT SHAFT
DISASSEMBLY 28
ASSEMBLY 30

MANUAL-AX5

DISASSEMBLY

ADAPTER/EXTENSION HOUSING

(1) Drain transmission lubricant, if necessary.
(2) Remove release bearing and lever.
(3) Remove clutch housing bolts and remove housing (Fig. 1).

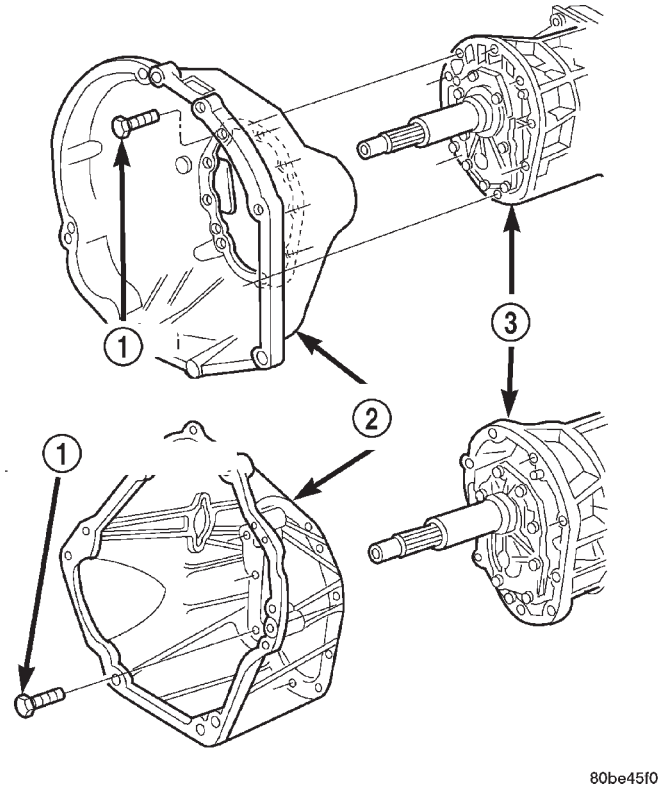


Fig. 1 Clutch Housing

1 - HOUSING-TO-TRANSMISSION BOLTS
2 - CLUTCH HOUSING
3 - TRANSMISSION

(4) Remove vehicle speed sensor and speedometer adapter, if necessary.

(5) Remove shift tower bolts and remove tower from transmission (Fig. 2).

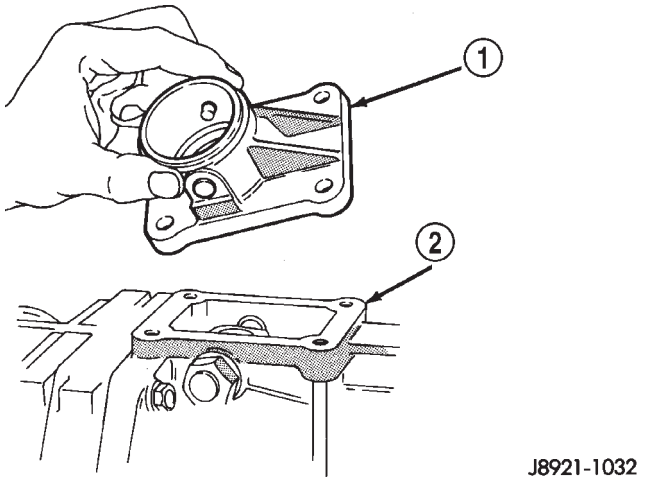


Fig. 2 Shift Tower

1 - SHIFT TOWER
2 - ADAPTER/EXTENSION HOUSING

(6) Remove shift tower gasket from shift tower or transmission (Fig. 3).

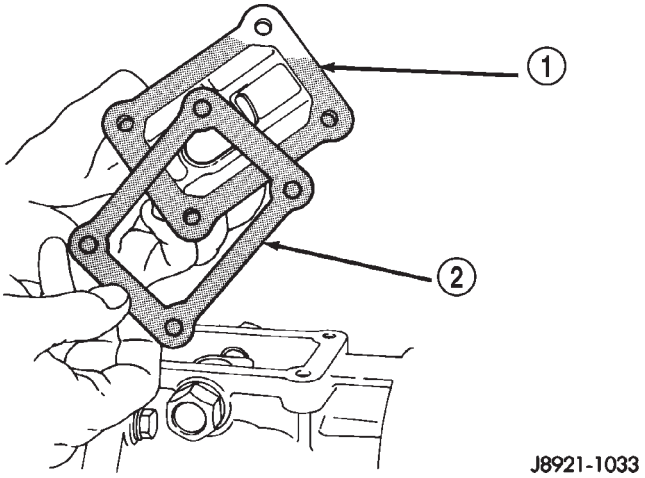


Fig. 3 Shift Tower Gasket

1 - SHIFT TOWER
2 - GASKET

MANUAL-AX5 (Continued)

(7) Remove detent ball plug (Fig. 4).

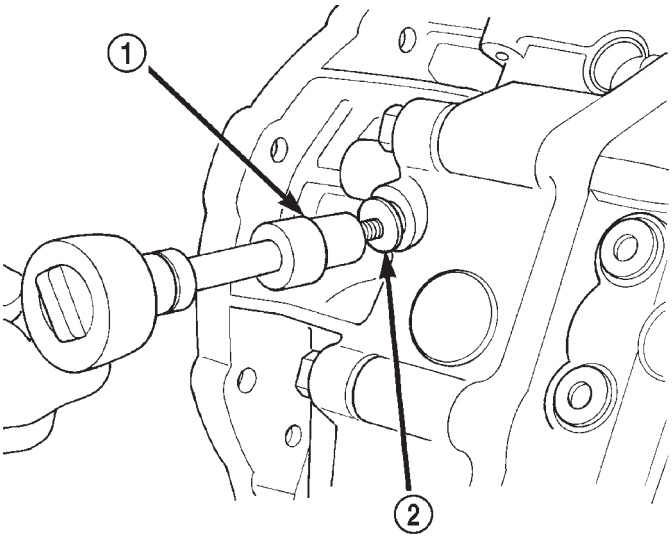


Fig. 4 Detent Ball Plug

1 - TORX BIT
2 - DETENT BALL PLUG

(8) Remove detent spring (Fig. 5) and ball (Fig. 6) with pencil magnet.

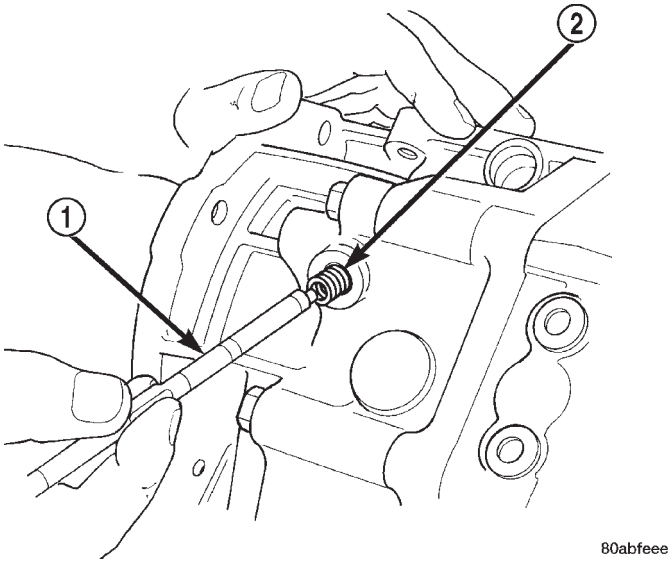


Fig. 5 Detent Spring

1 - PENCIL MAGNET
2 - DETENT BALL SPRING

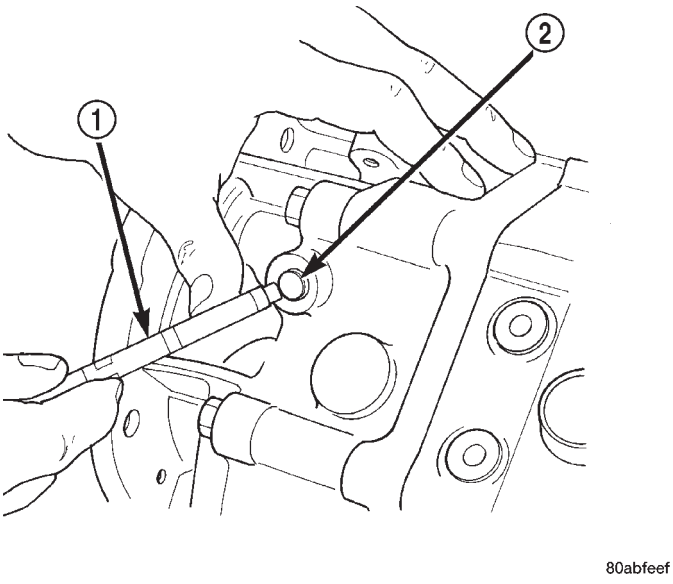


Fig. 6 Detent Ball

1 - PENCIL MAGNET
2 - SHIFT DETENT BALL

(9) Remove shift arm retainer bolt (Fig. 7).

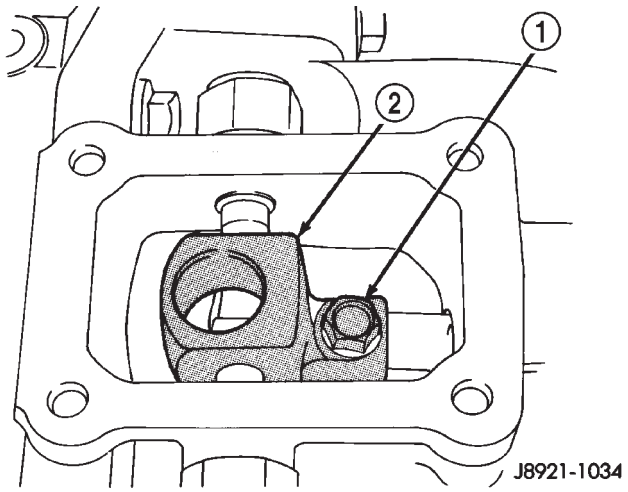


Fig. 7 Shift Arm Retainer Bolt

1 - RETAINER BOLT
2 - SHIFT ARM

MANUAL-AX5 (Continued)

(10) Remove shift arm restrictor pins (Fig. 8).

NOTE: Restrictor pins are not interchangeable, they are color coded. Note color and location of restrictor pins for installation reference.

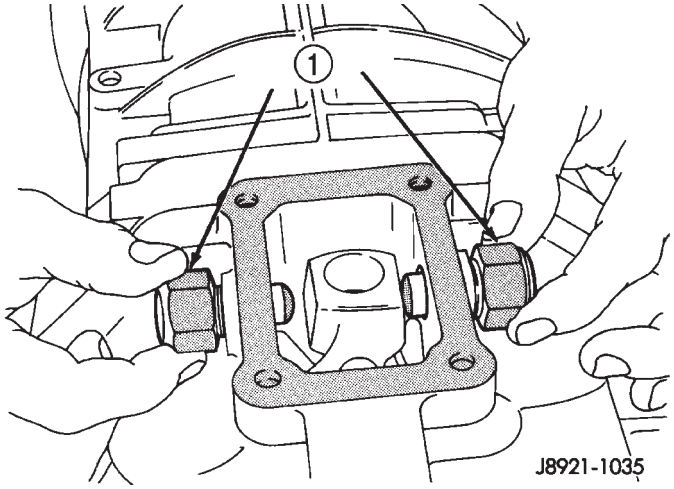


Fig. 8 Shift Arm Restrictor Pins

1 - RESTRICTOR PINS

(11) Remove shift lever shaft plug (Fig. 9).

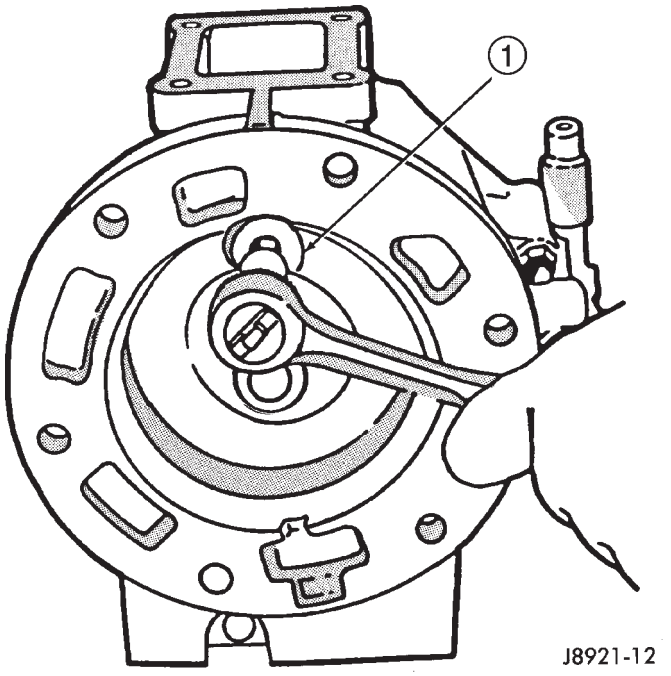


Fig. 9 Shift Lever Shaft Plug

1 - SHIFT LEVER SHAFT PLUG

(12) Remove shifter shaft with large magnet (Fig. 10).

(13) Remove shift arm from the adapter housing.

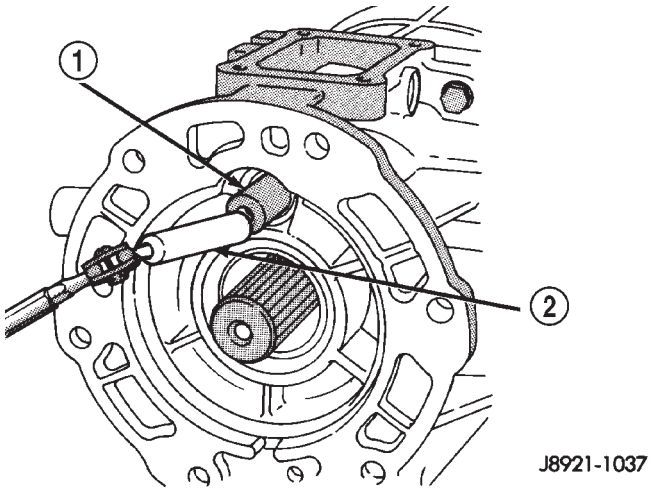


Fig. 10 Shifter Shaft

1 - SHIFT ARM SHAFT
2 - LARGE MAGNET

(14) Remove adapter/extension housing bolts.

(15) Loosen adapter/extension housing by tapping it loose with rawhide/rubber hammer (Fig. 11).

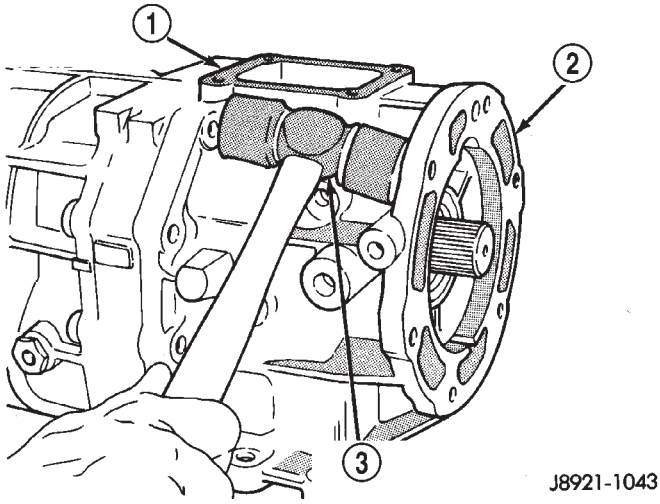


Fig. 11 Adapter/Extension Housing

1 - INTERMEDIATE PLATE
2 - ADAPTER HOUSING
3 - RUBBER HAMMER

MANUAL-AX5 (Continued)

(16) Remove adapter/extension housing (Fig. 12).

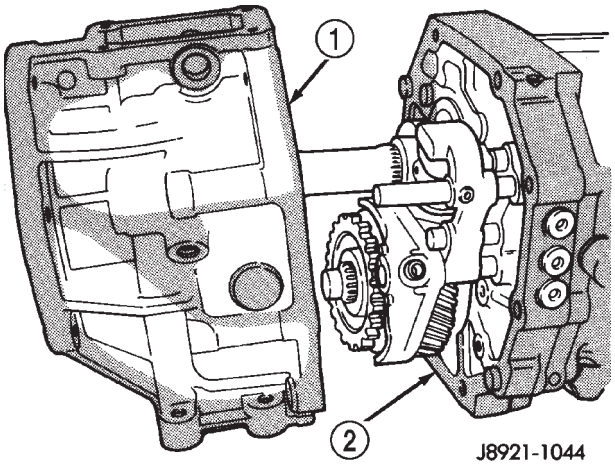


Fig. 12 Adapter/Extension Housing-Typical

1 - ADAPTER HOUSING
2 - INTERMEDIATE PLATE

(17) On 4x2 transmissions, remove speedometer gear retaining snap-ring from output shaft. Remove speedometer gear from output shaft and remove speedometer gear lock ball from output shaft. Remove speedometer drive gear locating snap-ring (Fig. 13).

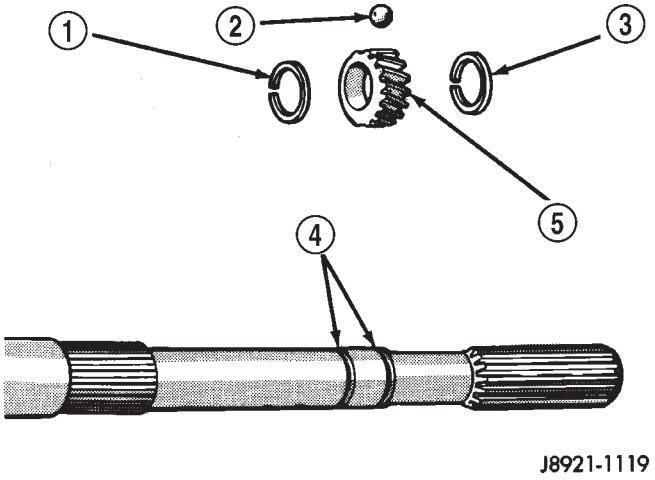


Fig. 13 Speedometer Drive Gear Assembly

1 - SNAP RING
2 - LOCK BALL
3 - SNAP RING
4 - OUTPUT SHAFT GROOVES
5 - SPEEDOMETER GEAR

(18) Remove bolts holding front bearing retainer to the transmission case.

(19) Remove bearing retainer from transmission case (Fig. 14).

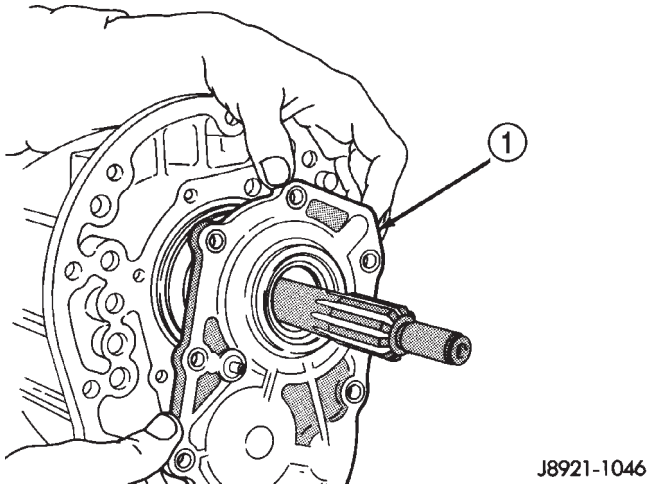


Fig. 14 Front Bearing Retainer

1 - FRONT BEARING RETAINER

(20) Remove input shaft bearing snap-ring (Fig. 15).

(21) Remove countershaft front bearing snap-ring.

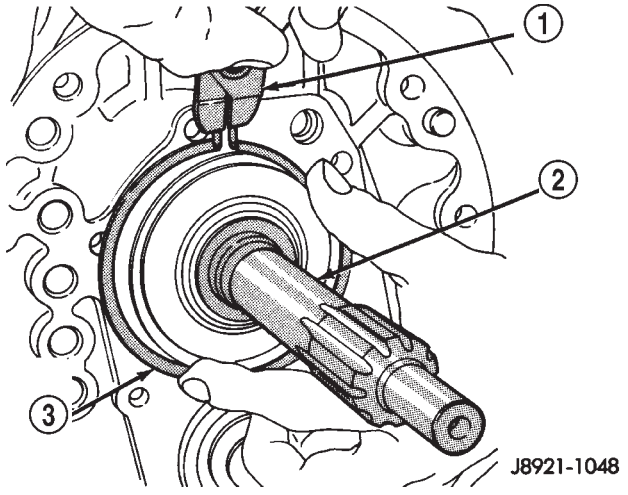


Fig. 15 Input Shaft

1 - SNAP RING PLIERS
2 - INPUT SHAFT
3 - INPUT SHAFT BEARING SNAP RING

MANUAL-AX5 (Continued)

(22) Separate intermediate plate and transmission case by tapping them loose with rawhide/rubber hammer (Fig. 16).

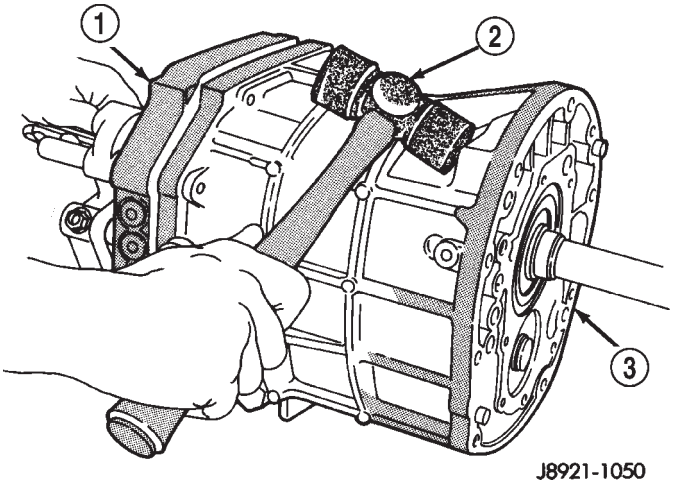


Fig. 16 Intermediate Plate and Transmission Case

1 - INTERMEDIATE PLATE
2 - RUBBER HAMMER
3 - GEAR CASE

(23) Separate intermediate plate from the transmission case (Fig. 17).

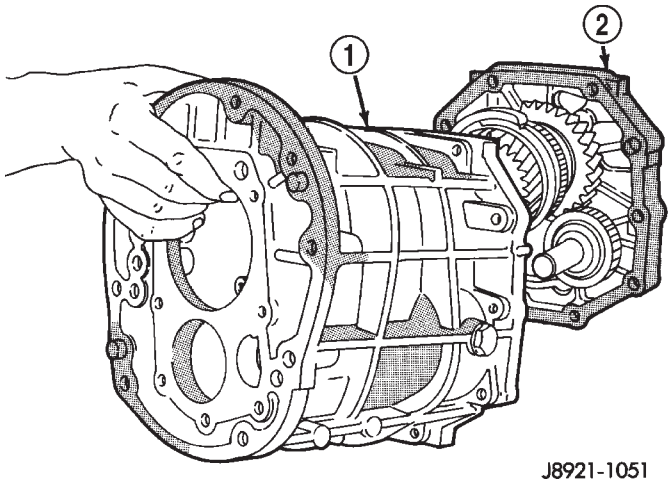


Fig. 17 Intermediate Plate from Transmission

1 - GEAR CASE
2 - INTERMEDIATE PLATE

GEARTRAIN AND SHIFT MECHANISM

(1) Install suitable bolts and washers in intermediate plate (Fig. 18). Then clamp plate and gear assembly in vise on bolt heads. Use enough washers to prevent bolts from touching.

(2) Remove countershaft fifth gear retaining snap-ring (Fig. 19).

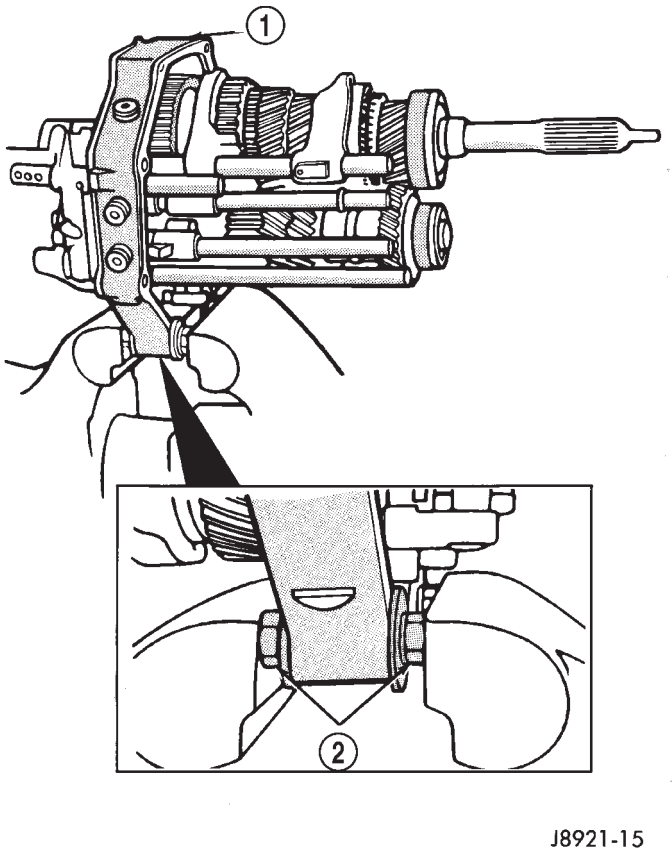


Fig. 18 Positioning Intermediate Plate In Vise

1 - INTERMEDIATE PLATE
2 - BOLTS

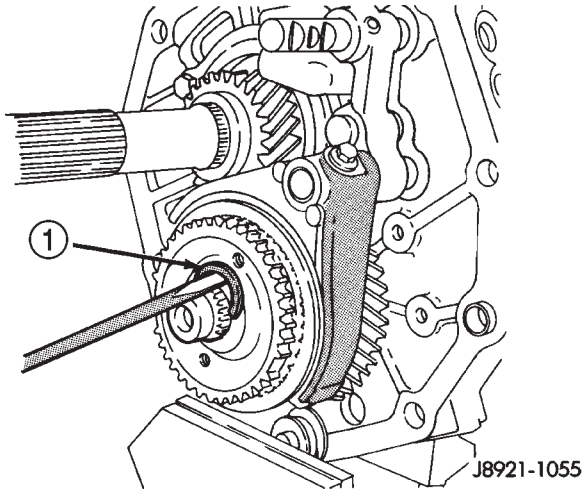


Fig. 19 Fifth Gear Snap-Ring

1 - FIFTH GEAR SNAP-RING (SELECT FIT)

MANUAL-AX5 (Continued)

(3) Remove bolt holding fifth gear shift fork to shift rail (Fig. 20).

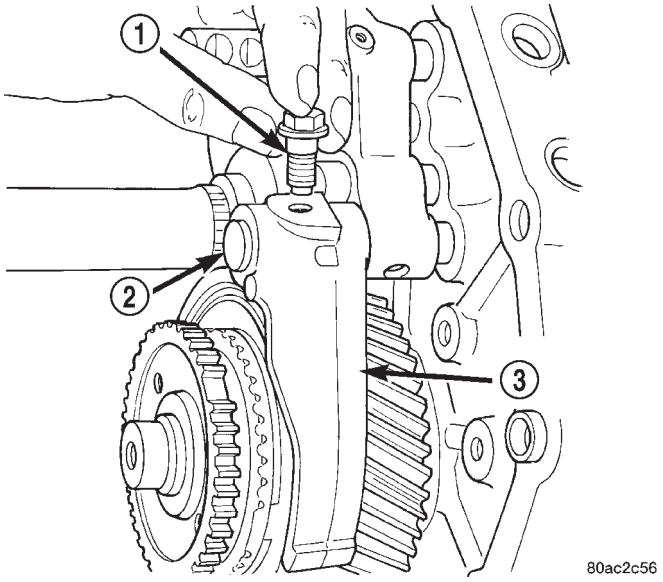


Fig. 20 Shift Fork Retainer Bolt

1 - SHIFT FORK RETAINER BOLT
2 - FIFTH GEAR SHIFT RAIL
3 - FIFTH GEAR SHIFT FORK

(4) Remove fifth gear blocker ring from countershaft assembly with Puller L-4407 (Fig. 21).

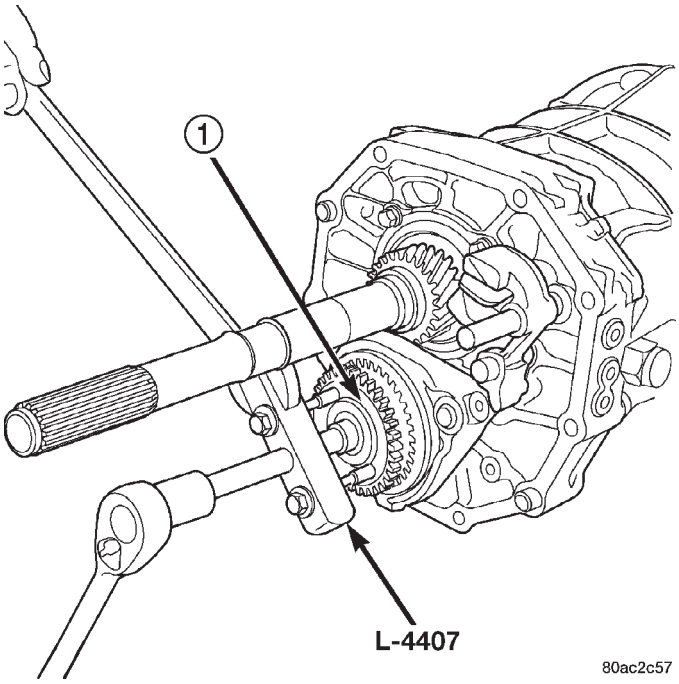


Fig. 21 Fifth Gear Blocker Ring

1 - FIFTH GEAR BLOCKER RING

(5) Remove fifth gear synchro ring (Fig. 22).

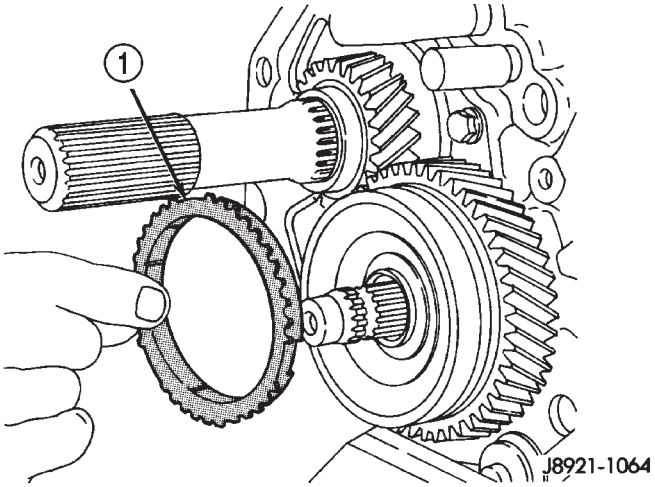


Fig. 22 Fifth Gear Synchro Ring

1 - FIFTH GEAR SYNCHRO RING

(6) Remove countershaft fifth gear assembly from countershaft (Fig. 23).

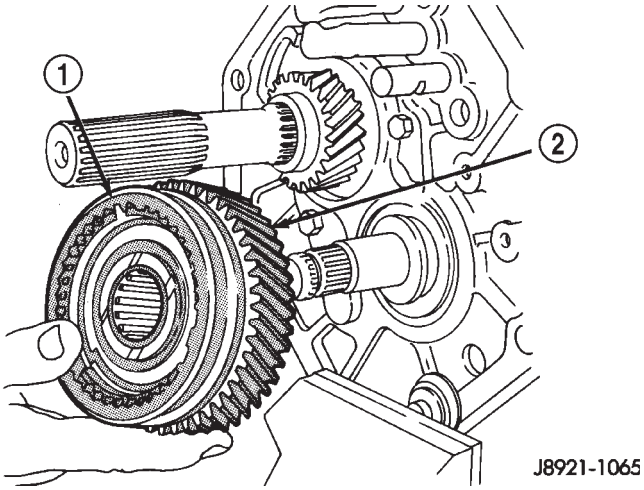


Fig. 23 Fifth Gear and Synchro

1 - FIFTH GEAR SYNCHRO SLEEVE ASSEMBLY
2 - COUNTER FIFTH GEAR

MANUAL-AX5 (Continued)

(7) Remove fifth gear thrust ring from countershaft (Fig. 24).

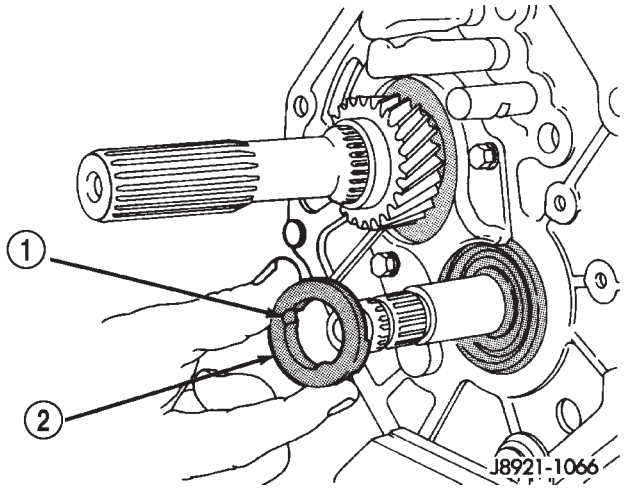


Fig. 24 Fifth Gear Thrust Ring

1 - LOCK BALL NOTCH
2 - FIFTH GEAR THRUST RING

(8) Remove fifth gear thrust ring lock ball from countershaft (Fig. 25).

CAUTION: Lock balls, check balls, interlock balls, and interlock pins are used in various places in the transmission. Pins or balls must be identified and marked for installation reference.

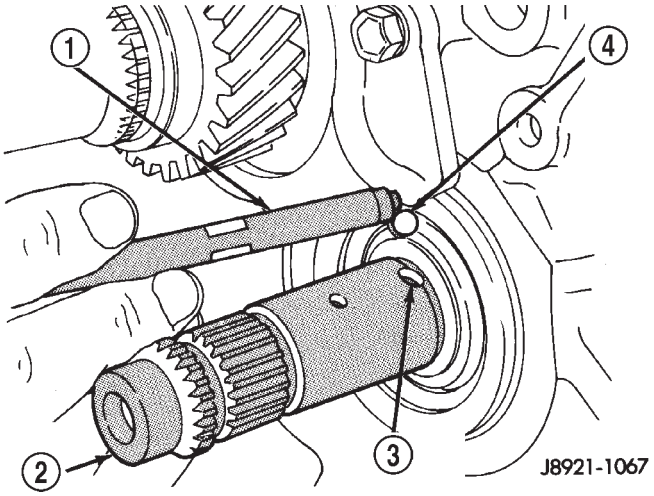


Fig. 25 Fifth Gear Thrust Ring Lock

1 - PENCIL MAGNET
2 - CLUSTER GEAR
3 - LOCK BALL RECESS
4 - THRUST RING LOCK BALL

(9) Remove bolt holding reverse idler gear shaft lock plate to the intermediate plate.

(10) Remove reverse idler gear shaft and reverse idler gear assembly (Fig. 26).

NOTE: Retrieve pin and compression spring from the reverse idler shaft.

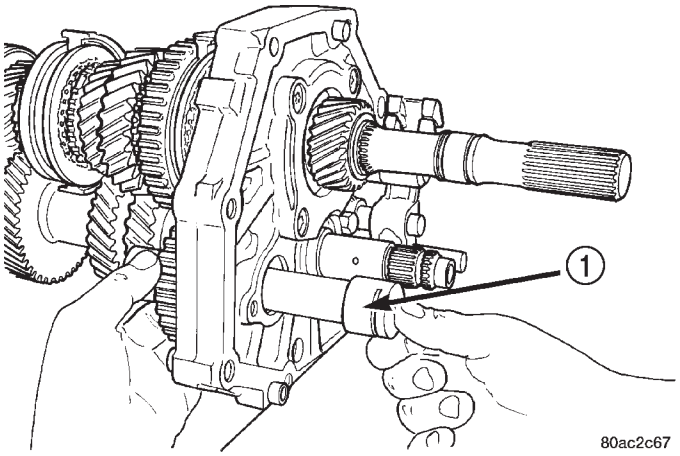


Fig. 26 Reverse Idler Shaft

1 - REVERSE IDLER SHAFT

(11) Remove output shaft rear bearing retainer bolts and remove retainer (Fig. 27).

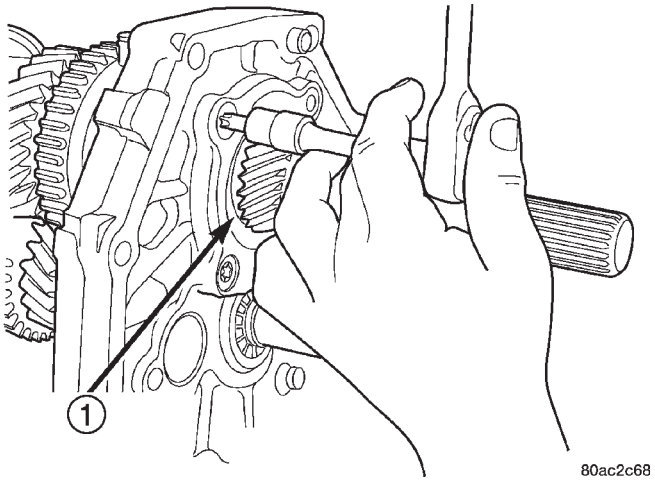


Fig. 27 Output Shaft Rear Bearing Retainer

1 - BEARING RETAINER

MANUAL-AX5 (Continued)

(12) Remove bolts holding 1-2 and 3-4 shift forks to the shift rails (Fig. 28) and discard bolts.

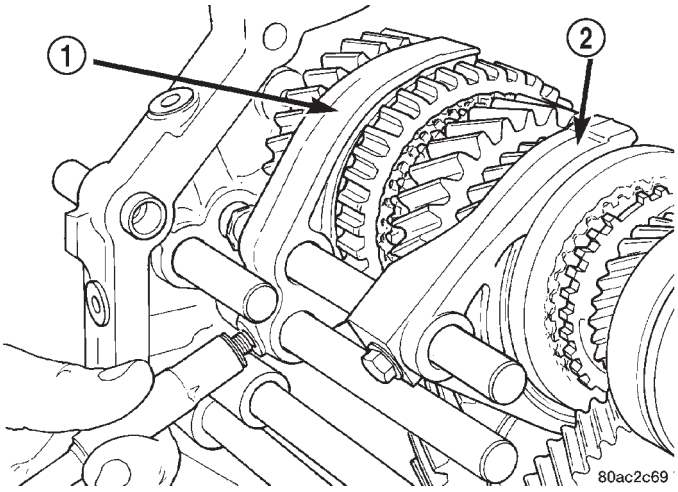


Fig. 28 Shift Fork Bolts

1 - 1-2 SHIFT FORK
2 - 3-4 SHIFT FORK

(13) Remove bolts holding reverse shift arm bracket to intermediate plate (Fig. 29).

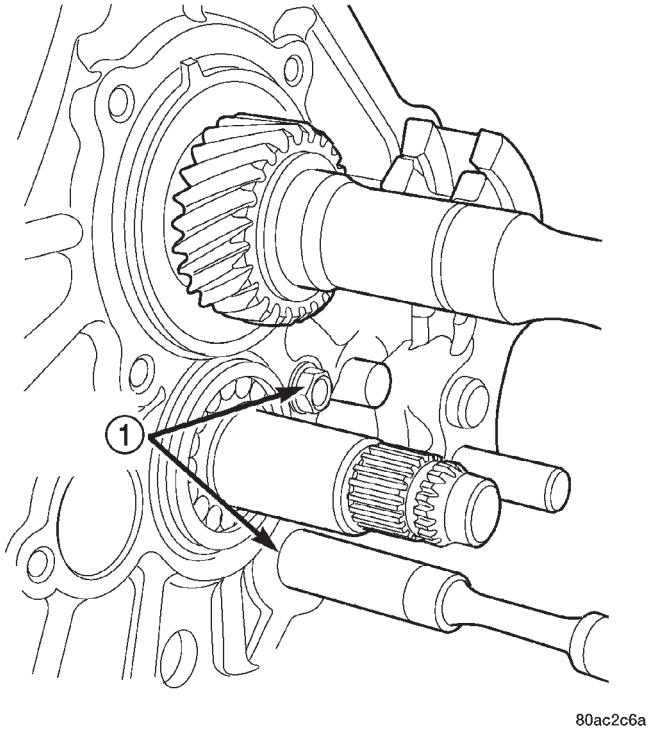


Fig. 29 Reverse Shift Arm Bracket Bolts

1 - BRACKET BOLTS

(14) Remove snap-ring holding output shift rear bearing into the intermediate plate (Fig. 30).

(15) Remove countershaft rear bearing snap-ring.

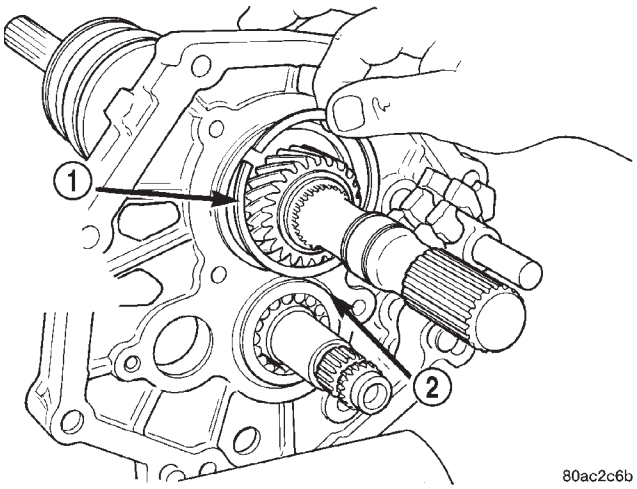


Fig. 30 Output Shaft Rear Bearing Snap-ring

1 - OUTPUT SHAFT BEARING SNAP-RING
2 - COUNTERSHAFT BEARING SNAP-RING

(16) With an assistant, support the mainshaft and countershaft. Tap on the rear of the mainshaft and countershaft with a plastic mallet. This will release the countershaft from the countershaft rear bearing and mainshaft rear bearing from the intermediate plate. The countershaft will release from the countershaft bearing first and can be removed by moving the countershaft rearward and downward (Fig. 31).

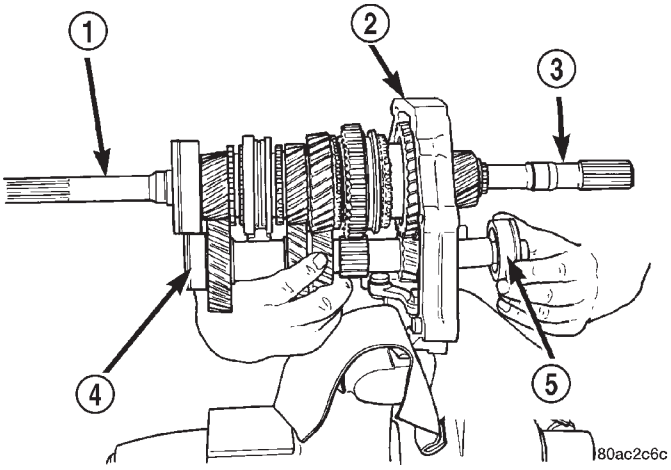


Fig. 31 Countershaft and Rear Bearing

1 - INPUT SHAFT
2 - INTERMEDIATE PLATE
3 - OUTPUT SHAFT
4 - COUNTERSHAFT
5 - COUNTERSHAFT REAR BEARING

(17) Remove the mainshaft forward until the mainshaft rear bearing is clear of the intermediate plate and then rotating the mainshaft downward out of the shift forks (Fig. 32).

MANUAL-AX5 (Continued)

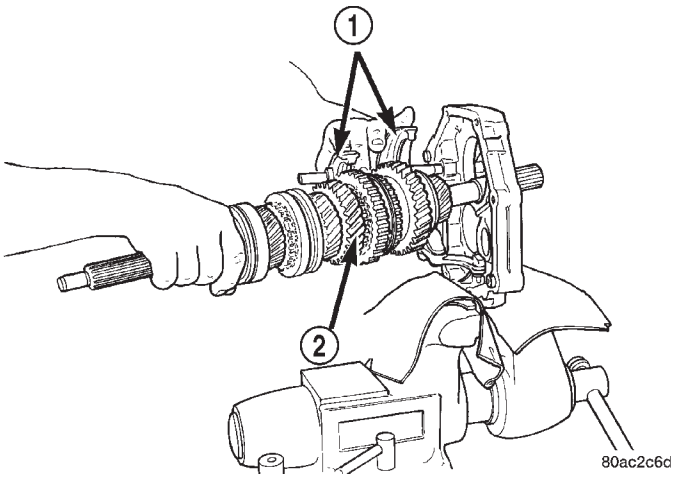


Fig. 32 Mainshaft

1 - SHIFT FORKS
2 - MAINSHAFT

(18) Remove 3-4 shift fork from the 3-4 shift rail (Fig. 33).

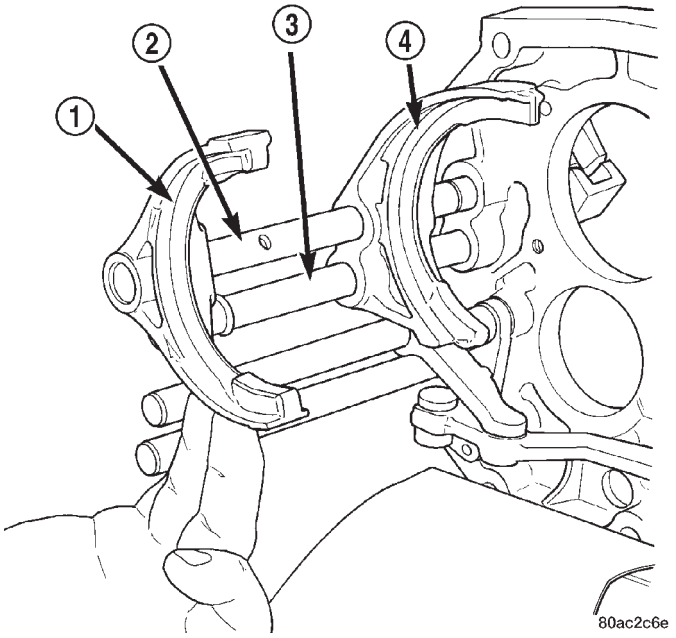


Fig. 33 Shift Rails and Forks

1 - 3-4 SHIFT FORK
2 - 3-4 SHIFT RAIL
3 - 1-2 SHIFT RAIL
4 - 1-2 SHIFT FORK

(19) Remove snap-ring from 1-2 shift rail to allow the removal of the 1-2 shift fork.

(20) Remove 1-2 shift fork from the 1-2 and the 3-4 shift rails (Fig. 34).

(21) Remove threaded plugs from intermediate plate. Then remove lock ball and spring from with pencil magnet (Fig. 35).

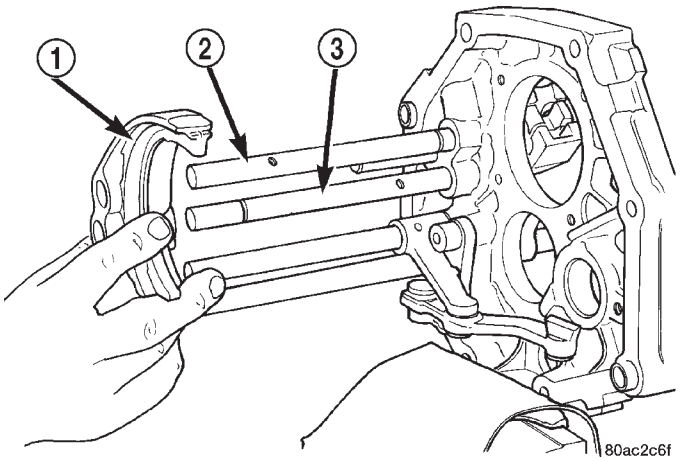


Fig. 34 1-2 Shift Fork

1 - 1-2 SHIFT FORK
2 - 3-4 SHIFT RAIL
3 - 1-2 SHIFT RAIL

NOTE: The bottom spring is shorter in length than the other two springs.

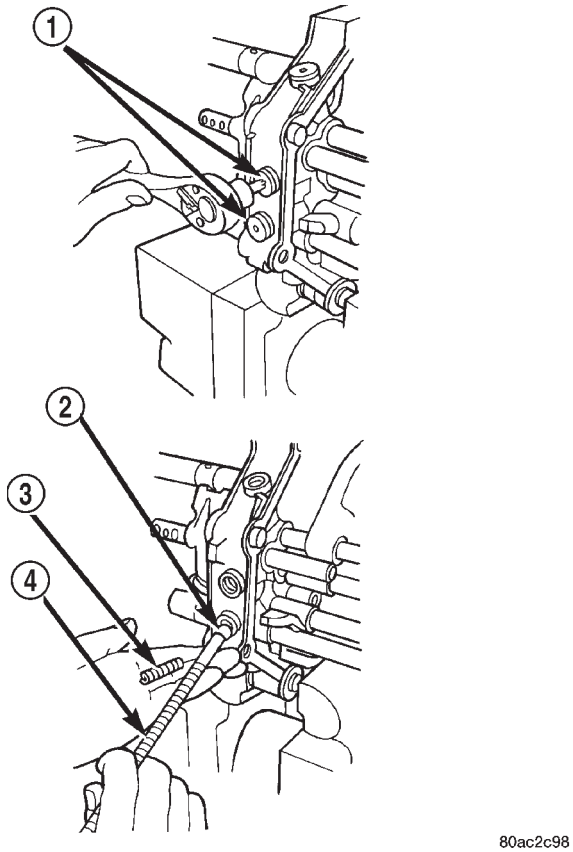


Fig. 35 Lock Ball And Spring

1 - THREADED PLUGS
2 - LOCK BALL
3 - SPRING
4 - PENCIL MAGNET

MANUAL-AX5 (Continued)

(22) Remove intermediate plate from the vise, rotate the plate 180°, and reinstall plate in the vise using the same bolt and washer mounting set-up.

CAUTION: Interlock balls and pins are different sizes and shapes. Pins and balls must be identified and marked for installation reference.

(23) Remove fifth gear shift rail (Fig. 36).

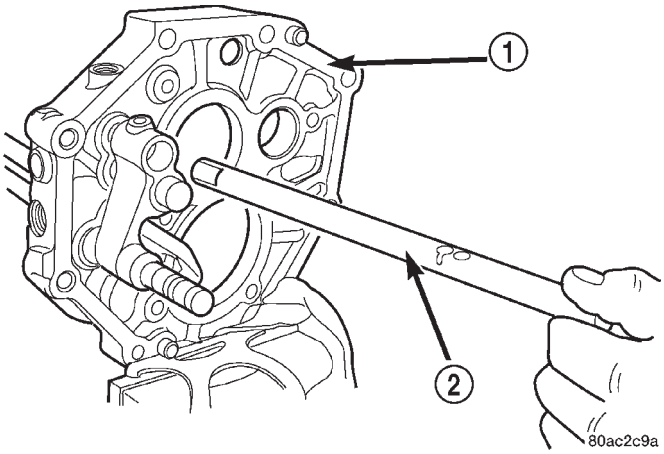


Fig. 36 Fifth Gear Shift Rail

1 - INTERMEDIATE PLATE
2 - FIFTH GEAR SHIFT RAIL

(24) Remove fifth gear check ball (Fig. 37) and interlock pin.

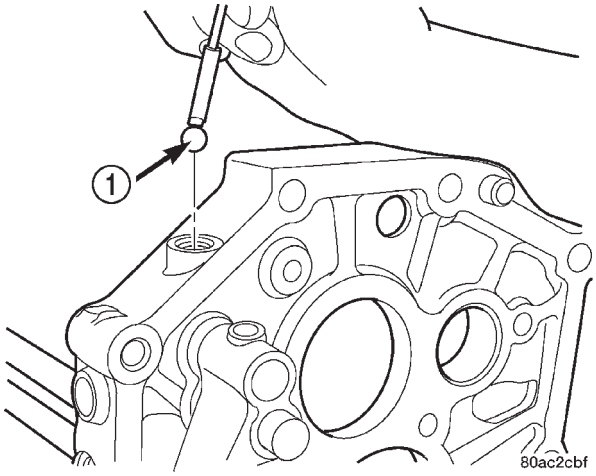


Fig. 37 Check Ball

1 - FIFTH GEAR CHECK BALL

(25) Remove reverse shift head and rail assembly (Fig. 38).

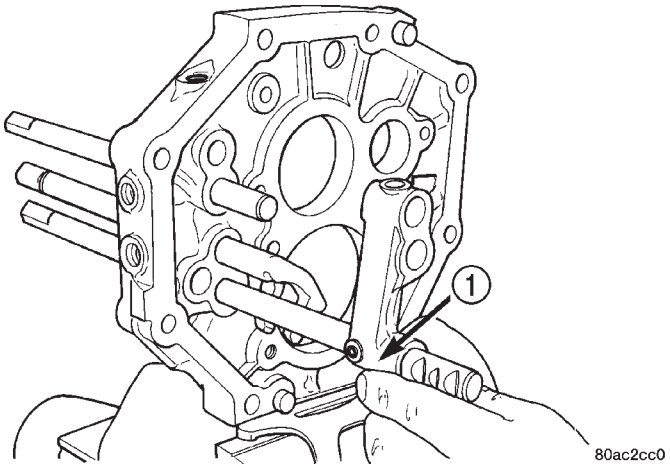


Fig. 38 Shift Head And Rail

1 - REVERSE SHIFT HEAD AND RAIL

(26) Remove snap-ring holding reverse shift rail into intermediate plate.

(27) Remove reverse shift rail and reverse shift fork and arm assembly from intermediate plate (Fig. 39).

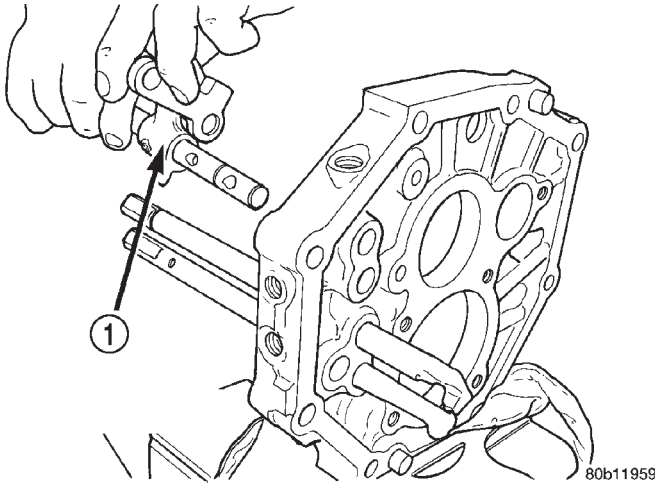


Fig. 39 Reverse Shift Rail

1 - REVERSE SHIFT RAIL AND FORK

MANUAL-AX5 (Continued)

(28) Remove interlock pin from reverse shift rail (Fig. 40).

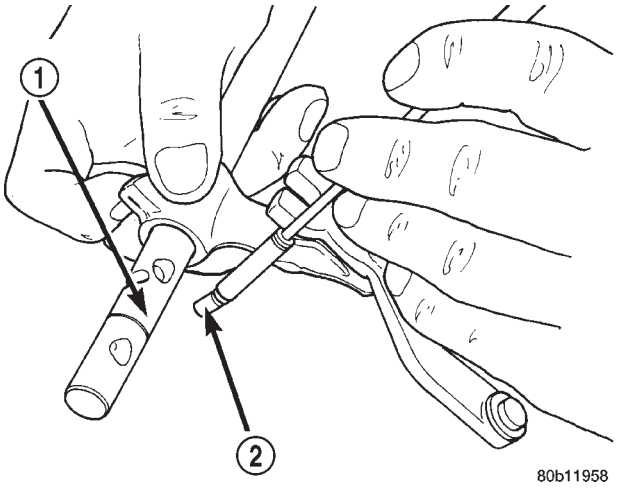


Fig. 40 Reverse Interlock Pin

1 - REVERSE SHIFT RAIL
2 - INTERLOCK PIN

(29) Remove reverse elongated check ball (Fig. 41).

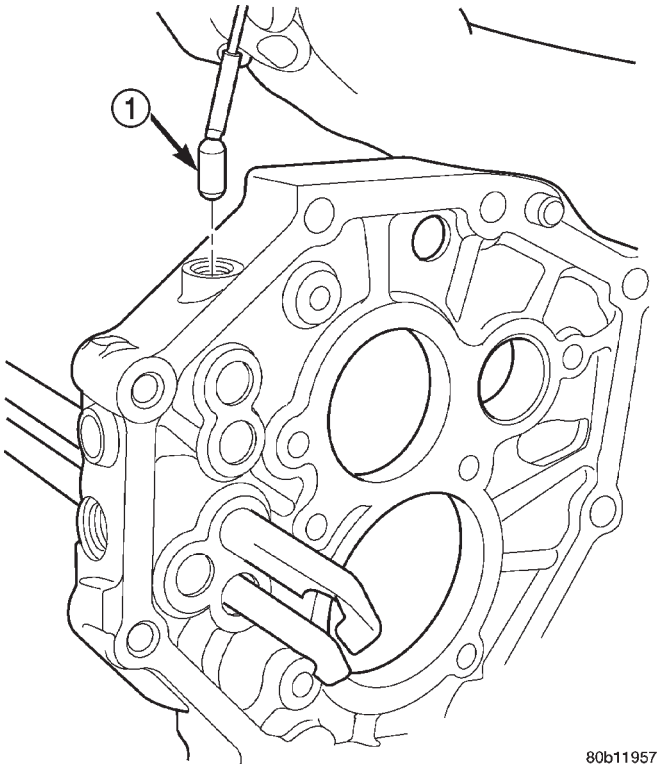


Fig. 41 Check Ball

1 - REVERSE CHECK BALL

(30) Remove snap-ring on 3-4 shift rail.
(31) Remove 1-2 shift rail from intermediate plate.

(32) Remove interlock pin from 1-2 shift rail (Fig. 42).

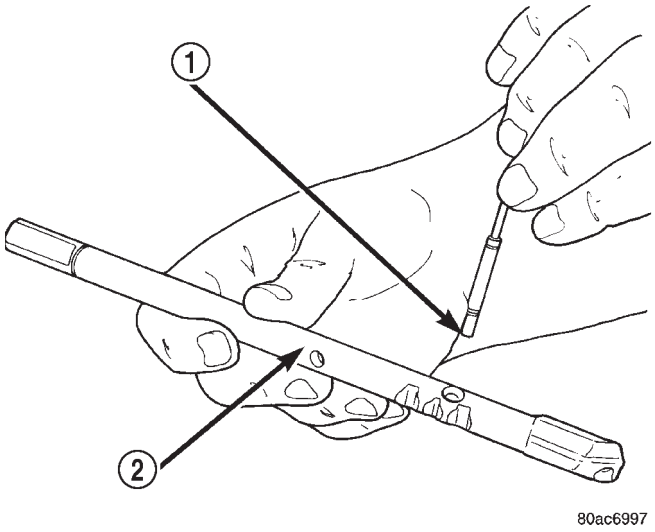


Fig. 42 1-2 SHIFT RAIL

1 - INTERLOCK PIN
2 - 1-2 SHIFT RAIL

(33) Remove 1-2 shift rail elongated check ball from intermediate plate (Fig. 43).
(34) Remove 3-4 shift rail from intermediate plate.

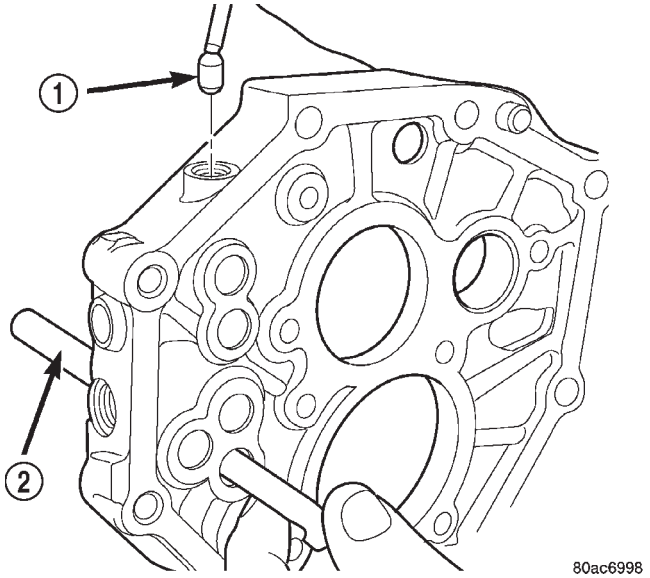


Fig. 43 1-2 Check Ball

1 - 1-2 CHECK BALL
2 - 3-4 SHIFT RAIL

MANUAL-AX5 (Continued)

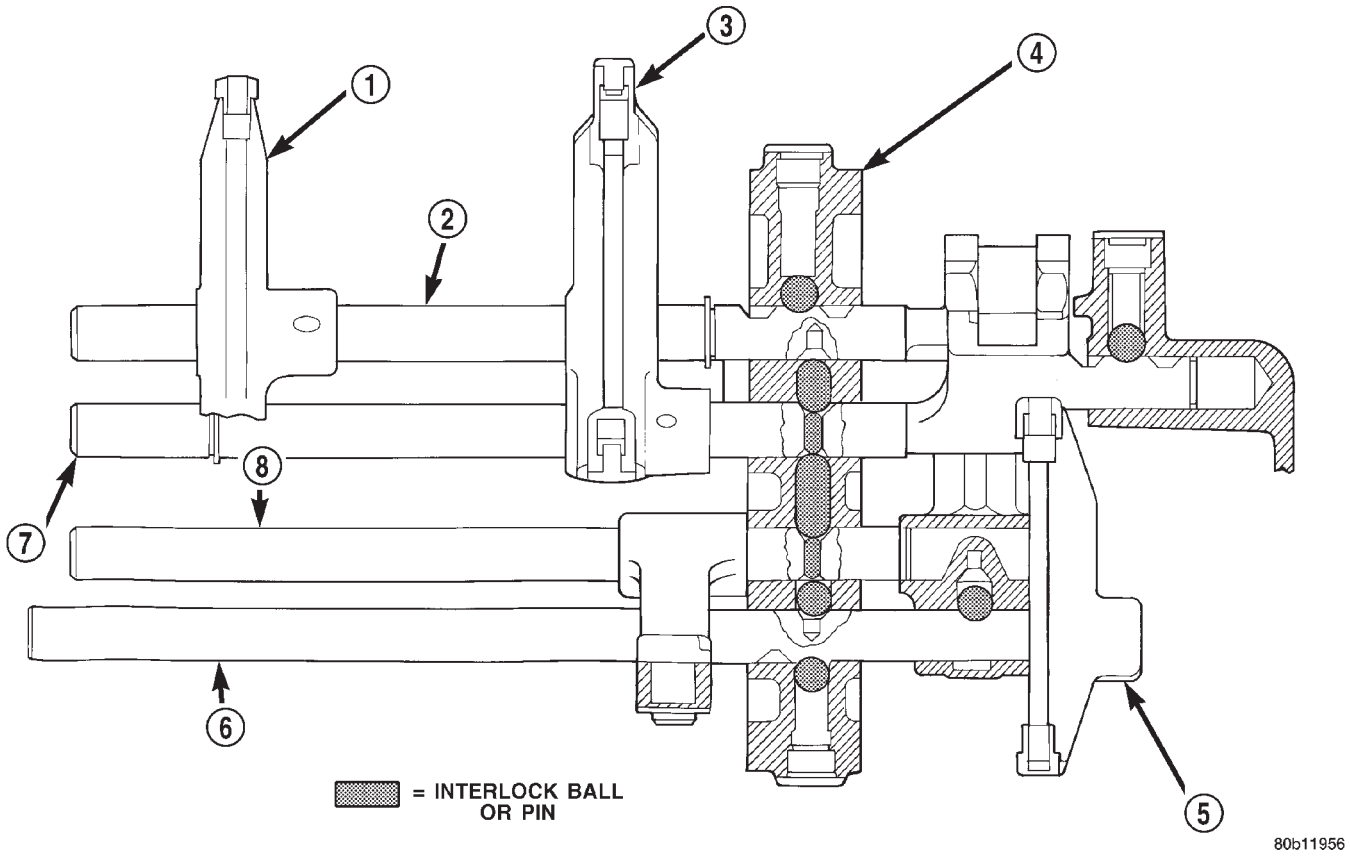


Fig. 44 Shift Rail Components

1 - 3-4 FORK
2 - 3-4 SHIFT RAIL
3 - 1-2 FORK
4 - INTERMEDIATE PLATE
5 - FIFTH GEAR FORK
6 - FIFTH GEAR SHIFT RAIL
7 - 1-2 SHIFT RAIL
8 - REVERSE SHIFT RAIL

ASSEMBLY

GEARTRAIN AND SHIFT MECHANISM

Refer to (Fig. 44) while assembling and installing the shift rail components.

NOTE: Shift rail components must be in neutral position when installing check balls and interlock pins. Check balls and interlock pins must be installed in original location.

(1) Install 3-4 shift rail into the intermediate plate.

MANUAL-AX5 (Continued)

(2) Install 1-2 elongated check ball into the intermediate plate (Fig. 45).

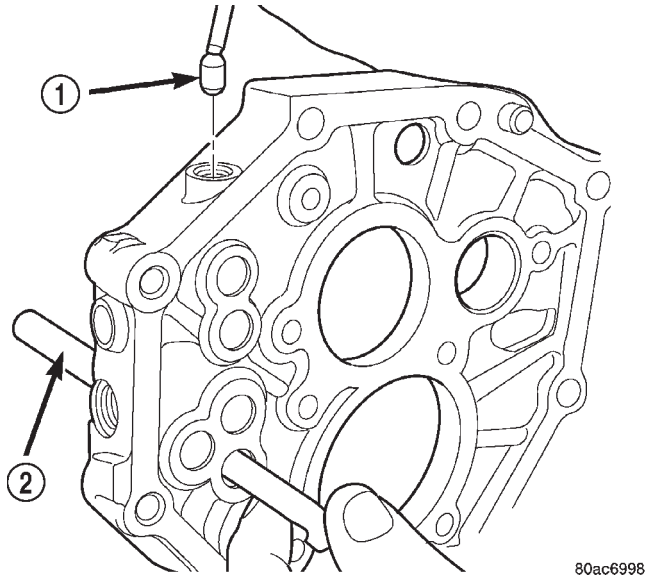


Fig. 45 1-2 Check Ball

1 - 1-2 CHECK BALL
2 - 3-4 SHIFT RAIL

(3) Install interlock pin into the 1-2 shift rail (Fig. 46).

(4) Install 1-2 shift rail into the intermediate plate.

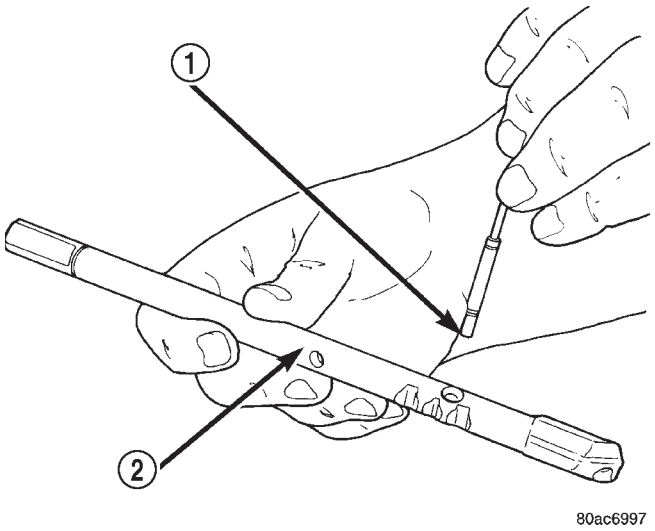


Fig. 46 1-2 Shift Rail Interlock Pin

1 - INTERLOCK PIN
2 - 1-2 SHIFT RAIL

(5) Install snap-ring onto 3-4 shift rail.

(6) Install reverse check ball into the intermediate plate (Fig. 47).

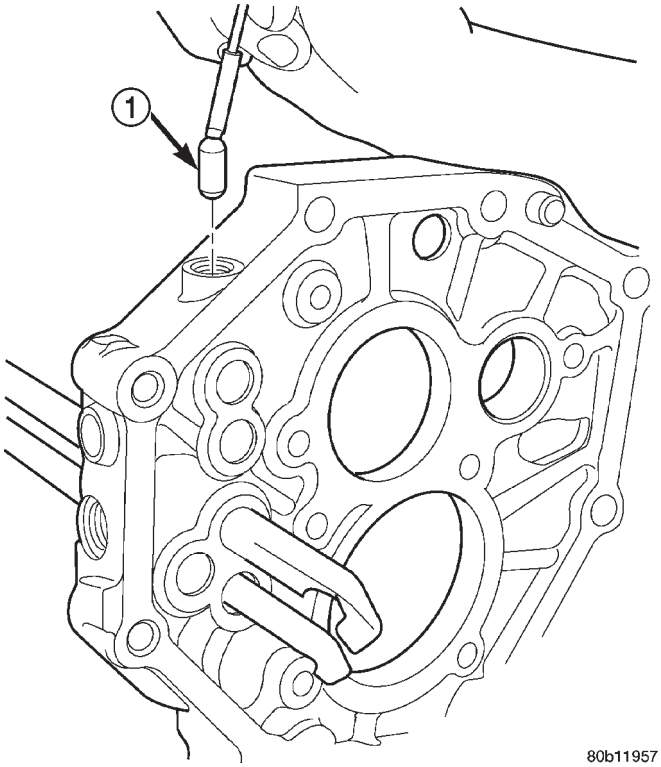


Fig. 47 Reverse Check Ball

1 - REVERSE CHECK BALL

(7) Install interlock pin into the reverse shift rail (Fig. 48).

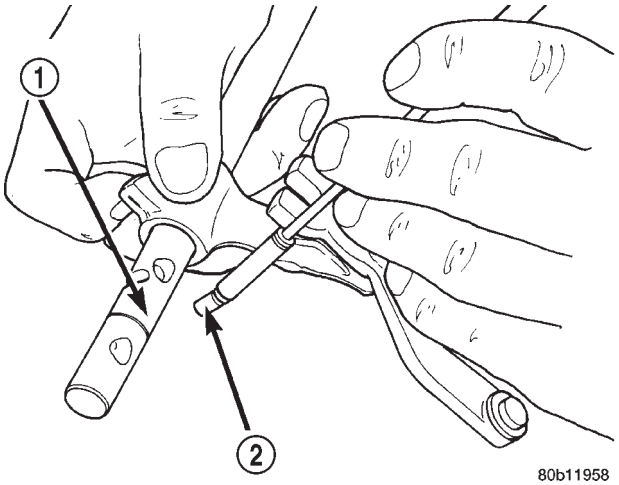


Fig. 48 Reverse Interlock Pin

1 - REVERSE SHIFT RAIL
2 - INTERLOCK PIN

MANUAL-AX5 (Continued)

(8) Assemble reverse arm bracket to the reverse fork (Fig. 49).

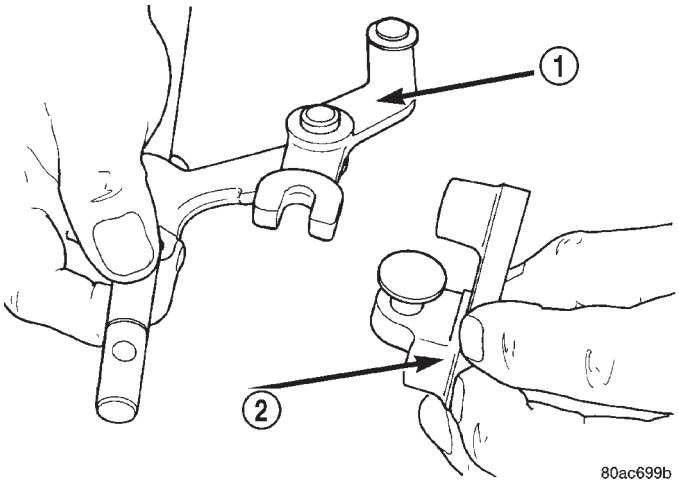


Fig. 49 Reverse Arm Bracket And Fork

1 - REVERSE SHIFT FORK
2 - REVERSE ARM BRACKET

(9) Install reverse shift rail into intermediate plate and position reverse arm bracket to intermediate plate (Fig. 50).

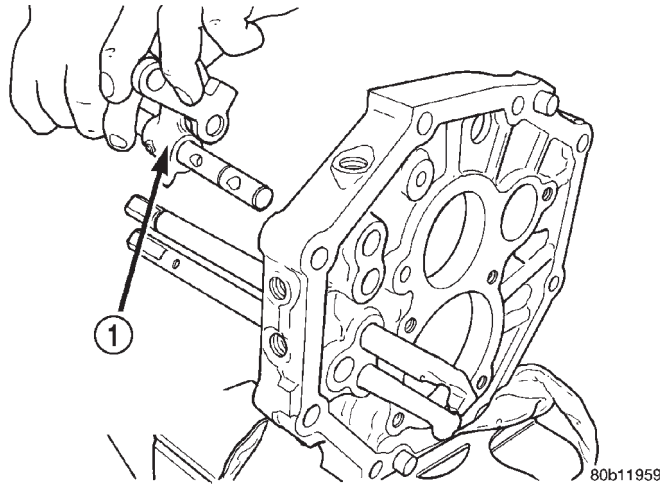


Fig. 50 Reverse Shift Rail

1 - REVERSE SHIFT RAIL AND FORK

(10) Install snap-ring onto reverse shift rail (Fig. 51).

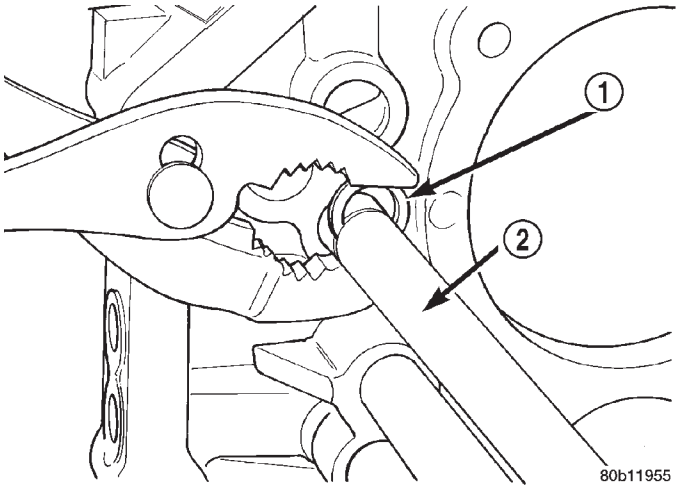


Fig. 51 Reverse Snap-ring

1 - SNAP RING
2 - REVERSE SHIFT RAIL

(11) Install reverse shift head and rail assembly into the intermediate plate.

(12) Install fifth gear interlock ball and check ball (Fig. 52).

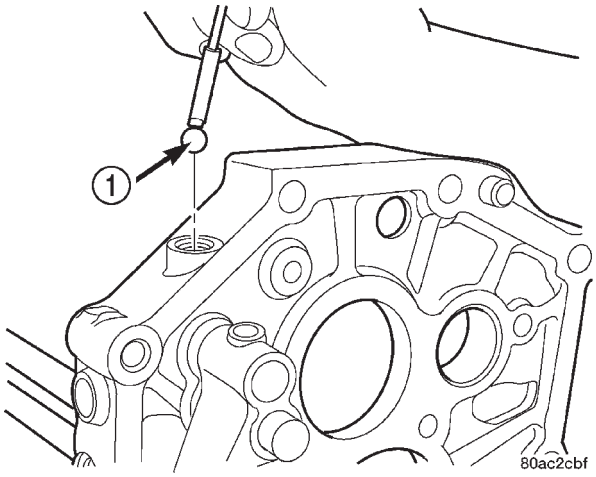


Fig. 52 Check Ball

1 - FIFTH GEAR CHECK BALL

MANUAL-AX5 (Continued)

(13) Install fifth gear shift rail (Fig. 53).

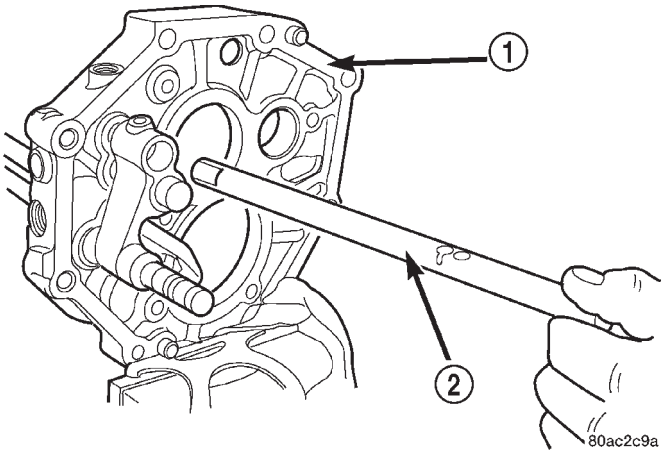


Fig. 53 Fifth Gear Shift Rail

1 - INTERMEDIATE PLATE
2 - FIFTH GEAR SHIFT RAIL

(14) Remove intermediate plate from the vise, rotate plate 180° and reinstall plate in the vise using the same bolt and washer mounting set-up.

(15) Install shift rail detent balls in the intermediate plate.

(16) Install shift rail detent springs in the intermediate plate.

NOTE: Bottom detent spring is shorter than the others.

(17) Install shift rail detent plugs in the intermediate plate.

(18) Install 1-2 shift fork onto the 1-2 and 3-4 shift rails (Fig. 54).

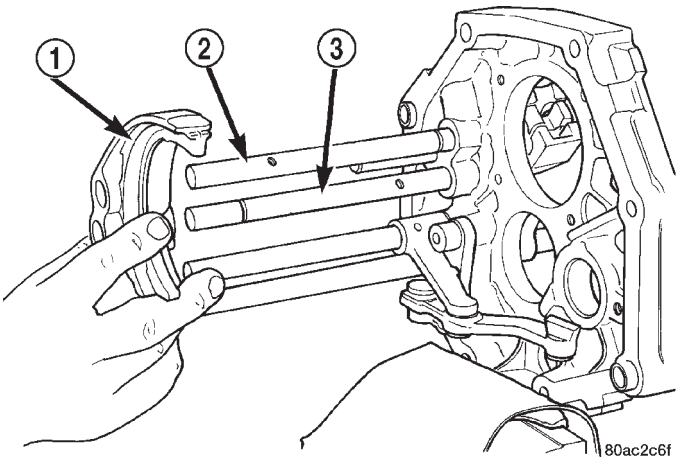


Fig. 54 1-2 Shift Fork

1 - 1-2 SHIFT FORK
2 - 3-4 SHIFT RAIL
3 - 1-2 SHIFT RAIL

(19) Install snap-ring onto the 1-2 shift rail.

(20) Install 3-4 shift fork onto the 3-4 shift rail (Fig. 55).

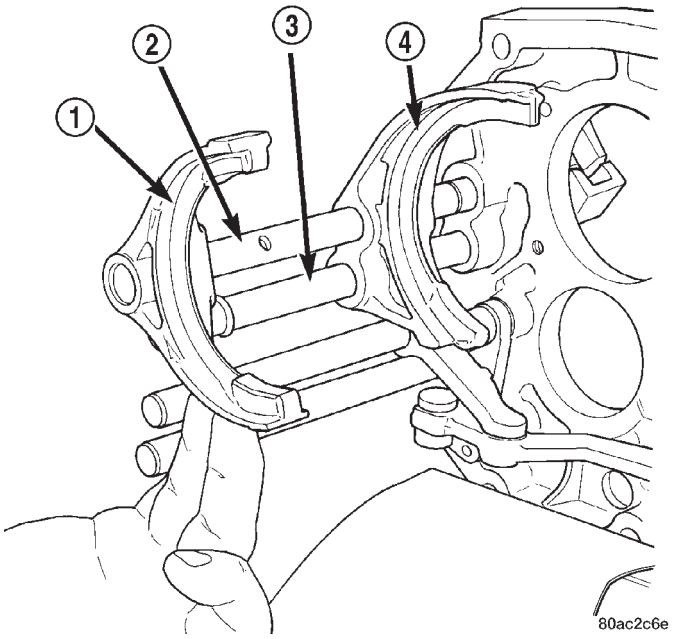


Fig. 55 3-4 SHIFT FORK

1 - 3–4 SHIFT FORK
2 - 3–4 SHIFT RAIL
3 - 1–2 SHIFT RAIL
4 - 1–2 SHIFT FORK

(21) Install mainshaft into intermediate plate. Guid output shaft through opening in intermediate plate until the shift forks are aligned with the appropriate synchronizer sleeves. The mainshaft rear bearing will be started in the intermediate plate but not fully driven in at this point.

(22) While an assistant supports the mainshaft, align rear of countershaft with inner race of countershaft rear bearing.

(23) Raise countershaft upward until gears mesh with the mating gears on the mainshaft.

(24) With a rubber mallet, tap on the input shaft and the front of the countershaft equally to install mainshaft rear bearing into intermediate plate and the rear of the countershaft into the rear countershaft bearing. It necessary hold countershaft into the intermediate plate and tap the countershaft rear bearing onto the countershaft and into the intermediate plate.

(25) Install snap-rings onto the rear mainshaft and countershaft bearings.

(26) Install bolts to hold the reverse shift arm bracket to the intermediate plate.

MANUAL-AX5 (Continued)

(27) Install **new** bolts to hold the shift forks to the shift rails (Fig. 56).

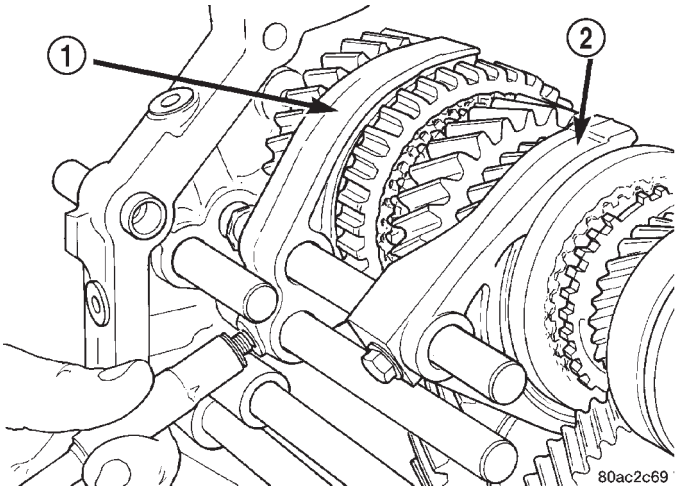


Fig. 56 Shift Fork Bolts

1 - 1-2 SHIFT FORK
2 - 3-4 SHIFT FORK

(28) Position mainshaft rear bearing retainer over the output shaft and onto the intermediate plate.

(29) Install **new** bearing retainer bolts into the intermediate plate.

(30) Move reverse shift arm into the reverse gear position. The reverse gear position is with the arm moved away from the intermediate plate (Fig. 57).

(31) Install reverse idler gear assembly into position on the mainshaft and reverse shift arm.

(32) Install compression spring and pin into the reverse idler gear shaft (Fig. 58).

(33) Install reverse idler shaft through the intermediate plate and reverse idler gear assembly (Fig. 59) until idler shaft pin contacts the gear assembly.

NOTE: The notched cut-out in the idler shaft goes toward the rear of the transmission.

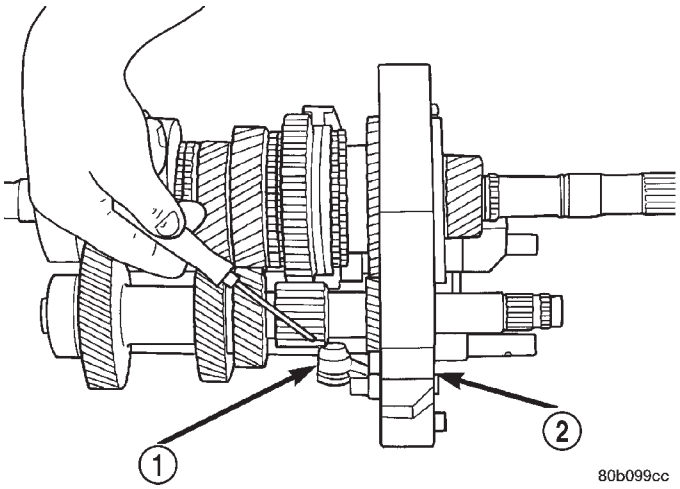


Fig. 57 Reverse Shift Arm Position

1 - REVERSE SHIFT ARM
2 - INTERMEDIATE PLATE

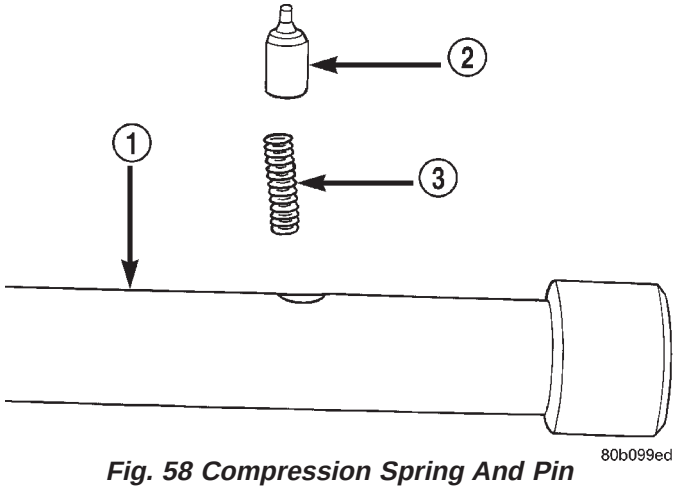


Fig. 58 Compression Spring And Pin

1 - REVERSE IDLER GEAR SHAFT
2 - PIN
3 - COMPRESSION SPRING

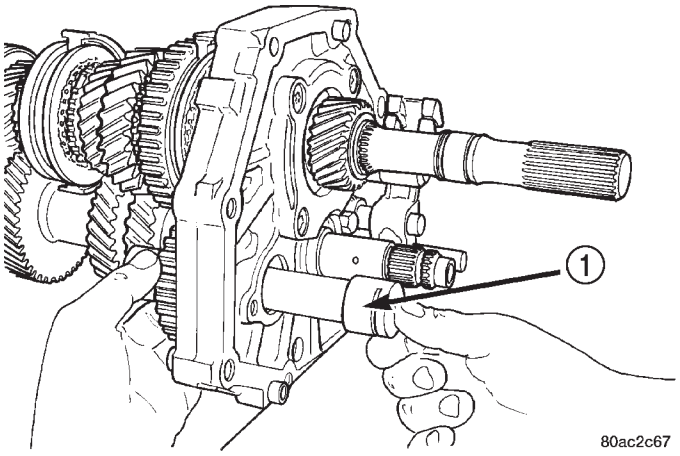


Fig. 59 Reverse Idler Shaft

1 - REVERSE IDLER SHAFT

MANUAL-AX5 (Continued)

(34) Align pin with the alignment notch in the reverse idler gear assembly (Fig. 60). Alignment notch in the reverse idler gear race/hub is a small relief cut above one of the main longitudinal slots. Verify pin is aligned with proper slot, the opposite slot has an oil drain hole which the pin will drop into. The assembly will then be locked onto the shaft and will need to be disassembled in order to be removed.

(35) Depress compression spring and pin in reverse idler gear shaft (Fig. 61).

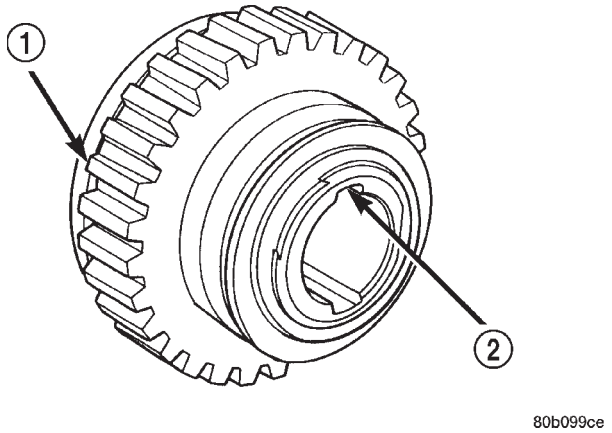


Fig. 60 Align Idler Shaft Pin

1 - REVERSE IDLER GEAR ASSEMBLY
2 - ALIGNMENT NOTCH

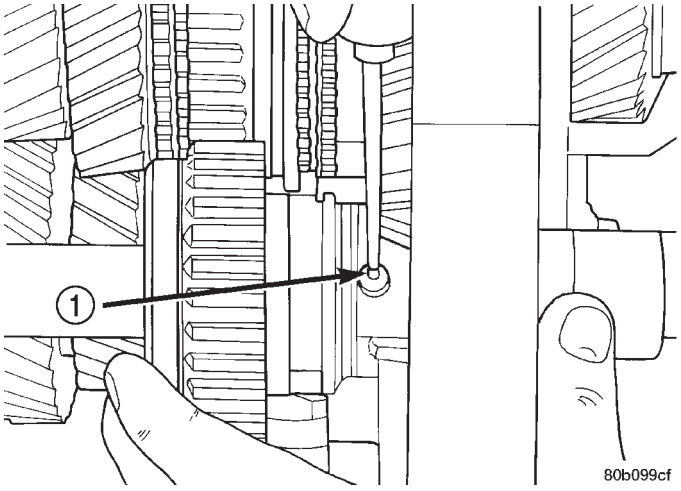


Fig. 61 Depress Pin In Reverse Idler Gear Shaft

1 - DEPRESS PIN

(36) Install reverse idler gear shaft the remainder of the way through the reverse idler gear assembly.

(37) Position reverse idler gear shaft lock plate onto the intermediate plate.

(38) Install a **new** bolt to hold the idler gear shaft lock plate to the intermediate plate.

(39) Install fifth gear thrust ring lock ball to the countershaft (Fig. 62).

(40) Install fifth gear thrust ring onto the countershaft and over the lock ball (Fig. 63).

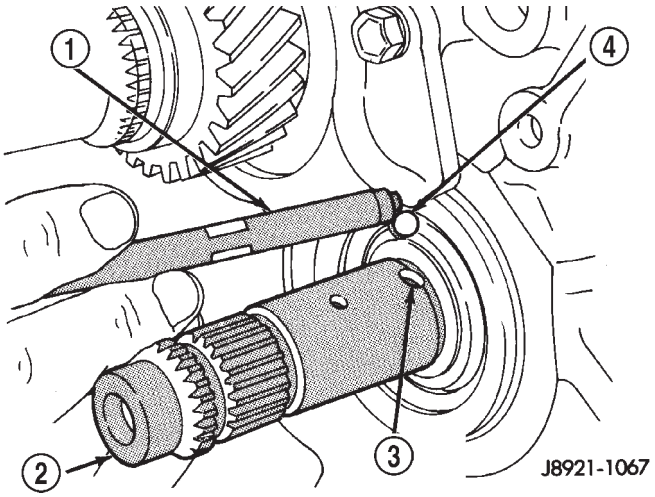


Fig. 62 Fifth Gear Thrust Ring Lock Ball

1 - PENCIL MAGNET
2 - CLUSTER GEAR
3 - LOCK BALL RECESS
4 - THRUST RING LOCK BALL

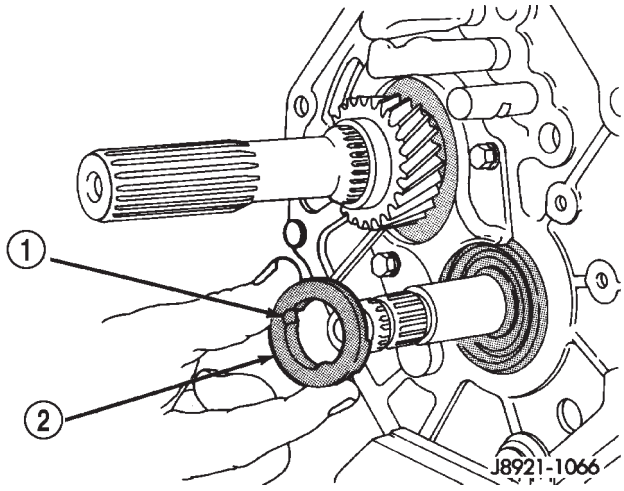


Fig. 63 Fifth Gear Thrust Ring

1 - LOCK BALL NOTCH
2 - FIFTH GEAR THRUST RING

MANUAL-AX5 (Continued)

(41) Install fifth gear shift fork to the countershaft fifth gear assembly.

(42) Install countershaft fifth gear bearings into the countershaft fifth gear assembly.

(43) Position countershaft fifth gear assembly on the countershaft. Verify fifth gear fork is installed onto the fifth gear shift rail.

(44) Install fifth gear synchro ring.

(45) Position fifth gear blocker ring onto the countershaft.

(46) With a mallet and spacer, tap fifth gear blocker ring onto the countershaft.

(47) Install **new** bolt to hold fifth gear shift fork to the fifth gear shift rail (Fig. 64).

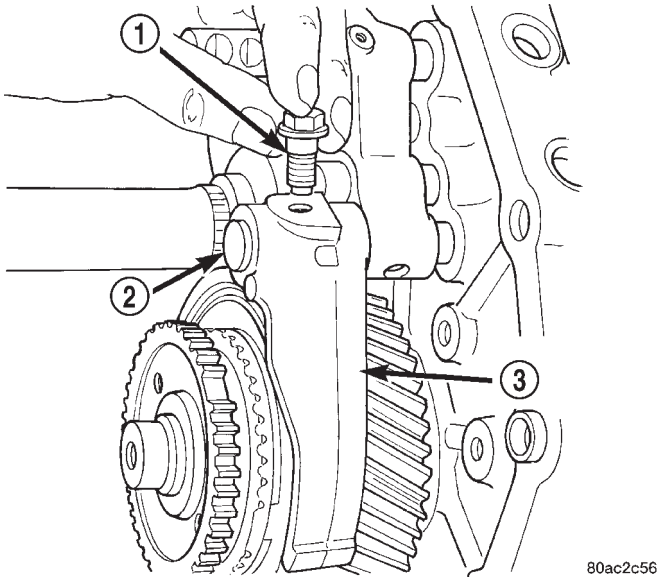


Fig. 64 Fifth Gear Retainer Bolt

1 - SHIFT FORK RETAINER BOLT
2 - FIFTH GEAR SHIFT RAIL
3 - FIFTH GEAR SHIFT FORK

(48) Measure countershaft fifth gear thrust clearance.

(49) Select a snap-ring that will provide a thrust clearance of 0.10-0.30 mm (0.004-0.010 in.).

(50) Install snap-ring to hold fifth gear blocker ring onto countershaft.

(51) Remove intermediate plate from vise and remove bolts and washers from intermediate.

EXTENSION AND ADAPTER HOUSING

(1) Remove any residual sealer from transmission case, intermediate plate, and adapter/extension housing.

(2) Apply a 1/8 to 3/16 inch wide bead of Threebond® Liquid Gasket TB1281. Make sure to keep sealer bead to inside of bolt holes (Fig. 65).

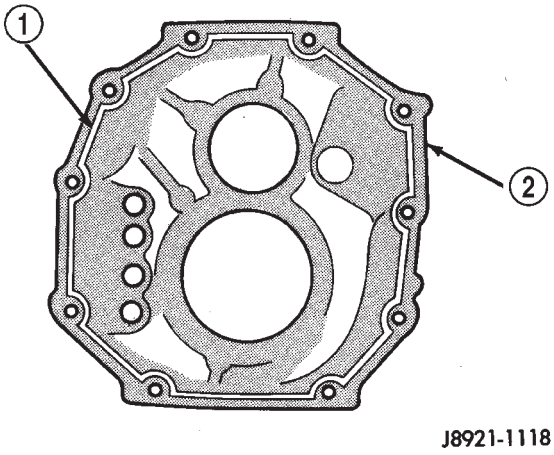


Fig. 65 Transmission Gear Case Sealer

1 - SEALER BEAD
2 - GEAR CASE

(3) Align geartrain and shift rails with mating holes in transmission case. Install transmission case to the intermediate plate (Fig. 66). Verify transmission case is seated on the intermediate plate locating pins.

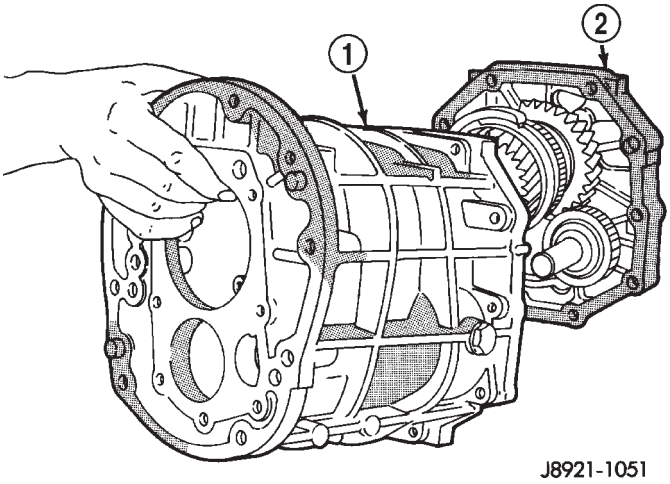


Fig. 66 Transmission Gear Case And Intermediate Plate

1 - GEAR CASE
2 - INTERMEDIATE PLATE

MANUAL-AX5 (Continued)

(4) Install **new** front bearing snap rings (Fig. 67).

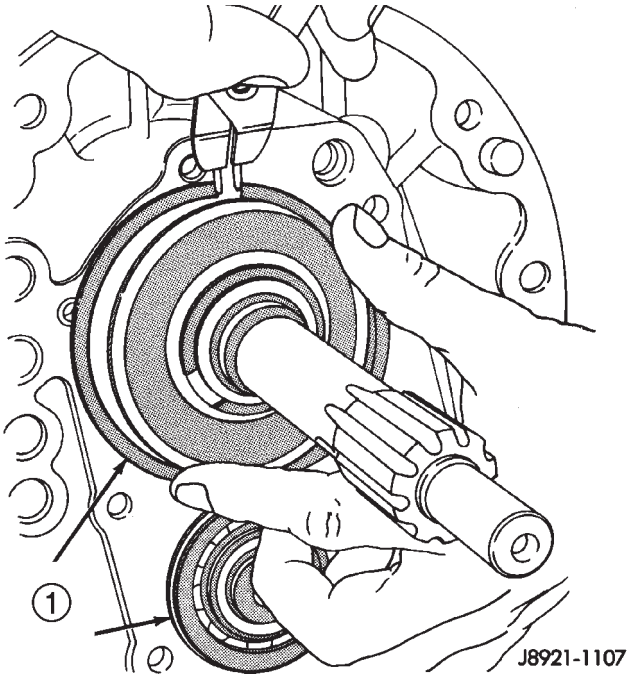


Fig. 67 Front Bearing

1 - FRONT BEARING SNAP RINGS

(5) Install front bearing retainer gasket to front bearing retainer.

(6) Install front bearing retainer (Fig. 68) and tighten bolts to 17 N·m (12 ft. lbs.).

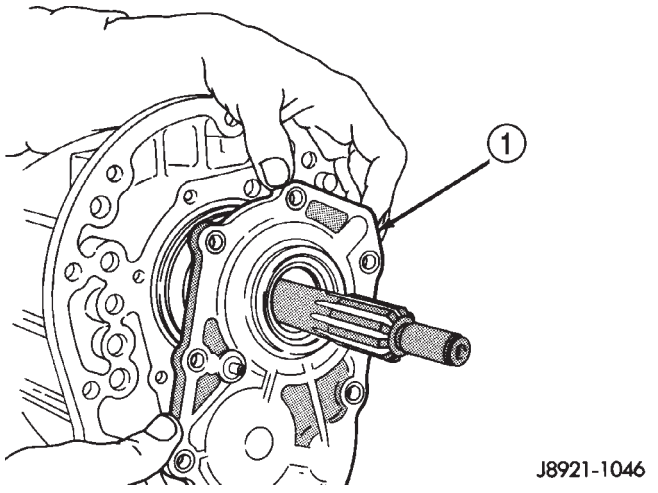


Fig. 68 Front Bearing Retainer

1 - FRONT BEARING RETAINER

(7) On 4x2 transmissions, install speedometer drive gear locating snap-ring (Fig. 69). Install speedometer gear lock ball in output shaft and install speedometer gear onto output shaft. Install speedometer gear retaining snap-ring onto output shaft.

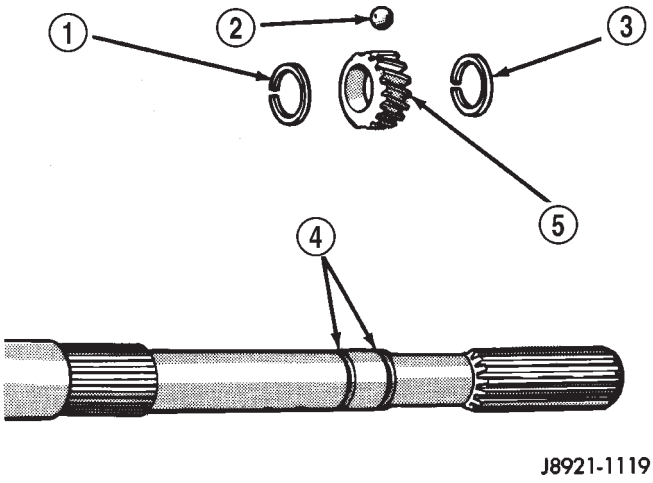


Fig. 69 Speedometer Drive Gear

1 - SNAP RING
2 - LOCK BALL
3 - SNAP RING
4 - OUTPUT SHAFT GROOVES
5 - SPEEDOMETER GEAR

(8) Apply a 1/8 to 3/16 inch wide bead of Threebond® Liquid Gasket TB1281 or equivalent, to sealing surface of adapter/extension housing. Keep sealer bead to inside of bolt holes.

(9) Install adapter or extension housing on intermediate plate (Fig. 70). Tighten housing bolts to 34 N·m (25 ft. lbs.).

(10) Position shift arm in shifter tower opening of adapter or extension housing (Fig. 71). Verify shifter arm is engaged into the shift rails.

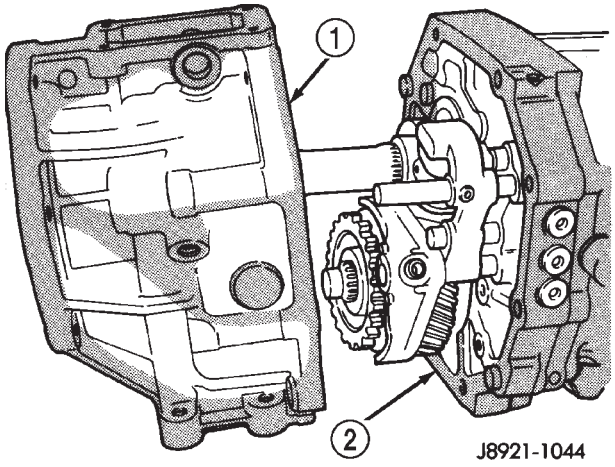


Fig. 70 Adapter/Extension Housing–Typical

1 - ADAPTER HOUSING
2 - INTERMEDIATE PLATE

MANUAL-AX5 (Continued)

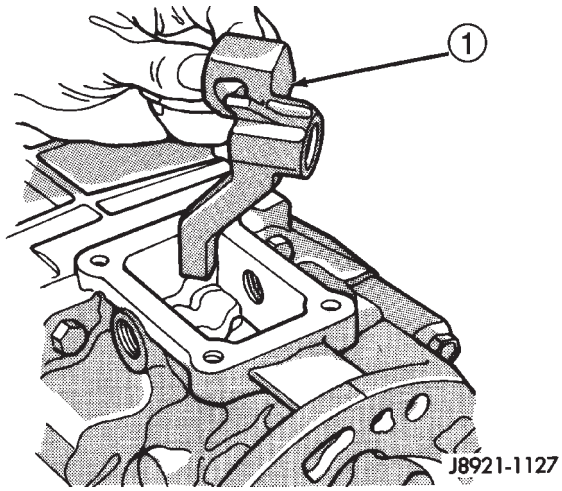


Fig. 71 Position Shift Arm

1 - SHIFT ARM

(11) Start shifter arm shaft in hole in back of adapter or extension housing. Align shift arm and shifter arm shaft. Insert shifter arm shaft through the shifter arm and into forward portion of the adapter or extension housing (Fig. 72).

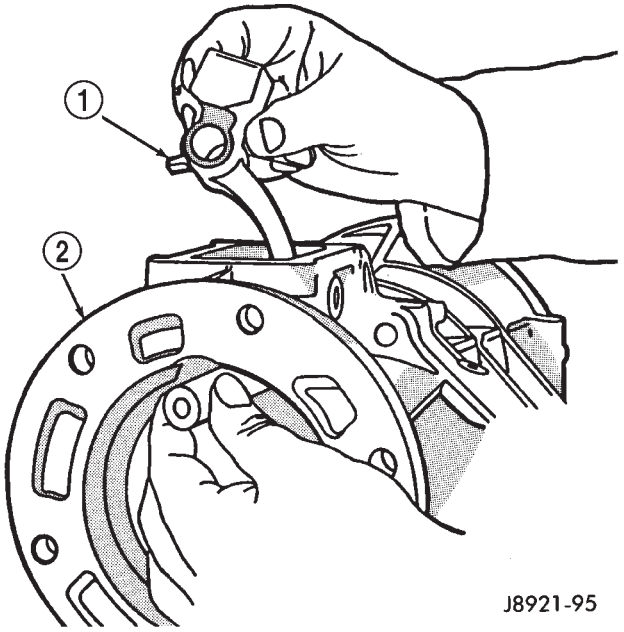


Fig. 72 Shifter Arm Shaft

1 - SHIFT ARM
2 - ADAPTER OR EXTENSION HOUSING

(12) Rotate shifter arm shaft until the hole in the shift arm is aligned with the hole in the shaft.

(13) Install shift arm retainer bolt and tighten to 38 N·m (28 ft. lbs.) (Fig. 73).

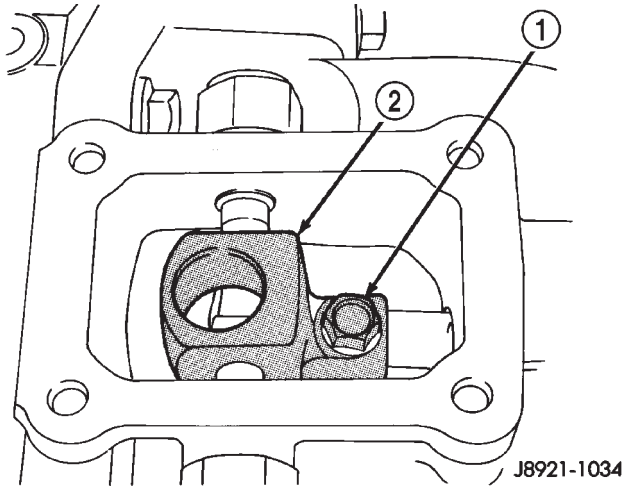


Fig. 73 Shift Arm Retainer Bolt

1 - RETAINER BOLT
2 - SHIFT ARM

(14) Install and tighten shifter arm shaft plug to 18 N·m (13 ft. lbs.) (Fig. 74).

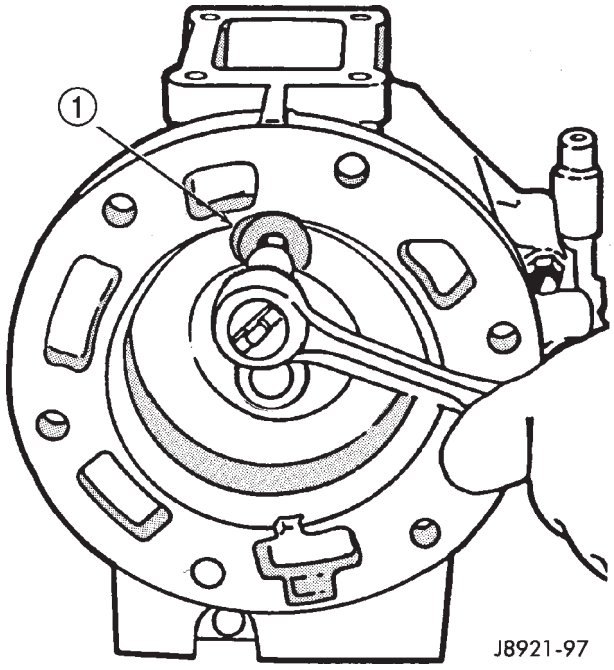


Fig. 74 Shifter Arm Shaft Plug

1 - SHAFT PLUG

MANUAL-AX5 (Continued)

(15) Install shift restrictor pins in shift tower and tighten to 27 N·m (20 ft. lbs.) (Fig. 75).

CAUTION: Restrictor pins are not interchangeable and are color coded. Verify pins are installed in the original locations.

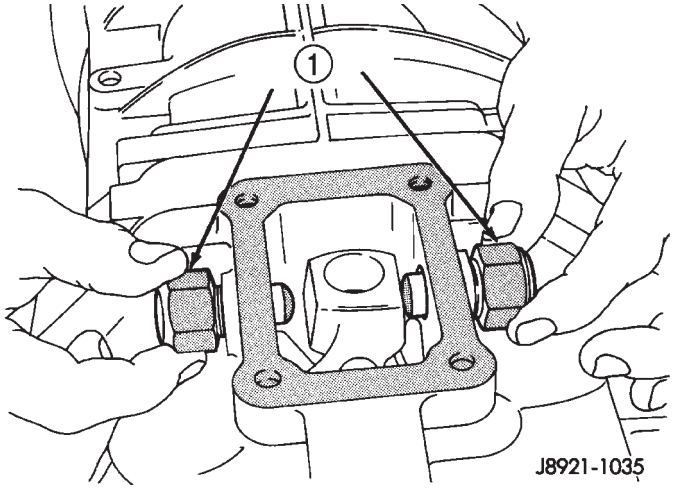


Fig. 75 Shifter Restrictor

1 - RESTRICTOR PINS

(16) Install shift detent ball in detent opening of case (Fig. 76).

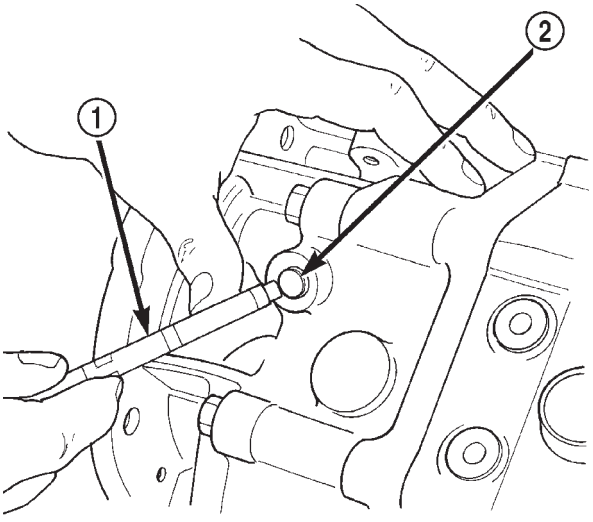


Fig. 76 Detent Ball

1 - PENCIL MAGNET
2 - SHIFT DETENT BALL

(17) Install detent spring in case (Fig. 77).

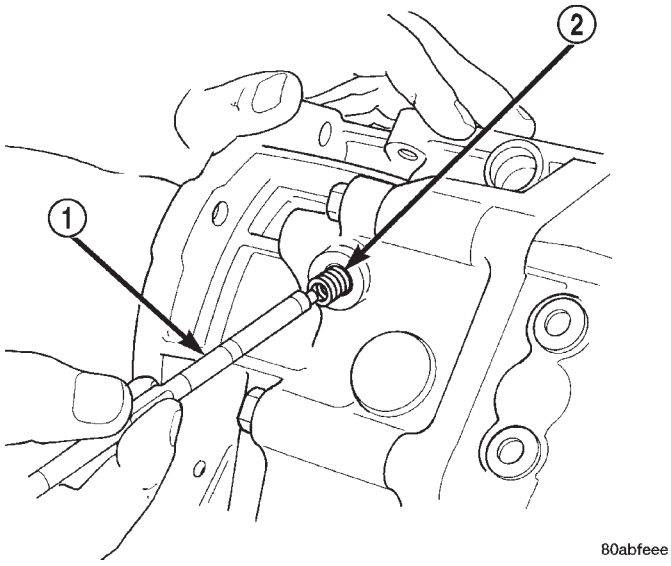


Fig. 77 Detent Spring

1 - PENCIL MAGNET
2 - DETENT BALL SPRING

(18) Install detent plug and tighten to 19 N·m (14 ft. lbs.) (Fig. 78).

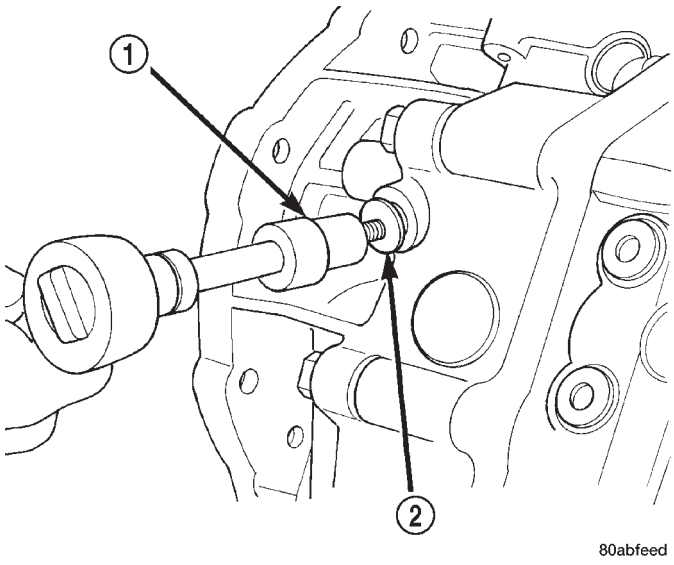


Fig. 78 Detent Ball Plug

1 - TORX BIT
2 - DETENT BALL PLUG

MANUAL-AX5 (Continued)

(19) Install shift tower gasket onto shift tower.
(20) Install shift tower oil deflector and gasket onto the adapter or extension housing.
(21) Install shift tower onto transmission case (Fig. 79).
(22) Install shift tower bolts and tighten to 18 N·m (13 ft. lbs.).

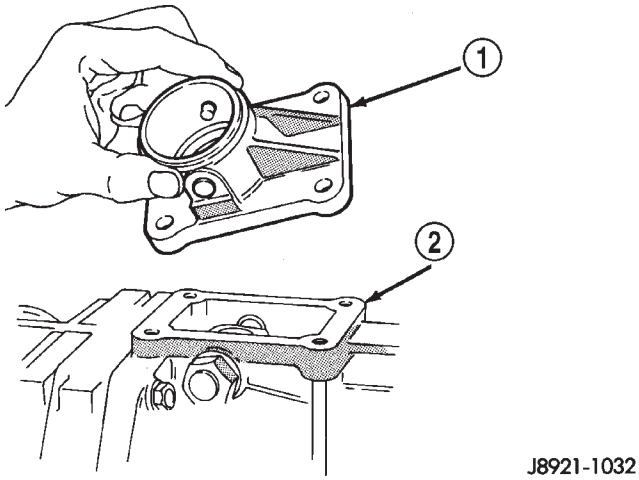


Fig. 79 Shift Tower

1 - SHIFT TOWER
2 - ADAPTER/EXTENSION HOUSING

(23) Install **new** metal o-ring onto the backup lamp switch.
(24) Install backup lamp switch (Fig. 80) and tighten to 44 N·m (32.5 ft. lbs.).

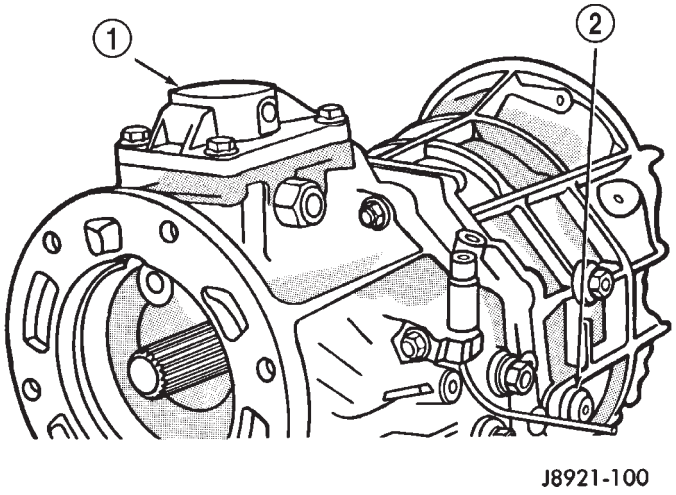


Fig. 80 Backup Lamp Switch

1 - SHIFT TOWER
2 - BACKUP LAMP SWITCH

(25) Install **new** seal in adapter/extension housing.
(26) Install vehicle speed sensor, if necessary.
(27) Install clutch housing, release bearing, release fork and retainer clip.

MANUAL-AX5 (Continued)

SPECIFICATIONS

SPECIFICATIONS - MANUAL - AX5

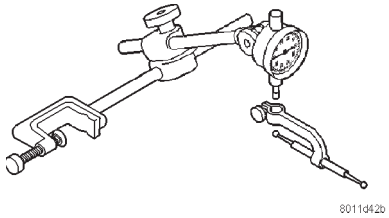
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Plugs, Access	19	14	-
Bolts, Adapter Housing	34	25	-
Switch, Back-up Light	44	32.5	-
Plugs, Drain and Fill	44	32.5	-
Bolts, Front Bearing Retainer	17	12	-
Plugs, Interlock and Detent	19	14	-
Screws, Propeller Shaft Clamp	16-23	-	140-200
Bolts, Rear Mount to Transmission	33-60	24-44	-
Nut, Rear Mount Clevis	54-75	40-55	-
Nuts, Rear Mount to Crossmember	41-68	30-50	-
Pins, Restrictor	24.7	20	-
Bolts, Reverse Shift Arm Bracket	18	13	-
Screw, Shift Arm Set	38	28	-
Screws, Shift Fork Set	20	15	-
Nut, Shift Knob	20-34	15-25	-
Screws, Shifter Floor Cover	2-3	-	17-30
Bolts, Shift Tower	18	13	-
Nuts, Transfer Case Mounting	30-41	22-30	-

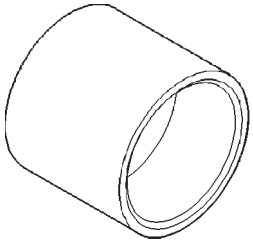
MANUAL-AX5 (Continued)

SPECIAL TOOLS

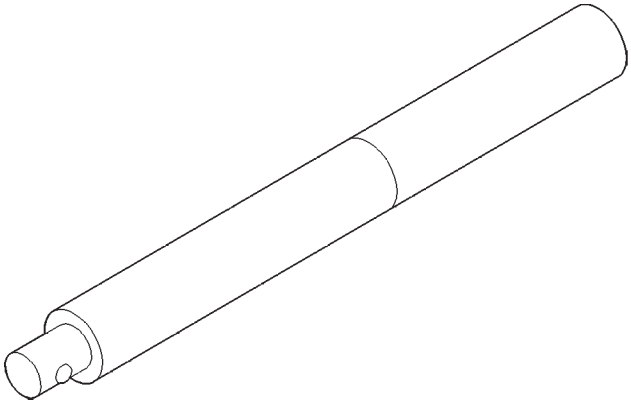
TRANSMISSION



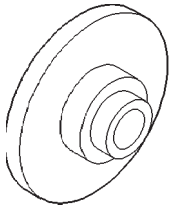
Dial Indicator C-3339



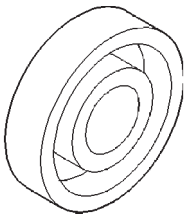
Installer C-3995-A



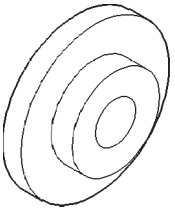
Handle C-4171



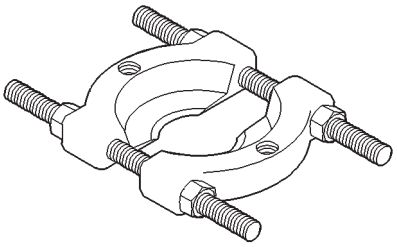
Installer 8211



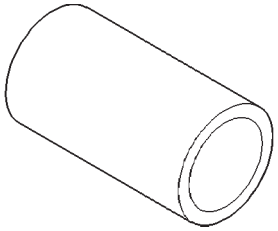
Installer 8212



Installer 8208



Splitter P-334

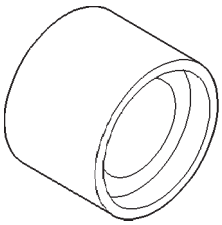


Installer 8109

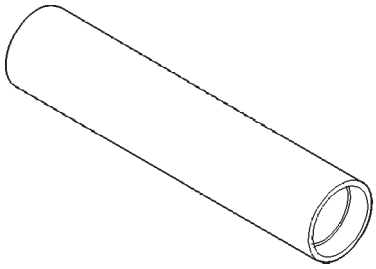


Tube Driver L-4507

MANUAL-AX5 (Continued)



Adapter 6747-1A



Installer MD-998805

BEARING RETAINER

REMOVAL

(1) Remove release bearing and lever from the transmission.

(2) Remove the bolts holding the front bearing retainer to the transmission case.

(3) Remove the front bearing retainer from the transmission case.

(4) With a pry tool, remove the front bearing retainer seal.

INSTALLATION

(1) Install new seal in the front bearing retainer with Tool Handle C-4171 and Installer 8211 (Fig. 81).

(2) Remove any residual gasket material from the sealing surfaces of the bearing retainer and the transmission case.

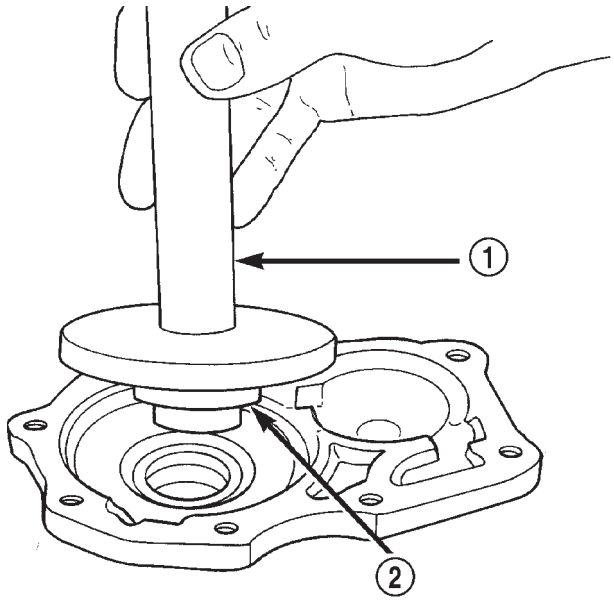
(3) Install new front bearing retainer gasket to the front bearing retainer.

(4) Install the front bearing retainer onto the transmission case.

(5) Install the bolts to hold the bearing retainer onto the transmission case.

(6) Tighten the bolts to 17 N·m (12 ft. lbs.).

(7) Install release bearing and lever onto the transmission.



80b099ca

Fig. 81 Front Bearing Retainer Seal

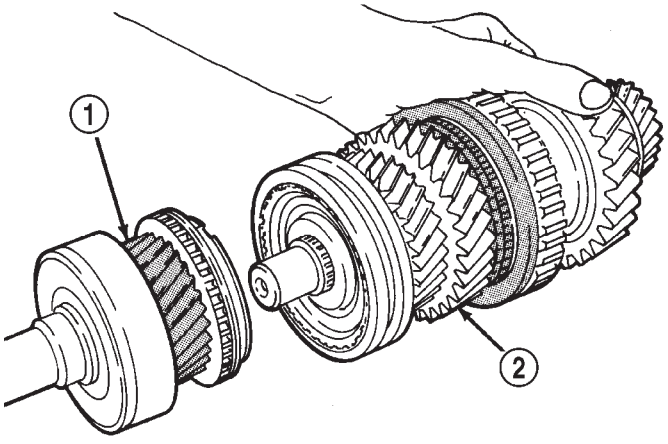
1 - HANDLE
2 - INSTALLER

INPUT SHAFT

DISASSEMBLY

(1) Verify that the 3-4 synchronizer is in the neutral position.

(2) Separate input shaft from output shaft (Fig. 82). Note that the output shaft pilot bearing is an uncaged roller type bearing.



J8921-1089

Fig. 82 Input and Output Shafts

1 - INPUT SHAFT ASSEMBLY
2 - OUTPUT SHAFT AND GEAR ASSEMBLY

INPUT SHAFT (Continued)

(3) Remove output shaft pilot bearing rollers from the input shaft and the output shaft.

(4) Remove fourth gear synchronizer ring from the input shaft (Fig. 83).

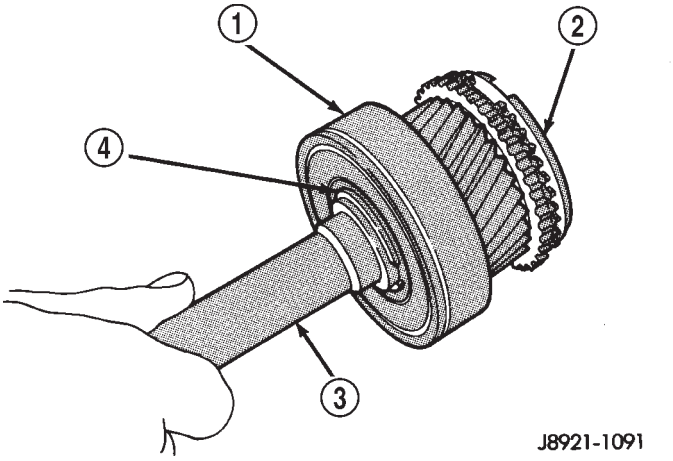


Fig. 83 Input Shaft Components

1 - BEARING
2 - SYNCHRO RING
3 - INPUT SHAFT
4 - BEARING SNAP RING

(5) Remove select fit snap-ring holding the input shaft bearing onto the input shaft.

(6) Remove bearing from the input shaft with Bearing Splitter P-334 and a shop press.

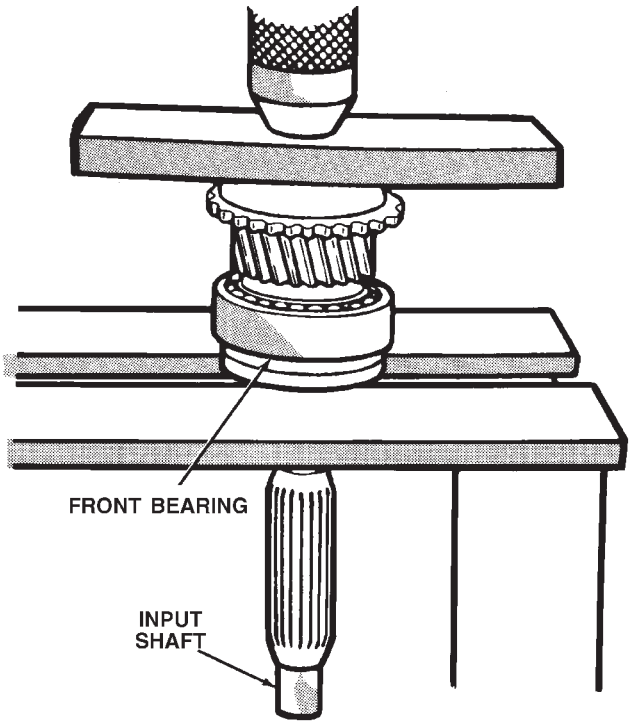
ASSEMBLY

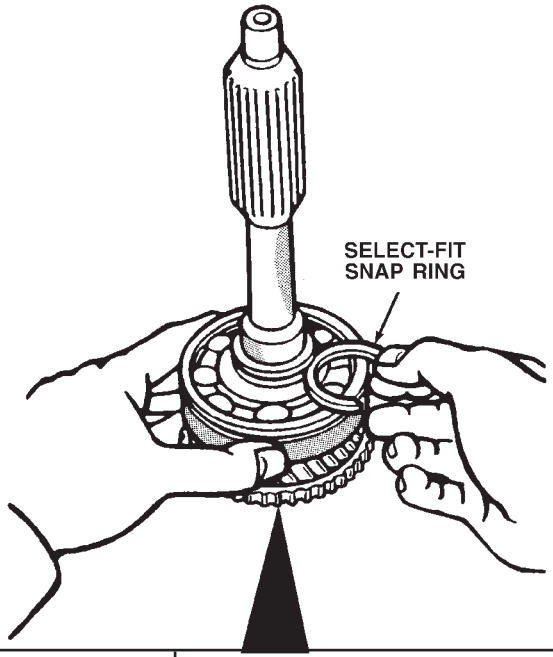
(1) Position input shaft bearing onto input shaft.

(2) Drive bearing onto input shaft with Driver L-4507.

(3) Select the thickest snap-ring that will fit into the snap-ring groove of the input shaft (Fig. 84).

(4) Lubricate output shaft pilot bearing bore of input shaft with petroleum jelly.





I.D. Mark	Snap Ring Thickness mm (in.)
0	2.05-2.10 (0.0807-0.0827)
1	2.10-2.15 (0.0827-0.0846)
2	2.15-2.20 (0.0846-0.0866)
3	2.20-2.25 (0.0866-0.0886)
4	2.25-2.30 (0.0886-0.0906)
5	2.30-2.35 (0.0906-0.0925)

J8921-50

Fig. 84 Select Input Shaft Bearing Snap-ring

INPUT SHAFT (Continued)

(5) Install output shaft pilot bearing rollers in input shaft bore (Fig. 85). Ensure to use sufficient petroleum jelly to hold rollers in position.

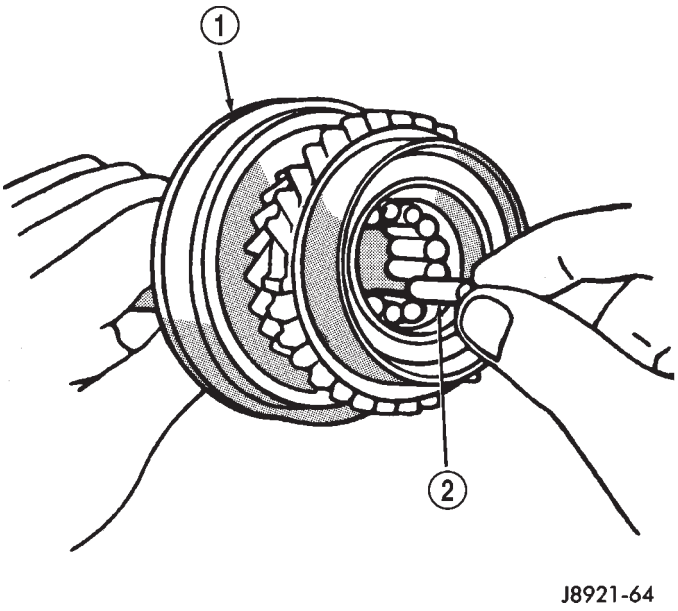


Fig. 85 Install Output Shaft Pilot Bearing Rollers

1 - INPUT SHAFT
2 - BEARING ROLLERS

(6) Install fourth gear synchronizer ring onto the input shaft.

(7) Install input shaft to output shaft. Use care when mating the two shafts not to displace any output shaft pilot bearing rollers.

OUTPUT SHAFT

DISASSEMBLY

(1) Remove input shaft and output shaft pilot bearing rollers from output shaft.

(2) Measure and note thrust clearance of output shaft gears (Fig. 86). Clearance should be 0.10-0.25 mm (0.004-0.010 in.).

(3) Remove output shaft fifth gear snap ring with two screwdrivers (Fig. 87).

(4) With Bearing Splitter P-334 or press plates positioned under first gear, press fifth gear, rear bearing, first gear and first gear bearing inner race off output shaft (Fig. 88).

(5) Remove first gear needle roller bearing from output shaft.

(6) Remove first gear bearing inner race lock ball with pencil magnet (Fig. 89).

(7) Remove first gear synchronizer ring.

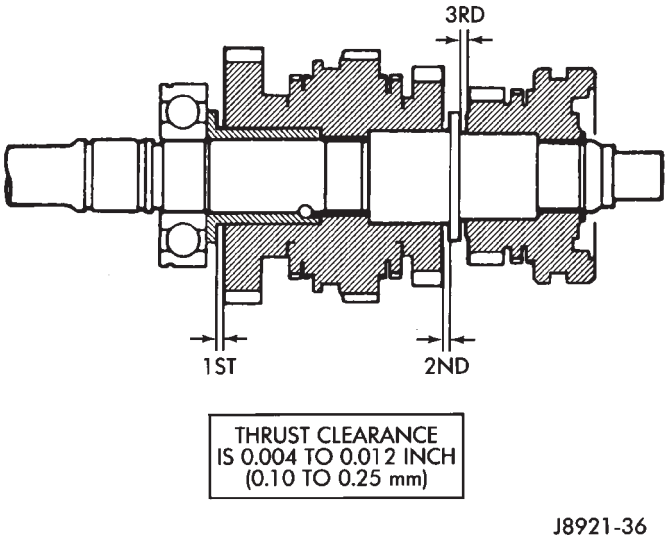


Fig. 86 Output Shaft Gear

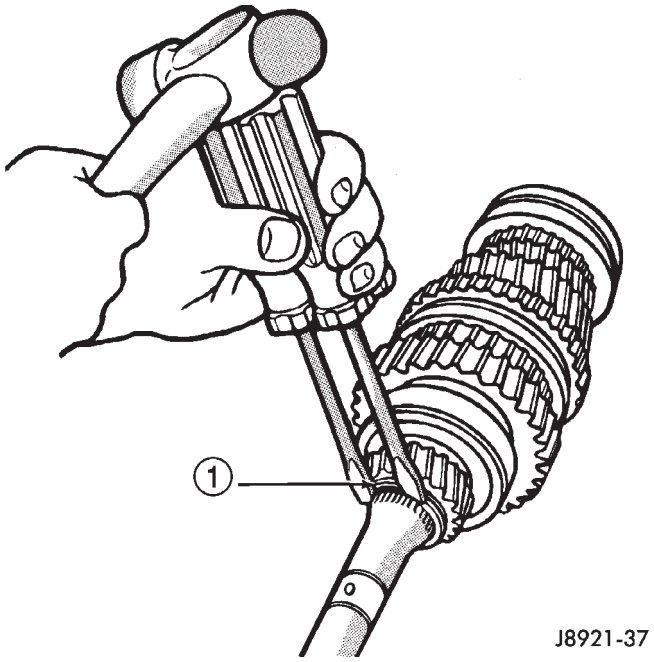


Fig. 87 Fifth Gear Snap-ring

1 - SNAP RING

(8) With Bearing Splitter P-334 or press plates positioned under second gear, press 1-2 synchronizer, reverse gear, and second gear from output shaft (Fig. 90).

(9) Remove second gear needle roller bearing from the output shaft or second gear.

(10) Remove select fit snap-ring holding the 3-4 synchronizer onto the output shaft (Fig. 91).

OUTPUT SHAFT (Continued)

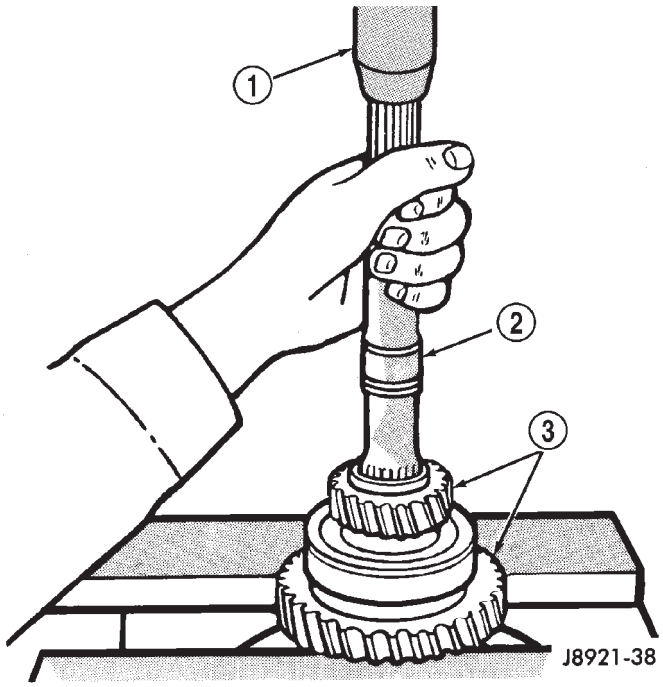


Fig. 88 Fifth Gear, First Gear Bearing And Race

1 - PRESS RAM
2 - OUTPUT SHAFT
3 - FIRST-FIFTH GEAR-BEARING ASSEMBLY

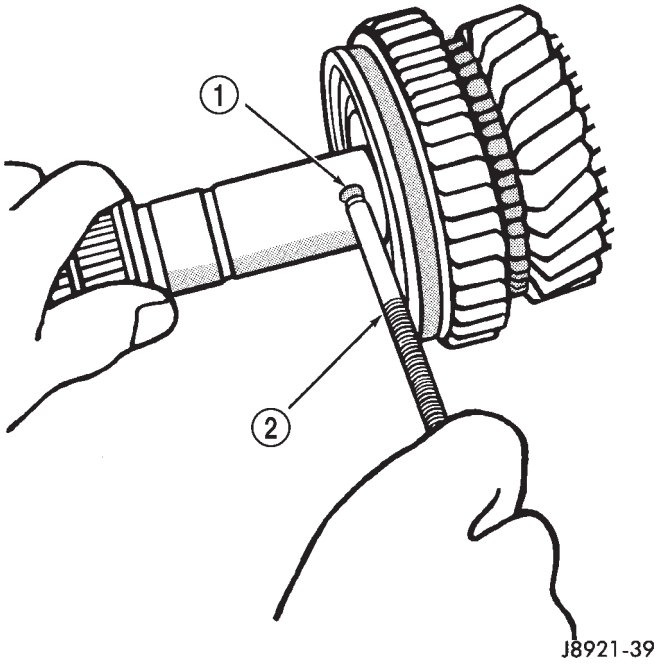


Fig. 89 First Gear Bearing Inner Race Lock Ball

1 - LOCK BALL
2 - PENCIL MAGNET

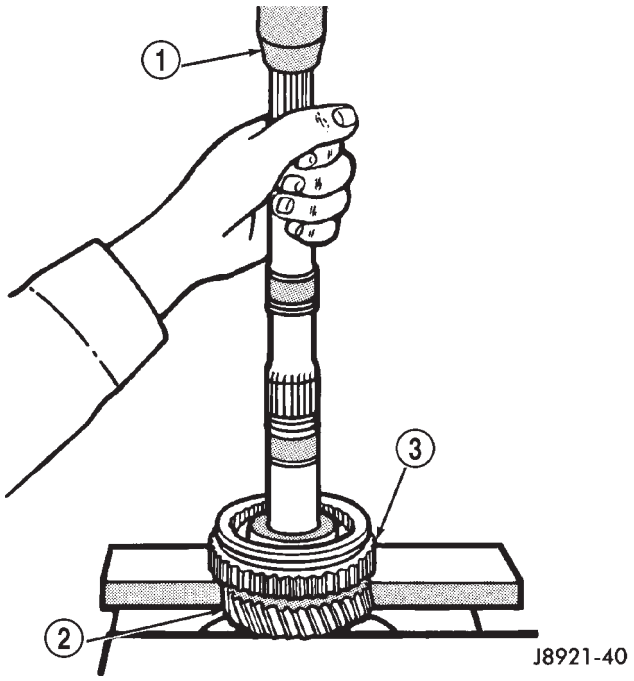


Fig. 90 Second Gear, Reverse Gear And 1-2 Synchronizer

1 - PRESS RAM
2 - SECOND GEAR
3 - 1-2 SYNCHRONIZER HUB

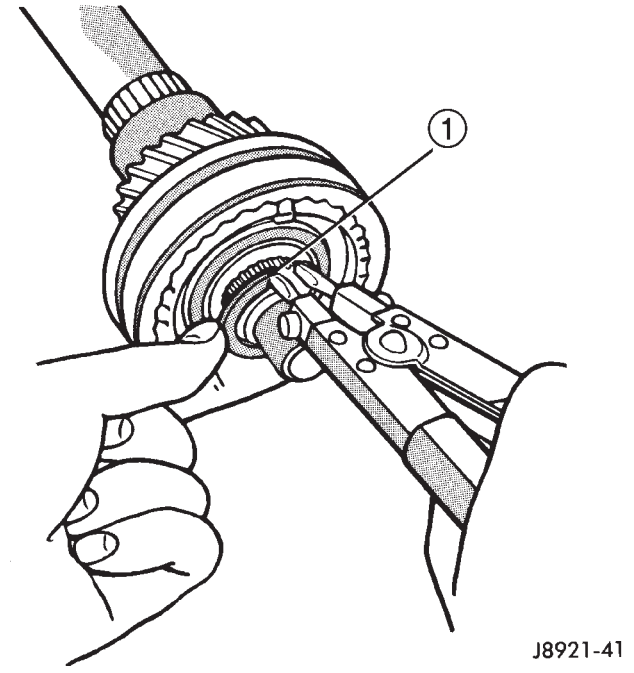


Fig. 91 3-4 Synchronizer Snap Ring

1 - 3-4 SYNCHRONIZER SNAP RING

OUTPUT SHAFT (Continued)

(11) With Bearing Splitter P-334 or press plates positioned under third gear, press the 3-4 synchronizer and third gear from output shaft (Fig. 92).

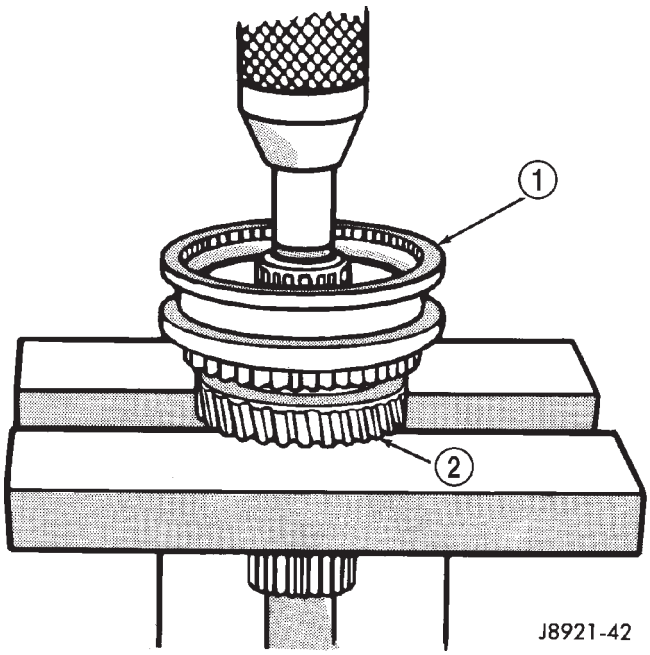


Fig. 92 3-4 Synchronizer And Third Gear

1 - 3-4 SYNCHRONIZER
2 - THIRD GEAR

(12) Remove third gear needle roller bearing from output shaft or gear.

ASSEMBLY

NOTE: Lubricate the transmission components with Mopar 75W-90 GL 3 gear lubricant during assembly. Use petroleum jelly to lubricate seal lips and/or hold parts in place during installation.

Refer to (Fig. 93) during assembly for AX5 gear assembly identification.

(1) Lubricate transmission components with specified gear lubricant.

(2) If necessary, assemble 1-2 and 3-4 synchronizer hubs, sleeves, springs and key inserts (Fig. 94).

(3) Install third gear needle bearing onto the output shaft.

(4) Install third gear over bearing and onto output shaft flange.

(5) Install third gear synchronizer ring to third gear.

(6) Position the 3-4 synchronizer onto the output shaft.

(7) Using Adapter 6747-1A and a shop press, press the 3-4 synchronizer onto the output shaft.

(8) Select the thickest snap-ring that will fit into the snap-ring groove of the output shaft (Fig. 95).

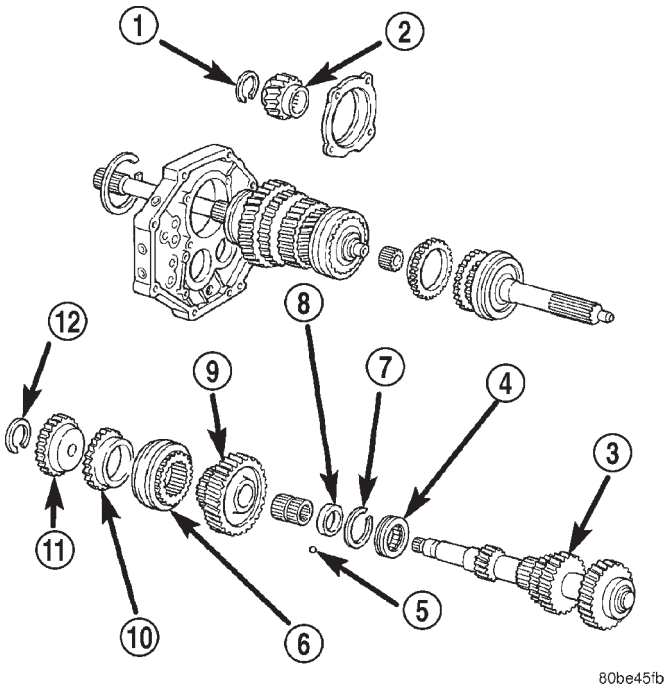


Fig. 93 Geartrain Components

1 - SNAP RING
2 - FIFTH GEAR
3 - COUNTER GEAR
4 - BEARING
5 - LOCK BALL
6 - SYNCHRO HUB/SLEEVE
7 - SNAP RING
8 - SPACER
9 - COUNTER 5TH GEAR
10 - SYNCHRO RING
11 - 5TH SPLINE GEAR
12 - SNAP RING

(9) Install snap-ring to hold 3-4 synchronizer onto output shaft.

(10) Verify third gear thrust clearance with feeler gauge (Fig. 96). Clearance should be 0.10 - 0.25 mm (0.004 - 0.010 in.). If clearance is out of specification, refer to Cleaning and Inspection.

(11) Install second gear needle bearing onto output shaft.

(12) Install second gear over bearing and onto output shaft flange.

(13) Install second gear synchronizer ring onto second gear.

(14) Position 1-2 synchronizer assembly onto splines of output shaft.

(15) With Driver MD-998805, Adapter 6747-1A and a shop press, press the 1-2 synchronizer onto the output shaft.

(16) Install first gear synchronizer ring into 1-2 synchronizer.

(17) Install first gear bearing inner race lock ball in output shaft (Fig. 97).

OUTPUT SHAFT (Continued)

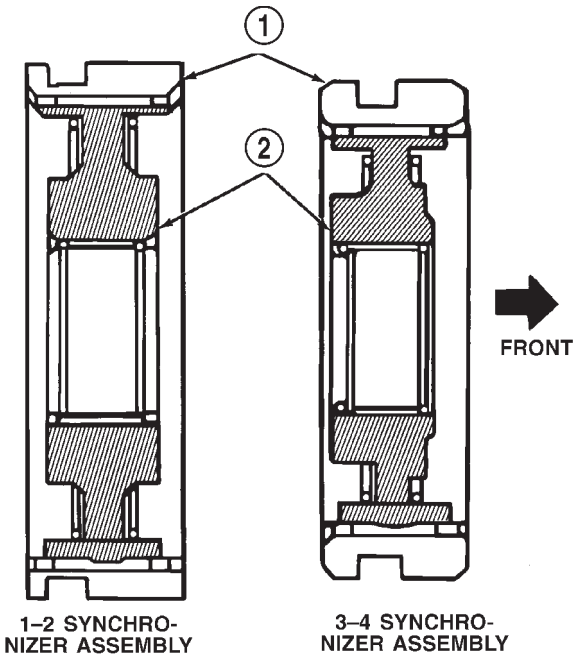
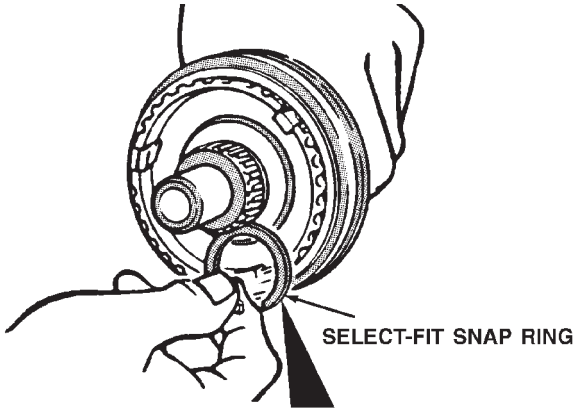


Fig. 94 Synchronizer Identification

1 - SLEEVES
2 - HUBS



I.D. Mark	Snap Ring Thickness mm (in.)
C-1	1.75-1.80 (0.0689-0.0709)
D	1.80-1.85 (0.0709-0.0728)
D-1	1.85-1.90 (0.0728-0.0748)
E	1.90-1.95 (0.0748-0.0768)
E-1	1.95-2.00 (0.0768-0.0787)
F	2.00-2.05 (0.0788-0.0807)
F-1	2.05-2.10 (0.0807-0.0827)

J8921-55

Fig. 95 Select 3-4 Synchronizer Snap-ring

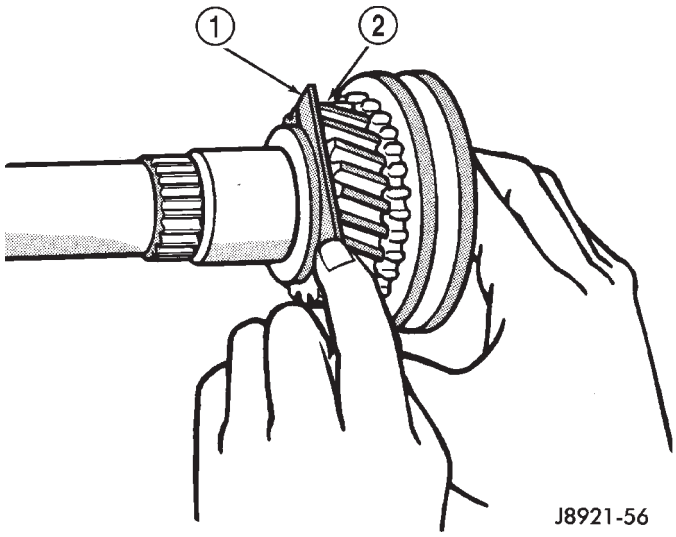


Fig. 96 Third Gear

1 - FEELER GAUGE
2 - THIRD GEAR

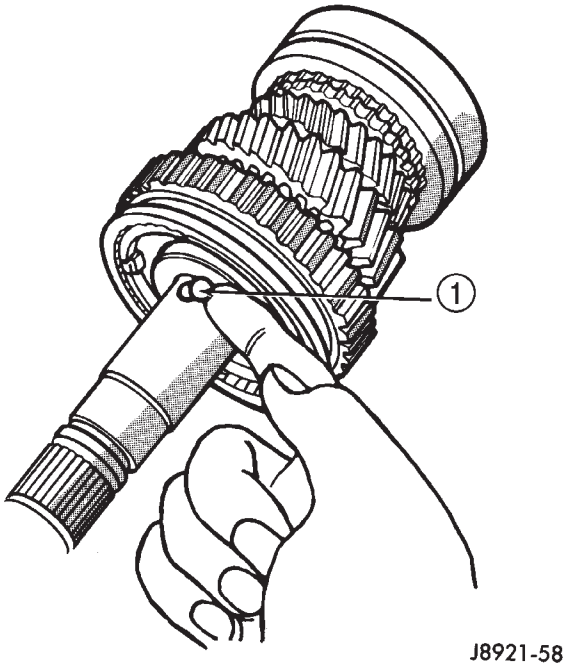


Fig. 97 First Gear Bearing Inner Race Lock Ball

1 - FIRST GEAR LOCK BALL

OUTPUT SHAFT (Continued)

(18) Install first gear needle bearing onto output shaft (Fig. 98).

(19) Install first gear onto output shaft and over bearing.

(20) Install first gear bearing inner race onto output shaft and inside first gear bearing. Rotate bearing race until race installs over lock ball.

(21) Position output shaft rear bearing onto output shaft. Ensure that the snap ring groove in bearing outer race is toward rear of output shaft.

(22) With Driver L-4507 and mallet, drive bearing onto output shaft.

(23) Install snap-ring onto output shaft rear bearing outer race.

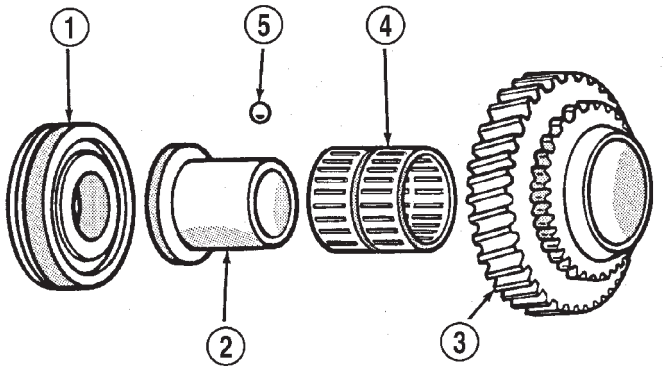


Fig. 98 First Gear Components

1 - REAR BEARING
2 - INNER RACE
3 - FIRST GEAR
4 - NEEDLE BEARING
5 - FIRST GEAR LOCK BALL

(24) Check first-second gear thrust clearance (Fig. 99). Standard clearance is 0.10 - 0.25 mm (0.004 - 0.010 in.). If clearance is out of specification, refer to Cleaning and Inspection.

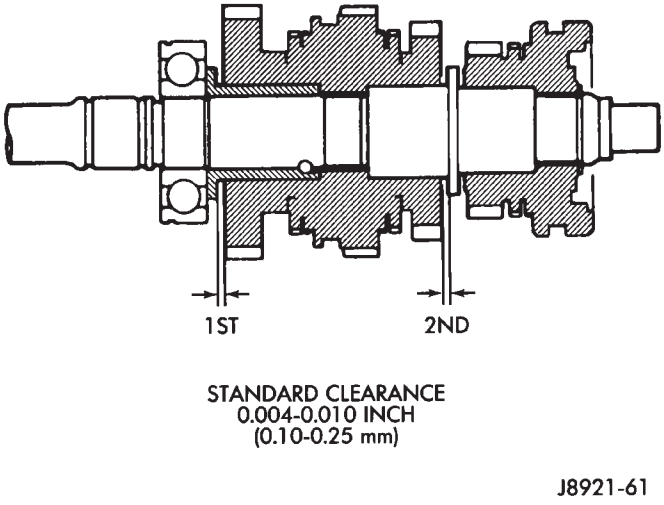


Fig. 99 First-Second Gear Thrust Clearance

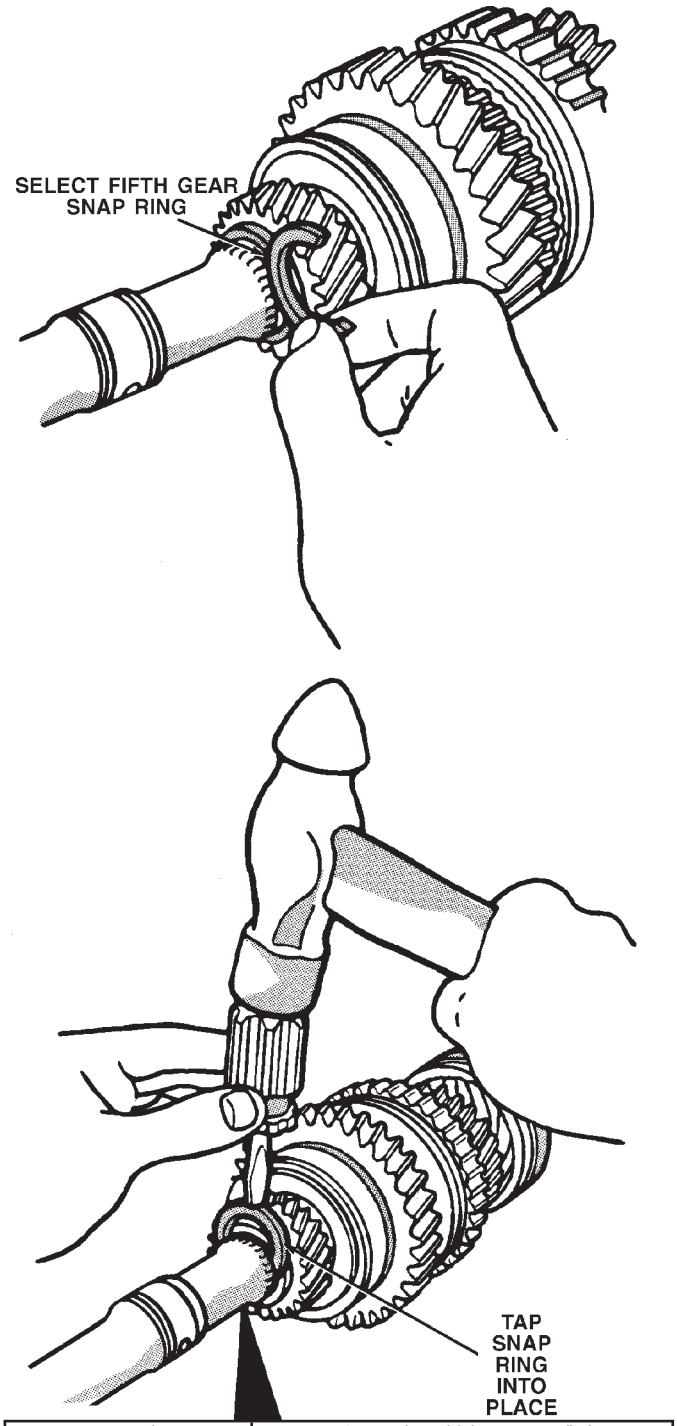
(25) Position fifth gear onto output shaft with the gear's short shoulder toward the rear of shaft. Ensure that the gear and output shaft splines are aligned.

(26) With Adapter 6747-1A, Driver L-4507 and a shop press, press fifth gear onto output shaft.

(27) Select the thickest snap-ring that will fit into the snap-ring groove of the output shaft (Fig. 100).

(28) Install snap-ring to hold fifth gear onto output shaft.

OUTPUT SHAFT (Continued)



I.D. Mark	Snap Ring Thickness mm (in.)
A	2.67-2.72 (0.1051-0.1071)
B	2.73-2.78 (0.1075-0.1094)
C	2.79-2.84 (0.1098-0.1118)
D	2.85-2.90 (0.1122-0.1142)
E	2.91-2.96 (0.1146-0.1165)
F	2.97-3.02 (0.1169-0.1189)
G	3.03-3.08 (0.1193-0.1213)
H	3.09-3.14 (0.1217-0.1236)
J	3.15-3.20 (0.1240-0.1260)
K	3.21-3.26 (0.1264-0.1283)
L	3.27-3.32 (0.1287-0.1307)

Fig. 100 Select/Install Fifth Gear Snap Ring

MANUAL-NV3550

TABLE OF CONTENTS

page

MANUAL-NV3550
REMOVAL 34
DISASSEMBLY. 36
ASSEMBLY 48
INSTALLATION. 70
SPECIFICATIONS 71
SPECIAL TOOLS 72
VEHICLE SPEED SENSOR
DESCRIPTION 74
OPERATION. 74
REMOVAL 74
INSTALLATION. 75
EXTENSION HOUSING
REMOVAL 75
INSTALLATION. 75

MANUAL-NV3550

REMOVAL - TRANSMISSION

(1) Shift transmission into first or third gear.

(2) Remove the floor console and shift boot as necessary to access the bottom of the shift lever at the shift tower attachment.

(3) Install nuts on two M6X1.0 bolts and thread the bolts into the threaded holes at the base of the shift lever.

(4) Tighten the nuts equally until the shift lever loosens on the shift tower stub shaft.

(5) Remove the shift lever from the shift tower.

(6) Raise and support vehicle on suitable safety stands.

(7) Support engine with adjustable jack stand. Position wood block between jack and oil pan to avoid damaging pan.

(8) Remove skid plate, if equipped.

(9) Remove crossmember.

(10) Disconnect necessary exhaust system components.

(11) Remove slave cylinder (Fig. 1) from clutch housing.

(12) Mark rear propeller shaft and rear axle yokes for installation alignment (Fig. 2).

(13) Mark front propeller shaft, axle and transfer case yokes for installation alignment, if equipped.

(14) Remove propeller shaft(s).

(15) Unclip wire harnesses from transmission and transfer case, if equipped.

(16) Disconnect transfer case vent hose, if equipped.

(17) Disengage any wire connectors attached to transmission or transfer case, if equipped, components.

(18) Support transfer case, if equipped, with transmission jack.

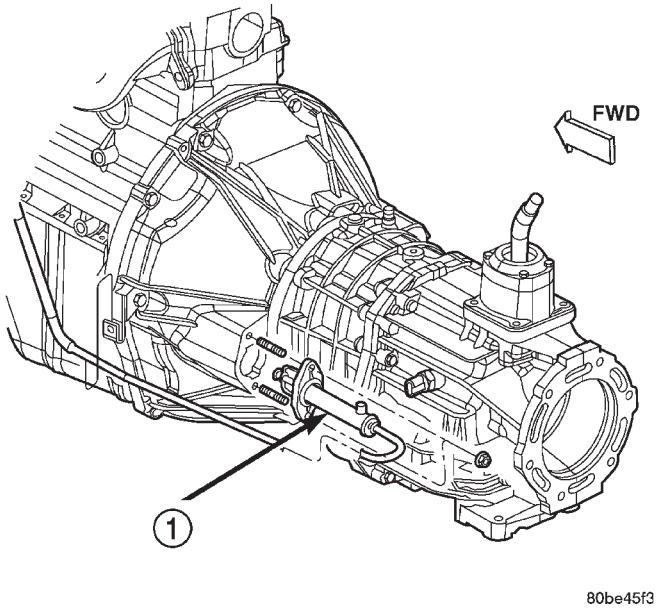


Fig. 1 Slave Cylinder

1 - CLUTCH SLAVE CYLINDER

(19) Secure transfer case, if equipped, to jack with safety chains.

(20) Disconnect transfer case shift linkage at transfer case, if equipped.

(21) Remove nuts attaching transfer case to transmission, if equipped.

(22) Remove transfer case, if equipped.

(23) Remove crankshaft position sensor (Fig. 3).

CAUTION: It is important that the crankshaft position sensor be removed prior to transmission removal. The sensor can easily be damaged if left in place during removal operations.

MANUAL-NV3550 (Continued)

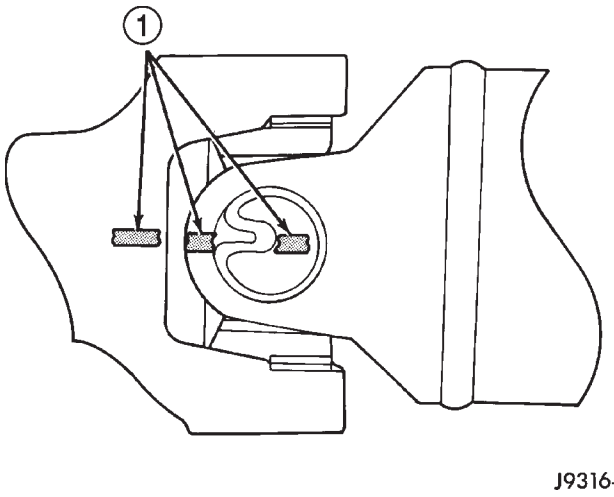


Fig. 2 Propeller Shaft And Axle Yokes

1 - REFERENCE MARKS

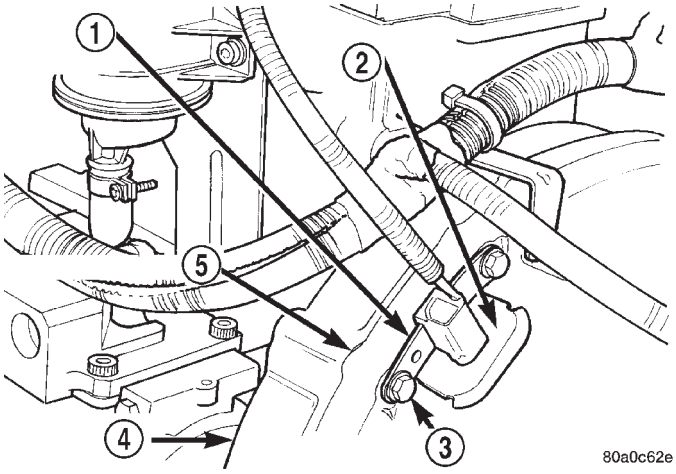


Fig. 3 Crankshaft

1 - ENGINE SPEED SENSOR
2 - GROMMET
3 - MOUNTING BOLT(S)
4 - LEFT REAR OF ENGINE
5 - TRANSMISSION

(24) Support engine with adjustable jack stand. Position wood block between jack and oil pan to avoid damaging pan.

(25) Support transmission with transmission jack.

(26) Secure transmission to jack with safety chains.

(27) Disconnect rear cushion and bracket from transmission.

(28) Remove rear crossmember.

(29) Remove clutch housing-to-engine bolts.

(30) Pull transmission jack rearward until input shaft clears clutch. Then slide transmission out from under vehicle.

(31) Remove clutch release bearing, release fork and retainer clip.

(32) Remove clutch housing from transmission (Fig. 4).

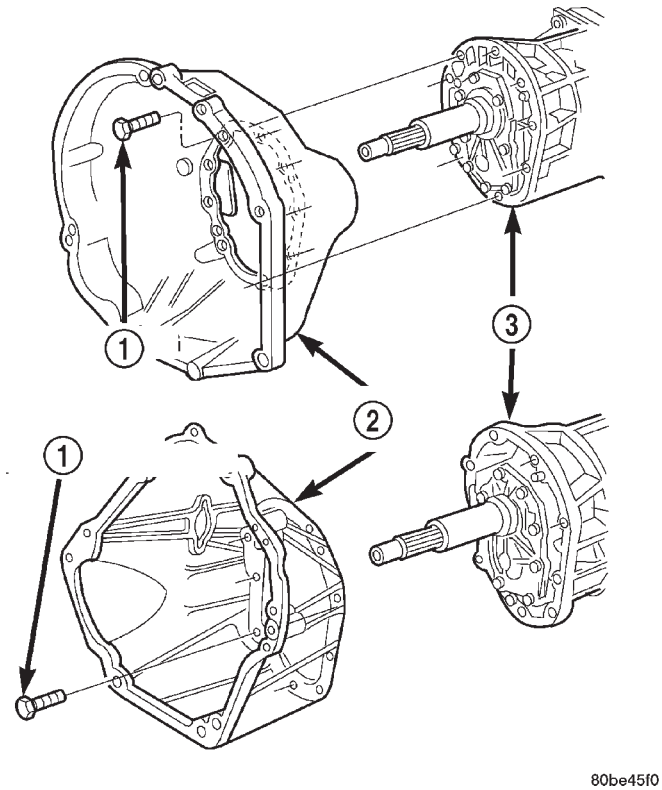


Fig. 4 Clutch Housing

1 - HOUSING-TO-TRANSMISSION BOLTS (46 N·m/34 ft. lbs.)
2 - CLUTCH HOUSING
3 - TRANSMISSION

MANUAL-NV3550 (Continued)

DISASSEMBLY

FRONT HOUSING

(1) Shift transmission into Neutral.
(2) Remove drain plug and drain lubricant.
(3) Inspect drain plug magnet for debris.
(4) Remove backup light switch. Switch is located on passenger side of rear housing (Fig. 5).

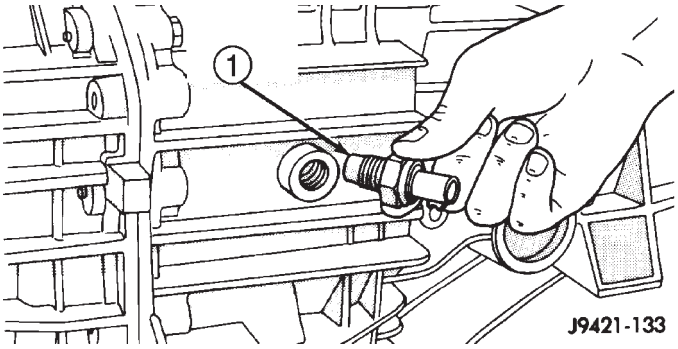


Fig. 5 BACKUP LIGHT SWITCH

1 - BACKUP LIGHT SWITCH

(5) Remove shift tower bolts and remove tower and lever assembly (Fig. 6).

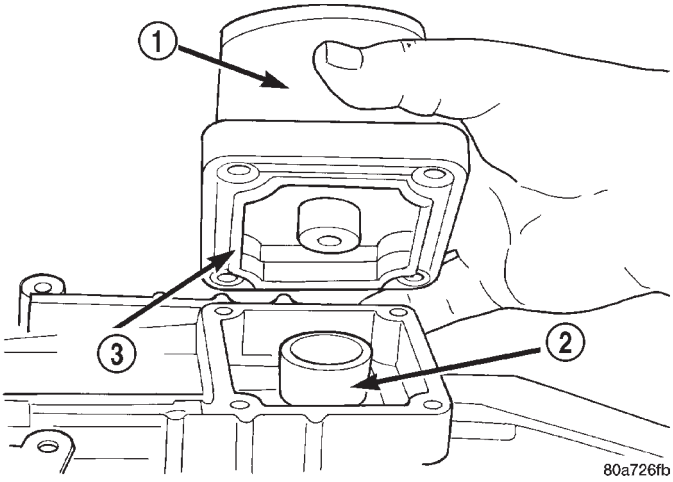


Fig. 6 SHIFT TOWER

1 - SHIFT TOWER AND LEVER ASSEMBLY
2 - SHIFT SOCKET
3 - SEAL

(6) Remove shift shaft lock bolt (Fig. 7) located on top of the housing just forward of shift tower.

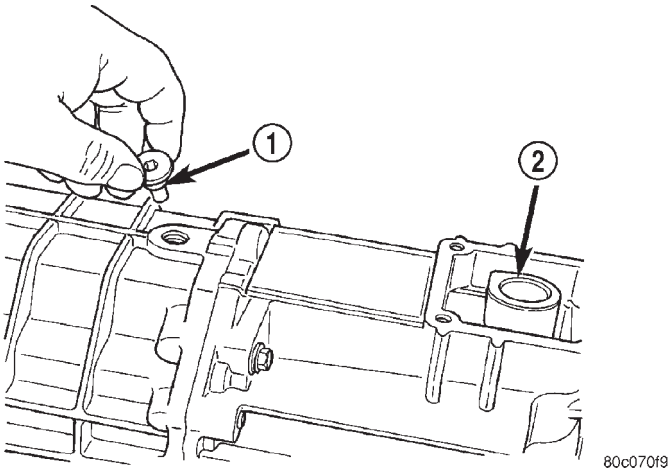


Fig. 7 SHIFT SHAFT LOCK BOLT

1 - SHIFT SHAFT LOCK BOLT
2 - SHAFT SOCKET

(7) Remove shift shaft detent plug with Remover 8117A. Attach the fingers of the remover to the detent plug (Fig. 8). Then push the cup down till it contacts the trans. Tighten the nut (Fig. 9) till it pulls the plug from the trans case.

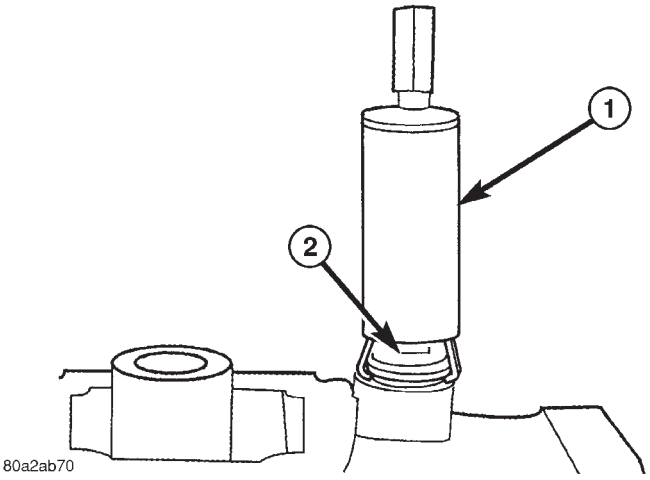


Fig. 8 DETENT PULLER

1 - REMOVER 8117A
2 - DETENT PLUG

MANUAL-NV3550 (Continued)

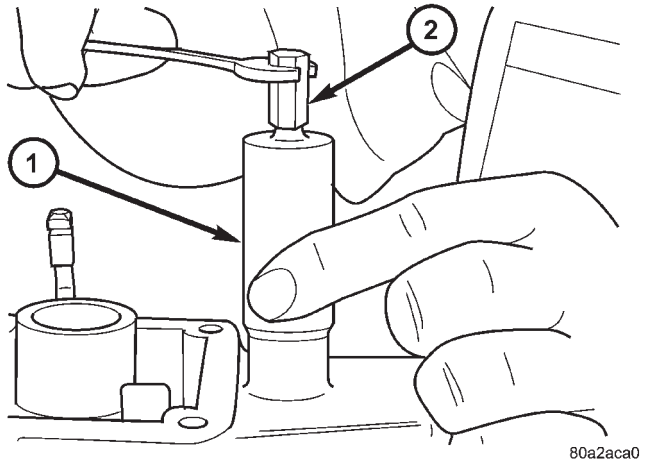


Fig. 9 PULL DETENT PLUG

1 - NUT
2 - REMOVER

(8) Remove shift shaft detent plunger and spring (Fig. 10). Remove spring and plunger with a pencil magnet.

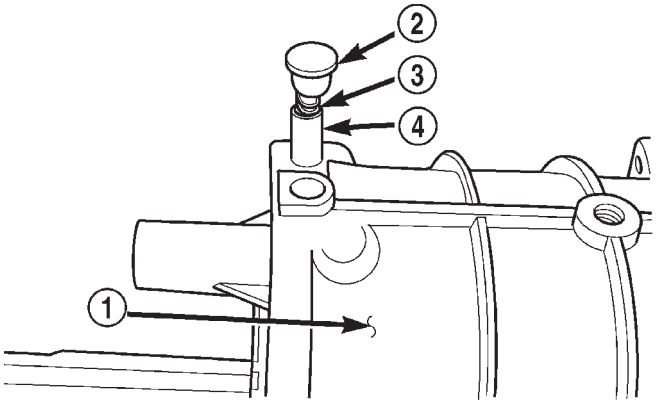


Fig. 10 DETENT PLUNGER

1 - FRONT HOUSING
2 - PLUG
3 - SPRING
4 - PLUNGER

(9) Remove bolts attaching input shaft bearing retainer to front housing and remove retainer.

NOTE: Use pry tool to carefully lift retainer and break sealer bead (Fig. 11).

(10) Remove bearing retainer from input shaft (Fig. 12).

(11) Remove snap ring that secures input shaft in front bearing (Fig. 13).

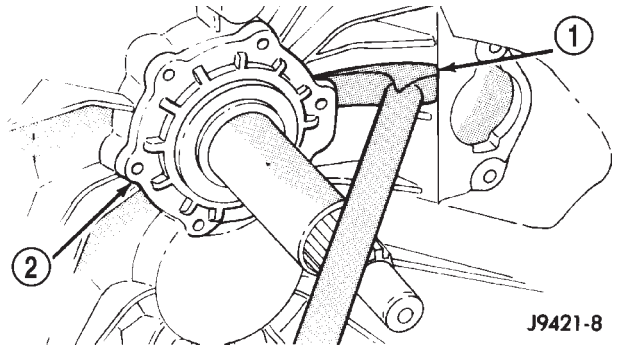


Fig. 11 BEARING RETAINER

1 - PRY TOOL
2 - INPUT SHAFT BEARING RETAINER

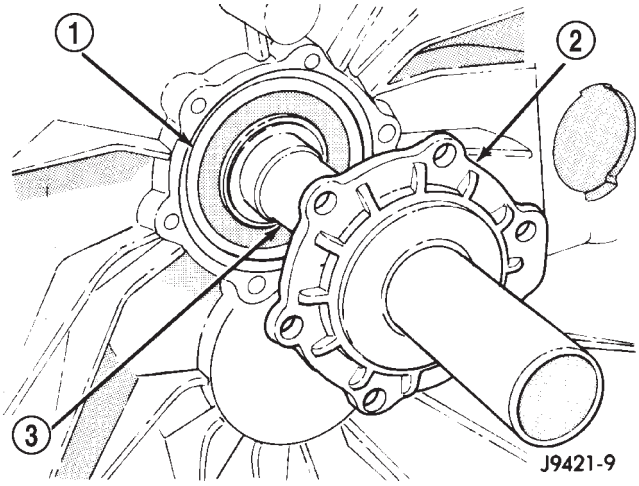


Fig. 12 INPUT SHAFT BEARING RETAINER

1 - SHAFT BEARING
2 - BEARING RETAINER
3 - INPUT SHAFT

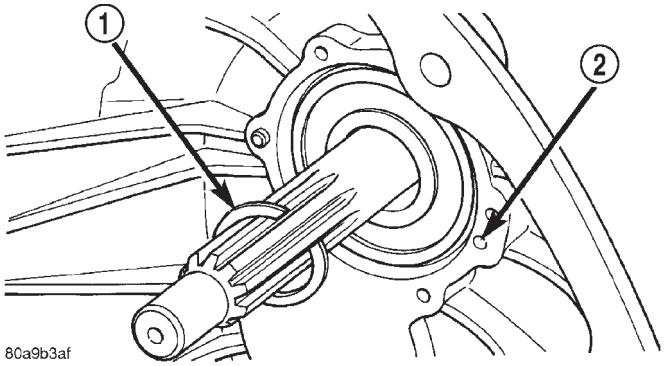


Fig. 13 INPUT SHAFT SNAP RING

1 - INPUT SHAFT SNAP RING
2 - OIL FEED

MANUAL-NV3550 (Continued)

(12) Remove bolts that attach front housing to rear housing (Fig. 14). Three bolts at extreme rear of housing are actually for the output shaft bearing retainer. It is not necessary to remove all three bolts at this time. Leave at least one bolt in place until geartrain is ready to be removed from case.

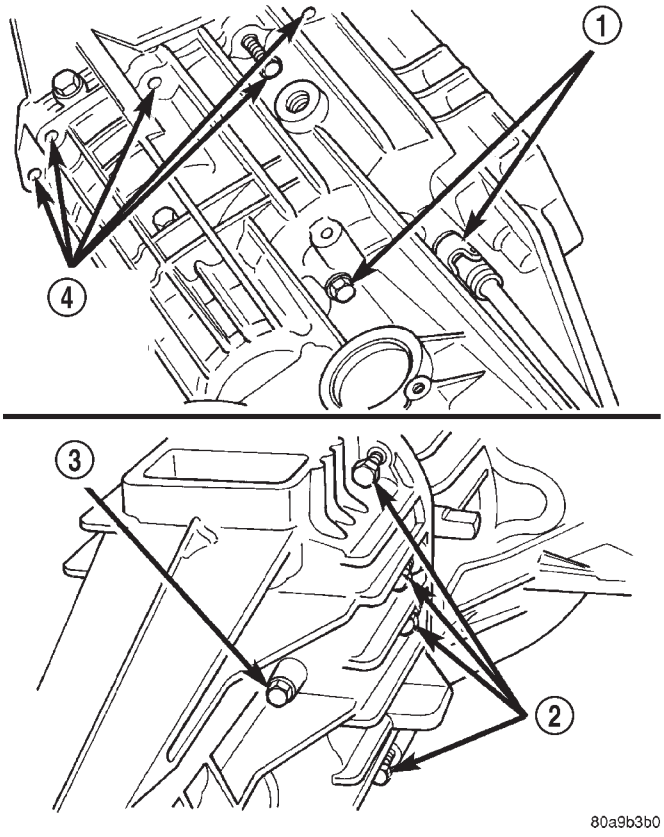


Fig. 14 HOUSING AND BEARING RETAINER BOLTS

1 - RETAINER BOLTS
2 - HOUSING BOLTS
3 - RETAINER BOLT
4 - HOUSING BOLT LOCATIONS

(13) Separate front housing from rear housing (Fig. 15). With a plastic mallet tap the front housing off the alignment dowels.

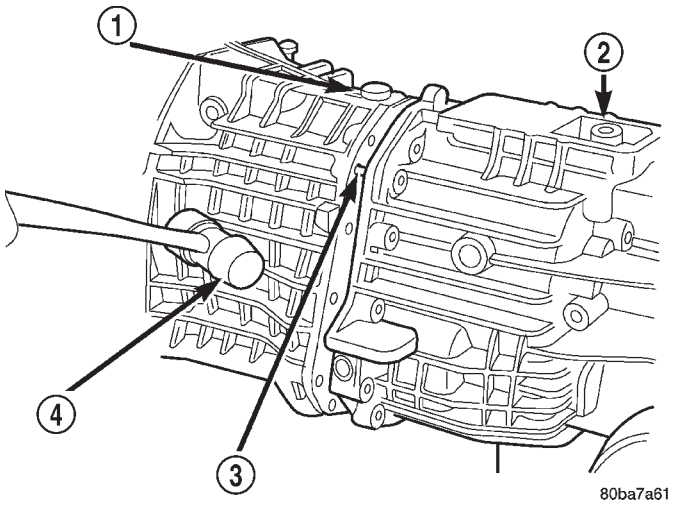


Fig. 15 FRONT HOUSING

1 - FRONT HOUSING
2 - REAR HOUSING
3 - DOWELS (2)
4 - PLASTIC MALLET

(14) Remove and inspect input shaft bearing and countershaft front bearing race (Fig. 16).

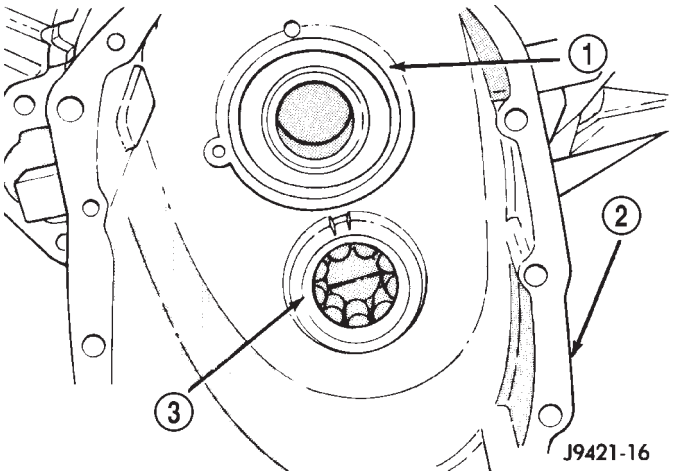


Fig. 16 INPUT SHAFT AND COUNTERSHAFT BEARING RACE

1 - INPUT SHAFT BEARING
2 - FRONT HOUSING
3 - COUNTERSHAFT FRONT BEARING

MANUAL-NV3550 (Continued)

(15) Remove screw from reverse blocker and remove blocker (Fig. 17) from case.

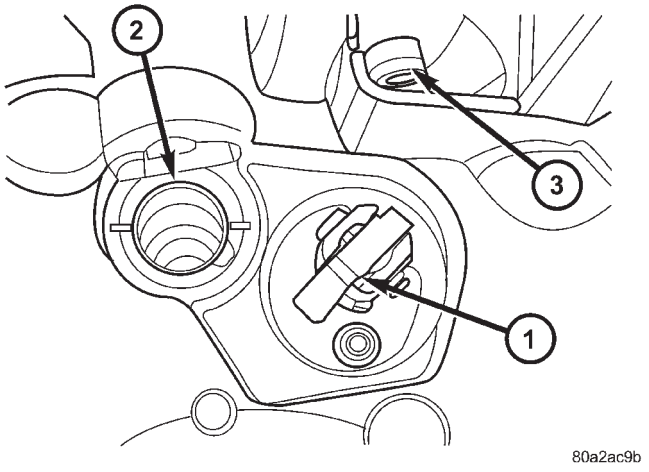


Fig. 17 REVERSE BLOCKER

1 - REVERSE BLOCKER
2 - SHIFTER SHAFT BUSHING
3 - VENT

(16) Note position of input shaft, shift shaft and forks, and geartrain components in housing (Fig. 18).

SHIFT/FORK SHAFTS AND REVERSE IDLER SEGMENT

(1) Unseat the roll pin that secures the shift socket to the shift shaft with Remover 6858 as follows:

(a) Position remover on the shift shaft. Center the tool over the roll pin and verify that the tool legs are firmly seated on the shift socket (Fig. 19).

(b) Tilt the socket toward the side of the case. This positions the roll pin at a slight angle to avoid trapping the pin between the gear teeth.

(c) Tighten the tool to press the roll pin downward and out of the shift socket (Fig. 19).

NOTE: Press the roll pin just enough to clear the shift shaft. Be careful not to push the pin into the geartrain.

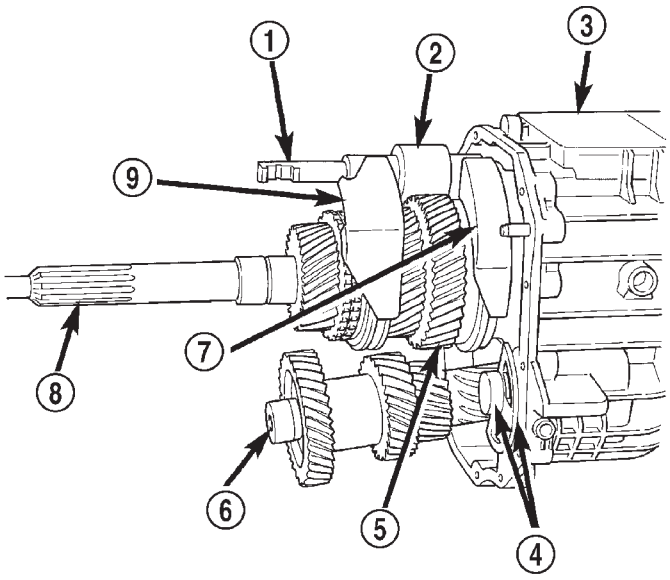


Fig. 18 GEARTRAIN AND SHIFT COMPONENT

1 - SHIFT SHAFT
2 - BUSHING
3 - REAR HOUSING
4 - REVERSE IDLER AND SUPPORT
5 - OUTPUT SHAFT AND GEARS
6 - COUNTERSHAFT
7 - 1-2 FORK
8 - INPUT SHAFT
9 - 3-4 FORK

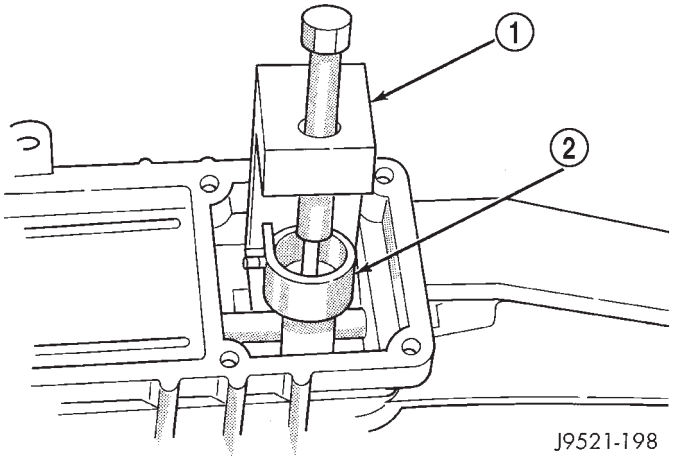


Fig. 19 SHIFT SOCKET ROLL PIN

1 - SPECIAL TOOL 6858
2 - SHIFT SOCKET

MANUAL-NV3550 (Continued)

(2) With a hammer and punch drive out roll pin that secures shift bushing and lever to shift shaft (Fig. 20).

NOTE: Use proper size punch to avoid bending the shift shaft.

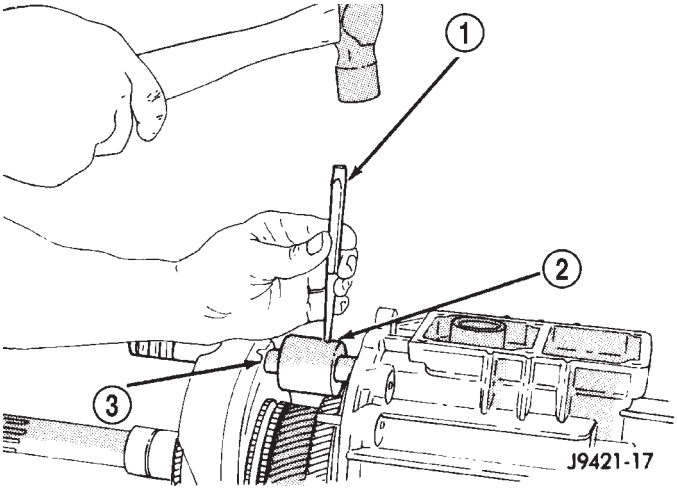


Fig. 20 SHIFT SHAFT LEVER AND BUSHING ROLL PIN

1 - PIN PUNCH
2 - BUSHING AND LEVER
3 - SHIFT SHAFT

(3) Pull shift shaft straight (Fig. 21) out of rear housing.

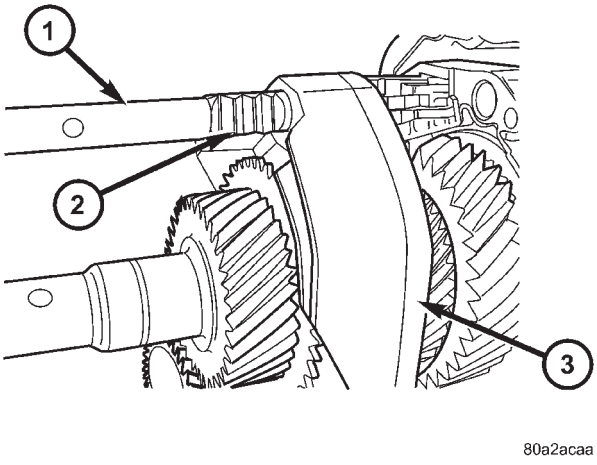


Fig. 21 SHIFT SHAFT

1 - SHIFTER SHAFT
2 - SHIFTER SHAFT DETENT
3 - 3-4 SHIFT FORK

(4) Remove shift socket from rear housing (Fig. 22).

(5) Remove lever and bushing (Fig. 23).

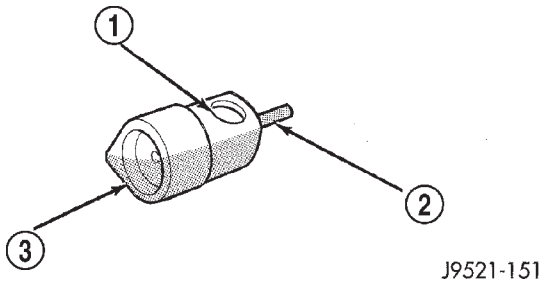


Fig. 22 SHIFT SOCKET AND ROLL PIN

1 - SHAFT BORE
2 - ROLL PIN
3 - SHIFT SOCKET

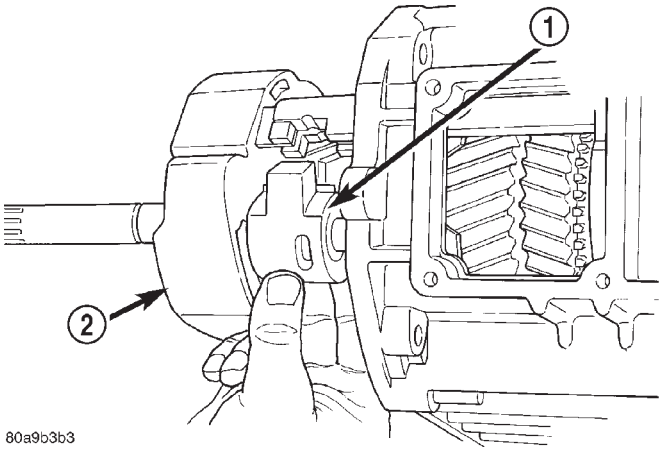


Fig. 23 SHIFT SHAFT LEVER AND BUSHING

1 - SHAFT LEVER AND BUSHING
2 - 3-4 FORK

(6) Rotate 3-4 fork around synchro sleeve until fork clears shift arms on 1-2 and fifth-reverse forks, then remove 3-4 fork (Fig. 24).

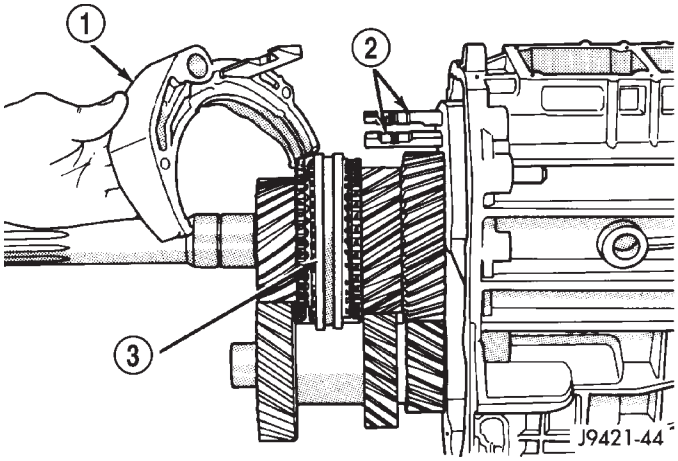


Fig. 24 3-4 SHIFT FORK

1 - 3–4 FORK
2 - 1–2 AND 5TH-REVERSE FORK ARMS
3 - 3–4 SYNCHRO SLEEVE

MANUAL-NV3550 (Continued)

(7) Remove the reverse idler shaft support bolt (front bolt) (Fig. 25).

(8) Loosen rear reverse idler shaft bolt (rear bolt) (Fig. 25).

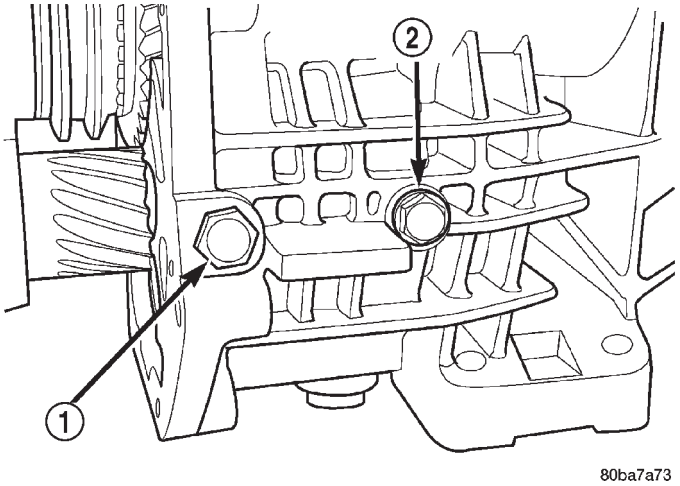


Fig. 25 REVERSE IDLER SHAFT/SUPPORT BOLT

1 - SUPPORT BOLT
2 - SHAFT BOLT

(9) Remove reverse idler shaft support (Fig. 26) segment by sliding it straight out of housing.

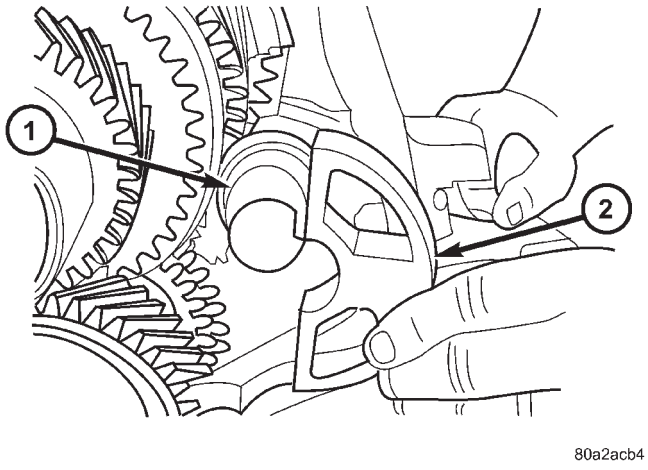


Fig. 26 IDLER SHAFT SUPPORT

1 - IDLER SHAFT
2 - IDLER SHAFT SUPPORT

(10) Support geartrain and rear housing on Fixture 6747 as follows:

(a) Adjust height of reverse idler pedestal rod until the reverse idle shaft bottoms in Cup 8115.

(b) Position Adapters 6747-1A and 6747-2B on Fixture 6747.

(c) Slide fixture tool onto input shaft, countershaft and idler gear (Fig. 27).

(d) Stand geartrain and rear housing upright on fixture (Fig. 28). Have helper hold fixture tool in place while housing and geartrain is being rotated into upright position.

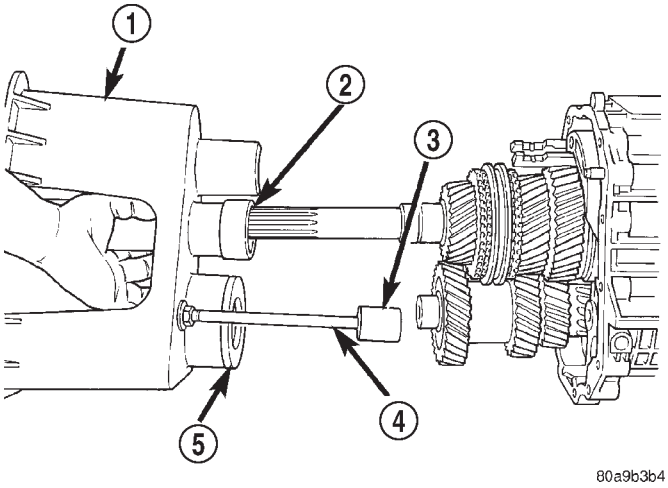


Fig. 27 FIXTURE ASSEMBLY

1 - FIXTURE
2 - ADAPTER 6747-1A
3 - CUP 8115
4 - REVERSE IDLER PEDESTAL
5 - ADAPTER 6747-2B

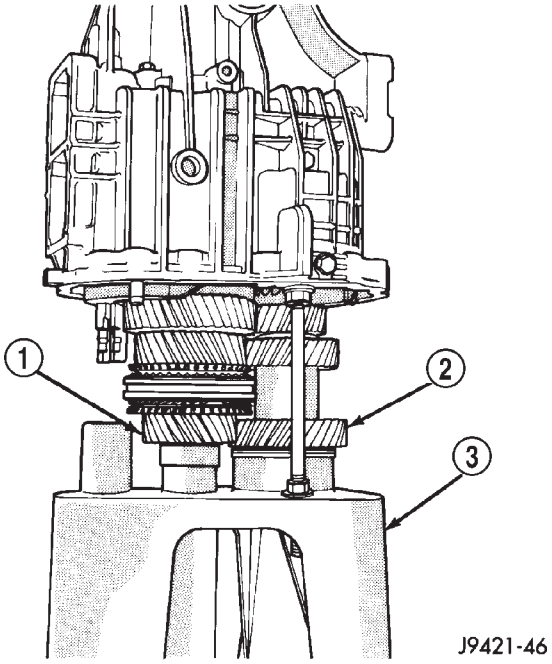


Fig. 28 GEARTRAIN/HOUSING FIXTURE

1 - INPUT SHAFT
2 - COUNTERSHAFT
3 - SPECIAL TOOL 6747

(11) Remove rear bolt holding reverse idler shaft in housing.

MANUAL-NV3550 (Continued)

REAR HOUSING - 2WD

(1) On 2-wheel drive transmission, remove three bolts that attach output shaft bearing retainer to rear case (Fig. 29). Bolts are rear of shift tower opening.

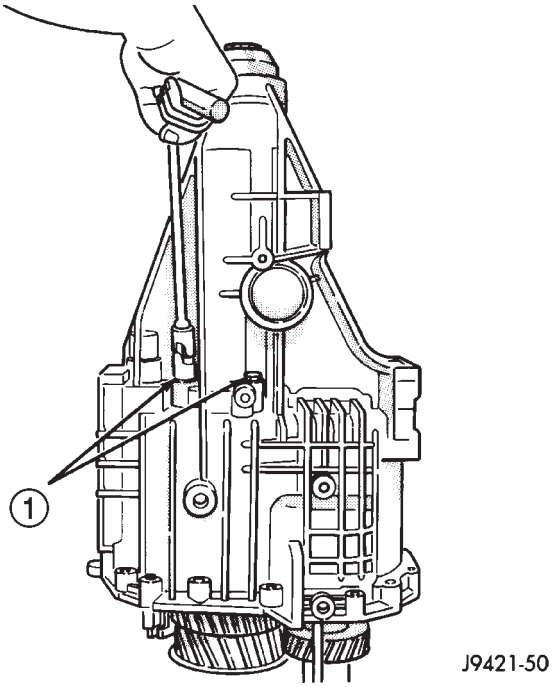


Fig. 29 OUTPUT SHAFT

1 - OUTPUT SHAFT BEARING RETAINER BOLTS (THIRD BOLT IS AT OPPOSITE SIDE OF CASE)

(2) Unseat output shaft bearing from bearing bore in rear housing. Use plastic/rawhide mallet to tap rear housing upward and off output shaft bearing as shown (Fig. 30).

(3) Lift rear housing up and off geartrain (Fig. 31).

(4) Remove countershaft rear bearing from countershaft (Fig. 32).

(5) Examine condition of bearing bore and idler shaft notch in rear housing. Replace housing if any of these components are damaged.

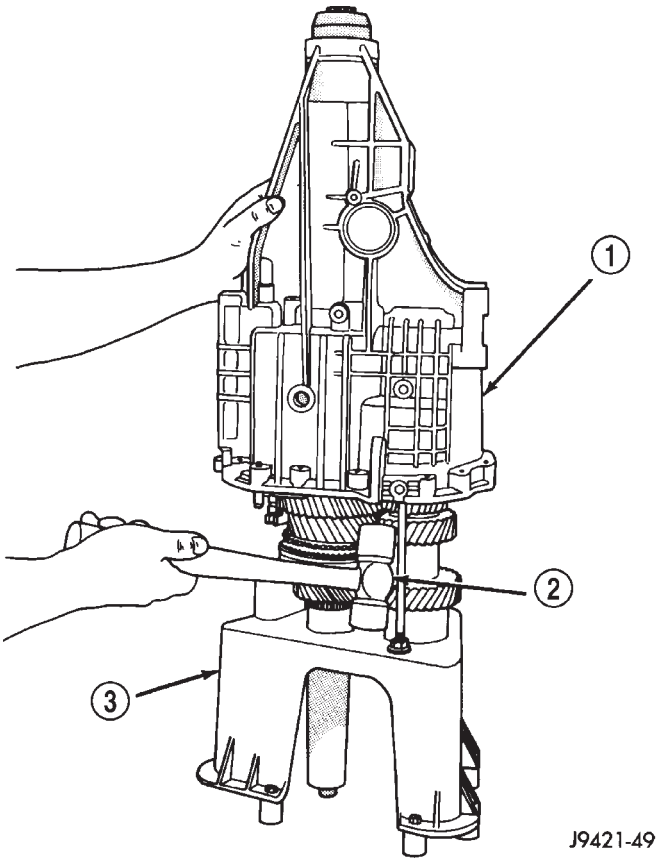


Fig. 30 REAR HOUSING - 2WD

1 - REAR HOUSING
2 - PLASTIC/RAWHIDE MALLET
3 - FIXTURE

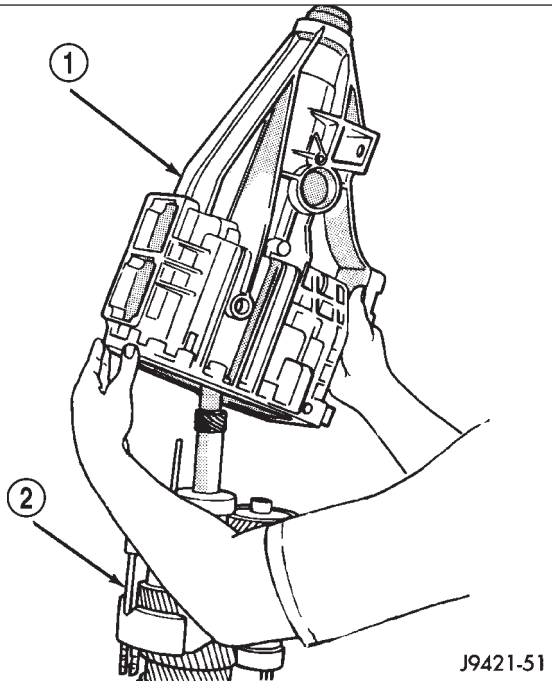


Fig. 31 REAR HOUSING

1 - REAR HOUSING
2 - SHIFT FORKS AND GEARTRAIN

MANUAL-NV3550 (Continued)

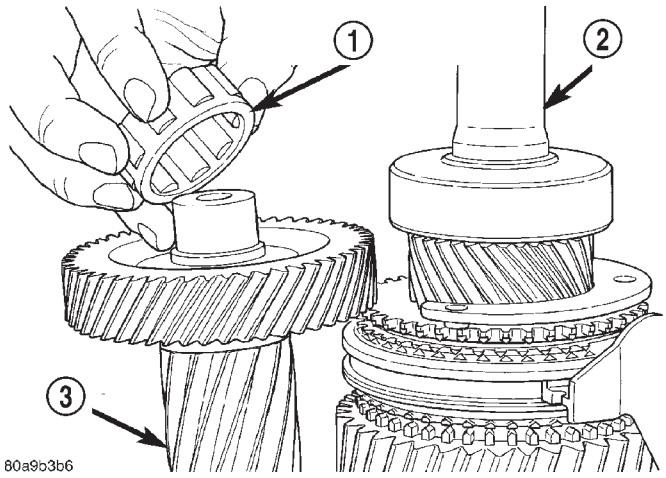


Fig. 32 COUNTERSHAFT REAR BEARING

1 - COUNTERSHAFT REAR BEARING
2 - OUTPUT SHAFT
3 - COUNTER SHAFT

REAR ADAPTER HOUSING - 4WD

(1) Locate rear seal dimples (Fig. 33). With slide hammer mounted screw, remove rear seal by inserting screw into one of the seal dimples (Fig. 34).

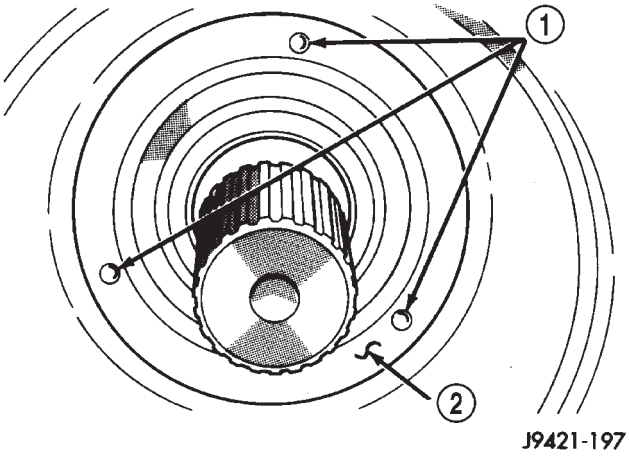


Fig. 33 SEAL DIMPLES - 4WD

1 - LOCATION OF DIMPLES
2 - SEAL FACE

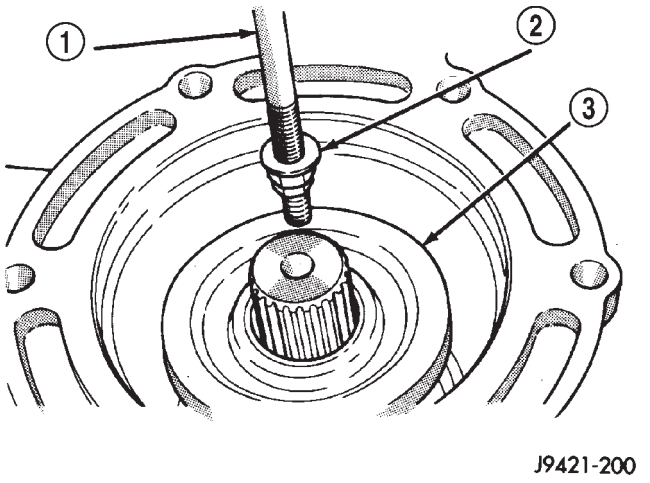


Fig. 34 REAR SEAL - 4WD

1 - SLIDE HAMMER
2 - REMOVER TOOL
3 - REAR SEAL

(2) Remove rear bearing snap ring from output shaft with snap ring pliers (Fig. 35).

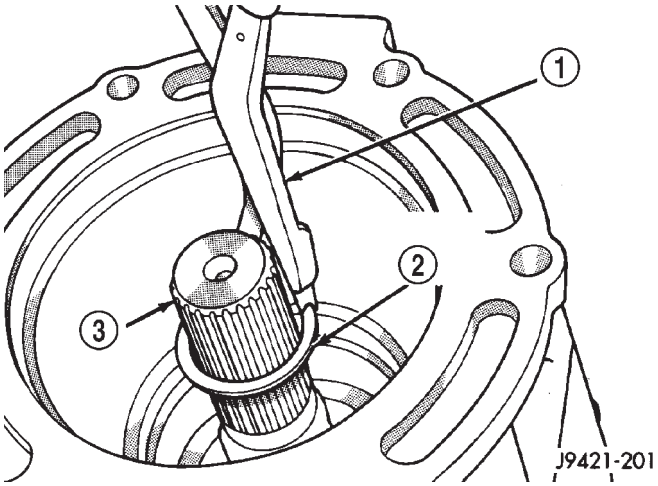


Fig. 35 REAR BEARING SNAP RING - 4WD

1 - HEAVY DUTY SNAP RING PLIERS
2 - REAR BEARING SNAP RING
3 - OUTPUT SHAFT

MANUAL-NV3550 (Continued)

(3) Lift rear adapter housing upward and off geartrain (Fig. 36).

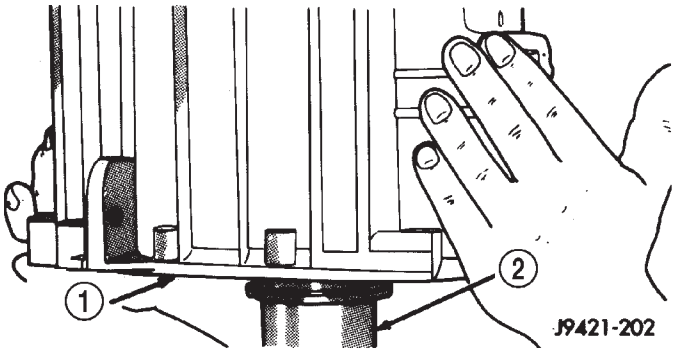


Fig. 36 REAR ADAPTER HOUSING

1 - REAR ADAPTER HOUSING
2 - OUTPUT SHAFT

(4) Remove bearing retainer bolts and remove rear bearing retainer and rear bearing (Fig. 37). If needed push or tap bearing out of the housing with a hammer.

(5) Examine condition of bearing bore, countershaft rear bearing race and idler shaft notch in rear housing. Replace housing if race, bore or notch are worn or damaged.

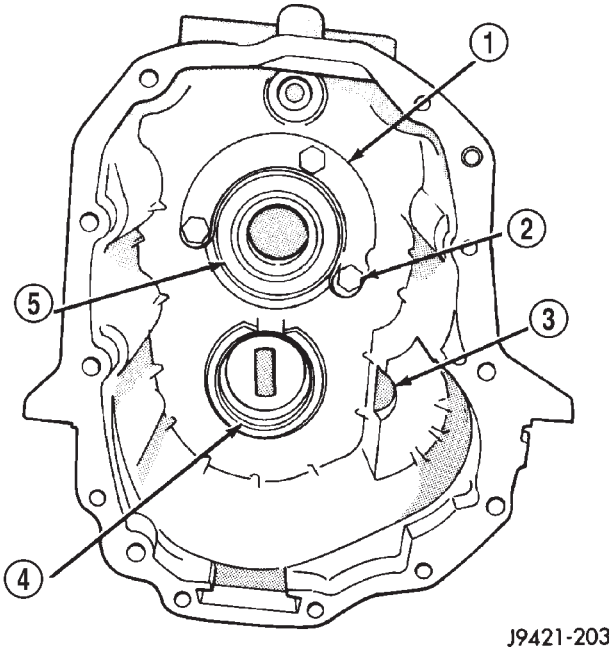


Fig. 37 REAR ADAPTER HOUSING COMPONENTS

1 - BEARING RETAINER
2 - RETAINER BOLTS (3)
3 - IDLER SHAFT NOTCH
4 - COUNTERSHAFT REAR BEARING RACE
5 - REAR BEARING

GEARTRAIN FROM FIXTURE

(1) Remove reverse idler gear assembly from assembly fixture cup.

(2) Remove 1-2 and fifth-reverse forks from synchro sleeves.

(3) Slide countershaft out of fixture tool.

(4) Remove output shaft bearing retainer from rear surface of fifth gear (retainer will drop onto gear after bolts are removed).

(5) Lift and remove output shaft and gears off input shaft.

(6) Lift and remove input shaft, pilot bearing and fourth gear synchro ring from assembly fixture tool.

OUTPUT SHAFT

NOTE: The synchronizer hubs and sleeves are different and must not be intermixed. Remove each synchronizer unit as an assembly to avoid intermixing parts. Reference mark or tag each synchro hub and sleeve for correct assembly.

(1) Remove snap ring that secures 3-4 synchro hub on output shaft.

(2) Remove 3-4 synchro assembly, third gear synchro ring and third gear with shop press and Bearing Splitter 1130. Position splitter between second and third gears.

(3) Remove third gear needle bearing (Fig. 38).

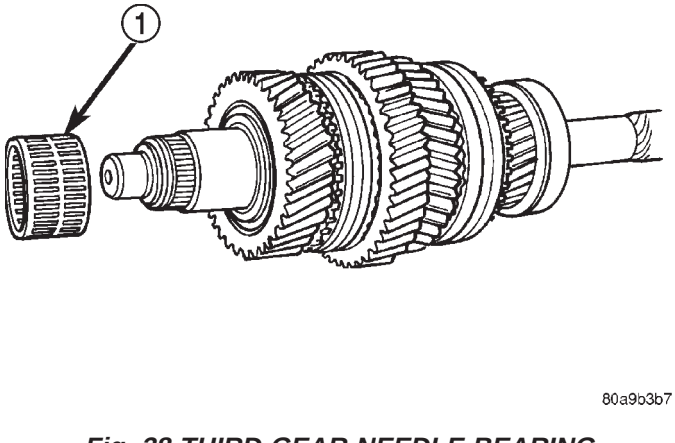


Fig. 38 THIRD GEAR NEEDLE BEARING

1 - THIRD GEAR NEEDLE BEARING

MANUAL-NV3550 (Continued)

(4) Remove retaining ring that secures two-piece thrust washer on shaft (Fig. 39). Use a small pry tool to remove retaining ring.

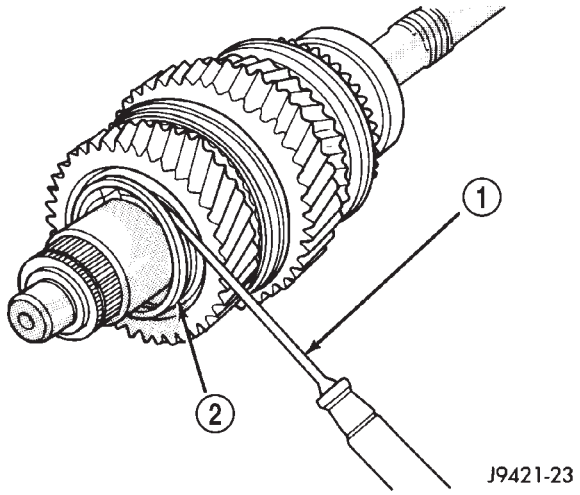


Fig. 39 THRUST WASHER

1 - PRY TOOL
2 - THRUST WASHER RETAINING RING

(5) Remove two-piece thrust washer (Fig. 40). Note position of washer locating lugs in shaft notches for installation reference.

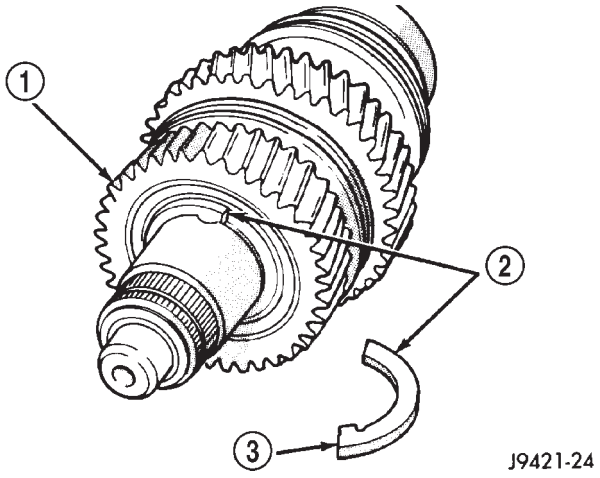


Fig. 40 TWO-PIECE THRUST WASHER

1 - SECOND GEAR
2 - THRUST WASHER (2–PIECE)
3 - WASHER LOCATING LUG

(6) Remove second gear and needle bearing (Fig. 41).

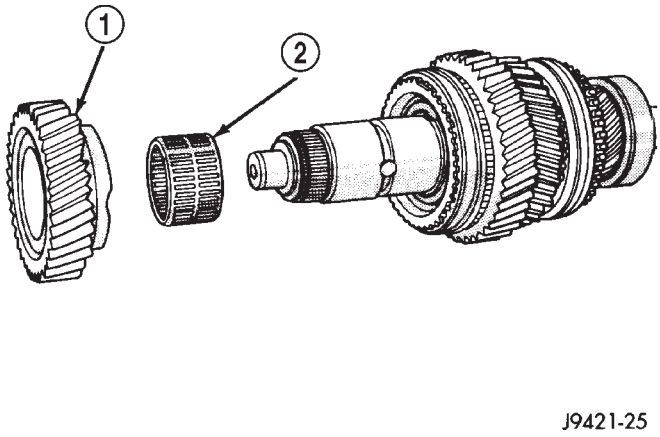


Fig. 41 SECOND GEAR AND NEEDLE BEARING

1 - SECOND GEAR
2 - SECOND GEAR NEEDLE BEARING

(7) Remove second gear synchro ring, synchro friction cone and synchro cone (Fig. 42).
(8) Remove interm ring.
(9) Remove 1-2 synchro hub snap ring.

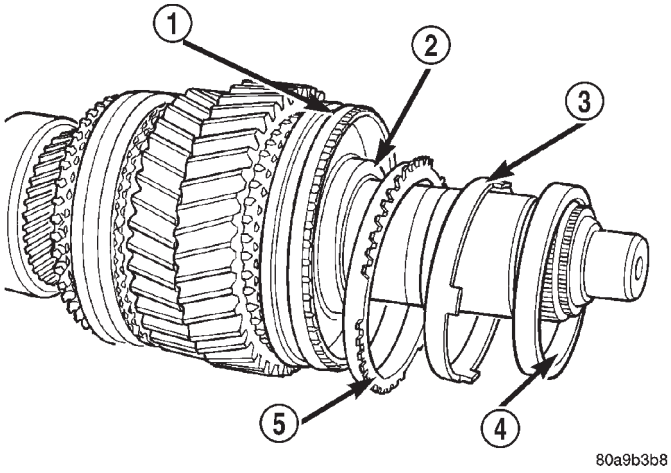


Fig. 42 SECOND GEAR SYNCHRO RING AND CONES

1 - 1–2 SYNCHRO HUB AND SLEEVE
2 - INTERM RING
3 - SYNCHRO FRICTION CONE
4 - SYNCHRO CONE
5 - SYNCHRO RING

MANUAL-NV3550 (Continued)

(10) Remove 1-2 synchro hub and sleeve and first gear from output shaft with press and Bearing Splitter 1130 (Fig. 43). Position splitter between first and reverse gears.

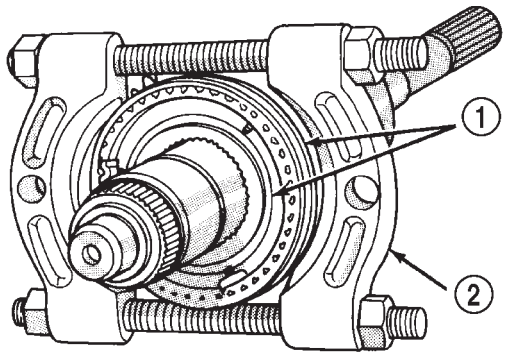


Fig. 43 HUB SLEEVE AND 1-2 SYNCHRO

1 - 1–2 SYNCHRO HUB AND SLEEVE
2 - SPECIAL TOOL 1130

(11) Remove first gear needle bearing (Fig. 44).

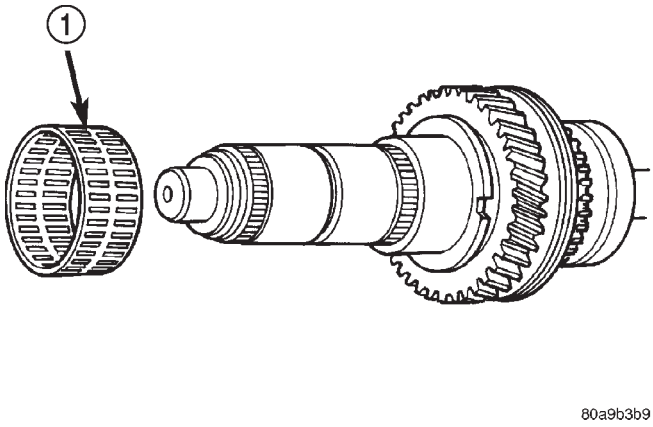


Fig. 44 FIRST GEAR NEEDLE BEARING

1 - FIRST GEAR NEEDLE BEARING

(12) Remove output shaft bearing snap ring (Fig. 45).

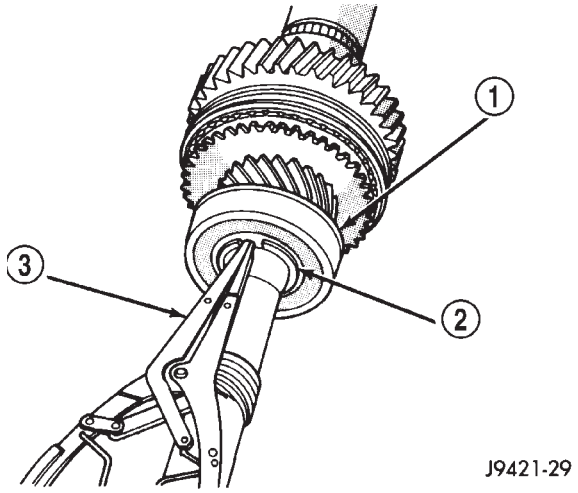


Fig. 45 OUTPUT SHAFT BEARING SNAP RING

1 - OUTPUT SHAFT BEARING
2 - BEARING SNAP RING
3 - SNAP RING PLIERS

(13) On 2-wheel drive models, remove output shaft bearing.

(14) Remove fifth gear (Fig. 46).

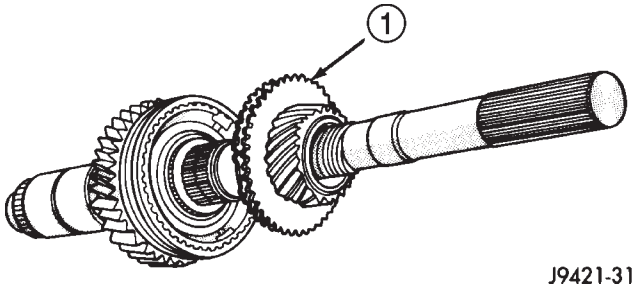


Fig. 46 FIFTH GEAR

1 - FIFTH GEAR AND SYNCHRO RING

(15) Remove fifth gear needle bearing. Spread bearing apart just enough to clear shoulder on output shaft (Fig. 47).

MANUAL-NV3550 (Continued)

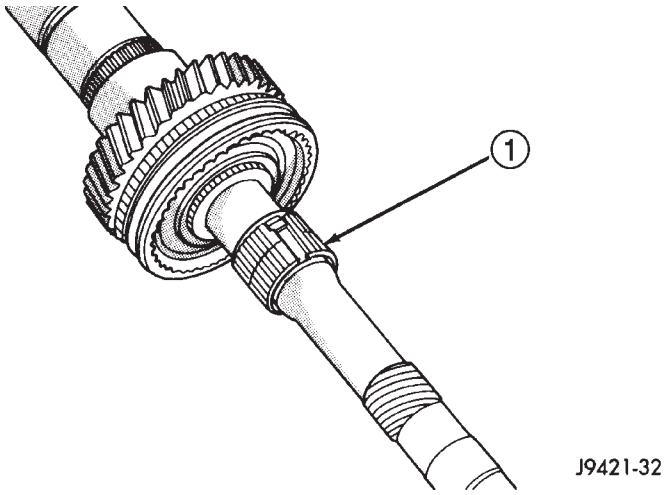


Fig. 47 FIFTH GEAR NEEDLE BEARING

1 - FIFTH GEAR NEEDLE BEARING (SPREAD BEARING TO CLEAR SHOULDER ON SHAFT)

(16) Remove fifth-reverse synchro hub snap ring (Fig. 48).

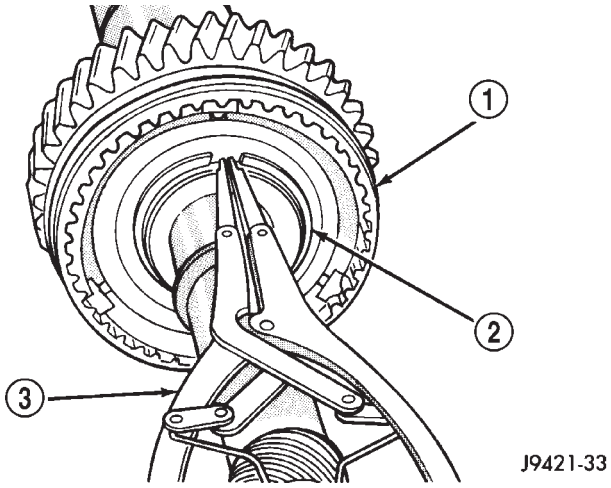


Fig. 48 FIFTH-REVERSE SYNCHRO HUB SNAP RING

1 - FIFTH-REVERSE SYNCHRO HUB AND SLEEVE
2 - SYNCHRO HUB SNAP RING
3 - SNAP RING PLIERS

(17) Remove fifth-reverse synchro hub and sleeve with a press (Fig. 49).

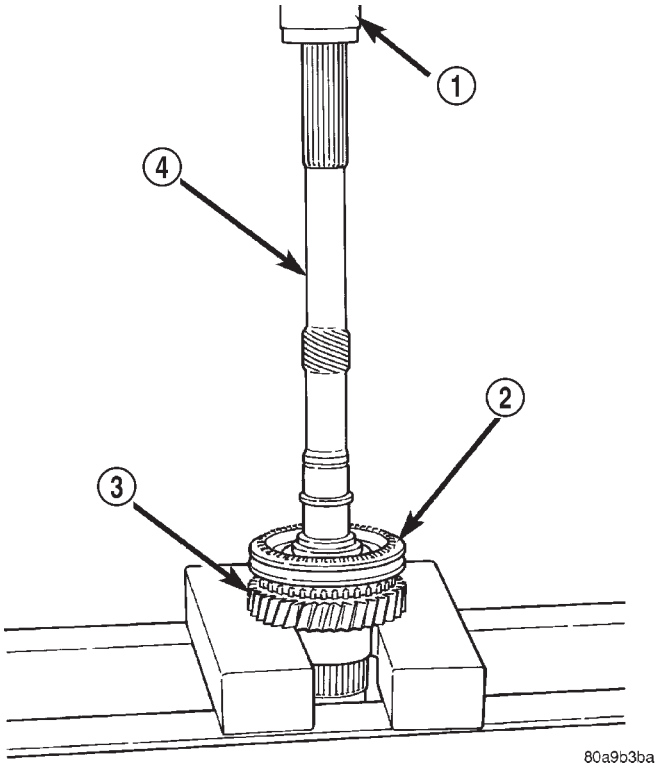


Fig. 49 FIFTH-REVERSE SYNCHRO HUB AND SLEEVE

1 - PRESS
2 - FIFTH-REVERSE SYNCHRO HUB AND SLEEVE
3 - REVERSE GEAR
4 - OUTPUT SHAFT

(18) Remove reverse gear and needle bearing (Fig. 50).

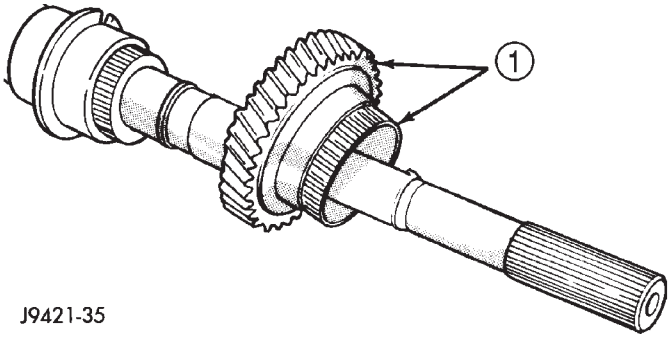
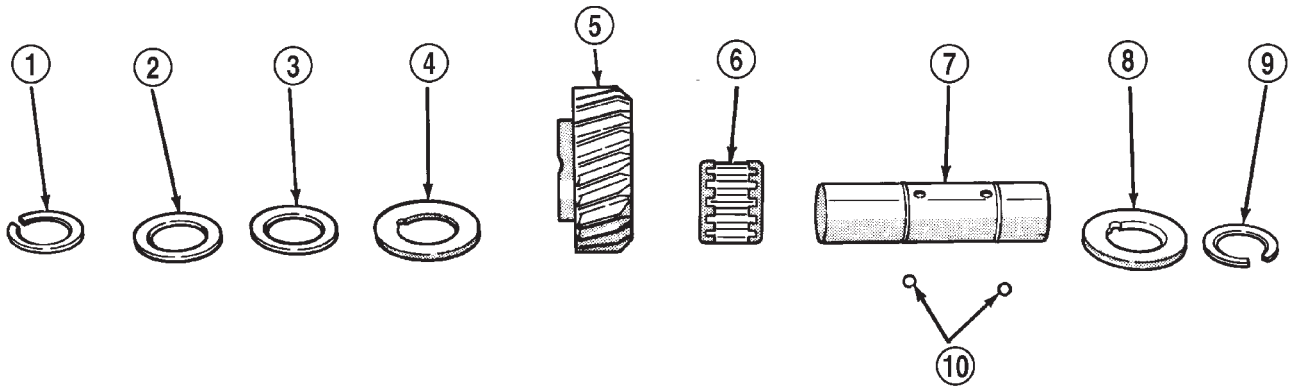


Fig. 50 REVERSE GEAR AND NEEDLE BEARING

1 - REVERSE GEAR AND NEEDLE BEARING

MANUAL-NV3550 (Continued)



J9421-53

Fig. 51 REVERSE IDLER COMPONENTS

1 - SNAP RING
2 - FLAT WASHER
3 - WAVE WASHER
4 - THRUST WASHER
5 - REVERSE IDLER GEAR
6 - IDLER GEAR BEARING
7 - IDLER SHAFT
8 - THRUST WASHER
9 - SNAP RING
10 - THRUST WASHER LOCKBALLS

REVERSE IDLER

(1) Remove idler gear snap rings (Fig. 51).
(2) Remove thrust washer, wave washer, thrust plate and idler gear from shaft.
(3) Remove idler gear needle bearing from shaft.

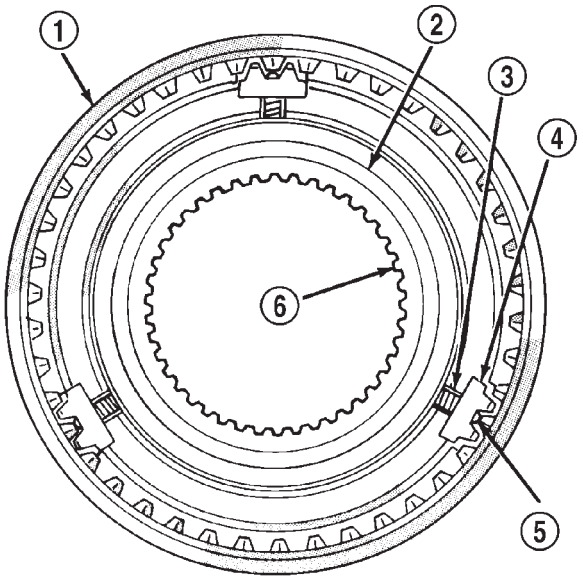
ASSEMBLY

Sealers are used at all case joints. Usa Mopar Gasket Maker for all case joints and Mopar silicone sealer or equivalent, for the input shaft bearing retainer. Apply these products as indicated in the assembly procedures.

CAUTION: The transmission shift components must be in the Neutral position during assembly. This prevents damage to the synchro and shift components when the housings are installed.

SYNCHRONIZER

To assemble each synchro install the springs, struts and detent balls one at a time as follows:
(1) Slide the sleeve part way onto the hub. Leave enough room to install the spring in the hub and the strut in the hub groove.
(2) Install the first spring in the hub. Then install a strut over the spring. Be sure the spring is seated in the spring bore in the strut.
(3) Slide the sleeve onto the hub just far enough to hold the first strut and spring in place.
(4) Place the detent ball in the top of the strut. Then carefully work the sleeve over the ball to hold it in place. Use a small flat blade screwdriver to press the ball into place while moving the sleeve over it.
(5) Repeat the procedure for the remaining springs, struts and balls. Tape or rubber band each strut and ball to temporarily secure as they are installed.
(6) Verify synchro springs, struts and detent balls are all in place (Fig. 52).



J9421-57

Fig. 52 SYNCHRONIZER COMPONENTS

1 - SLEEVE
2 - HUB SHOULDER
3 - SPRING (3)
4 - STRUT (3)
5 - DETENT BALL (3)
6 - HUB

MANUAL-NV3550 (Continued)

OUTPUT SHAFT

Lubricate shaft, gears and bearings with recommended lubricant during assembly. Petroleum jelly can be used to hold parts in place. Check bearing surfaces of output shaft for nicks or scratches. Smooth surfaces with 320/400 grit emery cloth if necessary. Apply oil to emery cloth and shaft surface before polishing.

Inspect and replace any synchro ring if worn or damage. Immerse each synchro ring in lubricant before installation.

(1) Lubricate and install reverse gear needle bearing on shaft (Fig. 53). Slide bearing up against shoulder on output shaft.

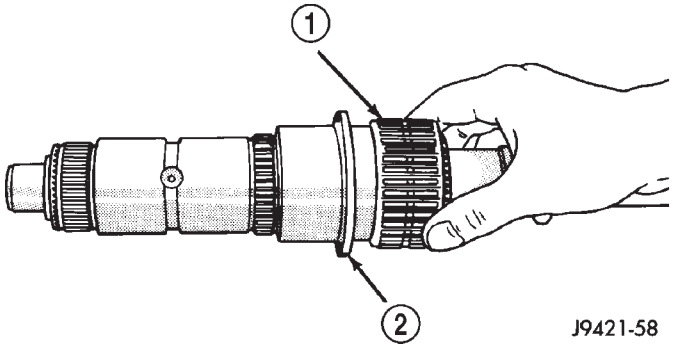


Fig. 53 REVERSE GEAR BEARING

1 - REVERSE GEAR BEARING
2 - SHOULDER

(2) Install reverse gear over needle bearing (Fig. 54).

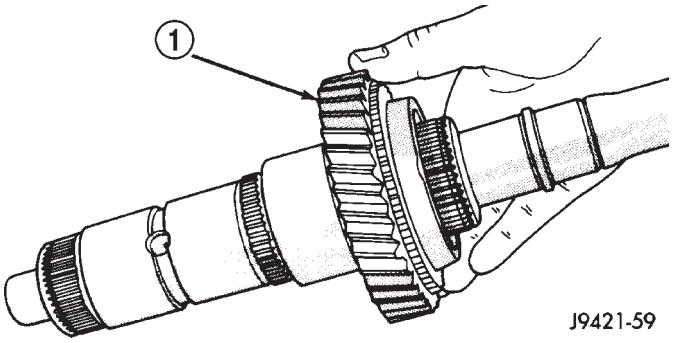


Fig. 54 REVERSE GEAR

1 - REVERSE GEAR

(3) Install brass synchro ring on reverse gear (Fig. 55).

(4) Assemble fifth-reverse synchro hub, sleeve, struts, springs and detent balls, if not previously done.

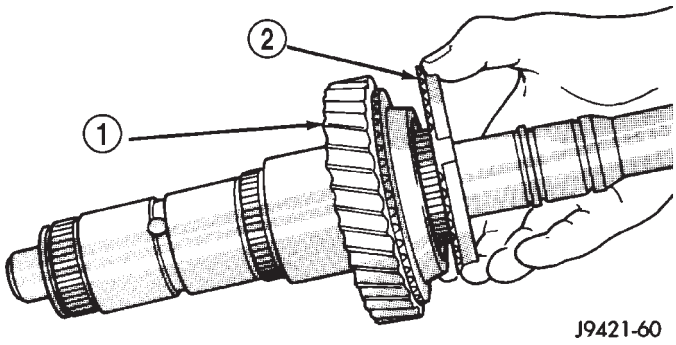


Fig. 55 REVERSE SYNCHRO

1 - REVERSE GEAR
2 - SYNCHRO RING

CAUTION: One side of the hub has shoulders around the hub bore, this side of the hub faces the front of the shaft. One side of the sleeve is tapered. The tapered side faces the front of the shaft.

(5) Start fifth-reverse synchro assembly on output shaft splines by hand. Then seat synchro onto shaft with a press and Cup 6310-1 (Fig. 56).

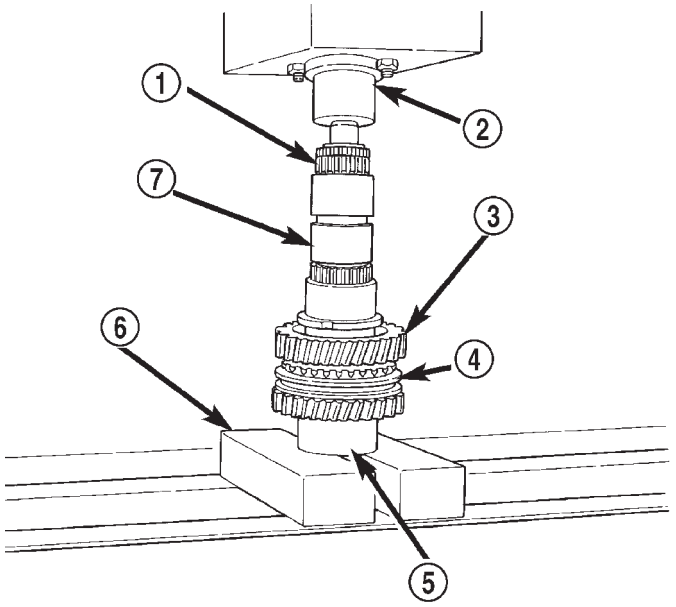


Fig. 56 FIFTH-REVERSE SYNCHRO ASSEMBLY

1 - SPACER
2 - PRESS RAM
3 - REVERSE GEAR
4 - FIFTH-REVERSE SYNCHRO ASSEMBLY
5 - CUP
6 - PRESS BLOCKS
7 - OUTPUT SHAFT

MANUAL-NV3550 (Continued)

(6) Install new fifth-reverse hub snap ring (Fig. 57) and verify the snap ring is seated.

NOTE: Snap rings are available in thicknesses from 2.00 mm to 2.20 mm (0.078 to 0.086 in.). Install thickest snap ring that will fit in shaft groove.

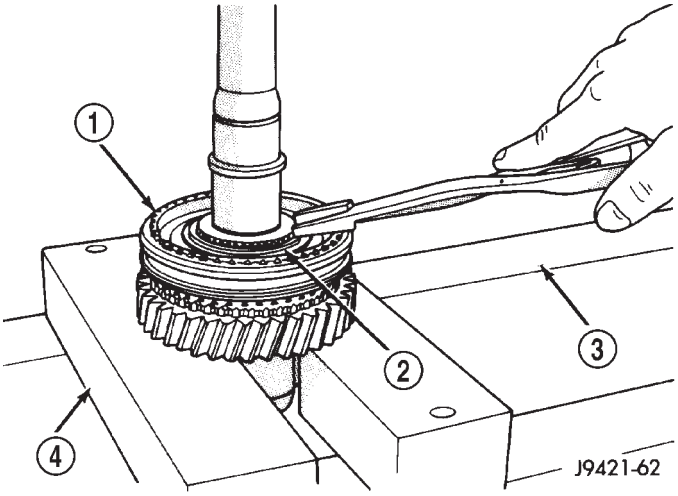


Fig. 57 FIFTH/REVERSE SYNCHRO HUB SNAP RING

1 - FIFTH-REVERSE SYNCHRO ASSEMBLY
2 - SNAP RING
3 - PRESS BED
4 - PRESS BLOCKS

(7) Install fifth gear synchro ring in synchro hub and sleeve (Fig. 58).

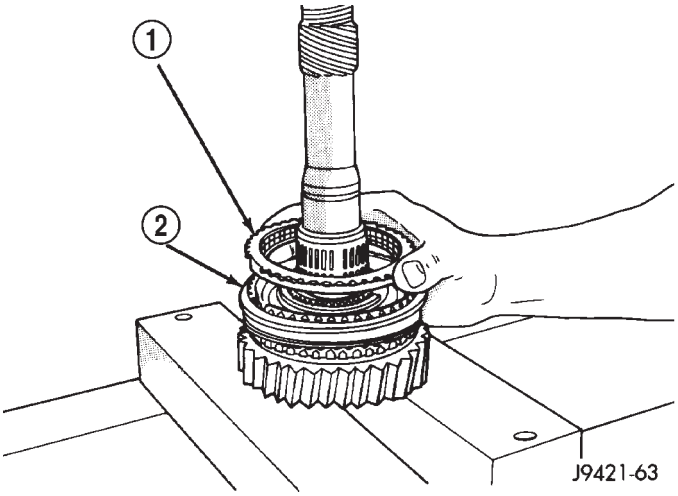


Fig. 58 FIFTH GEAR SYNCHRO RING

1 - FIFTH-SPEED SYNCHRO RING
2 - FIFTH-REVERSE SYNCHRO ASSEMBLY

(8) Install fifth gear bearing, spreading bearing only enough to clear shoulder on output shaft (Fig. 59). Verify bearing is properly seated.

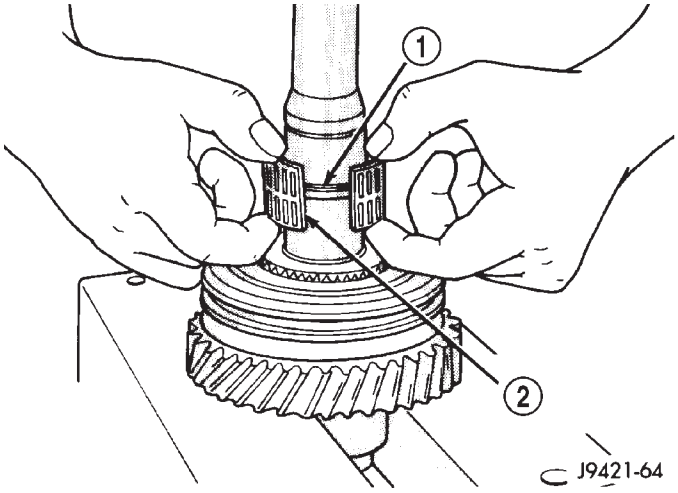


Fig. 59 FIFTH GEAR BEARING

1 - SHAFT SHOULDER
2 - FIFTH GEAR BEARING

(9) Install fifth gear on shaft and onto bearing (Fig. 60).

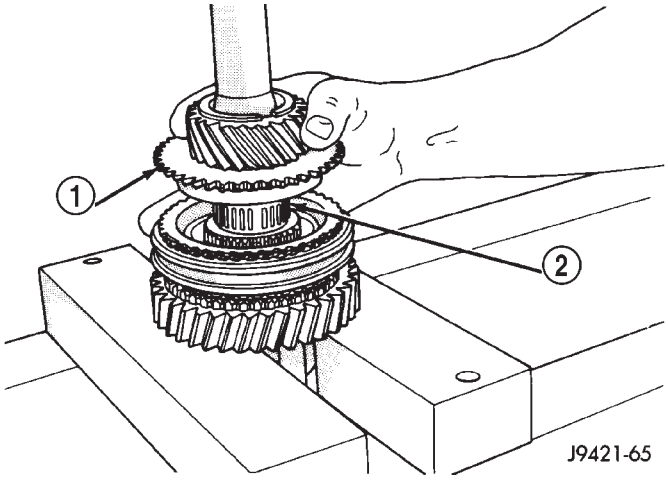


Fig. 60 FIFTH GEAR

1 - FIFTH GEAR
2 - BEARING

MANUAL-NV3550 (Continued)

(10) Invert output shaft and set the shaft in Cup 6310-1 so that fifth gear is seated on the tool (Fig. 61).

(11) Install first gear bearing on output shaft (Fig. 61). Verify bearing is seated on shaft shoulder and is properly joined.

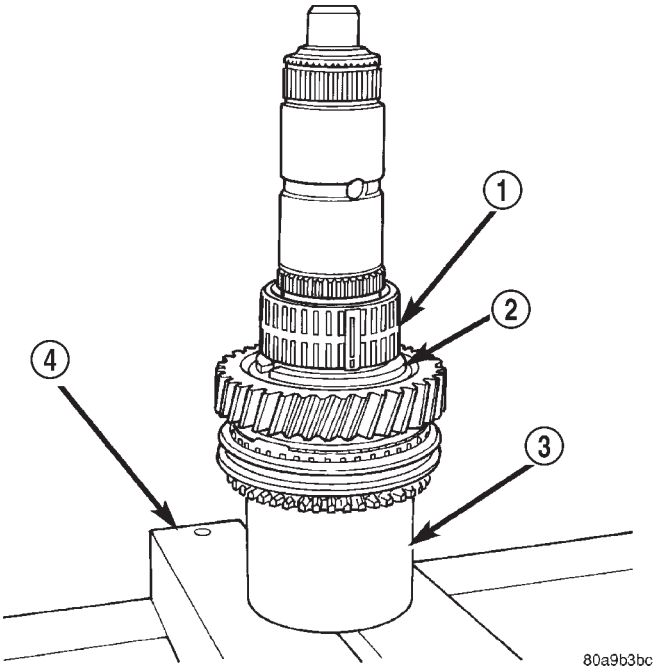


Fig. 61 FIRST GEAR BEARING

1 - FIRST GEAR BEARING
2 - SHAFT SHOULDER
3 - SPECIAL TOOL 6310–1
4 - PRESS BLOCKS

(12) Install first gear on shaft and over bearing with bearing synchro cone facing up (Fig. 62).

(13) Install first gear synchro ring (Fig. 63).

(14) Assemble 1-2 synchro hub sleeve, springs, struts and detent balls.

CAUTION: The 1-2 synchro hub and sleeve can be installed backwards. One side of the synchro sleeve is marked First Gear Side. Verify this side of the sleeve is facing first gear.

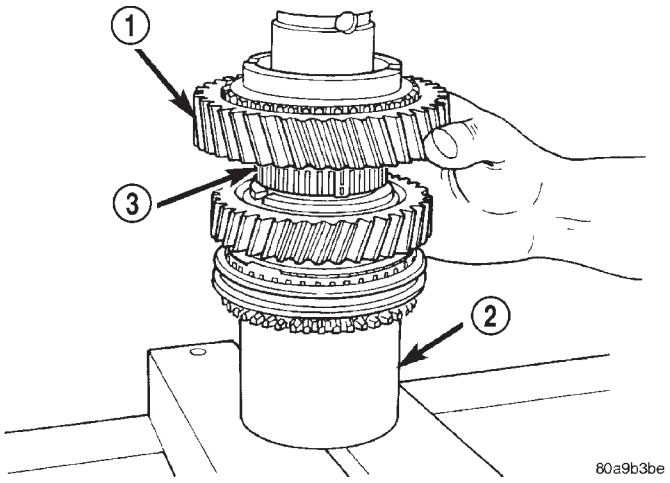


Fig. 62 FIRST GEAR

1 - FIRST GEAR
2 - CUP
3 - BEARING

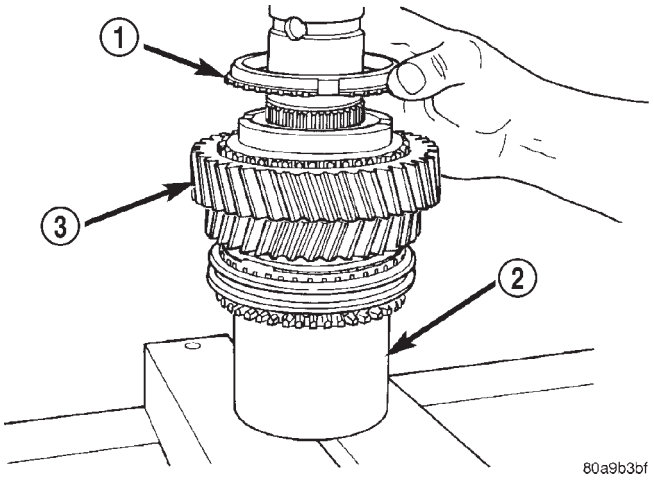


Fig. 63 FIRST GEAR SYNCHRO RING

1 - FIRST GEAR SYNCHRO RING
2 - SPECIAL TOOL 6310–1
3 - FIRST GEAR

(15) Start 1-2 synchro assembly on shaft by hand (Fig. 64). Verify synchro sleeve is properly positioned.

(16) Press 1-2 synchro onto output shaft using suitable size pipe tool and shop press (Fig. 65).

CAUTION: Align the synchro ring and sleeve as hub the is being pressed onto the shaft. The synchro ring can crack if not aligned.

MANUAL-NV3550 (Continued)

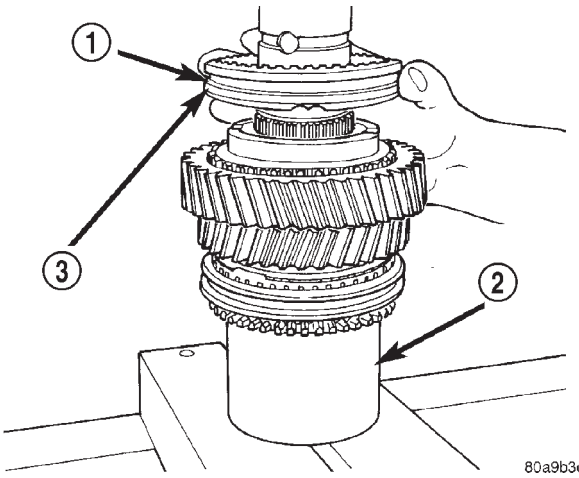


Fig. 64 STARTING 1-2 SYNCHRO

1 - 1-2 SYNCHRO ASSEMBLY
2 - CUP
3 - FIRST GEAR SIDE OF SYNCHRO SLEEVE

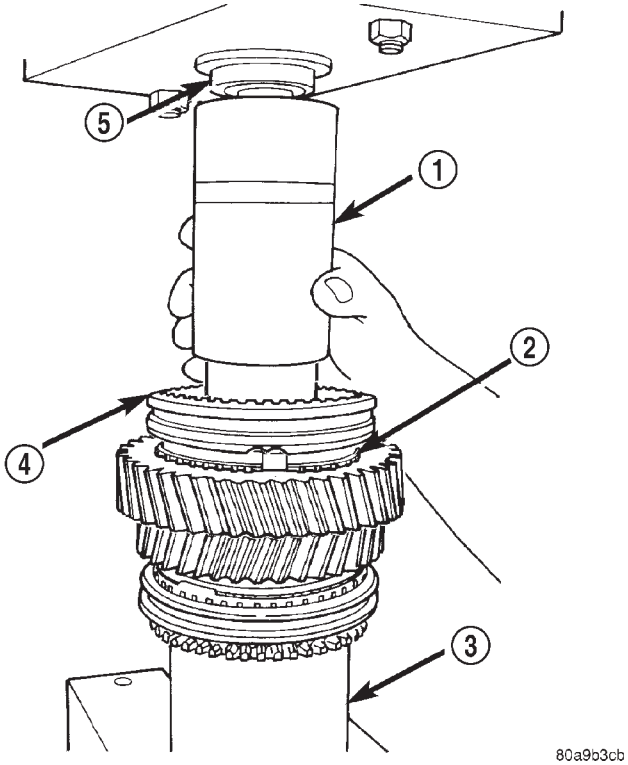


Fig. 65 PRESS 1-2 SYNCHRO

1 - SUITABLE SIZE PIPE TOOL
2 - SYNCHRO RING
3 - SPECIAL TOOL 6310–1
4 - 1–2 SYNCHRO ASSEMBLY
5 - PRESS RAM

(17) Install interm ring.

(18) Install new 1-2 synchro hub snap ring (Fig. 66) and verfiy the snap ring is seated.

NOTE: Snap rings are available in thicknesses from 1.80 mm to 2.00 mm (0.070 to 0.078 in.). Install thickest snap ring that will fit in shaft groove.

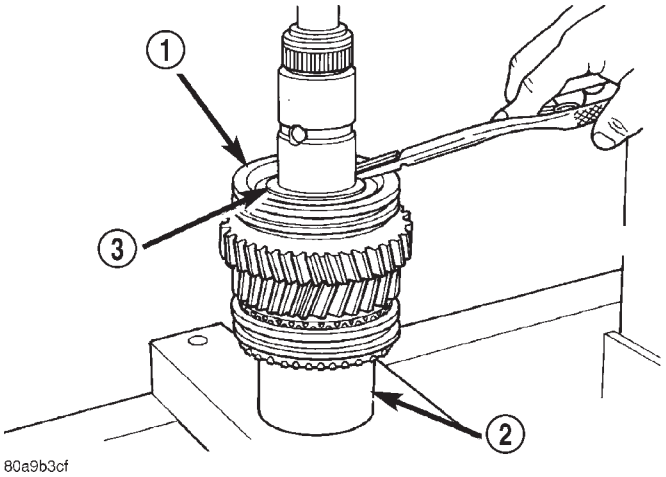


Fig. 66 1-2 SYNCHRO HUB SNAP RING

1 - 1-2 SYNCHRO
2 - SPECIAL TOOL
3 - SYNCHRO SNAP RING

(19) Install second gear synchro ring in 1-2 synchro hub and sleeve (Fig. 67). Verify synchro ring is properly seated.

(20) Install synchro friction cone and synchro cone in synchro ring.

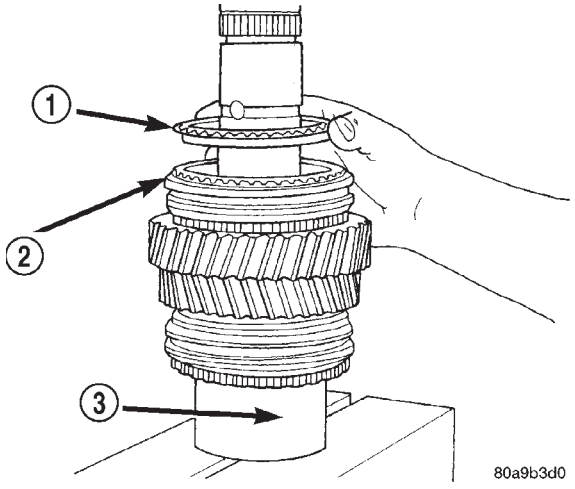


Fig. 67 SECOND GEAR SYNCHRO RING

1 - SECOND GEAR SYNCHRO RING
2 - 1-2 SYNCHRO
3 - SPECIAL TOOL

MANUAL-NV3550 (Continued)

(21) Install second gear needle bearing on shaft (Fig. 68).

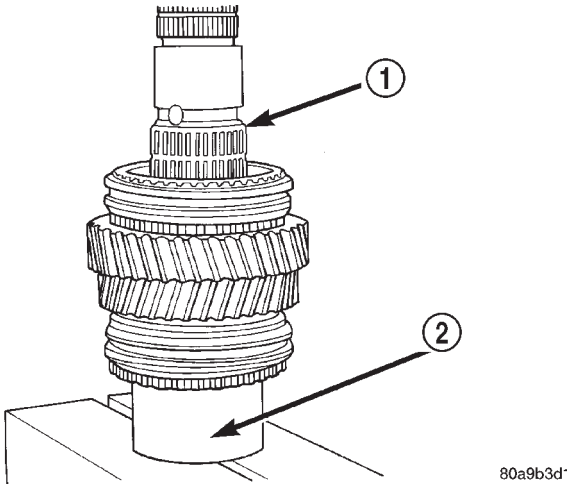


Fig. 68 SECOND GEAR BEARING

1 - SECOND GEAR BEARING
2 - SPECIAL TOOL 6310–1

(22) Install second gear onto shaft and bearing (Fig. 69). Verify second gear is fully seated on synchro components.

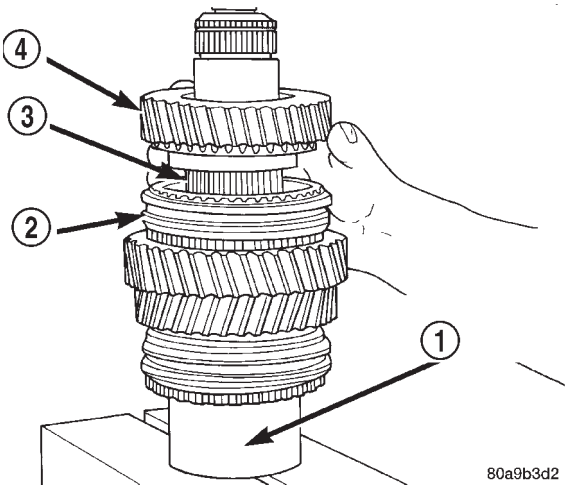


Fig. 69 SECOND GEAR

1 - CUP
2 - 1–2 SYNCHRO ASSEMBLY
3 - BEARING
4 - SECOND GEAR

(23) Install two-piece thrust washer (Fig. 70). Ensure washer halves are seated in shaft groove and that washer lugs are seated in shaft lug bores. Verify i.d. grooves and markings noted during removal are facing the correct direction.

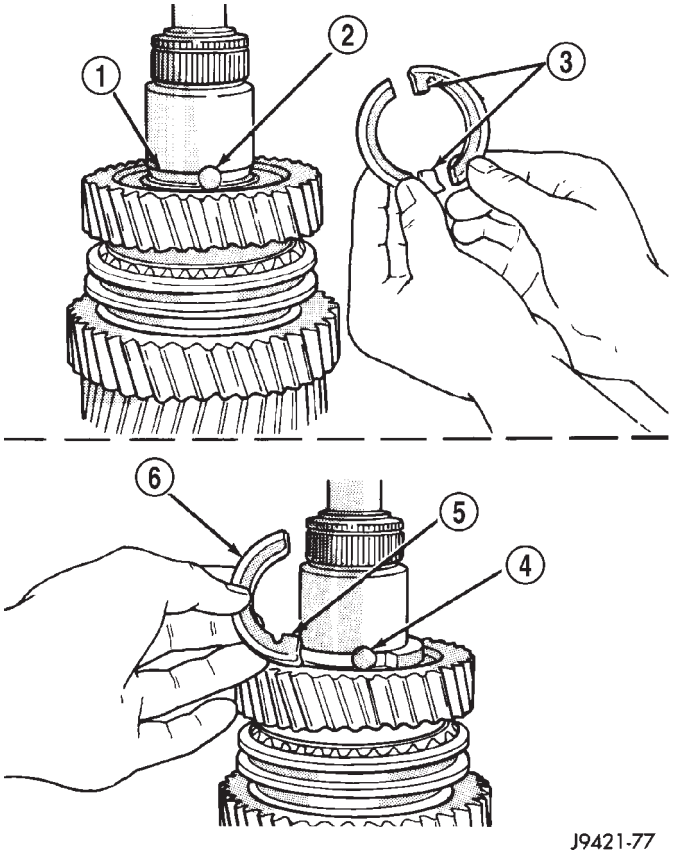


Fig. 70 TWO-PIECE THRUST WASH

1 - WASHER GROOVE IN SHAFT
2 - LUG BORE
3 - THRUST WASHER LUGS
4 - LUG BORE
5 - LUG
6 - WASHER HALF

MANUAL-NV3550 (Continued)

(24) Start retaining ring around two-piece thrust washer (Fig. 71). Ensure locating dimple is between the thrust washer halves.

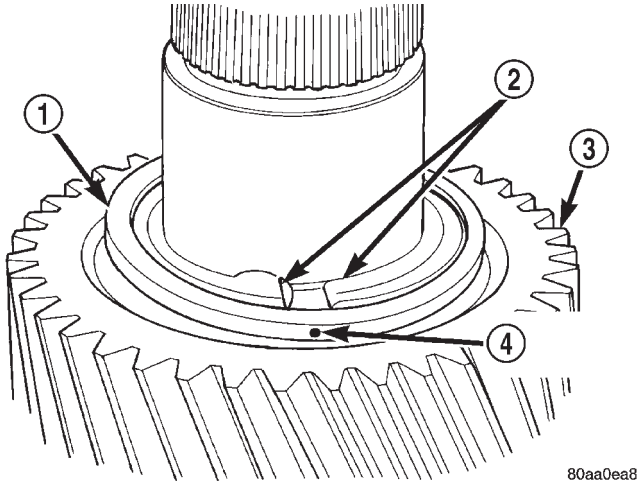


Fig. 71 RETAINING RING

1 - THRUST WASHER RETAINING RING
2 - THRUST WASHER HALVES
3 - SECOND GEAR
4 - LOCATING DIMPLE

(25) Seat thrust washer retaining ring with plastic mallet (Fig. 72).

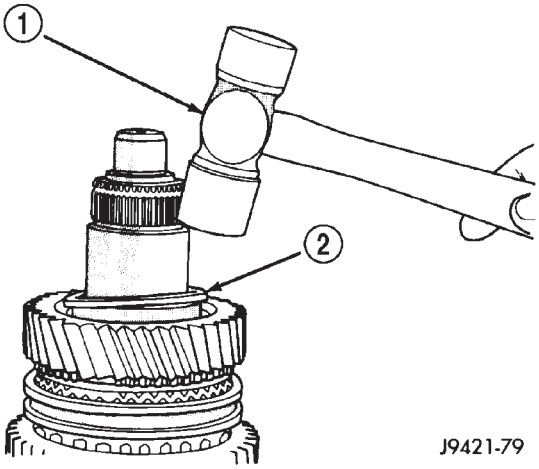


Fig. 72 THRUST RETAINER

1 - PLASTIC MALLET
2 - THRUST WASHER RETAINING RING

(26) Install third gear needle bearing on shaft (Fig. 73).

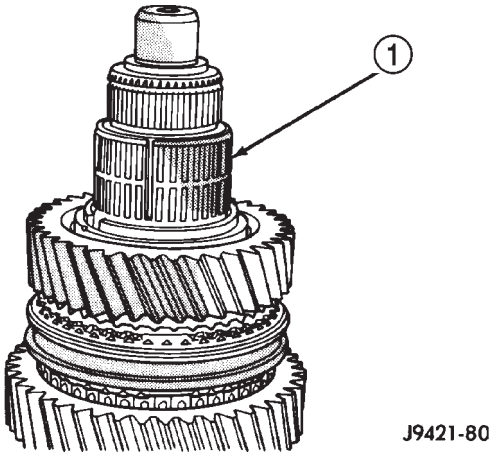


Fig. 73 THIRD GEAR BEARING

1 - THIRD GEAR BEARING

(27) Install third gear on shaft and bearing (Fig. 74).

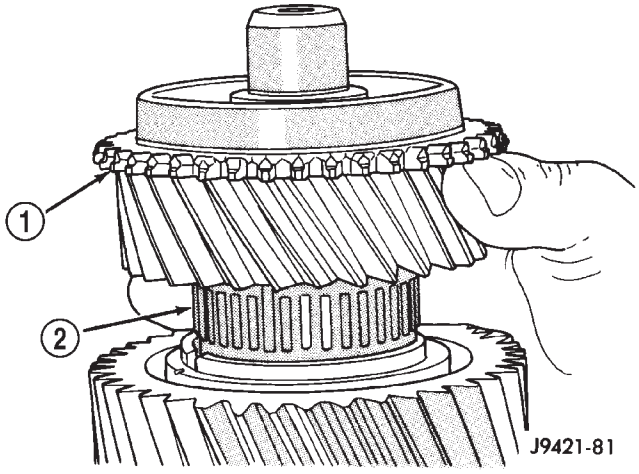


Fig. 74 THIRD GEAR

1 - THIRD GEAR
2 - BEARING

MANUAL-NV3550 (Continued)

(28) Install third speed synchro ring on third gear (Fig. 75).

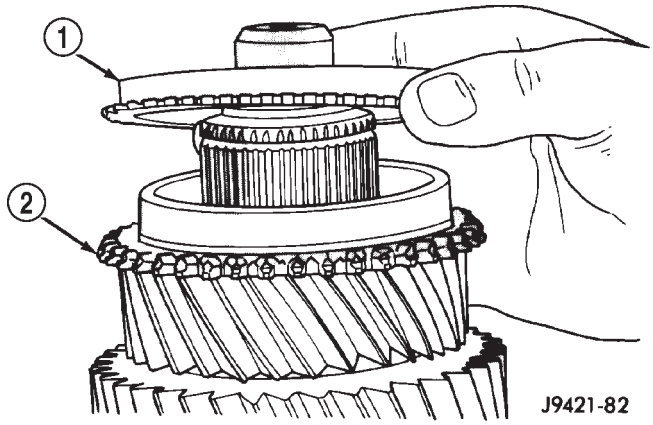


Fig. 75 THIRD SPEED SYNCHRO RING

1 - THIRD SPEED SYNCHRO RING
2 - THIRD GEAR

(29) Assemble 3-4 synchro hub, sleeve, springs, struts and detent balls.

(30) Start 3-4 synchro hub on output shaft splines by hand (Fig. 76).

CAUTION: The 3-4 synchro hub and sleeve can be installed backwards. One side of the sleeve has grooves in it. This side of sleeve faces the front of the shaft.

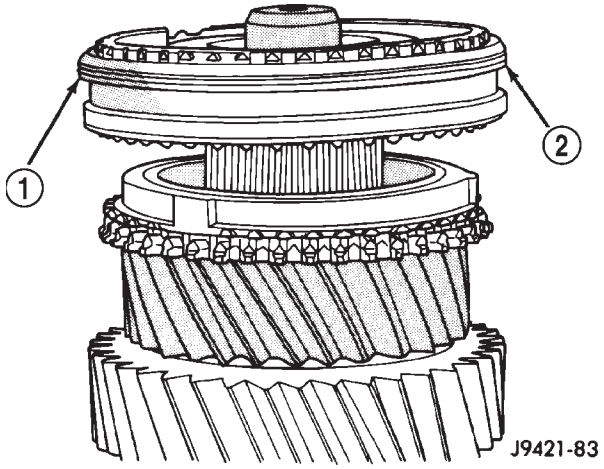


Fig. 76 3-4 SYNCHRO HUB ON OUTPUT SHAFT

1 - GROOVED SIDE OF SLEEVE (TO FRONT)
2 - 3-4 SYNCHRO ASSEMBLY

(31) Press 3-4 synchro assembly onto output shaft with shop press and suitable size pipe tool (Fig. 77).

NOTE: Place the pipe on hub as close to output shaft as possible without contacting the shaft splines.

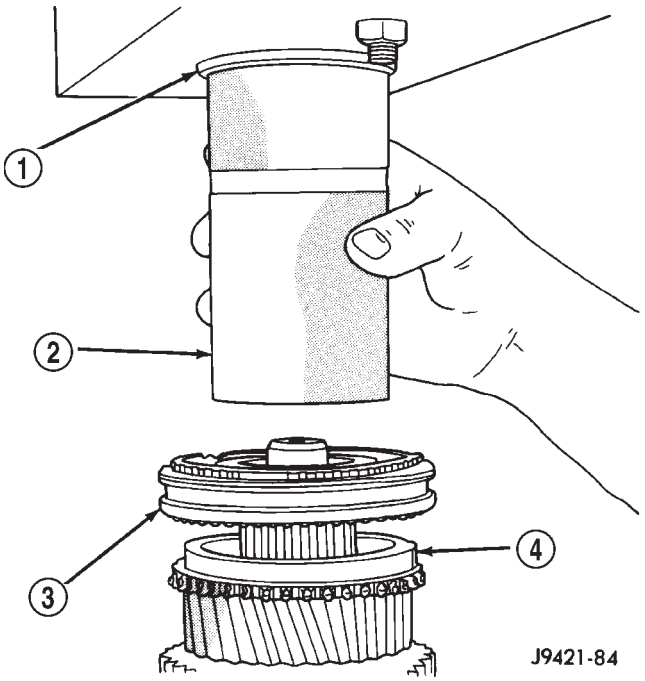


Fig. 77 PRESS 3-4 SYNCHRO ON OUTPUT SHAF

1 - PRESS RAM
2 - PIPE TOOL
3 - 3-4 SYNCHRO
4 - THIRD SPEED SYNCHRO RING

(32) Install 3-4 synchro hub snap ring (Fig. 78)and verify snap ring is seated.

NOTE: Snap rings are available in thicknesses from 2.00 mm to 2.30 mm (0.078 to 0.090 in.). Install thickest snap ring that will fit in shaft groove.

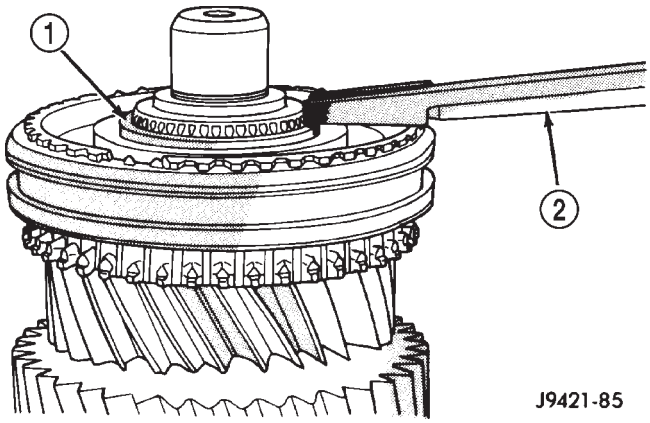


Fig. 78 3–4 SYNCHRO HUB SNAP RING

1 - 3-4 SYNCHRO HUB SNAP RING
2 - SNAP RING PLIERS

MANUAL-NV3550 (Continued)

(33) Install output shaft bearing.

(34) Install output shaft bearing snap ring, spreading it just enough to install it (Fig. 79). Verify snap ring is seated in shaft groove.

(35) Verify position of synchro sleeves before proceeding with assembly operations (Fig. 80). Grooved side of 3-4 sleeve should be facing forward. First gear side of 1-2 sleeve should be facing first gear. Tapered side of fifth-reverse sleeve should be facing forward.

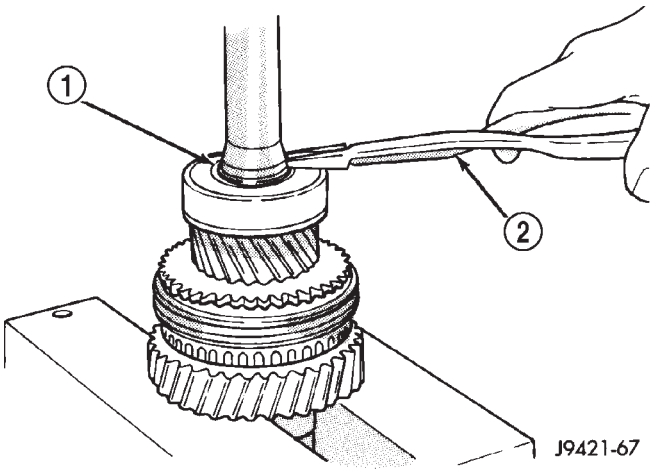
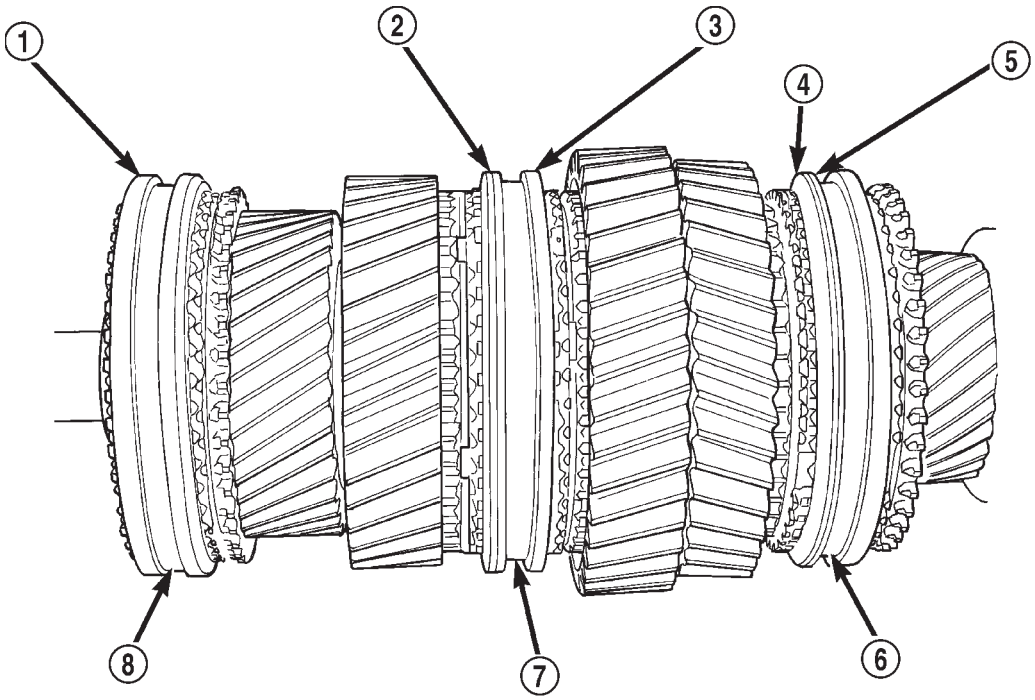


Fig. 79 OUTPUT SHAFT BEARING

1 - BEARING SNAP RING
2 - SNAP RING PLIERS



80aa0ea9

Fig. 80 SYNCHRO SLEEVE LOCATIONS

1 - DOUBLE GROOVE FORWARD
2 - GROOVE FORWARD
3 - FIRST GEAR SIDE MARKING TOWARD FIRST GEAR
4 - TAPER FORWARD
5 - GROOVE FORWARD
6 - 5TH-REV SYNCHRO SLEEVE
7 - 1–2 SYNCHRO SLEEVE
8 - 3–4 SYNCHRO SLEEVE

MANUAL-NV3550 (Continued)

REVERSE IDLER ASSEMBLY

(1) Lubricate idler components with gear lube.

(2) Slide idler gear bearing on shaft (Fig. 81). Bearing fits either way on shaft.

(3) Slide gear onto shaft. Side of gear with recess goes to rear (Fig. 81).

(4) Place first lock ball in dimple at rear end of idler shaft (Fig. 81). Hold ball in place with petroleum jelly.

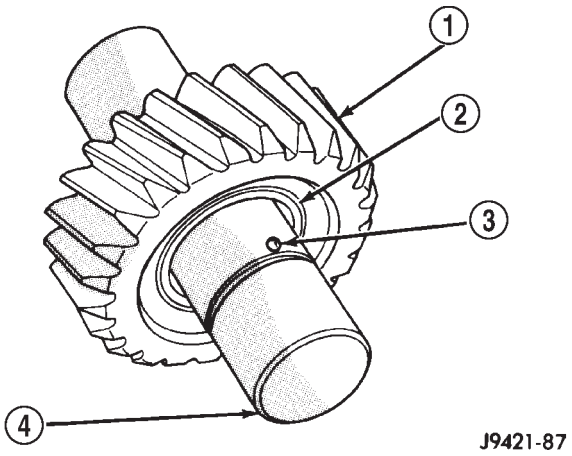


Fig. 81 IDLER GEAR AND BEARING

1 - IDLER GEAR
2 - BEARING
3 - LOCK BALL
4 - REAR OF SHAFT

(5) Slide thrust rear thrust washer onto shaft and over lock ball (Fig. 82).

(6) Install snap ring in groove at rear of shaft (Fig. 82).

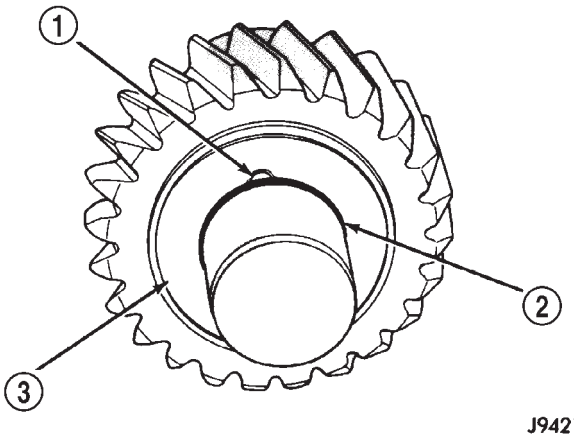


Fig. 82 IDLER GEAR REAR THRUST WASHER

1 - LOCK BALL
2 - SNAP RING GROOVE
3 - THRUST WASHER

(7) Install lock ball in dimple at front of shaft. Hold ball in place with petroleum jelly.

(8) Install front thrust washer on shaft and slide washer up against gear and over lock ball (Fig. 83).

(9) Install wave washer, flat washer and remaining snap ring on idler shaft (Fig. 83). Verify snap ring is seated.

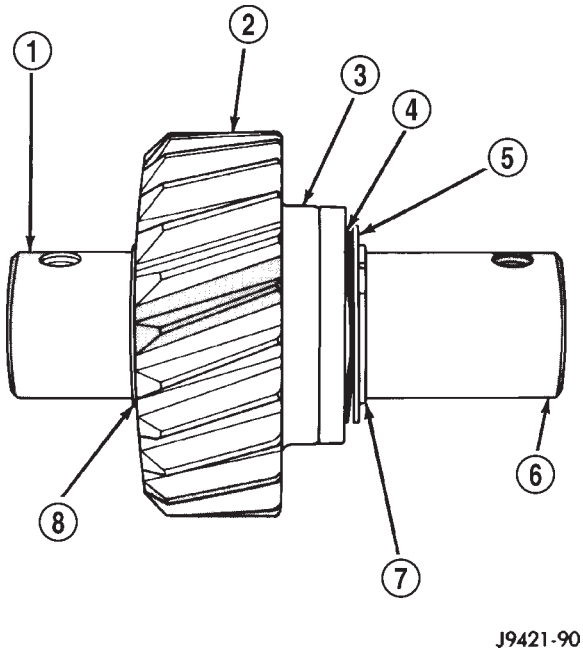


Fig. 83 IDLER GEAR AND SHAFT ASSEMBLY

1 - REAR OF SHAFT
2 - GEAR
3 - THRUST WASHER AND BALL
4 - WAVE WASHER
5 - FLAT WASHER
6 - FRONT OF SHAFT
7 - SNAP RING
8 - SNAP RING

SHIFT SHAFT AND BUSHINGS/BEARINGS

Inspect shift shaft bushing and bearing for damage and replace if necessary.

(1) Locate a bolt that will thread into the bushing without great effort.

(2) Thread the bolt into the bushing, allowing the bolt to make its own threads in the bushing.

(3) Attach a slide hammer or suitable puller to the bolt and remove bushing.

(4) Use the short end of Installer 8119 to install the new bushing.

(5) The bushing is correctly installed if the bushing is flush with the transmission case.

(6) To replace the bearing locate a bolt that will thread into the bearing without great effort.

(7) Thread the bolt into the bearing as much as possible.

MANUAL-NV3550 (Continued)

(8) Attach a slide hammer or suitable puller to the bolt and remove the bearing.

(9) Use the short end of Installer 8119 to install the new bearing.

(10) The bearing is correctly installed if the bearing is flush with the transmission case.

DETENT PLUNGER BUSHING

Inspect detent plunger bushings for damage and replace if necessary.

NOTE: The detent plunger bushings are installed to a specific depth. The space between the two bushings when correctly installed contain an oil feed hole. Do not attempt to install the bushings with anything other than the specified tool or this oil hole may become restricted.

(1) Using the long end of Installer 8119, drive the detent bushings through the outer case and into the shift shaft bore.

(2) Remove the bushings from the shift shaft bore.

(3) Install a new detent plunger bushing on the long end of Installer 8118.

(4) Start the bushing in the detent plunger bore in the case.

(5) Drive the bushing into the bore until the tool contacts the transmission case.

(6) Install a new detent plunger bushing on the short end of Installer 8118.

(7) Start the bushing in the detent plunger bore in the case.

(8) Drive the bushing into the bore until the tool contacts the transmission case.

GEARTRAIN ASSEMBLY

(1) Install Adapter 6747-1A on input shaft hub of Fixture 6747 (Fig. 84).

(2) Install input shaft in fixture tool. Make sure Adapter 6747-1A is positioned under shaft as shown (Fig. 85).

(3) Install pilot bearing in input shaft (Fig. 85).

NOTE: The side of the pilot bearing with the small diameter goes toward the input shaft.

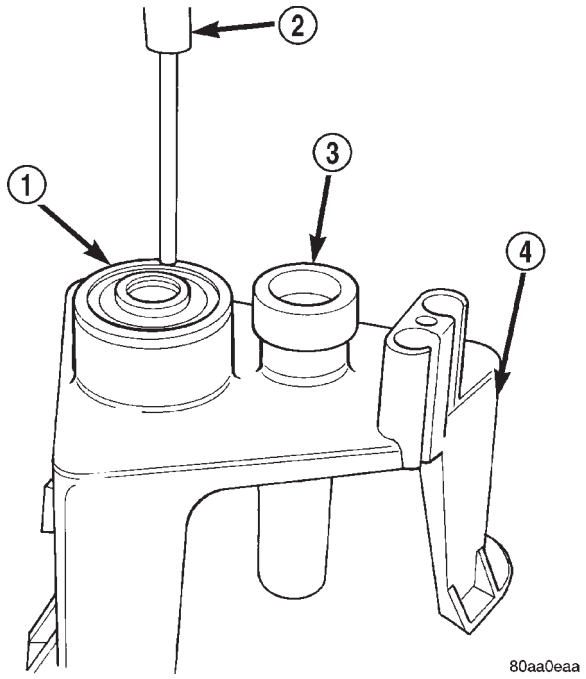


Fig. 84 ASSEMBLY FIXTURE

1 - SPECIAL TOOL 6747–2B (INSTALL ON COUNTERSHAFT FRONT HUB)
2 - SPECIAL TOOL 8115
3 - SPECIAL TOOL 6747–1A
4 - SPECIAL TOOL 6747

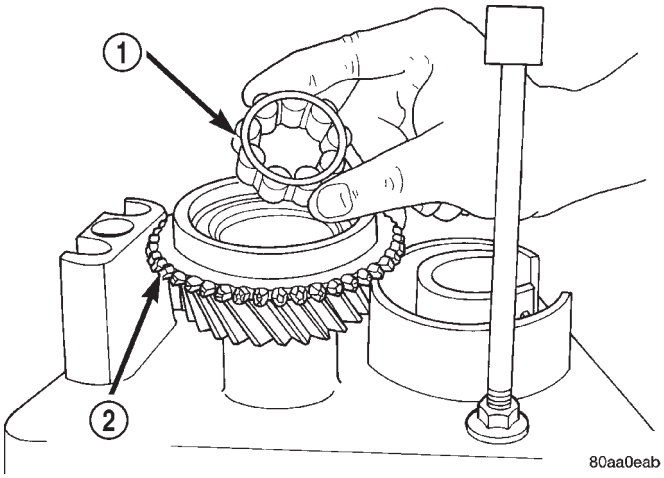


Fig. 85 PILOT BEARING AND INPUT SHAFT

1 - PILOT BEARING
2 - INPUT SHAFT

MANUAL-NV3550 (Continued)

(4) Install fourth gear synchro ring on input shaft (Fig. 86).

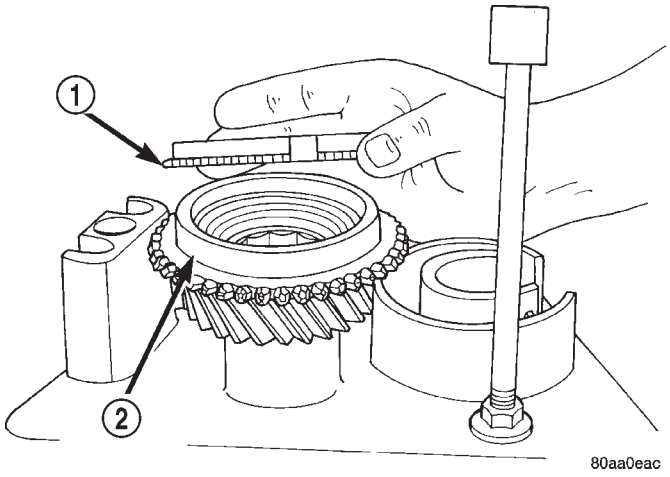


Fig. 86 FOURTH GEAR SYNCHRO

1 - FOURTH GEAR SYNCHRO RING
2 - INPUT SHAFT

(5) Adjust height of idler gear pedestal on assembly fixture (Fig. 87). Start with a basic height of 18.4 cm (7-1/4 in.). Final adjustment can be made after gear is positioned on pedestal.

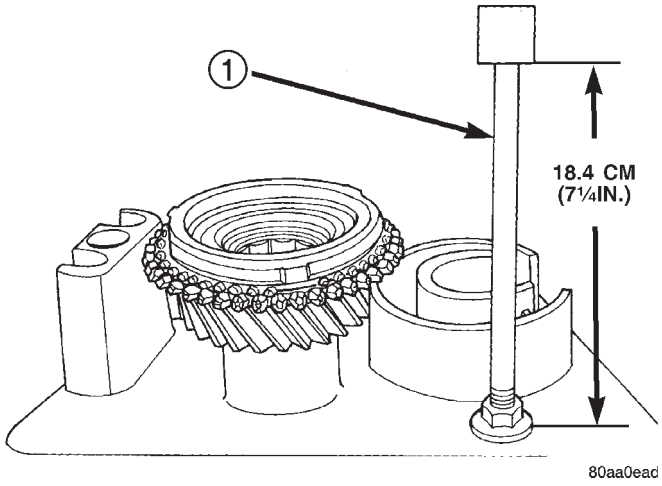


Fig. 87 IDLER PEDESTAL BASIC HEIGHT

1 - REVERSE IDLER PEDESTAL

(6) Install assembled output shaft and geartrain in input shaft (Fig. 88). Carefully rotate output shaft until the 3-4 synchro ring seats in synchro hub and sleeve.

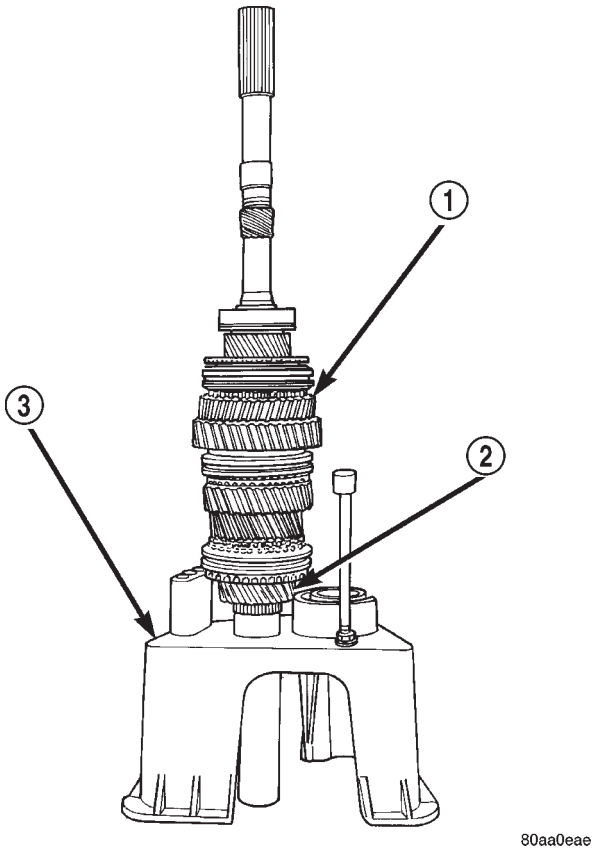


Fig. 88 OUTPUT SHAFT AND GEARTRAIN

1 - OUTPUT SHAFT AND GEARTRAIN
2 - INPUT SHAFT
3 - SPECIAL TOOL 6747

(7) Install Adapter 6747-2B on front bearing hub of countershaft. The adapter has a shoulder on one side that goes towards the countershaft.

(8) Slide countershaft (and adapter) into fixture slot. Verify countershaft and output shaft gears are fully meshed with the mainshaft gears (Fig. 89).

(9) Check alignment of countershaft and output shaft gear teeth. Note that gears may not align perfectly. A difference in height of 1.57 to 3.18 mm (1/16 to 1/8 in.) will probably exist. This difference will not interfere with assembly.

MANUAL-NV3550 (Continued)

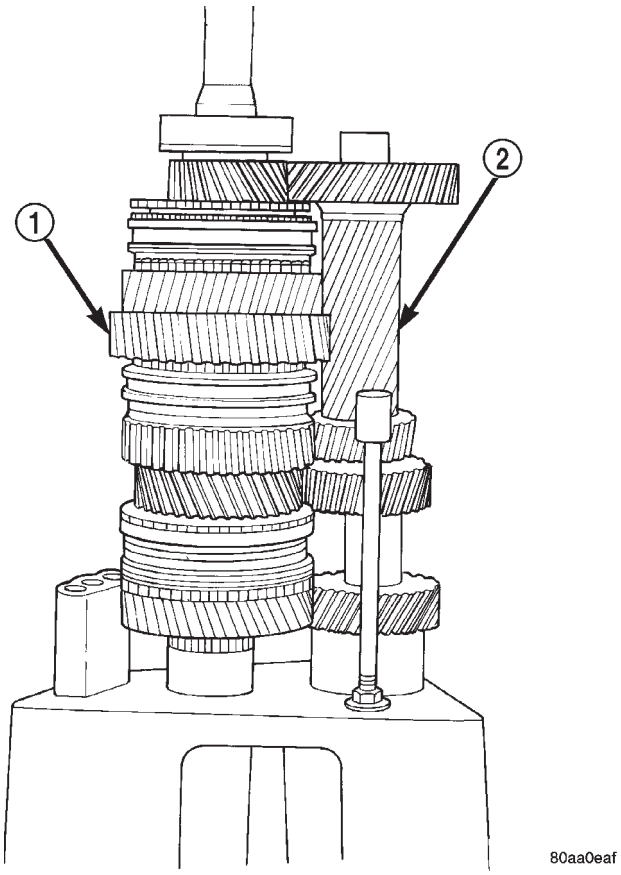


Fig. 89 COUNTERSHAFT ON FIXTURE

1 - OUTPUT SHAFT AND GEARTRAIN
2 - COUNTERSHAFT (SLIDE INTO PLACE ON FIXTURE TOOL)

(10) Position reverse idler in support cup of assembly fixture (Fig. 90). Ensure idler gear is properly meshed and aligned with shaft gear teeth and that bolt holes are facing out and not toward geartrain. Adjust pedestal up or down if necessary. Also be sure that short end of idler shaft is facing up as shown.

(11) On 2-wheel drive transmission, thread one Alignment Pin 8120 in center or passenger side hole of output shaft bearing retainer. Then position retainer on fifth gear as shown (Fig. 91).

(12) Assemble 1-2 and fifth reverse-shift forks (Fig. 92). Arm of fifth-reverse fork goes through slot in 1-2 fork.

(13) Install assembled shift forks in synchro sleeves (Fig. 93). Verify forks are properly seated in sleeves.

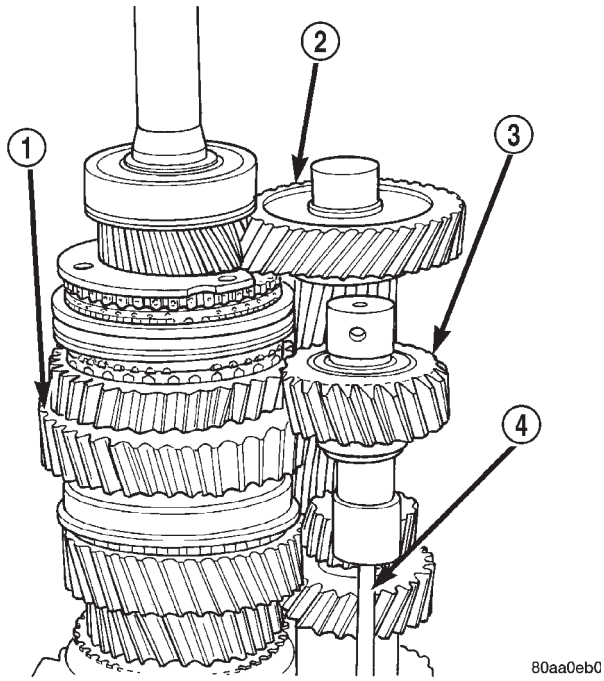


Fig. 90 REVERSE IDLER ASSEMBLY POSITION

1 - OUTPUT SHAFT AND GEARTRAIN
2 - COUNTERSHAFT
3 - REVERSE IDLER ASSEMBLY
4 - PEDESTAL

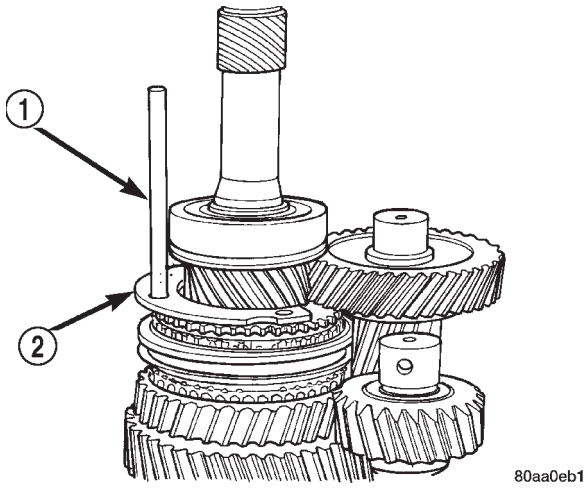


Fig. 91 POSITIONING OUTPUT SHAFT BEARING

1 - SPECIAL TOOL 8120
2 - OUTPUT SHAFT BEARING RETAINER

MANUAL-NV3550 (Continued)

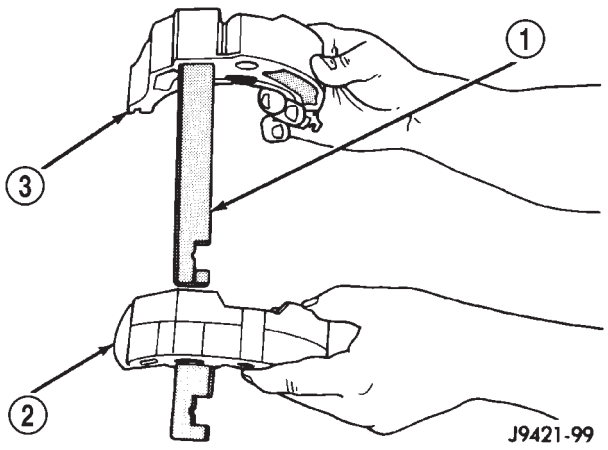


Fig. 92 1-2 AND FIFTH-REVERSE

1 - INSERT ARM THROUGH 1–2 FORK
2 - 1–2 FORK
3 - FIFTH-REVERSE FORK

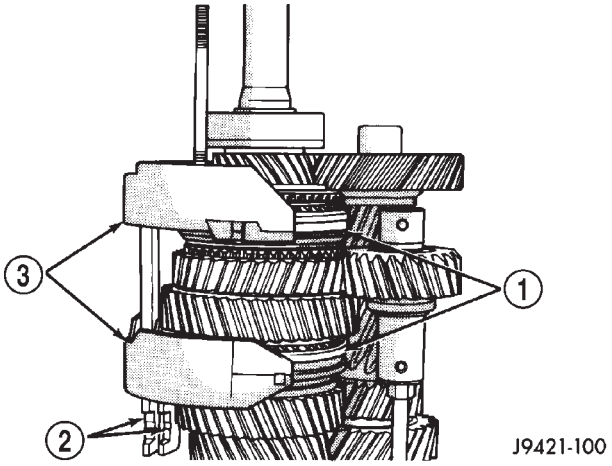


Fig. 93 SHIFT FORKS IN SYNCHRO

1 - SYNCHRO SLEEVES
2 - FORK ARMS
3 - SHIFT FORKS

REAR HOUSING - 2WD

(1) Drive adapter housing alignment dowels back into housing until dowels are flush with mounting surface (Fig. 94).

(2) Apply liberal quantity of petroleum jelly to countershaft rear bearing and bearing race.

(3) Install countershaft rear bearing in bearing race (Fig. 95).

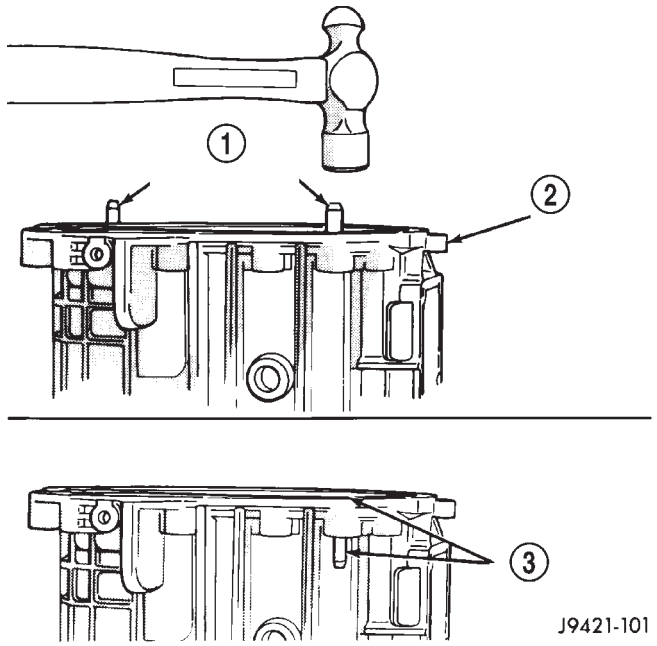


Fig. 94 REAR HOUSING DOWELS

1 - HOUSING ALIGNMENT DOWELS
2 - REAR HOUSING
3 - DOWEL FLUSH WITH SURFACE

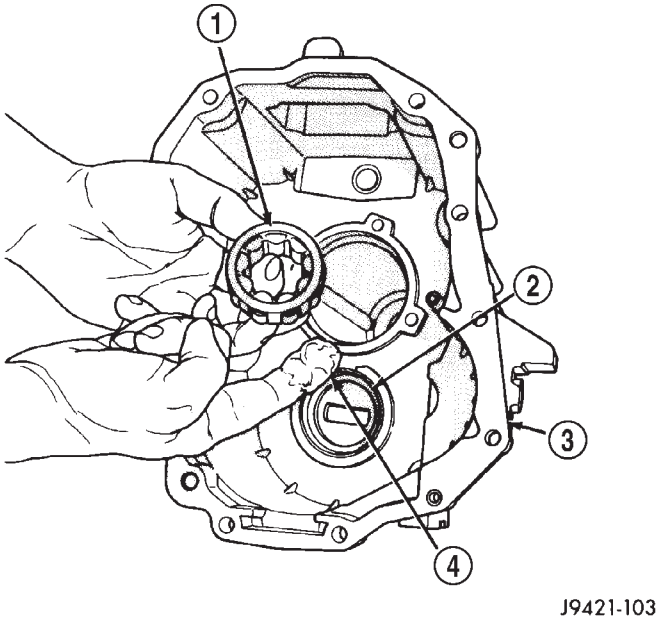


Fig. 95 COUNTERSHAFT REAR BEARING

1 - COUNTERSHAFT REAR BEARING
2 - REAR BEARING RACE
3 - REAR HOUSING
4 - PETROLEUM JELLY

MANUAL-NV3550 (Continued)

CAUTION: Be sure the large diameter side of the roller retainer faces the countershaft and the small diameter side faces the race and housing (Fig. 96).

(4) Apply extra petroleum jelly to hold countershaft rear bearing in place when housing is installed.

(5) Apply light coat of petroleum jelly to shift shaft bushing/bearing in rear housing (Fig. 96).

(6) Reach into countershaft rear bearing with finger and push each bearing roller outward against race. Then apply extra petroleum jelly to hold rollers in place. This avoids having rollers becoming displaced during housing installation.

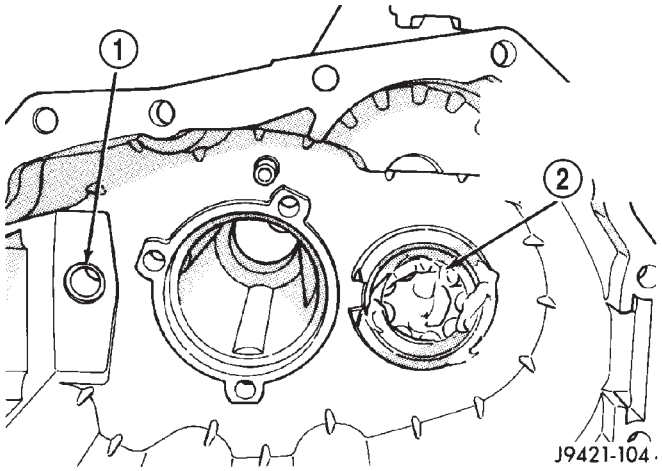


Fig. 96 COUNTERSHAFT REAR BEARING SEATED

1 - SHIFT SHAFT BUSHING/BEARING
2 - COUNTERSHAFT REAR BEARING (SEATED IN RACE)

(7) Install rear housing onto geartrain (Fig. 97). Verify bearing retainer pilot stud is in correct bolt hole in housing. Also be sure countershaft and output shaft bearings are aligned in housing and on countershaft. It may be necessary to lift upward on countershaft slightly to ensure that the countershaft rear bearing engages to the countershaft before the rear output shaft bearing engages the housing.

(8) Seat rear housing on output shaft rear bearing and countershaft. Use plastic or rawhide mallet to tap housing into place.

(9) Apply Mopar Gasket Maker or equivalent, to housing bolt threads, bolt shanks and under bolt heads (Fig. 98).

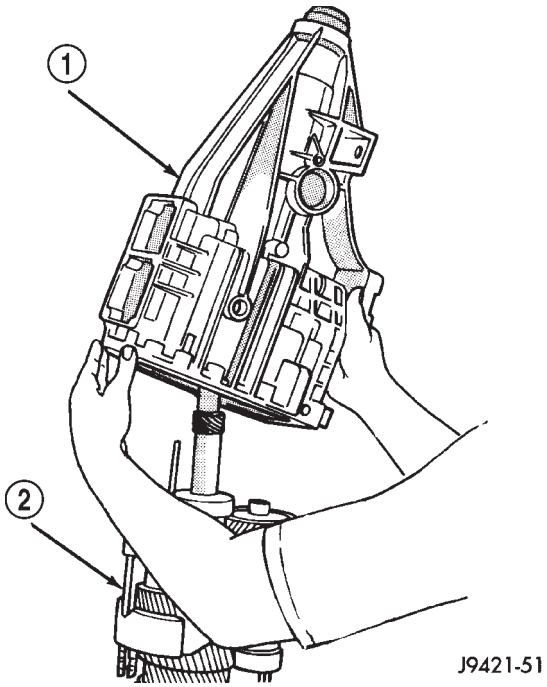


Fig. 97 REAR HOUSING - 2WD

1 - REAR HOUSING
2 - SHIFT FORKS AND GEARTRAIN

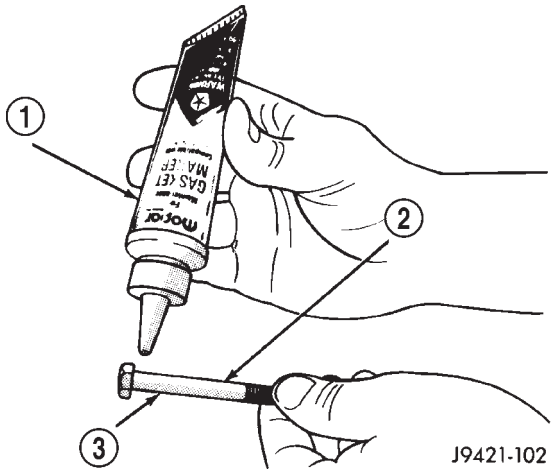


Fig. 98 SEAL RETAING BOLTS

1 - MOPAR GASKET MAKER (OR LOCTITE 518)
2 - RETAINER AND HOUSING BOLTS
3 - APPLY SEALER TO UNDERSIDE OF BOLT HEAD, SHANK AND THREADS

MANUAL-NV3550 (Continued)

(10) Start first two bolts in retainer (Fig. 99). It may be necessary to move retainer rearward (with pilot stud) in order to start bolts in retainer.

(11) Remove Alignment Pin 8120 and install last retainer bolt (Fig. 99).

(12) Tighten all three retainer bolts to 30-35 N·m (22-26 ft. lbs.).

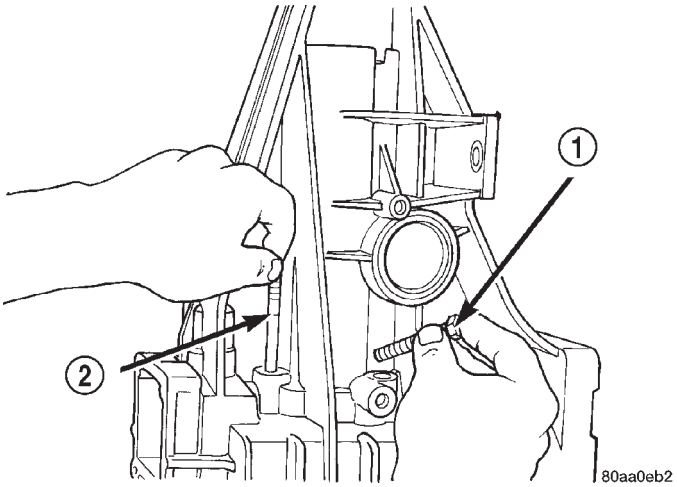


Fig. 99 PILOT STUD AND RETAINER BOLTS - 2WD

1 - BEARING RETAINER BOLT
2 - SPECIAL TOOL 8120

ADAPTER HOUSING - 4WD

(1) Install rear bearing in adapter housing. Use wood hammer handle or wood dowel to tap bearing into place.

(2) Position rear bearing retainer in adapter housing (Fig. 100).

(3) Apply Mopar Gasket Maker or equivalent, to threads, bolt shanks and under hex heads of bearing retainer bolts (Fig. 98).

(4) Apply liberal quantity of petroleum jelly to countershaft rear bearing and bearing race.

(5) Install countershaft rear bearing in bearing race (Fig. 96).

CAUTION: Be sure the large diameter side of the roller retainer faces the countershaft and the small diameter side faces the race and housing (Fig. 96).

(6) Apply extra petroleum jelly to hold countershaft rear bearing in place when housing is installed.

(7) Apply light coat of petroleum jelly to shift shaft bushing/bearing in adapter housing (Fig. 96).

(8) Install adapter housing on geartrain.

(9) Install rear bearing snap ring on output shaft (Fig. 101).

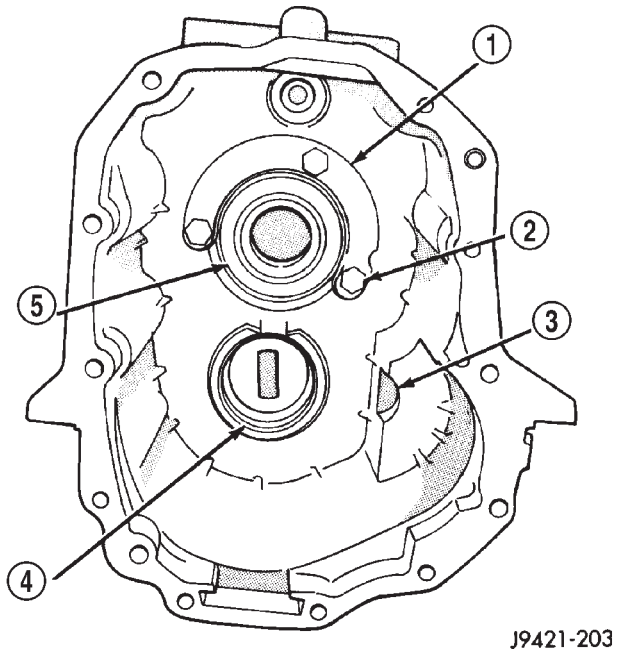


Fig. 100 ADAPTER HOUSING - 4WD

1 - BEARING RETAINER
2 - RETAINER BOLT
3 - IDLER SHAFT NOTCH
4 - COUNTERSHAFT BEARING RACE
5 - REAR BEARING

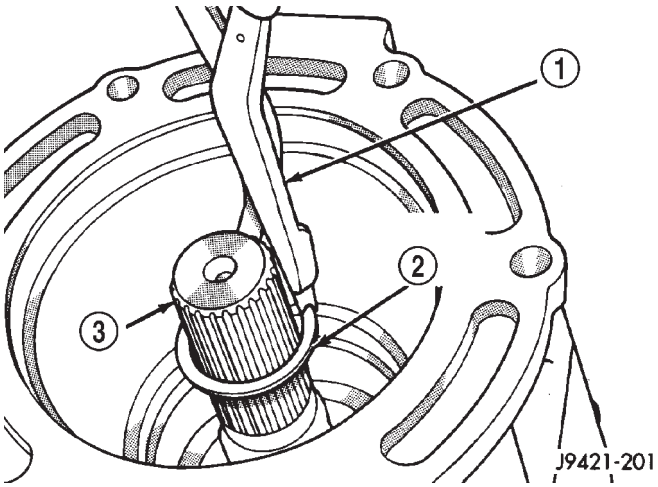


Fig. 101 REAR BEARING SNAP RING - 4WD

1 - SNAP RING PLIERS
2 - SNAP RING
3 - OUTPUT SHAFT

MANUAL-NV3550 (Continued)

(10) Lubricate lip of new rear seal (Fig. 102) with Mopar Door Ease or transmission fluid.

(11) Install new rear seal in adapter housing bore with Installer C-3860-A. Verify seal is seated in housing bore (Fig. 102).

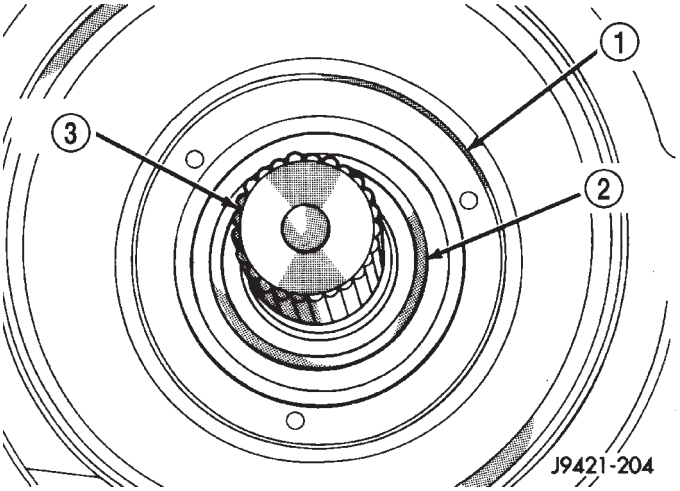


Fig. 102 REAR SEAL

1 - REAR SEAL
2 - SEAL LIP
3 - OUTPUT SHAFT

SHIFT SHAFT, SHAFT LEVER AND BUSHING AND SHIFT SOCKET

(1) Verify that all synchro sleeves are in Neutral position (centered on hub).

CAUTION: The transmission synchros must all be in Neutral position for assembly. Otherwise the housings, shift forks and gears can be damaged during installation of the two housings.

(2) Install 3-4 shift fork in synchro sleeve (Fig. 103). Verify that groove in fork arm is aligned with grooves in 1-2 and fifth-reverse fork arms as shown.

(3) Slide the end of shift shaft with shaft detent notches through 3-4 shift fork.

(4) Assemble shift shaft shift lever and bushing (Fig. 104). Be sure slot in bushing is facing up and roll pin hole for lever is aligned with hole in shaft.

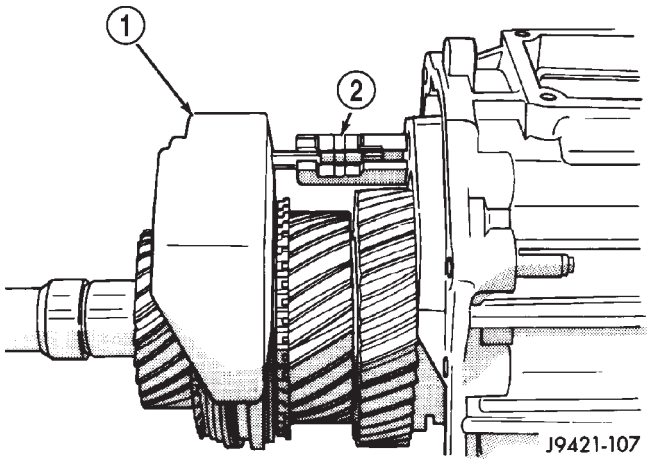


Fig. 103 3-4 SHIFT FORK

1 - 3-4 FORK
2 - ALIGN GROOVES IN FORK ARMS

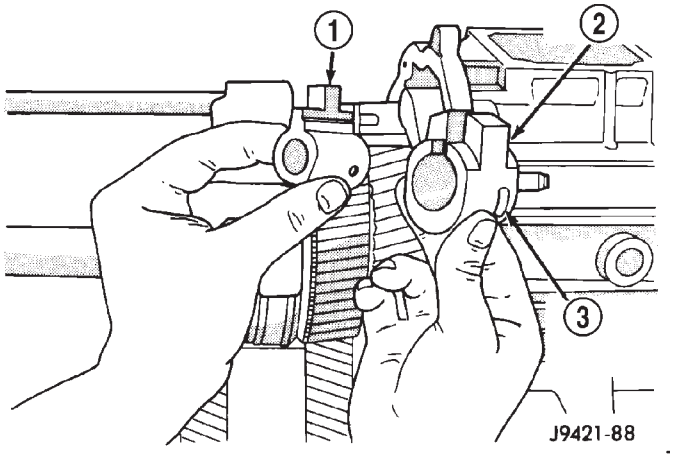


Fig. 104 LEVER AND BUSHING

1 - SHAFT LEVER
2 - LEVER BUSHING
3 - BUSHING LOCK PIN SLOT

(5) Install assembled lever and bushing on shift shaft (Fig. 105).

(6) Slide shift shaft through 1-2 and fifth-reverse fork and into shift lever opening in rear housing (Fig. 106).

(7) Align shift socket with shaft and slide shaft through socket and into shift shaft bearing in rear housing (Fig. 107).

(8) Rotate shift shaft so detent notches in shaft are facing the TOP of the transmission housing.

MANUAL-NV3550 (Continued)

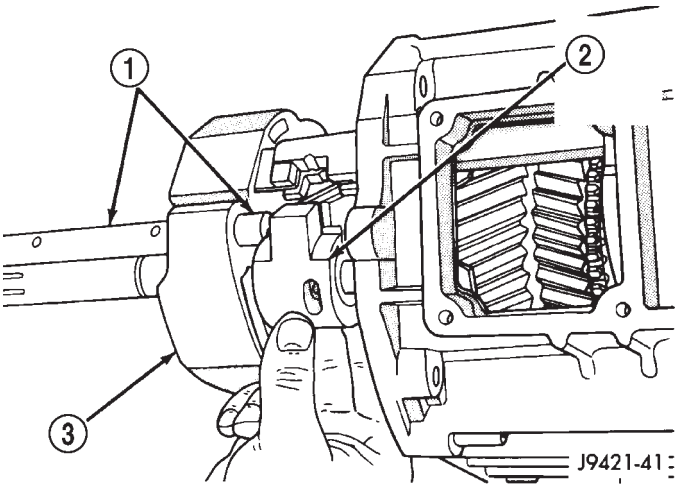


Fig. 105 LEVER AND BUSHING ASSENBLY

1 - SHIFT SHAFT
2 - SHAFT LEVER AND BUSHING
3 - 3–4 FORK

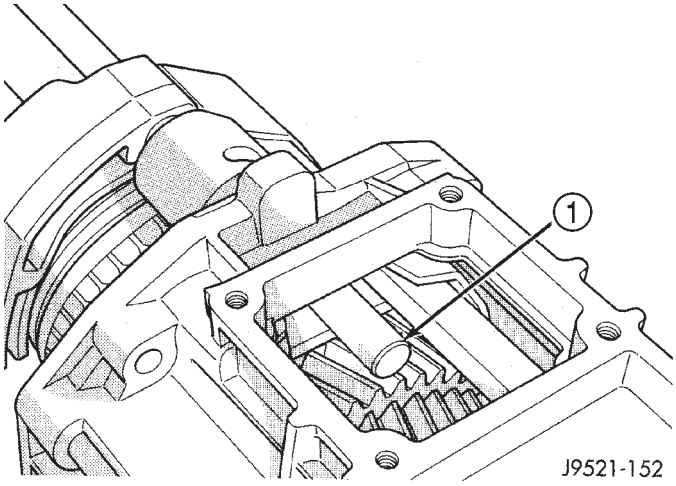


Fig. 106 SHAFT IN LEVER OPENING

1 - SHIFT SHAFT

CAUTION: Positioning of the shift shaft detent notch is important. Both of the shaft roll pins can be installed even when the shaft is 180° off. If this occurs, the transmission will have to be disassembled again to correct shaft alignment.

(9) Select correct new roll pin for shift shaft lever (Fig. 108). Shaft lever roll pin is approximately 22 mm (7/8 in.) long. Shift socket roll pin is approximately 33 mm (1-1/4 in.) long.

(10) Align roll pin holes in shift shaft, lever and bushing. Then start roll pin into shaft lever by hand (Fig. 109).

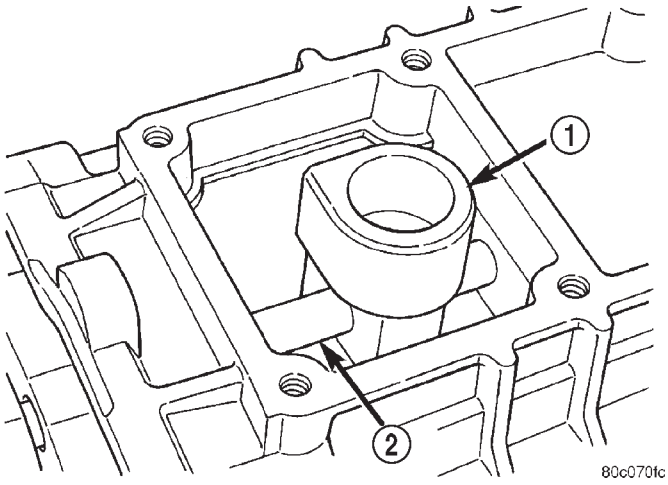


Fig. 107 SHIFT SOCKET

1 - SHIFT SOCKET
2 - SHIFT SHAFT

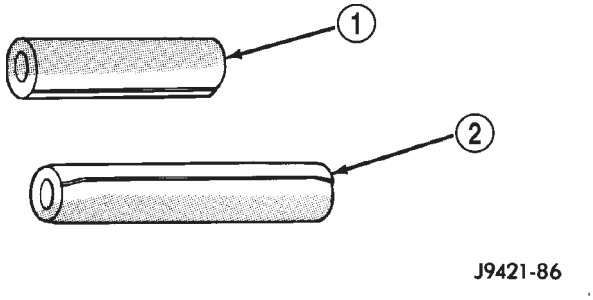


Fig. 108 ROLL PIN IDENTIFICATION

1 - SHAFT LEVER ROLL PIN
2 - SHIFT SOCKET ROLL PIN

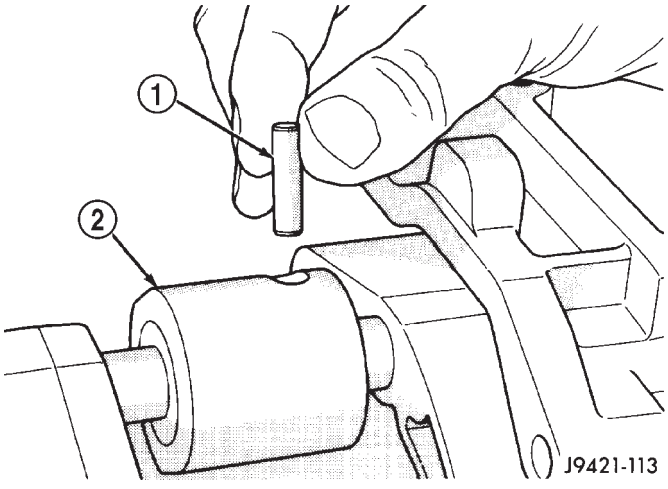


Fig. 109 ROLL PIN IN SHIFT SHAFT

1 - SHAFT LEVER ROLL PIN
2 - LEVER AND BUSHING

MANUAL-NV3550 (Continued)

(11) Seat shaft lever roll pin with pin punch (Fig. 110).

CAUTION: The shaft lever roll pin must be flush with the surface of the lever. The lever bushing will bind on the roll pin if the pin is not seated flush.

(12) Verify that lock pin slot in lever bushing is positioned as shown (Fig. 110).

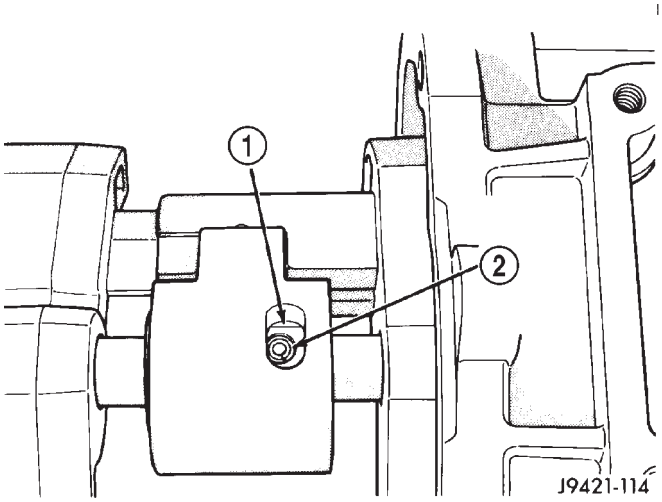


Fig. 110 SHIFT SHAFT LEVER ROLL

1 - BUSHING LOCK PIN SLOT
2 - SEAT ROLL PIN FLUSH WITH LEVER

(13) Align roll pin holes in shift socket and shift shaft. Then start roll pin into shift shaft by hand (Fig. 111).

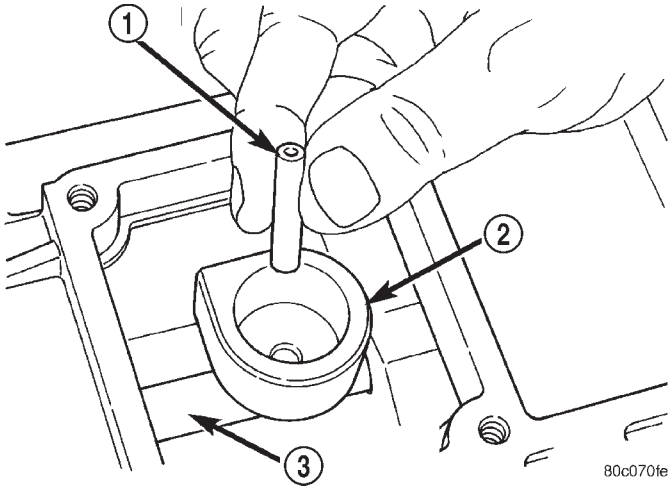


Fig. 111 ROLL PIN IN SHIFT SOCKET

1 - ROLL PIN
2 - SHIFT SOCKET
3 - SHIFT SHAFT

(14) Seat roll pin in shift socket with pin punch. Roll pin must be flush with socket (Fig. 112).

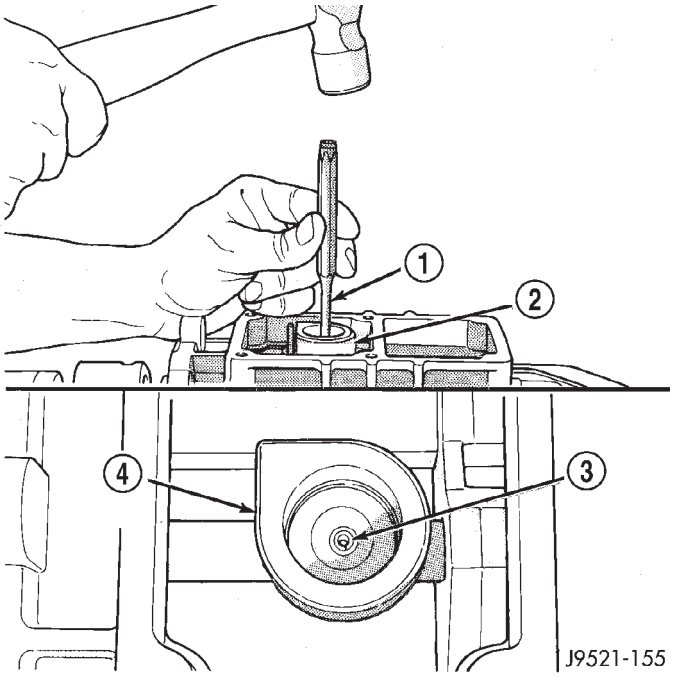


Fig. 112 SEATING SHIFT SOCKET ROLL PIN

1 - PIN PUNCH
2 - SHIFT SOCKET
3 - SEAT ROLL PIN FLUSH
4 - SHIFT SOCKET

(15) Verify that notches in shift fork arms are aligned. Realign arms if necessary.

FRONT HOUSING AND INPUT SHAFT BEARING RETAINER

(1) Install reverse blocker, retainter and retainer bolt in front housing.

(2) If previously removed, input shaft bearing in front housing (Fig. 113). Install snap ring and use plastic mallet to seat bearing. Bearing goes in from front side of housing only.

(3) Apply liberal quantity of petroleum jelly to countershaft front bearing. Then insert bearing in front housing race (Fig. 113). Large diameter side of bearing cage goes toward countershaft (Fig. 114). Small diameter side goes toward bearing race in housing.

(4) Reach into countershaft front bearing with finger, and push each bearing roller outward against race. Then apply extra petroleum jelly to hold rollers in place. This avoids having rollers becoming displaced during housing installation.

(5) Apply small amount of petroleum jelly to shift shaft bushing in front housing.

MANUAL-NV3550 (Continued)

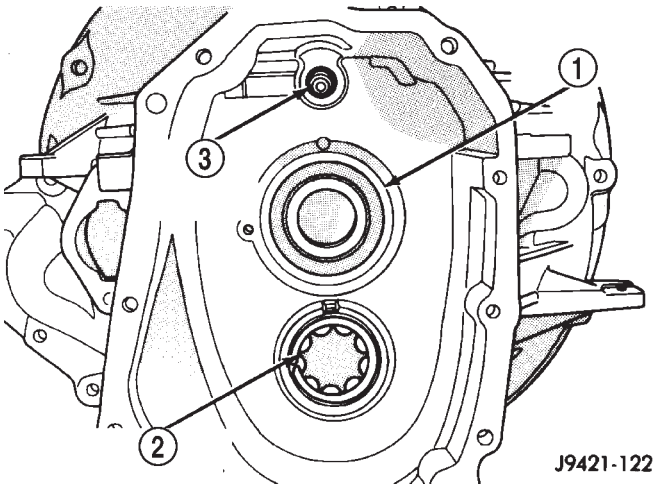


Fig. 113 INPUT SHAFT AND COUNTERSHAFT FRONT BEARING

1 - INPUT SHAFT BEARING
2 - COUNTERSHAFT FRONT BEARING
3 - SHIFT SHAFT BUSHING

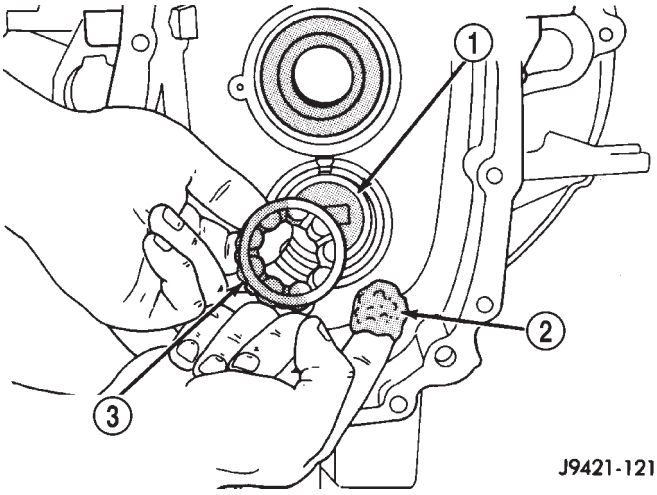


Fig. 114 COUNTERSHAFT FRONT BEARING

1 - BEARING RACE
2 - PETROLEUM JELLY
3 - COUNTERSHAFT FRONT BEARING

(6) Apply 1/8 in. wide bead of Mopar Gasket Maker or equivalent, to mating surfaces of front and rear housings (Fig. 115).

(7) Have helper hold rear housing and geartrain in upright position. Then install front housing on rear housing and geartrain.

(8) Work front housing downward onto geartrain until seated on rear housing.

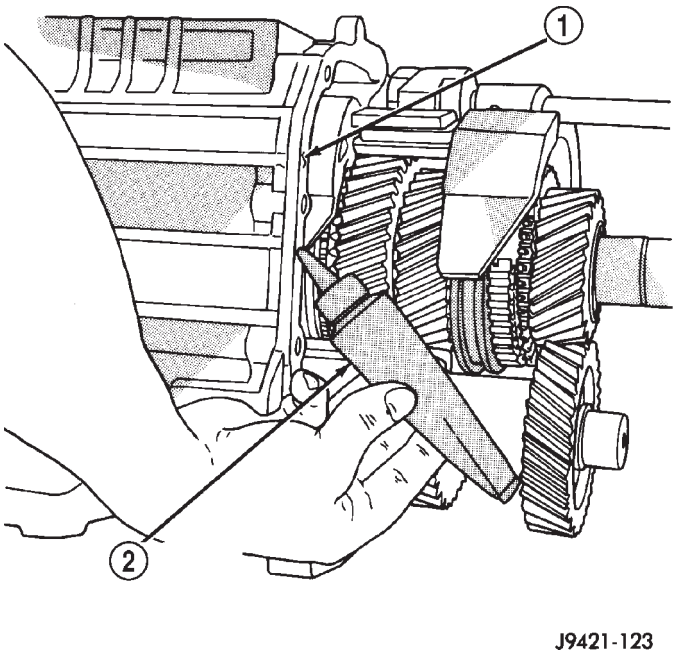


Fig. 115 SEAL FRONT/REAR HOUSINGS

1 - HOUSING FLANGE SURFACE
2 - MOPAR GASKET MAKER (OR LOCTITE 518)

CAUTION: If the front housing will not seat on the rear housing, either the shift components are not in Neutral, or one or more components are misaligned. Do not force the front housing into place. This will only result in damaged components.

(9) Tap rear housing alignment dowels back into place with hammer and pin punch. Both dowels should be flush fit in each housing. Have helper hold transmission upright while dowels are tapped back into place.

(10) Place transmission in horizontal position.

(11) Apply Mopar Gasket Maker or equivalent to housing attaching bolts. Apply sealer material sealer to underside of bolt heads and to bolt shanks and threads (Fig. 116).

(12) Install and start housing attaching bolts by hand (Fig. 116). Then tighten bolts to 34 N·m (25 ft. lbs.).

(13) Install shift shaft bushing lock bolt (Fig. 117). Apply Mopar Gasket Maker or equivalent, to bolt threads, shank and underside of bolt head before installation.

CAUTION: If the lock bolt cannot be fully installed, do not try to force it into place. Either the shift shaft is not in Neutral or the shaft bushing (or lever) is misaligned.

MANUAL-NV3550 (Continued)

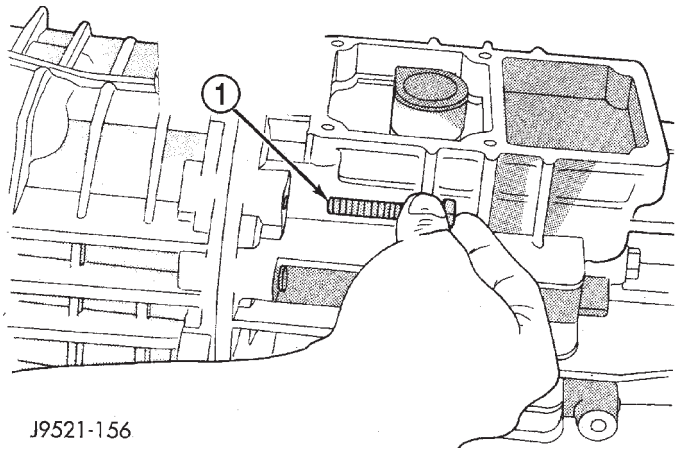


Fig. 116 HOUSING BOLTS

1 - HOUSING ATTACHING BOLTS (APPLY SEALER BEFOREHAND)

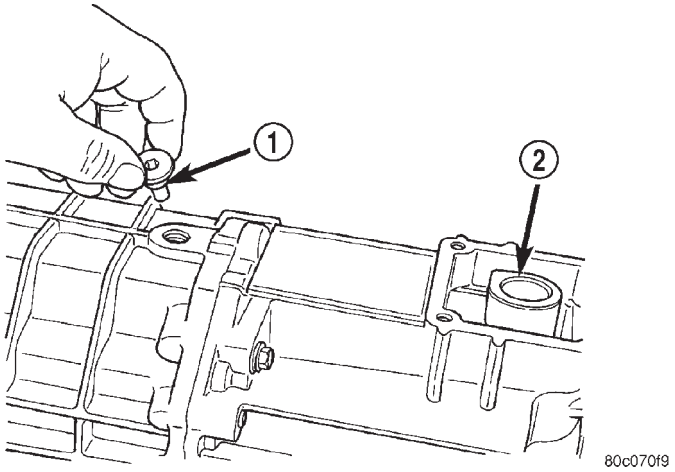


Fig. 117 SHIFT SHAFT BUSHING LOCK BOLT

1 - SHIFT SHAFT LOCK BOLT
2 - SHAFT SOCKET

(14) Lubricate then install shift shaft detent plunger in housing bore (Fig. 118). Lubricate plunger with petroleum jelly or gear lubricant. **Verify plunger is fully seated in detent notch in shift shaft.**

(15) Install detent spring inside plunger (Fig. 118).

(16) Install plug on detent spring and compress spring. Then drive detent plug into transmission case until plug seats.

(17) Install backup light switch (Fig. 119).

(18) Install input shaft snap ring (Fig. 120).

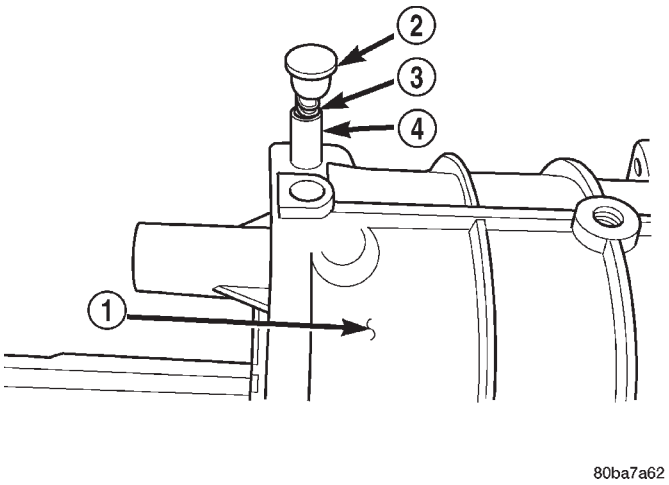


Fig. 118 SHIFT SHAFT DETENT PLUNGER

1 - FRONT HOUSING
2 - PLUG
3 - SPRING
4 - PLUNGER

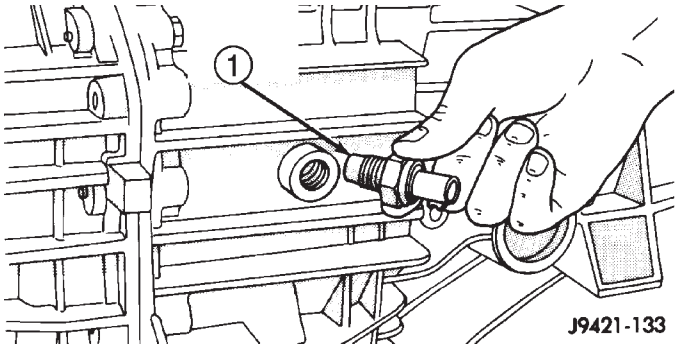


Fig. 119 BACKUP LIGHT SWITCH

1 - BACKUP LIGHT SWITCH

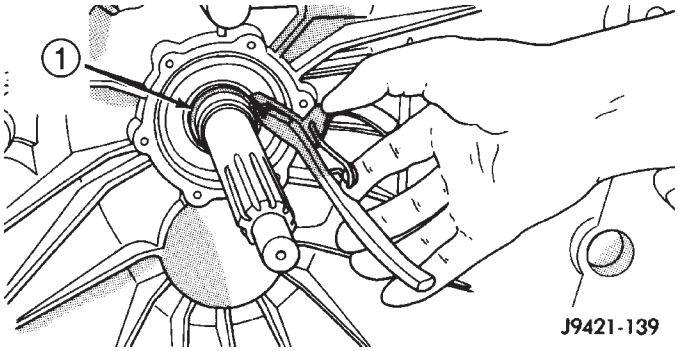


Fig. 120 SHAFT SNAP RING - TYPICAL

1 - INPUT SHAFT SNAP RING

MANUAL-NV3550 (Continued)

(19) Install new oil seal in front bearing retainer with Installer 6448 (Fig. 121).

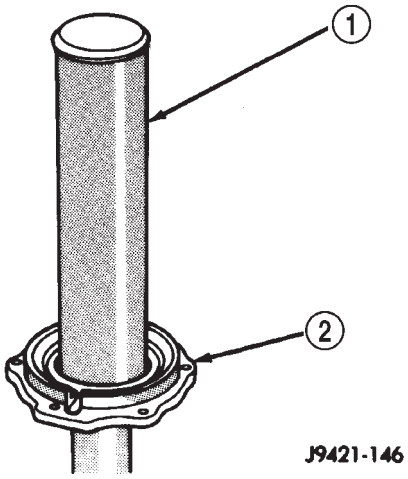


Fig. 121 OIL SEAL IN FRONT BEARING RETAINER

1 - INSTALLER
2 - FRONT BEARING RETAINER

(20) Apply bead of Mopar silicone sealer or equivalent to flange surface of front bearing retainer (Fig. 122).

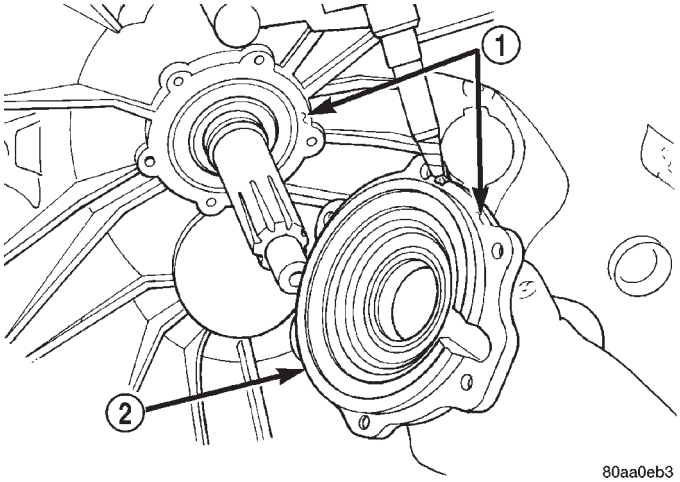


Fig. 122 SEAL BEARING RETAINER AND HOUSING

1 - APPLY SEALER BEAD
2 - INPUT SHAFT BEARING RETAINER

(21) Align and install front bearing retainer over input shaft and onto housing mounting surface (Fig. 123). Although retainer is one-way fit on housing, be sure bolt holes are aligned before seating retainer.

NOTE: Ensure no sealer gets into the oil feed hole in the transmission case or bearing retainer.

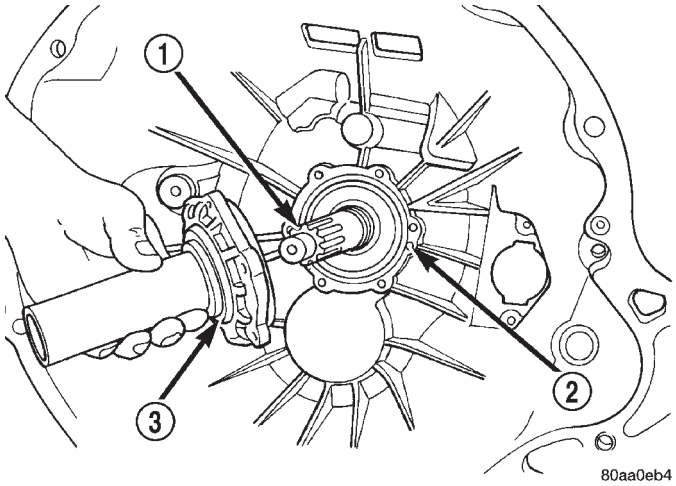


Fig. 123 INPUT SHAFT BEARING RETAINER

1 - INPUT SHAFT
2 - OIL FEED
3 - BEARING RETAINER

(22) Install and tighten bearing retainer bolts to 7-10 N·m (5-7 ft. lbs.) (Fig. 124).

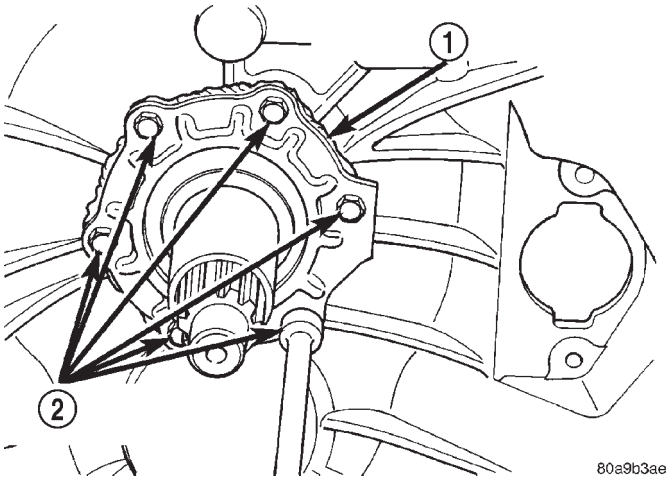


Fig. 124 BEARING RETAINER BOLTS

1 - RETAINER BOLTS

MANUAL-NV3550 (Continued)

SHIFT TOWER AND LEVER

(1) Apply petroleum jelly to ball end of shift lever and interior of shift socket.

(2) Shift the transmission into third gear.

(3) Align and install shift tower and lever assembly (Fig. 125). Be sure shift ball is seated in socket and the offset in the tower is toward the passenger side of the vehicle before installing tower bolts.

(4) Install shift tower bolts (Fig. 126). Tighten bolts to 8.5 N·m (75.2 in. lbs.).

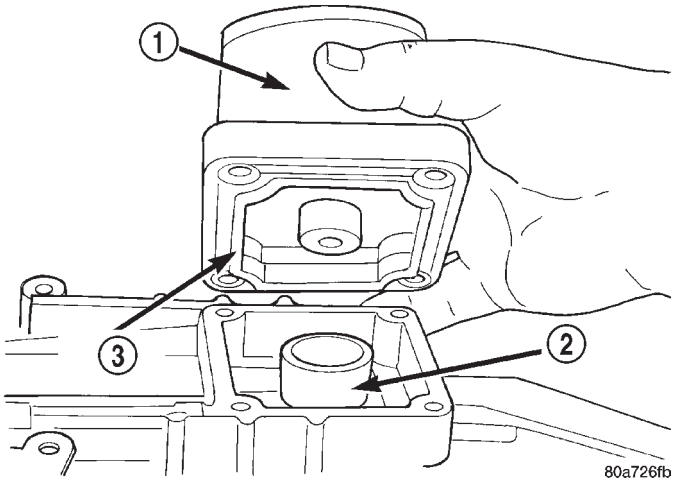


Fig. 125 SHIFT TOWER

1 - SHIFT TOWER
2 - SHIFT SOCKET
3 - SEAL

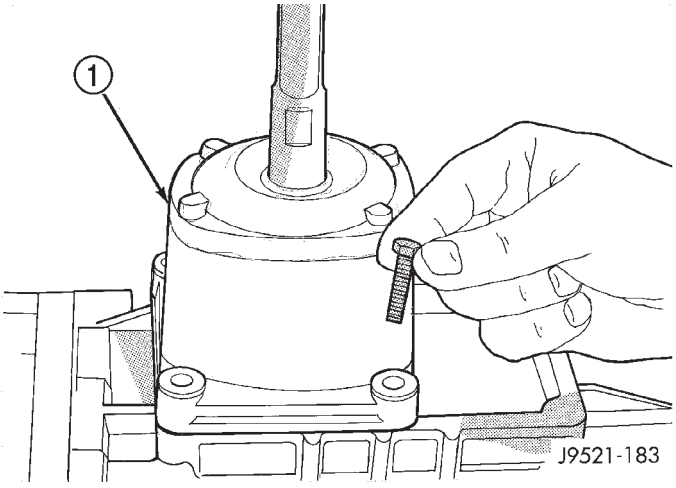


Fig. 126 SHIFT TOWER BOLTS

1 - SHIFT TOWER BOLT

(5) Fill transmission to bottom edge of fill plug hole with Mopar Transmission Lubricant.

(6) Install and tighten fill plug to 34 N·m (25 ft. lbs.).

(7) Check transmission vent. Be sure vent is open and not restricted.

INSTALLATION - TRANSMISSION

(1) Install clutch housing on transmission and tighten housing bolts to 46 N·m (34 ft. lbs.).

(2) Lubricate contact surfaces of release fork pivot ball stud and release fork with high temp grease.

(3) Install release bearing, fork and retainer clip.

(4) Position and secure transmission on transmission jack.

(5) Lightly lubricate pilot bearing and transmission input shaft splines with Mopar high temp grease.

(6) Raise transmission and align transmission input shaft and clutch disc splines. Then slide transmission into place.

(7) Install and tighten clutch housing-to-engine bolts to: **Be sure the housing is properly seated on engine block before tightening bolts.**

- Tighten 3/8” diameter bolts to 37 N·m (27 ft.lbs.).
- Tighten 7/16” diameter bolts to 58 N·m (43 ft.lbs.).
- Tighten M12 bolts to 75 N·m (55 ft.lbs.).

(8) Be sure transmission is in first or third gear.

(9) Install rear crossmember and tighten crossmember-to-frame bolts to 41 N·m (31 ft. lbs.).

(10) Install fasteners to hold rear cushion and bracket to transmission. Then tighten transmission-to-rear support bolts/nuts to 54 N·m (40 ft. lbs.).

(11) Remove support stands from engine and transmission.

(12) Install and connect crankshaft position sensor.

(13) Position transfer case on transmission jack, if equipped.

(14) Secure transfer case to jack with safety chains, if equipped.

(15) Raise transfer case if equipped and align transfer case input shaft to the transmission output shaft.

(16) Slide transfer case forward until case is seated on transmission, if necessary.

(17) Install nuts to attach transfer case to transmission, if equipped. Tighten transfer case-to-transmission nuts to 35 N·m (26 ft. lbs.).

(18) Connect transfer case shift linkage at transfer case, if equipped.

(19) Connect transfer case vent hose, if equipped.

(20) Secure wire harnesses in clips/tie straps on transmission and transfer case if equipped.

(21) Engage wire connectors attached to all necessary transmission or transfer case, if equipped, components.

(22) Install rear propeller shaft slip yoke to transmission or transfer case output shaft if equipped.

(23) Install rear propeller shaft with reference marks aligned (Fig. 127).

MANUAL-NV3550 (Continued)

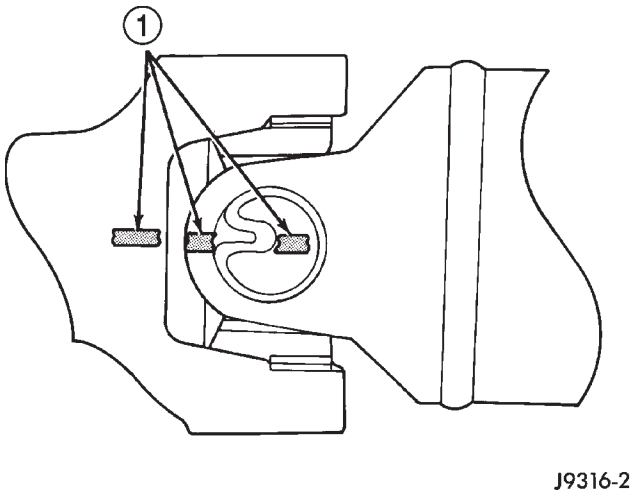


Fig. 127 Propeller Shaft

1 - REFERENCE MARKS

(24) Install and tighten propeller shaft U-joint clamp bolts to 19 N·m (170 in. lbs.).

(25) Align marks on front propeller shaft, axle and transfer case yokes, if equipped.

(26) Install and tighten propeller shaft U-joint clamp bolts to 19 N·m (170 in. lbs.).

(27) Install slave cylinder in clutch housing.

(28) Install skid plate, if equipped and tighten bolts to 42 N·m (31 ft. lbs.). Tighten stud nuts to 17 N·m (150 in. lbs.).

(29) Fill transmission and transfer case if equipped, with recommended lubricants. Refer to the Lubricant Recommendation sections of the appropriate component for correct fluid.

(30) Lower vehicle.

(31) Install nuts on two M6X1.0 bolts and thread the bolts into the threaded holes at the base of the shift lever.

(32) Tighten the nuts equally until the shift lever will slide over the shift tower stub shaft.

(33) Install the floor console and shift boot.

SPECIFICATIONS

TRANSMISSION - NV3550

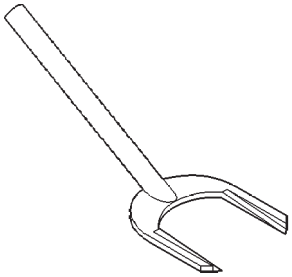
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Clutch Housing Bolts	54-61	40-45	-
Crossmember To Frame Bolts	61-75	44-55	-
Crossmember To Insulator Nuts	54-61	40-45	-
Drain/Fill Plug	9-27	14-20	-
Front To Rear Housing Bolts	30-35	22-26	-
Front Bearing Retainer Bolts	7-10	5-7	62-88
Idler Shaft Bolts	19-25	14-18	-
Rear Bearing Retainer Bolts	30-35	22-26	-
Shift Tower Bolts	7-10	5-7	62-88
Slave Cylinder Nuts	23	17	-
Transfer Case Nuts	47	35	-
U-Joint Clamp Bolts	19	14	-

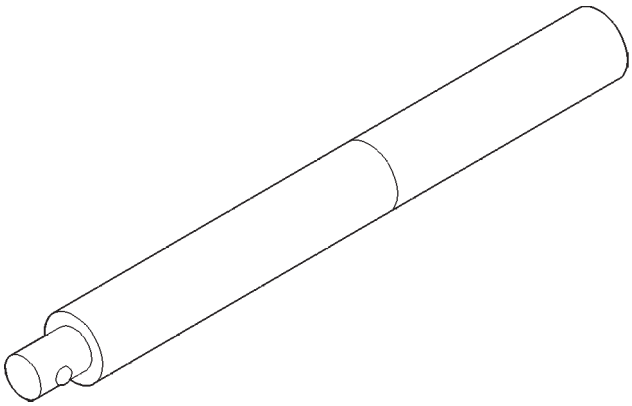
MANUAL-NV3550 (Continued)

SPECIAL TOOLS

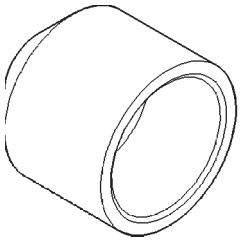
NV3550 MANUAL TRANSMISSION



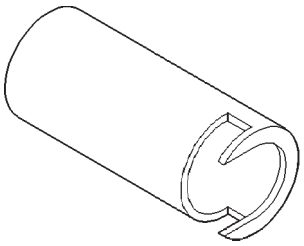
Remover C-3985-B



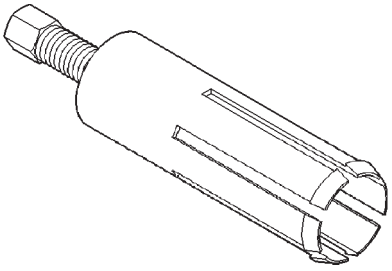
Handle C-4171



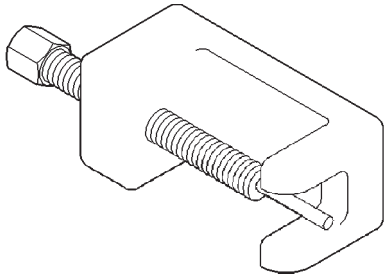
Installer C-3972-A



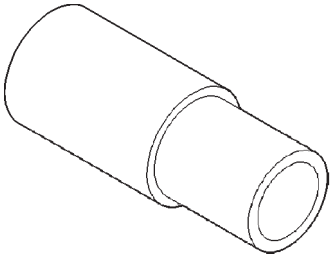
Remover 8117



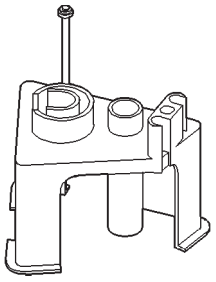
Remover Bushing 6957



Remover/Installer 6858

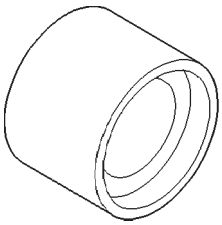


Installer Bushing 6951

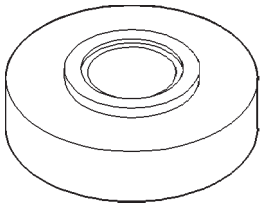


Fixture 6747

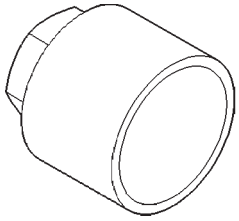
MANUAL-NV3550 (Continued)



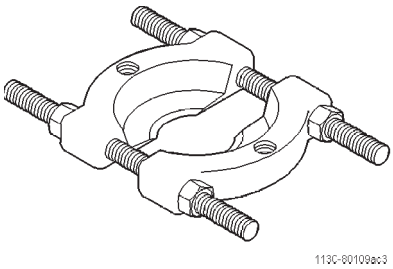
Adapter 6747-1A



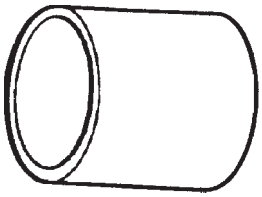
Adapter 6747-2B



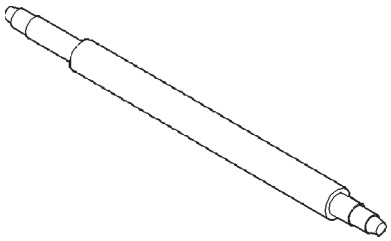
Cup 8115



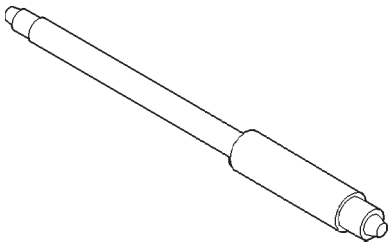
Splitter Bearing 1130



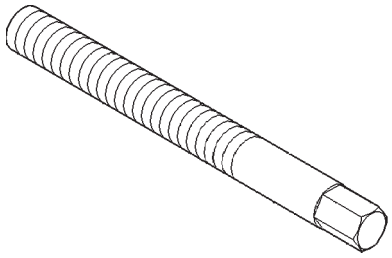
Tube 6310-1



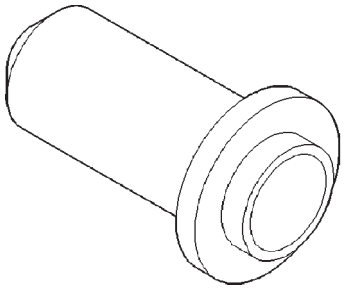
Installer 8118



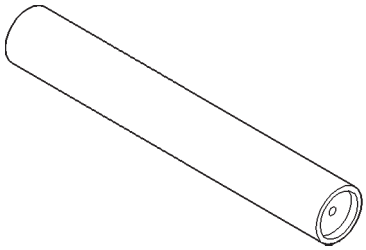
Remover/Installer 8119



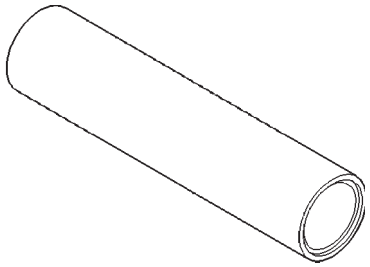
Pin Alignment 8120



Installer C-3860-A



Installer 8123



Installer Bearing Cone 6448

VEHICLE SPEED SENSOR

DESCRIPTION

The 3-wire Vehicle Speed Sensor (VSS) is located on the speedometer pinion gear adapter. If equipped with 4WD, this adapter is located on the extension housing of the transfer case (drivers side). If equipped with 2WD, this adapter is located on the left side of the transmission extension housing.

OPERATION

The VSS is a 3-circuit (3–wire), magnetic, hall-effect sensor.

The 3 circuits are:

- A 5-volt power supply from the Powertrain Control Module (PCM).
- A ground is provided for the sensor though a low-noise sensor return circuit in the PCM.
- An input to the PCM is used to determine vehicle speed and distance traveled.

The speed sensor generates 8 pulses per sensor revolution. These signals, in conjunction with a closed throttle signal from the throttle position sensor, indicate a closed throttle deceleration to the PCM. When the vehicle is stopped at idle, a closed throttle signal is received by the PCM (but a speed sensor signal is not received).

Under deceleration conditions, the PCM adjusts the Idle Air Control (IAC) motor to maintain a desired MAP value. Under idle conditions, the PCM adjusts the IAC motor to maintain a desired engine speed.

REMOVAL

The Vehicle Speed Sensor (VSS) is located on the speedometer pinion gear adapter. If equipped with 4WD, this adapter is located on the transfer case extension (left side) (Fig. 128). If equipped with 2WD, this adapter is located on the extension housing of the transmission (left side).

(1) Raise and support vehicle.

(2) Disconnect electrical connector from sensor by pushing slide tab (Fig. 128). After slide tab has been positioned, push in on secondary release lock (Fig. 128) on side of connector and pull connector from sensor.

(3) Remove sensor mounting bolt (Fig. 129).

(4) Remove sensor (pull straight out) from speedometer pinion gear adapter (Fig. 129). Do not remove gear adapter from transmission.

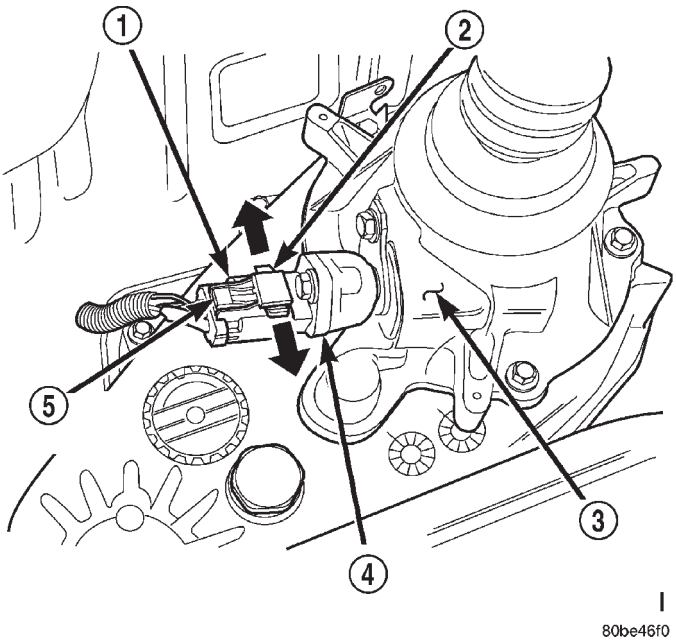


Fig. 128 VSS Location

1 - SENSOR ELECTRICAL CONNECTOR
2 - SLIDE TAB
3 - 4WD TRANSFER CASE EXTENSION
4 - VEHICLE SPEED SENSOR
5 - RELEASE LOCK

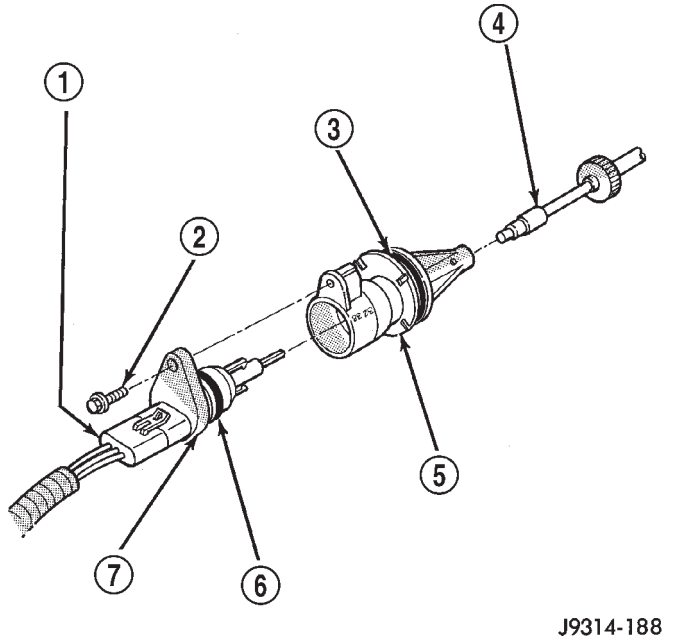


Fig. 129 VSS Removal/Installation

1 - ELECTRICAL CONNECTOR
2 - SENSOR MOUNTING BOLT
3 - O-RING
4 - SPEEDOMETER PINION GEAR
5 - SPEEDOMETER PINION GEAR ADAPTER
6 - O-RING
7 - VEHICLE SPEED SENSOR

VEHICLE SPEED SENSOR (Continued)

INSTALLATION

(1) Clean inside of speedometer pinion gear adapter before installing speed sensor.

(2) Install sensor into speedometer gear adapter and install mounting bolt. Before tightening bolt, verify speed sensor is fully seated (mounted flush) to speedometer pinion gear adapter.

(3) Tighten sensor mounting bolt to 2.2 N·m (20 in. lbs.) torque.

(4) Connect electrical connector to sensor.

EXTENSION HOUSING

REMOVAL

(1) Raise raise and support vehicle.

(2) Mark propeller shaft and axle yoke for alignment reference.

(3) Disconnect and remove propeller shaft.

(4) Remove old seal with Remover C-3985-B (Fig. 130) from transmission housing.

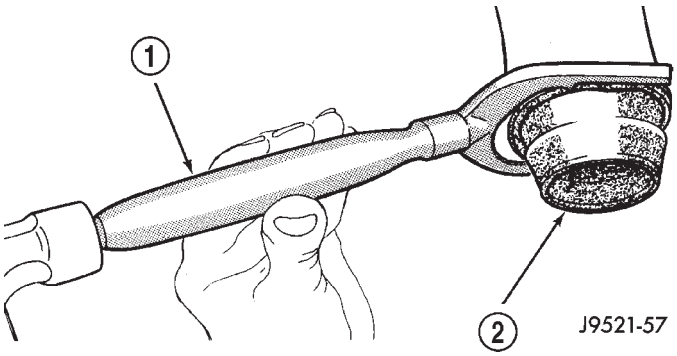


Fig. 130 YOKE SEAL

1 - REMOVER
2 - SEAL

REMOVAL

(1) Raise and support vehicle.

(2) Mark reference lines on the propeller shaft and remove the shaft.

(3) Remove housing yoke seal.

(4) Insert Remover 6957 into rear housing and tighten tool to bushing and remove bushing (Fig. 131).

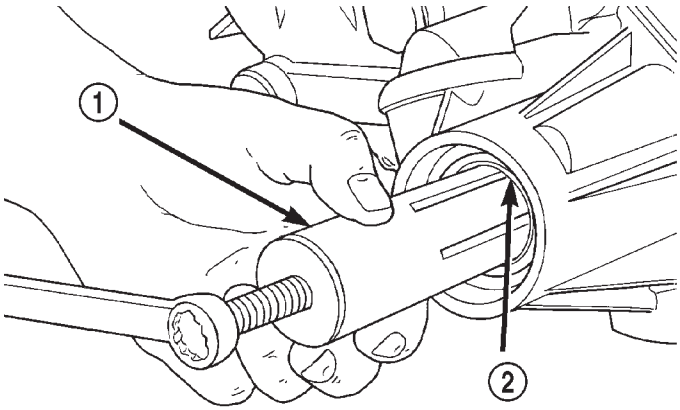


Fig. 131 Bushing Removal - Typical

1 - REMOVER 6957
2 - EXTENSION HOUSING BUSHING

INSTALLATION

(1) Place seal in position on transmission housing.

(2) Drive new seal into transmission housing with Installer C-3972-A and Handle C-4171 (Fig. 132).

(3) Carefully guide propeller shaft slip yoke into housing and onto output shaft splines.

(4) Install propeller shaft with reference marks aligned.

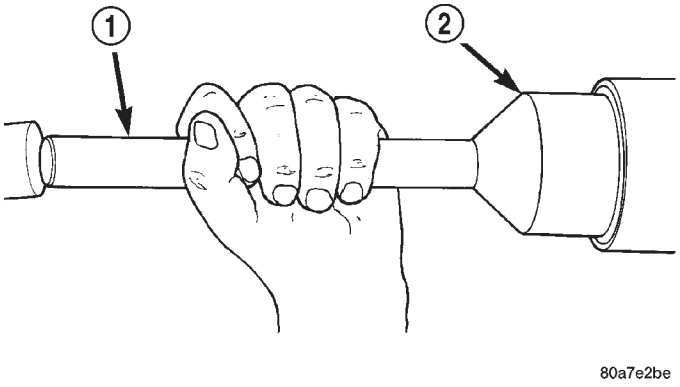


Fig. 132 Yoke Seal Installer

1 - HANDLE
2 - INSTALLER

(5) Remove support and lower vehicle.

(6) Check transmission fluid level.

EXTENSION HOUSING (Continued)

INSTALLATION

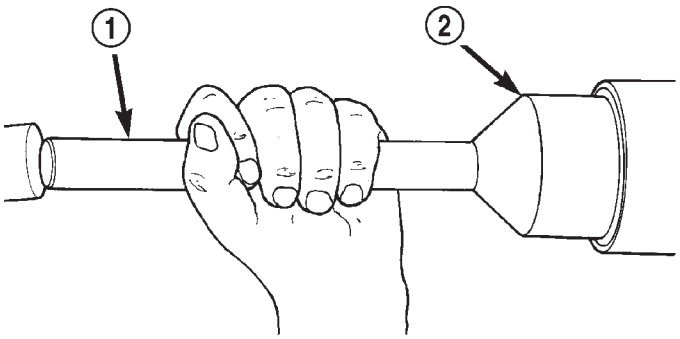
(1) Align bushing oil hole with oil slot in rear housing.

(2) Tap bushing into place with Installer 6951 and Handle C-4171.

(3) Install new oil seal in housing using Installer C-3972-A (Fig. 133).

(4) Install propeller shaft with reference marks aligned.

(5) Remove support and lower vehicle.



80a7e2be

Fig. 133 Rear Housing Seal

1 - HANDLE
2 - INSTALLER

(6) Check transmission fluid level.

AUTOMATIC - 30RH

TABLE OF CONTENTS

page

AUTOMATIC - 30RH
DISASSEMBLY. 77

AUTOMATIC - 30RH

DISASSEMBLY

(1) Remove transmission from vehicle.
(2) Install a suitable tail shaft housing plug to avoid contaminating internal components with cleaning solvents.
(3) Clean exterior of transmission with suitable solvent or pressure washer.
(4) Remove torque converter from transmission.
(5) Remove throttle and shift levers from valve body manual shaft and throttle lever shaft.
(6) Mount transmission in repair stand C-3750-B or similar type stand (Fig. 1).
(7) Remove extension housing.
(8) Remove fluid pan.
(9) Remove park/neutral position switch and seal (Fig. 2).
(10) Remove valve body.
(11) Remove accumulator spring and piston (Fig. 3).

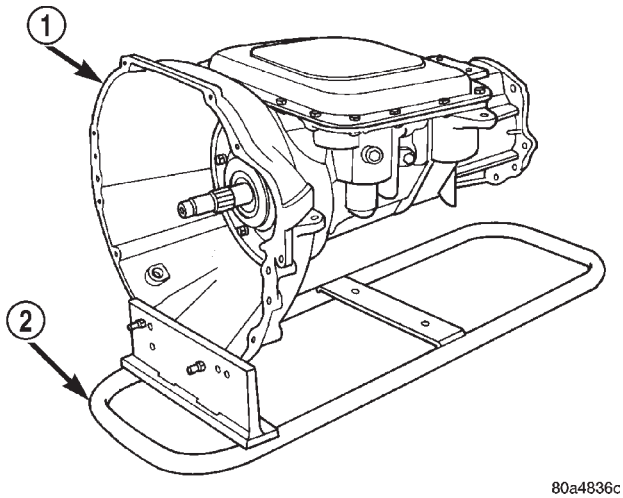


Fig. 1 Repair Stand

1 - TRANSMISSION
2 - STAND

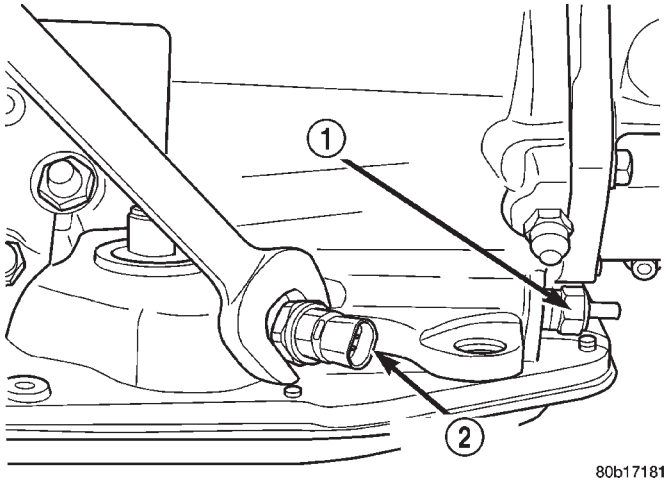


Fig. 2 Park/Neutral Position Switch

1 - SOLENOID CONNECTOR
2 - PARK/NEUTRAL SWITCH

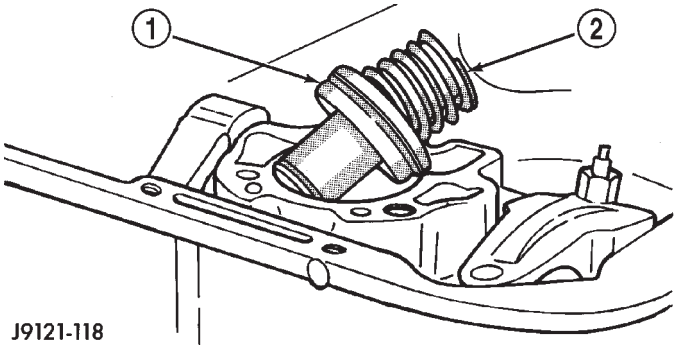


Fig. 3 Accumulator Piston And Spring

1 - ACCUMULATOR PISTON
2 - PISTON SPRING

(12) Measure input shaft end play (Fig. 4).
(a) Attach Adapter 8266-7 to Handle 8266-8.
(b) Attach dial indicator C-3339 to Handle 8266-8.
(c) Install the assembled tool onto the input shaft of the transmission and tighten the retaining screw on Adapter 8266-7 to secure it to the input shaft.

AUTOMATIC - 30RH (Continued)

(d) Position the dial indicator plunger against a flat spot on the oil pump and zero the dial indicator.

(e) Move input shaft in and out and record reading.

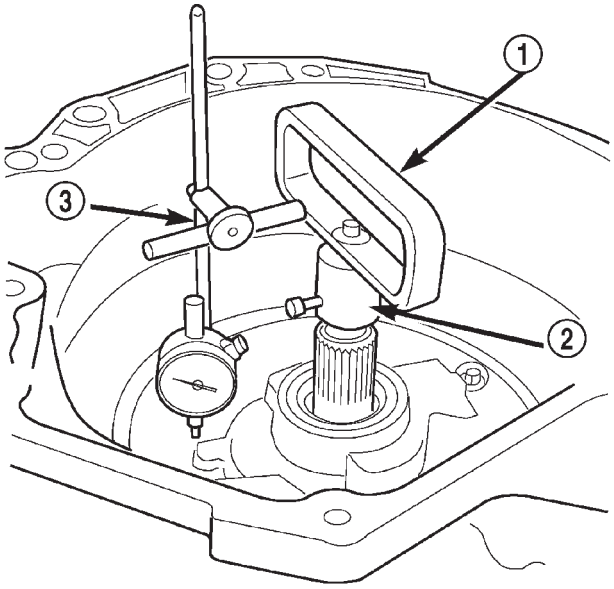


Fig. 4 Checking Input Shaft End Play

1 - TOOL 8266-8
2 - TOOL 8266-7
3 - TOOL C-3339

(13) Loosen front band adjusting screw lock nut (Fig. 5) 4-5 turns. Then tighten band adjusting screw until band is tight around front clutch. This prevents front/rear clutches from coming out with pump and possibly damaging clutch or pump components.

(14) Remove oil pump bolts.

(15) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 6).

(16) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 6).

(17) Loosen front band adjusting screw until band is completely loose (Fig. 5).

(18) Squeeze front band together and remove band strut (Fig. 7).

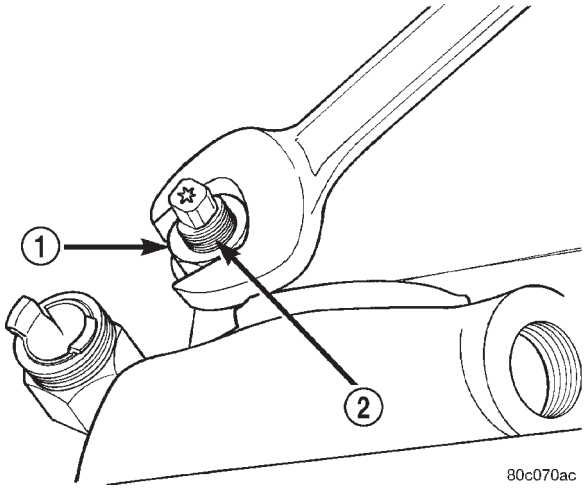


Fig. 5 Front Band Adjusting Screw Lock Nut

1 - LOCK-NUT
2 - FRONT BAND ADJUSTER

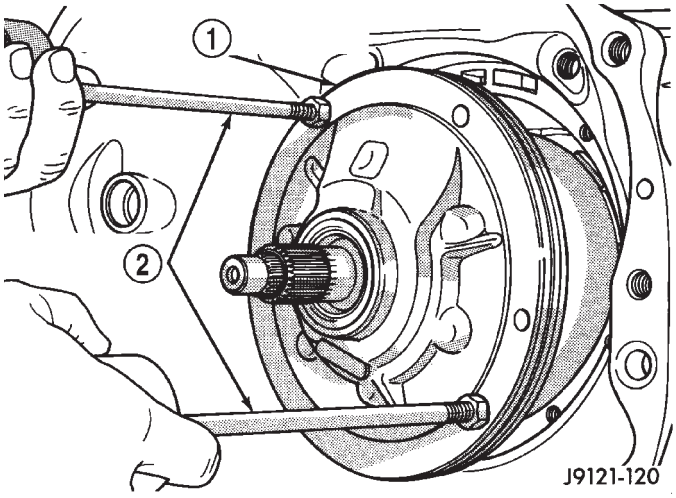


Fig. 6 Oil Pump/Reaction Shaft Support

1 - OIL PUMP AND REACTION SHAFT SUPPORT ASSEMBLY
2 - SLIDE HAMMER TOOLS C-3752

AUTOMATIC - 30RH (Continued)

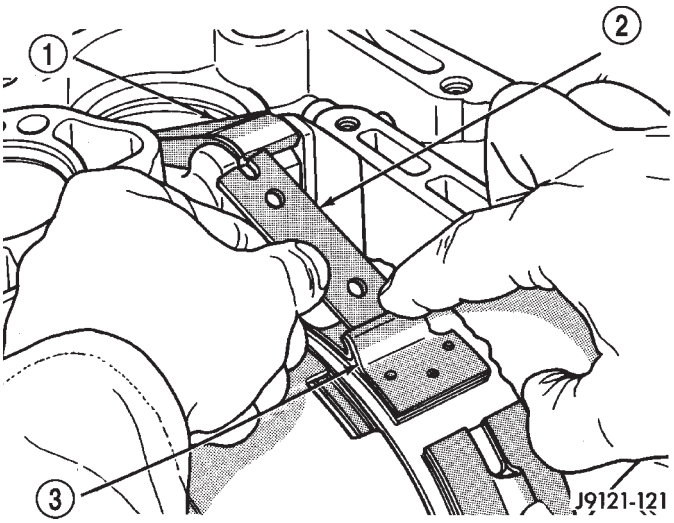


Fig. 7 Front Band Strut

1 - BAND LEVER
2 - BAND STRUT
3 - FRONT BAND

(19) Remove front and rear clutch units as an assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 8).

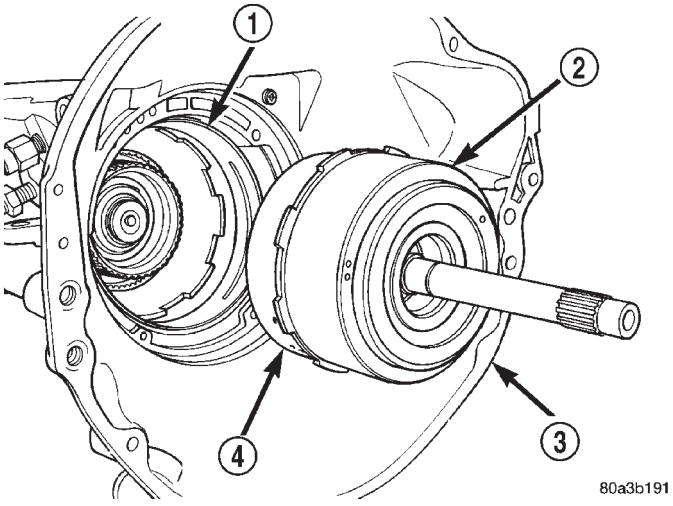


Fig. 8 Front/Rear Clutch Assemblies

1 - FRONT BAND
2 - FRONT CLUTCH AND DRUM
3 - TRANSMISSION HOUSING
4 - REAR CLUTCH

(20) Lift front clutch off rear clutch (Fig. 9). Set clutch units aside for overhaul.

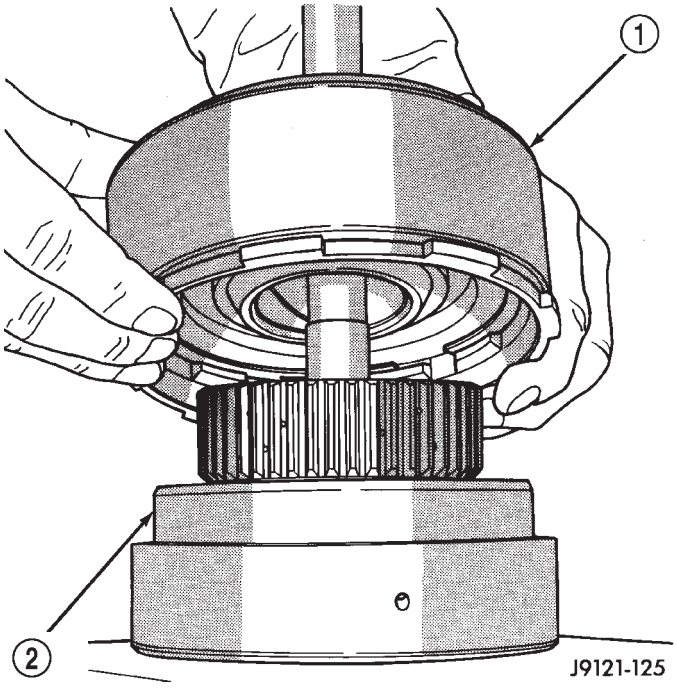


Fig. 9 Separating Front Clutch From Rear Clutch

1 - FRONT CLUTCH
2 - REAR CLUTCH

(21) Remove output shaft thrust washer from output shaft (or from rear clutch hub) (Fig. 10).

(22) Remove output shaft thrust plate and washer from output shaft hub (Fig. 10).

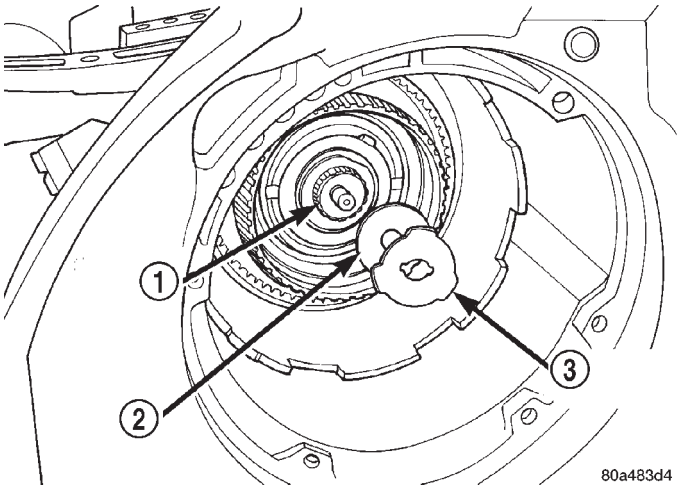


Fig. 10 Output Shaft Thrust Plate and Washer

1 - OUTPUT SHAFT
2 - THRUST PLATE
3 - THRUST WASHER

AUTOMATIC - 30RH (Continued)

(23) Remove front band from case (Fig. 11).

(24) Remove extension housing from transmission case.

(25) Remove governor body and park gear from output shaft.

(26) Remove output shaft and planetary geartrain as assembly (Fig. 12). Support geartrain with both hands during removal. Do not allow machined surfaces on output shaft to become nicked or scratched.

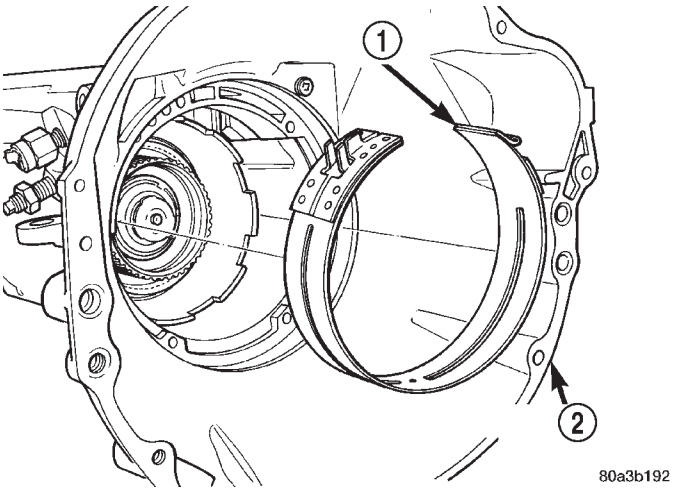


Fig. 11 Front Band

1 - FRONT BAND
2 - TRANSMISSION HOUSING

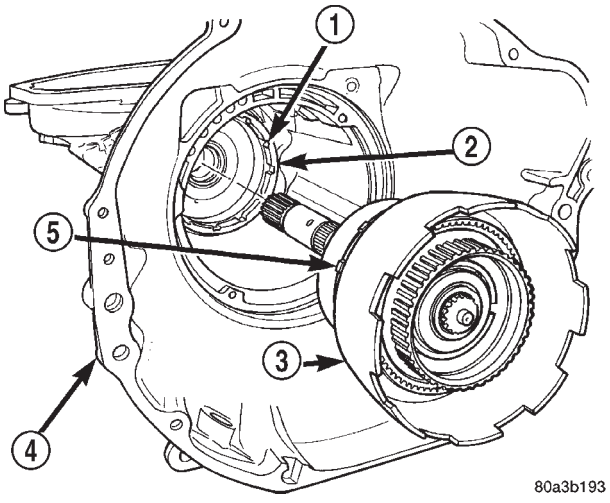


Fig. 12 Planetary Geartrain

1 - SLOTS
2 - LOW-REVERSE DRUM
3 - PLANETARY GEARTRAIN
4 - TRANSMISSION HOUSING
5 - LUGS

(27) Loosen rear band adjusting screw 4-5 turns (Fig. 13).

(28) Remove snap-ring that secures low-reverse drum to rear support hub, however do not remove drum (Fig. 14).

(29) Remove bolts attaching rear support to transmission case and pull support from low-reverse drum (Fig. 15).

(30) Remove bolts attaching overrunning clutch cam and low-reverse drum to transmission case (Fig. 16).

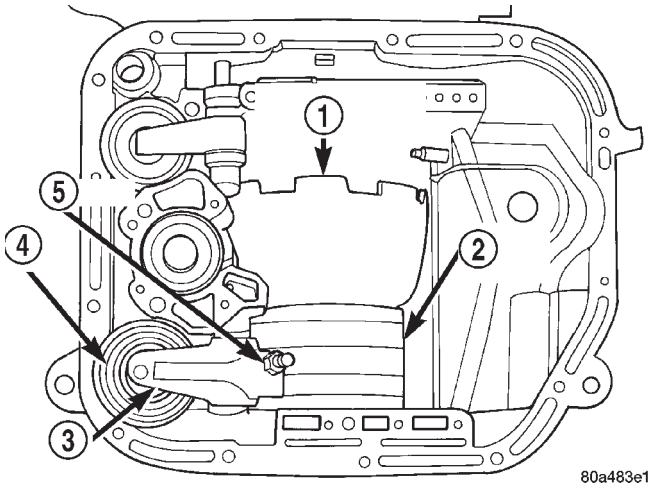


Fig. 13 Rear Band Adjuster Location

1 - PLANETARY GEARTRAIN
2 - REAR BAND
3 - LEVER
4 - SERVO
5 - ADJUSTER

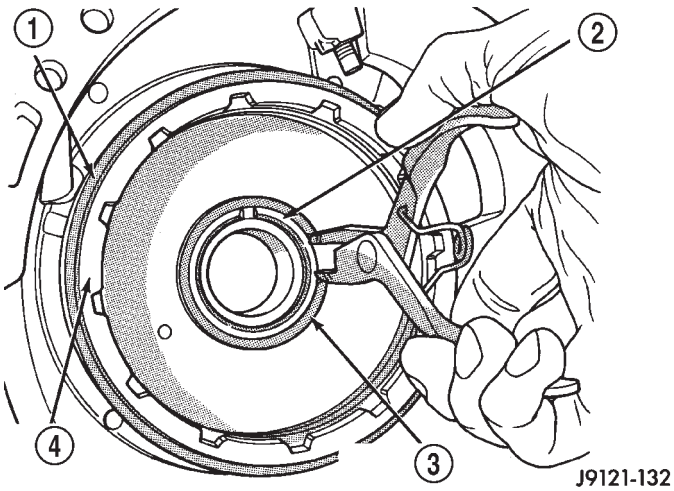


Fig. 14 Low-Reverse Drum Snap-Ring

1 - REAR BAND
2 - REAR SUPPORT HUB
3 - LOW-REVERSE DRUM SNAP-RING
4 - LOW-REVERSE DRUM

AUTOMATIC - 30RH (Continued)

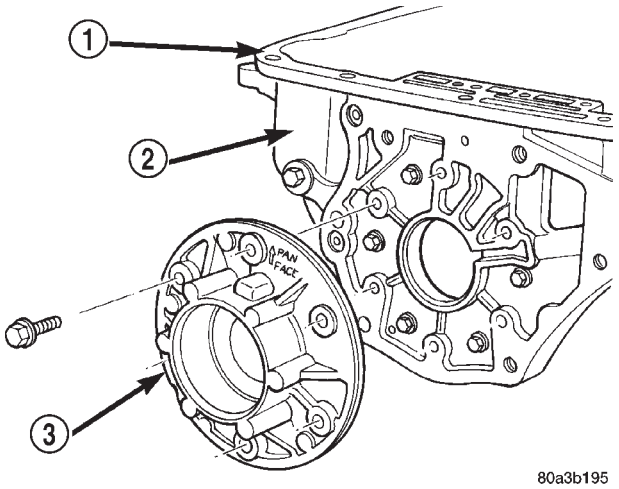


Fig. 15 Rear Support

1 - OIL PAN FACE
2 - TRANSMISSION HOUSING
3 - REAR SUPPORT

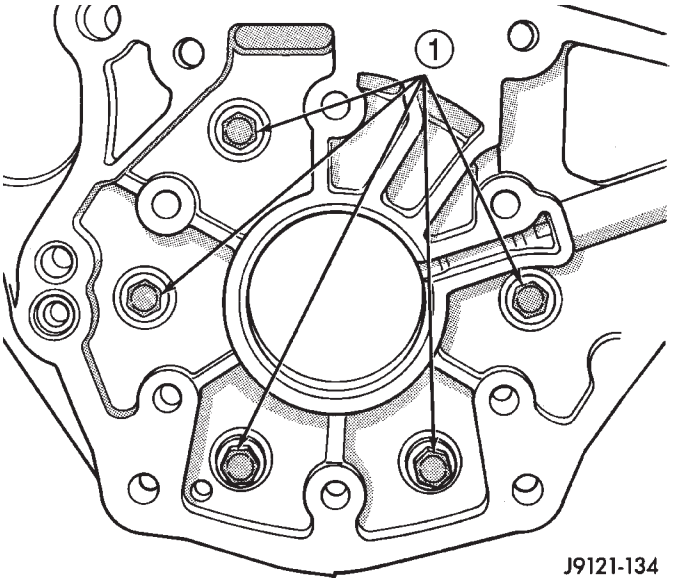


Fig. 16 Overrunning Clutch Cam Bolt Locations

1 - OVERRUNNING CLUTCH CAM BOLTS

(31) Using snap-ring plier, pull rear band anchor pin (located on the servo side of the rear support) from transmission case.

(32) Remove rear band and link from transmission (Fig. 17).

(33) Separate link from rear band (Fig. 18).

(34) If necessary remove front and rear band servo levers. All transmission components can be serviced without removing the levers.

(a) Using a 1/4 inch drive extension remove front band reaction pin access plug (Fig. 19).

(b) Remove front band reaction pin with pencil magnet. Pin is accessible from converter housing side of case (Fig. 20).

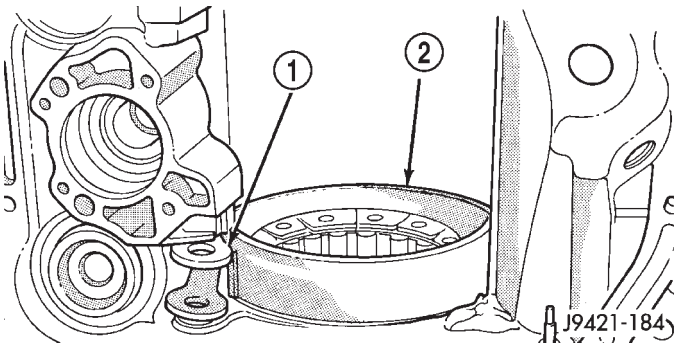


Fig. 17 Rear Band and Link

1 - LINK
2 - REAR BAND

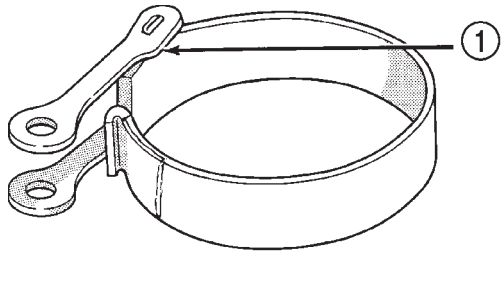


Fig. 18 Rear Band and Link

1 - NOTCHED SIDE OF LINK GOES TOWARD BAND

(c) Remove front band lever (Fig. 21).

(d) Using snap-ring plier, pull rear band lever pivot from transmission case (Fig. 22).

(e) Separate rear band servo lever from transmission.

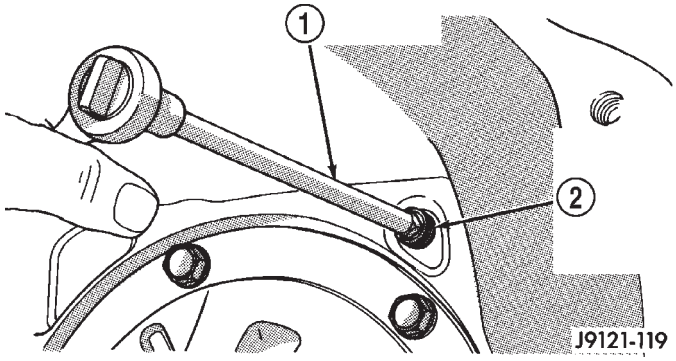


Fig. 19 Front Band Reaction Pin Access Plug

1 - 1/4" DRIVE EXTENSION
2 - FRONT BAND REACTION PIN ACCESS PLUG

(35) Compress front servo rod guide about 1/8 in. with large C-clamp and Tool C-4470, or Spring Compressor Tool C-3422-B (Fig. 23).

(36) Remove front servo rod guide snap-ring (Fig. 23). **Exercise caution when removing snap-ring. Servo bore can be scratched or nicked if care is not exercised.**

AUTOMATIC - 30RH (Continued)

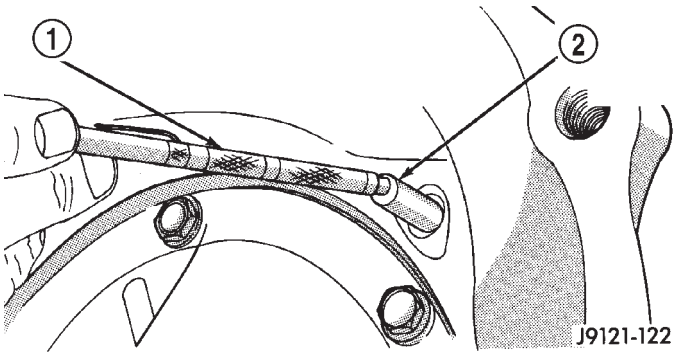


Fig. 20 Front Band Reaction Pin

1 - PENCIL MAGNET
2 - FRONT BAND REACTION PIN

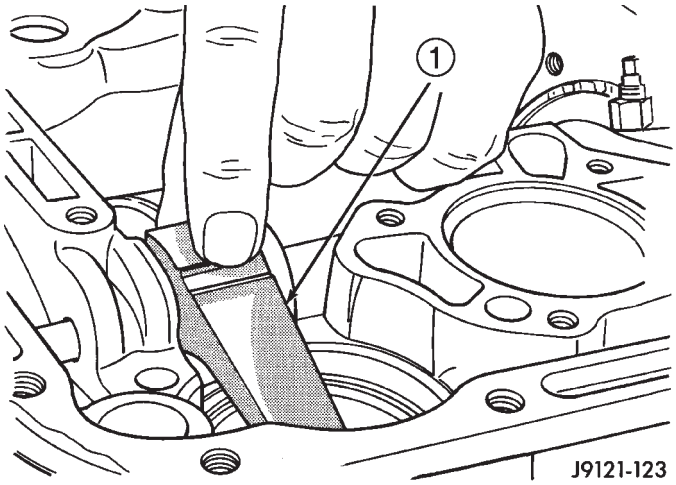


Fig. 21 Front Band Lever

1 - FRONT BAND LEVER

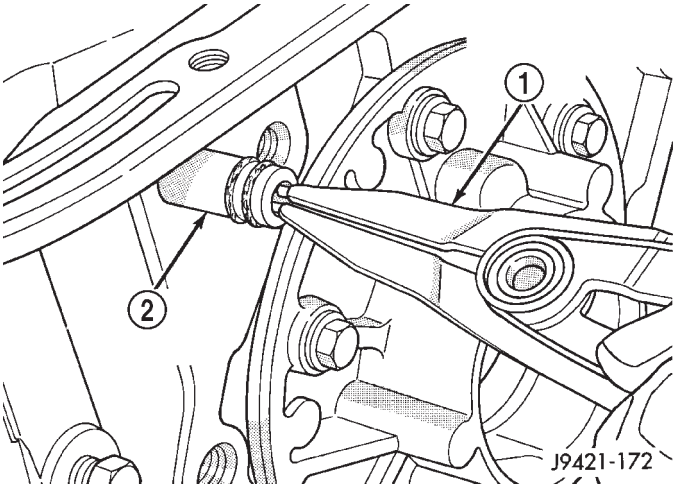


Fig. 22 Rear Band Servo Lever Pin

1 - PARALLEL JAW SNAP-RING PLIERS
2 - REAR BAND LEVER PIVOT PIN

(37) Remove compressor tools and remove front servo rod guide, spring and servo piston.

(38) Compress rear servo spring retainer about 1/16 in. with C-clamp and Tool C-4470 or SP-5560 (Fig. 24). Valve Spring Compressor C-3422-B can also be used to compress spring retainer.

(39) Remove rear servo spring retainer snap-ring. Then remove compressor tools and remove rear servo spring and piston.

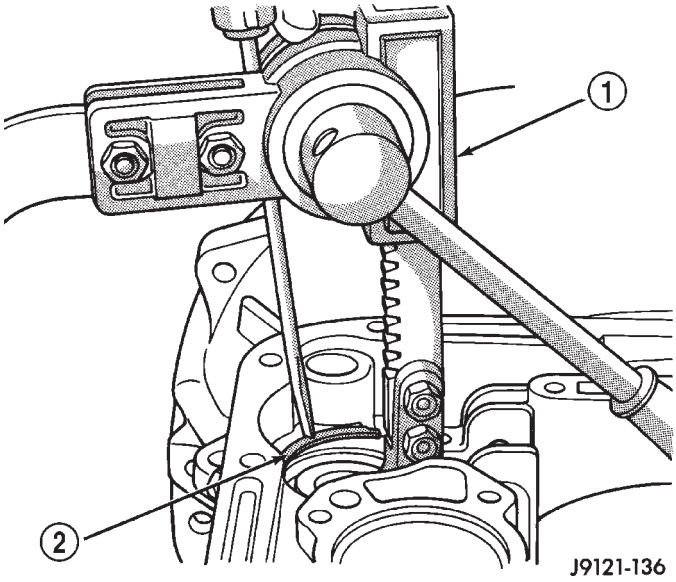


Fig. 23 Compressing Front Servo

1 - SPRING COMPRESSOR TOOL C-3422-B
2 - ROD GUIDE SNAP-RING

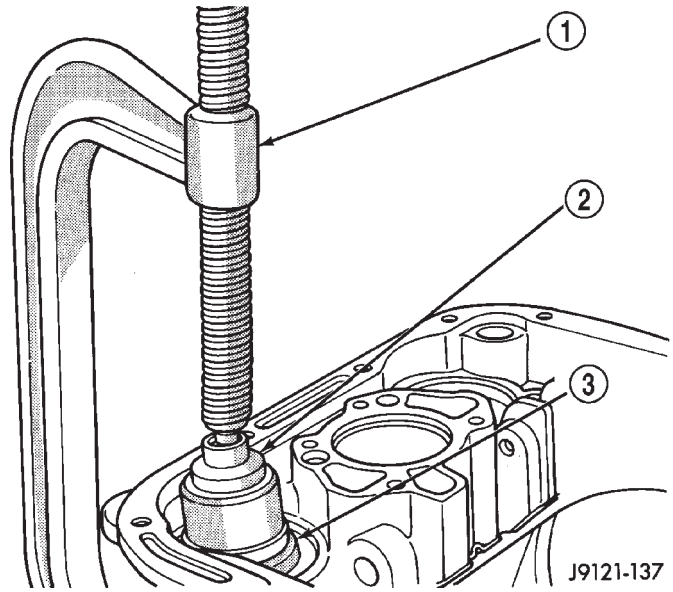


Fig. 24 Compressing Rear Servo Spring

1 - LARGE C-CLAMP
2 - TOOL C-4470 OR SP-5560
3 - SERVO SPRING RETAINER

AUTOMATIC - 32RH

TABLE OF CONTENTS

page

AUTOMATIC - 32RH
DESCRIPTION . . . 83
OPERATION . . . 83
DIAGNOSIS AND TESTING . . . 89
PRELIMINARY . . . 89
DISASSEMBLY . . . 89
ASSEMBLY . . . 95
SPECIFICATIONS . . . 105
ACCUMULATOR
INSPECTION . . . 107
BANDS
ADJUSTMENTS . . . 107
FLUID AND FILTER
DIAGNOSIS AND TESTING . . . 108
FLUID CONTAMINATION . . . 108
STANDARD PROCEDURE . . . 109
FLUID LEVEL CHECK . . . 109
TRANSMISSION FILL . . . 109
FLUID AND FILTER REPLACEMENT . . . 110
FRONT CLUTCH
OPERATION . . . 111

page

DISASSEMBLY . . . 111
ASSEMBLY . . . 111
GEAR SHIFT CABLE
REMOVAL . . . 113
INSTALLATION . . . 113
ADJUSTMENTS . . . 114
GOVERNOR AND PARK GEAR
DISASSEMBLY . . . 114
ASSEMBLY . . . 115
PARK/NEUTRAL POSITION SWITCH
DESCRIPTION . . . 116
OPERATION . . . 116
REAR SERVO
DISASSEMBLY . . . 116
ASSEMBLY . . . 116
SHIFT MECHANISM
DESCRIPTION . . . 117
OPERATION . . . 117
THROTTLE VALVE CABLE
ADJUSTMENTS . . . 117

AUTOMATIC - 32RH

DESCRIPTION

This Service Manual Supplement includes ONLY the information that is new or updated for 2001 Model Year. All other Service Manual information is in the 2000 Model Year Service Manual.

When you are using this information you may be referred to another section of the Service Manual. The refer to is written differently than in prior years.

OPERATION

The application of each driving or holding component is controlled by the valve body based upon the manual lever position,throttle pressure, and governor pressure. The governor pressure is a variable pressure input to the valve body and is one of the signals that a shift is necessary. First through third gear are obtained by selectively applying and releasing the different clutches and bands. Engine power is thereby routed to the various planetary gear assemblies which combine with the overrunning clutch assembly to generate the different gear ratios. The torque converter clutch is hydraulically applied and is released when fluid is vented from the hydraulic circuit by the torque converter control (TCC) solenoid on the valve body. The torque converter clutch is controlled by the Powertrain Control Module (PCM). The torque converter clutch engages in third gear when the vehicle is cruising on a level plane after the vehicle has warmed up. The torque converter clutch will disengage momentarily when an increase in engine load is sensed by the PCM, such as when the vehicle begins to go uphill or the throttle pressure is increased. The torque converter clutch feature increases fuel economy and reduces the transmission fluid temperature.

AUTOMATIC - 32RH (Continued)

PARK POWERFLOW

As the engine is running and the crankshaft is rotating, the flexplate and torque converter, which are also bolted to it, are all rotating in a clockwise direction as viewed from the front of the engine. The notched hub of the torque converter is connected to the oil pump's internal gear, supplying the transmission with oil pressure. As the converter turns, it turns the input shaft in a clockwise direction. As the input shaft is rotating, the front clutch hub-rear clutch retainer and all their associated parts are also rotating, all being directly connected to the input shaft. The power flow from the engine through the front-clutch-hub and rear-clutch-retainer stops at the rear-clutch-retainer. Therefore, no power flow to the output shaft, occurs because no clutches are applied. The only mechanism in use at this time is the parking sprag (Fig. 1), which locks the parking gear on the output shaft to the transmission case.

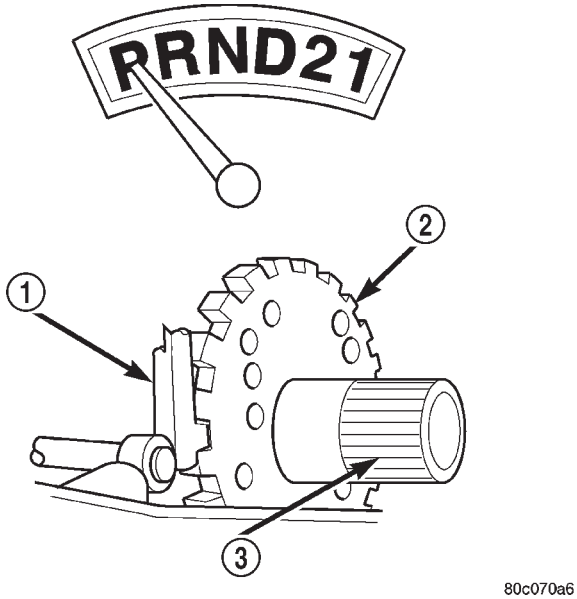


Fig. 1 Park Powerflow

1 - LEVER ENGAGED FOR PARK
2 - PARK SPRAG
3 - OUTPUT SHAFT

NEUTRAL POWERFLOW

With the gear selector in the neutral position (Fig. 2), the power flow of the transmission is essentially the same as in the park position. The only operational difference is that the parking sprag has been disengaged, unlocking the output shaft from the transmission case and allowing it to move freely.

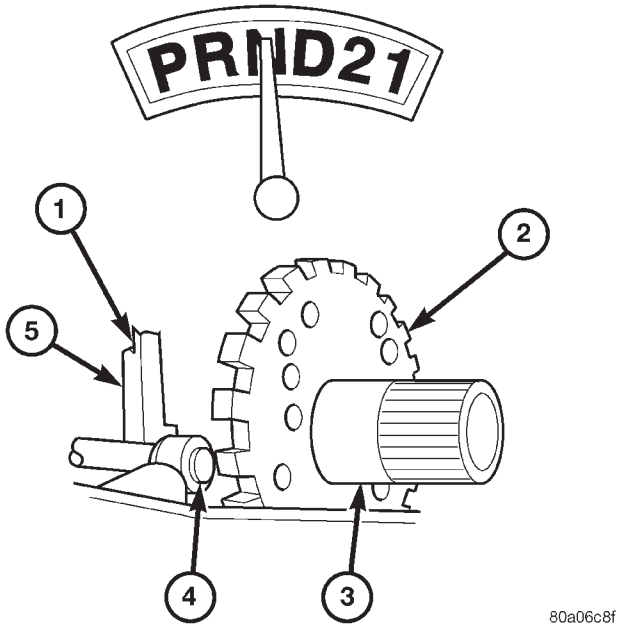


Fig. 2 Neutral Powerflow

1 - LEVER DISENGAGED FOR NEUTRAL
2 - PARK SPRAG
3 - OUTPUT SHAFT
4 - CAM
5 - LEVER

AUTOMATIC - 32RH (Continued)

REVERSE POWERFLOW

When the gear selector is moved into the reverse position (Fig. 3), the front clutch and the rear band are applied. With the application of the front clutch, engine torque is applied to the sun gear, turning it in a clockwise direction. The clockwise rotation of the sun gear causes the rear planet pinions to rotate against engine rotation in a counterclockwise direction. The rear band is holding the low reverse drum, which is splined to the rear carrier. Since the rear carrier is being held, the torque from the planet pinions is transferred to the rear annulus gear, which is splined to the output shaft. The output shaft in turn rotates with the annulus gear in a counterclockwise direction giving a reverse gear output. The entire transmission of torque is applied to the rear planetary gearset only. Although there is torque input to the front gearset through the sun gear, no other member of the gearset is being held. During the entire reverse stage of operation, the front planetary gears are in an idling condition.

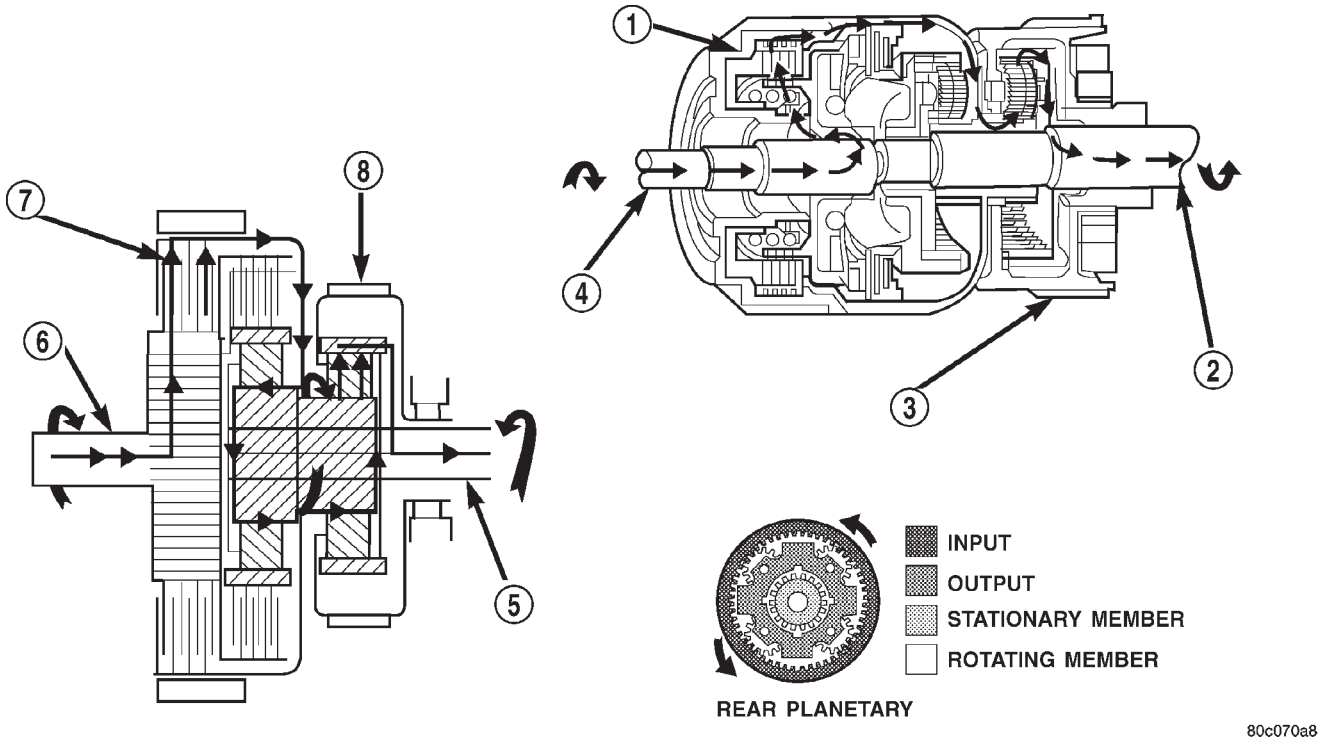


Fig. 3 Reverse Powerflow

1 - FRONT CLUTCH ENGAGED
2 - OUTPUT SHAFT
3 - LOW/REVERSE BAND APPLIED
4 - INPUT SHAFT
5 - OUTPUT SHAFT
6 - INPUT SHAFT
7 - FRONT CLUTCH ENGAGED
8 - LOW/REVERSE BAND APPLIED

AUTOMATIC - 32RH (Continued)

FIRST GEAR POWERFLOW

When the gearshift lever is moved into the drive position the transmission goes into first gear (Fig. 4). As soon as the transmission is shifted from park or neutral to drive, the rear clutch applies, applying the rear clutch pack to the front annulus gear. Engine torque is now applied to the front annulus gear turning it in a clockwise direction. With the front annulus gear turning in a clockwise direction, it causes the front planets to turn in a clockwise direction. The rotation of the front planets cause the sun to revolve in a counterclockwise direction. The sun gear now transfers its counterclockwise rotation to the rear planets which rotate back in a clockwise direction. With the rear annulus gear stationary, the rear planet rotation on the annulus gear causes the rear planet carrier to revolve in a counterclockwise direction. The rear planet carrier is splined into the low-reverse drum, and the low reverse drum is splined to the inner race of the over-running clutch. With the over-running clutch locked, the planet carrier is held, and the resulting torque provided by the planet pinions is transferred to the rear annulus gear. The rear annulus gear is splined to the output shaft and rotated along with it (clockwise) in an underdrive gear reduction mode.

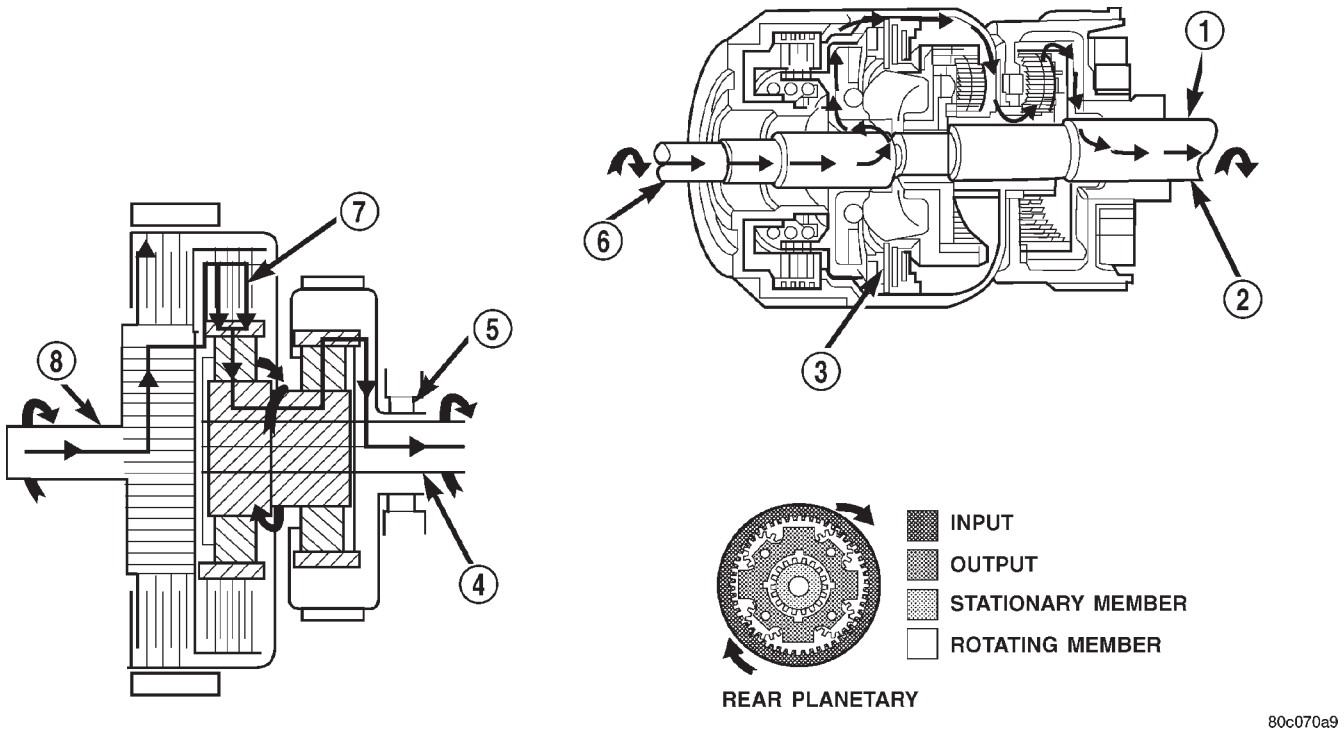


Fig. 4 First Gear Powerflow

1 - OUTPUT SHAFT
2 - OVER-RUNNING CLUTCH HOLDING
3 - REAR CLUTCH APPLIED
4 - OUTPUT SHAFT
5 - OVER-RUNNING CLUTCH HOLDING
6 - INPUT SHAFT
7 - REAR CLUTCH APPLIED
8 - INPUT SHAFT

AUTOMATIC - 32RH (Continued)

SECOND GEAR POWERFLOW

In drive-second (Fig. 5), the same elements are applied as in manual-second. Therefore, the power flow will be the same, and both gears will be discussed as one in the same. In drive-second, the transmission has proceeded from first gear to its shift point, and is shifting from first gear to second. The second gear shift is obtained by keeping the rear clutch applied and applying the front (kickdown) band. The front band holds the front clutch retainer that is locked to the sun gear driving shell. With the rear clutch still applied, the input is still on the front annulus gear turning it clockwise at engine speed. Now that the front band is holding the sun gear stationary, the annulus rotation causes the front planets to rotate in a clockwise direction. The front carrier is then also made to rotate in a clockwise direction but at a reduced speed. This will transmit the torque to the output shaft, which is directly connected to the front planet carrier. The rear planetary annulus gear will also be turning because it is directly splined to the output shaft. All power flow has occurred in the front planetary gear set during the drive-second stage of operation, and now the over-running clutch, in the rear of the transmission, is disengaged and freewheeling on its hub.

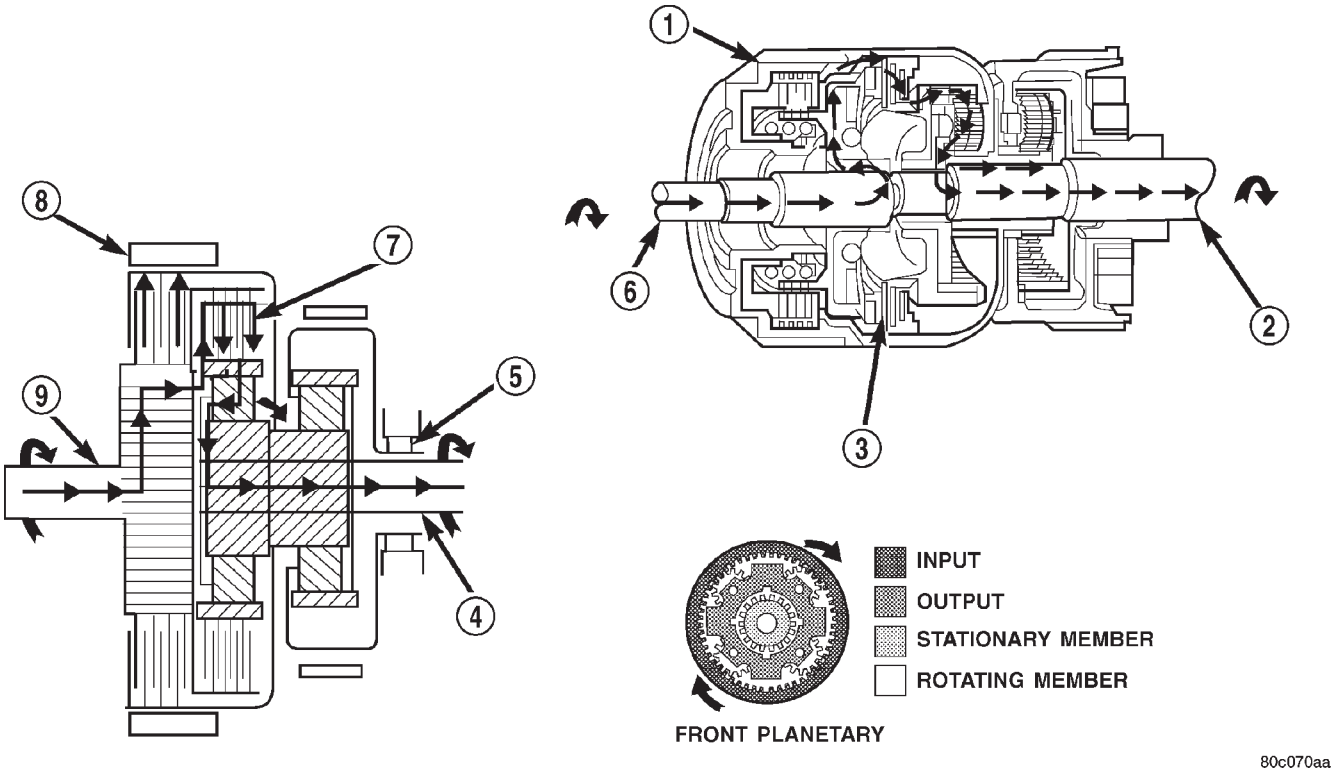


Fig. 5 Second Gear Powerflow

1 - KICKDOWN BAND APPLIED
2 - OUTPUT SHAFT
3 - REAR CLUTCH ENGAGED
4 - OUTPUT SHAFT
5 - OVER-RUNNING CLUTCH FREE-WHEELING
6 - INPUT SHAFT
7 - REAR CLUTCH APPLIED
8 - KICKDOWN BAND APPLIED
9 - INPUT SHAFT

AUTOMATIC - 32RH (Continued)

DIRECT DRIVE POWERFLOW

The vehicle has accelerated and reached the shift point for the 2-3 upshift into direct drive (Fig. 6). When the shift takes place, the front band is released, and the front clutch is applied. The rear clutch stays applied as it has been in all the forward gears. With the front clutch now applied, engine torque is now on the front clutch retainer, which is locked to the sun gear driving shell. This means that the sun gear is now turning in engine rotation (clockwise) and at engine speed. The rear clutch is still applied so engine torque is also still on the front annulus gear. If two members of the same planetary set are driven, direct drive results. Therefore, when two members are rotating at the same speed and in the same direction, it is the same as being locked up. The rear planetary set is also locked up, given the sun gear is still the input, and the rear annulus gear must turn with the output shaft. Both gears are turning in the same direction and at the same speed. The front and rear planet pinions do not turn at all in direct drive. The only rotation is the input from the engine to the connected parts, which are acting as one common unit, to the output shaft.

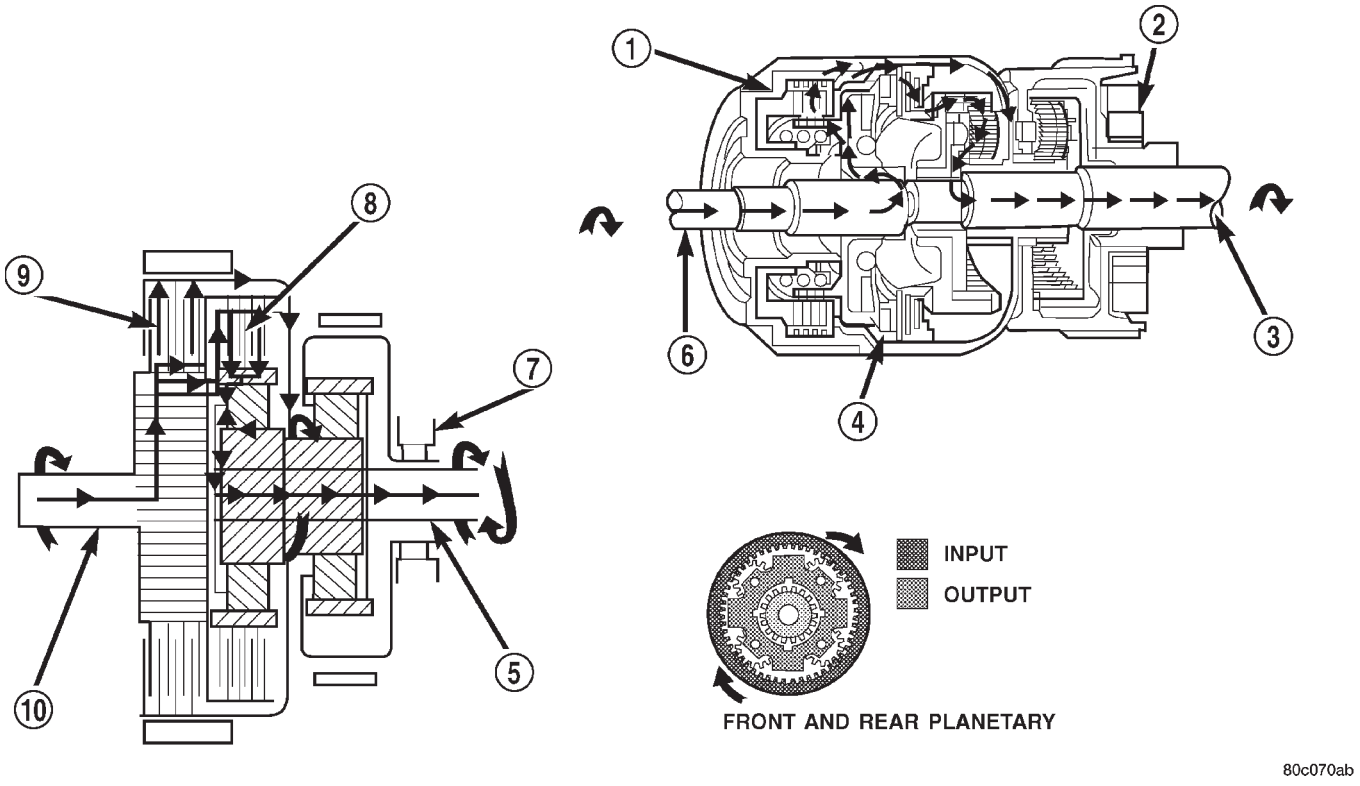


Fig. 6 Direct Drive Powerflow

1 - FRONT CLUTCH APPLIED
2 - OVER-RUNNING CLUTCH FREE-WHEELING
3 - OUTPUT SHAFT
4 - REAR CLUTCH APPLIED
5 - OUTPUT SHAFT
6 - INPUT SHAFT
7 - OVER-RUNNING CLUTCH FREE-WHEELING
8 - REAR CLUTCH APPLIED
9 - FRONT CLUTCH APPLIED
10 - INPUT SHAFT

AUTOMATIC - 32RH (Continued)

DIAGNOSIS AND TESTING - PRELIMINARY

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVEABLE

(1) Check for transmission fault codes using DRB® scan tool.
(2) Check fluid level and condition.
(3) Adjust throttle and gearshift linkage if complaint was based on delayed, erratic, or harsh shifts.
(4) Road test and note how transmission upshifts, downshifts, and engages.
(5) Perform hydraulic pressure test if shift problems were noted during road test.
(6) Perform air-pressure test to check clutch-band operation.

VEHICLE IS DISABLED

(1) Check fluid level and condition.
(2) Check for broken or disconnected gearshift or throttle linkage.
(3) Check for cracked, leaking cooler lines, or loose or missing pressure-port plugs.
(4) Raise and support vehicle on safety stands, start engine, shift transmission into gear, and note following:
(a) If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
(b) If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged drive plate, converter, oil pump, or input shaft.
(c) If propeller shaft does not turn and transmission is not noisy, perform hydraulic-pressure test to determine if problem is hydraulic or mechanical.

DISASSEMBLY

(1) Drain fluid from transmission.
(2) Clean exterior of transmission with suitable solvent or pressure washer.
(3) Remove torque converter from front of transmission.
(4) Remove throttle and shift levers from valve body manual shaft and throttle lever shaft.
(5) Mount transmission in repair stand C-3750-B or similar type stand (Fig. 7).
(6) Remove extension housing.
(7) Remove fluid pan.
(8) Remove park/neutral position switch and seal (Fig. 8).
(9) Remove valve body.
(10) Remove accumulator spring and piston (Fig. 9).

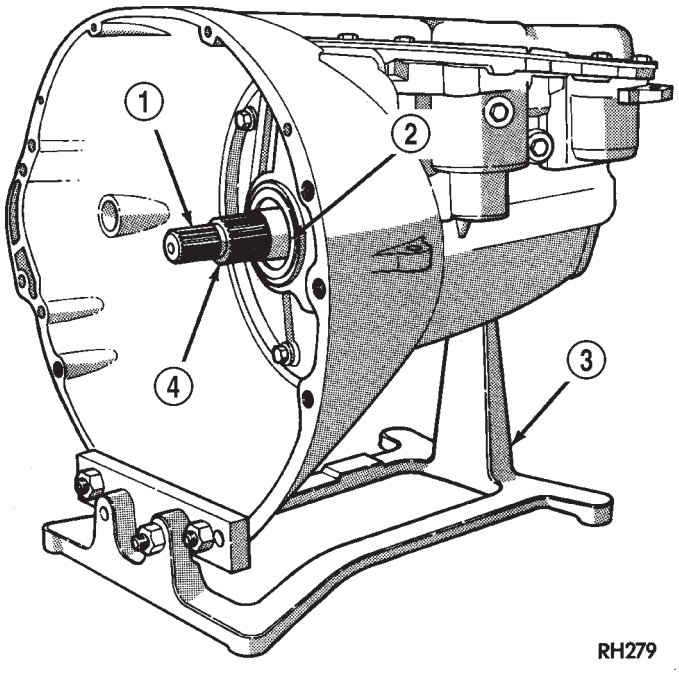


Fig. 7 Repair Stand

1 - INPUT SHAFT
2 - PUMP SEAL
3 - REPAIR STAND
4 - REACTION SHAFT

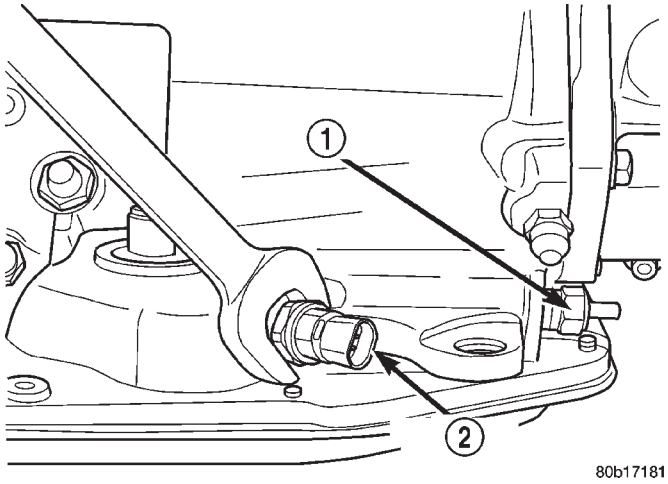


Fig. 8 Park/Neutral Position Switch

1 - SOLENOID CONNECTOR
2 - PARK/NEUTRAL SWITCH

AUTOMATIC - 32RH (Continued)

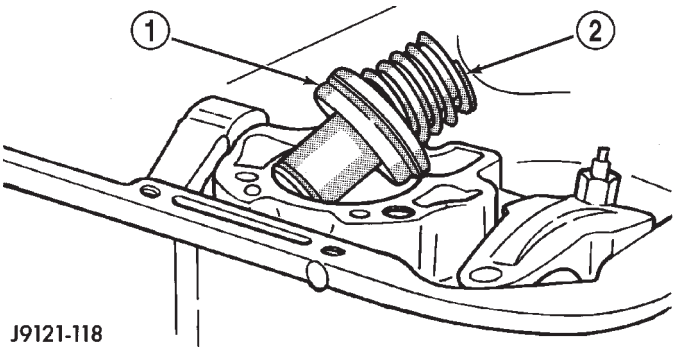


Fig. 9 Accumulator Piston And Spring

1 - ACCUMULATOR PISTON
2 - PISTON SPRING

(11) Measure input shaft end play (Fig. 10).

(a) Attach Adapter 8266-7 to Handle 8266-8.

(b) Attach dial indicator C-3339 to Handle 8266-8.

(c) Install the assembled tool onto the input shaft of the transmission and tighten the retaining screw on Adapter 8266-7 to secure it to the input shaft.

(d) Position the dial indicator plunger against a flat spot on the oil pump and zero the dial indicator.

(e) Move input shaft in and out and record reading.

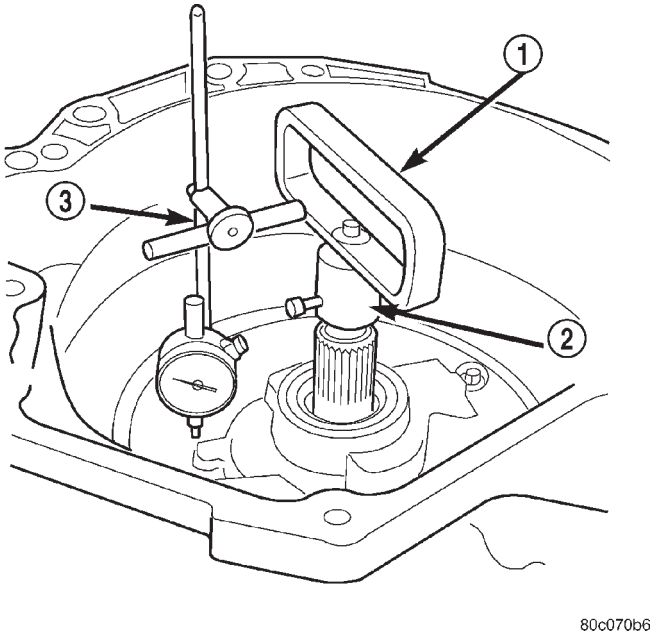


Fig. 10 Checking Input Shaft End Play

1 - TOOL 8266-8
2 - TOOL 8266-7
3 - TOOL C-3339

(12) Remove front band reaction pin access plug (Fig. 11). Plug is accessible through converter housing. Use 1/4 inch drive extension to remove plug as shown.

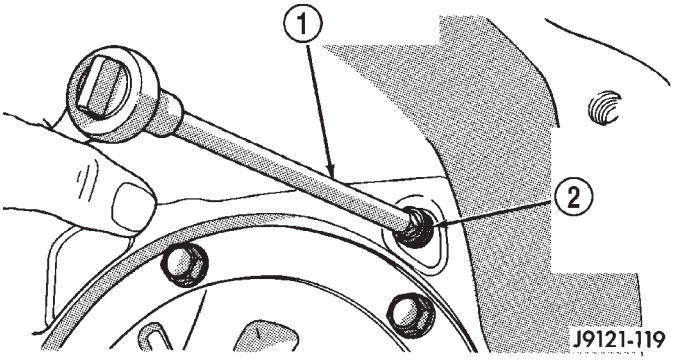


Fig. 11 Front Band Reaction Pin Access Plug

1 - 1/4" DRIVE EXTENSION
2 - FRONT BAND REACTION PIN ACCESS PLUG

(13) Loosen front band adjusting screw lock nut (Fig. 12) 4-5 turns. Then tighten band adjusting screw until band is tight around front clutch retainer. This prevents front/rear clutches from coming out with pump and possibly damaging clutch or pump components.

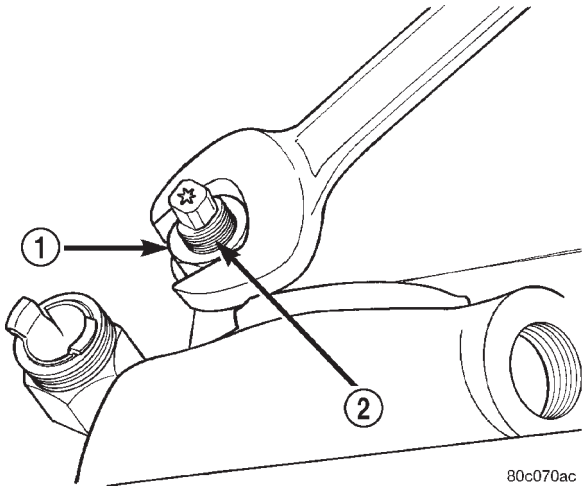


Fig. 12 Front Band Adjusting Screw Lock Nut

1 - LOCK-NUT
2 - FRONT BAND ADJUSTER

(14) Remove oil pump bolts.

(15) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 13).

(16) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 13).

(17) Loosen front band adjusting screw until band is completely loose.

AUTOMATIC - 32RH (Continued)

(18) Squeeze front band together and remove band strut (Fig. 14).

(19) Remove front band reaction pin with pencil magnet. Pin is accessible from converter housing side of case (Fig. 15).

(20) Remove front band lever (Fig. 16).

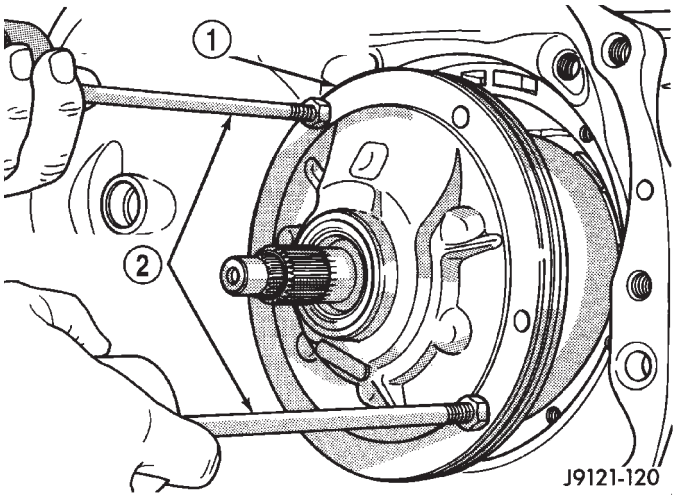


Fig. 13 Oil Pump/Reaction Shaft Support

1 - OIL PUMP AND REACTION SHAFT SUPPORT ASSEMBLY
2 - SLIDE HAMMER TOOLS C-3752

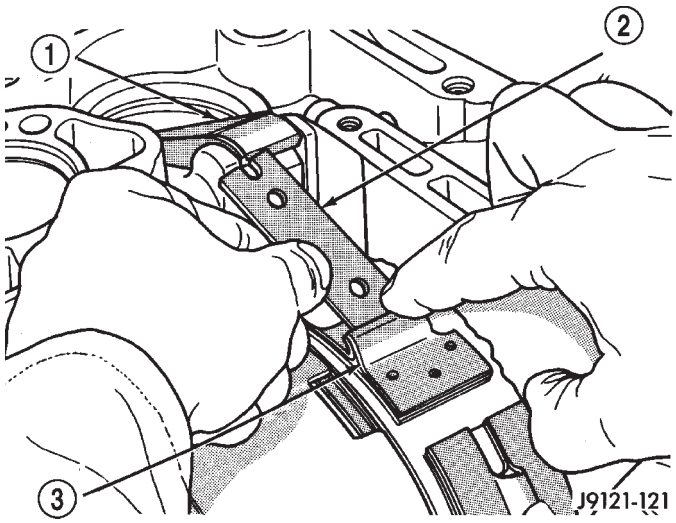


Fig. 14 Front Band Strut

1 - BAND LEVER
2 - BAND STRUT
3 - FRONT BAND

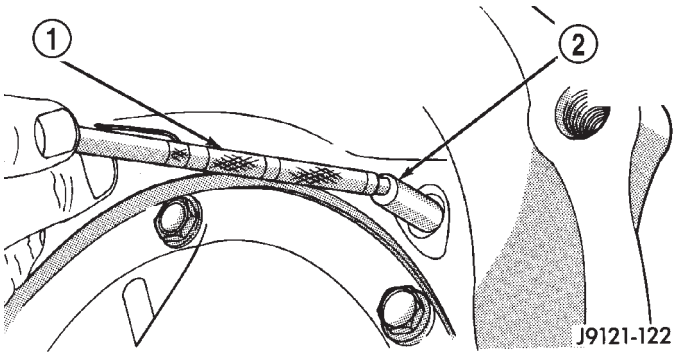


Fig. 15 Front Band Reaction Pin

1 - PENCIL MAGNET
2 - FRONT BAND REACTION PIN

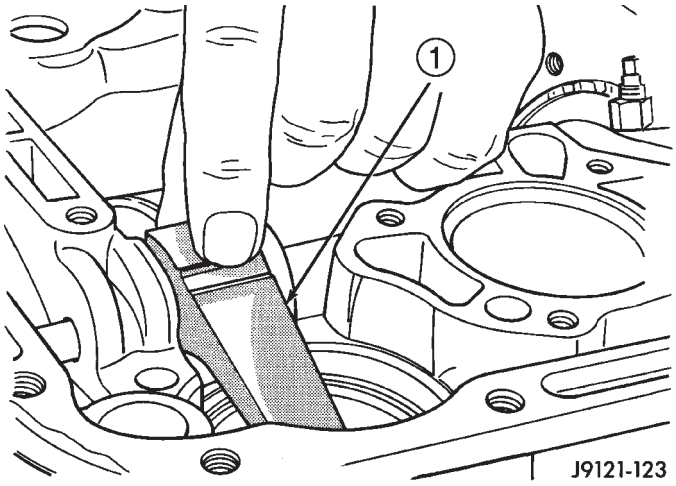


Fig. 16 Front Band Lever

1 - FRONT BAND LEVER

AUTOMATIC - 32RH (Continued)

(21) Slide front band rearward and onto driving shell. Band will not be removed until after front/rear clutch removal.

(22) Remove front and rear clutch units as assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 17).

(23) Lift front clutch off rear clutch (Fig. 18). Set clutch units aside for overhaul.

(24) Remove output shaft thrust washer from output shaft, or from rear clutch hub.

(25) Remove output shaft thrust plate from output shaft hub (Fig. 19).

(26) Slide front band off driving shell (Fig. 20)and remove band from case.

(27) Remove governor body and park gear from output shaft.

(28) Remove output shaft and planetary geartrain as assembly (Fig. 21). Support geartrain with both hands during removal. Do not allow machined surfaces on output shaft to become nicked or scratched.

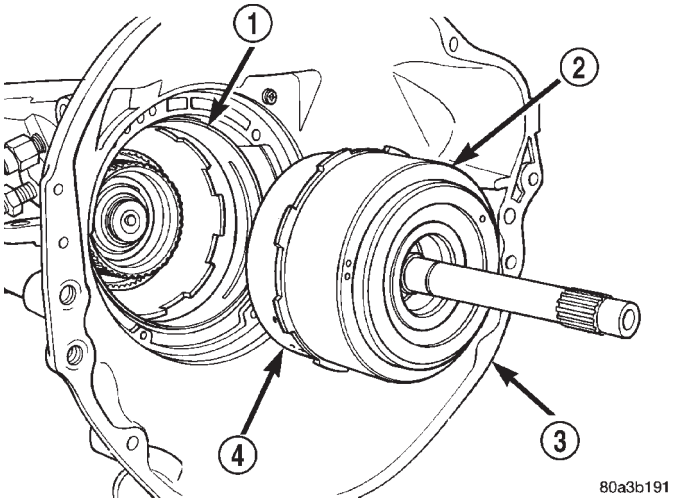


Fig. 17 Front/Rear Clutch Assemblies

1 - FRONT BAND
2 - FRONT CLUTCH AND DRUM
3 - TRANSMISSION HOUSING
4 - REAR CLUTCH

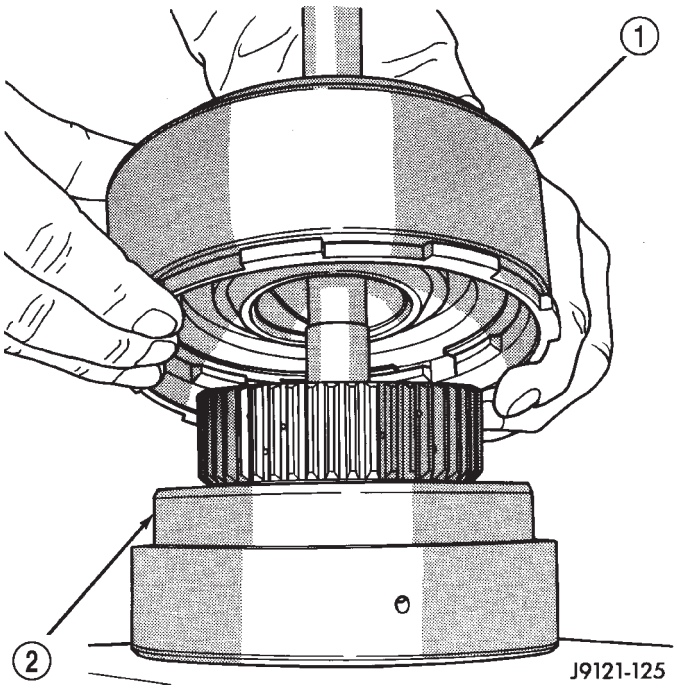


Fig. 18 Separating Front Clutch From Rear Clutch

1 - FRONT CLUTCH
2 - REAR CLUTCH

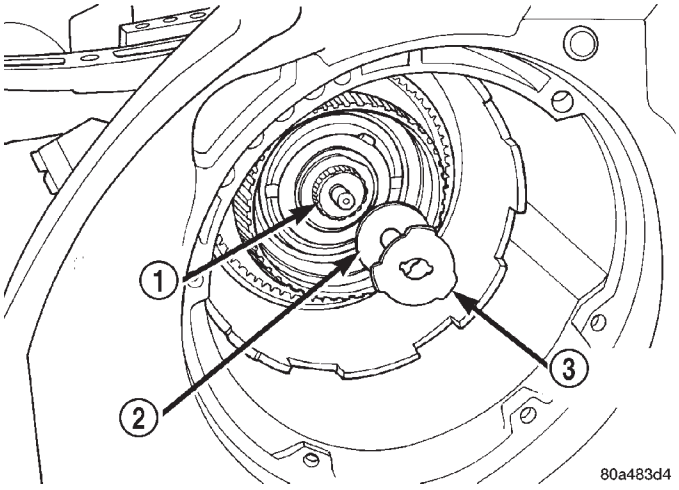


Fig. 19 Output Shaft Thrust Plate and Washer

1 - OUTPUT SHAFT
2 - THRUST PLATE
3 - THRUST WASHER

AUTOMATIC - 32RH (Continued)

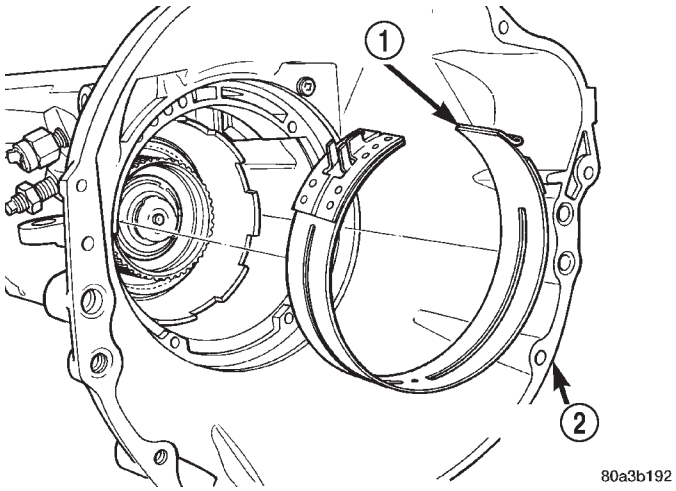


Fig. 20 Front Band

1 - FRONT BAND
2 - TRANSMISSION HOUSING

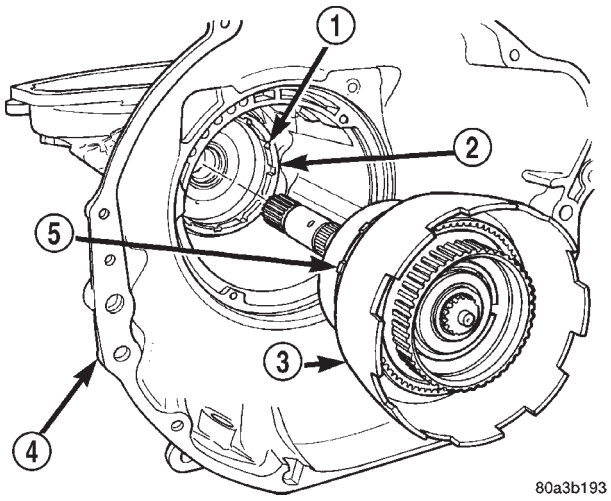


Fig. 21 Planetary Geartrain

1 - SLOTS
2 - LOW-REVERSE DRUM
3 - PLANETARY GEARTRAIN
4 - TRANSMISSION HOUSING
5 - LUGS

(29) Loosen rear band adjusting screw 4-5 turns (Fig. 22).

(30) Remove snap-ring that secures low-reverse drum to rear support hub, however do not remove drum at this time (Fig. 23).

(31) Remove rear band upper and lower reaction pins with parallel jaw snap-ring pliers (Fig. 24). Spread plier jaws in pin bore to grip pin. Then twist and pull pins to remove them as shown.

(32) Remove rear band lever and strut.

(33) Mark position of rear support for assembly reference (Fig. 25). Use scriber or center punch to mark case and support.

(34) Remove rear support bolts and remove support from low-reverse drum and case (Fig. 26). Keep rear support bolts together for assembly reference.

(35) Remove bolts attaching overrunning clutch cam to case (Fig. 27).

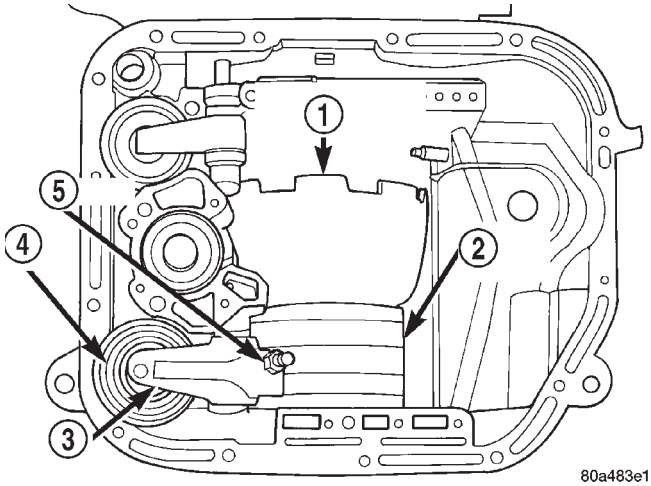


Fig. 22 Rear Band Adjustment Screw Location

1 - PLANETARY GEARTRAIN
2 - REAR BAND
3 - LEVER
4 - SERVO
5 - ADJUSTER

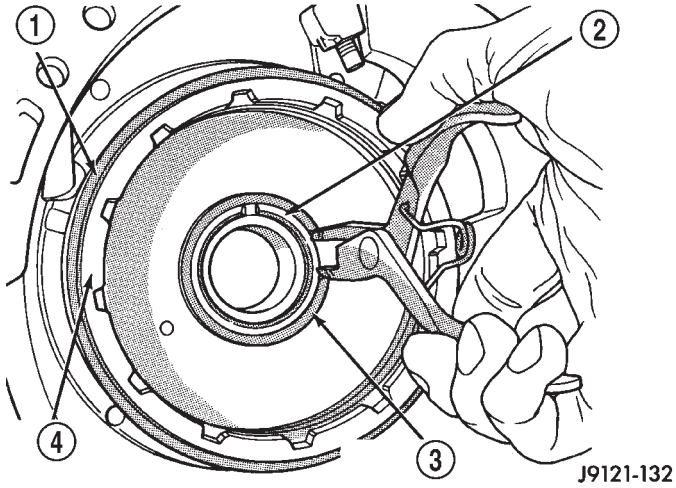


Fig. 23 Low-Reverse Drum Snap-Ring

1 - REAR BAND
2 - REAR SUPPORT HUB
3 - LOW-REVERSE DRUM SNAP-RING
4 - LOW-REVERSE DRUM

AUTOMATIC - 32RH (Continued)

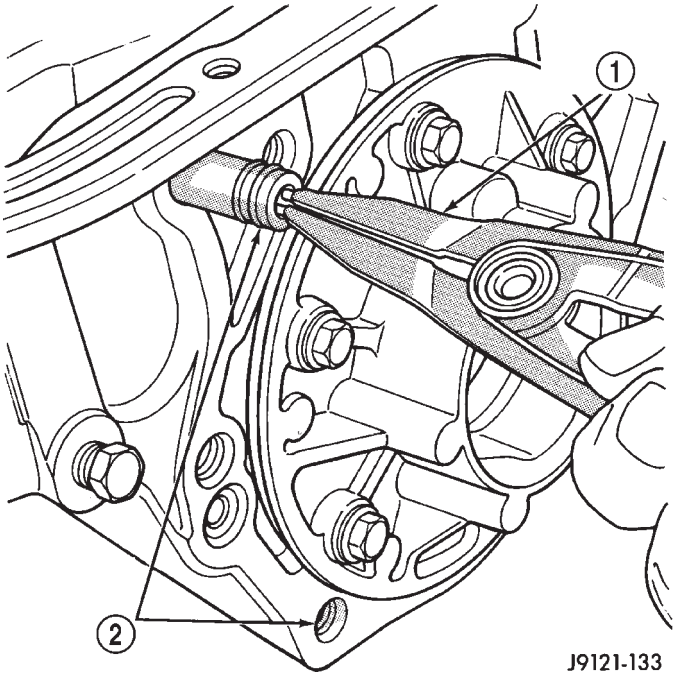


Fig. 24 Rear Band Pivot And Reaction Pins

1 - PARALLEL JAW SNAP-RING PLIERS
2 - REAR BAND PIVOT AND REACTION PINS

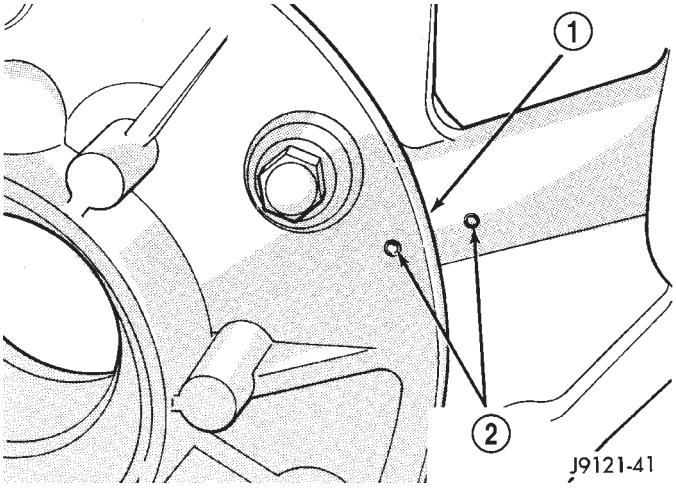


Fig. 25 Marking Rear Support To Aid Assembly

1 - REAR SUPPORT
2 - ASSEMBLY REFERENCE MARKS

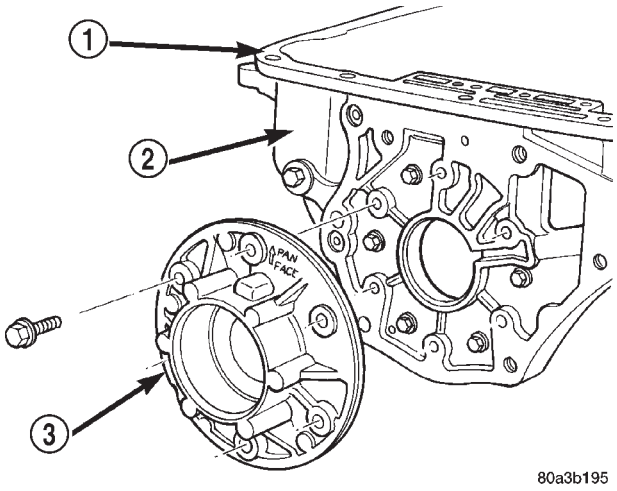


Fig. 26 Rear Support

1 - OIL PAN FACE
2 - TRANSMISSION HOUSING
3 - REAR SUPPORT

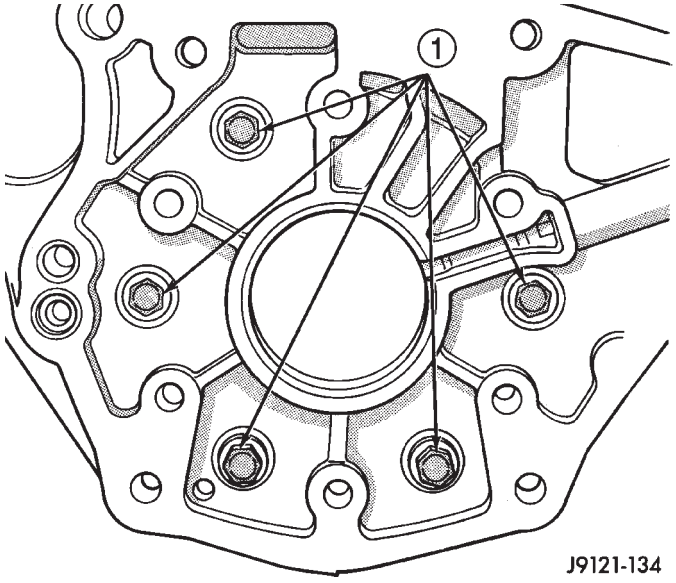


Fig. 27 Overrunning Clutch Cam Bolt Locations

1 - OVERRUNNING CLUTCH CAM BOLTS

AUTOMATIC - 32RH (Continued)

(36) Remove low-reverse drum and overrunning clutch as assembly. Slide drum and clutch through rear band and out of case. Set drum and clutch assembly aside for cleaning and inspection.

(37) Remove rear band from case.

(38) Compress front servo rod guide about 1/8 in. with Spring Compressor Tool C-3422-B (Fig. 28).

(39) Remove front servo rod guide snap-ring (Fig. 28). **Exercise caution when removing snap-ring. Servo bore can be scratched or nicked if care is not exercised.**

(40) Remove compressor tools and remove front servo rod guide, spring and servo piston.

(41) Compress rear servo spring retainer about 1/16 in. with Spring Compressor Tool C-3422-B.

(42) Remove rear servo spring retainer snap-ring. Then remove compressor tools and remove rear servo spring and piston.

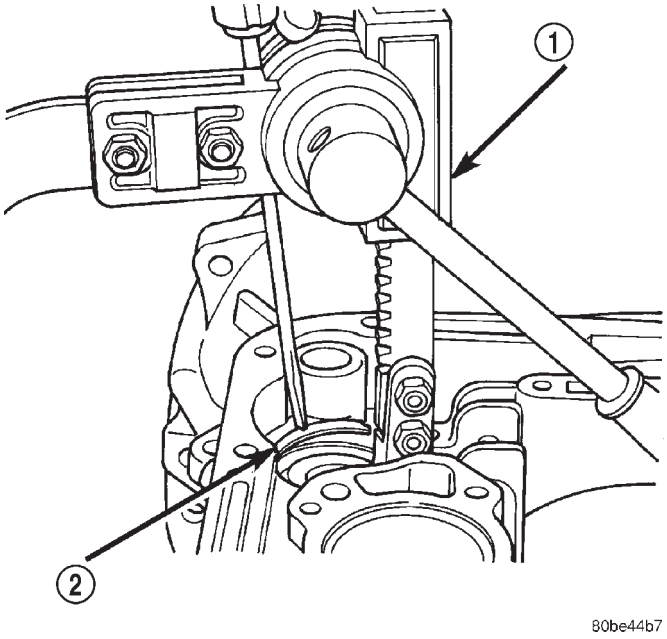


Fig. 28 Compressing Front Servo Rod Guide

1 - SPRING COMPRESSOR TOOL C-3422-B
2 - ROD GUIDE SNAP-RING

ASSEMBLY

SERVO

(1) Install rear servo piston, spring and spring retainer. Compress rear servo spring and retainer with Compressor Tool C-3422-B.

(2) Install front servo piston, spring and rod guide. Compress front servo rod guide with Valve Spring Compressor C-3422-B and install servo snap-ring (Fig. 28).

OVERRUNNING CLUTCH

(1) Examine bolt holes in overrunning clutch cam. Note that one hole is **not threaded** (Fig. 29). This hole must align with blank area in clutch cam bolt circle (Fig. 30).

(2) Mark location of non threaded hole in clutch cam and blank area of case with paint stripe (Fig. 31).

(3) Align and install overrunning clutch cam in case (Fig. 31). **Be sure cam is correctly installed. Bolt holes in cam are slightly countersunk on one side. This side of cam faces rearward (toward rear support).**

(4) Partially install overrunning clutch in cam (Fig. 31).

(5) Verify that non threaded hole in clutch cam is properly aligned (Fig. 31). Check alignment by threading a clutch cam bolt into each hole. Adjust cam position if necessary before proceeding.

(6) Seat overrunning clutch in clutch cam after verifying correct cam alignment.

(7) Install overrunning clutch cam bolts. **Clutch cam bolts are shorter than rear support bolts.** Tighten cam bolts to 17 N·m (150 in. lbs. or 13 ft. lbs.) torque.

(8) Lubricate overrunning clutch rollers, springs and cam with Mopar® ATF +4 transmission fluid.

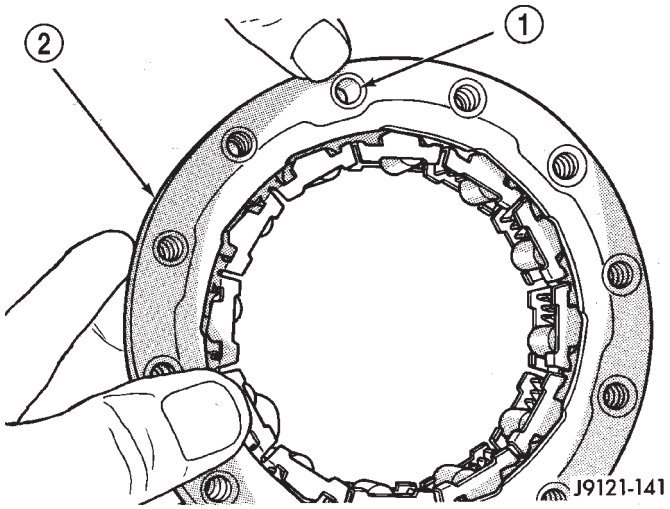


Fig. 29 Location Of Non-Threaded Hole In Clutch Cam

1 - NON-THREADED HOLE
2 - CLUTCH CAM

AUTOMATIC - 32RH (Continued)

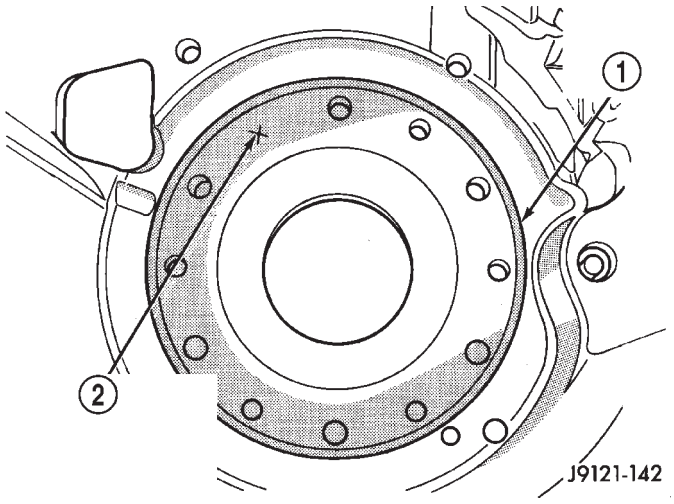


Fig. 30 Location Of Blank Area In Clutch Cam Seat Of Case

1 - CLUTCH CAM SEAT (IN CASE)
2 - NON-THREADED HOLE IN CLUTCH CAM ALIGNS HERE (BLANK AREA) OF SEAT

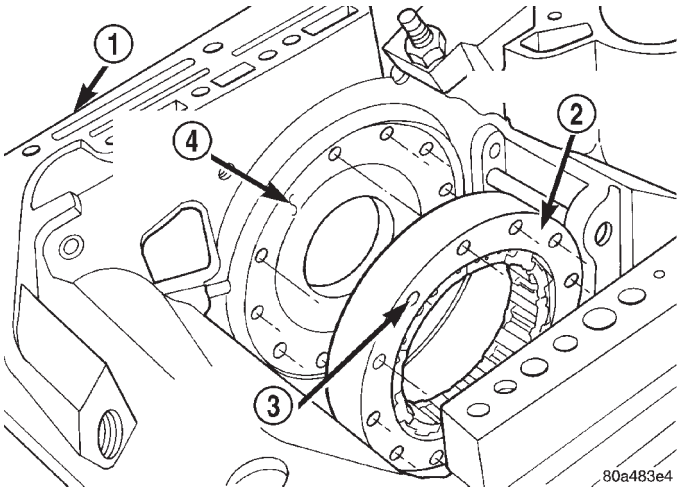


Fig. 31 Overrunning Clutch Cam Alignment

1 - TRANSMISSION CASE
2 - OVERRUNNING CLUTCH
3 - NON-THREADER HOLE
4 - WIDE SPACE AREA

REAR BAND

The 32RH transmission has a double wrap band, a pivot pin, and a reaction pin (Fig. 32). The band lever pivots against a lug on the band. The reaction pin functions as the stop, or locating mechanism for the band lower lug.

(1) Install band components and low-reverse drum as follows:

(2) Install reaction pin in case (Fig. 33).

(3) Position band in case and seat band lug against reaction pin.

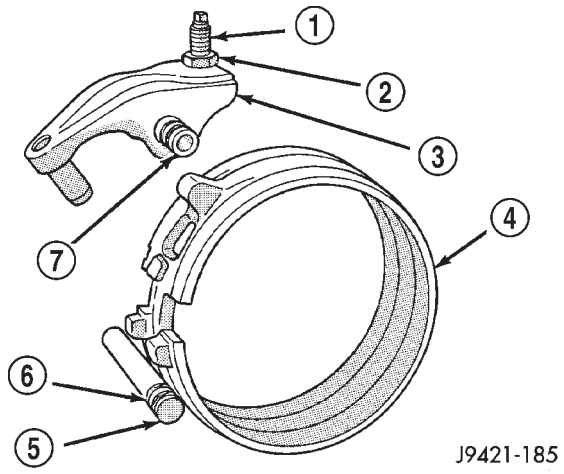


Fig. 32 Rear Band Components

1 - ADJUSTING SCREW
2 - LOCKNUT
3 - LEVER
4 - REAR BAND
5 - REACTION PIN
6 - O-RINGS
7 - PIVOT PIN

(4) Slide low-reverse drum through band (Fig. 34). Then tilt drum slightly and start clutch race into overrunning clutch rollers.

(5) Rotate drum in clockwise direction and push drum inward until race is seated in overrunning clutch.

(6) Install rear band lever (Fig. 35). Be sure lever pivot pin is fully seated in case afterward.

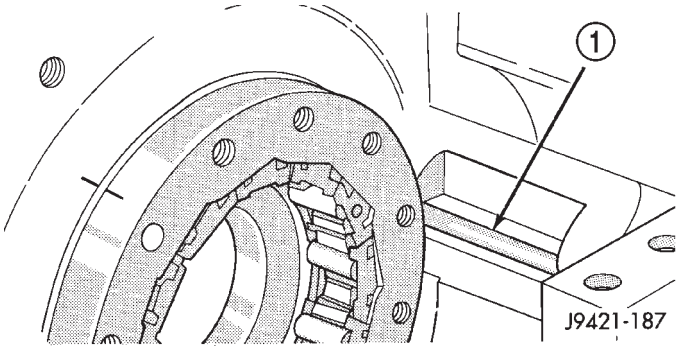


Fig. 33 Rear Band Reaction Pin

1 - REAR BAND REACTION PIN

AUTOMATIC - 32RH (Continued)

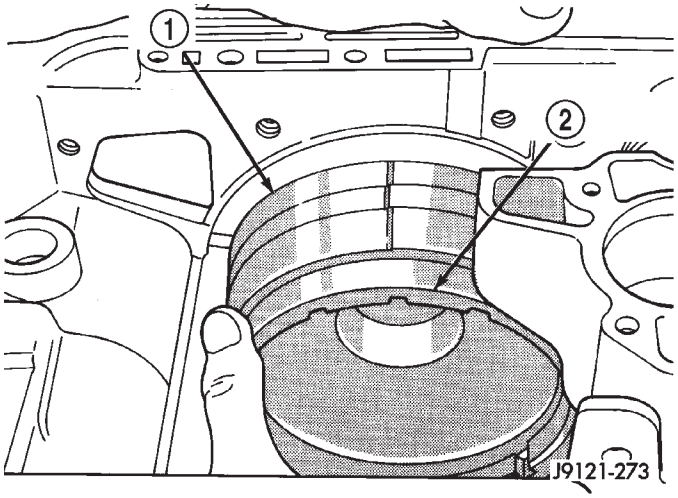


Fig. 34 Rear Band And Low-Reverse Drum

1 - REAR BAND
2 - LOW-REVERSE DRUM

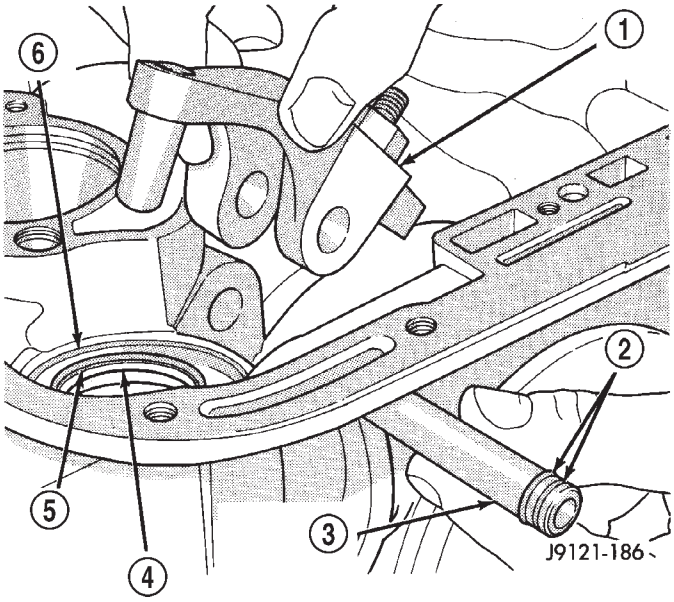


Fig. 35 Rear Band Lever And Pivot Pin

1 - REAR BAND LEVER
2 - O-RINGS
3 - BAND LEVER PIVOT PIN
4 - SPRING
5 - SPRING RETAINER
6 - SERVO SNAP-RING

REAR SUPPORT AND LOW-REVERSE DRUM

(1) Hold low-reverse drum in position and install rear support (Fig. 36).

(2) Align support with punch marks made during disassembly.

(3) Install and tighten rear support bolts to 17 N·m (150 in. lbs.) torque.

(4) Install snap-ring that retains low-reverse drum to hub of rear support (Fig. 37).

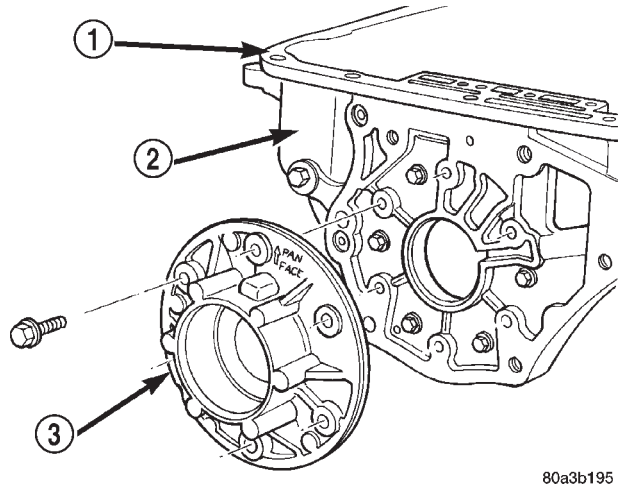


Fig. 36 Rear Support

1 - OIL PAN FACE
2 - TRANSMISSION HOUSING
3 - REAR SUPPORT

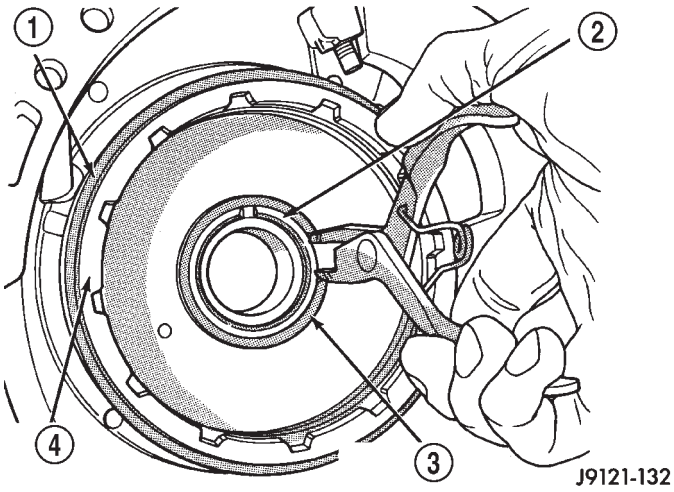


Fig. 37 Low-Reverse Drum Snap-Ring

1 - REAR BAND
2 - REAR SUPPORT HUB
3 - LOW-REVERSE DRUM SNAP-RING
4 - LOW-REVERSE DRUM

AUTOMATIC - 32RH (Continued)

PLANETARY GEARTRAIN AND OUTPUT SHAFT

(1) Lubricate output shaft, rear support bore and low-reverse drum hub with transmission fluid.

(2) Install assembled output shaft and planetary geartrain in case (Fig. 38).

(3) Align drive lugs on rear planetary gear with slots in low-reverse drum (Fig. 39). Then seat planetary assembly in drum.

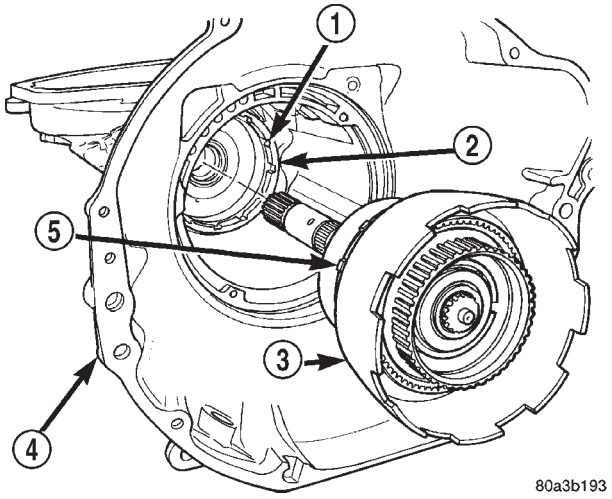


Fig. 38 Output Shaft And Planetary Geartrain

1 - SLOTS
2 - LOW-REVERSE DRUM
3 - PLANETARY GEARTRAIN
4 - TRANSMISSION HOUSING
5 - LUGS

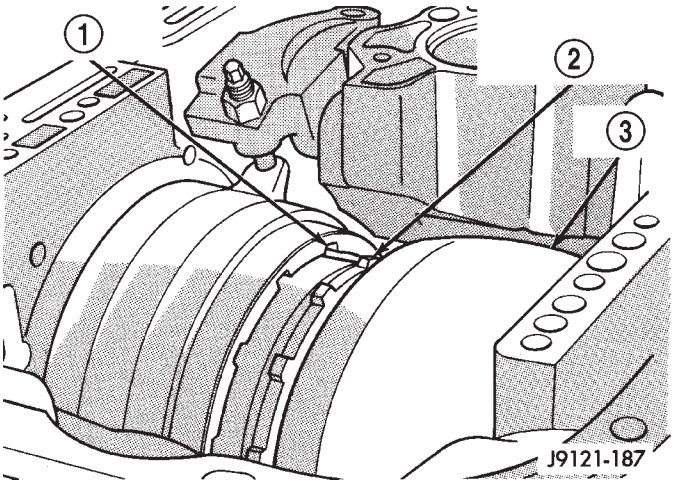


Fig. 39 Aligning/Seating Rear Planetary In Low-Reverse Drum

1 - LOW-REVERSE DRUM SLOTS
2 - REAR PLANETARY GEAR DRIVE LUGS
3 - DRIVING SHELL

GOVERNOR AND PARK GEAR

(1) Lubricate governor components and park gear seal rings with Mopar® ATF +4.

(2) Install governor filter in park gear and install governor body on gear. Align governor body on gear using marks made at disassembly.

(3) Install new seal rings on hub of park gear if necessary. Be sure ring with hooked ends is properly connected.

(4) Align and install governor/park gear assembly on output shaft as follows:

(a) **Note that output shaft in current transmission is spotfaced for governor valve end clearance (Fig. 40). Shaft must be indexed so that small end of governor valve will seat in this spotface. Install governor body and park as follows to ensure proper alignment and operation.**

(b) Rotate output shaft until spotface (at governor valve shaft hole) is facing upward (Fig. 40).

(c) Position valve bore in governor body over spotface on output shaft. Then align valve shaft holes in governor body and output shaft.

(d) Align splines in output shaft and park gear hub.

(e) Carefully push assembly into place in rear support (Fig. 41).

(f) Verify that governor valve shaft holes in output shaft and governor body are still in alignment. Reposition governor body and park gear if alignment is not correct.

(g) Tighten bolts attaching governor body to park gear to 11 N·m (95 in. lbs.) torque.

(5) Install first E-clip on governor valve shaft. Then install governor valve and shaft in governor body (Fig. 42). **Be sure valve shaft moves freely in valve and in output shaft. If valve shaft binds, governor/park gear is misaligned.**

(6) Rotate output shaft until opposite end of governor valve shaft is facing upward. Then install remaining E-clip on governor valve shaft (Fig. 43). **Be very sure both E-clips are firmly seated on shaft.**

(7) Install governor body-park gear retaining snap-rings and washer on output shaft as follows:

(a) On models with single snap-ring, install snap-ring. Be sure ring is seated in shaft.

(b) On models with thrust washer and two snap-rings, install thin snap-ring first. Then install thrust washer second, and thick snap-ring last (Fig. 44).

(c) Verify correct position of snap-rings. **Be sure flat side of each snap-ring is toward governor body.**

(8) Tighten bolts that attach governor body to park gear to 11 N·m (95 in. lbs.).

AUTOMATIC - 32RH (Continued)

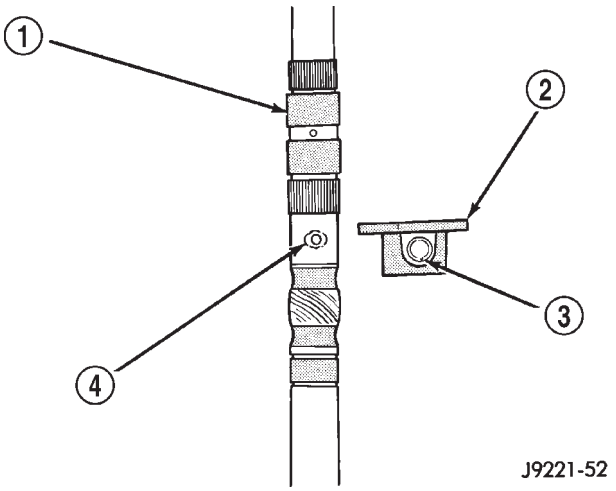


Fig. 40 Governor Valve And Output Shaft Spotface Alignment

1 - OUTPUT SHAFT
2 - GOVERNOR BODY
3 - GOVERNOR VALVE BORE
4 - SPOTFACE

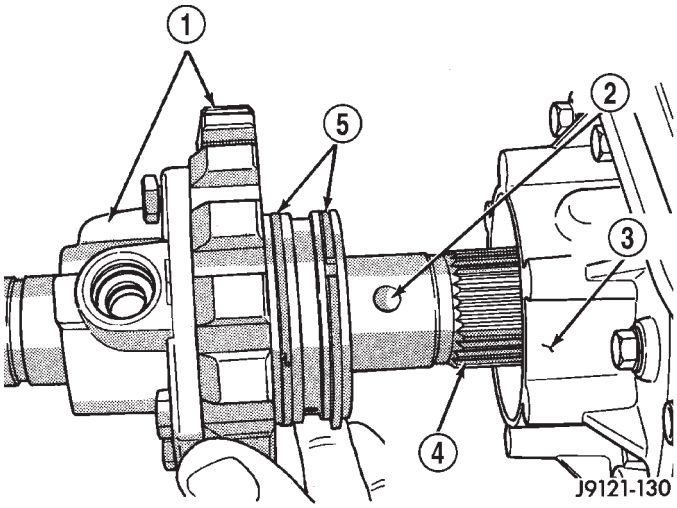


Fig. 41 Governor Body And Park Gear

1 - GOVERNOR/PARK ASSEMBLY
2 - GOVERNOR VALVE SHAFT BORE
3 - REAR SUPPORT
4 - OUTPUT SHAFT SPLINES
5 - SEAL RINGS

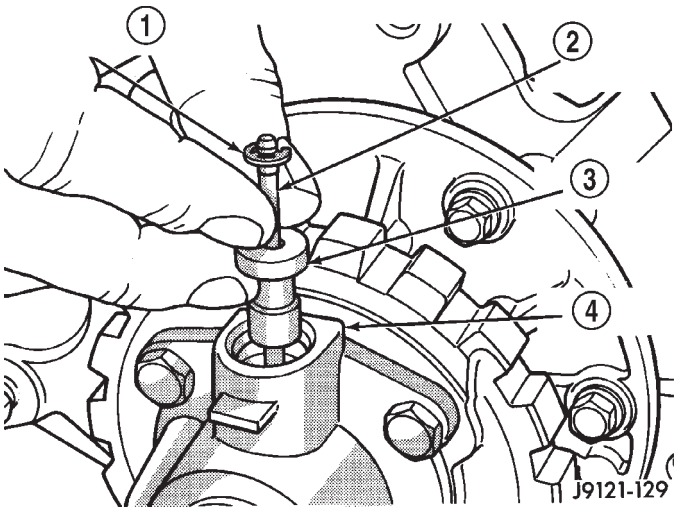


Fig. 42 Governor Valve And Shaft

1 - E-CLIP (2 REQ'D)
2 - GOVERNOR VALVE SHAFT
3 - GOVERNOR VALVE
4 - GOVERNOR BODY

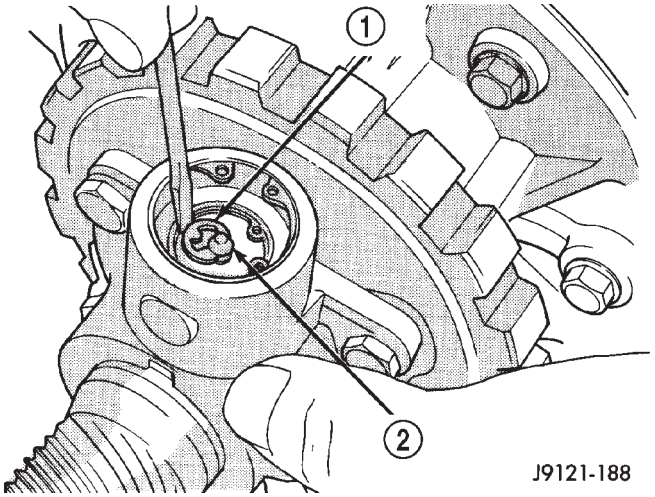


Fig. 43 Securing Governor Valve Shaft With New E-Clip

1 - SECOND E-CLIP
2 - GOVERNOR VALVE SHAFT

AUTOMATIC - 32RH (Continued)

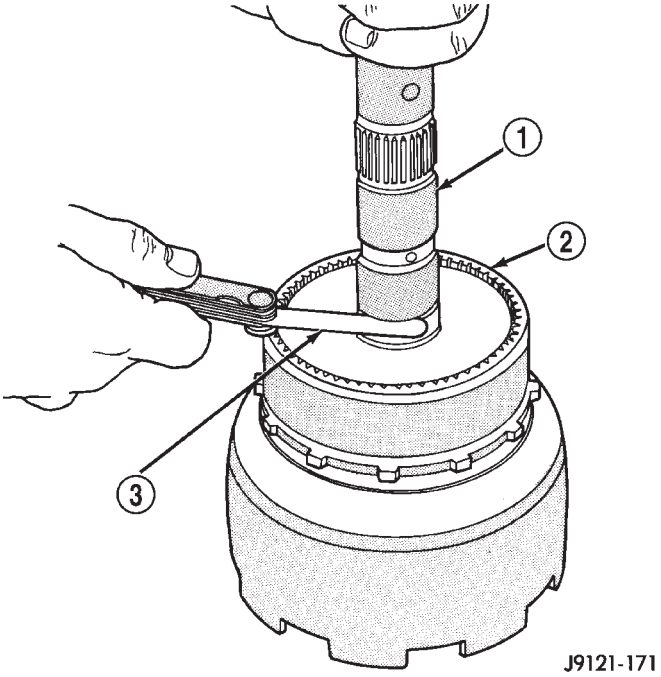


Fig. 44 Governor Body/Park Gear Retaining Snap-Rings And Thrust Washer Position

1 - OUTPUT SHAFT
2 - REAR ANNULUS GEAR
3 - FEELER GAUGE

FRONT/REAR CLUTCH

(1) Install output shaft thrust plate on shaft hub (Fig. 45). Use petroleum jelly to hold thrust plate in place.

(2) Check input shaft seal rings. Verify that diagonal-cut ends of teflon seal ring are properly joined and ends of plastic ring are correctly positioned. Also be sure rings are installed in sequence shown.

(3) Check rear clutch thrust washer. Use additional petroleum jelly to hold washer in place if necessary.

(4) Align clutch discs in front clutch and install front clutch on rear clutch (Fig. 46). Rotate front clutch retainer back and forth until completely seated on rear clutch.

(5) Coat output shaft thrust washer with petroleum jelly. Then install washer in rear clutch hub (Fig. 47). Use enough petroleum jelly to hold washer in place. **Be sure grooved side of washer faces rearward (toward output shaft) as shown. Also note that washer only fits one way in clutch hub.**

(6) Align drive teeth on rear clutch discs with small screwdriver (Fig. 48). This will make installation on front planetary easier.

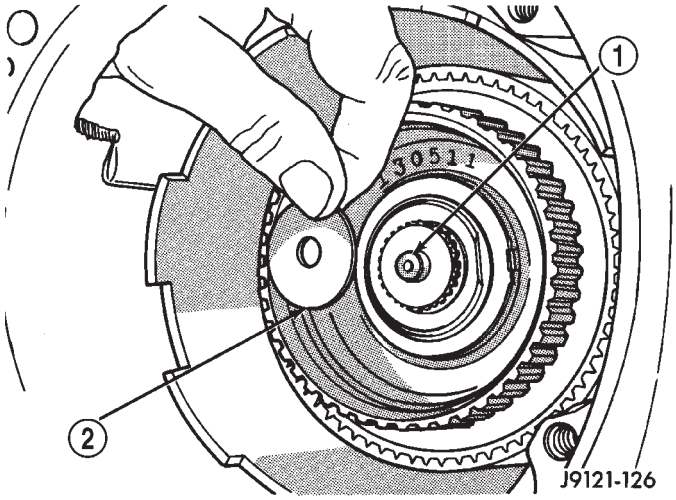


Fig. 45 Output Shaft Thrust Plate

1 - OUTPUT SHAFT HUB
2 - OUTPUT SHAFT THRUST PLATE

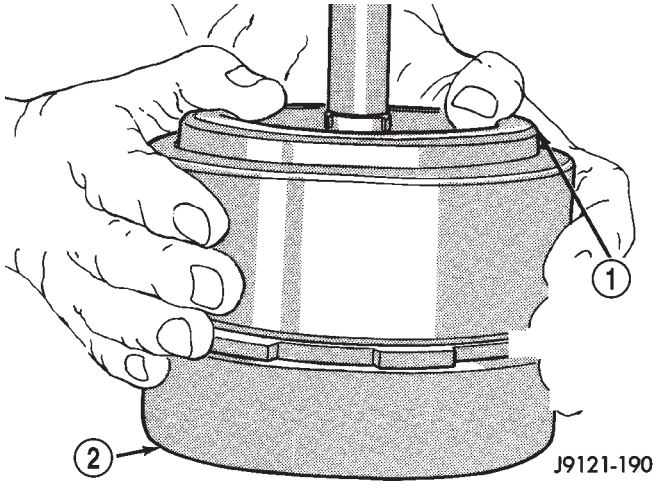


Fig. 46 Assembling Front And Rear Clutch Units

1 - TURN FRONT CLUTCH BACK & FORTH UNTIL SEATED
2 - REAR CLUTCH ASSEMBLY

AUTOMATIC - 32RH (Continued)

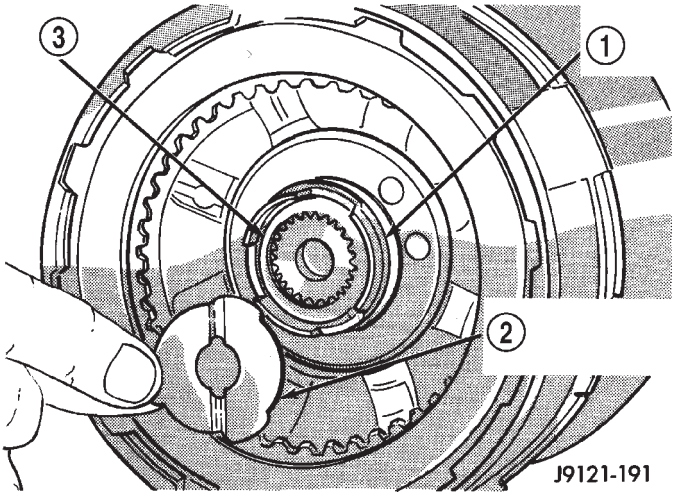


Fig. 47 Output Shaft Thrust Washer

1 - REAR CLUTCH HUB
2 - OUTPUT SHAFT THRUST WASHER
3 - OUTPUT SHAFT

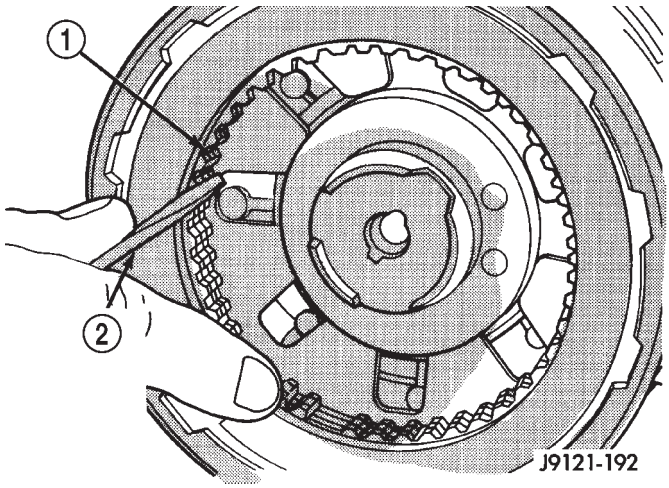


Fig. 48 Aligning Rear Clutch Disc Lugs

1 - REAR CLUTCH DISCS
2 - USE SMALL SCREWDRIVER TO ALIGN CLUTCH DISC TEETH

(7) Raise front end of transmission upward as far as possible and support case with wood blocks. Front/rear clutch and oil pump assemblies are easier to install if transmission is as close to upright position as possible.

(8) Install front and rear clutch units as assembly (Fig. 49). Align rear clutch with front annulus gear and install assembly in driving shell. **Be sure output shaft thrust washer and thrust plate are not displaced during installation.**

(9) Carefully work assembled clutches back and forth to engage and seat rear clutch discs on front annulus gear. Verify that front clutch drive lugs are fully engaged in slots of driving shell after installation.

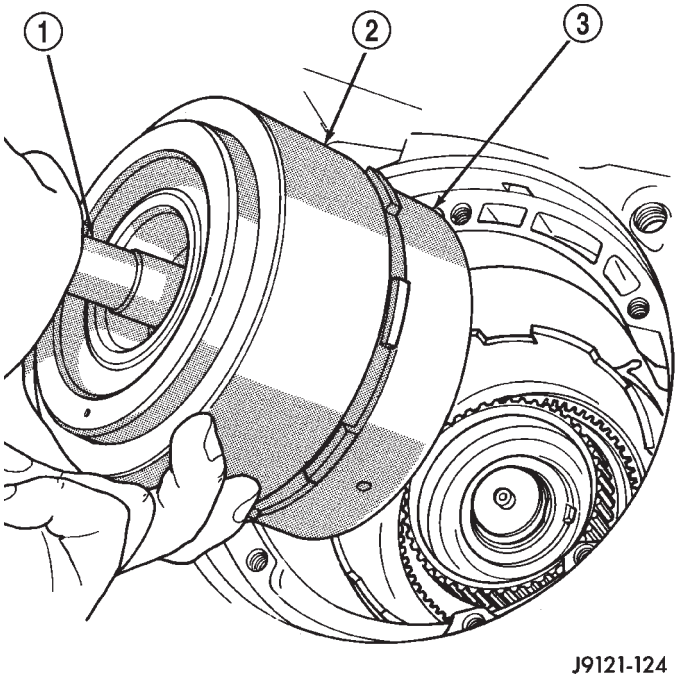


Fig. 49 Installing Front/Rear Clutch

1 - INPUT SHAFT
2 - FRONT CLUTCH
3 - REAR CLUTCH

FRONT BAND AND OIL PUMP

(1) Slide front band over front clutch retainer (Fig. 50).

(2) Insert front band reaction pin part way into case (Fig. 50).

(3) Install front band lever, strut, lever pin and adjusting screw (Fig. 51).

(4) Tighten front band adjusting screw until band just grips clutch retainer. Verify that front/rear clutches are still seated before continuing.

(5) Coat band lever pin access plug with sealer and install plug in converter housing (Fig. 52).

(6) Verify that reaction shaft support hub seal rings are hooked together (Fig. 53).

(7) Coat front clutch thrust washer with petroleum jelly to hold it in place. Then install washer over reaction shaft hub and seat it on pump (Fig. 54).

CAUTION: The thrust washer bore (I.D.), is chamfered on one side. Make sure the chamfered side is installed so it faces the pump.

AUTOMATIC - 32RH (Continued)

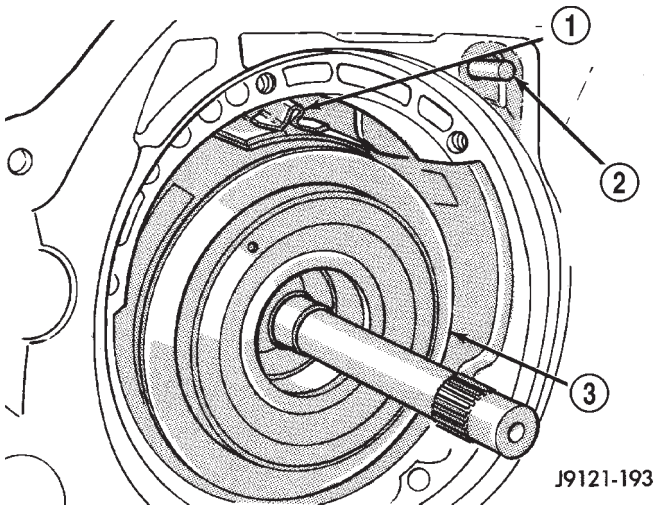


Fig. 50 Installing Front Band And Reaction Pin

1 - FRONT BAND
2 - FRONT BAND REACTION PIN
3 - FRONT CLUTCH RETAINER

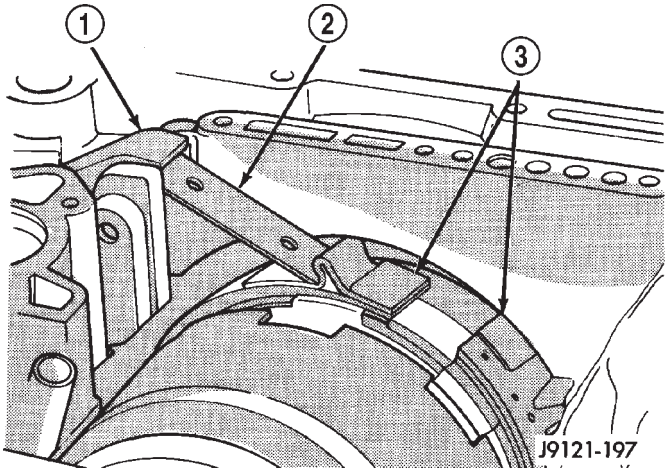


Fig. 51 Front Band Linkage Installation

1 - BAND LEVER
2 - BAND STRUT
3 - FRONT BAND

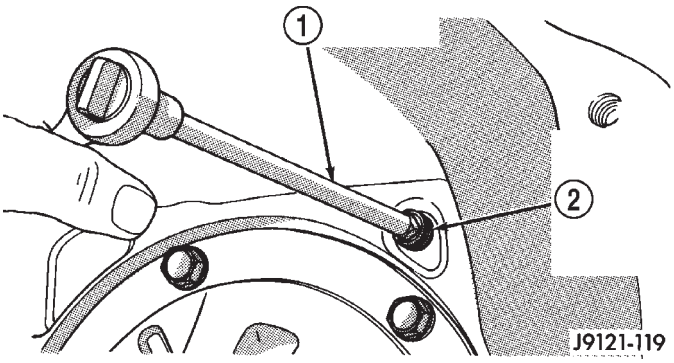


Fig. 52 Installing Front Band Pivot Pin Access Plug

1 - 1/4" DRIVE EXTENSION
2 - FRONT BAND REACTION PIN ACCESS PLUG

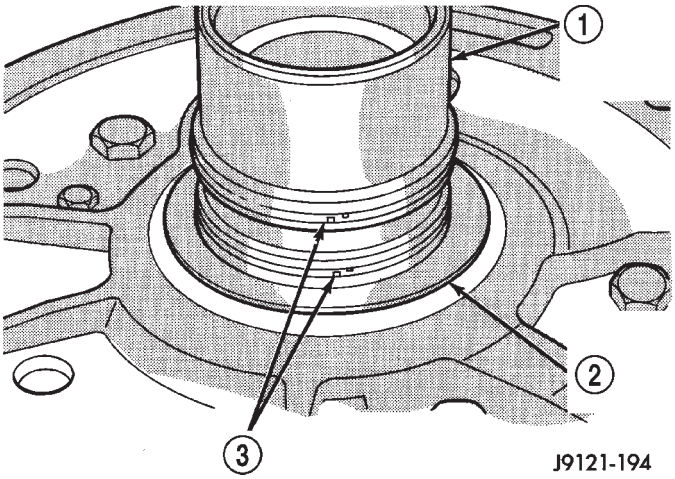


Fig. 53 Reaction Shaft Support Seal Rings

1 - REACTION SHAFT SUPPORT HUB
2 - THRUST WASHER
3 - SEAL RINGS

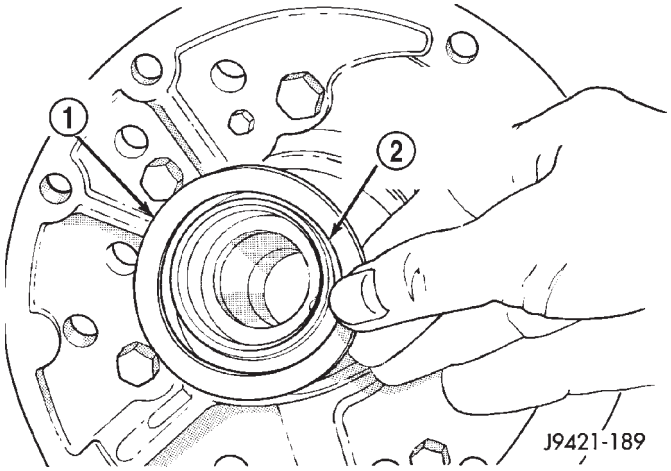


Fig. 54 Reaction Shaft Thrust Washer Installation

1 - THRUST WASHER
2 - CHAMFERED SIDE OF WASHER BORE GOES TOWARD PUMP

AUTOMATIC - 32RH (Continued)

(8) Thread two Pilot Stud Tools C-3288-B into bolt holes in oil pump flange (Fig. 55).

(9) Align and install oil pump gasket (Fig. 55).

(10) Lubricate oil pump seals with Mopar® Door-Ease, or Ru-Glyde, Door Eze, or ATF Plus 4.

(11) Install oil pump (Fig. 56). Align and position pump on pilot studs. Slide pump down studs and work it into front clutch hub and case by hand. Then install two or three pump bolts to hold pump in place.

(12) Remove pilot stud tools and install remaining oil pump bolts. Tighten bolts alternately in diagonal pattern to 20 N·m (15 ft. lbs.).

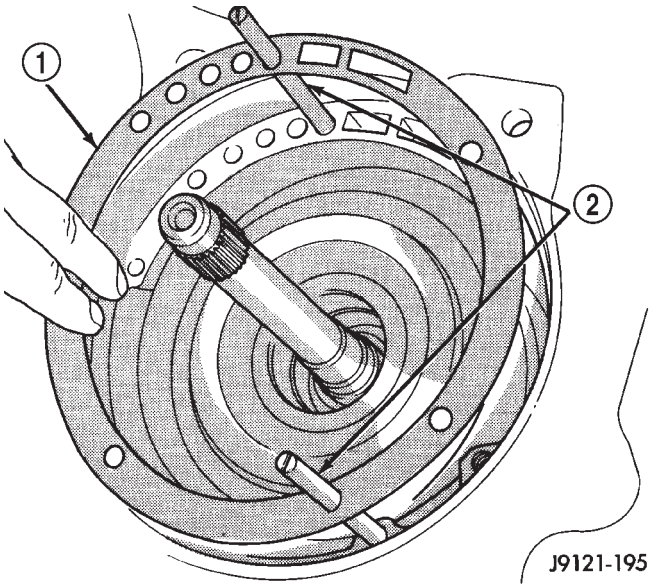


Fig. 55 Installing Pilot Studs And Gasket

1 - OIL PUMP GASKET
2 - PILOT STUD TOOLS C-3288-B

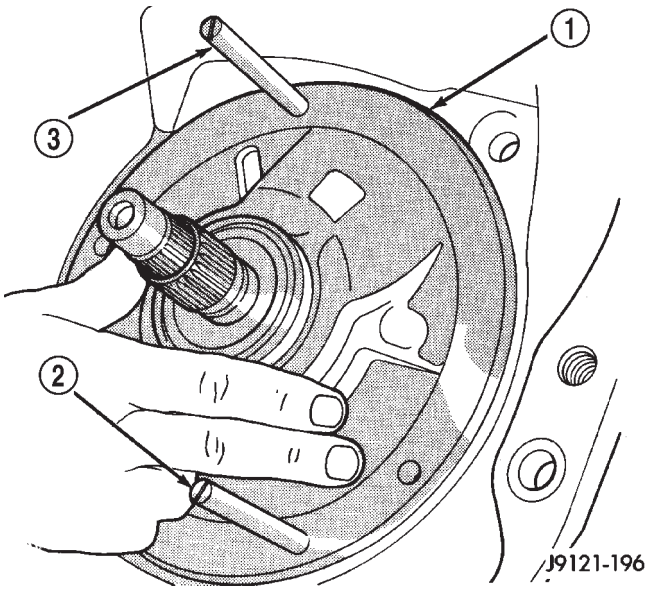


Fig. 56 Installing Oil Pump And Reaction Shaft Support

1 - OIL PUMP
2 - PILOT STUD TOOL
3 - PILOT STUD TOOL

CHECKING INPUT SHAFT END PLAY

(1) Measure input shaft end play (Fig. 57).

NOTE: If end play is incorrect, transmission is incorrectly assembled, or output shaft thrust washer and/or thrust plate are worn and need to be changed.

(a) Attach Adapter 8266-7 to Handle 8266-8.

(b) Attach dial indicator C-3339 to Handle 8266-8.

(c) Install the assembled tool onto the input shaft of the transmission and tighten the retaining screw on Adapter 8266-7 to secure it to the input shaft.

(d) Position the dial indicator plunger against a flat spot on the oil pump and zero the dial indicator.

(e) Move input shaft in and out and record reading. End play should be 0.56 - 2.31 mm (0.022 - 0.091 in.).

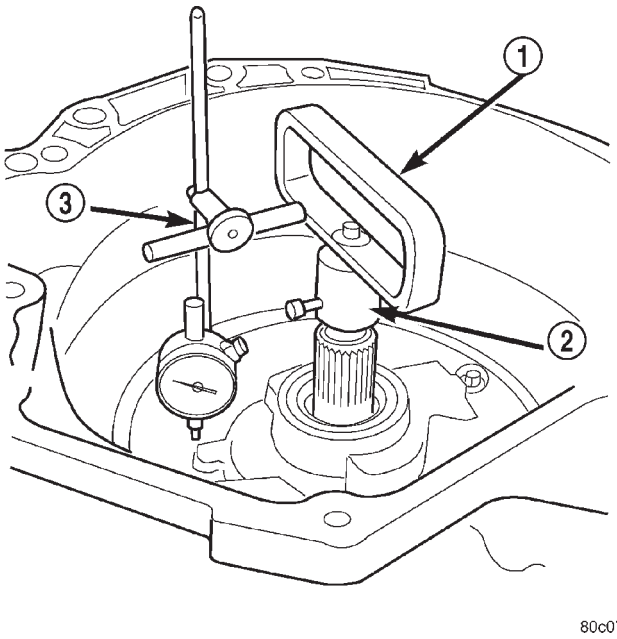


Fig. 57 Checking Input Shaft End Play

1 - TOOL 8266-8
2 - TOOL 8266-7
3 - TOOL C-3339

VALVE BODY

(1) Install new manual lever shaft seal in case. Use suitable deep well socket to install seal.

(2) Make sure neutral switch has **not** been installed in case. Remove switch if necessary as it will interfere with valve body installation.

(3) Install new seal rings on accumulator piston (Fig. 58). Lubricate accumulator piston, seals and accumulator bore with transmission fluid.

(4) Install accumulator piston and spring (Fig. 58)in case.

(5) Place valve body manual lever in low to move park lock rod rearward.

(6) Position valve body on case. Work park rod past sprag and install valve body-to-case bolts finger tight.

(7) Install park/neutral position switch in case. Tighten switch to 34 N·m (25 ft. lbs.) torque.

(8) Align valve body on case (Fig. 59).

(9) Install and tighten valve body-to-case bolts alternately and evenly to 12 N·m (105 in. lbs.) torque. Start at center and work outward when tightening bolts. **Do not overtighten valve body bolts. This could result in distortion and cross leakage after installation.**.

(10) Connect converter clutch solenoid wire to case connector (Fig. 59).

(11) Install new filter on valve body (Fig. 60). Tighten filter screws to 4 N·m (35 in. lbs.).

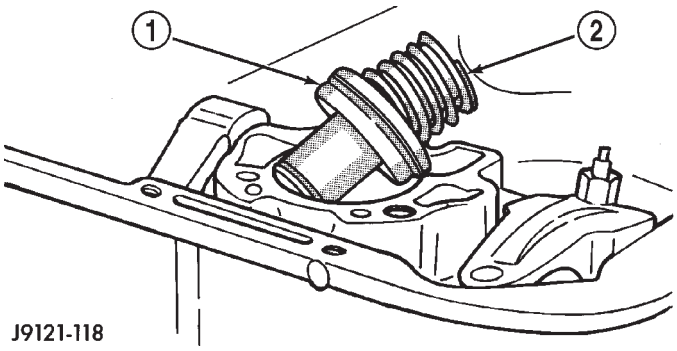


Fig. 58 Installing Accumulator Piston And Spring

1 - ACCUMULATOR PISTON
2 - PISTON SPRING

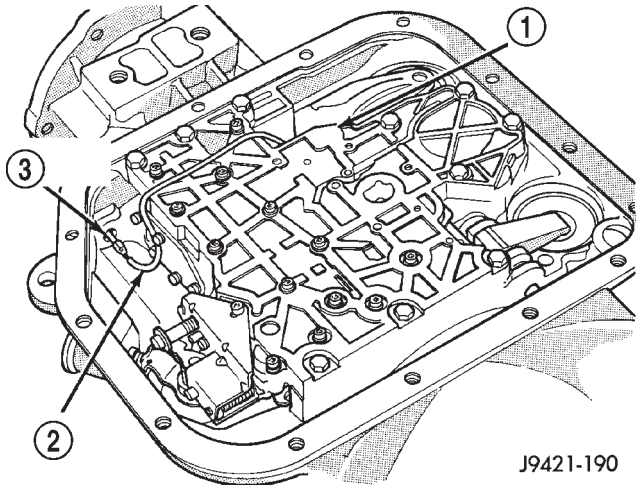


Fig. 59 Valve Body Installation

1 - VALVE BODY
2 - SOLENOID WIRE
3 - CONNECTOR PIN

AUTOMATIC - 32RH (Continued)

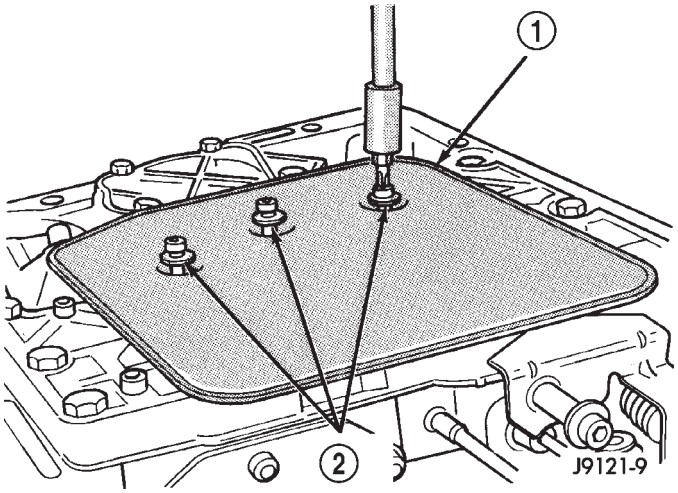


Fig. 60 Fluid Filter Installation

1 - FLUID FILTER
2 - FILTER SCREWS

EXTENSION HOUSING, CONTROL LEVER AND CONVERTER

(1) Install throttle valve and transmission shift levers on manual valve shaft. Tighten lever clamp screws securely.

(2) Position new extension housing gasket on transmission case. Use petroleum jelly to hold gasket in place.

(3) Install new rear seal in extension housing if required.

(4) Install extension housing on transmission case. Tighten housing fasteners to 33 N·m (24 ft. lbs.). Be sure park lock rod is properly engaged in sprag beforehand.

(5) Lubricate converter hub with transmission fluid and carefully install converter. Turn converter back and forth until seated.

(6) Secure converter in oil pump before mounting transmission on jack and before moving transmission back under vehicle. Use metal strapping, C-clamp, or locking pliers to hold converter in place. Attach holding tool to converter housing.

SPECIFICATIONS

32RH AUTOMATIC TRANSMISSION

SPECIFICATIONS

COMPONENT	METRIC	INCH
Oil pump gear tip clearance	0.089-0.190 mm	0.0035-0.0075 in.
Planetary end play	0.127-1.22 mm	0.005-0.048 in.
Input shaft end play	0.56-2.31 mm	0.022-0.091 in.
Clutch pack clearance/Front 4-disc.	1.70-3.40 mm	0.067-0.134 in.
Clutch pack clearance/Rear 4-disc.	0.81-1.40 mm	0.032-0.055 in.
Front clutch spring usage	1 spring	
Front Band adjustment from 72 in. lbs.	Back off 2.25 turns	
Rear Band adjustment from 41 in. lbs.	Back off 4 turns	
Recommended fluid	Mopar®, ATF +4, Type 9602	

AUTOMATIC - 32RH (Continued)

THRUST WASHER/SPACER/SNAP-RING DIMENSIONS

COMPONENT	METRIC	INCH
Front clutch thrust washer (reaction shaft support hub)	1.55 mm	0.061 in.
Rear clutch thrust washer (clutch retainer)	1.55 mm	0.061 in.
Output shaft thrust plate (output shaft pilot hub)	1.5-1.6mm	0.060-0.063 in.
Output shaft thrust washer (rear clutch hub)	1.3-1.4 mm 1.7-1.8 mm 2.1-2.2 mm	0.052-0.054 in. 0.068-0.070 in. 0.083-0.086 in.
Rear clutch pack snap-ring	1.5 mm 1.7 mm 1.9 mm 2.5 mm	0.060 in. 0.068 in. 0.076 in. 0.098 in.
Planetary geartrain snap-ring (at front of output shaft)	1.0-1.1 mm 1.6-1.7 mm 2.1-2.2 mm	0.040-0.044 in. 0.062-0.066 in. 0.082-0.086 in.

PRESSURE TEST

ITEM	RANGE	PRESSURE
Line pressure (at accumulator)	Closed throttle	372-414 kPa (54-60 psi).
Front servo	Third gear only	No more than 21 kPa (3 psi) lower than line pressure.
Rear servo	1 range R range	No more than 21 kPa (3 psi) lower than line pressure. 1103 kPa (160 psi) at idle, builds to 1862 kPa (270 psi) at 1600 rpm.
Governor	D range closed throttle	Pressure should respond smoothly to changes in mph and return to 0-7 kPa (0-1.5 psi) when stopped with transmission in D, 1, 2. Pressure above 7 kPa (1.5 psi) at stand still will prevent transmission from downshifting.

AUTOMATIC - 32RH (Continued)

TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Bolt/nut, crossmember	31	23	-
Bolt, driveplate to crankshaft	68	50	-
Plug, front band reaction	75	55	-
Locknut, front band adj.	34	25	-
Switch, park/neutral	34	25	-
Bolt, fluid pan	17	13	-
Bolt, oil pump	20	15	-
Bolt, overrunning clutch cam	17	13	-
Plug, pressure test port	14	10	-
Bolt, reaction shaft support	20	15	-
Locknut, rear band	41	30	-
Bolt. speedometer adapter	11	8	-
Screw, fluid filter	4	-	35
Bolt, valve body to case	12	-	100

ACCUMULATOR

INSPECTION

Inspect the accumulator piston and seal rings (Fig. 61). Replace the seal rings if worn or cut. Replace the piston if chipped or cracked.

Check condition of the accumulator inner and outer springs (Fig. 61). Replace the springs if the coils are cracked, distorted or collapsed.

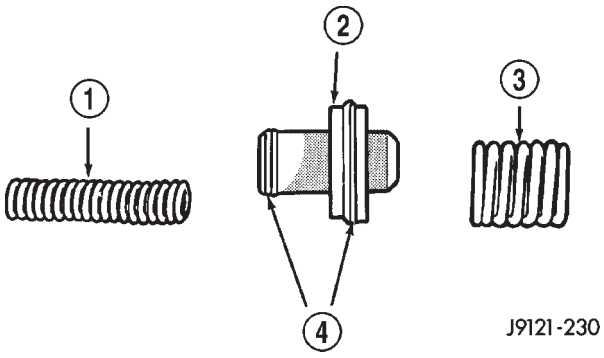


Fig. 61 Accumulator Components

1 - INNER SPRING
2 - ACCUMULATOR PISTON
3 - OUTER SPRING
4 - SEAL RINGS

BANDS

ADJUSTMENT - FRONT BAND

The front (kickdown) band adjusting screw is located on the left side of the transmission case above the manual valve and throttle valve levers.

(1) Raise vehicle.

(2) Loosen band adjusting screw locknut (Fig. 62). Then back locknut off 3-5 turns. Be sure adjusting screw turns freely in case. Apply lubricant to screw threads if necessary.

(3) Tighten band adjusting screw to 8 N·m (72 in. lbs.) torque with Inch Pound Torque Wrench C-3380-A, a 3-in. extension and the appropriate Torx™ socket.

CAUTION: If Adapter C-3705 is needed to reach the adjusting screw, tighten the screw to only 5 N·m (47-50 in. lbs.) torque.

(4) Back off front band adjusting screw 2-1/4 turns.

(5) Hold adjuster screw in position and tighten locknut to 41 N·m (30 ft. lbs.) torque.

(6) Lower vehicle.

BANDS (Continued)

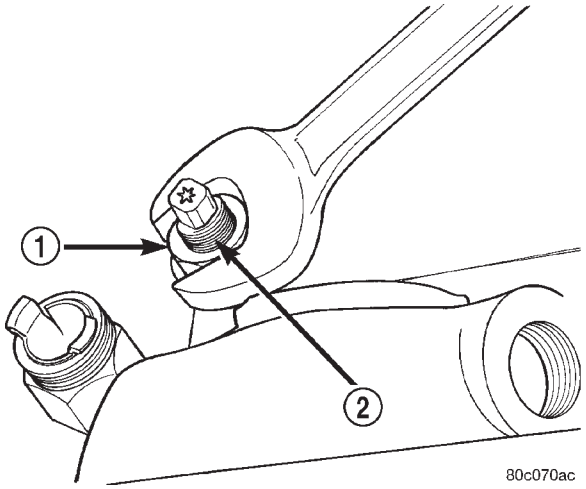


Fig. 62 Front Band Adjusting Screw Lock Nut

1 - LOCK-NUT
2 - FRONT BAND ADJUSTER

ADJUSTMENTS - REAR BAND

The transmission oil pan must be removed for access to the rear band adjusting screw.

(1) Raise vehicle.

(2) Remove transmission oil pan and drain fluid.

(3) Loosen band adjusting screw locknut 5-6 turns. Be sure adjusting screw turns freely in lever.

(4) Tighten adjusting screw to 5 N·m (41 in. lbs.) (Fig. 63).

(5) Back off adjusting screw 4 turns.

(6) Hold adjusting screw in place and tighten locknut to 34 N·m (25 ft. lbs.) torque.

(7) Position new gasket on oil pan and install pan on transmission. Tighten pan bolts to 17 N·m (13 ft. lbs.) torque.

(8) Lower vehicle and refill transmission with Mopar® ATF +4, Type 9602, fluid.

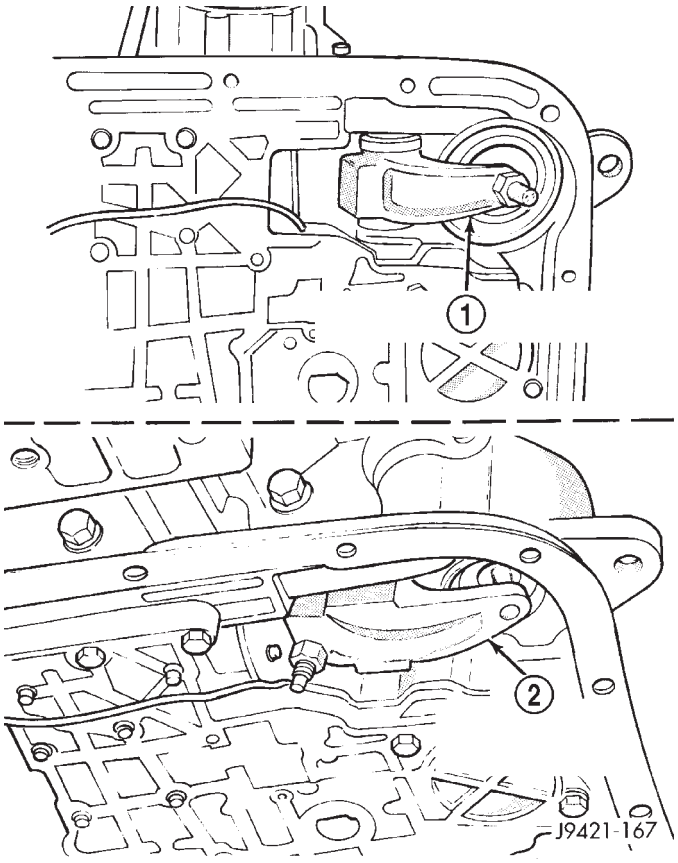


Fig. 63 Rear Band Adjustment Screw Location

1 - 30RH REAR BAND LEVER AND ADJUSTING SCREW
2 - 32RH REAR BAND LEVER AND ADJUSTING SCREW

FLUID AND FILTER

DIAGNOSIS AND TESTING - FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

- adding incorrect fluid
- failure to clean dipstick and fill tube when checking level
- engine coolant entering the fluid
- internal failure that generates debris
- overheat that generates sludge (fluid breakdown)
- failure to reverse flush cooler and lines after repair
- failure to replace contaminated converter after repair

The use of non-recommended fluids can result in transmission failure. The usual results are erratic shifts, slippage, abnormal wear and eventual failure due to fluid breakdown and sludge formation. Avoid this condition by using recommended fluids only.

The dipstick cap and fill tube should be wiped clean before checking fluid level. Dirt, grease and other foreign material on the cap and tube could fall into the tube if not removed beforehand. Take the time to wipe the cap and tube clean before withdrawing the dipstick.

Engine coolant in the transmission fluid is generally caused by a cooler malfunction. The only remedy is to replace the radiator as the cooler in the radiator is not a serviceable part. If coolant has circulated through the transmission, an overhaul is necessary.

The transmission cooler and lines should be reverse flushed whenever a malfunction generates sludge and/or debris. The torque converter should also be replaced at the same time.

Failure to flush the cooler and lines will result in recontamination. Flushing applies to auxiliary cool-

FLUID AND FILTER (Continued)

ers as well. The torque converter should also be replaced whenever a failure generates sludge and debris. This is necessary because normal converter flushing procedures will not remove all contaminants.

STANDARD PROCEDURE - FLUID LEVEL CHECK

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transmssion has too much fluid, the geartrain churns up foam and cause the same conditions which occur with a low fluid level.

In either case, air bubbles can cause overheating and/or fluid oxidation, and varnishing. This can interfere with normal valve, clutch, and accumulator operation. Foaming can also result in fluid escaping from the transmission vent where it may be mistaken for a leak.

Along with fluid level, it is important to check the condition of the fluid. When the fluid smells burned, and is contaminated with metal or friction material particles, a complete transmission recondition is needed. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample for a double check.

After the fluid has been checked, seat the dipstick fully to seal out water and dirt.

The transmission has a dipstick to check oil level. It is located on the right side of the engine. Be sure to wipe all dirt from dipstick handle before removing.

Fluid level is checked with the engine running at curb idle speed, the transmission in NEUTRAL and the transmission fluid at normal operating temperature. **The engine should be running at idle speed for at least one minute, with the vehicle on level ground.**

(1) Transmission fluid must be at normal operating temperature for accurate fluid level check. Drive vehicle if necessary to bring fluid temperature up to normal hot operating temperature of 82°C (180°F).

(2) Position vehicle on level surface.

(3) Start and run engine at curb idle speed.

(4) Apply parking brakes.

(5) Shift transmission momentarily into all gear ranges. Then shift transmission back to NEUTRAL.

(6) Clean top of filler tube and dipstick to keep dirt from entering tube.

(7) Remove dipstick (Fig. 64) and check fluid level as follows:

(a) Correct acceptable level is in crosshatch area.

(b) Correct maximum level is to MAX arrow mark.

(c) Incorrect level is at or below MIN line.

(d) If fluid is low, add only enough Mopar® ATF +4, type 9602, to restore correct level. Do not overfill.

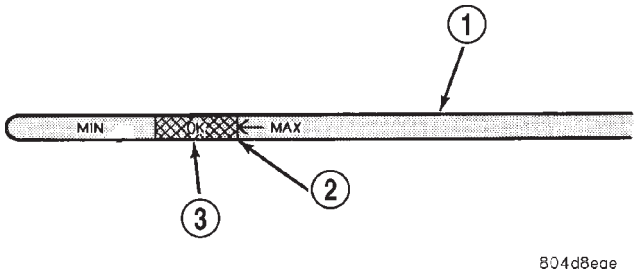


Fig. 64 Dipstick Fluid Level Marks - Typical

1 - DIPSTICK
2 - MAXIMUM CORRECT FLUID LEVEL
3 - ACCEPTABLE FLUID LEVEL

STANDARD PROCEDURE - TRANSMISSION FILL

To avoid overfilling transmission after a fluid change or overhaul, perform the following procedure:

(1) Remove dipstick and insert clean funnel in transmission fill tube.

(2) Add following initial quantity of Mopar® ATF +4, type 9602, to transmission:

(a) If only fluid and filter were changed, add **3 pints (1-1/2 quarts)** of ATF +4 to transmission.

(b) If transmission was completely overhauled, torque converter was replaced or drained, and cooler was flushed, add **12 pints (6 quarts)** of ATF +4 to transmission.

(3) Apply parking brakes.

(4) Start and run engine at normal curb idle speed.

(5) Apply service brakes, shift transmission through all gear ranges then back to NEUTRAL, set parking brake, and leave engine running at curb idle speed.

(6) Remove funnel, insert dipstick and check fluid level. If level is low, **add fluid to bring level to MIN mark on dipstick.** Check to see if the oil level is equal on both sides of the dipstick. If one side is noticably higher than the other, the dipstick has picked up some oil from the dipstick tube. Allow the oil to drain down the dipstick tube and re-check.

(7) Drive vehicle until transmission fluid is at normal operating temperature.

(8) With the engine running at curb idle speed, the gear selector in NEUTRAL, and the parking brake applied, check the transmission fluid level.

FLUID AND FILTER (Continued)

CAUTION: Do not overfill transmission, fluid foaming and shifting problems can result.

(9) Add fluid to bring level up to MAX arrow mark.

When fluid level is correct, shut engine off, release park brake, remove funnel, and install dipstick in fill tube.

STANDARD PROCEDURE - FLUID AND FILTER REPLACEMENT

For proper service intervals (Refer to LUBRICATION & MAINTENANCE/MAINTENANCE SCHEDULES - DESCRIPTION). The service fluid fill after a filter change is approximately 3.8 liters (4.0 quarts).

(1) Hoist and support vehicle on safety stands.

(2) Remove the transmission/skip plate as necessary to access the transmission oil pan.

(3) Place a large diameter shallow drain pan beneath the transmission pan.

(4) Remove bolts holding front and sides of pan to transmission (Fig. 65).

(5) Loosen bolts holding rear of pan to transmission.

(6) Slowly separate front of pan away from transmission allowing the fluid to drain into drain pan.

(7) Hold up pan and remove remaining bolts holding pan to transmission.

(8) While holding pan level, lower pan away from transmission.

(9) Pour remaining fluid in pan into drain pan.

(10) Remove screws holding filter to valve body (Fig. 66).

(11) Separate filter from valve body and pour fluid in filter into drain pan.

(12) Dispose used trans fluid and filter properly.

(13) Inspect bottom of pan and magnet for excessive amounts of metal or fiber contamination. A light coating of clutch or band material on the bottom of the pan does not indicate a problem unless accompanied by slipping condition or shift lag. If fluid and pan are contaminated with excessive amounts or debris, refer to the diagnosis section of this group.

(14) Using a suitable solvent, clean pan and magnet.

(15) Using a suitable gasket scraper, clean gasket material from gasket surface of transmission case and the gasket flange around the pan.

(16) Place replacement filter in position on valve body.

(17) Install screws to hold filter to valve body (Fig. 66). Tighten screws to 4 N·m (35 in. lbs.) torque.

(18) Place new gasket in position on pan. and install pan on transmission.

(19) Place pan in position on transmission.

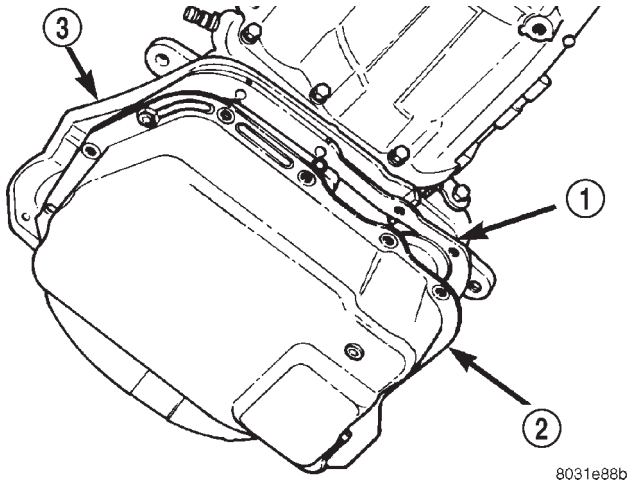


Fig. 65 Transmission Pan - Typical

1 - GASKET
2 - PAN
3 - TRANSMISSION

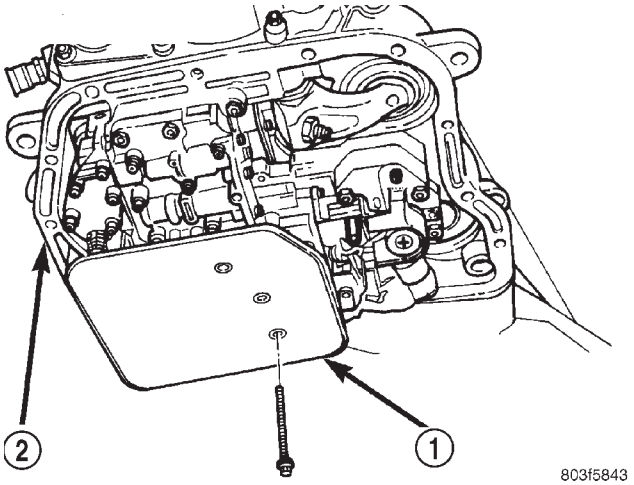


Fig. 66 Transmission Filter - Typical

1 - FILTER
2 - TRANSMISSION

(20) Install screws to hold pan to transmission (Fig. 65). Tighten bolts to 17 N·m (150 in. lbs.) torque.

(21) Install the transmission/skip plate.

(22) Lower vehicle and fill transmission with Mopar® ATF Plus 4, type 9602 fluid.

FRONT CLUTCH

OPERATION

To apply the clutch, pressure is applied between the clutch retainer and piston. The fluid pressure is provided by the oil pump, transferred through the control valves and passageways, and enters the clutch through the hub of the reaction shaft support. With pressure applied between the clutch retainer and piston, the piston moves away from the clutch retainer and compresses the clutch pack. This action applies the clutch pack, allowing torque to flow through the input shaft into the driving discs, and into the clutch plates and pressure plate that are lugged to the clutch retainer. The waved snap-ring is used to cushion the application of the clutch pack.

When pressure is released from the piston, the spring returns the piston to its fully released position and disengages the clutch. The release spring also helps to cushion the application of the clutch assembly. When the clutch is in the process of being released by the release spring, fluid flows through a vent and one-way ball-check-valve located in the clutch retainer. The check-valve is needed to eliminate the possibility of plate drag caused by centrifugal force acting on the residual fluid trapped in the clutch piston retainer.

DISASSEMBLY

(1) Remove waved snap-ring and remove pressure plate, clutch plates and clutch discs (Fig. 67).

(2) Compress clutch piston spring with Compressor Tool C-3575-A (Fig. 68). Be sure legs of tool are seated squarely on spring retainer before compressing spring.

(3) Remove retainer snap-ring and remove compressor tool.

(4) Remove spring retainer and clutch spring. Note position of retainer on spring for assembly reference.

(5) Remove clutch piston from clutch retainer. Remove piston by rotating it up and out of retainer.

(6) Remove seals from clutch retainer piston bore and clutch retainer hub. Discard both seals as they are not reusable.

ASSEMBLY

(1) Soak clutch discs in transmission fluid while assembling other clutch parts.

(2) Install new seals in the clutch retainer lower groove and on the outer diameter of the retainer hub. Be sure lip of each seal faces interior of clutch retainer.

(3) Lubricate lips of the retainer seals with liberal quantity of Mopar® Door Ease. Then lubricate retainer hub, bore, and piston with light coat of transmission fluid.

(4) Install clutch piston in retainer (Fig. 69). Use twisting motion to seat piston in bottom of retainer.

CAUTION: Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip.

FRONT CLUTCH (Continued)

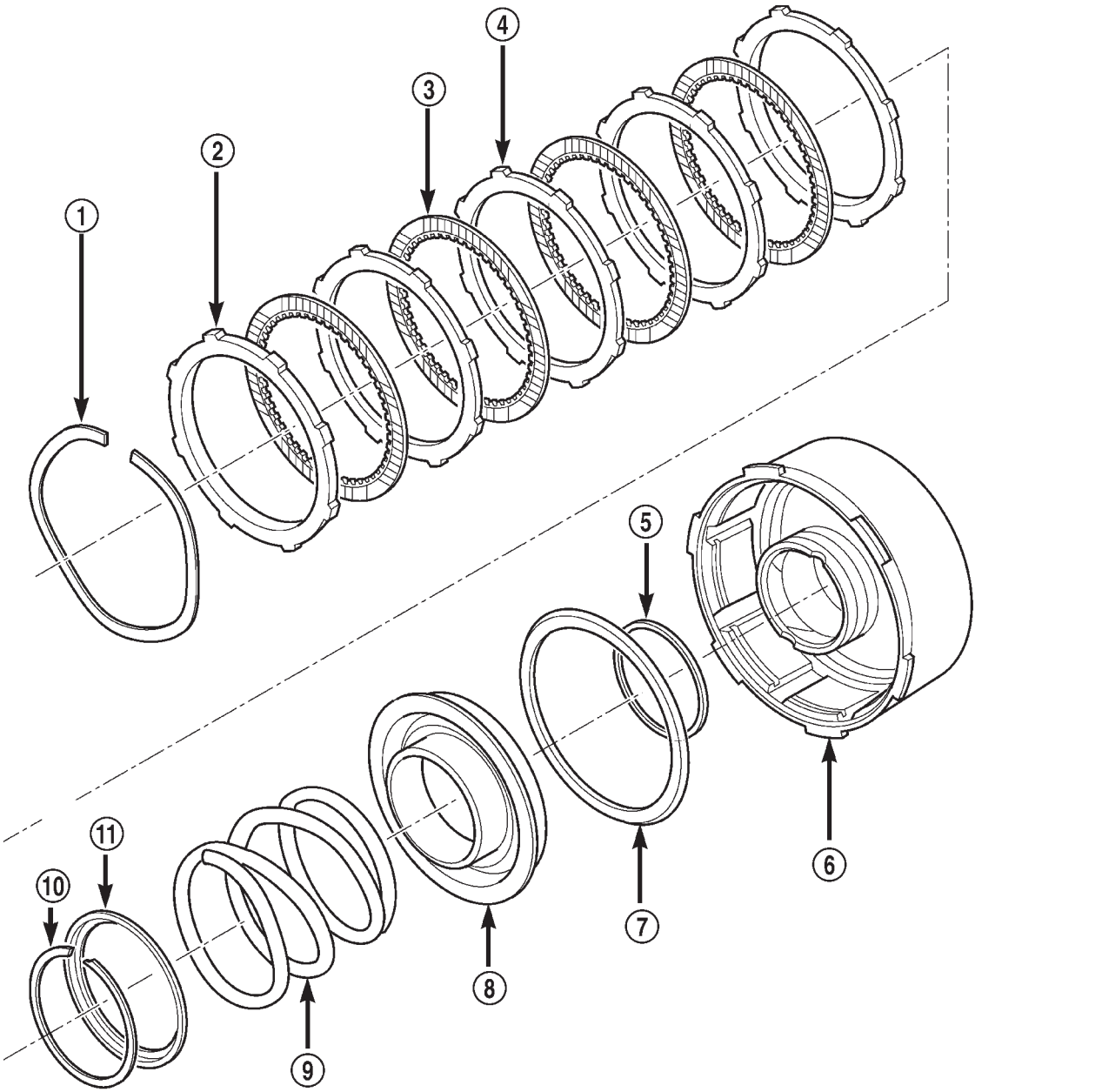


Fig. 67 Front Clutch Components - Typical

1 - SNAP-RING (WAVE)
2 - REACTION PLATE
3 - CLUTCH DISC
4 - CLUTCH PLATE
5 - SEAL
6 - CLUTCH RETAINER
7 - SEAL
8 - PISTON
9 - SPRING
10 - SNAP-RING
11 - SPRING RETAINER

FRONT CLUTCH (Continued)

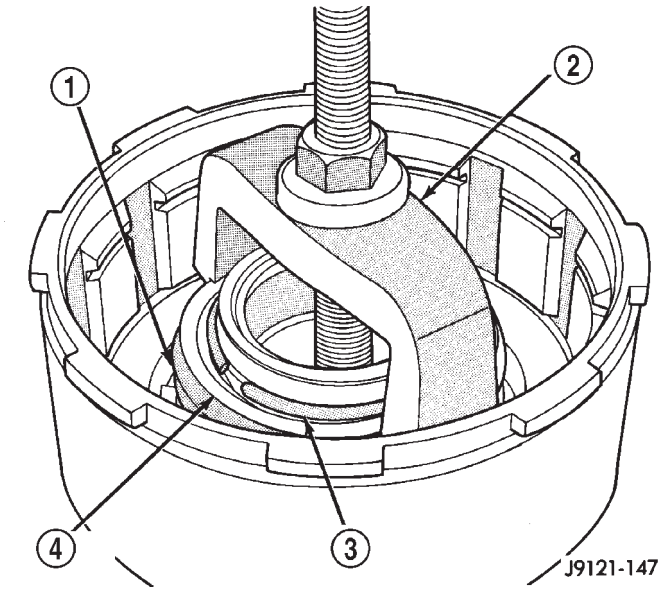


Fig. 68 Compressing Front Clutch Piston Spring

1 - FRONT CLUTCH SPRING
2 - COMPRESSOR TOOL C-3575-A
3 - RETAINER SNAP-RING
4 - SPRING RETAINER

(5) Position spring in clutch piston (Fig. 70).

(6) Position spring retainer on top of piston spring. Make sure retainer is properly installed (Fig. 67).

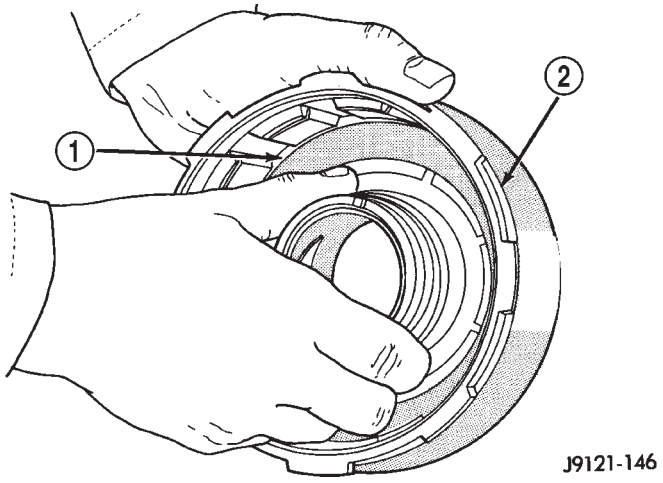


Fig. 69 Front Clutch Piston Installation

1 - CLUTCH PISTON
2 - FRONT CLUTCH RETAINER

(7) Compress piston spring and retainer with Compressor Tool C-3575-A (Fig. 68). Then install new snap ring to secure spring retainer and spring.

(8) Install clutch plates and discs. Install steel plate then disc until all plates and discs are installed.

(9) Install pressure plate and waved snap-ring.

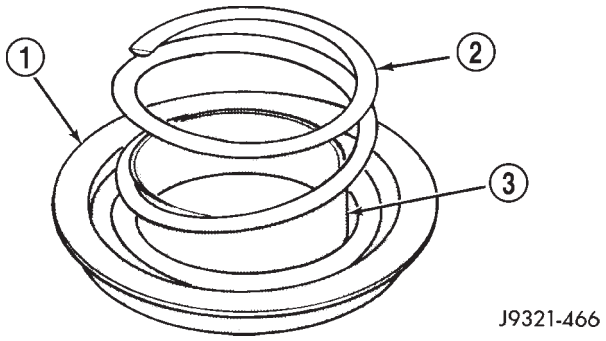


Fig. 70 Clutch Piston Spring Installation

1 - RETAINER
2 - CLUTCH SPRING
3 - PISTON

Clearance should be 1.70 to 3.40 mm (0.067 to 0.134 in.). If clearance is incorrect, clutch discs, plates, pressure plates and snap ring may have to be changed.

GEAR SHIFT CABLE

REMOVAL

(1) Shift transmission into PARK.

(2) Remove shift lever bezel and necessary console parts for access to shift lever assembly. (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - REMOVAL)

(3) Disconnect cable at shift lever and feed cable through dash panel opening to underside of vehicle.

(4) Raise vehicle.

(5) Disengage cable eyelet at transmission shift lever and pull cable adjuster out of mounting bracket. Then remove old cable from vehicle.

INSTALLATION

(1) Route cable through hole in dash panel. Fully seat cable grommet into dash panel.

(2) Place the auto transmission manual shift control lever in “PARK” detent (rearmost) position and rotate prop shaft to ensure transmission is in PARK.

(3) Connect shift cable to shifter mechanism by snapping cable retaining ears into shifter bracket and press cable end fitting onto lever ball stud.

(4) Place the floor shifter lever in PARK position. Ensure that the pawl is seated within the confines of the adjustment gauge clip.

(5) Snap the cable into the transmission bracket so the retaining ears are engaged and connect cable end fitting onto the manual control lever ball stud.

(6) Lock shift cable into position by pushing upward on the adjusting lock button.

(7) Remove and discard the shift cable adjustment gauge clip from the park gate of the shifter.

GEAR SHIFT CABLE (Continued)

(8) Install any floor console components removed previously. (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - INSTALLATION)

ADJUSTMENT - GEARSHIFT CABLE

Check adjustment by starting the engine in PARK and NEUTRAL. Adjustment is OK if the engine starts only in these positions. Adjustment is incorrect if the engine starts in one but not both positions. If the engine starts in any position other than PARK or NEUTRAL, or if the engine will not start at all, the transmission range sensor may be faulty.

Gearshift Adjustment Procedure

(1) Shift transmission into PARK.
(2) Raise vehicle.
(3) Release cable adjuster clamp (at transmission end of cable) to unlock cable.
(4) Unsnap cable from cable mounting bracket on transmission (Fig. 71).
(5) Slide cable eyelet off transmission shift lever.
(6) Verify transmission shift lever is in PARK detent by moving lever fully rearward. Last rearward detent is PARK position.
(7) Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
(8) Slide cable eyelt onto transmission shift lever.
(9) Snap shift cable adjuster into mounting bracket on transmission.
(10) Lock shift cable by pressing cable adjuster clamp down until it snaps into place.
(11) Lower vehicle and check engine starting. Engine should start only in PARK and NEUTRAL.

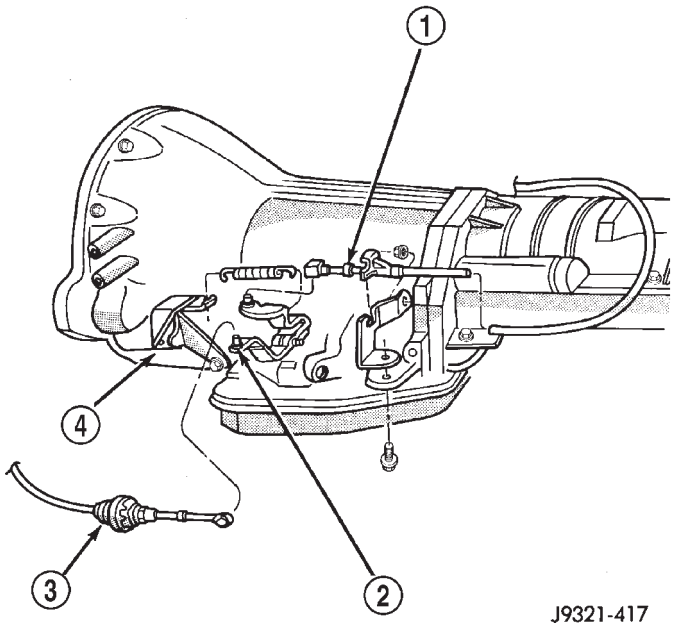


Fig. 71 Shift Cable Attachment At Transmission-Typical

1 - THROTTLE VALVE CABLE
2 - TRANSMISSION SHIFT LEVER
3 - SHIFT CABLE
4 - SHIFT CABLE BRACKET

GOVERNOR AND PARK GEAR

DISASSEMBLY

(1) Remove governor body from transmission.
(2) Clean and inspect governor filter (Fig. 72).
(3) Remove snap-ring and washer that secure governor weight assembly in body (Fig. 73).
(4) Remove governor weight assembly from governor body bore.
(5) Slide intermediate and inner weight from outer weight.
(6) Position intermediate weight on suitable size socket (Fig. 74).
(7) Push inner weight downward with nut driver. Then remove inner weight snap-ring with Snap-Ring Pliers 6823 (Fig. 74).
(8) Remove inner weight and spring from intermediate weight (Fig. 75).

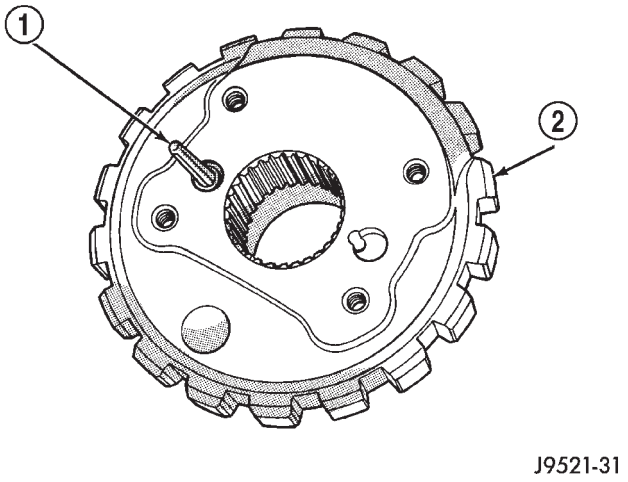


Fig. 72 Governor Filter

1 - GOVERNOR FILTER
2 - PARK GEAR

GOVERNOR AND PARK GEAR (Continued)

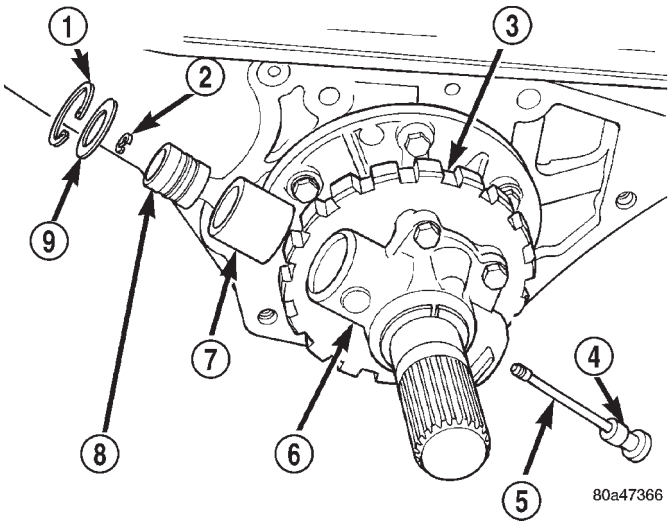


Fig. 73 Snap-Ring, Washer, and Outer Weight

1 - SNAP-RING
2 - E-CLIP
3 - PARK GEAR
4 - GOVERNOR VALVE
5 - SHAFT
6 - GOVERNOR
7 - OUTER WEIGHT
8 - INTERMEDIATE WEIGHT
9 - WASHER

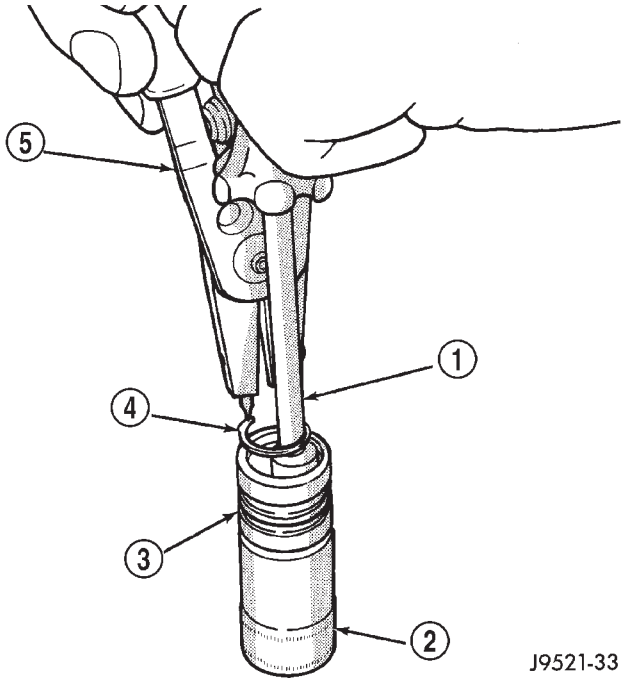


Fig. 74 Inner Weight Snap-Ring

1 - NUT DRIVER
2 - SUITABLE SIZE SOCKET
3 - INTERMEDIATE WEIGHT
4 - INNER WEIGHT SNAP-RING
5 - SPECIAL TOOL 6823

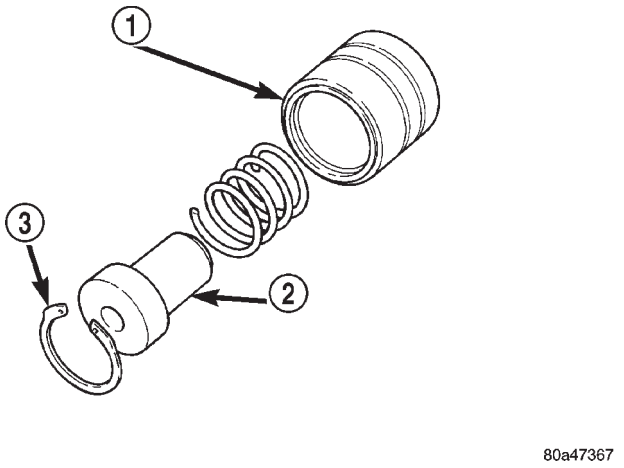


Fig. 75 Intermediate and Inner Governor Weights

1 - INTERMEDIATE WEIGHT
2 - INNER WEIGHT
3 - SNAP-RING

ASSEMBLY

CAUTION: Exercise care when installing the seal rings. They are easily broken if overspread or twisted during installation.

If it was necessary to remove the park gear, inspect the seal rings and bore in rear support. Install new seal rings on park gear hub only if original rings are damaged, or worn. Install ring with interlock ends first and ring with plain ends last. Slip each ring on hub and seat them in grooves. Verify that rear ring ends are securely interlocked before proceeding. If the bore in rear support is damaged, replace the rear support.

(1) Lubricate governor components with Mopar® ATF +4, Type 9602 transmission fluid before assembly.

(2) Clean and inspect governor weights and bores for scoring or wear. Replace the governor body and weights if damaged.

(3) Insert spring into intermediate weight.

(4) Insert inner weight into intermediate weight and install snap-ring (Fig. 75). Verify snap-ring is fully seated in groove in intermediate weight (Fig. 74).

(5) Assemble governor weights into governor body (Fig. 73).

(6) Install washer and snap-ring to hold weights in governor body.

(7) Install governor body in transmission

PARK/NEUTRAL POSITION SWITCH

DESCRIPTION

The park/neutral position switch (Fig. 76) is threaded into the side of the transmission case, just above the transmission oil pan mounting surface. The center terminal of the park/neutral position switch is the starter-circuit terminal. It provides the ground for the starter solenoid circuit through the selector lever in PARK and NEUTRAL positions only. The outer terminals on the switch are for the backup lamp circuit.

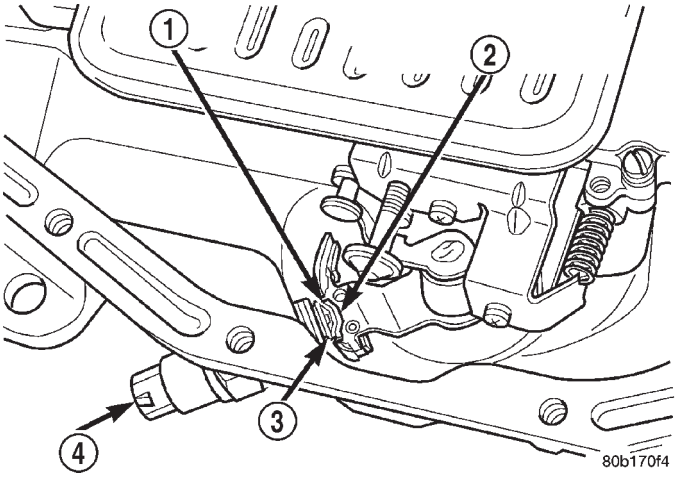


Fig. 76 Park/Neutral Position Switch

1 - NEUTRAL CONTACT
2 - MANUAL LEVER AND SWITCH PLUNGER IN REVERSE POSITION
3 - PARK CONTACT
4 - SWITCH

OPERATION

The park/netral position switch is operated by the manual lever of the valve body. When the valve body is in the PARK or NEUTRAL positions, the center terminal of the park/neutral position switch is grounded to the transmission case through the manual lever.

When the valve body is in the REVERSE position, the manual lever depresses the park/neutral position switch and connects the outer two terminals of the switch to provide continuity for the back-up lamp circuit.

REAR SERVO

DISASSEMBLY

(1) Remove small snap-ring and remove plug and spring from servo piston (Fig. 77).

(2) Remove and discard servo piston seal ring.

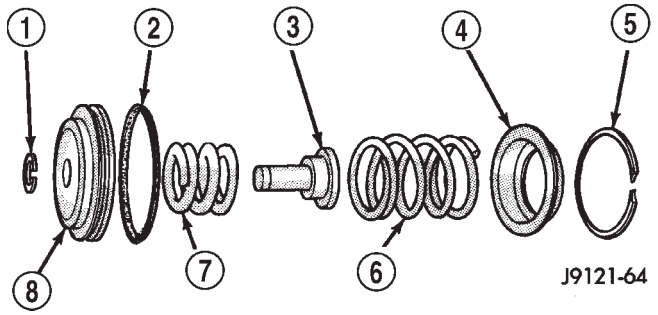


Fig. 77 Rear Servo Components

1 - SNAP-RING
2 - PISTON SEAL
3 - PISTON PLUG
4 - SPRING RETAINER
5 - SNAP-RING
6 - PISTON SPRING
7 - CUSHION SPRING
8 - PISTON

ASSEMBLY

(1) Lubricate piston and guide seals (Fig. 78) with petroleum jelly. Lubricate other servo parts with Mopar® ATF +4, type 9602, transmission fluid.

(2) Install new seal ring on servo piston.

(3) Assemble piston, plug, spring and new snap-ring.

(4) Lubricate piston seal lip with petroleum jelly.

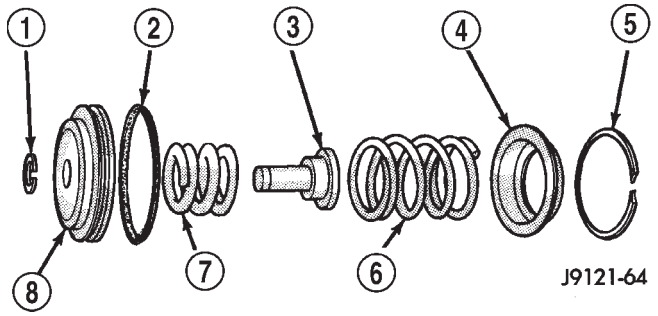


Fig. 78 Rear Servo Components

1 - SNAP-RING
2 - PISTON SEAL
3 - PISTON PLUG
4 - SPRING RETAINER
5 - SNAP-RING
6 - PISTON SPRING
7 - CUSHION SPRING
8 - PISTON

SHIFT MECHANISM

DESCRIPTION

The shift mechanism is cable operated and provides six shift positions. The shift indicator is located on the console next to the gear shift. The shift positions are:

- Park (P)
- Reverse (R)
- Neutral (N)
- Drive (D)
- Manual Second (2)
- Manual Low (1)

OPERATION

Manual low (1) range provides first gear only. Over run braking is also provided in this range. Manual second (2) range provides first and second gear only. Drive range provides first, second, and third gear ranges.

THROTTLE VALVE CABLE

ADJUSTMENT - THROTTLE VALVE CABLE

A correctly adjusted throttle valve cable will cause the throttle lever on the transmission to move simultaneously with the throttle body lever from the idle position. Proper adjustment will allow simultaneous movement without causing the transmission throttle lever to either move ahead of, or lag behind the lever on the throttle body.

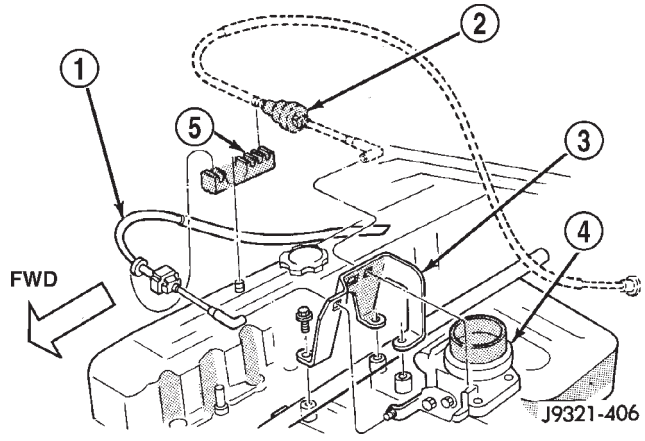


Fig. 79 Throttle Cable Attachment At Engine

1 - TRANSMISSION THROTTLE VALVE CABLE
2 - ACCELERATOR CABLE
3 - CABLE ENGINE BRACKET
4 - THROTTLE BODY
5 - CABLE GUIDE

ADJUSTMENT VERIFICATION

(1) Turn ignition key to OFF position.

(2) Remove air cleaner.

(3) Verify that lever on throttle body is at curb idle position (Fig. 79). Then verify that transmission throttle lever (Fig. 80) is also at idle (fully forward) position.

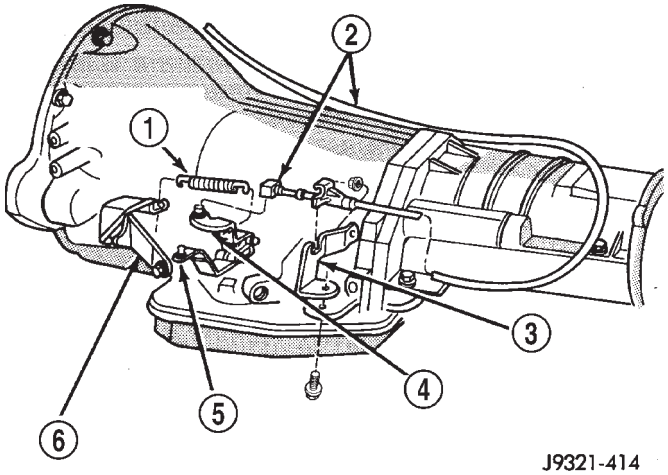


Fig. 80 Throttle Cable Attachment At Transmission

1 - RETURN SPRING
2 - THROTTLE VALVE CABLE
3 - THROTTLE VALVE CABLE BRACKET
4 - THROTTLE VALVE LEVER
5 - GEAR SELECTOR LEVER
6 - SHIFT CABLE BRACKET

(4) Slide cable off attachment stud on throttle body lever.

(5) Compare position of cable end to attachment stud on throttle body lever:

- Cable end and attachment stud should be aligned (or centered on one another) to within 1 mm (0.039 in.) in either direction (Fig. 81).
- If cable end and attachment stud are misaligned (off center), cable will have to be adjusted as described in Throttle Valve Cable Adjustment procedure.

(6) Reconnect cable end to attachment stud. Then with aid of a helper, observe movement of transmission throttle lever and lever on throttle body.

- If both levers move simultaneously from idle to half-throttle and back to idle position, adjustment is correct.
- If transmission throttle lever moves ahead of, or lags behind throttle body lever, cable adjustment will be necessary. Or, if throttle body lever prevents transmission lever from returning to closed position, cable adjustment will be necessary.

THROTTLE VALVE CABLE (Continued)

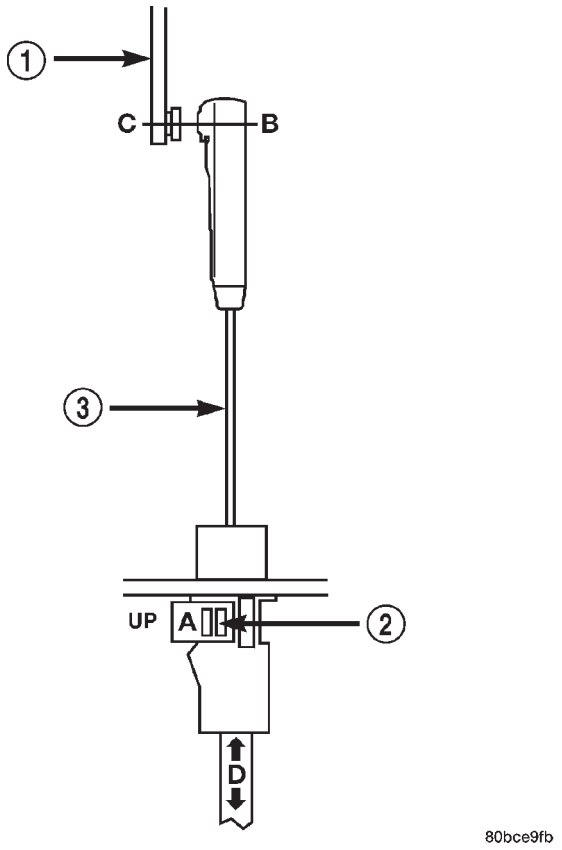


Fig. 81 Throttle Valve Cable at Throttle Linkage

1 - THROTTLE LINKAGE
2 - THROTTLE VALVE CABLE LOCKING CLIP
3 - THROTTLE VALVE CABLE

ADJUSTMENT PROCEDURE

(1) Turn ignition switch to OFF position.
(2) Remove air cleaner if necessary.
(3) Disconnect cable end from attachment stud. **Carefully slide cable off stud. Do not pry or pull cable off.**
(4) Verify that transmission throttle lever is in fully closed position. Then be sure lever on throttle body is at curb idle position.
(5) Pry the T.V. cable lock (A) into the UP position (Fig. 81). This will unlock the cable and allow for readjustment.
(6) Apply just enough tension on the T.V. cable (B) to remove any slack in the cable. **Pulling too tight will cause the T.V. lever on the transmission to move out of its idle position, which will result in an incorrect T.V. cable adjustment.** Slide the sheath of the T.V. cable (D) back and forth until the centerlines of the T.V. cable end (B) and the throttle bell crank lever (C) are aligned within one millimeter (1mm) (Fig. 81).
(7) While holding the T.V. cable in the set position push the T.V. cable lock (A) into the down position (Fig. 81). This will lock the present T.V. cable adjustment.

NOTE: Be sure that as the cable is pulled forward and centered on the throttle lever stud, the cable housing moves smoothly with the cable. Due to the angle at which the cable housing enters the spring housing, the cable housing may bind slightly and create an incorrect adjustment.

(8) Reconnect the T.V. cable (B) to the throttle bellcrank lever (C).
(9) Check cable adjustment. Verify transmission throttle lever and lever on throttle body move simultaneously.

TRANSFER CASE-NV231

TABLE OF CONTENTS

page

TRANSFER CASE-NV231
DISASSEMBLY 119
ASSEMBLY 127

SPEED SENSOR
REMOVAL 138
INSTALLATION 139

TRANSFER CASE-NV231

DISASSEMBLY

Position transfer case on shallow drain pan. Remove drain plug and drain lubricant remaining in case.

REAR RETAINER AND OIL PUMP

(1) Remove the speedometer adapter.

(2) Spread band clamp which holds output shaft boot to the output shaft slinger, or output shaft damper, with a suitable awl, or equivalent.

NOTE: Vehicles built with a 4.0L engine and a manual transmission use a damper weight on the transfer case output shaft. Be sure to identify the transfer case before proceeding.

(3) Remove output shaft boot from slinger, or output shaft damper, and output shaft.

(4) If the vehicle is not equipped with an output shaft damper, remove the output shaft rear slinger using Puller MD-998056-A (Fig. 1).

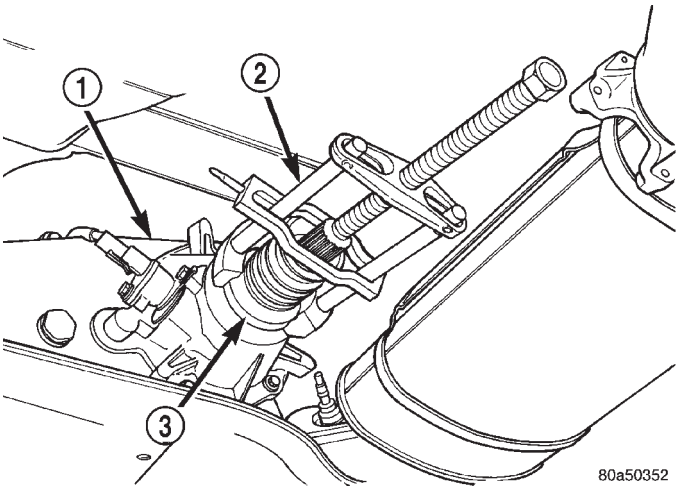


Fig. 1 Rear Slinger Removal

1 - TRANSFER CASE
2 - SPECIAL TOOL MD-998056-A
3 - SLINGER

(5) If the vehicle is equipped with an output shaft damper, use Screws 8421 and the puller yoke and forcing screw from a bolt-grip puller set, such as those used to remove steering wheels and harmonic balancers, to remove the transfer case output shaft damper.

(6) Use a suitable pry tool, or a slide hammer mounted screw, to remove the seal from the rear retainer (Fig. 2).

(7) Remove the rear output bearing I.D. retaining ring (Fig. 3).

(8) Remove the bolts holding the rear retainer to the rear case half.

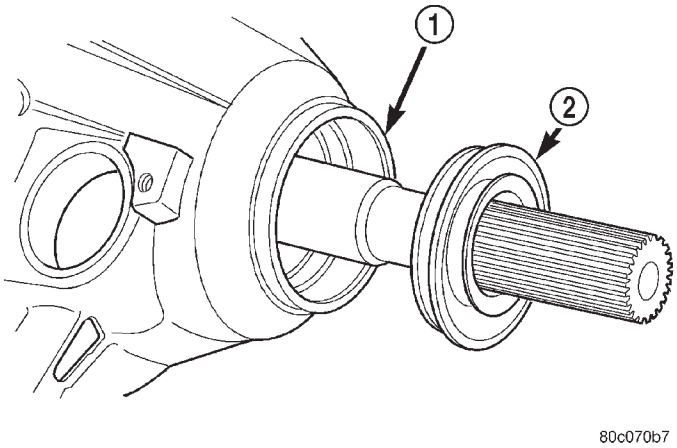


Fig. 2 Rear Retainer Seal

1 - REAR RETAINER
2 - OUTPUT SHAFT SEAL

TRANSFER CASE-NV231 (Continued)

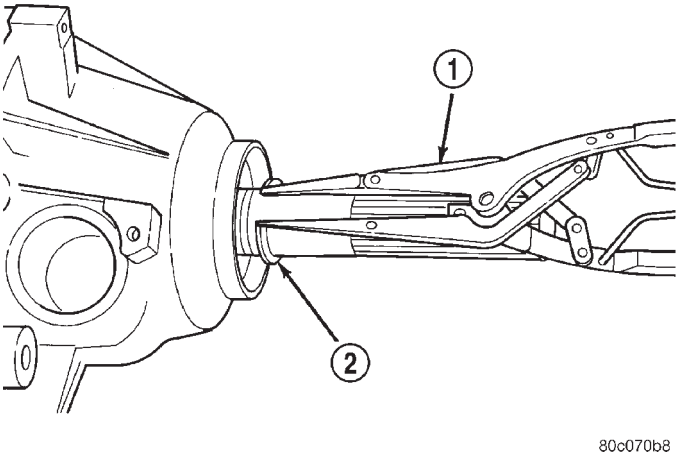


Fig. 3 Output Shaft Rear Bearing Retaining Ring

1 - SNAP-RING PLIERS
2 - REAR BEARING I.D. RETAINING RING

(9) Tap rear retainer with rawhide or rubber mallet to loosen sealer bead.

(10) Remove rear retainer from rear case half (Fig. 4).

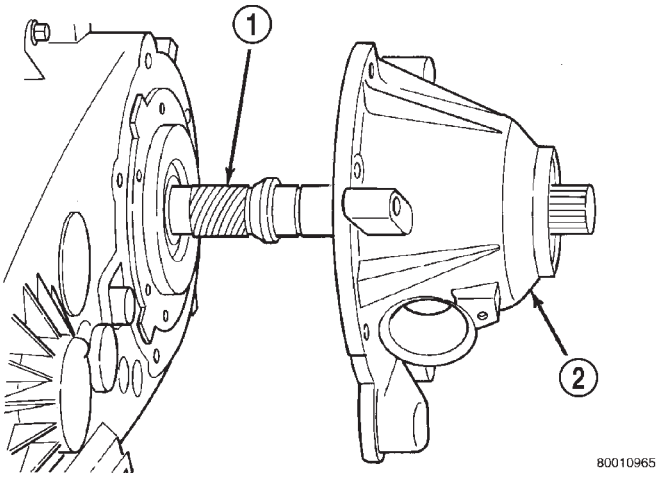


Fig. 4 Rear Retainer Removal

1 - MAINSHAFT
2 - REAR RETAINER

(11) Remove snap-ring holding oil pump in position on output shaft.

(12) Disengage oil pickup tube from oil pump and remove oil pump assembly. Remove oil pump by tilting the edge of the oil pump from under the edge of the rear case half and sliding the pump (Fig. 5).

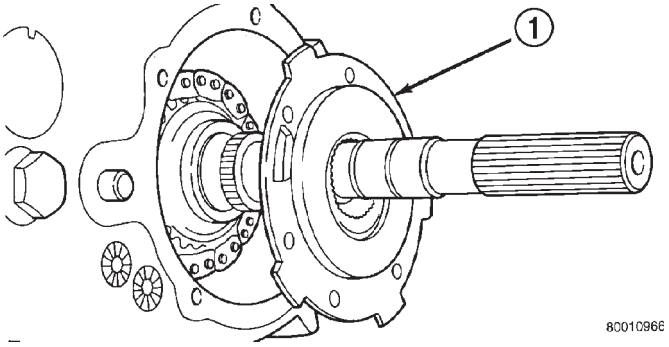


Fig. 5 Oil Pump Removal

1 - OIL PUMP

(13) Remove pick-up tube o-ring from oil pump (Fig. 6), if necessary. Do not disassemble the oil pump, it is not serviceable.

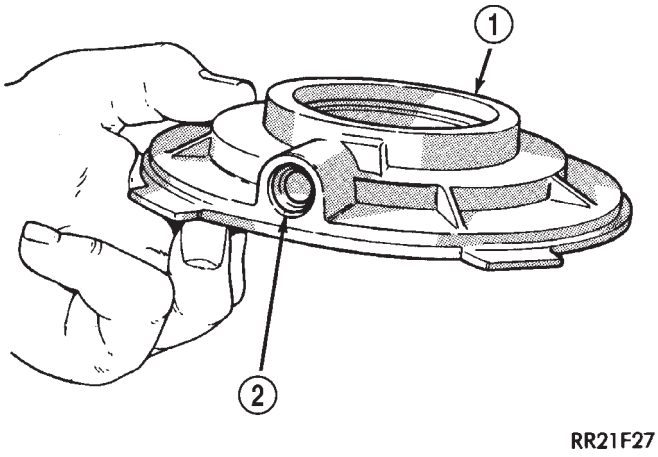


Fig. 6 Pick-up Tube O-ring Location

1 - OIL PUMP
2 - O-RING

TRANSFER CASE-NV231 (Continued)

YOKE AND RANGE LEVER

(1) Remove transfer case indicator switch.
(2) Remove front yoke nut as follows:
(a) Move range lever to 4L position.
(b) Then remove nut with socket and impact wrench (Fig. 7).
(3) Remove yoke. If yoke is difficult to remove by hand, remove it with bearing splitter, or with standard two jaw puller (Fig. 8). Be sure puller tool is positioned on yoke and not on slinger as slinger will be damaged.

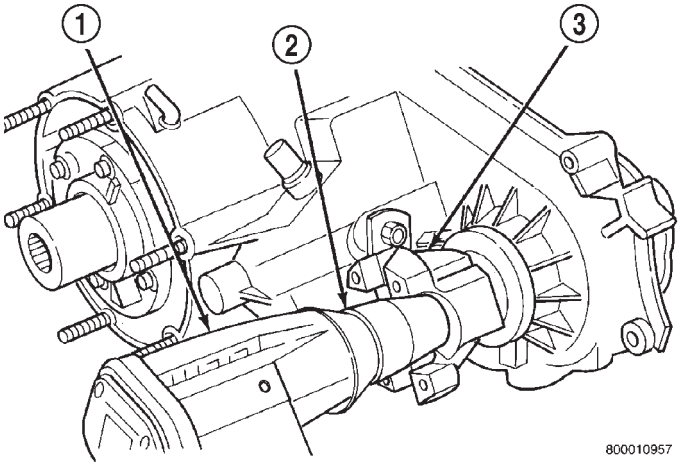


Fig. 7 Yoke Nut Removal

1 - IMPACT WRENCH
2 - SOCKET
3 - YOKE

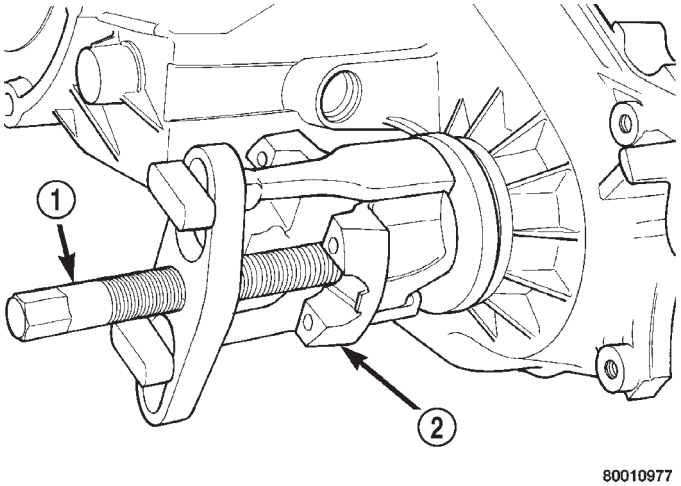


Fig. 8 Yoke Removal

1 - PULLER TOOL
2 - YOKE

(4) Remove seal washer from front output shaft. Discard washer as it should not be reused.

(5) Remove nut and washer that attach range lever to sector shaft. Then move sector to neutral position and remove range lever from shaft (Fig. 9).

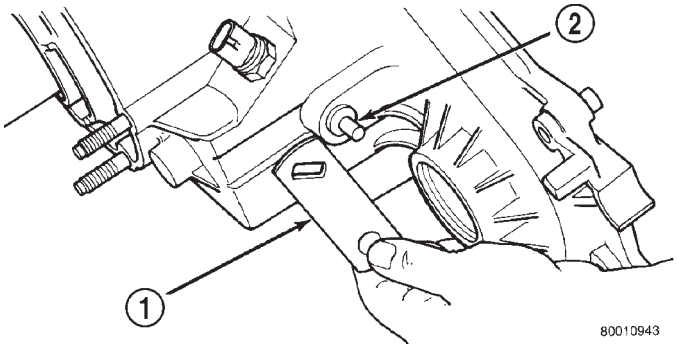


Fig. 9 Range Lever Removal

1 - RANGE LEVER
2 - SECTOR SHAFT

FRONT OUTPUT SHAFT AND DRIVE CHAIN

(1) Support transfer case so rear case is facing upward.
(2) Remove bolts holding front case to rear case. The case alignment bolts require flat washers (Fig. 10).
(3) Loosen rear case with flat blade screwdriver to break sealer bead. Insert pry tool blade only into notches provided at each end of case (Fig. 11).
(4) Remove rear case from front case.

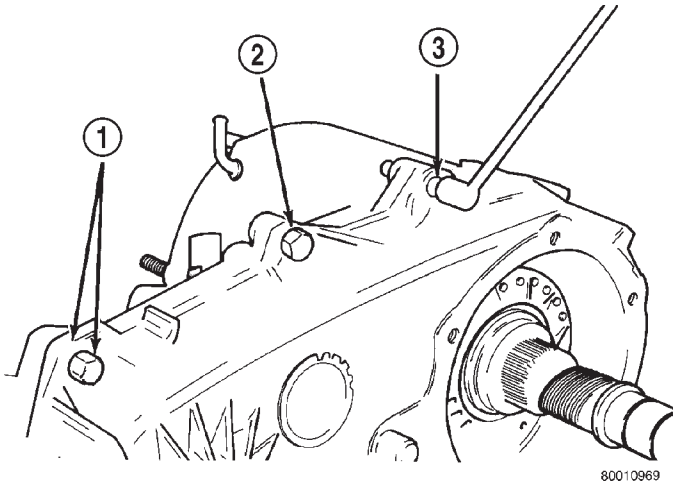


Fig. 10 Rear Case Alignment Bolt Locations

1 - DOWEL BOLT AND WASHER (2)
2 - CASE BOLT (5)
3 - SPLINE HEAD BOLT (1)

TRANSFER CASE-NV231 (Continued)

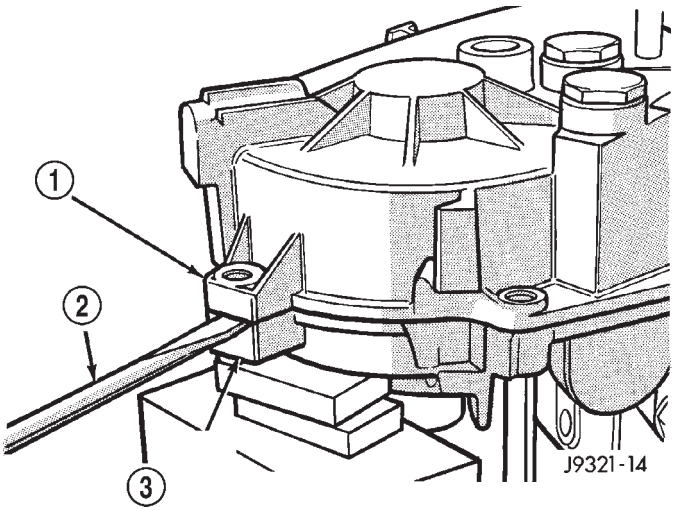


Fig. 11 Loosening Rear Case

1 - REAR CASE
2 - PRY TOOL (IN CASE SLOT)
3 - FRONT CASE

(5) Remove oil pickup tube from rear case (Fig. 12).

(6) Remove mode fork spring (Fig. 13).

(7) Pull front output shaft upward and out of front output shaft bearing (Fig. 14).

(8) Remove front output shaft and chain.

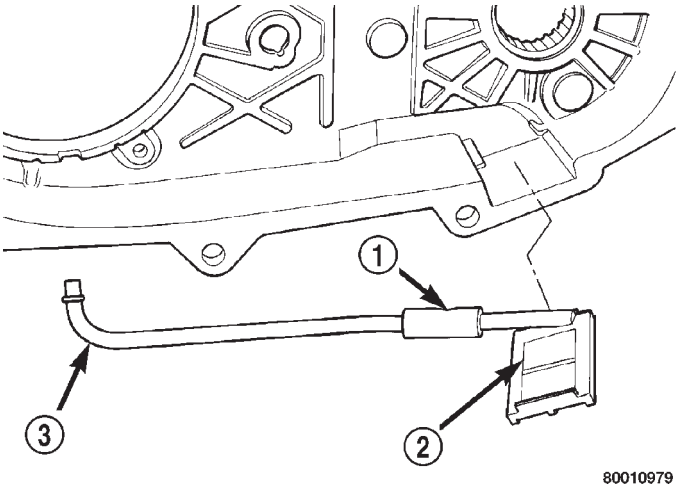


Fig. 12 Oil Pickup Tube Removal

1 - CONNECTING HOSE
2 - PICKUP SCREEN
3 - PICKUP TUBE

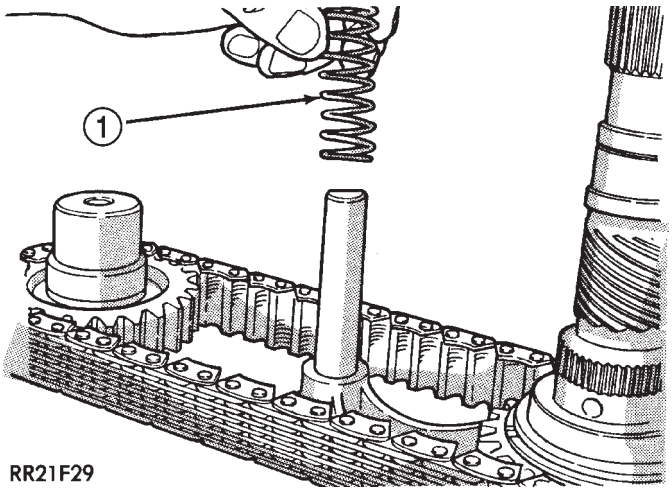


Fig. 13 Mode Fork Spring Removal

1 - MODE SPRING

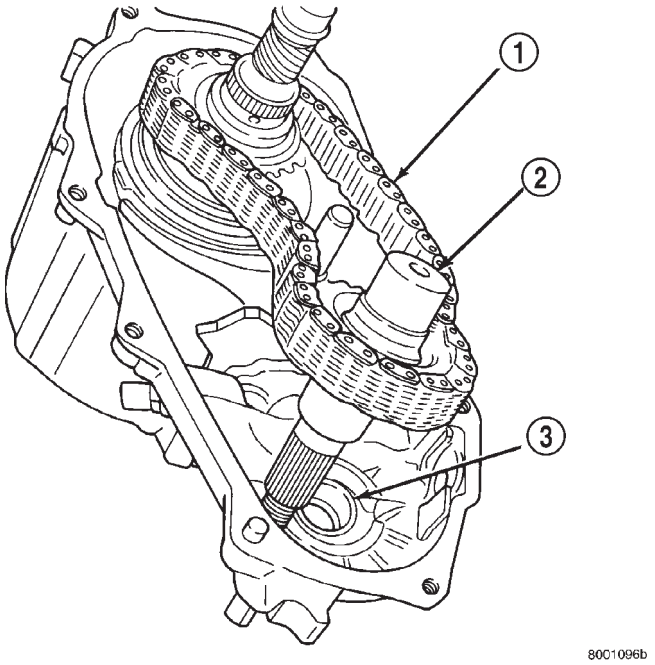


Fig. 14 Remove Front Output Shaft And Chain

1 - DRIVE CHAIN
2 - FRONT OUTPUT SHAFT
3 - SHAFT FRONT BEARING

TRANSFER CASE-NV231 (Continued)

SHIFT FORKS AND MAINSHAFT

(1) Remove detent plug, O-ring, detent spring and detent plunger (Fig. 15).

(2) Remove mainshaft from mode sleeve and input gear pilot bearing.

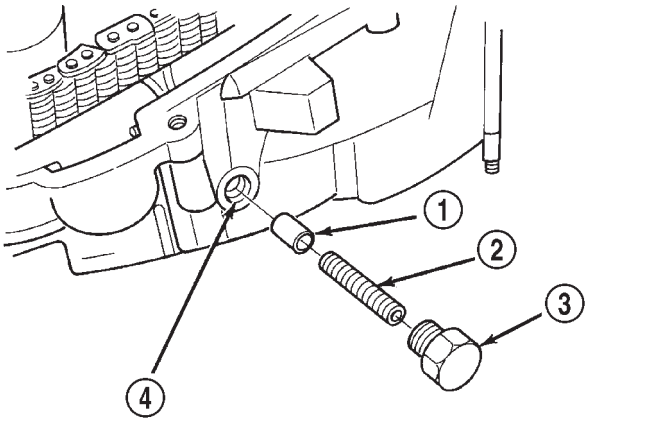


Fig. 15 Detent Plug, Spring And Plunger Removal

1 - POPPET
2 - SPRING
3 - SCREW
4 - POPPET BORE (IN CASE)

(3) Remove mode fork and sleeve as an assembly (Fig. 16). Note position of sleeve for assembly reference. The short side of the sleeve faces upward.

(4) Remove range fork and hub as an assembly (Fig. 17). Note fork position for installation reference.

(5) Remove shift sector from front case (Fig. 18).

(6) Remove shift sector bushing and O-ring (Fig. 19).

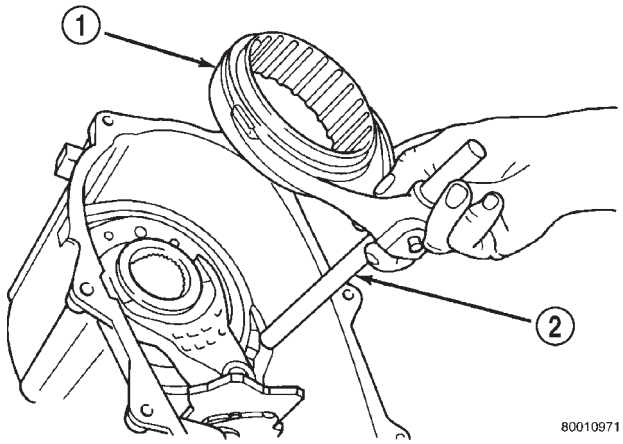


Fig. 16 Mode Fork And Sleeve Removal

1 - MODE SLEEVE
2 - MODE FORK AND RAIL

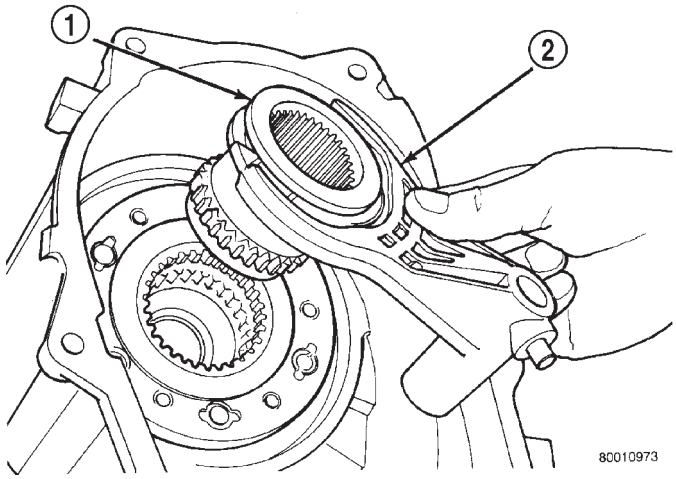


Fig. 17 Range Fork And Hub Removal

1 - RANGE HUB
2 - RANGE FORK

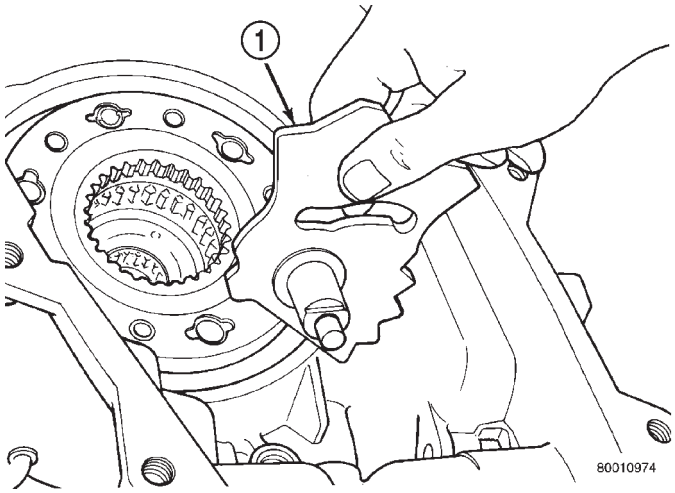


Fig. 18 Shift Sector Removal

1 - SHIFT SECTOR

TRANSFER CASE-NV231 (Continued)

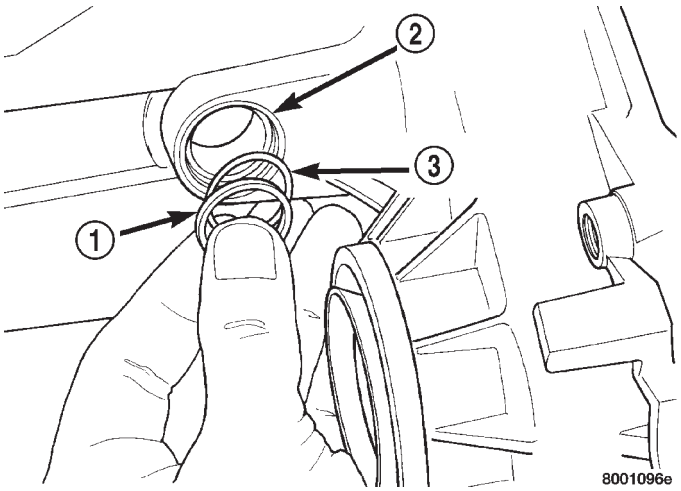


Fig. 19 Sector Bushing And O-Ring Removal

1 - SEAL RETAINER
2 - SECTOR SHAFT BORE
3 - O-RING SEAL

MAINSHAFT

(1) Remove mode hub retaining ring with heavy duty snap-ring pliers (Fig. 20).
(2) Slide mode hub off mainshaft (Fig. 21).
(3) Slide drive sprocket off mainshaft (Fig. 22).

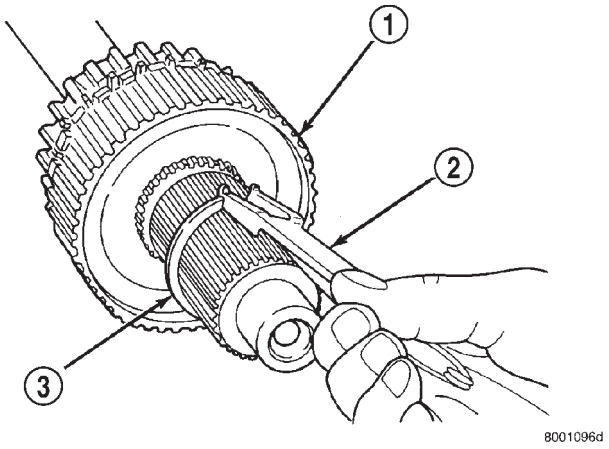


Fig. 20 Mode Hub Retaining Ring Removal

1 - MODE HUB
2 - SNAP-RING PLIERS (HEAVY DUTY)
3 - MODE HUB RETAINING RING

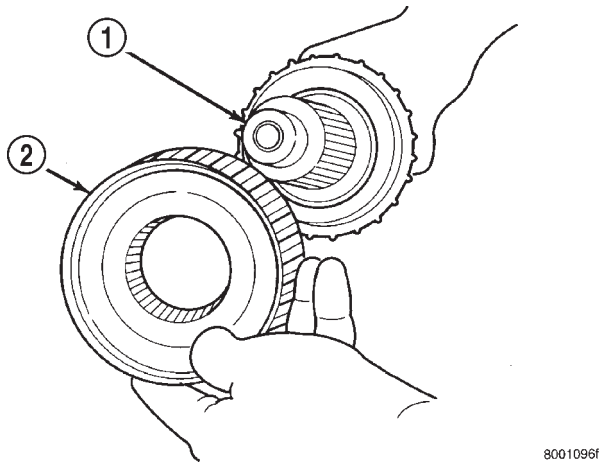


Fig. 21 Mode Hub Removal

1 - MAINSHAFT
2 - MODE HUB

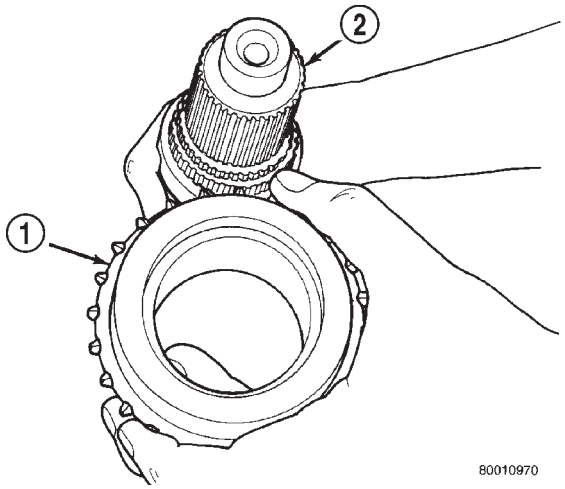


Fig. 22 Drive Sprocket Removal

1 - DRIVE SPROCKET
2 - MAINSHAFT

TRANSFER CASE-NV231 (Continued)

INPUT GEAR AND LOW RANGE GEAR

(1) Remove front bearing retainer attaching bolts (Fig. 23).

(2) Remove front bearing retainer. Pry retainer loose with pry tool positioned in slots at each end of retainer (Fig. 24).

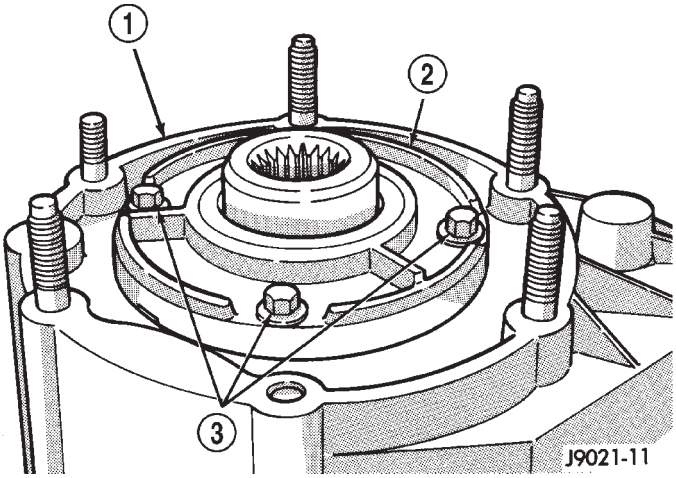


Fig. 23 Front Bearing Retainer Bolts

1 - FRONT CASE
2 - FRONT BEARING RETAINER
3 - RETAINER BOLTS

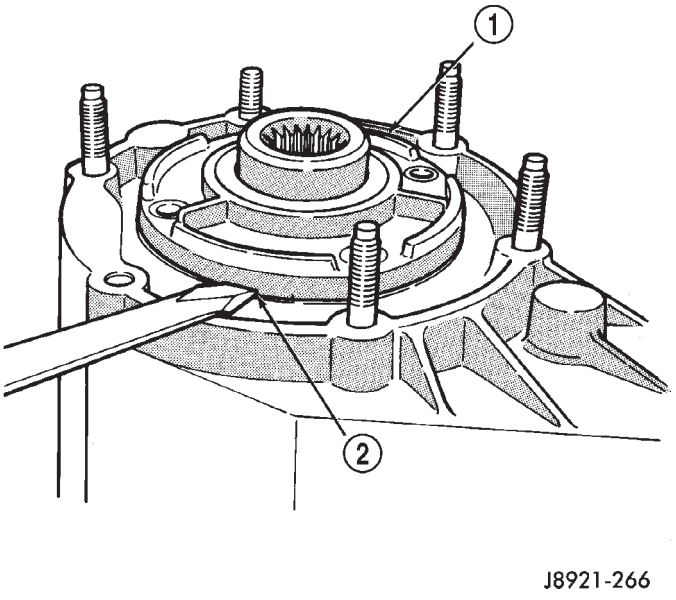


Fig. 24 Front Bearing Retainer Removal

1 - FRONT BEARING RETAINER
2 - RETAINER SLOT

(3) Remove front bearing retainer seal. Tap seal out with drift and hammer.

(4) Remove input gear retaining ring with heavy duty snap-ring pliers (Fig. 25)

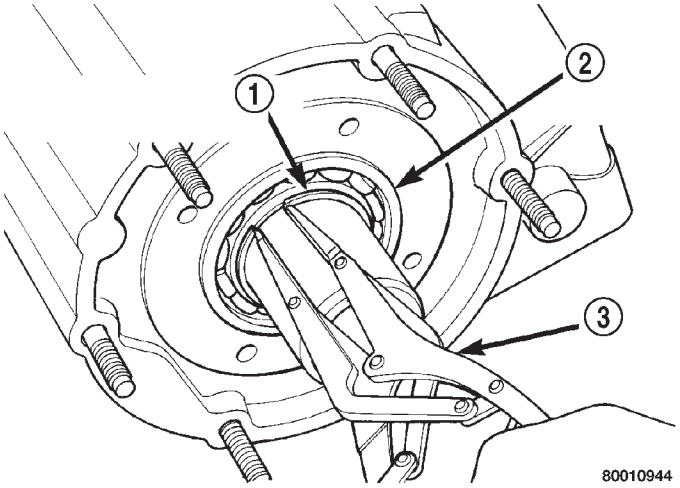


Fig. 25 Removing Input Gear Retaining Ring

1 - INPUT GEAR BEARING RETAINING RING
2 - INPUT GEAR BEARING
3 - SNAP-RING PLIERS

(5) Place front case in horizontal position. Then remove input gear and low range gear as an assembly (Fig. 26). Tap gear out of bearing with plastic mallet if necessary.

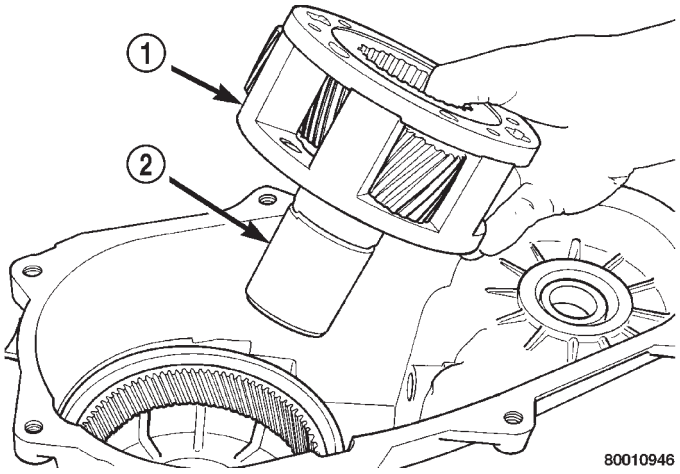


Fig. 26 Input Gear And Planetary Carrier Removal

1 - PLANETARY ASSEMBLY
2 - INPUT GEAR

TRANSFER CASE-NV231 (Continued)

INPUT AND LOW RANGE GEAR

(1) Remove snap-ring that retains input gear in low range gear (Fig. 27).
(2) Remove retainer (Fig. 28).
(3) Remove front tabbed thrust washer (Fig. 29).
(4) Remove input gear (Fig. 30).
(5) Remove rear tabbed thrust washer from low range gear (Fig. 31).

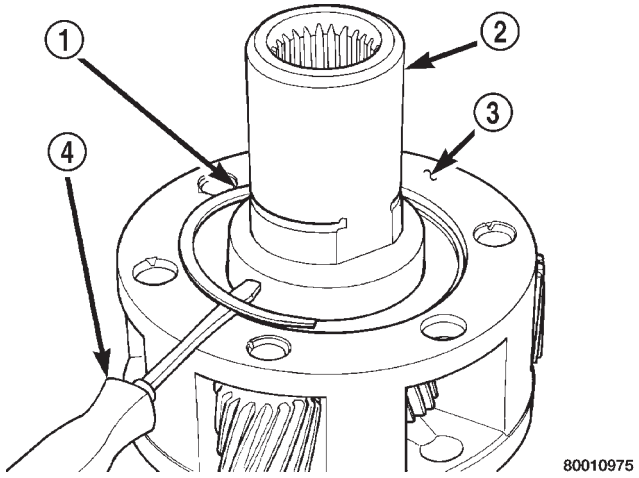


Fig. 27 Input Gear Snap-Ring Removal

1 - CARRIER LOCK RETAINING RING
2 - INPUT GEAR
3 - PLANETARY CARRIER
4 - SCREWDRIVER

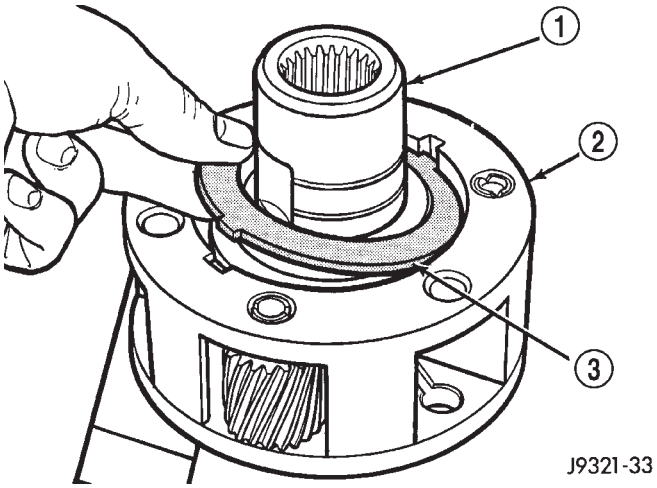


Fig. 28 Input Gear Retainer Removal

1 - INPUT GEAR
2 - LOW RANGE GEAR
3 - RETAINER

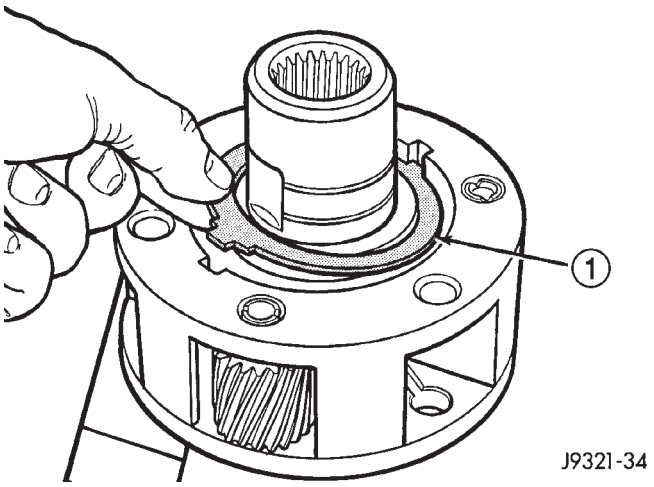


Fig. 29 Front Tabbed Thrust Washer Removal

1 - FRONT TABBED THRUST WASHER

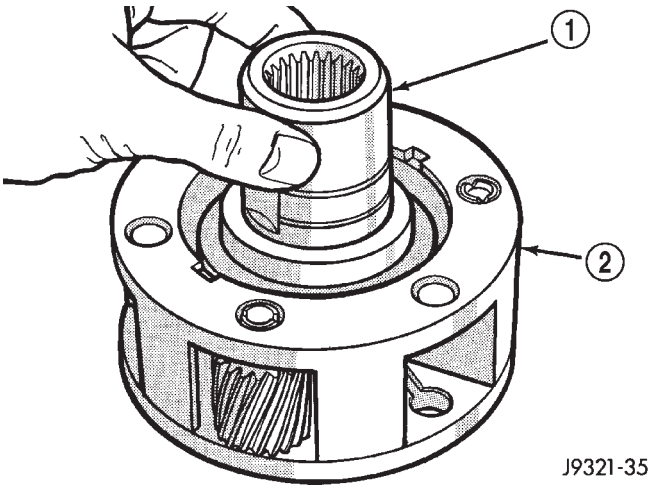


Fig. 30 Input Gear Removal

1 - INPUT GEAR
2 - LOW RANGE GEAR

TRANSFER CASE-NV231 (Continued)

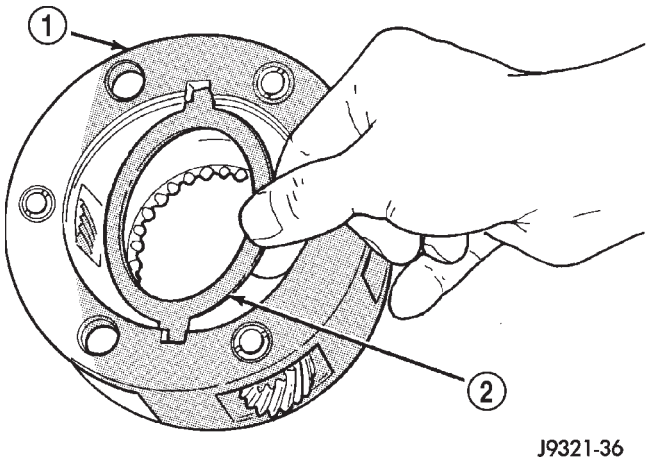


Fig. 31 Rear Tabbed Thrust Washer Removal

1 - LOW RANGE GEAR
2 - REAR TABBED THRUST WASHER

ASSEMBLY

Lubricate transfer case components with Mopar® ATF +4, type 9602, Automatic Transmission Fluid or petroleum jelly (where indicated) during assembly.

BEARINGS AND SEALS

CAUTION: The bearing bores in various transfer case components contain oil feed holes. Make sure replacement bearings do not block the holes.

(1) Remove the front output shaft seal from case with pry tool (Fig. 32).
(2) Remove the front output shaft bearing retaining ring with screwdriver (Fig. 33).
(3) Remove bearing with Tool Handle C-4171 and Tool 5065 (Fig. 34).

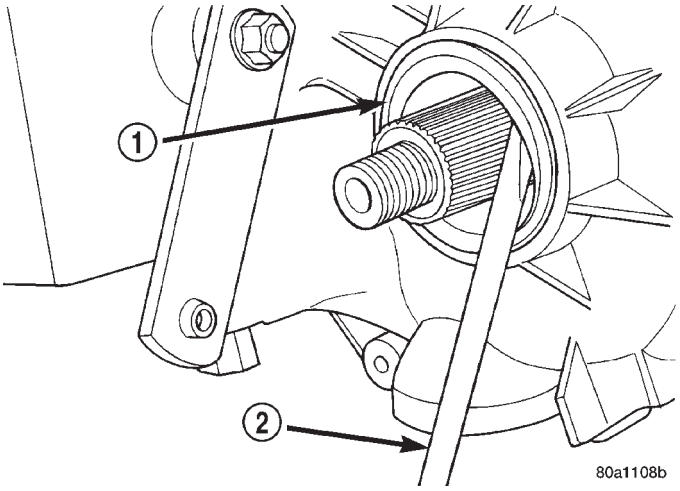


Fig. 32 Front Output Seal Removal

1 - OUTPUT SHAFT SEAL
2 - PRYBAR

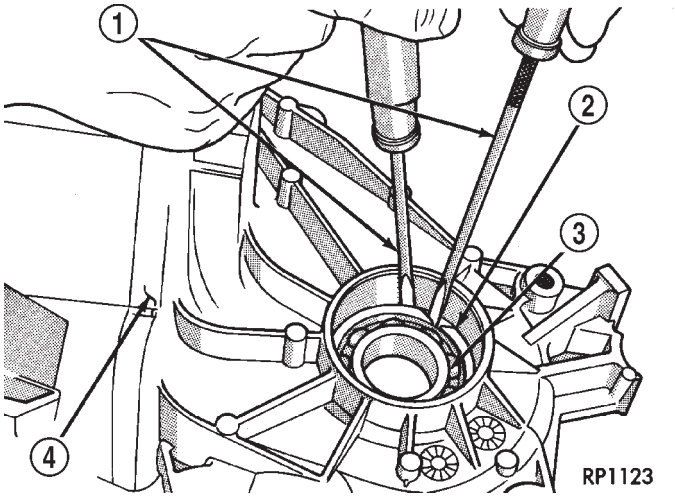


Fig. 33 Front Output Shaft Bearing Retaining Ring Removal

1 - SCREWDRIVERS
2 - SNAP-RING
3 - FRONT OUTPUT SHAFT BEARING
4 - FRONT CASE

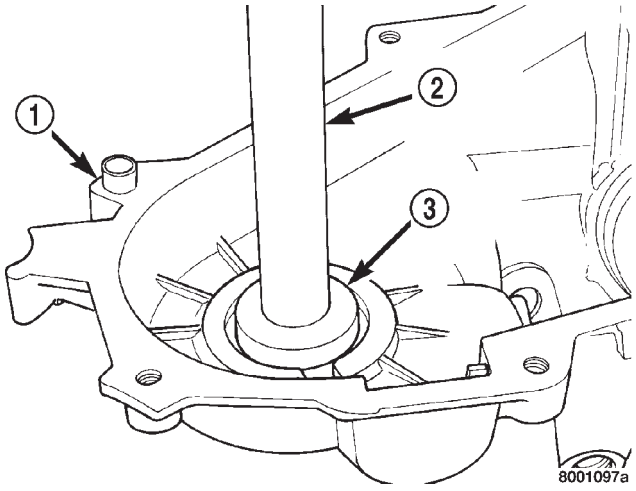


Fig. 34 Front Output Shaft Bearing Removal

1 - FRONT CASE
2 - SPECIAL TOOL C-4171
3 - SPECIAL TOOL 5065

(4) Install front output shaft front bearing in case with Tool Handle C-4171 and Installer 5064 (Fig. 35).

TRANSFER CASE-NV231 (Continued)

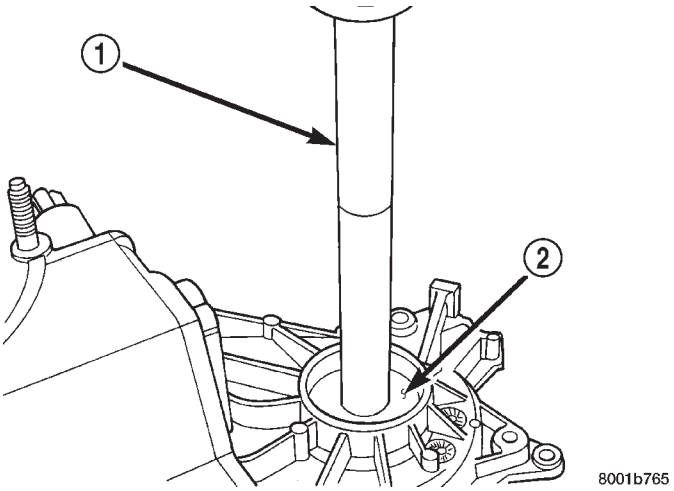


Fig. 35 Front Output Shaft Bearing Installation

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL 5064

(5) Install output shaft front bearing retaining ring (Fig. 36). Start ring into place by hand. Then use small screwdriver to work ring into case groove. Be sure ring is fully seated before proceeding.

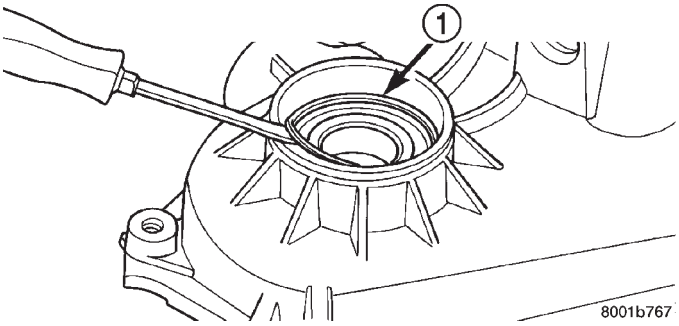


Fig. 36 Installing Output Shaft Front Bearing Retaining Ring

1 - WORK RETAINING RING INTO BORE GROOVE WITH SMALL SCREWDRIVER

(6) Install new front output seal in front case with Installer Tool 8143-A as follows:

(a) Place new seal on tool. **Garter spring on seal goes toward interior of case.**

(b) Start seal in bore with light taps from hammer (Fig. 37). Once seal is started, continue tapping seal into bore until installer tool bottoms against case.

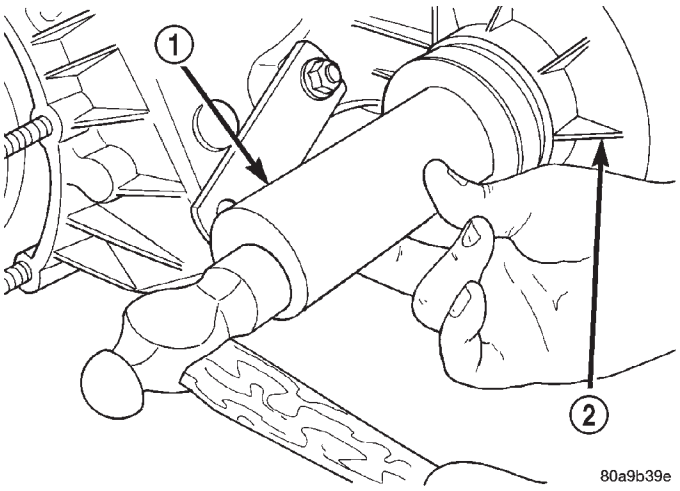


Fig. 37 Front Output Seal Installation

1 - INSTALLER 8143-A
2 - TRANSFER CASE

(7) Remove the output shaft rear bearing with the screw and jaws from Remover L-4454 and Cup 8148 (Fig. 38).

(8) Install new bearing with Tool Handle C-4171 and Installer 5066 (Fig. 39). The bearing bore is chamfered at the top. Install the bearing so it is flush with the lower edge of this chamfer (Fig. 40).

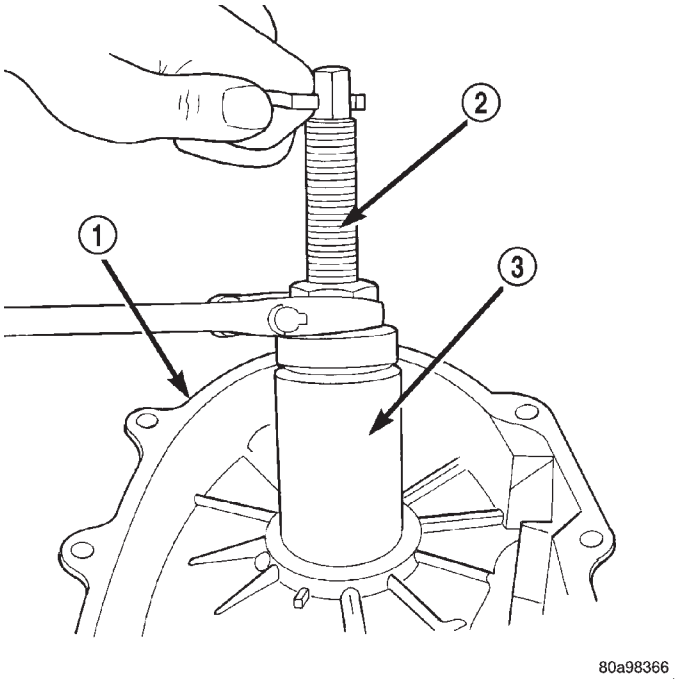


Fig. 38 Output Shaft Rear Bearing Removal

1 - REAR CASE
2 - SPECIAL TOOL L-4454-1 AND L-4454-3
3 - SPECIAL TOOL 8148

TRANSFER CASE-NV231 (Continued)

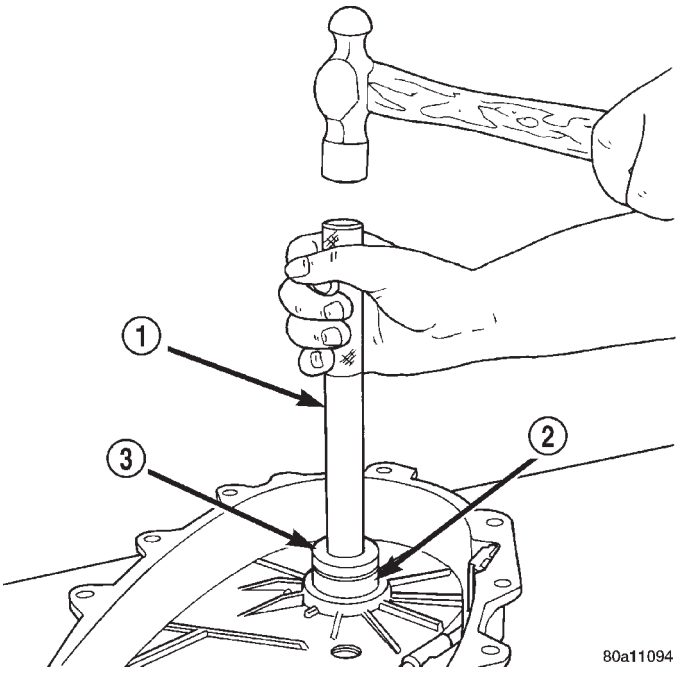


Fig. 39 Output Shaft Rear Bearing Installation

1 - HANDLE C-4171
2 - OUTPUT SHAFT INNER BEARING
3 - INSTALLER 5066

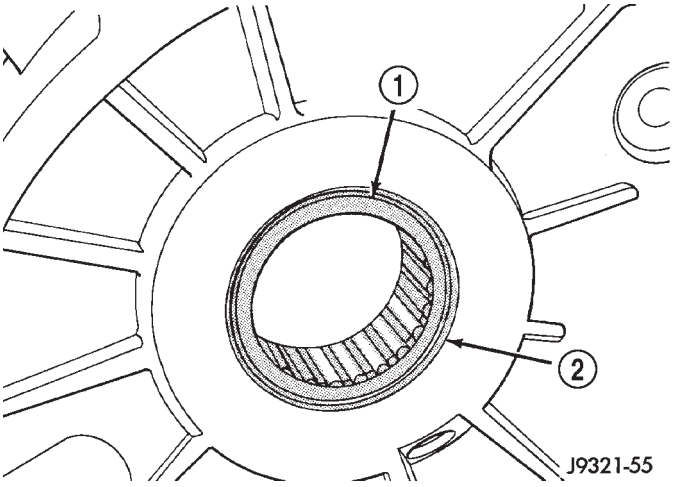


Fig. 40 Output Shaft Rear Bearing Installation Depth

1 - BEARING (SEATED) AT LOWER EDGE OF CHAMFER
2 - CHAMFER

(9) Using Remover C-4210 and Handle C-4171, drive input shaft bearing from inside the annulus gear opening in the case (Fig. 41).

(10) Install locating ring on new bearing.

(11) Position case so forward end is facing upward.

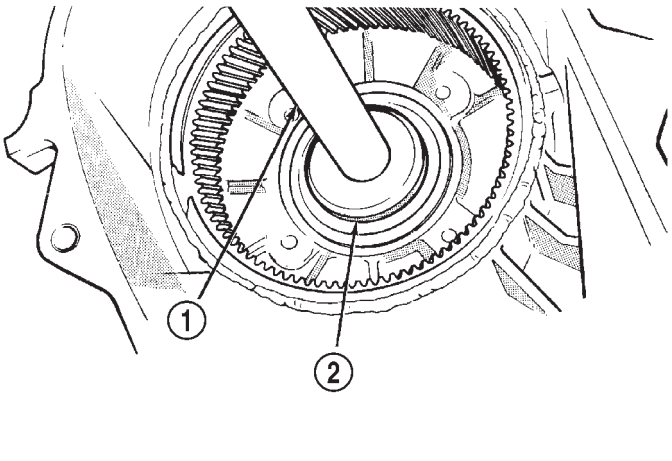


Fig. 41 Input Shaft Bearing Removal

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL C-4210

(12) Using Remover C-4210 and Handle C-4171, drive input shaft bearing into case. The bearing locating ring must be fully seated against case surface (Fig. 42).

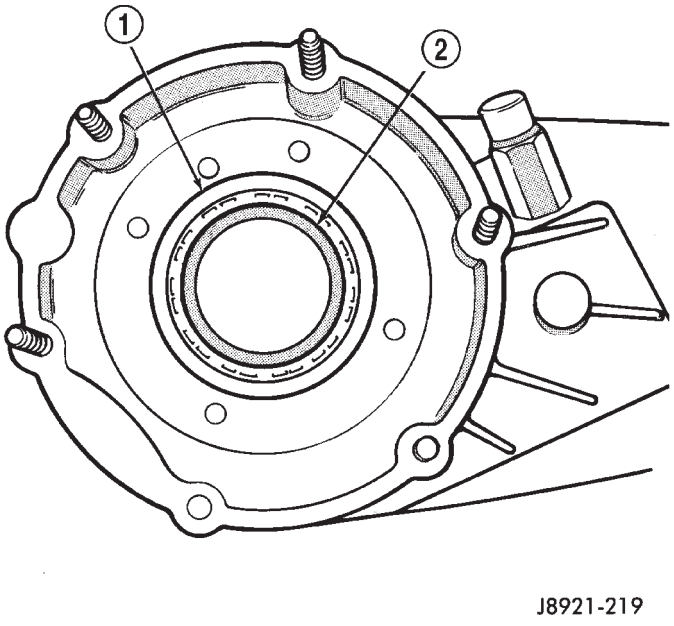


Fig. 42 Seating Input Shaft Bearing

1 - SNAP-RING
2 - INPUT SHAFT BEARING

TRANSFER CASE-NV231 (Continued)

(13) Remove input gear pilot bearing by inserting a suitably sized drift into the splined end of the input gear and driving the bearing out with the drift and a hammer (Fig. 43).

(14) Install new pilot bearing with Installer 5065 and Handle C-4171 (Fig. 44).

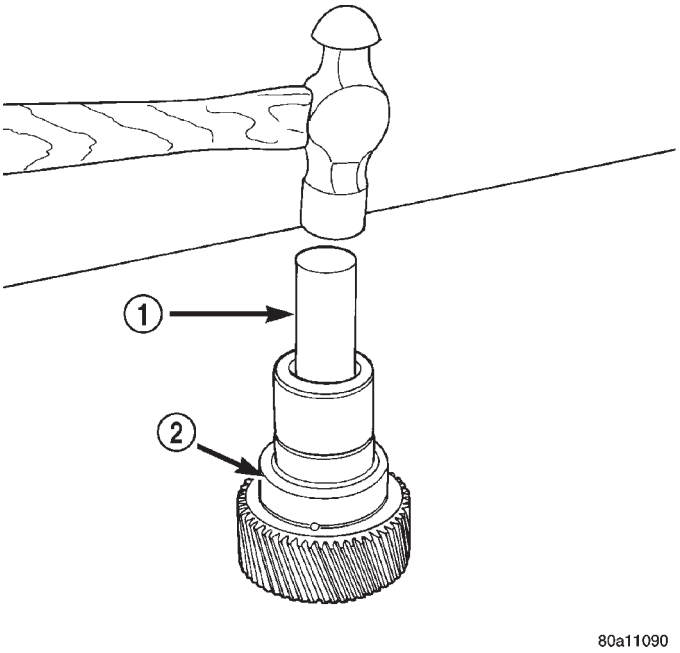


Fig. 43 Remove Input Gear Pilot Bearing

1 - DRIFT
2 - INPUT GEAR

(15) Remove front bearing retainer seal with suitable pry tool.

(16) Install new front bearing retainer seal with Installer 7884 (Fig. 45).

(17) Remove seal from oil pump housing with a suitable pry tool

(18) Install new seal in oil pump housing with Installer 7888 (Fig. 46).

(19) Remove rear retainer bearing with Installer 8128 and Handle C-4171.

(20) Install rear bearing in retainer with Handle C-4171 and Installer 5064 (Fig. 47).

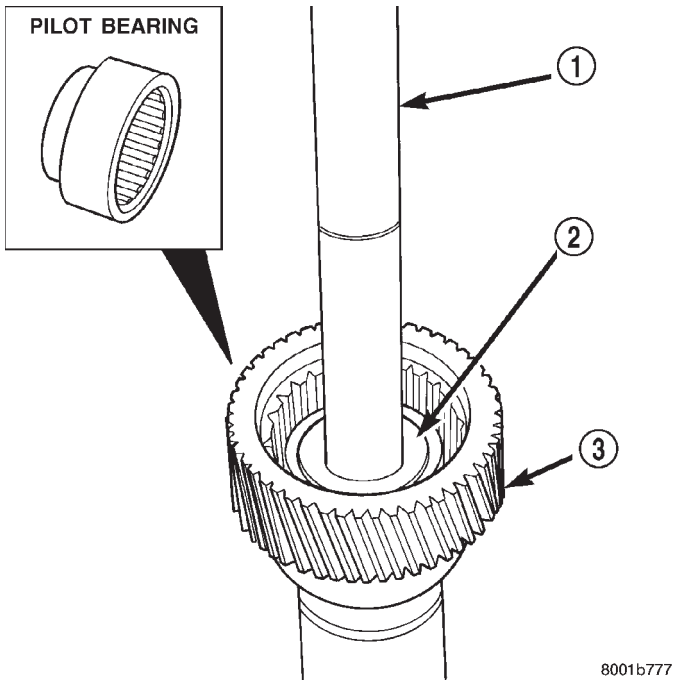


Fig. 44 Install Input Gear Pilot Bearing

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL 5065
3 - INPUT GEAR

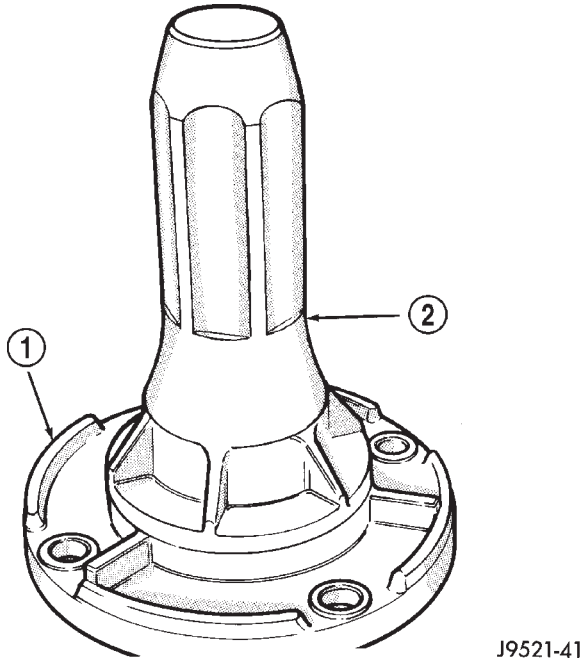


Fig. 45 Install Front Bearing Retainer Seal

1 - FRONT BEARING RETAINER
2 - SPECIAL TOOL 7884

TRANSFER CASE-NV231 (Continued)

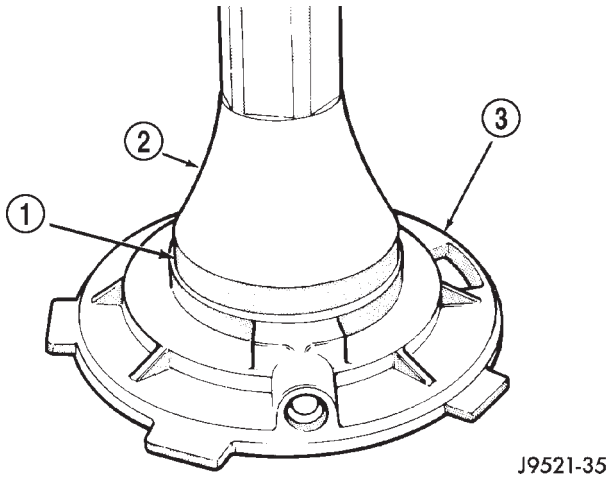


Fig. 46 Oil Pump Seal Installation

1 - HOUSING SEAL
2 - SPECIAL TOOL 7888
3 - OIL PUMP FEED HOUSING

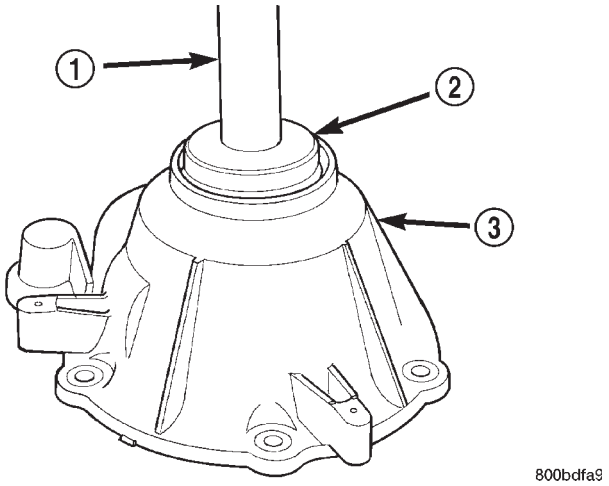


Fig. 47 Installing Rear Bearing In Retainer

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL 5064
3 - REAR RETAINER

INPUT AND LOW RANGE GEAR

(1) Install first thrust washer in low range gear (Fig. 48). Be sure washer tabs are properly aligned in gear notches.

(2) Install input gear in low range gear. Be sure input gear is fully seated.

(3) Install remaining thrust washer in low range gear and on top of input gear. Be sure washer tabs are properly aligned in gear notches.

(4) Install retainer on input gear and install snap-ring.

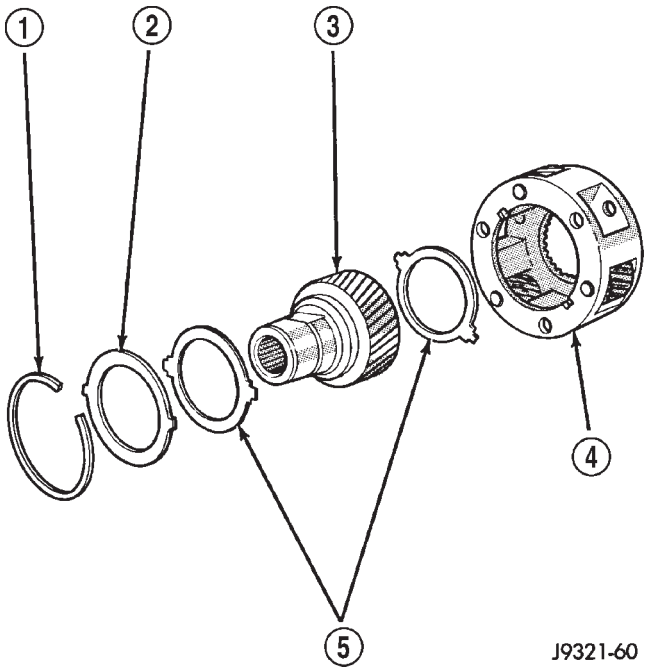


Fig. 48 Input/Low Range Gear Components

1 - SNAP-RING
2 - RETAINER PLATE
3 - INPUT GEAR
4 - LOW RANGE GEAR
5 - THRUST WASHERS

INPUT GEAR AND LOW RANGE GEAR

(1) Align and install low range/input gear assembly in front case (Fig. 49). Be sure low range gear pinions are engaged in annulus gear and that input gear shaft is fully seated in front bearing.

(2) Install snap-ring to hold input/low range gear into front bearing (Fig. 50).

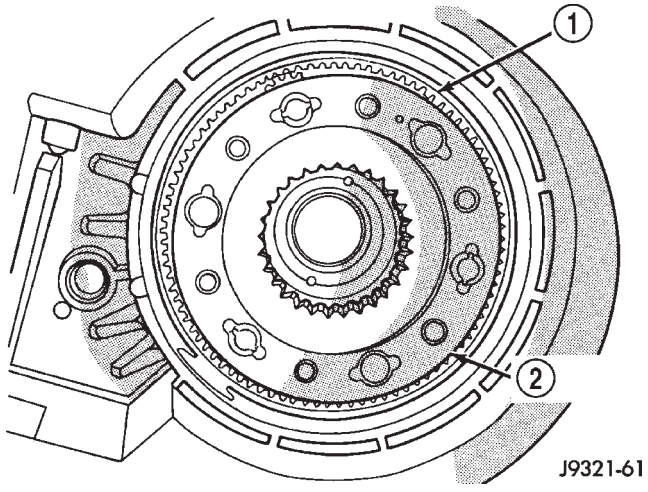


Fig. 49 Input/Low Range Gear Installation

1 - ANNULUS GEAR
2 - INPUT/LOW RANGE GEAR

TRANSFER CASE-NV231 (Continued)

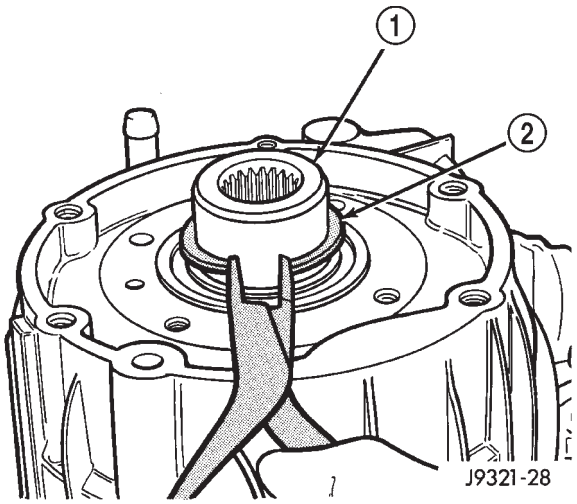


Fig. 50 Install Snap-Ring

1 - INPUT GEAR
2 - SNAP-RING

(3) Clean gasket sealer residue from retainer and inspect retainer for cracks or other damage.

(4) Apply a 3 mm (1/8 in.) bead of Mopar® gasket maker or silicone adhesive to sealing surface of retainer.

(5) Align cavity in seal retainer with fluid return hole in front of case.

CAUTION: Do not block fluid return cavity on sealing surface of retainer when applying Mopar® gasket maker or silicone adhesive sealer. Seal failure and fluid leak can result.

(6) Install bolts to hold retainer to transfer case (Fig. 51). Tighten to 21 N·m (16 ft. lbs.) of torque.

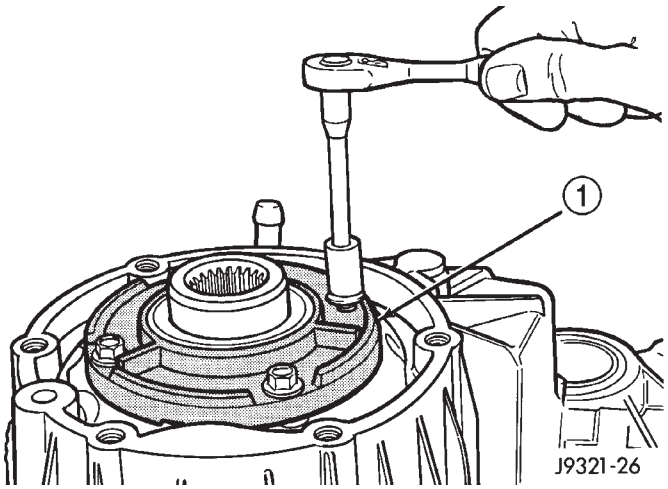


Fig. 51 Install Front Bearing Retainer

1 - FRONT BEARING RETAINER

MAINSHAFT

(1) Lubricate mainshaft splines with recommended transmission fluid.

(2) Slide drive sprocket onto mainshaft.

(3) Slide mode hub onto mainshaft.

(4) Install mode hub retaining ring. Verify that the retaining ring is fully seated in mainshaft groove.

SHIFT FORKS AND MAINSHAFT

(1) Install new sector shaft O-ring and bushing (Fig. 52).

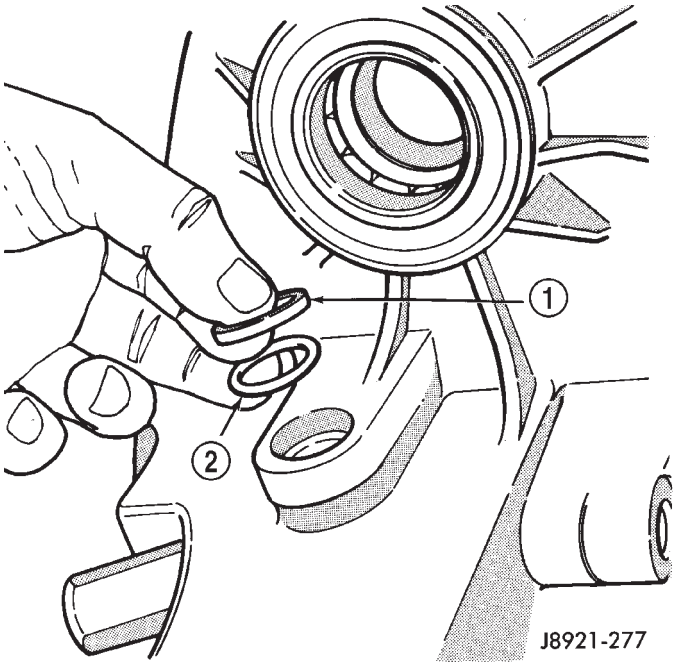


Fig. 52 Sector O-Ring And Bushing Installation

1 - SECTOR BUSHING
2 - O-RING

(2) Install shift sector in case (Fig. 53). Lubricate sector shaft with transmission fluid before installation.

(3) Install range lever, washer, and nut on sector shaft (Fig. 54). Tighten range lever nut to 27-34 N·m (20-25 ft. lbs.) torque.

(4) Assemble and install range fork and hub (Fig. 55). Be sure hub is properly seated in low range gear and engaged to the input gear.

(5) Align and insert range fork pin in shift sector slot.

(6) Install assembled mainshaft (Fig. 56). Be sure shaft is seated in pilot bearing and input gear.

(7) Install new pads on mode fork if necessary.

(8) Insert mode sleeve in mode fork mode fork. Be sure long side of sleeve is toward long end of shift rail (Fig. 57).

TRANSFER CASE-NV231 (Continued)

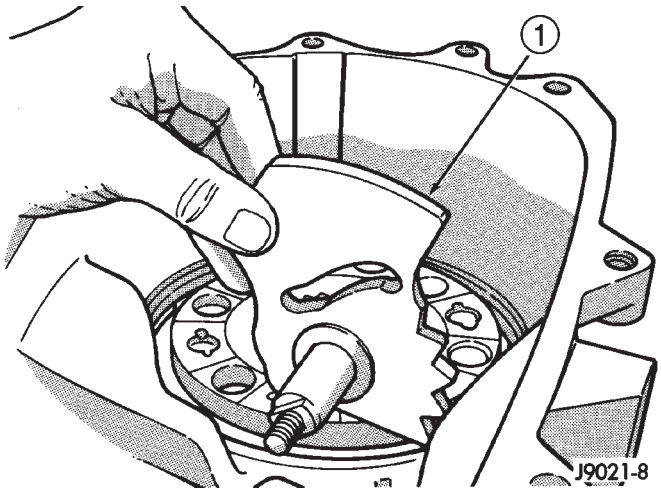


Fig. 53 Shift Sector Installation

1 - SHIFT SECTOR

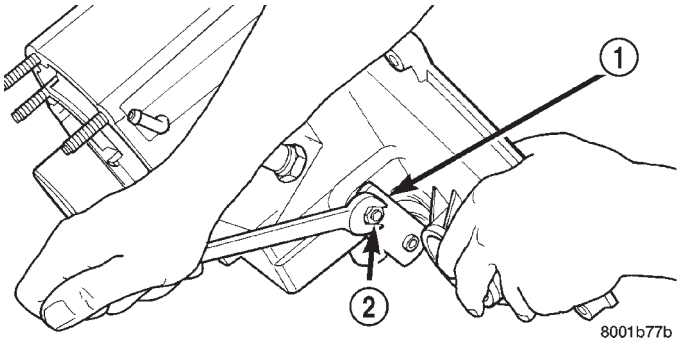


Fig. 54 Range Lever Installation

1 - RANGE LEVER
2 - LEVER NUT

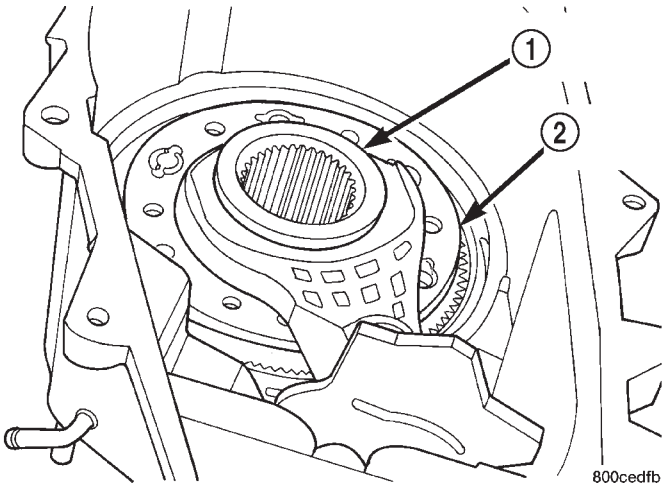


Fig. 55 Install Range Fork And Hub Assembly

1 - RANGE HUB
2 - RANGE FORK

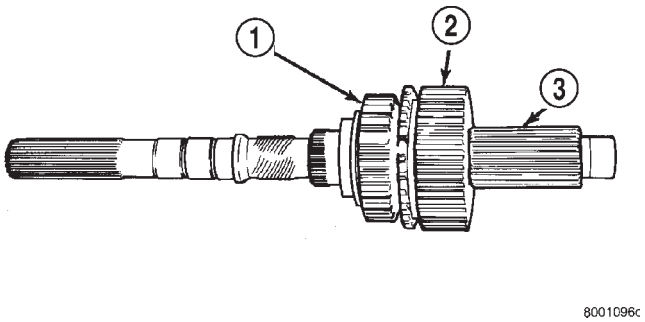


Fig. 56 Mainshaft Assembly Installation

1 - DRIVE SPROCKET
2 - MODE HUB
3 - MAINSHAFT

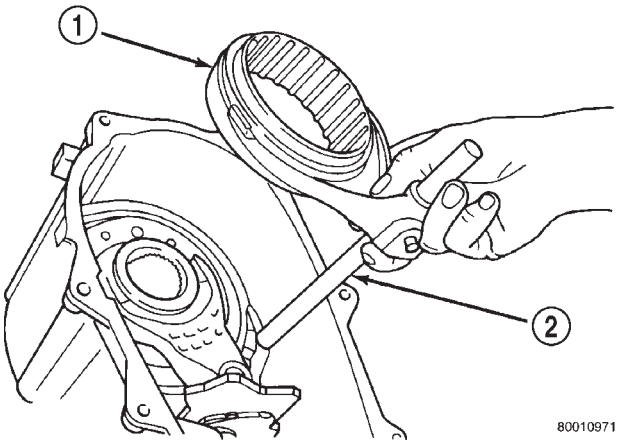


Fig. 57 Assembling Mode Fork And Sleeve

1 - MODE SLEEVE
2 - MODE FORK AND RAIL

(9) Install assembled mode fork and sleeve (Fig. 58). Be sure fork rail goes through range fork and into case bore. Also be sure sleeve is aligned and seated on mainshaft hub.

(10) Rotate sector to NEUTRAL position.

(11) Install new O-ring on detent plug (Fig. 59).

(12) Lubricate detent plunger with transmission fluid or light coat of petroleum jelly.

(13) Install detent plunger, spring and plug (Fig. 59).

(14) Verify that plunger is properly engaged in sector.

TRANSFER CASE-NV231 (Continued)

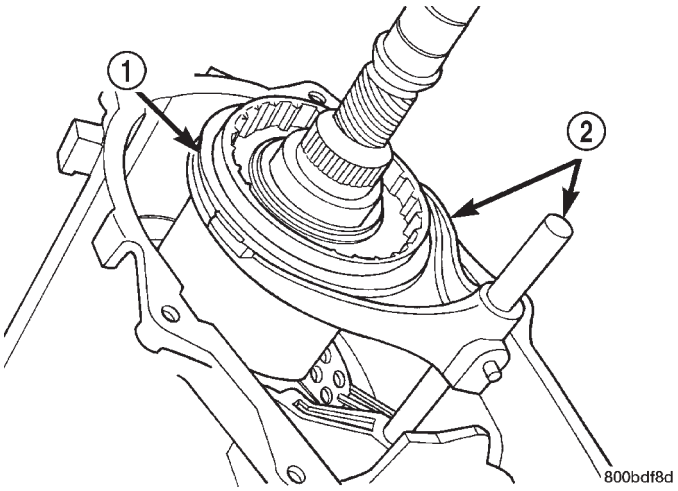


Fig. 58 Mode Fork And Sleeve Installation

1 - MODE SLEEVE
2 - MODE FORK AND RAIL

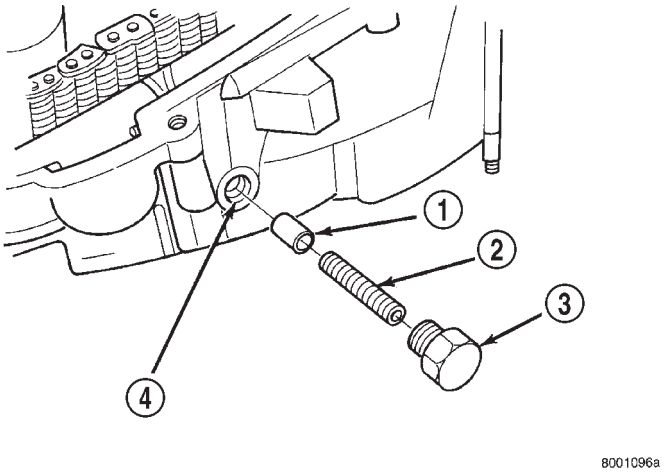


Fig. 59 Shift Detent Components

1 - POPPET
2 - SPRING
3 - SCREW
4 - POPPET BORE (IN CASE)

FRONT OUTPUT SHAFT AND DRIVE CHAIN

(1) Lubricate front output shaft-sprocket assembly, drive chain, and drive sprocket with transmission fluid.

(2) Assemble drive chain and front output shaft (Fig. 60).

(3) Start chain on mainshaft drive sprocket.

(4) Guide front shaft into bearing and drive sprocket onto mainshaft drive gear (Fig. 60).

(5) Install mode spring on upper end of mode fork shift rail (Fig. 61).

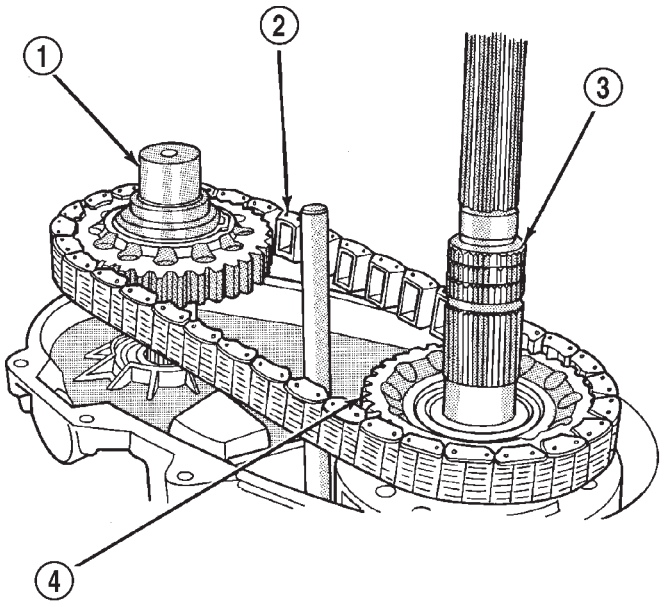


Fig. 60 Installing Drive Chain And Front Output Shaft

1 - FRONT OUTPUT SHAFT
2 - DRIVE CHAIN
3 - MAINSHAFT
4 - DRIVE SPROCKET

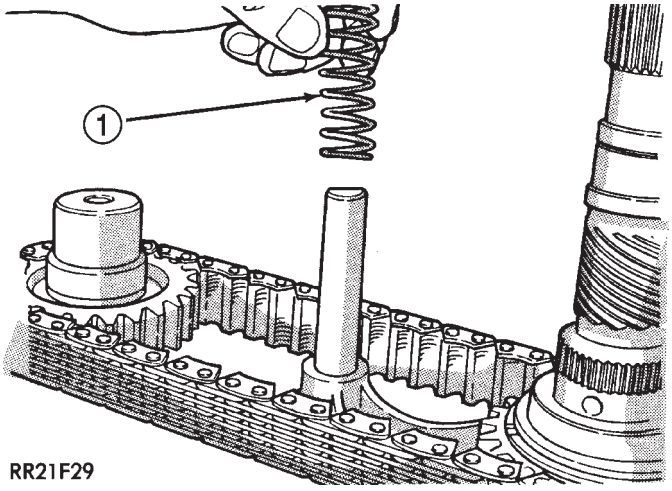


Fig. 61 Install Mode Fork Spring

1 - MODE SPRING

TRANSFER CASE-NV231 (Continued)

OIL PUMP AND REAR CASE

(1) Install magnet in front case pocket (Fig. 62).

(2) Assemble oil pickup screen, connecting hose, and tube.

(3) Install new pickup tube O-ring in oil pump (Fig. 63).

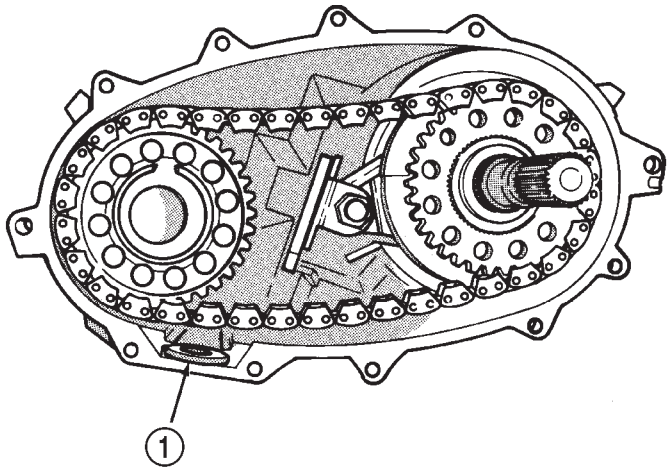


Fig. 62 Installing Case Magnet

1 - MAGNET

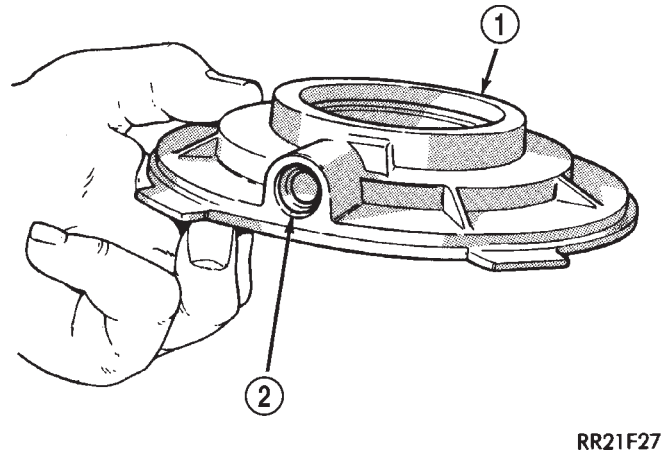


Fig. 63 Pickup Tube O-Ring Position

1 - OIL PUMP
2 - O-RING

(4) Insert oil pickup tube in oil pump inlet.

(5) Position assembled oil pump and pickup tube in rear case. Be sure pickup screen is securely seated in case slot. Also be sure oil pump locating tabs are outside rear case (Fig. 64).

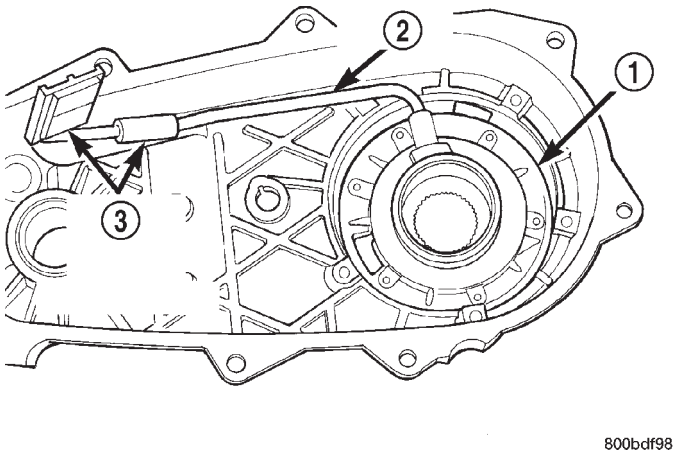


Fig. 64 Oil Pump And Pickup Tube Installation

1 - OIL PUMP
2 - PICKUP TUBE
3 - PICKUP SCREEN AND CONNECTOR

(6) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to mounting flange of front case. Work sealer bead around bolt holes.

(7) Lift rear case and oil pump and carefully position assembly on front case. Be sure case dowels are aligned and that mode fork rail extends through rear case before seating rear case on front case.

(8) Install case attaching bolts. Alignment bolts at each end of case are only ones requiring washers (Fig. 65).

(9) Tighten case bolts to 27-34 N·m (20-25 ft. lbs.) torque.

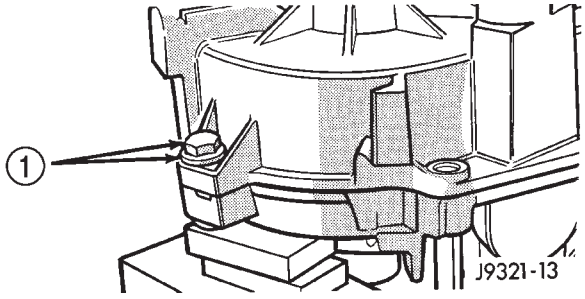


Fig. 65 Alignment Bolt Location

1 - ALIGNMENT BOLT AND WASHER (AT EACH END OF CASE)

YOKE AND RANGE LEVER

(1) Install indicator switch in front case. Tighten switch to 20-34 N·m (15-25 ft. lbs.) torque.

(2) Install range lever, washer and locknut on sector shaft (Fig. 66). Tighten locknut to 27-34 N·m (20-25 ft. lbs.) torque.

TRANSFER CASE-NV231 (Continued)

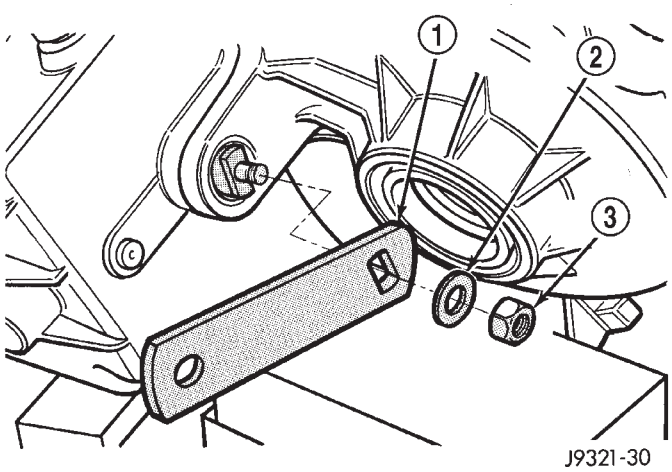


Fig. 66 Range Lever Installation

1 - RANGE LEVER
2 - WASHER
3 - LOCKNUT

(3) Install new seal washer on front output shaft (Fig. 68).

(4) Lubricate yoke hub with transmission fluid and install yoke on front shaft.

(5) Install new seal washer on front shaft.

(6) Install yoke and new yoke nut on front output shaft (Fig. 67).

(7) Tighten yoke nut to 122-176 N·m (90-130 ft. lbs.) torque. Use Tool C-3281, or similar tool to hold yoke while tightening yoke nut.

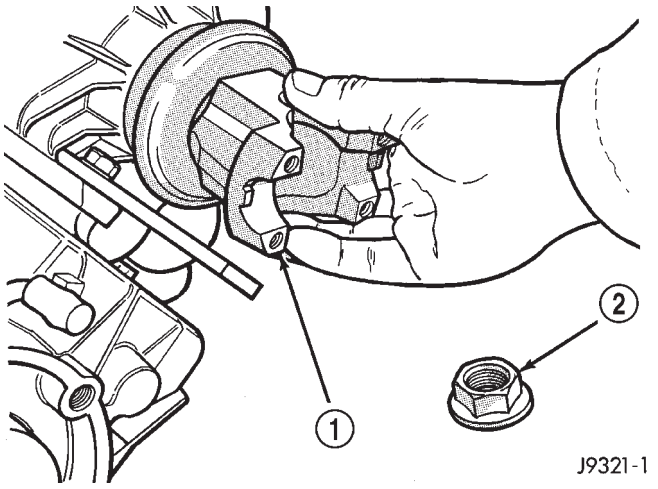


Fig. 67 Output Shaft Yoke Installation

1 - OUTPUT SHAFT YOKE
2 - YOKE NUT

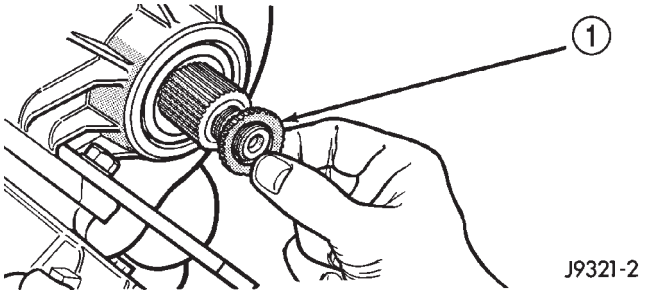


Fig. 68 Yoke Seal Washer Installation

1 - YOKE SEAL WASHER

REAR RETAINER

(1) Apply bead of Mopar® Sealer P/N 82300234, or Loctite™ Ultra Gray, to mating surface of rear retainer. Sealer bead should be a maximum of 3/16 inch.

(2) Install rear retainer on rear case. Tighten retainer bolts to 20-27 N·m (15-20 ft. lbs.) torque.

(3) Install rear bearing I.D. retaining ring and spacer on output shaft.

(4) Apply liberal quantity of petroleum jelly to new rear seal and to output shaft. Petroleum jelly is needed to protect seal lips during installation.

(5) Slide seal onto Seal Protector 6992 (Fig. 69). Slide seal protector and seal onto output shaft.

(6) Slide Installer C-4076-B onto seal protector with the recessed side of the tool toward the seal. Drive seal into rear bearing retainer with Installer C-4076-B and Handle MD-998323 (Fig. 70).

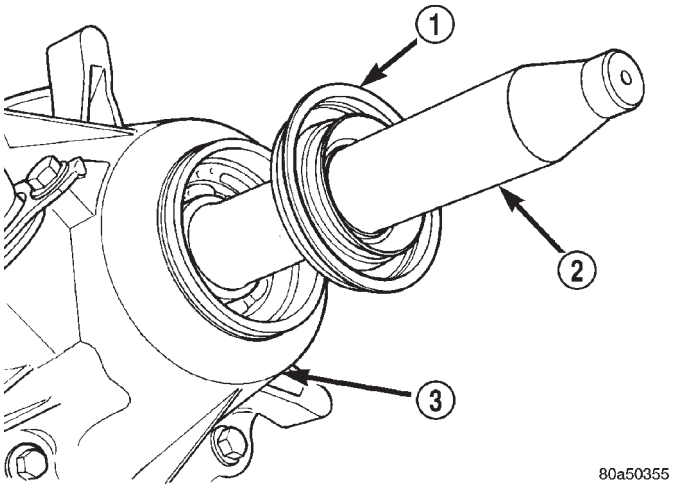


Fig. 69 Output Shaft Seal and Protector

1 - OUTPUT SHAFT SEAL
2 - SPECIAL TOOL 6992
3 - TRANSFER CASE

TRANSFER CASE-NV231 (Continued)

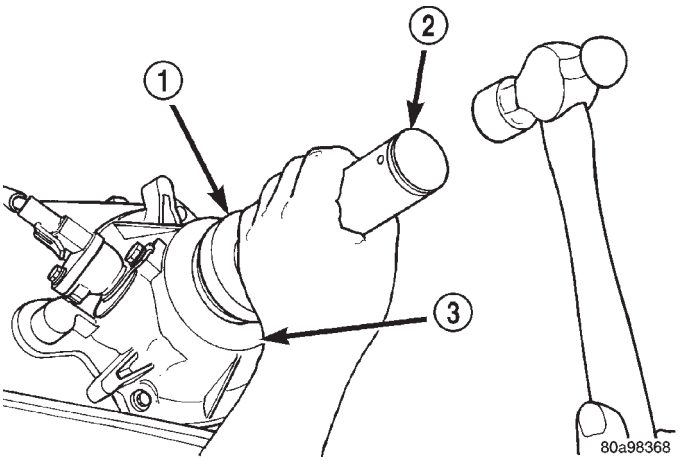


Fig. 70 Rear Seal Installation

1 - SPECIAL TOOL C-4076-B
2 - SPECIAL TOOL MD-998323
3 - TRANSFER CASE

NOTE: Vehicles built with a 4.0L engine and a manual transmission use a damper weight on the transfer case output shaft. Be sure to identify the transfer case before proceeding.

(7) Install a new output shaft rear slinger with Installer 8408, if the vehicle is not equipped with an output shaft damper.

(8) If the vehicle is equipped with an output shaft damper, install the output shaft damper as follows:

(a) Position the damper weight on the output shaft. Start the damper onto the output shaft chamfer, being careful to keep the weight square to the output shaft. (Fig. 71)

(b) Position the driver portion of Installer 8422 (Fig. 72) onto the damper, making sure the legs of the damper are positioned through the slots of the damper.

(c) Thread the puller screw of Installer 8422 into the output shaft by hand only. Make sure the screw is fully threaded into the output shaft.

(d) Using a wrench to hold the pulling screw stationary (Fig. 73), turn the pulling screw nut until the driver legs contact the rear face of the transfer case rear retainer. When the legs contact the retainer, the damper is properly positioned on the output shaft.

(9) Install boot on output shaft slinger, or output shaft damper, and crimp retaining clamp with tool C-4975-A (Fig. 74).

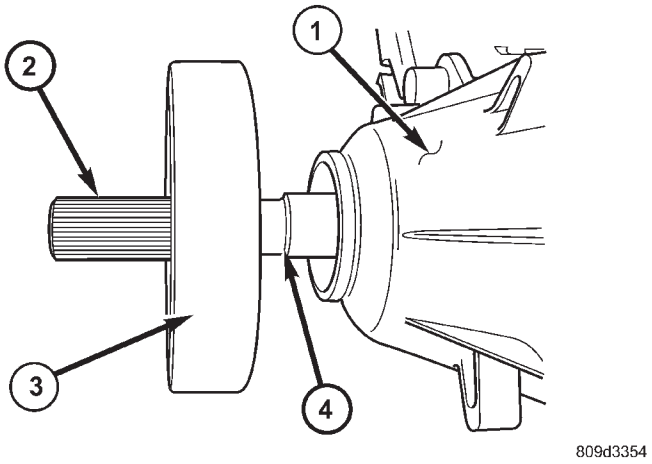


Fig. 71 Position Damper on Output Shaft

1 - Transfer Case
2 - Output Shaft
3 - Damper Weight
4 - Chamfer

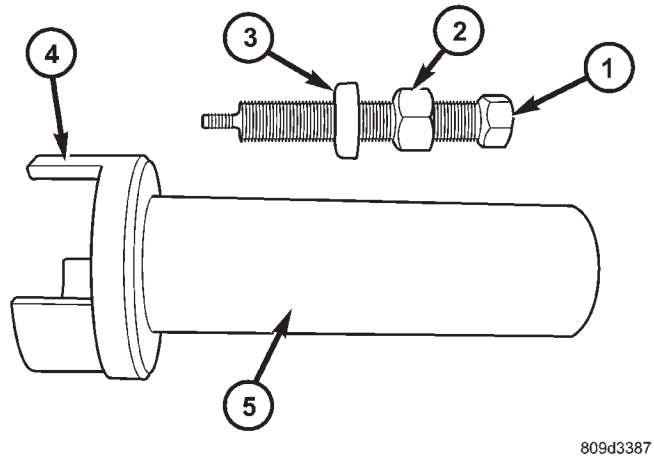


Fig. 72 Installer 8422

1 - Pulling Screw
2 - Pulling Screw Nut
3 - Bearing
4 - Driver Legs
5 - Installer Driver

TRANSFER CASE-NV231 (Continued)

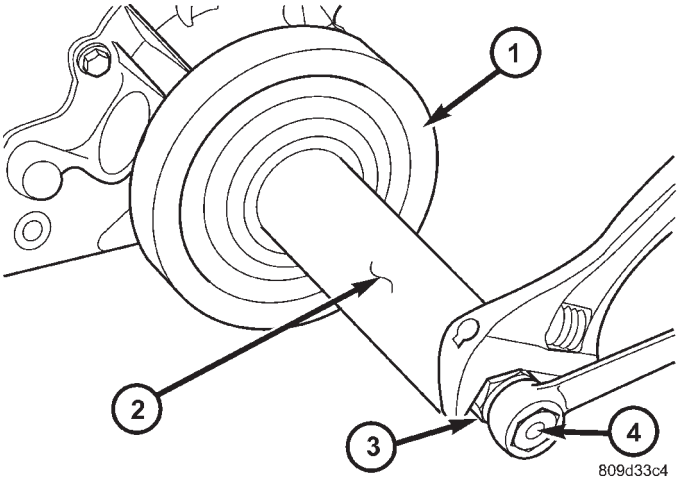


Fig. 73 Install Damper

1 - DAMPER
2 - INSTALLER DRIVER
3 - PULLING SCREW NUT
4 - PULLING SCREW

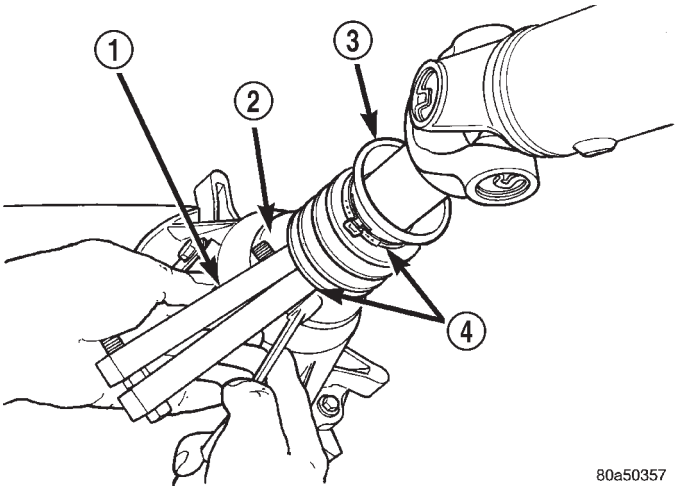


Fig. 74 Slinger Boot Installation - Typical

1 - SPECIAL TOOL C-4975-A
2 - SLINGER
3 - BOOT
4 - CLAMP

SPEED SENSOR

REMOVAL

The Vehicle Speed Sensor (VSS) is located on the speedometer pinion gear adapter. If equipped with 4WD, this adapter is located on the transfer case extension (left side) (Fig. 75). If equipped with 2WD, this adapter is located on the extension housing of the transmission (left side).

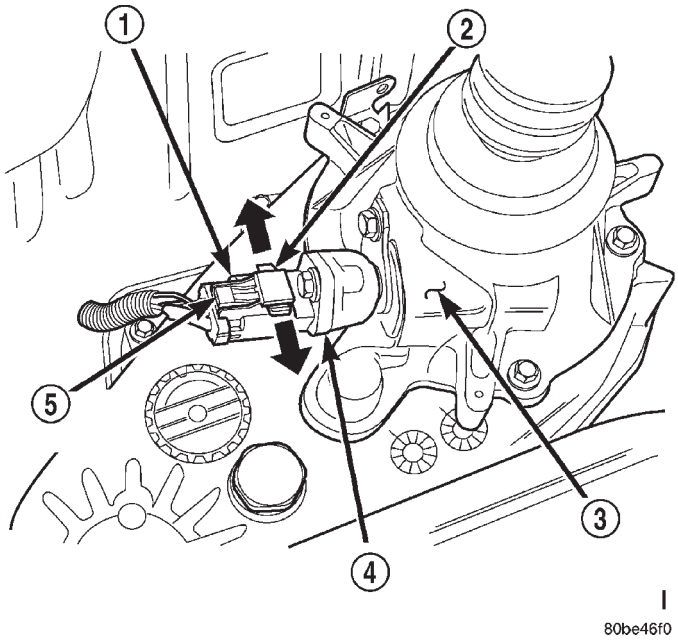


Fig. 75 VSS Location

1 - SENSOR ELECTRICAL CONNECTOR
2 - SLIDE TAB
3 - 4WD TRANSFER CASE EXTENSION
4 - VEHICLE SPEED SENSOR
5 - RELEASE LOCK

(1) Raise and support vehicle.

(2) Disconnect electrical connector from sensor by pushing slide tab (Fig. 75). After slide tab has been positioned, push in on secondary release lock (Fig. 75) on side of connector and pull connector from sensor.

(3) Remove sensor mounting bolt (Fig. 76).

(4) Remove sensor (pull straight out) from speedometer pinion gear adapter (Fig. 76). Do not remove gear adapter from transmission.

SPEED SENSOR (Continued)

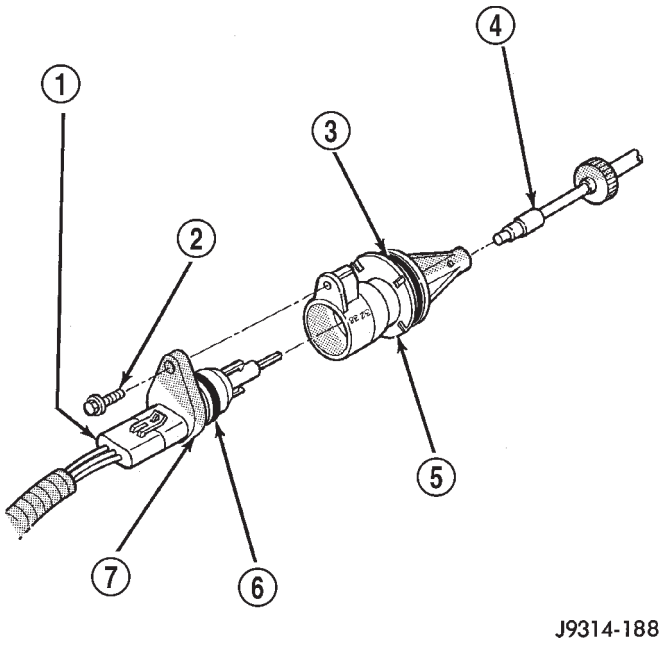


Fig. 76 VSS Removal/Installation

1 - ELECTRICAL CONNECTOR
2 - SENSOR MOUNTING BOLT
3 - O-RING
4 - SPEEDOMETER PINION GEAR
5 - SPEEDOMETER PINION GEAR ADAPTER
6 - O-RING
7 - VEHICLE SPEED SENSOR

INSTALLATION

(1) Clean inside of speedometer pinion gear adapter before installing speed sensor.

(2) Install sensor into speedometer gear adapter and install mounting bolt. Before tightening bolt, verify speed sensor is fully seated (mounted flush) to speedometer pinion gear adapter.

(3) Tighten sensor mounting bolt to 2.2 N·m (20 in. lbs.) torque.

(4) Connect electrical connector to sensor.

SERVICE MANUAL COMMENTS

What features do you find most useful? _____

_____

_____

_____

What errors have you found? Please include page number. _____

_____

_____

_____

_____

What topics are hard to locate, confusing, or not covered completely? _____

_____

_____

_____

_____

What comments or suggestions do you have? _____

_____

_____

_____

_____

Your Name: _____ **Dealership/Distributor:** _____

Address: _____

_____

Vehicle Identification Number _____

Manual Name, Year, Language and Number: _____

All comments become property of DaimlerChrysler International and may be used without compensation.

Fold Here

Place
Stamp
Here

DaimlerChrysler International Operations
Attn. Publications Dept.
CIMS 486-02-70
800 Chrysler Drive
Auburn Hills, MI 48326-2757

Fold Here