

# **1990 ELECTRICAL DIAGRAMS AND DIAGNOSIS MANUAL**

## **R/V, P TRUCK MODELS**

When reference is made in this manual to a brand name, number, or specific tool, an equivalent product may be used in place of the recommended item.

This manual should be kept in a handy place for ready reference. If properly used, it will enable the technician to better serve the owners of Chevrolet vehicles.

All information, illustrations, and specifications contained in this manual are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

No part of this publication may be reproduced, stored in any retrieval system or transmitted, in any form or by any means, including but not limited to electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the Chevrolet Motor Division of General Motors Corporation. This includes all text, illustrations, tables and charts.

# NOTICE



**CONTENTS SENSITIVE  
TO  
STATIC ELECTRICITY**

F-05403

## **HANDLING ELECTROSTATIC DISCHARGE SENSITIVE PARTS**

When handling an electronic part that has an ESD sensitive sticker, the service technician should follow these guidelines to reduce any possible electrostatic charge build-up on the service technician's body and the electronic part in the dealership.

1. Do not open the package until it is time to install the part.
2. Avoid touching electrical terminals of the part.
3. Before removing the part from its package, ground the package to a known good ground on the truck.
4. Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across the seat, sitting down from a standing position or walking a distance.

# 1990 R/V, P TRUCK MODELS

## TABLE OF CONTENTS

### INTRODUCTION

	PAGE
How To Use This Manual	iii
Circuit Operation	iii
Circuit Diagrams	iii
Component Locations	iii
Diagnosis Charts	iii
Troubleshooting	iii
Basic Electricity	iv
Circuit Malfunctions	iv
Electrical Test Equipment	iv
Circuit Wiring Repair Procedures	vi
Weather-Pack Connectors	vii
Metri-Pack Connectors	vii
Special Tools	viii
Regular Production Option (RPO) List	ix
Abbreviation List	ix

### R/V TRUCK MODELS — SECTION A

	SECTION—PAGE
Phantom View	A-1
Symptoms Index	A-2
Fuse Block	A-4
Convenience Center	A-5
Power Distribution (RPO L05, L19)	A-6
Power Distribution (RPO LH6, LL4)	A-10
Auxiliary Battery (RPO TP2)	A-12
Headlamps (With Daytime Running Lamps — Canada Only)	A-14
Front Park, Marker, Roof and Hazard Lamps	A-23
Directional Signal Lamps	A-30
Horns	A-34
Start and Charge	A-36
Fuel Controls—Gasoline	A-41
Glow Plugs	A-48
Diesel Engine Fuel Controls	A-54
Auxiliary Cooling Fan	A-58
Auxiliary Fuel Tanks (RPO NL2)	A-60
Electronic Engine Controls—Gasoline	A-64
Electronic Control Module—Diesel	A-71
Transmission Converter Clutch Detent Solenoid	A-76
Automatic Transmission Kickdown Solenoid (RPO M40)	A-78
Air Conditioning	A-80
Heater	A-85

### SECTION—PAGE

Instrument Panel: Gages and Indicators	A-89
Safety Belt Warning Buzzer	A-102
Audio Alarm	A-104
Brake Systems	A-106
Four-Wheel Drive	A-110
Cruise Control	A-112
Courtesy Lamps, Cargo Lamps and Underhood Lamp	A-115
Radio	A-120
Rear Defogger	A-124
Power Windows	A-127
Power Mirrors and Power Door Locks	A-133
Pulse Wiper/Washer	A-142
Rear Exterior Lamps	A-146
Camper and Trailer Wiring	A-156
Vacuum Systems	A-158
Power Brake Booster Vacuum System	A-162
Component Locator Views	A-165
Bulb Data	A-191
Component Locator Index	A-192

### P TRUCK MODELS — SECTION B

	SECTION—PAGE
Phantom View	B-1
Symptoms Index	B-2
Fuse Block (RPO LB4, L05 and L19)	B-3
Fuse Block (RPO LL4)	B-4
Power Distribution (RPO LB4, L05 and L19)	B-6
Power Distribution (RPO LL4)	B-10
Headlamps	B-12
Headlamps (With Daytime Running Lamps)	B-15
Park, Marker and Hazard Lamps	B-20
Directional Signal Lamps	B-24
Horns	B-26
Wiper/Washer	B-28
Start and Charge	B-30
Fuel Controls—Gasoline	B-35
Fuel Controls—Diesel	B-38
Glow Plugs (RPO LL4)	B-41
Automatic Transmission Kickdown Solenoid (RPO M40)	B-44
Electronic Control Module	B-46
Electronic Control Module—Pinouts	B-47

(Continued on page ii)

## TABLE OF CONTENTS (Continued)

	SECTION—PAGE
Brake Warning System .....	B-52
Cruise Control .....	B-56
Instrument Panel: Gages and Indicators .....	B-58
Rear Exterior Lamps .....	B-66
Vacuum Systems .....	B-70
Component Locator Views .....	B-73
Bulb Data .....	B-81
Component Locator Index .....	B-82

## P CHASSIS — SECTION C

	SECTION—PAGE
Phantom View .....	C-1
Symptoms Index .....	C-2
Fuse Block .....	C-3
Power Distribution (RPO L05, L19) .....	C-4
Headlamps .....	C-7
Headlamps (With Daytime Running Lamps) .....	C-10
Park, Marker and Hazard Lamps .....	C-17
Directional Lamps .....	C-21
Horns .....	C-24
Start and Charge .....	C-26
Fuel Controls—Gasoline .....	C-30
Auxiliary Cooling Fan (RPO L19 with RPO C60) .....	C-34
Automatic Transmission Kickdown Solenoid .....	C-36
Electronic Control Module .....	C-38
Electronic Control Module—Pinouts .....	C-39
Air Conditioning .....	C-44
Heater .....	C-48
Instrument Panel: Gages and Indicators .....	C-51
Safety Belt and Key-In Warning Buzzer .....	C-58
Brake Warning Systems .....	C-60
Overspeed Alarm (RPO UD4) .....	C-64
Cruise Control .....	C-66
Dome Lamp .....	C-68
Radio (RPO UM6, UM7, UU9 and U63) .....	C-70
Power Windows .....	C-73
Power Door Locks .....	C-76
Wiper/Washer (and RPO CD4) .....	C-78
Backup, Tail and License Lamps .....	C-82
Vacuum Systems .....	C-84
Component Locator Views .....	C-87
Bulb Data .....	C-99
Component Locator Index .....	C-100

## INDEX

	SECTION—PAGE
Index .....	Index-1

## HOW TO USE THIS MANUAL

The purpose of this manual is to provide:

- Clean and simple electrical circuit diagrams
- Discussion of circuit electrical operation
- Simplified diagnosis and testing procedures
- Component location views.

Each electrical system or circuit will provide the following information:

- Circuit Operation
- Circuit Diagrams
- Component Location
- Diagnosis Charts.

## CIRCUIT OPERATION

The description of circuit operation provides a simplified discussion of what is happening within each circuit. The discussion includes power application, ground paths and component operation. The explanation is tied to the circuit diagram, and in some cases, to specific switch movement or components in a circuit.

## CIRCUIT DIAGRAMS

The circuit diagrams show the circuits and components that are covered in that particular system. By eliminating circuits and components not related to the systems being covered, the circuit diagrams are greatly simplified.

Circuit diagrams provide a schematic picture of how a circuit is powered, what the current path is to the components, and how the circuit is grounded.

For ease of diagnosis, all connectors (C), splices (S) and grounds (G) are identified by their own unique number. This number is used to reference component locations and also for identification in the diagnostic charts. The beginning

digit designates the ZONE at which the connector, splice or ground can be found. For example: C302. The "C" is for connector, the "3" represents Zone 300 and 02 is the connector number.

The following is a list of zones for the R/V, P and P Cab Chassis truck:

ZONE	LOCATION
100	— At and forward of the cowl
200	— Within I/P
300	— From I/P to rear of front seats
400	— Rearward of front seats
500	— Within left doors
600	— Within right doors
900	— Within the rear doors/endgate

All connectors are shown with their part numbers and are viewed from the mating end. The part number is used to save time when ordering replacement parts. All components and switches are shown in their rest position, unless otherwise marked. Splices that are marked with a number "S2" refers to a single wire that is spliced into a fusible link.

Each wiring circuit is identified by circuit number, size (in mm) and color. Wire colors are shown in the abbreviated form. Figure 1 shows how the circuit numbers are identified and color abbreviations used in this manual.

## COMPONENT LOCATIONS

When you are ready to locate the schematic components on the vehicle, use the Component Locations List, see Figure 2.

Listed in the left-hand column are the components shown on the schematic. Next to the Fuse Block is the location, "Behind LH side of I/P." Reference to LH and RH is made as though the troubleshooter were sitting in the driver's seat. On the same line, in the far right column, are page and figure references. In this case, you are directed to page 132, Figure 37.

Grounds are listed next in the table. The location description for ground G202 reads, "Behind LH side of I/P, on ALDL bracket." You are directed to page 131, Figure 32.

Every component, connector, ground or splice shown on a schematic can be pinpointed visually by using the Component Location Views in the back of this manual.

## DIAGNOSIS CHARTS

The diagnostic charts (Figure 3) are a step-by-step approach of a symptom. Each chart covers one symptom. For example, "Horn(s) will not operate."

The charts are divided into three columns; Test, Result and Action.

The test procedures are listed in numerical sequence and must be followed in that order. Each test step will describe what must be done to the circuit, what test equipment to use and where to connect the test equipment.

After the test procedure has been performed, refer to the Result column. This will list possible results of the test. Once the correct result has been found, follow it directly over to the Action column.

The Action column will instruct what must be done to correct the problem or will list the next test step to be performed.

## TROUBLESHOOTING

Before beginning any troubleshooting, there are several important steps that should be taken:

## Verify the problem

Operate system and list symptoms in order to:

- Check the accuracy and completeness of the complaint.
- Learn more that might give a clue to the nature and location of the problem.
- Analyze what parts of the system are working.

## Check the circuit diagram

Refer to the circuit diagram for clues to the problem. Location and identification of circuit components may give some idea of where the problem is.

The circuit diagrams are designed to make it easy to identify common points in circuits. This knowledge can help narrow the problem to a specific area. For example, if several circuits fail at the same time, check for a common power or ground connection. If part of a circuit fails, check the connections between the part that works and the part that doesn't work.

For example, if low beam headlamps work, but the high beams and the indicator lamp don't, then power and ground paths are good. Since the dimmer switch is the component which switches this power, it is most likely the cause of failure.

## Read "electrical operation"

Read the electrical operation for the problem circuit. By studying the circuit diagram and electrical operation, enough information should be learned to narrow the cause to one component or one portion of the circuit.

## Check for the cause of the problem

Diagnosis charts are provided for most of the common faults. Follow the procedures in the chart until the cause of the problem is located.

## Make the repair

Repair the problem circuit as directed in the diagnosis charts.

WIRE CIRCUIT NUMBER	WIRE SIZE IN SQ. MM.	COLOR OF WIRE INSULATION	
9A	0.5	BRN	
		BLK. ....	Black
		BLU. ....	Blue
		BRN. ....	Brown
		CHK. ....	Check
		CR. ....	Cross
		DK. ....	Dark
		GRA. ....	Gray
		GRN. ....	Green
		LT. ....	Light
		NAT. ....	Natural
		ORN. ....	Orange
		PNK. ....	Pink
		PPL. ....	Purple
		RED. ....	Red
		RST. ....	Rust
		SGL. ....	Single
		SIL. ....	Silver
		STR. ....	Stripe
		TAN. ....	Tan
		TR. ....	Tracer
		WHT. ....	White
		YEL. ....	Yellow
		//. ....	Parallel

LC0064-CK-E-RP

Figure 1—Wire Coding

COMPONENT LOCATION	Page — Figure
Fuse Block	Behind LH side of I/P . . . . . 132 — 37
Headlamp Dimmer Switch	Behind LH side of I/P, on steering column . . . . . 131 — 36
C100 (Diesel)	Engine compartment, on LH front of cowl . . . . . 130 — 28
C100 (Gasoline)	Engine compartment, on LH front of cowl . . . . . 127 — 19
G104	Behind LH headlamp, on radiator support . . . . . 122 — 5
G105	Behind RH headlamp, on tender . . . . . 135 — 47
G202	Behind LH side of I/P, on ALDL bracket . . . . . 131 — 32
S101	Harness, LH side of engine compartment . . . . . 135 — 47
S102	Harness, behind LH headlamp . . . . . 135 — 47
S103	Harness, behind RH headlamp . . . . . 135 — 47
S104	Harness, behind LH headlamp . . . . . 135 — 47
S207	I/P harness, behind LH side of I/P above steering column . . . . . 132 — 37

LC0065-CK-E-RP

Figure 2—Component Location Chart

### Verify that the repair is complete

Operate the system and check that the repair has removed all symptoms, and also has not caused any new symptoms.

### BASIC ELECTRICITY

Ohm's Law states that voltage (E) is equal to resistance (R) times current (I) in a circuit ( $E = R \times I$ ). The equation can also be shown as  $I = E/R$  or  $R = E/I$ .

If any two of the values are known for a given circuit, the missing one can be found by substituting the values in amperes, volts or ohms and solving for the missing value.

In a typical simple circuit, battery voltage is applied to a bulb through a 10-amp fuse and a switch. Closing the switch turns on the bulb.

To find the circuit current flow, use the equation:  $I = E/R$ . Filling in the numbers for the equation:  $I = 12 \text{ volts (E)}/2 \text{ ohms (R)}$ , or  $I = 6 \text{ amps}$ .

The bulb in this circuit operates at 6 amps and is rated to operate at this level. With 12 volts applied to the bulb, it will glow at the rated level.

### CIRCUIT MALFUNCTIONS

There are three electrical conditions that can cause a non-working circuit; an "Open Circuit," a "Short Circuit," or a "Grounded Circuit."

#### Open circuit (Figure 4)

An open circuit occurs whenever there is a break in the circuit. The break can be corrosion at the connector, a wire broken off in a device, or a wire that burned open from too much current.

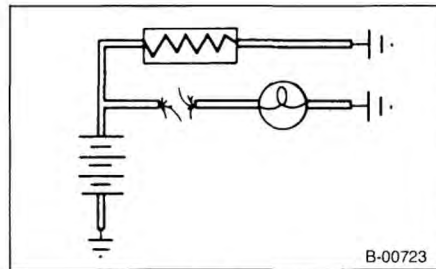


Figure 4—Open Circuit

#### Short circuit (Figure 5)

A short circuit happens when the current bypasses part of the normal circuit. This bypassing is usually caused by wires touching, salt water in or on a device such as a switch or a connector, or solder melting and bridging conductors in a device.

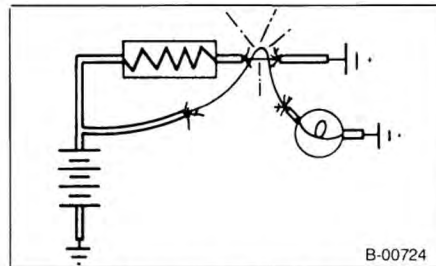


Figure 5—Short Circuit

#### Grounded circuit (Figure 6)

A ground circuit is like a short circuit but the current flows directly into a ground circuit that is not part of the original circuit. This may be caused by a wire rubbing against the frame or body. Sometimes a wire will break and fall against metal that is connected electrically to the ground side of the power supply. A grounded circuit may also be caused by deposits of oil, dirt and moisture around connections or terminals, which provide a good path to ground.

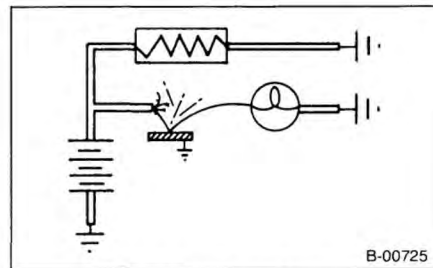


Figure 6—Grounded Circuit

### ELECTRICAL TEST EQUIPMENT

Various electrical testers have been developed over the years. A few of these are basic but required to perform a thorough electrical diagnosis. These include:

- Jumper wires
- Test lamps
- Self-powered test lamps
- Voltmeter
- Ohmmeter
- Ammeter

All of these testers come in a variety of models and any working model will be adequate for simple tests. However, when the value of a reading obtained using a meter is critical to the diagnostic procedure, accuracy becomes important. Make sure any electrical test meter used is of sufficient quality and accuracy to make the measurements required in the electrical testing.

#### Jumper wires

Jumper wires allow "jumping" across a suspected open or break in a circuit.

- If the circuit works properly with the jumper wire in place, but does not work when the jumper wire is removed, the circuit has an open spot.
- A circuit without any opens or breaks has continuity (which means continuous) and needs no further testing.

The jumper is usually a long wire with alligator clamps. A version of the jumper has a fuse holder in it with a 10-amp fuse. This will prevent damaging the circuit if the jumper is connected in the wrong way.

The jumper is used to locate opens in a circuit. One end of the jumper is attached to a power source and then the other end is attached to the load in the circuit, i.e., light, motor.

If the load works, try "jumping" to circuit points that are progressively closer to the power supply. When the circuit load stops working, the open has been located.

The jumper is also used to test components in the circuit such as connectors, switches, and suspected high resistance points.

#### Unpowered test lamp

This tool consists of a 12-volt lamp with leads. The ends of the leads usually have alligator clamps, but various kinds of probes, terminal spades, and special connectors are used also.

The unpowered test lamp is used on an open circuit. One lead of the test lamp is grounded and the other lead is moved around the circuit to find the open. Depending on the physical layout of the circuit, sometimes it will be easier to start at the power supply and other times it is easier to start at the circuit load or ground circuit.

**NOTICE: Test lamps are to be used only on circuits that do not contain solid state devices. If a test lamp is used in a circuit containing a solid state device, the current that the test lamp would draw would be above the current that the solid state device would be able to handle. Using a test lamp on a solid state device may destroy the device.**

Once one becomes familiar with the test lamp and the brilliance of the bulb in a normal circuit, high-resistance circuits can be recognized by the effect they have on the bulb. As the current drops in a high-resistance circuit, the bulb in the test lamp will glow less brightly. Although the 12-volt test lamp cannot be used as a foolproof test for high resistance, a less than normal brilliance of the light is an indication of circuit high resistance. Further testing will verify the condition and locate the cause.

The 12-volt test lamp continuity tester depends on the vehicle's battery to power the circuit under test. 12-volt testers are manufactured with a variety of tips, to permit touching them to connectors, bare wires, insulated wires or even wires within wiring harnesses. To check the tester before use, briefly touch the clip to one side of the battery and the probe to the other. 12-volt testers are NOT sensitive to polarity in a circuit, and can be connected either way.

The 12-volt test lamp generally has a sharp probe tip so it can be inserted into connector terminals or through the wire insulation for testing. It is important to keep the probe tip sharp to minimize the damage to wire insulation. When the test is complete at a particular point, be sure to tape any holes made in wire insulation.

#### Powered test lamp

This lamp is a pencil shaped unit with a self-contained battery, a 1.5 volt light bulb, a sharp probe and a ground lead fitted with an alligator clip.

### HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES

TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C204 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to junction block.
2. With the headlamp switch on and the dimmer switch to HIGH BEAM, connect a test lamp from YEL (10) wire at headlamp switch connector C204 to ground.	Test lamp lights.	Go to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C205 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from headlamp dimmer switch to headlamps.
	Test lamp does not light.	REPLACE headlamp dimmer switch.

LC0066-CK-E-RP

Figure 3—Typical Diagnosis Chart

This test lamp is used mainly for testing components that are disconnected from the vehicle power supply. The power test lamp is also useful for testing suspected high resistance points in a circuit such as connectors and ground circuits that are corroded or loose.

**NOTICE:** The following instruments: Ammeter, Voltmeter, and Ohmmeter, each have a particular application for troubleshooting electrical circuits.

When using an ammeter or voltmeter, and the value being tested is unknown, always use the highest scale first and work downward to a midscale reading whenever possible. This will avoid damage to the instrument.

Never use an ohmmeter in a power circuit, or as a substitute for a voltmeter or ammeter as damage to the instrument will result.

### Meters

Three types of meters are generally used for diagnosis. They are:

1. The Voltmeter.
2. The Ohmmeter.
3. The Ammeter.

These meters are available in two designs. They are:

1. Analog (Needle Type).
2. Digital (Electronic Display Type).

**CAUTION:** The correct type of meter must be used when diagnosing circuits containing solid state devices. Incorrect use of the meters will result in damage to the solid state devices.

Analog meters may be used for any circuit not containing a solid state device, while a digital meter **MUST** be used to diagnose any circuit with a solid state device. Circuits which contain a solid state device, such as the Electronic Control Module, should be tested only with a 10-megaohm or higher impedance digital multimeter (J 34029-A or equivalent).

### Ammeter (Figures 7 and 10)

An ammeter is used to measure current flow (amperage) in a circuit. Amperes are units of electron flow which indicate how many electrons are passing through the circuit. Ohm's Law indicates that current flow in a circuit is equal to the circuit voltage divided by total circuit resistance.

At normal operating voltage, most circuits have a characteristic amount of current flow, referred to as normal current draw. Current draw is measured in amperes (amps) with an ammeter. Referring to a specified current draw rating,

measuring current draw and comparing the two provides much useful diagnostic information.

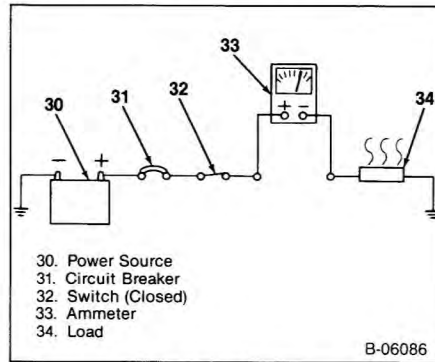


Figure 7—Ammeter

Disconnect the circuit from the power source before connecting the ammeter. The ammeter measures the amount of electrical current, amperes, moving through a conductor. The ammeter (Figure 7) must be placed in series with the circuit being tested. Be sure that the ammeter's positive terminal is connected to the positive (battery) side of the circuit and its negative terminal to the negative (ground) side of the circuit.

**CAUTION:** Never connect an ammeter across a circuit in the manner of a voltmeter. The ammeter could be damaged by the vehicle electrical system.

Excessive current draw is responsible for blowing fuses and, in some cases, draining the battery. An ammeter will help diagnose these conditions by locating the cause of the excessive current draw. On the other hand, there are times when a reduced current draw at a component (a power window motor for example) causes unsatisfactory performance of an electrical system.

### Ohmmeter (Figures 8 and 10)

The ohmmeter is used to read resistance (ohms) in a circuit. There are both analog-type and digital-type ohmmeters.

- An analog-type meter shows the actual resistance on a scale by the movement of a needle.
- On a digital-type meter, the resistance measured is converted inside the meter to a numerical output which is shown on a display panel.

Ohmmeters use a small battery to supply the voltage and current which flows through the circuit being tested. The cur-

rent flows through the circuit, positions the needle on analog-type meters, or converts to a digital readout on digital-type meters. This is done in terms of resistance as shown in Ohm's Law ( $R = E/I$ ).

Although there are several different styles of analog ohmmeters, all will usually have the following features in addition to the meter movement:

- A range selector switch which permits the selection of different ranges of resistance
- A set adjust control which allows the meter to be set at zero for accurate measurements
- Some model ohmmeters also have a built-in feature that allows the ohmmeter to be used as a self-powered test lamp.

Digital meters do not have to be zeroed. They have various ranges just like the analog meters.

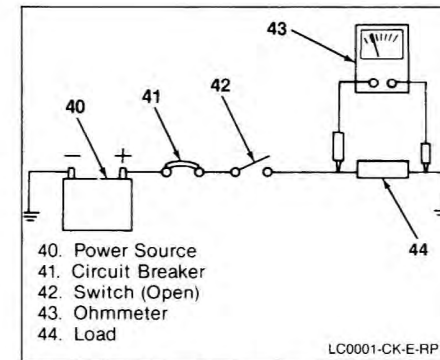


Figure 8—Ohmmeter

The ohmmeter can be used to perform tests for opens or shorts and to read actual resistance in a circuit or a component.

**CAUTION:** Like a self-powered test lamp, the ohmmeter can only be used on circuits where power has been removed (Figure 8). It is designed to be operated on its own power supply. This power supply provides low voltage and current levels for the meter to make resistance measurements. The 12-volt electrical system power in the automotive circuits could damage the meter.

Electrical circuits can be checked for opens using basically the same procedure as previously described for the self-powered test lamp. The circuit must be separated from all power sources. The ohmmeter is connected across the two open ends of the circuit to be checked. A high reading (infinity) is an indication of an open circuit. A low reading (near zero) is an indication of a continuous circuit.

Checks for short circuits are made in a similar manner to that used for open circuits, except that the circuit being checked must be isolated from both power and normal ground.

Connecting the ohmmeter between an isolated circuit and a good ground point will allow checking the circuit for shorts to ground.

A short to ground in the circuit will be indicated on the meter by a near zero reading. A good circuit (no short to ground) will show up as an infinity (very high resistance) indicated on the meter.

To measure the resistance of a component or a circuit, the component or circuit must be isolated from all other components (or circuits). The ohmmeter leads are then placed across the component or circuit and the resistance is read on the ohmmeter.

### Voltmeter (Figures 9 and 10)

The voltmeter (properly observed) will give the technician more information than the ammeter, ohmmeter and test lamp combined. Its application for troubleshooting here is to measure the electrical pressure (voltage) drop in a resistance circuit (Figure 9). Voltage drop is a reduction or "using up" of the voltage to push electricity through a resistance. It can be compared to the pressure water flowing through a metering valve makes.

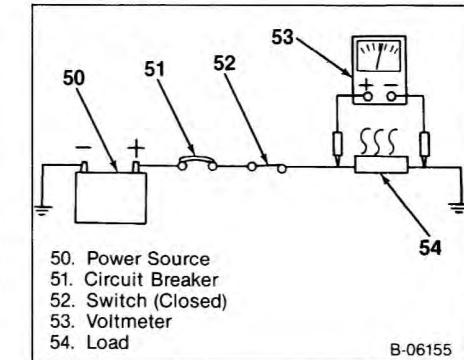


Figure 9—Voltmeter

Low voltage to a lamp will make the lamp glow dimly. This can be caused by low source voltage (battery discharge or low alternator output), or by high resistance in the circuit due to a poor connection. Before making any meter measurements, it is important to review the relationship between current, voltage and resistance (Ohm's Law).

Being able to determine voltage drops is important because it provides the following information:

- Too high of a voltage drop indicates excessive resistance. If, for instance, a blower motor runs too slowly or a light

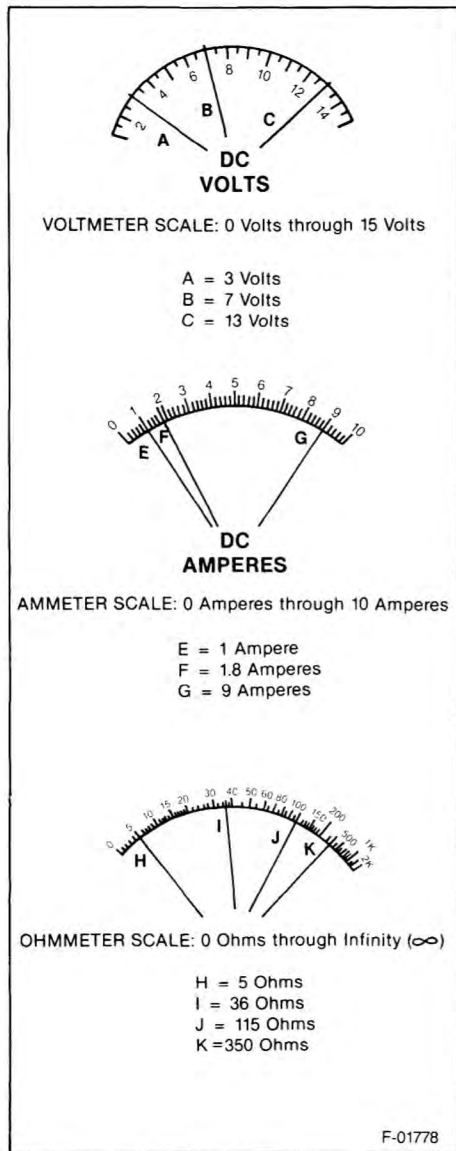


Figure 10—Meter Scales

glows too dimly, one can be sure there is excessive resistance in the circuit. By taking voltage drop readings in various parts of the circuit, the problem can be isolated (corroded terminals for example).

- Too low of a voltage drop, likewise, indicates low resistance. If, for instance, a blower motor ran too fast, the problem could be isolated to a low resistance in a resistor pack by taking voltage drop readings.
- Maximum allowable voltage drop under a load is critical, especially if there is more than one high resistance problem in a circuit. It is important because like all resistances, all voltage drops are cumulative. Corroded terminals, loose connections or other similar problems reduce the voltage available across the key circuit components. The current flow is reduced in the circuit and all of the affected components operate at less than peak efficiency. A small drop across wires (conductors), switches, connectors, etc., is normal. (This is due to the resistance of the conductors but should be less than 10 percent of the total drop.)

When using a voltmeter:

- Be sure to connect the positive lead to the battery side and the negative lead to the ground side of the component being checked.
- Voltage drop occurs when electricity flows (current) through a resistance. Make sure the voltage drop being measured is only through the component being checked, not through the component and a poor connection.
- The circuit must be operating (light ON or motor running, for example) to measure voltage drop.

The dash mounted voltmeter (in the vehicle) should also be observed for monitoring proper operation of the generator battery cranking motor, and cranking circuit. In this application, battery voltage drop can be monitored while the engine is cranking; and after the engine is running, generator output voltage can be monitored. This can be a valuable first step prior to diagnosing other electrical problems.

## CIRCUIT WIRING REPAIR PROCEDURES

### Maintenance and repair

All electrical connections must be kept clean and tight. Loose or corroded connections may cause a discharged battery, difficult starting, dim lights, and possible damage to the generator and regulator. Wires must be replaced if insulation becomes burned, cracked, or deteriorated.

To splice a wire or repair one that is frayed or broken always use rosin flux solder to bond the splice and insulating tape to cover all splices or bare wires.

When replacing wire, it is important that the correct size wire be used as shown on applicable wiring diagrams or parts book. Each harness or wire must be held securely in place to prevent chafing or damage to the insulation due to vibration.

Wire size in a circuit is determined by the amount of current, the length of the circuit and the voltage drop allowed. Wire size is specified using the metric gage. The metric gage describes the wire size directly in cross section area measured in square millimeters.

Never replace a wire with one of a smaller size or replace a fusible link with a wire of a larger size.

## WIRE SIZE CONVERSION TABLE

METRIC SIZE (mm) <sup>2</sup>	AWG SIZE
0.22	24
0.35	22
0.5	20
0.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8
13.0	6
19.0	4
32.0	2
40.0	1
50.0	0
62.0	00

### Wire repair

The wire repair is very important for the continued reliable operation of the vehicle. This repair must be done as described in the following procedures.

#### Twisted Wires (Figure 11)

##### Remove or Disconnect

1. Jacket (90)
2. Twisted wires (91).
3. Insulation from the wire.

##### Install or Connect

1. Splice clip (92).
  - Crimp (93).
  - Solder (93).
2. Electrical tape wrap (94) on wires.
3. Outer electrical tape wrap (95).

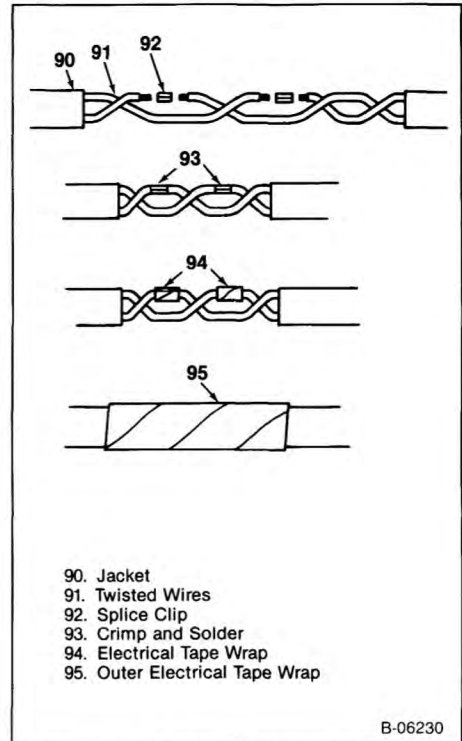


Figure 11—Twisted Wire Repair

#### Twisted Wires/Shielded Cable (Figure 12)

##### Remove or Disconnect

1. Jacket (100).
2. Unwrap aluminum/mylar tape (101).
3. Drain wire (102).
4. Leads.
5. Insulation on the leads.

##### Install or Connect

1. Splice clips (103).
2. Crimp and solder (104) the splice clips (103).
3. Electrical tape (105) on the splices.
4. Aluminum/mylar tape (101) by wrapping and taping.
5. Drain wire with a splice clip (106). Crimp and solder the splice clip.
6. Outer jacket electrical tape wrap (107).



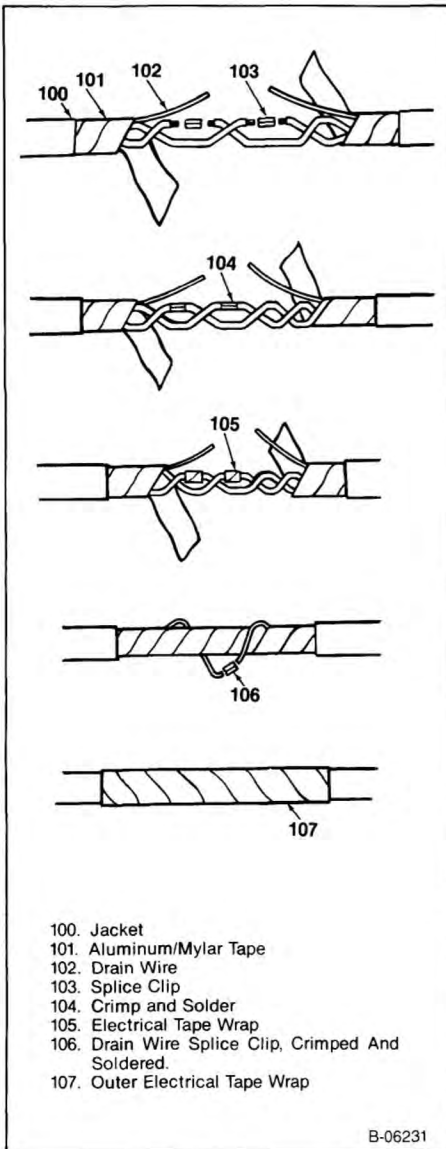


Figure 12—Twisted/Shielded Wire Repair

### Wiring connector terminal replacement (Blade type)

#### ↔ Remove or Disconnect (Figure 13)

1. Terminal lock tang.
2. Terminal (61).

#### ↔ Install or Connect (Figure 14)

1. Pry up on the tang (70).
2. Terminal (71) into the connector.

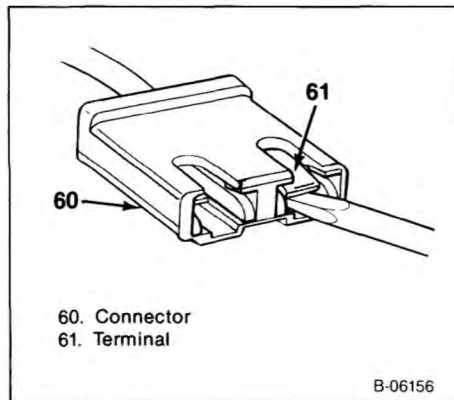


Figure 13—Removing the Terminals from the Connector

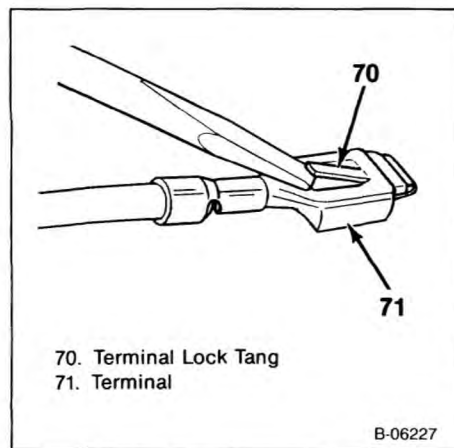


Figure 14—Resetting the Lock Tang

### Wiring connector terminal replacement (Twin lock type)

#### ↔ Remove or Disconnect (Figure 15)

Tool Required:

- J 22727 Terminal Remover
- 1. Connector lock tangs.
- 2. Terminal locks using J 22727.
- 3. Terminal (80).

#### ↔ Install or Connect

1. Pry out the tangs.
2. Terminal into the connector.

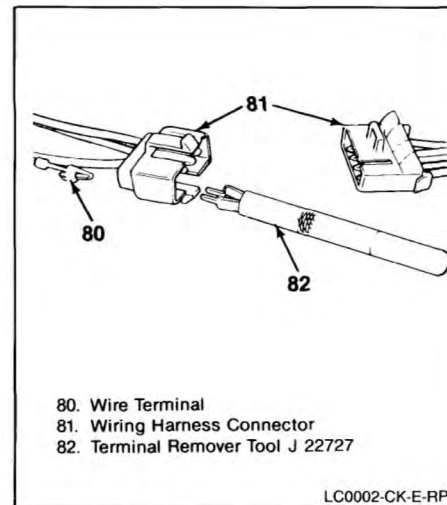


Figure 15—Twin Lock Connector Terminal

### WEATHER-PACK CONNECTORS

Special connectors known as Weather-Pack connectors (Figure 16) require a special tool J 28742-A for servicing. This special tool is required to remove the pin and sleeve terminals. If removal is attempted with an ordinary pick, there is a good chance that the terminal will be bent or deformed. Unlike standard blade-type terminals, these terminals cannot be straightened once they are bent.

Make sure that the connectors are properly seated and all of the sealing rings in place when connecting the leads. The hinge-type flap provides a backup, or secondary locking feature for terminals. They are used to improve the connector reliability by retaining the terminals if the small terminal lock tangs are not positioned properly.

Molded-on-connectors require complete replacement of the connection. This means splicing a new connector assembly into the harness. Environmental connections cannot be replaced with standard connections. Instructions are provided with the Weather-Pack connector and terminal packages.

With the low current and voltage levels found in some circuits, it is important that the best possible bond at all wire splices be made by soldering the splices.

Use care when probing the connections or replacing terminals in them, it is possible to short between opposite terminals. If this happens to the wrong terminal part, it is possible that damage may be done to certain components. Always use jumper wires between connectors for circuit checking. Never probe through the Weather-Pack seals.

When diagnosing for possible open circuits, it is often difficult to locate them by sight because oxidation or terminal misalignment are hidden by the connectors. Merely wiggling a connector on a sensor or in the wiring harness may correct the open circuit condition. This should always be considered when an open circuit is indicated while troubleshooting. Intermittent problems may also be caused by oxidized or loose connections.

### METRI-PACK CONNECTORS

The Metri-Pack connectors use a pull-to-seat type terminal, as shown in Figure 16. Special tools are required to remove the terminals. If removal is attempted with an ordinary pick, there is a good chance that the terminal will be bent or deformed. Refer to Figure 16.

#### ↔ Remove or Disconnect (Figure 16)

Tool Required:

- J 28742-A Terminal Removal
- 1. Primary lock (121) by lifting.
- 2. Connector sections.
- 3. Secondary lock (125) by spreading the sides of the hasp, thus clearing the staples and rotating the hasp (127).
- 4. Terminal (131) by using J 28742-A (128).
  - Snip off the old terminal assembly.
- 5. 5 mm of the wire insulation (130).

#### Clean

- Terminal barrel (124).

#### ↔ Install or Connect (Figure 16)

1. Terminal insulator (134) on the wire. Slide the insulator back on the wire about 8 cm (3 inches).
2. Terminal (131) on the wire.
  - Roll crimp (132) and solder the terminal.
3. Terminal insulator (134) and the roll crimp (133).
4. Terminal into the connector.
5. Secondary lock (125).
6. Connector sections until the primary lock (121) engages.

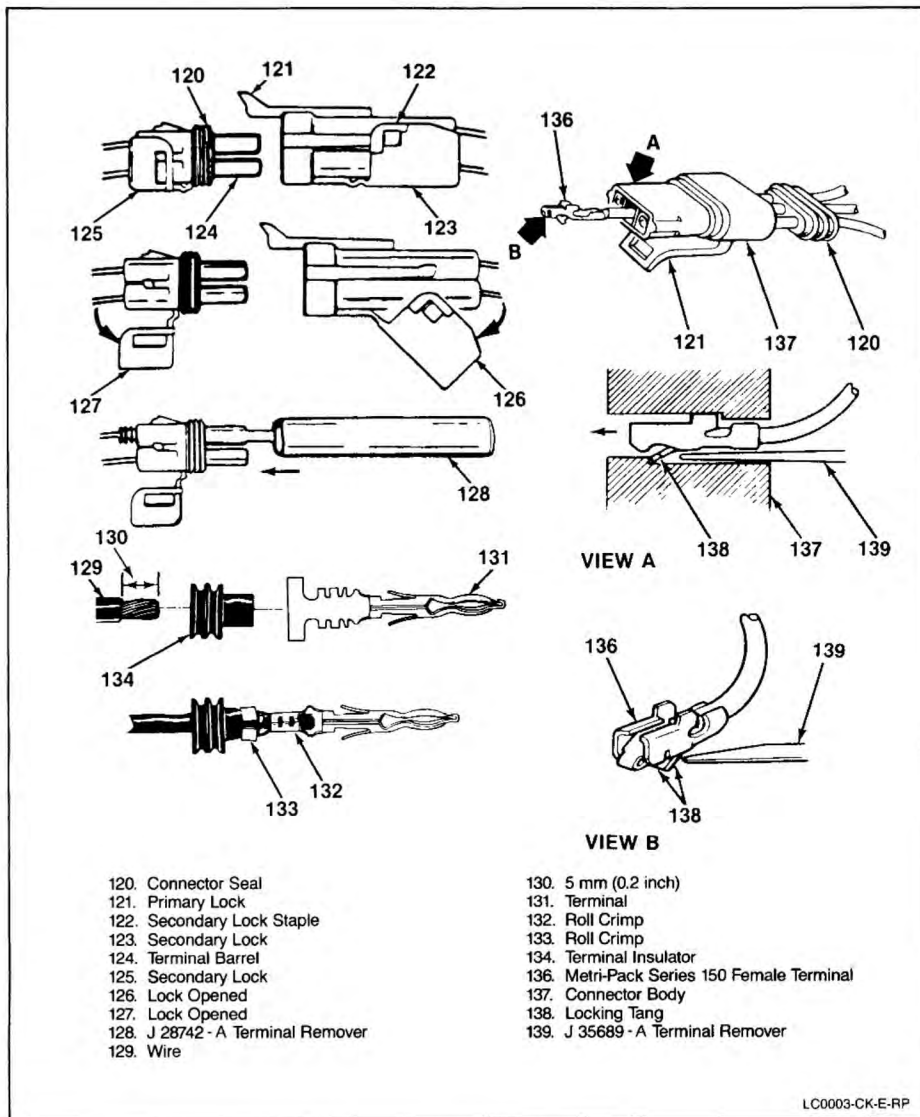


Figure 16—Weather-Pack and Metri-Pack Connectors

### Metri-pack connector replacement

#### ↔ Remove or Disconnect (Figure 16)

##### Tool Required:

J 35689-A Terminal Remover

1. Primary lock (121) by lifting.
2. Connector body (137).
3. Connector seal (120) by pulling the seal back onto the wires away from the connector body (137).
4. Terminal (136) by inserting J 35689-A (139) into the connector body (137) to depress the locking tang (138), then push the wire and terminal through the connector body (Figure 16).
  - Snip off the old terminal unless the terminal is to be reused, reshape the locking tang.
5. 5 mm (0.2-inch) of the wire insulation (130).

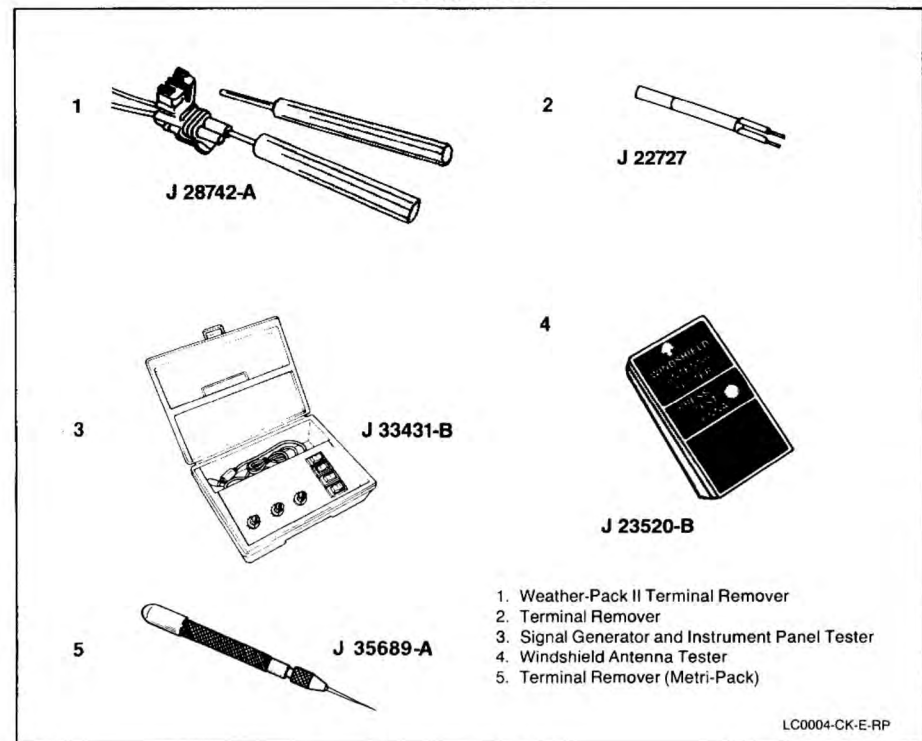
#### ☑ Clean

- Terminal cavity of the connector body.

#### ↔ Install or Connect (Figure 16)

1. Terminal (136) on the wire.
  - Crimp and solder the terminal.
2. Terminal (136) into the connector cavity by pulling the wire on the seal side of the connector until the locking tang (138) is fully seated.
3. Seal (120) by pressing the seal into the connector body (137) until it is fully seated.
4. Connector until the primary lock (121) engages.

### SPECIAL TOOLS



## REGULAR PRODUCTION OPTION (RPO) LIST

AU3 — Lock, Electric Side Door  
A31 — Window, Power Operated Side  
A33 — Window, Power Operated Tailgate or Back Door  
B3D — Equipment, School Bus  
CD4 — Windshield Wiper, Pulse  
C36 — Heater, Auxiliary  
C49 — Defogger, Electric Rear Window  
C60 — Air Conditioner, Front Manual Controls  
C69 — Air Conditioner, Roof Mounted  
D48 — Mirror, Outside Electric Remote Control  
E55 — End Gate, Suburban with Power Window  
E63 — Body, Fleetside  
K05 — Heater, Engine Block  
K09 — Generator, 120 Amp  
K34 — Cruise Control, Electronic  
K60 — Generator, 100 Amp  
K64 — Generator, 78 Amp  
K68 — Generator, 105 Amp  
K81 — Generator, 66 Amp  
K99 — Generator, 85 Amp  
LB4 — Engine, 4.3L V6 Gas  
LH6 — Engine, 6.2L V8 Diesel  
LL4 — Engine, 6.2L V8 Heavy Duty Diesel  
L05 — Engine, 5.7L V8 Gas  
L19 — Engine, 7.4L V8 Gas  
MD8 — Transmission, Automatic 4-Speed, Hydra-Matic 4L60  
M20 — Transmission, Manual 4-Speed, Hydra-Matic HM-117  
M40 — Transmission, Automatic 3-Speed, Hydra-Matic 3L80  
NA4 — Emission System, Above 8500 GVW  
R05 — Wheels, Dual Rear  
TP2 — Battery, Auxiliary  
TR9 — Lamp Group  
TT4 — Headlamps, Quad Halogen  
UD4 — Alarm, Vehicle Speed  
UF2 — Lamp, Cargo  
UJ1 — Indicator, Brake Warning System  
UM6 — Radio, ETR AM/FM Stereo, Seek and Scan, Auto Reverse Cassette, Clock  
UM7 — Radio, ETR AM/FM Stereo, Seek and Scan, Clock  
UT5 — Radio, ETR AM, Clock  
UU9 — Radio, ETR AM/FM Stereo  
UX1 — Radio, ETR AM/FM Stereo, Seek and Scan, Cassette with Auto Reverse and Repeat, Equalizer, Clock  
UY1 — Wiring Harness, Camper  
UY7 — Wiring Harness, Truck Trailer  
U01 — Lamps, Roof Marker  
U37 — Lighter, Cigarette  
V22 — Grille, Chrome with Quad Halogen Headlamps  
YE9 — Comfort, Convenience and Decor Package  
ZW9 — Body, Chassis  
Z62 — Comfort, Convenience and Decor Package

## ABBREVIATION LIST

The following is a list of abbreviations used in the wiring diagrams. The abbreviations have been developed in such a way that their meaning should be clear.

Use this page as a reference to determine the meaning of an abbreviation if necessary.

A—Ampere  
A/C—Air Conditioner  
ACC—Accessory  
ACCY—Accessory  
AIR—Air Injection Reaction  
AIR/COND—Air Conditioner  
ALDL—Assembly Line Diagnostic Link  
ALT—Alternator  
AMP—Ampere  
ANTI—Anticipate  
ASM—Assembly  
ASSY—Assembly  
AUD—Audio  
AUTO—Automatic  
AUX—Auxiliary

BAT—Battery  
BATT—Battery  
BI-LEV—Bi-Level  
BLK—Black  
BLT—Belt  
BLU—Blue  
BOT—Bottom  
BRK—Brake  
BRN—Brown  
BU—Backup  
BUZZ—Buzzer

CIR/BRK—Circuit Breaker  
CIRC—Circuit  
CLSTR—Cluster  
CNTL—Control  
COMP—Compartment  
COMP—Compressor  
CONN—Connector  
CONV—Convenience  
CTS—Courtesy  
CYL—Cylinder

DK—Dark  
DIAG—Diagnostic  
DIM—Dimmer  
DIR—Directional  
DISC—Discrete  
DIST—Distributor  
DIV—Diverter  
DM—Dome  
DR—Door  
DRAC—Digital Ratio Adapter Controller  
DRL—Daytime Running Lamps

ECM—Electronic Control Module  
EFE—Early Fuel Evaporation  
EGR—Exhaust Gas Recirculation  
ELEC—Electric  
ELEC CNTRL MOD—Electronic Control Module  
ENG—Engine  
EPR—Exhaust Pressure Regulator  
ESC—Electronic Spark Control  
EST—Electronic Spark Timing  
EVRV—Electronic Vacuum Regulator Valve  
EXC—Except

F-PUMP—Fuel Pump  
FLASH—Flasher  
FRT—Front  
4WD—Four Wheel Drive

GEN—Generator  
GRA—Gray  
GRD—Ground  
GRN—Green

HAND—Handling  
HAZ—Hazard  
HD—Heavy Duty  
HD LP—Headlamp  
HEI—High Energy Ignition  
HI—High  
HTR—Heater

IAC—Idle Air Control  
IGN—Ignition  
ILLUM—Illumination  
I/P—Instrument Panel  
INC—Increased  
IND—Indicator  
INJ—Injector  
INST PNL—Instrument Panel  
INTER—Interior

LD—Light Duty  
LH—Left Hand  
LO—Low  
LP—Lamp  
LPS—Lamps  
LT—Light  
LTR—Lighter

M—Motor  
MAN—Manual  
MAP—Manifold Absolute Pressure  
MAX—Maximum  
MED—Medium  
MRKR—Marker  
MULT—Multiple

NAT—Natural  
NEUT—Neutral  
NO—Normally Open  
NC—Normally Closed

ORN—Orange

PK—Park  
PLR—Puller  
PNK—Pink  
PNL—Panel  
PPL—Purple  
PRESS—Pressure  
PWR—Power

RCVR—Receiver  
REF—Reference  
RESIST—Resistance  
RH—Right Hand  
RPO—Regular Production Option  
RST—Rust

SEN—Sensor  
SEND—Sender  
SIG—Signal  
SIL—Silver  
SKT—Socket  
SOL—Solenoid  
SPEEDO—Speedometer  
STR—Stripe  
SW—Switch

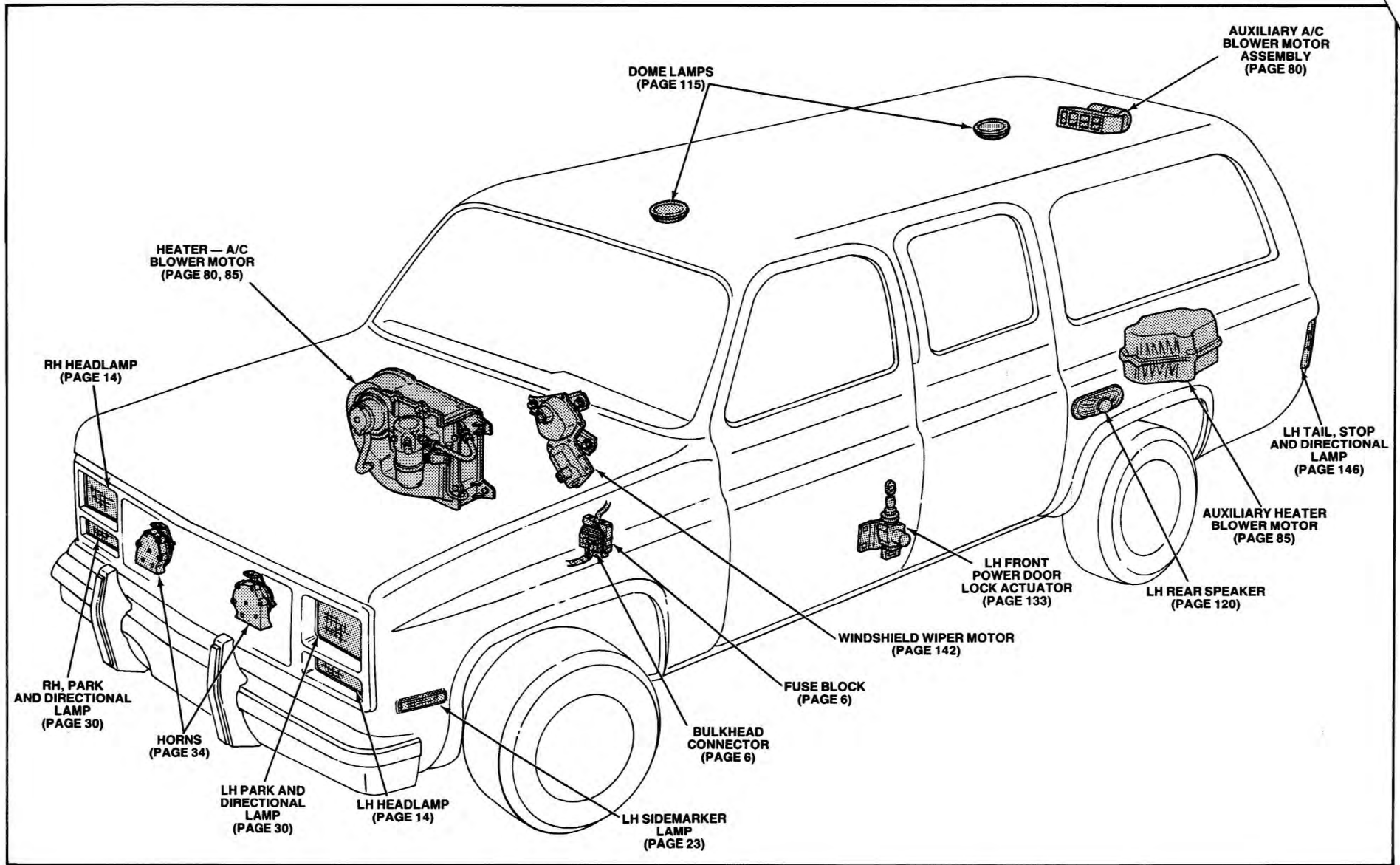
TACH—Tachometer  
TBI—Throttle Body Injection  
TCC—Torque Converter Clutch  
TEMP—Temperature  
T/L—Taillamp  
TRANS—Transmission  
TYP—Typical

V—Volt  
VAC—Vacuum  
VLV—Valve  
VSS—Vehicle Speed Sensor

W/—With  
W/O—Without  
WS—Windshield  
W WASHER—Window Washer  
WDO—Window  
WHT—White  
WRG—Wiring

YEL—Yellow



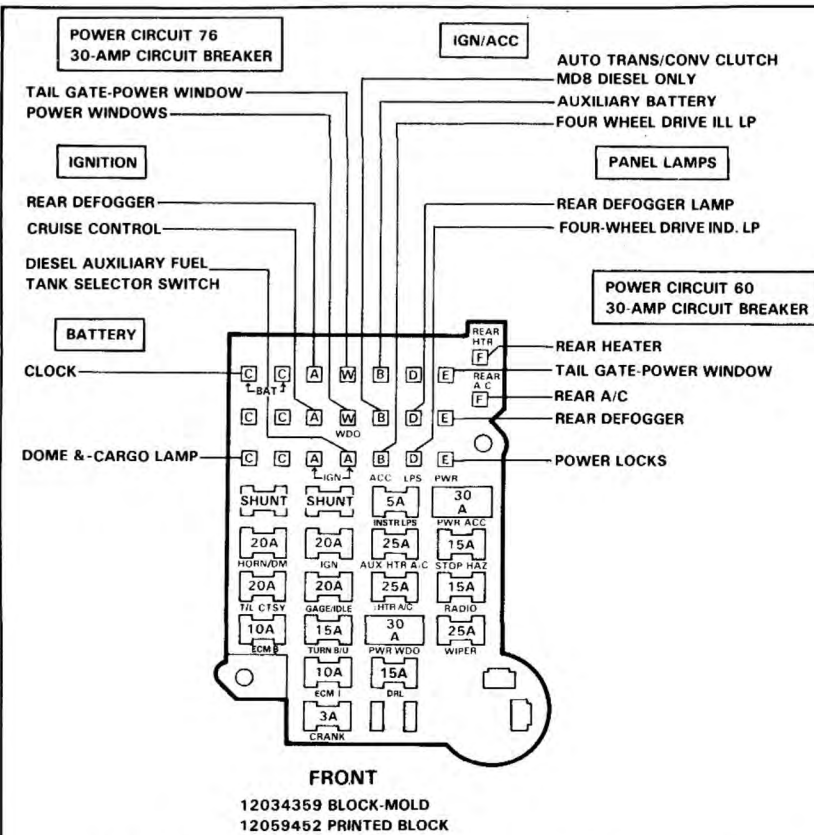


## SYMPTOMS INDEX

SECTION — PAGE	SYMPTOM	SECTION — PAGE
<b>CONDITIONING</b>		
A/C compressor clutch does not engage . . . . .	A-81	
Blower motor does not operate in any mode . . . . .	A-81	
Blower motor does not operate in HI . . . . .	A-81	
Blower motor does not operate in MED . . . . .	A-81	
Blower motor does not operate in LO . . . . .	A-81	
<b>AIR CONDITIONING, REAR (RPO C69)</b>		
Blower motor does not operate at all . . . . .	A-82	
Blower motor does not operate in HI but only in LO . . . . .	A-82	
Blower motor does not operate in LO but only in HI . . . . .	A-82	
<b>AUXILIARY COOLING FAN</b>		
Cooling fan does not run . . . . .	A-58	
Cooling fan runs continuously . . . . .	A-58	
<b>BRAKE SYSTEMS</b>		
Brake indicator remains on with ignition switch in run and park brake off . . . . .	A-106	
Brake indicator does not light during a warning condition or during the antilock system check . . . . .	A-106	
<b>CRUISE CONTROL</b>		
Cruise control does not disengage when clutch or brake pedal is depressed . . . . .	A-112	
Cruise control does not operate . . . . .	A-113	
<b>DIESEL ENGINE FUEL CONTROLS</b>		
Fuel heater does not operate . . . . .	A-54	
Service fuel filter indicator lights with no water in fuel . . . . .	A-54	
Service fuel filter indicator does not light briefly with ignition switch turned to run . . . . .	A-54	
<b>DIRECTIONAL SIGNAL LAMPS</b>		
Directional signals do not work on one side . . . . .	A-31	
Directional signals do not operate . . . . .	A-31	
Directional signal lamps flash rapidly . . . . .	A-31	
<b>FRONT PARK, MARKER, ROOF AND HAZARD LAMPS</b>		
Front park and side marker lamps do not operate . . . . .	A-24	
Roof marker lamps do not operate . . . . .	A-24	
Hazard warning lamps do not operate . . . . .	A-24	
<b>FOUR-WHEEL DRIVE INDICATOR LAMP</b>		
Four-wheel drive indicator lamp will not turn off . . . . .	A-110	
Four-wheel drive engages but 4WD indicator lamp does not light (V100, V200) . . . . .	A-110	
Four-wheel drive engages but 4WD indicator lamp does not light (V300) . . . . .	A-110	
<b>GLOW PLUGS</b>		
Wait indicator does not flash or flashes for the incorrect amount of time when engine is below normal operating temperature . . . . .	A-48	
Wait indicator stays on or flashes when engine is at normal operating temperature and ignition switch in run position (RPO LH6 engine only) . . . . .	A-49	
<b>HEADLAMPS</b>		
Headlamps do not illuminate high or low beams—both sides . . . . .	A-15	
Low beam lamp(s) do not operate . . . . .	A-15	
High beam lamp(s) do not operate . . . . .	A-16	
Daytime running lamps do not operate (Canada only) . . . . .	A-16	
Daytime running lamps stay on (Canada only) . . . . .	A-16	
<b>HEATER, FRONT</b>		
Blower motor does not operate at all . . . . .	A-85	
Blower motor does not run in HI but only in LO and/or MED . . . . .	A-85	
Blower motor does not operate in LO and/or MED but only in HI . . . . .	A-85	
<b>HEATER, AUXILIARY</b>		
Rear blower motor does not operate at all . . . . .	A-86	
<b>HORNS</b>		
Horn(s) will not operate . . . . .	A-34	
Horn sounds continuously without depressing horn switch . . . . .	A-34	
<b>INSTRUMENT PANEL GAGES AND INDICATORS</b>		
Fuel gage indicates full or beyond at all times . . . . .	A-89	
Fuel gage indicates empty when there is fuel in the tank . . . . .	A-90	
Fuel gage is inaccurate . . . . .	A-90	
Temperature gage indicates hot with engine coolant below operating temperature and ignition switch in run . . . . .	A-90	
Temperature gage indicates cold all the time . . . . .	A-90	
Temperature indicator stays on at all times with ignition switch in run . . . . .	A-90	
Temperature gage is not accurate . . . . .	A-90	
Temperature indicator does not light with engine coolant overheated . . . . .	A-90	
Check gages or temperature indicator does not light with ignition switch in bulb test or start . . . . .	A-90	
Oil pressure gage indicates low pressure when oil pressure is good (gage equipped) or oil pressure indicator is always lit . . . . .	A-91	
Oil pressure gage indicates high pressure at all times (gage equipped) or oil pressure indicator does not light . . . . .	A-91	
Oil pressure gage is not accurate . . . . .	A-91	
Voltmeter is not accurate . . . . .	A-91	
Speedometer is inoperative or inaccurate . . . . .	A-91	
Low coolant indicator does not light with coolant level low (Diesel only) . . . . .	A-91	
Low coolant indicator is lit when coolant level is good . . . . .	A-91	
<b>INTERIOR LAMPS</b>		
Courtesy lamps do not operate . . . . .	A-115	
Dome lamp does not work or stays on all the time . . . . .	A-115	
Cargo lamp does not work . . . . .	A-116	
Glove box lamp does not work . . . . .	A-116	
Under hood lamp does not work . . . . .	A-116	
<b>POWER DOOR LOCKS</b>		
None of the door lock motors lock or unlock . . . . .	A-134	
One door lock motor does not lock or unlock from a particular switch . . . . .	A-134	
One door lock motor does not operate from any switch . . . . .	A-134	
No door lock motors lock or unlock from any switches . . . . .	A-134	
<b>POWER WINDOWS</b>		
Power windows do not operate or only go in one direction . . . . .	A-127	
Power windows only operate from driver's side window switch . . . . .	A-128	
Power windows do not operate from driver's side window switch . . . . .	A-128	
Power rear window does not operate from tailgate window switch (front) . . . . .	A-128	
Power rear window does not operate from tailgate window switch (key operated) . . . . .	A-129	
<b>POWER MIRRORS</b>		
Neither mirror is operational . . . . .	A-133	
LH mirror will not adjust UP and DOWN . . . . .	A-133	
LH mirror will not adjust LEFT and RIGHT . . . . .	A-133	
RH mirror will not adjust UP and DOWN . . . . .	A-134	
RH mirror will not adjust LEFT and RIGHT . . . . .	A-134	

## SYMPTOMS INDEX

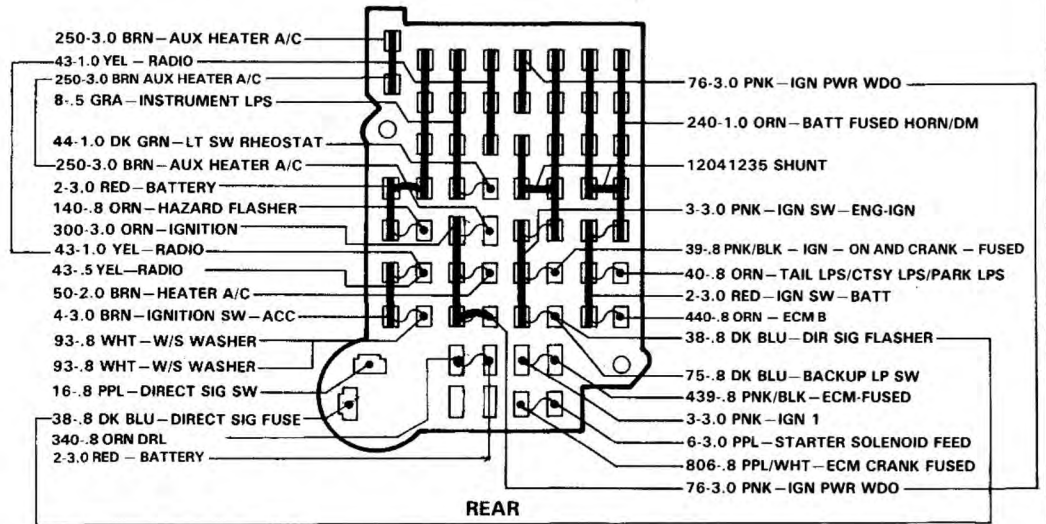
SYMPTOM	SECTION — PAGE
RADIO	
Radio does not appear to work (no display lights, no sound) . . . . .	A-120
Clock does not operate . . . . .	A-120
Panel lamp does not come on . . . . .	A-120
Display dimming function will not operate . . . . .	A-120
No sound or distorted sound from a speaker . . . . .	A-120
REAR DEFOGGER	
Rear window defogger does not work and on indicator does not light . . . . .	A-124
On indicator works but rear window defogger does not defrost . . . . .	A-124
Rear defogger panel lamp does not work . . . . .	A-124
REAR EXTERIOR LAMPS	
Backup lamps do not operate . . . . .	A-146
Rear park, marker and license lamps do not operate . . . . .	A-146
SAFETY BELT WARNING BUZZER	
The safety belt warning buzzer does not operate . . . . .	A-102
The safety belt warning buzzer operates when safety belt is buckled . . . . .	A-102
START AND CHARGE	
Engine does not crank and starter solenoid does not click . . . . .	A-37
Starter solenoid clicks, engine does not crank or cranks slowly . . . . .	A-37
Volts indicator does not light with ignition switch in run and engine stopped . . . . .	A-37
Volts indicator stays on when engine is running . . . . .	A-37
Battery is undercharged or overcharged . . . . .	A-37
VACUUM SYSTEMS	
Little or no heat from auxiliary heater . . . . .	A-159
Improper air distribution from outlets . . . . .	A-160
Cruise control does not operate . . . . .	A-160
WINDSHIELD WIPERS AND WASHERS (PULSE)	
Wipers do not operate in any mode . . . . .	A-143
Wipers do not operate in HI . . . . .	A-143
Wipers do not operate in LO or delay . . . . .	A-143
Washer motor does not operate . . . . .	A-143
Washer motor does not shut off . . . . .	A-143



**RPO LEGEND**

LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J  
 MD8 — AUTOMATIC 4-SPEED TRANSMISSION

NOTE: LL4 ENGINES DO NOT USE THE CRANK, ECM I, OR ECM B FUSES.  
 LH6 ENGINES DO NOT USE THE CRANK FUSE.  
 NOTE: DRL (DAYTIME RUNNING LAMPS) ARE ONLY ON VEHICLES FOR SALE IN CANADA WITH RPO Z49.



**CAUTION:** Determine if non-cycling circuit breakers are hot before removing them. Hot non-cycling circuit breakers can cause personal injury.

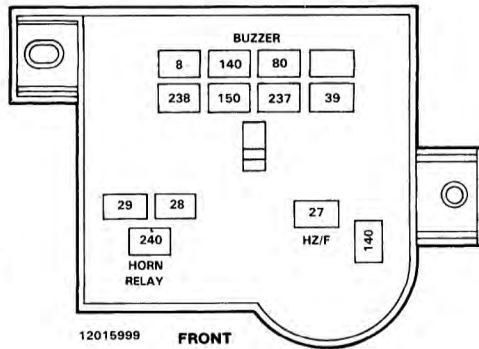
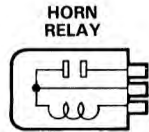
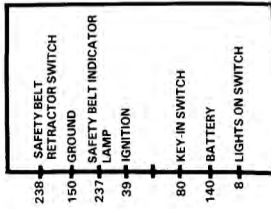
	COLOR	MALE CONN
A	NAT	12004888
B	BRN	12004887
C	BLK	12004886
D	GRN	12004885
E	RED	12004883
W	BLU	12004884
F	DK GRA	12004740

FUSE AND CIRCUIT BREAKER IDENTIFICATION

FUSE LOCATION	FUSE PART NO.	COLOR AND AMPERE	DESCRIPTION	FUSE LOCATION	FUSE PART NO.	COLOR AND AMPERE	DESCRIPTION
AUX HTR A/C	12004010	WHITE 25 AMP	AUXILIARY HEATER AND AIR CONDITIONING	INSTR LPS	12004005	TAN 5 AMP	INSTRUMENT PANEL LAMPS
CRANK	12004003	VIOLET 3 AMP	ELECTRONIC CONTROL MODULE CRANK CIRCUIT	PWR ACC (CIRCUIT BREAKER)		30 AMP	TAIL GATE-POWER WINDOW REAR DEFROGGER POWER LOCKS
DRL	12004008	LT BLUE 15 AMP	DAYTIME RUNNING LAMPS	PWR WDO (CIRCUIT BREAKER)		30 AMP	POWER WINDOWS
ECM 1	12004007	RED 10 AMP	ELECTRONIC CONTROL MODULE IGNITION 1	RADIO	12004008	LT BLUE 15 AMP	RADIO AUXILIARY BATTERY RELAY FOUR-WHEEL DRIVE INDICATOR LAMP AUTOMATIC TRANSMISSION CONVERTER CLUTCH (RPO MD8 ONLY)
ECM B	12004007	RED 10 AMP	ELECTRONIC CONTROL MODULE	STOP HAZ	12004008	LT BLUE 15 AMP	HAZARD FLASHER
GAGE/IDLE	12004009	YELLOW 20 AMP	IGNITION CRANK	T/L CTSY	12004009	YELLOW 20 AMP	TAIL LAMPS COURTESY LAMPS PARKING LAMPS
HORN/DM	12004009	YELLOW 20 AMP	HORN DOME AND CARGO LAMPS CLOCK	TURN B/U	12004008	LT BLUE 15 AMP	DIRECTIONAL SIGNALS BACKUP LAMPS
HTR AC	12004010	WHITE 25 AMP	HEATER AND AIR CONDITIONING	WIPER	12004010	WHITE 25 AMP	WINDSHIELD WIPERS
IGN	12004009	YELLOW 20 AMP	REAR DEFROGGER CRUISE CONTROL DIESEL AUXILIARY FUEL TANK SELECTOR SWITCH				



**AUDIO ALARM**

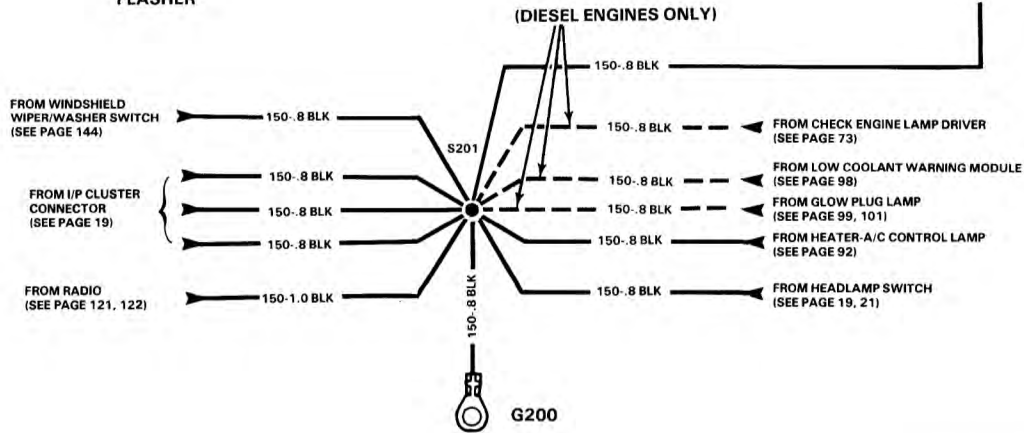
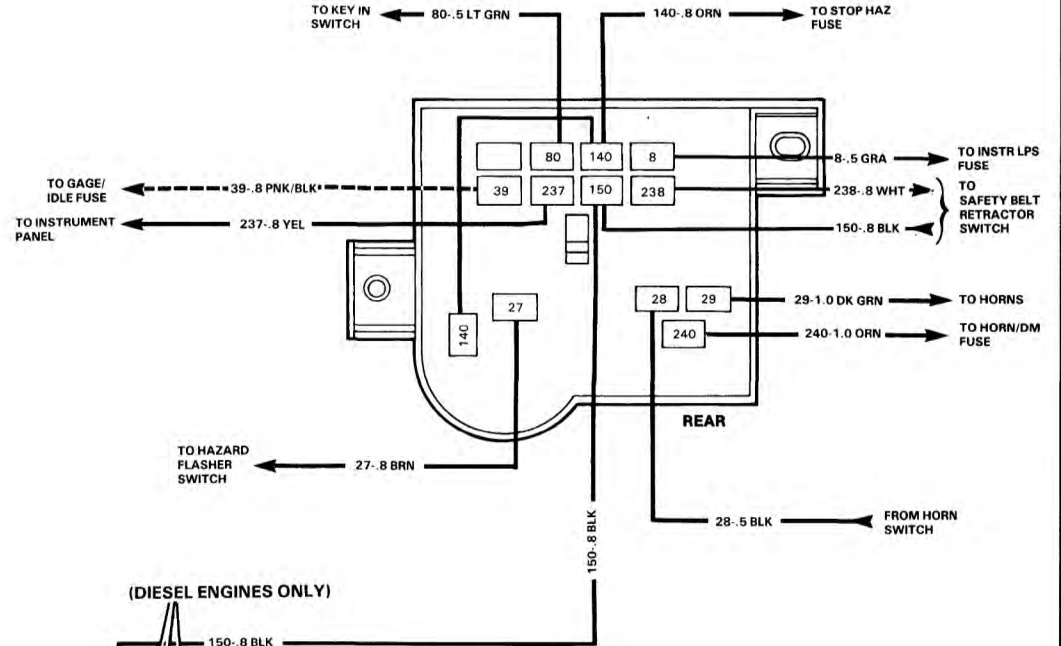


12015999 FRONT

CONVENIENCE CENTER



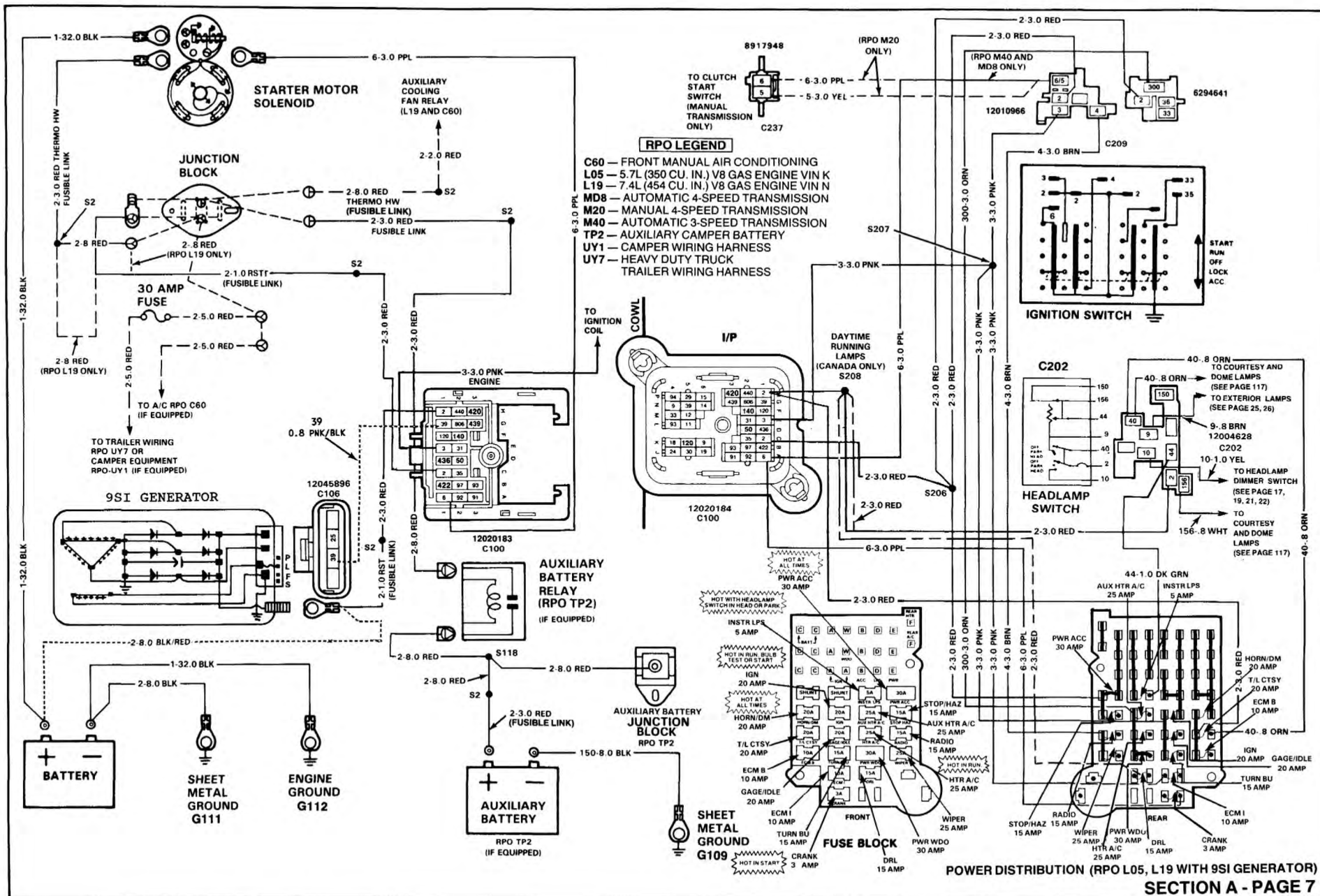
HAZARD FLASHER

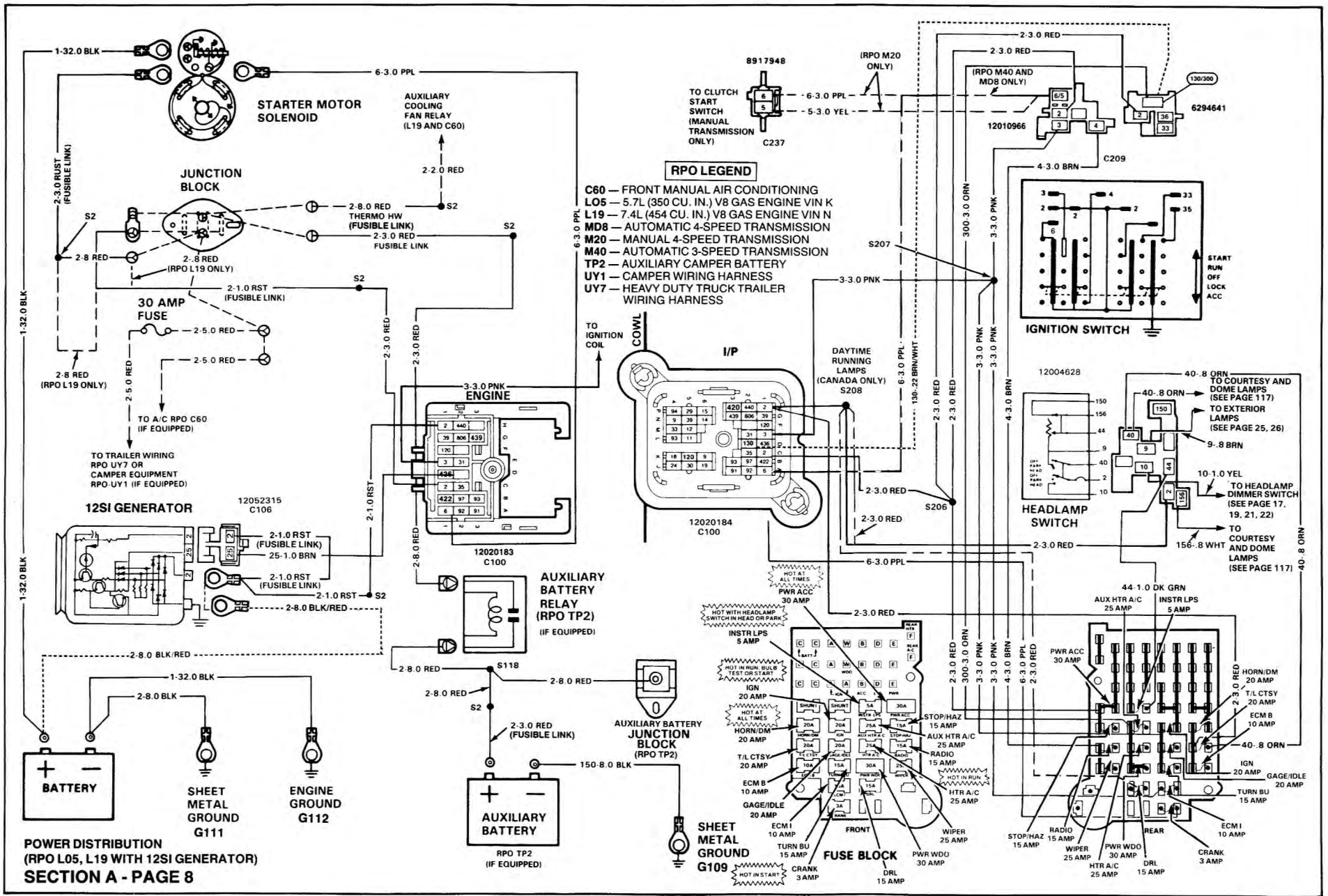


**COMPONENT LOCATION**

Page — Figure

Auxiliary Battery	LH front of engine compartment	.190	—	83
Auxiliary Battery Junction Block	LH side of engine compartment	.190	—	83
Auxiliary Battery Relay	LH side of engine compartment	.190	—	83
Battery	RH front of engine compartment	.170	—	20
Fuse Block	Under LH side of I/P	.166	—	4
Generator (RV100, 200(06), RPO L05)	LH front of engine	.171	—	22
Generator (RV200(43), RV300, RPO L19)	RH front of engine	.172	—	23
Generator (R200(43), RV300, RPO L05)	RH front of engine	.169	—	17
Generator (R200(43), RV300, RPO L19)	LH front of engine	.169	—	17
Headlamp Switch	LH side of I/P	.166	—	4
Ignition Switch	LH side of steering column	.166	—	5
Junction Block	Right front center of cowl	.165	—	2
Starter Motor Solenoid (RPO L05)	Lower right rear of engine	.169	—	17
Starter Motor Solenoid (RPO L19)	Lower right rear of engine	.172	—	23
C100	Lower left front of cowl	.166	—	4
C202	Behind LH side of I/P	.165	—	2
C209	LH side of steering column	.166	—	5
C237	At clutch switch	.166	—	5
G109	RH side of engine compartment	.190	—	83
G111	RH side of radiator support	.170	—	20
G112	RH side of engine	.170	—	19
S118	RH side of engine compartment	.190	—	83
S206	I/P harness, LH side of steering column	.166	—	5
S207	I/P harness, bottom of steering column	.166	—	5
S208	I/P harness, near fuse block	.166	—	4



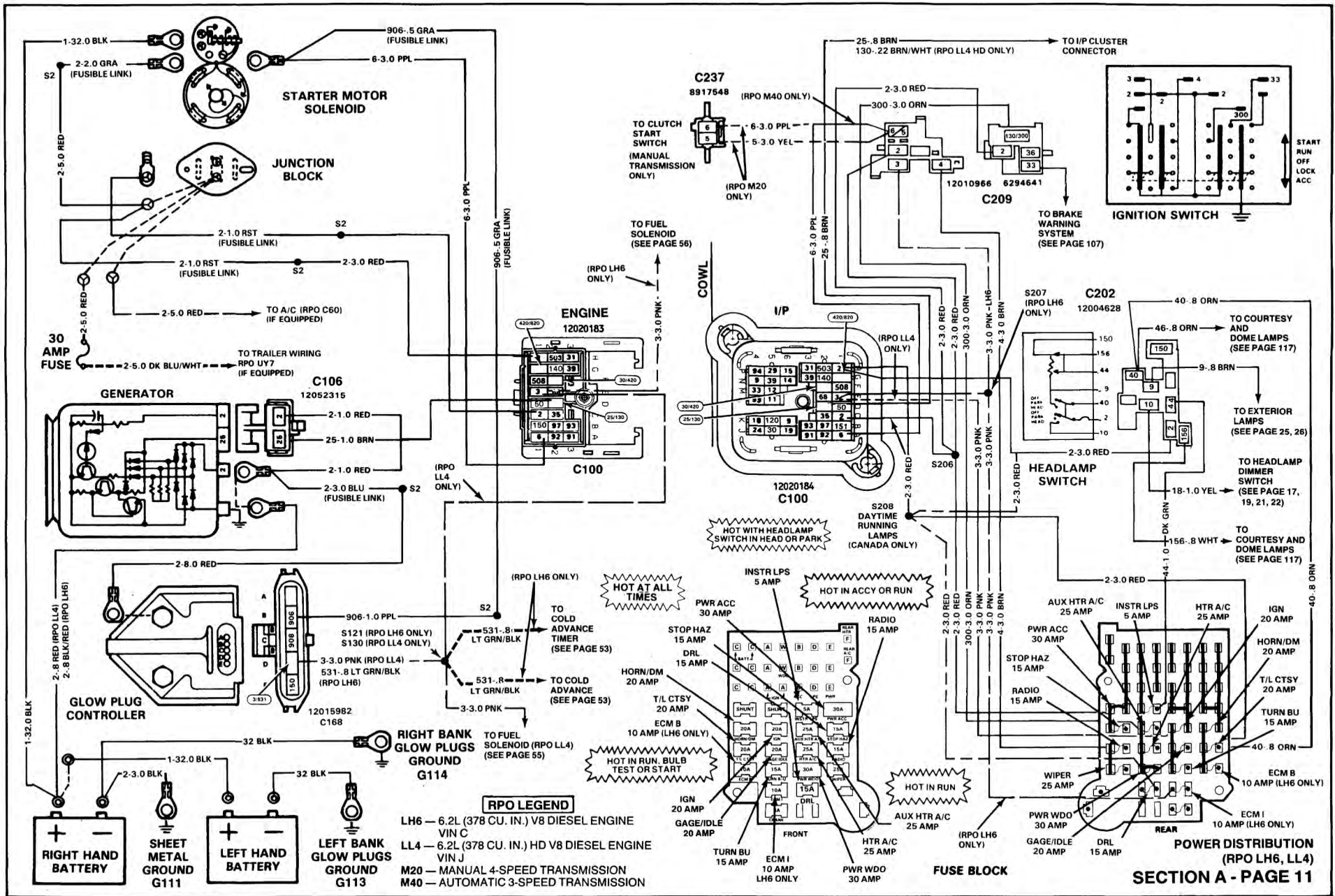


**BLANK**

**COMPONENT LOCATION**

Page — Figure

Battery, LH	LH front of engine compartment	.169	—	16
Battery, RH	RH front of engine compartment	.169	—	16
Fuse Block	Behind LH side of I/P, above kick panel	.166	—	4
Generator (RPO LH6, LL4)	Upper RH front of engine	.170	—	18
Glow Plug Controller	Rear RH side of engine	.173	—	26
Junction Block	Engine compartment, LH front of cowl	.165	—	2
Starter Motor Solenoid	Lower RH side of engine	.170	—	18
C100	Engine compartment, on RH front of cowl	.165	—	2
C106 (RPO LH6, LL4)	At generator	.170	—	18
C168 (RPO LH6, LL4)	At glow plug controller	.173	—	26
C202	At headlamp switch	.166	—	4
C209	At ignition switch	.166	—	5
C237 (Manual Transmission)	At clutch start switch	.166	—	5
G111 (Gasoline)	RH side of radiator support	.169	—	16
G113 (Diesel)	LH side of engine	.169	—	16
G114 (Diesel)	RH side of engine	.169	—	16
S121 (RPO LH6)	Engine harness, LH front of engine	.173	—	26
S130 (RPO LL4)	Engine harness, RH front of engine	.170	—	18
S207 (RPO LH6)	In I/P harness, bottom of steering column	.166	—	5
S208 (Daytime Running Lamps)	In I/P harness, above bulkhead	.166	—	4

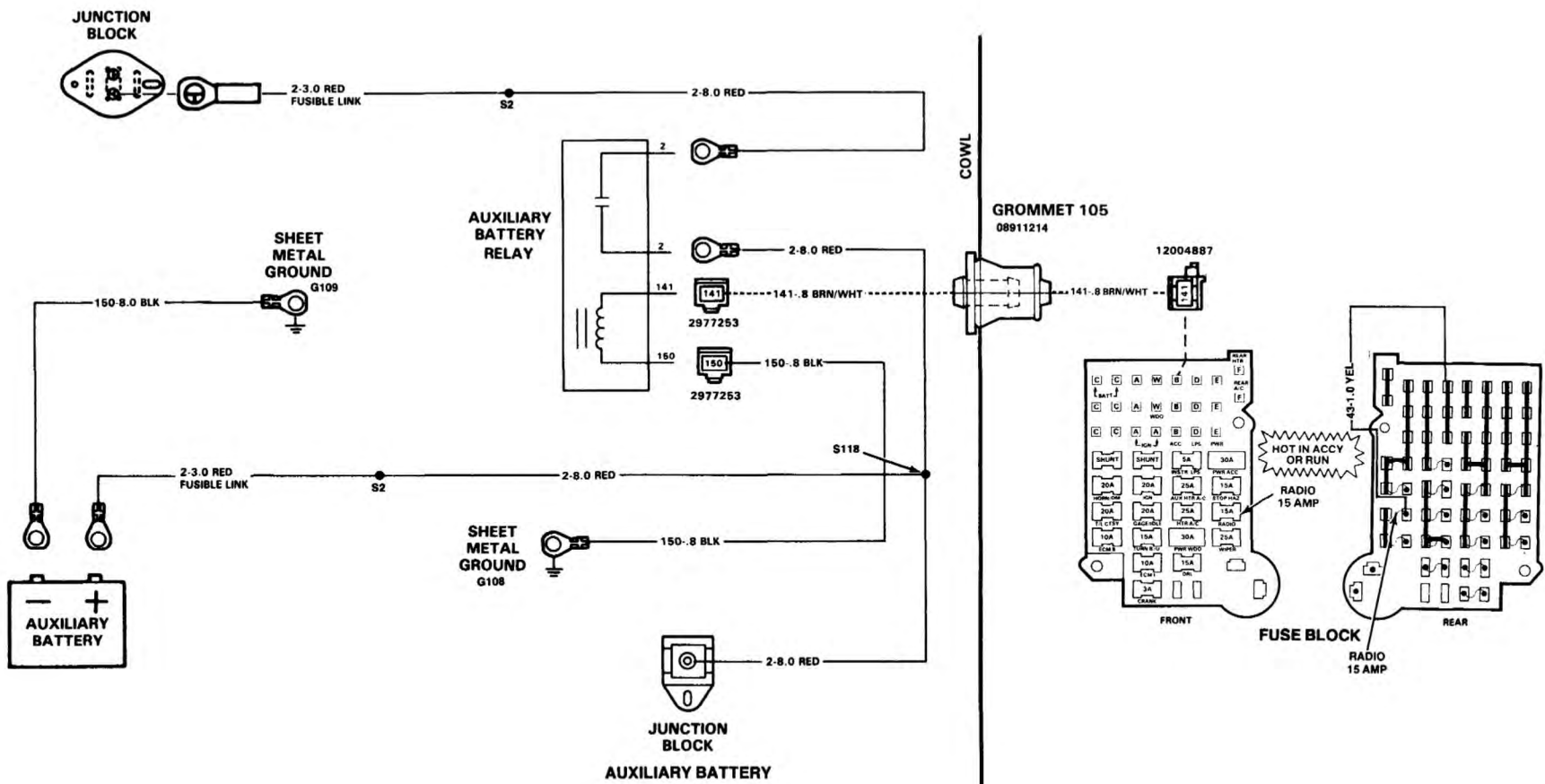


**COMPONENT LOCATION**

Page — Figure

Auxiliary Battery .....	LH front of engine compartment .....	.190 —	83
Auxiliary Battery Relay .....	LH side of engine compartment .....	.190 —	83
Auxiliary Junction Block .....	LH side of engine compartment .....	.190 —	83
Fuse Block .....	Under LH side of I/P .....	.166 —	4
Grommet 105 .....	LH side of cowl .....	.165 —	2
G108 .....	Inner panel, sheet metal ground .....	.190 —	83
G109 .....	RH side of engine compartment .....	.190 —	83
S118 .....	RH side of engine compartment .....	.190 —	83





**RPO LEGEND**

TP2 — CAMPER AUXILIARY BATTERY

## CIRCUIT OPERATION

### HEADLAMPS

Voltage is applied to the Headlamps Switch at all times. The Headlamp Switch includes a Self-Resetting Circuit Breaker. The Circuit Breaker opens when the Headlamp circuit draws too much current. When the Circuit Breaker opens, it interrupts the current flow. With no current flow, the Circuit Breaker cools off and resets automatically. When the Headlamp Switch is in HEAD, the Dimmer Switch directs voltage to either the Low Beams or the High Beams. The High Beam Indicator also receives voltage along with the High Beams. When the Headlamp Switch is in PARK or HEAD, voltage is directed to the parklamps.

### DAYTIME RUNNING LAMPS (CANADA ONLY)

Voltage is applied to the Daytime Running Lamp (DRL) relay at all times through the ORN (240) wire from the DRL Fuse and when the Ignition Switch is in RUN through the PNK/BLK (39) wire from the GAGE/IDLE Fuse. The DRL Relay Switch provides voltage to the Left Hand High

Beam through the DK BLU/ORN (593) wire and this wire also becomes the ground wire when the Headlamps are operated normally.

Voltage is applied to the Daytime Running Lamp Module when the Ignition Switch is in RUN through the PNK/BLK (39) wire from the GAGE/IDLE Fuse.

When the Ignition Switch is placed in RUN the Daytime Running Lamp Module energizes the Daytime Running Lamp Relay connecting the ORN (240) circuit (hot at all times) with the DK BLU/ORN (593) circuit, turning on the Headlamps.

When the Headlamps are turned on manually, or the Ignition Switch is turned OFF, the Daytime Running Lamp Module de-energizes the Daytime Running Lamp Relay connecting the DK BLU/ORN (593) circuit to the BLK (150) ground circuit. This allows normal operation of the Headlamps.

If the dimmer switch is put into the High Beam Position, the Daytime Running Lamp Module will supply voltage through the WHT (629) wire, to the Instrument Panel Cluster to turn on the High Beam Indicator bulb.

## COMPONENT LOCATION

	Page	Figure
Daytime Running Lamp Module	165	—
Daytime Running Lamp Relay	165	1
Fuse Block	166	4
Grommet 105	165	2
Headlamp, LH (Base)	165	2
Headlamp, LH (RPO V22)	165	3
Headlamp, RH (Base)	165	2
Headlamp, RH (RPO V22)	165	3
Headlamp Dimmer Switch	166	5
Headlamp Switch	166	4
I/P Cluster	166	4
Junction Block	165	2
Parking Brake Switch	166	4
Park and Directional Lamp, LH	165	2
Park and Directional Lamp, RH	165	2
Side Marker Lamp, LH Front	165	2
Side Marker Lamp, RH Front	165	2
C100	165	2
C125A	165	2
C126A	165	1
C137	165	2
C138	165	2
C139	165	2
C140	165	2
C144	165	2
C145	165	2
C146	165	2
C147	165	2
C149 (RPO V22)	165	3
C150 (RPO V22)	165	3
C151 (RPO V22)	165	3
C152 (RPO V22)	165	3
C153 (RPO V22)	165	3
C154 (RPO V22)	165	3
C155 (RPO V22)	165	3
C156 (RPO V22)	165	3
C157 (RPO V22)	165	3
C158 (RPO V22)	165	3
C201	166	5
C202	166	4
C203	166	4
C211A	—	—
C212A	—	—
C213A	—	—
C291	—	—
C293	166	4
G105	165	2
G106	165	2
G107	165	2
G200	166	6
S111	165	2
S112	165	2
S114 (RPO V22)	165	3
S201	166	4
S202	166	4

**PRELIMINARY CHECKS:**

Check condition of T/L CTSY fuse. If fuse is blown, LOCATE and REPAIR source of overload, then REPLACE fuse. If fuse is in good condition, use the following diagnostic procedures.

**TROUBLESHOOTING CHART—HEADLAMPS**  
**HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES**

TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C202 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to junction block.
2. With the headlamp switch on and the dimmer switch to HIGH BEAM, connect a test lamp from YEL (10) wire at headlamp switch connector C202 to ground.	Test lamp lights.	Go to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C201 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from headlamp dimmer switch to headlamps.
	Test lamp does not light.	REPLACE headlamp dimmer switch.

**LOW BEAM LAMP(S) DO NOT OPERATE**

TEST	RESULT	ACTION
1. Turn headlamp switch ON and dimmer switch to LOW BEAM position. Connect a test lamp from TAN (12) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from TAN (12) to BLK (150 or 151) wire(s) at headlamp connectors C138 or C144 (Base), C149 or C154 (RPO V22) to ground. (For Canadian vehicles w/o quad, DK BLU/ORN (593) is used in place of BLK (150) wire at connector C138.)	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) from headlamp connector(s) C138 or C144 (Base), C149 or C154 (RPO V22) to ground terminal(s) G105, G106 or G107. (For Canadian vehicles w/o RPO V22, GO to step 3.)
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from DK BLU/ORN (593) at daytime running lamp relay connector C126A to ground.	Test lamp does not light.	LOCATE and REPAIR open in DK BLU/ORN (593) wire from headlamp connector C138 to daytime running lamp relay C126A.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (150) wire at the daytime running lamp relay connector C126A to ground.	Test lamp does not light.	REPLACE daytime running lamp relay.
	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from daytime running lamp relay to ground G105.
5. Connect a test lamp from TAN (12) wire at dimmer switch connector C201 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in TAN (12) wire from headlamp dimmer switch to headlamp.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C201 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire from headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.

### HIGH BEAM LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch to ON and dimmer switch to HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from LT GRN (11) wire to BLK (150 or 151) wire(s) at headlamp connectors C138 or C144 (Base), C150 or C155 (RPO V22). (For Canadian vehicles, DK BLU/ORN (593) wire is used in place of BLK (150) wire at connector C138 or C155.)	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) at headlamp connector(s) C138 or C144 (Base), C150 or C155 (RPO V22) to ground connection(s) G105, G106 or G107. (For Canadian vehicles: GO to step 3).
	Test lamp lights.	REPLACE headlamps(s).
3. Connect a test lamp from DK BLU/ORN (593) wire to ground at daytime running lamp relay connector C201 to ground.	Test lamp does not light.	LOCATE and REPAIR open in DK BLU/ORN (593) wire at headlamp connector C138 or C150 to daytime running lamp relay C201.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (150) wire at daytime running lamp relay connector C201 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay.
	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from daytime running lamp relay connector to ground G105.
5. Place dimmer switch in the HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C201 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in LT GRN (11) wire from headlamps to headlamp dimmer switch.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C201 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.

#### PRELIMINARY CHECKS:

Before checking the DAYTIME RUNNING LAMPS system, do the following:

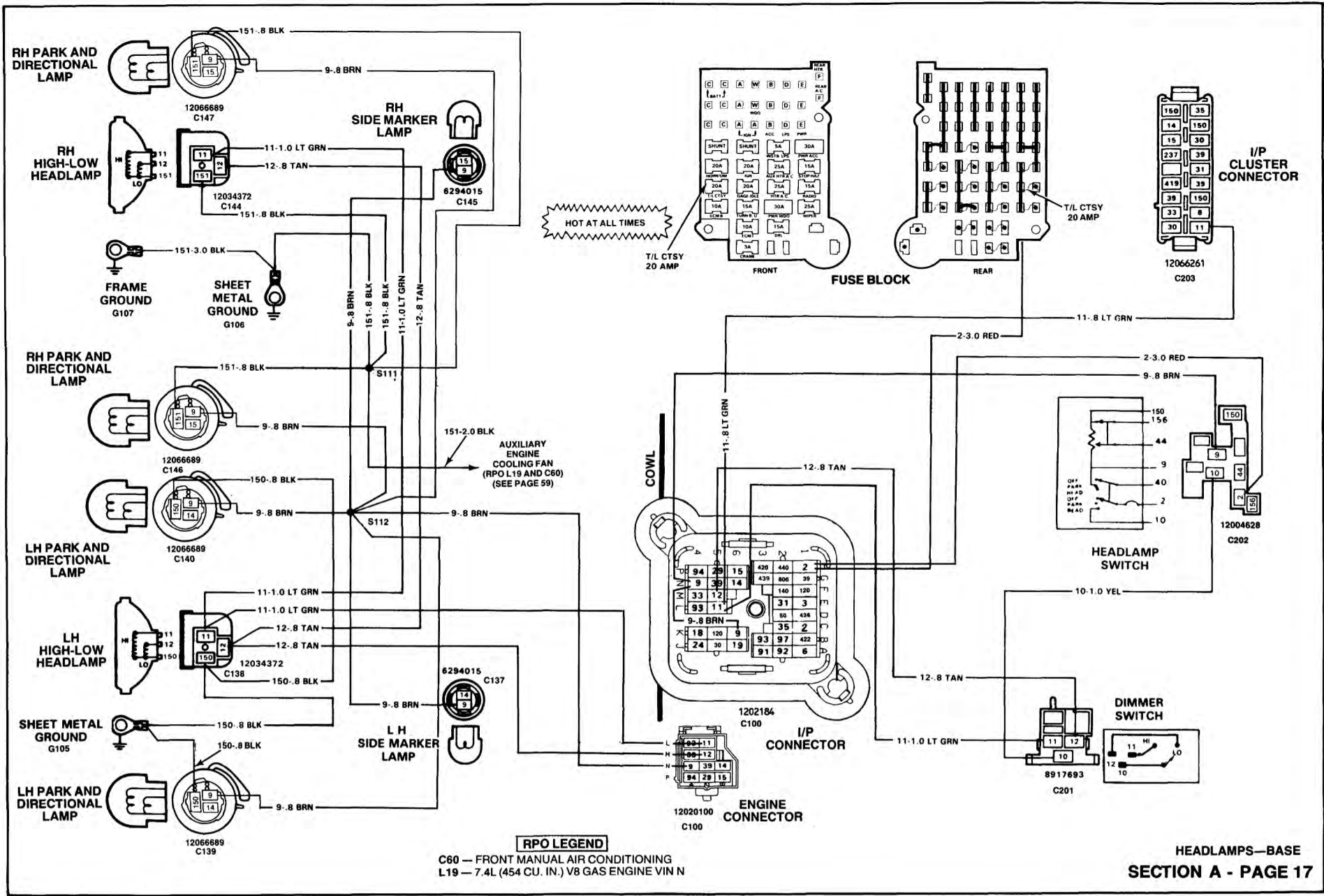
- Place Park Brake in the OFF position.
- Place Headlamp Switch to ON and Headlamp Dimmer Switch to HIGH BEAM position.  
If the High Beam Lamp(s) are inoperative, refer to the HIGH BEAM LAMP(S) DO NOT OPERATE test procedures.  
If the High Beam Lamp(s) are operative, use the following diagnostic procedures, after placing the Headlamp Switch to OFF position.

### DAYTIME RUNNING LAMPS DO NOT OPERATE (CANADA ONLY)

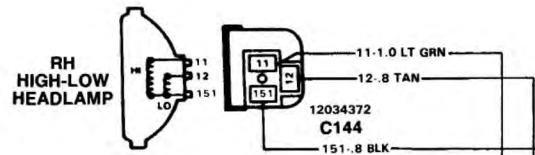
TEST	RESULT	ACTION
1. CHECK condition of DRL (daytime running lamp) fuse.	Fuse is not blown.	GO to step 2.
	Fuse is blown.	LOCATE and REPAIR source of overload. Then, REPLACE fuse.
2. Connect a test lamp from ORN (240) wire at daytime running lamp relay connector C201 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (240) wire from relay connector C201 to C125A and/or ORN (340) wire between C125A to fuse block.
3. CHECK condition of GAGE/IDLE fuse.	Fuse is not blown.	GO to step 4.
	Fuse is blown.	LOCATE and REPAIR source of overload. Then, REPLACE fuse.
4. Disconnect the daytime running lamp module connector C211A and place the ignition switch to RUN. Connect a test lamp from PNK/BLK (39) wire at the daytime running lamp relay connector C201 to ground.	Test lamp does not light.	LOCATE and REPAIR open in PNK/BLK (39) wire from relay connector to fuse block.
	Test lamp lights.	GO to step 5.
5. Connect a test lamp from LT GRN/BLK (592) wire at daytime running lamp relay connector C201 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay switch.
	Test lamp lights.	GO to step 6.
6. Connect a J 34029-A multimeter from LT GRN/BLK (592) wire at daytime running lamp module connector C211A to ground. Measure voltage.	No voltage.	LOCATE and REPAIR open in LT GRN/BLK (592) wire from daytime running lamp module connector to daytime running lamp relay connector C201.
	Battery voltage.	GO to step 7.
7. Connect a J 34029-A multimeter (or equivalent) from PNK/BLK (39) wire at daytime running lamp module connector C211A to ground. Measure voltage.	No voltage.	LOCATE and REPAIR open in PNK/BLK (39) wire from module connector to fuse block.
	Battery voltage.	GO to step 9.
8. Connect J 34029-A multimeter from LT GRN/BLK (592) wire to BLK (150) wire at module connector C211A.	No voltage.	LOCATE and REPAIR open in BLK (150) wire from module connector to ground G200.
	Battery voltage.	REPLACE daytime running lamp module. If daytime running lamps still are inoperative, also REPLACE daytime running lamp relay switch.

### DAYTIME RUNNING LAMPS STAY ON (CANADA ONLY)

TEST	RESULT	ACTION
Disconnect daytime running lamp module connector C211A. Place ignition switch to RUN and headlamp switch to ON position. Connect a J 34029-A multimeter to YEL (10) wire from module connector to ground. Measure voltage.	Battery voltage.	REPLACE daytime running lamp module.
	No voltage.	LOCATE and REPAIR open in YEL (10) wire from daytime running lamp module to headlamp switch.



RH  
HIGH-LOW  
HEADLAMP

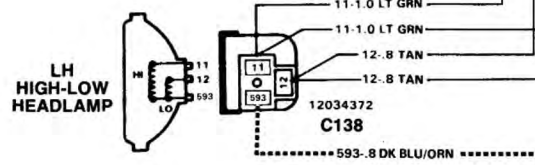


TO RH PARK  
AND DIRECTIONAL  
LAMPS  
(SEE PAGE 28)



TO LH PARK  
AND DIRECTIONAL  
LAMPS  
(SEE PAGE 28)

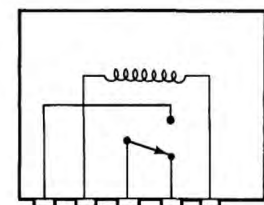
LH  
HIGH-LOW  
HEADLAMP



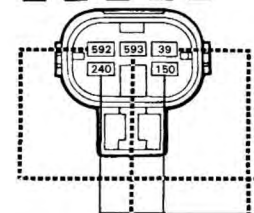
S111

TO AUXILIARY  
ENGINE  
COOLING FAN  
(RPO L19 WITH  
C60)  
(SEE PAGE 59)

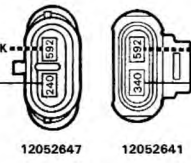
S113



DAYTIME  
RUNNING  
LAMP  
RELAY



12052287  
C126A

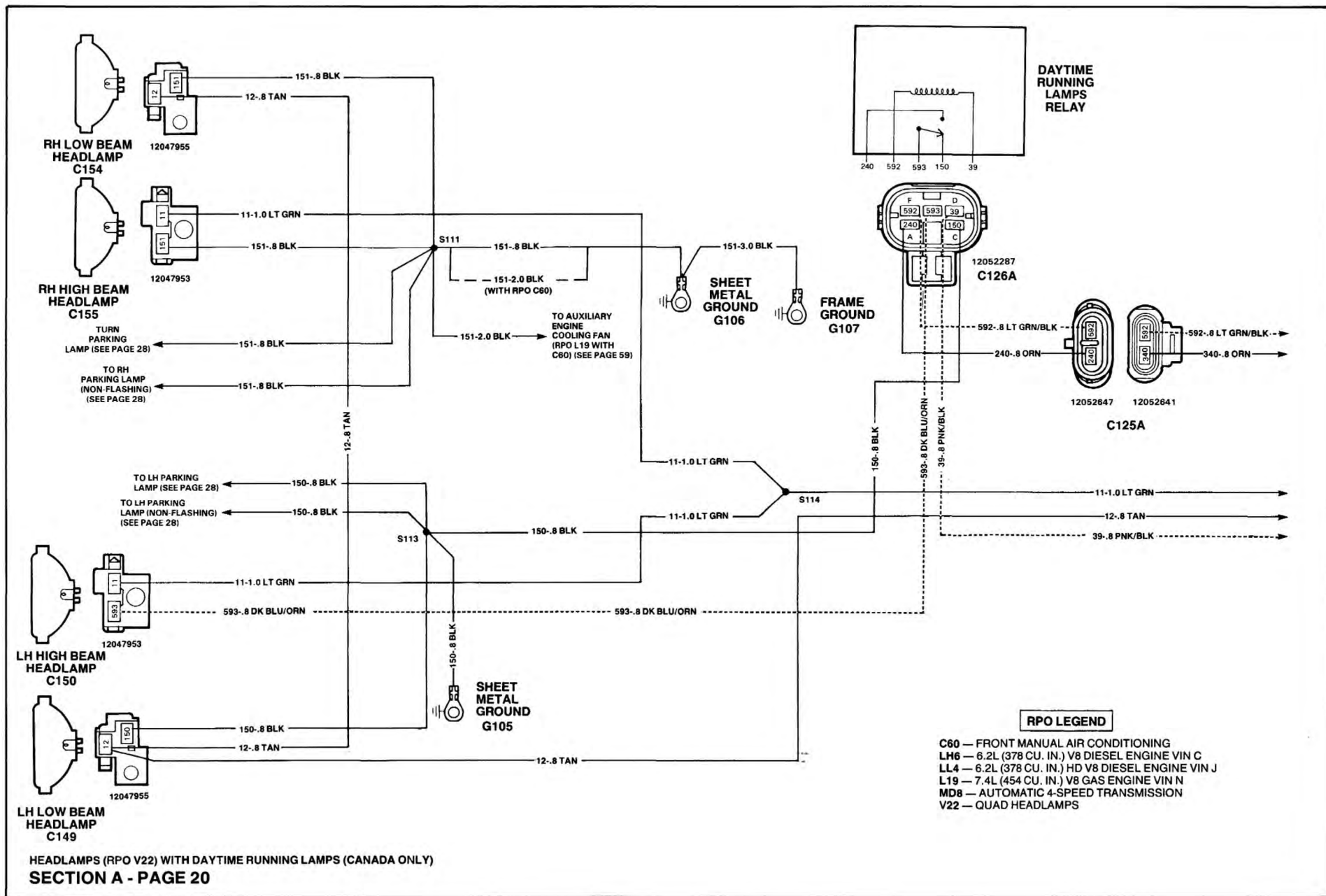


C125A

**RPO LEGEND**

- C60 — FRONT MANUAL AIR CONDITIONING
- LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C
- LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- MD8 — AUTOMATIC 4-SPEED TRANSMISSION











## CIRCUIT OPERATION

### HAZARD LAMPS

Voltage is applied at all times, through the STOP/HAZARD Fuse and the Hazard Flasher to the normally open contact of the Hazard Switch in the Directional Signal Switch Assembly. With the Hazard Switch in HAZARD FLASH, voltage is applied to both Front and Rear Directional Lamps. All of the Directional Lamps and both Directional Indicators flash on and off.

The Front Marker Lamps flash in HAZARD FLASH just as they did in TURN RIGHT and TURN LEFT. If the Lamp Switch is in OFF, they flash on when the Hazard Lamps are on. If the Lamp Switch is in either PARK or HEAD, they

flash on when the Hazard Lamps are off and off when the Hazard Lamps are on.

In Hazard, the circuit is always open, and the Hazard Flasher controls the Lamps.

### PARK AND MARKER LAMPS

Voltage is applied through the T/L CTSY Fuse to the Lamp Switch at all times. With the Lamp Switch in PARK or HEAD, voltage is applied to the Park, Tail, Marker, License Lamp and Roof Marker Lamps (if so equipped).

## COMPONENT LOCATION

### Page — Figure

Bus Bar Ground	LH side, behind I/P	166	—	6
Convenience Center	LH side, behind I/P	168	—	12
Directional Signal Switch	On steering column	166	—	5
Fuse Block	Behind LH side of I/P, above kick panel	166	—	4
Hazard Flasher	At convenience center	168	—	12
Headlamp Switch	LH side of I/P	168	—	13
Park and Directional Lamp, LH	LH front of vehicle	165	—	2
Park and Directional Lamp, RH	RH front of vehicle	165	—	2
Roof Marker Lamps	Front top of roof	168	—	13
Side Clearance Lamp, LH Front	Front LH side of rear fender	167	—	10
Side Clearance Lamp, LH Rear	Rear LH side of rear fender	167	—	10
Side Clearance Lamp, RH Front	Front RH side of rear fender	167	—	10
Side Clearance Lamp, RH Rear	Rear RH side of rear fender	167	—	10
Side Marker Lamp, LH Front	Front LH side of vehicle	165	—	2
Side Marker Lamp, LH Rear	Rear LH side of vehicle	167	—	8
Side Marker Lamp, RH Front	Front RH side of vehicle	165	—	2
Side Marker Lamp, RH Rear	Rear RH side of vehicle	167	—	8
Stop Lamp Switch	On top of brake pedal	168	—	11
C100	Engine compartment, on LH front of cowl	165	—	2
C137	Front LH side marker lamp	165	—	2
C138	Front LH side high-low headlamp	165	—	2
C139	Front LH park and directional lamp	165	—	2
C140	Front LH park and directional lamp	165	—	2
C144	Front RH high-low headlamp	165	—	2
C145	Front RH side marker lamp	165	—	2
C146	Front RH park and directional lamp	165	—	2
C147	Front RH park and directional lamp	165	—	2
C149 (RPO V22)	Front LH high-low headlamp	165	—	3
C150 (RPO V22)	Front LH high beam headlamp	165	—	3
C151 (RPO V22)	Front LH park and directional lamp	165	—	3
C153 (RPO V22)	Front LH marker lamp	165	—	3
C154 (RPO V22)	Front RH high-low headlamp	165	—	3
C155 (RPO V22)	Front RH high beam headlamp	165	—	3
C156 (RPO V22)	Front RH park and directional lamp	165	—	3
C157 (RPO V22)	Front RH side marker lamp	165	—	3
C200	At directional signal switch	166	—	5
C202	At headlamp switch	168	—	13
C203	LH side of I/P	166	—	4
C238	LH I/P, behind I/P cluster	168	—	13
C244	At stoplamp switch	181	—	55
C300	Above rear crossmember, towards RH side of vehicle	167	—	8
C301	Above rear crossmember, towards LH side of vehicle	167	—	8
C411	RH taillamp	167	—	8

## COMPONENT LOCATION

### Page — Figure

C412	LH taillamp	167	—	8
C413	Rear LH side marker lamp	167	—	8
C414	Rear RH side marker lamp	167	—	8
C415	RH side front clearance lamp	167	—	10
C416	RH side rear clearance lamp	167	—	10
C417	LH side front clearance lamp	167	—	10
C418	RH side rear clearance lamp	167	—	10
G105	LH front of vehicle, above LH headlamps	165	—	2
G106	RH front of vehicle, above RH headlamps	165	—	2
G107	RH front of vehicle, on frame below RH headlamps	165	—	2
G402	At LH rear lamps	167	—	9
G403	At RH rear lamps	167	—	9
S109	Forward lamps harness, LH side	165	—	2
S110	Forward lamps harness, LH side	165	—	2
S111	Forward lamps harness, in front of RH headlamps	165	—	2
S112	Forward lamps harness, in front of LH headlamps	165	—	2
S113	Forward lamps harness, LH side behind headlamps	165	—	3
S210	I/P harness, LH side	166	—	4
S300	Rear lamps extension harness	168	—	14
S301	LH frame rail, towards rear of vehicle	168	—	14
S302	LH frame rail, towards rear of vehicle	168	—	14
S402	Rear taillamp harness, LH side rear of vehicle	167	—	8
S403	Rear taillamps harness, RH side of vehicle	167	—	8
S404	Rear taillamps harness, rear center of vehicle	167	—	9
S405	Rear taillamps harness, RH side of vehicle	167	—	8
S406	Rear taillamps harness, LH side of vehicle	167	—	8

**TROUBLESHOOTING CHART—FRONT PARK, MARKER,  
ROOF AND HAZARD LAMPS**

**FRONT PARK AND SIDE MARKER LAMPS DO NOT OPERATE**

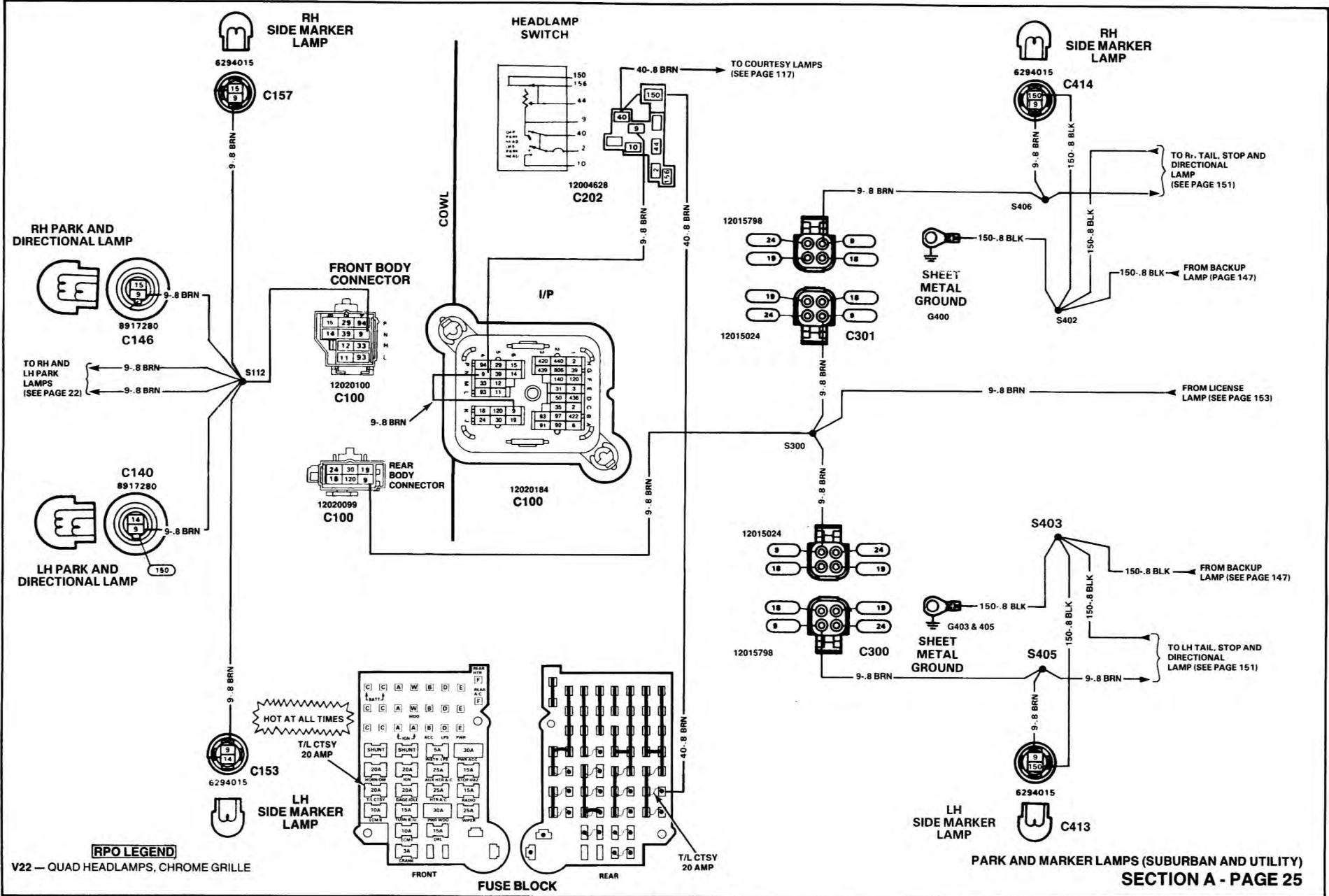
TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from BRN (40) wire at headlamp switch connector C202 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (40) wire between headlamp switch and fuseblock or REPLACE T/L CTSY fuse.
2. Connect test lamp from BRN (9) wire at headlamp switch connector C202 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect test lamp at BRN (9) wire at left hand park lamp connector C140 to ground.	Test lamp lights.	CHECK conditions of bulb sockets and BLK (150 and 151) wires from park lamps to ground terminals G106 and G107.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire from park lamps to headlamp switch.

**ROOF MARKER LAMPS DO NOT OPERATE**

TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at headlamp switch connector C202 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire between headlamp switch and fuse block or REPLACE (T/L CTSY) fuse.
2. Connect test lamp from BRN (9) wire at headlamp switch connector C202 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect test lamp at WHT (45) wire at left hand marker lamp terminal to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (45) and BRN (9) wires from marker lamp to headlamp switch.
4. Connect test lamp from WHT (45) wire to BLK (150) wire at left hand marker lamp.	Test lamp lights.	CHECK condition of light socket.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from marker lamps to bus bar ground.

**HAZARD WARNING LAMPS DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place ignition switch in RUN and position directional signal lamps as if making a turn.	Turn signal lights operate.	GO to step 2.
	Turn signal lights do not operate.	GO to step 3.
2. Turn off directional signal lamps and put hazard warning lamps ON. Connect a test lamp from BRN (27) wire at directional signal switch connector C200 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (STOP/HAZ) and an open in ORN (140) wire and BRN (27) wire. If fuse and wiring are good, REPLACE hazard flasher.
3. Place hazard lamps ON. Connect test lamp from LT BLU (14) wire at directional signal switch connector C200 to ground.	Test lamp flashes.	LOCATE and REPAIR open in wires from directional signal switch to convenience center.
	Test lamp does not light.	REPLACE directional signal switch.













## CIRCUIT OPERATION

### DIRECTIONAL SIGNAL LAMPS

With the Ignition Switch in RUN or START, voltage is applied through the TURN B/U Fuse and Directional Flasher to the normally closed contact of the Hazard Flasher Switch in the Directional Signal Switch Assembly.

With the Signal Switch in LH Turn position, voltage is applied to both the LH Directional Indicator and the LH Front Park/Directional Lamp (LT BLU wires). Voltage is applied to the LH Rear Directional Lamp (YEL wire).

The Lamps go on immediately. They begin to flash when the current flow heats up the timing element in the flasher and it repeatedly opens and closes the circuit.

The voltage applied to the LH Front Park and Directional Lamp will also be applied to the LH Front Marker Lamp. If the Lamp Switch is in the OFF position, the LH Front Marker Lamp will find a path to ground through splice S112 and the many Lamps connected in parallel to ground. These Lamps provide low resistance paths to ground. The Marker Lamp will flash with the Directional

Lamps. The Lamps used for the ground path will not flash, however, since the voltage drop across the Marker Lamp is much higher than that across the other Lamps.

When the Lamp Switch is in either PARK or HEAD, voltage is applied through the T/L CTSY Fuse, Lamp Switch, and splice S112 to the Marker and Park Lamps. If the Directional Signal Switch is in TURN LEFT, the LH Front Marker Lamp will have voltage at both connections and will go out. When the flasher removes voltage to the Directional Lamp, the Marker Lamp will be grounded through the Directional Lamp and will go on. In this way, the LH Front Marker Lamp will flash on when the LH Front Park and Directional Lamp goes off, and off when the Directional Lamp goes on.

With the Directional Signal Switch Assembly in TURN RIGHT, voltage will be applied to the RH Lamps in a similar manner.

## COMPONENT LOCATION

	Page — Figure
C203	LH side of I/P . . . . . 166 — 4
C300	Above rear crossmember, towards RH side of vehicle . . . . . 167 — 8
C301	Above rear crossmember, towards LH side of vehicle . . . . . 167 — 8
C411	RH taillamp . . . . . 167 — 9
C412	LH taillamp . . . . . 167 — 9
G105	LH front of vehicle, above LH headlamps . . . . . 165 — 2
G106	RH front of vehicle, above RH headlamps . . . . . 165 — 2
G107	RH front of vehicle, on frame below RH headlamps . . . . . 165 — 2
G402	At LH rear lamps . . . . . 167 — 9
G403	At RH rear lamps . . . . . 167 — 9
S109	Forward lamps harness, LH side . . . . . 165 — 2
S110	Forward lamps harness, LH side . . . . . 165 — 2
S111	Forward lamps harness, in front of RH headlamp . . . . . 165 — 2
S113	Forward lamps harness, LH side behind headlamps . . . . . 165 — 3
S301	LH frame rail, towards rear of vehicle . . . . . 168 — 14
S302	LH frame rail, towards rear of vehicle . . . . . 168 — 14
S402	Rear taillamp harness, LH side rear of vehicle . . . . . 167 — 8
S403	Rear taillamp harness, RH side of vehicle . . . . . 167 — 8

### COMPONENT LOCATION

Page — Figure

Directional Signal Flasher	On fuse block . . . . .	166 — 4
Directional Signal Switch	On steering column . . . . .	166 — 5
Fuse Block	Behind LH side of I/P, above kick panel . . . . .	166 — 4
Headlamp, LH High Beam (RPO V22)	LH front of vehicle . . . . .	165 — 3
Headlamp, LH High-Low (Base)	LH front of vehicle . . . . .	165 — 2
Headlamp, LH Low Beam (RPO V22)	LH front of vehicle . . . . .	165 — 3
Headlamp, RH High Beam (RPO V22)	RH front of vehicle . . . . .	165 — 3
Headlamp, RH High-Low (Base)	RH front of vehicle . . . . .	165 — 2
Headlamp, RH Low Beam (RPO V22)	RH front of vehicle . . . . .	165 — 3
Park and Directional Lamp, LH	LH front of vehicle . . . . .	165 — 2
Park and Directional Lamp, RH	RH front of vehicle . . . . .	165 — 2
Park Lamp, LH (RPO V22)	LH front of vehicle . . . . .	165 — 3
Park Lamp, RH (RPO V22)	RH front of vehicle . . . . .	165 — 3
Side Marker Lamp, LH Front	Front LH side of vehicle . . . . .	165 — 2
Side Marker Lamp, LH Rear	Rear LH side of vehicle . . . . .	167 — 8
Side Marker Lamp, RH Front	Front RH side of vehicle . . . . .	165 — 2
Side Marker Lamp, RH Rear	Rear RH side of vehicle . . . . .	167 — 8
C100	Engine compartment, on LH front of cowl . . . . .	165 — 2
C137 (Base)	Front LH side marker lamp . . . . .	165 — 2
C138 (Base)	Front LH side high-low headlamp . . . . .	165 — 2
C139 (Base)	Front LH park and directional lamp . . . . .	165 — 2
C140 (Base)	Front LH park and directional lamp . . . . .	165 — 2
C144 (Base)	Front RH high-low headlamp . . . . .	165 — 2
C145 (Base)	Front RH side marker lamp . . . . .	165 — 2
C146 (Base)	Front RH park and directional lamp . . . . .	165 — 2
C147 (Base)	Front RH park and directional lamp . . . . .	165 — 2
C149 (RPO V22)	Front LH high-low headlamp . . . . .	165 — 3
C150 (RPO V22)	Front LH high beam headlamp . . . . .	165 — 3
C151 (RPO V22)	Front LH park and directional lamp . . . . .	165 — 3
C152 (RPO V22)	Front LH park lamp . . . . .	165 — 3
C153 (RPO V22)	Front LH marker lamp . . . . .	165 — 3
C154 (RPO V22)	Front RH high-low headlamp . . . . .	165 — 3
C155 (RPO V22)	Front RH high beam headlamp . . . . .	165 — 3
C156 (RPO V22)	Front RH park and directional lamp . . . . .	165 — 3
C157 (RPO V22)	Front RH side marker lamp . . . . .	165 — 3
C158 (RPO V22)	Front RH park lamp . . . . .	165 — 3
C200	At directional signal switch . . . . .	166 — 5

**PRELIMINARY CHECKS:**

1. Check condition of TURN B/U fuse. If fuse is blown, LOCATE and REPAIR source of overload, then REPLACE fuse.
2. Place Headlamp Switch in PARK position. If any park or marker lamps do not operate, refer to

FRONT PARK AND SIDE MARKER LAMPS DO NOT OPERATE diagnostic procedure in this manual. If the park or marker lamps are operative, use the following diagnostic procedure.

**TROUBLESHOOTING CHART—DIRECTIONAL SIGNAL LAMPS**

**DIRECTIONAL SIGNALS DO NOT WORK ON ONE SIDE**

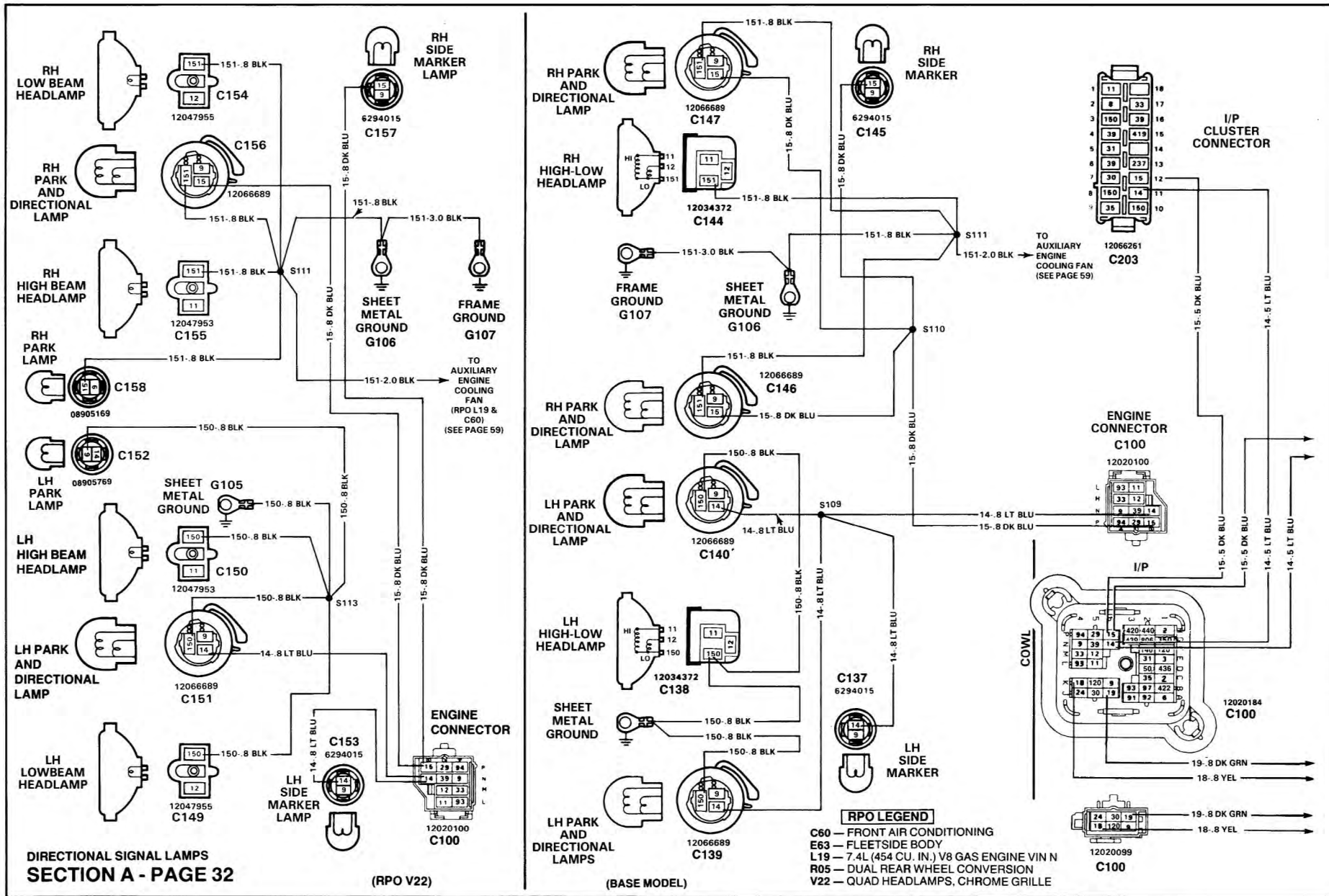
TEST	RESULT	ACTION
1. Turn hazard warning system ON. Observe lights on side of directional signals that did not work.	Lights flash.	CHECK for improper bulb. REPLACE if necessary.
	Lights do not come on.	GO to step 2.
2. Turn hazard warning system off. Place ignition switch to RUN and directional signal to side that does not work. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side does not work) at directional signal switch connector C200 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	GO to step 3.
3. Connect test lamp from PPL (16) at directional signal switch connector C200 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	REPLACE directional signal flasher.
4. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side did not work) at park and directional lamp connector C137, C139, C140, C145, C146, C147 (Base) or C151, C152, C153, C156, C157, C158 (RPO V22) to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in either LT BLU (14) or DK BLU (15) wires.
5. Connect test lamp from LT BLU (14) or DK BLU (15) wire to BLK (150 or 151) wire at park and directional lamp connector C139, C140, C146, C147 (Base) or C151, C156 (RPO V22).	Test lamp lights.	CHECK condition of bulb sockets.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire.

**DIRECTIONAL SIGNALS DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place hazard warning lamps to ON position.	Hazard lamps operate.	GO to step 2.
	Hazard lamps do not operate.	GO to step 3.
2. Connect a test lamp from PPL (16) wire at directional signal switch connector C200 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (TURN/BU) and an open in PPL (16) wire, DK BLU (38) wire, or BLK (150) wire. If fuse and wiring are good, REPLACE directional signal flasher.
3. Place ignition switch in RUN position and put directional signal switch as if making a left turn. Connect test lamp from LT BLU (14) wire at directional signal switch connector C200 to ground.	Test lamp flashes.	LOCATE and REPAIR open in wires from directional signal switch to convenience center.
	Test lamp does not light.	REPLACE directional signal switch.

**DIRECTIONAL SIGNAL LAMPS FLASH RAPIDLY**

TEST	RESULT	ACTION
Turn hazard lamp switch ON. Check front signal lamps and rear taillamps.	One side of directional signal lamps flash rapidly.	REPLACE inoperative directional signal bulb.
	Only one side of directional signals light but do not flash rapidly.	REFER to "Directional Signals Do Not Operate On One Side" symptom.





## CIRCUIT OPERATION

When the Horn Switch is depressed, one side of the coil of the Horn Relay is grounded. The relay is energized. The relay contacts close and battery voltage is applied to the horns.

## COMPONENT LOCATION

Page — Figure

Convenience Center	LH side, behind I/P	.168	—	12
Directional Signal Switch	On steering column	.166	—	5
Fuse Block	Behind LH side of I/P, above kick panel	.166	—	4
Horn, LH	Front of LH radiator support	.169	—	15
Horn, RH	Front of RH radiator support	.169	—	15
C100	Engine compartment, on LH front of cowl	.165	—	2
C200	At directional signal switch	.166	—	5

## PRELIMINARY CHECKS:

Check condition of HORN/DM fuse. If fuse is blown, LOCATE and REPAIR source of overload, then REPLACE fuse. If fuse is in good condition, use the following diagnostic procedure.

## TROUBLESHOOTING CHART—HORNS

### HORN(S) WILL NOT OPERATE

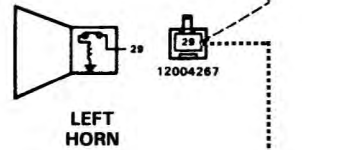
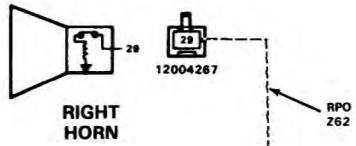
TEST	RESULT	ACTION
1. Connect test lamp from BLK/LT GRN (29) wire at horn connector to ground. Press horn switch.	Test lamp lights.	REPLACE.
	Test lamp does not light.	GO to step 3.
2. Remove horn relay. Connect test lamp from ORN (240) wire at convenience center to ground.	Test lamp lights at both connections.	GO to step 3.
	Test lamp does not light at one or either connection.	LOCATE and REPAIR open in ORN (240) wire.
3. Disconnect directional signal switch connector C200. Use a jumper wire to ground BLK (28) wire at directional signal switch connector C200.	Horn does not sound.	GO to step 4.
	Horn sounds.	REPLACE horn switch.
4. Disconnect horn relay. Install a jumper wire from ORN (240) terminal to DK GRN (29) terminal at convenience center.	Horn sounds.	REPLACE horn relay.
	Horn does not sound.	LOCATE and REPAIR open in DK GRN (29) wire from convenience center to C100 and/or BLK/LT GRN (29) wire between C100 and horn(s).

### HORN SOUNDS CONTINUOUSLY WITHOUT DEPRESSING HORN SWITCH

TEST	RESULT	ACTION
1. Disconnect directional signal switch connector C200.	Horn stops.	REPLACE horn switch.
	Horn continues to sound.	GO to step 2.
2. Disconnect horn relay. Check for a short to ground in DK GRN (29) and BLK (28) wires.	No shorts found.	REPLACE relay.
	Short(s) found.	REPAIR or REPLACE as required.

HORNS

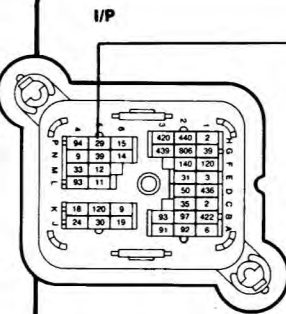
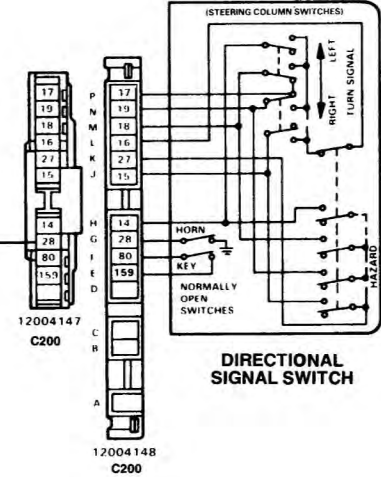
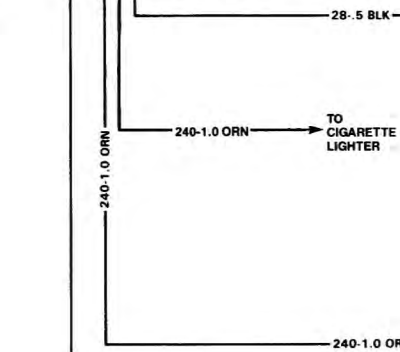
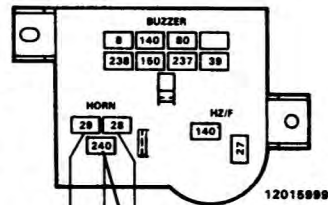
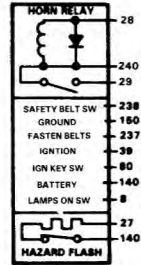
SECTION A - PAGE 34



**RPO LEGEND**

Z62 — EQUIPMENT PACKAGE, COMFORT, CONVENIENCE AND DECOR

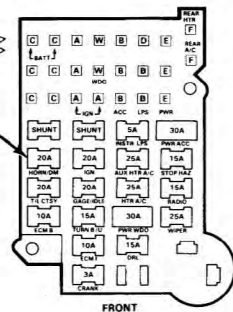
**CONVENIENCE CENTER**



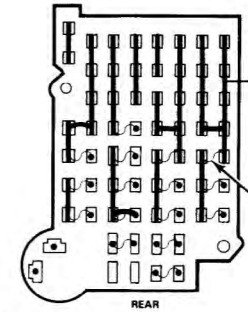
12020184  
C100

HOT AT ALL TIMES

HORN/DM 20 AMP



**FUSE BLOCK**



**HORNS**

## CIRCUIT OPERATION START

When the Ignition Switch is moved to the START position, battery voltage is applied to the Starter Solenoid. Both solenoid windings are energized. The circuit through the Pull-In Winding is completed to ground through the Starter Motor. The windings work together magnetically to pull in and hold in the Plunger. The Plunger moves the Shift Lever. This action causes the Starter Drive Assembly to rotate as it engages the Fly-wheel ring gear on the engine. At the same time, the Plunger also closes the solenoid switch contacts in the Starter Solenoid. Full battery voltage is applied directly to the Starter Motor and it cranks the engine.

As soon as the Solenoid Switch contacts close, voltage is no longer applied through the Pull-In Winding, since battery voltage is applied to both ends of the windings. The Hold-In Winding remains energized, and its magnetic field is strong enough to hold the Plunger, Shift Lever, and Drive Assembly Solenoid Switch contacts in place to continue cranking the engine.

When the Ignition Switch is released from the START position, battery voltage is removed from the PPL (6) wire and the junction of the two windings. Voltage is applied from the Motor contacts through both windings to ground at the end of the Hold-In Winding. However, the voltage applied to the Pull-In Winding is now opposing the voltage applied when the winding was first energized. The magnetic fields of the Pull-In and Hold-In Windings now oppose one another. This action of the windings, with the

help of the Return Spring, causes the Starter Drive Assembly to disengage and Solenoid Switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

## CHARGE

The Generator provides voltage to operate the vehicle's electrical system and to charge its Battery. A magnetic field is created when current flows through the Rotor. This field rotates as the Rotor is driven by the engine, creating an AC voltage in the Stator windings. The AC voltage is converted to DC by the rectifier bridge and is supplied to the electrical system at the Battery terminal.

This Generator's regulator uses digital techniques to supply the Rotor current and thereby control the output voltage. The Rotor current is proportional to the width of the electrical pulses supplied to it by the Regulator. When the Ignition Switch is placed in RUN, narrow width pulses are supplied to the Rotor, creating a weak magnetic field. When the engine is started, the Regulator senses Generator rotation by detecting AC voltage at the Stator through an internal wire. Once the engine is running the Regulator varies the field current by controlling the pulse width. This regulates the Generator output voltage for proper battery charging and electrical system operation.

The digital regulator controls the VOLTS Indicator light with a solid state light driver. The light driver turns on the light whenever undervoltage, overvoltage or a stopped Generator is detected.

## COMPONENT LOCATION

	Page — Figure
Battery (Gasoline) . . . . .	RH front of engine compartment . . . . . 170 — 20
Battery, LH (Diesel) . . . . .	LH front of engine compartment . . . . . 169 — 16
Battery, RH (Diesel) . . . . .	RH front of engine compartment . . . . . 169 — 16
Clutch Start Switch . . . . .	Below LH side of I/P, on clutch pedal support . . . . . 166 — 5
Coil (Gasoline) . . . . .	Rear of engine . . . . . 171 — 22
Distributor (Gasoline) . . . . .	Rear of engine . . . . . 171 — 22
Electronic Control Module . . . . .	Under center of I/P . . . . . 176 — 37
Fuse Block . . . . .	Behind LH side of I/P, above kick panel . . . . . 166 — 4
Generator (RPO LH6, LL4) . . . . .	Upper RH front of engine . . . . . 170 — 18
Generator (RPO L05, L19) . . . . .	Upper RH front of engine . . . . . 169 — 17
Grommet 100 . . . . .	Engine compartment, center of cowl . . . . . 169 — 17
Ignition Switch . . . . .	RH side of steering column . . . . . 166 — 5
Junction Block . . . . .	Engine compartment, LH front of cowl . . . . . 165 — 2
Starter Motor Assembly (RPO LH6, LL4) . . . . .	Lower RH side of engine . . . . . 170 — 18
Starter Motor Assembly (RPO L05, L19) . . . . .	Lower RH side of engine . . . . . 169 — 17
Tachometer (Gasoline) . . . . .	Near distributor . . . . . —
C103 . . . . .	Engine harness, LH side of engine . . . . . 175 — 35
C106 . . . . .	At generator . . . . . 169 — 17
C111 . . . . .	At distributor . . . . . 171 — 22
C112 . . . . .	At coil . . . . . 171 — 22
C113 . . . . .	At tachometer . . . . . 171 — 22
C117 . . . . .	Under center of I/P, in engine harness . . . . . 169 — 17
C120 . . . . .	At ECM . . . . . 176 — 37
C203 . . . . .	LH side of I/P . . . . . 166 — 4
C209 . . . . .	At ignition switch . . . . . 166 — 5
C237 . . . . .	At clutch switch . . . . . 166 — 5
G111 (Gasoline) . . . . .	RH side of radiator support . . . . . 170 — 20
G112 (Gasoline) . . . . .	RH side of engine . . . . . 170 — 19
G113 (Diesel) . . . . .	LH side of engine . . . . . 169 — 16
G114 (Diesel) . . . . .	RH side of engine . . . . . 169 — 16
S108 . . . . .	Top, RH side of engine . . . . . 171 — 21
S206 . . . . .	I/P harness, LH side of steering column . . . . . 166 — 5
S207 . . . . .	In I/P harness, bottom of steering column . . . . . 166 — 5
S208 . . . . .	I/P harness, near fuse block . . . . . 166 — 4



**PRELIMINARY CHECKS:**

Turn headlamps and dome lamps ON and place ignition in START. If lamps go dim or go out, check battery for correct charge. If battery charge is insufficient, refer to

Section 6D of the 1990 Light Duty Truck Service Manual. If battery has sufficient charge, use the following procedures.

**TROUBLESHOOTING CHART—START AND CHARGE**

**ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK**

TEST	RESULT	ACTION
1. Place transmission in PARK (auto) or depress clutch pedal for manual transmission. Connect a voltmeter from PPL (6) wire at starter solenoid to ground. Turn ignition switch to START position.	Battery voltage.	GO to step 2.
	No voltage.	GO to step 3 for manual transmission. GO to step 5 for auto transmission.
2. Connect voltmeter from PPL (6) wire to starter mounting bolts.	Battery voltage.	REPLACE starter solenoid.
	Less than battery voltage.	CLEAN starter motor mounting bolts, starter motor, and mounting surface.
3. Disconnect clutch start switch connector C237. Connect voltmeter from YEL (5) wire at clutch start switch connector C237 to ground. Ignition switch must be in START position.	Battery voltage.	GO to step 4.
	No voltage.	LOCATE and REPAIR open in YEL (5) wire between the clutch start switch and the ignition switch. If wire is in good condition, GO to step 5.
4. Depress clutch and put transmission in neutral. Apply parking brake. Connect a fused jumper from YEL (5) to PPL (6) at clutch start switch connector C237. Turn ignition switch to START position.	Engine cranks.	REPLACE clutch start switch.
	Engine does not crank.	LOCATE and REPAIR open in PPL (6) wire from clutch start switch to starter solenoid.
5. With ignition switch OFF, connect a voltmeter from BAT 2 terminal at ignition switch connector C209 to ground. Repeat step except connect from BAT 3 terminal to ground.	Battery voltage.	REPLACE ignition switch.
	No voltage.	LOCATE and REPAIR open in RED (2) wires and fusible link at junction block.

**STARTER SOLENOID CLICKS, ENGINE DOES NOT CRANK OR CRANKS SLOWLY**

TEST	RESULT	ACTION
1. Remove CRANK and ECM 1 fuses. Connect a voltmeter to positive and negative battery terminals. Turn ignition switch to START.	Voltage reading greater than 9.6 volts after 15 seconds cranking.	GO to step 2.
	Voltage less than 9.6 volts after 15 seconds cranking.	PERFORM a Battery Load Test. Refer to Section 6D in service manual.
2. Connect a voltmeter from negative battery terminal to engine block.	Less than .5 volts.	GO to step 3.
	More than .5 volts.	REPLACE negative battery cable.
3. Connect voltmeter from positive battery terminal to starter solenoid terminal at BLK (2) wire.	Less than .5 volts.	REPAIR starter motor.
	More than .5 volts.	REPLACE positive battery cable.

**VOLTS INDICATOR DOES NOT LIGHT WITH IGNITION SWITCH IN RUN AND ENGINE STOPPED**

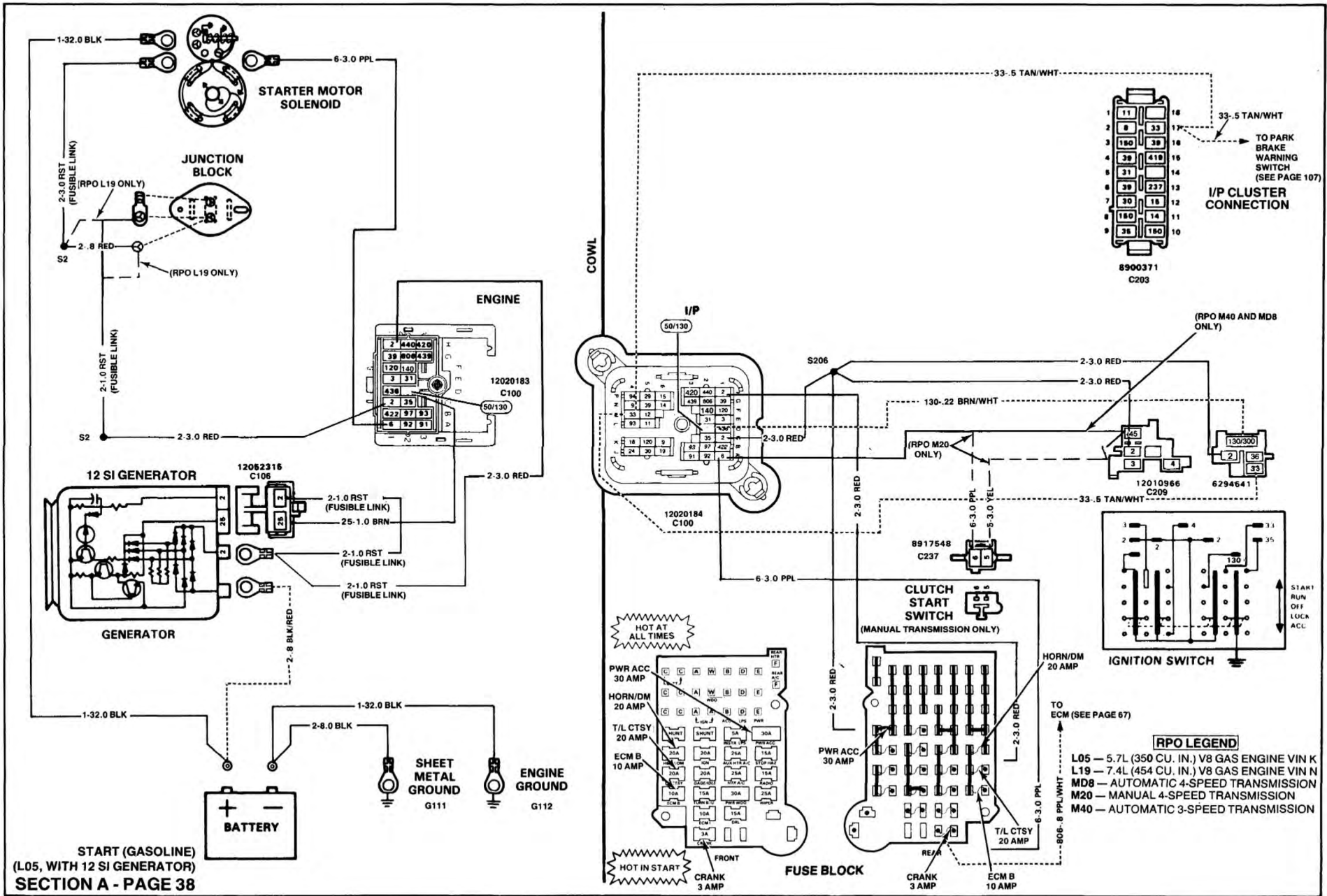
TEST	RESULT	ACTION
Disconnect generator connector C106. Place ignition switch in RUN position. Connect a fused jumper from BRN (25) wire at generator connector C106 to ground.	VOLTS indicator lights.	REPAIR generator.
	VOLTS indicator does not light.	CHECK condition of indicator bulb. If good, LOCATE and REPAIR open in BRN (25) wire from generator to I/P cluster.

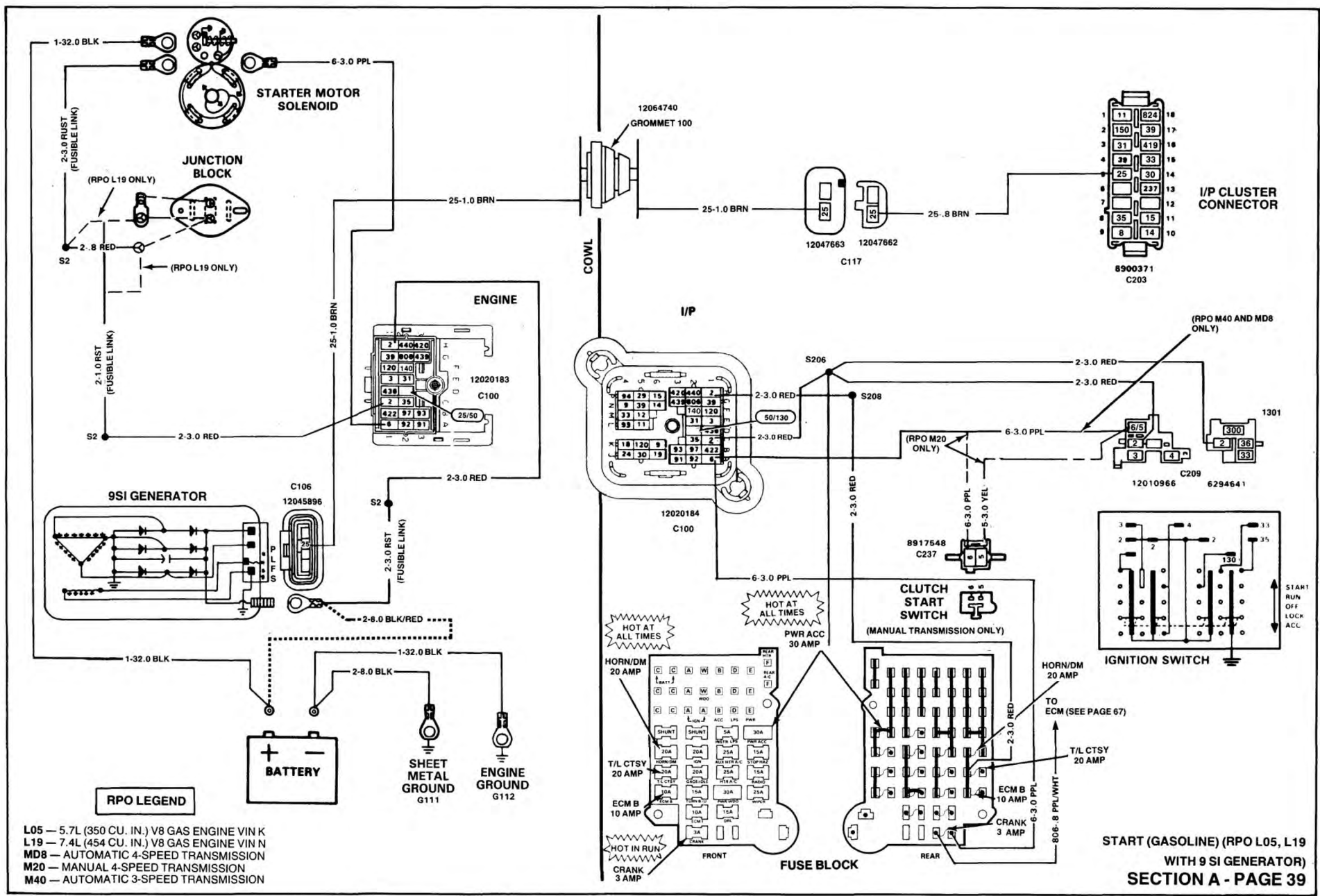
**VOLTS INDICATOR STAYS ON WHEN ENGINE IS RUNNING**

TEST	RESULT	ACTION
Disconnect generator connector C106.	VOLTS indicator does not light.	REPAIR generator.
	VOLTS indicator remains lit.	LOCATE and REPAIR short to ground in BRN (25) wire from generator to I/P cluster.

**BATTERY IS UNDERCHARGED OR OVERCHARGED**

TEST	RESULT	ACTION
1. Disconnect generator connector C106. Place ignition switch in RUN position. Connect voltmeter from BRN (25) wire at generator connector C109 to ground.	Battery voltage.	GO to step 2.
	No voltage.	CHECK condition of indicator bulb. If good, LOCATE and REPAIR open in BRN (25) wire from generator to I/P cluster.
2. Connect voltmeter from RED (2) wire at generator to ground.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in RED (2) wire and fusible link from generator to junction block.
3. Reconnect generator connector C106 and terminal. Have all accessories turned off and engine running at fast idle. Connect voltmeter from battery terminal on generator to ground.	Reading of 13-16 volts.	PERFORM Generator Bench Test. Refer to Section 6D in Service Manual.
	Reading of less than or greater than 13-16 volts.	REPAIR generator.

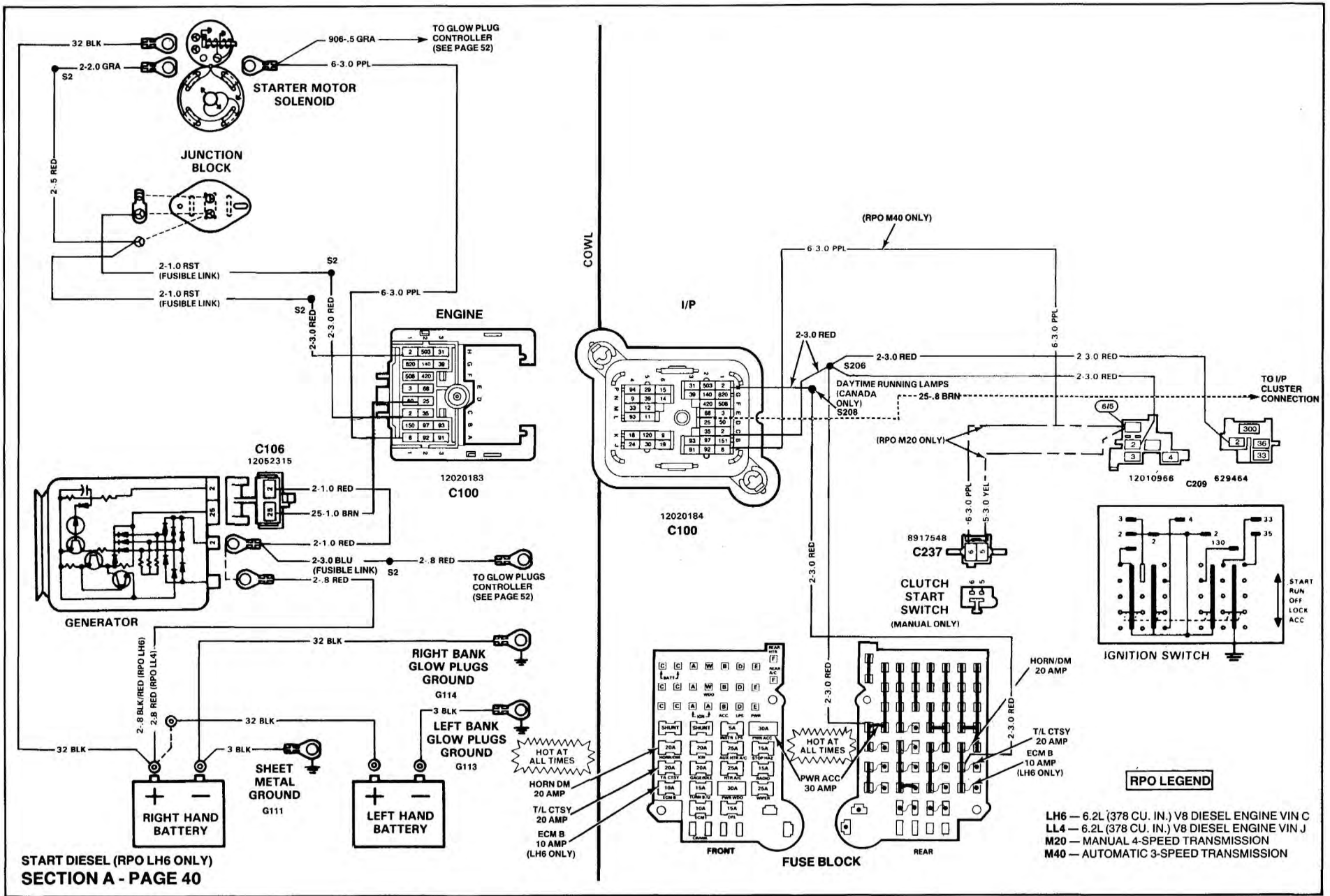




**RPO LEGEND**

L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
 L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N  
 MD8 — AUTOMATIC 4-SPEED TRANSMISSION  
 M20 — MANUAL 4-SPEED TRANSMISSION  
 M40 — AUTOMATIC 3-SPEED TRANSMISSION

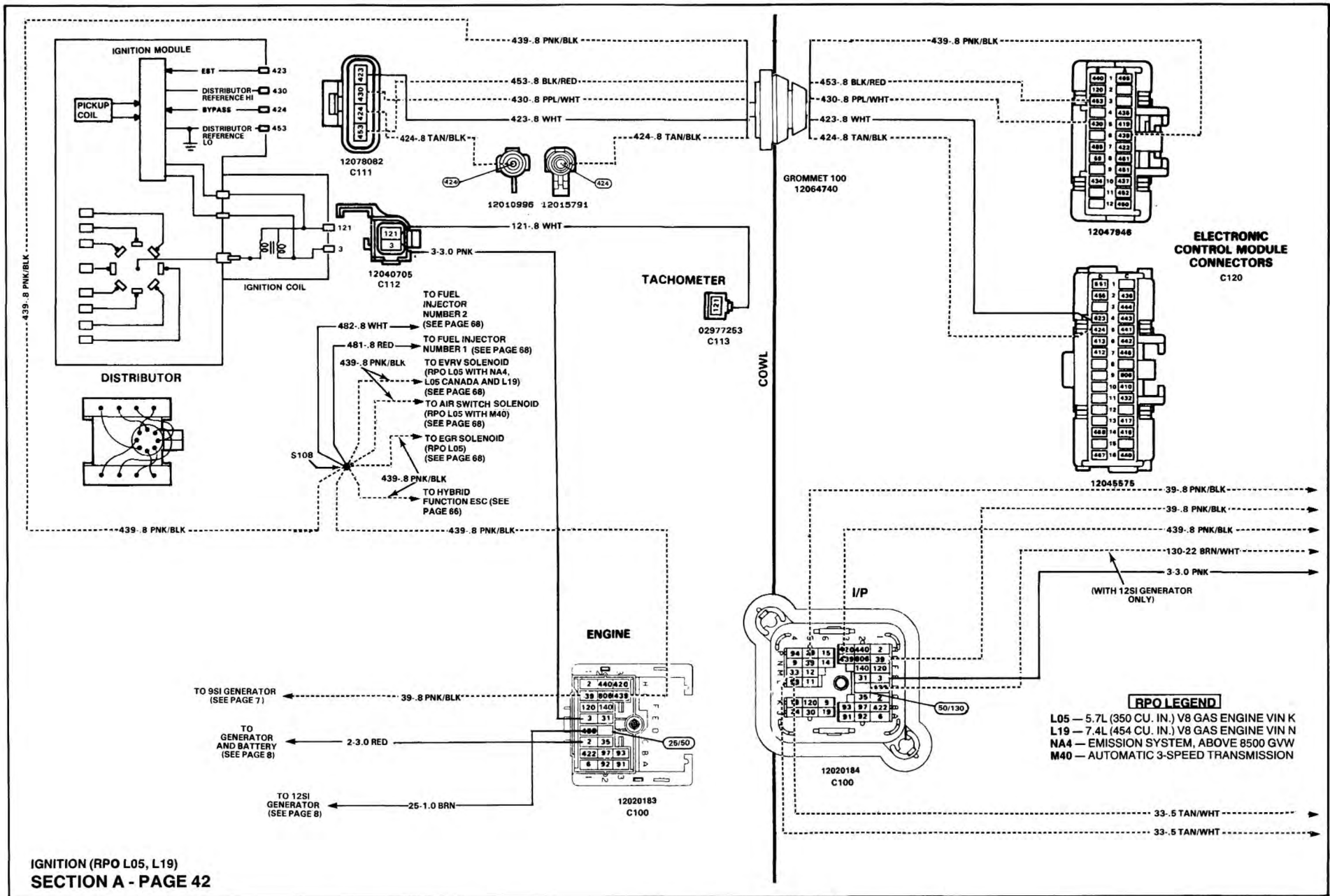
START (GASOLINE) (RPO L05, L19  
 WITH 9 SI GENERATOR)  
**SECTION A - PAGE 39**

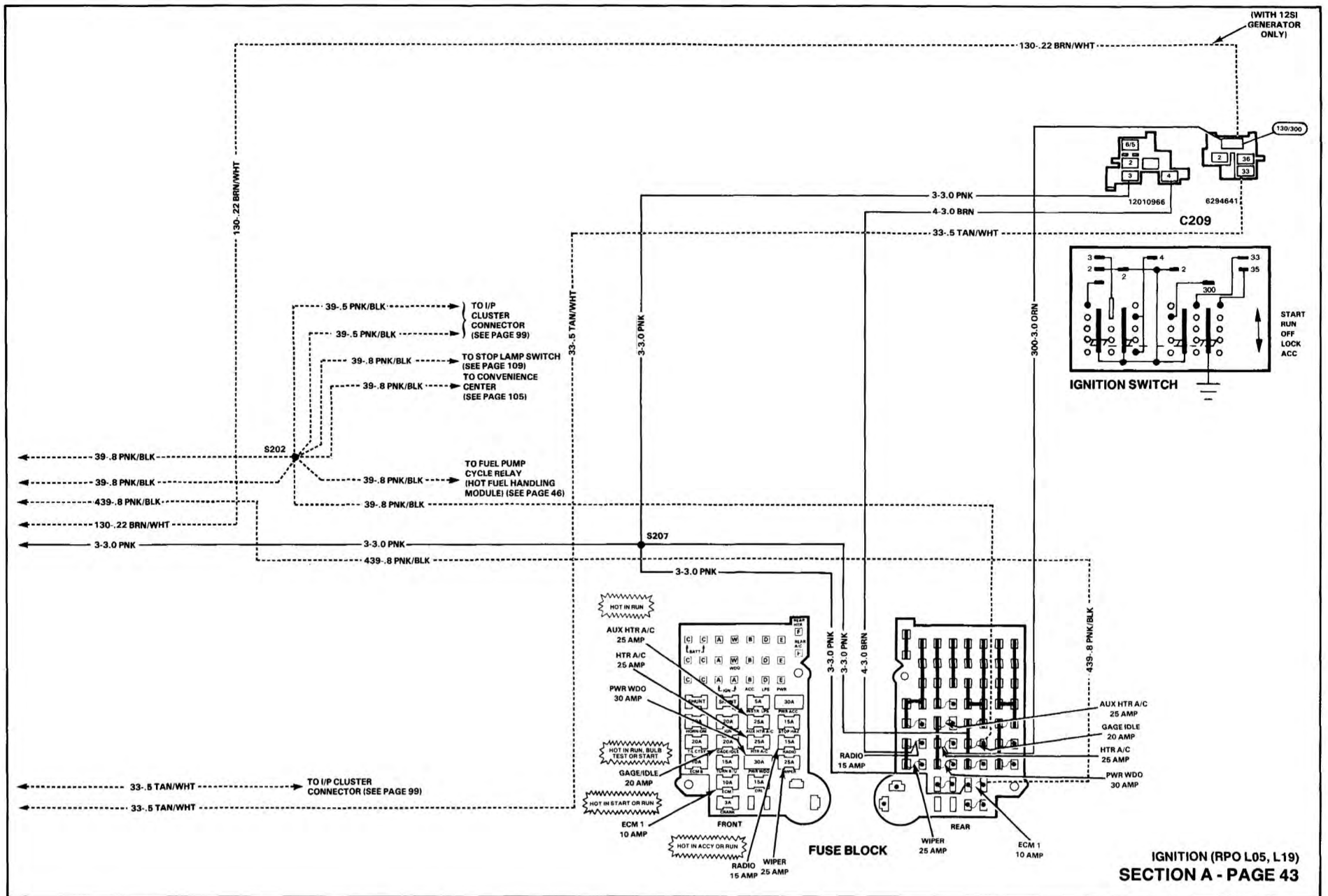


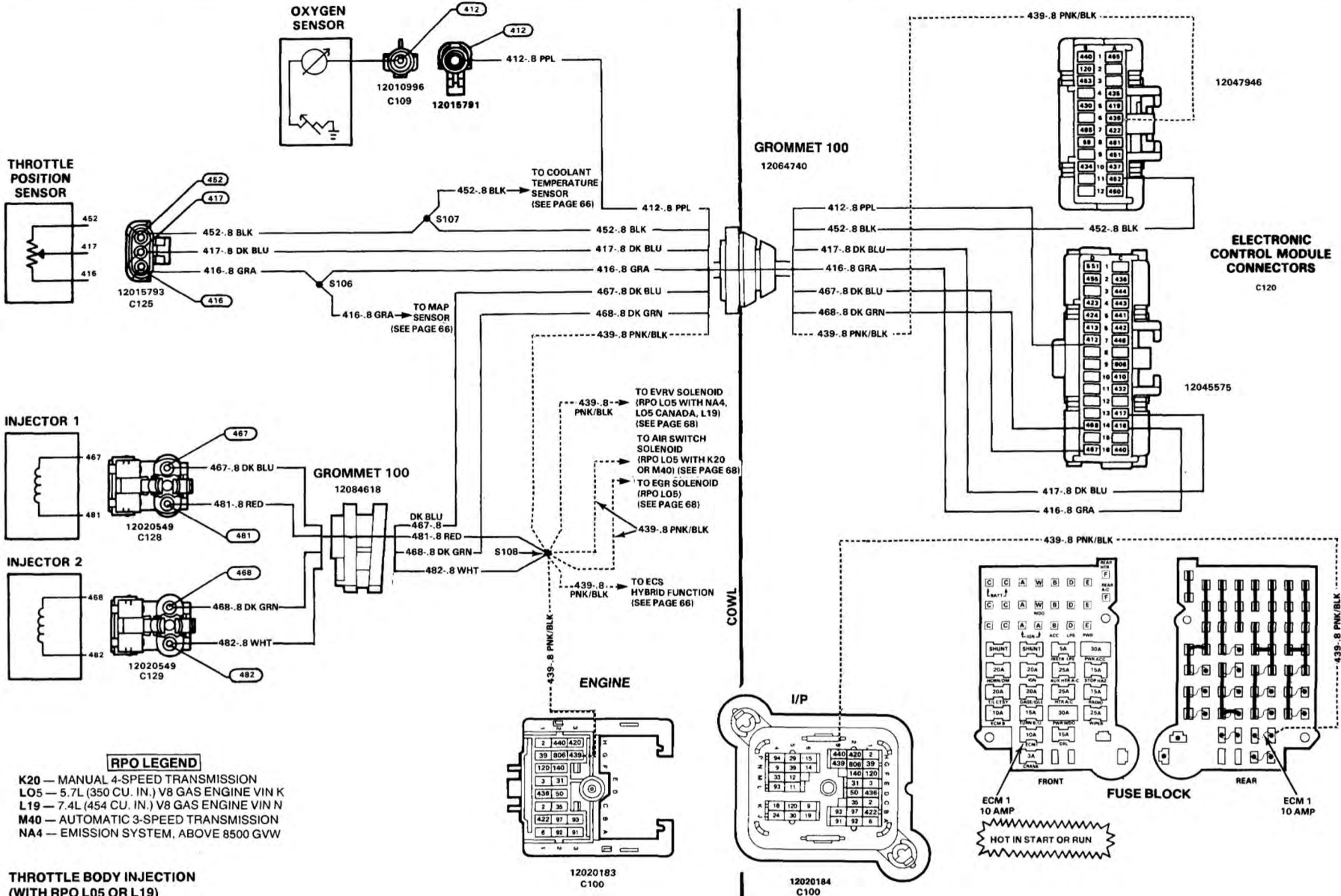
## COMPONENT LOCATION

Page — Figure

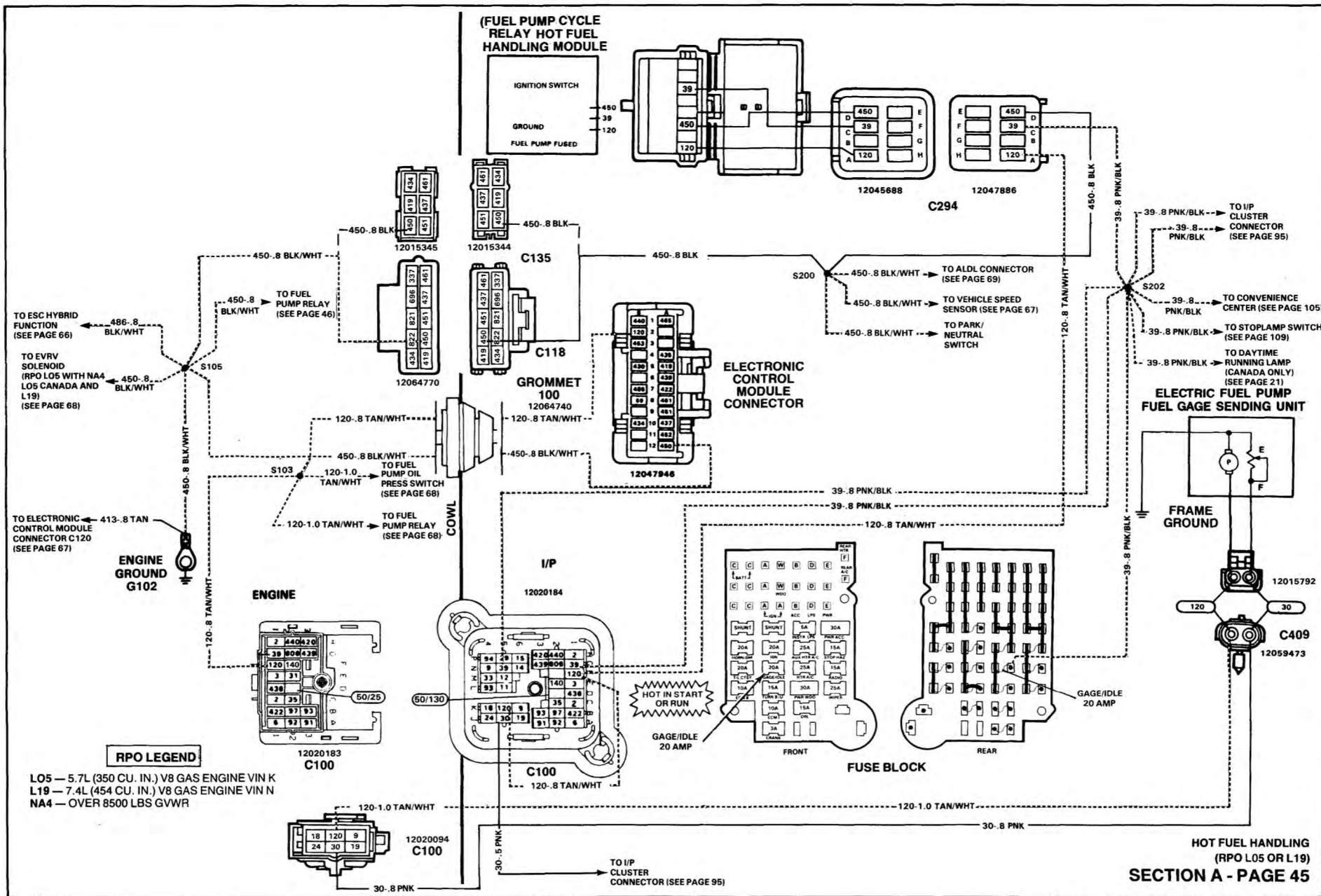
Electronic Control Module (RPO L05) . . . . .	Under center of I/P . . . . .	.171 —	21
Electronic Control Module (RPO L19) . . . . .	Under center of I/P . . . . .	.172 —	23
Fuel Injector 1 . . . . .	In throttle body . . . . .	.171 —	21
Fuel Injector 2 . . . . .	In throttle body . . . . .	.171 —	21
Fuel Pump . . . . .	In fuel tank . . . . .	.173 —	25
Fuel Pump Cycle Relay . . . . .	Under I/P . . . . .	—	—
Fuel Pump Oil Pressure Switch (RPO L05) . . . . .	Rear LH side of engine . . . . .	.171 —	22
Fuel Pump Oil Pressure Switch (RPO L19) . . . . .	Front LH side of engine . . . . .	.172 —	24
Fuel Pump Relay . . . . .	Engine compartment, center of cowl . . . . .	.171 —	21
Fuse Block . . . . .	Behind LH side of I/P, above kick panel . . . . .	.166 —	4
Grommet 100 . . . . .	Engine compartment, center of cowl . . . . .	.171 —	21
Grommet 101 . . . . .	Front of throttle body . . . . .	.171 —	21
Idle Air Control Actuator (RPO L05) . . . . .	RH side of engine, near throttle body . . . . .	.171 —	21
Idle Air Control Actuator (RPO L19) . . . . .	RH side of engine, near throttle body . . . . .	.172 —	23
Oxygen Sensor . . . . .	LH exhaust manifold . . . . .	.171 —	22
Throttle Position Sensor . . . . .	RH side of throttle body . . . . .	.171 —	21
C100 . . . . .	Engine compartment, LH side of cowl . . . . .	.165 —	2
C109 . . . . .	At oxygen sensor . . . . .	.171 —	22
C115 . . . . .	At fuel pump oil pressure switch . . . . .	.172 —	24
C118 . . . . .	Under center of I/P . . . . .	.171 —	21
C120 . . . . .	At electronic control module . . . . .	.171 —	21
C122 . . . . .	At fuel pump relay . . . . .	.171 —	21
C123 . . . . .	At fuel pump prime . . . . .	.171 —	21
C125 . . . . .	At throttle position sensor . . . . .	.171 —	21
C126 . . . . .	At idle air control actuator . . . . .	.171 —	21
C128 . . . . .	At fuel injector 1 . . . . .	.171 —	21
C129 . . . . .	At fuel injector 2 . . . . .	.171 —	21
C134 . . . . .	At idle air control actuator . . . . .	.172 —	23
C194 . . . . .	Under I/P . . . . .	—	—
C409 . . . . .	At fuel tank . . . . .	.173 —	25
G102 . . . . .	At front RH side of engine . . . . .	.172 —	24
G103 . . . . .	Rear RH side of engine . . . . .	.171 —	22
G409 . . . . .	On frame, near fuel tank . . . . .	.173 —	25
S103 . . . . .	Engine harness, rear RH side of engine . . . . .	.171 —	22
S104 . . . . .	Engine harness in front of grommet 100 . . . . .	.171 —	21
S105 . . . . .	Engine harness in front of grommet 100 . . . . .	.171 —	21
S106 . . . . .	Engine harness rear RH side of engine . . . . .	.171 —	21
S107 . . . . .	Engine harness, RH side of engine . . . . .	.171 —	21
S108 . . . . .	Engine harness, RH side of engine . . . . .	.171 —	21
S200 . . . . .	I/P harness, behind LH side of I/P . . . . .	.166 —	4
S202 . . . . .	I/P harness, behind LH side of I/P . . . . .	.166 —	4

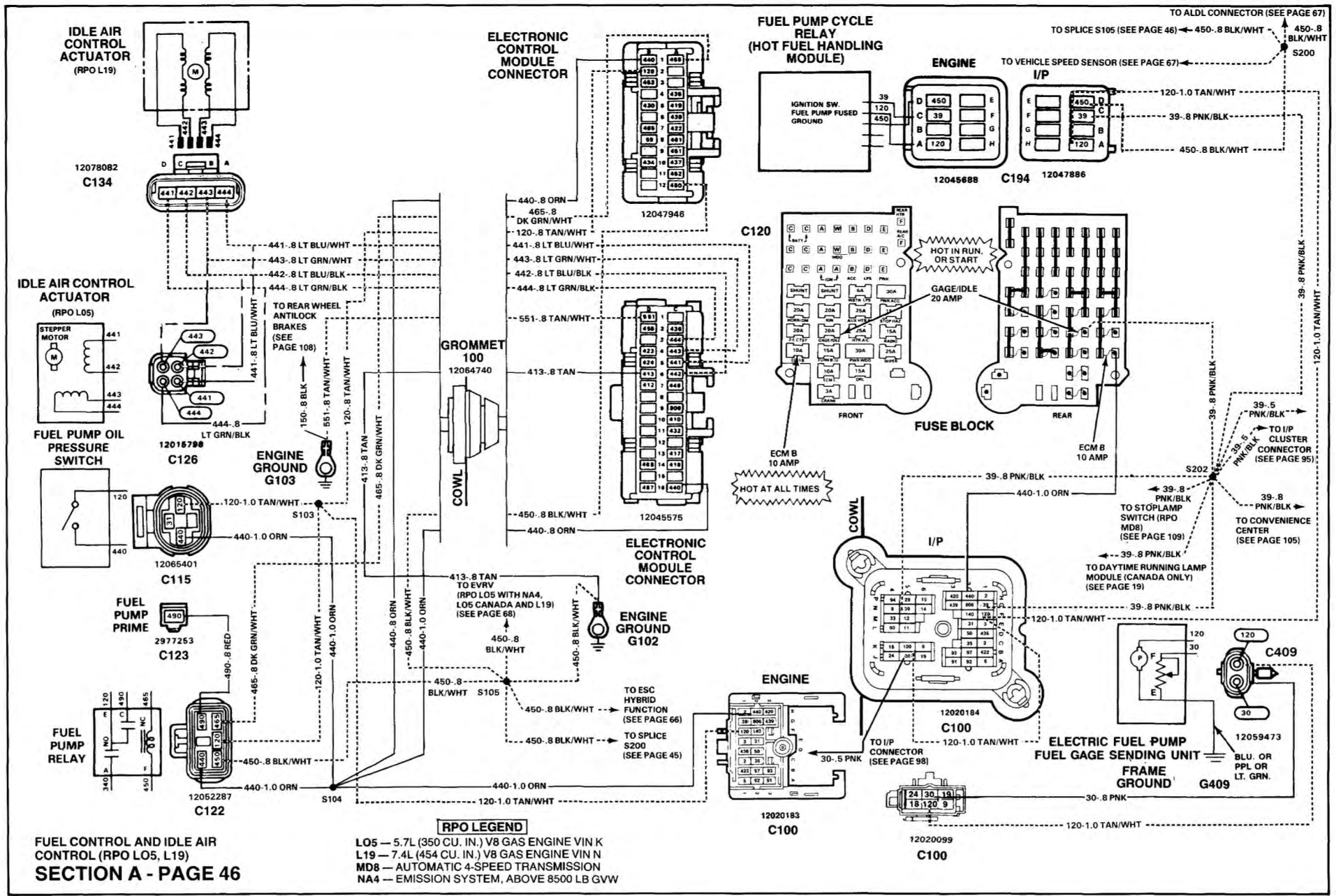












**BLANK**

## CIRCUIT OPERATION

The heating of the Glow Plugs is controlled by the Glow Plug Relay in the Glow Plug Controller. Battery voltage is applied to the relay contacts through the RED wire from the Junction Block. The relay is operated by a Solid State Controller. The Controller responds to engine temperature and also to an Ignition Switch Start Input.

When the Ignition Switch is turned to RUN, battery voltage is applied to the Enable Input of the Controller. The Glow Plug Relay within the Controller will be energized for approximately 5 seconds during which it applies voltage to the Glow Plugs and WAIT Indicator. After the initial time

period the relay will be de-energized for 5 seconds then will cycle ON/OFF for approximately 10 seconds.

When the Glow Plug Controller receives the Start Input, the Glow Plugs and WAIT Indicator will cycle ON/OFF after the Ignition Switch is returned to RUN.

After approximately 25 seconds the Controller will open the Glow Plug Relay and the heating of the plugs stops. If the engine is restarted while the engine is at normal operating temperature, the ECM (V8 VIN C) will keep the relay contacts open so that no plug heating takes place.

## COMPONENT LOCATION

		Page	Figure
Check Engine Lamp Driver (RPO LH6)	Under I/P	179	49
Cold Advance Control Solenoid (RPO LH6)	Front LH side of engine	170	18
Cold Advance Glow Plug Inhibit Relay (RPO LH6)	LH inner fender	173	26
Electronic Control Module (RPO LH6)	Under center of I/P	173	27
Fuel Shutoff Solenoid (RPO LH6)	Front LH side of engine	170	18
Fuse Block	Behind LH side of I/P, above kick panel	166	4
Glow Plug Controller Module (RPO LH6)	Rear RH side of engine	173	26
Glow Plugs	Above exhaust manifold, at each engine	173	26
Grommet 100	Engine compartment, center of cowl	173	27
Ignition Switch	RH side of steering column	166	5
C106	At cold advance glow plug inhibit relay	173	26
C120 (RPO LH6)	At electronic control module	173	27
C167	At cold advance solenoid	170	18
C168	At glow plug controller module	170	18
C169	Under I/P, near electronic control module	173	27
C172	At check engine lamp driver module	179	49
C199	At fuel shutoff solenoid	170	18
C209	At ignition switch	166	5
G110	Engine harness front LH side of engine	170	18
G113	Engine harness, LH cylinder head	169	16
G114	Engine harness, RH cylinder head	169	16
S122	Engine harness, RH side of engine	173	26
S130	Engine harness, RH front of engine	170	18
S131	Engine harness, rear of engine	173	26
S132	Engine harness, rear of engine	173	26
S133	Engine harness, LH side of engine	173	26
S134	Engine harness, RH side of engine	170	18

## PRELIMINARY CHECKS:

A check of the glow plug system should be performed before diagnostic procedures.

With engine below normal operating temperature, turn ignition switch to RUN. The WAIT indicator should light. After approximately 10 seconds, the WAIT indicator must begin to flash for an additional 10 seconds and then go out.

Turn ignition switch to OFF and then momentarily to

START and return to RUN position. The WAIT indicator should flash for approximately 25 seconds and then go out.

With engine at normal operating temperature, turn ignition switch to RUN. The WAIT indicator should not flash for an RPO LH6 engine, but should flash for an RPO LL4 engine.

## TROUBLESHOOTING CHART—GLOW PLUGS

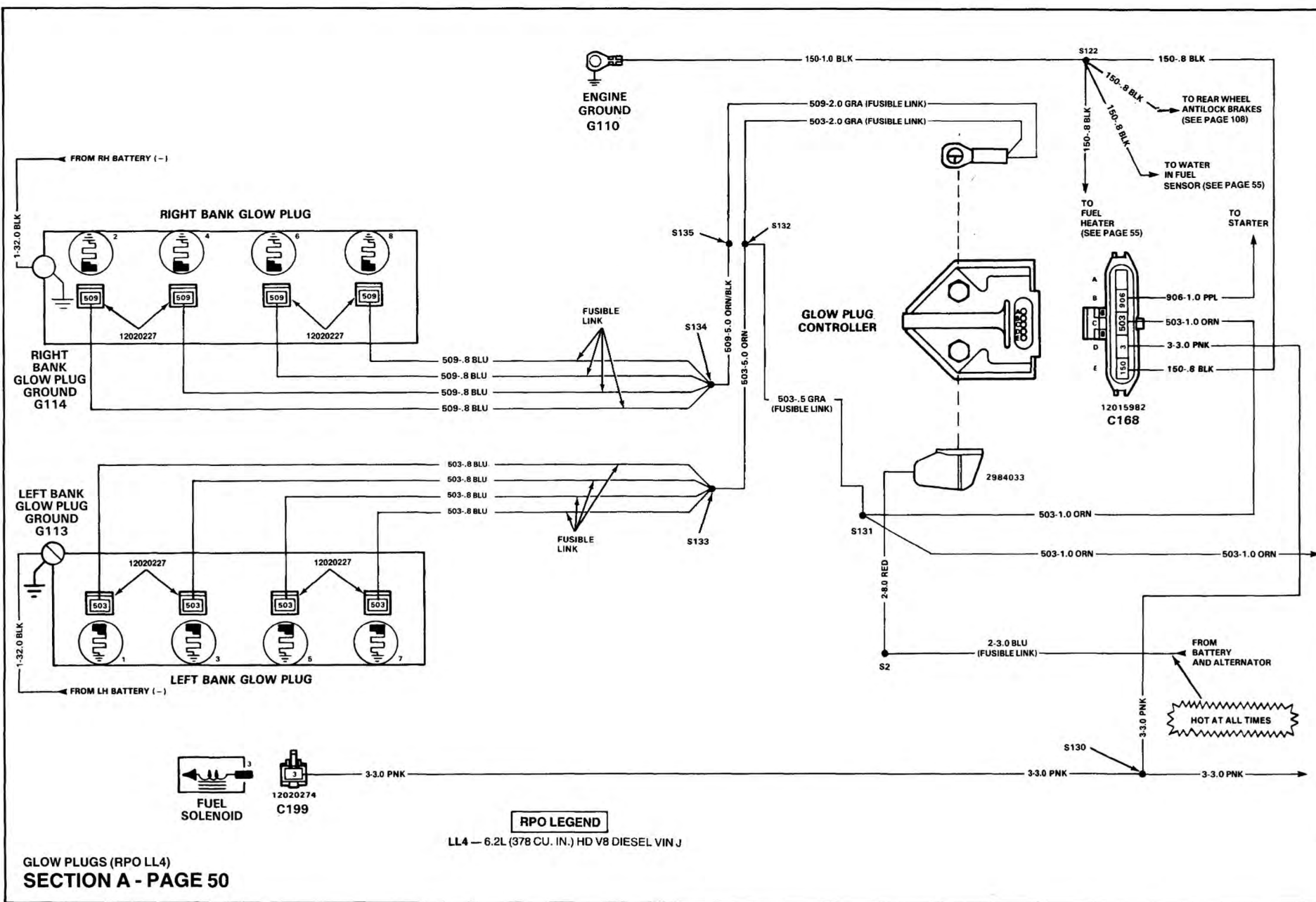
### WAIT INDICATOR DOES NOT FLASH OR FLASHES FOR THE INCORRECT AMOUNT OF TIME WHEN ENGINE IS BELOW NORMAL OPERATING TEMPERATURE

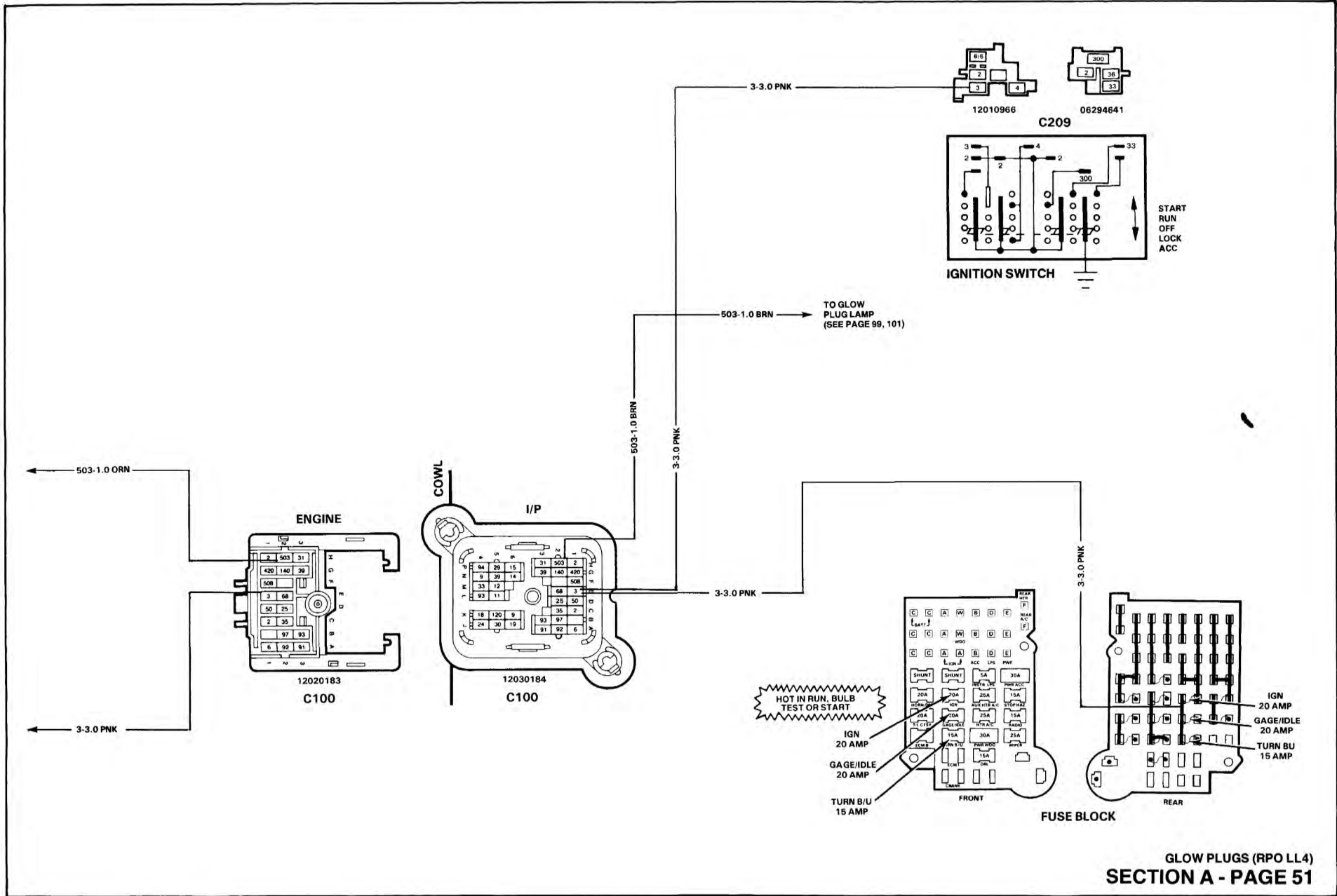
TEST	RESULT	ACTION
<b>NOTE:</b> For V8 diesel engines with an RPO LH6, ground BRN (905) wire at cold advance glow plug inhibit relay connector C106.  1. Place ignition switch in RUN position. Connect test lamp from RED (2) wire at glow plug controller to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire and fusible link from glow plug controller to junction block.
2. Connect test lamp from LT GRN/BLK (531) wire for RPO LH6 or PNK (3) wire for RPO LL4 engines at glow plug controller connector C168 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	GO to step 3 for RPO LH6 engines. For RPO LL4 engines LOCATE and REPAIR open in PNK (3) wire from glow plug controller to fuel shutoff valve.
3. Connect test lamp from PNK/BLK (39) wire at cold advance glow plug inhibit relay connector C106 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	CHECK condition of (GAGE/IDLE) fuse. If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire from inhibit relay to fuse block.
4. Connect test lamp from PNK/BLK (39) wire at cold advance glow plug inhibit relay connector C106 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in PNK/BLK (39) wire.
5. Connect a 10 amp fused jumper from BRN (905) wire at cold advance glow plug inhibit relay connector C106 to ground. Connect test lamp from LT GRN/BLK (531) wire at inhibit relay connector C106 to ground.	Test lamp lights.	CHECK for open in BRN (905) wire from inhibit relay to ECM. If wire is good, problem is with ECM. Refer to Section 6E in Service Manual.
	Test lamp does not light.	CHECK for open in LT GRN/BLK (531) wire. If good, REPLACE cold advance glow plug inhibit relay.
6. Connect test lamp from LT GRN/BLK (531) wire for RPO LH6 engines or PNK (3) wire for RPO LL4 engines to BLK (150) wire at glow plug controller connector C168.	Test lamp lights.	GO to step 7.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from glow plug controller to ground terminal G110.

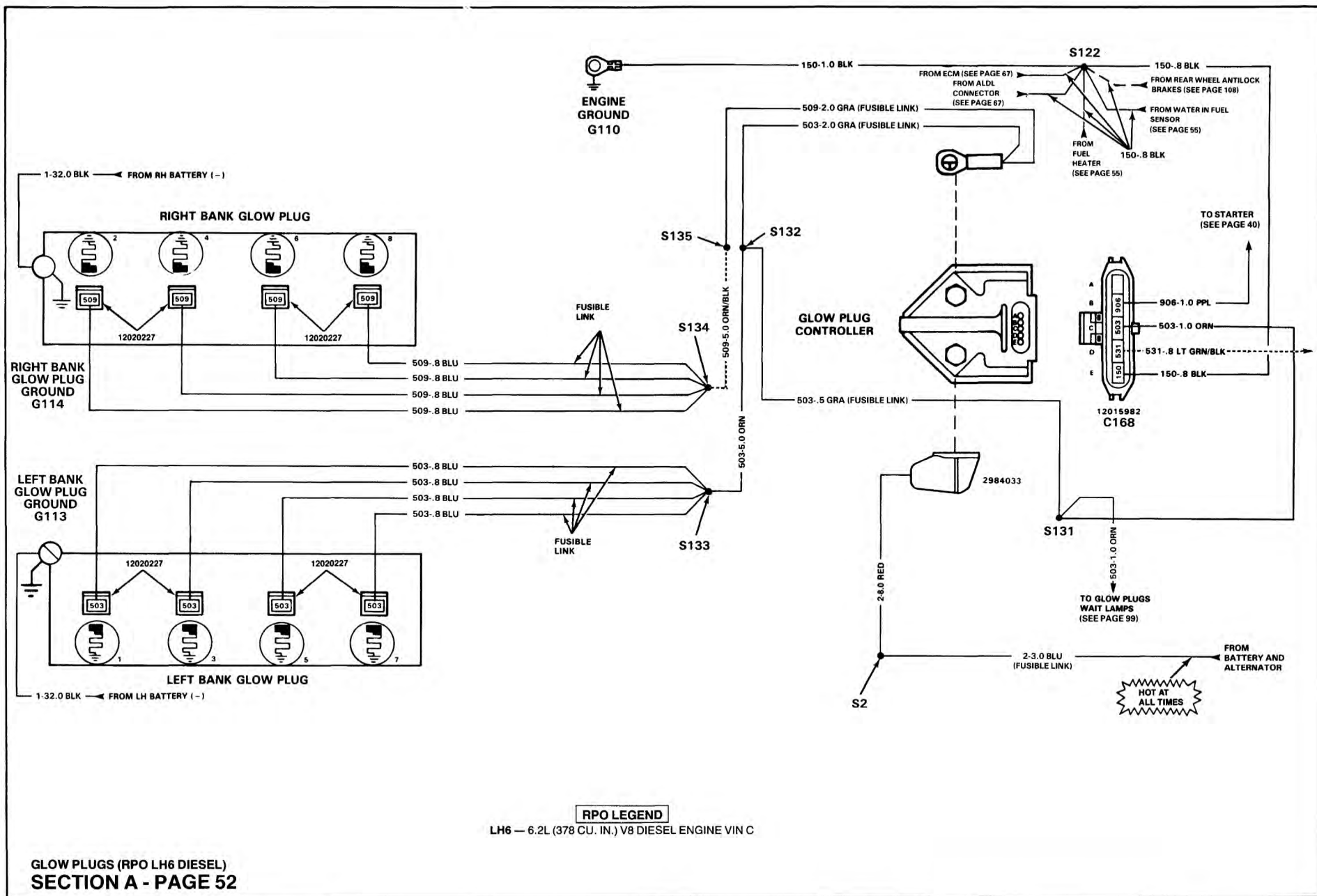
**WAIT INDICATOR STAYS ON OR FLASHES WHEN ENGINE IS AT NORMAL OPERATING TEMPERATURE AND IGNITION SWITCH IN RUN POSITION (LH6 ENGINE ONLY)**

7. Connect test lamp from PPL (906) wire at glow plug controller connector C168 to ground. Move ignition switch to START position.	Test lamp lights.	GO to step 8.
	Test lamp does not light.	LOCATE and REPAIR open in PPL (906) wire from glow plug controller to starter motor.
8. Place ignition switch to OFF position. Connect test lamp from ORN (503) wires at glow plug controller to ground.	Test lamp lights.	REPLACE glow plug controller.
	Test lamp does not light.	GO to step 9.
9. Disconnect glow plug controller connector C168. Using a positive polarity ohmmeter. Check continuity between ORN (503) and BLK (150) wires.	Reading of 2 ohms or less.	GO to step 10.
	Reading greater than 2 ohms.	LOCATE and REPAIR open in GRA (503) and ORN (503) wires from glow plug controller connector to glow plug harness splice S109.
10. Reconnect glow plug controller connector. Connect test lamp from ORN (503) wire at glow plug controller to ground. Turn ignition switch momentarily to START and then release to RUN position.	Test lamp cycles on and off for approximately 25 seconds then goes off.	GO to step 11.
	Test lamp does not light or cycles for the incorrect time.	REPLACE glow plug controller.
11. Remove all connectors from glow plugs. Connect one lead of test lamp to battery voltage and other lead to each glow plug.	Test lamp lights for all glow plugs.	LOCATE and REPAIR open in ORN (503) or ORN/BLK (509) wires and fusible links from glow plug to controller.
	Test lamp does not light for one or more glow plugs.	REPLACE glow plug(s) where test lamp did not light.

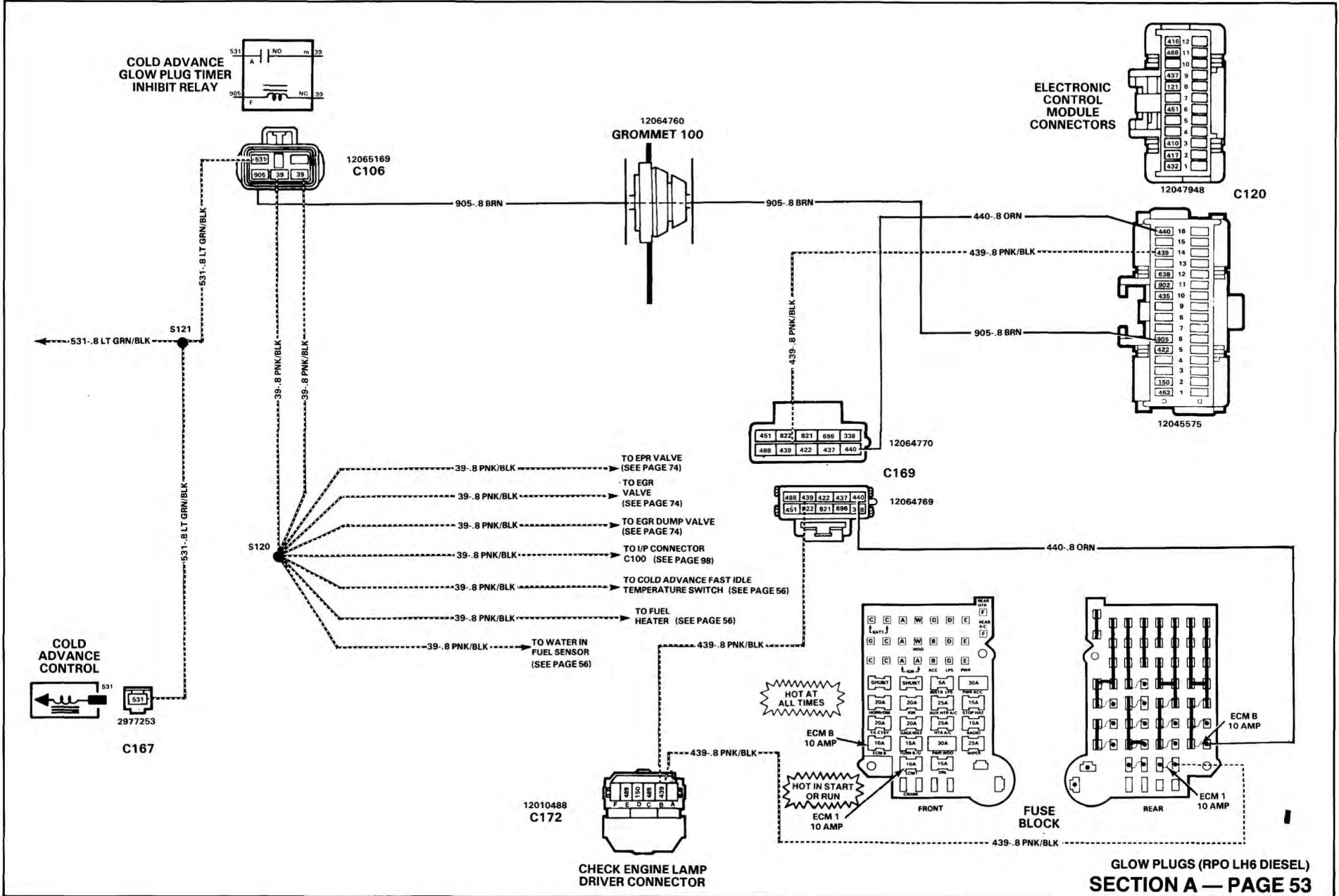
TEST	RESULT	ACTION
1. Connect test lamp from PNK (39) wire at cold advance glow plug inhibit relay connector C106 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of (GAGE/IDLE) fuse. If fuse is good, LOCATE and REPAIR open from inhibit relay to fuse block.
2. Connect test lamp from PNK/BLK (39) wire at cold advance glow plug inhibit relay connector C106 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in PNK/BLK (39) wire.
3. Connect a fused jumper from BRN (905) wire at cold advance glow plug inhibit relay connector C106 to ground. Connect test lamp from LT GRN/BLK (531) wire at inhibit relay connector C106 to ground.	Test lamp lights.	CHECK for open in BRN (905) wire from inhibit relay to ECM. If wire is good, problem is with ECM. Refer to Section 6E in Service Manual.
	Test lamp does not light.	REPLACE cold advance glow plug inhibit relay.











## CIRCUIT OPERATION

The Diesel Fuel Filter System combines six functions into a single package:

1. It heats diesel fuel to prevent wax-plugging of the filter;
2. It combines very small droplets of water in the fuel into larger drops and separates the water from the fuel;
3. It filters the diesel fuel;
4. It detects the presence of excess water in the fuel; and
5. It provides a means to drain the water it has separated.

The Fuel Filter Assembly consists of the Fuel Heater, the Water-In-Fuel Sensor and a Filter. The Filter contains the "coalescer" (the device that combines small droplets of water into larger ones) and the filter/separator.

An electric fuel pump delivers diesel fuel from the tank to the fuel filter. As fuel enters the filter, it passes first through the Fuel Heater. The heater contains a thermostatic switch. The switch opens or closes, to turn the heater off or on, depending on the temperature of the fuel.

The fuel then passes through the Primary and Secondary filters. Next the fuel flows through the water coalescer. Here the droplets of water in the fuel are combined into larger drops, the drops fall to the water reservoir in the filter. When fuel flows from the Fuel Filter Assembly to the injection pump, it is clean and free of water.

The Solid State Water-In-Fuel Sensor applies voltage to a Probe. When the Probe touches water, the Module closes a switch. This completes a circuit to ground to light the SERVICE FUEL FILTER indicator.

A time delay circuit in the Water-In-Fuel Module grounds the indicator bulb briefly to test the bulb each time the system is turned on.

The Fuel Heater is operated by a built-in thermostatic switch. When the switch is closed, battery voltage is applied to the heater from the GAGE/IDLE Fuse.

## COMPONENT LOCATION

Page — Figure

Cold Advance Control Solenoid	On front of engine	170	18
Cold Advance/Fast Idle Temperature Switch	RH rear bottom of engine	170	18
Fast Idle Solenoid	On front top of engine	170	18
Fuel Heater	Engine compartment, on cowl behind engine	170	18
Fuel Shutoff Solenoid	On front top of engine	170	18
Fuse Block	LH side of I/P, above kick panel	166	4
Glow Plug Controller	Rear RH side of engine	173	26
Ignition Switch	RH side of steering column	166	5
Transmission Kickdown Switch	LH side of transmission	173	28
Vacuum Regulator Valve	Engine compartment, LH side of engine	—	—
C100	Engine compartment, LH side of cowl	165	2
C100A	At fast idle solenoid	170	18
C101A	At cold advance control solenoid	170	18
C102A	At cold advance/fast idle temperature switch	170	18
C103A	At water-in-fuel sensor	170	18
C104A	At fuel heater	170	18
C168	At glow plug controller module	173	26
C189	At transmission kickdown switch	173	28
C199	At fuel shut-off solenoid	170	18
C209	At ignition switch	166	5
G110	Engine harness, front LH side of engine	170	18
S120	Engine harness, RH side of engine	170	18
S122	Engine harness, RH side of engine	173	26
S130	Engine harness, RH front of engine	170	18
S202	I/P harness, behind LH side of I/P	166	4

## PRELIMINARY CHECKS:

CHECK condition of GAGE/IDLE fuse. If fuse is blown, LOCATE and REPAIR source of overload, then REPLACE fuse.

If fuse is in good condition, use the following diagnostic procedures.

## TROUBLESHOOTING CHART—DIESEL ENGINE FUEL CONTROLS

### FUEL HEATER DOES NOT OPERATE

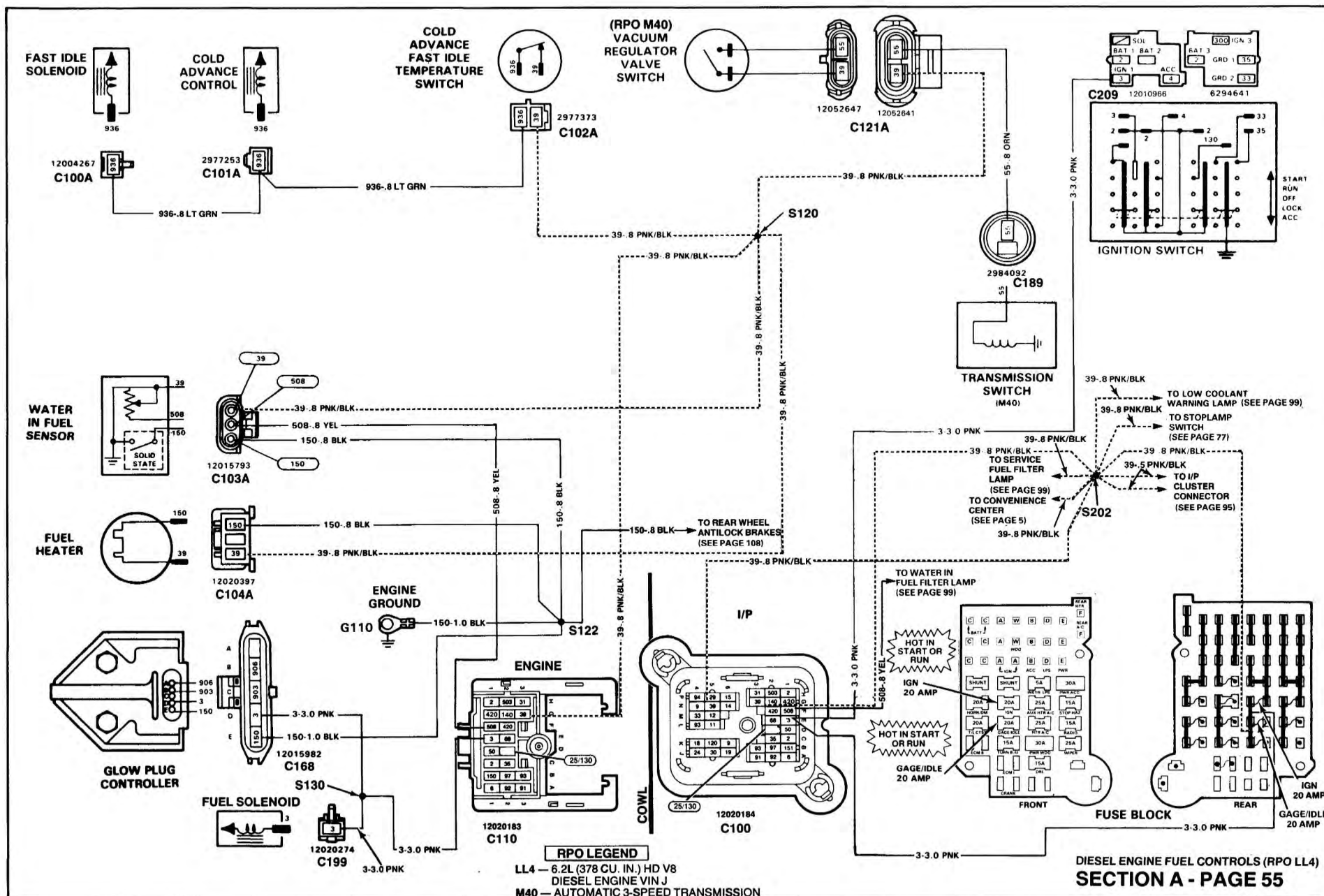
TEST	RESULT	ACTION
1. Disconnect fuel heater connector C104A. Place ignition switch to RUN position. Connect voltmeter from PNK/BLK (39) wire at fuel heater connector C104A to ground.	Battery voltage.	GO to step 2.
	No voltage.	LOCATE and REPAIR open in PNK/BLK (39) wire from fuel heater to fuse block.
2. Connect voltmeter from PNK/BLK (39) wire to BLK (150) wire at fuel heater connector C104A.	Battery voltage.	REPLACE fuel heater.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from fuel heater to ground terminal G110.

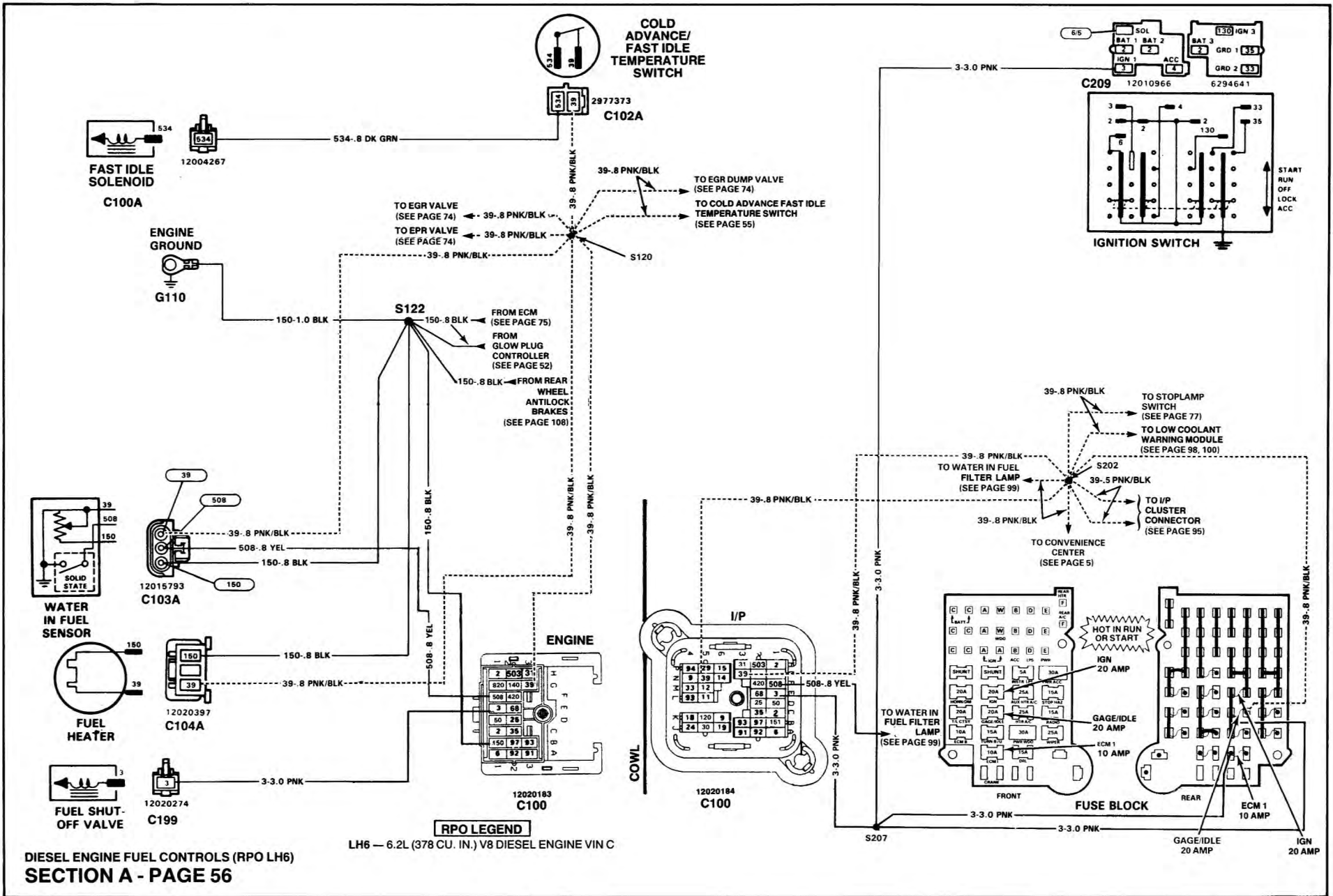
### SERVICE FUEL FILTER INDICATOR LIGHTS WITH NO WATER IN FUEL

TEST	RESULT	ACTION
Place ignition switch in RUN position. Disconnect water-in-fuel sensor connector C103A.	SERVICE FUEL FILTER indicator stays on.	LOCATE and REPAIR short to ground in YEL (508) wire.
	SERVICE FUEL FILTER indicator goes out.	REPLACE water-in-fuel sensor.

### SERVICE FUEL FILTER INDICATOR DOES NOT LIGHT BRIEFLY WITH IGNITION SWITCH TURNED TO RUN

TEST	RESULT	ACTION
1. Disconnect water-in-fuel sensor connector C103A and place ignition switch in RUN. Connect a voltmeter from PNK/BLK (39) wire at fuel sensor connector C103A to ground.	Battery voltage.	GO to step 2.
	No voltage reading.	LOCATE and REPAIR open in PNK/BLK (39) wire from fuel sensor to fuse block.
2. Connect voltmeter from PNK/BLK (39) to BLK (150) wire at water-in-fuel sensor connector C103A.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from fuel sensor to ground terminal G110.
3. Connect voltmeter from YEL (508) wire at water-in-fuel sensor connector C103A to ground.	Battery voltage.	REPLACE water-in-fuel sensor.
	No voltage.	CHECK Service Fuel Filter lamp. If lamp is good, LOCATE and REPAIR open in YEL (508) wire.





**BLANK**

## CIRCUIT OPERATION

Battery voltage is applied to the Cooling Fan Relay at all times by the RED (2) wire and by the PNK/BLK (39) wire through the GAGE/IDLE fuse, when the Ignition Switch is in RUN, BULB TEST or START. When the Cooling Fan

Switch closes at 107°C (225°F), the DK GRN (935) wire is grounded and the Cooling Fan Relay energizes. Battery voltage is applied across the Cooling Fan Motor and the Cooling Fan runs.

## COMPONENT LOCATION

		Page	Figure
Auxiliary Cooling Fan	Behind RH side of radiator support	174	30
Auxiliary Cooling Fan Relay	LH inner fender, in engine compartment	174	30
Auxiliary Fan Temperature Switch	RH side of engine, above exhaust manifold	174	29
Fuse Block	Behind LH side of I/P, above kick panel	166	4
Junction Block	Engine compartment, center of cowl	165	2
C100	Engine compartment, LH front of cowl	165	2
C190	At auxiliary cooling fan relay	174	30
C191	At auxiliary cooling fan	174	30
C192	Engine compartment to RH side of bulkhead connector	174	30
C193	At auxiliary fan temperature switch	174	29
G106	RH front of vehicle, above RH headlamps	165	2
G107	RH front of vehicle, on frame below RH headlamps	165	2
S111	Forward lamp harness, in front of RH headlamps	165	2
S202	I/P harness, behind LH side of I/P	166	4

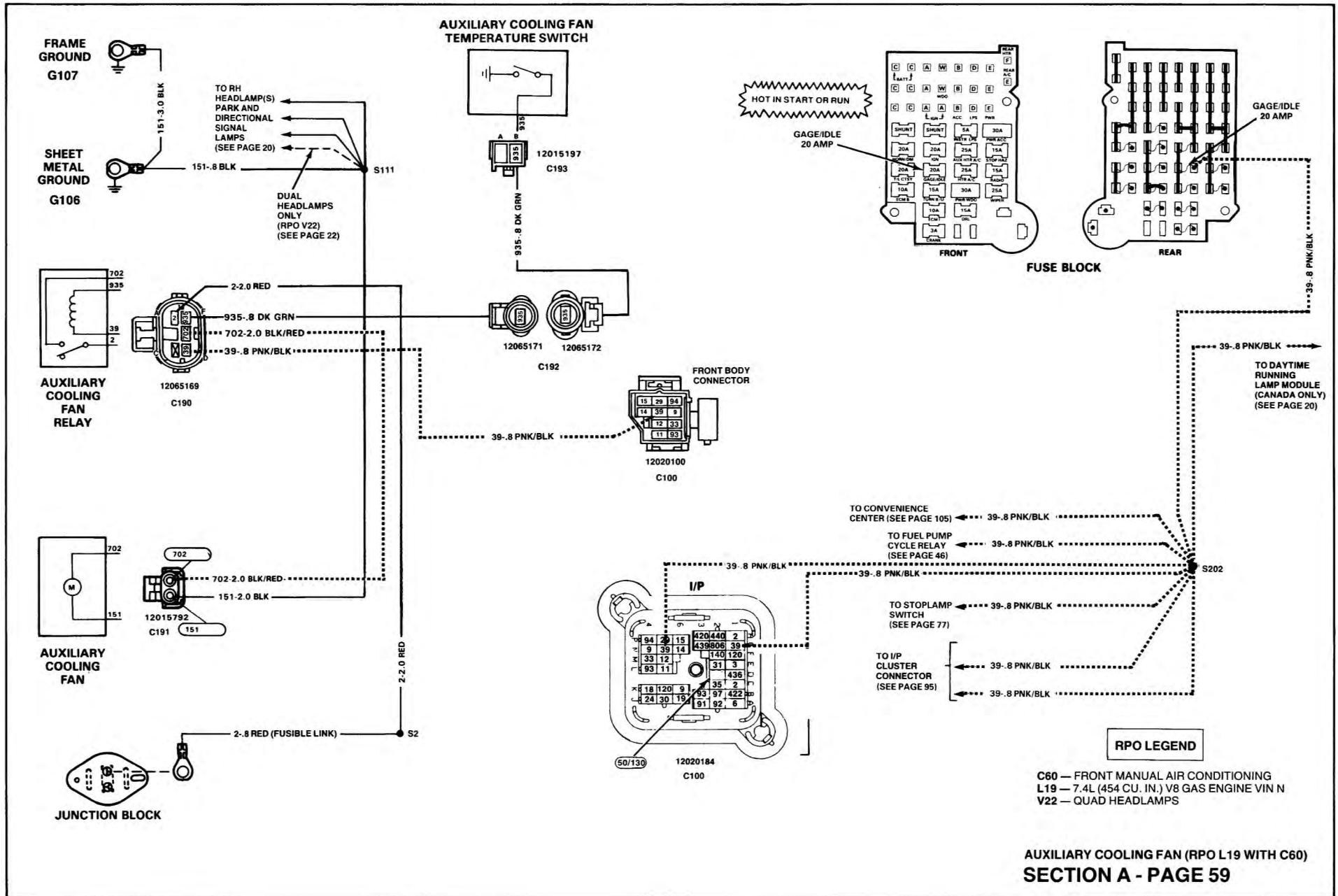
## TROUBLESHOOTING CHART—AUXILIARY COOLING FAN

### COOLING FAN DOES NOT RUN

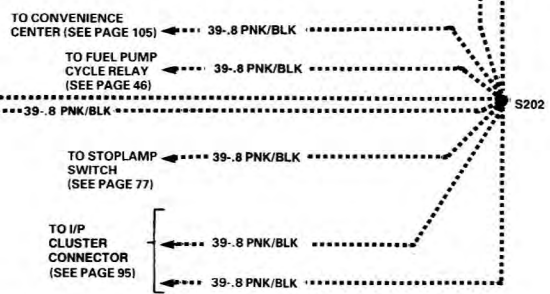
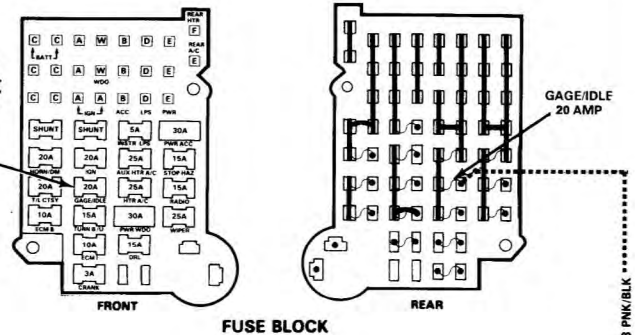
TEST	RESULT	ACTION
1. Disconnect fan temperature switch connector C193. Connect a fused jumper from DK GRN (935) wire at fan temperature switch connector C193 to ground.	Cooling fan does not run.	GO to step 2.
	Cooling fan runs.	REPLACE cooling fan temperature switch.
2. Disconnect fan relay connector C190. Connect test lamp from PNK/BLK (39) wire at fan relay connector C190 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	CHECK condition of fuse (GAGE/IDLE) and/or LOCATE and REPAIR open in PNK/BLK (39) wire from fan relay to fuse block.
3. Connect fused jumper from DK GRN (935) wire at fan temperature switch connector C193 to ground. Connect test lamp from PNK/BLK (39) wire to DK GRN (935) wire at fan relay connector C190.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (935) wire.
4. Connect test lamp from RED (2) wire at fan relay connector C190 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire and fusible link.
5. Connect 30 amp fused jumper from RED (2) wire to BLK/RED (702) wire at the fan relay connector C190.	Cooling fan does not run.	GO to step 6.
	Cooling fan runs.	REPLACE cooling fan relay.
6. Leave 30 amp fused jumper connected. Disconnect cooling fan connector C191. Connect a test lamp from BLK/RED (702) at cooling fan connector C191 to ground.	Test lamp lights.	GO to step 7.
	Test lamp does not light.	LOCATE and REPAIR open in BLK/RED (702) wires from cooling fan to fan relay.
7. Connect test lamp from BLK/RED (702) to BLK (151) wires at cooling fan connector C191.	Test lamp lights.	REPLACE cooling fan.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (151) wire from cooling fan to ground terminal G106.

### COOLING FAN RUNS CONTINUOUSLY

TEST	RESULT	ACTION
1. Place ignition switch in RUN position and with engine coolant temperature below 107°C (225°F), disconnect fan temperature switch connector C193.	Cooling fan runs.	GO to step 2.
	Cooling fan does not run.	REPLACE cooling fan temperature switch.
2. Disconnect fan relay connector C190. Connect test lamp from PNK/BLK (39) to DK GRN (935) wires at fan relay connector C190.	Test lamp lights.	CHECK for short in DK GRN (935) wire from fan relay to fan temperature switch.
	Test lamp does not light.	REPLACE cooling fan relay.



HOT IN START OR RUN



**RPO LEGEND**

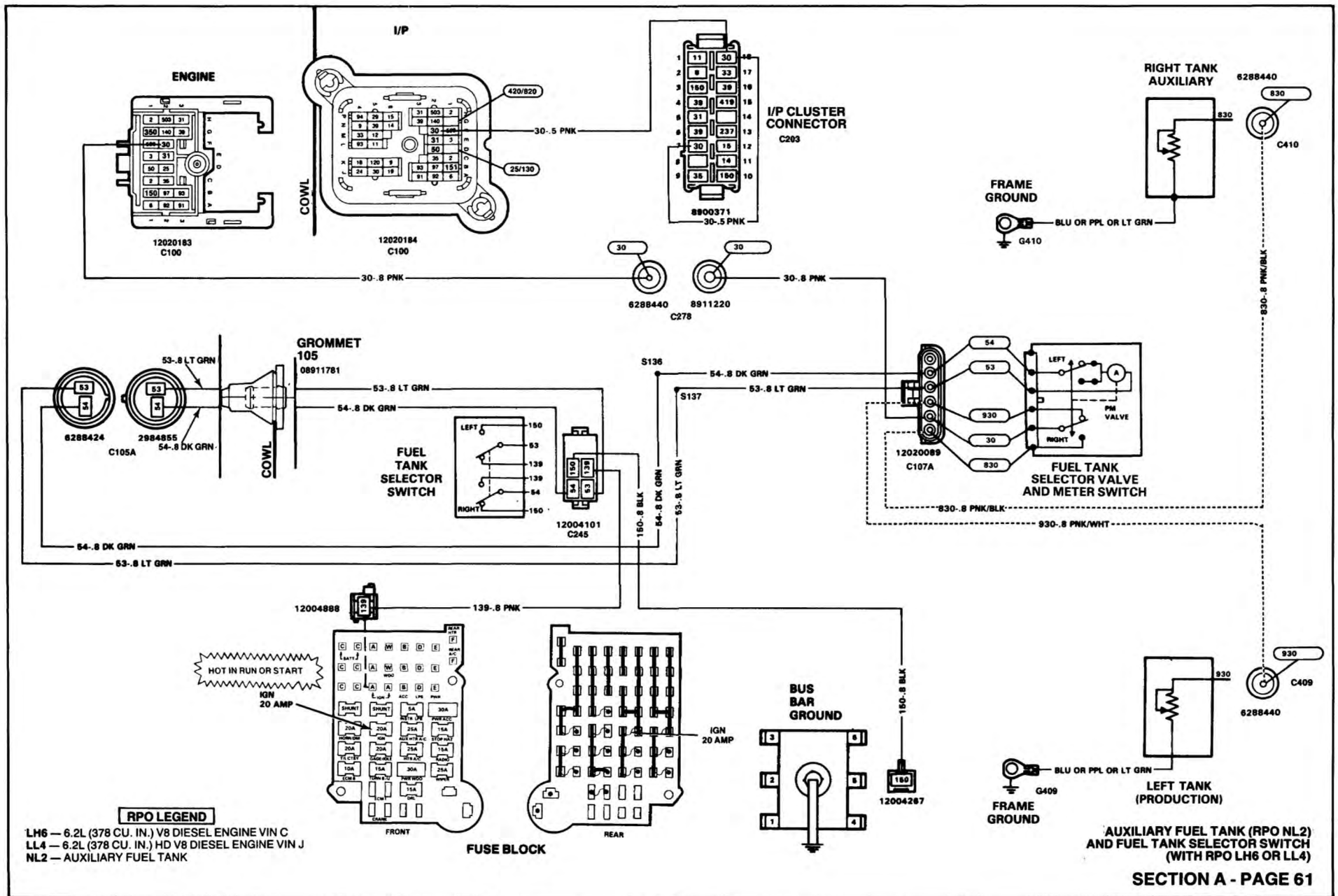
- C60 — FRONT MANUAL AIR CONDITIONING
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN R
- V22 — QUAD HEADLAMPS

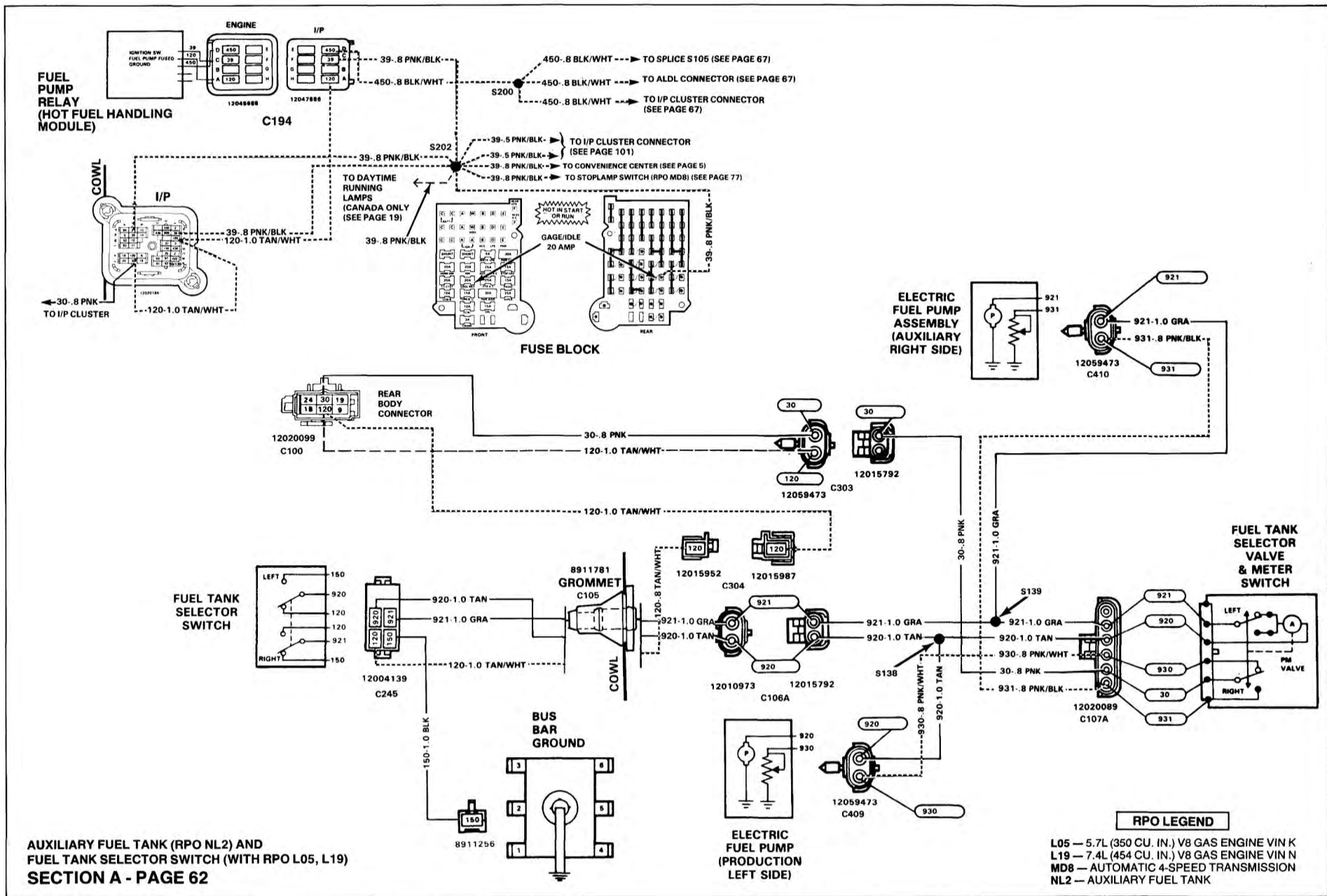
**AUXILIARY COOLING FAN (RPO L19 WITH C60)**  
**SECTION A - PAGE 59**

**COMPONENT LOCATION****Page — Figure**

Bus Bar Ground . . . . .	LH side of I/P . . . . .	.166 —	6
Electric Fuel Pump (Gas), LH . . . . .	At LH fuel tank . . . . .	.175 —	33
Electric Fuel Pump (Gas), RH . . . . .	At RH fuel tank . . . . .	.175 —	33
Fuel Tank (Diesel), LH . . . . .	LH side of vehicle . . . . .	.174 —	32
Fuel Tank (Diesel), RH . . . . .	RH side of vehicle . . . . .	.174 —	32
Fuel Tank Selector Switch . . . . .	RH side of I/P, near steering column . . . . .	.174 —	31
Fuel Tank Selector Valve and Meter Switch (Diesel) . . . . .	On frame rail, near RH fuel tank . . . . .	.174 —	32
Fuel Tank Selector Valve and Meter Switch (Gas) . . . . .	On frame rail, near RH fuel tank . . . . .	.175 —	33
Fuse Block . . . . .	Under LH side of I/P, above kick panel . . . . .	.166 —	4
Grommet 105 . . . . .	Engine compartment, LH side of cowl . . . . .	.174 —	31
C100 . . . . .	Engine compartment, LH side of cowl . . . . .	.165 —	2
C105A . . . . .	Engine compartment, LH side of cowl . . . . .	.174 —	31
C107A . . . . .	At fuel tank selector valve and meter switch . . . . .	.174 —	32
C203 . . . . .	Behind I/P cluster . . . . .	.166 —	4
C245 . . . . .	At fuel tank selector switch . . . . .	.174 —	31
C246 . . . . .	At fuse block . . . . .	.174 —	31
C247 . . . . .	At bus bar ground . . . . .	.174 —	31
C278 . . . . .	In auxiliary fuel harness . . . . .	.175 —	35
C303 (Gas) . . . . .	In auxiliary fuel harness . . . . .	.175 —	35
C304 (Gas) . . . . .	In auxiliary fuel harness . . . . .	.175 —	35
C409 (Diesel) . . . . .	At LH fuel tank . . . . .	.174 —	32
C410 (Diesel) . . . . .	At RH fuel tank . . . . .	.174 —	32
S136 (Diesel) . . . . .	In auxiliary fuel harness . . . . .	.174 —	32
S137 (Diesel) . . . . .	In auxiliary fuel harness . . . . .	.174 —	32
S138 (Gas) . . . . .	In auxiliary fuel harness . . . . .	.175 —	33
S139 (Gas) . . . . .	In auxiliary fuel harness . . . . .	.175 —	33







**BLANK**

**COMPONENT LOCATION**

	Page — Figure
Air Switch Solenoid (RPO L05)	Front RH side of engine . . . . . 175 — 35
ALDL Connector	Under LH side of I/P . . . . . 166 — 4
Coolant Temperature Sensor (RPO L05)	Front of engine . . . . . 175 — 34
Coolant Temperature Sensor (RPO L19)	Front of engine . . . . . 176 — 38
Digital Ratio Adapter Controller Module	Under LH side of I/P . . . . . 177 — 39
EGR Solenoid (RPO L05)	RH rear side of engine . . . . . 171 — 21
Electronic Control Module	Under RH side of I/P . . . . . 175 — 34
Electronic Spark Timing (EST) Module	At distributor . . . . . 171 — 22
Electronic Spark Control (ESC) Hybrid Function (RPO L05)	RH side of engine . . . . . 175 — 34
Electronic Spark Control (ESC) Hybrid Function (RPO L19)	Engine compartment, RH side of cowl . . . . . 176 — 37
EVRV Solenoid (RPO L05)	RH rear of engine . . . . . 175 — 34
EVRV Solenoid (RPO L19)	RH front of engine . . . . . 176 — 38
Fuel Injectors	Top of engine, in throttle body . . . . . 175 — 34
Fuel Pump Oil Pressure Switch (RPO L05)	Rear of engine . . . . . 171 — 22
Fuel Pump Oil Pressure Switch (RPO L19)	Front lower LH side of engine . . . . . 176 — 38
Fuel Pump Relay	Engine compartment RH side of cowl . . . . . 175 — 34
Fuse Block	Under LH side of I/P, above kick panel . . . . . 166 — 4
Grommet 100	Center of cowl . . . . . 175 — 34
Grommet 101	Front of throttle body . . . . . 175 — 34
Idle Air Control Actuator (RPO L05)	Top RH side of engine . . . . . 175 — 34
Idle Air Control Actuator (RPO L19)	Top RH side of engine . . . . . 176 — 37
Knock Sensor (RPO L05)	Lower RH side of engine . . . . . 175 — 34
Knock Sensor (RPO L19)	Lower RH side of engine . . . . . 176 — 37
Manifold Absolute Pressure Sensor (RPO L05)	Top of RH side of engine . . . . . 175 — 34
Manifold Absolute Pressure Sensor (RPO L19)	Top of RH side of engine . . . . . 176 — 37
Oxygen Sensor	In LH exhaust manifold . . . . . 171 — 22
Throttle Position Sensor	RH side of throttle body . . . . . 175 — 34
Transmission Converter Clutch Solenoid (RPO L05)	Rear LH of transmission . . . . . 175 — 36
Vehicle Speed Sensor	Rear of transmission . . . . . 175 — 36

**COMPONENT LOCATION**

	Page — Figure
C100	Engine compartment, LH side of cowl . . . . . 175 — 35
C103	Engine compartment, LH side of cowl . . . . . 175 — 35
C108	At vehicle speed sensor . . . . . 175 — 36
C109	At oxygen sensor . . . . . 171 — 22
C110	At transmission converter clutch solenoid . . . . . 175 — 36
C111	At electronic spark timing module . . . . . 171 — 22
C115	At fuel pump oil pressure switch . . . . . 176 — 38
C116 (RPO L05)	At knock sensor . . . . . 175 — 34
C116 (RPO L19)	At knock sensor . . . . . 176 — 37
C118	Near ECM module, under I/P . . . . . 175 — 34
C120	At electronic control module . . . . . 175 — 34
C122	At fuel pump relay . . . . . 175 — 34
C124 (RPO L05)	At EGR Solenoid . . . . . 171 — 21
C125	At throttle position sensor . . . . . 175 — 34
C126 (RPO L05)	At idle air control actuator . . . . . 175 — 34
C127	At manifold absolute pressure sensor . . . . . 175 — 34
C128	LH fuel injector . . . . . 175 — 34
C129	RH fuel injector . . . . . 175 — 34
C130 (RPO L05)	At ESC hybrid function . . . . . 175 — 34
C130 (RPO L19)	At ESC hybrid function . . . . . 176 — 37
C131 (RPO L05)	At EVRV solenoid . . . . . 175 — 34
C131 (RPO L19)	At EVRV solenoid . . . . . 176 — 38
C132 (RPO L05)	At coolant temperature sensor . . . . . 175 — 34
C132 (RPO L19)	At coolant temperature sensor . . . . . 176 — 38
C133 (RPO L05)	At air switch solenoid . . . . . 175 — 35
C134 (RPO L19)	At idle air control solenoid . . . . . 176 — 37
C135	Near ECM, under I/P . . . . . 172 — 23
C203	At I/P cluster . . . . . 166 — 4
C279	Behind I/P . . . . . —
C289	At DRAC module . . . . . 177 — 39
G102 (RPO L19)	At front side of engine . . . . . 172 — 24
G103	Rear RH side of engine . . . . . 171 — 22
S103	Engine harness, rear RH side of engine . . . . . 171 — 22
S104	Engine harness, in front of grommet 100 . . . . . 171 — 21
S106	Engine harness, rear RH side of engine . . . . . 171 — 21
S107	Engine harness, RH side of engine . . . . . 175 — 34
S108	Engine harness, RH side of engine . . . . . 171 — 21
S200	I/P harness, behind LH side of I/P . . . . . 166 — 4
S211	I/P harness, under I/P . . . . . 177 — 39
S213	I/P harness, under I/P . . . . . 177 — 39

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
465	.8	DK GRN/WHT	A1	FUEL PUMP RELAY DRIVE
			A2	NOT USED
			A3	NOT USED
435	.8	GRA	A4	EGR SOLENOID (RPO L05) EVRV (RPO L05 WITH NA4, L05 CANADA & L19)
419	.8	BRN/WHT	A5	SYSTEM CHECK LAMP
439	.8	PNK/BLK	A6	12V IGNITION FUSED
*422	.8	TAN/BLK	A7	TORQUE CONVERTER CLUTCH (RPO MD8)
461	.8	ORN	A8	SERIAL DATA
451	.8	WHT/BLK	A9	ASSEMBLY LINE DIAGNOSTIC LINK
437	.8	BRN	A10	SPEED SENSOR (RPO L05, L19 WITHOUT REAR WHEEL ANTI LOCK BRAKES) DRAC MODULE (RPO L05, L19 WITH REAR WHEEL ANTI LOCK BRAKES)
452	.8	BLK	A11	5V RETURN B
450	.8	BLK/WHT	A12	SYSTEM RETURN
440	.8	ORN	B1	12V BATTERY FUSED
120	.8	TAN/WHT	B2	ELEC FUEL PUMP FUSED FEED
453	.8	BLK/RED	B3	DISTRIBUTOR REF LOW
			B4	NOT USED
430	.8	PPL/WHT	B5	DISTRIBUTOR REF HIGH
			B6	NOT USED
485	.8	BLK	B7	SPARK RETARD CONTROL
59	.8	DK GRN	B8	AIR CONDITION
			B9	NOT USED
*434	.5	ORN/BLK	B10	PARK/NEUTRAL SWITCH
			B11	NOT USED
			B12	NOT USED

ELECTRONIC CONTROL MODULE  
CONNECTOR

\*AUTO TRANS ONLY

RPO LEGEND

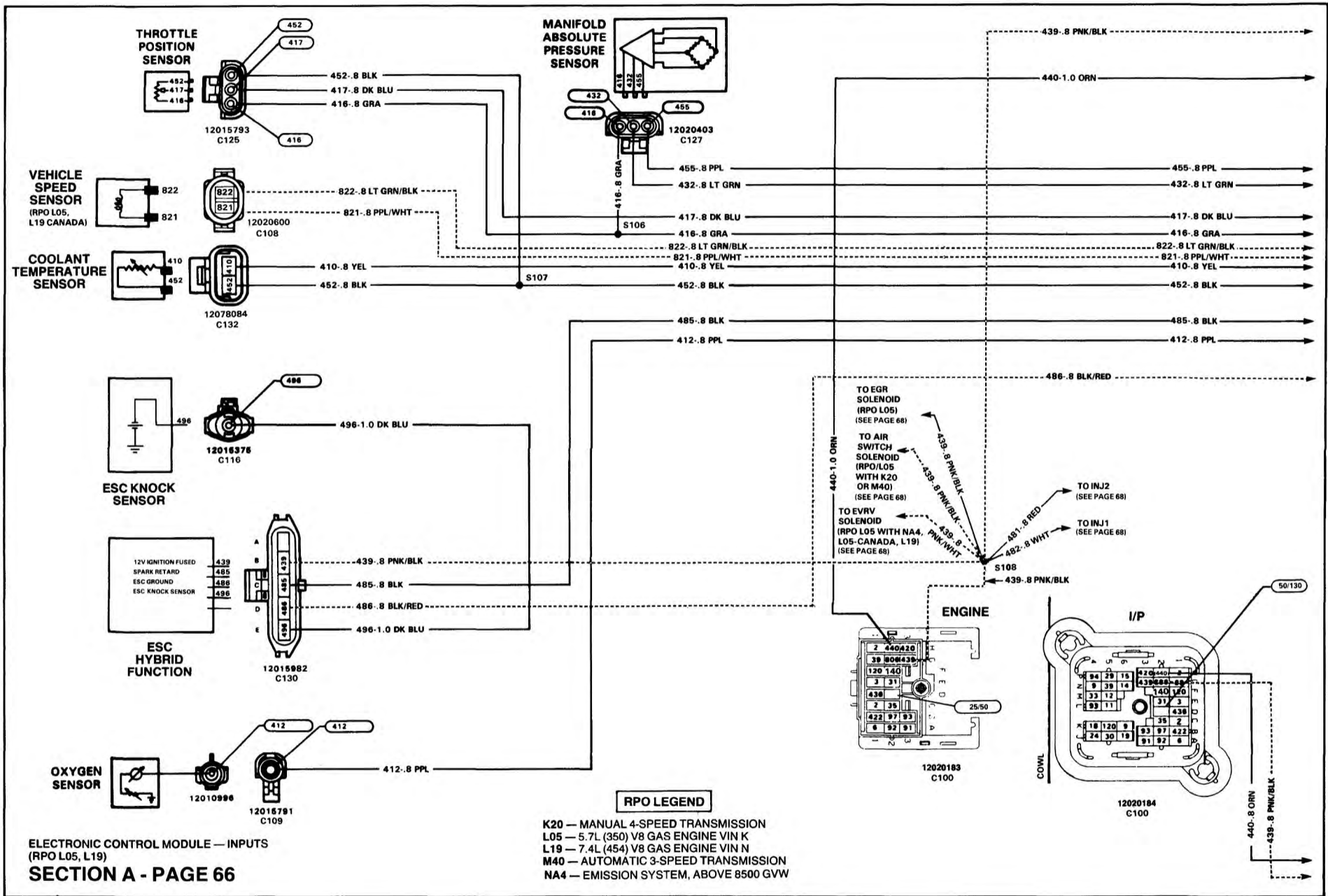
K20 — MANUAL 4-SPEED TRANSMISSION  
L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N  
MD8 — AUTOMATIC 4-SPEED TRANSMISSION  
M40 — AUTOMATIC 3-SPEED TRANSMISSION  
NA4 — EMISSION SYSTEM, OVER 8500 LBS GVW

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
436	.8	BRN	C1	NOT USED
			C2	AIR SWITCH SOLENOID (RPO L05 WITH K20 OR M40)
444	.8	LT GRN/BLK	C3	STEPPER COIL B LOW
443	.8	LT GRN/WHT	C4	STEPPER COIL B HIGH
441	.8	LT BLU/WHT	C5	STEPPER COIL A HIGH
442	.8	LT BLU/BLK	C6	STEPPER COIL A LOW
*446	.8	LT BLU	C7	A/C CONTROL (4TH GEAR DISCRETE) (RPO L05 WITH MD8)
			C8	NOT USED
806	.8	PPL/WHT	C9	CRANK DISCONNECT (FUSED)
410	.8	YEL	C10	COOLANT TEMPERATURE
432	.8	LT GRN	C11	MANIFOLD ABSOLUTE PRESS. NOT USED
417	.8	DK BLU	C13	THROTTLE POSITION SENSOR
416	.8	GRA	C14	5V SENSOR REFERENCE
			C15	NOT USED
440	.8	ORN	C16	12V BATTERY FUSED
551	.8	TAN/WHT	D1	SYSTEM GROUND
455	.8	PPL	D2	5V RETURN A
			D3	NOT USED
423	.8	WHT	D4	HEI SPARK TIMING
424	.8	TAN/BLK	D5	HEI BYPASS
413	.8	TAN	D6	OXYGEN SENSOR LOW (GROUND)
412	.8	PPL	D7	OXYGEN SENSOR HIGH
			D8	NOT USED
			D9	NOT USED
			D10	NOT USED
			D11	NOT USED
			D12	NOT USED
			D13	NOT USED
468	.8	DK GRN	D14	INJECTOR B (2) DRIVE
			D15	NOT USED
467	.8	DK BLU	D16	INJECTOR A (1) DRIVE

ELECTRONIC CONTROL MODULE  
CONNECTOR

\*AUTO TRANS ONLY

ELECTRONIC CONTROL MODULE (RPO L05, L19)

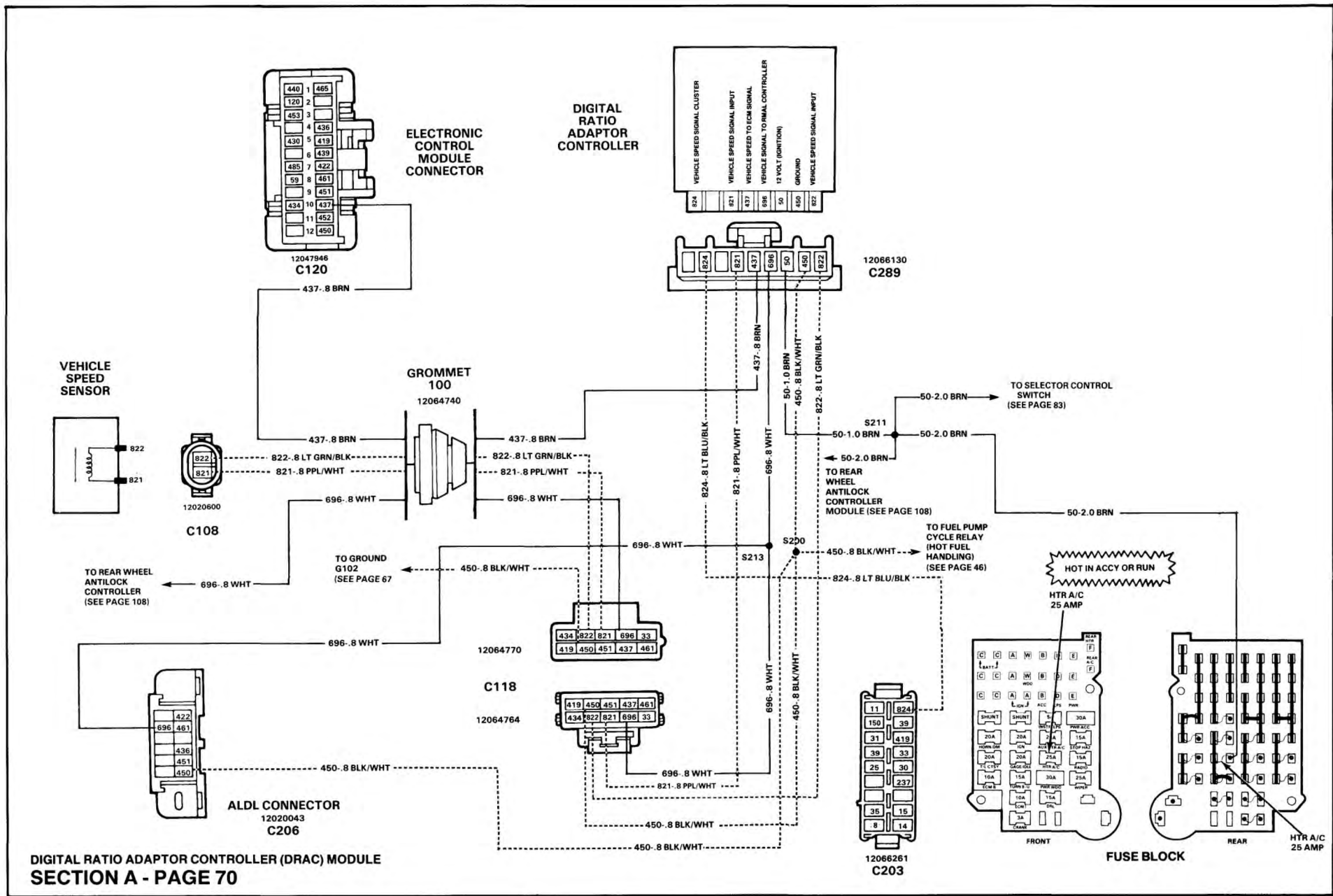












## COMPONENT LOCATION

Page — Figure

ALDL Connector	Under LH side of I/P	.166	—	4
Check Engine Lamp Driver	Under I/P	.179	—	49
Cold Advance Control Solenoid	Front of engine	.170	—	18
Cold Advance Glow Plug Inhibit Delay	LH inner fender	.173	—	26
Coolant Temperature Switch	Front of engine	.170	—	18
EGR Dump Valve	Top RH side of engine	.173	—	26
EGR Valve	Top RH side of engine	.173	—	26
Electronic Control Module	Under center I/P	.173	—	27
Engine Speed Sensor	Rear RH side of engine	.170	—	18
EPR Valve	Top RH side of engine	.173	—	26
Fuse Block	Under LH side of I/P, above kick panel	.166	—	4
Glow Plug Controller	Rear RH side of engine	.173	—	26
Grommet 100	Center of cowl	.173	—	27
Manifold Absolute Pressure Sensor	Rear RH side of engine	.170	—	18
Throttle Position Sensor	Front RH side of engine	.170	—	18
Transmission Converter Clutch Solenoid	Rear LH side of transmission	.175	—	36
Vehicle Speed Sensor	Rear of transmission	.175	—	36
C100	Engine compartment, LH side of cowl	.173	—	26
C106	At cold advance glow plug inhibit relay	.173	—	26
C108	At vehicle speed sensor	.175	—	36
C108A	At coolant temperature switch	.170	—	18
C109A	At engine speed sensor	.170	—	18
C120	At electronic control module	.173	—	27
C125	At throttle position sensor	.170	—	18
C127	At manifold absolute pressure sensor	.170	—	18
C160	At EGR valve	.173	—	26
C161	At EPR valve	.173	—	26
C162	At EGR dump valve	.173	—	26
C163	Engine compartment, LH side of cowl	.170	—	18
C167	At cold advance control solenoid	.170	—	18
C168	At glow plug controller	.173	—	26
C169	Under center of I/P	.173	—	27
C170	At transmission converter clutch solenoid	.175	—	36
C172	At check engine lamp driver	.179	—	49
G110	Engine harness, LH side of engine	.170	—	18
S120	Engine harness, LH side rear of engine	.173	—	26
S121	Engine harness, RH side rear of engine	.173	—	26
S122	Engine harness, LH side rear of engine	.173	—	26
S123	Under I/P, near ECM module	.173	—	27
S124	Under I/P	.170	—	18
S140	Engine harness, LH side of engine	.173	—	26
S141	Engine harness, on side of engine	.173	—	26

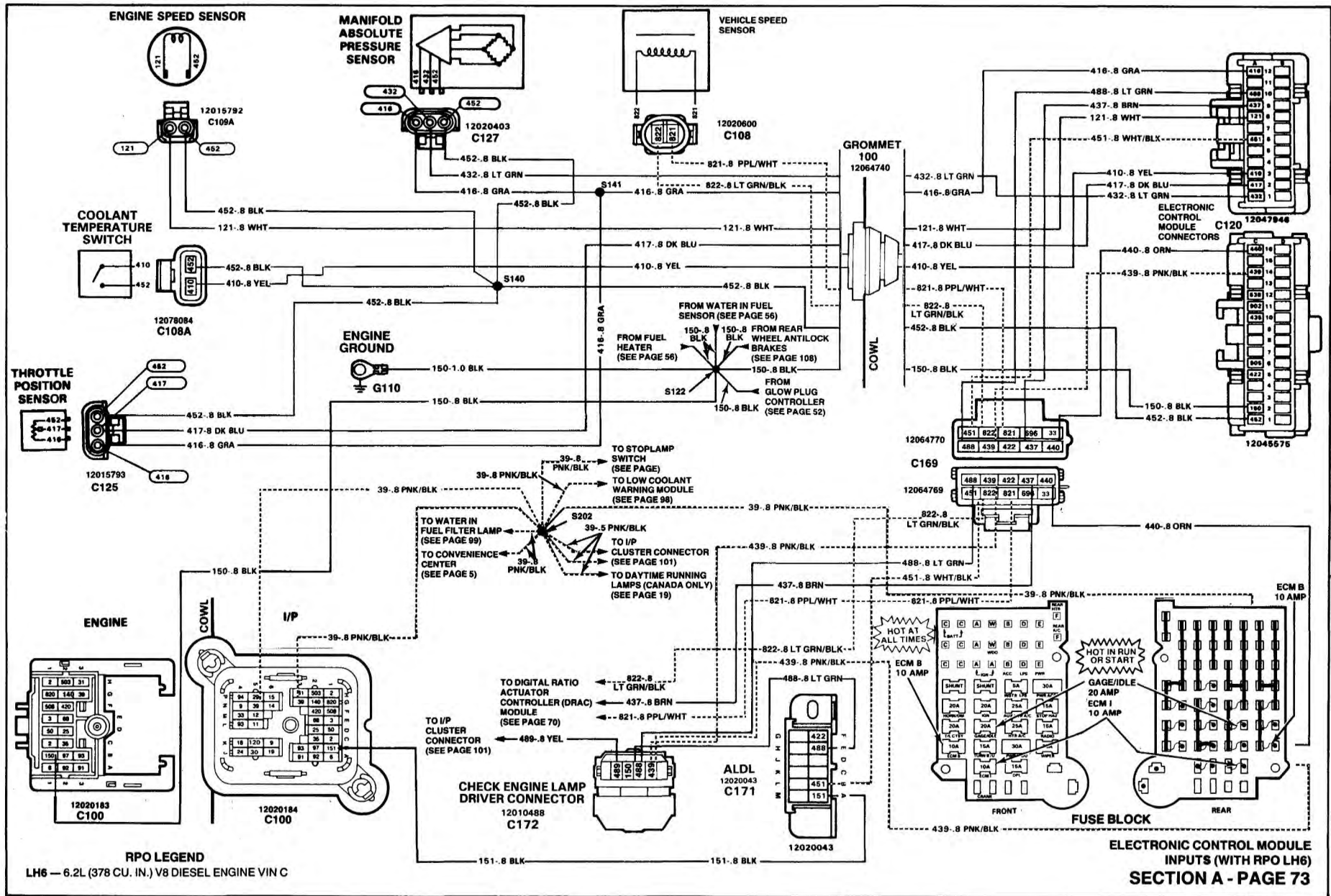
CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
432	.8	LT GRN	A1	MANIFOLD ABSOLUTE PRESSURE
417	.8	DK BLU	A2	THROTTLE POSITION SENSOR
410	.8	YEL	A3	COOLANT TEMPERATURE SWITCH
			A4	NOT USED
			A5	NOT USED
451	.8	WHT/BLK	A6	ASSEMBLY LINE DIAGNOSTIC LINK CONNECTOR
			A7	NOT USED
121	.8	WHT	A8	ENGINE SPEED SENSOR
437	.8	BRN	A9	VEHICLE SPEED SIGNAL FROM DRAC MODULE
488	.8	LT GRN	A10	ASSEMBLY LINE DIAGNOSTIC LINK CONNECTOR
			A11	NOT USED
416	.8	GRA	A12	THROTTLE POSITION SENSOR AND MANIFOLD ABSOLUTE PRESSURE 5V REFERENCE
			B1	NOT USED
			B2	NOT USED
			B3	NOT USED
			B4	NOT USED
			B5	NOT USED
			B6	NOT USED
			B7	NOT USED
			B8	NOT USED
			B9	NOT USED
			B10	NOT USED
			B11	NOT USED
			B12	NOT USED

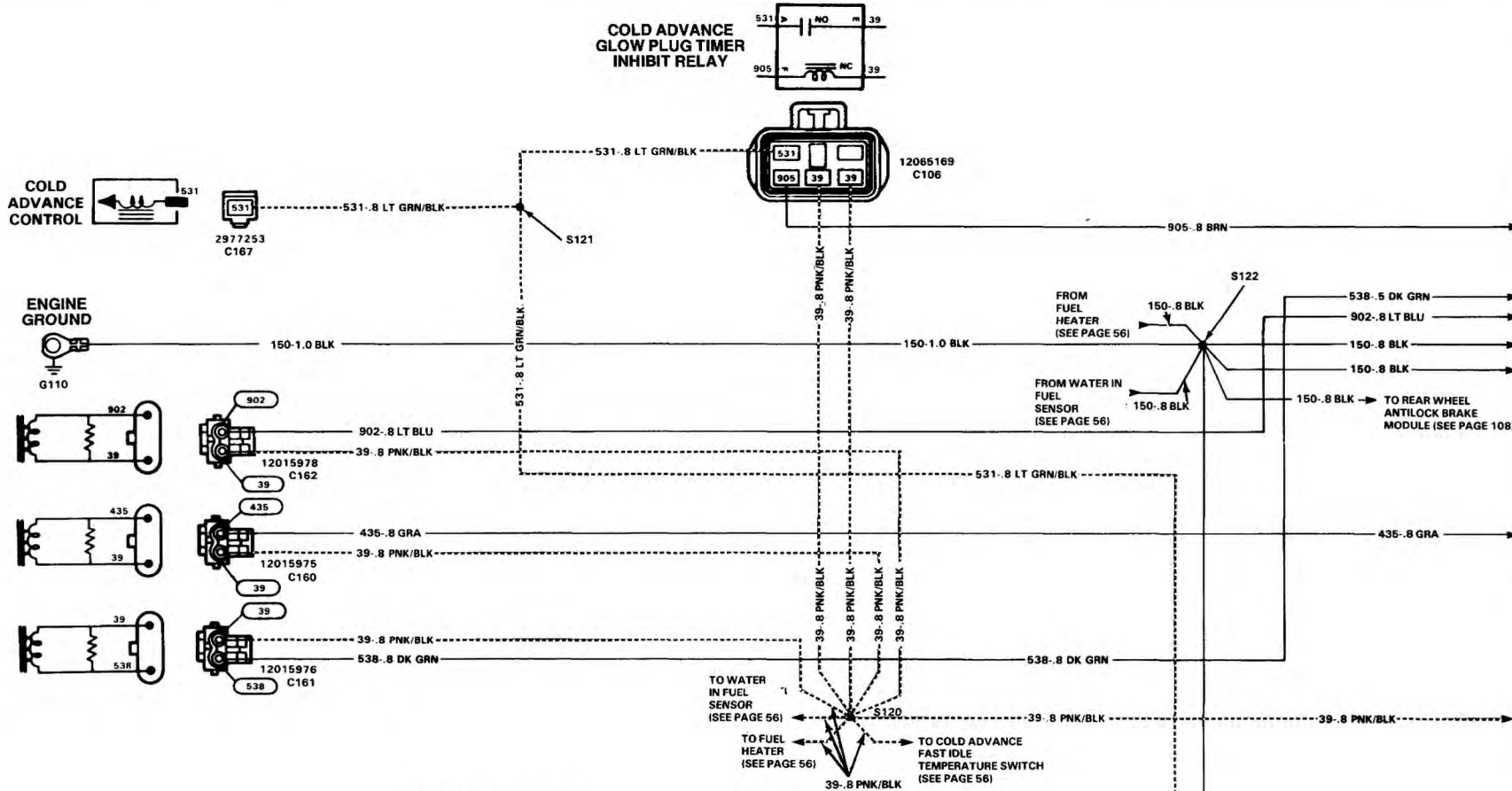
ELECTRONIC CONTROL MODULE CONNECTOR

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
452	.8	BLK	C1	SYSTEM RETURN
150	.8	BLK	C2	SYSTEM GROUND
			C3	NOT USED
			C4	NOT USED
*422	.8	TAN/BLK	C5	TORQUE CONVERTER CLUTCH
905	.8	BRN	C6	COLD ADVANCE/GLOW PLUG TIMER INHIBIT RELAY
			C7	NOT USED
			C8	NOT USED
			C9	NOT USED
435	.5	GRA	C10	EGR DIAGNOSTIC CONNECTOR
902	.8	LT BLU	C11	EGR DUMP SOLENOID
538	.8	DK GRN	C12	EPR VALVE SOLENOID
			C13	NOT USED
439	.8	PNK/BLK	C14	12V IGNITION FUSED
			C15	NOT USED
440	.8	ORN	C16	12V BATTERY FUSED
			D1	NOT USED
			D2	NOT USED
			D3	NOT USED
			D4	NOT USED
			D5	NOT USED
			D6	NOT USED
			D7	NOT USED
			D8	NOT USED
			D9	NOT USED
			D10	NOT USED
			D11	NOT USED
			D12	NOT USED
			D13	NOT USED
			D14	NOT USED
			D15	NOT USED
			D16	NOT USED

ELECTRONIC CONTROL MODULE CONNECTOR

\*AUTO TRANS ONLY





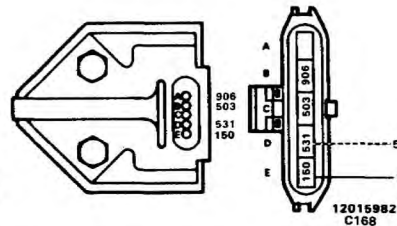
**RPO LEGEND**

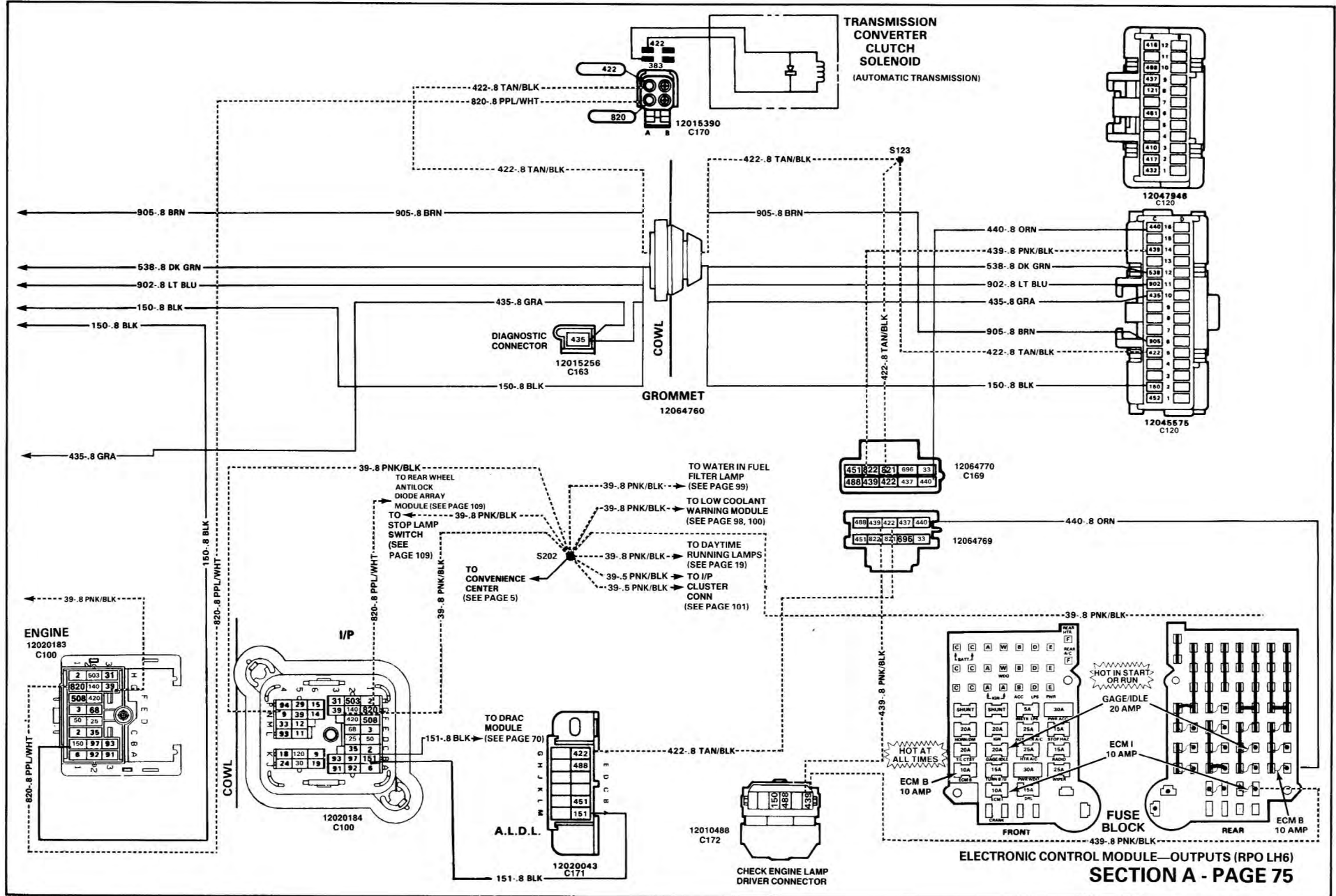
LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 Z49 — CANADIAN MANDATORY BASE EQUIPMENT

ELECTRONIC CONTROL MODULE—OUTPUTS  
 (RPO LH6)

SECTION A - PAGE 74

**GLOW PLUG CONTROLLER**

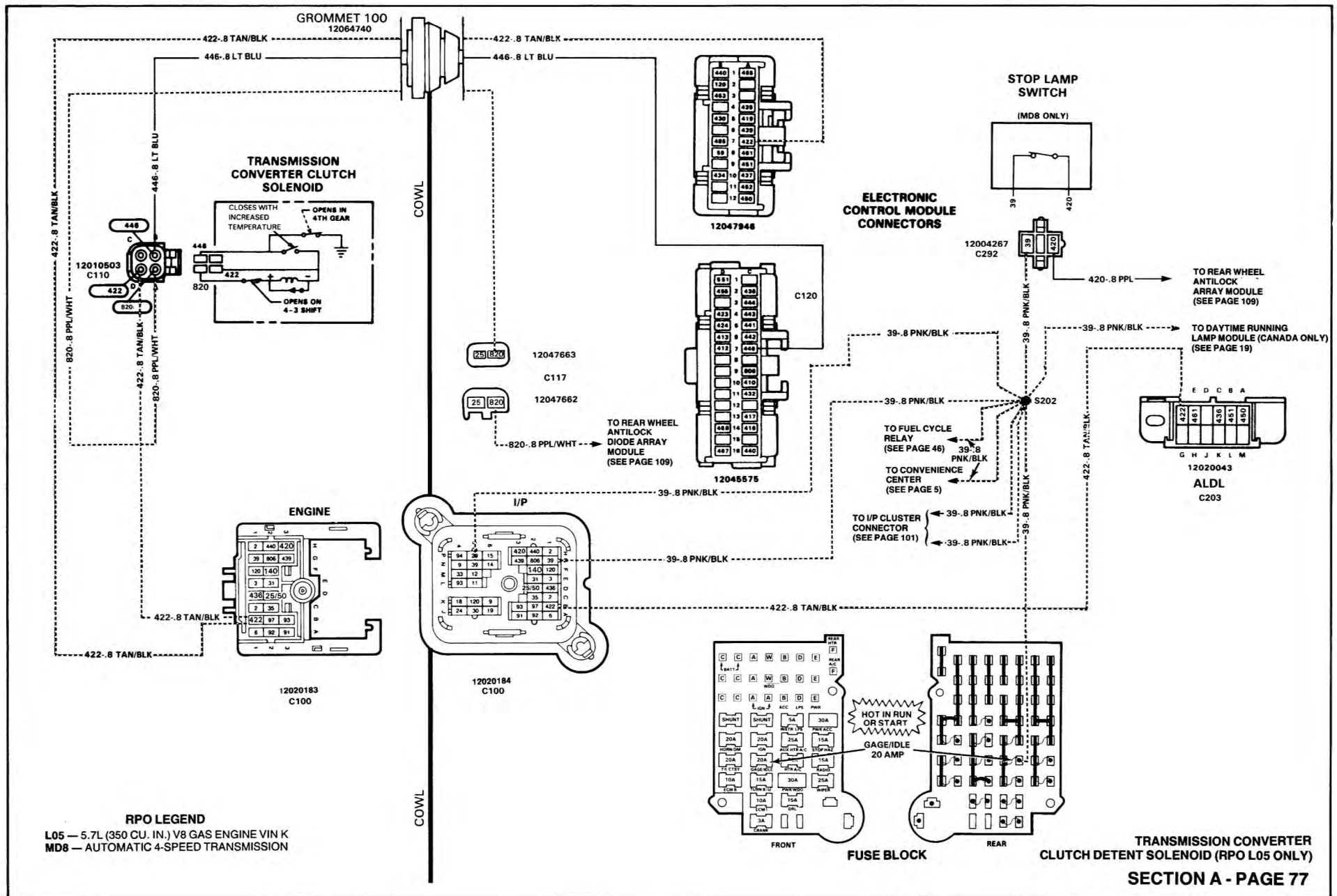




**COMPONENT LOCATION****Page — Figure**

ALDL Connector .....	Under LH side of I/P .....	.166 —	4
Electronic Control Module .....	Under RH side of I/P .....	.173 —	27
Fuse Block .....	Under LH side of I/P, above kick panel .....	.166 —	4
Grommet 100 .....	Center of cowl .....	.165 —	2
Stop Lamp Switch .....	On top of brake pedal .....	.168 —	11
Transmission Converter Clutch Solenoid ..	On rear LH side of transmission .....	.175 —	36
C100 .....	Engine compartment, LH side of cowl .....	.165 —	2
C110 .....	At transmission converter clutch solenoid ..	.175 —	36
C117 .....	Under I/P .....	.173 —	27
C120 .....	At electronic control module .....	.173 —	27
C244 .....	At stoplamp switch .....	.181 —	55
S202 .....	I/P harness, behind LH side of I/P .....	.166 —	4



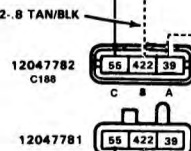
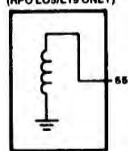


**COMPONENT LOCATION**

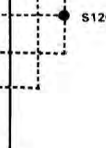
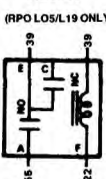
Page — Figure

Electronic Control Module .....	Under RH side of I/P .....	.173 —	27
Fuse Block .....	Under LH side of I/P, above kick panel .....	.166 —	4
Grommet 100 .....	Center of cowl .....	.173 —	27
Transmission Kickdown Relay (RPO L05, L19) .....	Engine compartment, RH side of cowl .....	.172 —	23
Transmission Kickdown Solenoid (RPO L05, L19) .....	LH rear of transmission .....	.177 —	40
Transmission Kickdown Solenoid (RPO LH6, LL4) .....	LH rear of transmission .....	.177 —	41
Transmission Kickdown Switch (RPO LL4) .....	Front RH side of engine .....	.170 —	18
C100 .....	Engine compartment, LH side of cowl .....	.173 —	26
C114 .....	At transmission kickdown relay .....	.172 —	23
C120 .....	At electronic control module .....	.173 —	27
C186 (RPO LL4) .....	At transmission kickdown switch .....	.170 —	18
C188 .....	Engine compartment, below kickdown relay .....	.177 —	41
C189 (RPO LH6, LL4) .....	At transmission kickdown solenoid .....	.177 —	41
C189 (RPO L05, L19) .....	At transmission kickdown solenoid .....	.177 —	40
S128 .....	RH side of engine .....	.170 —	18
S202 .....	I/P harness, behind LH side of I/P .....	.166 —	4

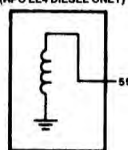
**TRANSMISSION  
KICKDOWN  
SOLENOID**  
(RPO LO5/L19 ONLY)



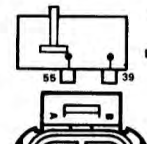
**KICKDOWN  
RELAY**  
(RPO LO5/L19 ONLY)



**TRANSMISSION  
KICKDOWN  
SOLENOID**  
(RPO LL4 DIESEL ONLY)



**KICKDOWN  
SWITCH  
LL4 DIESEL ONLY**

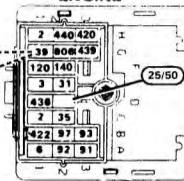


**RPO LEGEND**

- LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C
- LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J
- LO5 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- M40 — AUTOMATIC 3-SPEED TRANSMISSION

422-8 TAN/BLK

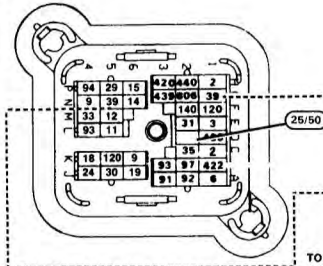
**ENGINE**



12020183  
C100

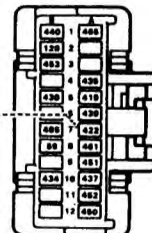
GROMMET 100  
12064740

I/P



12020184  
C100

**ELECTRONIC  
CONTROL MODULE  
CONNECTION**  
(RPO LO5, L19 ONLY)



12047846  
C120

(RPO LL4 ONLY)

(RPO LL4 ONLY)

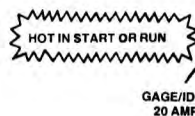
(RPO LL4 ONLY)

- 39-8 PNK/BLK TO FUEL HEATER (SEE PAGE 55)
- 39-8 PNK/BLK TO COLD ADVANCE AND FAST IDLE TEMP SWITCH (SEE PAGE 55)
- 39-8 PNK/BLK TO WATER IN FUEL SENSOR (SEE PAGE 55)

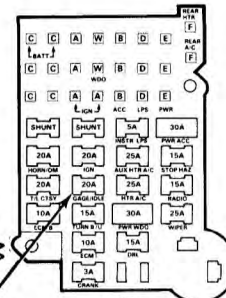
(RPO LL4 DIESEL ONLY)

- 39-8 PNK/BLK TO I/P CLUSTER CONNECTOR (SEE PAGE 101)
- 39-8 PNK/BLK TO CONVENIENCE CENTER (SEE PAGE 5)
- 39-8 PNK/BLK TO FUEL PUMP CYCLE RELAY (SEE PAGE 46)

- 39-8 PNK/BLK TO STOP LAMP SWITCH (SEE PAGE 77)
- 39-8 PNK/BLK TO WATER IN FUEL FILTER LAMP (RPO LH6, LL4) (SEE PAGE 99)
- 39-8 PNK/BLK TO LOW COOLANT WARNING MODULE (RPO LH6, LL4) (SEE PAGE 99, 100)
- 39-8 PNK/BLK TO DAYTIME RUNNING LAMP (CANADA ONLY) (SEE PAGE 19)

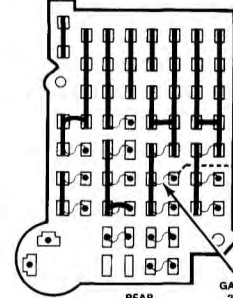


GAGE/IDLE  
20 AMP



FRONT

**FUSE BLOCK**



REAR  
GAGE/IDLE  
20 AMP

## CIRCUIT OPERATION

### BLOWER CONTROLS

Battery voltage is applied at all times to the Hi Blower Relay, through the RED (2) wire. When the Blower Switch is in the OFF, LO or MED positions, the Hi Blower Relay is de-energized.

When the Ignition Switch is in the RUN or ACCY position, voltage is supplied to the Selector Control by way of the BRN (50) wire through the HTR A/C Fuse. This voltage is supplied, through the Selector Control, and then through the BRN/WHT (64) wire to the Blower Switch and Resistor Block. At the Resistor Block, voltage is dropped through three resistors. This reduced voltage flows through the DK BLU (101) wire to the de-energized Hi Blower Relay. Since the Hi Blower Relay is de-energized, circuits 101 and 65 are connected through the relay. This reduced voltage flows through the PPL (65) wire to the Blower Motor and the Blower Motor will run at a slow speed.

When the Blower Switch is turned to LO, voltage flows through the Blower Switch, to the Resistor Block, through the TAN (63) wire. Voltage flows through two resistors, through the DK BLU (101) wire, through the contacts of the de-energized Hi Blower Relay to the Blower Motor by way of the PPL (65) wire.

When the Blower Switch is turned to MED, voltage flows through the Blower Switch, to the Resistor Block, through the LT BLU (72) wire. Voltage flows through one resistor, through the DK BLU (101) wire, through the contacts of the de-energized Hi Blower Relay to the Blower Motor by way of the PPL (65) wire.

When the Blower Switch is turned to HI, voltage flows through the Blower Switch, to the Hi Blower Relay, through the ORN (52) wire. This voltage flows through the coil of the Hi Blower Relay. With the Hi Blower Relay energized, battery voltage flows through the RED (2) wire, through the contacts of the energized Hi Blower Relay to the Blower Motor by way of the PPL (65) wire. This allows battery voltage to power the Blower Motor.

### COMPRESSOR CONTROLS

The Compressor for the Air Conditioning System is driven by the engine by means of a belt drive and the A/C Compressor Clutch. The Clutch allows the Compressor to be disengaged when Air Conditioning is not required.

Operation of the Compressor depends on the particular A/C Mode selected at the Heater and A/C Controller. With A/C ON selected, battery voltage flows through the Selector Control to the Evaporator Pressure Control Switch by way of the LT GRN (66) wire. Voltage flows through the normally closed contacts of the Evaporator Pressure Control Switch to the A/C Compressor Clutch. The coil is energized and the A/C Compressor Clutch engages.

If the refrigerant pressure drops to a point which may cause icing of the evaporator, the Evaporator Pressure Control Switch opens, de-energizing the A/C Compressor Clutch. When the refrigerant pressure rises to a point where cooling is required again, the Evaporator Pressure Control Switch closes to re-energize the A/C Compressor Clutch.

The A/C Compressor Clutch Diode is connected across the terminals of the A/C Compressor Clutch. Whenever the clutch is de-energized, the magnetic field around it collapses, generating an induced voltage in the clutch coil. The Diode provides a path for the current resulting from the induced voltage so that other circuit components are not damaged by it.

### REAR BLOWER CONTROL

Battery voltage is supplied to the Blower Switch through the AUX HTR A/C Fuse and the BRN (50) wire. When the Blower Switch is turned to LO, voltage flows through the Blower Switch to the Resistors by way of the YEL (51) wire. Voltage flows through two resistors, through the ORN (52) wire to the Rear Blower Motor.

When the Blower Switch is turned to HI, voltage flows through the Blower Switch directly to the Rear Blower Motor through the ORN (52) wire.

### COMPONENT LOCATION

	Page	Figure
A/C Compressor	177	42
Blower Motor, Front	177	43
Blower Motor, Rear	178	46
Blower Switch, Front	178	44
Blower Switch, Rear	178	47
Diode	177	42
Electronic Control Module	175	34
Evaporator Pressure Control Switch	177	43
Fuse Block	178	44
Grommet 102	178	45
Grommet 103	177	43
Hi Blower Relay	177	43
Junction Block	177	42
Resistor Block, Front	177	43
Resistor Block, Rear	178	45
Selector Control	178	44
C110A	177	43
C111A	177	42
C112A	177	43
C120	175	34
C123A	177	42
C124A	178	45
C173	177	43
C174	177	43
C204	178	44
C205	178	44
C280	178	44
C281	178	45
C282	178	45
C283	178	45
C423	178	46
G115	177	43
G116	177	42
G117	177	43
G405	178	46
Front LH side of engine	177	42
Engine compartment, RH side of cowl	177	43
Top rear of passenger compartment	178	46
RH side of I/P	178	44
Center of I/P	178	47
At A/C compressor wiring connector	177	42
Under RH side of I/P	175	34
Engine compartment, RH side of cowl	177	43
LH side under I/P, above kick panel	178	44
Right center of cowl	178	45
Engine compartment, right center of cowl	177	43
Engine compartment, RH side of cowl	177	43
Center of cowl in engine compartment	177	42
Engine compartment, on evaporator	177	43
On evaporator and blower module	178	45
RH side of I/P	178	44
At evaporator pressure control switch	177	43
Near junction block, at center of cowl	177	42
At Hi blower relay	177	43
At electronic control module	175	34
At A/C compressor	177	42
At rear A/C resistor block	178	45
At front resistor block	177	43
At blower motor	177	43
At rear of fuse block	178	44
At front blower switch	178	44
At selector control	178	44
At rear A/C blower switch	178	45
At fuse block	178	45
Upper LH side of I/P at "A" pillar	178	45
At rear blower motor	178	46
At blower motor	177	43
Front of engine, near A/C compressor	177	42
At blower motor	177	43
At rear blower motor	178	46

**PRELIMINARY CHECK:**

Outside temperature must be above 16°C (60°F) in order to properly diagnose system.

**TROUBLESHOOTING CHART—AIR CONDITIONING**

**A/C COMPRESSOR CLUTCH DOES NOT ENGAGE**

TEST	RESULT	ACTION
1. Turn A/C switch OFF. Connect voltmeter from BRN (50) at A/C controller connector C280 to ground.	Battery voltage.	GO to step 2.
	No voltage.	LOCATE and REPAIR open in BRN (50) wire from A/C controller to fuse block. Check HTR/AC fuse.
2. Turn A/C switch ON. Connect voltmeter from BRN (50) wire at A/C controller connector C280 to ground.	A reading of less than 0.5 volt.	A/C controller is operating properly. GO to step 3.
	A reading greater than 0.5 volt.	REPLACE A/C controller.
3. Disconnect A/C evaporator pressure control switch connector C110A and turn A/C switch to ON. Connect a fused jumper between LT GRN (66) wire and DK GRN (59) wire at A/C evaporator pressure control switch connector C110A.	A/C clutch engages.	GO to step 4.
	A/C clutch does not engage.	CHECK for open switch. If switch is open and refrigerant pressure is normal, REPLACE A/C pressure cycling switch.
4. Connect voltmeter from DK GRN (59) wire at A/C compressor clutch connector C123A to ground.	Battery voltage.	GO to step 5.
	No voltage.	LOCATE and REPAIR open in DK GRN (59) wire from A/C compressor clutch to A/C evaporator pressure control switch.
5. Connect voltmeter from DK GRN (59) wire to BLK (150) wire at A/C compressor clutch connector C123A.	Battery voltage.	REPLACE A/C compressor clutch.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from A/C compressor clutch to ground terminal G116.

**BLOWER MOTOR DOES NOT OPERATE IN ANY MODE**

TEST	RESULT	ACTION
1. Disconnect blower motor connector C174. Place ignition switch in RUN position. A/C selector control to VENT-UPPER and blower switch to HI. Connect voltmeter from PPL (65) wire at connector C174 to ground.	Battery voltage.	GO to step 2.
	No voltage.	Check for open in PPL (65) wire. If no open is found, REPLACE Hi Blower Relay.
2. Connect voltmeter from PPL (65) wire to BLK ground wire at blower motor connector C174.	Battery voltage.	REPLACE blower motor.
	No voltage.	LOCATE and REPAIR open in BLK ground wire from blower motor to ground terminal G117.

**BLOWER MOTOR DOES NOT OPERATE IN HI**

TEST	RESULT	ACTION
1. Place ignition switch to RUN and turn blower switch to HI. Connect voltmeter from ORN (52) wire at Hi Blower Relay connector C112A to ground.	Battery voltage.	GO to step 2.
	No voltage.	LOCATE and REPAIR open in ORN (52) wire from Hi Blower Relay to blower switch.
2. Connect voltmeter to RED (2) wire at Hi Blower Relay connector C112A to ground.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in RED (2) wire on fusible link.
3. Connect voltmeter to RED (2) wire at Hi Blower Relay connector C112A to BLK (150) wire.	Battery voltage.	REPLACE Hi Blower Relay.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire to ground G115.

**BLOWER MOTOR DOES NOT OPERATE IN MED**

TEST	RESULT	ACTION
1. Place blower switch to MED. Connect voltmeter to LT BLU (72) wire at blower switch connector C205 to ground.	Battery voltage.	GO to step 2.
	No voltage.	REPLACE blower switch.
2. Connect voltmeter to LT BLU (72) wire at resistor block connector C173 to ground.	Battery voltage.	REPLACE resistor block.
	No voltage.	LOCATE and REPAIR open in LT BLU (72) wire between resistor block and blower switch.

**BLOWER MOTOR DOES NOT OPERATE IN LO**

TEST	RESULT	ACTION
1. Place blower switch to LO. Connect voltmeter to TAN (63) wire at blower switch connector C205 to ground.	Battery voltage.	GO to step 2.
	No voltage.	REPLACE blower switch.
2. Connect voltmeter to TAN (63) wire at resistor block connector C173 to ground.	Battery voltage.	REPLACE resistor block.
	No voltage.	LOCATE and REPAIR open in TAN (63) wire between resistor block and blower switch.

**PRELIMINARY CHECKS:**

CHECK condition of AUX HTR A/C fuse. If fuse is blown, LOCATE and REPAIR source of overload, then REPLACE fuse. If fuse is in good condition, use following diagnostic procedures.

**TROUBLESHOOTING CHART—AIR CONDITIONING, REAR (RPO C69)****BLOWER MOTOR DOES NOT OPERATE AT ALL**

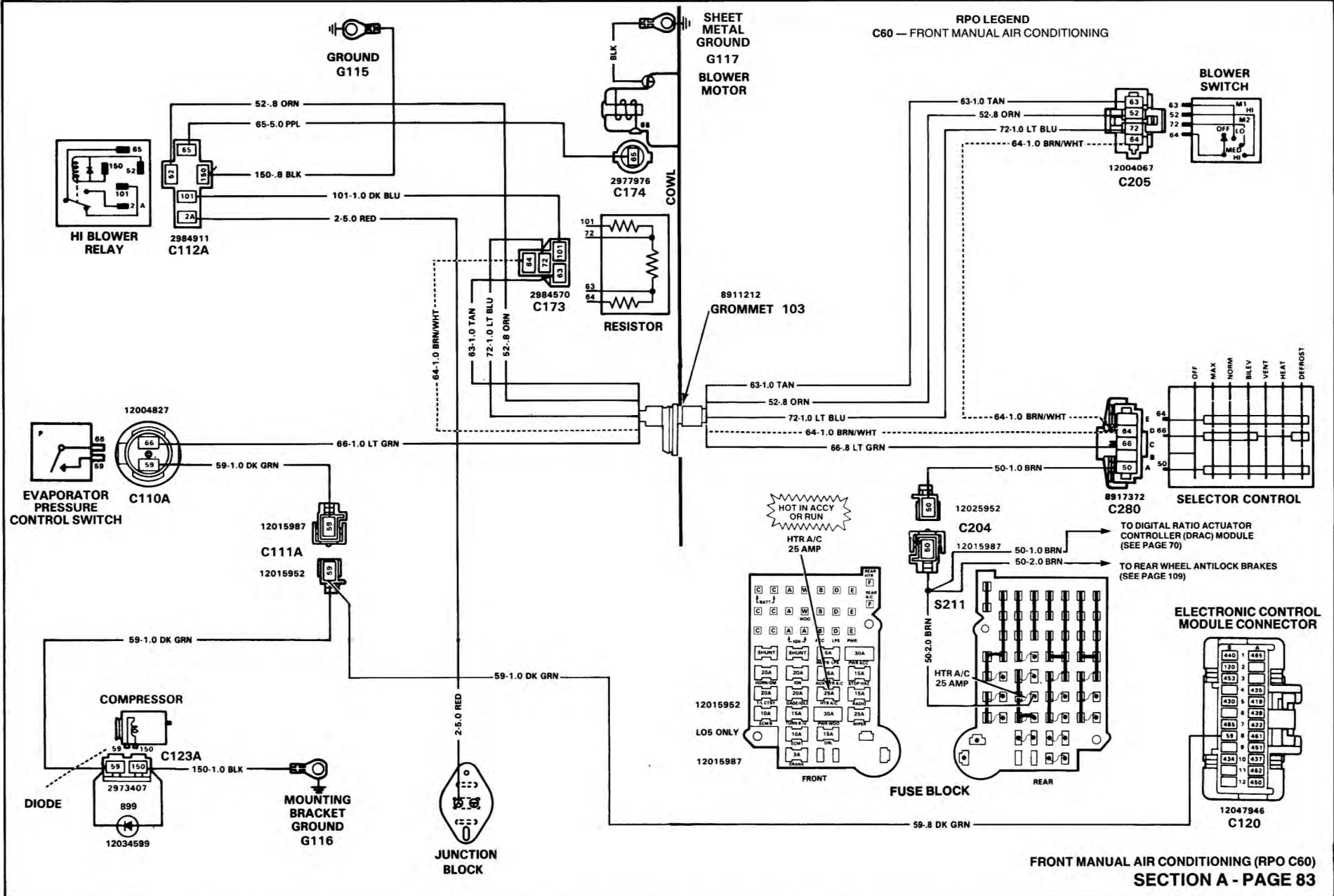
TEST	RESULT	ACTION
1. Disconnect blower motor connector C423. Place ignition switch in RUN position. Connect a test lamp from PPL (52) wire at blower motor connector C423 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. Connect a test lamp from PPL (52) wire to BLK (2) wire at blower motor connector C134.	Test lamp lights.	REPLACE blower motor.
	Test lamp does not light.	LOCATE and REPAIR open in ground BLK (2) wire to ground terminal G405.
3. Connect a test lamp from BRN (50) wire at blower switch connector C281 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) and/or BRN (250) wire(s).
4. Place blower switch in LO or HI. Connect a test lamp from blower switch connector C281 at wire that applies to position of switch to ground. LO is YEL (51) wire and HI is ORN (52) wire.	Test lamp does not light.	REPLACE blower switch.
	Test lamp lights.	LOCATE and REPAIR open in wires to blower motor.

**BLOWER MOTOR DOES NOT OPERATE IN HI BUT ONLY IN LO**

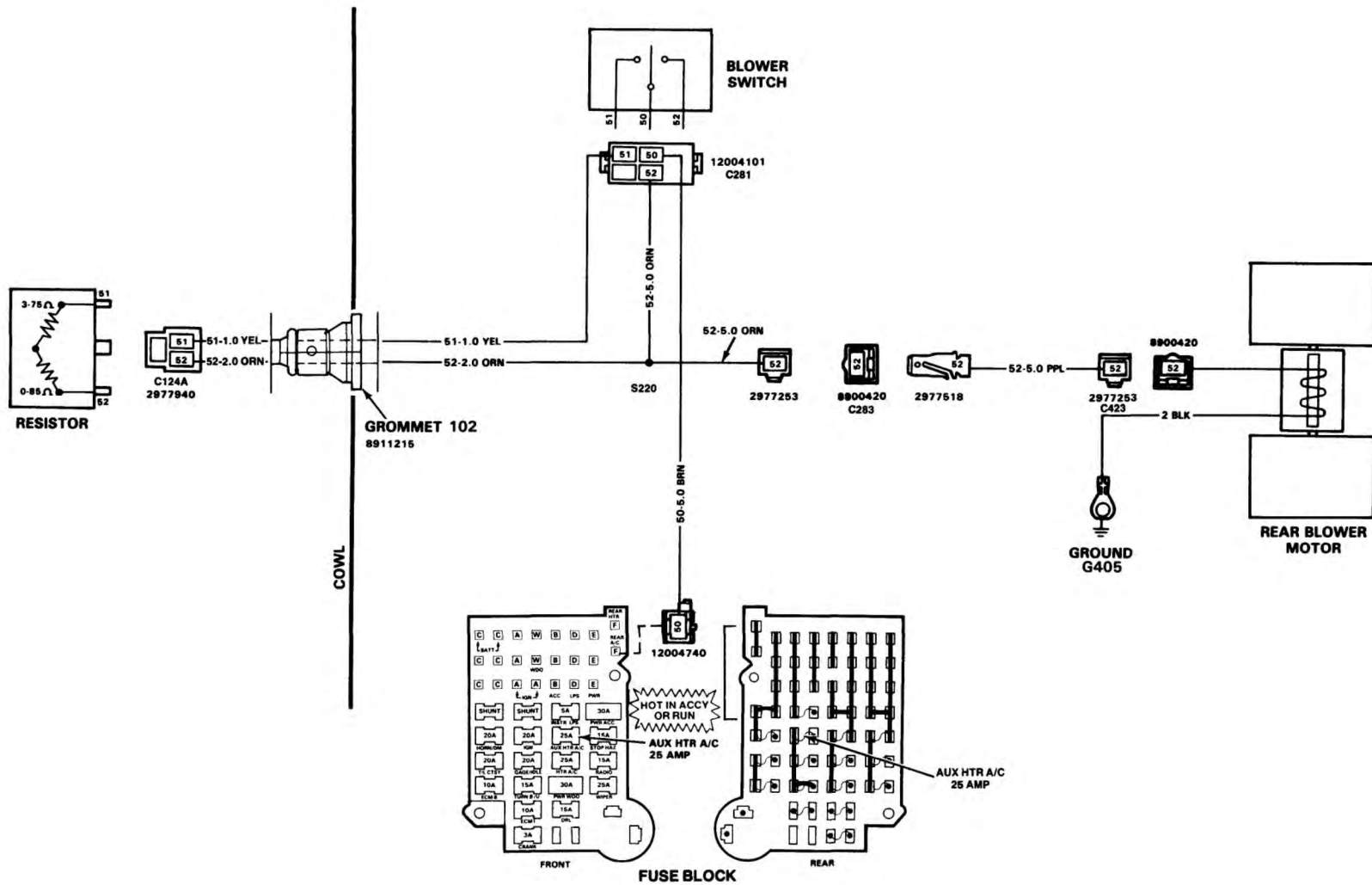
TEST	RESULT	ACTION
1. Connect test lamp from ORN (52) wire at blower switch connector C281 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from ORN (52) wire at resistor connector C124A to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (52) wire from resistor to blower switch.

**BLOWER MOTOR DOES NOT OPERATE IN LO BUT ONLY IN HI**

TEST	RESULT	ACTION
1. Place blower switch in LO position. Connect test lamp from YEL (51) LO wire at blower motor switch connector C281 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from YEL (51) LO wire at resistor connector C124A to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in YEL (51) wire from resistor to blower switch.
3. Connect test lamp from ORN (52) wire at resistor connector C124A to ground.	Test lamp does not light.	REPLACE resistor.



FRONT MANUAL AIR CONDITIONING (RPO C60)  
SECTION A - PAGE 83





## CIRCUIT OPERATION

### FRONT HEATER

The blower motor delivers air to the interior of the vehicle. Its speed is controlled by the Blower Switch and Blower Resistors. When the Ignition Switch is placed in RUN, battery voltage is applied to the Blower Switch through the HTR A/C Fuse. With the Blower Switch in LO, voltage is applied across both resistors to the Blower Motor. With the Blower Switch in MED, voltage is applied across one resistor to the Blower Motor, and the Blower runs faster when the Blower Switch is in HI, battery voltage is applied directly to the Blower Motor and the Blower operates at its fastest speed.

### AUXILIARY HEATER

The Auxiliary Blower Motor delivers heated air to the rear of the vehicle. Its speed is controlled by a rear Blower Switch and Blower Resistors. When the Ignition Switch is placed in RUN, battery voltage is applied to the rear Blower Motor through the AUX HTR A/C Fuse. With the rear Blower Switch in LO, a ground path through two resistors allows the voltage at the rear Blower Motor to flow to ground. With the rear Blower Switch in HI, a ground path allows full voltage at the rear Blower Motor to flow to ground.

### COMPONENT LOCATION

		Page	Figure
Auxiliary Heater Blower Motor	Rear RH side of vehicle	.179	48
Auxiliary Heater Blower Switch	Center of I/P, next to ashtray	.178	47
Auxiliary Heater Resistor	At rear blower motor	.179	48
Blower Motor, Front Heater	Engine compartment, RH side	.177	43
Blower Switch, Front Heater	Center of I/P	.178	44
Bus Bar Ground	Under LH I/P, above kick panel	.178	47
Fuse Block	Under LH I/P, above kick panel	.178	47
Grommet 201	Center of cowl	.178	47
Grommet 400	Rear RH side of vehicle, under blower motor	.179	48
Resistor, Front Heater	At front blower motor	.177	43
C174	At blower motor	.177	43
C204	Heater control harness	.178	44
C205	At front heater blower switch	.178	44
C284	At auxiliary heater blower switch	.178	47
C285	At fuse block	.178	47
C311	Engine compartment, near water valve	.179	48
C312	Engine compartment, near water valve	.179	48
C424	Rear RH side at blower resistors	.179	48
C425	Rear RH side at blower motor	.179	48

## TROUBLESHOOTING CHART—FRONT HEATER

### BLOWER MOTOR DOES NOT OPERATE AT ALL

TEST	RESULT	ACTION
1. Check condition of fuse (HTR A/C).	Fuse is not blown.	GO to step 2.
	Fuse is blown.	LOCATE and REPAIR source of overload. Then, REPLACE fuse.
2. Disconnect blower motor connector C174. Connect a test lamp from ORN (52) wire at blower motor connector C174 to ground.	Test lamp lights.	REPLACE blower motor.
	Test lamp does not light.	GO to step 3.
3. Connect a test lamp from BRN (50) wire at blower switch connector C205 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) wire.
4. Place blower switch in LO, MED, or HI. Connect a test lamp from blower switch connector C205 at wire that applies to position of switch to ground. LO is YEL (51) wire, MED is LT BLU (72) wire, and HI is ORN (52) wire.	Test lamp does not light.	REPLACE blower switch.
	Test lamp lights.	LOCATE and REPAIR open in wires to blower motor.

### BLOWER MOTOR DOES NOT OPERATE IN HI BUT ONLY IN LO AND/OR MED

TEST	RESULT	ACTION
1. Connect test lamp from ORN (52) wire at blower switch connector C205 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from ORN (52) wire at resistor connector C173 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (52) wire from resistor to blower switch.

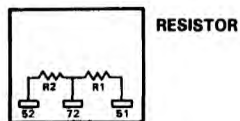
### BLOWER MOTOR DOES NOT OPERATE IN LO AND/OR MED BUT ONLY IN HI

TEST	RESULT	ACTION
1. Place blower switch in position where blower motor does not work. Connect test lamp from either YEL (51) LO wire or LT BLU (72) MED wire (depending on switch position) at blower motor switch connector C205 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from either YEL (51) LO wire or LT BLU (72) MED wire (depending on switch position) at resistor connector C173 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in wire(s) (51 or 72) from resistor to blower switch.
3. Connect test lamp from ORN (52) wire at resistor connector C173 to ground.	Test lamp does not light.	REPLACE resistor.

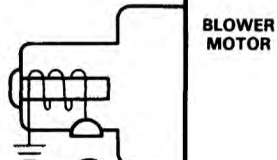
## TROUBLESHOOTING CHART—AUXILIARY HEATER

### REAR BLOWER MOTOR DOES NOT OPERATE AT ALL

TEST	RESULT	ACTION
1. Check condition of (AUX HTR A/C) fuse.	Fuse is not blown.	GO to step 2.
	Fuse is blown.	LOCATE and REPAIR source of overload. Then, REPLACE fuse.
2. Disconnect blower motor connector C425. Connect test lamp from BRN (50) wire to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) wire.
3. Connect test lamp to rear of blower motor connector C425 at DK GRN (952) wire to ground.	Test lamp lights.	GO to Step 4.
	Test lamp does not light.	REPLACE blower motor.
4. Disconnect resistor connector C424. Connect test lamp from DK GRN (952) wire to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (952) wire.
5. Disconnect blower switch connector C284. Connect test lamp from DK GRN (952) wire to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (952) wire.
6. Connect test lamp from DK GRN (952) wire to BLK (150) wire, at blower switch connector C284.	Test lamp lights.	REPLACE blower switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire to ground.



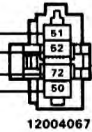
2965019  
C174



BLOWER MOTOR

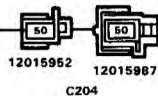
2977976  
C174

GROMMET 201  
8911217

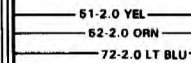
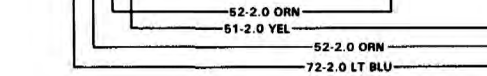


HEATER BLOWER SWITCH

12004067  
C205



12015952 12015987  
C204

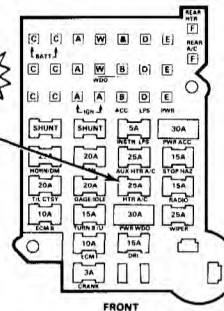


50-2.0 BRN

COWL

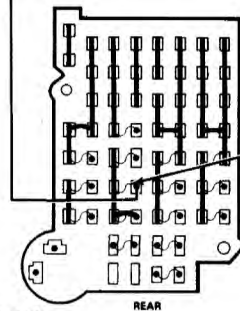
HOT IN RUN

HTR A/C  
25 AMP



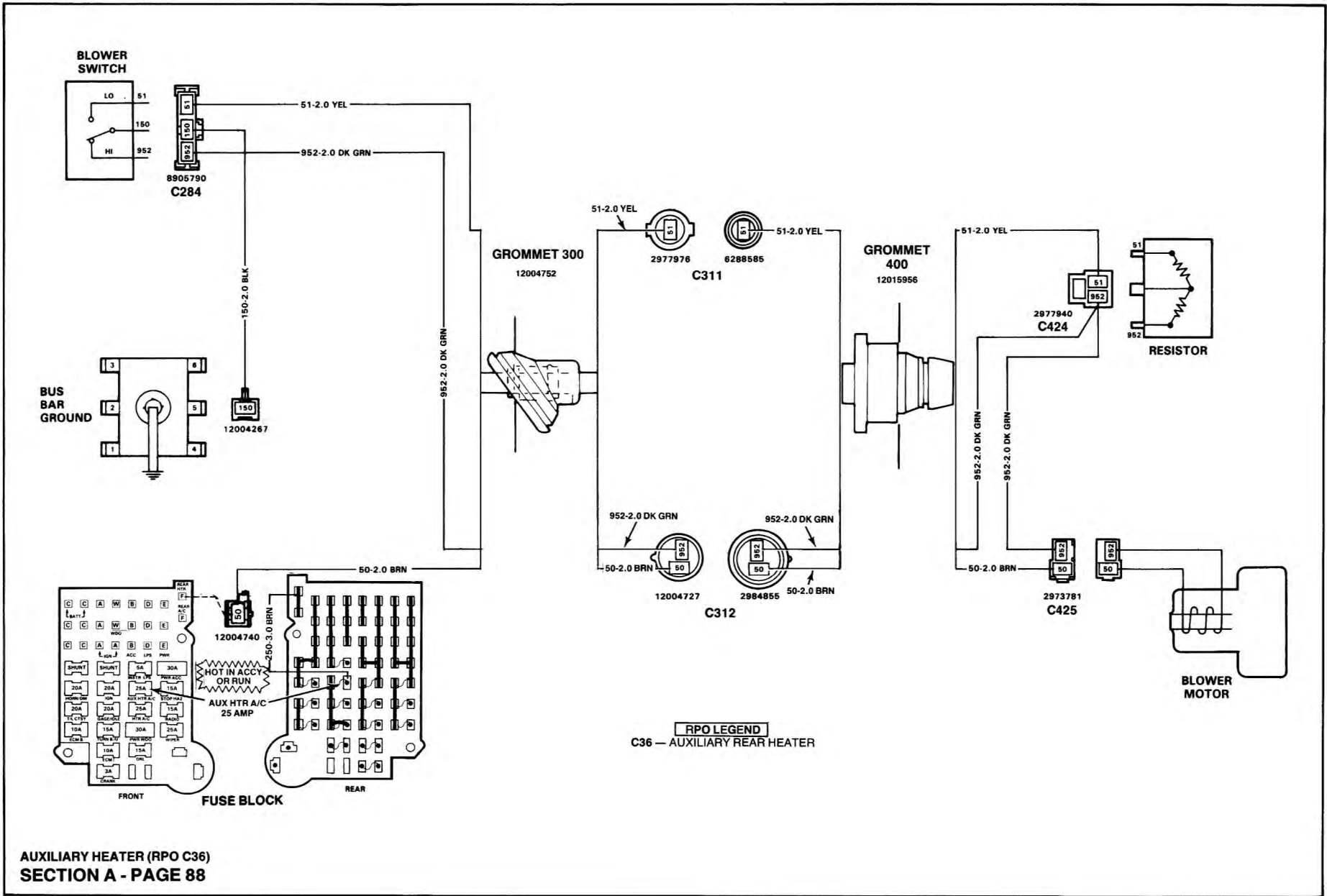
FRONT

FUSE BLOCK



REAR

HTR A/C  
25 AMP



## CIRCUIT OPERATION FUEL GAGE

The pointer of the Fuel Gage is moved by the magnetic fields of two coils. The coils are at right angles to each other. Battery voltage is applied to the E coil and the circuit divides at the opposite end of the coil. One path continues to ground through the F coil. Another goes to ground through the variable resistor of the Fuel Gage Sender.

When the tank is low, the resistance of the Sender is low. A large flow of current passes through the E coil and the Fuel Gage Sender resistor. This moves the pointer toward E on the scale. When the tank is full, the Sender resistance is high. More current now flows through the F coil, moving the pointer toward F on the scale.

With two coils operating the pointer, the Gage is not affected by changes in the system's battery voltage.

## OIL PRESSURE GAGE

The engine oil pressure is displayed by the Oil Pressure Gage. The pointer of the Gage is moved by two coils, and its operation is similar to that of the Fuel Gage.

The Oil Pressure Sender is connected to the junction of the two coils. It has low resistance when the oil pressure is low, and 90 ohms resistance when the oil pressure is high. This changing resistance changes the current flow through the coils. The magnetic fields of the coils move the pointer from low to high.

## TEMPERATURE GAGE

The Temperature Gage is also operated by two coils. Battery voltage is applied to both coils. One is grounded directly and the other is grounded through the Tempera-

ture Sender. This has 55 ohms resistance at 260°F (hot coolant) and its resistance becomes greater at low temperatures. It is approximately 1400 ohms at 100°F. This causes the current through the Sender and one coil to increase as the coolant temperature increases. This moves the pointer.

## VOLTMETER

The Voltmeter measures the electrical system's voltage with the Ignition Switch in RUN, BULB TEST, or START. With the engine stopped, the Voltmeter indicates Battery condition. With the engine running, the Voltmeter indicates Charging System operation.

## LOW COOLANT INDICATOR

The Low Coolant Indicator comes on to warn the driver when a low level of coolant exists in the radiator. Battery voltage is applied to the Low Coolant Module. When a low coolant condition exists, a signal is sent to the Low Coolant Module from the Low Coolant Sensor. The Low Coolant Module will provide a ground to the Low Coolant Indicator.

The Low Coolant Sensor is not a switch that opens and closes. It has a very high resistance to ground, more than 50,000 ohms, when the engine coolant level is low. This causes the Low Coolant Module to light the Low Coolant Indicator. With more of the Sensor covered by coolant, its resistance decreases. When the fluid level is good, the resistance will be less than 10,000 ohms. With the Sensor resistance between 10,000 and 50,000 ohms, the Sensor is partly covered and the fluid is not low enough to cause the warning to be displayed.

## COMPONENT LOCATION

Page — Figure

Bus Bar Ground	Under LH I/P, above kick panel	178 — 47
Convenience Center	LH side, behind I/P	168 — 12
Coolant Temperature Sender (RPO LH6, LL4)	Front LH side of engine	173 — 26
Coolant Temperature Sender (RPO L05)	Front LH side of engine	175 — 35
Coolant Temperature Sender (RPO L19)	Front LH side of engine	172 — 24
Daytime Running Lamp Indicator	I/P cluster	—
Dimmer Switch	LH side of I/P, on steering column	166 — 5
Directional Signal Switch	On steering column	166 — 5
Electronic Control Module	Under center of I/P	171 — 21
Fuel Pump Oil Pressure Switch (RPO L05)	Rear LH side of engine	171 — 22
Fuel Pump Oil Pressure Switch (RPO L19)	Front LH side of engine	176 — 38
Fuel Tank Sender	In fuel tank	173 — 25
Fuse Block	Under LH side of I/P, above kick panel	166 — 4
Glow Plugs Wait Lamp	Top RH side of I/P	179 — 49
Headlamp Switch	LH side of I/P	166 — 4
Heater A/C Control Assembly Lamp	LH I/P, RH side of steering column	177 — 39
Ignition Switch	RH side of steering column	166 — 5
Instrument Cluster	LH side of I/P	179 — 49
Low Coolant Module	Behind LH side of I/P	179 — 49
Low Coolant Warning Lamp	Below fuel gage	179 — 49

## COMPONENT LOCATION

Page — Figure

Oil Pressure Sender (RPO LH6, LL4)	Rear of engine	173 — 26
Water in Fuel Lamp	Top of I/P cluster	179 — 49
C100	Engine compartment, LH side of cowl	165 — 2
C107 (RPO LH6, LL4)	At coolant temperature sender	173 — 26
C107 (RPO L05)	At coolant temperature sender	175 — 35
C107 (RPO L19)	At coolant temperature sender	172 — 24
C115 (RPO L05)	At fuel pump oil pressure switch	171 — 22
C115 (RPO L19)	At fuel pump oil pressure switch	176 — 38
C120	At electronic control module	171 — 21
C127A (RPO LH6, LL4)	At oil pressure sender	173 — 26
C135	Near ECM, under I/P	171 — 21
C200	At directional signal switch	166 — 5
C201	LH side of I/P, at dimmer switch	166 — 5
C202	LH side of I/P, at headlamp switch	166 — 4
C203	LH side of I/P	166 — 4
C209	At ignition switch	166 — 5
C221A	At heater A/C control assembly lamp	177 — 39
C222A	At glow plugs wait lamp	179 — 49
C223A	At water in fuel lamp	179 — 49
C224A	At low coolant warning lamp	179 — 49
C225A	At low coolant warning module	179 — 49
C409	At fuel tank	173 — 25
S201	I/P harness, behind LH side of I/P	166 — 4
S202	I/P harness, behind LH side of I/P	166 — 4
S209	I/P harness, behind I/P cluster	166 — 4

## TROUBLESHOOTING CHART—INSTRUMENT PANEL: GAGES AND INDICATORS

### FUEL GAGE INDICATES FULL OR BEYOND AT ALL TIMES

TEST	RESULT	ACTION
Disconnect fuel tank sender connector C409 and place ignition switch to RUN. Connect a fused jumper from PNK (30) wire at fuel tank sender connector C409 to ground.	Fuel gage indicates full.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.
	Fuel gage indicates empty.	REPAIR/REPLACE fuel gage sender.

**FUEL GAGE INDICATES EMPTY WHEN THERE IS FUEL IN THE TANK**

TEST	RESULT	ACTION
Disconnect fuel tank sender connector C409 and place ignition switch to RUN.	Fuel gage indicates full.	REPAIR/REPLACE fuel gage sender.
	Fuel gage indicates empty.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.

**FUEL GAGE IS INACCURATE**

TEST	RESULT	ACTION
Disconnect fuel tank sender connector C409. Connect one red lead of tester J 33431-B to PNK (30) wire and other to ground. Set resistance dials to 0 ohms and then to 90 ohms. Fuel gage should indicate empty and then full. (Allow time for gage to reach full due to anti-slosh device.)	Gage responds correctly.	CHECK fuel tank ground wire for high resistance. If wire is good, REPAIR/REPLACE fuel gage sender.
	Gage does not respond correctly.	CHECK for high resistance in PNK (30) wire. If wire is good, REPLACE fuel gage.

**TEMPERATURE GAGE INDICATES HOT WITH ENGINE COOLANT BELOW OPERATING TEMPERATURE AND IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107 and place ignition switch to RUN.	Temperature gage indicates cold.	REPLACE temperature sender.
	Temperature gage does not indicate cold.	LOCATE and REPAIR a short in DK GRN (35) wire. If no short is found, PERFORM diagnostic procedures under symptom "Temperature Gage Is Not Accurate."

**TEMPERATURE GAGE INDICATES COLD ALL THE TIME**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107. Ground the DK GRN (35) wire at temperature sender connector C107.	Temperature gage indicates hot.	REPAIR/REPLACE temperature sender.
	Temperature gage does not indicate hot.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR STAYS ON AT ALL TIMES WITH IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
1. Disconnect temperature sender connector C107 and place ignition switch to RUN. Observe temperature indicator.	Indicator stays on.	GO to step 2.
	Indicator goes out.	REPLACE temperature sender.
2. Disconnect DK GRN (35) wire at ignition switch connector C209. Observe temperature indicator.	Indicator stays on.	LOCATE and REPAIR short in DK GRN (35) wire. If wire is good, REPLACE instrument cluster.
	Indicator goes out.	REPLACE ignition switch.

**TEMPERATURE GAGE IS NOT ACCURATE**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107. Connect red lead from J 33431-B tester to DK GRN (35) wire and other lead to ground. Adjust resistance dials to 1400 ohms and then to 55 ohms. Temperature gage should indicate cold then hot.	Gage indicates correctly.	REPLACE temperature sender.
	Gage is not correct.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR DOES NOT LIGHT WITH THE ENGINE COOLANT OVERHEATED**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107 and place ignition switch to RUN. Connect fused jumper from DK GRN (35) wire at temperature sending connector C107 to ground. Observe temperature indicator.	Indicator lights.	REPLACE temperature sender.
	Indicator does not light.	LOCATE and REPAIR open in bulb and DK GRN (35) wire. If wire and bulb are good, REPLACE instrument cluster.

**CHECK GAGES OR TEMPERATURE INDICATOR DOES NOT LIGHT WITH IGNITION SWITCH IN BULB TEST OR START**

TEST	RESULT	ACTION
Disconnect half of ignition switch connector C209 that contains DK GRN (35) wire. Connect a fused jumper from DK GRN (35) wire at ignition switch connector C209 to ground. Place ignition switch to RUN. Do not place ignition in RUN position until fused jumper is grounded.	Temperature or check gages indicator lights.	REPLACE ignition switch.
	Temperature or check gages does not light.	LOCATE and REPAIR open in DK GRN (35) wire from ignition switch to instrument cluster.

**OIL PRESSURE GAGE INDICATES LOW PRESSURE WHEN OIL PRESSURE IS GOOD (GAGE EQUIPPED) OR OIL PRESSURE INDICATOR IS ALWAYS LIT**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector G115 (Gasoline) or C127A (Diesel) and place ignition switch to RUN.	Oil pressure gage indicates high pressure or indicator light goes out.	REPLACE oil pressure sender.
	Oil pressure gage indicates no or low pressure or indicator light stays on.	LOCATE and REPAIR short TAN (31) wire. If wire is good, REPLACE oil pressure gage or instrument cluster if equipped with indicator light.

**OIL PRESSURE GAGE INDICATES HIGH PRESSURE AT ALL TIMES (GAGE EQUIPPED) OR OIL PRESSURE INDICATOR DOES NOT LIGHT**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C115 (Gasoline) or C127A (Diesel) and place ignition switch to RUN. Connect a fused jumper from TAN (31) wire at oil pressure sender connector C115 (Gasoline) or C127A (Diesel) to ground.	Oil pressure gage indicates low pressure or indicator lights.	REPLACE oil pressure sender.
	Oil pressure gage indicates high pressure or indicator does not light.	LOCATE and REPAIR open in TAN (31) wire and bulb. If wire and bulb are good, REPLACE oil pressure gage or instrument cluster if equipped with indicator light.

**OIL PRESSURE GAGE IS NOT ACCURATE**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C115 (Gasoline) or C127A (Diesel). Connect one red lead of J33431-B tester to TAN (31) wire at oil pressure sender connector C115 (Gasoline) or C127A (Diesel) and other lead to ground. Set resistance dials to 0 ohms and then to 90 ohms. The oil pressure gage should indicate low pressure and then high pressure.	Oil pressure gage indicates correctly.	REPLACE oil pressure sender.
	Oil pressure gage does not indicate correctly.	LOCATE and REPAIR open in TAN (31) wire. If wire is good, REPLACE oil pressure gage.

**VOLTMETER IS NOT ACCURATE**

TEST	RESULT	ACTION
Place ignition switch to RUN position. Connect a voltmeter between positive and negative terminals of the battery.	Voltage reading is same as vehicle's voltmeter.	Voltmeter is good.
	Voltage reading is different from vehicle's voltmeter.	LOCATE and REPAIR open in PNK/BLK (39) wire and BLK (150) wire at instrument cluster. If wires are good, REPLACE voltmeter.

**SPEEDOMETER IS INOPERATIVE OR INACCURATE**

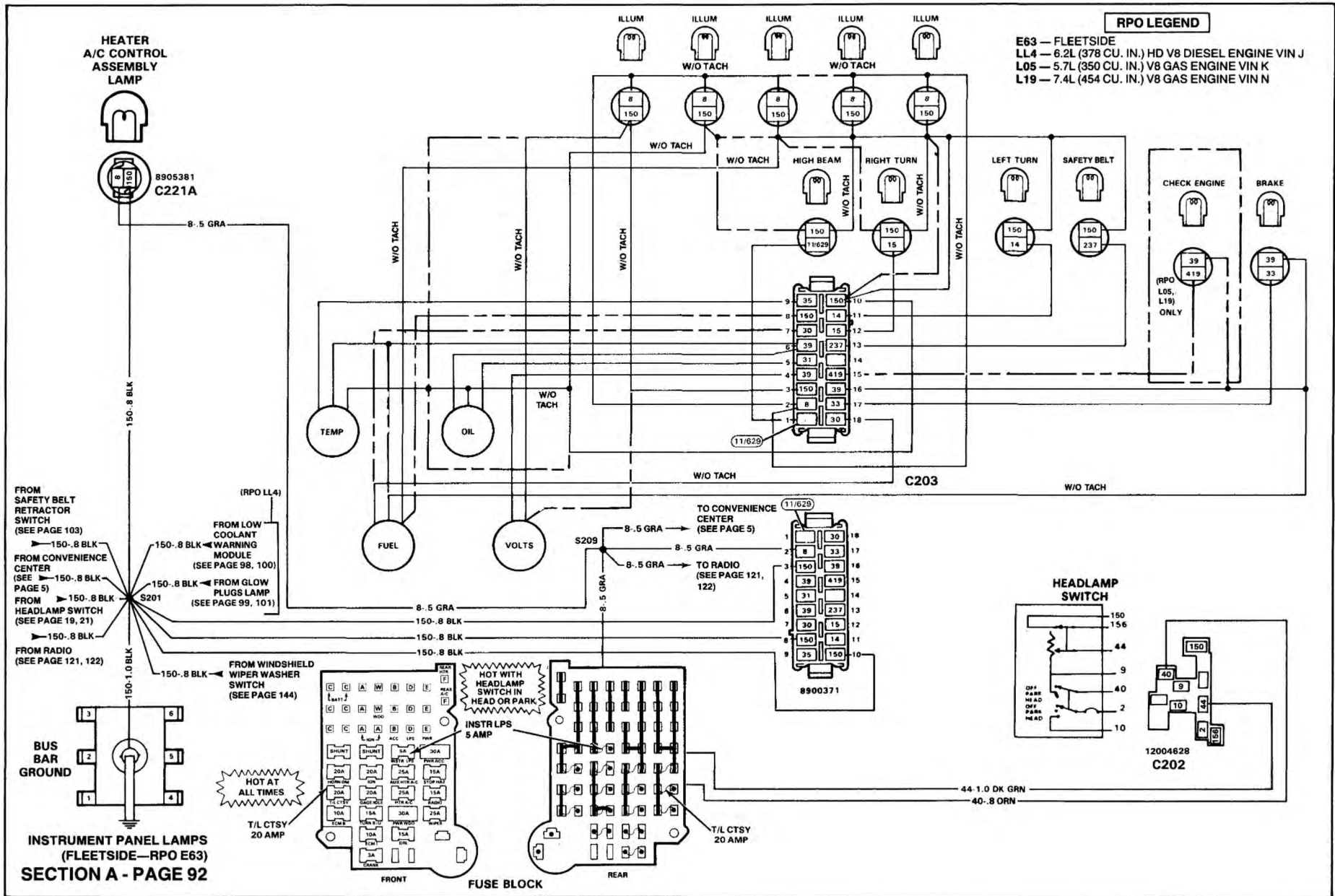
TEST	RESULT	ACTION
1. Disconnect instrument cluster connector C203 and place ignition switch to RUN. Connect voltmeter from LT BLU/BLK (824) wire at instrument cluster connector C203 to ground.	Battery voltage.	GO to step 2. (HTR A/C).
	No voltage.	CHECK condition of fuse (BRAKE). If fuse is good, LOCATE and REPAIR open in LT BLU/BLK (824) wire.
2. Connect voltmeter from LT BLU/BLK (824) wire to BLK (150) wire at instrument cluster connector C203.	Battery voltage.	REFER to speed sensor in Emissions Manual (gas engines) or Service Manual (diesel engines) for further diagnosing.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from instrument cluster to ground.

**LOW COOLANT INDICATOR DOES NOT LIGHT WITH COOLANT LEVEL LOW (DIESEL ONLY)**

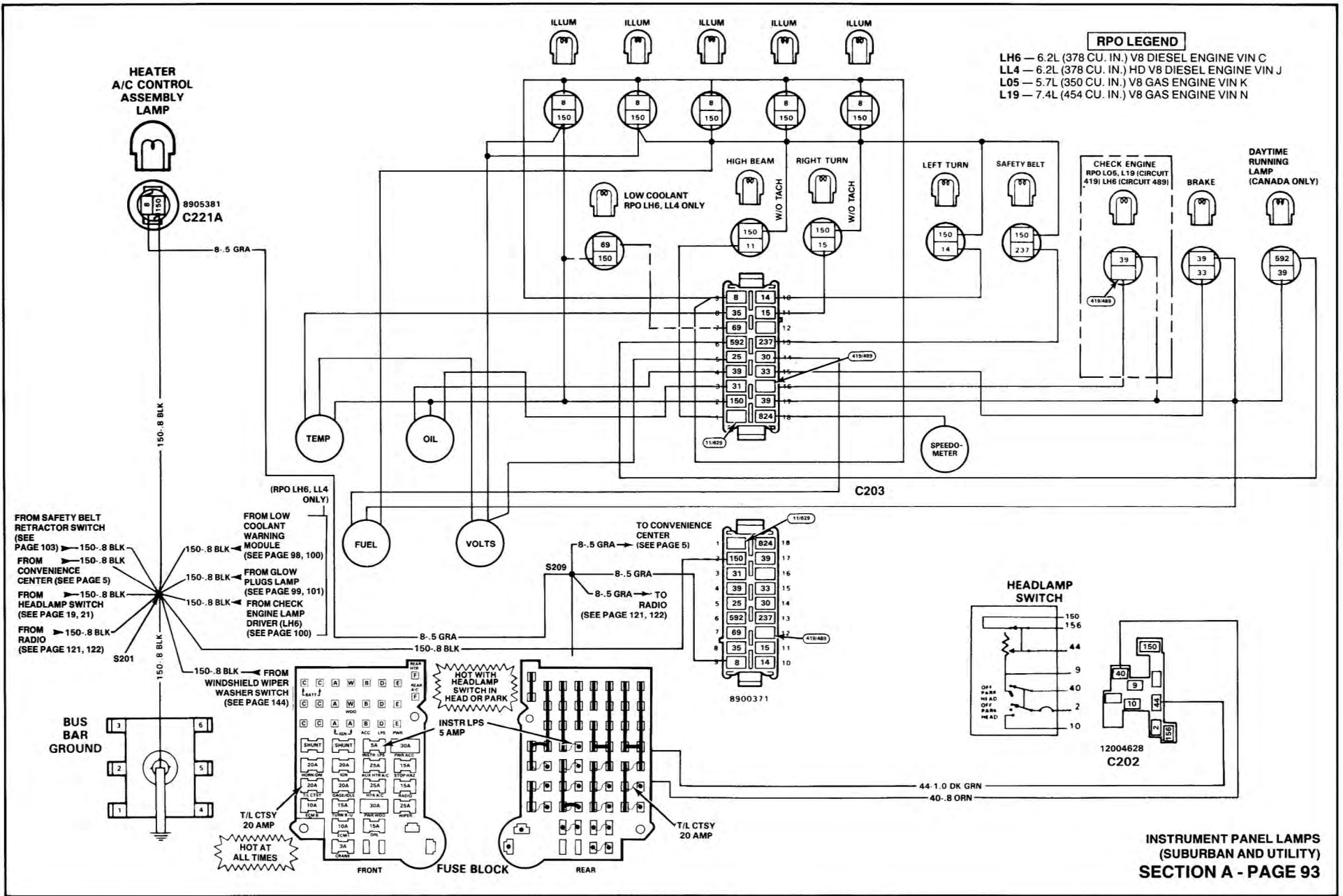
TEST	RESULT	ACTION
1. Disconnect low coolant probe connector C108A and place ignition switch to RUN. Observe low coolant indicator light.	Low coolant indicator lights.	REPLACE low coolant probe.
	Low coolant indicator does not light.	GO to step 2.
2. Disconnect low coolant module connector C225A. Connect voltmeter from PNK/BLK (39) wire at low coolant module connector C225A to ground.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in PNK/BLK (39) wire.
3. Connect voltmeter from PNK/BLK (39) wire to BLK (150) wire at low coolant module connector C225A.	Battery voltage.	GO to step 4.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire.
4. Connect voltmeter from GRA (69) wire at low coolant module connector C225A to ground.	Battery voltage.	GO to step 5.
	No voltage.	LOCATE and REPAIR open or short to ground in GRA (69) wire going from low coolant module to low coolant indicator lamp.
5. Connect voltmeter from PNK/BLK (39) wire to YEL/BLK (68) at low coolant module connector C225A.	Battery voltage.	LOCATE and REPAIR short to ground in YEL/BLK (68) wire from low coolant module to low coolant probe.
	No voltage.	REPLACE low coolant module.

**LOW COOLANT INDICATOR IS LIT WHEN COOLANT LEVEL IS GOOD**

TEST	RESULT	ACTION
Connect a fused jumper from low coolant probe connector C108A to ground. Place ignition switch to RUN and observe low coolant indicator light.	Low coolant indicator goes out.	REPLACE low coolant probe.
	Low coolant indicator stays lit.	LOCATE and REPAIR open in YEL/BLK (68) wire. If wire is good, follow diagnostic procedures listed under symptom "Low Coolant Indicator Does Not Light With Coolant Level Low."

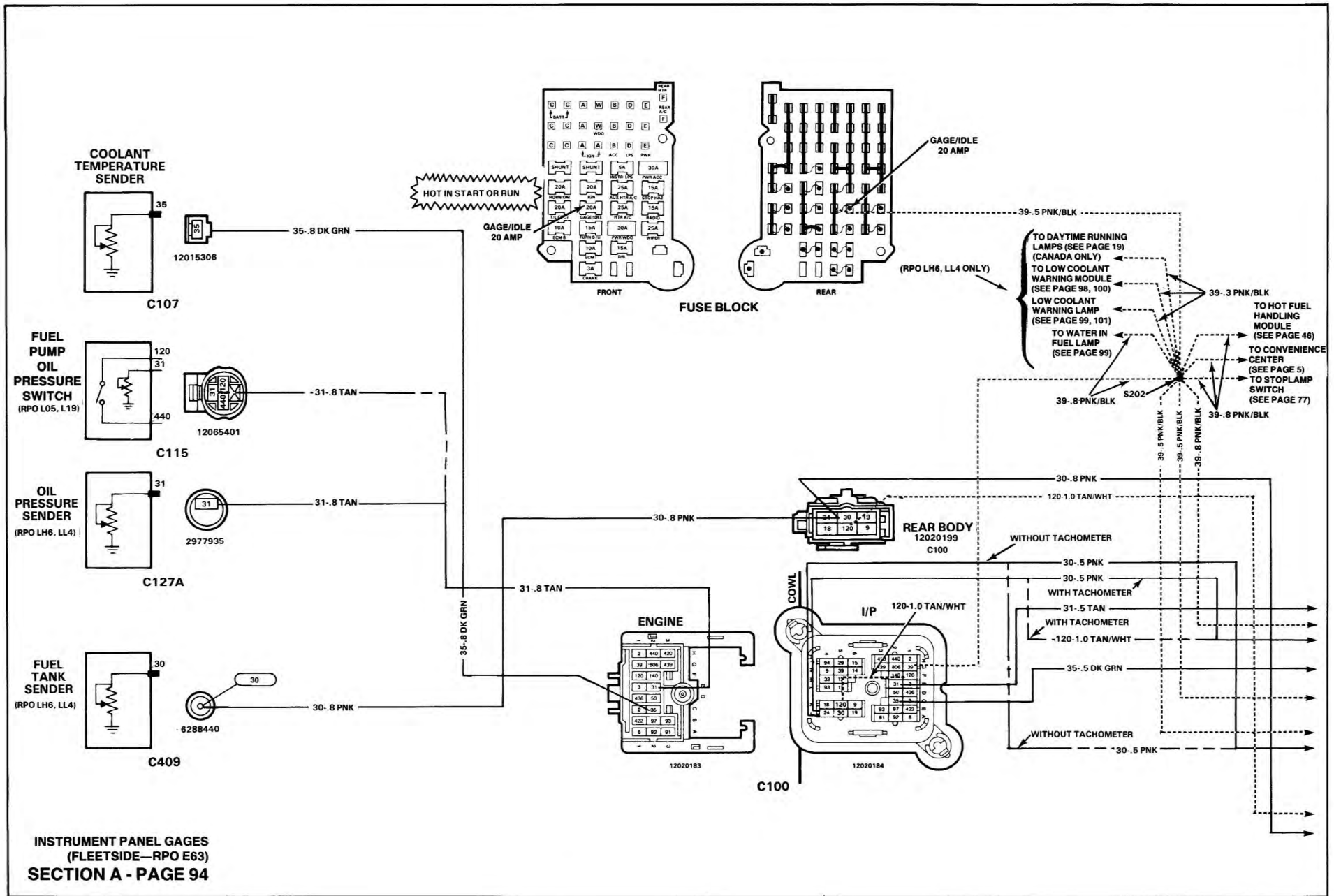


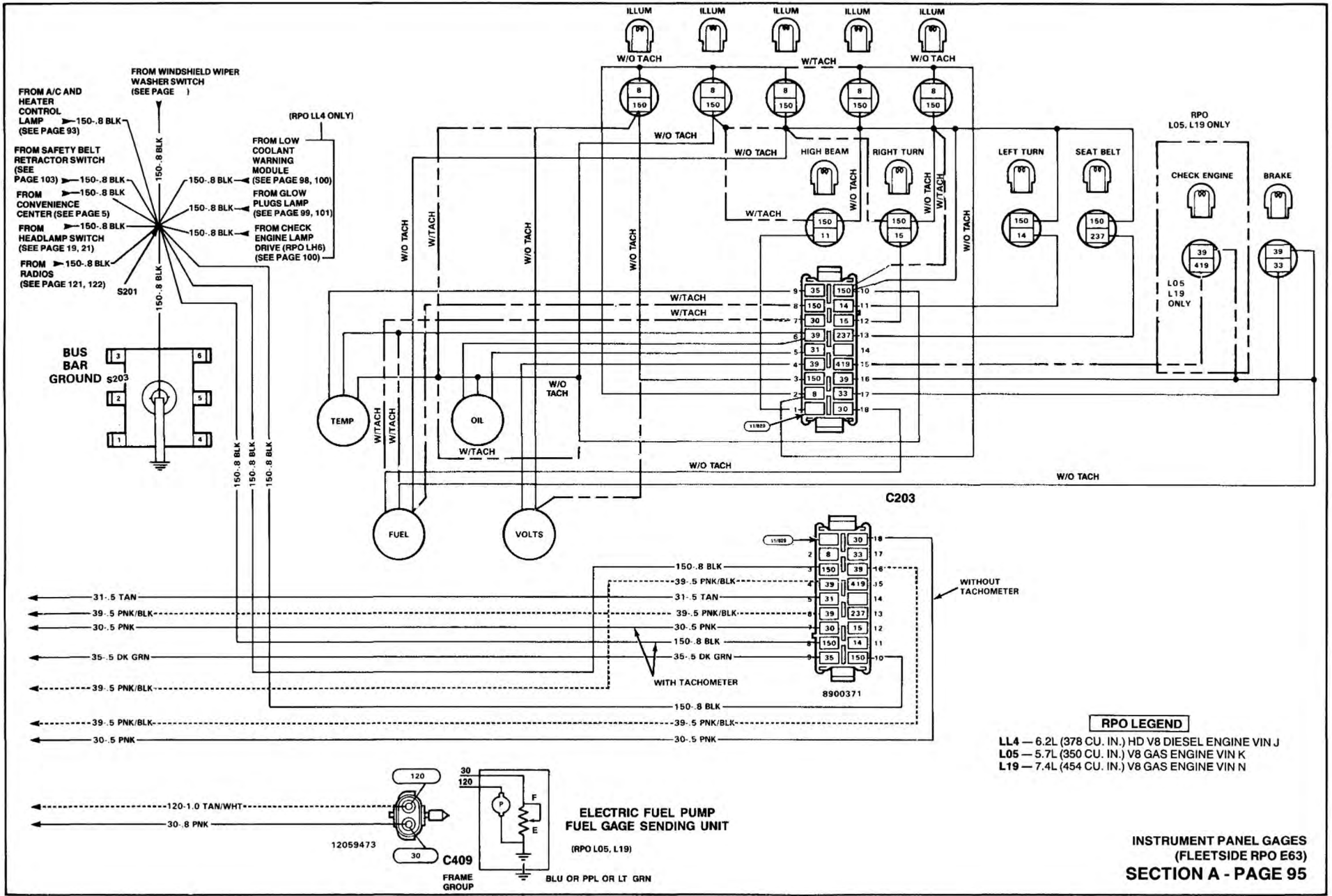


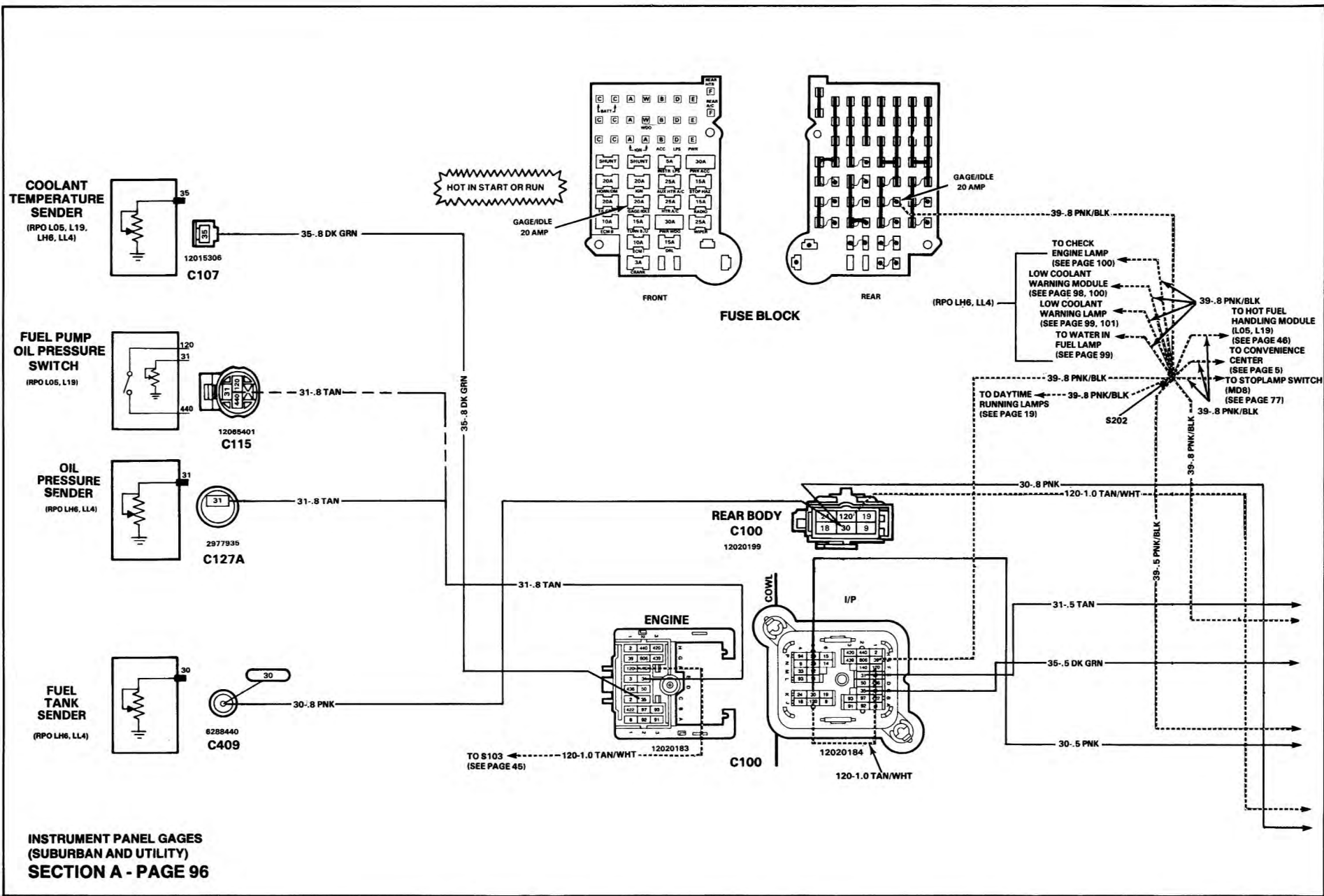


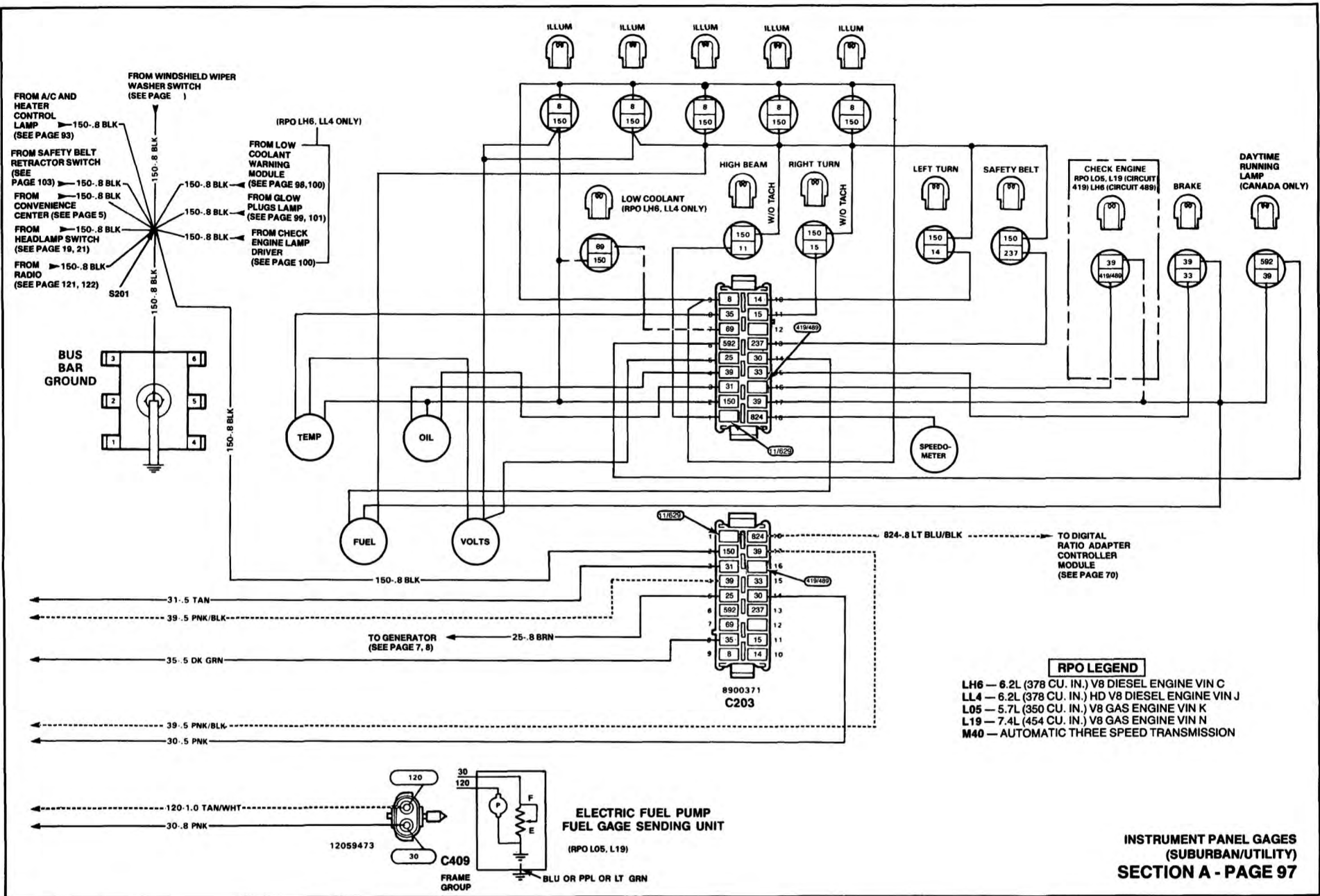
**RPO LEGEND**

LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J  
 L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
 L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N

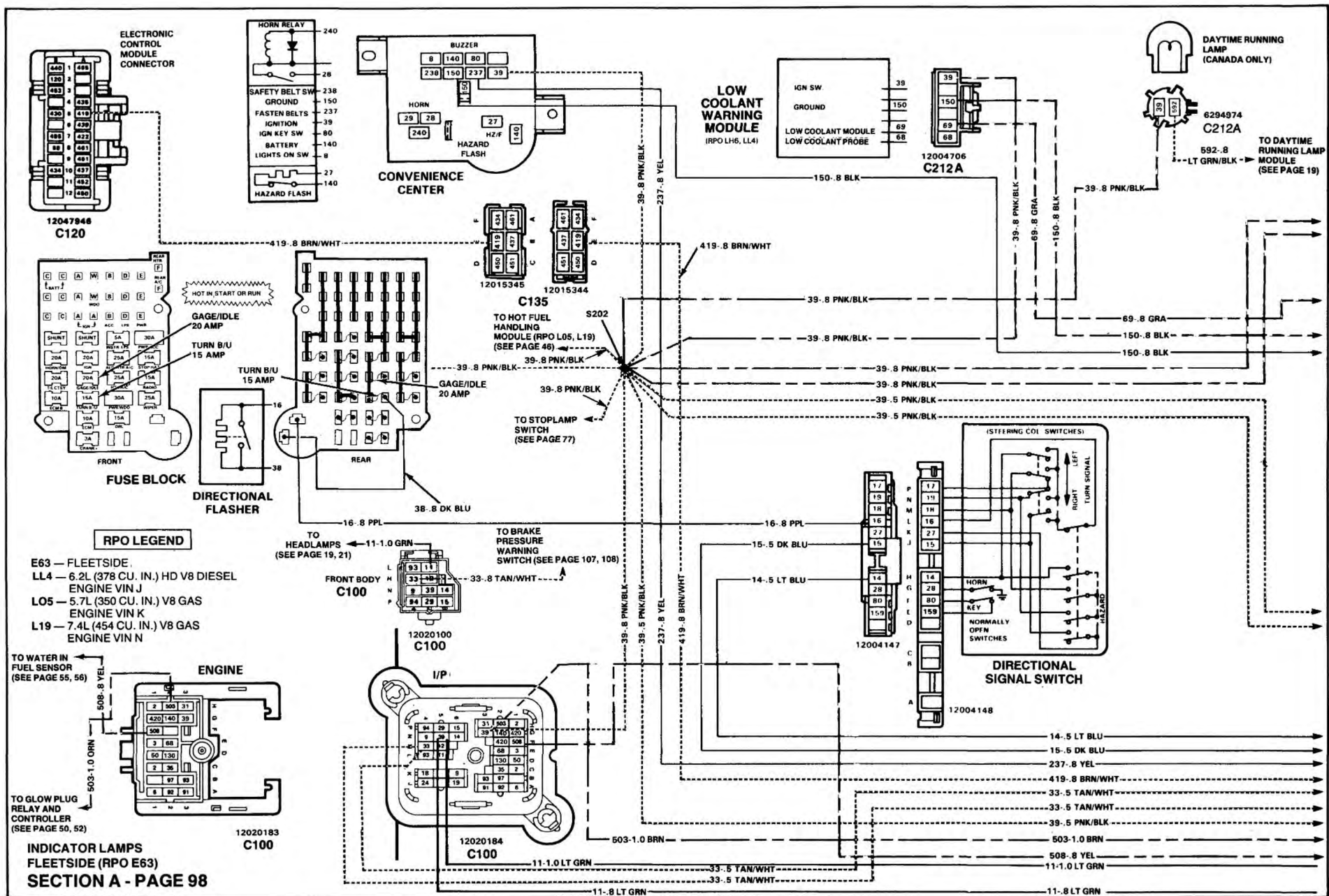


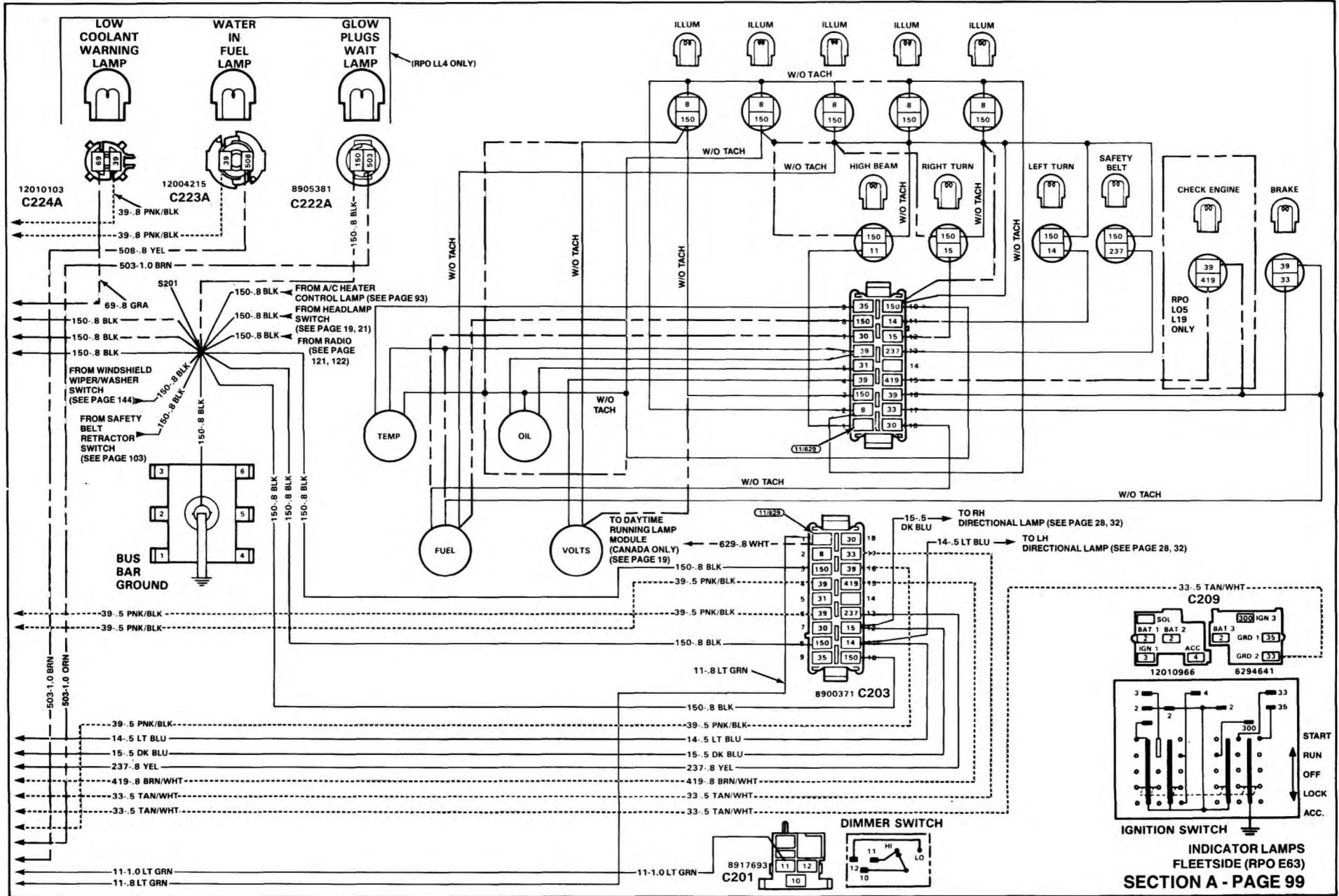


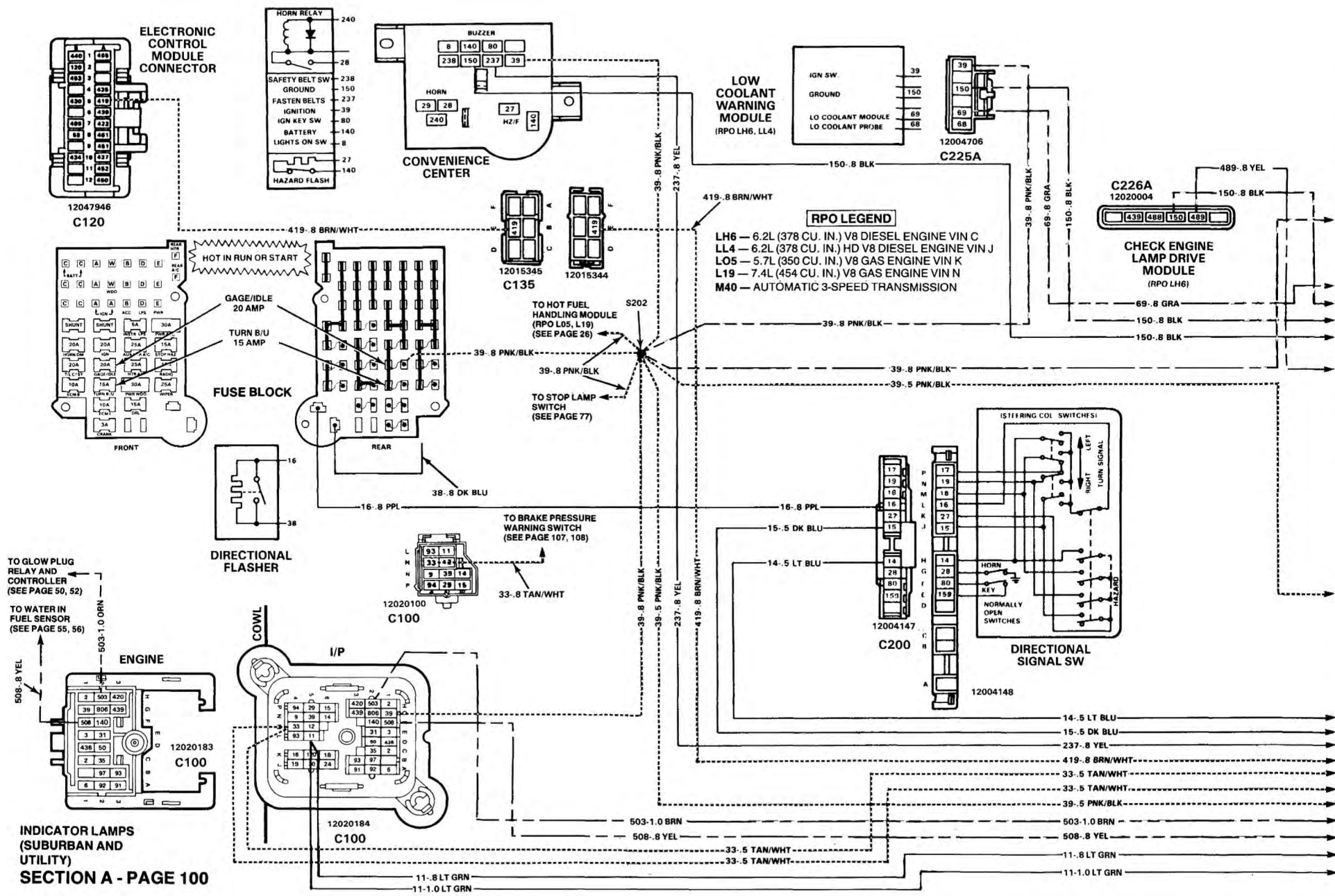




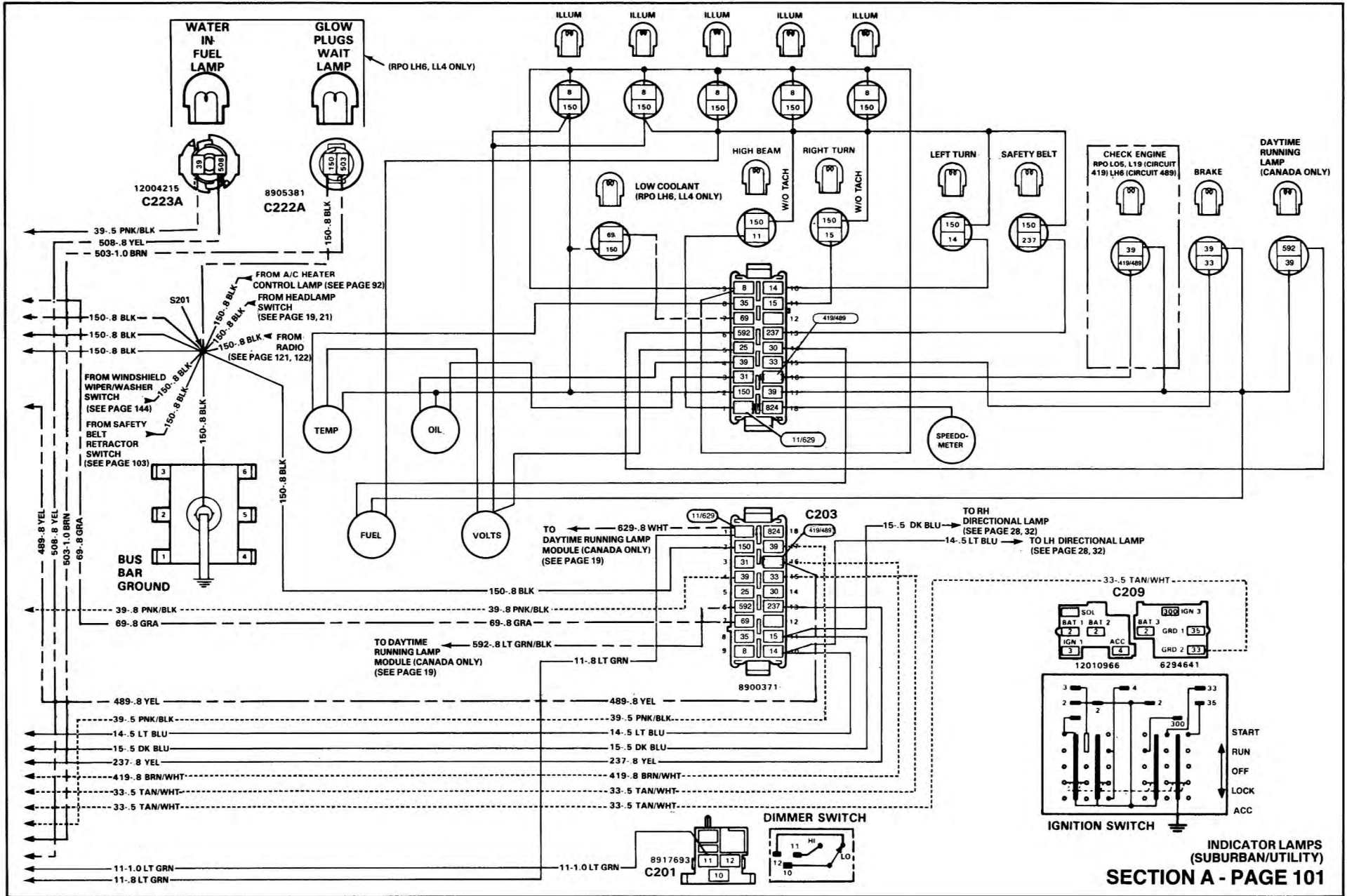
- RPO LEGEND**
- LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C
  - LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J
  - L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
  - L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
  - M40 — AUTOMATIC THREE SPEED TRANSMISSION











## CIRCUIT OPERATION

With the Ignition Switch in RUN, BULB TEST, or START, voltage is applied through the GAGES Fuse to the Safety Belt Buzzer at the Convenience Center. With the driver's safety belt not buckled, terminal 39 of the module is grounded through the Safety Belt Switch. The Fasten Belts Indicators always goes on for about 5 seconds when the Ignition Switch is turned to RUN, BULB TEST, or START.

## COMPONENT LOCATION

		Page — Figure
Convenience Center .....	LH side behind I/P .....	.168 — 12
Fuse Block .....	Under LH side of I/P, above kick panel .....	.166 — 4
Safety Belt Retractor Switch .....	In LH seat belt assembly .....	.179 — 50
C204 .....	Under LH seat, at seat belt assembly .....	.179 — 50
S201 .....	I/P harness, behind LH side of I/P .....	.166 — 4
S202 .....	I/P harness, behind LH side of I/P .....	.166 — 4

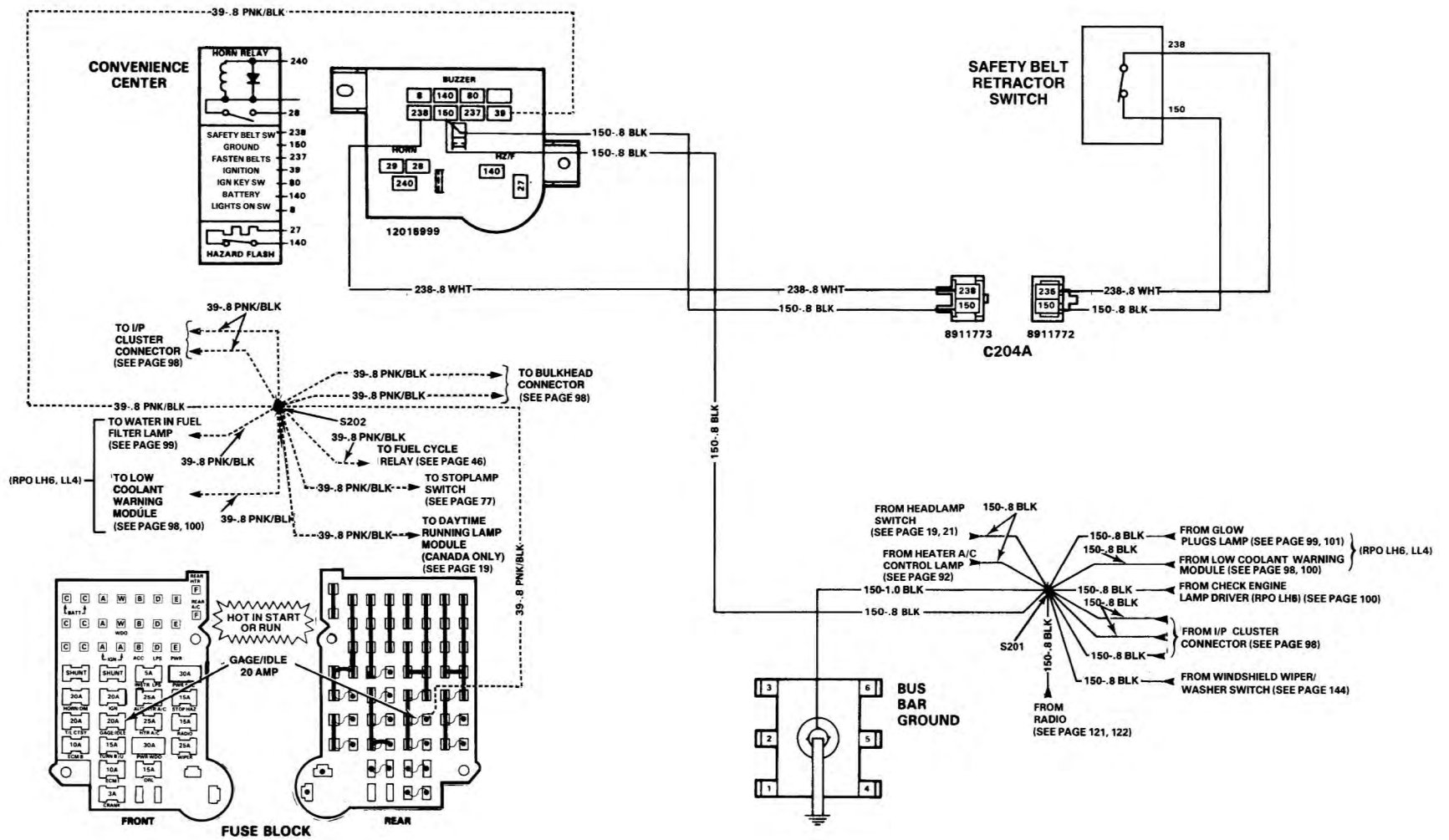
## TROUBLESHOOTING CHART—SAFETY BELT WARNING BUZZER

### THE SAFETY BELT WARNING BUZZER DOES NOT OPERATE

TEST	RESULT	ACTION
1. Connect test lamp from PNK/BLK (39) wire at convenience center to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of the GAGE/IDLE fuse. If fuse is not blown, LOCATE and REPAIR open in PNK/BLK (39) wire from convenience center to fuse block.
2. Connect test lamp from WHT (238) wire and BLK (150) wire at convenience center.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from convenience center to bus bar ground.
3. Connect test lamp from WHT (238) wire at safety belt retractor switch connector C204 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (238) wire from safety belt retractor switch to convenience center.
4. Buckle safety belt. Connect test lamp from BLK (150) wire at safety belt retractor switch connector C204 to ground.	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from safety belt retractor switch to bus bar ground.
	Test lamp does not light.	REPLACE safety belt retractor switch.

### THE SAFETY BELT WARNING BUZZER OPERATES WHEN SAFETY BELT IS BUCKLED

TEST	RESULT	ACTION
Disconnect safety belt retractor switch connector C204.	Safety belt buzzer stops.	REPLACE safety belt retractor switch.
	Safety belt buzzer continues.	CHECK for a short from WHT (238) wire to ground. REPAIR as required.



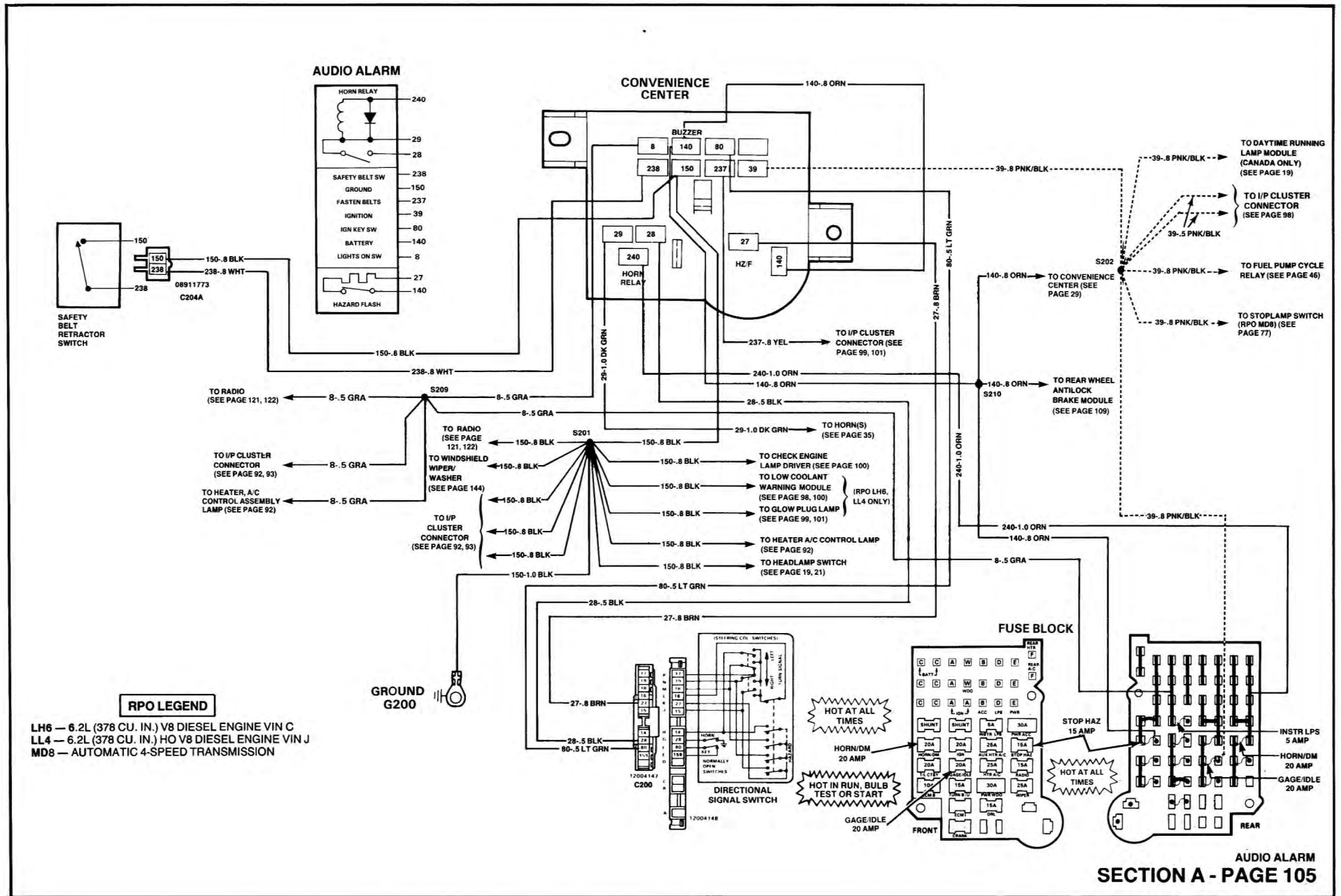
**RPO LEGEND**

LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J

**COMPONENT LOCATION**

Page — Figure

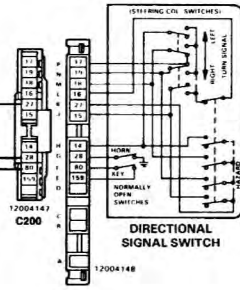
Convenience Center .....	LH side, behind I/P .....	168	—	12
Directional Signal Switch .....	On steering column .....	166	—	5
Fuse Block .....	Under LH side of I/P, above kick panel .....	166	—	4
Safety Belt Retractor Switch .....	Under LH seat, at safety belt assembly .....	179	—	50
C200 .....	At directional signal switch .....	166	—	5
C204 .....	Under LH seat, at safety belt assembly .....	179	—	50
G200 .....	LH side, behind I/P .....	166	—	6
S201 .....	I/P harness, behind LH side of I/P .....	166	—	4
S202 .....	I/P harness, behind LH side of I/P .....	166	—	4
S209 .....	I/P harness, behind I/P cluster .....	166	—	4
S210 .....	I/P harness, LH side .....	166	—	4



**RPO LEGEND**

LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 LL4 — 6.2L (378 CU. IN.) HO V8 DIESEL ENGINE VIN J  
 MD8 — AUTOMATIC 4-SPEED TRANSMISSION

**GROUND G200**

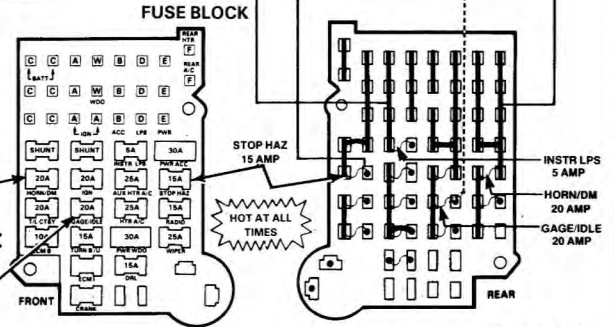


**HOT AT ALL TIMES**

**HORN/DM 20 AMP**

**HOT IN RUN, BULB TEST OR START**

**GAGE/IDLE 20 AMP**



## CIRCUIT OPERATION

Battery voltage is applied to the Brake Indicator when the Ignition Switch is in RUN or START. Two switches are connected to the Brake Indicator. When either of these two switches close, ground is provided and the indicator lights. The Brake Indicator is also connected to the Rear Wheel Antilock Brake Module.

The Park Brake Warning Switch provides a ground when the Parking Brake is applied. The Park Brake Indicator lights to alert the driver.

The Brake Pressure Switch closes to light the Brake

Indicator when there is low brake fluid pressure in one of the two hydraulic brake systems. This could be caused by a leak in one of the brake lines. Refer to Section 5 in the Service Manual for Switch reset procedures. This can only be accomplished after the faulty system has been repaired.

The Rear Wheel Antilock Brake Module grounds the Brake Indicator when the module senses a fault in the Antilock Brake System. For Rear Wheel Antilock Brake Diagnosis, refer to Section 5A in the Service Manual.

## COMPONENT LOCATION

Page — Figure

ALDL Connector	Under LH side of I/P	.166	—	4
Brake Pressure Warning Switch	Engine compartment, LH side of master cylinder	.176	—	38
Digital Ratio Adapter Controller	Under LH side of I/P	.177	—	39
Fuse Block	Under LH side of I/P, above kick panel	.166	—	4
Grommet 100	Center of cowl	.165	—	2
Ignition Switch	RH side of steering column	.166	—	5
Park Brake Warning Switch	Under LH side of I/P	.166	—	4
Rear Wheel Antilock Controller Module	Engine compartment, next to master cylinder	.176	—	38
Stoplamp Switch	On top of brake pedal (RPO MD8 only)	.168	—	11
C100	Engine compartment, LH side of cowl	.176	—	38
C104	At brake pressure warning switch	.176	—	38
C105	At rear wheel antilock controller module	.176	—	38
C118	Under center of I/P	.171	—	21
C203	LH side of I/P	.166	—	4
C209	At ignition switch	.166	—	5
C289	At digital ratio adaptor controller module	.177	—	39
C290	At diode assembly, under I/P	—	—	—
C291	At diode assembly, under I/P	—	—	—
C292	At stoplamp switch (RPO MD8 only)	.181	—	55
C293	At parking brake warning switch	.166	—	4
G103	Rear RH side of engine	.171	—	22
S143	Engine harness, near master cylinder	.176	—	38
S202	I/P harness, behind LH side of I/P	.166	—	4
S210	I/P harness, LH side	.166	—	4
S211	I/P harness, under LH side	.177	—	39
S213	I/P harness, under I/P	.177	—	39
S214	I/P harness, under I/P	—	—	—

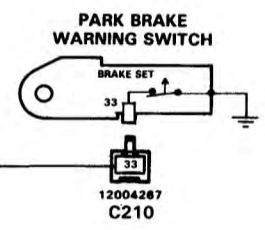
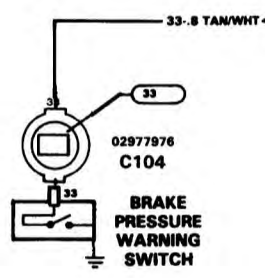
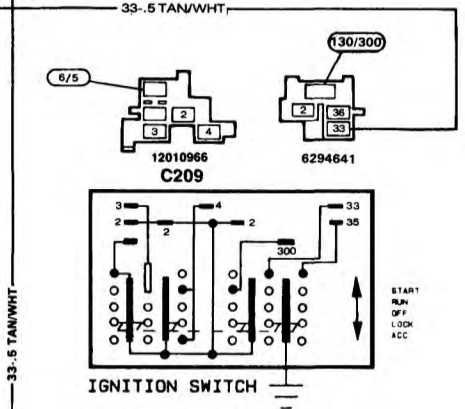
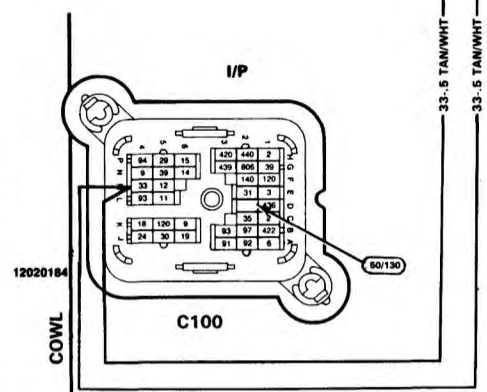
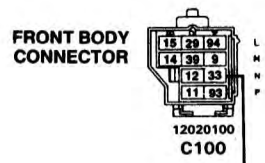
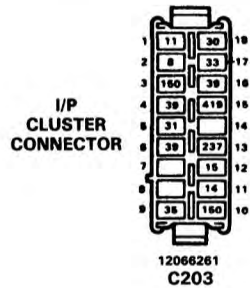
## TROUBLESHOOTING CHART—BRAKE SYSTEMS

### BRAKE INDICATOR REMAINS ON WITH IGNITION SWITCH IN RUN AND PARK BRAKE OFF

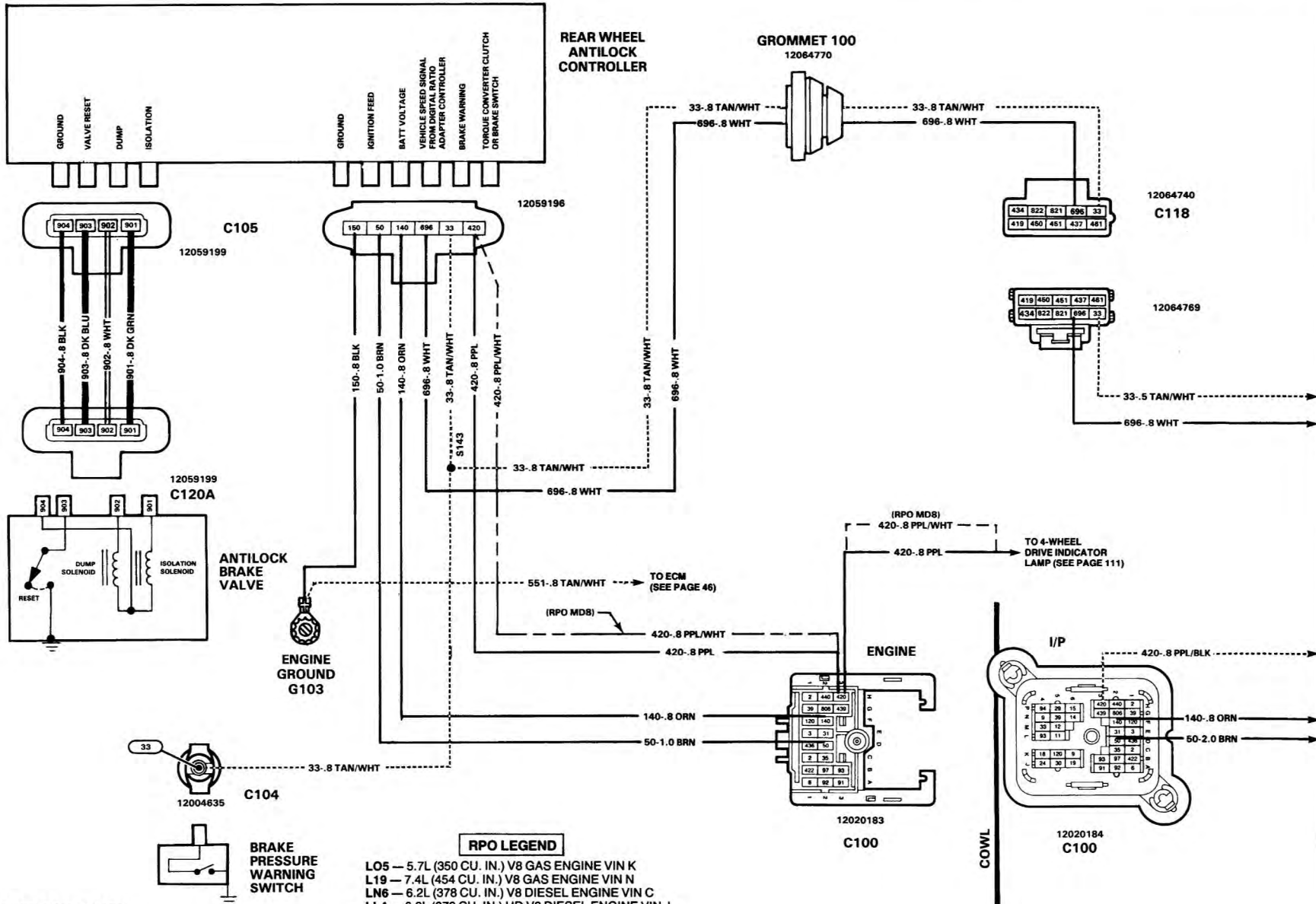
TEST	RESULT	ACTION
1. Disconnect park brake switch connector C293.	Brake indicator lamp does not go out.	GO to step 2.
	Brake indicator lamp goes out.	CHECK adjustment of park brake switch. If adjustment cannot be corrected, REPLACE brake switch.
2. Disconnect brake pressure warning switch connector C104.	Brake indicator lamp does not go out.	GO to step 3.
	Brake indicator lamp goes out.	CHECK for a possible leak or loss of fluid in the brake system.
3. Disconnect rear wheel antilock module connector C105.	Brake indicator lamp does not go out.	CHECK wiring between instrument cluster and each switch and module for a short to ground. If wiring is good, the problem is in the instrument cluster.
	Brake indicator lamp goes out.	CHECK for an inoperative antilock brake system. Refer to Section 5A in Service Manual for a diagnostic circuit check.

### BRAKE INDICATOR DOES NOT LIGHT DURING A WARNING CONDITION OR DURING THE ANTILOCK SYSTEM CHECK

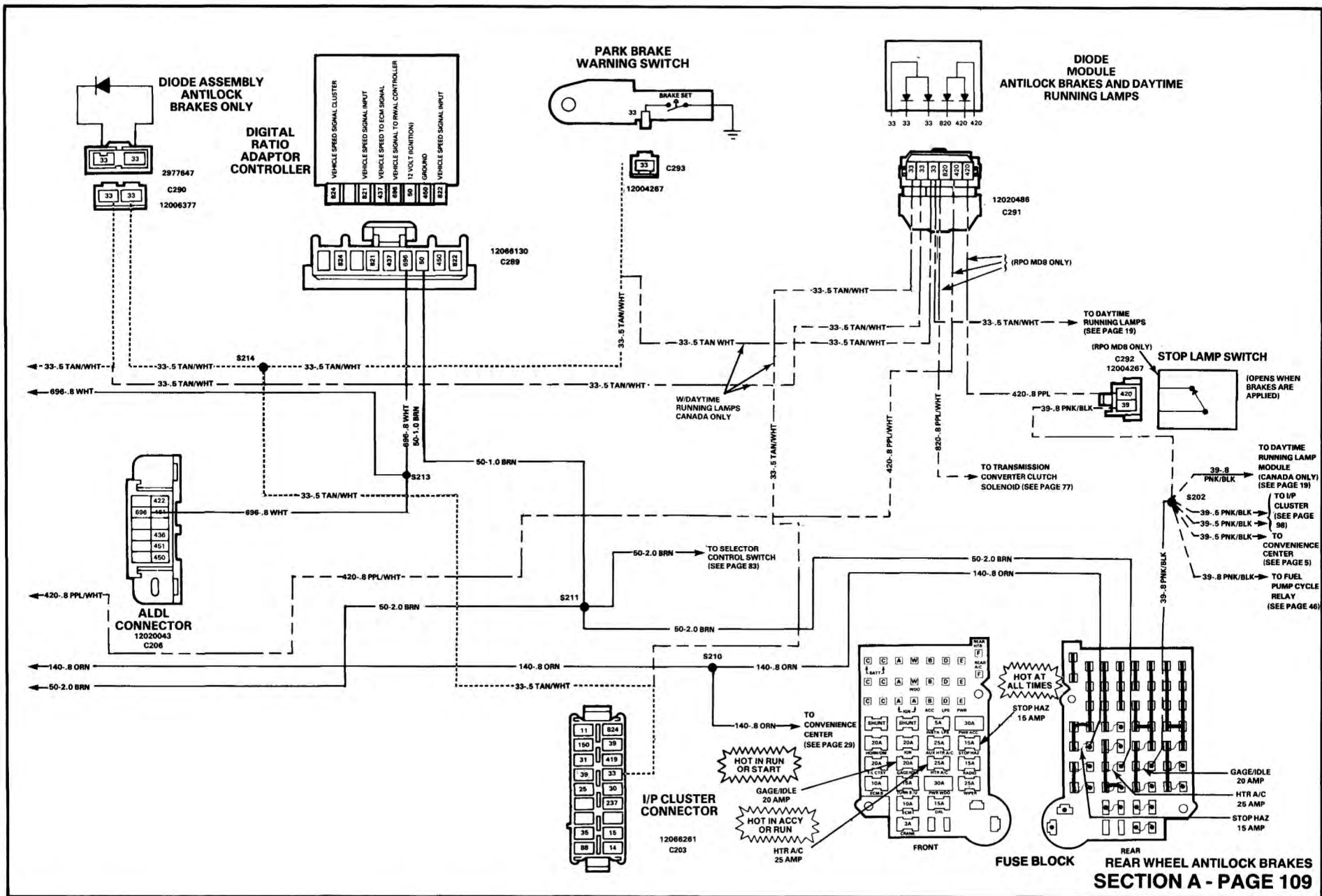
TEST	RESULT	ACTION
1. Disconnect park brake switch connector C293. Connect a fused jumper from park brake switch connector C293 to ground.	Brake indicator lamp does not come on.	GO to step 2.
	Brake indicator lamp comes on.	CHECK adjustment of park brake switch. If adjustment cannot be corrected, REPLACE brake switch.
2. Disconnect brake pressure warning switch connector C104. Connect a fused jumper from TAN/WHT (33) wire at park brake switch connector C104 to ground.	Brake indicator lamp does not come on.	GO to step 3.
	Brake indicator lamp comes on.	REPLACE brake pressure warning switch.
3. Disconnect rear wheel antilock module connector C105. Connect a fused jumper from TAN/WHT (33) wire at antilock module connector C105 to ground.	Brake indicator lamp does not come on.	CHECK wiring and in-line diode (if equipped) between instrument cluster and each switch and module for an open. If wiring is good, the problem is in the instrument cluster.
	Brake indicator lamp comes on.	CHECK for an inoperative antilock brake system. Refer to Section 5A in the 1990 Service Manual for a diagnostic circuit check.



**BRAKE WARNING SYSTEM  
WITHOUT REAR WHEEL ANTILOCK BRAKES  
SECTION A - PAGE 107**







## CIRCUIT OPERATION

When the Ignition Switch is in RUN and the Four-Wheel-Drive Control Lever is engaged, the Transfer Case Switch closes and battery voltage is applied across the Front Axle Actuator. The Front Axle Actuator energizes and the four-wheel-drive gears are meshed. This meshing action of the four-wheel-drive gears closes the Front Axle Switch, and battery voltage is applied through the WHT (156) wire across the four-wheel-drive indicator lighting the bulb in V100 and V200 models. On V300 models, the

closing of the switch provides a ground for the indicator lamp. Battery voltage is also applied through the front axle switch contacts and the PPL (420) wires to the Rear Wheel Antilock Brake Module in the V100 and V200 models. This will keep the antilock braking system disabled in 4WD mode. The In-Line Resistor (automatic transmission only) prevents the Transmission Converter Clutch Solenoid from engaging when the Front Axle Switch is closed.

## COMPONENT LOCATION

Page — Figure

Bus Bar Ground	Under LH side of I/P, on kick panel	166	6
Four-Wheel Drive Indicator Lamp (V100, V200)	In I/P cluster	180	51
Four-Wheel Drive Indicator Lamp (V300)	In I/P cluster	180	52
Four-Wheel Drive Shift Lever Lamp (V100, V200)	At transfer case shift lever	180	51
Fuse Block	Under LH side of I/P	166	4
Grommet 101	LH side of cowl	180	51
In-Line Diode	In 4WD harness, behind I/P cluster	—	—
Transfer Case Switch (V100, V200)	Top of transfer case	180	51
Transfer Case Switch (V300)	Top of transfer case	180	52
C195 (V100, V200)	Engine compartment, LH side of cowl	180	51
C211 (V100, V200)	Behind I/P cluster	180	51
C211 (V300)	Behind I/P cluster	180	52
C215 (V300)	Under 4WD shift lever housing	180	52
C306 (V100, V200)	At transfer case switch	180	51
C306 (V300)	At transfer case switch	180	52
C307 (V100, V200)	At 4WD shift lever lamp	180	51

## PRELIMINARY CHECKS:

Make sure all mechanical components are operative before diagnosing the electrical portion of the four-wheel-drive system.

To determine whether the vehicle is in Two-Wheel Drive or Four-Wheel Drive, it must be lifted up so the wheels can spin freely.

While performing the following diagnostic procedures, the Ignition Switch must be in RUN, and the 4WD Control Lever must be in the 4WD ENGAGED position.

## TROUBLESHOOTING CHART—FOUR-WHEEL DRIVE INDICATOR LAMP

### FOUR-WHEEL DRIVE INDICATOR LAMP WILL NOT TURN OFF

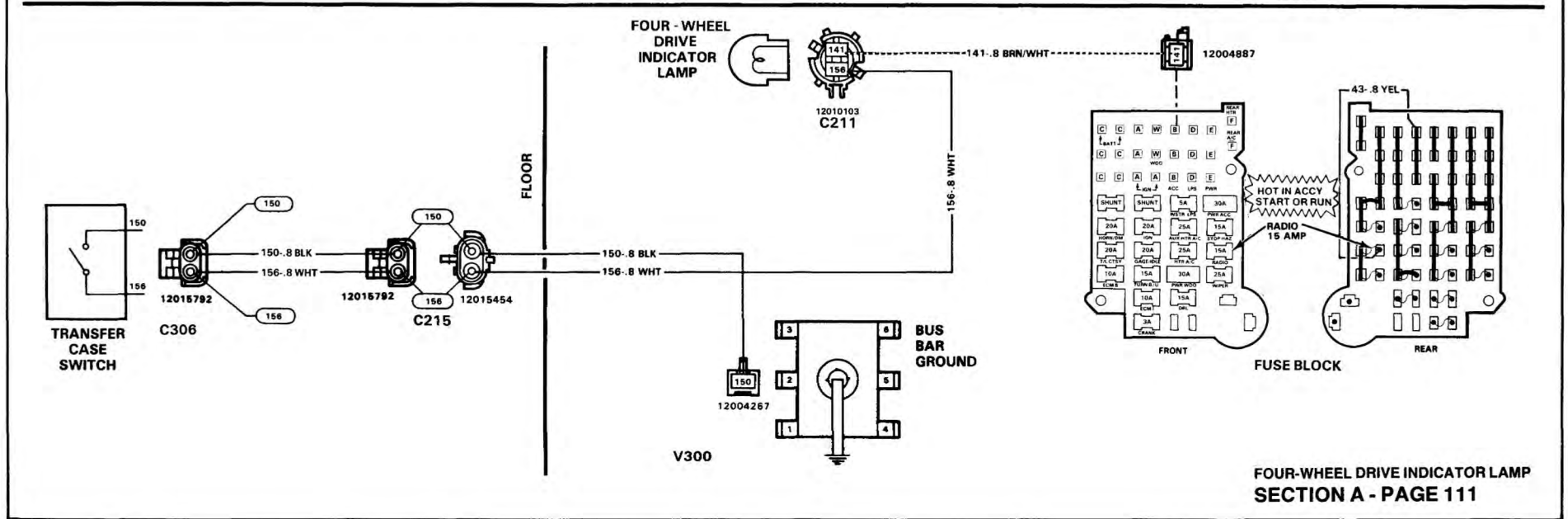
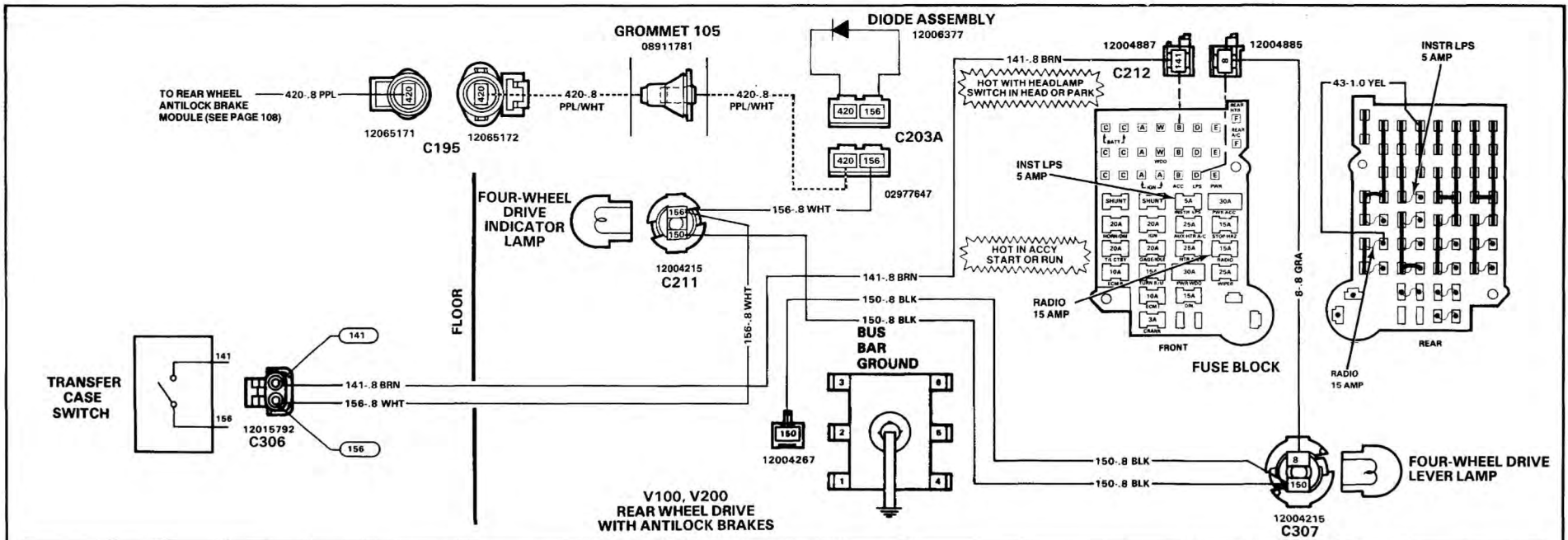
TEST	RESULT	ACTION
Disconnect transfer case switch connector C306.	4WD indicator lamp goes off.	REPLACE transfer case switch.

### FOUR-WHEEL DRIVE ENGAGES BUT 4WD INDICATOR LAMP DOES NOT LIGHT (V100, V200)

TEST	RESULT	ACTION
1. Place ignition switch in RUN. Remove transfer case connector C306. Connect a test lamp from the BRN (141) wire to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK radio fuse, if good, LOCATE and REPAIR open in BRN (141) wire.
2. Reconnect transfer case connector C306. Connect a test lamp to the WHT (156) wire at the back of the transfer case connector C306 to ground. Place the transfer case in four-wheel drive.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE transfer case switch.
3. With ignition switch in RUN and transfer case in four-wheel drive, disconnect 4WD indicator lamp connector C211. Connect a test lamp between WHT (156) wire and ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (156) wire.
4. Connect a test lamp between WHT (156) wire and BLK (150) wire at connector C211.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire to ground.

### FOUR-WHEEL DRIVE ENGAGES BUT 4WD INDICATOR LAMP DOES NOT LIGHT (V300)

TEST	RESULT	ACTION
1. Disconnect 4WD indicator lamp connector C211. Connect test lamp to BRN/WHT (141) wire to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK radio fuse, if good LOCATE and REPAIR open in BRN/WHT (141) wire.
2. Connect test lamp to connector C211 at BRN/WHT (141) wire to WHT (156) wire. Engage four-wheel drive.	Test lamp lights.	REPLACE 4WD indicator lamp.
	Test lamp does not light.	GO to step 3.
3. Disconnect transfer case switch connector C306. Connect test lamp to WHT (156) wire to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (156) wire.
4. Connect test lamp between WHT (156) wire and BLK (150) wire at transfer case switch connector C211 make sure four-wheel drive is engaged.	Test lamp lights.	REPAIR transfer case switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire to ground.



## CIRCUIT OPERATION

The Cruise Control System operates a mechanical linkage to the throttle by means of a Vacuum Motor. This is a diaphragm moved by a vacuum applied to one side. A solenoid operated valve connects the Vacuum Motor to a Vacuum Tank. Another solenoid valve vents the vacuum to reduce the suction. The Cruise Control Module controls the vacuum motor and the throttle by pulsing these solenoid valves on and off.

One input to the module is the vehicle speed. This input comes from the Digital Ratio Adapter. If the actual speed signal is different from the speed that was sent into and remembered by the module, the module generates pulses to change the vacuum and return the vehicle to the set speed. Other inputs to the module are from the Cruise

Switch and the Set Switch. A disconnect input to the module comes from a switch on the brake pedal and on vehicles equipped with a manual transmission, from the Clutch Switch. A separate vacuum shut-down of the Cruise Control comes from the Brake/Clutch Cruise Release Valve on the brake pedal.

The two outputs of the Cruise Control Module operate the coils of the Vacuum Valve and the Vent Valve. Both valves are located in the Cruise Control Servo. These valves move the throttle by means of the Vacuum Motor. The Servo Position Sensor coil senses the position and motion of the Vacuum Motor. It feeds this information back to the module to provide smooth acceleration while the vehicle is in Cruise Control.

## COMPONENT LOCATION

Page — Figure

Brake Switch	On top of brake pedal assembly	.181	—	55
Bus Bar Ground	On LH kick panel, under I/P	.181	—	55
Clutch Switch	On top of clutch pedal assembly	.181	—	54
Cruise Control Actuator	Part of multi-function switch	.182	—	58
Cruise Control Module	Behind I/P, on LH side of steering column	.181	—	54
Cruise Control Servo (RPO L05, L19)	Front of engine	.182	—	56
Cruise Control Servo (RPO LH6, LL4)	Rear of engine	.182	—	57
Digital Ratio Actuator Controller	Behind I/P, on LH side steering column	.177	—	39
Fuse Block	Behind LH side of I/P	.181	—	55
Grommet 202	Behind LH side of I/P	.181	—	55
Vehicle Speed Sensor	At transmission	—		
C196 (RPO LH6, LL4)	Near front of engine	.182	—	56
C196 (RPO L05, L19)	Near rear of engine	.182	—	57
C197 (RPO LH6, LL4)	At cruise control servo	.182	—	56
C197 (RPO L05, L19)	At cruise control servo	.182	—	57
C216	At cruise control module	.181	—	54
C217	At brake switch	.181	—	55
C218	Under steering column	.181	—	55
C219	At clutch switch	.181	—	54
C220	At DRAC	—		
C221 (RPO LH6, LL4)	At vehicle speed sensor	—		
C222 (RPO L05, L19)	At vehicle speed sensor	—		
S204	Cruise control harness, under LH side of I/P	.181	—	54
S205 (RPO LH6, LL4)	Cruise control harness, under LH side of I/P	.181	—	54

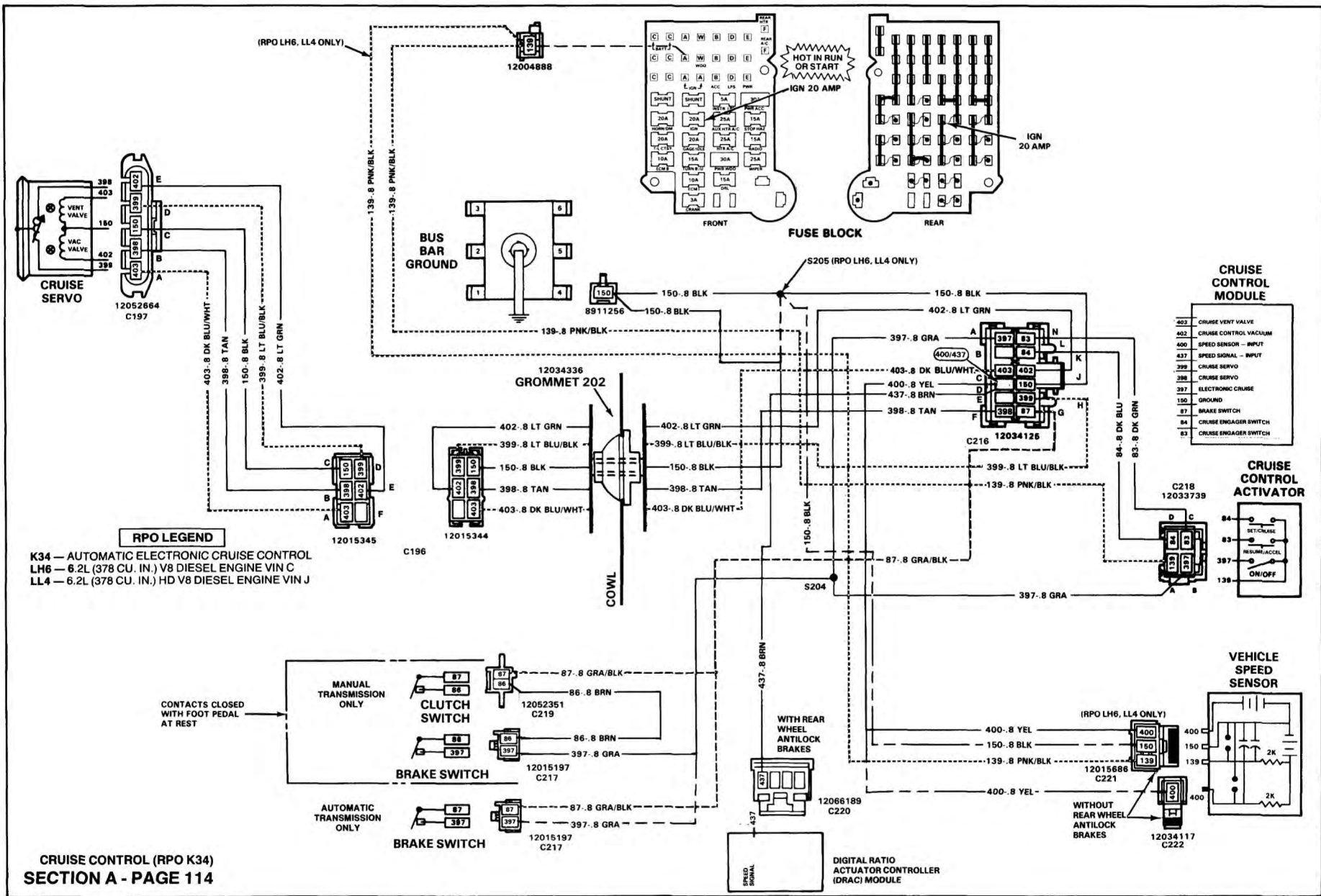
## TROUBLESHOOTING CHART—CRUISE CONTROL

### CRUISE CONTROL DOES NOT DISENGAGE WHEN CLUTCH OR BRAKE PEDAL IS DEPRESSED

TEST	RESULT	ACTION
1. Place ignition switch in RUN position and cruise control activator to ON. Connect a test lamp from GRA (397) wire at brake switch connector C217 to ground.	Test lamp lights.	GO to step 2, if vehicle equipped with manual transmission. GO to step 5, if equipped with automatic transmission.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (397) wire between brake switch and cruise control activator.
2. Connect a test lamp from BRN (86) wire at brake switch connector C217 to ground. Do not depress brake pedal.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	CHECK adjustment of brake switch. If brake switch cannot be adjusted, REPLACE brake switch.
3. Connect a test lamp from BRN (86) wire at clutch switch connector C219 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (86) wire between brake switch and clutch switch.
4. Connect a test lamp from GRA/BLK (87) wire at clutch switch connector C219 to ground. Do not depress clutch pedal.	Test lamp lights.	REFER to "Cruise Control Does Not Operate" procedure.
	Test lamp does not light.	CHECK adjustment of clutch switch. If adjustment cannot be corrected, REPLACE clutch switch.
5. Connect a test lamp from GRA/BLK (87) wire at brake switch connector C217 to ground. Do not depress brake pedal.	Test lamp lights.	REFER to "Cruise Control Does Not Operate" symptom.
	Test lamp does not light.	CHECK adjustment of brake switch. If adjustment cannot be made, REPLACE brake switch.

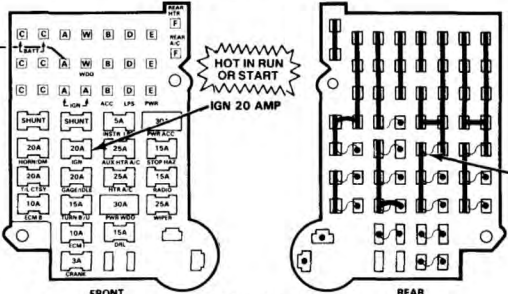
**CRUISE CONTROL DOES NOT OPERATE**

TEST	RESULT	ACTION
1. Place ignition switch in RUN and cruise control activator to ON. Connect a test lamp from GRA (397) wire at cruise control activator connector C218 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK/BLK (139) wire between cruise control activator and fuse block. If wire is in good condition, REPLACE cruise control activator.
2. Connect a test lamp from DK BLU (84) wire at cruise control activator connector C218 to ground.	Test lamp lights.	REPLACE cruise control activator.
	Test lamp does not light.	GO to step 3.
3. DEPRESS SET/COAST switch. Connect a test lamp from DK BLU (84) wire at cruise control module connector C216 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in DK BLU (84) wire between cruise control activator and cruise control module. If wire is in good condition, REPLACE cruise control activator.
4. DEPRESS and HOLD RESET/ACCELERATE switch. Connect a test lamp from DK GRN (83) wire at cruise control module connector C216 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (83) wire. If wire is in good condition, REPLACE cruise control activator.
5. Connect a test lamp from GRA (397) wire at cruise control module connector C216 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (397) wire between cruise control module and brake switch and/or brake switch and cruise control activator.
6. Connect a test lamp from BLK (150) wire to GRA (397) wire at cruise control module connector C251.	Test lamp lights.	GO to step 7.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire between cruise control module and bus bar ground.
7. Place ignition switch to OFF position. Disconnect cruise control servo connector C146. Using 4 jumper leads, connect cavities A, B, D and E to ground. Place ignition switch to RUN position. Using a digital ohmmeter, check for continuity in DK BLU/WHT (403), TAN (398), LT BLU/BLK (399) and LT GRN (402) wires at cruise control servo connector C197 to ground.	No continuity in any or all wires.	LOCATE and REPAIR open in wire(s) that show no continuity.
	Continuity.	GO to step 8.
8. Connect a digital ohmmeter at BLK (150) cavity in cruise control servo connector C197 and check for continuity to ground.	No continuity.	LOCATE and REPAIR open in BLK (150) wire between cruise control servo and bus bar ground.
	Continuity.	Problem is not related to the cruise control system wiring or switches, replace cruise control module and test drive. If still inoperative, replace cruise control servo.



(RPO LH6, LL4 ONLY)

12004888



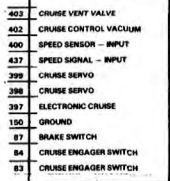
IGN 20 AMP



8911256

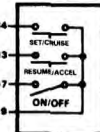
S205 (RPO LH6, LL4 ONLY)

**CRUISE CONTROL MODULE**

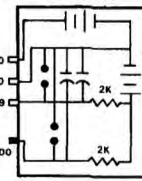


**CRUISE ACTUATOR**

C218  
12033739



**VEHICLE SPEED SENSOR**



(RPO LH6, LL4 ONLY)

12015688  
C221

WITHOUT REAR WHEEL ANTILOCK BRAKES

12034117  
C222



12066189  
C220

12034336  
GROMMET 202

COWL

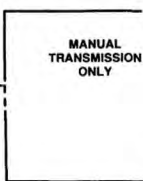
12015344

C196

12015345

**RPO LEGEND**

K34 — AUTOMATIC ELECTRONIC CRUISE CONTROL  
 LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C  
 LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J



CONTACTS CLOSED WITH FOOT PEDAL AT REST



437



12066189  
C220

WITHOUT REAR WHEEL ANTILOCK BRAKES

12034117  
C222

## CIRCUIT OPERATION

### COURTESY DOME, VANITY, GLOVE BOX, CARGO AND UNDERHOOD LAMPS

Voltage is applied at all times from the T/L CTSY Fuse to the Courtesy Lamp, Dome Lamp, Glove Box Lamp and Vanity Lamps. The Courtesy and Dome Lamps turn on when a ground path is provided by the Panel Dimmer Switch or one of the Door Jamb Switches.

The Glove Box and Vanity Lamps have their own switches that provide ground paths when their switches close.

## CARGO LAMP

Voltage is applied at all times through the HORN/DM Fuse to the Cargo Lamp Switch. When the Cargo Lamp Switch is turned on, power flows through the switch to the Lamp. On models with a tailgate, a ground path is provided when the tailgate is opened.

## UNDERHOOD LAMP

Voltage is applied at all times to the Underhood Lamp from the Junction Block, through an in-line fuse. When the switch is closed a ground path is provided.

## COMPONENT LOCATION

Page — Figure

Cargo Lamp	Outside rear of cab	.185	—	65
Cargo Lamp Switch	In 'B' pillar	.185	—	65
Courtesy Lamp	Under center of I/P	.183	—	60
Dome Lamp, Front	Above passenger seats in roof	.183	—	59
Dome Lamp, Rear	Above rear cargo area in roof	.183	—	59
Dome Jamb Switch, LH Front	In LH 'A' pillar	.183	—	60
Door Jamb Switch, LH Rear	In LH 'B' pillar	.183	—	59
Door Jamb Switch, RH Front	In RH 'A' pillar	.183	—	60
Door Jamb Switch, RH Rear	In RH 'B' pillar	.183	—	59
Fuse Block	Under LH side of I/P, above kick panel	.183	—	60
Glove Box Lamp Switch	In glove box on RH side of I/P	.183	—	60
Grommet 502	LH 'A' pillar	.183	—	60
Grommet 602	RH 'A' pillar	.183	—	60
Headlamp Switch	LH side of I/P	.166	—	4
In-Line Fuse (RPO LH6, LL4)	Engine compartment, LH fender	.184	—	62
In-Line Fuse (RPO L05, L19)	Engine compartment, RH cowl	.184	—	63
Junction Block	Center of cowl, in engine compartment	.184	—	62
Rear Gate Switch	At rear tailgate	.184	—	64
Underhood Lamp (RPO LH6, LL4)	Engine compartment, LH fender	.184	—	62
Underhood Lamp (RPO L05, L19)	Engine compartment, RH cowl	.184	—	63
Vanity Mirror Switch	On RH side vanity	.184	—	61
C100	Engine compartment, LH cowl	.183	—	60
C115A (RPO LH6, LL4)	At in-line fuse	.184	—	62
C115A (RPO L05, L19)	At in-line fuse	.184	—	63
C116A (RPO LH6, LL4)	At underhood lamp	.184	—	62
C116A (RPO L05, L19)	At underhood lamp	.184	—	63
C202	At headlamp switch	.166	—	4
C217A	At glove box switch	.183	—	60
C220A	In LH 'B' pillar	.183	—	59
C323	Bottom of RH 'A' pillar	.184	—	61
C324	At RH vanity mirror	.184	—	61
C430	At cargo lamp switch	.185	—	65
C431	At cargo lamp	.185	—	65
C432	Above rear tailgate	.184	—	64
C433	At rear gate switch	.184	—	64
C434	In 'B' pillar	.185	—	65
G118 (RPO LH6, LL4)	Center of cowl, in engine compartment	.184	—	62
G118 (RPO L05, L19)	Center of cowl, in engine compartment	.184	—	63
S212	I/P harness, RH side under I/P	.183	—	60
S413	I/P harness, above LH rear door	.183	—	59

## PRELIMINARY CHECKS:

Check condition of T/L CTSY fuse. If fuse is good, refer to appropriate diagnostic procedure.

## TROUBLESHOOTING CHART—INTERIOR LAMPS

### COURTESY LAMPS DO NOT OPERATE

TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at courtesy lamp connector C218A to ground. Check at each courtesy lamp.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire.
2. Open right door. Connect test lamp from ORN (40) wire to WHT (156) wire at courtesy lamp connector C218.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	CHECK to make sure jamb switch is closing. If switch closes, LOCATE and REPAIR open in WHT (156) wire and BLK (150) wire.

### DOME LAMP DOES NOT WORK OR STAYS ON ALL THE TIME

TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at both dome lamps to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire.
2. Open both doors and turn panel lamp switch to ON. Connect test lamp from ORN (40) wire to WHT (156) wire at dome lamp.	Test lamp lights.	REPLACE bulb if dome lamp did not work. If dome lamp stayed ON all the time, GO to step 3.
	Test lamp does not light.	GO to step 3.
3. Disconnect jamb switch connectors. Connect ohmmeter from WHT (156) terminal to BLK (150) terminal at jamb switch. Take a reading with door open and a reading with door closed. With door open reading must be 0 ohms and door closed, infinite ohms.	Correct readings.	GO to step 4.
	Incorrect readings.	REPLACE jamb switch(es) that have incorrect reading.
4. Disconnect headlamp switch connector C202. Connect ohmmeter from WHT (156) terminal to BLK (150) terminal at panel lamp switch. Turn panel lamp switch to ON and then OFF and take a reading in each position. When ON, reading must be 0 ohms and when OFF, reading must be infinite ohms.	Correct readings.	LOCATE and REPAIR open or short in WHT (156) wire and BLK (150) wire.
	Incorrect readings.	REPLACE panel lamp switch.

**CARGO LAMP DOES NOT WORK**

TEST	RESULT	ACTION
1. Turn cargo switch ON. Connect test lamp from ORN (140) wire at cargo lamp connector C431 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. Connect test lamp from ORN (140) wire to WHT (156) wire at cargo lamp connector C431.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (156) wire from cargo lamp to panel lamp switch.
3. Connect test lamp from ORN (40) wire at cargo lamp switch connector C430 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire.
4. Connect test lamp from ORN (140) wire at cargo lamp switch connector C430 to ground.	Test lamp lights.	LOCATE and REPAIR open in ORN/WHT (140) wire from cargo lamp switch to cargo lamp.
	Test lamp does not light.	REPLACE cargo lamp switch.

**GLOVE BOX LAMP DOES NOT WORK**

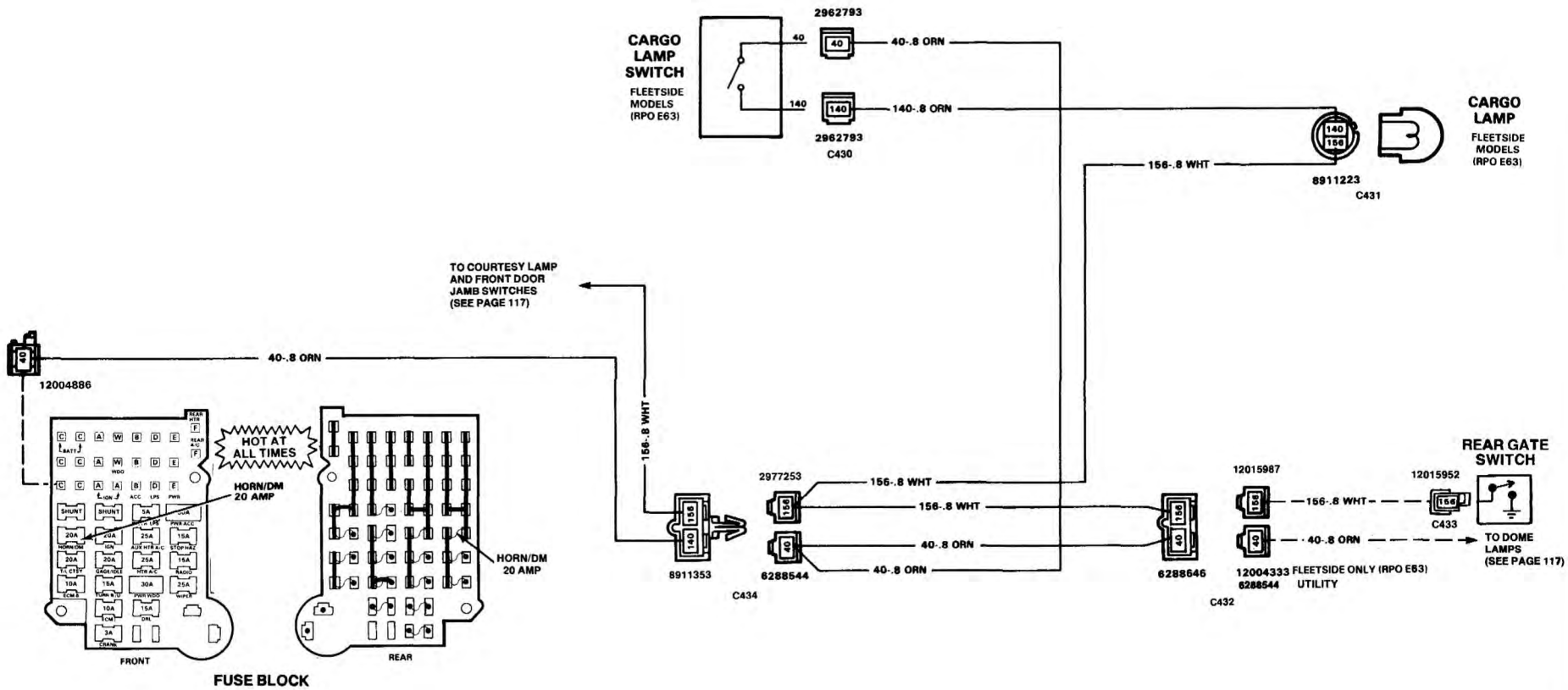
TEST	RESULT	ACTION
1. Open glove box door. Connect test lamp from ORN (40) wire at glove box lamp connector C217A to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire.
2. Connect test lamp from ORN (40) wire to BLK (150) wire at glove box lamp connector C217A.	Test lamp lights.	REPLACE glove box lamp assembly.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from glove box lamp to ground terminal G201.

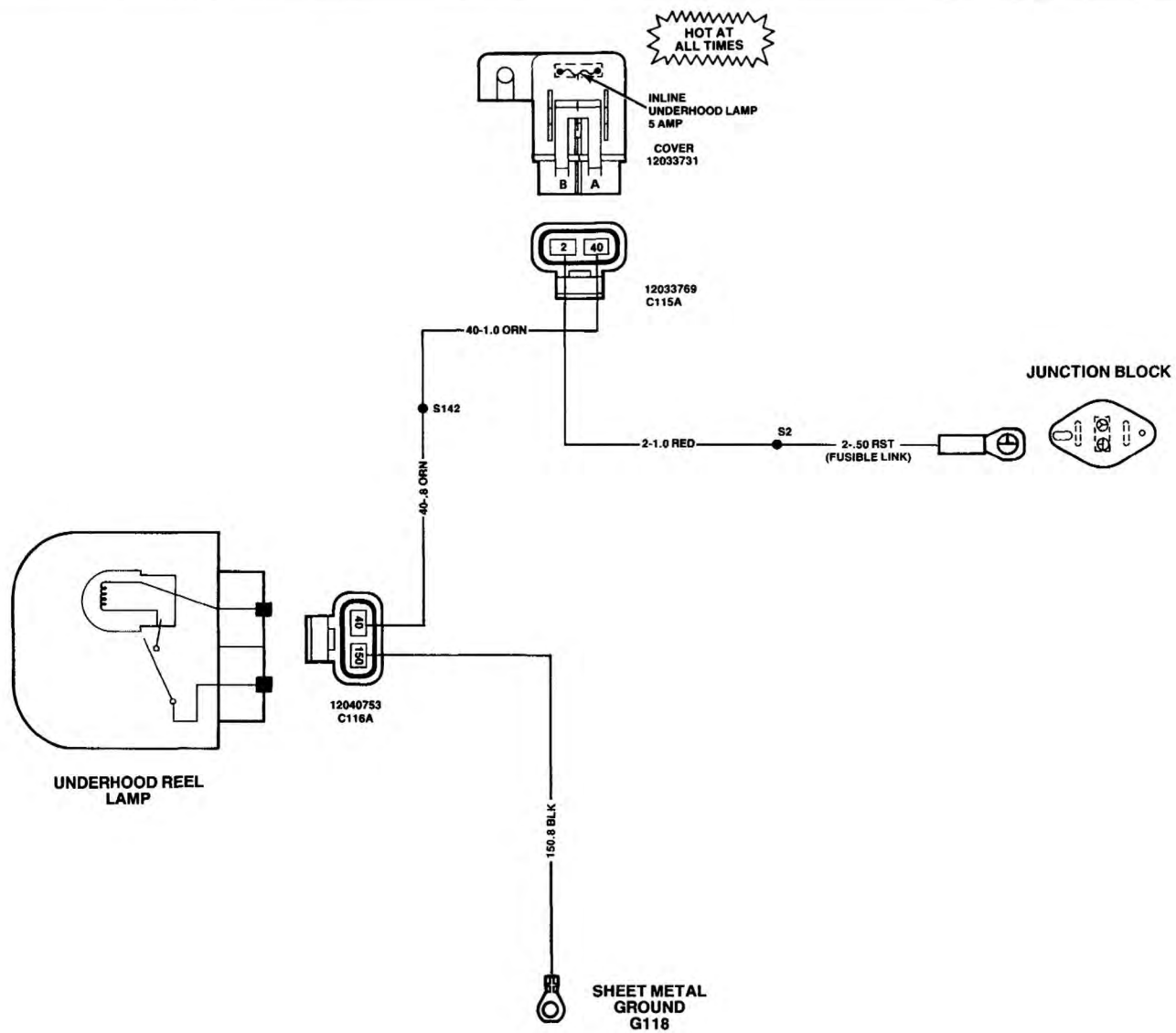
**UNDERHOOD LAMP DOES NOT WORK**

TEST	RESULT	ACTION
1. Connect a test lamp from ORN (40) wire to BLK (150) wire at underhood lamp connector C116A.	Test lamp lights.	REPLACE underhood lamp bulb.
	Test lamp does not light.	GO to step 2.
2. Connect test lamp to RED (2) wire at in-line fuse connector C115A to ground.	Test lamp lights.	REPLACE in-line fuse.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire or fusible link.









**RPO LEGEND**  
TR9 — LAMP GROUP

## CIRCUIT OPERATION

The RADIO Fuse provides main power to the Radio and to the Power Antenna. With the Ignition Switch in ACCY or RUN, voltage is applied through the RADIO Fuse and the YEL wire to the On/Off Switch in the Radio. The On/Off Switch is located in the Radio (without Cassette) or Radio Control Head (with Cassette). The circuit is grounded at Bus Bar Ground. With the On/Off Switch closed, voltage is applied to the Solid State Radio circuits to ground. Two wires connect each speaker to the Radio. The ETR Radio has two inputs that other models do not have: Display Dim Signal and Clock Power.

The ETR model is an AM/FM Radio that changes sta-

tions electronically. The frequency of preselected stations can be stored in the electronic memory. The ETR model also provides a digital display of time or station frequency. As in other models, the Panel Lamp Switch controls panel lamp dimming. In the ETR model, dimming is also controlled by the Radio itself by means of the DIM Display Input Signal.

The ETR model's Clock memory and Radio and memory functions are powered at all times through the HORN/DM Fuse. If power to the ETR model is cut off — by disconnecting the Battery, for example — the operator must reset the memory functions when power is restored.

## COMPONENT LOCATION

		Page	Figure
Bus Bar Ground	LH side, behind I/P	188	74
Fuse Block	Under LH side of I/P, above kick panel	190	86
Headlamp Switch	LH side of I/P	190	86
Radio Receiver	Center of I/P	190	86
Speaker, Front	Top center of I/P	190	84
Speaker, Left Front	LH side of I/P	190	84
Speaker, Left Rear	LH rear of passenger compartment	190	85
Speaker, Right Front	RH side of I/P	190	84
Speaker, Right Rear	RH rear of passenger compartment	190	85
C202	At headlamp switch	190	86
C214A	At right front speaker	190	84
C215A	At left front speaker	190	84
C239	Behind radio, center of I/P	190	86
C240	At radio	190	84
C241	At radio	190	86
C242	At radio	190	84
C243	At front speaker	190	84
C435	At right rear speaker	190	85
C436	At left rear speaker	190	85
S201	I/P harness, behind LH side of I/P	166	4
S209	I/P harness, behind I/P cluster	166	4

## TROUBLESHOOTING CHART—RADIO

### RADIO DOES NOT APPEAR TO WORK (NO DISPLAY LIGHTS, NO SOUND)

TEST	RESULT	ACTION
1. Disconnect radio connector C241 and place ignition switch to RUN. Connect voltmeter from YEL (43) wire at radio connector C241 to ground.	Battery voltage.	GO to step 2.
	No voltage.	CHECK condition of fuse (RADIO). If fuse is good, LOCATE and REPAIR open in YEL (43) wire.
2. Connect voltmeter from YEL (43) wire to BLK (150) wire at radio connector C241.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from radio to bus bar ground.

### CLOCK DOES NOT OPERATE (RPO UM6)

TEST	RESULT	ACTION
Disconnect radio connector C239. Connect voltmeter from ORN (40) wire at radio connector C239 to ground.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	CHECK condition of fuse HORN/DM. If fuse is good, LOCATE and REPAIR open in ORN (40) wire.

### PANEL LAMP DOES NOT COME ON

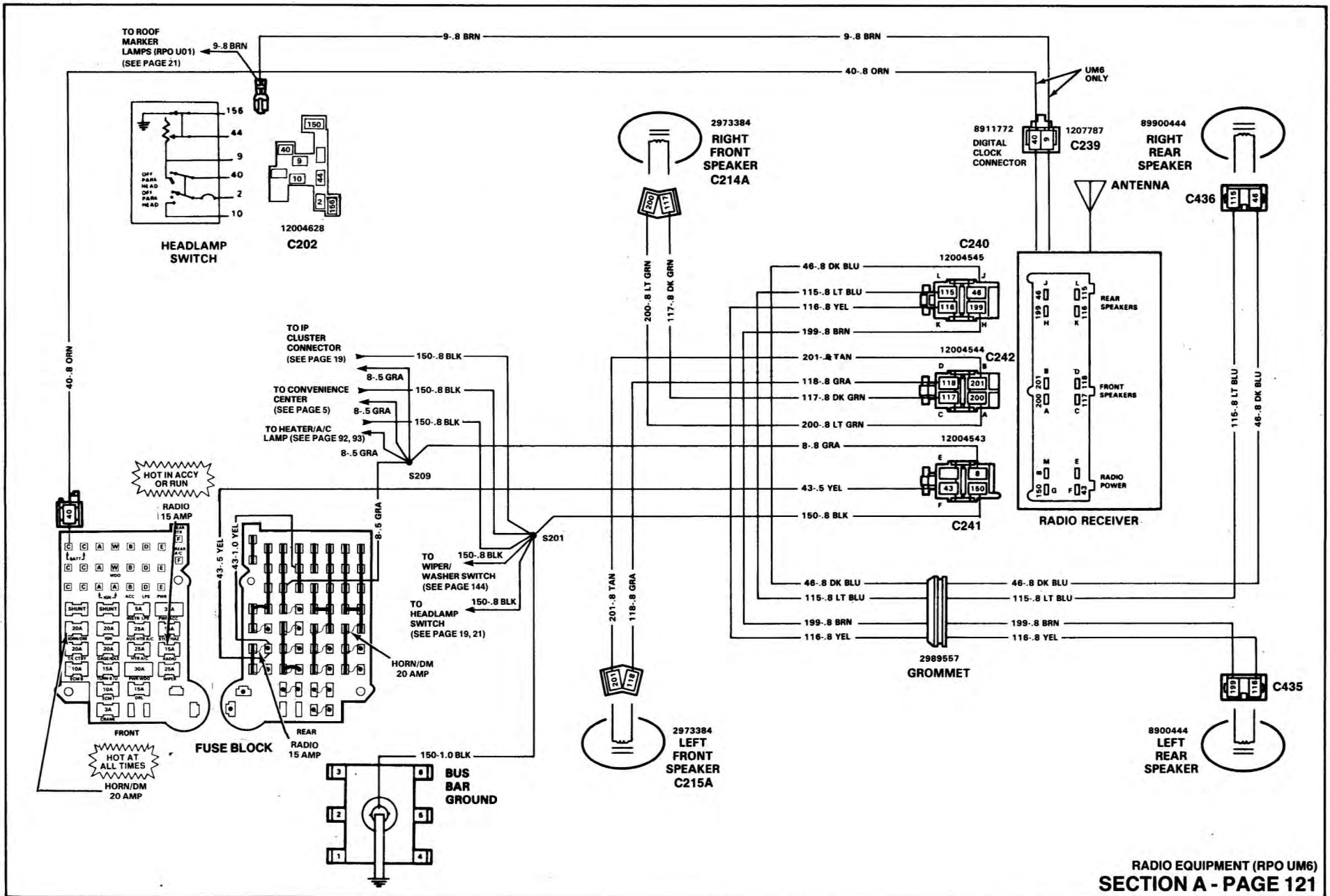
TEST	RESULT	ACTION
Disconnect radio connector C241. Place light switch to PARK and panel dimmer switch to HIGH. Connect voltmeter from GRY (8) wire at radio connector C241 to ground.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	CHECK condition of fuse (INST LPS). If fuse is good, LOCATE and REPAIR open in GRY (8) wire from radio to fuse block.

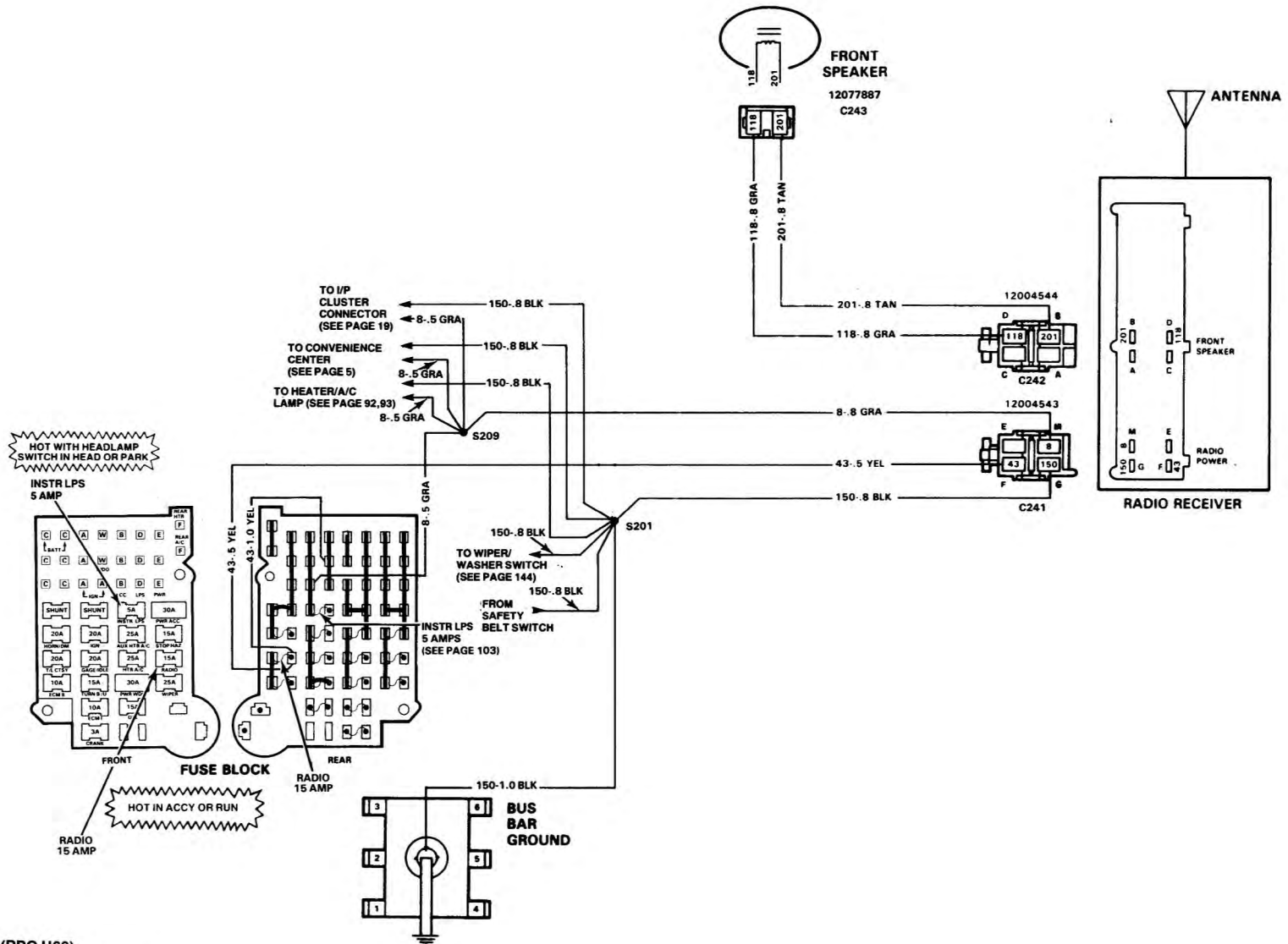
### DISPLAY DIMMING FUNCTION WILL NOT OPERATE (RPO UM6)

TEST	RESULT	ACTION
Disconnect radio connector C239. Place headlamp switch to PARK. Connect voltmeter from BRN (9) wire at radio connector C239 to ground.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	LOCATE and REPAIR open in BRN (9) wire from radio to headlamp switch.

### NO SOUND OR DISTORTED SOUND FROM A SPEAKER

TEST	RESULT	ACTION
1. Disconnect suspected speaker connector. Set analog ohmmeter on RX1 scale. Connect ohmmeter across speaker terminals.	Speaker pops.	GO to step 2.
	No noise.	REPLACE speaker.
2. Place ignition switch to RUN and turn radio ON. Tune radio to a strong signal. Connect voltmeter across outputs for suspect speaker.	Varying around 1 volt AC.	LOCATE and REPAIR speaker wires between radio and speaker.
	No voltage or greater than 1 volt AC.	REMOVE radio and send in for repairs.





AM RADIO (RPO U63)  
SECTION A - PAGE 122

**BLANK**

## CIRCUIT OPERATION

With the Ignition Switch in RUN, voltage is applied to the Rear Defogger Control. When the Rear Defogger Control Switch is moved to the ON position, voltage is then applied to the Rear Defogger Timer Relay. The contact closes, which provides voltage to the ON Indicator and the Rear Defogger. The rear window will become warm to remove fog from the surface of the window.

The contact in the Rear Defogger Control will stay closed until the Rear Defogger Control Switch is turned off, or the timer cycle is complete.

The first time the Rear Defogger Switch is activated, the Timer-Relay will allow the Rear Defogger to operate for 10 minutes. Each time after the Rear Defogger Switch is activated, the Timer-Relay will allow the Rear Defogger to operate for a maximum of 5 minutes. The Timer-Relay will reset to 10 minutes when the Ignition Switch is turned OFF and then back to the RUN position.

The Timer also shuts off at any time the Rear Defogger Control On-Off Switch is depressed to OFF.

## COMPONENT LOCATION

Page — Figure

Bus Bar Ground	LH side of I/P, above kick panel	188	74
Fuse Block	LH side of I/P, above kick panel	188	74
Rear Window Defogger Switch	Center of I/P	188	74
Rear Window Heater	In LH panel door window	188	77
Rear Window Heater	In rear window glass	188	76
Timer Relay	Under fuse block	188	74
C198	LH side of engine compartment	188	74
C223	At timer relay	188	74
C224	At rear window defogger switch	188	74
C225	At bus bar ground	188	74
C226	Near bus bar ground	188	74
C231	In LH kick panel, below "A" pillar	188	74
C400	LH rear, near frame rail	188	75
C401	In LH rear of vehicle	188	77
C402	In LH rear of vehicle	188	77
C403	In rear RH side of vehicle	188	76
C404	In rear RH side of vehicle	188	76
C909	In LH side of tailgate	188	75
C910	In top LH side of tailgate	188	75
C911	In LH rear door	188	77
C912	In RH rear door	188	76
C913	In LH rear door	188	77
C914	In LH rear door	188	77
C915	In RH rear door	188	76
G400	Rear top LH side of vehicle	188	77
S400	Rear top LH side of vehicle	188	77
S401	Rear top LH side of vehicle	188	77

## TROUBLESHOOTING CHART—REAR DEFOGGER

### REAR WINDOW DEFOGGER DOES NOT WORK AND ON INDICATOR DOES NOT LIGHT

TEST	RESULT	ACTION
1. Place ignition switch in RUN position. Connect test lamp from ORN/BLK (60) at timer relay connector C223 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of circuit breaker (PWR ACC). If circuit breaker is good, LOCATE and REPAIR open in ORN/BLK (60) wire.
2. Connect test lamp from PNK/BLK (39) wire at rear window defogger switch connector C224 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	CHECK condition of fuse (IGN). If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire.
3. Connect test lamp from PNK/BLK (39) and BLK (150) wires at rear window defogger switch connector C224.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire.
4. Place rear window defogger switch ON and hold. Connect test lamp from LT BLU (292) wire at rear window defogger switch connector C224 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	REPLACE rear window defogger switch.
5. Place rear window defogger switch ON and hold. Connect test lamp from PPL/WHT (293) connector at timer relay to ground.	Test lamp does not light.	REPLACE timer relay.

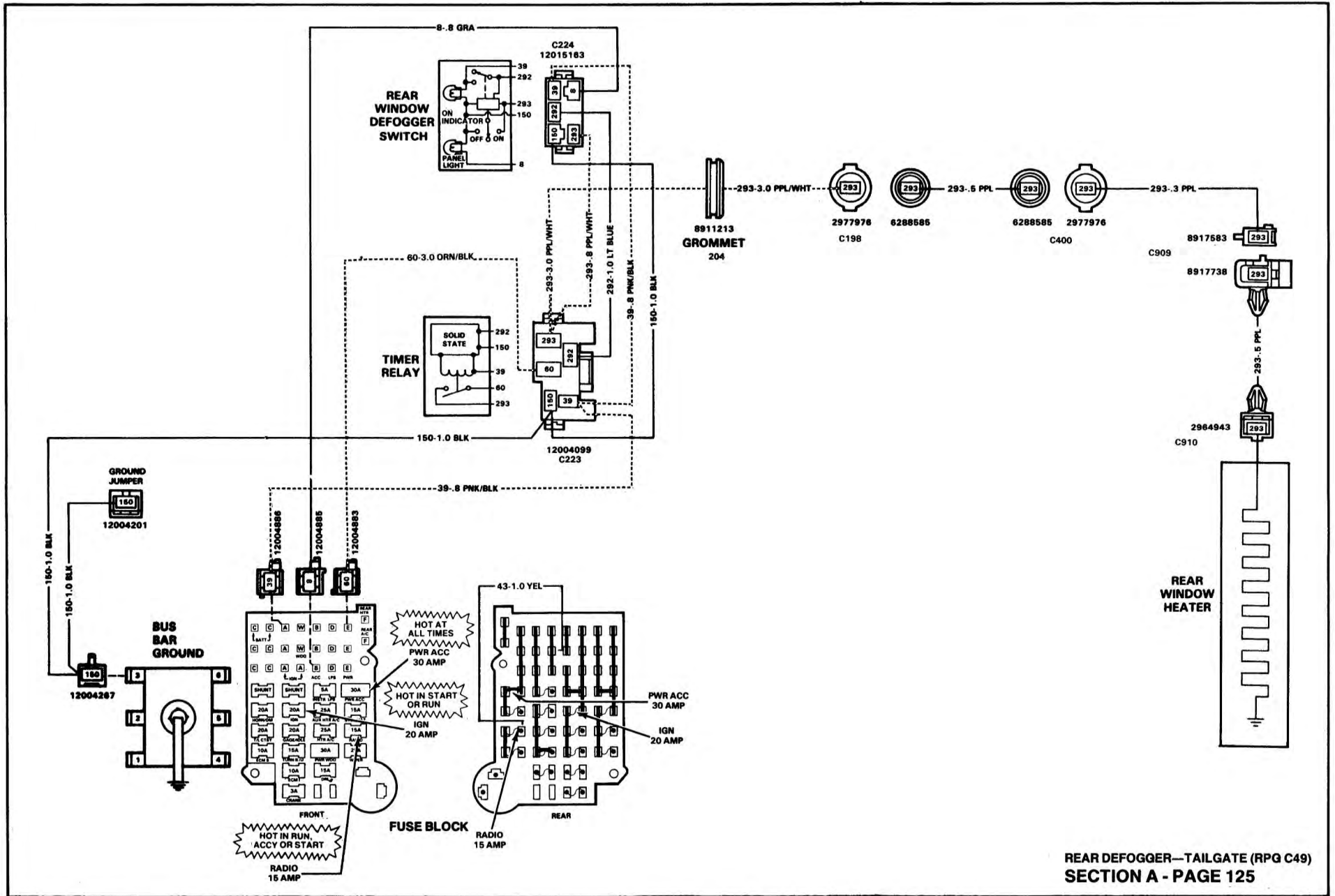
### ON INDICATOR WORKS BUT REAR WINDOW DEFOGGER DOES NOT DEFROST

TEST	RESULT	ACTION
1. Place ignition switch in RUN and rear defogger switch ON. Connect test lamp from PPL (293) wire to ground (tailgate models) or PPL/WHT (293) wire at rear window defogger to ground (panel door models).	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PPL and PPL/WHT (293) wires.
2. Connect test lamp from PPL (293) to ground wires at rear window defogger (tailgate models) or PPL/WHT (293) to ground G400 wires at rear window defogger (panel door models).	Test lamp lights.	REPAIR rear defogger as required.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire.

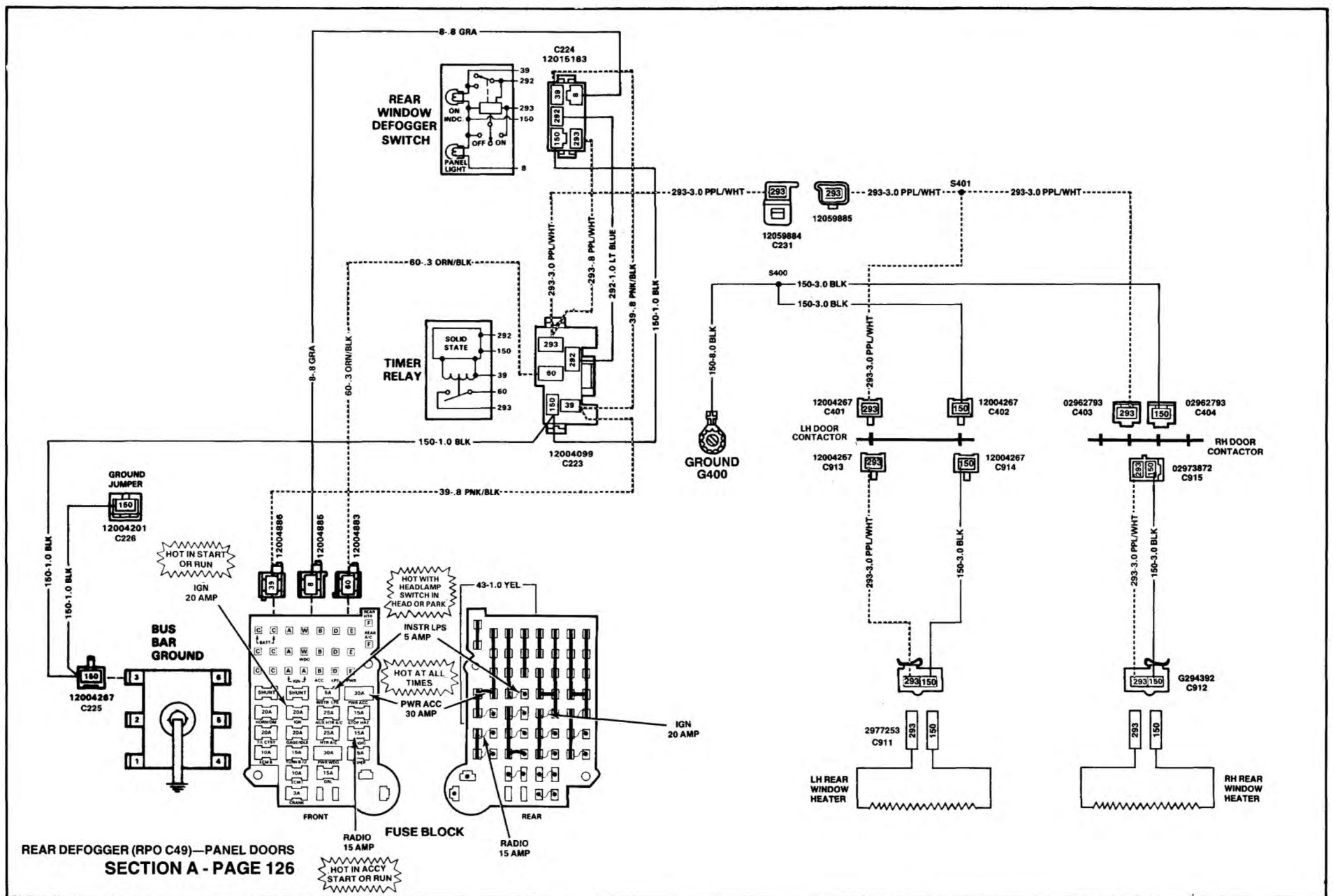
### REAR DEFOGGER PANEL LAMP DOES NOT WORK

TEST	RESULT	ACTION
Turn headlamps ON and position dimmer control to BRIGHT. Connect test lamp from GRA (8) wire at rear window defogger switch connector C224 to ground.	Test lamp lights.	REPLACE panel light bulb.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (8) wire.





REAR DEFOGGER—TAILGATE (RPG C49)  
SECTION A - PAGE 125



## CIRCUIT OPERATION

A permanent magnet (PM) motor operates each of the Power Windows. Each Motor raises or lowers the glass when voltage is supplied to it. The direction the Motor turns depends on the polarity of the supply voltage. The Switches control the supply voltage polarity.

The Master Door Lock/Power Window Switch Assembly controls all of the Motors. (except Tailgate Window Motor). Each window also has its own control switch.

Each Motor is protected by a built-in circuit breaker. If a Window Switch is held too long with the window obstructed or after the window is fully up or down, the circuit breaker opens the circuit. The circuit breaker resets automatically as it cools.

When the Ignition Switch is in RUN, or ACCY, battery voltage is applied to the Master Door Lock/Power Window Switch Assembly, the PWR WDO Circuit Breaker, and the PNK wires. (ORN/BLK wire for Rear Window.)

When any of the UP Switches are operated, battery voltage is applied to the Window Motor through the DK BLU (TAN/WHT wire for Rear Window) wire. The Window Motor is grounded through the DN contact. The Motor runs to drive the window up. When any of the DN Switches are operated, battery voltage is applied to the Window Motor in the opposite direction through the BRN wire. (LT BLU wire for Rear Window). The Window Motor

is grounded through the UP contact. The Motor runs to drive the window down.

## WINDOW SWITCH OPERATION

When the Ignition Switch is in RUN or ACCY, battery voltage is applied to the Window Switch through the PWR WDO Circuit Breaker and the PNK wires to terminal 76. When the UP Switch in the Window Switch is operated, battery voltage is applied to the Window Motor through the DK BLU wire. (TAN/WHT wire for Rear Window). The Motor is grounded through the BRN (LT BLU for Rear Window) wire, the DN contact in the Window Switch, the TAN wire and the DN contact in the Master Door Lock/Power Window Switch Assembly. (Rear Window grounds at motor). The Motor runs to drive the window up. When the DN switch in the Window Switch is operated, battery voltage is applied to the Window Motor in the opposite direction through the BRN (LT BLU for Rear Window) wire. The Motor is grounded through the DK BLU wire, the UP contact in the Window Switch, the DK BLU/WHT wire and the UP contact in the Master Door Lock/Power Window Switch Assembly. The Motor runs to drive the window down.

## COMPONENT LOCATION

		Page	Figure
Bus Bar Ground	LH side, under I/P	185	67
Cut-out Switch (Suburban)	Top LH side of tailgate	187	73
Cut-out Switch (Utility)	Top RH side of tailgate	187	72
Fuse Block	LH side, under I/P	185	67
Grommet 500	LH side, at kick panel	185	67
Grommet 600	RH side, at kick panel	185	67
Tailgate Window Motor (Utility)	Center of tailgate	187	72
Tailgate Window Switch	I/P panel	—	—
Tailgate Window Switch — Key Operated	Center of tailgate	187	72
Window Motor, LH Front	Bottom of LH front door	186	69
Window Motor, LH Rear	Center of LH rear door	186	71
Window Motor, RH Front	Bottom of RH front door	186	69
Window Motor, RH Rear	Center of RH rear door	186	71
Window Switch, LH Front	Top of door panel	186	69
Window Switch, LH Rear	Top of door panel	186	71
Window Switch, RH Front	Top of door panel	186	69
Window Switch, RH Rear	Top of door panel	186	69
C125A	LH side of engine compartment	185	66
C126A	LH side of engine compartment	185	66
C232	At tailgate window switch, in I/P	185	66
C314	In RH kick panel, under I/P	185	67
C317	In LH kick panel, under I/P	185	67
C405	In rear, near LH frame	187	73
C406	In rear, near LH frame	187	73
C407	In rear, near LH frame	187	72
C408	In rear, near LH frame	187	72
C500	In bottom of LH door, at window motor	186	69
C501	In LH front door, at window switch	186	69
C504	In LH front door, at window switch	186	69
C510	In LH rear door, at window switch	186	71
C511	In LH rear door, at window motor	186	71
C600	In bottom of RH door, at window motor	186	69
C603	In RH front door, at window switch	186	69

## COMPONENT LOCATION

		Page	Figure
C605	In RH rear door, at window switch	186	71
C606	In RH rear door, at window motor	186	71
C916 (Suburban)	At key operated tailgate under switch	187	73
C916 (Utility)	At key operated tailgate window switch	187	72
C917 (Suburban)	At cut-out switch, in tailgate	187	73
C917 (Utility)	At cut-out switch, in rear tailgate	187	72
C918	At tailgate window motor	187	72
G401	LH side, near rear cross member	187	73
G904	In tailgate, at window motor	187	73
S309	Near LH kick panel	186	69
S311	Near LH kick panel	186	69
S908 (Suburban)	In tailgate window harness	187	73
S908 (Utility)	In tailgate window harness	187	72
S909 (Suburban)	In tailgate window harness	187	73
S909 (Utility)	In tailgate window harness	187	72

## PRELIMINARY CHECKS:

Check condition of PWR WDO circuit breaker. If circuit breaker is in good condition, use the following diagnostic procedures.

## TROUBLESHOOTING CHART—POWER WINDOWS

### POWER WINDOW(S) DO NOT OPERATE OR ONLY GO IN ONE DIRECTION

TEST	RESULT	ACTION
1. Place ignition switch in ACC position. Connect test lamp from PNK (76) wire at affected window switch connector C504, C510, C603 or C605 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from affected window switch to fuse block.
2. Connect test lamp from PNK (76) wire to BLK (150) wire at affected window switch connector C504.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from affected window switch to bus bar ground.
3. Move and hold affected window switch to UP position. Connect test lamp from BRN (165, 667, or 669) wire at affected window switch connector C504, C510, C603 or C605 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE affected window switch.
4. Connect test lamp from BRN (165, 667 or 669) wire to DK BLU (164, 666, or 668) wire at affected window switch connector C504, C510, C603 or C605.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	REPLACE affected window switch.
5. Connect test lamp from BRN (165, 667 or 669) wire to affected window motor connector C500, C511, C600 or C606 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (165, 667 or 669) wire from affected window motor to window switch.
6. Connect test lamp from BRN (165, 667 or 669) wire to DK BLU (164, 666, or 668) wire at affected window motor connector C500, C511, C600 or C606.	Test lamp lights.	REPLACE affected window motor.
	Test lamp does not light.	LOCATE and REPAIR open in DK BLU (164, 666 or 668) wire between affected window motor and window switch.

**POWER WINDOWS ONLY OPERATE FROM DRIVER'S SIDE WINDOW SWITCH**

TEST	RESULT	ACTION
1. Place ignition switch in ACCY position. Connect test lamp from PNK (76) wire at affected window switch connector C603, C605 or C510 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from affected window switch to fuse block.
2. Move affected window switch to UP position. Connect test lamp from BRN (667 or 669) wire at affected window switch connector C603, C605 or C510 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE affected window switch.
3. Move affected window switch to DOWN position. Connect test lamp from DK BLU (666 or 668) wire at affected window switch connector C603, C605 or C510 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE affected window switch.

**POWER WINDOWS DO NOT OPERATE FROM DRIVER'S SIDE WINDOW SWITCH**

TEST	RESULT	ACTION
1. Place ignition switch to ACCY position. Position and hold affected window switch to UP. Connect test lamp from BRN (667 or 669) wire at affected window motor connector C600, C606 or C511 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. Connect test lamp from BRN (667 or 669) wire to DK BLU (666 or 668) wire at affected window motor connector C600, C606 or C511.	Test lamp lights.	REPLACE affected window motor.
	Test lamp does not light.	GO to step 3.
3. Connect a test lamp from PNK (76) wire at affected window switch connector C504 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from affected window switch to fuse block.
4. Connect test lamp from PNK (76) wire to DK BLU/WHT (166), DK GRN (168) or LT GRN (170) wire at affected window switch connector C504.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	GO to step 5.
5. Connect test lamp from PNK (76) wire to BLK (150) wire at affected window switch connector C504.	Test lamp lights.	REPLACE affected window switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from affected window switch to bus bar ground.
6. Connect test lamp from PNK (76) wire to TAN (167), PPL (169) or PPL/WHT (171) wire at affected window switch connector C504.	Test lamp lights.	GO to step 8.
	Test lamp does not light.	GO to step 7.
7. Connect test lamp from PNK (76) wire to BLK (150) wire at affected window switch connector C504.	Test lamp lights.	REPLACE affected window switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from affected window switch to bus bar ground.

8. Connect test lamp from PNK (76) wire to DK BLU/WHT (166), DK GRN (168) or LT GRN (170) wire and then to TAN (167), PPL (169) or PPL/WHT (171) wire at affected window switch connector C603, C605 or C510.	Test lamp lights at all wires.	REPLACE affected window switch.
	Test lamp lights at only one wire or not at all.	LOCATE and REPAIR open in wires (166, 168, 170, 167, 169 or 171) from affected window switch to left window switch.

**PRELIMINARY CHECKS:**

1. Tailgate should remain closed throughout the diagnosis of the POWER REAR WINDOW circuit.

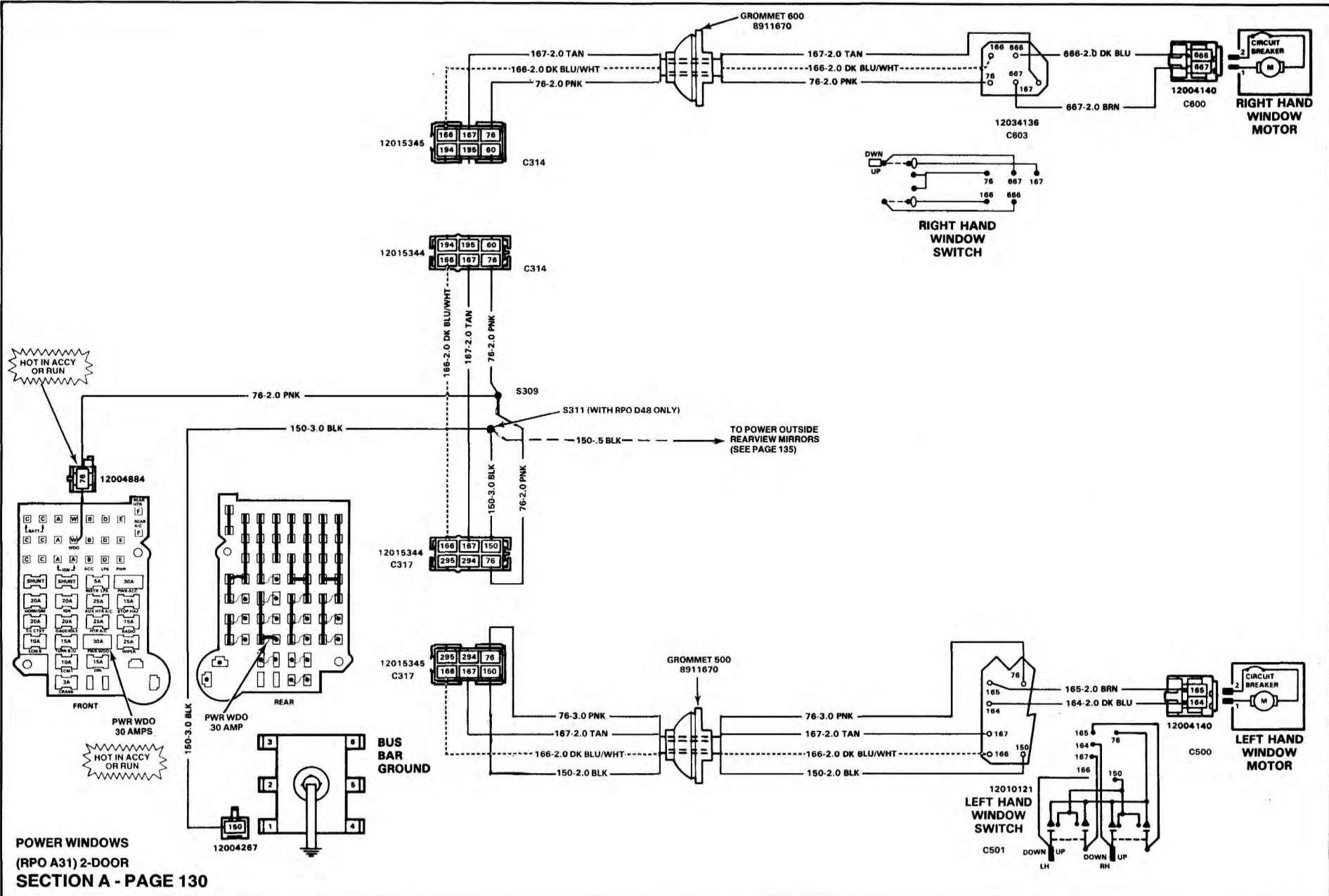
2. CHECK condition of PWR WDO and PWR ACC circuit breakers. If circuit breakers are in good condition, use the following diagnostic procedures.

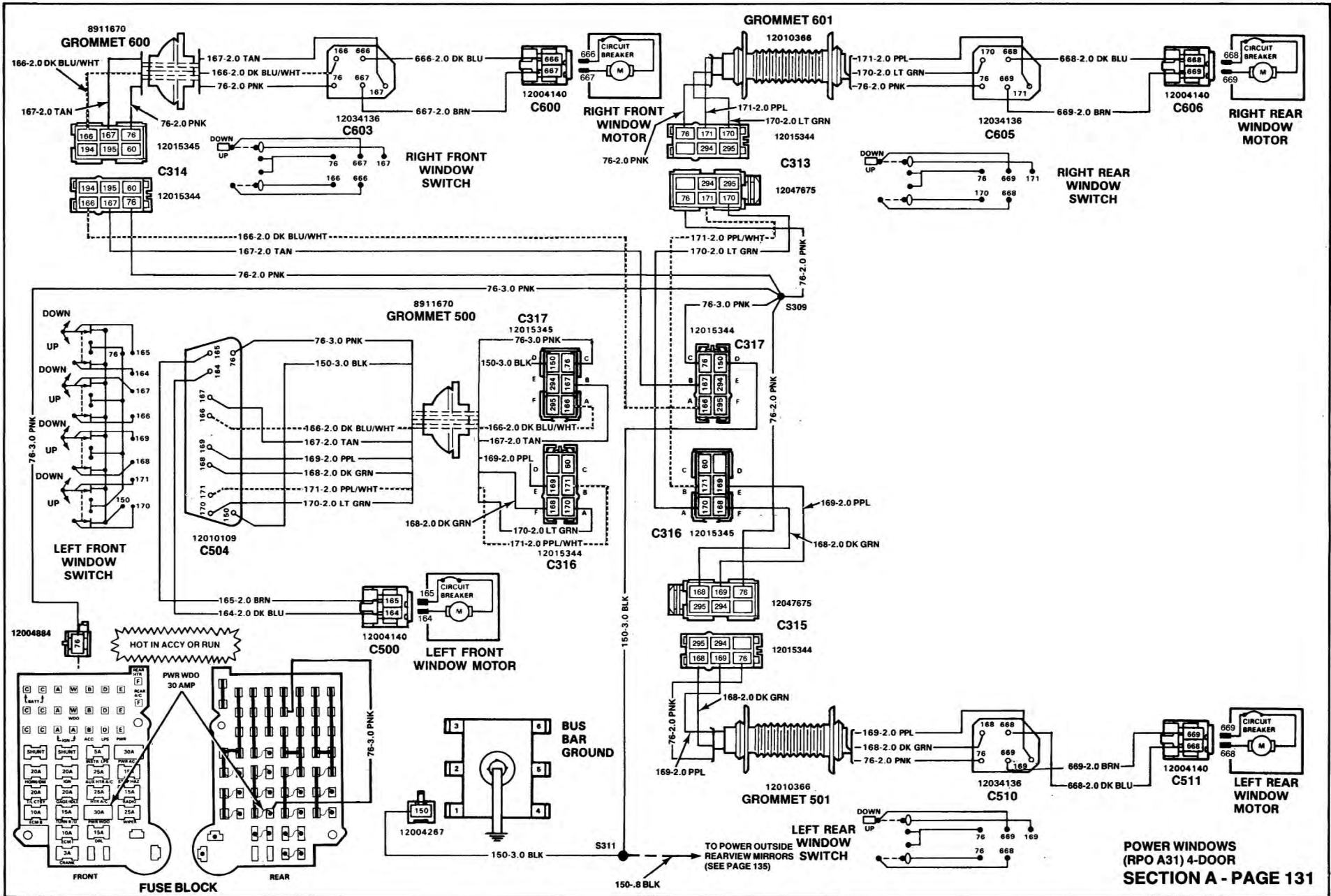
**POWER REAR WINDOW DOES NOT OPERATE FROM TAILGATE WINDOW SWITCH (FRONT)**

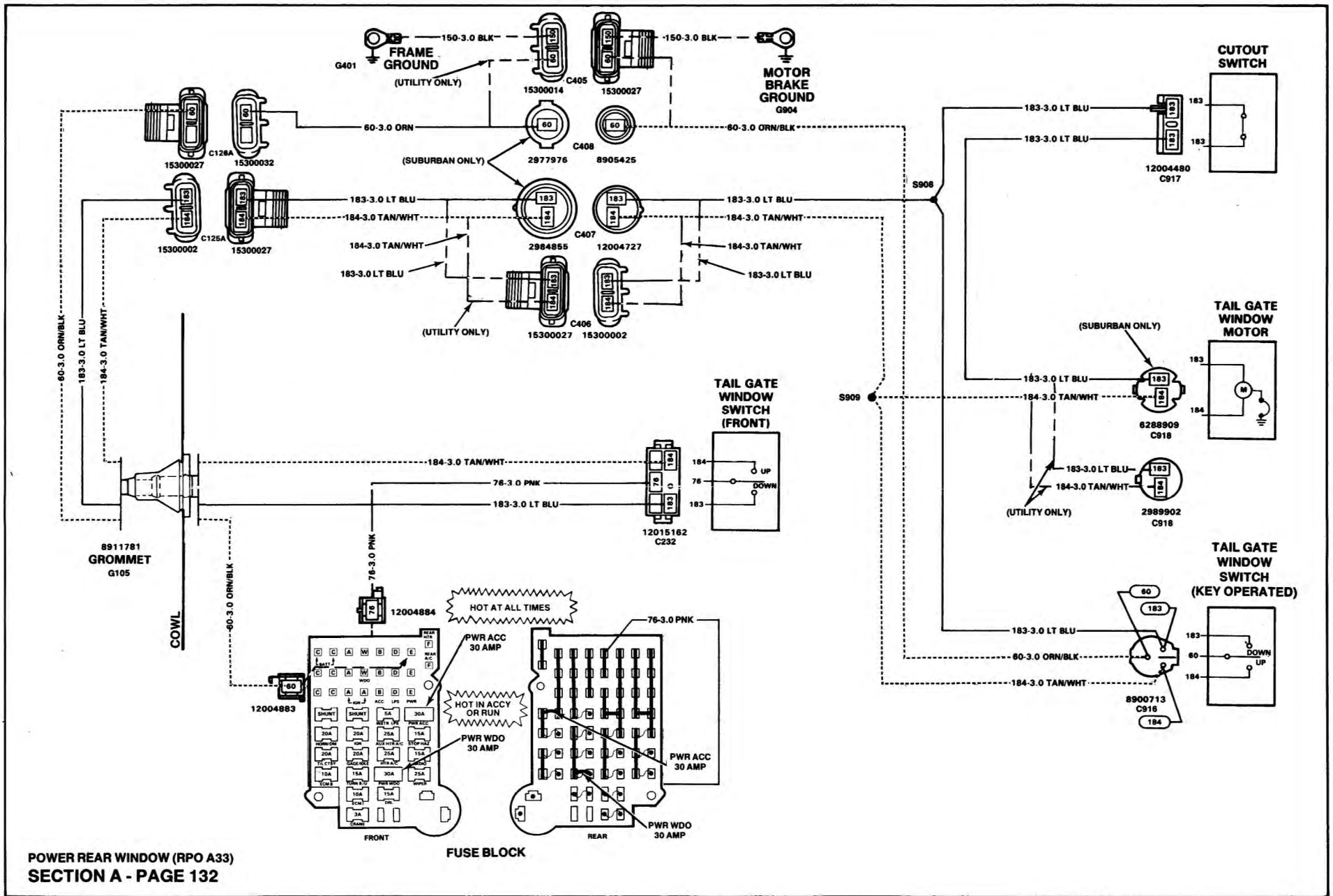
TEST	RESULT	ACTION
1. Place ignition switch in ACC position. Connect a test lamp from PNK (76) wire at tailgate window switch connector C232 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from tailgate window switch to fuse block.
2. Position and hold tailgate window switch in the UP position. Connect a test lamp from TAN/WHT (184) wire at tailgate window switch connector C232 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE tailgate window switch.
3. Position and hold tailgate window switch in the DOWN position. Connect a test lamp from LT BLU (183) wire at tailgate window switch connector C232 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE tailgate window switch.
4. Connect a fused jumper from PNK (76) wire at the tailgate window switch connector C232 to TAN/WHT (184) wire. Then connect a test lamp from TAN/WHT (184) wire at tailgate window motor connector C918 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in TAN/WHT (184) wire between tailgate window motor and tailgate window switch.
5. Connect a fused jumper from PNK (76) wire at the tailgate window switch connector C232 to LT BLU (183) wire. Then connect a test lamp from one LT BLU (183) wire at cut out switch connector C917 to ground. REPEAT for the other LT BLU (183) wire.	Test lamp lights at both wires.	GO to step 6.
	Test lamp does not light at one or both wires.	LOCATE and REPAIR open in LT BLU (183) wire from cut out switch to tailgate window switch. If wire is in good condition, REPLACE cut out switch.
6. Connect a test lamp from LT BLU (183) at tailgate window motor connector C918 to ground.	Test lamp lights.	REPLACE tailgate window motor.
	Test lamp does not light.	LOCATE and REPAIR open in LT BLU (183) wire between tailgate motor and cutout switch. If wire is in good condition, REPLACE tailgate window motor.

**POWER REAR WINDOW DOES NOT OPERATE FROM TAILGATE WINDOW SWITCH  
(KEY-OPERATED)**

TEST	RESULT	ACTION
1. Connect a test lamp from ORN (60) wire at tailgate window switch connector C916 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (60) wire from tailgate window switch to fuse block.
2. Position and hold tailgate window switch in UP position. Connect a test lamp from TAN/WHT (184) wire at tailgate window switch connector C916 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE tailgate window switch.
3. Connect a test lamp from TAN/WHT (184) wire at tailgate window motor connector C918 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in TAN/WHT (184) wire from window motor to tailgate window switch.
4. Position and hold tailgate window switch in DOWN position. Connect a test lamp from LT BLU (183) wire at cut out switch connector C917 to ground. REPEAT at other LT BLU (183) wire.	Test lamp lights at both wires.	GO to step 5.
	Test lamp does not light at first wire only.	LOCATE and REPAIR open in LT BLU (183) wire from cutout switch to tailgate window switch. If wire is in good condition, REPLACE tailgate window switch.
	Test lamp does not light at second wire only.	REPLACE cutout switch.
5. Connect a test lamp from LT BLU (183) wire at tailgate window motor connector C917 to ground.	Test lamp lights.	REPLACE tailgate window motor.
	Test lamp does not light.	LOCATE and REPAIR open in LT BLU (183) wire from tailgate window motor to cutout switch. If wire is in good condition, REPLACE tailgate window motor.









## CIRCUIT OPERATION

### POWER MIRRORS

Voltage is applied at all times to the Power Outside Rearview Mirror Switch, through the HORN/DM Fuse and an In-Line Auto Fuse.

The mirror assemblies contain two motors. One motor positions the mirror up and down, the other motor positions the mirror to the left or right. By reversing the polarity of the motors, the motors will move the mirrors either up/down or left/right.

### POWER DOOR LOCKS

When a Door Lock Switch is operated, all of the doors will unlock or lock. Each lock can also be operated manually. The locks are operated by reversible motors that receive voltage from the PWR ACC Circuit Breaker. The Door Lock Switches operate to turn the Motors on by applying battery voltage to one of the terminals and ground to the other terminal.

When either Door Lock Switch is moved to the LOCK position, it completes the circuit to the Motors. Voltage is

applied to the GRA wire and to the Door Lock Motors, which are grounded by the TAN wire from the other terminal of the Motor through the other switch contact to the BLK wire and ground. The Motor in each door runs to operate the Door Locks. When the Door Lock Switch is released, the circuit is opened and the Motors turn off.

A similar action occurs with either of the Door Lock Switches closing to the UNLOCK position. Now the TAN wires to the Motors supply battery voltage and the GRA wires are grounded. The polarity of the voltage to the Motors has reversed. The Motors run in the opposite direction to unlock the doors.

The Door Lock Switches are usually closed for just a moment. If the Door Lock Switches are held closed, a circuit breaker in each Motor will open to protect against damage. The circuit breakers close automatically when they cool off.

## COMPONENT LOCATION

Page — Figure

Bus Bar Ground	LH side of I/P, above kick panel	185 — 67
Fuse Block	Under LH side of I/P, above kick panel	185 — 67
Door Lock Motor, LH Front	Rear of LH front door	186 — 69
Door Lock Motor, LH Rear	Rear of LH door	186 — 71
Door Lock Motor, RH Front	Rear of RH front door	186 — 69
Door Lock Motor, RH Rear	Rear of RH rear door	—
Door Lock Relay	Center of cowl	185 — 67
Door Lock Switch, LH Front	LH front door	186 — 70
Door Lock Switch, LH Rear	RH rear door	—
Door Lock Switch, RH Front	RH front door	186 — 70
Door Lock Switch, RH Rear	RH rear door	—
In-Line Auto Fuse	At fuse block	185 — 67
Power Outside Rearview Mirror, LH	On outside of LH front door	—
Power Outside Rearview Mirror, RH	On outside of RH front door	—
Power Outside Rearview Mirror Switch	In top LH front door	186 — 69
Rear Panel Door Lock Motor	In RH rear panel door	186 — 68
C201A	At door lock relay	185 — 67
C209A	At in-line autofuse	185 — 67
C313	RH 'B' pillar	186 — 71
C314	RH kick panel	185 — 67
C315	LH 'B' pillar	186 — 71
C317	LH kick panel	185 — 67
C318	LH kick panel	185 — 67
C320	In RH 'B' pillar	186 — 68
C321	Under I/P	185 — 67
C322	Under I/P	—
C436	In RH rear of vehicle	186 — 68
C502	At front LH door lock switch	186 — 69
C503	At LH front door lock motor	186 — 70
C508	At LH power outside rearview mirror	186 — 69
C509	In LH front door	186 — 69
C512	At rear LH door lock motor	186 — 71
C601	At RH front door lock motor	186 — 70
C602	At front RH door lock switch	186 — 69
C604	At RH power outside rearview mirror	186 — 69

## COMPONENT LOCATION

Page — Figure

C607	At rear RH door lock motor	186 — 71
C926	In RH rear door	186 — 68
C927	In lower part of RH rear door	186 — 68
S217	Under LH side of I/P	185 — 67
S310	In RH kick panel	186 — 69
S312	In LH kick panel	186 — 69
S313	In LH kick panel	186 — 69

### PRELIMINARY CHECKS:

1. Check to see that the HORN/DM, PWR ACC and in-line (C209A) fuses are not blown. Replace if blown.

2. Refer to Section 9 of the 1990 Light Duty Truck Electrical Service Manual for diagnosis and repair of all non-electrical system components.

## TROUBLESHOOTING CHART—POWER MIRRORS

### NEITHER MIRROR IS OPERATIONAL

TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at mirror switch connector C509 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire between mirror switch and fuse block. If none can be found check condition of in-line fuse (C209A) and HORN/DM fuse.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from ORN (40) wire to BLK (150) wire at mirror switch connector C509.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire between mirror switch and bus bar ground.
	Test lamp lights.	REPLACE mirror switch.

### LH MIRROR WILL NOT ADJUST UP AND DOWN

TEST	RESULT	ACTION
Disconnect in-line fuse connector C209A and connector C508 at LH mirror motor. Place ohmmeter on Rx1 scale and connect leads to YEL (88) and LT BLU (82) wires at LH mirror motor connector C508. While holding mirror adjustment switch in the UP and DOWN positions, measure for continuity.	Continuity.	REPLACE LH mirror motor.
	No continuity.	LOCATE and REPAIR open in YEL (88) or LT BLU (82) wires between switch and motor. If none is found, REPLACE switch.

### LH MIRROR WILL NOT ADJUST LEFT AND RIGHT

TEST	RESULT	ACTION
Disconnect in-line fuse connector C209A and connector C508 at LH mirror motor. Place ohmmeter on Rx1 scale and connect leads to WHT (81) and LT BLU (82) wires at LH mirror motor connector C508. While holding mirror adjustment switch in the LEFT and RIGHT positions, measure for continuity.	Continuity.	REPLACE LH mirror motor.
	No continuity.	LOCATE and REPAIR open in WHT (81) or LT BLU (82) wires between switch and motor. If none is found, REPLACE switch.

**RH MIRROR WILL NOT ADJUST UP AND DOWN**

TEST	RESULT	ACTION
Disconnect in-line fuse connector C209A and connector C609 at RH mirror motor. Place ohmmeter on Rx1 scale and connect leads to YEL/BLK (888) and LT BLU/BLK (82) wires at RH mirror motor connector C604. While holding mirror adjustment switch in the UP and DOWN positions, measure for continuity.	Continuity.	REPLACE RH mirror motor.
	No continuity.	LOCATE and REPAIR open in YEL/BLK (888) and LT BLU (82) wires between switch and motor. If none is found, REPLACE switch.

**RH MIRROR WILL NOT ADJUST LEFT AND RIGHT**

TEST	RESULT	ACTION
Disconnect in-line fuse connector C209A and C604 at RH mirror motor. Place ohmmeter on Rx1 scale and connect leads to WHT/BLK (881) and LT BLU/BLK (82) wires at RH mirror motor connector C604. While holding mirror adjustment switch in the LEFT and RIGHT positions, measure for continuity.	Continuity.	REPLACE RH mirror motor.
	No continuity.	LOCATE and REPAIR open in WHT/BLK (881) and LT BLU/BLK (82) wires between switch and motor. If none is found, REPLACE switch.

**TROUBLESHOOTING CHART—POWER DOOR LOCKS  
NONE OF THE DOOR LOCK MOTORS LOCK OR UNLOCK**

TEST	RESULT	ACTION
Connect test lamp from ORN/BLK (60) wire at door lock relay connector C201A to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN/BLK (60) wire between door lock relay and fuse block. Also inspect splice S310 for open wire or REPLACE PWR ACC circuit breaker.
	Test lamp lights.	INSPECT door lock relay for poor ground condition or REPLACE door lock relay.

**ONE DOOR LOCK MOTOR DOES NOT LOCK OR UNLOCK FROM A PARTICULAR SWITCH**

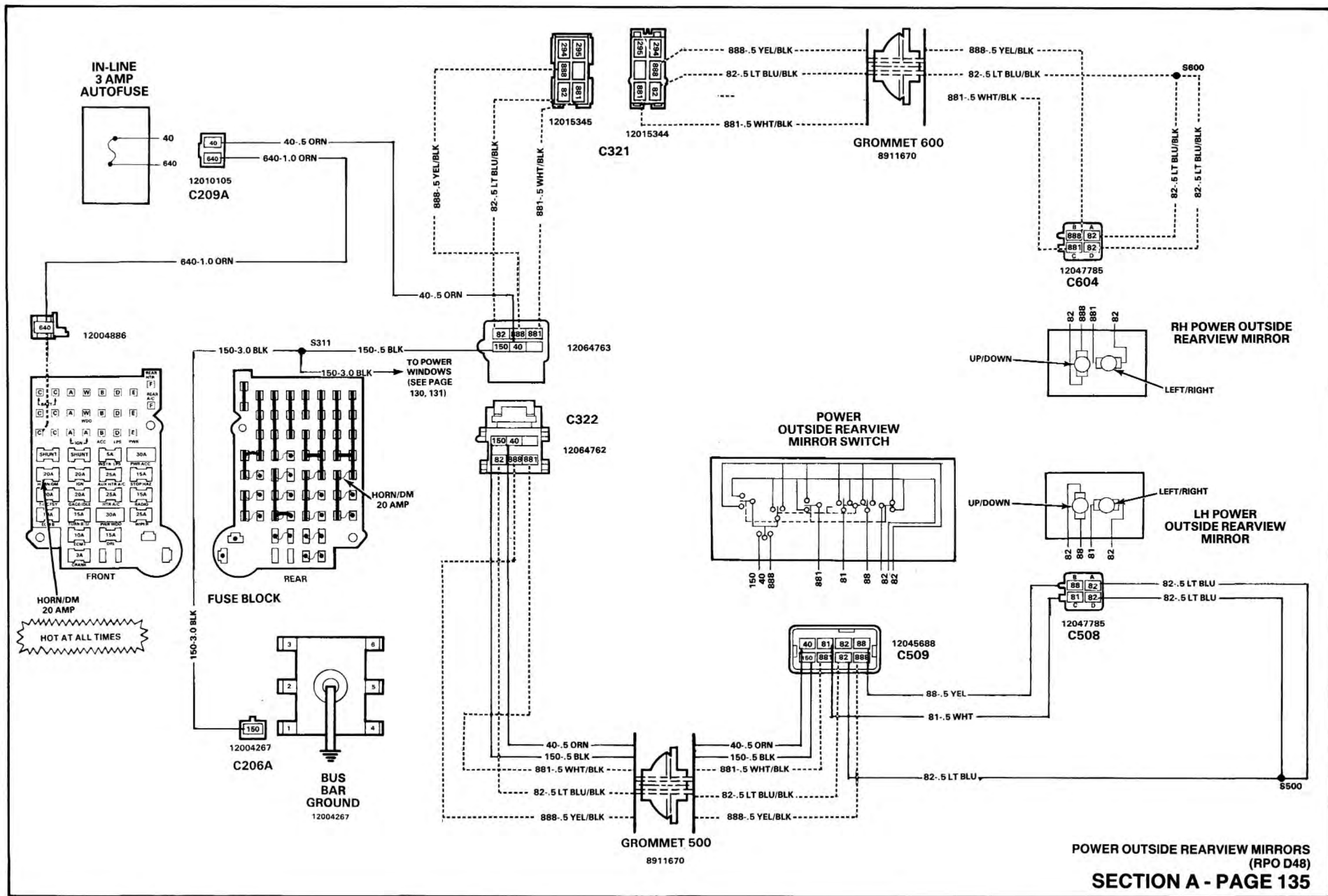
TEST	RESULT	ACTION
1. Connect test lamp from ORN/BLK (60) wire at inoperative switch connector to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN/BLK (60) wire between switch and splice S310.
	Test lamp lights.	If door lock will not lock, go to step 2. If door lock will not unlock, go to step 3.
2. Connect a fused jumper from ORN/BLK (60) wire to LT BLU (195) wire at inoperative switch connector.	Door lock motor runs.	REPLACE door lock switch.
	Door lock motor does not run.	LOCATE and REPAIR open in LT BLU (195) wire between switch and door lock relay.
3. Connect a fused jumper from ORN/BLK (60) wire to BLK/WHT (194) wire at inoperative switch connector.	Door lock motor runs.	REPLACE door lock switch.
	Door lock motor does not run.	LOCATE and REPAIR open in BLK/WHT (194) wire between switch and door lock relay.

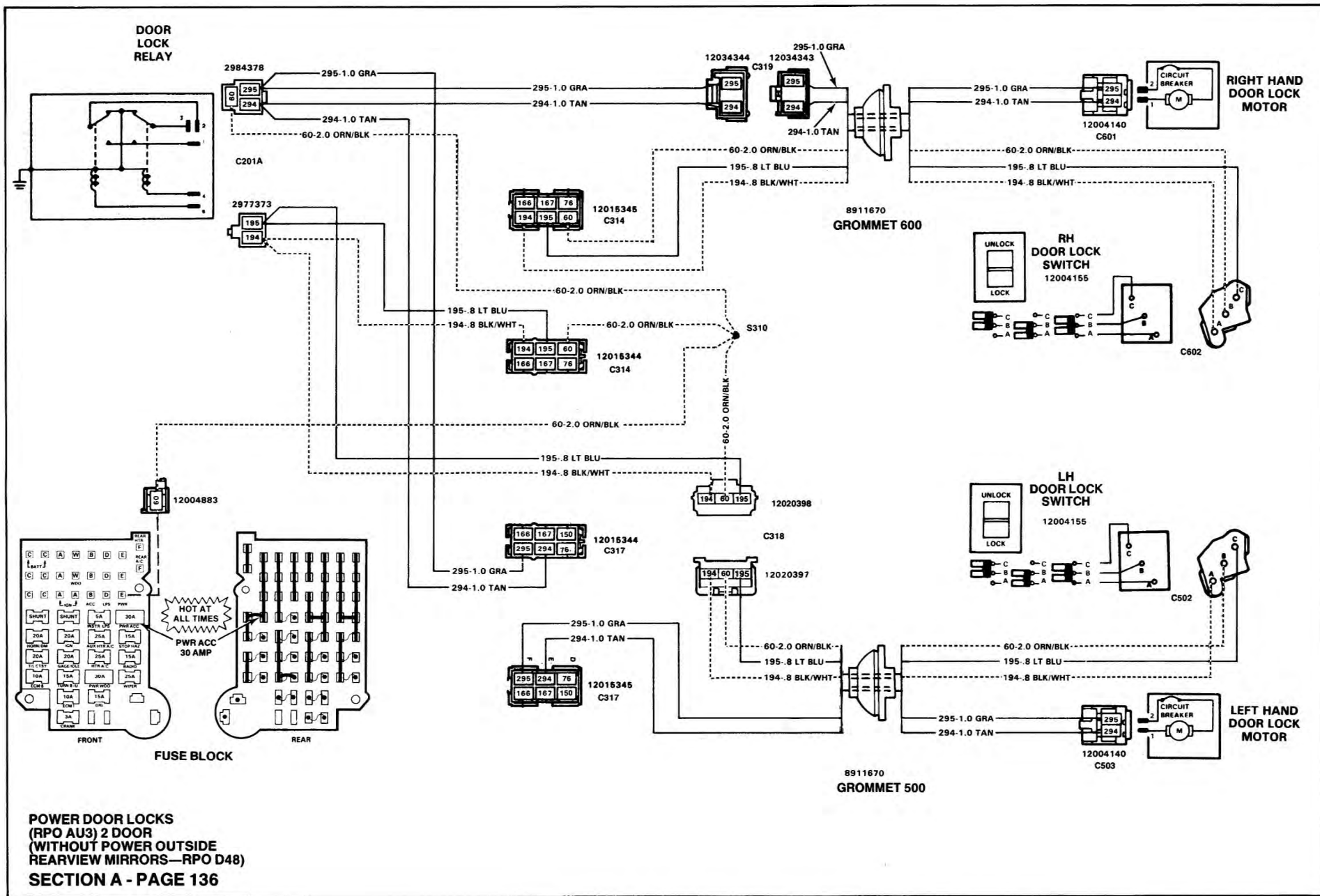
**ONE DOOR LOCK MOTOR DOES NOT OPERATE FROM ANY SWITCH**

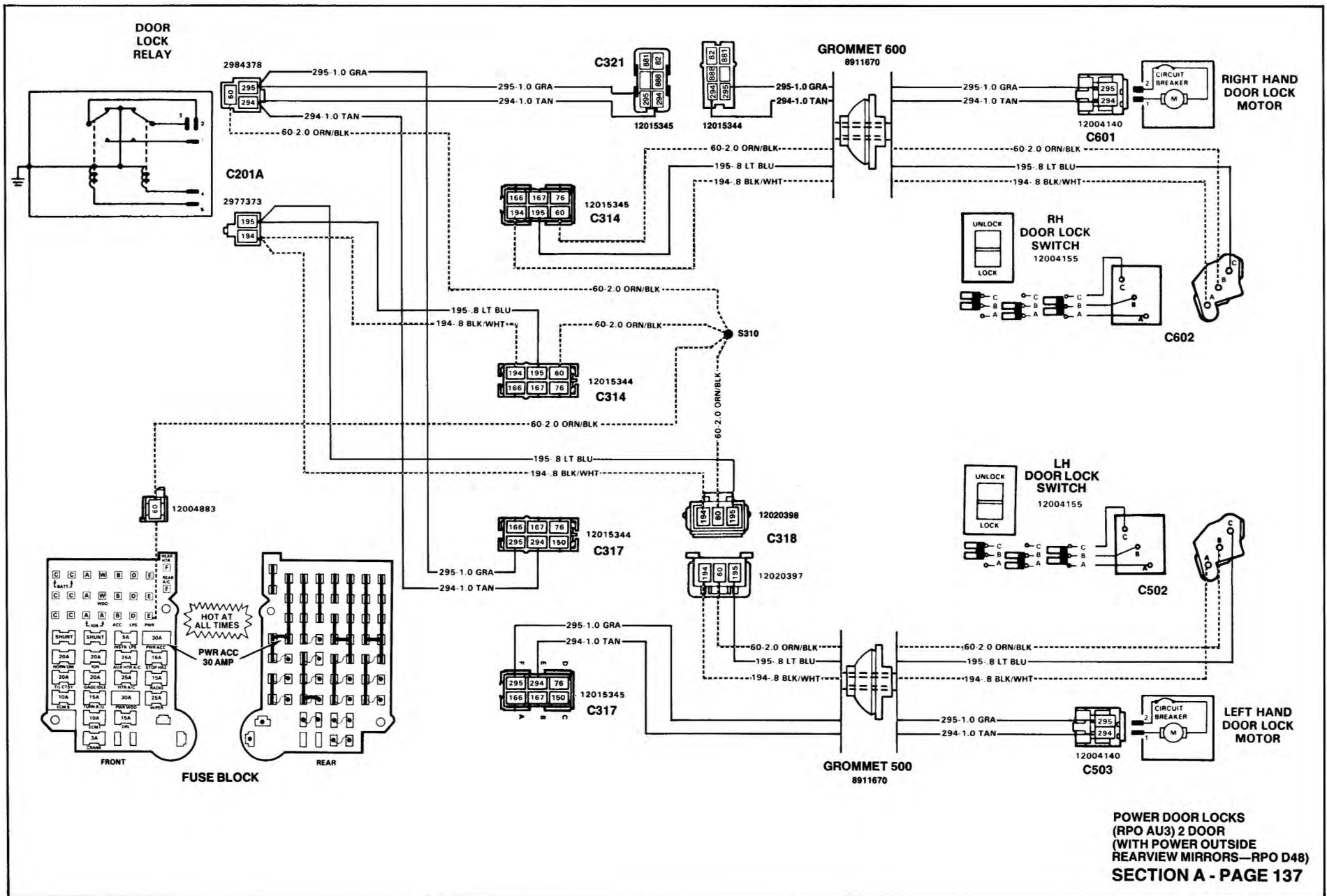
TEST	RESULT	ACTION
1. Connect test lamp from TAN (294) wire to GRA (295) wire at inoperative motor and momentarily place door lock switch in lock or unlock position while observing test lamp.	Test lamp lights.	REPLACE door lock motor.
	Test lamp does not light.	GO to step 2.
2. Connect test lamp from TAN (294) wire at inoperative motor to ground and momentarily place door lock switch to unlock position while observing test lamp.	Test lamp lights.	LOCATE and REPAIR open in GRA (295) wire between inoperative motor connector and splice.
	Test lamp does not light.	LOCATE and REPAIR open in TAN (294) wire between inoperative motor connector and splice.

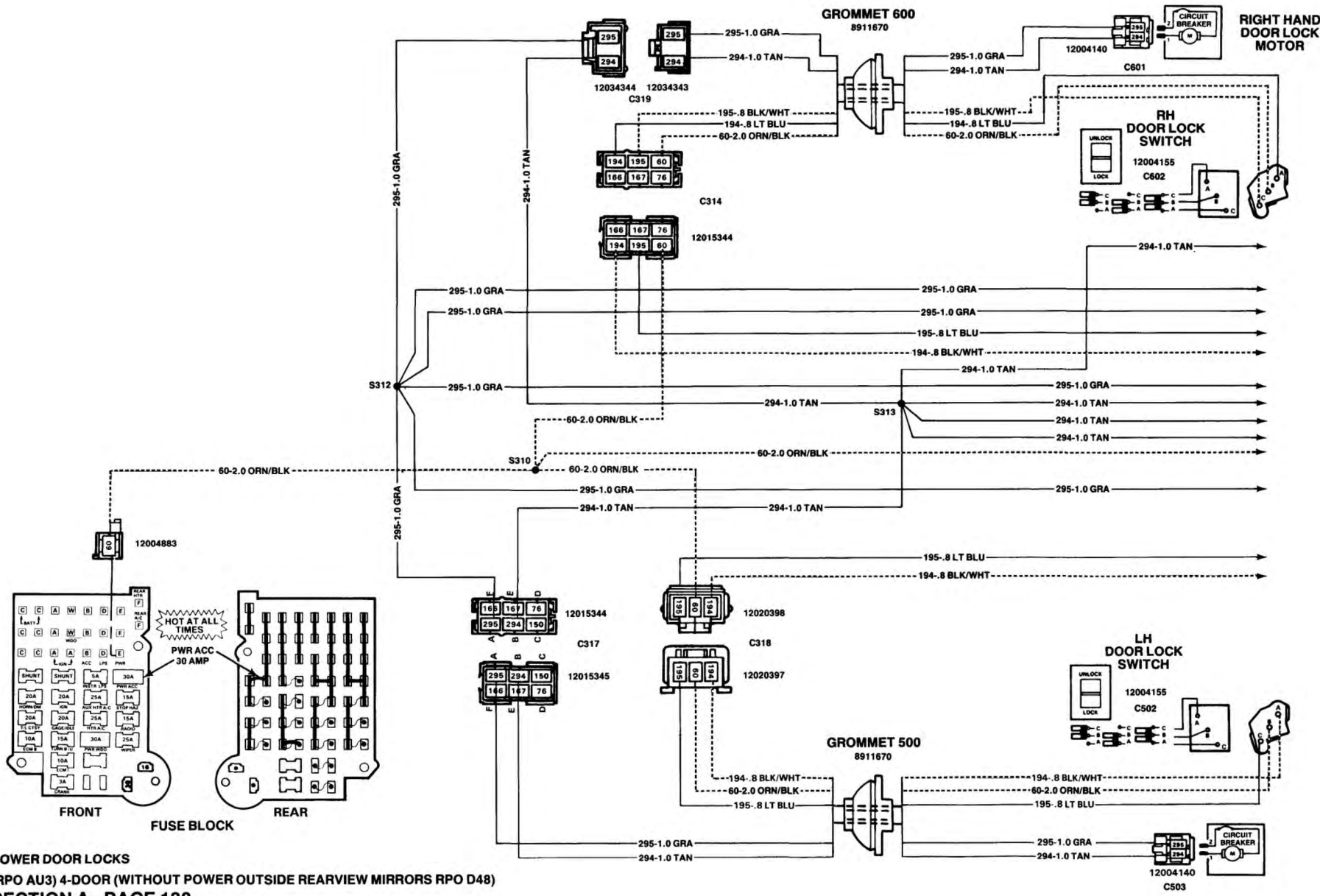
**NO DOOR LOCK MOTORS LOCK OR UNLOCK FROM ANY SWITCHES**

TEST	RESULT	ACTION
None.	None.	REPLACE door lock relay.

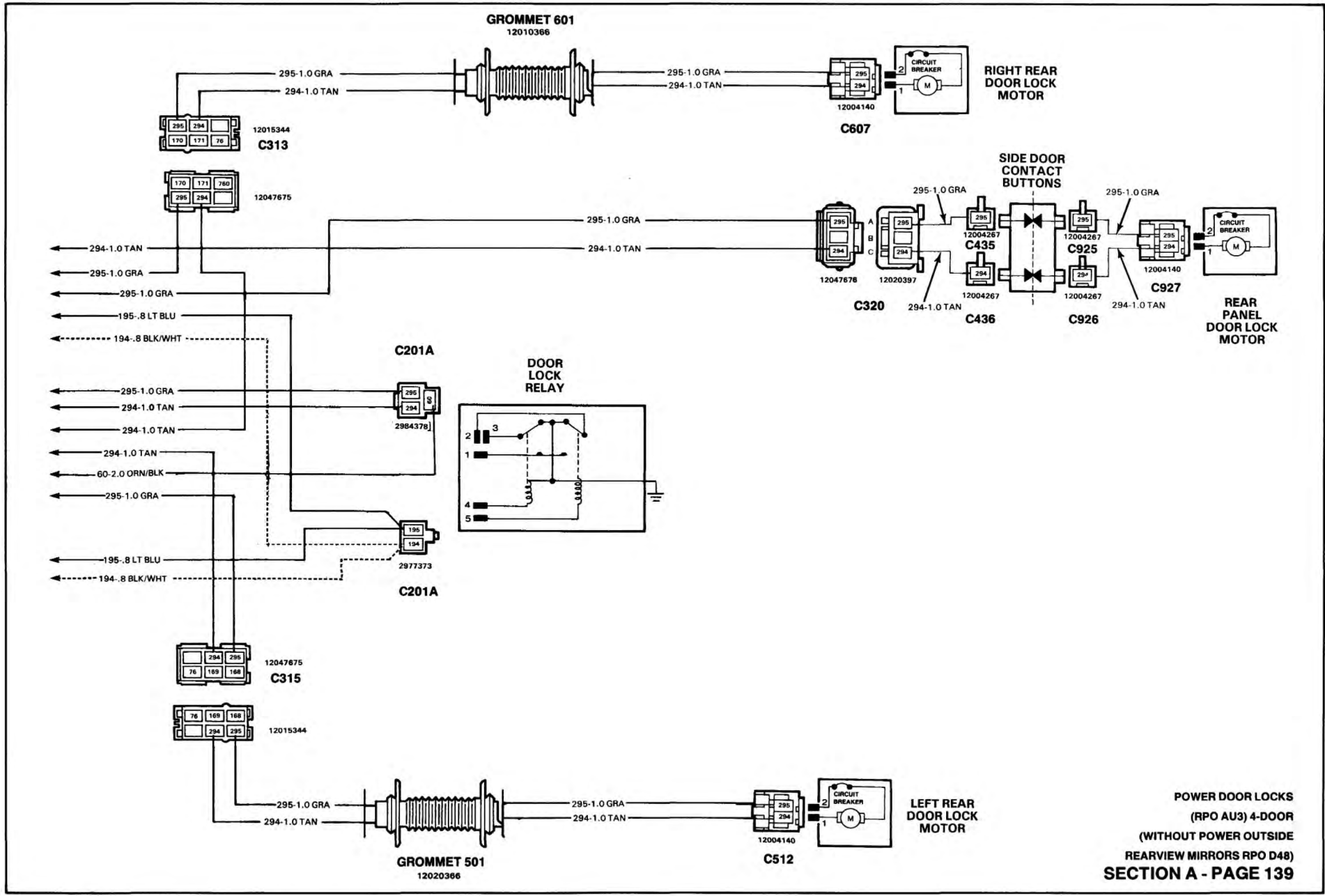




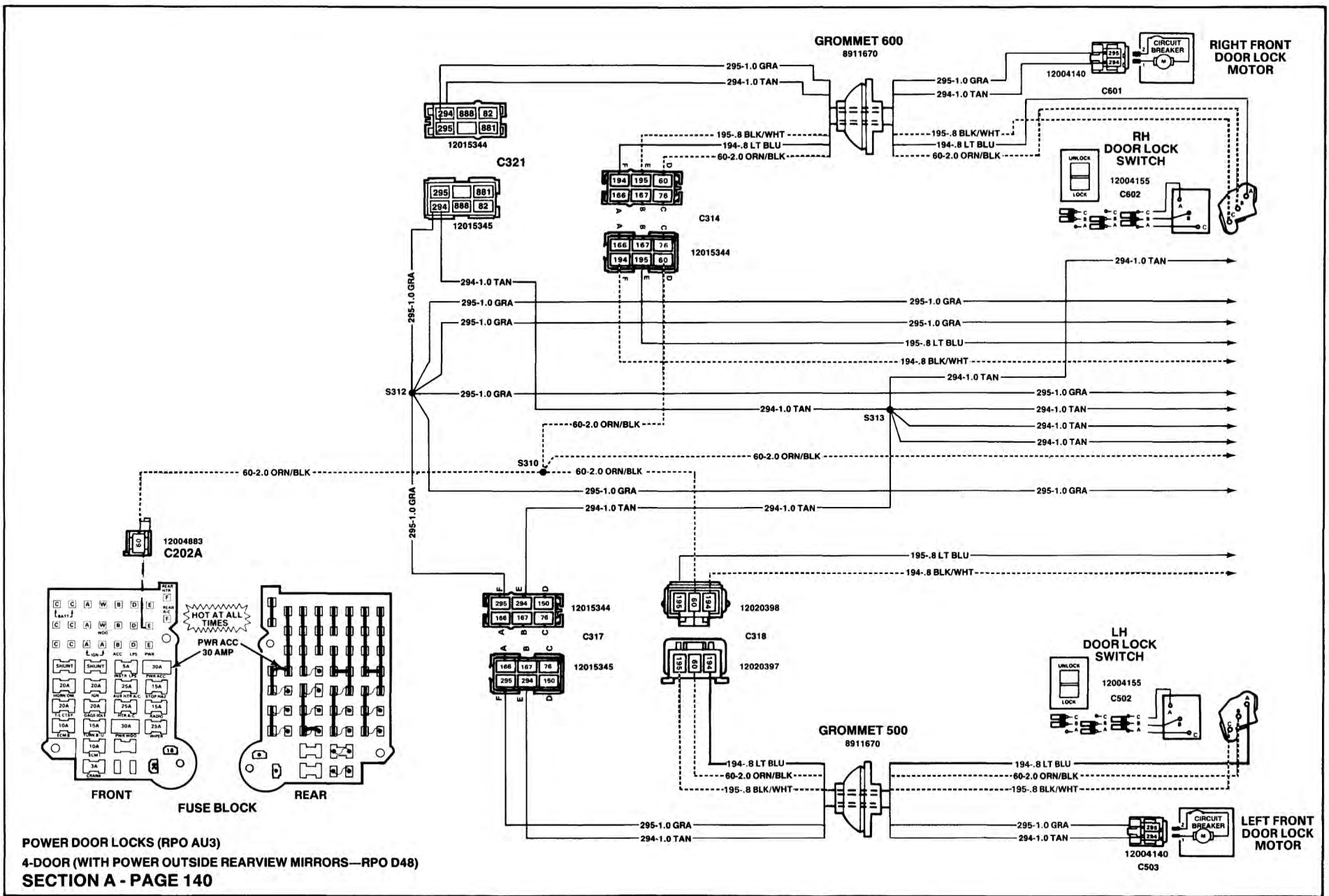




**POWER DOOR LOCKS**  
 (RPO AU3) 4-DOOR (WITHOUT POWER OUTSIDE REARVIEW MIRRORS RPO D48)  
**SECTION A - PAGE 138**

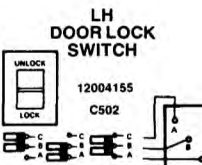
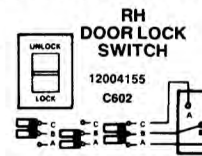


POWER DOOR LOCKS  
 (RPO AU3) 4-DOOR  
 (WITHOUT POWER OUTSIDE  
 REARVIEW MIRRORS RPO D48)  
**SECTION A - PAGE 139**



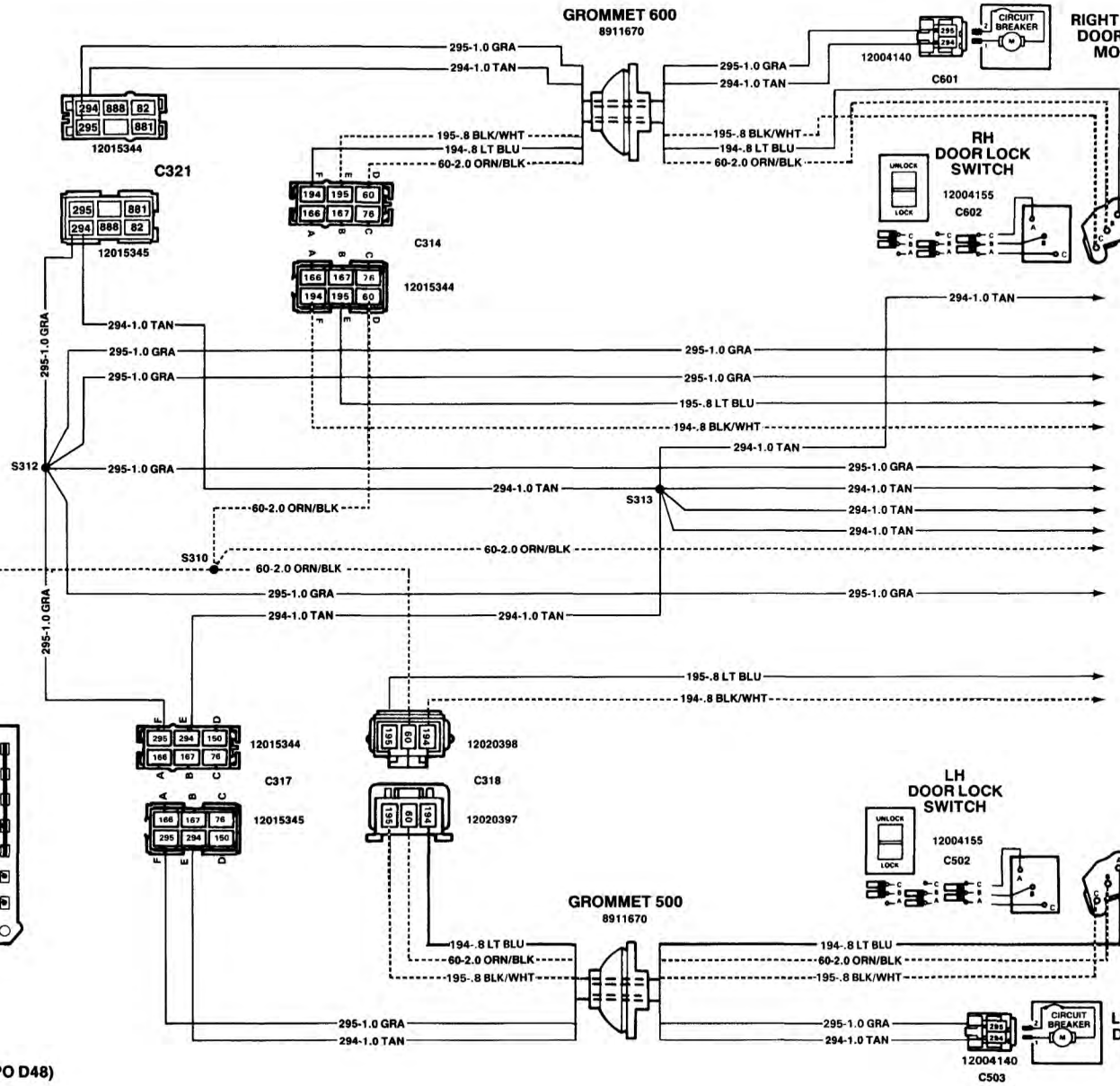
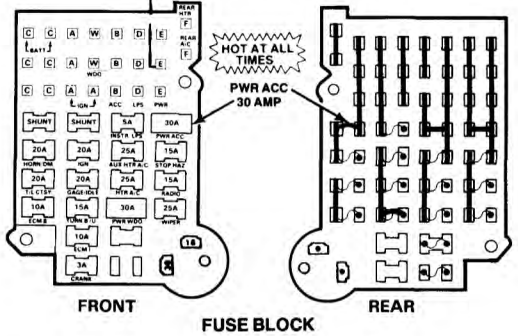
**GROMMET 600**  
8911670

**RIGHT FRONT DOOR LOCK MOTOR**

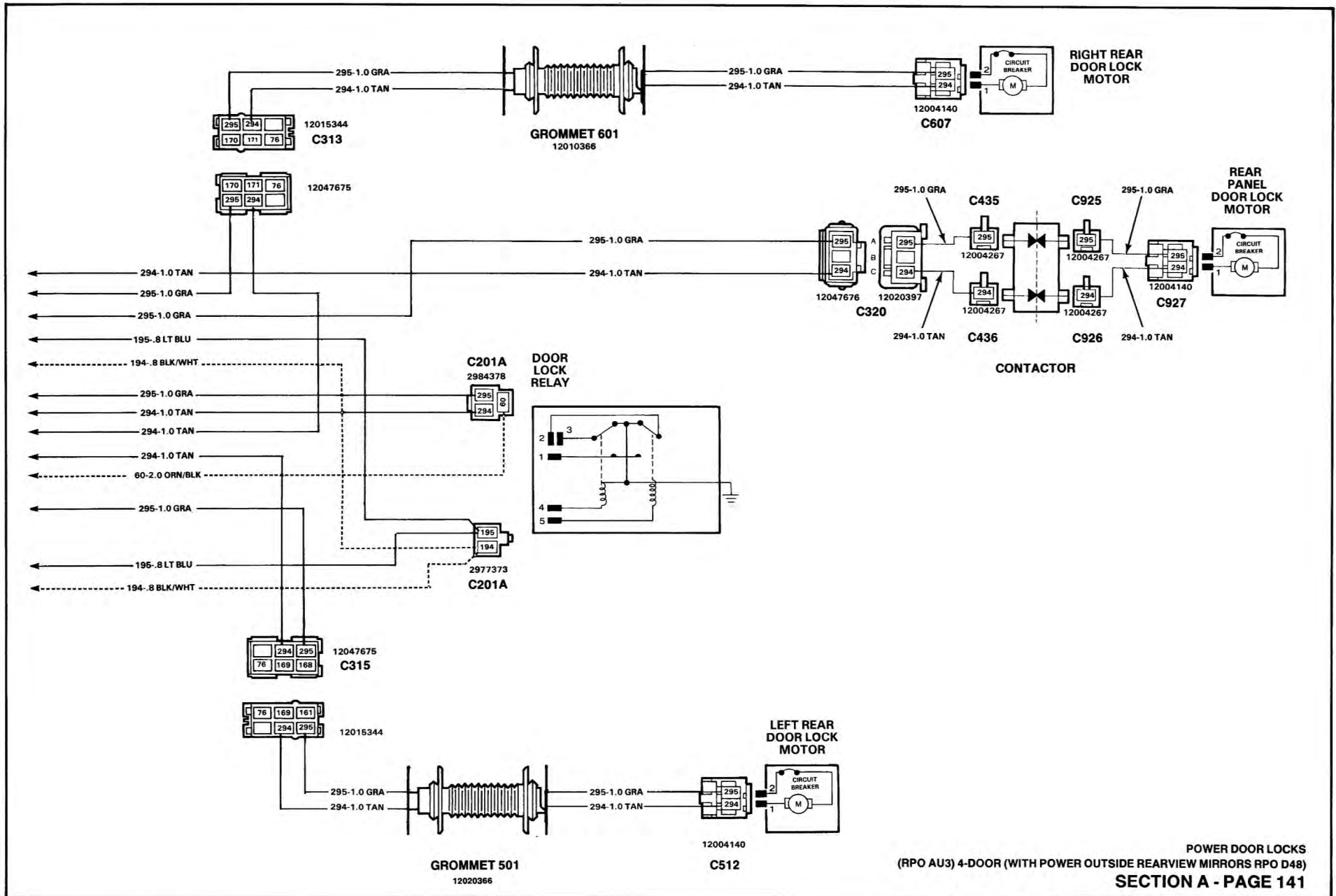


**GROMMET 500**  
8911670

**LEFT FRONT DOOR LOCK MOTOR**







## CIRCUIT OPERATION

### CONVENTIONAL WIPER

#### WIPERS

When the Wiper/Washer Switch is in LO, battery voltage is applied through the GRA wire directly to the low speed brushes of the Wiper Motor. The Wiper Motor runs at low speed.

When the Wiper/Washer Switch is in HI, battery voltage is applied through the PPL wire to the high speed brushes of the Wiper Motor. The motor operates at a higher speed.

The Park Switch is open only when the wiper blades are in the PARK position. In all other positions, the Park Switch is closed. When the Wiper/Washer Switch is moved to OFF, the Wiper Motor continues to run at low speed until the wiper blades reach the PARK position. At that time the Park Switch opens and stops the Wiper Motor.

The Wiper Motor is protected by a circuit breaker which opens if the current through the Motor rises to a high level. This may happen if the wiper blades are blocked by ice or snow. The circuit breaker resets automatically after it cools off.

#### WASHER

The Washer Motor is energized whenever the Washer Switch is pressed and runs as long as the Washer Switch is closed. Battery voltage is applied to the Washer Motor by the GRA wire and a ground is supplied by the switch by the PNK wire.

### CIRCUIT OPERATION—PULSE WIPERS

In addition to the features of a conventional (non-pulse) Wiper System (MIST, LO, and HI speeds), the pulse-type Wiper/Washer System includes an operating mode in which the wipers make single strokes with an adjustable time interval between strokes. The time interval is controlled by a Solid State Pulse/Speed/Wash Control in the Wiper Motor Module. The duration of the relay interval is determined by the Pulse Delay Resistance in the Wiper/Washer Switch. Low Speed, High Speed and Park positions operate the same as non-pulse wipers.

#### LOW SPEED

In the LO position, the Wiper/Washer Switch supplies voltage in the GRA wire and the Pulse/Speed/Wash Control. The Pulse/Speed/Wash Control provides ground to the Park/Run Relay which is energized and supplies voltage to the brushes of the Wiper Motor. The wipers run at low speed until they are turned off.

#### HIGH SPEED

With the Wiper/Washer Switch in the HI position, battery voltage is supplied from the PPL wire directly to a second armature terminal of the Wiper Motor. The wipers run at high speed. When the Wiper/Washer Switch is turned to OFF, the wipers complete the last sweep at low speed and park.

### PULSE WIPER/WASHER SECTION A - PAGE 142

#### PARK

When the wipers are turned off, the Wiper Motor runs at low speed until the wiper blades reach the PARK position. At that time the Park/Run Relay opens and shunts the Wiper Motor to stop it immediately. The wiper blades remain in the PARK position.

#### MIST

When the control is moved to MIST and released, the wipers make one sweep at low speed and return to PARK. The circuit operation is the same as low speed.

#### PULSE

With the Wiper/Washer Switch in PULSE (Delay), voltage is applied to the GRA wire, the Wiper Motor Module, and the Solid State Control Board. Voltage is applied to the Park/Run Relay coil which is momentarily grounded by the Pulse/Speed/Wash Control circuit and the relay closes. Battery voltage is supplied through the closed contacts of the relay to run the Wiper Motor. The relay remains energized as long as the contacts of the Park/Run Switch remain closed. When the wiper blades have reached PARK, the Park/Run Switch opens, de-energizing the Park/Run Relay. The wiper blades remain in PARK until the Control Board grounds the Park/Relay coil to start another sweep. The delay time between sweeps is controlled by the pulse delay resistors. The delay can be adjusted from 0 to 43 seconds.

#### WASHER

When the Washer Switch is depressed, voltage is applied to the Solid State Control Board. The Control Board supplies a ground to the washer motor through the PNK wire. It also starts the wiper cycle through the low speed brushes of the Wiper Motor. The washer continues to run as long as the switch is held down. The Solid State Control Board keeps the wipers on for approximately six seconds after the washer goes off. If the washer is switched on during the PULSE operation, the wipers run in low speed for six seconds. The wash cycle is completed before the wipers return to the delayed pulse operation.

The Wiper Motor is equipped with a circuit breaker which protects the motor when the wipers are blocked. The resulting high current will open the circuit breaker which will reset upon cooling.

## COMPONENT LOCATION

Page — Figure

Fuse Block . . . . .	Behind LH side of I/P, above kick panel . . . . .	185 —	67
Washer Motor . . . . .	Engine compartment, LH fender . . . . .	165 —	3
Wiper Motor . . . . .	LH side of cowl . . . . .	176 —	38
Wiper Pulse Module . . . . .	Under steering column . . . . .	189 —	78
Wiper Switch . . . . .	On directional signal lever . . . . .	182 —	58
C100 . . . . .	Engine compartment, LH side of cowl . . . . .	176 —	38
C101 . . . . .	At wiper motor . . . . .	176 —	38
C102 . . . . .	At wiper motor . . . . .	176 —	38
C187 . . . . .	At windshield washer bottle . . . . .	165 —	3
C202 . . . . .	At pulse wiper control module . . . . .	166 —	4
C204 . . . . .	At pulse wiper control module . . . . .	189 —	78
G200 . . . . .	LH side, behind I/P . . . . .	166 —	6

**PRELIMINARY CHECKS:**

CHECK condition of WIPER fuse. If fuse is in good condition, use the following diagnostic procedure.

### TROUBLESHOOTING CHART—WINDSHIELD WIPERS AND WASHERS (PULSE)

#### WIPERS DO NOT OPERATE IN ANY MODE

TEST	RESULT	ACTION
1. Place ignition in ACC and turn wipers to HI. Connect test lamp from WHT (93) wire at wiper motor connector C101 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between wiper motor and fuse block.
	Test lamp lights.	GO to step 2.
2. Connect a fused jumper from BLK (150) wire at pulse wiper module connector C202 to ground.	Wiper motor runs.	LOCATE and REPAIR open in BLK (150) wire between pulse wiper module C202 and ground G200.
	Wiper motor does not run.	REPLACE wiper motor.

#### WIPERS DO NOT OPERATE IN HI

TEST	RESULT	ACTION
1. Place ignition in ACC and wipers to HI. Connect a fused jumper from PPL (92) wire at pulse wiper module connector C202 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in PPL (92) wire between wiper motor and pulse wiper module or REPLACE wiper motor.
	Wiper motor runs.	GO to step 2.
2. Connect a fused jumper from PPL (92) wire at pulse wiper switch connector C204 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in PPL (92) wire between pulse wiper switch and pulse wiper module connector C202. If wire is in good condition, REPLACE pulse wiper control module.
	Wiper motor runs.	REPLACE wiper, washer switch.

#### WIPERS DO NOT OPERATE IN LO OR DELAY

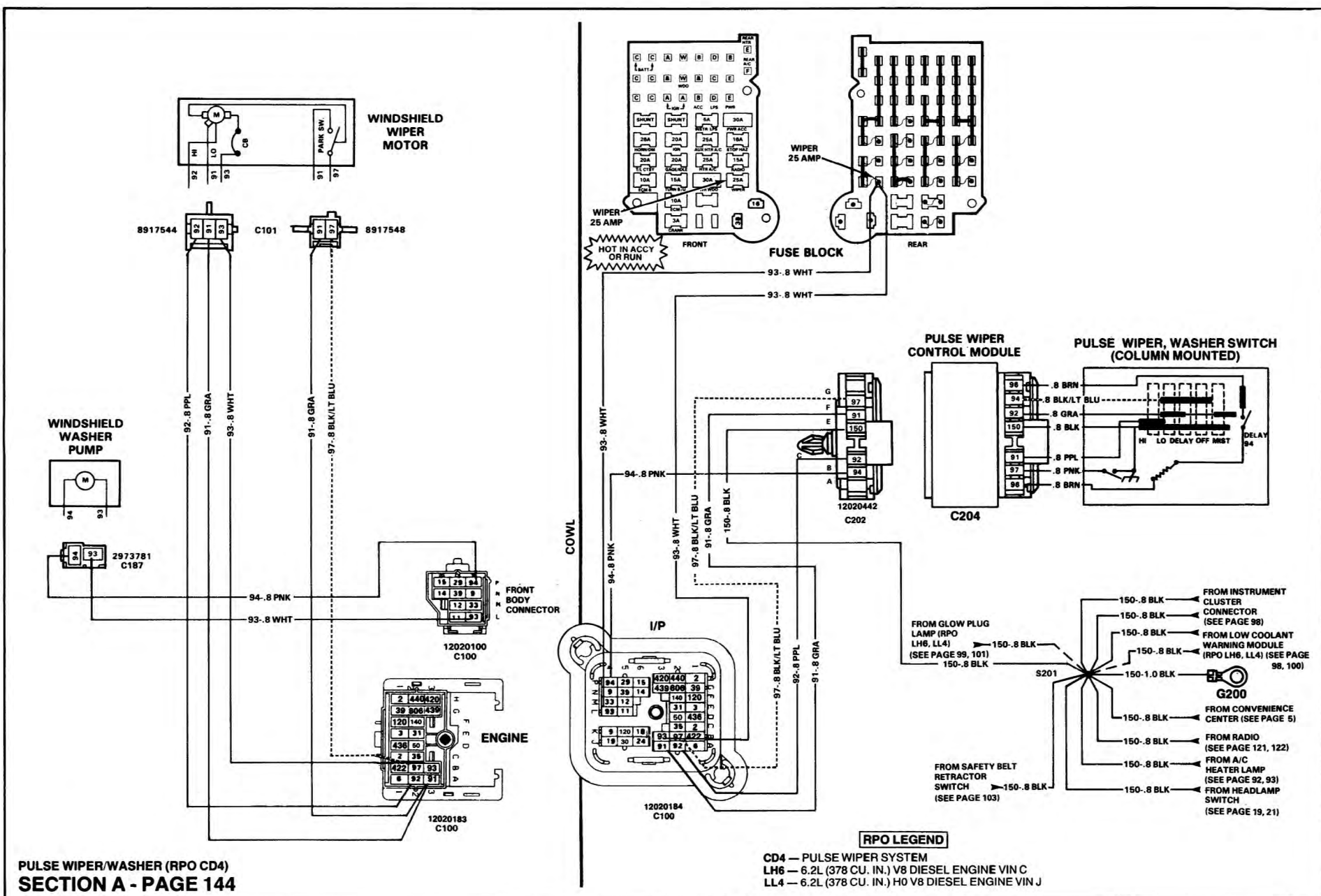
TEST	RESULT	ACTION
1. Place ignition in RUN and wipers to LO. Connect a fused jumper from GRA (91) wire at pulse wiper module connector C202 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in GRA (91) wire between wiper motor and pulse wiper module. If wire is in good condition, REPLACE wiper motor.
	Wiper motor runs.	GO to step 2.
2. Connect a fused jumper from GRA (91) wire at wiper switch connector C204 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in GRA (91) wire between pulse wiper switch and pulse wiper module. If wire is in good condition, REPLACE pulse wiper control module.
	Wiper motor runs.	REPLACE pulse wiper/washer switch.

#### WASHER MOTOR DOES NOT OPERATE

TEST	RESULT	ACTION
1. Place ignition to ACC and pulse wiper/washer switch to WASH. Connect test lamp from WHT (93) wire at washer pump connector C187 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between washer pump and fuse block.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from WHT (93) wire to PNK (94) wire at washer pump connector C187.	Test lamp lights.	REPLACE washer pump.
	Test lamp does not light.	GO to step 3.
3. Connect a fused jumper from PNK (94) wire at pulse wiper control module connector C202 to ground.	Washer motor does not pump.	LOCATE and REPAIR open in PNK (94) wire between washer pump and pulse wiper control module.
	Washer motor pumps.	GO to step 4.
4. Connect fusible jumper from PNK (94) wire at wiper switch connector C204 to ground.	Washer motor does not pump.	LOCATE and REPAIR open in PNK (94) wire between pulse wiper control module and pulse wiper switch.
	Washer pumps.	GO to step 5.
5. Connect a fusible jumper from BLK (150) wire at wiper switch connector C204 to ground.	Washer motor does not pump.	REPLACE wiper switch.
	Washer motor pumps.	LOCATE and REPAIR open in BLK (150) wire between wiper switch and ground G200.

#### WASHER MOTOR DOES NOT SHUT OFF

TEST	RESULT	ACTION
1. Place ignition in ACC and wiper switch to WASH. Disconnect wiper switch connector C204.	Washer motor stops pumping.	REPLACE wiper switch.
	Washer motor pumps.	GO to step 2.
2. Disconnect wiper control module connector C202.	Washer motor stops pumping.	REPLACE wiper control module.
	Washer motor pumps.	LOCATE and REPAIR short to ground in PNK (94) wire between pulse wiper control module and washer pump.



**BLANK**

## CIRCUIT OPERATION

### BACKUP LAMPS

With the Ignition Switch in RUN, BULB TEST, or START, voltage is applied through the TURN/BU Fuse to the Transmission Position Switch or the Backup Lamp Switch. Whenever the gear selector lever is shifted to REVERSE the Transmission Position Switch or the Backup Lamp Switch closes and voltage is applied to the Backup Lamps and the Lamps turn on.

### COMPONENT LOCATION

		Page	Figure
Backup Lamps, LH	At rear LH side of vehicle	.167	8
Backup Lamps, RH	At rear RH side of vehicle	.167	8
Backup Lamp Switch, (Automatic Transmission)	Bottom of steering column	.166	5
Backup Lamp Switch, (Manual Transmission)	On LH side of transmission	.189	79
Fuse Block	Under LH side of I/P, above kick panel	.166	4
Grommet 104	LH side of cowl	.189	79
Headlamp Switch	LH side of I/P	.166	4
License Lamp	Rear center of vehicle	.167	8
Taillamp, LH	Rear RH side of vehicle	.167	9
Taillamp, RH	Rear LH side of vehicle	.167	9
C100	Engine compartment, LH side of cowl	.165	2
C117A	Engine compartment, top LH side of cowl	.189	79
C118A	At manual transmission backup lamp switch	.189	79
C202	At headlamp switch	.166	4
C286	Automatic transmission backup lamp switch	.166	5
C300	Rear center of vehicle	.167	9
C301	Rear center of vehicle	.167	8
C411	At rear taillamp	.167	8
C412	At RH rear taillamp	.167	8
C419	At license lamp	.167	8
C420	At RH rear license lamp	.189	80
C421	At LH rear license lamp	.189	80
C428	At RH rear backup lamp	.167	8
C429	At rear LH backup lamp	.167	8
G402	At LH rear lamps	.167	9
G403	At RH rear lamps	.167	9
G406	Rear center of vehicle	—	—
G407	RH rear of vehicle	—	—
G408	LH rear of vehicle	.167	9
S308	Rear of vehicle	.167	9
S402	Rear LH side of vehicle	.167	8
S403	Rear taillamp harness RH side of vehicle	.167	8
S404	Rear taillamps harness, rear center of vehicle	.167	9
S405	Rear taillamp harness, RH side of vehicle	.167	8
S406	Rear LH side of vehicle	.167	8
S410	Rear RH side of vehicle	.167	8
S412	Rear RH side of vehicle	.167	8
S907	License lamp extension harness rear of vehicle	.189	80

### PRELIMINARY CHECK

The rear lamp systems (taillamps, clearance lamps, end gate lamps, and license plate lamps) all receive voltage from same wire circuit (BRN 9) and share same ground terminals G402 and G403. If only one system is not working, LOCATE and REPAIR an open in the wiring and/or bulbs that pertain to that system.

### REAR EXTERIOR LAMPS

#### SECTION A — PAGE 146

## PARK, TAIL, MARKER, AND LICENSE LAMPS

Voltage is applied through the T/L CTSY Fuse to the Light Switch at all times. With the Headlamp Switch in PARK or HEAD, voltage is applied to the Park, Tail, Marker, and License Lamps.

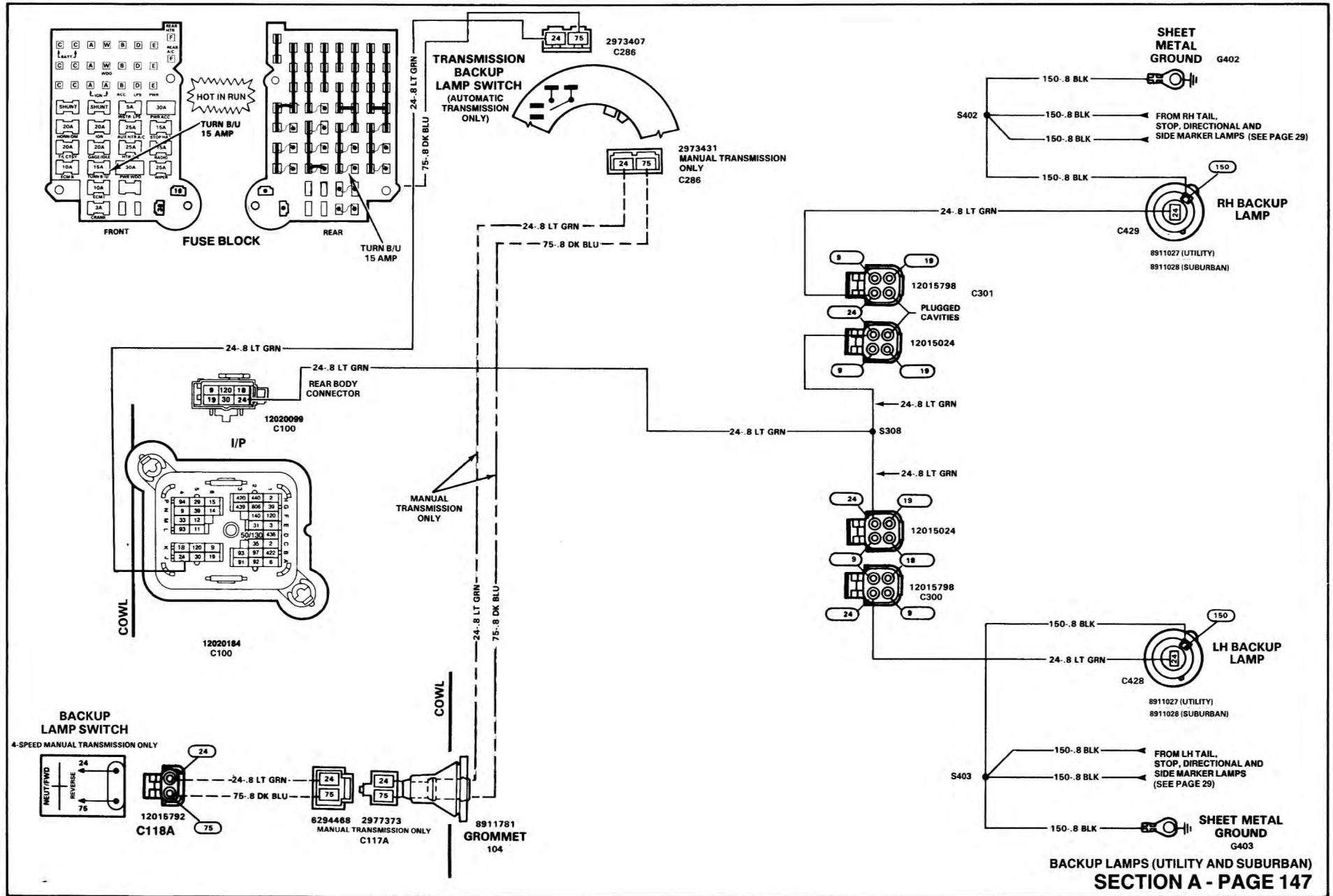
## TROUBLESHOOTING CHART—REAR EXTERIOR LAMPS

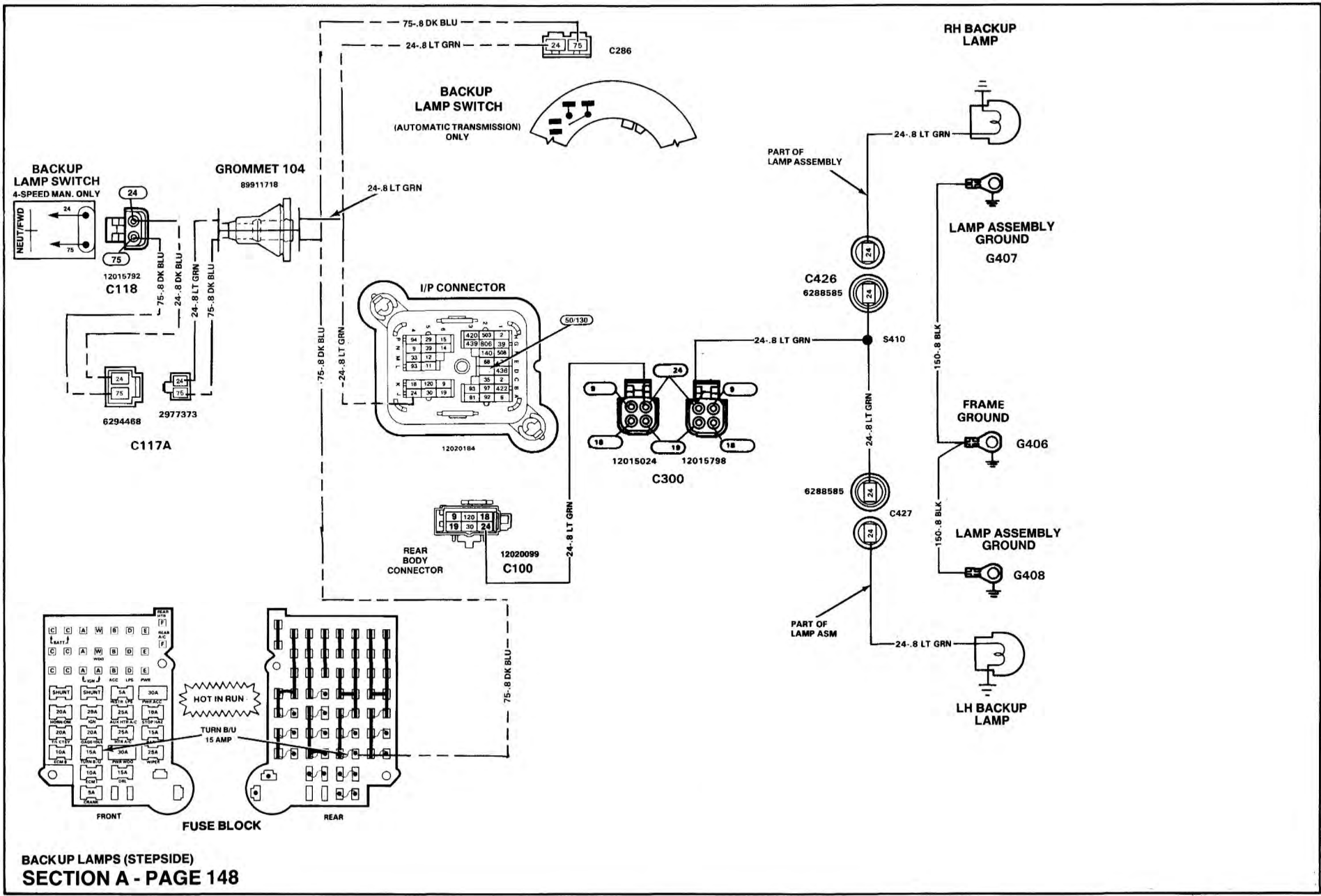
### BACKUP LAMPS DO NOT OPERATE

TEST	RESULT	ACTION
1. Place transmission in reverse. Connect test lamp from LT GRN (24) wire at backup lamp connector to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. Connect test lamp from LT GRN (24) wire to BLK (150) wire at backup lamp connector.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from backup lamp to ground terminal G403.
3. Connect test lamp from DK BLU (75) wire at backup lamp switch connector C286 or C118A to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	CHECK condition of fuse (TURN/BU). If fuse is good LOCATE and REPAIR open in DK BLU (75) wire from backup lamp switch to fuse block.
4. Connect test lamp from LT GRN (24) wire at backup lamp switch connector C286 or C118A to ground.	Test lamp lights.	LOCATE and REPAIR open in LT GRN (24) wire from backup lamp switch to backup lamps.
	Test lamp does not light.	Adjust backup lamp switch. If backup lamp switch will not adjust properly, REPLACE backup lamp switch.

### REAR PARK, MARKER AND LICENSE LAMPS DO NOT OPERATE

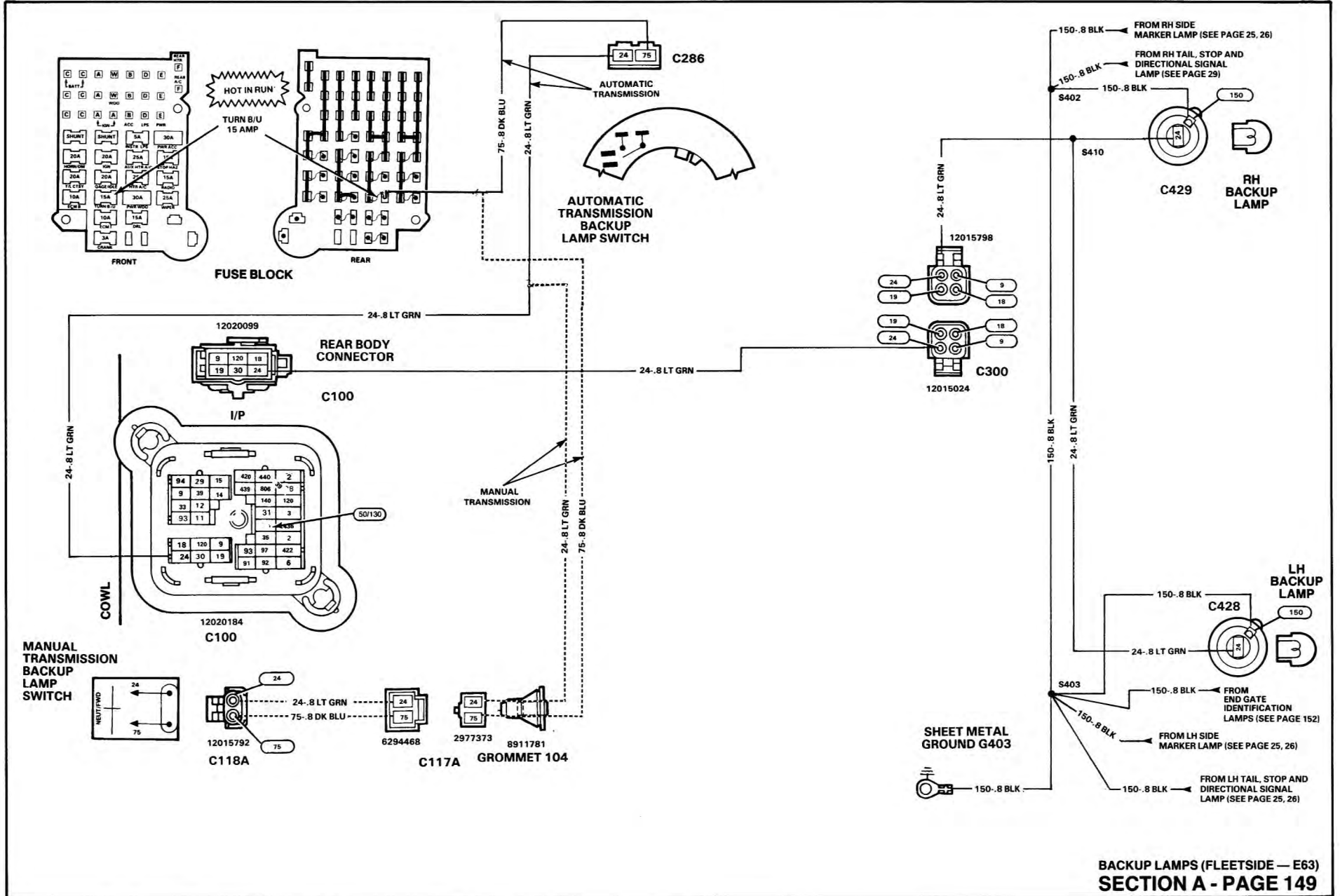
TEST	RESULT	ACTION
1. Place Headlamp Switch in HEAD or PARK position. If only license lamp does not operate, GO to step 7. If only one rear park lamp does not operate, GO to step 3. If only one rear marker lamp does not operate, GO to step 5. Connect test lamp from BRN (9) wire at S404 to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire between Headlamp Switch connector C202 and S404.
	Test lamp lights.	If only RH rear Park/Marker lamps and license lamps do not operate, GO to step 2. If only LH Rear Park/Marker lamps do not operate, GO to step 3.
2. Connect test lamp from BRN (9) wire at RH lamp connector to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire between S404 and RH lamp connector.
	Test lamp lights.	GO to step 3.
3. Connect test lamp from BRN (9) wire at inoperative park lamp connector to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire between lamp connector and S404.
	Test lamp lights.	GO to step 4.
4. Connect test lamp from BRN (9) wire and BLK (150) wire at inoperative lamp connector.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) between lamp connector and G403.
	Test lamp lights.	If rear park lamp is inoperative, REPLACE bulb. For inoperative side license lamps, GO to step 5.
5. Connect test lamp from BRN (9) wire at license lamp connector to ground.	Test lamp does not light.	LOCATE and REPAIR open BRN (9) wire between connector and S300 and S404.
	Test lamp lights.	Inspect ground connection at license bulb socket. If satisfactory REPLACE bulb.

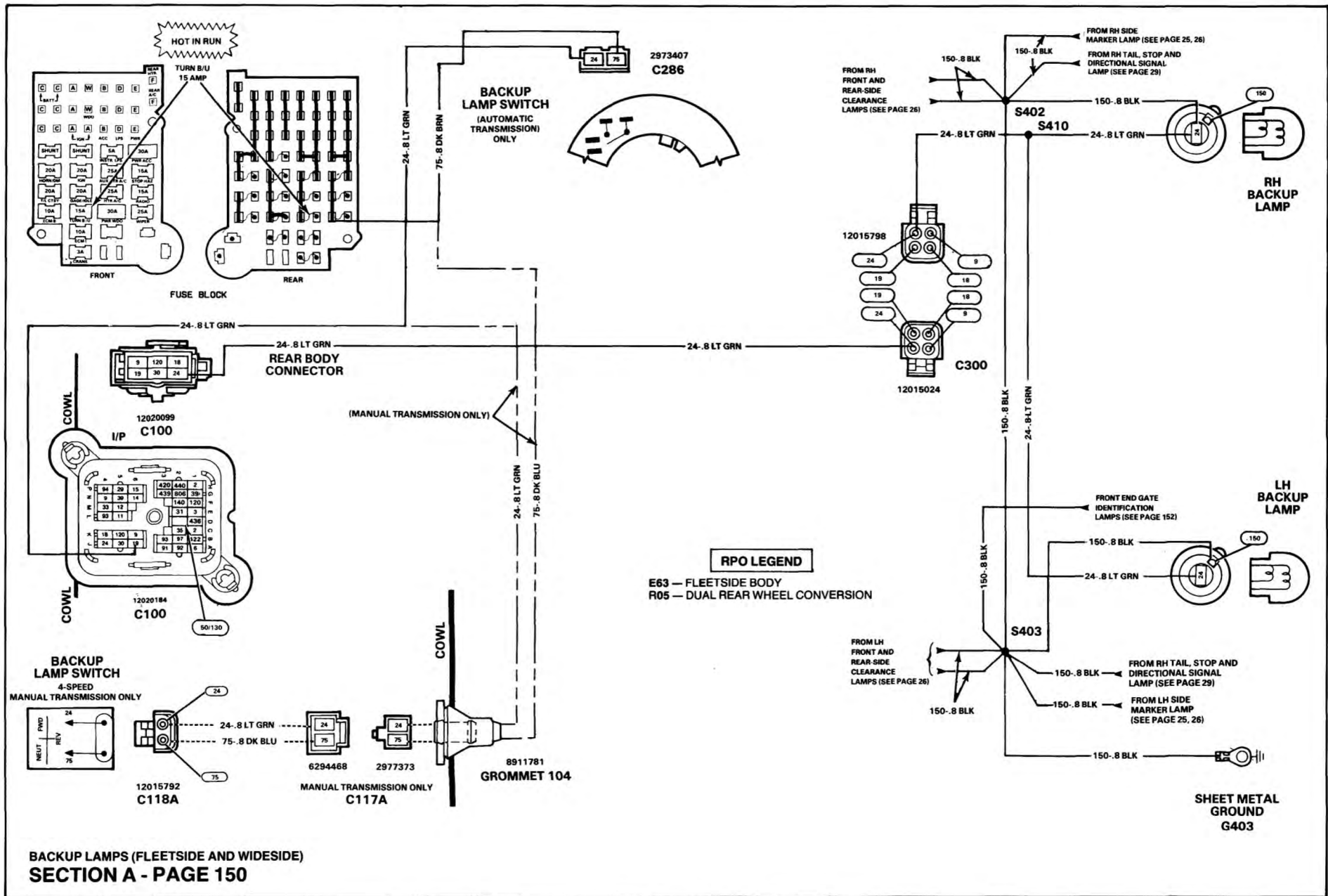


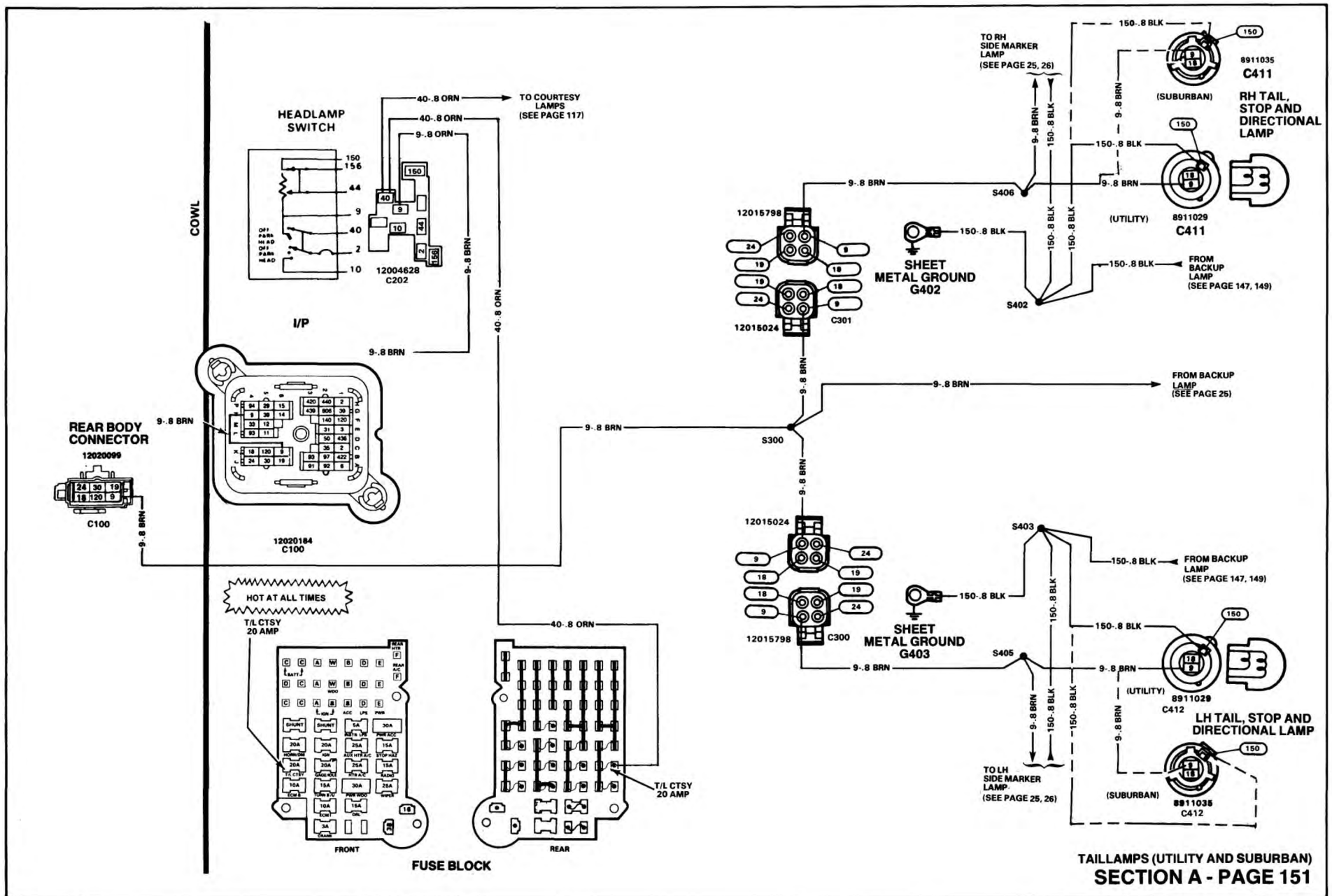


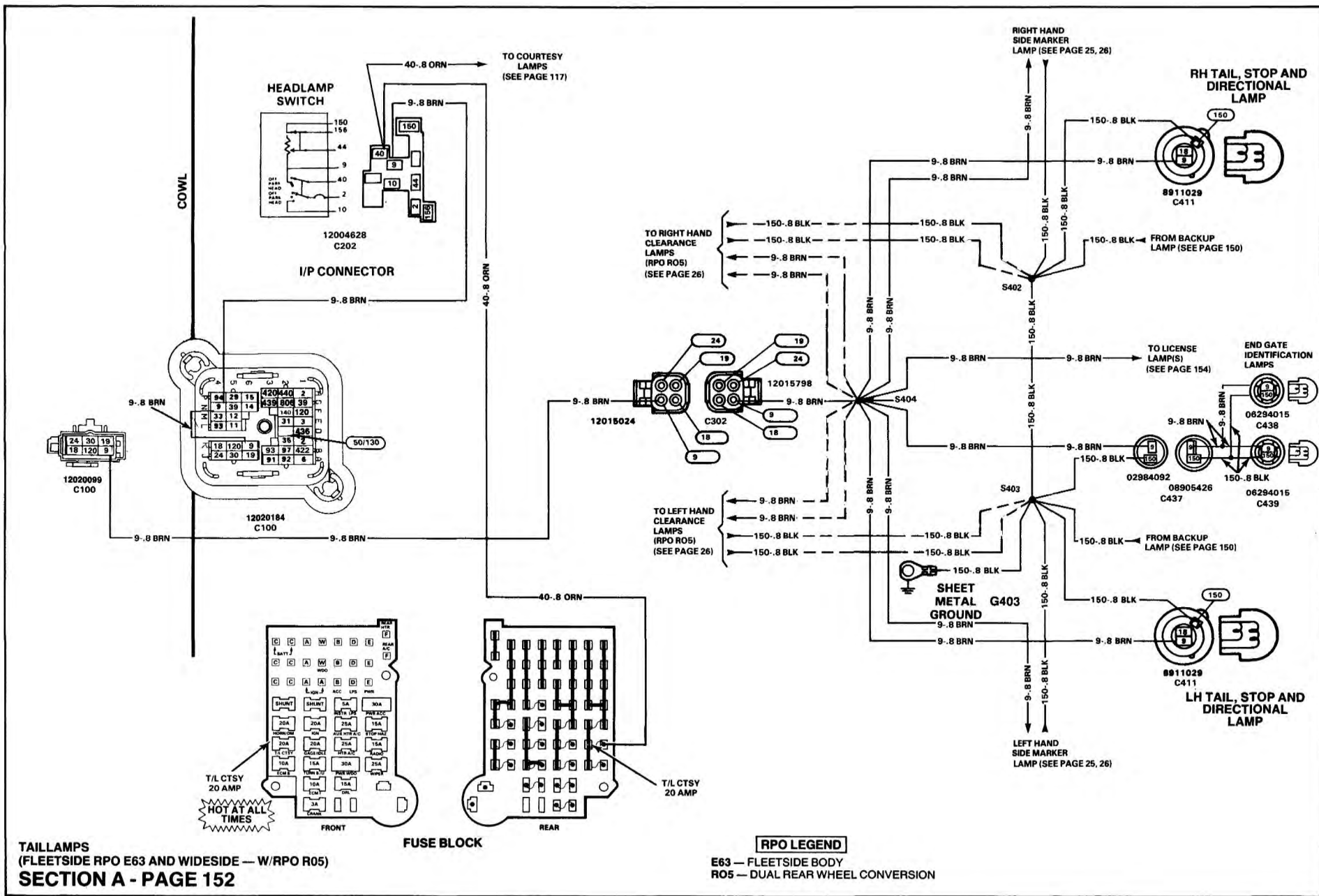
**BACKUP LAMPS (STEPSIDE)**  
**SECTION A - PAGE 148**



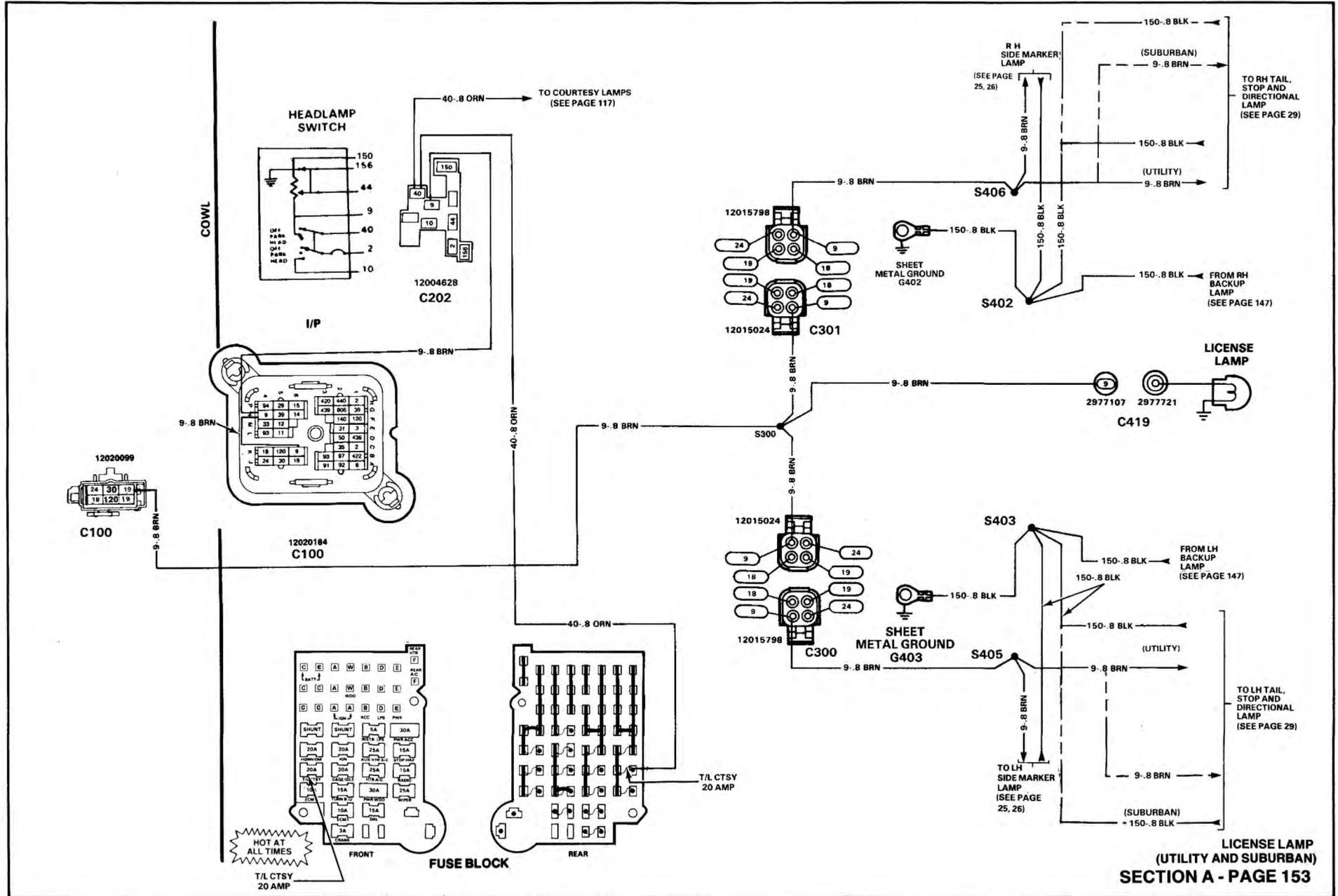


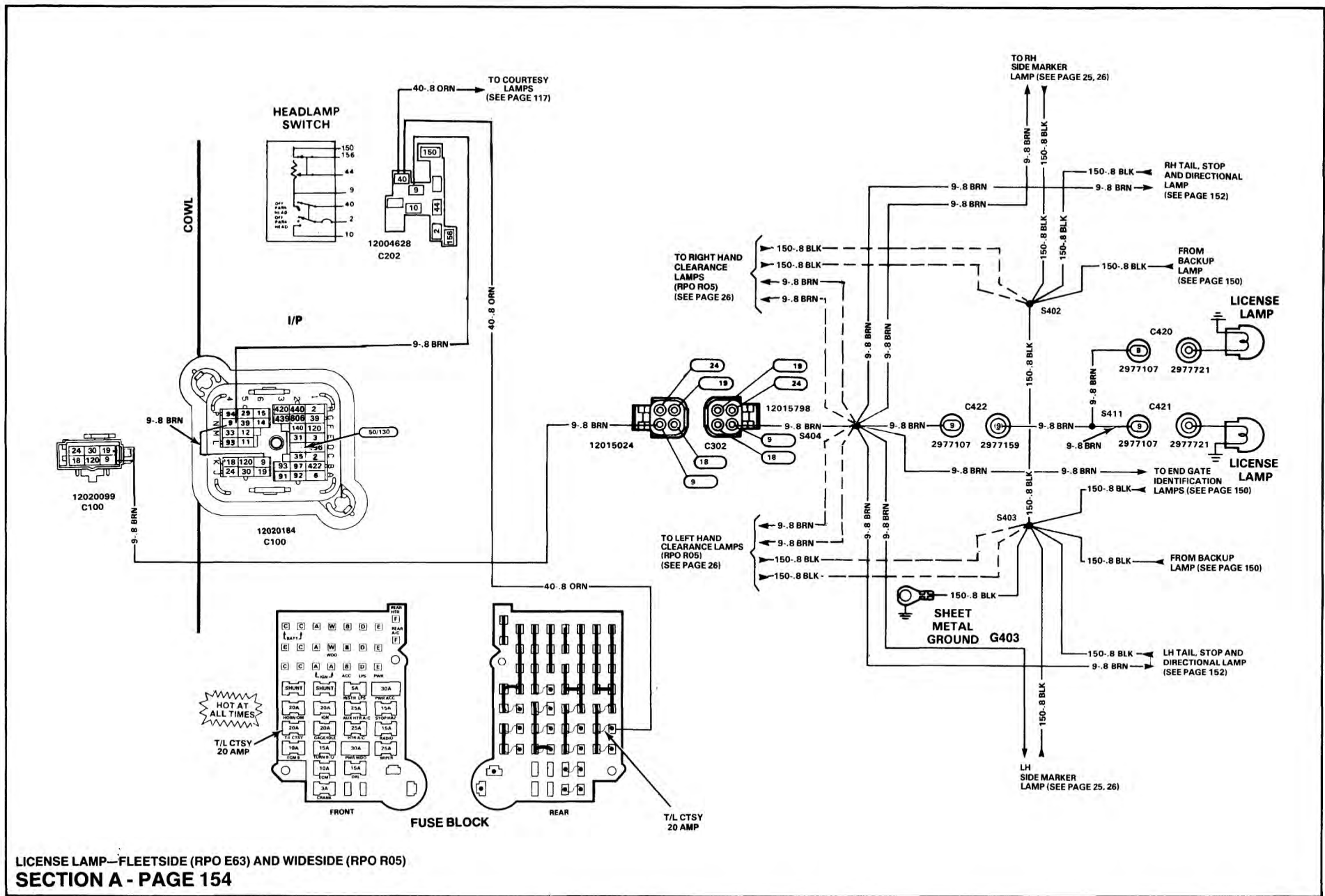






TAILLAMPS  
(FLEETSIDE RPO E63 AND WIDESIDE — W/RPO R05)  
**SECTION A - PAGE 152**





TO COURTESY LAMPS  
(SEE PAGE 117)

HEADLAMP SWITCH

12004628  
C202

COWL

I/P

12020099  
C100

12020184  
C100

HOT AT ALL TIMES  
T/L CTSY 20 AMP

FRONT

FUSE BLOCK

REAR

T/L CTSY 20 AMP

TO RIGHT HAND CLEARANCE LAMPS (RPO R05) (SEE PAGE 26)

12015024

12015798

TO LEFT HAND CLEARANCE LAMPS (RPO R05) (SEE PAGE 26)

SHEET METAL GROUND G403

TO RH SIDE MARKER LAMP (SEE PAGE 25, 26)

RH TAIL, STOP AND DIRECTIONAL LAMP (SEE PAGE 152)

FROM BACKUP LAMP (SEE PAGE 150)

LICENSE LAMP

LICENSE LAMP

TO END GATE IDENTIFICATION LAMPS (SEE PAGE 150)

LH TAIL, STOP AND DIRECTIONAL LAMP (SEE PAGE 152)

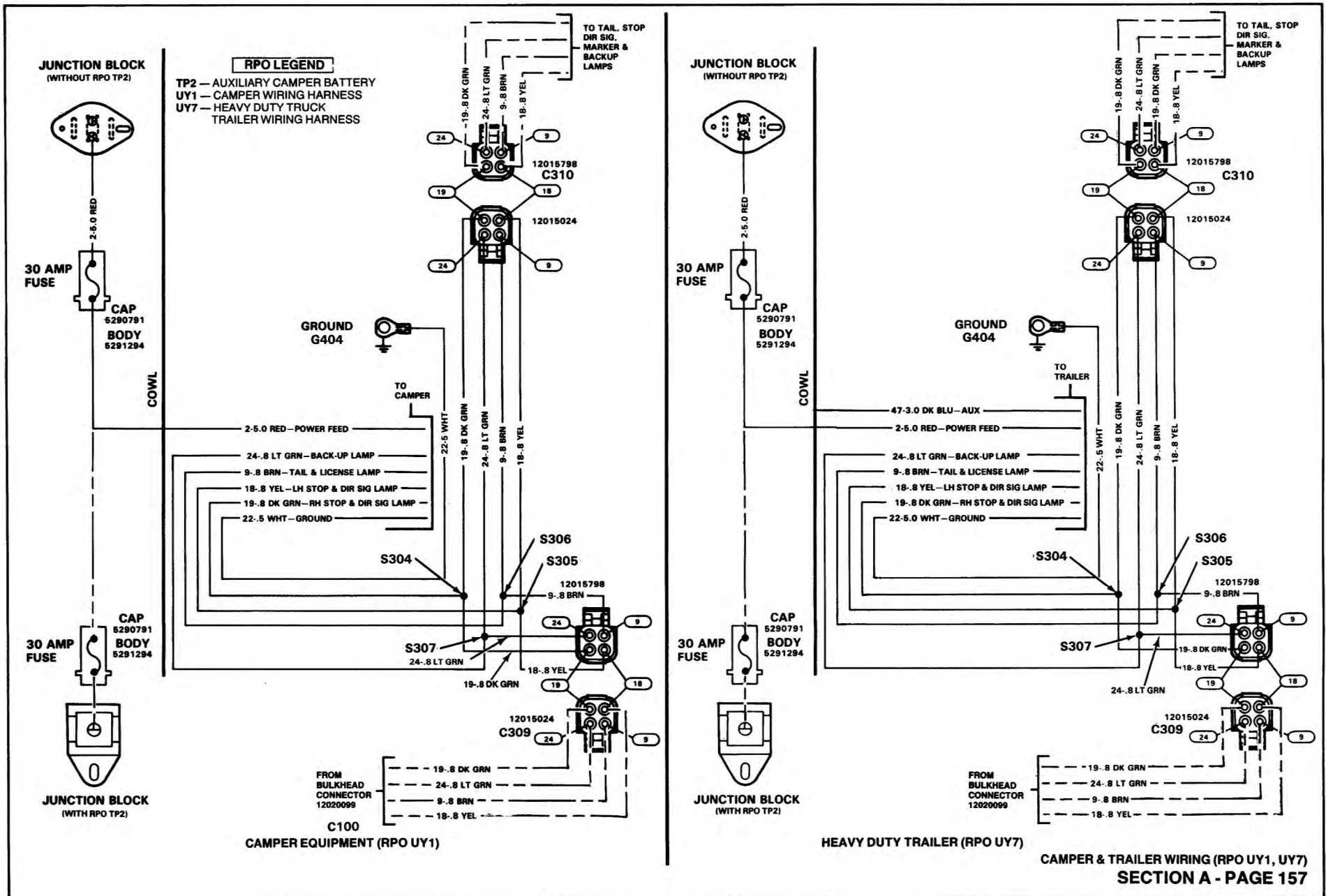
LH SIDE MARKER LAMP (SEE PAGE 25, 26)

**BLANK**

**COMPONENT LOCATION****Page — Figure**

In-Line Fuse .....	Located in cowl wiring conduit in engine compartment . . .	.189 —	81
Junction Block .....	Center of cowl in engine compartment . . . . .	.189 —	81
Junction Block with Auxiliary Battery .....	LH inner fender, in engine compartment . . . . .	.189 —	81
C309 .....	Near LH rear frame rail by rear crossmember . . . . .	.189 —	82
C310 .....	Near LH rear frame rail by rear crossmember . . . . .	.189 —	82
G404 .....	On rear crossmember, near LH rear frame rail . . . . .	.189 —	82
S304 .....	Rear taillamp harness, near rear crossmember . . . . .	.189 —	82
S305 .....	Rear taillamp harness, near rear crossmember . . . . .	.189 —	82
S306 .....	Rear taillamp harness, near rear crossmember . . . . .	.189 —	82
S307 .....	Rear taillamp harness, near rear crossmember . . . . .	.189 —	82





## CIRCUIT OPERATION

### VACUUM SYSTEMS

A vacuum-operated component uses the force of normal air pressure working against the lower air pressure of a partial vacuum to provide power that operates the component. With a gasoline engine, the vacuum created in the inlet manifold when the engine is running is stored in a ball-shaped vacuum tank suspended from the center of the hood inner panel. A check valve in the line feeding vacuum to the tank keeps the stored vacuum from weakening when inlet manifold vacuum drops during high speed or high power operation.

An engine driven mechanical vacuum pump serves as the source of vacuum with a diesel engine. A vacuum tank is not required with a vacuum pump.

Vacuum is routed through hoses to a mechanical or electric valve that provides a means of controlling the vacuum-operated component. When the valve is open, it allows vacuum to go to an actuator that actually operates the component. When the component is to be returned to its original position, the valve cuts off the vacuum to the actuator hose and vents the hose to normal air pressure.

A typical actuator is a metal shell with a movable shaft that retracts and extends to mechanically operate the component. A flexible diaphragm separates the interior of the shell into two chambers — a sealed chamber to which vacuum can be admitted, and an open chamber exposed to normal air pressure. The movable shaft is attached to the center of the diaphragm and extends from the open chamber.

When vacuum is directed to the sealed chamber, normal air pressure presses on the other side of the diaphragm and causes it to retract the shaft. When the vacuum is cut off, the sealed chamber is vented to outside air to balance the air pressure on both sides of the diaphragm and eliminate the force that retracted the shaft. A coiled spring within the sealed chamber expands to push the diaphragm back to its original position. This extends the shaft.

In addition to the two-position actuator described above, a three-position actuator may be used for certain applications. The three-position actuator has a vacuum hose at each end of the shell. When vacuum is applied to either end of the actuator and the opposite end is vented, the shaft will move in the direction of the end having the vacuum. When both ends of the actuator are vented to normal air pressure, internal springs center the shaft. This provides a center position as well as both extremes for an actuator application that requires three operating positions. The heater and air conditioning actuator of the R/V truck front manual air conditioning system (RPO C60) is a three-position actuator.

The servo unit of the cruise control (RPO K34) is a special type of vacuum actuator with an internal control

valve that can apply varying amounts of vacuum to the diaphragm. The varying vacuum provides a calibrated range of throttle positions that can accurately control vehicle speed. The function of the servo is explained more fully under "CRUISE CONTROL (RPO K34) VACUUM CONTROL" in this section.

### AUXILIARY HEATER (RPO C36) VACUUM SYSTEM

The auxiliary heater control switch in the instrument panel routes battery voltage to the auxiliary heater blower motor when the auxiliary heater control switch is "ON" and the ignition switch is in RUN.

In addition, the switch routes vacuum from the vacuum tank to the vacuum actuator that opens the auxiliary heater hot water valve. When open, the hot water valve admits heated coolant to the auxiliary heater inlet pipe and auxiliary heater core.

When the auxiliary heater control switch is turned "OFF," electric power to the blower motor is cut off and the hot water valve vacuum actuator is vented to atmospheric air to close the valve. This stops the flow of coolant to prevent unwanted heat.

### FRONT MANUAL AIR CONDITIONING SYSTEM (RPO C60) VACUUM SYSTEM

The front manual air conditioning system uses vacuum to operate the air valves ("doors") that control airflow through the air conditioning module.

Vacuum is supplied from the vacuum tank on the cowl panel in the left rear corner of the engine compartment. The vacuum supply line brings vacuum to the rotary selectors valve that is operated by the mode lever of the air conditioning control assembly in the instrument panel. A vacuum hose harness brings vacuum from the ports in the rotary selector valve to the vacuum actuators for the air valves of the air conditioning system. All actuators except the heater and air conditioning actuator are two-position actuators controlled by one vacuum hose. The heater and air conditioning actuator is a three-position actuator with two vacuum hoses. Application of vacuum or vented air to each actuator is determined by the operating mode selected by setting the mode lever in the control assembly. The following charts indicate the air outlets that operate in each mode selection and the response of the rotary selector valve to each mode lever position.

### AIR DISTRIBUTION

MODE SELECTION	UPPER (I/P) A/C OUTLETS	LOWER (FLOOR) HEATER OUTLETS	DEFROSTER OUTLETS	REMARKS
OFF	NONE	NONE	NONE	
MAX A/C	HIGH	NONE	NONE	a, b
NORM A/C	HIGH	NONE	NONE	a
BI-LEVEL	MEDIUM	MEDIUM	NONE	a
VENT	HIGH	NONE	NONE	c
HEAT	NONE	HIGH	LOW	c
DEF	NONE	LOW	HIGH	a

#### REMARKS:

a — Refrigeration system operates.

b — Inside air recirculated.

c — Refrigeration system off; no air cooling available.

### ROTARY SELECTOR VALVE OPERATING CHART

CONNECTIONS			MODE SELECTION						
VALVE PORT NO.	TERMINAL	HOSE COLOR	OFF	MAX A/C	NORM A/C	BI-LEVEL	VENT	HEAT	DEF
1	SOURCE	GRA	VAC	VAC	VAC	VAC	VAC	VAC	VAC
2	A/C MODE	TAN	VENT	VAC	VAC	VAC	VAC	VAC	VAC
3	HEAT MODE	BLUE	VAC	VENT	VENT	VENT	VENT	VAC	VAC
4	RECIRC & PLENUM	ORN	VENT	VAC	VENT	VENT	VENT	VENT	VENT
5	DEFROST MODE	BLK	VENT	VENT	VENT	VENT	VENT	VENT	VAC

### CRUISE CONTROL (RPO K34) VACUUM SYSTEM

The cruise control system uses vacuum to operate a servo unit that adjusts throttle position to maintain a desired vehicle speed. The electronic control module of the cruise control system operates a vacuum valve and a vent valve in the servo to trap enough vacuum in the servo to hold the required throttle setting. A vacuum release valve on the brake pedal bracket vents the trapped vacuum to atmosphere when the brake pedal is depressed, allowing the servo to quickly return the throttle to idle.

#### Control Module Functions

The cruise control module continually interprets the setting of the mode control switches, the position of the servo linkage to the throttle and the output of the vehicle speed sensor. In response to these inputs, the cruise control module electrically signals the momentary opening or closing of the vacuum and vent solenoid valves in the servo unit.

#### Servo Unit Functions

The cruise control servo consists of a vacuum-operated diaphragm, a normally closed solenoid valve to admit vacuum to the servo diaphragm chamber, a normally open solenoid valve to vent the diaphragm chamber to atmosphere, and a variable inductance position sensor that signals the position of the servo linkage — and accordingly, the throttle setting — to the cruise control module.

When the system is engaged and operating, the servo operates the throttle as follows:

**Steady Cruise:** Both the vacuum valve and the vent valve are closed, trapping vacuum in the diaphragm chamber to hold a steady throttle setting.

**Vehicle Losing Speed:** The cruise control module opens the vacuum valve to increase the strength of the vacuum in the diaphragm chamber. The vent valve remains closed.

**Vehicle Gaining Speed:** The cruise control module opens the vent valve to the atmosphere to reduce the vacuum in the diaphragm chamber so the throttle return spring can take over and reduce the throttle opening. The vacuum valve remains closed.

The cruise control module pulses the opening of the vacuum valve or the vent valve for minor speed corrections until the vehicle reaches the set speed. Under normal road load conditions, the vacuum valve will remain completely open, instead of pulsing, when vehicle speed drops 5 mph below the set speed. When vehicle speed exceeds 3 mph over the set speed, the vent valve will remain completely open, instead of pulsing.

The servo will go into a completely open vent valve position, returning the throttle to idle, when the brake or clutch pedal is depressed, when electrical power to the system is lost (such as when the cruise control switch or the ignition switch is turned off) or when there is an open in the variable inductance position sensor coil in the servo.

## COMPONENT LOCATION

Page—Figure

Air Conditioning Control Assembly . . . . .	Instrument panel, RH side of instrument cluster . . . . .	178 —	44
Air Conditioning Module . . . . .	Under RH side of instrument panel . . . . .	—	—
Auxiliary Heater Control Switch . . . . .	Instrument panel, to right of steering column . . . . .	178 —	45
Auxiliary Heater Hot Water Valve . . . . .	Forward of cowl, lower RH side of engine compartment . . . . .	—	—
Cruise Control Module . . . . .	On upper LH side of brake pedal bracket . . . . .	181 —	54
Cruise Control Servo . . . . .	Bracket on rear of LH cylinder head (gas engines); bracket on top front of engine behind water pump (diesel engines) . . . . .	182 —	56
Cruise Control Servo Check Valve . . . . .	In vacuum supply line to cruise control servo . . . . .	—	—
Cruise Control Vacuum Release Valve . . . . .	Brake pedal bracket . . . . .	—	—
Vacuum Tank . . . . .	On cowl, LH side of engine compartment . . . . .	—	—

## TROUBLESHOOTING

Conditions most likely to cause vacuum system problems include hoses that leak or become disconnected. With the engine running, either condition is easily detected from the hiss of air at the opening. Other common vacuum problems are kinked or obstructed hoses, hoses connected incorrectly or binding components.

A vacuum pump can be used as a vacuum source to operate components and test the system. The built-in

vacuum gage of the pump provides a means of checking for a vacuum leak as well. Once vacuum is applied to operate the component, the gage should hold steady until the vacuum is purposely released.

On vacuum systems that are controlled by electrical or electronic switches, check for a blown fuse, wiring that is cracked, frayed or burned, and high resistance in connectors of the control circuit(s) before checking for a suspected vacuum system problem.

## TROUBLESHOOTING CHART — AUXILIARY HEATER VACUUM CONTROL

### PRELIMINARY CHECKS

With the engine warmed up and running, verify that the front heater can deliver a strong flow of heated air from the floor outlets with the blower switch on "HI," the mode selector set for heater operation and the temperature lever in the full "HOT" position. If the front

heater or A/C heating system is functioning correctly but the auxiliary heater does not, the problem is in the auxiliary heater system. The following procedure will isolate the cause.

### LITTLE OR NO HEAT FROM AUXILIARY HEATER

TEST	RESULT	ACTION
1. With the engine running and the auxiliary heater "OFF," move the auxiliary heater control rocker switch to "LO" and then to "HI," pausing to listen for a change in the force of the airflow from the heater outlet with the change.	No airflow (or improper airflow).	REFER to "Troubleshooting Chart Auxiliary Heater," page 86.
	Proper airflow in both control switch positions.	GO to step 2.
2. With the engine running and the auxiliary heater switch in "LO," disconnect the vacuum hose at the hot water valve and feel for vacuum at the hose end.	No vacuum.	GO to step 3.
	Vacuum.	GO to step 4.
3. Disconnect the hot water valve vacuum hose at the auxiliary heater control switch and feel for vacuum at the open port of the switch.	No vacuum.	REPAIR vacuum source line or REPLACE auxiliary heater control switch, as necessary.
	Vacuum.	REPAIR or REPLACE faulty hot water valve vacuum hose.
4. Connect all vacuum hoses. With the engine warmed up and running, place the auxiliary heater control switch in "HI." After at least a minute of operation in this mode, carefully feel the temperature of the heater inlet pipe downstream from the hot water valve.	Little or no heat.	REPAIR or REPLACE the hot water valve, heater core or heater hoses and pipes as necessary.
	Adequate heat.	VERIFY complaint. Vacuum system is OK.

## TROUBLESHOOTING CHART — FRONT MANUAL AIR CONDITIONING VACUUM CONTROL

### PRELIMINARY CHECKS

Use the charts in this section to verify that air is either being delivered from an outlet when it should not be, or that air is not being delivered when it should be, during operation in one or more modes.

After making quick checks of the vacuum system

(listening for the hiss of a vacuum leak, checking for proper vacuum hose connections and kinked, pinched or misrouted hoses), be sure the complaint is not caused by a mechanical problem before making additional vacuum system checks.

### IMPROPER AIR DISTRIBUTION FROM OUTLETS

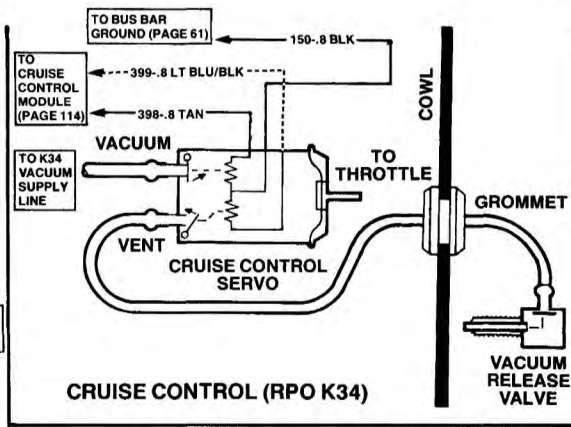
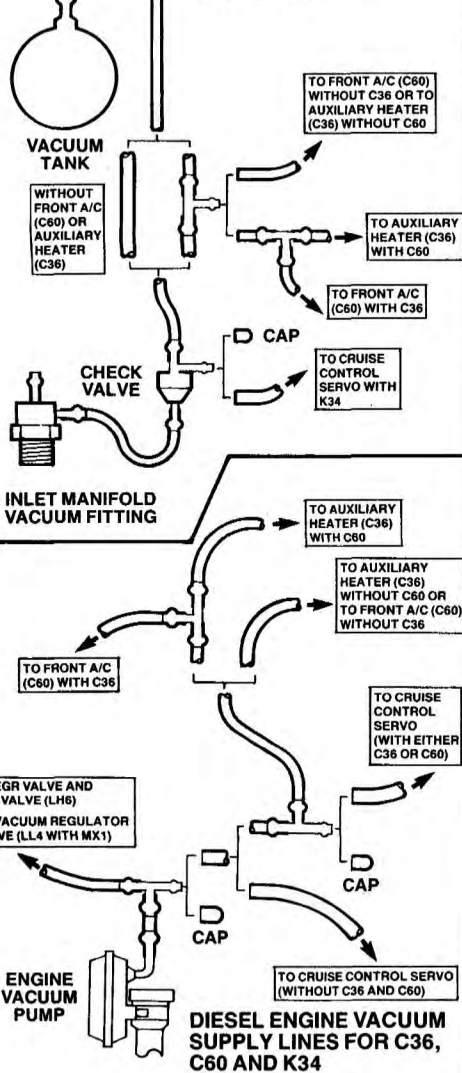
TEST	RESULT	ACTION
1. Disconnect the vacuum hose at the actuator for the inoperative air valve ("door"). With the engine idling and the mode lever set in a position that will apply vacuum to the actuator, check for vacuum at the disconnected hose.	Vacuum at or near engine vacuum at idle.	REPAIR binding condition in air valve or linkage. (If no binding is found, REPLACE actuator.)
	Little or no vacuum.	GO to step 2.
2. Disconnect the vacuum hose harness at the rotary selector valve on the A/C control assembly. With the same test conditions as in step 1, check for vacuum at the rotary selector valve port that feeds the suspected vacuum hose.	Vacuum at or near engine vacuum at idle.	REPAIR obstruction or vacuum leak in hose to the affected actuator.
	Little or no vacuum.	GO to step 3.
3. With the vacuum supply hose disconnected from the rotary selector valve and with the same test conditions as in step 2, check for vacuum at the open end of the tan vacuum supply hose.	Vacuum at or near engine vacuum.	REPLACE rotary selector valve.
	Little or no vacuum.	REPAIR obstruction or vacuum leak in vacuum supply hose.

## TROUBLESHOOTING CHART — CRUISE CONTROL VACUUM HARNESS

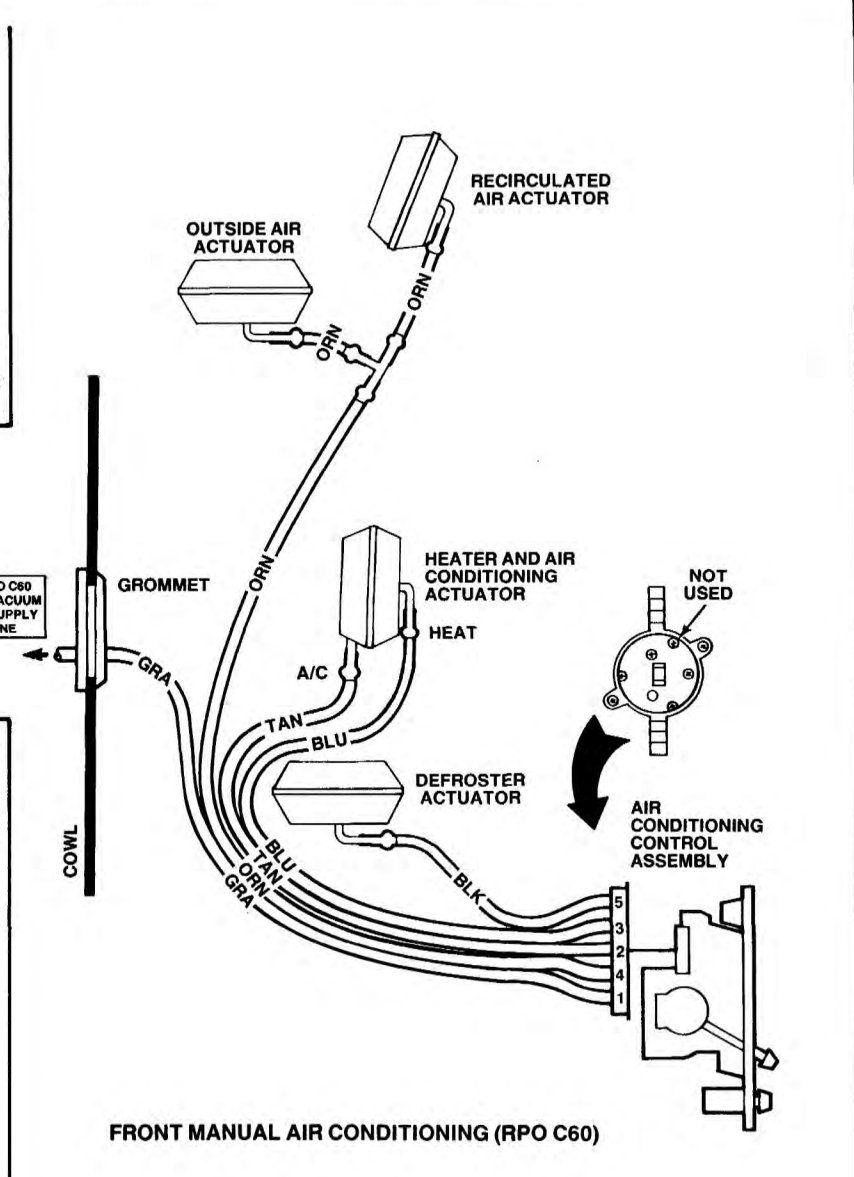
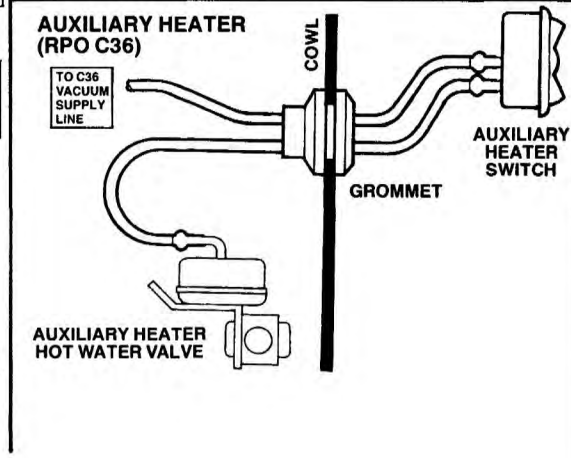
### CRUISE CONTROL DOES NOT OPERATE

TEST	RESULT	ACTION
1. Disconnect vacuum hose (smaller hose) at vacuum valve inlet of servo unit. Connect a vacuum gage to the disconnected hose. Start engine and allow it to idle. Measure vacuum at vacuum hose.	Vacuum is less than normal engine vacuum at idle.	REPAIR vacuum pump (diesel engine) or air leak in hose or connections between cruise control servo and vacuum source (inlet manifold vacuum fitting or vacuum pump).
	Vacuum is same as normal engine vacuum at idle.	GO to step 2 (gas engine). Verify complaint (diesel engine).
2. Momentarily accelerate engine sharply while watching vacuum gage.	Vacuum reduces noticeably as engine accelerates.	REPLACE check valve in line from vacuum source.
	Vacuum does not change.	GO to step 3.
3. Stop engine. Disconnect vacuum gage and connect vacuum hose to servo unit. Disconnect vent hose (larger hose) from servo unit and connect a vacuum pump with built-in vacuum gage to the disconnected hose. Operate vacuum pump to obtain the same vacuum as observed in step 1. Stop pumping and observe the vacuum reading.	Vacuum drops.	REPAIR air leak in hose or connections, or ADJUST or REPLACE vacuum release valve on brake pedal bracket.
	Vacuum does not change.	REFER to "Troubleshooting Chart Cruise Control," page 112.

**GAS ENGINE VACUUM SUPPLY LINES FOR C36, C60 AND K34**



- RPO LEGEND**
- C36 — AUXILIARY HEATER
  - C60 — FRONT MANUAL AIR CONDITIONING
  - K34 — CRUISE CONTROL
  - LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C
  - LL4 — 6.2L (378 CU. IN.) HEAVY DUTY V8 DIESEL ENGINE VIN J
  - MX1 — 3-SPEED AUTOMATIC TRANSMISSION



## CIRCUIT OPERATION

### POWER BRAKE BOOSTER VACUUM SYSTEM

The power brake booster is a tandem diaphragm vacuum-suspended unit. When the engine is running, inlet manifold vacuum is transmitted to the booster unit through a vacuum hose. A check valve at the power brake booster end of the hose keeps air from flowing from the hose into the booster unit and weakening the power brake operating force when inlet manifold vacuum is low.

With the service brakes released, vacuum is supplied equally to both sides of the two diaphragms in the booster unit. Because pressures on both sides of the diaphragms are balanced, no boost is provided to the braking system and the brakes are not applied.

When the driver presses down on the brake pedal, the pedal pushrod depresses a spring-loaded air valve within the power brake booster. The air valve opens to admit air at atmospheric pressure to the back side of both diaphragms. This forces the diaphragms forward and causes a piston rod in the booster unit to push the brake master cylinder pistons and apply the service brakes.

The amount of atmospheric air admitted to the back side of both diaphragms depends upon the force the driver applies to the brake pedal. The greater the pedal pressure, the more the valve opens. This provides a power boost that multiplies the force applied to the master cylinder pistons in proportion to the pressure on the brake pedal.

When the brake pedal is released, the flow of atmospheric air is cut off and inlet manifold vacuum draws off the air behind the diaphragms. As a result, air pressures within the diaphragm chambers are once again balanced so no power boost is developed.

### EGR VALVE VACUUM SYSTEM

The exhaust gas recirculation (EGR) system allows a small amount of exhaust gas to flow from the exhaust manifold into the inlet manifold when the throttle is opened beyond idle and inlet manifold vacuum is normal. This reduces combustion temperatures in the engine to control oxides of nitrogen emissions.

The EGR valve is operated by an integral vacuum actuator that controls a pintle within the valve. The pintle remains closed to prevent exhaust gas recirculation until vacuum is applied to the actuator. The vacuum causes the pintle to open, allowing the measured flow of exhaust gas to enter the inlet manifold.

The EGR system used with gasoline engines remains closed during periods of engine idle and deceleration to prevent rough idle from excessive dilution of the fuel-air mixture. It also remains closed at wide open throttle to prevent power loss. At other times, it rapidly cycles open

and closed to modulate the flow of exhaust gas as required. Under certain circumstances, it may remain fully open to provide the maximum EGR.

In gasoline engines, the manifold absolute pressure (MAP) sensor measures the strength of inlet manifold vacuum in the EGR vacuum circuit and sends a signal back to the electronic control module (ECM). The ECM uses the signal from the MAP sensor to control fuel delivery and ignition timing. In addition, the ECM will adjust the on-off intervals of the EGR valve to correct the flow of exhaust gas into the cylinders if actual vacuum differs from the preferred vacuum as calculated by the ECM. This provides the required control of oxides of nitrogen emissions while retaining engine performance under all operating conditions.

Vacuum for the EGR system of gasoline engines is taken from the throttle body and routed through a hose to the electronic vacuum regulator valve (EVRV). This valve is controlled by the 435 circuit from the ECM. When the EVRV solenoid is energized, the valve routes vacuum to the EGR actuator. The actuator opens the EGR pintle valve to allow exhaust gas to flow into the inlet manifold. When the EVRV solenoid is released, the valve vents the EGR actuator to outside air to close the EGR pintle valve.

In the LH6 diesel engine, the operation of the EGR valve is assisted by the exhaust pressure regulator (EPR) valve. At idle, the EPR valve increases exhaust back pressure to force more exhaust through the EGR valve and reduce combustion temperatures. The vacuum which operates the EGR valve and the EPR valve is supplied by an engine-driven vacuum pump.

The electronic control module (ECM) controls the EGR valve solenoid to regulate the vacuum to the EGR valve in the same way as with a gasoline engine. The ECM calculates the amount of exhaust gas recirculation based on inputs from the engine speed sensor and the throttle position sensor, and pulses the EGR valve solenoid to control EGR. The manifold absolute pressure (MAP) sensor monitors the control of exhaust gas recirculation as indicated by the air pressure in the EPR vacuum line. If actual vacuum differs from the preferred vacuum as calculated by the ECM, the ECM will adjust the on-off intervals of the EGR valve to correct the flow of exhaust gas into the cylinders.

When the ECM recognizes the operating range in which no exhaust gas recirculation is needed, the EGR vent solenoid opens to vent the vacuum at the EGR valve.

At idle, the ECM energizes the EPR valve solenoid to send vacuum to close the EPR valve. This increases exhaust back pressure to force more exhaust gas through the EGR system and lower combustion temperatures to reduce oxides of nitrogen emissions.

### TRANSMISSION VACUUM MODULATOR SYSTEM

Shift points and oil pressure of the MX1 three speed automatic transmission are controlled by a vacuum modulator that responds to engine vacuum as an indicator of engine operation. The vacuum modulator controls modulator oil pressure within the transmission to hold the 1-2 and 2-3 shift valves closed until governor oil pressure increases with an increase in engine speed or torque and forces an upshift. A part-throttle 3-2 downshift is forced when the accelerator pedal is depressed enough to over-

come the force of governor oil while operating in third gear.

With L05 and L19 gasoline engines, vacuum is taken from the inlet manifold and routed directly to the transmission vacuum modulator. In the LL4 heavy duty diesel engine, vacuum is supplied by the engine-driven vacuum pump and modified by the vacuum regulator valve on the injection distributor pump before reaching the transmission vacuum modulator.

### COMPONENT LOCATION

	Page — Figure
EGR Valve Hose Vacuum Source:	
Gasoline Engines . . . . .	Front of throttle body, port "J" (NA1 Light Duty Emissions); Front of throttle body, port "S" (NA4 Heavy Duty Emissions) . . . . . —
LH6 Diesel Engine (Combined EGR Valve/EPR Valve Hose Vacuum Source) . . . . .	T-fitting in line from vacuum pump, RH rear of engine . . . . . —
EGR Valve Solenoid:	
LH6 Diesel Engine . . . . .	On bracket, LH rear of engine . . . . . 173 — 26
EGR Valve Vent Solenoid:	
LH6 Diesel Engine . . . . .	On bracket, LH rear of engine . . . . . —
Electronic Vacuum Regulator Valve Solenoid:	
L05/L19 Gasoline Engines . . . . .	On bracket, inboard side of RH cylinder head . . . . . 175 — 34
EPR Valve Solenoid:	
LH6 Diesel Engine . . . . .	On bracket, LH rear of engine . . . . . 173 — 26
Exhaust Gas Recirculation (EGR) Valve	
L05 V8 Engine . . . . .	Rear of inlet manifold . . . . . 171 — 21
L19 V8 Engine . . . . .	Front of inlet manifold, LH side . . . . . 171 — 21
LH6 Diesel Engine . . . . .	In air intake of inlet manifold . . . . . 173 — 26
Exhaust Pressure Regulator (EPR) Valve:	
LH6 Diesel Engine . . . . .	Between LH exhaust manifold and exhaust pipe . . . . . 173 — 26
MAP Sensor:	
Gasoline Engines . . . . .	On bracket, RH cylinder head . . . . . 176 — 37
LH6 Diesel Engines . . . . .	Upper front of cowl, RH side . . . . . 170 — 18
MAP Sensor Hose Vacuum Source:	
Gasoline Engines . . . . .	Rear of throttle body, port "F" . . . . . 176 — 37
LH6 Diesel Engine . . . . .	Branch fitting at EGR valve hose connection to EGR valve solenoid, LH rear of engine . . . . . —
Power Brake Booster Unit . . . . .	Front of cowl, LH Side . . . . . —
Power Brake Hose Vacuum Fitting:	
L05 V8 Gasoline Engine . . . . .	Front of inlet manifold riser, LH side . . . . . —
L19 V8 Gasoline Engine . . . . .	Rear of inlet manifold riser, RH side . . . . . —
Transmission Vacuum Modulator Hose Vacuum Source:	
Gasoline Engines . . . . .	On rear of inlet manifold . . . . . —
LL4 Diesel Engine . . . . .	T-fitting in line from vacuum pump, RH rear of engine . . . . . —
Transmission Vacuum Modulator (MX1 three-speed automatic transmission) . . . . .	RH side of transmission case, just above transmission oil pan flange . . . . . —

## PRELIMINARY CHECKS:

### POWER BRAKE BOOSTER VACUUM SYSTEM

Little or no power assist upon brake application can be caused by a faulty power brake booster vacuum system. A simple two-step procedure can be used to check out the vacuum system if a visual inspection fails to uncover the cause.

- With the engine off, apply and release the brake a number of times to exhaust all vacuum from the power brake booster. As many as 8 to 10 strokes may be required. Then hold your foot on the brake pedal with a firm pressure (comparable to the pressure required to bring the vehicle to a normal gradual stop). While maintaining a steady pressure, start the engine. If the vacuum system is working properly, you should feel the brake pedal "fall away" slightly under your foot as the engine starts. If there is no power assist, refer to the R/V, G and P Truck Service Manual, Section 5A-1.
- With no pressure applied to the brake pedal, shut off the engine and allow the vehicle to stand undisturbed for 3-5 minutes. Then depress and release the brake pedal a number of times until firm resistance is met with very little brake pedal travel. A vacuum leak or a faulty check valve at the booster unit end of the vacuum hose is indicated if firm resistance is encountered with very little brake pedal travel on the first few strokes.

### EGR VALVE VACUUM SYSTEM

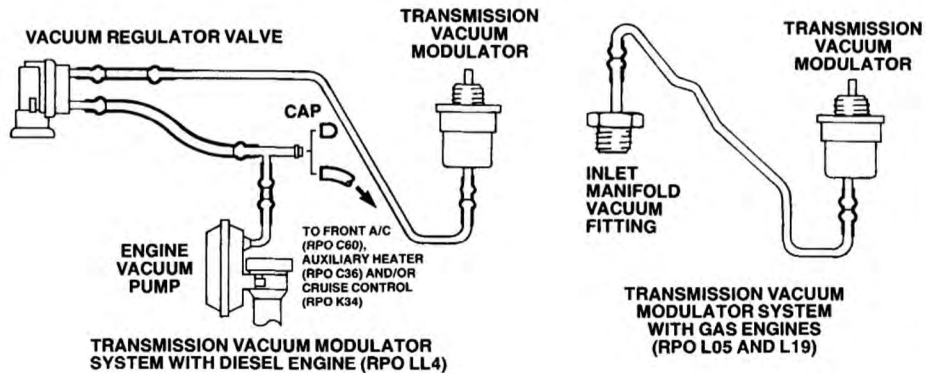
A leak in the EGR (exhaust gas recirculation) vacuum system can upset the ECM's programmed control of exhaust gas recirculation and adversely affect engine operation. Too much exhaust gas recirculation at idle or cruise with a gasoline engine can result in the engine stalling after closed throttle deceleration, surging during steady throttle cruising, or a rough idle. Too little exhaust gas flow allows combustion temperatures to become too high and bring about detonation ("spark knock") or an overheated engine. In addition, nitrous oxide emissions may be high enough to cause the vehicle to fail an emissions test.

Because the source of an EGR system symptom might be traced to a mechanical or electrical condition as well as a faulty vacuum system, an effective systematic diagnosis procedure should examine all three categories of components — not just the vacuum system alone. Therefore, no exclusive vacuum system diagnosis procedures are provided here. For more information on the EGR system, refer to the "Fuel and Emissions Service Manual."

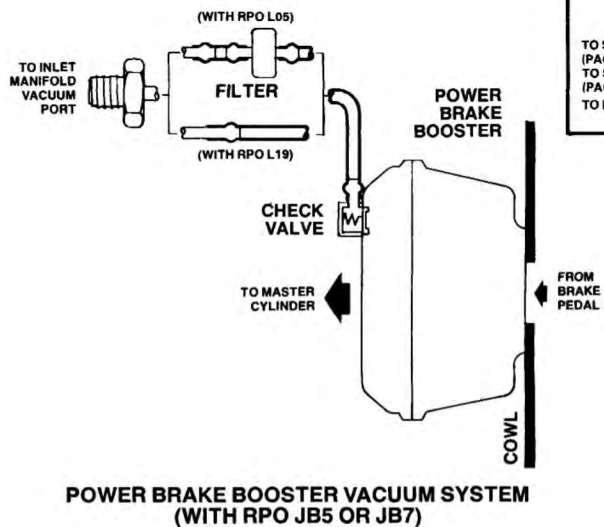
### TRANSMISSION VACUUM MODULATOR VACUUM SYSTEM

A leak in the vacuum system for the transmission vacuum modulator of the MX1 three speed automatic transmission can cause high line pressure in the transmission hydraulic control system, a condition that can result in a variety of upshift problems ranging from delayed upshifts to no 1-2 or 2-3 shifts. An improper engine speed signal from the vacuum system of the LH6 diesel engine can result in early, soft or slipping shifts or no part-throttle downshifts as well as the symptoms mentioned in the previous sentence.

The conditions described here may be caused by a vacuum system problem. However, mechanical or hydraulic conditions also might cause the same problems. Therefore, it is advisable to follow diagnosis procedures that check out all possibilities in a systematic order, not just a check for a malfunctioning vacuum component. For effective diagnosis procedures, refer to the R/V, G and P Truck Service Manual, Section 7A2.

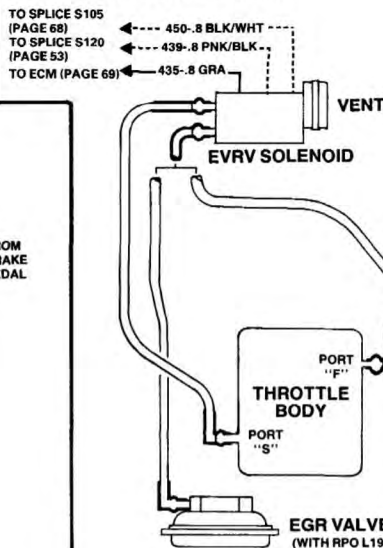


**TRANSMISSION VACUUM MODULATOR SYSTEM (WITH RPO MX1)**

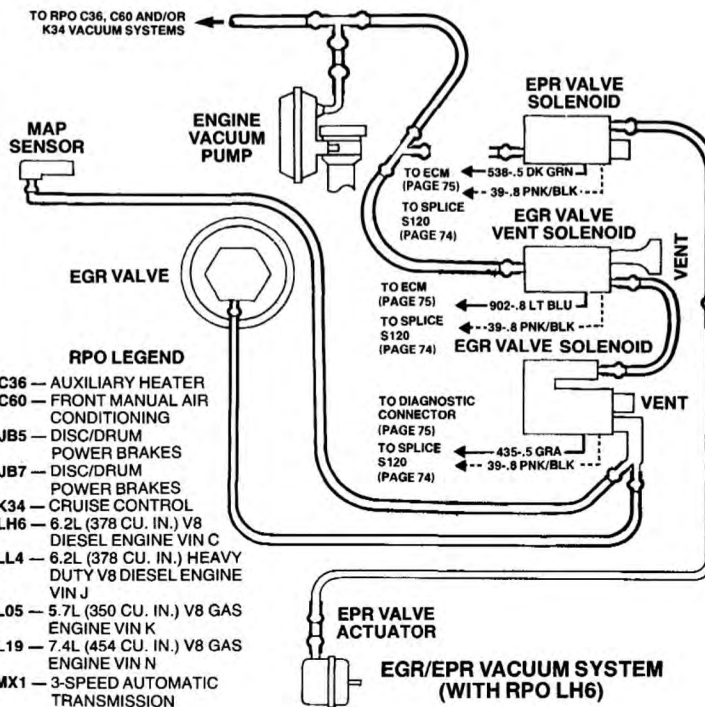


**POWER BRAKE BOOSTER VACUUM SYSTEM (WITH RPO JB5 OR JB7)**

**EXHAUST GAS RECIRCULATION VACUUM SYSTEM**



**EGR VALVE VACUUM SYSTEM (WITH RPO L05 AND L19)**



**RPO LEGEND**

- C36 — AUXILIARY HEATER
- C60 — FRONT MANUAL AIR CONDITIONING
- JB5 — DISC/DRUM POWER BRAKES
- JB7 — DISC/DRUM POWER BRAKES
- K34 — CRUISE CONTROL
- LH6 — 6.2L (378 CU. IN.) V8 DIESEL ENGINE VIN C
- LL4 — 6.2L (378 CU. IN.) HEAVY DUTY V8 DIESEL ENGINE VIN J
- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- MX1 — 3-SPEED AUTOMATIC TRANSMISSION



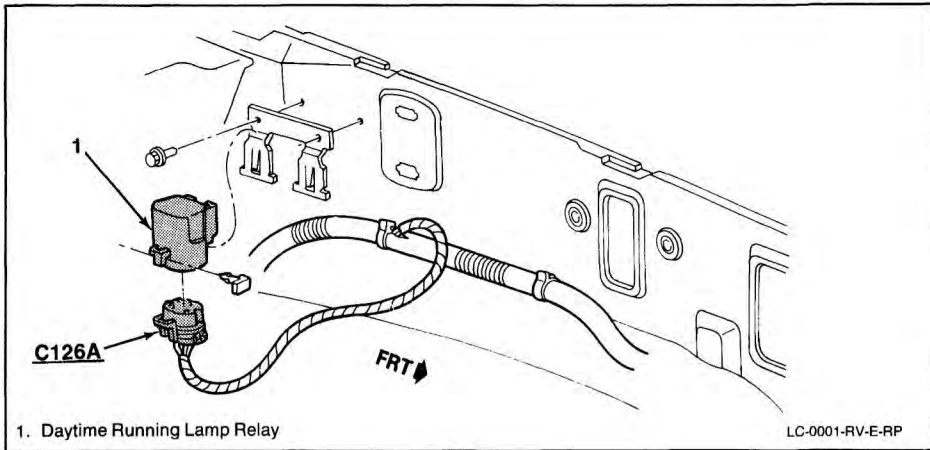


Figure 1 - Daytime Running Lamps Relay (Canada Only)

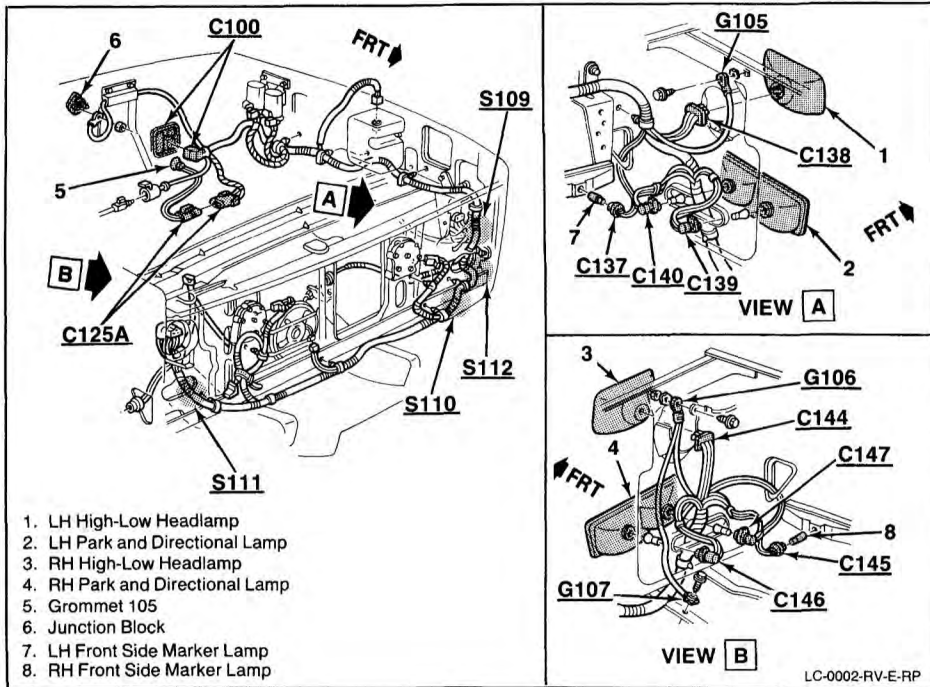


Figure 2 - Front Headlamps-Base

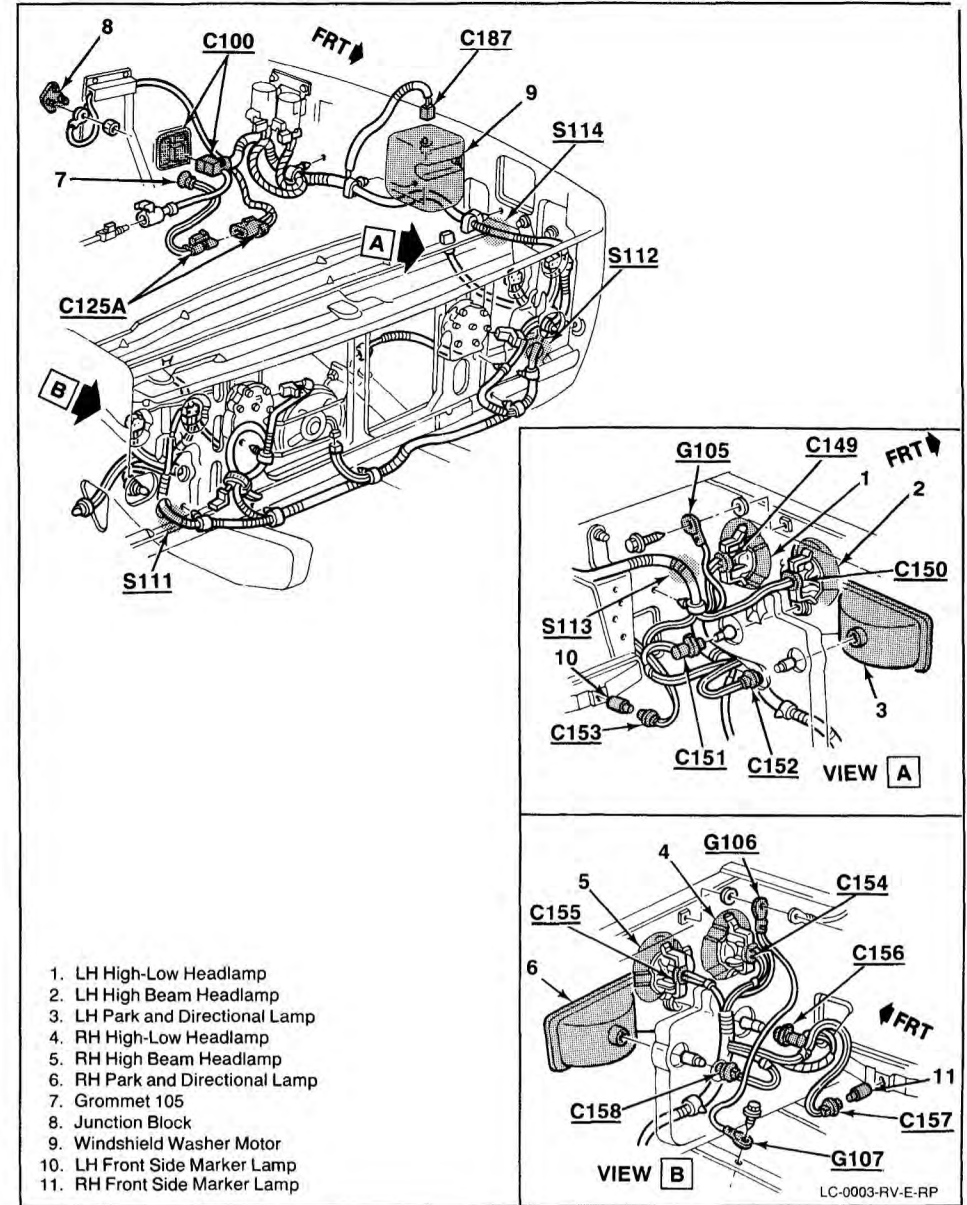


Figure 3 - Front Headlamps-Dual Headlamps RPO V22

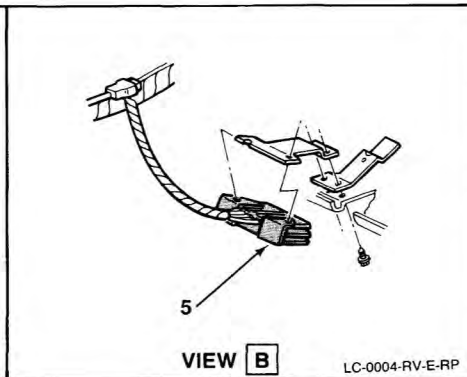
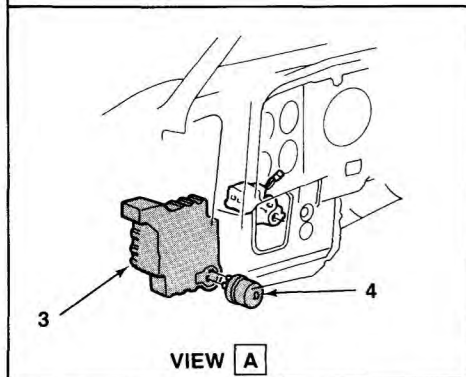
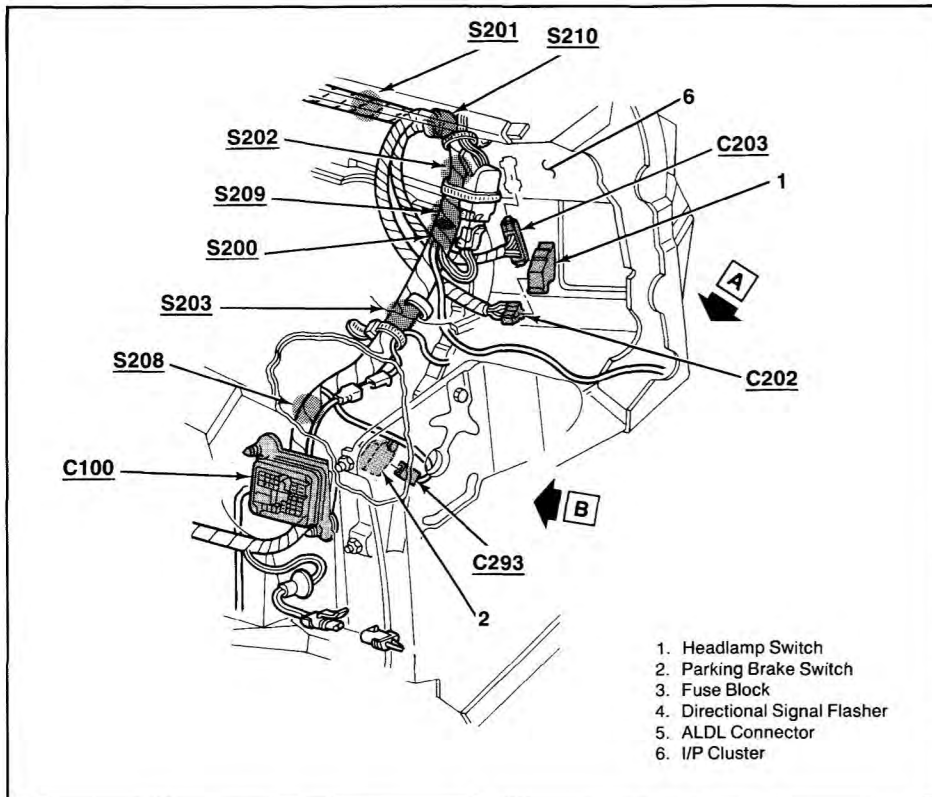


Figure 4 - Headlamp Switch and Fuse Block

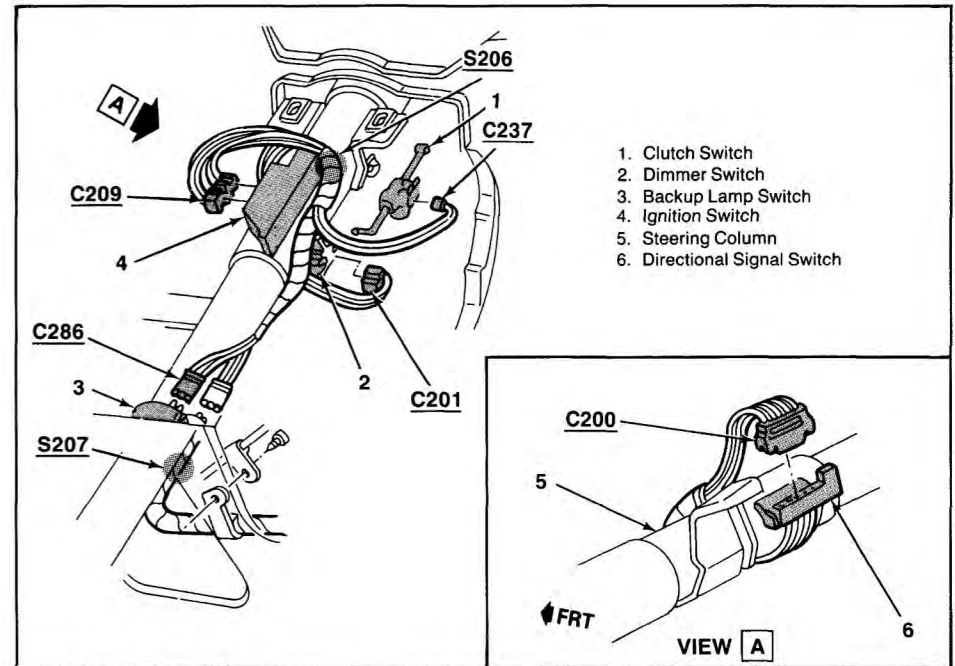


Figure 5 - Dimmer Switch

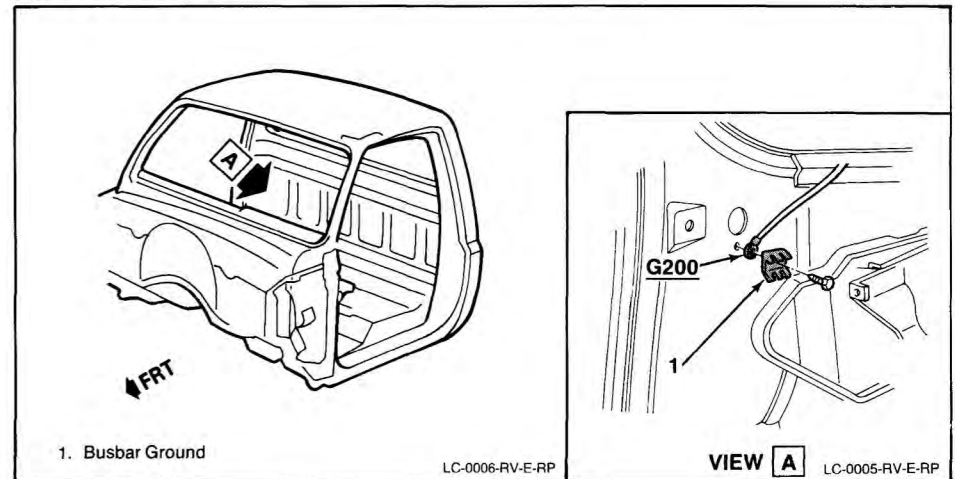


Figure 6 - I/P Ground

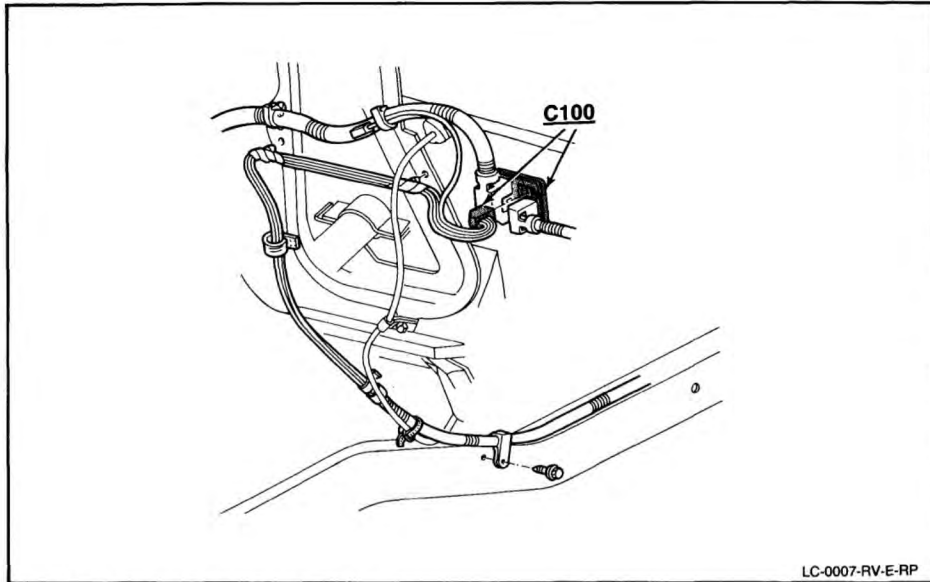


Figure 7 - Rear Lamps Wiring Extension Harness

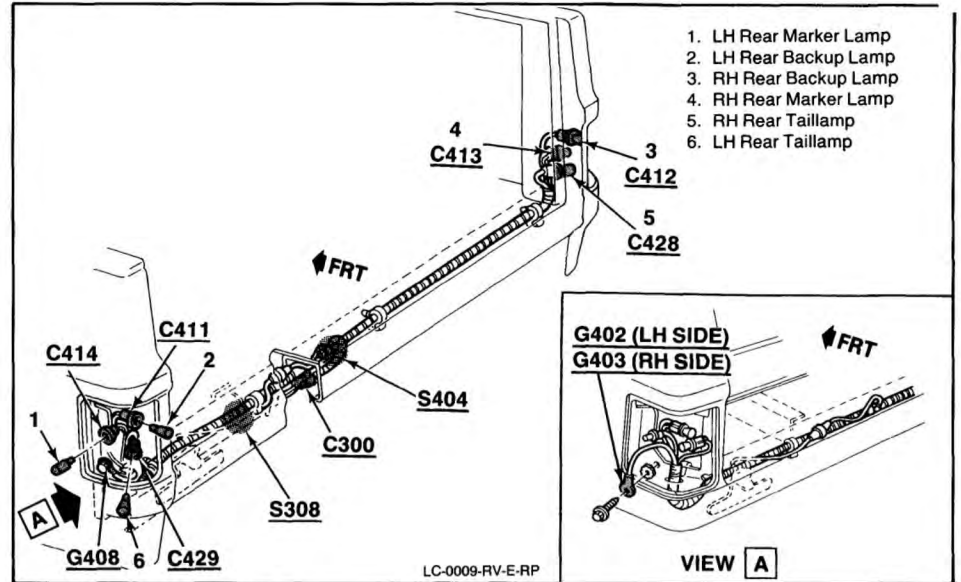


Figure 9 - Rear Lamps-Fleetside

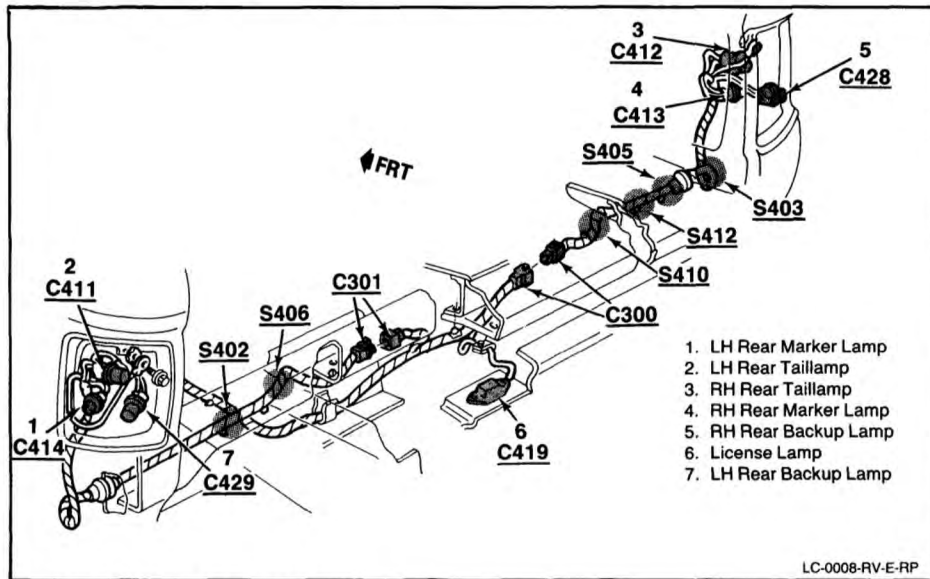


Figure 8 - Rear Lamps-Suburban and Utility

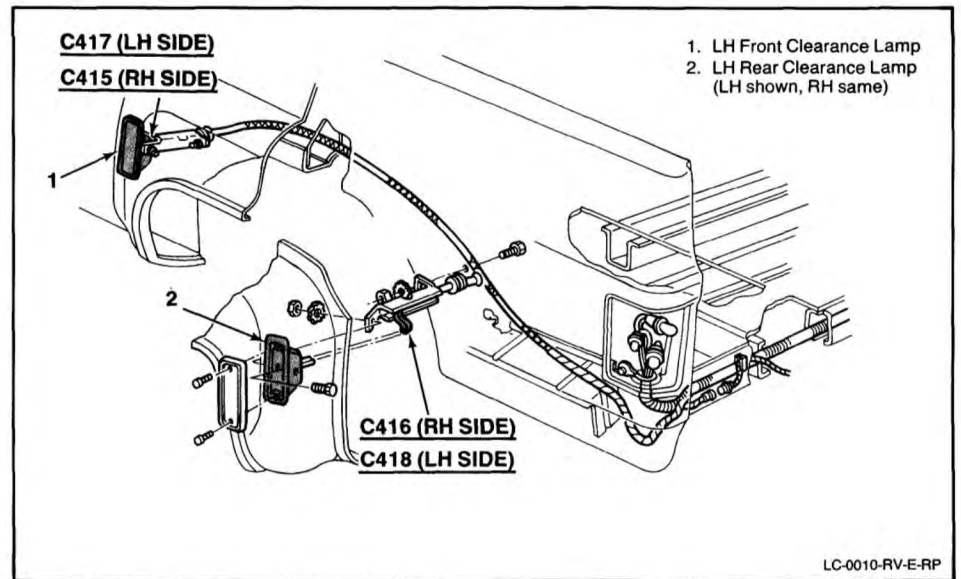


Figure 10 - Side Clearance Lamps-RPO R05

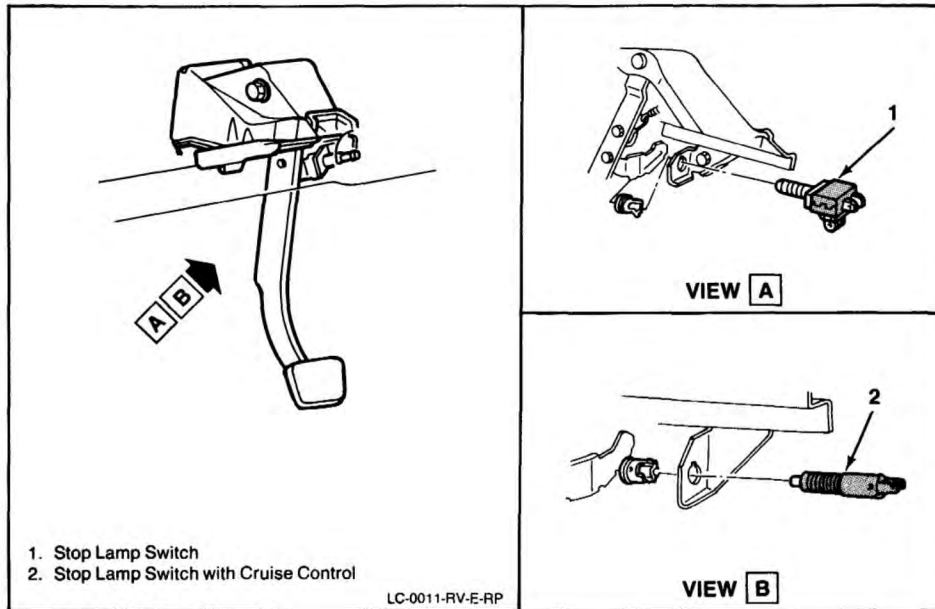


Figure 11 - Stop Lamp Switch

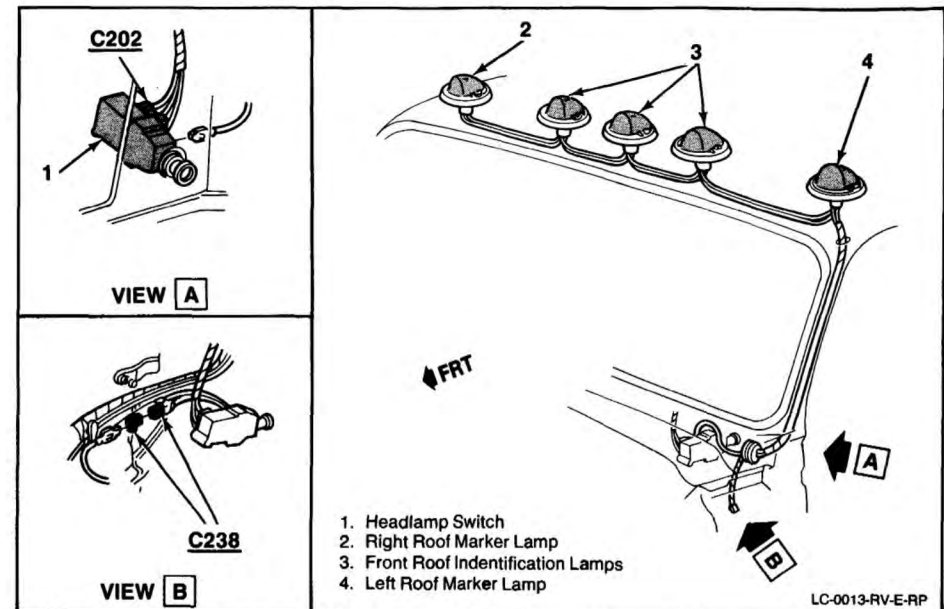


Figure 13 - Roof Marker Lamps (RPO U01)

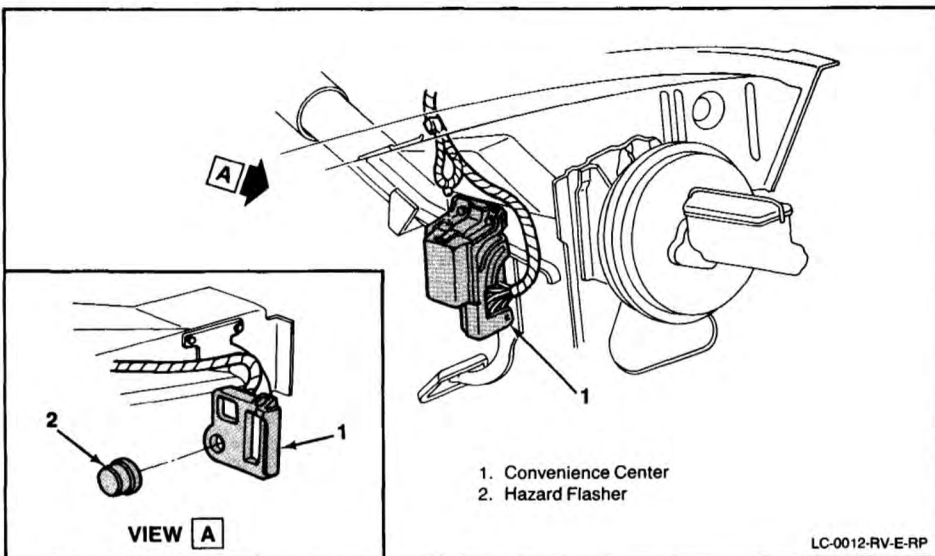


Figure 12 - Convenience Center

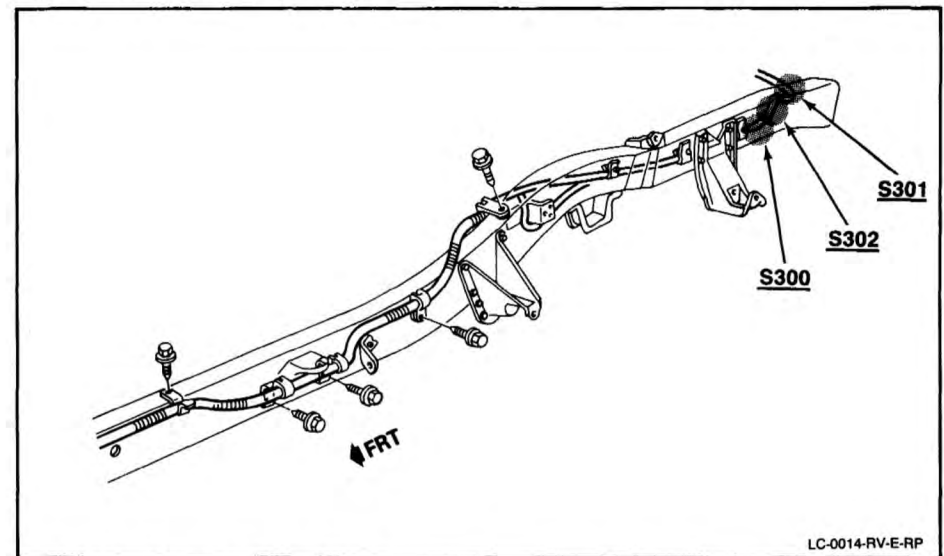


Figure 14 - Rear Lamps Extension Harness

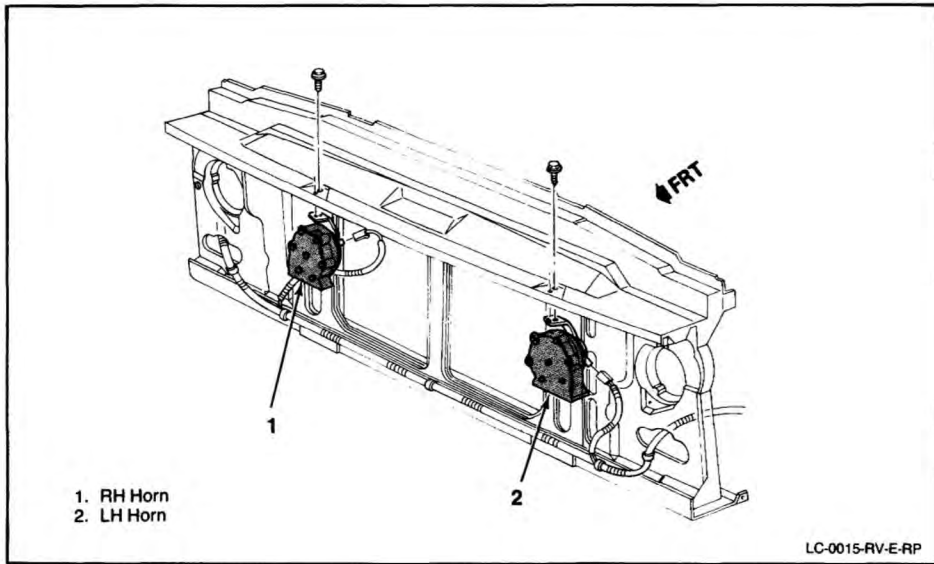


Figure 15 - Horn Assemblies

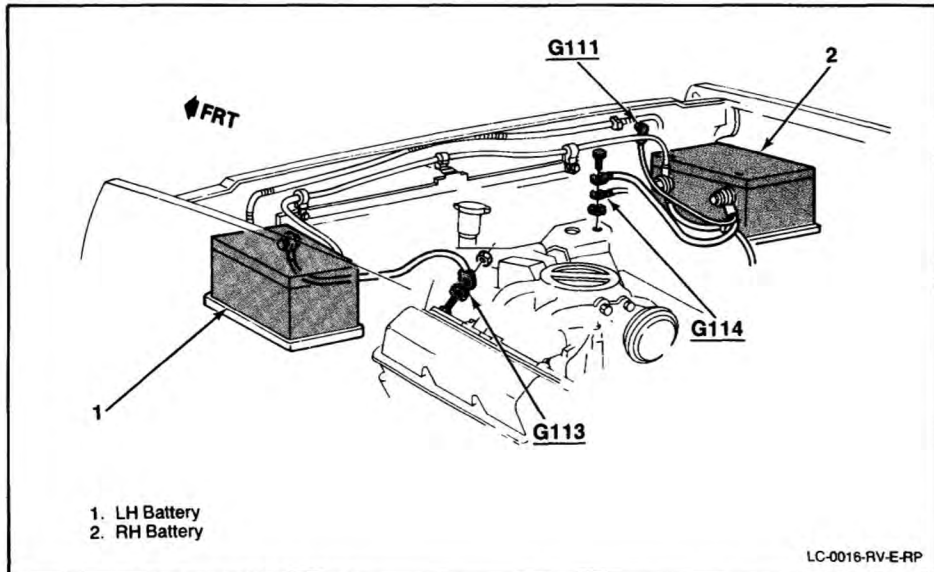


Figure 16 - Batteries — RPO LH6 and LL4

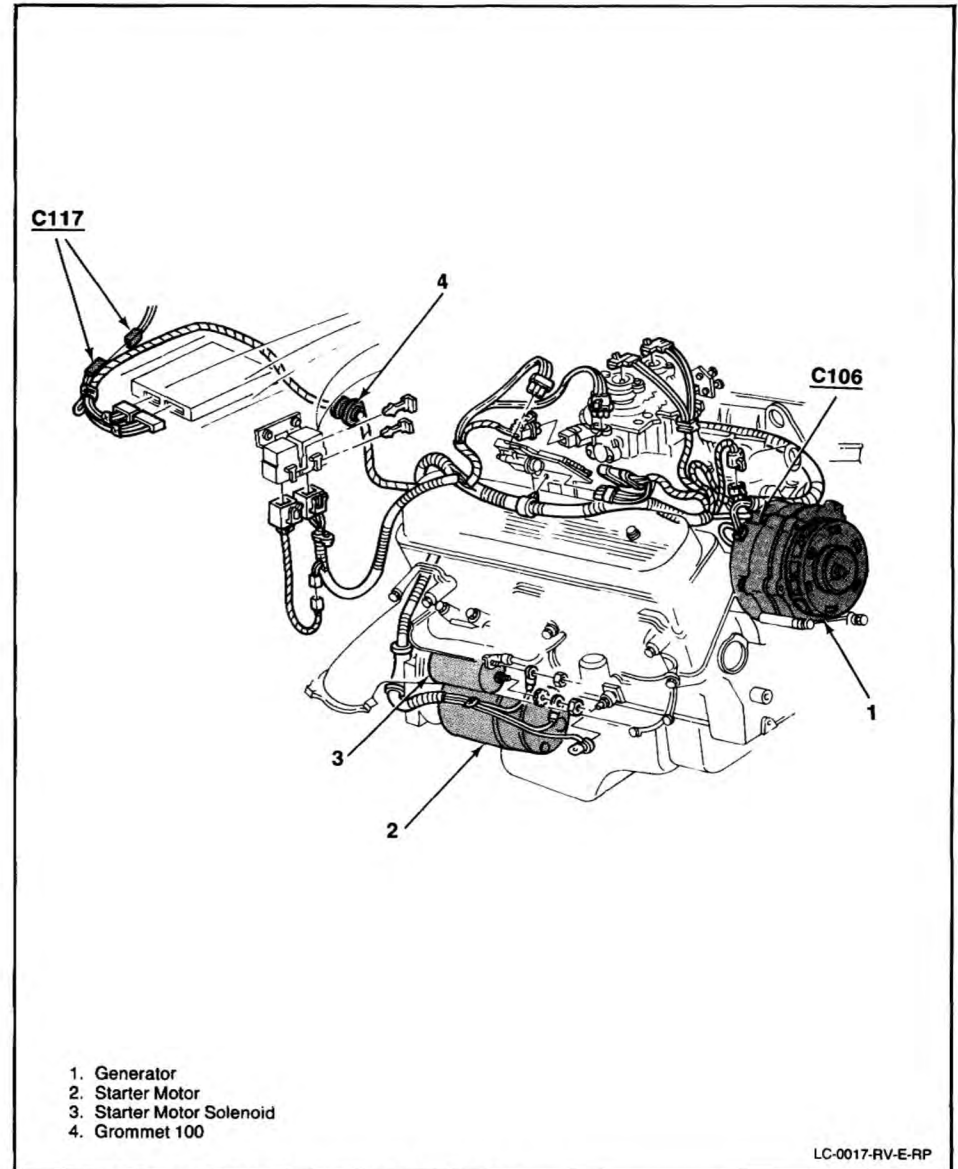


Figure 17 - Generator and Starter Motor — RPO L05 and L19

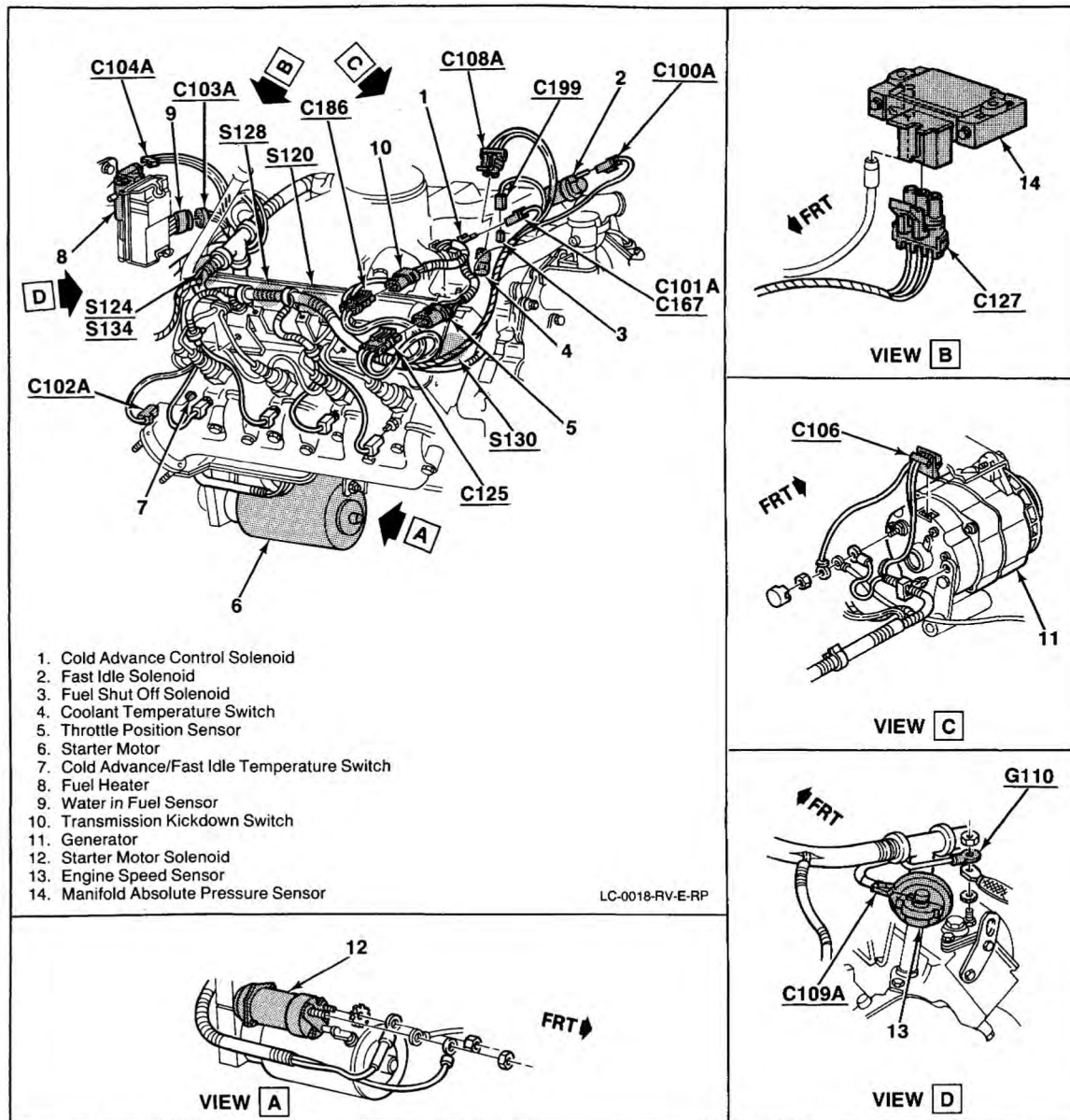


Figure 18 - Engine Wiring Harness — RH Side — RPO LH6 and LL4

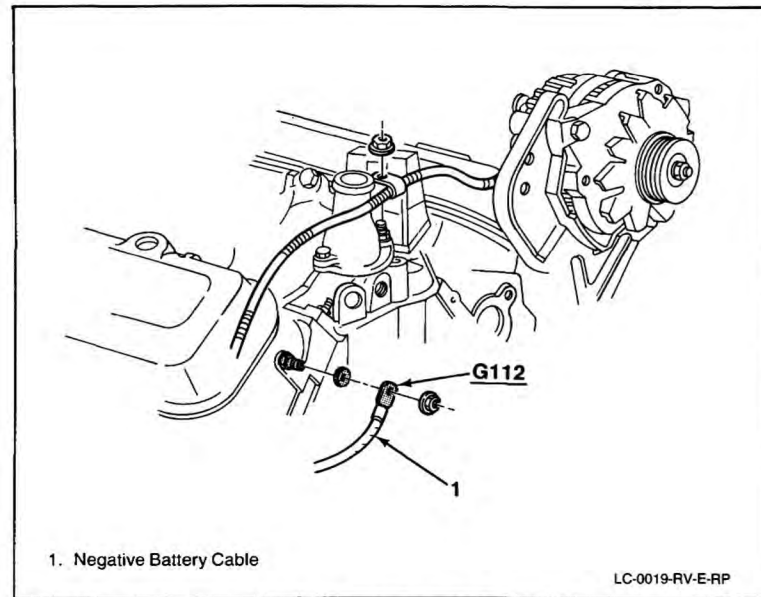


Figure 19 - Battery to Engine Ground — RPO L05 and L19

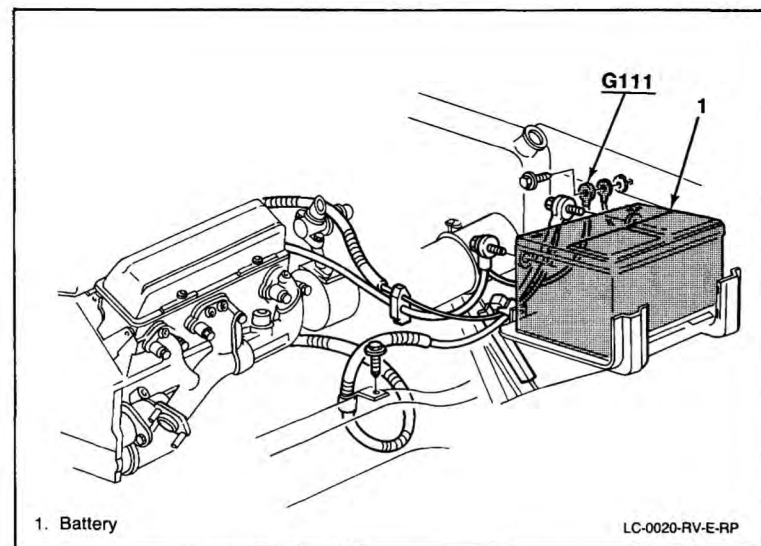
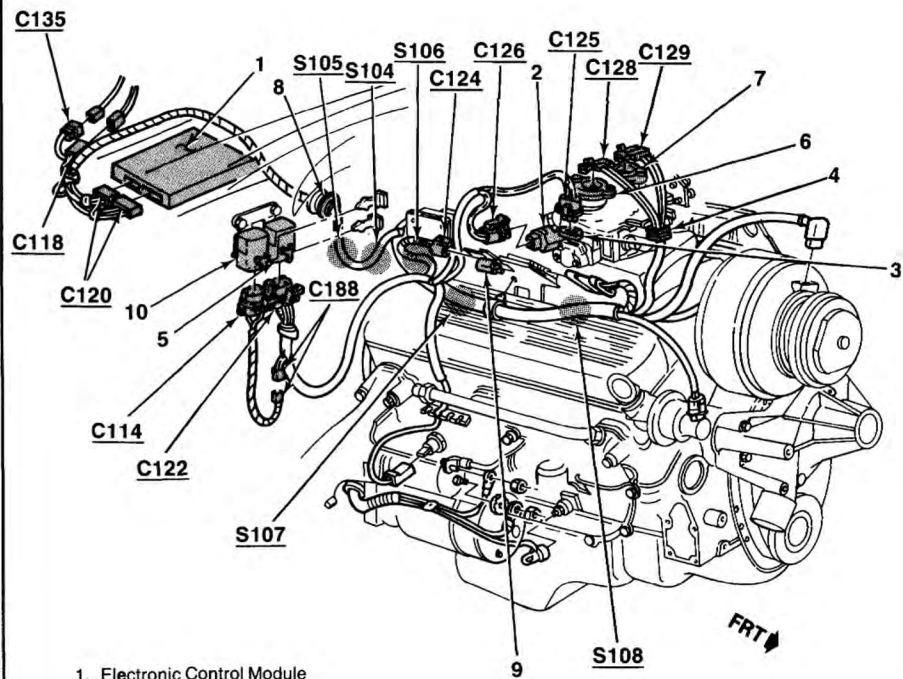


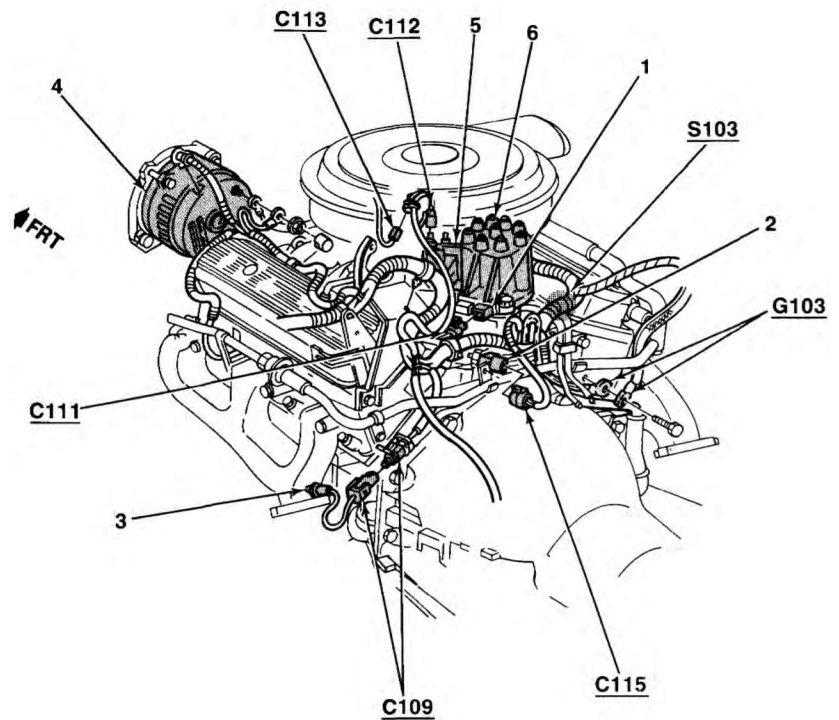
Figure 20 - Battery — RPO L05 and L19



1. Electronic Control Module
2. Idle Air Control Actuator
3. Throttle Position Sensor
4. Grommet 101
5. Fuel Pump Relay
6. Fuel Injector 1
7. Fuel Injector 2
8. Grommet 100
9. EGR Solenoid
10. Transmission Kickdown Relay

LC-0021-RV-E-RP

Figure 21 - Engine Wiring, Right Side — RPO L05



1. Electronic Spark Timing Module
2. Fuel Pump Oil Pressure Switch
3. Oxygen Sensor
4. Generator
5. Coil
6. Distributor

LC-0022-RV-E-RP

Figure 22 - Engine Wiring, Rear Left Side — RPO L05  
(Suburban/Utility)

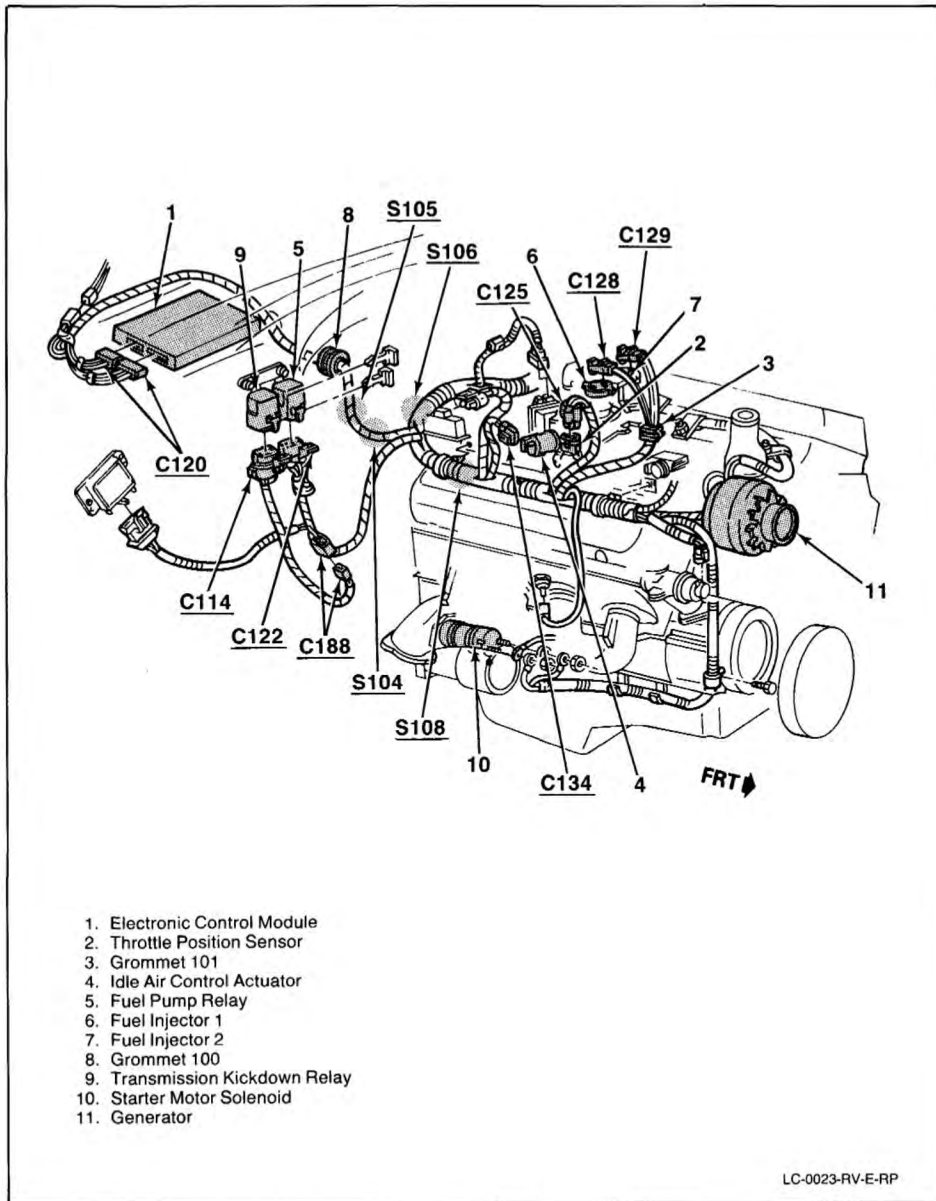


Figure 23 - Engine Wiring, Right Side — RPO L19

COMPONENT LOCATOR VIEWS  
 SECTION A - PAGE 172

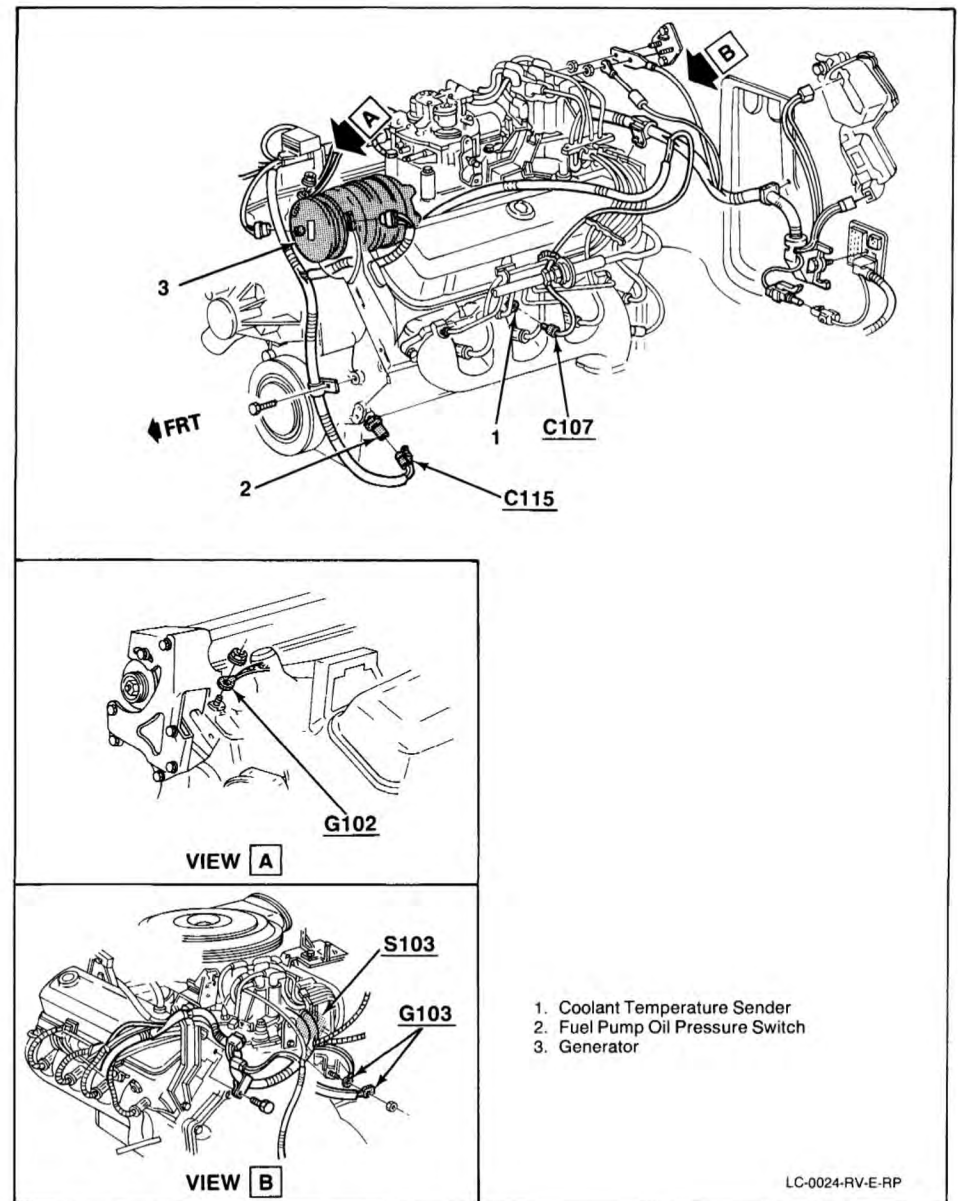


Figure 24 - Engine Wiring, Rear Left Side — RPO L19 (Fleetside)



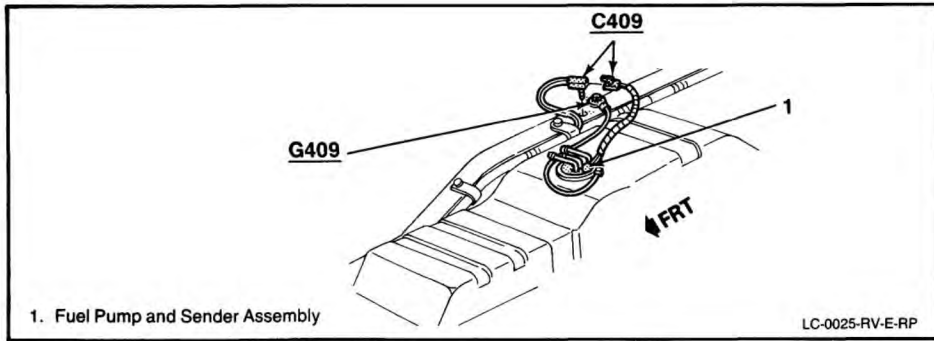


Figure 25 - Fuel Pump and Sender Assembly

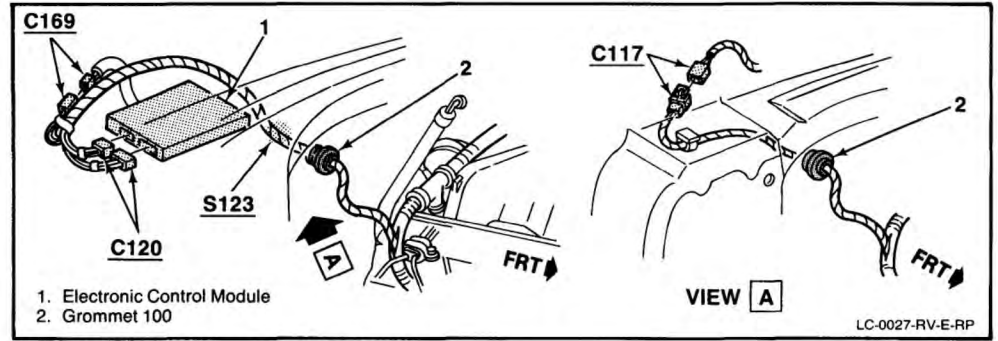


Figure 27 - Electronic Control Module — Diesel

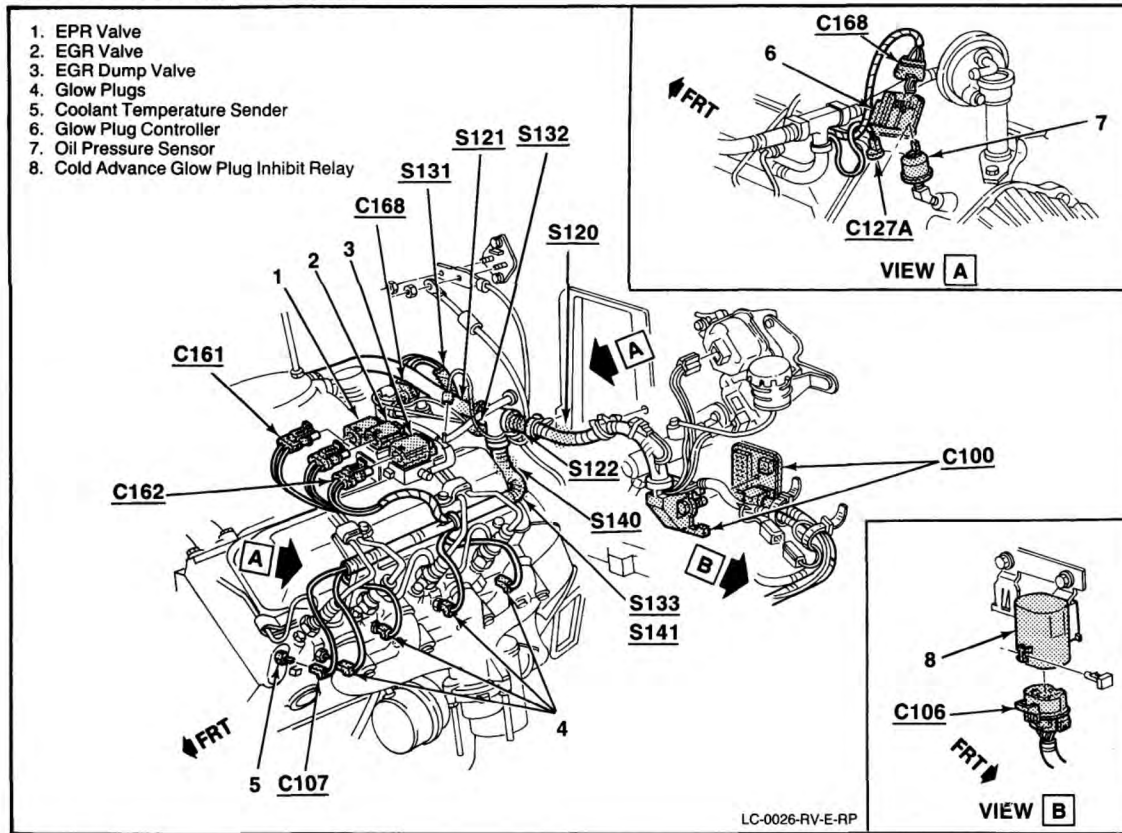


Figure 26 - Diesel Engine Harness — LH Side

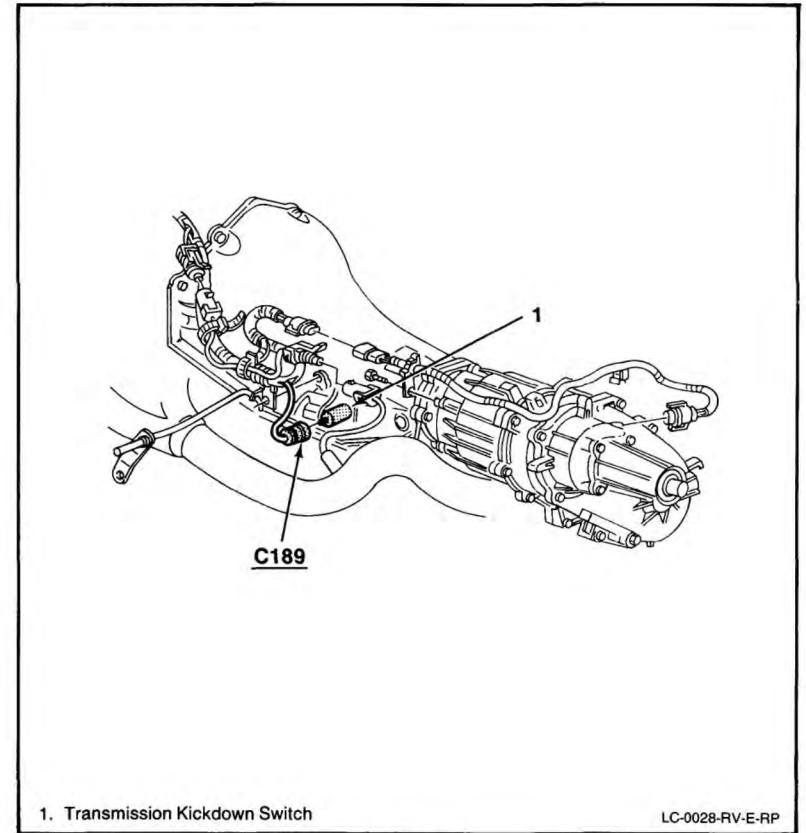


Figure 28 - Transmission Kickdown Switch - RPO M40

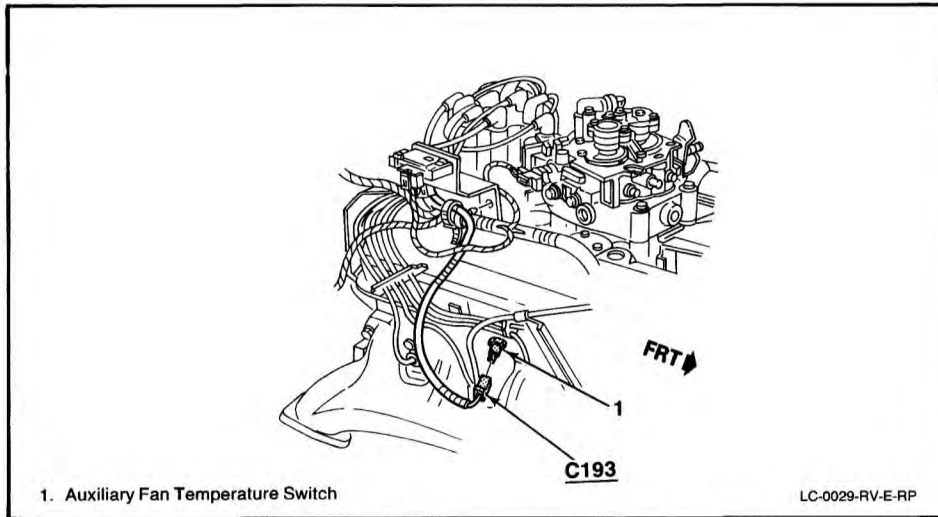


Figure 29 - Auxiliary Cooling Fan Wiring Harness

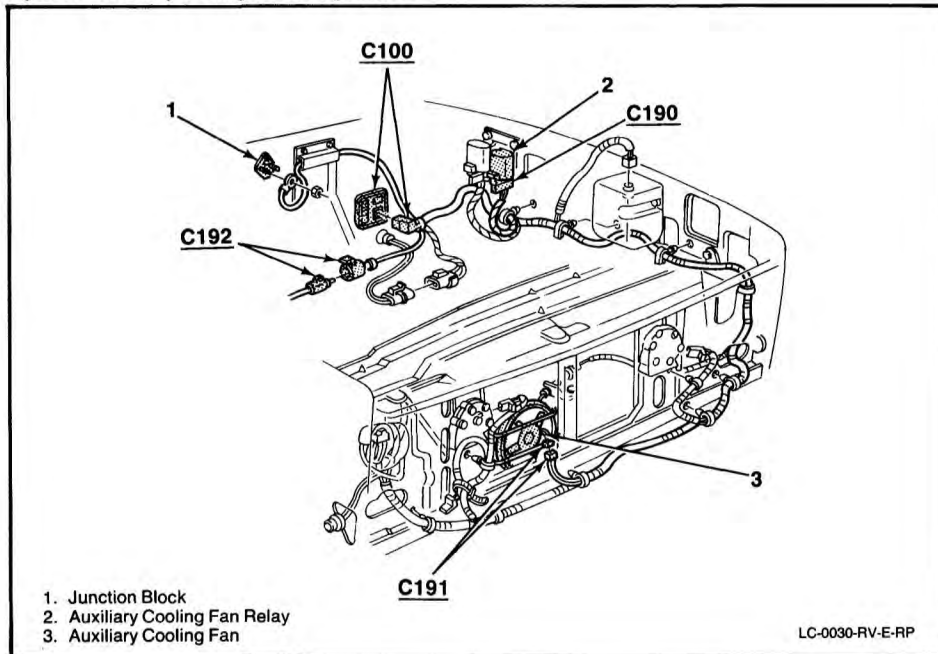


Figure 30 - Auxiliary Cooling Fan

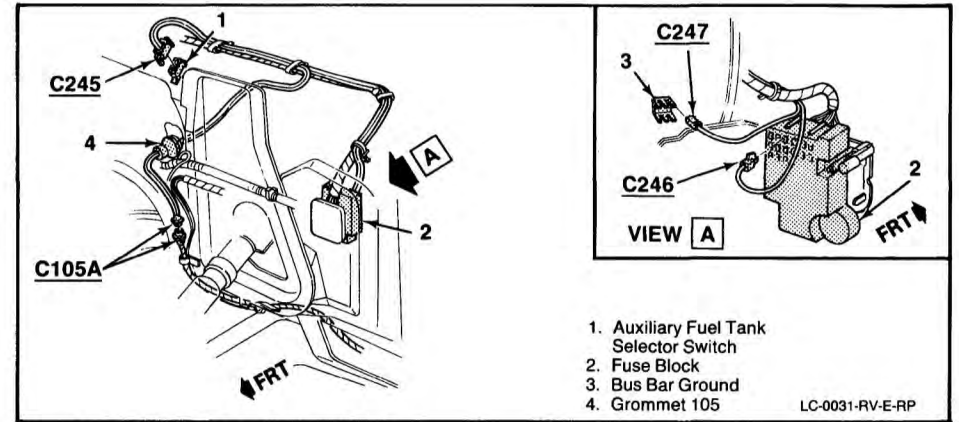


Figure 31 - Auxiliary Fuel Tank Selector Switch

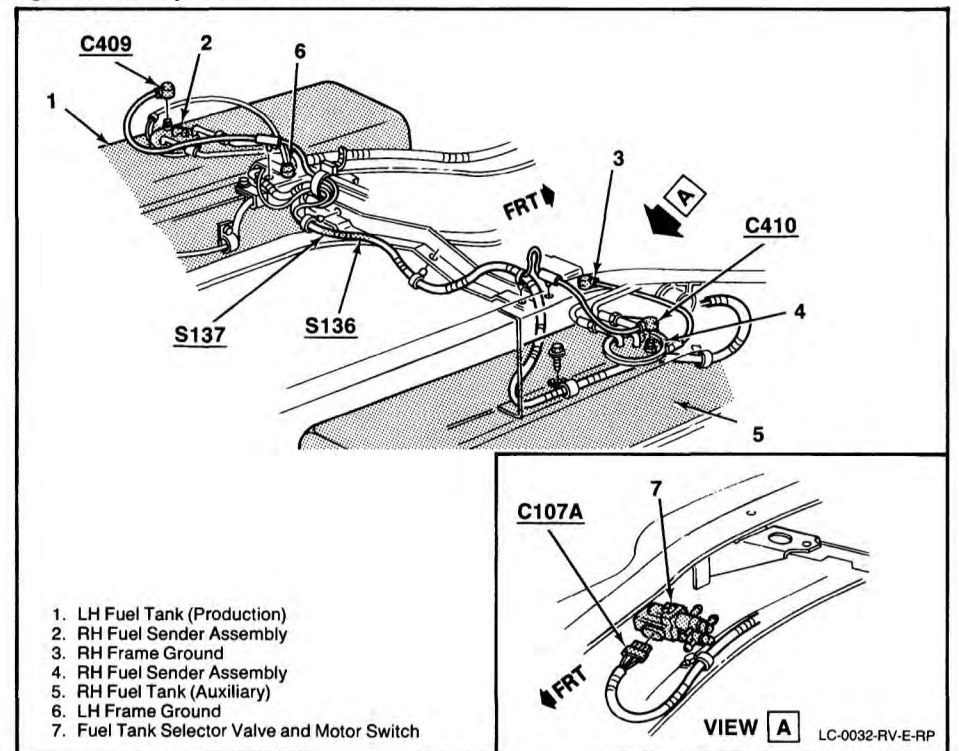


Figure 32 - Auxiliary Fuel Tanks — Diesel

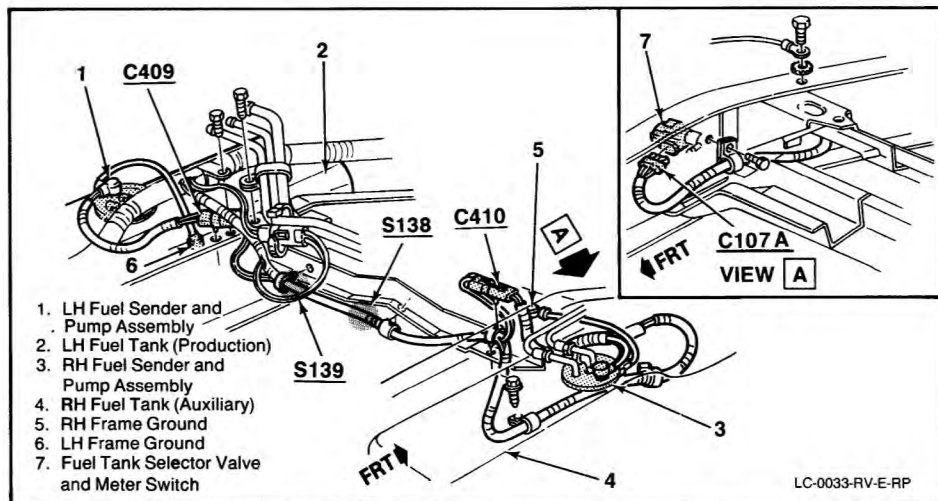


Figure 33 - Auxiliary Fuel Tanks — Gasoline

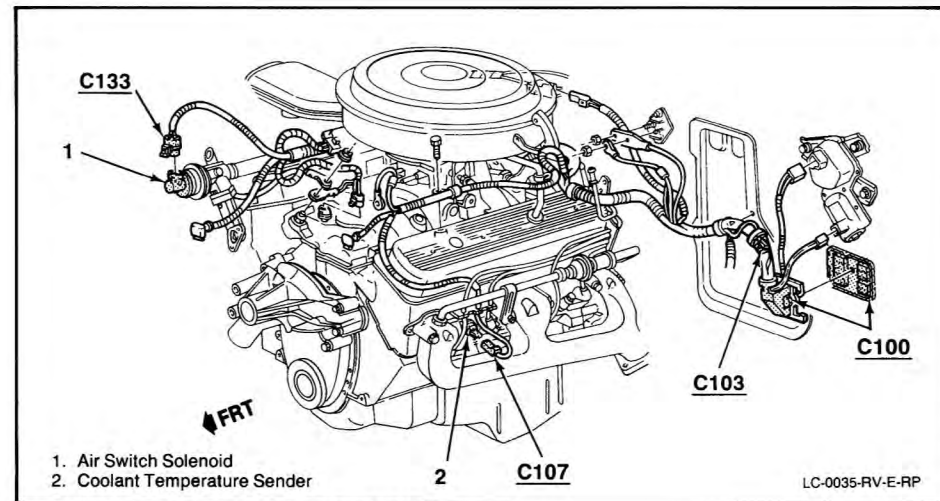


Figure 35 - Electronic Engine Controls — RPO L05

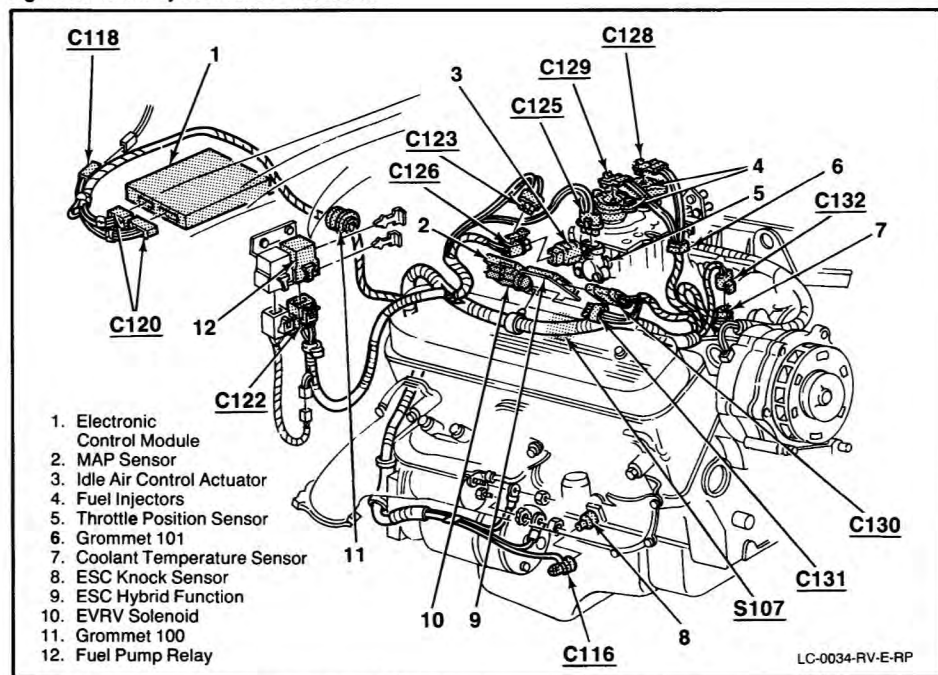


Figure 34 - Electronic Engine Controls — RPO L05

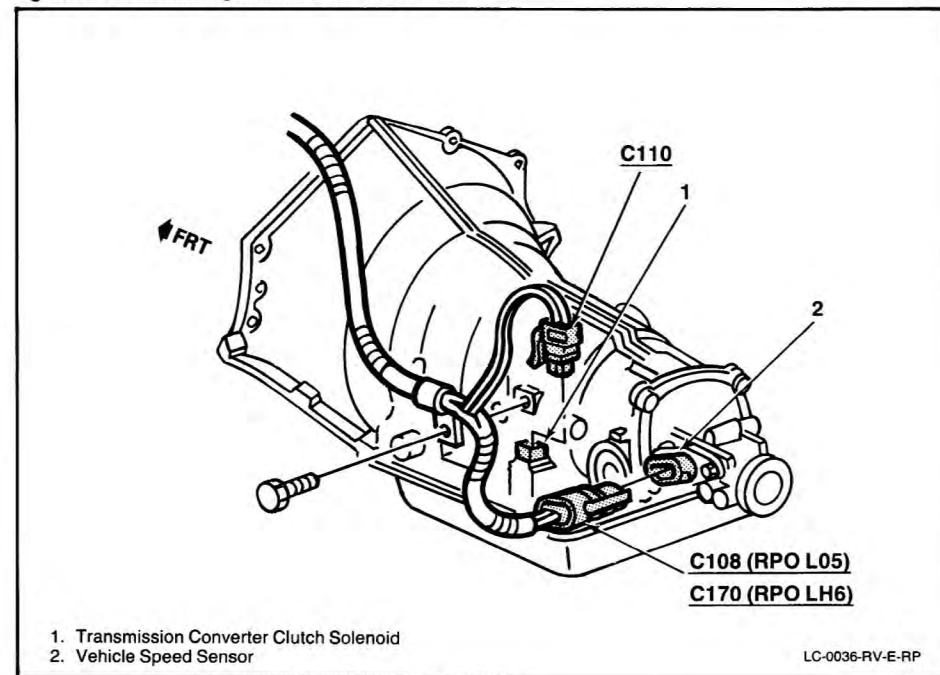


Figure 36 - Automatic 4-Speed Transmission (RPO MD8) Wiring

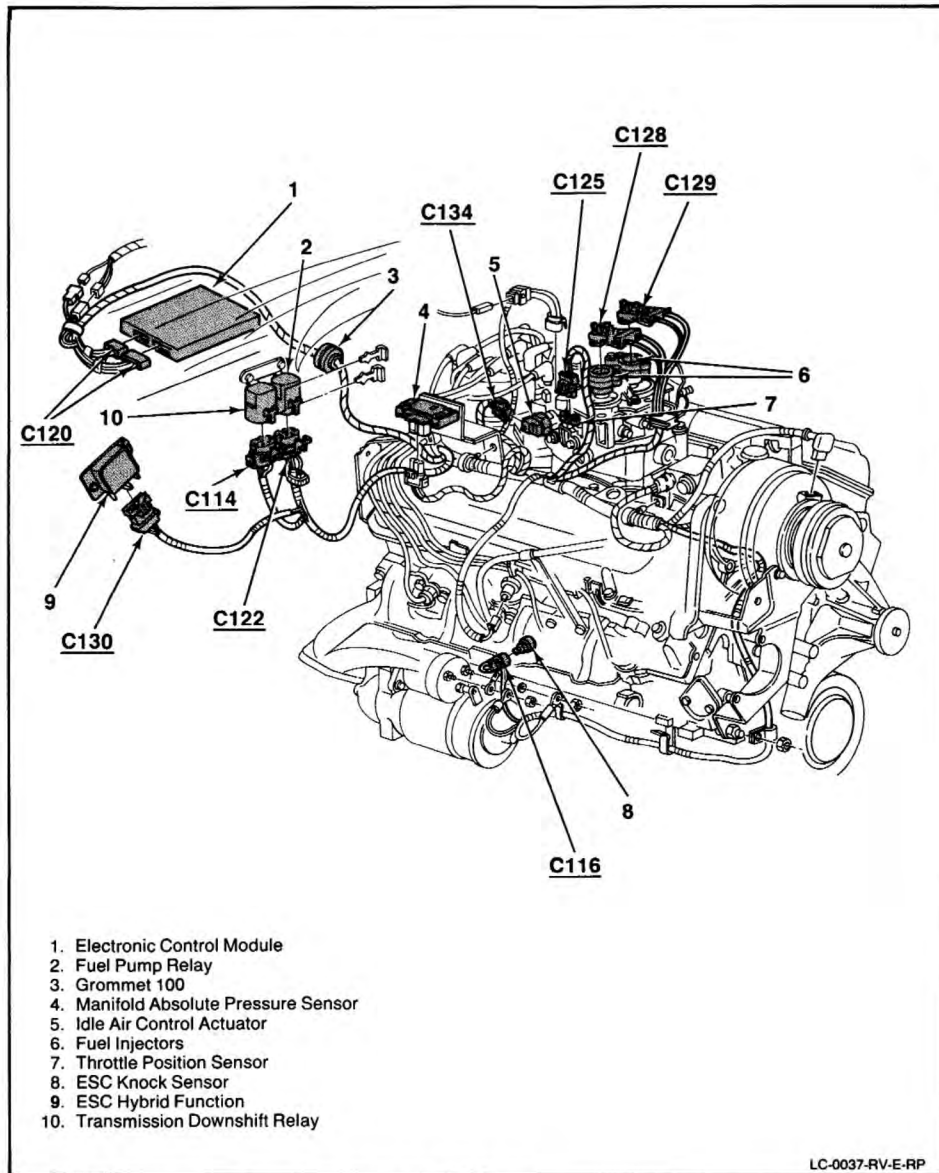


Figure 37 - Electronic Engine Controls, RH Side — RPO L19

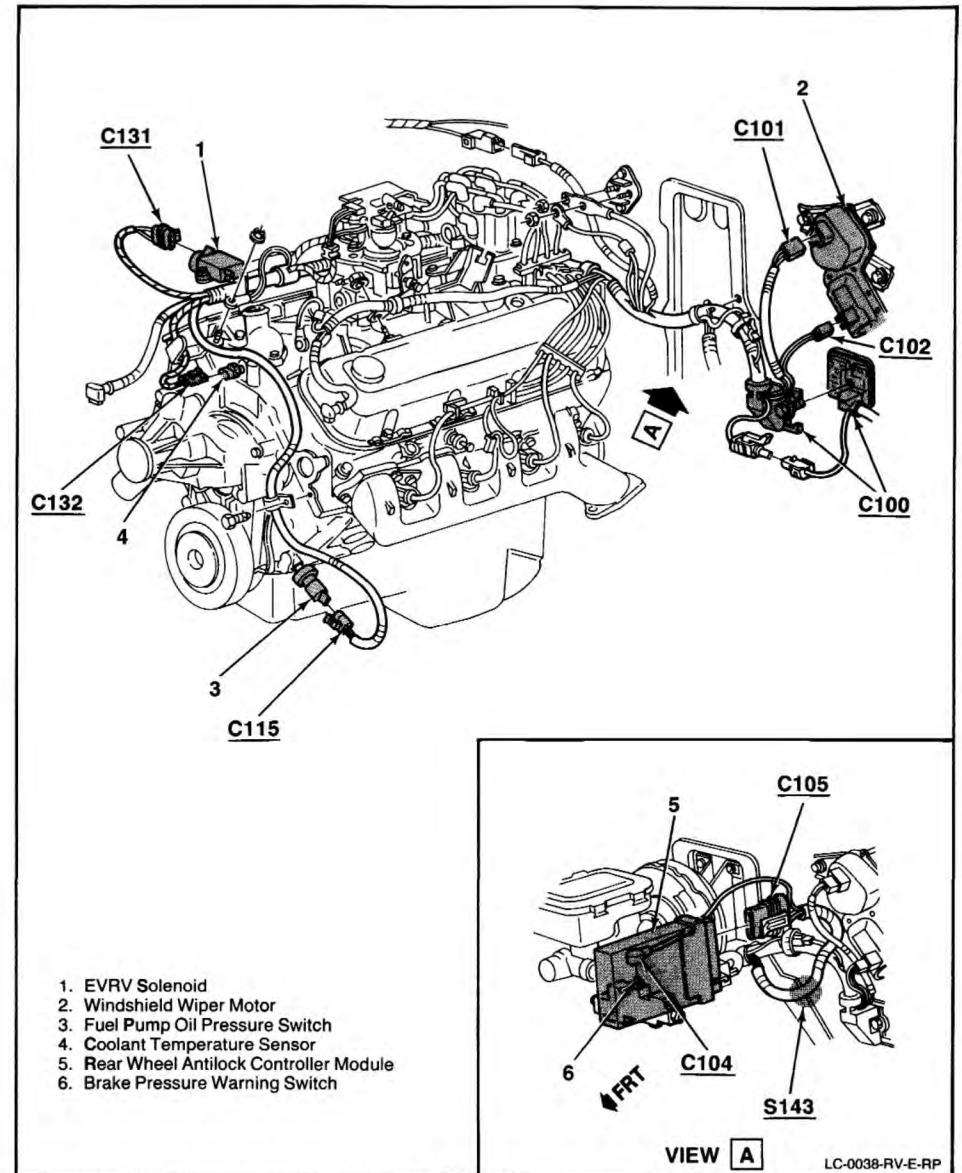


Figure 38 - Electronic Engine Controls, LH Side — RPO L19

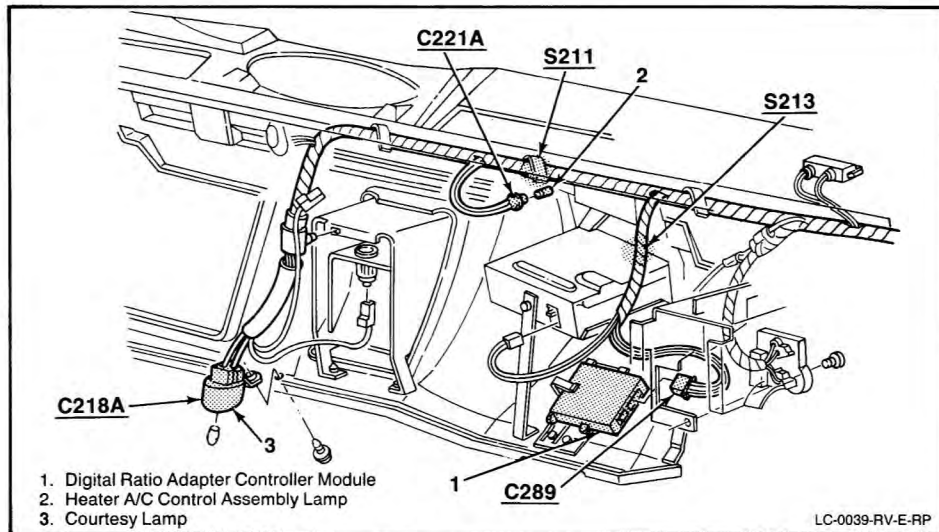


Figure 39 - Digital Ratio Adapter Controller Module

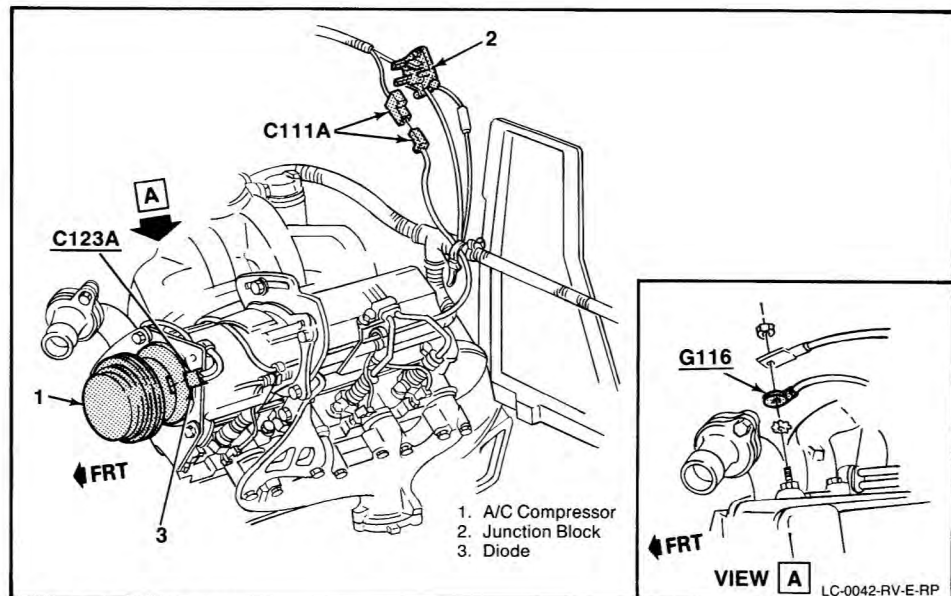


Figure 42 - A/C Compressor

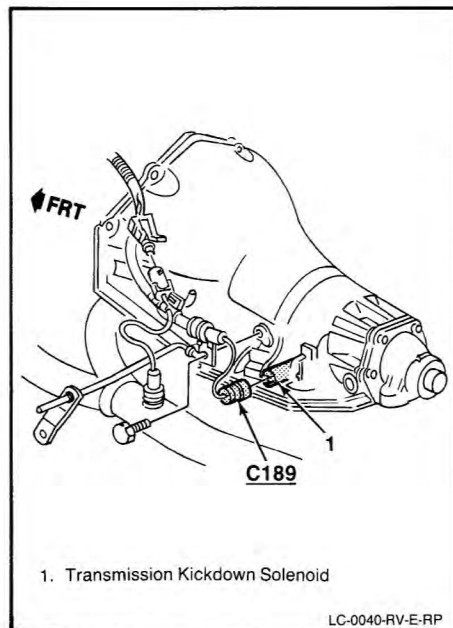


Figure 40 - Transmission Kickdown Solenoid with RPO L05/L19

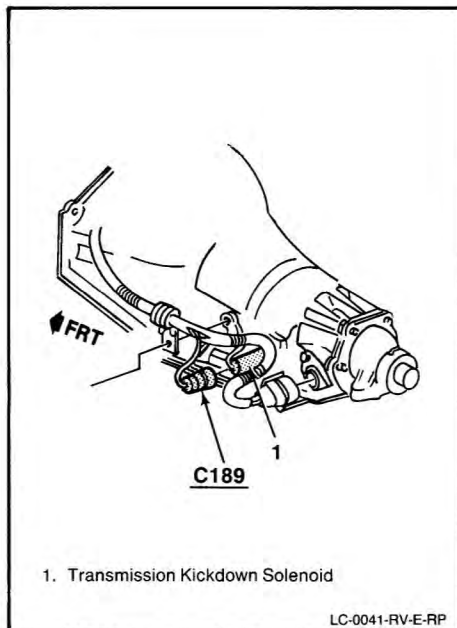


Figure 41 - Transmission Kickdown Solenoid with RPO LH6/LL4

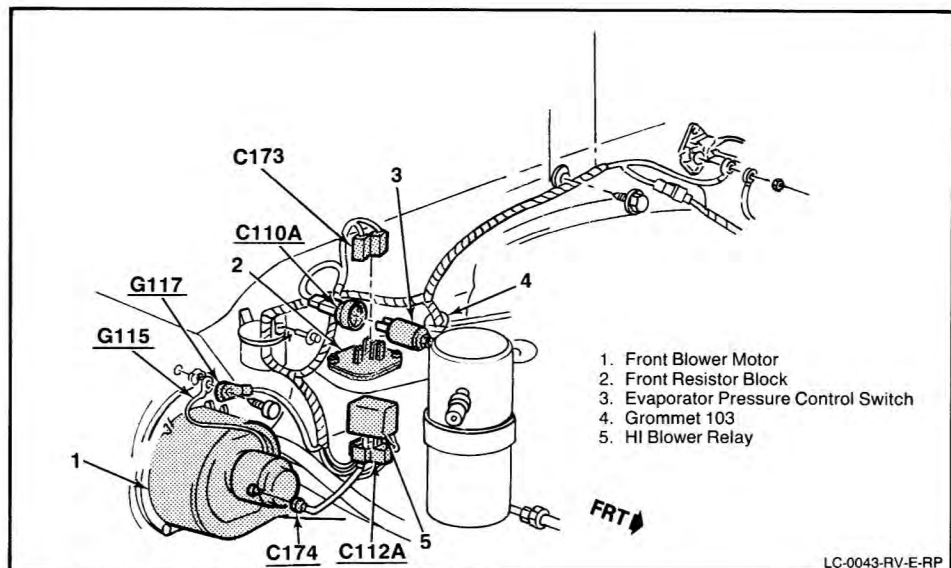


Figure 43 - A/C System Wiring

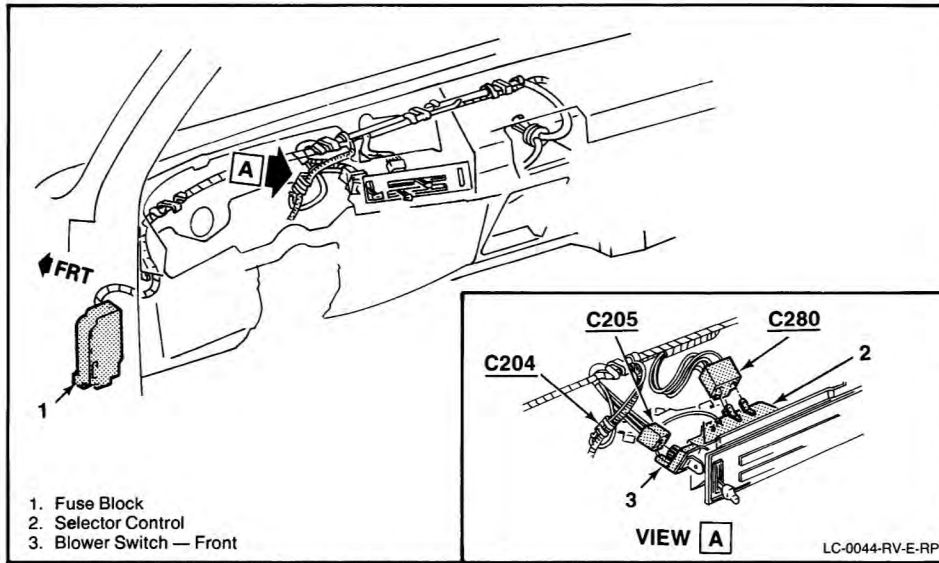


Figure 44 - A/C and Heater Control Wiring — Front

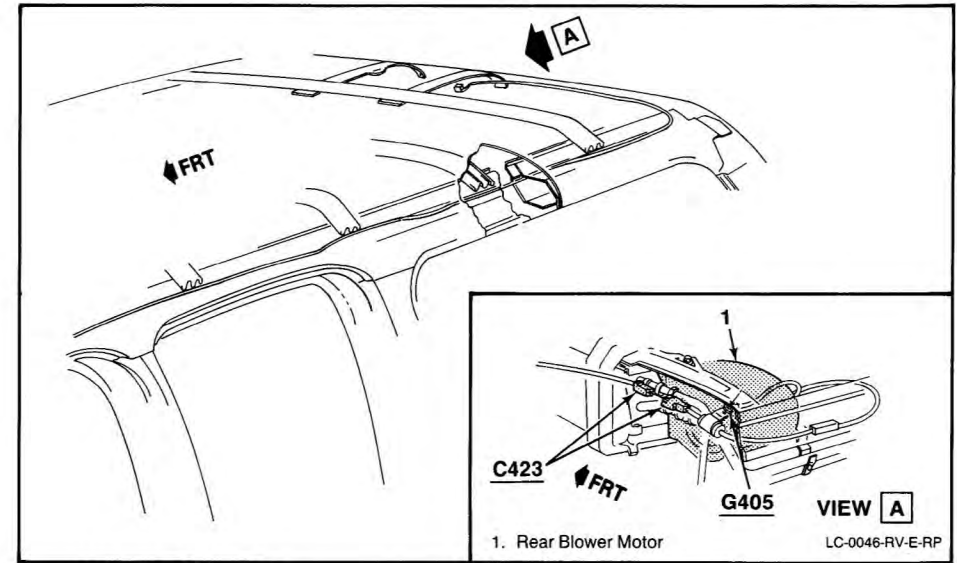


Figure 46 - Rear A/C Blower Motor

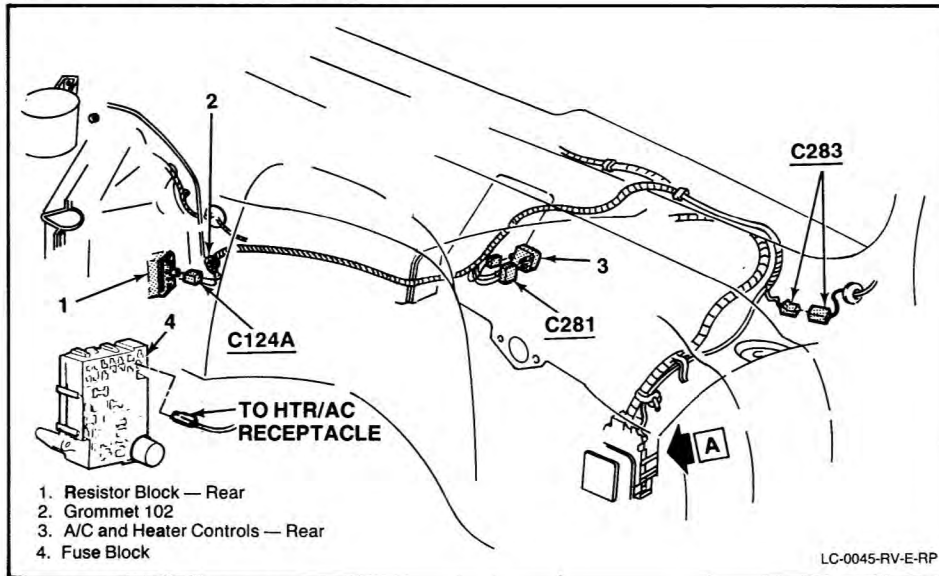


Figure 45 - A/C Control Wiring - Rear

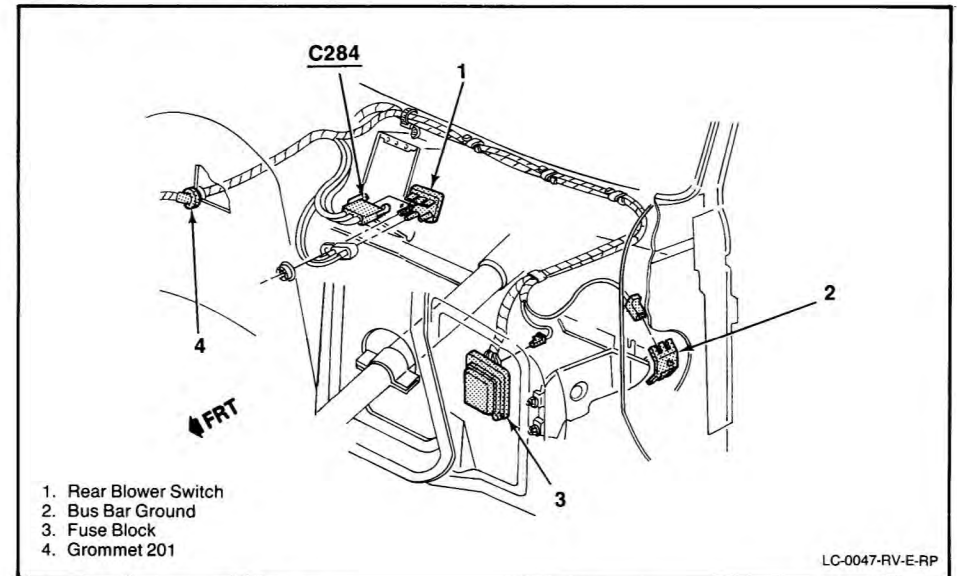


Figure 47 - Rear Heater Switch Wiring

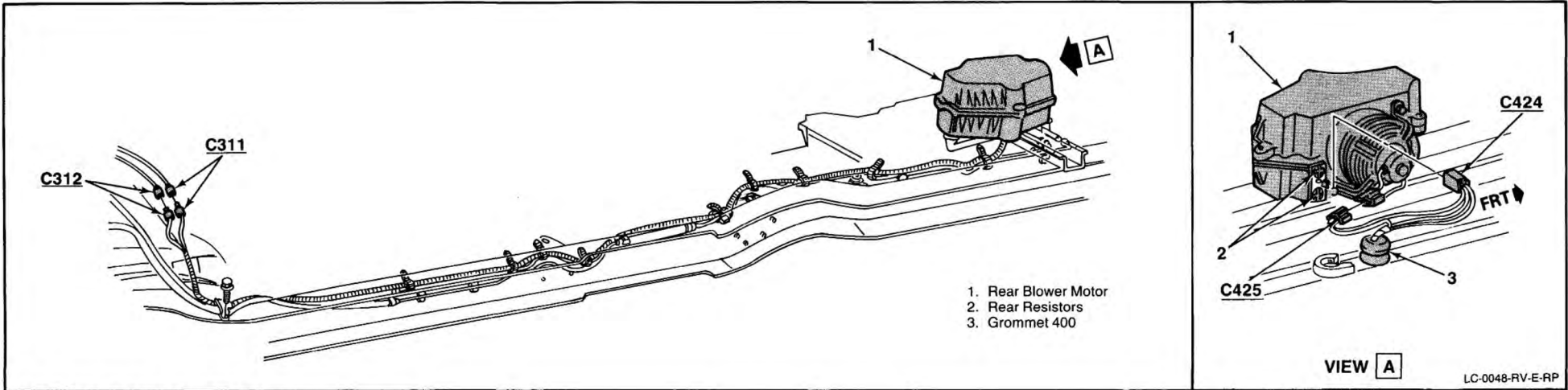


Figure 48 - Rear Heater Blower Wiring

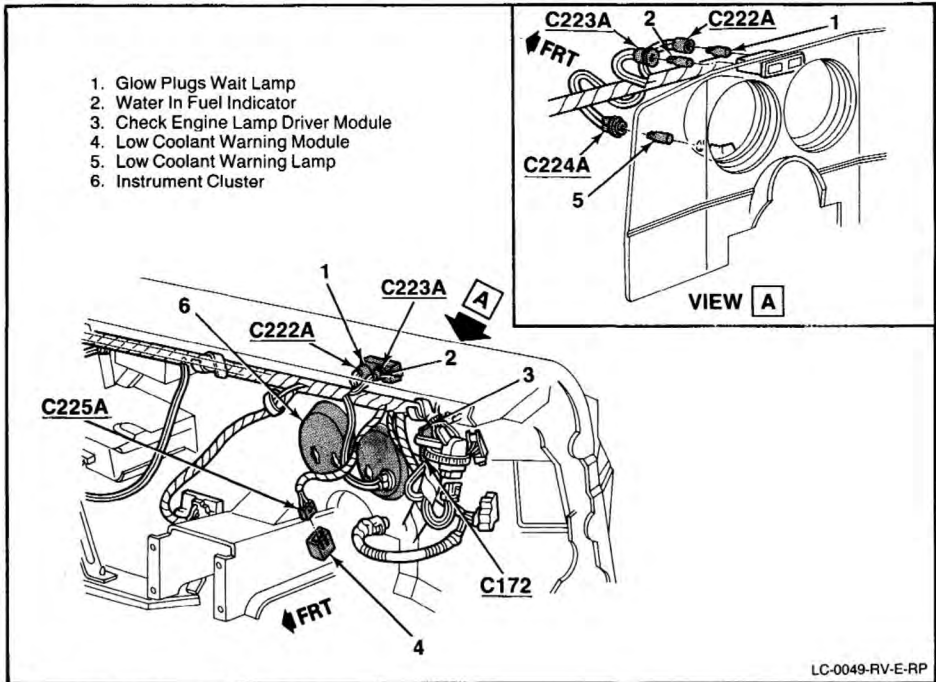


Figure 49 - I/P Wiring—RPO LH6/LL4

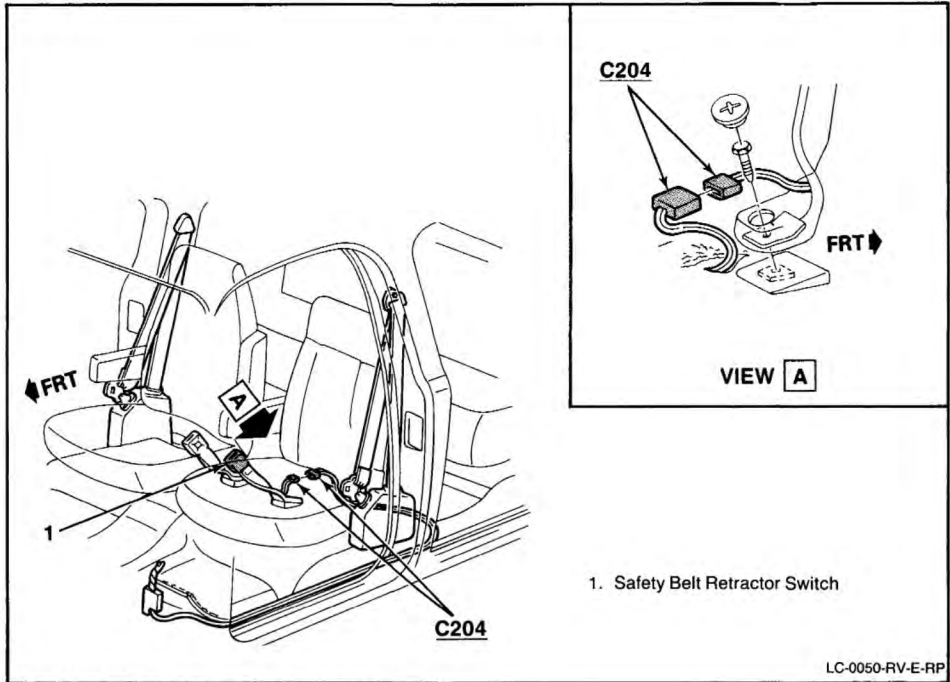
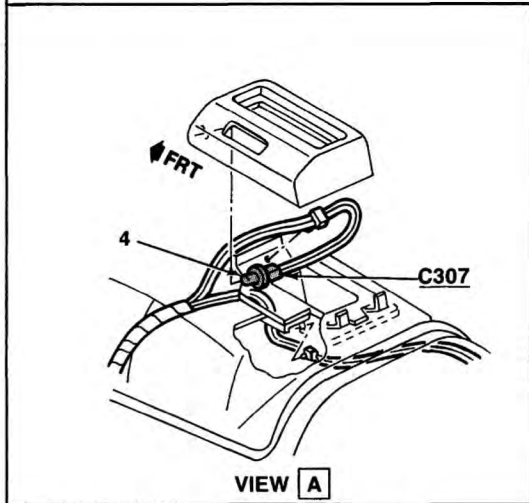
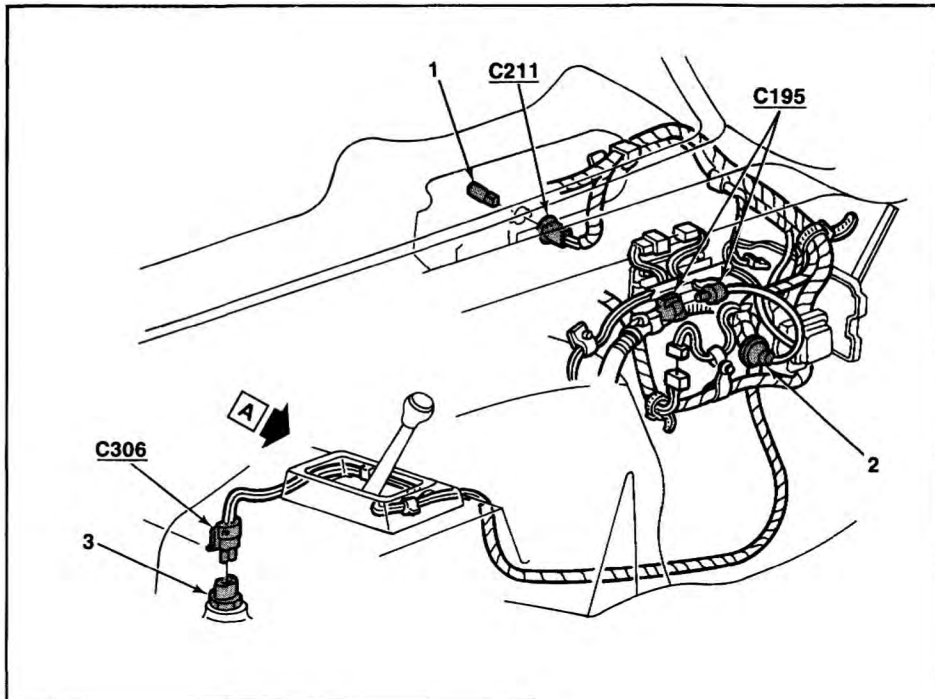


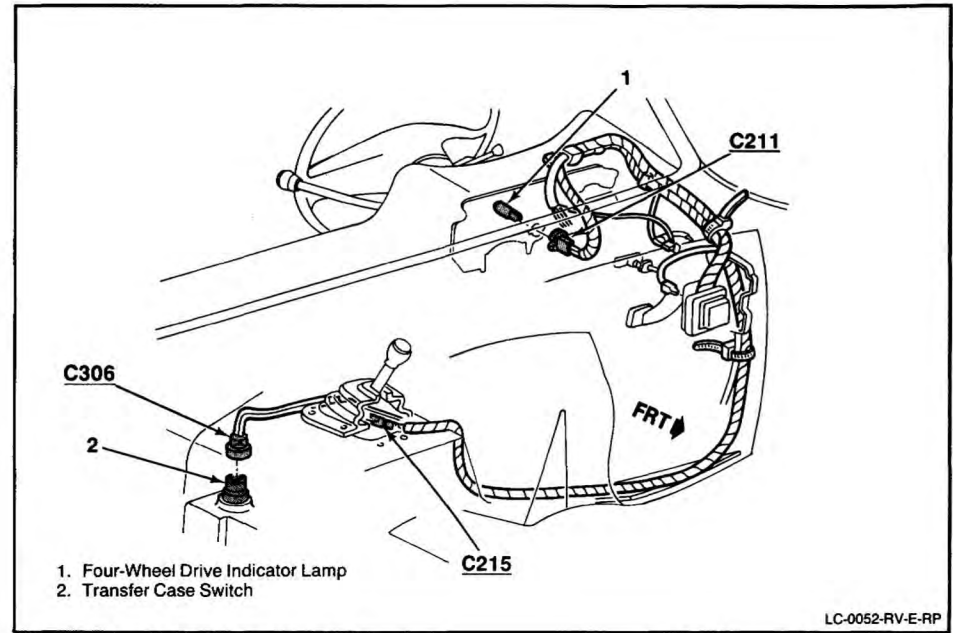
Figure 50 - Safety Belt Retractor Switch Wiring



1. Four-Wheel Drive Indicator Lamp
2. Grommet 101
3. Transfer Case Switch
4. Four-Wheel Drive Shift Lever Lamp

LC-0051-RV-E-RP

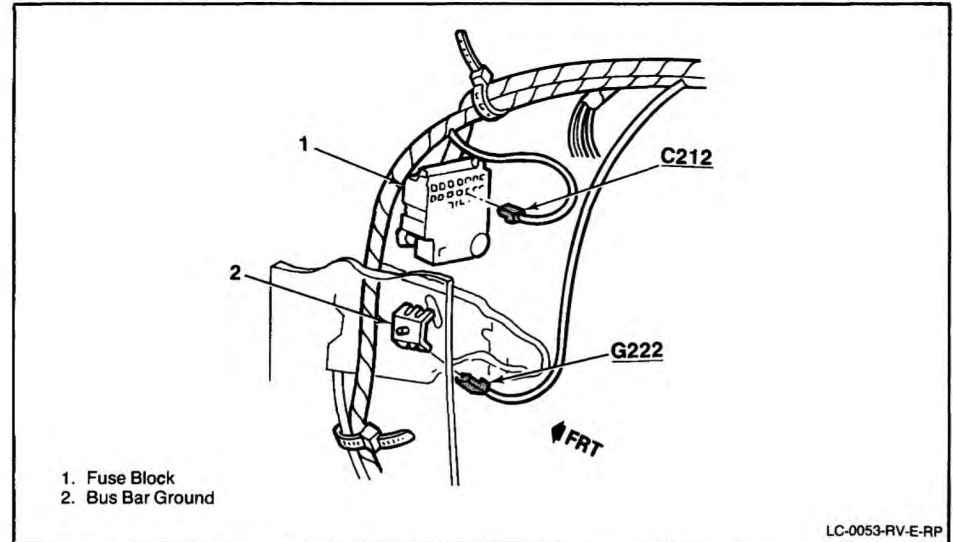
Figure 51 - Transfer Case Wiring — V100, V200



1. Four-Wheel Drive Indicator Lamp
2. Transfer Case Switch

LC-0052-RV-E-RP

Figure 52 - Transfer Case Wiring — V300

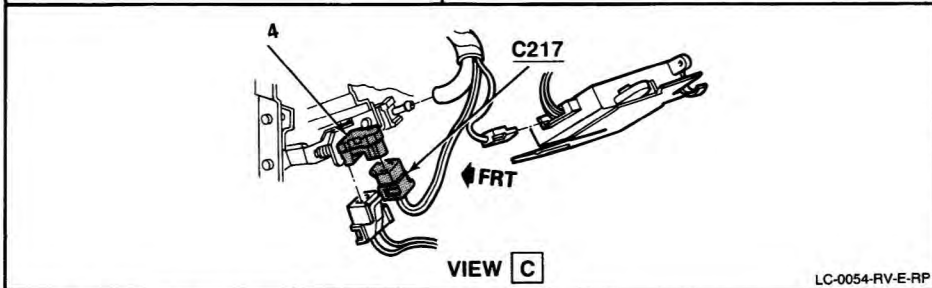
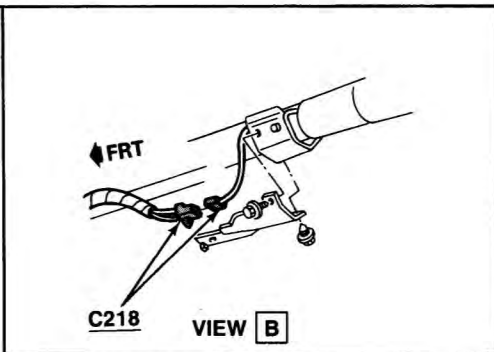
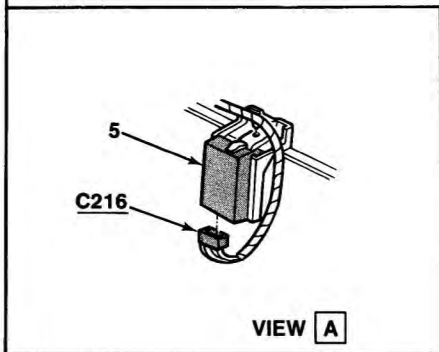
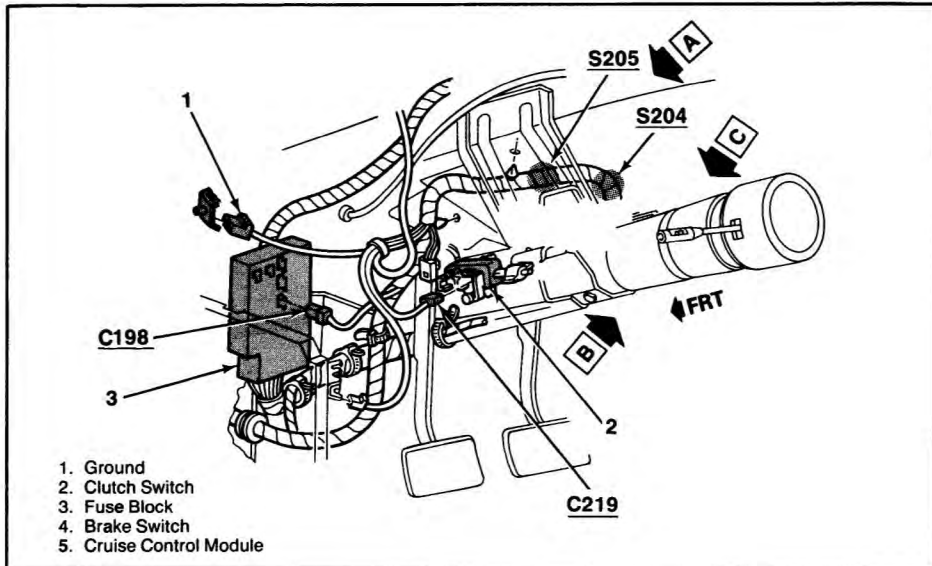


1. Fuse Block
2. Bus Bar Ground

LC-0053-RV-E-RP

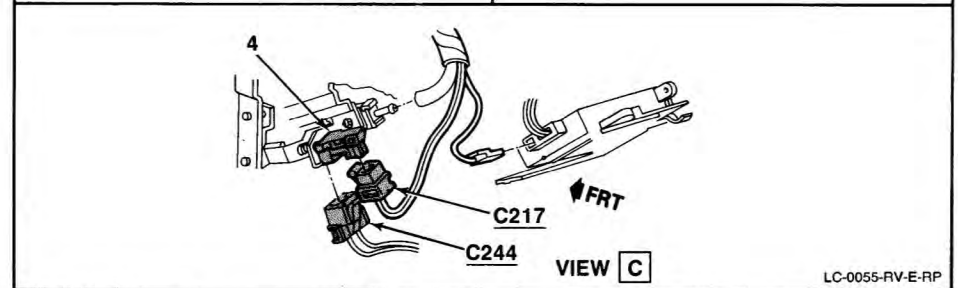
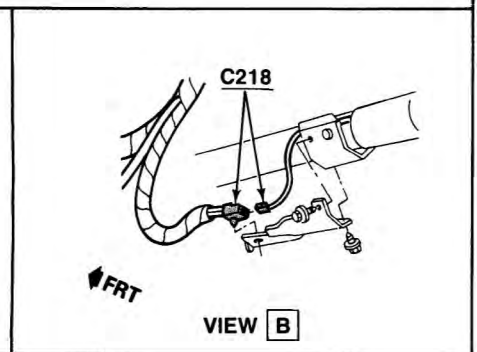
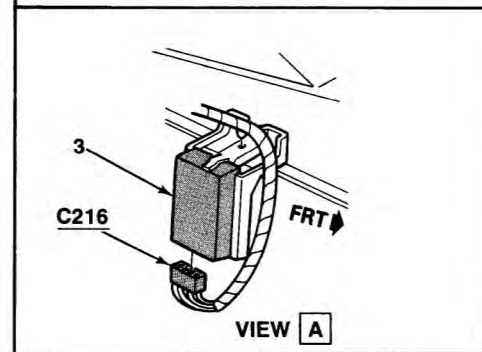
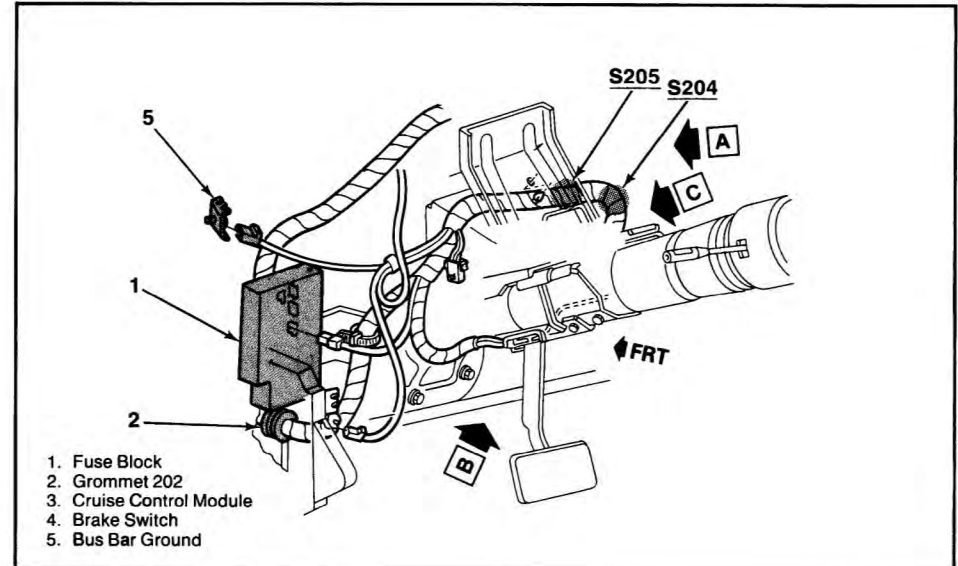
Figure 53 - Transfer Case — Power and Ground Connections





LC-0054-RV-E-RP

Figure 54 - Cruise Control Wiring—Manual Transmission



LC-0055-RV-E-RP

Figure 55 - Cruise Control Wiring—Automatic Transmission

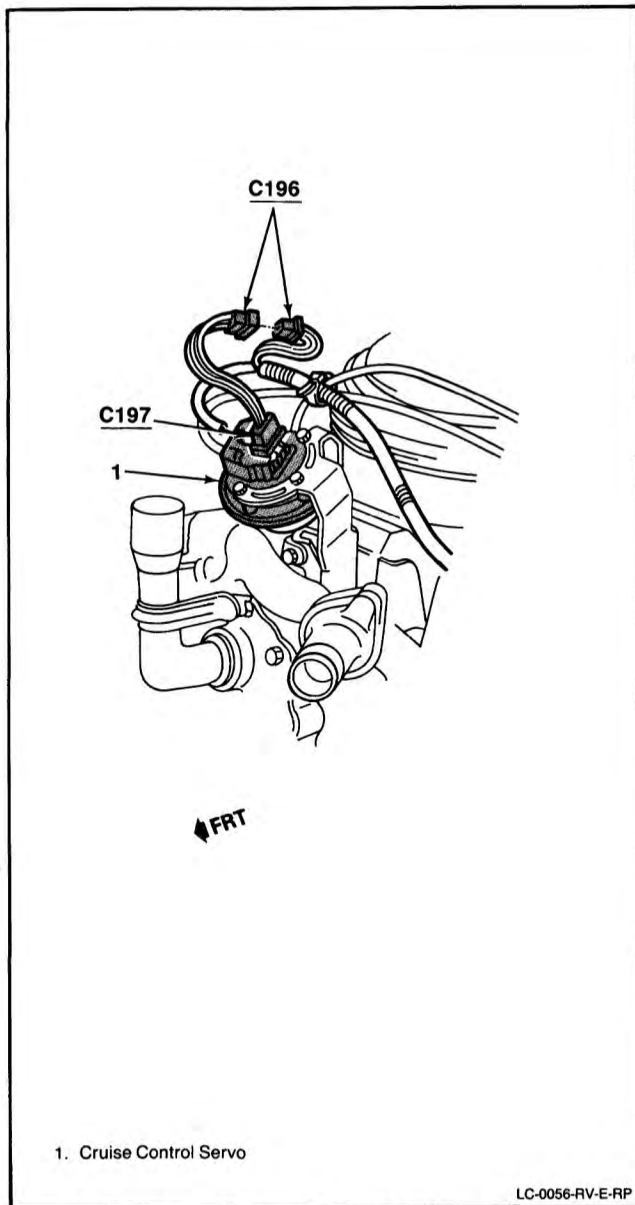


Figure 56 - Cruise Control Servo—RPO LH6/LL4

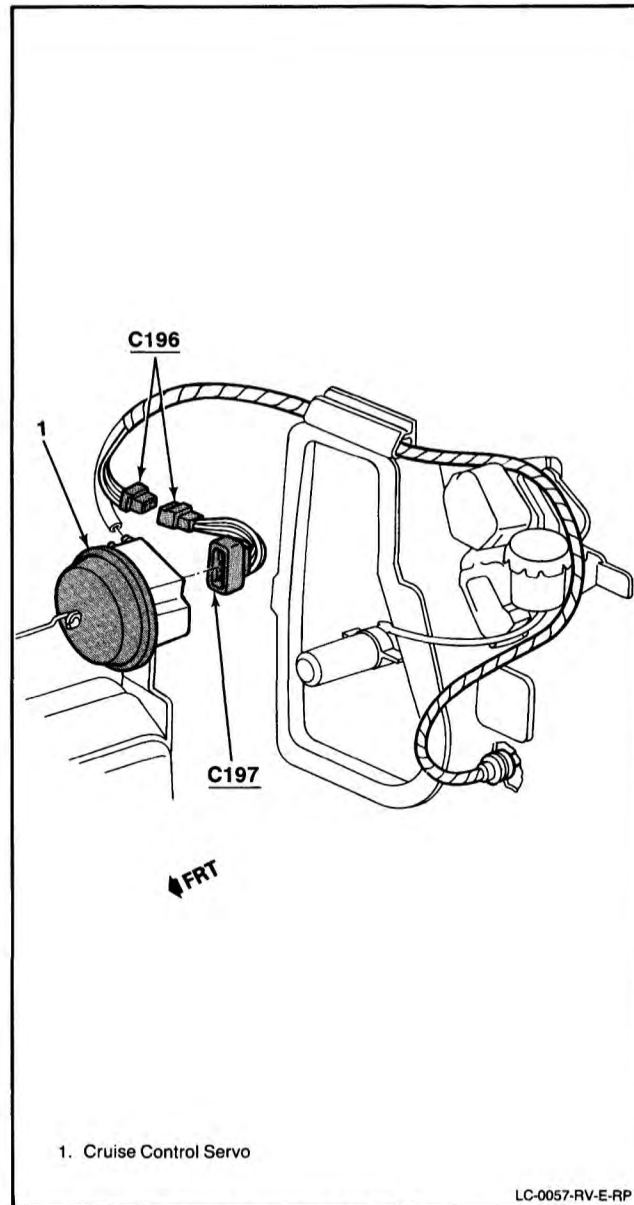


Figure 57 - Cruise Control Servo—RPO L05/L19

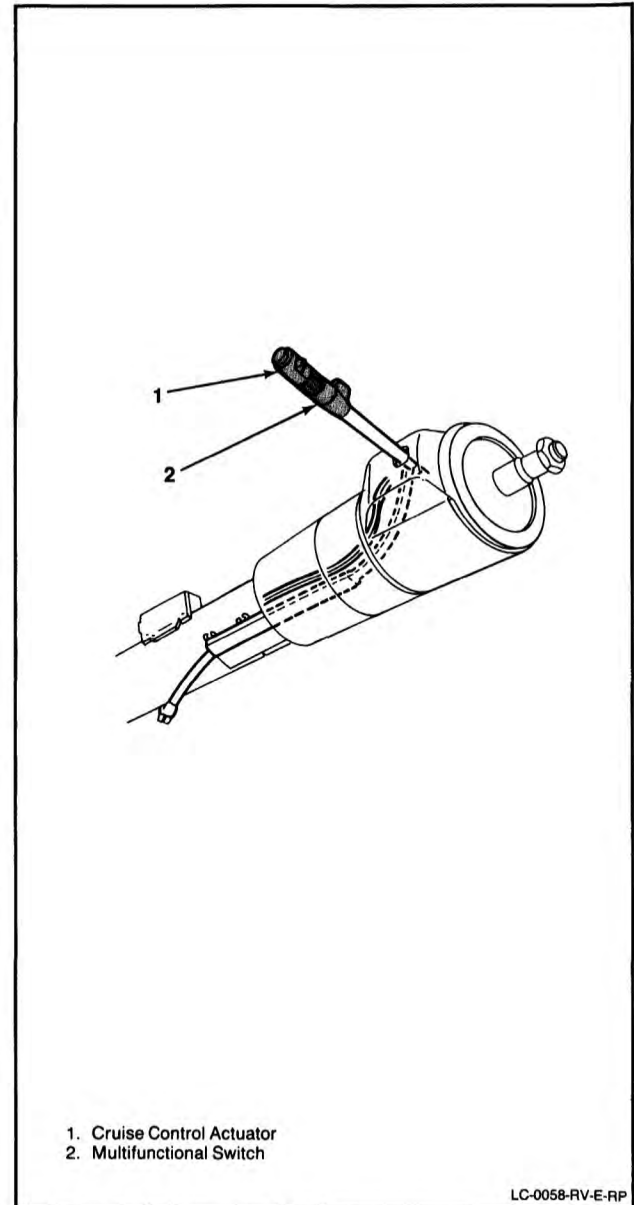


Figure 58 - Cruise Control Actuator

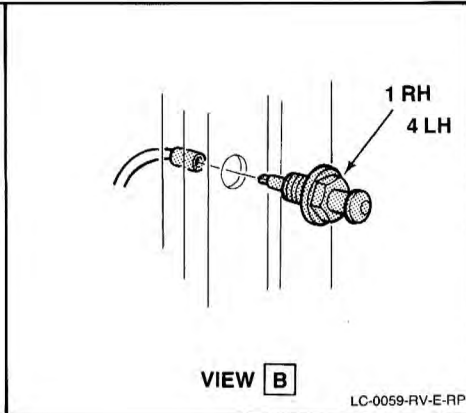
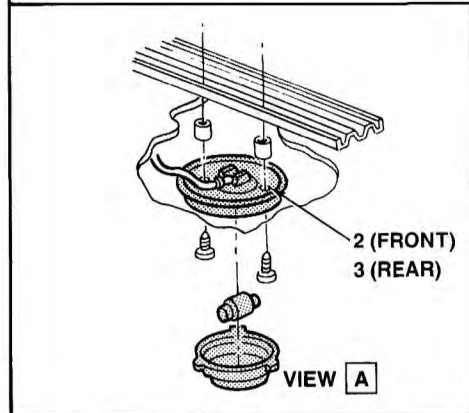
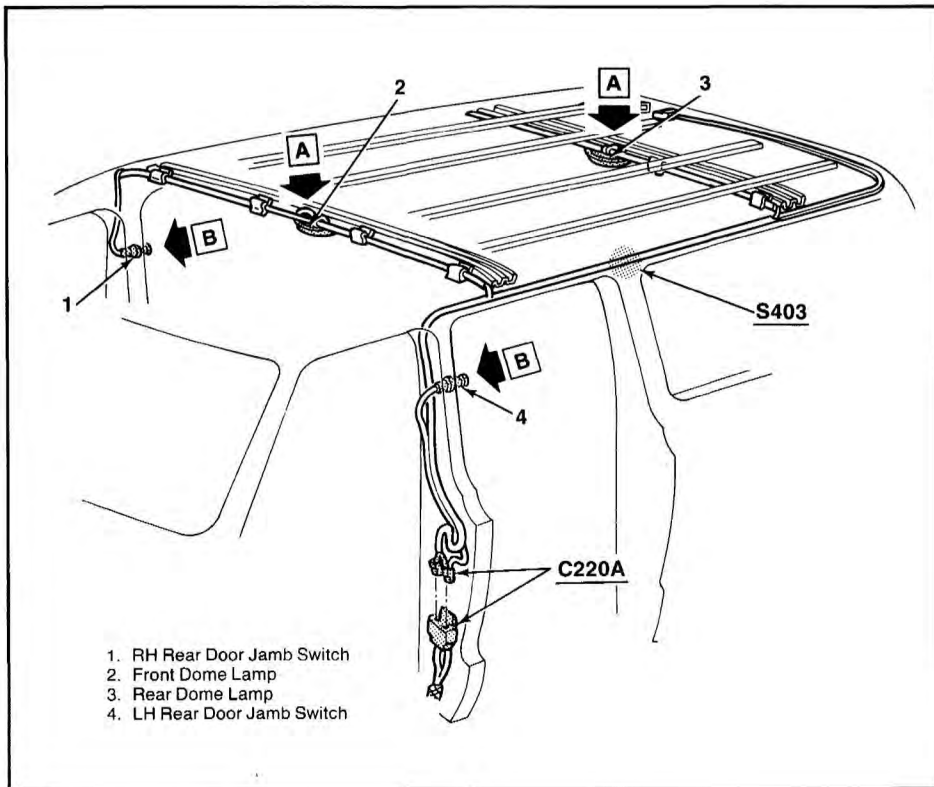
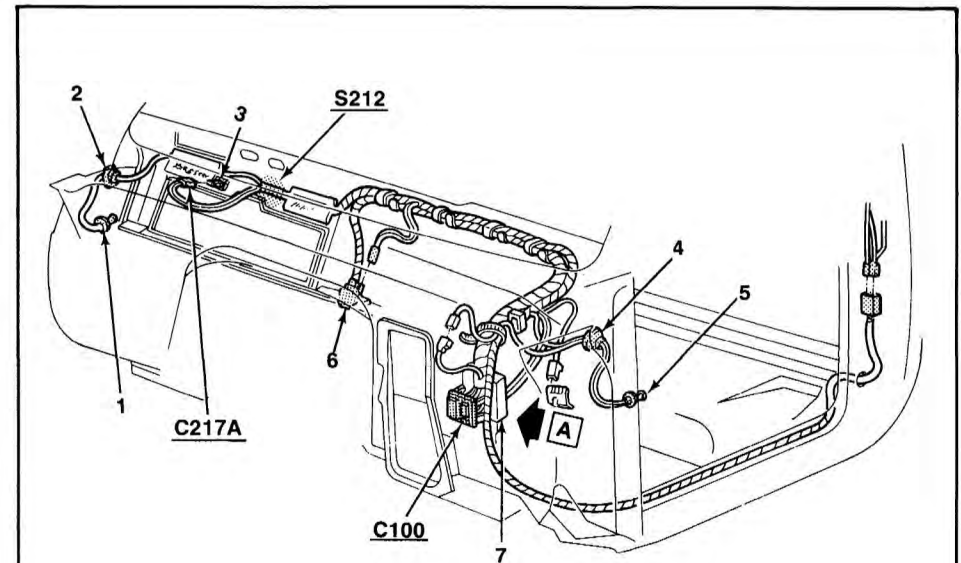


Figure 59 - Dome Lamp Wiring

LC-0059-RV-E-RP



1. RH Front Door Jamb Switch
2. Grommet 602
3. Glove Box Lamp Switch
4. Grommet 502
5. LH Front Door Jamb Switch
6. Courtesy Lamp
7. Fuse Panel

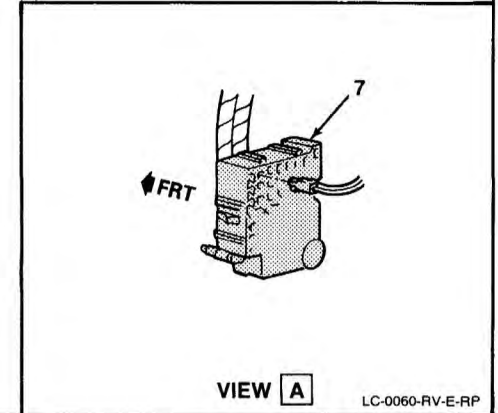


Figure 60 - Front Door Jamb Switch Wiring

LC-0060-RV-E-RP

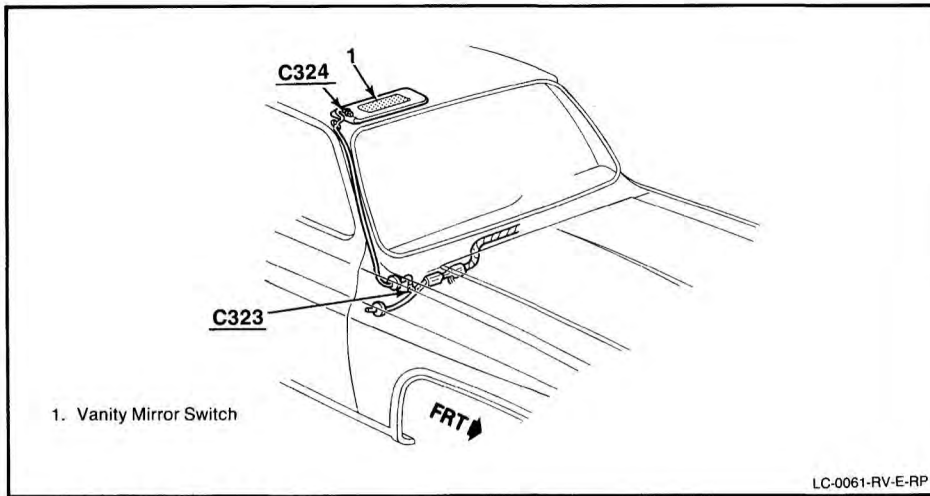


Figure 61 - Vanity Mirror Switch Wiring

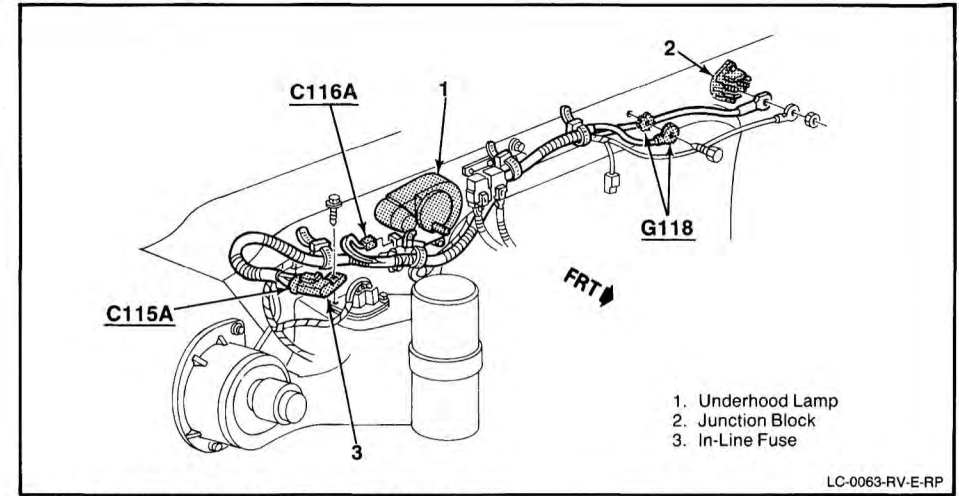


Figure 63 - Underhood Lamp Wiring — RPO L05/L19

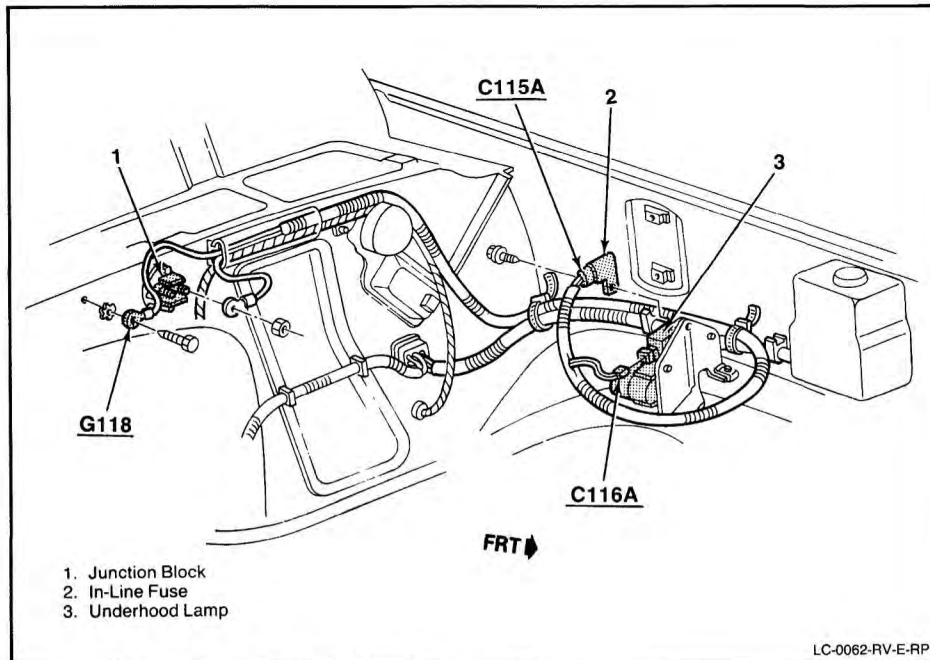


Figure 62 - Underhood Lamp Wiring — RPO LH6/LL4

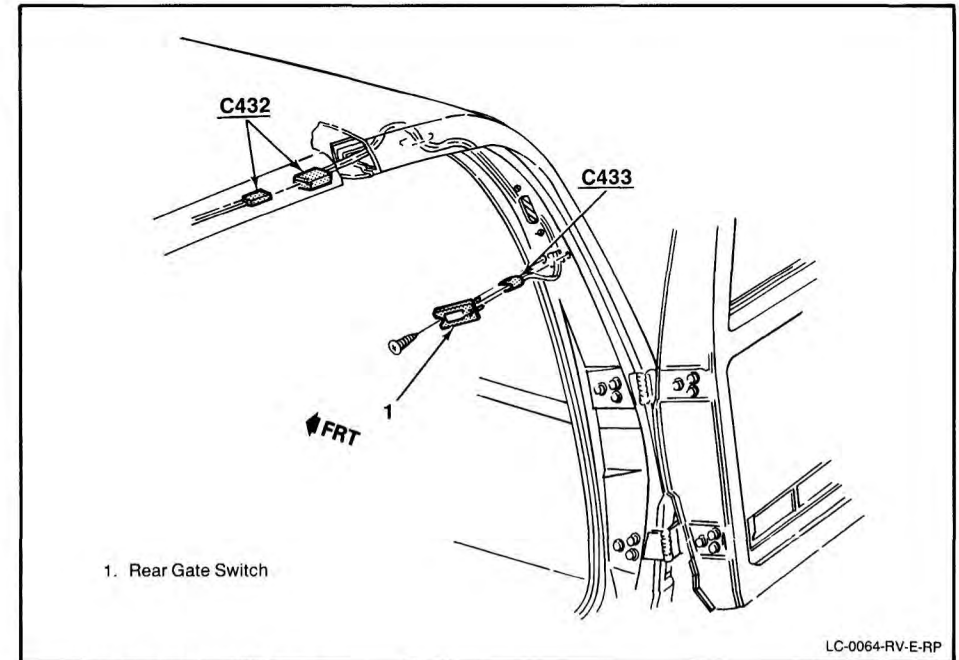


Figure 64 - Rear Gate Switch Wiring

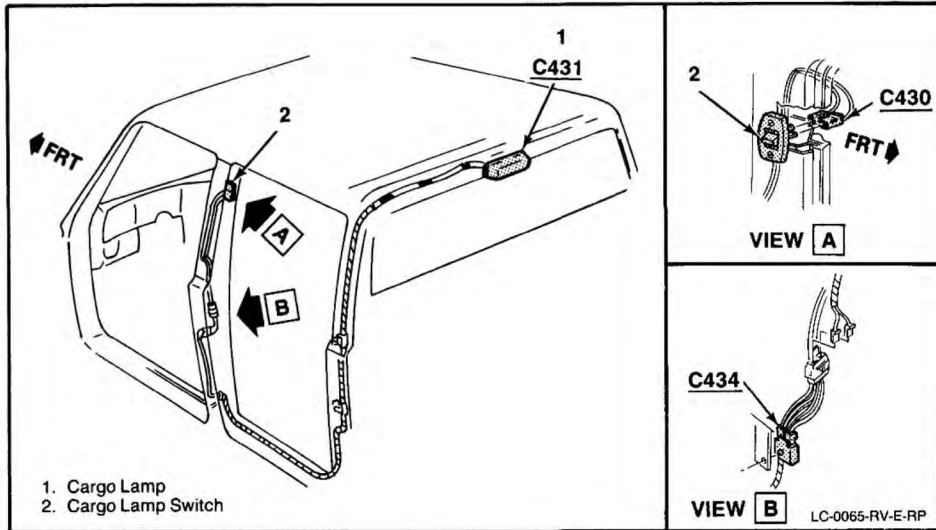


Figure 65 - Cargo Lamp Wiring

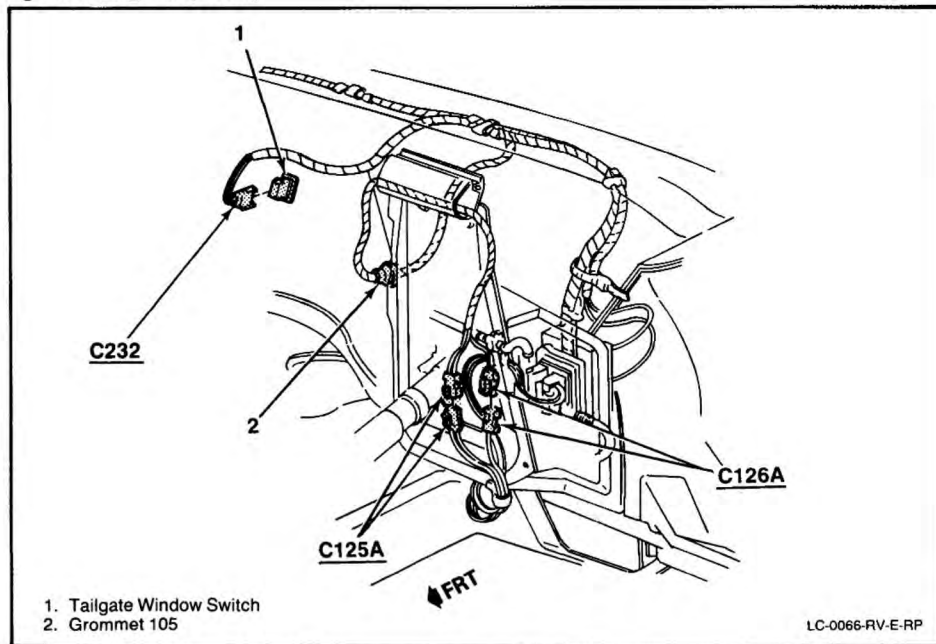


Figure 66 - Tailgate Window Front Wiring

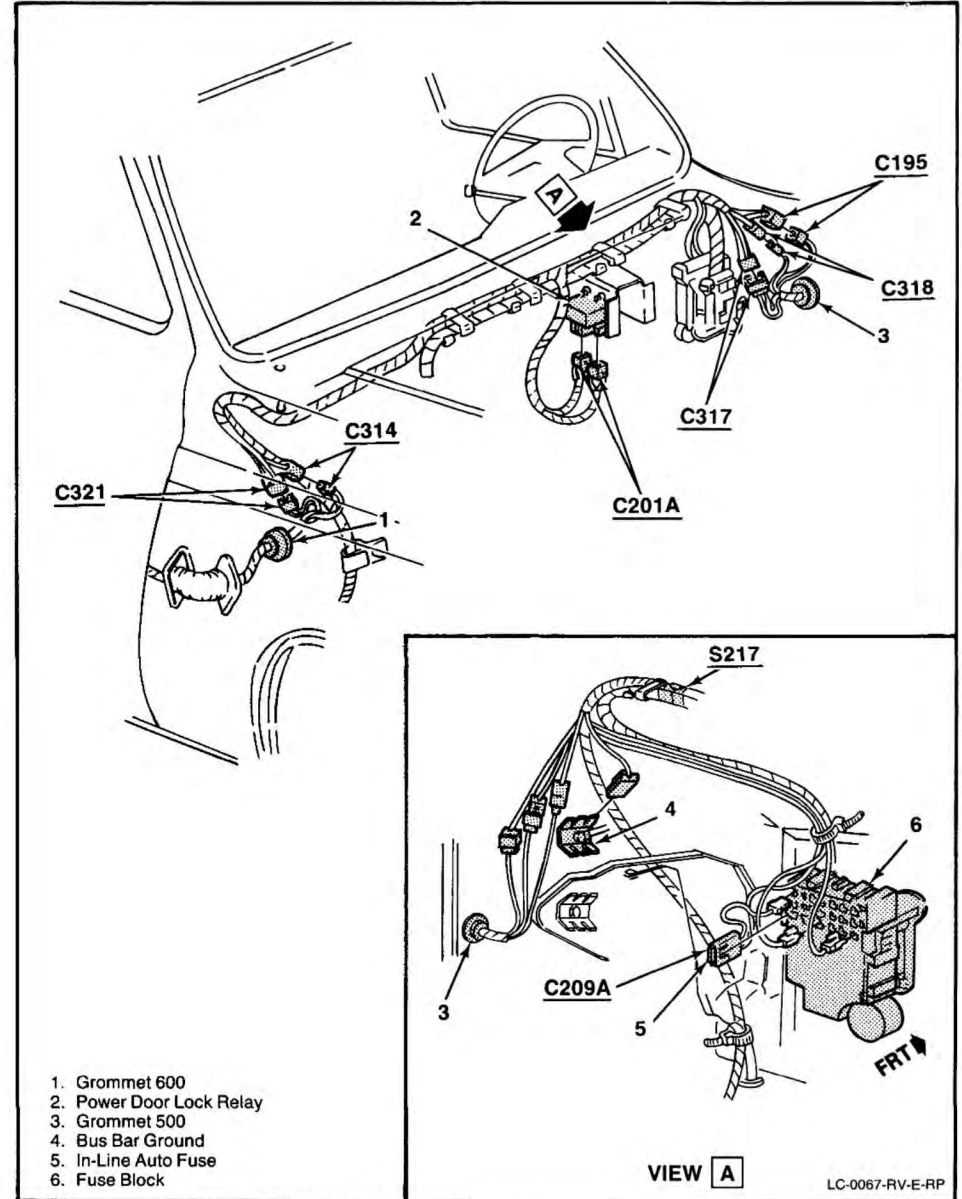


Figure 67 - Power Window, Locks and Mirror Wiring

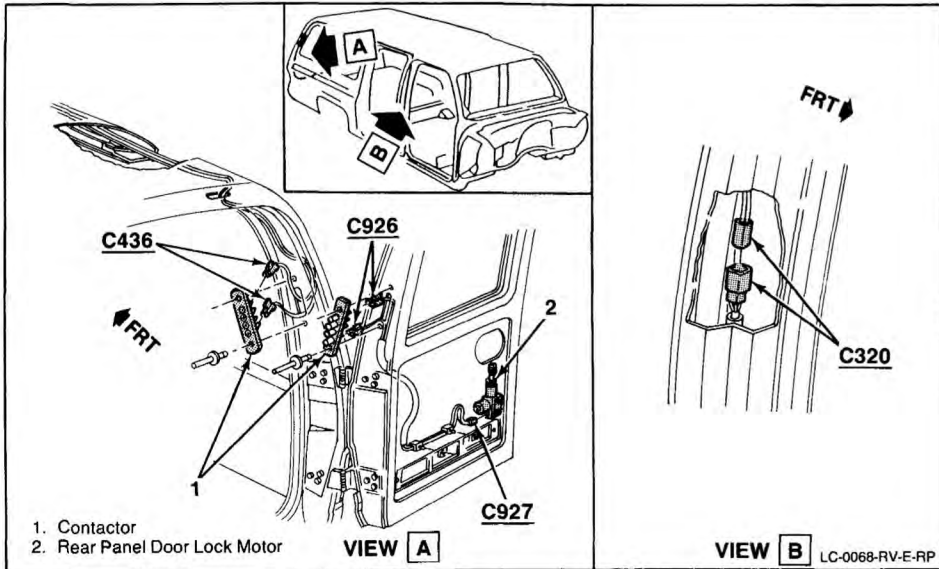


Figure 68 - Rear Panel Door Lock Wiring

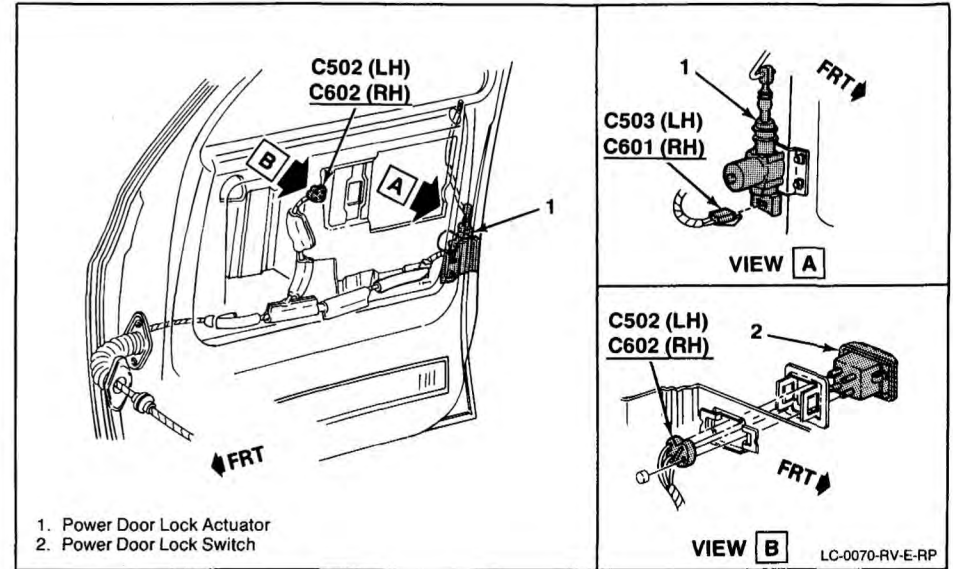


Figure 70 - Power Door Lock Wiring

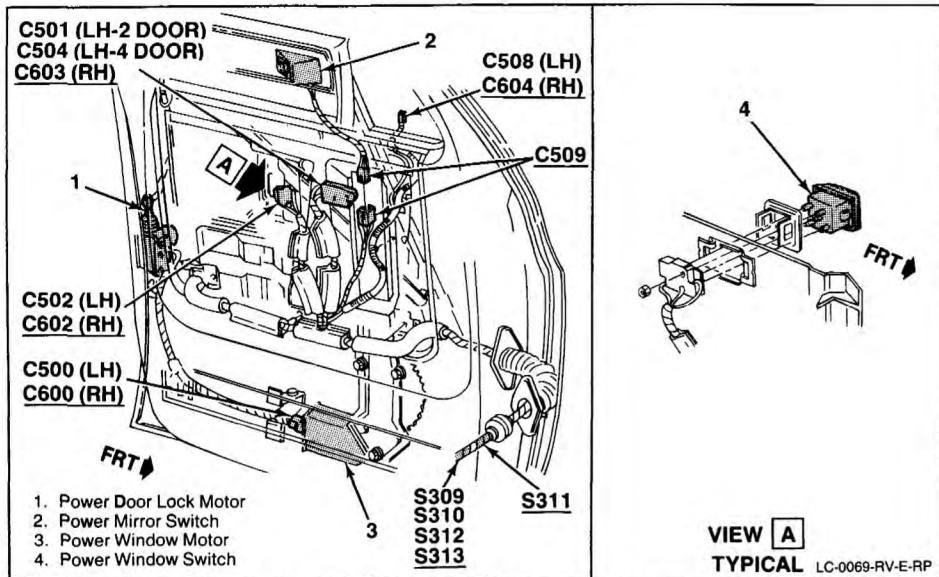


Figure 69 - Front Door Wiring with Power Door Locks, Windows and Mirrors

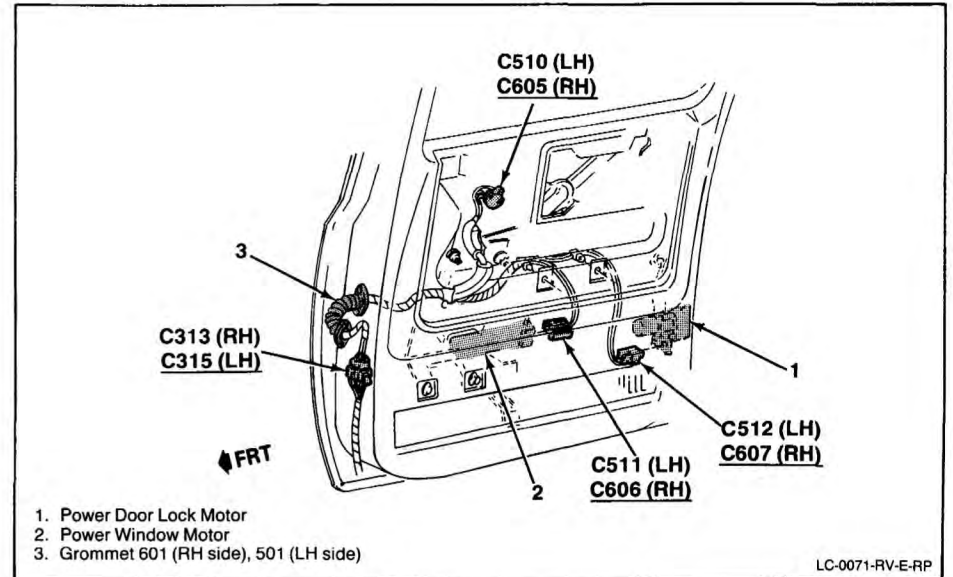
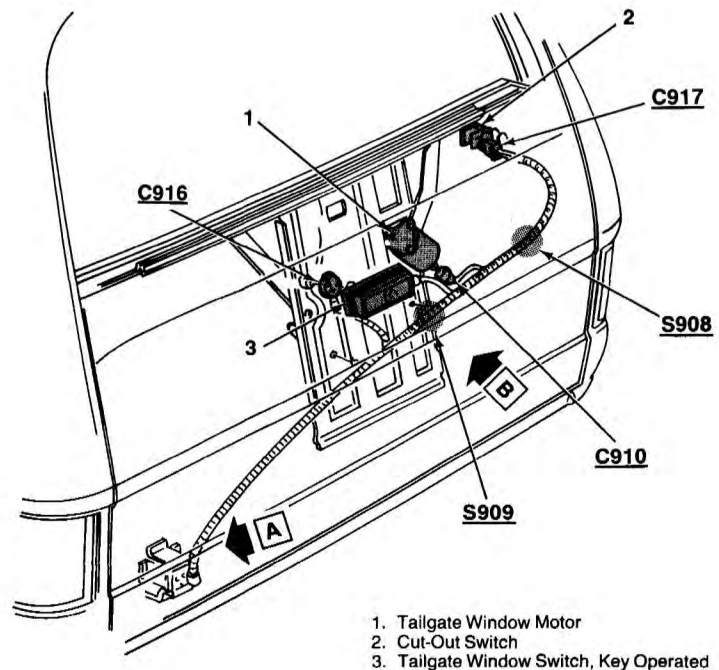
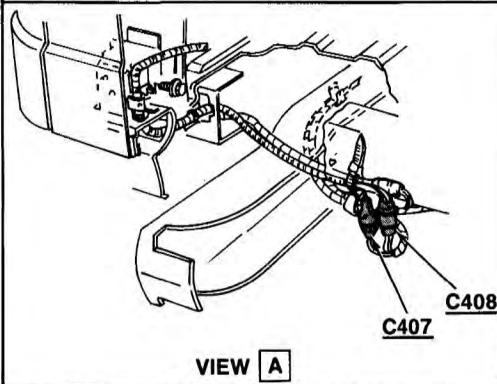


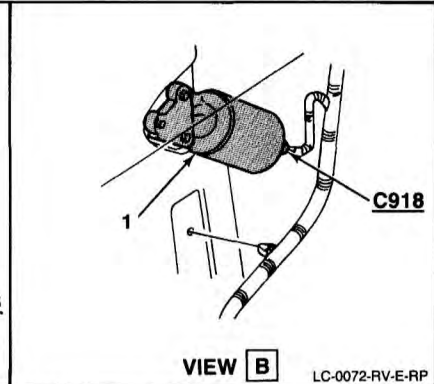
Figure 71 - Rear Door Power Windows and Locks



1. Tailgate Window Motor
2. Cut-Out Switch
3. Tailgate Window Switch, Key Operated



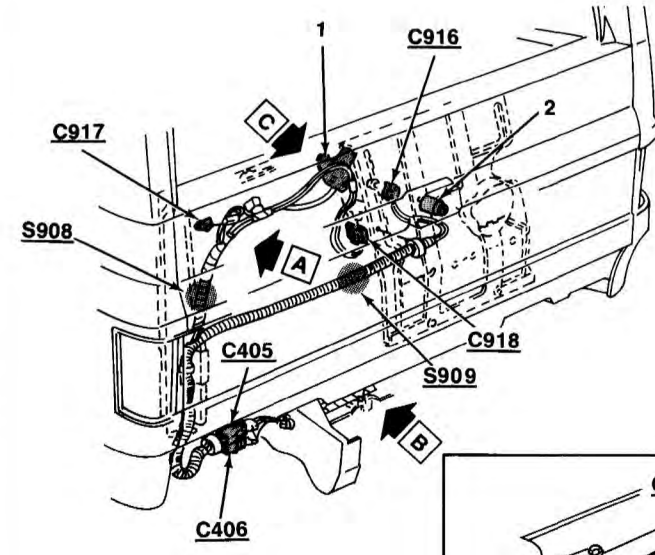
VIEW A



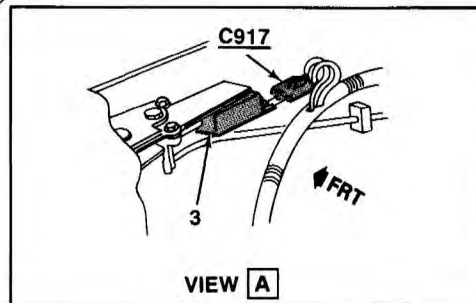
VIEW B

LC-0072-RV-E-RP

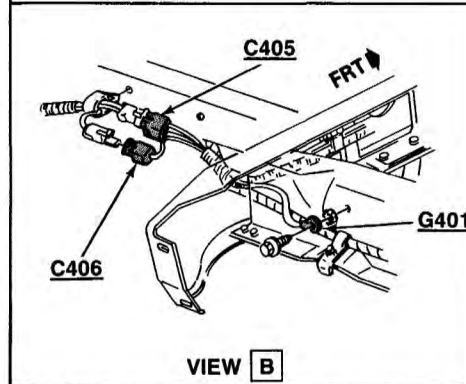
Figure 72 - Tailgate Rear Window Wiring—Utility



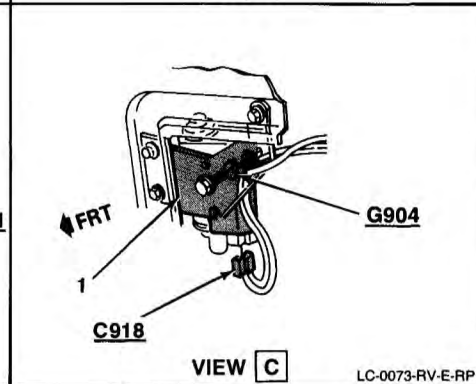
1. Rear Tailgate Window Motor
2. Tailgate Window Switch, Key Operated
3. Cut-Out Switch



VIEW A



VIEW B



VIEW C

LC-0073-RV-E-RP

Figure 73 - Tailgate Rear Window Wiring—Suburban

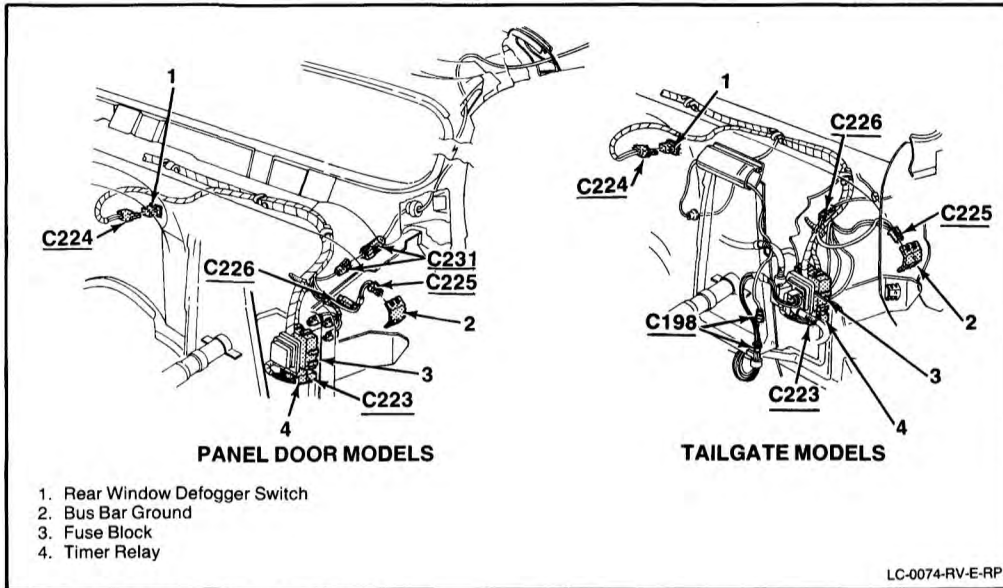


Figure 74 - Rear Defogger I/P Wiring—All Models

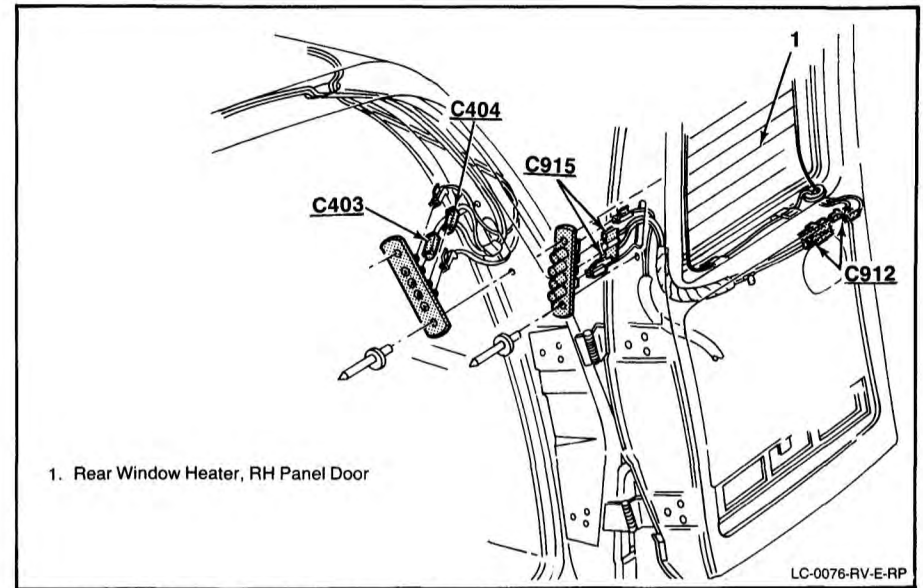


Figure 76 - Rear Window Defogger Wiring—Panel Door Model

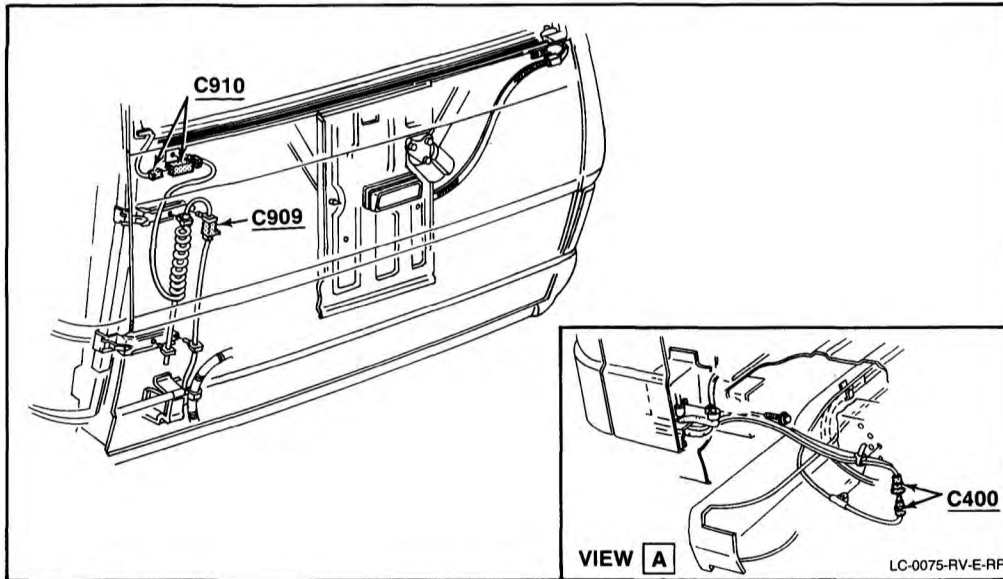


Figure 75 - Rear Window Defogger Wiring—Tailgate Model

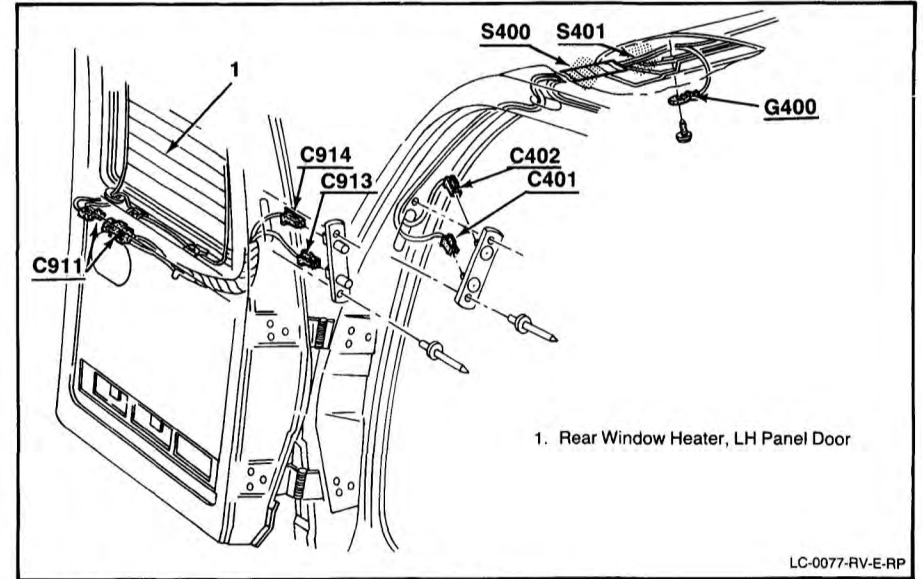


Figure 77 - Rear Window Defogger Wiring—Panel Door Model—LH Side



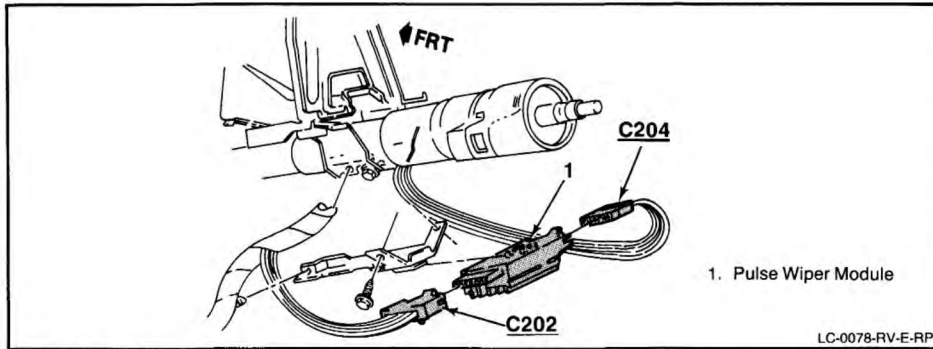


Figure 78 - Pulse Wiper Module Wiring

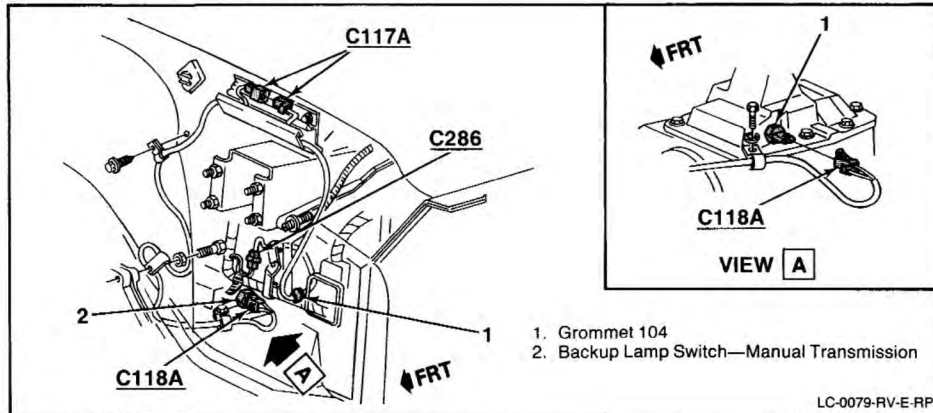


Figure 79 - Backup Lamp Switch Wiring—Manual Transmission

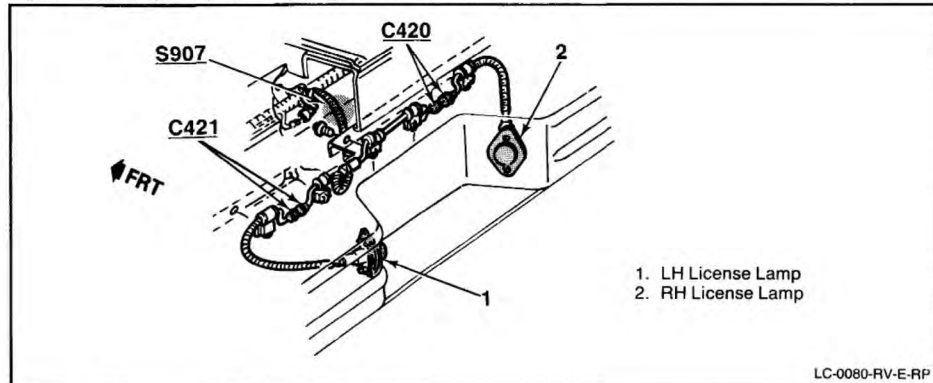


Figure 80 - License Lamps Wiring — Fleetside

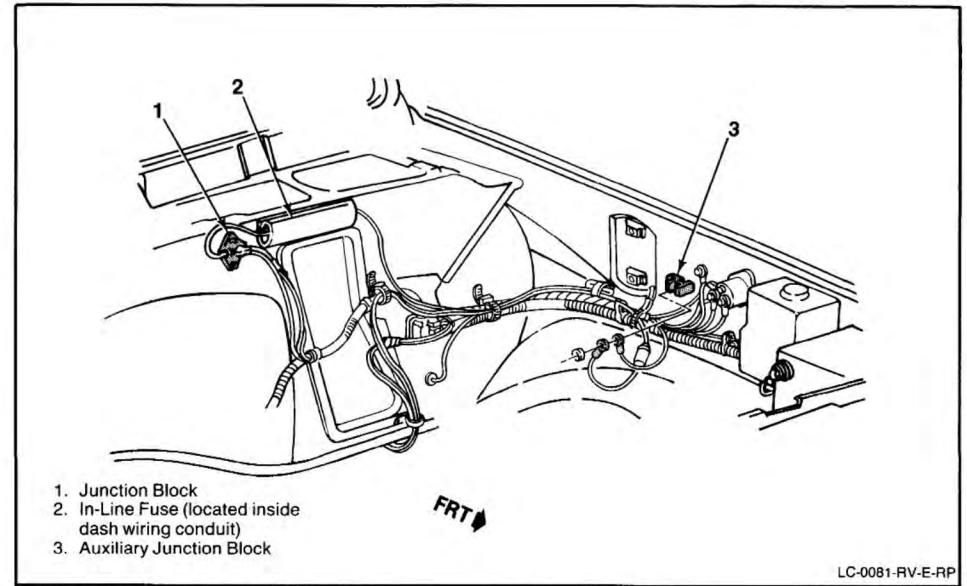


Figure 81 - Camper and Trailer Equipment Harness — Engine Compartment

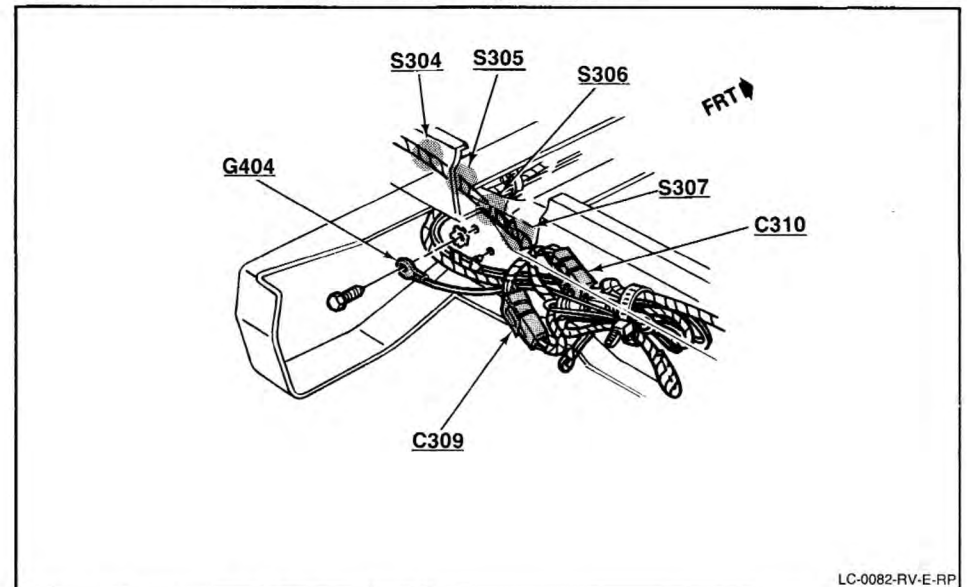


Figure 82 - Camper and Trailer Equipment Wiring

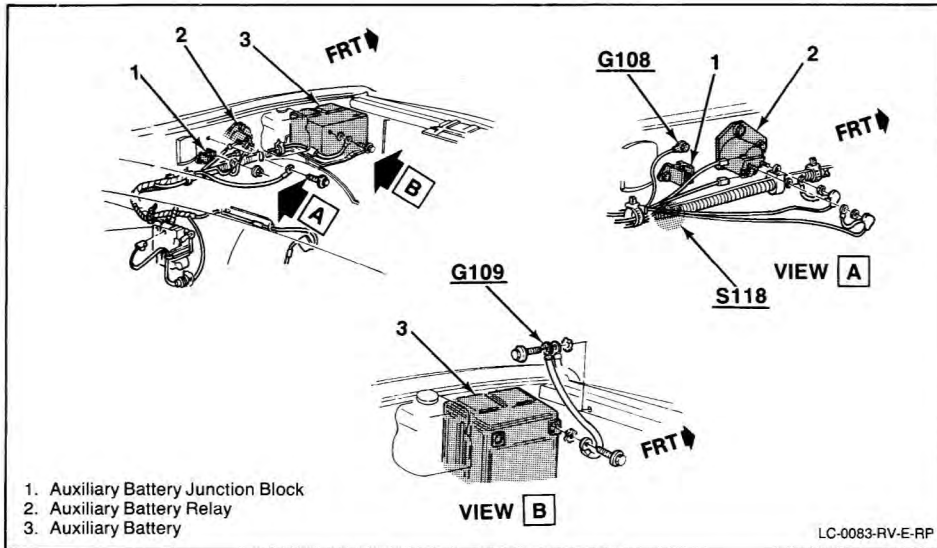


Figure 83 - Auxiliary Battery

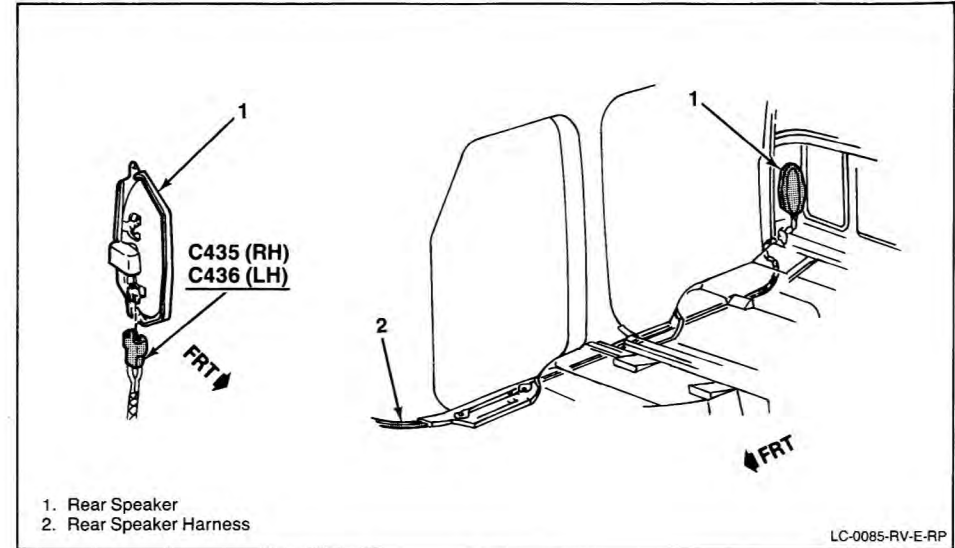


Figure 85 - Rear Speaker Wiring Harness

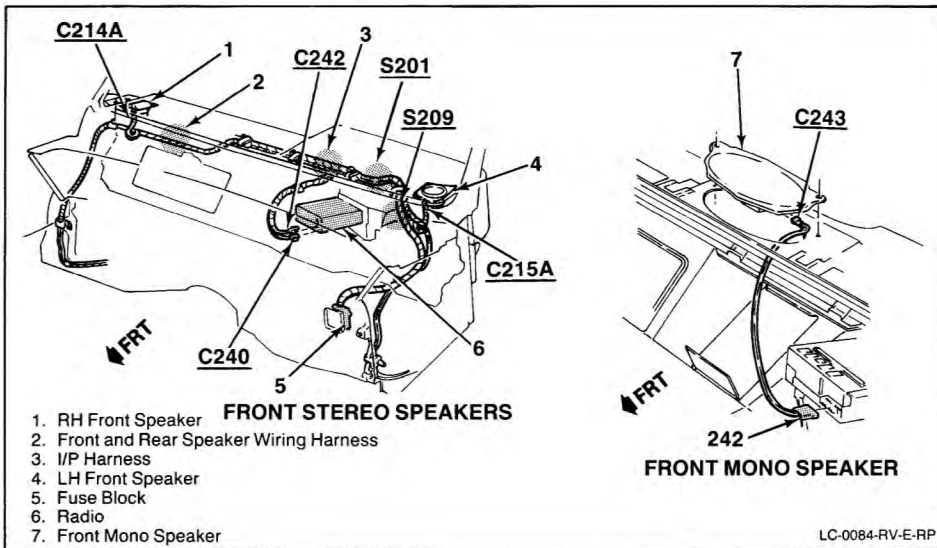


Figure 84 - Radio and Front Speaker Wiring Harness

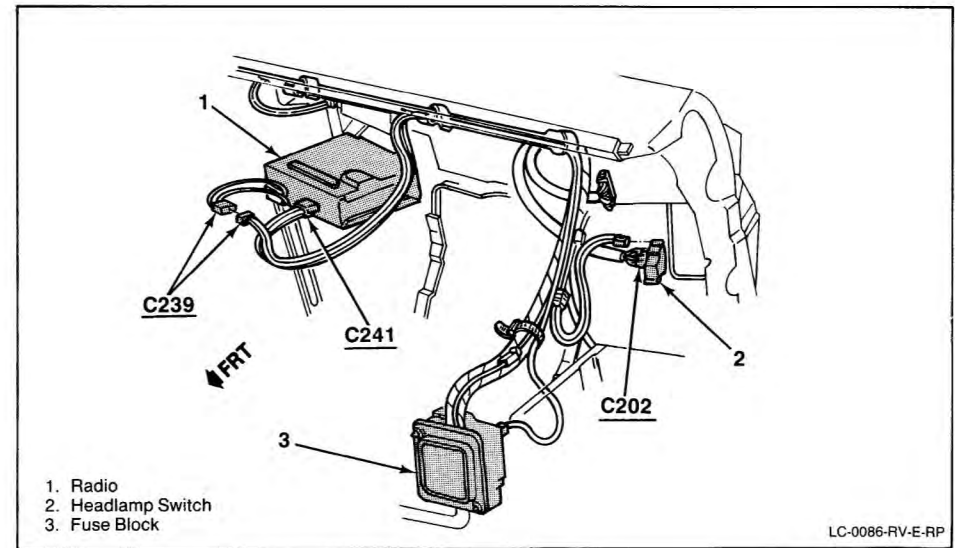


Figure 86 - Radio Wiring, Front Harness

### LAMP BULB DATA

AC Type Guide Lamps are recommended when replacement becomes necessary.

Lamp Usage	Quantity	Trade No.	Power Rating at 12V, Watts
Headlamps (2) Headlamp System	2	6025	66/65
	2	H6054 (Opt.)	35/65
(4) Headlamp System-Lo	2	H4703	55
	2	H4701	65
	2	H4651 (Opt.)	50
			<b>Candle Power</b>
Dome Lamps	2	211-2	12
Instrument Cluster Lamps	5	168	3
Headlamp Beam Indicator Lamp	1	168	3
Taillamp and Stoplamp	2	2057	2-32
License Lamp	3	67	4
Directional Signal (Front Park Lamps)	4**	2457NA	1.5-24
Directional Signal Indicator Lamp	2	168	3
Park Lamps (w/4 Headlamps)	2	194NA	1.5
Front Side Marker Lamps	2	194	2
Rear Side Marker Lamps	2	168	3
Roof Marker Lamps	5	194	2
Brake Warning Indicator	1	168	3
Backup Lamp	2	1156	32
Heater or A/C Control	1	194	2
Cargo Lamp*	1	1142	21
Fender Clearance Lamp*	4	168	3
Rear Identification*	5	Part of Lens	3
Radio Dial Lamp	1	1893	2
Four Wheel Drive Indicator	1	161	1
Courtesy Lamp	1	1003	15
Low Coolant Lamp <sup>1</sup>	1	194	2
Clock	1	168	3
Safety Belt Warning	1	168	3
Glow Plugs Indicator <sup>1</sup>	1	194	2
4 WD Shift Lever	1	194	2
Water in Fuel <sup>1</sup>	1	194	2
"SERVICE ENGINE SOON" Lamp (w/Gas Engine)	1	194	2
(w/LH6 Diesel)	1	1893	2
Underhood Lamp	1	19/10	9.9
Reading Lamp	2	906	6

Double filament bulb.

<sup>1</sup>Diesel only.

\*Not used on Suburban and Utility.

\*\*2 required with 4 headlamp system.

## R/V TRUCK COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page — Figure	COMPONENT LOCATION	Page — Figure
A/C Compressor	177 — 42	Daytime Running Lamp Relay	165 — 1
Air Switch Solenoid (RPO L05)	175 — 35	Digital Ratio Actuator Controller	177 — 39
ALDL Connector	166 — 4	Digital Ratio Adapter Controller	177 — 39
Auxiliary Battery Junction Block	190 — 83	Dimmer Switch	166 — 5
Auxiliary Battery	190 — 83	Diode	177 — 42
Auxiliary Battery Relay	190 — 83	Directional Signal Flasher	166 — 4
Auxiliary Cooling Fan	174 — 30	Directional Signal Switch	166 — 5
Auxiliary Cooling Fan Relay	174 — 30	Distributor (Gasoline)	171 — 22
Auxiliary Fan Temperature Switch	174 — 29	Dome Lamp, Front	183 — 59
Auxiliary Heater Blower Motor	179 — 48	Dome Lamp, Rear	183 — 59
Auxiliary Heater Blower Switch	178 — 47	Door Jamb Switch, LH Rear	183 — 59
Auxiliary Heater Resistor	179 — 48	Door Jamb Switch, RH Front	183 — 60
Auxiliary Junction Block	190 — 83	Door Jamb Switch, RH Rear	183 — 59
Backup Lamps, LH	167 — 8	Door Lock Motor, LH Front	186 — 69
Backup Lamps, RH	167 — 8	Door Lock Motor, LH Rear	186 — 71
Backup Lamp Switch, (Automatic Transmission)	166 — 5	Door Lock Motor, RH Front	186 — 69
Backup Lamp Switch, (Manual Transmission)	189 — 79	Door Lock Motor, RH Rear	186 — 71
Battery (Gasoline)	170 — 20	Door Lock Relay	185 — 67
Battery, LH (Diesel)	169 — 16	Door Lock Switch, LH Front	186 — 70
Battery, RH (Diesel)	169 — 16	Door Lock Switch, LH Rear	—
Blower Motor, Front	177 — 43	Door Lock Switch, RH Front	186 — 70
Blower Motor, Rear	178 — 46	Door Lock Switch, RH Rear	—
Blower Switch, Front	178 — 44	EGR Dump Valve	173 — 26
Blower Switch, Rear	178 — 47	EGR Solenoid (RPO L05)	171 — 21
Brake Pressure Warning Switch	176 — 38	EGR Valve	173 — 26
Brake Switch	181 — 55	EGR Valve Hose Vacuum Source: Gasoline Engines	—
Bus Bar Ground	166 — 6	Front of throttle body, port "J" (NA1 Light Duty Emissions); Front of throttle body, port "S" (NA4 Heavy Duty Emissions)	—
Cargo Lamp	185 — 65	LH6 Diesel Engine (Combined EGR Valve/EPR Valve Hose Vacuum Source)	—
Cargo Lamp Switch	185 — 65	T-fitting in line from vacuum pump, RH rear of engine	—
Check Engine Lamp Driver (RPO LH6)	179 — 49	EGR Valve Solenoid: LH6 Diesel Engine	173 — 26
Clutch Start Switch	166 — 5	EGR Valve Vent Solenoid: LH6 Diesel Engine	—
Clutch Switch	181 — 54	Electric Fuel Pump (Gas), LH	175 — 33
Coil (Gasoline)	171 — 22	Electric Fuel Pump (Gas), RH	175 — 33
Cold Advance Control Solenoid (RPO LH6)	170 — 18	Electronic Control Module (RPO LH6)	173 — 27
Cold Advance Glow Plug Inhibit Relay (RPO LH6)	173 — 26	Electronic Control Module (RPO L05)	171 — 21
Cold Advance/Fast Idle Temperature Controller Module	177 — 39	Electronic Control Module (RPO L19)	172 — 23
Convenience Center	168 — 12	Electronic Spark Control (ESC) Hybrid Function (RPO L05)	175 — 34
Coolant Temperature Sender (RPO L05)	175 — 35	Electronic Spark Control (ESC) Hybrid Function (RPO L19)	176 — 37
Coolant Temperature Sender (RPO L19)	172 — 24	Electronic Spark Timing (EST) Module	171 — 22
Coolant Temperature Sender (RPO LH6, LL4)	173 — 26	Electronic Vacuum Regulator Valve Solenoid: L05/L19 Gasoline Engines	175 — 34
Coolant Temperature Sensor (RPO L05)	175 — 34	Engine Speed Sensor	170 — 18
Coolant Temperature Sensor (RPO L19)	176 — 38	Engine Vacuum Pump, RPO LL4 Diesel Engine	—
Coolant Temperature Switch	170 — 18	EPR Valve	173 — 26
Courtesy Lamp	183 — 60	EPR Valve Solenoid: LH6 Diesel Engine	173 — 26
Cruise Control Actuator	182 — 58	Evaporator Pressure Control Switch	177 — 43
Cruise Control Module	181 — 54	EV RV Solenoid (RPO L05)	175 — 34
Cruise Control Servo (RPO L05, L19)	182 — 56		
Cruise Control Servo (RPO LH6, LL4)	182 — 57		
Cut-out Switch (Suburban)	187 — 73		
Cut-out Switch (Utility)	187 — 72		
Daytime Running Lamp Indicator	—		
Daytime Running Lamp Module	—		

## R/V TRUCK COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page — Figure	COMPONENT LOCATION	Page — Figure
EV RV Solenoid (RPO L19)	176 — 38	Headlamp Switch	166 — 4
Exhaust Gas Recirculation (EGR) Valve:		Headlamp, LH (Base)	165 — 2
L05 V8 Engine	171 — 21	Headlamp, LH High Beam (RPO V22)	165 — 3
L19 V8 Engine	171 — 21	Headlamp, LH High-Low (Base)	165 — 2
LH6 Diesel Engine	173 — 26	Headlamp, LH Low Beam (RPO V22)	165 — 3
Exhaust Pressure Regulator (EPR) Valve:		Headlamp, LH (RPO V22)	165 — 3
LH6 Diesel Engine	173 — 26	Headlamp, RH (Base)	165 — 2
Fast Idle Solenoid	170 — 18	Headlamp, RH High Beam (RPO V22)	165 — 3
Four-Wheel Drive Indicator Lamp		Headlamp, RH High-Low (Base)	165 — 2
(V100, V200)	180 — 51	Headlamp, RH Low Beam (RPO V22)	165 — 3
Four-Wheel Drive Indicator Lamp		Headlamp, RH (RPO V22)	165 — 3
(V300)	180 — 52	Heater A/C Control Assembly Lamp	177 — 39
Four-Wheel Drive Shift Lever Lamp		HI Blower Relay	177 — 43
(V100, V200)	180 — 51	Horn, LH	169 — 15
Fuel Heater	170 — 18	Horn, RH	169 — 15
Fuel Injector 1	171 — 21	I/P Cluster	166 — 4
Fuel Injector 2	171 — 21	Idle Air Control Actuator (RPO L05)	171 — 21
Fuel Injectors	175 — 34	Idle Air Control Actuator (RPO L19)	172 — 23
Fuel Pump	173 — 25	Ignition Switch	166 — 5
Fuel Pump Cycle Relay	—	In-Line Auto Fuse	185 — 67
Fuel Pump Oil Pressure Switch (RPO L05)	171 — 22	In-Line Diode	—
Fuel Pump Oil Pressure Switch (RPO L19)	176 — 38	In-Line Fuse	189 — 81
Fuel Pump Relay	175 — 34	In-Line Fuse (RPO LH6, LL4)	184 — 62
Fuel Pump Relay	171 — 21	In-Line Fuse (RPO L05, L19)	184 — 63
Fuel Shutoff Solenoid (RPO LH6)	170 — 18	Inlet Manifold Vacuum Fitting:	
Fuel Tank (Diesel), LH	174 — 32	RPO LB4 4.3L (262 Cu. In.) V6	—
Fuel Tank (Diesel), RH	174 — 32	Instrument Cluster	179 — 49
Fuel Tank Selector Switch	174 — 31	Junction Block	177 — 42
Fuel Tank Selector Valve and		Junction Block with Auxiliary Battery	189 — 81
Meter Switch (Diesel)	174 — 32	Knock Sensor (RPO L05)	175 — 34
Fuel Tank Selector Valve and		Knock Sensor (RPO L19)	176 — 37
Meter Switch (Gas)	175 — 33	License Lamp	167 — 8
Fuel Tank Sender	173 — 25	Low Coolant Module	179 — 49
Fuse Block	166 — 4	Low Coolant Warning Lamp	179 — 49
Generator (R200(43), RV300, RPO L05)	169 — 17	Manifold Absolute Pressure	
Generator (R200(43), RV300, RPO L19)	169 — 17	Sensor (RPO L05)	175 — 34
Generator (RPO LH6, LL4)	170 — 18	Manifold Absolute Pressure	
Generator (RPO L05, L19)	169 — 17	Sensor (RPO L19)	176 — 37
Generator (RV100, 200(06), RPO L05)	171 — 22	MAP Sensor:	
Generator (RV200(43), RV300, RPO L19)	172 — 23	Gasoline Engines	176 — 37
Glove Box Lamp Switch	183 — 60	LH6 Diesel Engines	170 — 18
Glow Plug Controller Module (RPO LH6)	173 — 26	MAP Sensor Hose Vacuum Source:	
Glow Plugs	173 — 26	Gasoline Engines	176 — 37
Glow Plugs Wait Lamp	179 — 49	LH6 Diesel Engine	—
Grommet 100	165 — 2	Oil Pressure Sender (RPO LH6, LL4)	173 — 26
Grommet 101	175 — 34	Oxygen Sensor	171 — 22
Grommet 102	178 — 45	Park and Directional Lamp, LH	165 — 2
Grommet 103	177 — 43	Park and Directional Lamp, RH	165 — 2
Grommet 104	189 — 79	Park Brake Warning Switch	166 — 4
Grommet 105	165 — 2	Park Lamp, LH (RPO V22)	165 — 3
Grommet 201	98 — 47	Park Lamp, RH (RPO V22)	165 — 3
Grommet 202	181 — 55	Power Brake Booster Unit	—
Grommet 400	99 — 48	Power Brake Hose Vacuum Fitting:	
Grommet 500	185 — 67	L05 V8 Gasoline Engine	—
Grommet 502	183 — 60	L19 V8 Gasoline Engine	—
Grommet 600	185 — 67	Power Outside Rearview Mirror, LH	—
Grommet 602	183 — 60	Power Outside Rearview Mirror, RH	—
Hazard Flasher	168 — 12	Power Outside Rearview Mirror Switch	186 — 69
Headlamp Dimmer Switch	166 — 5		

## R/V TRUCK COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page — Figure	COMPONENT LOCATION	Page — Figure
Radio Receiver	Center of I/P . . . . . 190 — 86	LL4 Diesel Engine	T-fitting in line from vacuum pump, RH rear of engine . . . . . —
Rear Gate Switch	At rear tailgate . . . . . 184 — 64	Underhood Lamp (RPO L05, L19)	Engine compartment, RH cowl . . . . . 184 — 63
Rear Panel Door Lock Motor	In RH rear panel door . . . . . 186 — 68	Underhood Lamp (RPO LH6, LL4)	Engine compartment, LH fender . . . . . 184 — 62
Rear Wheel Antilock Controller Module	Engine compartment, next to master cylinder . . . . . 176 — 38	Vacuum Regulator Valve	Engine compartment, LH side of engine . . . . . —
Rear Window Defogger Switch	Center of I/P . . . . . 188 — 74	Vacuum Regulator Valve, RPO LL4 Diesel Engine	On injection distributor pump, top center of engine . . . . . —
Rear Window Heater	In rear window glass . . . . . 188 — 76	Vanity Mirror Switch	On RH side vanity . . . . . 184 — 61
Resistor Block, Front	Engine compartment, on evaporator . . . . . 177 — 43	Vehicle Speed Sensor	Rear of transmission . . . . . 175 — 36
Resistor Block, Rear	On evaporator and blower module . . . . . 178 — 45	Washer Motor	Engine compartment, LH fender . . . . . 165 — 3
Roof Marker Lamps	Front top of roof . . . . . 168 — 13	Water in Fuel Lamp	Top of I/P cluster . . . . . 179 — 49
Safety Belt Retractor Switch	Under LH seat, at safety belt assembly . . . . . 179 — 50	Window Motor, LH Front	Bottom of LH front door . . . . . 186 — 69
Selector Control	RH side of I/P . . . . . 178 — 44	Window Motor, LH Rear	Center of LH rear door . . . . . 186 — 71
Sensor (gasoline engines)	On bracket, inboard side of RH cylinder head . . . . . —	Window Motor, RH Front	Bottom of RH front door . . . . . 186 — 69
Side Clearance Lamp, LH Front	Front LH side of rear fender . . . . . 167 — 10	Window Motor, RH Rear	Center of RH rear door . . . . . 186 — 71
Side Clearance Lamp, LH Rear	Rear LH side of rear fender . . . . . 167 — 10	Window Switch, LH Front	Top of door panel . . . . . 186 — 69
Side Clearance Lamp, RH Front	Front RH side of rear fender . . . . . 167 — 10	Window Switch, LH Rear	Top of door panel . . . . . 186 — 71
Side Clearance Lamp, RH Rear	Rear RH side of rear fender . . . . . 167 — 10	Window Switch, RH Front	Top of door panel . . . . . 186 — 69
Side Marker Lamp, LH Front	Front LH side of vehicle . . . . . 165 — 2	Window Switch, RH Rear	Top of door panel . . . . . 186 — 69
Side Marker Lamp, LH Rear	Rear LH side of vehicle . . . . . 167 — 8	Wiper Motor	LH side of cowl . . . . . 176 — 38
Side Marker Lamp, RH Front	Front RH side of vehicle . . . . . 165 — 2	Wiper Pulse Module	Under steering column . . . . . 189 — 78
Side Marker Lamp, RH Rear	Rear RH side of vehicle . . . . . 167 — 8	Wiper Switch	On directional signal lever . . . . . 182 — 58
Solenoid (RPO L05)	Rear LH of transmission . . . . . 175 — 36	C100	Engine compartment, LH cowl . . . . . 103 — 60
Speaker, Front	Top center of I/P . . . . . 190 — 84	C100A	At fast idle solenoid . . . . . 170 — 18
Speaker, Left Front	LH side of I/P . . . . . 190 — 84	C101	At wiper motor . . . . . 176 — 38
Speaker, Left Rear	LH rear of passenger compartment . . . . . 190 — 85	C101A	At cold advance control solenoid . . . . . 170 — 18
Speaker, Right Front	RH side of I/P . . . . . 190 — 84	C102	At wiper motor . . . . . 176 — 38
Speaker, Right Rear	RH rear of passenger compartment . . . . . 190 — 85	C102A	At cold advance/fast idle temperature switch . . . . . 170 — 18
Starter Motor Assembly (RPO LH6, LL4)	Lower RH side of engine . . . . . 170 — 18	C103	Engine compartment, LH side of cowl . . . . . 175 — 35
Starter Motor Assembly (RPO L05, L19)	Lower RH side of engine . . . . . 169 — 17	C103A	At water-in-fuel sensor . . . . . 170 — 18
Starter Motor Solenoid (RPO L05)	Lower right rear of engine . . . . . 169 — 17	C104	At brake pressure warning switch . . . . . 176 — 38
Starter Motor Solenoid (RPO L19)	Lower right rear of engine . . . . . 172 — 23	C104A	At fuel heater . . . . . 170 — 18
Stoplamp Switch	On top of brake pedal (RPO MD8 only) . . . . . 168 — 11	C105	At rear wheel antilock controller module . . . . . 176 — 38
Switch	RH rear bottom of engine . . . . . 170 — 18	C105A	Engine compartment, LH side of cowl . . . . . 174 — 31
Tachometer (Gasoline)	Near distributor . . . . . —	C106 (RPO LH6, LL4)	At generator . . . . . 170 — 18
Tailgate Window Motor (Utility)	Center of tailgate . . . . . 187 — 72	C106	At cold advance flow plug inhibit relay . . . . . 173 — 26
Tailgate Window Switch Key Operated	Center of tailgate . . . . . 187 — 72	C107 (RPO LH6, LL4)	At coolant temperature sender . . . . . 173 — 26
Tailgate Window Switch	I/P panel . . . . . —	C107 (RPO L05)	At coolant temperature sender . . . . . 175 — 35
Taillamp, LH	Rear RH side of vehicle . . . . . 167 — 9	C107 (RPO L19)	At coolant temperature sender . . . . . 172 — 24
Taillamp, RH	Rear LH side of vehicle . . . . . 167 — 9	C107A	At fuel tank selector valve and meter switch . . . . . 174 — 32
Throttle Position Sensor	Front RH side of engine . . . . . 170 — 18	C108	At vehicle speed sensor . . . . . 175 — 36
Throttle Position Sensor	RH side of throttle body . . . . . 171 — 21	C108A	At coolant temperature switch . . . . . 170 — 18
Timer Relay	Under fuse block . . . . . 188 — 74	C109	At oxygen sensor . . . . . 171 — 22
Transfer Case Switch (V100, V200)	Top of transfer case . . . . . 180 — 51	C109A	At engine speed sensor . . . . . 170 — 18
Transfer Case Switch (V300)	Top of transfer case . . . . . 180 — 52	C110	At transmission converter clutch solenoid . . . . . 175 — 36
Transmission Converter Clutch Solenoid	On rear LH side of transmission . . . . . 175 — 36	C110A	At evaporator pressure control switch . . . . . 177 — 43
Transmission Kickdown Relay (RPO L05, L19)	Engine compartment, RH side of cowl . . . . . 172 — 23	C111	At electronic spark timing module . . . . . 171 — 22
Transmission Kickdown Solenoid (RPO L05, L19)	LH rear of transmission . . . . . 177 — 40	C111A	Near junction block, at center of cowl . . . . . 177 — 42
Transmission Kickdown Solenoid (RPO LH6, LL4)	LH rear of transmission . . . . . 177 — 41	C112	At coil . . . . . 171 — 22
Transmission Kickdown Switch (RPO LL4)	Front RH side of engine . . . . . 170 — 18	C112A	At HI blower relay . . . . . 177 — 43
Transmission Vacuum Modulator: (MX1 three-speed automatic transmission)	RH side of transmission case, just above transmission oil pan flange . . . . . —	C113	At tachometer . . . . . 171 — 22
Transmission Vacuum Modulator Hose Vacuum Source: Gasoline Engines	On rear of inlet manifold . . . . . —	C114	At transmission kickdown relay . . . . . 172 — 23
		C115 (RPO L05)	At fuel pump oil pressure switch . . . . . 171 — 22
		C115 (RPO L19)	At fuel pump oil pressure switch . . . . . 176 — 38
		C115	At fuel pump oil pressure switch . . . . . 172 — 24
		C115A (RPO LH6, LL4)	At in-line fuse . . . . . 184 — 62
		C115A (RPO L05, L19)	At in-line fuse . . . . . 184 — 63
		C116 (RPO L05)	At knock sensor . . . . . 175 — 34
		C116 (RPO L19)	At knock sensor . . . . . 176 — 37
		C116A (RPO LH6, LL4)	At underhood lamp . . . . . 184 — 62

### R/V TRUCK COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page	Figure	COMPONENT LOCATION	Page	Figure		
C116A (RPO L05, L19)	At underhood lamp	.184	63	C174	At blower motor	.177	43
C117	Under center of I/P, in engine harness	.169	17	C186 (RPO LL4)	At transmission kickdown switch	.170	18
C117A	Engine compartment, top LH side of cowl	.189	79	C187	At windshield washer bottle	.165	3
C118	Near ECM module, under I/P	.175	34	C188	Engine compartment, below kickdown relay	.177	41
C118	Under center of I/P	.171	21	C188A	At manual transmission backup lamp switch	.189	80
C118A	At manual transmission backup lamp switch	.189	79	C189 (RPO L05, L19)	At transmission kickdown solenoid	.177	40
C120	At electronic control module	.171	21	C189 (RPO LH6, LL4)	At transmission kickdown solenoid	.177	41
C120 (RPO LH6)	At electronic control module	.173	27	C190	At auxiliary cooling fan relay	.174	30
C122	At fuel pump relay	.171	21	C191	At auxiliary cooling fan	.174	30
C123	At fuel pump prime	.171	21	C192	Engine compartment to RH side of bulkhead connector	.174	30
C123A	At A/C compressor	.177	42	C193	At auxiliary fan temperature switch	.174	29
C124 (RPO L05)	At EGR Solenoid	.171	21	C194	Under I/P	—	—
C124A	At rear A/C resistor block	.178	45	C195 (V100, V200)	Engine compartment, LH side of cowl	.180	51
C125	At throttle position sensor	.170	18	C196 (RPO L05, L19)	Near rear of engine	.182	57
C125A	Engine compartment, near LH front of cowl	.165	2	C196 (RPO LH6, LL4)	Near front of engine	.182	56
C126 (RPO L05)	At idle air control actuator	.175	34	C197 (RPO L05, L19)	At cruise control servo	.182	57
C126A	LH inner fender, at daytime running lamp relay	.165	1	C197 (RPO LH6, LL4)	At cruise control servo	.182	56
C126A	LH side of engine compartment	.185	66	C198	LH side of engine compartment	.188	74
C127	At manifold absolute pressure sensor	.170	18	C199	At fuel shut-off solenoid	.170	18
C127A (RPO LH6, LL4)	At oil pressure sender	.173	26	C200	At directional signal switch	.166	5
C128	LH fuel injector	.175	34	C201	LH side of I/P, at dimmer switch	.166	5
C129	RH fuel injector	.175	34	C201A	LH side of I/P, at dimmer switch	.166	5
C130 (RPO L05)	At ESC hybrid function	.175	34	C201A	At door lock relay	.185	67
C130 (RPO L19)	AT ESC hybrid function	.176	37	C202	At headlamp switch	.166	4
C131 (RPO L05)	At EVRV solenoid	.175	34	C203	LH side of I/P	.166	4
C131 (RPO L19)	At EVRV solenoid	.176	38	C204	At pulse wiper control module	.189	78
C132 (RPO L05)	At coolant temperature sensor	.175	34	C204	Under LH seat, at safety belt assembly	.179	50
C132 (RPO L19)	At coolant temperature sensor	.176	38	C205	At front blower switch	.178	44
C133 (RPO L05)	At air switch solenoid	.175	35	C209	LH side of steering column	.166	5
C134 (RPO L19)	At idle air control solenoid	.176	37	C209A	At in-line autofuse	.185	67
C135	Near ECM, under I/P	.171	21	C211 (V100, V200)	Behind I/P cluster	.180	51
C137 (Base)	Front LH side marker lamp	.165	2	C211 (V300)	Behind I/P cluster	.180	52
C138 (Base)	Front LH side high-low headlamp	.165	2	C211A	Behind LH side of I/P, at daytime running lamp module	—	—
C139 (Base)	Front LH park and directional lamp	.165	2	C212A	At daytime running lamp indicator lamp	—	—
C140 (Base)	Front LH park and directional lamp	.165	2	C213A	At diode assembly, behind I/P	—	—
C144 (Base)	Front RH high-low headlamp	.165	2	C214A	At right front speaker	.190	84
C145 (Base)	Front RH side marker lamp	.165	2	C215 (V300)	Under 4WD shift lever housing	.180	52
C146 (Base)	Front RH park and directional lamp	.165	2	C215A	At left front speaker	.190	84
C147 (Base)	Front RH park and directional lamp	.165	2	C216	At cruise control module	.181	54
C149 (RPO V22)	Front LH high-low headlamp	.165	3	C217	At brake switch	.181	55
C150 (RPO V22)	Front LH high beam headlamp	.165	3	C217A	At glove box switch	.183	60
C151 (RPO V22)	Front LH park and directional lamp	.165	3	C218	Under steering column	.181	55
C152 (RPO V22)	Front LH park lamp	.165	3	C219	At clutch switch	.181	54
C153 (RPO V22)	Front LH side marker lamp	.165	3	C220	At DRAC	—	—
C154 (RPO V22)	Front RH high-low headlamp	.165	3	C220A	In LH 'B' pillar	.103	59
C155 (RPO V22)	Front RH high beam headlamp	.165	3	C220A	In LH 'B' pillar	.183	59
C156 (RPO V22)	Front RH park and directional lamp	.165	3	C221 (RPO LH6, LL4)	At vehicle speed sensor	—	—
C157 (RPO V22)	Front RH side marker lamp	.165	3	C221A	At heater A/C control assembly lamp	.177	39
C158 (RPO V22)	Front RH park lamp	.165	3	C222 (RPO L05, L19)	At vehicle speed sensor	—	—
C160	At EGR valve	.173	26	C222A	At glow plugs wait lamp	.179	49
C161	At EPR valve	.173	26	C223	At timer relay	.188	74
C162	At EGR dump valve	.173	26	C223A	At water in fuel lamp	.179	49
C163	Engine compartment, LH side of cowl	.170	18	C224	At rear window defogger switch	.188	74
C167	At cold advance control solenoid	.170	18	C224A	At low coolant warning lamp	.179	49
C168 (RPO LH6, LL4)	At glow plug controller	.173	26	C225	At bus bar ground	.188	74
C169	Under I/P, near electronic control module	.173	27	C225A	At low coolant warning module	.179	49
C170	At transmission converter clutch solenoid	.175	36	C226	Near bus bar ground	.188	74
C172	At check engine lamp driver module	.179	49	C231	In LH kick panel, below "A" pillar	.188	74
C173	At front resistor block	.177	43	C232	At tailgate window switch, in I/P	.185	66

## R/V TRUCK COMPONENT LOCATOR INDEX

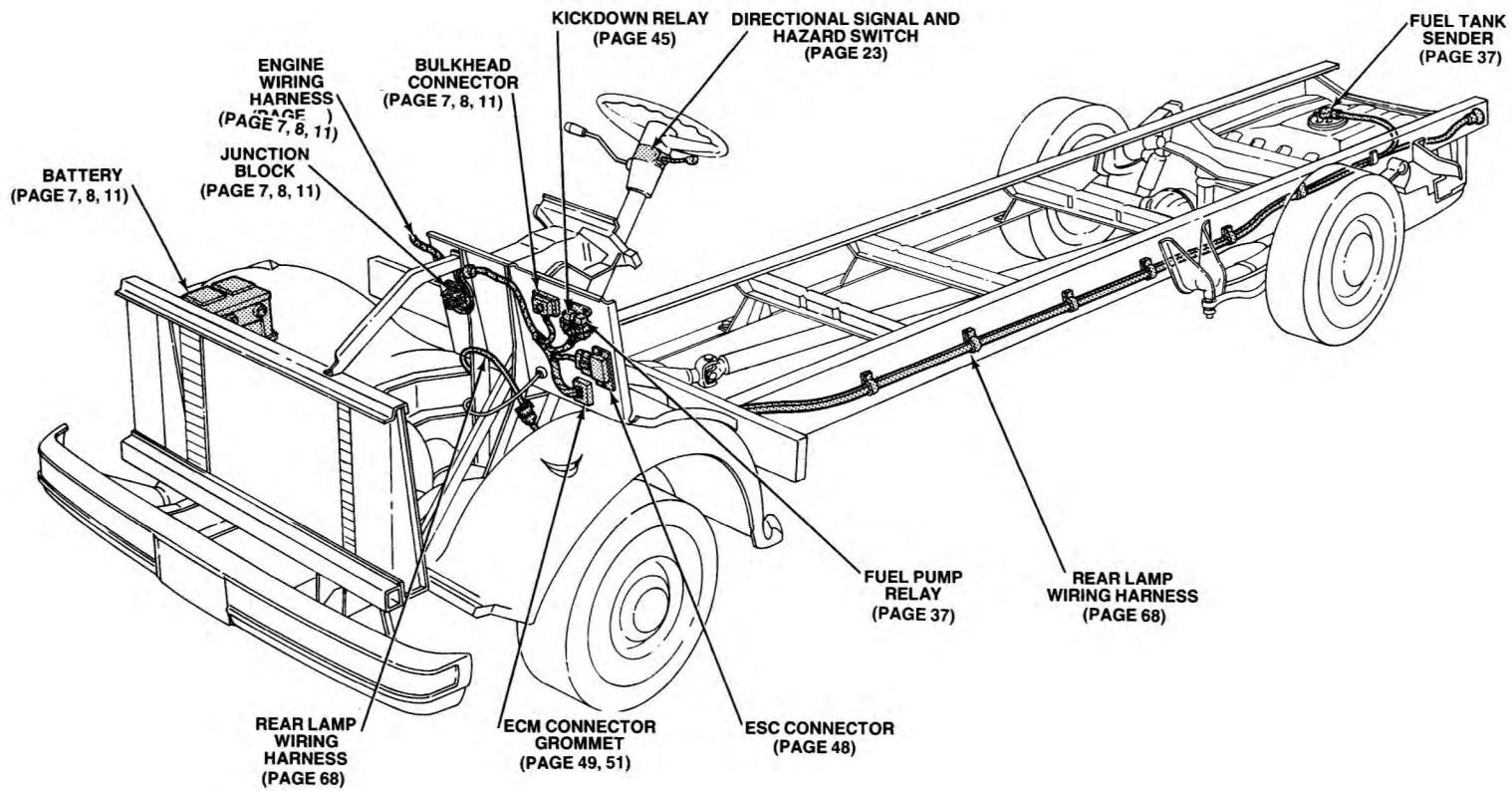
COMPONENT LOCATION	Page — Figure	COMPONENT LOCATION	Page — Figure
C237 (Manual Transmission) . . . . .	At clutch start switch . . . . . 166 — 5	C411 . . . . .	RH taillamp . . . . . 167 — 8
C237 . . . . .	At clutch switch . . . . . 166 — 5	C412 . . . . .	At RH rear taillamp . . . . . 167 — 8
C238 . . . . .	LH I/P, behind I/P cluster . . . . . 168 — 13	C413 . . . . .	Rear LH side marker lamp . . . . . 167 — 8
C239 . . . . .	Behind radio, center of I/P . . . . . 190 — 86	C414 . . . . .	Rear RH side marker lamp . . . . . 167 — 8
C240 . . . . .	At radio . . . . . 190 — 84	C415 . . . . .	RH side front clearance lamp . . . . . 167 — 10
C241 . . . . .	At radio . . . . . 190 — 86	C416 . . . . .	RH side rear clearance lamp . . . . . 167 — 10
C242 . . . . .	At radio . . . . . 190 — 84	C417 . . . . .	LH side front clearance lamp . . . . . 167 — 10
C243 . . . . .	At front speaker . . . . . 190 — 84	C418 . . . . .	RH side rear clearance lamp . . . . . 167 — 10
C244 . . . . .	At stoplamp switch . . . . . 181 — 55	C419 . . . . .	At license lamp . . . . . 167 — 8
C245 . . . . .	At fuel tank selector switch . . . . . 174 — 31	C420 . . . . .	At RH rear license lamp . . . . . 189 — 80
C246 . . . . .	At fuse block . . . . . 174 — 31	C421 . . . . .	At LH rear license lamp . . . . . 189 — 80
C247 . . . . .	At bus bar ground . . . . . 174 — 31	C423 . . . . .	At rear blower motor . . . . . 178 — 46
C278 . . . . .	In auxiliary fuel harness . . . . . 175 — 35	C424 . . . . .	Rear RH side at blower resistors . . . . . 179 — 48
C279 . . . . .	Behind I/P . . . . . —	C425 . . . . .	Rear RH side at blower motor . . . . . 179 — 48
C280 . . . . .	At selector control . . . . . 178 — 44	C428 . . . . .	At RH rear backup lamp . . . . . 167 — 8
C281 . . . . .	At rear A/C blower switch . . . . . 178 — 45	C429 . . . . .	At rear LH backup lamp . . . . . 167 — 8
C282 . . . . .	At fuse block . . . . . 178 — 45	C430 . . . . .	At cargo lamp switch . . . . . 185 — 65
C283 . . . . .	Upper LH side of I/P at "A" pillar . . . . . 178 — 45	C431 . . . . .	At cargo lamp . . . . . 185 — 65
C284 . . . . .	At auxiliary heater blower switch . . . . . 178 — 47	C432 . . . . .	Above rear tailgate . . . . . 184 — 64
C285 . . . . .	At fuse block . . . . . 178 — 47	C433 . . . . .	At rear gate switch . . . . . 184 — 64
C286 . . . . .	Automatic transmission backup lamp switch . . . . . 166 — 5	C434 . . . . .	In "B" pillar . . . . . 185 — 65
C289 . . . . .	At digital ratio adaptor controller module . . . . . 177 — 39	C435 . . . . .	At right rear speaker . . . . . 190 — 85
C290 . . . . .	At diode assembly, under I/P . . . . . —	C436 . . . . .	At left rear speaker . . . . . 190 — 85
C291 . . . . .	At diode assembly, behind I/P . . . . . —	C436 . . . . .	In RH rear of vehicle . . . . . 186 — 68
C292 . . . . .	At stoplamp switch (RPO MD8 only) . . . . . 181 — 55	C500 . . . . .	In bottom of LH door, at window motor . . . . . 186 — 69
C293 . . . . .	At parking brake warning switch . . . . . 166 — 4	C501 . . . . .	In LH front door, at window switch . . . . . 186 — 69
C300 . . . . .	Above rear crossmember, towards RH side of vehicle . . . . . 167 — 8	C502 . . . . .	At front LH door lock switch . . . . . 186 — 69
C301 . . . . .	Above rear crossmember, towards LH side of vehicle . . . . . 167 — 8	C503 . . . . .	At LH front door lock motor . . . . . 186 — 70
C303 (Gas) . . . . .	In auxiliary fuel harness . . . . . 175 — 35	C504 . . . . .	In LH front door, at window switch . . . . . 186 — 69
C304 (Gas) . . . . .	In auxiliary fuel harness . . . . . 175 — 35	C508 . . . . .	At LH power outside rearview mirror . . . . . 186 — 69
C306 (V100, V200) . . . . .	At transfer case switch . . . . . 180 — 51	C509 . . . . .	In LH front door . . . . . 186 — 69
C306 (V300) . . . . .	At transfer case switch . . . . . 180 — 52	C510 . . . . .	In LH rear door, at window switch . . . . . 186 — 71
C307 (V100, V200) . . . . .	At 4WD shift lever lamp . . . . . 180 — 51	C511 . . . . .	In LH rear door, at window motor . . . . . 186 — 71
C309 . . . . .	Near LH rear frame rail by rear crossmember . . . . . 189 — 82	C512 . . . . .	At rear LH door lock motor . . . . . 186 — 71
C310 . . . . .	Near LH rear frame rail by rear crossmember . . . . . 189 — 82	C600 . . . . .	In bottom of RH door, at window motor . . . . . 186 — 69
C311 . . . . .	Engine compartment, near water valve . . . . . 179 — 48	C601 . . . . .	At RH front door lock motor . . . . . 186 — 70
C312 . . . . .	Engine compartment, near water valve . . . . . 179 — 48	C602 . . . . .	At front RH door lock switch . . . . . 186 — 69
C313 . . . . .	RH "B" pillar . . . . . 186 — 71	C603 . . . . .	In RH front door, at window switch . . . . . 186 — 69
C314 . . . . .	In RH kick panel, under I/P . . . . . 185 — 67	C604 . . . . .	At RH power outside rearview mirror . . . . . 186 — 69
C315 . . . . .	LH "B" pillar . . . . . 186 — 71	C605 . . . . .	In RH rear door, at window switch . . . . . 186 — 71
C317 . . . . .	In LH kick panel, under I/P . . . . . 185 — 67	C606 . . . . .	In RH rear door, at window motor . . . . . 186 — 71
C318 . . . . .	LH kick panel . . . . . 185 — 67	C607 . . . . .	At rear RH door lock motor . . . . . 186 — 71
C320 . . . . .	In RH "B" pillar . . . . . 186 — 68	C909 . . . . .	In LH side of tailgate . . . . . 188 — 75
C321 . . . . .	Under I/P . . . . . 185 — 67	C910 . . . . .	In top LH side of tailgate . . . . . 188 — 75
C322 . . . . .	Under I/P . . . . . —	C911 . . . . .	In LH rear door . . . . . 188 — 77
C323 . . . . .	Bottom of RH "A" pillar . . . . . 184 — 61	C912 . . . . .	In RH rear door . . . . . 188 — 76
C324 . . . . .	At RH vanity mirror . . . . . 184 — 61	C913 . . . . .	In LH rear door . . . . . 188 — 77
C400 . . . . .	LH rear, near frame rail . . . . . 188 — 75	C914 . . . . .	In LH rear door . . . . . 188 — 77
C401 . . . . .	In LH rear of vehicle . . . . . 188 — 77	C915 . . . . .	In RH rear door . . . . . 188 — 76
C402 . . . . .	In LH rear of vehicle . . . . . 188 — 77	C916 (Suburban) . . . . .	At key operated tailgate under switch . . . . . 187 — 73
C403 . . . . .	In rear RH side of vehicle . . . . . 188 — 76	C916 (Utility) . . . . .	At key operated tailgate window switch . . . . . 187 — 72
C404 . . . . .	In rear RH side of vehicle . . . . . 188 — 76	C917 (Suburban) . . . . .	At cut-out switch, in tailgate . . . . . 187 — 73
C405 . . . . .	In rear, near LH frame . . . . . 187 — 73	C917 (Utility) . . . . .	At cut-out switch, in rear tailgate . . . . . 187 — 72
C406 . . . . .	In rear, near LH frame . . . . . 187 — 73	C918 . . . . .	At tailgate window motor . . . . . 187 — 72
C407 . . . . .	In rear, near LH frame . . . . . 187 — 72	C926 . . . . .	In RH rear door . . . . . 186 — 68
C408 . . . . .	In rear, near LH frame . . . . . 187 — 72	C927 . . . . .	In lower part of RH rear door . . . . . 186 — 68
C409 (Diesel) . . . . .	At LH fuel tank . . . . . 174 — 32	G102 (RPO L19) . . . . .	At front side of engine . . . . . 172 — 24
C409 . . . . .	At fuel tank . . . . . 173 — 25	G103 . . . . .	Rear RH side of engine . . . . . 171 — 22
C410 (Diesel) . . . . .	At RH fuel tank . . . . . 174 — 32	G105 . . . . .	LH front of vehicle, above LH headlamps . . . . . 165 — 2



## R/V TRUCK COMPONENT LOCATOR INDEX

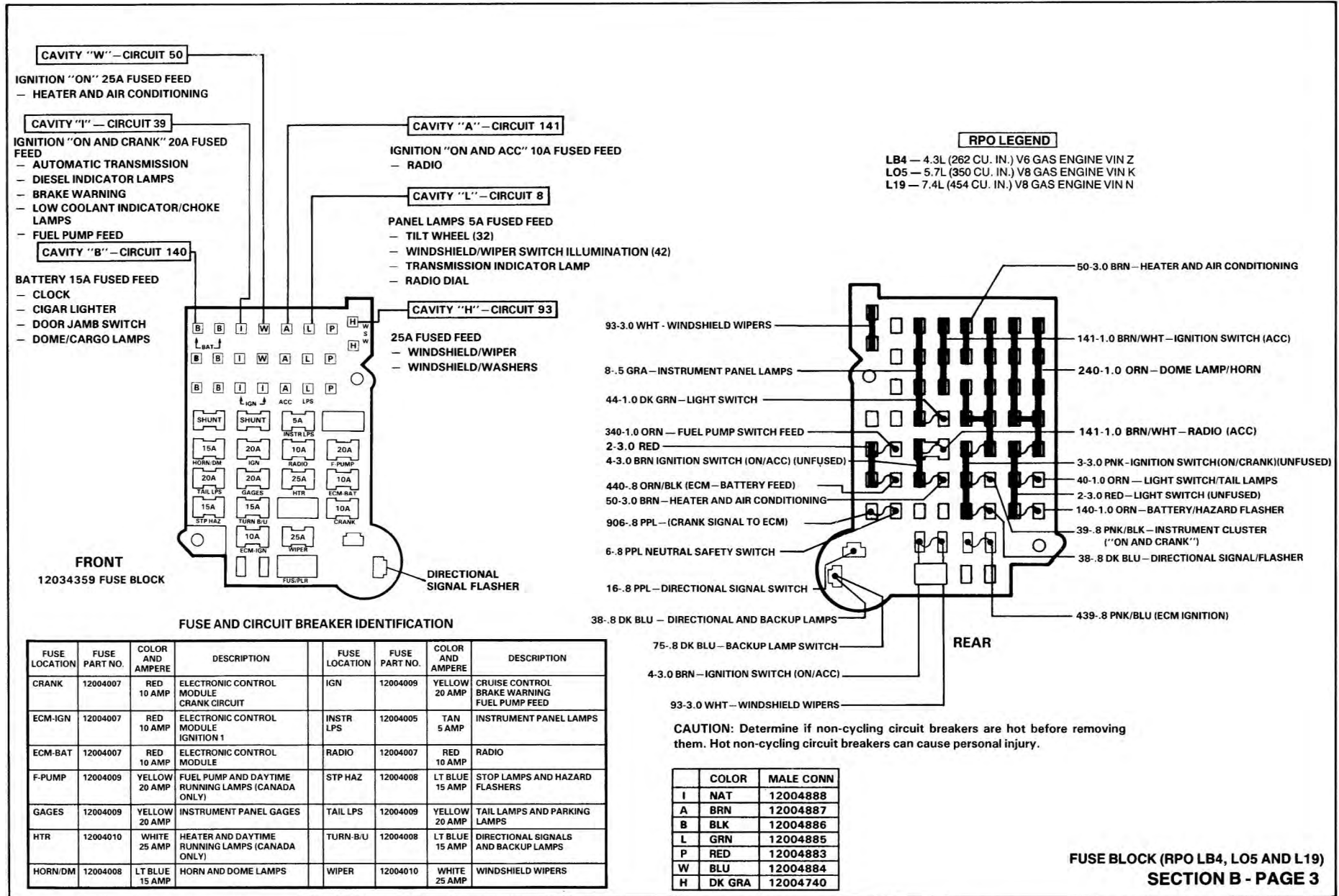
COMPONENT LOCATION	Page	Figure	COMPONENT LOCATION	Page	Figure
G106	.165	2	S201	.166	4
G107	.165	2	S202	.166	4
G108	.190	83	S204	.181	54
G109	.190	83	S205 (RPO LH6, LL4)	.181	54
G110	.170	18	S206	.166	5
G111 (Gasoline)	.169	16	S207 (RPO LH6)	.166	5
G112 (Gasoline)	.170	19	S208 (Daytime Running Lamps)	.166	4
G113 (Diesel)	.169	16	S209	.166	4
G114 (Diesel)	.169	16	S210	.166	4
G115	.177	43	S211	.177	39
G116	.177	42	S212	.103	60
G117	.177	43	S213	.177	39
G118 (RPO LH6, LL4)	.184	62	S214	—	—
G118 (RPO L05, L19)	.184	63	S217	.185	67
G200	.166	6	S300	.168	14
G302	.98	47	S301	.168	14
G400	.188	77	S302	.168	14
G401	.187	73	S304	.189	82
G402	.167	9	S305	.189	82
G403	.167	9	S306	.189	82
G404	.189	82	S307	.189	82
G405	.178	46	S308	.167	9
G406	—	—	S309	.186	69
G407	—	—	S310	.186	69
G408	.167	9	S311	.186	69
G409	.173	25	S312	.186	69
G904	.187	73	S313	.186	69
S103	.171	22	S400	.188	77
S104	.171	21	S401	.188	77
S105	.171	21	S402	.167	8
S106	.171	21	S403	.167	8
S107	.171	21	S404	.167	9
S108	.171	21	S405	.167	8
S109	.165	2	S406	.167	8
S110	.165	2	S410	.167	8
S111	.165	2	S412	.167	8
S112	.165	2	S413	.183	59
S113	.165	3	S907	.189	80
S114 (RPO V22)	.165	3	S908 (Suburban)	.187	73
S118	.190	83	S908 (Utility)	.187	72
S120	.173	26	S909 (Suburban)	.187	73
S121 (RPO LH6)	.173	26	S909 (Utility)	.187	72
S122	.173	26			
S123	.173	27			
S124	.170	18			
S128	.170	18			
S130 (RPO LL4)	.170	18			
S131	.173	26			
S132	.173	26			
S133	.173	26			
S134	.170	18			
S136 (Diesel)	.174	32			
S137 (Diesel)	.174	32			
S138 (Gas)	.175	33			
S139 (Gas)	.175	33			
S140	.173	26			
S141	.173	26			
S143	.176	38			
S200	.166	4			
			I/P harness, behind LH side of I/P	.166	4
			I/P harness, behind LH side of I/P	.166	4
			Cruise control harness, under LH side of I/P	.181	54
			Cruise control harness, under LH side of I/P	.181	54
			I/P harness, LH side of steering column	.166	5
			In I/P harness, bottom of steering column	.166	5
			In I/P harness, above bulkhead	.166	4
			I/P harness, behind I/P cluster	.166	4
			I/P harness, LH side	.166	4
			I/P harness, under I/P	.177	39
			I/P harness, RH side under I/P	.103	60
			I/P harness, under I/P	.177	39
			I/P harness, under I/P	—	—
			Under LH side of I/P	.185	67
			Rear lamps extension harness	.168	14
			LH frame rail, towards rear of vehicle	.168	14
			LH frame rail, towards rear of vehicle	.168	14
			Rear taillamp harness, near rear crossmember	.189	82
			Rear taillamp harness, near rear crossmember	.189	82
			Rear taillamp harness, near rear crossmember	.189	82
			Rear taillamp harness, near rear crossmember	.189	82
			Rear of vehicle	.167	9
			Near LH kick panel	.186	69
			In RH kick panel	.186	69
			Near LH kick panel	.186	69
			In LH kick panel	.186	69
			In LH kick panel	.186	69
			Rear top LH side of vehicle	.188	77
			Rear top LH side of vehicle	.188	77
			Rear taillamp harness, LH side rear of vehicle	.167	8
			Rear taillamp harness RH side of vehicle	.167	8
			Rear taillamps harness, rear center of vehicle	.167	9
			Rear taillamp harness, RH side of vehicle	.167	8
			Rear LH side of vehicle	.167	8
			Rear RH side of vehicle	.167	8
			Rear RH side of vehicle	.167	8
			I/P harness, above LH rear door	.183	59
			License lamp extension harness rear of vehicle	.189	80
			In tailgate window harness	.187	73
			In tailgate window harness	.187	72
			In tailgate window harness	.187	73
			In tailgate window harness	.187	72

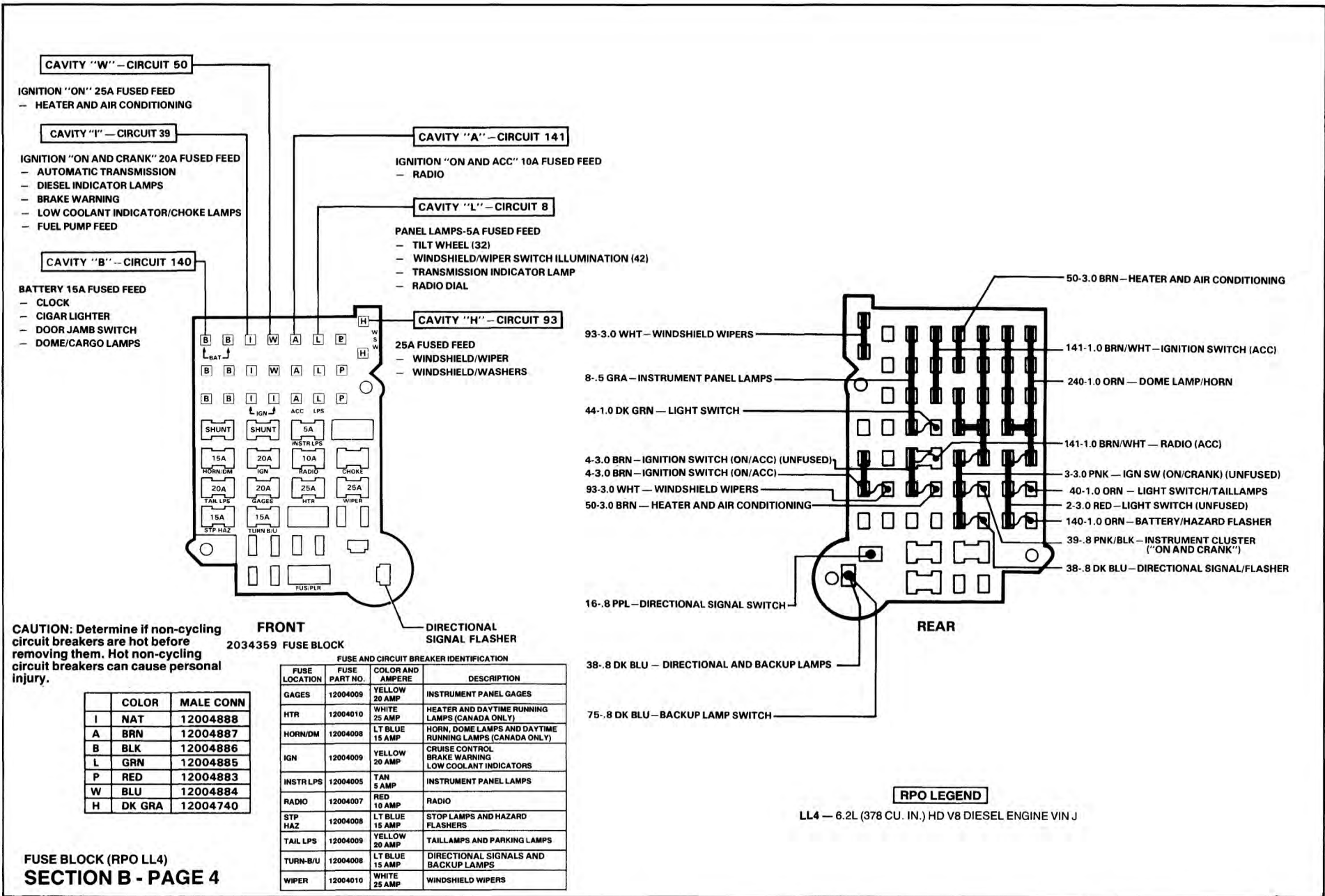




## SYMPTOMS INDEX

SYMPTOM	SECTION — PAGE	SYMPTOM	SECTION — PAGE
<b>BRAKE WARNING SYSTEM</b>			
Brake indicator remains on with ignition switch in run and park brake off . . . . .	B-52	<b>INSTRUMENT PANEL GAGES AND INDICATORS</b>	
<b>CRUISE CONTROL</b>			
Cruise control does not disengage when brake pedal is depressed . . . . .	B-56	Fuel gage indicates full or beyond at all times . . . . .	B-59
Cruise control does not operate . . . . .	B-56	Fuel gage indicates empty when there is fuel in the tank . . . . .	B-59
<b>DIESEL ENGINE FUEL CONTROLS</b>			
Fuel heater does not operate . . . . .	B-38	Fuel gage is inaccurate . . . . .	B-59
Water-in-fuel indicator lights with no water in fuel . . . . .	B-38	Temperature gage indicates hot with engine coolant below operating temperature and ignition switch in run . . . . .	B-59
Service fuel filter indicator does not light briefly with ignition switch turned to run . . . . .	B-38	Temperature gage indicates cold all the time . . . . .	B-59
<b>FRONT EXTERIOR LAMPS</b>			
Park lamps do not operate . . . . .	B-20	Temperature indicator stays on at all times with ignition switch in run . . . . .	B-59
Hazard warning lamps do not operate . . . . .	B-20	Temperature gage is not accurate . . . . .	B-59
Side marker lamps do not operate . . . . .	B-21	Temperature indicator does not light with engine coolant overheated . . . . .	B-59
Directional signals do not work on one side . . . . .	B-24	Oil pressure gage indicates low pressure when oil pressure is good . . . . .	B-60
Directional signals do not operate . . . . .	B-24	Oil pressure gage indicates high pressure at all times . . . . .	B-60
Directional signal lamps flash rapidly . . . . .	B-24	Oil pressure gage is not accurate . . . . .	B-60
<b>GLOW PLUGS</b>			
Wait indicator does not flash or flashes for the incorrect amount of time when engine is below normal operating temperature . . . . .	B-41	Low coolant indicator does not light with coolant level low (Diesel only) . . . . .	B-60
<b>HEADLAMPS</b>			
Headlamps do not illuminate high or low beams—both sides . . . . .	B-12	Low coolant indicator is lit when coolant level is good . . . . .	B-60
Low beam lamp(s) do not operate . . . . .	B-12	<b>REAR EXTERIOR LAMPS</b>	
High beam lamp(s) do not operate . . . . .	B-12	Rear marker lamps do not operate . . . . .	B-21
Headlamps do not illuminate high or low beams—both sides (Canada Only) . . . . .	B-15	None of the rear lamp systems operate . . . . .	B-66
Low beam lamp(s) do not operate (Canada Only) . . . . .	B-16	Backup lamps do not operate . . . . .	B-66
High beam lamp(s) do not operate (Canada Only) . . . . .	B-16	<b>START AND CHARGE</b>	
Daytime running lamps do not operate (Canada only) . . . . .	B-17	Engine does not crank and starter solenoid does not click . . . . .	B-31
<b>HORNS</b>			
Horn(s) will not operate . . . . .	B-26	Starter solenoid clicks, engine does not crank or cranks slowly . . . . .	B-31
Horn sounds continuously without depressing horn switch. . . . .	B-26	Battery is undercharged or overcharged . . . . .	B-31
		<b>WIPER/WASHER</b>	
		Wipers do not operate in any mode . . . . .	B-28
		Wipers do not operate in HI . . . . .	B-28
		Wipers do not operate in LO . . . . .	B-28
		Washer motor does not operate . . . . .	B-28
		Washer motor does not shut off . . . . .	B-28





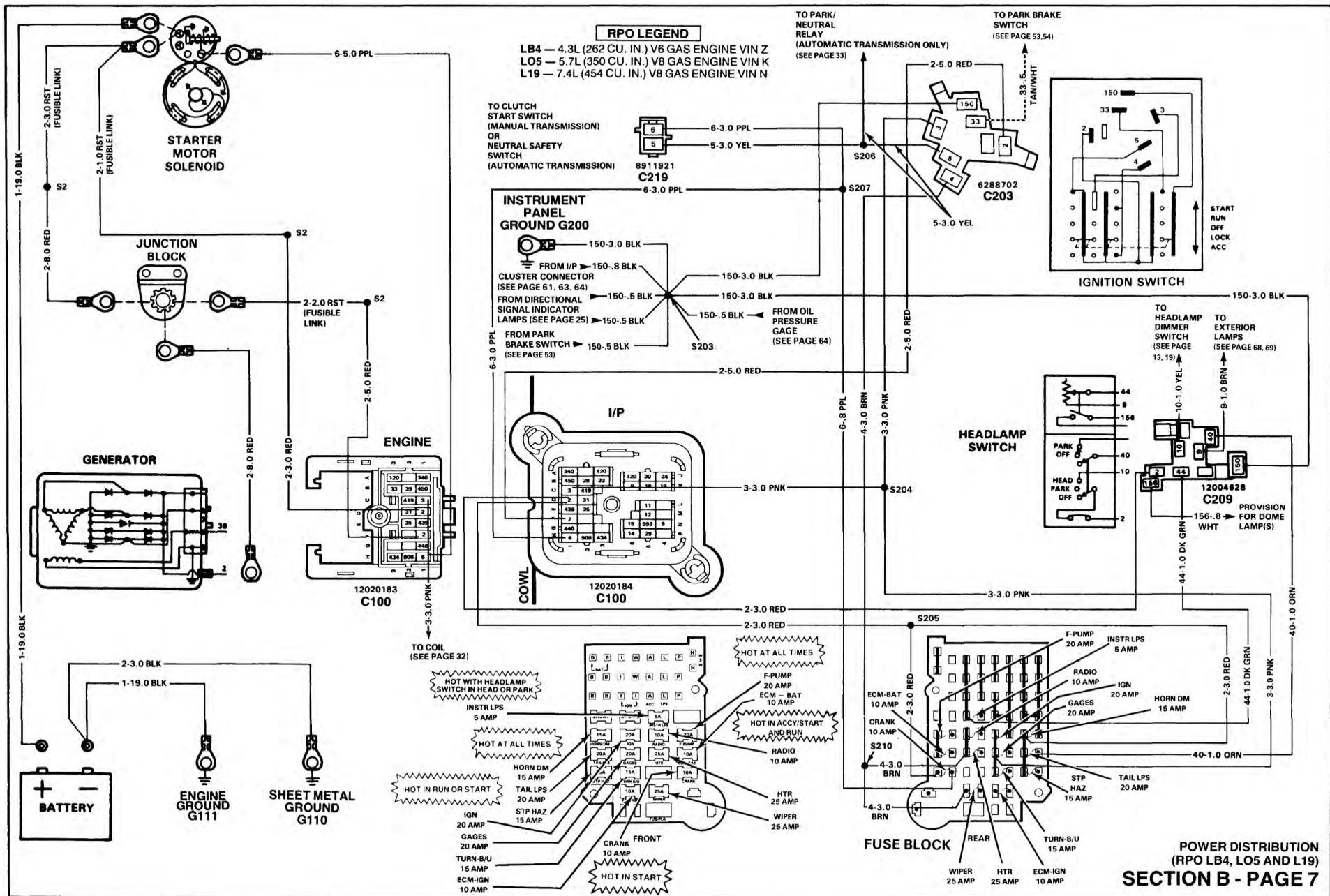
**BLANK**

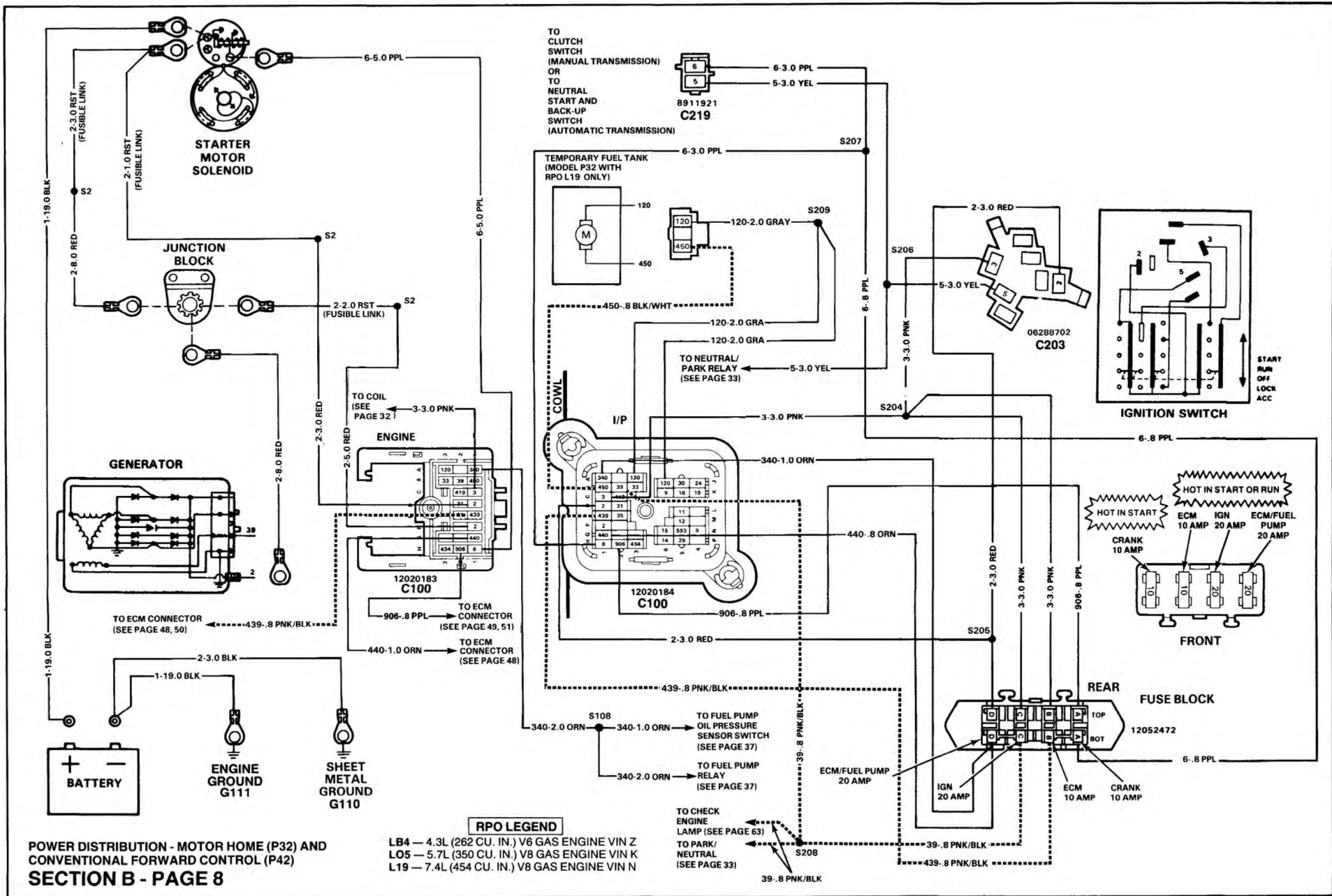
**COMPONENT LOCATION**

**Page — Figure**

Battery (P32 w/RPO L19) . . . . .	On RH frame rail . . . . .	.80 —	20
Battery (P32, P42 w/RPO LB4, L05, L19) w/o RPO B3M . . . . .	RH side of engine compartment . . . . .	.80 —	22
Battery (P42 w/RPO B3M, LB4, L05) . . . . .	On RH frame rail . . . . .	.80 —	21
Bulkhead Connector (P42 w/RPO LB4, L05, L19) . . . . .	Lower RH side of cowl . . . . .	.78 —	16
Fuse Block (Gasoline) . . . . .	Body builder installed . . . . .	—	—
Fuse Block (Gasoline P32, P42) . . . . .	Body builder installed . . . . .	—	—
Generator (P32, P42 w/RPO L19) . . . . .	Top RH side of engine . . . . .	.76 —	9
Generator (P42 w/RPO LB4) . . . . .	Top RH side of engine . . . . .	.77 —	13
Generator (P42 w/RPO L05) . . . . .	Top RH side of engine . . . . .	.76 —	11
Headlamp Switch . . . . .	Body builder installed . . . . .	—	—
Ignition Switch . . . . .	Body builder installed . . . . .	—	—
Junction Block (P42 w/RPO LB4, L05, L19) . . . . .	LH side of cowl . . . . .	.78 —	16
Starter Motor Solenoid (P32, P42 w/B3M, LB4, L05) . . . . .	Bottom RH side of engine . . . . .	.80 —	21
Starter Motor Solenoid (P32, P42 w/LB4, L05, L19 w/o RPO B3M) . . . . .	Bottom RH side of engine . . . . .	.80 —	22
Temporary Fuel Tank (P32 w/RPO L19) . . . . .	Temporary location . . . . .	—	—
C100 (P32 w/RPO L19) . . . . .	Lower, LH side of cowl . . . . .	.78 —	14
C100 (P42 w/RPO LB4, L05, L19) . . . . .	Lower, LH side of cowl . . . . .	.78 —	16
C203 . . . . .	At ignition switch . . . . .	—	—
C209 . . . . .	At headlamp switch . . . . .	—	—
C219 . . . . .	At clutch start switch (with manual transmission) or neutral safety switch (with automatic transmission) . . . . .	—	—
G110 . . . . .	Top, radiator support . . . . .	.80 —	22
G110 (P32 w/RPO L19) . . . . .	On RH frame assembly . . . . .	.80 —	20
G110 (P42 w/RPO B3M, LB4, L05) . . . . .	On RH frame assembly . . . . .	.80 —	21
G111 (P32, P42 w/RPO LB4, L05, L19 w/o RPO B3M) . . . . .	On top RH front of engine . . . . .	.80 —	22
G111 (P42 w/RPO B3M, LB4, L05) . . . . .	On top RH front of engine . . . . .	.80 —	21
G200 (P32 w/RPO L19) . . . . .	Near C100 (bulkhead connector) . . . . .	—	—
S108 (P32 w/RPO L19) . . . . .	Engine harness, LH side of cowl . . . . .	.78 —	14
S108 (P42 w/RPO L05, L19) . . . . .	Engine harness, LH side of cowl . . . . .	.78 —	16
S203 . . . . .	Body builder installed harness . . . . .	—	—
S204 . . . . .	Body builder installed harness . . . . .	—	—
S205 . . . . .	Body builder installed harness . . . . .	—	—
S206 . . . . .	Body builder installed harness . . . . .	—	—
S207 . . . . .	Body builder installed harness . . . . .	—	—
S208 . . . . .	Body builder installed harness . . . . .	—	—
S209 . . . . .	Body builder installed harness . . . . .	—	—
S210 . . . . .	Body builder installed harness . . . . .	—	—





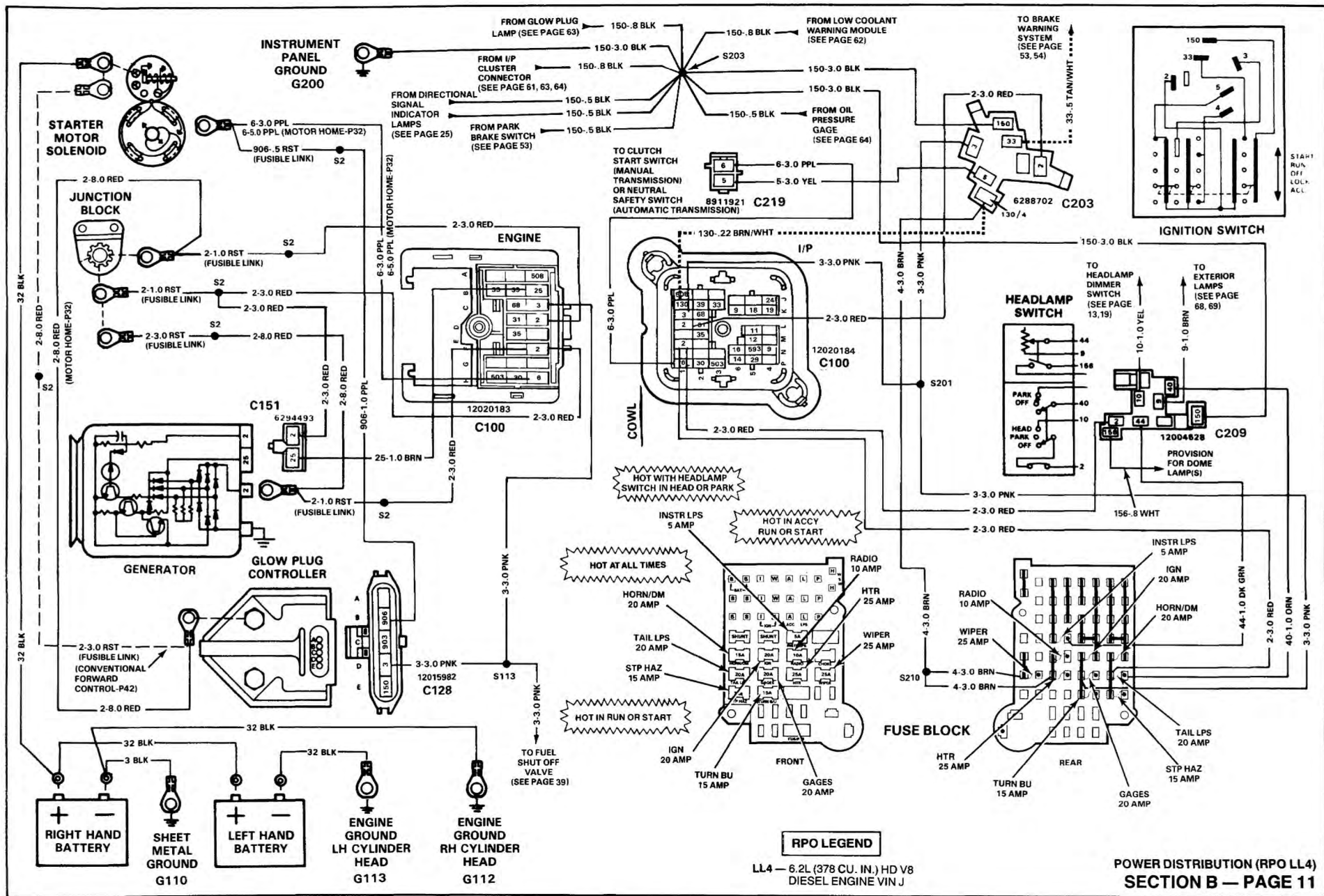


**BLANK**

## COMPONENT LOCATION

Page — Figure

Battery, LH (P42)	Front LH side of engine compartment	.73	—	1
Battery, RH (P32, P42 w/RPO B3M)	RH frame rail, behind engine	.73	—	1
Battery, RH (P42)	Front RH side of engine compartment	.73	—	1
Fuse Block	LH front of cowl			—
Generator	RH front of engine	.73	—	2
Glow Plug Controller	Top LH rear of engine	.74	—	4
Headlamp Switch	Body builder installed			—
Ignition Switch	Body builder installed			—
Junction Block (P32)	LH front of cowl	.74	—	5
Junction Block (P42)	LH front of cowl	.75	—	6
Starter Motor Solenoid	Lower RH side of engine	.73	—	1
C100 (P32)	LH front of cowl (temporary)	.74	—	5
C100 (P42)	LH front of cowl (temporary)	.75	—	6
C128	At glow plug controller	.74	—	4
C151	At generator	.73	—	2
C203	At ignition switch			—
C209	At headlamp switch			—
C219	At clutch start or neutral safety switch			—
G110 (P32, P42 w/RPO B3M)	RH frame rail, below batteries	.73	—	1
G110 (P42)	RH front of engine compartment	.73	—	1
G112 (P32, P42 w/RPO B3M)	Top right rear of engine	.73	—	1
G112 (P42)	Top right front of engine	.73	—	1
G113 (P42)	Top left front of engine	.73	—	1
G200	Body builder installed harness			—
S113	RH front of engine, near rocker cover	.73	—	2
S201	Body builder installed harness			—
S203	Body builder installed harness			—
S210	Body builder installed harness			—



## CIRCUIT OPERATION

Voltage is applied to the Headlamp Switch at all times. The Headlamp Switch includes a Self-Resetting Circuit Breaker. The Circuit Breaker opens when the Headlamp circuit draws too much current. When the Circuit Breaker opens, it interrupts the current flow. With no current flow,

the Circuit Breaker cools off and resets automatically. When the Headlamp Switch is in HEAD, the Dimmer Switch directs voltage to either the Low Beams or the High Beams. The HI Beam Indicator also receives voltage along with the High Beams.

## COMPONENT LOCATION

Page — Figure

Dimmer Switch	Body builder installed	—
Fuse Block	Body builder installed	—
Headlamp Switch	Body builder installed	—
High-Low Headlamp, LH	Body builder installed	—
High-Low Headlamp, RH	Body builder installed	—
Park and Directional Lamp, LH	Body builder installed	—
Park and Directional Lamp, RH	Body builder installed	—
Side Marker Lamp, LH	Body builder installed	—
Side Marker Lamp, RH	Body builder installed	—
C100 (P32 w/RPO LL4)	LH front of cowl	74 — 5
C100 (P32 w/RPO L19)	LH front of cowl	78 — 14
C100 (P42 w/RPO LB4, L05, L19)	LH front of cowl	78 — 16
C100 (P42 w/RPO LL4)	LH front of cowl	75 — 6
C140	Body builder installed	—
C141	Body builder installed	—
C142	Body builder installed	—
C143	Body builder installed	—
C144	Body builder installed	—
C145	Body builder installed	—
C205	Body builder installed	—
C209	Body builder installed	—
C210	Body builder installed	—
G104	Body builder installed harness	—
G105	Body builder installed harness	—
G106	Body builder installed harness	—
G107	Body builder installed harness	—
G108	Body builder installed harness	—
S120	Body builder installed harness	—
S121	Body builder installed harness	—
S122	Body builder installed harness	—
S211	Body builder installed harness	—

## TROUBLESHOOTING CHART—HEADLAMPS

### HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES

TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to junction block.
2. With the headlamp switch on and the dimmer switch to HIGH BEAM, connect a test lamp from YEL/BLK (10) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from headlamp dimmer switch to headlamps.
	Test lamp does not light.	REPLACE headlamp dimmer switch.

### LOW BEAM LAMP(S) DO NOT OPERATE

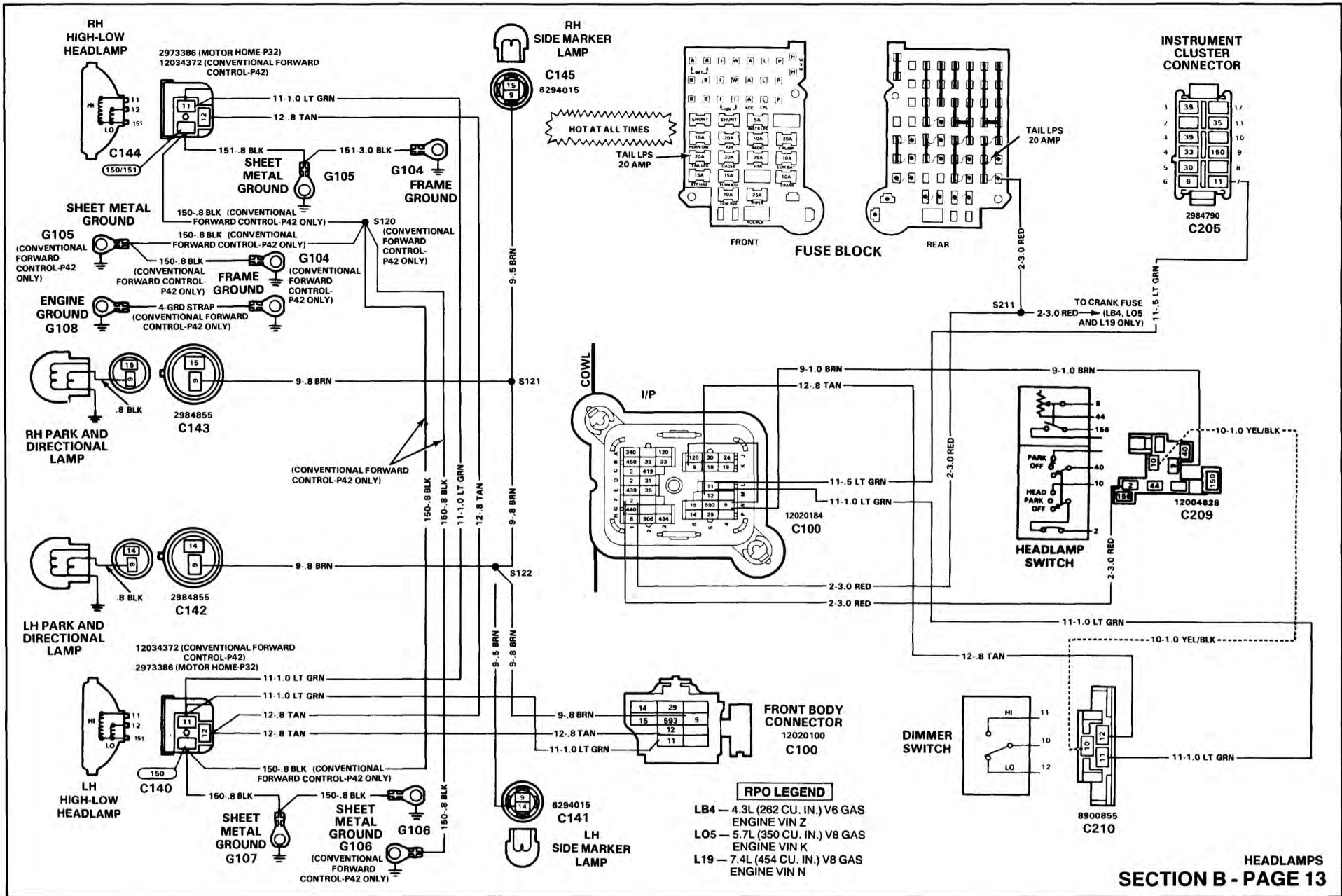
TEST	RESULT	ACTION
1. Turn headlamp switch ON and dimmer switch to LOW BEAM position. Connect a test lamp from TAN (12) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 3.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from TAN (12) to BLK (150 or 151) wire(s) at headlamp connectors C140 or C144.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) from headlamp connector(s) C140 or C144 to ground terminal(s) G104, G105, G106 or G107. If wire(s) is (are) in good condition, GO to step 3.
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from TAN (12) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 4.
	Test lamp lights.	LOCATE and REPAIR open in TAN (12) wire from headlamp dimmer switch to headlamp.
4. Connect a test lamp from YEL/BLK (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL/BLK (10) wire from headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.

### HIGH BEAM LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch to ON and dimmer switch to HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 3.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from LT GRN (11) wire to BLK (150 or 151) wire(s) at headlamp connectors C140 or C144.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) at headlamp connector(s) C140 or C144 to ground connection(s) G104, G105, G106 or G107. If wire(s) is (are) in good condition, GO to step 3.
	Test lamp lights.	REPLACE headlamps(s).
3. Place dimmer switch in the HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 4.
	Test lamp lights.	LOCATE and REPAIR open in LT GRN (11) wire from headlamp(s) to headlamp dimmer switch.
4. Connect a test lamp from YEL/BLK (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL/BLK (10) wire headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.

## HEADLAMPS

### SECTION B - PAGE 12



**BLANK**



**CIRCUIT OPERATION**  
**DAYTIME RUNNING LAMPS**  
**(CANADA ONLY)**

Battery voltage is applied to the Daytime Running Lamp (DRL) Relay Switch at all times through the ORN (340) wire from the DRL fuse and, when the Ignition Switch is in RUN, through the PNK/BLK (39) wire from the GAGES fuse. Battery voltage is also applied to the Daytime Running Lamp Module from the BRN (50) wire and the HTR fuse.

With the Headlamps on, the Daytime Running Lamp Relay is not energized and the LT BLU/ORN (593) wire is grounded to BLK (150) wire inside of the relay. This serves as ground for the LH Headlamp(s).

With Ignition in RUN, headlamps off and Parking Brake released, the Daytime Running Lamp Module applies bat-

tery voltage to the LT GRN/BLK (592) wire. This action illuminates the DRL indicator in the Instrument Panel and energizes the DRL Relay. When energized, the DRL Relay disconnects the LT BLU/ORN (593) wire from ground and internally connects it to the ORN (340) wire, causing it to be 12 volts.

The LT BLU/ORN (593) wire feeds the LH High beam(s) which are connected in series to the RH Headlamp(s) through the LT GRN (11) wire. Grounding of the entire DRL circuit is accomplished through the BLK (151) wire at the RH Headlamp(s). This results in High beam headlamps that are less intense for daytime driving and should provide longer service.

**COMPONENT LOCATION**

Page — Figure

Daytime Running Lamp Module	Body builder installed	—	—
Daytime Running Lamp Relay Switch	Body builder installed	—	—
Dimmer Switch	Body builder installed	—	—
Fuse Block (Diesel)	Body builder installed	—	—
Fuse Block (Gasoline)	Body builder installed	—	—
Headlamp Switch	Body builder installed	—	—
High-Low Headlamp, LH	Body builder installed	—	—
High-Low Headlamp, RH	Body builder installed	—	—
Park and Directional Lamp, LH	Body builder installed	—	—
Park and Directional Lamp, RH	Body builder installed	—	—
Side Marker Lamp, LH	Body builder installed	—	—
Side Marker Lamp, RH	Body builder installed	—	—
C100 (P32 w/RPO LL4)	LH front of cowl	74 —	5
C100 (P32 w/RPO L19)	LH front of cowl	78 —	14
C100 (P42 w/RPO LB4, L05, and L19)	LH front of cowl	78 —	16
C100 (P42 w/RPO LL4)	LH front of cowl	75 —	6
C140	At LH high-low headlamp	—	—
C141	At LH side marker lamp	—	—
C142	At LH park and directional lamp	—	—
C143	At RH park and directional lamp	—	—
C144	At RH high-low headlamp	—	—
C145	At RH side marker lamp	—	—
C205	In body builder installed instrument panel	—	—
C209	At headlamp switch	—	—
C210	At dimmer switch	—	—

**COMPONENT LOCATION**

Page — Figure

C242	At daytime running lamp switch	—
C243	At daytime running lamp module	—
G104	Body builder installed harness	—
G104 (P42)	Body builder installed harness	—
G105	Body builder installed harness	—
G105 (P42)	Body builder installed harness	—
G106 (P42)	Body builder installed harness	—
G108	Body builder installed harness	—
G200	Near C100 (bulkhead connector)	—
S120	Body builder installed harness	—
S121	Body builder installed harness	—
S122	Body builder installed harness	—
S202	Body builder installed harness	—
S203	Body builder installed harness	—
S211	Body builder installed harness	—
S212	Body builder installed harness	—
S213	Body builder installed harness	—

**TROUBLESHOOTING CHART—HEADLAMPS**  
**(WITH DAYTIME RUNNING LAMPS)**  
**HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES**

TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to fuse block.
2. With the headlamp switch on and the dimmer switch to HIGH BEAM, connect a test lamp from YEL (10) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from dimmer switch to headlamps.
	Test lamp does not light.	REPLACE dimmer switch.

**LOW BEAM LAMP(S) DO NOT OPERATE**

TEST	RESULT	ACTION
1. Turn headlamp switch ON and dimmer switch to LOW BEAM position. Connect a test lamp from TAN (12) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from TAN (12) to BLK (150 or 151) wire(s) at headlamp connectors C140 or C144 to ground. (For Canadian vehicles LT BLU/ORN (593) is used in place of BLK (150) wire at connector C140.)	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) from headlamp connector(s) C140 or C144 to ground terminal(s) G107 or G105. (For Canadian vehicles, GO to step 3.)
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from LT BLU/ORN (593) wire at daytime running lamp relay switch connector C242 to ground.	Test lamp does not light.	LOCATE and REPAIR open in LT BLU/ORN (593) wire from headlamp connector C140 to daytime running lamp relay switch C242.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (150) wire at the daytime running lamp relay switch connector C242 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay switch.
	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from daytime running lamp relay switch to ground G200.
5. Connect a test lamp from TAN (12) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in TAN (12) wire from dimmer switch to headlamp.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire from dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE dimmer switch.

**HIGH BEAM LAMP(S) DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place headlamp switch to ON and dimmer switch to HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from LT GRN (11) wire to BLK (150 or 151) wire(s) at headlamp connectors C140 or C144. (For Canadian vehicles, LT BLU/ORN (593) wire is used in place of BLK (150) wire at connector C140.)	Test lamp does not light.	If RH headlamp is inoperative, LOCATE and REPAIR open in BLK (150/151) wire to ground. If LH headlamp is inoperative, GO to step 3.
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from LT BLU/ORN (593) wire to ground at daytime running lamp relay switch connector C242.	Test lamp does not light.	LOCATE and REPAIR open in LT BLU/ORN (593) wire at headlamp connector C140 to daytime running lamp relay switch C242.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (150) wire at daytime running lamp relay switch connector C242 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay switch.
	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from daytime running lamp relay switch connector to ground G200.
5. Place dimmer switch in the HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in LT GRN (11) wire from headlamps to dimmer switch.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE dimmer switch.

**PRELIMINARY CHECKS:**

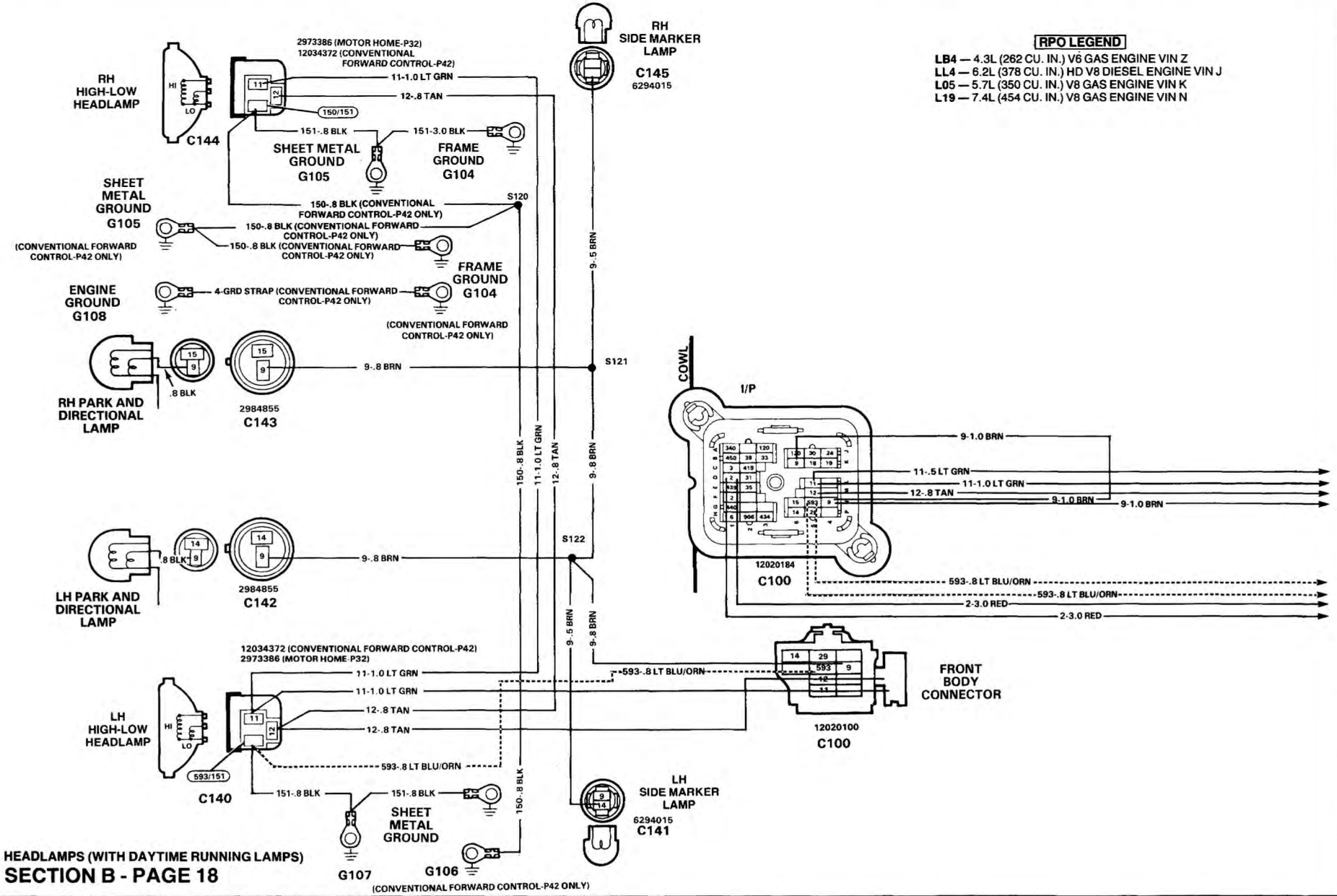
Before checking the DAYTIME RUNNING LAMPS system, do the following:

1. Place Park Brake in the OFF position.
2. Place Headlamp Switch to ON and Headlamp Dimmer Switch to HIGH BEAM position.  
If the High Beam Lamp(s) are inoperative, refer to the HIGH BEAM LAMP(S) DO NOT OPERATE test procedures.  
If the High Beam Lamp(s) are operative, use the following diagnostic procedures, after placing the Headlamp Switch to OFF position.

**DAYTIME RUNNING LAMPS DO NOT OPERATE (CANADA ONLY)**

TEST	RESULT	ACTION
1. With Ignition in RUN, Headlamps off and park brake released, connect test lamp from ORN (340) (240 RPO LL4) wire at DRL relay connector C242 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (340) (240 RPO LL4) wire between DRL relay connector C242 and fuse block or REPLACE DRL fuse.
	Test lamp lights.	GO to step 2.
2. Connect J 34029-A Multimeter from BRN (50) wire at DRL module connector C243 and DRL relay switch connector C242 to ground. Measure voltage.	Battery voltage at only one connector.	LOCATE and REPAIR open in BRN (50) wire between splice S212 and connector with missing voltage.
	No battery voltage at either connector.	LOCATE and REPAIR open in BRN (50) wire between splice S212 and fuse block or REPLACE HTR fuse.
	Battery voltage at both connectors.	GO to step 3.
3. Connect J 34029-A Multimeter from BRN (50) wire at DRL module connector C243 and DRL relay switch connector C242 to BLK (150) wire at each component connector. Measure voltage.	No voltage.	LOCATE and REPAIR open in BLK (150) wire between suspect connector and ground G200.
	Battery voltage.	GO to step 4.
4. Connect J 34029-A Multimeter from LT GRN/BLK (592) wire at DRL relay switch connector C242 to ground. Measure voltage.	No voltage.	LOCATE and REPAIR open in LT GRN/BLK (592) wire between the DRL relay switch and the DRL module or REPLACE daytime running lamp module.
	Battery voltage.	GO to step 5.
5. Connect test lamp from LT BLU/BRN (593) wire at LH HI/LOW beam connector C140.	Test lamp does not light.	LOCATE and REPAIR open in LT BLU/ORN (593) wire between DRL relay switch connector and the LH HI/LOW headlamp connector.
	Test lamp lights.	Daytime running lamps are operational.

HEADLAMPS (WITH DAYTIME RUNNING LAMPS)  
SECTION B - PAGE 18



**RPO LEGEND**

- LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z
- LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J
- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N

(CONVENTIONAL FORWARD CONTROL-P42 ONLY)



## CIRCUIT OPERATION

### PARK AND MARKER LAMPS

Voltage is applied through the TAIL LPS Fuse to the Headlamp Switch at all times. With the Headlamp Switch in PARK or HEAD, voltage is applied to the Park, Tail, Marker, and License Lamps. The Front Marker Lamps are grounded through the LH and RH Park and Directional Lamps.

### HAZARD LAMPS

Voltage is applied at all times, through the STP-HAZ Fuse and the Hazard Flasher to the normally open contact of the Hazard Switch in the Directional Signal Switch.

With the Hazard Switch in HAZARD FLASH, voltage is applied to both Front and Rear Directional Lamps. All of the Directional Lamps and both Directional Indicators flash on and off.

The Front Marker Lamps flash in HAZARD FLASH just as they did in TURN RIGHT and TURN LEFT, if the Lamp switch is in OFF, they flash on when the Hazard Lamps are on. If the Lamp Switch is in either PARK or HEAD, they flash on when the Hazard Lamps are off and off when the Hazard Lamps are on.

In HAZARD, the circuit is always open, and the Hazard Flasher Controls the Lamps.

### COMPONENT LOCATION

Page — Figure

Directional Signal Indicator Lamp, LH	Body builder installed	—	—
Directional Signal Indicator Lamp, RH	Body builder installed	—	—
Directional Signal Switch	In top of steering column	.78	15
Fuse Block	LH front of cowl	—	—
Hazard Flasher	Body builder installed	—	—
Headlamp Switch	Body builder installed	—	—
Park and Directional Lamp, LH	Body builder installed	—	—
Park and Directional Lamp, RH	Body builder installed	—	—
Rear Side Marker Lamp, LH	Body builder installed	—	—
Rear Side Marker Lamp, RH	Body builder installed	—	—
Stoplamp Switch	Body builder installed	—	—
Tail, Stop and Directional Lamp, LH	Body builder installed	—	—
Tail, Stop and Directional Lamp, RH	Body builder installed	—	—
C100	LH front of cowl (Temporary)	—	—
C141	At LH side marker lamp	—	—
C142	At LH park and directional lamp	—	—
C143	At RH park and directional lamp	—	—
C145	At LH side marker lamp	—	—
C206	At directional signal switch	.78	15
C209	At handlamp switch	—	—
C211	At stoplamp switch	—	—
C212	At RH directional signal indicator lamp	—	—
C213	At LH directional signal indicator lamp	—	—
C228	At hazard flasher	—	—
C402	On rear, LH frame rail	.79	17
C403	At LH tail, stop and directional lamp	—	—
C404	At RH tail, stop and directional lamp	—	—
C408	At RH rear side marker lamp	—	—
C409	At LH rear side marker lamp	—	—
G200	Body builder installed harness	—	—
G401	Body builder installed harness	—	—
G402	Body builder installed harness	—	—
S121	Body builder installed harness	—	—
S122	Body builder installed harness	—	—
S123	Body builder installed harness	—	—
S124	Body builder installed harness	—	—
S203	Body builder installed harness	—	—
S400	Body builder installed harness	—	—
S401	Body builder installed harness	—	—

## PRELIMINARY CHECKS:

If only one lamp is inoperative, inspect wire(s) to affected lamp socket, check bulb-to-socket fit or replace bulb.

## TROUBLESHOOTING CHART — PARK, MARKER AND HAZARD LAMPS

### PARK LAMPS DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from ORN (40) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	GO to step 2.
2. Connect test lamp from RED (2) wire at fuse block to ground.	Test lamp lights.	CHECK condition of fuse (TAIL LPS). If fuse is good, LOCATE and REPAIR open in ORN (40) wire.
	Test lamp does not light.	LOCATE and REPAIR open RED (2) wire from fuse block to junction block.
3. Connect test lamp from BRN (9) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE headlamp switch.
4. Connect test lamp at BRN (9) wire at LH park and directional lamp connector C142 to ground. Repeat at RH park and directional lamp connector C143.	Test lamp lights.	CHECK conditions of bulb socket ground. If socket ground is in good condition, REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire from park and directional lamp(s) to headlamp switch.

### HAZARD WARNING LAMPS DO NOT OPERATE

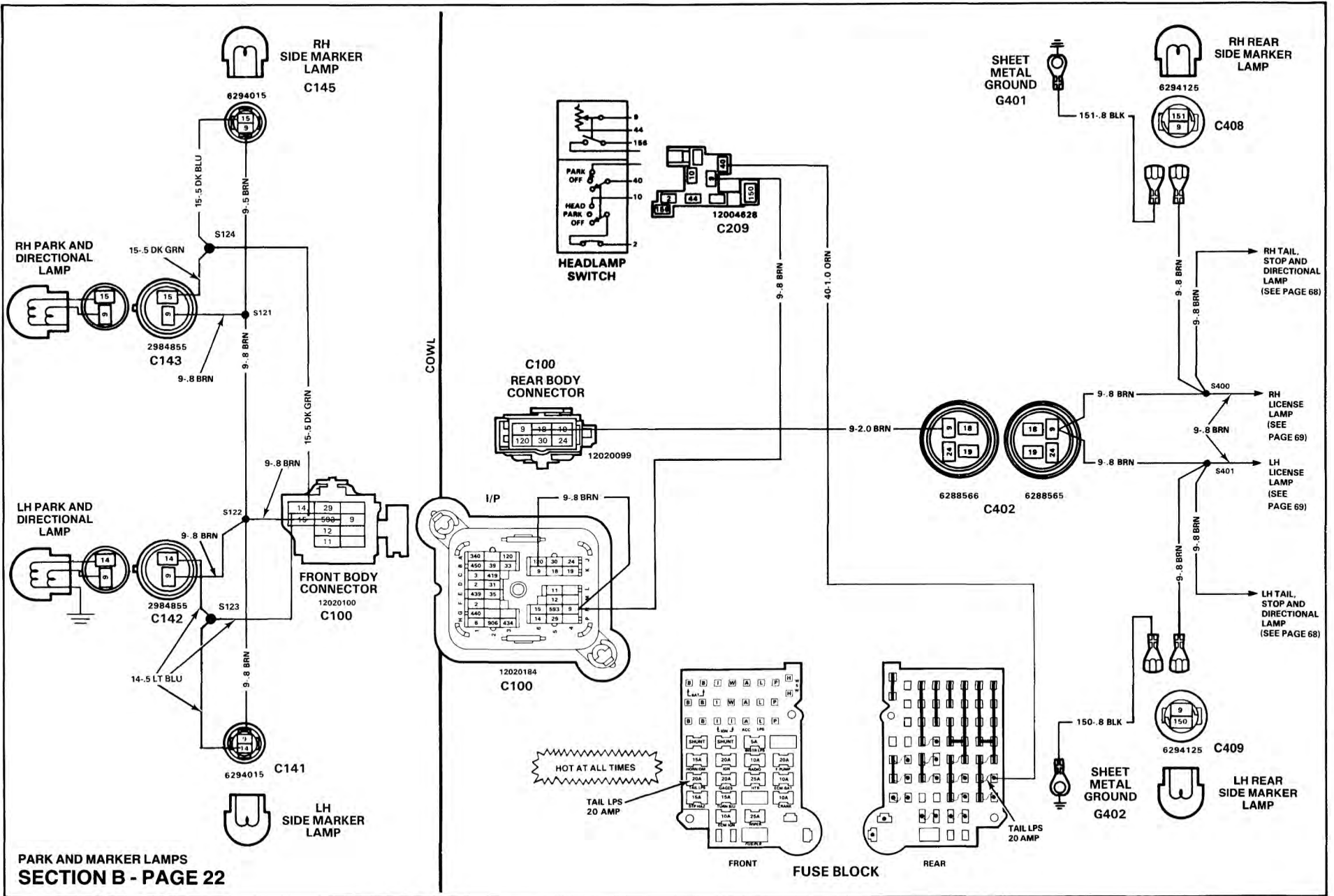
TEST	RESULT	ACTION
1. Place ignition switch in RUN and position directional signal lamps as if making a turn.	Directional signal lights operate.	GO to step 2.
	Directional signal lights do not operate.	Refer to "Directional Signals Do Not Work On One Side" symptom.
2. Turn off directional signal lamps and put hazard warning lamps ON. Connect a test lamp from BRN (27) wire at directional signal switch connector C206 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (STP/HAZ) and an open in ORN (140) wire and BRN (27) wire. If fuse and wiring are good, REPLACE hazard flasher.

**SIDE MARKER LAMP(S) DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from BRN (9) wire at LH side marker lamp connector C141 to ground. Repeat at RH side marker lamp connector C145.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire(s) from side marker lamp(s) to headlamp switch.
2. REMOVE bulb from socket, then connect a test lamp between BRN (9) wire and LT BLU (14) or DK BLU (15) wire(s) at side marker lamp connector(s) C141 or C145.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in LT BLU (14) or DK BLU (15) wire(s) from side marker lamp(s) to park and directional lamp(s).

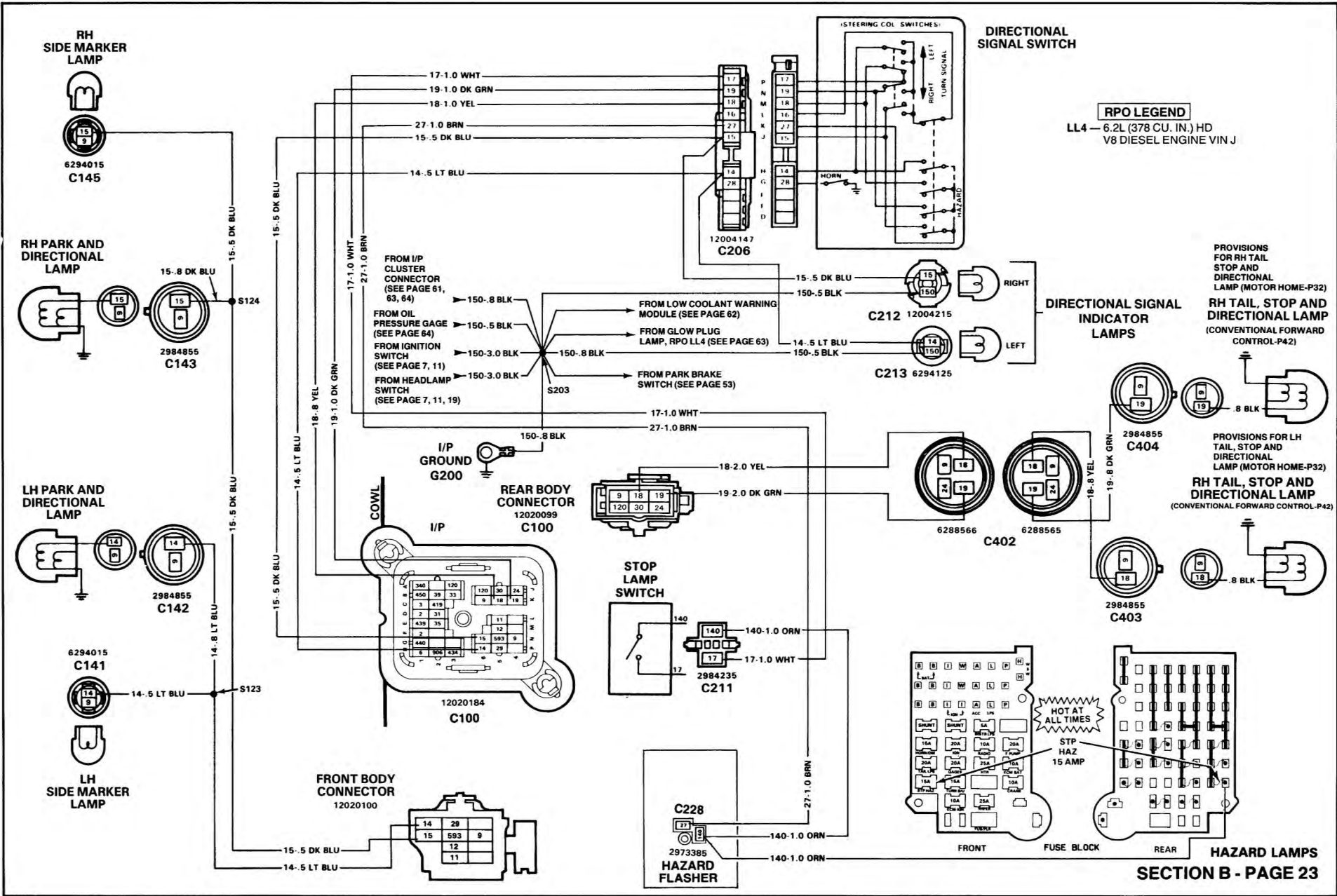
**REAR MARKER LAMP(S) DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from BRN (9) wire at LH rear side marker lamp connector C409 to ground. Repeat at RH rear side marker lamp connector C408.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire(s) from rear side marker lamp(s) to headlamp switch.
2. REMOVE bulb from socket, then connect a test lamp between BRN (9) wire and BLK (150 or 151) wire(s) at rear side marker lamp connector(s) C408 or C409.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) from rear side marker lamp(s) to ground terminal(s) G401 or G402.



PARK AND MARKER LAMPS  
SECTION B - PAGE 22





## CIRCUIT OPERATION

### DIRECTIONAL SIGNAL LAMPS

With the Ignition Switch in RUN or START, voltage is applied through the TURN B/U Fuse and Directional Flasher to the normally closed contact of the Hazard Flasher Switch in the Directional Signal Switch.

With the Signal Switch in LH Turn position, voltage is applied to both the LH Directional Indicator and the LH Front Park and Directional Lamp (LT BLU wires). Voltage is applied to the LH Tail, Stop and Directional Lamp (YEL wire).

The Lamps go on immediately. They begin to flash when the current flow heats up the Timing Element in the Flasher and it repeatedly opens and closes the circuit.

The voltage applied to the LH Park and Directional Lamp will also be applied to the LH Side Marker Lamp. If the Lamp Switch is in the OFF position, the LH Side Marker Lamp will find a path to ground through Splice

S123 and the Park and Directional Lamp to ground. This Lamp provides low resistance paths to ground. The Marker Lamps will flash with the Directional Lamps.

When the Headlamp Switch is in either PARK or HEAD, voltage is applied through the TAIL LPS Fuse, Lamp Switch, and Splice S122 to the Marker and Park Lamps. If the Directional Signal Switch is in TURN LEFT, the LH Side Marker Lamp will have voltage at both connections and will go out. When the Flasher removes voltage to the Directional Lamp, the Marker Lamp will be grounded through the Directional Lamp and will go on. In this way, the LH Side Marker Lamp will flash on when the LH Park and Directional Lamp goes off, and off when the directional lamp goes on.

With the Directional Signal Switch in TURN RIGHT, voltage will be applied to the RH Lamps in the same way.

### COMPONENT LOCATION

Page — Figure

Directional Flasher	Body builder installed	—	—
Directional Signal Indicator Lamp, LH	Body builder installed	—	—
Directional Signal Indicator Lamp, RH	Body builder installed	—	—
Directional Signal Switch	In top of steering column	.78	15
Fuse Block	LH front of cowl	—	—
Park and Directional Lamp, LH	Body builder installed	—	—
Park and Directional Lamp, RH	Body builder installed	—	—
Side Marker Lamp, LH	Body builder installed	—	—
Side Marker Lamp, RH	Body builder installed	—	—
Tail, Stop and Directional Lamp, RH	Body builder installed	—	—
Tail, Stop and Directional Lamp, LH	Body builder installed	—	—
C100 (P32, RPO LL4)	LH front of cowl	.74	5
C100 (P32, RPO L19)	LH front of cowl	.78	14
C100 (P42 w/RPO LB4, L05 and L19)	LH front of cowl	.78	16
C100 (P42, RPO LL4)	LH front of cowl	.75	6
C141	At LH side marker lamp	—	—
C142	At LH park and directional lamp	—	—
C143	At RH park and directional lamp	—	—
C145	At RH side marker lamp	—	—
C206	Top of steering column	.78	15
C212	At RH directional signal lamp	—	—
C213	At LH directional signal lamp	—	—
C402	On rear, LH frame rail	.79	17
C403	At LH tail, stop and directional lamp	—	—
C404	At RH tail, stop and directional lamp	—	—
G200	Near C100 (bulkhead connector)	—	—
S123	Body builder installed harness	—	—
S124	Body builder installed harness	—	—
S203	Body builder installed harness	—	—

## TROUBLESHOOTING CHART—DIRECTIONAL LAMPS

### DIRECTIONAL SIGNALS DO NOT WORK ON ONE SIDE

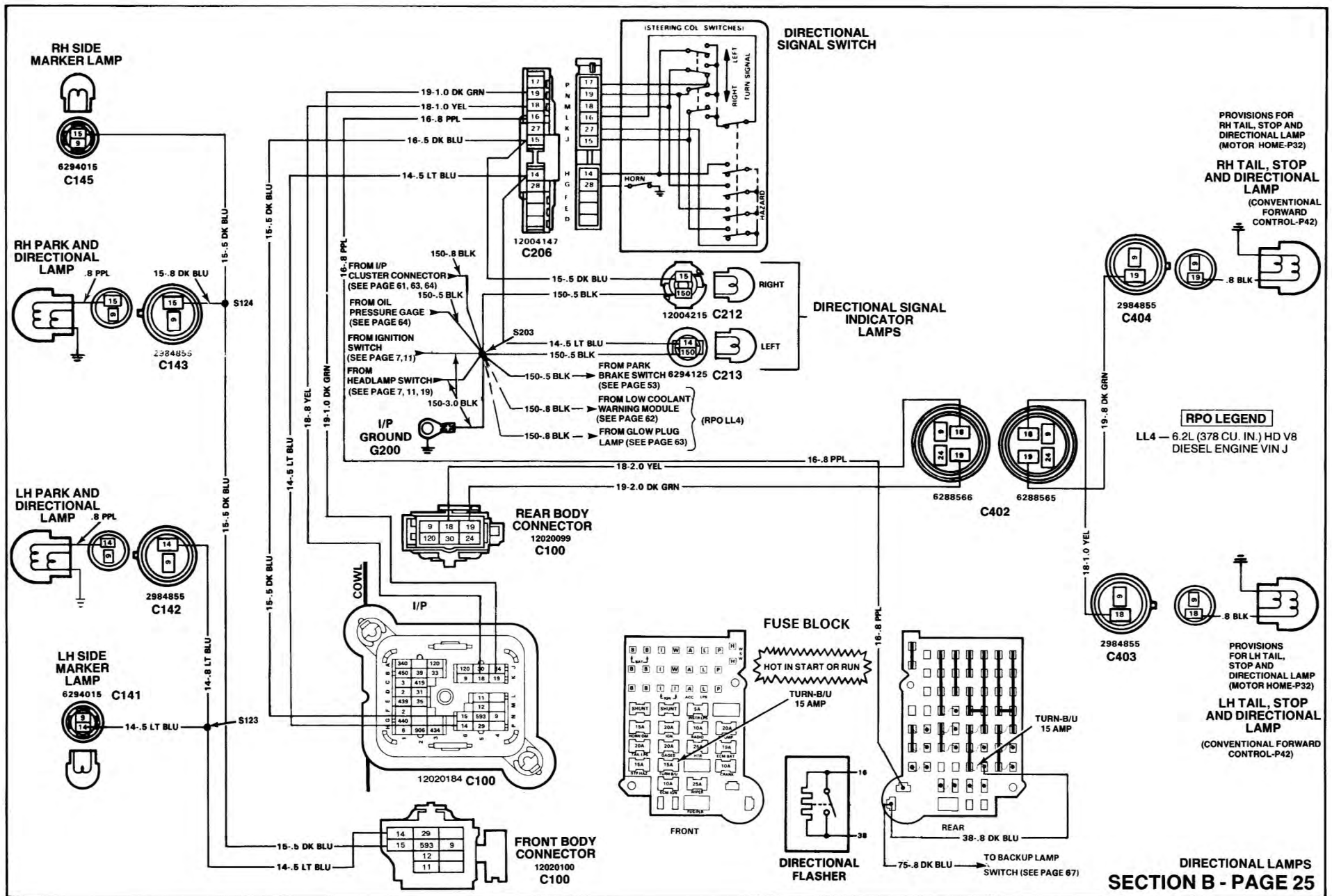
TEST	RESULT	ACTION
1. Turn hazard warning system on. Observe lights on side of directional signals that did not work.	Lights flash.	CHECK for improper bulb. REPLACE if necessary.
	Lights do not come on.	GO to step 2.
2. Turn hazard warning system off. Place ignition switch to RUN and directional signal to side that does not work. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side does not work) at directional signal switch connector C206 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	GO to step 3.
3. Connect test lamp from PPL (16) at directional signal switch connector C206 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	REPLACE directional signal flasher.
4. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side did not work) at park and directional lamp connector C142 or C143 to ground.	Test lamp lights.	CHECK condition of bulb sockets. If sockets are in good condition, REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in either LT BLU (14) or DK BLU (15) wires.

### DIRECTIONAL SIGNALS DO NOT OPERATE

TEST	RESULT	ACTION
1. Place hazard warning lamps to on position.	Hazard lamps operate.	GO to step 2.
	Hazard lamps do not operate.	REFER to "Hazard Lamps Do Not Operate" symptom.
2. Connect a test lamp from PPL (16) wire at directional signal switch connector C206 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (TURN/BU) and an open in PPL (16) wire or DK BLU (38) wire. If fuse and wiring are good, REPLACE directional signal flasher.

### DIRECTIONAL SIGNAL LAMPS FLASH RAPIDLY

TEST	RESULT	ACTION
Turn hazard lamp switch ON. Check front signal lamps and rear taillamps.	One side of directional signal lamps flash rapidly.	REPLACE inoperative directional signal bulb.
	Only one side of directional signals light but do not flash rapidly.	REFER to "Directional Signals Do Not Work On One Side" symptom.



## CIRCUIT OPERATION

When the Horn Switch is depressed, one side of the coil of the Horn Relay is grounded. The relay is energized. Its contacts close and battery voltage is applied to the Horns.

## COMPONENT LOCATION

Page — Figure

Directional Signal Switch	On steering column	.78 — 15
Fuse Block	LH front of cowl	—
Horn, LH	Body builder installed	—
Horn Relay	Body builder installed	—
Horn, RH	Body builder installed	—
C100	LH front of cowl (temporary)	—
C137	At LH horn	—
C138	At LH horn	—
C139	At RH horn	—
C206	At directional signal switch	.78 — 15
C207	At horn relay	—
C208	At dome lamp	—

## PRELIMINARY CHECKS:

Check to see that the HORN D/M fuse is not blown. REPLACE if blown.

## TROUBLESHOOTING CHART—HORNS

### HORN(S) WILL NOT OPERATE

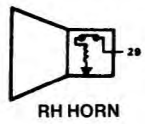
TEST	RESULT	ACTION
1. Connect test lamp from DK GRN (29) wire at inoperative horn connector to ground. Press horn switch.	Test lamp lights.	REPLACE horn.
	Test lamp does not light.	GO to step 2.
2. Remove horn relay. Connect test lamp from ORN (240) wire at horn relay to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (240) wire between horn relay connector and fuse block.
3. REINSERT horn relay. Disconnect directional signal switch connector C206. Use a jumper wire to ground BLK (28) wire at directional signal switch connector C206.	Horn does not sound.	GO to step 4.
	Horn sounds.	REPLACE horn switch.
4. Disconnect horn relay. Install a jumper wire from ORN (240) terminal to DK GRN (29) terminal at horn relay connector C207.	Horn sounds.	REPLACE horn relay.
	Horn does not sound.	LOCATE and REPAIR open in DK GRN (29) wire from horn relay connector to horn(s).

### HORN SOUNDS CONTINUOUSLY WITHOUT DEPRESSING HORN SWITCH

TEST	RESULT	ACTION
1. Disconnect directional signal switch connector C206.	Horn stops.	REPLACE horn switch.
	Horn continues to sound.	GO to step 2.
2. Disconnect horn relay. Check for a short to ground in BLK (28) wire.	No shorts found.	REPLACE relay.
	Short(s) found.	REPAIR or REPLACE as required.

## HORNS

### SECTION B - PAGE 26



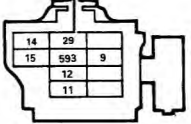
12004267  
C139



12004267  
C138

12004267  
C137

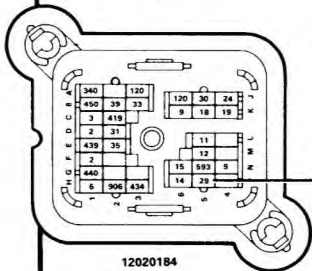
**FRONT  
BODY  
CONNECTOR**



12020100  
C100

**COWL**

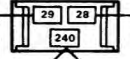
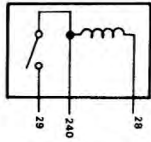
**I/P**



12020184

**C100**

**HORN RELAY**



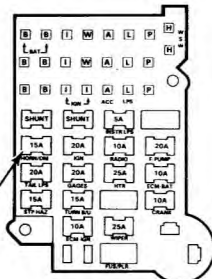
2984164  
C207

156-B  
WHT  
2965981  
C208

**TO HEADLAMP  
SWITCH  
(SEE PAGE 7, 11)**

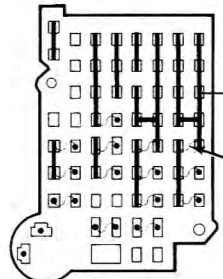


240-1.0 ORN



**FRONT**

**FUSE BLOCK**



**REAR**

**HOT AT  
ALL TIMES**

**HORN/D/M  
15 AMP**

**HORN/D/M  
15 AMP**

28-1.0 DK GRN

240-1.0 ORN

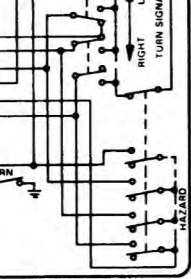
240-1.0 ORN

28-5 BLK

12004147  
C206

12004148  
**DIRECTIONAL  
SIGNAL SWITCH**

(STEERING COL SWITCHES)



## CIRCUIT OPERATION

### WIPER

The Wiper Motor is supplied battery voltage with the Ignition Switch in START or RUN, with ground supplied by the Wiper/Washer Switch.

When the Wiper Motor is in LO, Battery voltage is supplied to the motor through the WHT wire and the ground circuit is through the GRA wire, the Wiper/Washer Switch and the BLK wire to ground.

When the wiper is in HI, battery voltage is supplied to the motor through the WHT wire and the ground circuit is

through the PPL wire, the Wiper/Washer Switch and the BLK wire to ground.

### WASHER

Battery voltage is applied to the washer pump through the WHT wire, to the switch and to ground through the BLK wire. The washers are operational as long as the paddle switch on the Wiper Switch arm is on.

### COMPONENT LOCATION

Page — Figure

Fuse Block	LH front of cowl	—
Washer Motor	Body builder installed	—
Windshield Wiper, Washer Switch	Body builder installed	—
Wiper Motor	Body builder installed	—
Wiper, Washer Switch Lamp	Body builder installed	—
C221	At windshield wiper, washer switch	—
C222	At wiper, washer switch lamp	—
C224	At wiper, washer motors	—
G201	Body builder installed harness	—

### PRELIMINARY CHECKS:

CHECK condition of WIPER and INST LPS fuses. If fuses are in good condition, use the following diagnostic procedures.

## TROUBLESHOOTING CHART—WIPER/WASHER

### WIPERS DO NOT OPERATE IN ANY MODE

TEST	RESULT	ACTION
1. Place ignition in RUN and turn wipers to HI. Connect test lamp from WHT (93) wire at wiper motor connector C224 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between wiper motor and fuse block.
	Test lamp lights.	GO to step 2.
2. Connect a fused jumper from BLK (150) wire at wiper switch connector C221 to ground.	Wiper motor runs.	LOCATE and REPAIR open in BLK (150) wire between wiper switch and ground terminal G201.
	Wiper motor does not run.	REPLACE wiper motor.

### WIPERS DO NOT OPERATE IN HI

TEST	RESULT	ACTION
Place ignition in RUN and wipers to HI. Connect a fused jumper from PPL (92) wire at wiper switch connector C221 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in PPL (92) wire between wiper motor and wiper switch or REPLACE wiper motor.
	Wiper motor runs.	REPLACE wiper washer switch.

### WIPERS DO NOT OPERATE IN LO

TEST	RESULT	ACTION
Place ignition in RUN and wipers to LO. Connect a fused jumper from GRA (91) wire at wiper switch connector C221 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in GRA (91) wire between wiper motor and wiper switch or REPLACE wiper motor.
	Wiper motor runs.	REPLACE wiper washer switch.

### WASHER MOTOR DOES NOT OPERATE

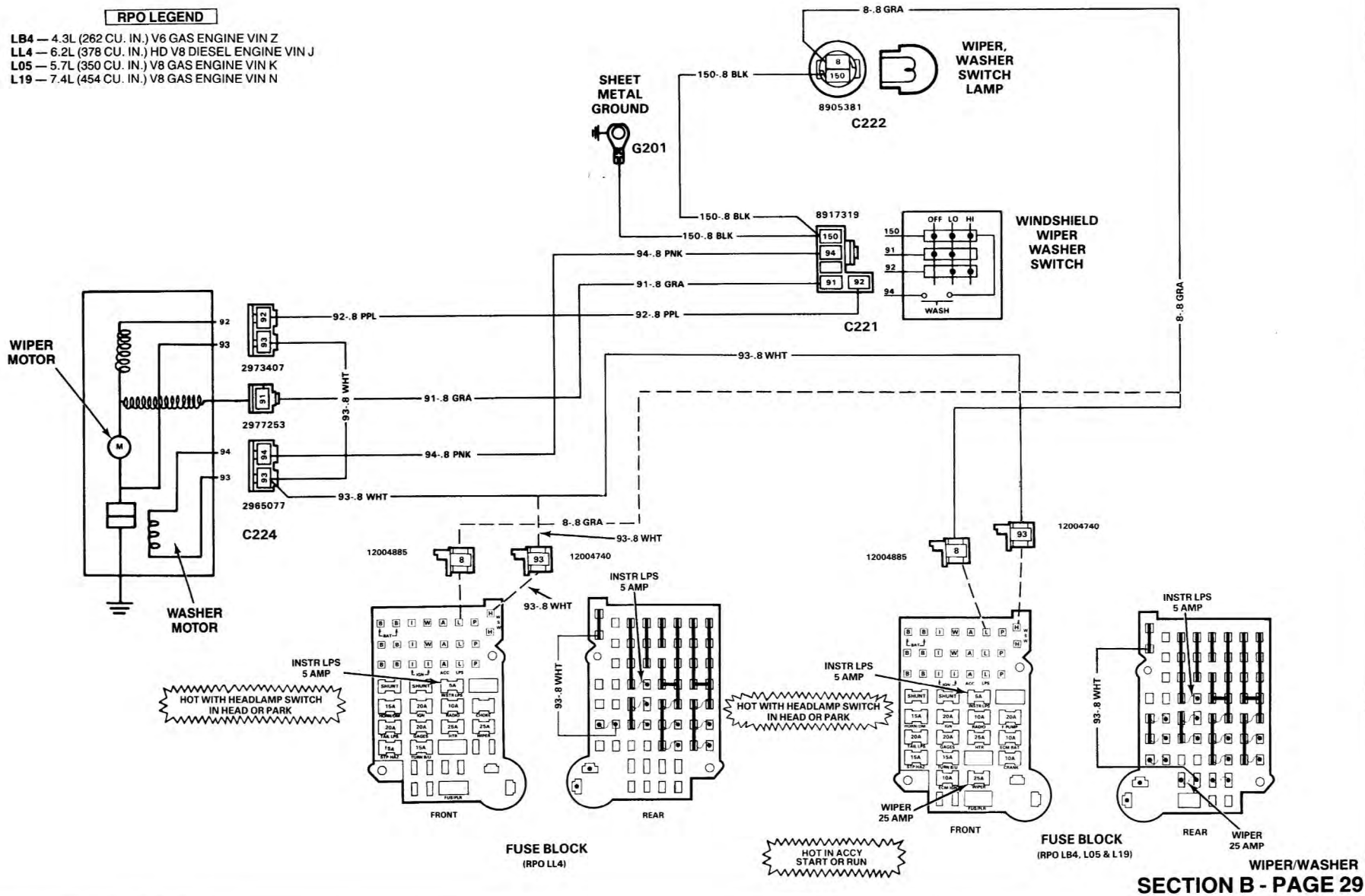
TEST	RESULT	ACTION
1. Place ignition in RUN and wiper switch to WASH. Connect test lamp from WHT (93) wire at washer motor connector C224 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between washer pump and fuse block.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from WHT (93) wire to PNK (94) wire at washer motor connector C224.	Test lamp lights.	REPLACE washer pump.
	Test lamp does not light.	GO to step 3.
3. Connect a fused jumper from PNK (94) wire at wiper switch connector to ground.	Washer motor does not pump.	LOCATE and REPAIR open in PNK (94) wire between washer motor and wiper switch.
	Washer motor pumps.	GO to step 4.
4. Connect a fusible jumper from BLK (150) wire at wiper switch connector C221 to ground.	Washer motor does not pump.	REPLACE wiper switch.
	Washer motor pumps.	LOCATE and REPAIR open in BLK (150) wire between wiper switch and ground terminal G201.

### WASHER MOTOR DOES NOT SHUT OFF

TEST	RESULT	ACTION
Place ignition switch in RUN and wiper switch to WASH. Disconnect wiper switch connector C221.	Washer motor stops pumping.	REPLACE wiper washer switch.
	Washer motor pumps.	LOCATE and REPAIR short to ground in PNK (94) wire between wiper switch and washer motor.

**RPO LEGEND**

- LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z
- LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J
- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N



## CIRCUIT OPERATION

### START

When the Ignition Switch is moved to the START position, battery voltage is applied to the Starter Solenoid. Both solenoid windings are energized. The circuit through the Pull-In Winding is completed to ground through the Starter Motor. The windings work together magnetically to pull in and hold in the Plunger. The Plunger moves the Shift Lever. This action causes the Starter Drive Assembly to rotate as it engages the Flywheel ring gear on the engine. At the same time, the Plunger also closes the solenoid switch contacts in the Starter Solenoid. Full battery voltage is applied directly to the Starter Motor and it cranks the engine.

As soon as the Solenoid Switch contacts close, voltage is no longer applied through the Pull-In Winding, since battery voltage is applied to both ends of the windings. The Hold-In Winding remains energized, and its magnetic field is strong enough to hold the Plunger, Shift Lever, and Drive Assembly Solenoid Switch contacts in place to continue cranking the engine.

When the Ignition Switch is released from the START position, battery voltage is removed from the PPL (6) wire and the junction of the two windings. Voltage is applied from the Motor contacts through both windings to ground at the end of the Hold-In Winding. However, the voltage applied to the Pull-In Winding is now opposing the voltage applied when the winding was first energized. The magnetic fields of the Pull-In and Hold-In Windings now oppose one another. This action of the windings, with the

help of the Return Spring, causes the Starter Drive Assembly to disengage and Solenoid Switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

### CHARGE

The Generator provides voltage to operate the vehicle's electrical system and to charge its Battery. A magnetic field is created when current flows through the Rotor. This field rotates as the Rotor is driven by the engine, creating an AC voltage in the Stator windings. The AC voltage is converted to DC by the rectifier bridge and is supplied to the electrical system at the Battery terminal.

This Generator's regulator uses digital techniques to supply the Rotor current and thereby control the output voltage. The Rotor current is proportional to the width of the electrical pulses supplied to it by the Regulator. When the Ignition Switch is placed in RUN, narrow width pulses are supplied to the Rotor, creating a weak magnetic field. When the engine is started, the Regulator senses Generator rotation by detecting AC voltage at the Stator through an internal wire. Once the engine is running the Regulator varies the field current by controlling the pulse width. This regulates the Generator output voltage for proper battery charging and electrical system operation.

The digital regulator controls the VOLTS Indicator light with a solid state light driver. The light driver turns on the light whenever undervoltage, overvoltage or a stopped Generator is detected.

### COMPONENT LOCATION (RPO LB4, L05, L19)

	Page	Figure
Battery (P32, P42 w/RPO LB4, L05, L19 w/o RPO B3M)	74	4
Battery (P32 w/RPO L19)	73	2
Battery (P42 w/RPO B3M, LB4, L05)	74	3
Bulkhead Connector (P42 w/RPO LB4, L05, L19)	78	16
Coil (P32 w/RPO L19)	75	7
Coil (P42 w/RPO LB4, L05)	—	—
Coil (P42 w/RPO L19)	75	8
Coil Jumper	—	—
Distributor	75	7
Electronic Control Module (ECM)	79	18
Fuse Block	—	—
Generator (P32, P42, w/RPO L19)	—	—
Generator (P42 w/RPO LB4)	77	13
Generator (P42 w/RPO L05)	76	11
Grommet 100	78	16
Ignition Switch	—	—
Junction Block (P42 w/RPO LB4, L05, L19)	78	16
Park Neutral Relay	—	—
Starter Motor Solenoid (P32, P42 w/RPO B3M, LB4, L05)	73	1

### Starter Motor Solenoid

	Page	Figure
(P32, P42 w/RPO LB4, L05, L19 w/o RPO B3M)	73	1
C100 (P32 w/RPO L19)	78	14
C100 (P42 w/RPO LB4, L05, L19)	78	16
C107 (P32, P42, w/RPO L19)	76	9
C107 (P42 w/RPO LB4)	77	13
C107 (P42 w/RPO L05)	76	11
C120 (P32 w/RPO L19)	75	7
C120 (P42 w/RPO L19)	75	8
C120 (P42 w/RPO L05)	76	10
C120 (P42 w/RPO LB4)	77	12
C121 (P32 w/RPO L19)	75	7
C121 (P42 w/RPO L19)	75	8
C121 (P42 w/RPO L05)	76	10
C122	—	—
C154	75	7
C200	79	18
C203	—	—
C205	—	—
C219	—	—
C220	—	—
G110	74	4
G110 (P32 w/RPO L19)	73	2
G110 (P42 w/RPO B3M, LB4, L05)	74	4
G111 (P32, P42 w/RPO LB4, L05, L19 w/o RPO B3M)	74	4
G111 (P42 w/RPO B3M, LB4, L05)	74	3

### COMPONENT LOCATION (RPO LL4)

	Page	Figure
Battery, RH (P32, P42 w/RPO B3M)	73	1
Battery, LH (P42)	73	1
Battery, RH (P42)	73	1
Fuse Block	—	—
Generator	73	2
Glow Plug Controller	74	4
Ignition Switch	—	—
Junction Block (P32)	74	5
Junction Block (P42)	75	6
Starter Motor Solenoid	73	1
C100 (P32)	74	5
C100 (P42)	75	6
C128	74	4
C151	73	2
C203	—	—
C205	—	—
C219	—	—
G110 (P32, P42 w/RPO B3M)	73	1
G110 (P42)	73	1
G112 (P32, P42 w/RPO B3M)	73	1
G112 (P42)	73	1
G113 (P42)	73	1
S113	73	2
S201	—	—
S210	—	—

## START AND CHARGE

### SECTION B - PAGE 30



## TROUBLESHOOTING CHART—START AND CHARGE

### ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK

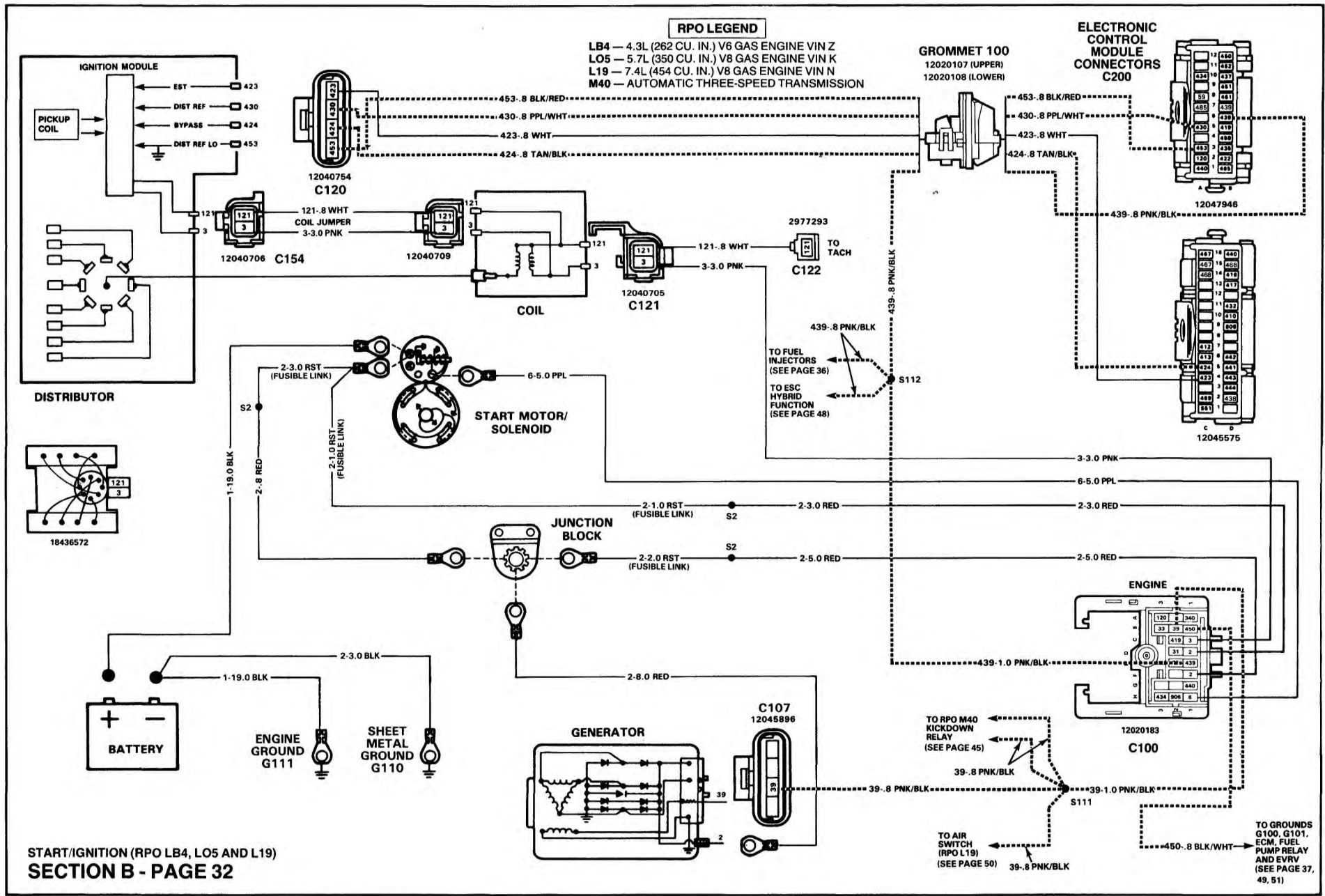
TEST	RESULT	ACTION
1. Place transmission in PARK (auto) or depress clutch pedal for manual transmission. Connect a voltmeter from PPL (6) wire at starter solenoid to ground. Turn ignition switch to START position.	Battery voltage.	GO to step 2.
	No voltage.	GO to step 3 for manual transmission. GO to step 5 for automatic transmission.
2. Connect voltmeter from PPL (6) wire to starter mounting bolts.	Battery voltage.	REPLACE starter solenoid.
	Less than battery voltage.	CLEAN starter motor mounting bolts, starter motor, and mounting surface.
3. Disconnect clutch start switch connector C219. Connect voltmeter from YEL (5) wire at clutch start switch connector C219 to ground. Ignition switch must be in START position.	Battery voltage.	GO to step 4.
	No voltage.	GO to step 5.
4. Depress clutch and put transmission in neutral. Apply parking brake. Connect a fused jumper from YEL (5) to PPL (6) at clutch start switch connector C219. Turn ignition switch to START position.	Engine cranks.	REPLACE clutch start switch.
	Engine does not crank.	CHECK condition of fuse (CRANK). If fuse is good, LOCATE and REPAIR open in PPL (6) wire from clutch start switch to starter solenoid.
5. With ignition switch OFF, connect a voltmeter from BAT 2 terminal at ignition switch connector C203 to ground.	Battery voltage.	REPLACE ignition switch.
	No voltage.	LOCATE and REPAIR open in RED (2) wires and fusible link at junction block.

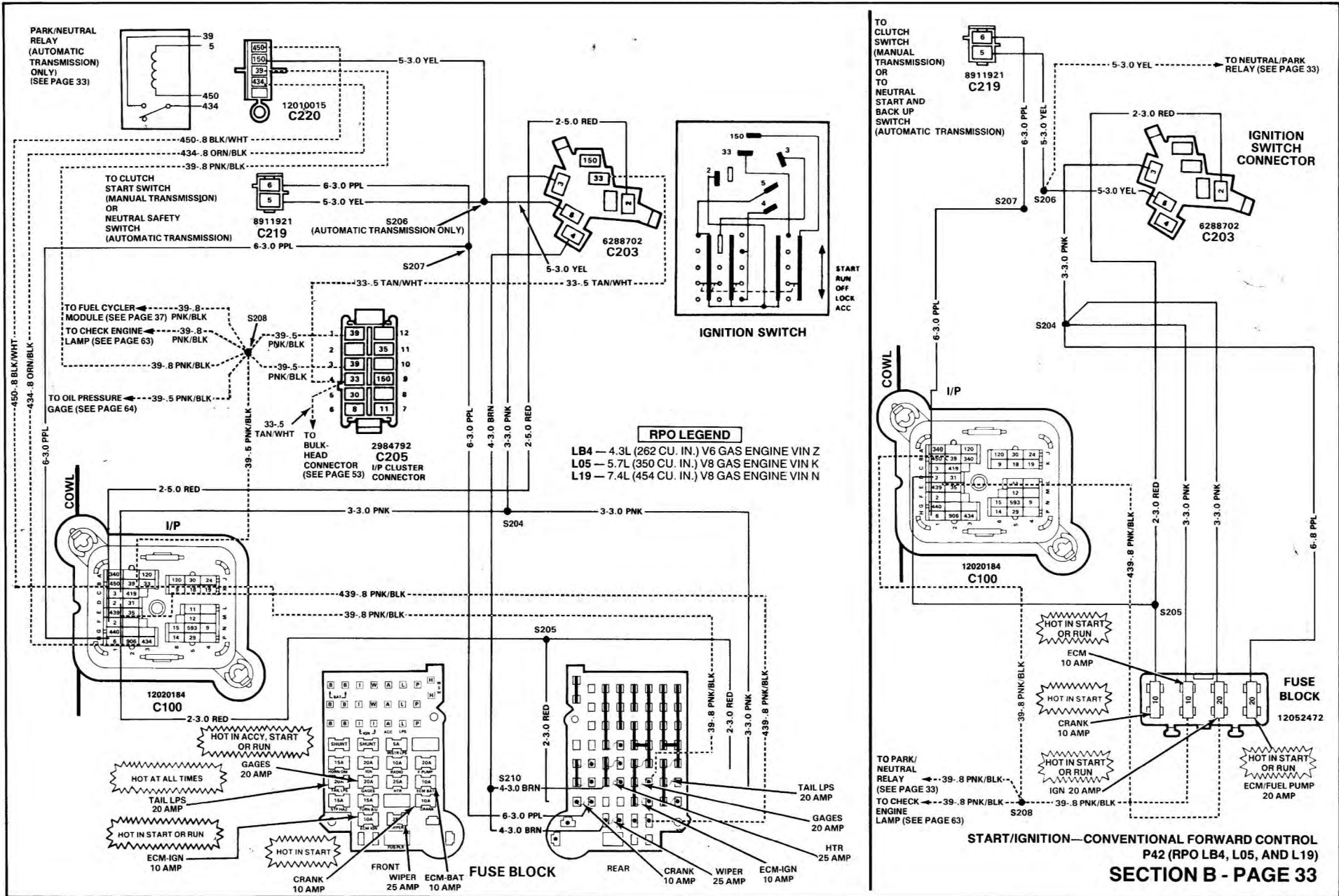
### STARTER SOLENOID CLICKS, ENGINE DOES NOT CRANK OR CRANKS SLOWLY

TEST	RESULT	ACTION
1. Remove CRANK fuse. Connect a voltmeter to positive and negative battery terminals. Turn ignition switch to START.	Voltage reading greater than 9.5 volts after 15 seconds cranking.	GO to step 2.
	Voltage less than 9.5 volts after 15 seconds cranking.	PERFORM a Battery Load Test. Refer to Section 6D in Service Manual.
2. Connect a voltmeter from negative battery terminal to engine block.	Less than .5 volts.	GO to step 3.
	More than .5 volts.	REPLACE negative battery cable.
3. Connect voltmeter from positive battery terminal to starter solenoid terminal at BLK (2) wire.	Less than .5 volts.	REPAIR starter motor.
	More than .5 volts.	REPLACE positive battery cable.

### BATTERY IS UNDERCHARGED OR OVERCHARGED

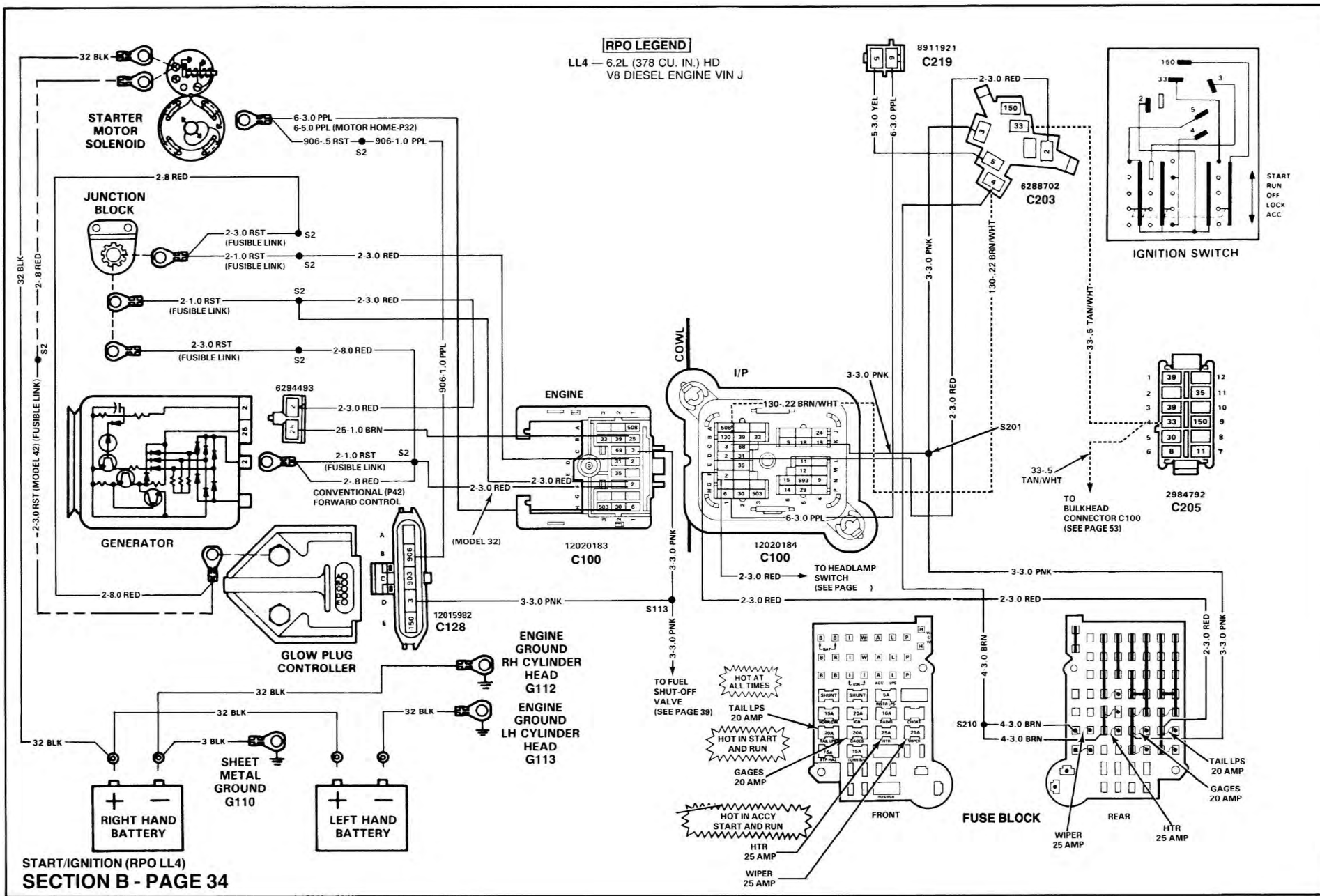
TEST	RESULT	ACTION
1. Connect voltmeter from RED (2) wire at generator to ground.	Battery voltage.	GO to step 2.
	No voltage.	LOCATE and REPAIR open in RED (2) wire and fusible link from generator to junction block.
2. Reconnect generator connector C109 and terminal. Have all accessories turned off and engine running at fast idle. Connect voltmeter from battery terminal on generator to ground.	Reading of 13-16 volts.	PERFORM Generator Bench Test. Refer to Section 6D in Service Manual.
	Reading of less than or greater than 13-16 volts.	REPAIR generator.





**RPO LEGEND**

LL4 — 6.2L (378 CU. IN.) HD  
V8 DIESEL ENGINE VIN J



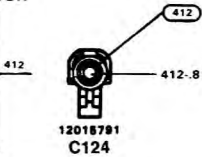
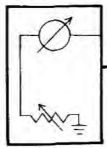
START/IGNITION (RPO LL4)  
**SECTION B - PAGE 34**

## COMPONENT LOCATION

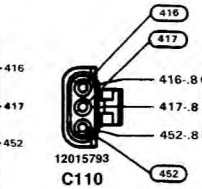
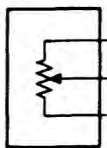
Page — Figure

Electric Fuel Pump	In fuel tank	.79	—	17
Electronic Control Module	Lower, LH side of cowl	.79	—	18
Fuel Cyclor Module	Body builder installed			—
Fuel Pump/Oil Pressure Sensor and Switch	Rear, LH side of engine	.76	—	10
Fuel Pump Relay	LH side of cowl	.78	—	14
Fuse Block	Body builder installed			—
Grommet 100	Lower, LH side of cowl	.78	—	16
Grommet 101	Top, center of engine	.76	—	9
Idle Air Control Actuator	Top, center of engine	.76	—	9
Injector 1	Top of throttle body injection	.76	—	9
Injector 2	Top of throttle body injection	.76	—	9
Oxygen Sensor	Lower, rear LH side of engine	.77	—	12
Throttle Position Sensor	Top, RH side of engine	.76	—	9
C100 (P32 w/RPO L19)	LH side of cowl	.78	—	14
C100 (P42 w/RPO LB4, L05, L19)	LH side of cowl	.78	—	16
C103	At fuel pump relay			—
C110 (P32, P42 w/RPO L19)	At throttle position sensor	.76	—	9
C110 (RPO LB4)	At throttle position sensor	.77	—	13
C111 (P32, P42 w/RPO L19)	At injector	.76	—	9
C111 (RPO LB4)	At injector	.77	—	13
C112 (P32, P42 w/RPO L19)	At injector	.76	—	9
C112 (RPO LB4)	At injector	.77	—	13
C115 (RPO LB4, L05)	On idle air control actuator	.76	—	11
C115 (RPO L19)	On idle air control actuator	.76	—	9
C118 (P42 w/RPO LB4)	At fuel pump/oil pressure sensor switch	.77	—	12
C200	LH side of cowl	.79	—	18
C202	At fuel cyclor module			—
C400	Rear, RH frame rail	.79	—	17
C401	Body builder installed			—
G100	At alternator bracket	.76	—	9
G101	RH side of engine	.76	—	9
G400	On fuel tank cross member	.79	—	17
S100 (P32, P42 w/RPO L19)	Engine harness, RH side of engine	.76	—	9
S100 (P42 w/RPO L05)	Engine harness, RH side of engine	.76	—	11
S101 (P32, P42 w/RPO L19)	Engine harness, front of engine	.76	—	9
S102 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S102 (P42 w/RPO LB4, L05, L19)	LH side of cowl	.78	—	16
S104 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S104 (P42 w/RPO LB4, L05, L19)	LH side of cowl	.78	—	16
S105 (P32, P42 w/RPO L19)	Top of engine	.76	—	9
S105 (P42 w/RPO LB4)	RH side of engine	.77	—	13
S106 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S106 (P42 w/RPO LB4, L19)	LH side of cowl	.78	—	16
S107 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S107 (P42 w/RPO LB4, L19)	LH side of cowl	.78	—	16
S108 (P32 w/RPO L19)	Engine harness, LH side of cowl	.78	—	14
S108 (P42 w/RPO L05, L19)	Engine harness, LH side of cowl	.78	—	16
S109 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S109 (P42 w/RPO LB4, L19)	LH side of cowl	.78	—	16
S112 (P32 w/RPO L19)	LH side of cowl	.78	—	14
S112 (P42 w/RPO LB4, L19)	LH side of cowl	.78	—	16
S112 (P42 w/RPO LB4)	RH side of engine	.77	—	13
S208	Body builder installed harness			—

**OXYGEN SENSOR**



**THROTTLE POSITION SENSOR**



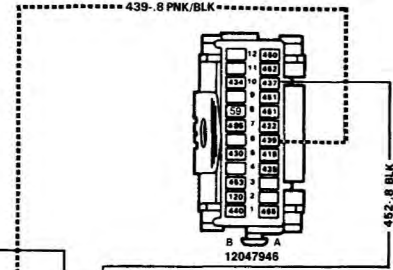
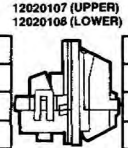
TO MANIFOLD ABSOLUTE PRESSURE SENSOR (SEE PAGE 48)

TO COOLANT TEMPERATURE SENSOR (SEE PAGE 48)

**RPO LEGEND**

- LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z
- LO5 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N

**GROMMET 100**

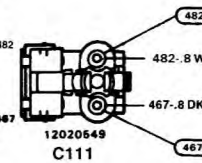
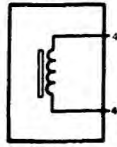


**ELECTRONIC CONTROL MODULE**

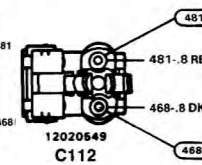
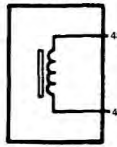
C200

12045575

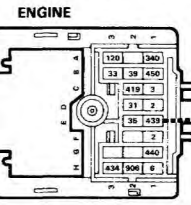
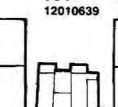
**INJECTOR 1**



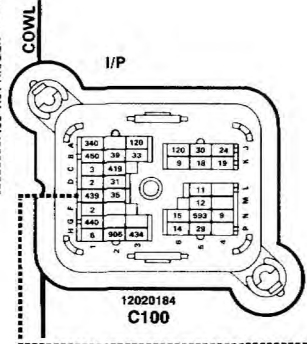
**INJECTOR 2**



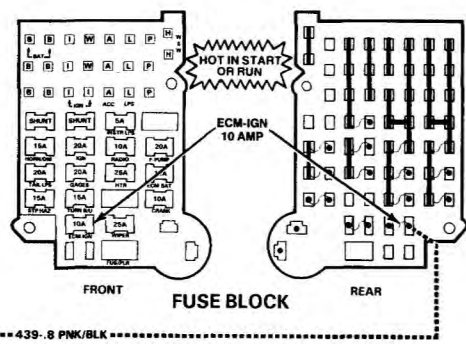
**GROMMET 101**



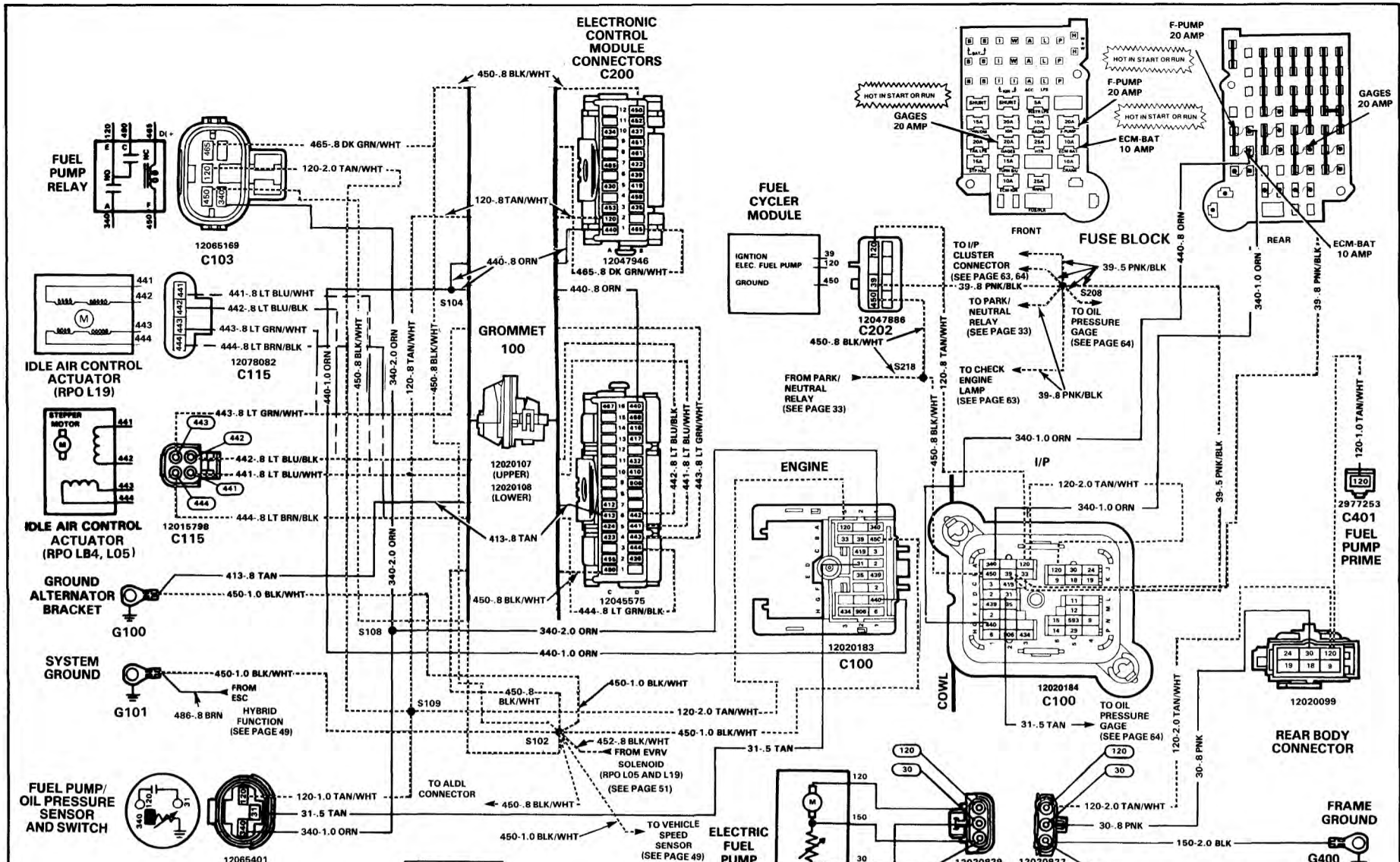
12020183 C100



12020184 C100



**FUSE BLOCK**



**RPO LEGEND**  
 LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z  
 L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
 L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N

FUEL CONTROL AND  
 IDLE AIR CONTROL (RPO LB4, L05 AND L19)  
**SECTION B - PAGE 37**

## CIRCUIT OPERATION

The Diesel Fuel Filter System combines six functions into a single package:

1. It heats diesel fuel to prevent wax-plugging of the filter;
2. It combines very small droplets of water in the fuel into larger drops and separates the water from the fuel;
3. It filters the diesel fuel;
4. It detects an excessive pressure drop indicating filter plugging; (Vacuum Switch)
5. It detects the presence of excess water in the fuel; and
6. It provides a means to drain the water it has separated.

The Fuel Filter Assembly consists of the following main parts: Fuel Heater, the Water-In-Fuel Sensor, the Fuel Pressure Switch, and a Filter. The Filter contains the "coalescer" (the device that combines small droplets of water into larger ones) and the filter/separator.

An electric fuel pump delivers diesel fuel from the tank to the fuel filter. As fuel enters the filter, it passes first through the Fuel Heater. The heater contains a thermostatic switch.

The switch opens or closes, to turn the heater off or on, depending on the temperature of the fuel.

The fuel then passes through the Primary and Secondary filters. Next the fuel flows through the water coalescer. Here the droplets of water in the fuel are combined into larger drops, the drops fall to the water reservoir in the filter. When fuel flows from the Fuel Filter Assembly to the injection pump, it is clean and free of water.

The Solid State Water-In-Fuel Sensor applies voltage to a Probe. When the Probe touches water, the Module closes a switch. This completes a circuit to ground to light the SERVICE FUEL FILTER Indicator.

A time delay circuit in the Water-In-Fuel Module grounds the Indicator bulb briefly to test the bulb each time the system is turned on.

The Fuel Heater is operated by a built-in thermostatic switch. When the switch is closed, battery voltage is applied to the heater from the GAGES Fuse.

## COMPONENT LOCATION

Page — Figure

Cold Advance and Fast Idle Temperature Switch	Right rear side of engine	.73	—	2
Cold Advance Control	Top front center of engine	.73	—	2
Fast Idle Solenoid	Top front center of engine	.73	—	2
Fuel Shut-Off Valve	Top front center of engine	.73	—	2
Fuse Block	LH front of cowl		—	
Glow Plug Controller	Top LH rear of engine	.74	—	4
Ignition Switch	Body builder installed		—	
Transmission Kickdown Switch (RPO M40)	Body builder installed		—	
Transmission Switch (RPO M40)	LH side of transmission	.74	—	4
Water-in-Fuel Sensor	Top rear center of engine	.74	—	4
C100	LH front of cowl (temporary)	.75	—	6
C128	At glow plug controller	.74	—	4
C129	At fuel shut-off valve	.73	—	2
C130	At water-in-fuel sensor	.74	—	4
C131	At cold advance and fast idle temperature switch	.73	—	2
C132	At fuel heater	.74	—	4
C133	At transmission kickdown switch (RPO M40)	.73	—	2
C134	At cold advance control	.73	—	2
C135	At fast idle solenoid	.73	—	2
C136	At transmission switch	.74	—	4
C203	At ignition switch		—	
G102	RH front of engine, at cylinder head	.73	—	2
G103	Near C100 (Body builder installed)	.74	—	5
S113	LH side of engine, near center of rocker cover	.74	—	3
S114	Rear of engine, near transmission filler tube	.74	—	4
S115	Rear of engine, near transmission filler tube	.74	—	4
S201	Body builder installed harness		—	

## TROUBLESHOOTING CHART—DIESEL ENGINE FUEL CONTROLS

### FUEL HEATER DOES NOT OPERATE

TEST	RESULT	ACTION
1. Disconnect fuel heater connector C132. Place ignition switch to RUN position. Connect voltmeter from PNK/BLK (39) wire at fuel heater connector C132 to ground.	Battery voltage.	GO to step 2.
	No voltage.	CHECK condition of fuse (GAGES). If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire from fuel heater to fuse block.
2. Connect voltmeter from PNK/BLK (39) wire to BLK (150) wire at fuel heater connector C132.	Battery voltage.	REPLACE fuel heater.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from fuel heater to ground terminal G102.

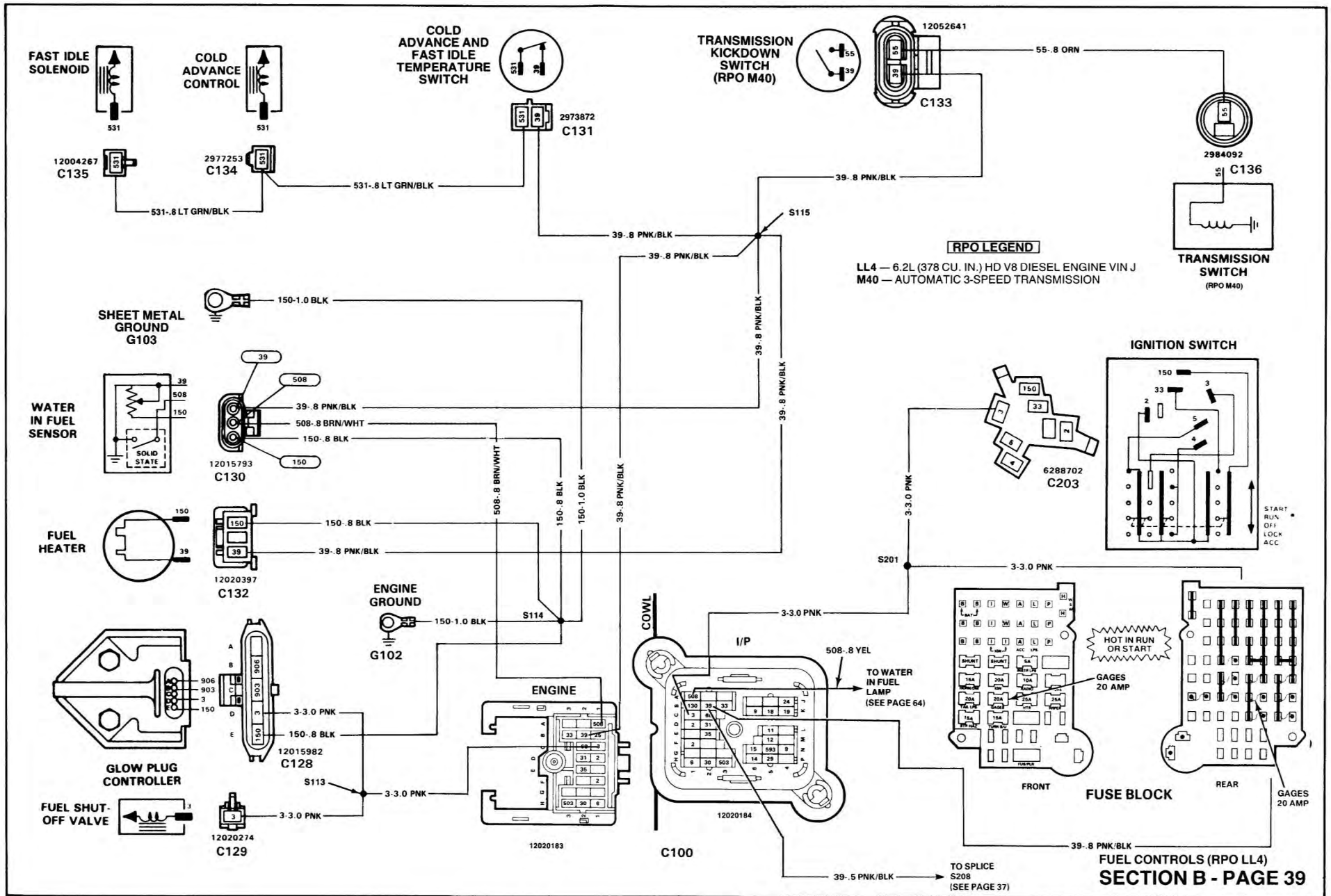
### WATER-IN-FUEL INDICATOR LIGHTS WITH NO WATER IN FUEL

TEST	RESULT	ACTION
Place ignition switch in RUN position. Disconnect water-in-fuel sensor connector C130.	WATER-IN-FUEL indicator stays on.	LOCATE and REPAIR short to ground in YEL/BLK (508) wire.
	WATER-IN-FUEL indicator goes out.	REPLACE water-in-fuel sensor.

### SERVICE FUEL FILTER INDICATOR DOES NOT LIGHT BRIEFLY WITH IGNITION SWITCH TURNED TO RUN

TEST	RESULT	ACTION
1. Disconnect water-in-fuel sensor connector C130 and place ignition switch in RUN. Connect a voltmeter from PNK/BLK (39) wire at water-in-fuel sensor connector C130 to ground.	Battery voltage.	GO to step 2.
	No voltage reading.	CHECK condition of fuse (GAGES). If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire from water-in-fuel sensor to fuse block.
2. Connect voltmeter from PNK/BLK (39) to BLK (150) wire at water-in-fuel sensor connector C130.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from fuel sensor to ground terminal G102.
3. Connect voltmeter from YEL/BLK (508) wire at water-in-fuel sensor connector C130 to ground.	Battery voltage.	REPLACE water-in-fuel sensor.
	No voltage.	CHECK Water-In-Fuel lamp. If lamp is good, LOCATE and REPAIR open in YEL/BLK (508) wire.





**BLANK**

## CIRCUIT OPERATION

The heating of the Glow Plugs is controlled by the Glow Plug Relay in the Glow Plug Controller. Battery voltage is applied to the relay contacts through the RED wire from Junction Block. The relay is operated by a Solid State Controller. The Controller responds to engine temperature and also to an Ignition Switch Start Input.

When the Ignition Switch is turned to Run, battery voltage is applied to the Enable Input of the Controller. The Glow Plug Relay within the Controller will be energized for

approximately 5 seconds during which it applies voltage to the Glow Plugs and WAIT Indicator. After the initial time period the relay will be de-energized for 5 seconds then will cycle ON/OFF for approximately 10 seconds.

When the Glow Plug Controller receives the Start Input, the Glow Plugs and WAIT Indicator will cycle ON/OFF after the Ignition Switch is returned to RUN.

After approximately 25 seconds the Controller will open the Glow Plug Relay and the heating of the plugs stops.

## COMPONENT LOCATION

Page — Figure

Fuel Shut-Off Valve	Top front center of engine	.73	—	2
Fuse Block	LH front of cowl	—	—	—
Glow Plug Controller	Top LH rear of engine	.74	—	4
Ignition Switch	Body builder installed	—	—	—
Left Bank Glow Plug	In LH cylinder head	.74	—	3
Right Bank Glow Plug	In RH cylinder head	.73	—	2
C100	LH front of cowl (temporary)	.75	—	6
C128	At glow plug controller	.74	—	4
C129	At fuel shut off valve	.73	—	2
C152	At left bank of glow plugs	.74	—	3
C153	At right bank of glow plugs	.73	—	2
G102	RH front of engine, at cylinder head	.73	—	2
G103	Near C100 (body builder installed)	.74	—	5
S113	LH side of engine, near rocker cover	.74	—	3
S114	Rear of engine, near transmission filler tube	.74	—	4
S116	LH side of engine, near rocker cover	.74	—	3
S117	RH side of engine, near rocker cover	.74	—	3
S201	Body builder installed harness	—	—	—

## PRELIMINARY CHECKS:

A check of the glow plug system should be performed before doing diagnostic procedures.

With engine below normal operating temperature, turn ignition switch to RUN. The WAIT indicator should light. After approximately 10 seconds, the WAIT indicator must begin to flash for an additional 10 seconds and then go out.

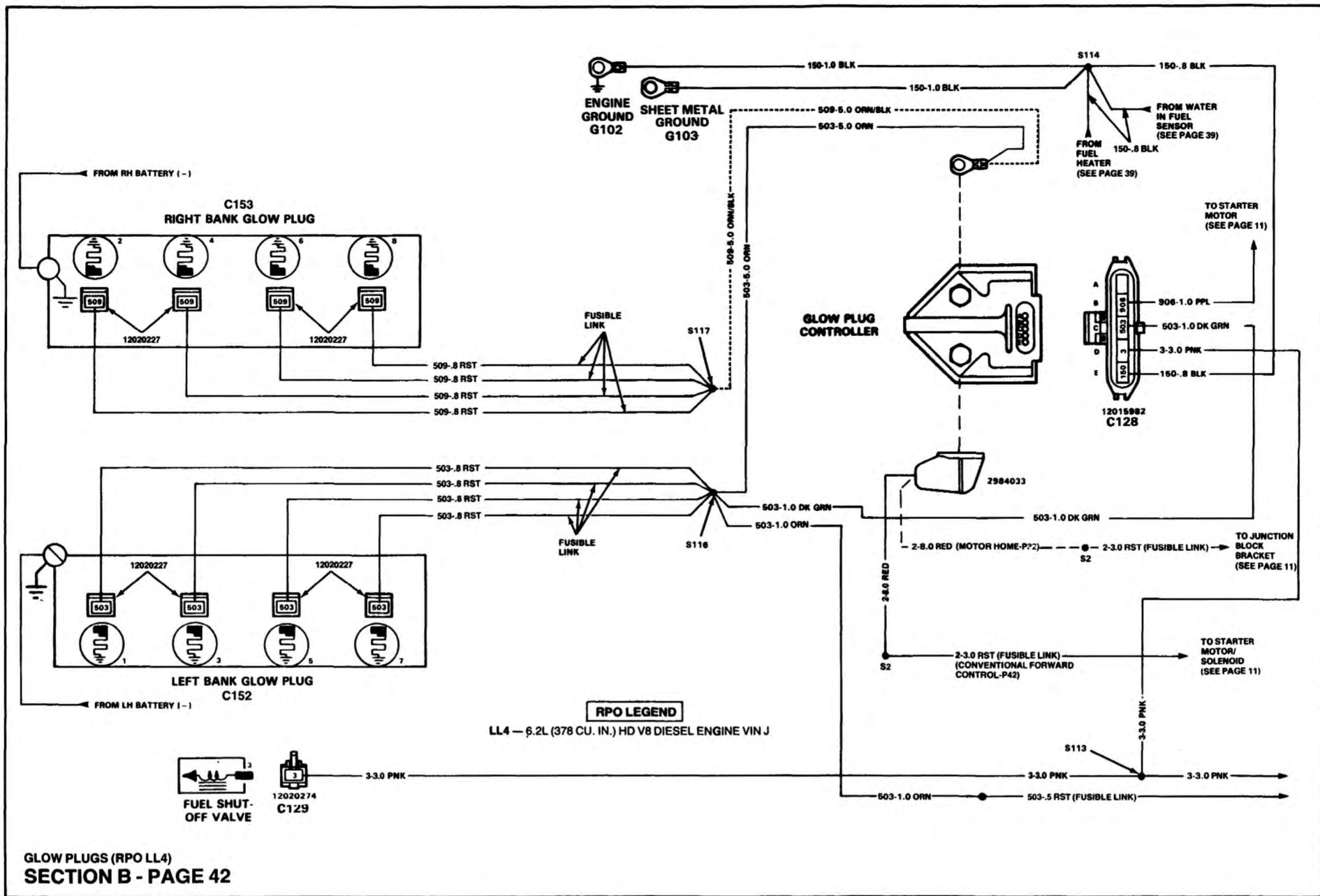
Turn ignition switch to OFF and then momentarily to START and return to RUN position. The WAIT indicator should flash for approximately 25 seconds and then go out.

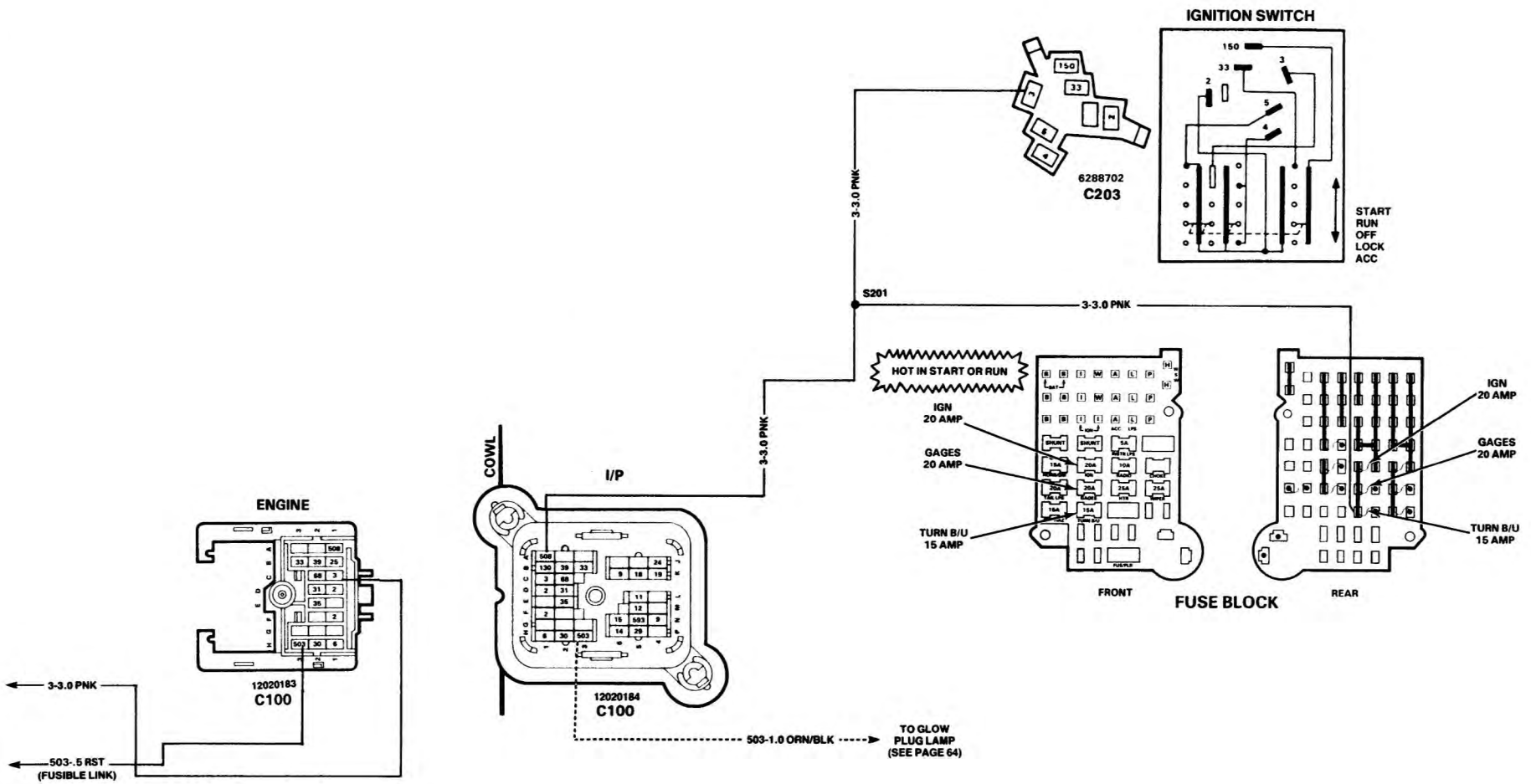
With engine at normal operating temperature, turn ignition switch to RUN. The WAIT indicator should flash for a RPO LL4 engine.

## TROUBLESHOOTING CHART—GLOW PLUGS

### WAIT INDICATOR DOES NOT FLASH OR FLASHES FOR THE INCORRECT AMOUNT OF TIME WHEN ENGINE IS BELOW NORMAL OPERATING TEMPERATURE

TEST	RESULT	ACTION
1. Place ignition switch in RUN position. Connect test lamp from RED (2) wire at glow plug controller to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire and fusible link from glow plug controller to junction block.
2. Connect test lamp from PNK (3) wire at glow plug controller connector C128 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (3) wire from glow plug controller to fuel shutoff valve.
3. Connect test lamp from PNK (3) wire to BLK (150) wire at glow plug controller connector C128.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from glow plug controller to ground terminal G102 and/or G103.
4. Connect test lamp from PPL (906) wire at glow plug controller connector C128 to ground. Move ignition switch to START position.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in PPL (906) wire from glow plug controller to starter motor.
5. Place ignition switch to OFF position. Connect test lamp from ORN (503) and ORN/BLK (509) wires at glow plug controller to ground.	Test lamp lights.	REPLACE glow plug controller.
	Test lamp does not light.	GO to step 6.
6. Disconnect glow plug controller connector C128. Using a positive polarity ohmmeter. Check continuity between DK GRN (503) and BLK (150) wires.	Reading of 2 ohms or less.	GO to step 7.
	Reading greater than 2 ohms.	LOCATE and REPAIR open in DK GRN (503) and ORN (503) wires from glow plug controller connector to glow plug harness splice S116.
7. Reconnect glow plug controller connector. Connect test lamp from ORN (503) and ORN/BLK (509) wires at glow plug controller to ground. Turn ignition switch momentarily to START and then release to RUN position.	Test lamp cycles on and off for approximately 25 seconds then goes off.	GO to step 8.
	Test lamp does not light or cycles for the incorrect time.	REPLACE glow plug controller.
8. Remove all connectors from glow plugs. Connect one lead of test lamp to battery voltage and other lead to each glow plug.	Test lamp lights for all glow plugs.	LOCATE and REPAIR open in ORN (503) and ORN/BLK (509) wires and fusible links from glow plug to controller.
	Test lamp does not light for one or more glow plugs.	REPLACE glow plug(s) where test lamp did not light.

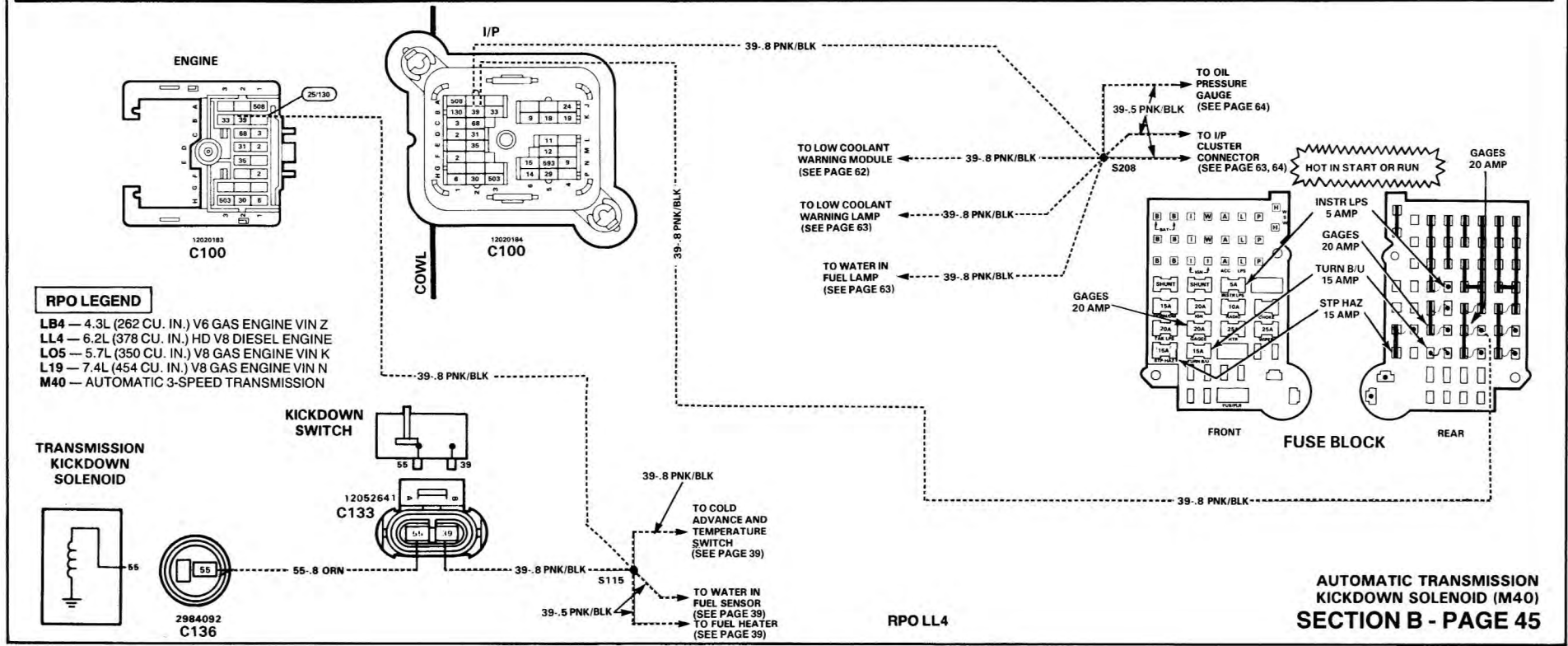
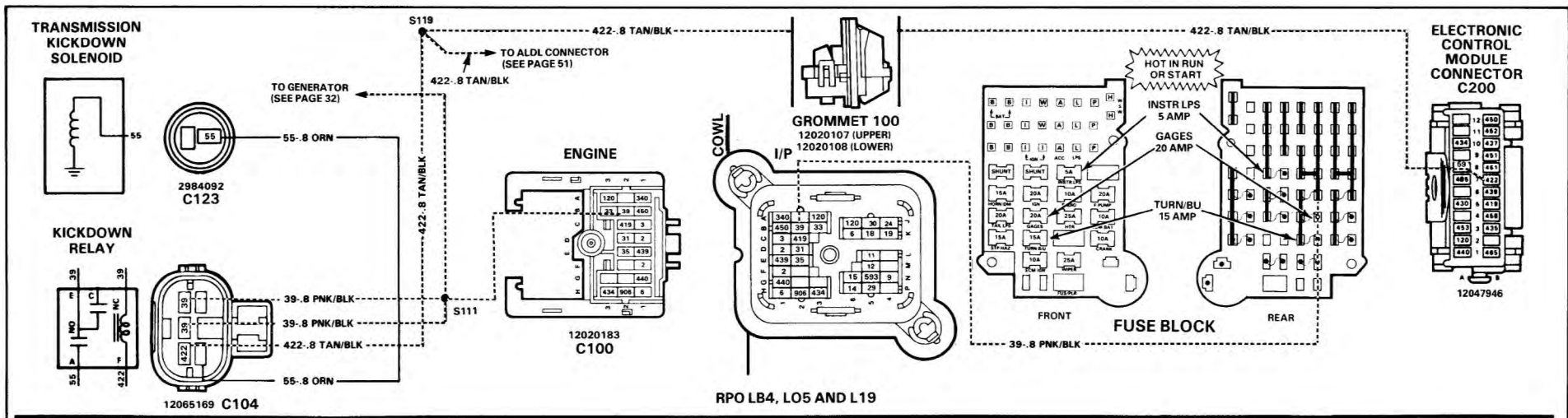




**COMPONENT LOCATION**

Page — Figure

Electronic Control Module	LH side of cowl	.79	—	18
Fuse Block (Diesel)	Body builder installed		—	
Fuse Block (Gas)	Body builder installed		—	
Grommet 100	LH front of cowl	.78	—	16
Kickdown Relay (P32)	LH front of cowl	.78	—	14
Kickdown Relay (P42)	LH front of cowl	.78	—	16
Kickdown Switch	Body builder installed		—	
Transmission Kickdown Solenoid (RPO LB4)	LH side of transmission	.77	—	12
Transmission Kickdown Solenoid (RPO LL4)	LH side of transmission	.76	—	10
Transmission Kickdown Solenoid (RPO L05)	LH side of transmission	.74	—	4
Transmission Kickdown Solenoid (RPO L19)	LH side of transmission	.75	—	8
C100 (P32 w/RPO LL4)	LH front of cowl	.74	—	5
C100 (P32 w/RPO L19)	LH front of cowl	.78	—	16
C100 (P42 w/RPO LB4, L05, L19)	LH front of cowl	.78	—	14
C100 (P42 w/RPO LL4)	LH front of cowl	.75	—	6
C104 (P32)	LH front of cowl	.78	—	14
C104 (P42)	LH front of cowl	.78	—	16
C123 (RPO LB4)	At transmission kickdown solenoid	.77	—	12
C123 (RPO L05)	At transmission kickdown solenoid	.76	—	10
C123 (RPO L19)	At transmission kickdown solenoid	.75	—	8
C133	At transmission kickdown switch	.73	—	2
C136	At transmission kickdown solenoid	.74	—	4
C200	At electronic control module	.79	—	18
S111	LH side of cowl	.78	—	16
S115	Rear of engine, near transmission filler tube	.74	—	4
S119 (P32)	LH front of cowl	.78	—	14
S119 (P42)	LH front of cowl	.78	—	16
S208	Body builder installed harness		—	



**COMPONENT LOCATION**

Page — Figure

ALDL	Body builder installed	—
Coolant Temperature Sensor (RPO LB4)	Top, front of engine	.77 — 13
Coolant Temperature Sensor (RPO L05)	Top, front of engine	.76 — 10
Coolant Temperature Sensor (RPO L19)	RH side of engine, behind alternator	.76 — 9
EGR Solenoid (LB4)	Rear, top RH side of engine	.77 — 13
Electronic Control Module	LH side of cowl	.79 — 18
Electronic Spark Timing	Rear, top of engine	.75 — 8
ESC Hybrid Function	RH side of engine	.76 — 11
EVRV (RPO L05)	Top, RH side of engine	.76 — 11
EVRV (RPO L19)	Top, RH side of engine	.76 — 9
Fuel Pump Oil Pressure Sensor and Switch (LB4)	Top, rear of engine	.77 — 12
Fuel Pump Oil Pressure Sensor and Switch (L05)	Top, rear of engine	.76 — 10
Fuel Pump Relay (P32 w/RPO L19)	LH side of cowl	.78 — 14
Fuel Pump Relay (P42)	LH side of cowl	.78 — 16
Fuse Block	Body builder installed	—
Grommet 100	LH side of cowl	.78 — 16
Grommet 101	Top, center of engine	.76 — 9
Idle Air Control Actuator (RPO LB4)	Top, RH rear of engine	.77 — 13
Idle Air Control Actuator (RPO L05)	Top, RH rear of engine	.76 — 11
Idle Air Control Actuator (RPO L19)	Top, RH rear of engine	.76 — 9
INJ-1 (RPO LB4)	In throttle body injection unit	.77 — 13
INJ-1 (RPO L05)	In throttle body injection unit	.76 — 11
INJ-1 (RPO L19)	In throttle body injection unit	.76 — 9
INJ-2 (RPO LB4)	In throttle body injection unit	.77 — 13
INJ-2 (RPO L05)	In throttle body injection unit	.76 — 11
INJ-2 (RPO L19)	In throttle body injection unit	.76 — 9
Knock Sensor (RPO LB4)	Lower, LH side of engine	.77 — 12
Knock Sensor (RPO L05)	Lower, RH side of engine	.76 — 11
Knock Sensor (RPO L19)	Lower, RH side of engine	.76 — 9
Manifold Absolute Pressure Sensor (RPO LB4)	On rear of engine	.77 — 13
Manifold Absolute Pressure Sensor (RPO L19)	On rear of engine	.76 — 9
Oxygen Sensor (RPO LB4)	On LH side of transmission	.77 — 12
Oxygen Sensor (RPO L05)	On LH side of transmission	.76 — 10
Oxygen Sensor (RPO L19)	ON LH side of transmission	.76 — 10
Throttle Position Sensor (RPO LB4)	RH side of throttle body	.77 — 13
Throttle Position Sensor (RPO L05)	RH side of throttle body	.76 — 11
Throttle Position Sensor (RPO L19)	RH side of throttle body	.76 — 9
Vehicle Speed Sensor	LH side of transmission	.75 — 8
C100 (P32 w/RPO L19)	LH front of cowl	.78 — 14
C100 (P42 w/RPO LB4, L05, L19)	LH front of cowl	.78 — 16
C103 (P32 w/RPO L19)	At fuel pump relay	.78 — 14
C103 (P42)	At fuel pump relay	.78 — 16
C109 (RPO LB4)	At coolant temperature sensor	.77 — 13
C109 (RPO L05)	At coolant temperature sensor	.76 — 10
C109 (RPO L19)	At coolant temperature sensor	.76 — 9
C110 (RPO LB4)	At throttle position sensor	.77 — 13
C110 (RPO L05)	At throttle position sensor	.76 — 11
C110 (RPO L19)	At throttle position sensor	.76 — 9
C111 (RPO LB4)	At throttle body injector	.77 — 13
C111 (RPO L05)	At throttle body injector	.76 — 11
C111 (RPO L19)	At throttle body injector	.76 — 9
C112 (RPO LB4)	At throttle body injector	.77 — 13
C112 (RPO L05)	At throttle body injector	.76 — 11
C112 (RPO L19)	At throttle body injector	.76 — 9
C113	At ESC hybrid function	.76 — 11
C114 (RPO L19)	At EVRV solenoid	.76 — 9

**COMPONENT LOCATION**

Page — Figure

C115 (RPO LB4)	At idle air control actuator	.77 — 13
C115 (RPO L05)	At idle air control actuator	.76 — 11
C115 (RPO L19)	At idle air control actuator	.76 — 9
C116 (RPO LB4)	At manifold absolute pressure sensor	.77 — 13
C116 (RPO L19)	At manifold absolute pressure sensor	.76 — 9
C117 (RPO LB4)	Lower LH side of engine	.77 — 12
C117 (RPO L05)	Lower RH side of engine	.76 — 11
C117 (RPO L19)	Lower RH side of engine	.76 — 9
C118 (RPO LB4)	At fuel pump oil pressure sensor and switch	.77 — 12
C118 (RPO L05)	At fuel pump oil pressure sensor and switch	.76 — 10
C119	At vehicle speed sensor	.75 — 8
C120 (RPO LB4)	At electronic spark timer	.77 — 12
C120 (RPO L05)	At electronic spark timer	.76 — 10
C120 (RPO L19)	At electronic spark timer	.75 — 8
C124 (RPO LB4)	At oxygen sensor	.77 — 12
C124 (RPO L05)	At oxygen sensor	.76 — 10
C124 (RPO L19)	At oxygen sensor	.75 — 8
C127 (RPO LB4)	At EGR solenoid	.77 — 13
C200	LH side of cowl	.79 — 18
C201	Body builder installed	—
G100	On alternator bracket	.76 — 9
G101	On alternator bracket	.76 — 9
S100 (P32, P42 w/RPO L19)	Engine harness, RH side of engine	.76 — 9
S100 (RPO L05)	Engine harness, RH side of engine	.76 — 11
S101	Engine harness, front of engine	.76 — 9
S102	LH front of cowl	.78 — 16
S102 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S104 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S104	LH front of cowl	.78 — 16
S105 (P32, P42 w/RPO L19)	Top of engine	.76 — 9
S105 (P42 w/RPO LB4)	RH side of engine	.77 — 13
S106 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S106	LH front of cowl	.78 — 16
S107 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S107	LH front of cowl	.78 — 16
S108 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S108	LH front of cowl	.78 — 16
S109 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S109	LH front of cowl	.78 — 16
S111	LH front of cowl	.78 — 16
S112 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S112 (RPO LB4)	RH side of engine	.77 — 13
S112	LH front of cowl	.78 — 16
S119 (P32 w/RPO L19)	LH front of cowl	.78 — 14
S119	LH front of cowl	.78 — 16



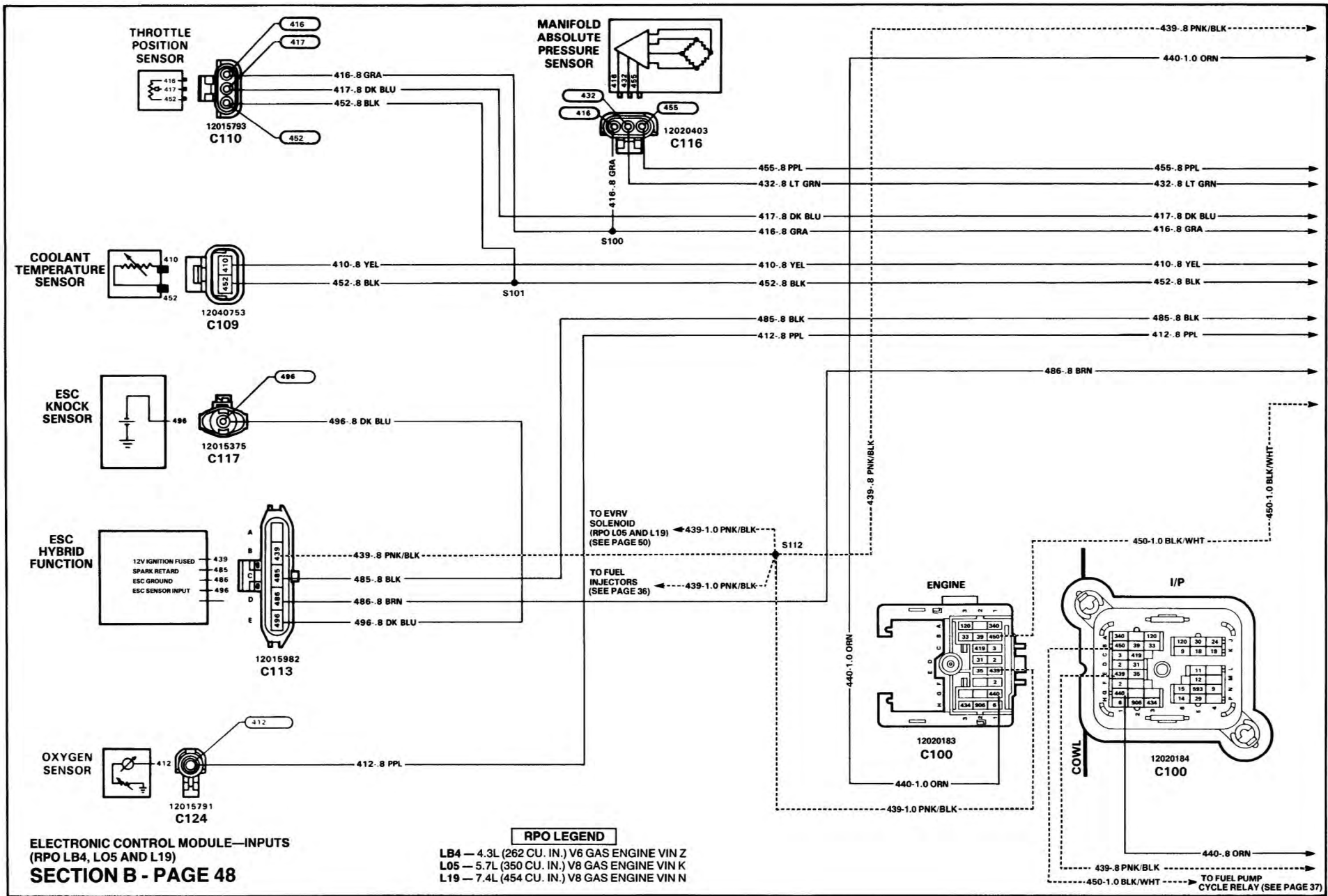
CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
465	.8	DK GRN/WHT	A1	FUEL PUMP RELAY DRIVE
			A2	NOT USED
			A3	NOT USED
435	.8	GRA	A4	EVRV (RPO L05 AND L19)
				EGR (RPO LB4)
419	.8	BRN/WHT	A5	SYSTEM CHECK LAMP
439	.8	PNK/BLK	A6	12V IGNITION FUSED
*422	.8	TAN/BLK	A7	KICKDOWN RELAY (RPO M40)
461	.8	ORN	A8	SERIAL DATA
451	.8	WHT/BLK	A9	ASS'Y LINE DIAG/LINK
437	.8	BRN	A10	SPEED SENSOR
452	.8	BLK	A11	5V SYSTEM RETURN A
450	.8	BLK/WHT	A12	SYSTEM RETURN
440	.8	ORN	B1	12V BATTERY FUSED
120	.8	TAN/WHT	B2	ELEC FUEL PUMP FUSED FEED
453	.8	BLK/RED	B3	DISTRIBUTOR REF LOW
			B4	NOT USED
430	.8	PPL/WHT	B5	DISTRIBUTOR REF HIGH
			B6	NOT USED
485	.8	BLK	B7	SPARK RETARD CONTROL
59	.8	DK GRN	B8	A/C INPUT
			B9	NOT USED
*434	.8	ORN/BLK	B10	PARK/NEUTRAL SWITCH
			B11	NOT USED
			B12	NOT USED

\*AUTO TRANS ONLY

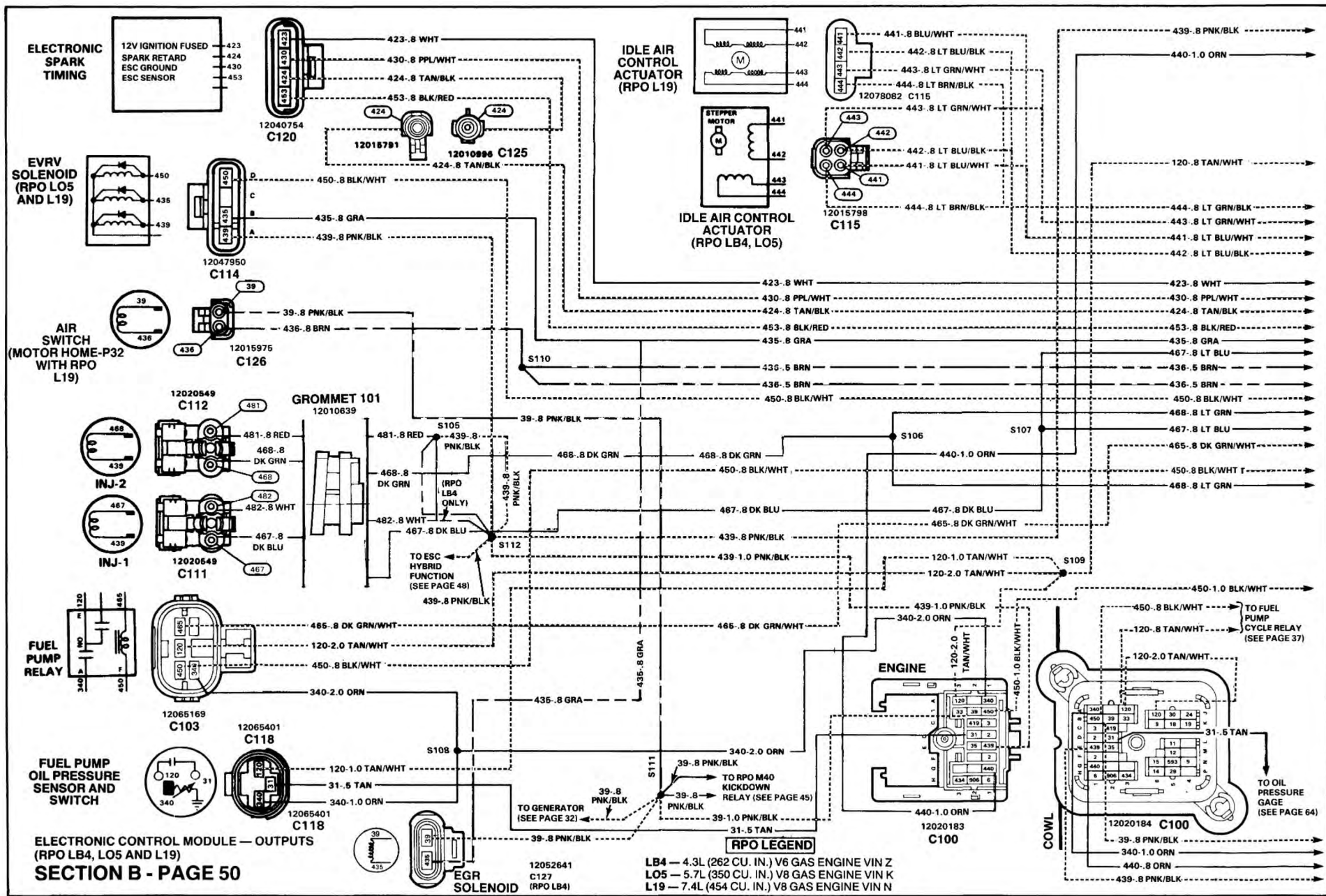
**RPO LEGEND**

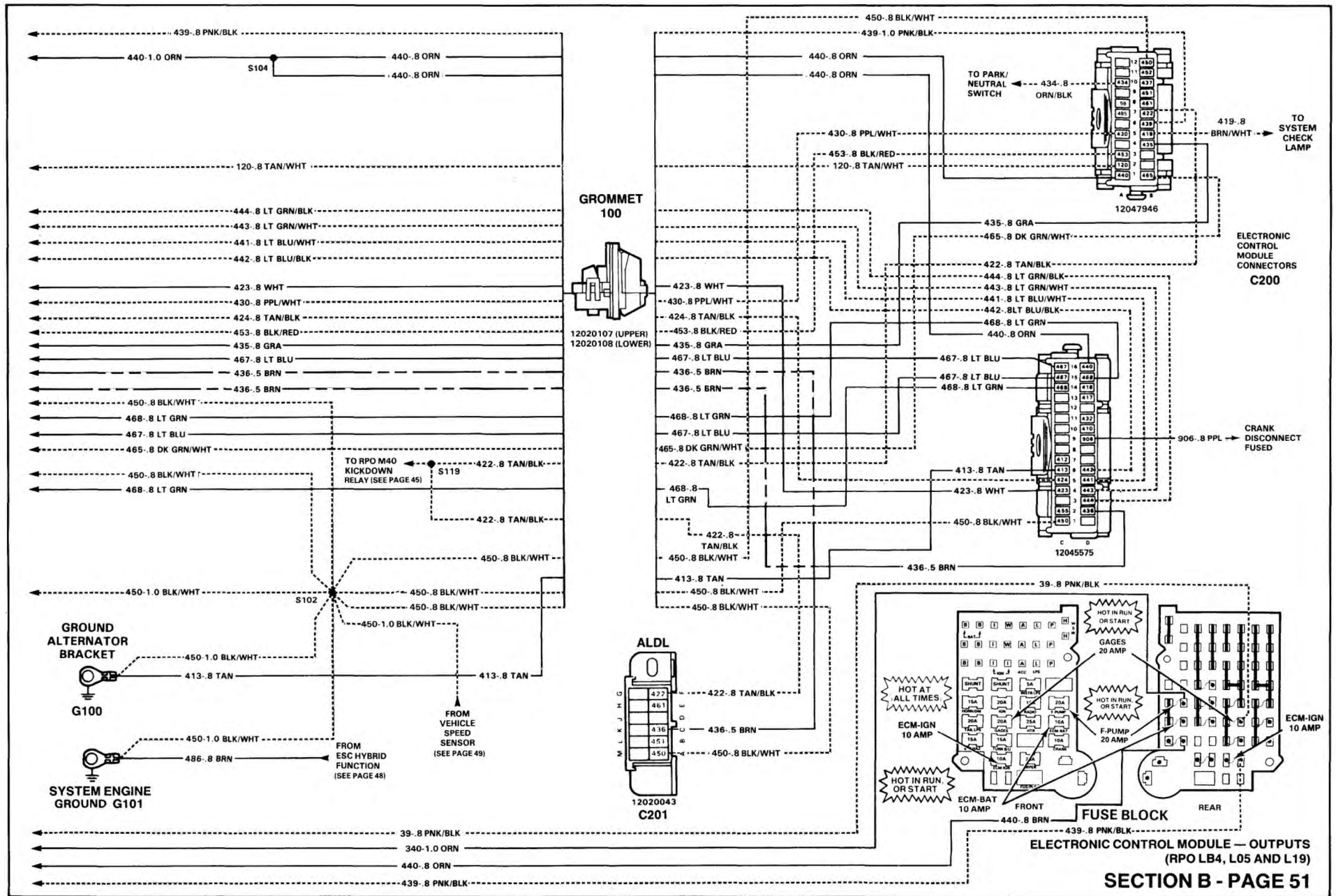
LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z  
L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
436	.5	BRN	C1	NOT USED
			C2	AIR SW SOLENOID (RPO L19)
444	.8	LT GRN/BLK	C3	STEPPER COIL B LOW
443	.8	LT GRN/WHT	C4	STEPPER COIL B HIGH
441	.8	LT BLU/WHT	C5	STEPPER COIL A HIGH
442	.8	LT BLU/BLK	C6	STEPPER COIL A LOW
			C7	NOT USED
			C8	NOT USED
906	.8	PPL	C9	CRANK DISCONNECT FUSED
410	.8	YEL	C10	COOLANT TEMPERATURE
432	.8	LT GRN	C11	MANIFOLD ABSOLUTE PRESS
			C12	NOT USED
417	.8	DK BLU	C13	THROTTLE POSITION SENSOR
416	.8	GRA	C14	5V SENSOR REFERENCE
468	.8	LT GRN	C15	INJECTOR B DRIVE
440	.8	ORN	C16	12V BATTERY FUSED
450	.8	BLK/WHT	D1	SYSTEM RETURN
455	.8	PPL	D2	5V RETURN A
			D3	NOT USED
423	.8	WHT	D4	HEI SPARK TIMING
424	.8	TAN/BLK	D5	HEI BYPASS
413	.8	TAN	D6	OXYGEN SENSOR LOW
412	.8	PPL	D7	OXYGEN SENSOR HIGH
			D8	NOT USED
			D9	NOT USED
			D10	NOT USED
			D11	NOT USED
			D12	NOT USED
			D13	NOT USED
468	.8	LT GRN	D14	INJECTOR B DRIVE
467	.8	LT BLU	D15	INJECTOR A DRIVE
467	.8	LT BLU	D16	INJECTOR A DRIVE









## CIRCUIT OPERATION

Vehicles equipped with the Hydro-Boost Brake system have an optional warning harness that plugs into the I/P harness in place of the Park Brake Warning Switch. Refer to the 1990 Light Duty Truck Service Manual, Section 5A1 for further description and operation of the Hydro-Boost System.

## COMPONENT LOCATION

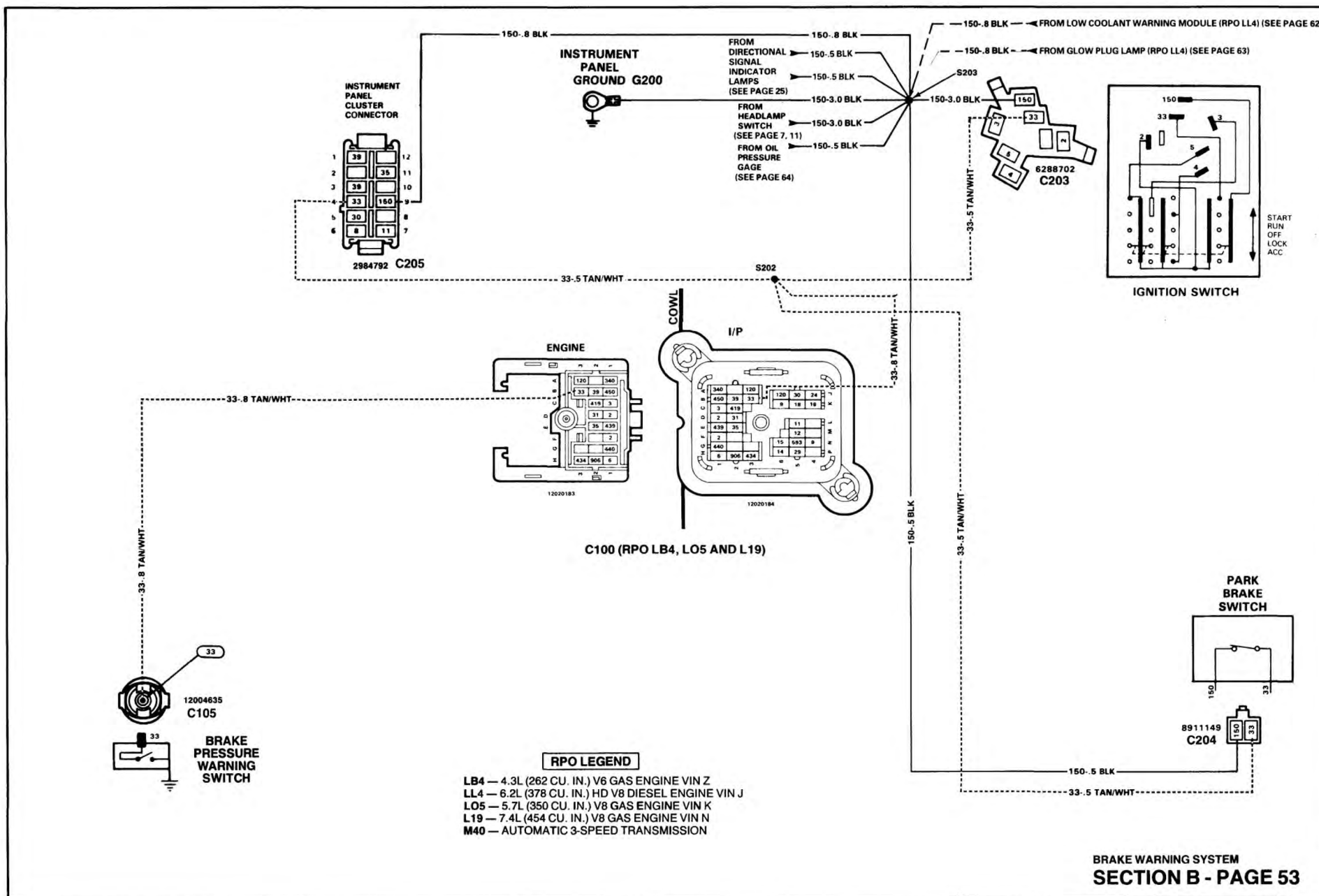
Page — Figure

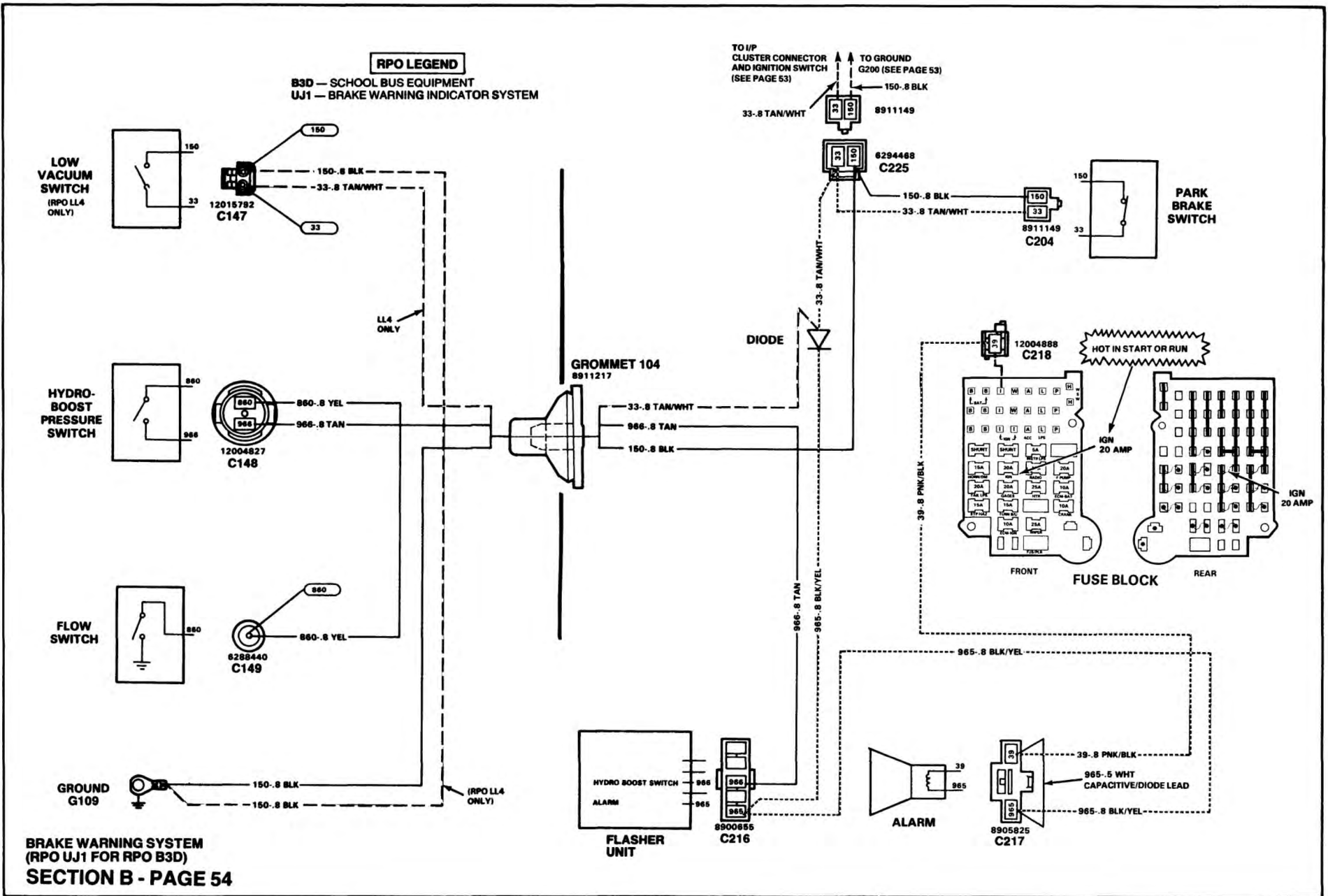
Alarm	Body builder installed	—	—
Brake Pressure Warning Switch	On brake cylinder	.74	5
Flasher Unit	Body builder installed	—	—
Fuse Block	Body builder installed	—	—
Grommet 104	Body builder installed	—	—
Hydro-Boost Pressure Switch	Body builder installed	—	—
Ignition Switch	Body builder installed	—	—
Low Vacuum Switch (RPO LL4)	Body builder installed	—	—
Park Brake Switch	Body builder installed	—	—
C100	At bulkhead, on LH front of cowl	.78	16
C105	At brake pressure warning switch	.78	16
C147	At low vacuum switch	—	—
C148	At hydro-boost pressure switch	—	—
C149	At flow switch	—	—
C203	At flow switch	—	—
C204	At park brake switch	—	—
C205	In instrument panel	—	—
C216	At flasher unit	—	—
C217	At alarm assembly	—	—
G109	Body builder installed harness	—	—
G200	Body builder installed harness	—	—
S202	Body builder installed harness	—	—
S203	Body builder installed harness	—	—

## TROUBLESHOOTING CHART—BRAKE WARNING SYSTEM

### BRAKE INDICATOR REMAINS ON WITH IGNITION SWITCH IN RUN AND PARK BRAKE OFF

TEST	RESULT	ACTION
1. Disconnect park brake switch connector C205.	Brake indicator lamp does not go out.	GO to step 2.
	Brake indicator lamp goes out.	CHECK adjustment of park brake switch. If adjustment cannot be corrected, REPLACE park brake switch.
2. Disconnect brake pressure warning switch connector C105.	Brake indicator lamp does not go out.	GO to step 3, for vehicles equipped with RPO UJ1.
	Brake indicator lamp goes out.	CHECK for a possible leak or loss of fluid in the brake system.
3. Connect a digital ohmmeter from I/P side of TAN/WHT (33) wire at connector C225. CHECK for continuity to ground.	Continuity.	REPAIR short to ground in TAN/WHT (33) wire between C225 and instrument cluster.
	No continuity.	REFER to 1990 Light Duty Truck Service Manual for diagnosis of the brake system Section 5A1.







**BLANK**

## CIRCUIT OPERATION

The Cruise Control regulates the speed of the vehicle in response to driver commands.

The Cruise Control Module contains electronic circuitry and a stepper motor. The other system components are:

- Cruise Control Activator
- Brake Switch
- Vehicle Speed Sensor

The Cruise Control Module receives voltage from the IGN fuse in RUN or START. A speed signal is received from the Vehicle Speed Sensor. The driver gives his input to the Cruise Control Module through the components

listed above. The Cruise Control Module circuitry receives the driver's input and generates electrical pulses. These pulses cause the stepper motor and its output reel to rotate. The throttle is controlled by a cable wound on the output reel. The Cruise Control Module also contains a clutch which releases the cable when the Cruise Control System must be shut off. This clutch will operate when the Brake Pedal is depressed, the Cruise Control System is turned off, or the Cruise Control System detects a failure.

## COMPONENT LOCATION

Page — Figure

Brake Switches	Body builder installed	—	—
Cruise Control Activator	LH side of steering column	.78	15
Cruise Control Module	Top LH side of radiator support	.80	19
Fuse Block	Body builder installed	—	—
Vehicle Speed Sensor	LH side of transmission	.75	8
C244	Lower steering column	.78	15
C246	At brake switch	—	—
C247	At vehicle speed sensor	.75	8
C248	At cruise control module (body builder installed)	—	—
G202	Body builder installed harness	—	—
S214	Body builder installed harness	—	—
S215	Body builder installed harness	—	—
S216	Body builder installed harness	—	—

## TROUBLESHOOTING CHART—CRUISE CONTROL

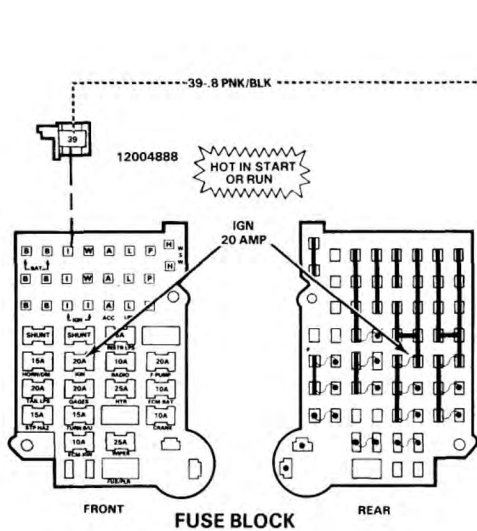
### CRUISE CONTROL DOES NOT DISENGAGE WHEN BRAKE PEDAL IS DEPRESSED

TEST	RESULT	ACTION
Place ignition switch in RUN position and cruise control switch to ON. Depress brake pedal. Connect test lamp from BRN (86) wire at brake switch connectors C245 and C246 to ground.	Test lamp does not light.	REPLACE control module.
	Test lamp lights.	CHECK adjustment of brake switch. If adjustment cannot be corrected, REPLACE brake switch.

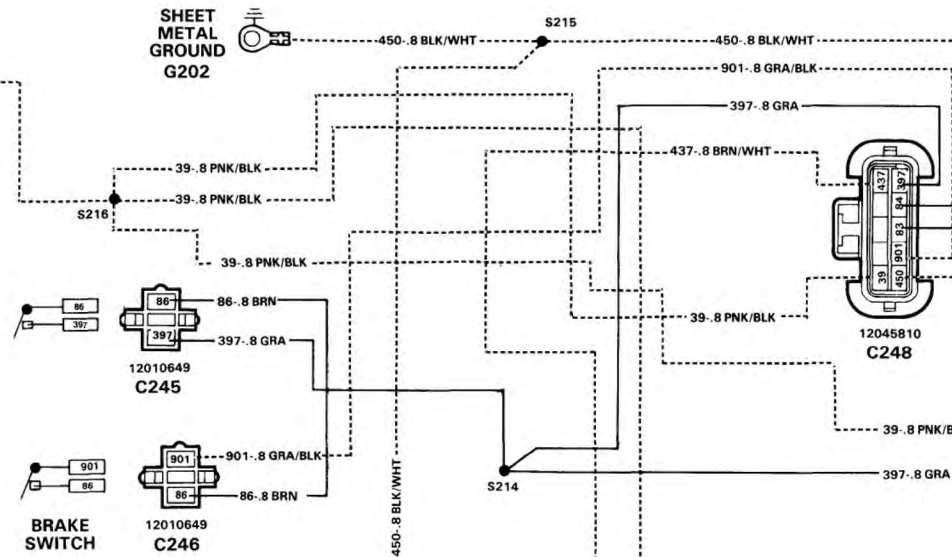
### CRUISE CONTROL DOES NOT OPERATE

TEST	RESULT	ACTION
1. Place ignition switch in RUN and cruise control switch to ON. Connect test lamp from PNK/BLK (39) wire at cruise control activator connector C244 to ground and then cruise control module connector C248 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of fuse (IGN). If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire from cruise control switch and cruise module to fuse block.
2. Connect test lamp from GRA (397) wire at cruise control activator connector C244 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE cruise control activator.
3. Connect test lamp from GRA (397) at cruise control module connector C248 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (397) wire from cruise control module to cruise control activator.

4. Connect test lamp from GRA (397) to BLK/WHT (450) wires at cruise control module connector C248.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in BLK/WHT (450) wire from cruise control module to ground terminal G202.
5. Connect test lamp from GRA (397) wire at brake switch connector C245 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (397) wire from brake switch to splice S214.
6. Connect test lamp from GRA/BLK (901) wire at brake switch connector C246 to ground.	Test lamp lights.	GO to step 7.
	Test lamp does not light.	LOCATE and REPAIR open in GRA/BLK (901) wire from brake switch to cruise control module.
7. Connect test lamp from BRN (86) wire at brake switch connector C246 to ground.	Test lamp lights.	GO to step 8.
	Test lamp does not light.	CHECK adjustment of brake switch. If properly adjusted, REPLACE brake switch.
8. Connect test lamp from BRN (86) wire at brake switch connector C245 to ground.	Test lamp lights.	GO to step 9.
	Test lamp does not light.	CHECK adjustment of brake switch. If properly adjusted, REPLACE brake switch.
9. Connect test lamp from DK BLU (84) wire at cruise control activator connector C244 to ground.	Test lamp lights.	REPLACE cruise control activator.
	Test lamp does not light.	GO to step 10.
10. Depress SET switch. Connect test lamp from DK BLU (84) wire at cruise control activator connector C244 to ground.	Test lamp lights.	GO to step 11.
	Test lamp does not light.	REPLACE cruise control activator.
11. Connect test lamp from DK BLU (84) wire at cruise control module connector C248 to ground.	Test lamp lights.	GO to step 12.
	Test lamp does not light.	LOCATE and REPAIR open in DK BLU (84) wire from cruise control module to cruise control activator.
12. Depress and hold RES/ACCEL switch. Connect test lamp from DK GRN (83) wire at cruise control activator connector C248 to ground.	Test lamp lights.	GO to step 13.
	Test lamp does not light.	REPLACE cruise control switch.
13. Connect test lamp from DK GRN (83) wire at cruise control module connector C248 to ground.	Test lamp lights.	GO to step 14.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (83) wire from cruise control module to cruise control activator.
14. Raise vehicle so drive wheels can be turned by hand. Connect voltmeter from PNK/WHT (39) wire to BRN (50) wire at cruise control module connector C248. Slowly turn drive wheels.	Pulses between 0 and battery voltage as wheels are turned.	REPLACE cruise control module.
	Does not pulse or no voltage reading.	CHECK speed sensor circuit. Refer to Section 6E of Fuel and Emission Manual (Gasoline).



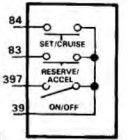
SHEET METAL GROUND G202



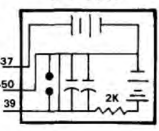
CRUISE CONTROL MODULE

403	CRUISE VENT VALVE
402	CRUISE CONTROL VAC
400	SPEED SENSOR
399	CRUISE SERVO
398	CRUISE SERVO
397	ELECTRONIC CRUISE
150	GROUND
87	BRAKE SWITCH
84	CRUISE ENGAGER SWITCH
83	CRUISE ENGAGER SWITCH

CRUISE ACTIVATOR



VEHICLE SPEED SENSOR



## CIRCUIT OPERATION

The operation of an individual Indicator is described along with its circuit. Refer to the schematic and text for the circuit that is indicated below each of the Indicators.

## BRAKE WARNING LAMP

Battery voltage is applied to the Brake Indicator when the Ignition Switch is in RUN, BULB TEST or START. Three Switches are connected to the Brake Indicator. When any one of these Switches closes, ground is provided and the Indicator lights.

The Park Brake Switch provides a ground when the Park Brake is applied. The Brake indicator lights to alert the driver.

The Brake Pressure Switch closes to light the Brake Indicator when there is low brake fluid pressure in one of the two hydraulic brake systems. This could be caused by a leak in one of the brake lines.

The Ignition Switch grounds the Brake Indicator when the Ignition Switch is turned to BULB CHECK or START to provide a quick check of the Brake Indicator Bulb and circuitry.

## FUEL GAGE

The pointer of the Fuel Gage is moved by the magnetic fields of two coils. The coils are at right angles to each other. Battery voltage is applied to the E coil and the circuit divides at the opposite end of the coil. One path continues to ground through the F coil. Another goes to ground through the variable resistor of the Fuel Gage Sender.

When the tank is low, the resistance of the Sender is low. A large flow of current passes through the E coil and the Fuel Gage Sender resistor. This moves the pointer toward E on the scale. When the tank is full, the Sender resistance is high. More current now flows through the F coil, moving the pointer toward F on the scale.

With two coils operating the pointer, the Gage is not affected by changes in the system's battery voltage.

## OIL PRESSURE GAGE

The engine oil pressure is displayed by the Oil Pressure Gage. The pointer of the Gage is moved by two coils, and its operation is similar to that of the Fuel Gage.

The Oil Pressure Sender is connected to the junction of the two coils. It has low resistance when the oil pressure is low, and 90 ohms resistance when the oil pressure is high. This changing resistance changes the current flow through the coils. The magnetic fields of the coils move the pointer from low to high.

## COMPONENT LOCATION

		Page	Figure
Brake Pressure Warning Switch	On brake cylinder	.75	— 8
Check Engine Lamp (Gasoline)	Body builder installed	—	—
Coolant Temperature Sender (RPO LL4)	LH front of engine, on cylinder head	.74	— 3
Daytime Running Lamps Indicator (CANADA ONLY)	Body builder installed	.74	— 3
Dimmer Switch	Body builder installed	—	—
Directional Signal Lamp, LH	Body builder installed	—	—

## TEMPERATURE GAGE

The Temperature Gage is also operated by two coils. Battery voltage is applied to both coils. One is grounded directly and the other is grounded through the Temperature Sender. This has 55 ohms resistance at 260°F (hot coolant) and its resistance becomes greater at low temperatures. It is approximately 1400 ohms at 100°F. This causes the current through the Sender and one coil to increase as the coolant temperature increases. This moves the pointer.

## LOW COOLANT INDICATOR (RPO LL4)

The Low Coolant Indicator comes on to warn the driver when a low level of coolant exists in the radiator. Battery voltage is applied to the Low Coolant Module. When a low coolant condition exists, a signal is sent to the Low Coolant Module from the Low Coolant Sensor. The Low Coolant Module will provide a ground to the Low Coolant Indicator.

The Low Coolant Sensor is not a switch that opens and closes. It has a very high resistance to ground, more than 50,000 ohms, when the engine coolant level is low. This causes the Low Coolant Module to light the Low Coolant Indicator. With more of the Sensor covered by coolant, its resistance decreases. When the fluid level is good, the resistance will be less than 10,000 ohms. With the Sensor resistance between 10,000 and 50,000 ohms, the Sensor is partly covered and the fluid is not low enough to cause the warning to be displayed.

## CHECK ENGINE (RPO LB4, L05 AND L19) INDICATOR

Refer to Light Duty Truck Fuel, Driveability and Emissions Service Manual, Section 3.

## WATER-IN-FUEL WARNING INDICATOR

Refer to Fuel Controls (RPO LL4), Page B-38.

## GLOW PLUG INDICATOR

Refer to Glow Plugs (RPO LL4), Page B-11.

## RH/LH DIRECTIONAL SIGNAL INDICATORS

Refer to Front Exterior Lamps, Page B-24.

## HIGH BEAM INDICATOR

Refer to Headlamps, Page B-12, B-16.

## COMPONENT LOCATION

		Page	Figure
Directional Signal Lamp, RH	Body builder installed	—	—
Directional Signal Switch	In upper steering column	.78	— 15
Engine Temperature Switch (RPO LB4)	LH side of engine	.77	— 12
Engine Temperature Switch (RPO L05)	LH side of engine	.76	— 10
Engine Temperature Switch (RPO L19)	LH side of engine	.75	— 8
Fuel Pump	In fuel tank	.79	— 17
Fuel Pump/Oil Pressure Sensor and Switch (RPO LB4)	LH side of engine	.77	— 12
Fuel Pump/Oil Pressure Sensor and Switch (RPO L05)	LH side of engine	.76	— 10
Fuse Block	Body builder installed	—	—
Generator (RPO LB4)	Top, RH side of engine	.77	— 13
Generator (RPO LL4)	Right front of engine	.73	— 2
Generator (RPO L05)	Top, RH side of engine	.76	— 11
Generator (RPO L19)	Top, RH side of engine	.76	— 9
Glow Plug Lamp (RPO LL4)	Body builder installed	—	—
Hazard Flasher	Body builder installed	—	—
Headlamp Switch	Body builder installed	—	—
Ignition Switch	Body builder installed	—	—
Low Coolant Warning Lamp (RPO LL4)	Body builder installed	—	—
Low Coolant Warning Module (RPO LL4)	Body builder installed	—	—
Low Coolant Warning Switch (RPO LL4)	Top, RH side of radiator	—	—
Oil Pressure Gage	Body builder installed	—	—
Park Brake Switch	Body builder installed	—	—
Water-In-Fuel Sensor (RPO LL4)	Top rear center of engine	.74	— 4
Water-In-Fuel Warning Lamp (RPO LL4)	Body builder installed	—	—
Windshield Wiper/Washer Switch	Body builder installed	—	—
Wiper/Washer Switch Lamp	Body builder installed	—	—
C100 (P32 w/RPO L19)	LH front of cowl	.78	— 16
C100 (P42 w/RPO LB4, L05, L19)	LH front of cowl	.78	— 14
C100 (P32 w/RPO LL4)	LH front of cowl	.74	— 5
C100 (P42 w/RPO LL4)	LH front of cowl	.75	— 6
C105	At brake pressure warning switch	.78	— 16
C106 (RPO LL4)	At coolant temperature sender	.74	— 3
C107 (P32 w/RPO L19)	At generator	.76	— 9
C107 (RPO LB4)	At generator	.76	— 13
C107 (RPO L05)	At generator	.77	— 13
C108 (RPO LB4)	At engine temperature switch	.77	— 12
C108 (RPO L05)	At engine temperature switch	.76	— 10
C108 (RPO L19)	At engine temperature switch	.75	— 8
C118 (P42 w/RPO LB4)	At fuel pump/oil pressure sensor and switch	.77	— 12
C118 (RPO L05)	At fuel pump/oil pressure sensor and switch	.76	— 10
C130 (RPO LL4)	At water-in-fuel sensor	.74	— 4
C150 (RPO LL4)	At low coolant warning switch	.75	— 6
C151 (RPO LL4)	At generator	.73	— 2
C203	Body builder installed	—	—
C204	Body builder installed	—	—
C205	Body builder installed	—	—
C206	Top of steering column	—	—
C209	Body builder installed	—	—
C210	Body builder installed	—	—
C212	At RH directional signal lamp	—	—
C213	At LH directional signal lamp	—	—
C221	Body builder installed	—	—
C222	Body builder installed	—	—
C228	Body builder installed	—	—
C235	At oil pressure gage	—	—
C236 (RPO LL4)	At low coolant warning lamp	—	—
C237 (RPO LL4)	At low coolant warning lamp	—	—
C238 (RPO LL4)	At water-in-fuel warning lamp	—	—

**COMPONENT LOCATION**

Page — Figure

C239 (RPO LL4)	At glow plug lamp	—
C240 (Gas)	At check engine lamp	—
C241 (CANADA ONLY)	At daytime running lamps indicator	—
C400	Rear, RH frame rail	.79 — 17
G200	Body builder installed	—
G201	Body builder installed	—
S111	Engine harness, LH front of cowl	—
S202	Body builder installed harness	—
S203	Body builder installed harness	—
S208	Body builder installed harness	—

**PRELIMINARY CHECKS:**

CHECK condition of GAGES and INST LPS fuses. If fuses are in good condition use the following diagnostic procedures.

**TROUBLESHOOTING CHART—INSTRUMENT PANEL: GAGES AND INDICATORS**

**FUEL GAGE INDICATES FULL OR BEYOND AT ALL TIMES**

TEST	RESULT	ACTION
1. Disconnect fuel tank sender connector C100 and place ignition switch to RUN. Connect a fused jumper from PNK (30) wire at fuel pump connector C400 to ground.	Fuel gage indicates full.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.
	Fuel gage indicates empty.	GO to step 2.
2. Connect fused jumper from PNK (30) wire to BLK (150) wire at fuel pump connector C400.	Fuel gage indicates full.	LOCATE and REPAIR open in BLK (150) wire.
	Fuel gage indicates empty.	REPAIR/REPLACE fuel pump.

**FUEL GAGE INDICATES EMPTY WHEN THERE IS FUEL IN THE TANK**

TEST	RESULT	ACTION
Disconnect fuel pump and place ignition switch to RUN.	Fuel gage indicates full.	REPAIR/REPLACE fuel pump.
	Fuel gage indicates empty.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.

**FUEL GAGE IS INACCURATE**

TEST	RESULT	ACTION
Disconnect fuel pump connector C400. Connect one red lead of J34029-A multimeter to PNK (30) wire and other to ground. Set resistance dials to 0 ohms and then to 90 ohms. Fuel gage should indicate empty and then full. (Allow time for gage to reach full due to anti-slosh device.)	Gage responds correctly.	CHECK BLK (150) wire for high resistance. If wire is good, REPAIR/REPLACE fuel pump.
	Gage does not respond correctly.	CHECK for high resistance in PNK (30) wire. If wire is good, REPLACE fuel gage.

**TEMPERATURE GAGE INDICATES HOT WITH ENGINE COOLANT BELOW OPERATING TEMPERATURE AND IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
Disconnect temperature sender connector C108 (Gas) or C106 (Diesel) and place ignition switch to RUN.	Temperature gage indicates cold.	REPLACE temperature sender.
	Temperature gage does not indicate cold.	LOCATE and REPAIR a short in DK GRN (35) wire. If no short is found, PERFORM diagnostic procedures under symptom "Temperature Gage Is Not Accurate."

**TEMPERATURE GAGE INDICATES COLD ALL THE TIME**

TEST	RESULT	ACTION
Disconnect temperature sender connector C108 (Gas) or C106 (Diesel). Ground the DK GRN (35) wire at temperature sender connector C108 (Gas) or C106 (Diesel).	Temperature gage indicates hot.	REPAIR/REPLACE temperature sender.
	Temperature gage does not indicate hot.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR STAYS ON AT ALL TIMES WITH IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
Disconnect temperature sender connector C108 (Gas) or C106 (Diesel) and place ignition switch to RUN. Observe temperature indicator.	Indicator stays on.	LOCATE and REPAIR short in DK GRN (35) wire. If wire is good, REPLACE instrument cluster.
	Indicator goes out.	REPLACE temperature sender.

**TEMPERATURE GAGE IS NOT ACCURATE**

TEST	RESULT	ACTION
Disconnect temperature sender connector C108 (Gas) or C106 (Diesel). Connect red lead from J34029-A multimeter to DK GRN (35) wire and other lead to ground. Adjust resistance dials to 1400 ohms and then to 55 ohms. Temperature gage should indicate cold then hot.	Gage indicates correctly.	REPLACE temperature sender.
	Gage is not correct.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR DOES NOT LIGHT WITH THE ENGINE COOLANT OVERHEATED**

TEST	RESULT	ACTION
Disconnect temperature sender connector C108 (Gas) or C106 (Diesel) and place ignition switch to RUN. Connect fused jumper from DK GRN (35) wire at temperature sending connector C108 (Gas) or C106 (Diesel) to ground. Observe temperature indicator.	Indicator lights.	REPLACE temperature sender.
	Indicator does not light.	LOCATE and REPAIR open in bulb and DK GRN (35) wire. If wire and bulb are good, REPLACE instrument cluster.

**OIL PRESSURE GAGE INDICATES LOW PRESSURE WHEN OIL PRESSURE IS GOOD**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C118 and place ignition switch to RUN.	Oil pressure gage indicates high pressure or indicator light goes out.	REPLACE oil pressure sender.
	Oil pressure gage indicates no or low pressure or indicator light stays on.	LOCATE and REPAIR short in TAN (31) wire. If wire is good, REPLACE oil pressure gage.

**OIL PRESSURE GAGE INDICATES HIGH PRESSURE AT ALL TIMES**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C118 and place ignition switch to RUN. Connect a fused jumper from TAN (31) wire at oil pressure sender connector C118 to ground.	Oil pressure gage indicates low pressure or indicator lights.	REPLACE oil pressure sender.
	Oil pressure gage indicates high pressure or indicator does not light.	LOCATE and REPAIR open in TAN (31) wire and bulb. If wire and bulb are good, REPLACE oil pressure gage.

**OIL PRESSURE GAGE IS NOT ACCURATE**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C118. Connect one red lead of J34029-A multimeter to TAN (31) wire at oil pressure sender connector C118 and other lead to ground. Set resistance dials to 0 ohms and then to 90 ohms. The oil pressure gage should indicate low pressure and then high pressure.	Oil pressure gage indicates correctly.	REPLACE oil pressure sender.
	Oil pressure gage does not indicate correctly.	LOCATE and REPAIR open in TAN (31) wire. If wire is good, REPLACE oil pressure gage.

**LOW COOLANT INDICATOR DOES NOT LIGHT WITH COOLANT LEVEL LOW (DIESEL ONLY)**

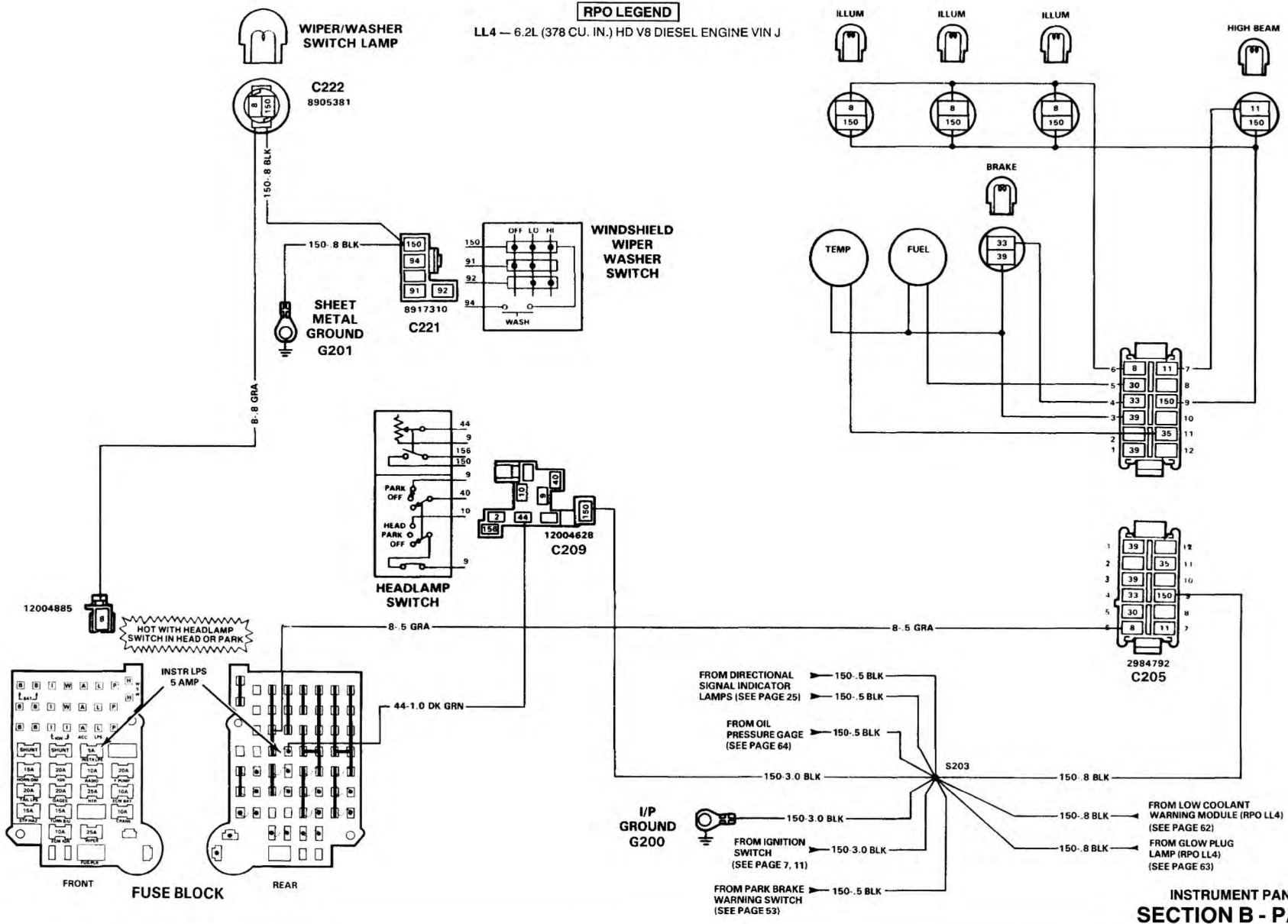
TEST	RESULT	ACTION
1. Disconnect low coolant warning switch connector C150 and place ignition switch to RUN. Observe low coolant indicator light.	Low coolant indicator lights.	REPLACE low coolant warning switch.
	Low coolant indicator does not light.	GO to step 2.
2. Disconnect low coolant module connector C236. Connect voltmeter from PNK/BLK (39) wire at low coolant module connector C236 to ground.	Battery voltage.	GO to step 3.
	No voltage.	LOCATE and REPAIR open in PNK/BLK (39) wire.
3. Connect voltmeter from PNK/BLK (39) wire to BLK (150) wire at low coolant module connector C236.	Battery voltage.	GO to step 4.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire.
4. Connect voltmeter from GRA (69) wire at low coolant module connector C236 to ground.	Battery voltage.	GO to step 5.
	No voltage.	LOCATE and REPAIR open or short to ground in GRA (69) wire from low coolant module to low coolant warning lamp.
5. Connect voltmeter from PNK/BLK (39) wire to YEL/BLK (68) at low coolant module connector C236.	Battery voltage.	LOCATE and REPAIR short to ground in YEL/BLK (68) wire from low coolant module to low coolant warning switch.
	No voltage.	REPLACE low coolant module.

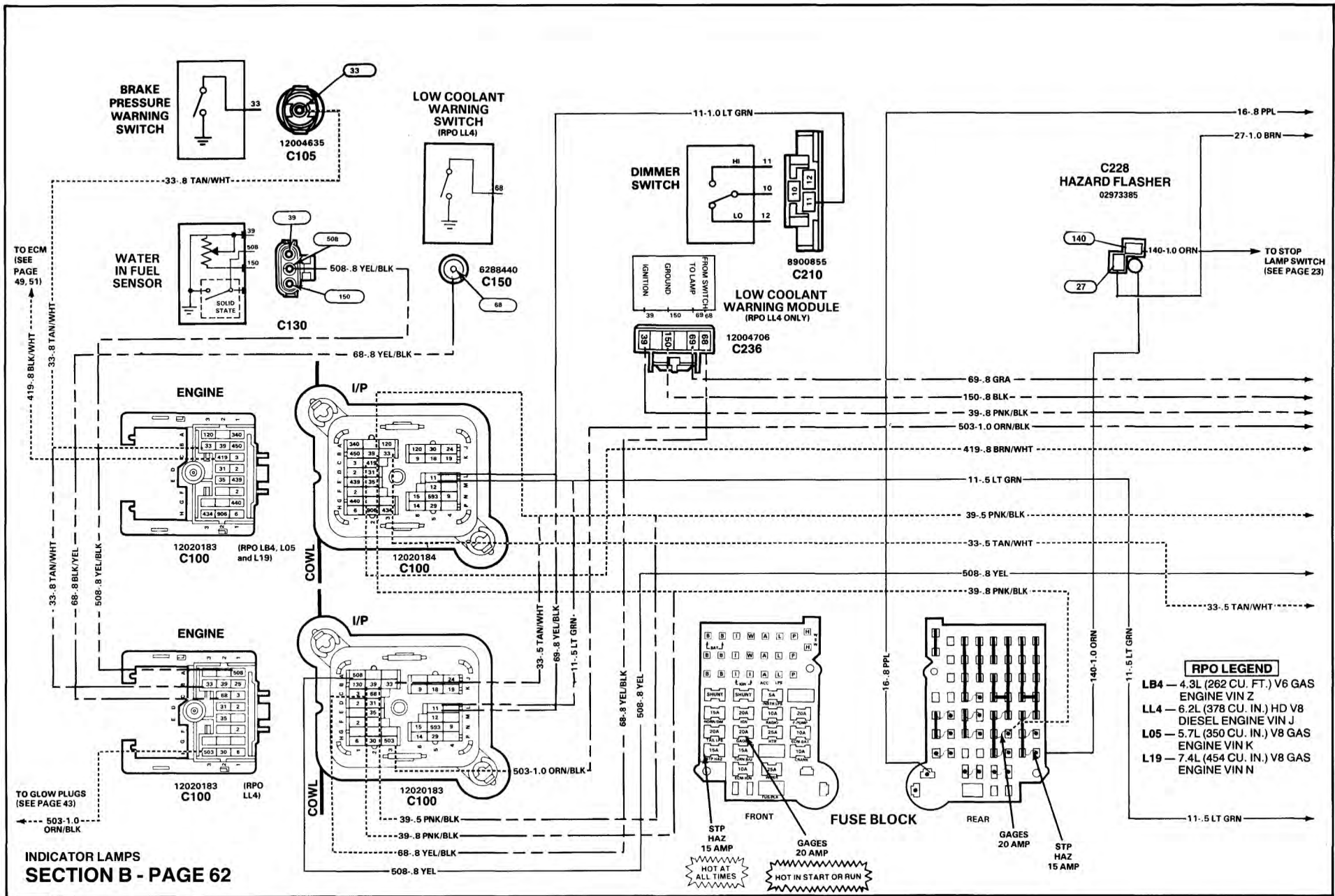
**LOW COOLANT INDICATOR IS LIT WHEN COOLANT LEVEL IS GOOD**

TEST	RESULT	ACTION
Connect a fused jumper from low coolant warning switch connector C150 to ground. Place ignition switch to RUN and observe low coolant indicator light.	Low coolant indicator goes out.	REPLACE low coolant probe.
	Low coolant indicator stays lit.	LOCATE and REPAIR open in YEL/BLK (68) wire. If wire is good, follow diagnostic procedures listed under symptom "Low Coolant Indicator Does Not Light With Coolant Level Low."

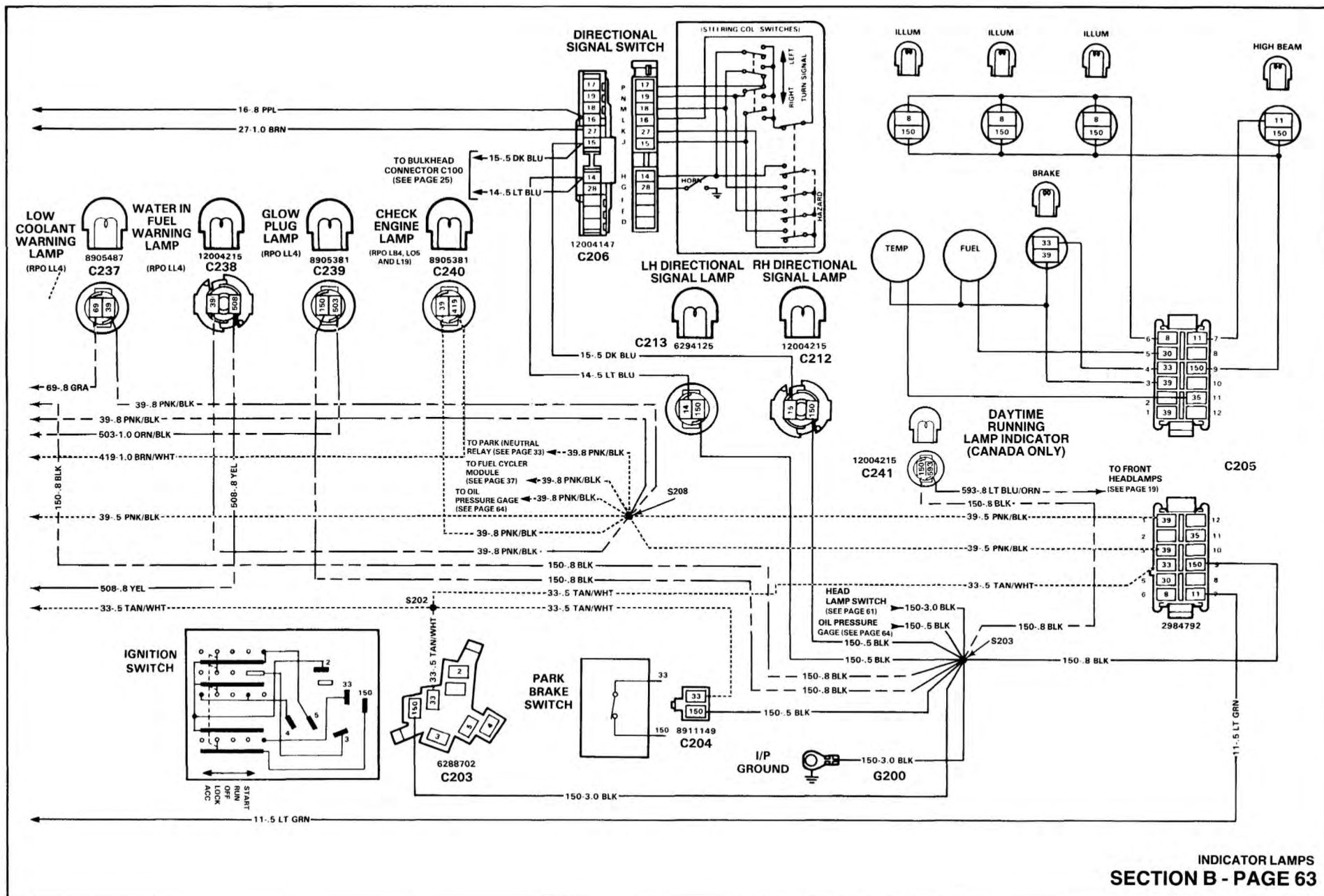
**RPO LEGEND**

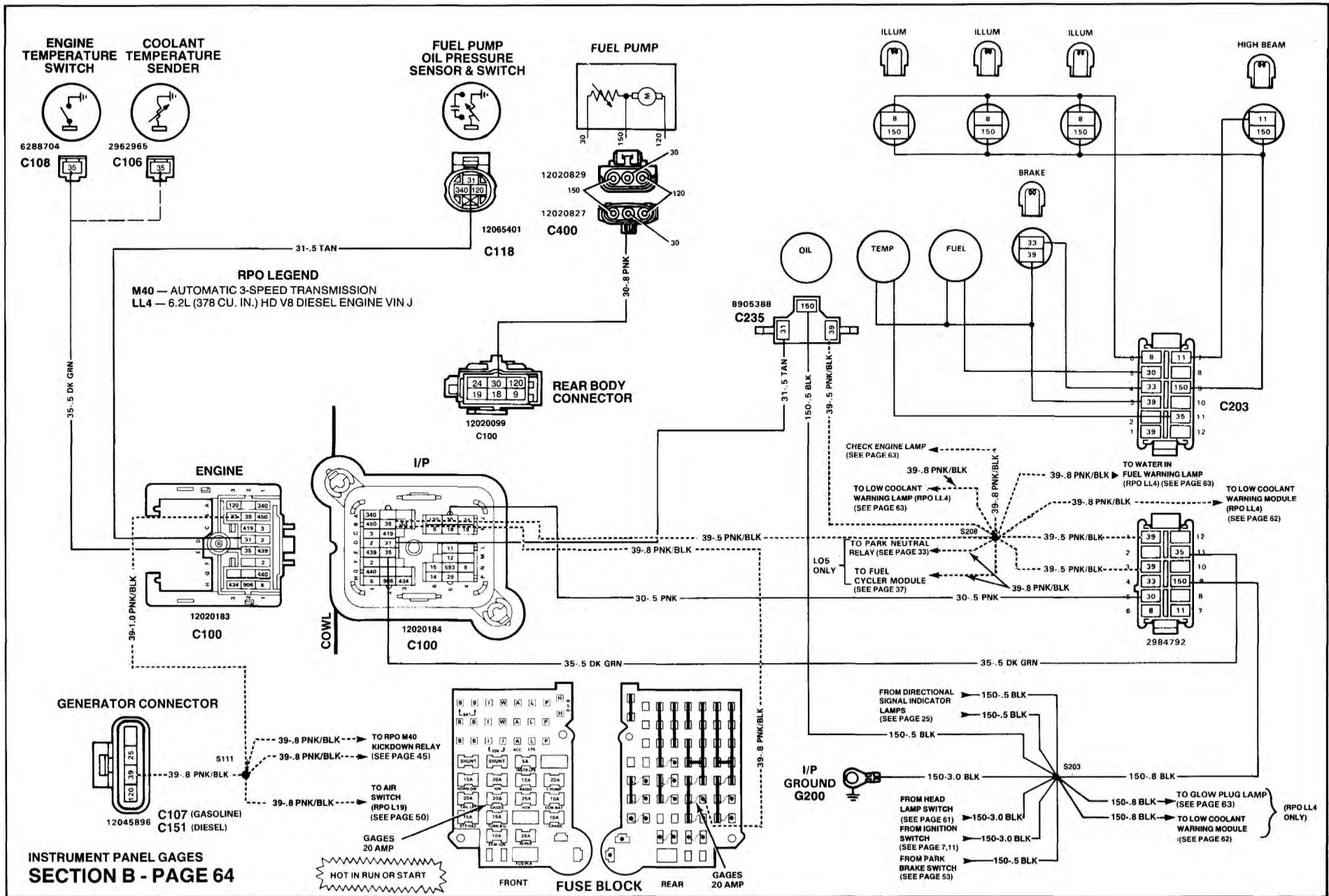
LL4 — 6.2L (378 CU. IN.) HD V8 DIESEL ENGINE VIN J











**BLANK**

**CIRCUIT OPERATION  
BACKUP LAMPS**

With the Ignition Switch in RUN or START, voltage is applied through the Turn/BU Fuse to the Transmission Position Switch or the Backup Lamp Switch. Whenever the gear selector lever is shifted to REVERSE the Transmission Position Switch or the Backup Lamp Switch closes and voltage is applied to the Backup Lamps and the lamps turn on.

**PARK, TAIL, MARKER, AND  
LICENSE LAMPS**

Voltage is applied through the PARK LP Fuse to the Headlamp Switch at all times. With the Headlamp Switch in PARK or HEAD, voltage is applied to the Park, Tail, Marker, and License Lamps.

**COMPONENT LOCATION**

Page — Figure

Backup Lamp, LH	Body builder installed	—	—
Backup Lamp, RH	Body builder installed	—	—
Backup Lamp Switch (Automatic Transmission)	On lower steering column	.78	15
Backup Lamp Switch (Manual Transmission)	On top of transmission	.75	8
Fuse Block	Body builder installed	—	—
Headlamp Switch	Body builder installed	—	—
License Lamp, LH	Body builder installed	—	—
License Lamp, RH	Body builder installed	—	—
Tail, Stop and Directional Lamp, LH	Body builder installed	—	—
Tail, Stop and Directional Lamp, RH	Body builder installed	—	—
C100	At bulkhead, LH front of cowl	.78	16
C146	At backup lamp switch	.75	8
C209	Body builder installed	—	—
C214 (Automatic Transmission)	On lower steering column	.78	15
C214 (Manual Transmission)	On lower steering column	.78	15
C402	On rear, LH frame rail	.79	17
C404	At LH tail, stop and directional lamp	—	—
C405	At LH backup lamp	—	—
C406	At RH backup lamp	—	—
C407	Body builder installed	—	—
S400	Body builder installed harness	—	—
S401	Body builder installed harness	—	—

**PRELIMINARY CHECKS:**

The rear lamp systems (tail lamps, backup lamps, and license plate lamps) all receive voltage from same wire circuit (BRN 9) and are grounded at the bulb socket(s). If only one system is not working, LOCATE and REPAIR an open in the wiring and/or bulbs that pertain to that system.

**TROUBLESHOOTING CHART—REAR EXTERIOR LAMPS**

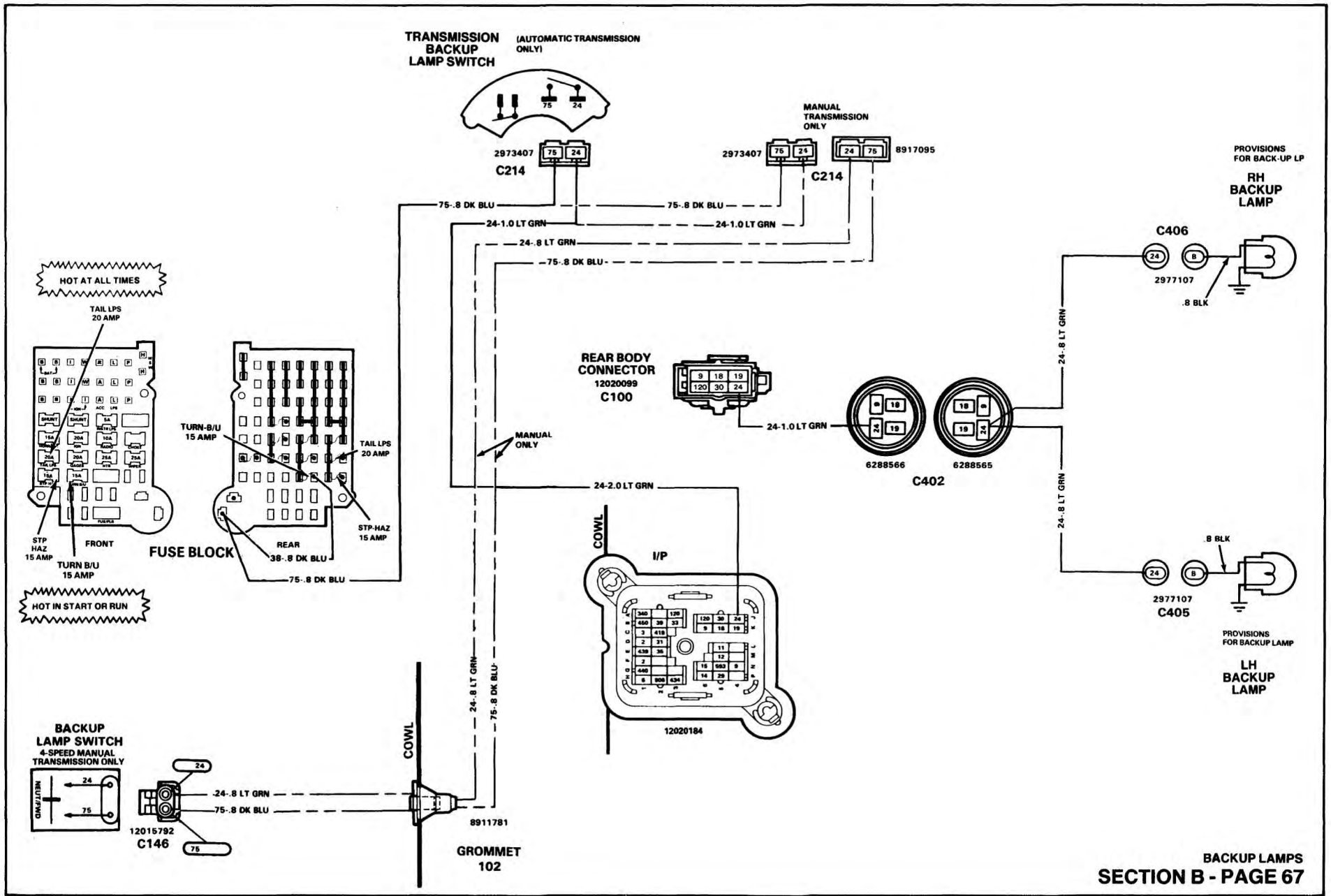
**NONE OF THE REAR LAMP SYSTEMS OPERATE**

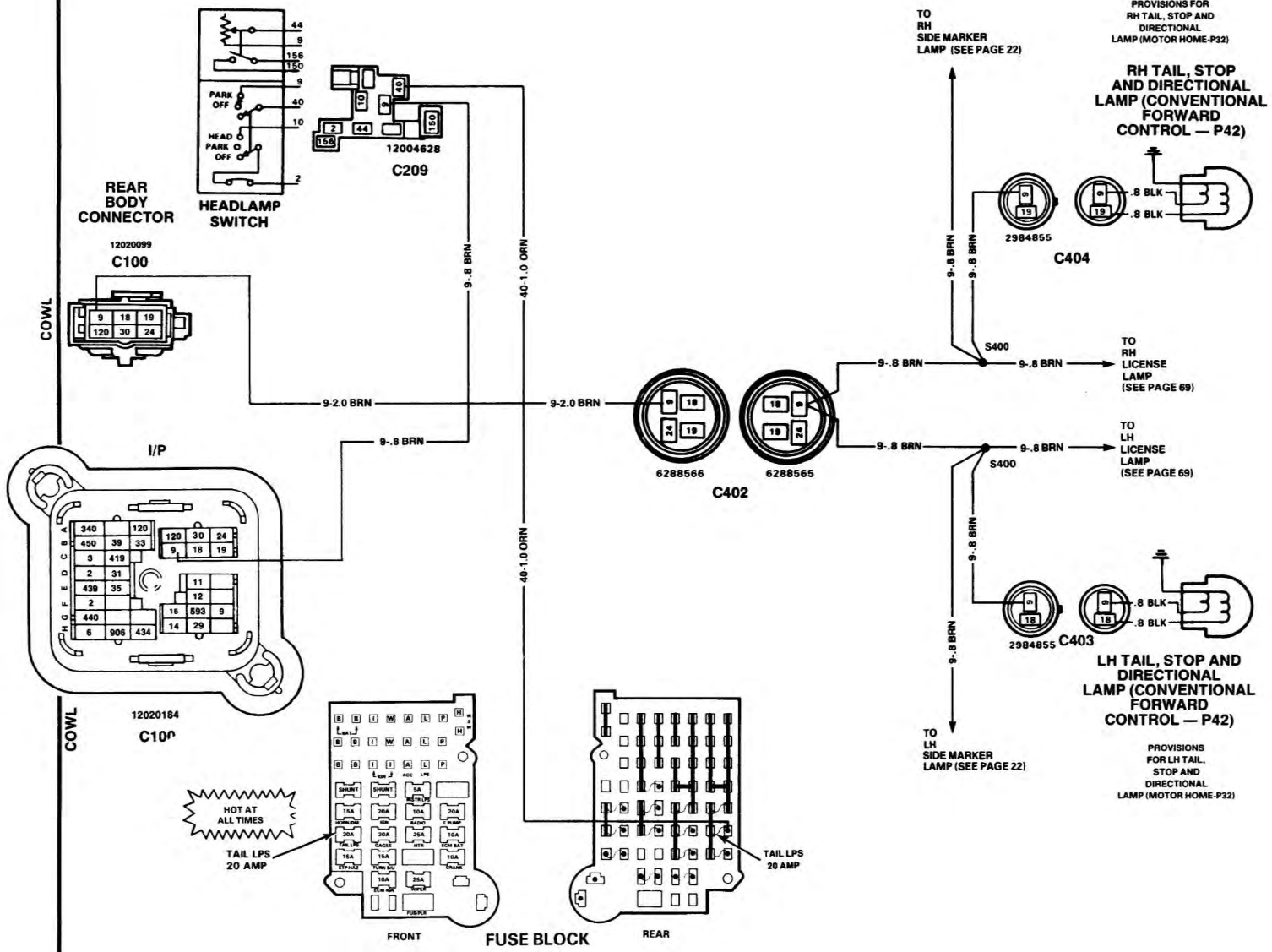
TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of fuse (TAIL LPS). If fuse is good, LOCATE and REPAIR open in RED (2) wire from headlamp switch to junction block and/or ORN (40) wire from headlamp switch to fuse block.
2. Place headlamp switch to PARK position. Connect test lamp from BRN (9) wire at headlamp switch connector C209 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.

3. Connect test lamp from BRN (9) wire at rear lamp connector C402 to ground.	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire from rear lamps to headlamp switch.

**BACKUP LAMPS DO NOT OPERATE**

TEST	RESULT	ACTION
1. Place transmission in reverse. Connect test lamp from LT GRN (24) wire at backup lamp connector(s) C405 and C406 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. CHECK condition of bulb socket(s).	Bulb socket(s) in good condition.	REPLACE bulb(s).
	Bulb socket(s) in poor condition.	REPLACE socket.
3. Connect test lamp from DK BLU (75) wire at backup lamp switch connector C214 (automatic) or C146 (manual) to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	CHECK condition of fuse (TURN/BU). If fuse is good, LOCATE and REPAIR open in DK BLU (75) wire from backup lamp switch to fuse block and DK BLU (38) wire.
4. Connect test lamp from LT GRN (24) wire at backup lamp switch connector C214 (automatic) or C146 (manual) to ground.	Test lamp lights.	LOCATE and REPAIR open in LT GRN (24) wire from backup lamp switch to backup lamps.
	Test lamp does not light.	Adjust backup lamp switch. If backup lamp switch will not adjust properly, REPLACE backup lamp switch.





PROVISIONS FOR RH TAIL, STOP AND DIRECTIONAL LAMP (MOTOR HOME-P32)

**RH TAIL, STOP AND DIRECTIONAL LAMP (CONVENTIONAL FORWARD CONTROL - P42)**

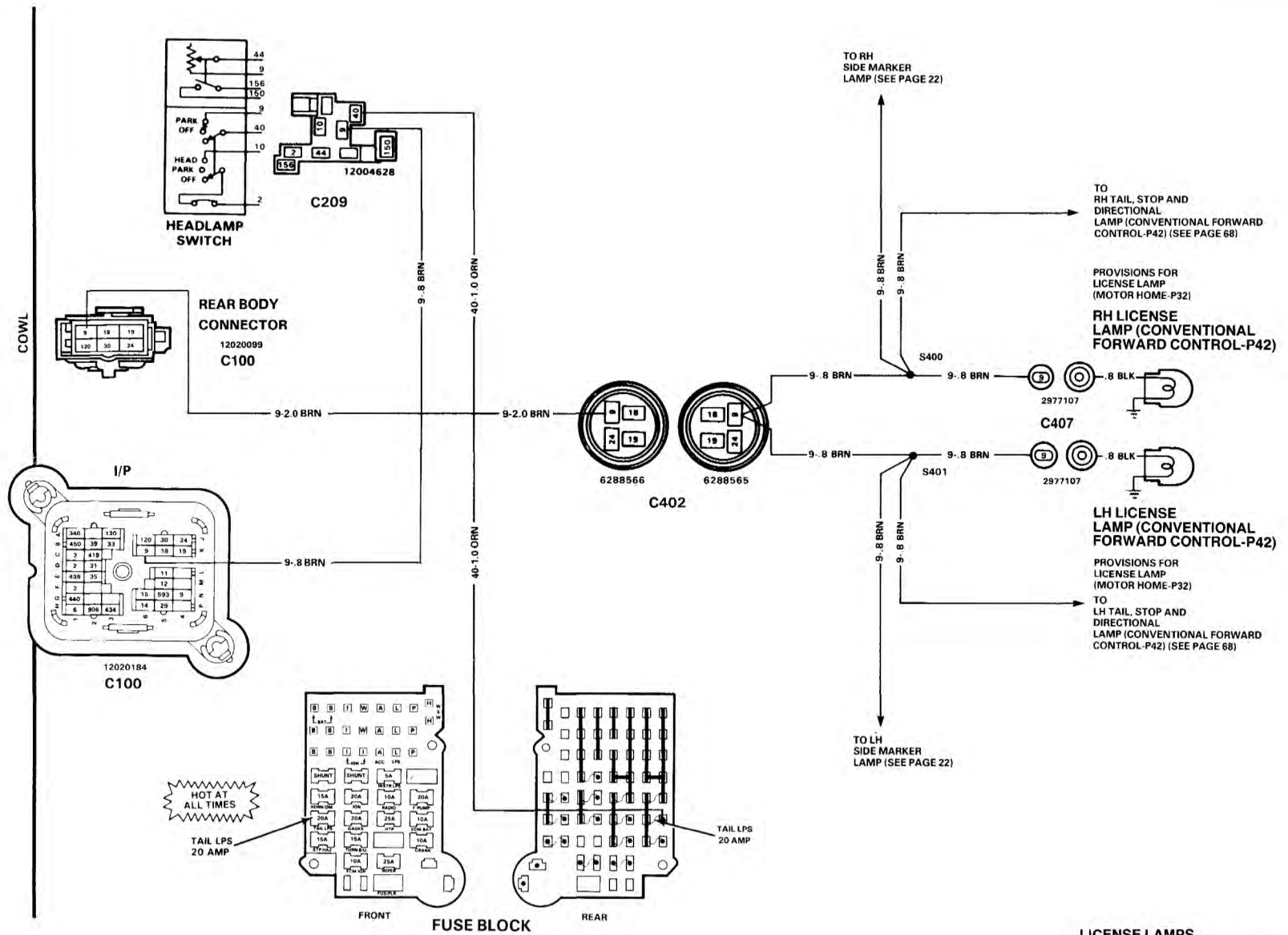
TO RH SIDE MARKER LAMP (SEE PAGE 22)

TO RH LICENSE LAMP (SEE PAGE 69)

TO LH LICENSE LAMP (SEE PAGE 69)

**LH TAIL, STOP AND DIRECTIONAL LAMP (CONVENTIONAL FORWARD CONTROL - P42)**

PROVISIONS FOR LH TAIL, STOP AND DIRECTIONAL LAMP (MOTOR HOME-P32)



## CIRCUIT OPERATION

### VACUUM SYSTEMS

A vacuum-operated component uses the force of normal air pressure working against the lower air pressure of a partial vacuum to provide power that operates the component. The vacuum created within the inlet manifold when the engine is running is stored in a vacuum tank in the engine compartment. A check valve in the line feeding vacuum to the tank keeps the stored vacuum from weakening when inlet manifold vacuum drops during high speed or high power operation.

Vacuum is routed through hoses (and in some cases, tubing) to a mechanical or electric valve that provides a means of controlling the vacuum-operated component. When the valve is open, it allows vacuum to go to an actuator that actually operates the component. When the component is to be returned to its original position, the valve cuts off the vacuum to the actuator hose and vents the hose to normal air pressure.

A typical actuator is a metal shell with a movable shaft that retracts and extends to mechanically operate the component. A flexible diaphragm separates the interior of the shell into two chambers — a sealed chamber to which vacuum can be admitted, and an open chamber exposed to normal air pressure. The movable shaft is attached to the center of the diaphragm and extends from the open chamber.

When vacuum is directed to the sealed chamber, normal air pressure presses on the other side of the diaphragm and causes it to retract the shaft. When the vacuum is cut off, the sealed chamber is vented to outside air to balance the air pressure on both sides of the diaphragm and eliminate the force that retracted the shaft. A coiled spring within the sealed chamber expands to push the diaphragm back to its original positions. This extends the shaft.

## FRONT MANUAL AIR CONDITIONING (RPO C60)

### VACUUM SYSTEM

The front manual air conditioning system (RPO C60) is available in 1990 P-Truck forward control chassis models with the 5.7L V8 gasoline engine, VIN K (RPO L05). This air conditioning system uses vacuum to operate the air valves ("doors") that control airflow through the air conditioning module and the heater core hot water bypass valve that controls the flow of coolant through the heater core of the air conditioning system.

Installation of the air conditioning control assembly, air conditioning module and many other components of the air conditioning system is the responsibility of the second unit body installer. Refer to the body builder/installer service literature for more information.

### TRANSMISSION VACUUM MODULATOR VACUUM SYSTEM

Shift points and oil pressure of the MX1 three-speed automatic transmission are controlled by a vacuum modulator that responds to engine vacuum as an indicator of engine operation and performance demands. The vacuum modulator controls modulator oil pressure within the transmission to hold the 1-2 and 2-3 shift valves closed until governor oil pressure increases with an increase in engine speed or torque and forces an upshift. A part-throttle 3-2 downshift is forced when the accelerator pedal is depressed enough to overcome the force of governor oil while operating in third gear.

With gasoline engines, vacuum is taken from the inlet manifold and routed directly to the transmission vacuum modulator. In the diesel engine, vacuum is supplied by the engine-driven vacuum pump and modified by the vacuum regulator valve on the injection distributor pump before reaching the transmission vacuum modulator.

## EXHAUST GAS RECIRCULATION VACUUM SYSTEM

All 1990 P-Truck gasoline engines are equipped with an exhaust gas recirculation (EGR) system. The EGR system allows a small amount of exhaust gas to flow from the exhaust manifold into the inlet manifold when the throttle is opened beyond idle and inlet manifold vacuum is normal. This reduces combustion temperatures in the engine to control oxides of nitrogen emissions.

The EGR valve is operated by an integral vacuum actuator that controls a pintle within the valve. The pintle remains closed to prevent exhaust gas recirculation until vacuum is applied to the actuator. The vacuum causes the pintle to open, allowing a measured flow of exhaust gas to enter the inlet manifold.

The EGR system remains closed during periods of engine idle and deceleration to prevent rough idle from excessive dilution of the fuel-air mixture. It also remains closed at wide open throttle to prevent power loss. At other times, it rapidly cycles open and closed to modulate the flow of exhaust gas as required. Under certain circumstances, it may remain fully open to provide the maximum EGR.

A manifold absolute pressure (MAP) sensor measures the strength of the vacuum in the EGR vacuum circuit and sends a signal back to the electronic control module (ECM). If actual vacuum differs from the preferred vacuum as calculated by the ECM, the ECM will adjust the on-off intervals of the EGR valve to correct the flow of exhaust gas into the cylinders. This provides the required control of oxides of nitrogen emissions while retaining engine performance under all operating conditions. The ECM also uses the signal from the MAP sensor to control fuel delivery and ignition timing.

Vacuum for the EGR system is taken from the throttle body and routed through a hose to the electronic vacuum regulator valve (EVRV) solenoid (V8 engine) or to the EGR valve solenoid (V6 engine). The solenoid is controlled by the 435 circuit from the ECM. When the solenoid opens the electronic vacuum regulator valve or the EGR valve, vacuum reaches the EGR actuator through another vacuum hose and opens the EGR pintle valve to allow exhaust gas to flow into the inlet manifold. When the EVRV solenoid or the EGR valve solenoid is released, the valve vents the EGR actuator to outside air to close the EGR pintle valve.



## COMPONENT LOCATION (RPO LB4, L05, L19)

Page — Figure

Inlet Manifold Vacuum Fitting:			
RPO LB4 4.3L (262 Cu. In.) V6	In top of inlet manifold, RH front of engine	—	
RPO L05 5.7L (350 Cu. In.) and RPO L19 7.4L (454 Cu. In.) V8s	In top of inlet manifold, RH rear of engine	—	
Engine Vacuum Pump:			
RPO LL4 Diesel Engine	Lower RH front of engine	—	
Vacuum Regulator Valve:			
RPO LL4 Diesel Engine	On injection distributor pump, top center of engine	—	
Transmission Vacuum Modulator (MX1 three-speed automatic transmission)	RH side of transmission case, just above oil pan flange	—	
Exhaust Gas Recirculation (EGR) Valve:			
RPO LB4 4.3L (262 Cu. In.) V6	Rear of inlet manifold riser	.77	13
Electronic Vacuum Regulator Valve (EVRV) and Solenoid (V8 gasoline engines)	On bracket, inboard side of RH cylinder head	.76	9
EGR Valve Solenoid (V6 engine)	On bracket, inboard side of RH cylinder head	.76	11
Manifold Absolute Pressure (MAP) Sensor (gasoline engines)	On bracket, inboard side of RH cylinder head	.77	13
MAP Sensor Hose Vacuum Source:			
RPO LB4 4.3L (262 Cu. In.) V6	Port "F", RH rear of throttle body	.77	13
RPO L05 5.7L (350 Cu. In.) and RPO L19 7.4L (454 Cu. In.) V8s	Port "S," LH front of throttle body	.76	9

## TROUBLESHOOTING

Conditions most likely to cause vacuum system problems include hoses that leak or become disconnected. With the engine running, either condition is easily detected from the hiss of air at the opening. Other common vacuum problems are kinked or obstructed hoses, hoses connected incorrectly or binding components.

A vacuum pump can be used as a vacuum source to operate components and test the system. The built-in vacuum gage of the pump provides a means of checking for a vacuum leak as well. Once vacuum is applied to operate the component, the gage should hold steady until the vacuum is purposely released.

On vacuum systems that are controlled by electrical or electronic switches, check for a blown fuse, wiring that is cracked, frayed or burned, and high resistance in connectors of the control circuit(s) before checking for a suspected vacuum system problem.

## FRONT MANUAL AIR CONDITIONING VACUUM SYSTEM

For diagnosis of the air conditioning vacuum system, refer first to service literature and instructions released by the body builder/installer. If the information is not adequate, refer to the diagnosis instructions for the air conditioning vacuum system in Section C — P-Cab Chassis. Although some details may differ, the information given there should serve as a guide to troubleshooting the P-Truck forward control chassis model air conditioning vacuum system.

## TRANSMISSION VACUUM MODULATOR VACUUM SYSTEM

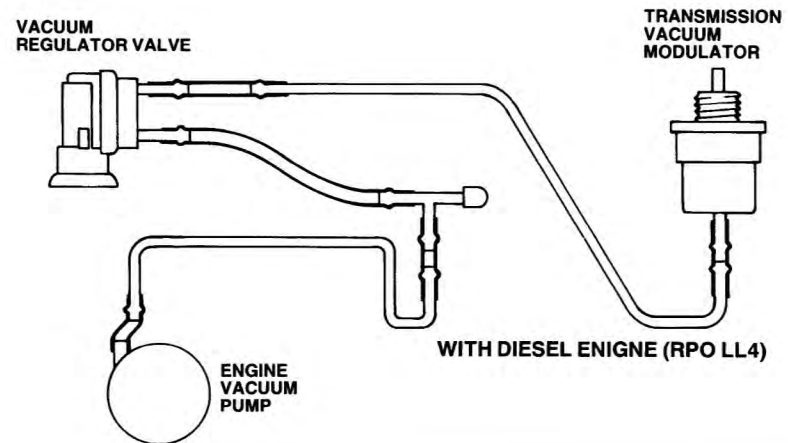
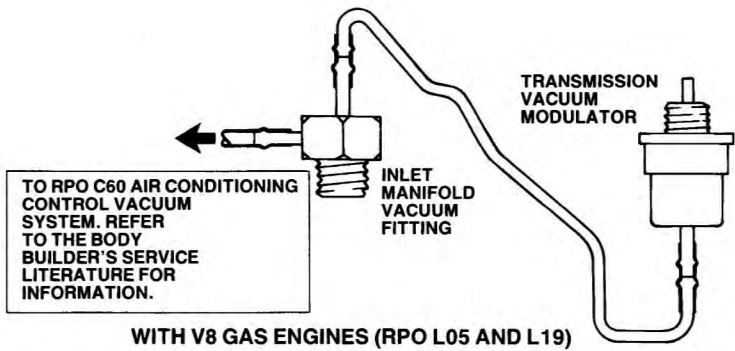
A leak in the vacuum system for the transmission vacuum modulator of the three-speed automatic transmission can cause high line pressure in the transmission hydraulic control system, a condition that can result in a variety of upshift problems ranging from delayed upshifts to no 1-2 or 2-3 shifts. An improper engine speed signal from the vacuum regulator valve in the vacuum system of the diesel engine can result in early, soft or slipping shifts or no part-throttle downshifts as well as the symptoms mentioned in the previous sentence.

The conditions described here may be caused by a vacuum system problem. However, mechanical or hydraulic conditions also might cause the same problems. Therefore, it is advisable to follow diagnosis procedures that check out all possibilities in a systematic order, not just a check for a malfunctioning vacuum component. For effective diagnosis procedures, refer to the 1990 R/V, G and P Truck Service Manual, Section 7A2.

## EGR VALVE VACUUM SYSTEM

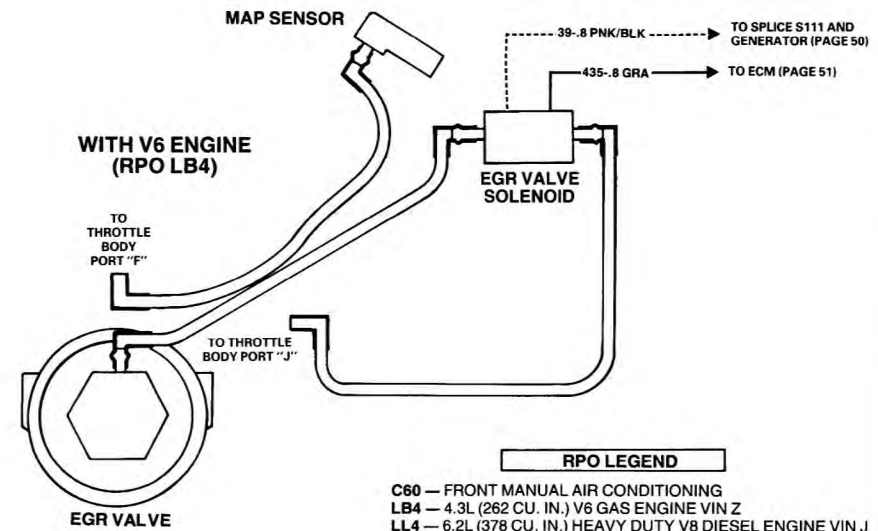
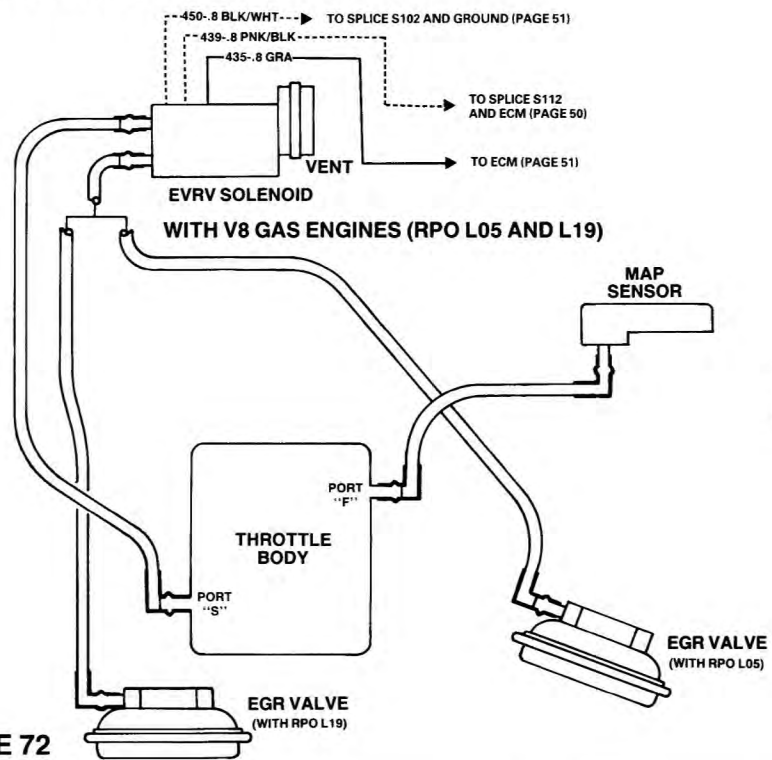
A leak in the EGR (exhaust gas recirculation) vacuum system can upset the ECM's programmed control of exhaust gas recirculation and adversely affect engine operation. Too much exhaust gas recirculation at idle or cruise can result in the engine stalling after closed throttle deceleration, surging during steady throttle cruising, or a rough idle. Too little exhaust gas flow allows combustion temperatures to become too high and bring about detonation ("spark knock") or an overheated engine. In addition, nitrous oxide emissions may be high enough to cause the vehicle to fail an emissions test.

Because the source of an EGR system symptom might be traced to a mechanical or electrical condition as well as a faulty vacuum system, an effective systematic diagnosis procedure should examine all three categories of components — not just the vacuum system alone. Therefore, no exclusive vacuum system diagnosis procedures are provided here. For more information on the EGR system, refer to the 1990 "Fuel and Emissions Service Manual."



**AIR CONDITIONING (RPO C60) AND AUTOMATIC TRANSMISSION (RPO MX1) VACUUM SYSTEMS**

**EXHAUST GAS RECIRCULATION (EGR) VACUUM SYSTEMS**



**RPO LEGEND**

- C60 — FRONT MANUAL AIR CONDITIONING
- LB4 — 4.3L (262 CU. IN.) V6 GAS ENGINE VIN Z
- LL4 — 6.2L (378 CU. IN.) HEAVY DUTY V8 DIESEL ENGINE VIN J
- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- MX1 — 3-SPEED AUTOMATIC TRANSMISSION

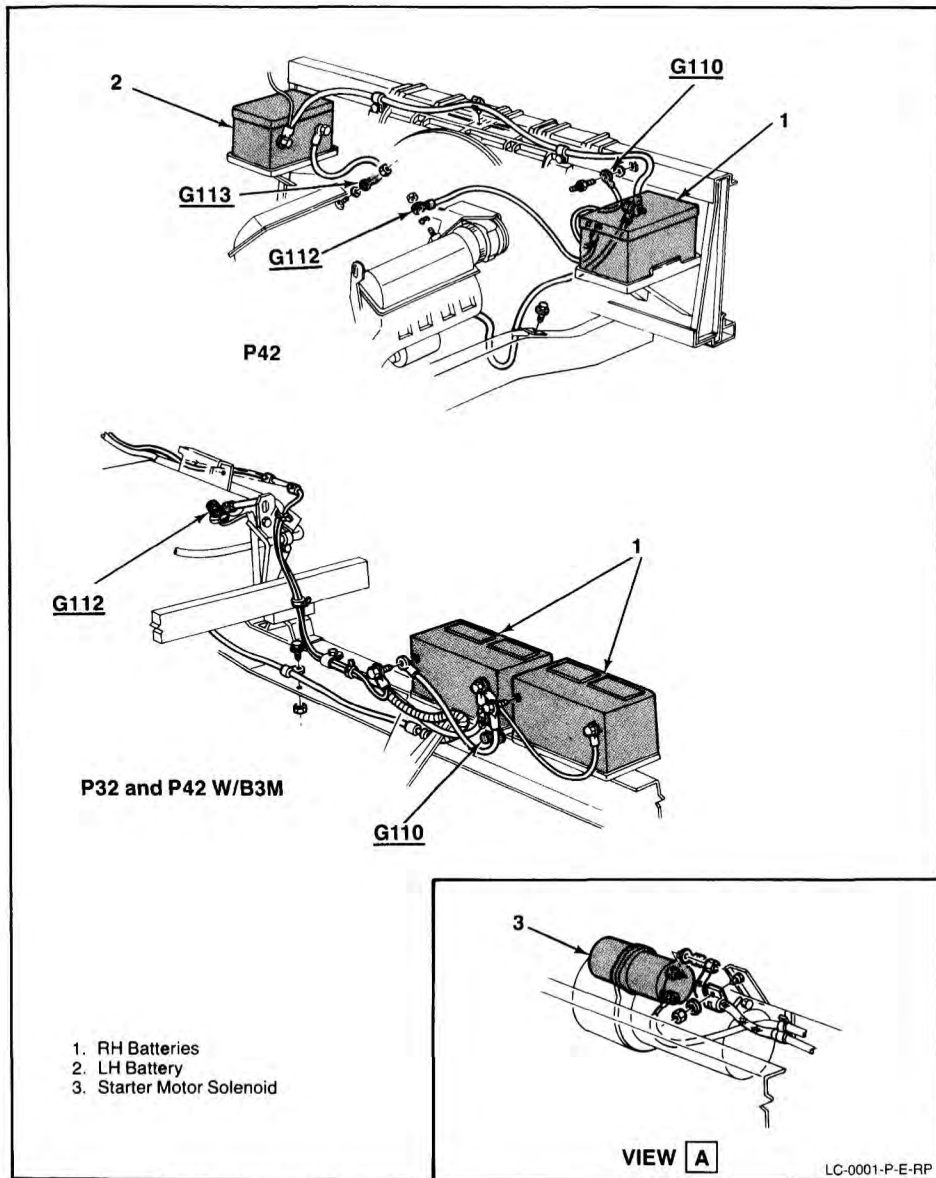


Figure 1 - Batteries and Cables (RPO LL4)

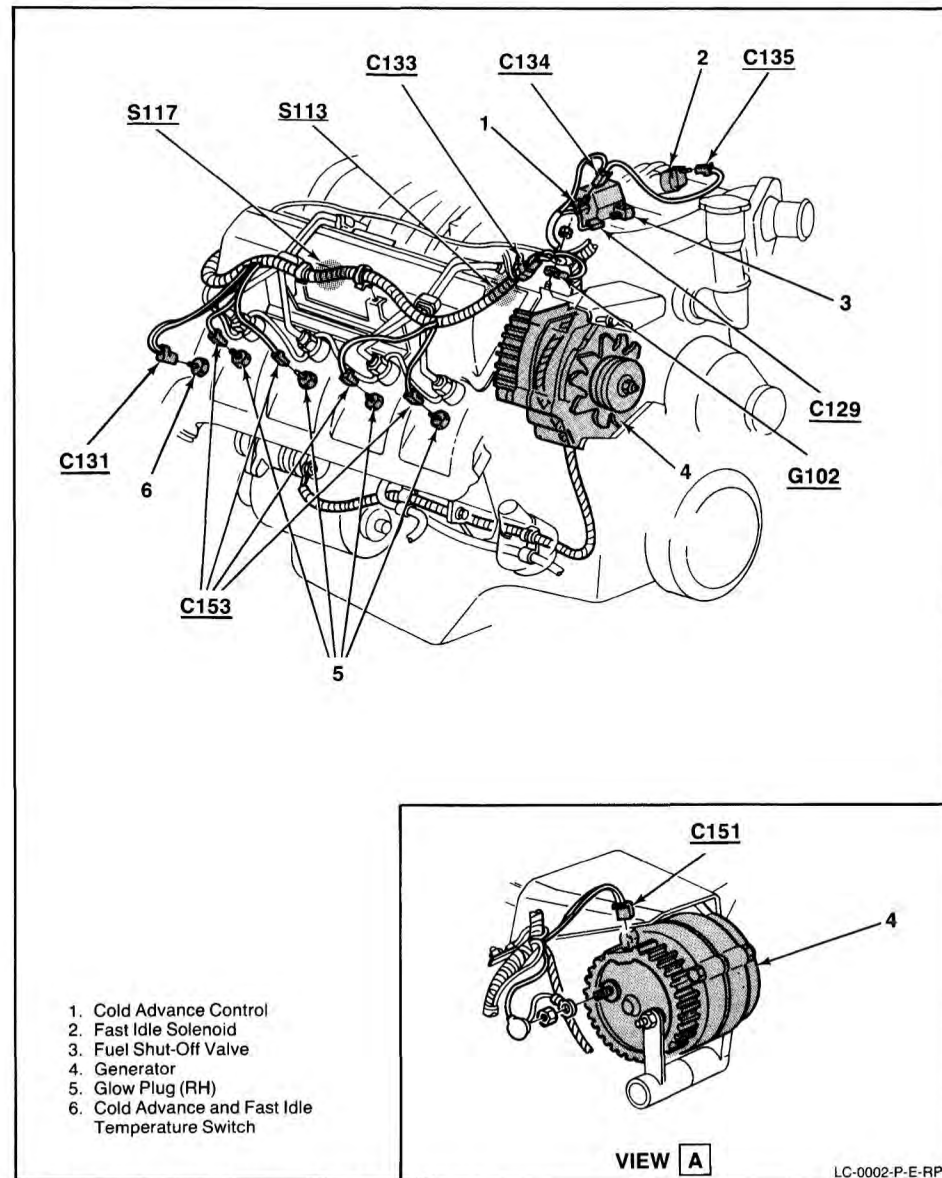


Figure 2 - Engine Wiring Harness - Right Side (RPO LL4)

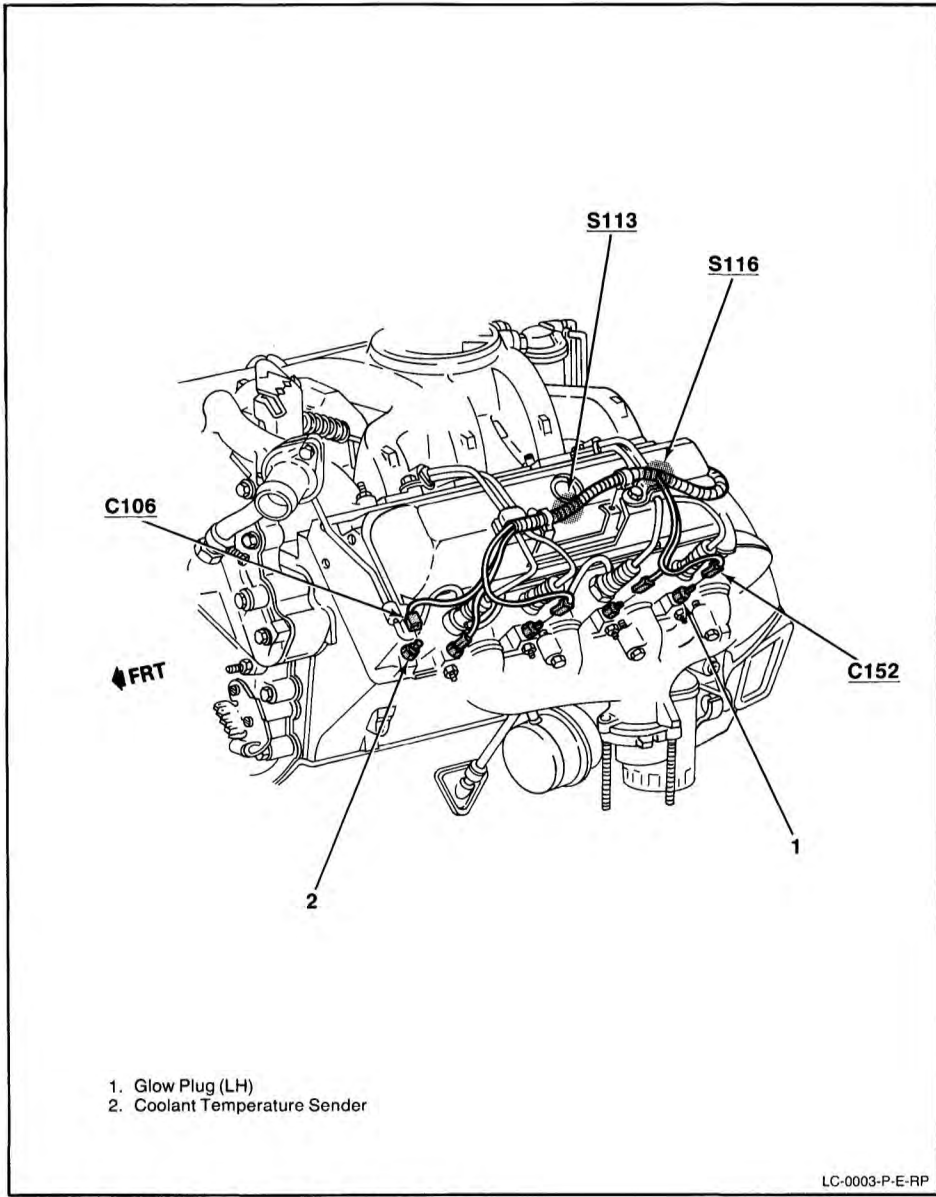


Figure 3 - Engine Wiring Harness — Left Side (RPO LL4)

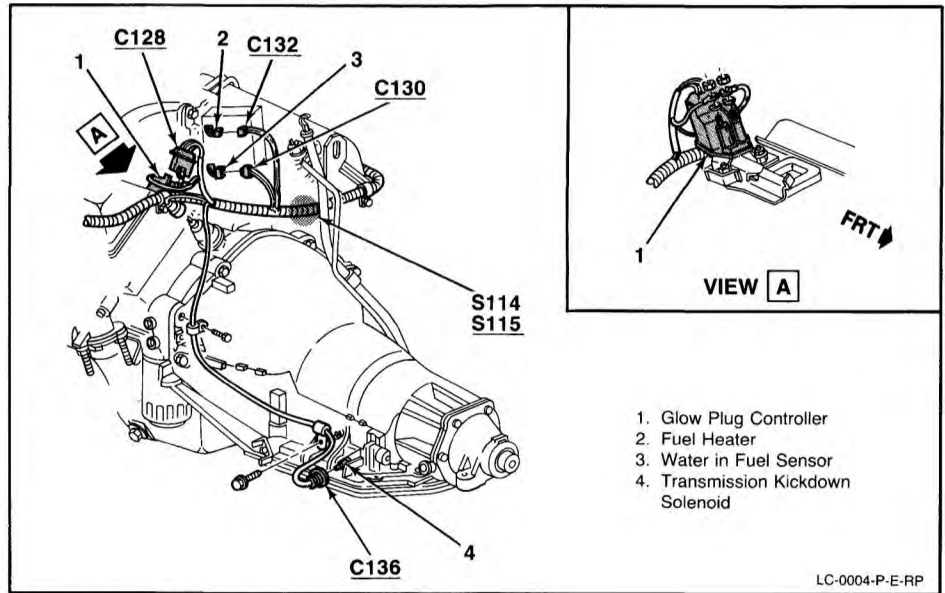


Figure 4 - Engine Wiring Harness — Rear (RPO LL4)

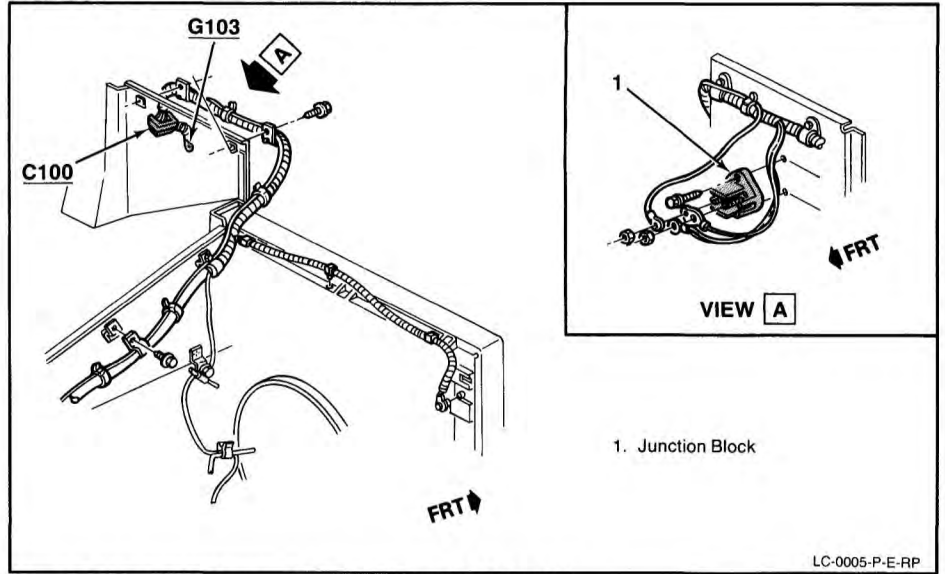


Figure 5 - Engine Wiring Harness to Cowl/Radiator (RPO LL4 w/P32)

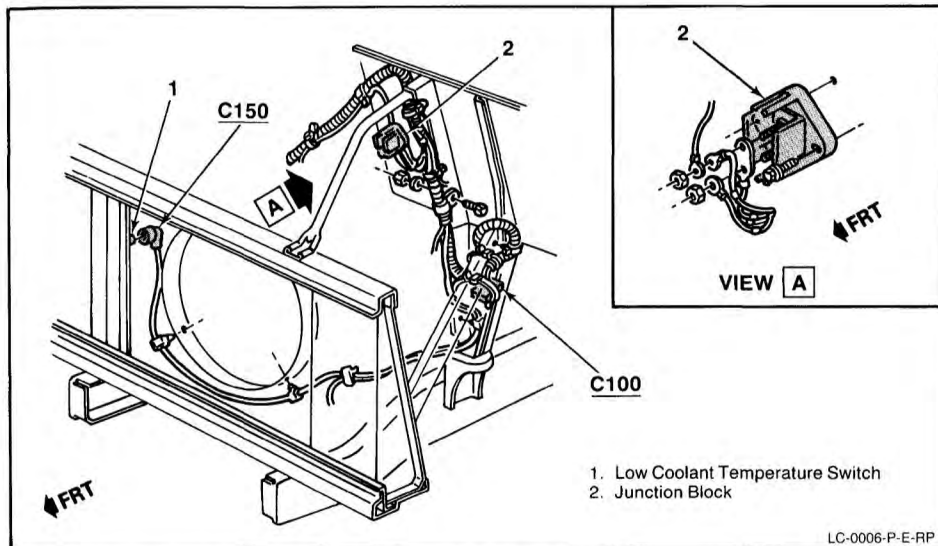


Figure 6 - Engine Wiring Harness to Cowl/Radiator (RPO LL4 w/P42)

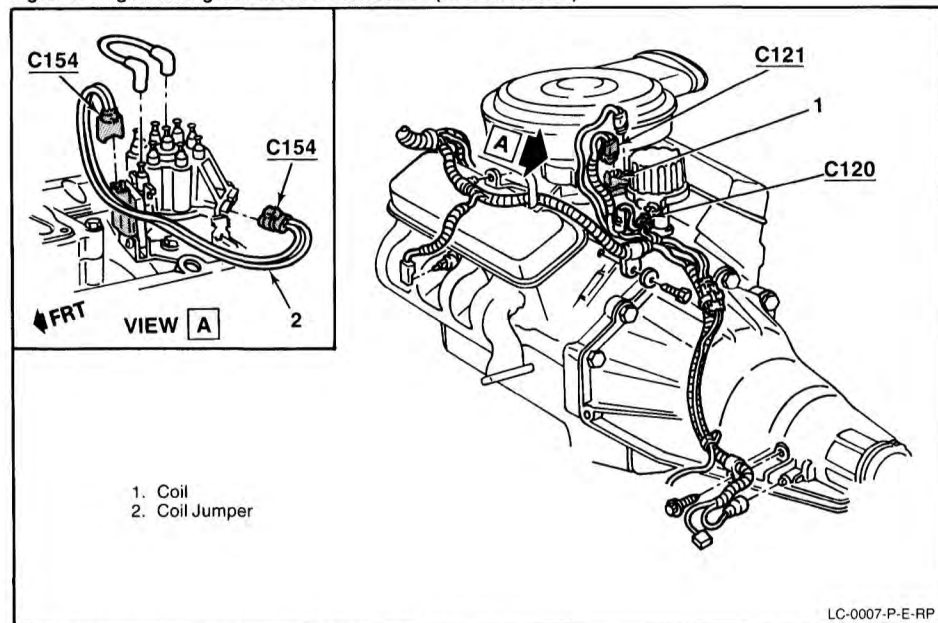


Figure 7 - Engine Wiring Harness, LH Side (RPO L19 w/P32)

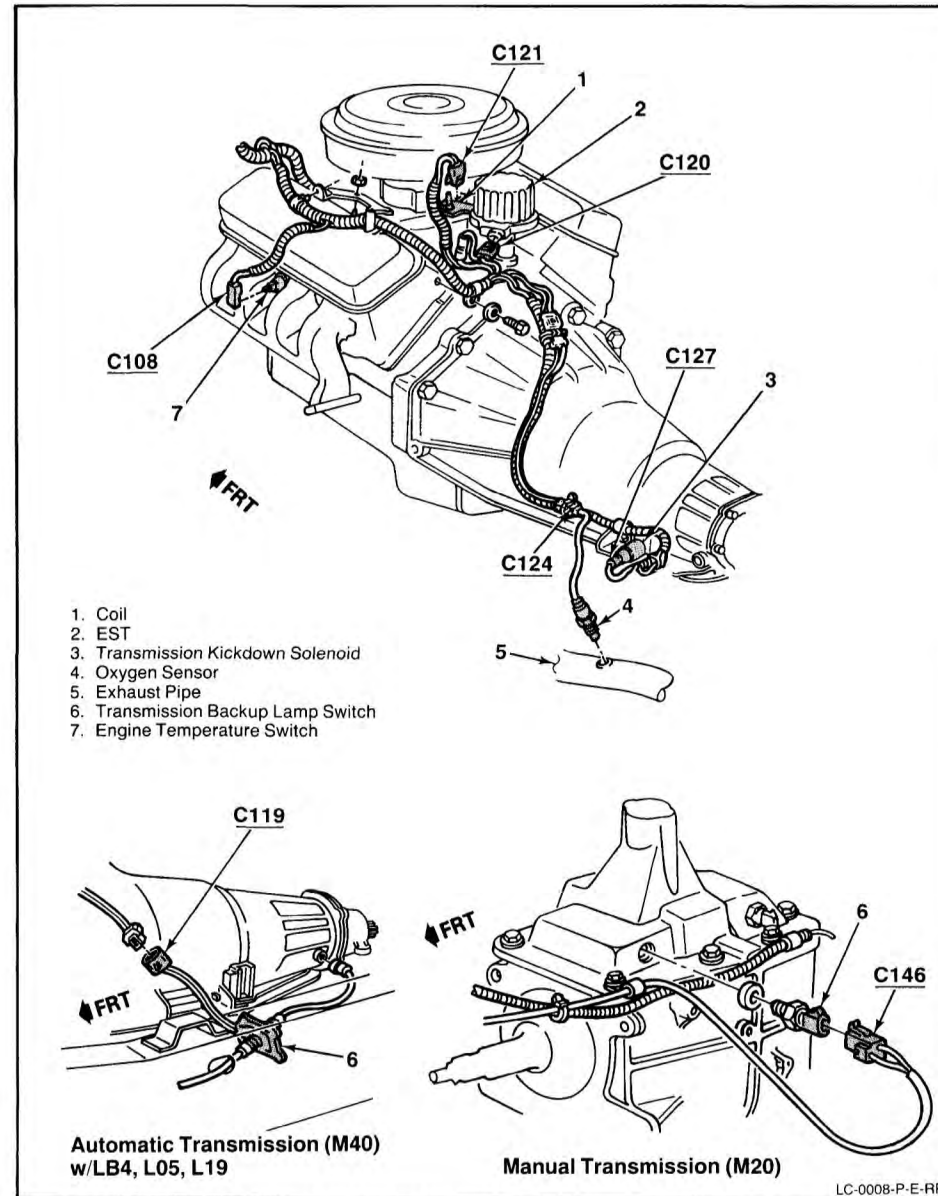


Figure 8 - Engine Wiring Harness, LH Side (RPO L19 w/P42)

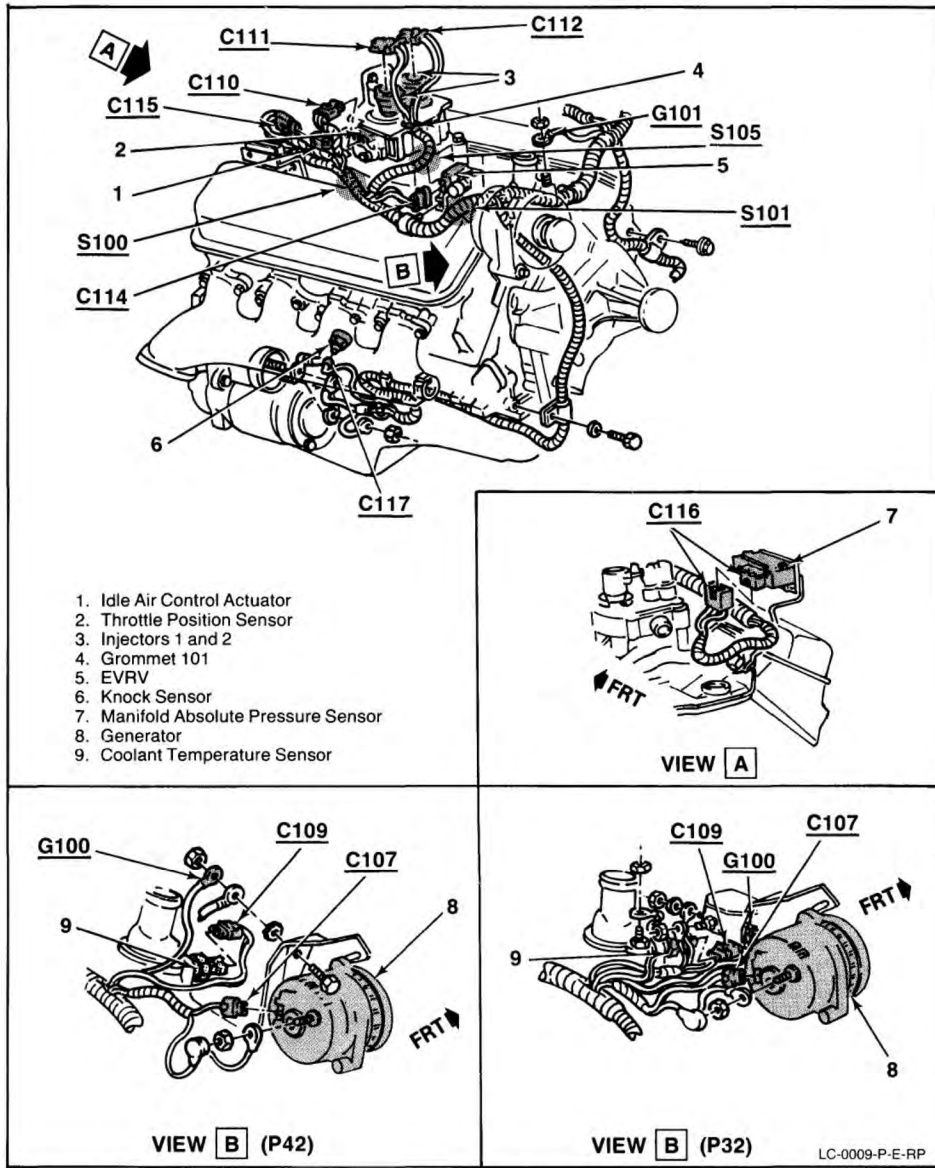


Figure 9 - Engine Wiring Harness, RH Side (RPO L19 w/P32, P42)

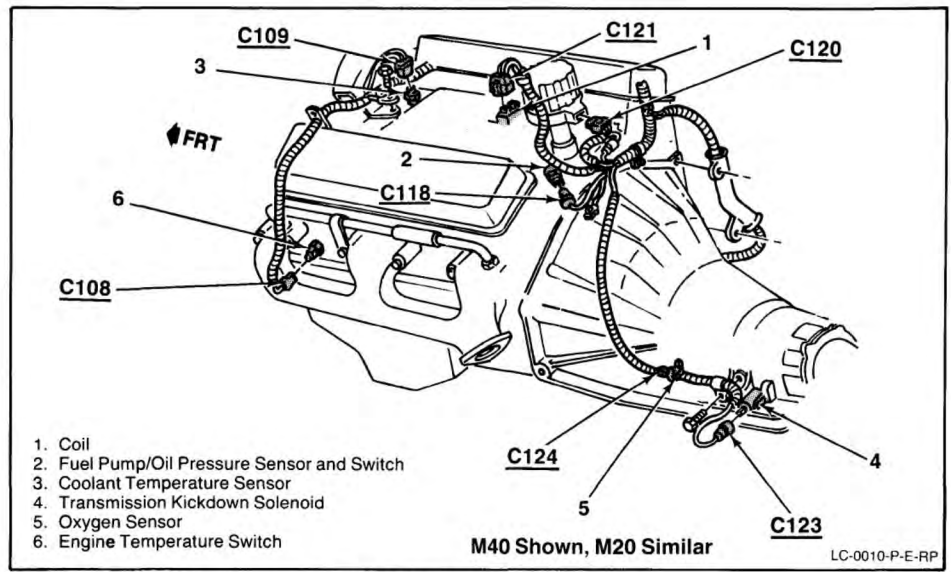


Figure 10 - Engine Wiring Harness, LH Side (RPO L05 w/P42)

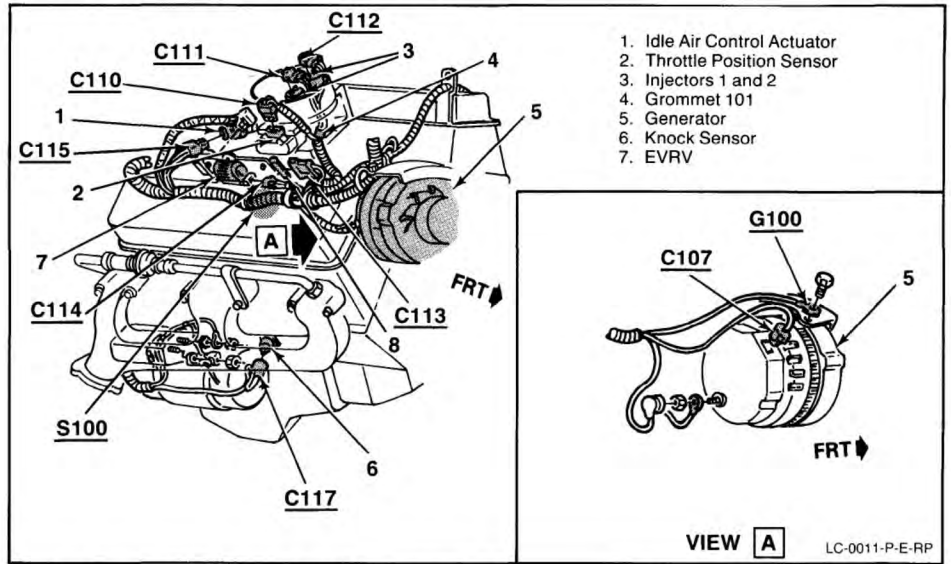


Figure 11 - Engine Wiring Harness, RH Side (RPO L05 w/P42)

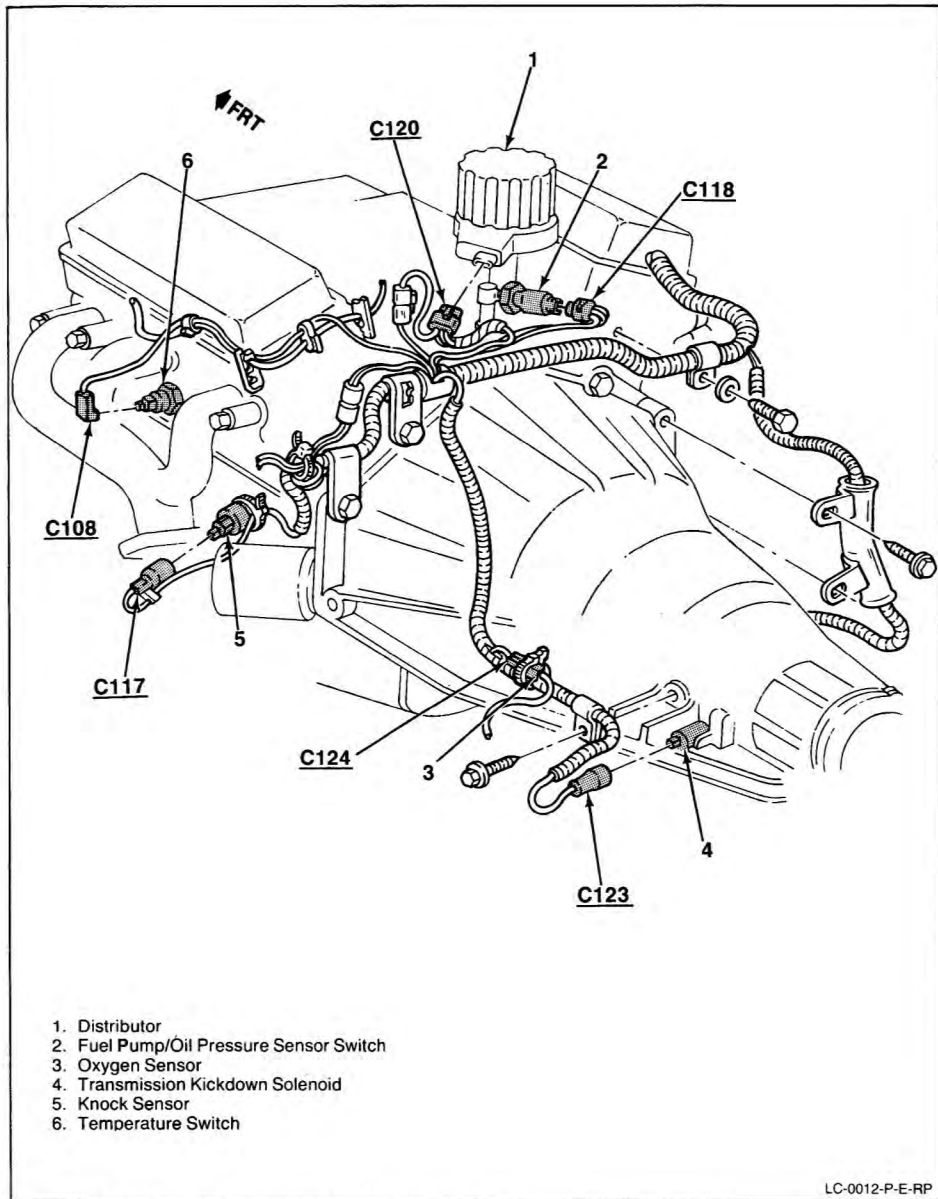


Figure 12 - Engine Wiring Harness, LH Side (RPO LB4 w/P42)

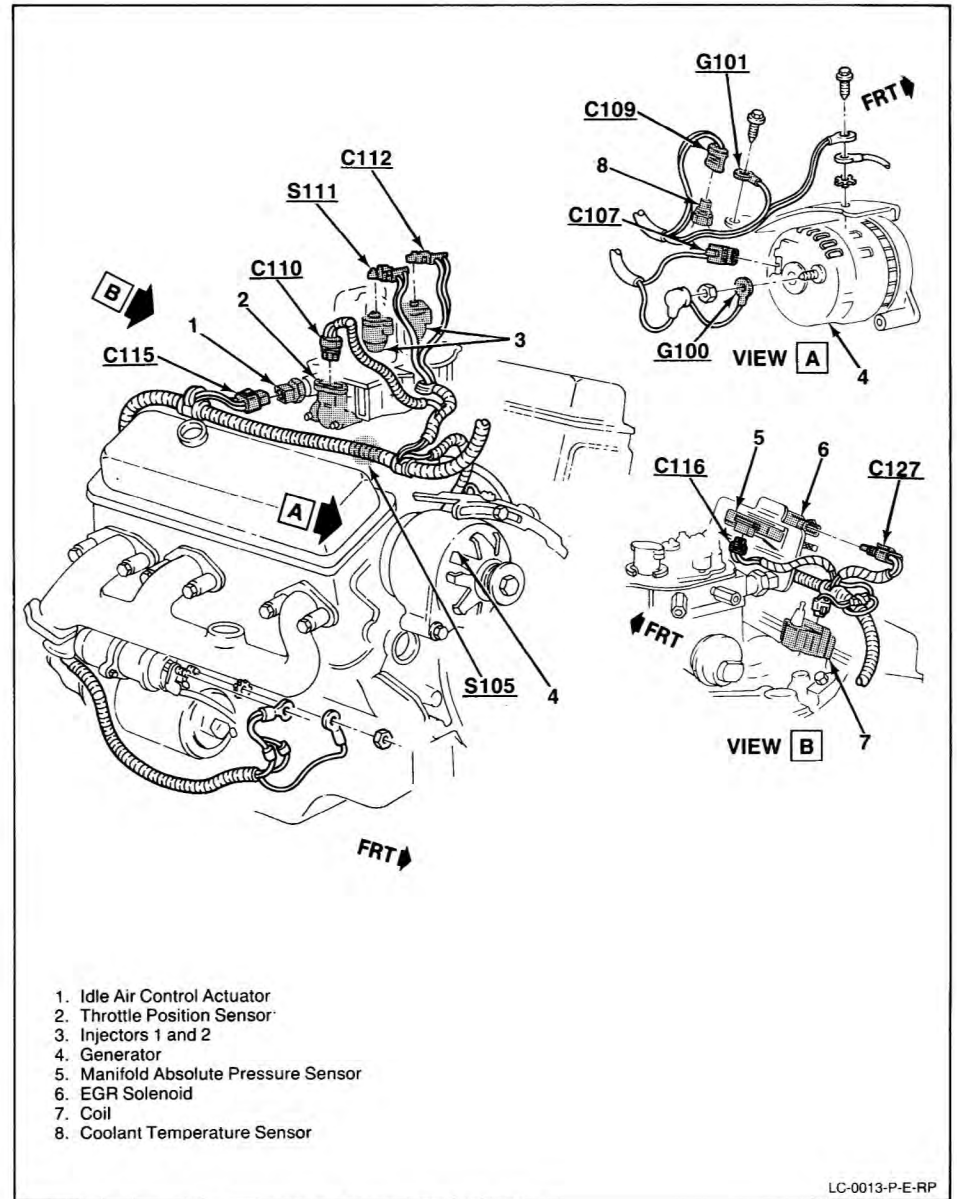


Figure 13 - Engine Wiring Harness, RH Side (RPO LB4 w/P42)

1. Distributor
2. Fuel Pump/Oil Pressure Sensor Switch
3. Oxygen Sensor
4. Transmission Kickdown Solenoid
5. Knock Sensor
6. Temperature Switch

1. Idle Air Control Actuator
2. Throttle Position Sensor
3. Injectors 1 and 2
4. Generator
5. Manifold Absolute Pressure Sensor
6. EGR Solenoid
7. Coil
8. Coolant Temperature Sensor

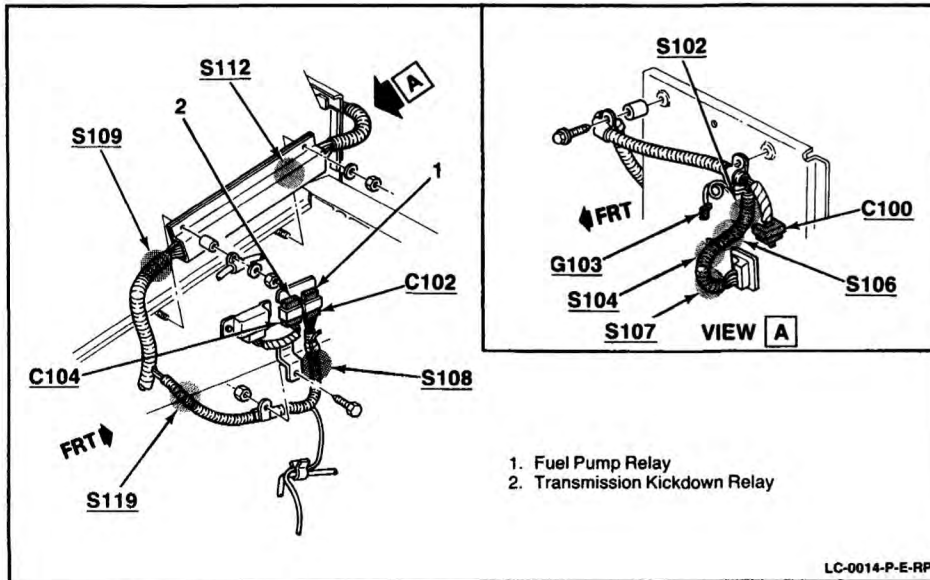


Figure 14 - Engine Wiring Harness to Cowl (RPO L19 w/P32)

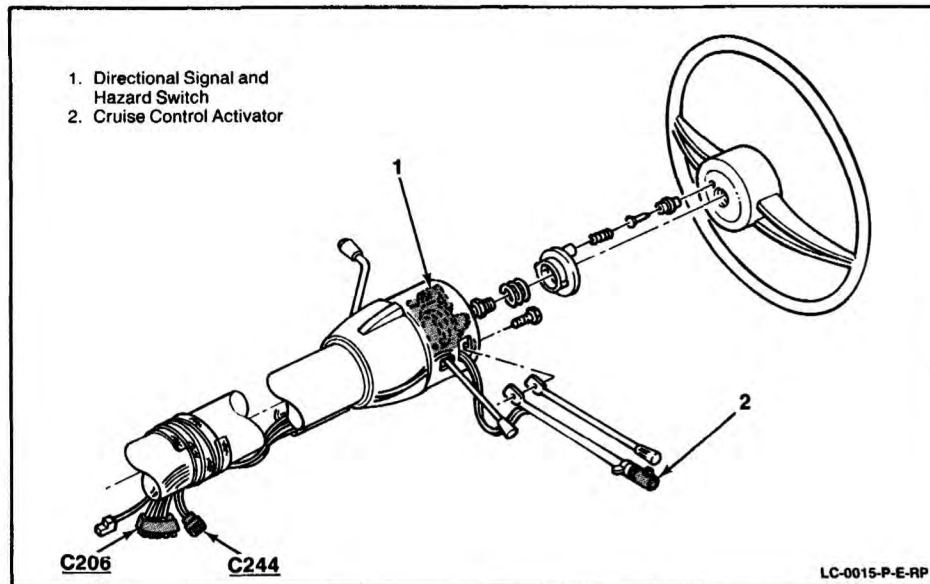


Figure 15 - Steering Column Switches

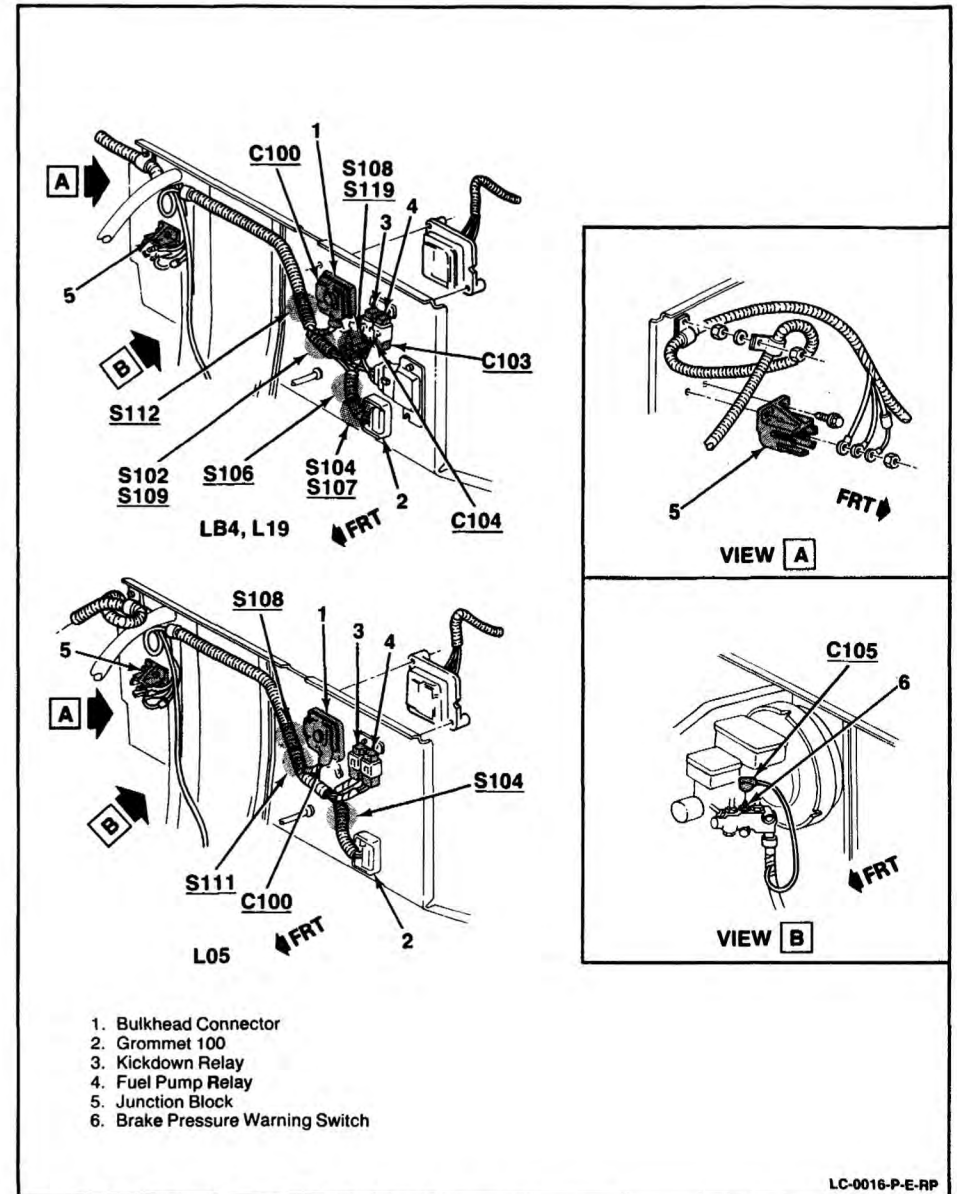


Figure 16 - Engine Wiring Harness to Cowl (RPO LB4, L05, L19 w/P42)



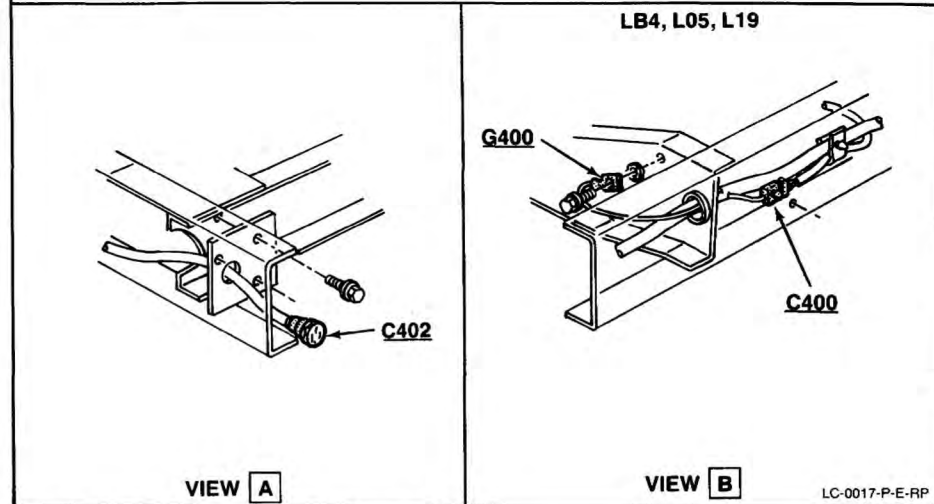
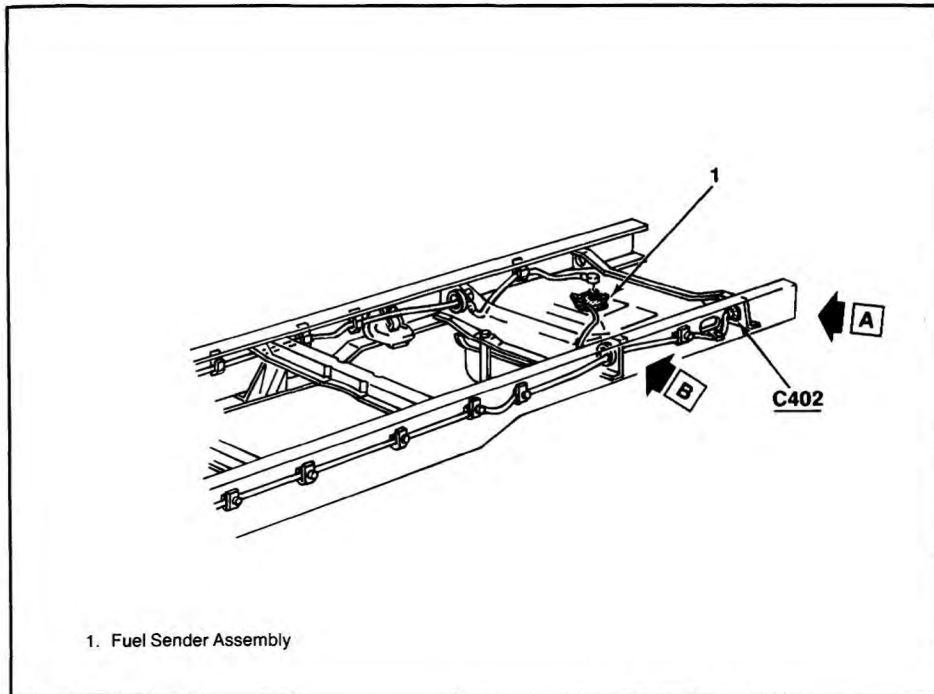


Figure 17 - Fuel Sender and Rear Lamp Wiring (Typical)

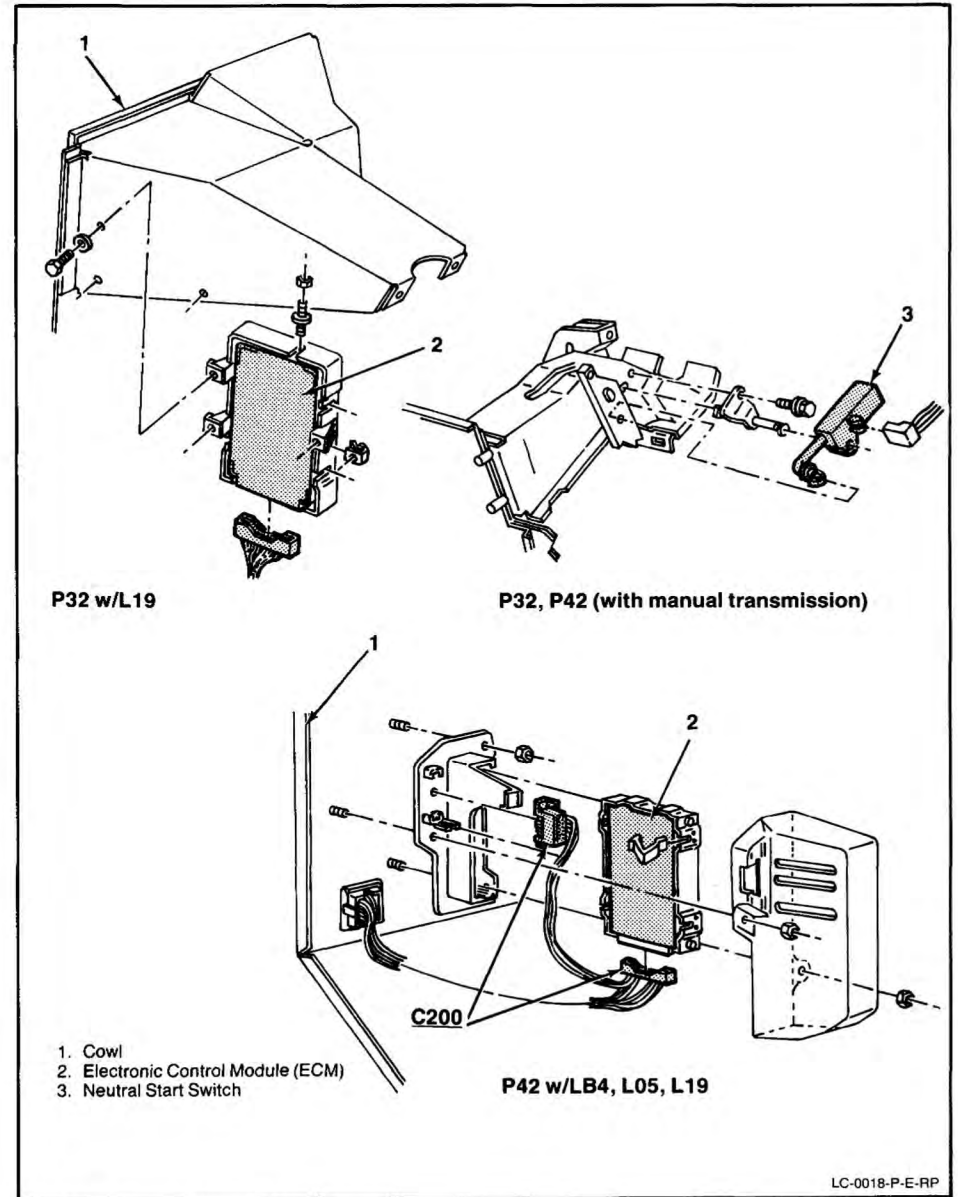


Figure 18 - Electronic Control Module

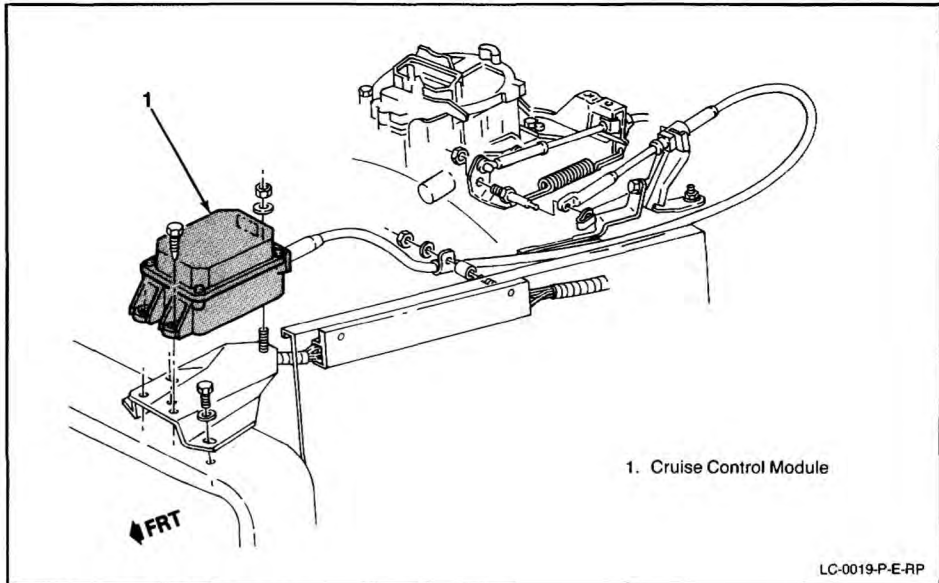


Figure 19 - Cruise Control Module

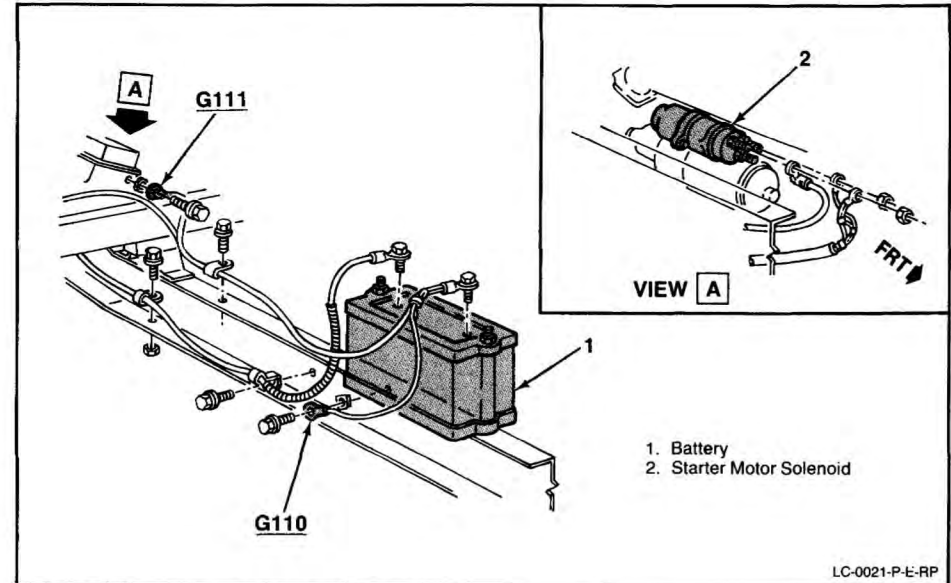


Figure 21 - Battery and Leads (RPO B3M, LB4, L05)

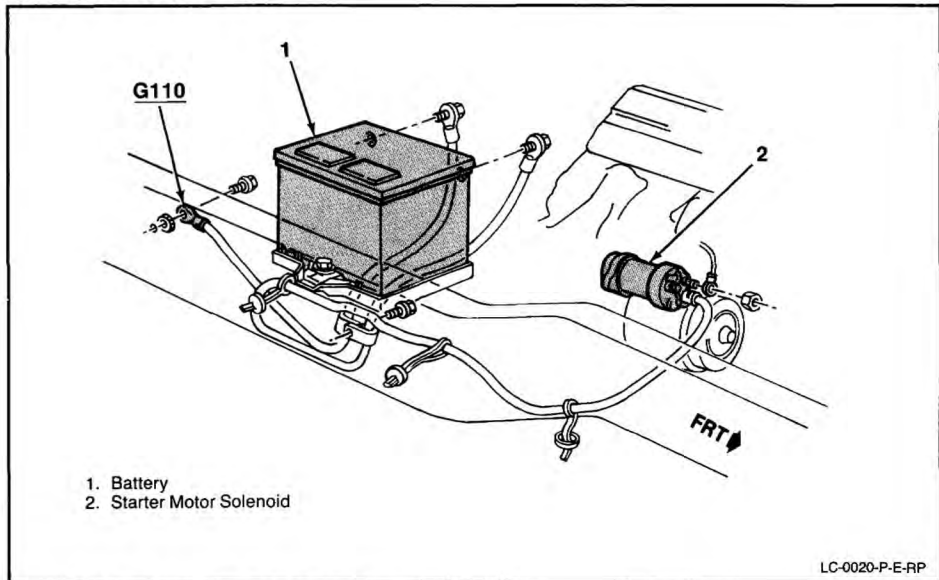


Figure 20 - Battery and Leads (RPO L19 w/P32)

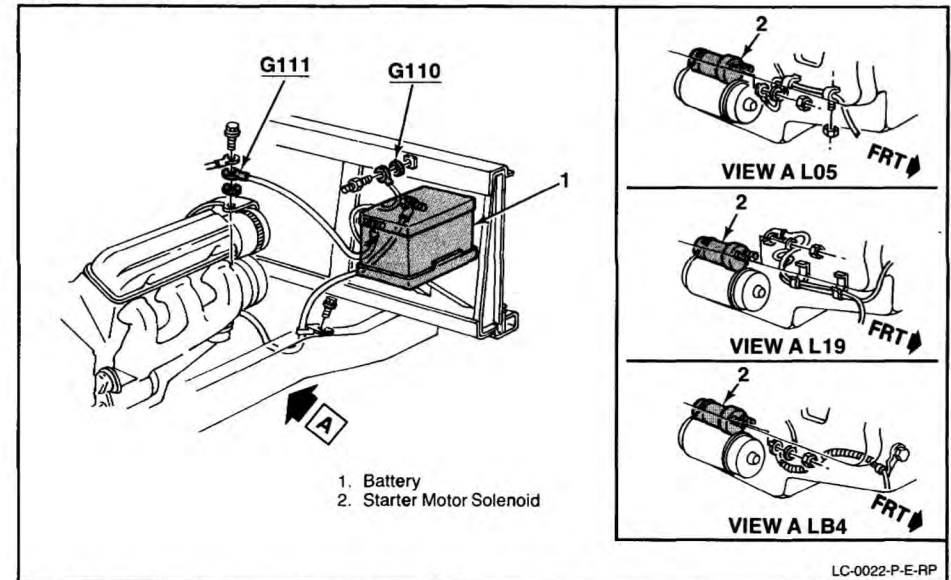


Figure 22 - Battery and Leads (RPO LB4, L05, L19 w/o B3M w/P32, P42)

### LAMP BULB DATA

Always replace with AC type Guide Lamps.

Lamp Usage	Quantity	Trade No.	Power Rating at 12V, Watts
Headlamp <sup>1</sup>	2	6014	50/60W
			<b>Candle Power</b>
Park and Signal Lamp <sup>2</sup>	2	2057	2-32
Tail and Stop Lamp <sup>2</sup>	2	2057	2-32
Backup Lamp <sup>3</sup>	2	1156	32
Marker Lamp	4	194	2
License Lamp	2	67	4
Instrument Cluster Illumination	3	168	3
Directional Indicator	2	168	3
Headlamp High Beam Indicator	1	168	3
Brake Warning Indicator	1	168	3
Transmission Control Illumination	1	1445	0.7
Windshield Wiper Switch Illumination	1	161	1
Backup Lamp <sup>4</sup>	2	1295	50
Choke Heater Indicator	1	1893	2
Low Coolant Lamp (Diesel)	1	194	2
Glow Plugs Lamp (Diesel)	1	194	2
Water in Fuel (Diesel)	1	194	2

<sup>1</sup>Double filament sealed beam: 50W low beam, 60W high beam.

<sup>2</sup>Double filament lamp: 2CP low, 32CP high.

<sup>3</sup>Model 42

<sup>4</sup>Model 32

## P TRUCK COMPONENT LOCATOR INDEX

### COMPONENT LOCATION

	Page	Figure
Alarm	—	—
ALDL	—	—
Backup Lamp, LH	—	—
Backup Lamp, RH	—	—
Backup Lamp Switch (Automatic Transmission)	78	15
Backup Lamp Switch (Manual Transmission)	75	8
Battery, LH (P42)	73	1
Battery, RH (P32, P42 w/RPO B3M)	73	1
Battery, RH (P42)	73	1
Battery (P32 w/RPO L19)	80	20
Battery (P32, P42 w/RPO LB4, L05, L19) w/o RPO B3M	80	22
Battery (P42 w/RPO B3M, LB4, L05)	74	3
Body Builder Connector	—	—
Brake Pressure Warning Switch	75	8
Bulkhead Connector (P42 w/RPO LB4, L05, L19)	78	16
Check Engine Lamp (Gasoline)	—	—
Coil (P32 w/RPO L19)	75	7
Coil (P42 w/RPO L19)	75	8
Coil (P42 w/RPO LB4, L05)	—	—
Coil Jumper	—	—
Cold Advance Control	73	2
Coolant Temperature Sender (RPO LL4)	74	3
Coolant Temperature Sensor (RPO LB4)	77	13
Coolant Temperature Sensor (RPO L05)	76	10
Coolant Temperature Sensor (RPO L19)	76	9
Daytime Running Lamp Module	—	—
Daytime Running Lamp Relay Switch	—	—
Daytime Running Lamps Indicator (CANADA ONLY)	74	3
Dimmer Switch	—	—
Directional Flasher	—	—
Directional Signal Indicator Lamp, LH	—	—
Directional Signal Indicator Lamp, RH	—	—
Directional Signal Lamp, LH	—	—
Directional Signal Lamp, RH	—	—
Directional Signal Switch	78	15
Distributor	75	7
EGR Solenoid (LB4)	77	13
Electric Fuel Pump	79	17
Electronic Control Module (ECM)	79	18
Electronic Spark Timing	75	8
Electronic Vacuum Regulator	—	—
Engine Temperature Switch (RPO L05)	76	10
Engine Temperature Switch (RPO L19)	75	8
Engine Temperature Switch (RPO LB4)	77	12
Engine Vacuum Pump: RPO LL4 Diesel Engine	—	—
ESC Hybrid Function	76	11
EVRV (RPO L05)	76	11
EVRV (RPO L19)	76	9
Exhaust Gas Recirculation (EGR) Valve: RPO LB4 4.3L (262 Cu. In.) V6	77	13
Fast Idle Solenoid	73	2
Flasher Unit	—	—
Fuel Cycler Module	—	—

### COMPONENT LOCATION

	Page	Figure
Fuel Pump Oil Pressure Sensor and Switch Fuel Pump	79	17
Fuel Pump Relay (P32 w/RPO L19)	78	14
Fuel Pump Relay (P42)	78	16
Fuel Pump/Oil Pressure Sensor and Switch (RPO L05)	76	10
Fuel Pump/Oil Pressure Sensor and Switch	76	10
Fuel Pump/Oil Pressure Sensor and Switch (RPO LB4)	77	12
Fuel Shut-Off Valve	73	2
Fuse Block (Diesel)	—	—
Fuse Block (Gas)	—	—
Fuse Block (Gasoline P32, P42)	—	—
Generator (P32, P42 w/RPO L19)	76	9
Generator (P42 w/RPO L05)	76	11
Generator (P42 w/RPO LB4)	77	13
Generator (RPO L05)	76	11
Generator (RPO L19)	76	9
Generator (RPO LB4)	77	13
Generator (RPO LL4)	73	2
Glow Plug Controller	74	4
Glow Plug Lamp (RPO LL4)	—	—
Grommet 100	78	16
Grommet 101	76	9
Grommet 104	—	—
Hazard Flasher	—	—
Headlamp Switch	—	—
High-Low Headlamp, LH	—	—
High-Low Headlamp, RH	—	—
Horn, LH	—	—
Horn, RH	—	—
Horn Relay	—	—
Hydro-Boost Pressure Switch	—	—
Idle Air Control Actuator (RPO L05)	76	11
Idle Air Control Actuator (RPO L19)	76	9
Idle Air Control Actuator (RPO LB4)	77	13
Ignition Switch	74	—
INJ-1 (RPO L05)	76	11
INJ-1 (RPO L19)	76	9
INJ-1 (RPO LB4)	77	13
INJ-2 (RPO L05)	76	11
INJ-2 (RPO L19)	76	9
INJ-2 (RPO LB4)	77	13
Inlet Manifold Vacuum Fitting: RPO LB4 4.3L (262 Cu. In.) V6	—	—
RPO L05 5.7L (350 Cu. In.) and RPO L19 7.4L (454 Cu. In.) V8s	—	—
Junction Block (P42 w/RPO LB4, L05, L19)	78	16
Kickdown Relay (P32)	78	14
Kickdown Relay (P42)	78	16
Kickdown Switch	—	—
Knock Sensor (RPO L05)	76	11
Knock Sensor (RPO L19)	76	9
Knock Sensor (RPO LB4)	77	12
Lamp, LH	—	—
Lamp, RH	—	—
Left Bank Glow Plug	74	3

## P TRUCK COMPONENT LOCATOR INDEX

### COMPONENT LOCATION

Page — Figure

License Lamp, LH	Body builder installed	—
License Lamp, RH	Body builder installed	—
Low Coolant Warning Lamp (RPO LL4)	Body builder installed	—
Low Coolant Warning Module (RPO LL4)	Body builder installed	—
Low Coolant Warning Switch (RPO LL4)	Top, RH side of radiator	—
Low Vacuum Switch (RPO LL4)	Body builder installed	—
Manifold Absolute Pressure Sensor (RPO L19)	On rear of engine	.76 — 9
Manifold Absolute Pressure Sensor (RPO LB4)	On rear of engine	.77 — 13
MAP Sensor Hose Vacuum Source: RPO LB4 4.3L (262 Cu. In.) V6. RPO LO5 5.7L (350 Cu. In.) and RPO L19 7.4L (454 Cu. In.) V8s.	Port "F", RH rear of throttle body	.77 — 13
Oil Pressure Gage	Port "S," LH front of throttle body	.76 — 9
Oxygen Sensor (RPO L05)	Body builder installed	—
Oxygen Sensor (RPO L19)	On LH side of transmission	.76 — 10
Oxygen Sensor (RPO LB4)	ON LH side of transmission	.76 — 10
Park and Directional Lamp, LH	On LH side of transmission	.77 — 12
Park and Directional Lamp, RH	Body builder installed	—
Park Brake Switch	Body builder installed	—
Park Neutral Relay	Body builder installed	—
Rear Side Marker Lamp, LH	Body builder installed	—
Rear Side Marker Lamp, RH	Body builder installed	—
Right Bank Glow Plug	In RH cylinder head	.73 — 2
Side Marker Lamp, LH	Body builder installed	—
Side Marker Lamp, RH	Body builder installed	—
Starter Motor Solenoid	Lower RH side of engine	.73 — 1
Starter Motor Solenoid (P32, P42 w/B3M, LB4, L05)	Bottom RH side of engine	.80 — 21
Starter Motor Solenoid (P32, P42 w/LB4, L05, L19 w/o RPO B3M)	Bottom RH side of engine	.80 — 22
Stoplamp Switch	Body builder installed	—
Tail, Stop and Directional Lamp, LH	Body builder installed	—
Tail, Stop and Directional Lamp, RH	Body builder installed	—
Temperature Switch	Right rear side of engine	.73 — 2
Temporary Fuel Tank (P32 w/RPO L19)	Temporary location	—
Throttle Position Sensor (RPO L05)	RH side of throttle body	.76 — 11
Throttle Position Sensor (RPO L19)	RH side of throttle body	.76 — 9
Throttle Position Sensor (RPO LB4)	RH side of throttle body	.77 — 13
Transmission Backup Lamp Switch	Top of steering column, under I/P	.77 — 12
Transmission Switch (RPO M40)	LH side of transmission	.74 — 4
Transmission Vacuum Modulator (MX1 three-speed automatic transmission)	RH side of transmission case, just above oil pan flange	—
Vacuum Regulator Valve: RPO LL4 Diesel Engine	On injection distributor pump, top center of engine	—
Vehicle Speed Sensor	LH side of transmission	.75 — 8
Washer Motor	Body builder installed	—
Water-In-Fuel Sensor (RPO LL4)	Top rear center of engine	.74 — 4
Water-In-Fuel Warning Lamp (RPO LL4)	Body builder installed	—
Windshield Wiper, Washer Switch	Body builder installed	—
Wiper Motor	Body builder installed	—
Wiper/Washer Switch Lamp	Body builder installed	—
C100	At bulkhead, LH front of cowl	.78 — 16
C100	LH front of cowl (temporary)	.75 — 6
C100 (P32)	LH front of cowl (temporary)	.74 — 5
C100 (P42)	LH front of cowl (temporary)	.75 — 6
C100 (P32 w/RPO LL4)	LH front of cowl	.74 — 5

### COMPONENT LOCATION

Page — Figure

C100 (P32 w/RPO L19)	Lower, LH side of cowl	.78 — 14
C100 (P42 w/RPO LB4, L05 and L19)	LH front of cowl	.78 — 16
C100 (P42 w/RPO LL4)	LH front of cowl	.75 — 6
C103	At fuel pump relay	—
C103 (P32 w/RPO L19)	At fuel pump relay	.78 — 14
C103 (P42)	At fuel pump relay	.78 — 16
C104 (P32)	LH front of cowl	.78 — 14
C104 (P42)	LH front of cowl	.78 — 16
C105	At brake pressure warning switch	.78 — 16
C106 (RPO LL4)	At coolant temperature sender	.74 — 3
C107 (P32, P42, w/RPO L19)	Rear of generator	.76 — 9
C107 (P42 w/RPO LB4)	Rear of generator	.77 — 13
C107 (P42 w/RPO L05)	Rear of generator	.76 — 11
C108 (RPO LB4)	At engine temperature switch	.77 — 12
C108 (RPO L05)	At engine temperature switch	.76 — 10
C108 (RPO L19)	At engine temperature switch	.75 — 8
C109 (RPO LB4)	At coolant temperature sensor	.77 — 13
C109 (RPO L05)	At coolant temperature sensor	.76 — 10
C109 (RPO L19)	At coolant temperature sensor	.76 — 9
C110 (P32, P42 w/RPO L19)	At throttle position sensor	.76 — 9
C110 (RPO LB4)	At throttle position sensor	.77 — 13
C110 (RPO L05)	At throttle position sensor	.76 — 11
C110 (RPO L19)	At throttle position sensor	.76 — 9
C111 (P32, P42 w/RPO L19)	At injector	.76 — 9
C111 (RPO LB4)	At injector	.77 — 13
C111 (RPO L05)	At throttle body injector	.76 — 11
C111 (RPO L19)	At throttle body injector	.76 — 9
C111 (RPO LB4)	At throttle body injector	.77 — 13
C112 (P32, P42 w/RPO L19)	At injector	.76 — 9
C112 (RPO LB4)	At injector	.77 — 13
C112 (RPO L05)	At throttle body injector	.76 — 11
C112 (RPO L19)	At throttle body injector	.76 — 9
C113	At ESC hybrid function	.76 — 11
C113	At ESC hybrid function	.76 — 11
C114 (RPO L19)	At EVRV solenoid	.76 — 9
C115 (RPO LB4)	At idle air control actuator	.77 — 13
C115 (RPO L05)	At idle air control actuator	.76 — 11
C115 (RPO L19)	On idle air control actuator	.76 — 9
C116 (RPO LB4)	At manifold absolute pressure sensor	.77 — 13
C116 (RPO L19)	At manifold absolute pressure sensor	.76 — 9
C117 (RPO LB4)	Lower LH side of engine	.77 — 12
C117 (RPO L05)	Lower RH side of engine	.76 — 11
C117 (RPO L19)	Lower RH side of engine	.76 — 9
C118 (P42 w/RPO LB4)	At fuel pump/oil pressure sensor and switch	.77 — 12
C118 (RPO LB4)	At fuel pump oil pressure sensor and switch	.77 — 12
C118 (RPO L05)	At fuel pump oil pressure sensor and switch	.76 — 10
C119	At vehicle speed sensor	.75 — 8
C120 (P32 w/RPO L19)	On distributor	.75 — 7
C120 (P42 w/RPO LB4)	On distributor	.77 — 12
C120 (P42 w/RPO L05)	On distributor	.76 — 10
C120 (P42 w/RPO L19)	On distributor	.75 — 8
C121 (P32 w/RPO L19)	On coil	.75 — 7
C121 (P42 w/RPO L05)	On coil	.76 — 10
C121 (P42 w/RPO L19)	On coil	.75 — 8
C122	Between coil and tachometer	—
C123 (RPO LB4)	At transmission kickdown solenoid	.77 — 12
C123 (RPO L05)	At transmission kickdown solenoid	.76 — 10
C123 (RPO L19)	At transmission kickdown solenoid	.75 — 8
C124 (RPO LB4)	At oxygen sensor	.77 — 12

## P TRUCK COMPONENT LOCATOR INDEX

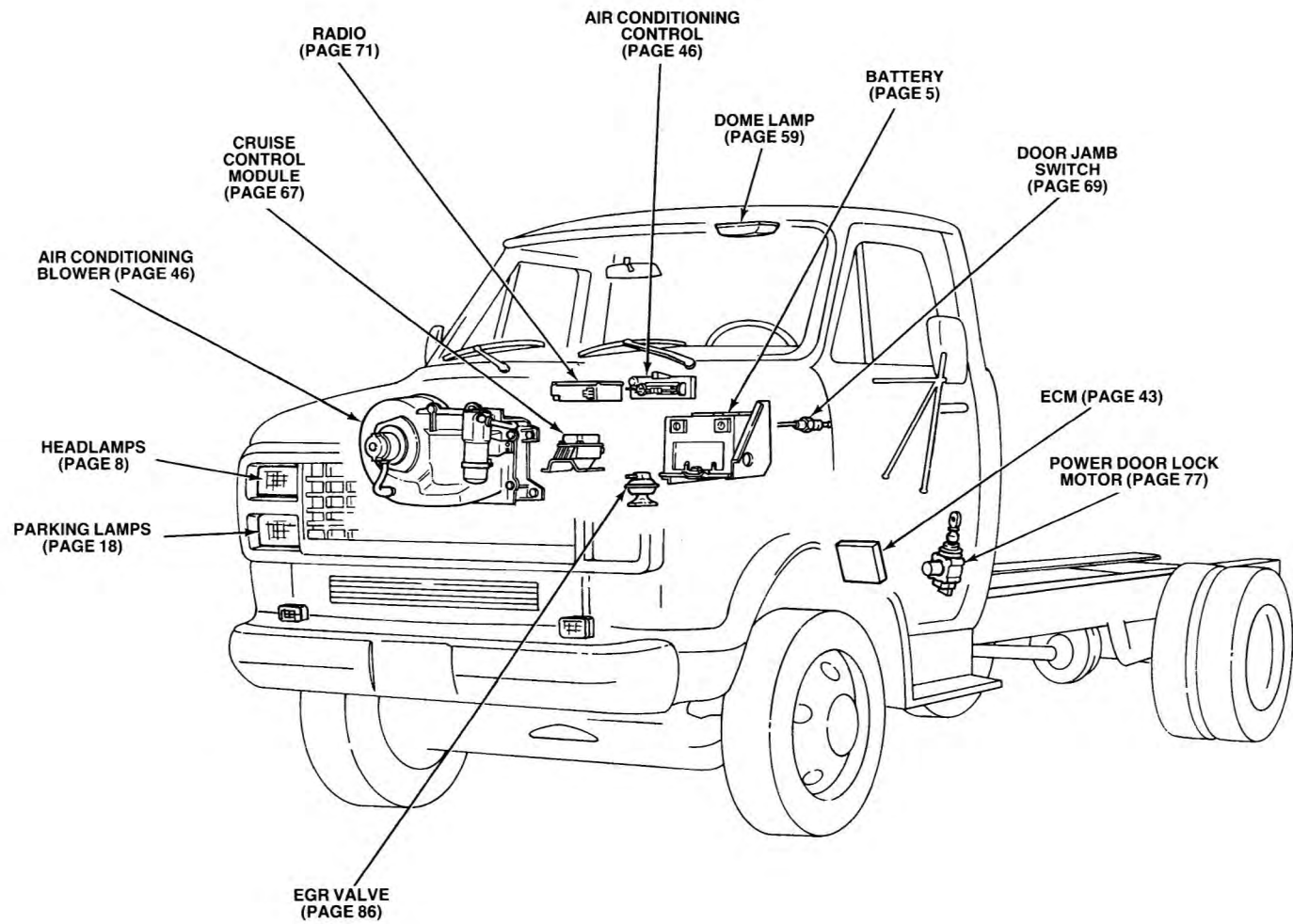
COMPONENT LOCATION	Page	Figure	COMPONENT LOCATION	Page	Figure
C124 (RPO L05)			C238 (RPO LL4)		
C124 (RPO L19)			C239 (RPO LL4)		
C127 (RPO LB4)			C240 (Gas)		
C128			C241 (CANADA ONLY)		
C129			C242		
C130 (RPO LL4)			C243		
C131			C248		
C132			C400		
C133			C401		
C134			C402		
C135			C403		
C136			C404		
C137			C405		
C138			C406		
C139			C407		
C140			C408		
C141			C409		
C142			G100		
C143			G101		
C144			G102		
C145			G103		
C146			G104 (P42)		
C146			G105 (P42)		
C147			G106 (P42)		
C148			G107		
C149			G108		
C150 (RPO LL4)			G109		
C151 (RPO LL4)			G110 (P32, P42 w/RPO B3M)		
C152			G110 (P42)		
C153			G110 (P42 w/RPO B3M, LB4, L05)		
C154			G110 (P32 w/RPO L19)		
C200			G110		
C201			G111 (P32, P42 w/RPO LB4, L05, L19 w/o RPO B3M)		
C202			G111 (P42 w/RPO B3M, LB4, L05)		
C203			G112 (P32, P42 w/RPO B3M)		
C204			G112 (P42)		
C205			G113 (P42)		
C206			G200		
C207			G201		
C208			G400		
C209			G401		
C210			G402		
C211			S100 (P32, P42 w/RPO L19)		
C212			S100 (P42 w/RPO L05)		
C213			S100 (RPO L05)		
C214 (Automatic Transmission)			S101		
C214 (Manual Transmission)			S101 (P32, P42 w/RPO L19)		
C216			S102 (P32 w/RPO L19)		
C217			S102 (P42 w/RPO LB4, L05, L19)		
C219			S104 (P32 w/RPO L19)		
C220			S104 (P42 w/RPO LB4, L05, L19)		
C221			S105 (P32, P42 w/RPO L19)		
C222			S105 (P42 w/RPO LB4)		
C224			S106 (P32 w/RPO L19)		
C228			S106 (P42 w/RPO LB4, L19)		
C235			S107 (P32 w/RPO L19)		
C236 (RPO LL4)			S107 (P42 w/RPO LB4, L19)		
C237 (RPO LL4)			S108 (P32 w/RPO L19)		
			At water-in-fuel warning lamp		
			At glow plug lamp		
			At check engine lamp		
			At daytime running lamps indicator		
			At daytime running lamp switch		
			At daytime running lamp module		
			At transmission backup lamp switch	.77	12
			Rear, RH frame rail	.79	17
			Body builder installed		
			On rear, LH frame rail	.79	17
			At LH tail, stop and directional lamp		
			At LH tail, stop and directional lamp		
			At LH backup lamp		
			At RH backup lamp		
			Body builder installed		
			At RH rear side marker lamp		
			At LH rear side marker lamp		
			At alternator bracket	.76	9
			RH side of engine	.76	9
			RH front of engine, at cylinder head	.73	2
			Near C100 (Body builder installed)	.74	5
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			Body builder installed harness		
			RH frame rail, below batteries	.73	1
			RH front of engine compartment	.73	1
			On RH frame assembly	.80	21
			On RH frame assembly	.73	2
			Top of radiator support	.74	4
			On top RH front of engine	.80	22
			On top RH front of engine	.80	21
			Top right rear of engine	.73	1
			Top right front of engine	.73	1
			Top left front of engine	.73	1
			Body builder installed harness		
			Body builder installed harness		
			On fuel tank cross member	.79	17
			Body builder installed harness		
			Body builder installed harness		
			Engine harness, RH side of engine	.76	9
			Engine harness, RH side of engine	.76	11
			Engine harness, RH side of engine	.76	11
			Engine harness, front of engine	.76	9
			Engine harness, front of engine	.76	9
			LH front of cowl	.78	14
			LH side of cowl	.78	16
			LH front of cowl	.78	14
			LH side of cowl	.78	16
			Top of engine	.76	9
			RH side of engine	.77	13
			LH front of cowl	.78	14
			LH side of cowl	.78	16
			LH front of cowl	.78	14
			LH side of cowl	.78	16

## P TRUCK COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page	Figure
S108 (P42 w/RPO L05, L19) . . . . .	.78	16
S109 (P32 w/RPO L19) . . . . .	.78	14
S109 (P42 w/RPO LB4, L19) . . . . .	.78	16
S111 . . . . .	.78	16
S112 (P32 w/RPO L19) . . . . .	.78	14
S112 (P42 w/RPO LB4) . . . . .	.77	13
S112 (P42 w/RPO LB4, L19) . . . . .	.78	16
S113 . . . . .	.74	3
S113 . . . . .	.73	2
S114 . . . . .	.74	4
S115 . . . . .	.74	4
S116 . . . . .	.74	3
S117 . . . . .	.74	3
S119 (P32 w/RPO L19) . . . . .	.78	14
S119 (P42) . . . . .	.78	15
S120 . . . . .		—
S121 . . . . .		—
S122 . . . . .		—
S123 . . . . .		—
S124 . . . . .		—
S200 . . . . .	.74	4
S201 . . . . .		—
S202 . . . . .		—
S203 . . . . .		—
S204 . . . . .		—
S205 . . . . .		—
S206 . . . . .		—
S207 . . . . .		—
S208 . . . . .		—
S209 . . . . .		—
S210 . . . . .		—
S211 . . . . .		—
S212 . . . . .		—
S213 . . . . .		—
S400 . . . . .		—
S401 . . . . .		—

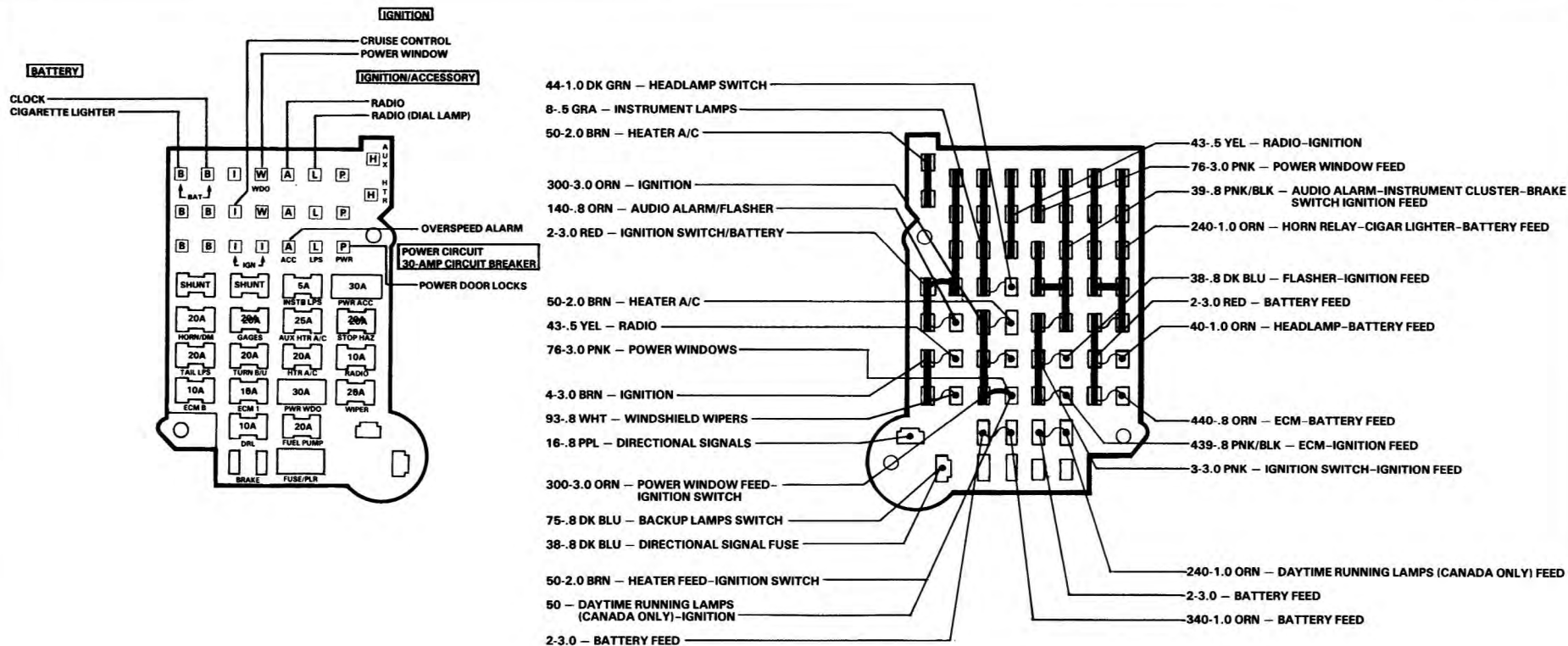






## SYMPTOMS INDEX

SYMPTOM	SECTION — PAGE	SYMPTOM	SECTION — PAGE
<b>AIR CONDITIONING</b>			
A/C compressor clutch does not engage . . . . .	C-44	INTERIOR LAMPS	
Blower motor does not operate at any speed . . . . .	C-44	Dome lamp does not work or stays on all the time . . . . .	C-68
Blower motor does not operate in HI . . . . .	C-45	<b>POWER DOOR LOCKS</b>	
Blower motor does not operate in LO and/or MED speed . . . . .	C-45	Power door locks do not operate . . . . .	C-76
<b>AUXILIARY COOLING FAN</b>			
Cooling fan does not run . . . . .	C-34	Door lock motor does not operate from a particular switch . . . . .	C-76
Cooling fan runs continuously . . . . .	C-34	One door lock motor does not operate from any switch . . . . .	C-76
<b>BRAKE WARNING SYSTEMS</b>			
Brake indicator remains on with ignition switch in run and park brake off . . . . .	C-60	<b>POWER WINDOWS</b>	
<b>CHARGING</b>			
Battery is undercharged or overcharged . . . . .	C-26	Both power windows do not operate . . . . .	C-73
<b>CRUISE CONTROL AND OVERSPEED ALARM</b>			
Overspeed alarm does not sound . . . . .	C-64	LH power window does not operate or only goes in one direction . . . . .	C-73
Cruise control does not disengage when brake pedal is depressed . . . . .	C-66	RH power window only operates from driver's side window switch . . . . .	C-73
Cruise control does not operate . . . . .	C-66	RH power window does not operate from either switch . . . . .	C-74
<b>FRONT EXTERIOR LAMPS</b>			
Hazard warning lamps do not operate . . . . .	C-17	<b>RADIO</b>	
Park lamps do not operate . . . . .	C-17	AM Radio	
Sidemarkers do not operate . . . . .	C-17	Radio does not appear to work (no display lights, no sound) . . . . .	C-70
Directional signals do not work on one side . . . . .	C-21	Panel lamp does not come on . . . . .	C-70
Directional signals do not operate . . . . .	C-21	No sound or distorted sound from a speaker . . . . .	C-70
Directional signal lamps flash rapidly . . . . .	C-21	<b>AM/FM Stereo Radio With Options</b>	
<b>HEADLAMPS</b>			
Headlamps do not illuminate high or low beams—both sides . . . . .	C-7	Radio does not appear to work (no display lights, no sound) . . . . .	C-70
Low beam lamp(s) do not operate . . . . .	C-7	Clock does not operate . . . . .	C-70
High beam lamp(s) do not operate . . . . .	C-7	Panel lamp does not come on . . . . .	C-70
<b>HEADLAMPS (WITH DAYTIME RUNNING LAMPS, CANADA ONLY)</b>			
Headlamps do not illuminate high or low beams — both sides . . . . .	C-10	Display dimming function will not operate . . . . .	C-70
Low beam lamp(s) do not operate . . . . .	C-10	<b>SAFETY BELT AND KEY-IN WARNING BUZZER</b>	
High beam lamps do not operate . . . . .	C-11	The safety belt warning buzzer does not operate . . . . .	C-58
Daytime running lamps do not operate . . . . .	C-11	The safety belt warning buzzer operates when safety belt is buckled . . . . .	C-58
<b>HEATER</b>			
Blower motor does not operate at all . . . . .	C-48	Key-in warning buzzer does not operate . . . . .	C-58
Blower motor does not operate in HI but only in LO and/or MED . . . . .	C-48	<b>START AND CHARGE</b>	
Blower motor does not operate in LO and/or MED but only in HI . . . . .	C-48	Engine does not crank and starter solenoid does not click . . . . .	C-26
<b>HORNS</b>			
Horn(s) will not operate . . . . .	C-24	Starter solenoid clicks, engine does not crank or cranks slowly . . . . .	C-26
Horn sounds continuously without depressing horn switch . . . . .	C-24	Battery is undercharged or overcharged . . . . .	C-26
<b>INSTRUMENT PANEL GAGES AND INDICATORS</b>			
Fuel gage indicates full or beyond at all times . . . . .	C-51	<b>WIPER/WASHER</b>	
Fuel gage indicates empty when there is fuel in the tank . . . . .	C-51	Wipers do not operate in any mode . . . . .	C-78
Fuel gage is inaccurate . . . . .	C-52	Wipers do not operate in HI . . . . .	C-78
Temperature gage indicates hot with engine coolant below operating temperature and ignition switch in run . . . . .	C-52	Wipers do not operate in LO or delay . . . . .	C-78
Temperature gage indicates cold all the time . . . . .	C-52	Washer motor does not operate . . . . .	C-78
Temperature indicator stays on at all times with ignition switch in run . . . . .	C-52	Washer motor does not shut off . . . . .	C-79
Temperature gage is not accurate . . . . .	C-52	<b>VACUUM SYSTEMS</b>	
Temperature indicator does not light with engine coolant overheated . . . . .	C-52	Insufficient cooling—HI blower, MAX A/C mode, cold temperature setting . . . . .	C-85
Oil pressure gage indicates low pressure when oil pressure is good . . . . .	C-52	Improper air distribution from outlets . . . . .	C-85
Oil pressure gage indicates high pressure at all times . . . . .	C-52		
Oil pressure gage is not accurate . . . . .	C-52		
Voltmeter is not accurate . . . . .	C-52		



**CAUTION: Determine if non-cycling circuit breakers are hot before removing them. Hot non-cycling circuit breakers can cause personal injury.**

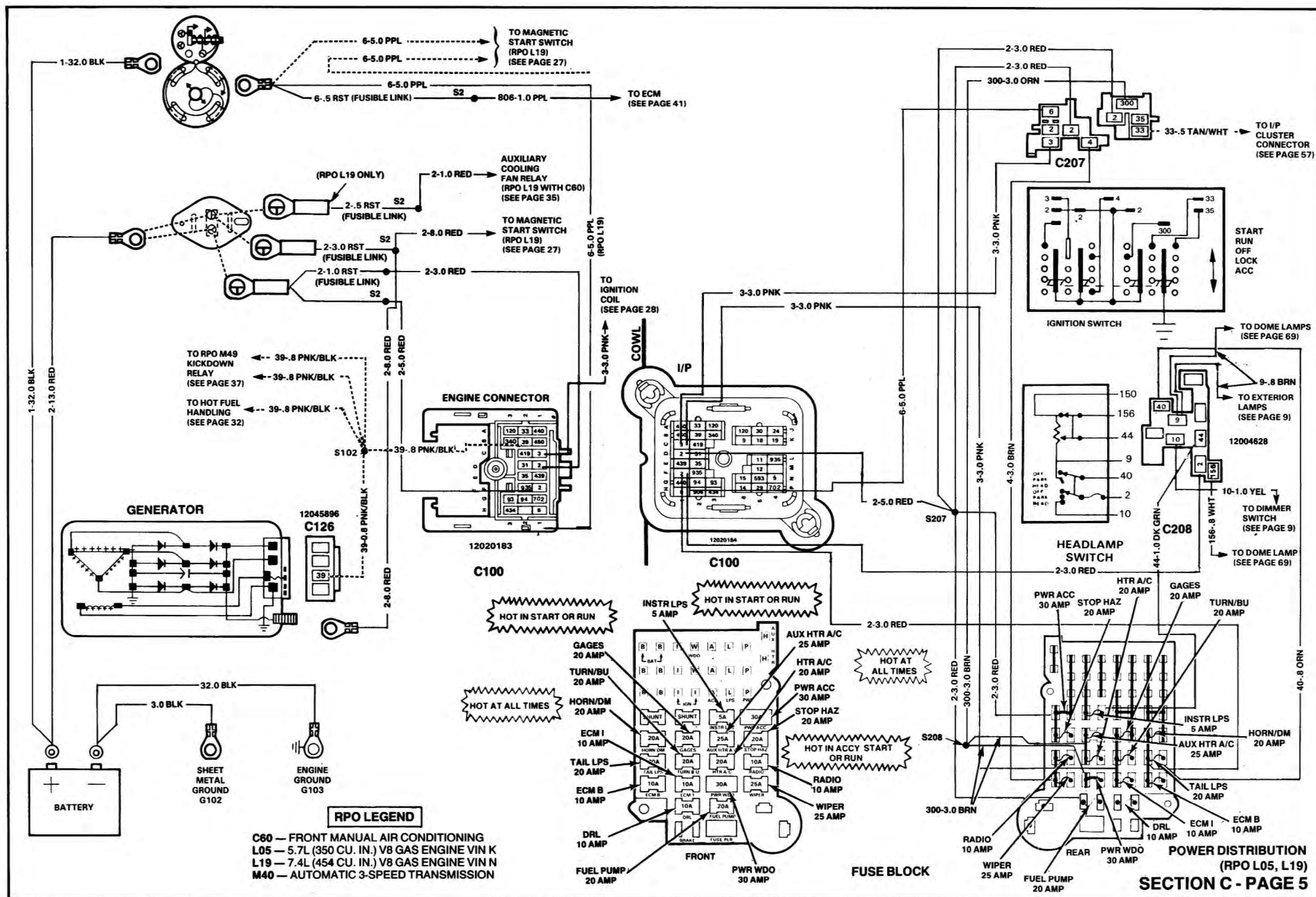
#### FUSE AND CIRCUIT BREAKER IDENTIFICATION

FUSE LOCATION	FUSE PART NO.	COLOR & AMPERES	DESCRIPTION
AUX HTR A/C	12004010	WHITE 25 AMP	Auxiliary Heater, Air Conditioning
DRL	12004007	RED 10 AMP	Daytime Running Lamps (Canada Only)
ECM I	12004007	RED 10 AMP	Electronic Control Module Ignition
ECM B	12004007	RED 10 AMP	Electronic Control Module Battery Feed
FUEL PUMP	12004008	YELLOW 20 AMP	Electric Fuel Pump Feed
GAGES	12004009	YELLOW 20 AMP	Audio Alarm, Instrument Panel Gauges, Brake Switch, Instrument Cluster, Cruise Control
HTR A/C	12004009	YELLOW 20 AMP	Heater, Air Conditioning
HORN/DM	12004008	YELLOW 20 AMP	Horn Relay, Cigarette Lighter, Dome Lamp, Clock
INSTR LPS	12004005	TAN 5 AMP	Instrument Lamps

FUSE LOCATION	FUSE PART NO.	COLOR & AMPERES	DESCRIPTION
PWR ACC	CIRCUIT BREAKER	30 AMP	Power Door Locks
PWR WDO	CIRCUIT BREAKER	30 AMP	Power Windows
RADIO	12004007	RED 10 AMP	Radio, Radio Dial Lamp, Overspeed Alarm
STOP-HAZ	12004009	YELLOW 20 AMP	Audio Alarm, Hazard Flasher, Stop Lamps
TAIL LPS	12004009	YELLOW 20 AMP	Headlamps, Tailamps
TURN B/U	12004009	YELLOW 20 AMP	Backup Lamps, Directional Lamps
WIPER	12004010	WHITE 25 AMP	Windshield Wipers, Windshield Washers

**COMPONENT LOCATION****Page — Figure**

Battery	LH front of cowl	.89	—	5
Fuse Block	LH side of cowl, under I/P	.92	—	13
Generator	RH side of engine	.90	—	8
Headlamp Switch	LH side of I/P	.92	—	13
Ignition Switch	On steering column	.95	—	20
Junction Block	LH front of cowl	.89	—	5
Starter Motor Solenoid	Lower, RH side of engine	.89	—	5
C100	Engine compartment, LH side of cowl	.91	—	9
C126	At generator	.90	—	8
C207	At ignition switch	.92	—	12
C208	At headlamp switch	.92	—	13
G102	On RH frame rail, beneath battery	.89	—	5
G103	Rear, RH cylinder head	.89	—	5
S102	Engine wiring harness, center of cowl	.91	—	9
S207	I/P harness, above fuse block	.92	—	13
S208	I/P harness, above fuse block	.92	—	13



**BLANK**

## CIRCUIT OPERATION

Voltage is applied to the Headlamp Switch at all times. The Headlamp Switch includes a Self-Resetting Circuit Breaker. The Circuit Breaker opens when the Headlamp circuit draws too much current. When the Circuit Breaker opens, it interrupts the current flow. With no current flow,

the Circuit Breaker cools off and resets automatically. When the Headlamp Switch is in HEAD, the Dimmer Switch directs voltage to either the Low Beams or the High Beams. The HI Beam Indicator also receives voltage along with the High Beams.

## COMPONENT LOCATION

Page — Figure

Dimmer Switch	Part of multi-function lever	.95 —	20
Fuse Block	LH side of cowl, under I/P	.92 —	13
Headlamp Switch	LH side of I/P	.92 —	13
Headlamp, High Beam LH (RPO V22)	LH front of vehicle	.87 —	1
Headlamp, High Beam RH (RPO V22)	RH front of vehicle	.87 —	2
Headlamp, High-Low LH	LH front of vehicle	.87 —	1
Headlamp, High-Low RH	RH front of vehicle	.87 —	2
Park and Directional Lamp, LH	LH front of vehicle	.87 —	1
Park and Directional Lamp, RH	RH front of vehicle	.87 —	2
Side Marker Lamp, LH	LH front of vehicle	.87 —	1
Side Marker Lamp, RH	RH front of vehicle	.87 —	2
C100	Engine compartment, LH side of cowl	.91 —	9
C127	At RH side marker lamp	.87 —	2
C128	At LH side marker lamp	.87 —	1
C129	At RH park and directional lamp	.87 —	2
C130	At LH park and directional lamp	.87 —	1
C131	At RH high-low headlamp	.87 —	2
C132	At LH high-low headlamp	.87 —	1
C133 (RPO V22)	At RH high beam headlamp	.87 —	2
C134 (RPO V22)	At LH high beam headlamp	.87 —	2
C135	LH side of engine compartment, in forward lamp harness	.88 —	4
C136	LH side of engine compartment, in forward lamp harness	.88 —	4
C208	At headlamp switch	.92 —	13
C209	Behind I/P, at I/P cluster	.96 —	24
C210	Under I/P, on LH side of steering column	.92 —	12
G104 (P52)	On side of radiator support	.88 —	3
G104 (P62)	At radiator support	.88 —	4
G105 (P52)	On side of radiator support	.88 —	3
G105 (P62)	At radiator support	.88 —	4
S110	In forward lamp harness, LH side	.87 —	1
S111	In forward lamp harness, RH side	.87 —	2
S112	In forward lamp harness, LH side	.87 —	1

## TROUBLESHOOTING CHART—HEADLAMPS

### HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES

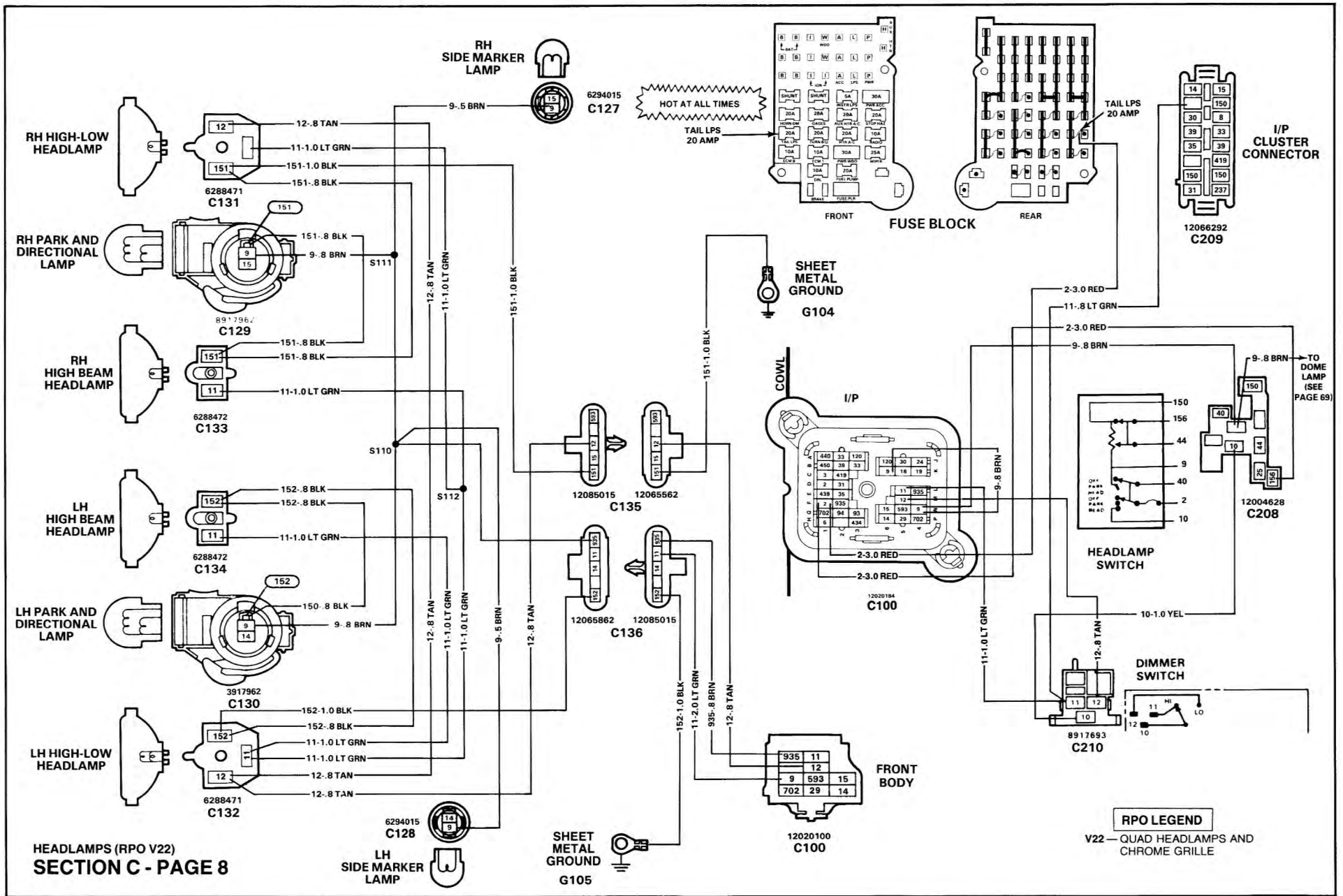
TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to junction block.
2. With the headlamp switch ON and the dimmer switch to HIGH BEAM, connect a test lamp from YEL (10) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from headlamp dimmer switch to headlamps.
	Test lamp does not light.	REPLACE headlamp dimmer switch.

## LOW BEAM LAMP(S) DO NOT OPERATE

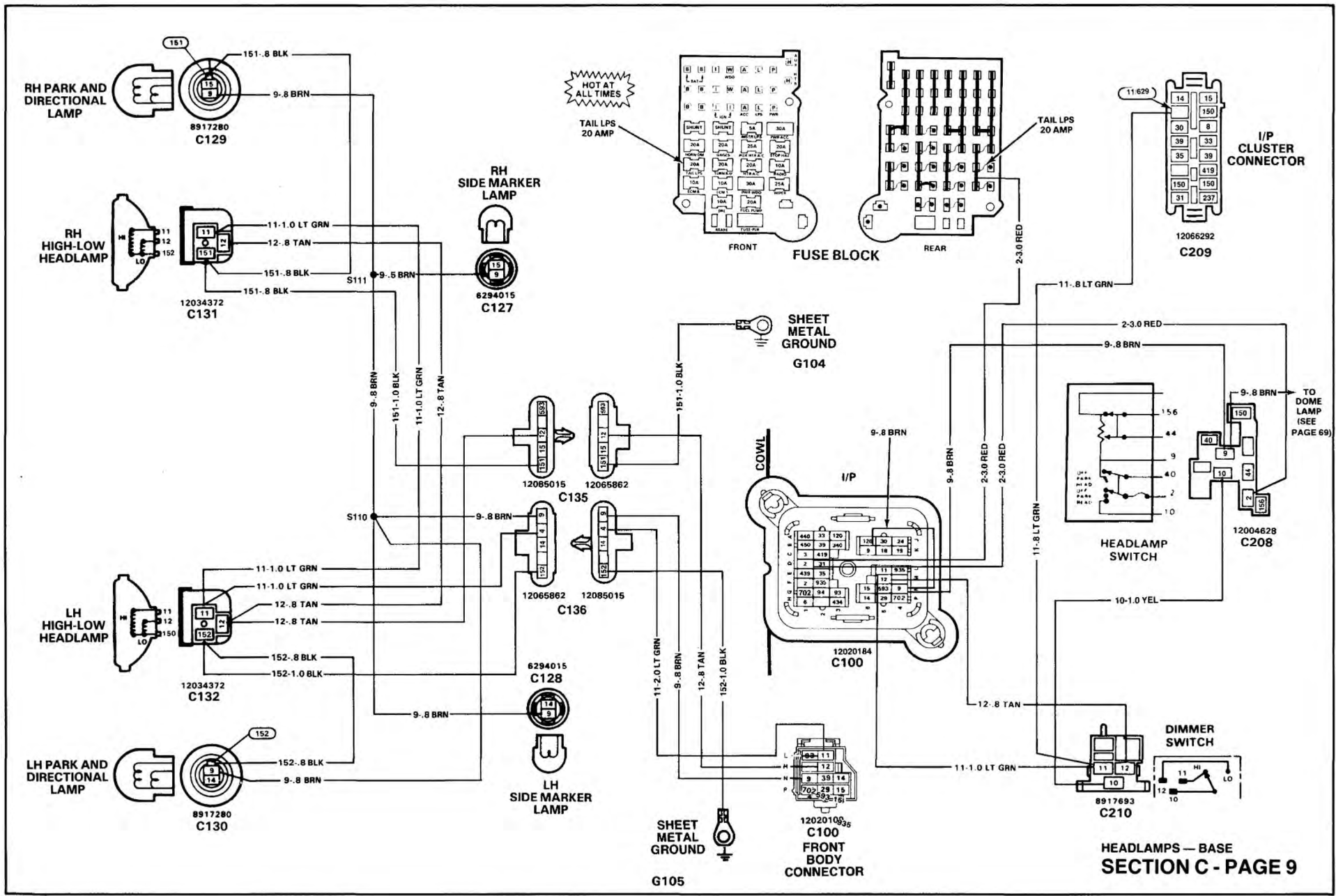
TEST	RESULT	ACTION
1. Turn headlamp switch ON and dimmer switch to LOW BEAM position. Connect a test lamp from TAN (12) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 3.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from TAN (12) to BLK (151 or 152) wire(s) at headlamp connectors C131 or C132.	Test lamp does not light.	LOCATE and REPAIR open in BLK (151 or 152) wire(s) from headlamp connector(s) C131 or C132 to ground terminal(s) G104 or G105. If wire(s) is (are) in good condition, to to step 3.
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from TAN (12) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 4.
	Test lamp lights.	LOCATE and REPAIR open in TAN (12) wire from headlamp dimmer switch to headlamp.
4. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire from headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.

## HIGH BEAM LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch to ON and dimmer switch to HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 3.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from LT GRN (11) wire to BLK (151 or 152) wire(s) at headlamp connectors C131 or C132 and/or C133 or C134, if vehicle is equipped with RPO V22, to ground connection(s) G104 or G105. If wire(s) is (are) in good condition, GO to step 3.	Test lamp does not light.	LOCATE and REPAIR open in BLK (151 or 152) wire(s) at headlamp connector(s) C131 or C132 and/or C133 or C134, if vehicle is equipped with RPO V22, to ground connection(s) G104 or G105. If wire(s) is (are) in good condition, GO to step 3.
	Test lamp lights.	REPLACE headlamps(s).
3. Place dimmer switch in the HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 4.
	Test lamp lights.	LOCATE and REPAIR open in LT GRN (11) wire from headlamps to headlamp dimmer switch.
4. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire headlamp dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE headlamp dimmer switch.







## CIRCUIT OPERATION

### DAYTIME RUNNING LAMPS (CANADA ONLY)

Battery voltage is applied to the Daytime Running Lamp (DRL) Relay Switch at all times through the ORN (240) wire from the DRL fuse and, when the Ignition Switch is in RUN through the PNK/BLK (39) wire from the GAGES fuse. Battery voltage is also applied to the Daytime Running Lamp Module from the PNK/BLK (39) wire and the GAGES fuse.

With the Headlamps on, the Daytime Running Lamp Relay is not energized and the DK BLU/ORN (593) wire is grounded to BLK (153) wire, inside the relay. This serves as ground for the LH Headlamps.

With Ignition in RUN, headlamps off and Parking Brake released, the Daytime Running Lamp Module applies bat-

tery voltage to the LT GRN/BLK (592) wire. This action illuminates the DRL indicator in the instrument panel and energizes the DRL Relay. When energized, the DRL Relay disconnects the DK BLU/ORN (593) wire from ground and internally connects it to the ORN (240) wire.

The DK BLU/ORN (593) wire feeds the LH High beam(s) which is/are connected in series to the RH Headlamp(s) through the LT GRN (11) wire.

Grounding of the entire circuit is accomplished through the BLK (151) wire at the RH Headlamps. This results in High beam headlamps which are less intense for daytime driving and should provide longer service life.

### COMPONENT LOCATION

		Page	Figure
Daytime Running Lamp Diode			
Array Module	Behind LH side of I/P, near ALDL	.93	14
Daytime Running Lamp Indicator	In instrument cluster	—	—
Daytime Running Lamp Module	Behind LH side of I/P, near ALDL	.93	14
Daytime Running Lamp Relay Switch	Behind LH side of I/P, near ALDL	.93	14
Dimmer Switch	Part of multi-function lever	.95	20
Fuse Block	LH side of cowl, under I/P	.92	13
Headlamp Switch	LH side of I/P	.92	13
Headlamp, High Beam, LH	LH front of vehicle	.87	1
Headlamp, High Beam, RH	RH front of vehicle	.87	2
Headlamp, High-Low, LH	LH front of vehicle	.87	1
Headlamp, High-Low, RH	RH front of vehicle	.87	2
Park and Directional Lamp, LH	LH front of vehicle	.87	1
Park and Directional Lamp, RH	RH front of vehicle	.87	2
Park Brake Warning Switch	Under I/P, on top of park brake pedal support	.92	13
Side Marker Lamp, LH	LH front of vehicle	.87	1
Side Marker Lamp, RH	RH front of vehicle	.87	2
C100	Engine compartment, LH side of cowl	.91	9
C127	At RH side marker lamp	.87	2
C128	At LH side marker lamp	.87	1
C129	At RH park and directional lamp	.87	2
C130	At LH park and directional lamp	.87	1
C131	At RH high-low headlamp	.87	2
C132	At LH high-low headlamp	.87	1
C133	At RH high beam headlamp	.87	2
C134	At LH high beam headlamp	.87	1
C208	Behind LH side of I/P, at headlamp switch	.92	13
C209	Behind I/P, at I/P cluster	.96	24
C210	Under I/P, on LH side of steering column	.92	12
C217	LH side of I/P	—	—
C220	Under I/P, on park brake pedal support	.92	13
C251	At daytime running lamp module	.93	14
C252	At daytime running lamp diode array module	.93	14
C253	At daytime running lamp relay switch	.93	14
G104 (P52)	On side of radiator support	.88	3
G104 (P62)	At radiator support	.88	4
G105 (P52)	On side of radiator support	.88	3
G105 (P62)	At radiator support	.88	4
G200	Under LH I/P, at bus bar ground	.92	13
S110	In forward lamp harness, LH side	.87	1
S111	In forward lamp harness, RH side	.87	2
S112	In forward lamp harness, LH side	.87	1
S200	I/P harness, above fuse block	.92	13
S206	I/P harness, above steering column	.92	12

### HEADLAMPS (WITH DAYTIME RUNNING LAMPS) SECTION C - PAGE 10

## TROUBLESHOOTING CHART—HEADLAMPS (WITH DAYTIME RUNNING LAMPS, CANADA ONLY)

### HEADLAMPS DO NOT ILLUMINATE HIGH OR LOW BEAMS—BOTH SIDES

TEST	RESULT	ACTION
1. Connect a test lamp from RED (2) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire from headlamp switch to fuse block or REPLACE GAGES fuse.
2. With the headlamp switch ON and the dimmer switch to HIGH BEAM, connect a test lamp from YEL (10) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE headlamp switch.
3. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp lights.	REPAIR open in LT GRN (11) wire from dimmer switch to headlamps.
	Test lamp does not light.	REPLACE dimmer switch.

### LOW BEAM LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Turn headlamp switch ON and dimmer switch to LOW BEAM position. Connect a test lamp from TAN (12) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from TAN (12) to BLK (150 or 151) wire(s) at headlamp connectors C131 or C132 to ground. (For Canadian vehicles w/o quad, DK BLU/WHT (593) is used in place of BLK (152) wire at connector C132.)	Test lamp does not light.	LOCATE and REPAIR open in BLK (150 or 151) wire(s) from headlamp connector(s) C131 or C132 to ground terminal(s) G104 or G105. (For Canadian vehicles w/o quad, GO to step 3.)
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from DK BLU/WHT (593) at daytime running lamp relay switch connector C253 to ground.	Test lamp does not light.	LOCATE and REPAIR open in DK BLU/WHT (593) wire from headlamp connector C132 to daytime running lamp relay switch C253.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (153) wire at the daytime running lamp relay switch connector C253 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay switch.
	Test lamp lights.	LOCATE and REPAIR open in BLK (153) wire from daytime running lamp relay switch to ground G200.

5. Connect a test lamp from TAN (12) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in TAN (12) wire from dimmer switch to headlamps.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire from dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE dimmer switch.

#### HIGH BEAM LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch to ON and dimmer switch to HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at inoperative lamp(s) to ground.	Test lamp does not light.	GO to step 5.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from LT GRN (11) wire to BLK (151) or DK BLU (593) wire at inoperative headlamp connector.	Test lamp does not light.	If RH headlamps are inoperative LOCATE and REPAIR open in BLK (151) wire between headlamp connector and ground G104. If LH headlamps are inoperative, GO to step 3.
	Test lamp lights.	REPLACE headlamp(s).
3. Connect a test lamp from DK BLU/WHT (593) wire to ground at daytime running lamp relay switch connector C253.	Test lamp does not light.	LOCATE and REPAIR open in DK BLU/WHT (593) wire at headlamp connector C132 to daytime running lamp relay switch C253.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from BLK (153) wire at daytime running lamp relay switch connector C253 to ground.	Test lamp does not light.	REPLACE daytime running lamp relay switch.
	Test lamp lights.	LOCATE and REPAIR open in BLK (153) wire from daytime running lamp relay switch connector to ground G200.
5. Place dimmer switch in the HIGH BEAM position. Connect a test lamp from LT GRN (11) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	GO to step 6.
	Test lamp lights.	LOCATE and REPAIR open in LT GRN (11) wire from headlamps to dimmer switch.
6. Connect a test lamp from YEL (10) wire at dimmer switch connector C210 to ground.	Test lamp does not light.	LOCATE and REPAIR open in YEL (10) wire dimmer switch to headlamp switch.
	Test lamp lights.	REPLACE dimmer switch.

#### PRELIMINARY CHECKS:

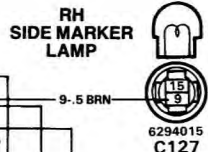
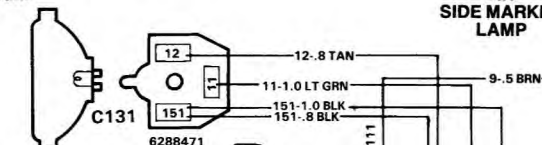
Before checking the DAYTIME RUNNING LAMP system, do the following:

1. Place Park Brake in the OFF position.
2. Place Headlamp Switch to ON and Headlamp Dimmer Switch to HIGH BEAM position.  
If the High Beam Lamp(s) are inoperative, refer to the HIGH BEAM LAMP(S) DO NOT OPERATE test procedures.  
If the High Beam Lamp(s) are operative, use the following diagnostic procedures, after placing the Headlamp Switch to OFF position.

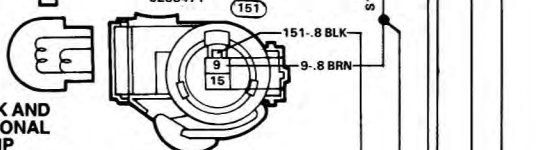
#### DAYTIME RUNNING LAMPS DO NOT OPERATE

TEST	RESULT	ACTION
1. With Ignition in RUN, Headlamps off and park brake released, connect test lamp from ORN (240) wire at DRL relay connector switch C253 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (240) wire between DRL relay switch and fuse block or REPLACE DRL fuse.
	Test lamp lights.	GO to step 2.
2. Connect J 34029-A Multimeter from PNK/BLK (39) wire at DRL module connector C251 and DRL relay switch connector C253 to ground. Measure voltage.	Battery voltage at only one connector.	LOCATE and REPAIR open in PNK/BLK (39) wire between splice S206 and connector with missing voltage.
	No battery voltage at either connector.	LOCATE and REPAIR open in PNK/BLK (39) wire between splice S206 and fuse block or REPLACE GAGES fuse.
	Battery voltage at both connectors.	GO to step 3.
3. Connect J 34029-A Multimeter from PNK/BLK (39) wire at DRL module connector C251 and DRL relay switch connector C253 to BLK (150) and BLK (153) respectively. Measure voltage.	No voltage.	LOCATE and REPAIR open in BLK (150) or BLK (153) wire between connectors and ground G200.
	Battery voltage.	GO to step 4.
4. Connect J 34029-A Multimeter from LT GRN/BLK (592) wire at DRL relay switch connector C253 to ground. Measure voltage.	No voltage.	LOCATE and REPAIR open in LT GRN/BLK (592) wire between the DRL relay switch and the DRL module or REPLACE daytime running lamp module.
	Battery voltage.	GO to step 5.
5. Connect test lamp from DK BLU/WHT (593) wire at LH HI/LOW beam connector C132.	Test lamp does not light.	LOCATE and REPAIR open in DK BLU/WHT (593) wire between DRL relay switch and the LH HI/LOW headlamp connector.
	Test lamp lights.	Daytime running lamps operational.

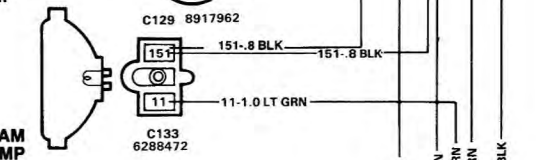
**RH HIGH-LOW HEADLAMP**



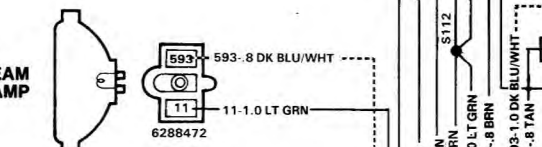
**RH PARK AND DIRECTIONAL LAMP**



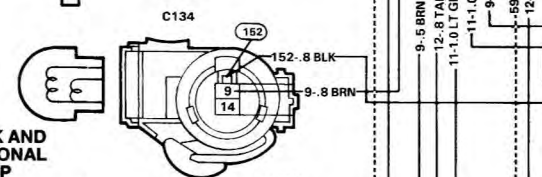
**RH HIGH BEAM HEADLAMP**



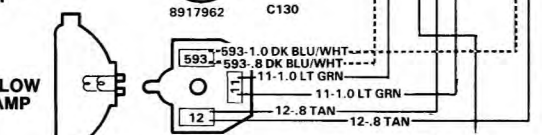
**LH HIGH BEAM HEADLAMP**



**LH PARK AND DIRECTIONAL LAMP**



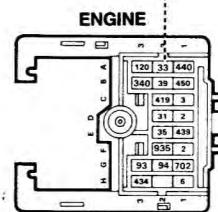
**LH HIGH-LOW HEADLAMP**



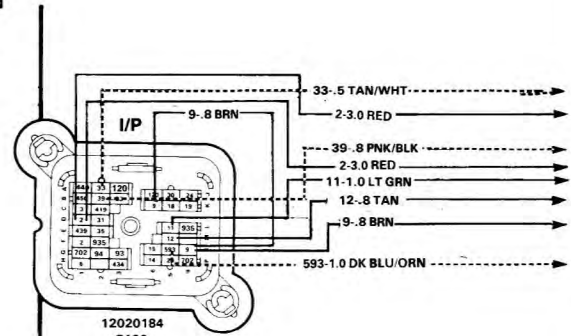
HEADLAMPS (RPO V22) WITH DAYTIME RUNNING LAMPS  
SECTION C - PAGE 12

SHEET METAL GROUND G105

SHEET METAL GROUND G104

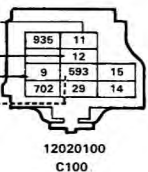


12020183  
C100



COWL

12020184  
C100

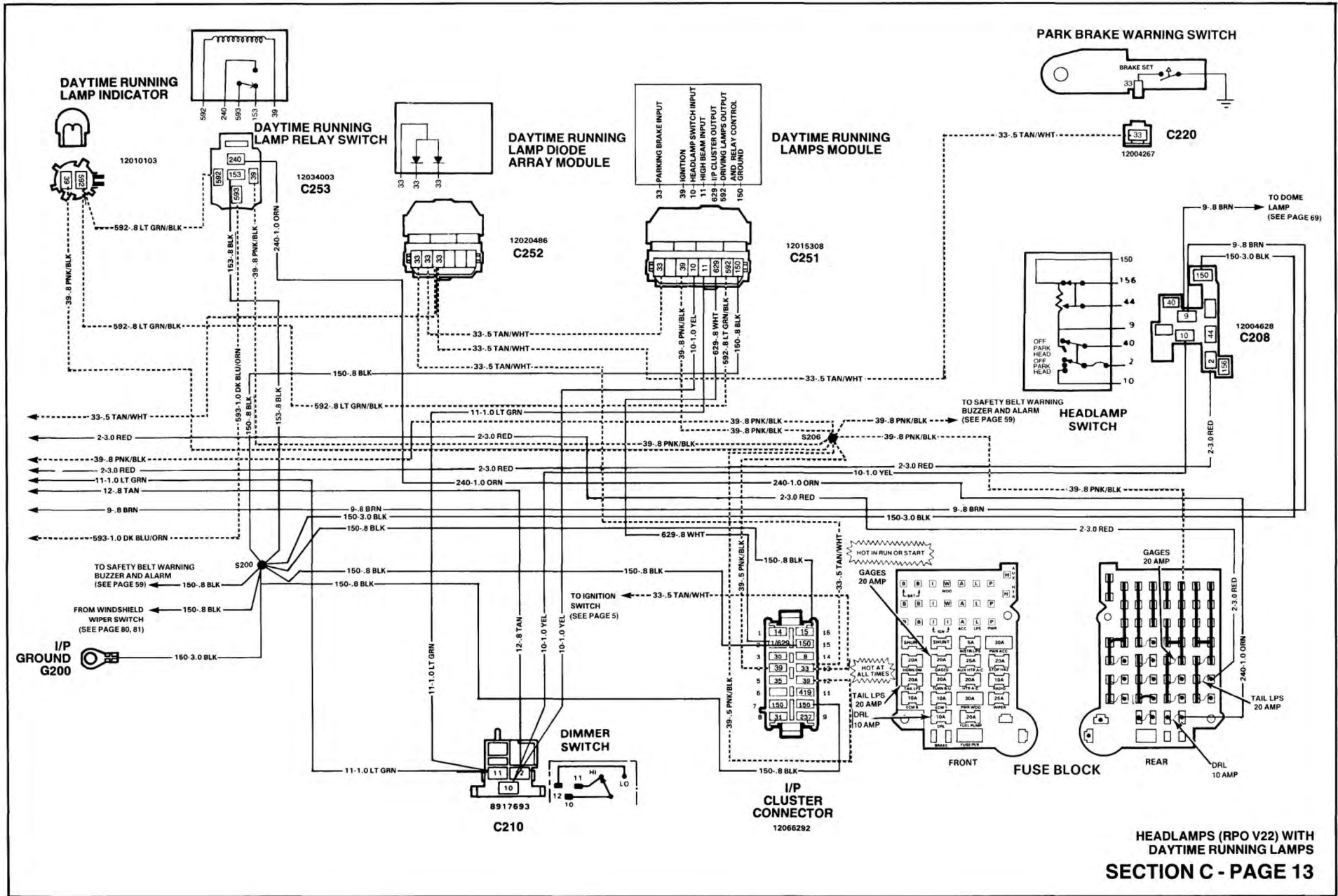


FRONT BODY

12020100  
C100

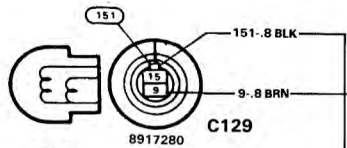
TO BRAKE PRESSURE WARNING SWITCH (SEE PAGE 61)

**RPO LEGEND**  
V22 — QUAD HEADLAMPS AND CHROME GRILLE

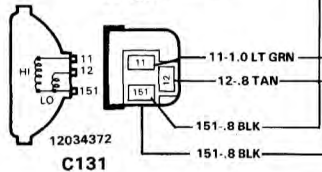


HEADLAMPS (RPO V22) WITH DAYTIME RUNNING LAMPS  
SECTION C - PAGE 13

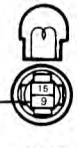
RH PARK AND DIRECTIONAL LAMP



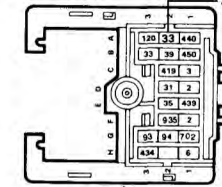
RH HIGH-LOW HEADLAMP



RH SIDE MARKER LAMP



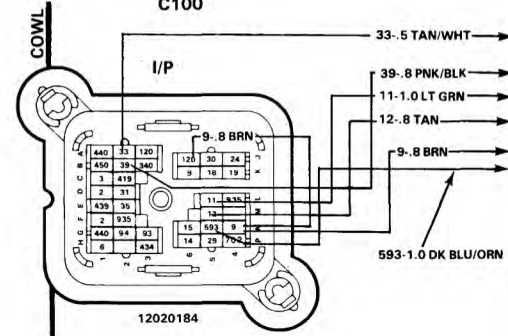
ENGINE



TO BRAKE PRESSURE WARNING SWITCH (SEE PAGE 61)

12020183

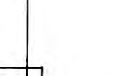
C100



SHEET METAL GROUND G104



151-1.0 BLK



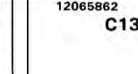
593-1.0 DK BLU/WHT



12085015



12065862



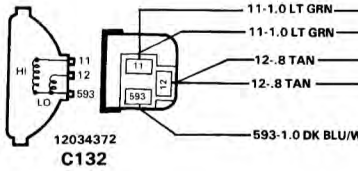
12065862



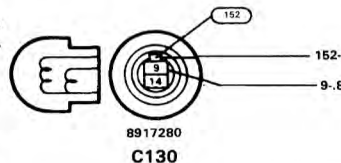
12065862



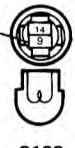
LH HIGH-LOW HEADLAMP



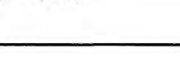
LH PARK AND DIRECTIONAL LAMP



LH SIDE MARKER LAMP

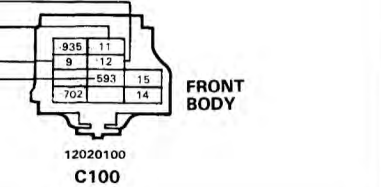


SHEET METAL GROUND G105



12020100

C100



HEADLAMPS  
BASE MODEL WITH DAYTIME RUNNING LAMPS  
SECTION C - PAGE 14



**BLANK**



## CIRCUIT OPERATION

### PARK AND MARKER LAMPS

Voltage is applied through the TAIL LPS fuse to the Headlamp Switch at all times. With the Headlamp Switch in PARK or HEAD, voltage is applied to the Park and Marker Lamps.

### HAZARD LAMPS

Voltage is applied at all times, through the STOP-HAZ fuse and the Hazard Flasher to the normally open contact of the Hazard Switch in the Directional Signal Switch Assembly. With the Hazard Switch in HAZARD FLASH, voltage is applied to Front Directional Signal Lamps. All of the

Directional Signal Lamps and both Directional Signal Indicators flash on and off.

The Front Marker Lamps flash in HAZARD FLASH just as they did in TURN RIGHT and TURN LEFT. If the Lamp Switch is in OFF, they flash on when the Hazard Lamps are on. If the Lamp Switch is in either PARK or HEAD, they flash on when the Hazard Lamps are off and off when the Hazard Lamps are on.

In HAZARD, the circuit is always open, and the Hazard Flasher controls the Lamps.

### COMPONENT LOCATION

Page — Figure

Body Builder Connector	LH frame rail at end crossmember	.98	—	30
Directional Signal Switch	Inside top of steering column	.95	—	20
Fuse Block	Under I/P, LH side of cowl	.92	—	13
Hazard Flasher	Under I/P, below headlamp switch	.95	—	19
Headlamp Switch	LH side of I/P	.92	—	13
Park and Directional Lamp, LH	LH front of vehicle	.87	—	1
Park and Directional Lamp, RH	RH front of vehicle	.87	—	2
Side Marker Lamp, LH	LH front of vehicle	.87	—	1
Side Marker Lamp, RH	RH front of vehicle	.87	—	2
Stop Lamp Switch	Top of brake pedal, at brake pedal support	.93	—	16
C100	Engine compartment, LH side of cowl	.91	—	9
C127	At RH side marker lamp	.87	—	2
C128	At LH side marker lamp	.87	—	1
C129	At RH park and directional lamp	.87	—	2
C130	At LH park and directional lamp	.87	—	1
C135	LH side of engine compartment, in forward lamp harness	.88	—	4
C136	LH side of engine compartment, in forward lamp harness	.88	—	4
C208	At headlamp switch	.92	—	13
C209	Behind I/P, at I/P cluster	.96	—	24
C212	Lower steering column, under I/P	.92	—	12
C249	At hazard flasher	.95	—	19
C250	At stop lamp switch	.93	—	16
C403	At body builder connector	.98	—	30
S110	In forward lamp harness, LH side	.87	—	1
S111	In forward lamp harness, RH side	.87	—	2
S116	In forward lamp harness, LH side	.87	—	1
S117	In forward lamp harness, RH side	.87	—	2

## TROUBLESHOOTING CHART—PARK, MARKER AND HAZARD LAMPS

### HAZARD WARNING LAMPS DO NOT OPERATE

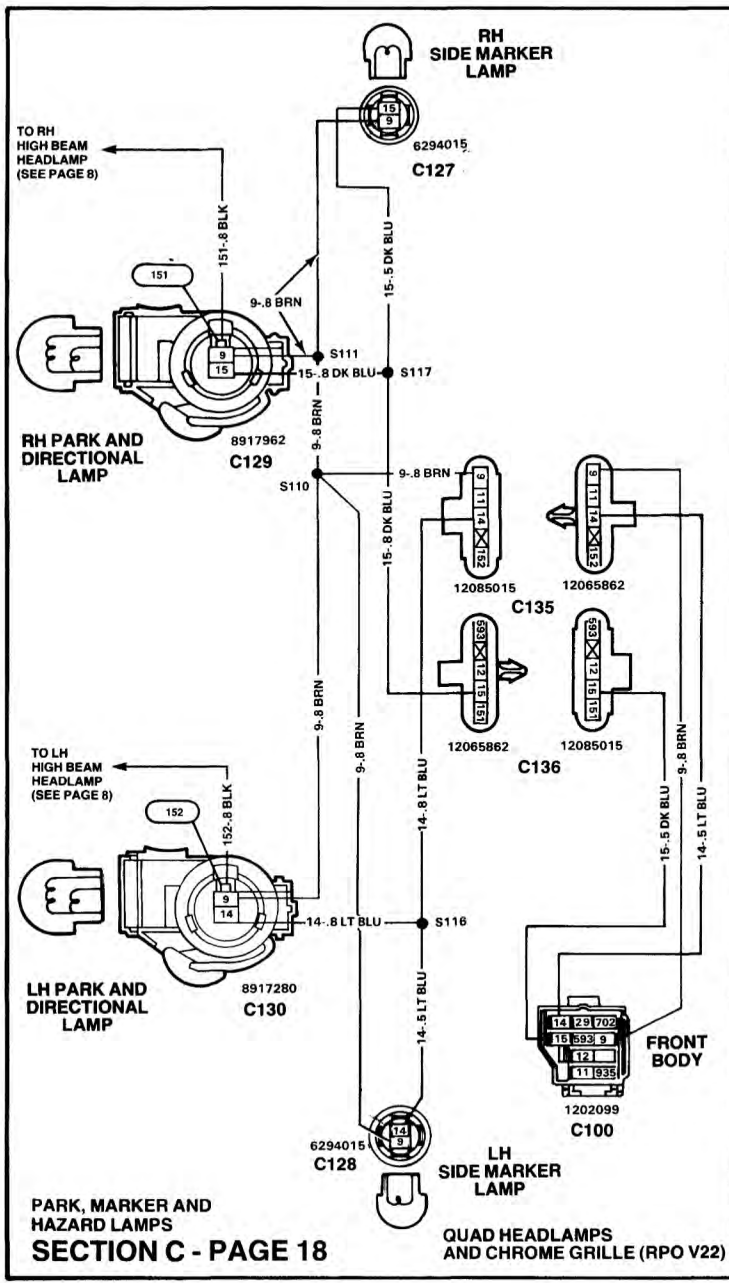
TEST	RESULT	ACTION
1. Place ignition switch in RUN and position directional signal lamps as if making a turn.	Directional signal lamps operate.	GO to step 2.
	Directional signal lamps do not operate.	REFER to "Directional Signals Do Not Operate" symptom.
2. Turn off directional signal lamps and put hazard warning lamps ON. Connect a test lamp from BRN (27) wire at directional signal switch connector C212 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (STOP/HAZ) and an open in ORN (140) wire and BRN (27) wire. If fuse and wiring are good, REPLACE hazard flasher.

### PARK LAMPS DO NOT OPERATE

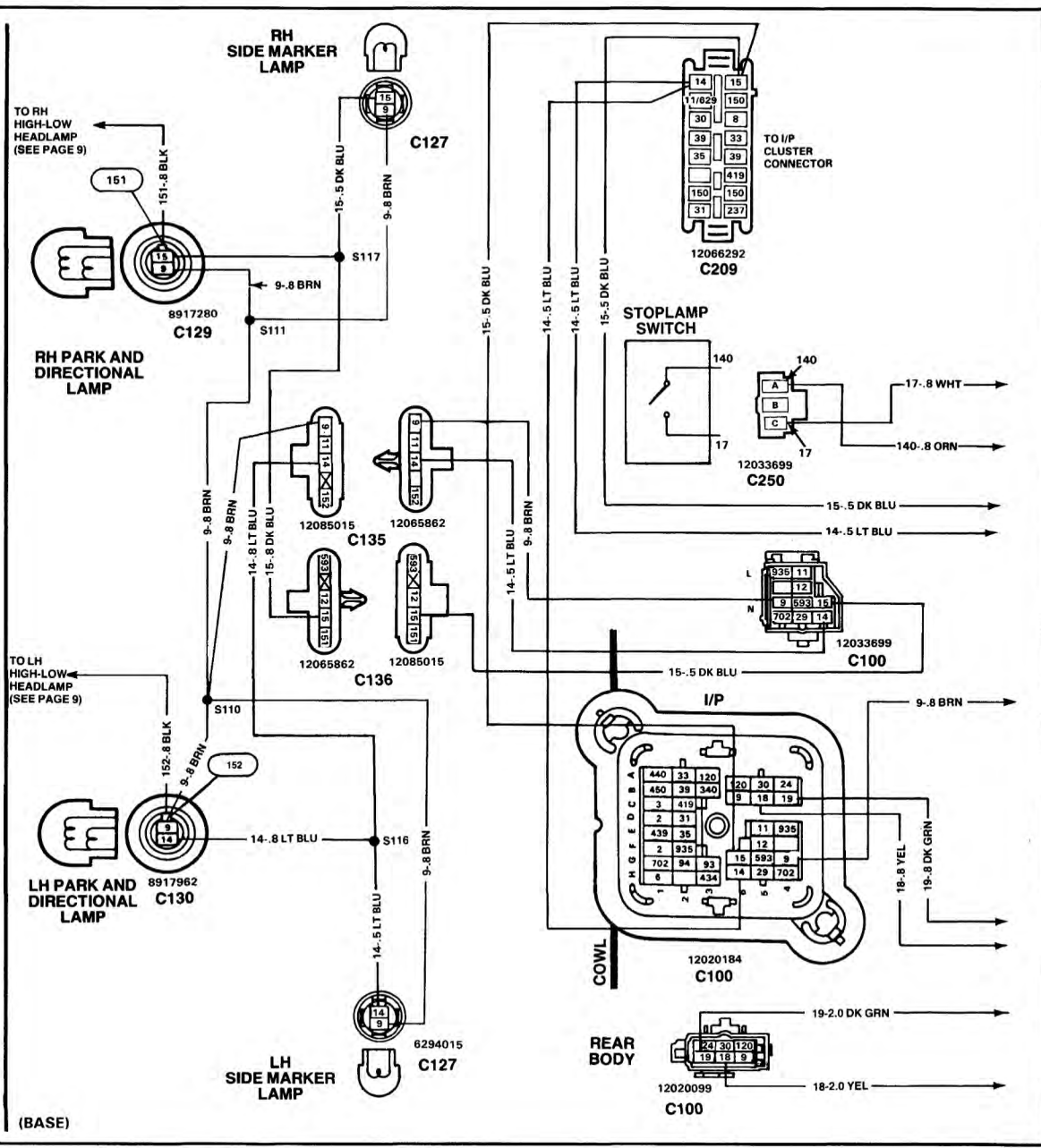
TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from ORN (40) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	GO to step 2.
2. Connect test lamp from RED (2) wire at fuse block to ground.	Test lamp lights.	CHECK condition of fuse (TAIL LPS). If fuse is good, LOCATE and REPAIR open in ORN (40) wire.
	Test lamp does not light.	LOCATE and REPAIR open RED (2) wire from fuse block to junction block.
3. Connect test lamp from BRN (9) wire at headlamp switch connector C208 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE headlamp switch.
4. Connect test lamp at BRN (9) wire at LH park and directional lamp connector C130 to ground. Repeat at RH park and directional lamp connector C129.	Test lamp lights.	CHECK conditions of bulb sockets and BLK (151 and 152) wire(s) from park and directional lamp(s) to ground terminal(s) G104 and G105.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire from park lamps to headlamp switch.

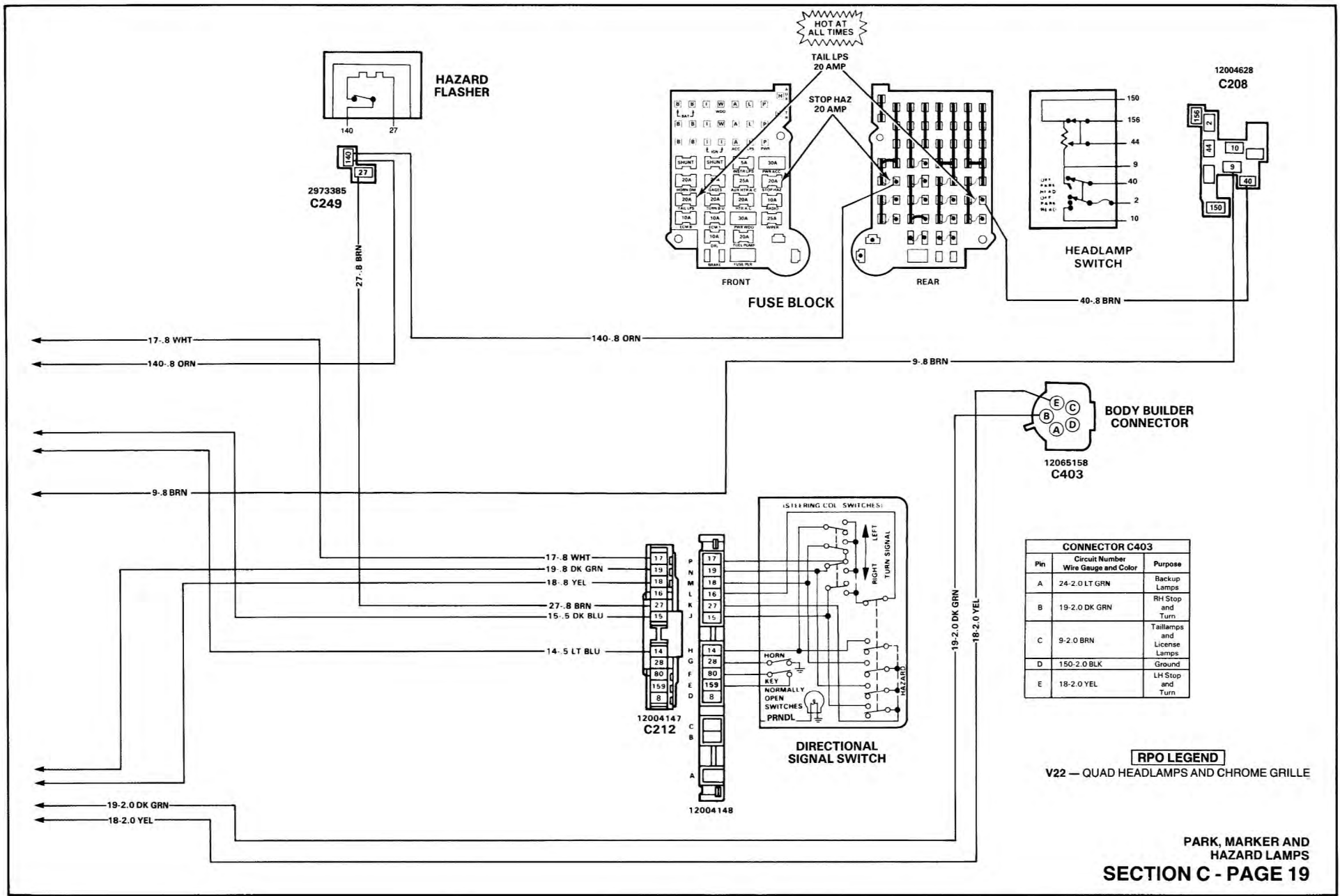
### SIDE MARKER LAMP(S) DO NOT OPERATE

TEST	RESULT	ACTION
1. Place headlamp switch in PARK position. Connect a test lamp from BRN (9) wire at LH side marker lamp connector C141 to ground. Repeat at RH side marker lamp connector C145.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (9) wire(s) from side marker lamp(s) to headlamp switch.
2. Remove bulb from socket, then connect a test lamp between BRN (9) wire and LT BLU (14) or DK BLU (15) wire(s) at side marker lamp connector(s) C141 or C145.	Test lamp lights.	REPLACE bulb.
	Test lamp does not light.	LOCATE and REPAIR open in LT BLU (14) or DK BLU (15) wire(s) from side marker lamp(s) to park and directional lamp(s).



**PARK, MARKER AND HAZARD LAMPS**  
**SECTION C - PAGE 18**





**CONNECTOR C403**

Pin	Circuit Number Wire Gauge and Color	Purpose
A	24-2.0 LT GRN	Backup Lamps
B	19-2.0 DK GRN	RH Stop and Turn
C	9-2.0 BRN	Tailamps and License Lamps
D	150-2.0 BLK	Ground
E	18-2.0 YEL	LH Stop and Turn

**RPO LEGEND**  
V22 — QUAD HEADLAMPS AND CHROME GRILLE

**BLANK**

## CIRCUIT OPERATION

### DIRECTIONAL SIGNAL LAMPS

With the Ignition Switch in RUN or START, voltage is applied through the TURN B/U fuse and Directional Flasher to the normally closed contact of the Hazard Switch in the Directional Signal Switch.

With the Signal Switch in the LH Turn position, voltage is applied to both the LH Indicator and the LH Park and Directional Lamp (LT BLU wires). Voltage is also applied to the LH Rear Lamp (YEL wire).

The Directional Lamps go on immediately. They begin to flash when the current flow heats up the timing element in the flasher and it repeatedly opens and closes the circuit.

The voltage applied to the LH Park and Directional Lamp will also be applied to the LH Side Marker Lamp. If the Parking Lamps are not on, the LH Side Marker Lamp will find a path to ground through splice S116 and the many Lamps connected in parallel to ground. These Lamps provide low resistance paths to ground. The

Marker Lamp will flash with the Directional Lamps. The Lamps used for the ground path will not flash, however, since the voltage drop across the Marker Lamp is much higher than that across the other Lamps.

When the Parking or Headlamps are on, voltage is applied through the Tail LPS fuse, Headlamp Switch, and splices S110 and S111 to the Marker and Park Lamps. If the Directional Signal Switch is in TURN LEFT, the LH Side Marker Lamp will have voltage at both connections and will go out. When the flasher removes voltage to the Directional Lamp, the Marker Lamp will be grounded through the Directional Lamp and will go on. In this way, the LH Side Marker Lamp will flash on when the LH Directional Lamp goes off, and off when the Park and Directional Lamp goes on.

With the Park and Directional Signal Switch in TURN RIGHT, voltage will be applied to the RH Lamps in the same way.

### COMPONENT LOCATION

Page — Figure

Body Builder Connector	LH frame rail at end crossmember	.98	30
Directional Flasher	Fuse block	.95	19
Directional Signal Switch	Inside top of steering column	.95	20
Fuse Block	LH side of cowl, under I/P	.92	13
Park and Directional Lamp, LH	LH front of vehicle	.87	1
Park and Directional Lamp, RH	RH front of vehicle	.87	2
Side Marker Lamp, LH	LH front of vehicle	.87	1
Side Marker Lamp, RH	RH front of vehicle	.87	2
C100	Engine compartment, LH side of cowl	.91	9
C127	At RH side marker lamp	.87	2
C128	At LH side marker lamp	.87	1
C129	At RH park and directional lamp	.87	2
C130	At LH park and directional lamp	.87	1
C135	LH side of engine compartment, in forward lamp harness	.88	4
C136	LH side of engine compartment, in forward lamp harness	.88	4
C209	Behind I/P, at I/P cluster	.96	24
C212	RH side of steering column	.92	12
C403	At body builder connector	.98	30
S116	In forward lamp harness, LH side	.87	1
S117	In forward lamp harness, RH side	.87	2

## TROUBLESHOOTING CHART—DIRECTIONAL LAMPS

### DIRECTIONAL SIGNALS DO NOT WORK ON ONE SIDE

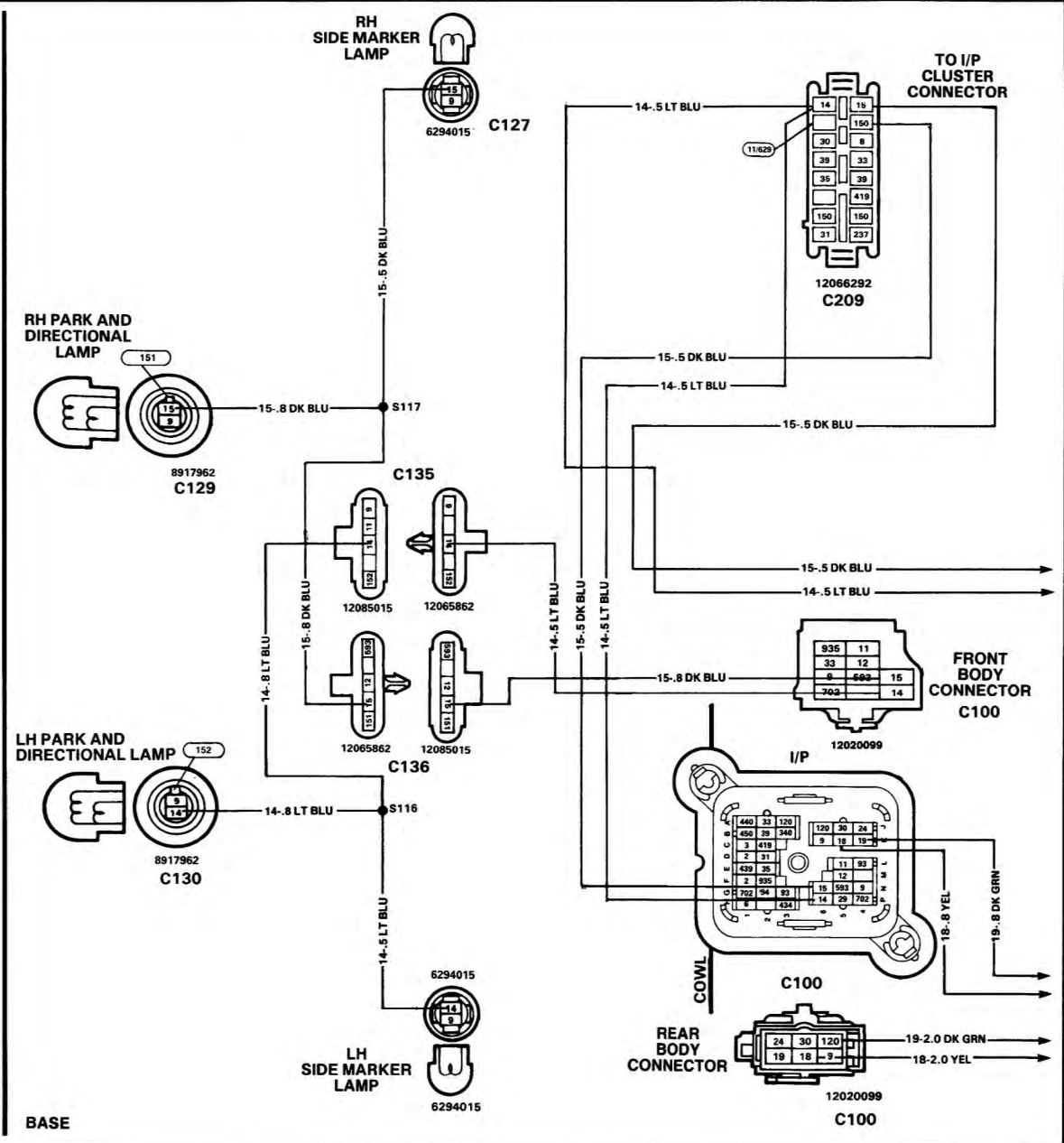
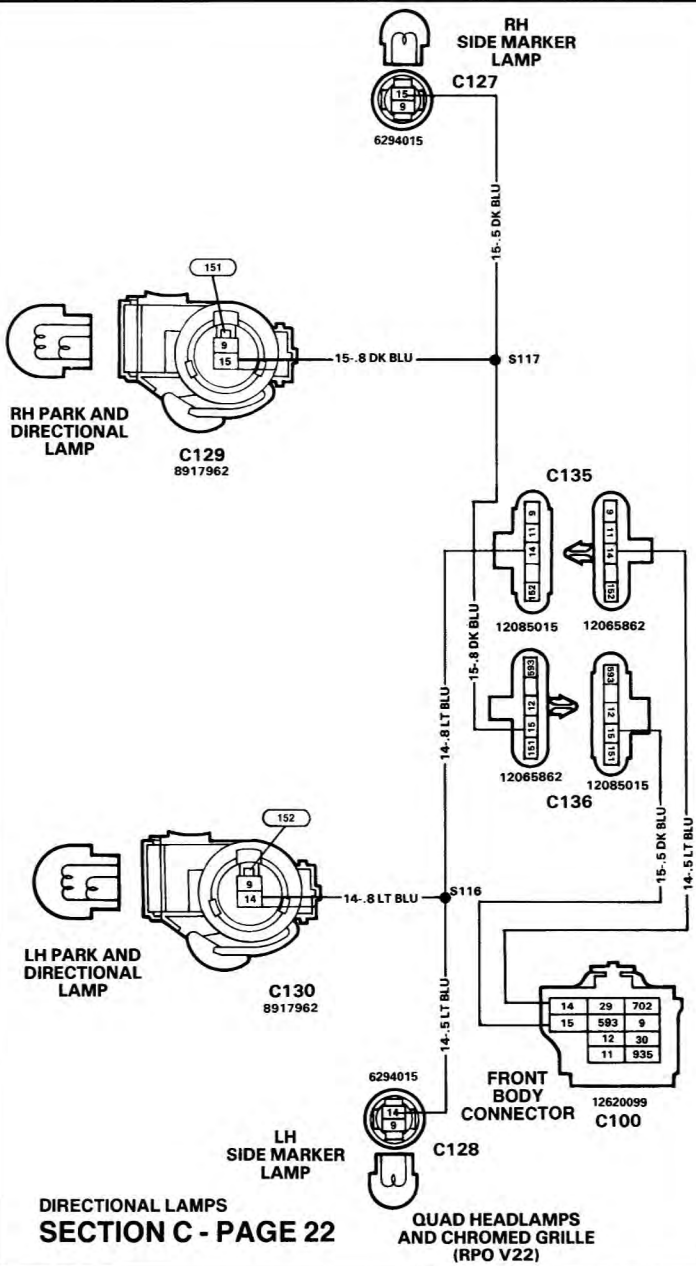
TEST	RESULT	ACTION
1. Turn hazard warning system ON. Observe lamps on side of directional signals that did not work.	Lamps flash.	CHECK for improper bulb. REPLACE if necessary.
	Lamps do not come on.	GO to step 2.
2. Turn hazard warning system off. Place ignition switch to RUN and directional signal to side that does not work. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side does not work) at directional signal switch connector C212 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	GO to step 3.
3. Connect test lamp from PPL (16) at directional signal switch connector C212 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	REPLACE directional signal flasher.
4. Connect test lamp from LT BLU (14) or DK BLU (15) wire (depending on which side did not work) at park lamp connector C129 or C130 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in either LT BLU (14) or DK BLU (15) wires.
5. Connect test lamp from LT BLU (14) or DK BLU (15) wire to BLK (151 or 152) wire at park lamp C129 or C130.	Test lamp lights.	CHECK condition of bulb sockets.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (151 or 152) wire.

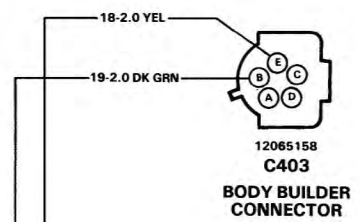
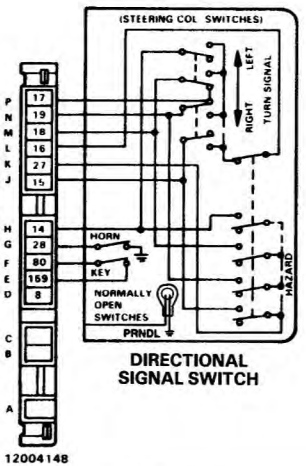
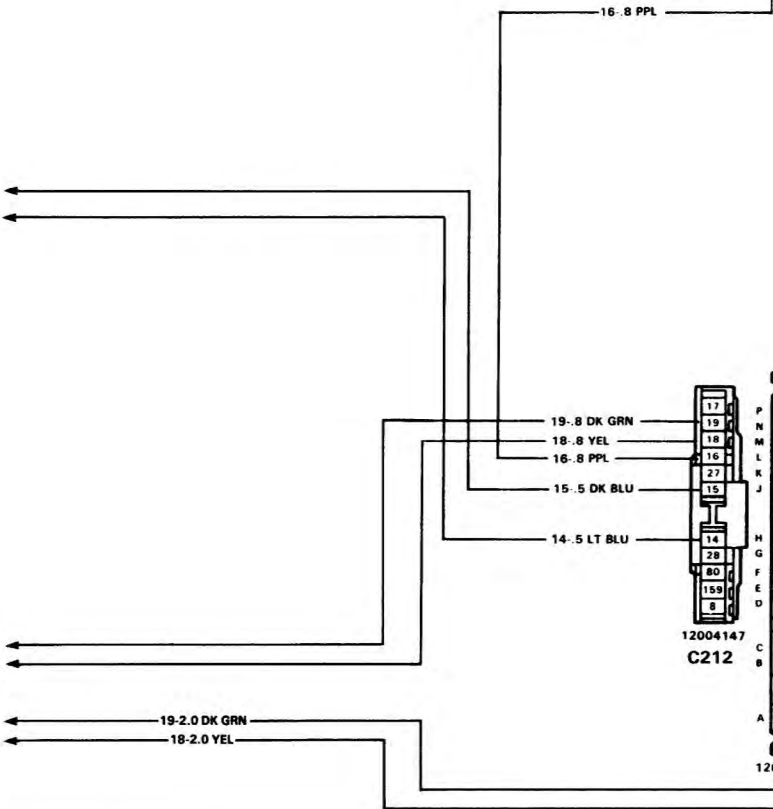
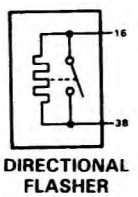
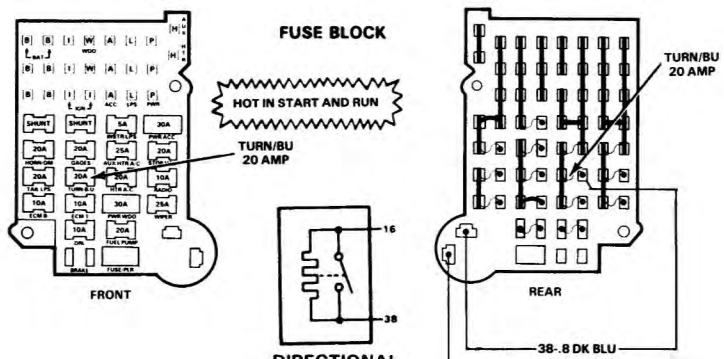
### DIRECTIONAL SIGNALS DO NOT OPERATE

TEST	RESULT	ACTION
1. Place hazard warning lamps to ON position.	Hazard lamps operate.	GO to step 2.
	Hazard lamps do not operate.	GO to step 3.
2. Connect a test lamp from PPL (16) wire at directional signal switch connector C212 to ground.	Test lamp lights.	REPLACE directional signal switch.
	Test lamp does not light.	CHECK condition of fuse (TURN/BU) and an open in PPL (16) wire, DK BLU (38) wire. If fuse and wiring are good, REPLACE directional signal flasher.
3. Place ignition switch in RUN position and put directional signal switch as if making a left turn. Connect test lamp from LT BLU (14) wire at directional signal switch connector C212 to ground.	Test lamp flashes.	LOCATE and REPAIR open in wires from directional signal switch to convenience center.
	Test lamp does not light.	REPLACE directional signal switch.

### DIRECTIONAL SIGNAL LAMPS FLASH RAPIDLY

TEST	RESULT	ACTION
Turn hazard lamp switch ON. Check front signal lamps and rear taillamps.	One side of directional signal lamps flash rapidly.	REPLACE inoperative directional signal bulb.
	Only one side of directional signals light but do not flash rapidly.	REFER to "Directional Signals Do Not Operate On One Side" symptom.





CONNECTOR C403		
Pin	Circuit Number Wire Gauge and Color	Purpose
A	24-2.0 LT GRN	Backup Lamps
B	19-2.0 DK GRN	RH Stop and Turn
C	9-2.0 BRN	Tailamps and License Lamps
D	150-2.0 BLK	Ground
E	18-2.0 YEL	LH Stop and Turn

## CIRCUIT OPERATION

When the Horn Switch is depressed, one side of the coil of the Horn Relay is grounded. The relay is energized, its contacts close and battery voltage is applied to the Horns.

## COMPONENT LOCATION

Page — Figure

Directional Signal Switch	LH side of steering column	.95	—	20
Fuse Block	LH side of cowl, under I/P	.92	—	13
Horn, LH (P52)	LH side of radiator support	.88	—	3
Horn, LH (P62)	LH rear of radiator support	.88	—	4
Horn Relay	Above fuse block	.92	—	13
Horn, RH (P52)	RH side of radiator support	.88	—	3
Horn, RH (P62)	RH rear of radiator support	.88	—	4
C100 (P52)	Engine compartment, LH side of cowl	.88	—	3
C100 (P62)	Engine compartment, LH side of cowl	.88	—	4
C137 (P52)	At LH horn	.88	—	3
C137 (P62)	At LH horn	.88	—	4
C138 (P52)	At RH horn	.88	—	3
C138 (P62)	At RH horn	.88	—	4
C211	At horn relay	.92	—	13
C212	At directional signal switch	.95	—	20

## PRELIMINARY CHECKS:

Check to see that the HORN D/M fuse is not blown. RE-PLACE if blown.

## TROUBLESHOOTING CHART—HORNS

### HORN(S) WILL NOT OPERATE

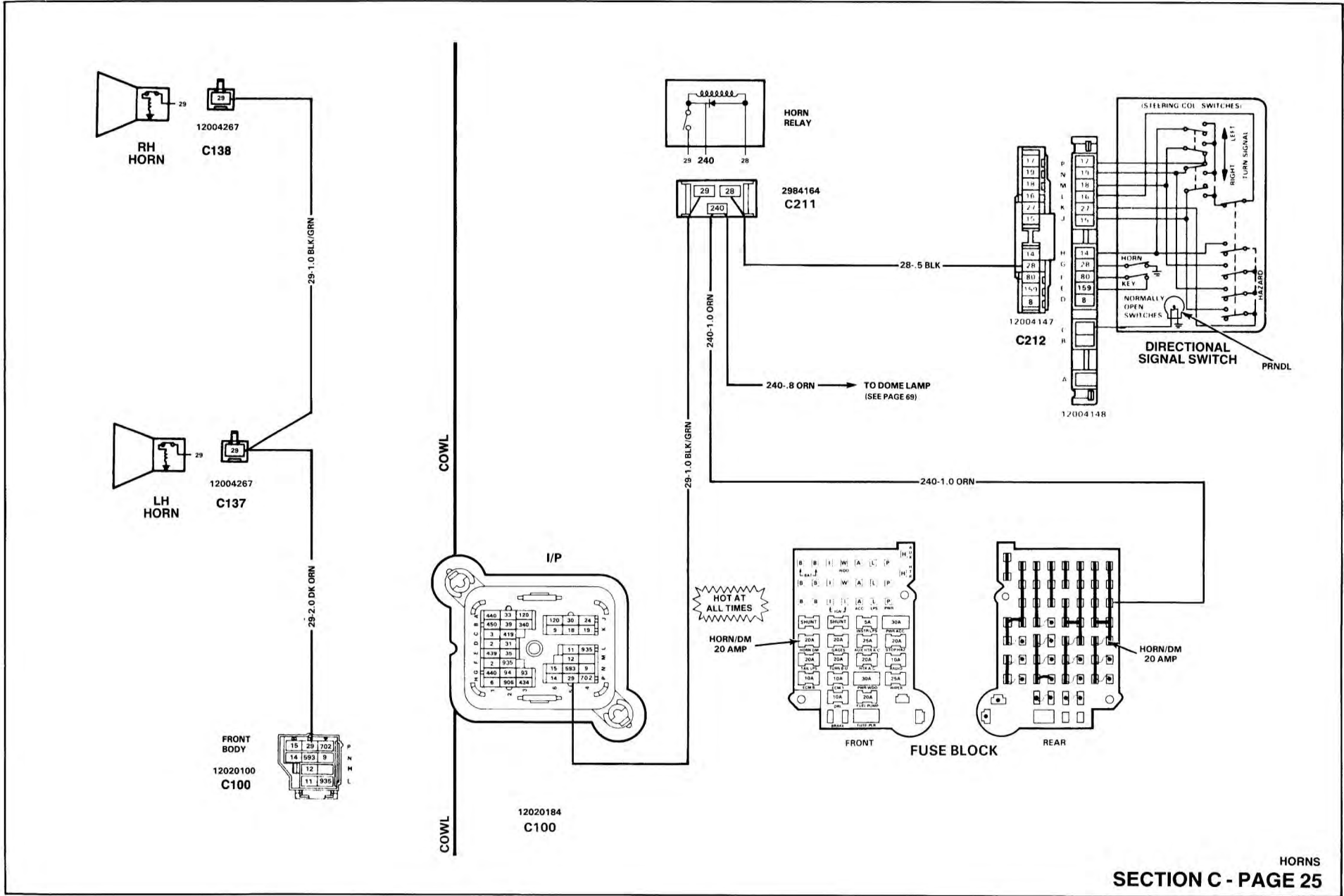
TEST	RESULT	ACTION
1. Connect test lamp from DK GRN (29) wire at inoperative horn connector to ground. Press horn switch.	Test lamp lights.	REPLACE horn.
	Test lamp does not light.	GO to step 2.
2. Remove horn relay. Connect test lamp from ORN (240) wire at horn relay connector C211 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (240) wire between horn relay connector and fuse block.
3. Insert horn relay. Disconnect directional signal switch connector C212. Use a jumper wire to ground BLK (28) wire at directional signal switch connector C212.	Horn does not sound.	GO to step 4.
	Horn sounds.	REPLACE horn switch.
4. Disconnect horn relay. Install a jumper wire from ORN (240) terminal to DK GRN (29) terminal at horn relay connector.	Horn sounds.	REPLACE horn relay.
	Horn does not sound.	LOCATE and REPAIR open in DK GRN (29) wire from horn relay connector to horn(s).

### HORN SOUNDS CONTINUOUSLY WITHOUT DEPRESSING HORN SWITCH

TEST	RESULT	ACTION
1. Disconnect directional signal switch connector C212.	Horn stops.	REPLACE horn switch.
	Horn continues to sound.	GO to step 2.
2. Disconnect horn relay. Check for a short to ground in BLK (28) wires.	No shorts found.	REPLACE relay.
	Short(s) found.	REPAIR or REPLACE as required.

## HORNS





## CIRCUIT OPERATION

### STARTER

When the Ignition Switch is moved to the START position, battery voltage is applied to the Starter Solenoid. Both solenoid windings are energized. The circuit through the Pull-In Winding is completed to ground through the Starter Motor. The windings work together magnetically to pull in and hold in the Plunger. The Plunger moves the Shift Lever. This action causes the Starter Drive Assembly to rotate as it engages the Flywheel ring gear on the engine. At the same time, the Plunger also closes the solenoid switch contacts in the Starter Solenoid. Full battery voltage is applied directly to the Starter Motor and it cranks the engine.

As soon as the Solenoid Switch contacts close, voltage is no longer applied through the Pull-In Winding, since battery voltage is applied to both ends of the windings. The Hold-In Winding remains energized, and its magnetic field is strong enough to hold the Plunger, Shift Lever, and Drive Assembly Solenoid Switch contacts in place to continue cranking the engine.

When the Ignition Switch is released from the START position, battery voltage is removed from the PPL (6) wire and the junction of the two windings. Voltage is applied from the Motor contacts through both windings to ground at the end of the Hold-In Winding. However, the voltage applied to the Pull-In Winding is now opposing the voltage applied when the winding was first energized. The magnetic fields of the Pull-In and Hold-In Windings now oppose one another. This action of the windings, with the help of the Return Spring, causes the Starter Drive Assembly to disengage and Solenoid Switch contacts to

open simultaneously. As soon as the contacts open, the starter circuit is turned off.

### CHARGING

The Generator provides voltage to operate the vehicle's electrical system and to charge the Battery. A magnetic field is created when current flows through the Rotor. This field rotates as the Rotor is driven by the engine, creating an AC voltage in the Stator windings. The AC voltage is converted to DC by the rectifier bridge and is supplied to the electrical system at the Battery terminal.

This Generator's regulator uses digital techniques to supply the Rotor current and thereby control the output voltage. The Rotor current is proportional to the width of the electrical pulses supplied to it by the Regulator. When the Ignition Switch is placed in RUN, narrow width pulses are supplied to the Rotor, creating a weak magnetic field. When the engine is started, the Regulator senses Generator rotation by detecting AC voltage at the Stator through an internal wire. Once the engine is running the Regulator varies the field current by controlling the pulse width. This regulates the Generator output voltage for proper battery charging and electrical system operation.

The digital regulator controls the VOLTS Indicator light with a solid state light driver. The light driver turns on the light whenever undervoltage, overvoltage or a stopped Generator is detected.

## COMPONENT LOCATION

		Page	Figure
Battery	LH front of cowl	.89	5
Distributor (P52)	Top rear of engine	.89	6
Distributor (P62)	Top rear of engine	.90	7
Electronic Control Module	Under driver's seat	.95	21
Fuse Block	LH side of cowl, under I/P	.92	13
Generator	RH front of engine	.90	8
Ignition Switch	RH side of steering column	.95	20
Junction Block	LH front of cowl	.89	5
Starter Motor Solenoid	Lower RH side of engine	.90	8
Grommet 100	Under driver's seat	.95	21
C100	Engine compartment, LH side of cowl	.91	9
C118 (P52)	At distributor	.89	6
C118 (P62)	At distributor	.90	7
C124 (P52)	Top rear of engine	.89	6
C124 (P62)	Top rear of engine	.90	7
C126	At generator	.90	8
C139 (P52)	At ignition coil	.89	6
C139 (P62)	At ignition coil	.90	7
C140	To tachometer, top rear of engine	.90	7
C207	RH side of steering column, under I/P	.92	12
C209	Behind I/P, at I/P cluster	.96	24
C308	At ECM, under driver's seat	.95	21
G102	On RH frame rail, beneath battery	.89	5
G103	Rear, RH cylinder head	.89	5
S102	Engine wiring harness, center of cowl	.91	9

## START AND CHARGE

### SECTION C - PAGE 26

## COMPONENT LOCATION

		Page	Figure
S103	Engine harness, RH side of engine	.90	8
S206	I/P harness, above steering column	.92	12
S207	I/P harness, above fuse block	.92	13
S208	I/P harness, above fuse block	.92	13
S300	Under driver's seat	.95	21

## TROUBLESHOOTING CHART—START AND CHARGE

### ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK

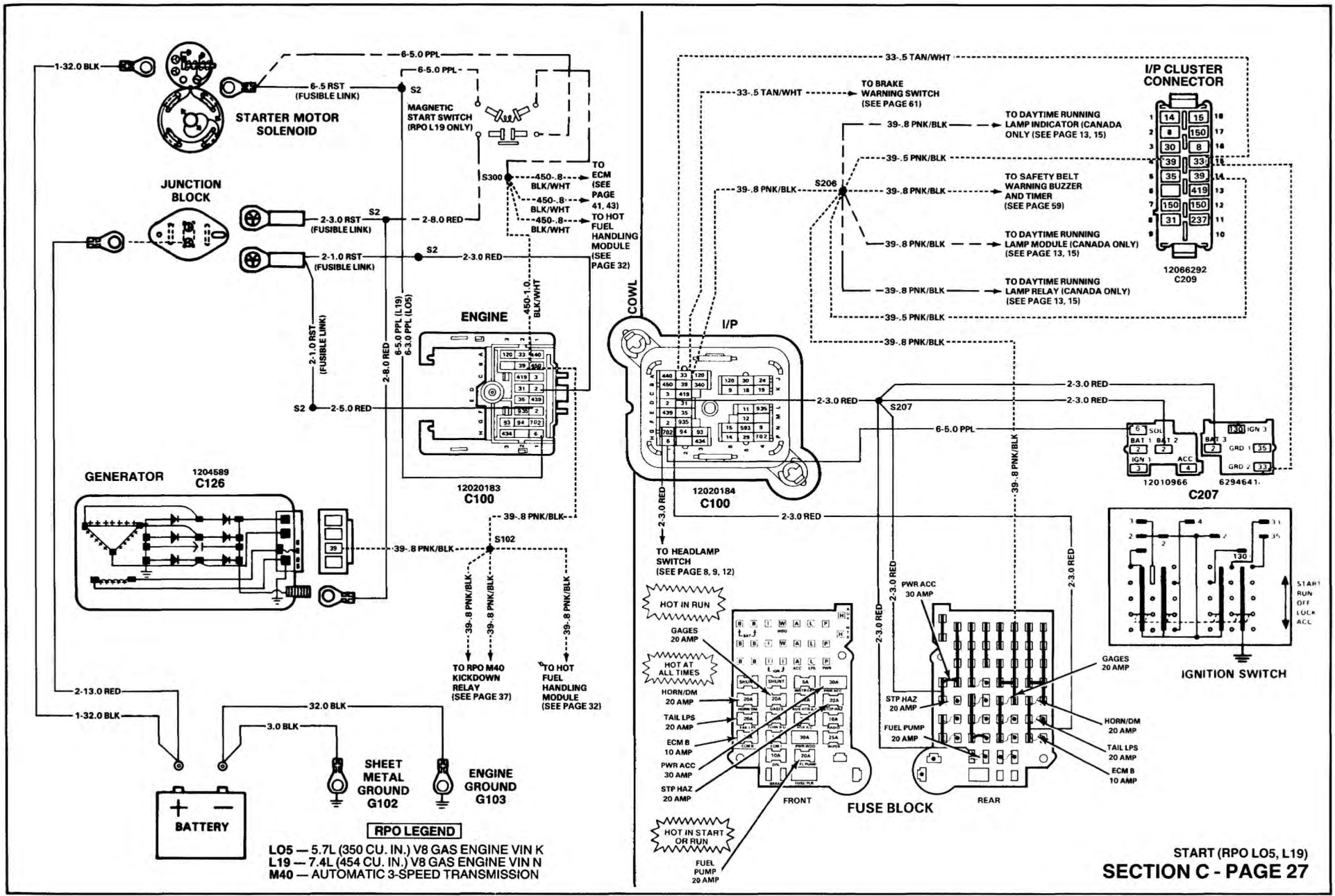
TEST	RESULT	ACTION
1. Place transmission in PARK (auto) or depress clutch pedal for manual transmission. Connect a voltmeter from PPL (6) wire at starter solenoid to ground. Turn ignition switch to START position.	Battery voltage.	GO to step 2.
	No voltage.	GO to step 3 for manual transmission.
2. Connect voltmeter from PPL (6) wire to starter mounting bolts.	Battery voltage.	REPLACE starter solenoid.
	Less than battery voltage.	CLEAN starter motor mounting bolts, starter motor, and mounting surface.
3. With ignition switch OFF, connect a voltmeter from BAT 2 terminal at ignition switch connector C207 to ground. Repeat step except connect from BAT 3 terminal to ground.	Battery voltage.	REPLACE ignition switch.
	No voltage.	LOCATE and REPAIR open in RED (2) wires and fusible link at junction block.

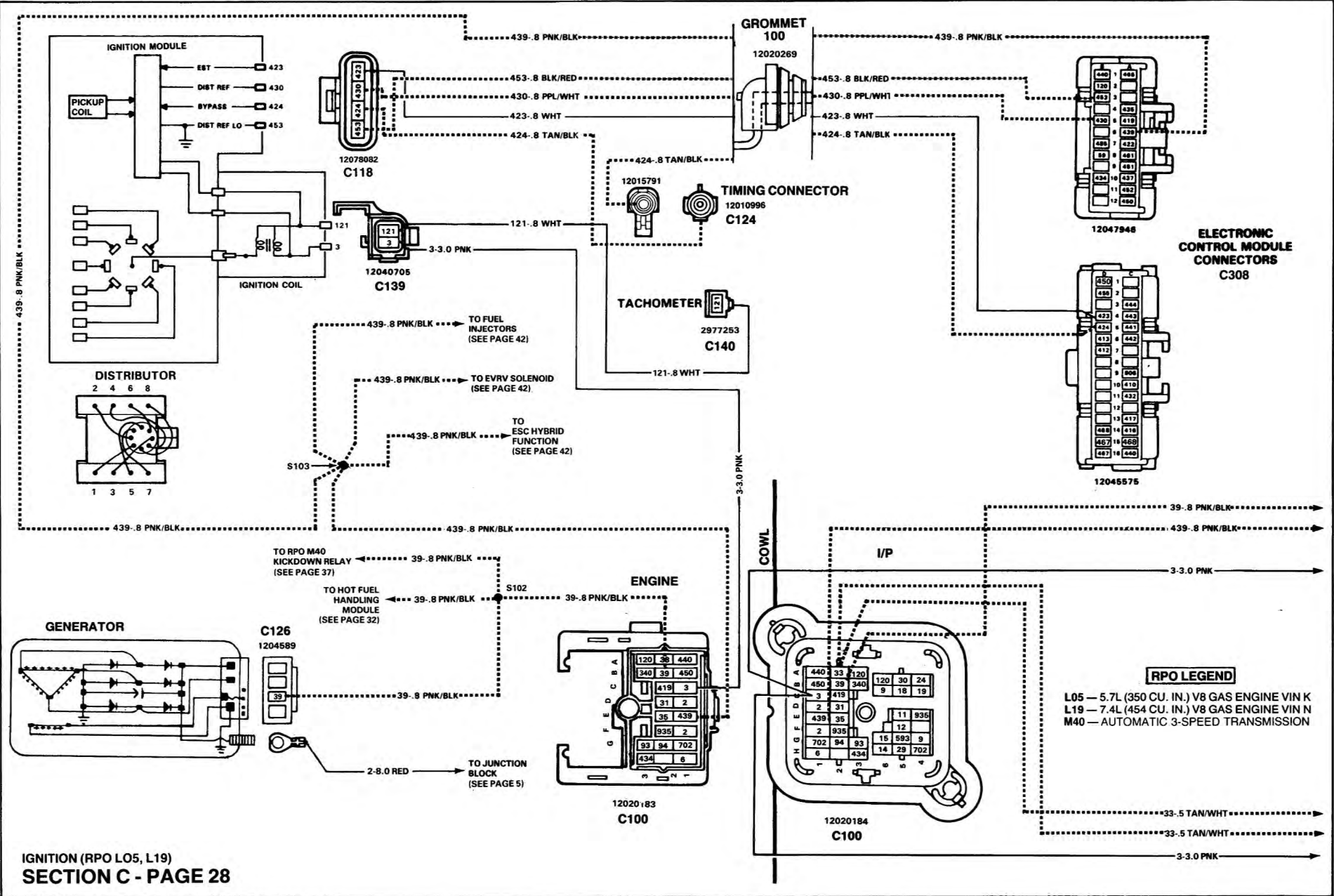
### STARTER SOLENOID CLICKS, ENGINE DOES NOT CRANK OR CRANKS SLOWLY

TEST	RESULT	ACTION
1. Remove CRANK fuse. Connect a voltmeter to positive and negative battery terminals. Turn ignition switch to START.	Voltage reading greater than 9.5 volts after 15 seconds cranking.	GO to step 2.
	Voltage less than 9.5 volts after 15 seconds cranking.	PERFORM a Battery Load Test. Refer to Section 6D in service manual.
2. Connect a voltmeter from negative battery terminal to engine block.	Less than .5 volts.	GO to step 3.
	More than .5 volts.	REPLACE negative battery cable.
3. Connect voltmeter from positive battery terminal to starter solenoid terminal at BLK (2) wire.	Less than .5 volts.	REPAIR starter motor.
	More than .5 volts.	REPLACE positive battery cable.

### BATTERY IS UNDERCHARGED OR OVERCHARGED

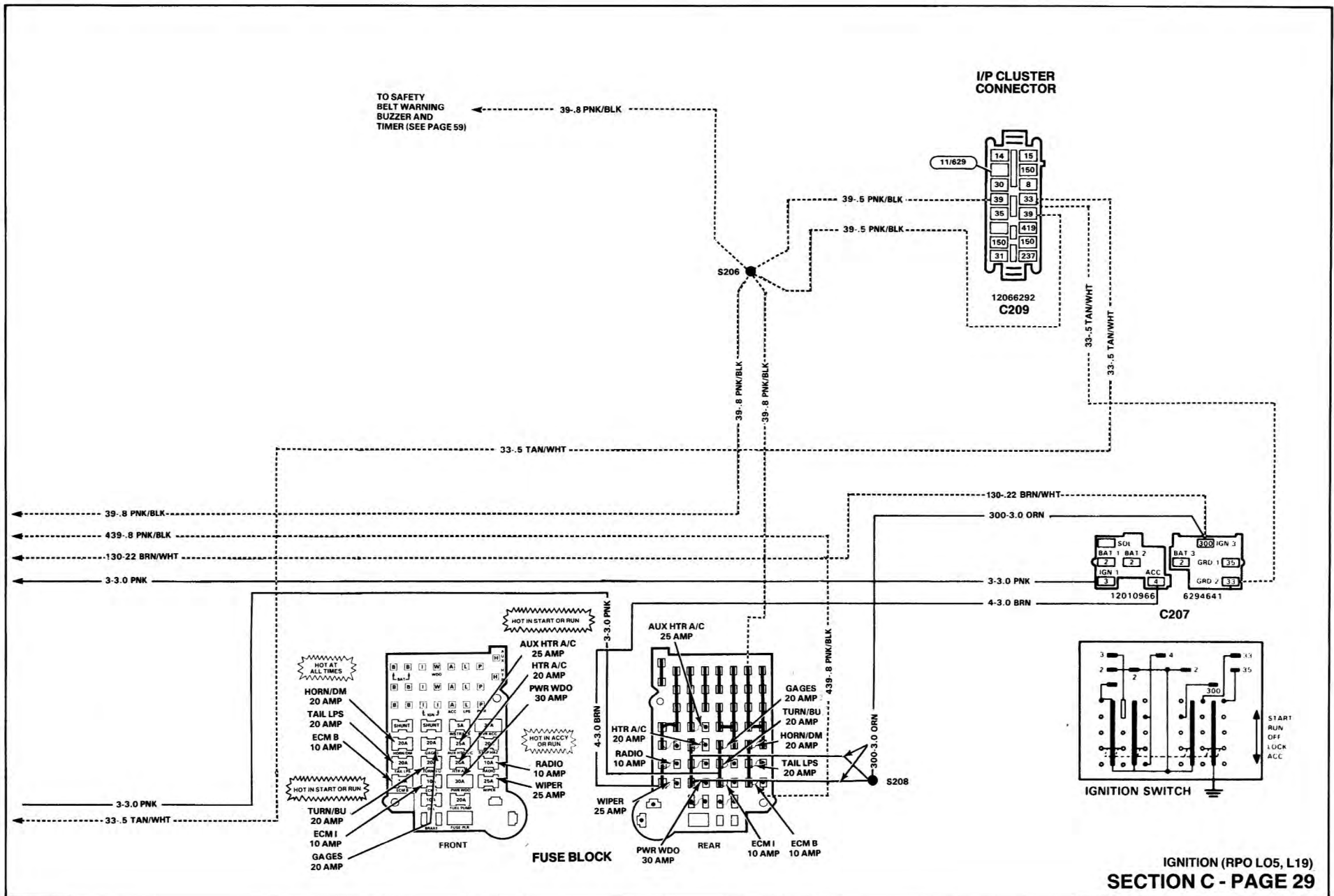
TEST	RESULT	ACTION
1. Connect voltmeter from RED (2) wire at generator to ground.	Battery voltage.	GO to step 2.
	No voltage.	LOCATE and REPAIR open in RED (2) wire and fusible link from generator to junction block.
2. Reconnect generator connector C109 and terminal. Have all accessories turned off and engine running at fast idle. Connect voltmeter from battery terminal on generator to ground.	Reading of 13-16 volts.	PERFORM Generator Bench Test. Refer to Section 6D in service manual.
	Reading of less than or greater than 13-16 volts.	REPAIR generator.





**IGNITION (RPO L05, L19)  
SECTION C - PAGE 28**

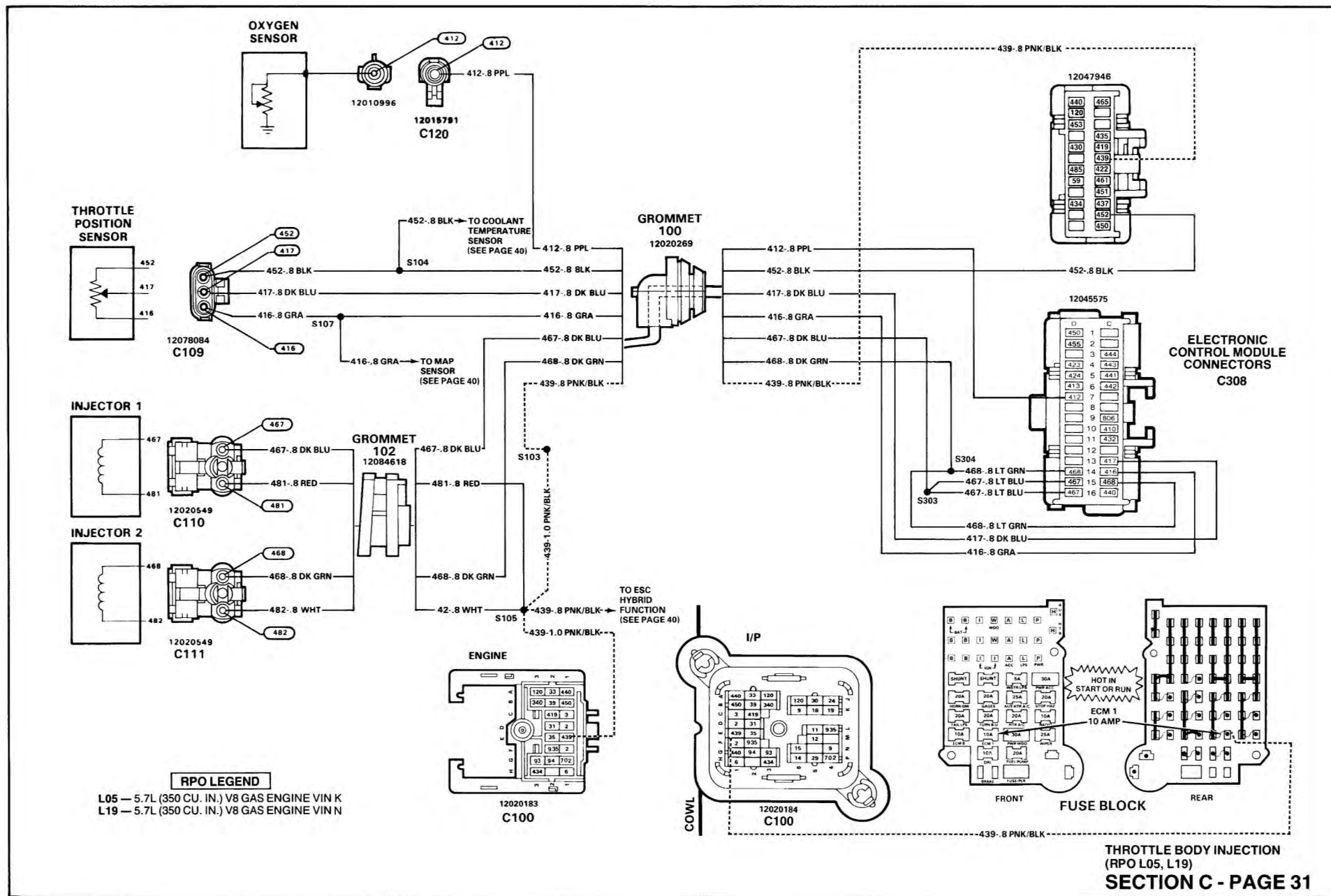
**RPO LEGEND**  
 L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K  
 L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N  
 M40 — AUTOMATIC 3-SPEED TRANSMISSION



## COMPONENT LOCATION

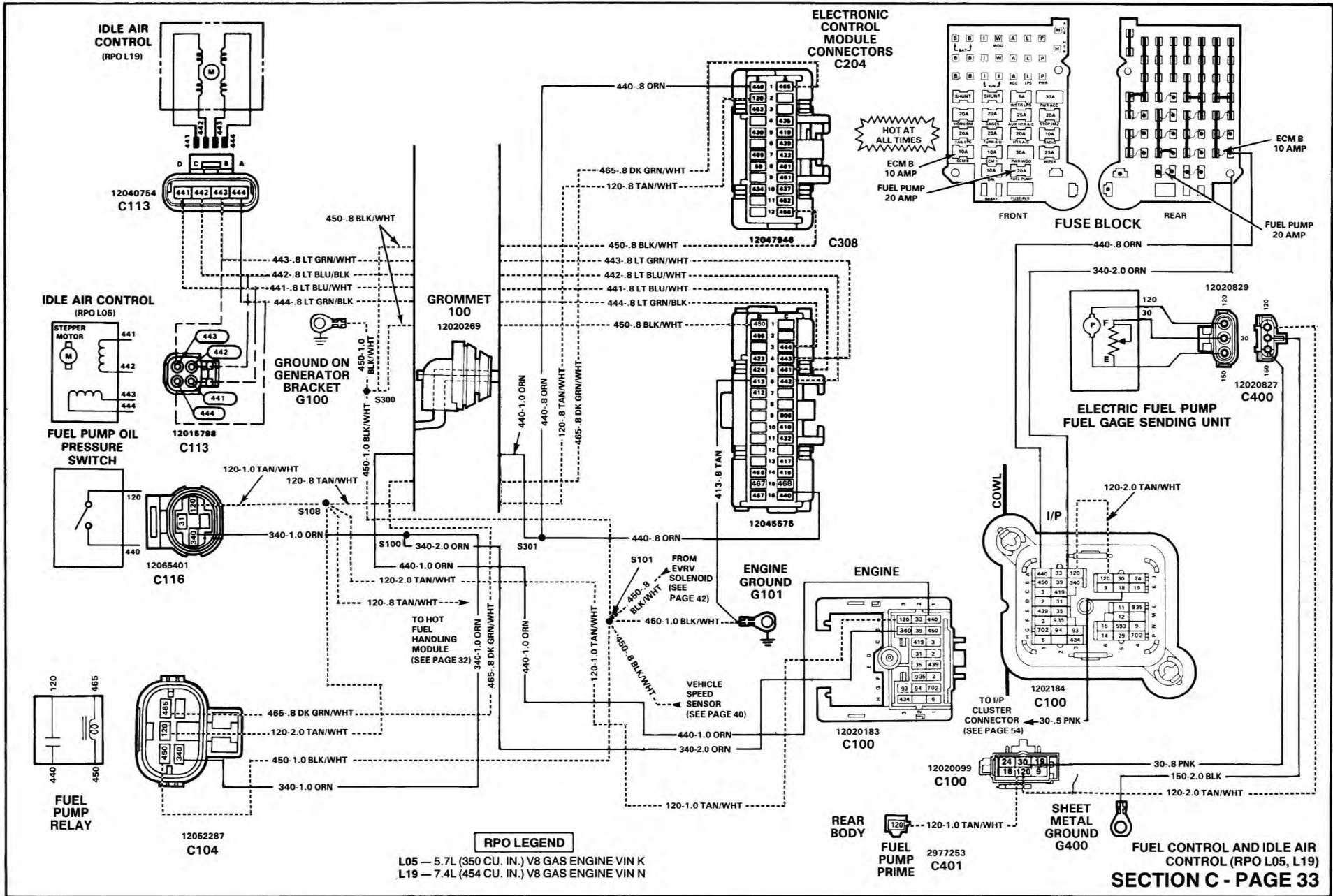
Page — Figure

Electric Fuel Pump/Fuel Gage			
Sending Unit	In top of fuel tank	.98 —	30
Electronic Control Module	Under driver's seat	.95 —	21
Fuel Pump/Oil Pressure Switch	Top LH rear of engine	.90 —	7
Fuel Pump Relay	RH side of cowl	.91 —	9
Fuse Block	LH side of cowl, under I/P	.92 —	13
Grommet 100	Under driver's seat	.95 —	21
Grommet 102	Engine compartment, under throttle body	.90 —	8
Hot Fuel Handling Module	Under driver's seat	.95 —	21
Idle Air Control	RH side of engine	.90 —	8
Injector 1	On throttle body	.90 —	8
Injector 2	On throttle body	.90 —	8
Oxygen Sensor	In exhaust pipe	.89 —	6
Throttle Position Sensor	RH side of throttle body	.90 —	8
C100	Engine compartment, LH side of cowl	.91 —	9
C104	At fuel pump relay, RH side of cowl	.91 —	9
C109	At throttle position sensor	.90 —	8
C110	At injector 1	.90 —	8
C111	At injector 2	.90 —	8
C113	At idle air control	.90 —	8
C116	At fuel pump/oil pressure switch	.90 —	7
C120	LH side of transmission case	.89 —	6
C308	At ECM, under driver's seat	.95 —	21
C312	Under driver's seat	.95 —	21
C313	At hot fuel handling module	.95 —	21
C400	At electric fuel pump/fuel gage sending unit	.98 —	30
C401	At fuel tank crossmember, LH frame side rail	.98 —	30
G100	On generator bracket	.90 —	8
G101	Top front center of engine	.90 —	7
G400	LH side of rear crossmember, in front of fuel tank	.98 —	30
S100	Engine harness, RH side of cowl	.91 —	9
S101	Engine harness, RH side of cowl	.91 —	9
S102	Engine harness, center of cowl	.91 —	9
S105	TBI harness, RH front of engine	.90 —	8
S108	Engine harness, rear of engine	.90 —	7
S206	I/P harness, above steering column	.92 —	12
S300	Under driver's seat	.95 —	21
S301	Under driver's seat	.95 —	21
S303	Under driver's seat	.95 —	21
S304	Under driver's seat	.95 —	21









### CIRCUIT OPERATION

Battery voltage is applied to the Auxiliary Cooling Fan Relay at the RED (2) wire at all times and to the PNK/BLK (39) wire when the Ignition Switch is in RUN or START. When the Auxiliary Cooling Fan Switch closes, circuit 935

is grounded and Auxiliary Cooling Fan Relay energizes. Battery voltage is applied across the Auxiliary Cooling Fan Motor and the Auxiliary Cooling Fan runs.

### COMPONENT LOCATION

Page — Figure

Auxiliary Cooling Fan, LH	LH front of engine compartment	—	—
Auxiliary Cooling Fan Relay	RH side, front of cowl	.91	9
Auxiliary Cooling Fan, RH	RH front of engine compartment	—	—
Auxiliary Cooling Fan Switch	Behind, RH side of radiator	.88	3
Fuse Block	LH side of cowl, under I/P	.92	13
Junction Block	LH front of cowl	.89	5
C100	Engine compartment, LH side of cowl	.91	9
C123	At auxiliary cooling fan relay	.91	9
C125	At auxiliary cooling fan switch	.88	3
G105 (P52)	On side of radiator support	.88	3
G105 (P62)	At radiator support	.88	4
S102	Engine wiring harness, center of cowl	.91	9
S206	I/P harness, above steering column	.92	12

### COOLING FAN RUNS CONTINUOUSLY

TEST	RESULT	ACTION
1. Place ignition switch in RUN position and with engine coolant temperature below 107°C (225°F), disconnect fan temperature switch connector C125.	Cooling fan runs.	GO to step 2.
	Cooling fan does not run.	REPLACE fan temperature switch.
2. Disconnect fan relay connector C123. Connect test lamp from PNK/BLK(39) to DK GRN (935) wires at fan relay connector C123.	Test lamp lights.	CHECK for short in DK GRN (935) wire from fan relay to fan temperature switch.
	Test lamp does not light.	REPLACE fan relay.

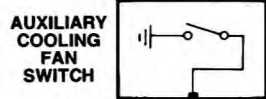
### TROUBLESHOOTING CHART—AUXILIARY COOLING FAN

#### COOLING FAN DOES NOT RUN

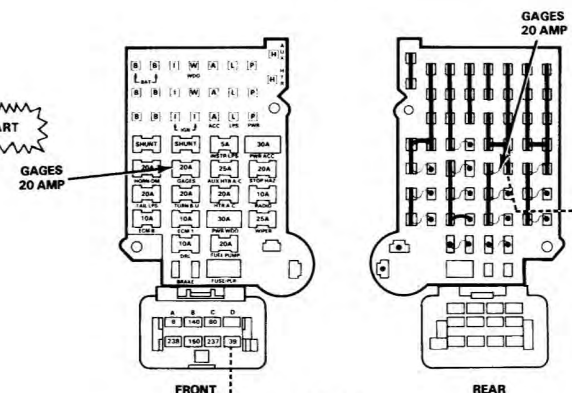
TEST	RESULT	ACTION
1. Place ignition switch in RUN. Disconnect fan temperature switch connector C125. Connect a fused jumper from DK GRN (935) wire at fan temperature switch connector C125 to ground.	Cooling fan does not run.	GO to step 2.
	Cooling fan runs.	REPLACE cooling fan temperature switch.
2. Disconnect fan relay connector C123. Connect test lamp from PNK/BLK (39) wire at fan relay connector C123 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	CHECK condition of fuse (GAGES) and/or LOCATE and REPAIR open in PNK/BLK (39) wire from fan relay to fuse block.
3. Connect fused jumper from DK GRN (935) wire at fan temperature switch connector C125 to ground. Connect test lamp from PNK/BLK (39) wire to DK GRN (935) wire at fan relay connector C141.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (935) wire.
4. Connect test lamp from RED (2) wire at fan relay connector C123 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in RED (2) wire and fusible link.
5. Connect 30 amp fused jumper from RED (2) wire to BLK/RED (702) wire at the fan relay connector C123.	Cooling fan does not run.	GO to step 6.
	Cooling fan runs.	REPLACE cooling fan relay.
6. Leave 30 amp fused jumper connected. Disconnect cooling fan connector C139. Connect a test lamp from BLK/RED (702) at cooling fan connector to ground.	Test lamp lights.	REPLACE cooling fan.
	Test lamp does not light.	LOCATE and REPAIR open in BLK/RED and BLK/WHT (702) wires from cooling fan to fan relay.

AUXILIARY COOLING FAN  
(RPO L19 WITH RPO C60)

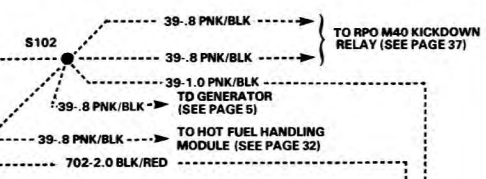
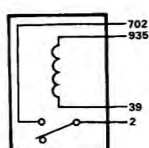
SECTION C - PAGE 34



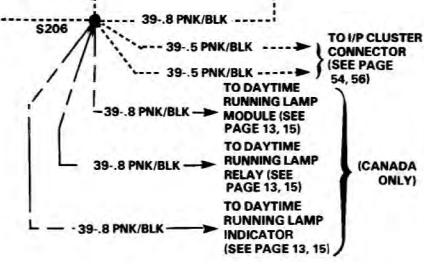
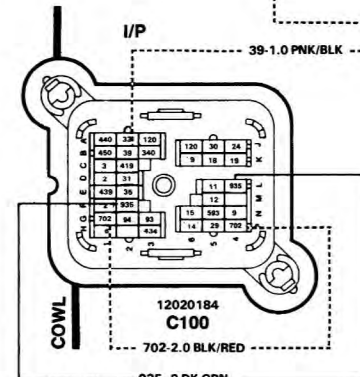
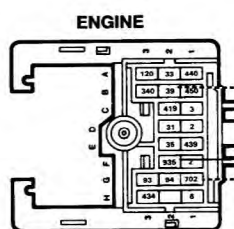
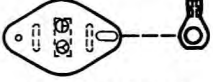
HOT IN RUN OR START



FUSE BLOCK

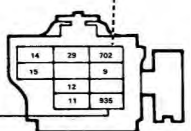


HOT AT ALL TIMES



RPO LEGEND

C60 — FRONT MANUAL AIR CONDITIONING  
 L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N  
 M40 — AUTOMATIC 3-SPEED TRANSMISSION



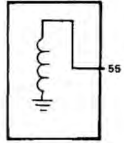
AUXILIARY COOLING FAN (RPO L19 WITH RPO C60)  
**SECTION C - PAGE 35**

**COMPONENT LOCATION**

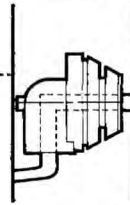
Page — Figure

Electronic Control Module . . . . .	Under driver's seat . . . . .	.95 —	21
Fuse Block . . . . .	LH side of cowl, under I/P . . . . .	.92 —	13
Grommet 100 . . . . .	Under driver's seat . . . . .	.95 —	21
Kickdown Relay . . . . .	RH side of cowl . . . . .	.91 —	9
Transmission Kickdown Solenoid . . . . .	Rear, LH side of transmission . . . . .	.90 —	7
C100 . . . . .	Engine compartment, LH side of cowl . . . . .	.91 —	9
C105 . . . . .	At transmission kickdown relay . . . . .	.91 —	9
C121 . . . . .	At transmission kickdown solenoid . . . . .	.90 —	7
C308 . . . . .	At ECM, under driver's seat . . . . .	.95 —	21
S102 . . . . .	Engine wiring harness, center of cowl . . . . .	.91 —	9
S206 . . . . .	I/P harness, above steering column . . . . .	.92 —	12

**TRANSMISSION  
KICKDOWN  
SOLENOID**

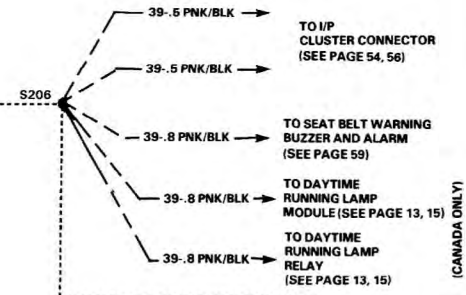
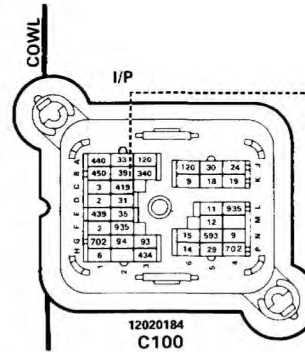
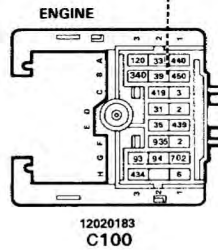
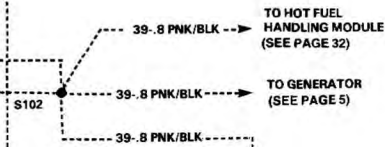
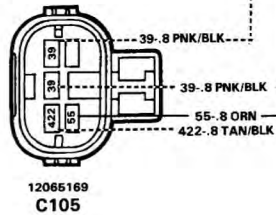
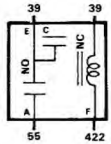


**GROMMET  
100  
12020269**



**ELECTRONIC  
CONTROL  
MODULE  
CONNECTOR  
C308**

**KICKDOWN  
RELAY  
LO5/L19 ONLY**

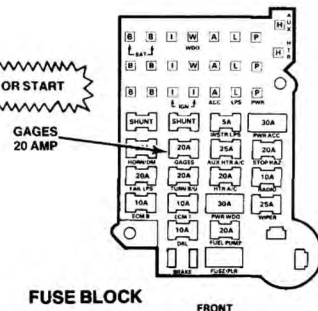


(CANADA ONLY)

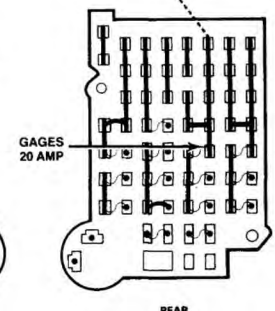
**RPO LEGEND**

- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- M40 — AUTOMATIC 3-SPEED TRANSMISSION

HOT IN RUN OR START



**FUSE BLOCK  
FRONT**



**AUTOMATIC TRANSMISSION  
KICKDOWN SOLENOID (RPO M40)  
SECTION C - PAGE 37**

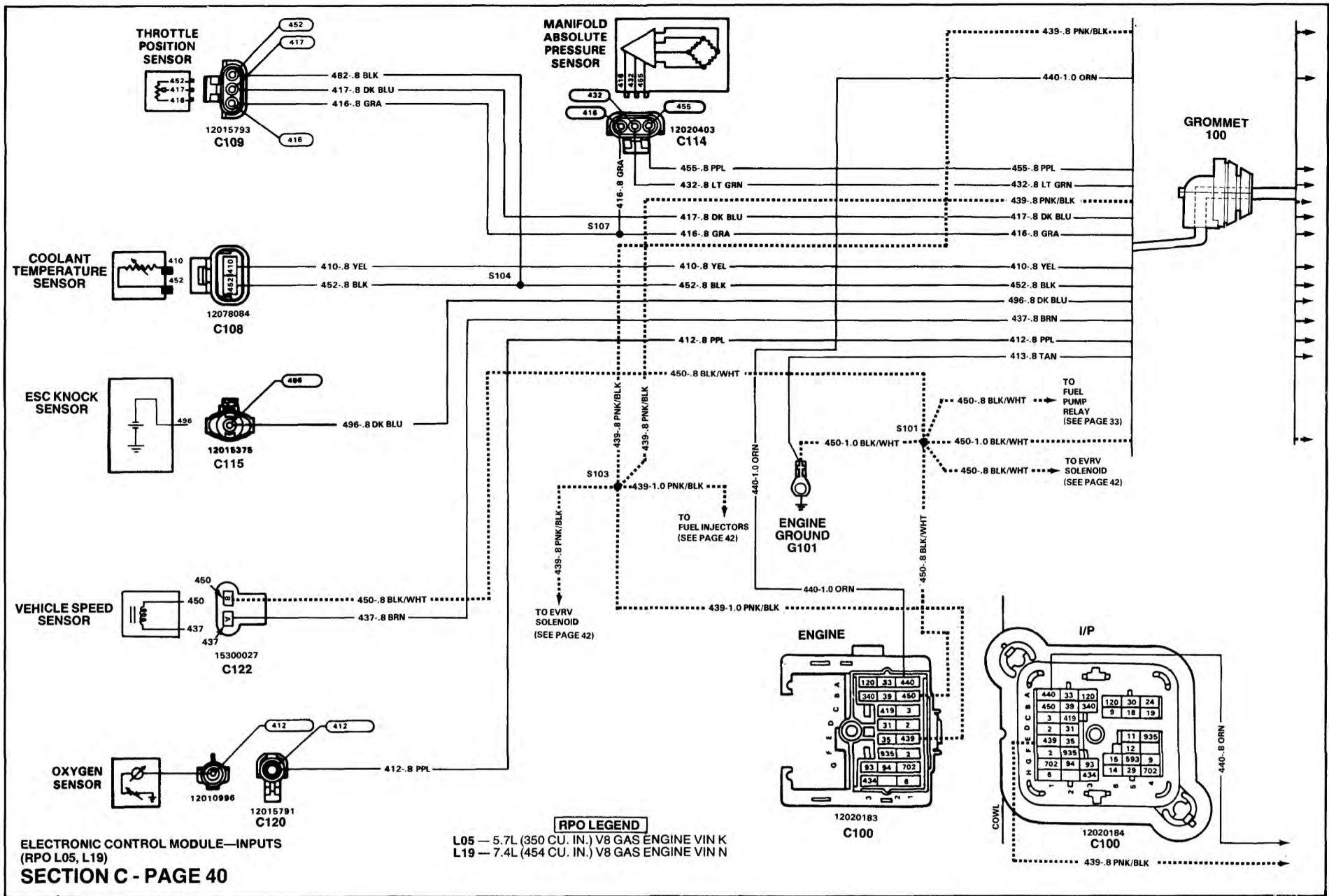
**COMPONENT LOCATION**

Page — Figure

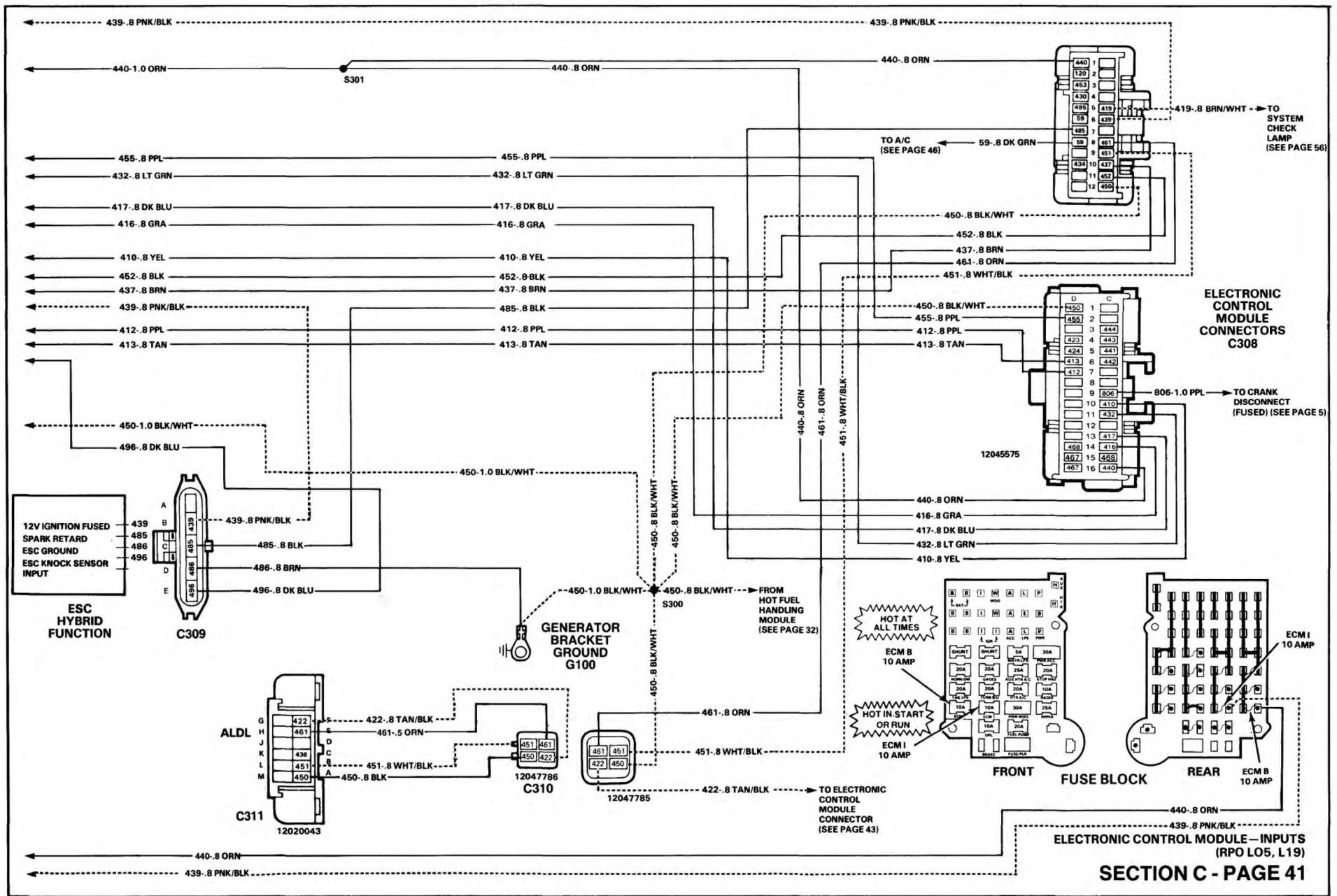
ALDL .....	Under LH side of I/P .....	.93 —	14
Coolant Temperature Sensor .....	Top, center of engine .....	.90 —	7
Distributor (P52) .....	Top, rear of engine .....	.89 —	6
Distributor (P62) .....	Top, rear of engine .....	.90 —	7
Electronic Control Module .....	Under driver's seat .....	.95 —	21
ESC Hybrid Function .....	Under driver's seat .....	.95 —	21
ESC Knock Sensor .....	Top, RH side of engine .....	.90 —	8
EVRV .....	Top, RH side of engine .....	.90 —	8
Fuel Pump Oil Pressure Sensor Switch .....	Top, rear of engine .....	.90 —	7
Fuel Pump Relay (P52) .....	RH side of cowl .....	.91 —	9
Fuel Pump Relay (P62) .....	RH side of cowl .....	.91 —	9
Fuse Block .....	LH side of cowl, under I/P .....	.92 —	13
Grommet 100 .....	Under driver's seat .....	.95 —	21
Grommet 102 .....	Engine compartment, under throttle body .....	.90 —	8
Idle Air Control Actuator .....	RH side of engine .....	.90 —	8
INJ-1 .....	On throttle body .....	.90 —	8
INJ-2 .....	On throttle body .....	.90 —	8
Manifold Absolute Pressure Sensor .....	Top, RH side of engine .....	.90 —	8
Oxygen Sensor .....	In exhaust pipe .....	.89 —	6
Throttle Position Sensor .....	RH side of throttle body .....	.90 —	8
Vehicle Speed Sensor .....	LH side of transmission case .....	—	—
C100 .....	Engine compartment, LH side of cowl .....	.91 —	9
C104 .....	At fuel pump relay, RH side of cowl .....	.91 —	9
C108 .....	Front of engine, at coolant temperature sensor .....	.90 —	7
C109 .....	At throttle position sensor .....	.90 —	8
C110 .....	At injector 1 .....	.90 —	8
C111 .....	At injector 2 .....	.90 —	8
C112 .....	Top, RH side of engine .....	.90 —	8
C113 .....	At idle air control .....	.90 —	8
C114 .....	At MAP sensor .....	.90 —	8
C115 .....	At lower RH side of engine .....	.90 —	8
C116 (RPO L05) .....	Top, LH rear of engine .....	.90 —	7
C118 (P52) .....	At distributor .....	.89 —	6
C118 (P62) .....	At distributor .....	.90 —	7
C120 .....	LH side of transmission case .....	.90 —	6
C122 (P52) .....	Engine harness, rear of engine, top of transmission .....	.89 —	6
C122 (P62) .....	Engine harness, rear of engine, top of transmission .....	.90 —	7
C124 (P52) .....	Top, rear of engine .....	.89 —	6
C124 (P62) .....	Top, rear of engine .....	.90 —	7
C308 .....	At ECM, under driver's seat .....	.95 —	21
C309 (RPO L05) .....	Under driver's seat .....	.95 —	21
C309 (RPO L19) .....	Under driver's seat .....	.95 —	21
C310 .....	At ALDL pigtail .....	.95 —	21
C311 .....	Under LH side of I/P .....	.93 —	14
G100 .....	On generator bracket .....	.90 —	8
S100 .....	Engine harness, RH side of cowl .....	.91 —	9
S101 .....	Engine harness, RH side of cowl .....	.91 —	9
S103 .....	Engine harness, RH side of engine .....	.90 —	8
S104 .....	Engine harness, RH side of engine .....	.90 —	8
S105 .....	TBI harness, RH front of engine .....	.90 —	8
S107 .....	Engine harness, rear RH side of engine .....	.90 —	8
S108 .....	Engine harness, rear of engine .....	.90 —	7
S300 .....	Under driver's seat .....	.95 —	21
S301 .....	Under driver's seat .....	.95 —	21
S302 .....	Under driver's seat .....	.95 —	21
S303 .....	Under driver's seat .....	.95 —	21
S304 .....	Under driver's seat .....	.95 —	21

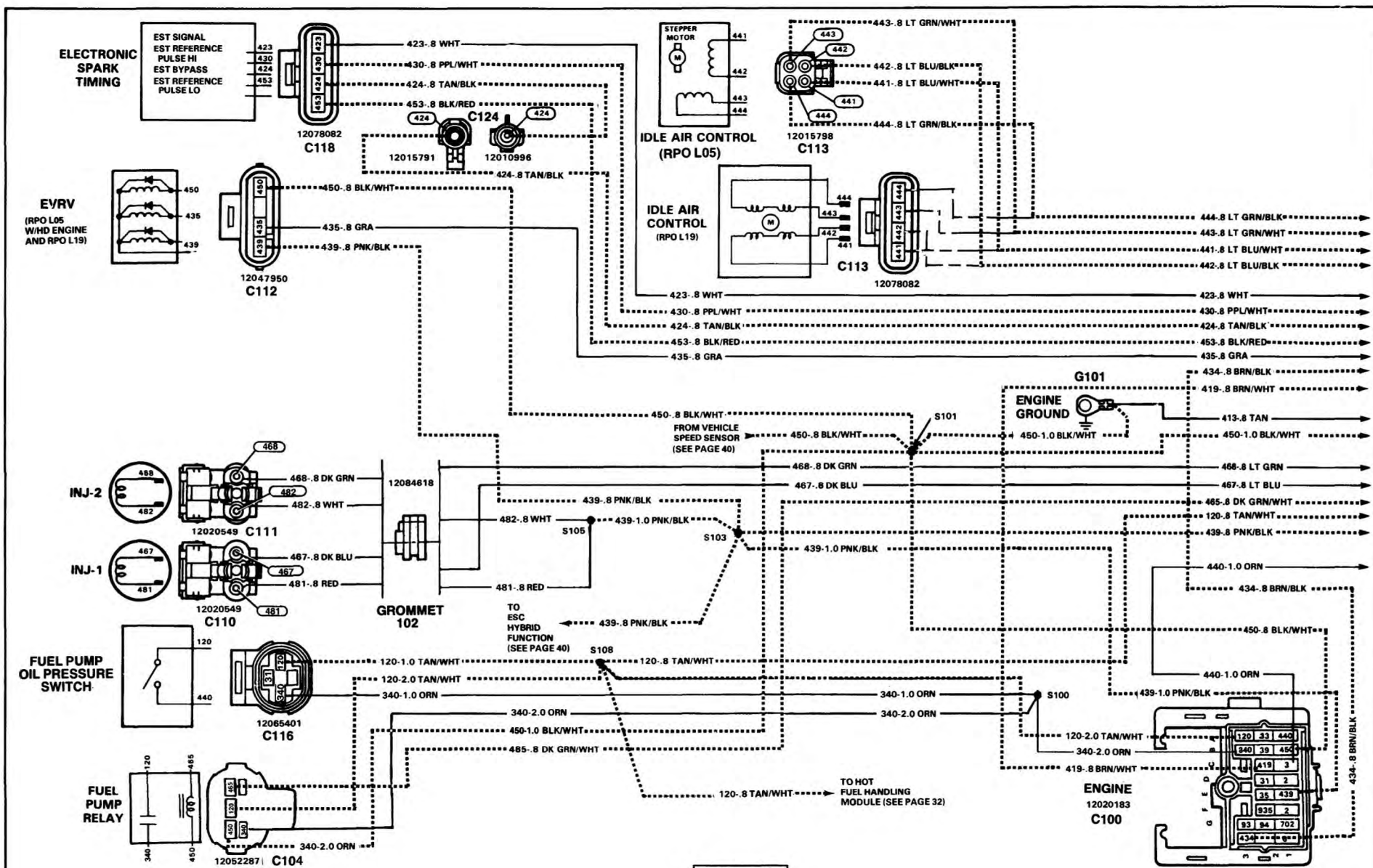
CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
465	.8	DK GRN/WHT	A1	FUEL PUMP RELAY DRIVE
			A2	NOT USED
			A3	NOT USED
435	.8	GRA	A4	EGR/SOLENOID
419	.8	BRN/WHT	A5	SYSTEM CHECK LAMP
439	.8	PNK/BLK	A6	12V IGNITION FUSED
422	.8	TAN/BLK	A7	RPO M40 KICKDOWN RELAY
461	.8	ORN	A8	SERIAL DATA
451	.8	WHT/BLK	A9	ASSEMBLY LINE DIAGNOSTIC LINK
437	.8	BRN	A10	SPEED SENSOR
452	.8	BLK	A11	5V RETURN B
450	.8	BLK/WHT	A12	SYSTEM RETURN
440	.8	ORN	B1	12V BATTERY FUSED
120	.8	TAN/WHT	B2	ELEC FUEL PUMP FUSED FEED
453	.8	BLK/RED	B3	DISTRIBUTOR REFERENCE LOW
			B4	NOT USED
430	.8	PPL/WHT	B5	DISTRIBUTOR REFERENCE HIGH
			B6	NOT USED
485	.8	BLK	B7	SPARK RETARD CONTROL
59	.8	DK GRN	B8	AIR CONDITIONING
			B9	NOT USED
434	.5	ORN/BLK	B10	PARK/NEUTRAL SWITCH
			B11	NOT USED
			B12	NOT USED

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
			C1	NOT USED
			C2	NOT USED
444	.8	LT GRN/BLK	C3	STEPPER COIL B LOW
443	.8	LT GRN/WHT	C4	STEPPER COIL B HIGH
441	.8	LT BLU/WHT	C5	STEPPER COIL A HIGH
442	.8	LT BLU/BLK	C6	STEPPER COIL A LOW
			C7	NOT USED
			C8	NOT USED
806	1.0	PPL/WHT	C9	CRANK DISCRETE FUSED
410	.8	YEL	C10	COOLANT TEMPERATURE
432	.8	LT GRN	C11	MANIFOLD ABSOLUTE PRESSURE
			C12	NOT USED
417	.8	DK BLU	C13	THROTTLE POSITION SENSOR
416	.8	GRA	C14	5V SENSOR REFERENCE
468	.8	LT GRN	C15	INJECTOR B DRIVE
440	.8	ORN	C16	12V BATTERY FUSED
450	.8	BLK/WHT	D1	SYSTEM GROUND
455	.8	PPL	D2	5V RETURN A
			D3	NOT USED
423	.8	WHT	D4	HEI SPARK TIMING
424	.8	TAN/BLK	D5	HEI BYPASS
413	.8	TAN	D6	OXYGEN SENSOR LOW
412	.8	PPL	D7	OXYGEN SENSOR HIGH
			D8	NOT USED
			D9	NOT USED
			D10	NOT USED
			D11	NOT USED
			D12	NOT USED
			D13	NOT USED
468	.8	LT GRN	D14	INJECTOR B DRIVE
467	.8	LT BLU	D15	INJECTOR A DRIVE
467	.8	LT BLU	D16	INJECTOR A DRIVE



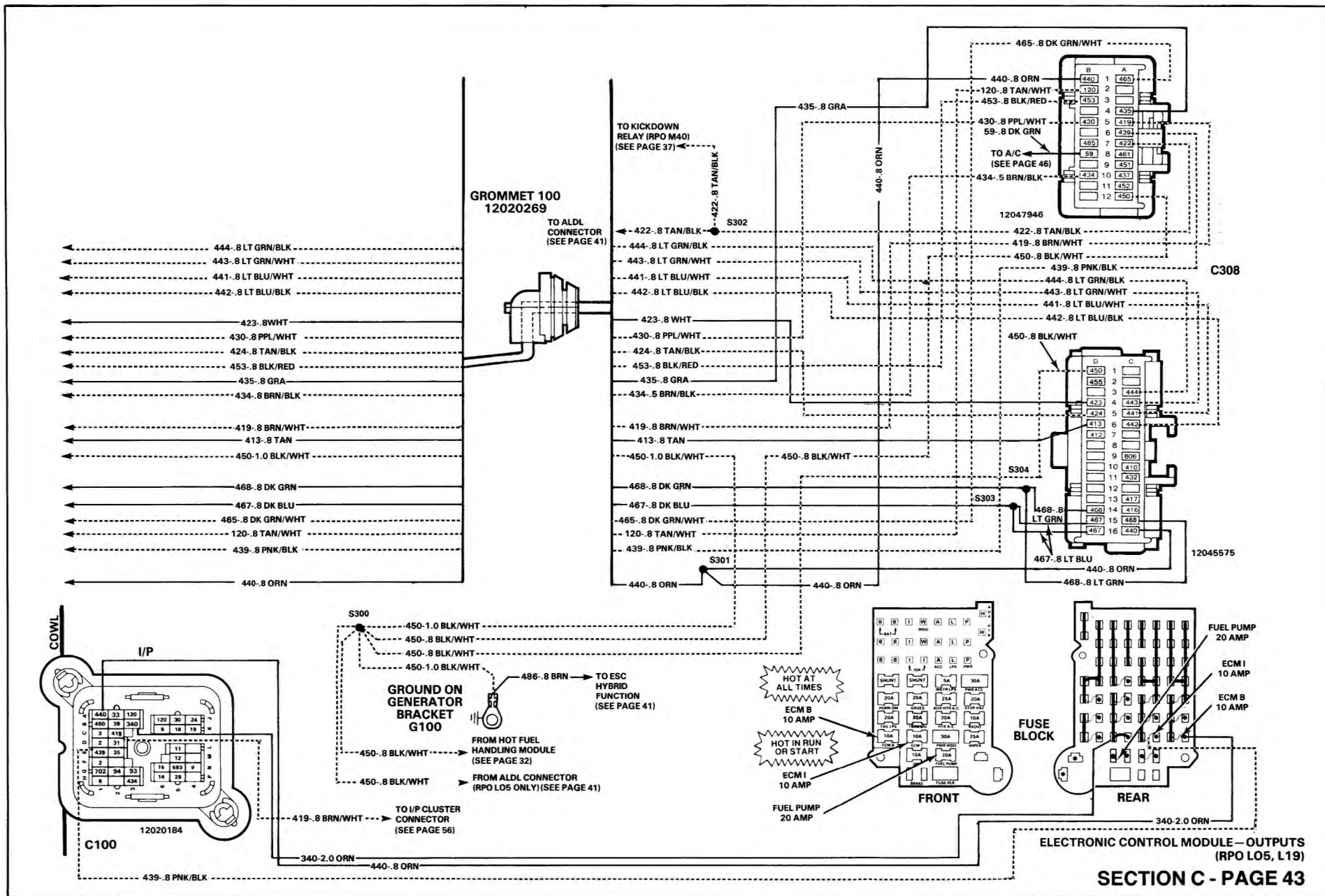






**RPO LEGEND**

- L05 — 5.7L (350 CU. IN.) V8 GAS ENGINE VIN K
- L19 — 7.4L (454 CU. IN.) V8 GAS ENGINE VIN N
- M40 — AUTOMATIC THREE SPEED TRANSMISSION



## CIRCUIT OPERATION

### COMPRESSOR CONTROLS

With the A/C-Heater Select Control in any mode except VENT or HEAT, current flows from the HTR-A/C fuse through the Selector Control, and Evaporator Pressure Control Switch to the A/C Compressor Clutch, and the A/C Compressor operates. At the same time a signal is sent to the Electronic Control Module (ECM). This A/C Request signal increases engine idle speed.

If the A/C system pressure drops below 25 psi, the Evaporator Pressure Control Switch opens, stopping current flow to the A/C Compressor. When the A/C system pressure rises to 45 psi, the switch closes and current again flows to the A/C Compressor.

The A/C Compressor Clutch Diode is connected across the terminals of the A/C Compressor Clutch. Whenever the clutch is de-energized, the magnetic field around it collapses, generating an induced voltage in the clutch coil. The Diode provides a path for the current resulting from the induced voltage so that other circuit components are not damaged.

### BLOWER MOTOR CONTROL

In all blower speeds except HI, power to the Blower Motor is supplied by the HTR-A/C fuse. In HI blower speed, the blower motor is supplied by Fuse Link C.

The Blower Motor operates whenever the A/C-Heater

Select Control is in MAX A/C, NORM A/C, BI-LEVEL, BLEND or DEFROST. Power through the A/C-Heater Select Control is available to the Blower resistors through the 51 (YEL) wire. The current then flows through all three resistors and the normally closed contacts of the HI Blower Relay to the Blower Motor and the Blower Motor runs at very low speed. With the A/C-Heater Select Control in VENT or HEAT no power is available to the Blower Motor.

With the Blower Switch in LO, current flows from the HTR-A/C fuse through the Blower Switch to the 63 (TAN) wire at the Blower Resistors. Current then flows through two of the resistors and the normally closed contacts of the HI Blower Relay to the Blower Motor. The Blower Motor then runs at low speed.

With the Blower Switch in MED, the blower operates the same as in Low Speed, except that the current is directed to the Blower Resistors through the 72 (LT BLU) wire and passes through only one resistor and the Blower Motor runs at slightly faster speed.

With the Blower Switch in HI, current bypasses the Blower Resistors and flows to the HI Blower Relay. This current energizes the relay and closes the normally open contacts of the relay. This allows current to flow from Fuse Link B through the relay to the Blower Motor and the Blower Motor runs at high speed.

### COMPONENT LOCATION

		Page	Figure
A/C Compressor	Engine compartment, in front of RH cylinder head	.91	10
Blower Switch	A/C control assembly, RH side of I/P cluster	.93	15
Blower Motor	Engine compartment, RH side of cowl	.91	10
Electronic Control Module	Under driver's seat	.95	21
Evaporator Pressure Control Switch	Engine compartment, front of evaporator accumulator	.91	10
Fuse Block	LH side of cowl, under I/P	.92	13
Grommet 103	Engine compartment, RH side of cowl	.91	10
HI Blower Relay	Engine compartment, RH side of cowl	.91	10
Junction Block	Engine compartment, LH side of cowl	.91	10
Resistor	Engine compartment, RH side of cowl	.91	10
Selector Control	A/C control assembly, right of I/P cluster	.93	15
C141	RH side of I/P, right of blower motor	.91	10
C142	Front of blower motor	.91	10
C143	RH side of I/P, right of blower motor	.91	10
C144	Engine compartment, front of evaporator accumulator	.91	10
C145	Center of engine compartment, above air cleaner snorkel	.91	10
C150	At top of A/C compressor	.91	10
C213	At A/C control assembly, right of I/P cluster	.93	15
C214	At A/C control assembly, right of I/P cluster	.93	15
C215 (RPO L05)	Behind I/P, RH side of steering column	.93	15
C308	Under driver's seat	.95	21
G107	Engine compartment, above air cleaner snorkel	.91	10
G108	Engine compartment, center of cowl	.91	10

## TROUBLESHOOTING CHART—AIR CONDITIONING

### A/C COMPRESSOR CLUTCH DOES NOT ENGAGE

NOTE: Outside temperature must be above 16°C (60°F) in order to properly diagnose system.

TEST	RESULT	ACTION
1. Place ignition in RUN, A/C ON and blower to HI. Listen for blower operation.	Blower motor runs.	GO to step 3.
	Blower motor does not run.	GO to step 2.
2. Connect test lamp from BRN (50) wire at selector control connector C214 to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) wire between selector control connector C214 and fuse block.
	Test lamp lights.	GO to step 3.
3. Connect a test lamp from LT GRN (66) wire at evaporator pressure control switch connector C144 to ground.	Test lamp does not light.	LOCATE and REPAIR open in LT GRN (66) wire between evaporator pressure control switch connector C144 and selector control connector C214 or REPLACE selector control switch.
	Test lamp lights.	GO to step 4.
4. Connect a test lamp from DK GRN (59) wire at A/C compressor connector C150 to ground.	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (59) wire between selector control switch connector C144 or REPLACE evaporator pressure control switch.
	Test lamp lights.	GO to step 5.
5. Connect a test lamp from DK GRN (59) wire to BLK (150) wire at A/C compressor connector C150.	Test lamp lights.	REPLACE A/C compressor.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire between A/C compressor and ground G107.

### BLOWER MOTOR DOES NOT OPERATE AT ANY SPEED

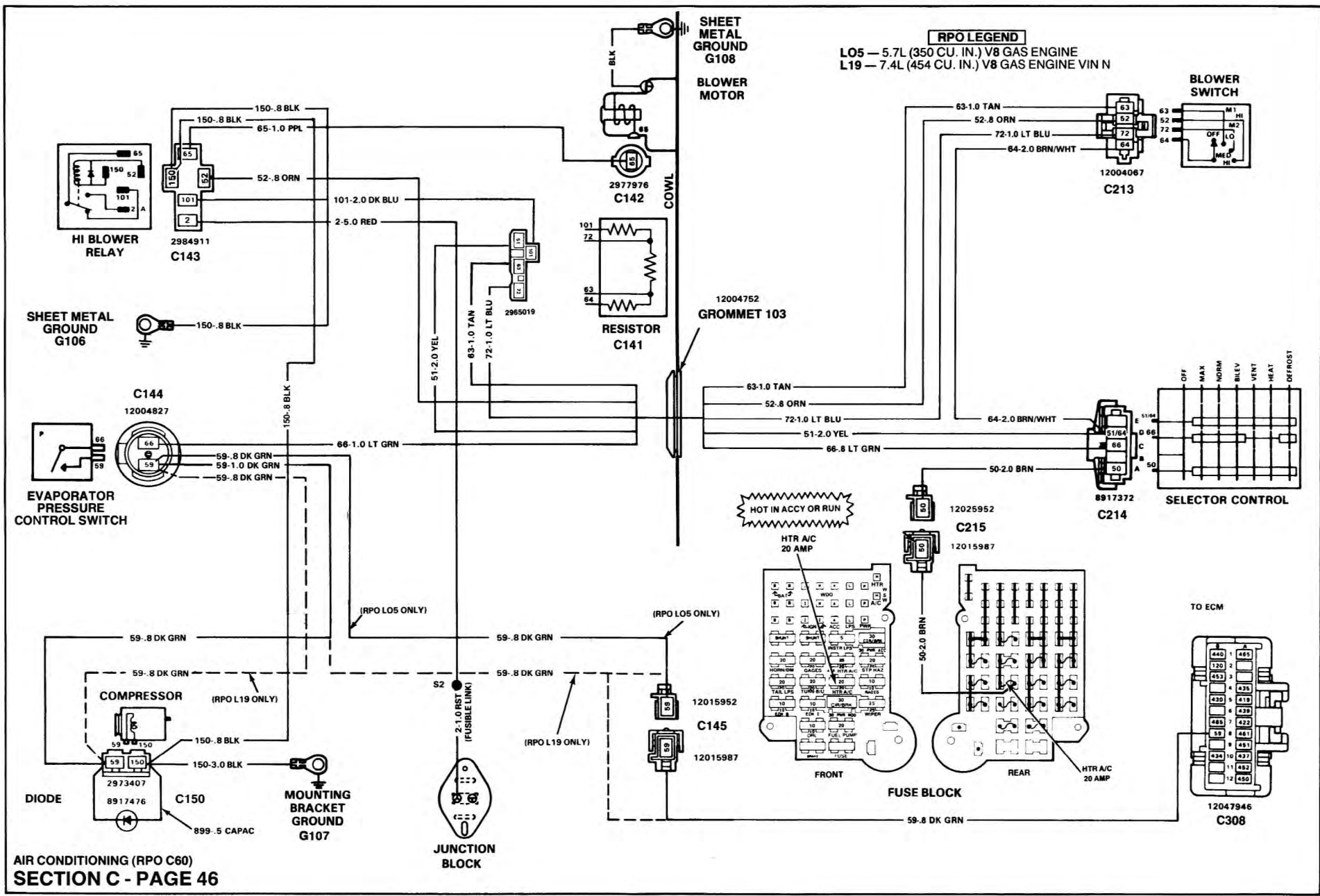
TEST	RESULT	ACTION
1. Place ignition in RUN and blower speed to HI. Connect test lamp from BRN (50) wire at selector control connector C214 to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) wire between selector control and fuse block or REPLACE HTR A/C fuse.
	Test lamp lights.	GO to step 2.
2. Connect a test lamp from BRN/WHT (64) wire at blower switch connector C213 to ground.	Test lamp does not light.	LOCATE and REPAIR open in BRN/WHT (64) wire between selector control and blower switch or REPLACE selector control.
	Test lamp lights.	GO to step 3.
3. Connect a test lamp from PPL (65) wire at blower motor connector C142 to ground.	Test lamp does not light.	LOCATE and REPAIR open in PPL (65) wire between hi blower relay and blower motor.
	Test lamp lights.	GO to step 4.
4. Connect test lamp from PPL (65) wire to BLK (150) wire at blower motor.	Test lamp lights.	REPLACE blower motor.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) between blower motor and ground G108.

**BLOWER DOES NOT OPERATE IN HI**

TEST	RESULT	ACTION
1. Place ignition in RUN and blower speed to HI. Connect test lamp from ORN (52) wire at blower switch connector C213 to ground.	Test lamp does not light.	REPLACE blower switch.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from ORN (52) wire at HI blower relay connector C143 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (52) wire between hi blower relay and blower switch.
	Test lamp lights.	GO to step 3.
3. Connect a test lamp from RED (2) wire at hi blower relay connector C143 to ground	Test lamp does not light.	LOCATE and REPAIR open in RED (2) fusible link.
	Test lamp lights.	GO to step 4.
4. Connect test lamp from RED (2) wire to BLK (150) wire at hi blower relay connector C143.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire between hi blower relay and ground G107.
	Test lamp lights.	REPLACE hi blower relay.

**BLOWER MOTOR DOES NOT OPERATE IN LO AND/OR MED SPEED**

TEST	RESULT	ACTION
1. Place ignition in RUN and blower to inoperative blower speed. If blower does not operate in both LO and MED, go to step 2. If LO speed is inoperative, connect test lamp from TAN (63) wire at blower resistor connector C141 to ground. If MED speed is inoperative, connect test lamp from LT BLU (72) wire at blower resistor connector C141 to ground.	Test lamp does not light.	LOCATE and REPAIR open in TAN (63) or LT BLU (72) wire between blower switch and blower resistor.
	Test lamp lights.	GO to step 2.
2. Connect a fused jumper from TAN (63) or LT BLU (72) (depending on which speed is inoperative) to DK BLU (101) wire at blower resistor connector C141.	Blower runs.	REPLACE blower resistor.
	Blower does not run.	GO to step 3.
3. Connect a fused jumper from DK BLU (101) wire at blower motor resistor connector to DK BLU (101) wire at hi blower relay connector C143.	Blower runs.	LOCATE and REPAIR open in DK BLU (101) wire between blower motor resistor and hi blower relay.
	Blower does not run.	REPLACE hi blower relay.



**BLANK**

## CIRCUIT OPERATION

The Blower Motor delivers air to the interior of the vehicle. Its speed is controlled by the Blower switch and the Blower Resistors. When the Ignition Switch is in RUN, battery voltage is applied to the Blower Switch. With the Blower Switch in LO, voltage is applied across both Blower Resistors and the Blower Motor. The Blower Motor runs at its slowest speed. With the Blower Switch in MED, one of the Blower Resistors is bypassed and the Blower Motor runs faster. When the Blower Switch is set to HI, battery voltage is applied directly to the Blower Motor and the Blower Motor runs at its fastest speed.

## COMPONENT LOCATION

Page — Figure

Blower Motor	Engine compartment side of cowl, RH side	.91	10
Fuse Block	LH side of cowl, under I/P	.92	13
Grommet 103	Engine compartment, RH side of cowl	.91	10
Heater Blower Switch	On heater control assembly, to right of instrument cluster	.93	15
Resistor	In top of heater blower housing, RH side of cowl	.91	10
C141	At resistor	.91	10
C142	At blower motor	.91	10
C213	At heater blower switch, behind I/P	.93	15
C215	Heater blower switch jumper, under I/P	.93	15

## TROUBLESHOOTING CHART—HEATER

### BLOWER MOTOR DOES NOT OPERATE AT ALL

TEST	RESULT	ACTION
1. Check condition of fuse (HTR A/C).	Fuse is not blown.	GO to step 2.
	Fuse is blown.	LOCATE and REPAIR source of overload. Then, REPLACE fuse.
2. Disconnect blower motor connector C142. Connect a test lamp from ORN (52) wire at blower motor connector C142 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	GO to step 4.
3. Inspect ground connection at blower motor.	Connection in good condition.	REPLACE blower motor.
	Poor ground connection.	REPAIR ground connection.
4. Connect a test lamp from BRN (50) wire at blower switch connector C213 to ground.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (50) wire.
5. Place blower switch in LO, MED, or HI. Connect a test lamp from blower switch connector C213 at wire that applies to position of switch to ground. LO is YEL (51) wire, MED is LT BLU (72) wire, and HI is ORN (52) wire.	Test lamp does not light.	REPLACE blower switch.
	Test lamp lights.	LOCATE and REPAIR open in wires to blower motor.

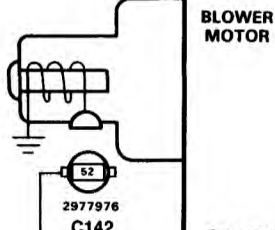
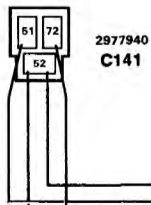
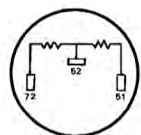
### BLOWER MOTOR DOES NOT OPERATE IN HI BUT ONLY IN LO AND/OR MED

TEST	RESULT	ACTION
1. Connect test lamp from ORN (52) wire at blower switch connector C213 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from ORN (52) wire at resistor connector C213 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN (52) wire from resistor to blower switch.

### BLOWER MOTOR DOES NOT OPERATE IN LO AND/OR MED BUT ONLY IN HI

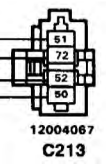
TEST	RESULT	ACTION
1. Place blower switch in position where blower motor does not work. Connect test lamp from either YEL (51) LO wire or LT BLU (72) MED wire (depending on switch position) at blower motor switch connector C213 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	REPLACE blower switch.
2. Connect test lamp from either YEL (51) LO wire or LT BLU (72) MED wire (depending on switch position) at resistor connector C141 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in wire(s) (51 or 72) from resistor to blower switch.
3. Connect test lamp from ORN (52) wire at resistor connector C141 to ground.	Test lamp does not light.	REPLACE resistor.



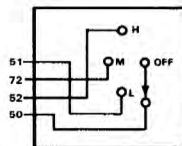


**BLOWER MOTOR**

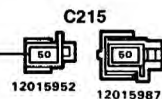
**GROMMET 103**  
12004752



12004067  
**C213**



**HEATER BLOWER SWITCH**



**C215**

52-2.0 ORN  
51-2.0 YEL  
52-2.0 ORN  
72-2.0 LT BLU

51-2.0 YEL  
52-2.0 ORN  
72-2.0 LT BLU

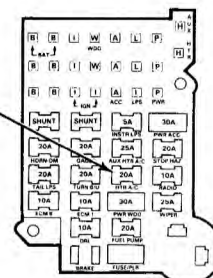
50-2.0 BRN

50-2.0 BRN

COWL

HOT IN ACCY,  
START AND RUN

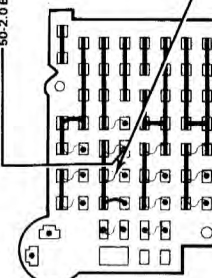
HTR A/C  
20 AMP



FRONT

**FUSE BLOCK**

50-2.0 BRN



REAR

**BLANK**

## CIRCUIT OPERATION

The operation of an individual Indicator is described along with its circuit. Refer to the schematic and text for the circuit that is indicated below each of the Indicators.

### BRAKE WARNING LAMP

Battery voltage is applied to the Brake Indicator when the Ignition Switch is in RUN or START. Three Switches are connected to the Brake Indicator. When any one of these Switches closes, ground is provided and the Indicator lights.

The Park Brake Switch provides a ground when the Park Brake is applied. The Brake Indicator lights to alert the driver.

The Brake Pressure Switch closes to light the Brake Indicator when there is low brake fluid pressure in one of the two hydraulic brake systems. This could be caused by a leak in one of the brake lines. Refer to Section 5 for Switch reset procedure. This can only be accomplished after the faulty system has been repaired.

The Ignition Switch grounds the Brake Indicator when the Ignition Switch is turned to START to provide a quick check of the Brake Indicator Bulb and circuitry.

### FUEL GAGE

The pointer of the Fuel Gage is moved by the magnetic fields of two coils. The coils are at right angles to each other. Battery voltage is applied to the E coil and the circuit divides at the opposite end of the coil. One path continues to ground through the F coil. Another goes to ground through the variable resistor of the Fuel Gage Sender.

When the tank is low, the resistance of the Sender is low. A large flow of current passes through the E coil and the Fuel Gage Sender resistor. This moves the pointer toward E on the scale. When the tank is full, the Sender resistance is high. More current now flows through the F coil, moving the pointer toward F on the scale.

With two coils operating the pointer, the Gage is not affected by changes in the system's battery voltage.

### OIL PRESSURE GAGE

The engine oil pressure is displayed by the Oil Pressure Gage. The pointer of the Gage is moved by two coils, and its operation is similar to that of the Fuel Gage.

The Oil Pressure Sender is connected to the junction of the two coils. It has low resistance when the oil pressure is low, and 90 ohms resistance when the oil pressure is high. This changing resistance changes the current flow through the coils. The magnetic fields of the coils move the pointer from LOW to HIGH.

### TEMPERATURE GAGE

The Temperature Gage is also operated by two coils. Battery voltage is applied to both coils. One is grounded directly and the other is grounded through the Temperature Sender. This has 55 ohms resistance at 260°F (hot coolant) and its resistance becomes greater at low temperatures. It is approximately 1400 ohms at 100°F. This causes the current through the Sender and one coil to increase as the coolant temperature increases. This moves the pointer.

### VOLTMETER

The Voltmeter shows the battery voltage. The Voltmeter is connected across the 39 (PNK/BLK) wire and the 150 (BLK) circuits of the cluster.

If the generator output is high, low or 0 volts, the BATT indicator, which monitors generator output by monitoring the differences in voltage between circuits 25 and 29, will come ON.

Refer to the 1990 Light Duty Truck Fuel and Emissions Manual.

### CHECK ENGINE INDICATOR

Refer to Light Duty Truck Fuel, Driveability and Emissions Service Manual, Section 3.

### RH/LH DIRECTIONAL SIGNAL INDICATORS

Refer to Directional Signal Lamps, Page 21.

### HIGH BEAM INDICATOR

Refer to Headlamps, Page 7.

### FASTEN BELTS INDICATOR

Refer to Safety Belt Key-In Warning Buzzer, Page 58.

## COMPONENT LOCATION

		Page	Figure
Coolant Temperature Sender	Top front center of engine	90	7
Daytime Running Lamp Indicator	In instrument cluster		
Dimmer Switch	Part of multifunction lever	95	20
Directional Signal Switch	In upper steering column	95	20
Electric Fuel Pump/Fuel Gage Sending Unit	In top of fuel tank	98	30
Fuel Pump/Oil Pressure Switch	Top LH rear of engine	90	7
Fuse Block	LH side of cowl, under I/P	92	13
Headlamp Switch	LH side of I/P	92	13
Heater A/C Control Assembly Lamp	Behind LH side of I/P, at heater, A/C Control	93	14
Ignition Switch	RH side of steering column	95	20

## COMPONENT LOCATION

		Page	Figure
C100	Engine compartment, LH side of cowl	91	9
C107	At coolant temperature sender	90	7
C116	At fuel pump/oil pressure switch	90	7
C207	RH side of steering column, under I/P	92	12
C208	At headlamp switch	92	13
C209	Behind I/P, at I/P cluster	96	24
C210	Under I/P, on LH side of steering column	92	12
C212	Under I/P, on RH side of steering column	92	12
C216	Behind LH side of I/P, at heater, A/C control	93	14
C217	LH side of I/P		
C400	LH side of rear crossmember, in back of fuel tank	98	30
G200	Under LH side of I/P, at bus bar ground	92	13
G400	LH side of rear crossmember, in front of fuel tank	98	30
S200	I/P harness, above fuse block	92	13
S206	I/P harness, above steering column	92	12

## PRELIMINARY CHECKS:

CHECK condition of GAGES and INST LPS fuses. If fuses are in good condition, use following diagnostic procedures.

## TROUBLESHOOTING CHART—INSTRUMENT PANEL: GAGES AND INDICATORS

### FUEL GAGE INDICATES FULL OR BEYOND AT ALL TIMES

TEST	RESULT	ACTION
1. Disconnect fuel tank sending unit connector C400 and place ignition switch to RUN. Connect a fused jumper from PNK (30) wire at fuel tank sending unit connector C400 to ground.	Fuel gage indicates full.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.
	Fuel gage indicates empty.	GO to step 2.
2. Connect fused jumper from PNK (30) wire to BLK (150) wire at fuel tank sending unit connector C400.	Fuel gage indicates full.	LOCATE and REPAIR open in BLK (150) wire.
	Fuel gage indicates empty.	REPAIR/REPLACE fuel gage sending unit.

### FUEL GAGE INDICATES EMPTY WHEN THERE IS FUEL IN THE TANK

TEST	RESULT	ACTION
Disconnect fuel tank sending unit connector C400 and place ignition switch to RUN.	Fuel gage indicates full.	REPAIR/REPLACE fuel gage sending unit.
	Fuel gage indicates empty.	LOCATE and REPAIR a short in PNK (30) wire. If no short is found, REPLACE fuel gage.

**FUEL GAGE IS INACCURATE**

TEST	RESULT	ACTION
Disconnect fuel tank sending unit connector C400. Connect one red lead of tester J 33431-B to PNK (30) wire and other to ground. Set resistance dials to 0 ohms and then to 90 ohms. Fuel gage should indicate empty and then full. (Allow time for gage to reach full due to anti-slosh device.)	Gage responds correctly.	CHECK BLK (150) wire for high resistance. If wire is good, REPAIR/REPLACE fuel gage sending unit.
	Gage does not respond correctly.	CHECK for high resistance in PNK (30) wire. If wire is good, REPLACE fuel gage.

**TEMPERATURE GAGE INDICATES HOT WITH ENGINE COOLANT BELOW OPERATING TEMPERATURE AND IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107 and place ignition switch to RUN.	Temperature gage indicates cold.	REPLACE coolant temperature sender.
	Temperature gage does not indicate cold.	LOCATE and REPAIR a short in DK GRN (35) wire. If no short is found, PERFORM diagnostic procedures under "Temperature Gage Is Not Accurate" symptom.

**TEMPERATURE GAGE INDICATES COLD ALL THE TIME**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107. Ground the DK GRN (35) wire at temperature sender connector C107.	Temperature gage indicates hot.	REPAIR/REPLACE coolant temperature sender.
	Temperature gage does not indicate hot.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR STAYS ON AT ALL TIMES WITH IGNITION SWITCH IN RUN**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107 and place ignition switch to RUN. Observe temperature indicator.	Indicator stays on.	LOCATE and REPAIR short in DK GRN (35) wire. If wire is good, REPLACE instrument cluster.
	Indicator goes out.	REPLACE coolant temperature sender.

**TEMPERATURE GAGE IS NOT ACCURATE**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107. Connect red lead from J 33431-B tester to DK GRN (35) wire and other lead to ground. Adjust resistance dials to 1400 ohms and then to 55 ohms. Temperature gage should indicate cold then hot.	Gage indicates correctly.	REPLACE coolant temperature sender.
	Gage is not correct.	LOCATE and REPAIR open in DK GRN (35) wire. If wire is good, REPLACE temperature gage.

**TEMPERATURE INDICATOR DOES NOT LIGHT WITH ENGINE COOLANT OVERHEATED**

TEST	RESULT	ACTION
Disconnect temperature sender connector C107 and place ignition switch to RUN. Connect fused jumper from DK GRN (35) wire at temperature sending connector C107 to ground. Observe temperature indicator.	Indicator lights.	REPLACE coolant temperature sender.
	Indicator does not light.	LOCATE and REPAIR open in bulb and DK GRN (35) wire. If wire and bulb are good, REPLACE instrument cluster.

**OIL PRESSURE GAGE INDICATES LOW PRESSURE WHEN OIL PRESSURE IS GOOD**

TEST	RESULT	ACTION
Disconnect oil pressure sender connector C116 and place ignition switch to RUN.	Oil pressure gage indicates high pressure.	REPLACE oil pressure sender.
	Oil pressure gage indicates no or low pressure.	LOCATE and REPAIR short in TAN (31) wire. If wire is good, REPLACE oil pressure gage.

**OIL PRESSURE GAGE INDICATES HIGH PRESSURE AT ALL TIMES**

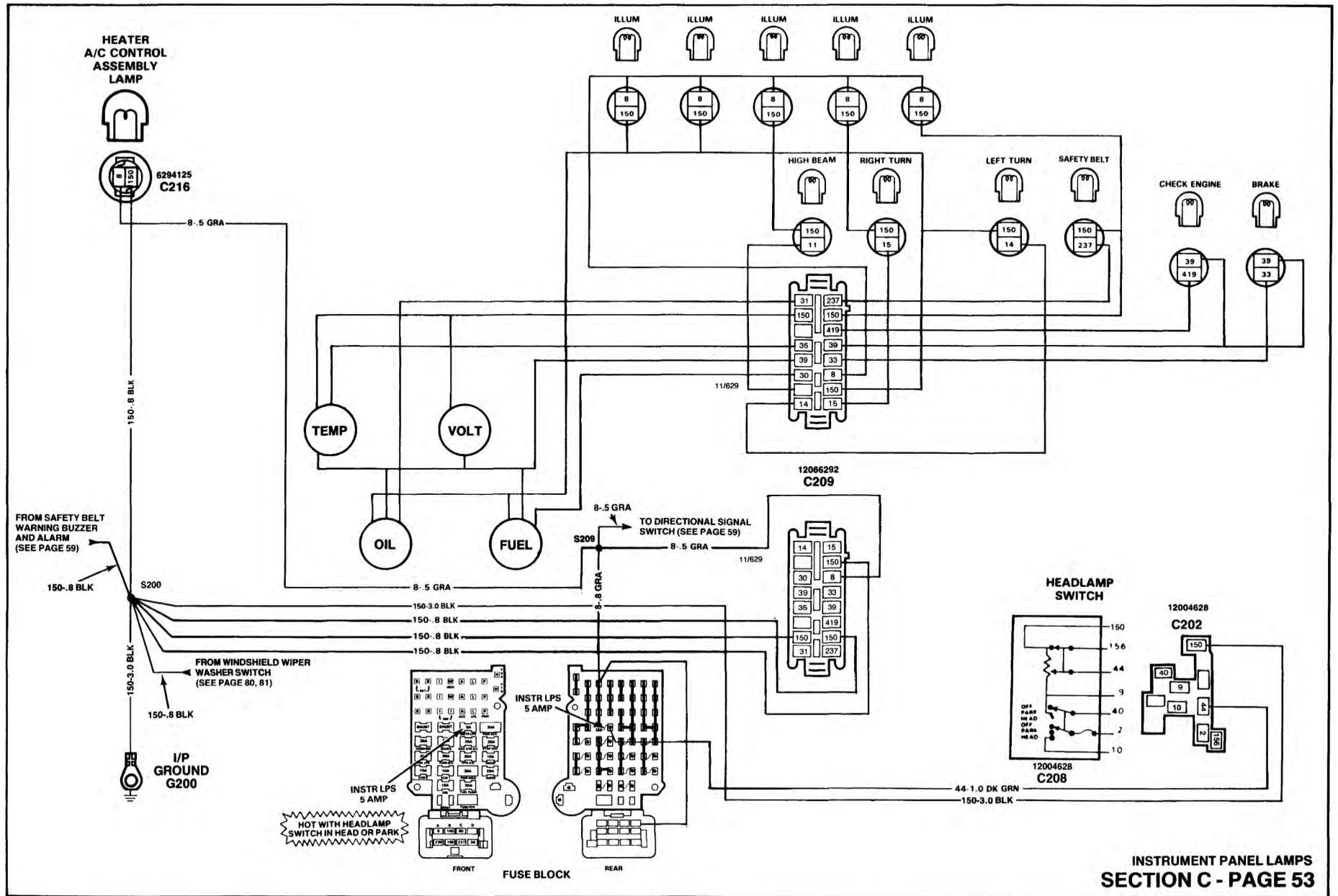
TEST	RESULT	ACTION
Disconnect oil pressure sender connector C116 and place ignition switch to RUN. Connect a fused jumper from TAN (31) wire at oil pressure sender connector C116 to ground.	Oil pressure gage indicates low pressure.	REPLACE oil pressure sender.
	Oil pressure gage indicates high pressure.	LOCATE and REPAIR open in TAN (31) wire and bulb. If wire and bulb are good, REPLACE oil pressure gage.

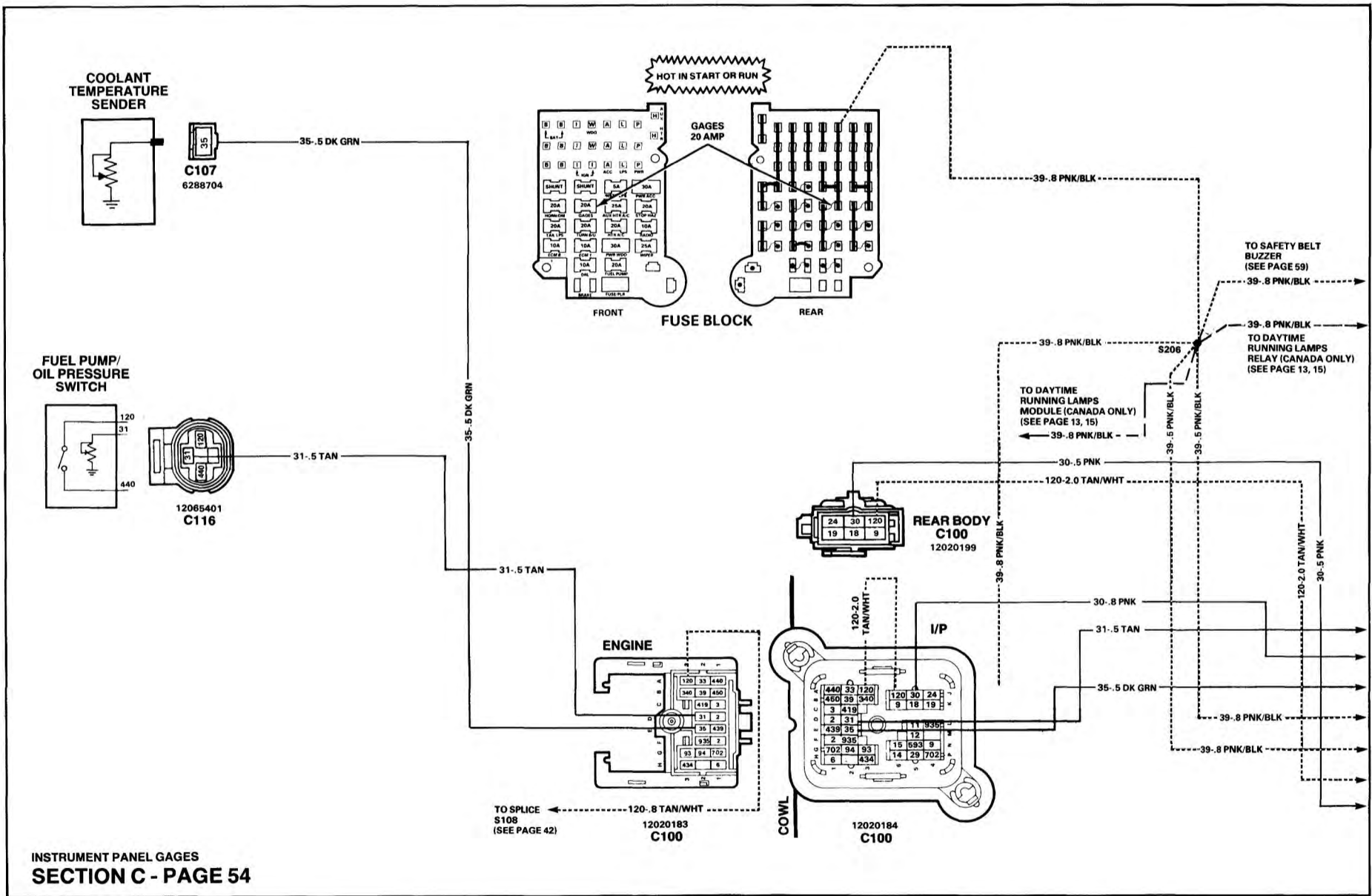
**OIL PRESSURE GAGE IS NOT ACCURATE**

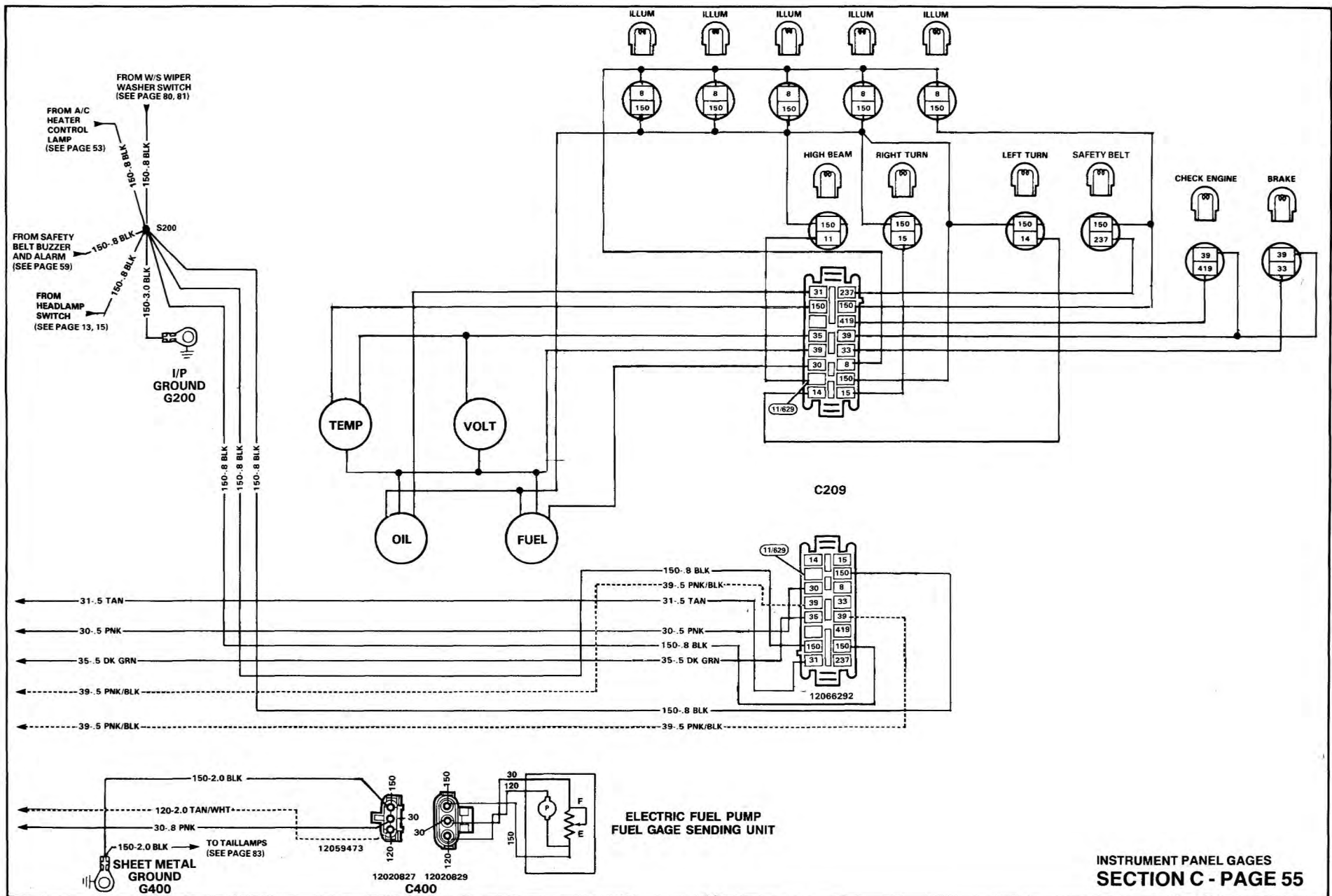
TEST	RESULT	ACTION
Disconnect oil pressure sender connector C116. Connect one red lead of J 33431-B tester to TAN (31) wire at oil pressure sender connector C116 and other lead to ground. Set resistance dials to 0 ohms and then to 90 ohms. The oil pressure gage should indicate low pressure and then high pressure.	Oil pressure gage indicates correctly.	REPLACE oil pressure sender.
	Oil pressure gage does not indicate correctly.	LOCATE and REPAIR open in TAN (31) wire. If wire is good, REPLACE oil pressure gage.

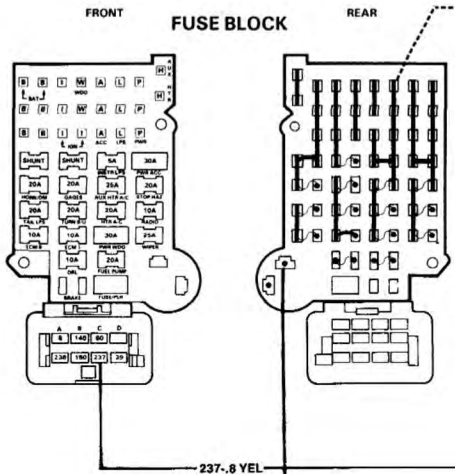
**VOLTMETER IS NOT ACCURATE**

TEST	RESULT	ACTION
Place ignition switch to RUN position. Connect a voltmeter between positive and negative terminals of the battery.	Voltage reading is same as vehicle's voltmeter.	Voltmeter is good.
	Voltage reading is different from vehicle's voltmeter.	LOCATE and REPAIR open in PNK/BLK (39) wire and BLK (150) wire at instrument cluster. If wires are good, REPLACE voltmeter.



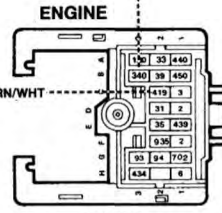




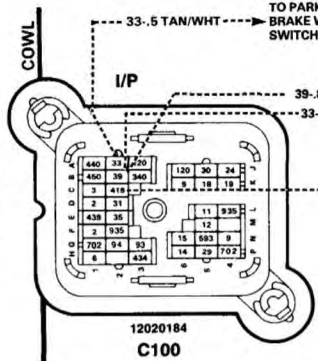


TO BRAKE PRESSURE SWITCH (SEE PAGE 61)

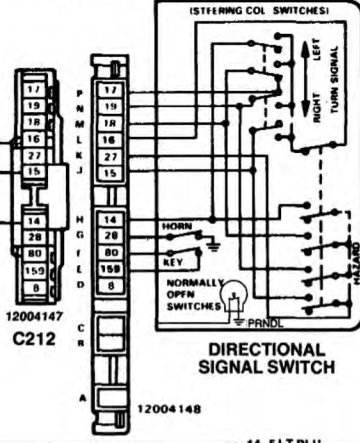
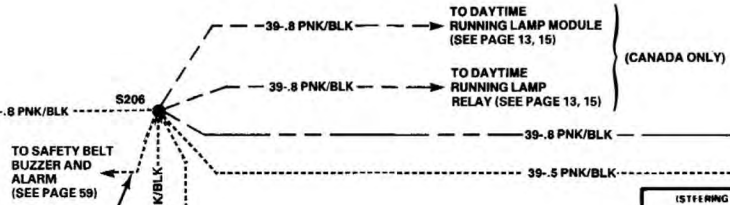
TO ECM (SEE PAGE 41)



12020183  
**C100**



12020184  
**C100**



**INDICATOR LAMPS**  
**SECTION C - PAGE 56**

- 14-5 LT BLU
- 15-5 DK BLU
- 237-.8 YEL
- 419-.8 BRN/WHT
- 33-.5 TAN/WHT
- 39-.5 PNK/BLK





## CIRCUIT OPERATION

### SAFETY BELT WARNING BUZZER

With the Ignition Switch in RUN or START, voltage is applied through the GAGES fuse to the Safety Belt Buzzer at the Audio Alarm Center. With the driver's safety belt not buckled, terminal 39 of the module is grounded through the Safety Belt Retractor Switch. The Safety Belts Indicator always goes on for about 5 seconds when the Ignition Switch is turned to RUN or START.

### KEY-IN WARNING BUZZER

Whenever the key is in the Ignition Switch, the Ignition Switch is in LOCK, OFF, or ACCY, and the driver's door is open, terminal 80 of the Directional Signal Switch is grounded. This sounds the alarm.

### COMPONENT LOCATION

Component	Location	Page	Figure
Audio Alarm Center	Attached below fuse block	.97	27
Directional Signal Switch	In upper steering column	.95	20
Fuse Block	LH side of cowl, under I/P	.97	27
Safety Belt Retractor Switch	Base of driver safety belt, RH side of seat riser	.97	27
C212	RH side of steering column	.92	12
C218	Base of driver seat riser, LH lower flange	.97	27
G200	Under LH side of I/P, at bus bar ground	.92	13
S200	I/P harness, above fuse block	.92	13
S206	I/P harness, above steering column	.92	12
S209	I/P harness, above steering column	.96	24

## TROUBLESHOOTING CHART—SAFETY BELT AND KEY-IN WARNING BUZZER

### THE SAFETY BELT WARNING BUZZER DOES NOT OPERATE

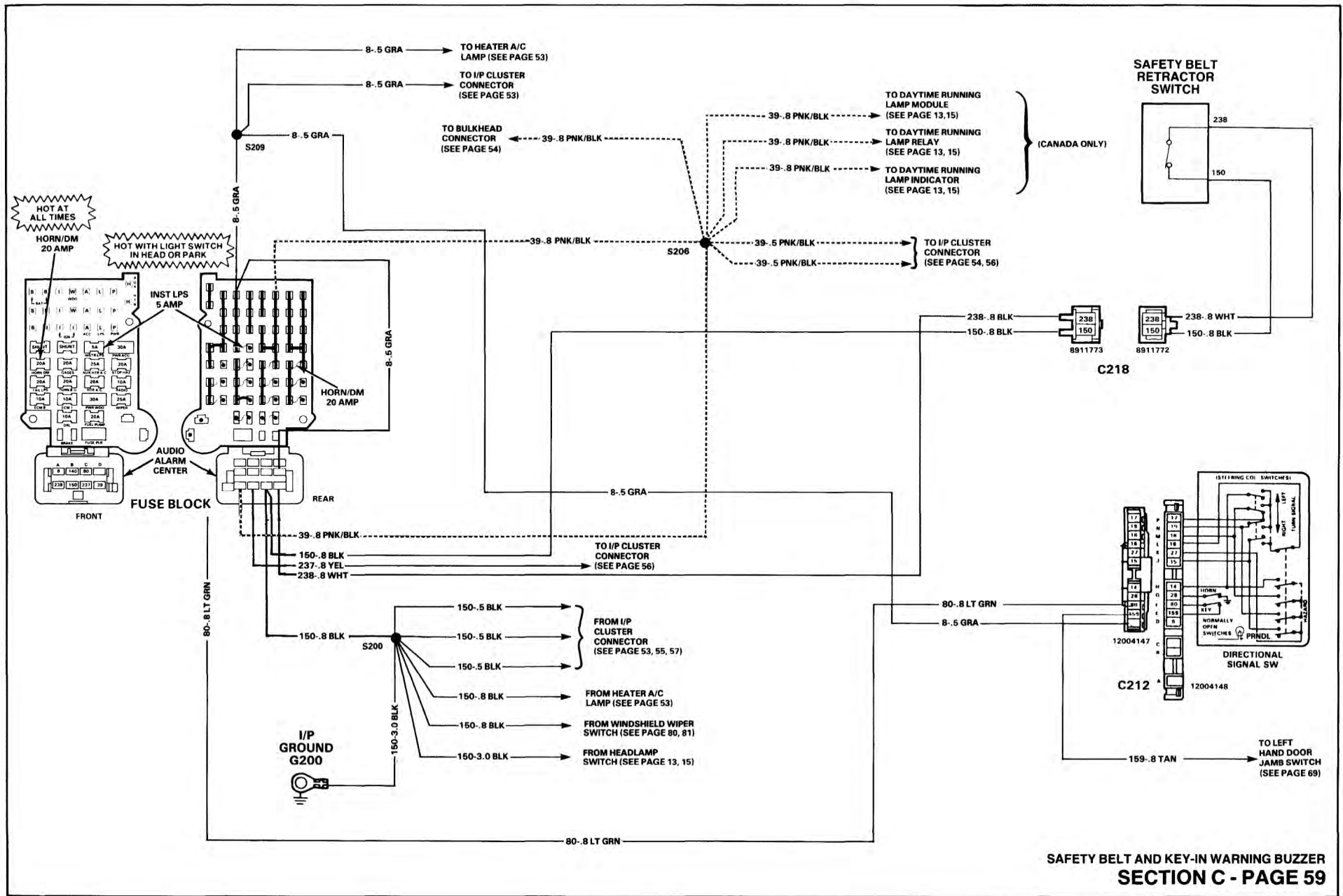
TEST	RESULT	ACTION
1. Connect test lamp from PNK/BLK (39) wire at audio alarm center to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of fuse (GAGES) and/or LOCATE and REPAIR open in PNK/BLK (39) wire from audio alarm center to fuse block.
2. Connect test lamp from WHT (238) wire and BLK (150) wire at audio alarm center.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from audio alarm center to ground terminal G200.
3. Connect test lamp from WHT (238) wire at safety belt retractor switch connector C218 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in WHT (238) wire from safety belt retractor switch to audio alarm center.
4. Buckle safety belt. Connect test lamp from BLK (150) wire at safety belt retractor switch connector C218 to ground.	Test lamp lights.	LOCATE and REPAIR open in BLK (150) wire from safety belt retractor switch to audio alarm center and/or ground terminal G200.
	Test lamp does not light.	REPLACE safety belt retractor switch.

### THE SAFETY BELT WARNING BUZZER OPERATES WHEN SAFETY BELT IS BUCKLED

TEST	RESULT	ACTION
Disconnect safety belt retractor switch connector C218.	Safety belt buzzer stops.	REPLACE safety belt retractor switch.
	Safety belt buzzer continues.	CHECK for a short from WHT (238) wire to ground. REPAIR as required.

### KEY-IN WARNING BUZZER DOES NOT OPERATE

TEST	RESULT	ACTION
1. Insert key in ignition switch and open left hand door. Connect a test lamp from PNK/BLK (39) wire at audio alarm center to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of fuse (GAGES). If fuse is good, LOCATE and REPAIR open in PNK/BLK (39) wire.
2. Connect a test lamp from LT GRN (80) wire at directional signal switch connector C212 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in LT GRN (80) wire. If wire is good, REPLACE audio alarm center.
3. Connect test lamp from TAN (159) wire at directional signal switch connector C212 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE directional signal switch.
4. Disconnect left hand jamb switch connector C504. Connect ohmmeter from TAN (159) terminal to ground terminal on jamb switch.	A reading of 0 ohms.	Close door. If reading stays at 0 ohms, REPLACE jamb switch. If reading is infinite GO to step 5.
	A reading of infinite ohms.	REPLACE left hand jamb switch.
5. Connect ohmmeter from ground terminal at left hand jamb switch connector C504 to ground.	A reading of 0 ohms.	LOCATE and REPAIR open in TAN (159) wire from jamb switch to directional signal switch.
	A reading of infinite ohms.	REPLACE left hand jamb switch.



## CIRCUIT OPERATION

Vehicles equipped with the Hydro-Boost Brake system have an optional warning harness that plugs into the I/P harness in place of the Park Brake Warning Switch. Refer to the 1990 Light Duty Truck Service Manual, Section 5A1 for further description and operation of the Hydro-Boost System.

## COMPONENT LOCATION

Page — Figure

Alarm .....	On I/P harness, above fuse block .....	.94 — 17
Brake Pressure Warning Switch .....	LH side of cowl, under junction block .....	.91 — 9
Electronic Delay Module .....	LH side of cowl, on parking brake bracket .....	.94 — 17
Flow Switch .....	In brake booster outlet line .....	.94 — 17
Fuse Block .....	LH side of cowl, under I/P .....	.94 — 17
Grommet 104 .....	On cowl, RH side of fuse block .....	.94 — 17
Hydro-Boost Pressure Switch .....	On brake cylinder .....	.94 — 17
Ignition Switch .....	On steering column .....	.95 — 20
Park Brake Warning Switch .....	LH side of cowl, on parking brake bracket .....	.94 — 17
C100 .....	Engine compartment, LH side of cowl .....	.91 — 9
C101 .....	Under brake cylinder, at brake pressure warning switch .....	.91 — 9
C146 .....	At flow switch .....	.94 — 17
C147 .....	At hydro-boost pressure switch .....	.94 — 17
C207 .....	At ignition switch .....	.92 — 12
C209 .....	Behind I/P, at I/P cluster connector .....	.94 — 17
C219 .....	Under I/P, on top of park brake pedal support .....	.94 — 17
C220 .....	LH side of cowl, at park brake warning switch .....	.94 — 17
C221 .....	On I/P harness, above fuse block .....	.94 — 17
C222 .....	Electronic delay module .....	.94 — 17

## TROUBLESHOOTING CHART—BRAKE WARNING SYSTEMS

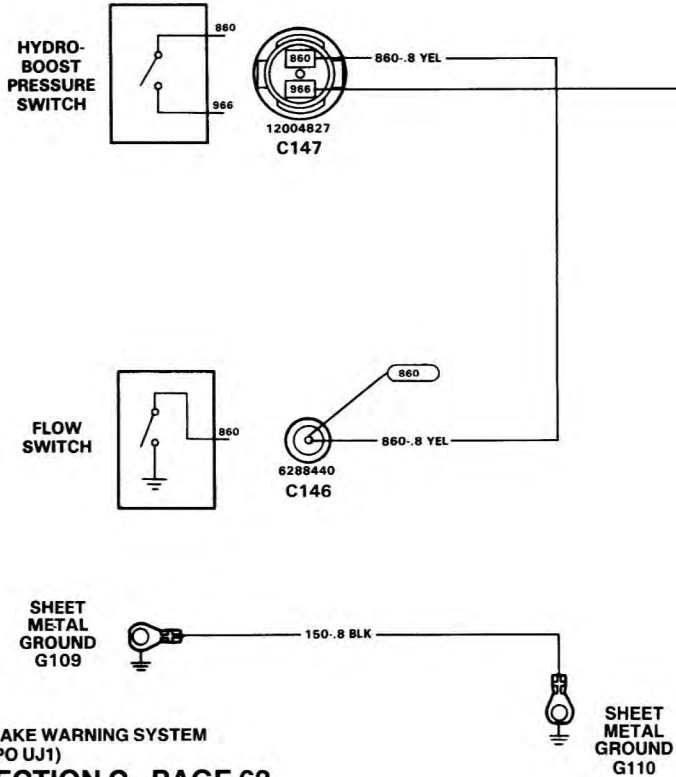
### BRAKE INDICATOR REMAINS ON WITH IGNITION SWITCH IN RUN AND PARK BRAKE OFF

TEST	RESULT	ACTION
1. Disconnect park brake warning switch connector C220.	Brake indicator lamp does not go out.	GO to step 2.
	Brake indicator lamp goes out.	CHECK adjustment of park brake switch. If adjustment cannot be corrected, REPLACE park brake warning switch.
2. Disconnect brake pressure warning switch connector C101.	Brake indicator lamp does not go out.	GO to step 3 for vehicles equipped with RPO UJ1.
	Brake indicator lamp goes out.	CHECK for a possible leak or loss of fluid in the brake system.
3. Connect a digital ohmmeter from I/P side of TAN/WHT (33) wire at connector C219 and check for continuity to ground.	Continuity.	REPAIR short to ground in TAN/WHT (33) wire between C219 and instrument panel.
	No continuity.	REFER to 1990 Light Duty Truck Service Manual Section 5A1 for diagnosis of the brake system.



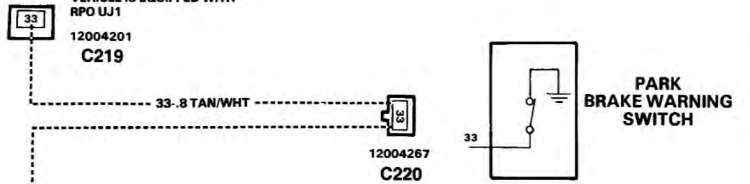
**RPO LEGEND**

UJ1 — BRAKE SYSTEM WARNING INDICATOR



CONNECTS TO I/P HARNESS PARK BRAKE SWITCH WHEN VEHICLE IS EQUIPPED WITH RPO UJ1

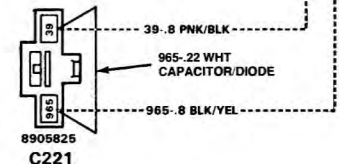
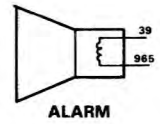
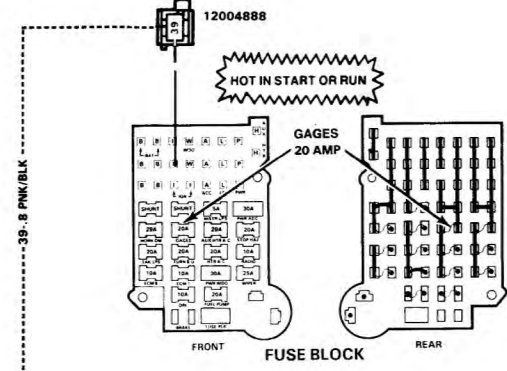
12004201  
C219



DIODE

GROMMET 104

8911781



**BLANK**

## CIRCUIT OPERATION

The Overspeed Alarm consists of an Amplifier with Chime module, a Dual Vehicle Speed Sensor Buffer module and an optically triggered Vehicle Speed Sensor. The Amplifier with Chime and Dual Vehicle Speed Sensor Buffer are located behind the LH side of the I/P, and the Vehicle Speed Sensor is mounted at the cowl, to the right of the fuse block.

The Vehicle Speed Sensor receives pulses of light, converts them to electronic signals and feeds this information to the Dual Vehicle Speed Sensor Buffer. If the vehicle exceeds a preset speed, the Dual Vehicle Speed Sensor Buffer supplies a voltage to the Amplifier with Chime which alerts the driver to an overspeed condition.

## COMPONENT LOCATION

		Page	Figure
Amplifier With Chime	Behind I/P, LH side	97	26
Bus Bar Ground	On cowl, RH side of fuse block	93	16
Dual Vehicle Speed Sensor Buffer	Behind I/P, LH side	97	26
Fuse Block	LH side of cowl, under I/P	92	13
C243	Behind I/P, LH side	97	26
C245	Behind I/P, LH side	97	26

## PRELIMINARY CHECKS:

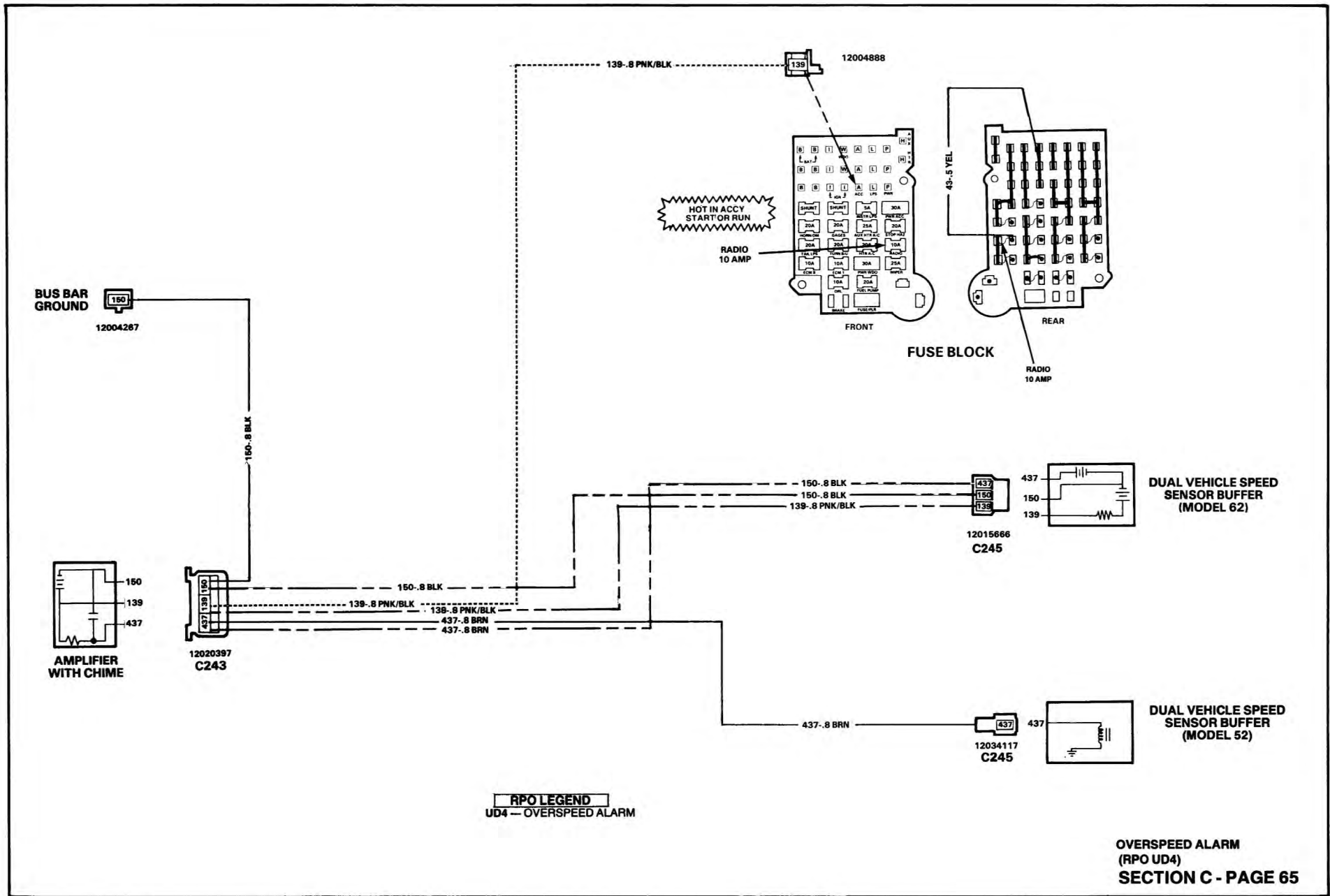
1. Before beginning overspeed alarm diagnosis, check to see that the RADIO fuse is not blown. REPLACE if blown.
2. If speedometer and cruise control also do not function, check to see that the GAGES fuse is not blown. REPLACE if blown.

## TROUBLESHOOTING CHART—OVERSPEED ALARM

### OVERSPEED ALARM DOES NOT SOUND

TEST	RESULT	ACTION
1. Place ignition switch to ACCY position. Disconnect amplifier with chime connector C243 and connect test lamp from PNK/BLK (139) wire to ground.	Test lamp does not light.	LOCATE and REPAIR open in PNK/BLK (139) wire between amplifier with chime and fuse block or REPLACE RADIO fuse.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from PNK/BLK (139) wire to BLK (150) wire at amplifier with chime connector C243.	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire between amplifier with chime and bus bar ground.
	Test lamp lights.	If vehicle is a commercial type (model 62) GO to step 3. If vehicle is a motor home (model 52) GO to step 5.
3. Disconnect dual vehicle speed sensor buffer connector C245. Place ohmmeter on RX1 scale. Connect ohmmeter from cavity C at amplifier with chime connector C243 to cavity C at dual vehicle speed sensor buffer connector C245. Measure resistance.	No continuity.	LOCATE and REPAIR open in BLK (150) wire between dual vehicle speed sensor buffer and amplifier with chime.
	Continuity.	GO to step 4.
4. Connect ohmmeter from cavity B at amplifier with chime connector C243 to cavity B at dual vehicle speed sensor buffer connector C245. Measure resistance.	No continuity.	LOCATE and REPAIR open in PNK/BLK (139) wire between dual vehicle speed sensor buffer and amplifier with chime.
	Continuity.	GO to step 5.
5. Connect ohmmeter from cavity A at amplifier with chime connector C243 to cavity A at dual vehicle speed sensor buffer connector C245. Measure resistance.	No continuity.	LOCATE and REPAIR open in BRN (437) wire between dual vehicle speed sensor buffer and amplifier with chime.
	Continuity.	GO to step 6.
6. REPLACE amplifier with chime module and road test vehicle for proper operation.	Overspeed alarm is operational.	No further action is necessary.
	Overspeed alarm is not operational.	GO to step 7.
7. REPLACE dual vehicle speed sensor buffer module and road test vehicle for proper operation.	Overspeed alarm is operational.	No further action is necessary.
	Overspeed alarm is not operational.	REFER to Section 6E of 1990 Service Manual to troubleshoot speed sensor circuit.





## CIRCUIT OPERATION

The Cruise Control regulates the speed of the vehicle in response to driver commands.

The Cruise Control Module contains electronic circuitry and a stepper motor. The other system components are:

- Cruise Control Activator
- Brake Switch
- Vehicle Speed Sensor

The Cruise Control Module receives voltage from the IGN fuse in RUN or START. A speed signal is received from the Instrument Cluster Speed Sensor Buffer. The

driver gives his input to the Cruise Control Module through the components listed above. The Cruise Control Module circuitry receives the driver's input and generates electrical pulses. These pulses cause the stepper motor and its output reel to rotate. The throttle is controlled by a cable wound on the output reel. The Cruise Control Module also contains a clutch which releases the cable when the Cruise Control System must be shut off. This clutch will operate when the Brake Pedal is depressed, the Cruise Control System is turned off, or the Cruise Control System detects a failure.

## COMPONENT LOCATION

Page — Figure

Brake Switch	On brake support bracket, to right of steering column	.93	—	16
Bus Bar Ground	On cowl, to right of fuse block	.93	—	16
Cruise Control Activator	Part of multi-function switch	.95	—	20
Cruise Control Module	Top left of radiator support	.91	—	11
Fuse Block	LH side of cowl, under I/P	.93	—	16
Vehicle Speed Sensor	On cowl, to right of fuse block	.93	—	16
C223	On steering column, under I/P	—		
C224	Above and to the right of steering column	.93	—	16
C225	Left of steering column	.93	—	16
C226	At speed sensor	.93	—	16
C227	On brake support bracket, to right of steering column	.93	—	16
C228	On brake support bracket, to right of steering column	.93	—	16
S214	Cruise control harness, above steering column	.93	—	16
S215	Cruise control harness, RH side of steering column	.93	—	16

## TROUBLESHOOTING CHART—CRUISE CONTROL

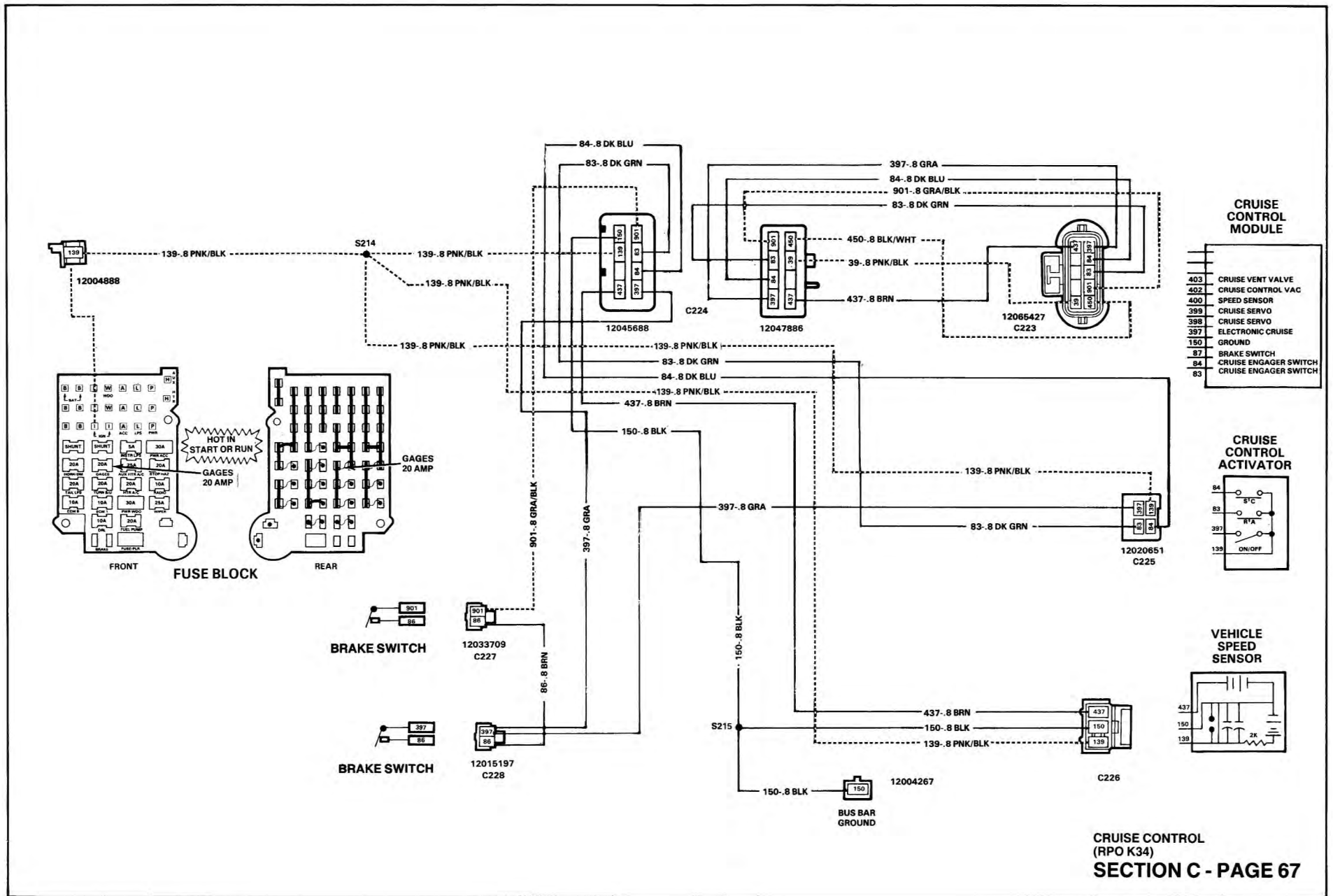
### CRUISE CONTROL DOES NOT DISENGAGE WHEN BRAKE PEDAL IS DEPRESSED

TEST	RESULT	ACTION
Place ignition switch in RUN position and cruise control activator to ON. Depress brake pedal. Connect test lamp from BRN (86) wire at brake switch connector(s) C227 and C228 to ground.	Test lamp does not light.	REPLACE control module.
	Test lamp lights.	CHECK adjustment of brake switch. If adjustment cannot be corrected, REPLACE brake switch.

### CRUISE CONTROL DOES NOT OPERATE

TEST	RESULT	ACTION
1. Place ignition switch in RUN and cruise control switch to ON. Connect test lamp from PNK/BLK (139) wire at cruise control activator connector C225 to ground and then cruise control module connector C223 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of (GAGES) fuse. If fuse is good, LOCATE and REPAIR open in PNK/BLK (139) wire from cruise control activator and cruise module to fuse block.
2. Connect test lamp from GRA (397) wire at cruise control activator connector C225 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE cruise control activator.

3. Connect test lamp from GRA (397) at cruise control module connector C223 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in GRA (397) wire from cruise control module to brake switch.
4. Connect test lamp from GRA (397) to BLK/WHT (450) wires at cruise control module connector C223.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	LOCATE and REPAIR open in BLK/WHT (450) wire from cruise control module to connector C224 and BLK (150) wire from C224 to bus bar ground.
5. Connect test lamp from GRA/BLK (901) wire at brake switch connector C227 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in GRA/BLK (901) wire from brake switch to cruise control module.
6. Connect test lamp from BRN (86) wire at brake switch connector C227 to ground.	Test lamp lights.	GO to step 7.
	Test lamp does not light.	CHECK adjustment of brake switch. If properly adjusted, REPLACE brake switch.
7. Connect test lamp from BRN (86) wire at brake switch connector C228 to ground.	Test lamp lights.	GO to step 8.
	Test lamp does not light.	CHECK adjustment of brake switch. If properly adjusted, REPLACE brake switch.
8. Connect test lamp from DK BLU (84) wire at cruise control activator connector C225 to ground.	Test lamp lights.	REPLACE cruise control activator.
	Test lamp does not light.	GO to step 9.
9. Depress SET switch. Connect test lamp from DK BLU (84) wire at cruise control activator connector C225 to ground.	Test lamp lights.	GO to step 10.
	Test lamp does not light.	REPLACE cruise control activator.
10. Connect test lamp from DK BLU (84) wire at cruise control module connector C223 to ground.	Test lamp lights.	GO to step 11.
	Test lamp does not light.	LOCATE and REPAIR open in DK BLU (84) wire from cruise control module to cruise control activator.
11. Depress and hold RES/ACCEL switch. Connect test lamp from DK GRN (83) wire at cruise control activator connector C225 to ground.	Test lamp lights.	GO to step 12.
	Test lamp does not light.	REPLACE cruise control activator.
12. Connect test lamp from DK GRN (83) wire at cruise control module connector C223 to ground.	Test lamp lights.	GO to step 13.
	Test lamp does not light.	LOCATE and REPAIR open in DK GRN (83) wire from cruise control module to cruise control activator.
13. Raise vehicle so drive wheels can be turned by hand. Connect voltmeter from BRN (437) wire to PNK/BLK (139) wire at cruise control module connector C223. Slowly turn drive wheels.	Pulses between 0 and battery voltage as wheels are turned.	REPLACE cruise control module.
	Does not pulse or no voltage reading.	CHECK speed sensor circuit. Refer to Section 6E of Fuel and Emission Manual (Gasoline).



## CIRCUIT OPERATION

The Dome Lamp receives battery voltage at all times from the TAIL LPS fuse. The Dome Lamps can be turned on by either opening one of the front doors, or by turning the Headlamp Switch to the full counterclockwise position.

## COMPONENT LOCATION

		Page — Figure
Dome Lamp	Center of roof	.97 — 25
Door Jamb Switch, LH	At LH A-pillar	.98 — 28
Door Jamb Switch, RH	At RH A-pillar	.98 — 28
Fuse Block	Under I/P, LH side of cowl	.97 — 25
Grommet 500	At LH A-pillar	—
Grommet 600	At RH A-pillar	—
Headlamp Switch	LH side of I/P	.92 — 13
C100	Engine compartment, LH side of cowl	.91 — 9
C208	At headlamp switch	.92 — 13
C231	Below I/P, near fuse block	.97 — 25
C232	Below I/P, near fuse block	.97 — 25
C300	Body Harness, near center of roof	.97 — 25
C301	Taped to roof bow	.97 — 25
C302	Taped to roof bow	.97 — 25
C504	At LH door jamb switch	.98 — 28
C604	At RH door jamb switch	.98 — 28

## PRELIMINARY CHECK:

Check condition of TAIL LPS fuse. If fuse is good, refer to appropriate diagnostic procedure.

## TROUBLESHOOTING CHART—INTERIOR LAMPS

### DOME LAMP DOES NOT WORK OR STAYS ON ALL THE TIME

TEST	RESULT	ACTION
1. Connect test lamp from ORN (40) wire at dome lamp connector C300 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in ORN (40) wire.
2. Open both doors and turn headlamp switch to full counterclockwise position. Connect test lamp from ORN (40) wire to WHT (156) wire at dome lamp connector C300.	Test lamp lights.	REPLACE bulb if dome lamp did not work. If dome lamp stayed ON all the time, GO to step 3.
	Test lamp does not light.	GO to step 3.
3. Disconnect jamb switch connectors C504 and C604. Connect ohmmeter from WHT (156) terminal to ground terminal at jamb switch. Take a reading with door open and a reading with door closed. With door open reading must be 0 ohms and door closed, infinite ohms.	Correct readings.	GO to step 4.
	Incorrect readings.	REPLACE jamb switch(es) that have incorrect reading.
4. Disconnect headlamp switch connector C208. Connect ohmmeter from WHT (156) terminal to BLK (150) terminal at headlamp switch. Turn headlamp switch to full counterclockwise and then full clockwise positions, and take a reading in each position. When counterclockwise, reading must be 0 ohms and when clockwise, reading must be infinite ohms.	Correct readings.	LOCATE and REPAIR open or short in WHT (156) wire and BLK (150) wire.
	Incorrect readings.	REPLACE headlamp switch.



## CIRCUIT OPERATION

The RADIO fuse provides main power to the Radio. With the Ignition Switch in START or RUN, voltage is applied through the RADIO fuse and the YEL wire to the On/Off Switch in the Radio.

The circuit is grounded at the Bus Bar ground. With the On/Off Switch closed, voltage is applied to the Solid State Radio circuits to ground. Two wires connect each front speaker to the Radio. The ETR Radio has two inputs that other models do not have: Display Dim Signal and Clock/Memory Power.

The ETR model is an AM/FM Radio that changes stations electronically. The frequency of pre-selected sta-

tions can be stored in the electronic memory. The ETR model also provides a digital display of time or station frequency. As in other models, the Head Panel and Dome Lamp Switch controls panel light dimming. In the ETR model, dimming of the station and clock display is controlled within the Radio itself by means of the Dim Display Input Signal.

The ETR Clock memory and Radio memory functions are powered at all times. If power to the ETR model is cut off — by disconnecting the Battery, for example — the operator must reset the memory functions when power is restored.

## COMPONENT LOCATION

		Page	Figure
Bus Bar Ground	On cowl, to right of steering column	.93	— 16
Front Speaker, LH	Top of instrument panel	.96	— 22
Front Speaker, RH	Top of instrument panel	.96	— 22
Fuse Block	LH side of cowl, under I/P	.92	— 13
Headlamp Switch	LH side of I/P	.92	— 13
Radio Receiver	Center of I/P	.96	— 22
C208	At headlamp switch	.92	— 13
C233	At radio receiver	.96	— 24
C236	At left front speaker	.96	— 22
C237	At right front speaker	.96	— 22
C239	Under I/P, left of radio receiver	.96	— 23
C303	Rear speaker harness	—	—
C402	Rear speaker harness	—	—

## TROUBLESHOOTING CHART—RADIO: AM

### RADIO DOES NOT APPEAR TO WORK (NO DISPLAY LIGHTS, NO SOUND)

TEST	RESULT	ACTION
1. Disconnect the half of the radio connector C233 containing the YEL (43) wire and place ignition switch to RUN. Connect voltmeter from YEL (43) wire at radio connector C233 to ground.	Battery voltage.	GO to step 2.
	No voltage.	CHECK condition of fuse (RADIO). If fuse is good, LOCATE and REPAIR open in YEL (43) wire.
2. Connect voltmeter from YEL (43) wire to BLK (150) wire at radio connector C233.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from radio to bus bar ground.

### PANEL LAMP DOES NOT COME ON

TEST	RESULT	ACTION
Disconnect the half of the radio connector C233 containing the GRA (8) wire. Place headlamp switch to PARK and panel dimmer switch to HIGH. Connect voltmeter from GRA (8) wire at radio connector C233 to ground.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	LOCATE and REPAIR open in GRA (8) wire from radio to fuse block.

## NO SOUND OR DISTORTED SOUND FROM A SPEAKER

TEST	RESULT	ACTION
1. Disconnect suspected speaker connector C236 or C237. Set analog ohmmeter on RX1 scale. Connect ohmmeter across speaker terminals.	Speaker pops.	GO to step 2.
	No noise.	REPLACE speaker.
2. Place ignition switch to RUN and turn radio ON. Tune radio to a strong signal. Connect voltmeter across outputs for suspect speaker. LT GRN (200) and DK GRN (117) wires for RH speaker. GRA (118) and TAN (201) wires for LH speaker.	Varying around 1 volt AC.	LOCATE and REPAIR speaker wires between radio and speaker.
	No voltage or greater than 1 volt AC.	REMOVE radio and send in for repairs.

## TROUBLESHOOTING CHART—RADIO: AM/FM STEREO WITH OPTIONS

### RADIO DOES NOT APPEAR TO WORK (NO DISPLAY LIGHTS, NO SOUND)

TEST	RESULT	ACTION
1. Disconnect one third of radio connector C233 containing the YEL (43) wire and place ignition switch to RUN. Connect voltmeter from YEL (43) wire at radio connector C233 to ground.	Battery voltage.	GO to step 2.
	No voltage.	CHECK condition of fuse (RADIO). If fuse is good, LOCATE and REPAIR open in YEL (43) wire.
2. Connect voltmeter from YEL (43) wire to BLK (150) wire at radio connector C233.	Battery voltage.	REMOVE radio and send in for service.
	No voltage.	LOCATE and REPAIR open in BLK (150) wire from radio to bus bar ground.

### CLOCK DOES NOT OPERATE

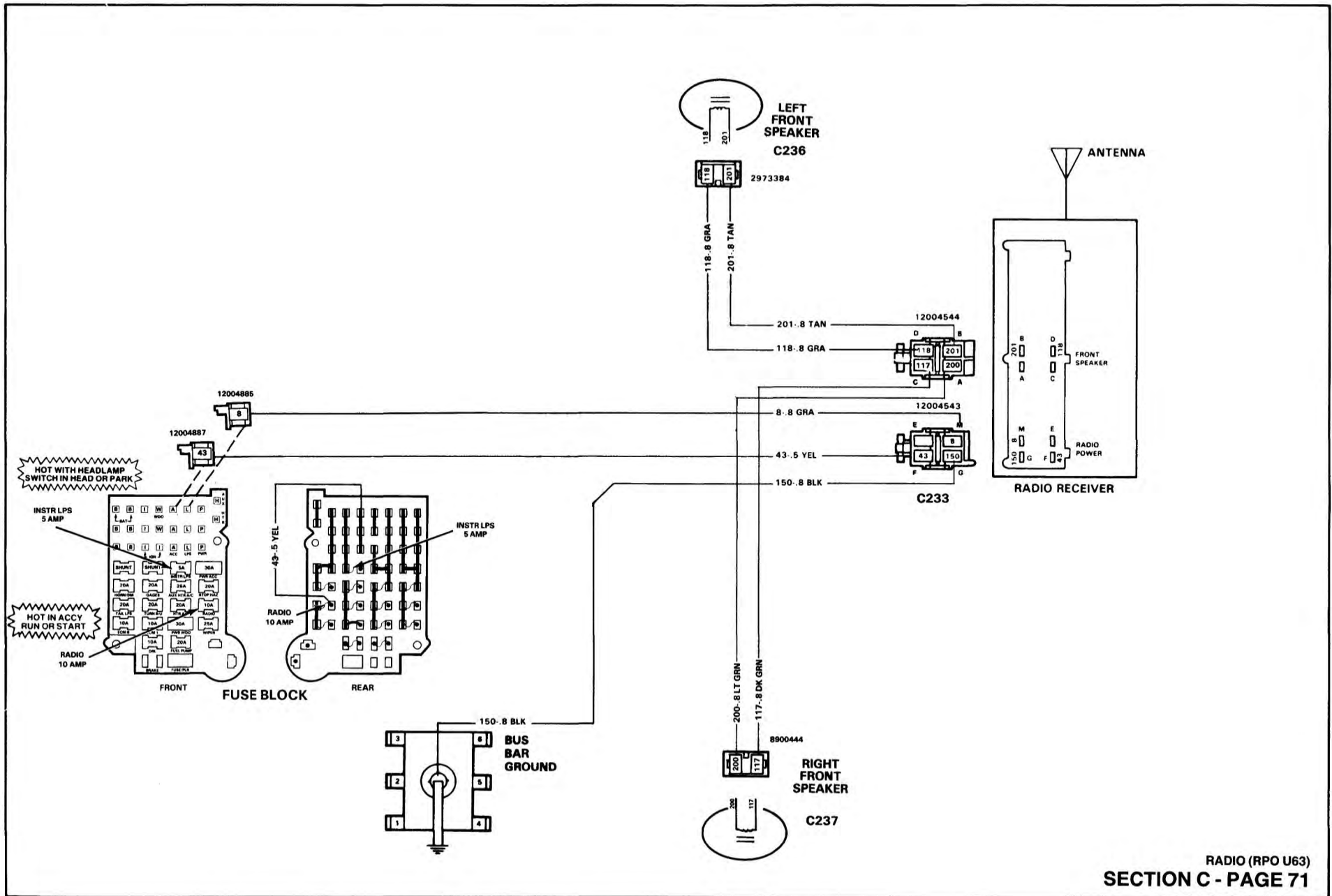
TEST	RESULT	ACTION
Disconnect radio connector C239. Connect voltmeter from ORN (140) wire at radio connector C239 to ground.	Battery voltage.	REMOVE radio control head and send in for service.
	No voltage.	CHECK condition of fuse (HORN/DM). If fuse is good, LOCATE and REPAIR open in ORN (40) wire.

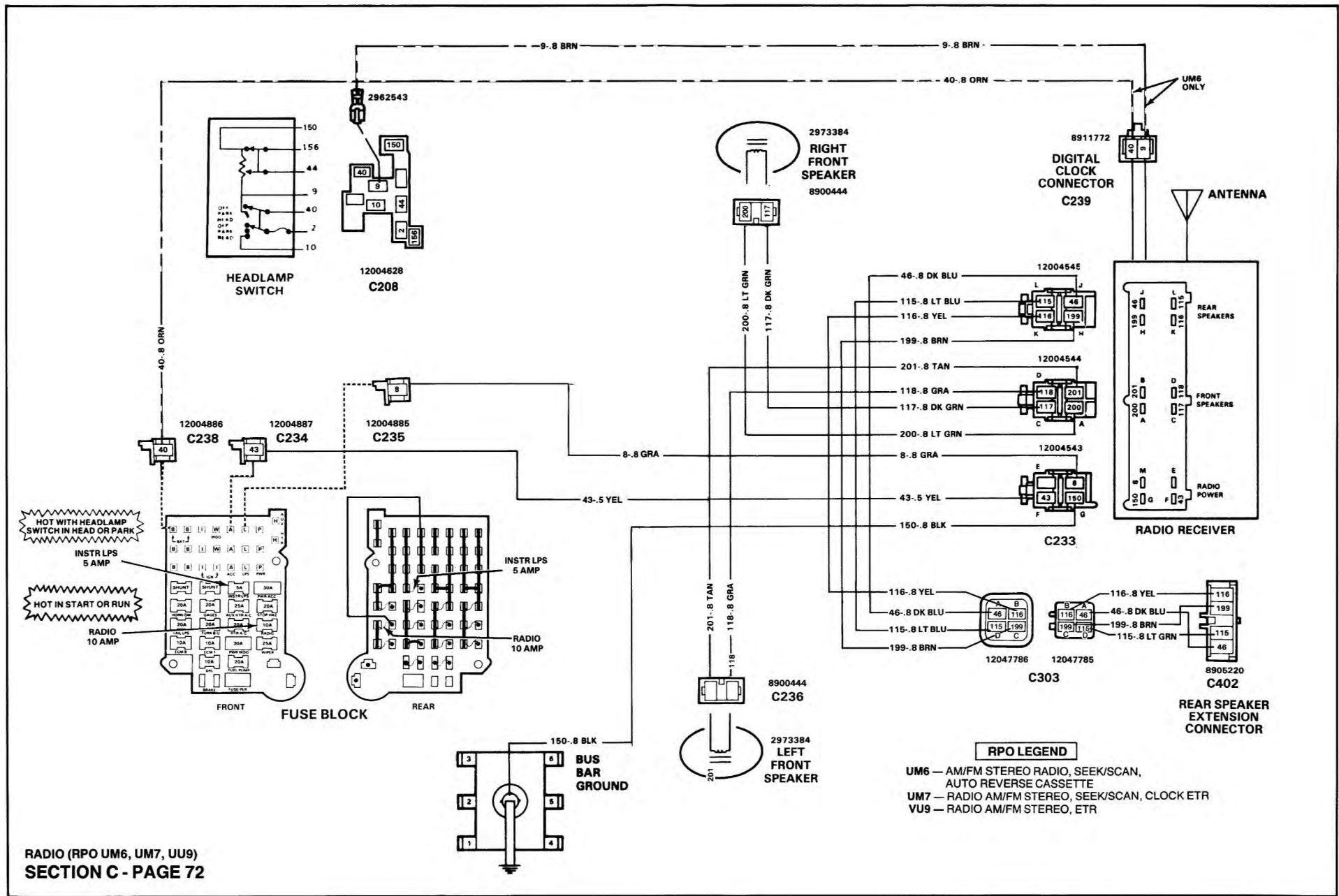
### PANEL LAMP DOES NOT COME ON

TEST	RESULT	ACTION
Place light switch to PARK and panel dimmer switch to HIGH. Connect voltmeter from GRA (8) wire at radio connector C245 to ground.	Battery voltage.	REMOVE radio control head and send in for service.
	No voltage.	LOCATE and REPAIR open in GRA (8) wire from radio to fuse block or REPLACE (INST LPS) fuse.

### DISPLAY DIMMING FUNCTION WILL NOT OPERATE

TEST	RESULT	ACTION
Place light switch to PARK. Connect voltmeter from BRN (9) wire at radio connector C239 to ground.	Battery voltage.	REMOVE radio control head and send in for repairs.
	No voltage.	LOCATE and REPAIR open in BRN (9) wire from radio to headlamp switch connector.







## CIRCUIT OPERATION

A permanent magnet (PM) motor operates each of the Power Windows. Each Motor raises or lowers the glass when voltage is supplied to it. The direction the Motor turns depends on the polarity of the supply voltage. The Switches control the supply voltage polarity.

The Master Door Lock/Power Window Switch Assembly controls both of the Motors. The RH Window Switch controls only the RH Window Motor.

Each Motor is protected by a built-in circuit breaker. If a Window Switch is held too long with the window obstructed or after the window is fully up or down, the circuit breaker opens the circuit. The circuit breaker resets automatically as it cools.

When the Ignition Switch is in RUN, or ACCY, battery voltage is applied to the Master Door Lock/Power Window Switch Assembly, the PWR WDO Circuit Breaker, and the PNK wires. When any of the UP Switches are operated, battery voltage is applied to the Window Motor through the DK BLU wire. The Window Motor is grounded through the DN contact. The Motor runs to drive the Window up. When any of the DN Switches are operated, battery voltage is applied to the Window Motor in the opposite direc-

tion through the BRN wire. The Window Motor is grounded through the UP contact. The Motor runs to drive the Window down.

## RH WINDOW SWITCH OPERATION

When the Ignition Switch is in RUN or ACCY, battery voltage is applied to the RH Window Switch through the PWR WDO Circuit Breaker and the PNK wires to Terminal 76. When the UP Switch in the RH Window Switch is operated, battery voltage is applied to the RH Window Motor through the DK BLU wire. The Motor is grounded through the BRN wire, the DN contact in the RH Window Switch, the TAN wire and the DN contact in the Master Door Lock/Power Window Switch Assembly. The Motor runs to drive the Window up. When the DN Switch in the RH Window Switch is operated, battery voltage is applied to the RH Window Motor in the opposite direction through the BRN wire. The Motor is grounded through the DK BLU wire, the UP contact in the RH Window Switch, the DK BLU/WHT wire and the UP contact in the Master Door Lock/Power Window Switch Assembly. The Motor runs to drive the Window down.

## COMPONENT LOCATION

Page — Figure

Bus Bar Ground	On cowl, to right of steering column	.93 — 16
Fuse Block	Under I/P, LH side of cowl	.92 — 13
Grommet 501	At LH A-pillar	.98 — 28
Grommet 601	At RH A-pillar	.98 — 28
Window Motor, LH	Inside LH door	.98 — 29
Window Motor, RH	Inside RH door	.98 — 29
Window Switch, LH	LH door panel	.98 — 29
Window Switch, RH	RH door panel	.98 — 29
C306	Behind LH kick panel	.98 — 28
C307	Behind RH kick panel	.98 — 28
C502	At LH window switch	.98 — 29
C503	At LH window motor	.98 — 29
C602	At RH window switch	.98 — 29
C603	At RH window motor	.98 — 29
S212	In power window and door lock harness	.98 — 28

## TROUBLESHOOTING CHART—POWER WINDOWS

### BOTH POWER WINDOWS DO NOT OPERATE

TEST	RESULT	ACTION
1. Place ignition switch in RUN position. Connect test lamp from PNK (76) wire at left window switch connector C502 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	CHECK condition of circuit breaker (PWR WDO). If fuse is good, LOCATE and REPAIR open in PNK (76) wire from window switch to fuse block.
2. Connect test lamp from PNK (76) wire to BLK (150) wire at left window switch connector C502.	Test lamp lights.	REPLACE left window switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from left window switch to bus bar ground.

### LH POWER WINDOW DOES NOT OPERATE OR ONLY GOES IN ONE DIRECTION

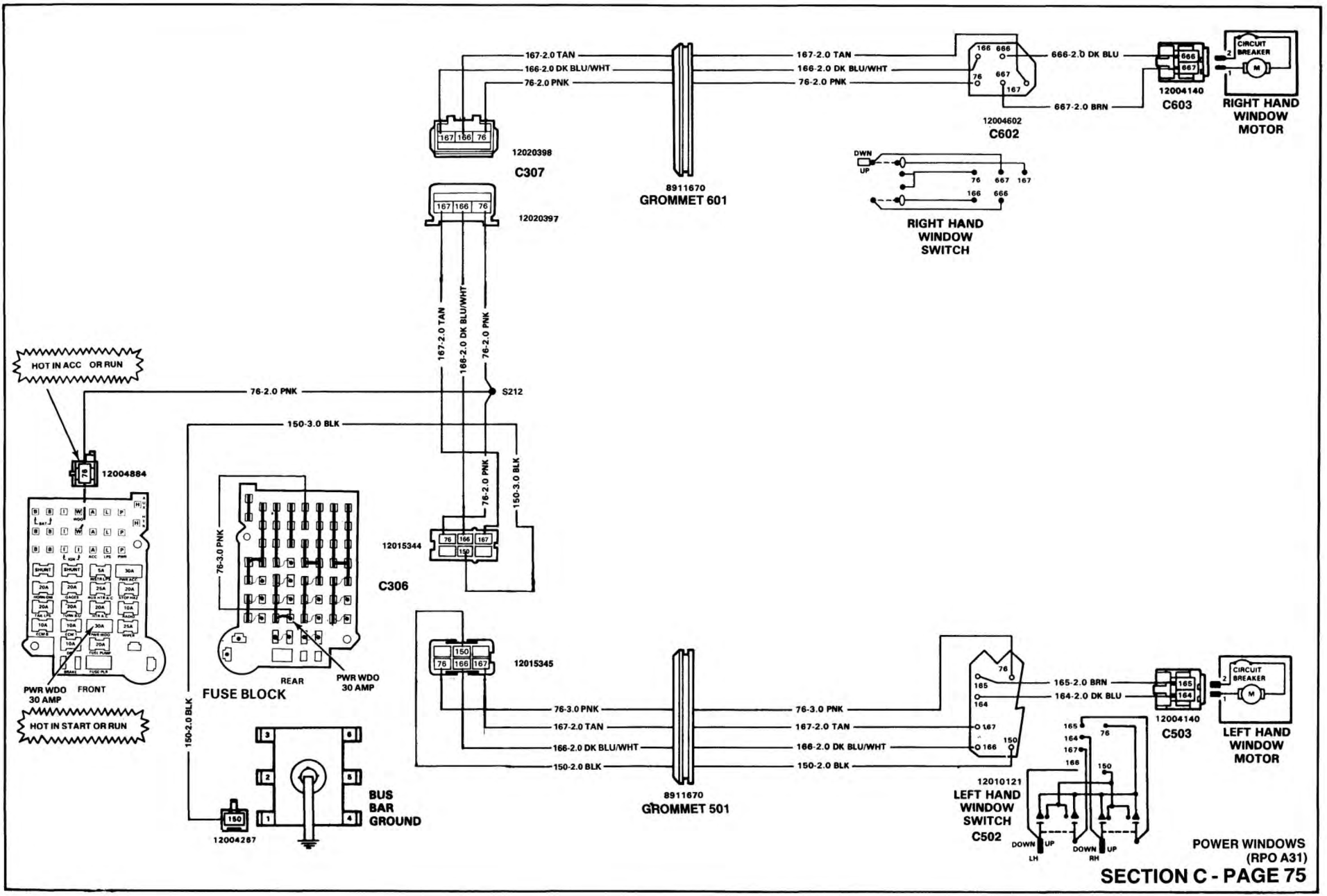
TEST	RESULT	ACTION
1. Place ignition switch in RUN position. Connect test lamp from PNK (76) wire at left window switch connector C502 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from left window switch to splice S212.
2. Connect test lamp from PNK (76) wire to BLK (150) wire at left window switch connector C502.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from left window switch bus bar ground.
3. Move and hold left window switch to UP position. Connect test lamp from BRN (165) wire at left window switch connector C502 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	REPLACE left window switch.
4. Connect test lamp from BRN (165) wire to DK BLU (164) wire at left window switch connector C502.	Test lamp lights.	GO to step 5.
	Test lamp does not light.	REPLACE left window switch.
5. Connect test lamp from BRN (165) wire at left window motor connector C503 to ground.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	LOCATE and REPAIR open in BRN (165) wire from left window motor to left window switch.
6. Connect test lamp from BRN (165) wire to DK BLU (164) wire at left window motor connector C503.	Test lamp lights.	REPLACE left window motor.
	Test lamp does not light.	LOCATE and REPAIR open in DK BLU (164) wire between left window motor and left window switch.

### RH POWER WINDOW ONLY OPERATES FROM DRIVER'S SIDE WINDOW SWITCH

TEST	RESULT	ACTION
1. Place ignition switch in RUN position. Connect test lamp from PNK (76) wire at right window switch connector C602 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from right window switch to splice S212.
2. Move right window switch to UP position. Connect test lamp from BRN (667) wire at right window switch connector C602 to ground.	Test lamp lights.	GO to step 3.
	Test lamp does not light.	REPLACE right window switch.
3. Move right window switch to DOWN position. Connect test lamp from DK BLU (666) wire at right window switch connector C602 to ground.	Test lamp does not light.	REPLACE right window switch.

**RH POWER WINDOW DOES NOT OPERATE FROM EITHER SWITCH**

TEST	RESULT	ACTION
1. Place ignition switch to RUN position. Position and hold right window switch to UP. Connect test lamp from BRN (667) wire at right window motor connector C603 to ground.	Test lamp lights.	GO to step 2.
	Test lamp does not light.	GO to step 3.
2. Connect test lamp from BRN (667) wire to DK BLU (666) wire at right window motor connector C603.	Test lamp lights.	REPLACE right window motor.
	Test lamp does not light.	GO to step 4.
3. Connect a test lamp from PNK (76) wire at left window switch connector C502 to ground.	Test lamp lights.	GO to step 4.
	Test lamp does not light.	LOCATE and REPAIR open in PNK (76) wire from left window switch to fuse block.
4. Connect test lamp from PNK (76) wire to DK BLU/WHT (166) wire at left window switch connector C502.	Test lamp lights.	GO to step 6.
	Test lamp does not light.	GO to step 5.
5. Connect test lamp from PNK (76) wire to BLK (150) wire at left window switch connector C502.	Test lamp lights.	REPLACE left window switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from left window switch to bus bar ground.
6. Connect test lamp from PNK (76) wire to TAN (167) wire at left window switch connector C502.	Test lamp lights.	GO to step 8.
	Test lamp does not light.	GO to step 7.
7. Connect test lamp from PNK (76) wire to BLK (150) wire at left window switch connector C502.	Test lamp lights.	REPLACE left window switch.
	Test lamp does not light.	LOCATE and REPAIR open in BLK (150) wire from left window switch to bus bar ground.
8. Connect test lamp from PNK (76) wire to DK BLU/WHT (166) wire and then to TAN (167) wire at right window switch connector C602.	Test lamp lights at both wires (166 and 167).	REPLACE right window switch.
	Test lamp lights at only one wire or not at all.	LOCATE and REPAIR open in wires (166 and 167) from right window switch to left window switch.



## CIRCUIT OPERATION

The Power Door Locks are operated by reversible motors located in each front door, the side door and the RH rear door. Power to the door locks is supplied through the PWR/ACC circuit breaker.

Moving either Door Lock Switch mounted in the front doors to LOCK applies power to the lock coil of the Door Lock Relay. This energizes the lock coil in the relay and power flows direction to the front, side and rear Door

Locks through the 295 (GRA) wires. Ground for the motors is provided through the 294 (TAN) wires and the normally closed contacts of the UNLOCK contacts in the Door Lock Relay. Moving one of the Door Lock Switches to UNLOCK reverses the polarity of the system. Power flows through the energized UNLOCK contacts in the Door Lock Relay contacts.

## COMPONENT LOCATION

Page — Figure

Door Lock Motor, LH	Inside LH door	.98	—	29
Door Lock Motor, RH	Inside RH door	.98	—	29
Door Lock Relay	Behind LH side of I/P	.98	—	28
Door Lock Switch, LH	LH door panel	.98	—	29
Door Lock Switch, RH	RH door panel	.98	—	29
Fuse Block	Under I/P, LH side of cowl	.98	—	28
Grommet 501	At LH A-pillar	.98	—	29
Grommet 601	At RH A-pillar	.98	—	29
C246	At door lock relay	.98	—	28
C304	Behind LH kick panel	.98	—	28
C305	Behind RH kick panel	.98	—	28
C500	At LH door lock motor	.98	—	29
C501	At LH door lock switch	.98	—	29
C600	At RH door lock motor	.98	—	29
C601	At RH door lock switch	.98	—	29
S211	In power window and door lock harness	.98	—	28

## TROUBLESHOOTING CHART—POWER DOOR LOCKS (WITHOUT DELAY RELAY)

### POWER DOOR LOCKS DO NOT OPERATE

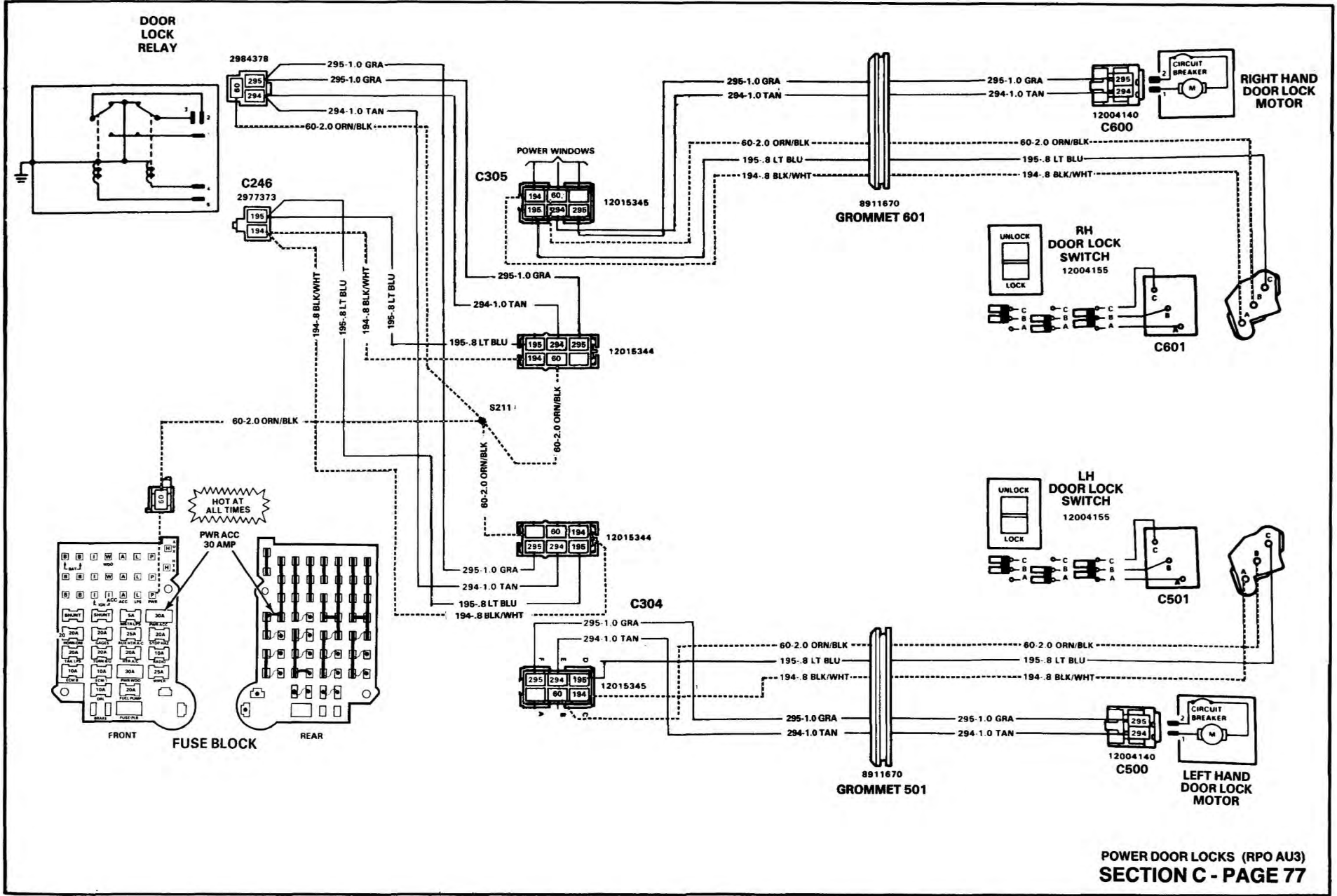
TEST	RESULT	ACTION
Connect test lamp from ORN/BLK (60) wire at door lock relay connector C246 to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN/BLK (60) wire between door lock relay and fuse block. Also inspect splice S211 for open wire or REPLACE PWR ACC circuit breaker.
	Test lamp lights.	INSPECT door lock relay for poor ground condition or REPLACE door lock relay.

### DOOR LOCK MOTOR DOES NOT OPERATE FROM A PARTICULAR SWITCH

TEST	RESULT	ACTION
1. Connect test lamp from ORN/BLK (60) wire at inoperative switch connector to ground.	Test lamp does not light.	LOCATE and REPAIR open in ORN/BLK (60) wire between switch and splice S211.
	Test lamp lights.	IF door lock will not lock, GO to step 2. IF door lock will not unlock, GO to step 3.
2. Connect a fused jumper from ORN/BLK (60) wire to LT BLU (195) wire at inoperative switch connector.	Door lock motor runs.	REPLACE door lock switch.
	Door lock motor does not run.	LOCATE and REPAIR open in LT BLU (195) wire between switch and door lock relay.
3. Connect a fused jumper from ORN/BLK (60) wire to BLK/WHT (194) wire at inoperative switch connector.	Door lock motor runs.	REPLACE door lock switch.
	Door lock motor does not run.	LOCATE and REPAIR open in BLK/WHT (194) wire between switch and door lock relay.

### ONE DOOR LOCK MOTOR DOES NOT OPERATE FROM ANY SWITCH

TEST	RESULT	ACTION
1. Connect test lamp from TAN (294) wire to GRA (295) wire at inoperative motor and momentarily place door lock switch in lock or unlock position while observing test lamp.	Test lamp lights.	REPLACE door lock motor.
	Test lamp does not light.	GO to step 2.
2. Connect test lamp from TAN (294) wire at inoperative motor to ground and momentarily place door lock switch. To unlock position while observing test lamp.	Test lamp lights.	LOCATE and REPAIR open in GRA (295) wire between inoperative motor connector and splice.
	Test lamp does not light.	LOCATE and REPAIR open in TAN (294) wire between inoperative motor connector and splice.



## CIRCUIT OPERATION

### WIPER

The Wiper Motor is supplied power at all times with ground supplied by the Wiper/Washer Switch.

When the Wiper Motor is in LO, battery voltage is supplied to the motor through the WHT wire and the ground circuit is through the GRA wire, the Wiper/Washer Switch and the BLK wire to ground.

When the wiper is in HI, battery voltage is supplied to the motor through the WHT wire and the ground circuit is through the PPL wire, the Wiper/Washer Switch and the BLK wire to ground.

The Park Switch is only open when the wipers are in the PARK position. In all other positions, the park switch is closed. When the Wiper Switch is moved to OFF, battery voltage at the WHT wire is applied through the motor, out the GRA wire, through the park switch and to the Wiper/Washer Switch to ground. The Wiper Motor continues to run at low speed until the wiper blades reach the PARK position. At that time the Park Switch opens and the Wiper Motor stops.

The Wiper Motor is protected by a circuit breaker switch

which opens if the current through the Motor rises to a high level. This may happen if the wiper blades are blocked by ice or snow. The circuit breaker resets automatically after it cools off.

### WASHER

Battery voltage is applied to the Washer Pump through the WHT wire, to the switch and to ground through the BLK wire. The washers are operational as long as the paddle switch on the wiper switch arm is on.

### DELAY

With the Wiper Switch in DELAY, the solid state Pulse Wiper Control Module controls the wiper delay time through the wiper ground circuit. In all other modes of operation, the Pulse Wiper Control Module is bypassed and the wiper system functions the same as the standard wiper system.

### COMPONENT LOCATION

#### Page — Figure

Fuse Block	LH side of cowl, under I/P	.92	—	13
Pulse Wiper Control Module	Behind I/P, above steering column	.94	—	18
Pulse Wiper/Washer Switch	Part of multi-function switch	.95	—	20
Windshield Washer Pump	Engine compartment, middle of cowl	.91	—	9
Windshield Wiper Motor	Engine compartment, LH side of cowl	.91	—	9
Wiper/Washer Switch	Part of multi-function switch	.95	—	20
C100	Engine compartment, LH side of cowl	.91	—	9
C102	At windshield wiper motor	.91	—	9
C148	On windshield wiper motor	.94	—	18
C149	Near windshield wiper motor	.94	—	18
C240	At pulse wiper control module	.94	—	18
C241	I/P harness, above steering column	.94	—	12
G200	Under LH side of I/P, bus bar ground	.92	—	13
S200	I/P harness, above fuse block	.92	—	13

## TROUBLESHOOTING CHART—WIPER/WASHER (AND RPO CD4)

### WIPERS DO NOT OPERATE IN ANY MODE

TEST	RESULT	ACTION
1. Place ignition in RUN and turn wipers to HI. Connect test lamp from WHT (93) wire at windshield wiper motor connector C148 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between windshield wiper motor and fuse block or REPLACE (WIPER) fuse.
	Test lamp lights.	GO to step 2.
2. Connect a fused jumper from BLK (150) wire at wiper switch connector C240 to ground.	Wiper motor runs.	LOCATE and REPAIR open in BLK (150) wire between wiper switch ground terminal G200.
	Wiper motor does not run.	REPLACE wiper motor.

### WIPERS DO NOT OPERATE IN HI

TEST	RESULT	ACTION
1. Place ignition in RUN and wipers to HI. Connect a fused jumper from PPL (92) wire at pulse wiper module connector C224 or wiper/washer switch connector C241 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in PPL (92) wire between wiper motor and pulse wiper module or wiper/washer switch or REPLACE wiper motor.
	Wiper motor runs.	GO to step 2, if vehicle is equipped with pulse wipers.
2. Connect a fused jumper from PPL (92) wire at column wiper switch to ground.	Wiper motor does not run.	LOCATE and REPAIR open in PPL (92) wire between wiper switch and pulse wiper module or REPLACE pulse wiper control module.
	Wiper motor runs.	REPLACE wiper washer switch.

### WIPERS DO NOT OPERATE IN LO OR DELAY

TEST	RESULT	ACTION
1. Place ignition in RUN and wipers to LO. Connect a fused jumper from GRA (91) wire at pulse wiper module connector C240 or wiper/washer switch connector C241 to ground.	Wiper motor does not run.	LOCATE and REPAIR open in GRA (91) wire between wiper motor and pulse wiper module or REPLACE wiper motor.
	Wiper motor runs.	GO to step 2, if vehicle is equipped with pulse wipers.
2. Connect a fused jumper from GRA (91) wire at wiper switch to ground.	Wiper motor does not run.	LOCATE and REPAIR open in GRA (91) wire between wiper switch and pulse wiper module or REPLACE pulse wiper control module.
	Wiper motor runs.	REPLACE wiper washer switch.

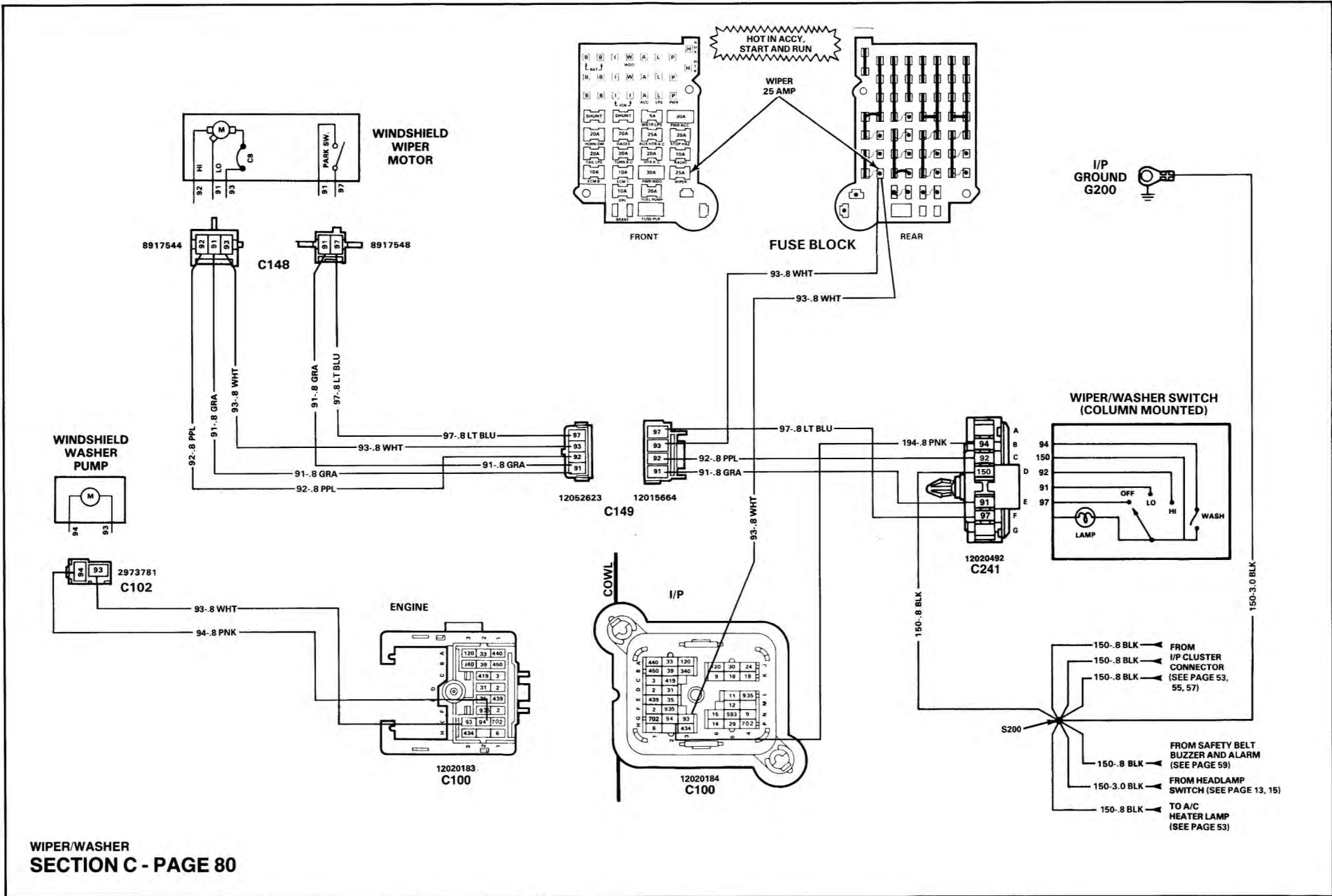
### WASHER MOTOR DOES NOT OPERATE

TEST	RESULT	ACTION
1. Place ignition to RUN and wiper switch to WASH. Connect test lamp from WHT (93) wire at washer pump connector C102 to ground.	Test lamp does not light.	LOCATE and REPAIR open in WHT (93) wire between washer pump and fuse block.
	Test lamp lights.	GO to step 2.
2. Connect test lamp from WHT (93) wire to PNK (94) wire at washer pump connector C102.	Test lamp lights.	REPLACE washer pump.
	Test lamp does not light.	GO to step 3.
3. Connect a fused jumper from PNK (94) wire at pulse wiper control module connector C240 or wiper/washer switch connector C241 to ground.	Washer motor does not pump.	LOCATE and REPAIR open in PNK (94) wire between washer pump and pulse wiper control module or wiper/washer switch.
	Washer motor pumps.	GO to step 4, if vehicle is equipped with pulse wipers. GO to step 5 for standard wipers.

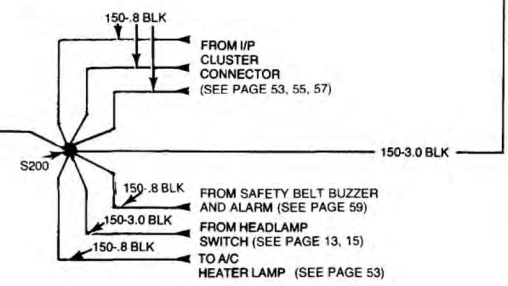
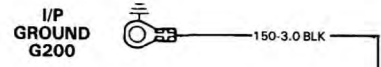
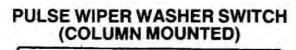
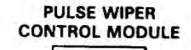
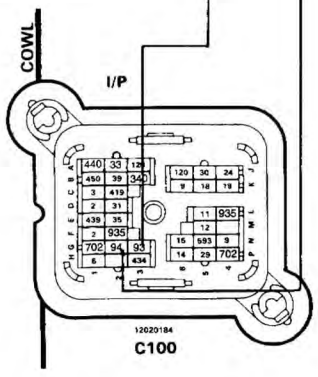
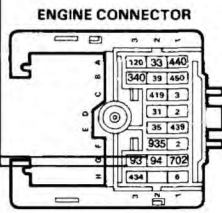
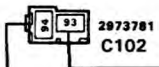
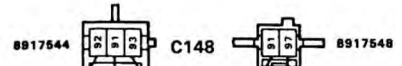
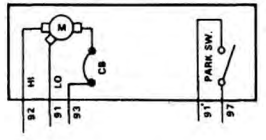
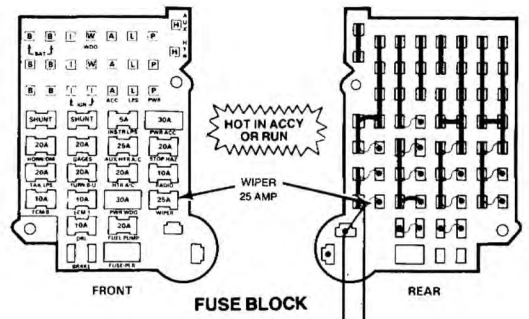
4. Connect a fusible jumper from PNK (94) wire at wiper switch to ground.	Washer motor does not pump.	LOCATE and REPAIR open in PNK (94) wire between pulse wiper control module and wiper switch.
	Washer motor pumps.	GO to step 5.
5. Connect a fusible jumper from BLK (150) wire at pulse wiper module connector C240 or wiper/washer switch connector C241 to ground.	Washer motor does not pump.	REPLACE wiper switch.
	Washer motor pumps.	LOCATE and REPAIR open in BLK (150) wire between wiper/washer switch or pulse wiper module and ground terminal G200.

**WASHER MOTOR DOES NOT SHUT OFF**

TEST	RESULT	ACTION
1. Place ignition in RUN and wiper switch to WASH. Disconnect wiper/washer switch connector C241.	Washer motor stops pumping.	REPLACE wiper switch.
	Washer motor pumps.	GO to step 2, if vehicle is equipped with pulse wipers.
2. Disconnect wiper control module connector C240.	Washer motor stops pumping.	REPLACE wiper control module.
	Washer motor pumps.	LOCATE and REPAIR short to ground in PNK (94) wire between pulse wiper control module and washer pump.







**PULSE WIPER/WASHER (RPO CD4)  
SECTION C - PAGE 81**

## CIRCUIT OPERATION

### BACKUP LAMPS

With the Ignition Switch in RUN or START, voltage is applied through the TURN/BU fuse to the Transmission Position Switch or the Backup Lamp Switch. Whenever the gear selector lever is shifted to REVERSE the Transmission Position Switch or the Backup Lamp Switch closes and voltage is applied to the Backup Lamps and the Lamps turn on.

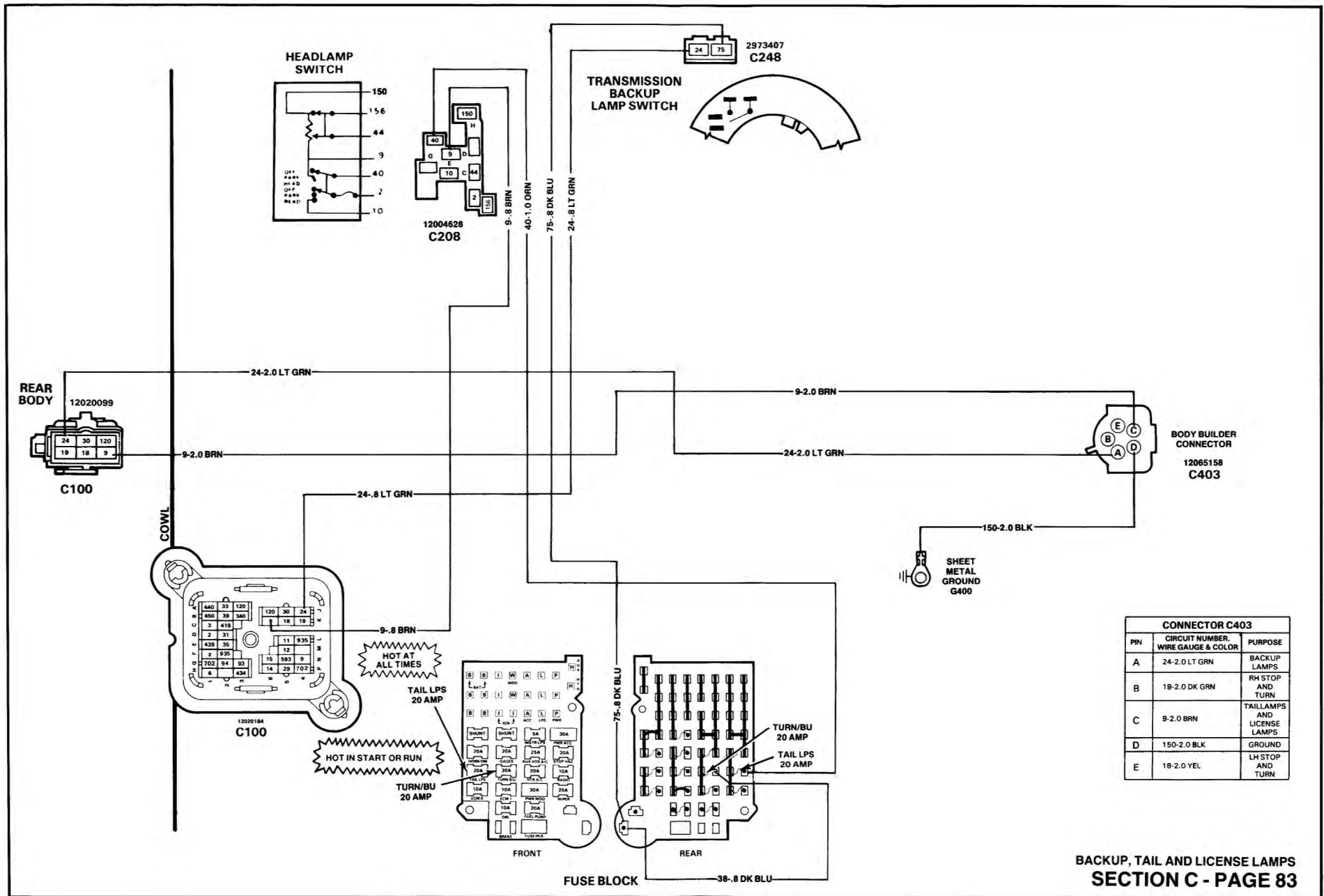
### PARK, TAIL, MARKER, AND LICENSE LAMPS

Voltage is applied through the TAIL LPS fuse to the Headlamp Switch at all times. With the Headlamp Switch in PARK or HEAD, voltage is applied to the Park, Tail, Marker, and License Lamps.

### COMPONENT LOCATION

#### Page — Figure

Body Builder Connector	LH frame rail, at end crossmember	.98	—	30
Fuse Block	Under I/P, LH side of cowl	.92	—	13
Headlamp Switch	LH side of I/P	.92	—	13
Transmission Backup Lamp Switch	Top of steering column, under I/P	.92	—	12
C100	Engine compartment, LH side of cowl	.91	—	9
C208	At headlamp switch	.92	—	13
C248	At transmission backup lamp switch	.92	—	12
C403	At body builder connector	.98	—	30
G400	LH side of rear crossmember, in front of fuel tank	.98	—	30



CONNECTOR C403		
PIN	CIRCUIT NUMBER, WIRE GAUGE & COLOR	PURPOSE
A	24-2.0 LT GRN	BACKUP LAMPS
B	18-2.0 DK GRN	RH STOP AND TURN
C	9-2.0 BRN	TAIL LAMPS AND LICENSE LAMPS
D	150-2.0 BLK	GROUND
E	18-2.0 YEL	LH STOP AND TURN

## CIRCUIT OPERATION

### VACUUM SYSTEMS

A vacuum-operated component uses the force of normal air pressure working against the lower air pressure of a partial vacuum to provide power that operates the component. The vacuum created within the inlet manifold when the engine is running is stored in a ball-shaped vacuum tank on the air conditioning evaporator and blower module, adjacent to the accumulator. A check valve in the line feeding vacuum to the tank keeps the stored vacuum from weakening when inlet manifold vacuum drops during high speed or high power operation.

Vacuum is routed through hoses (and in some cases, tubing) to a mechanical or electric valve that provides a means of controlling the vacuum-operated component. When the valve is open, it allows vacuum to go to an actuator that actually operates the component. When the component is to be returned to its original position, the valve cuts off the vacuum to the actuator hose and vents the hose to normal air pressure.

A typical actuator is a metal shell with a movable shaft that retracts and extends to mechanically operate the component. A flexible diaphragm separates the interior of the shell into two chambers — a sealed chamber to which vacuum can be admitted, and an open chamber exposed to normal air pressure. The movable shaft is attached to the center of the diaphragm and extends from the open chamber.

When vacuum is directed to the sealed chamber, normal air pressure presses on the other side of the diaphragm and causes it to retract the shaft. When the vacuum is cut off, the sealed chamber is vented to outside air to balance the air pressure on both sides of the diaphragm and eliminate the force that retracted the shaft. A coiled spring within the sealed chamber expands to push the diaphragm back to its original position. This extends the shaft.

### FRONT MANUAL AIR CONDITIONING (RPO C60) VACUUM SYSTEM

The front manual air conditioning system uses vacuum to operate the air valves ("doors") that control airflow through the air conditioning module and the heater core hot water bypass valve that controls the flow of coolant through the heater core of the air conditioning system.

Vacuum is supplied from the vacuum tank adjacent to the refrigeration system accumulator. Just ahead of the air conditioning control assembly in the instrument panel, the vacuum supply line divides into two branches. One branch brings vacuum to an on-off vacuum valve on the control assembly. When the control assembly temperature lever is in the full "COLD" position, the vacuum valve is open and vacuum is supplied to a hot water bypass valve in the right side of the engine compartment, forward of the air conditioning heater inlet and outlet pipes. This causes hot water to bypass the air conditioning system heater core to prevent unwanted heat from reducing the cooling effect of the system. When the temperature lever is moved away from the full "COLD" position, bypass valve vacuum is vented and the bypass valve permits hot water to reach the heater core.

The other branch of the vacuum supply line brings vacuum to the rotary selector valve that is operated by the mode lever of the control assembly. A vacuum hose harness brings vacuum from the ports in the rotary selector valve to the vacuum actuators for the air valves of the air conditioning system. All air conditioning vacuum actuators are two-positioned actuators, each controlled by one vacuum hose. Application of vacuum or vented air to each actuator except the hot water bypass valve actuator is determined by the operating mode selected by setting the mode lever in the control assembly. The following charts indicate the air outlets that operate in each mode selection, and the response of the rotary selector valve to each mode lever position.

AIR DISTRIBUTION				
MODE SELECTION	UPPER (I/P) A/C OUTLETS	LOWER (FLOOR) HEATER OUTLETS	DEFROSTER OUTLETS	REMARKS
MAX A/C	HIGH	NONE	NONE	a, b
NORM A/C	HIGH	NONE	NONE	a
BI-LEVEL	MEDIUM	MEDIUM	NONE	a
VENT	HIGH	NONE	NONE	c
HEAT	NONE	HIGH	LOW	c
DEF	NONE	LOW	HIGH	a

#### REMARKS:

- a — Refrigeration system operates.
- b — Inside air recirculated.
- c — Refrigeration system off; no air cooling available.

ROTARY SELECTOR VALVE OPERATING CHART									
CONNECTIONS			MODE SELECTION						
VALVE PORT NO.	TERMINAL	HOSE COLOR	OFF	MAX A/C	NORM A/C	BI-LEVEL	VENT	HEAT	DEF
2	RECIRC.	ORN	VENT	VAC	VENT	VENT	VENT	VENT	VENT
3	HEAT-DEF.	RED	VAC	VAC	VAC	VAC	VAC	VAC	VENT
4	SOURCE	TAN	VAC	VAC	VAC	VAC	VAC	VAC	VAC
5	A/C	BLU	VENT	VAC	VAC	VENT	VAC	VENT	VENT
9	BI-LEVEL	GRA	VENT	VAC	VAC	VAC	VAC	VENT	VENT

### TRANSMISSION VACUUM MODULATOR SYSTEM

Shift points and oil pressure of the MX1 three-speed automatic transmission are controlled by a vacuum modulator that responds to engine vacuum as an indicator of engine operation and performance demands. Vacuum is taken from the inlet manifold and routed directly to the transmission vacuum modulator on the right side of the transmission case. The vacuum modulator controls modulator oil pressure within the transmission to hold the 1-2 and 2-3 shift valves closed until governor oil pressure increases with an increase in engine speed or torque and forces an upshift. A part-throttle 3-2 downshift is forced when the accelerator pedal is depressed enough to overcome the force of governor oil while operating in third gear.

### EXHAUST GAS RECIRCULATION SYSTEM

The exhaust gas recirculation (EGR) system allows a small amount of exhaust gas to flow from the exhaust manifold into the inlet manifold when the throttle is opened beyond idle and inlet manifold vacuum is normal. This reduces combustion temperatures in the engine to control oxides of nitrogen emissions.

The EGR valve is operated by an integral vacuum actuator that controls a pintle within the valve. The pintle remains closed to prevent exhaust gas recirculation until vacuum is applied to the actuator. The vacuum causes the pintle to open, allowing a measured flow of exhaust gas to enter the inlet manifold.

The EGR system remains closed during periods of engine idle and deceleration to prevent rough idle from excessive dilution of the fuel-air mixture. It also remains closed at wide open throttle to prevent power loss. At other times, it rapidly cycles open and closed to modulate the flow of exhaust gas as required. Under certain circumstances, it may remain fully open to provide the maximum EGR.

A manifold absolute pressure (MAP) sensor measures the strength of the vacuum in the EGR vacuum circuit and sends a signal back to the electronic control module (ECM). If actual vacuum differs from the preferred vacuum as calculated by the ECM, the ECM will adjust the on-off intervals of the EGR valve to correct the flow of exhaust gas into the cylinders. This provides the required control of oxides of nitrogen emissions while retaining engine performance under all operating conditions. The ECM also uses the signal from the MAP sensor to control fuel delivery and ignition timing.

Vacuum for the EGR system is taken from the throttle body and routed through a hose to the electronic vacuum regulator valve (EVRV) solenoid. This solenoid is controlled by the 435 circuit from the ECM. When the solenoid opens the electronic vacuum regulator valve, vacuum reaches the EGR actuator through another vacuum hose and opens the EGR pintle valve to allow exhaust gas to flow into the inlet manifold. When the EVRV solenoid is released, the valve vents the EGR actuator to outside air to close the EGR pintle valve.

### COMPONENT LOCATION

	Page-Figure
Air Conditioning Control Assembly	Instrument panel, RH side of instrument cluster . . . . . 93 — 15
Air Conditioning Heater Hot Water Valve	In heater hose assembly, RH side of engine compartment . . . . . —
Air Conditioning Module	Under RH side of instrument panel . . . . . —
EGR Valve Hose Vacuum Source	Front of throttle body, port "S" . . . . . —
Electronic Vacuum Regulator Valve (EVRV)	On bracket, inboard side of RH cylinder head . . . . . 90 — 8
Exhaust Gas Recirculation (EGR) Valve:	
RPO L05 5.7L (350 cu. in.) V8	Rear of inlet manifold, RH side . . . . . —
RPO L16 7.4L (454 cu. in.) V8	Front of inlet manifold, LH side . . . . . —
Heat-Defrost, A/C and Bi-Level Air Valve Actuators	On air conditioning module . . . . . —
Inlet Manifold Vacuum Fitting	In top of inlet manifold, RH rear of engine . . . . . —
Manifold Absolute Pressure (MAP) Sensor	On bracket, RH cylinder head . . . . . 90 — 8
MAP Sensor Hose Vacuum Source	Rear of throttle body, port "F" . . . . . —
Recirculating/Fresh Air Valve Actuator	In RH side cowl panel . . . . . —
Transmission Vacuum Modulator	RH side of transmission case, just above transmission oil pan flange . . . . . —
Vacuum Tank	Adjacent to A/C accumulator on A/C evaporator and blower module, RH side of engine compartment . . . . . —

## VACUUM SYSTEMS

### SECTION C — PAGE 84

## TROUBLESHOOTING

Conditions most likely to cause vacuum system problems include hoses that leak or become disconnected. With the engine running, either condition is easily detected from the hiss of air at the opening. Other common vacuum problems are kinked or obstructed hoses, hoses connected incorrectly or binding components.

A vacuum pump can be used as a vacuum source to operate components and test the system. The built-in

vacuum gage of the pump provides a means of checking for a vacuum leak as well. Once vacuum is applied to operate the component, the gage should hold steady until the vacuum is purposely released.

On vacuum systems that are controlled by electrical or electronic switches, check for a blown fuse, wiring that is cracked, frayed or burned, and high resistance in connectors of the control circuit(s) before checking for a suspected vacuum system problem.

### TROUBLESHOOTING CHART — FRONT MANUAL AIR CONDITIONING VACUUM CONTROL

#### PRELIMINARY CHECKS:

Verify the validity of the complaint by comparing the discharge air temperature of the suspected air conditioning system against the discharge air temperature of a known good system in a comparable 1990 vehicle.

After making quick checks of the vacuum system

(listening for the hiss of a vacuum leak, checking for proper vacuum hose connections and kinked, pinched or misrouted hoses), be sure the complaint is not caused by a mechanical problem before making additional vacuum system checks.

#### INSUFFICIENT COOLING — "HI" BLOWER, "MAX A/C" MODE, "COLD" TEMPERATURE SETTING

TEST	RESULT	ACTION
1. Disconnect vacuum hose from the heater water bypass valve. With engine running and air conditioning controls set for "HI" blower, "MAX A/C" mode and "COLD" temperature, measure vacuum at disconnected end of vacuum hose.	Vacuum reading close to inlet manifold vacuum at idle.	REPLACE the heater water bypass valve.
	Little or no vacuum.	GO to step 2.
2. Disconnect the hose to the heater water bypass valve (lower hose) at the L-shaped 2-hose connector to the valve at the LH side of the A/C control assembly. (Do not disconnect the connector from the valve.) With the engine idling and A/C controls set as in step 1, check for vacuum at the exposed nipple of the connector.	Strong vacuum.	REPAIR vacuum leak or obstruction in hose to the heater water bypass valve.
	Little or no vacuum.	GO to step 3.
3. Disconnect the L-shaped connector from the vacuum valve at the LH side of the A/C control assembly. With the same test conditions as in step 2, check for vacuum at the vacuum supply port (upper port) of the connector.	Strong vacuum.	REPLACE the vacuum valve.
	Little or no vacuum.	REPAIR vacuum leak or obstruction in vacuum supply line branch to the vacuum valve.

#### PRELIMINARY CHECKS:

Use the charts in this section to verify that air is either being delivered from an outlet when it should not be, or that air is not being delivered when it should be, during operation in one or more modes.

After making quick checks of the vacuum system

(listening for the hiss of a vacuum leak, checking for proper vacuum hose connections and kinked, pinched or misrouted hoses), be sure the complaint is not caused by a mechanical problem before making additional vacuum system checks.

#### IMPROPER AIR DISTRIBUTION FROM OUTLETS

TEST	RESULT	ACTION
1. Disconnect the vacuum hose at the actuator for the inoperative air valve ("door"). With the engine idling and the mode lever set in a position that will apply vacuum to the actuator, check for vacuum at the disconnected hose.	Vacuum at or near inlet manifold vacuum at idle.	REPAIR binding condition in air valve or linkage. (If no binding is found, REPLACE actuator.)
	Little or no vacuum.	GO to step 2.
2. Disconnect the vacuum hose harness at the rotary selector valve on the A/C control assembly. With the same test conditions as in step 1, check for vacuum at the rotary selector valve port that feeds the suspected vacuum hose.	Vacuum at or near inlet manifold vacuum at idle.	REPAIR obstruction or vacuum leak in hose to the affected actuator.
	Little or no vacuum.	GO to step 3.
3. With the vacuum supply hose disconnected from the rotary selector valve and with the same test conditions as in step 2, check for vacuum at the open end of the tan vacuum supply hose.	Vacuum at or near inlet manifold vacuum.	REPLACE rotary selector valve.
	Little or no vacuum.	REPAIR obstruction or vacuum leak in vacuum supply hose.

#### TRANSMISSION VACUUM MODULATOR VACUUM SYSTEM

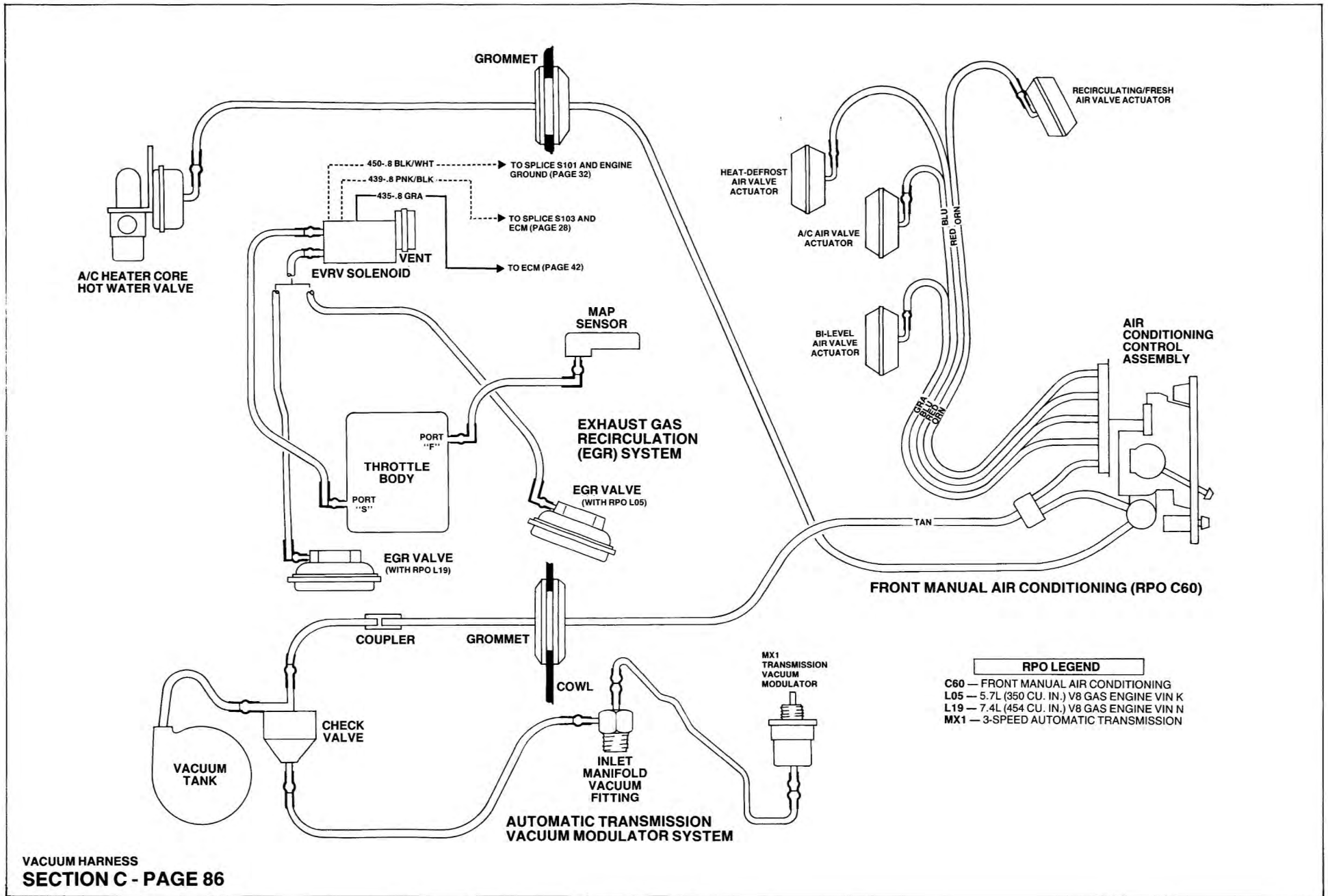
A leak in the vacuum system for the transmission vacuum modulator of the MX1 three speed automatic transmission can cause high line pressure in the transmission hydraulic control system, a condition that can result in a variety of upshift problems ranging from delayed upshifts to no 1-2 or 2-3 shifts. These conditions may be caused by a vacuum system problem. However, mechanical or hydraulic conditions also might cause the same problems. Therefore, it is advisable to follow diagnosis procedures that check out all possibilities in a systematic order, not just a check for a malfunctioning vacuum component. For effective diagnosis procedures, refer to the R/V, G and P Truck Service Manual, Section 7A2.

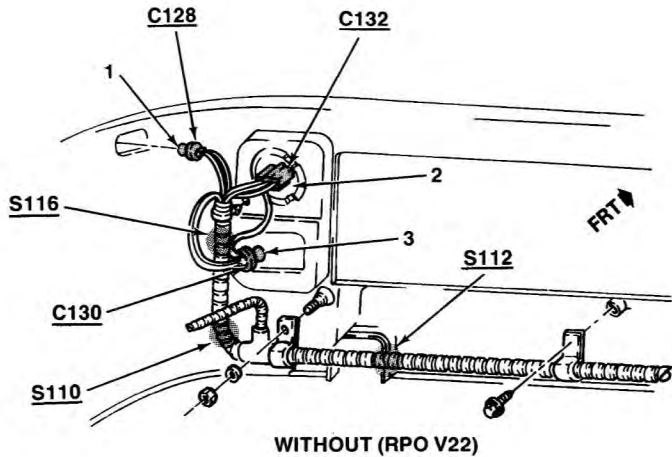
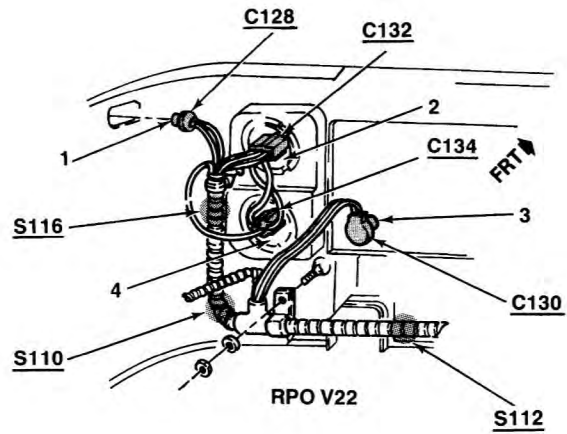
#### EGR VALVE VACUUM SYSTEM

A leak in the EGR (exhaust gas recirculation) vacuum system can upset the ECM's programmed control of exhaust gas recirculation and adversely affect en-

gine operation. Too much exhaust gas recirculation at idle or cruise can result in the engine stalling after closed throttle deceleration, surging during steady throttle cruising, or a rough idle. Too little exhaust gas flow allows combustion temperatures to become too high and bring about detonation ("spark knock") or an overheated engine. In addition, nitrous oxide emissions may be high enough to cause the vehicle to fail an emissions test.

Because the source of an EGR system symptom might be traced to a mechanical or electrical condition as well as a faulty vacuum system, an effective systematic diagnosis procedure should examine all three categories of components — not just the vacuum system alone. Therefore, no exclusive vacuum system diagnosis procedures are provided here. For more information on the EGR system, refer to the "Fuel and Emissions Service Manual."

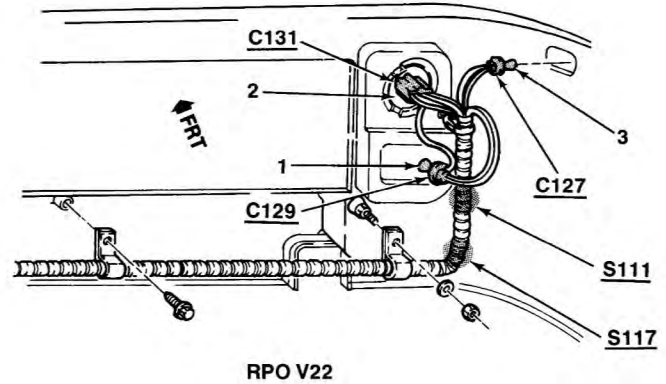
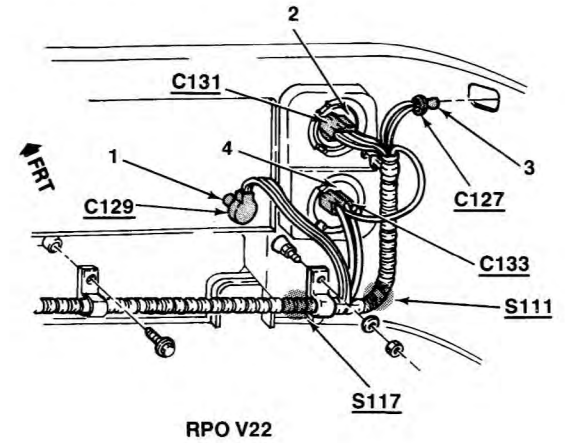




1. LH Side Marker Lamp
2. LH High-Low Beam Headlamp
3. LH Park and Directional Lamp
4. LH High Beam Headlamp

LC-0001-GP-E-RP

Figure 1 - Forward Lamp Wiring Harness, LH Side



1. RH Park and Directional Lamp
2. RH High Low Headlamp
3. RH Side Marker
4. RH High Beam Headlamp

LC-0002-GP-E-RP

Figure 2 - Forward Lamp Wiring Harness, RH Side

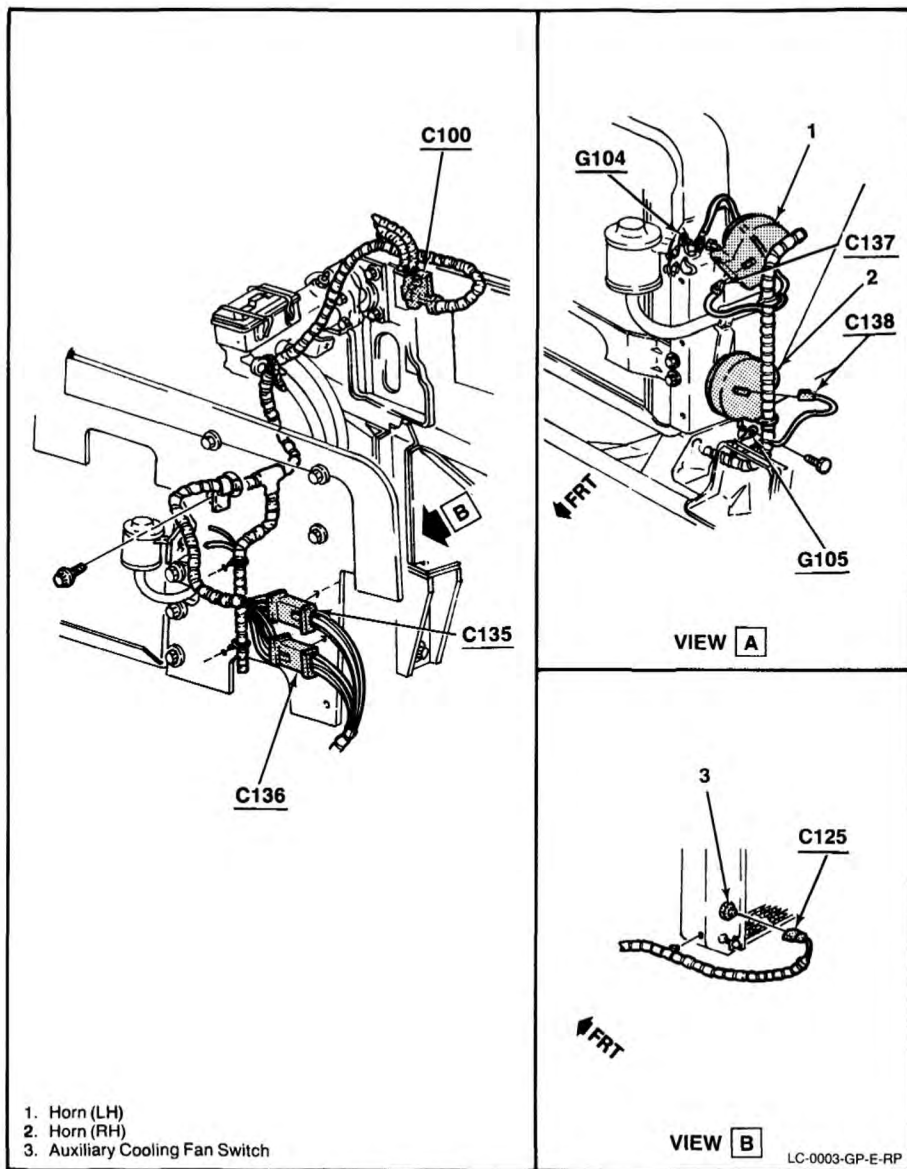


Figure 3 - Forward Harness Extension and Horns (P52)

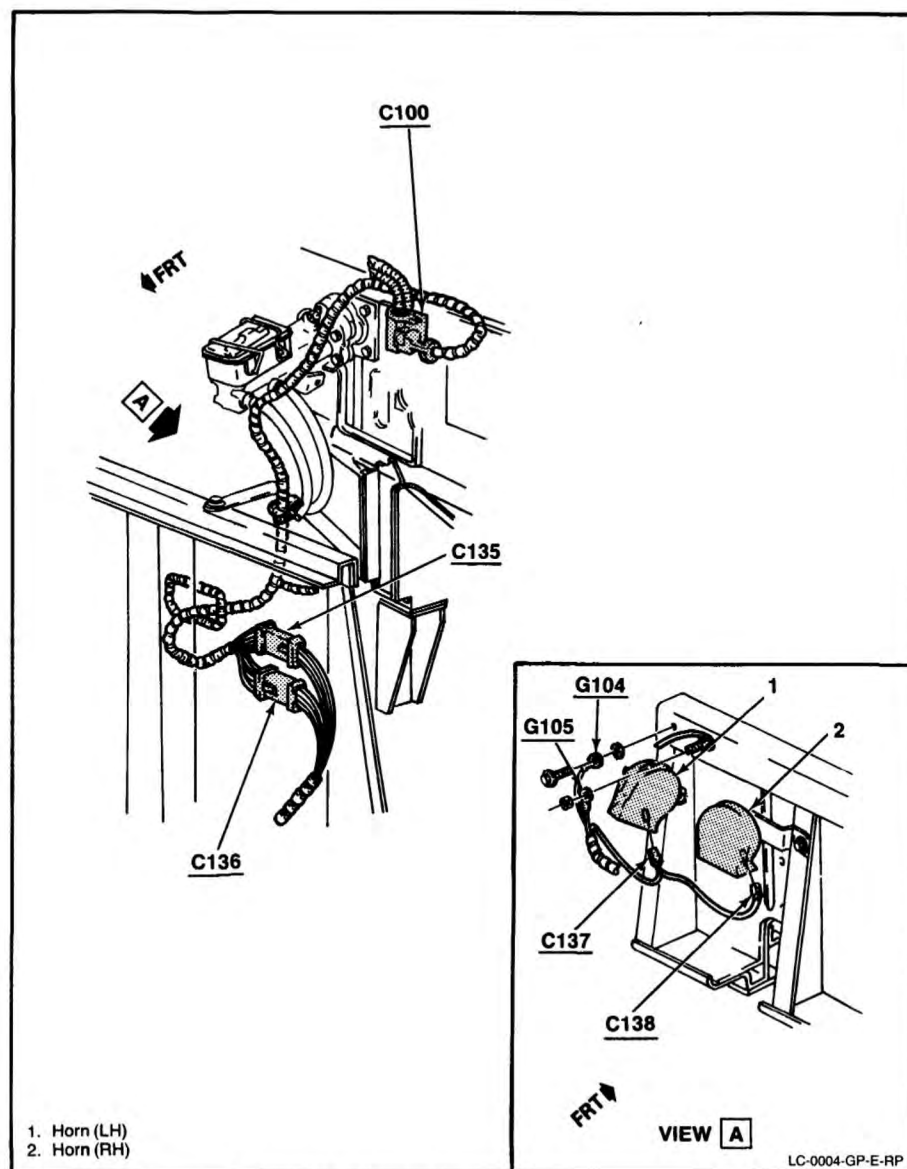


Figure 4 - Forward Harness Extension and Horns (P62)



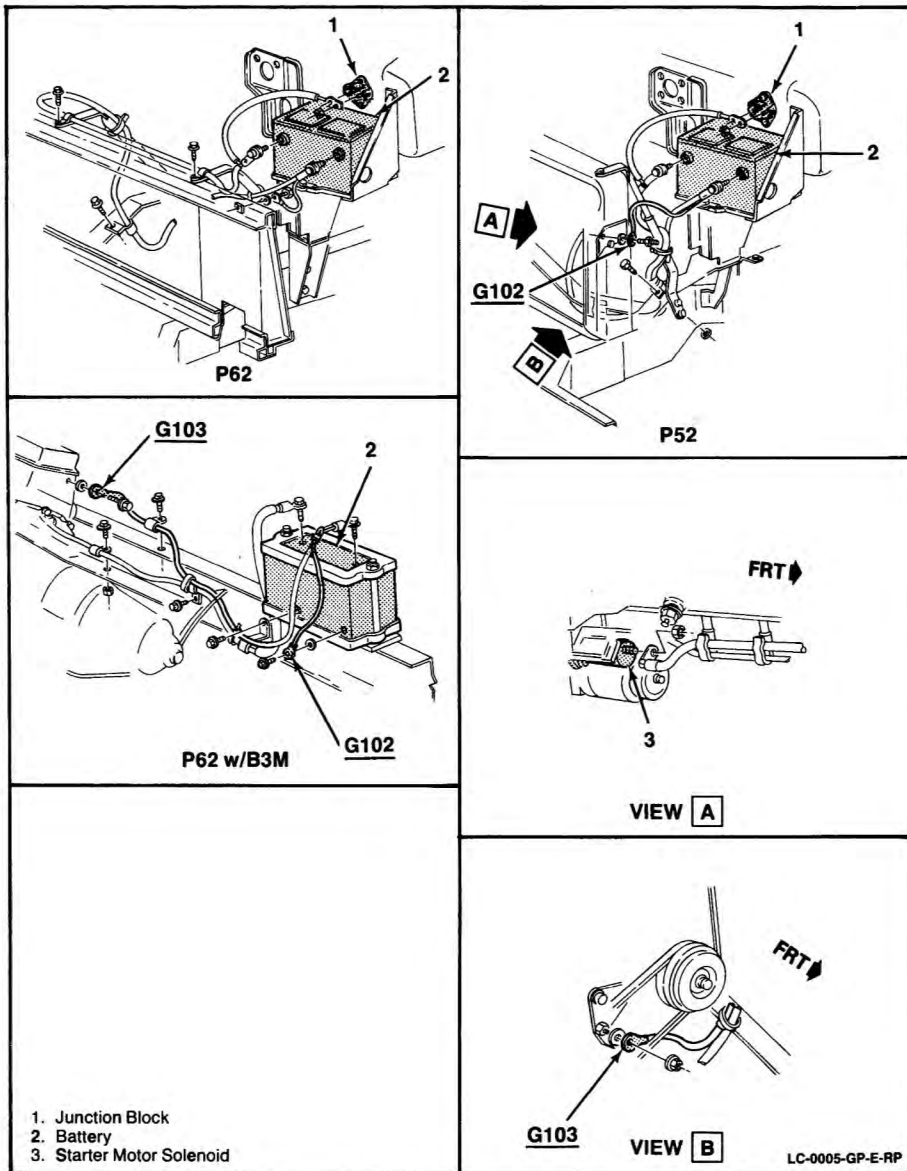


Figure 5 - Batteries (P52, P62)

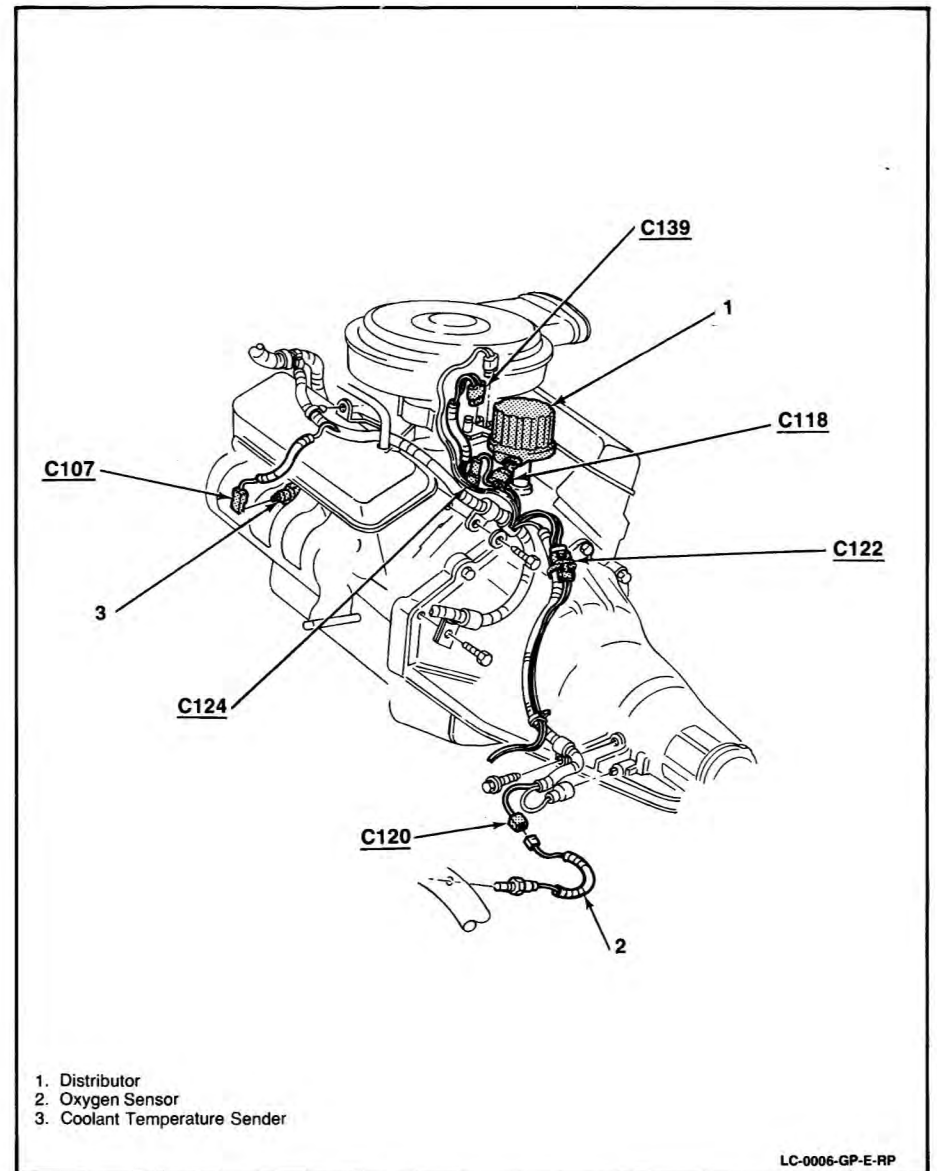


Figure 6 - Engine Wiring Harness LH Side (P52)

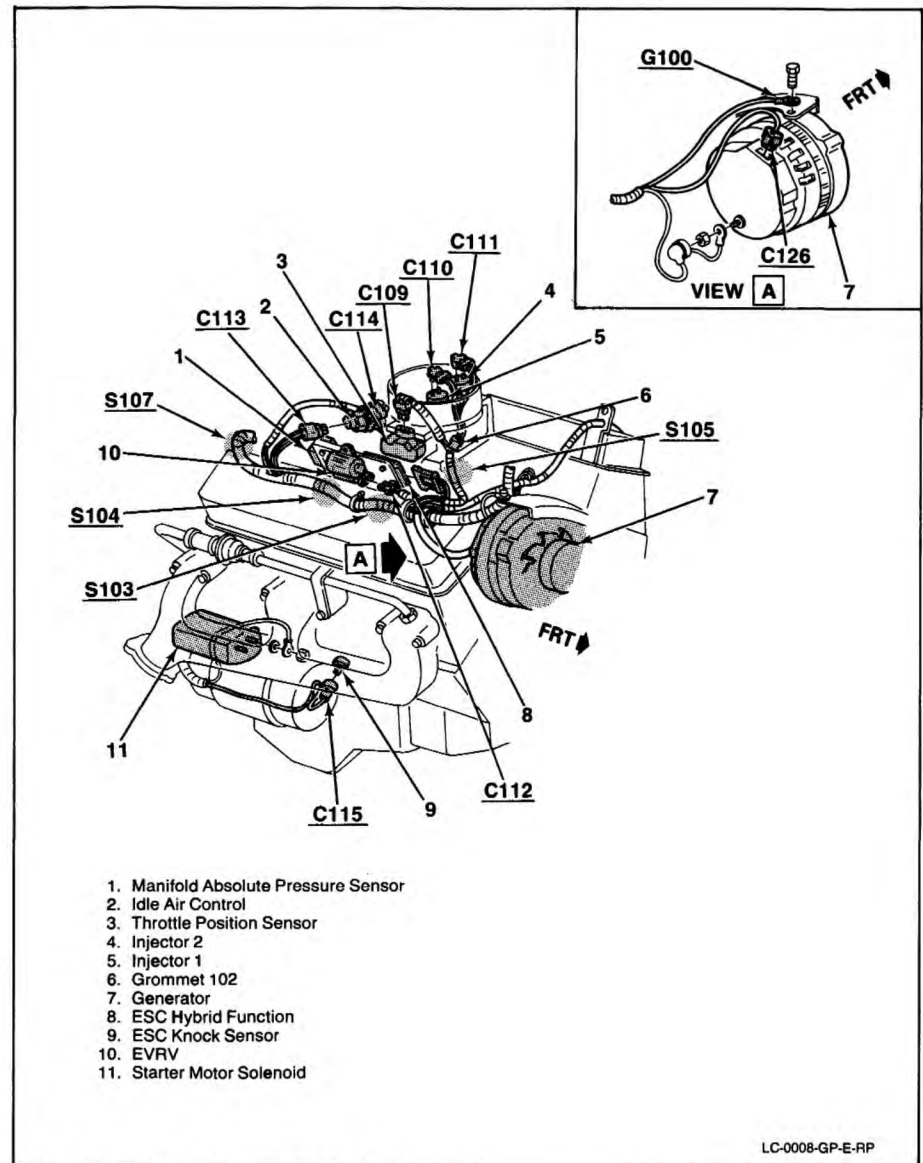
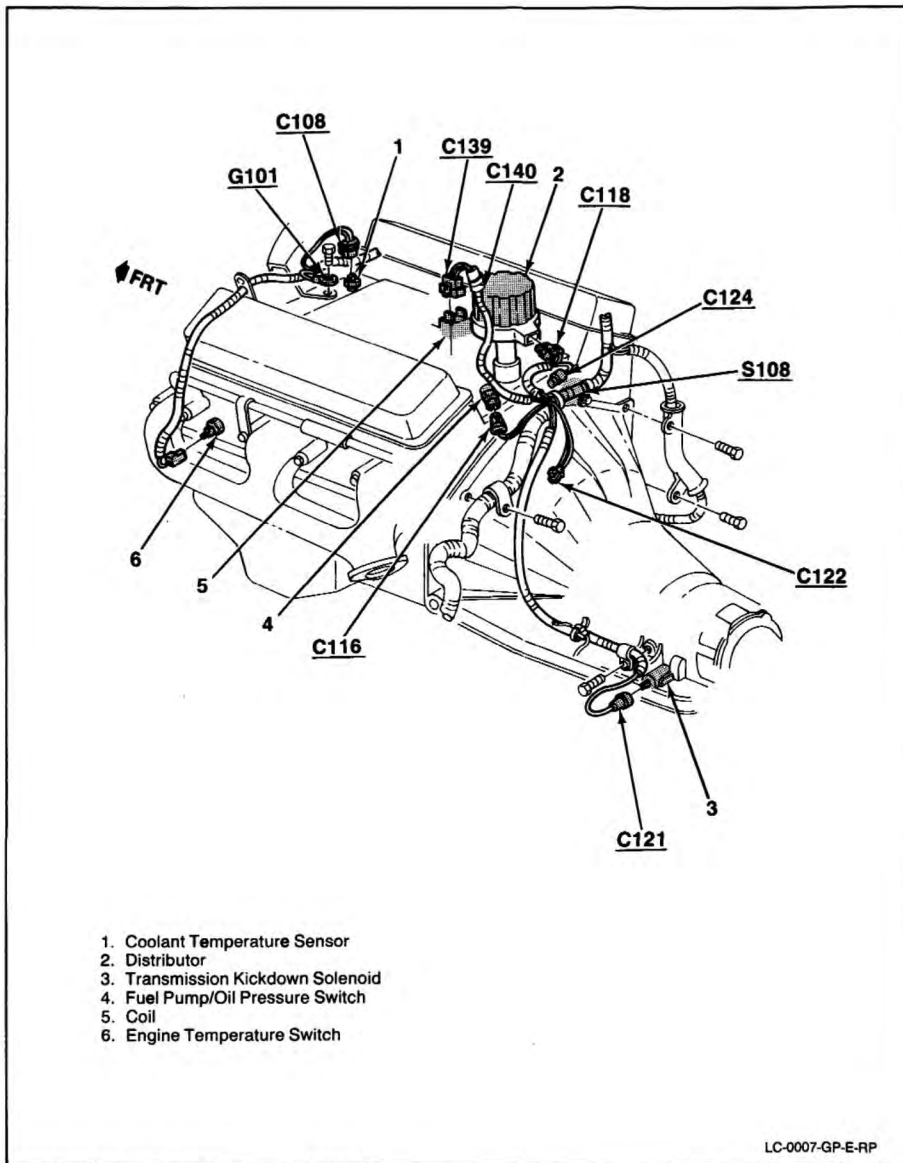


Figure 7 - Engine Wiring Harness, LH side (P62)

Figure 8 - Engine Wiring Harness, RH side (P62)

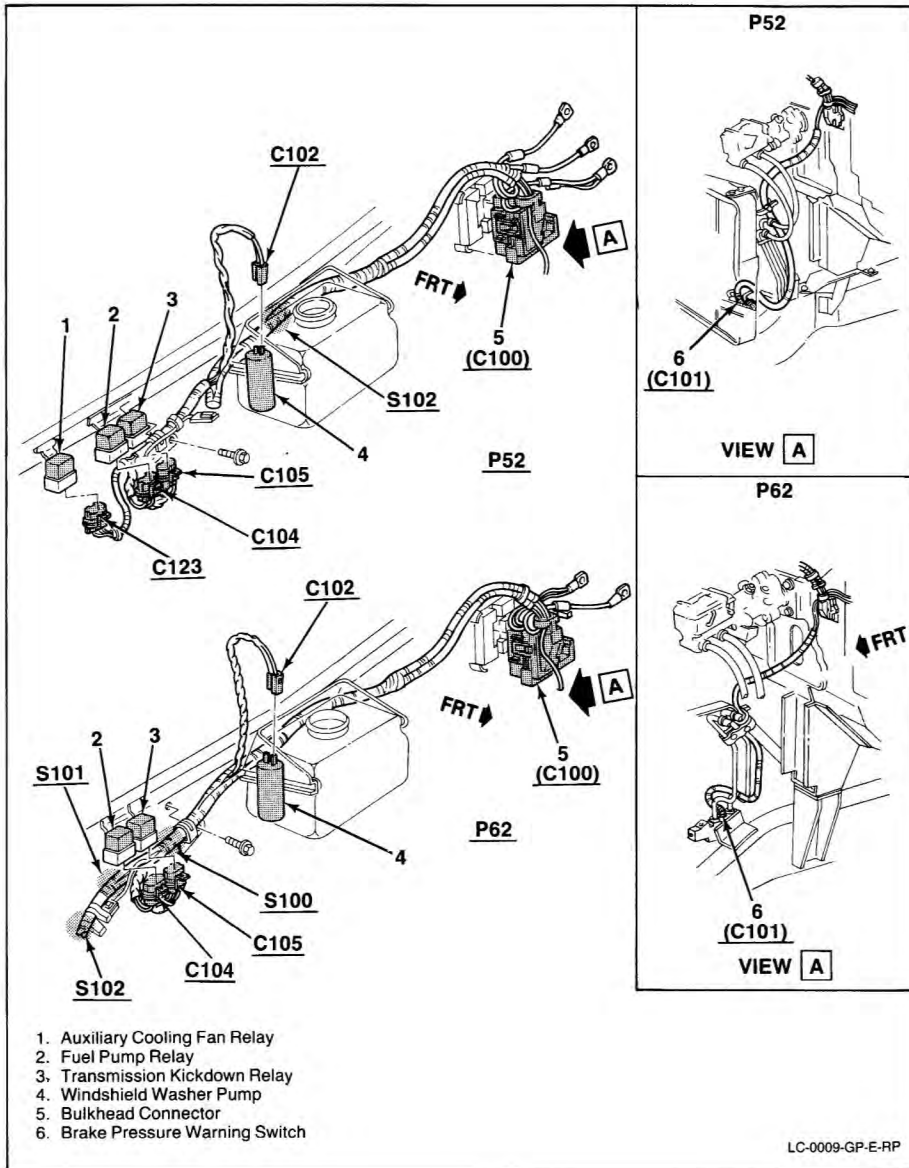


Figure 9 - Engine Wiring Harness, Cowl

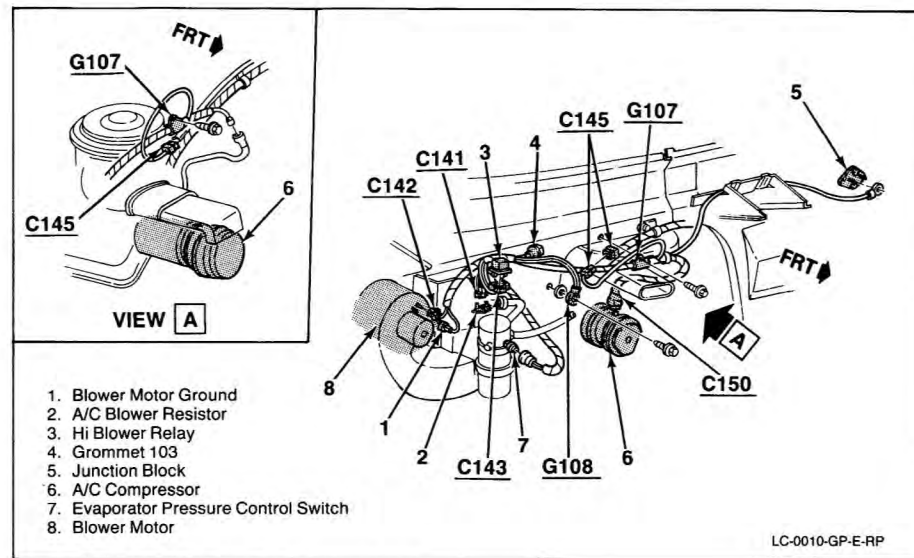


Figure 10 - Air Conditioning, Engine Compartment

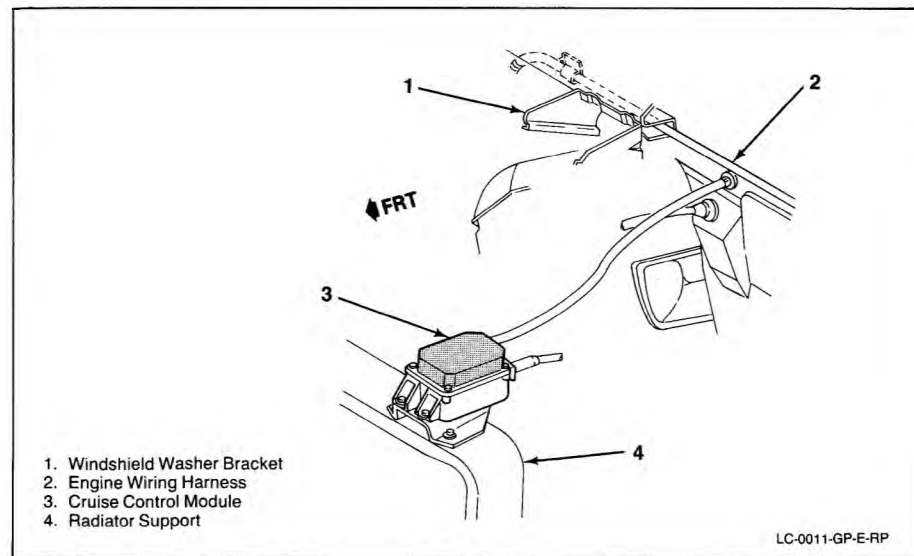


Figure 11 - Cruise Control Module

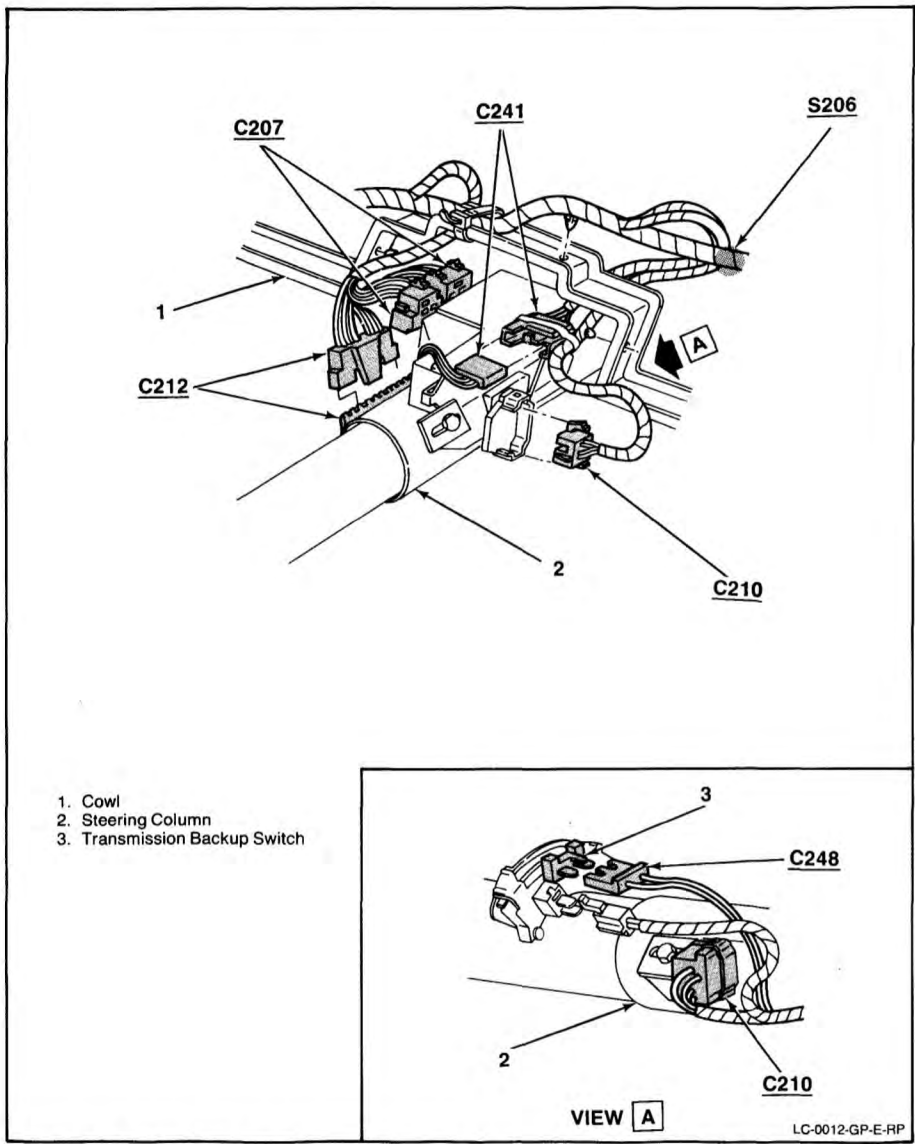


Figure 12 - I/P Harness and Controls

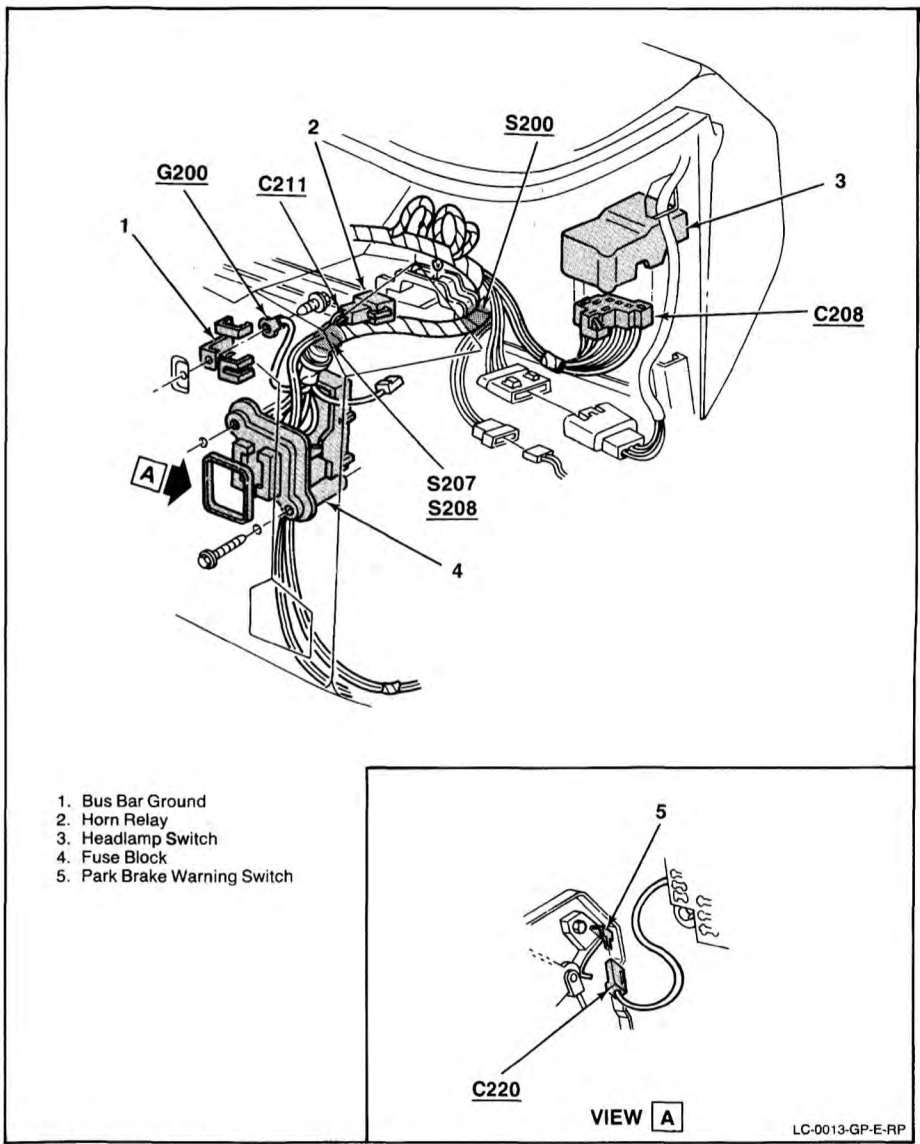


Figure 13 - Steering Column Wiring and Switches

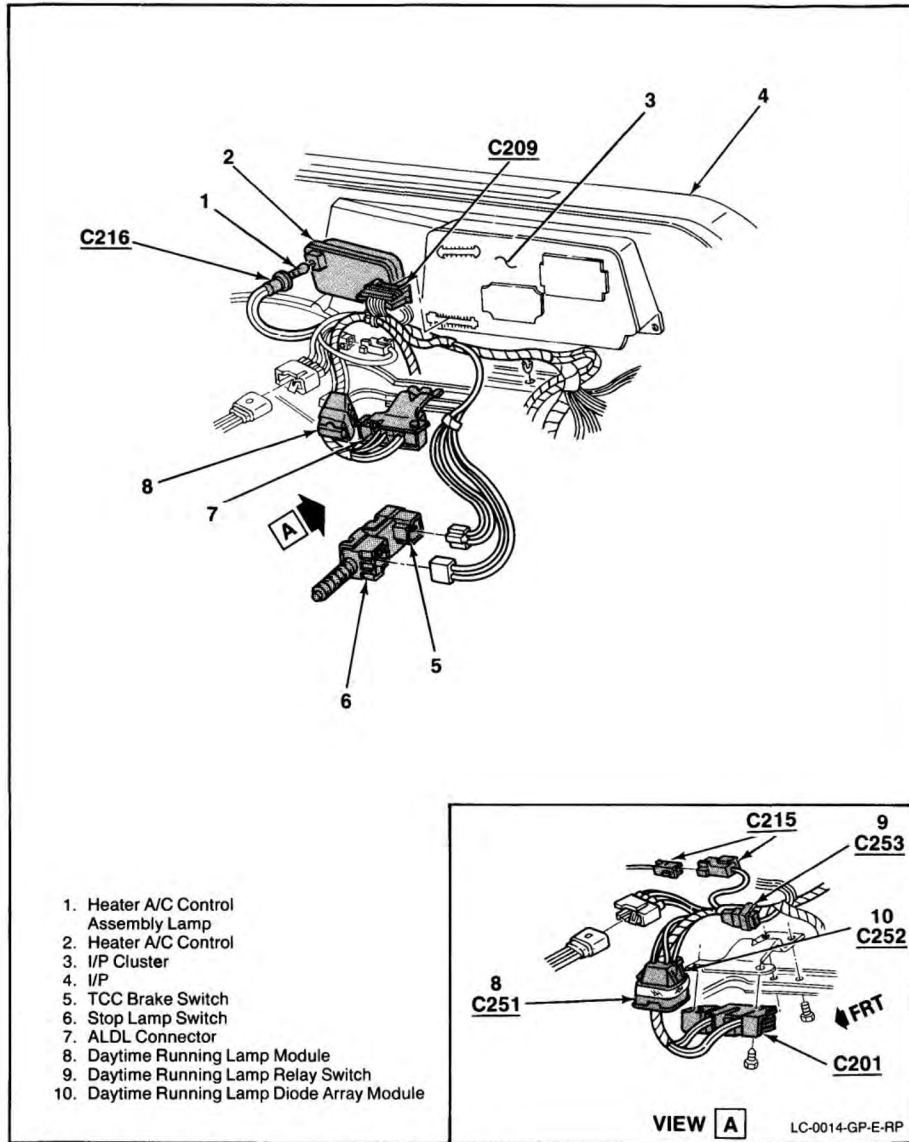


Figure 14 - I/P Wiring, LH Side

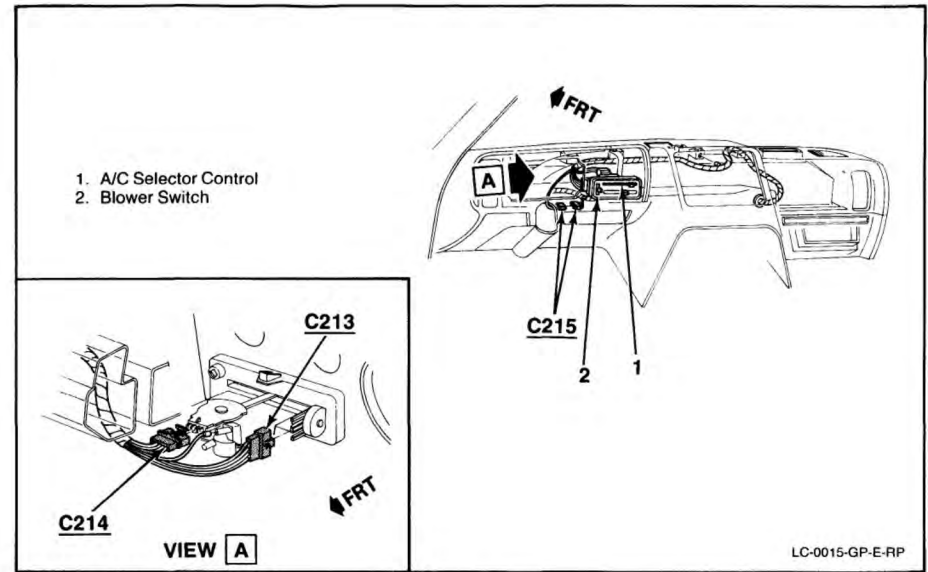


Figure 15 - Air Conditioning, I/P

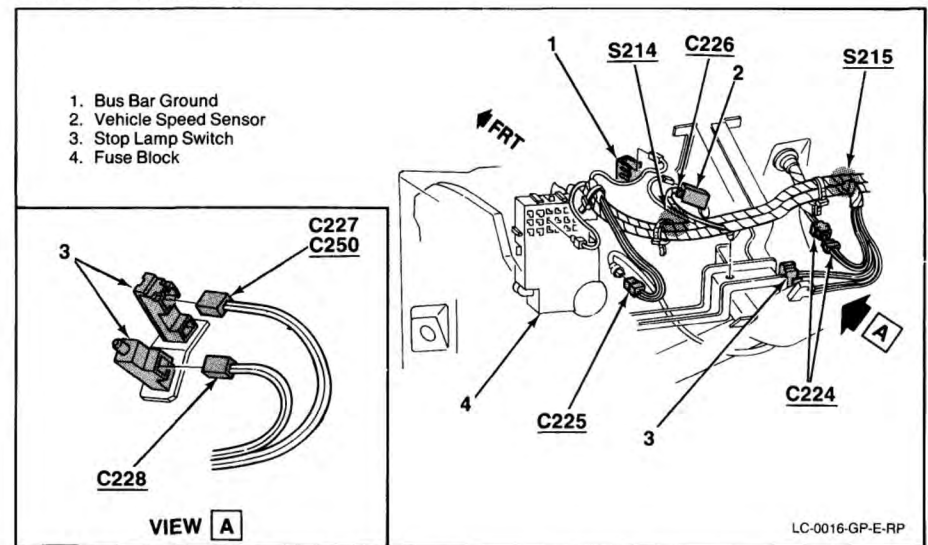


Figure 16 - Cruise Control Wiring Harness (P52)

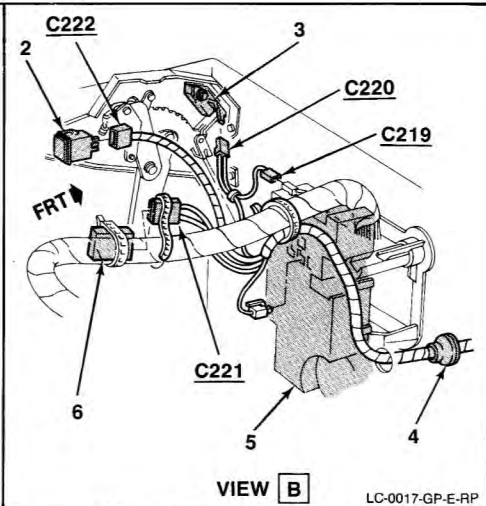
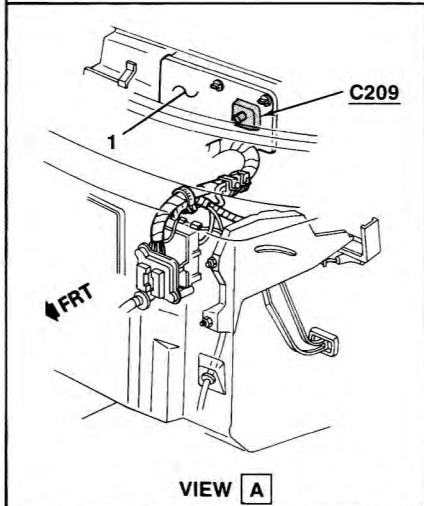
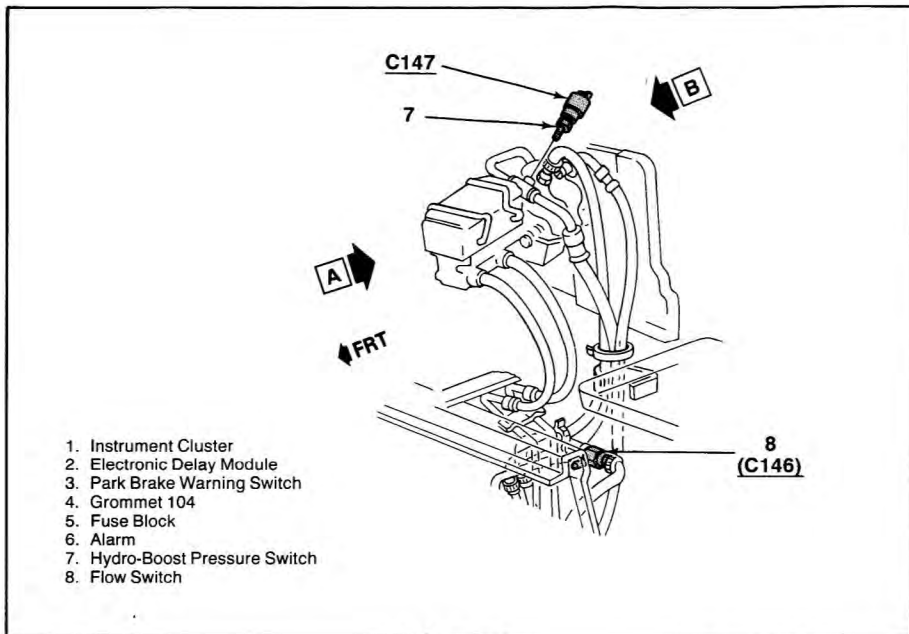


Figure 17 - Hydro-Boost and Alarm Switch Wiring

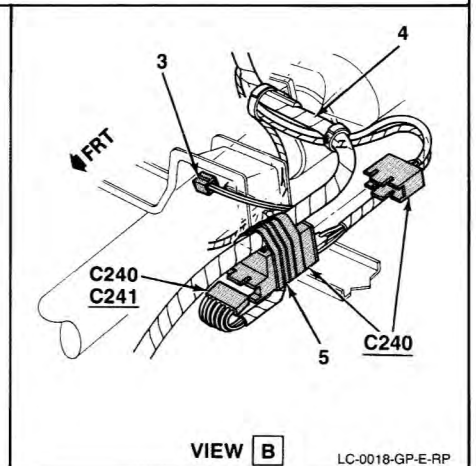
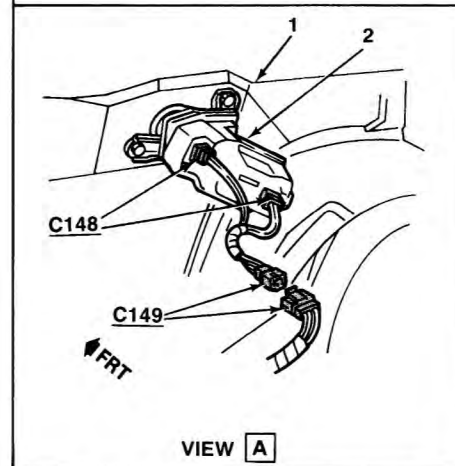
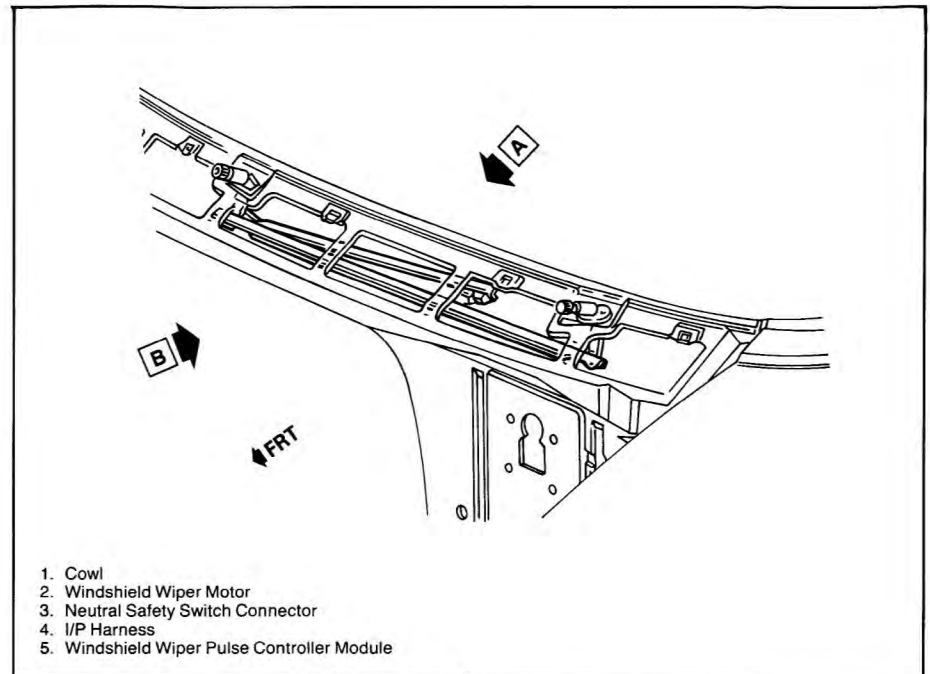


Figure 18 - Pulse Windshield Wiper/Washer Wiring

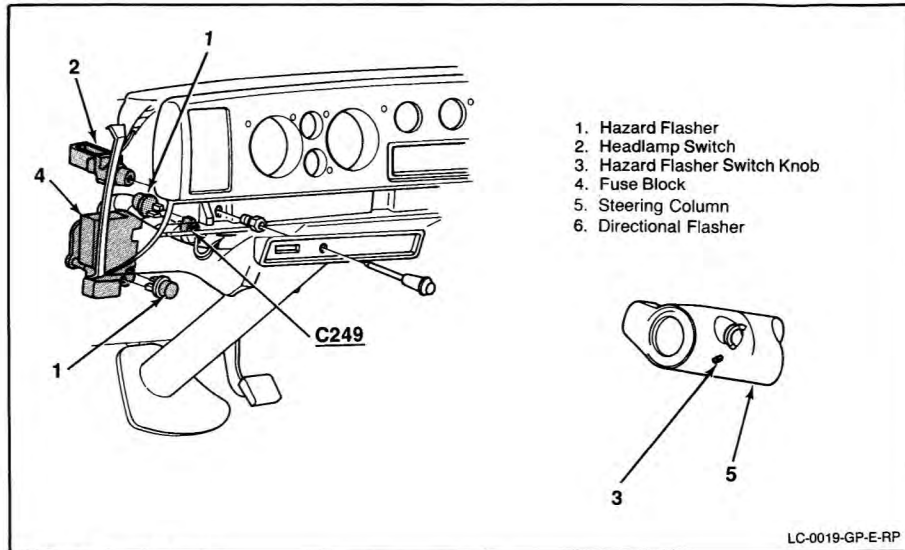


Figure 19 - Hazard Flasher

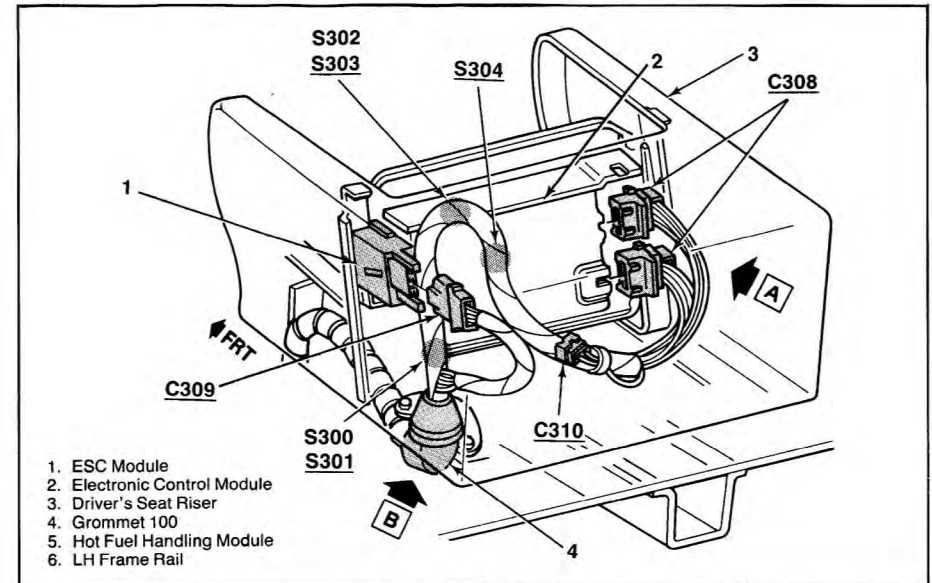


Figure 21 - Electronic Control Module and Wiring

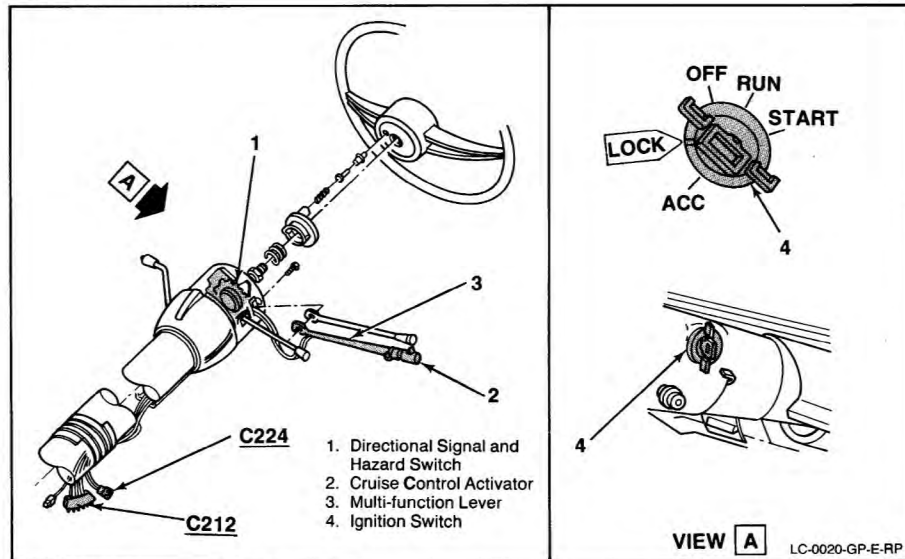


Figure 20 - Multi-function Switch

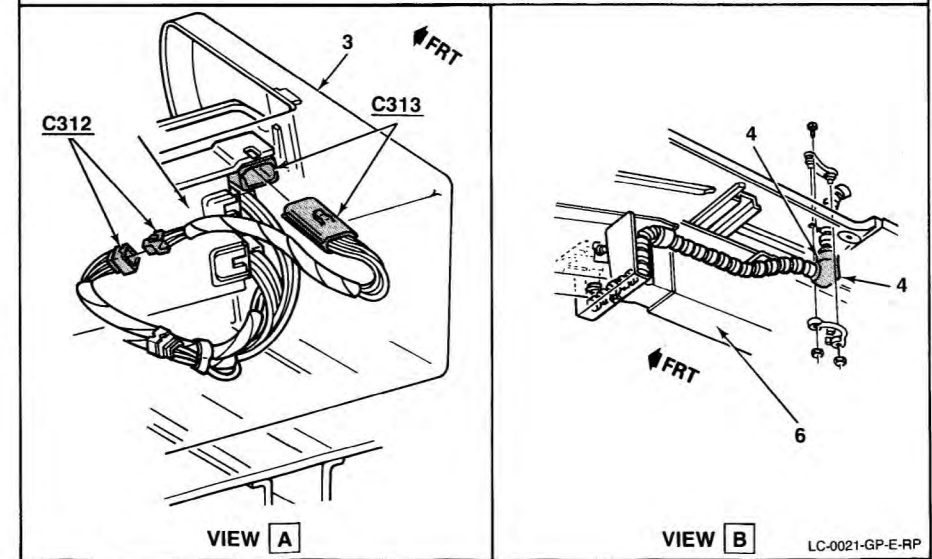


Figure 21 - Electronic Control Module and Wiring

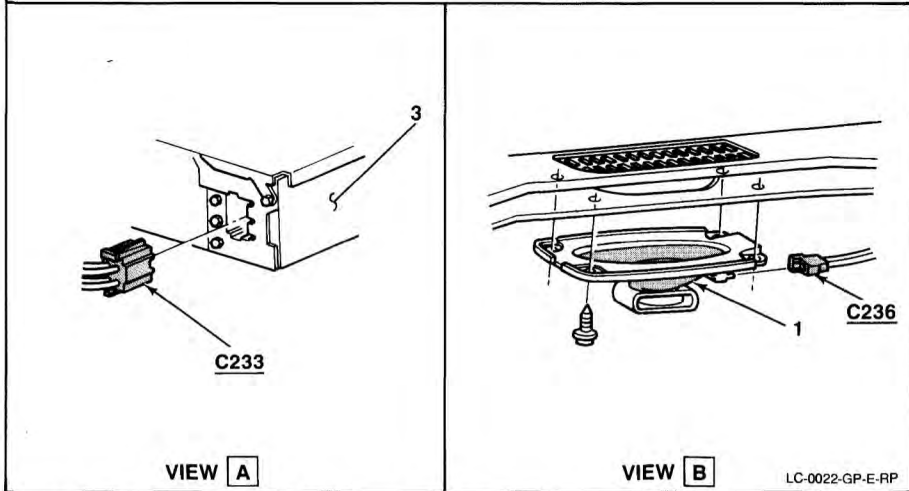
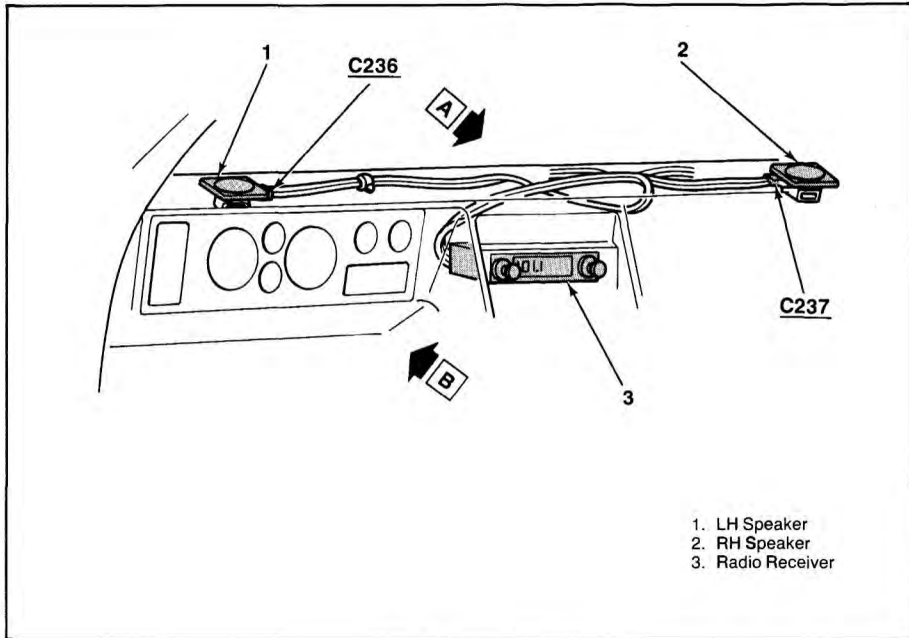


Figure 22 - Radio Front Speaker Harness

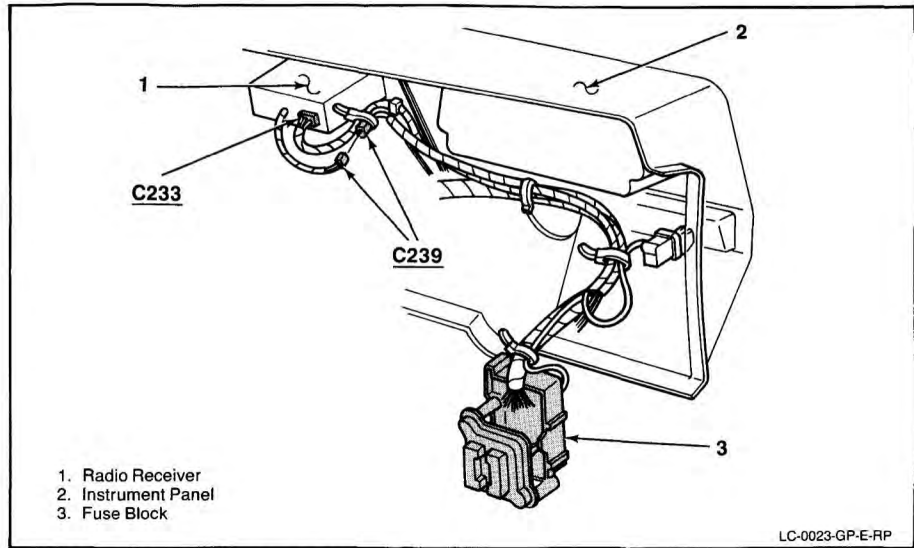


Figure 23 - Radio Wiring Harness, I/P with Digital Clock

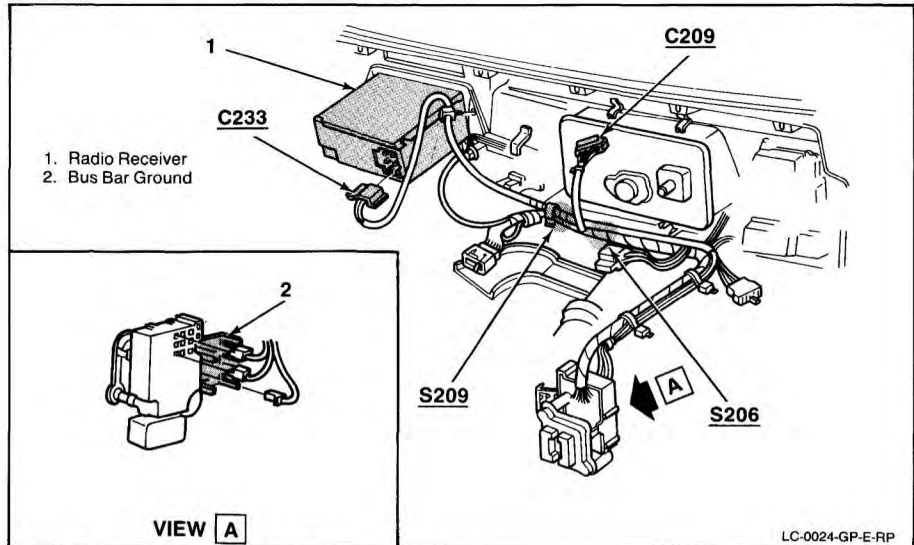


Figure 24 - Radio Wiring Harness, I/P without Digital Clock



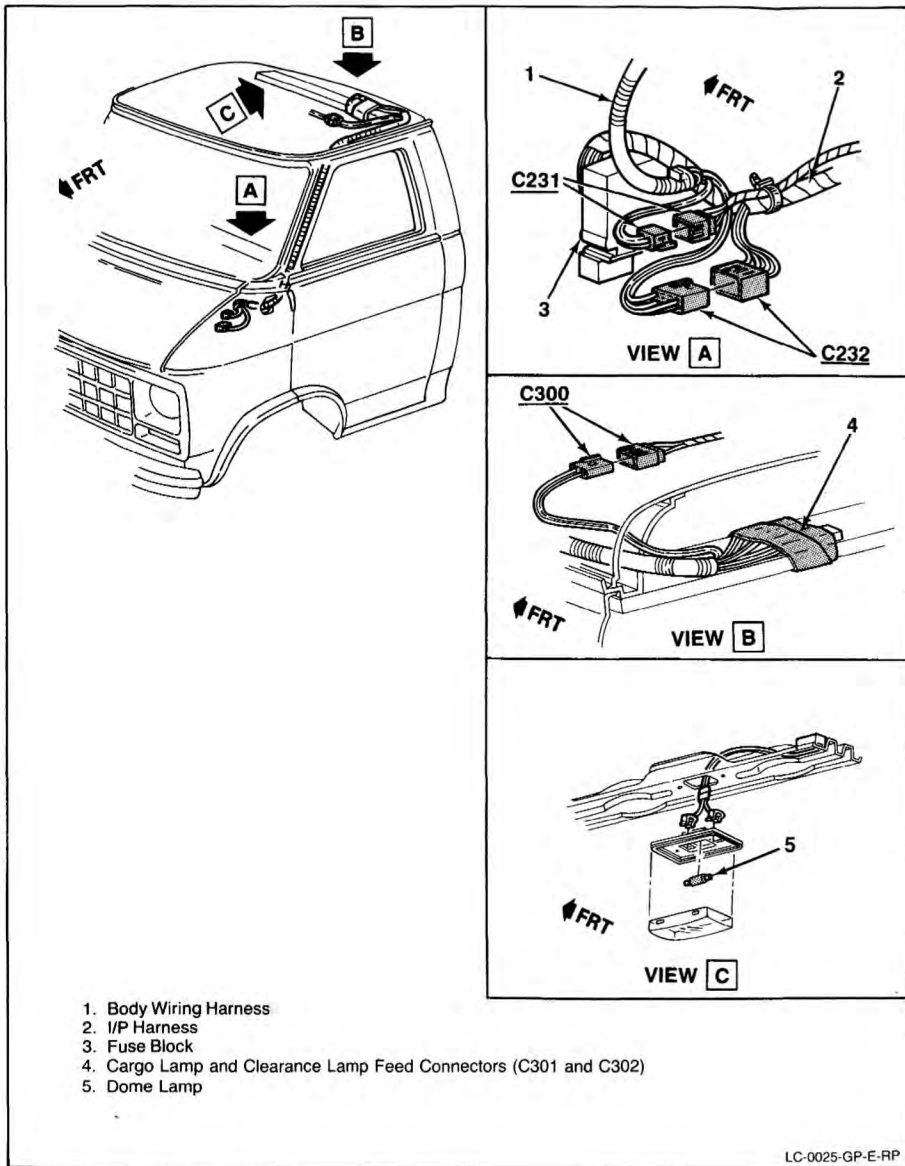


Figure 25 - Dome Lamp and Body Wiring Harness

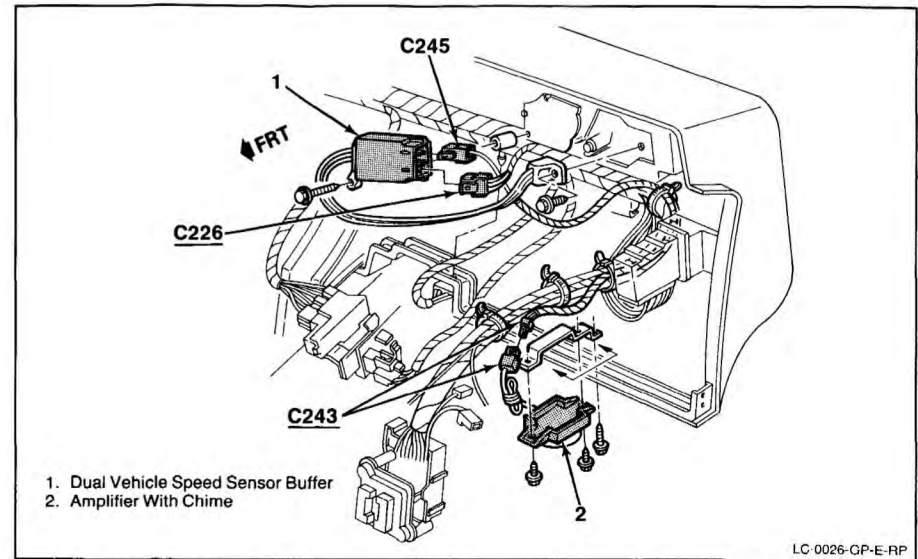


Figure 26 - Overspeed Alarm

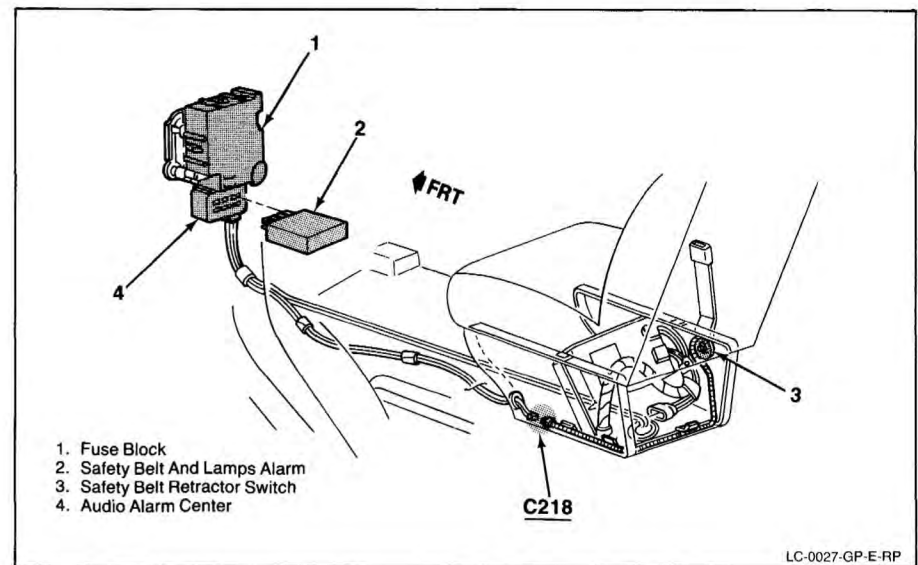


Figure 27 - Safety Belt and Key-In Warning Buzzer

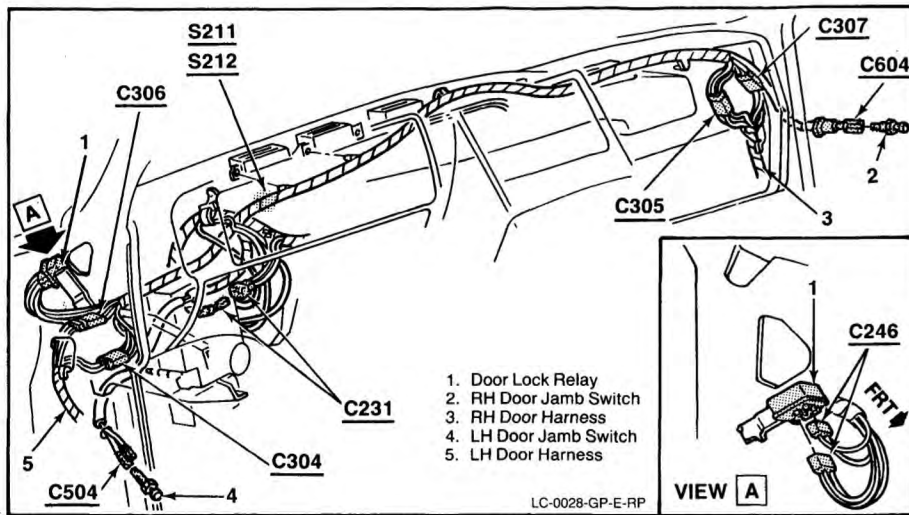


Figure 28 - Power Window and Door Lock Wiring Harness

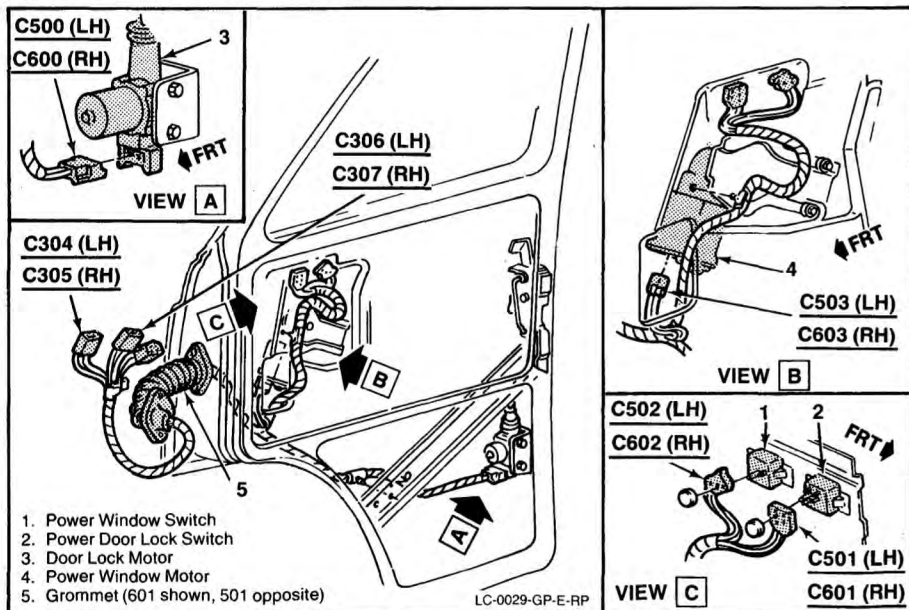


Figure 29 - Power Windows and Power Door Locks

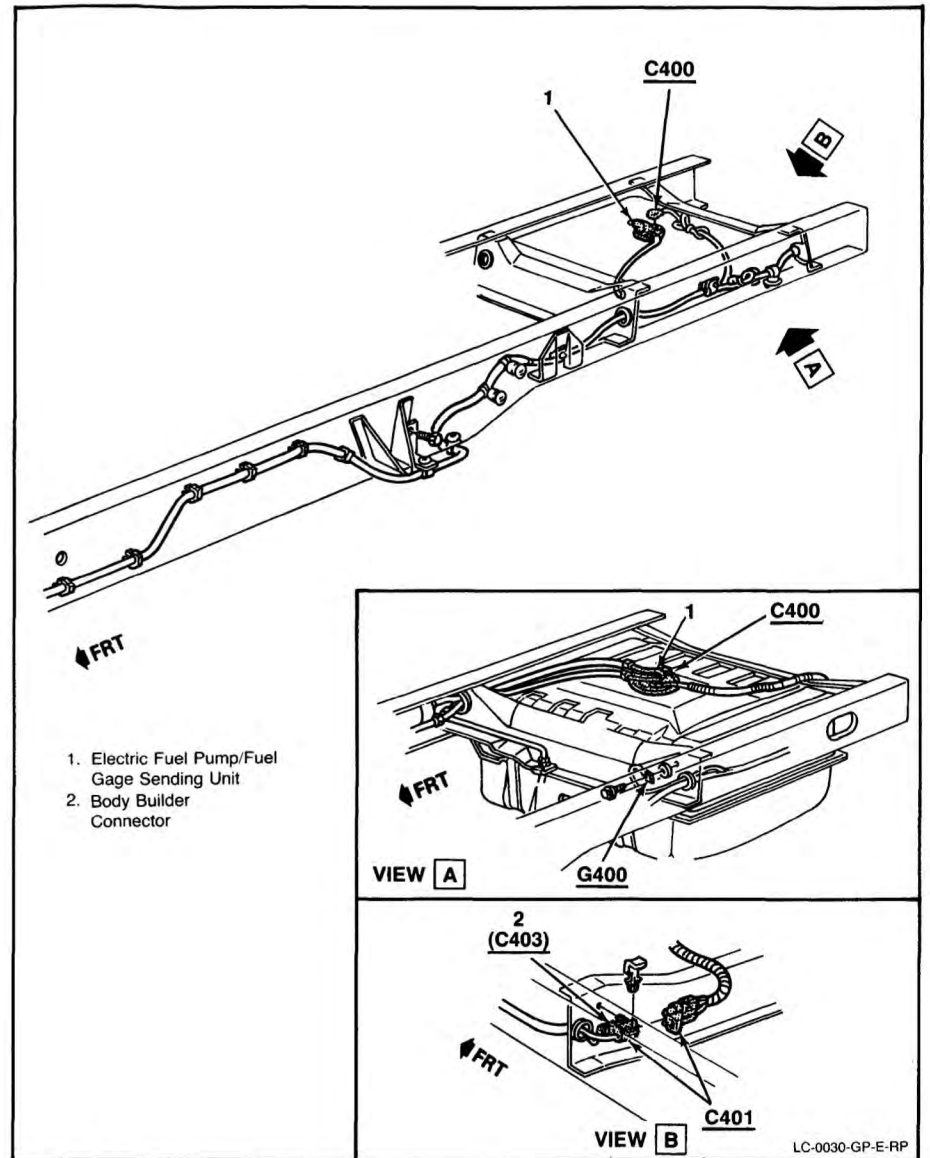


Figure 30 - Rear Wiring Harness

### LAMP BULB DATA

AC Type Guide Lamps are recommended when replacement becomes necessary.

Lamp Usage	Quantity	Trade No.	Power Rating at 12.8V, Watts
Headlamps	2	4652	60 40*
Quad System	2	4651 (Opt.) H4651	50 50
Dual System	2	6052 (Opt.)	55 65*
	2	H6054 (Opt.)	35 65*
			<b>Candle Power</b>
Dome Lamp	1	211-2	12
Headlamp Beam Indicator Lamp	1	161	1
Park, Signal Lamp Asm.	2	2057NA	1.5-24*
Taillamp, Stoplamps	2	2057	2-32†
License Lamp	2	67	4
Temperature Indicator Lamp	1	194	2
Directional Indicator Lamp	2	194	2
Marker Lamps	4	194	2
Brake Warning Indicator Lamp	1	194	2
Backup Lamp	2	1156	32
Radio Dial Lamp	1	1893	2
Heater or A/C Control Lamp	1	194	2
Transmission Indicator Dial Lamp with Automatic Transmission	1	1445	0.7
Check Engine Lamp	1	194	2
Safety Belt Warning Lamp	1	194	2
Service Engine Soon Indicator	1	194	2
Instrument Cluster Illum.†	3	168	3
Instrument Cluster Illum.†	1	161	1
Instrument Cluster Illum.†	1	194	2
Daytime Running Lamps Indicator (Canada Only)	1	194	2

† With gages only.

\* Double filament bulb.

## P CHASSIS COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page	Figure	COMPONENT LOCATION	Page	Figure
A/C Compressor	.91	— 10	Fuel Pump/Oil Pressure Switch	.90	— 7
Air Conditioning Control Assembly	.93	— 15	Fuse Block	.92	— 13
Air Conditioning Heater Hot Water Valve	—	—	Gage Sending Unit	.98	— 30
Air Conditioning Module	—	—	Generator	.90	— 8
Alarm	.94	— 17	Grommet 100	.95	— 21
ALDL	.93	— 14	Grommet 102	.91	— 10
Amplifier With Chime	.97	— 26	Grommet 103	.91	— 10
Array Module	.93	— 14	Grommet 104	.94	— 17
Audio Alarm Center	.97	— 27	Grommet 500	—	—
Auxiliary Cooling Fan Relay	.91	— 9	Grommet 501	.98	— 29
Auxiliary Cooling Fan Switch	.88	— 3	Grommet 600	—	—
Auxiliary Cooling Fan, LH	—	—	Grommet 601	.98	— 29
Auxiliary Cooling Fan, RH	—	—	Hazard Flasher	.95	— 19
Battery	.89	— 5	Headlamp, High Beam LH (RPO V22)	.87	— 1
Blower Motor	.91	— 10	Headlamp, High Beam RH (RPO V22)	.87	— 2
Blower Switch	.93	— 15	Headlamp, High Beam, LH	.87	— 1
Body Builder Connector	.98	— 30	Headlamp, High Beam, RH	.87	— 2
Brake Pressure Warning Switch	.91	— 9	Headlamp, High-Low LH	.87	— 1
Brake Switch	.93	— 16	Headlamp, High-Low RH	.87	— 2
Bus Bar Ground	.93	— 16	Headlamp Switch	.92	— 13
Coolant Temperature Sender	.90	— 7	Heater A/C Control Assembly Lamp	.93	— 14
Coolant Temperature Sensor	.90	— 7	Heat-Defrost, A/C and Bi-Level Air Valve Actuators	—	—
Cruise Control Activator	.95	— 20	Heater Blower Switch	.93	— 15
Cruise Control Module	.91	— 11	HI Blower Relay	.91	— 10
Daytime Running Lamp Indicator	—	—	Horn Relay	.92	— 13
Daytime Running Lamp Module	.93	— 14	Horn, LH (P52)	.88	— 3
Daytime Running Lamp Relay Switch	.93	— 14	Horn, LH (P62)	.88	— 4
Dimmer Switch	.95	— 20	Horn, RH (P52)	.88	— 3
Directional Signal Switch	.95	— 20	Horn, RH (P62)	.88	— 4
Distributor (P52)	.89	— 6	Hot Fuel Handling Module	.95	— 21
Distributor (P62)	.90	— 7	Hydro-Boost Pressure Switch	.94	— 17
Dome Lamp	.97	— 25	Idle Air Control Actuator	.90	— 8
Door Jamb Switch, LH	.98	— 28	Ignition Switch	.95	— 20
Door Jamb Switch, RH	.98	— 28	INJ-1	.90	— 8
Door Lock Motor, LH	.98	— 29	INJ-2	.90	— 8
Door Lock Motor, RH	.98	— 29	Inlet Manifold Vacuum Fitting	—	—
Door Lock Relay	.98	— 28	Junction Block	.91	— 10
Door Lock Switch, LH	.98	— 29	Kickdown Relay	.91	— 9
Door Lock Switch, RH	.98	— 29	Manifold Absolute Pressure Sensor	.90	— 8
Dual Vehicle Speed Sensor Buffer	.97	— 26	MAP Sensor Hose Vacuum Source	—	—
EGR Valve Hose Vacuum Source	—	—	Oxygen Sensor	.89	— 6
Electronic Control Module	.95	— 21	Park and Directional Lamp, LH	.87	— 1
Electronic Delay Module	.94	— 17	Park and Directional Lamp, RH	.87	— 2
Electronic Vacuum Regulator Valve (EVRV)	.90	— 8	Park Brake Warning Switch	.92	— 13
ESC Hybrid Function	.95	— 21	Pulse Wiper Control Module	.94	— 18
ESC Knock Sensor	.90	— 8	Pulse Wiper/Washer Switch	.95	— 20
Evaporator Pressure Control Switch	.91	— 10	Radio Receiver	.96	— 22
EVRV	.90	— 8	Recirculating/Fresh Air Valve Actuator	—	—
Exhaust Gase Recirculation (EGR) Valve; RPO L05 5.7L (350 cu. in.) V8	—	—	Resistor	.91	— 10
Exhaust Gase Recirculation (EGR) Valve; RPO L16 7.4L (454 cu. in.) V8	—	—	Safety Belt Retractor Switch	.97	— 27
Flow Switch	.94	— 17	Selector Control	.93	— 15
Front Speaker, LH	.96	— 22	Sending Unit	.98	— 30
Front Speaker, RH	.96	— 22	Sensor Switch	.90	— 7
Fuel Pump Relay (P52)	.91	— 9	Side Marker Lamp, LH	.87	— 1
Fuel Pump Relay (P62)	.91	— 9	Side Marker Lamp, RH	.87	— 2
			Starter Motor Solenoid	.90	— 8
			Stoplamp Switch	.93	— 16
			Top LH rear of engine	.90	— 7
			LH side of cowl, under I/P	.92	— 13
			In top of fuel tank	.98	— 30
			RH front of engine	.90	— 8
			Under driver's seat	.95	— 21
			Engine compartment, RH side of cowl	.91	— 10
			Engine compartment, RH side of cowl	.91	— 10
			On cowl, RH side of fuse block	.94	— 17
			At LH A-pillar	—	—
			At LH A-pillar	.98	— 29
			At RH A-pillar	—	—
			At RH A-pillar	.98	— 29
			Under I/P, below headlamp switch	.95	— 19
			LH front of vehicle	.87	— 1
			RH front of vehicle	.87	— 2
			LH front of vehicle	.87	— 1
			RH front of vehicle	.87	— 2
			LH front of vehicle	.87	— 1
			RH front of vehicle	.87	— 2
			LH side of I/P	.92	— 13
			Behind LH side of I/P, at heater, A/C Control	.93	— 14
			On air conditioning module	—	—
			On heater control assembly, to right of instrument cluster	.93	— 15
			Engine compartment, RH side of cowl	.91	— 10
			Above fuse block	.92	— 13
			LH side of radiator support	.88	— 3
			LH rear of radiator support	.88	— 4
			RH side of radiator support	.88	— 3
			RH rear of radiator support	.88	— 4
			Under driver's seat	.95	— 21
			On brake cylinder	.94	— 17
			RH side of engine	.90	— 8
			On steering column	.95	— 20
			On throttle body	.90	— 8
			On throttle body	.90	— 8
			In top of inlet manifold, RH rear of engine	—	—
			Engine compartment, LH side of cowl	.91	— 10
			RH side of cowl	.91	— 9
			Top, RH side of engine	.90	— 8
			Rear of throttle body, port "F"	—	—
			In exhaust pipe	.89	— 6
			LH front of vehicle	.87	— 1
			RH front of vehicle	.87	— 2
			Under I/P, on top of park brake pedal support	.92	— 13
			Behind I/P, above steering column	.94	— 18
			Part of multi-function switch	.95	— 20
			Center of I/P	.96	— 22
			In RH side of cowl panel	—	—
			In top of heater blower housing, RH side of cowl	.91	— 10
			Base of driver safety belt, RH side of seat riser	.97	— 27
			A/C control assembly, right of I/P cluster	.93	— 15
			In top of fuel tank	.98	— 30
			Top, rear of engine	.90	— 7
			LH front of vehicle	.87	— 1
			RH front of vehicle	.87	— 2
			Lower RH side of engine	.90	— 8
			Top of brake pedal, at brake pedal support	.93	— 16

## P CHASSIS COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page — Figure	COMPONENT LOCATION	Page — Figure
Throttle Position Sensor	90 — 8	C144.	91 — 10
Transmission Backup Lamp Switch	92 — 12	C145.	91 — 10
Transmission Kickdown Solenoid	90 — 7	C146.	94 — 17
Transmission Vacuum Modulator	—	C147.	94 — 17
Vacuum Tank	—	C148.	94 — 18
Vehicle Speed Sensor	93 — 16	C149.	94 — 18
Windshield Washer Pump	91 — 9	C150.	91 — 10
Windshield Wiper Motor	91 — 9	C207.	92 — 12
Wiper/Washer Switch	95 — 20	C208.	92 — 13
C100 (P52)	88 — 3	C209.	94 — 17
C100 (P62)	88 — 4	C210.	92 — 12
C100.	91 — 9	C211.	92 — 13
C101.	91 — 9	C212.	95 — 20
C102.	91 — 9	C213.	93 — 15
C104.	91 — 9	C214.	93 — 15
C105.	91 — 9	C215 (RPO L05).	93 — 15
C107.	90 — 7	C216.	93 — 14
C108.	90 — 7	C217.	—
C109.	90 — 8	C218.	97 — 27
C110.	90 — 8	C219.	94 — 17
C111.	90 — 8	C220.	92 — 13
C112.	90 — 8	C221.	94 — 17
C113.	90 — 8	C222.	94 — 17
C114.	90 — 8	C223.	—
C115.	90 — 8	C224.	93 — 16
C116.	90 — 7	C225.	93 — 16
C118 (P52)	89 — 6	C226.	93 — 16
C118 (P62)	90 — 7	C227.	93 — 16
C120.	89 — 6	C228.	93 — 16
C121.	90 — 7	C231.	97 — 25
C122 (P52)	89 — 6	C232.	97 — 25
C122 (P62)	90 — 7	C233.	96 — 24
C123.	91 — 9	C236.	96 — 22
C124 (P52)	89 — 6	C237.	96 — 22
C124 (P62)	90 — 7	C239.	96 — 23
C125.	88 — 3	C240.	94 — 18
C126.	90 — 8	C241.	92 — 12
C127.	87 — 2	C243.	97 — 26
C128.	87 — 1	C245.	97 — 26
C129.	87 — 2	C246.	98 — 28
C130.	87 — 1	C248.	92 — 12
C131.	87 — 2	C249.	95 — 19
C132.	87 — 1	C250.	93 — 16
C133 (RPO V22)	87 — 2	C251.	93 — 14
C134 (RPO V22)	87 — 2	C252.	93 — 14
C135.	88 — 4	C253.	93 — 14
C136.	88 — 4	C300.	97 — 25
C137 (P52)	88 — 3	C301.	97 — 25
C137 (P62)	88 — 4	C302.	97 — 25
C138 (P52)	88 — 3	C303.	—
C138 (P62)	88 — 4	C304.	98 — 28
C139 (P52)	89 — 6	C305.	98 — 28
C139 (P62)	90 — 7	C308.	95 — 21
C140.	90 — 7	C309 (RPO L05).	95 — 21
C141.	91 — 10	C309 (RPO L19).	95 — 21
C142.	91 — 10	C310.	95 — 21
C143.	91 — 10	C311.	93 — 14
		C312.	95 — 21
		C313.	95 — 21
			95 — 21

## P CHASSIS COMPONENT LOCATOR INDEX

COMPONENT LOCATION	Page — Figure
C400.....	LH side of rear crossmember, in back of fuel tank ..... 98 — 30
C401.....	At fuel tank crossmember, LH frame side rail ..... 98 — 30
C402.....	Rear speaker harness ..... —
C403.....	At body builder connector ..... 98 — 30
C500.....	At LH door lock motor ..... 98 — 29
C501.....	At LH door lock switch ..... 98 — 29
C504.....	At LH door jamb switch ..... 98 — 28
C600.....	At RH door lock motor ..... 98 — 29
C601.....	At RH door lock switch ..... 98 — 29
C604.....	At RH door jamb switch ..... 98 — 28
G100.....	On generator bracket ..... 90 — 8
G101.....	Top front center of engine ..... 90 — 7
G102.....	On RH frame rail, beneath battery ..... 89 — 5
G103.....	Rear, RH cylinder head ..... 89 — 5
G103.....	Rear, RH cylinder head ..... 89 — 5
G104 (P52).....	On side of radiator support ..... 88 — 3
G104 (P62).....	At radiator support ..... 88 — 4
G105 (P52).....	On side of radiator support ..... 88 — 3
G105 (P62).....	At radiator support ..... 88 — 4
G107.....	Engine compartment, above air cleaner snorkel ..... 91 — 10
G108.....	Engine compartment, center of cowl ..... 91 — 10
G200.....	Under LH I/P, at bus bar ground ..... 92 — 13
G400.....	LH side of rear crossmember, in front of fuel tank ..... 98 — 30
S100.....	Engine harness, RH side of cowl ..... 91 — 9
S101.....	Engine harness, RH side of cowl ..... 91 — 9
S102.....	Engine harness, center of cowl ..... 91 — 9
S103.....	Engine harness, RH side of engine ..... 90 — 8
S104.....	Engine harness, RH side of engine ..... 90 — 8
S105.....	TBI harness, RH front of engine ..... 90 — 8
S107.....	Engine harness, rear RH side of engine ..... 90 — 8
S108.....	Engine harness, rear of engine ..... 90 — 7
S110.....	In forward lamp harness, LH side ..... 87 — 1
S111.....	In forward lamp harness, RH side ..... 87 — 2
S112.....	In forward lamp harness, LH side ..... 87 — 1
S116.....	In forward lamp harness, LH side ..... 87 — 1
S117.....	In forward lamp harness, RH side ..... 87 — 2
S200.....	I/P harness, above fuse block ..... 92 — 13
S206.....	I/P harness, above steering column ..... 92 — 12
S207.....	I/P harness, above fuse block ..... 92 — 13
S208.....	I/P harness, above fuse block ..... 92 — 13
S209.....	I/P harness, above steering column ..... 96 — 24
S211.....	In power window and door lock harness ..... 98 — 28
S214.....	Cruise control harness, above steering column ..... 93 — 16
S215.....	Cruise control harness, RH side of steering column ..... 93 — 16
S300.....	Under driver's seat ..... 95 — 21
S301.....	Under driver's seat ..... 95 — 21
S302.....	Under driver's seat ..... 95 — 21
S303.....	Under driver's seat ..... 95 — 21
S304.....	Under driver's seat ..... 95 — 21

## INDEX

	PAGE		PAGE		PAGE
Abbreviation List	ix	Bulb Data, G/P	C-99	Cooling Fan, Auxiliary, R/V	A-58
Air Conditioning (RPO C60), Front Manual, R/V	A-83	Bulb Data, P	B-81	Cooling Fan (RPO L19 With C60), Auxiliary, R/V	A-59
Air Conditioning (RPO C60), G/P	C-46	Bulb Data, R/V	A-191	Cooling Fan (RPO L19 With RPO C60), Auxiliary, G/P	C-34
Air Conditioning (RPO C69), Rear, R/V	A-84	Camper and Trailer Wiring		Courtesy Lamps, Cargo Lamps and Underhood Lamp, R/V	A-115
Air Conditioning, G/P	C-44	(RPO UY1, UY7), R/V	A-157	Cruise Control, G/P	C-66
Air Conditioning, R/V	A-80	Camper and Trailer Wiring, R/V	A-156	Cruise Control, P	B-56
Air Conditioning, Rear, R/V	A-82	Cargo Lamp (RPO UF2), R/V	A-118	Cruise Control, R/V	A-112
Alarm, Audio, R/V	A-104	Cargo Lamps and Underhood Lamp, Courtesy Lamps, R/V	A-115	Data, Bulb, G/P	C-99
Alarm (RPO UD4), Overspeed, G/P	C-64	Center, Convenience, R/V	A-5	Data, Bulb, P	B-81
AM Radio (RPO U63), R/V	A-122	Charge, Start and, G/P	C-26	Data, Bulb, R/V	A-191
Antilock Brakes, Rear Wheel, R/V	A-108	Charge, Start and, P	B-30	Daytime Running Lamps (Canada Only), Headlamps (RPO V22) With, R/V	A-20
Audio Alarm, R/V	A-104	Charge, Start and, R/V	A-36	Defogger, Rear, R/V	A-124
Automatic Transmission Kickdown Solenoid, G/P	C-36	Charts, Diagnosis	iii	Diagnosis Charts	iii
Automatic Transmission Kickdown Solenoid (RPO M40), G/P	C-37	Circuit Diagrams	iii	Diagrams, Circuit	iii
Automatic Transmission Kickdown Solenoid (RPO M40), P	B-44	Circuit Malfunctions	iv	Diesel, Electronic Control Module - R/V	A-71
Automatic Transmission Kickdown Solenoid (RPO M40), R/V	A-78	Circuit Operation	iii	Diesel Engine Fuel Controls, R/V	A-54
Auxiliary Battery (RPO TP2), R/V	A-12	Circuit Wiring Repair Procedures	vi	Diesel Engine Fuel Controls (RPO LH6), R/V	A-56
Auxiliary Cooling Fan (RPO L19 With C60), R/V	A-59	Component Locations	iii	Diesel Engine Fuel Controls (RPO LL4), R/V	A-55
Auxiliary Cooling Fan (RPO L19 With RPO C60), G/P	C-34	Component Locator Index, G/P	C-100	Diesel (RPO LH6 Only), Start, R/V	A-40
Auxiliary Cooling Fan, R/V	A-58	Component Locator Index, P	B-82	Digital Ratio Adaptor Controller (DRAC) Module, R/V	A-70
Auxiliary Fuel Tanks (RPO NL2), R/V	A-60	Component Locator Index, R/V	A-192	Directional Lamps, G/P	C-21
Auxiliary Fuel Tank (RPO NL2) and Fuel Tank Selector Switch (With RPO LH6 or LL4), R/V	A-61	Component Locator Views, G/P	C-87	Directional Lamps, P	B-24
Auxiliary Fuel Tank (RPO NL2) and Fuel Tank Selector Switch (With RPO L05, L19), R/V	A-62	Component Locator Views, P	B-73	Directional Signal Lamps, R/V	A-30
Auxiliary Heater (RPO C36), R/V	A-88	Component Locator Views, R/V	A-165	Distribution - Motor Home (P32) and Conventional Forward Control (P42), Power, P	B-8
Backup Lamps (Fleetside and Wideside), R/V	A-150	Conditioning (RPO C60), Air, G/P	C-46	Distribution (RPO LB4, L05 and L10), Power, P	B-6
Backup Lamps (Fleetside), R/V	A-149	Conditioning, Air, G/P	C-44	Distribution (RPO LH6, LL4), Power, R/V	A-10
Backup Lamps (Stepside), R/V	A-148	Conditioning, Air, R/V	A-80	Distribution (RPO LL4), Power, P	B-10
Backup Lamps (Utility and Suburban), R/V	A-147	Connectors, Metri-Pack	vii	Distribution (RPO L05, L19), Power, G/P	C-4
Backup Lamps, P	B-67	Connectors, Weather-Pack	vii	Distribution (RPO L05, L19), Power, R/V	A-6
Backup, Tail and License Lamps, G/P	C-82	Contents, Table of	i	Distribution (RPO L05, L19 With 9SI Generator), Power, R/V	A-7
Basic Electricity	iv	Control, Cruise, G/P	C-66	Distribution (RPO L05, L19 With 12SI Generator), Power, R/V	A-8
Battery (RPO TP2), Auxiliary, R/V	A-12	Control, Cruise, P	B-56	Dome Lamp, G/P	C-68
Block, Fuse, G/P	C-3	Control, Cruise, R/V	A-112	Dome Lamps, Glove Box Lamp and Lighted Vanity Mirror, R/V	A-117
Block, Fuse, R/V	A-4	Control Module - Inputs (RPO L05, L19), Electronic, R/V	A-66	Door Locks, Power, G/P	C-76
Block (RPO LB4, L05 and L10), Fuse, P	B-3	Control Module - Inputs (With RPO LH6), Electronic, R/V	A-73	Door Locks (RPO AU3) 2 Door (With Power Outside Rearview Mirrors-RPO D48), Power, R/V	A-137
Block (RPO LL4), Fuse, P	B-4	Control Module (RPO L05, L19), Electronic, R/V	A-65	Door Locks (RPO AU3) 2 Door (Without Power Outside Rearview Mirrors-RPO D48), Power, R/V	A-136
Brake Booster Vacuum System, Power, R/V	A-162	Control Module (RPO LH6), Electronic, R/V	A-72	Door Locks (RPO AU3) 4-Door (With Power Outside Rearview Mirrors-RPO D48), Power, R/V	A-140
Brake Systems, R/V	A-106	Control Module - Outputs (RPO L05, L19), Electronic, R/V	A-68	Door Locks (RPO AU3) 4-Door (Without Power Outside Rearview Mirrors RPO D48), Power, R/V	A-138
Brake Warning System (RPO UJ1 For RPO B3D), P	B-54	Control Module-Outputs (RPO LH6), Electronic, R/V	A-74		
Brake Warning System (RPO UJ1), G/P	C-62	Controller (DRAC) Module, Digital Ratio Adaptor, R/V	A-70		
Brake Warning System Without Rear Wheel Antilock Brakes, R/V	A-107	Controls (RPO LL4), Fuel, P	B-38		
Brake Warning System, P	B-52	Controls - Gasoline, Fuel, R/V	A-41		
Brake Warning Systems, G/P	C-60	Controls-Gasoline, Fuel, G/P	C-30		
		Convenience Center, R/V	A-5		
		Conventional Forward Control P42 (RPO LB4, L05, and L19), Start/Ignition - P	B-33		
		Converter Clutch Detent Solenoid (RPO L05 Only), Transmission, R/V	A-77		
		Converter Clutch Detent Solenoid, Transmission, R/V	A-76		

## INDEX

PAGE	PAGE	PAGE	PAGE
Fuel Handling (RPO L05, L19), Hot, G/P . . . . .	C-32	Headlamps (RPO V22), G/P . . . . .	C-8
Fuel Tank Selector Switch (With RPO L05, L19), Auxiliary Fuel Tank (RPO NL2) and, R/V . . . . .	A-62	Headlamps (RPO V22), R/V . . . . .	A-22
Fuel Tank Selector Switch (With RPO LH6 or LL4), Auxiliary Fuel Tank (RPO NL2) and, R/V . . . . .	A-61	Headlamps (RPO V22) With Daytime Running Lamps (Canada Only), R/V . . . . .	A-20
Fuel Tanks (RPO NL2), Auxiliary, R/V . . . . .	A-60	Headlamps (RPO V22) With Daytime Running Lamps, G/P . . . . .	C-12
Fuse Block, G/P . . . . .	C-3	Headlamps (With Daytime Running Lamps - Canada Only), R/V . . . . .	A-14
Fuse Block, R/V . . . . .	A-4	Headlamps (With Daytime Running Lamps), G/P . . . . .	C-10
Fuse Block (RPO LB4, L05 and L19), P . . . . .	B-3	Headlamps (With Daytime Running Lamps), P . . . . .	B-15
Fuse Block (RPO LL4), P . . . . .	B-4	Heater (RPO C36), Auxiliary, R/V . . . . .	A-88
Gages and Indicators, Instrument Panel, G/P . . . . .	C-51	Heater, G/P . . . . .	C-48
Gages and Indicators, Instrument Panel, P . . . . .	B-58	Heater, R/V . . . . .	A-85
Gages and Indicators, Instrument Panel, R/V . . . . .	A-89	Horns, G/P . . . . .	C-24
Gages (Fleetside-RPO E63), Instrument Panel, R/V . . . . .	A-94	Horns, P . . . . .	B-26
Gages (Suburban and Utility), Instrument Panel, R/V . . . . .	A-96	Horns, R/V . . . . .	A-34
Gages, Instrument Panel, G/P . . . . .	C-54	Hot Fuel Handling (RPO L05 or L19), R/V . . . . .	A-45
Gages, Instrument Panel, P . . . . .	B-64	Hot Fuel Handling (RPO L05, L19), G/P . . . . .	C-32
Gas (L05, With 12 SI Generator), Start, R/V . . . . .	A-38	How To Use This Manual . . . . .	iii
Gas (RPO L05, L19 With 9 SI Generator), Start, R/V . . . . .	A-39	Idle Air Control (RPO L05, L19), Fuel Control and, G/P . . . . .	C-33
Gasoline, Fuel Controls -, P . . . . .	B-35	Idle Air Control (RPO L05, L19), Fuel Control and, R/V . . . . .	A-46
Gasoline, Fuel Controls -, R/V . . . . .	A-41	Idle Air Control (RPO LB4, L05 and L19), Fuel Control and, P . . . . .	B-37
Glove Box Lamp and Lighted Vanity Mirror, Dome Lamps, R/V . . . . .	A-117	Ignition (RPO L05, L19), G/P . . . . .	C-28
Glow Plugs (RPO LH6 Diesel), R/V . . . . .	A-52	Ignition (RPO L05, L19), R/V . . . . .	A-42
Glow Plugs (RPO LL4), P . . . . .	B-41	Index, Component Locator, G/P . . . . .	C-100
Glow Plugs (RPO LL4), R/V . . . . .	A-50	Index, Component Locator, P . . . . .	B-82
Glow Plugs, R/V . . . . .	A-48	Index, Component Locator, R/V . . . . .	A-192
Harness, Vacuum, G/P . . . . .	C-86	Index, Symptoms, G/P . . . . .	C-2
Harnesses (With RPO C36, C60 or K34), Vacuum, R/V . . . . .	A-161	Index, Symptoms, P . . . . .	B-2
Harnesses (With RPO JB5/JB7, MX1 and EGR System), Vacuum, R/V . . . . .	A-164	Index, Symptoms, R/V . . . . .	A-2
Harnesses, Vacuum, P . . . . .	B-72	Indicator Lamps, P . . . . .	B-62
Hazard Lamps (All Models), Rear, R/V . . . . .	A-29	Indicator Lamps Fleetside (RPO E63), R/V . . . . .	A-98
Hazard Lamps (With RPO V22), R/V . . . . .	A-28	Indicator Lamps, G/P . . . . .	C-56
Hazard Lamps, Front Park, Marker, Roof and, R/V . . . . .	A-23	Indicator Lamp, Four-Wheel Drive, R/V . . . . .	A-111
Hazard Lamps, P . . . . .	B-23	Indicator Lamps (Suburban and Utility), R/V . . . . .	A-100
Hazard Lamps, Park, Marker and, G/P . . . . .	C-17	Indicators, Instrument Panel: Gages and, G/P . . . . .	C-51
Hazard Lamps, Park, Marker and, P . . . . .	B-20	Indicators, Instrument Panel: Gages and, P . . . . .	B-58
Headlamps-Base, G/P . . . . .	C-9	Injection (RPO L05, L19), Throttle Body, G/P . . . . .	C-31
Headlamps - Base Model With Daytime Running Lamps (Canada Only), R/V . . . . .	A-18	Injection (RPO LB4, L05 and L19), Throttle Body, P . . . . .	B-36
Headlamps - Base, R/V . . . . .	A-17	Injection (With RPO L05 or L19), Throttle Body, R/V . . . . .	A-44
Headlamps Base Module With Daytime Running Lamps, G/P . . . . .	C-14	Instrument Panel: Gages and Indicators, G/P . . . . .	C-51
Headlamps, G/P . . . . .	C-7	Instrument Panel: Gages and Indicators, P . . . . .	B-58
Headlamps, P . . . . .	B-12	Instrument Panel: Gages and Indicators, R/V . . . . .	A-89
		Instrument Panel Gages (Fleetside- RPO E63), R/V . . . . .	A-94
		Instrument Panel Gages, G/P . . . . .	C-54
		Instrument Panel Gages (Suburban and Utility), R/V . . . . .	A-96
		Instrument Panel Gages, P . . . . .	B-64
		Instrument Panel Lamps (Fleetside-RPO E63), R/V . . . . .	A-92
		Instrument Panel Lamps, G/P . . . . .	C-53
		Instrument Panel Lamps (Suburban and Utility), R/V . . . . .	A-93
		Instrument Panel Lamps, P . . . . .	B-61
		Introduction . . . . .	iii
		Key-In Warning Buzzer, Safety Belt and, G/P . . . . .	C-58
		Kickdown Solenoid, Automatic Transmission, G/P . . . . .	C-36
		Kickdown Solenoid (RPO M40), Automatic Transmission, G/P . . . . .	C-37
		Kickdown Solenoid (RPO M40), Automatic Transmission, P . . . . .	B-44
		Kickdown Solenoid (RPO M40), Automatic Transmission, R/V . . . . .	A-78
		Lamp (RPO UF2), Cargo, R/V . . . . .	A-118
		Lamp (Utility and Suburban), License, R/V . . . . .	A-153
		Lamp (With RPO TR9), Underhood, R/V . . . . .	A-119
		Lamp, Dome, G/P . . . . .	C-68
		Lamp-Fleetside (RPO E63) and Wideside (RPO R05), License, R/V . . . . .	A-154
		Lamps (All Models), Rear Hazard, R/V . . . . .	A-29
		Lamps, Backup, P . . . . .	B-67
		Lamps, Backup, Tail and License, G/P . . . . .	C-82
		Lamps (Base Model), Directional Signal, R/V . . . . .	A-33
		Lamps, Directional, G/P . . . . .	C-21
		Lamps, Directional Signal, R/V . . . . .	A-30
		Lamps, Directional, P . . . . .	B-24
		Lamps (Fleetside and Wideside), Backup, R/V . . . . .	A-150
		Lamps (Fleetside (RPO E63) and Wideside (RPO R05), Park and Marker, R/V . . . . .	A-26
		Lamps (Fleetside), Backup, R/V . . . . .	A-149
		Lamps Fleetside (RPO E63), Indicator, R/V . . . . .	A-98
		Lamps (Fleetside-RPO E63), Instrument Panel, R/V . . . . .	A-92
		Lamps, Front Park, Marker, Roof and Hazard, R/V . . . . .	A-23
		Lamps, Hazard, P . . . . .	B-23
		Lamps, Indicator, G/P . . . . .	C-56
		Lamps, Indicator, P . . . . .	B-62
		Lamps, Instrument Panel, G/P . . . . .	C-53
		Lamps, Instrument Panel, P . . . . .	B-61
		Lamps, License, P . . . . .	B-69
		Lamps, Park and Marker, P . . . . .	B-22
		Lamps, Park, Marker and Hazard, G/P . . . . .	C-17
		Lamps, Park, Marker and Hazard, P . . . . .	B-20
		Lamps, Rear Exterior, P . . . . .	B-66
		Lamps, Rear Exterior, R/V . . . . .	A-146
		Lamps (RPO U01), Roof Marker, R/V . . . . .	A-27
		Lamps (Stepside), Backup, R/V . . . . .	A-148
		Lamps (Suburban and Utility), Indicator, R/V . . . . .	A-100
		Lamps (Suburban and Utility), Instrument Panel, R/V . . . . .	A-93
		Lamps (Suburban and Utility), Park and Marker, R/V . . . . .	A-25
		Lamps (Utility and Suburban), Backup, R/V . . . . .	A-147
		Lamps (With RPO V22), Hazard, R/V . . . . .	A-28
		License Lamps, Backup, Tail and, G/P . . . . .	C-82
		License Lamp-Fleetside (RPO E63) and Wideside (RPO R05), R/V . . . . .	A-154
		License Lamps, P . . . . .	B-69
		License Lamp (Utility and Suburban), R/V . . . . .	A-153
		Lighted Vanity Mirror, Dome Lamps, Glove Box Lamp and, R/V . . . . .	A-117
		Locations, Component . . . . .	iii
		Malfunctions, Circuit . . . . .	iv
		Manual, How To Use This . . . . .	iii
		Marker and Hazard Lamps, Park, G/P . . . . .	C-17
		Marker and Hazard Lamps, Park, P . . . . .	B-20
		Marker Lamps (Fleetside (RPO E63) and Wideside (RPO R05), Park and, R/V . . . . .	A-26
		Marker Lamps, Park and, P . . . . .	B-22
		Marker Lamps (Suburban and Utility), Park and, R/V . . . . .	A-25
		Marker, Roof and Hazard Lamps, Front Park, R/V . . . . .	A-23
		Metri-Pack Connectors . . . . .	vii
		Module, Electronic Control, G/P . . . . .	C-38
		Module, Electronic Control, P . . . . .	B-46
		Module-Inputs (RPO L05, L19), Electronic Control, G/P . . . . .	C-40
		Module-Inputs (RPO LB4, L05 and L19), Electronic Control, P . . . . .	B-48
		Module-Outputs (RPO L05, L19), Electronic Control, G/P . . . . .	C-42
		Module-Outputs (RPO LB4, L05 and L19), Electronic Control, P . . . . .	B-50
		Module-Pinout, Electronic Control, G/P . . . . .	C-39
		Module-Pinouts, Electronic Control, P . . . . .	B-47
		Operation, Circuit . . . . .	iii
		Overspeed Alarm (RPO UD4), G/P . . . . .	C-64
		Panel Doors, Rear Defogger (RPO C49), R/V . . . . .	A-126
		Park and Marker Lamps, P . . . . .	B-22
		Park and Marker Lamps (Fleetside (RPO E63) and Wideside (RPO R05), R/V . . . . .	A-26
		Park and Marker Lamps (Suburban and Utility), R/V . . . . .	A-25
		Park, Marker and Hazard Lamps, G/P . . . . .	C-17
		Park, Marker and Hazard Lamps, P . . . . .	B-20
		Phantom View, G/P . . . . .	C-1
		Phantom View, P . . . . .	B-1
		Phantom View, R/V . . . . .	A-1
		Plugs, Glow, R/V . . . . .	A-48
		Plugs (RPO LH6 Diesel), Glow, R/V . . . . .	A-52
		Plugs (RPO LL4), Glow, P . . . . .	B-41



## INDEX

	PAGE
Plugs (RPO LL4), Glow, R/V	A-50
Power Brake Booster Vacuum System, R/V	A-162
Power Distribution - Motor Home (P32) and Conventional Forward Control (P42), P	B-8
Power Distribution (RPO L05, L19 With 12SI Generator), R/V	A-8
Power Distribution (RPO L05, L19 With 9SI Generator), R/V	A-7
Power Distribution (RPO L05, L19), G/P	C-4
Power Distribution (RPO L05, L19), R/V	A-6
Power Distribution (RPO LB4, L05 and L19), P	B-6
Power Distribution (RPO LH6, LL4), R/V	A-10
Power Distribution (RPO LL4), P	B-10
Power Door Locks (RPO AU3), G/P	C-77
Power Door Locks (RPO AU3) 2 Door (With Power Outside Rearview Mirrors-RPO D48), R/V	A-137
Power Door Locks (RPO AU3) 2 Door (Without Power Outside Rearview Mirrors-RPO D48), R/V	A-136
Power Door Locks (RPO AU3) 4-Door (With Power Outside Rearview Mirrors-RPO D48), R/V	A-140
Power Door Locks (RPO AU3) 4-Door (Without Power Outside Rearview Mirrors-RPO D48), R/V	A-138
Power Door Locks, G/P	C-76
Power Door Locks, Power Mirrors and, R/V	A-133
Power Mirrors and Power Door Locks, R/V	A-133
Power Outside Rearview Mirrors (RPO D48), R/V	A-135
Power Rear Window (RPO A33), R/V	A-132
Power Windows, G/P	C-73
Power Windows (RPO A31) 2-Door, R/V	A-130
Power Windows (RPO A31) 4-Door, R/V	A-131
Power Windows (RPO A31), G/P	C-75
Power Windows, R/V	A-127
Pulse Wiper/Washer (RPO CD4), G/P	C-81
Pulse Wiper/Washer (RPO CD4), R/V	A-144
Pulse Wiper/Washer, R/V	A-142
Radio (RPO U63), AM, R/V	A-122
Radio (RPO U63), G/P	C-71
Radio (RPO UM6, UM7, UU9 and U63), G/P	C-70
Radio (RPO UM6, UM7, UU9), G/P	C-72
Radio Equipment (RPO UM6), R/V	A-121
Radio, R/V	A-120
Rear Air Conditioning (RPO C69), R/V	A-84
Rear, Air Conditioning, R/V	A-82
Rear Defogger (RPO C49) - Panel Doors, R/V	A-126
Rear Defogger, R/V	A-124
Rear Defogger - Tailgate (RPO C49), R/V	A-125
Rear Exterior Lamps, P	B-66
Rear Exterior Lamps, R/V	A-146
Rear Hazard Lamps (All Models), R/V	A-29
Rear Wheel Antilock Brakes, R/V	A-108
Rear Window (RPO A33), Power, R/V	A-132

	PAGE
Rearview Mirrors (RPO D48), Power Outside, R/V	A-135
Regular Production Option (RPO) List	ix
Repair Procedures, Circuit Wiring	vi
Roof and Hazard Lamps, Front Park, Marker, R/V	A-23
Roof Marker Lamps (RPO U01), R/V	A-27
Safety Belt and Key-In Warning Buzzer, G/P	C-58
Safety Belt Warning Buzzer, R/V	A-102
Special Tools	viii
Start (RPO L05, L19), G/P	C-27
Start and Charge, G/P	C-26
Start and Charge, P	B-30
Start and Charge, R/V	A-36
Start Diesel (RPO LH6 Only), R/V	A-40
Start Gas (L05, With 12 SI Generator), R/V	A-38
Start Gas (RPO L05, L19 With 9 SI Generator), R/V	A-39
Start/Ignition - Conventional Forward Control P42 (RPO LB4, L05, and L19), P	B-33
Start/Ignition (RPO LB4, L05 and L19), P	B-32
Start/Ignition (RPO LL4), P	B-34
Symptoms Index, G/P	C-2
Symptoms Index, P	B-2
Symptoms Index, R/V	A-2
Table of Contents	i
Tail and License Lamps, Backup, G/P	C-82
Tailgate (RPO C49), Rear Defogger - R/V	A-125
Taillamps (Fleetside RPO E63 and Wideside - W/RPO R05), R/V	A-152
Taillamps (Utility and Suburban), R/V	A-151
Taillamps, P	B-68
Test Equipment, Electrical	iv
Throttle Body Injection (RPO L05, L19), G/P	C-31
Throttle Body Injection (RPO LB4, L05 and L19), P	B-36
Throttle Body Injection (With RPO L05 or L19), R/V	A-44
Tools, Special	viii
Trailer Wiring, Camper and, R/V	A-156
Trailer Wiring (RPO UY1, UY7), Camper and, R/V	A-157
Transmission Converter Clutch Detent Solenoid (RPO L05 Only), R/V	A-77
Transmission Converter Clutch Detent Solenoid, R/V	A-76
Troubleshooting	iii
Underhood Lamp, Courtesy Lamps, Cargo Lamps and, R/V	A-115
Underhood Lamp (With RPO TR9), R/V	A-119
Vacuum Harness, G/P	C-86
Vacuum Harnesses, P	B-72
Vacuum Harnesses (With RPO C36, C60 or K34), R/V	A-161
Vacuum Harnesses (With RPO JB5/JB7, MX1 and EGR System), R/V	A-164

	PAGE
Vacuum Systems, G/P	C-84
Vacuum Systems, P	B-70
Vacuum Systems, R/V	A-158
View, Phantom, G/P	C-1
View, Phantom, P	B-1
View, Phantom, R/V	A-1
Views, Component Locator, G/P	C-87
Views, Component Locator, P	B-73
Views, Component Locator, R/V	A-165
Warning Buzzer, Safety Belt and Key-In, G/P	C-58
Warning Buzzer, Safety Belt, R/V	A-102
Warning System (RPO UJ1), Brake, G/P	C-62
Warning System, Brake, P	B-52
Warning Systems, Brake, G/P	C-60
Warning System (RPO UJ1 For RPO B3D), Brake, P	B-54
Warning System Without Rear Wheel Antilock Brakes, Brake, R/V	A-107
Weather-Pack Connectors	vii
Windows, Power, G/P	C-73
Windows, Power, R/V	A-127
Windows (RPO A31) 2-Door, Power, R/V	A-130
Windows (RPO A31) 4-Door, Power, R/V	A-131
Windows (RPO A31), Power, G/P	C-75
Wiper/Washer, G/P	C-80
Wiper/Washer, P	B-28
Wiper/Washer, Pulse, R/V	A-142
Wiper/Washer (And RPO CD4), G/P	C-78
Wiper/Washer (RPO CD4), Pulse, G/P	C-81
Wiper/Washer (RPO CD4), Pulse, R/V	A-144
Wiring, Camper and Trailer, R/V	A-156
Wiring (RPO UY1, UY7), Camper and Trailer, R/V	A-157

