

WIRING DIAGRAMS

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8W-01 GENERAL INFORMATION

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DESCRIPTION AND OPERATION

HOW TO USE THIS GROUP

The purpose of this group is to show the electrical circuits in a clear, simple fashion and to make troubleshooting easier. Components that work together are shown together. All electrical components used in a specific system are shown on one diagram. The feed for a system is shown at the top of the page. All wires, connectors, splices, and components are shown in the flow of current to the bottom of the page. Wiring which is not part of the circuit represented is referenced to another page/section, where the complete circuit is shown. In addition, all switches, components, and modules are shown in the **at rest position with the doors closed and the key removed from the ignition.**

If a component is part of several different circuits, it is shown in the diagram for each. For example, the headlamp switch is the main part of the exterior lighting, but it also affects the interior lighting and the chime warning system. **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.**

SECTION IDENTIFICATION

Sections in Group 8W are organized by sub-systems. The sections contain circuit operation descrip-

tions, helpful information, and system diagrams. The intention is to organize information by system, consistently from year to year.

CONNECTOR/GROUND LOCATIONS

Section 8W-90 contains connector/ground location illustrations. The illustrations contain the connector name (or number)/ground number and component identification. Connector/ground location charts in Section 8W-90 reference the illustration number for components and connectors.

Section 8W-80 shows each connector and the circuits involved with that connector. The connectors are identified using the name/number on the Diagram pages.

SPLICE LOCATIONS

Splice Location charts in Section 8W-70 show the entire splice, and provide references to other sections the splice serves.

Section 8W-95 contains illustrations that show the general location of the splices in each harness. The illustrations show the splice by number, and provide a written location.

NOTES, CAUTIONS, and WARNINGS

Throughout this group additional important information is presented in three ways; Notes, Cautions, and Warnings.

NOTES are used to help describe how switches or components operate to complete a particular circuit. They are also used to indicate different conditions

DESCRIPTION AND OPERATION (Continued)

that may appear on the vehicle. For example, an up-to and after condition.

CAUTIONS are used to indicate information that could prevent making an error that may damage the vehicle.

WARNINGS provide information to prevent personal injury and vehicle damage. Below is a list of general warnings that should be followed any time a vehicle is being serviced.

WARNING: ALWAYS WEAR SAFETY GLASSES FOR EYE PROTECTION.

WARNING: USE SAFETY STANDS ANYTIME A PROCEDURE REQUIRES BEING UNDER A VEHICLE.

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.

WIRE CODE IDENTIFICATION

Each wire shown in the diagrams contains a code (Fig. 1) which identifies the main circuit, part of the main circuit, gauge of wire, and color. The color is shown as a two letter code which can be identified by referring to the Wire Color Code Chart (Fig. 2)

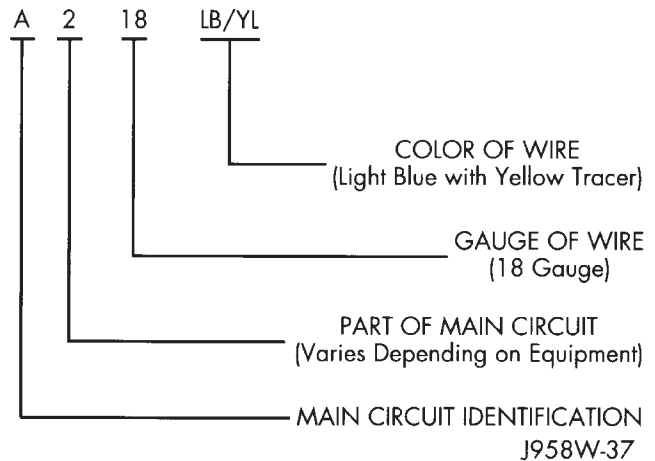


Fig. 1 Wire Code Identification

COLOR CODE	COLOR	STANDARD TRACER COLOR	COLOR CODE	COLOR	STANDARD TRACER CODE
BL	BLUE	WT	OR	ORANGE	BK
BK	BLACK	WT	PK	PINK	BK OR WT
BR	BROWN	WT	RD	RED	WT
DB	DARK BLUE	WT	TN	TAN	WT
DG	DARK GREEN	WT	VT	VIOLET	WT
GY	GRAY	BK	WT	WHITE	BK
LB	LIGHT BLUE	BK	YL	YELLOW	BK
LG	LIGHT GREEN	BK	*	WITH TRACER	

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Fig. 2 Wire Color Code Chart

DESCRIPTION AND OPERATION (Continued)

CIRCUIT IDENTIFICATION

All circuits in the diagrams use an alpha/numeric code to identify the wire and its function (Fig. 3). To identify which circuit code applies to a system, refer to the Circuit Identification Code Chart. This chart shows the main circuits only and does not show the secondary codes that may apply to some models.

<u>CIRCUIT</u>	<u>FUNCTION</u>
A	Battery Feed
B	Brake Controls
C	Climate Controls
D	Diagnostic Circuits
E	Dimming Illumination Circuits
F	Fused Circuits (Secondary Feed)
G	Monitoring Circuits (Gauges)
H	Open
I	Not Used
J	Open
K	Powertrain Control Module
L	Exterior Lighting
M	Interior Lighting
N	ESA Module
O	Not Used
P	Power Option (Battery Feed)
Q	Power Options (Battery Feed)
R	Passive Restraint
S	Suspension/Steering
T	Transmission/Transaxle/Transfer Case
U	Open
V	Speed Control, Washer/Wiper
W	Open
X	Audio Systems
Y	Open
Z	Grounds

948W-190

Fig. 3 Circuit Identification

CONNECTORS

Connectors shown in the diagrams are identified using the international standard arrows for male and female terminals (Fig. 4). A connector identifier is placed next to the arrows to indicate the connector number (Fig. 4).

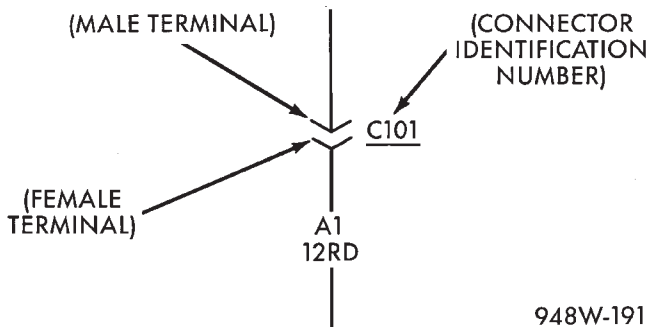


Fig. 4 Connector Identification

For viewing connector pin outs, with two terminals or greater, refer to section 8W-80. This section identifies in-line connectors by number, and component connectors by name. If a component has two or more connectors they will be identified as C1, C2, C3...etc. This sections also provides terminal numbering, circuit identification, wire colors, and functions.

All connectors are viewed from the terminal end unless otherwise specified. To find the connector location in the vehicle refer to section 8W-90. This section uses the connector identification number from the wiring diagrams to provide a figure number reference.

TAKE OUTS

The abbreviation T/O is used in the component location section to indicate a point in which the wiring harness branches out to a component.

SYMBOLS

Various symbols are used throughout the Wiring Diagrams. These symbols can be identified by referring to the symbol identification chart (Fig. 5).

DESCRIPTION AND OPERATION (Continued)








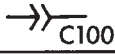




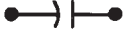











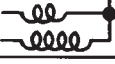






















LEGEND OF SYMBOLS USED ON WIRING DIAGRAMS			
	POSITIVE		BY-DIRECTIONAL ZENER DIODE
	NEGATIVE		MOTOR
	GROUND		ARMATURE AND BRUSHES
	FUSE		CONNECTOR IDENTIFICATION
	GANG FUSES WITH BUSS BAR		MALE CONNECTOR
	CIRCUIT BREAKER		FEMALE CONNECTOR
	CAPACITOR		DENOTES WIRE CONTINUES ELSEWHERE
	OHMS		DENOTES WIRE GOES TO ONE OF TWO CIRCUITS
	RESISTOR		SPLICE
	VARIABLE RESISTOR		SPLICE IDENTIFICATION
	SERIES RESISTOR		THERMAL ELEMENT
	COIL		TIMER
	STEP UP COIL		MULTIPLE CONNECTOR
	OPEN CONTACT		OPTIONAL WIRING WITH WIRING WITHOUT
	CLOSED CONTACT		"Y" WINDINGS
	CLOSED SWITCH		DIGITAL READOUT
	OPEN SWITCH		SINGLE FILAMENT LAMP
	CLOSED GANGED SWITCH		DUAL FILAMENT LAMP
	OPEN GANGED SWITCH		L.E.D. — LIGHT EMITTING DIODE
	TWO POLE SINGLE THROW SWITCH		THERMISTOR
	PRESSURE SWITCH		GAUGE
	SOLENOID SWITCH		SENSOR
	MERCURY SWITCH		FUEL INJECTOR
	DIODE OR RECTIFIER		

Fig. 5 Symbol Identification

DESCRIPTION AND OPERATION (Continued)

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES

All ESD sensitive components are solid state and a symbol (Fig. 6) is used to indicate this. When handling any component with this symbol comply with the following procedures to reduce the possibility of electrostatic charge build up on the body and inadvertent discharge into the component. If it is not known whether the part is ESD sensitive, assume that it is.

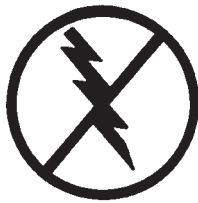
(1) Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position, or walking a distance.

(2) Avoid touching electrical terminals of the part, unless instructed to do so by a written procedure.

(3) When using a voltmeter, be sure to connect the ground lead first.

(4) Do not remove the part from its protective packing until it is time to install the part.

(5) Before removing the part from its package, ground the package to a known good ground on the vehicle.



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Fig. 6 Electrostatic Discharge Symbol**DIAGNOSIS AND TESTING****TROUBLESHOOTING TOOLS**

When diagnosing a problem in an electrical circuit there are several common tools necessary. These tools are listed and explained below.

- Jumper Wire - This is a test wire used to connect two points of a circuit. It can be used to bypass an open in a circuit.

WARNING: NEVER USE A JUMPER WIRE ACROSS A LOAD, SUCH AS A MOTOR, CONNECTED BETWEEN A BATTERY FEED AND GROUND.

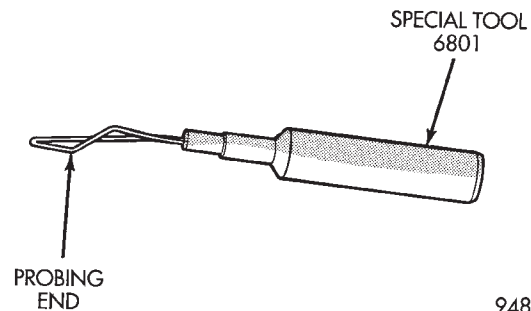
- Voltmeter - Used to check for voltage on a circuit. Always connect the black lead to a known good ground and the red lead to the positive side of the circuit.

CAUTION: Most of the electrical components used in today's vehicle are solid state. When checking voltages in these circuits use a meter with a 10-megohm or greater impedance.

- Ohmmeter - Used to check the resistance between two points of a circuit. Low or no resistance in a circuit means good continuity.

CAUTION: - Most of the electrical components used in today's vehicle are Solid State. When checking resistance in these circuits use a meter with a 10-megohm or greater impedance. In addition, make sure the power is disconnected from the circuit. Circuits that are powered up by the vehicle electrical system can cause damage to the equipment and provide false readings.

- Probing Tools - These tools are used for probing terminals in connectors (Fig. 7). 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.



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Fig. 7 Probing Tool**INTERMITTENT AND POOR CONNECTIONS**

Most intermittent electrical problems are caused by faulty electrical connections or wiring. It is also possible for a sticking component or relay to cause a problem. Before condemning a component or wiring assembly check the following items.

- Connectors are fully seated
- Spread terminals, or terminal push out
- Terminals in the wiring assembly are fully seated into the connector/component and locked in position
- Dirt or corrosion on the terminals. Any amount of corrosion or dirt could cause an intermittent problem
- Damaged connector/component casing exposing the item to dirt and moisture
- Wire insulation that has rubbed through causing a short to ground
- Wiring broke inside of the insulation

DIAGNOSIS AND TESTING (Continued)

TROUBLESHOOTING TESTS

Before beginning any tests on a vehicles electrical system use the Wiring Diagrams and study the circuit. Also refer to the Troubleshooting Wiring Problems section in this section.

TESTING FOR VOLTAGE

(1) Connect the ground lead of a voltmeter to a known good ground (Fig. 8).

(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.

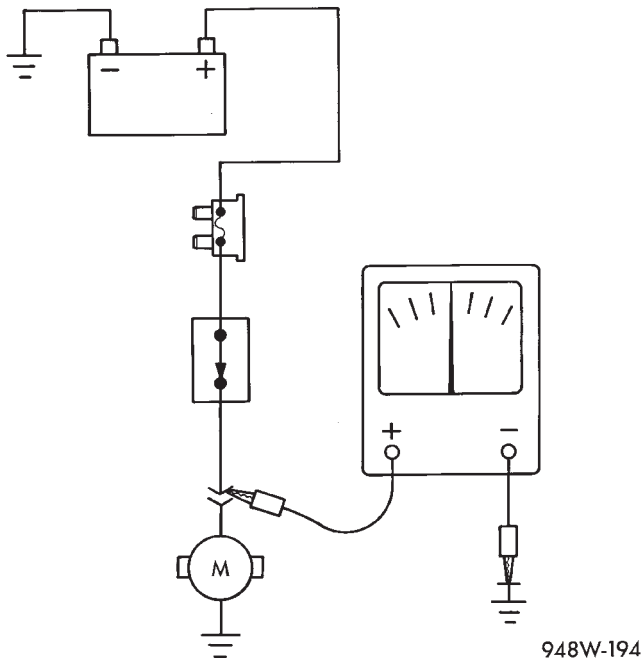


Fig. 8 Testing for Voltage

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. 9).

(3) Connect the other lead to the other end of the circuit being tested. Low or no resistance means good continuity.

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.

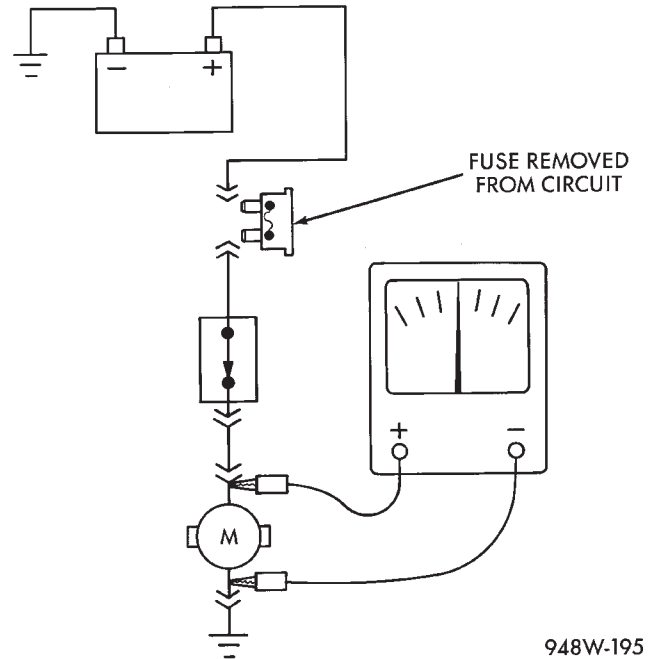


Fig. 9 Testing for Continuity

TESTING FOR A SHORT TO GROUND ON FUSES POWERING SEVERAL LOADS

(1) Refer to the wiring diagrams and disconnect or isolate all items on the fused circuit.

(2) Replace the blown fuse.

(3) Supply power to the fuse by turning ON the ignition switch or re-connecting the battery.

(4) Start connecting the items in the fuse circuit one at a time. When the fuse blows the circuit with the short to ground has been isolated.

TESTING FOR A VOLTAGE DROP

(1) Connect the positive lead of the voltmeter to the side of the circuit closest to the battery (Fig. 10).

(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.

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.

DIAGNOSIS AND TESTING (Continued)

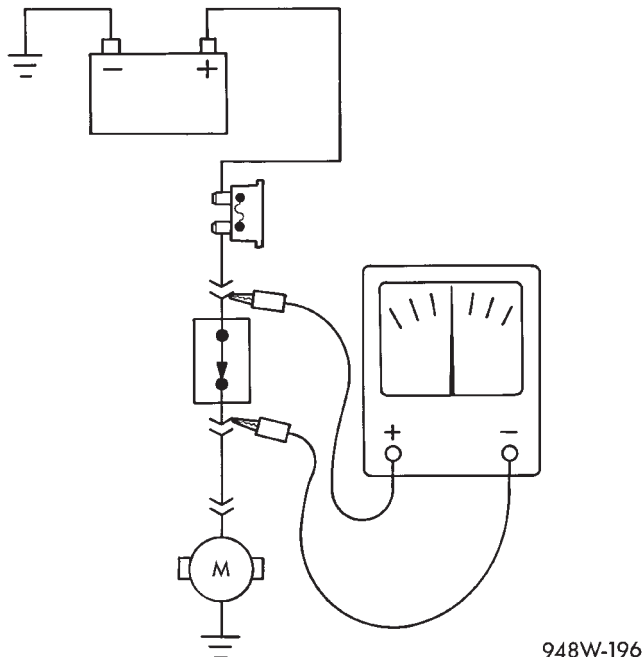


Fig. 10 Testing for Voltage Drop

(3) Analyze the symptoms. Use the wiring diagrams to determine what the circuit is doing, where the problem most likely is occurring and where the diagnosis will continue.

- (4) Isolate the problem area.
- (5) Repair the problem.
- (6) Verify proper operation. For this step check for proper operation of all items on the repaired circuit. Refer to the wiring diagrams.

SERVICE PROCEDURES

WIRING REPAIR

When replacing or repairing a wire, it is important that the correct gauge be used as shown in the wiring diagrams. The wires must also be held securely in place to prevent damage to the insulation.

- (1) Disconnect battery negative cable
- (2) Remove 1 inch of insulation from each end of the wire.
- (3) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.
- (4) Spread the strands of the wire apart on each part of the exposed wire (example 1). (Fig. 11)
- (5) Push the two ends of wire together until the strands of wire are close to the insulation (example 2) (Fig. 11)
- (6) Twist the wires together (example 3) (Fig. 11)
- (7) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

- (8) Center the heat shrink tubing over the joint, and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.
- (9) Secure the wire to the existing ones to prevent chafing or damage to the insulation
- (10) Connect battery and test all affected systems.

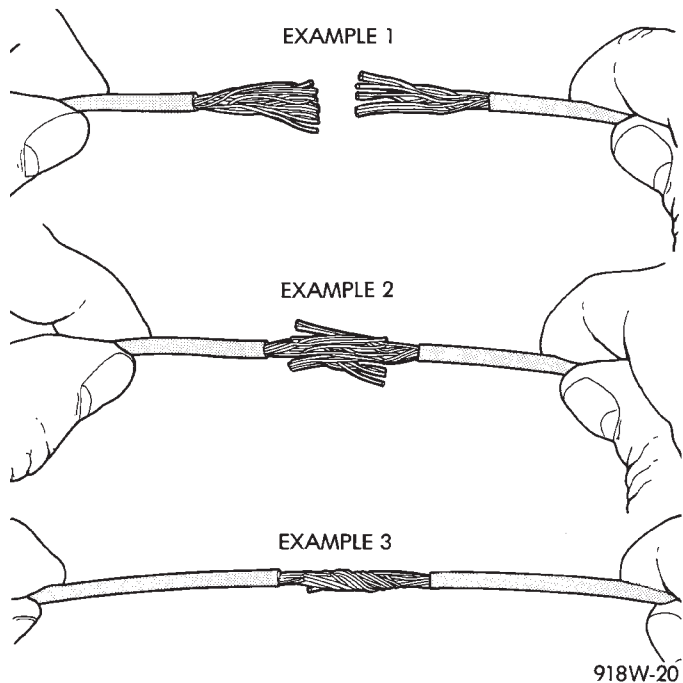


Fig. 11 Wire Repair

TERMINAL/CONNECTOR REPAIR-MOLEX CONNECTORS

- (1) Disconnect battery.
- (2) Disconnect the connector from its mating half/component.
- (3) Insert the terminal releasing special tool 6742 into the terminal end of the connector (Fig. 12).

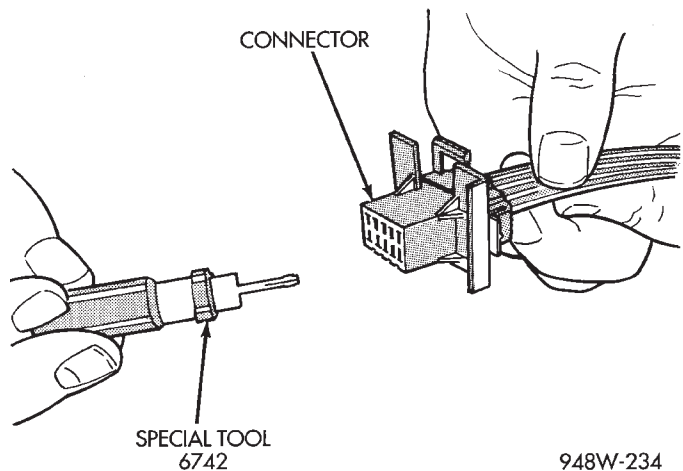


Fig. 12 Molex Connector Repair

SERVICE PROCEDURES (Continued)

(4) Using special tool 6742 release the locking fingers on the terminal (Fig. 13).

(5) Pull on the wire to remove it from the connector.

(6) Repair or replace the connector or terminal, as necessary.

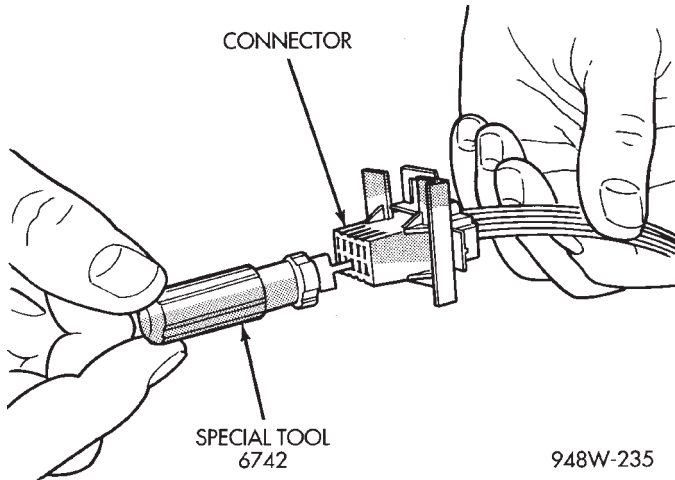


Fig. 13 Using Special Tool 6742

TERMINAL/CONNECTOR REPAIR—THOMAS AND BETTS CONNECTORS

- (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. 14).

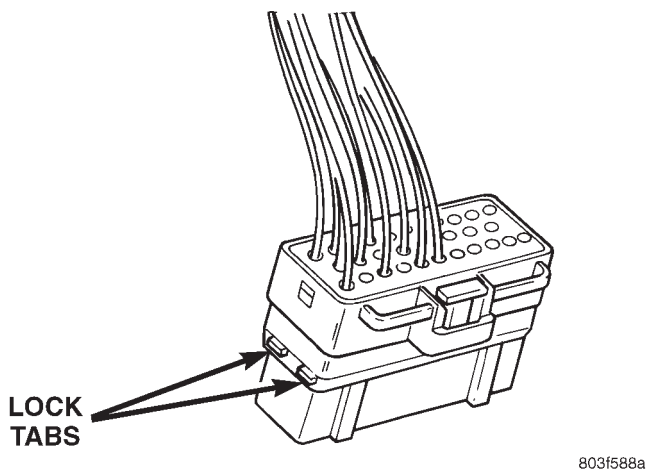


Fig. 14 Thomas and Betts Connector Lock Release Tabs

(4) Insert the probe end of special tool 6934 into the back of the connector cavity (Fig. 15).

(5) Grasp the wire and tool 6934 and slowly remove the wire and terminal from the connector.

(6) Repair or replace the terminal.

(7) Install the wire and terminal in the connector. Fully seat the terminal in the connector.

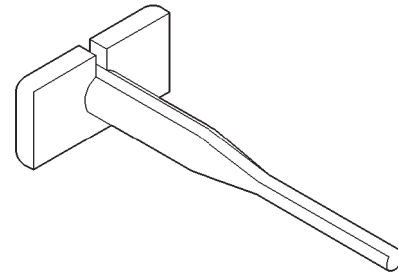


Fig. 15 Removing Wire Terminal

(8) Push in the single lock tab on the side of the connector (Fig. 16).

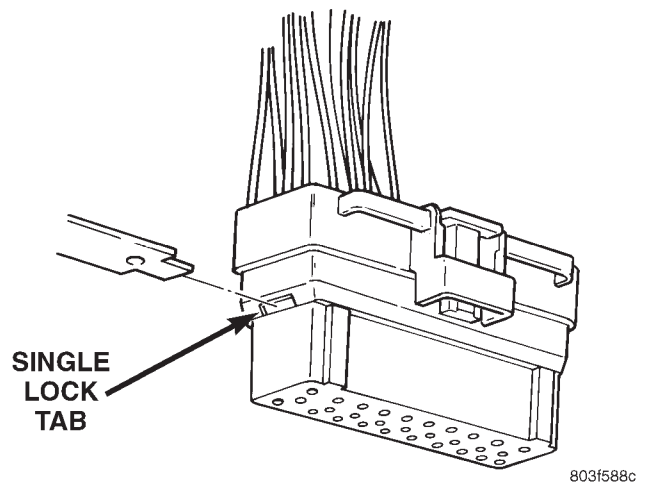


Fig. 16 Single Lock Tab

CONNECTOR REPLACEMENT

- (1) Disconnect battery.
- (2) Disconnect the connector that is to be repaired from its mating half/component
- (3) Remove the connector locking wedge, if required (Fig. 17)

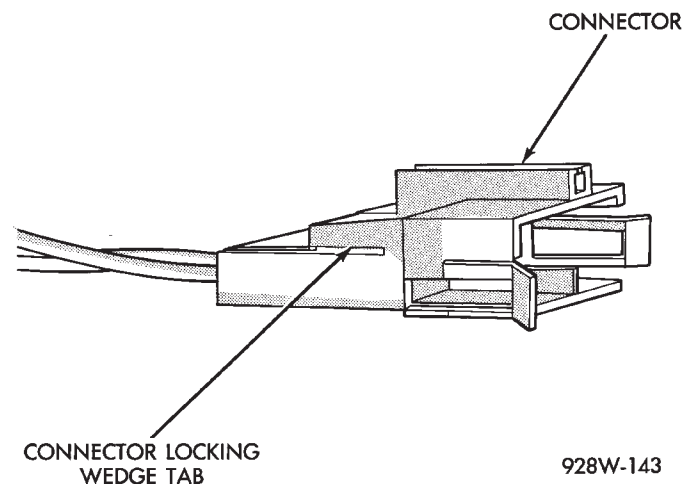


Fig. 17 Connector Locking Wedge

SERVICE PROCEDURES (Continued)

- (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. 18) (Fig. 19).
- (5) Reset the terminal locking tang, if it has one.
- (6) Insert the removed wire in the same cavity on the repair connector.
- (7) Repeat steps four through six for each wire in the connector, being sure that all wires are inserted into the proper cavities. For additional connector pin-out identification, refer to the wiring diagrams.
- (8) Insert the connector locking wedge into the repaired connector, if required.
- (9) Connect connector to its mating half/component.
- (10) Connect battery and test all affected systems.

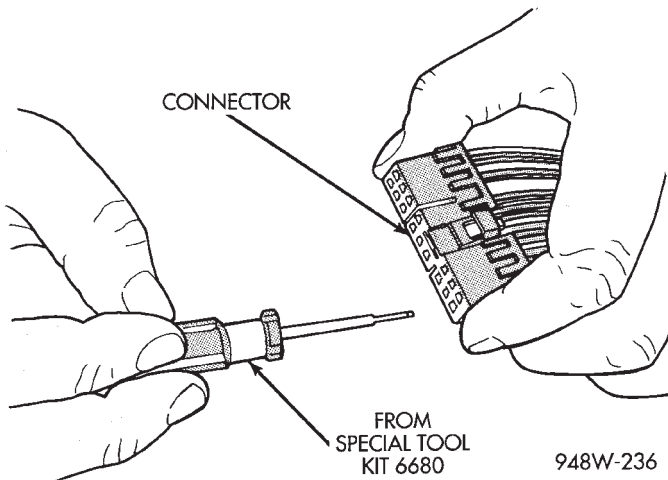


Fig. 18 Terminal Removal

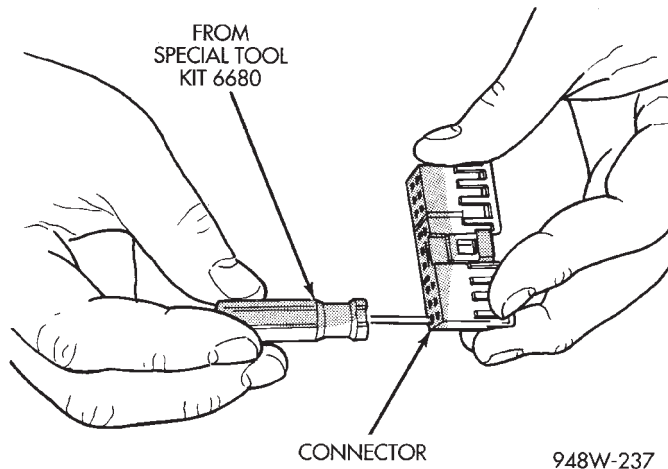


Fig. 19 Terminal Removal Using Special Tool

CONNECTOR AND TERMINAL REPLACEMENT

- (1) Disconnect battery.
- (2) Disconnect the connector (that is to be repaired) from its mating half/component.

- (3) Cut off the existing wire connector directly behind the insulator. Remove six inches of tape from the harness.
- (4) Stagger cut all wires on the harness side at 1/2 inch intervals (Fig. 20).
- (5) Remove 1 inch of insulation from each wire on the harness side.
- (6) Stagger cut the matching wires on the repair connector assembly in the opposite order as was done on the harness side of the repair. Allow extra length for soldered connections. Check that the overall length is the same as the original (Fig. 20).

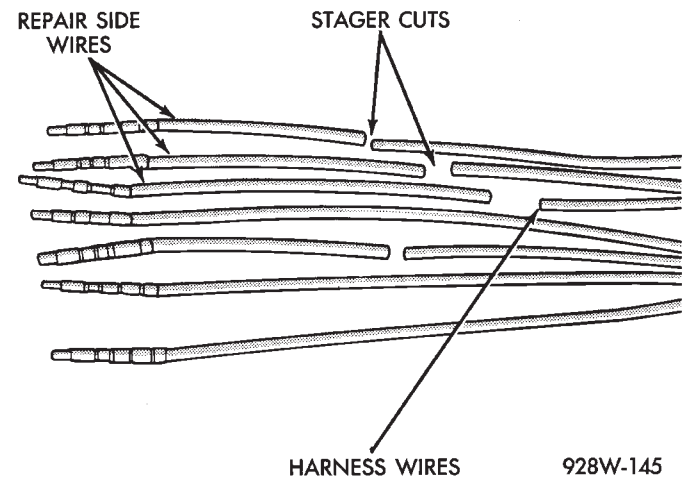


Fig. 20 Stagger Cutting Wires

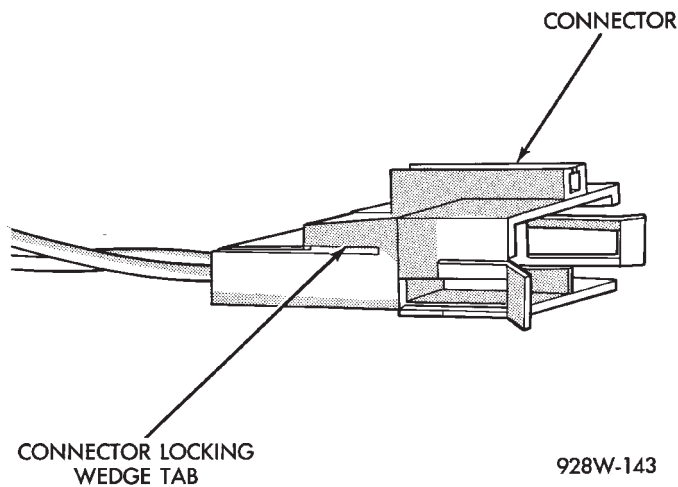
- (7) Remove 1 inch of insulation from each wire.
- (8) Place a piece of heat shrink tubing over one side of the wire. Be sure the tubing will be long enough to cover and seal the entire repair area.
- (9) Spread the strands of the wire apart on each part of the exposed wires.
- (10) Push the two ends of wire together until the strands of wire are close to the insulation.
- (11) Twist the wires together.
- (12) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**
- (13) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing
- (14) Repeat steps 8 through 13 for each wire.
- (15) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.
- (16) Re-connect the repaired connector.
- (17) Connect the battery, and test all affected systems.

TERMINAL REPLACEMENT

- (1) Disconnect battery.
- (2) Disconnect the connector being repaired from its mating half. Remove connector locking wedge, if required (Fig. 21).

SERVICE PROCEDURES (Continued)

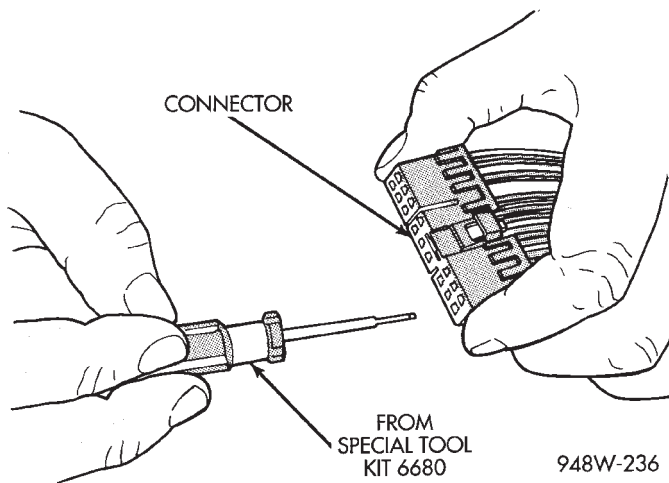
(3) Remove connector locking wedge, if required (Fig. 21).



928W-143

Fig. 21 Connector Locking Wedge Tab (Typical)

(4) Position the connector locking finger away from the terminal using the proper pick from special tool kit 6680. Pull on the wire to remove the terminal from the connector (Fig. 22) (Fig. 23).



948W-236

Fig. 22 Terminal Removal

(5) Cut the wire 6 inches from the back of the connector.

(6) Remove 1 inch of insulation from the wire on the harness side.

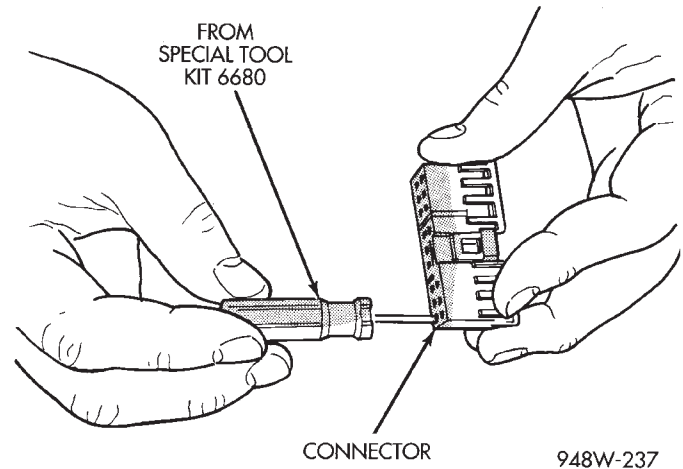
(7) Select a wire from the terminal repair assembly that best matches the color wire being repaired.

(8) Cut the repair wire to the proper length and remove 1 inch of insulation.

(9) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(10) Spread the strands of the wire apart on each part of the exposed wires.

(11) Push the two ends of wire together until the strands of wire are close to the insulation.



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Fig. 23 Terminal Removal Using Special Tool

(12) Twist the wires together.

(13) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(14) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(15) Insert the repaired wire into the connector.

(16) Install the connector locking wedge, if required, and reconnect the connector to its mating half/component.

(17) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.

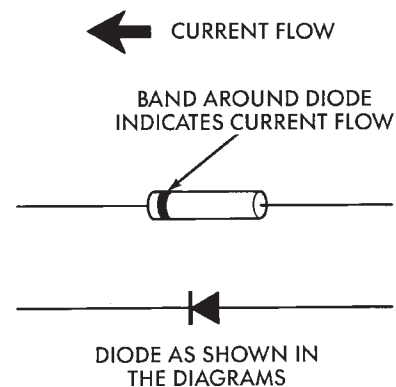
(18) Connect battery, and test all affected systems.

DIODE REPLACEMENT

(1) Disconnect the battery.

(2) Locate the diode in the harness, and remove the protective covering.

(3) Remove the diode from the harness, pay attention to the current flow direction (Fig. 24).



948W-197

Fig. 24 Diode Identification

SERVICE PROCEDURES (Continued)

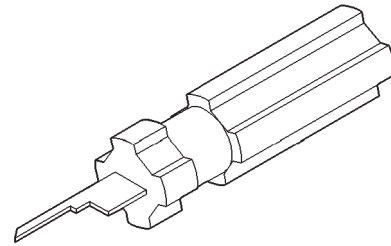
(4) Remove the insulation from the wires in the harness. Only remove enough insulation to solder in the new diode.

(5) Install the new diode in the harness, making sure current flow is correct. If necessary refer to the appropriate wiring diagram for current flow.

(6) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(7) Tape the diode to the harness using electrical tape making, sure the diode is completely sealed from the elements

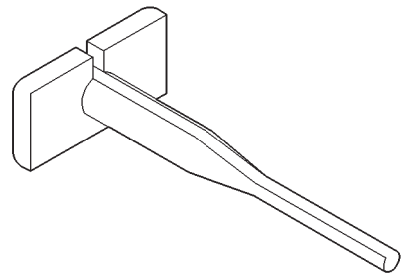
(8) Re-connect the battery, and test affected systems.



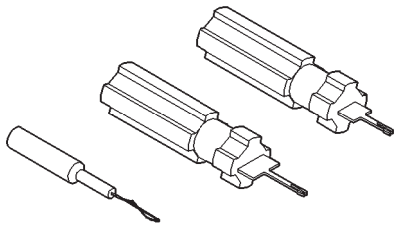
Terminal Removing Tool 6932

SPECIAL TOOLS

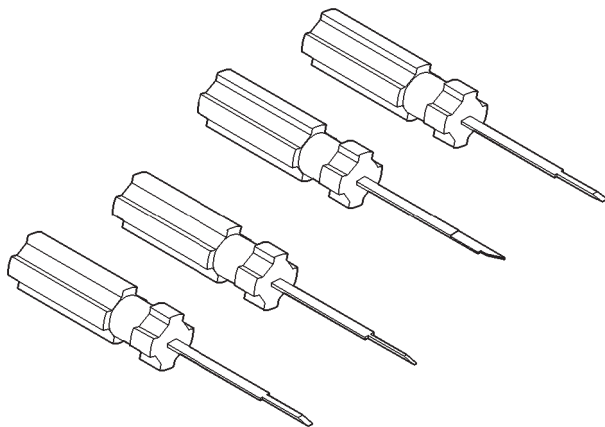
WIRING/TERMINAL



Terminal Removing Tool 6934



Probing Tool Package 6807



Terminal Pick 6680

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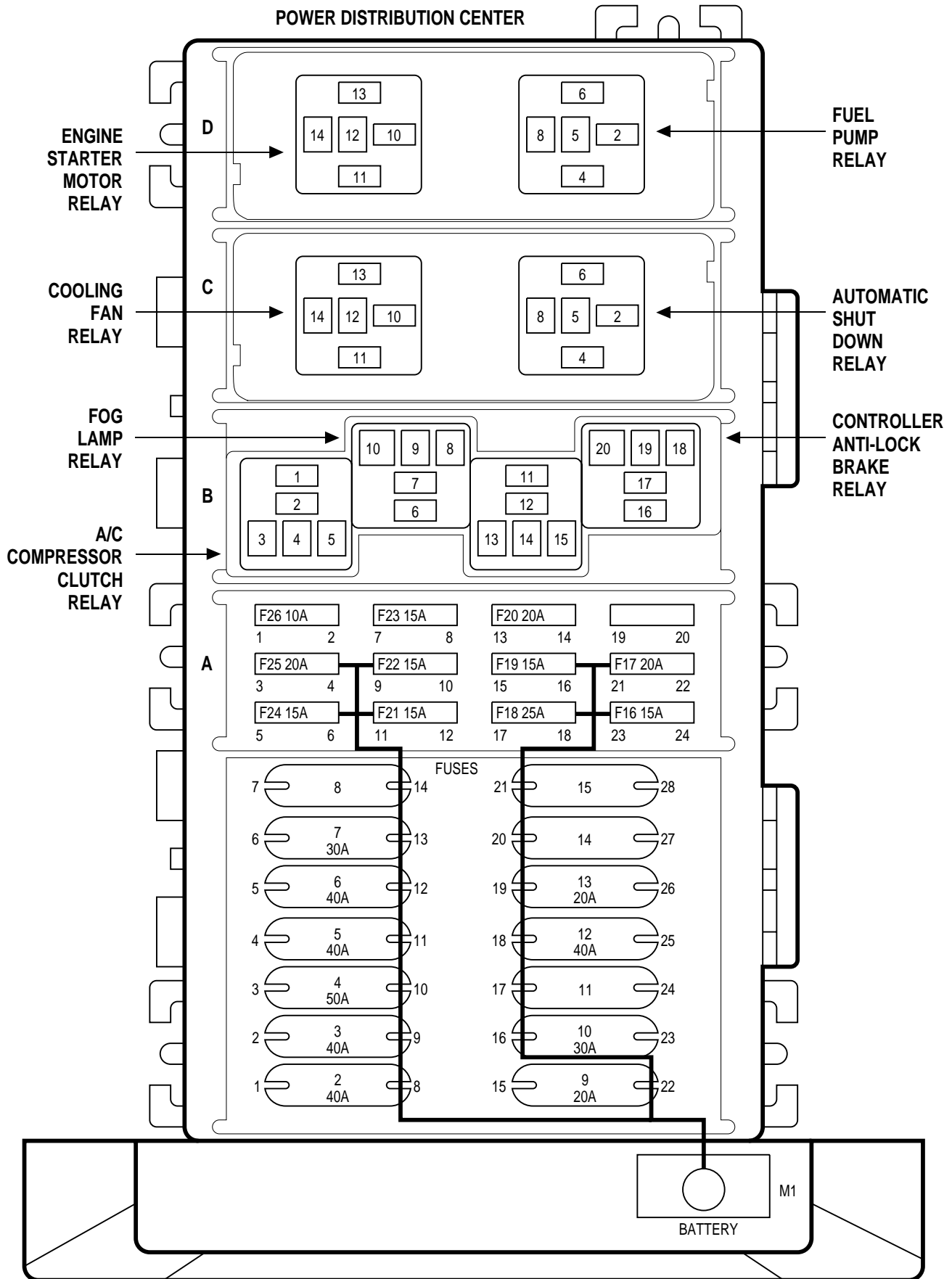
INTRODUCTION

This section provides an alphabetical listing of all the components covered in group 8W. For information on system operation, refer to the appropriate section of the wiring diagrams.

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FUSES

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2	40A	A1 12RD IGNITION SWITCH	A0 6RD
3	40A	A2 12PK/BK IGNITION SWITCH	A0 6RD
4	40A	A7 10RD/BK	A0 6RD
5	40A	F141 12LG/RD COOLING FAN RELAY	A0 6RD
6	40A	A111 12RD/LG A/C HEATER CONTROL	A0 6RD
7	30A	A3 16RD/WT	A0 6RD
8	-	-	-
9	20A	A17 16RD/BK	A0 6RD
		A17 16RD/BK	A0 6RD
10	30A	A4 14BK/PK	A0 6RD
		A4 14BK/PK	
11	-	-	-
12	40A	A10 12RD/DG ABS CONTROL MODULE	A0 6RD
13	20A	A20 14RD/DB ABS CONTROL MODULE	A0 6RD
14	-	-	-
15	-	-	-
16	15A	M1 20PK	A0 6RD
17	20A	F34 18TN/BK	A0 6RD
18	25A	A16 16RD/LG AUTOMATIC SHUT DOWN RELAY	A0 6RD
19	15A	L9 20BK/PK COMBINATION FLASHER	A0 6RD
20	20A	A142 18DG/OR	A999 16RD
21	15A	A61 14DG/BK	A0 6RD
22	15A	F32 20PK/DB STOP LAMP SWITCH	A0 6RD
23	15A	F142 20DG/WT	A999 16RD
24	15A	F61 20WT/OR FOG LAMP RELAY NO. 1	A0 6RD
25	20A	F75 16VT POWER AMPLIFIER	A0 6RD
26	10A	F1 20DB/GY	A17 16RD/BK

A/C COMPRESSOR CLUTCH RELAY

CAVITY	CIRCUIT	FUNCTION
B1	A17 16RD/BK	FUSED B(+)
B2	C3 16DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
B3	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
B4	-	-
B5	F12 18DB/WT	FUSED IGN. (ST-RUN)

FOG LAMP RELAY

CAVITY	CIRCUIT	FUNCTION
B6	F61 20WT/OR	FUSED B(+)
B7	L139 20VT	FOG LAMP RELAY OUTPUT
B8	L35 20BR/WT	GROUND
B9	-	-
B10	L77 20BR/YL	FUSED HEADLAMP SWITCH OUTPUT
	L77 20BR/YL	FUSED HEADLAMP SWITCH OUTPUT

CONTROLLER ANTI-LOCK BRAKE RELAY

CAVITY	CIRCUIT	FUNCTION
B16	G19 20LG/OR	CONTROLLER ANTI-LOCK BRAKE INDICATOR OUTPUT
B17	-	-
B18	G83 20GY/BK	CONTROLLER ANTI-LOCK BRAKE RELAY CONTROL
B19	Z1 20BK	GROUND
B20	F15 20DB/WT	FUSED IGNITION (RUN)

AUTOMATIC SHUT DOWN RELAY

CAVITY	CIRCUIT	FUNCTION
C2	A16 16RD/LG	FUSED B(+)
C4	F12 18DB/WT	FUSED IGN. (ST-RUN)
C5	-	-
C6	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
C8	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT
	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT

COOLING FAN RELAY

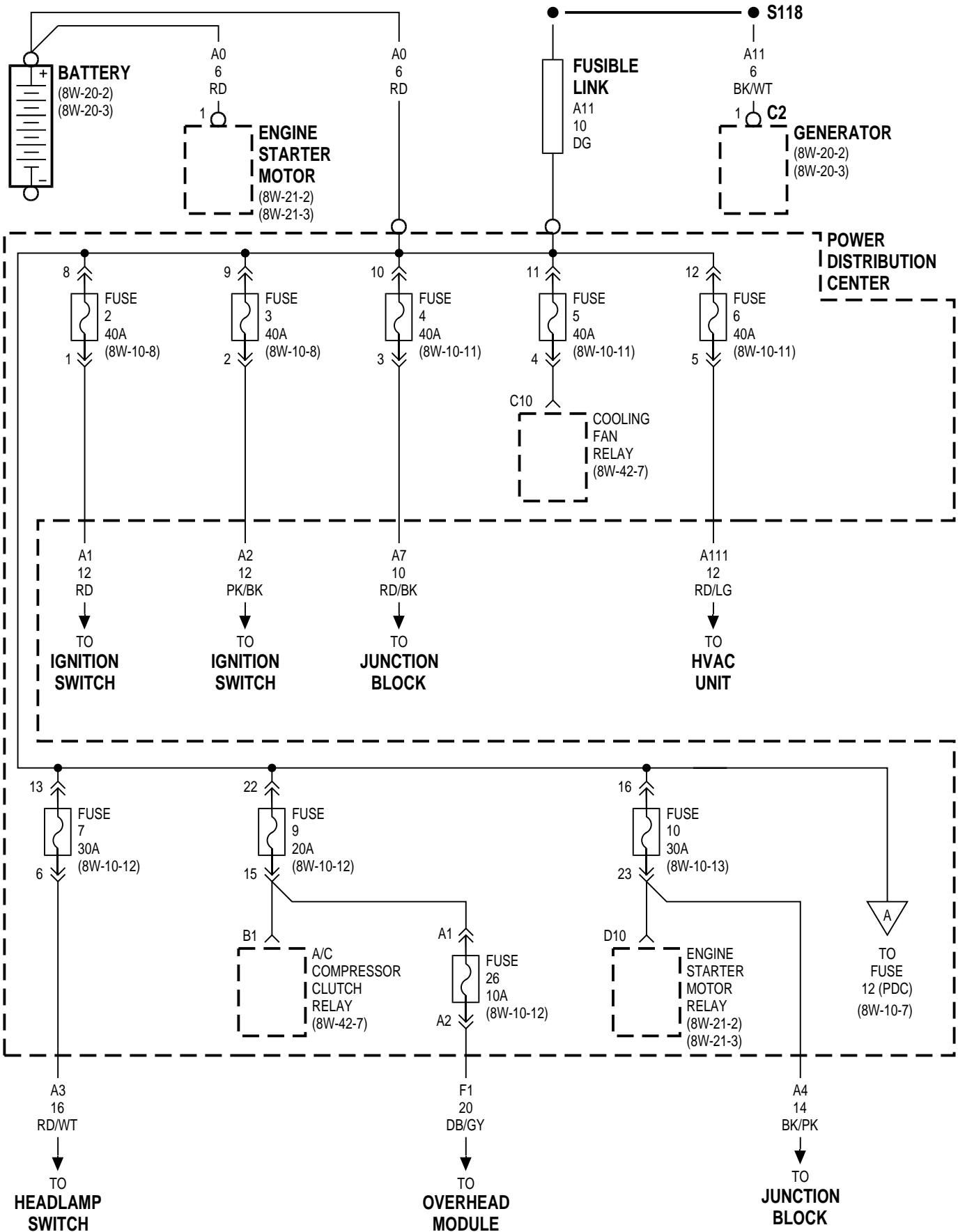
CAVITY	CIRCUIT	FUNCTION
C10	F141 12LG/RD	FUSED B(+)
C11	F12 18DB/WT	FUSED IGN. (ST-RUN)
C12	-	-
C13	C27 18DB/PK	COOLING FAN RELAY CONTROL
C14	C25 12LB	COOLING FAN RELAY OUTPUT

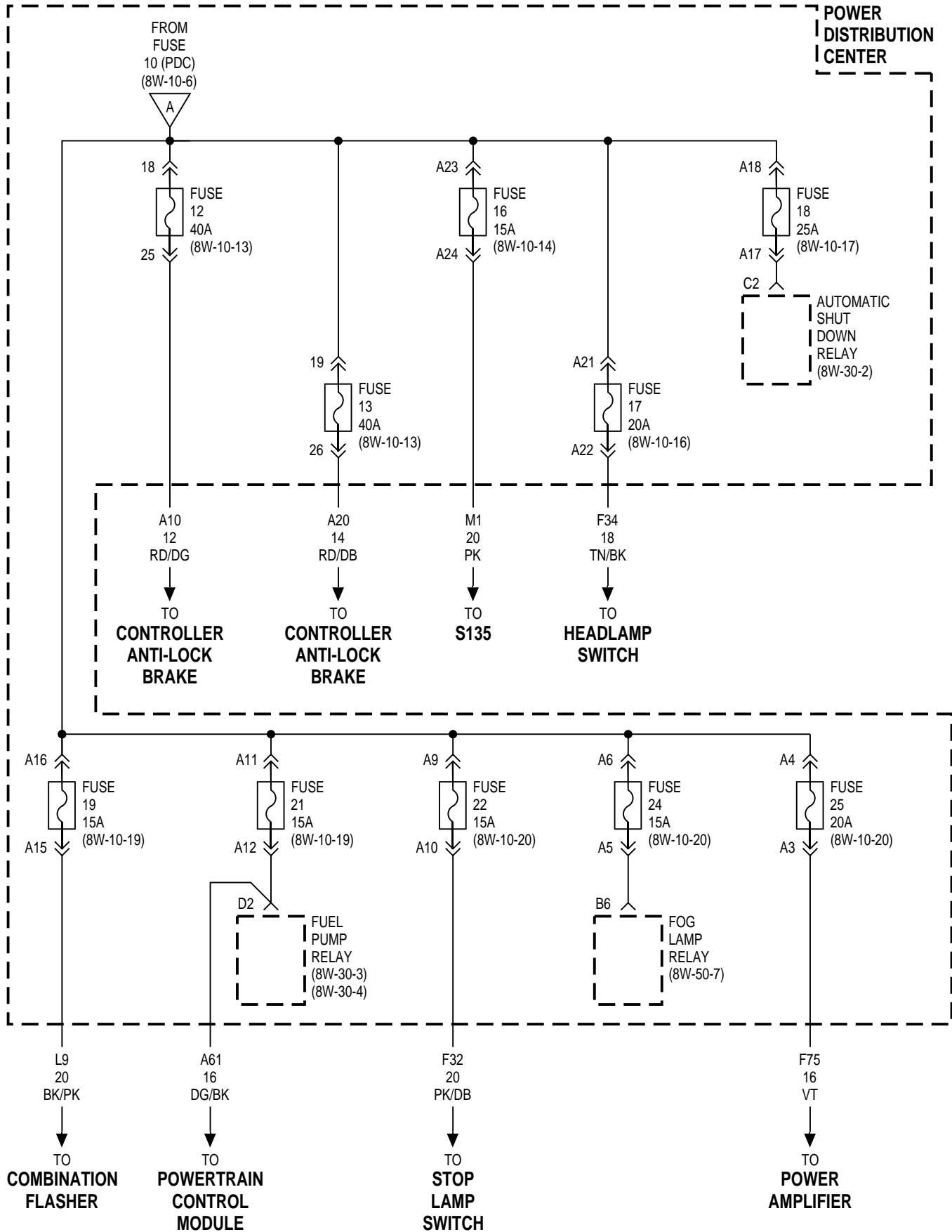
FUEL PUMP RELAY

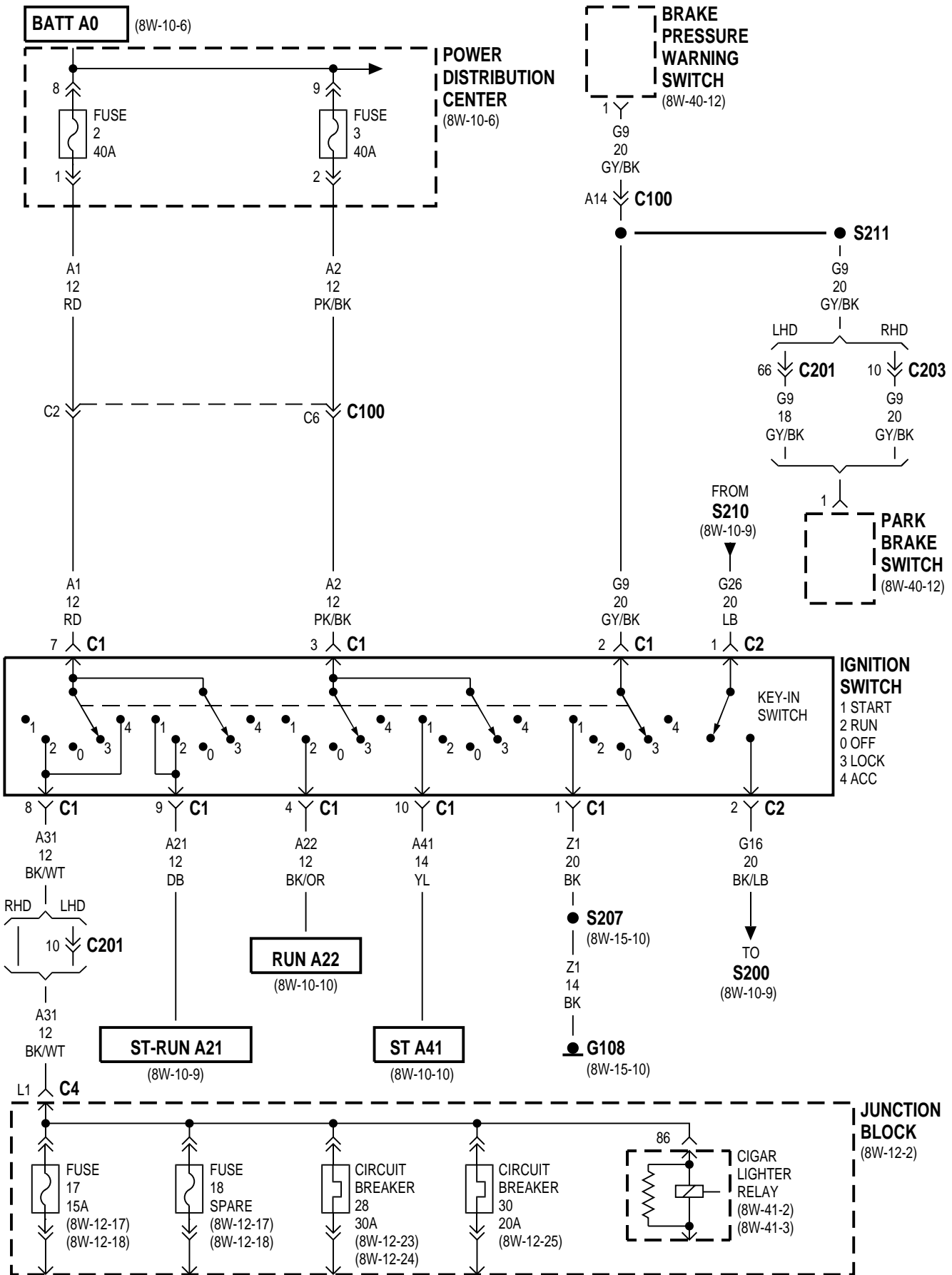
CAVITY	CIRCUIT	FUNCTION
D2	A61 14DG/BK	FUSED B(+)
	A61 14DG/BK	FUSED B(+)
D4	F12 18DB/WT	FUSED IGN. (ST-RUN)
D5	-	-
D6	K31 18BR	FUEL PUMP RELAY CONTROL
D8	A141 14DG/WT	FUEL PUMP RELAY OUTPUT

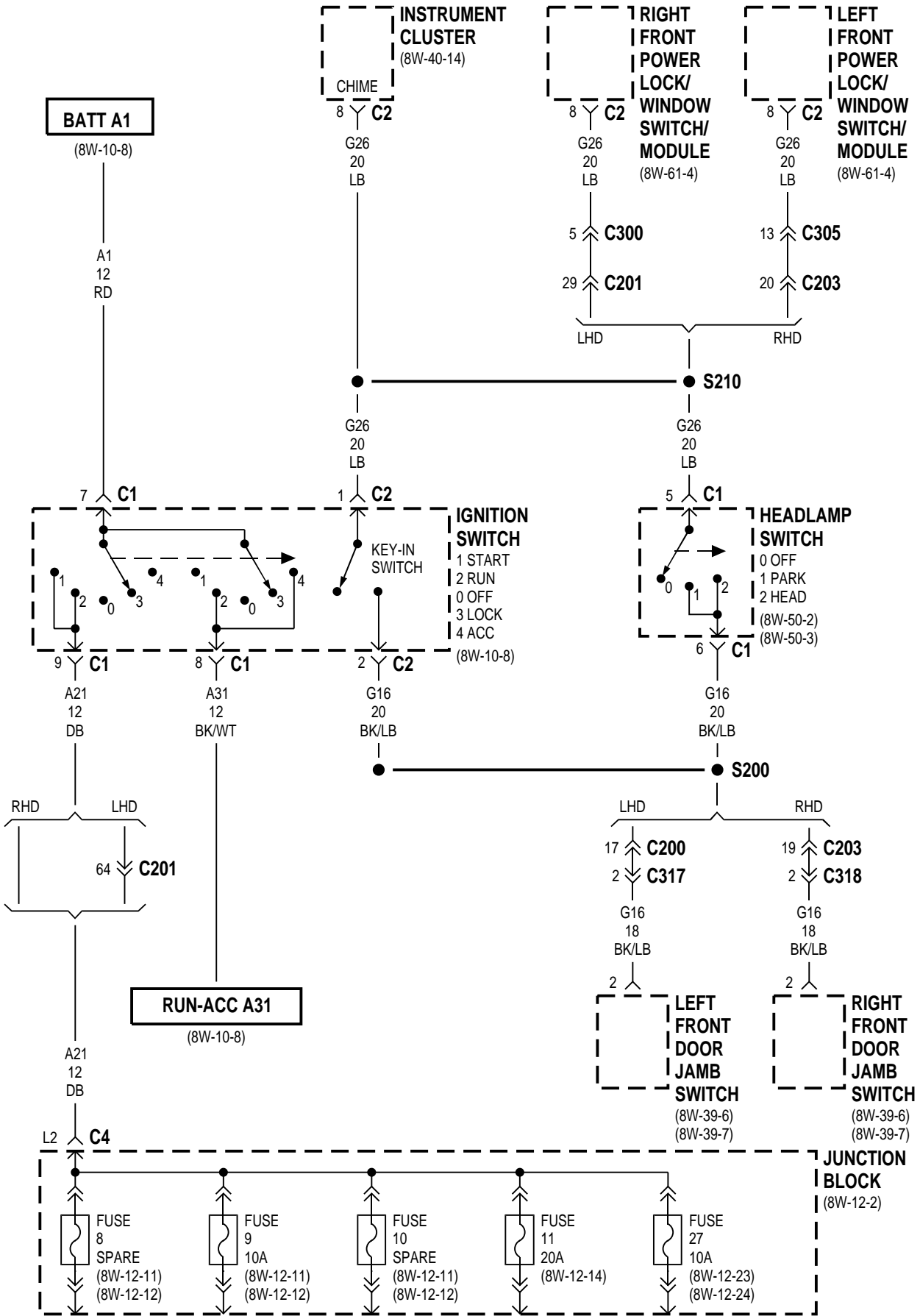
ENGINE STARTER MOTOR RELAY

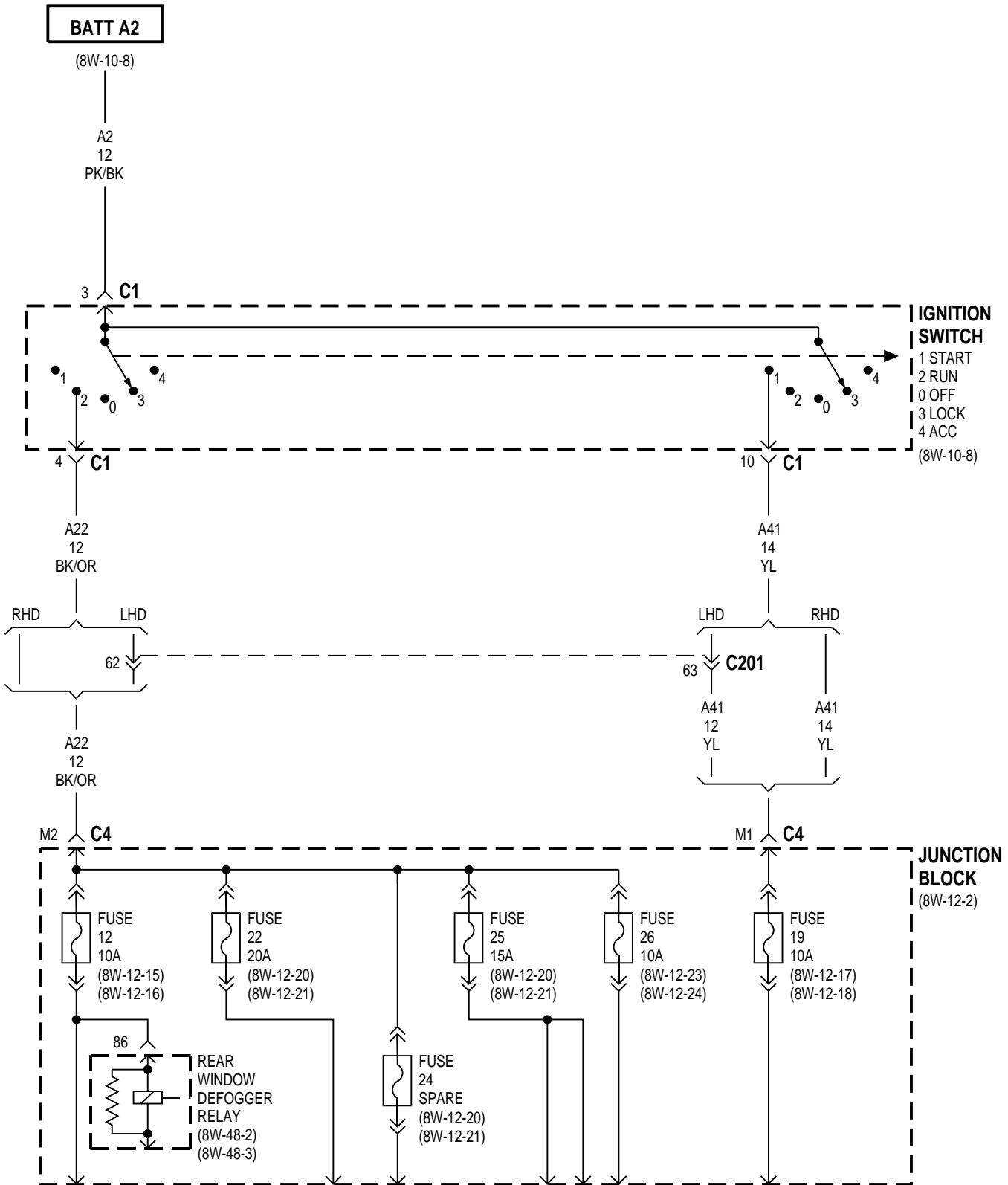
CAVITY	CIRCUIT	FUNCTION
D10	A4 14BK/PK	FUSED B(+)
D11 (A/T)	T41 20BK/WT	ENGINE STARTER MOTOR RELAY CONTROL
	T41 20BK/WT	ENGINE STARTER MOTOR RELAY CONTROL
D11 (M/T)	T41 20BR/LB	ENGINE STARTER MOTOR RELAY CONTROL
D12	-	-
D13 (A/T)	F45 20YL/RD	FUSED IGN. (ST)
D13 (M/T)	T141 20YL	SWITCHED FUSED IGN. (ST)
D14	T40 14BR	ENGINE STARTER MOTOR RELAY OUTPUT

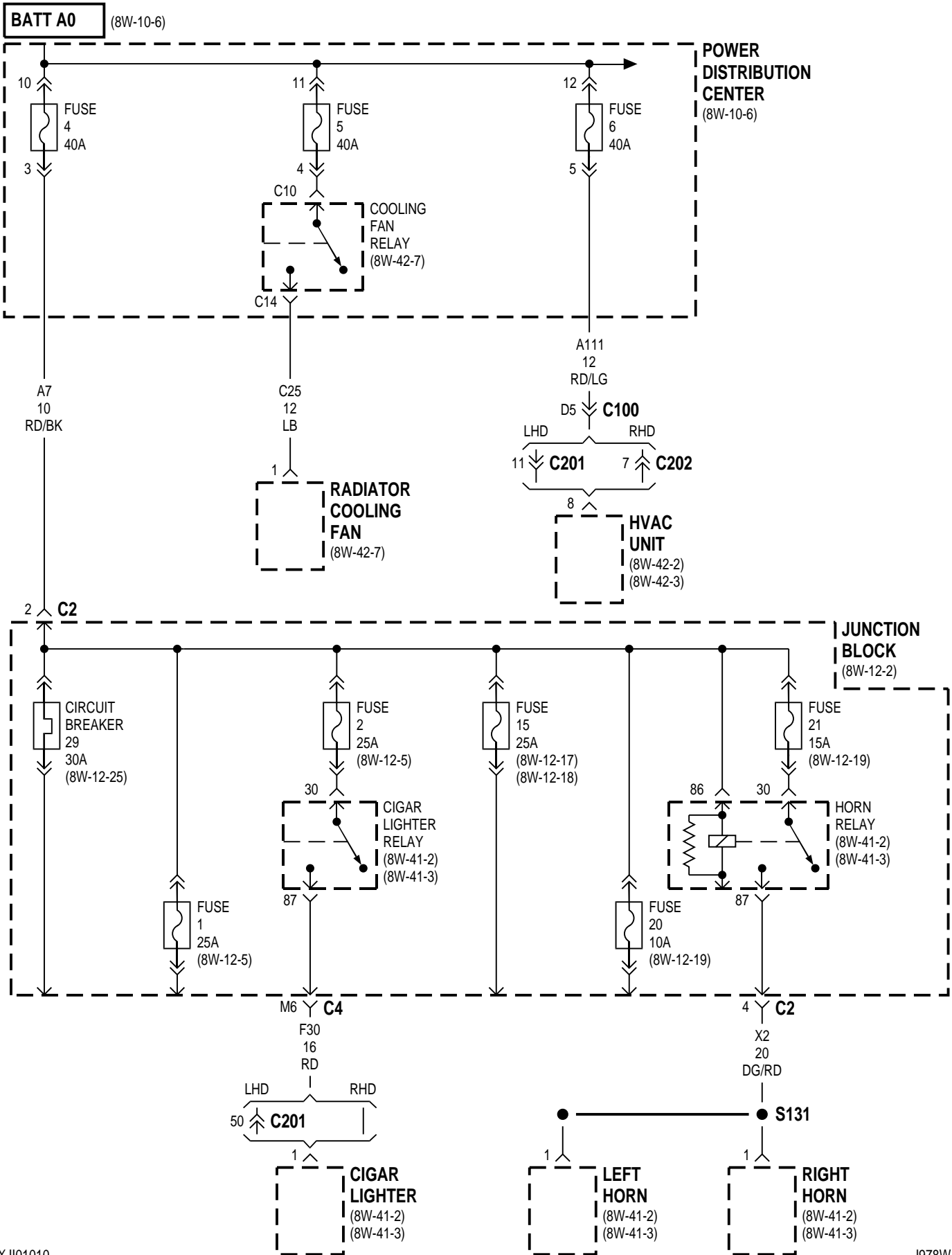


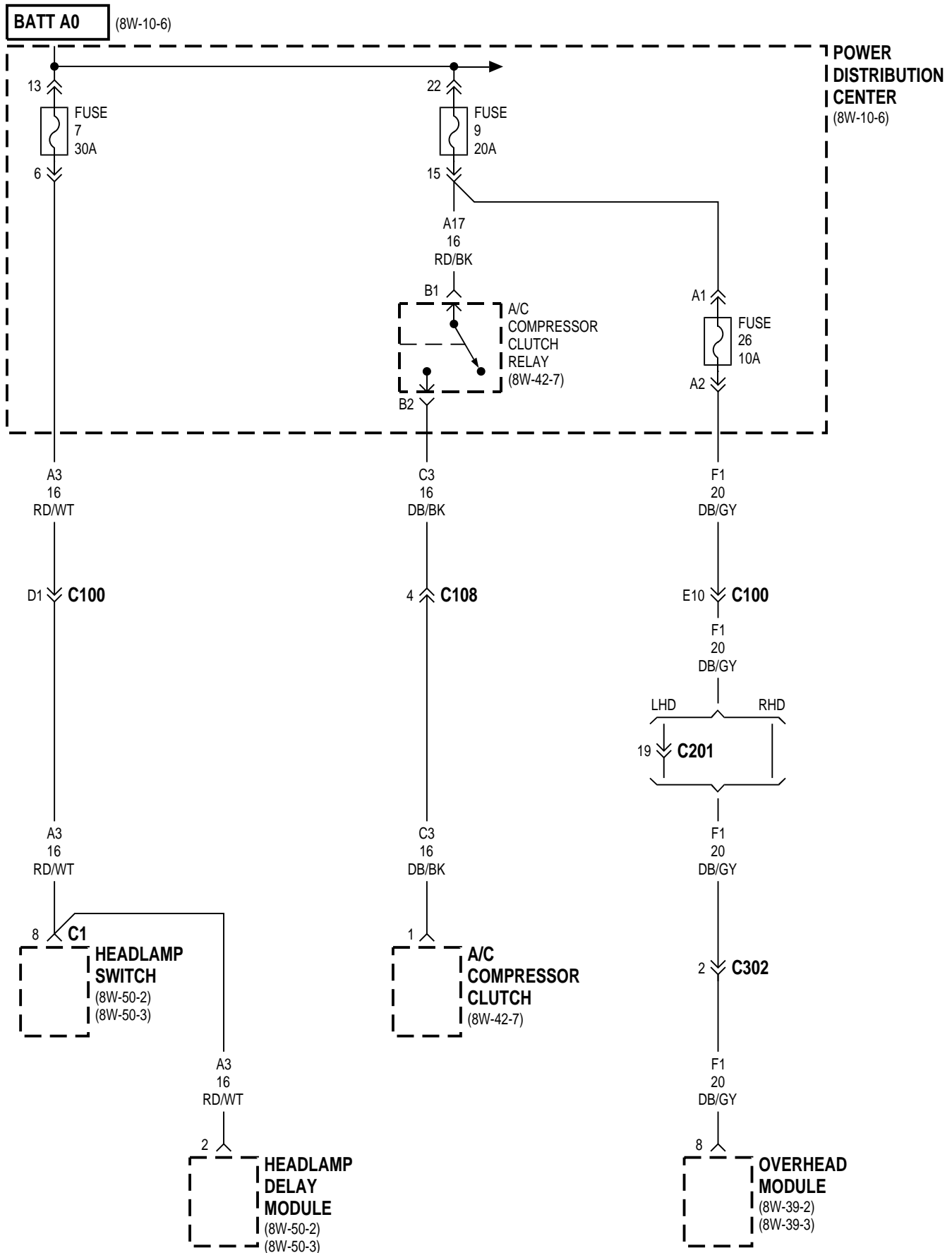


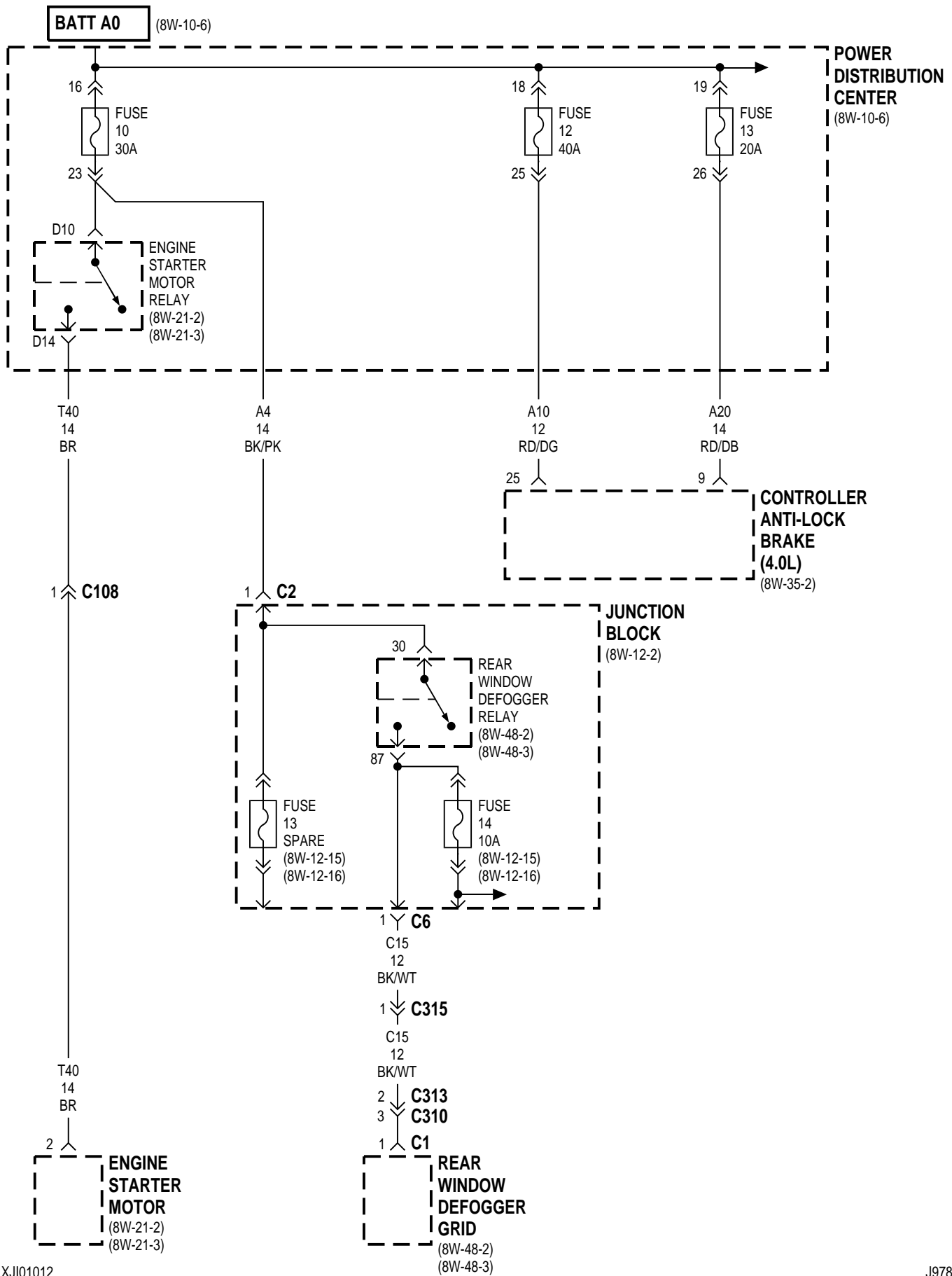


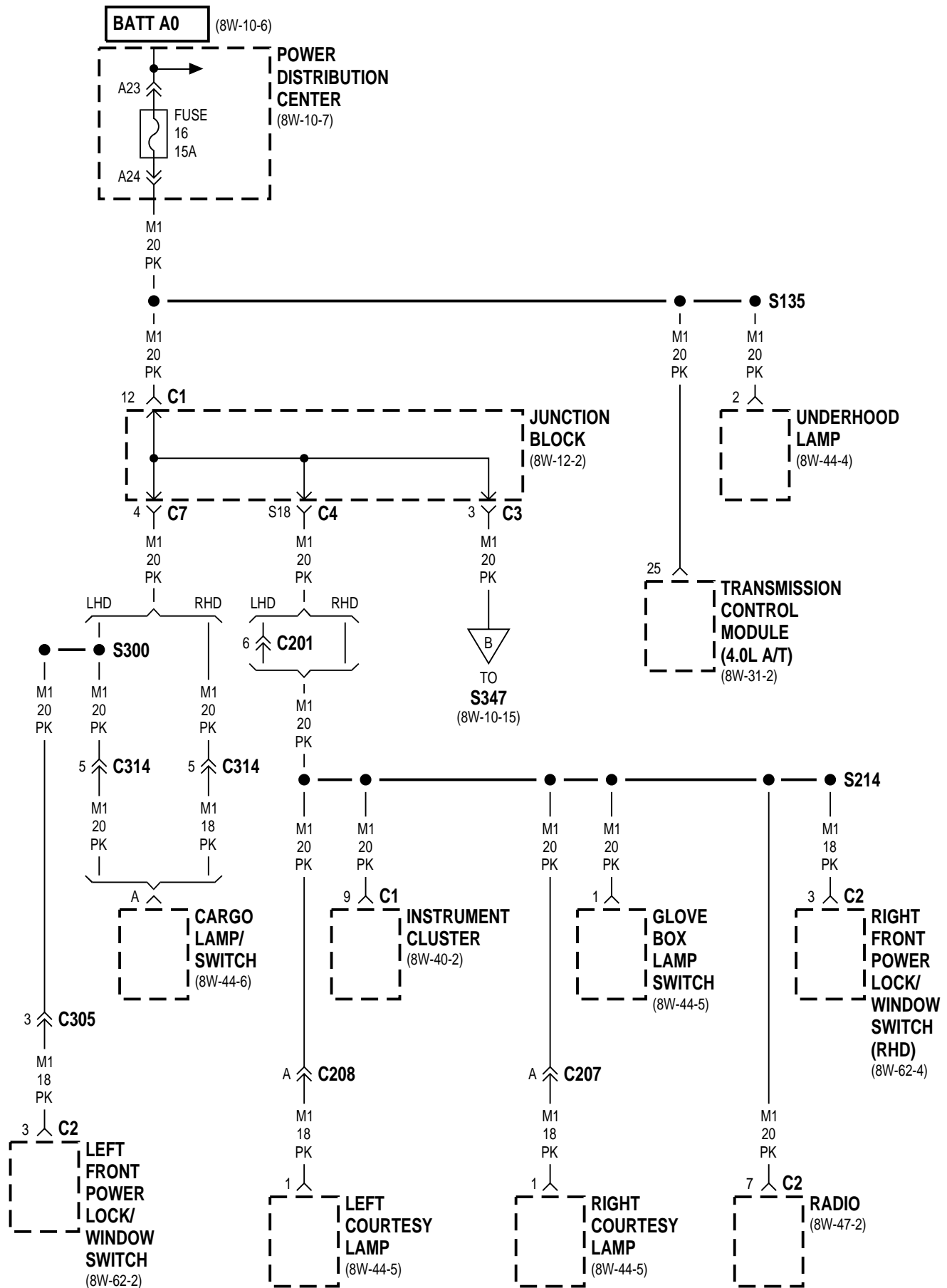




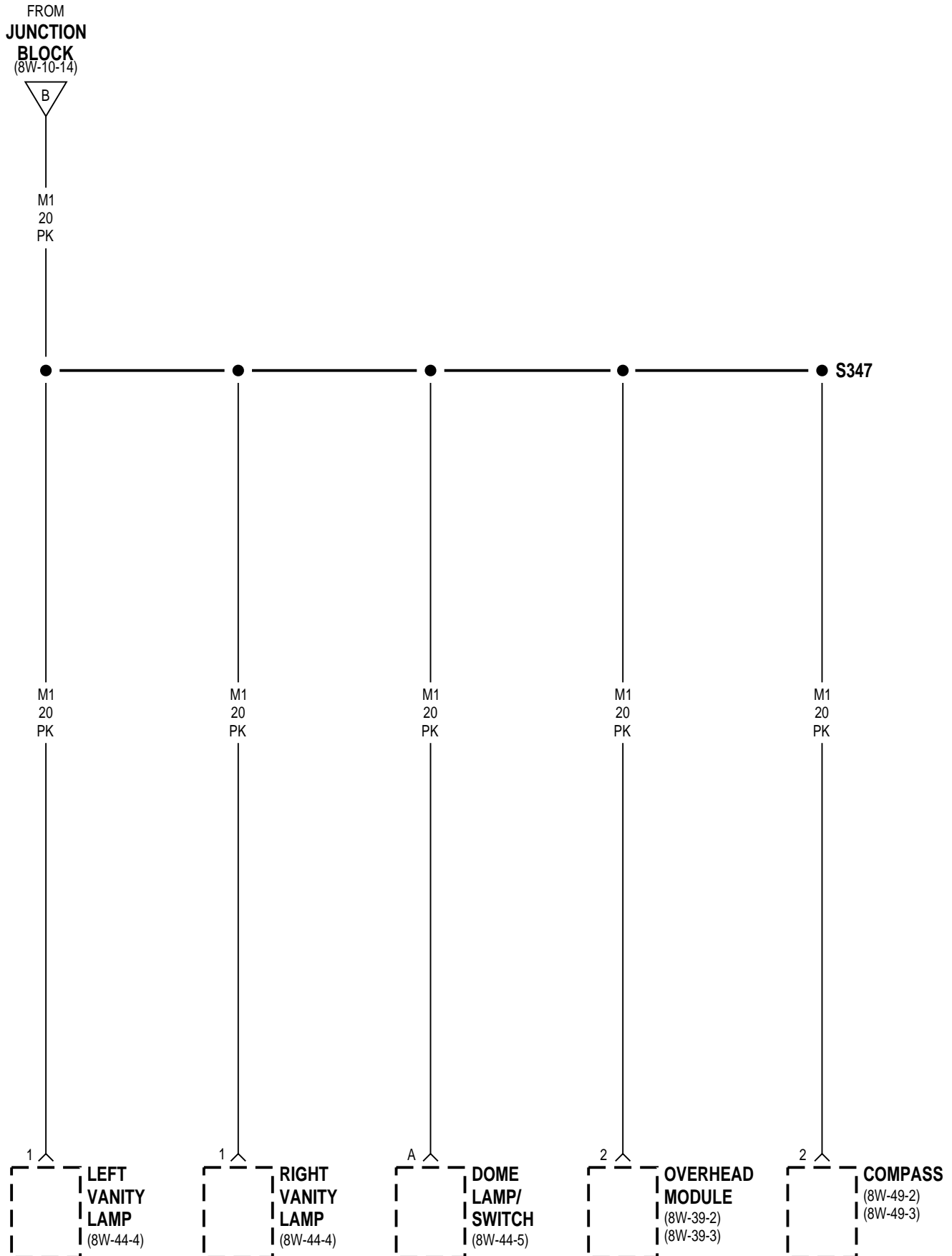


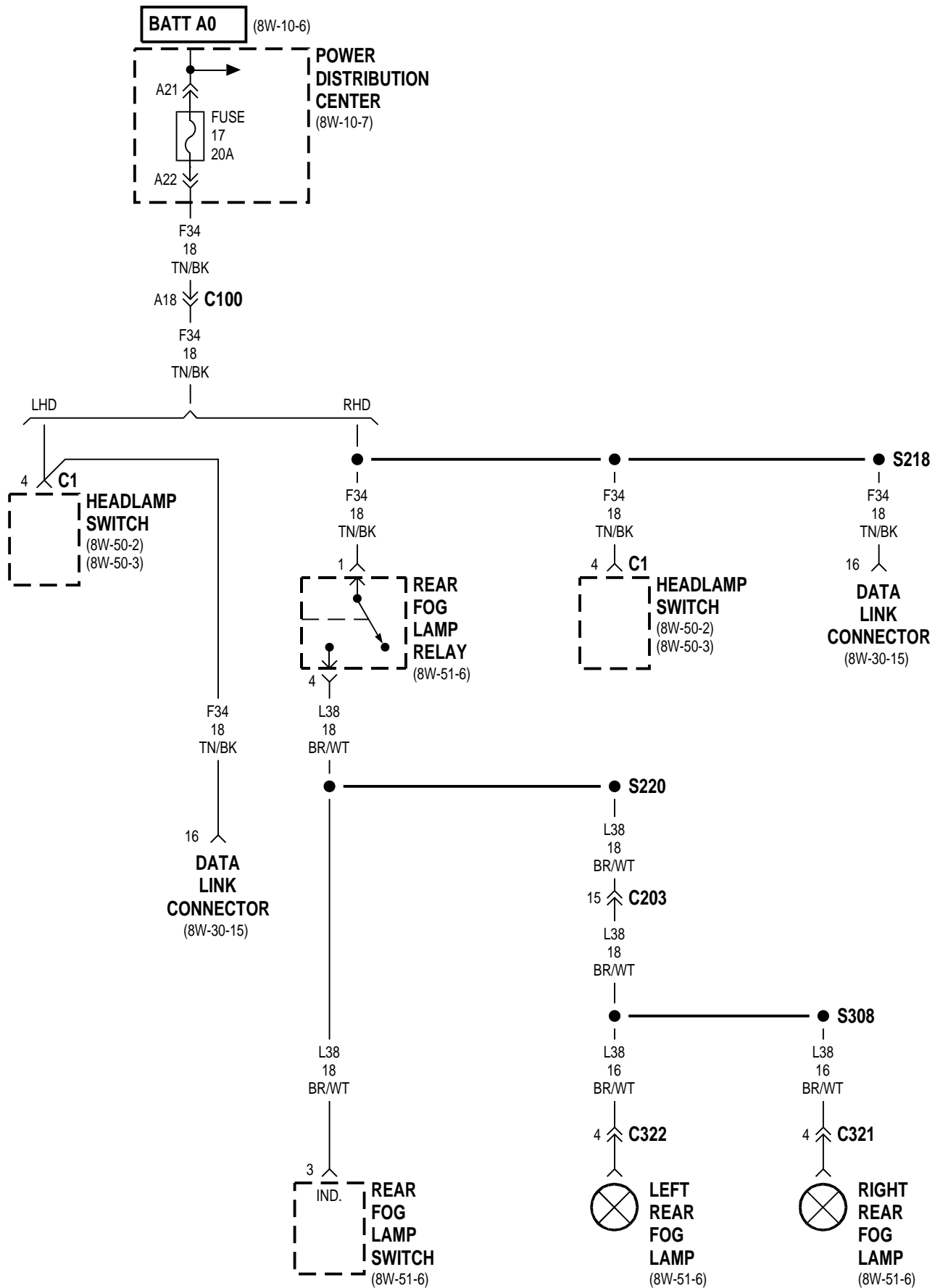


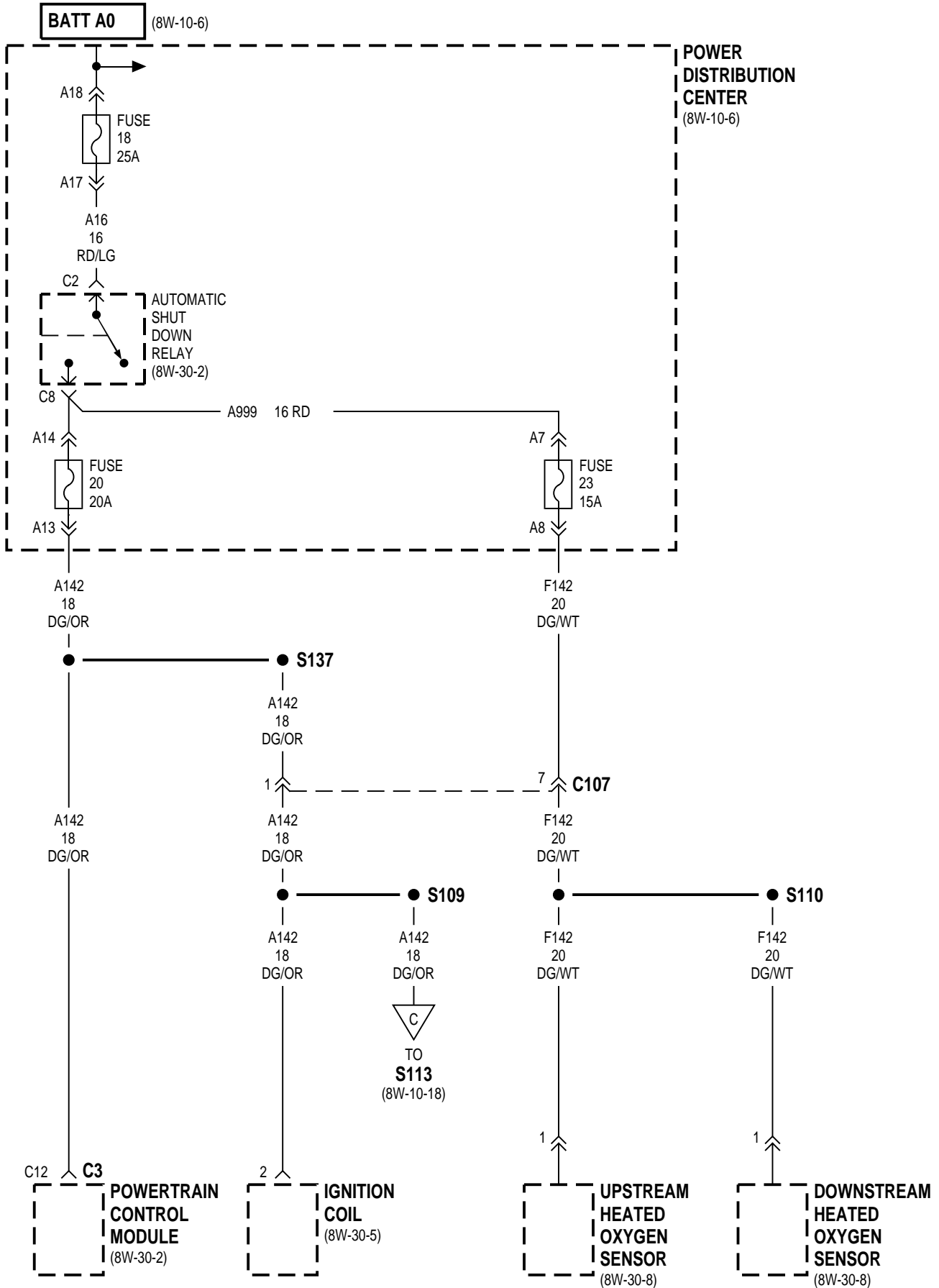


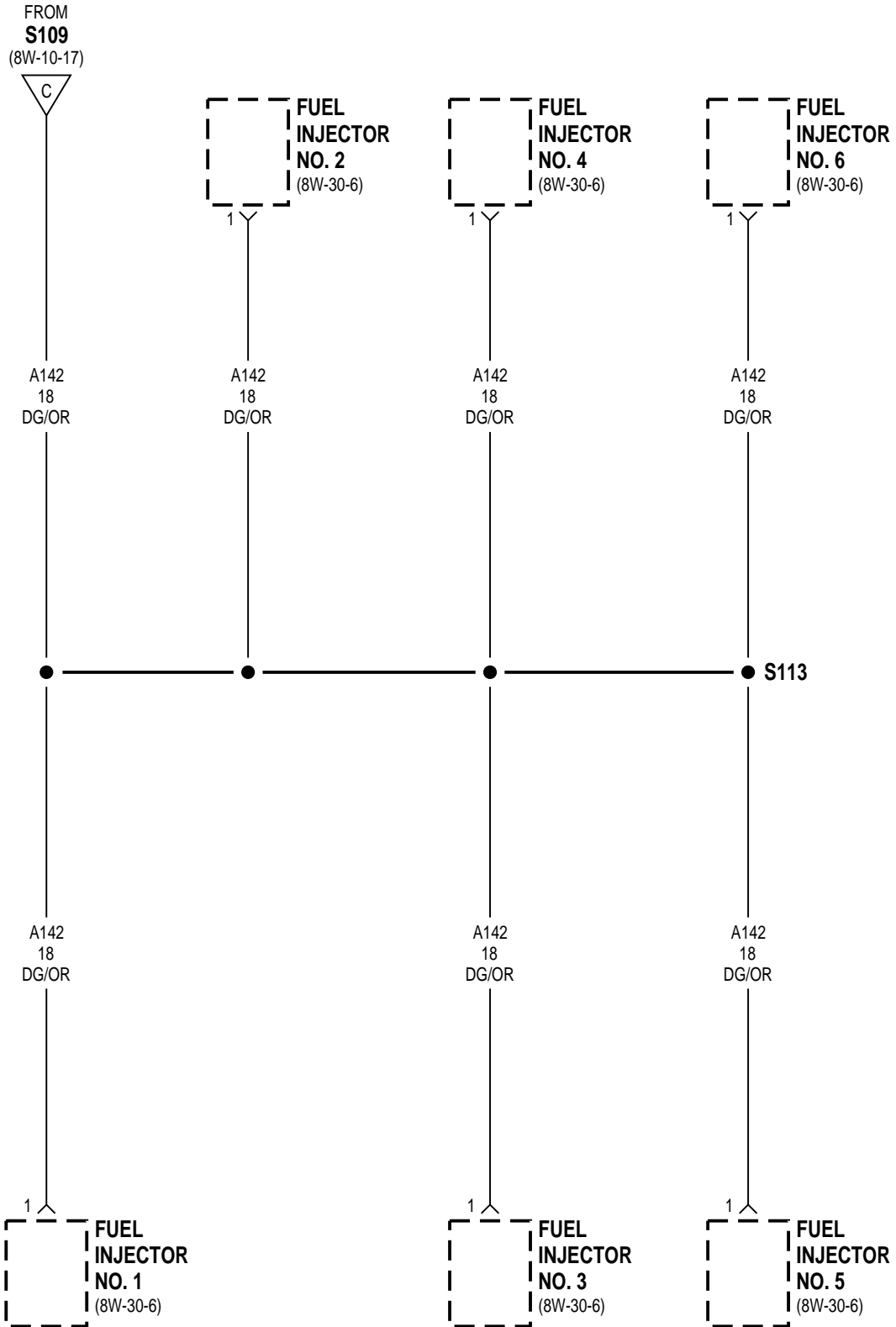


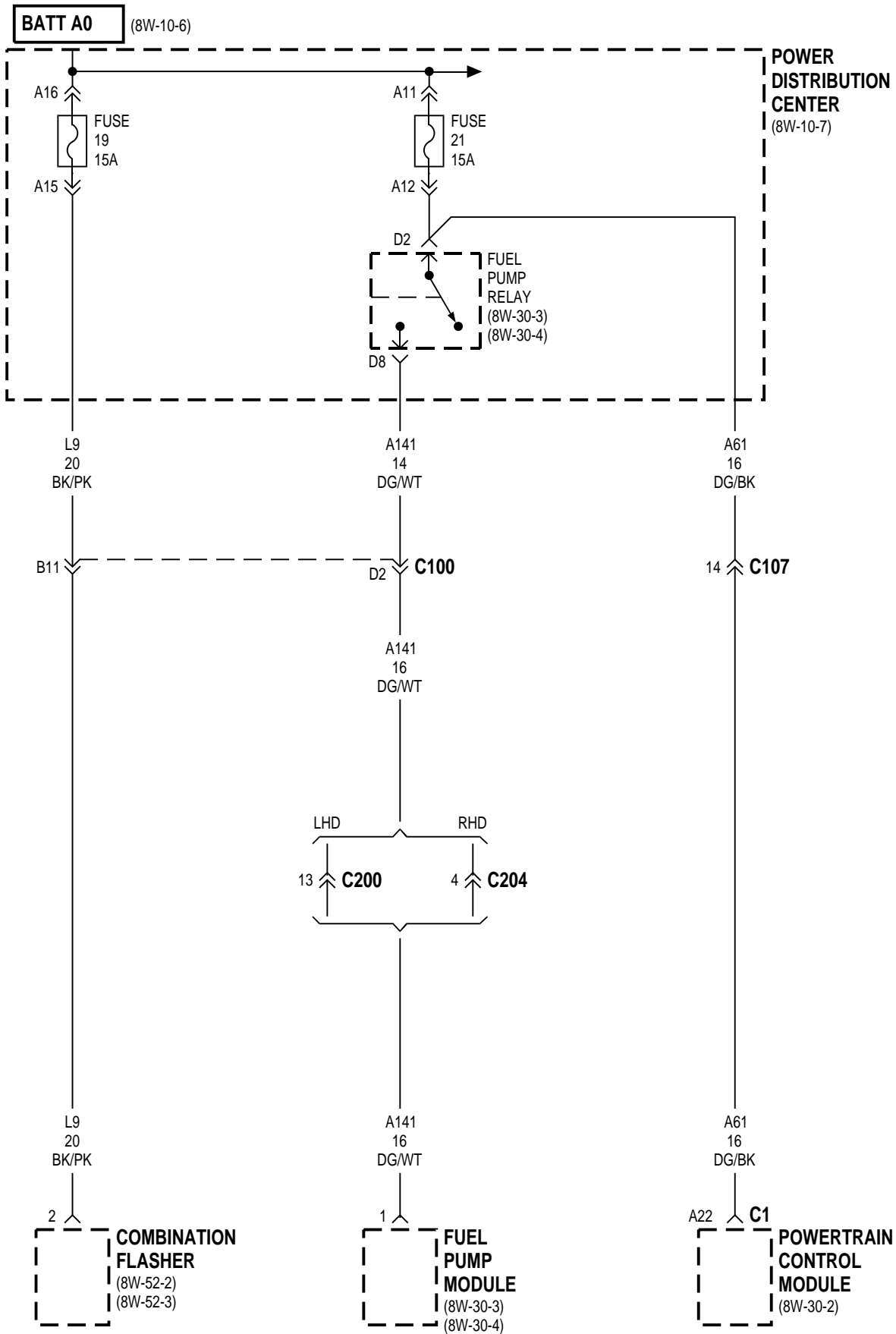
XJ ————— **8W-10 POWER DISTRIBUTION** ————— **8W - 10 - 15**
GAS

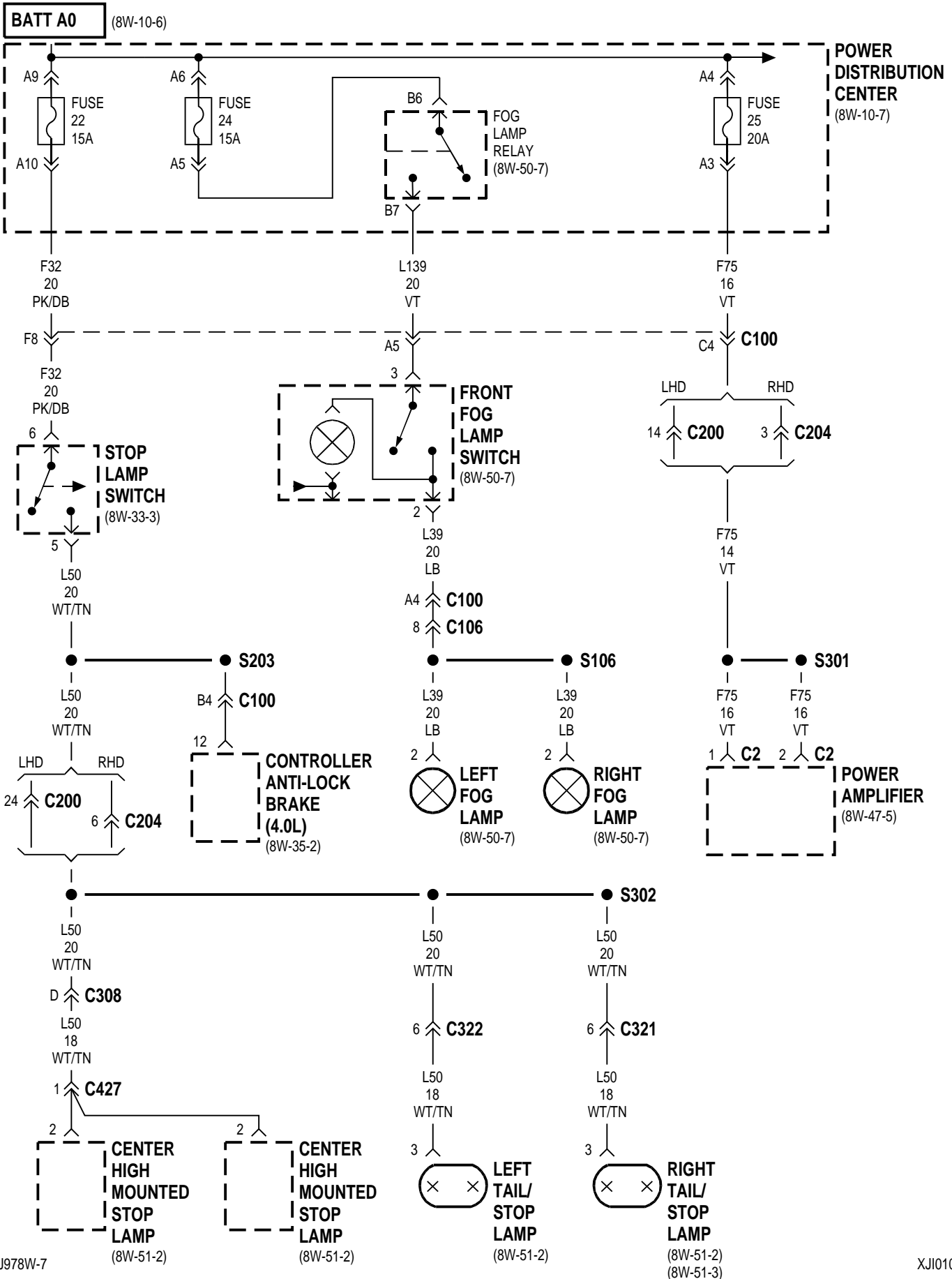












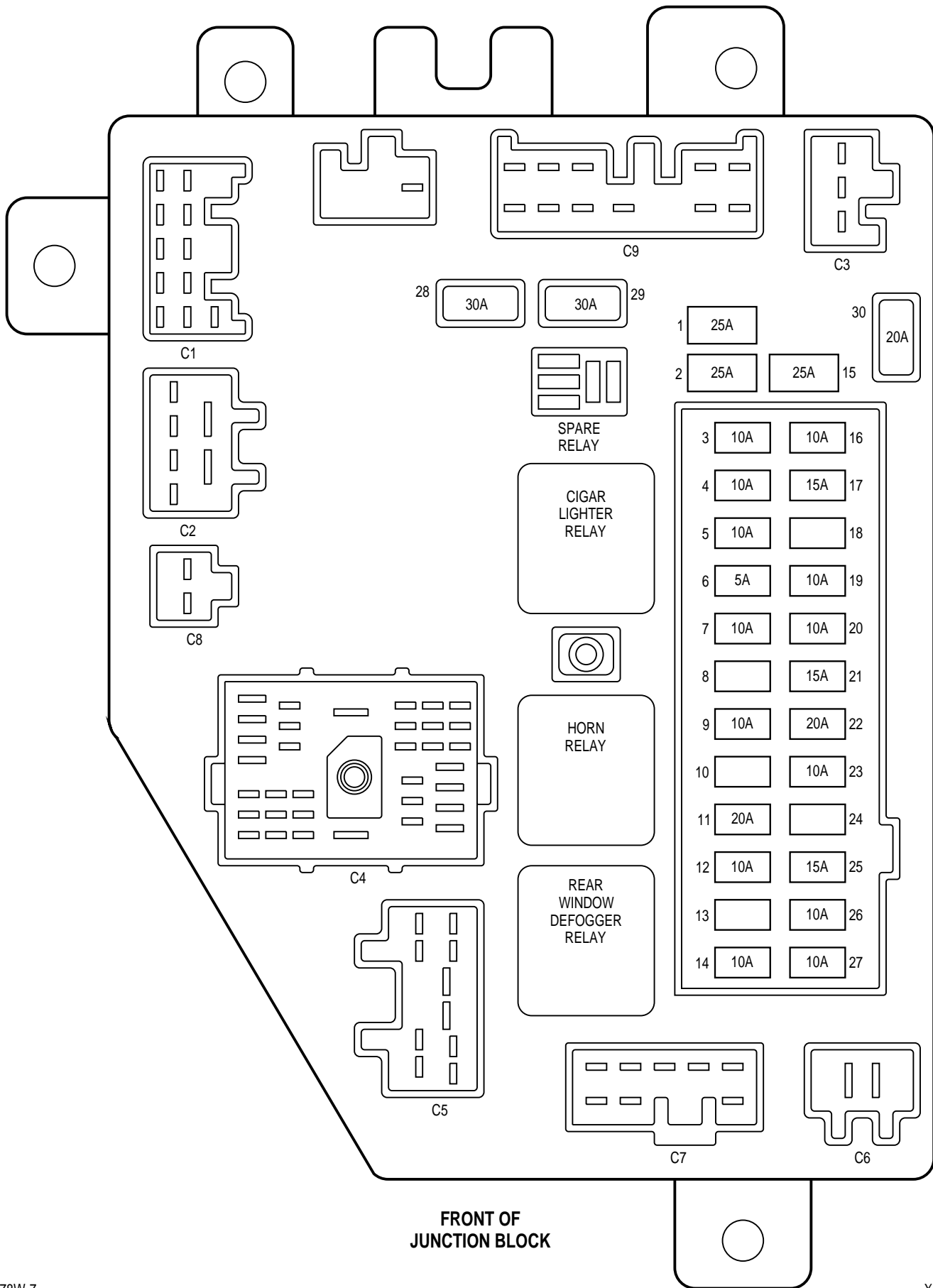
8W-12 JUNCTION BLOCK

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FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	25A	F38 16RD/LB	A7 10RD/BK
2	25A	-	A7 10RD/BK
3	10A	L33	L3 16RD/OR
4	10A	L43	L4 16VT/WT
5	10A	L44	L4 16VT/WT
6	5A	E2 20OR	E1 20TN
7	10A	L77	L7 18BK/YL
8	-	-	A21 12DB
9	10A	F87 20WT/BK	A21 12DB
10	-	-	A21 12DB
11	20A	F12 18DB/WT	A21 12DB
12	10A	L5 20BK	A22 12BK/OR
13	-	-	A4 14PK/BK
14	10A	C16	C15
15	25A	F35 16RD	A7 10RD/BK
16	10A	L34	L3 16RD/OR
17	15A	X12 16RD/WT	A31 12BK/WT
18	-	-	A31 12BK/WT
19	10A	F45 20YL/RD	A41
20	10A	A6 20RD/OR	A7 10RD/BK
21	15A	-	A7 10RD/BK
22	20A	V23 18BR/PK	A22 12BK/OR
23	10A	L78	L7 18BK/YL
24	-	-	
25	15A	F15 20DB/WT	A22 12BK/OR
26	10A	F14 18LG/YL	A22 12BK/OR
27	10A	F23 18DB/YL	A21 12DB

CIRCUIT BREAKERS

CB NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
28	30A	F81 12TN	A31 12BK/WT
29	30A	F37 14RD/LB	A7 10RD/BK
30	20A	V6 16DB	A31 12BK/WT

CIGAR LIGHTER RELAY

CAVITY	CIRCUIT	FUNCTION
30	-	FUSED B (+)
85	C81 20LB/WT	GROUND
86	A31 12BK/WT	FUSED B (+)
87	F30 16RD	CIGAR LIGHTER RELAY OUTPUT
-	-	-

HORN RELAY

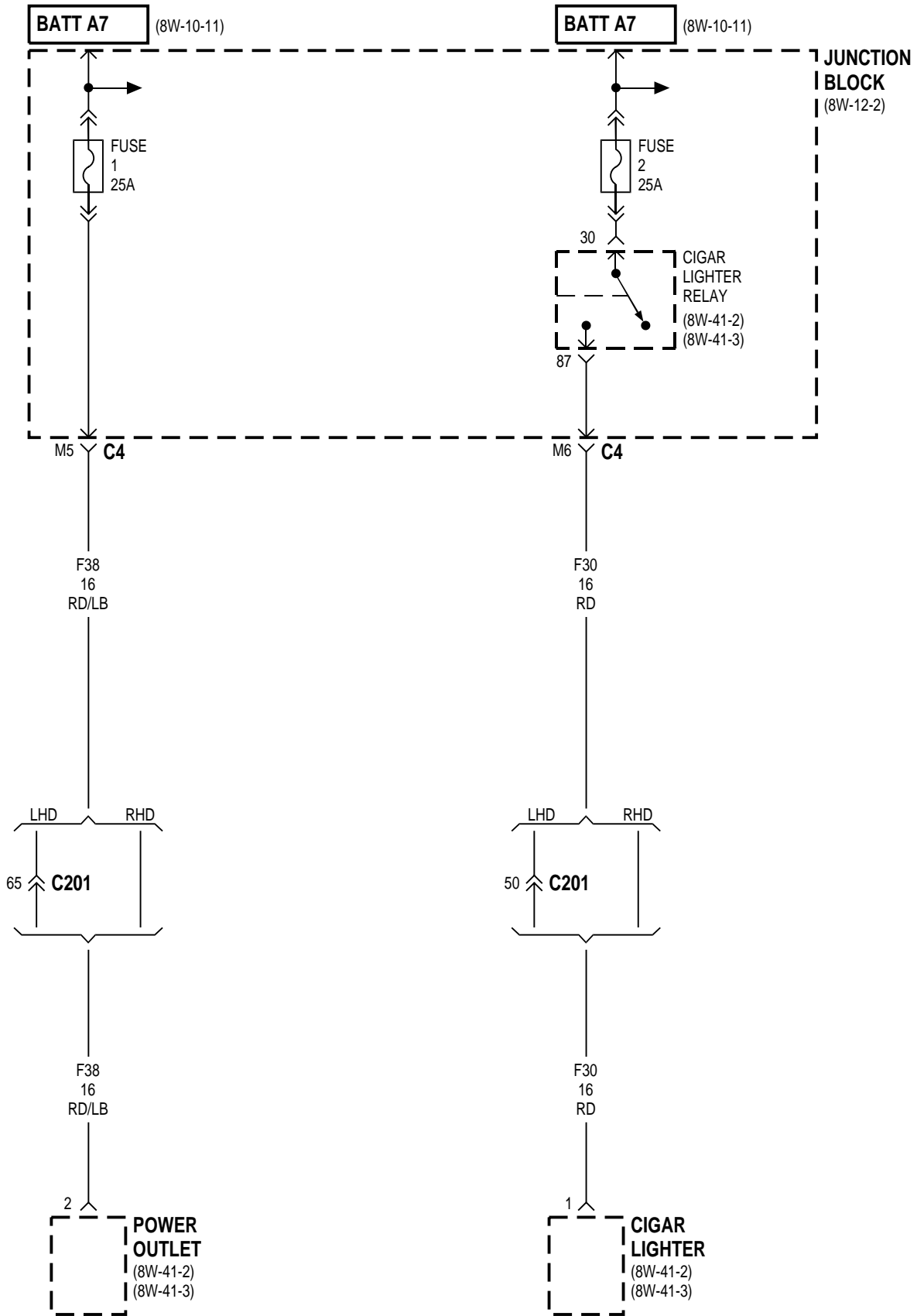
CAVITY	CIRCUIT	FUNCTION
30	-	FUSED B (+)
85	X3 20BK/RD	HORN RELAY CONTROL
86	A2	FUSED B (+)
87	X2	HORN RELAY OUTPUT
-	-	-

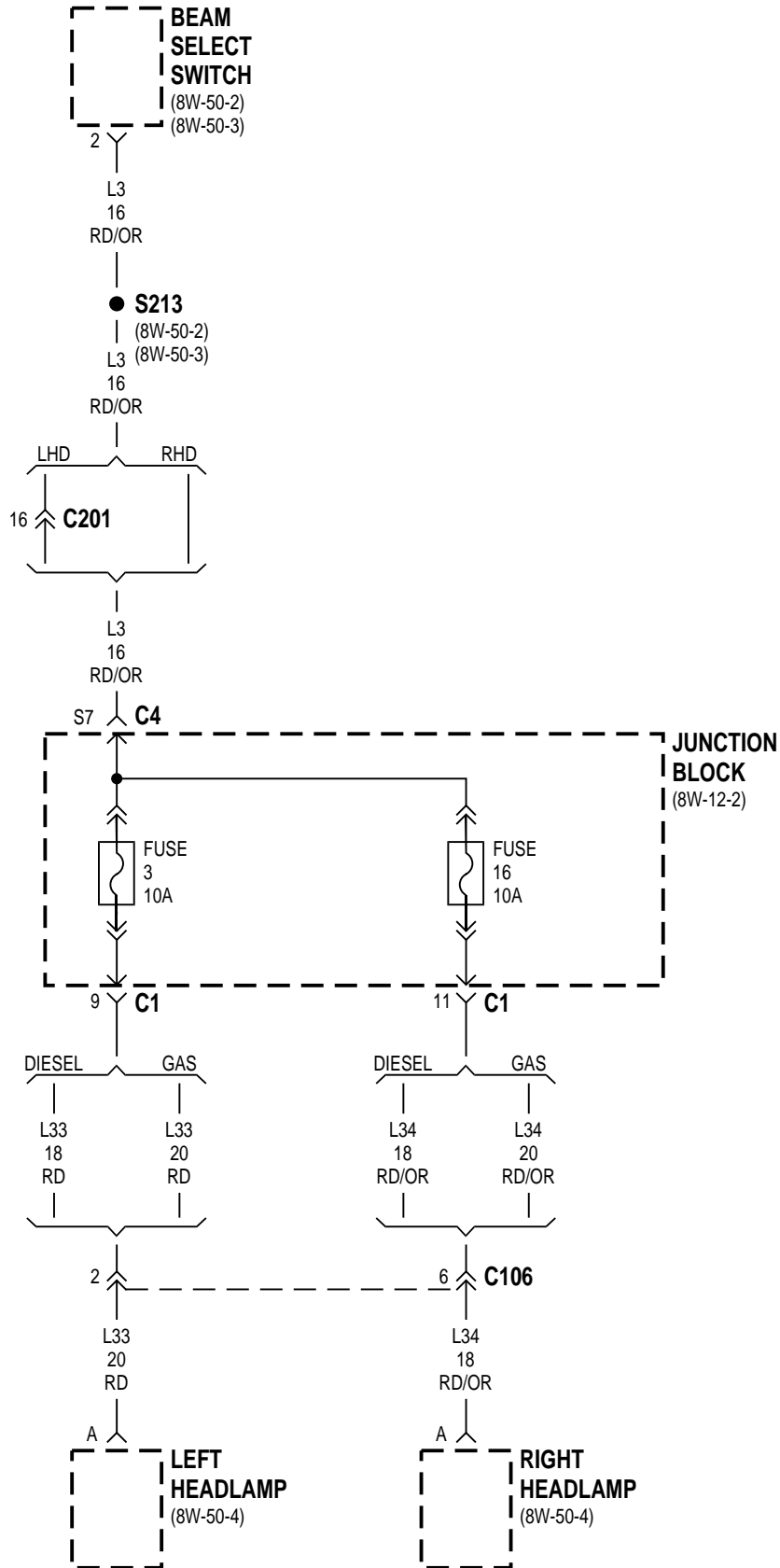
REAR WINDOW DEFOGGER RELAY

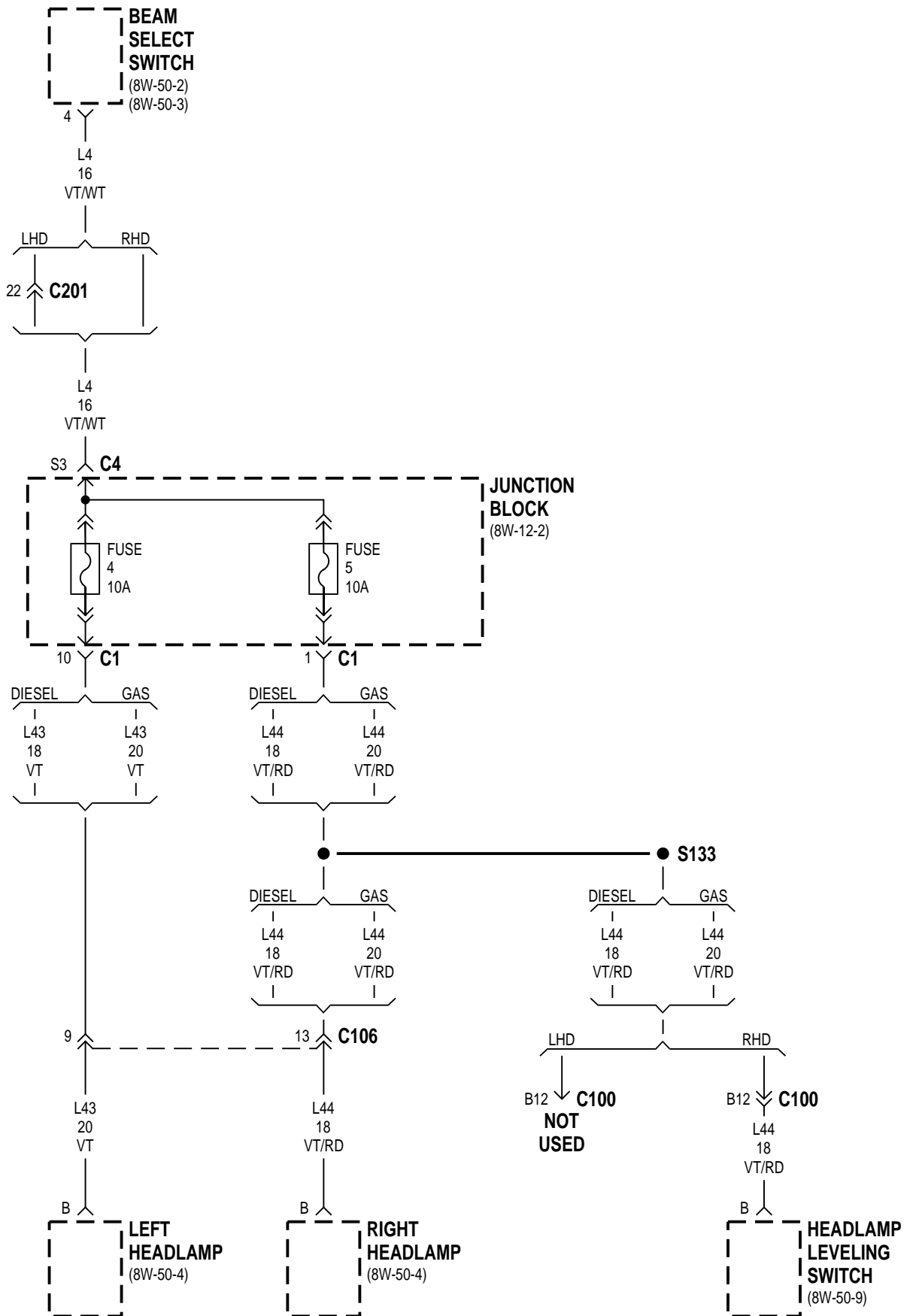
CAVITY	CIRCUIT	FUNCTION
30	A4 12PK/BK	FUSED B (+)
85	C81 20LB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
86	L5	FUSED B (+)
87	C15	REAR WINDOW DEFOGGER RELAY OUTPUT
-	-	-

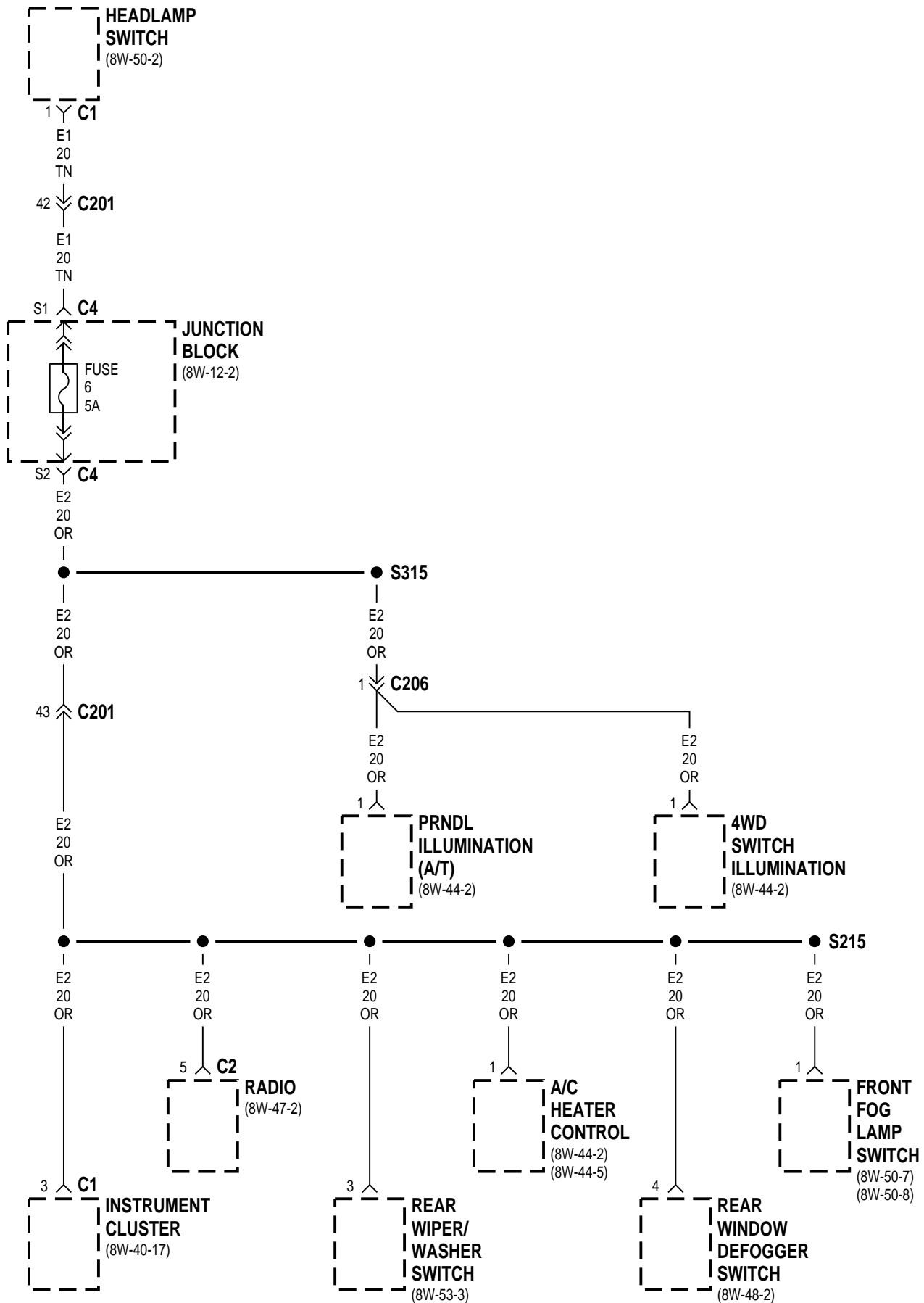
SPARE RELAY

CAVITY	CIRCUIT	FUNCTION
30	-	-
85	-	-
86	-	-
87	-	-
87A	-	-

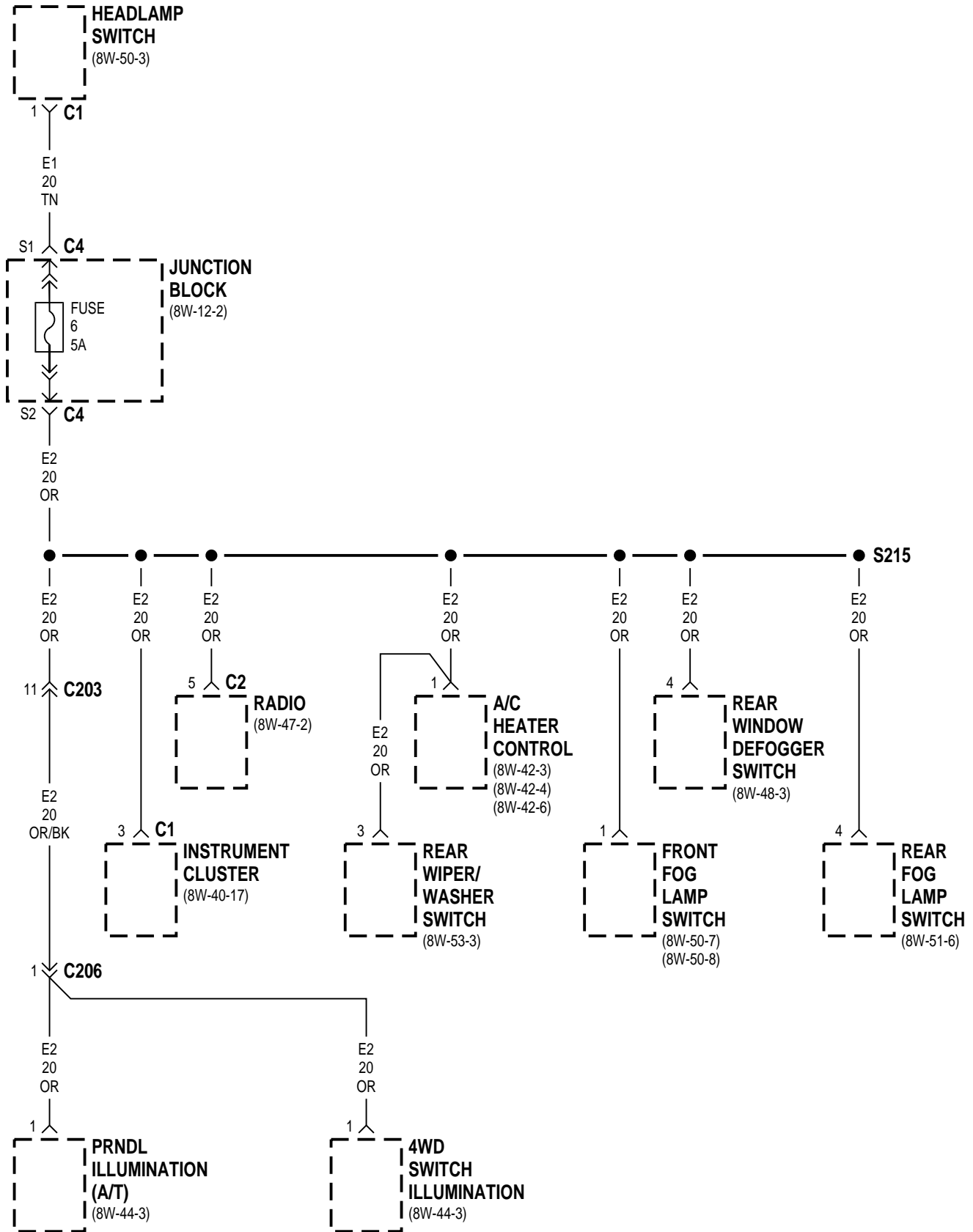


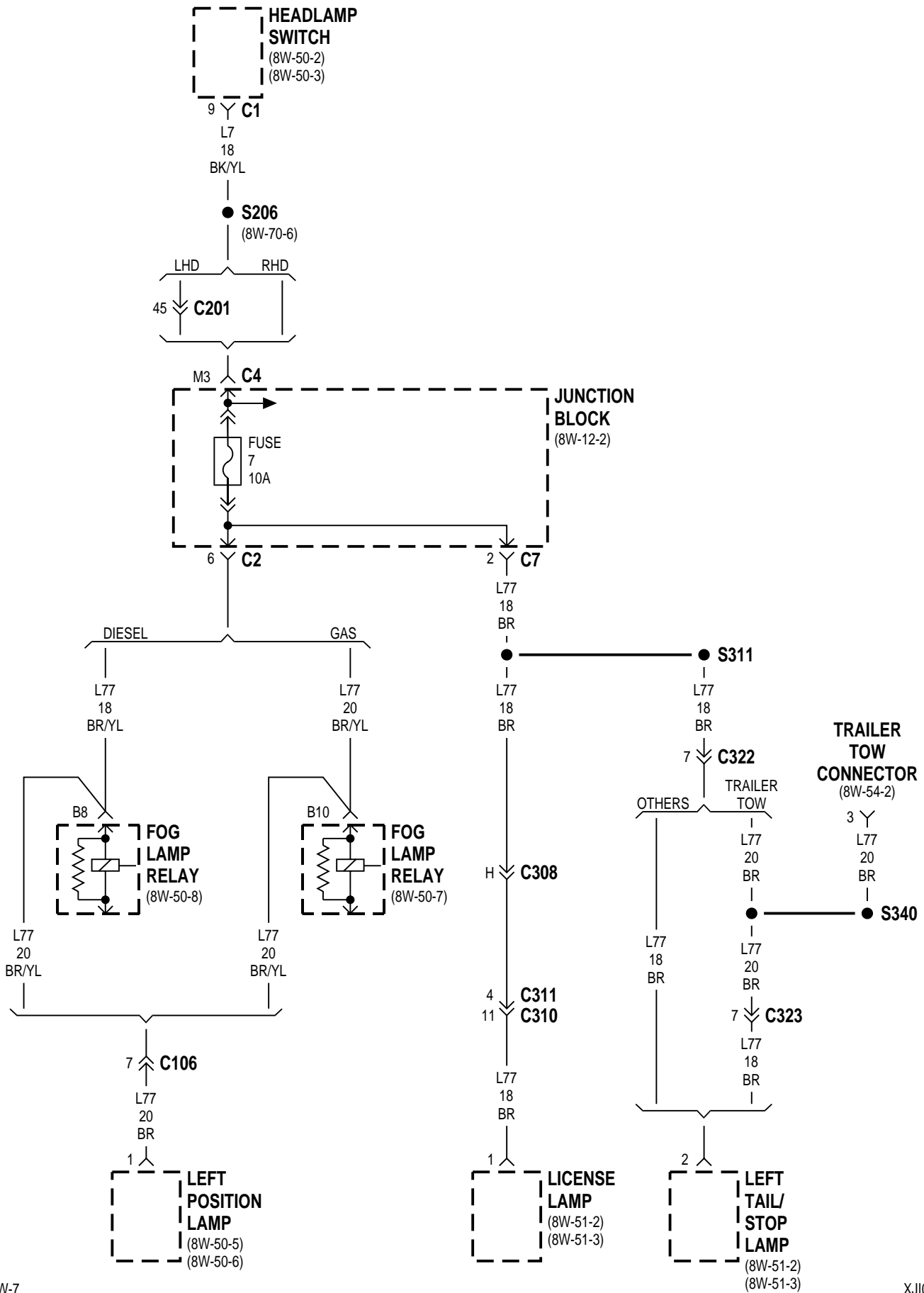


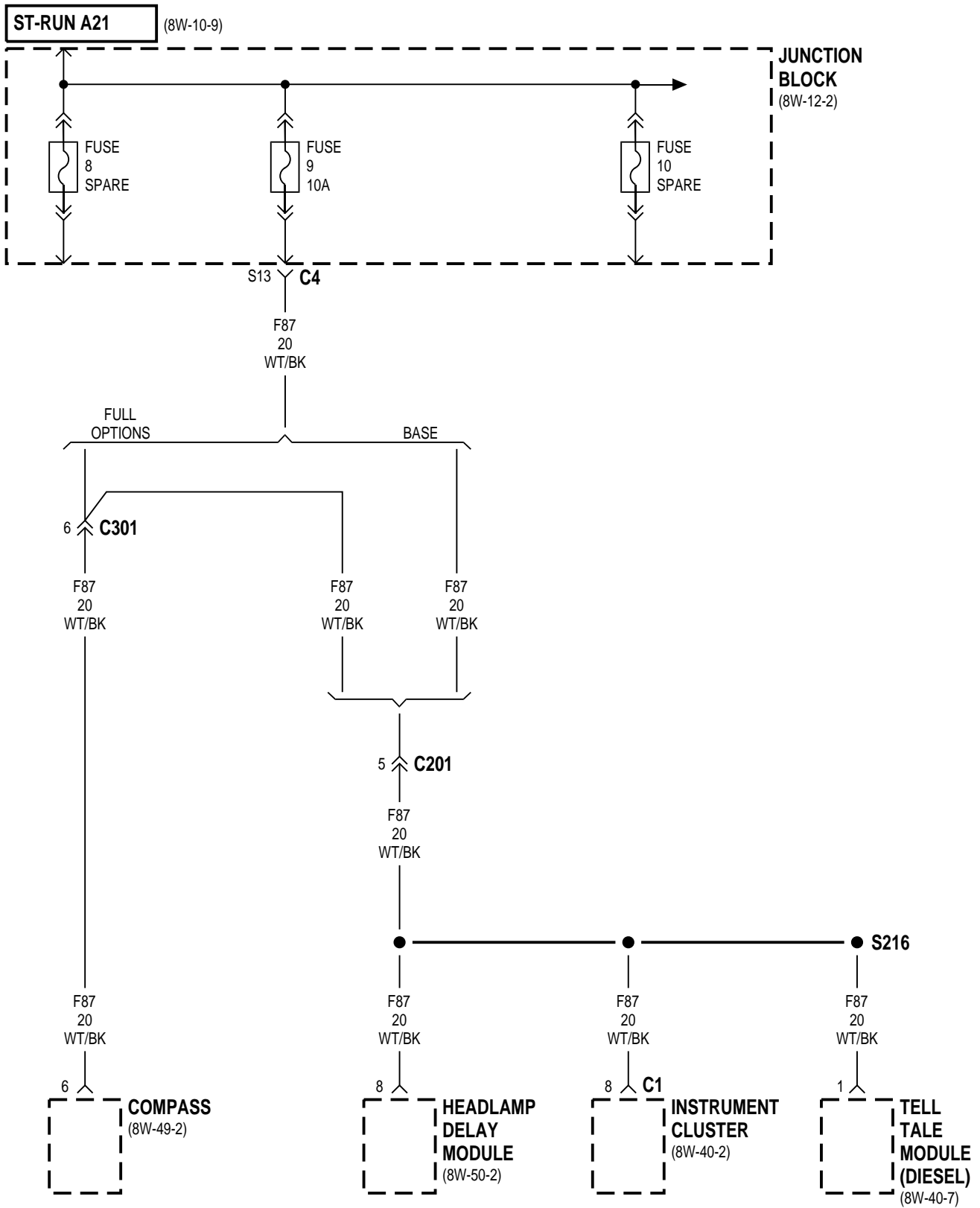


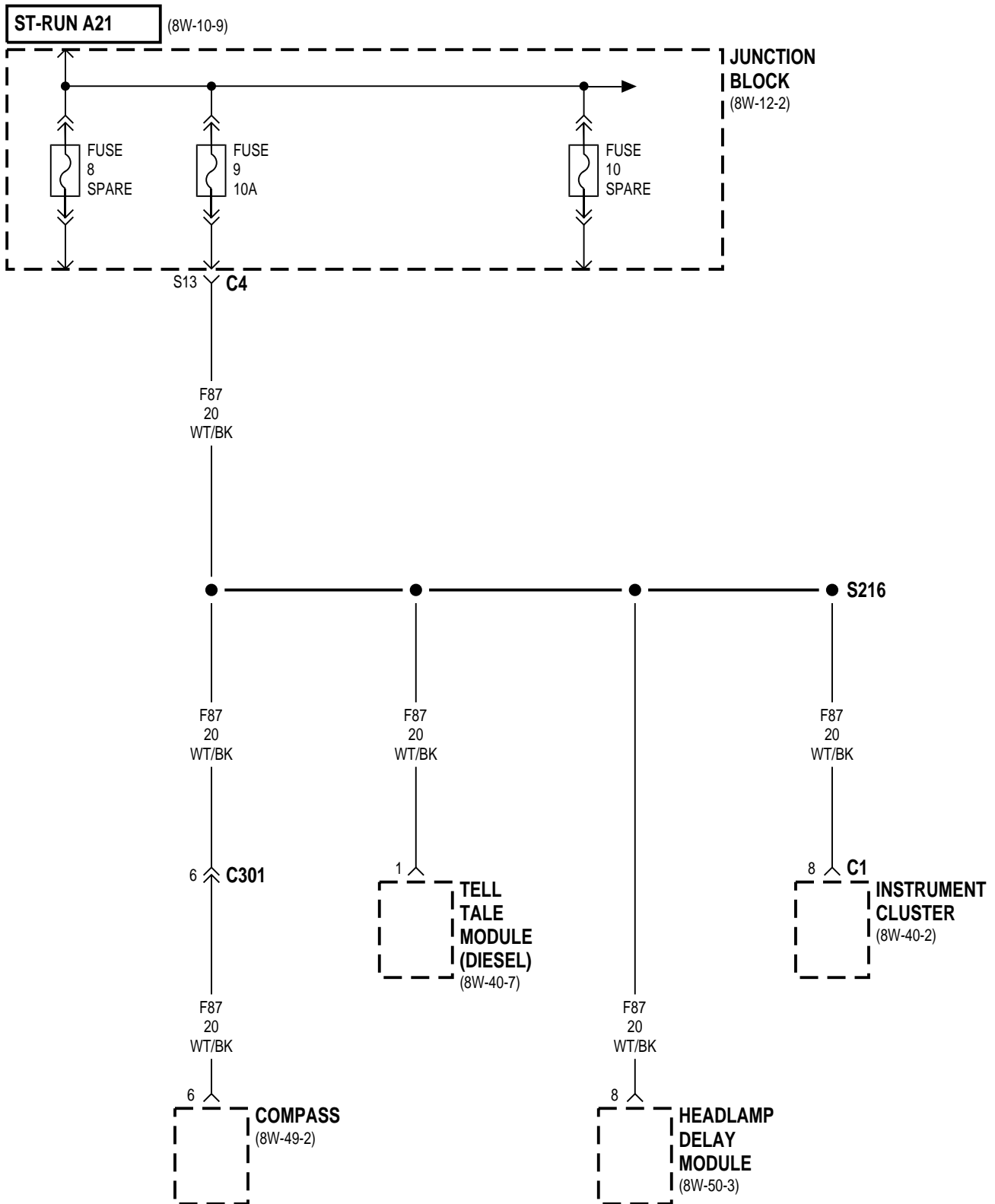


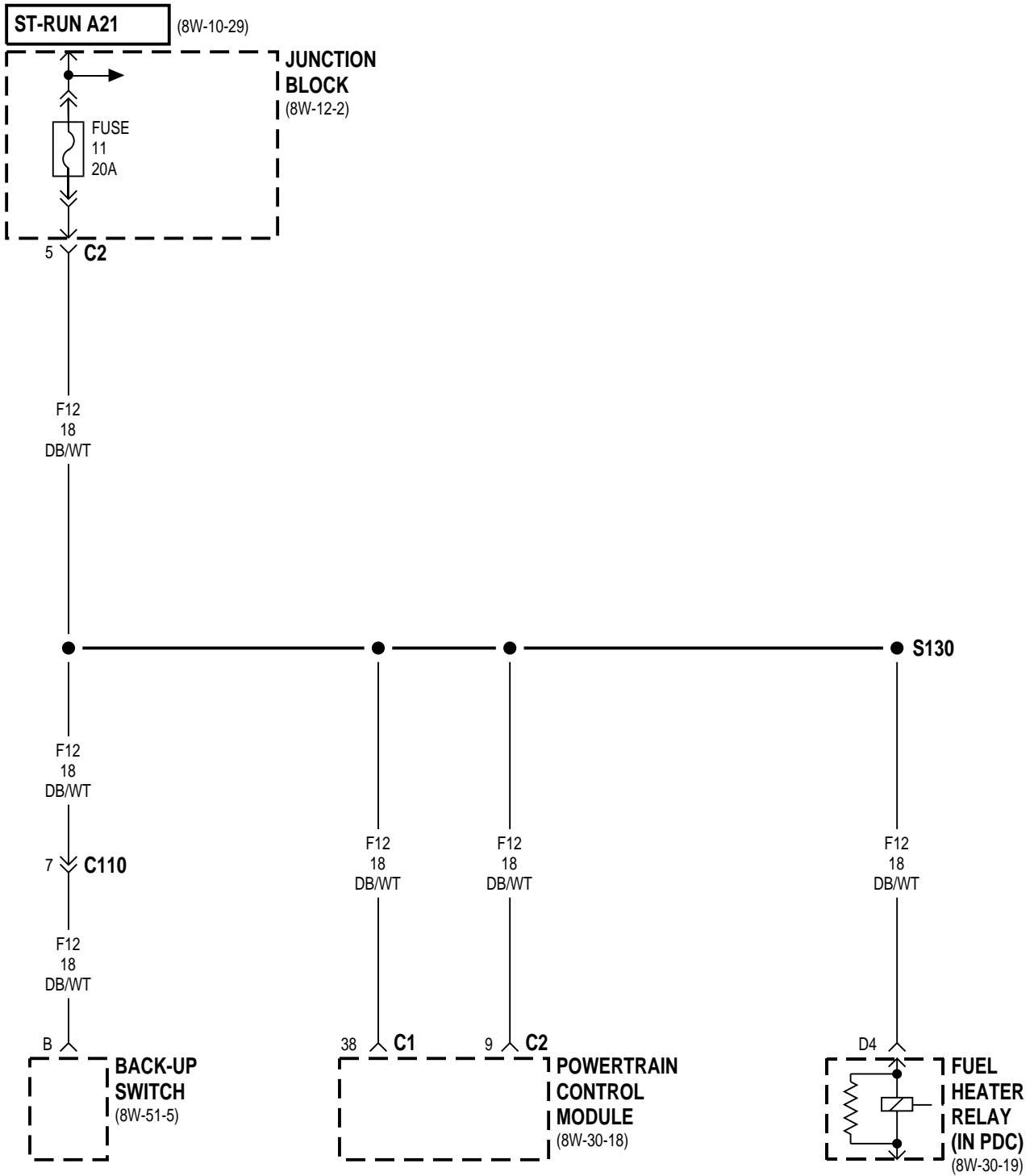
XJ ————— **8W-12 JUNCTION BLOCK** ————— **8W - 12 - 9**
RHD

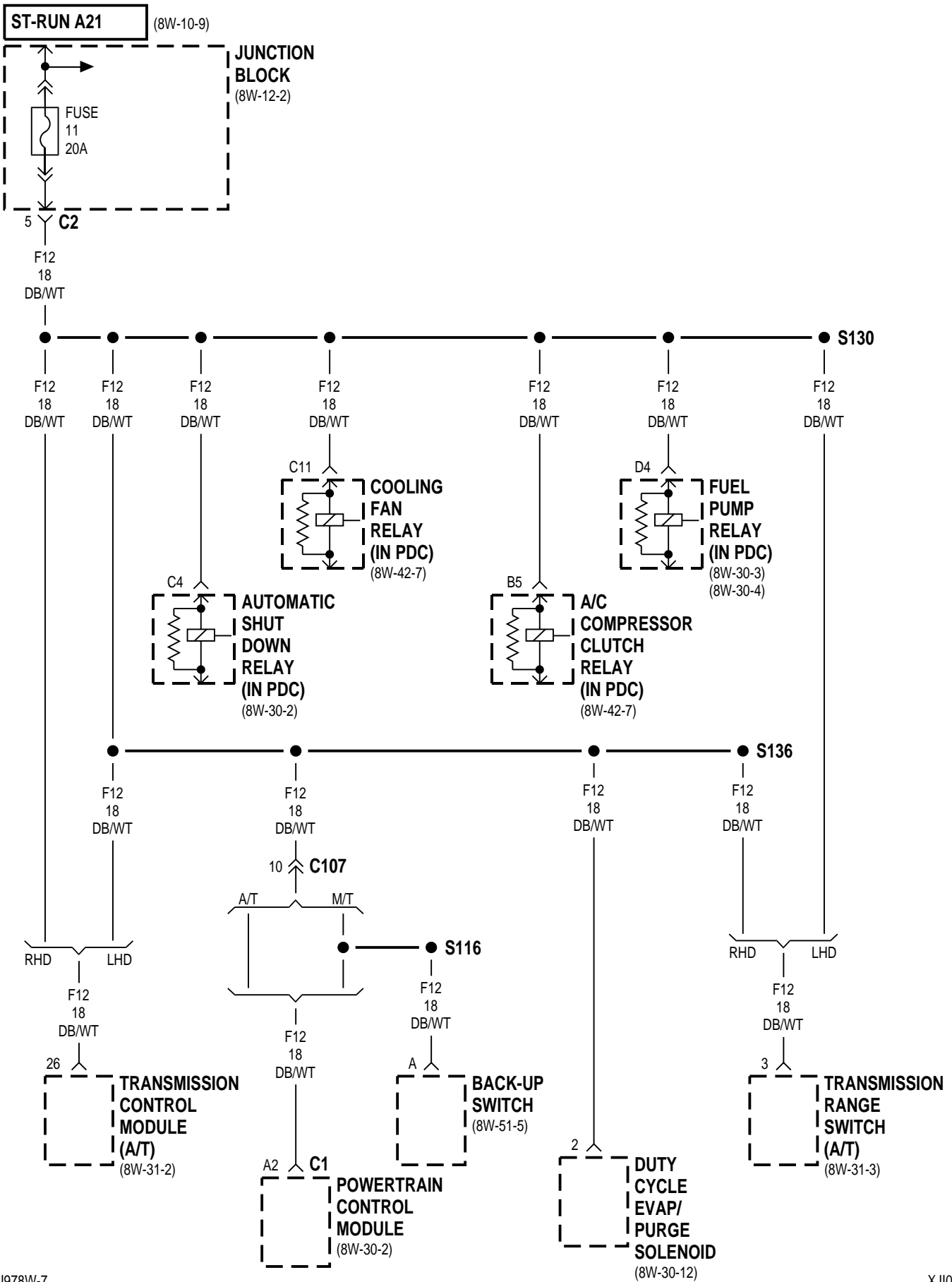


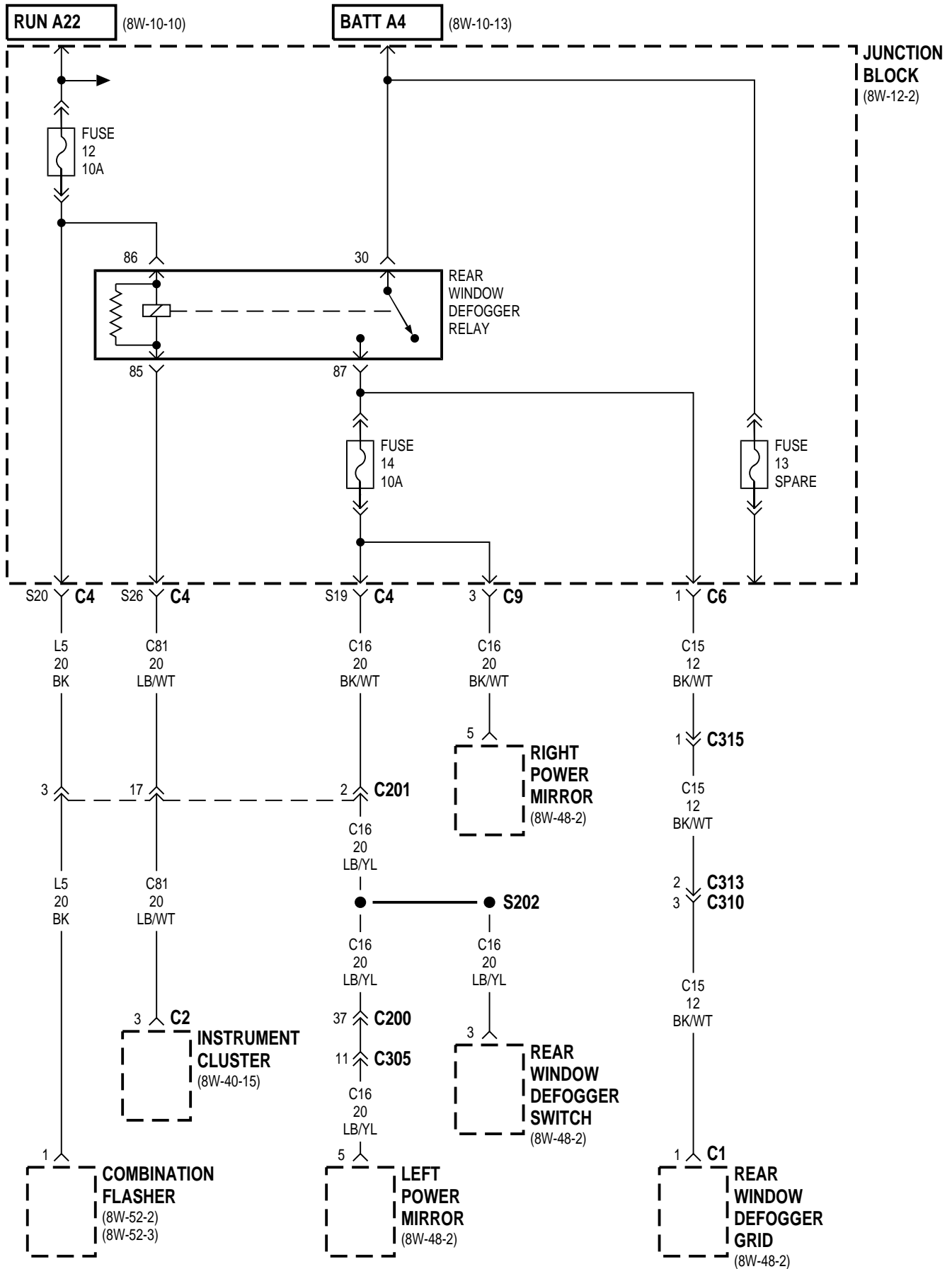


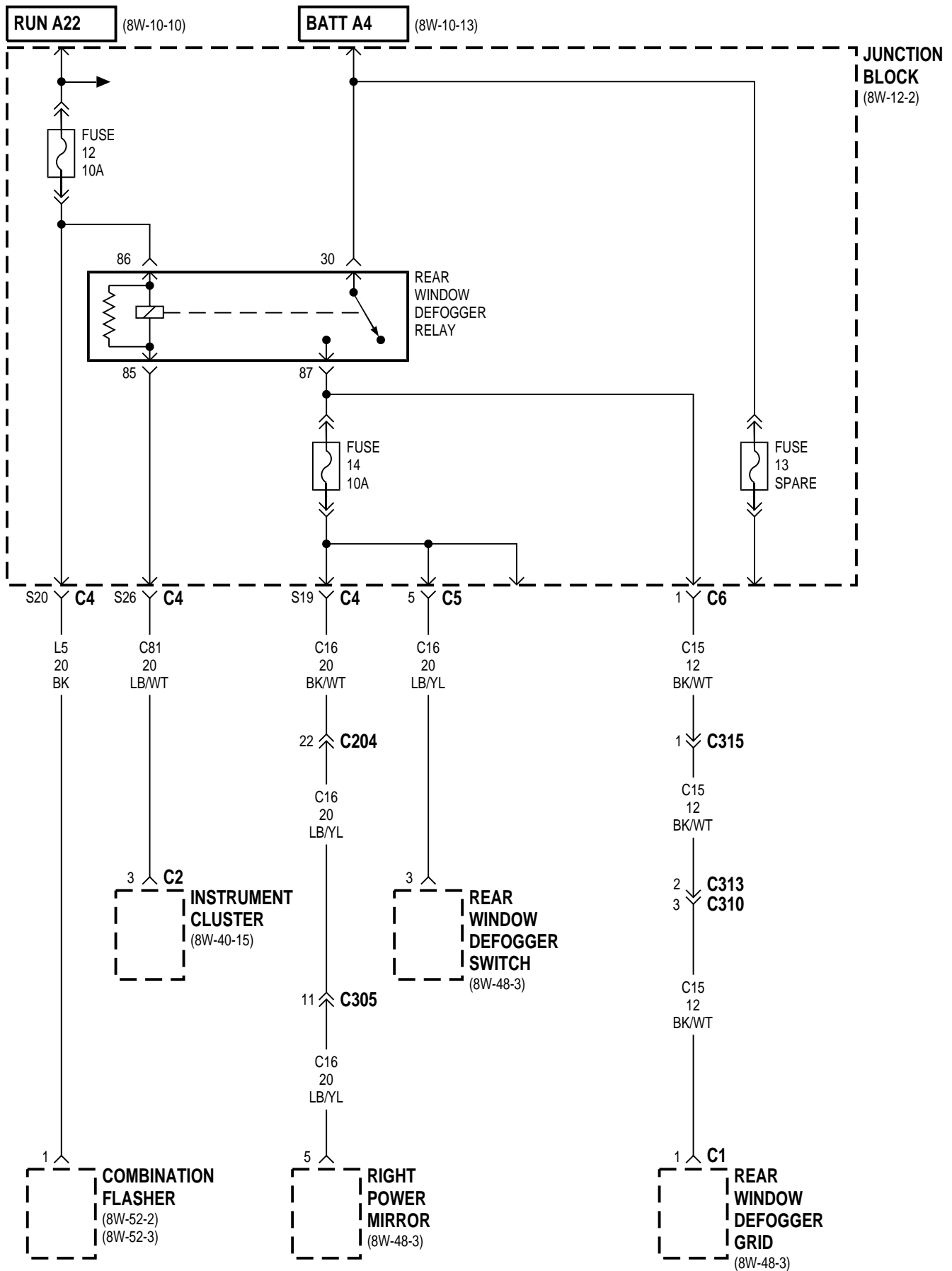




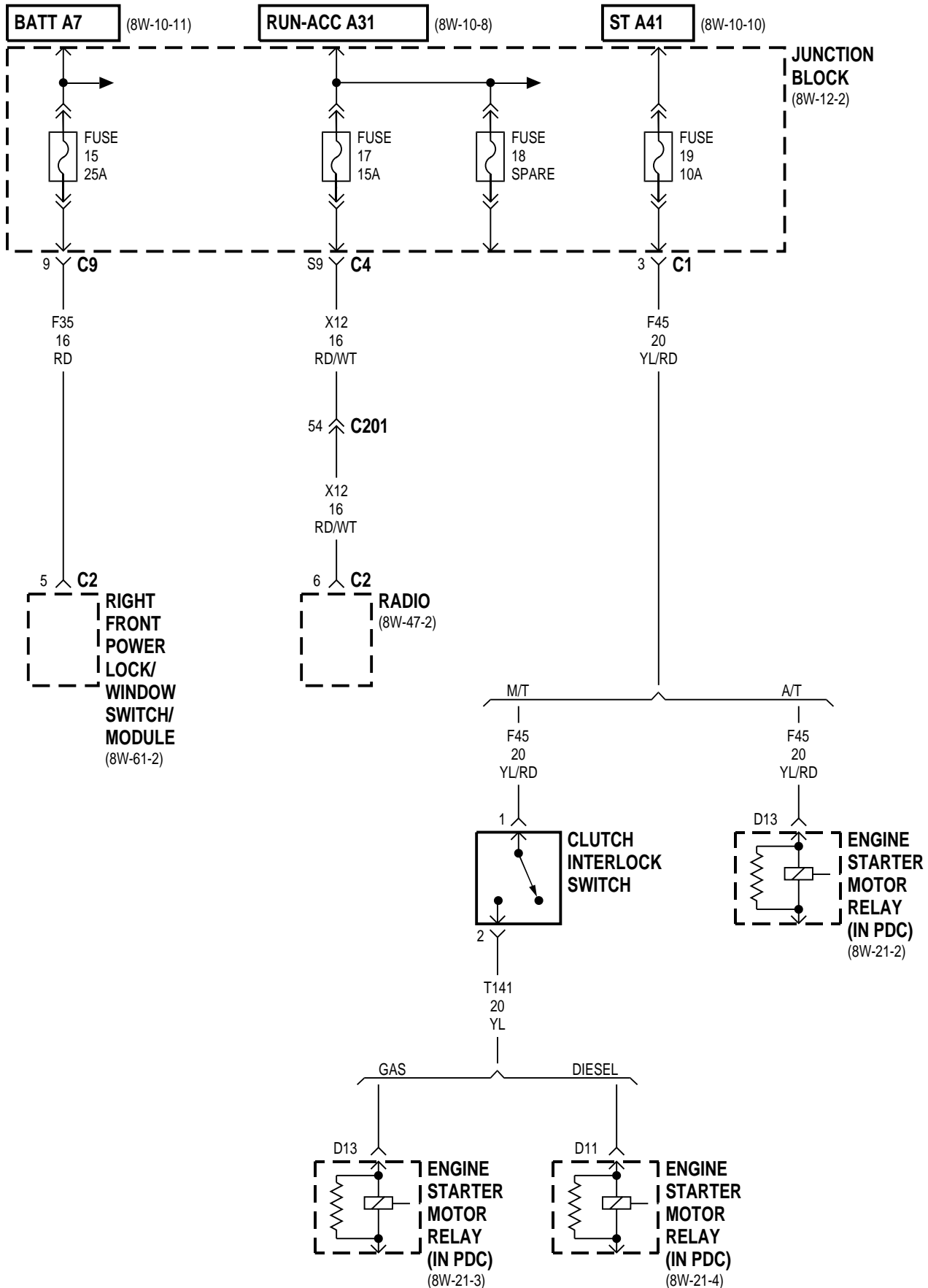




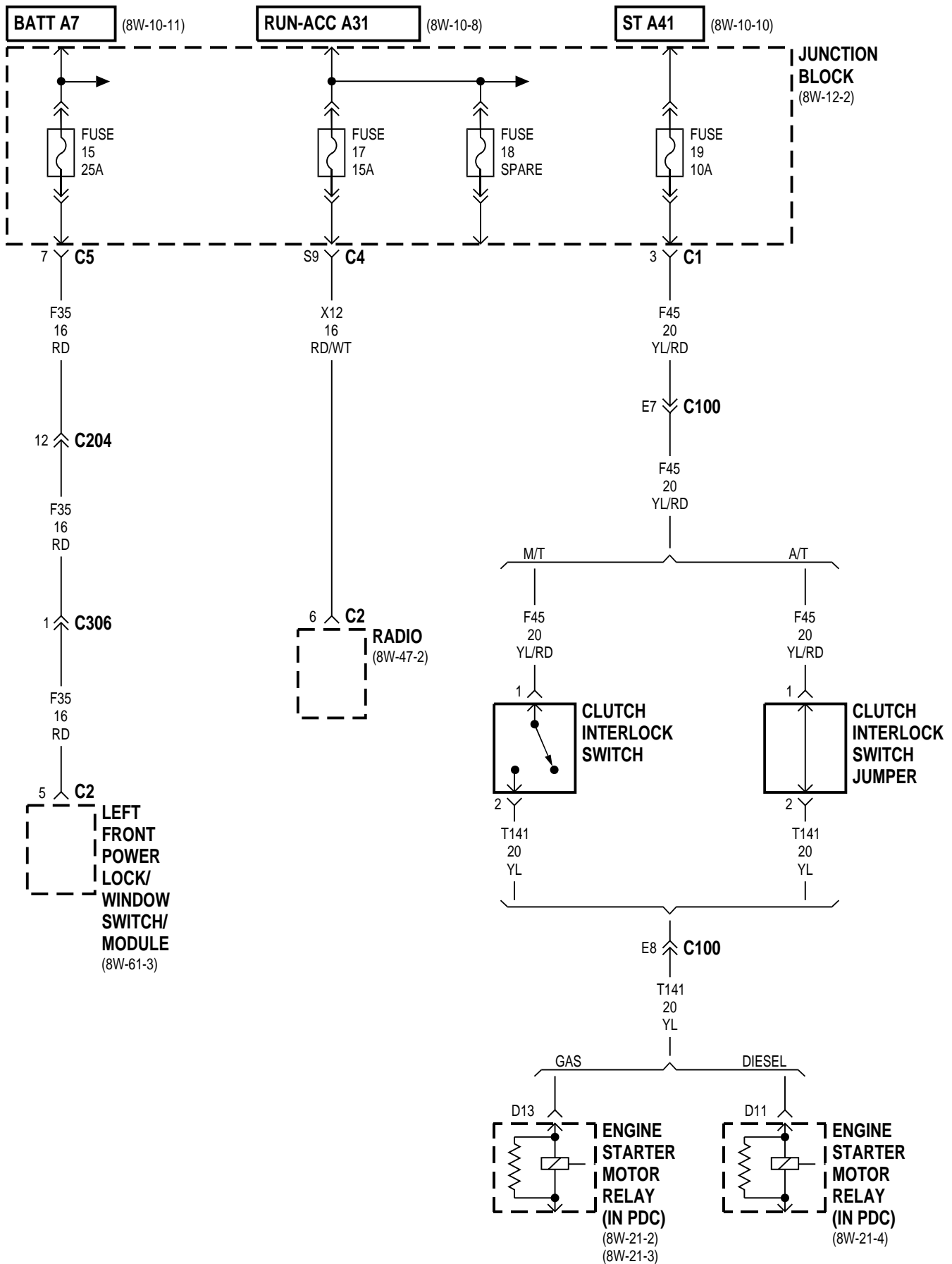


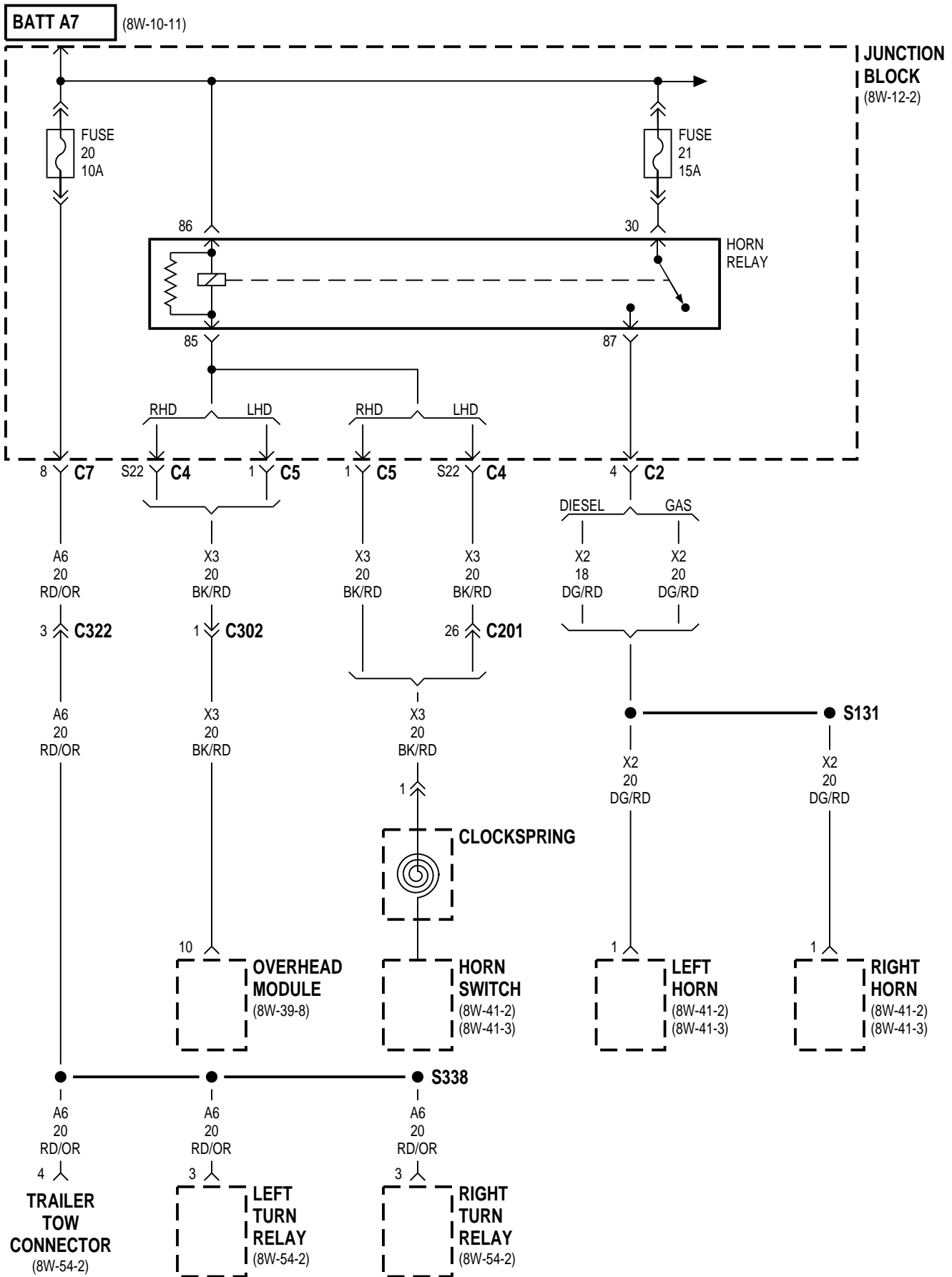


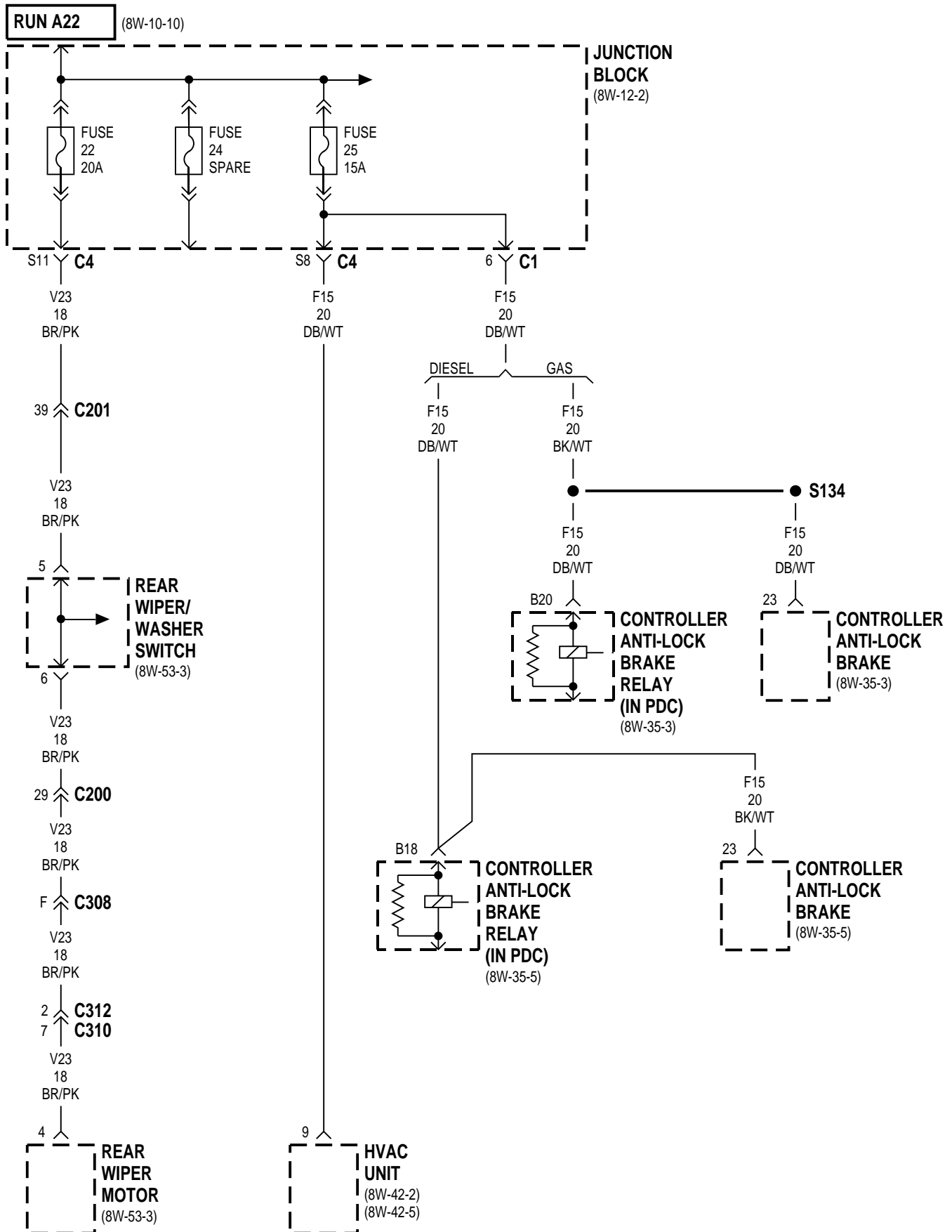
LHD

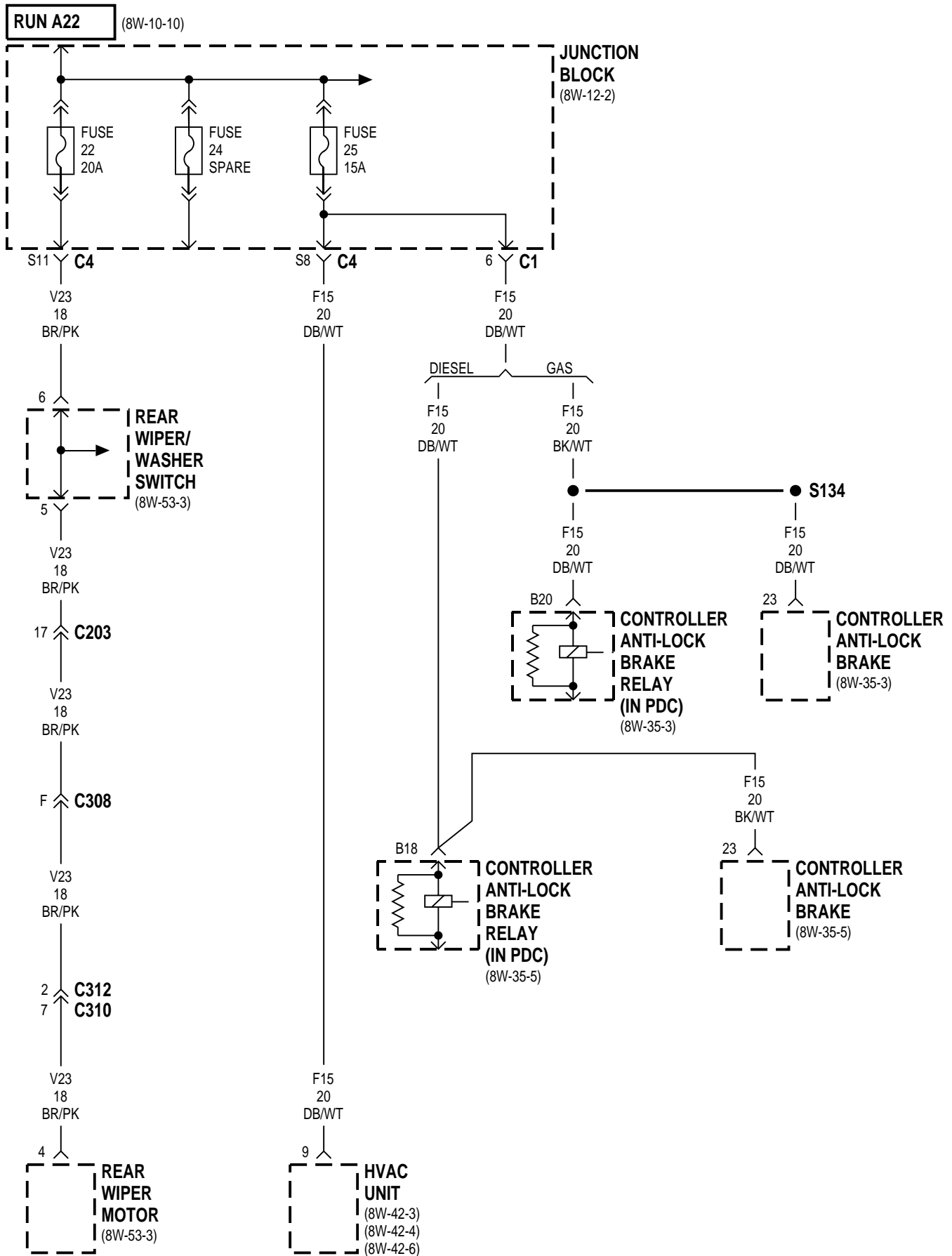


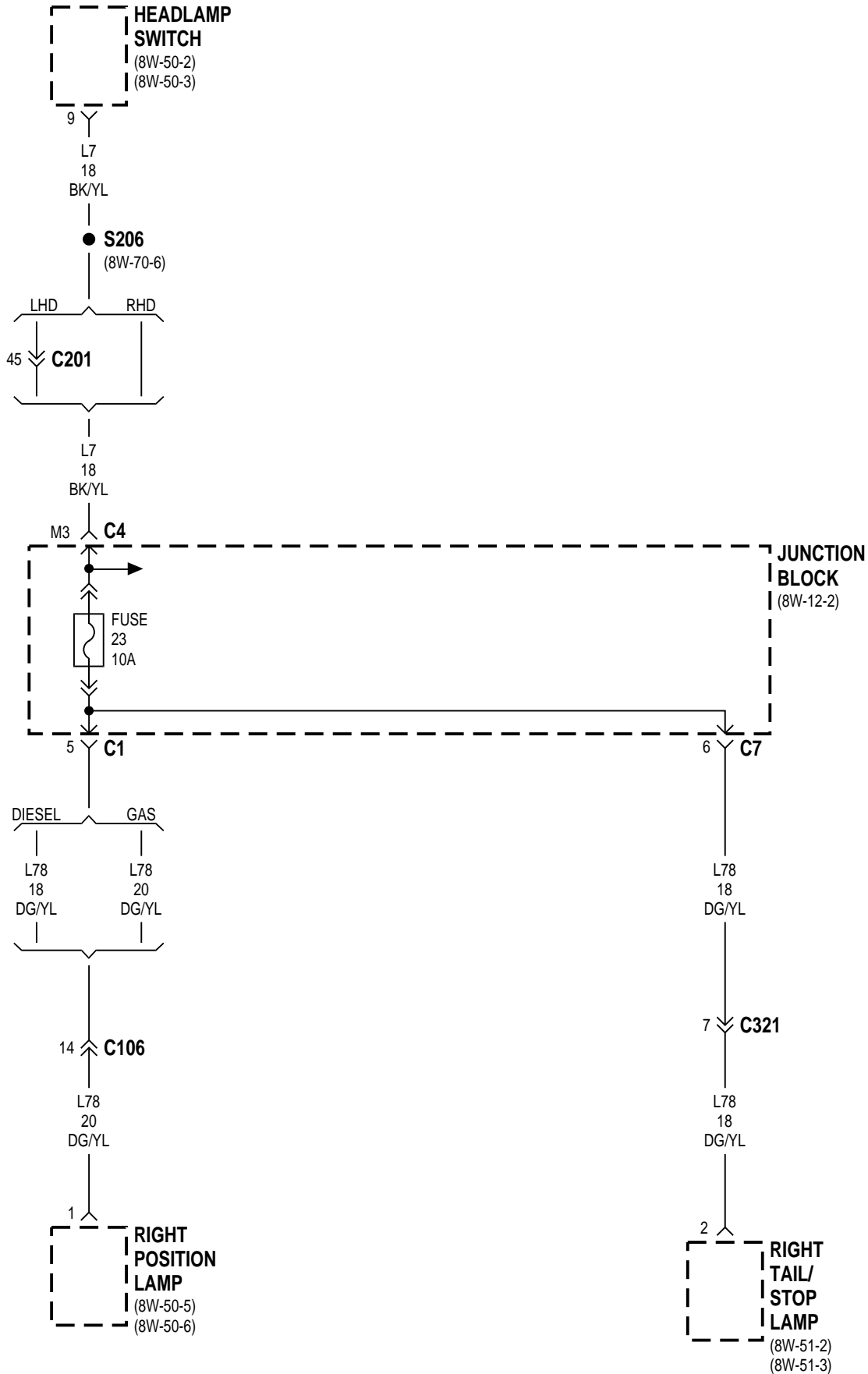
RHD



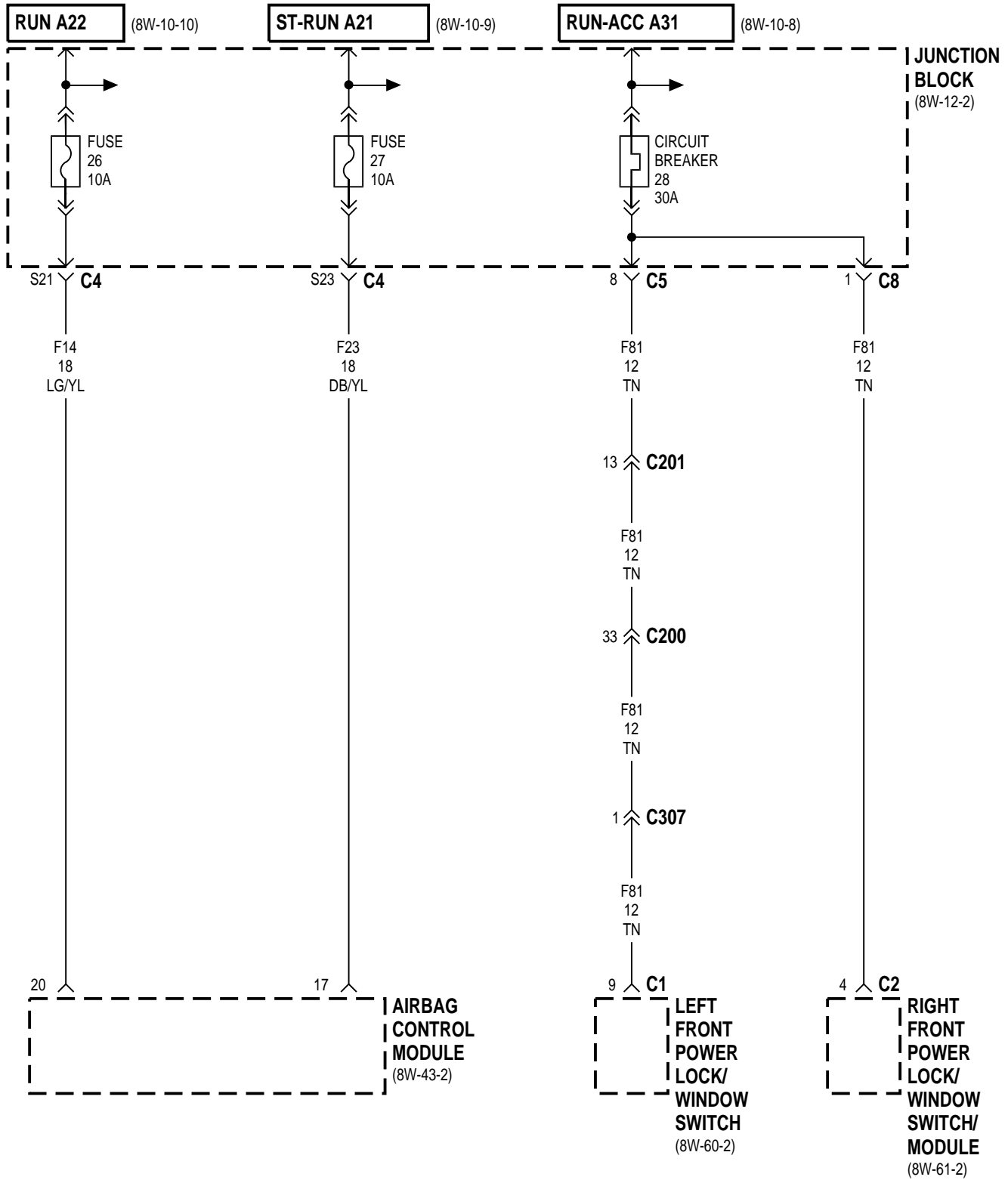


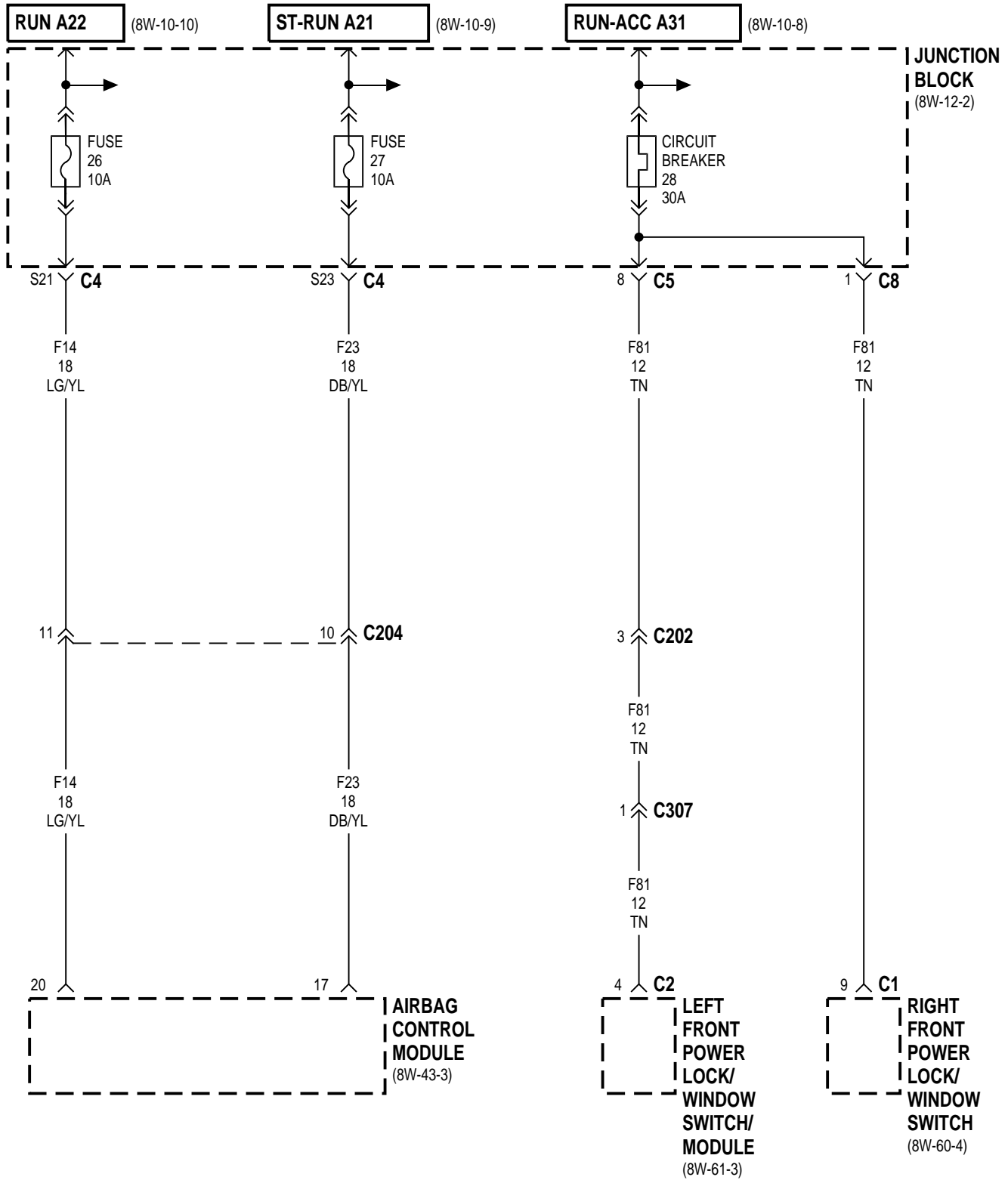


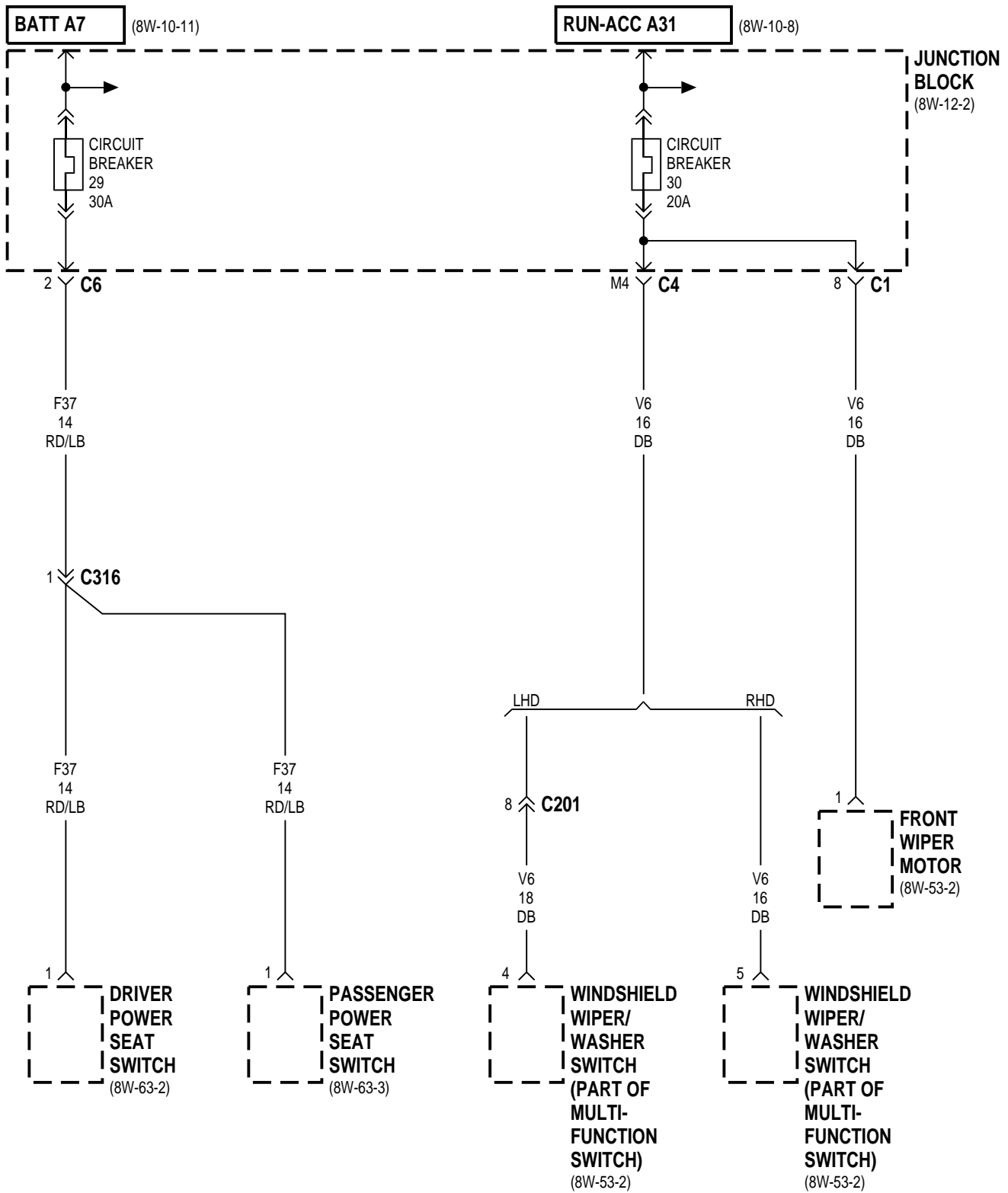


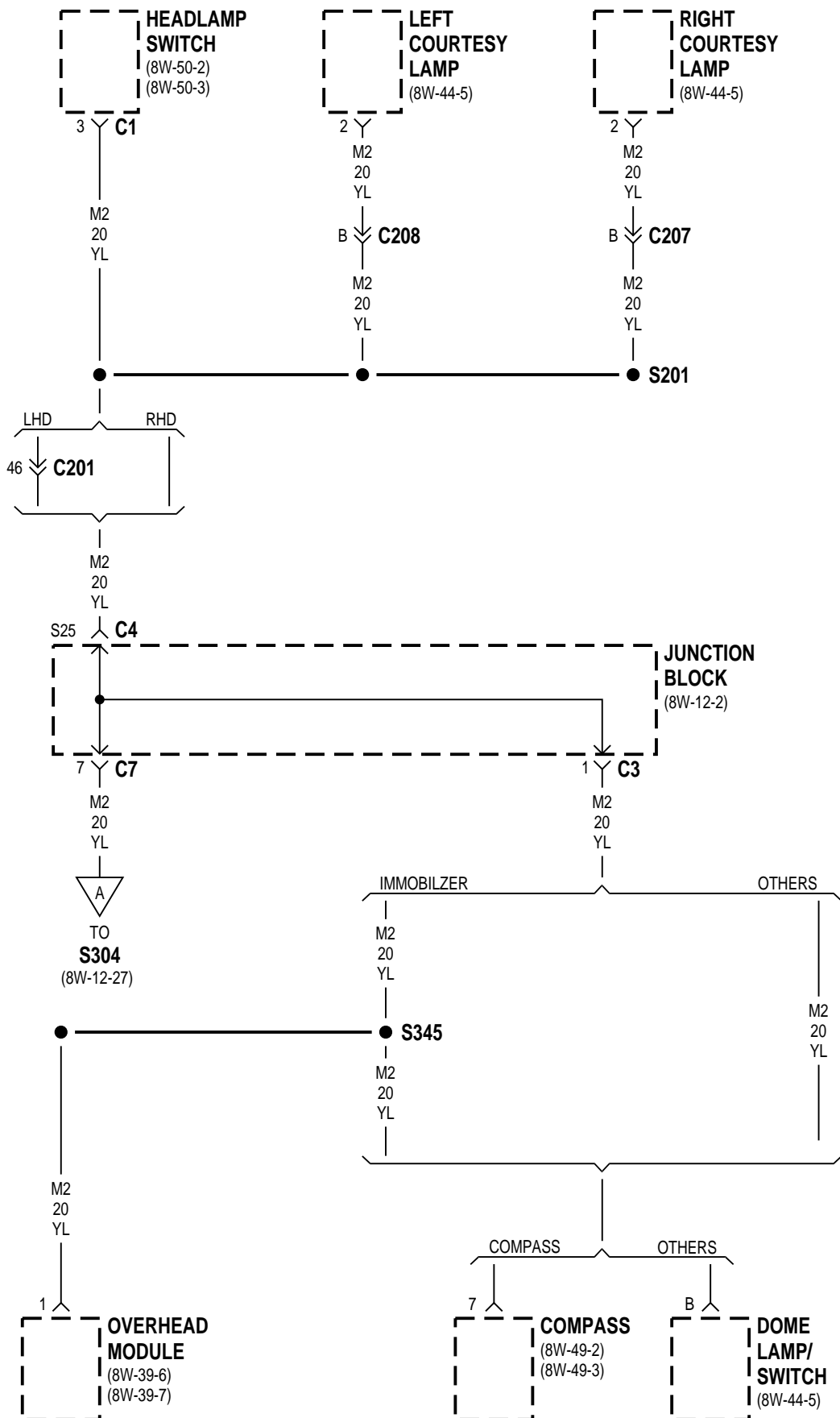


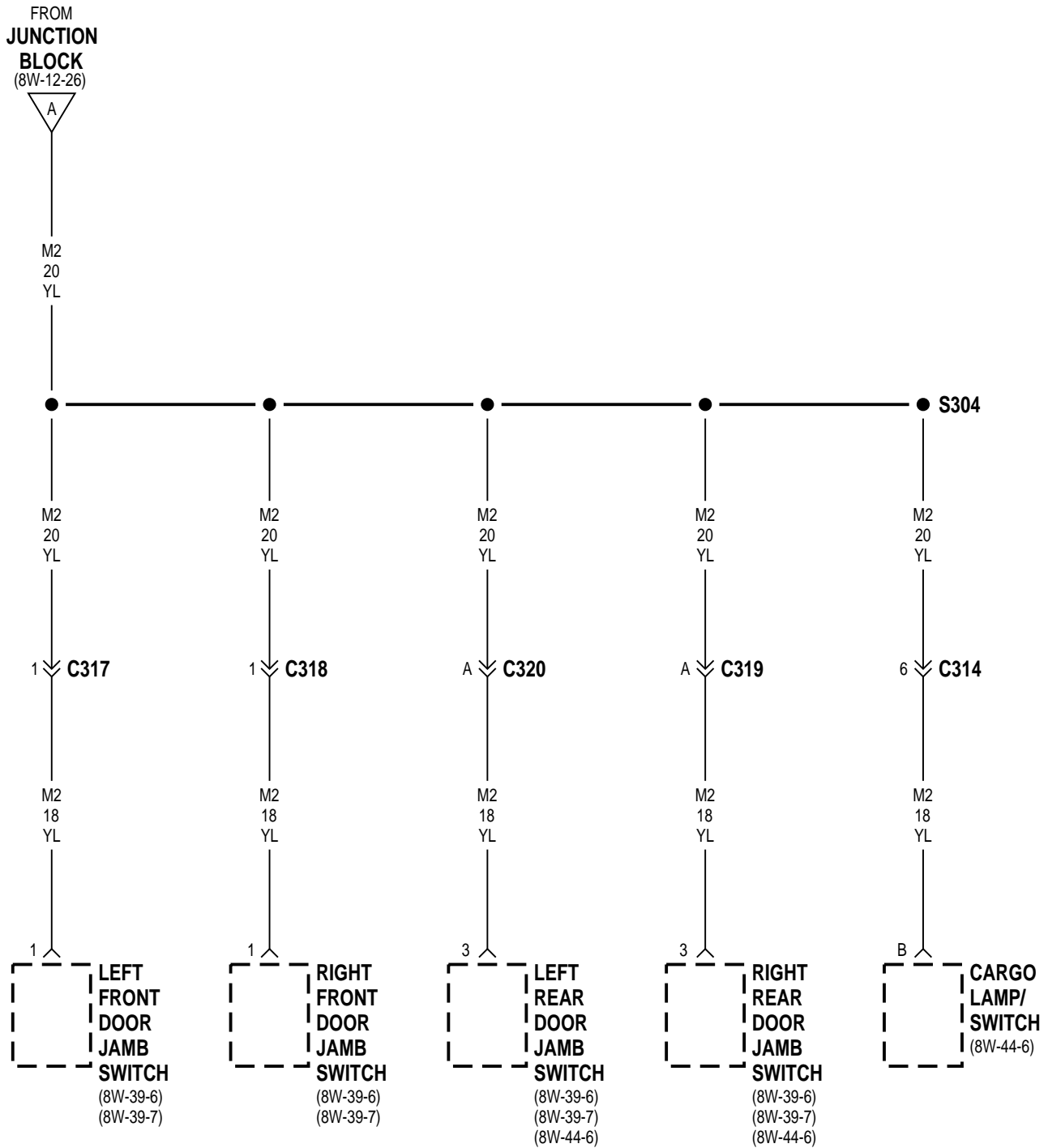
XJ ————— **8W-12 JUNCTION BLOCK** ————— **8W - 12 - 23**
LHD

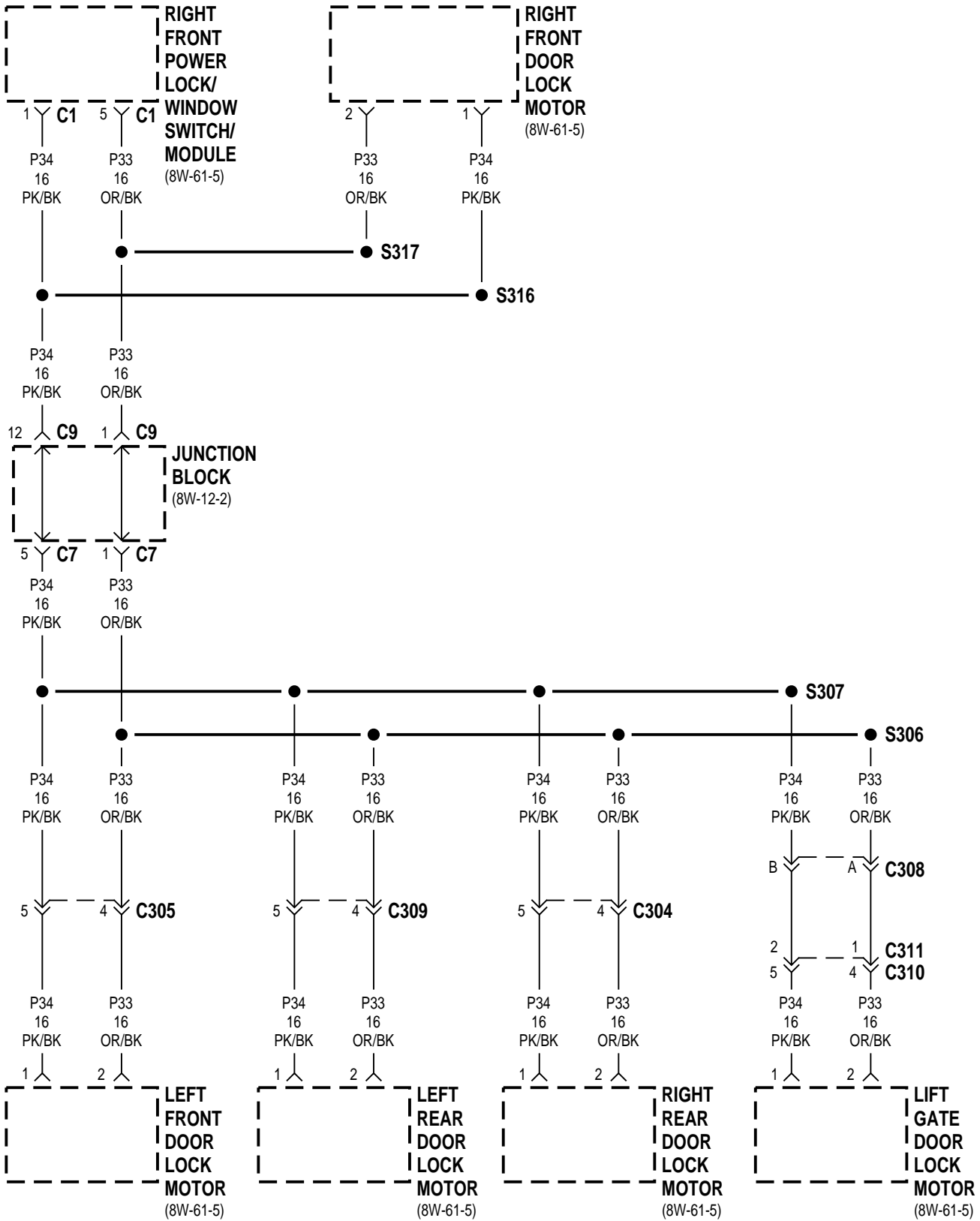


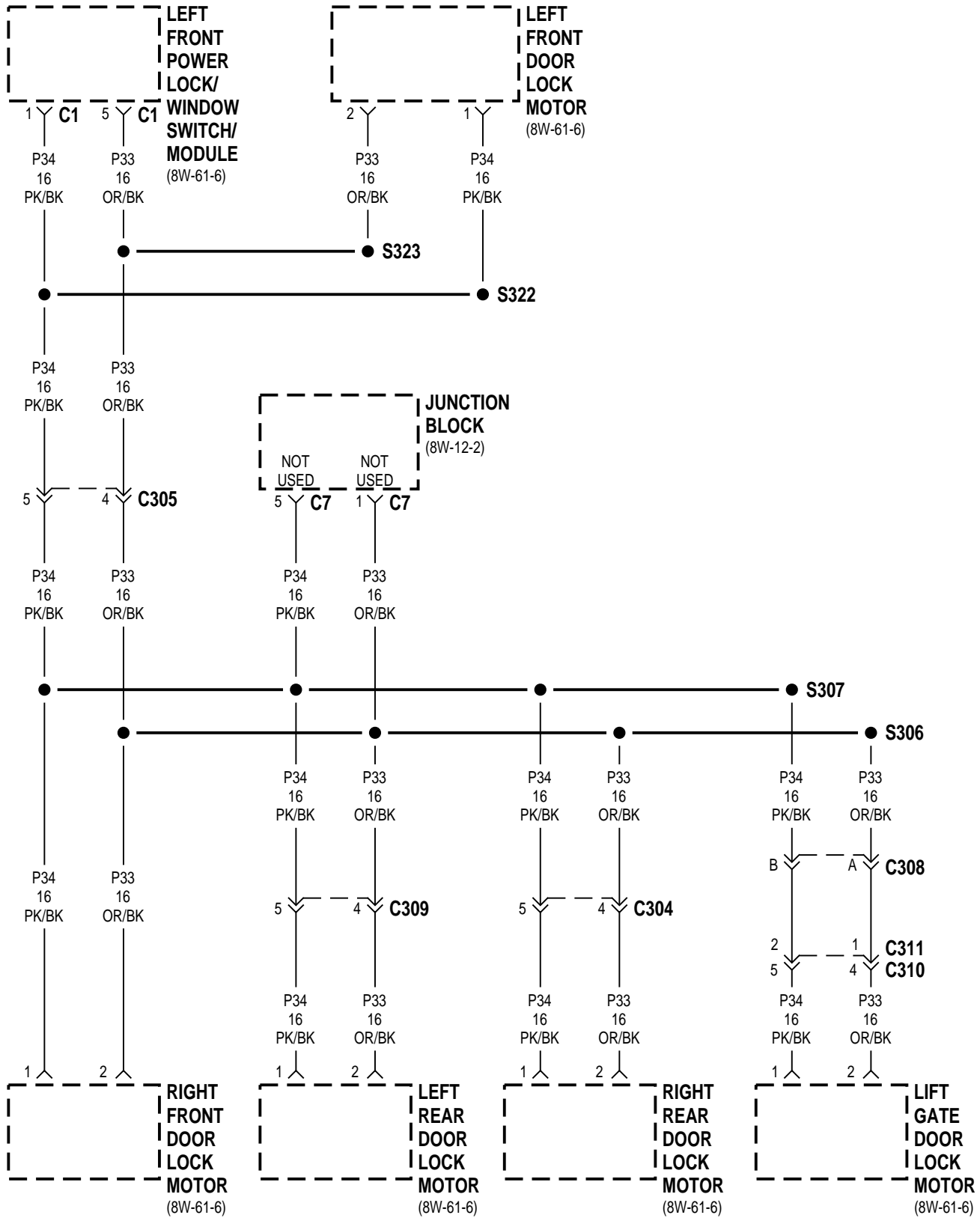


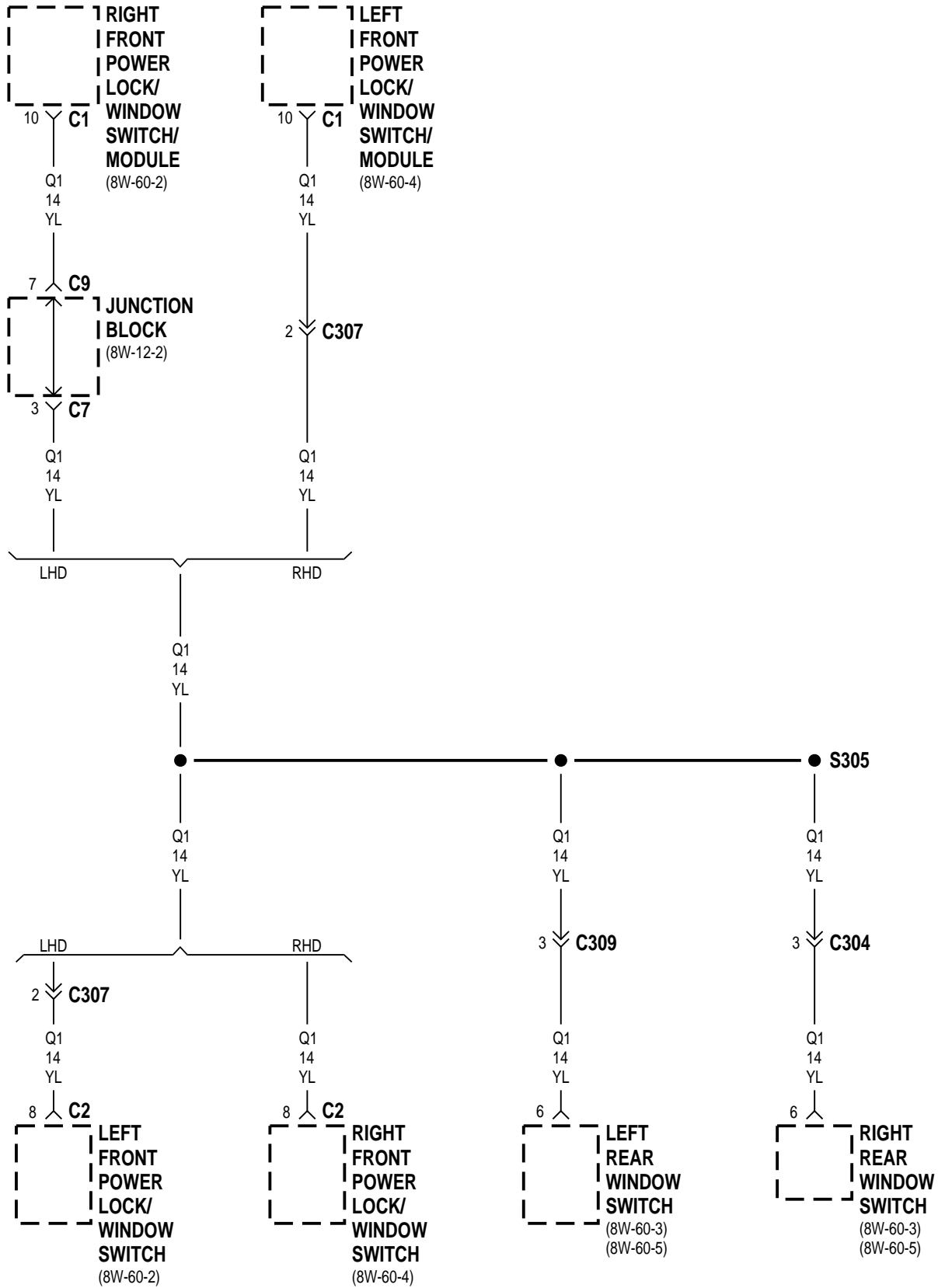


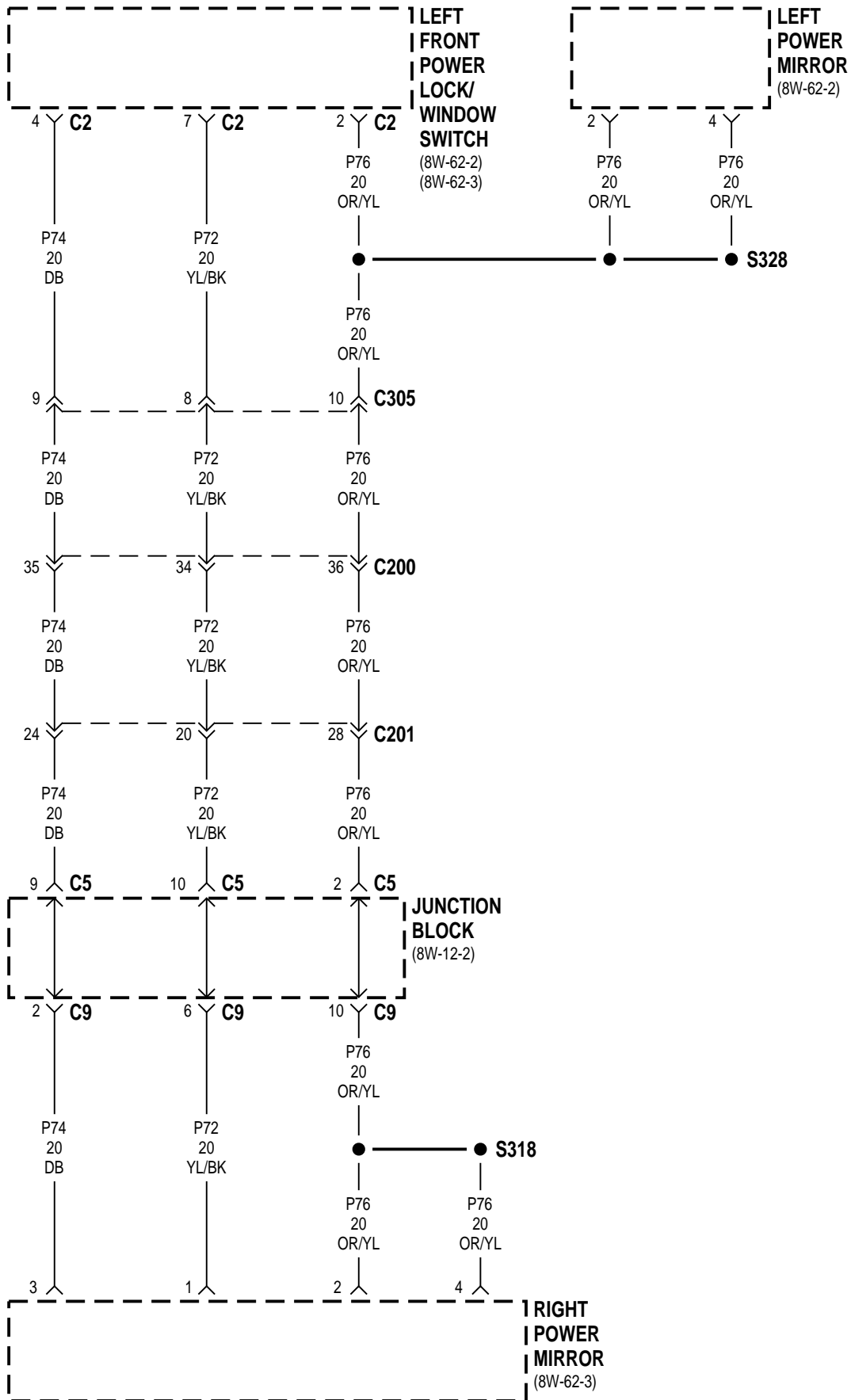


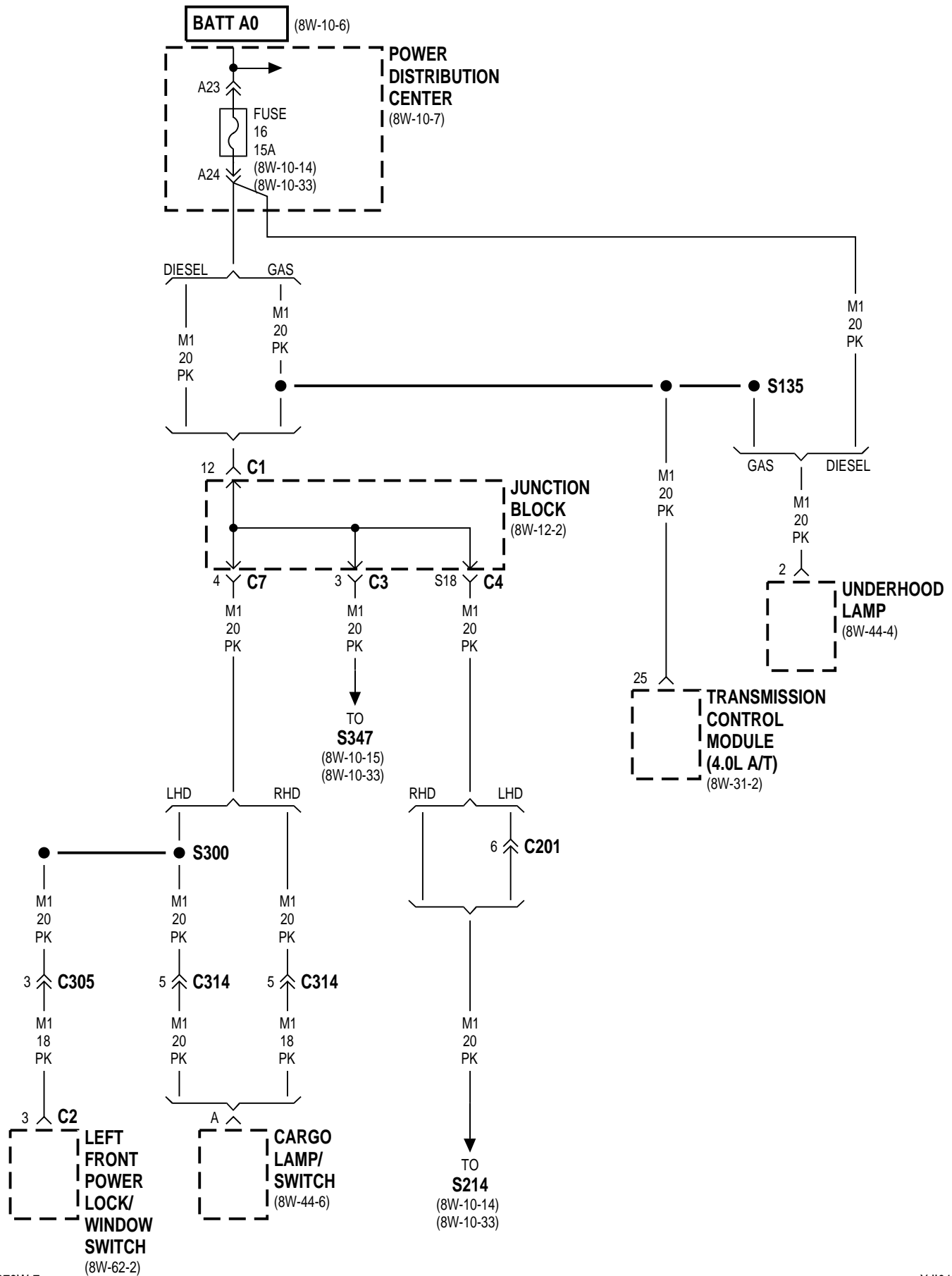


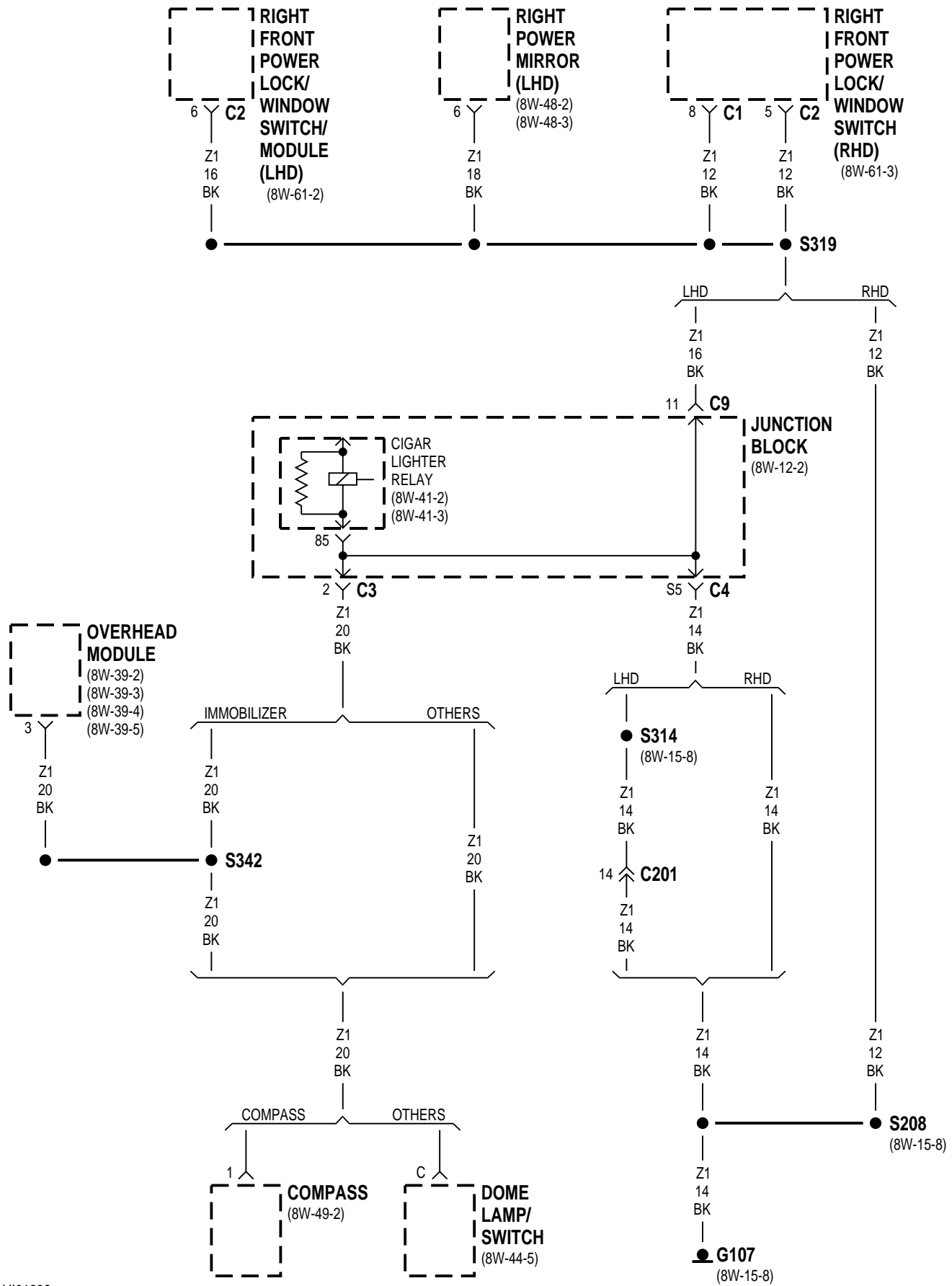










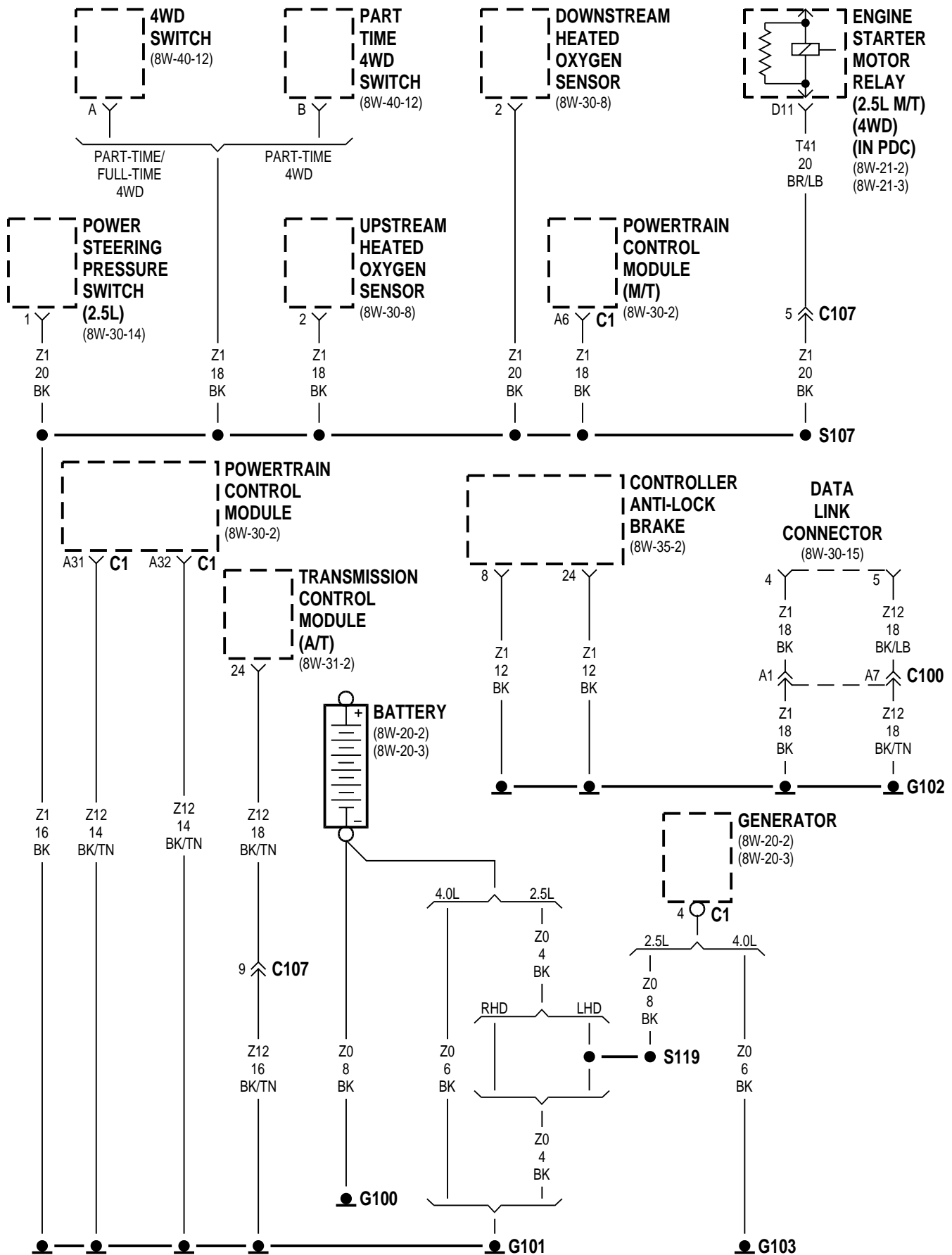


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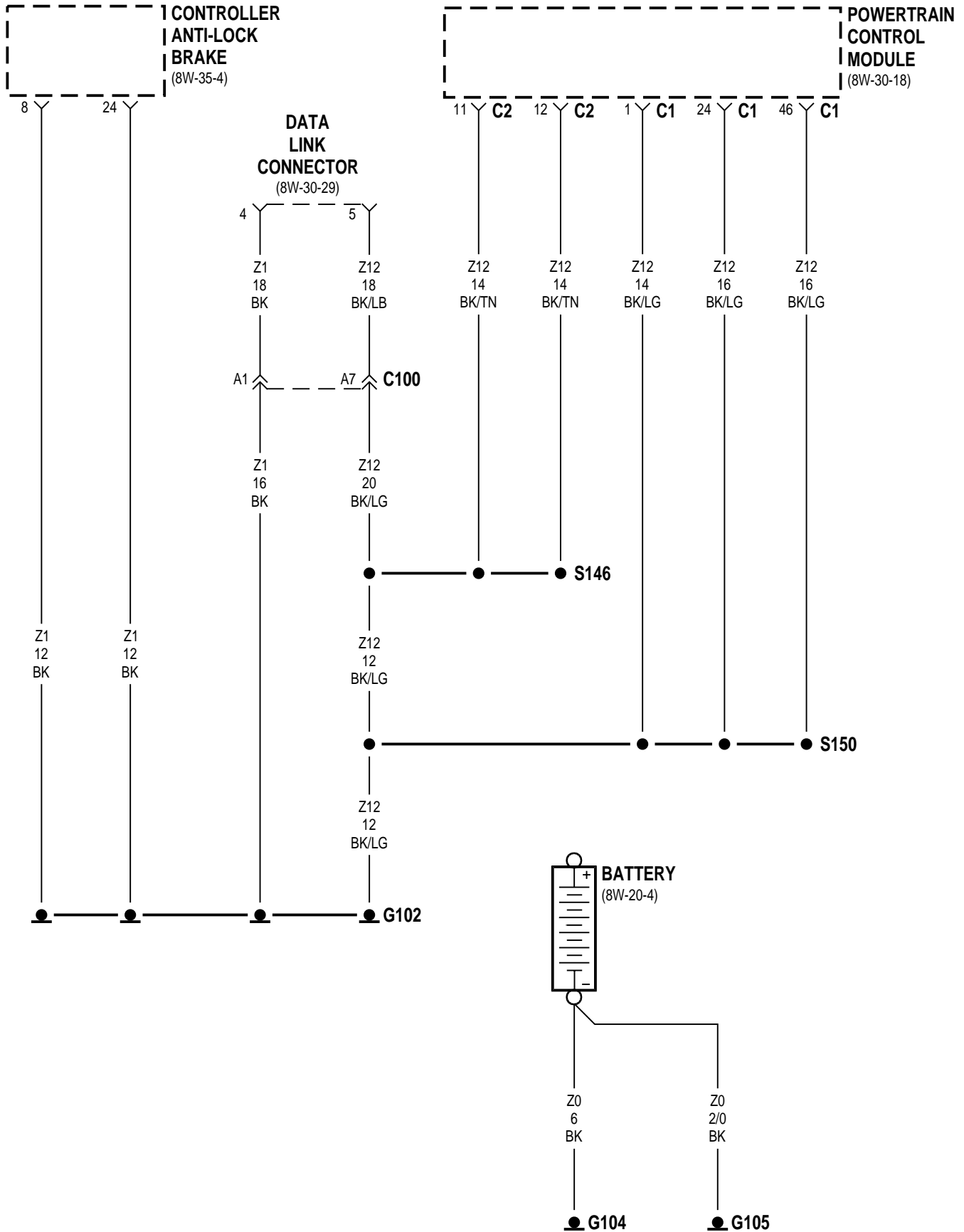
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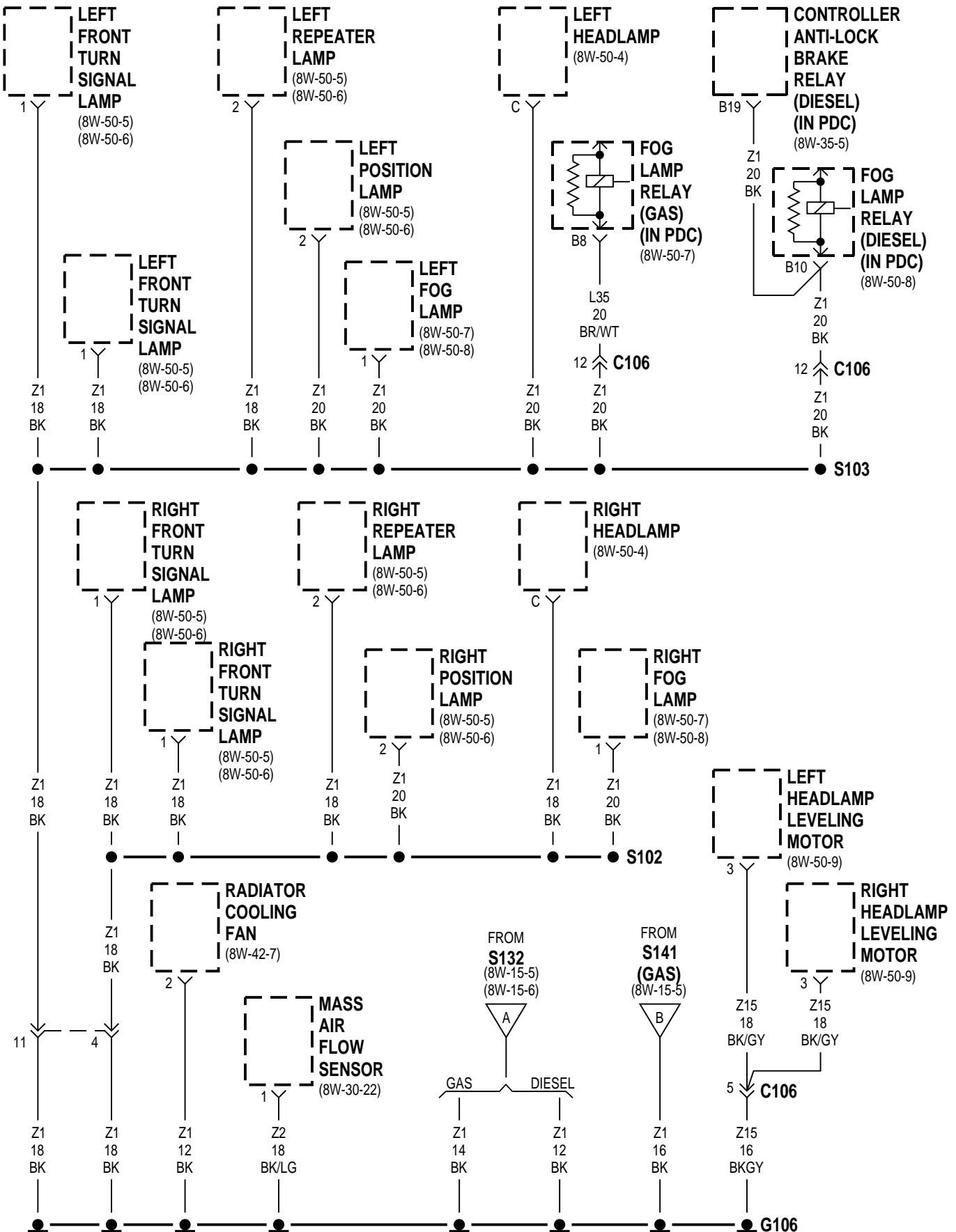
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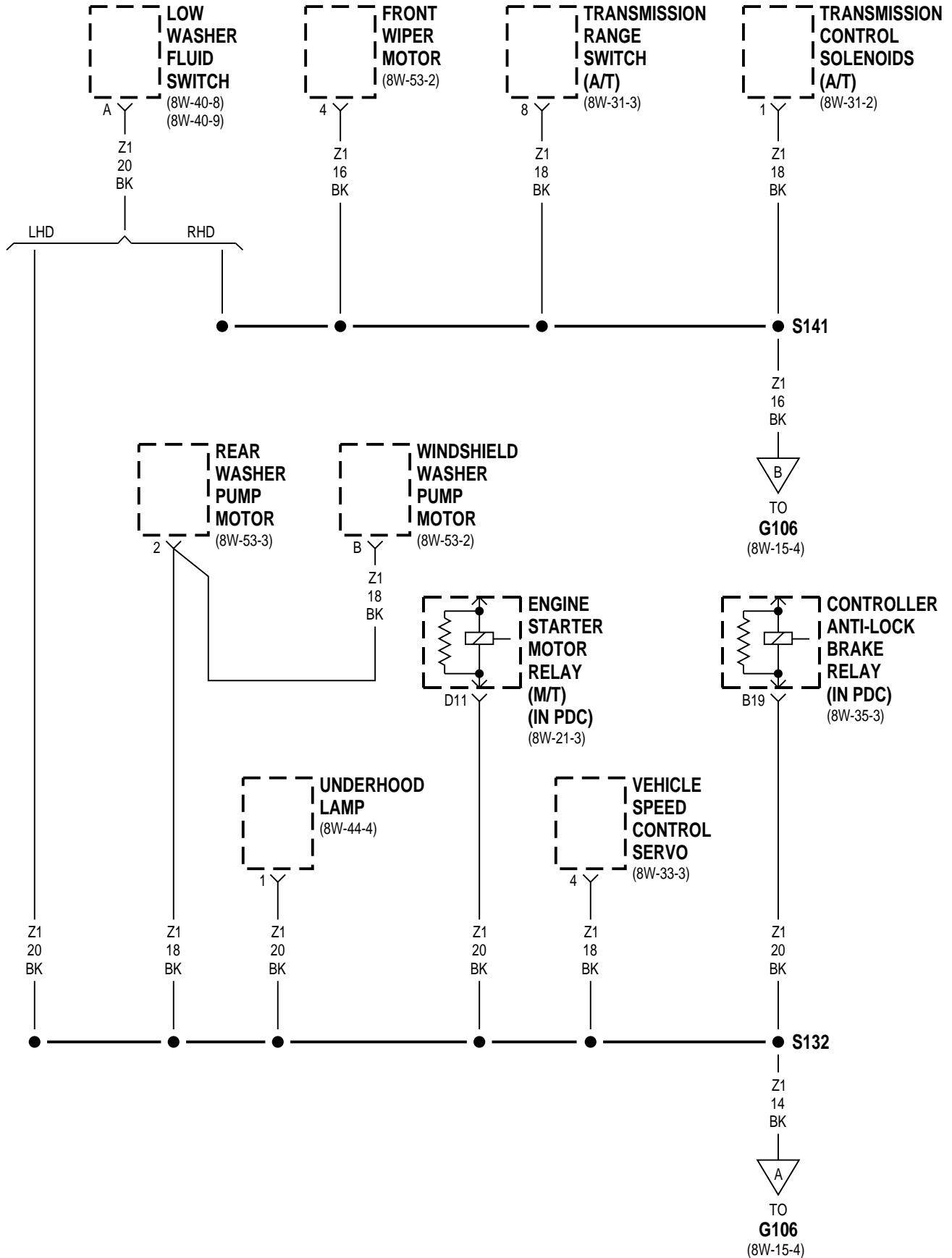


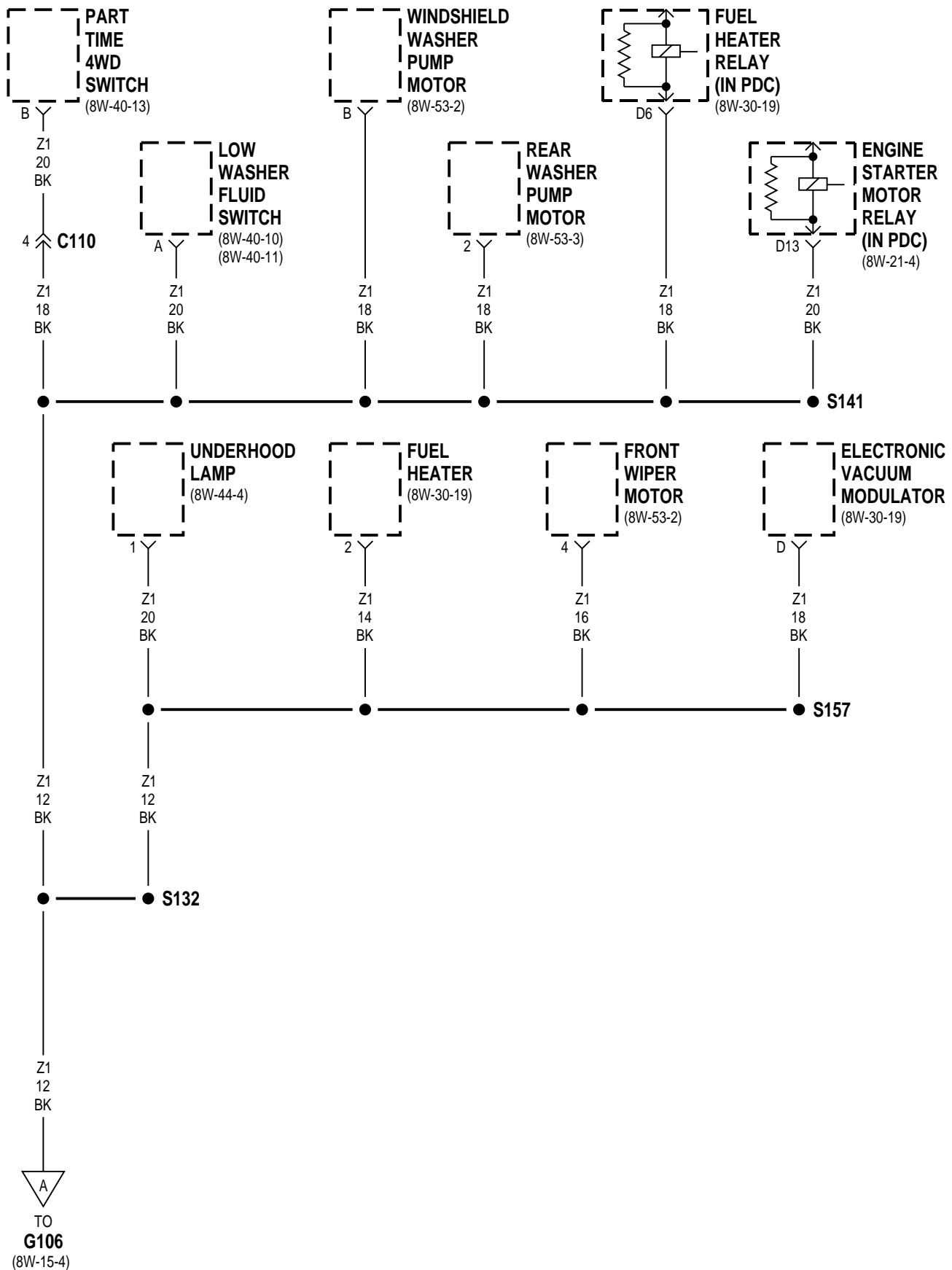
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DIESEL

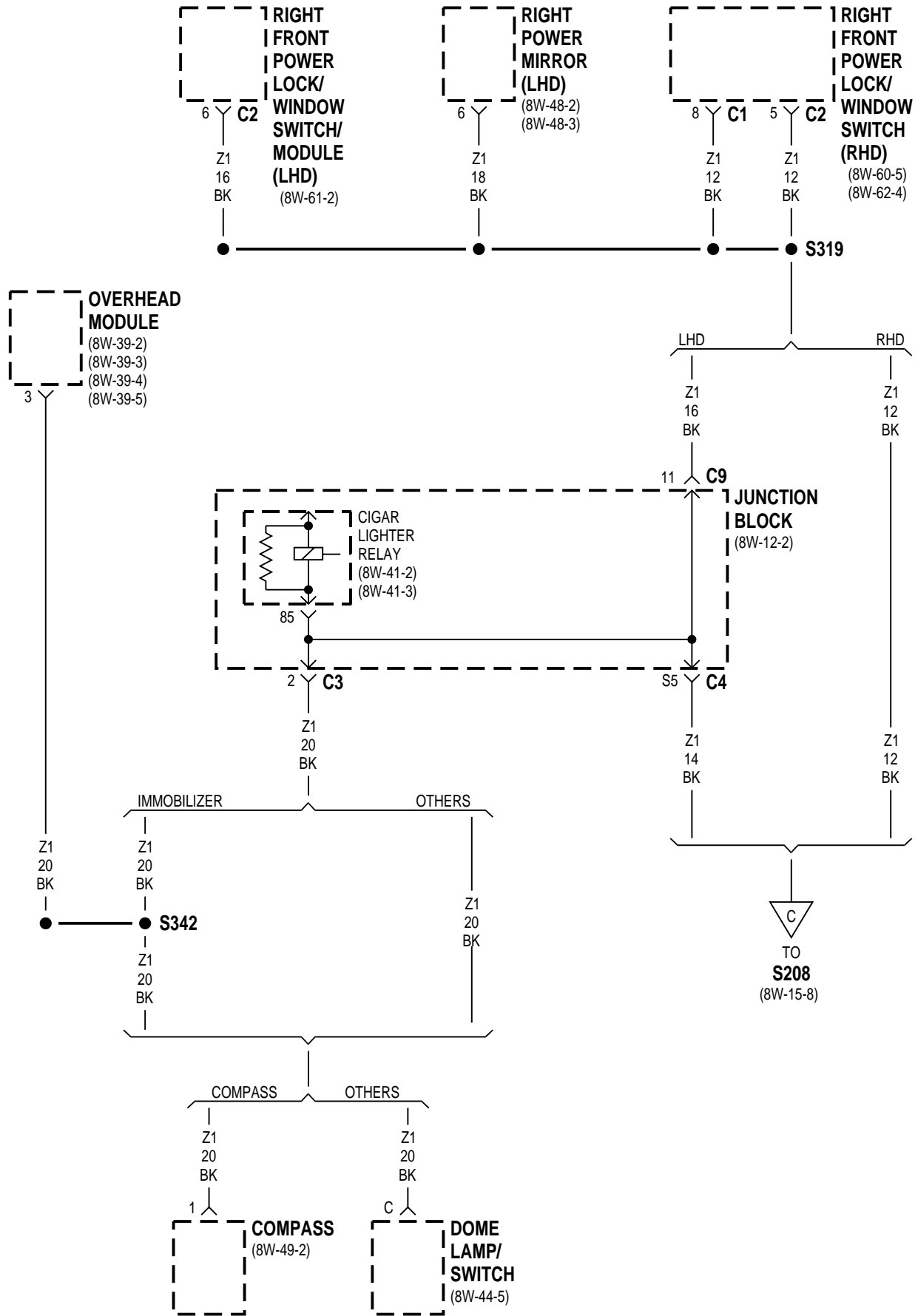


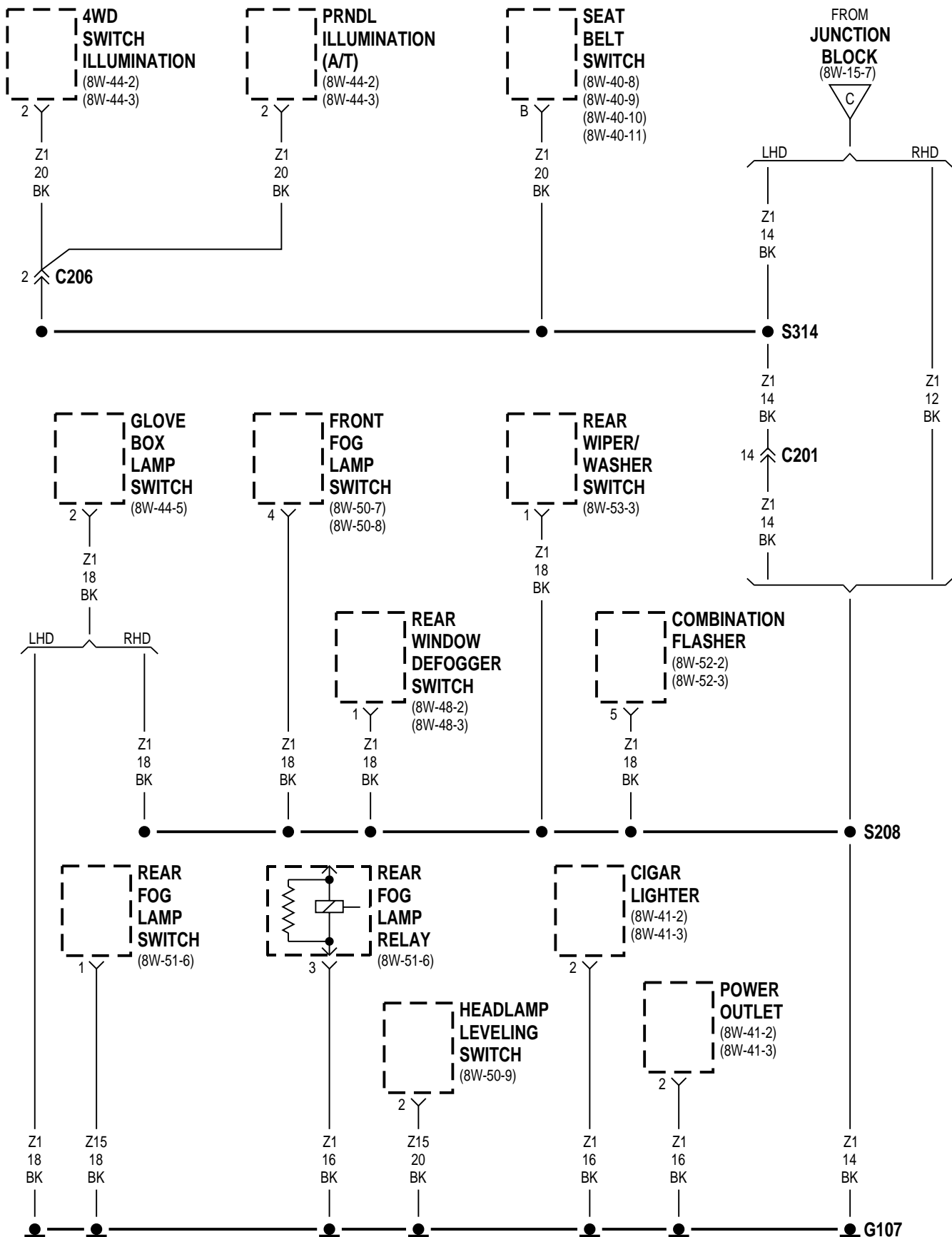


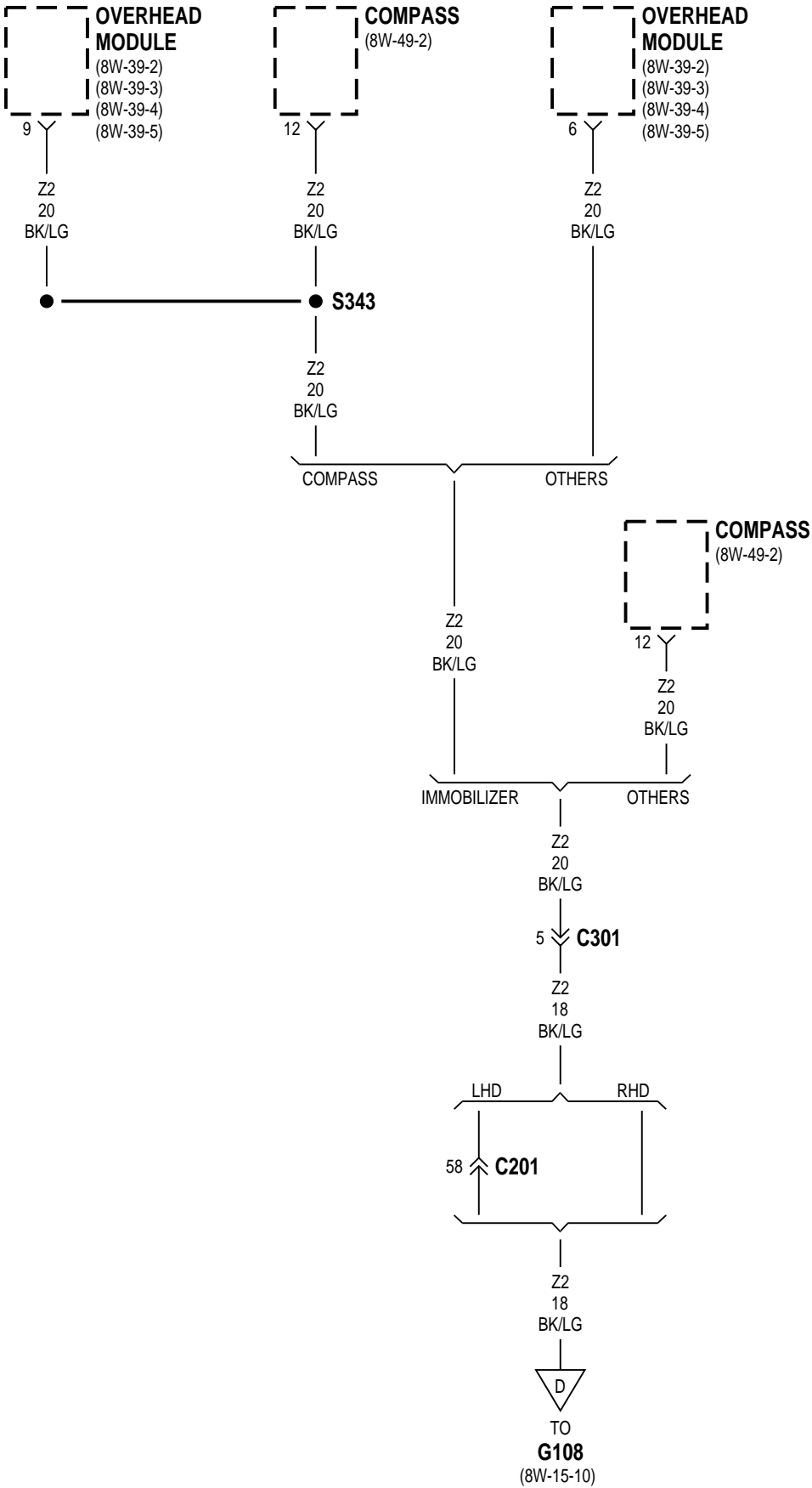
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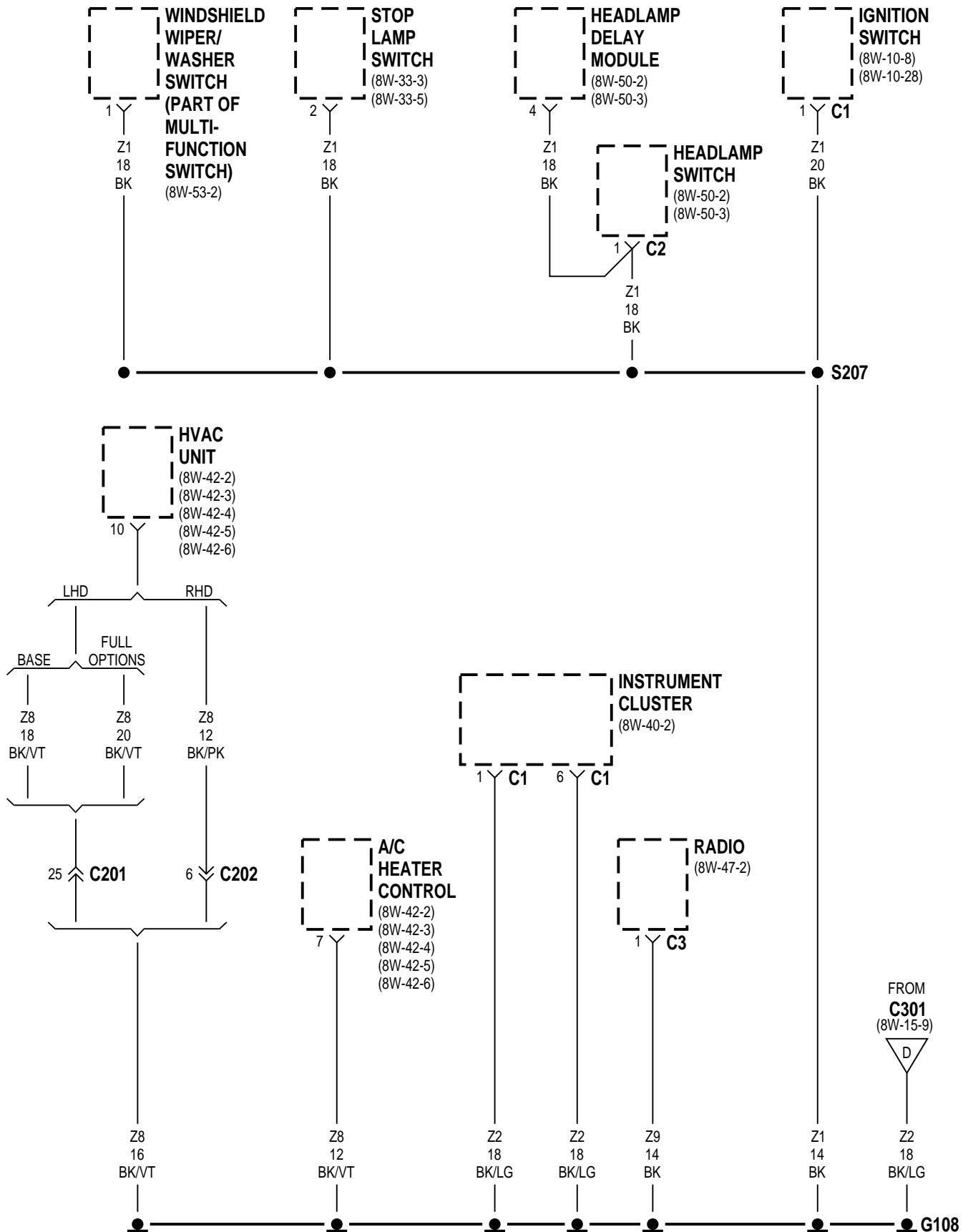




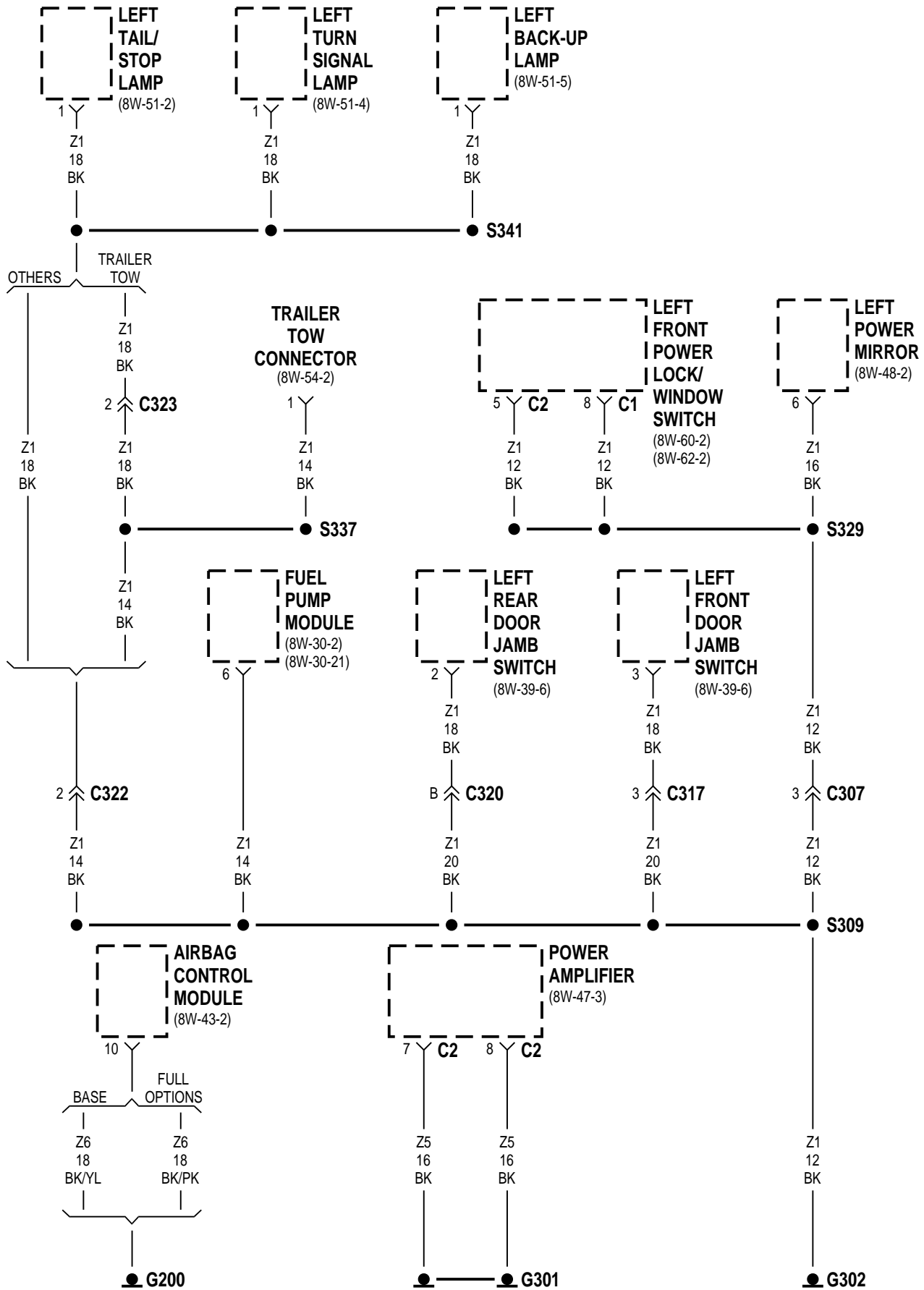




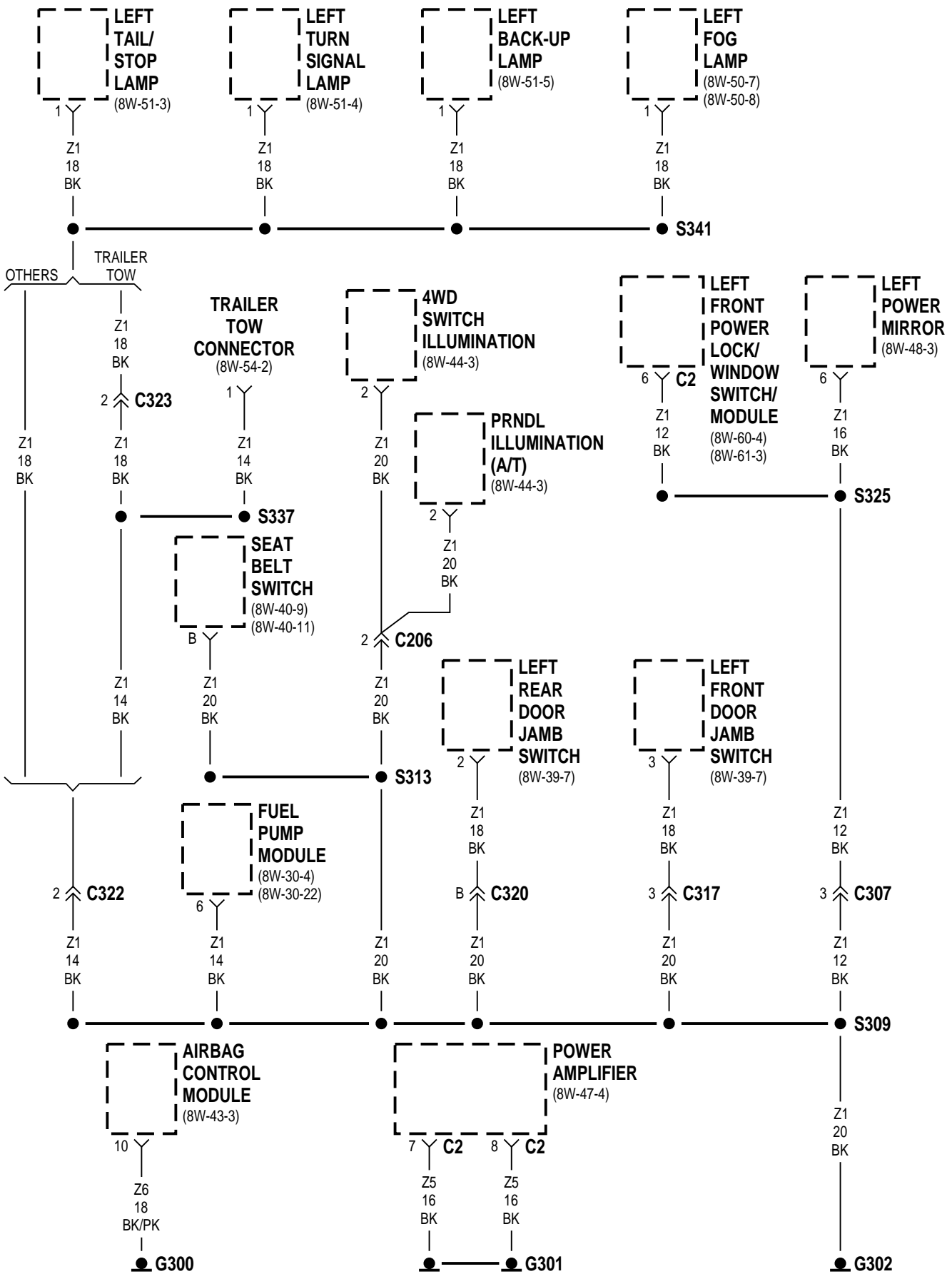




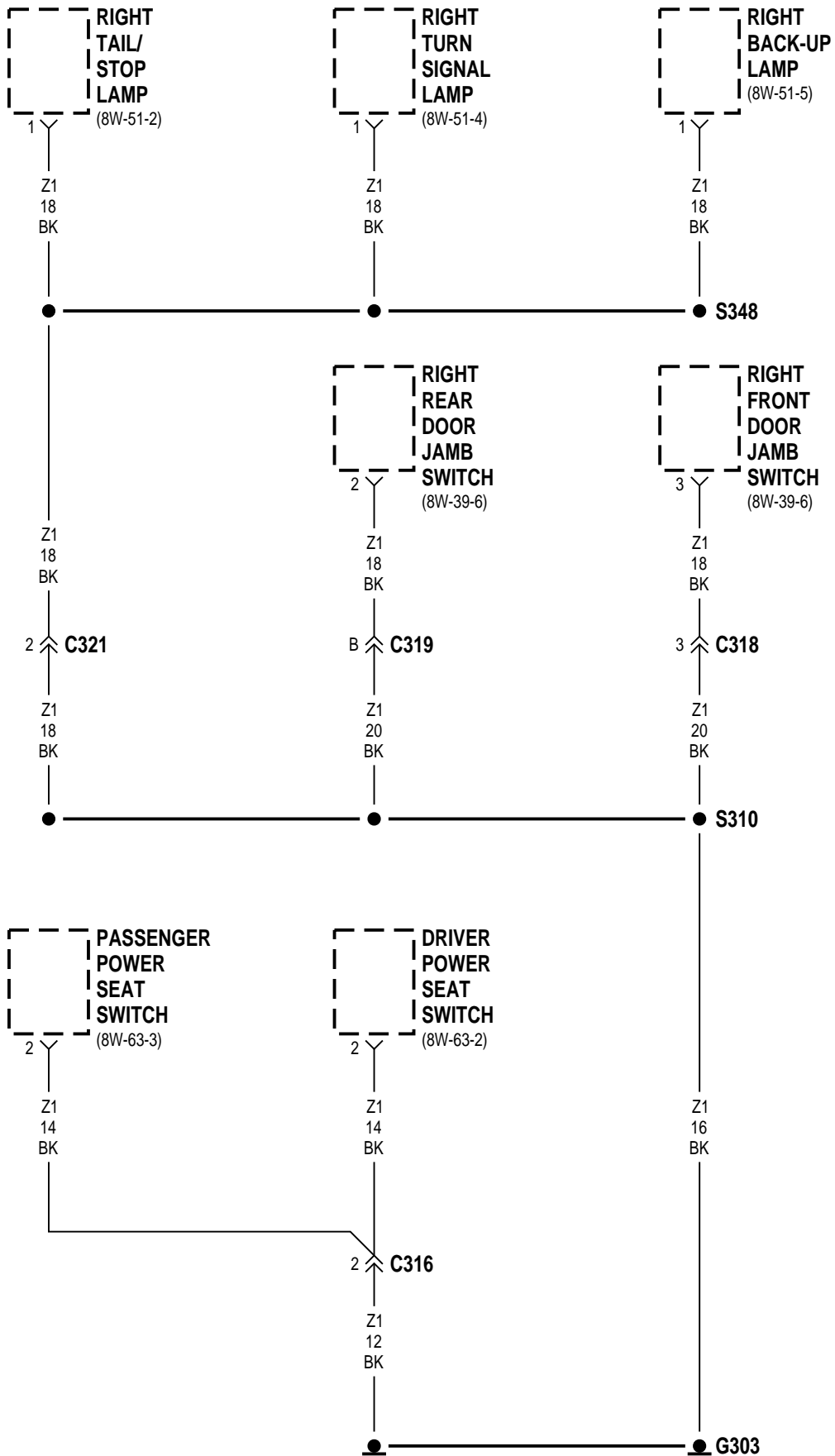
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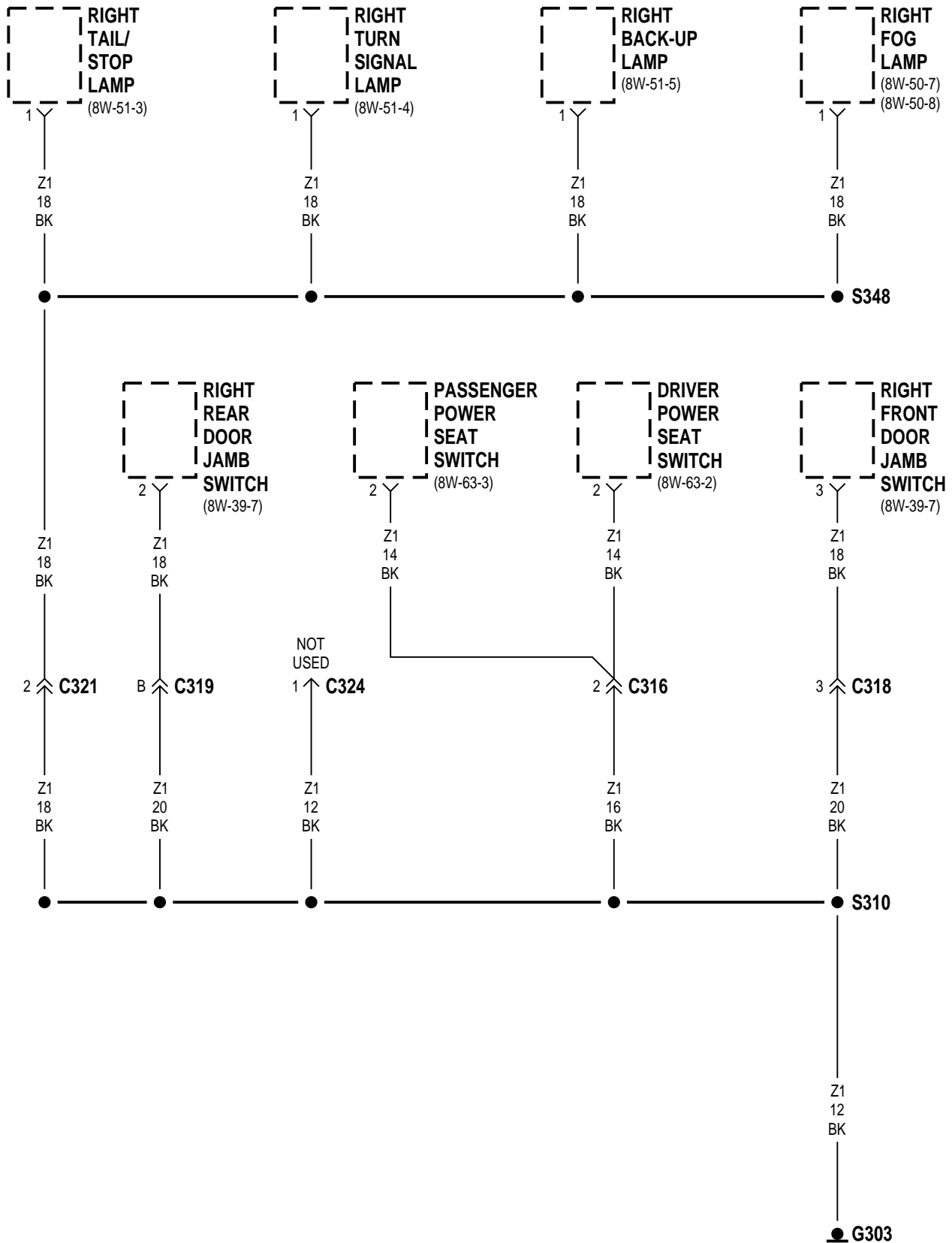


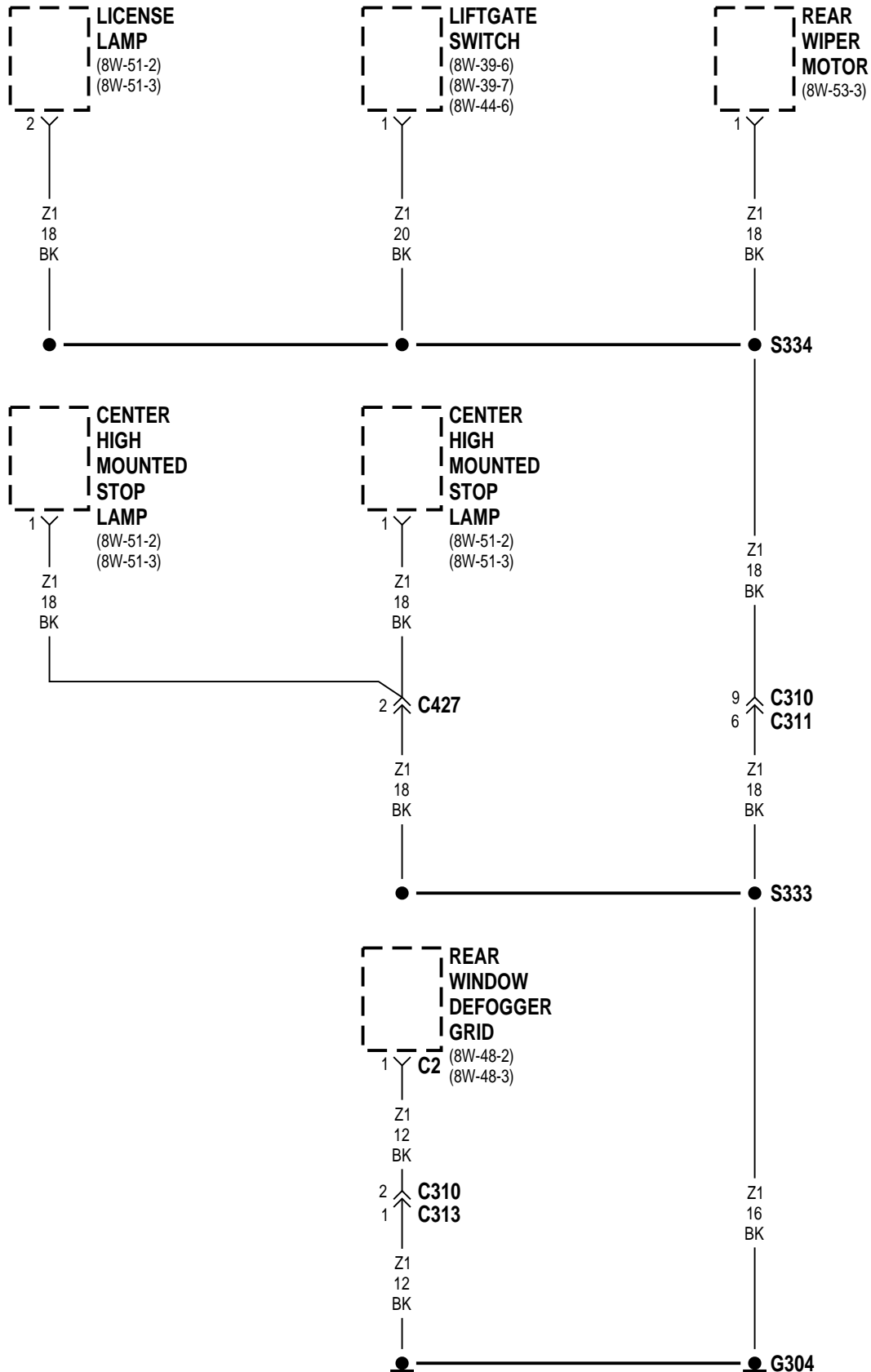
RHD



LHD





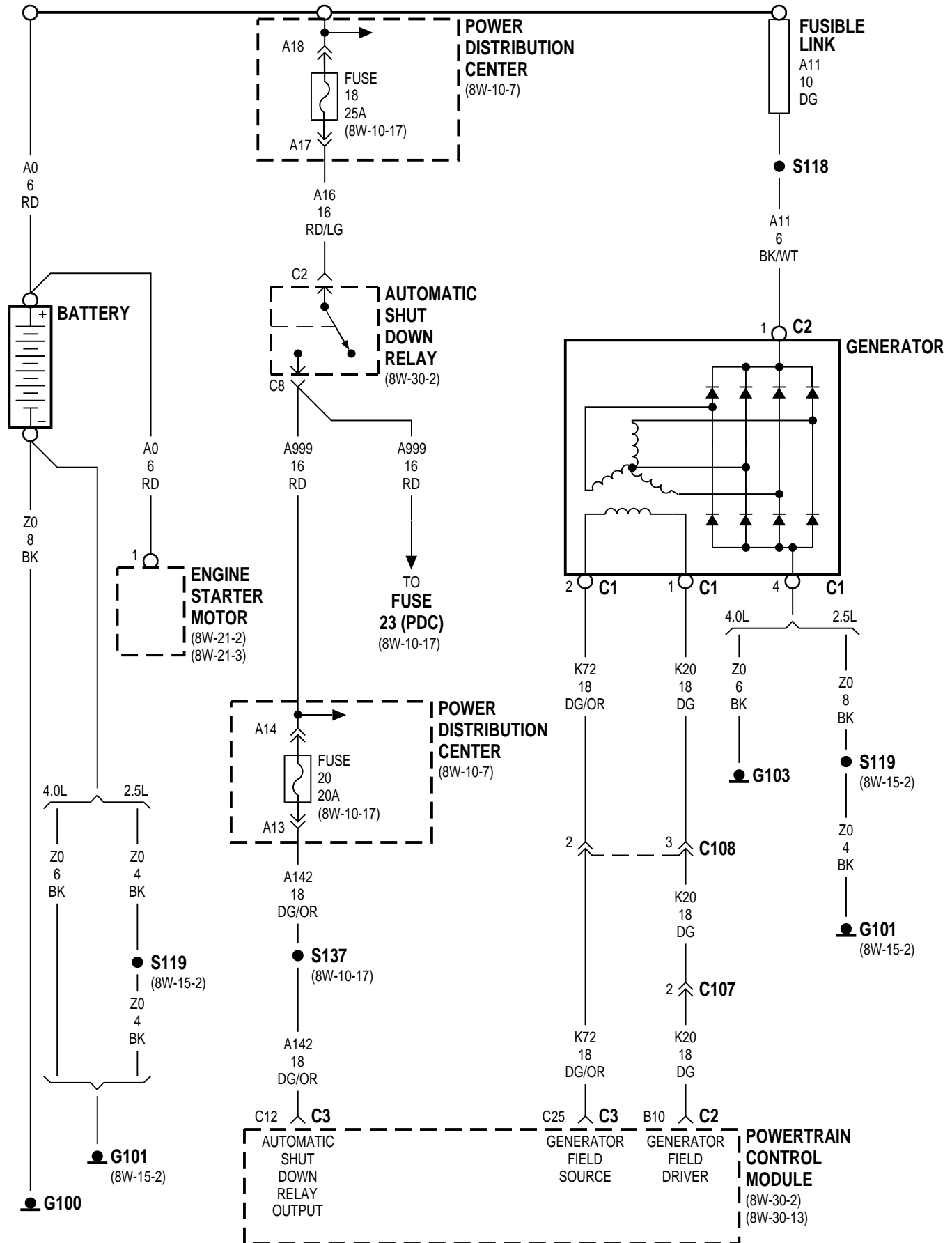


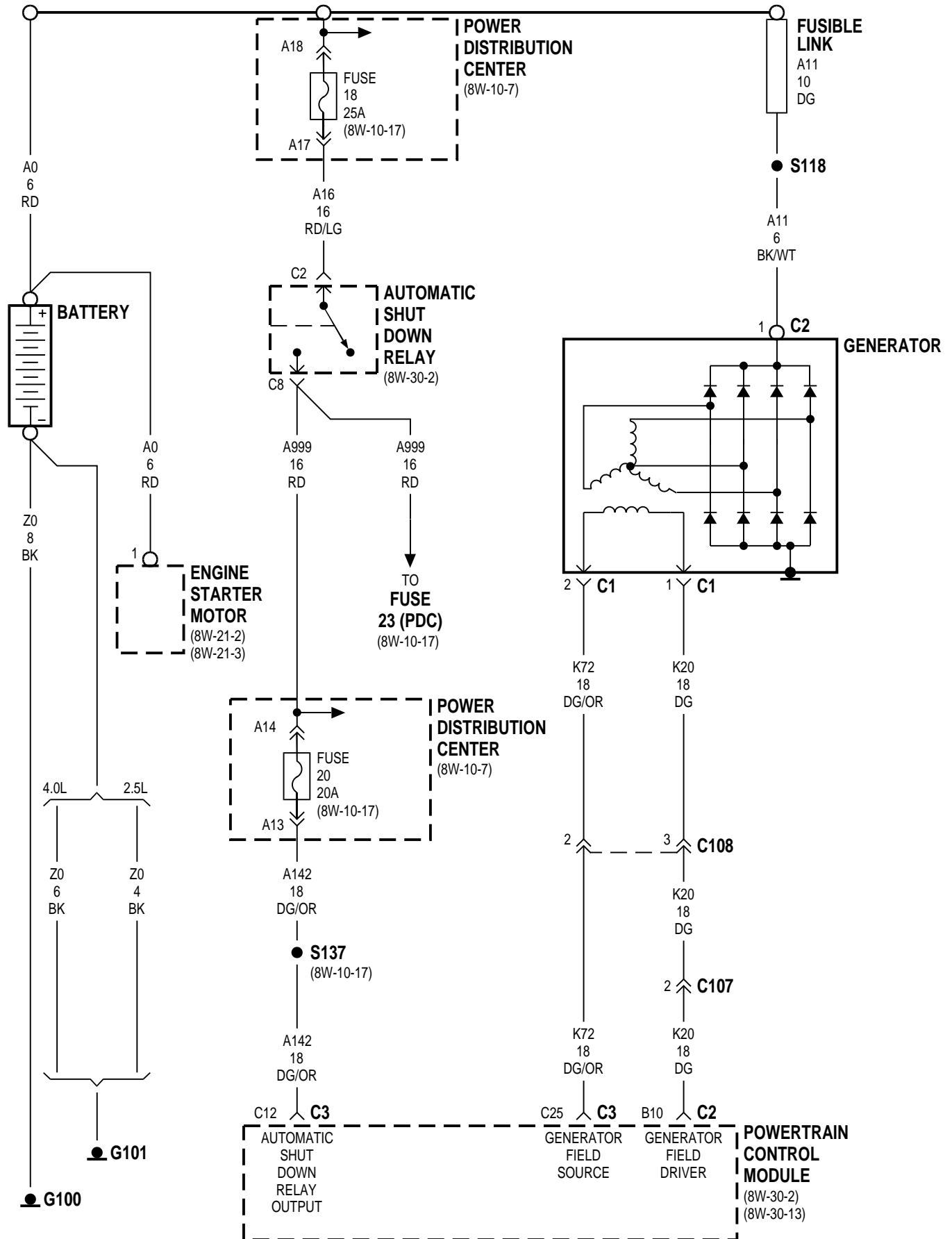
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8W-20 CHARGING SYSTEM

DESCRIPTION AND OPERATION

CHARGING SYSTEM

The charging system is an integral part of the battery and starting systems. Because all these systems work in conjunction, diagnose and test them together.

Circuit A11 connects to the generator output terminal and the Power Distribution Center (PDC). Circuit A0 connects the battery to the PDC. Circuit Z0 provides ground for the generator.

When the ignition switch is in either the START or RUN positions, it connects circuit A1 from fuse 2 in the PDC to circuit A21. Circuit A21 splices to circuit F12 and supplies current to the coil side of the Automatic Shut Down (ASD) relay. The Powertrain Control Module (PCM) provides ground for the relay on circuit K51. Circuit K51 connects to cavity C3 of the PCM.

When the PCM grounds the ASD relay, contacts inside the relay close and connect circuit A16 from fuse 18 in the PDC to circuit A142. Circuit A142 connects to cavity C12 of the PCM.

The PCM has an internal voltage regulator that controls generator output. The PCM controls the generator field on circuit K20. Circuit K20 connects to PCM cavity B10.

When the engine operates and there is current in the generator field, the generator produces a B+ volt-

age. The generator supplies B+ voltage to the battery through the A11 and A0 circuits.

HELPFUL INFORMATION

- The ignition switch also connects circuit A1 with circuit A31.
- Circuit F12 also powers the coil side of the fuel pump relay.

CHARGING SYSTEM (DIESEL)

The charging system is an integral part of the battery and starting systems. Because all these systems work in conjunction, diagnose and test them together.

Circuit A11 connects to the generator output terminal and the Power Distribution Center (PDC). Circuit A0 connects the battery to the PDC. The generator is case grounded.

Power for the field terminal in the generator is supplied on circuit A142. This circuit is HOT when the contacts in the Diesel Power relay are CLOSED.

The PCM has an internal voltage regulator that controls generator output. The PCM controls the generator field on circuit K20.

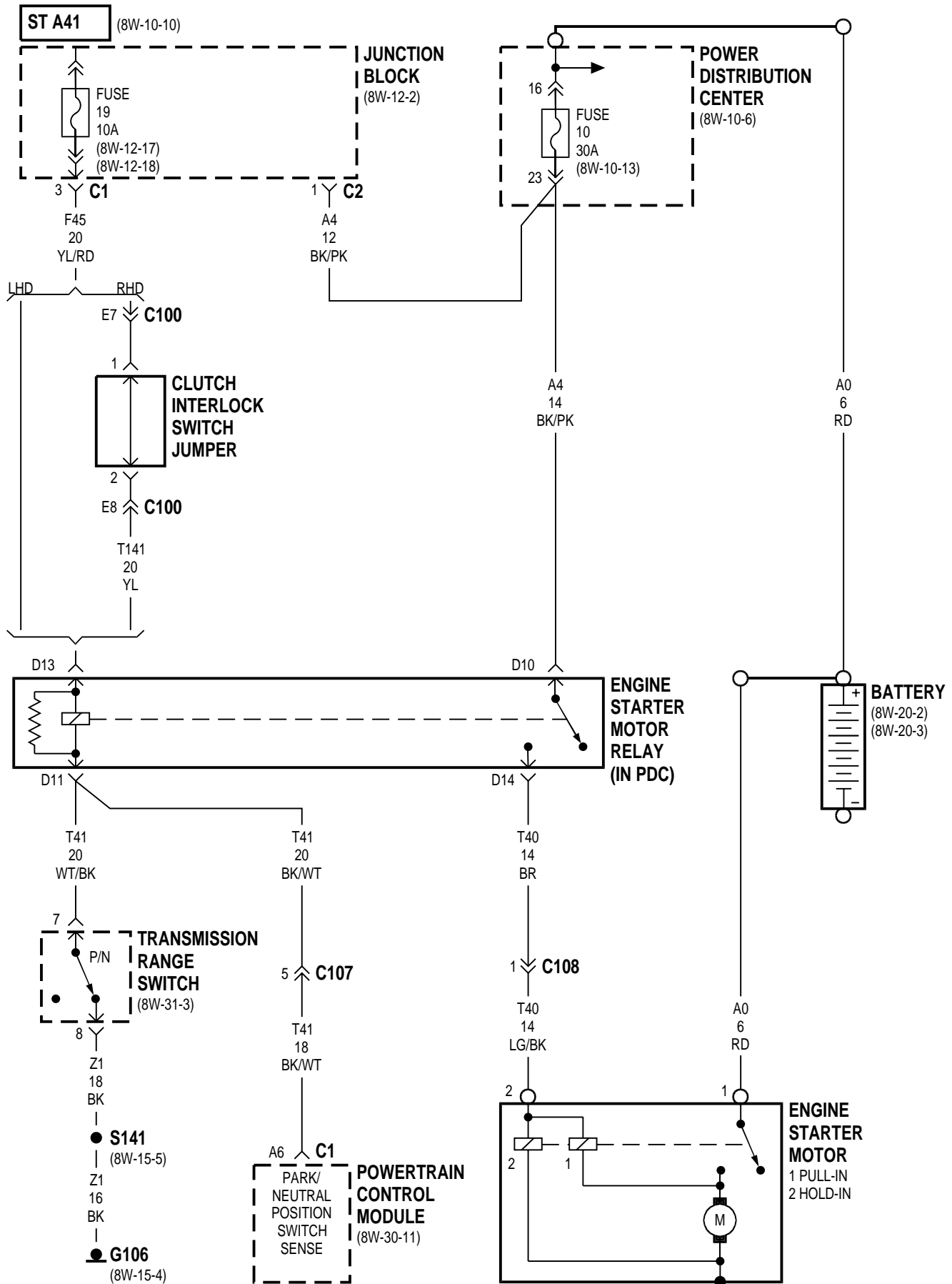
When the engine operates and there is current in the generator field, the generator produces a B+ voltage. The generator supplies B+ voltage to the battery through the A11 and A0 circuits.

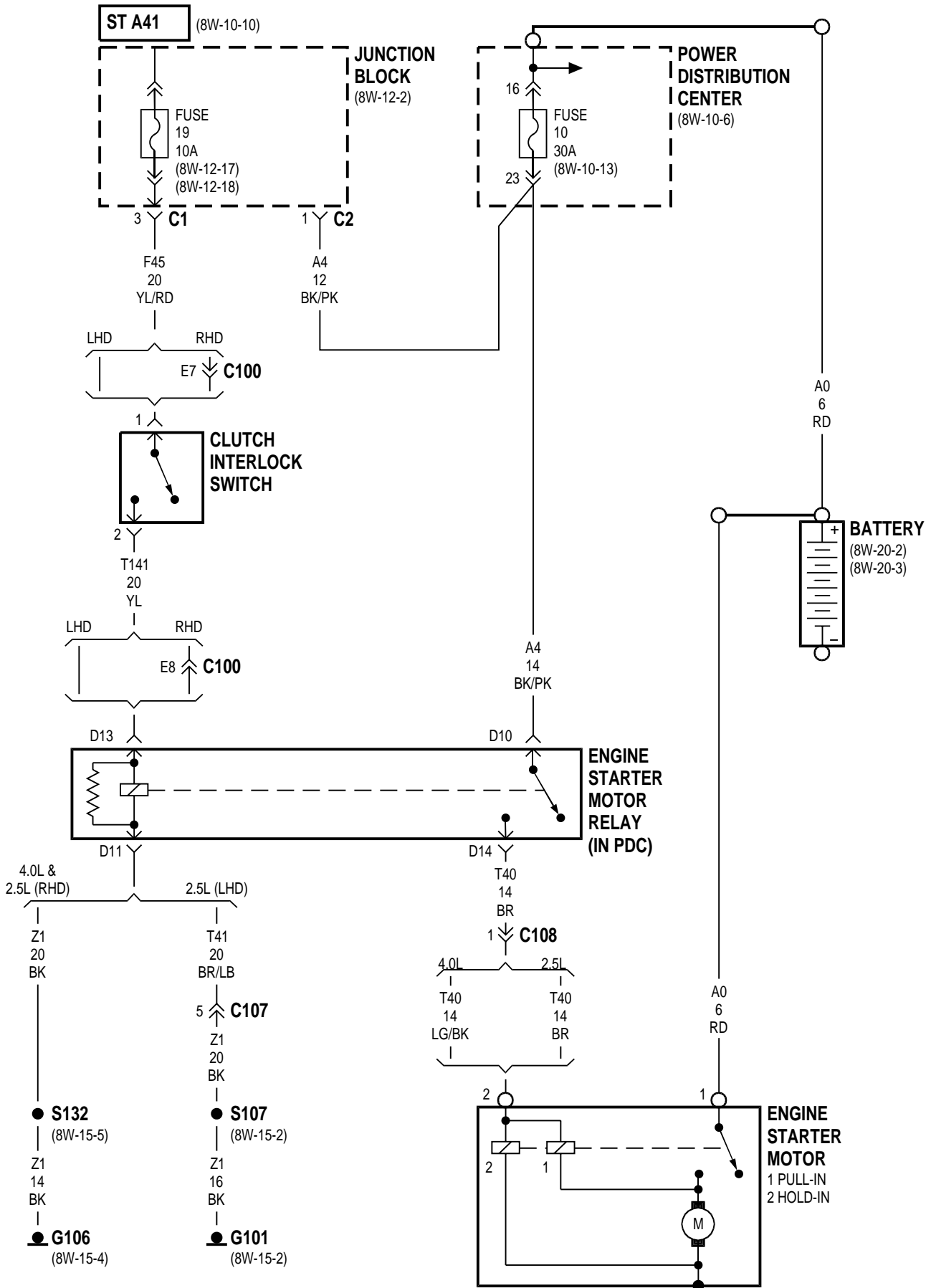
8W-21 STARTING SYSTEM

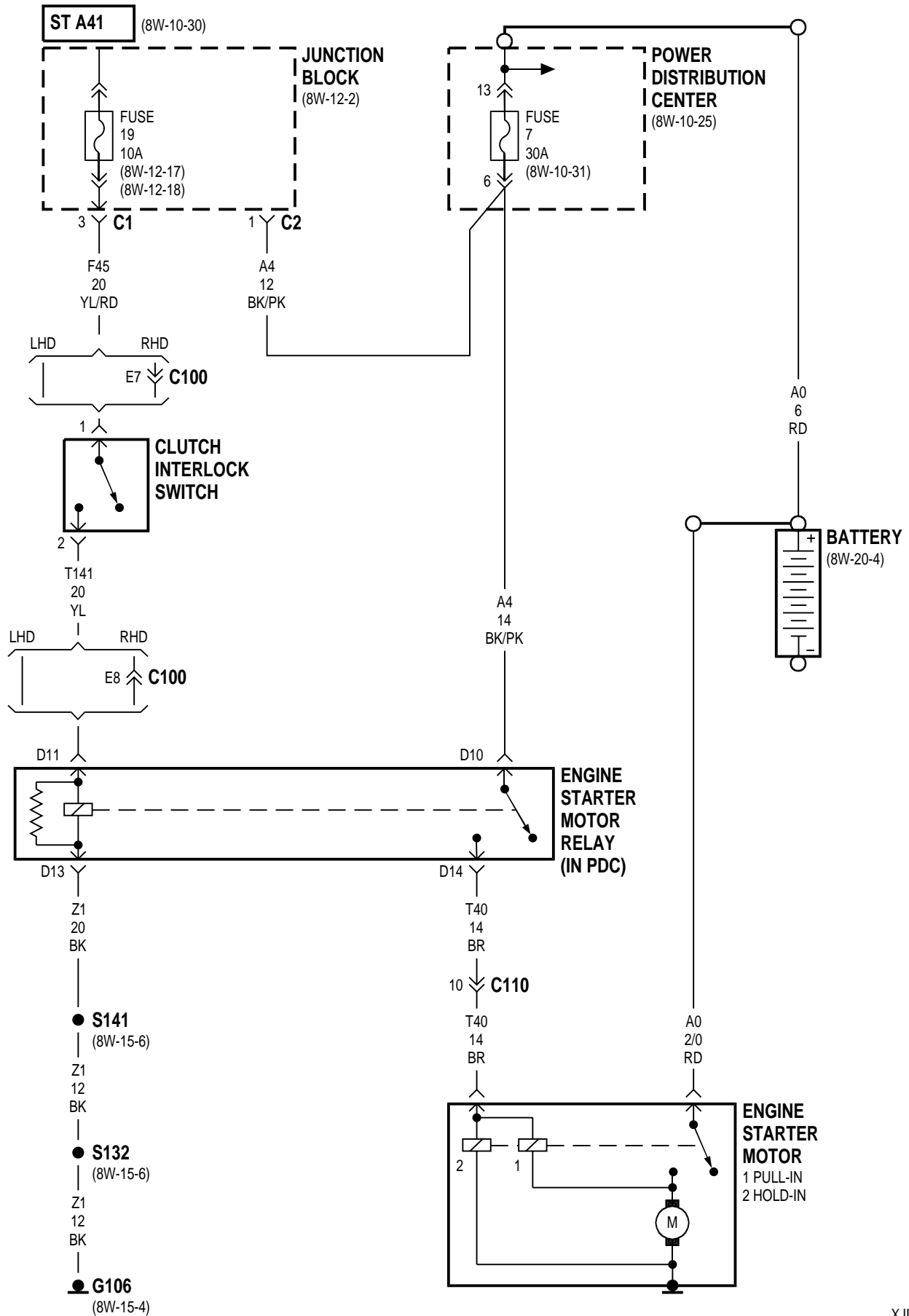
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8W-21 STARTING SYSTEM

DESCRIPTION AND OPERATION

STARTING SYSTEM—AUTOMATIC TRANSMISSIONS

Circuit A0 from the battery is double crimped at the positive battery post. One branch of circuit A0 (battery positive cable) connects to the engine starter motor. The other A0 branch supplies voltage to the bus bar in the Power Distribution Center (PDC).

Fuse 10 in the PDC supplies battery voltage to the contact side of the engine starter motor relay on circuit A4. When the coil side of the engine starter motor relay energizes, the contacts close and connect circuit A4 to circuit T40. Circuit T40 supplies battery voltage to the starter motor solenoid.

The ignition switch supplies battery voltage to the coil side of the starter motor relay on circuit A41 when the key is moved to the START position and the PARK/NEUTRAL position switch is closed. Ground for the coil side of the starter motor relay is supplied by the PARK/NEUTRAL position switch. Circuit T41 connects the coil side of the relay to the PARK/NEUTRAL position switch.

When the starter motor relay energizes and the contacts close, circuit T40 supplies battery voltage to the starter motor solenoid. Circuit A0 from the battery supplies voltage to the starter motor when the solenoid energizes.

STARTING SYSTEM—MANUAL TRANSMISSION

Circuit A0 from the battery is double crimped at the positive battery post. One branch of circuit A0 (battery positive cable) connects to the battery starter motor. The other A0 branch supplies voltage to the bus bar in the Power Distribution Center (PDC).

Fuse 10 in the PDC supplies battery voltage to the contact side of the engine starter motor relay on circuit A4. When the coil side of the engine starter motor relay energizes, the contacts close and connect

circuit A4 to circuit T40. Circuit T40 supplies battery voltage to the starter motor solenoid.

The ignition switch supplies battery voltage to the coil side of the starter motor relay on circuit A41 when the key is moved to the START position. Circuit Z1 provides ground for the coil side of the relay.

When the starter motor relay energizes and the contacts close, circuit T40 supplies battery voltage to the starter motor solenoid. Circuit A0 from the battery supplies voltage to the starter motor when the solenoid energizes.

STARTING SYSTEM (DIESEL)

Power for the coil side of the engine starter motor relay is supplied on circuit T141. This circuit is HOT when the operator has moved the ignition key to the START position and the clutch pedal position switch is CLOSED.

Ground for the coil side of the relay is supplied by circuit Z1.

When the coil side of the relay energizes the contacts in the relay CLOSE connecting circuits A4 and T40. The A4 circuit is protected by a 30 amp fuse located in the Power Distribution Center (PDC). Circuit T40 connects from the relay to the solenoid in the engine starter motor.

Power for the motor in the starter is supplied on circuit A0. This is a direct feed from the battery. Ground for the engine starter motor is supplied through a case ground.

HELPFUL INFORMATION (DIESEL)

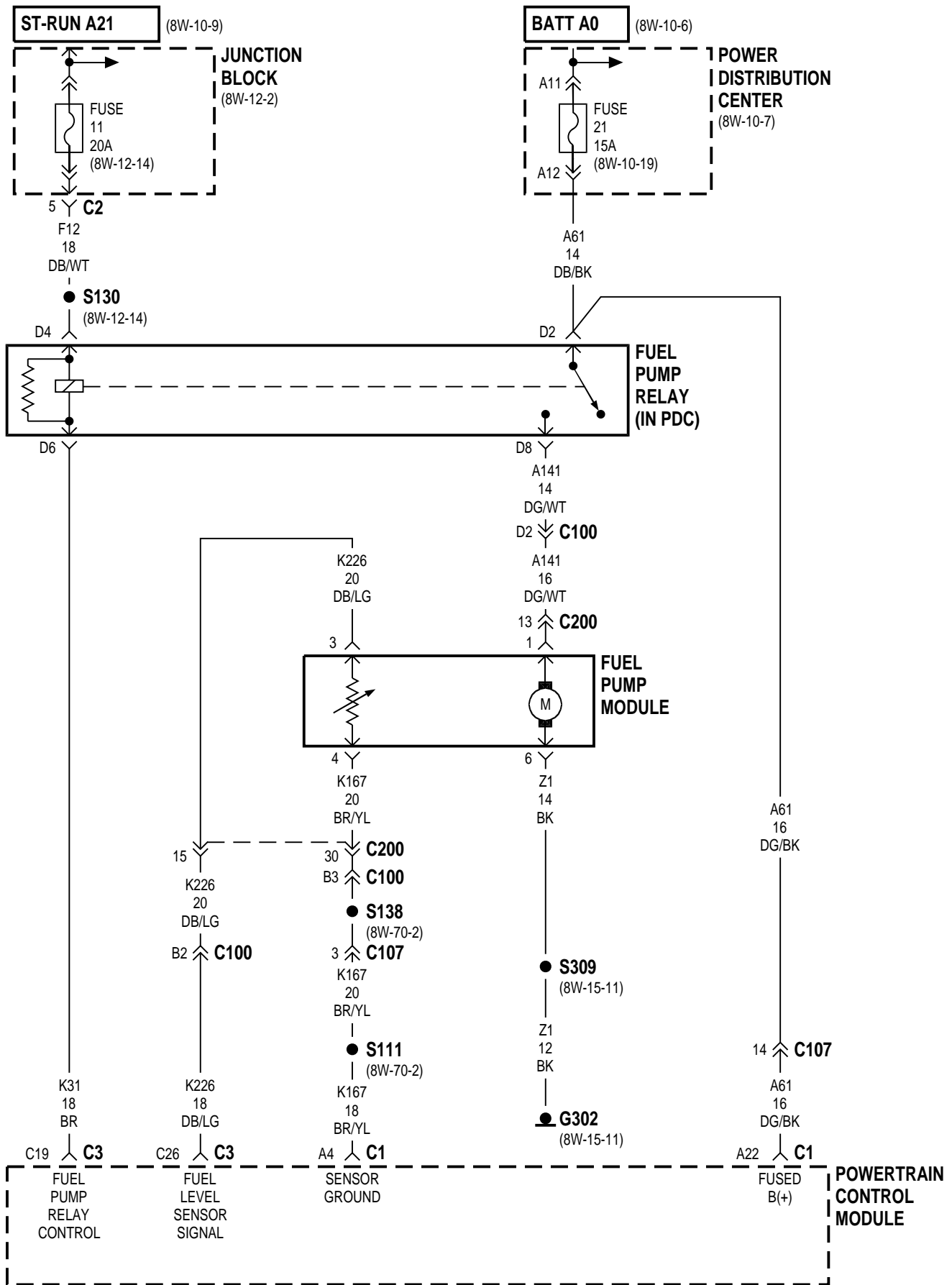
- Check the 30 amp fuse located in the PDC
- Check the clutch pedal position switch for proper operation
- Check the case ground of the engine starter motor

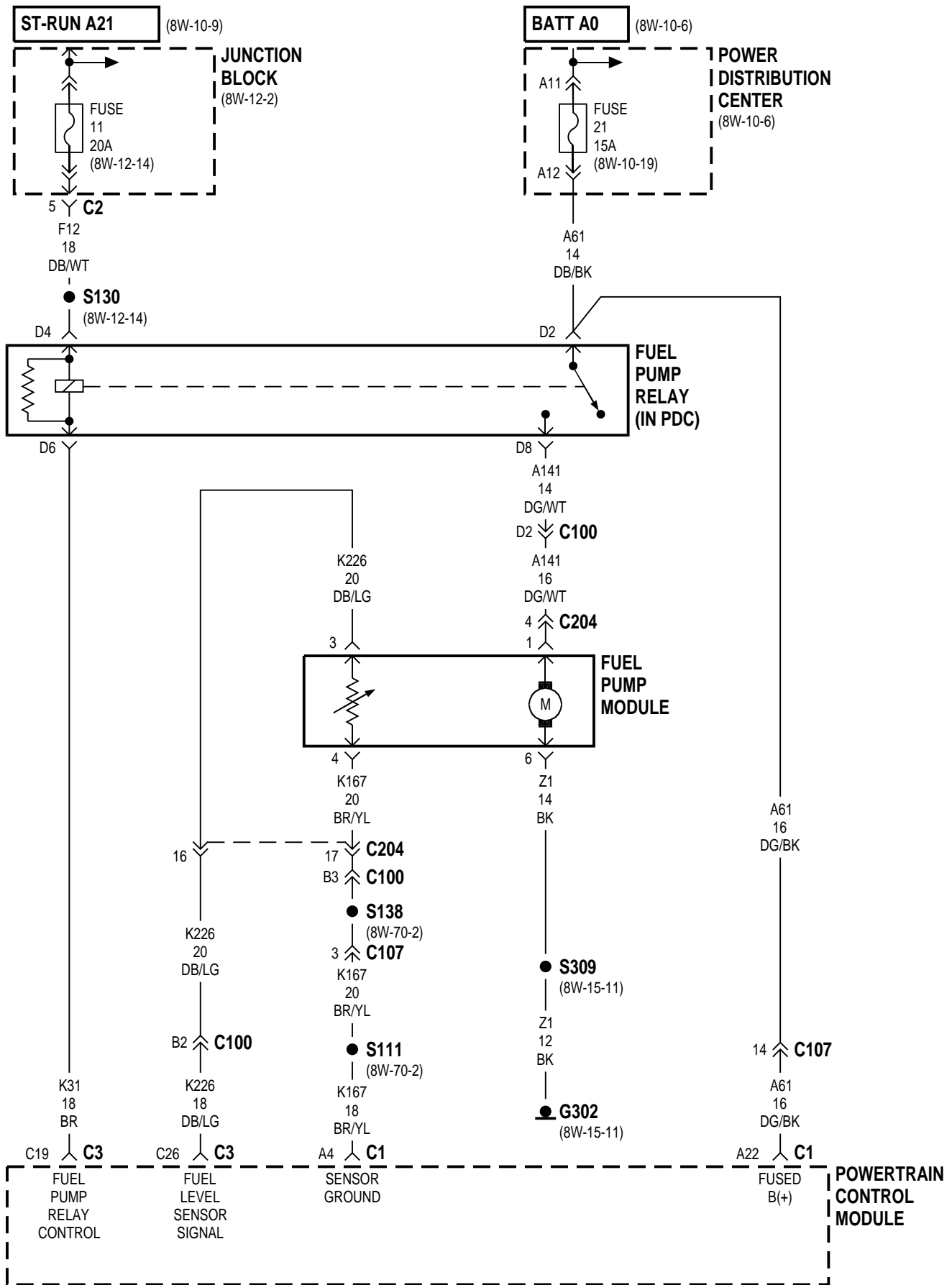
8W-30 FUEL/IGNITION SYSTEMS

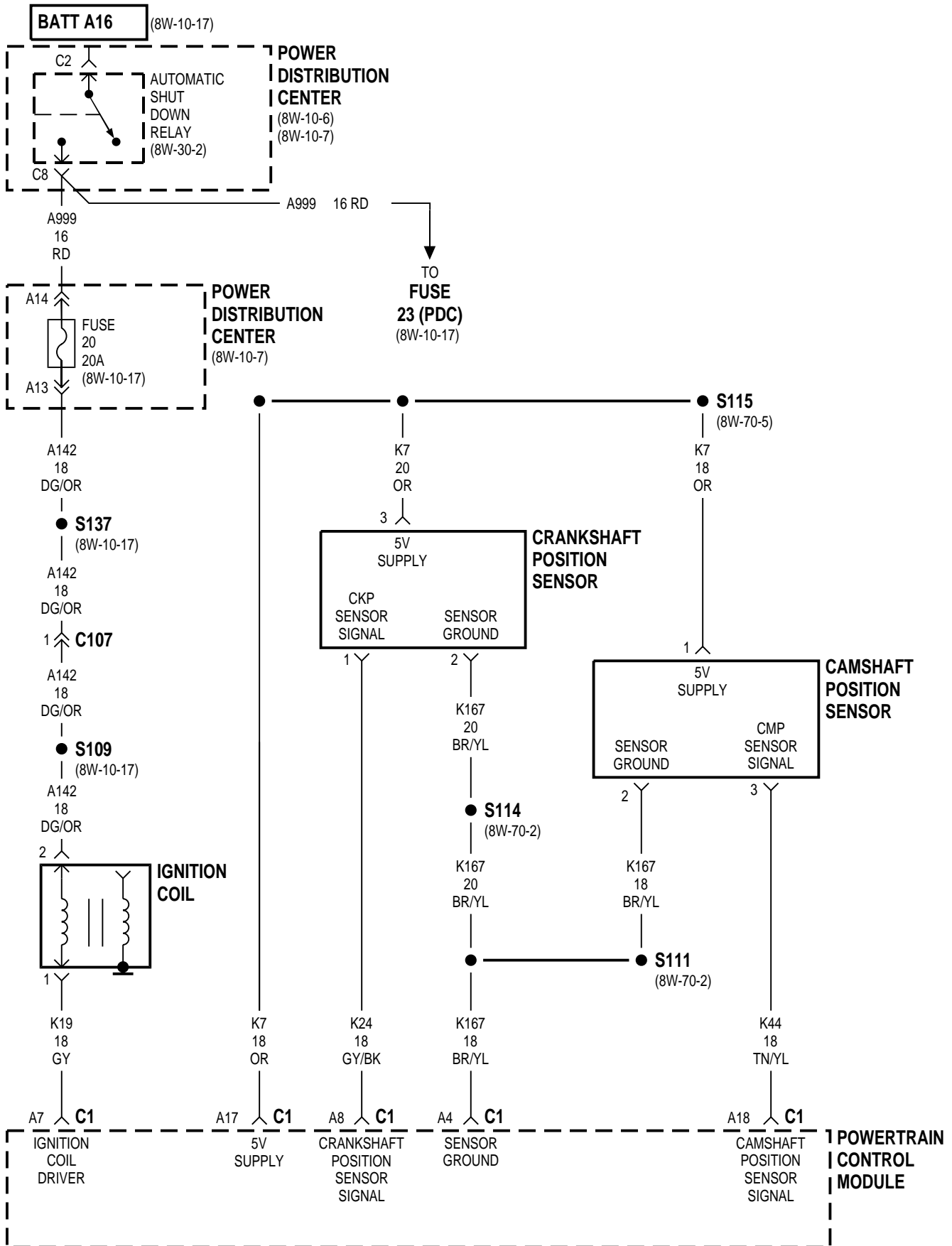
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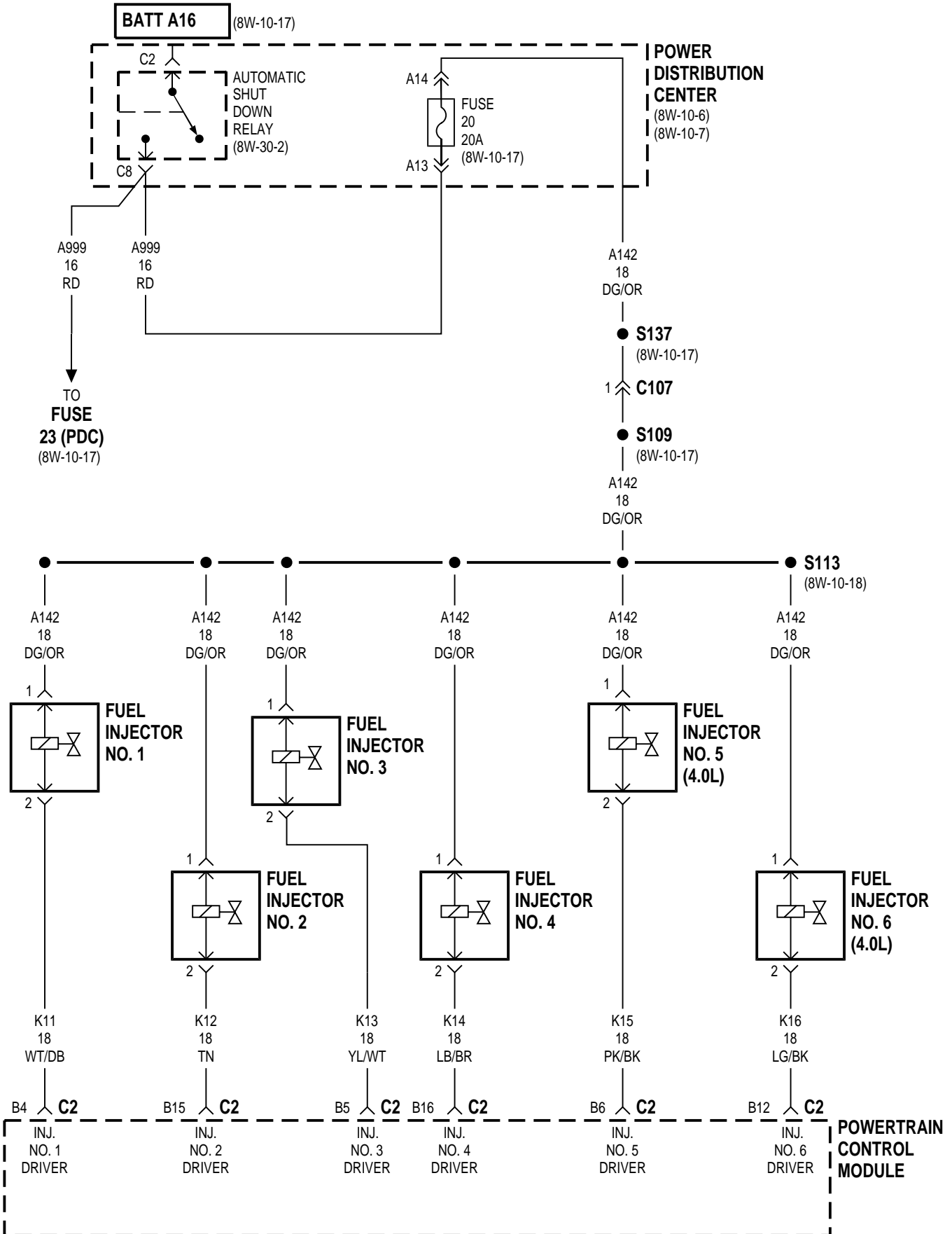
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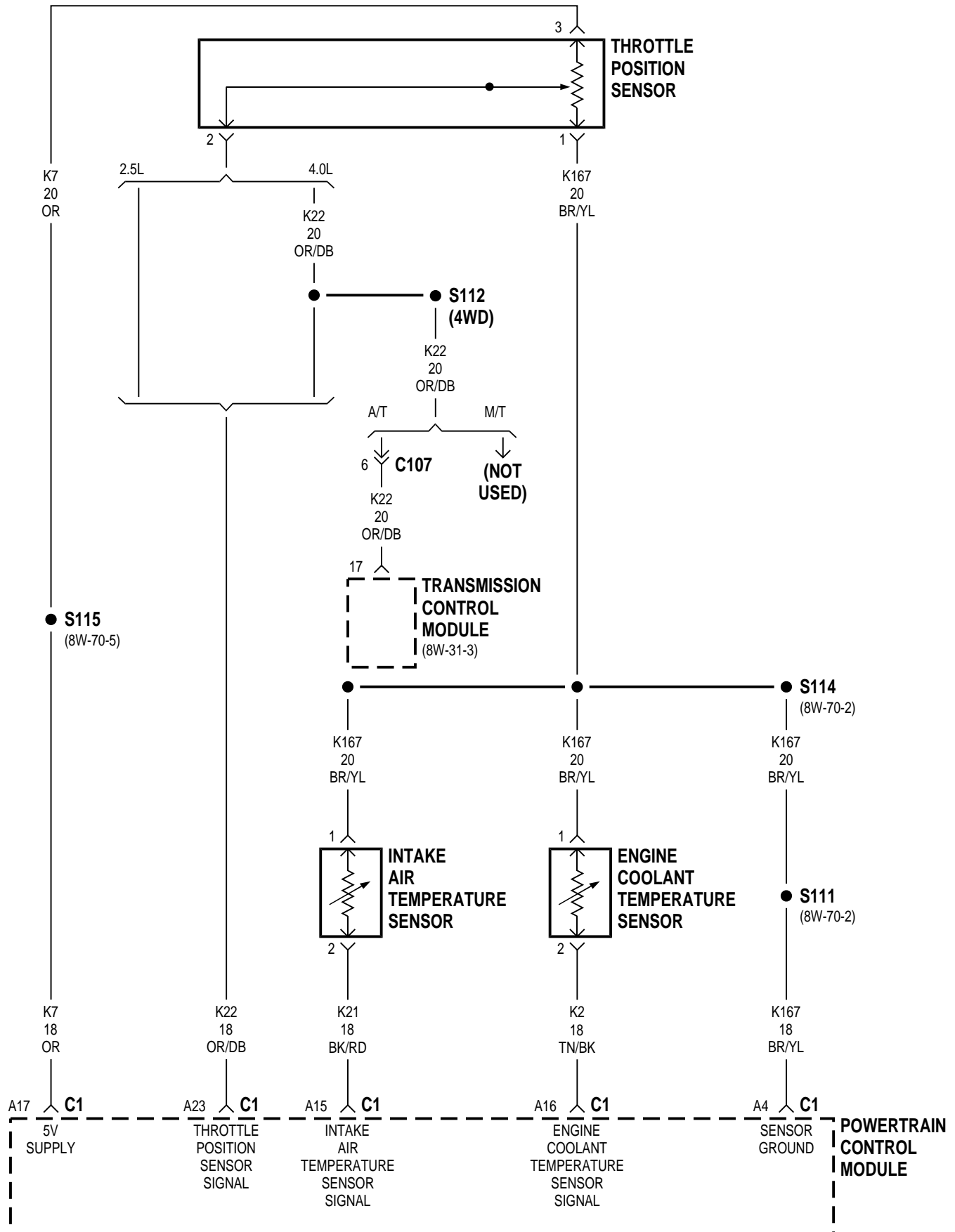
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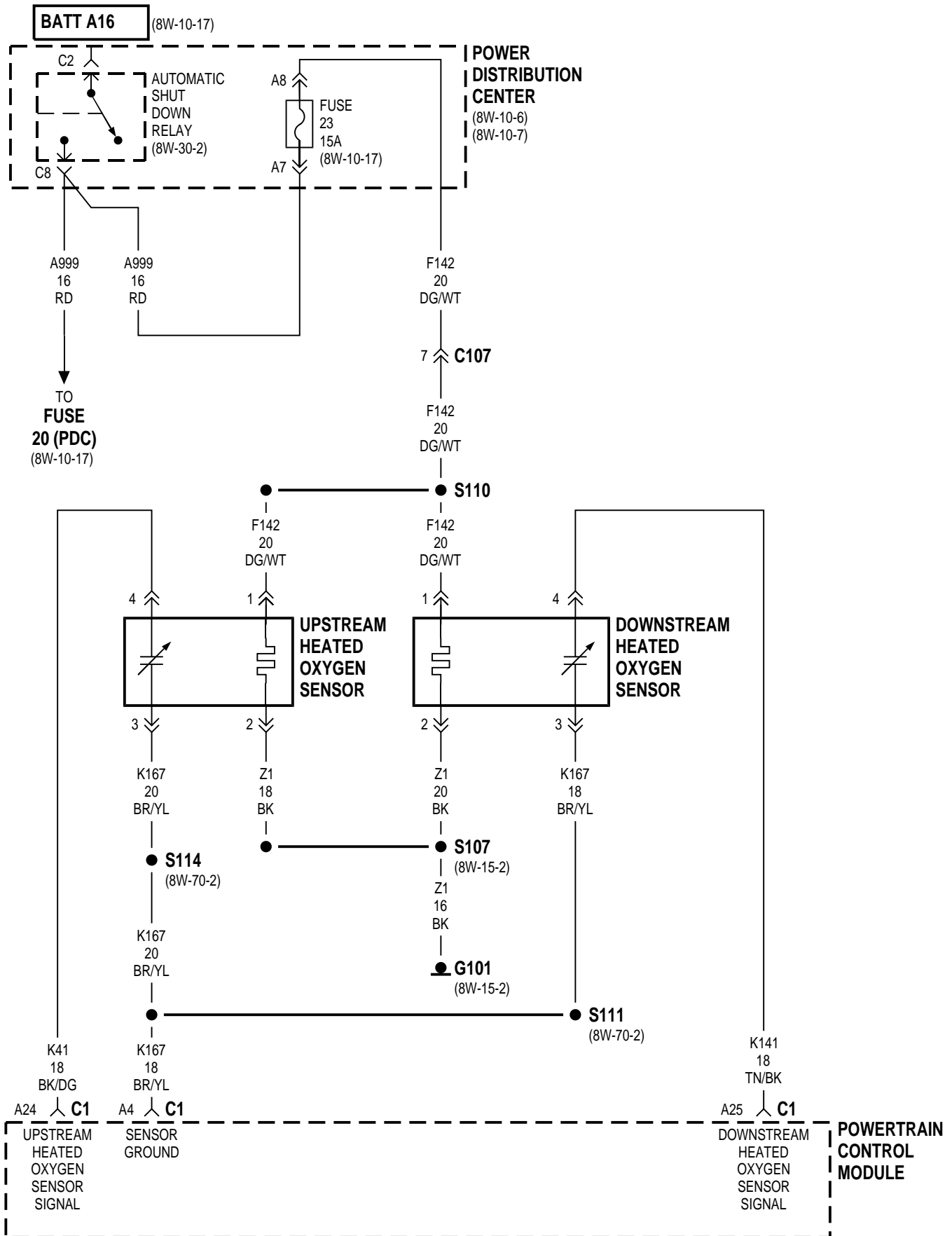


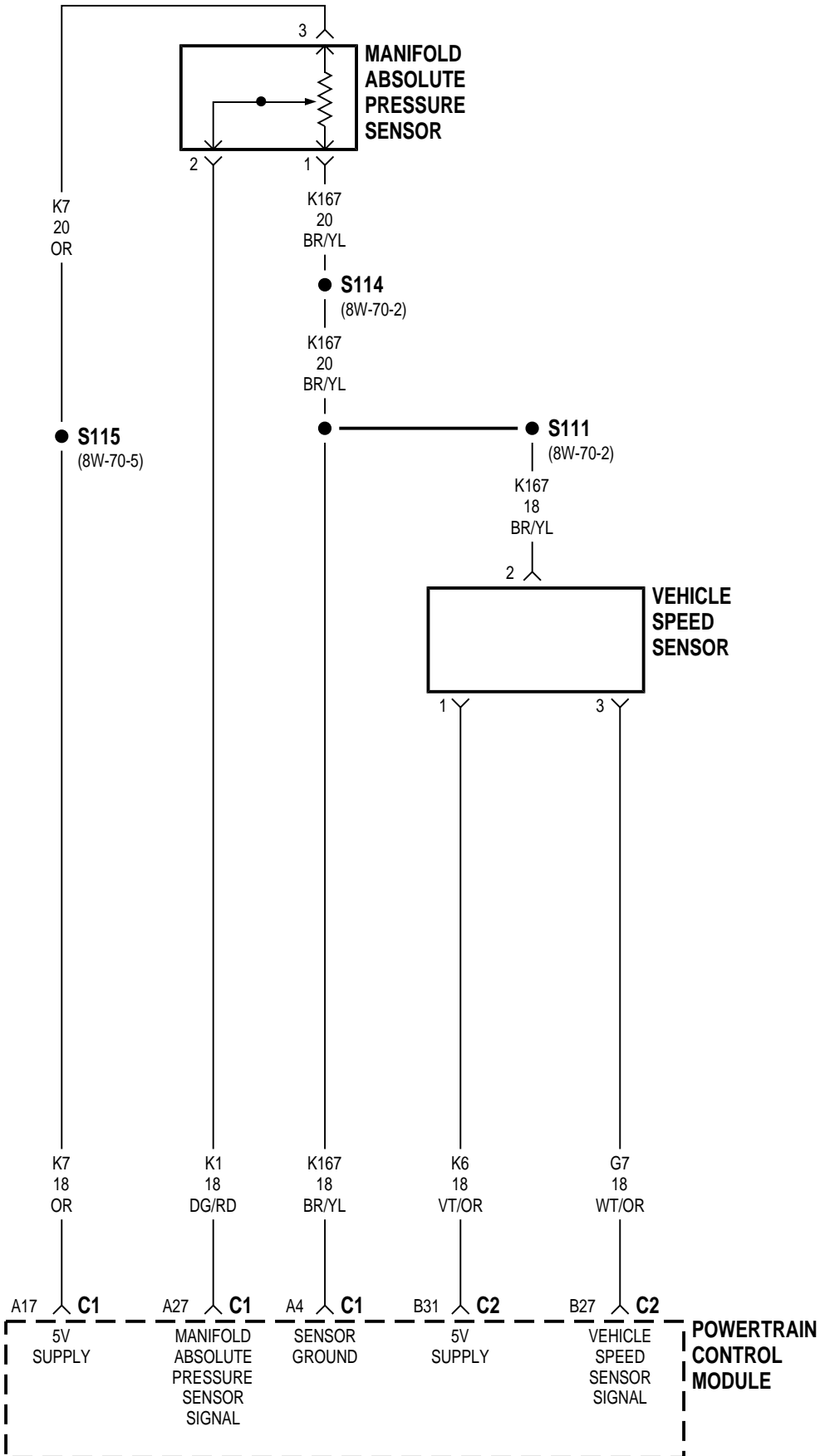




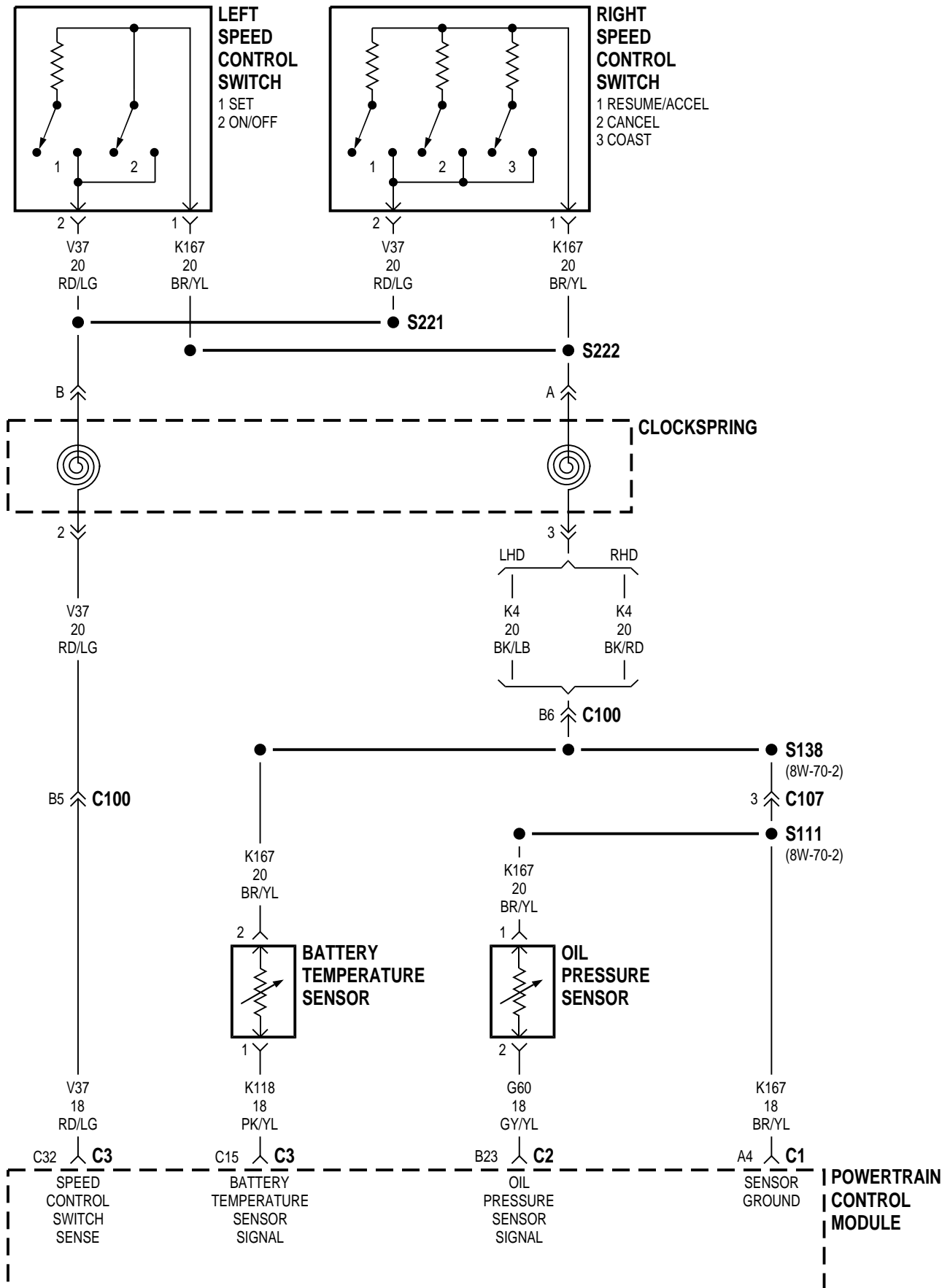


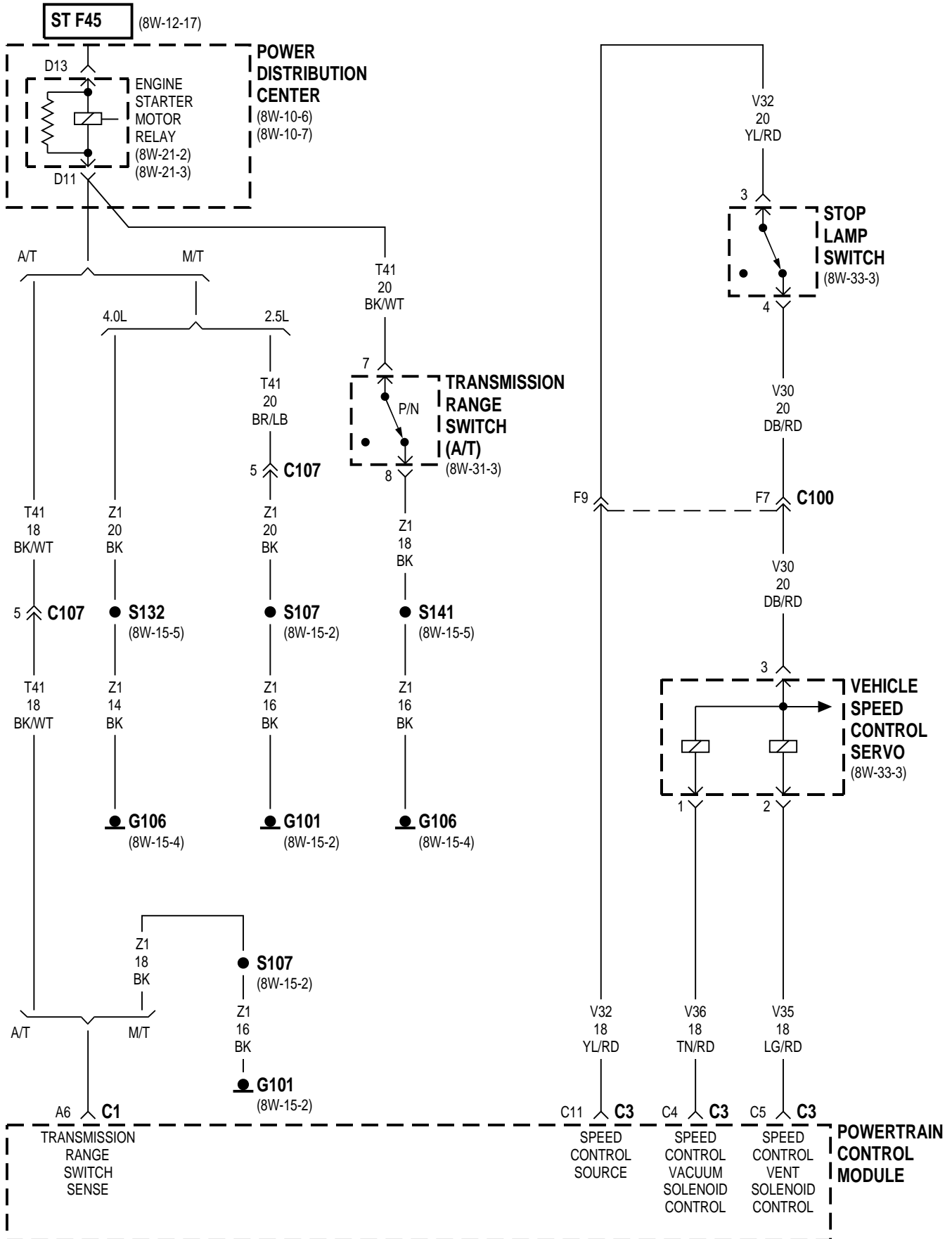


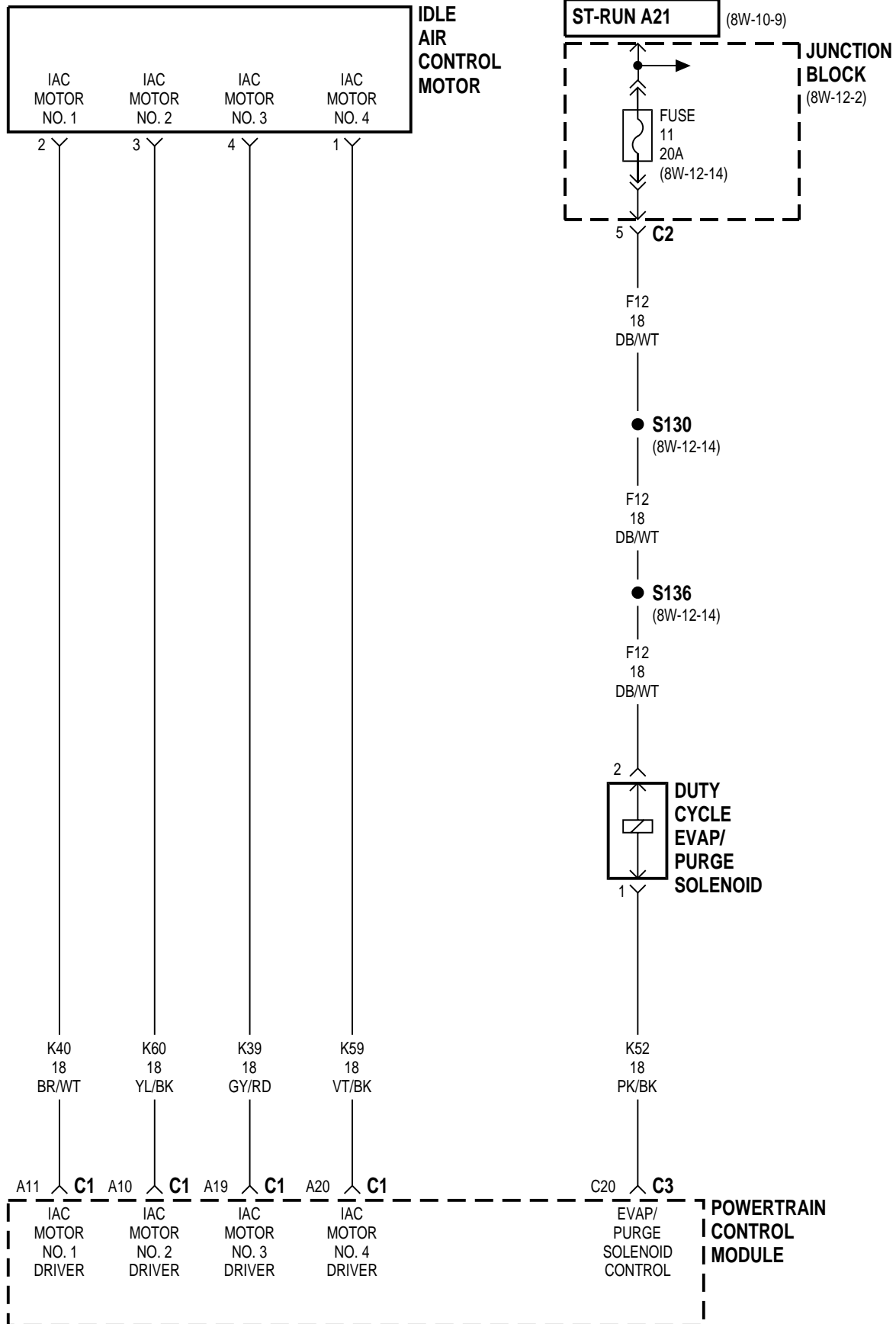


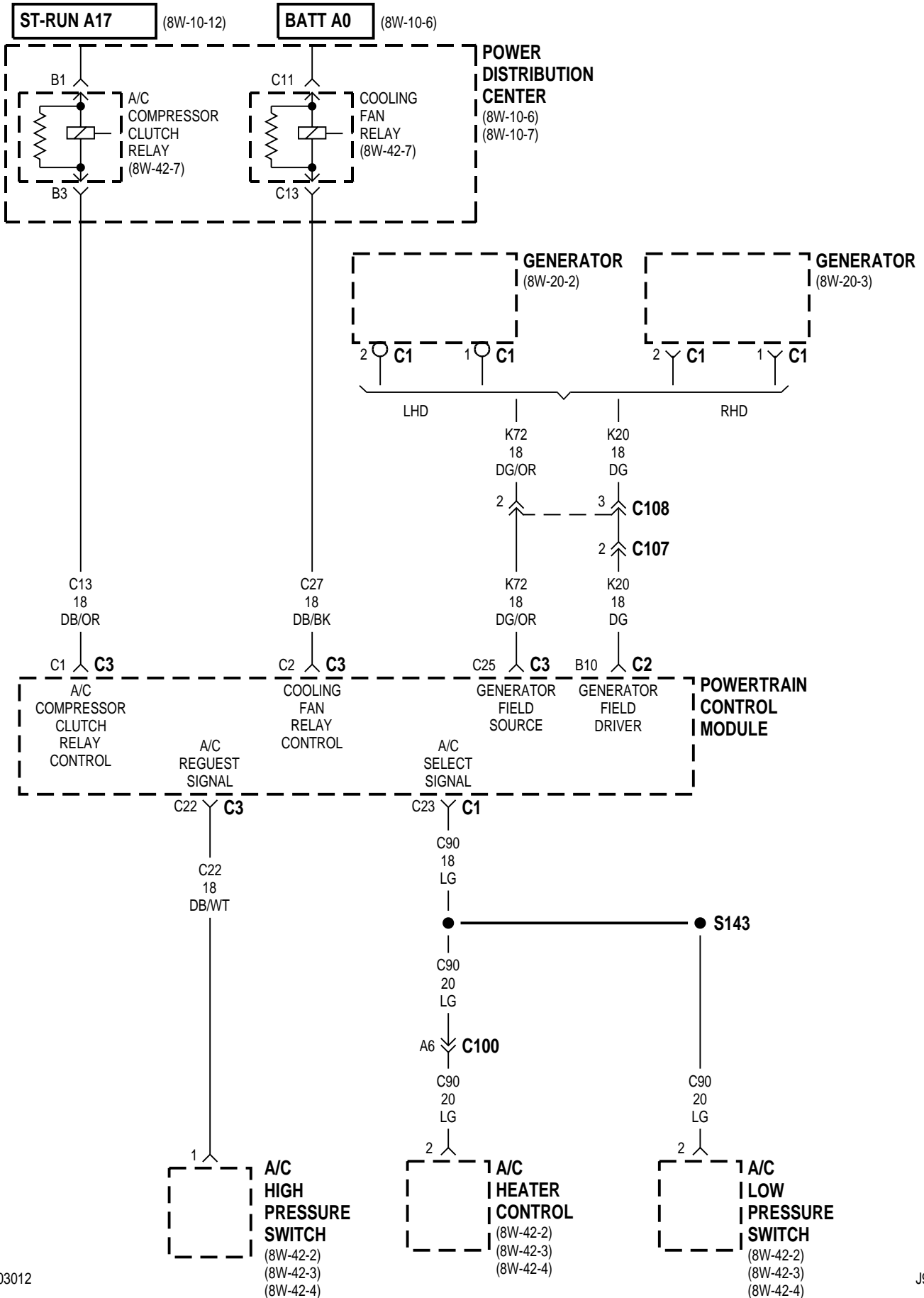


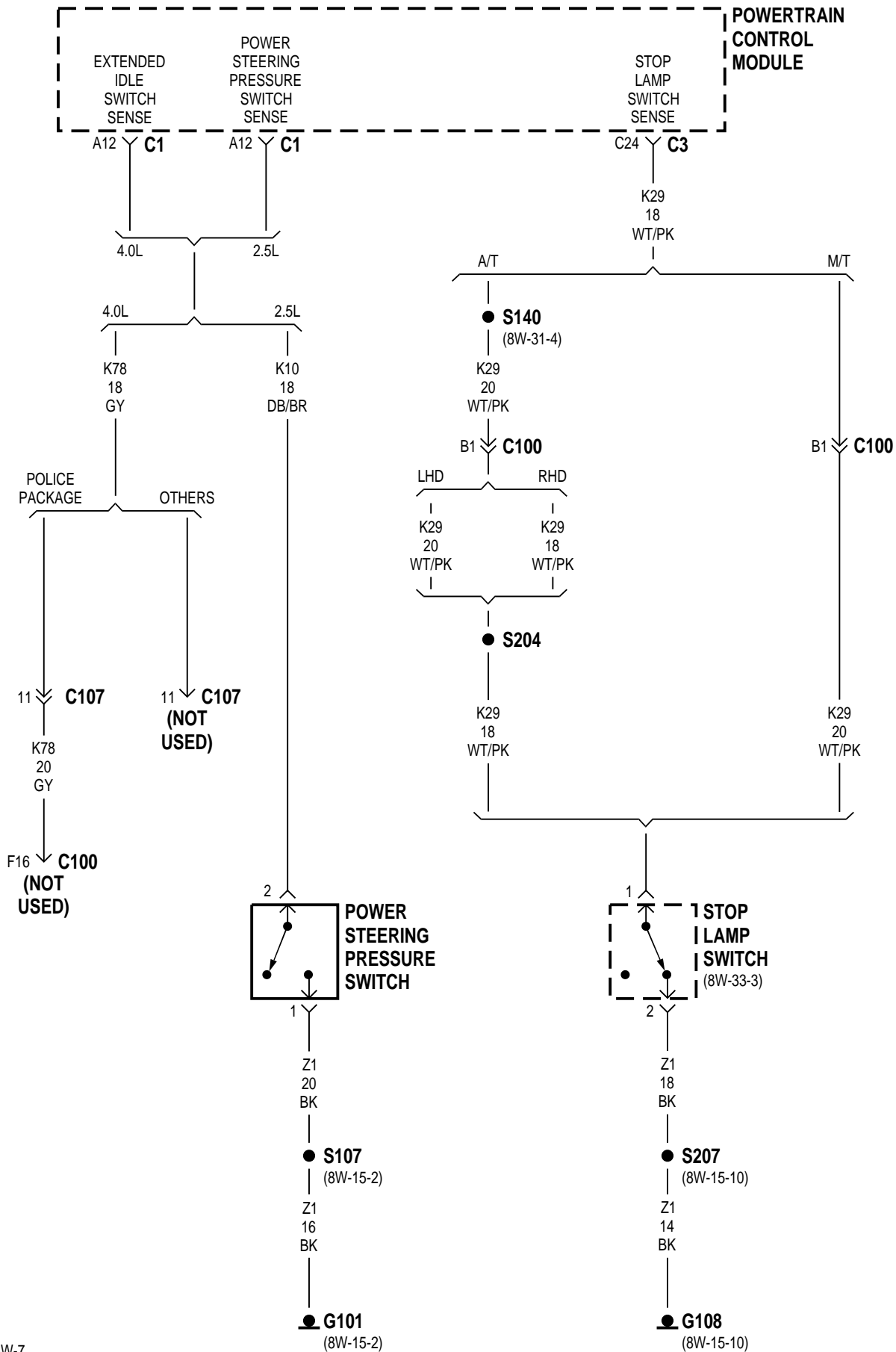
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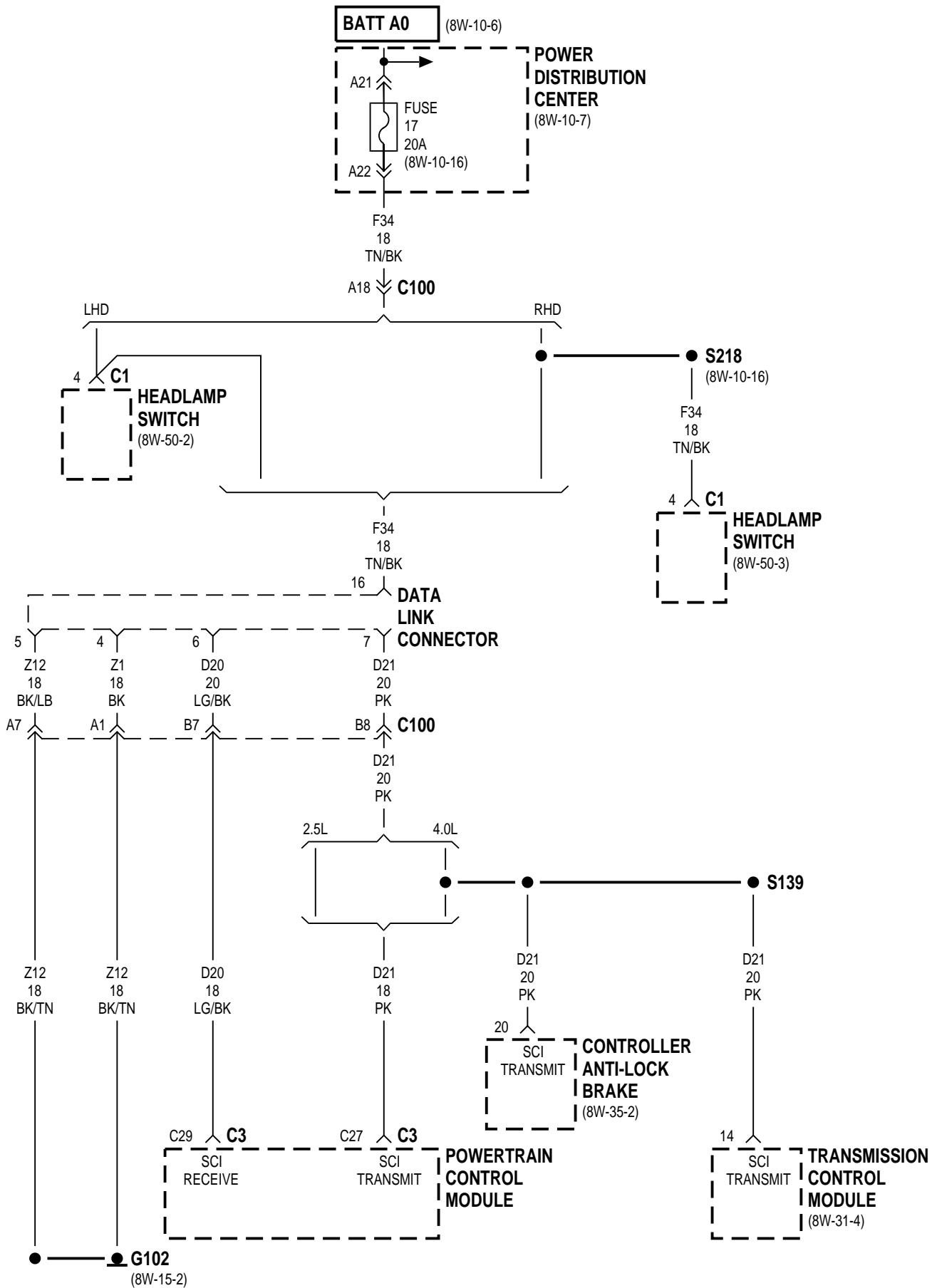


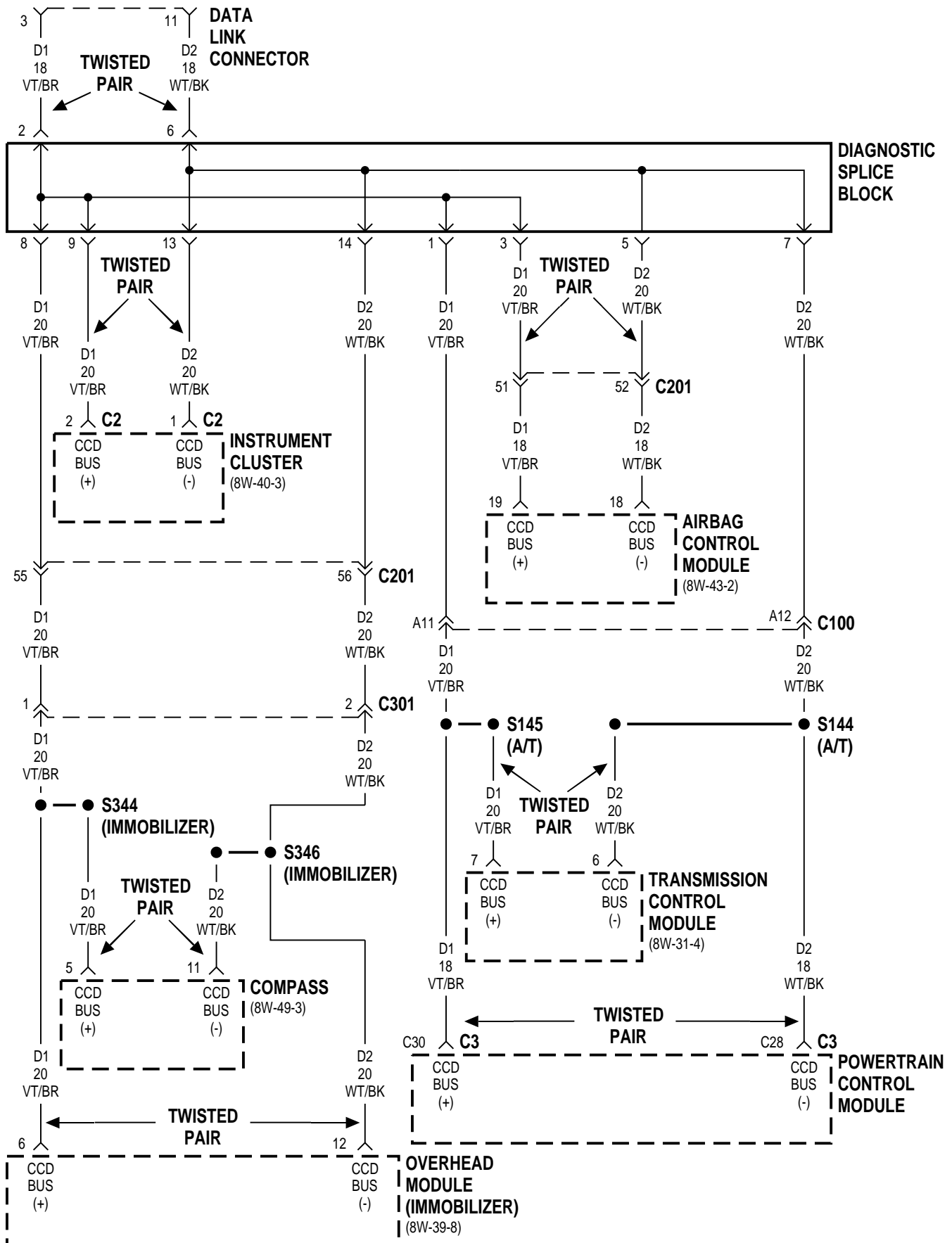


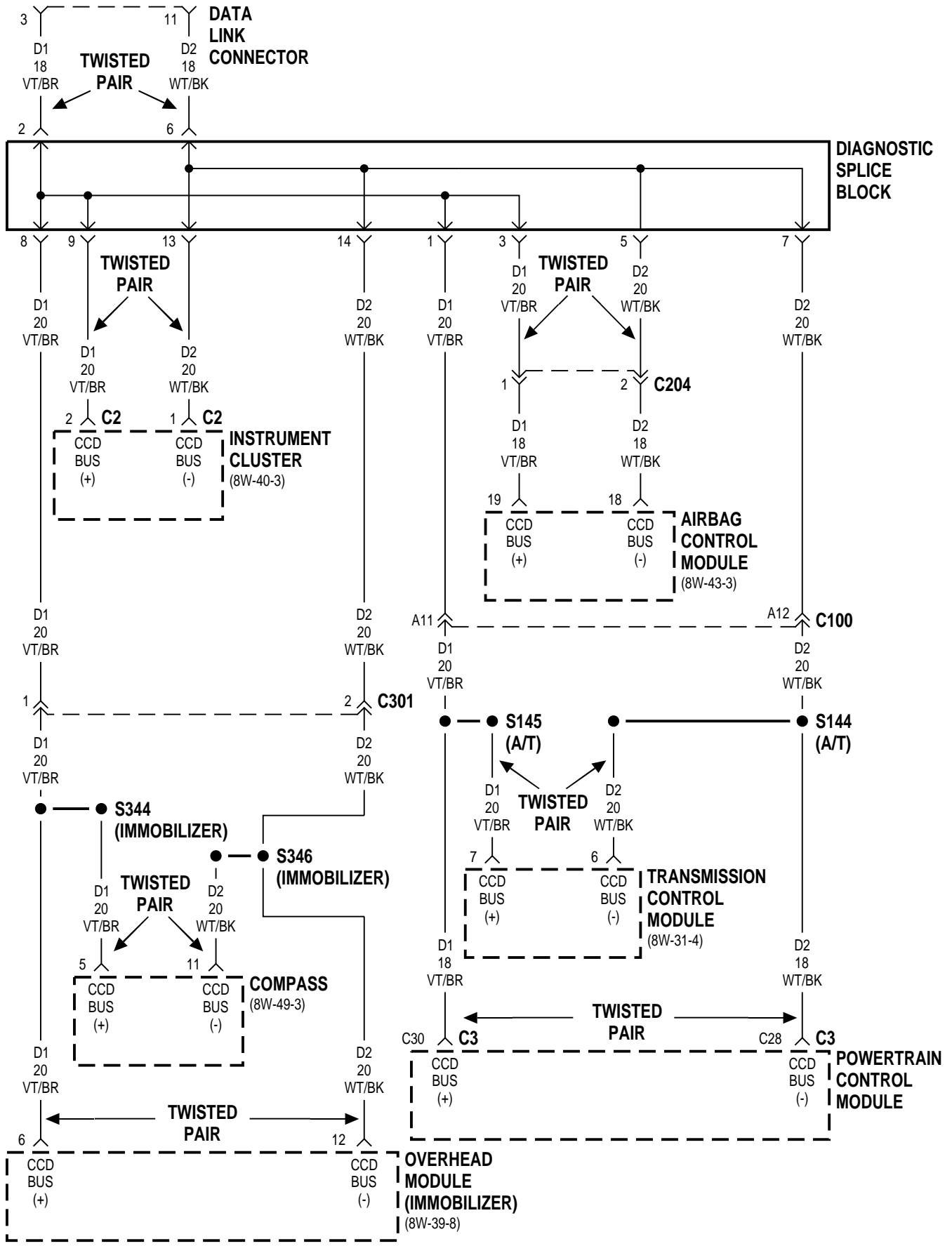












8W-30 FUEL/IGNITION SYSTEMS

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DESCRIPTION AND OPERATION

IGNITION SWITCH

Circuit A1 from fuse 2 and circuit A2 from fuse 3, in the power distribution center (PDC), supply battery voltage to the ignition switch. Depending upon position, the ignition switch powers circuits A21, A22, A31, A41, G9, G26, and G99.

START POSITION

In the START position, the ignition switch connects circuit A1 to circuit A21 and circuit A2 to circuit A41.

Additionally in the START position, the case grounded ignition switch provides ground for the brake lamp switch and the warning lamps in the instrument cluster.

START OR RUN POSITION

In the START or RUN position, the ignition switch connects circuit A1 to circuit A21.

RUN (ONLY) POSITION

When the ignition switch is in the RUN position, it connects circuit A1 to circuit A21 and circuit A2 to circuit A22.

ACCESSORY OR RUN POSITIONS

In the ACCESSORY or RUN positions, the ignition switch connects circuit A1 to circuit A31.

BATTERY FEED

Circuit A61 from fuse 21 in the Power Distribution Center (PDC) supplies battery voltage to cavity A22 of the Powertrain Control Module (PCM).

HELPFUL INFORMATION

Circuit A61 also supplies power to the contact side of the fuel pump relay.

BATTERY FEED (DIESEL)

Battery feed for the Powertrain Control Module (PCM) is supplied from several sources. One is a constant battery feed on circuit F16. This circuit is protected by a 10 amp fuse located in the Power Distribution Center (PDC)

DESCRIPTION AND OPERATION (Continued)

Battery voltage is also provided on circuit F12. This circuit is HOT in the START and RUN position and protected by a 20 amp fuse located in the Junction Block. Power for the fuse is supplied on circuit A21 from the ignition switch.

GROUND

Circuit Z12 connects to cavities A31 and A32 of the PCM. The Z12 circuit provides ground for PCM internal drivers that operate high current devices like the injectors and ignition coil.

Internal to the PCM, the power (device) ground circuit connects to the PCM sensor return circuit (from circuit K167).

HELPFUL INFORMATION

- The grounding point for circuit Z12 is the right front of the engine.
- If the system loses ground for the Z12 circuits at the front of the engine, the vehicle will not operate. Check the connection at the ganged-ground circuit eyelet.

POWER GROUND (DIESEL)

Circuit Z12 attaches to cavities 11 and 12 of the Powertrain Control Module (PCM) and cavities 1, 24 and 46 of the MSA Controller. Circuit Z12 terminates at the battery ground at the engine.

DATA LINK CONNECTOR

Circuit F39 from the Power Distribution Center (PDC) supplies battery voltage to the data link connector.

Circuit D20 connects to cavity C29 of the PCM. Circuit D20 is the SCI receive circuit for the Powertrain Control Module (PCM). Circuit D21 connects to cavity C27 of the PCM and cavity A3 of the Controller-Anti Lock Brakes. Circuit D21 is the SCI transmit circuit for the PCM. CCD Bus Circuits D1 and D2 connect to the data link connector.

Circuits Z1 and Z12 provide ground for the data link connector. Circuit Z12 also connects to cavities A31 and A32 of the PCM.

AUTOMATIC SHUT DOWN (ASD) RELAY

When the ignition switch is in either the START or RUN position, it connects circuit A1 from fuse 8 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 splices to circuit F12 and supplies battery voltage to the coil side of the Automatic Shut Down (ASD) relay. The Powertrain Control Module (PCM) provides ground for the relay on circuit K51. Circuit K51 connects to cavity C3 of the PCM.

When the PCM grounds the ASD relay, contacts inside the relay close and connect circuit A16 from fuse 18 in the PDC to circuit A142. Circuit A142 connects to cavity C12 of the PCM.

HELPFUL INFORMATION

Along with supplying voltage to the coil side of the ASD relay, circuit F12 also supplies voltage to the coil side of the fuel pump relay.

DIESEL POWER RELAY

Power for the coil and contact side of the diesel power relay is supplied on circuit A16. This circuit is HOT at all times and protected by a 30 amp fuse located in the Power Distribution Center (PDC).

Ground for the coil side of the relay is controlled by the MSA Controller on circuit K51.

When the MSA Controller provides a ground for the coil side of the relay, the contacts in the relay CLOSE and connect circuits A16 to circuits A142 and F142. The A142 and F142 circuits supply power to various components and modules in the fuel system.

HELPFUL INFORMATION

- Check the 30 amp fuse located in the PDC
- Refer to the appropriate section of the service manual or Diagnostic Test Procedures manual

FUEL PUMP RELAY

When the ignition switch is in either the START or RUN positions, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 splices to circuit F12 and supplies battery voltage to the coil side of the fuel pump relay. The Powertrain Control Module (PCM) provides ground for the relay on circuit K31. Circuit K31 connects to cavity C19 of the PCM.

When the PCM grounds the fuel pump relay, contacts inside the relay close and connect circuit A61 from fuse 21 in the PDC to circuit A141. Circuit A141 supplies voltage to the fuel pump motor (part of the in-tank fuel pump module).

HELPFUL INFORMATION

Circuit A61 also splices to supply battery voltage to cavity A22 of the PCM.

FUEL PUMP MODULE

The in-tank fuel pump module contains the fuel pump motor and fuel level sensor.

FUEL PUMP MOTOR

When the fuel pump relay contacts close, circuit A141 supplies voltage to the fuel pump module. Circuit Z1 provides ground for the fuel pump motor.

FUEL LEVEL SENSOR

The fuel level sensor is a variable resistor. Circuit K226 provides the fuel level input to cavity C26 of the Powertrain Control Module (PCM). The PCM broadcasts fuel level data on the CCD bus. The micro-processor in the instrument cluster receives

DESCRIPTION AND OPERATION (Continued)

the message on the CCD bus, calculates fuel gauge needle position and adjusts the gauge.

FUEL PUMP MODULE (DIESEL)

The fuel pump module used on this engine package contains the fuel gauge level sending unit. The fuel level sensor is a variable resistor. Circuit K226 provides the fuel level input to the Powertrain Control Module (PCM). The PCM broadcasts fuel level data on the CCD bus. The micro-processor in the instrument cluster receives the message on the CCD bus, calculates fuel gauge needle position and adjusts the gauge.

Ground for the module is supplied on circuit K167.

VEHICLE SPEED SENSOR

Circuit K6 supplies 5 volts from the Powertrain Control Module (PCM) to the vehicle speed sensor. The K6 circuit connects to cavity B31 of the PCM.

Circuit G7 from the vehicle speed sensor provides an input signal to the PCM. The G7 circuit connects to cavity B27 of the PCM.

The PCM provides a ground for the vehicle speed sensor signal (circuit G7) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

VEHICLE SPEED SENSOR (DIESEL)

Circuit K7 supplies voltage from the Powertrain Control Module (PCM) to the vehicle speed sensor.

Circuit G7 from the vehicle speed sensor provides an input signal to the PCM.

The PCM provides a ground for the vehicle speed sensor signal (circuit G7) through circuit K167.

HEATED OXYGEN SENSORS

When the Automatic Shut Down (ASD) relay contacts close, they connect circuits A16 and F142. Circuit F142 supplies voltage to the upstream and downstream heated oxygen sensors.

Circuit K41 delivers the signal from the upstream heated oxygen sensor to the Powertrain Control Mod-

ule (PCM). Circuit K41 connects to cavity A24 of the PCM. Circuit K141 supplies the signal from the downstream heated oxygen sensor to the PCM. Circuit K141 connects to PCM cavity A25.

The PCM provides a ground for the heated oxygen sensor signals (circuits K41 and K141) through circuit K167. Circuit H167 connects to cavity A4 of the PCM connector.

Circuit Z1 provides ground for the heater circuit in each sensor.

HELPFUL INFORMATION

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

BATTERY TEMPERATURE SENSOR

The Powertrain Control Module (PCM) determines battery temperature on circuit K15. Circuit K15 connects the PCM to the battery temperature sensor. Circuit K15 connects to cavity C15 of the PCM. Circuit K167 provides ground for the sensor and connects to PCM cavity A4.

CRANKSHAFT POSITION SENSOR

The Powertrain Control Module (PCM) supplies 5 volts to the crankshaft position sensor on circuit K7. Circuit K7 connects to cavity A17 of the PCM.

The PCM receives the crankshaft position sensor signal on circuit K24. Circuit K24 connects to cavity A8 of the PCM.

The PCM provides a ground for the crankshaft position sensor (circuit K24) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

• Circuit K7 splices to supply 5 volts to the camshaft position sensor.

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor

DESCRIPTION AND OPERATION (Continued)

- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

CRANKSHAFT POSITION SENSOR (DIESEL)

The MSA Controller supplies voltage to the crankshaft position sensor on circuit K24.

The MSA Controller provides a ground for the crankshaft position sensor (circuit K24) through circuit K3.

CAMSHAFT POSITION SENSOR

The Powertrain Control Module (PCM) supplies 5 volts to the camshaft position sensor (in distributor) on circuit K7. Circuit K7 connects to cavity A17 of the PCM.

The PCM receives the camshaft position sensor signal on circuit K44. Circuit K44 connects to cavity A18 of the PCM.

The PCM provides a ground for the camshaft position sensor signal (circuit K44) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

- Circuit K7 splices to supply 5 volts to the crankshaft position sensor.

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

ENGINE COOLANT TEMPERATURE SENSOR

The engine coolant temperature sensor provides an input to the Powertrain Control Module (PCM) on circuit K2. From circuit K2, the engine coolant temperature sensor draws up to 5 volts from the PCM. The sensor is a variable resistor. As coolant temperature changes, the resistance in the sensor changes, causing a change in current draw. The K2 circuit connects to cavity A16 of the PCM.

The PCM provides a ground for the engine coolant temperature sensor signal (circuit K2) through circuit K167. Circuit K167 connects to cavity A4 of the PCM connector.

HELPFUL INFORMATION

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

ENGINE COOLANT TEMPERATURE SENSOR (DIESEL)

The Engine Coolant Temperature (ECT) sensor on this engine application is a dual function sensor. It provides an engine coolant temperature input to the Powertrain Control Module (PCM) on Circuit K222 and to the MSA Controller on circuit K2.

Ground for the sensor is supplied on circuit K4.

The sensor is a variable resistor. As engine coolant temperature changes the resistance on the K4 circuit changes.

THROTTLE POSITION SENSOR

From the Powertrain Control Module (PCM), circuit K7 supplies 5 volts to the throttle position sensor (TPS). Circuit K7 connects to cavity A17 of the PCM.

Circuit K22 delivers the TPS signal to the PCM. Circuit K22 connects to cavity A23 of the PCM.

The PCM provides a ground for the throttle position sensor signal (circuit K22) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

Refer to Group 14 for throttle position sensor operation.

Circuit K7 splices to supply 5 volts to the manifold absolute pressure sensor, battery temperature sensor, camshaft position sensor, and crankshaft position sensor.

On vehicles equipped with the 4.0L engine and automatic transmission, circuit K22 splices to the transmission control module.

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor

DESCRIPTION AND OPERATION (Continued)

- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

ACCELERATOR PEDAL POSITION SENSOR (DIESEL)

Power for the accelerator pedal position sensor is supplied by the MSA Controller on circuit K6. This is a 5 volt feed from the MSA Controller.

Circuit K22 provides the pedal position input to the MSA Controller. Ground for the sensor is supplied from the MSA Controller on circuit K255.

LOW IDLE POSITION SWITCH (DIESEL)

Circuit K151 connects from the MSA Controller to the Accelerator Pedal Position Sensor. This circuit provides the low idle switch input.

Ground for the Accelerator Pedal Position Sensor is provided on circuit K255.

MANIFOLD ABSOLUTE PRESSURE SENSOR

From the Powertrain Control Module (PCM), circuit K7 supplies 5 volts to the manifold absolute pressure (MAP) sensor. Circuit K7 connects to cavity A17 of the PCM.

Circuit K1 delivers the MAP signal to the PCM. Circuit K1 connects to cavity A27 of the PCM.

The PCM provides a ground for the MAP sensor signal (circuit K1) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

Refer to Group 14 for MAP sensor operation.

Circuit K7 splices to supply 5 volts to the camshaft position sensor, crankshaft position sensor and throttle position sensor.

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

MASS AIR FLOW SENSOR (DIESEL)

Power for the mass air flow sensor is supplied on circuit F142. This circuit is HOT when the contacts in the Diesel Power Relay are CLOSED.

Circuit K155 provides the input to the MSA Controller. A sensor ground is provided by the MSA Controller on circuit K4.

Ground is also provided on circuit Z2.

INTAKE AIR TEMPERATURE SENSOR

The intake air temperature sensor provides an input to the Powertrain Control Module (PCM) on circuit K21. Circuit K21 connects to cavity A15 of the PCM.

From circuit K21, the intake air temperature sensor draws voltage from the PCM. The sensor is a variable resistor. As intake air temperature changes, the resistance in the sensor changes, causing a change in current draw.

The PCM provides a ground for the intake air temperature sensor signal (circuit K21) through circuit K167. Circuit K167 connects to cavity A4 of the PCM.

HELPFUL INFORMATION

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Camshaft position sensor
- Crankshaft position sensor
- Engine coolant temperature sensor
- Engine oil pressure sensor
- Fuel level sensor
- Heated oxygen sensor
- Intake air temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Vehicle speed control module
- Vehicle speed sensor

OIL PRESSURE SENSOR (DIESEL)

The oil pressure sensor is a variable resistor. A change in engine oil pressure changes the resistance in the sending unit which alters the signal sensed by the Powertrain Control Module on circuit G60.

The PCM provides ground for the oil pressure sensor on circuit K167.

The PCM broadcasts the oil pressure data on the CCD bus. The micro-processor in the instrument cluster receives the signal from the CCD bus, calculates oil pressure and adjusts the gauge needle position.

WATER IN FUEL SENSOR (DIESEL)

The water in fuel sensor provides an input to the Powertrain Control Module (PCM) on circuit G123.

DESCRIPTION AND OPERATION (Continued)

The PCM provides ground for the water in fuel sensor signal (circuit G123) through circuit K167.

PARK/NEUTRAL POSITION SWITCH

When closed, the park/neutral position switch provides a ground path on circuit T41 for the coil side of the starter motor relay. Circuit T141 from the ignition switch provides battery voltage to the coil side of the relay.

Circuit T41 is double crimped at the coil side of the relay and connects to cavity A6 of the Powertrain Control Module (PCM). The park/neutral position switch provides an input to the PCM.

POWER STEERING PRESSURE SWITCH

The Powertrain Control Module (PCM) connects to the power steering pressure switch on circuit K10. On vehicles equipped with a manual transmission, circuit Z12 provides ground for the switch. If the vehicle has an automatic transmission, circuit Z1 provides ground. When the switch closes, it connects circuit K10 to ground. The switch closes during periods of high power steering pump load and low engine speed; such as parking maneuvers.

Circuit K10 connects to cavity A12 of the PCM. Circuit Z12 also connects to cavities A31 and A32 of the PCM.

STOP LAMP SWITCH INPUT

Circuit K29 provides the stop lamp switch input to the PCM. Circuit K29 connects to cavity C24 of the PCM. Circuit K29 also connects to the Transmission Control Module (TCM) and the shift interlock.

FUEL INJECTORS

When the Automatic Shut Down (ASD) relay contacts close, they connect circuits A16 and A142. Circuit A142 supplies voltage to the fuel injectors. Each injector has a separate ground circuit controlled by the Powertrain Control Module (PCM).

Circuit K11 provides ground for injector number one. The K11 circuit connects to cavity B4 of the PCM.

Circuit K12 provides ground for injector number two. The K12 circuit connects to cavity B15 of the PCM.

Circuit K13 provides ground for injector number three. The K13 circuit connects to cavity B5 of the PCM.

Circuit K14 provides ground for injector number four. The K14 circuit connects to cavity B16 of the PCM.

On the 4.0L engine, circuit K15 provides ground for injector number five. The K15 circuit connects to cavity B6 of the PCM.

Also on the 4.0L engine, circuit K16 provides ground for injector number six. The K16 circuit connects to cavity B12 of the PCM.

HELPFUL INFORMATION

- For information about fuel injector operation, refer to Group 14.

FUEL INJECTION PUMP (DIESEL)

The fuel injection pump used on this engine application performs several functions. Each of these is described as follows.

FUEL SHUTDOWN SOLENOID

Power for the fuel shutdown solenoid is supplied by the MSA Controller on circuit K153. The solenoid is case grounded

FUEL TIMING SOLENOID

Power for the solenoid is supplied on circuit F142. This circuit is HOT when the contacts in the Diesel Power Relay are CLOSED. Ground for the solenoid is controlled by the MSA Controller on circuit K126.

FUEL TEMPERATURE SENSOR

Circuit K156 connects between the MSA Controller and the fuel temperature sensor. The sensor is a variable resistor. As fuel temperature changes the resistance on circuit K156 changes. Ground for the sensor is supplied on circuit K4.

CONTROL SLEEVE POSITION SENSOR

Circuit K134 connects between the MSA Controller and the control sleeve position sensor. This circuit is the position input to the MSA Controller.

Circuit K57 is used for the middle tap, and circuit K135 is used for the measure coil.

FUEL QUANTITY ACTUATOR

Power for the fuel quantity Actuator is supplied on circuit A142. This circuit is HOT when the contacts in the Diesel Power Relay are CLOSED. Ground for the Actuator is controlled by the MSA Controller on circuit K140.

FUEL HEATER (DIESEL)

When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F12 through PDC fuse 11. Circuit F12 feeds the coil side of the fuel heater relay. Ground for the relay is supplied by circuit Z1.

When the contacts of the fuel heater relay are closed they connect circuit A61 from fuse 6 of the PDC and circuit A93. Circuit A93 supplies voltage to the fuel heater. Ground for the fuel heater is supplied on circuit Z1.

DESCRIPTION AND OPERATION (Continued)

NEEDLE MOVEMENT SENSOR (DIESEL)

The needle movement sensor is used to provide an input to the MSA Controller. Circuit K67 connects from the MSA Controller, cavity 12, to the injector and is used as the signal wire.

Circuit K68, from cavity 11 of the MSA Controller connector, is used for a return from the injector.

GLOW PLUGS (DIESEL)

The glow plugs used on this vehicle are controlled by the MSA Controller and the glow plug relay. Power for the coil side of the relay is supplied on circuit F142. This circuit is HOT when the contacts in the Diesel Power Relay are CLOSED.

The ground side of the relay is controlled by the MSA Controller on circuit K152. This circuit connects to cavity 50 of the MSA Controller.

When the MSA Controller determines a need for glow plug operation it supplies a ground path on circuit K152. This causes the contacts in the relay to CLOSE connecting circuit A54 and K154. The A54 circuit is HOT at all times. Circuit K154 connects from the relay to the glow plugs.

The glow plugs are case grounded.

IGNITION COIL

When the Automatic Shut Down (ASD) relay contacts close, they connect circuits A16 and A142. Circuit A142 splices to supply voltage to the ignition coil. The Powertrain Control Module (PCM) controls the ground path for the ignition coil on circuit K19. Circuit K19 connects to cavity A7 of the PCM.

HELPFUL INFORMATION

Circuit A142 splices to supply voltage to the fuel injectors, PCM, and heated oxygen sensors.

IDLE AIR CONTROL (IAC) MOTOR

The Powertrain Control Module (PCM) operates the idle air control motor through 4 circuits; K39, K40, K59, and K60. Each circuit connects to separate cavities in the PCM connector.

- Circuit K39 connects to cavity A19 of the PCM
- Circuit K40 connects to cavity A11 of the PCM
- Circuit K59 connects to cavity A20 of the PCM
- Circuit K60 connects to cavity A10 of the PCM

DUTY CYCLE EVAP/PURGE SOLENOID

When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F12 through fuse 11 in the junction block. Circuit F12 supplies power to the Duty Cycle EVAP/Purge solenoid.

The Powertrain Control Module (PCM) provides the ground path for the solenoid on circuit K52. Circuit K52 connects to cavity C20 of the PCM.

ELECTRIC VACUUM MODULATOR (DIESEL)

Power for the Electric Vacuum Modulator is supplied on circuit F142. This circuit is HOT when the contacts in the Diesel Power Relay are CLOSED. The Electric Vacuum Modulator is case grounded.

The MSA Controller controls the operation of the modulator by supplying a ground path for circuit K35. This circuit connects to cavity 25 of the MSA Controller.

LOW COOLANT LEVEL SWITCH (DIESEL)

When the low coolant level switch closes, it connects circuit G18 from the Powertrain Control Module (PCM) and circuit K167. Circuit K167 is the sensor ground circuit.

When the low coolant level switch is closed the PCM receives a signal from circuit G18.

TORQUE CONVERTER CLUTCH (TCC) SOLENOID

The TCC solenoid is only used on 2.5L engines with the three-speed automatic transmissions. When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F12 through fuse 11 in the junction block. Circuit F12 supplies power to the TCC solenoid. The Powertrain Control Module (PCM) provides ground for the solenoid on circuit K54. Circuit K54 connects to cavity B11 of the PCM.

EXTENDED IDLE SWITCH

On Police Package vehicles, an optional extended idle switch provides an input to the Powertrain Control Module (PCM) on circuit K78. Circuit K78 connects to cavity A12 of the PCM. When the ignition switch is in the RUN position, circuit F15 from fuse 25 in the junction block supplies battery voltage to the extended idle switch. Circuit Z1 grounds the switch.

CCD BUS

Circuits D1 and D2 connect the Powertrain Control Module (PCM) to the CCD Bus. Circuit D1 connects to cavity C30 of the PCM. Circuit D2 connects to cavity C28 of the PCM. Circuits D1 and D2 are a twisted pair of wires.

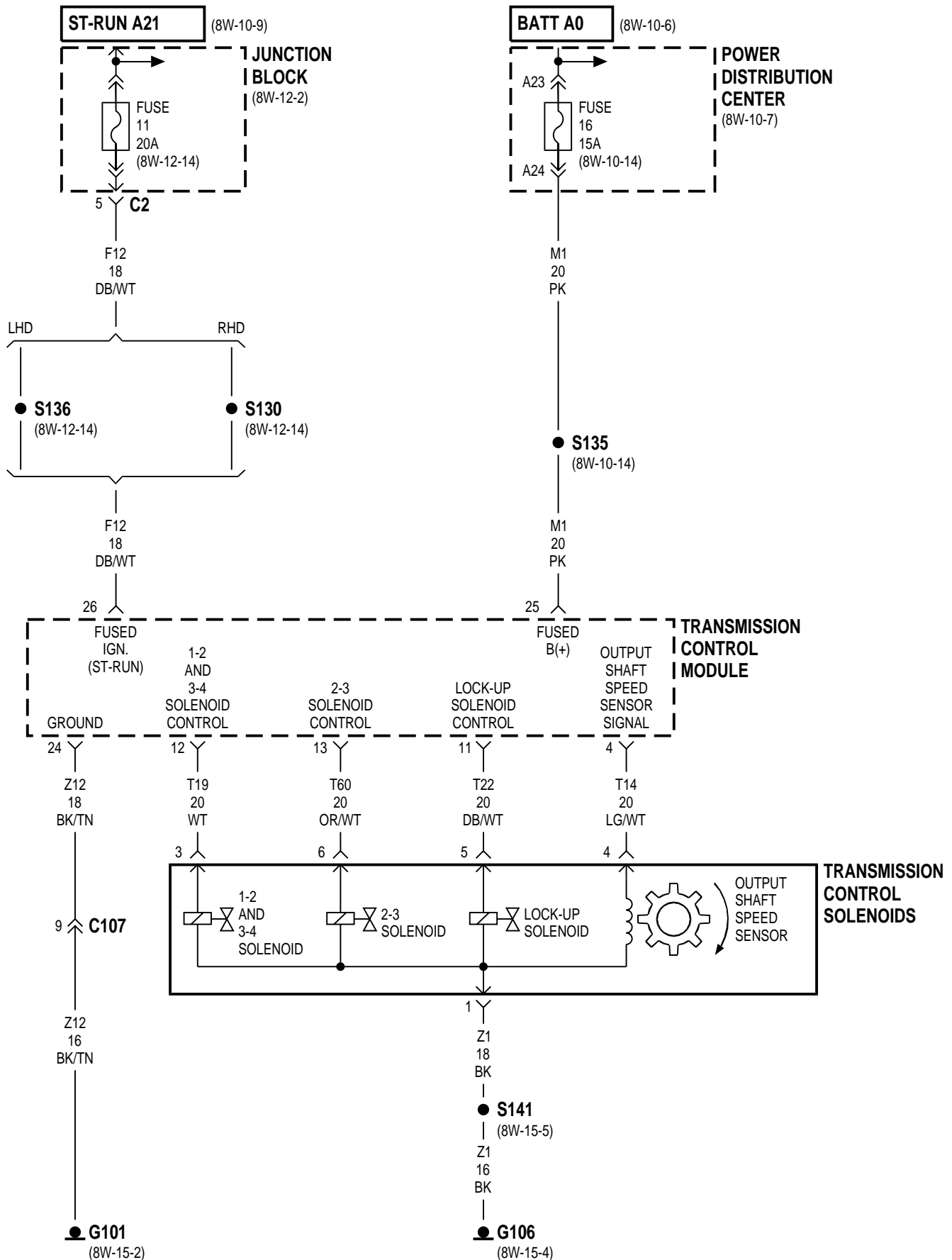
Several modules and controllers broadcast and receive data on the CCD Bus.

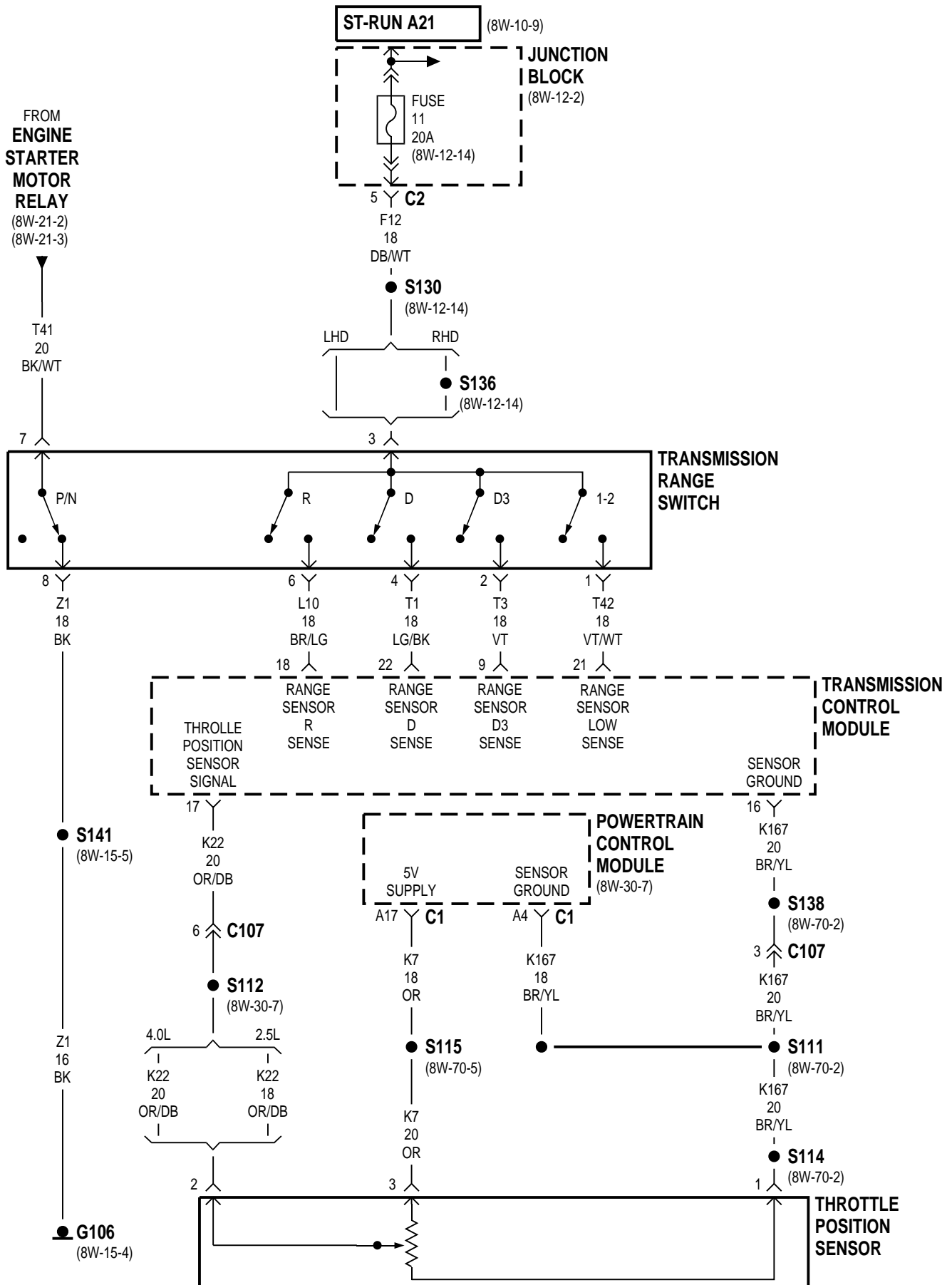
8W-31 TRANSMISSION CONTROL SYSTEM

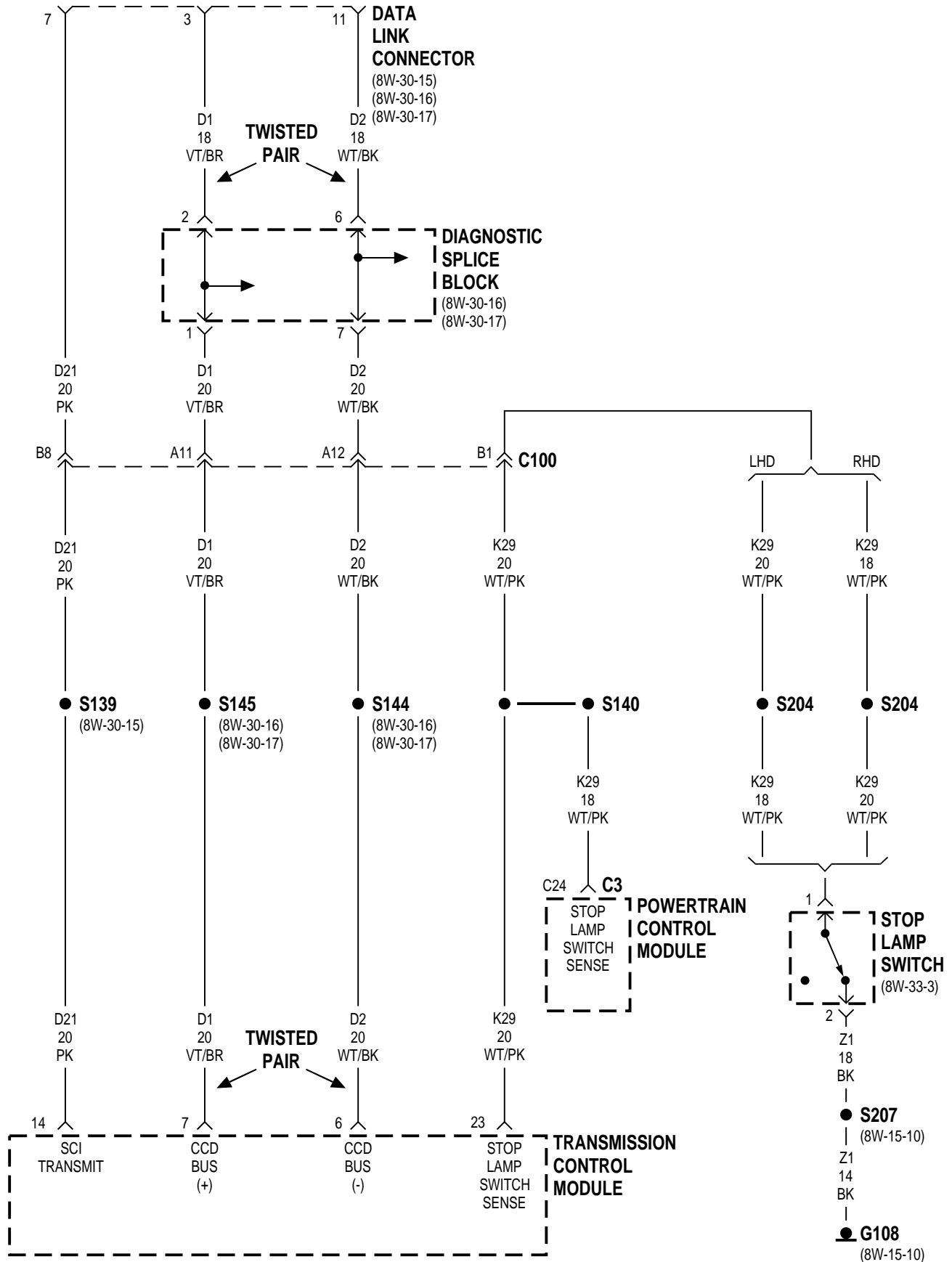
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8W-31 TRANSMISSION CONTROL SYSTEM

DESCRIPTION AND OPERATION

TORQUE CONVERTER CLUTCH (TCC) SOLENOID

The TCC solenoid is only used on 2.5L engines with the three-speed automatic transmissions. When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F12 through fuse 11 in the junction block. Circuit F12 supplies power to the TCC solenoid. The Powertrain Control Module (PCM) provides ground for the solenoid on circuit K54. Circuit K54 connects to cavity B11 of the PCM.

FOUR-WHEEL DRIVE (4WD) SWITCH

When the 4WD switch CLOSES, circuit Z1 provides ground for the 4WD indicator lamp in the instrument cluster. Circuit F87 connects to the instrument cluster and supplies battery voltage to the 4WD indicator lamp. Circuit G107 connects the indicator lamp to the 4WD switch.

On vehicles equipped with the 4.0L engine and an automatic transmission, circuit G107 connects to the solenoid assembly in the transmission. Circuit G106 from the solenoid assembly provides ground during 4WD Full Time operation.

SHIFT INTERLOCK

The shift interlock prevents the operator from shifting the vehicle out of PARK unless the brake pedal is pressed. When the ignition switch is in the

START or RUN position, circuit A22 feeds circuit F15 through fuse 25 in the junction block. Circuit F15 splices to power the shift interlock.

When the brake pedal is not depressed, the stop lamp switch provides ground for interlock by connecting circuit K29 to ground circuit Z1. When grounded, the interlock prevents shifting the transmission out of PARK. When the brake pedal is pressed, the stop lamp switch disconnects circuits K29 and Z1, removing ground from the shift interlock.

TRANSMISSION CONTROL MODULE—4.0L ENGINE ONLY

Vehicles equipped with the 4.0L engine have electronically controlled solenoids in the automatic transmission valve body.

The Transmission Control Module (TCM) receives inputs from the Throttle Position Sensor (TPS) on circuit K22 and the stop lamp switch on circuit K29. Circuit K167 connects to the TCM to provide ground for the TPS signal. The TCM receives the transmission output speed sensor signal on circuit T14. Circuit M1 from fuse 16 in the Power Distribution Center (PDC) supplies battery voltage to the TCM. Circuit Z12 provides ground for the TCM.

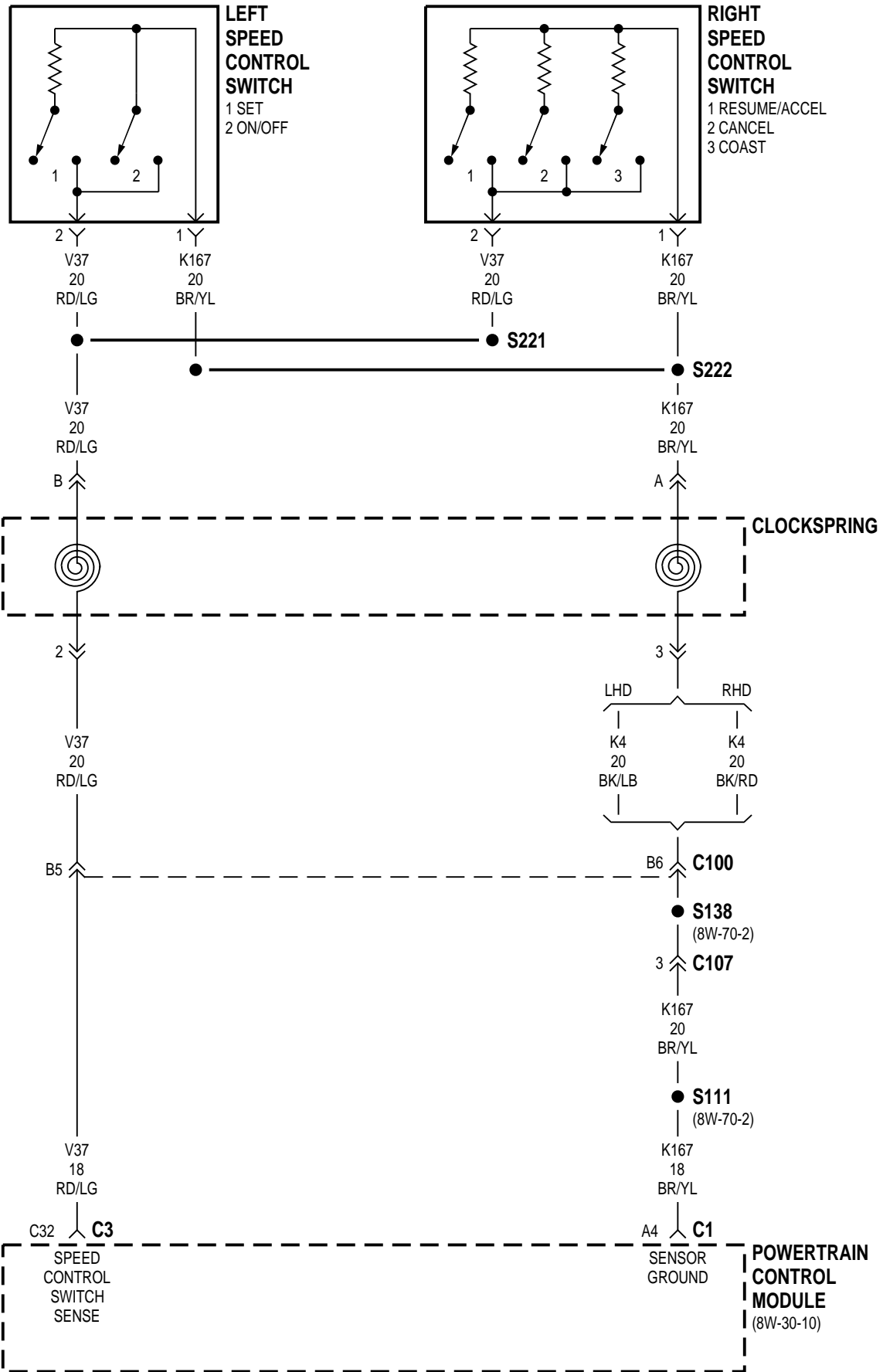
The TCM powers the S1 solenoid on circuit T19, the S2 solenoid on circuit T60, and the S3 solenoid on circuit T22. The S1, S2, and S3 solenoids are case grounded.

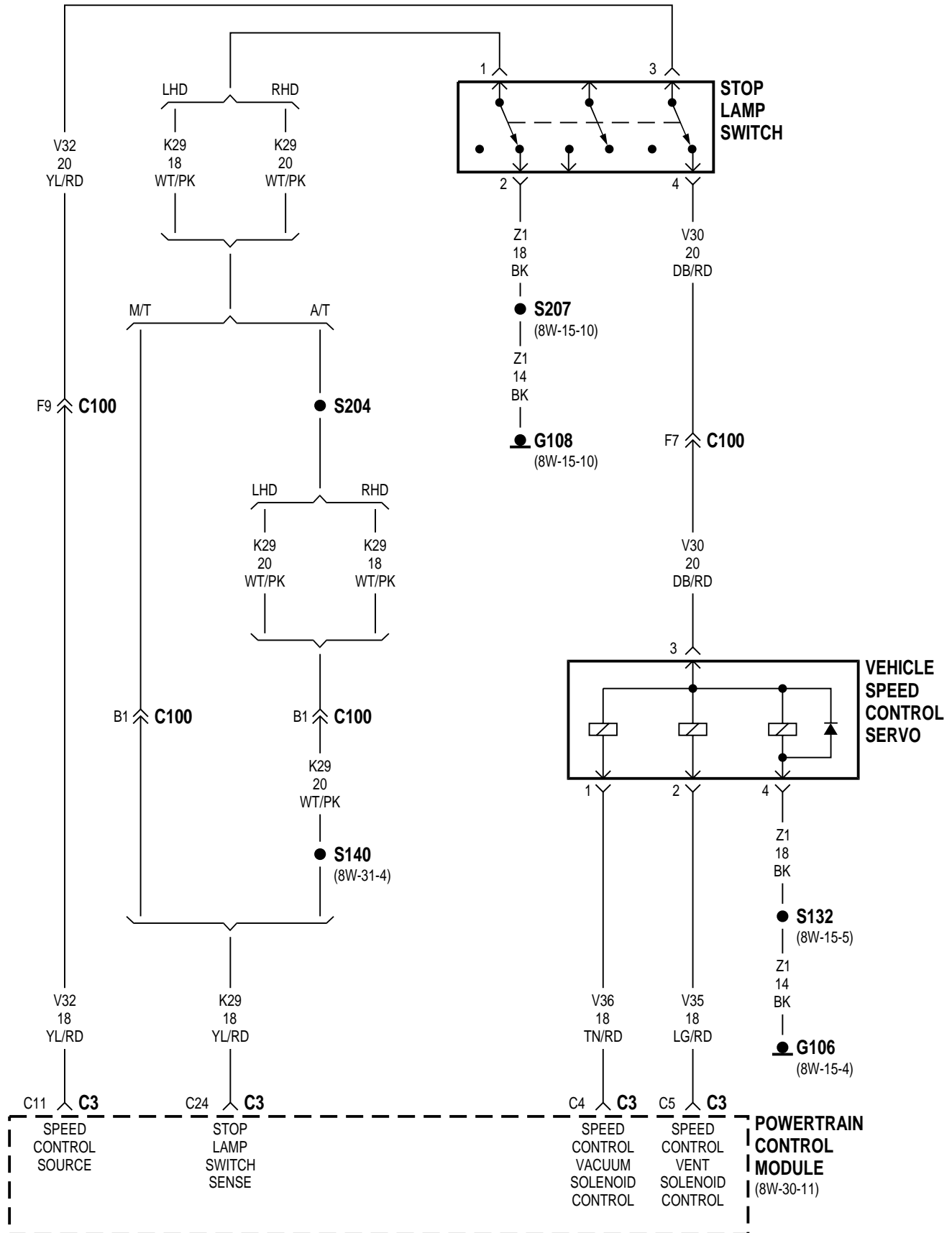
8W-33 VEHICLE SPEED CONTROL

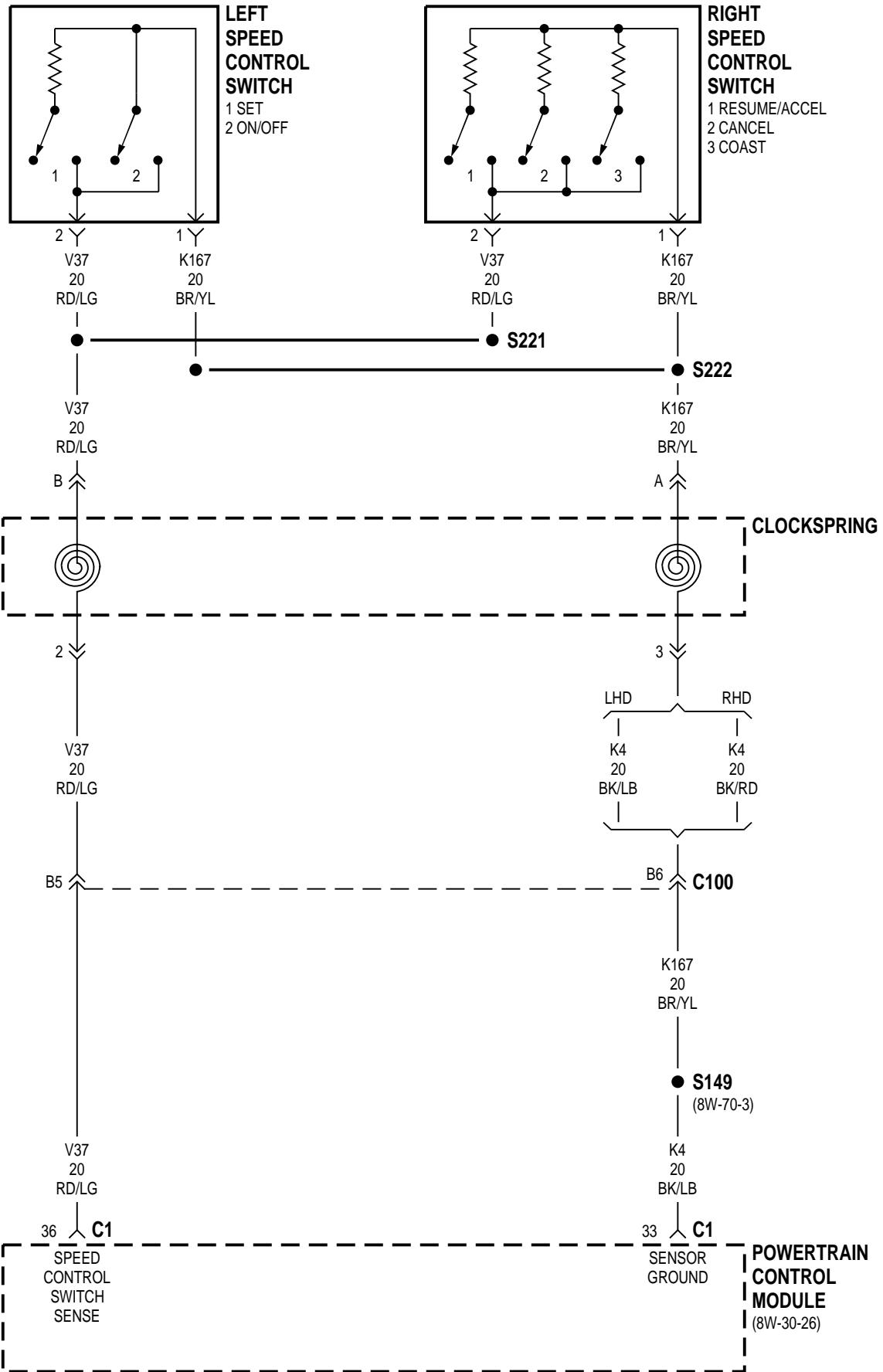
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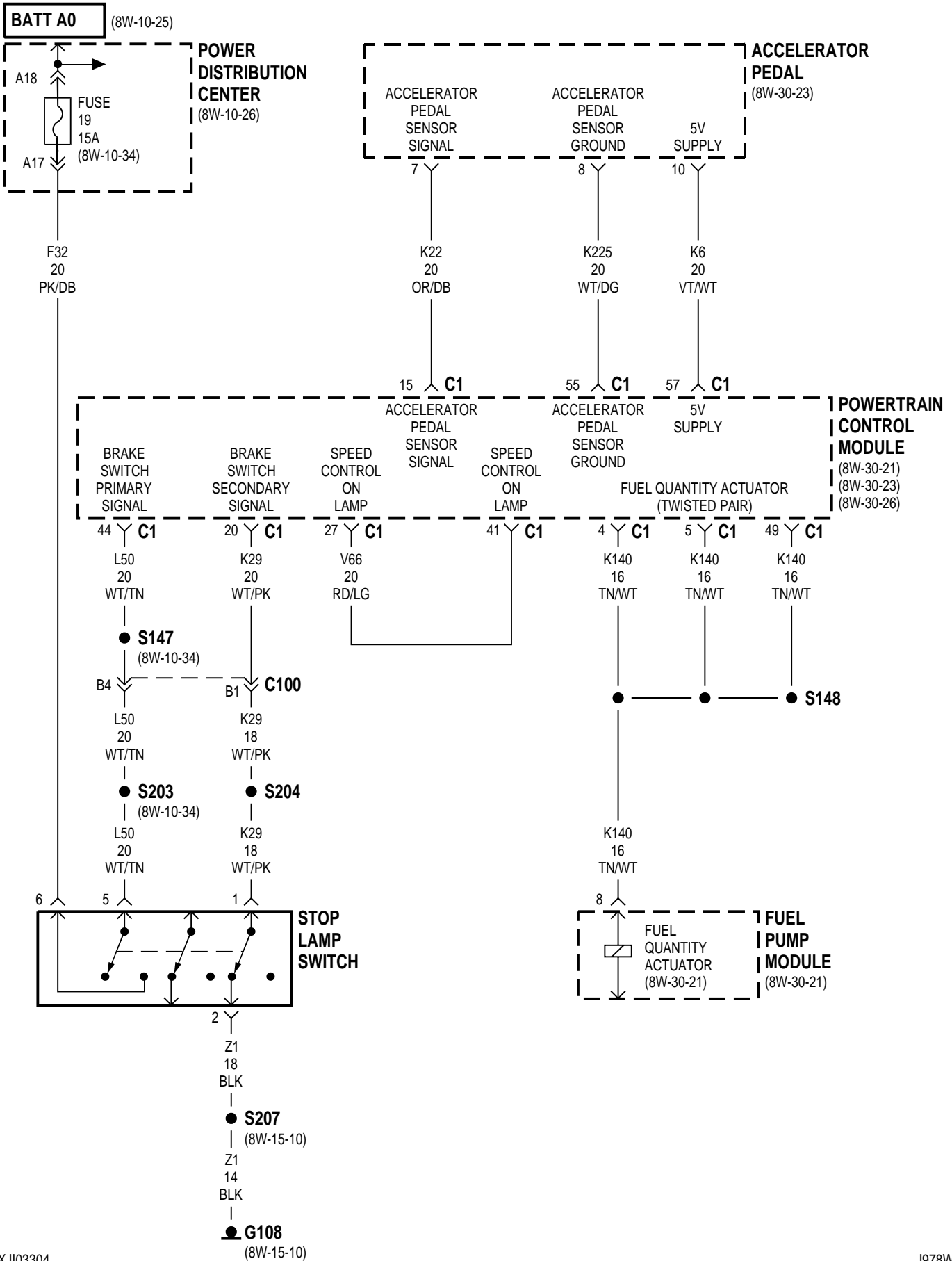
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S132	8W-33-3		









8W-33 VEHICLE SPEED CONTROL

DESCRIPTION AND OPERATION

VEHICLE SPEED CONTROL

The Powertrain Control Module (PCM) operates the vehicle speed control system. The vehicle speed control switches are located in the steering wheel.

Circuit V32 from cavity C11 of the PCM supplies 12 volts to the Light Emitting Diode (LED) used for the speed control indicator lamp and the speed control switches. Circuit V32 also connects to circuit V30 through the stop lamp switch. Circuit V30 powers the vehicle speed control servo.

Circuit V37 from PCM cavity C32 connects to the vehicle speed control switches. The switches are wired in parallel and each contains a separate resistor. The voltage level present on circuit V37 (at PCM cavity C32) depends on which speed control switch is selected. Circuit K167 from PCM cavity A4 supplies ground for the speed control switches.

- When the ON/OFF switch is open, the voltage level on circuit V37 at PCM cavity C32 has a nominal value of 5.0 volts with a range from 4.8 to 5.0 volts.

- When the ON/OFF switch closes, the voltage level on circuit V37 at PCM cavity C32 has nominal value of 1.51 volts with a range from 1.31 to 1.61 volts.

- When the SET/COAST switch closes, the voltage level on circuit V37 at PCM cavity C32 has nominal value of 3.8 volts with a range from 3.6 to 3.9 volts.

- When the RESUME/ACCEL switch closes, the voltage level on circuit V37 at PCM cavity C32 has nominal value of 4.4 volts with a range from 4.2 to 4.5 volts.

The PCM controls the vent and vacuum functions of the vehicle speed control servo on circuits V35 and

V36. Depending on the signal it receives from vehicle speed control switches, the PCM either applies vacuum to or vents vacuum from the servo. Circuit V36 from cavity C4 of the PCM sends the vacuum signal to the servo. Circuit V35 from cavity C5 sends the vent signal.

Circuit K29 provides the stop lamp switch sense input to the PCM at cavity C24. The stop lamp switch connects circuit K29 to ground on circuit Z1. When the brake pedal is depressed, the stop lamp switch opens and disconnects circuits K29 and Z1, and circuits V32 and V30. When the stop lamp switch disconnects circuits V32 and V30, power is removed from the speed control servo.

HELPFUL INFORMATION

Circuit K167 also provides ground for some of the engine control sensors that provide inputs to the PCM.

VEHICLE SPEED CONTROL (DIESEL)

The MSA Controller operates the vehicle speed control system. The vehicle speed control switches are located in the steering wheel.

Circuit V32 from the Powertrain Control Module (PCM) connects to circuit V30 through the stop lamp switch. Circuit V30 provides power to the speed control servo.

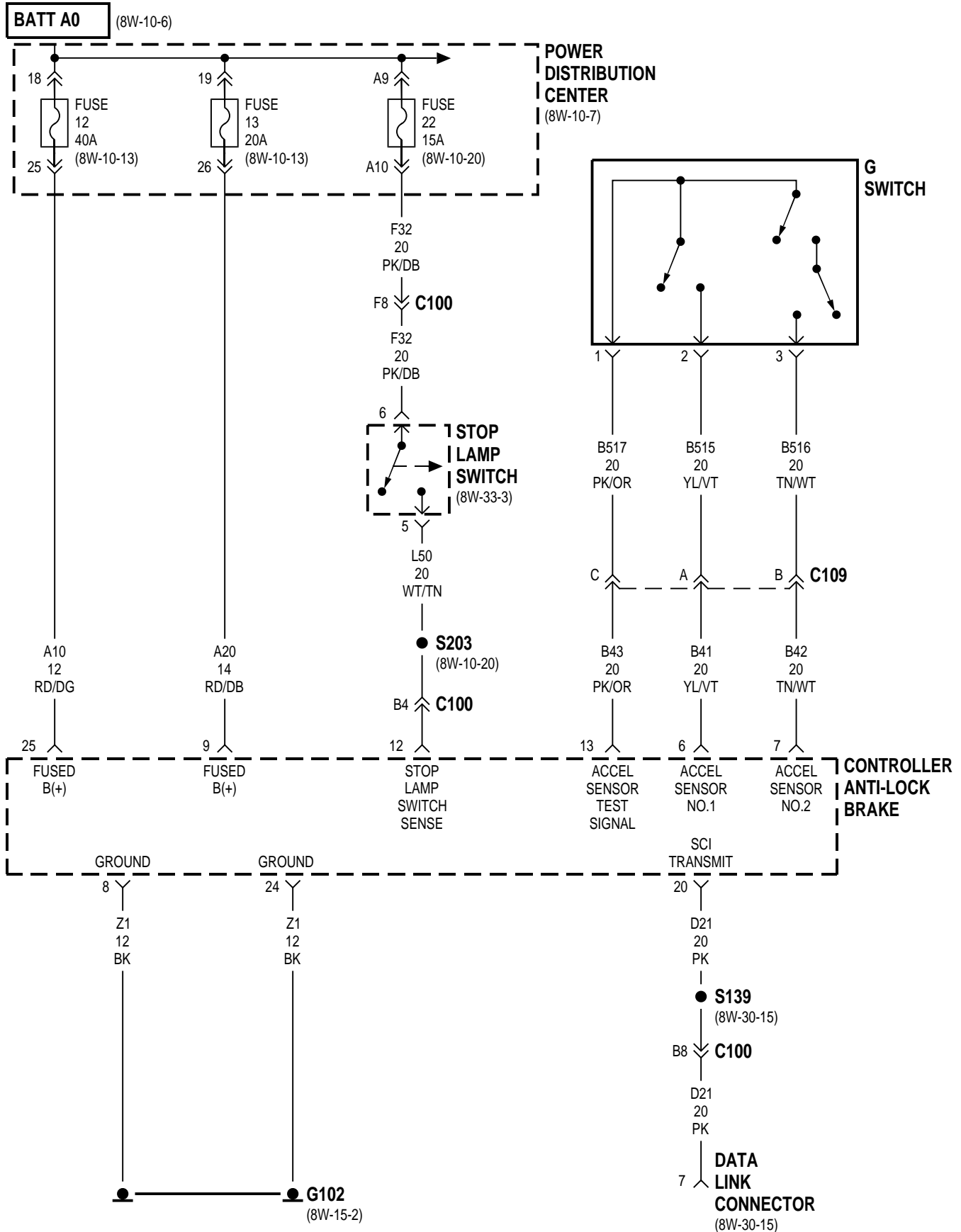
Circuit V37 from the MSA Controller supplies voltage to the vehicle speed control switches. The switches are wired in parallel and each contains a separate resistor. The voltage level present on circuit V37 at the MSA Controller depends on which speed control switch is selected. Circuit K4 from MSA Controller supplies ground for the speed control switches.

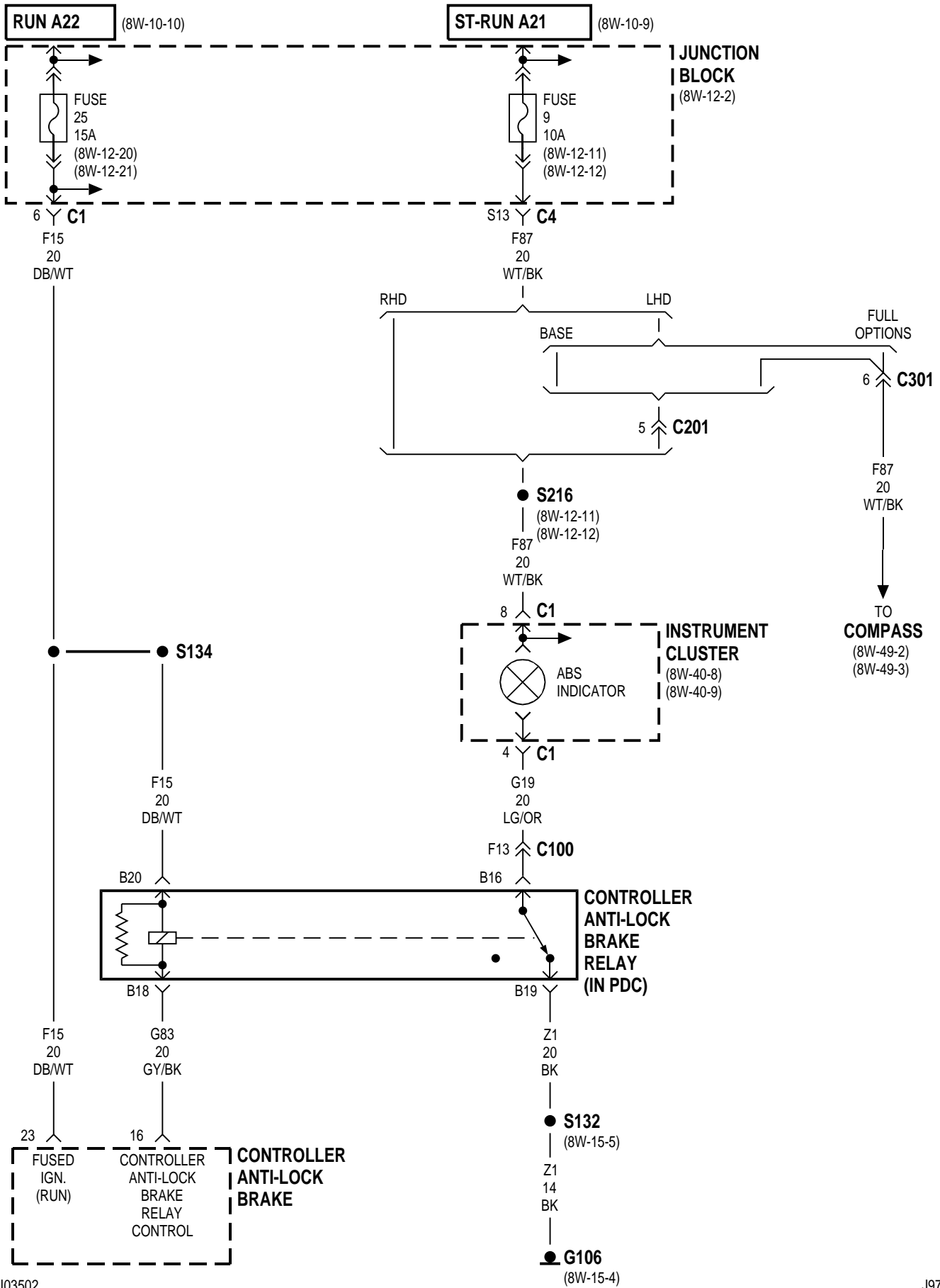
8W-35 ALL-WHEEL ANTI-LOCK BRAKES

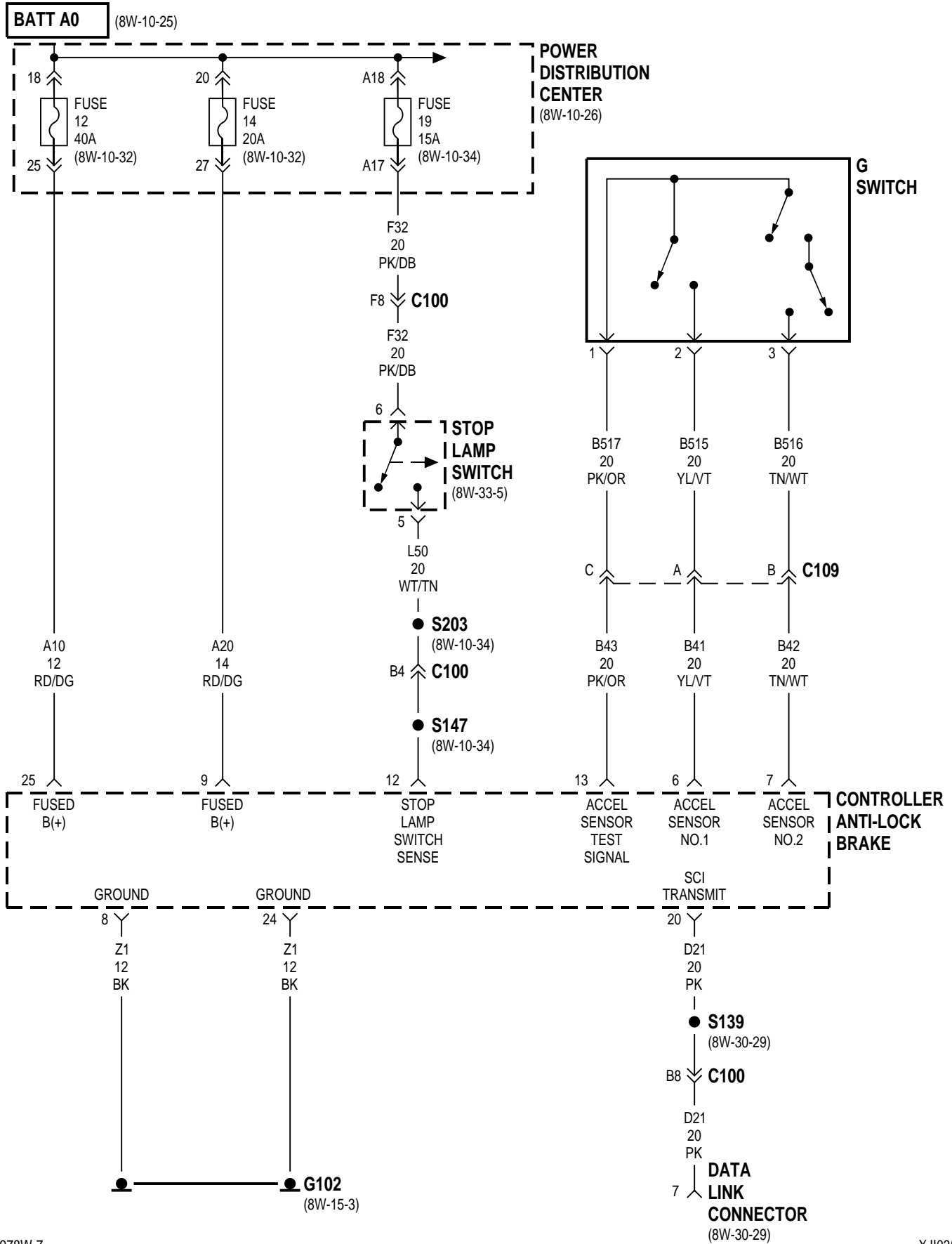
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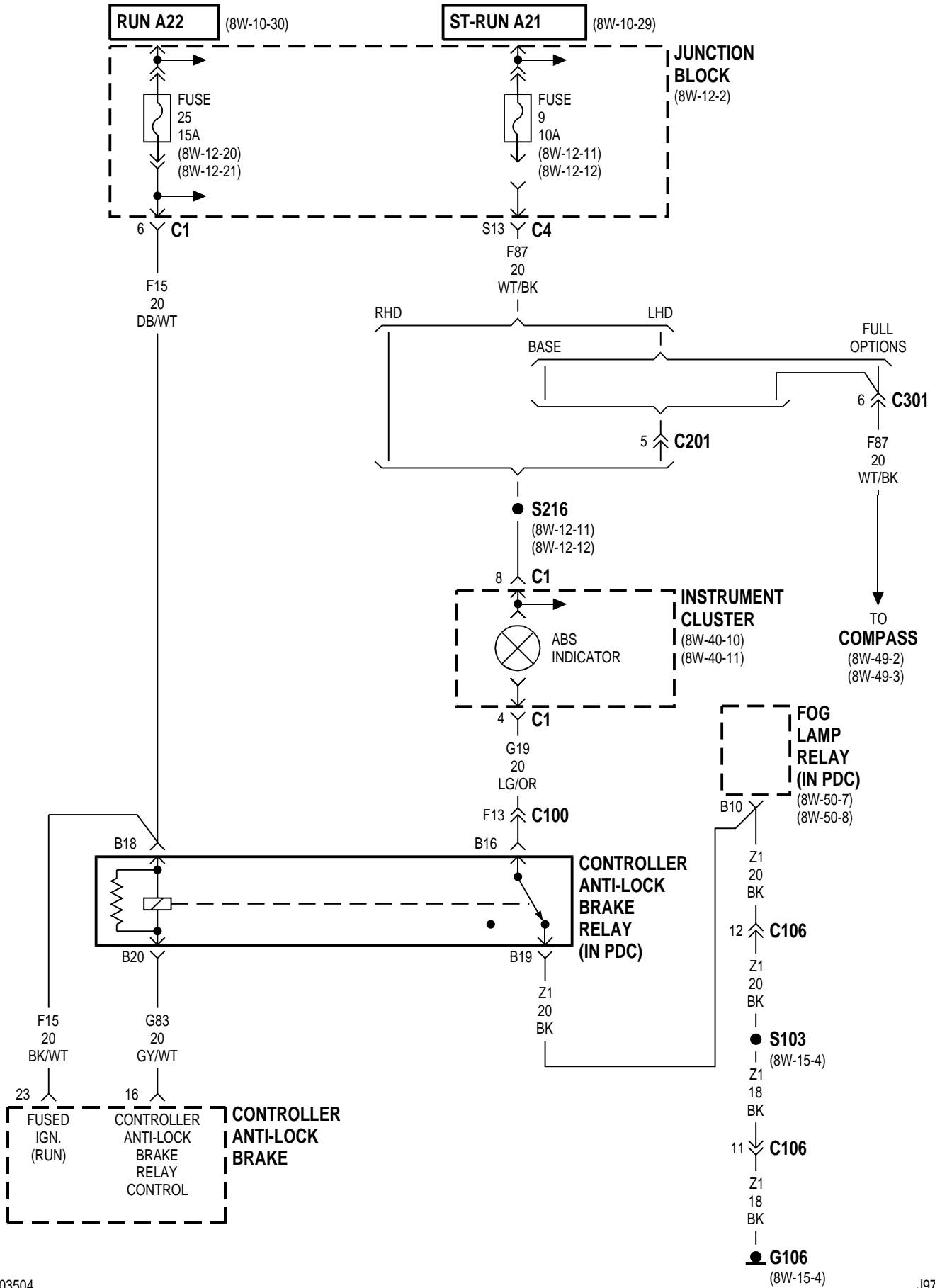
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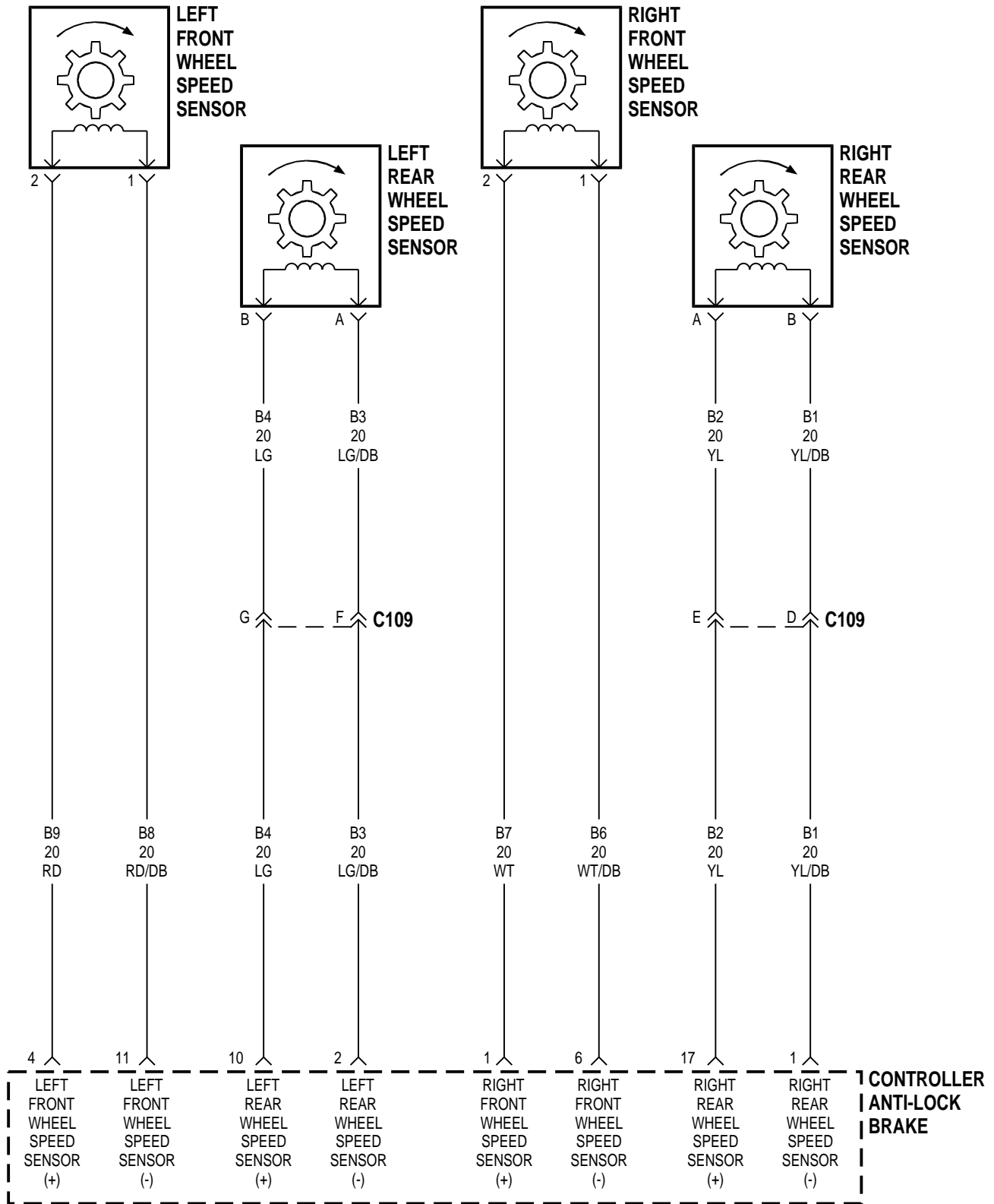
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Controller Anti-Lock Brake Relay	8W-35-3, 5	Left Rear Wheel Speed Sensor	8W-35-6
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Fuse 13 (PDC)	8W-35-2	S103	8W-35-5
Fuse 14 (PDC)	8W-35-4	S132	8W-35-3
Fuse 19 (PDC)	8W-35-4	S134	8W-35-3
Fuse 22 (PDC)	8W-35-2	S139	8W-35-2, 4
Fuse 25 (JB)	8W-35-3, 5	S147	8W-35-4
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G102	8W-35-2, 4	S216	8W-35-3, 5
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8W-35 ALL-WHEEL ANTI-LOCK BRAKES

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DESCRIPTION AND OPERATION

INTRODUCTION

Four fuses supply power for the Anti-Lock Brake System (ABS); fuses 5, 8 and 14 in the Power Distribution Center (PDC) and fuse 18 in the fuse block. Fuses 5, 8 and 14 in the PDC are connected directly to battery voltage and are HOT all times. Fuse 18 in the fuse block is HOT when the ignition switch is the RUN Position.

In the RUN position, the ignition switch connects circuit A1 from fuse 8 in the PDC with circuit A38. Circuit A38 connects to a bus bar in the fuse block. The bus bar feeds circuit B236 through fuse 18. Fuse 18 is a 2 amp fuse.

Circuit B236 connects to the coil side of the ABS main relay and the Controller, Anti-Lock Brakes (CAB).

Circuit Z1 provides ground for the CAB. Circuit Z1 connects to cavities B14 and B13 of the CAB.

Refer to group 5, Brakes for operational descriptions of ABS system components.

WHEEL SPEED SENSORS

The all wheel anti-lock system uses four wheel speed sensors; one for each wheel. Each sensor converts wheel speed into an electrical signal that it transmits to the Controller, Anti-Lock Brakes (CAB). A pair of twisted wires connect to each sensor to provide signals to the CAB.

Circuits B6 and B7 provide signals to the CAB from the right front wheel speed sensor. Circuit B6 which provides the LOW signal connects to cavity 18 of the CAB. Circuit B7 connects to cavity 3 of the CAB and provides the HIGH signal.

Circuits B8 and B9 provide signals to the CAB from the left front wheel speed sensor. Circuit B8, which provides the LOW signal, connects to cavity 11 of the CAB. Circuit B9 connects to cavity 4 of the CAB and provides the HIGH signal.

Circuits B1 and B2 provide signals to the CAB from right rear wheel speed sensor. Circuit B1 which provides the LOW signal connects to cavity 1 of the CAB. Circuit B2 connects to cavity 17 and provides the HIGH signal. Circuits B3 and B4 provide signals to the CAB from the left rear wheel speed sensor. Circuit B3, which provides the LOW signal, connects to cavity 2 of the CAB. Circuit B4 connects to cavity 10 and provides the HIGH signal.

G-SWITCH

During four-wheel drive operation, the G-switch provides deceleration data to the Controller, Anti-Lock Brakes (CAB). Refer to Group 5, Brakes for additional information.

Circuits B41, B42, and B43 connect the G-Switch to the CAB. Circuits B41 and B42 provide switch states while circuit B43 provides ground.

ABS RELAY

Circuit F15 from fuse 25 of the junction block supplies voltage to the coil side of the ABS relay. Ground for the coil side of the relay is supplied by the Controller, Anti-Lock Brake (CAB).

When the relay contacts close, the ground circuit for the ABS warning lamp is completed on circuit Z1.

ABS WARNING LAMP

Circuit F87 provides power for the ABS warning lamp at the instrument cluster. Ground for the ABS warning lamp is provided by circuit Z1 when the ABS relay is not energized.

STOP LAMP SWITCH INPUT

Circuit L50 from the stop lamp switch provides the brake switch input to the Controller, Anti-Lock Brakes (CAB). When the brake pedal is depressed, the stop lamp switch closes to supply battery voltage from circuit F32 to circuit L50. Circuit L50 connects to cavity 12 of the CAB. Circuit F32 originates at fuse 22 in the Power Distribution Center (PDC).

DATA LINK CONNECTOR

Circuit D21 from cavity 20 of the Controller, Anti-Lock Brakes (CAB) transmits data to the DRB scan tool through the data link connector. Circuit D21 is double crimped at the data link connector and connects to cavity C27 of the Powertrain Control Module (PCM).

Through the data link connector, circuit Z1 provides ground for the DRB scan tool.

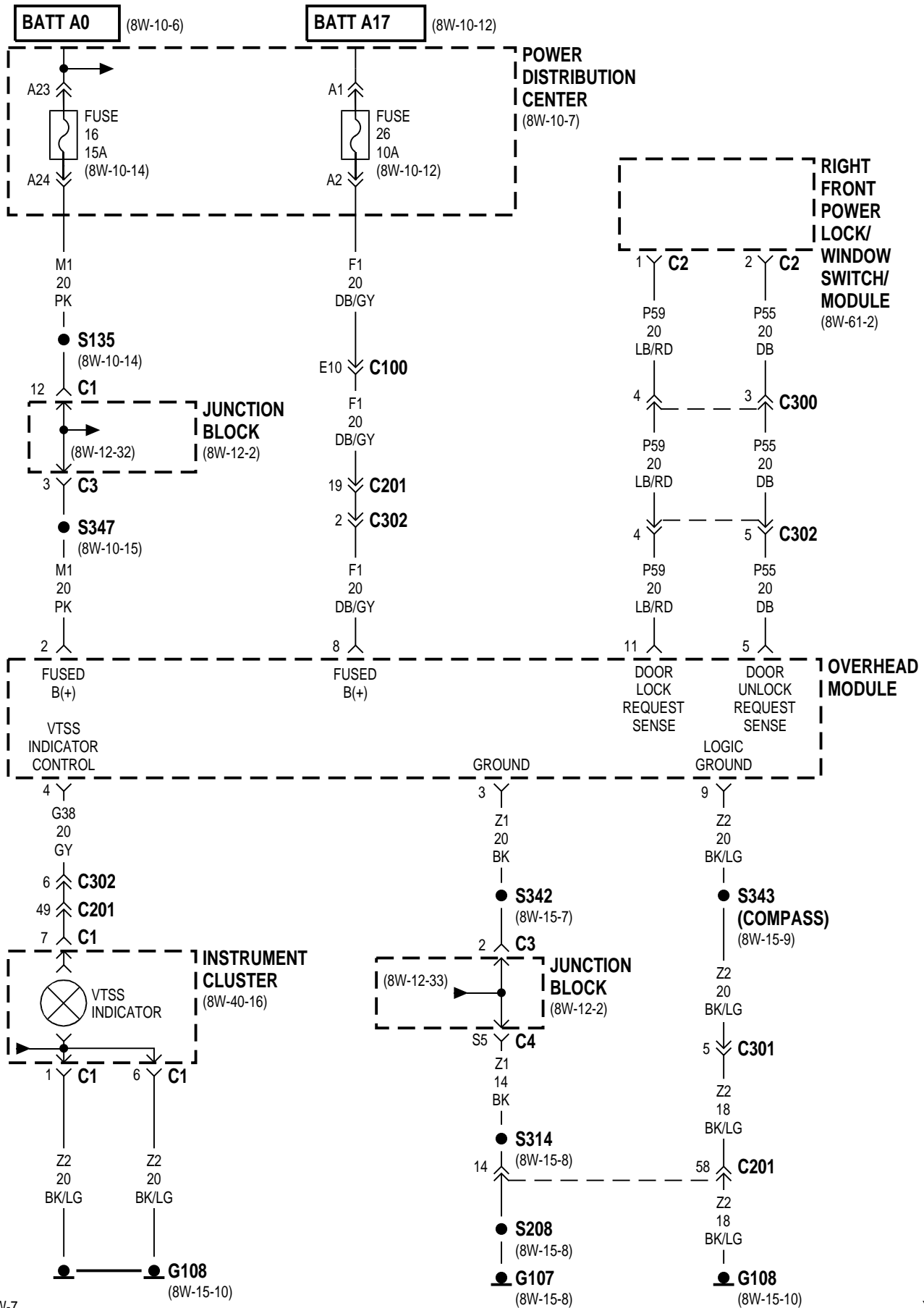
Circuit F34 from fuse 17 in the Power Distribution Center (PDC) supplies battery voltage to the scan tool through the diagnostic connector.

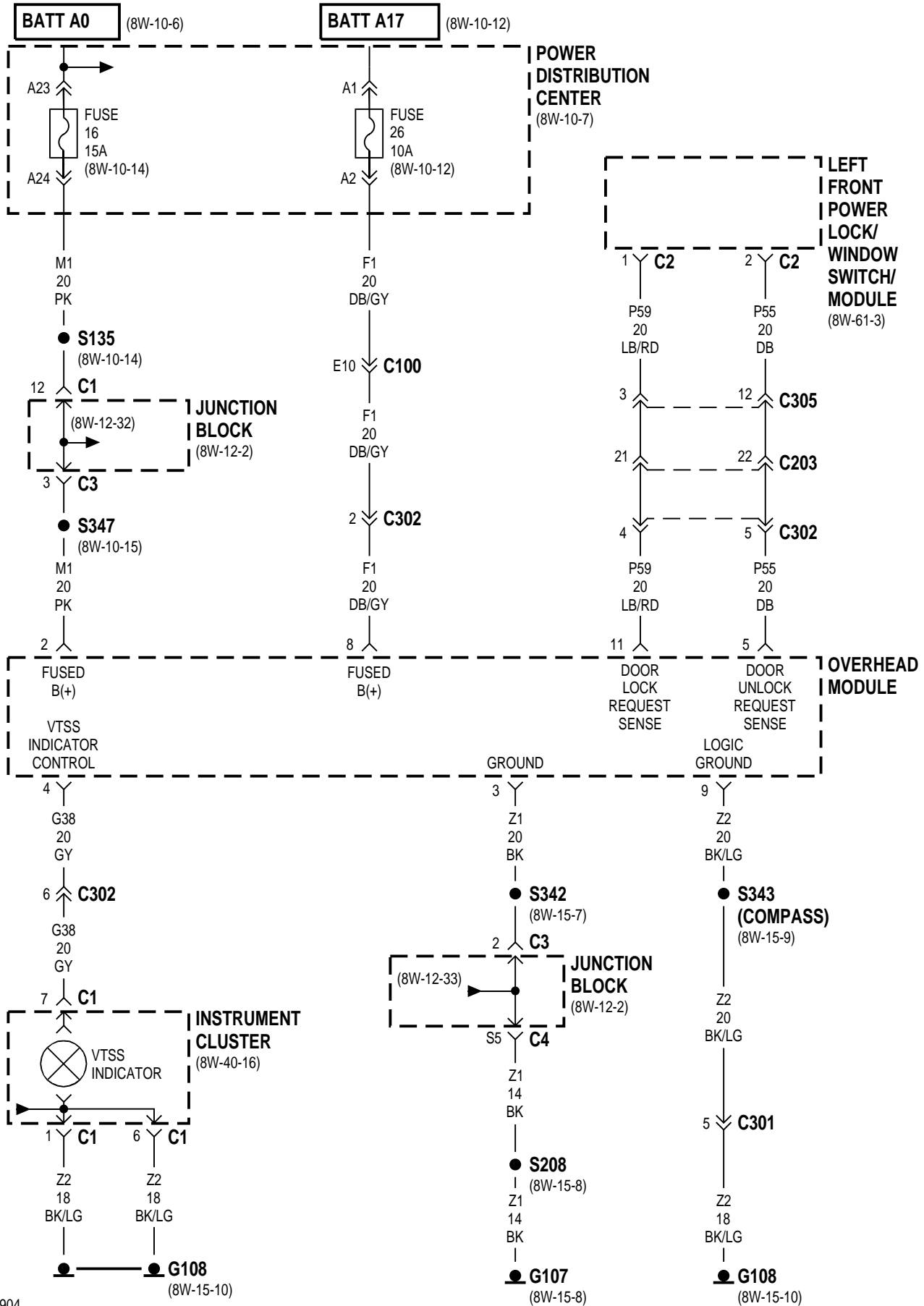
8W-39 VEHICLE THEFT SECURITY SYSTEM

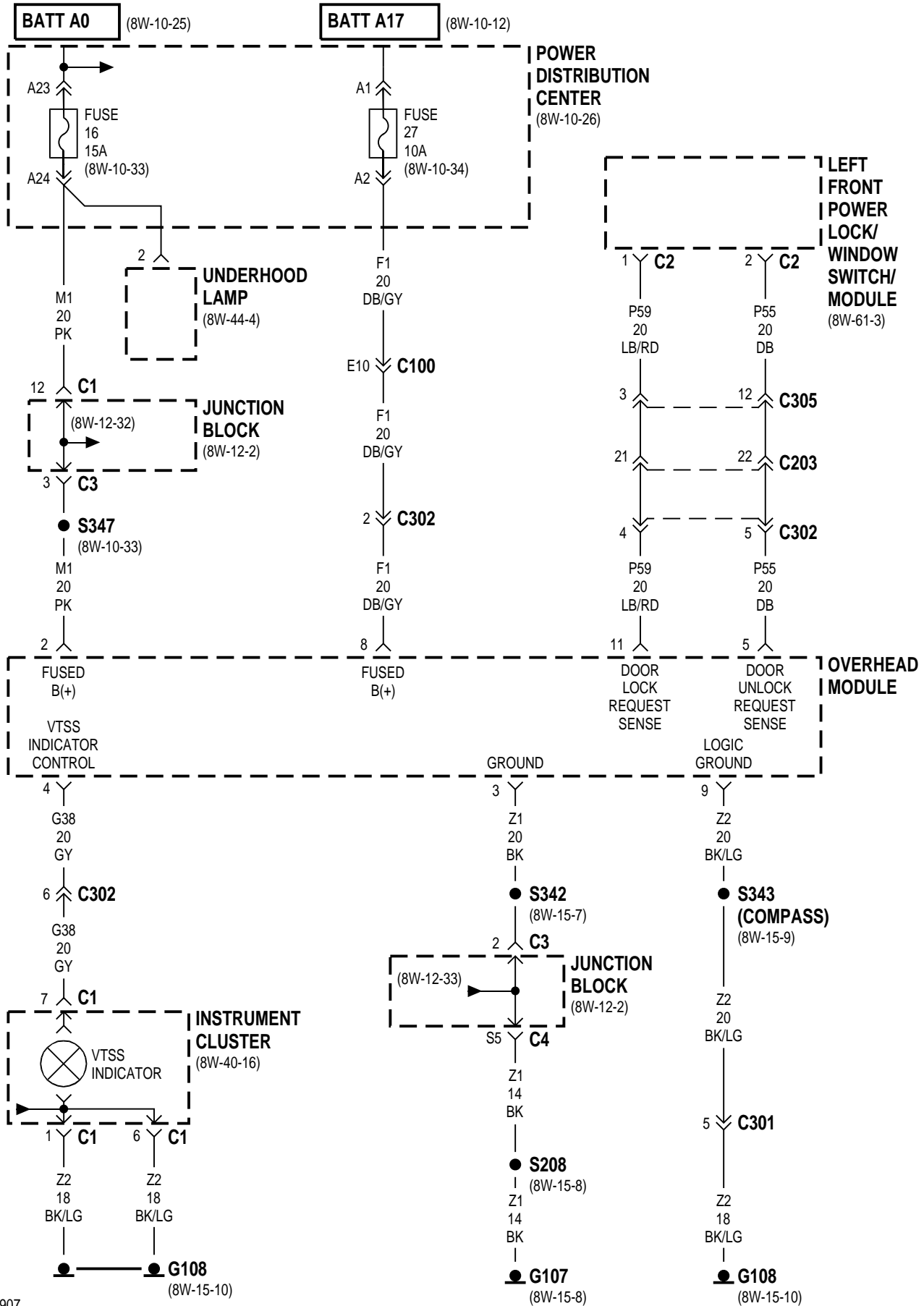
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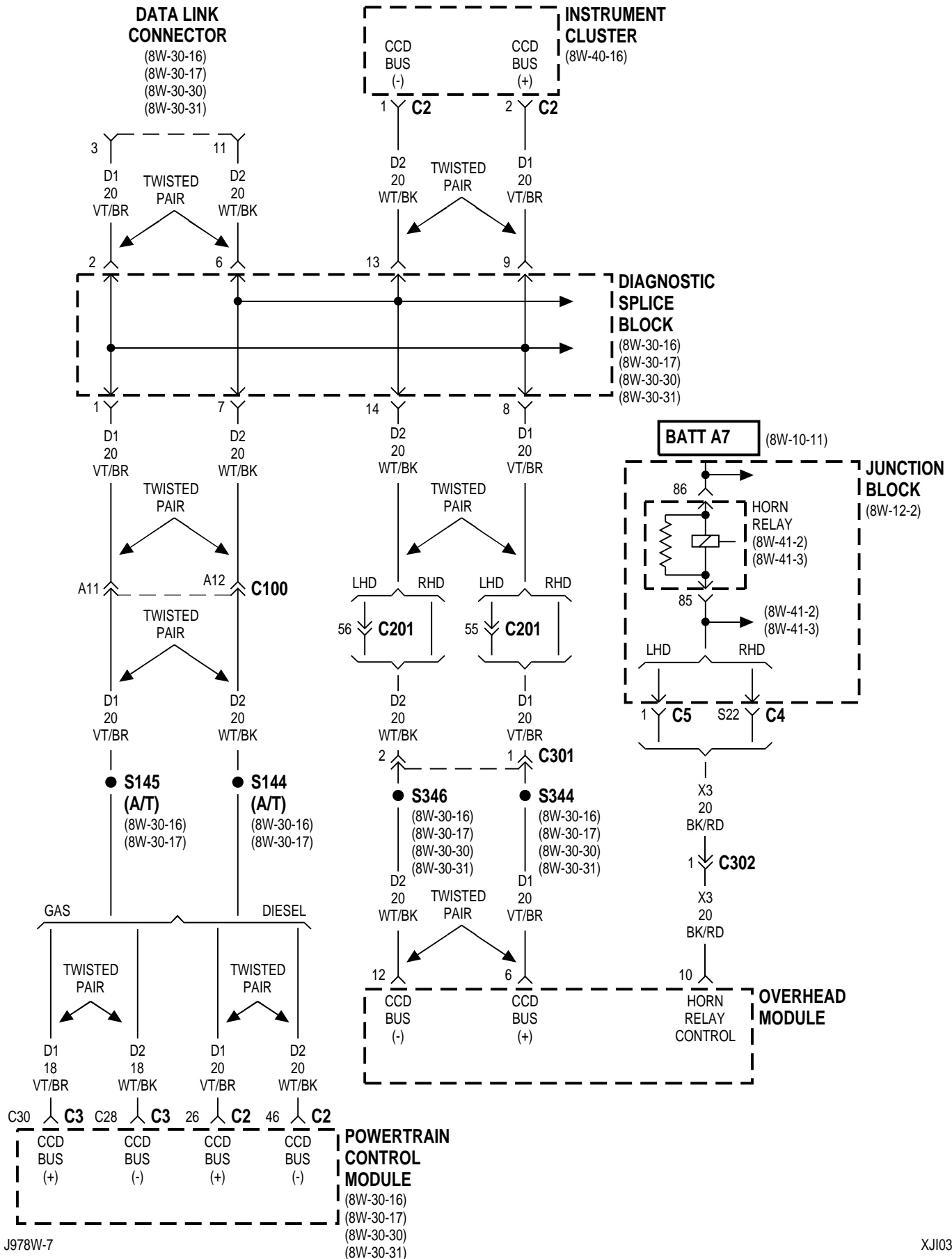
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8W-39 VEHICLE THEFT SECURITY SYSTEM

DESCRIPTION AND OPERATION

IMMOBILIZER

The Immobilizer provides protection against unauthorized vehicle use by preventing the engine from operating when the system is armed. The system is operated by radio signals sent from a hand-held immobilizer transmitter to a receiver in the vehicle.

REMOTE KEYLESS ENTRY

Immobilizers use key-fob radio signal transmitters and vehicle-mounted receivers to lock and unlock the system. In most cases, the transmitters and receivers also operate the Remote Keyless Entry (RKE) system for locking and unlocking doors.

OVERHEAD MODULE

The Overhead Module operates the Remote Keyless Entry and the Immobilizer system.

Power for the Overhead Module is supplied by circuit F1 from fuse 26 in the Power Distribution Center. Inputs to the overhead module include; door ajar illumination sense, door lock and unlock request, and horn relay control.

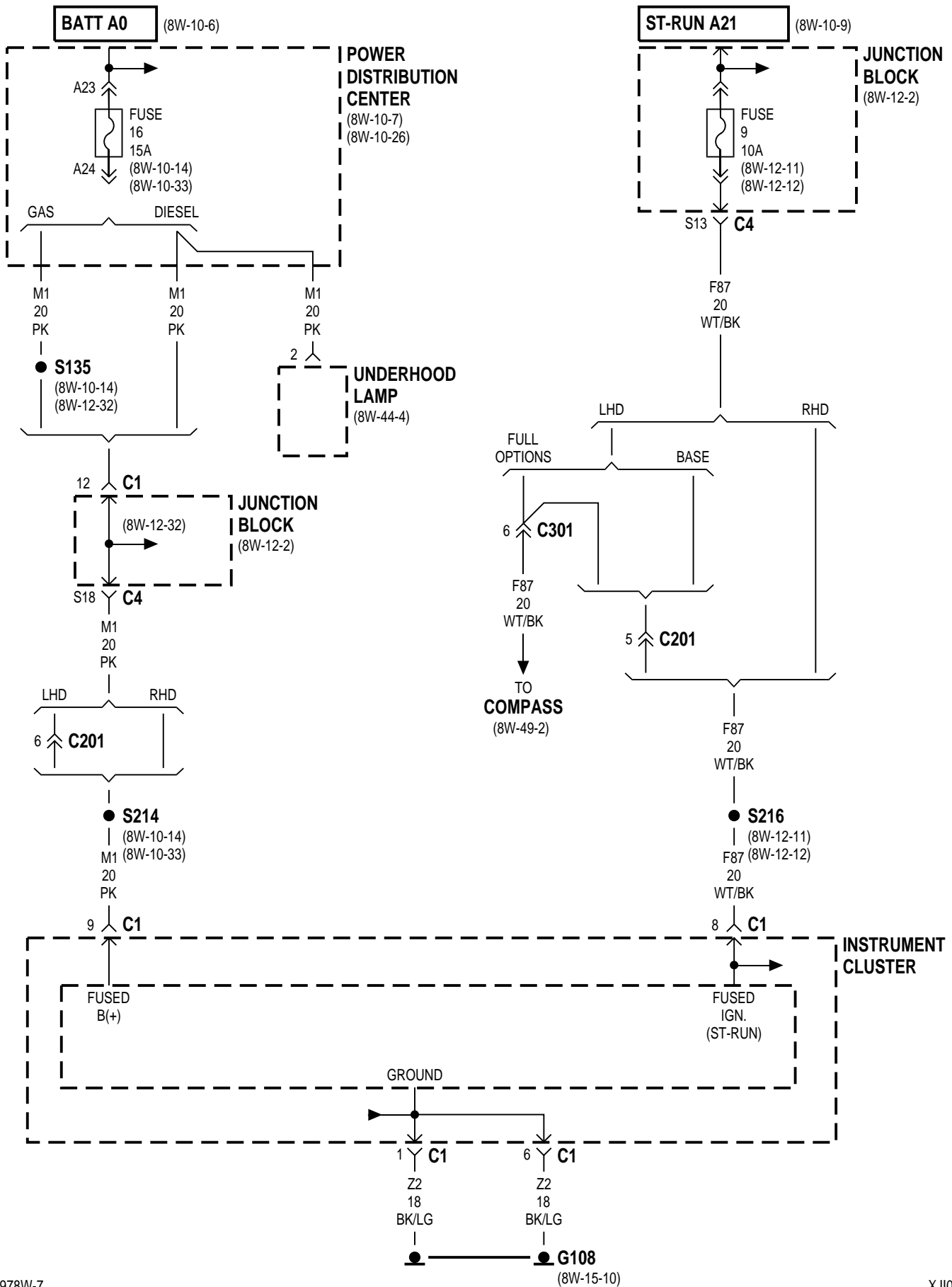
The Overhead Module controls systems based on inputs broadcast on the CCD bus.

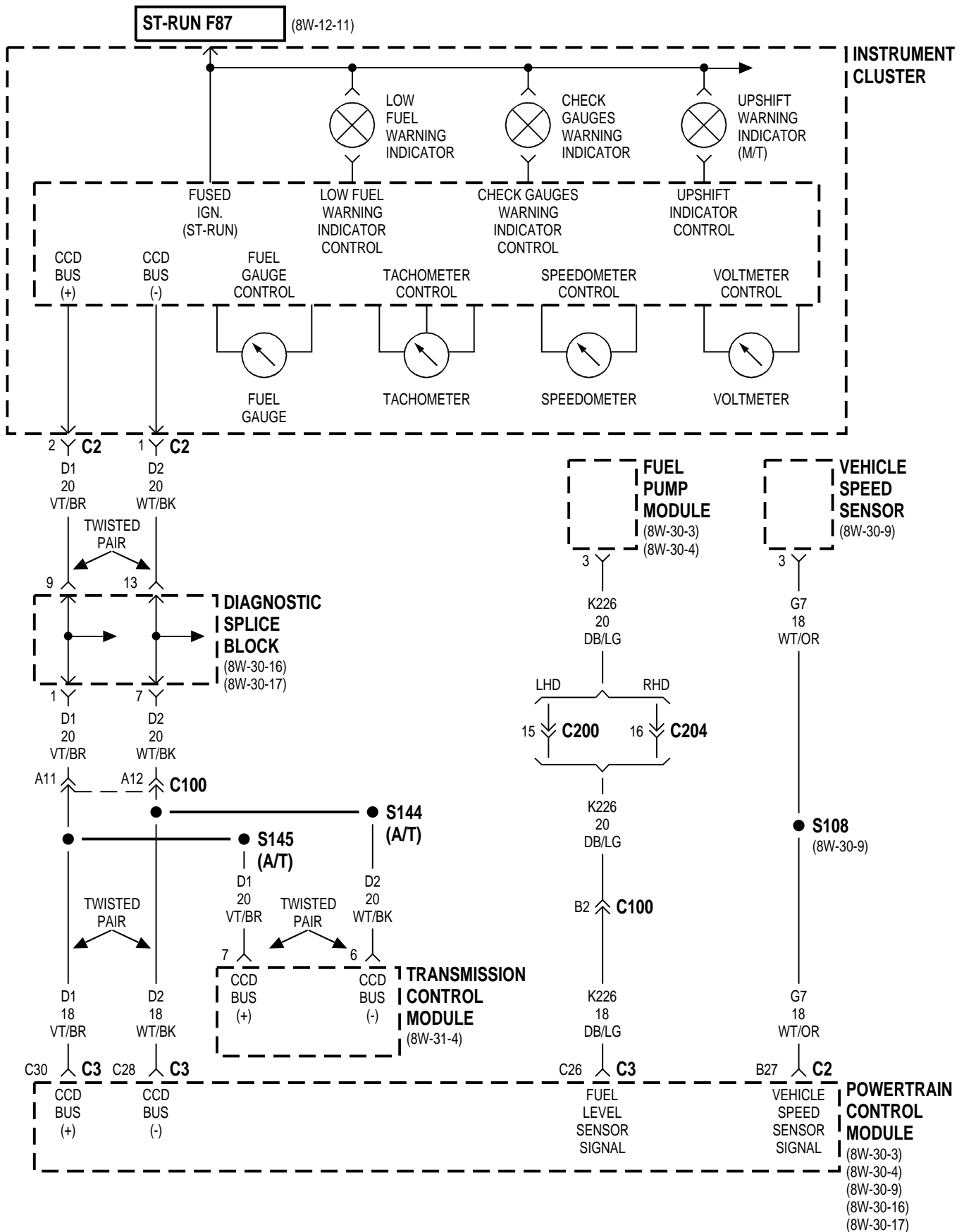
8W-40 INSTRUMENT CLUSTER

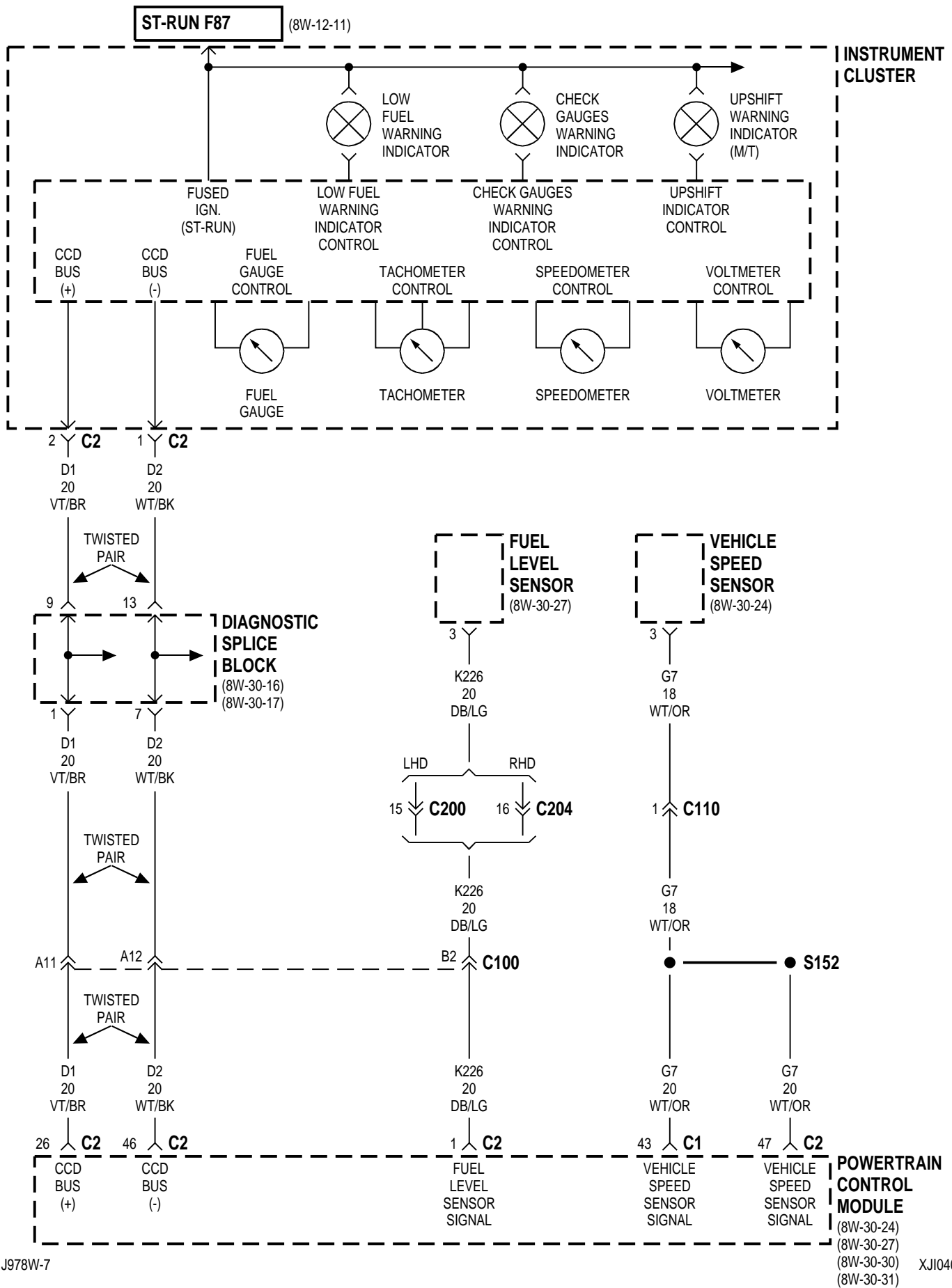
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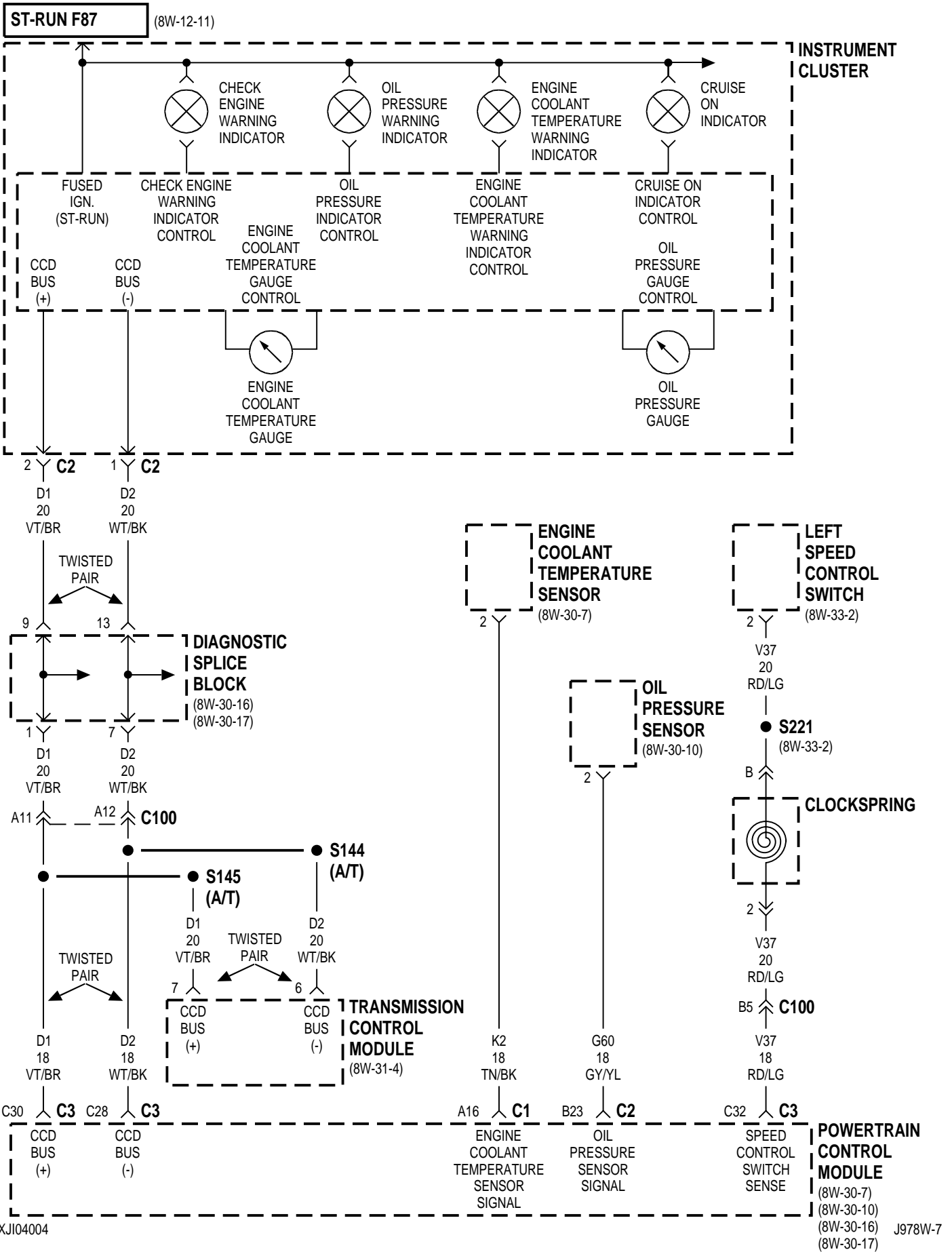
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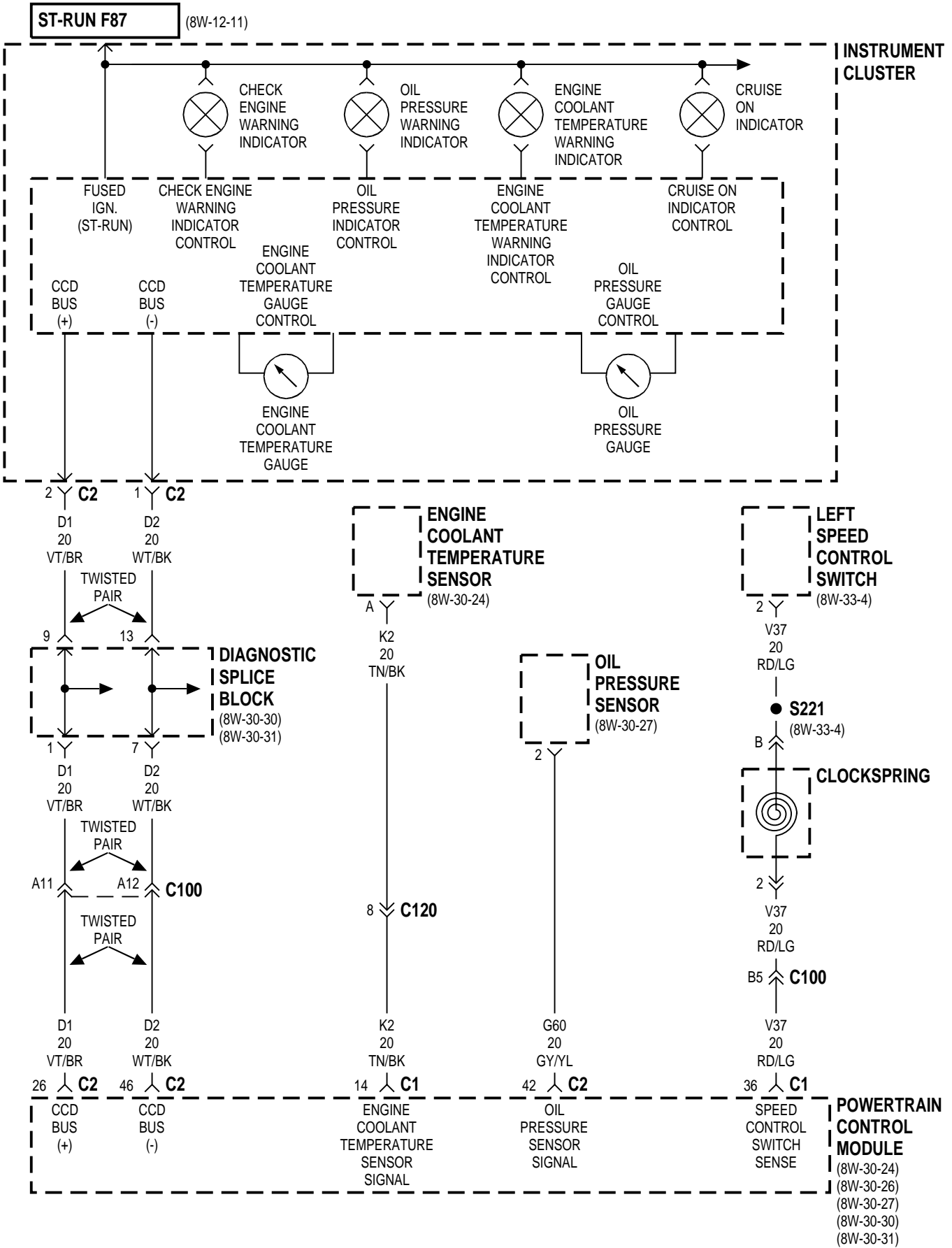
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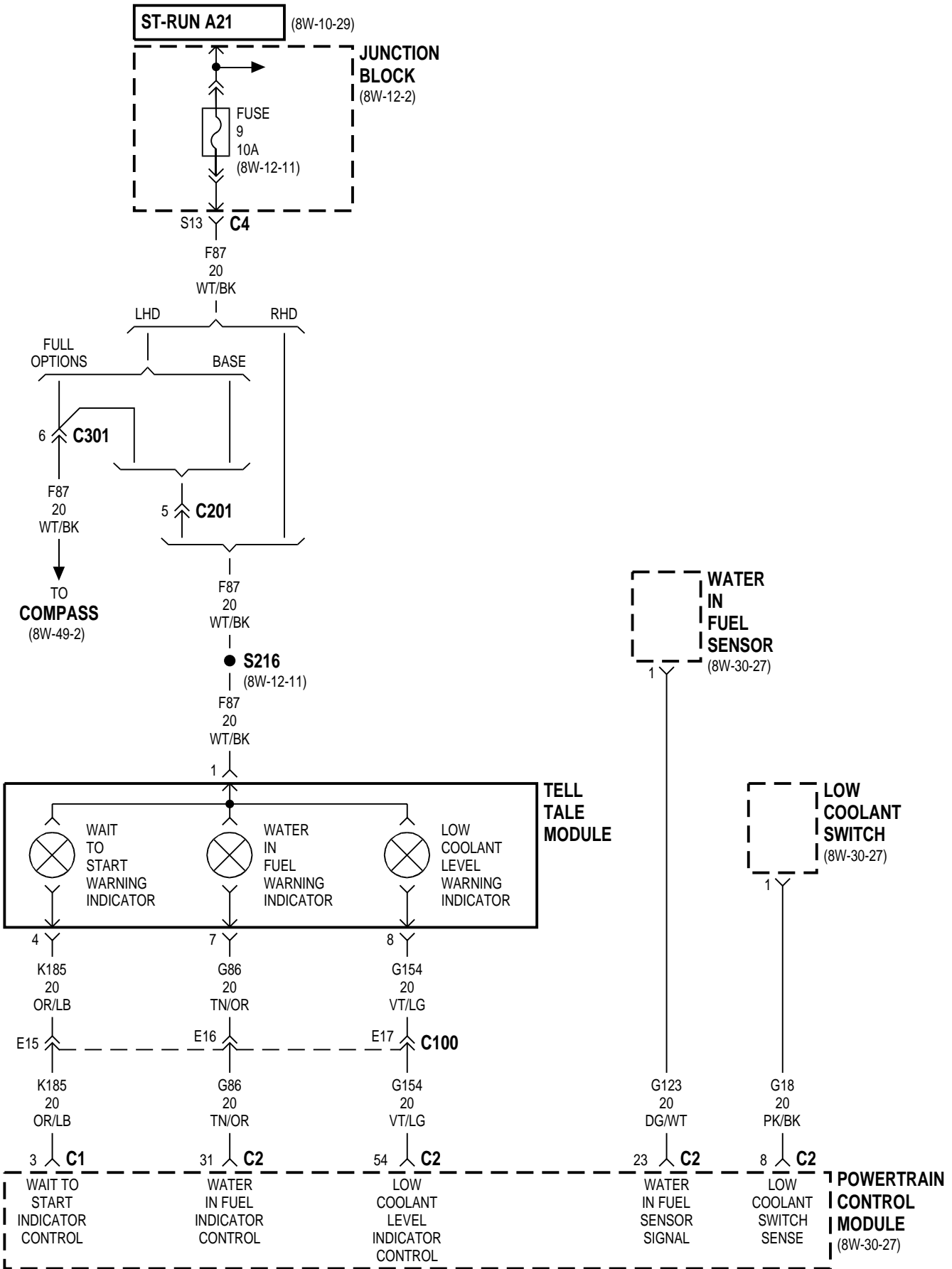


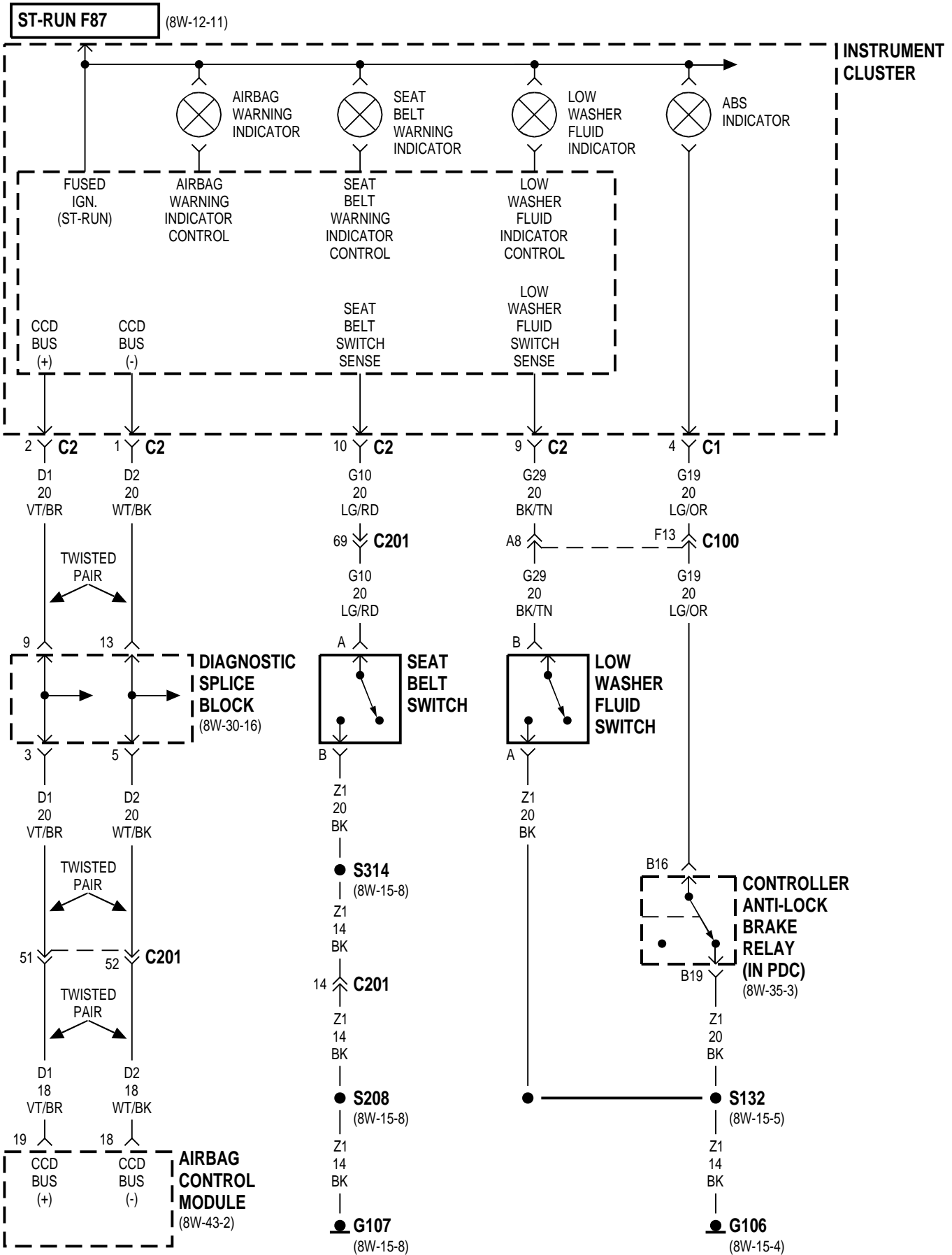


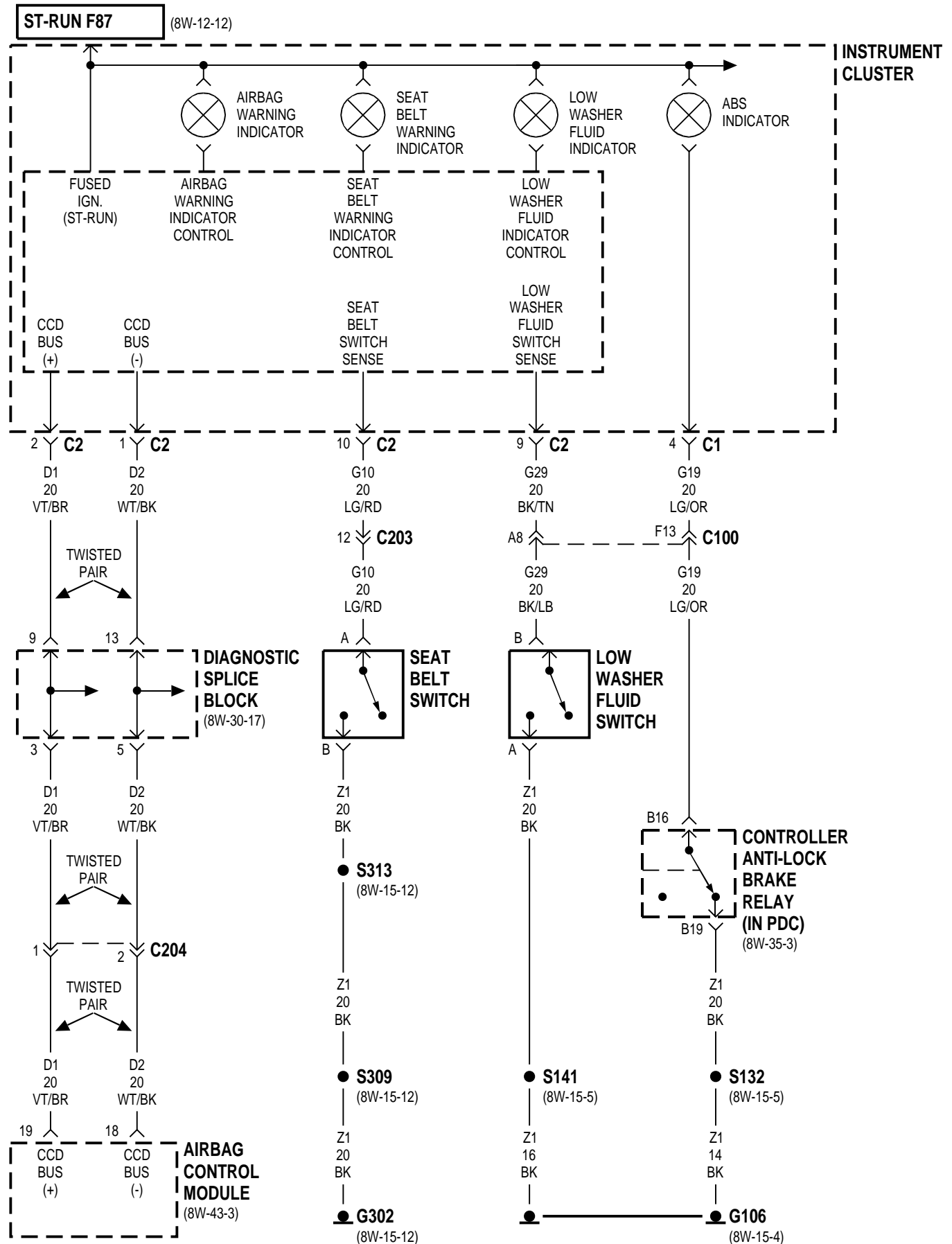


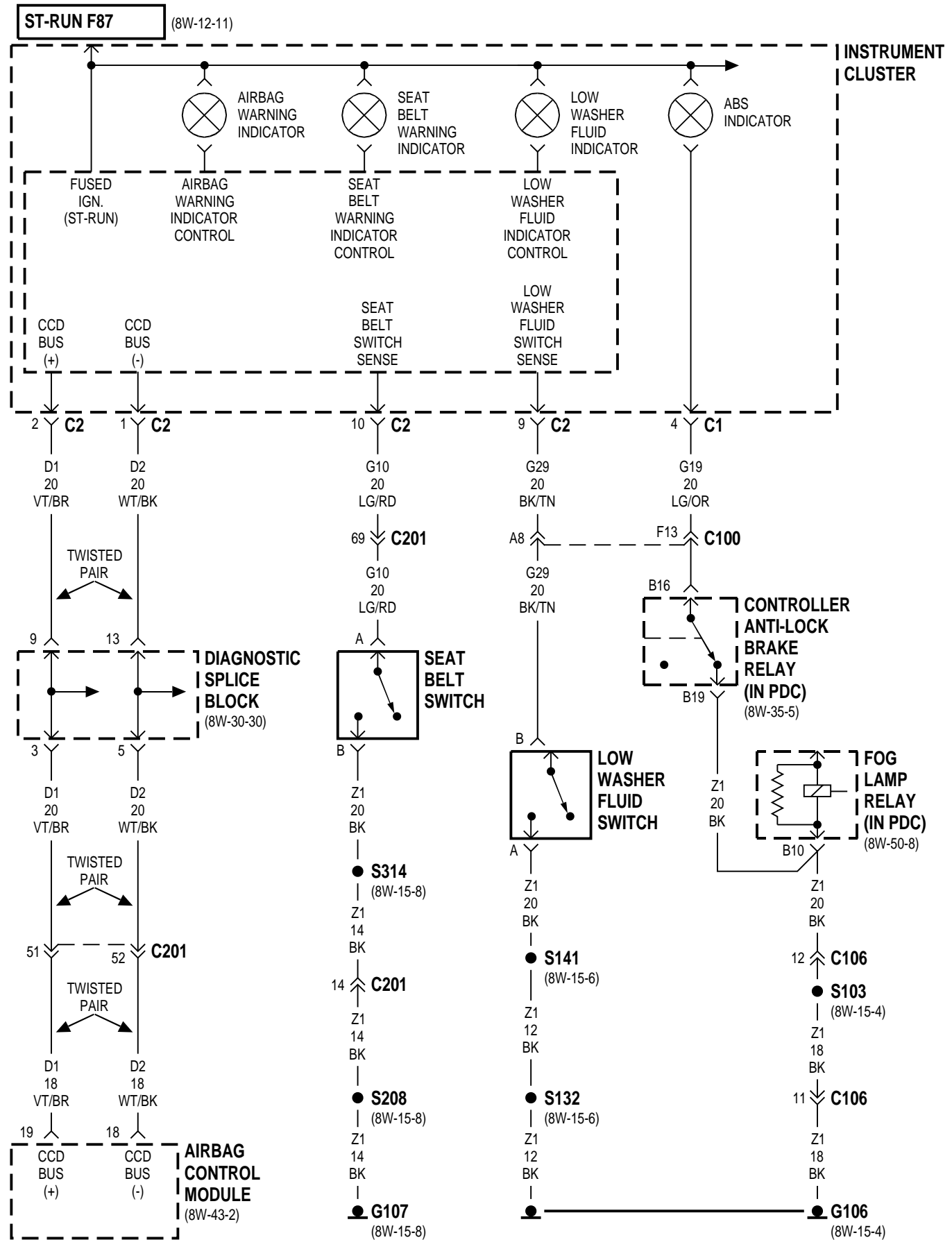


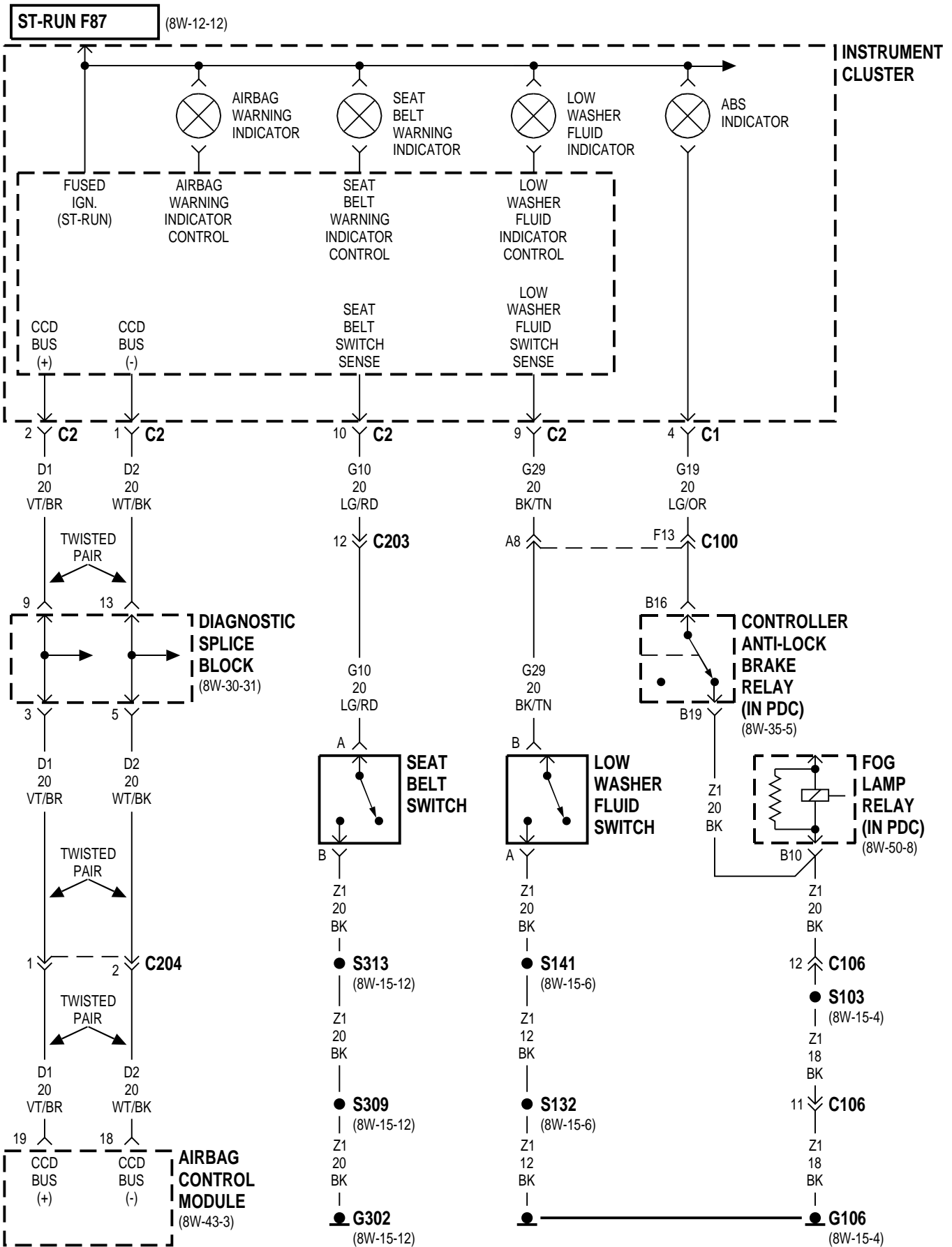


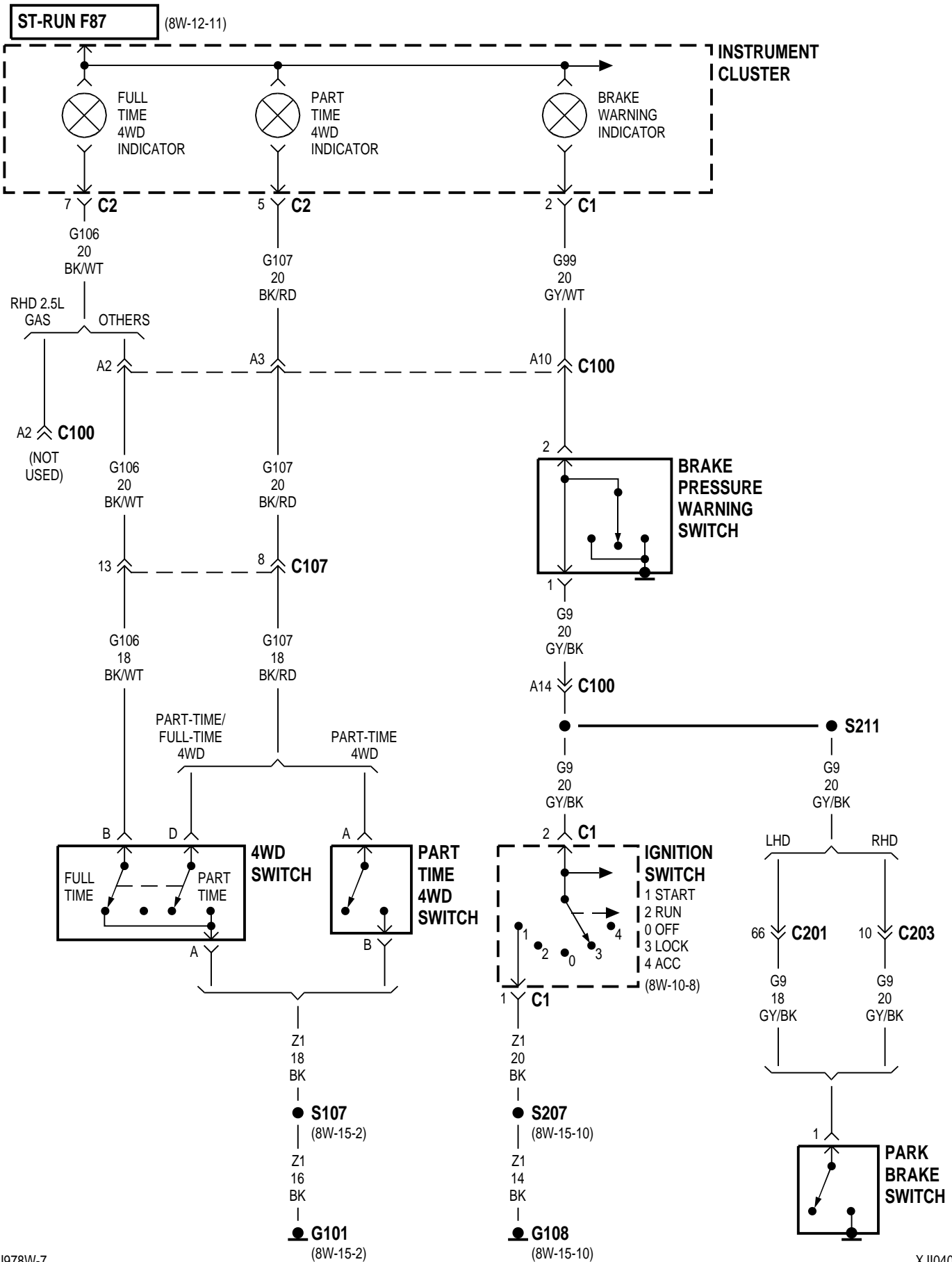


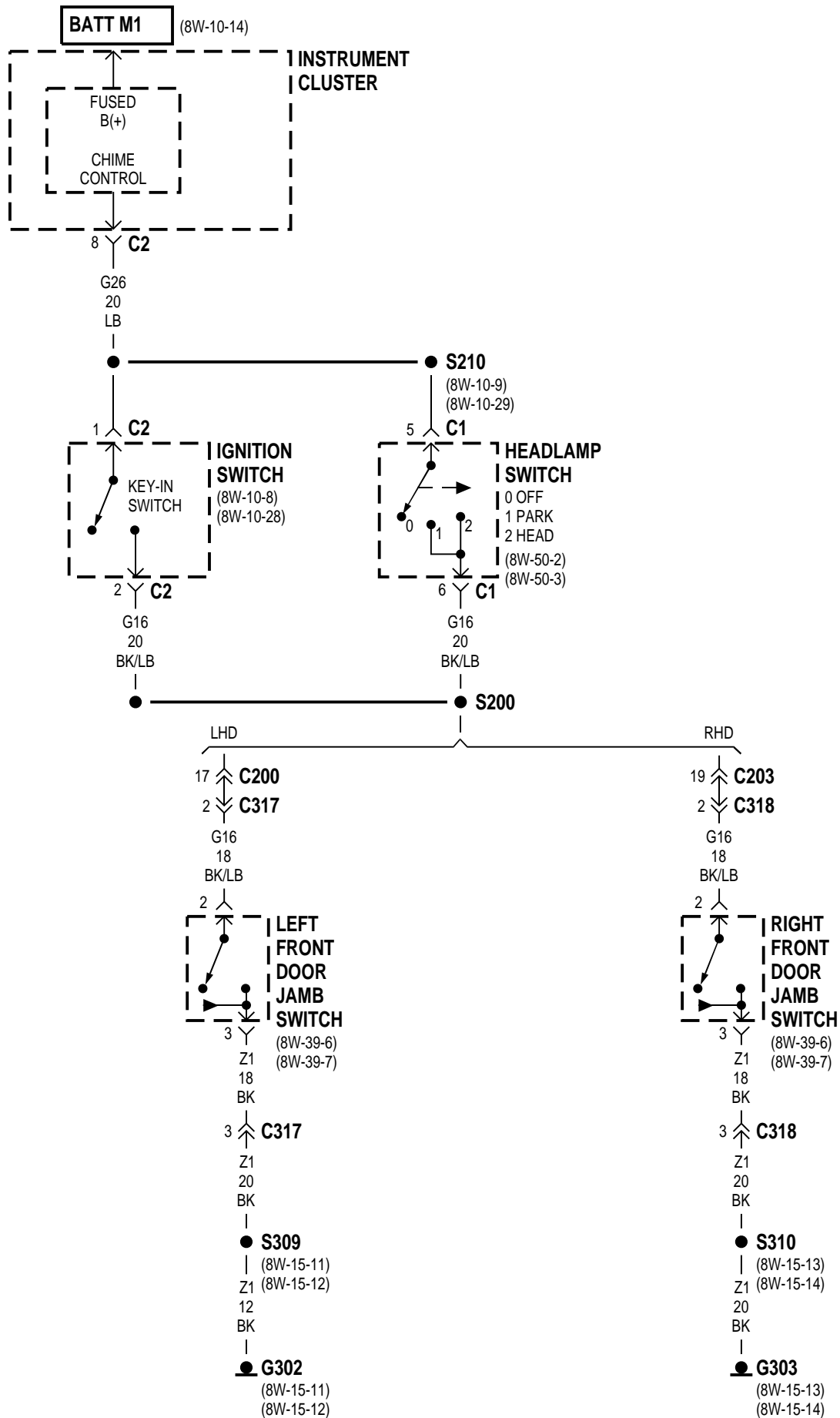


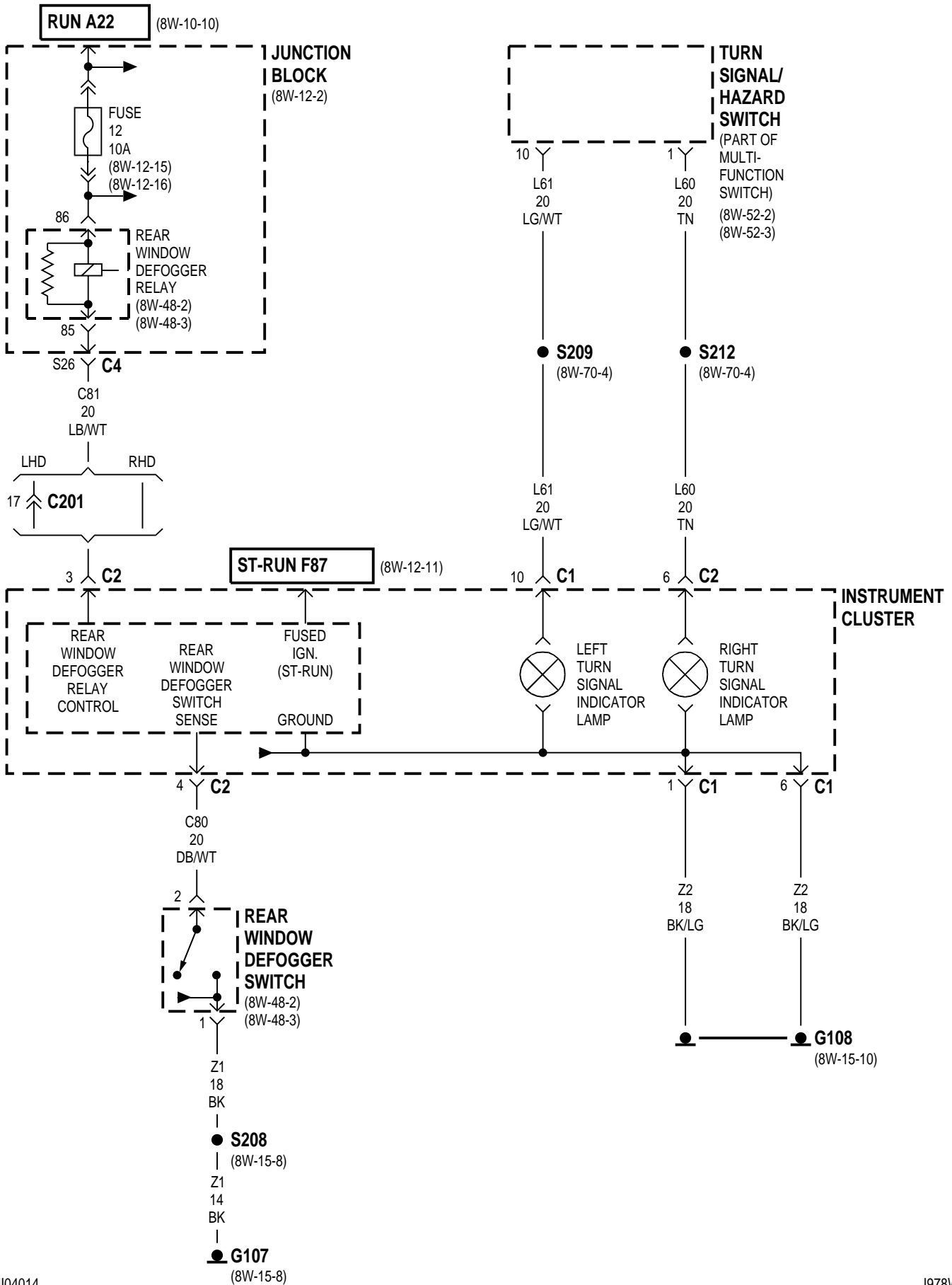


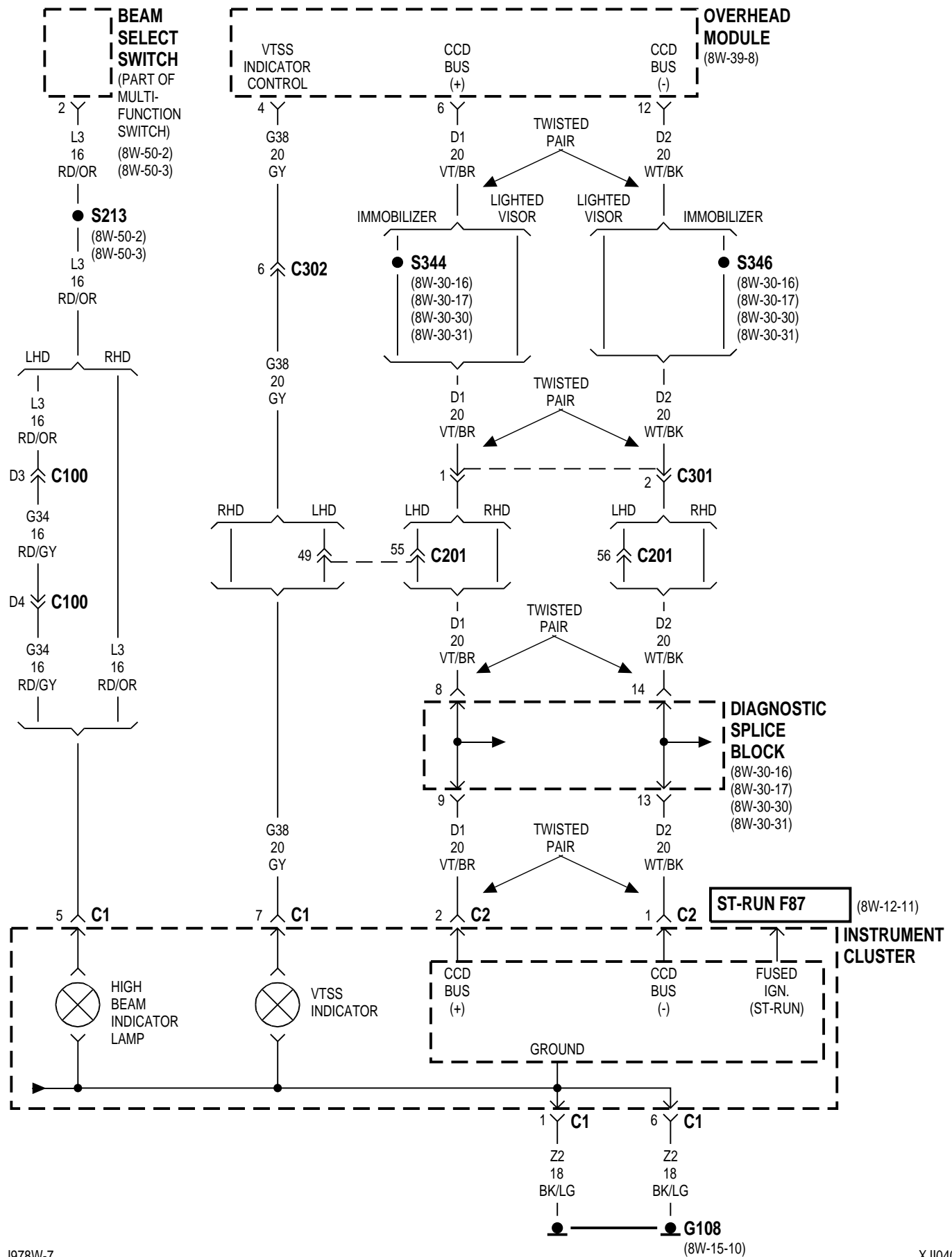


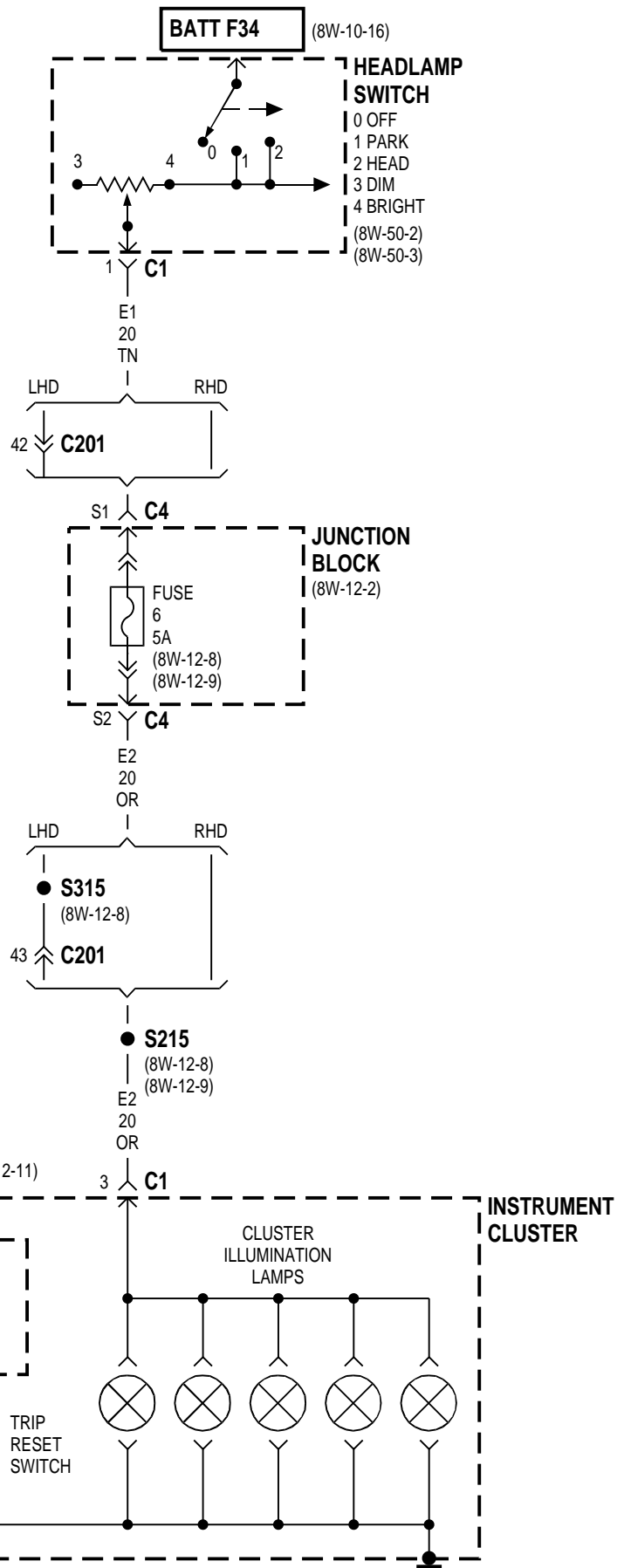












8W-40 INSTRUMENT CLUSTER

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DESCRIPTION AND OPERATION

INTRODUCTION

The electronic instrument cluster contains a microprocessor which controls cluster functions based on data it receives from the CCD bus. Circuit M1 from fuse 16 in the Power Distribution Center (PDC) supplies power to the cluster microprocessor. When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the PDC to circuit A21. Circuit A21 powers circuit F87 through fuse 9 in the junction block. Circuit F87 powers the cluster microprocessor plus the warning lamps in the cluster. The cluster microprocessor switches the warning lamps on and off by controlling the ground path for each lamp.

ILLUMINATION LAMPS

When the headlamp switch is in the PARK or ON position, circuit E1 from the dimmer switch circuitry feeds circuit E2 through fuse 6 in the junction block. Circuit E2 powers the illumination lamps. Circuit Z2 provides ground for the lamps.

WARNING LAMPS—EXCEPT ABS and BRAKE

Circuit F87 feeds all the warning lamps in the instrument cluster. The microprocessor turns on and off all the warning lamps except the seat belt warning lamp, ABS warning lamp, and brake warning lamp based on inputs broadcast on the CCD bus. The microprocessor controls the ground path for these lamps. Circuits Z2 provide ground for the microprocessor.

ABS WARNING LAMP

Circuit F87 from fuse 9 in the junction block provides power for the ABS warning lamp in the instrument cluster. Ground for the ABS warning lamp is

provided by the ABS relay when the relay is not energized. When the ABS relay is not energized circuit G19 is connected to circuit Z1 ground, through the ABS relay.

HELPFUL INFORMATION

When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F87 through fuse 9 in the junction block.

Circuit F87 supplies voltage to the coil side of ABS relay and circuit G83 provides the ground. Circuit G83 connects to cavity 16 of the Controller, Anti-Lock Brakes (CAB).

BRAKE WARNING LAMP

Circuit F87 from fuse 9 in the junction block supplies power to the brake warning lamp. Ground for the brake warning lamp is supplied through the case grounded park brake switch, ignition switch (in the START position) or brake warning switch. Circuit G99 from the lamp connects to the brake warning switch. Circuit G9 connects the brake warning switch to the park brake switch and ignition switch.

SPEEDOMETER

The instrument cluster microprocessor calculates speedometer needle position based on the vehicle speed signal broadcast on the CCD bus by the Powertrain Control Module (PCM). The PCM determines vehicle speed from the input provided by the vehicle speed sensor.

TACHOMETER

The Powertrain Control Module (PCM) broadcasts the engine RPM data on the CCD bus. From the

DESCRIPTION AND OPERATION (Continued)

RPM message on the CCD bus, the instrument cluster calculates tachometer needle position.

VOLTMETER

The Powertrain Control Module (PCM) broadcasts system voltage data on the CCD bus. The microprocessor in the instrument cluster calculate voltmeter needle position based on the signal received from the CCD bus.

FUEL GAUGE

The Powertrain Control Module (PCM) transmits the fuel percentage data over the CCD bus. The microprocessor in the instrument cluster calculates position of the fuel gauge needle based on the signal from the PCM.

ENGINE COOLANT TEMPERATURE GAUGE

The Powertrain Control Module (PCM) broadcasts the engine coolant temperature data over the CCD bus. From the data message on the CCD bus, the instrument cluster microprocessor calculates coolant temperature gauge needle position.

OIL PRESSURE GAUGE

On circuit G60, the Powertrain Control Module (PCM) provides current to the oil pressure sensor. The sensor is a variable resistor. As engine oil pressure changes, the resistance in the sensor changes resulting in a change in current draw. The PCM provides ground for the sensor on circuit K167. Circuit K167 connects to cavity A4 of the PCM.

The instrument cluster microprocessor calculates engine oil pressure gauge needle position based on the oil pressure data message on the CCD bus. The Powertrain Control Module (PCM) broadcasts the data message over the CCD bus.

Circuit K167 splices to supply ground for the signals from the following:

- Battery temperature sensor
- Upstream and downstream heated oxygen sensors
- Camshaft position sensor
- Crankshaft position sensor
- Intake air temperature sensor
- Throttle position sensor
- Engine coolant temperature sensor
- Vehicle speed sensor

SEAT BELT WARNING LAMP

Circuit F87 feeds all the warning lamps in the instrument cluster. The microprocessor turns on and off all the warning lamps except the seat belt warning lamp, ABS warning lamp, and brake warning lamp based on inputs broadcast on the CCD bus. The microprocessor controls the ground path for these

lamps. Circuits Z2 provide ground for the microprocessor.

Circuit G10 from the instrument cluster microprocessor connects to the seat belt switch. The switch is closed when the seat belt is removed from the seat belt clasp. When the seat belt is inserted into the clasp, it opens the switch. When closed, the seat belt switch connects circuit G10 to ground on circuit Z1. If the ignition switch is in the START or RUN position, the instrument cluster microprocessor grounds the seat belt warning lamp if it senses a closed seat belt switch.

HIGH BEAM INDICATOR LAMP

When the operator selects high beam operation, the multi-function switch powers the headlamp high beams on circuit L3. Circuit L3 connects to circuit G34. Circuit G34 supplies power for the high-beam indicator lamp. Circuit Z2 provides ground for the high beam indicator lamp at the cluster.

TURN SIGNAL INDICATOR LAMPS

Circuits L60 and L61 from the turn signal/hazard flasher circuitry in the multi-function switch power the turn signal indicator lamps. Circuit L60 powers the right turn signal indicator lamp. Circuit L61 powers the left indicator lamp. Circuit Z2 provides ground for the lamps.

MANUAL TRANSMISSION UP-SHIFT LAMP

The Powertrain Control Module (PCM) broadcasts the transmission up-shift message on the CCD bus. The microprocessor in the instrument cluster monitors the CCD bus and switches the up-shift lamp on or off by supplying or removing ground from the lamp. Circuit F87 from fuse 9 in the junction block powers the lamp.

FOUR-WHEEL DRIVE (4WD) SWITCH

Circuit F87 from fuse 9 in the junction block powers the 4WD indicator lamp. Circuit G107 connects the indicator lamp to the 4WD switch. When the 4WD switch closes, it connects circuit G107 to circuit G106. Circuit G106 connects to circuit Z1. Circuit Z1 provides ground for the 4WD indicator lamp.

CHIME

The instrument cluster microprocessor sounds the audible warning chime. The chime sounds for seat belt warning and when the ignition key is in the ignition switch while the drivers door is open. The chime sounds when the ignition key is in the ON position while the drivers side seat belt is not buckled. Lastly, the chime sounds when the headlamps are ON when the ignition is OFF.

DESCRIPTION AND OPERATION (Continued)

When the parking lamps or headlamps are ON, the headlamp switch connects circuit G26 from the instrument cluster microprocessor to circuit G16. Circuit G16 connects to the drivers side door jamb switch. Circuit G16 also connects to the key-in switch. When the cluster microprocessor senses ground on circuit G26, it sounds the chime.

If the headlamps are ON, and the drivers door opens, the drivers door jamb switch connects circuit G16 to ground. When the instrument cluster senses ground on circuit G26, it sounds the chime.

If the headlamps are OFF with the key in the ignition switch while the drivers side door is open, the cluster sounds the chime. In this case, the closed key-in switch and drivers door jamb connect the cluster microprocessor to ground.

Circuit G10 connects the cluster microprocessor to the seat belt switch. When the seat belt switch

closes, a path to ground is completed on circuit Z1 and the cluster momentarily sounds the chime.

TELL TALE MODULE

Circuit F87 from fuse 9 in the junction block powers the tell tale module. The warning lamps within the telltale module receive ground from the powertrain control module and the MSA controller.

Circuit K185 from cavity 3 of the MSA controller provides the ground for the Diesel Wait lamp.

Circuit G86 from cavity 31 of the powertrain control module provides the ground for the Water In Fuel lam.

Circuit G154 from cavity 54 of the powertrain control module provides ground for the Low Coolant lamp.

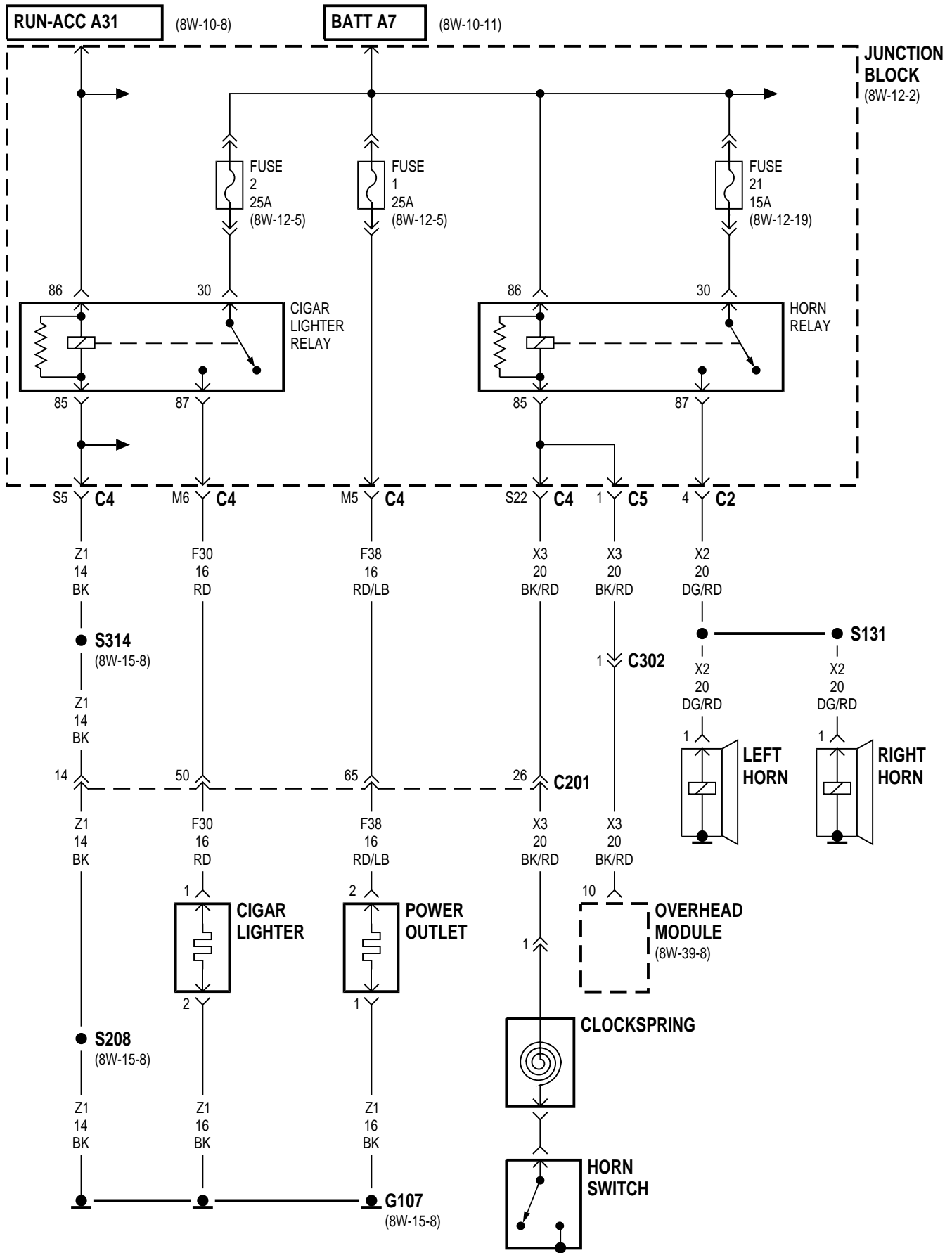
8W-41 HORN/CIGAR LIGHTER

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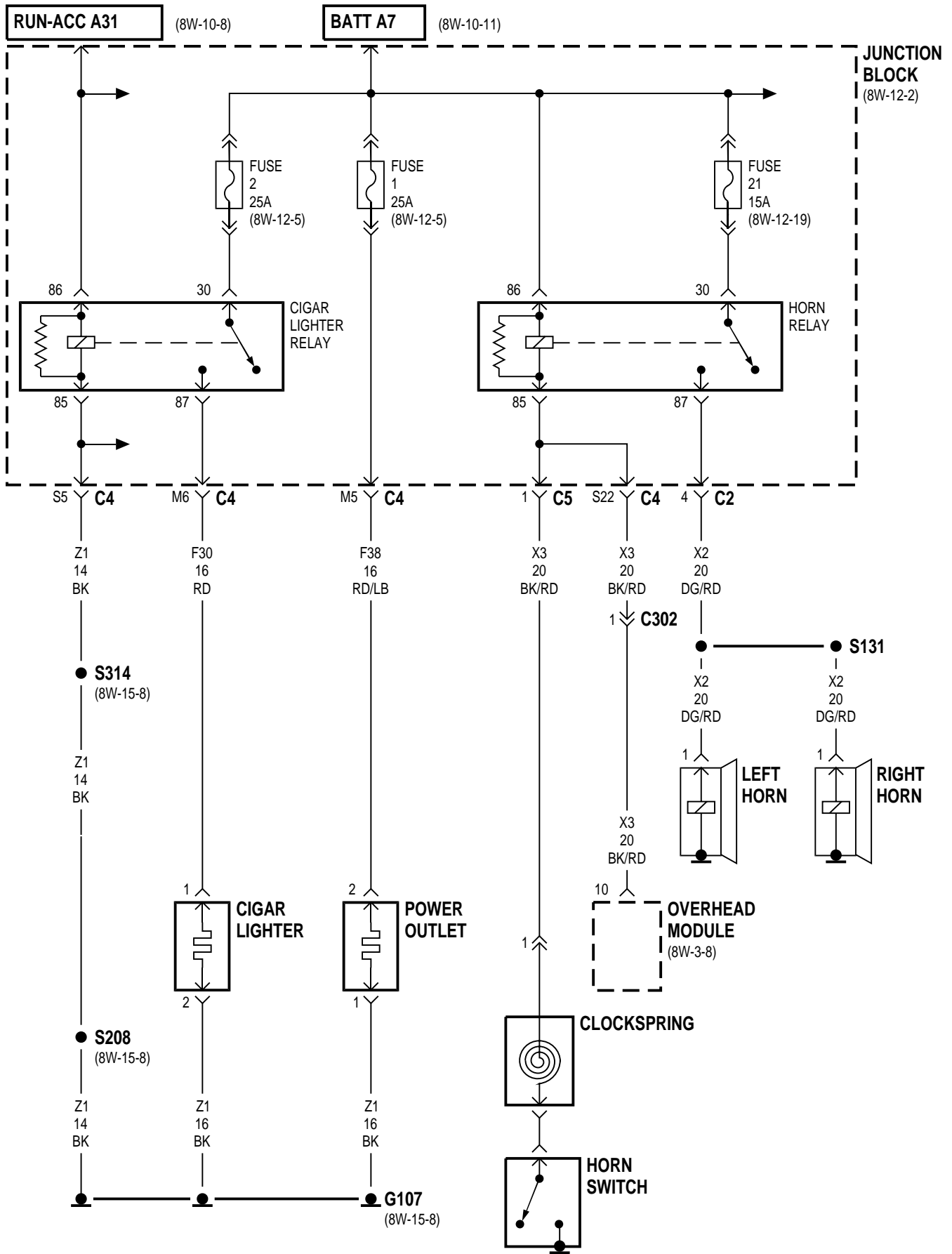
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LHD



XJ ————— **8W-41 HORN/CIGAR LIGHTER/POWER OUTLET** ————— **8W - 41 - 3**
RHD



8W-41 HORN/CIGAR LIGHTER

DESCRIPTION AND OPERATION

HORN

The horn system uses a single horn switch and horn relay. The horn switch is installed in the center of the steering wheel.

Circuit A7 from fuse 4 in the Power Distribution Center (PDC) feeds a junction block bus bar. The bus bar powers the coil side of the horn relay, and the contact side through fuse 21 in the junction block..

When the case grounded horn switch is depressed, circuit X3 provides ground for the coil side of the relay and the contacts CLOSE. When the contacts CLOSE, circuit X2 supplies voltage to the case grounded horns.

HELPFUL INFORMATION

- The horn switch is grounded to the steering wheel.
- Check fuse 4 in the PDC and fuse 21 in the junction block.

CIGAR LIGHTER

The cigar lighter relay powers the cigar lighter. The relay energizes when the ignition switch is in

the ACCESSORY or RUN position. In the ACCESSORY or RUN position, the switch connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A31. Circuit A31 powers relay coil. Circuit Z1 provides ground for the relay coil.

When the relay energizes, it connects circuit A7 from fuse 4 in the PDC to circuit F30. Circuit F30 powers the cigar lighter.

When the operator depresses the lighter, contacts inside the lighter element close, and voltage from circuit F30 flows through the heating element to ground. Circuit Z1 provides ground for the lighter.

HELPFUL INFORMATION

Circuit Z1 also grounds the power outlet.

POWER OUTLET

Circuit A7 from FUSE 4 in the Power Distribution Center (PDC) powers circuit F38 through fuse 1 in the junction block. Circuit F38 feeds the power outlet. Circuits A7 and F38 are HOT at all times. Circuit Z1 provides ground for the power outlet.

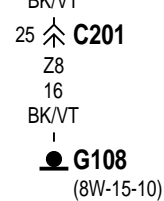
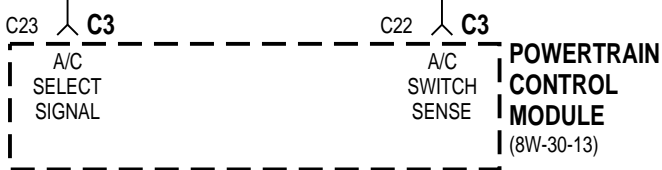
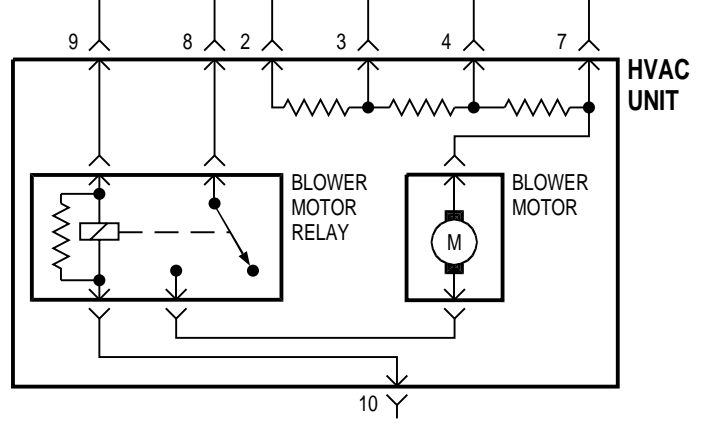
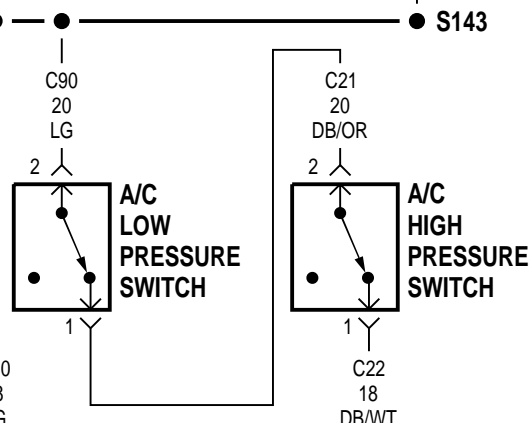
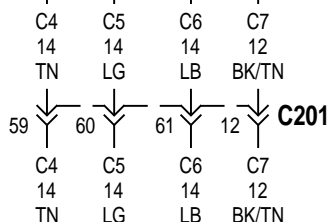
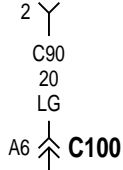
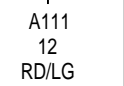
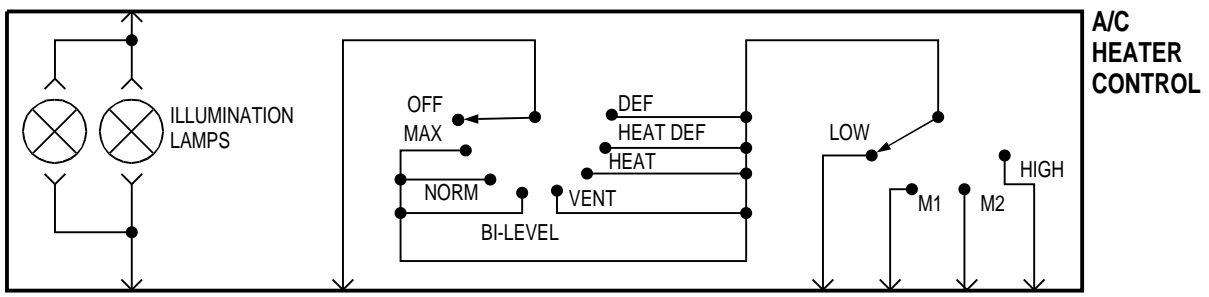
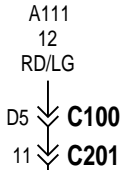
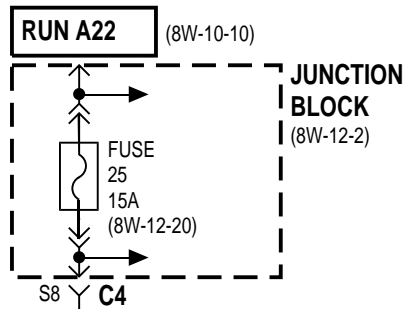
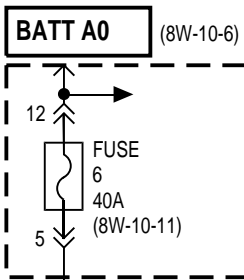
8W-42 AIR CONDITIONING/HEATER

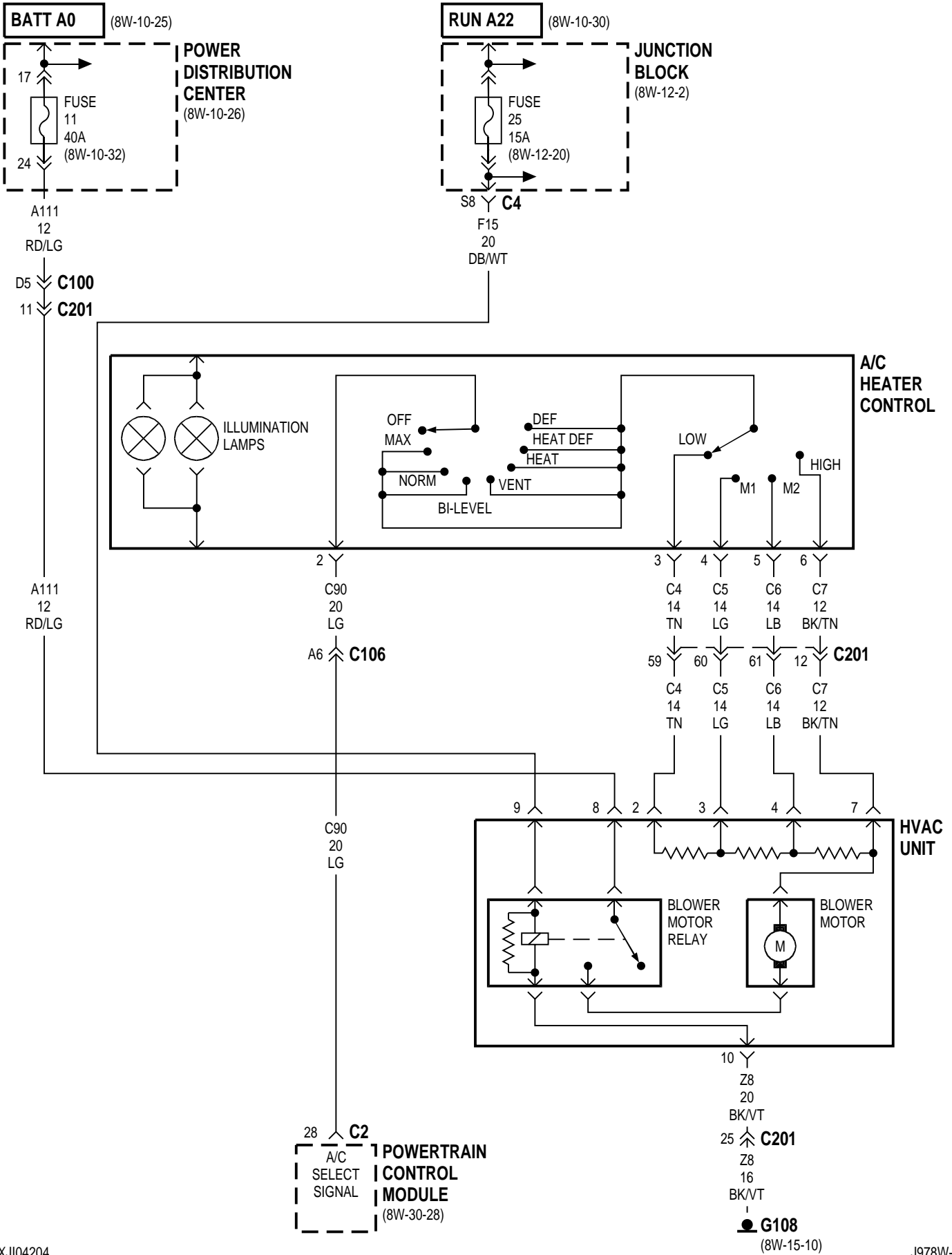
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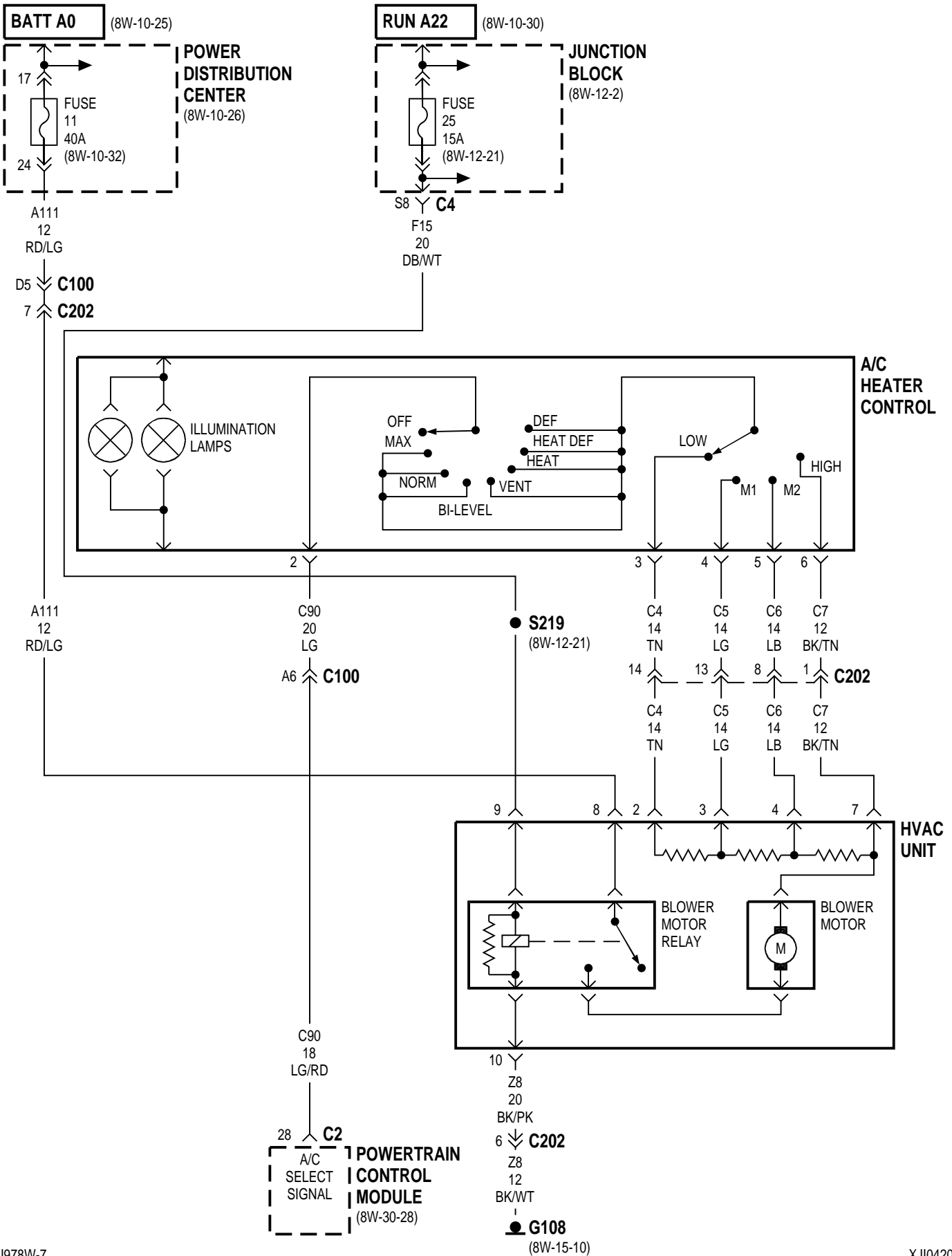
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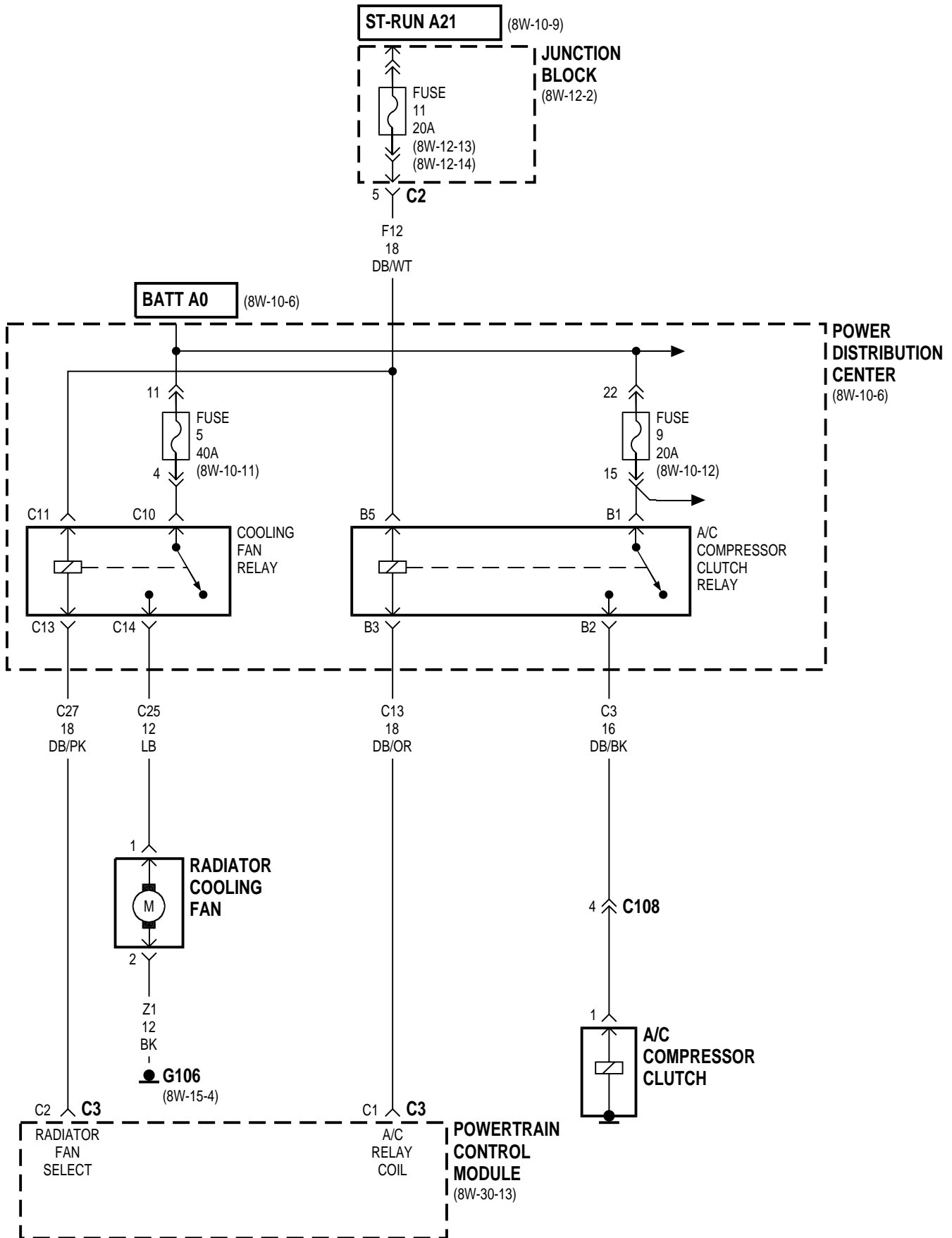
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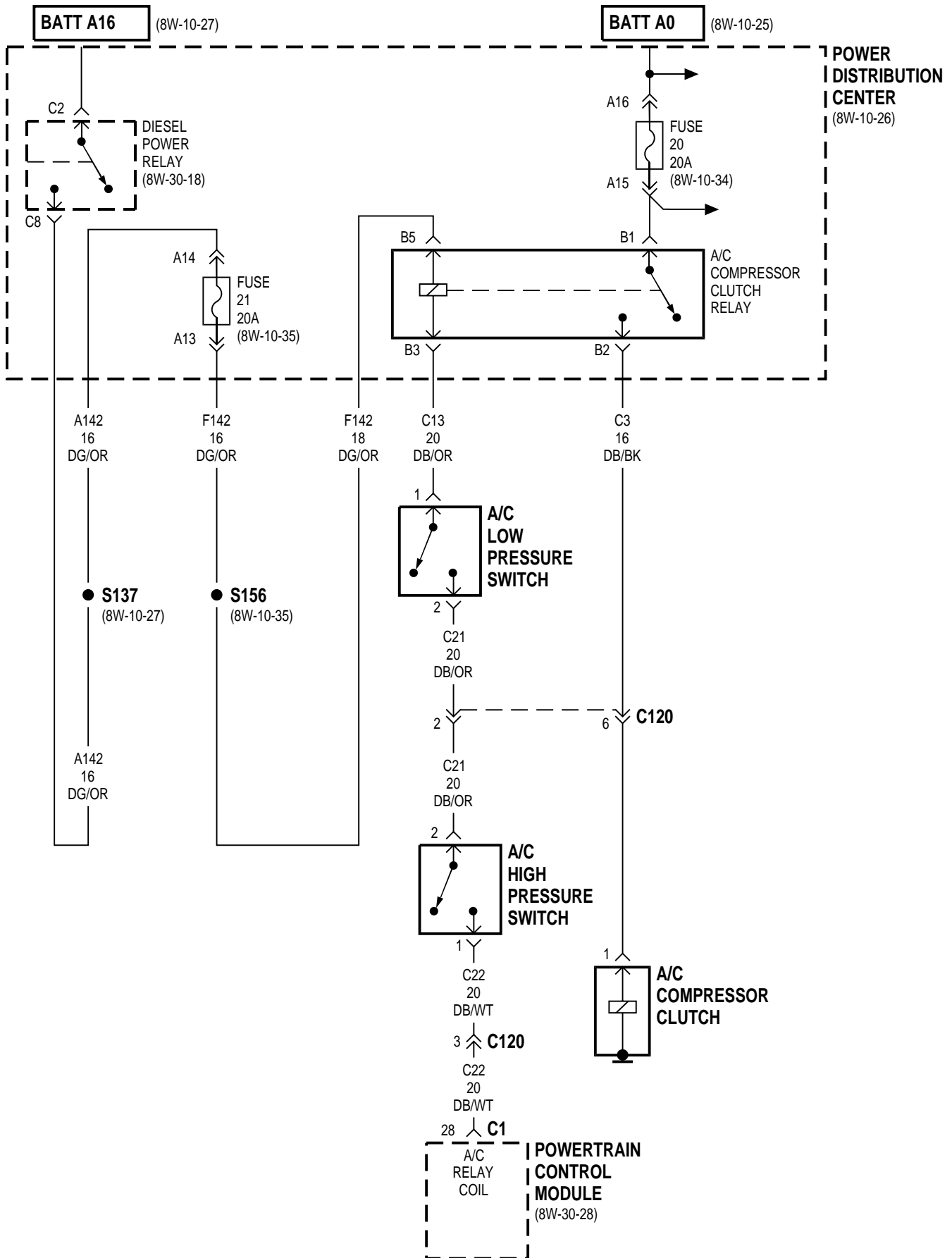
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8W-42 AIR CONDITIONING/HEATER

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GENERAL INFORMATION

INTRODUCTION

The wiring diagrams in this section are divided into two sub-sections; Heater only, and A/C and Heater. When referring to the wiring diagrams, ensure that you use the correct sub-section.

DESCRIPTION AND OPERATION

BLOWER MOTOR

In the RUN position, the ignition switch connects circuit A2 from fuse 3 in the Power Distribution Center (PDC) to circuit A22. Circuit A22 feeds circuit F15 through fuse 25 in the junction block. Circuit F15 supplies voltage to coil side of the blower motor relay. Ground for the coil side of the relay is circuit Z8. When the relay contacts close they connect circuit A111 from fuse 6 of the PDC to circuit C1. Circuit C1 supplies voltage to the blower motor. Circuit C7 connects the ground side of the blower motor to the blower resistor block.

The blower switch receives ground through the control switch on circuit Z8. The blower switch connects to circuit C4. Circuit C4 connects to the blower resistor block. The blower resistor block controls blower motor speed in all positions except HIGH. The blower motor switch has four positions; LOW, MEDIUM 1, MEDIUM 2, AND HIGH.

In the LOW position, circuit C4 passes through all three resistors in the blower resistor block, to the blower motor.

In the MEDIUM 1 position, circuit C5 passes through two resistors in the blower resistor block, to the blower motor.

In the MEDIUM 2 position, circuit C6 passes through one resistor in the blower resistor block, to the blower motor.

When the blower motor switch is in the HIGH position it connects circuit C7 directly to the blower motor.

Circuit Z8 provides ground for the blower motor switch. Circuit Z8 also supplies ground for the coil side of the blower motor relay.

A/C OPERATION

When the A/C-heater control switch is moved to an A/C position or the defrost position, it connects circuit C90 to ground on circuit Z8. Circuit C90 connects to cavity C23 of the Powertrain Control Module (PCM). When circuit C90 connects to ground circuit Z8, it provides the A/C select signal to the PCM.

When the A/C high pressure and low pressure switches are closed, circuit C90 connects to circuit C21, and circuit C21 connects to circuit C22. Circuit C22 connects to cavity C22 of the PCM. The PCM senses the A/C request signal on circuit C22 when the A/C-heater control switch is in defrost or an A/C position.

After sensing the A/C request signal, the PCM supplies ground for the coil side of A/C compressor clutch relay on circuit C13. Circuit C13 originates at cavity C1 of the PCM. Circuit F12 from fuse 11 in the fuse block powers the coil side of the A/C compressor clutch relay.

When the PCM grounds the A/C compressor clutch relay, the contacts close and connect circuit A17 from fuse 9 in the PDC to circuit C3. Circuit C3 supplies power to the case grounded A/C compressor clutch.

The A/C compressor clutch has a built-in diode. The diode controls the induced voltage that results from the magnetic field collapsing when the clutch disengages. The diode provides a current path to protect other components and systems.

A/C OPERATION

When the A/C-heater control switch is moved to an A/C position or the defrost position, it connects circuit C90 to ground on circuit Z8. Circuit C90 connects to cavity C28 of the Powertrain Control Module (PCM). When circuit C90 connects to ground circuit Z8, it provides the A/C input signal to the PCM.

Circuit F142 from the diesel power relay powers the coil side of the A/C compressor relay. Circuit C13 provides ground for the coil side of the A/C com-

DESCRIPTION AND OPERATION (Continued)

pressor relay. When the A/C high pressure and low pressure switches are closed, they connect circuit C13 to to circuit C22 which connects to cavity 28 of the MSA Controller and provides A/C compressor relay ground.

When the MSA Controller grounds the A/C compressor clutch relay, the contacts close and connect circuit A17 from fuse 20 in the PDC to circuit C3.

Circuit C3 supplies power to the A/C compressor clutch. Circuit Z0 provides ground for the compressor clutch.

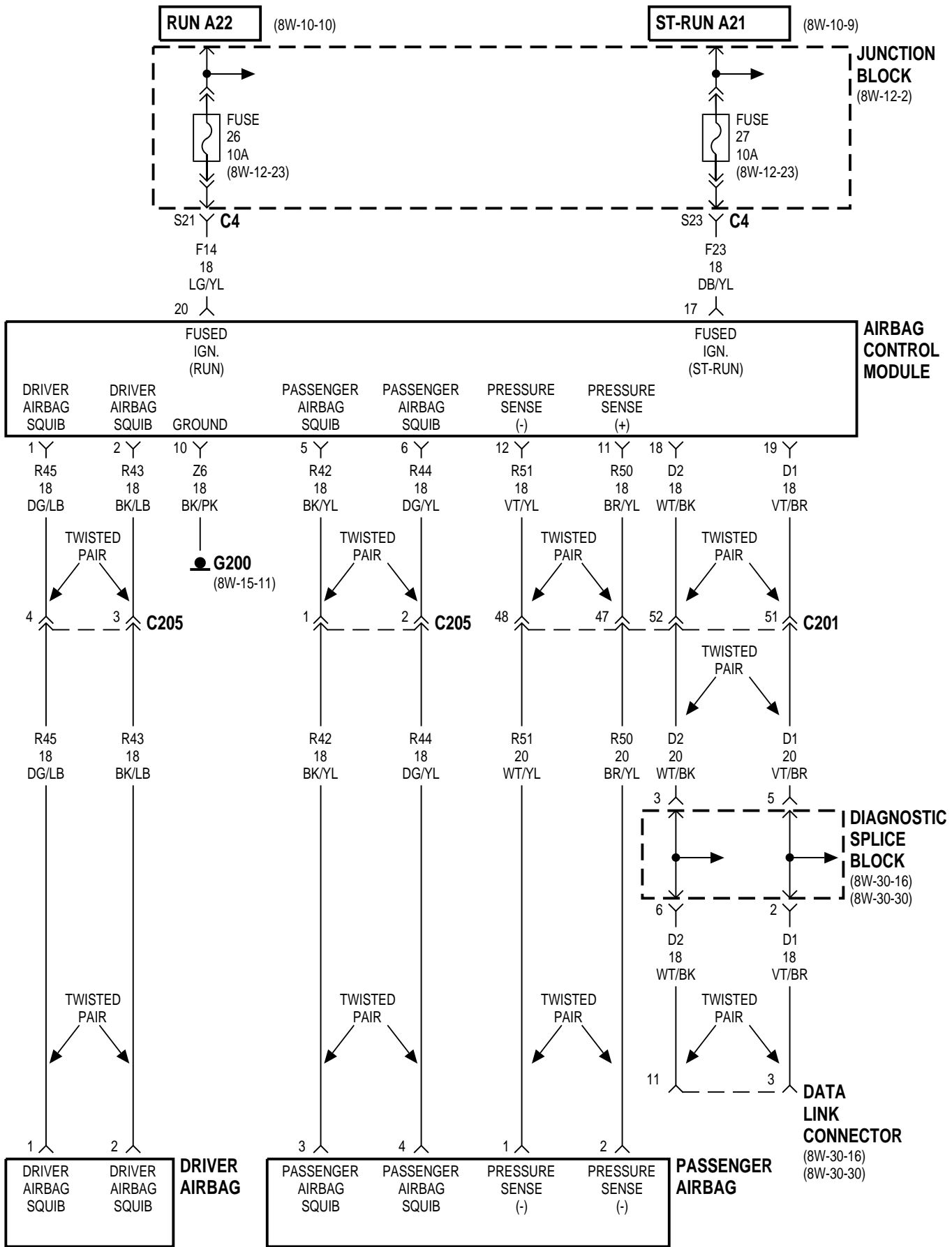
The A/C compressor clutch has a built-in diode. The diode controls the induced voltage that results from the magnetic field collapsing when the clutch disengages. The diode provides a current path to protect other components and systems.

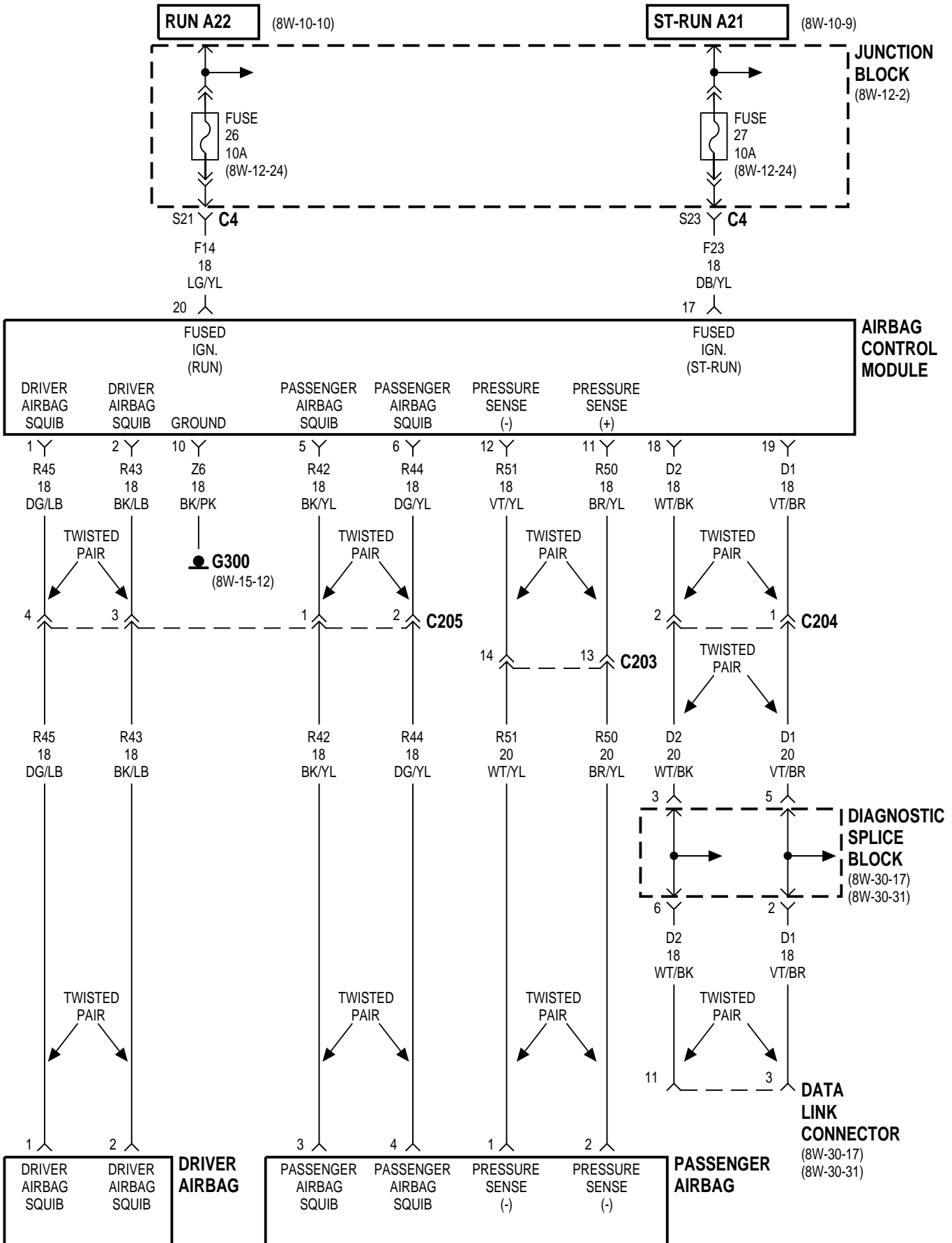
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DESCRIPTION AND OPERATION

INTRODUCTION

This vehicle has a drivers airbag and a passengers airbag. The Airbag Control Module (ACM) operates both. The airbag system has one impact sensor located inside the Airbag Control Module (ACM). The ACM is secured to a bracket under the left side front seat inside the vehicle.

The ACM has two ignition switch feeds. In the START or RUN position, the ignition switch connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 powers circuit F23 through fuse 27 in the junction block. Circuit F23 connects to the ACM.

When the ignition switch is in the RUN position, it connects circuit A2 to circuit A22. Circuit A22 powers circuit F14 through fuse 26 in the junction block. Circuit F14 connects to the ACM. Circuit Z6 provides ground for the ACM.

AIRBAG IMPACT SENSOR

The Airbag system uses a sensor internal to the Airbag Control Module (ACM) to detect impact. For information regarding operation of this sensor, refer to the appropriate group of the Service Manual.

AIRBAG SQUIB (AIRBAG IGNITER)

Circuits, R43 and R45, connect the ACM to the drivers airbag squib (igniter) after passing through the clock spring connector. Circuit R43 from cavity 2 of the ACM 4-way connector connects to the squib. Circuit R45 from cavity 1 of the ACM 4-way connector connects to the squib.

Circuits, R42 and R44, connect the ACM to the passenger airbag squib (igniter). Circuit R42 from cavity 5 of the ACM 4-way connector connects to the squib. Circuit R44 from cavity 6 of the ACM 4-way connector connects to the squib.

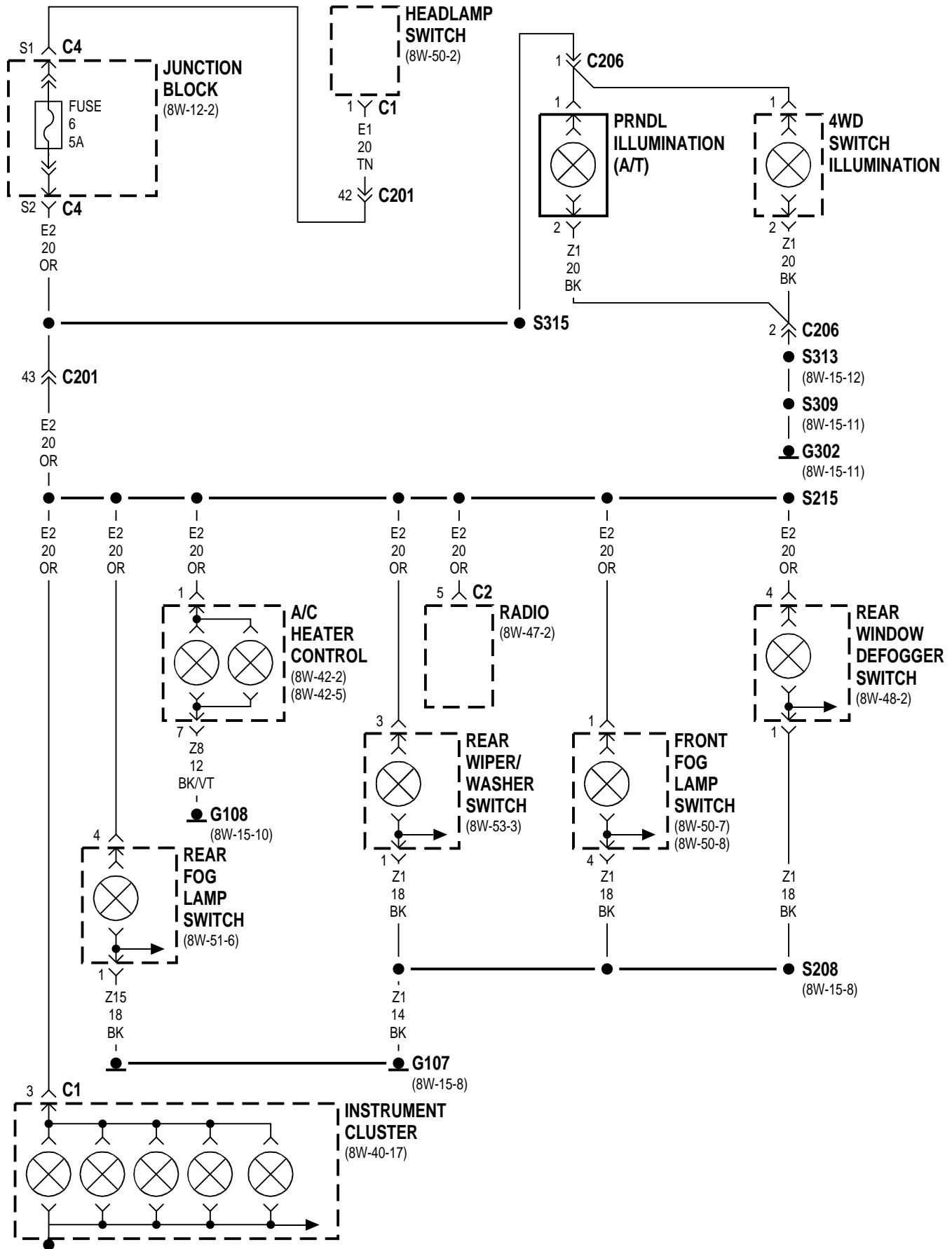
8W-44 INTERIOR LIGHTING

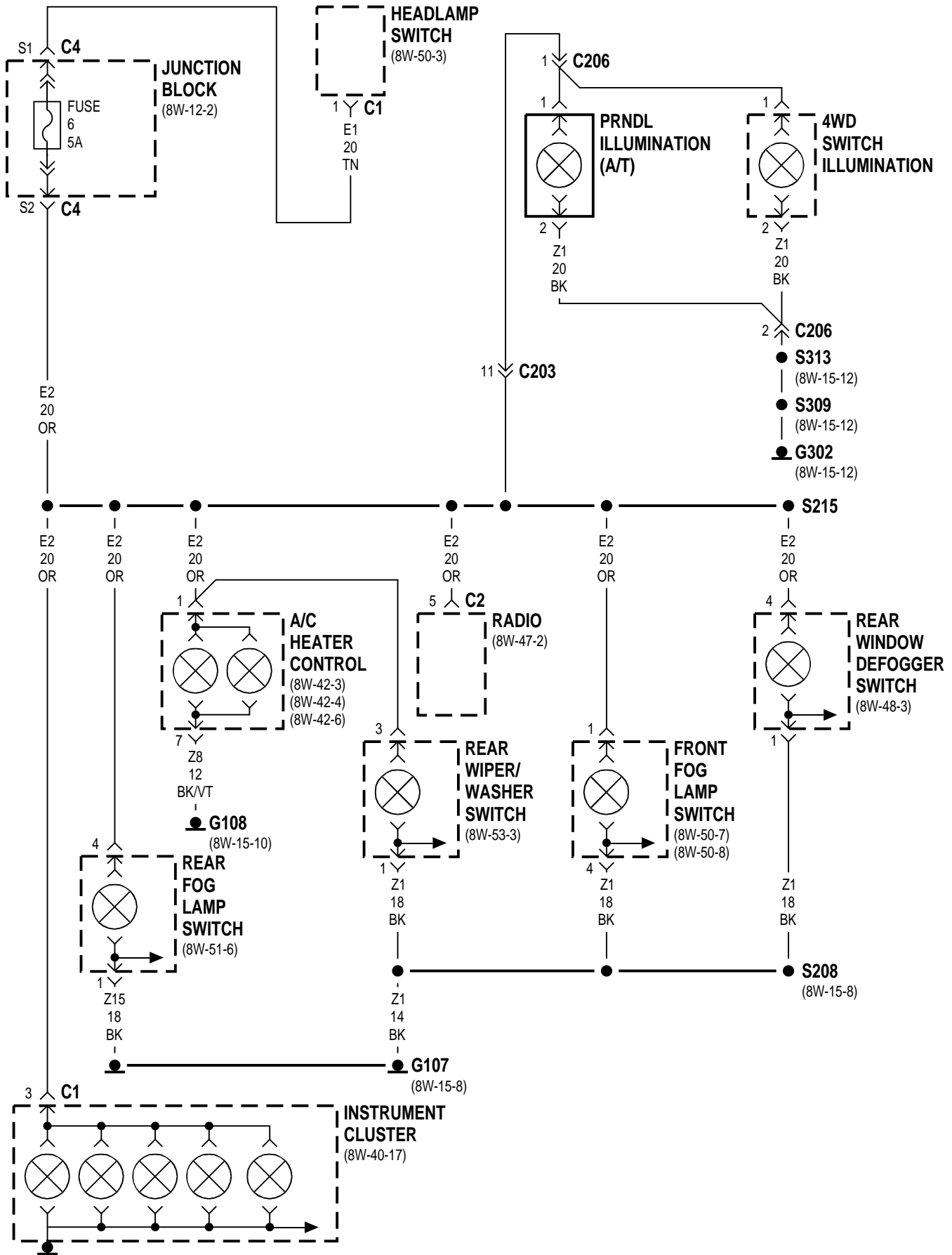
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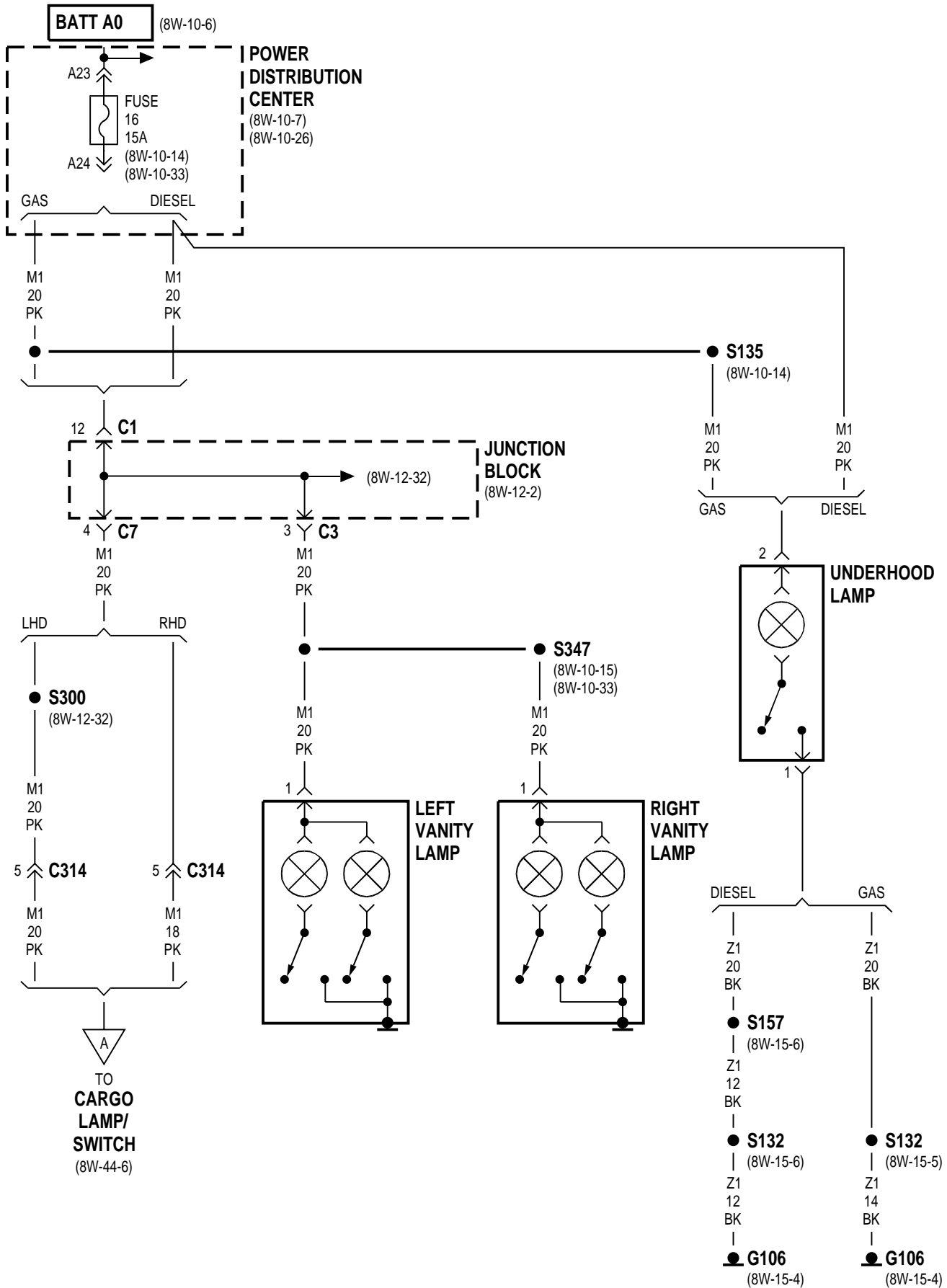
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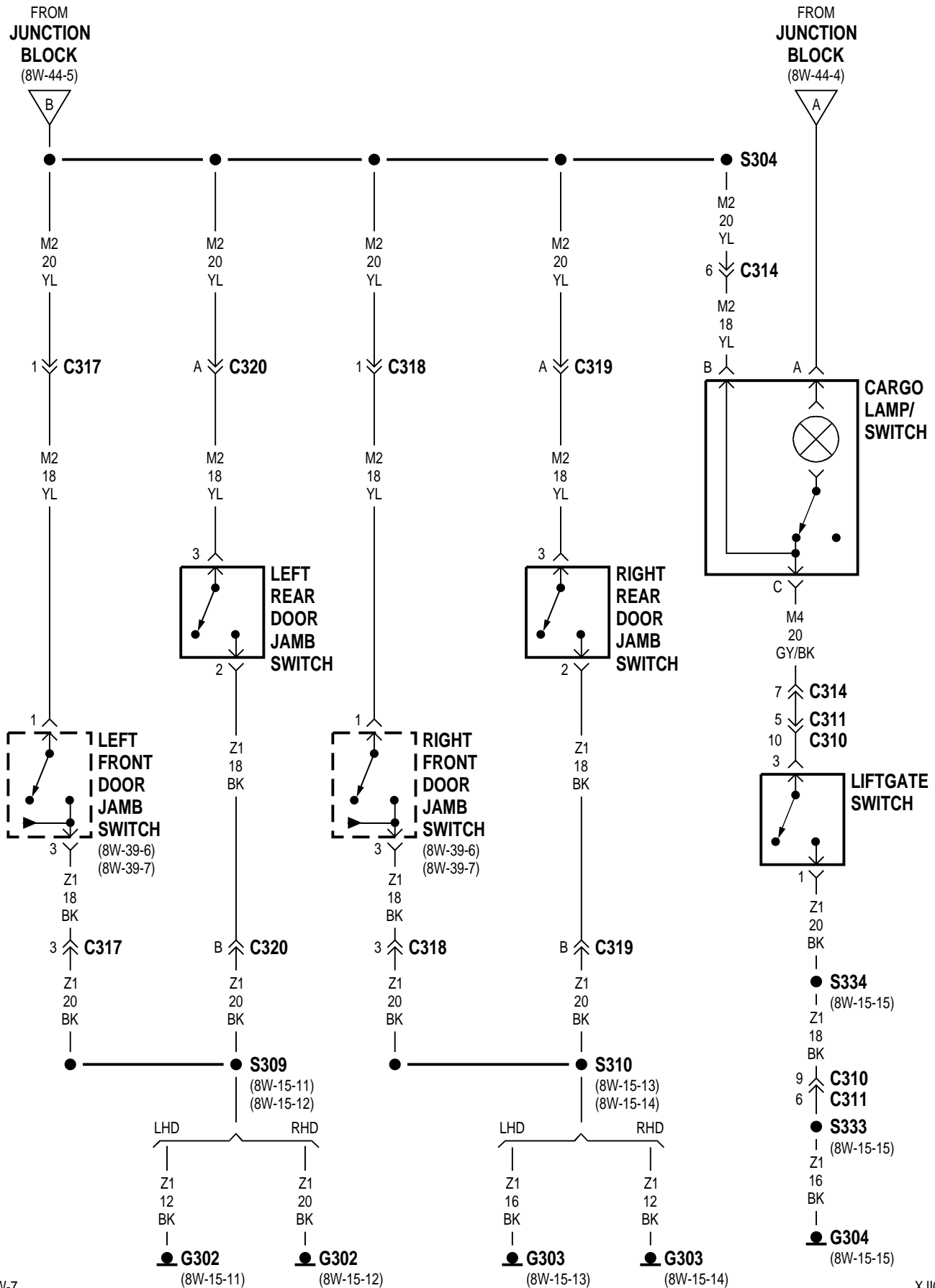
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4wWD Switch Illumination	8W-44-2, 3	Rear Window Defogger Switch	8W-44-2, 3
A/C Heater Control	8W-44-2, 3	Rear Wiper/Washer Switch	8W-44-2, 3
Cargo Lamp/Switch	8W-44-6	Right Courtesy Lamp	8W-44-5
Dome Lamp/Switch	8W-44-5	Right Front Door Jamb Switch	8W-44-6
Front Fog Lamp Switch	8W-44-2, 3	Right Rear Door Jamb Switch	8W-44-6
Fuse 6 (JB)	8W-44-2, 3	Right Vanity Lamp	8W-44-4
Fuse 16 (PDC)	8W-44-4	S132	8W-44-4
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G107	8W-44-2, 3, 5	S157	8W-44-4
G108	8W-44-2, 3, 5	S201	8W-44-5
G302	8W-44-2, 3, 6	S207	8W-44-5
G303	8W-44-6	S208	8W-44-2, 3, 5
G304	8W-44-6	S214	8W-44-5
Glove Box Lamp Switch	8W-44-5	S215	8W-44-2, 3
Headlamp Delay Module	8W-44-5	S300	8W-44-4
Headlamp Switch	8W-44-2, 3, 5	S304	8W-44-6
Instrument Cluster	8W-44-2, 3	S309	8W-44-2, 3, 6
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Left Courtesy Lamp	8W-44-5	S314	8W-44-5
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Left Rear Door Jamb Switch	8W-44-6	S333	8W-44-6
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LHD









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GLOVE BOX LAMP	7	READING LAMPS	8
UNDERHOOD LAMP	7		

DESCRIPTION AND OPERATION

INTRODUCTION

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies power to the glove box lamp, left courtesy lamp, right courtesy lamp, dome lamp, cargo lamp, and visor vanity mirror lamps. The M1 circuit also feeds the radio and instrument cluster microprocessor.

Circuit E2 supplies power for the instrument panel illumination lamps.

INSTRUMENT PANEL ILLUMINATION LAMPS

When parking lamps or headlamps are ON, the headlamp switch connects circuit F34 from fuse 17 in the Power Distribution Center (PDC) to circuit E1 through the dimmer switch circuitry. Circuit E1 feeds circuit E2 through fuse 6 in the junction block. Circuit E2 powers to the following illumination lamps:

- Instrument cluster
- A/C-Heater control lamp
- Fog lamp switch lamp
- Rear wiper switch lamp
- Rear window defogger switch lamp
- Transmission range (PRNDL) indicator lamp
- Radio

Circuit Z1 provides ground for all of the illumination lamps except the instrument cluster, radio, and A/C-Heater control. Circuit Z2 provides ground for the instrument cluster illumination lamps. Circuit Z5 provides ground for the radio, and circuit Z8 provides ground for the A/C-Heater control lamp.

GLOVE BOX LAMP

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) powers the glove box lamp. A case grounded switch, in series after the lamp, CLOSES when the glove box door is opened. The switch completes a path to ground on circuit Z1.

UNDERHOOD LAMP

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies battery voltage for the underhood lamp. A mercury switch, in series after the lamp, connects the lamp to ground on circuit Z1. When the hood is raised, mercury inside the switch moves to a position where it connects circuit M1 to ground circuit Z1, illuminating the lamp.

CARGO LAMP, COURTESY LAMPS AND DOME LAMP

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies power to the cargo lamp, courtesy lamps and dome lamp. This circuit is HOT at all times. The ground path for the lamp is provided in three different ways.

One way is through the door jamb switches. Circuit M2 connects to the door jamb switches from the courtesy and dome lamps. The switches are connected to ground circuit Z1. When a door is opened, the plunger in the switch CLOSES, completing a path to ground.

The second way is through the liftgate switch. Circuit M2 connects to circuit M4 through the liftgate switch. The liftgate switch connects to ground circuit Z1. When the lift gate opens, the plunger in the switch CLOSES, completing a path to ground.

The third ground path is through the headlamp switch. Circuit M2 is spliced in with the headlamp switch. When the operator turns the headlamp switch to the dome lamp ON position, a ground path is provided through the switch.

VISOR VANITY MIRROR LAMPS

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies power to the vanity lamps. Circuit M1 is HOT at all times. When the vanity lamps switch closes, voltage flows to vanity mirror lamps. Circuit Z1 supplies ground for the vanity mirror lamps.

DESCRIPTION AND OPERATION (Continued)

READING LAMPS

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies power to the reading lamps. Circuit M1 is

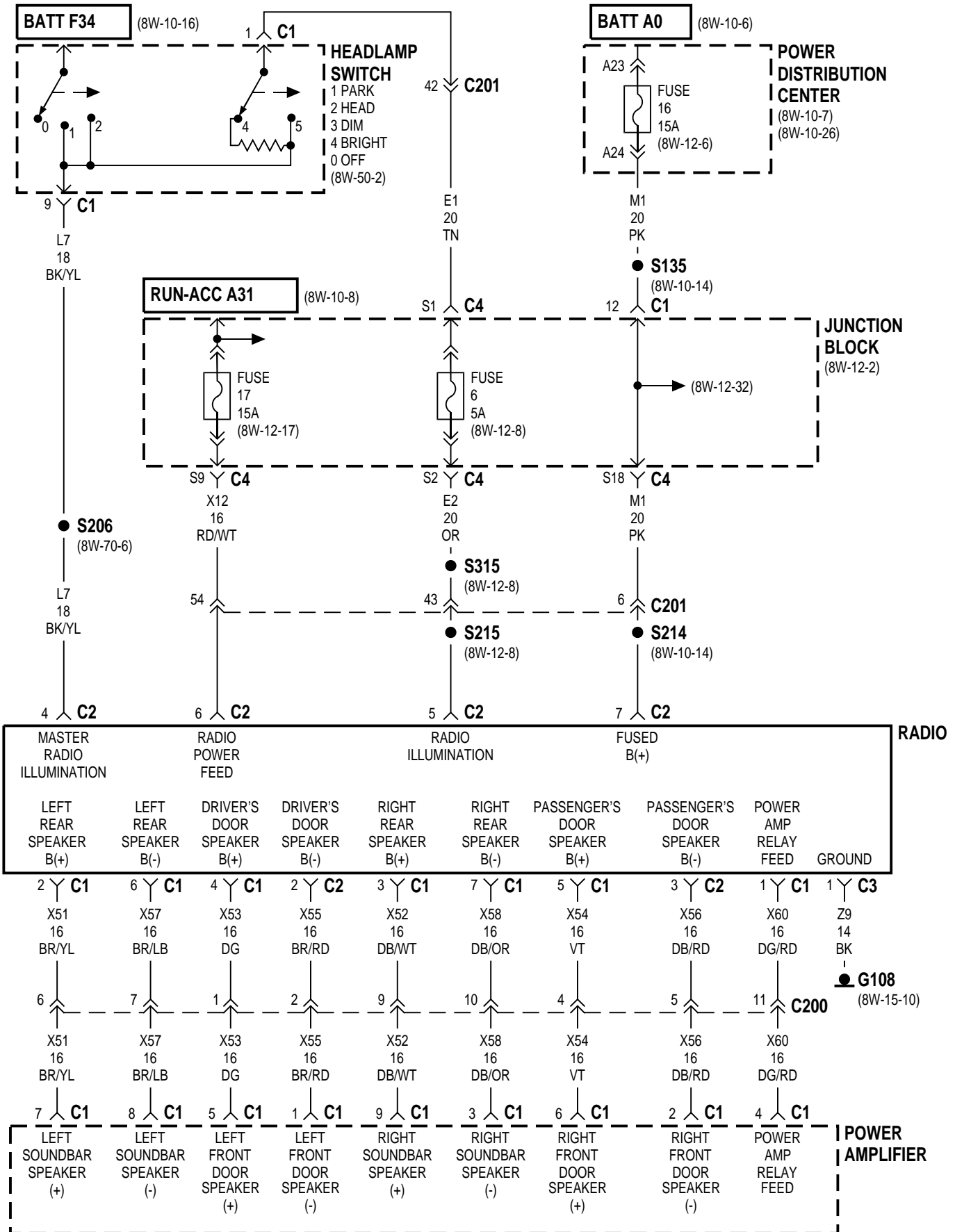
HOT at all times. When the operator depresses the reading lamp, the reading lamp switch closes and supplies ground on circuit Z1.

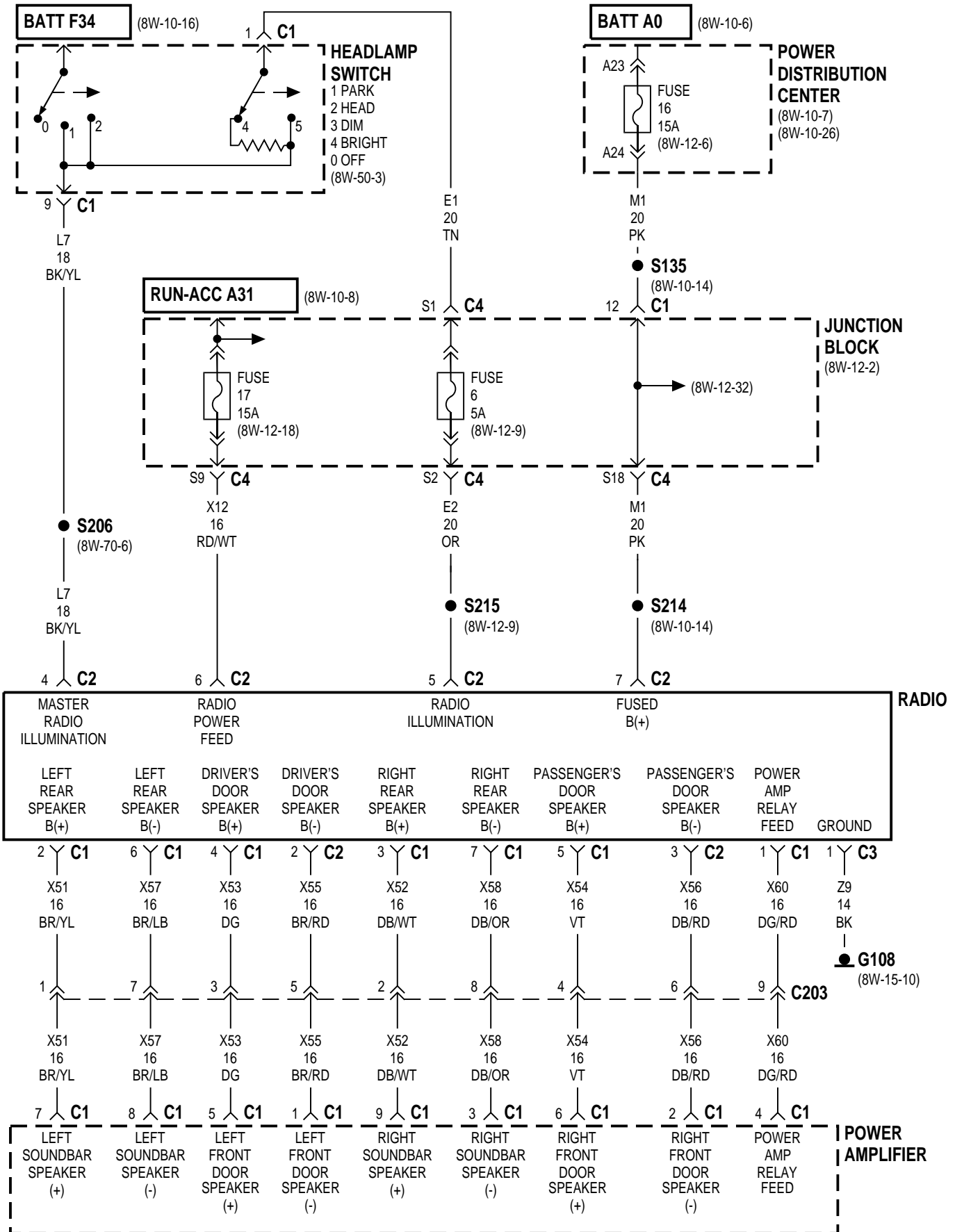
8W-47 AUDIO SYSTEM

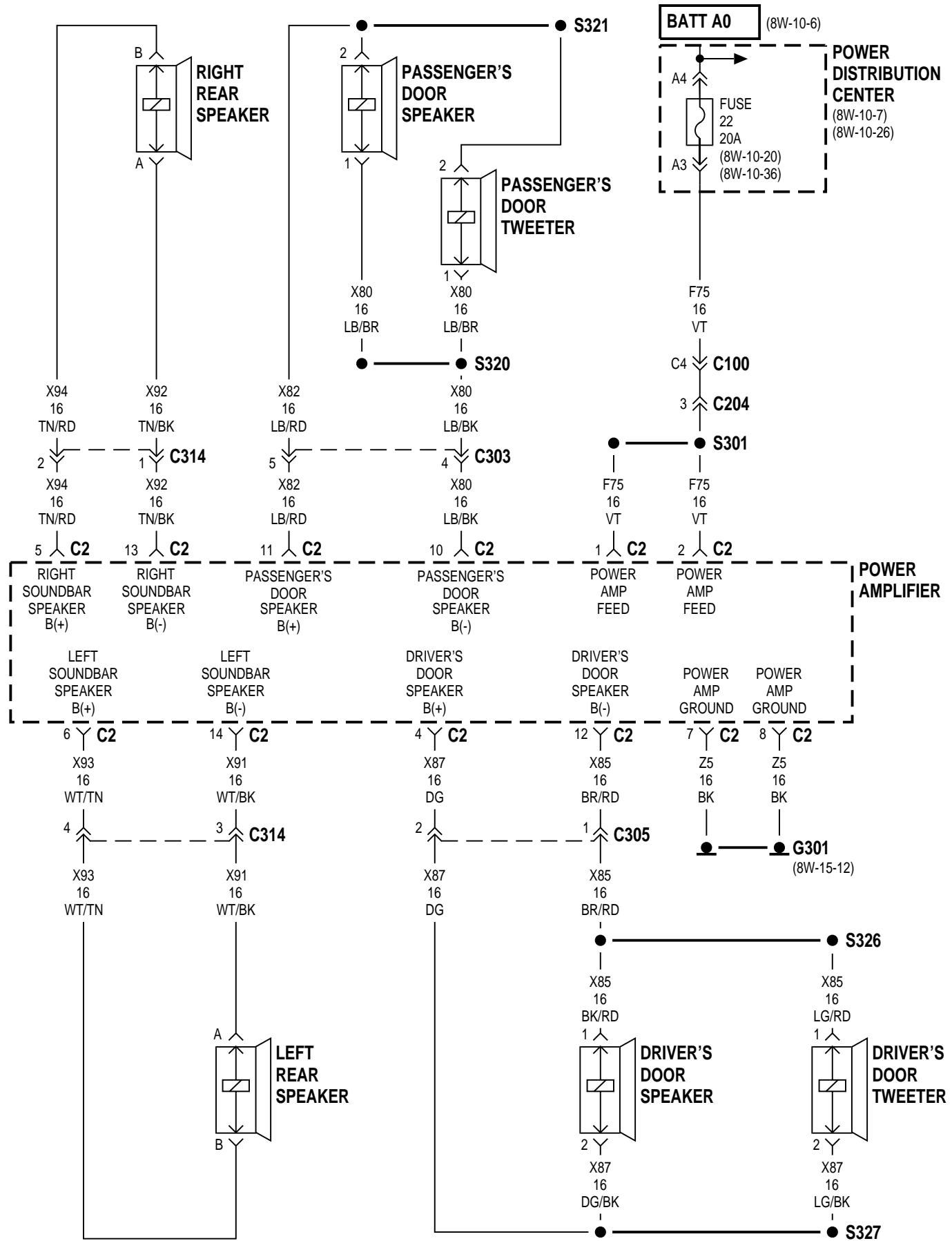
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Driver's Door Tweeter	8W-47-3, 4	Right Rear Speaker	8W-47-3, 4
Fuse 6 (JB)	8W-47-2	S135	8W-47-2
Fuse 16 (JB)	8W-47-2	S206	8W-47-2
Fuse 17 (JB)	8W-47-2	S214	8W-47-2
Fuse 25 (PDC)	8W-47-3, 4	S215	8W-47-2
G108	8W-47-2	S301	8W-47-3, 4
G301	8W-47-3, 4	S315	8W-47-2
Headlamp Switch	8W-47-2	S320	8W-47-3, 4
Junction Block	8W-47-2	S321	8W-47-3, 4
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Passenger's Door Speaker	8W-47-3, 4	S327	8W-47-4
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Power Amplifier	8W-47-2, 3, 4	S331	8W-47-3
Power Distribution Center	8W-47-2, 3, 4		







8W-47 AUDIO SYSTEM

DESCRIPTION AND OPERATION

RADIO

When the ignition switch is in the ACCESSORY or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A31. Circuit A31 feeds circuit X12 through fuse 15 in the junction block. Circuit X12 powers the radio.

Circuit Z5 provides ground for the radio. The antenna connects to the rear of the radio.

RADIO MEMORY

Circuit M1 from the Ignition Off Draw (IOD) fuse in cavity 16 of the Power Distribution Center (PDC) supplies power for the radio memory. Circuit M1 is HOT at all times.

The IOD fuse is removed during vehicle shipping to prevent excessive battery draw.

RADIO ILLUMINATION

When the parking lamps or headlamps are ON, circuit L7 provides the illumination signal to the radio. Also when the headlamps or parking lamps are ON, circuit E2 provides the illumination intensity signal to the radio.

SPEAKERS—STANDARD SYSTEM

The standard system uses four speakers. Circuit X53 feeds the speaker in the left front door. Circuit X55 is the return from the speaker to the radio.

Circuit X54 feeds the right front door speaker. Circuit X56 is the return from the speaker to the radio.

Circuit X51 feeds the left rear door speaker. Circuit X57 is the return from the speaker to the radio.

Circuit X52 feeds the right rear door speaker. Circuit X58 is the return from the speaker to the radio.

AMPLIFIER AND SPEAKERS—PREMIUM

A power amplifier is used on premium systems only. The amplifier is connected between the radio and the speakers.

Circuit F75 from fuse 25 in the Power Distribution Center (PDC) feeds the radio amplifier. Circuit Z5 provides ground for the amplifier. Circuit X60 from the radio supplies power to the amplifier.

From the radio, circuits X54 and X56 are the right front speaker inputs to the power amplifier; circuits X53 and X55 the left front inputs, circuits X51 and X57 the left rear inputs, and circuits X52 and X58 the right rear inputs.

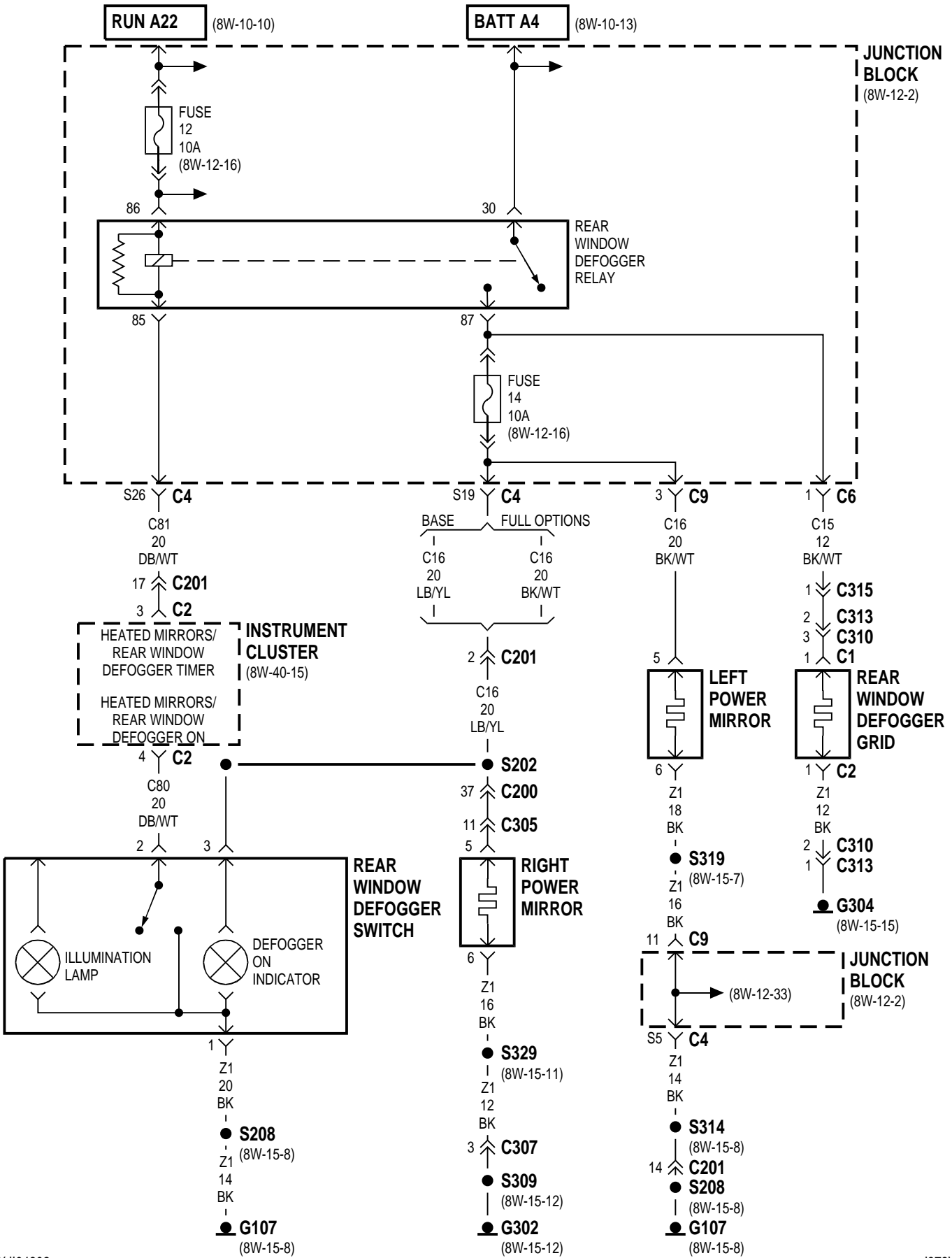
From the power amplifier, circuits X80 and X82 feed the right front door and instrument panel. Circuits X85 and X87 feed the left front door and instrument panel. Circuits X92 and X94 feed the right sound bar. Circuits X91 and X93 feed the left sound bar.

8W-48 REAR WINDOW DEFOGGER

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Fuse 14 (JB)	8W-48-2, 3	Right Power Mirror	8W-48-2, 3
G107	8W-48-2, 3	S202	8W-48-2, 3
G302	8W-48-2, 3	S208	8W-48-2, 3
G304	8W-48-2, 3	S309	8W-48-2, 3
Illumination Lamp	8W-48-2, 3	S314	8W-48-2, 3
Instrument Cluster	8W-48-2, 3	S319	8W-48-2, 3
Junction Block	8W-48-2, 3	S329	8W-48-2, 3
Left Power Mirror	8W-48-2, 3		
Rear Window Defogger Grid	8W-48-2, 3		



8W-48 REAR WINDOW DEFOGGER

DESCRIPTION AND OPERATION

REAR WINDOW DEFOGGER

When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A22. Circuit A22 powers the coil side of the rear window defogger relay through fuse 12 in the junction block..

When the operator presses the rear window defogger switch, the switch contacts momentarily CLOSE. When closed, the switch contacts connect circuit C80 from the instrument cluster microprocessor to ground on circuit Z1. After it senses ground on circuit C80, the microprocessor energizes the rear window defog-

ger relay by providing ground for the relay coil on circuit C81.

When the rear window defogger relay energizes, it connects circuit A4 from PDC fuse 10 to circuit C15. Circuit C15 supplies power the rear window defogger grid. Circuit Z1 provides ground for the rear window defogger grid.

HELPFUL INFORMATION

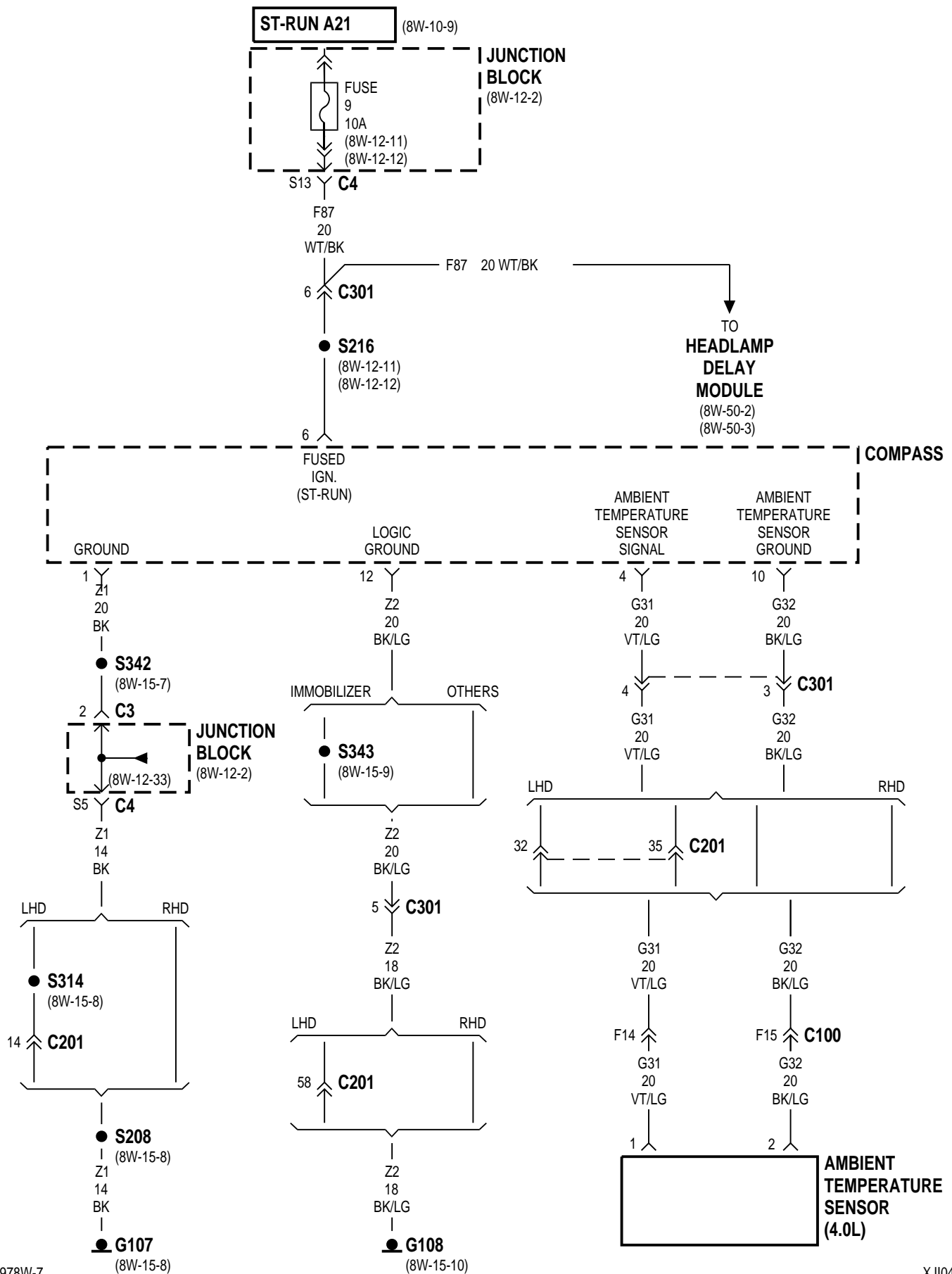
- Check for broken grid lines on the window.
- Check for a broken bus bar or disconnected leads at the rear window.
- Check for a good ground at the rear window defogger grid.

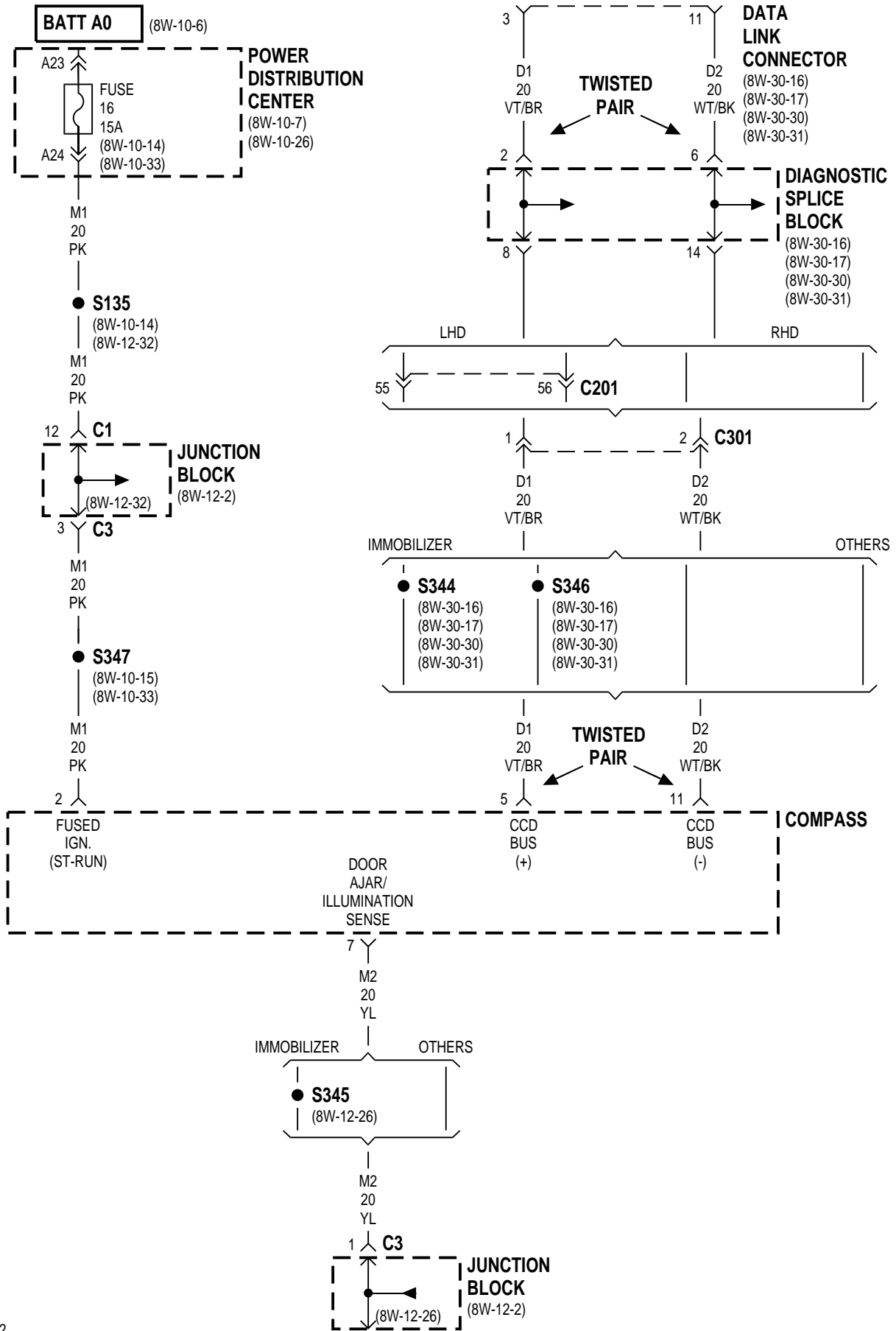
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Compass	8W-49-2,3	S216	8W-49-2
Data Link Connector	8W-49-3	S314	8W-49-2
Diagnostic Splice Block	8W-49-3	S342	8W-49-2
Fuse 9 (JB)	8W-49-2	S343	8W-49-2
Fuse 16 (PDC)	8W-49-3	S344	8W-49-3
G107	8W-49-2	S345	8W-49-3
G108	8W-49-2	S346	8W-49-3
Junction Block	8W-49-2,3	S347	8W-49-3
Power Distribution Center	8W-49-3		
S135	8W-49-3		





8W-49 OVERHEAD CONSOLE

DESCRIPTION AND OPERATION

INTRODUCTION

When the ignition switch is in the START or RUN position, it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 supplies power to circuit F87 through fuse 9 in the junction block. Circuit F87 supplies power to the overhead console.

To allow the overhead console to communicate with other modules and controllers the CCD Bus is used.

The circuits involved are D1 for CCD (+), and D2 for CCD (-).

Circuits Z1 and Z2 provides ground for the overhead console. Circuit M2 from the door jamb switches also connects to the overhead console.

AMBIENT TEMPERATURE SENSOR

The ambient temperature sensor is a variable resistor. Circuit G31 supplies voltage from the overhead console to the sensor. Circuit G32 is the signal return from the sensor to the overhead console.

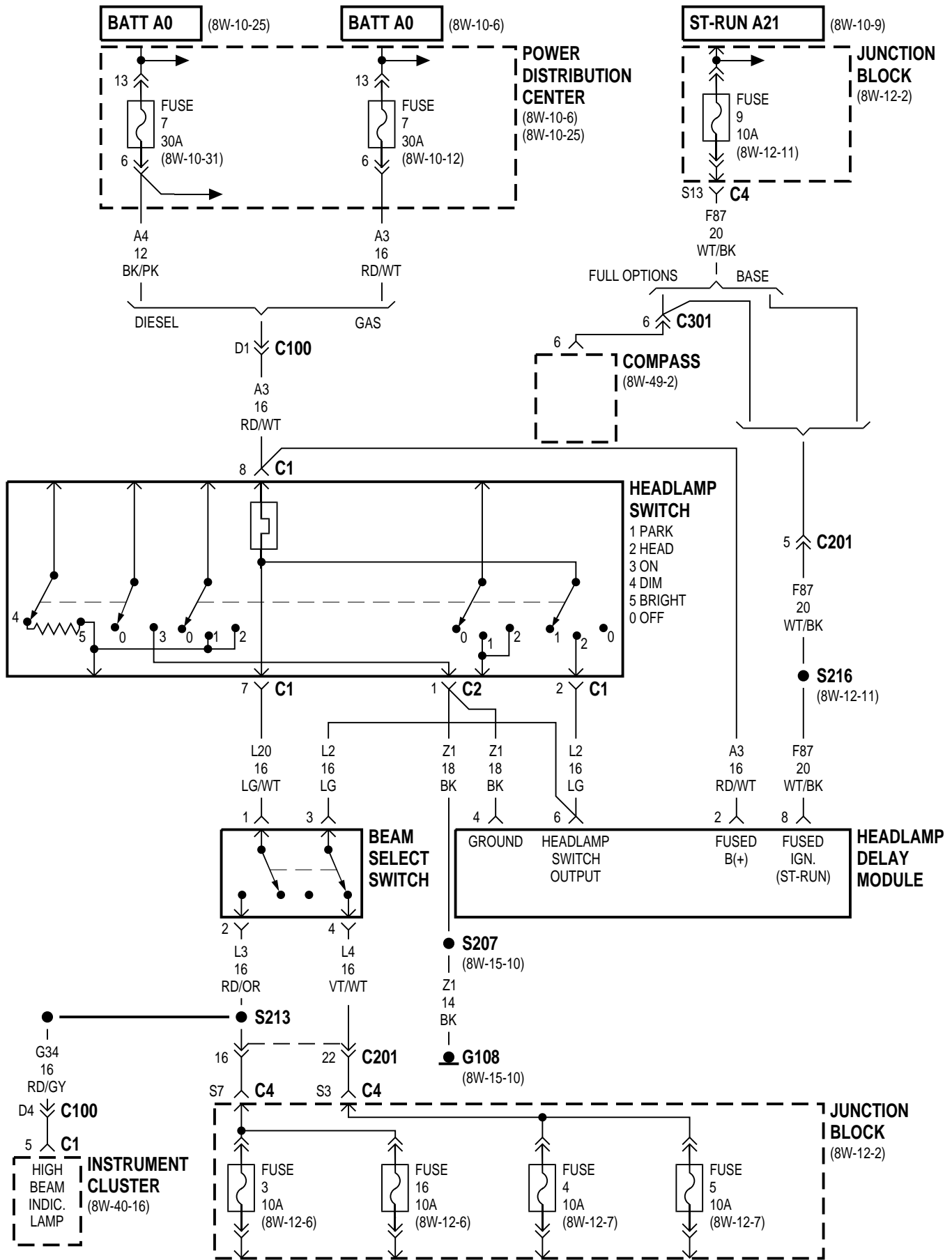
8W-50 FRONT LIGHTING

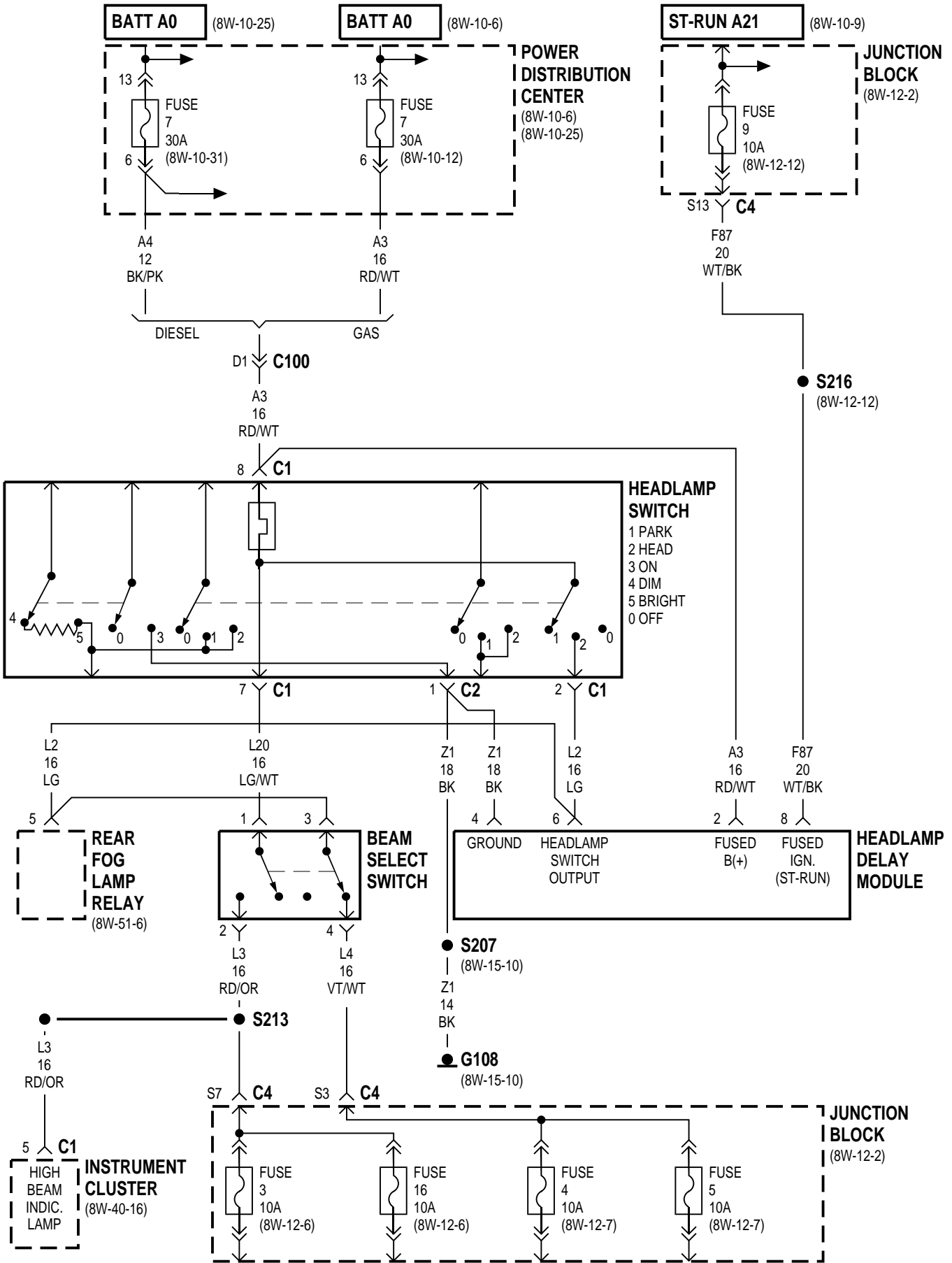
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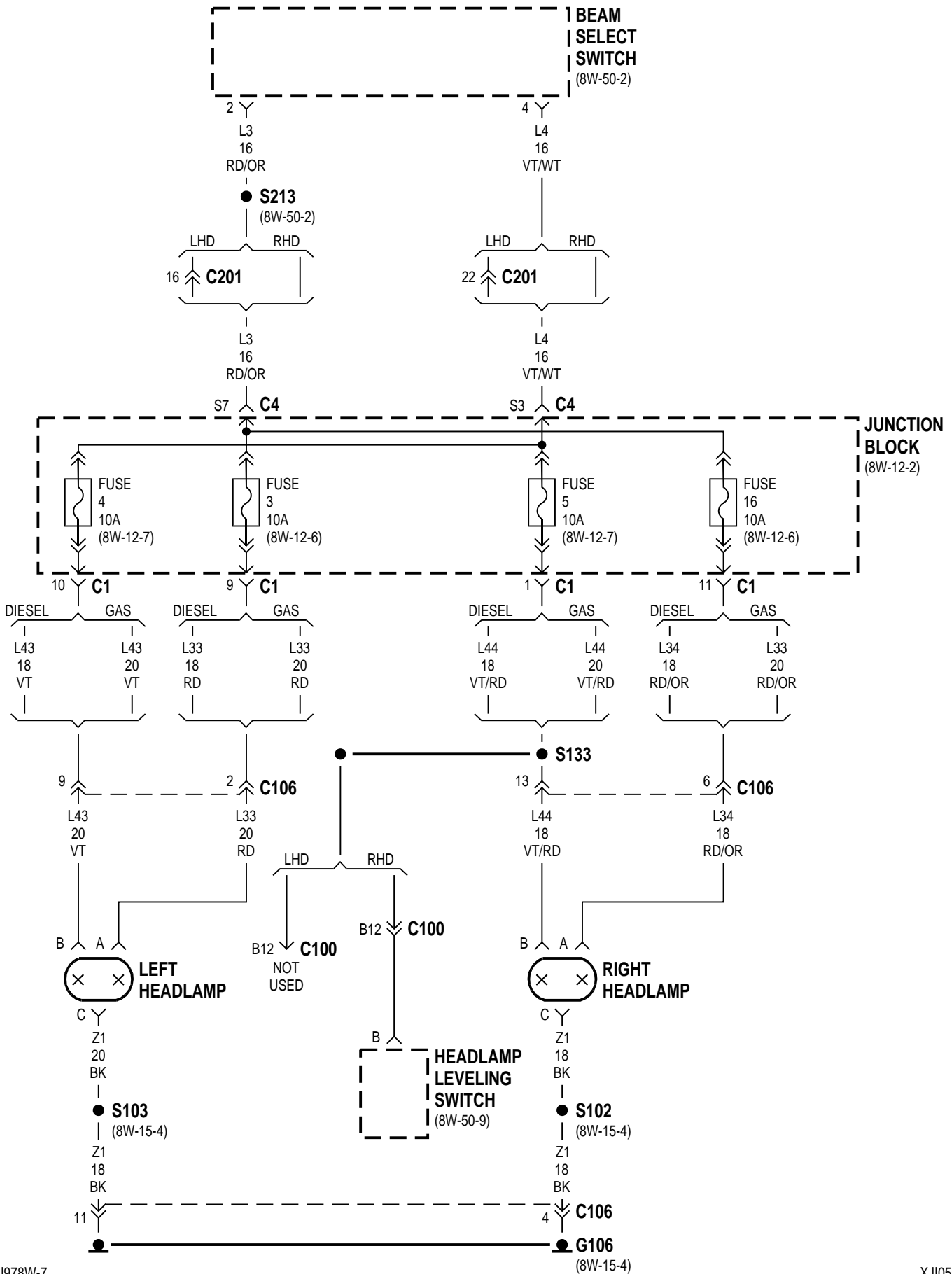
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Beam Select Switch	8W-50-2, 3, 4, 9	Left Headlamp	8W-50-4
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Controller Anti-Lock Brake Relay	8W-50-8	Left Position Lamp	8W-50-5, 6
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Fuse 4 (JB)	8W-50-2, 3, 4	Right Fog Lamp	8W-50-7, 8
Fuse 5 (JB)	8W-50-2, 3, 4, 9	Right Front Turn Signal Lamp	8W-50-5, 6
Fuse 7 (JB)	8W-50-5, 6, 7, 8	Right Headlamp	8W-50-4, 9
Fuse 7 (PDC)	8W-50-2, 3	Right Headlamp Leveling Motor	8W-50-9
Fuse 9 (JB)	8W-50-2, 3	Right Position Lamp	8W-50-5, 6
Fuse 16 (JB)	8W-50-2, 3, 4	Right Repeater Lamp	8W-50-5, 6
Fuse 23 (JB)	8W-50-5, 6	S100	8W-50-5, 6
Fuse 24 (PDC)	8W-50-7, 8	S102	8W-50-4, 5, 6, 7, 8
G106	8W-50-4, 5, 6, 7, 8, 9	S103	8W-50-4, 5, 6, 7, 8
G107	8W-50-9	S105	8W-50-5, 6
G108	8W-50-2, 3	S106	8W-50-7, 8
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Headlamp Leveling Switch	8W-50-4, 9	S206	8W-50-5, 6, 7, 8
Headlamp Switch	8W-50-2, 3, 5, 6, 7, 8	S207	8W-50-2, 3
Illumination Lamp	8W-50-7, 8	S209	8W-50-5, 6
Instrument Cluster	8W-50-2, 3	S212	8W-50-5, 6
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Left Fog Lamp	8W-50-7, 8	S216	8W-50-2, 3
Left Front Turn Signal Lamp	8W-50-5, 6	Turn Signal/Hazard Switch	8W-50-5, 6

LHD

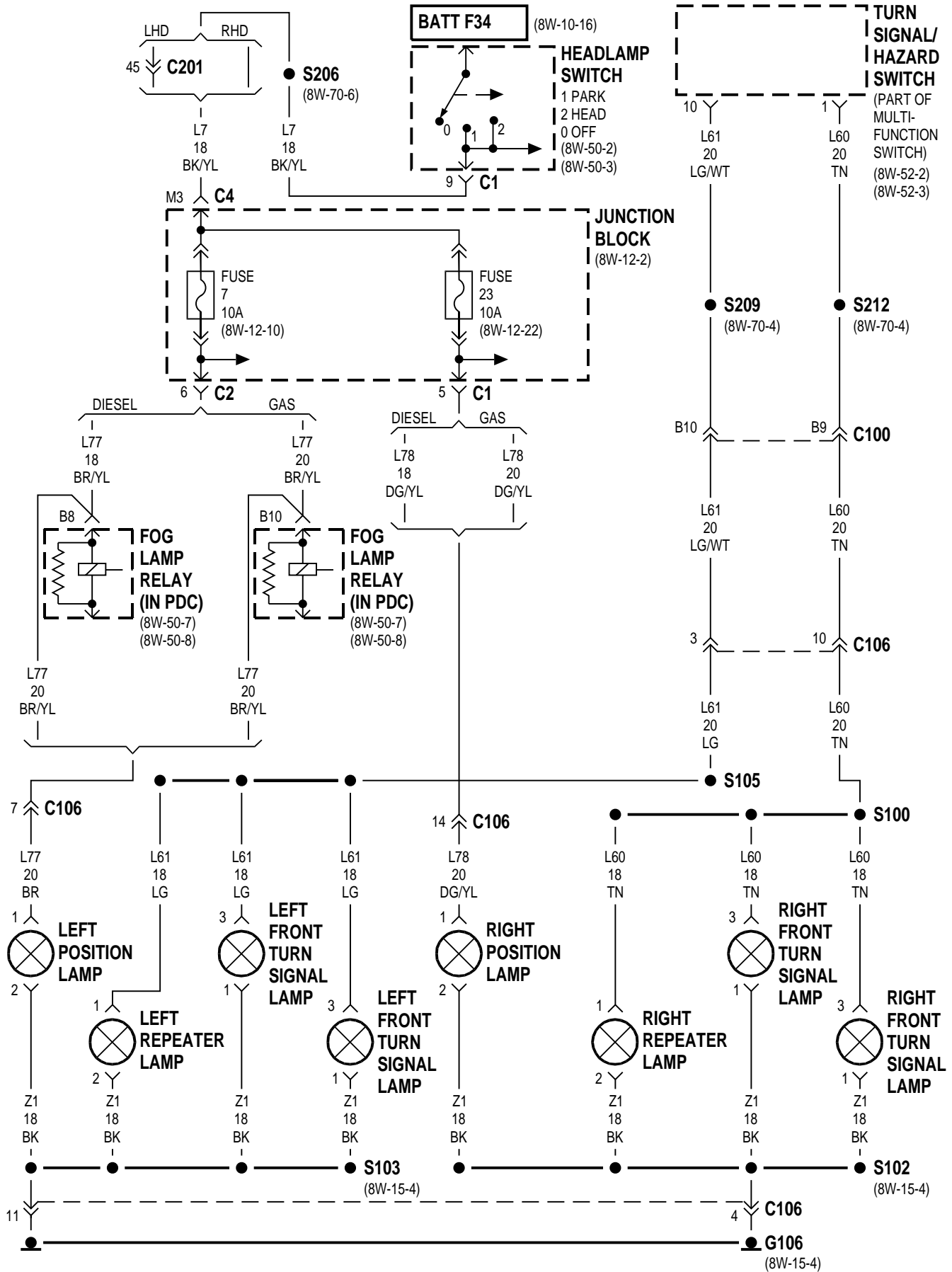


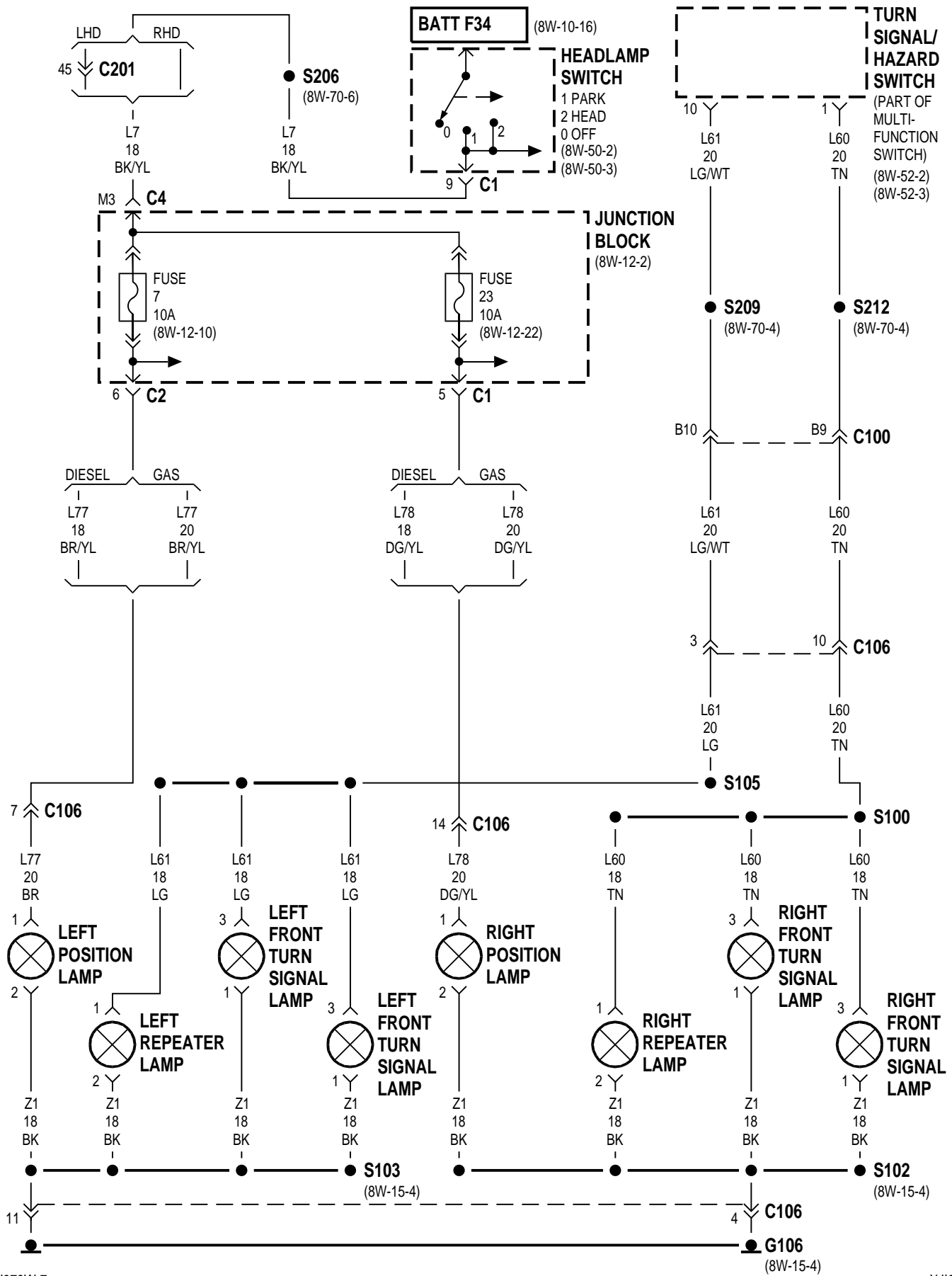


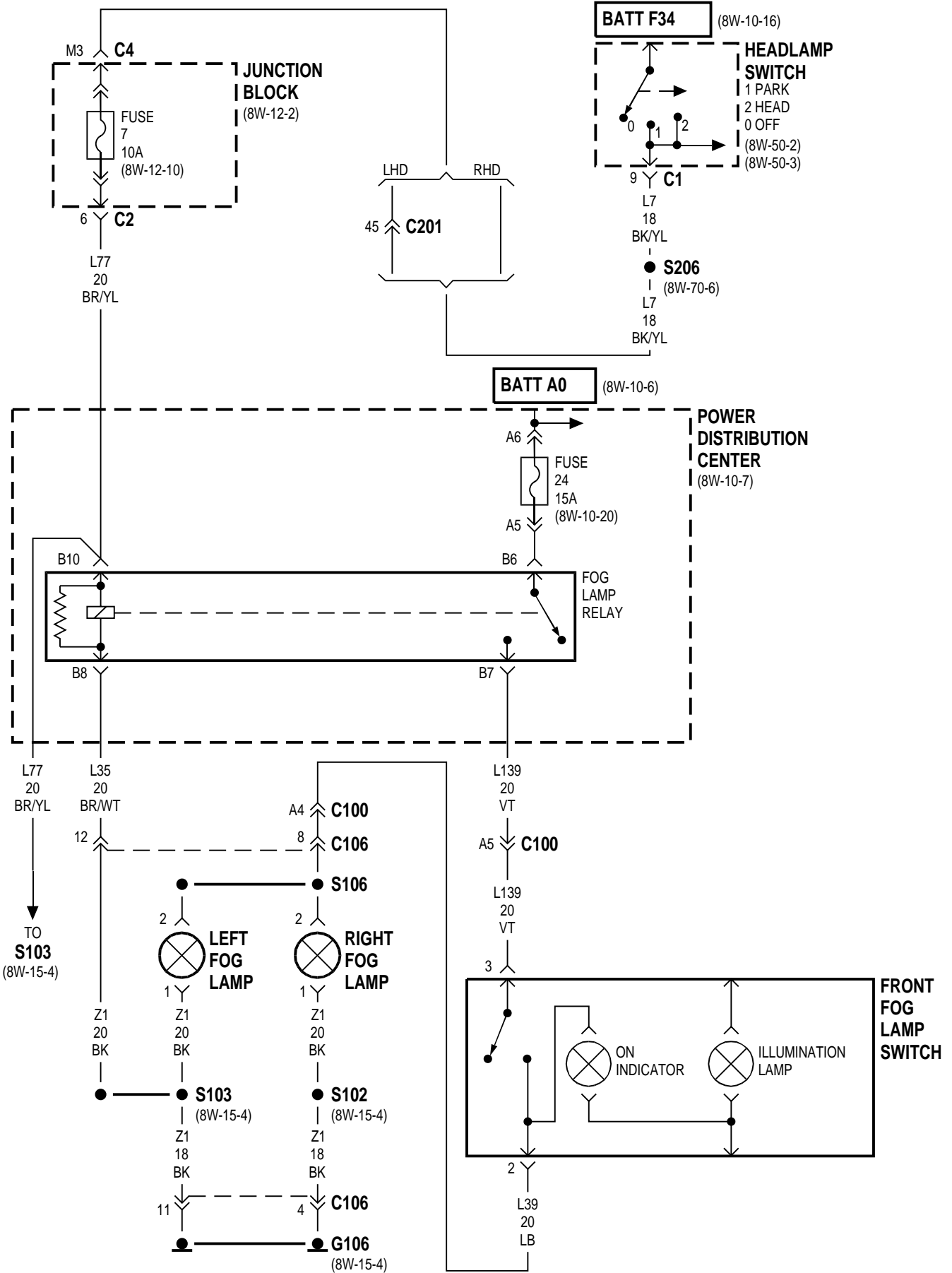
LHD

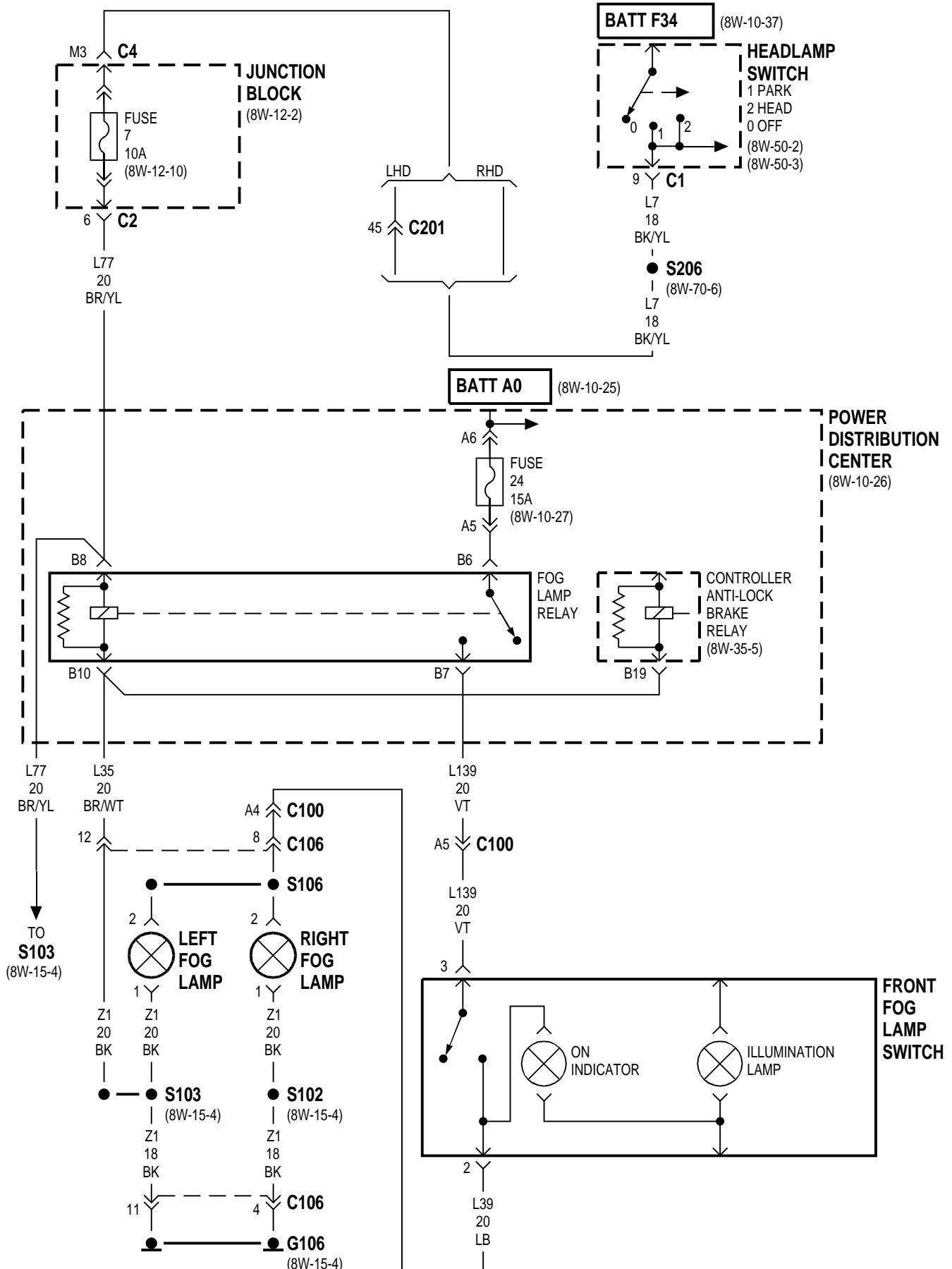


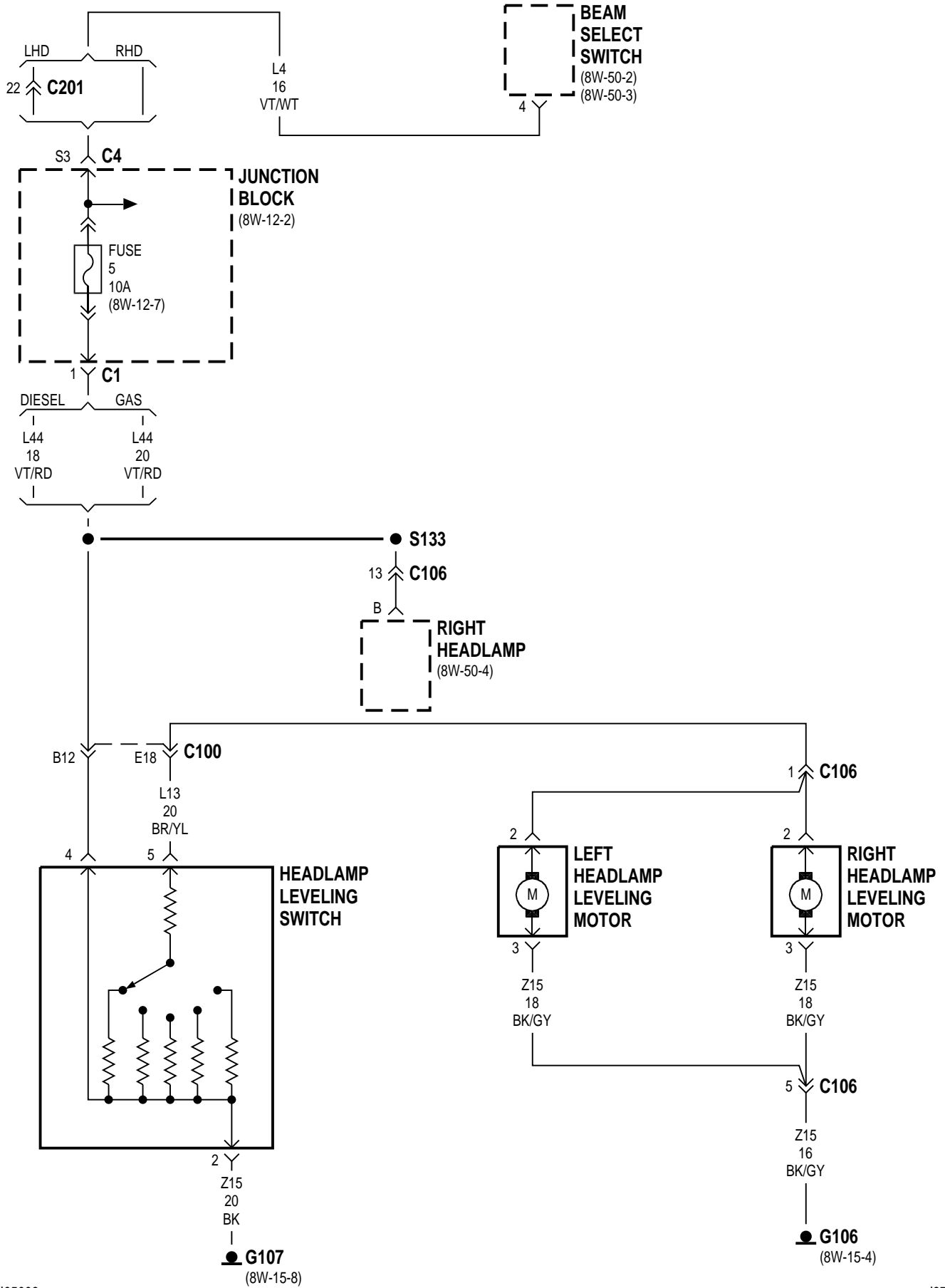
XJ **8W-50 FRONT LIGHTING** **8W - 50 - 5**
FOG LAMPS











8W-50 FRONT LIGHTING

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HEADLAMP LEVELING	10		

DESCRIPTION AND OPERATION

PARKING LAMPS

Circuit F34 from fuse 17 in the Power Distribution Center (PDC) connects to circuit L7 through the headlamp switch. Circuit L7 powers circuits L77 and L78 through fuses 7 and 23 in the junction block. Circuit L78 powers the right park and marker lamps. Circuit L77 powers the left park and marker lamps.

HELPFUL INFORMATION

- Circuits L77 and L78 also power the rear tail lamps.
- Circuit L77 powers the coil side of the fog lamp relay.
- Circuit L77 provides the illumination lamp signal to the radio.
- Circuit L78 feeds the license plate lamp.
- Circuit Z1 provides ground for the parking lamps, marker lamps, rear tail lamps, and license lamp.

HEADLAMPS

HEADLAMP SWITCH IN ON POSITION

The headlamp switch has three positions: ON, PARK (parking lamps) and OFF. In the ON position, the headlamp switch connects circuit A3 from fuse 7 in the Power Distribution Center (PDC) to circuit L2. Circuit L2 connects to circuit L4 through the dimmer switch circuitry in the multi-function switch. Circuit L4 connects to circuits L43 and L44 through fuses 4 and 5 in the junction block. Circuits L43 and L44 power the low beams of the headlamps.

When the operator selects high beam operation, the multi-function switch connects circuit L2 to circuit L3. Circuit L3 connects to circuits L33 and L34 through fuses 3 and 16 in the junction block. Circuits L33 and L34 power high beam operation. Circuit Z1 provides ground for the headlamps.

HEADLAMP SWITCH IN OFF OR PARKING LAMP POSITION

The headlamps switch contains an internal circuit breaker that connects circuit A3 to circuit L20. Cir-

cuit L20 connects to the multi-function switch. When the operator momentarily flashes the high beams of the headlamps with the turn signal lever, circuit L20 connects to circuit L3. Circuit L3 feeds the high beams of the headlamps.

HEADLAMP GROUND

Circuit Z1 provides ground for both right and left headlamps.

HEADLAMP LEVELING

When the headlamp switch is in the ON or Headlamp position, it connects circuit A3 from fuse 7 in the Power Distribution Center (PDC) to circuit L2. Circuit L2 connects to circuit L4 through the multi-function switch. Circuit L4 feeds the headlamp leveling switch. Circuit Z15 grounds the switch.

HEADLAMP DELAY MODULE

When the operator turns OFF the ignition switch and then turns OFF the headlamp switch, the headlamp delay module powers the headlamps for approximately 45 seconds.

When the ignition switch is in the START or RUN position, circuit A22 powers circuit F87 through fuse 9 in the junction block. Circuit F87 supplies the IGNITION ON/OFF signal to the headlamp delay module. Circuit Z1 provides ground for the module.

When the headlamp delay module activates, it connects circuit A3 from fuse 7 in the Power Distribution Center (PDC) to circuit L2. Circuit L2 powers the headlamps through the multifunction switch.

FOG LAMPS

WITHOUT DAYTIME RUNNING LAMPS

The fog lamps are controlled by the fog lamp switch and fog lamp relay. The fog lamps operate only when the headlamp switch is in the PARK or ON position, and the operator has selected low-beam

DESCRIPTION AND OPERATION (Continued)

operation. When the headlamps are in high-beam operation, the fog lamps will not operate.

Circuit F61 from fuse 24 in the Power Distribution Center (PDC) powers the contact side of fog lamp relay. Circuit F61 connects to circuit L139 through the contacts of the fog lamp relay. Circuit L139 connects to circuit L39 through the contacts of the fog lamp switch. When the contacts in the fog lamp relay and the fog lamp switch are closed, circuit L39 feeds the fog lamps. Circuit Z1 provides ground for the fog lamps.

Circuit E2 provides voltage for the illumination lamp in the fog lamp switch.

WITH DAYTIME RUNNING LAMPS

The fog lamps are controlled by the fog lamp switch and two fog lamp relays. The fog lamps operate only when the headlamp switch is in the PARK or ON position, and the operator has selected low-beam operation. When the headlamps are in high-beam operation, the fog lamps will not operate.

Circuit F61 from fuse 24 in the Power Distribution Center (PDC) powers the contact side of fog lamp relay number one (1).

When the headlamp switch is in the PARK or ON position, circuit L77 from the switch supplies voltage to the coil side of relay number one (1). Circuit Z1 provides ground for the coil side of relay number one (1). When the contacts in relay number one are closed circuit F61 is connected to circuit L34. Circuit L34 connects to circuit L139 through the contacts in fog lamp relay number two (2). When the fog lamp switch closes, it connects circuit L139 to circuit L39. When the contacts in the fog lamp relays and the fog lamp switch are closed, circuit L39 feeds the fog lamps. Circuit Z1 provides ground for the fog lamps.

If the high beam lamps are ON, circuit G34 energizes fog lamp relay number two (2). When fog lamp relay number two (2) energizes, its contacts open and disconnect circuits L34 and L139. When circuits L34 and L139 are disconnected, power is not supplied to the fog lamps.

Circuit E2 provides voltage for the illumination lamp in the fog lamp switch.

HELPFUL INFORMATION

- The fog lamp switch contains a light emitting diode (LED) that illuminates during fog lamp operation.

DAYTIME RUNNING LAMP (DRL) MODULE

On vehicles built for sale in Canada, the headlamps operate when the ignition switch is in the RUN position.

When the ignition switch is in the START or RUN position, circuit A1 from fuse 2 in the Power Distribution Center (PDC) connects to circuit A21. Circuit A21 powers circuit F12 through fuse 11 in the junction block. Circuit F12 splices to supply power to the DRL module.

The headlamp switch connects circuit A3 from fuse 7 in the PDC to circuit L20. Circuits A3 and L20 are HOT at all times. Circuit L20 connects to the headlamp dimmer switch circuitry in the multi-function switch and to the DRL module.

The DRL module receives the vehicle speed sensor input from circuit G7. Circuit G34 from the DRL module provides power for the high beam indicator lamp in the instrument cluster.

When the headlamp switch is OFF and the ignition switch is in the START or RUN position, the DRL module powers the headlamps on circuit L3 at reduced intensity. When the headlamps are ON, the dimmer switch in the multi-function switch powers the low beams on circuit L4.

Circuit L3 feeds the high beams of the headlamps. When the operator flashes the headlamps with the stalk of the multi-function switch, the DRL senses voltage on circuit L3.

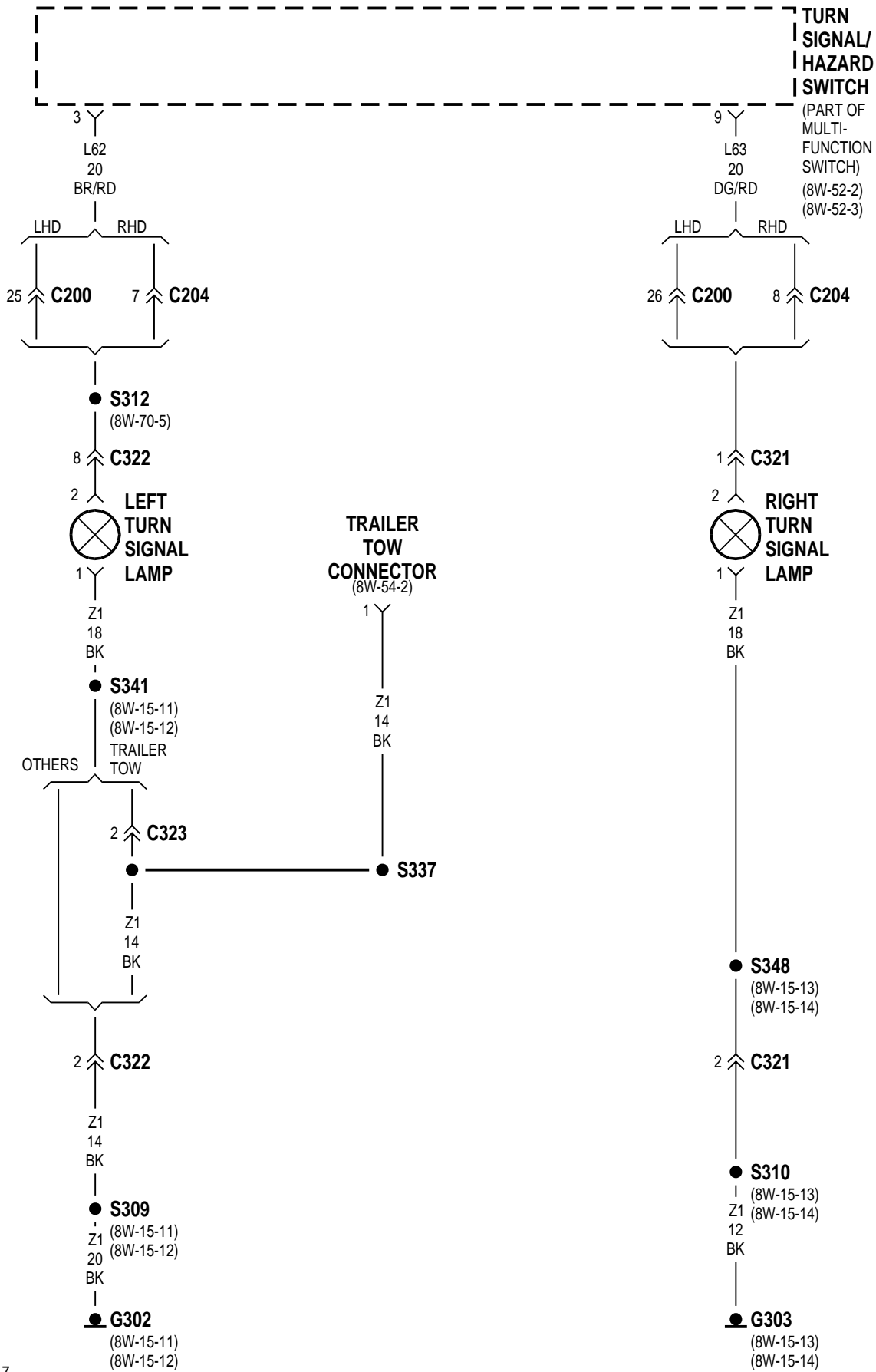
Circuit Z1 provides ground for the DRL module.

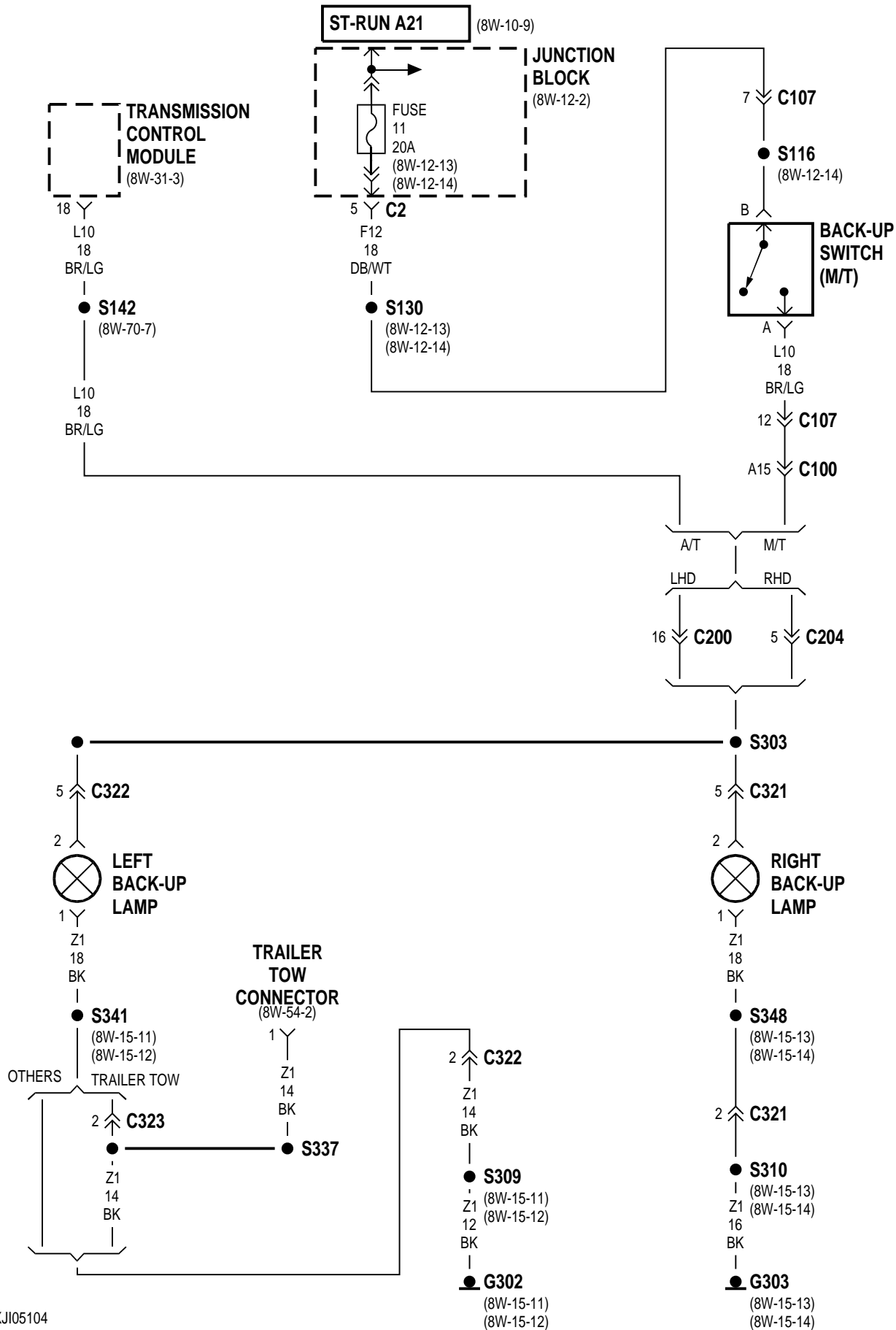
8W-51 REAR LIGHTING

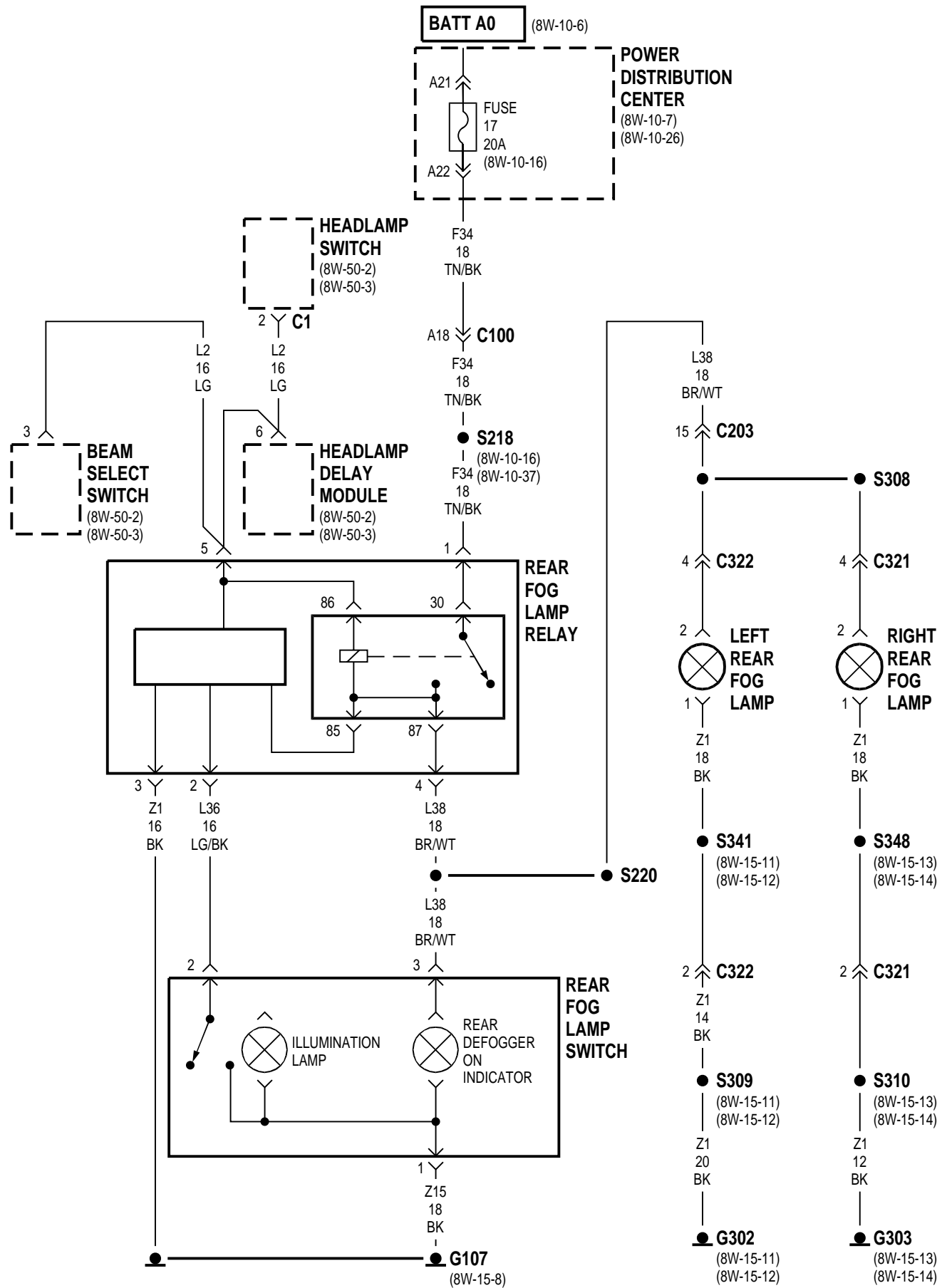
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Right Rear Fog Lamp	8W-51-6		







8W-51 REAR LIGHTING

DESCRIPTION AND OPERATION

TAIL LAMPS AND REAR LICENSE PLATE LAMPS

Circuit F34 from fuse 17 in the Power Distribution Center (PDC) connects to circuit L7 through the headlamp switch. Circuit L7 powers circuits L77 and L78 through fuses 7 and 23 in the junction block. Circuit L78 powers the right tail lamps, the right park and marker lamps, and the license lamp. Circuit L77 powers the left tail lamps, and the left left park and marker lamps.

GROUND CIRCUIT

Circuit Z1 provides a ground for the tail lamps, parking lamps, marker lamps, and rear license plate lamp.

STOP LAMPS AND CHMSL LAMPS

Circuit F32 from fuse 22 in the Power Distribution Center (PDC). Circuit F32 connects to the stop lamp switch.

When the operator presses the brake pedal, the stop lamp switch CLOSES and connects circuit F32 to circuit L50. Circuit L50 connects to the stop lamps and Center High Mounted Stop Lamps (CHMSL). Circuit Z1 provides a ground for the CHMSL lamps and stop lamps.

HELPFUL INFORMATION

- Check fuse 22 in the PDC.
- Check for continuity across the stop lamp switch when it is closed.

REAR FOG LAMPS

The rear fog lamps are powered by the rear fog lamp relay on circuit L38. Circuit L2 supplies voltage to the coil side of the relay (only when the headlamps operate on Low beam. The relay coil ground is supplied by circuit Z1.

When the relay contacts close they connect circuit F34 and L38. Circuit L38 feeds the right and left rear fog lamps.

BACK-UP LAMPS

In the RUN position, the ignition switch connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A21. Circuit A21 feeds circuit F12 through fuse 11 in the junction block.

Circuit F12 supplies power to the back-up lamp switch. On automatic transmission equipped vehicles, the back-up lamp switch circuitry is part of the PARK/NEUTRAL position switch. When the operator puts the transmission in REVERSE, the back-up lamp switch connects circuit F12 to circuit L10. Circuit L10 feeds the back-up lamps. Circuit Z1 provides ground for the back-up lamps.

HELPFUL INFORMATION

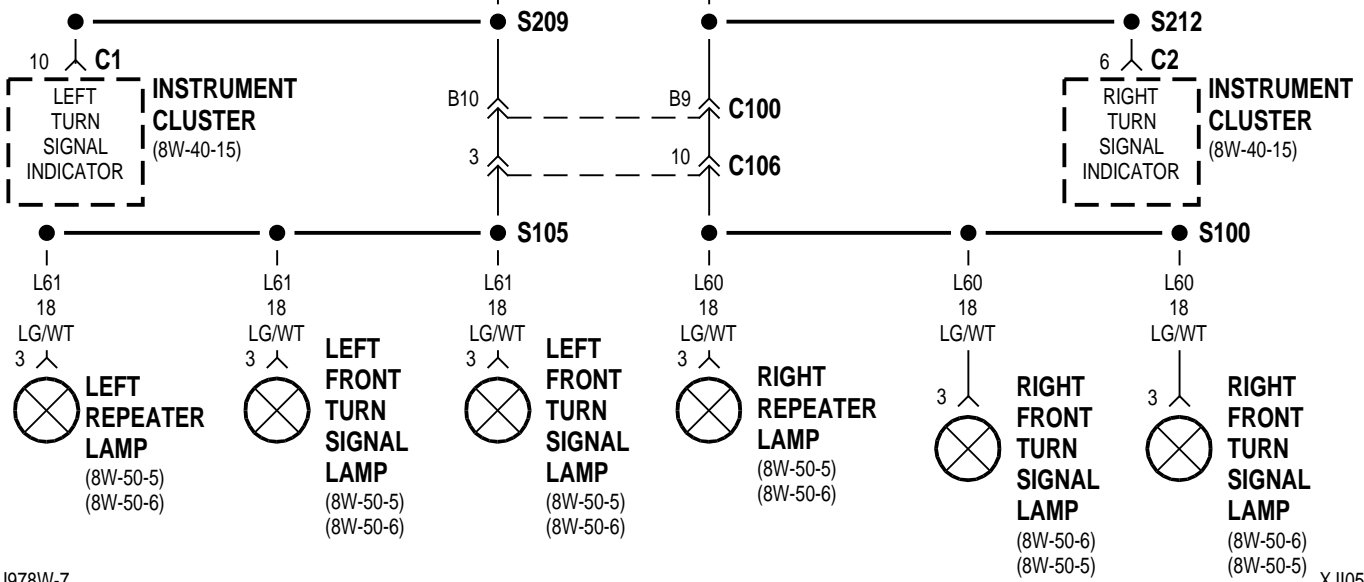
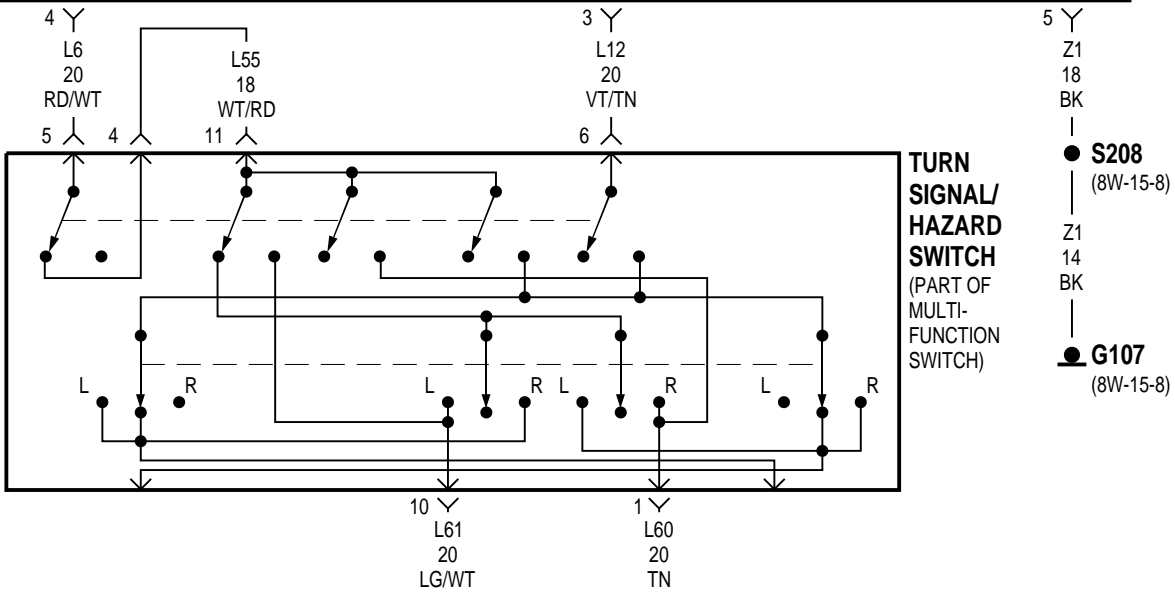
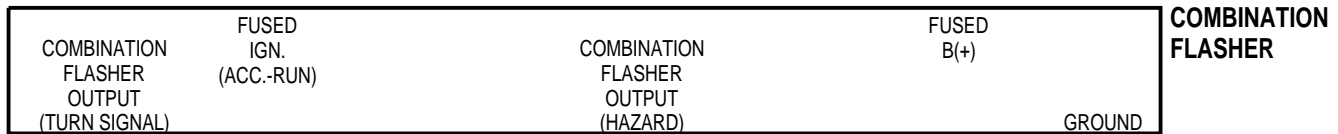
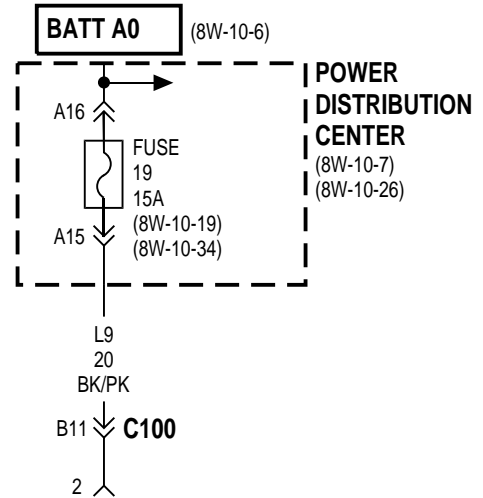
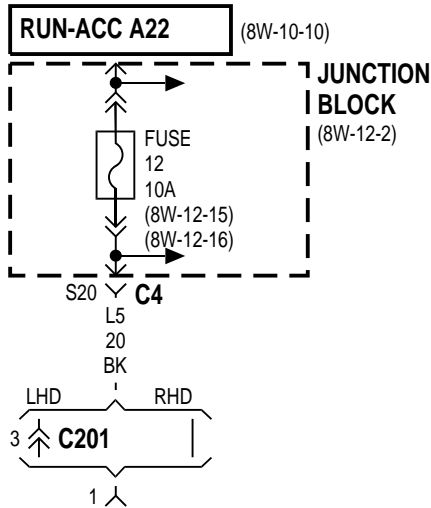
- Check fuse 2 in the PDC and fuse 11 in the junction block.
- Check for continuity across the back-up lamp switch when it is closed.

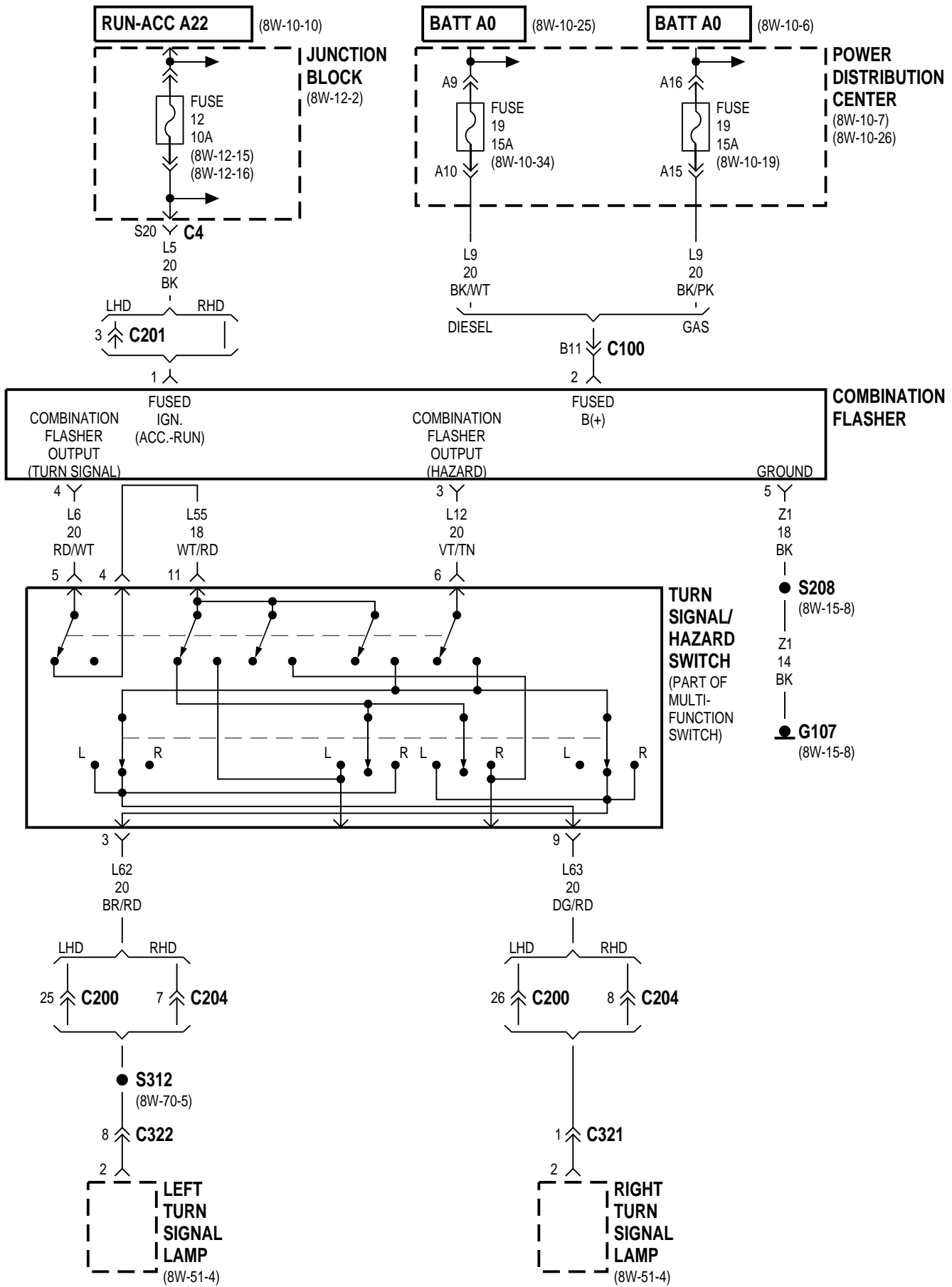
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8W-52 TURN SIGNALS

DESCRIPTION AND OPERATION

TURN SIGNALS

When the operator selects the right turn signal, the multi-function switch connects power from circuit L55 to circuit L60 and L62. Circuit L60 feeds the right front turn signal lamps and the right turn signal indicator lamp on the instrument cluster. Circuit L62 feeds the right rear turn signal lamp.

When the operator selects the left turn signal, the multi-function switch connects power from circuit L55 to circuit L61 and L63. Circuit L61 feeds the left front turn signal lamp and the left turn signal indicator lamp on the instrument cluster. Circuit L63 feeds the left rear turn signal lamp.

Circuit Z1 provides ground for the turn signal lamps.

HELPFUL INFORMATION

- The turn signal lamps are the same lamps used for the hazard flasher.
- Check fuse 19 in the PDC if the turn signals do not operate.

COMBINATION FLASHER

In the ACCESSORY or RUN position, the ignition switch connects circuit A2 from fuse 3 in the Power Distribution Center (PDC) to circuit A22. Circuit A22 feeds circuit L5 through fuse 12 in the junction block.

Circuit L5 powers the combination flasher for the turn signals. Circuit L9 from fuse 19 in the PDC supplies battery voltage to the combination flasher for

the hazard lamps. Circuit Z1 provides ground for the combination flasher.

Circuit L6 from the flasher connects to the multi-function switch to supply power to the turn signals on circuit L55. The multi-function switch supplies voltage to the turn signals and side marker lamps on circuits L60 and L61.

Circuit L12 from the flasher connects to the multi-function switch to supply power to the hazard flasher circuits. The multi-function switch connects to the turn signal and side marker lamps on circuits L62 and L63.

HAZARD FLASHERS

When the operator selects the hazard flashers, the multi-function switch connects circuit L12 from the combination flasher to circuits L60, L61, L62 and L63.

Circuits L60 and L61 feed the front turn signal lamps and the turn signal indicator lamps on the instrument cluster.

Circuits L62 and L63 feed the rear turn signal lamps

Circuit Z1 provides ground for the hazard flasher lamps.

HELPFUL INFORMATION

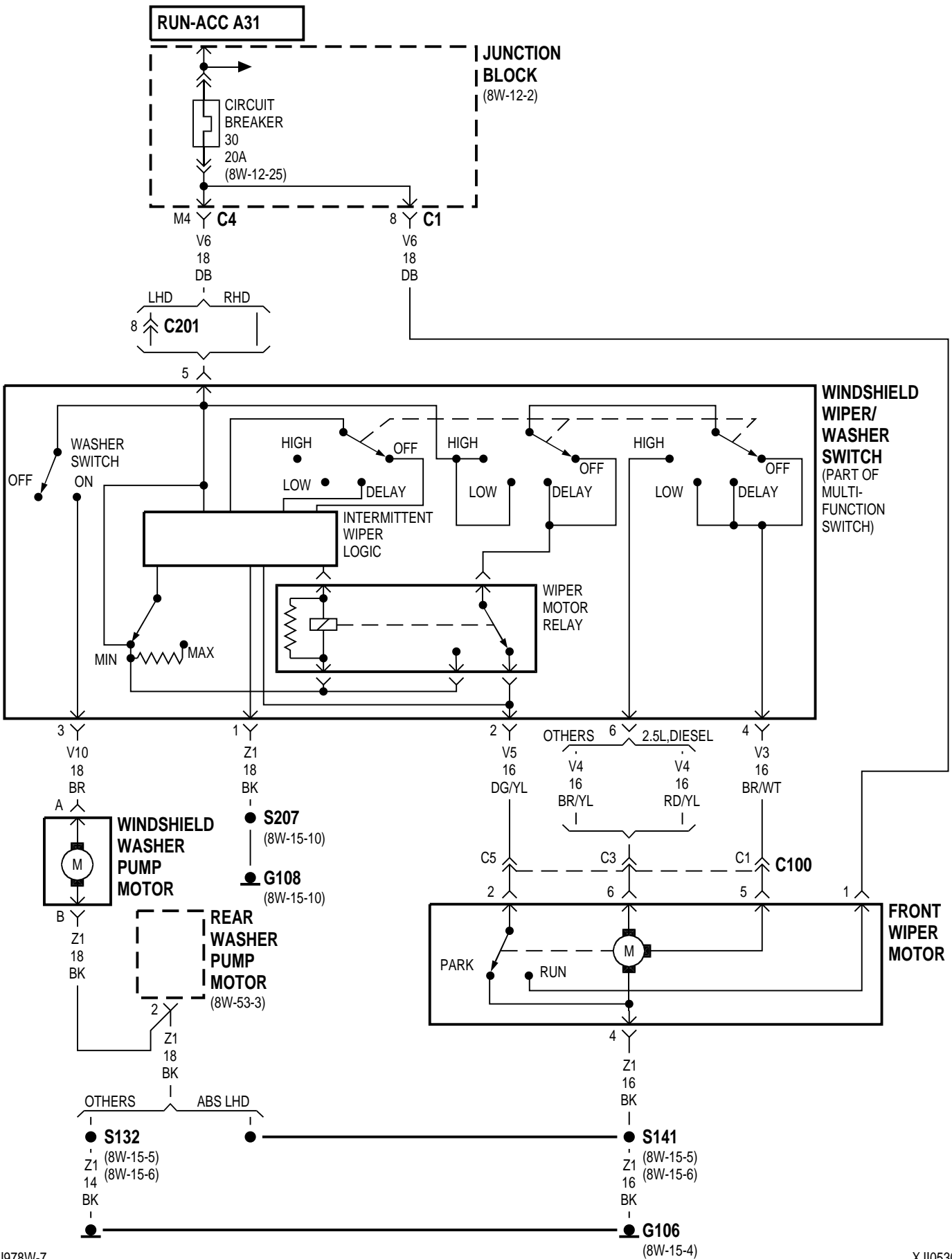
- The hazard flasher lamps are the same lamps used for the turn signals.
- Circuit L9 powers circuit L12 through the combination flasher.

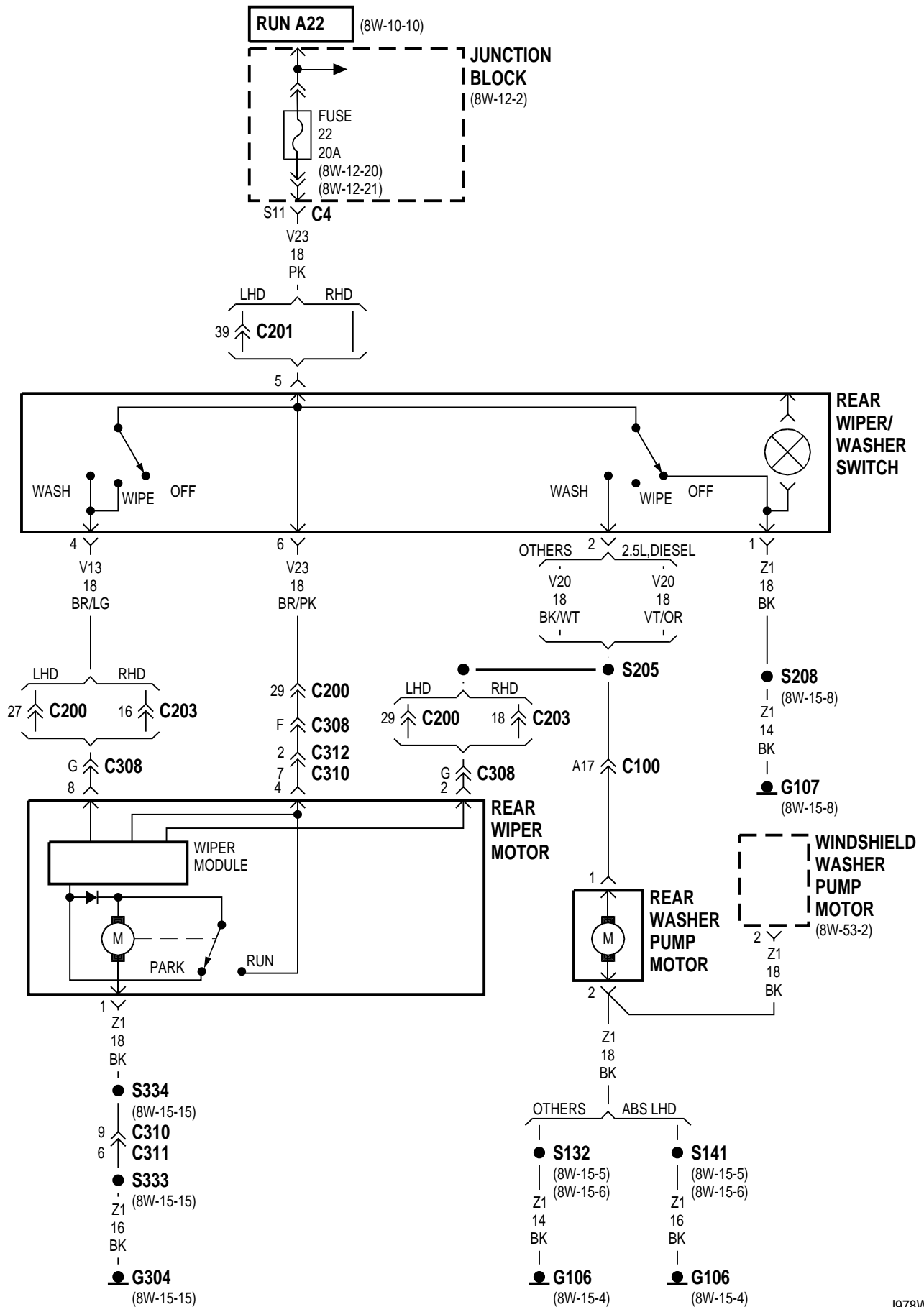
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8W-53 WIPERS

DESCRIPTION AND OPERATION

INTERMITTENT WIPERS

A circuit breaker powers the intermittent wiper system. The intermittent wiper system operates at either LOW or HIGH or DELAY speeds.

In the ACCESSORY or RUN position, the ignition switch connects circuit A1 from fuse 8 in the Power Distribution Center (PDC) with circuit A48. Circuit A48 supplies voltage to circuit F86 through the circuit breaker near the left kick panel.

Circuit F86 supplies power to the front wiper motor and the intermittent wiper control module. Circuit Z1 provides ground for the front wiper motor and the intermittent wiper control module.

When the operator moves the wiper switch to the LOW position, battery voltage passes through the switch to circuit V3. Circuit V3 feeds the wiper motor low speed brushes. If the operator selects wiper HIGH speed operation, the wiper switch passes current to circuit V4. Circuit V4 feeds the wiper motor high speed brushes.

The DELAY portion of the wiper switch contains a variable resistor. The variable resistor connects to the intermittent wiper module on circuit V51. The amount of delay selected by the operator determines the voltage drop through the resistor and the voltage level received by the intermittent wiper module.

After the intermittent wiper control module determines the amount of delay selected, it cycles the wipers by periodically energizing circuit V3. Circuit V3 powers the wiper motor low speed brushes.

As the windshield wiper motor turns, the park switch, internal to the motor, moves from its DOWN position to the UP position. When the wiper switch is

turned OFF, the V55 circuit prevents the wipers from stopping in any position but park.

The windshield washer uses a pump motor located inside the windshield washer fluid reservoir. When the washer switch is pressed, circuit V11 provides an input to the intermittent wiper module. The module powers the pump motor on circuit V10. Circuit Z1 provides ground for the pump motor.

HELPFUL INFORMATION

Circuit Z1 also provides ground for the rear wiper washer pump.

REAR WIPER SYSTEM

In the RUN position, the ignition switch connects circuit A1 from fuse 8 in the PDC with circuit A38. Circuit A38 connects to a fuse block bus bar that powers circuit V15 through the fuse in cavity 1. Circuit V15 supplies power to the rear wiper switch.

In the WIPE or WASH positions, the rear wiper switch supplies voltage to the wiper motor on circuit V13. Circuit Z1 provides ground for the wiper motor.

The rear windshield washer uses a pump motor located inside the windshield washer fluid reservoir. When the rear wiper switch is in the WASH position, power is supplied through the wiper switch to the rear wiper on circuit V13 and the rear washer pump motor on circuit V20. Circuit Z1 provides ground for the rear washer pump motor.

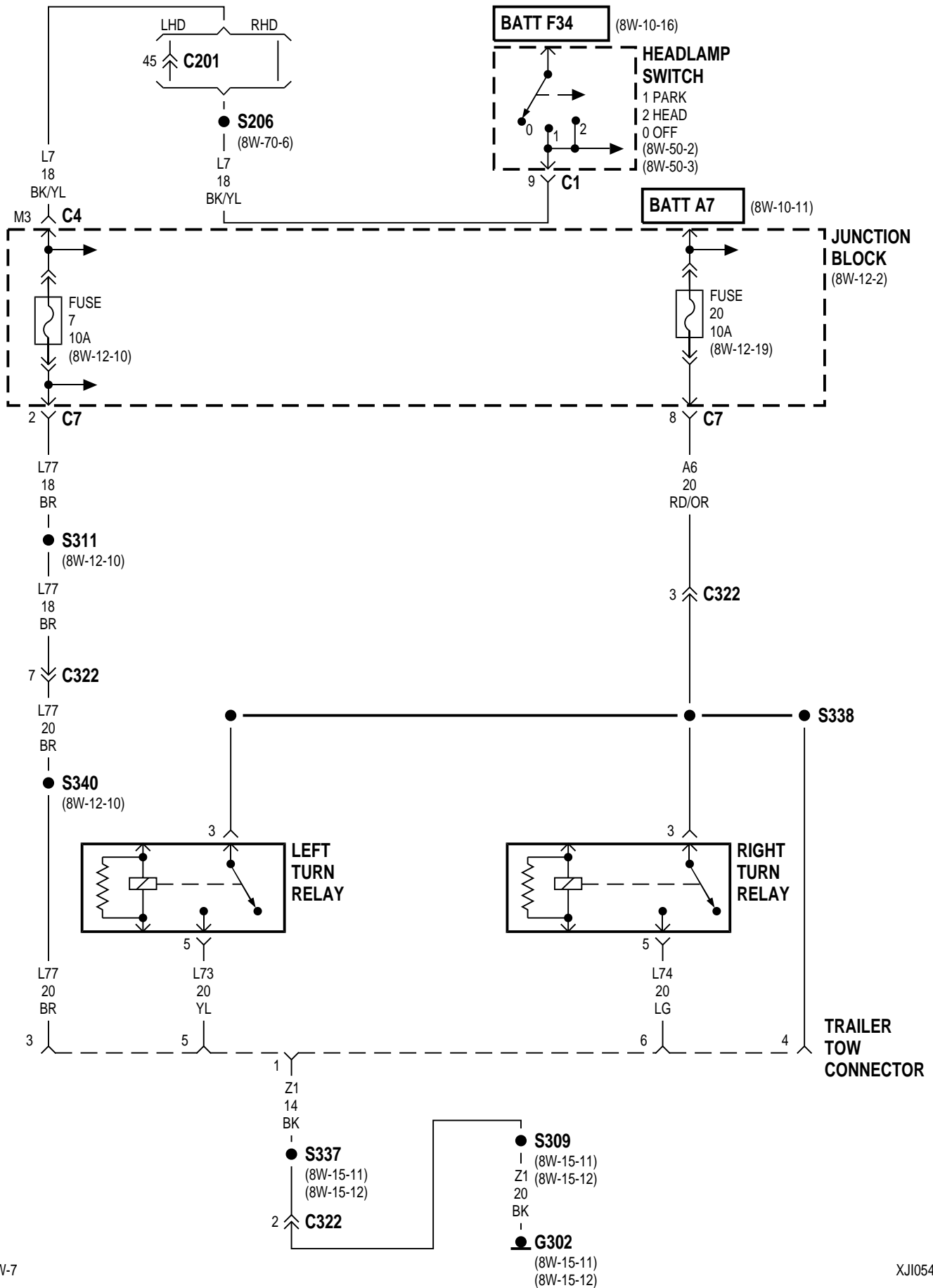
As the rear wiper motor turns, the park switch, internal to the motor, moves from the RUN position to the PARK position. When the wiper switch is turned OFF, the F20 circuit prevents the wipers from stopping in any position but park.

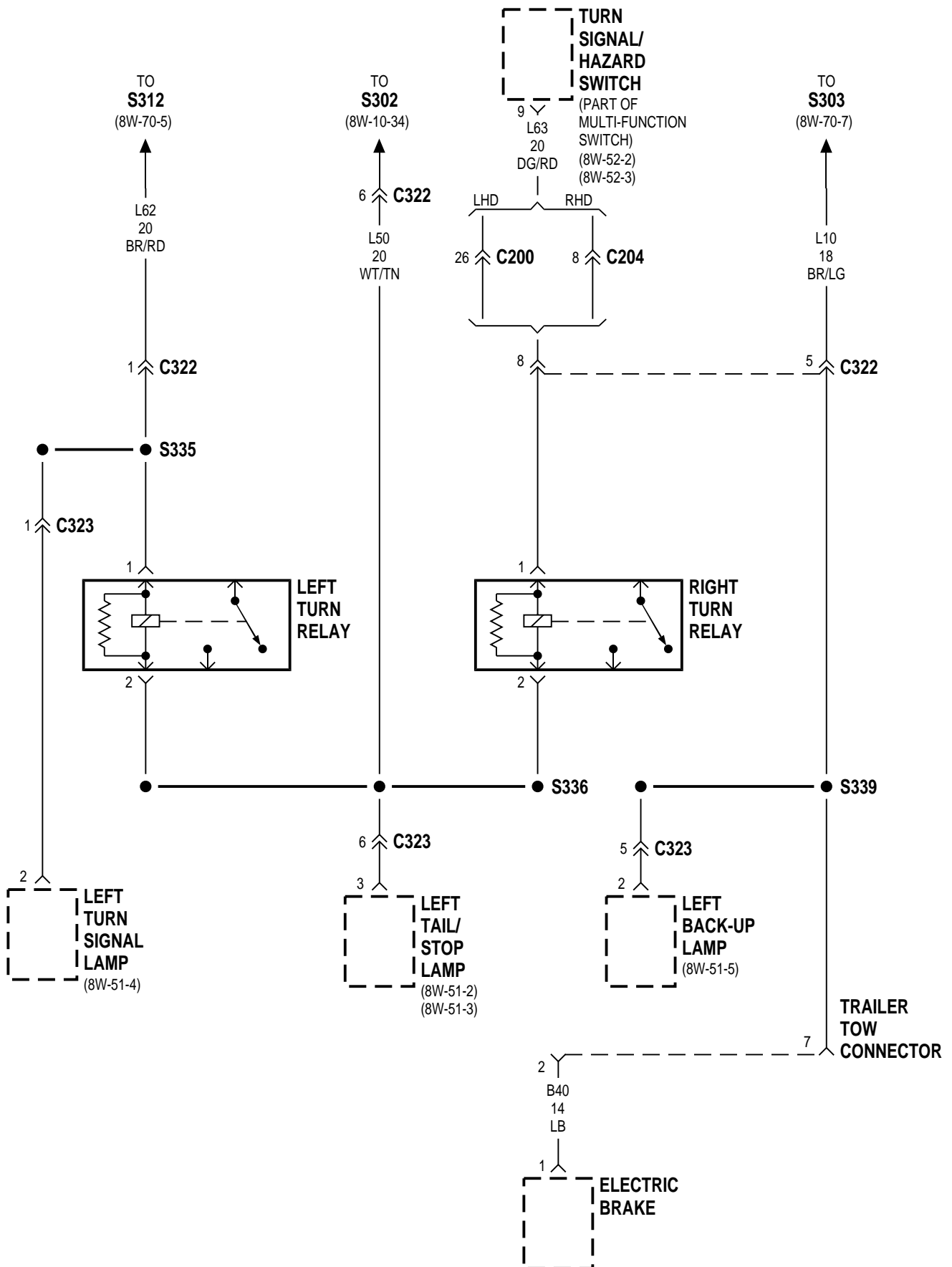
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8W-54 TRAILER TOW

DESCRIPTION AND OPERATION

TRAILER TOW

The factory installed trailer tow system in this vehicle uses two relays with the trailer tow wiring connector located below the rear bumper.

Battery voltage for the trailer tow system is supplied on circuit A7. This circuit is HOT at all times and connects to circuit A6 through fuse 20 in the junction block.

RIGHT TURN RELAY

Circuit A6 is the feed for the contact side of the relay. When the contacts are closed they connect circuit A6 and circuit L74. Circuit L74 supplies voltage to the trailer connector for the right turn and stop lamps.

Power and ground for the coil sides of the relay are supplied by circuits L50 and L62. When the brakes are depressed circuit L50 supplies voltage to the coil side of the relay through the stop lamp switch. When the stop lamp switch is open circuit L50 supplies ground to the coil side of the relay.

HELPFUL INFORMATION

Circuit L62 supplies voltage to the right rear turn signal lamps and the coil side of the relay, through the combination flasher.

LEFT TURN RELAY

Circuit A6 is the feed for the contact side of the relay. When the contacts are closed they connect circuit A6 and circuit L73. Circuit L73 supplies voltage to the trailer connector for the left turn and stop lamps.

Power and ground for the coil sides of the relay are supplied by circuits L50 and L63. When the brakes are depressed circuit L50 supplies voltage to the coil side of the relay through the stop lamp switch. When the stop lamp switch is open circuit L50 supplies ground to the coil side of the relay.

HELPFUL INFORMATION

Circuit L63 supplies voltage to the right rear turn signal lamps and the coil side of the relay, through the combination flasher.

HELPFUL INFORMATION

- Circuit L1 supplies voltage for the trailer back-up lamps.
- Circuit L77 supplies voltage for the running lamps.
- Circuit A6 supplies trailer battery voltage.

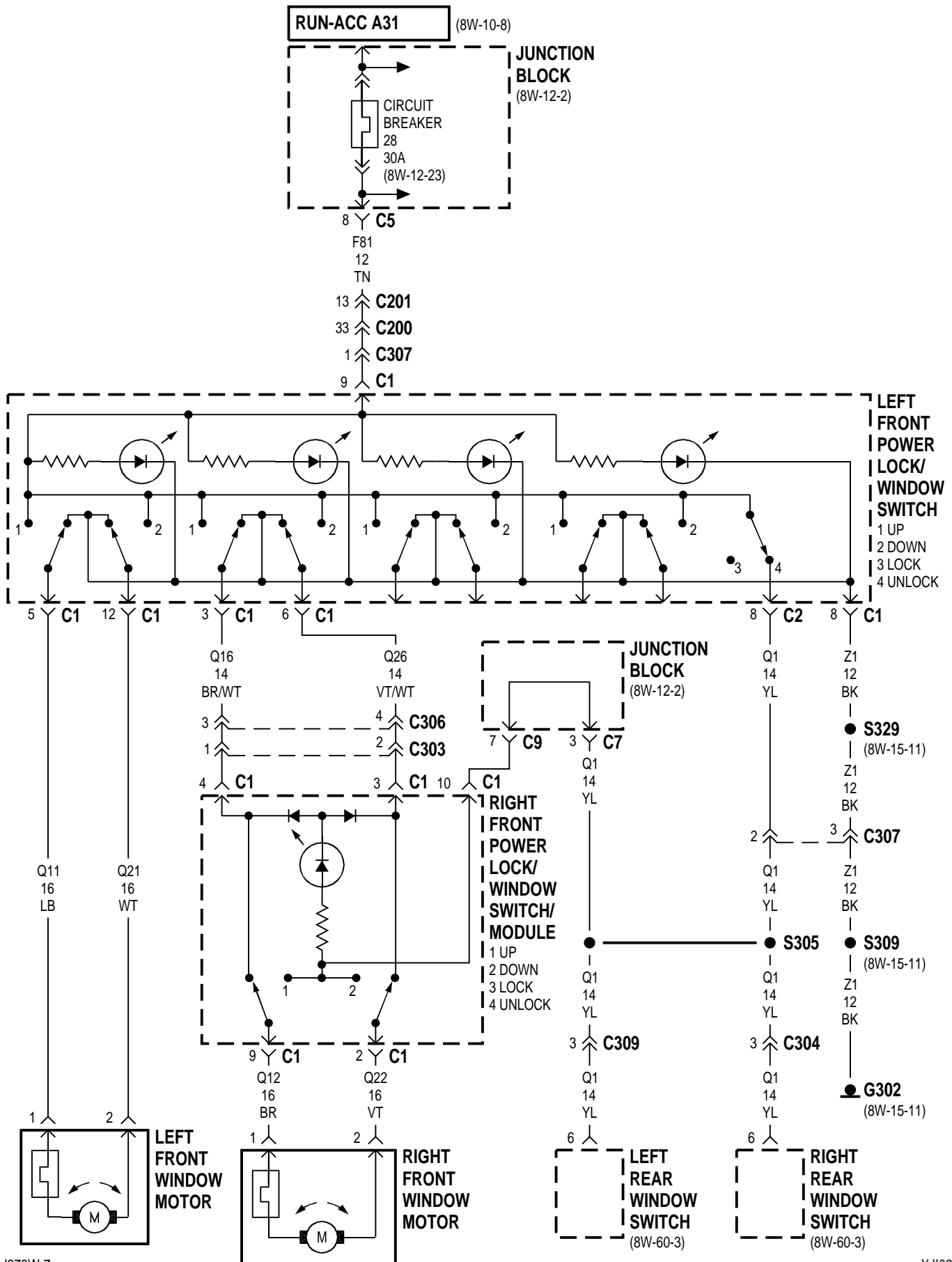
8W-60 POWER WINDOWS

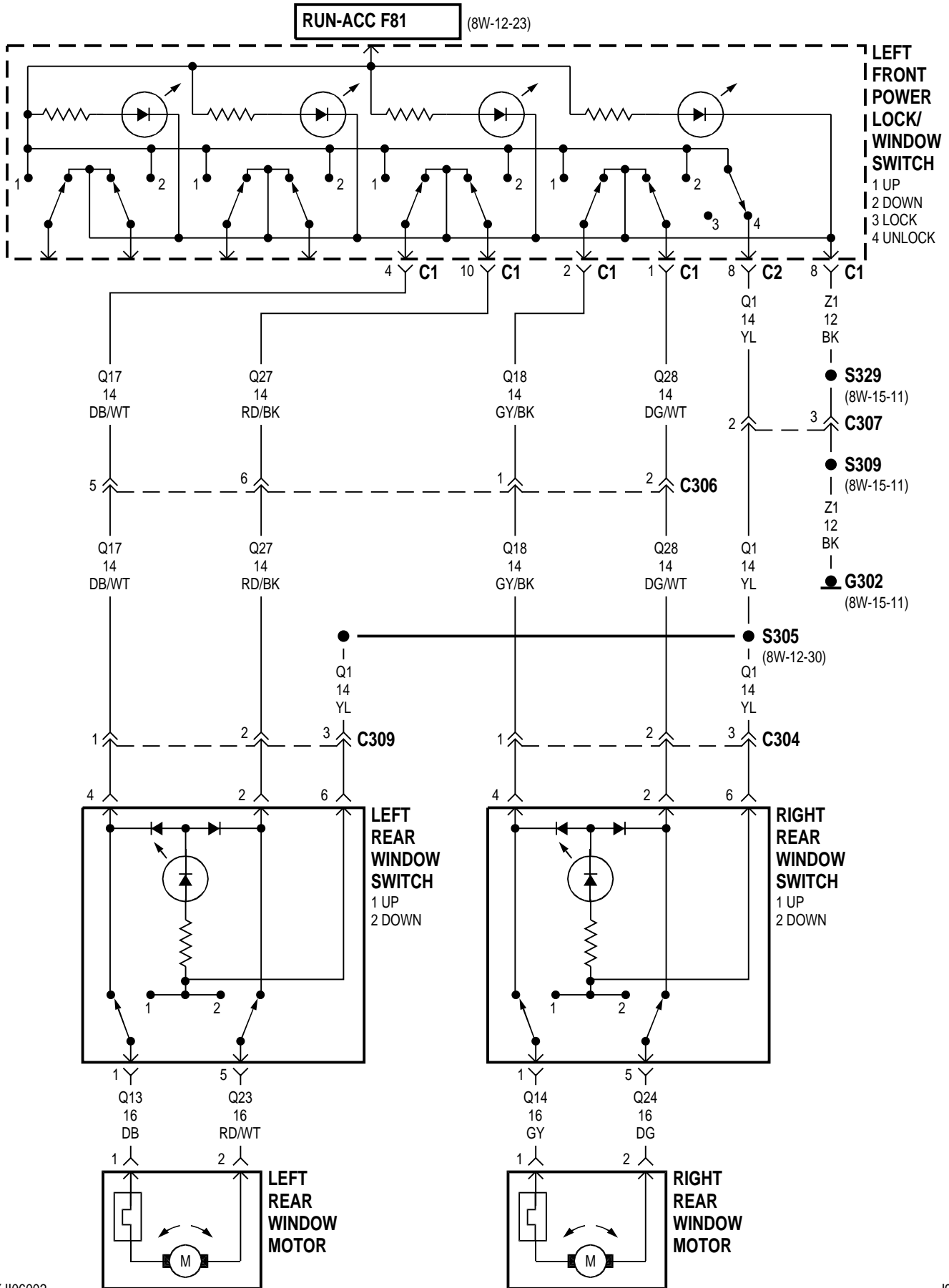
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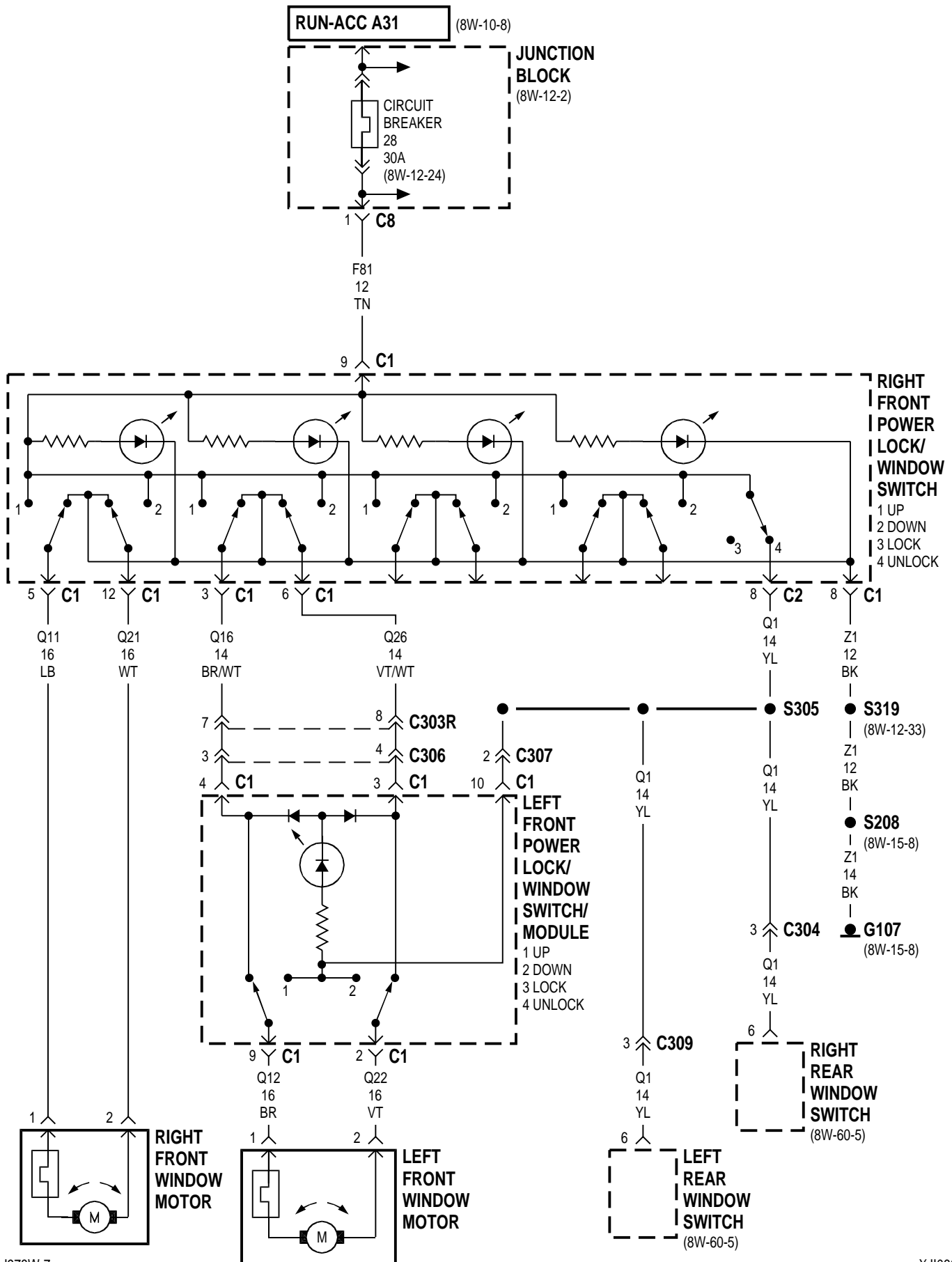
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G302	8W-60-2, 3	Right Rear Window Motor	8W-60-3, 5
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Left Rear Window Switch	8W-60-2, 3, 4, 5	S329	8W-60-2, 3
Right Front Power Lock/Window Switch ..	8W-60-4, 5		

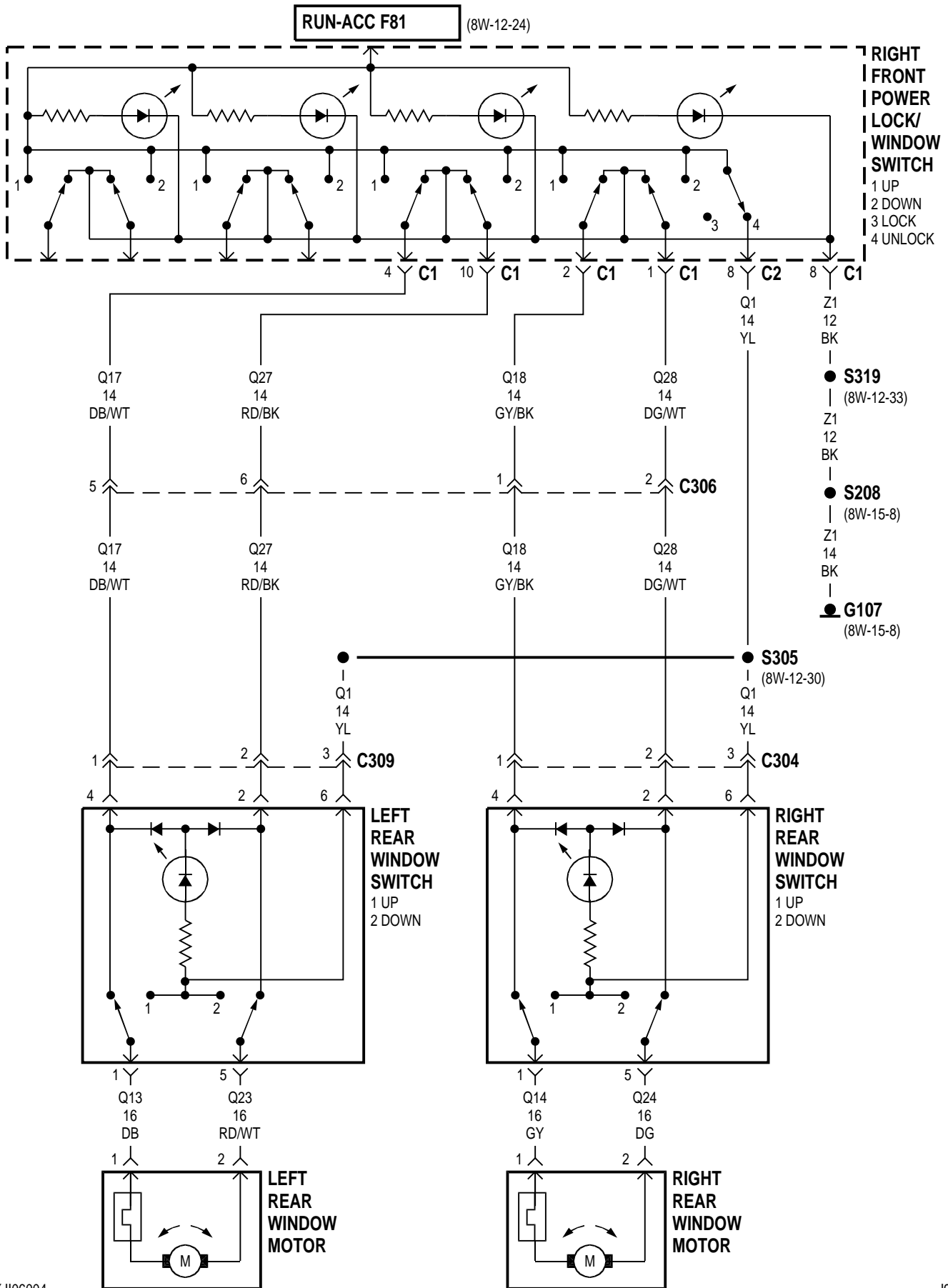
LHD





RHD





8W-60 POWER WINDOWS

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DESCRIPTION AND OPERATION

POWER WINDOW OPERATION

When the ignition switch is in the RUN or ACCESSORY position it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A31. Circuit A31 is connected to circuit F81 through a 20 amp. circuit breaker located in cavity 28 of the junction block. The power window system is powered by circuit F81.

Circuit F81 connects to the master window switch. Circuit Z1 provides ground for the power windows.

A LOCK-OUT feature is provided on the driver's door window switch. When this feature is engaged the other windows in the system will not operate.

LEFT FRONT WINDOW OPERATION

When the operator selects window DOWN operation, power is supplied on the F81 circuit through the switch to circuit Q21. Circuit Q21 connects the switch to the power window motor. Ground for the motor is supplied on the Q11 circuit back to the switch. A bus bar, internal to the switch, connects the Q11 circuit to the Z1 ground circuit.

For window UP operation the circuits are reversed. Circuit Q11 is the feed, and circuit Q21 is the ground.

RIGHT FRONT WINDOW OPERATION

When the DRIVER selects window DOWN operation, power is supplied on the F81 circuit through the switch to circuit Q26. Circuit Q26 connects the driver's door switch to the right front door switch. Power is passed through this switch to circuit Q22. The Q22 circuit then goes to the right front window motor.

Ground for the window motor is supplied on the Q12 circuit back to the right front door switch. Circuitry internal to the switch then passes the ground to circuit Q16. Circuit Q16 connects the right front door switch to the master switch. A bus bar, internal to the switch, connects the Q16 circuit to the Z1 ground circuit.

For window UP operation the circuits are reversed. Circuits Q16 and Q12 are the feeds, and circuits Q22 and Q26 are the grounds.

If the switch is being operated from the RIGHT FRONT door, and the operator is requesting window

DOWN operation, power is supplied on the Q1 circuit from the driver's master switch circuit through the switch to the Q22 circuit.

Ground for the motor is supplied on the Q12 circuit through the switch and back to the master switch on circuit Q16. A bus bar, internal to the switch, connects the Q16 circuit to the Z1 ground circuit.

For window UP operation, the circuits are reversed. Circuit Q12 is the power and circuit Q22 is the ground.

LEFT REAR WINDOW

When the DRIVER selects window DOWN operation, power is supplied on the F81 circuit through the switch to circuit Q27. Circuit Q27 connects the driver's door switch to the left rear door switch. Power is passed through this switch to circuit Q23. The Q23 circuit then goes to the left rear window motor.

Ground for the window motor is supplied on the Q13 circuit back to the left rear door switch. Circuitry internal to the switch then passes the ground to circuit Q17. Circuit Q17 connects the right front door switch to the master switch. A bus bar, internal to the switch, connects the Q17 circuit to the Z1 ground circuit.

For window UP operation the circuits are reversed. Circuits Q17 and Q13 are the feeds, and circuits Q23 and Q27 are the grounds.

If the switch is being operated from the LEFT REAR door, and the operator is requesting window DOWN operation, power is supplied on the Q1 circuit from the driver's master switch circuit through the switch to the Q23 circuit.

Ground for the motor is supplied on the Q13 circuit through the switch and back to the master switch on circuit Q17. A bus bar, internal to the switch, connects the Q17 circuit to the Z1 ground circuit.

For window UP operation, the circuits are reversed. Circuit Q13 is the power and circuit Q23 is the ground.

RIGHT REAR WINDOW

When the DRIVER selects window DOWN operation, power is supplied on the F81 circuit through the

DESCRIPTION AND OPERATION (Continued)

switch to circuit Q28. Circuit Q28 connects the drivers door switch to the right rear door switch. Power is passed through this switch to circuit Q24. The Q24 circuit then goes to the right rear window motor.

Ground for the window motor is supplied on the Q14 circuit back to the right rear door switch. Circuitry internal to the switch then passes the ground to circuit Q18. Circuit Q18 connects the right rear door switch to the master switch. A bus bar, internal to the switch, connects the Q18 circuit to the Z1 ground circuit.

For window UP operation the circuits are reversed. Circuits Q18 and Q14 are the feeds, and circuits Q28 and Q24 are the grounds.

If the switch is being operated from the RIGHT REAR door, and the operator is requesting window DOWN operation, power is supplied on the Q1 circuit from the driver's master switch circuit through the switch to the Q24 circuit.

Ground for the motor is supplied on the Q14 circuit through the switch and back to the master switch on circuit Q18. A bus bar, internal to the switch, connects the Q18 circuit to the Z1 ground circuit.

For window UP operation, the circuits are reversed. Circuit Q14 is the power and circuit Q24 is the ground.

HELPFUL INFORMATION

- When the ignition switch is in the RUN position, it connects circuit A1 from fuse 8 in the Power Distribution Center (PDC) to circuit A38.

- Refer to the appropriate group of the Service Manual for test procedures.

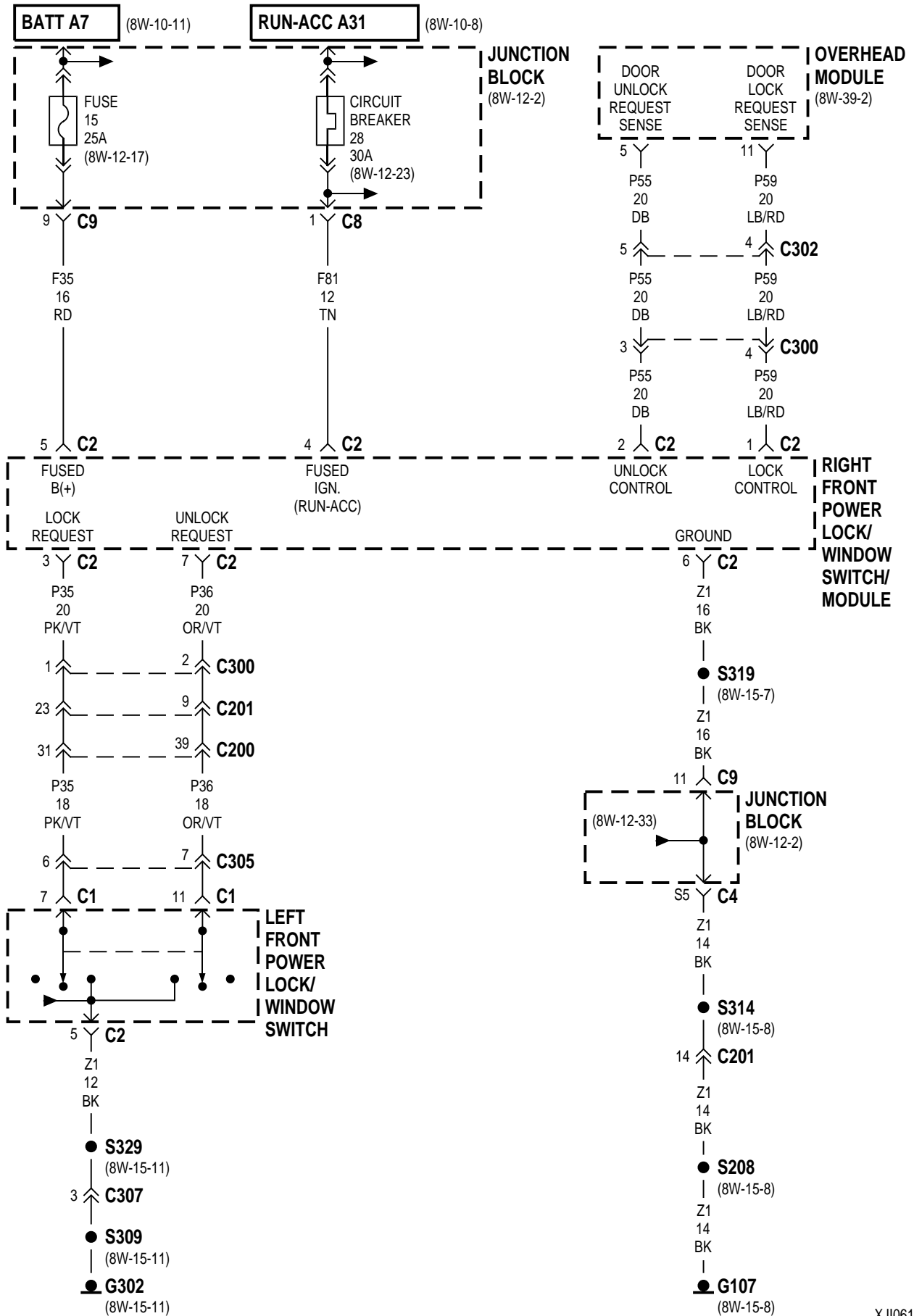
8W-61 POWER DOOR LOCKS

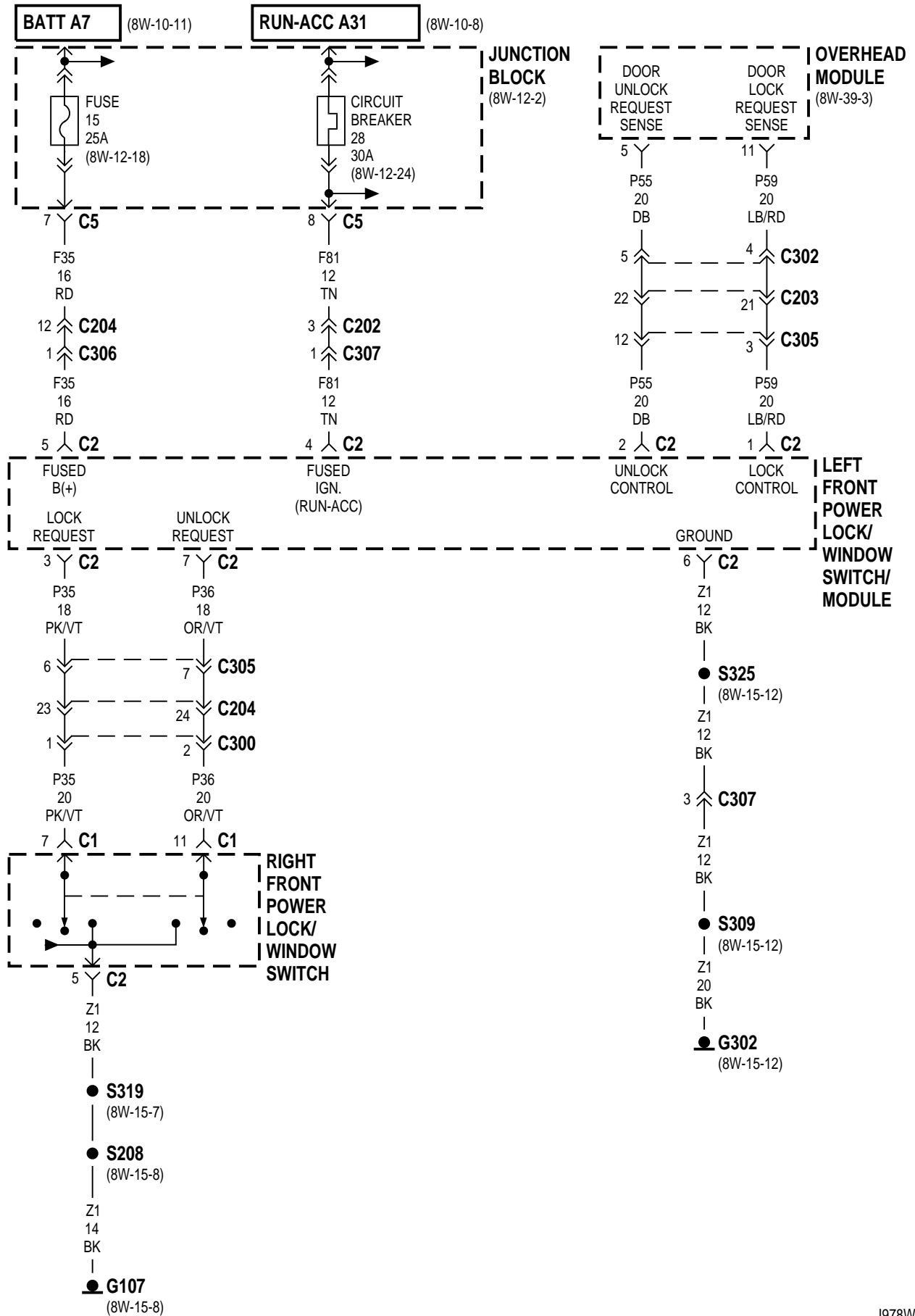
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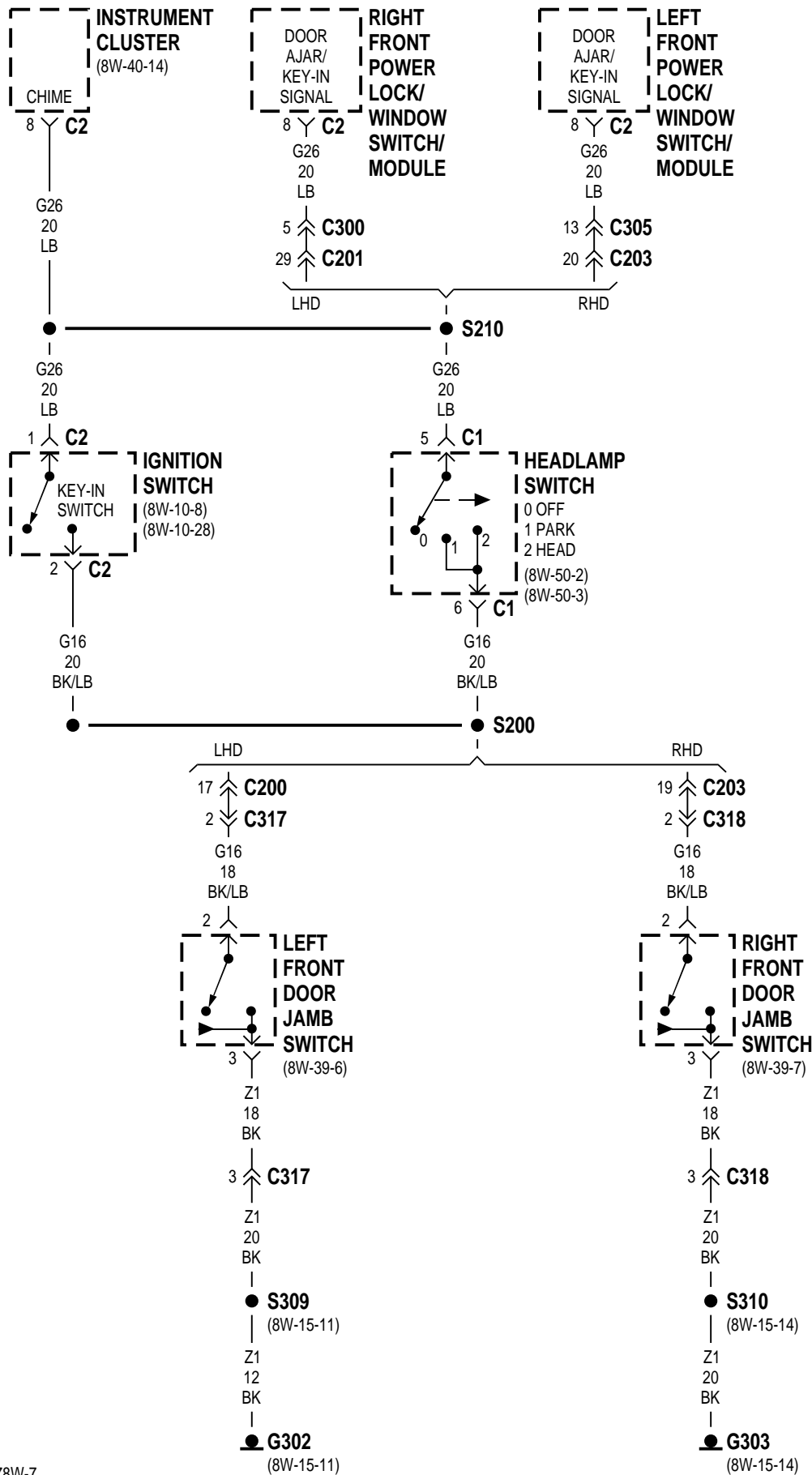
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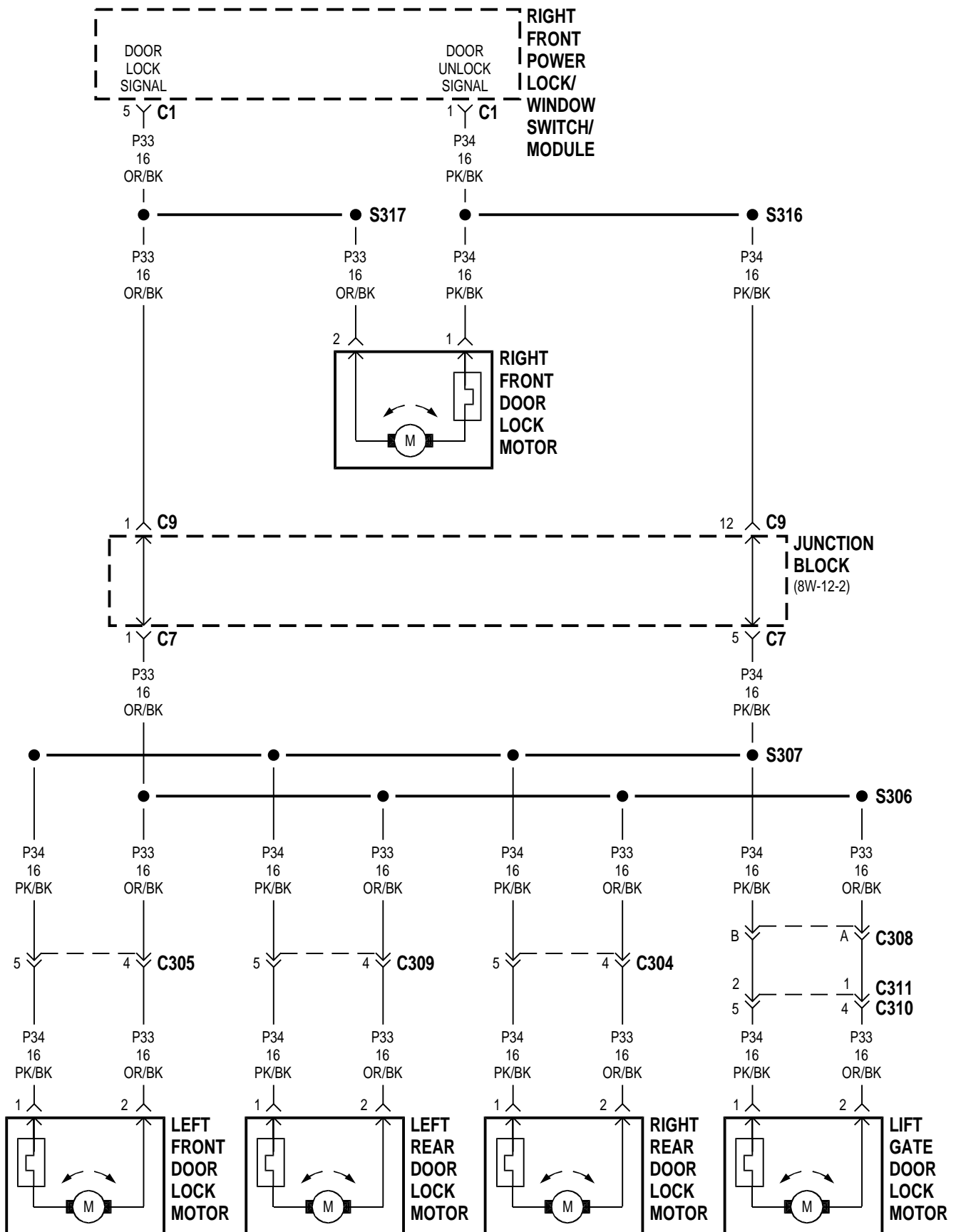
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G303	8W-61-4	S210	8W-61-4
Headlamp Switch	8W-61-4	S306	8W-61-5, 6
Ignition Switch	8W-61-4	S307	8W-61-5, 6
Instrument Cluster	8W-61-4	S309	8W-61-2, 3, 4
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Left Front Door Lock Motor	8W-61-5, 6	S316	8W-61-5
Left Front Power Lock/Window Switch ...	8W-61-2	S317	8W-61-5
Left Front Power Lock/Window Switch/Module	8W-61-3, 4, 6	S319	8W-61-2, 3
Left Rear Door Lock Motor	8W-61-5, 6	S322	8W-61-6
Lift Gate Door Lock Motor	8W-61-5, 6	S323	8W-61-6
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Right Front Door Jamb Switch	8W-61-4	S329	8W-61-2
Right Front Door Lock Motor	8W-61-5, 6		
Right Front Power Lock/Window Switch ...	8W-61-3		

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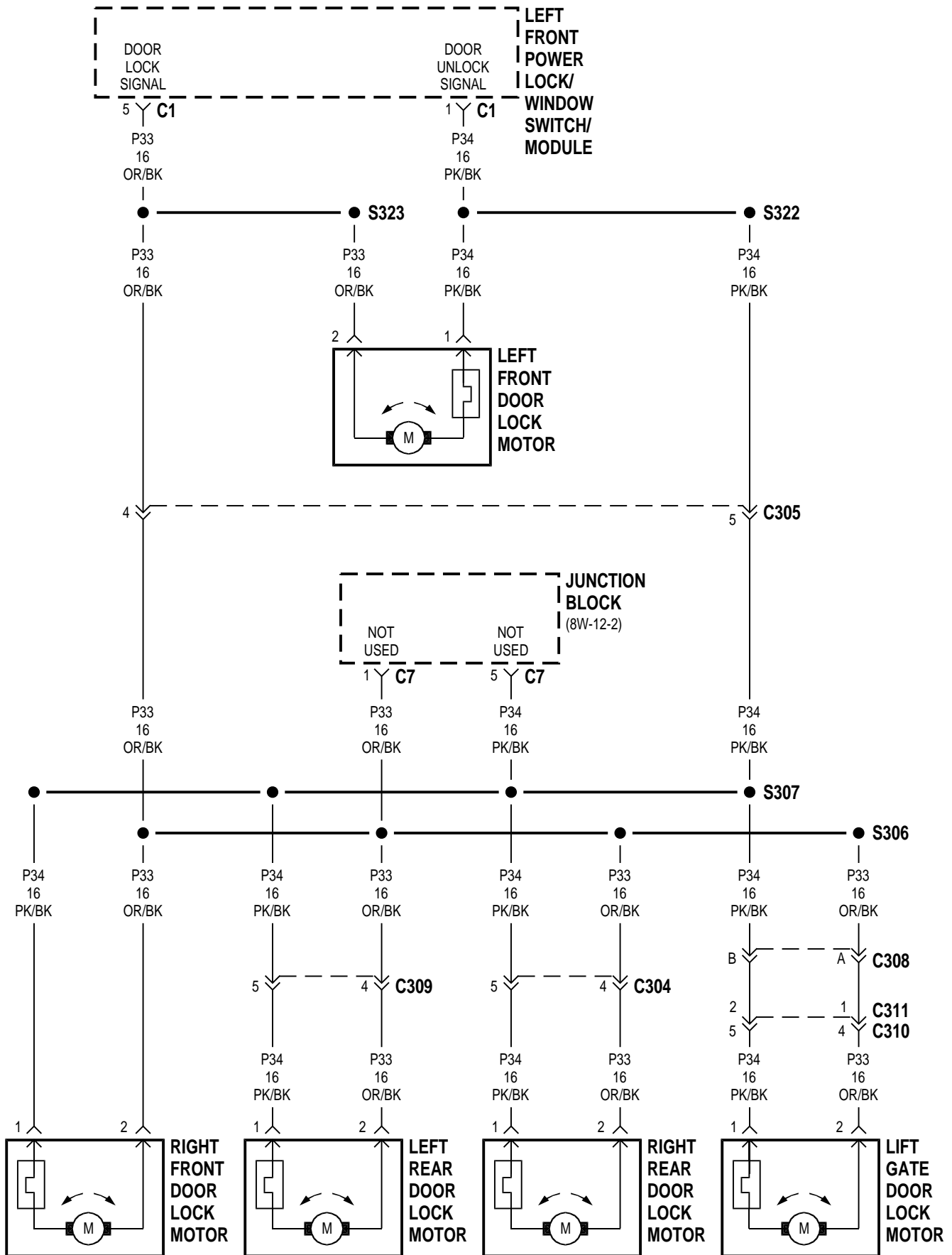








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8W-61 POWER DOOR LOCKS

DESCRIPTION AND OPERATION

INTRODUCTION

The Passenger Door Module and the left door lock switch, control the door locks, keyless entry, and illuminated entry systems.

POWER DOOR LOCK OPERATION

Circuit A7 from fuse 4 in the Power Distribution Center (PDC) supplies voltage to circuit F35 through fuse 15 in the junction block. Circuit F35 supplies voltage to the passenger door lock module.

When the ignition switch is in the ACCESSORY or RUN position it connects circuit A1 from fuse 2 in the Power Distribution Center (PDC) to circuit A31. Circuit A31 supplies power to circuit F81 through a circuit breaker in cavity 28 of the junction block.

DOOR LOCK SWITCH OPERATION—LOCK POSITION

When either door lock switch is put in the LOCK position, the switch connects voltage from circuit F35 to circuit P35. Circuit P35 provides the LOCK input to the door lock module. After receiving the LOCK input, the door lock module supplies power to the door locks on circuit P33. Circuit P33 is spliced to provide power for all the door lock motors.

In the LOCK position, ground for the door lock motors is on circuit P34, through the door lock module to ground on circuit Z1.

DOOR LOCK SWITCH OPERATION—UNLOCK POSITION

When either door lock switch is put in the UNLOCK position, the switch connects voltage from circuit F35 to circuit P36. Circuit P36 provides the UNLOCK input to the door lock module. After receiving the UNLOCK input, the door lock module supplies power to the door locks on circuit P34. Circuit P34 is spliced to provide power to all the door lock motors.

In the UNLOCK position, ground for the door lock motors is on circuit P33, through the door lock module to ground on circuit Z1.

REMOTE KEYLESS ENTRY AND ILLUMINATED ENTRY

The PDM controls the remote keyless entry and illuminated entry systems. When the module receives input from the transmitter, it operates the door locks and provides ground for courtesy lamps.

GROUND CIRCUIT

Circuit Z1 provides ground for the door lock module and drivers door lock switch..

HELPFUL INFORMATION

- Each door lock motor has an internal circuit breaker.

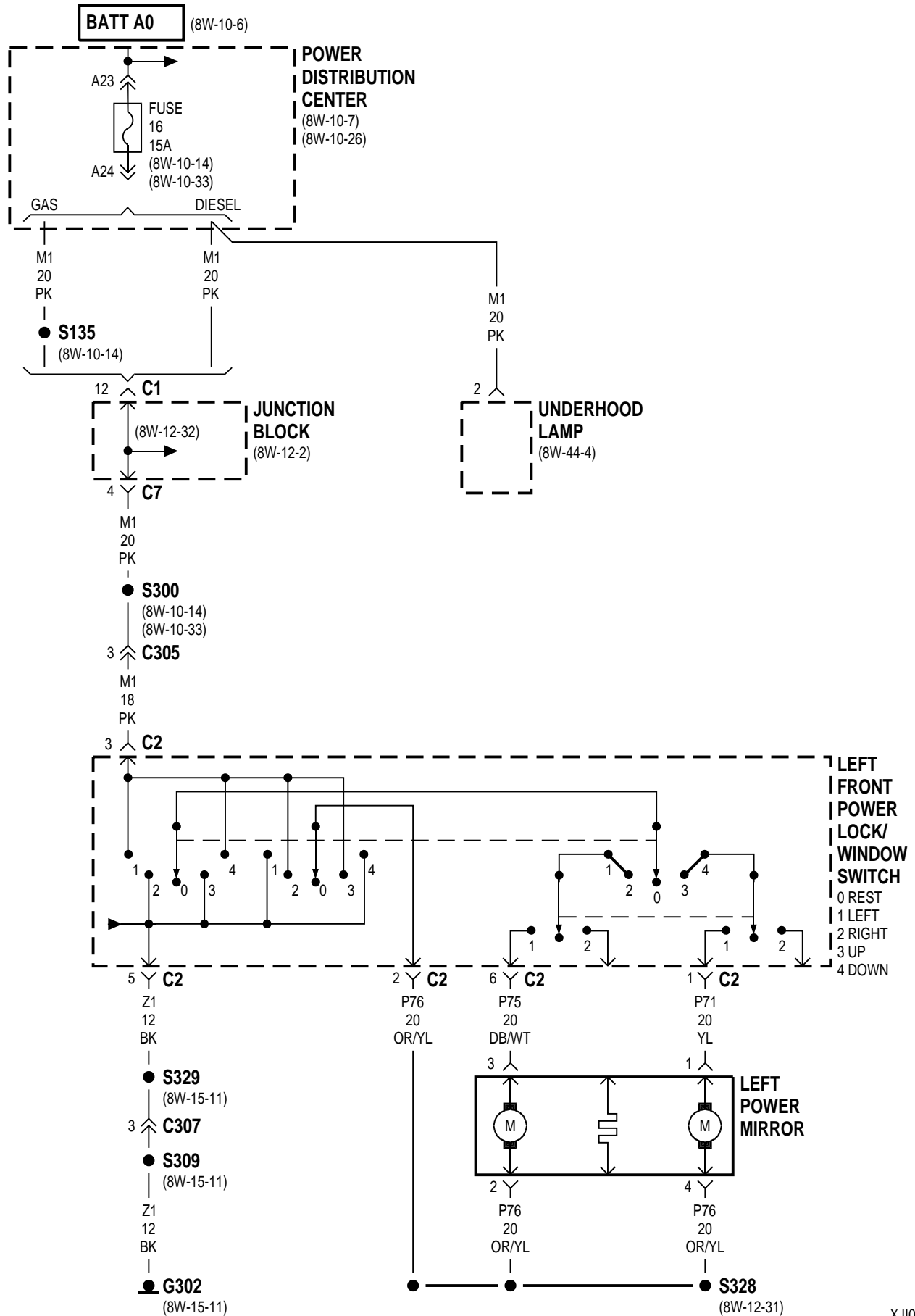
8W-62 POWER MIRRORS

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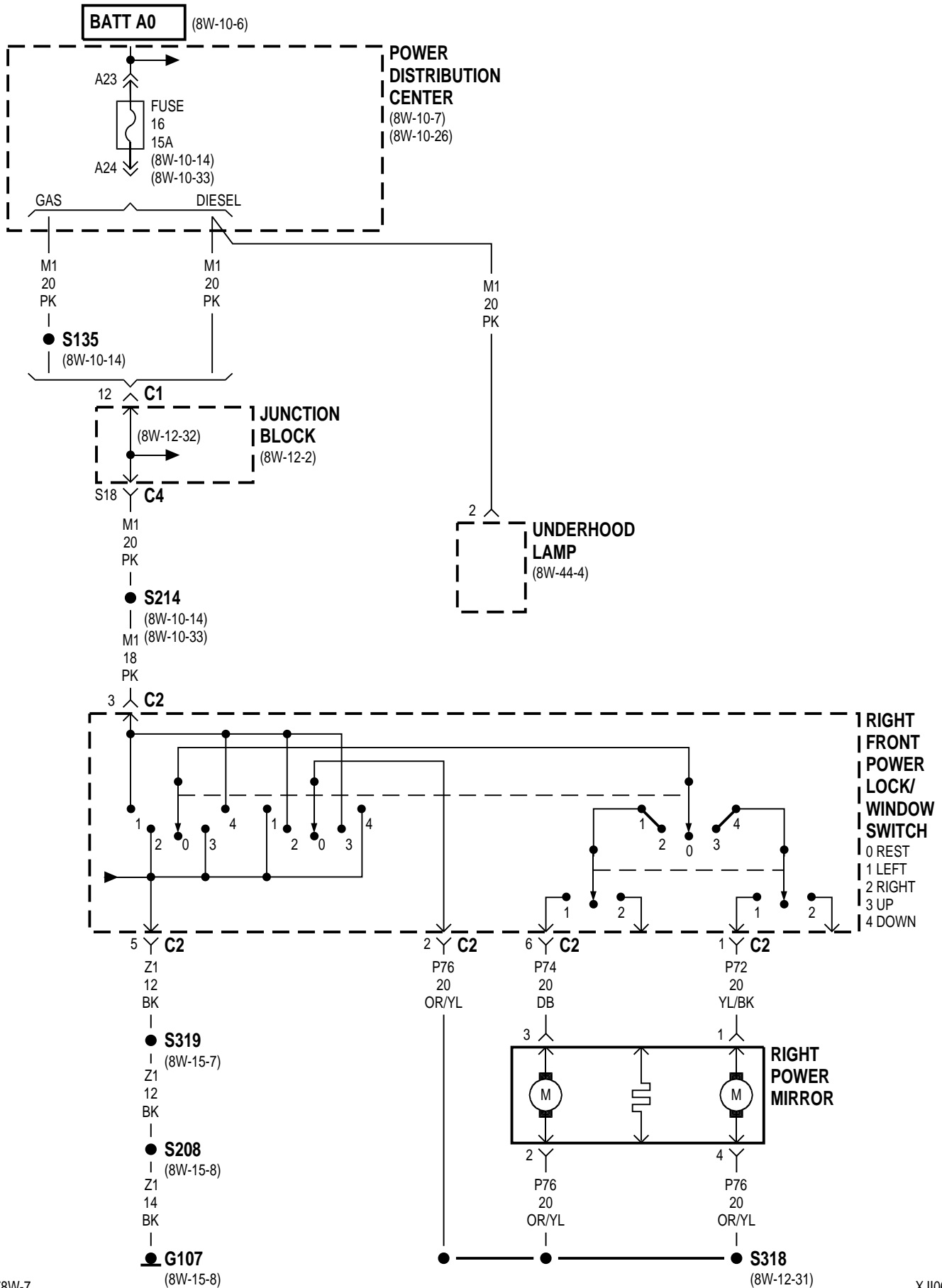
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G302	8W-62-2, 3	S300	8W-62-2
Junction Block	8W-62-2, 3, 4	S309	8W-62-2, 3
Left Front Power Lock/Window Switch ..	8W-62-2, 3	S318	8W-62-3, 4, 5
Left Power Mirror	8W-62-2, 3, 5	S319	8W-62-4, 5
Power Distribution Center	8W-62-2, 4	S328	8W-62-2, 3, 5
Right Front Power Lock/Window Switch ..	8W-62-4, 5	S329	8W-62-2, 3
Right Power Mirror	8W-62-3, 4, 5	Underhood Lamp	8W-62-2, 4
S135	8W-62-2, 4		

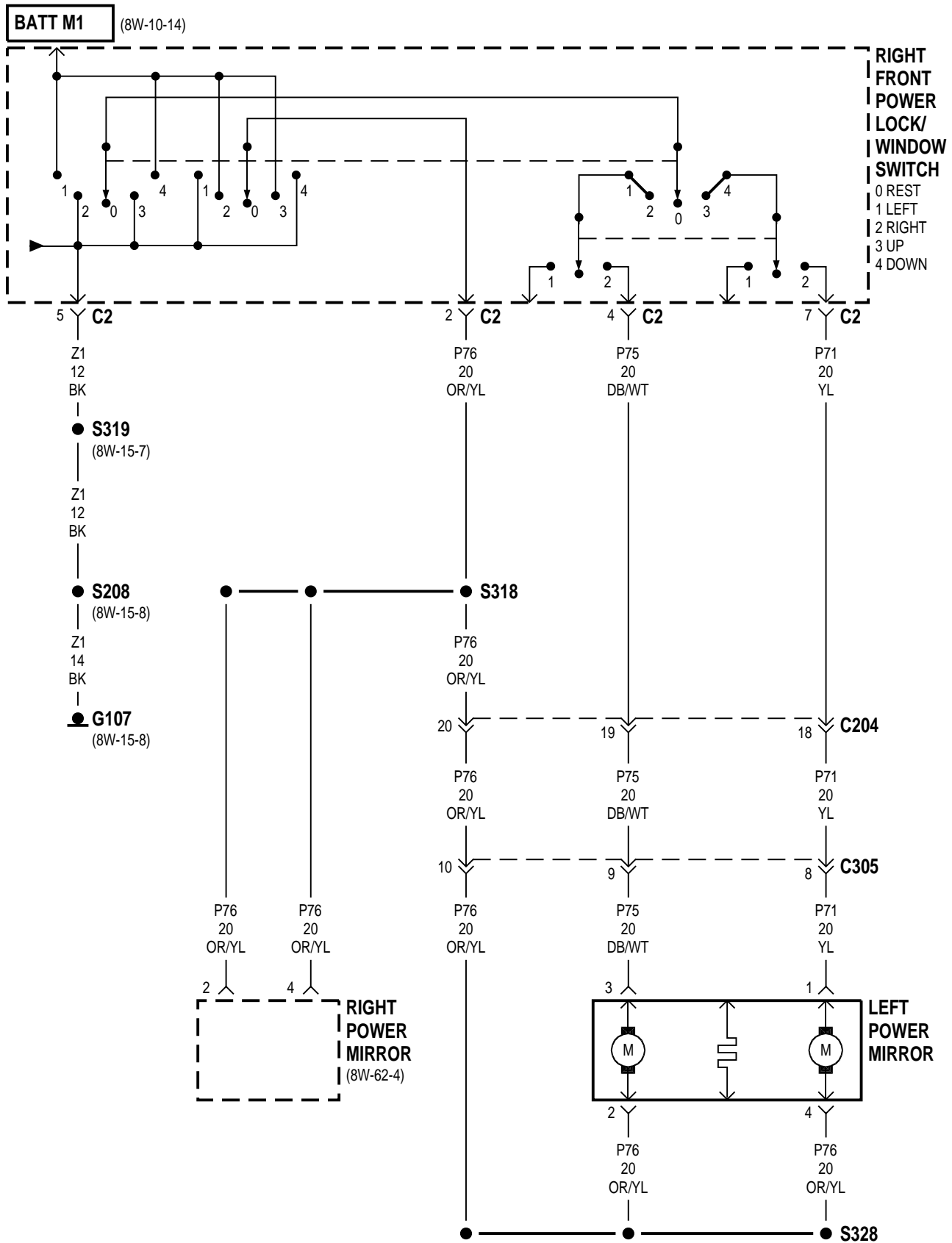
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XJ ————— **8W-62 POWER MIRRORS** ————— **8W - 62 - 5**
RHD



8W-62 POWER MIRRORS

DESCRIPTION AND OPERATION

POWER MIRRORS

Two power mirror systems are available. One power mirror system is used if the vehicle is also equipped with power windows and locks, and another system is used if the vehicle is not equipped with power windows and locks.

Each power mirror system uses a different switch and circuitry; however, on both systems have a single switch that operates both the left and right power mirrors. Each mirror has two motors; a LEFT/RIGHT motor and a UP/DOWN motor. The motors switch polarity to allow mirror adjustment.

Battery voltage for each system is supplied on circuit M1. This is the Ignition-Off Draw (IOD) circuit and protected by a 15 amp fuse located in the junction block.

Circuit Z1 connects to the power mirror switch and supplies ground for the power mirror system.

RIGHT POWER MIRROR OPERATION

WITH POWER WINDOWS AND LOCKS

In the RIGHT position, the power mirror switch supplies power to the right mirror LEFT/RIGHT motor on circuit P74 when a RIGHTWARD adjustment is made. Circuit P76 provides the ground path for the RIGHTWARD adjustments.

When the operator makes a LEFTWARD adjustment, polarity reverses. For LEFTWARD adjustments, the switch supplies battery voltage the right mirror LEFT/RIGHT motor on circuit P76. Circuit P74 supplies ground for LEFTWARD adjustments.

During UPWARD adjustments, the switch supplies voltage to the right mirror UP/DOWN motor on circuit P72. Circuit P76 supplies ground during UPWARD adjustments.

For DOWNWARD adjustments, the polarity is reversed, the switch powers the right mirror UP/DOWN motor on circuit P76. Circuit P72 supplies the ground path.

WITHOUT POWER WINDOWS AND LOCKS

In the RIGHT position, the power mirror switch supplies power to the right mirror LEFT/RIGHT motor on circuit P91 when a RIGHTWARD adjustment is made. Circuit P74 provides the ground path for the RIGHTWARD adjustments.

When the operator makes a LEFTWARD adjustment, polarity reverses. For LEFTWARD adjustments, the switch supplies battery voltage the right mirror LEFT/RIGHT motor on circuit P74. Circuit P91 supplies ground for LEFTWARD adjustments.

During UPWARD adjustments, the switch supplies voltage to the right mirror UP/DOWN motor on circuit P72. Circuit P90 supplies ground during UPWARD adjustments.

For DOWNWARD adjustments, the polarity is reversed, the switch powers the right mirror UP/DOWN motor on circuit P90. Circuit P72 supplies the ground path.

LEFT POWER MIRROR OPERATION

WITH POWER WINDOWS AND LOCKS

In the LEFT position, the power mirror switch supplies power to the left mirror LEFT/RIGHT motor on circuit P75 when a RIGHTWARD adjustment is made. Circuit P76 provides the ground path for the RIGHTWARD adjustments.

When the operator makes LEFTWARD adjustment, polarity reverses. For LEFTWARD adjustments, the switch supplies battery voltage to the left mirror LEFT/RIGHT motor on circuit P76. Circuit P75 supplies ground for LEFTWARD adjustments.

During UPWARD adjustments, the switch supplies voltage to the left mirror UP/DOWN motor on circuit P71. Circuit P76 supplies ground during UPWARD adjustments.

For DOWNWARD adjustments, the polarity is reversed, the switch powers the left mirror UP/DOWN motor on circuit P76. Circuit P71 supplies the ground path.

WITHOUT POWER WINDOWS AND LOCKS

In the LEFT position, the power mirror switch supplies power to the left mirror LEFT/RIGHT motor on circuit P91 when a RIGHTWARD adjustment is made. Circuit P75 provides the ground path for the RIGHTWARD adjustments.

When the operator makes LEFTWARD adjustment, polarity reverses. For LEFTWARD adjustments, the switch supplies battery voltage to the left mirror LEFT/RIGHT motor on circuit P775. Circuit P91 supplies ground for LEFTWARD adjustments.

During UPWARD adjustments, the switch supplies voltage to the left mirror UP/DOWN motor on circuit P71. Circuit P90 supplies ground during UPWARD adjustments.

For DOWNWARD adjustments, the polarity is reversed, the switch powers the left mirror UP/DOWN motor on circuit P90. Circuit P71 supplies the ground path.

HELPFUL INFORMATION

- Check the IOD fuse in cavity 16 of the junction block

DESCRIPTION AND OPERATION (Continued)

- Circuit M1 supplies voltage to the radio memory, lamp, underhood lamp, dome lamp, overhead console lamps and glove box lamp. Check for proper operation of these items.
- Move the switch to its various positions and listen for the motors to click or try to move. Some movement or clicking indicates a poor connection or a mechanical problem with a mirror.

HEATER ELEMENTS

The rear window defogger relay powers the heater elements in power mirrors. When the relay energizes, it supplies power to the heater elements on circuit C15. Circuit Z1 provides ground for the power mirror heater elements.

HELPFUL INFORMATION

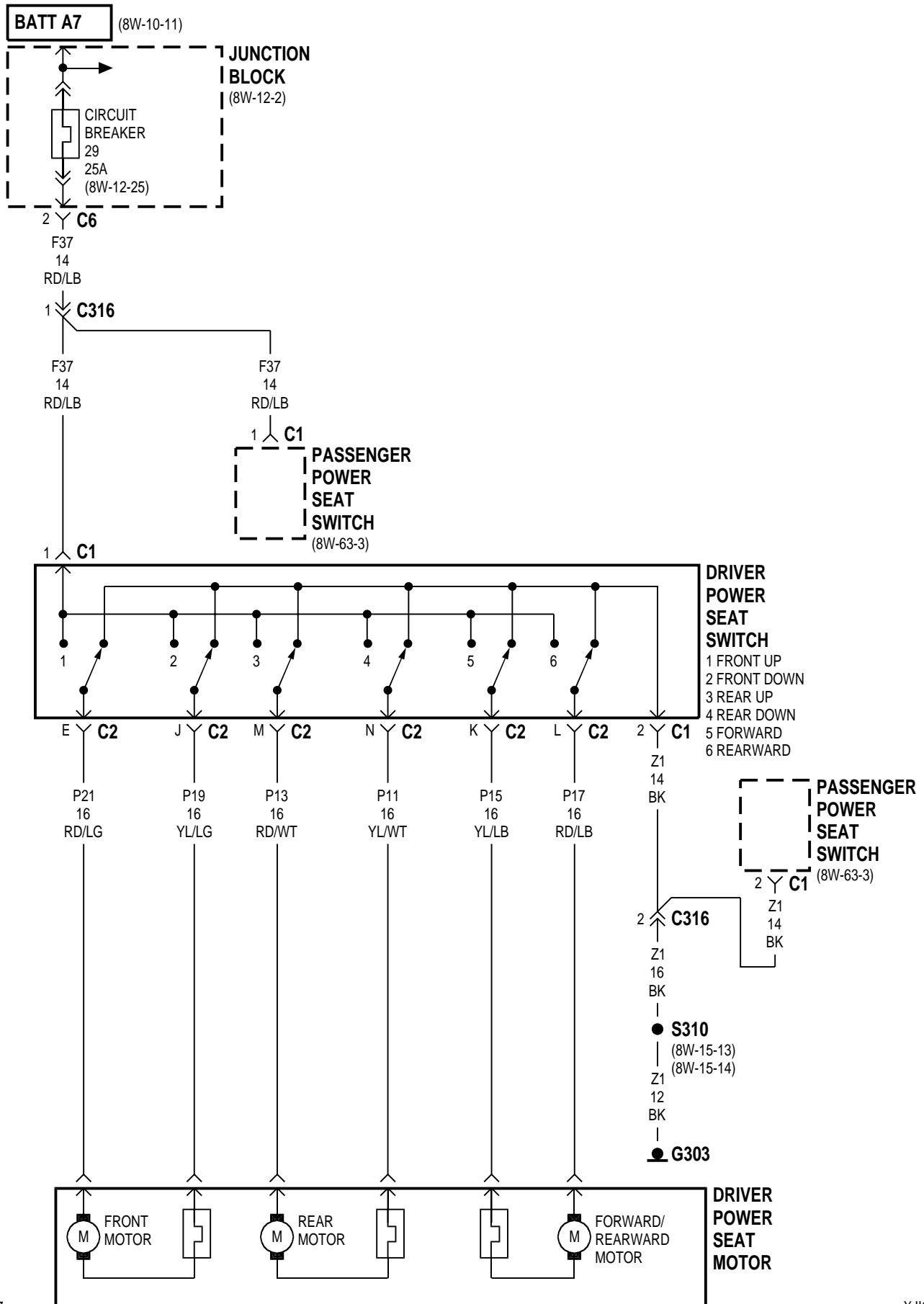
- Circuit F82 from fuse 2 in the fuse block powers circuit C15 when the rear window defogger relay energizes.
- Circuit A4 from fuse 3 in the Power Distribution Center (PDC) supplies battery voltage to the fuse block for fuse 2 and circuit F82.
- Check fuse 2 in the fuse block.
- Check fuse 3 in the PDC.

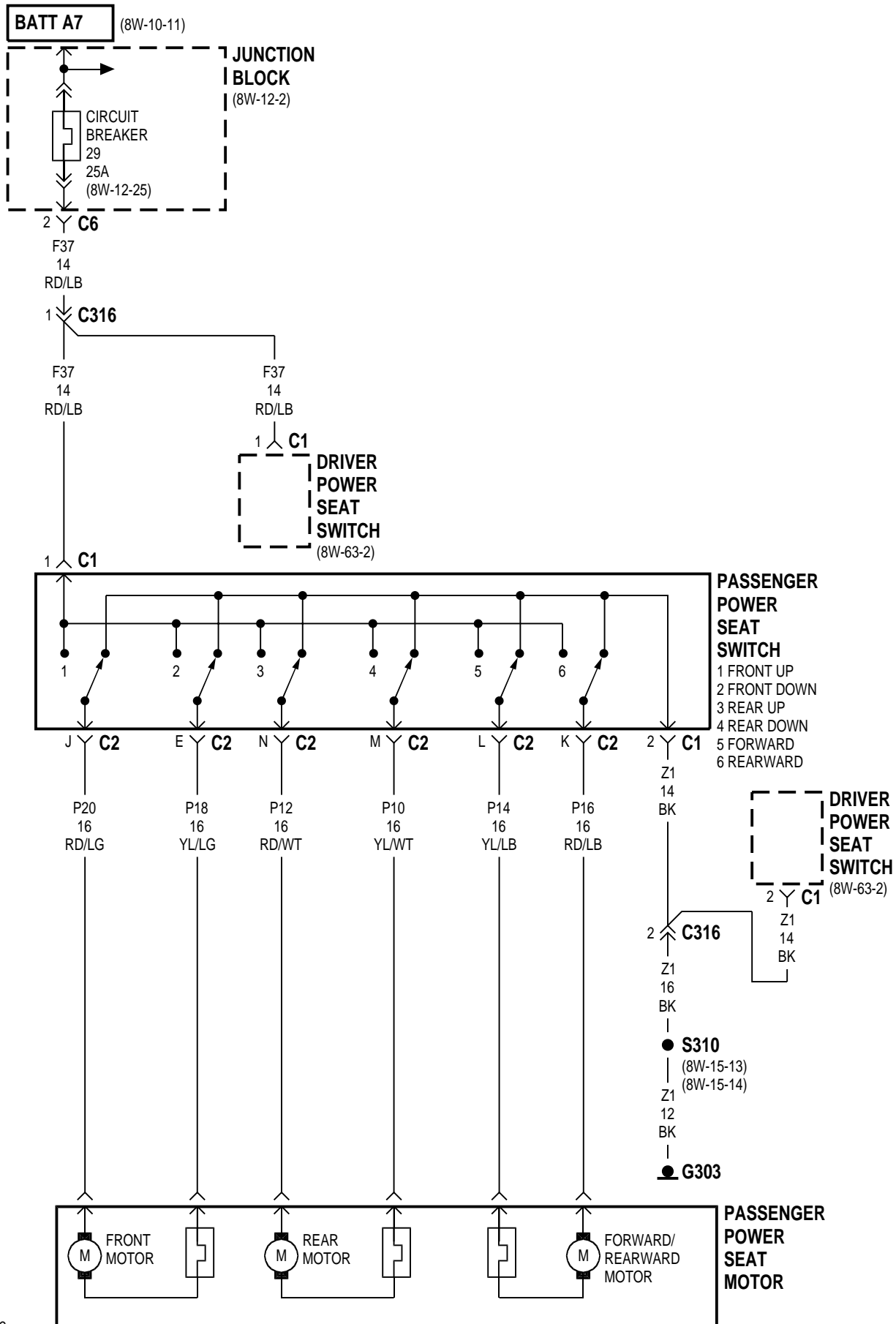
8W-63 POWER SEAT

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8W-63 POWER SEAT

DESCRIPTION AND OPERATION

POWER SEAT OPERATION

Battery voltage for the power seat system is supplied by circuit A7 from fuse 4 in the Power Distribution Center (PDC). Circuit A7 connects to circuit F37 through a circuit breaker in cavity 29 of the junction block. Circuit F37 connects to the power seat switch.

A bus bar internal to the power seat switch connects the power from circuit F37 to the switches. Grounding for the seat system is supplied on circuit Z1.

The motors located under the seat are protected by circuit breakers wired in with the motors. Each motor has its own circuit breaker.

When the operator selects the FRONT UP function, power is passed on the F37 circuit through the CLOSED contacts in the switch to the P19 circuit. The P19 circuit connects to the motor. Ground is provided on the P21 circuit back to the switch. A ground bus bar internal to the switch then connects to the Z1 ground circuit.

For FRONT DOWN function the circuits are reversed. P21 is the feed and P19 is the ground.

When the operator selects the SEAT FORWARD function, power is passed on the F37 circuit through the CLOSED contacts in the switch to the P15 circuit. The P15 circuit connects to the motor. Ground is

provided on the P17 circuit back to the switch. A ground bus bar internal to the switch then connects to the Z1 ground circuit.

For SEAT REARWARD function the circuits are reversed. P17 is the feed and P15 is the ground.

When the operator selects the REAR UP function, power is passed on the F37 circuit through the CLOSED contacts in the switch to the P11 circuit. The P11 circuit connects to the motor. Ground is provided on the P13 circuit back to the switch. A ground bus bar internal to the switch then connects to the Z1 ground circuit.

For REAR DOWN function the circuits are reversed. P13 is the feed and P11 is the ground.

When the operator selects the SEAT UP function power is passed on the F37 circuit through the CLOSED contacts in the switch to the P11 and P19 circuits. The P11 circuit connects to the REAR UP motor, and P19 connects to the FRONT UP motor. Ground is provided on the P13 and P21 circuits back to the switch. A ground bus bar internal to the switch then connects to the Z1 ground circuit.

For SEAT DOWN function the circuits are reversed. P13 and P21 circuits are the feeds and P11 and P19 are the grounds.

HELPFUL INFORMATION

Check the circuit breaker located in cavity 29 of the junction block

8W-70 SPLICE INFORMATION

Component	Page	Component	Page
S100	8W-70-4	S205	8W-706
S105	8W-70-4	S206	8W-70-6
S111	8W-70-2	S209	8W-70-4
S114	8W-70-2	S212	8W-70-4
S115	8W-70-5	S222	8W-70-2, 3
S117	8W-70-3	S303	8W-70-7
S138	8W-70-2, 3	S312	8W-70-5
S142	8W-70-7	S339	8W-70-7
S149	8W-70-3		

GAS

