

**1994-1995  
P-CHASSIS AND G-VAN**

**1994  
C/K TRUCK**

**6.5 DIESEL/TURBO DIESEL  
ELECTRICAL DIAGNOSIS  
MANUAL SUPPLEMENT**



**GMC  
TRUCK**

## **CAUTION**

To reduce the chance of personal injury and/or property damage, the following instructions must be carefully observed:

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of all motor vehicles. If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended and described in this service manual are effective methods of performing service and repair. Some of these procedures require the use of tools specifically designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure, or tool that is not recommended by the vehicle manufacturer must first determine that neither his safety nor the safe operation of the vehicle will be jeopardized by the replacement part, service procedure, or tool selected.

It is important to note that this manual contains various 'Cautions' and 'Notices' that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these 'Cautions' and 'Notices' are not exhaustive, because it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

On vehicles equipped with Supplemental Inflatable Restraint (SIR), refer to CAUTIONS in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

To help avoid accidental air bag deployment and personal injury, when servicing a vehicle that requires repair of the SIR system and another vehicle system, it is recommended that the SIR system be repaired first using service manual procedures.

# FOREWORD

The Electrical Diagnosis section of this manual contains wiring diagrams for the 1994 C/K, 1994 and 1995 G-VAN, and 1994 and 1995 P-CHASSIS.

Procedures involving disassembly and assembly of major components for these vehicles are published in the Light Duty Truck Unit Repair Manual (1994 = NATP - 9437, 1995 = GMT/95-LUR). Diagnosis, on-vehicle maintenance, and light repair procedures are published in the 1994 C/K SERVICE MANUAL (NATP - 9531), 1994 G-VAN SERVICE MANUAL (NATP - 9557), 1995 G-VAN SERVICE MANUAL (GMT/95-G-1), 1994 P-CHASSIS SERVICE MANUAL (NATP - 9532), 1995 P-CHASSIS SERVICE MANUAL (GMT/95-PG-1).

This manual should be kept in a handy place for ready reference. If properly used, it will meet the needs of technicians and vehicle owners.

**CAUTION:** General Motors service manuals are intended for use by professional, qualified technicians. Attempting repairs or service without the appropriate training, tools, and equipment could cause injury to you or others and damage to your vehicle that may cause it not to operate properly.

# **1994 - 1995 P-CHASSIS AND G-VAN 1994 C/K TRUCK 6.5L DIESEL/TURBO DIESEL ELECTRICAL DIAGNOSIS MANUAL SUPPLEMENT**

The Main Table of Contents indicates the sections and Vehicle Lines covered in this manual. At the beginning of each individual section is a Table of Contents which gives the page number on which each major subject begins.

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.

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.

**General Motors Corporation  
Pontiac, Michigan**

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**SECTION 8A**  
**ELECTRICAL DIAGNOSIS**

**1994 C/K**  
**1994 & 1995 G VAN**  
**1994 & 1995 P-CHASSIS**

**GENERAL INFORMATION**

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- 3 Symbols
- 4 Troubleshooting Procedures
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## INTRODUCTION

### DIAGNOSTIC INFORMATION

The Electrical Diagnosis section contains the following types of diagnostic information (the way in which the information is arranged may vary from system to system or vehicle to vehicle):

- Electrical Schematics
- Component Location Lists
- Harness Connector Faces
- Troubleshooting Hints
- System Checks
- System Diagnosis
- Circuit Operation Descriptions
- Harness Routing Views

Using these elements together will make electrical troubleshooting faster and easier. Each element is described below.

The **Circuit Schematic** shows the electrical current paths when a circuit is operating properly. It is essential to understand how a circuit should work before trying to diagnose a failure.

The **Component Location List** helps to find where the components of a system can be located. A brief statement of the location is given and also a reference to a drawing that shows the component and its connecting wires. These **Component Location Views** are in SECTION 8A-201.

The **Harness Connector Faces** show the cavity or terminal locations in all the 4 pin or larger connectors shown in the schematic. Together with the wire colors and terminals given in the schematic, they help locate test points. The drawings show the connector faces as seen after the harness connector has been disconnected from a component or mating connector.

The **Troubleshooting Hints** offer short-cuts or checks to help determine the cause of a complaint. They are not intended to be a rigid procedure for solving an electrical situation. Rather, Troubleshooting Hints represent a common-sense approach, based on an understanding of the circuit.

The **System Check** gives a summary of how the system should be operated and what should happen. This is especially important when working on a new system. The System Check will help identify symptoms, lead to diagnosis and confirm normal operation of the system after repair.

The **System Diagnosis** provides a procedure to follow that will locate the condition in a circuit causing a malfunction. If your own knowledge of the system and the Troubleshooting Hints have not produced a quick fix, follow the System Diagnosis. All procedures are based on symptoms to assist in locating the condition as fast as possible.

The **Circuit Operation** describes the components and how the circuit works.

### SECTION/PAGE NUMBER

Sections are organized by subsystems with most containing a circuit schematic and the associated text. This makes the section easy to use, since the page number will stay the same year after year. For example, the Cruise Control schematic will always begin on page 8A-34-0. The other information for Cruise Control follows and is paged 8A-34-1, 8A-34-2, etc.

Some sections may have more than one circuit schematic, such as Power Distribution, Interior Lights and Air Conditioning. The circuit of interest can either be located by using the Index or by a quick look through the related section.

All the engine circuits for a particular engine VIN type are in the same section. This makes that section easy to use, since schematics for other engines are not in your way. The Instrument Panel schematics are organized similarly. If you are working on a vehicle with a Digital Cluster, only the schematics that apply to that vehicle's Digital Cluster will be in the section you use. Information on the Indicators and Gages Clusters will be in other sections.

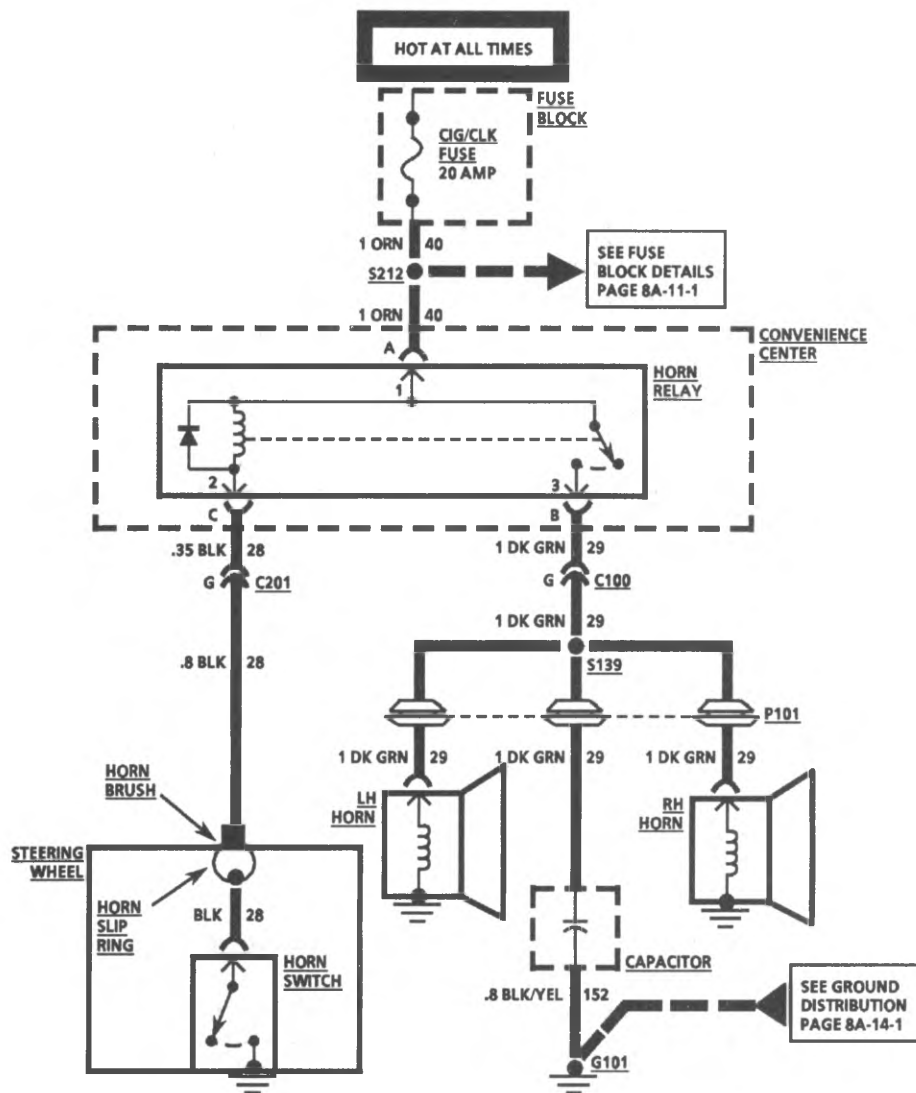
6-1-94  
BS0008A2

Figure 1—Typical Horn Schematic

## SCHEMATICS

Schematics break the entire electrical system down into individual circuits. Wiring which is not part of the circuit of interest is referenced to another page, where the circuit is shown complete.



### Important:

- It is important to realize that no attempt is made on the schematic to represent components and wiring as they physically appear on the vehicle. For example, a 4-foot length of wire is treated no differently in a schematic from one which is only a few inches long. The number of cavities for each connector is listed in the Component Location List. Similarly, switches and other components are shown as simply as possible, with regard to function only.

When diagnosing a Horn problem, the technician would reference the Horn section. The schematic in Figure 1 is a typical example of what would be found in a Horn section of SECTION 8A, along with the following text.

Voltage is applied to the Horn Relay at all times. When the relay coil is grounded by closing the Horn Switch, the relay contacts close. When the relay contacts are closed, both the LH and RH Horns are energized.

## COMPONENT LOCATIONS

To locate the schematic components on the vehicle, use the Component Location List. Refer to "Typical Entries in the Component Location List."

Listed in the left hand column are the components, connectors, grounds and splices shown on the schematic. To the right of the component is the location, "Under RH side of IP." Reference to LH and RH is made as though

## INTRODUCTION

the technician was sitting in the driver's seat. On the same line, in the next two columns, are page and figure references for SECTION 8A-201, "Component Location Views." In this case, you are directed to Figure 4 on page 8A-201-1.

Where connectors are listed, the number of cavities is provided. This represents the total number of cavities in the connector, regardless of how many are actually used. This information is provided to help identify connectors on the vehicle. In the far right column is a page reference where a

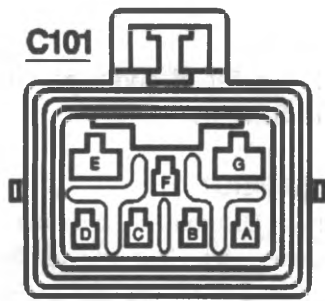
view of the connector face may be found. Connectors with 3 cavities or less are not included in SECTION 8A-202, "Harness Connector Faces."

Grounds are listed next in the table. The location description for G101 reads, "Behind LH Composite Headlamp." You are directed to page 8A-201-8, Figure 14.

Nearly every component, connector, ground or splice shown on a schematic can be pinpointed visually by using the Component Location View figures.

COMPONENT	LOCATION	201-PG	FIG.	CONN
Convenience Center.....	Under RH side of I/P .....	1 .....	4	
Fuse Block .....	Behind I/P Compartment Door .....	0 .....	2	
<b>CONNECTORS</b>				
C100 (34 cavities) .....	Mounted to LH Hood Hinge .....	7 .....	11 .....	202-0
C210 (15 cavities) .....	Above Convenience Center, behind I/P Compartment.....	18 .....	23 .....	202-2
<b>GROUND</b>				
G101 .....	Behind LH Composite Headlamp .....	8 .....	14	
<b>SPLICES</b>				
S139.....	Forward Lamp Wiring Harn, behind RH Composite Headlamp .....	8 .....	15	
S212.....	I/P Wiring Harn, behind I/P, above Steering Column .....	6 .....	8	

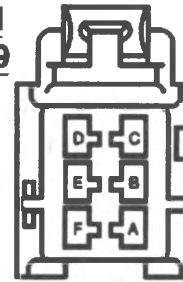
Figure 2—Typical Entries in the Component Location List



12059472

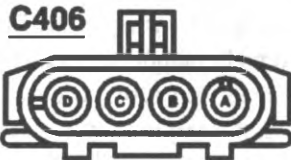
7-WAY F METRI-PACK MIXED SERIES  
BLK

C201  
C209



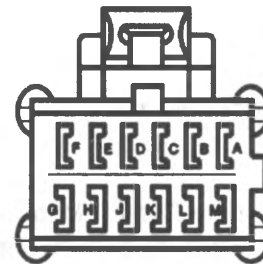
12064752

6-WAY F METRI-PACK 280 SERIES  
BLK



12034297

4-WAY M/F WEATHER PACK SHD  
BLK



12065666

12-WAY PC EDGEBOARD-ECM  
BLK  
CRUISE CONTROL MODULE

6-1-94  
BS0018A2

Figure 3—Typical Harness Connector Faces

## HARNESS CONNECTOR FACES

The connectors (see Figure 3) are labeled with the component they are connected to, or the connector number. In addition the color of the connector is given along with the family/series name.

If you need to backprobe a connector while it is on the component (refer to page 8A-4-3 for probing procedures),

the order of the terminals must be mentally reversed. The wire color is a help in this situation. If there is more than one wire of the same color, you may need to locate a test point from its terminal number. A useful trick is to imagine that you are probing a terminal from behind the page you are looking at. Then mentally locate that terminal with respect to the keyway or other reference mark.



## INTRODUCTION

### OTHER INFORMATION

#### VIN REFERENCES

If schematics for more than one variation of an engine type—V6, for example—are shown, then the schematics will be labeled with VIN designation to distinguish the variations.

#### SERVICE PARTS IDENTIFICATION LABEL

To aid service and parts personnel in identifying options and parts originally installed, a Service Parts Identification Label has been placed in the vehicle. See SECTION 0A for the location of the label and the definition of the option codes.

#### ABBREVIATIONS

<b>A/C</b>	Air Conditioning
<b>CCM</b>	Central Control Module
<b>CKT</b>	Circuit
<b>CONN</b>	Connector
<b>EBCM</b>	Electronic Brake Control Module
<b>EBTCM</b>	Electronic Brake and Traction Control Module
<b>ECM</b>	Engine Control Module
<b>HARN</b>	Harness
<b>I/P</b>	Instrument Panel
<b>LH</b>	Left Hand
<b>PCM</b>	Powertrain Control Module

**RH** Right Hand

**TERM** Terminal

For a list of additional abbreviations, refer to SECTION 0A.

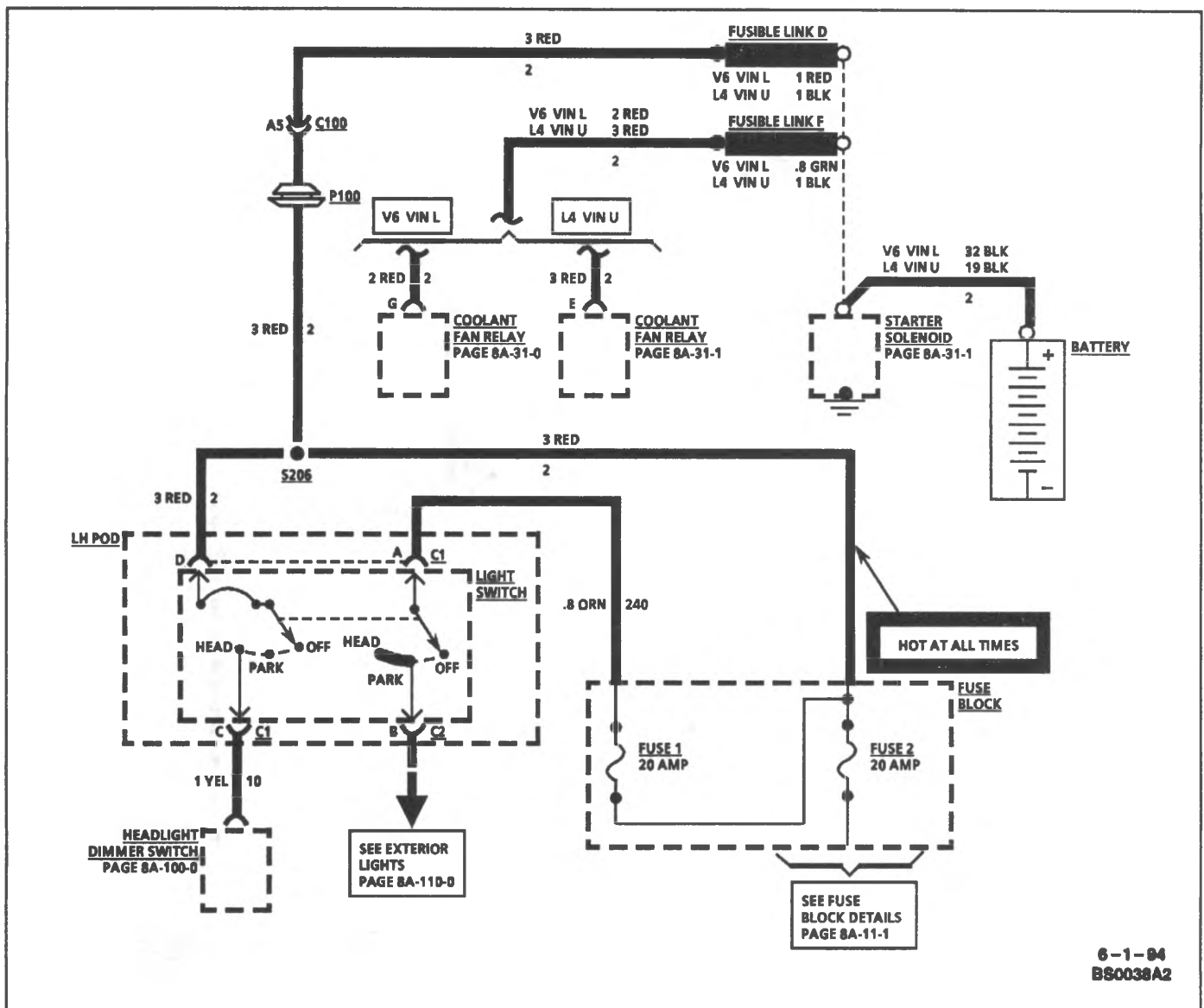
#### POWER DISTRIBUTION

The Power Distribution schematic shows the wiring from the Battery and Generator to the Starter Solenoid, Fuse Block, Ignition Switch and Light Switch. The first component after a Fusible Link is also shown. In certain instances, the first component after a Fuse Block fuse and Light Switch is also shown.

The Power Distribution schematic refers to Fuse Block Details or the appropriate section schematics. By using these schematics, power distribution wiring can be followed from the Battery and Generator to the first component after a Fusible Link, Fuse or Light Switch. The ability to follow the power distribution wiring to the first component in each circuit is extremely helpful in locating short circuits which cause fusible links and fuses to open.

Figure 4 is a sample Power Distribution schematic. It shows how voltage is applied from the positive battery terminal to the various circuits on the vehicle. For example, battery voltage is applied to the Starter Solenoid, Fusible Link D, Fuses 1 and 2 in the Fuse Block and the Light Switch in the LH Pod. These fuses are said to be Hot At All Times, since battery voltage is always applied to them.

Notice that battery voltage is also applied to Fusible Link F and Coolant Fan Relay.



6-1-84  
BS0038A2

Figure 4—Typical Power Distribution Schematic

## INTRODUCTION

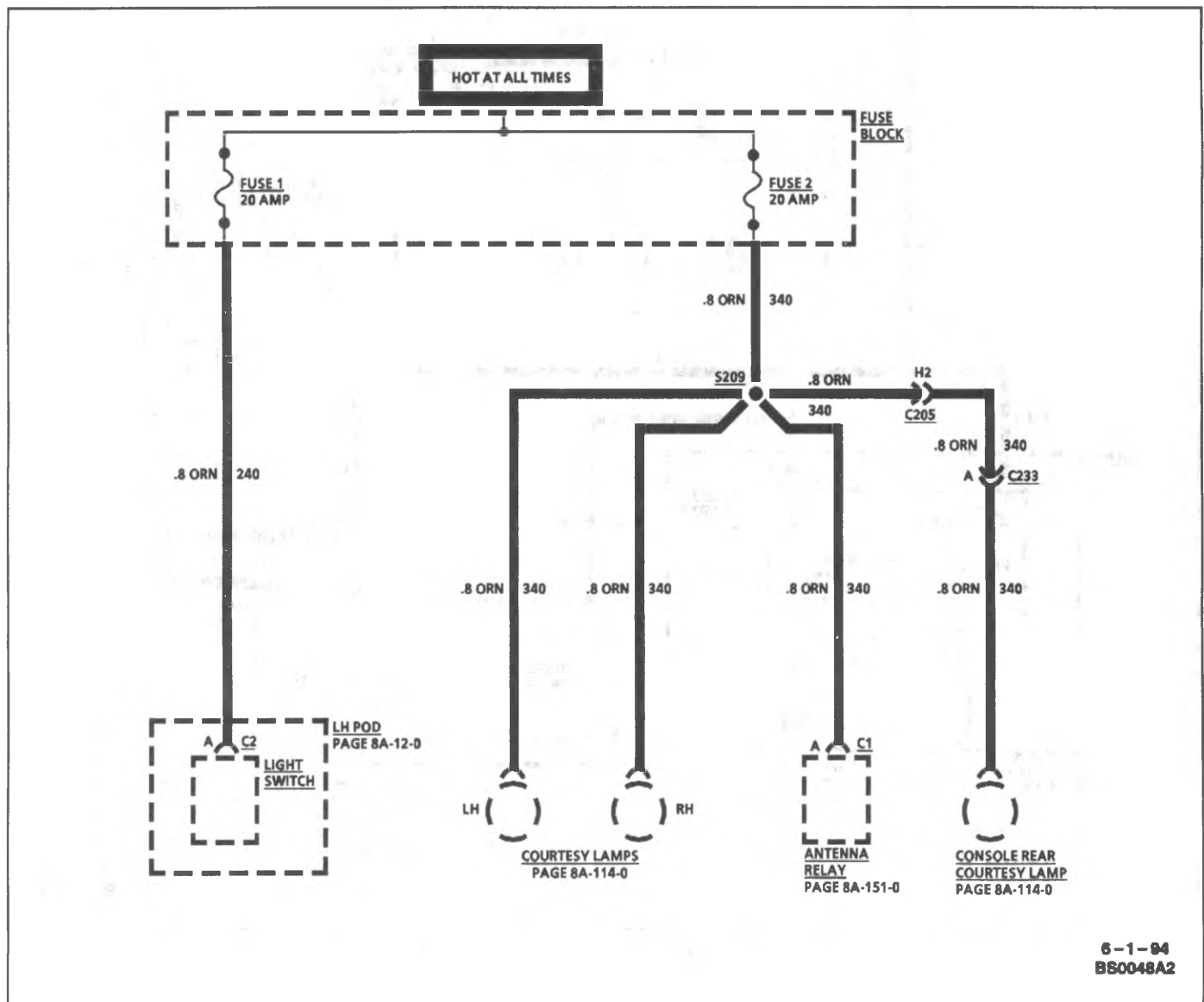


Figure 5—Typical Fuse Block Details Schematic

## FUSE BLOCK DETAILS

The Fuse Block Details schematic (see Figure 5) shows all of the wiring between a fuse and the components connected to the fuse. The Fuse Block Details schematic is extremely helpful in locating a short circuit that causes a fuse to open.

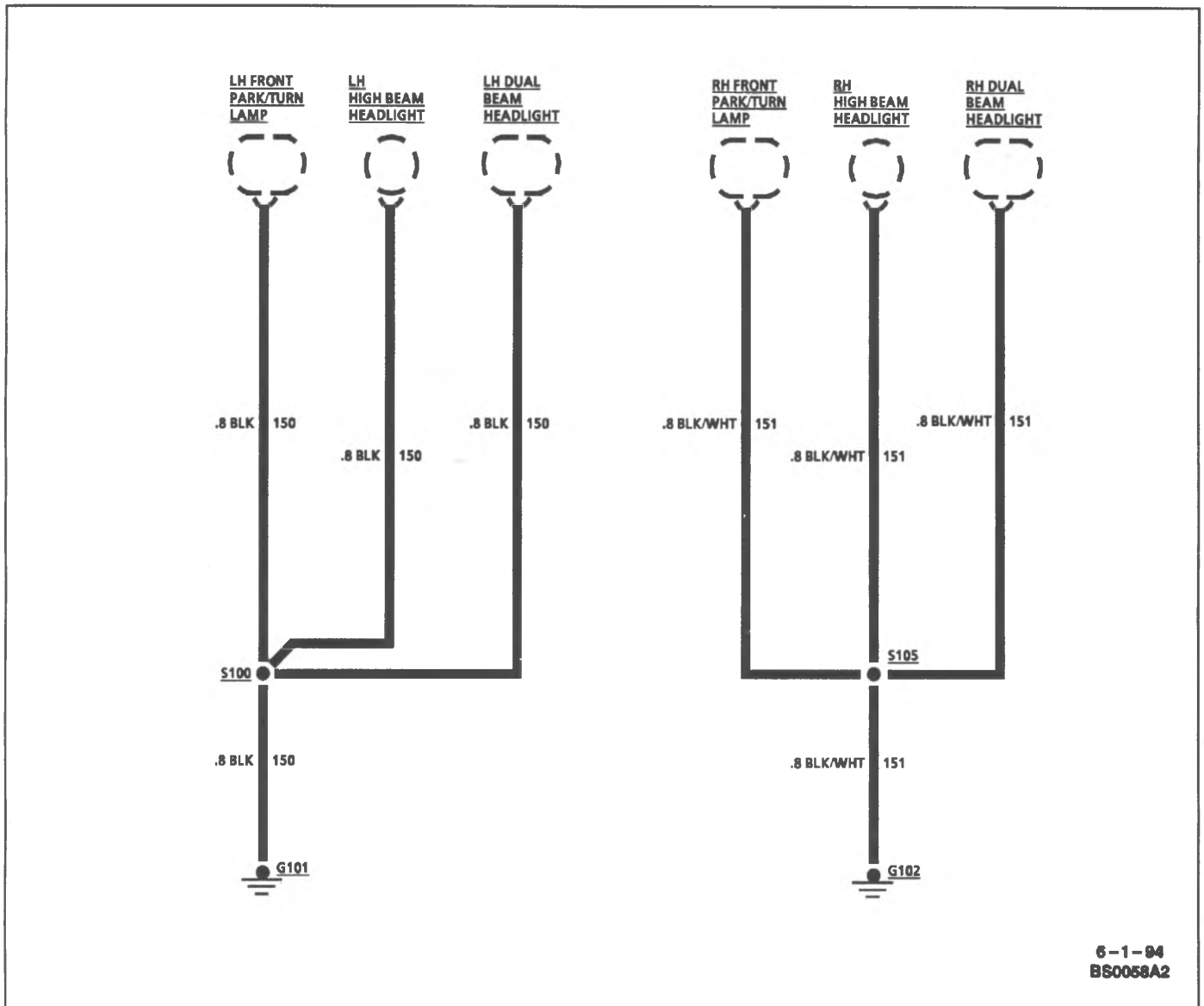


Figure 6—Typical Ground Distribution Schematic

### GROUND DISTRIBUTION

Figure 6 is a sample Ground Distribution schematic for the Headlamps. It shows exactly which components share each ground. This information can often be a time-saver when troubleshooting ground circuits.

For example, if both Headlamps and the Park/Turn Lamp on one side are out, suspect an open in their

common ground wire or the ground connection itself. On the other hand, if one of the lamps work, the ground and the wire up to the splice are good. You have learned this just by inspecting the schematic and knowing the vehicle's symptoms. No actual work on the lighting system was needed.

## SYMBOLS



ENTIRE  
COMPONENT  
SHOWN



PART OF A  
COMPONENT  
SHOWN



NAME OF  
COMPONENT  
DETAILS ABOUT  
COMPONENT OR  
ITS OPERATION



COMPONENT CASE  
IS DIRECTLY  
ATTACHED TO  
METAL PART  
OF VEHICLE  
(GROUNDED).



WIRE IS ATTACHED TO  
METAL PART OF VEHICLE  
(GROUNDED).  
GROUND IS NUMBERED  
FOR REFERENCE ON  
COMPONENT LOCATION LIST.



SEE GROUND  
DISTRIBUTION  
PAGE 8A-14-0

WIRE IS INDIRECTLY  
CONNECTED TO GROUND.  
WIRE MAY HAVE ONE OR  
MORE SPLICES OR CONNECTORS  
BEFORE IT IS GROUNDED.



FEMALE TERMINAL

MALE TERMINAL

CONNECTOR REFERENCE  
NUMBER FOR COMPONENT  
LOCATION LIST  
LIST ALSO SHOWS TOTAL  
NUMBER OF TERMINALS  
POSSIBLE. C103 (6 CAVITIES)



CONNECTOR  
ATTACHED TO  
COMPONENT

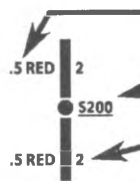
.5 GRY 8



CONNECTOR ON  
COMPONENT  
LEAD (PIGTAIL)

2 RED/YEL  
79

WIRE INSULATION  
IS RED WITH A  
YELLOW STRIPE.



WIRE GAGE AND INSULATION  
COLOR ARE LABELED.

SPLICES ARE SHOWN  
AND NUMBERED.

CIRCUIT NUMBER IS  
SHOWN TO HELP IN  
TRACING CIRCUITS.



PASS THROUGH  
GROMMET, NUMBERED  
FOR REFERENCE.

A WAVY LINE  
MEANS A WIRE IS  
TO BE CONTINUED.



FUSIBLE LINK SIZE AND  
INSULATION COLOR  
ARE LABELED.



TO GENERATOR  
PAGE 8A-30-0

CURRENT PATH  
IS CONTINUED  
AS LABELED.  
THE ARROW SHOWS  
THE DIRECTION OF  
CURRENT FLOW  
AND IS REPEATED  
WHERE CURRENT  
PATH CONTINUES.

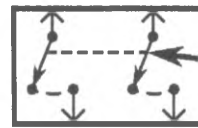


TO INSTRUMENT CLUSTER  
PAGE 8A-81-3

A WIRE WHICH  
CONNECTS TO  
ANOTHER CIRCUIT.  
THE WIRE IS  
SHOWN AGAIN  
ON THAT CIRCUIT.

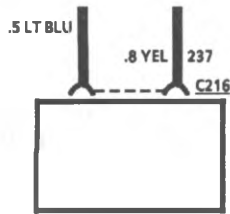


CIRCUIT  
BREAKER



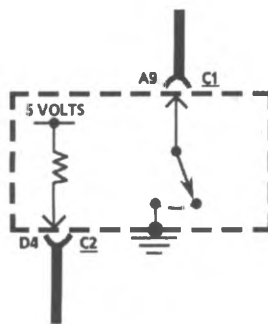
SWITCH CONTACTS THAT  
MOVE TOGETHER  
DASHED LINE SHOWS  
A MECHANICAL  
CONNECTION BETWEEN  
SWITCH CONTACTS.

## SYMBOLS



TWO TERMINALS  
IN THE SAME  
CONNECTOR

DASHED LINE SHOWS  
A PHYSICAL  
CONNECTION  
BETWEEN PARTS  
(SAME CONNECTOR).

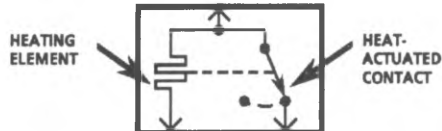


## ECM CONNECTOR IDENTIFICATION

C1 - BLACK - 32 WAY  
C2 - BLACK - 24 WAY

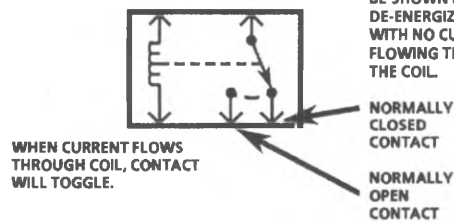
ENGINE  
CONTROL  
MODULE (ECM)

ELECTROSTATIC DISCHARGE  
(ESD) SENSITIVE DEVICES  
ARE IDENTIFIED. REFER TO  
PAGE 8A-3-0 FOR HANDLING  
AND MEASURING PROCEDURES.



HEATING  
ELEMENT

HEAT-  
ACTUATED  
CONTACT

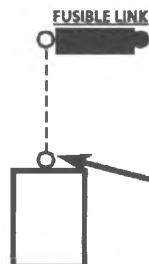


UNLESS NOTED,  
THE RELAY WILL  
BE SHOWN IN A  
DE-ENERGIZED STATE  
WITH NO CURRENT  
FLOWING THROUGH  
THE COIL.

NORMALLY  
CLOSED  
CONTACT

NORMALLY  
OPEN  
CONTACT

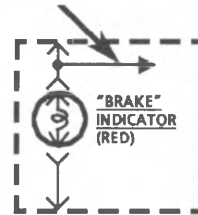
WHEN CURRENT FLOWS  
THROUGH COIL, CONTACT  
WILL TOGGLE.



FUSIBLE LINK

FUSIBLE LINK  
CONNECTS TO  
SCREW TERMINAL.  
SHOWN SEPARATED

INDICATES THIS CIRCUIT  
CONTINUES WITHIN DEVICE;  
I.E., OTHER BULBS

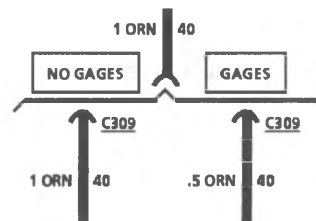


AN INDICATOR  
WHICH DISPLAYS  
THE LIGHTED  
WORD "BRAKE"

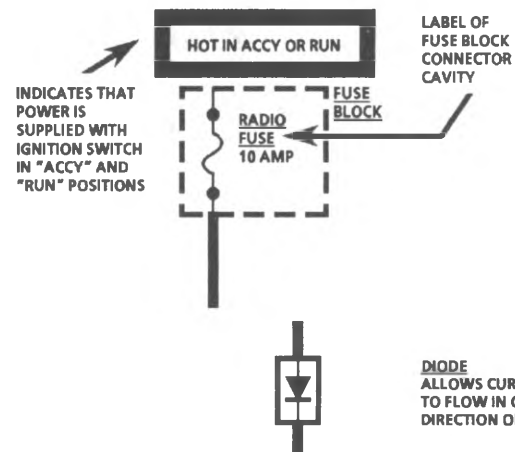


SEE GROUND  
DISTRIBUTION  
PAGE 8A-14-0

INDICATES THAT  
THE CIRCUITRY IS  
NOT SHOWN IN  
COMPLETE DETAIL  
BUT IS COMPLETE ON  
THE INDICATED PAGE



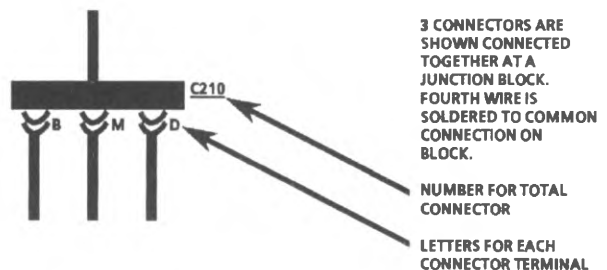
WIRE CHOICES  
FOR OPTIONS  
OR DIFFERENT  
MODELS ARE  
SHOWN AND  
LABELED.



INDICATES THAT  
POWER IS  
SUPPLIED WITH  
IGNITION SWITCH  
IN "ACCY" AND  
"RUN" POSITIONS

LABEL OF  
FUSE BLOCK  
CONNECTOR  
CAVITY

DIODE  
ALLOWS CURRENT  
TO FLOW IN ONE  
DIRECTION ONLY

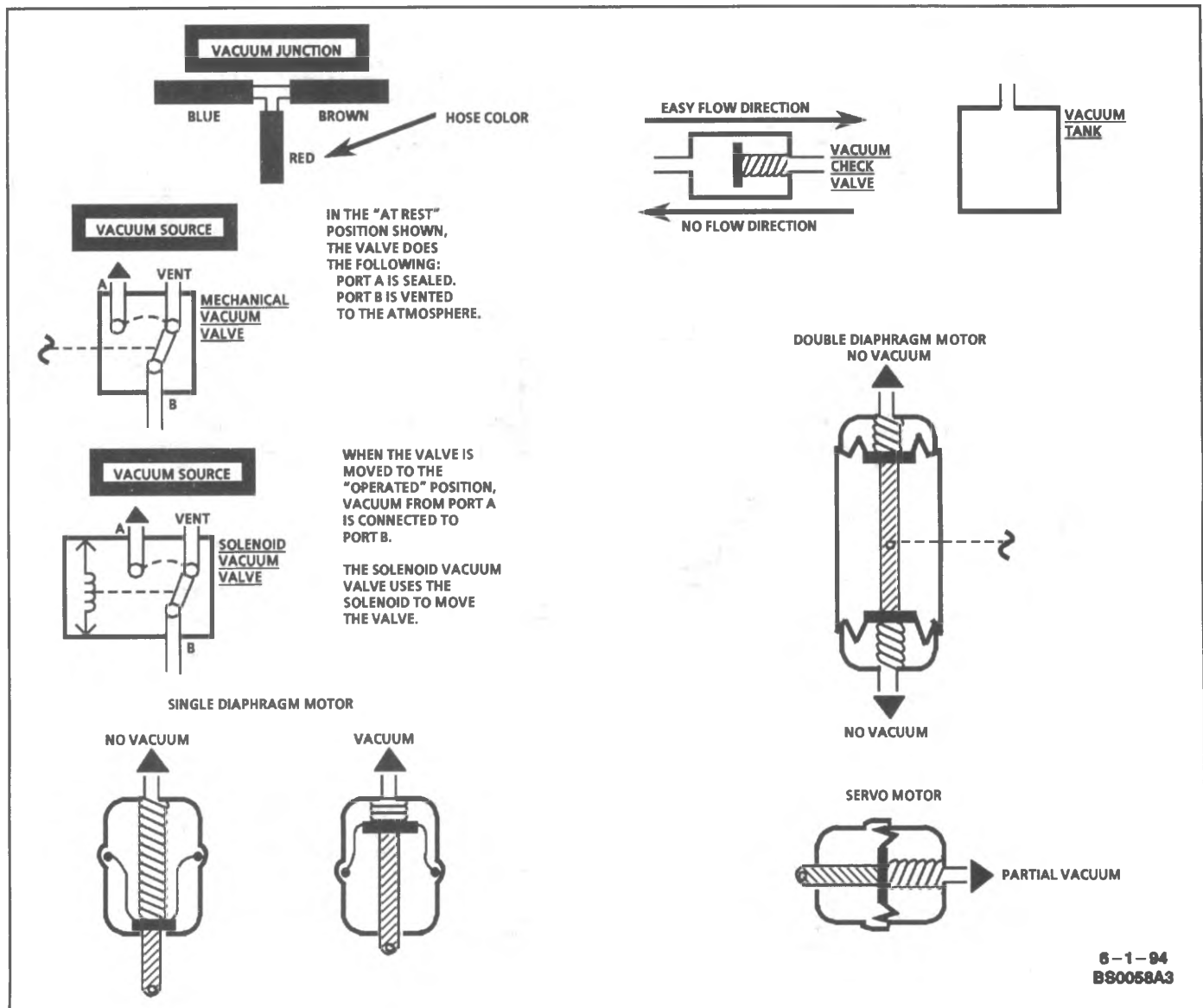


3 CONNECTORS ARE  
SHOWN CONNECTED  
TOGETHER AT A  
JUNCTION BLOCK.  
FOURTH WIRE IS  
SOLDERED TO COMMON  
CONNECTION ON  
BLOCK.

NUMBER FOR TOTAL  
CONNECTOR

LETTERS FOR EACH  
CONNECTOR TERMINAL

# SYMBOLS



## SYMBOLS

Vacuum Motors operate like electrical solenoids, mechanically pushing or pulling a shaft between two fixed positions. When vacuum is applied, the shaft is pulled in. When no vacuum is applied, the shaft is pushed all the way out by a spring.

Double Diaphragm Motors can be operated by vacuum in two directions. When there is no vacuum, the motor is in the center "at rest" position.

Some Vacuum Motors such as the Servo Motor in the Cruise Control can position the actuating arm at any position between fully extended and fully retracted. The servo is operated by a control valve that applies varying amounts of vacuum to the motor. The higher the vacuum level, the greater the retraction of the motor arm. Servo Motors work like the two position motors; the only difference is in the way the vacuum is applied. Servo Motors are generally larger and provide a calibrated control.



## SYMBOLS

## ELECTROSTATIC DISCHARGE (ESD) AND SUPPLEMENTAL INFLATABLE RESTRAINT (SIR)

ELECTROSTATIC DISCHARGE (ESD)  
SENSITIVE DEVICES

All ESD sensitive components are Solid State and the following information applies to them.

The ESD symbol (Figure 1) is used on schematics (Figure 2) to indicate which components are ESD sensitive. When handling any electronic part, the service technician should follow the guidelines below to reduce any possible electrostatic charge build-up on the service technician's body and inadvertent discharge to the electronic part. If it is not known whether or not a component is ESD sensitive, assume it is susceptible.

## HANDLING PROCEDURES

1. Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position or walking a distance.
2. Avoid touching electrical terminals of the part, unless so instructed by a written diagnostic procedure.
3. When using a voltmeter, be sure to connect the ground lead first.
4. Do not remove a part from its protective package until it is time to install the part.
5. Before removing the part from its package, ground the package to a known good ground on the vehicle.



Figure 1 - ESD Symbol

## MEASURING PROCEDURES

The circuits shown within the boxes are greatly simplified. Do not troubleshoot by measuring resistance at any terminal of these devices unless so instructed by a written diagnostic procedure. Due to the simplification of the schematics, resistance measurements could be misleading, or could lead to electrostatic discharge.

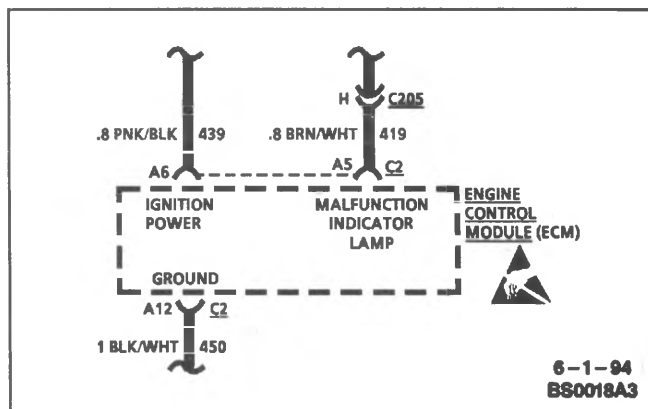


Figure 2 - Typical Schematic

## SUPPLEMENTAL INFLATABLE RESTRAINT (SIR) SYSTEM: IF EQUIPPED

The SIR symbol (Figure 3) is used on schematics to alert the technician to the following important caution:

**CAUTION: This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to CAUTIONS in SECTION 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in SECTION 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.**



Figure 3 - SIR Symbol

**BLANK**

## TROUBLESHOOTING PROCEDURES

## BASIC KNOWLEDGE REQUIRED

Without a basic knowledge of electricity, it will be difficult to use the diagnostic procedures contained in this section. You should understand the basic theory of electricity and know the meaning of voltage, current (amps) and resistance (ohms). You should understand what happens in a circuit with an open or a shorted wire. You should be able to read and understand a wiring diagram.

The following four-step troubleshooting procedure is recommended:

## Step 1: Check the Problem

Perform a System Check to determine a symptom. Don't waste time fixing part of the problem! Do not begin disassembly or testing until you have narrowed down the possible causes.

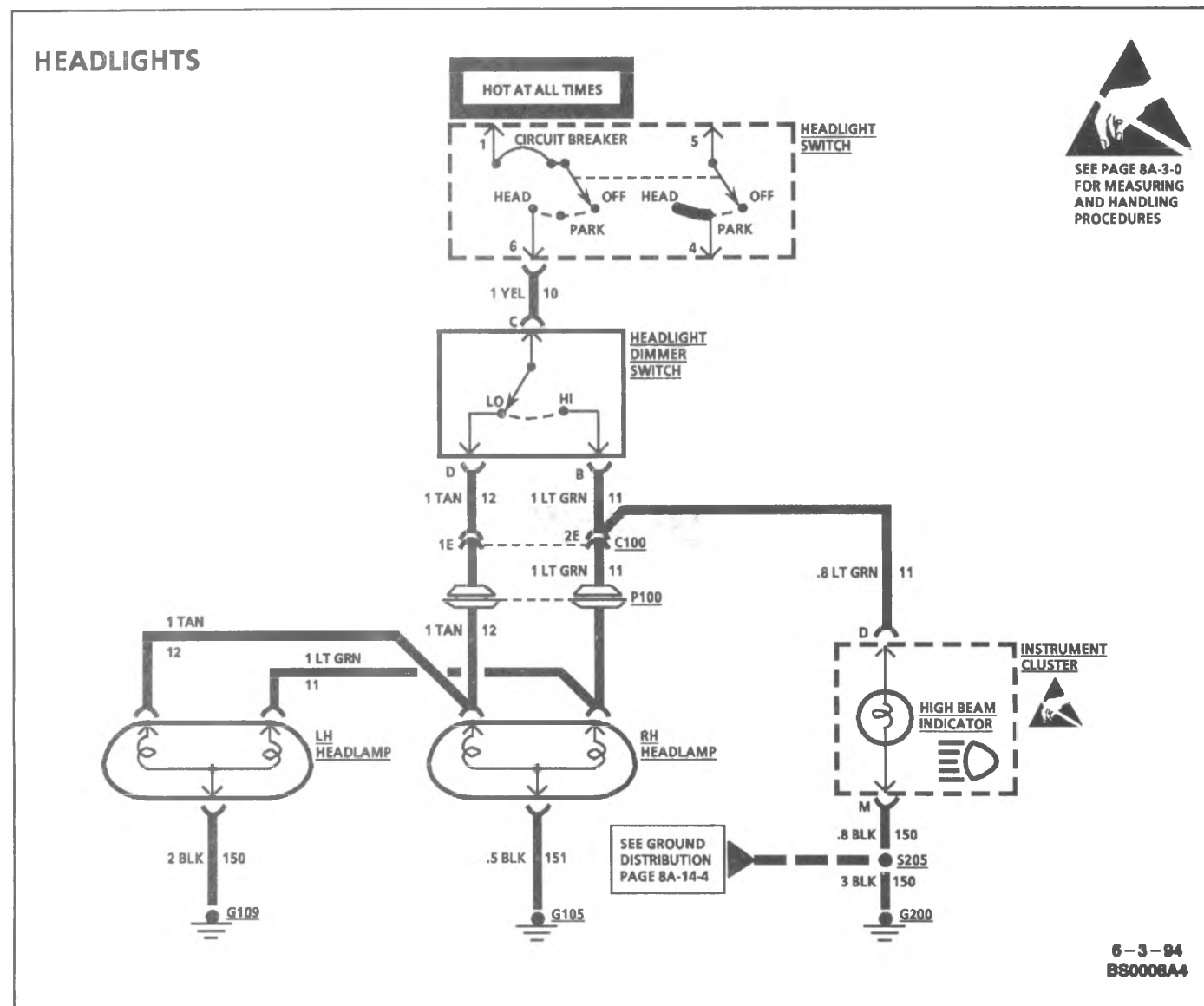


Figure 1—Typical Headlights Schematic

## Step 2: Read the Electrical Schematic

Study the schematic. Read the Circuit Operation text if you do not understand how the circuit should work. Check circuits that share wiring with the problem circuit. (Shared circuits are shown on Power Distribution, Ground Distribution, Fuse Block Details and Light Switch Details pages.) Try to operate the shared circuits. If the shared circuits work, then the shared wiring is OK. The cause must be within the wiring used only by the problem circuit.

If several circuits fail at the same time, chances are the power (fuse) or ground circuit is faulty.

## Step 3: Find the fault and repair

- Narrow down the possible causes.
- Use the Troubleshooting Hints.
- Make the necessary measurements or checks as given in the System Diagnosis.

- Before replacing a component, check power, signal and ground wires at the component harness connector. If the checks and connections are OK, the most probable cause is component failure.

#### Step 4: Test the Repair

Repeat the System Check to verify that the fault has been corrected and that no other faults were induced during the repair.

#### Example:

A customer brings in a vehicle and says that the HI beams do not work.

#### Step 1: Perform a System Check on the Headlight Circuit

You may discover that both LO beams operate. In "HI," you may notice that the HI Beam Indicator comes on, but neither HI beam operates.

#### Step 2: Read the Headlights Electrical Schematic (Figure 1).

This is the step that will save time and labor. Remember, it is essential to understand how a circuit should work, before trying to figure out why it doesn't.

After you understand how the circuit should operate, read the schematic again, this time keeping in mind what you have learned by operating the circuit.

Since both LO beams work, you know that the Headlight Switch, the YEL wire, the LO contacts of the Headlight Dimmer Switch, terminal "1E" of C100, the TAN wires and grounds G105 and G109 are all good.

Furthermore, since you saw that the HI Beam Indicator came on when the Headlight Dimmer Switch was moved to "HI," you know that the HI contacts of the Headlight Dimmer Switch and the LT GRN wire between the Headlight Dimmer Switch and C100 are good.

At this point, you could test for voltage at the RH Headlamp with the Headlight Dimmer Switch in "HI." However, it is extremely unlikely that the HI beam filaments have burned out in both headlamps, or that both headlamps connections are bad. The cause must be a bad connection at C100, or a break in the LT GRN wire between C100 and the RH Headlamp.

You have quickly narrowed the possible causes down to one specific area, and have *done* absolutely *no* work on the vehicle itself.

#### Step 3: Find the fault and repair it.

Using the Component Location List and the corresponding figure, you can quickly find C100 and the LT GRN wire, locate the exact trouble point and make the repair.

#### Step 4: Check the repair by performing a System Check on the Headlights Circuit.

This, of course, means making sure that both HI beams, both LO beams and the HI Beam Indicator are all working.

Now suppose that the symptoms were different. You may have operated the Headlamps and found that the LO beams were working, but neither the HI beams nor the HI Beam Indicator were working. Looking at the schematic, you might conclude that it is unlikely that both HI beam filaments and the HI Beam Indicator have all burned out at once. The cause is probably the Headlight Dimmer Switch or its connector.

### TROUBLESHOOTING TOOLS

Electrical troubleshooting requires the use of common electrical test equipment.

#### TEST LIGHT/DIGITAL VOLTMETER

Use a test light to check for voltage. A Test Light (J 34142-B) is made up of a 12 volt light bulb with a pair of leads attached. After grounding one lead, touch the other lead to various points along the circuit where voltage should be present. When the bulb goes on, there is voltage at the point being tested.

A DVM can be used instead of a test light. While a test light shows whether or not voltage is present, a DVM indicates how much voltage is present.

An increasing number of circuits include solid state control modules. One example is the Engine Control Module (ECM). Voltages in these circuits should be tested only with a 10-megohm or higher impedance DVM or multimeter (J 39200). Unless directed to within the diagnostics, never use a test light on circuits that contain solid state components, since damage to these components may result.

When testing for voltage or continuity at the connection, it is not necessary to separate the two halves of the connector. Unless testing a Weather Pack® connector, always probe the connector from the back. Always check both sides of the connector. An accumulation of dirt and corrosion between contact surfaces is sometimes a cause of electrical problems. A terminal contact checking procedure can be found on page 8A-4-6.

#### CONNECTOR TEST ADAPTERS

Connector Test Adapter Kit (J 35616-A) is available for making tests and measurements at separated connectors. This kit contains an assortment of probes which mate with many of the types of terminals you will see. Avoid using paper clips and other substitutes since they can damage terminals and cause incorrect measurements.

## **TROUBLESHOOTING PROCEDURES**

### **SELF-POWERED TEST LIGHT**

A self-powered test light (J 21008-A) can be used to check for continuity. This tool is made up of a light bulb, Battery and two leads. If the leads are touched together, the bulb will go on.

A self-powered test light is used only on an unpowered circuit. First remove the fuse which feeds the circuit you're working on. Select two specific points along the circuit through which there should be continuity. Connect one lead of the self-powered test light to each point. If there is continuity, the test light circuit will be completed and the bulb will go on.

Never use a self-powered test light on circuits that contain solid state components, since damage to these components may result.

### **OHMMETER**

An ohmmeter can be used instead of a self-powered test light. The ohmmeter shows how much resistance there is between two points along a circuit. Low resistance means good continuity.

Circuits which include any solid state control modules, such as the Engine Control Module (ECM), should be tested only with a 10-megohm or higher impedance digital multimeter (J 39200).

When measuring resistance with a DVM, the vehicle Battery should be disconnected. This will prevent incorrect readings. DVMs apply such a small voltage to measure resistance that the presence of voltages can upset a resistance reading.

Diodes and solid state components in a circuit can cause an ohmmeter to give a false reading. To find out if a component is affecting a measurement, take a reading once, reverse the leads and take a second reading. If the readings differ, the solid state component is affecting the measurement.

### **FUSED JUMPER WIRE**

A fused jumper (J 36169) is available with small clamp connectors providing adaptation to most connectors without damage. This fused jumper wire is supplied with a 20 amp fuse which may not be suitable for some circuits. Do not use a fuse with a higher rating than the fuse that protects the circuit being tested.

**NOTICE:** A fused jumper may not protect solid state components from being damaged.

### **SHORT FINDER**

Short Finders (J 8681-A) are available to locate hidden shorts to ground. The short finder creates a pulsing

magnetic field in the shorted circuit and shows you the location of the short through body trim or sheet metal.

### **FUSE TESTER**

A simple tester (J 34764) can detect a blown fuse. To check a fuse, the tester is applied directly to the fuse in the Fuse Block. Two probes contact the fuse, either into the slots of a flat fuse or to the metal ends of a glass fuse. With power on, a red LED in the tester lights if the fuse is open. The handle of the tester is a tool for removing either type of fuse.

## **TROUBLESHOOTING TESTS**

Always check for aftermarket accessories (non-OEM) as the first step in diagnosing electrical problems. If the vehicle is so equipped, disconnect the system to verify that these add-on accessories are not the cause of the problems.

Some possible causes of vehicle problems related to aftermarket accessories include:

1. Power feeds connected to points other than the Battery.
2. Antenna location.
3. Transceiver wiring located too close to vehicle electronic modules or wiring.
4. Poor shielding or poor connectors on antenna feed line.

Refer to 1990/1991 model year bulletin entitled, "Installation Guidelines for Aftermarket Accessories" for specific information.

### **PROBING**

After probing, when reconnecting connectors or replacing terminals, always be sure to reinstall Connector Position Assurance (CPA) and Terminal Position Assurance (TPA).

#### **Frontprobe**

When frontprobing of connectors is required, always use a mating terminal adapter from Connector Test Adapter Kit (J 35616-A). The use of proper adapters will ensure that proper terminal contact integrity is maintained. For a terminal contact checking procedure, refer to page 8A-4-6.

#### **Backprobe**

Only backprobe connector terminals when specifically called for in diagnostic procedures. Since backprobing can be a source of damage to connector terminals, extra care must be taken to avoid deforming the terminal, either by forcing the test probe too far into the cavity or by using too large a test probe.

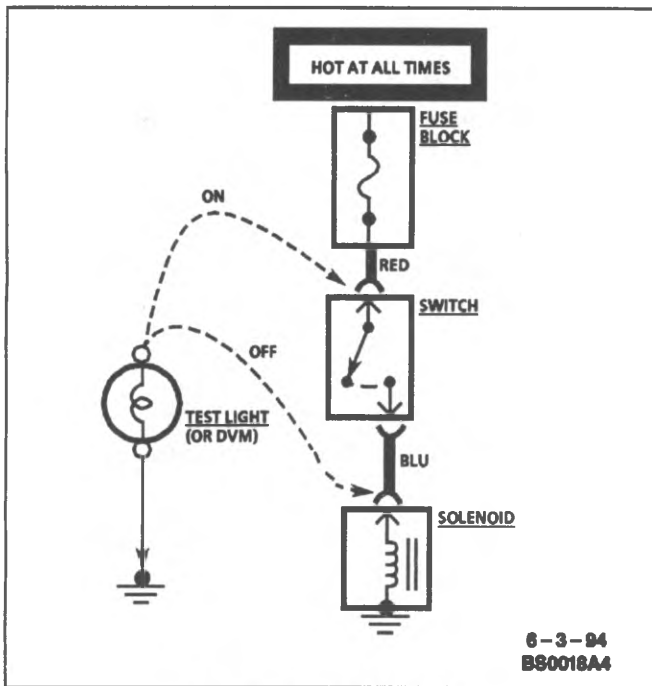


Figure 2—Voltage Check

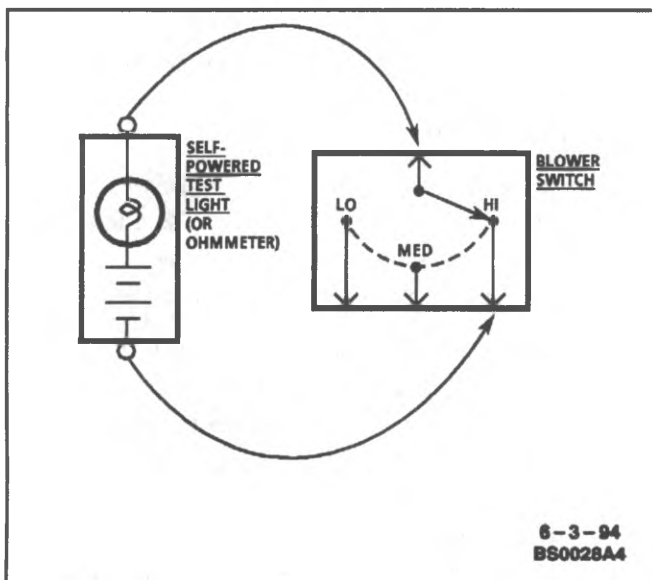


Figure 3—Continuity Check through a Switch

After backprobing any connector, always check for terminal damage. If terminal damage is suspected, check for proper terminal contact (refer to "Checking Terminal Contact," page 8A-4-6).

### TESTING FOR VOLTAGE (Figure 2)

1. Connect one lead of a test light to a known good ground. When using a DVM, be sure the voltmeter's negative lead is connected to ground.
2. Connect the other lead of the test light or voltmeter to a selected test point (connector or terminal).
3. If the test light illuminates, there is voltage present. When using a DVM, note the voltage reading.

### TESTING FOR CONTINUITY (Figure 3)

1. Remove the fuse to the circuit involved.
2. Connect one lead of a self-powered test light or ohmmeter to one end of the part of the circuit you wish to test.
3. Connect the other lead to the other end of the circuit.
4. If the self-powered test light glows, there is continuity. When using an ohmmeter, low or no resistance means good continuity.

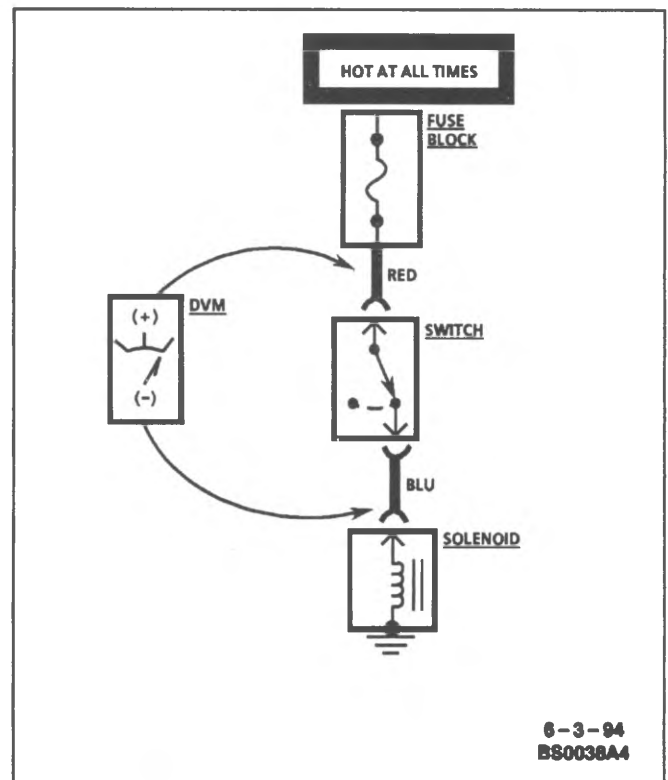


Figure 4—Voltage Drop Test

### TESTING FOR VOLTAGE DROP (Figure 4)

This test checks for voltage being lost along a wire, or through a connection or switch.

1. Connect the positive lead of a DVM to the end of the wire (or to one side of the connection or switch) which is closer to the Battery.
2. Connect the negative lead to the other end of the wire (or the other side of the connection or switch).
3. Operate the circuit.
4. The DVM will show the difference in voltage between the two points.

## TROUBLESHOOTING PROCEDURES

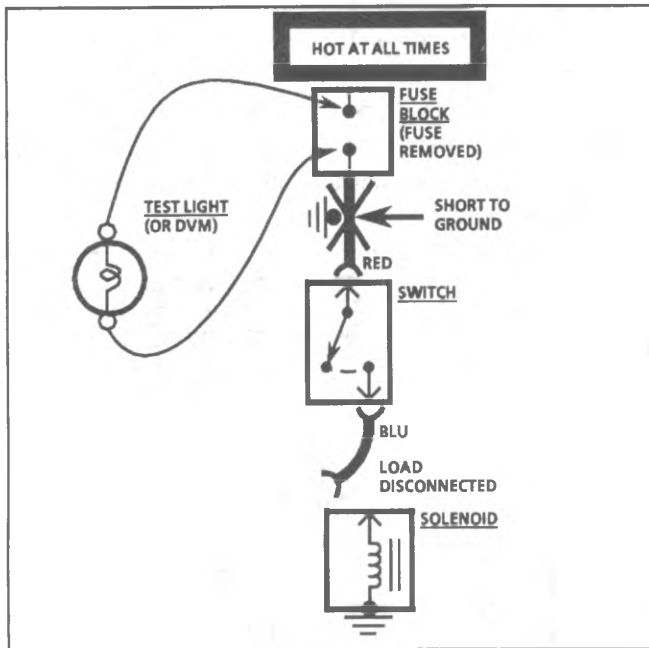


Figure 5 - Testing for Short with Test Light or DVM

## TESTING FOR SHORT TO GROUND

## With a Test Light or DVM (Figure 5)

1. Remove the blown fuse and disconnect the load.
2. Connect a test light or voltmeter across the fuse terminals (be sure that the fuse is powered).
3. Beginning near the Fuse Block, wiggle the harness from side to side. Continue this at convenient points (about 6 inches apart) while watching the test light or DVM.
4. When the test light glows, or the DVM registers, there is a short to ground in the wiring near that point.

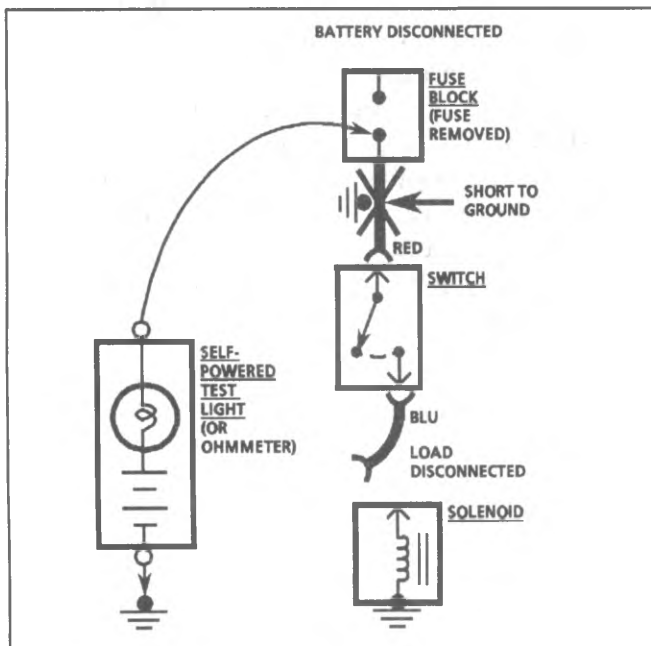


Figure 6—Test for Short wSelf-Powered Test Light or Ohmmeter

## With a Self-Powered Test Light or Ohmmeter (Figure 6)

1. Remove the blown fuse and disconnect the Battery and load.
2. Connect one lead of a self-powered test light or ohmmeter to the fuse terminal on the load side.
3. Connect the other lead to a known good ground.
4. Beginning near the Fuse Block, wiggle the harness from side to side. Continue this at convenient points (about 6 inches apart) while watching the self-powered test light or ohmmeter.
5. When the self-powered test light glows, or the ohmmeter registers, there is a short to ground in the wiring near that point.

## Fuses Powering Several Loads

1. Find the schematic in "Fuse Block Details," page 8A-11-0, for the fuse that has blown.
2. Open the first connector or switch leading from the fuse to each load.
3. Replace the fuse.
  - If the fuse blows, the short is in the wiring leading to the first connector or switch. Use a test light or meter as described on previous page.
  - If fuse does not blow, refer to next step.
4. Close each connector or switch until the fuse blows in order to find which circuit has the short. Connect test lamp or meter at the connector to the suspect circuit (disconnected) rather than at the fuse terminals.

## JUMP STARTING PROCEDURE

Refer to SECTION 6D-1 for jump starting procedure.

## INTERMITTENT AND POOR CONNECTIONS

Most intermittents are caused by faulty electrical connections or wiring, although occasionally a sticking relay or solenoid can be a problem. Some items to check are:

- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.

- Improperly formed or damaged terminals. All connector terminals in problem circuits should be checked carefully to ensure good contact tension. Use a corresponding mating terminal to check for proper tension. Refer to "Checking Terminal Contact" in this section for the specific procedure.
- The J 35616-A Connector Test Adapter Kit must be used whenever a diagnostic procedure requests checking or probing a terminal. Using the adapter will ensure that no damage to the terminal will occur, as well as giving an idea of whether contact tension is sufficient. If contact tension seems incorrect, refer to "Checking Terminal Contact" in this section for specifics.
- Poor terminal-to-wire connection. Some conditions which fall under this description are poor crimps, poor solder joints, crimping over wire insulation rather than the wire itself, corrosion in the wire-to-terminal contact area, etc.
- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wiring broken inside the insulation. This condition could cause a continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand type wire are intact, resistance could be far too high.

To avoid any of the above problems when making wiring or terminal repairs, always follow the instructions for wiring and terminal repair outlined in SECTION 8A-5.

## CHECKING TERMINAL CONTACT

When diagnosing an electrical system that utilizes Metri-Pack 150/280/480/630 series terminals (refer to Terminal Repair Kit, J 38125-A, instruction manual, J 38125-4 for terminal identification), it is important to check terminal contact between a connector and component, or between in-line connectors, before replacing a suspect component.

Frequently, a diagnostic chart leads to a step that reads: "Check for poor connection." Mating terminals must be inspected to assure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination is caused by the connector halves being improperly connected, a missing or damaged connector seal, or damage to the connector itself, exposing the terminals to moisture and dirt. Contamination, usually in underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter, improperly joining the connector halves or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact (see Figure 7), causing an open or intermittently open circuit.

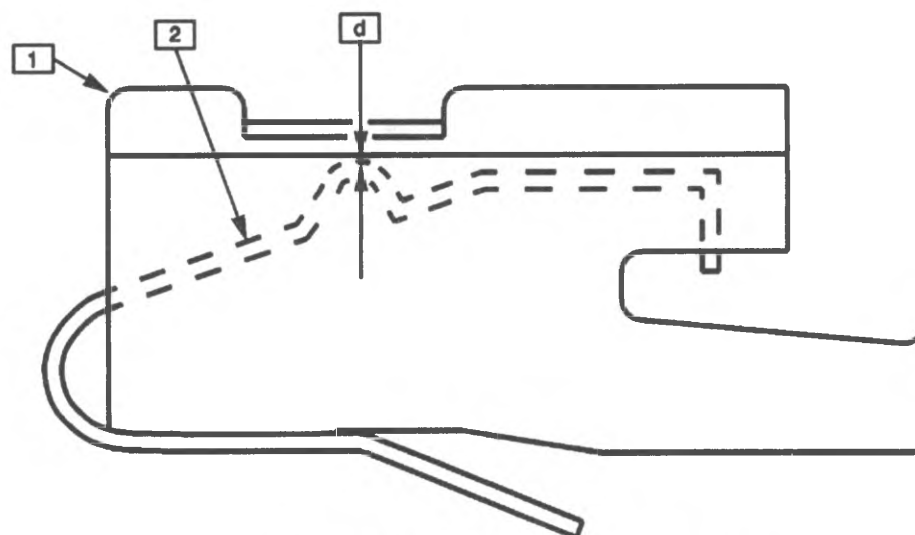
Follow the procedure below to check terminal contact.

1. Separate the connector halves. Refer to Terminal Repair Kit, J 38125-A, instruction manual, J 38125-4.
2. Inspect the connector halves for contamination. Contamination will result in a white or green build-up within the connector body or between terminals, causing high terminal resistance, intermittent contact or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals and connector body.
3. Using an equivalent male terminal from the Terminal Repair Kit, J 38125-A, check the retention force of the female terminal in question by inserting and removing the male terminal to the female terminal in the connector body. Good terminal contact will require a certain amount of force to separate the terminals.
4. Using an equivalent female terminal from the Terminal Repair Kit, J 38125-A, compare the retention force of this terminal to the female terminal in question by joining and separating the male terminal to the good female terminal, and then joining and separating the male terminal to the female terminal in question. If the retention force is significantly different between the two female terminals, replace the female terminal in question (refer to Terminal Repair Kit, J 38125-A).

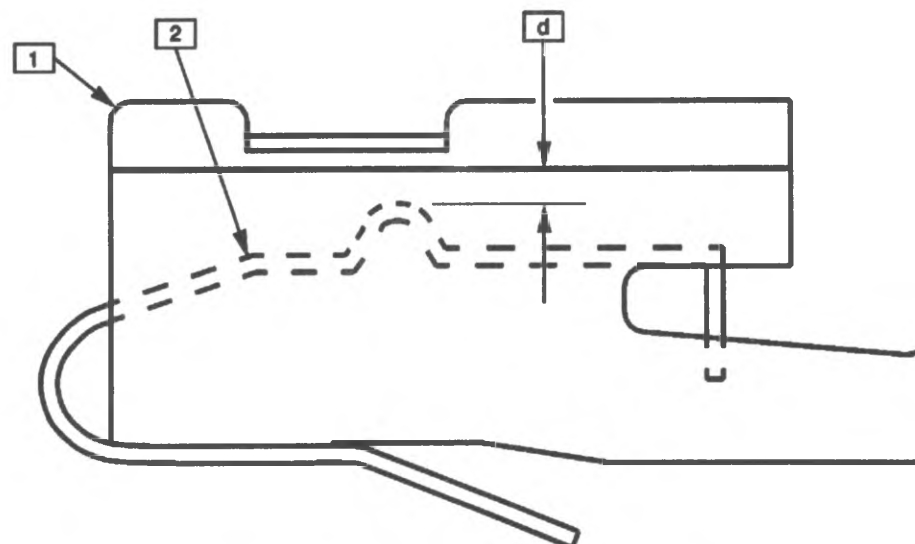
If a visual (physical) check does not reveal the cause of the problem, the vehicle may be able to be driven with a DVM connected to the suspected circuit. An abnormal voltage reading when the problem occurs indicates the problem may be in that circuit.



## TROUBLESHOOTING PROCEDURES



d ABOUT EQUAL TO 0, GOOD TERMINAL CONTACT



d MUCH GREATER THAN 0, POOR TERMINAL CONTACT

- 1** TYPICAL METRI-PACK 150/280/480/630 SERIES FEMALE TERMINAL  
(150 SERIES PUSH-TO-SEAT SHOWN)
- 2** CONTACT TANG
- d** AMOUNT OF DEFORMATION

Figure 7 - Deformation of a Typical Metri-Pack 150/280/480/630 Series Female Terminal

## DETECTING ELECTRICAL INTERMITTENTS

Use the following procedure to detect intermittent terminal contact or a broken wire with an intermittent connection inside the insulation.

The J 39200 Digital Multimeter has the ability to monitor current, resistance, or voltage while recording the minimum (MIN) and maximum (MAX) values measured. The meter can also be set to display the average (AVG) value measured.

When diagnosing circuits that have voltage applied, use the voltage setting to monitor a connector (or length of a circuit) which is suspected of having an intermittent connection but is currently operating normally.

1. Connect the J 39200 Digital Multimeter to both sides of a suspect connector (still connected) or from one end of a suspect circuit to the other. This will continuously monitor the terminal contacts or length of wire being checked. See "Meter Connections" for examples of the various methods for connecting the meter to the circuit.
2. Set the meter for voltage. Since the "MIN MAX" mode does not use auto ranging, manually select the voltage range necessary before proceeding.
3. Press the "MIN MAX" button. The meter should read "100 ms RECORD" (100 millisecond record) and emit a 1/4 second beep. The meter is now ready to record and will generate an audible tone for any change in voltage. At this point, you may wish to press the "PEAK MIN MAX" button, which will record any voltage variations that occur for at least 1 millisecond.
4. Try to simulate the condition that is potentially causing an intermittent connection, either by wiggling connections or wiring, test driving or performing other operations. If an open or resistance is created, a voltage will be present and the meter will emit a tone for as long as the open or resistance exists. Any change in voltage will cause the meter to emit a tone for no less than 1/4 second. (Listening for a tone while manipulating wiring is very helpful for narrowing down an intermittent connection.)

Use the MIN and MAX values when the meter is out of sight or sound range, in noisy areas or for test driving when it may not be possible to monitor the meter.

To check the MIN and MAX recorded voltages press "MIN MAX" once for MAX and twice for MIN. A variation between MIN and MAX recorded voltages (unless nearly 0 volts) suggests an intermittent open or that resistance exists and should be repaired as necessary. Refer to SECTION 8A-5 of any current GM Service Manual for approved repair procedures.

## Important:

- The "100 ms RECORD" (100 millisecond record) mode is NOT the amount of time allowed to perform a specific procedure. It is the amount of time used to record each snapshot of information used for calculating "AVG" when in the "MIN MAX" mode.

## METER CONNECTIONS

The previous diagnostic procedure was written to detect intermittents using the meter set to voltage. Whether using the current, voltage or resistance setting to detect intermittents, it is necessary to connect the meter to the circuit.

Following are examples of the various methods of connecting the meter to the circuit to be checked:

- Backprobe both ends of the connector and either hold the leads in place while manipulating the connector or tape the leads to the harness for continuous monitoring while performing other operations or test driving. (Do not backprobe "Weather Pack®" type connectors.)
- Disconnect the harness at both ends of the suspect circuit where it connects either to a component or to other harnesses.
- Use Connector Test Adapter Kit J 35616-A to connect the meter to the circuit.
- If the system being diagnosed has a specified pinout or breakout box, it may be used to simplify connecting the meter to the circuit or for checking multiple circuits quickly.

## ADDITIONAL INFORMATION

**NOTICE:** Turn off power to the test circuit before attempting in-circuit resistance measurements to prevent false readings or damage to the meter. Do not use the meter to measure resistance through a solid state module.

Continuity tests that work well for detecting intermittent shorts to ground can be performed by setting the meter to "ohms" then pressing the "PEAK MIN MAX" button. An audible tone will be heard whenever the meter detects continuity for at least 1 millisecond.

The J 39200 Instruction Manual is a good source of information and should be read thoroughly upon receipt of the meter as well as kept on hand for reference during new procedures.

## REPAIR PROCEDURES

### ELECTRICAL REPAIRS

This section provides instruction in the following repairs:

- Circuit Protection
- Typical Electrical Repairs
- Splicing Copper Wire
- Splicing Twisted/Shielded Cable
- Repairing Connectors (Except Weather Pack®)
- Repairing Weather Pack® (Environmental) Connectors
- Terminal Repair

After any electrical repair is made, always test the circuit afterwards by operating the devices in the circuit. This confirms not only that the repair is correct but, also, that it was the cause of the complaint.

### CIRCUIT PROTECTION

The purpose of circuit protection is to protect the wiring assembly during normal and overload conditions. An overload is defined as a current requirement that is higher than normal. This overload could be caused by a short circuit or system malfunction. The short circuit could be the result of a pinched or cut wire or an internal device short circuit, such as an electronic module failure.

The circuit protection device is only applied to protect the wiring assembly, and not the electrical load at the end of the assembly. For example, if an electronic component short circuits, the circuit protection device will assure a minimal amount of damage to the wiring assembly. However, it will not necessarily prevent damage to the component.

### CIRCUIT PROTECTION DEVICES

There are three basic types of circuit protection devices: Circuit Breaker, Fuse and Fusible Link.

### CIRCUIT BREAKERS

A circuit breaker is a protective device designed to open the circuit when a current load is in excess of rated breaker capacity. If there is a short or other type of overload condition in the circuit, the excessive current will open the circuit between the circuit breaker terminals. There are two basic types of circuit breakers used in GM vehicles: cycling and non-cycling.

#### CYCLING CIRCUIT BREAKER

The cycling breaker will open due to heat generated when excessive current passes through it for a period of time. Once the circuit breaker cools, it will close again after a few seconds. If the cause of the high current is still present it will open again. It will continue to cycle open and closed until the condition causing the high current is removed.

#### NON-CYCLING CIRCUIT BREAKER

There are two types of non-cycling circuit breakers. One type is mechanical and is nearly the same as a cycling breaker. The difference is a small heater wire within the non-cycling circuit breaker. This wire provides enough heat to keep the bimetallic element open until the current source is removed.

The other type is solid state, called out in this section as Electronic Circuit Breaker (ECB). This device has a Positive Temperature Coefficient. It increases its resistance greatly when excessive current passes through it. The excessive current heats the ECB. As it heats, its resistance increases, therefore having a Positive Temperature Coefficient. Eventually the resistance gets so high that the circuit is effectively open. The ECB will not reset until the circuit is opened, removing voltage from its terminals. Once voltage is removed, the circuit breaker will re-close within a second or two.

### FUSES

The most common method of automotive wiring circuit protection is the fuse (Figure 1). A fuse is a device that, by the melting of its element, opens an electrical circuit when the current exceeds a given level for a sufficient time. The

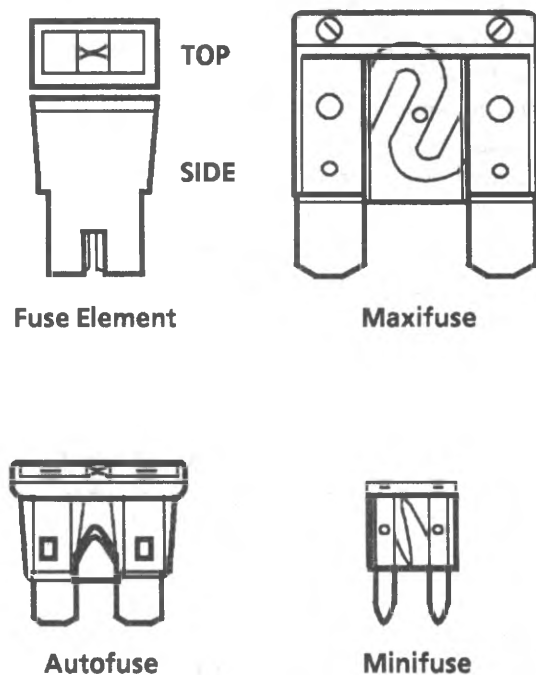


Figure 1 - Fuse Devices

AUTOFUSE

CURRENT RATING	COLOR
3	VIOLET
5	TAN
7.5	BROWN
10	RED
15	BLUE
20	YELLOW
25	NATURAL
30	GREEN

MAXIFUSE

CURRENT RATING	COLOR
20	YELLOW
30	GREEN
40	AMBER
50	RED
60	BLUE
70	BROWN
80	NATURAL

MINIFUSE

CURRENT RATING	COLOR
5	TAN
7.5	BROWN
10	RED
15	BLUE
20	YELLOW
25	NATURAL
30	GREEN

PACIFIC FUSE ELEMENT

CURRENT RATING	COLOR
30	PINK
40	GREEN
50	RED
60	YELLOW

action is non-reversible and the fuse must be replaced each time a circuit is overloaded or after a malfunction is repaired.

Fuses are color coded. The standardized color identification and ratings are shown in Figure 2. For service replacement, non-color coded fuses of the same respective current rating can be used.

Examine a suspect fuse for a break in the element. If the element is broken or melted, replace the fuse with one of equal current rating.

There are additional specific circuits with in-line fuses. These fuses are located within the individual wiring harness and will appear to be an open circuit if blown.

### AUTOFUSE

The Autofuse, normally referred to simply as "Fuse," is the most common circuit protection device in today's vehicle. The Autofuse is most often used to protect the wiring assembly between the Fuse Block and the system components.

### MAXIFUSE

The Maxifuse was designed to replace the fusible link and Pacific Fuse elements. The Maxifuse is designed to protect cables, normally between the battery and fuse block, from both direct short circuits and resistive short circuits.

Compared to a fusible link or a Pacific Fuse element, the Maxifuse performs much more like an Autofuse, although the average opening time is slightly longer. This is because the Maxifuse was designed to be a slower blowing fuse, with less chance of nuisance blows.

### MINIFUSE

The Minifuse is a smaller version of the Autofuse and has a similar performance. As with the Autofuse, the Minifuse is usually used to protect the wiring assembly between a fuse block and system components. Since the Minifuse is a smaller device, it allows for more system specific fusing to be accomplished within the same amount of space as Autofuses.

### PACIFIC FUSE ELEMENT/MAXIFUSE

The Pacific Fuse Element and Maxifuse were developed to be a replacement for the fusible link. Like a fusible link, the fuses are designed to protect wiring from a direct short to ground. These elements are easier to service and inspect than a fusible link and will eventually replace fusible links in all future vehicle applications.

Figure 2 - Fuse Rating and Color

## REPAIR PROCEDURES

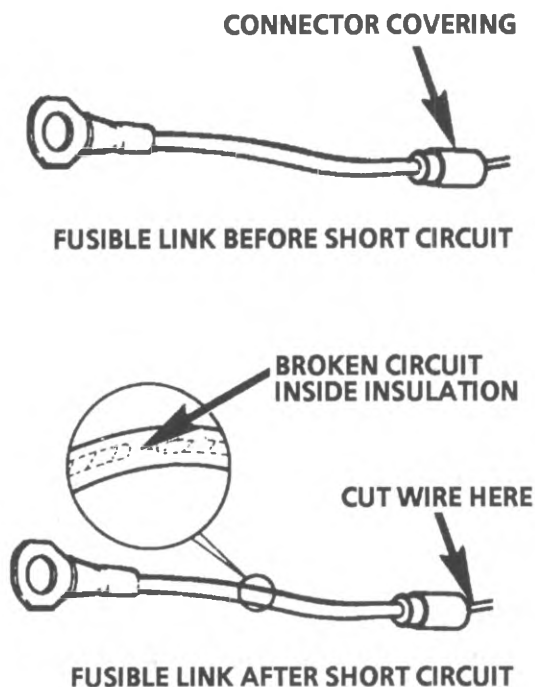
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Figure 3 - Good and Damaged Fusible Links

## FUSIBLE LINKS

In addition to circuit breakers and fuses, some circuits use fusible links to protect the wiring. Like fuses, fusible links are "one-time" protection devices that will melt and create an open circuit (see Figure 3).

Not all fusible link open circuits can be detected by observation. Always inspect that there is battery voltage past the fusible link to verify continuity.

Fusible links are used instead of a fuse in wiring circuits that are not normally fused, such as the ignition circuit. For AWG sizes, each fusible link is four wire gage sizes smaller than the wire it is designed to protect. For example: to protect a 10 gage wire use a 14 gage link or for metric, to protect a 5 mm<sup>2</sup> wire use a 2 mm<sup>2</sup> link (see Figure 6). Links are marked on the insulation with wire-gage size because the heavy insulation makes the link appear to be a heavier gage than it actually is. The same wire size fusible link must be used when replacing a blown fusible link.

Fusible links are available with three types of insulation: Hypalon®, Silicone/GXL (SIL/GXL) and Expanded Duty. All future vehicles that use fusible links will utilize the Expanded Duty type of fusible link. When servicing fusible links, all fusible links can be replaced

with the Expanded Duty type. SIL/GXL fusible links can be used to replace either SIL/GXL or Hypalon® fusible links. Hypalon® fusible links can only be used to replace Hypalon® fusible links.

Determining characteristics of the types of fusible links are:

- Hypalon® (limited use): only available in .35 mm<sup>2</sup> or smaller and its insulation is one color all the way through.
- SIL/GXL (widely used): available in all sizes and has a white inner core under the outer color of insulation.
- Expanded Duty: available in all sizes, has an insulation that is one color all the way through and has three dots following the writing on the insulation.

Service fusible links are available in many lengths. Choose the shortest length that is suitable. If the fusible link is to be cut from a spool, it should be cut 150-225 mm (approx. 6-9 in.) long. NEVER make a fusible link longer than 225 mm (approx. 9 in.).

**CAUTION: Fusible links cut longer than 225 mm (approx. 9 in.) will not provide sufficient overload protection.**

To replace a damaged fusible link (Figure 4), cut it off beyond the splice. Replace with a repair link. When

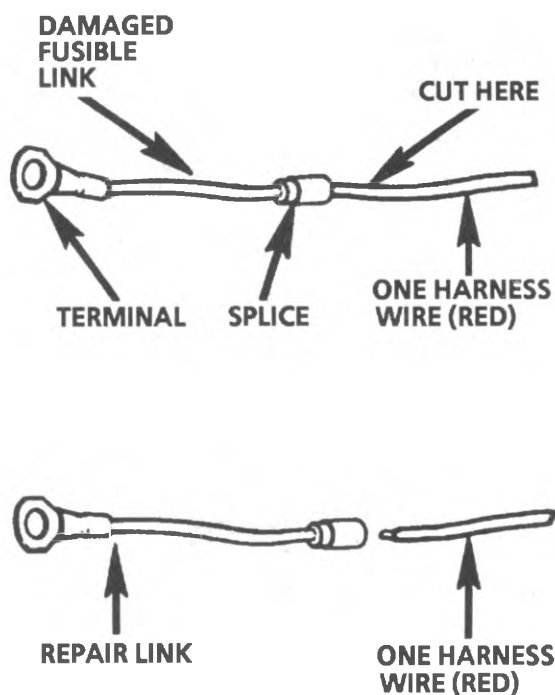
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Figure 4 - Single Wire Feed Fusible Link

connecting the repair link, strip wire and use staking-type pliers to crimp the splice securely in two places. For more details on splicing procedures, see "Splicing Copper Wire." Use crimp and seal splices whenever possible. When using splice clips, refer to page 8A-5-3; when using crimp and seal splice sleeves, refer to page 8A-5-6.

To replace a damaged fusible link which feeds two harness wires, cut them both off beyond the splice. Use two repair links, one spliced to each harness wire (see Figure 5).

## TYPICAL ELECTRICAL REPAIRS

An open circuit is an incomplete circuit. Power cannot reach the load or reach ground. If a circuit is open, active components do not energize. A short circuit is an unwanted connection between one part of the circuit and either ground or another part of the circuit. A short circuit causes a fuse to blow or a circuit breaker to open.

### SHORT CIRCUITS CAUSED BY DAMAGED WIRE INSULATION

- Locate the damaged wire.
- Find and correct the cause of the wire insulation damage.
- For minor damage, tape over the wire. If damage is more extensive, replace the faulty segment of the wire (refer to the splicing instructions for copper or shielded cable for the correct splicing procedure).

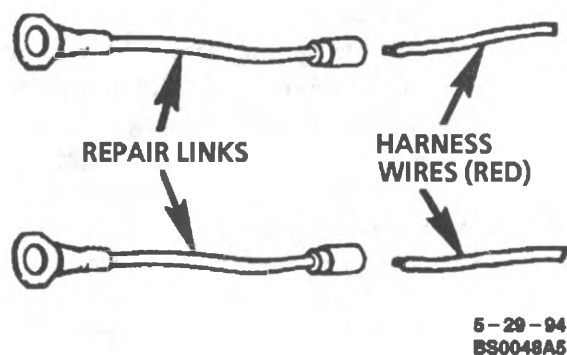
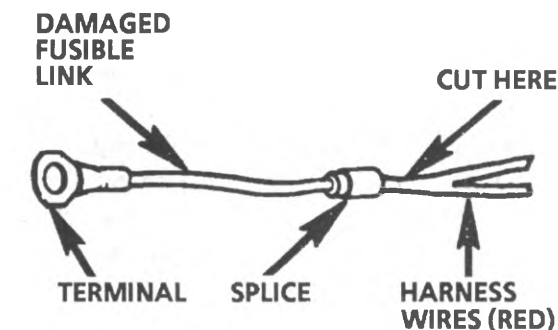


Figure 5 - Double Wire Feed Fusible Link

## SPLICING COPPER WIRE USING SPLICE CLIPS

Splice clips are included in the J 38125-A Terminal Repair Kit. The splice clip is a general purpose wire repair device. It may not be acceptable for applications having special requirements such as moisture sealing. Refer to the appropriate Service Manual section to determine if there are any special requirements.

### Step 1: Open the Harness

If the harness is taped, remove the tape. To avoid wire insulation damage, use a sewing "seam ripper" to cut open the harness (available from sewing supply stores). If the harness has a black plastic conduit, simply pull out the desired wire.

### Step 2: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of the wire later if you decide to cut more wire off to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5 in.) away from other splices, harness branches or connectors.

### Step 3: Strip the Insulation

When replacing a wire, use a wire of the same size as the original wire or larger. The schematics list wire size in metric units. The following table (Figure 6) shows the commercial (AWG) wire sizes that can be used to replace each metric wire size. Each AWG size is either equal to or larger than the equivalent metric size.

To find the correct wire size either find the wire on the schematic page and convert the metric size to the AWG size, or use an AWG wire gage.

If you aren't sure of the wire size, start with the largest opening in the wire stripper and work down until a clean strip of the insulation is removed. Be careful to avoid nicking or cutting any of the wires.

METRIC WIRE SIZES (mm <sup>2</sup> )	AWG SIZES
.22	24
.35	22
.5	20
.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

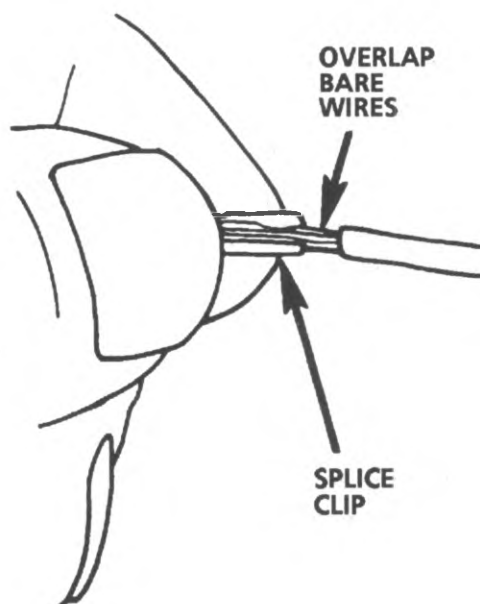
Figure 6 - Wire Size Conversion Table

## REPAIR PROCEDURES

**Step 4: Crimp the Wires**

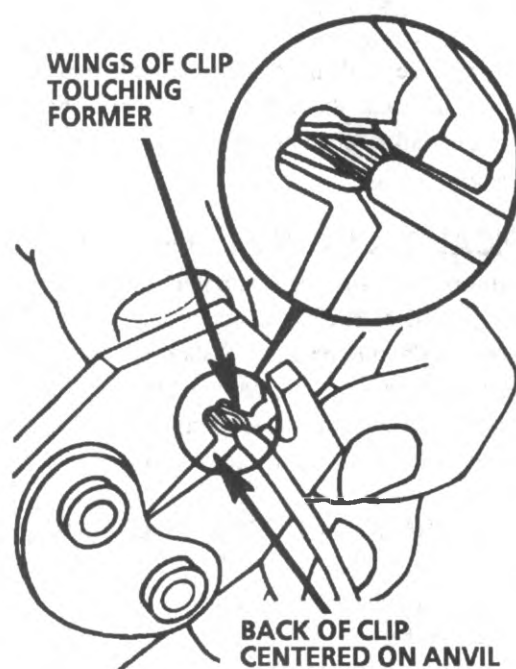
Select the proper clip to secure the splice. To determine the proper clip size for the wire being spliced, follow the directions included in the J 38125-A Terminal Repair Kit. Select the correct anvil on the crimper. (On most crimpers your choice is limited to either a small or large anvil.) Overlap the stripped wire ends and hold them between your thumb and forefinger as shown in Figure 7. Then, center the splice clip under the stripped wires and hold it in place.

- Open the crimping tool to its full width and rest one handle on a firm flat surface.
- Center the back of the splice clip on the proper anvil and close the crimping tool to the point where the former touches the wings of the clip.
- Make sure that the clip and wires are still in the correct position. Then, apply steady pressure until the crimping tool closes (see Figure 8).



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Figure 7 - Centering the Splice Clip



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Figure 8 - Crimping the Splice Clip

- Before crimping the ends of the clip, be sure that:
  - The wires extend beyond the clip in each direction.
  - No strands of wire are cut loose.
  - No insulation is caught under the clip.

Crimp the splice again, once on each end. Do not let the crimping tool extend beyond the edge of the clip or you may damage or nick the wires (see Figure 9).

**Step 5: Solder**

Apply 60/40 rosin core solder to the opening in the back of the clip (see Figure 10). Follow the manufacturer's instruction for the solder equipment you are using.

**Step 6: Tape the Splice**

Center and roll the splicing tape. The tape should cover the entire splice. Roll on enough tape to duplicate the thickness of the insulation on the existing wires. Do not flag the tape. Flagged tape may not provide enough insulation, and the flagged ends will tangle with the other wires in the harness (see Figure 11).

If the wire does not belong in a conduit or other harness covering, tape the wire again. Use a winding motion to cover the first piece of tape (Figure 12).

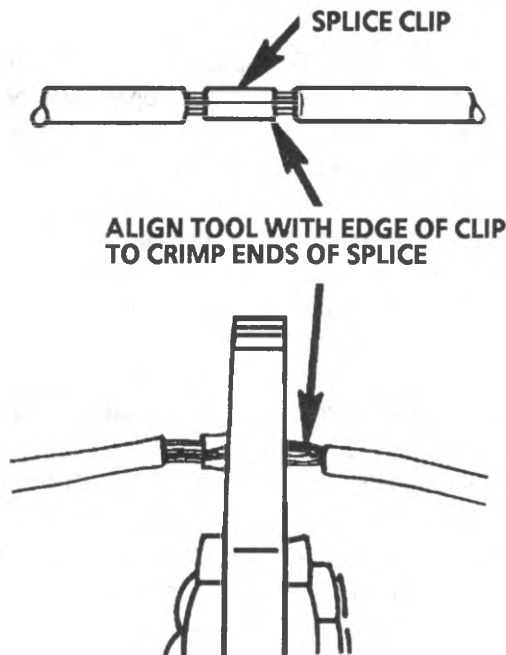
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Figure 9 - Completing the Crimp

### SPLICING COPPER WIRE USING CRIMP AND SEAL SPLICE SLEEVES

Crimp and seal splice sleeves may be used on all types of insulation except Tefzel and coaxial to form a one-to-one splice. They are to be used where there are special requirements such as moisture sealing. Refer to the appropriate section of the Service Manual to determine if the crimp and seal is necessary. Crimp and seal splice sleeves are included in the J 38125-A Terminal Repair Kit.

#### Step 1: Open the Harness

If the harness is taped, remove the tape. To avoid wire insulation damage, use a sewing "seam ripper" to cut open the harness (available from sewing supply stores). The crimp and seal splice sleeves may be used on all types of insulation except Tefzel and coaxial and may only be used to form a one-to-one splice.

#### Step 2: Cut the Wire

Begin by cutting as little wire off the harness as possible. You may need the extra length of wire later if you decide to cut more wire to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40 mm (1.5 in.) away from other splices, harness branches or connectors. This will help prevent moisture from bridging adjacent splices and causing damage.



Figure 10 - Applying the Solder

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Figure 11 - Proper First Taping

#### Step 3: Strip the Insulation

If it is necessary to add a length of wire to the existing harness, be certain to use the same size as the original wire (refer to Figure 6, "Wire Size Conversion Table").

To find the correct wire size either find the wire on the schematic and convert the metric size to the equivalent



## REPAIR PROCEDURES



TAPE AGAIN IF NEEDED

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Figure 12 - Proper Second Taping

AWG size or use an AWG wire gage. If unsure about the wire size, begin with the largest opening in the wire stripper and work down until a clean strip of the insulation is removed. Strip approximately 7.5 mm (5/16 in.) of insulation from each wire to be spliced. Be careful to avoid nicking or cutting any of the wires. Check the stripped wire for nicks or cut strands. If the wire is damaged, repeat this procedure after removing the damaged section.

**Step 4: Select and Position the Splice Sleeve**

Select the proper splice sleeve according to wire size. The splice sleeves and tool nests are color coded (see following chart).

**CRIMP AND SEAL SPLICE SLEEVE CHART**

Color splice sleeve	Crimp tool nest color	Wire gage AWG/(metric)
Salmon (yellowish-pink)	Red	20, 18/(0.5, 0.8)
Blue	Blue	16, 14/(1.0, 2.0)
Yellow	Yellow	12, 10/(3.0, 5.0)

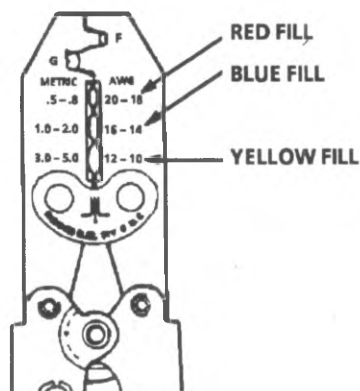
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Figure 13 - Hand Crimp Tool

Using the J 38125-8 splice crimp tool (Figure 13), position the splice sleeve in the proper color nest of the hand crimp tool. Place the splice sleeve in the nest so that the crimp falls midway between the end of the barrel and the stop.

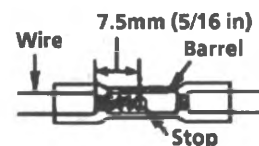
The sleeve has a stop in the middle of the barrel to prevent the wire from going further (see Figure 14). Close the hand crimper handles slightly to hold the splice sleeve firmly in the proper nest.

**Step 5: Insert Wires into Splice Sleeve and Crimp**

Insert the wire into the splice sleeve until it hits the barrel stop and close the handles of the J 38125-8 crimper tightly until the crimper handles open when released. The crimper handles will not open until the proper amount of pressure is applied to the splice sleeve. Repeat steps 4 and 5 for opposite end of the splice.

**Step 6: Shrink the Insulation Around the Splice**

Using the Ultratorch J 38125-5 (follow instructions that accompany Ultratorch), apply heat where the barrel is crimped. Gradually move the heat barrel to the open end of the tubing, shrinking the tubing completely as the heat is moved along the insulation. A small amount of sealant will come out of the end of the tubing when sufficient shrinking is achieved (Figure 14).



a. Splice before crimping



b. Splice after crimping



c. Splice after heating

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Figure 14 - Seal Splice Sequence

## SPLICING TWISTED/SHIELDED CABLE

Twisted/shielded cable is sometimes used to protect wiring from electrical noise (stray signals). For example, two-conductor cable of this construction is used between the ECM and the distributor. See Figure 15 for a breakdown of twisted/shielded cable construction.

### Step 1: Remove Outer Jacket

Remove the outer jacket and discard it. Be careful to avoid cutting into the drain wire or the mylar tape.

### Step 2: Unwrap the Tape

Unwrap the aluminum/mylar tape, but do not remove it. The tape will be used to rewrap the twisted conductors after the splices have been made.

### Step 3: Prepare the Splice

Untwist the conductors. Then, prepare the splice by following the splicing instructions for copper wire presented earlier. Remember to stagger splices to avoid shorts (Figure 16).

### Step 4: Re-assemble the Cable

After you have spliced and taped each wire, rewrap the

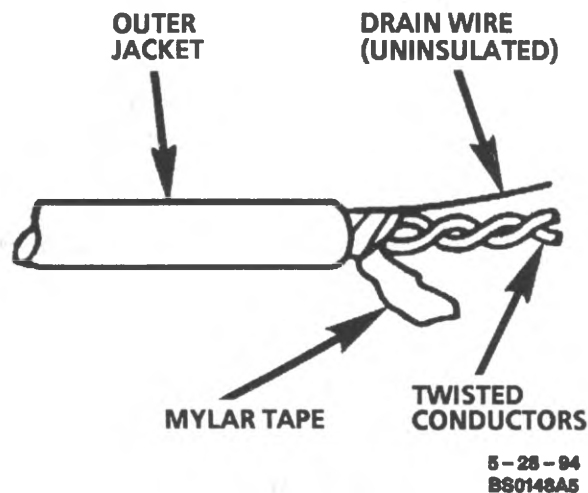


Figure 15 - Twisted/Shielded Cable



Figure 16 - The Untwisted Conductors

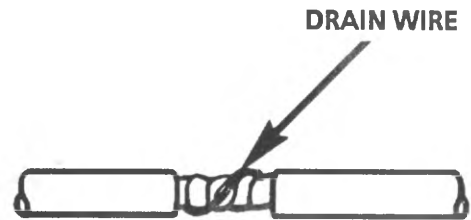


Figure 17 - The Re-assembled Cable

conductors with the mylar tape. Be careful to avoid wrapping the drain wire in the tape.

Next, splice the drain wire following the splicing instructions for copper wire. Then, wrap the drain wire around the conductors and mylar tape (Figure 17).

### Step 5: Tape the Cable

Tape over the entire cable using a winding motion (see Figure 18). This tape will replace the section of the jacket you removed to make the repair.

## REPAIRING CONNECTORS

- The following general repair procedures can be used to repair most types of connectors. The repair procedures are divided into three general groups: Push-to-Seat and Pull-to-Seat and Weather Pack®.
- See "Harness Connector Faces," page 8A-202-0, to determine which type of connector is to be serviced.
- Use the proper Pick(s) or Tool(s) that apply to the terminal.
- The Terminal Repair Kit (J 38125-A) contains further information.

### PUSH-TO-SEAT AND PULL-TO-SEAT

Follow the steps below to repair Push-to-Seat (Figure 19) or Pull-to-Seat (Figure 20) connectors. The steps are



Figure 18 - Proper Taping

## REPAIR PROCEDURES

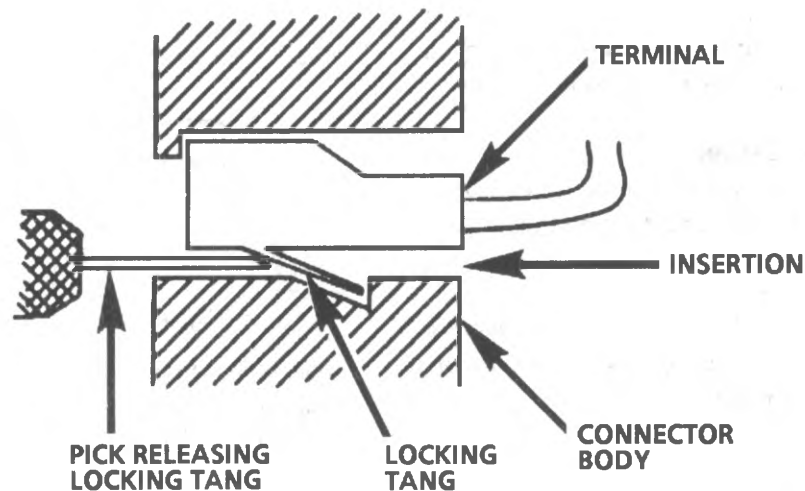
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Figure 19 - Typical Push-to-Seat Connector and Terminal

illustrated with typical connectors. Your connector may differ, but the repair steps are similar. Some connectors do not require all the steps shown. Skip those that don't apply.

**Step 1:**

Remove any CPA (Connector Position Assurance) Locks. CPAs are designed to retain connectors when mated.

**Step 2:**

Remove any TPA (Terminal Position Assurance) Locks. TPAs are designed to keep the terminal from backing out of the connector.

**NOTICE:** The TPA must be removed prior to terminal removal and must be replaced when the terminal is repaired and resealed.

**Step 3:**

Open any secondary locks. A secondary lock aids in terminal retention and is usually molded to the connector.

**Step 4:**

Separate the connector halves and back out seals.

**Step 5:**

Grasp the lead and push the terminal to the forward most position. Hold the lead at this position.

**Step 6:**

Locate the terminal lock tang in the connector canal.

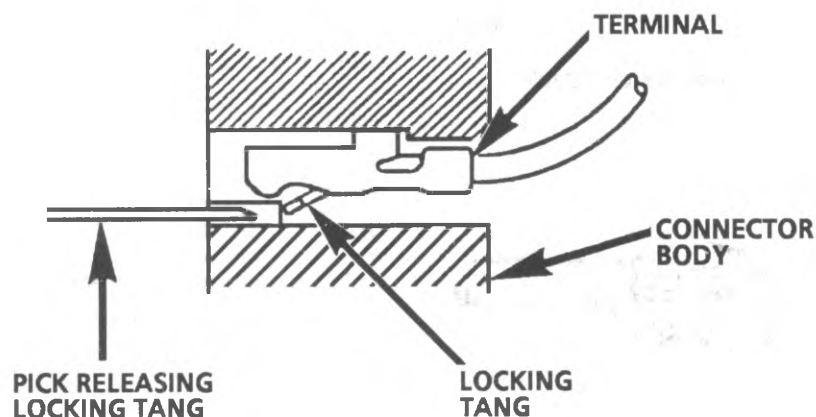
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Figure 20 - Typical Pull-to-Seat Connector and Terminal

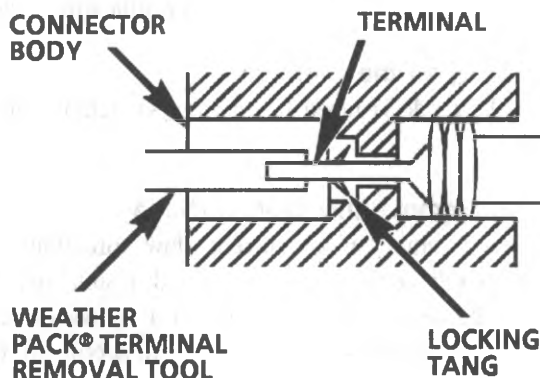
**Step 7:**

Insert the proper size pick (refer to Terminal Repair Kit J 38125-A) straight into the connector canal at the mating end of the connector.

**Step 8:**

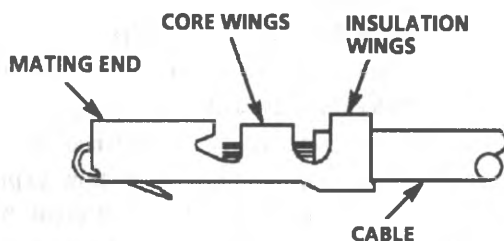
Depress the locking tang to unseat the terminal.

- Push-to-Seat—Gently pull on the lead to remove the terminal through the back of the connector.

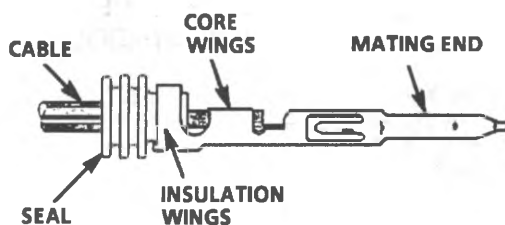


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Figure 21 - Typical Weather Pack® Connector and Terminal



TYPICAL PUSH-TO-SEAT TERMINAL



TYPICAL WEATHER PACK® TERMINAL

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Figure 22 - Terminal Repair

- Pull-to-Seat—Gently push on the lead to remove the terminal through the front of the connector.

**NOTICE:** Never use force to remove a terminal from a connector.

**Step 9:**

Inspect terminal and connector for damage. Repair as necessary (see "Terminal Repair," page 8A-5-11).

**Step 10:**

Reform lock tang and reseat terminal in connector body. Apply grease if connector was originally equipped with grease.

**Step 11:**

Install any CPAs or TPAs, close any secondary locks and join connector halves.

**WEATHER PACK®**

Follow the steps below to repair Weather Pack® connectors (Figure 21).

**Step 1:**

Separate the connector halves.

**Step 2:**

Open secondary lock. A secondary lock aids in terminal retention and is usually molded to the connector.

**Step 3:**

Grasp the lead and push the terminal to the forward most position. Hold the lead at this position.

**Step 4:**

Insert the Weather Pack® terminal removal tool into the front (mating end) of the connector cavity until it rests on the cavity shoulder.

**Step 5:**

Gently pull on the lead to remove the terminal through the back of the connector.

**NOTICE:** Never use force to remove a terminal from a connector.

**Step 6:**

Inspect the terminal and connector for damage. Repair as necessary (see "Terminal Repair," on the following page).

**Step 7:**

Re-form the lock tang and reseat terminal in connector body.

## REPAIR PROCEDURES

### Step 8:

Close secondary locks and join connector halves.

### TERMINAL REPAIR

The following repair procedures can be used to repair Push-to-Seat, Pull-to-Seat or Weather Pack® terminals (Figure 22). Some terminals do not require all steps shown. Skip those that don't apply. The Terminal Repair Kit (J 38125-A) contains further information.

### Step 1:

Cut off terminal between core and insulation crimp (minimize wire loss) and remove seal for Weather Pack® terminals.

### Step 2:

Apply correct seal per gauge size of wire and slide back along wire to enable insulation removal (Weather Pack® terminals only).

### Step 3:

Remove insulation.

### Step 4:

Align seal with end of cable insulation (Weather Pack® terminals only).

### Step 5:

Position strip (and seal for Weather Pack®) in terminal.

### Step 6:

Hand crimp core wings.

### Step 7:

Hand crimp insulation wings (non-Weather Pack®).

Hand crimp insulation wings around seal and cable (Weather Pack®).

### Step 8:

Solder all hand crimped terminals.

## DIODE REPLACEMENT

Many vehicle electrical systems use a diode to isolate circuits and protect the components from voltage spikes. When installing a new diode, use the following procedure:

### Step 1: Open the Harness

If the diode is taped to the harness, remove all of the tape.

### Step 2: Remove Inoperative Diode

Paying attention to current flow direction, remove inoperative diode from the harness with a suitable soldering tool. If the diode is located next to a connector terminal, remove the terminal(s) from the connector to prevent damage from the soldering tool.

### Step 3: Strip the Insulation

Carefully strip away a section of insulation next to the old soldered portion of the wire(s). Do not remove any more than is needed to attach the new diode.

### Step 4: Install New Diode

Check current flow direction of the new diode, being sure to install the diode with correct bias. Reference the appropriate service manual wiring schematic to obtain the correct diode installation position. Reference Figure 23 for replacement diode symbols and current flow explanations. Attach the new diode to the wire(s) using 60/40 rosin core solder. Use a heat sink (aluminum alligator clip) attached

### DIODE IDENTIFICATION MARKINGS

1. INDUSTRY STANDARD RATING NUMBER
2. TRADEMARK AND/OR PART NUMBER

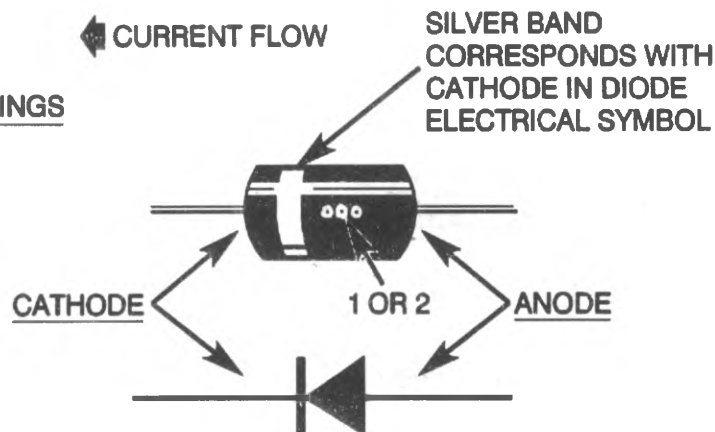


Figure 23 - Diode Identification

across the diode wire ends to protect the diode from excess heat. Follow the manufacturer's instructions for the soldering equipment you are using.

#### Step 5: Install Terminal(s)

Install terminal(s) into the connector body if previously removed in Step 2.

#### Step 6: Tape Diode to Harness

Tape the diode to the harness or connector using electrical tape. To prevent shorts to ground and water intrusion, completely cover all exposed wire and diode attachment points.

### ACCEPTABLE DIODE REPLACEMENTS

Diode Brand	Rating Number	Rating	P/N
GMSP0	1N4004	1 amp, 400 PIV	12112421
GMSP0	1N5404	3 amp, 400 PIV	12112422
GMSP0	1N4001	1 amp, 50 PIV	16020519
GMSP0	1N4005	1 amp, 600 PIV	16011840
GMSP0	1N4004	1 amp, 400 PIV	16039386

In the event 1 amp, 50 PIV (Peak Inverse Rating) diodes are unavailable, a universal diode with a 1 amp, 400 PIV rating can be used for the following applications:

- A/C Compressor Clutch
- ABS/4WAL (the ABS Diode on the Delco Moraine is hidden inside of an electrical connector under the carpet at the right panel)
- Wiper
- Charging System (hidden in wire harness)
- Parking Brake (vehicle with ABS)
- Relays
- Solenoids
- Diesel Glow Plug Circuit

### HEATED OXYGEN SENSOR (O2S) REPAIR

If the Heated Oxygen Sensor pigtail wiring, connector or terminal is damaged, the entire Oxygen Sensor Assembly must be replaced. Do not attempt to repair the wiring, connector or terminals. In order for the sensor to function properly, it must have provided to it a clean air reference. This clean air reference is obtained by way of the Oxygen Sensor signal and heater wires. Any attempt to repair the wires, connectors or terminals could result in the obstruction of the air reference and degraded Oxygen Sensor performance.

The following guidelines should be used when servicing the Heated Oxygen Sensor:

- Do not apply contact cleaner or other materials to the sensor or vehicle harness connectors. These materials may get into the sensor causing poor performance. Also, the sensor pigtail and harness wires must not be damaged in such a way that the wires inside are exposed. This could provide a path for foreign materials to enter the sensor and cause performance problems.
- Neither the sensor or vehicle lead wires should be bent sharply or kinked. Sharp bends, kinks, etc., could block the reference air path through the lead wire.
- Do not remove or defeat the Oxygen Sensor ground wire (where applicable). Vehicles that utilize the ground wired sensor may rely on this ground as the only ground contact to the sensor. Removal of the ground wire will also cause poor engine performance.
- To prevent damage due to water intrusion, be sure that the peripheral seal remains intact on the vehicle harness connector.

The Engine Harness may be repaired using Packard's Crimp and Splice Seals Terminal Repair Kit J 38125-A. Under no circumstances should repairs be soldered since this could result in the air reference being obstructed.

#### GMSP0 Standard Parts Catalog

Check the GMSP0 Standard Parts Catalog, Group 8.965. Fuses, circuit breakers, connectors, terminals, conduit, pigtail kits, and seals are listed in that group.

#### GMSP0 Carline Parts Catalog

The GMSP0 Carline Parts Catalog, Group 2.535 contains connector repair kits with terminals and leads.

#### Complete Harness

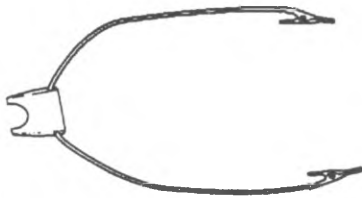
Complete harnesses should only be ordered when there is major damage to the wiring harness. Minor damage should always be repaired. Complete harness part numbers can be found in the GMSP0 Carline Parts Catalog.

#### Parts Ordering

1. If you can't find the repair parts you need in the J 38125-A Terminal Repair Kit, GMSP0 Standard Parts Catalog, or the GMSP0 Carline Parts Catalog, refer to Section 8A-202 (Harness Connector Faces) to find a listing of the OE part number(s).
2. Call PARTECH (1-800-433-6961) and give the PARTECH advisor the OE part number(s). The PARTECH advisor can determine if there is a GMSP0 part number(s) for the OE part number(s).

## REPAIR PROCEDURES

3. If PARTECH cannot find a GMSPO part number, call the Service Parts Assistance Center (SPAC) with the OE part number(s). The SPAC advisor will assist you in placing a priority order using the "No Part Number" process with the Packard Electric Division. The SPAC advisor may have you place the order with the Packard Electric Division (1-800-PACKARD). Parts are typically shipped within 24 hours direct to your dealership.



**J 36169**  
Jumper Wire



**J 35689 - A**  
Micro-Pack Connector  
Terminal Remover



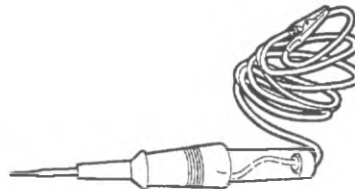
**J 34636**  
Solenoid, Relay  
and Circuit Tester



**J 35616 - A**  
Connector Test Adapter Kit



**J 28742 - A**  
Weather Pack II Terminal Remover



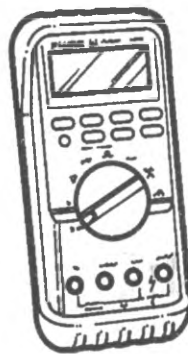
**J 34142 - B**  
Unpowered Test Light



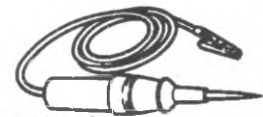
**J 8681 - A**  
Universal Short Checker



**J 22727**  
Electrical Terminal Remover



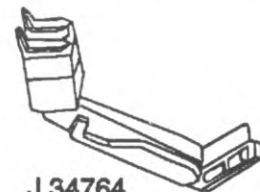
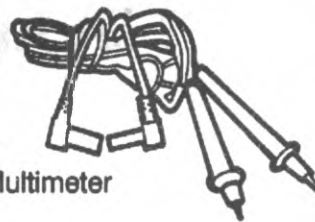
**J 39200**  
Digital Multimeter



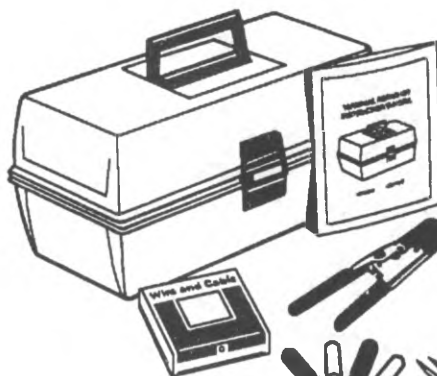
**J 21008 - A**  
Self-Powered Test Light



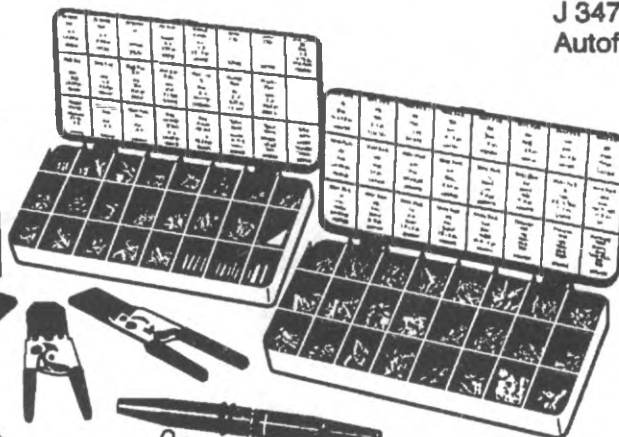
**J 33095**  
Terminal Remover: Micro Pack,  
Com-Pack III and ECM Edgeboard  
Connectors



**J 34764**  
Autofuse Tester



**J 38125 - A**  
Terminal Repair Kit





**BLANK**

**C/K**  
**SECTION 8A**  
**ELECTRICAL DIAGRAMS**  
**AND**  
**DIAGNOSIS**

**BLANK**

**SECTION 8A**  
**ELECTRICAL DIAGNOSIS**  
**1994 C/K**

**CAUTION:** This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to CAUTIONS in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

**SECTION**

- 1 Index
- 25 Engine Controls - 6.5L Diesel VIN P

**SECTION**

- 26 Engine Controls - 6.5L Turbo Diesel VIN S
- 27 Engine Controls - 6.5L Turbo Diesel VIN F

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		Vehicle Speed Sensor Buffer.....	25-4, 26-4, 27-4

**BLANK**

**COMPONENT LOCATION**

**Page — Figure**

Battery .....	At front of vehicle .....	Not Shown	
Battery Junction Block .....	RH rear engine compartment at cowl .....	25-20	1
Clutch Pedal Position Switch .....	On clutch pedal support bracket .....	Not Shown	
Crankshaft Position Sensor .....	Lower front of engine .....	Not Shown	
DLC .....	Under LH side of I/P .....	25-22	6
Fuel Pump Oil Pressure Switch .....	Upper rear of engine .....	25-18	2
Fuel Pump Relay .....	RH upper cowl .....	25-21	5
Fuel Pump .....	LH frame rail .....	Not Shown	
EGR Control Pressure/Baro .....	Upper LH side of cowl .....	25-20	4
EGR Solenoid (Pulse Width) .....	LH rear top of engine .....	25-19	3
EGR Vent Solenoid .....	LH rear top of engine .....	25-19	3
Electronic Accelerator Pedal			
Actuator .....	Top of accelerator bracket .....	Not Shown	
Electronic Injection Pump .....	Top front of engine .....	Not Shown	
Engine Coolant Temperature			
Sensor .....	RH rear front of engine .....	25-19	3
Fuel Heater .....	Lower fuel filter housing .....	25-17	1
Fuse Block .....	Under LH side of I/P .....	25-22	6
Glow Plug Relay .....	RH rear top of engine .....	25-19	3
Intake Manifold Air Temperature			
Sensor .....	RH side of upper intake manifold .....	Not Shown	
I/P Cluster .....	LH side of I/P .....	Not Shown	
Powertrain Control Module (PCM) ..	Under RH end of I/P .....	25-23	8
TCC/Brake Switch .....	On brake pedal support bracket .....	Not Shown	
Transfer Case Switch .....	Side of transfer case .....	Not Shown	

**CONNECTORS:**

C100 .....	At bulkhead connector .....	25-20	4
C101 .....	At bulkhead connector .....	Not Shown	
C106A .....	LH side of cowl near bulkhead connector .....	25-20	4
C160 .....	Center rear of engine .....	Not Shown	
C160A .....	Top front of engine .....	Not Shown	
C174 .....	Top front of engine .....	Not Shown	
C200 .....	Under RH side of I/P, near blower motor .....	25-23	8

**GROMMETS:**

P101 .....	RH lower cowl (engine compartment) .....	25-20	4
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**GROUNDS:**

G106 .....	Top RH rear of engine .....	25-17	1
G108 .....	Top RH rear of engine .....	25-17	1

**SPLICES:**

S100 .....	At RH battery .....	Not Shown	
S108 .....	Upper RH side of engine .....	25-17	1
S109 .....	Upper LH side of engine .....	25-17	1
S113 .....	Engine compartment .....	25-18	2
S118 .....	Rear of engine .....	25-18	2
S136 .....	Rear of engine compartment, near center .....	25-18	2
S137 .....	Near fuel pump relay .....	25-20	4
S145 .....	At glow plug controller .....	25-19	3
S146 .....	At glow plug controller .....	25-19	3
S153 .....	Near battery junction block .....	25-21	5

**COMPONENT LOCATION**

**Page — Figure**



## COMPONENT LOCATION

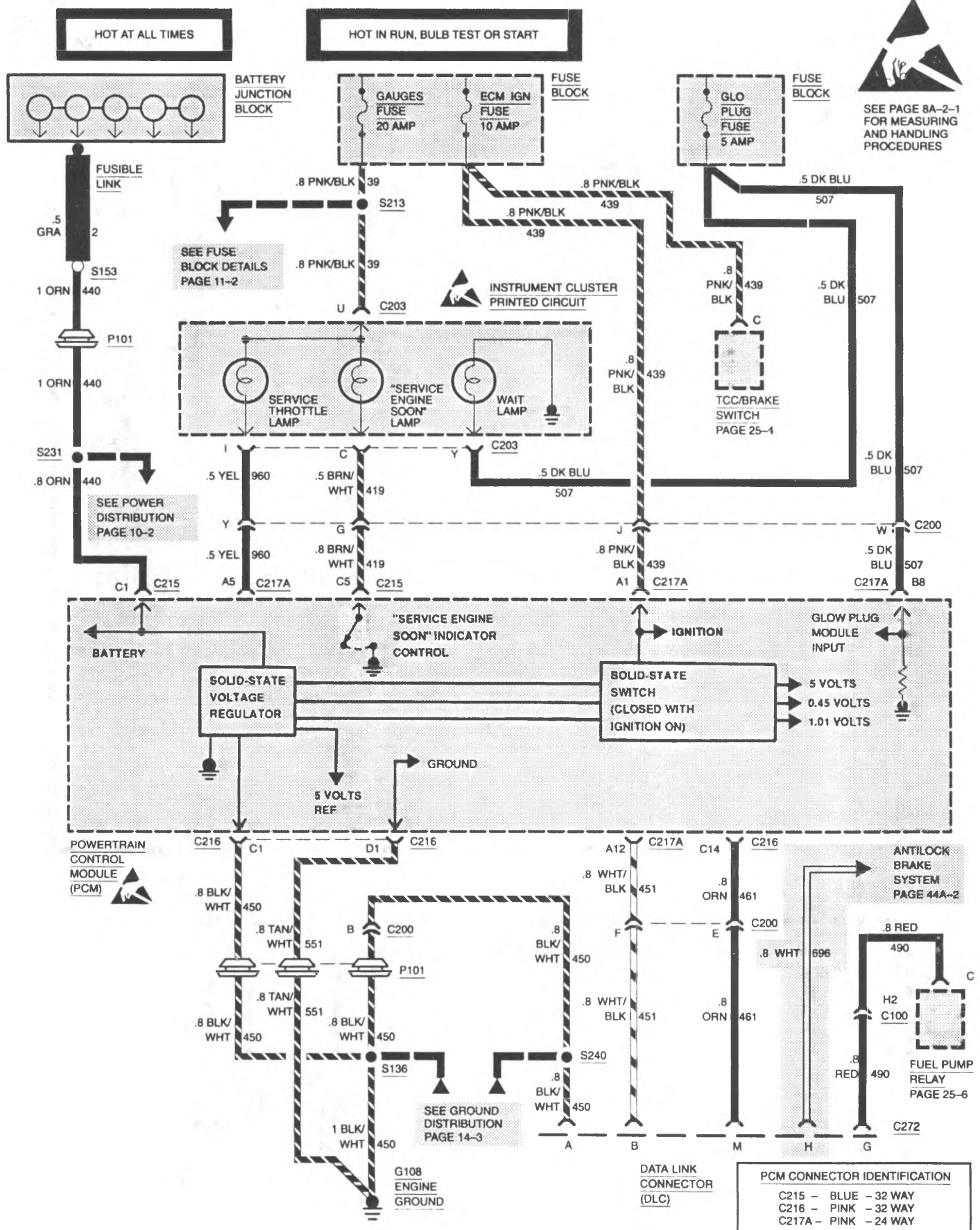
Page — Figure

### SPLICES (CONTINUED):

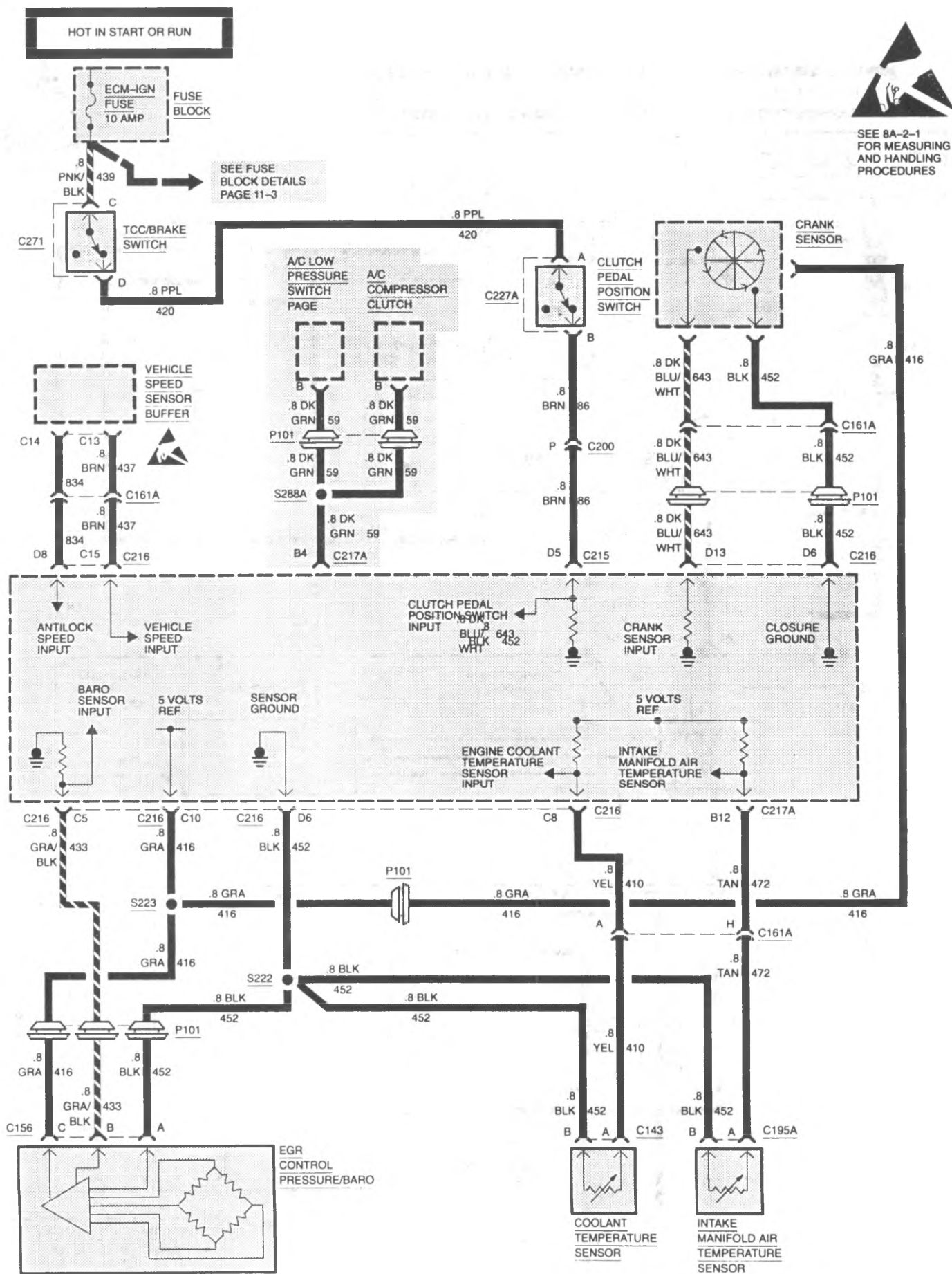
S161	At battery junction block	25-21	5
S190A	Engine harness near cowl, LH rear engine compartment	Not Shown	
S207	Under LH side of I/P	25-22	6
S213	Under LH side of I/P	25-22	6
S222	Near PCM, under RH side of I/P	25-23	8
S223	Near PCM, under RH side of I/P	25-23	8
S231	Engine harness, near PCM	25-23	8
S238	Engine harness, near PCM	25-23	8
S288A	Near PCM, under RH side of I/P	Not Shown	
S290 (Suburban, Yukon)	Under LH side of I/P	25-23	8

# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-3

## W/MANUAL OR AUTOMATIC TRANSMISSION



# 8A-25-4 ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P

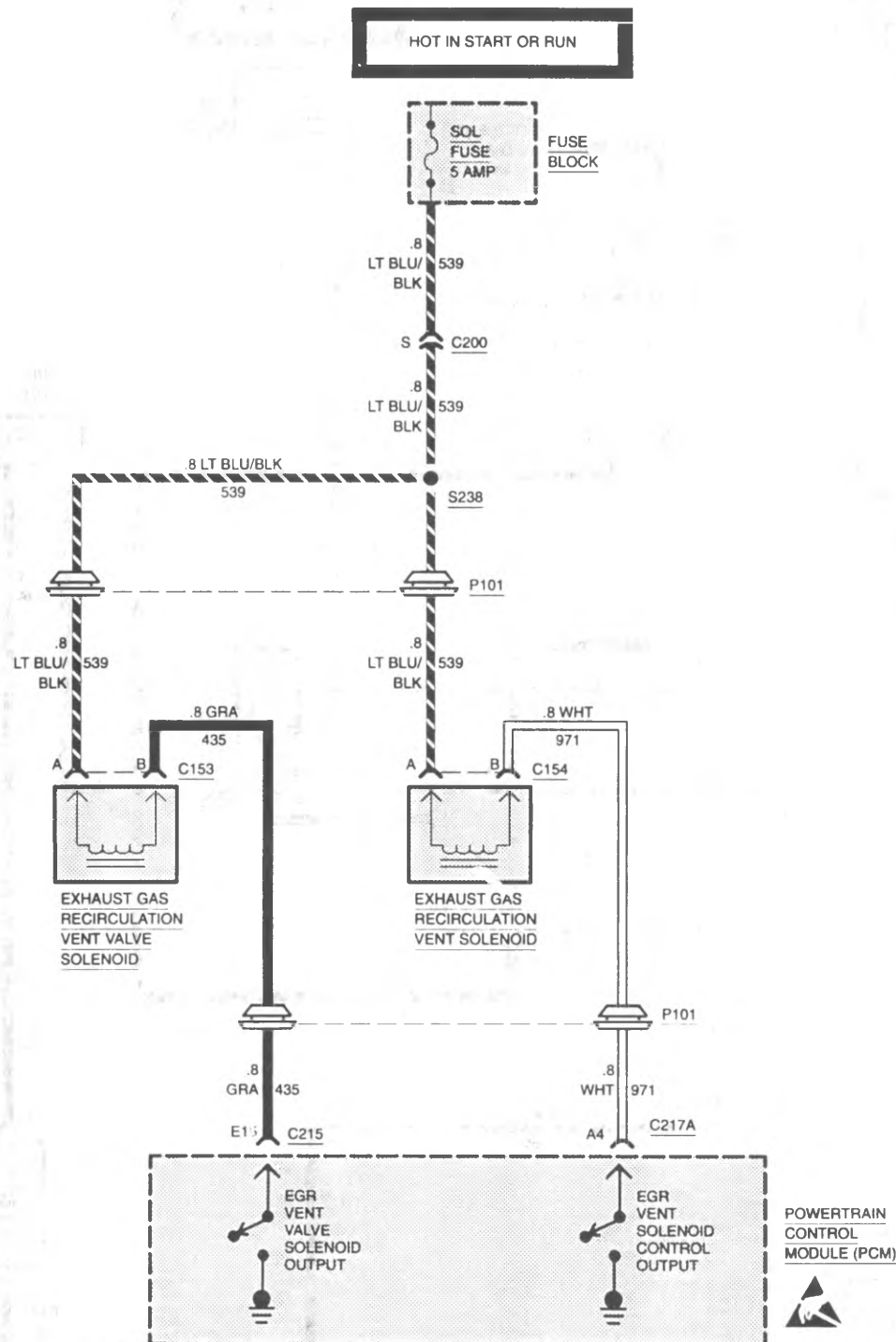


# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-5

## W/MANUAL OR AUTOMATIC TRANSMISSION



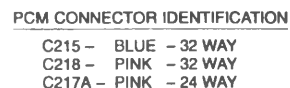
SEE BA-2-1  
FOR MEASURING  
AND HANDLING  
PROCEDURES



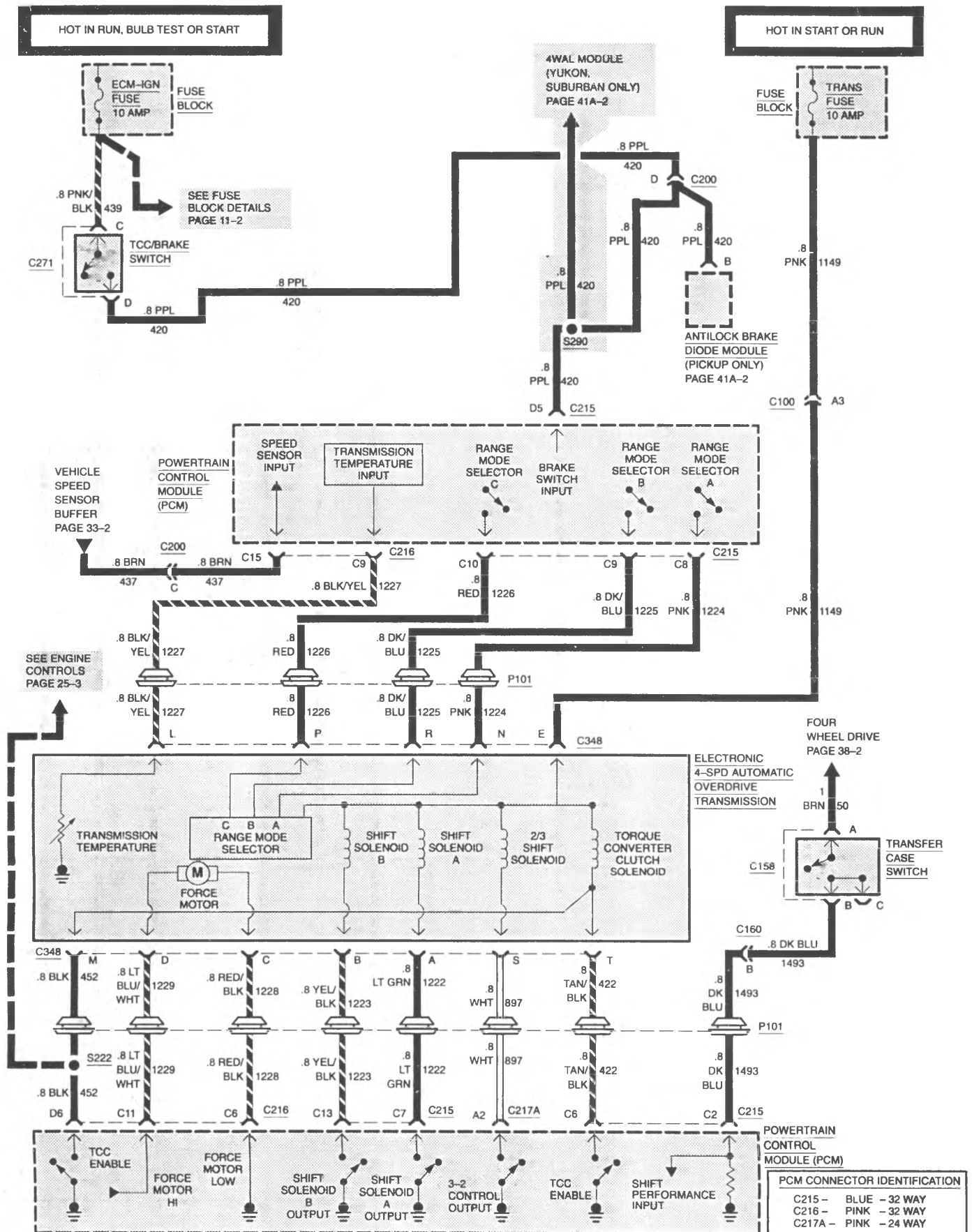
### PCM CONNECTOR IDENTIFICATION

C215 - BLUE - 32 WAY  
C216 - PINK - 32 WAY  
C217A - PINK - 24 WAY

**(FUEL PUMP CONTROLS)**

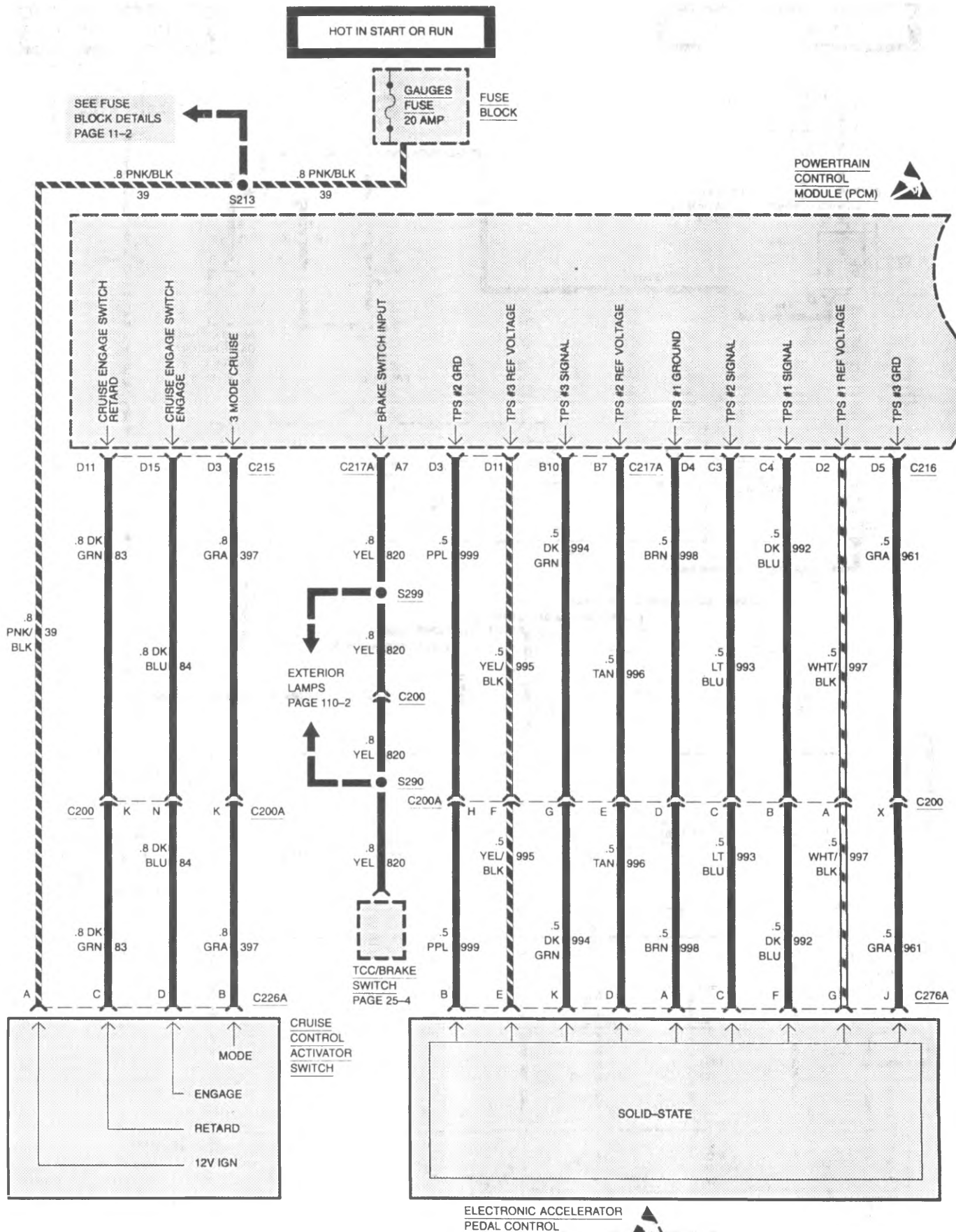


# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-7 (W/AUTOMATIC TRANSMISSION)

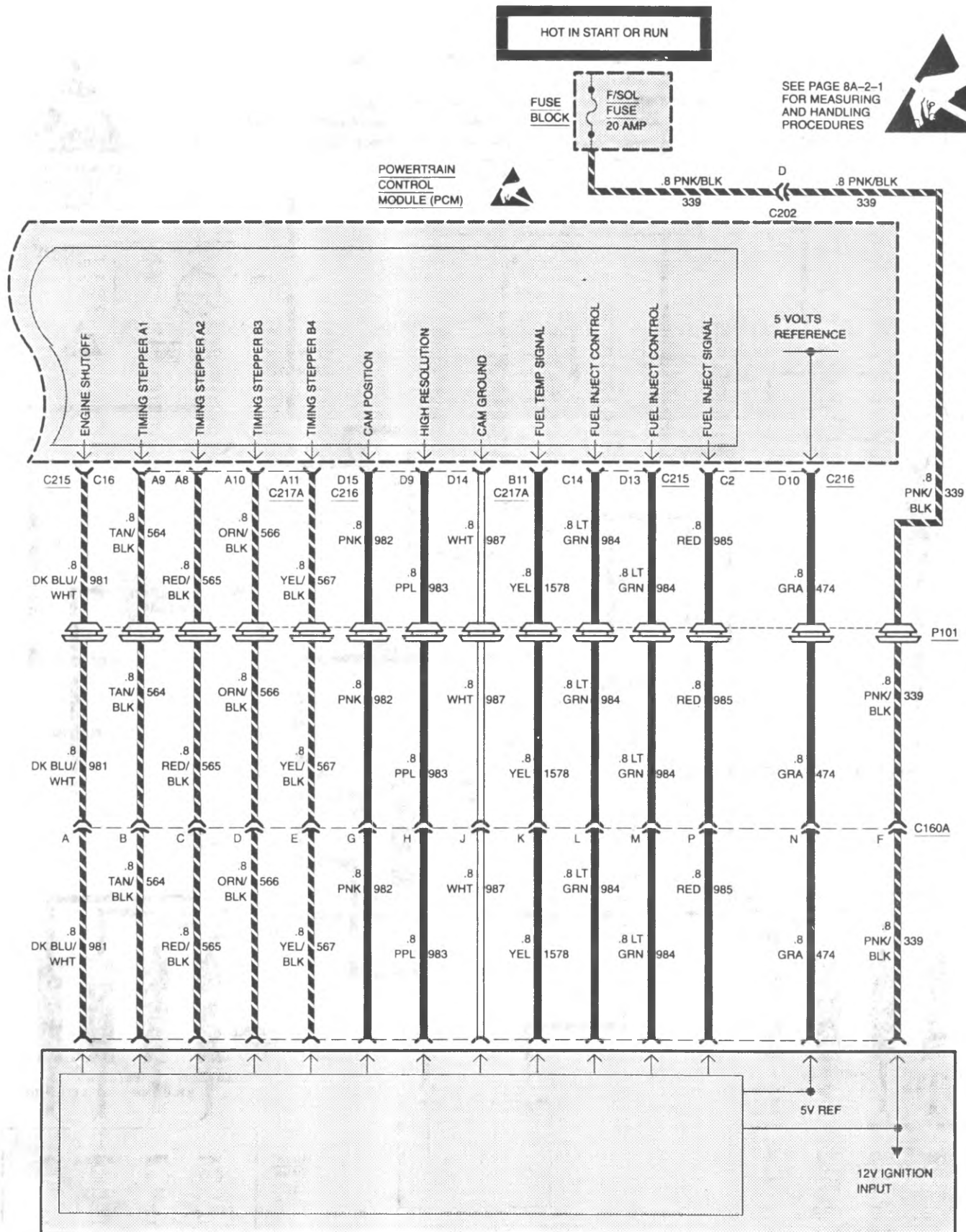




# 8A-25-8 ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P



# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-9

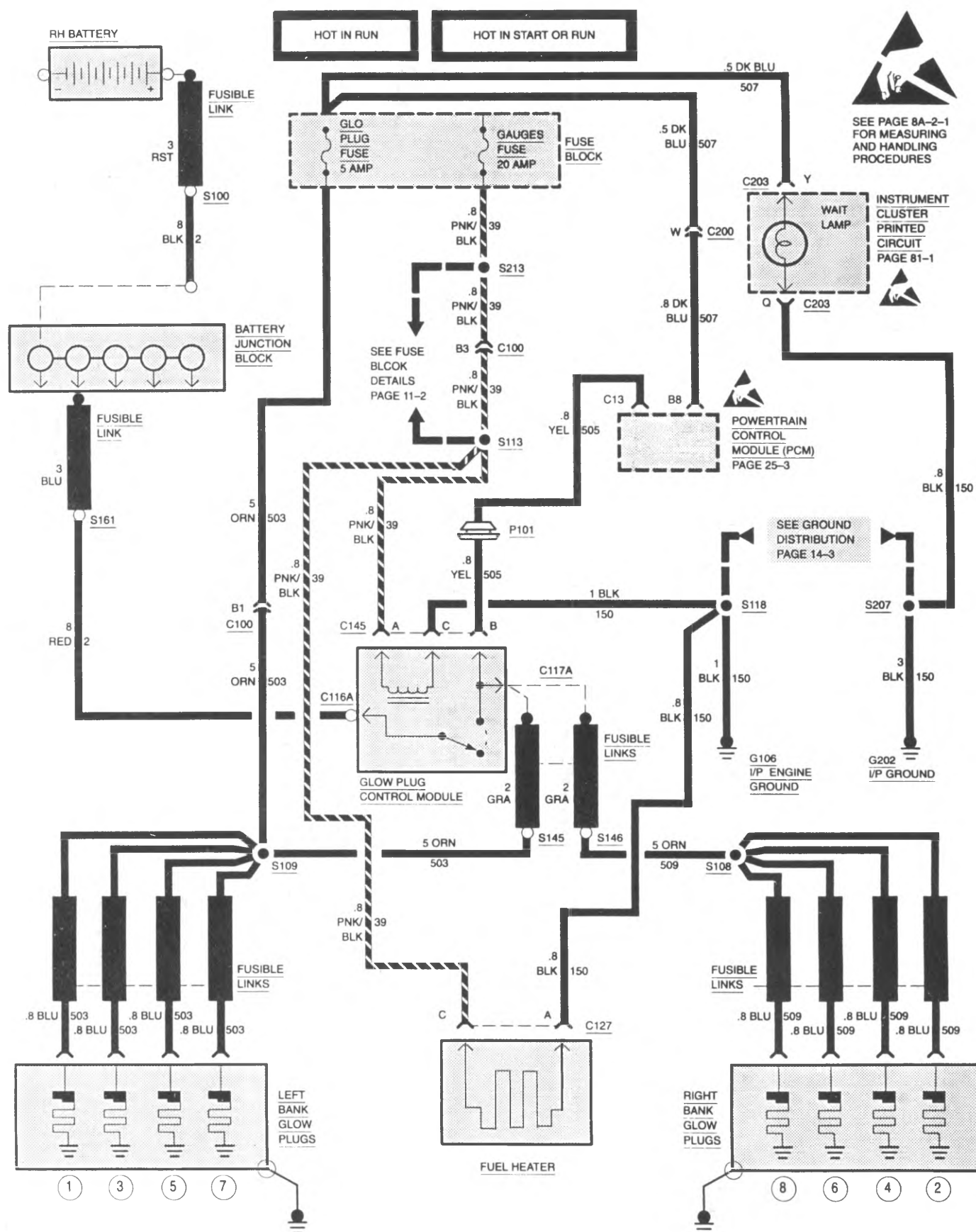


ELECTRONIC  
INJECTION PUMP

PCM CONNECTOR IDENTIFICATION		
C215 -	BLUE -	32 WAY
C216 -	PINK -	32 WAY
C217A -	PINK -	24 WAY



## GLOW PLUG SYSTEM



# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-11

## POWERTRAIN CONTROL MODULE — 6.5L DIESEL ENGINE (32 PIN LT BLU)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
440	.8	ORN	C1	12V + BATTERY
*1493	.8	DK BLU	C2	4WD INPUT
			C3	NOT USED
			C4	NOT USED
419	.8	BRN/WHT	C5	"SERVICE ENGINE SOON" LAMP OUTPUT
▲422	.8	TAN/BLK	C6	TORQUE CONVERTER CLUTCH
*1222	.8	LT GRN	C7	TRANS SHIFT SOLENOID A
*1224	.8	PNK	C8	TRANS RANGE MODE A
*1225	.8	DK BLU	C9	TRANS RANGE MODE B
*1226	.8	RED	C10	TRANS RANGE MODE C
			C11	NOT USED
			C12	NOT USED
*1223	.8	YEL/BLK	C13	TRANS SHIFT SOLENOID B
984	.8	LT GRN	C14	FUEL INJECT CONTROL
435	.8	GRA	C15	EGR SOLENOID
981	.8	DK BLU/WHT	C16	FUEL SHUTOFF SOLENOID
			D1	NOT USED
997	.5	WHT/BLK	D2	REFERENCE VOLTAGE TPS 1
397	.8	GRA	D3	CRUISE "ON/OFF" REQUEST SIGNAL CONTROL
			D4	NOT USED
420	.8	PPL	D5	BRAKE SWITCH INPUT (TCC)
			D6	NOT USED
			D7	NOT USED
834	.5	BRN	D8	VEHICLE SPEED SIGNAL
			D9	NOT USED
			D10	NOT USED
83	.8	DK GRN	D11	CRUISE CONTROL SWITCH — RESUME/ACCEL
			D12	NOT USED
984	.8	LT GRN	D13	FUEL INJECT CONTROL
			D14	NOT USED
84	.8	DK BLU	D15	CRUISE CONTROL SWITCH — SET/COAST
			D16	NOT USED

\* W/AUTO TRANS ONLY

▲ W/M30 AUTO TRANS

# 8A-25-12 ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P

## POWERTRAIN CONTROL MODULE — 6.5L DIESEL ENGINE (32 PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
450	.8	BLK/WHT	C1	SYSTEM GROUND
985	.8	RED	C2	FUEL INJECT SIGNAL
993	.5	LT BLU	C3	TPS 2 SIGNAL
992	.5	DK BLU	C4	TPS 1 SIGNAL
433	.8	GRA/BLK	C5	BAROMETRIC PRESSURE SENSOR INPUT
*1228	.8	RED/BLK	C6	TRANS FORCE MOTOR HIGH
432	.8	LT GRN	C7	MANIFOLD ABSOLUTE PRESSURE SENSOR INPUT (BOOST SIGNAL)
410	.8	YEL	C8	COOLANT TEMPERATURE (ECT)
*1227	.8	BLK/YEL	C9	TRANS TEMPERATURE INPUT
416	.8	GRA	C10	+5 VOLT REFERENCE FOR: CRANKSHAFT POSITION AND EGR CONTROL PRESSURE/BARO SENSOR
*1229	.8	LT BLU/WHT	C11	TRANS FORCE MOTOR LOW
			C12	NOT USED
505	.8	YEL	C13	GLOW PLUG RELAY CONTROL
1061	.8	ORN/BLK	C14	SERIAL DATA
437	.8	BRN	C15	VEHICLE SPEED SENSOR INPUT
			C16	NOT USED
551	.8	TAN/WHT	D1	ENGINE GROUND
950	.8	LT GRN	D2	CLOSURE GROUND
999	.5	PPL	D3	TPS 2 GROUND
998	.5	BRN	D4	TPS 1 GROUND
961	.5	GRA	D5	TPS 3 GROUND
452	.8	BLK	D6	COOLANT TEMP, INTAKE AIR TEMP, CRANKSHAFT POSITION, TRANS FLUID TEMP AND EGR CONTROL PRESSURE/ BARO SENSOR GROUND
			D7	NOT USED
1586	.8	BRN/WHT	D8	2000 PULSE VEHICLE SPEED INPUT
983	.8	PPL	D9	HIGH RESOLUTION SIGNAL
474	.8	GRA	D10	OPTICAL SENSOR +5 VOLT REFERENCE
995	.5	YEL/BLK	D11	REFERENCE VOLTAGE TPS 3
			D12	NOT USED
643	.8	DK BLU/WHT	D13	CRANK SENSOR
987	.8	WHT	D14	OPTICAL SENSOR GROUND
982	.8	PNK	D15	OPTICAL SENSOR CAM SIGNAL
			D16	NOT USED

\* W/AUTO TRANS ONLY

# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-13

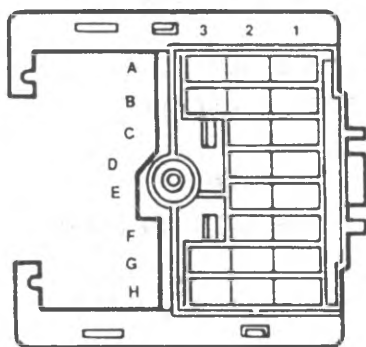
## POWERTRAIN CONTROL MODULE — 6.5L DIESEL ENGINE (24 PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
439	.8	PNK/BLK	A1	12V IGNITION (FUSED)
▲897	.8	WHT	A2	3/2 SHIFT CONTROL OUTPUT
			A3	NOT USED
971	.8	WHT	A4	EGR VENT SOLENOID
960	.5	YEL	A5	"SERVICE THROTTLE" LAMP OUTPUT
			A6	NOT USED
820	.8	YEL	A7	CRUISE CONTROL BRAKE SWITCH SIGNAL
565	.8	RED/BLK	A8	TIMING STEPPER A2
564	.8	TAN/BLK	A9	TIMING STEPPER A1
566	.8	ORN/BLK	A10	TIMING STEPPER B3
567	.8	YEL/BLK	A11	TIMING STEPPER B4
451	.8	WHT/BLK	A12	DIAGNOSTIC ENABLE
			B1	NOT USED
			B2	NOT USED
			B3	NOT USED
59		DK GRN	B4	A/C ON INPUT
			B5	NOT USED
			B6	NOT USED
996	.5	TAN	B7	REFERENCE VOLTAGE TPS 2
507	.5	DK BLU	B8	GLOW PLUG "WAIT" LAMP OUTPUT
			B9	NOT USED
994	.5	DK GRN	B10	TPS 3 SIGNAL INPUT
1578	.8	YEL	B11	FUEL TEMPERATURE INPUT
472	.8	TAN	B12	INTAKE MANIFOLD AIR TEMPERATURE

▲ W/M30 AUTO TRANS ONLY

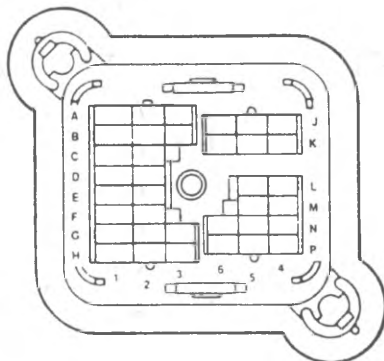
# 8A-25-14 ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P

12020183



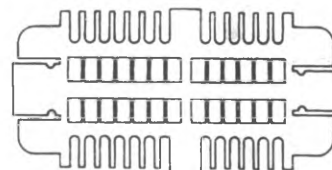
**GRAY**  
Metri-Pack  
**C100**  
Bulkhead Connector – Eng

12020184



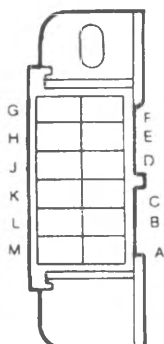
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Metri-Pack  
**C100**  
Bulkhead Connector – I/P

12089908



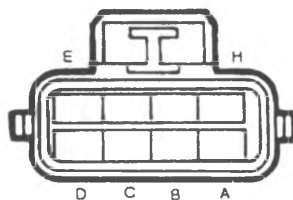
**BLACK**  
Bow Series  
**C203**  
I/P Cluster

12020043



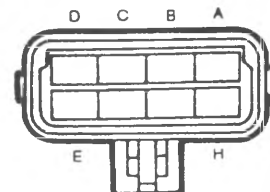
**BLACK**  
Metri-Pack 480  
**C272**  
Data Link Connector

12047937



**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line PCM to Engine

12047931



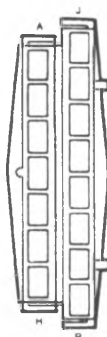
**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line Engine to PCM

12041254



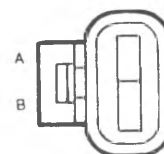
**C200**  
In-Line I/P to Bulkhead

12020213



**C200**  
In-Line Bulkhead to I/P

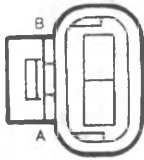
12084247



**GRAY**  
Metri-Pack 150  
**C195A**  
Intake Manifold Air Temperature  
Sensor

# ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN P 8A-25-15

12078084



**BLACK**  
Metri-Pack 150  
**C143**  
Coolant Temperature Sensor

12020403



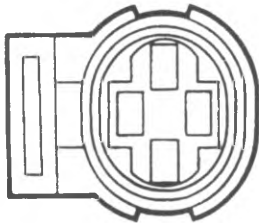
**BLACK**  
**C100A**  
MAP Sensor

12020403



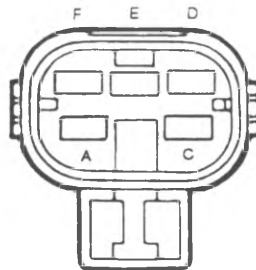
**BLACK**  
**C156**  
Barometric Pressure Sensor

12065401



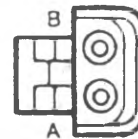
**GRAY**  
Metri-Pack 150  
**C167**  
Fuel Pump Oil Pressure Switch

12052287



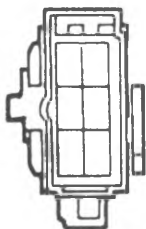
**BLACK**  
Metri-Pack  
**C132**  
Fuel Pump Relay

12015792



**BLACK**  
Weather Pack  
**C106A**  
In-Line Fuse to Fuel Pump and Sender

12020099



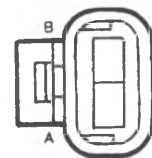
**C102**  
In-Line Fuel Pump to Bulkhead

12033709



**BLACK**  
Metri-Pack 280  
**C271**  
TCC/Brake Switch

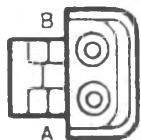
12078084



**BLACK**  
Metri-Pack 150  
**C365**  
Transmission Speed Sensor

# 8A-25-16 ENGINE CONTROLS 6.5L (396 CID) V8 DIESEL VIN.P

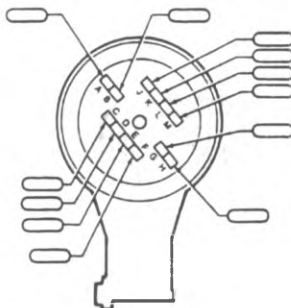
12015792



**BLACK**  
Weather Pack

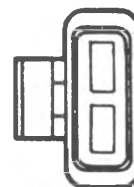
**C155A**  
Transfer Case Switch

12084690



**C348**  
Transmission

12066681



**BLACK**  
Metri-Pack 630

**C130**  
Fuel Pump In-Line Fuse

12034417



**C227A**  
Clutch Pedal Position Switch

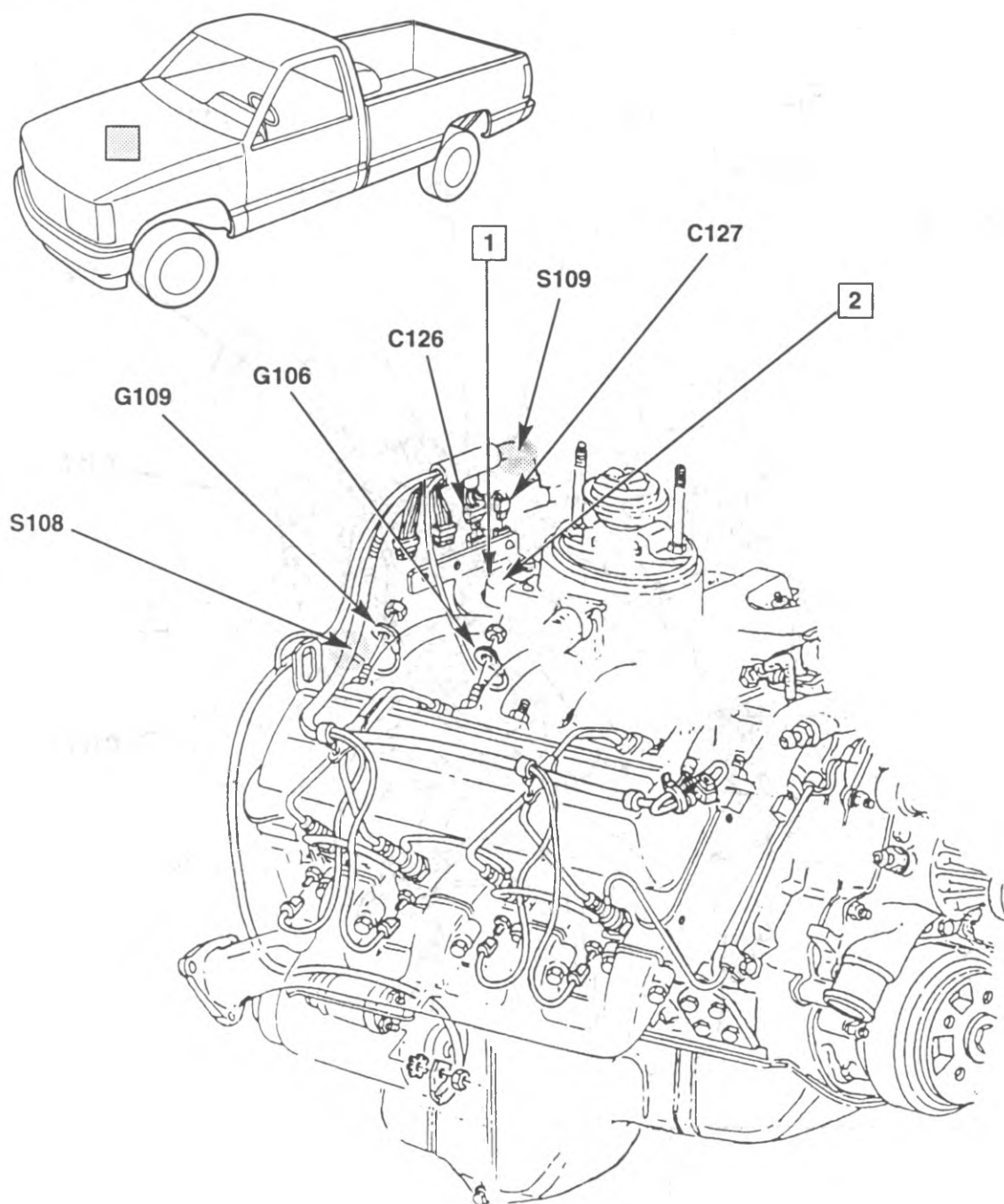


Figure 1 — 6.5L Diesel Engine Wiring, RH Side



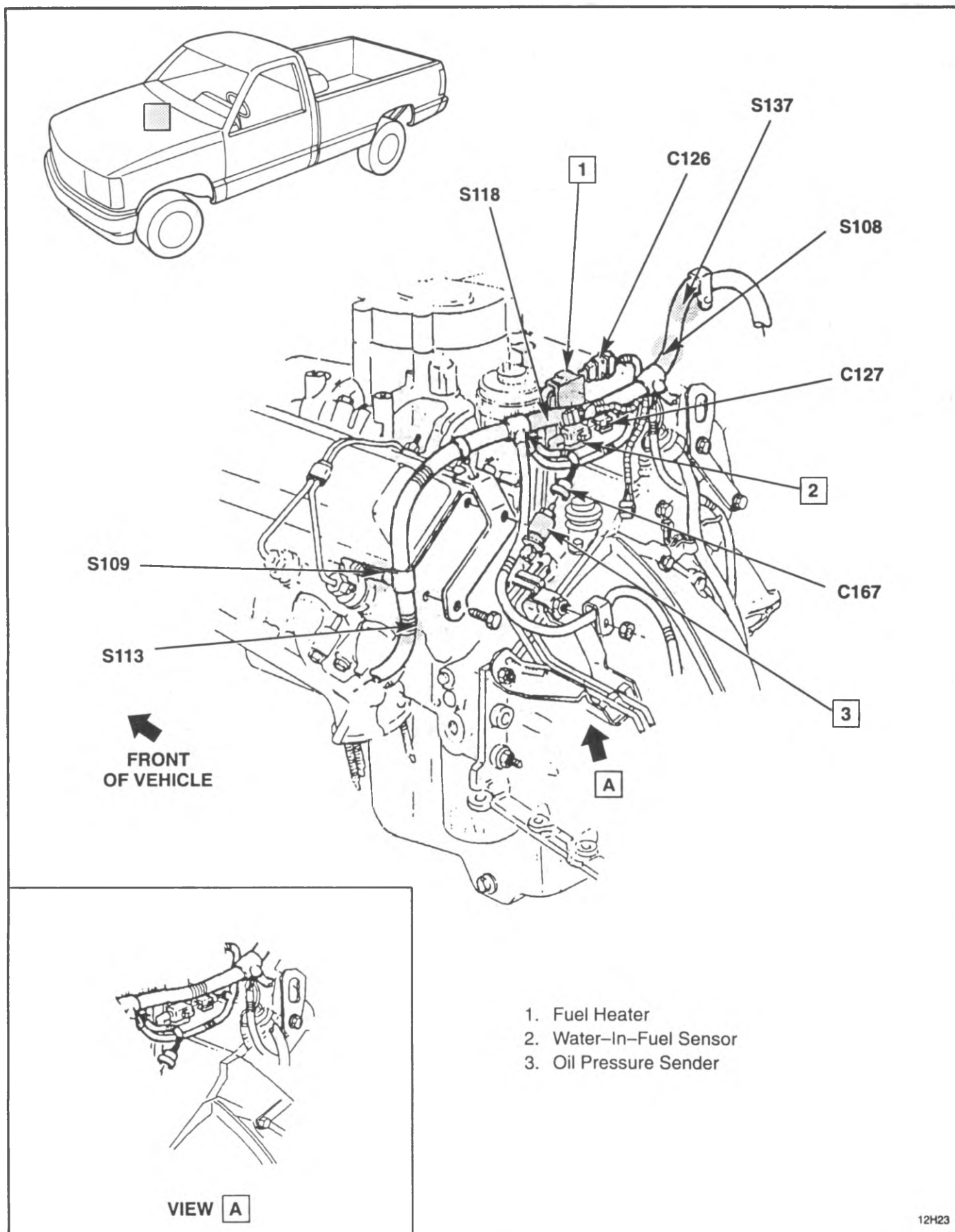


Figure 2 — 6.5L Diesel Engine Wiring, Rear

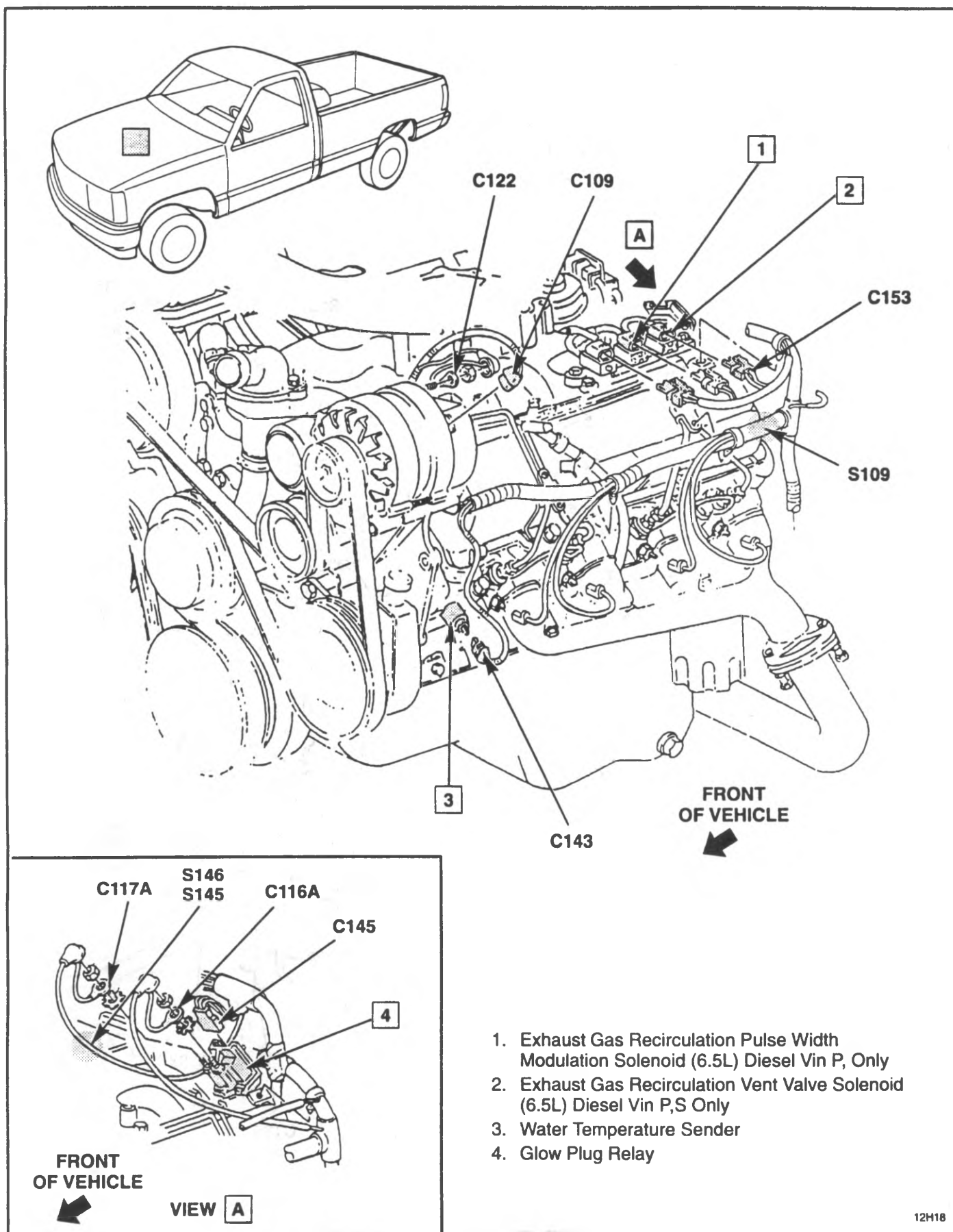


Figure 3 — 6.5L Diesel Engine Wiring, LH Side

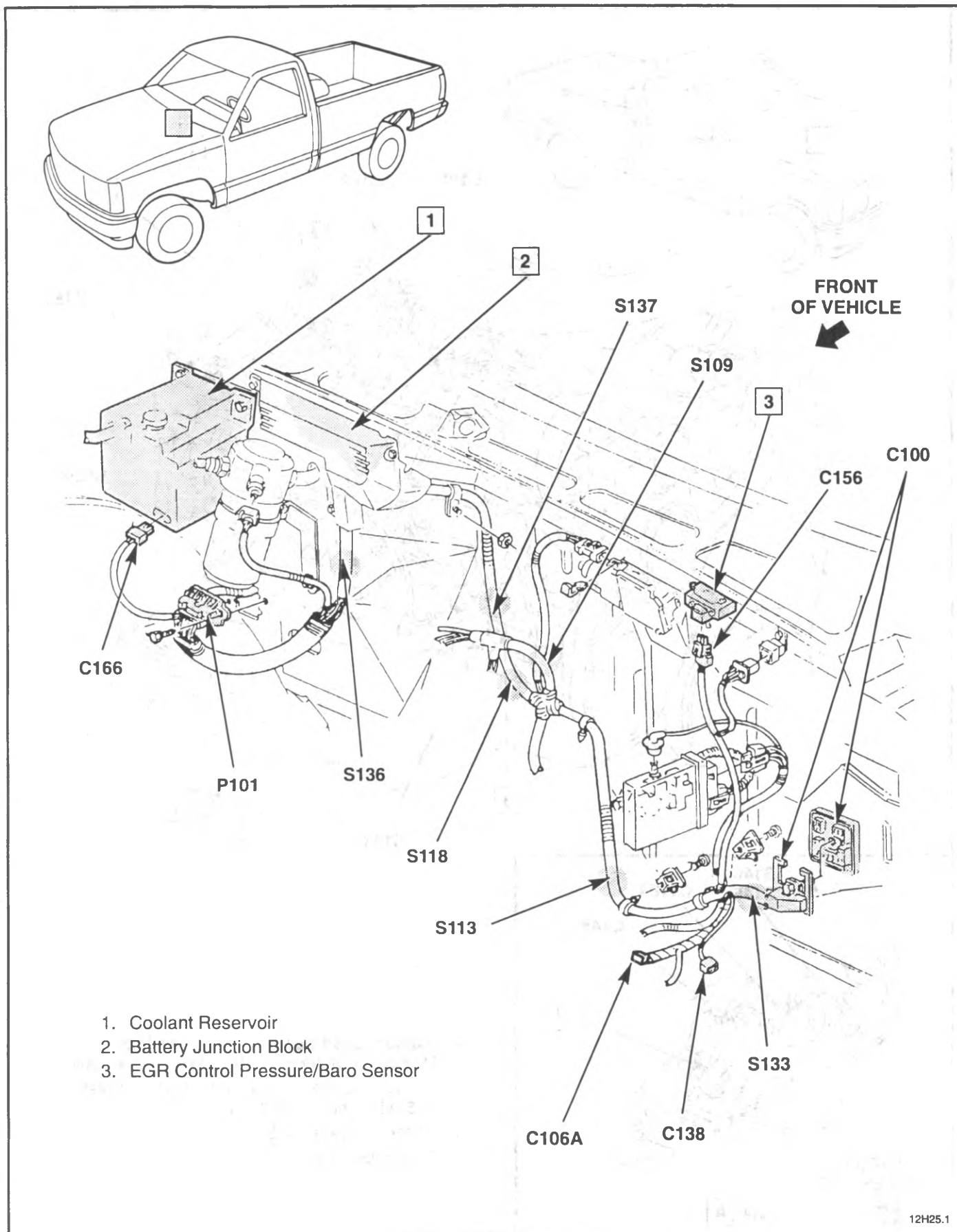


Figure 4 — Cowl Wiring, (6.5L) Diesel Engine

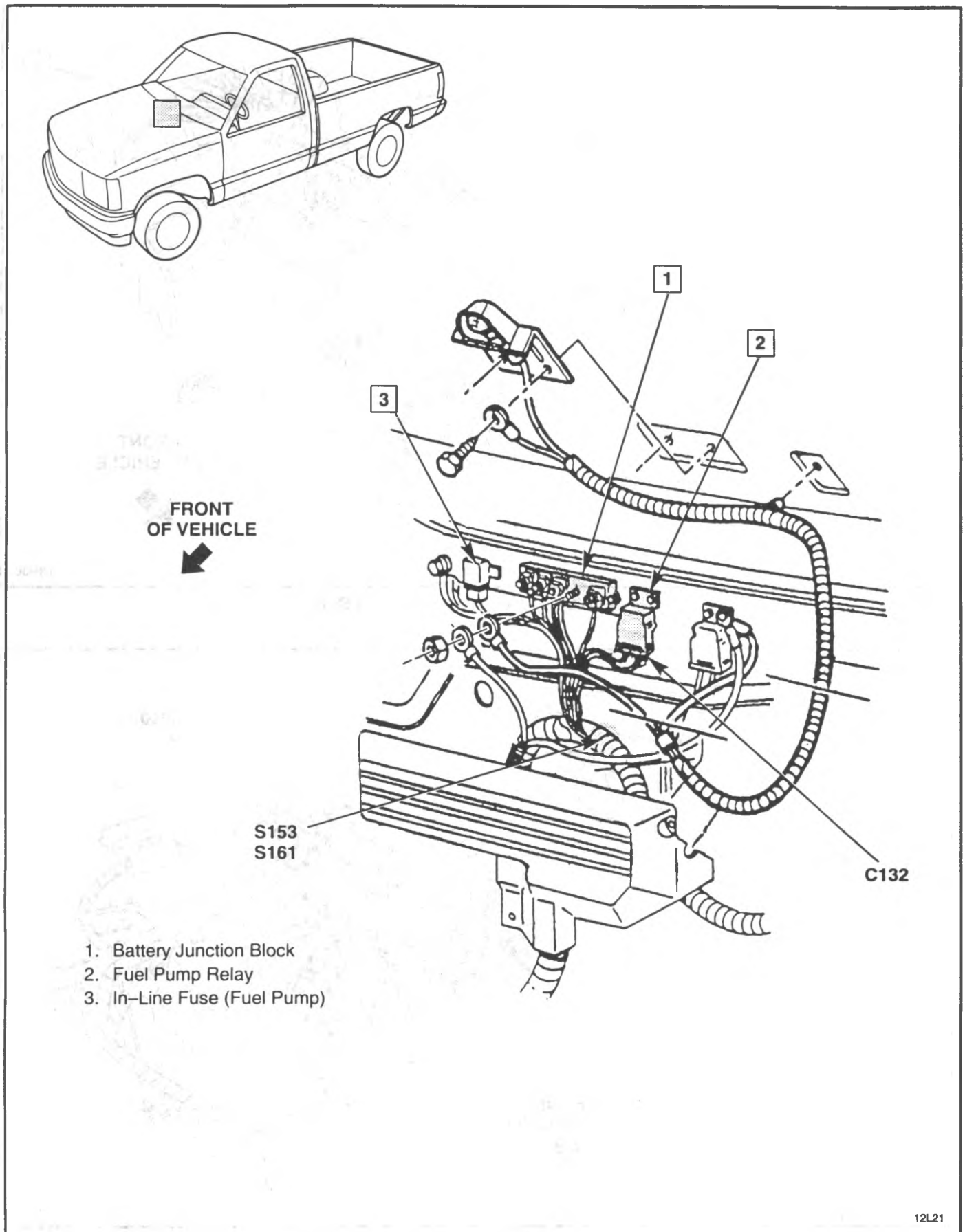


Figure 5 — Battery Junction Block Wiring

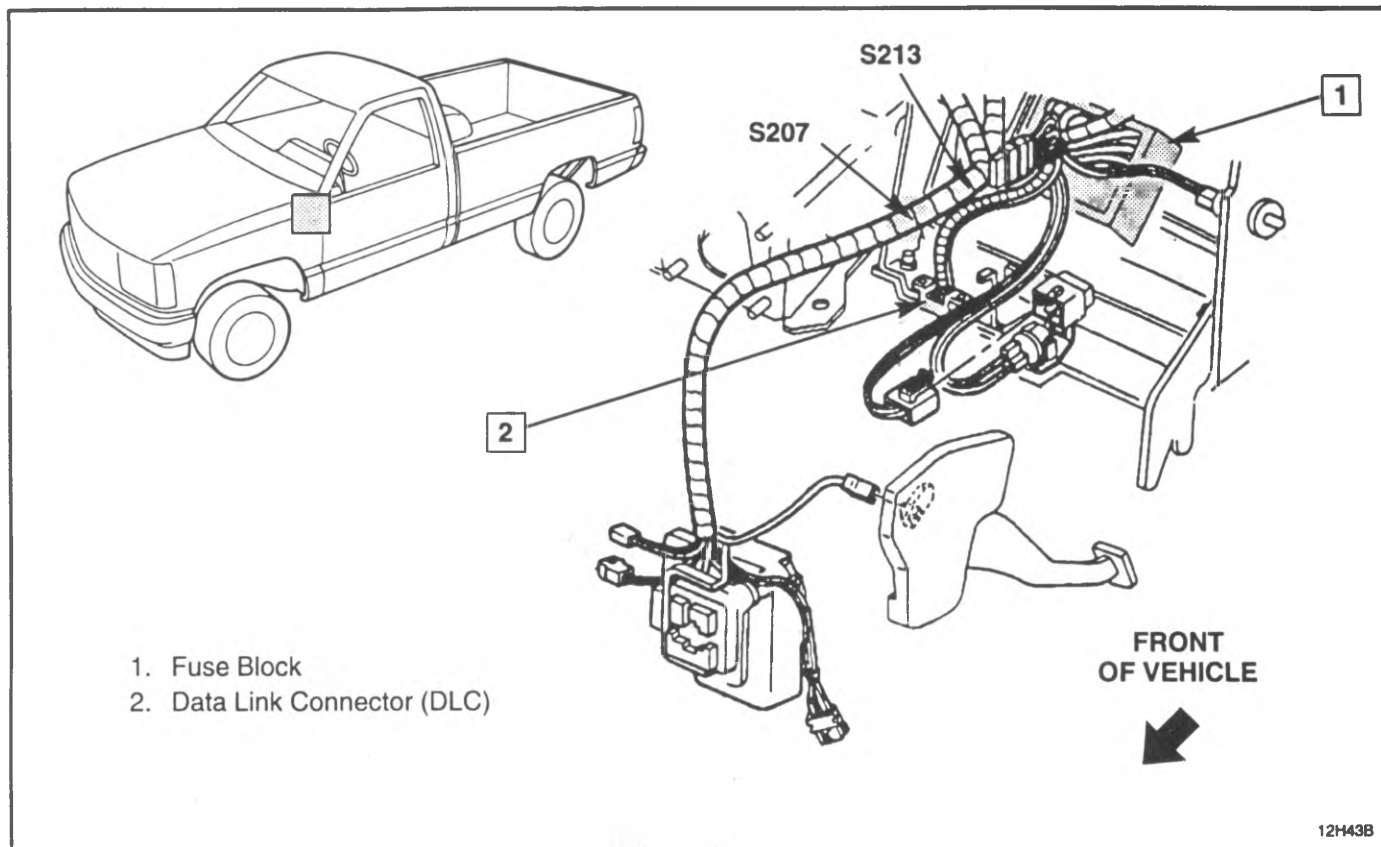


Figure 6 — Instrument Panel, LH Side

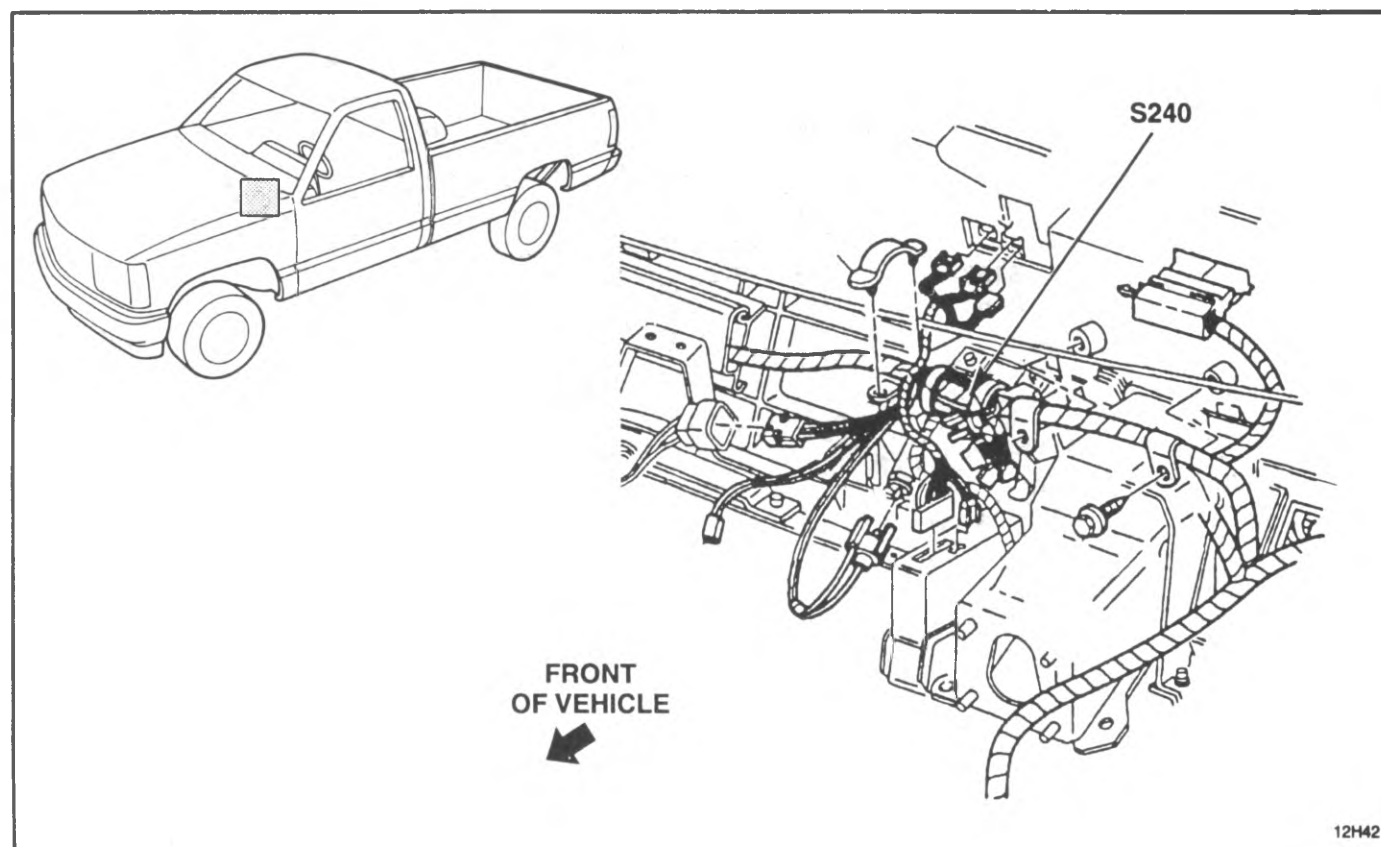
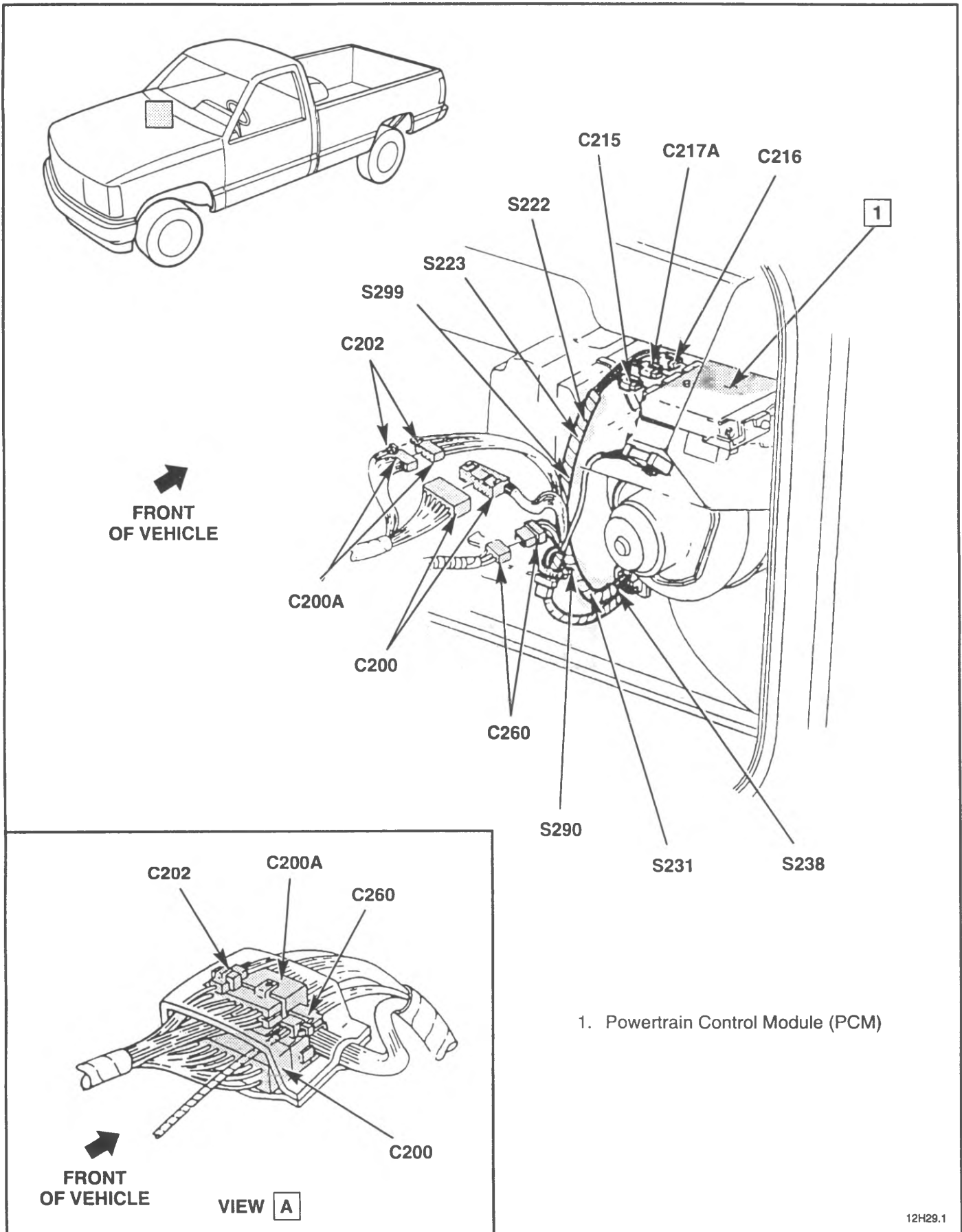


Figure 7 — Instrument Panel Wiring, RH Side



12H29.1

Figure 8 — PCM Wiring, Diesel Engines

**BLANK**

## COMPONENT LOCATION

Page — Figure

Battery	At front of vehicle	Not Shown	
Battery Junction Block	RH rear engine compartment at cowl	26-21	4
Clutch Pedal Position Switch	On clutch pedal support bracket	Not Shown	
Crankshaft Position Sensor	Lower front of engine	Not Shown	
DLC	Under LH side of I/P	26-23	6
EGR Control Pressure/Baro	Upper LH side of cowl	26-21	4
Fuel Pump Oil Pressure Switch	Upper rear of engine	26-19	2
Fuel Pump Relay	RH upper cowl	26-22	5
Fuel Pump	LH frame rail	Not Shown	
EGR Solenoid (Pulse Width)	LH rear top of engine	26-20	3
EGR Vent Solenoid	LH rear top of engine	26-20	3
Electronic Accelerator Pedal			
Actuator	Top of accelerator bracket	Not Shown	
Electronic Injection Pump	Top front of engine	Not Shown	
Engine Coolant Temperature			
Sensor	RH rear front of engine	26-20	3
Fuel Heater	Lower fuel filter housing	26-18	1
Fuse Block	Under LH side of I/P	26-23	6
Glow Plug Controller	RH rear top of engine	26-20	3
Intake Manifold Air Temperature			
Sensor	RH side of upper intake manifold	Not Shown	
I/P Cluster	LH side of I/P	Not Shown	
Powertrain Control Module (PCM)	Under RH end of I/P	26-24	8
TCC/Brake Switch	On brake pedal support bracket	Not Shown	
Transfer Case Switch	Side of transfer case	Not Shown	

## CONNECTORS:

C100	At bulkhead connector	26-21	4
C101	At bulkhead connector	Not Shown	
C106A	LH side of cowl near bulkhead connector	Not Shown	
C160	Center rear of engine	Not Shown	
C160A	Top front of engine	Not Shown	
C161A	Top front of engine	Not Shown	
C174	Top front of engine	26-24	8
C200	Under RH side of I/P, near blower motor	Not Shown	

## GROMMETS:

P101	RH lower cowl (engine compartment)	26-21	4
------	------------------------------------	-------	---

## GROUND:

G106	Rear of RH cylinder head	26-18	1
G108	Top RH rear of engine	Not Shown	

## SPLICES:

S100	At RH battery	Not Shown	
S108	Upper RH side of engine	26-18	1
S109	Upper LH side of engine	26-18	1
S113	Engine compartment	26-19	2
S118	Rear of engine	26-19	2
S136	Rear of engine compartment, near center	26-21	4
S137	Near fuel pump relay	26-19	2
S145	At glow plug controller	26-20	3
S146	At glow plug controller	26-20	3

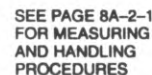


## COMPONENT LOCATION (CONTINUED)

Page — Figure

S153	Near battery junction block	26-22	5
S161	At battery junction block	26-22	5
S190A	Engine harness near cowl, LH rear engine compartment at	Not Shown	
S207	Under LH side of I/P	26-23	6
S213	Under LH side of I/P	26-23	6
S222	Under RH side of I/P, near PCM	26-24	8
S223	Near PCM, under RH side of I/P	26-24	8
S231	Engine harness, near PCM	26-24	8
S238	Engine harness, near PCM	26-24	8
S240	Behind LH side of I/P	26-23	7
S243	Engine harness, near P101	Not Shown	
S288A	Near PCM, under RH side of I/P	Not Shown	
S290 (Suburban, Yukon)	Under LH side of I/P	Not Shown	

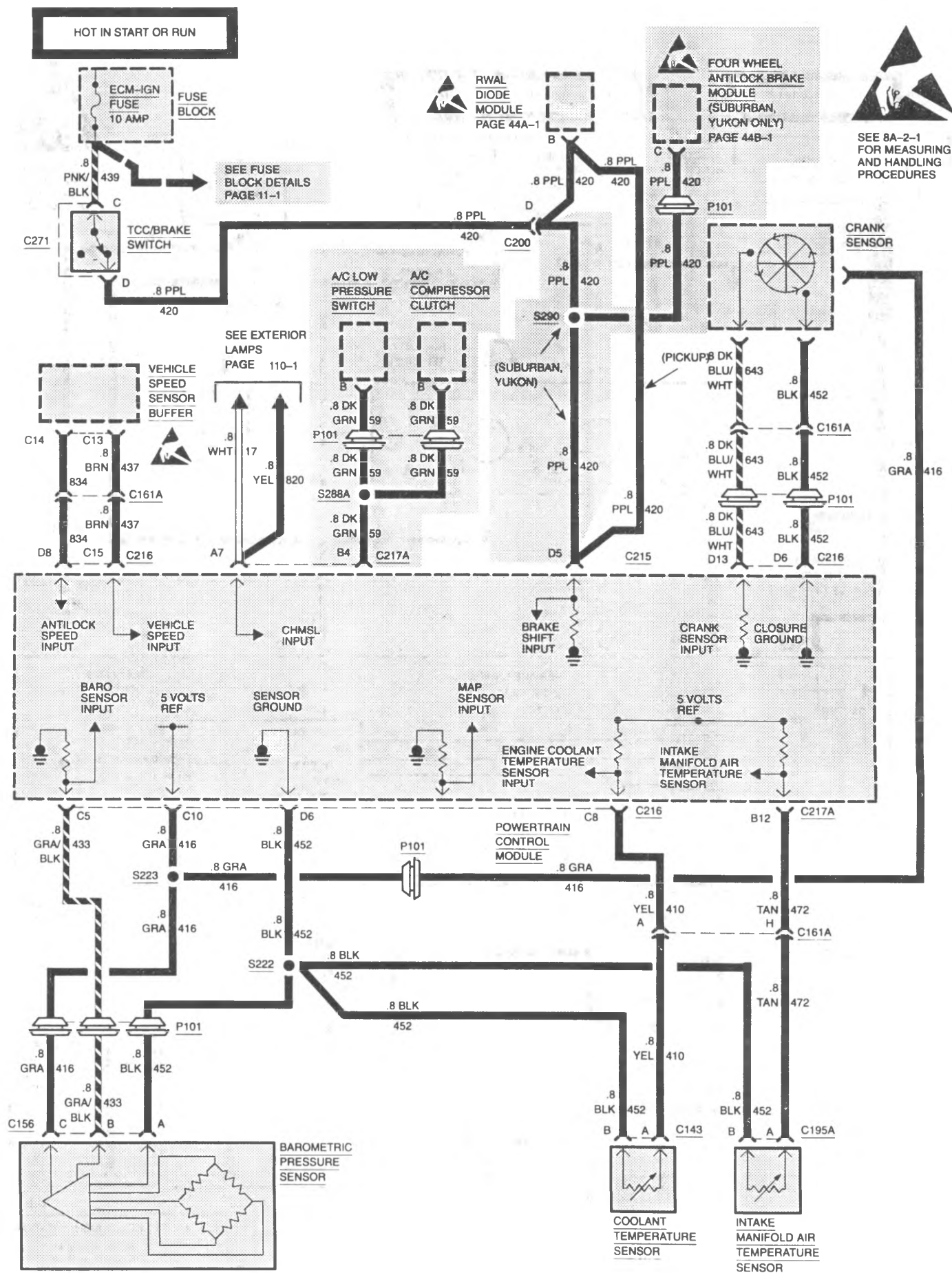
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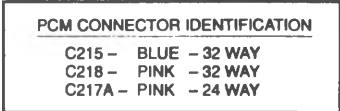
**PCM CONNECTOR IDENTIFICATION**

C215	-	BLUE	-	32 WAY
C216	-	PINK	-	32 WAY
C217A	-	PINK	-	24 WAY

## W/HD AUTOMATIC TRANSMISSION



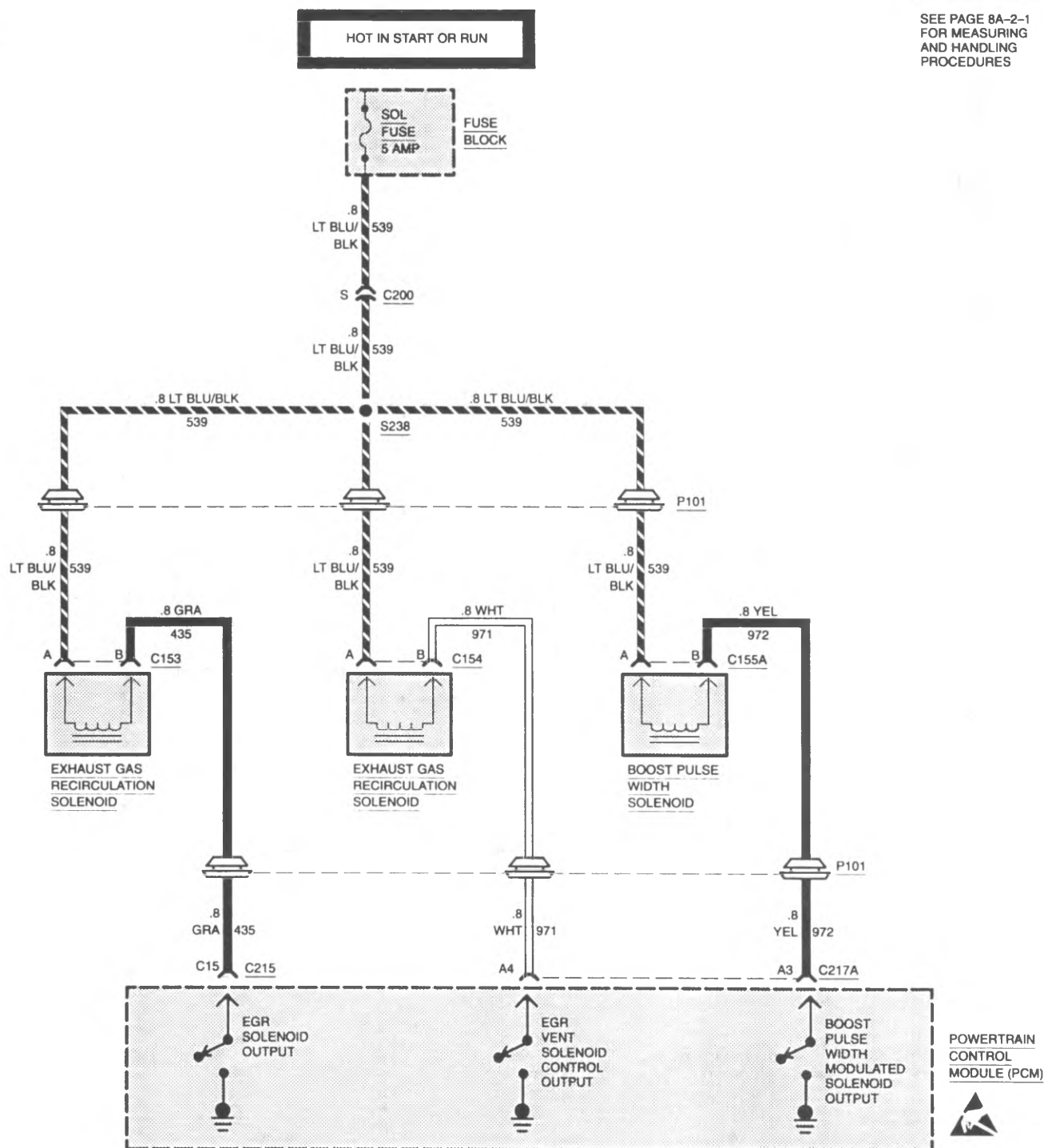
**(FUEL PUMP CONTROLS)**



# 8A-26-6 ENGINE CONTROLS 6.5L (396 CID) HD V8 TURBO DIESEL VIN S W/HD AUTOMATIC TRANSMISSION



SEE PAGE 8A-2-1  
FOR MEASURING  
AND HANDLING  
PROCEDURES

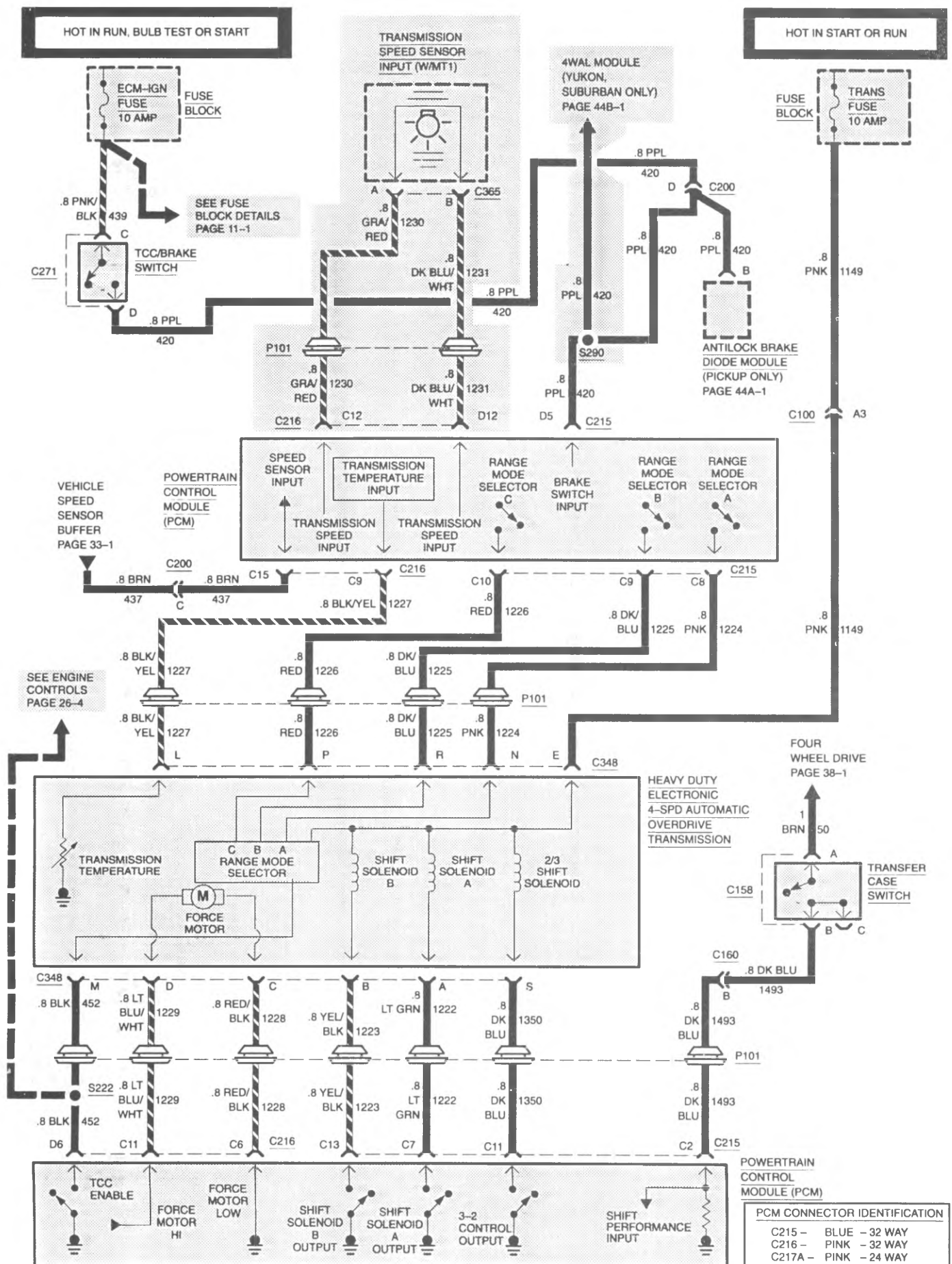


## PCM CONNECTOR IDENTIFICATION

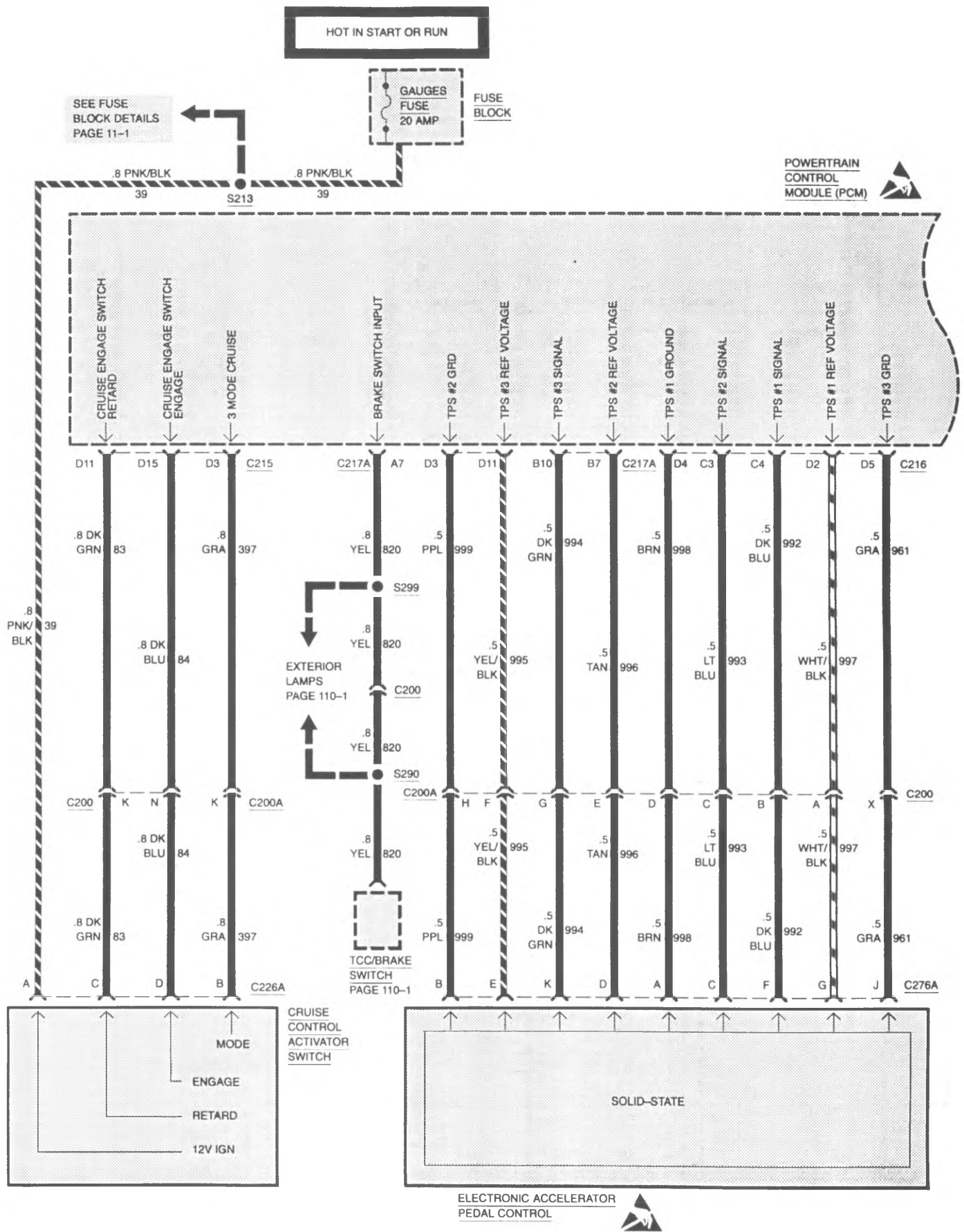
C215 - BLUE - 32 WAY  
C218 - PINK - 32 WAY  
C217A - PINK - 24 WAY



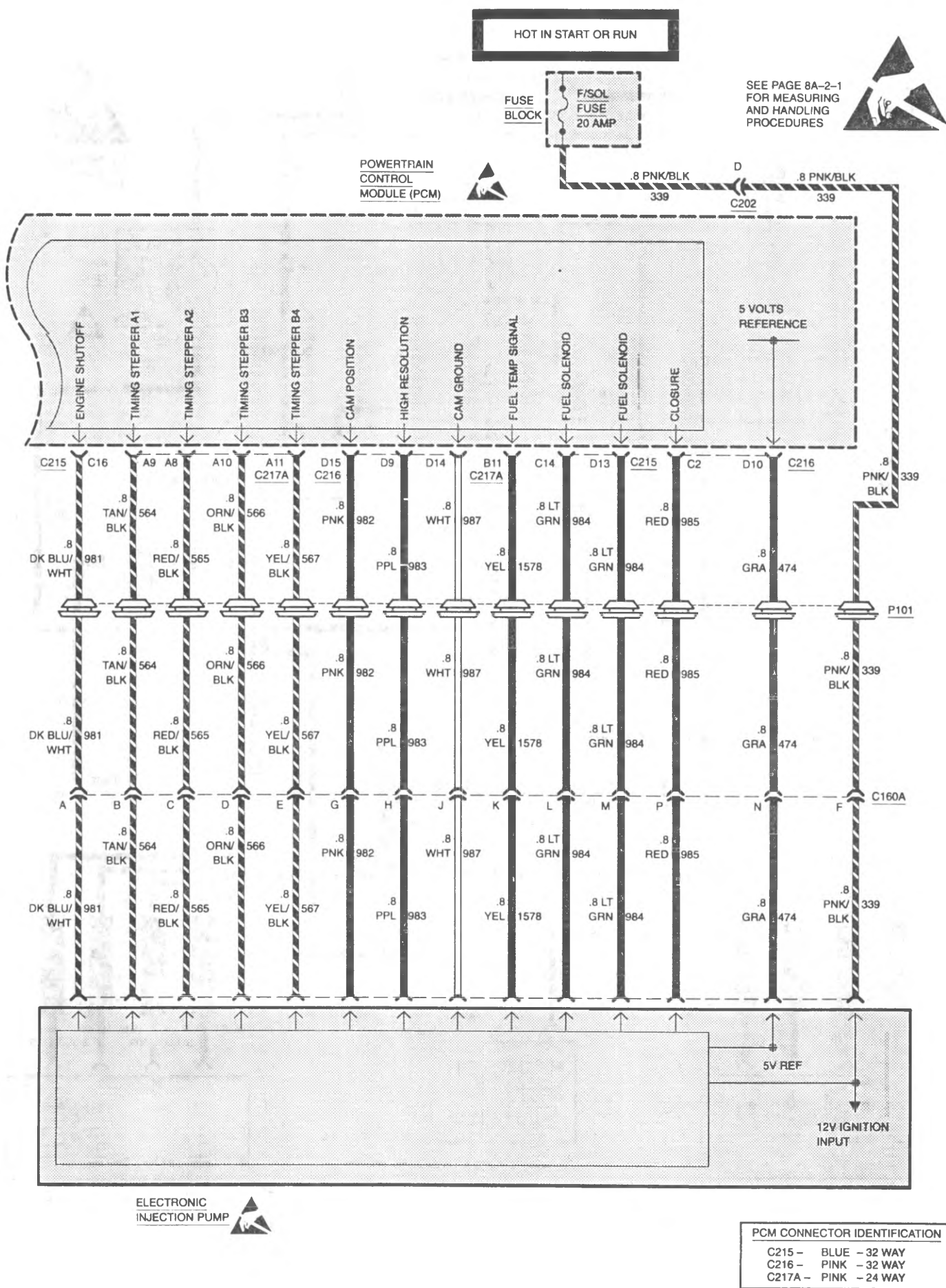
## (W/HD AUTOMATIC TRANSMISSION)



# 8A-26-8 ENGINE CONTROLS 6.5L (396 CID) HD V8 TURBO DIESEL VIN S



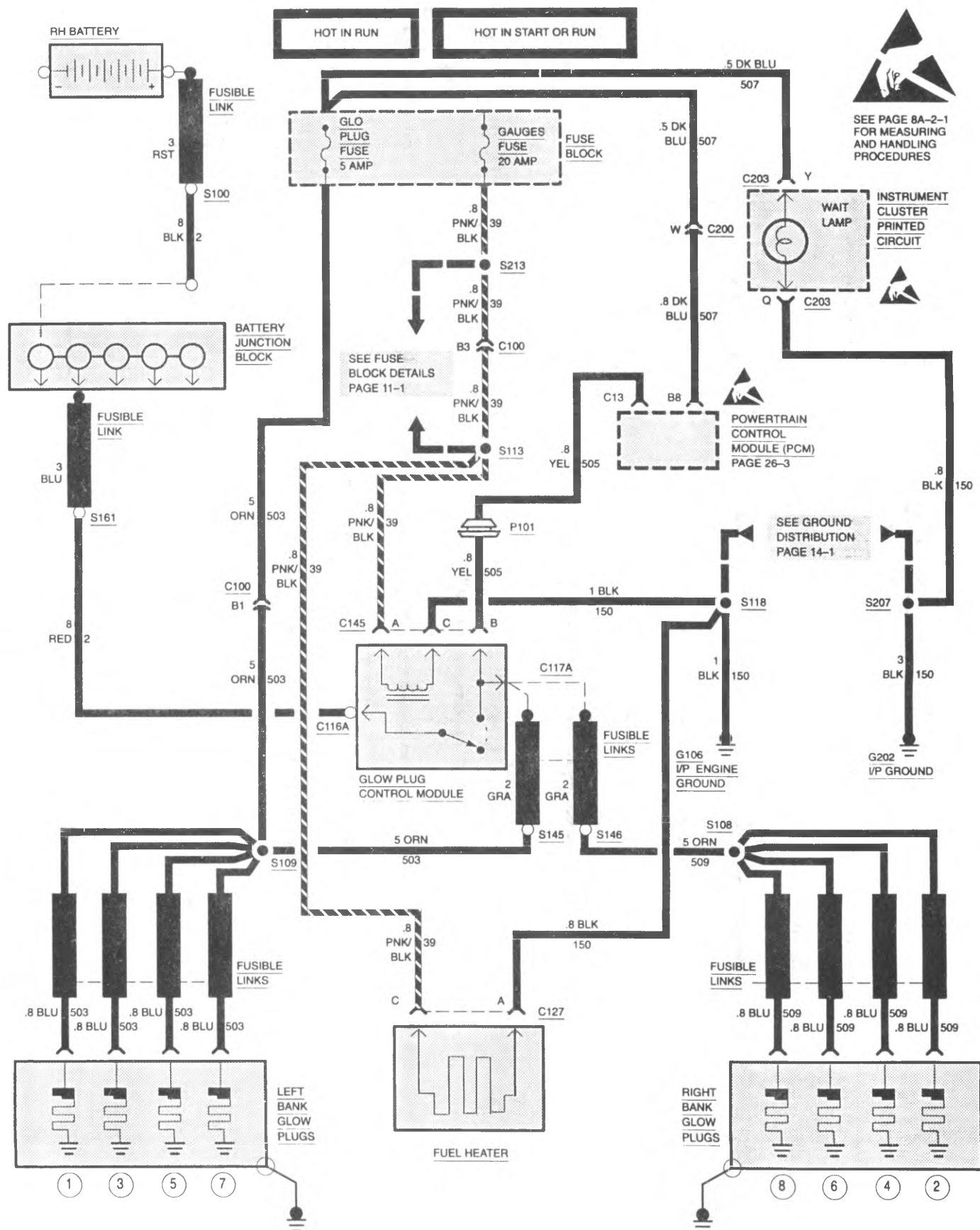
# ENGINE CONTROLS 6.5L (396 CID) HD V8 DIESEL TURBO VIN S 8A-26-9





# 8A-26-10 ENGINE CONTROLS 6.5L (396 CID) HD V8 TURBO DIESEL VIN S

## GLOW PLUG SYSTEM



# ENGINE CONTROLS 6.5L (396 CID) HD V8 DIESEL TURBO VIN S 8A-26-11

## POWERTRAIN CONTROL MODULE — 6.5L TURBO DIESEL ENGINE (32-PIN BLUE)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
440	.8	ORN	C1	12V + BATTERY
1493	.8	DK BLU	C2	4WD INPUT
			C3	NOT USED
			C4	NOT USED
419	.8	BRN/WHT	C5	"SERVICE ENGINE SOON" LAMP OUTPUT
			C6	NOT USED
1222	.8	LT GRN	C7	TRANS SHIFT SOLENOID A
1224	.8	PNK	C8	TRANS RANGE MODE A
1225	.8	DK BLU	C9	TRANS RANGE MODE B
1226	.8	RED	C10	TRANS RANGE MODE C
1350	.8	DK BLU	C11	TCC SOLENOID CONTROL
			C12	NOT USED
1223	.8	YEL/BLK	C13	TRANS SHIFT SOLENOID B
984	.8	LT GRN	C14	FUEL INJECT CONTROL
435	.8	GRA	C15	EGR SOLENOID
981	.8	DK BLU/WHT	C16	FUEL SHUTOFF SOLENOID
			D1	NOT USED
997	.5	WHT/BLK	D2	REFERENCE VOLTAGE TPS 1
397	.8	GRA	D3	CRUISE "ON/OFF" REQUEST SIGNAL
			D4	NOT USED
420	.8	PPL	D5	BRAKE SWITCH INPUT (TCC)
			D6	NOT USED
			D7	NOT USED
834	.5	BRN	D8	VEHICLE SPEED SIGNAL
			D9	NOT USED
			D10	NOT USED
83	.8	DK GRN	D11	CRUISE CONTROL SWITCH — RESUME/ACCEL
			D12	NOT USED
984	.8	LT GRN	D13	FUEL INJECT CONTROL
			D14	NOT USED
84	.8	DK BLU	D15	CRUISE CONTROL SWITCH — SET/COAST
			D16	NOT USED

# 8A-26-12 ENGINE CONTROLS 6.5L (396 CID) HD V8 TURBO DIESEL VIN S

## POWERTRAIN CONTROL MODULE — 6.5L TURBO DIESEL ENGINE (32-PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
450	.8	BLK/WHT	C1	SYSTEM GROUND
985	.8	RED	C2	FUEL INJECT SIGNAL
993	.5	LT BLU	C3	TPS 2 SIGNAL
992	.5	DK BLU	C4	TPS 1 SIGNAL
433	.8	GRA/BLK	C5	BAROMETRIC PRESSURE SENSOR INPUT
1228	.8	RED/BLK	C6	TRANS FORCE MOTOR HIGH
432	.8	LT GRN	C7	MANIFOLD ABSOLUTE PRESSURE SENSOR INPUT (BOOST SIGNAL)
410	.8	YEL	C8	COOLANT TEMPERATURE (ECT)
1227	.8	BLK/YEL	C9	TRANS TEMPERATURE INPUT
416	.8	GRA	C10	+5 VOLT REFERENCE FOR: CRANKSHAFT POSITION AND EGR CONTROL PRESSURE/BARO SENSOR
1229	.8	LT BLU/WHT	C11	TRANS FORCE MOTOR LOW
1230	.8	GRA/RED	C12	TRANS SPEED SENSOR INPUT
505	.8	YEL	C13	GLOW PLUG RELAY CONTROL
1061	.8	ORN/BLK	C14	SERIAL DATA
437	.8	BRN	C15	VEHICLE SPEED SENSOR INPUT
			C16	NOT USED
551	.8	TAN/WHT	D1	ENGINE GROUND
950	.8	LT GRN	D2	CLOSURE GROUND
999	.5	PPL	D3	TPS 2 GROUND
998	.5	BRN	D4	TPS 1 GROUND
961	.5	GRA	D5	TPS 3 GROUND
452	.8	BLK	D6	COOLANT TEMP, INTAKE AIR TEMP, CRANKSHAFT POSITION TRANS FLUID TEMP AND EGR CONTROL PRESSURE/ BARO SENSOR
			D7	NOT USED
1586	.8	BRN/WHT	D8	2000 PULSE VEHICLE SPEED INPUT
983	.8	PPL	D9	HIGH RESOLUTION SIGNAL
474	.8	GRA	D10	OPTICAL SENSOR +5 VOLT REFERENCE
995	.5	YEL/BLK	D11	REFERENCE VOLTAGE TPS 3
1231	.8	DK BLU/WHT	D12	TRANS SPEED SENSOR INPUT
643	.8	DK BLU/WHT	D13	CRANK SENSOR
987	.8	WHT	D14	OPTICAL SENSOR GROUND
982	.8	PNK	D15	OPTICAL SENSOR CAM SIGNAL
			D16	NOT USED

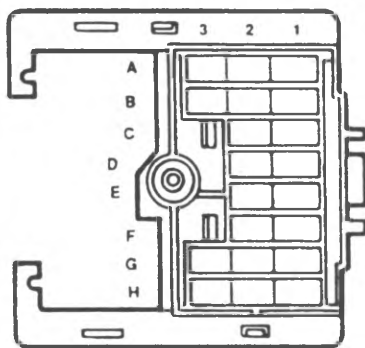
# ENGINE CONTROLS 6.5L (396 CID) HD V8 DIESEL TURBO VIN S 8A-26-13

## POWERTRAIN CONTROL MODULE — 6.5L TURBO DIESEL ENGINE (24-PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
439	.8	PNK/BLK	A1	12V IGNITION (FUSED)
			A2	NOT USED
972		YEL	A3	WASTEGATE SOLENOID CONTROL
971	.8	WHT	A4	EGR VENT SOLENOID
960	.5	YEL	A5	"SERVICE THROTTLE" LAMP OUTPUT
			A6	NOT USED
820	.8	YEL	A7	CRUISE CONTROL BRAKE SWITCH SIGNAL
565	.8	RED/BLK	A8	TIMING STEPPER A2
564	.8	TAN/BLK	A9	TIMING STEPPER A1
566	.8	ORN/BLK	A10	TIMING STEPPER B3
567	.8	YEL/BLK	A11	TIMING STEPPER B4
451	.8	WHT/BLK	A12	DIAGNOSTIC ENABLE
			B1	NOT USED
			B2	NOT USED
			B3	NOT USED
59		DK GRN	B4	A/C ON INPUT
			B5	NOT USED
			B6	NOT USED
996	.5	TAN	B7	REFERENCE VOLTAGE TPS 2
507	.5	DK BLU	B8	GLOW PLUG "WAIT" LAMP OUTPUT
			B9	NOT USED
994	.5	DK GRN	B10	TPS 3 SIGNAL INPUT
1578	.8	YEL	B11	FUEL TEMPERATURE INPUT
472	.8	TAN	B12	INTAKE MANIFOLD AIR TEMPERATURE

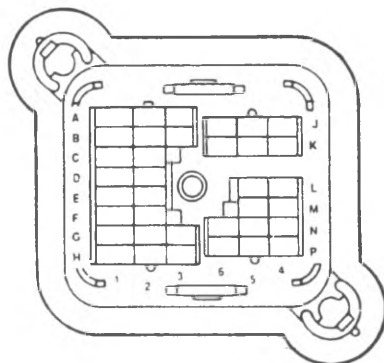
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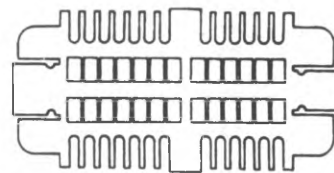
**GRAY**  
Metri-Pack  
**C100**  
Bulkhead Connector – Eng

12020184



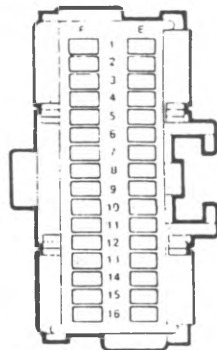
**GRAY**  
Metri-Pack  
**C100**  
Bulkhead Connector – I/P

12089908



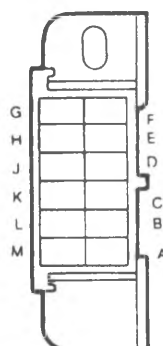
**BLACK**  
Bow Series  
**C203**  
I/P Cluster

12110115



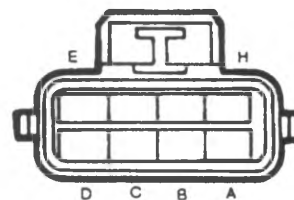
**BLUE**  
Metri-Pack 280  
**C216**  
PCM

12020043



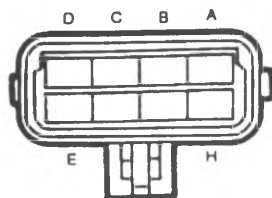
**BLACK**  
Metri-Pack 480  
**C272**  
Data Link Connector

12047937



**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line PCM to Engine

12047931



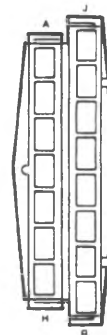
**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line Engine to PCM

12041254



**C200**  
In-Line I/P to Bulkhead

12020213



**C200**  
In-Line Bulkhead to I/P

# ENGINE CONTROLS 6.5L (396 CID) HD V8 DIESEL VIN S 8A-26-15

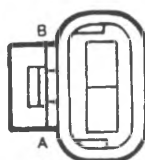
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**GRAY**  
Metri-Pack 150

**C195A**  
Intake Manifold Air Temperature  
Sensor

12078084



**BLACK**  
Metri-Pack 150

**C143**  
Coolant Temperature Sensor

12020403



**BLACK**

**C100A**  
MAP Sensor

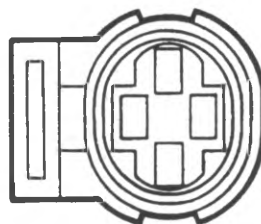
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**BLACK**

**C156**  
Barometric Pressure Sensor

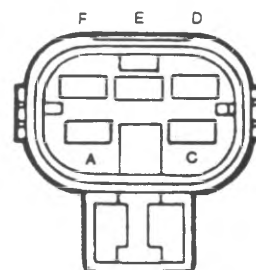
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**GRAY**  
Metri-Pack 150

**C167**  
Fuel Pump Oil Pressure Switch

12052287



**BLACK**  
Metri-Pack

**C132**  
Fuel Pump Relay

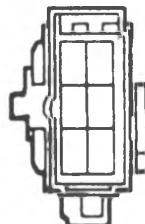
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**BLACK**  
Weather Pack

**C106A**  
In-Line Fuse to Fuel Pump and  
Sender

12020099



**C102**  
In-Line Fuel Pump to Bulkhead

12033709

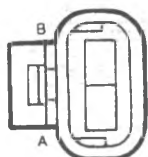


**BLACK**  
Metri-Pack 280

**C271**  
TCC/Brake Switch

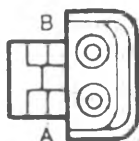
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12078084



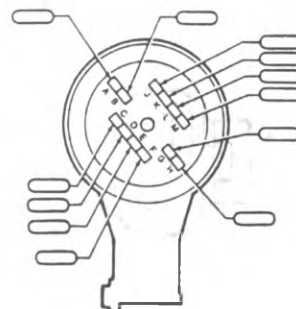
**BLACK**  
Metri-Pack 150  
**C365**  
Transmission Speed Sensor

12015792



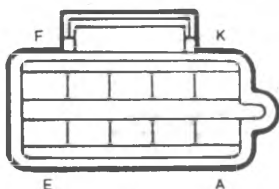
**BLACK**  
Weather Pack  
**C155A**  
Transfer Case Switch

12084690



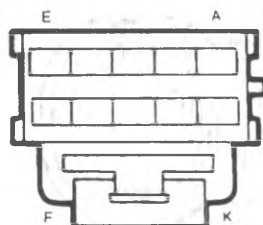
**C348**  
Transmission

12064770



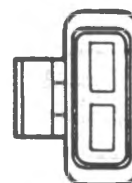
**NATURAL**  
Metri-Pack 150  
**C200A**  
In-Line Electronic Accelerator  
Pedal Control to PCM

12064769



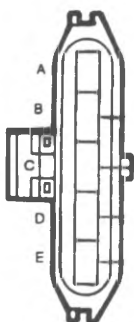
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Metri-Pack 150  
**C200A**  
In-Line PCM to Electronic  
Accelerator Pedal Control

12066681



**BLACK**  
Metri-Pack 630  
**C130**  
Fuel Pump In-Line Fuse

12015982



**C145**  
Glow Plug Control Module

12065172



**BLACK**  
Metri-Pack 280  
**C160**  
In-Line Transfer Case Switch to  
PCM

12065171



**BLACK**  
Metri-Pack 280  
**C160**  
In-Line PCM to Transfer Case  
Switch

12020600



**BLACK**  
Metri-Pack 280

**C365**  
**Transmission Speed Sensor**



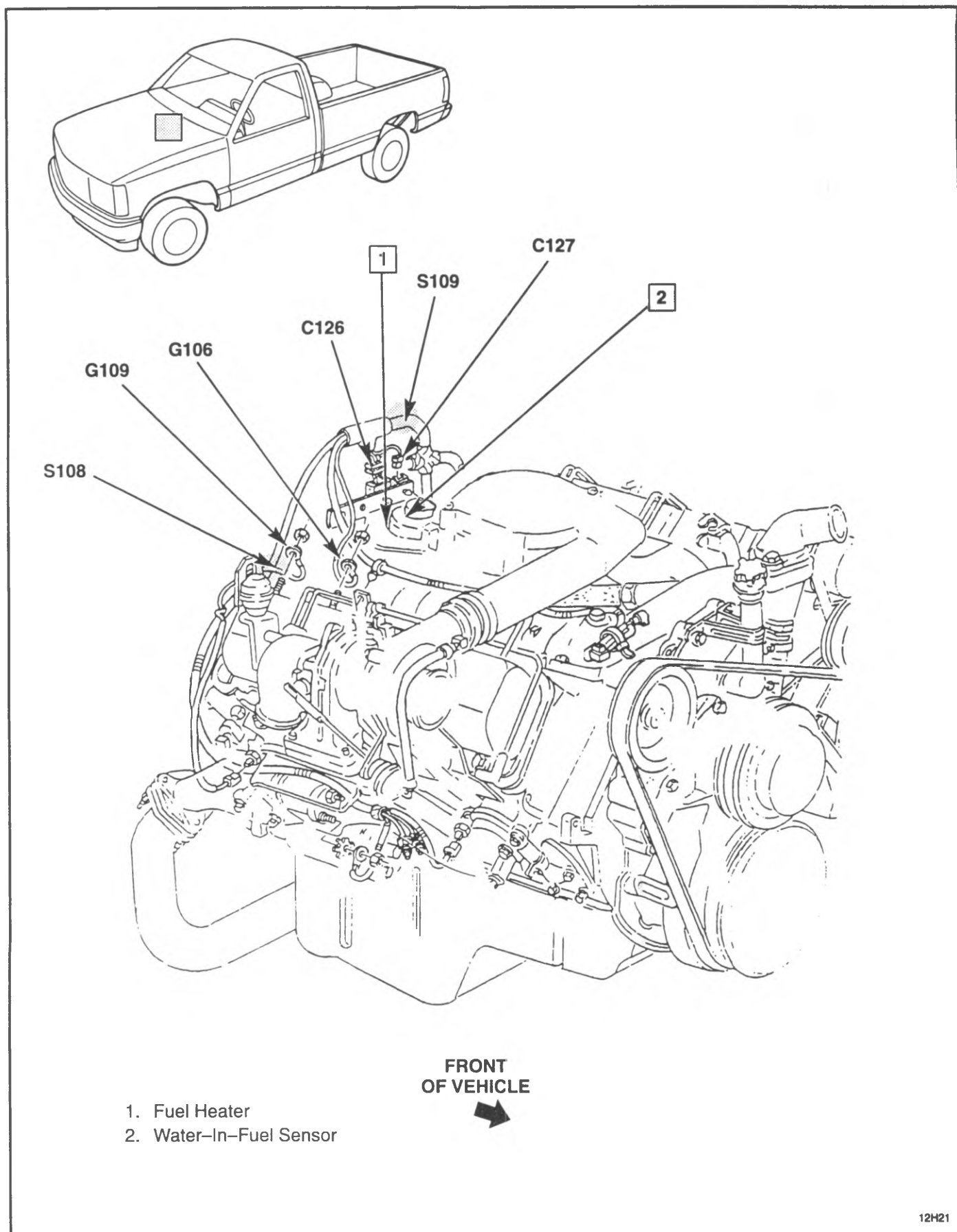


Figure 1 — Turbo Diesel Engine Wiring, RH Side

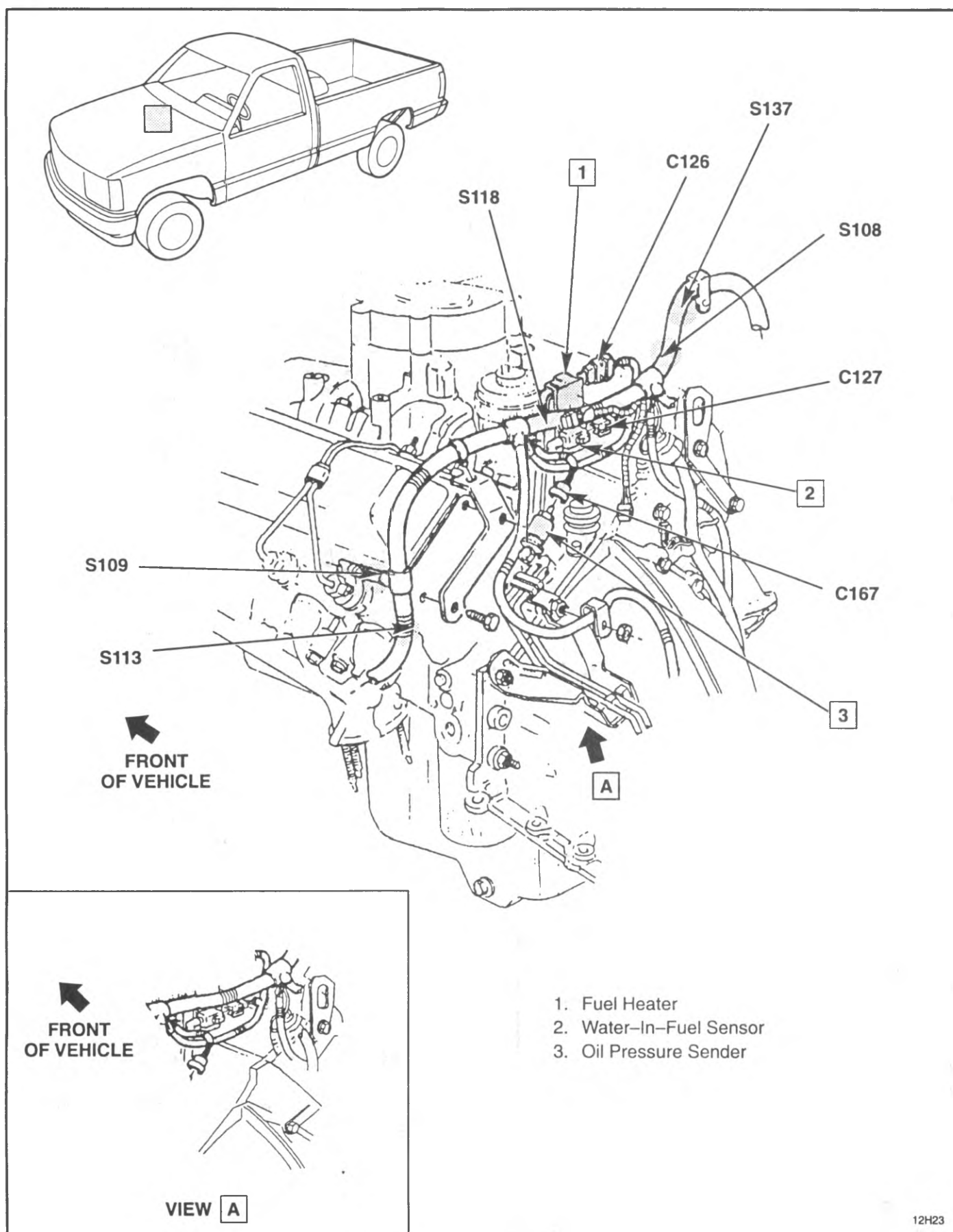


Figure 2 — 6.5L Diesel Engine Wiring, Rear

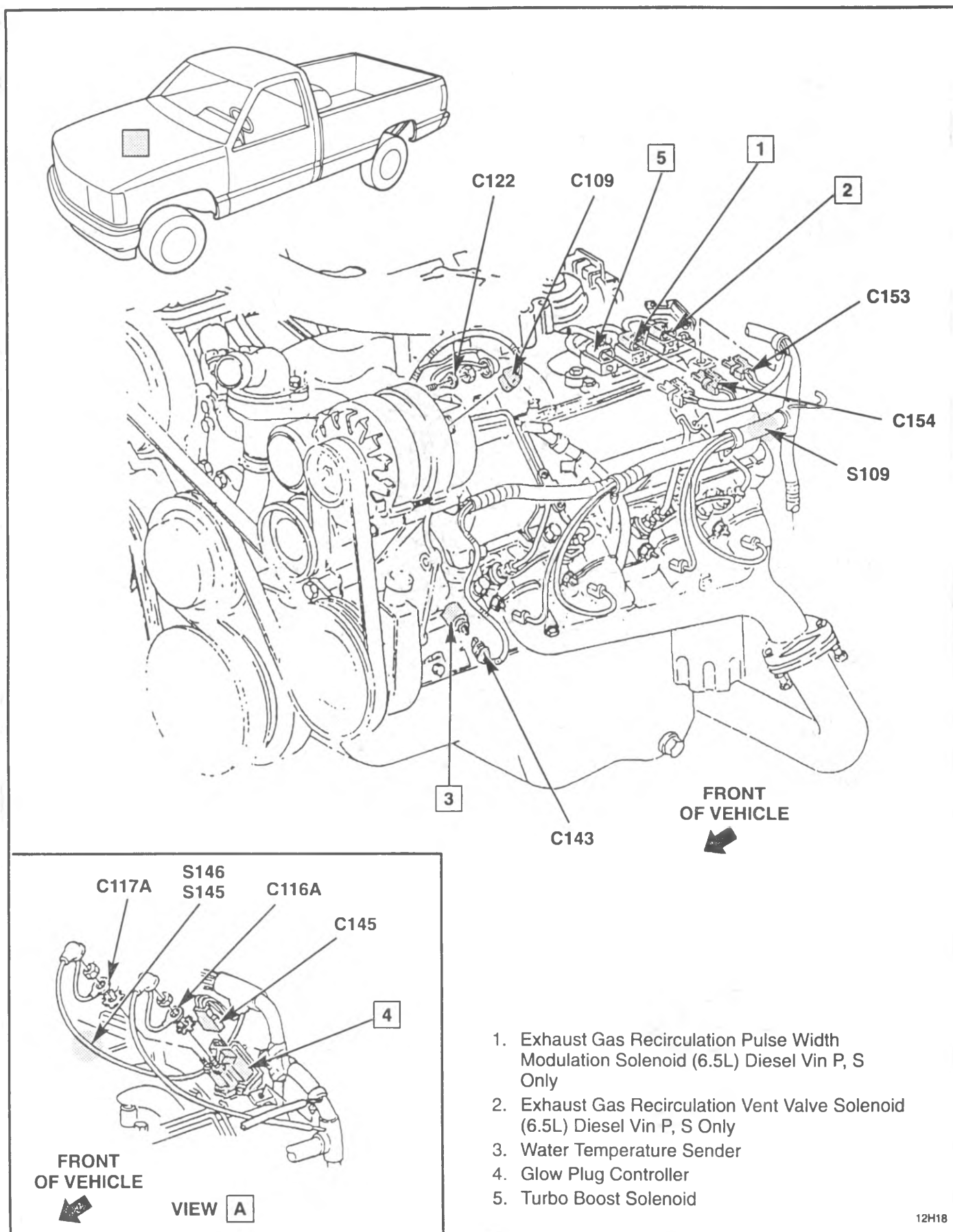


Figure 3 — 6.5L Diesel Engine Wiring, LH Side

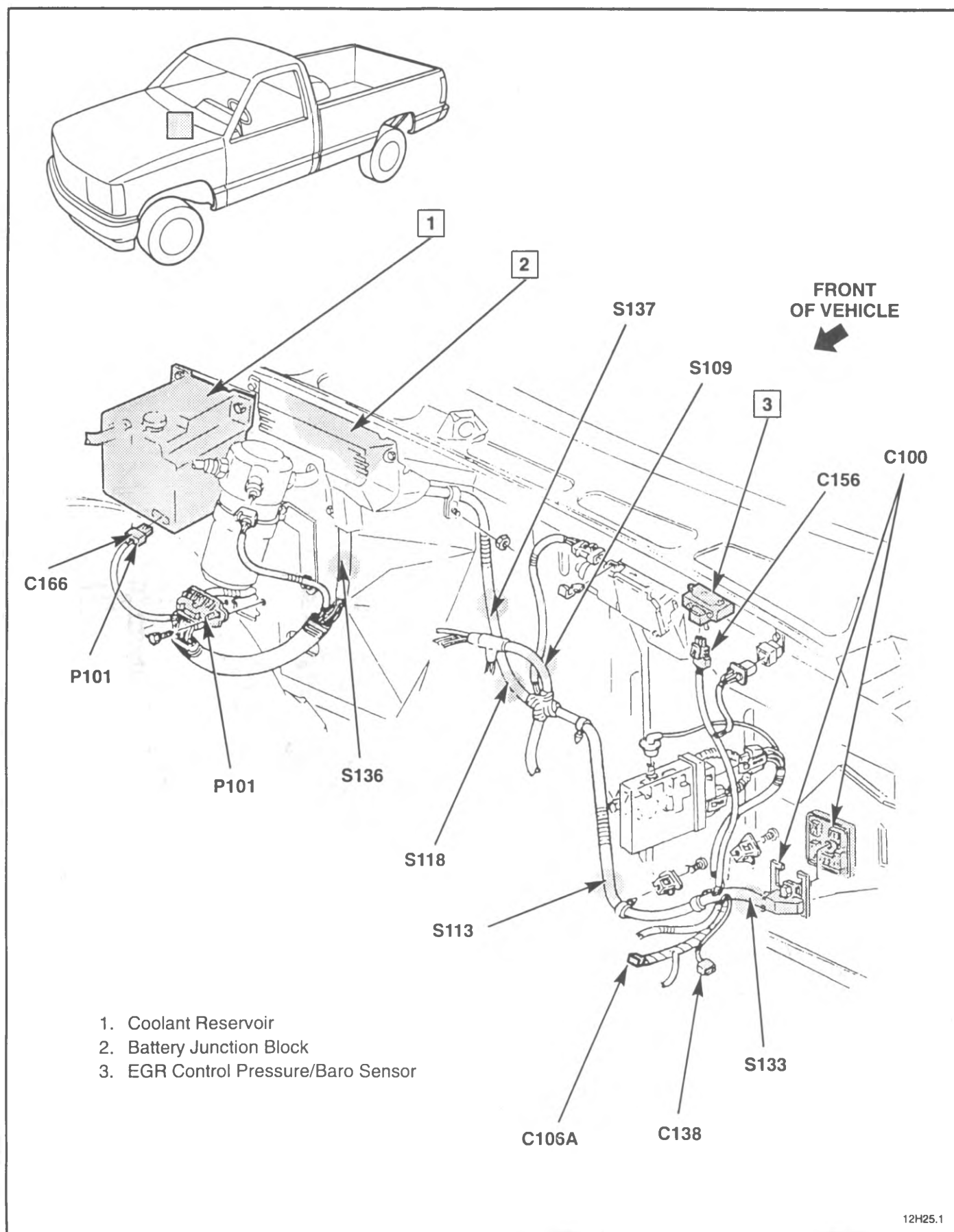


Figure 4 — Cowl Wiring, (6.5L) Diesel Engine

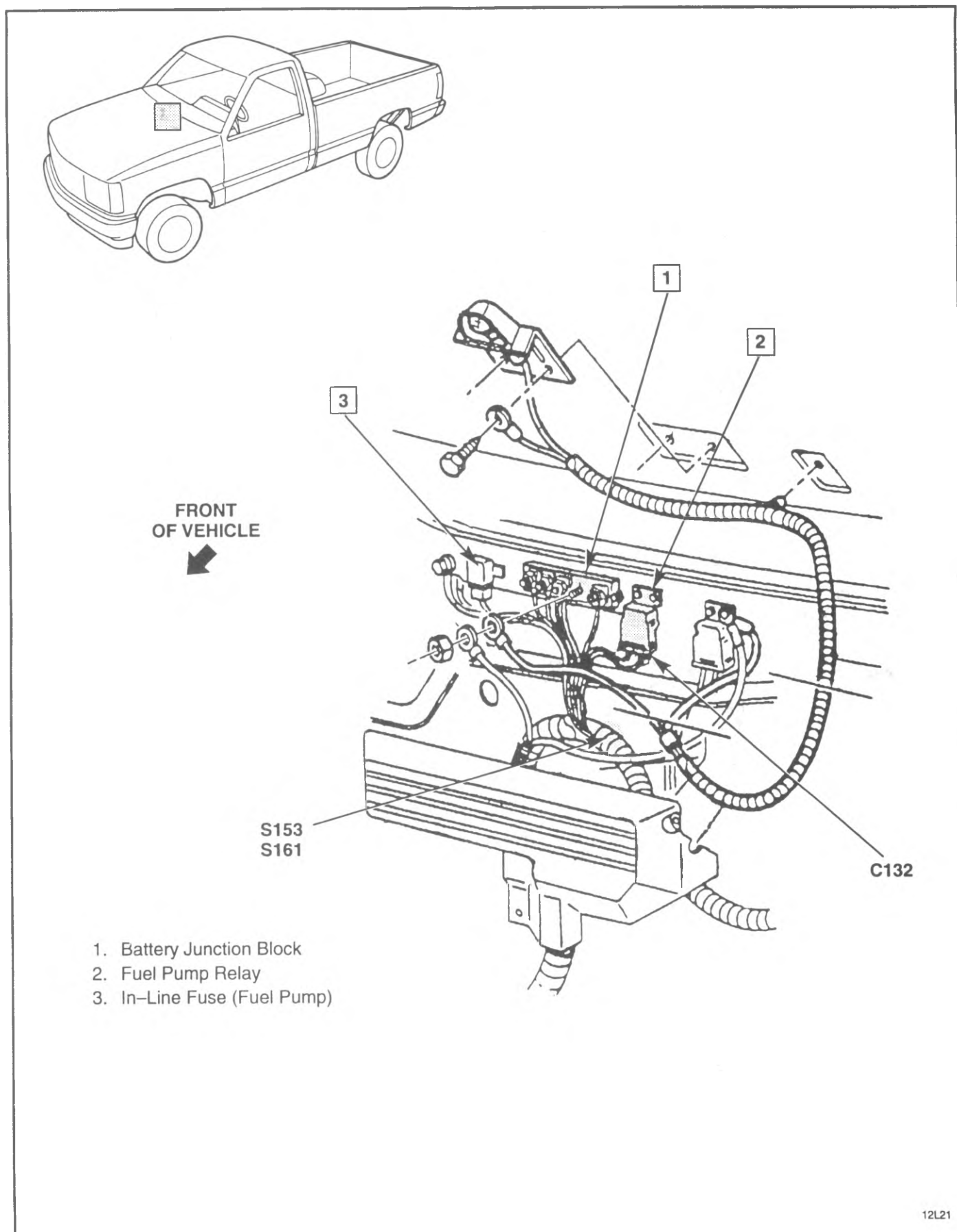


Figure 5 — Battery Junction Block Wiring

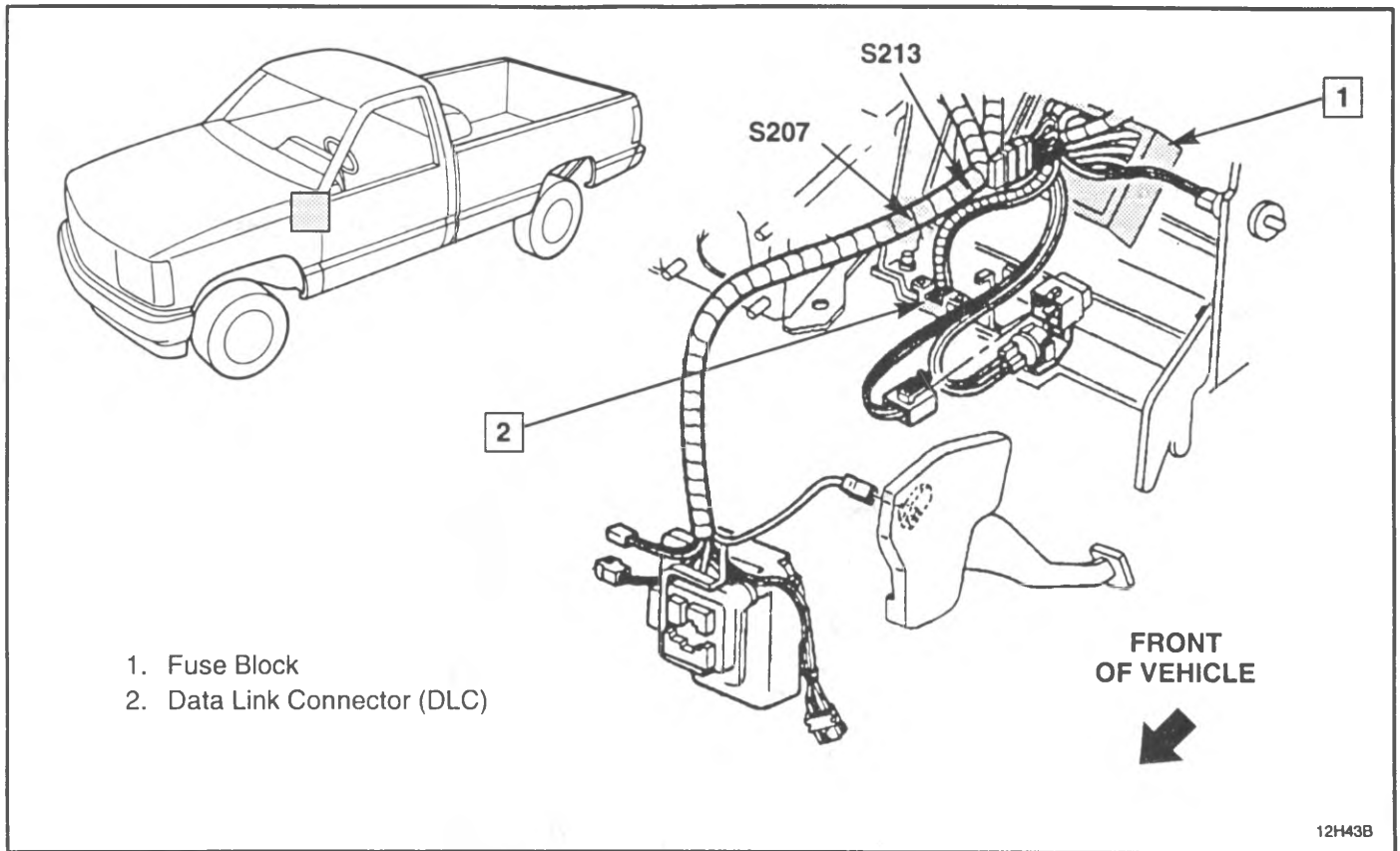


Figure 6 — Instrument Panel, LH Side

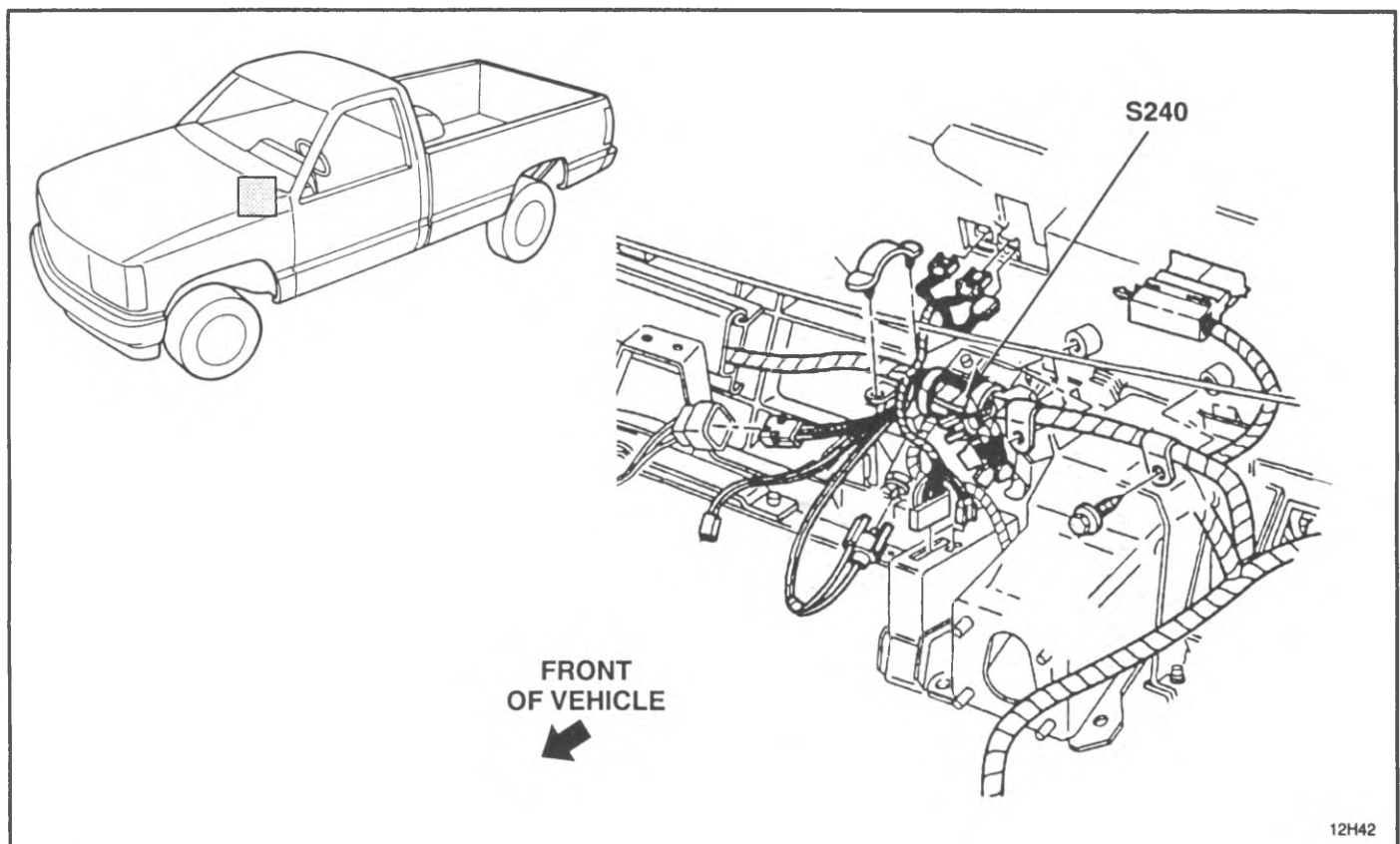
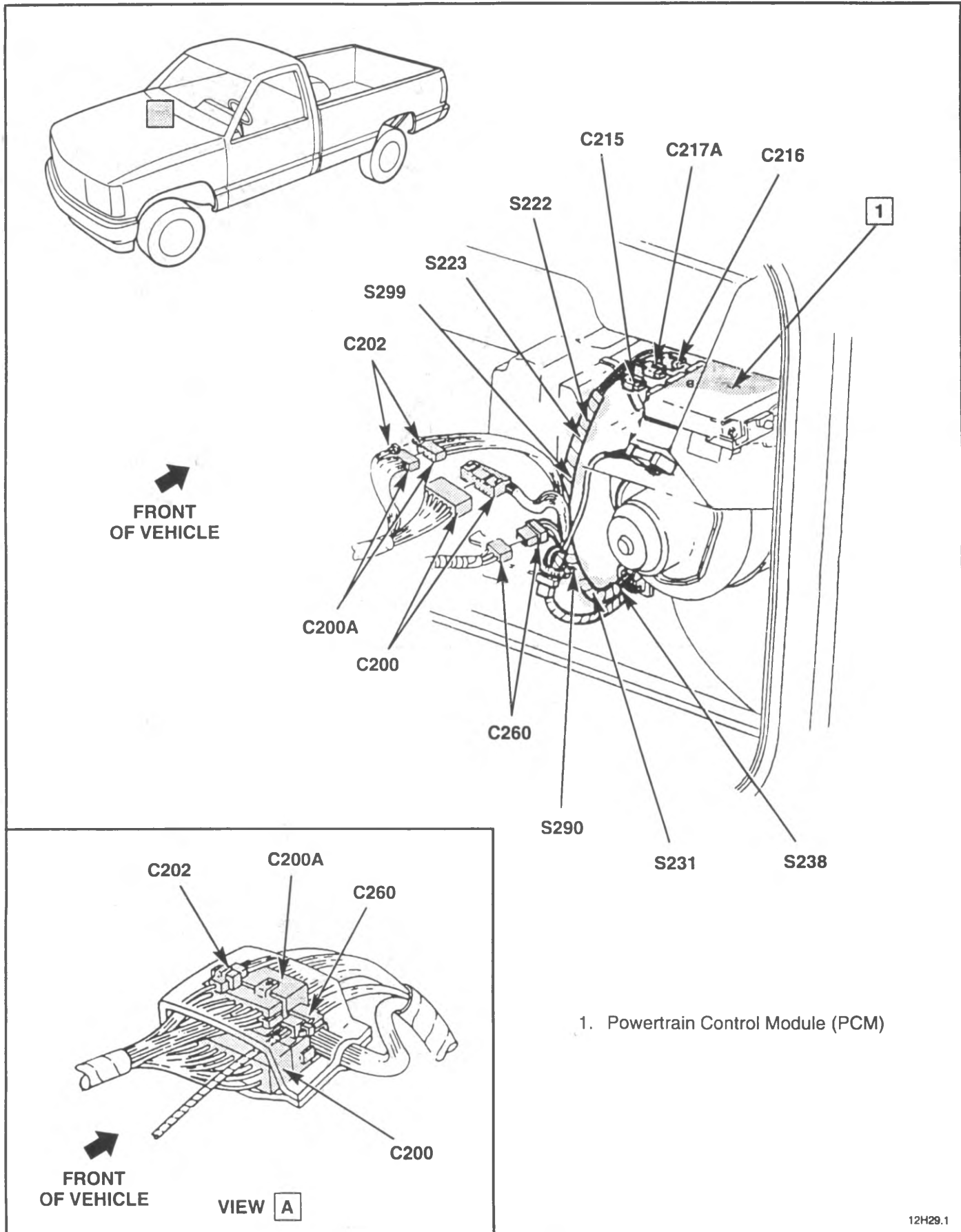


Figure 7 — Instrument Panel Wiring, RH Side



12H29.1

Figure 8 — PCM Wiring, Diesel Engines



## COMPONENT LOCATION

**Page — Figure**

Barometric Pressure Sensor	Upper LH side of cowl	27-20	4
Battery	LH front of engine compartment	27-20	4
Battery Junction Block	RH rear engine compartment at cowl	27-20	4
Clutch Pedal Position Switch	On clutch pedal support bracket	Not Shown	
DLC	Under LH side of I/P	27-22	6
Fuel Pump Oil Pressure Switch	Upper rear of engine	27-18	2
Fuel Pump	LH frame rail	27-21	5
Fuel Pump and Sender	In fuel tank	Not Shown	
EGR Solenoid (Pulse Width)	LH rear top of engine	27-19	3
Electronic Accelerator Pedal			
Actuator	Top of accelerator bracket	Not Shown	
Electronic Injection Pump	Top front of engine	Not Shown	
Engine Coolant Temperature			
Sensor	LH front of engine	27-19	3
Fuel Heater	Lower fuel filter housing	27-17	1
Fuse Block	Under LH side of I/P	27-22	6
Glow Plug Controller	LH rear top of engine	27-19	3
Intake Manifold Air Temperature			
Sensor	RH side of upper intake manifold	Not Shown	
I/P Cluster	LH side of I/P	Not Shown	
Powertrain Control Module (PCM)	Under RH end of I/P	27-23	8
TCC/Brake Switch	On brake pedal support bracket	Not Shown	

## CONNECTORS:

C100	At bulkhead connector	27-20	4
C101	At bulkhead connector	Not Shown	
C106A	LH side of cowl near bulkhead connector	27-20	4
C160A	Top front of engine	Not Shown	
C161A	Top front of engine	Not Shown	
C174	Top front of engine	Not Shown	
C200	Under RH side of I/P, near blower motor	27-23	8

## GROMMETS:

P101	RH lower cowl (engine compartment)	27-20	4
------	------------------------------------	-------	---

## GROUND:

G106	Top RH rear of engine	27-17	1
G108	Top RH rear of engine	Not Shown	

## SPLICES:

S108	Upper RH side of engine	27-17	1
S109	Upper LH side of engine	27-17	1
S113	Engine compartment	27-18	2
S118	Rear of engine	27-18	2
S136	Rear of engine compartment, near center	27-18	2
S137	Near fuel pump relay	27-20	4
S145	At glow plug controller	27-19	3
S146	At glow plug controller	27-19	3
S153	Near battery junction block	27-21	5
S161	At battery junction block	27-21	5
S190A	Engine harness near cowl, LH rear engine compartment	Not Shown	
S207	Under LH side of I/P	27-22	6
S213	Under LH side of I/P	27-22	6

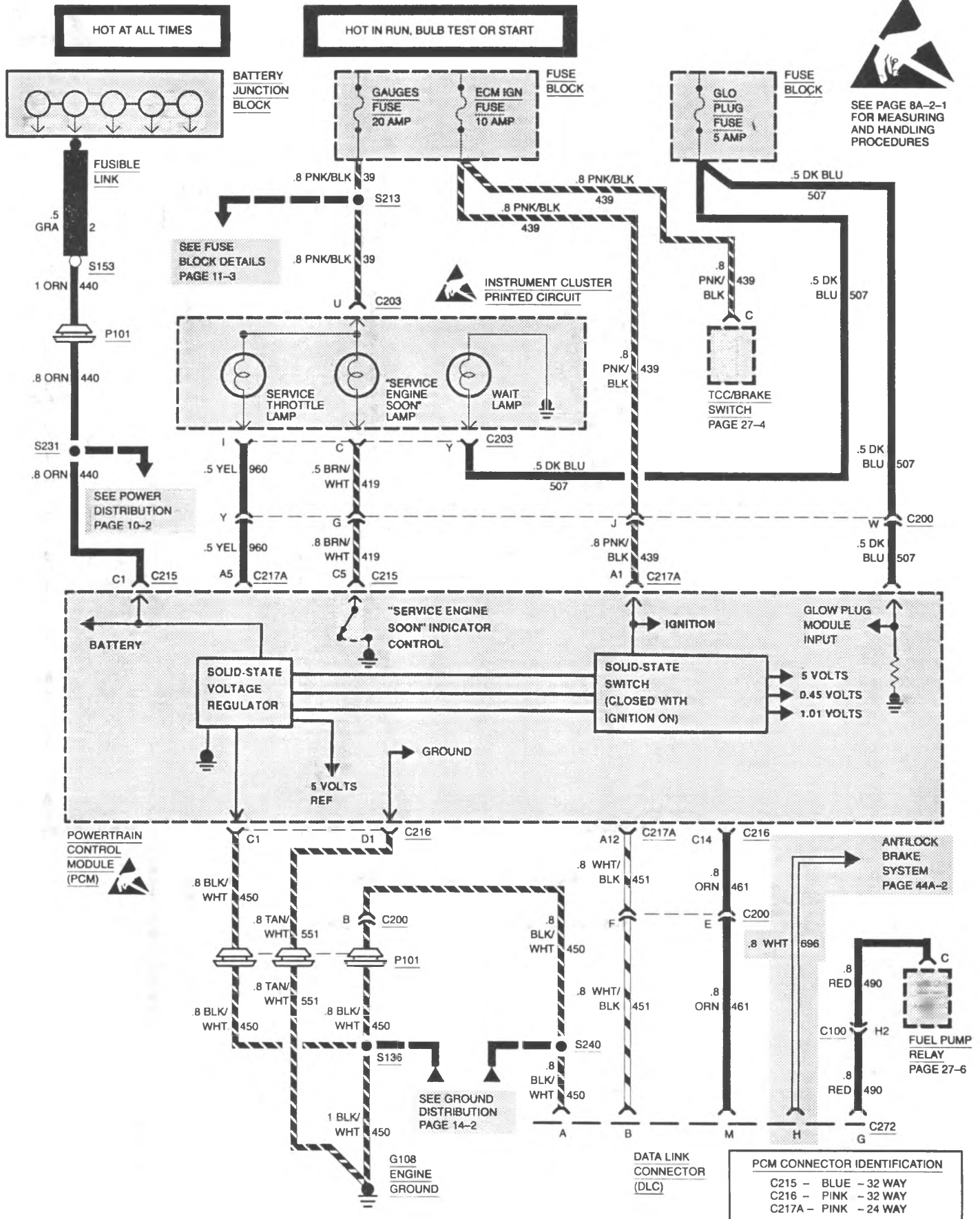


**COMPONENT LOCATION****Page — Figure****SPLICES (CONTINUED):**

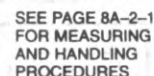
S222	Under RH side of I/P, near PCM	27-23	8
S223	Near PCM, under RH side of I/P	27-23	8
S231	Engine harness, near PCM	27-23	8
S238	Engine harness, near PCM	27-23	8
S240	Behind LH side of I/P	27-22	7
S288A	Near PCM, under RH side of I/P	Not Shown	
S290 (Suburban, Yukon)	Under RH side of I/P, near PCM	27-23	8

# ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F L65 8A-27-3

## W/MANUAL TRANSMISSION OR HD AUTOMATIC TRANSMISSION



## W/MANUAL OR HD AUTOMATIC TRANSMISSION

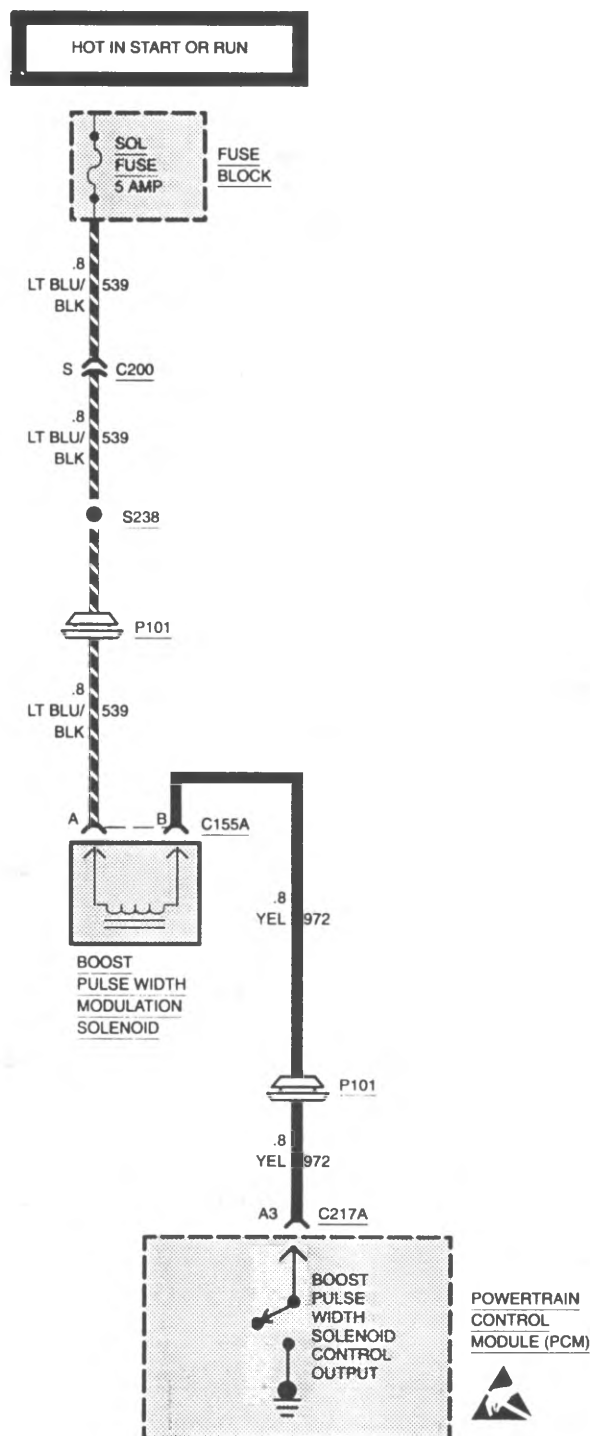


# ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F L65 8A-27-5

W/MANUAL OR HD AUTOMATIC TRANSMISSION



SEE PAGE 8A-2-1  
FOR MEASURING  
AND HANDLING  
PROCEDURES

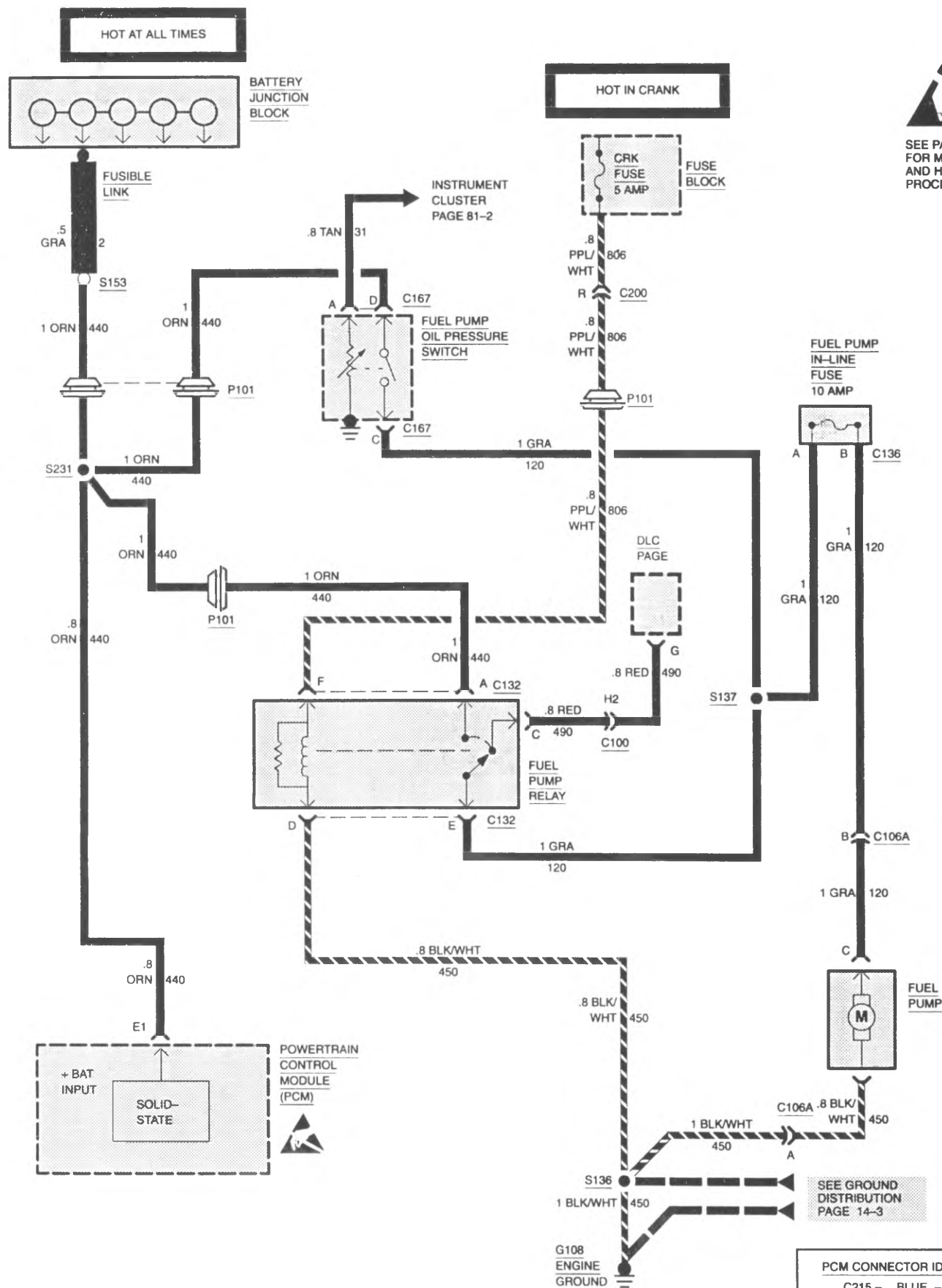


## PCM CONNECTOR IDENTIFICATION

C215 - BLUE - 32 WAY  
C218 - PINK - 24 WAY  
C217A - PINK - 32 WAY

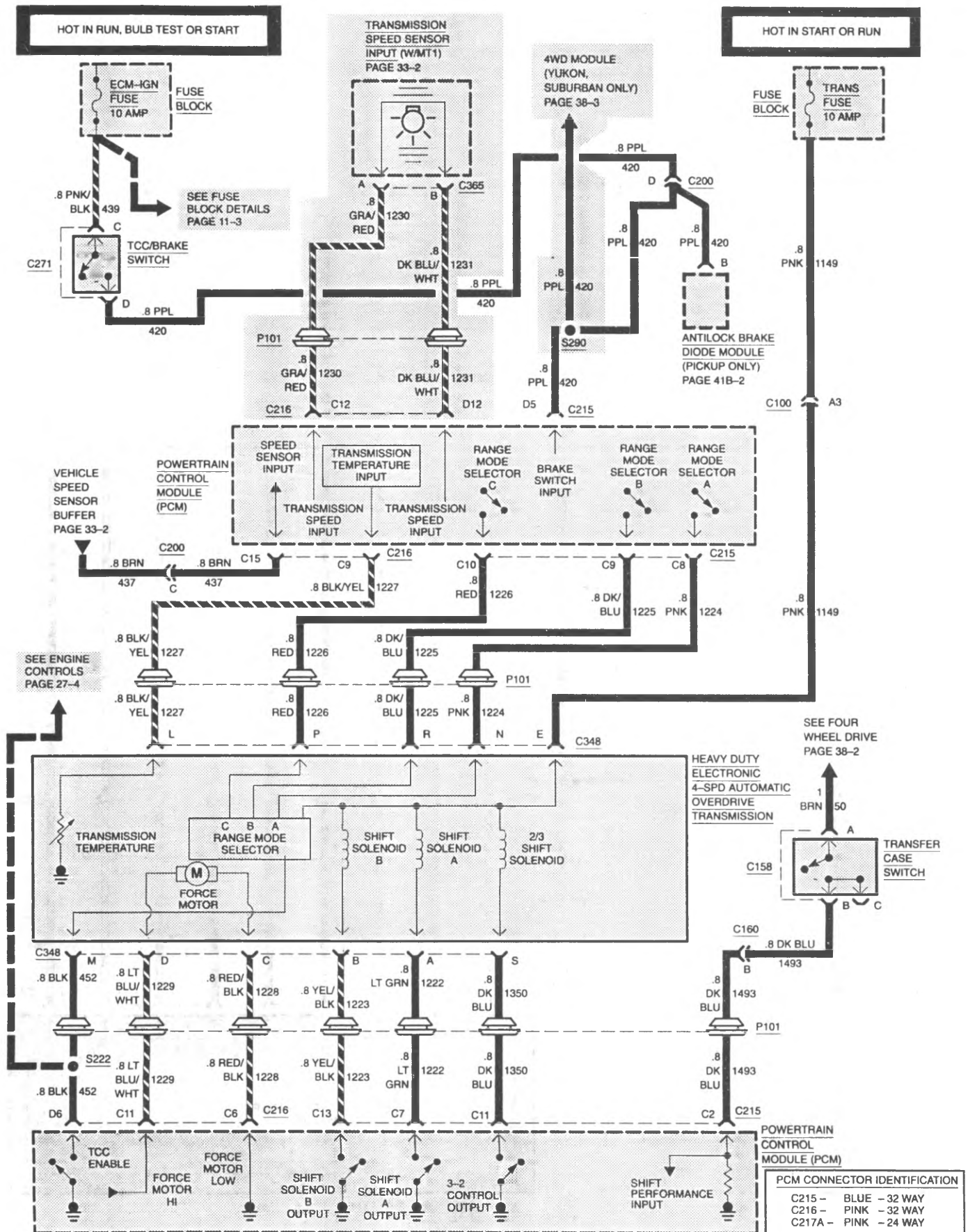
# 8A-27-6 ENGINE CONTROLS HD 6.5L TURBO DIESEL V8 VIN F

## FUEL PUMP CONTROLS



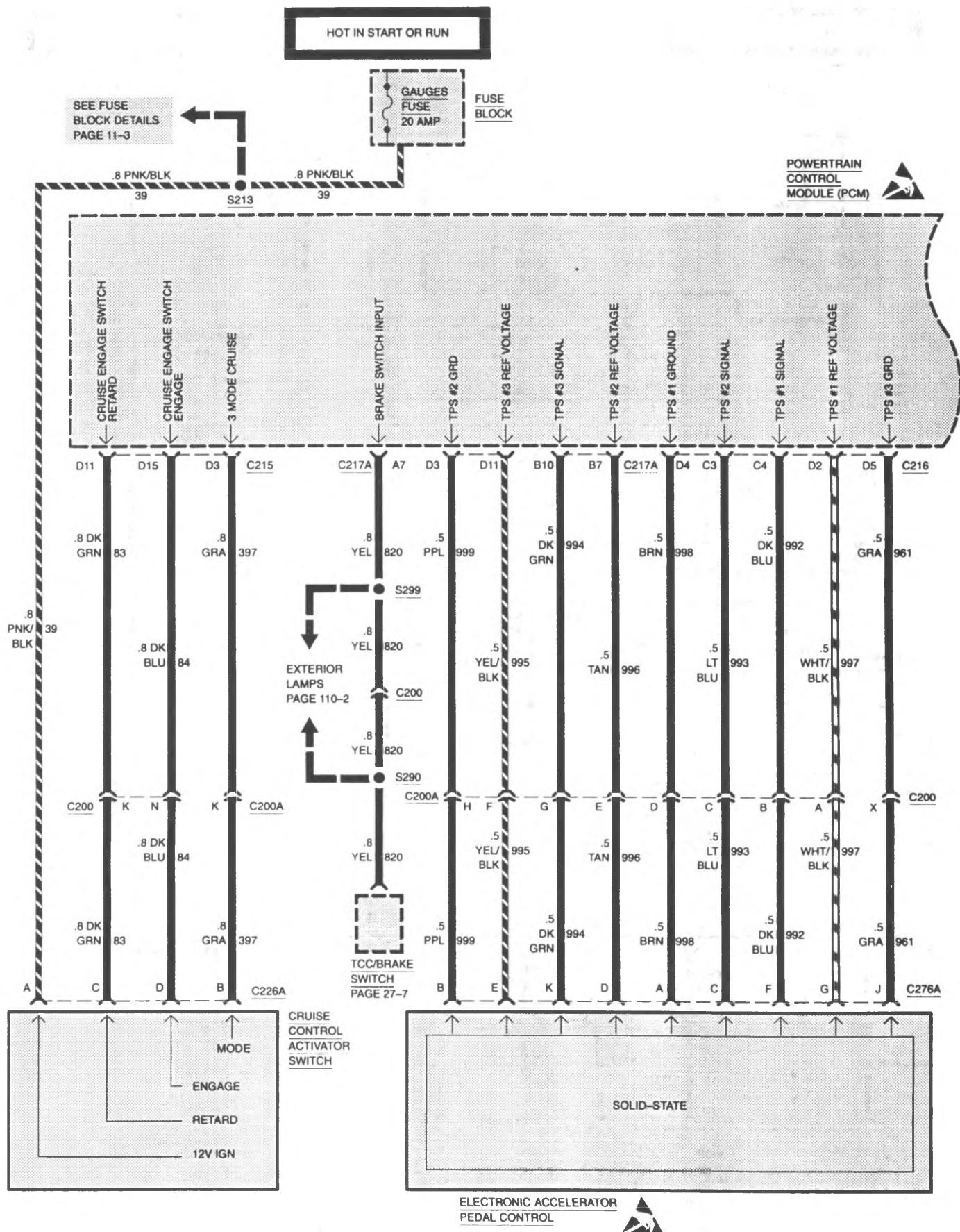
PCM CONNECTOR IDENTIFICATION		
C215 -	BLUE -	32 WAY
C218 -	PINK -	32 WAY
C217A -	PINK -	24 WAY

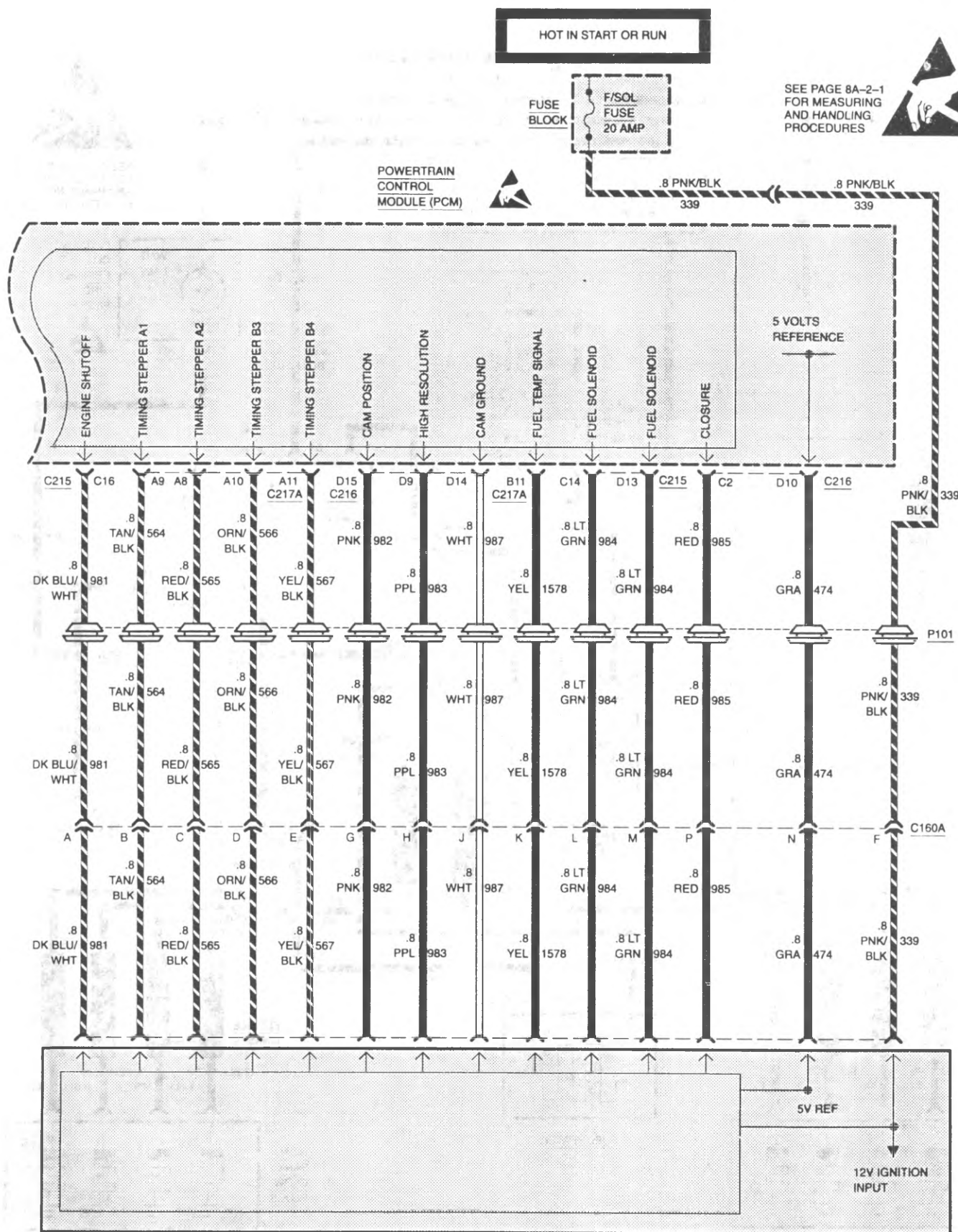
## W/HD AUTOMATIC TRANSMISSION





# 8A-27-8 ENGINE CONTROLS HD 6.5L TURBO DIESEL V8 VIN F



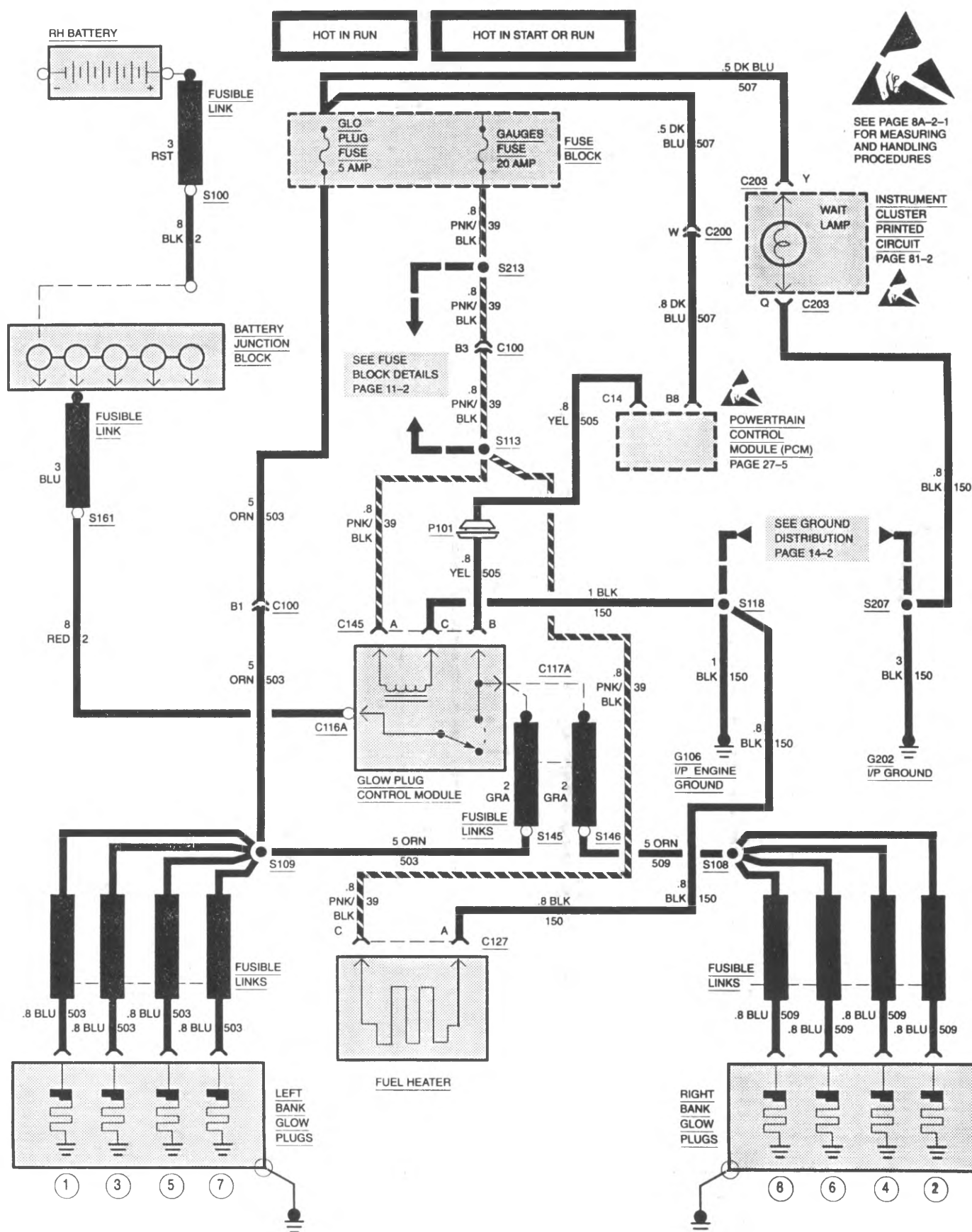


ELECTRONIC  
INJECTION PUMP

PCM CONNECTOR IDENTIFICATION	
C215 -	BLUE - 32 WAY
C216 -	PINK - 32 WAY
C217A -	PINK - 24 WAY



## GLOW PLUG SYSTEM



# ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F 8A-27-11

## POWERTRAIN CONTROL MODULE — HD 6.5L TURBO DIESEL ENGINE (32-PIN BLUE)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
440	.8	ORN	C1	12V + BATTERY
*1493	.8	DK BLU	C2	4WD INPUT
			C3	NOT USED
			C4	NOT USED
419	.8	BRN/WHT	C5	"SERVICE ENGINE SOON" LAMP OUTPUT
			C6	NOT USED
*1222	.8	LT GRN	C7	TRANS SHIFT SOLENOID A
*1224	.8	PNK	C8	TRANS RANGE MODE A
*1225	.8	DK BLU	C9	TRANS RANGE MODE B
*1226	.8	RED	C10	TRANS RANGE MODE C
1350	.8	DK BLU	C11	TCC SOLENOID CONTROL
			C12	NOT USED
*1223	.8	YEL/BLK	C13	TRANS SHIFT SOLENOID B
984	.8	LT GRN	C14	FUEL INJECT CONTROL
435	.8	GRA	C15	EGR SOLENOID
981	.8	DK BLU/WHT	C16	FUEL SHUTOFF SOLENOID
			D1	NOT USED
997	.5	WHT/BLK	D2	REFERENCE VOLTAGE TPS 1
397	.8	GRA	D3	CRUISE "ON/OFF" REQUEST SIGNAL
			D4	NOT USED
420	.8	PPL	D5	BRAKE SWITCH INPUT (TCC)
			D6	NOT USED
			D7	NOT USED
834	.5	BRN	D8	VEHICLE SPEED SIGNAL
			D9	NOT USED
			D10	NOT USED
83	.8	DK GRN	D11	CRUISE CONTROL SWITCH — RESUME/ACCEL
			D12	NOT USED
984	.8	LT GRN	D13	FUEL INJECT CONTROL
			D14	NOT USED
84	.8	DK BLU	D15	CRUISE CONTROL SWITCH — SET/ COAST
			D16	NOT USED

\* W/AUTO TRANS ONLY

# 8A-27-12 ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F

## POWERTRAIN CONTROL MODULE — HD 6.5L TURBO DIESEL ENGINE (32-PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
450	.8	BLK/WHT	C1	SYSTEM GROUND
985	.8	RED	C2	FUEL INJECT SIGNAL
993	.5	LT BLU	C3	TPS 2 SIGNAL
992	.5	DK BLU	C4	TPS 1 SIGNAL
433	.8	GRA/BLK	C5	BAROMETRIC PRESSURE SENSOR INPUT
*1228	.8	RED/BLK	C6	TRANS FORCE MOTOR HIGH
432	.8	LT GRN	C7	MANIFOLD ABSOLUTE PRESSURE SENSOR INPUT (BOOST SIGNAL)
410	.8	YEL	C8	COOLANT TEMPERATURE (ECT)
*1227	.8	BLK/YEL	C9	TRANS TEMPERATURE INPUT
416	.8	GRA	C10	+5 VOLT REFERENCE (MULTI)
*1229	.8	LT BLU/WHT	C11	TRANS FORCE MOTOR LOW
1230	.8	GRA/RED	C12	TRANS SPEED SENSOR INPUT
505	.8	YEL	C13	GLOW PLUG RELAY CONTROL
1061	.8	ORN/BLK	C14	SERIAL DATA
437	.8	BRN	C15	VEHICLE SPEED SENSOR INPUT
			C16	NOT USED
551	.8	TAN/WHT	D1	ENGINE GROUND
950	.8	LT GRN	D2	CLOSURE GROUND
999	.5	PPL	D3	TPS 2 GROUND
998	.5	BRN	D4	TPS 1 GROUND
961	.5	GRA	D5	TPS 3 GROUND
452	.8	BLK	D6	COOLANT TEMP, INTAKE AIR TEMP, CRANKSHAFT POSITION, TRANS FLUID TEMP AND EGR CONTROL PRESSURE/BARO SENSOR
			D7	NOT USED
1586	.8	BRN/WHT	D8	2000 PULSE VEHICLE SPEED INPUT
983	.8	PPL	D9	HIGH RESOLUTION SIGNAL
474	.8	GRA	D10	+5 VOLT REFERENCE, OPTICAL SENSOR
995	.5	YEL/BLK	D11	REFERENCE VOLTAGE TPS 3
1231	.8	DK BLU/WHT	D12	TRANS SPEED SENSOR INPUT
643	.8	DK BLU/WHT	D13	CRANK SENSOR
987	.8	WHT	D14	OPTICAL SENSOR GROUND
982	.8	PNK	D15	OPTICAL SENSOR CAM SIGNAL
			D16	NOT USED

\* W/AUTO TRANS ONLY

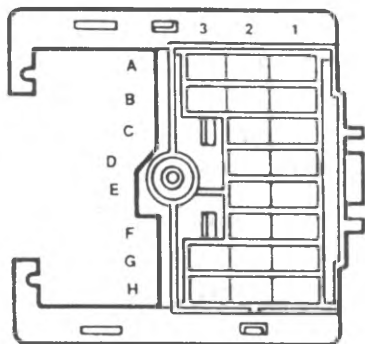
# ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F 8A-27-13

## POWERTRAIN CONTROL MODULE — HD 6.5L TURBO DIESEL ENGINE (32-PIN PINK)

CIRCUIT NO.	WIRE SIZE	COLOR	CAVITY	DESCRIPTION
439	.8	PNK/BLK	A1	12V IGNITION (FUSED)
			A2	NOT USED
972		YEL	A3	WASTEGATE SOLENOID CONTROL
971	.8	WHT	A4	EGR VENT SOLENOID
960	.5	YEL	A5	"SERVICE THROTTLE" LAMP OUTPUT
			A6	NOT USED
820	.8	YEL	A7	CRUISE CONTROL BRAKE SWITCH SIGNAL
565	.8	RED/BLK	A8	TIMING STEPPER A2
564	.8	TAN/BLK	A9	TIMING STEPPER A1
566	.8	ORN/BLK	A10	TIMING STEPPER B3
567	.8	YEL/BLK	A11	TIMING STEPPER B4
451	.8	WHT/BLK	A12	DIAGNOSTIC ENABLE
			B1	NOT USED
			B2	NOT USED
			B3	NOT USED
59		DK GRN	B4	A/C ON INPUT
			B5	NOT USED
			B6	NOT USED
996	.5	TAN	B7	REFERENCE VOLTAGE TPS 2
507	.5	DK BLU	B8	GLOW PLUG "WAIT" LAMP OUTPUT
			B9	NOT USED
994	.5	DK GRN	B10	TPS 3 SIGNAL INPUT
1578	.8	YEL	B11	FUEL TEMPERATURE INPUT
472	.8	TAN	B12	INTAKE MANIFOLD AIR TEMPERATURE

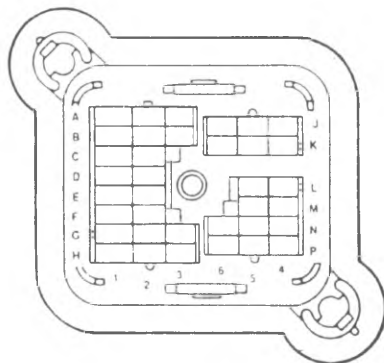
# 8A-27-14 ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F

12020183



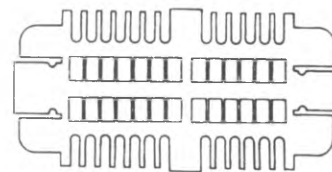
**GRAY**  
Metri-Pack  
**C100**  
Bulkhead Connector – Eng

12020184



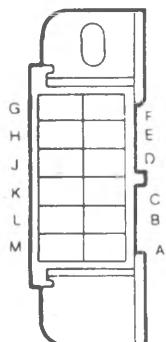
**GRAY**  
Metri-Pack  
**C100**  
Bulkhead Connector – I/P

12089908



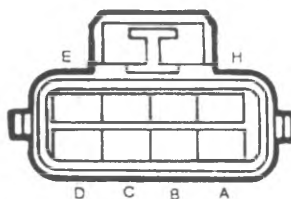
**BLACK**  
Bow Series  
**C203**  
I/P Cluster

12020043



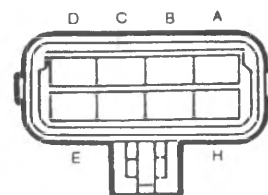
**BLACK**  
Metri-Pack 480  
**C272**  
Data Link Connector

12047937



**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line PCM to Engine

12047931



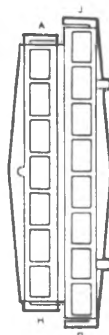
**BLACK**  
Metri-Pack 150  
**C161A**  
In-Line Engine to PCM

12041254



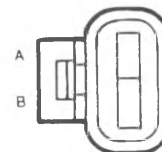
**C200**  
In-Line I/P to Bulkhead

12020213



**C200**  
In-Line Bulkhead to I/P

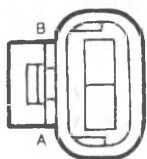
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**GRAY**  
Metri-Pack 150  
**C195A**  
Intake Manifold Air Temperature  
Sensor

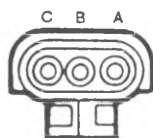
# ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F 8A-27-15

12078084



**BLACK**  
Metri-Pack 150  
**C143**  
Coolant Temperature Sensor

12020403



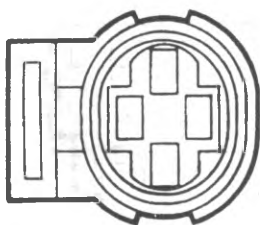
**BLACK**  
**C100A**  
MAP Sensor

12020403



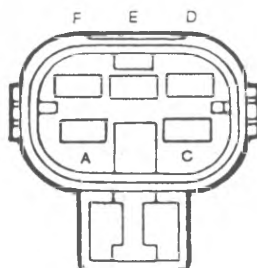
**BLACK**  
**C156**  
Barometric Pressure Sensor

12065401



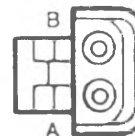
**GRAY**  
Metri-Pack 150  
**C167**  
Fuel Pump Oil Pressure Switch

12052287



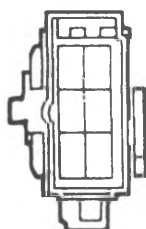
**BLACK**  
Metri-Pack  
**C132**  
Fuel Pump Relay

12015792



**BLACK**  
Weather Pack  
**C106A**  
In-Line Fuse to Fuel Pump and Sender

12020099



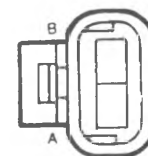
**C102**  
In-Line Fuel Pump to Bulkhead

12033709



**BLACK**  
Metri-Pack 280  
**C271**  
TCC/Brake Switch

12078084



**BLACK**  
Metri-Pack 150  
**C365**  
Transmission Speed Sensor

# 8A-27-16 ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F

12015792



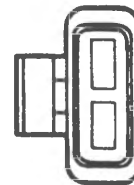
**BLACK**  
Weather Pack  
**C155A**  
Transfer Case Switch

12084690



**C348**  
Transmission

12066681



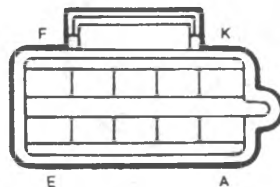
**BLACK**  
Metri-Pack 630  
**C130**  
Fuel Pump In-Line Fuse

12034417



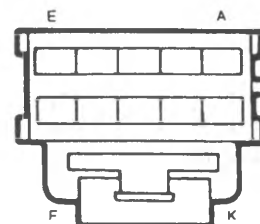
**C227A**  
Clutch Pedal Position Switch

12064770



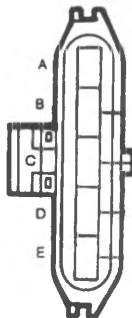
**NATURAL**  
Metri-Pack 150  
**C200A**  
In-Line Electronic Accelerator  
Pedal Control to PCM

12064769



**NATURAL**  
Metri-Pack 150  
**C200A**  
Inline PCM to Electronic  
Accelerator Pedal Control

12015982



**C145**  
Glow Plug Control Module

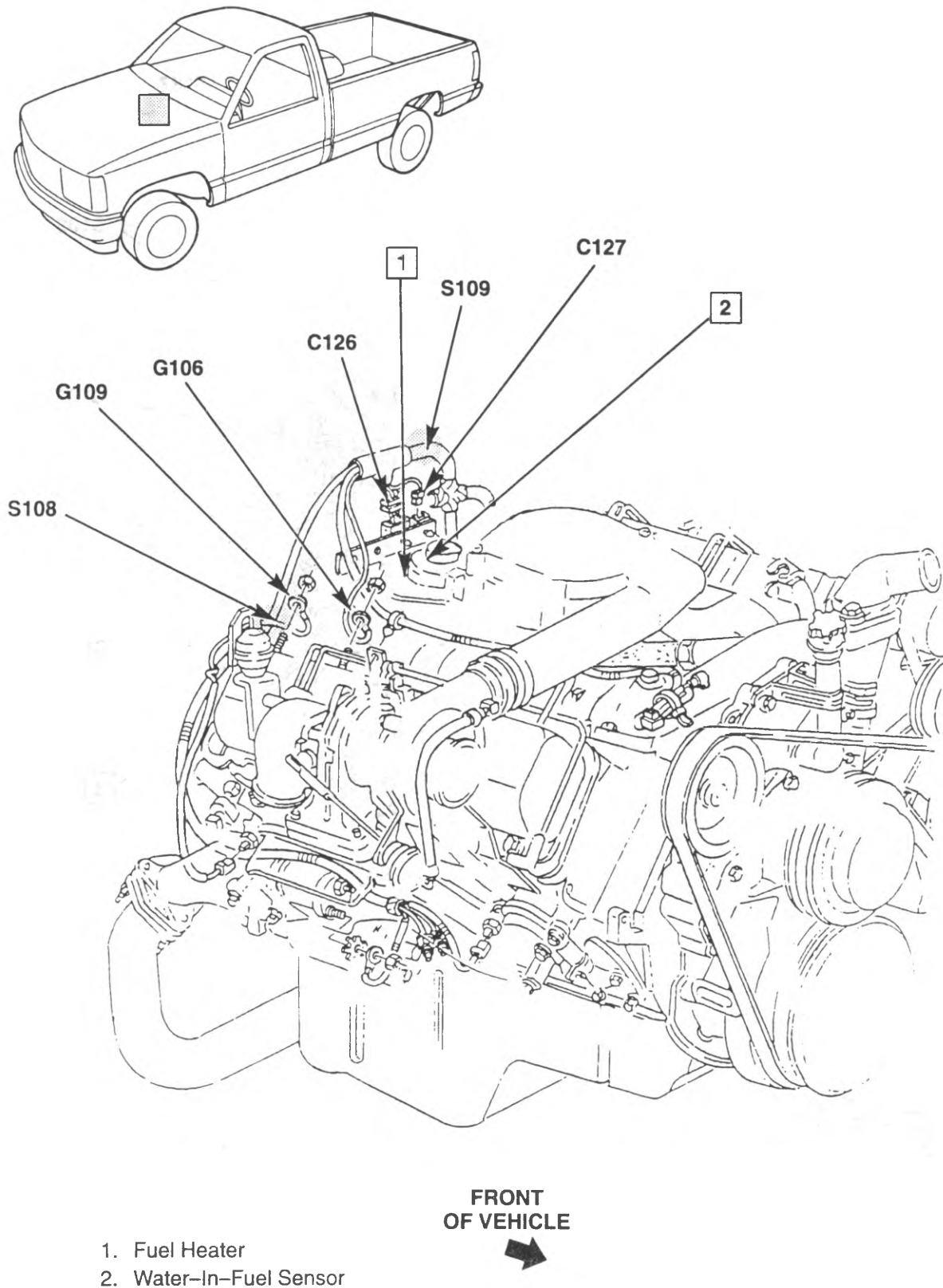


Figure 1 — Turbo Diesel Engine Wiring, RH Side



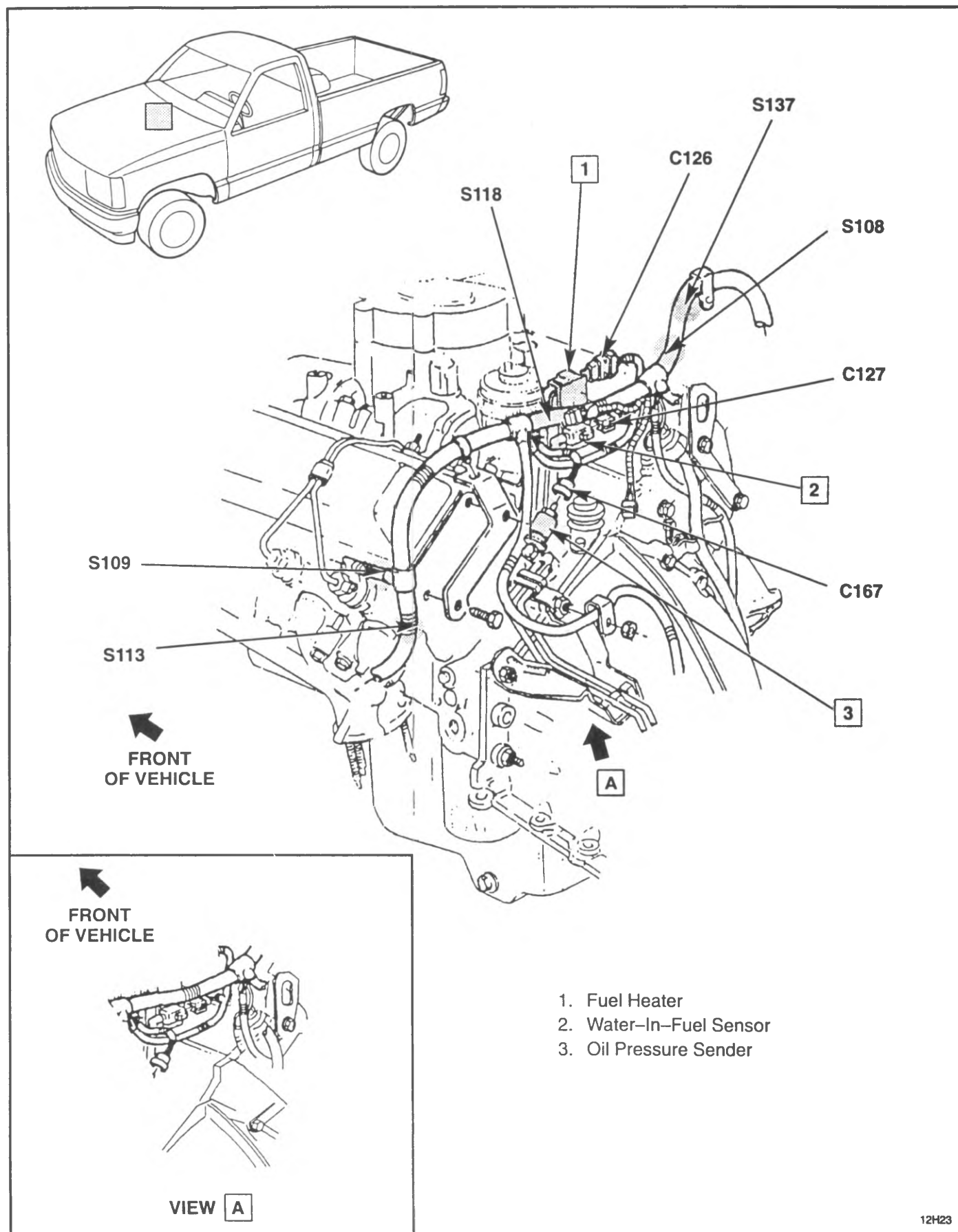


Figure 2 — 6.5L Diesel Engine Wiring, Rear

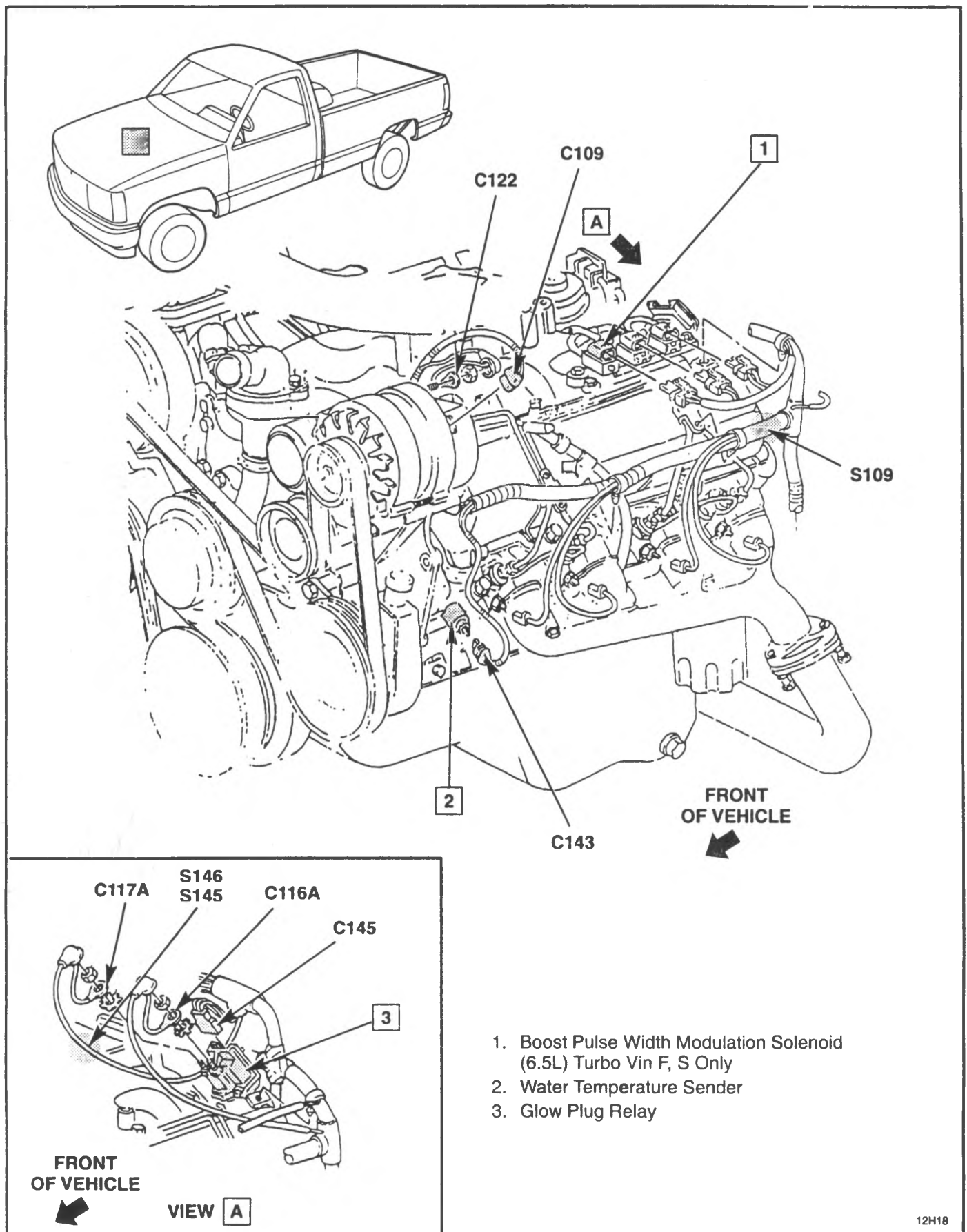


Figure 3 — 6.5L Diesel Engine Wiring, LH Side

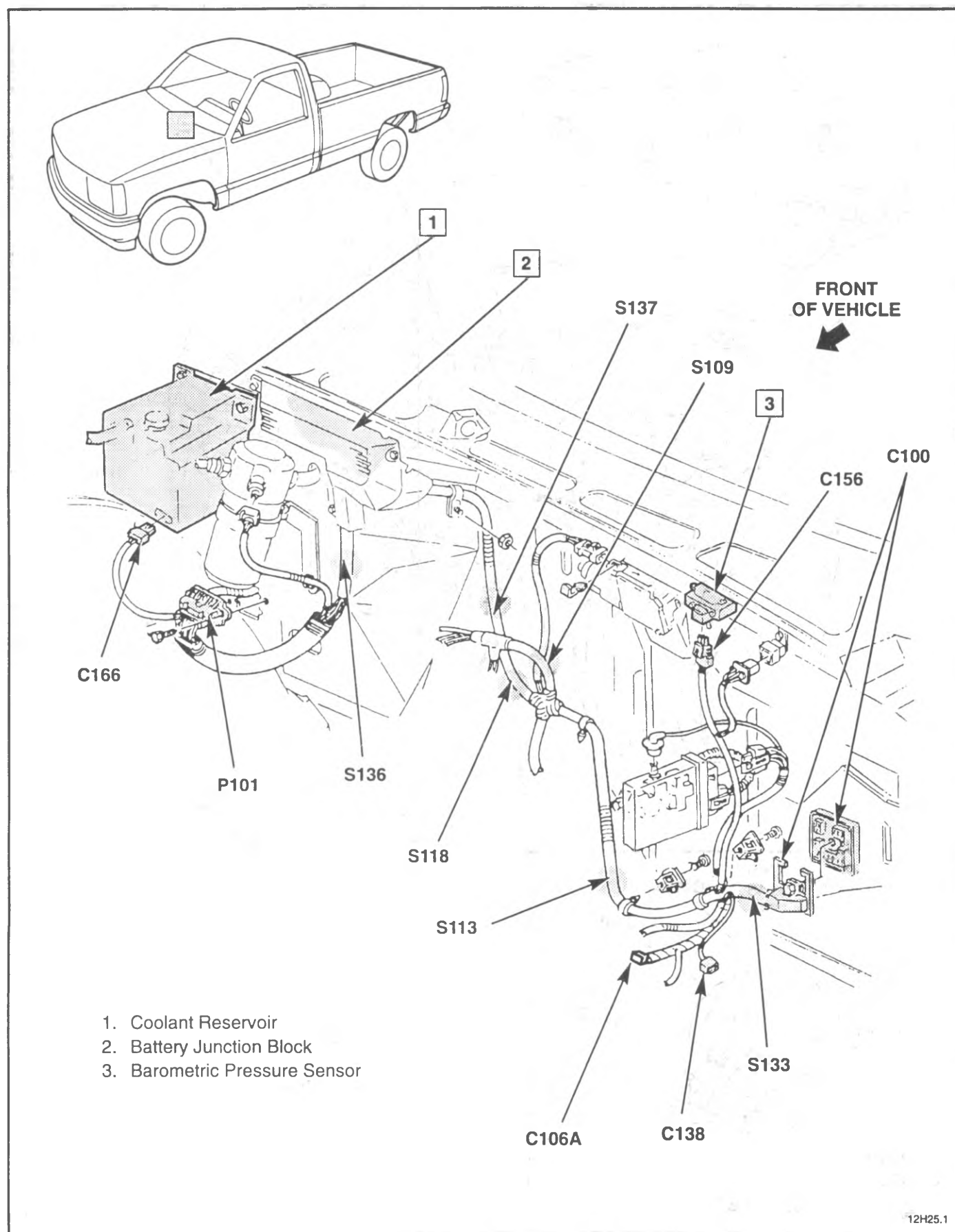


Figure 4 — Cowl Wiring, (6.5L) Diesel Engine

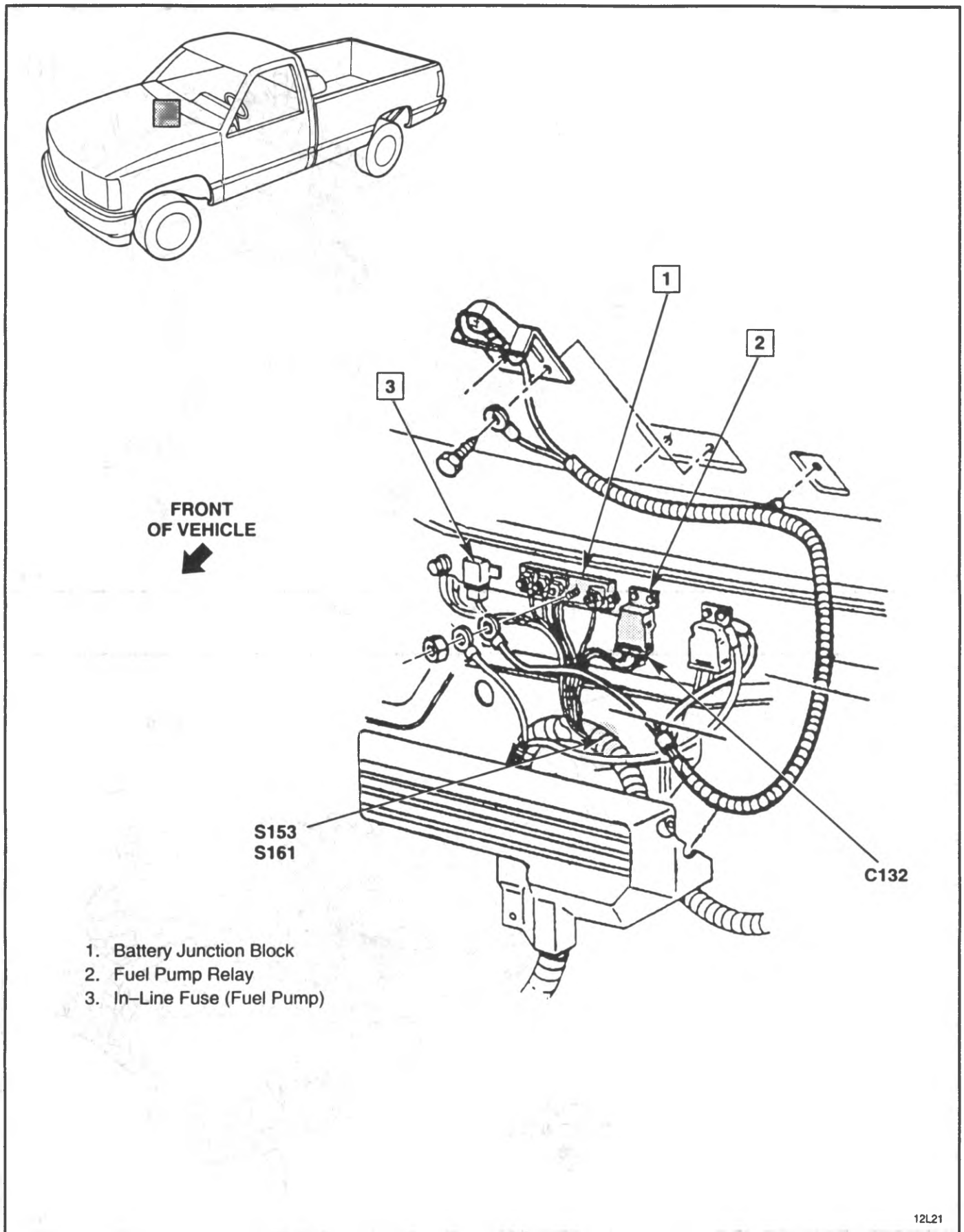


Figure 5 — Battery Junction Block Wiring

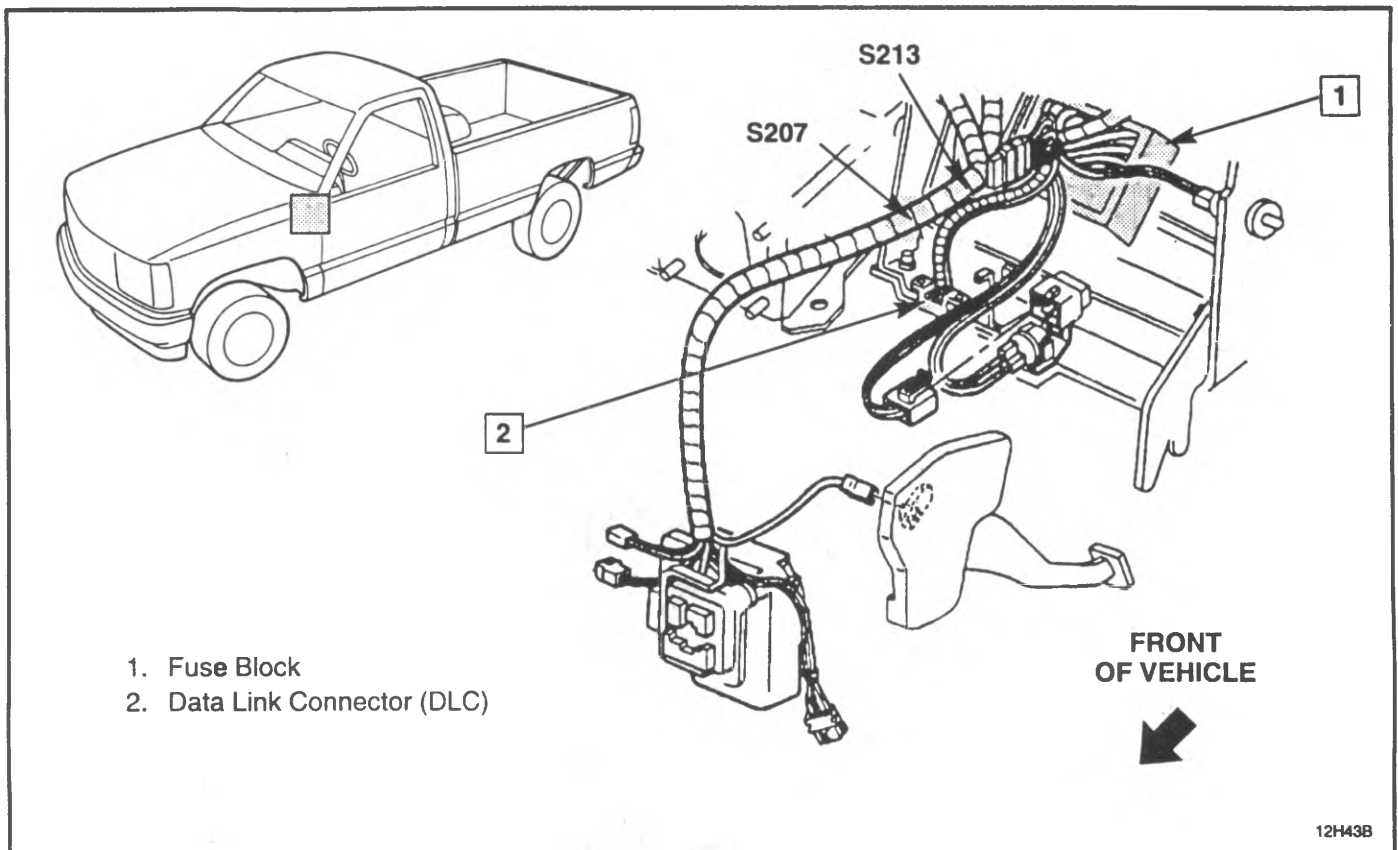


Figure 6 — Instrument Panel, LH Side

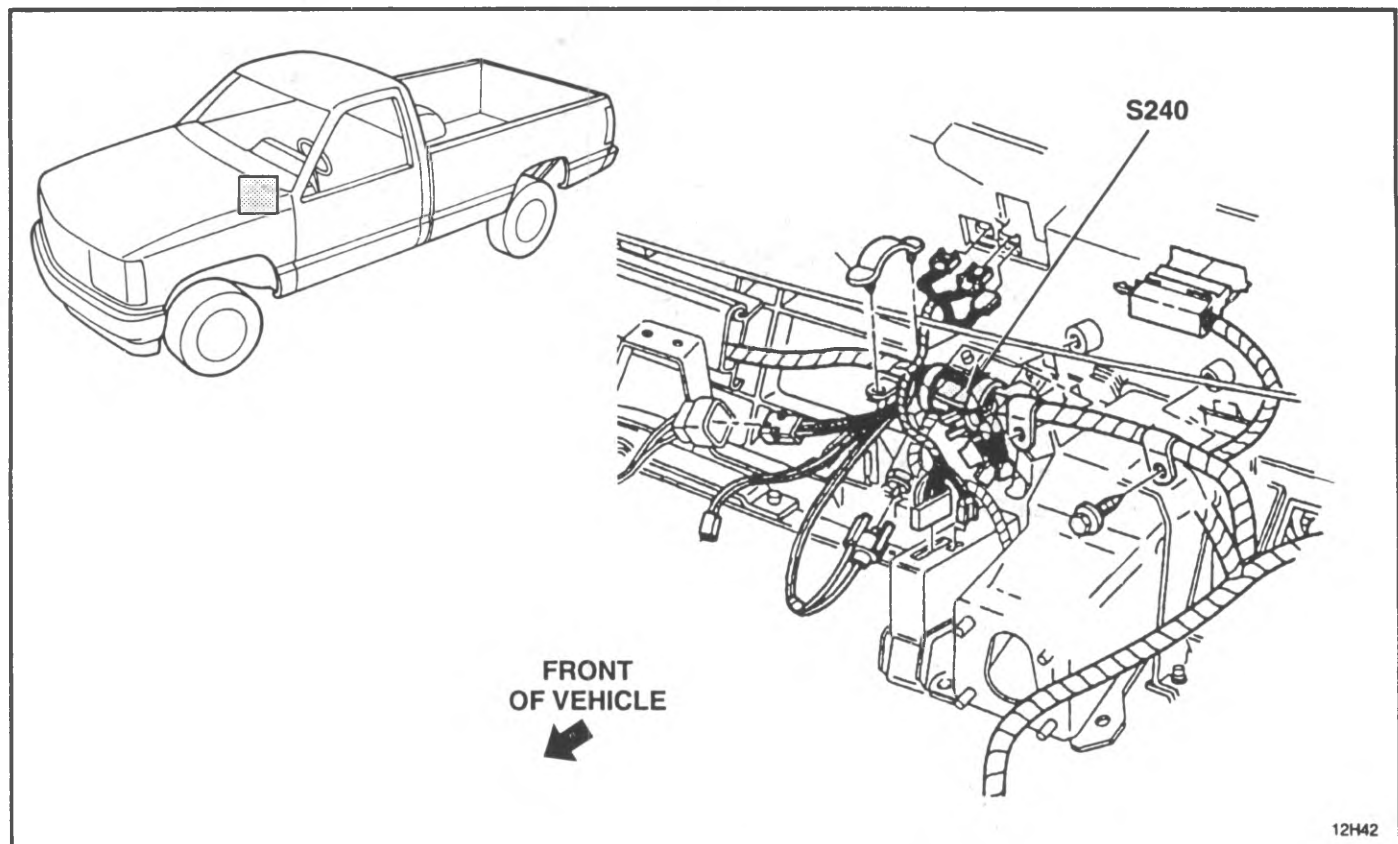


Figure 7 — Instrument Panel Wiring, RH Side

ENGINE CONTROLS 6.5L TURBO DIESEL V8 VIN F 8A-27-23

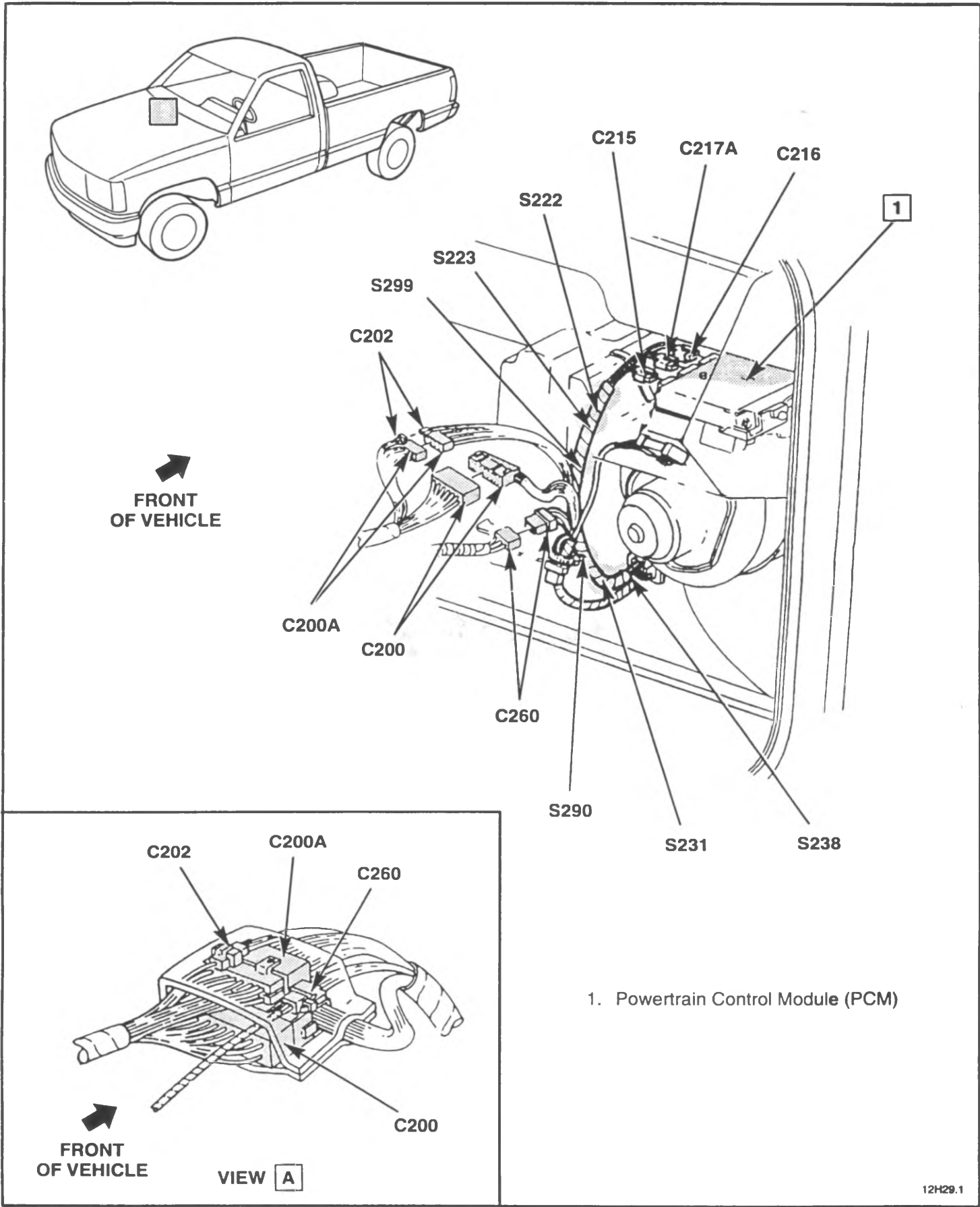


Figure 8 — PCM Wiring, Diesel Engines

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**G-VAN  
SECTION 8A  
ELECTRICAL DIAGRAMS  
AND  
DIAGNOSIS**



**BLANK**

**SECTION 8A**  
**ELECTRICAL DIAGNOSIS**  
**1994 AND 1995 G**

**CAUTION:** This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to **CAUTIONS** in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

**SECTION**

- 1 Index
- 24 Engine Controls - 6.5L Diesel VIN P
- 26 Engine Controls - 6.5L Diesel VIN Y

**SECTION**

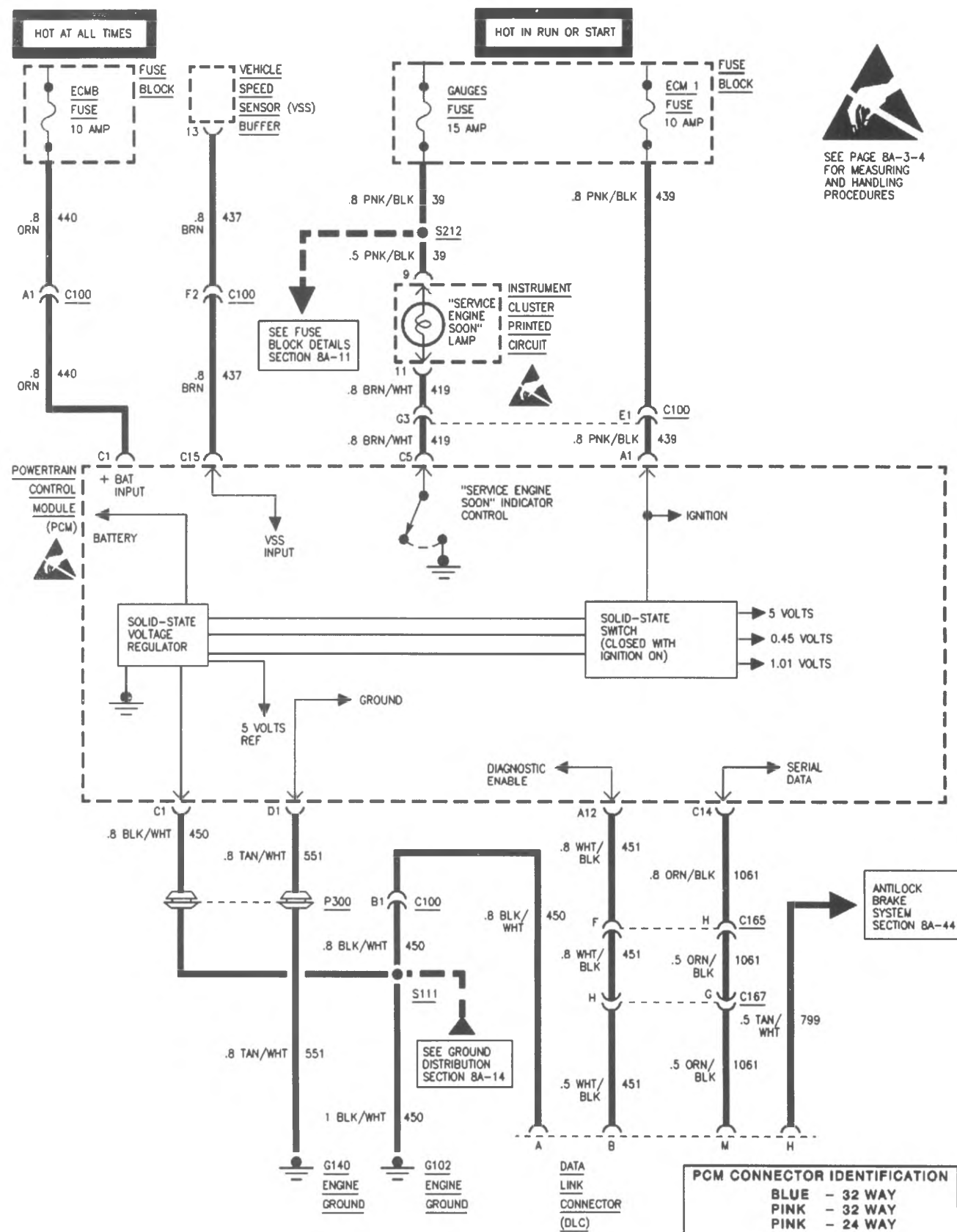
- 201 Component Location Views
- 202 Harness Connector Faces

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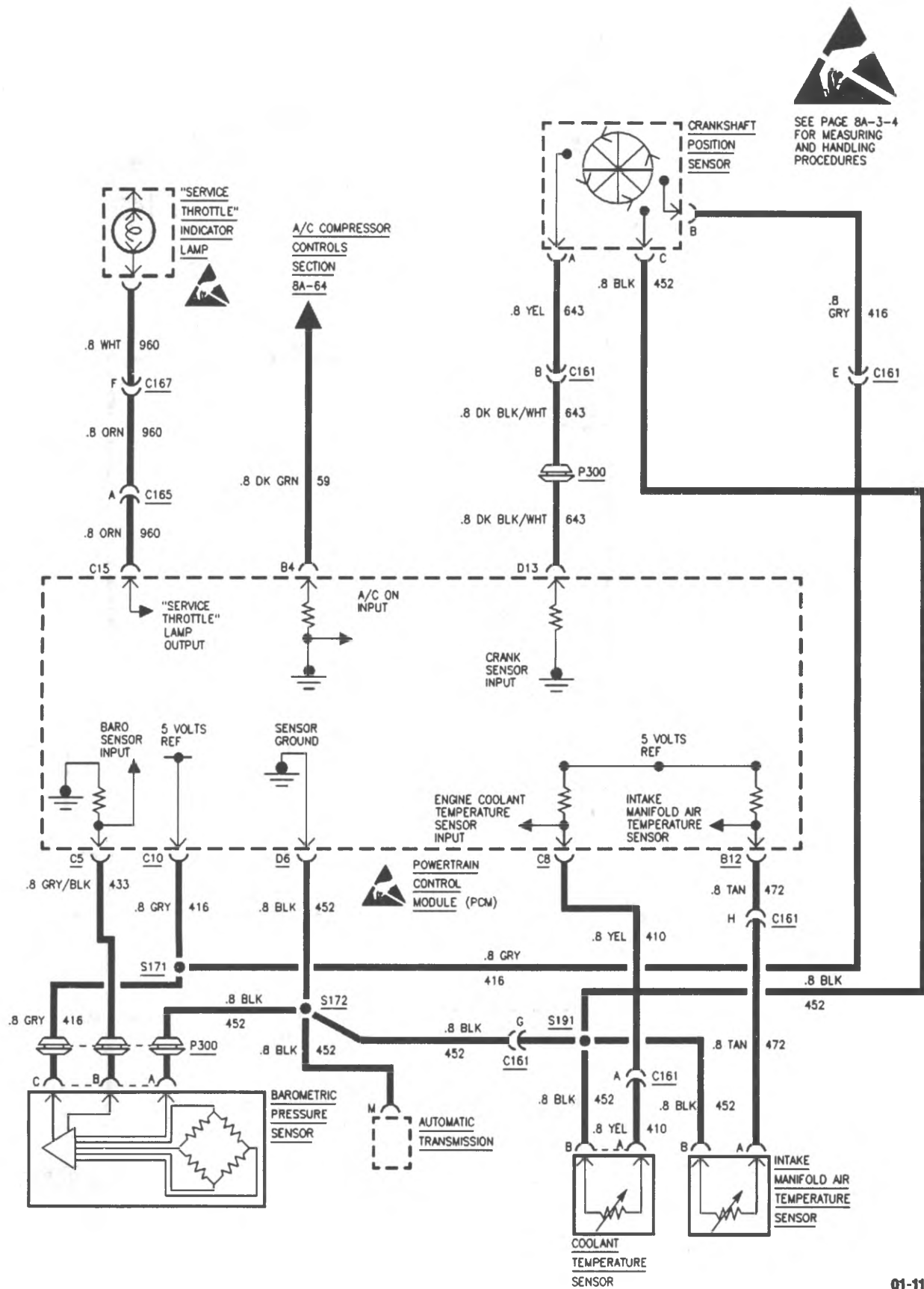
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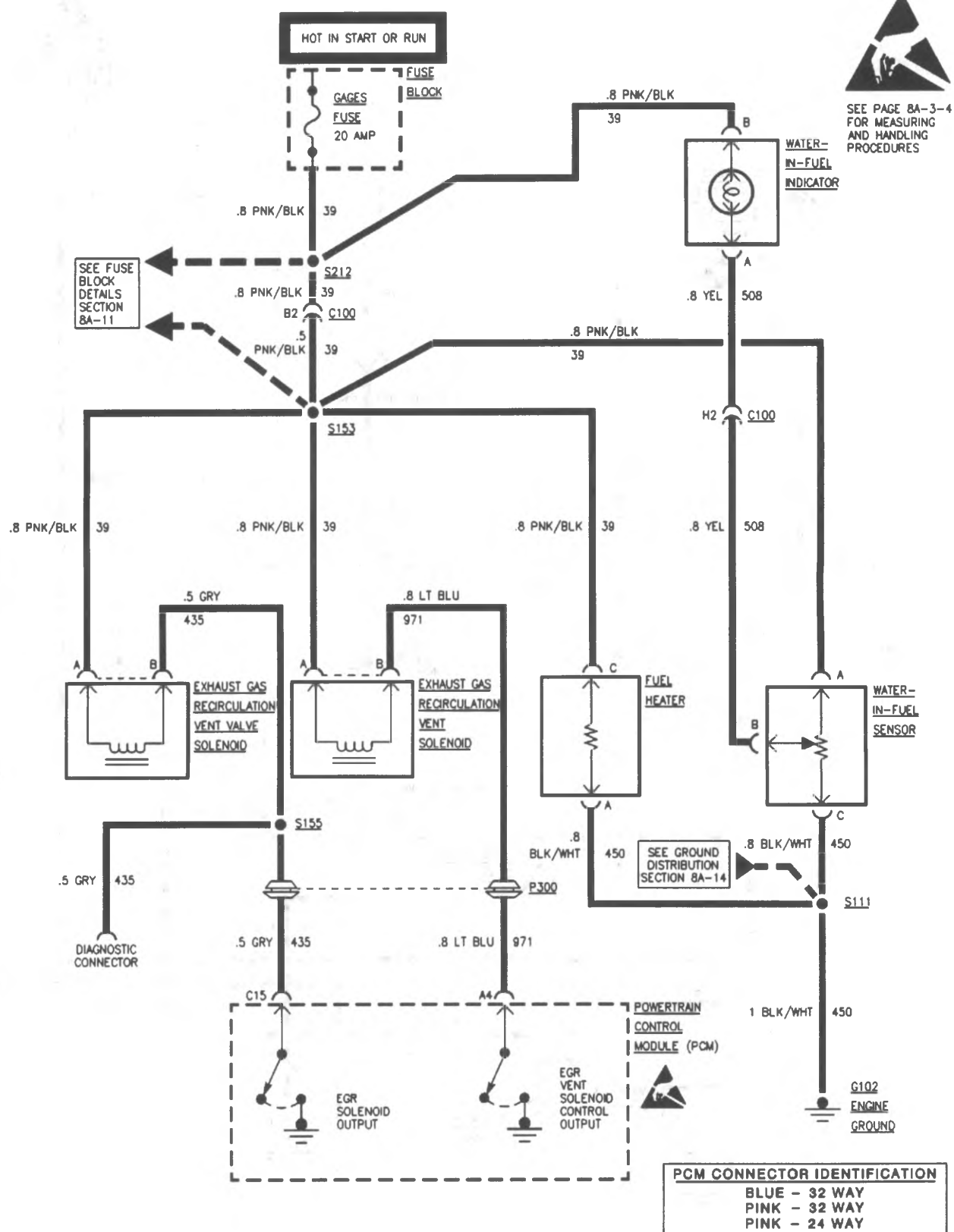
## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



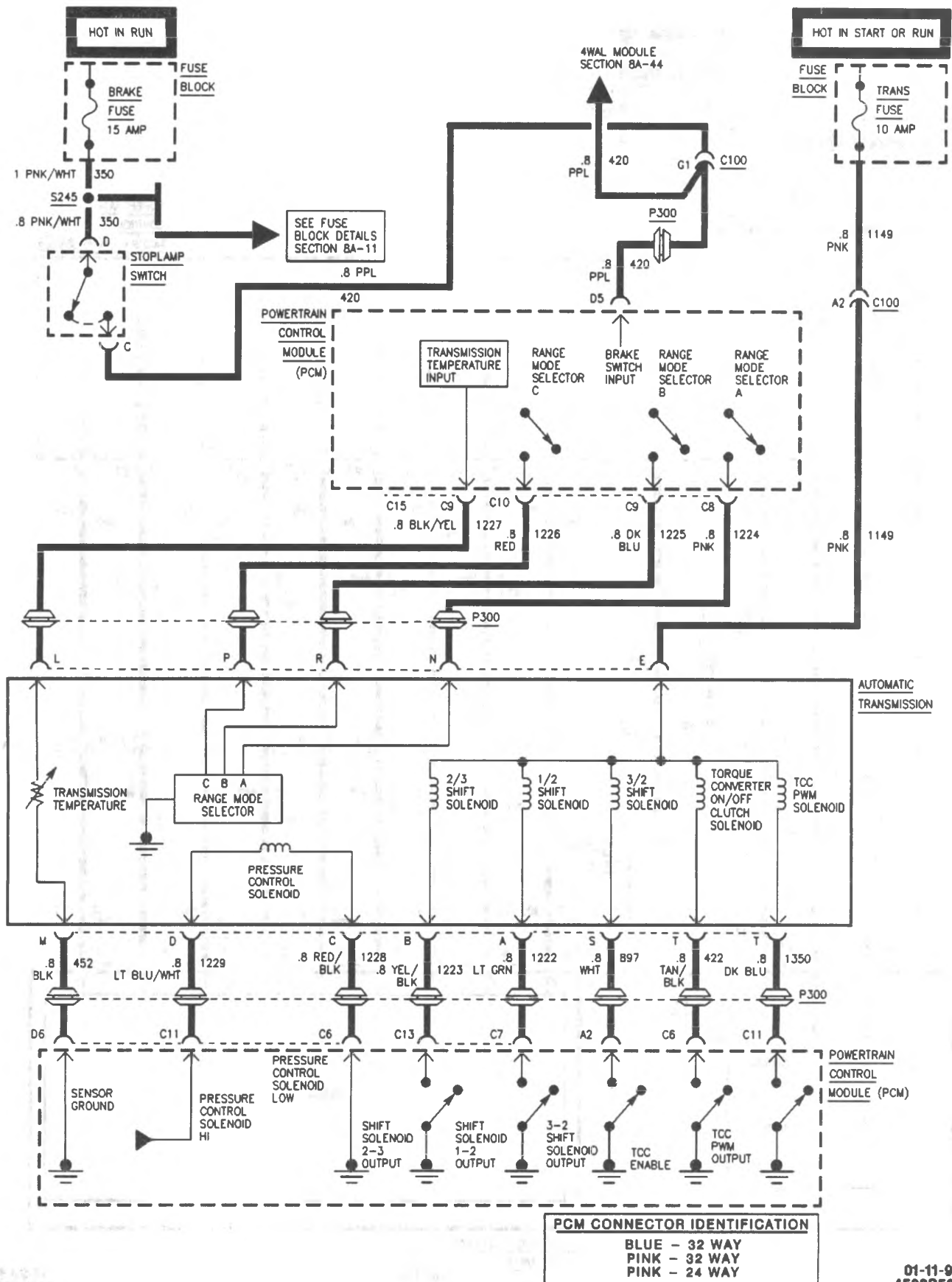
## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P

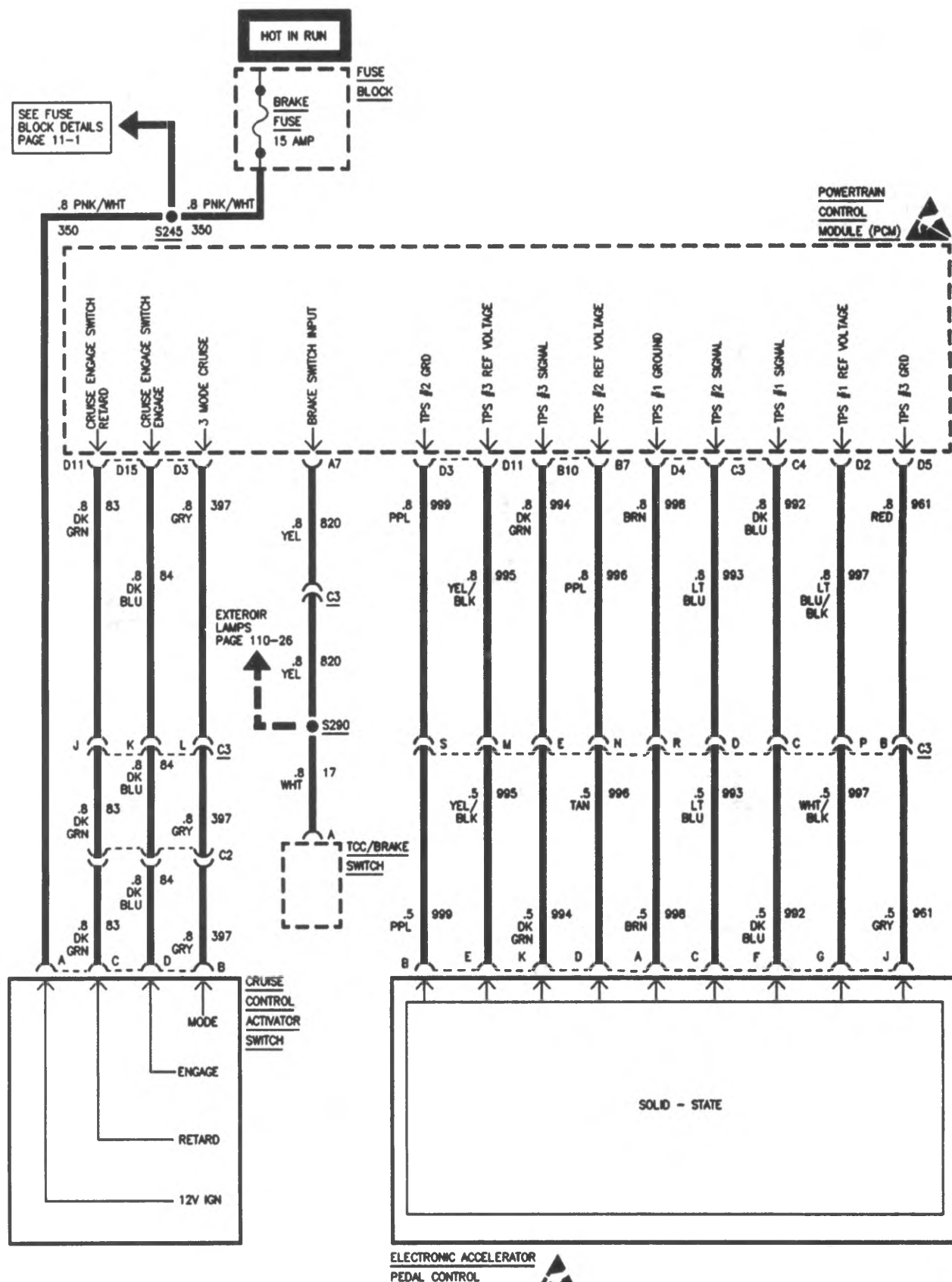


## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P

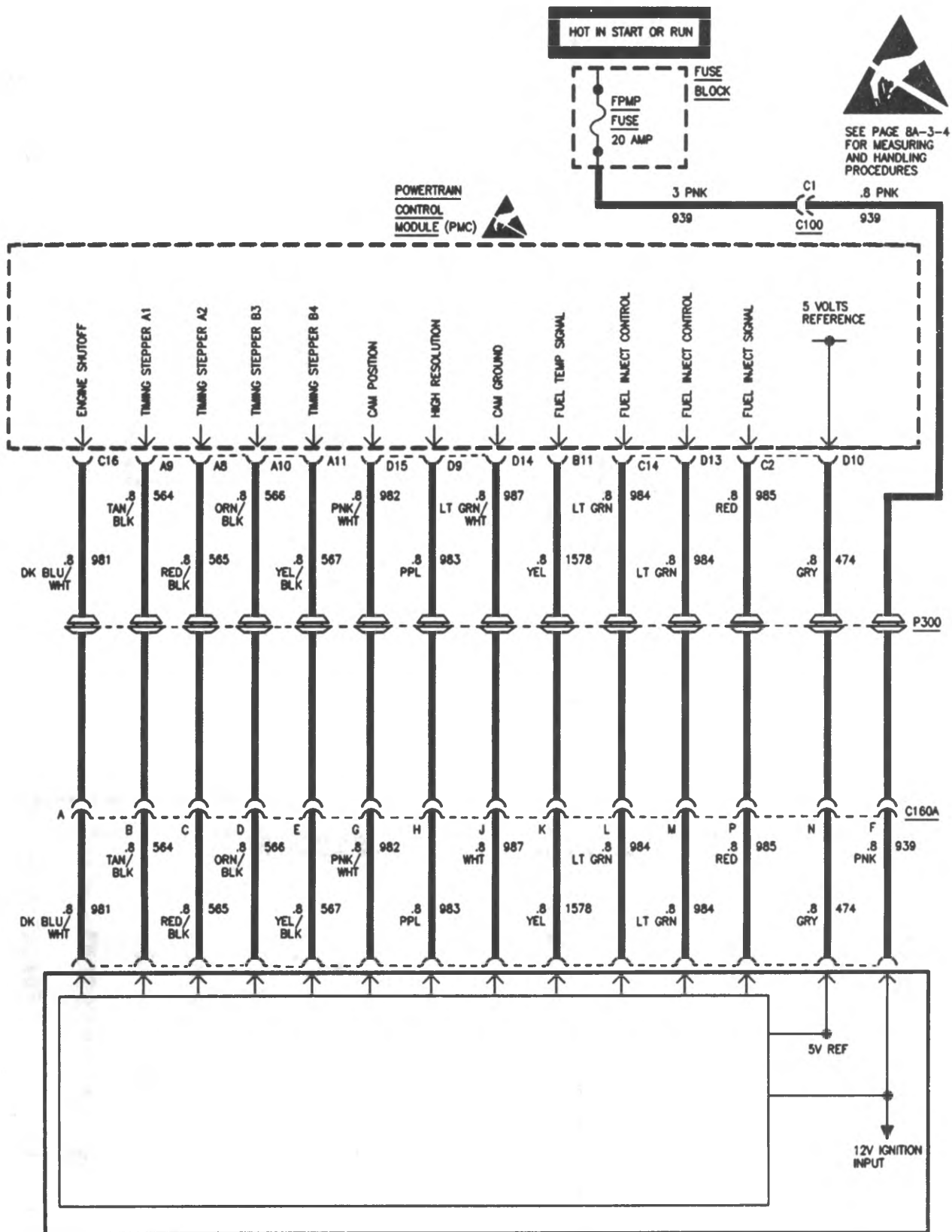




## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



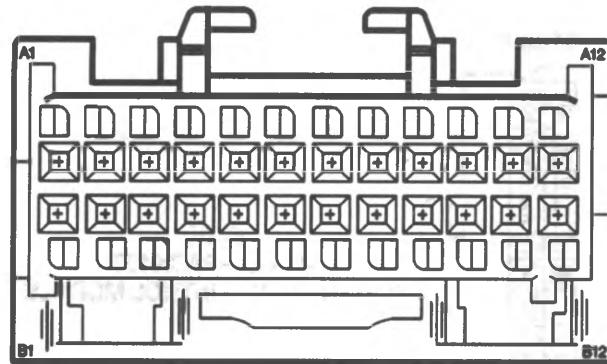
## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



ELECTRONIC  
INJECTION PUMP



## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



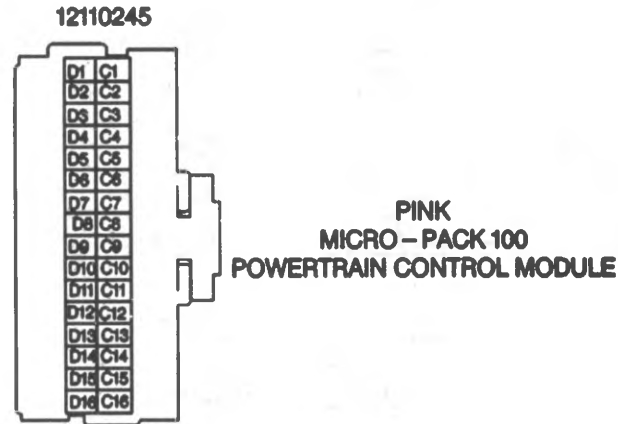
12110244  
24-WAY F MICRO-PACK 100 SERIES  
PNK  
POWERTRAIN CONTROL MODULE  
400685331

## POWERTRAIN CONTROL MODULE—24-PIN PINK

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A1	PNK/BLK	0.8	439	12V IGNITION (FUSED)
A2	WHT	0.8	897	2/3 SHIFT SOLENOID
A4	WHT	0.8	971	EGR VENT SOLENOID
A5	YEL	0.5	960	"SERVICE THROTTLE" LAMP OUTPUT
A7	YEL	0.8	820	CHMSL INPUT
A8	RED/BLK	0.8	565	TIMING STEPPER A2
A9	TAN/BLK	0.8	564	TIMING STEPPER A1
A10	ORN/BLK	0.8	566	TIMING STEPPER B3
A11	YEL/BLK	0.8	567	TIMING STEPPER B4
A12	WHT/BLK	0.8	451	DIAGNOSTIC ENABLE
B4	DK GRN	0.8	59	A/C "ON" INPUT
B7	TAN	0.5	996	REFERENCE VOLTAGE TPS 2
B8	DK BLU	0.5	507	GLOW PLUG "WAIT" LAMP OUTPUT
B10	DK GRN	0.5	994	TPS 3 SIGNAL INPUT
B11	YEL	0.8	1578	FUEL TEMPERATURE INPUT
B12	TAN	0.8	472	INTAKE MANIFOLD AIR TEMPERATURE

\*CAVITIES NOT LISTED ARE NOT USED

## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



400885334

## POWERTRAIN CONTROL MODULE—32 PIN PINK

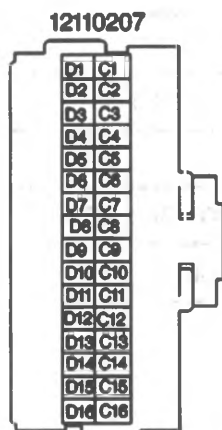
CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
C1	BLK/WHT	0.8	450	SYSTEM GROUND
C2	RED	0.8	985	CLOSURE SIGNAL
C3	LT BLU	0.5	993	TPS 2 SIGNAL
C4	DK BLU	0.5	992	TPS 1 SIGNAL
C5	GRY/BLK	0.8	433	BAROMETRIC PRESSURE SENSOR INPUT
C6	RED/BLK	0.8	1228	TRANS FORCE MOTOR HIGH
C8	YEL	0.8	410	COOLANT TEMPERATURE
C9	BLK/YEL	0.8	1227	TRANS TEMPERATURE INPUT
C10	GRY	0.8	416	+5 VOLT REFERENCE
C11	LT BLU/WHT	0.8	1229	TRANS FORCE MOTOR LOW
C13	YEL	0.8	505	GLOW PLUG RELAY
C14	ORN/BLK	0.8	1061	SERIAL DATA
C15	BRN	0.8	437	VEHICLE SPEED SENSOR INPUT
D1	TAN/WHT	0.8	551	ENGINE GROUND
D2	LT GRN	0.8	950	CLOSURE GROUND
D3	PPL	0.5	999	TPS 2 GROUND
D4	BRN	0.5	998	TPS 1 GROUND
D5	GRY	0.5	961	TPS 3 GROUND
D6	BLK	0.8	452	TRANS TEMPERATURE/PRESSURE REFERENCE LOW
D9	PPL	0.8	983	TPS 2 SIGNAL

**ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P**

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
D10	GRY	0.8	474	+5 VOLT REFERENCE
D11	YEL/BLK	0.5	995	REFERENCE VOLTAGE TPS 3
D13	DK BLU/WHT	0.8	643	CRANK SENSOR
D14	WHT	0.8	987	CAM POSITION SENSOR GROUND
D15	PNK	0.8	982	CAM POSITION SENSOR

\*CAVITIES NOT LISTED ARE NOT USED

## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P



**LIGHT BLUE  
MICRO - PACK 100  
POWERTRAIN CONTROL MODULE**

400685333

## POWERTRAIN CONTROL MODULE—32-PIN BLUE

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
C1	ORN	0.8	440	12V + BATTERY
C5	BRN/WHT	0.8	419	"SERVICE ENGINE SOON" LAMP OUTPUT
C7	LT GRN	0.8	1222	TRANS SHIFT SOLENOID A
C8	PNK	0.8	1224	TRANS RANGE MODE A
C9	DK BLU	0.8	1225	TRANS RANGE MODE B
C10	RED	0.8	1226	TRANS RANGE MODE C
C11	DK BLU	0.8	1350	TCC CONTROL
C13	YEL/BLK	0.8	1223	TRANS SHIFT SOLENOID B
C14	LT GRN	0.8	984	FUEL SOLENOID
C15	GRY	0.8	435	EGR SOLENOID
C16	DK BLU/WHT	0.8	981	FUEL SHUTOFF
D2	WHT/BLK	0.8	997	REFERENCE VOLTAGE TPS 1
D3	GRY	0.8	397	3 MODE ELECTRONIC CRUISE CONTROL
D5	PPL	0.8	420	BRAKE SWITCH INPUT
D8	DK GRN/WHT	0.8	817	VEHICLE SPEED SIGNAL - 4000 PULSES/MILE
D11	DK GRN	0.8	83	CRUISE CONTROL SWITCH - RETARD
D13	LT GRN	0.8	984	FUEL SOLENOID
D15	DK BLU	0.8	84	CRUISE CONTROL SWITCH - ENGAGE

\*CAVITIES NOT LISTED ARE NOT USED

**ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P**

<b>COMPONENT</b>	<b>LOCATION</b>	<b>201-PG</b>	<b>FIG.</b>	<b>CONN</b>
Barometric Pressure Sensor .....	On Bulkhead .....	6 .....	9	
Battery Junction Block .....	On LH side of Bulkhead, near Master Cylinder .....	5 .....	8	
Coolant Temperature Sensor.....	Front of LH Cylinder Head.....	0 .....	1	
Crankshaft Position Sensor.....	Front of Engine			
Cruise Control Switch.....	On Multifunction Lever			
Data Link Connector (DLC) .....	Lower LH side of Instrument Panel			
Electronic Accelerator pedal control.....	At Top of Accelerator Pedal Bracket .....	10 .....	18	
Electronic Injection Pump .....	Top Front of Engine .....	4 .....	5	
Engine Shutoff Solenoid.....	Top Front of Engine			
Exhaust Gas Recirculation Vent Solenoid.....	Top Rear of LH Cylinder Head .....	0 .....	1	
Exhaust Gas Recirculation Vent Valve Solenoid .....	Top Rear of LH Cylinder Head .....	0 .....	1	
Fuel Heater .....	Under Water-in-Fuel Sensor, at Top Rear of Engine .....	1 .....	2	
Fuel Solenoid Driver.....	Top Front of Engine			
Fuel Temperature Sensor .....	Top Front of Engine			
Fuse Block.....	Below LH side of Instrument Panel.....	8 .....	13	
Glow Plug Control Module.....	Top Rear of LH Cylinder Head.....	5 .....	7	
Glow Plug Indicator Lamp.....	RH side of Instrument Cluster .....	9 .....	15	
Glow Plugs (LH & RH).....	On Respective Cylinder Head .....	0 .....	1	
Instrument Cluster .....	LH side of Instrument Panel .....	8 .....	14.....	202-4
Intake Manifold Air Temperature Sensor .....	Top Front of Engine			
Optical Sensor .....	Top Front of Engine			
Powertrain Control Module (PCM).....	Under Driver's seat .....	11 .....	19	
Service Throttle Indicator Lamp	LH side of Instrument Panel			
Stoplamp Switch.....	At Top of Brake Pedal Bracket .....	9 .....	16	
Timing Stepper Motor.....	Top Front of Engine			
Transmission .....	Behind Engine .....	7 .....	11 .....	202-6
Vehicle Speed Sensor (VSS) Buffer.....	On Brake Lever Bracket.....	10 .....	17.....	202-8
Water-in-Fuel Indicator .....	RH side of Instrument Cluster .....	9 .....	15	
Water-in-Fuel Sensor.....	Top Rear of Engine, Behind Intake Manifold .....	4 .....	6	

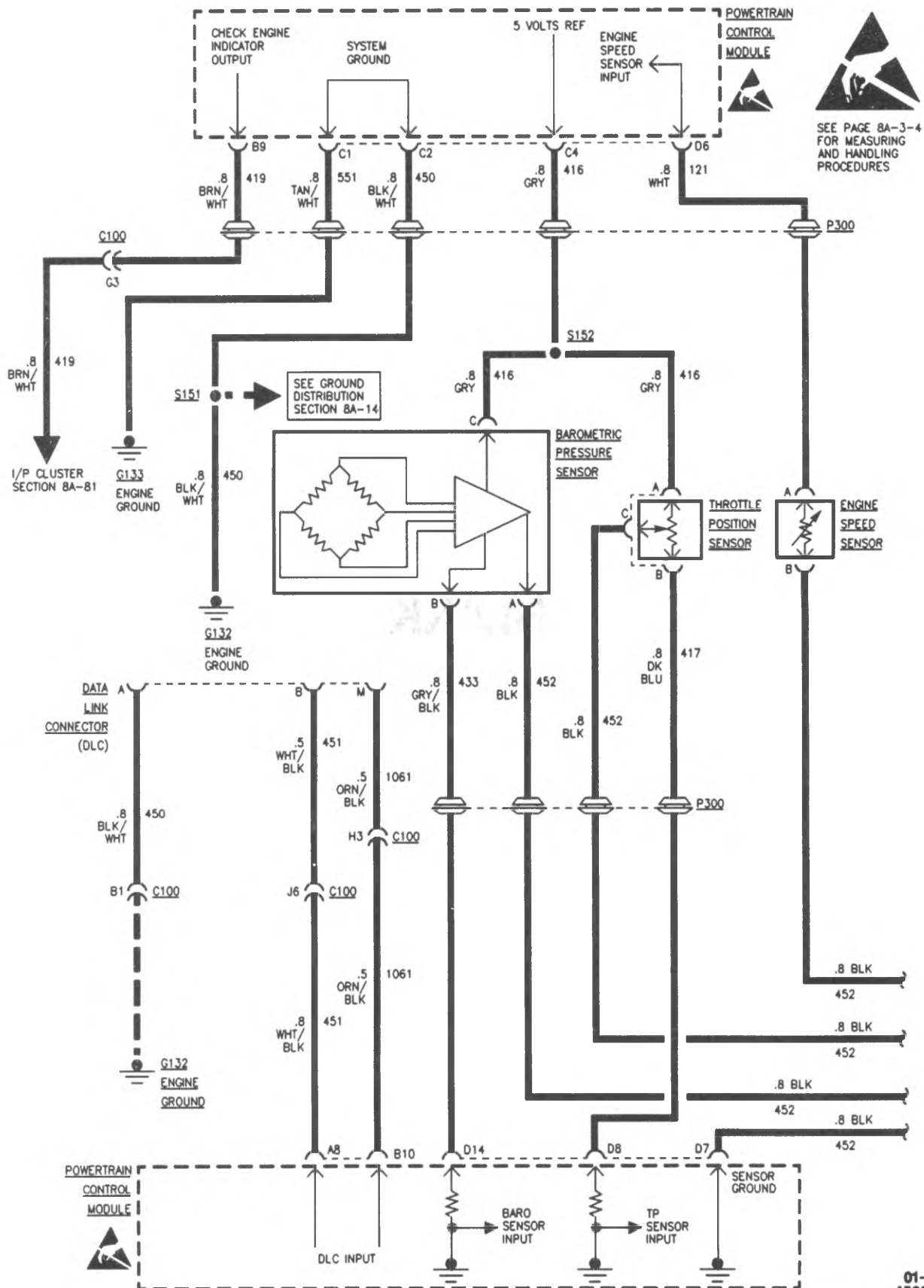


## ENGINE CONTROLS - G VAN 6.5L DIESEL L49 VIN P

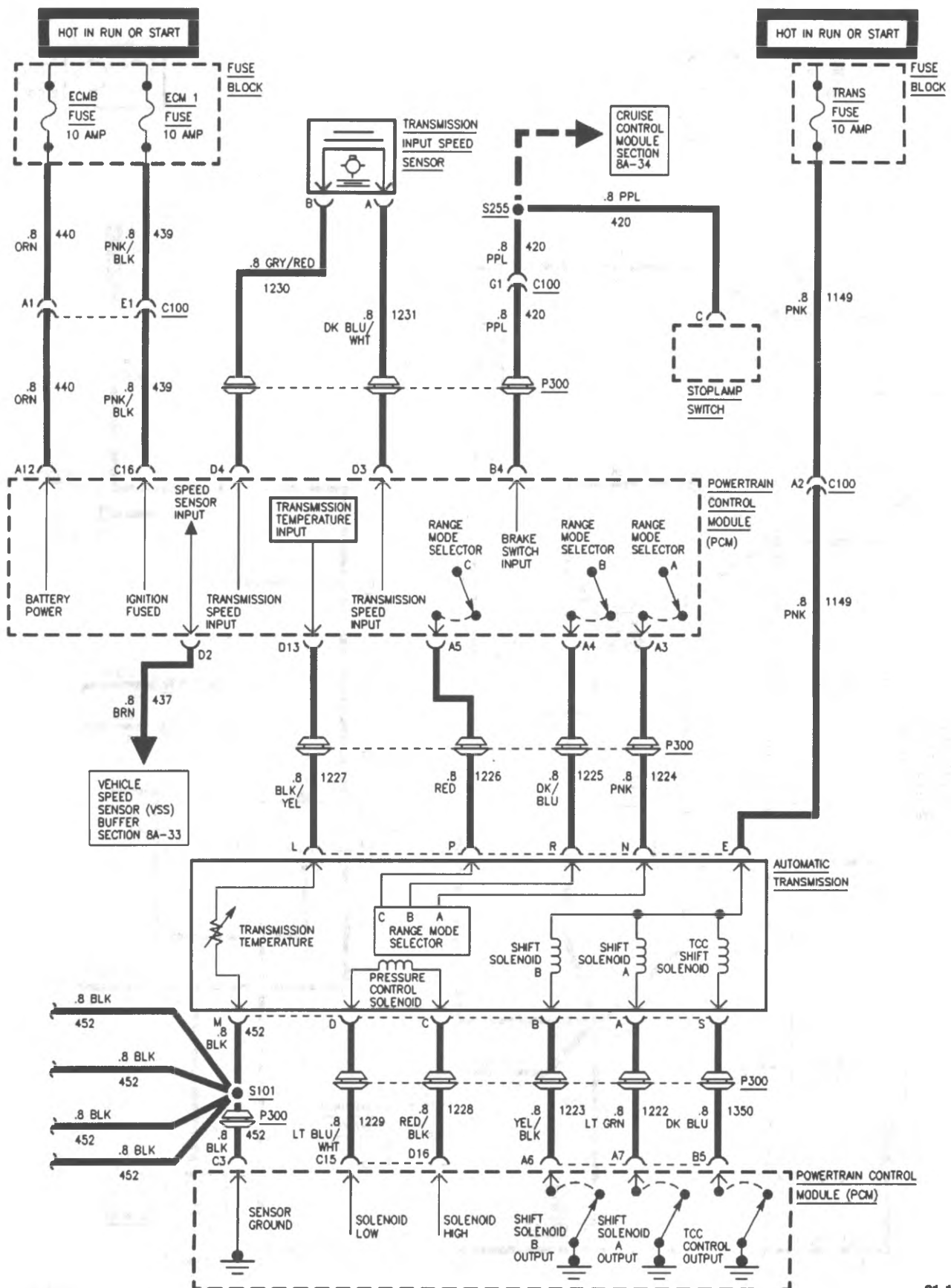
COMPONENT	LOCATION	201-PG	FIG.	CONN
<b>CONNECTORS:</b>				
C100.....	LH side of Bulkhead .....	5.....	8.....	202-0
C160.....	Top rear of Engine, Behind Intake Manifold.....	6.....	10.....	202-2
C161.....	Top rear of Engine, Behind Intake Manifold.....	6.....	10.....	202-8
C165.....	Under Driver's seat .....	10.....	18.....	202-3
C167.....	Near Electronic Accelerator Pedal Control .....	10.....	18	
<b>GROMMETS</b>				
P101 .....	Below C100 .....	7.....	12	
P300 .....	Under Driver's Seat, near PCM.....	10.....	18	
<b>GROUND</b>				
G102.....	Top rear of Engine, Behind Intake Manifold.....	0.....	1	
G200.....	Near Fuse Block.....	8.....	13	
G140.....	LH side of Engine Block, near Glow Plugs			
<b>SPLICES</b>				
S108 .....	Engine Harness, near RH Glow Plugs Fusible Links			
S109 .....	Engine Harness, Top Rear of LH Cylinder Head			
S111.....	Engine Harness, 6 cm from C160 Breakout			
S153 .....	Engine Harness, 8 cm from RH Glow Plugs Breakout			
S155 .....	Engine Harness, 6 cm from Glow Plug Control Module Breakout			
S165 .....	Engine Harness, 20 cm from C100 Breakout			
S171 .....	Engine Harness, 4 cm from C160 Breakout			
S172 .....	Engine Harness, 12 cm from Generator Breakout			
S180 .....	Engine Harness, 6 cm from Generator Breakout			
S191 .....	Engine Harness Jumper, Below Intake Manifold			
S193 .....	Engine Harness Jumper, Below Intake Manifold			
S194 .....	Engine Harness Jumper, Below Intake Manifold			
S195 .....	Engine Harness Jumper, Below Intake Manifold			
S208 .....	Instrument Panel Harness, 8 cm from Instrument Cluster Breakout			
S212 .....	Instrument Panel Harness, 5 cm from Stoplamp Switch Breakout			
S245 .....	Instrument Panel Harness, 4 cm from Instrument Cluster Breakout			
S290 .....	Instrument Panel Harness, 3 cm from Stoplamp Switch Breakout			

**BLANK**

ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y

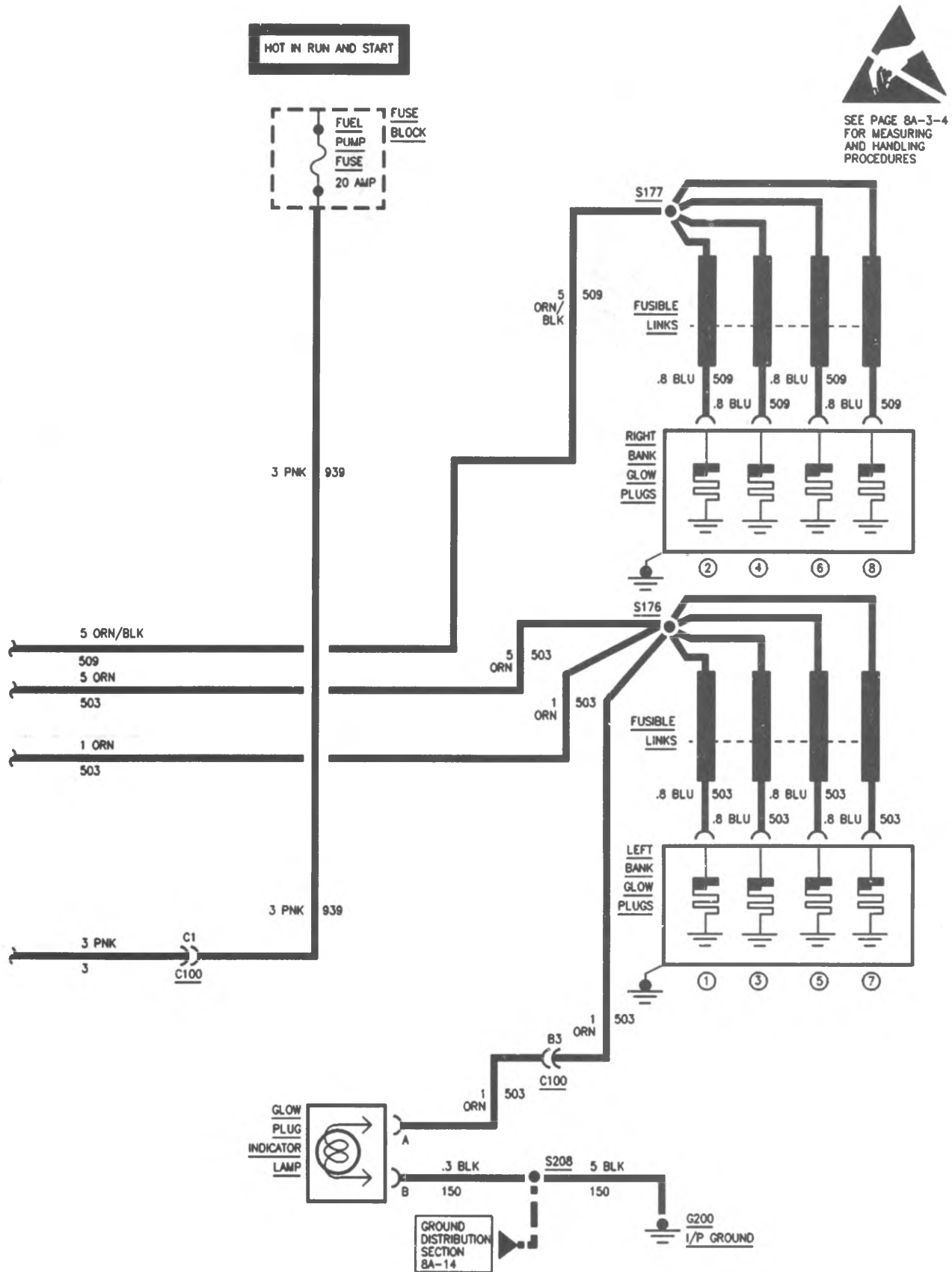


## ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y



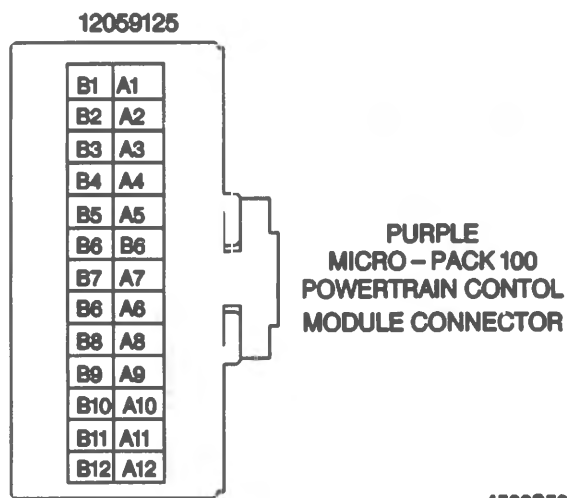


## ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y



# 8A - 26 - 4 ELECTRICAL DIAGNOSIS

## ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y

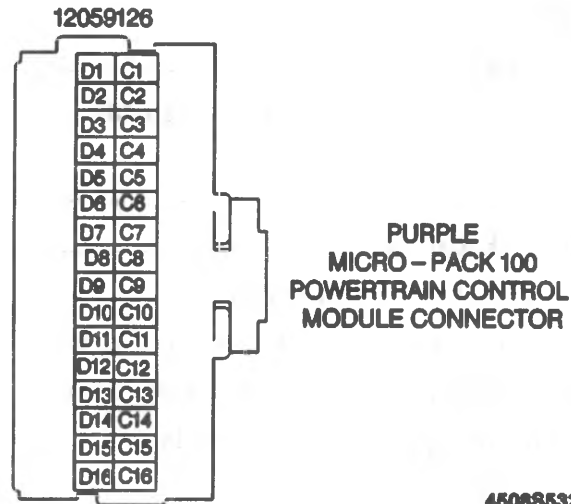


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CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A3	PNK	0.8	1224	TRANS RANGE MODE A
A4	DK BLU	0.8	1225	TRANS RANGE MODE B
A5	RED	0.8	1226	TRANS RANGE MODE C
A6	YEL/BLK	0.8	1223	TRANS SHIFT SOLENOID B
A7	LT GRN	0.8	1222	TRANS SHIFT SOLENOID A
A8	WHT/BLK	0.8	451	ECM GROUND
A12	ORN	0.8	440	12V+ BATTERY
B3	DK GRN	0.8	59	A/C COMPRESSOR CLUTCH SOLENOID FEED
B4	PPL	0.8	420	BRAKE PEDAL SWITCH OUTPUT
B5	DK BLU	0.8	1350	TCC SHIFT SOLENOID SIGNAL
B9	BRN/WHT	0.8	419	CHECK ENGINE INDICATOR LAMP OUTPUT
B10	ORN/BLK	0.8	1061	SERIAL DATA SIGNAL

\*CAVITIES NOT LISTED ARE NOT USED

## ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y



450685325

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
C1	TAN/WHT	0.8	551	SYSTEM GROUND
C2	BLK/WHT	0.8	450	SYSTEM GROUND
C3	BLK	0.8	452	SENSOR RETURN
C4	GRA	0.8	416	5V SENSOR REFERENCE
C15	LT BLU/WHT	0.8	1229	PRESSURE CONTROL SOLENOID LOW
C16	PNK/BLK	0.8	439	12V IGNITION FUSED
D2	BRN	0.8	437	VEHICLE SPEED SENSOR BUFFER SIGNAL
D3	DK BLU/WHT	0.8	1231	TRANS INPUT SPEED SENSOR
D4	GRA/RED	0.8	1230	TRANS INPUT SPEED SENSOR
D6	WHT	0.8	121	TACH SIGNAL
D7	BLK	0.8	452	SENSOR RETURN
D8	DK BLU	0.8	417	THROTTLE POSITION SIGNAL
D13	BLK/YEL	0.8	1227	PCM TO TRANS TEMP SIGNAL
D14	GRA/BLK	0.8	433	BAROMETRIC PRESSURE SENSOR SIGNAL
D16	RED/BLK	0.8	1228	PRESSURE CONTROL SOLENOID HIGH

\*CAVITIES NOT LISTED ARE NOT USED



## ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y

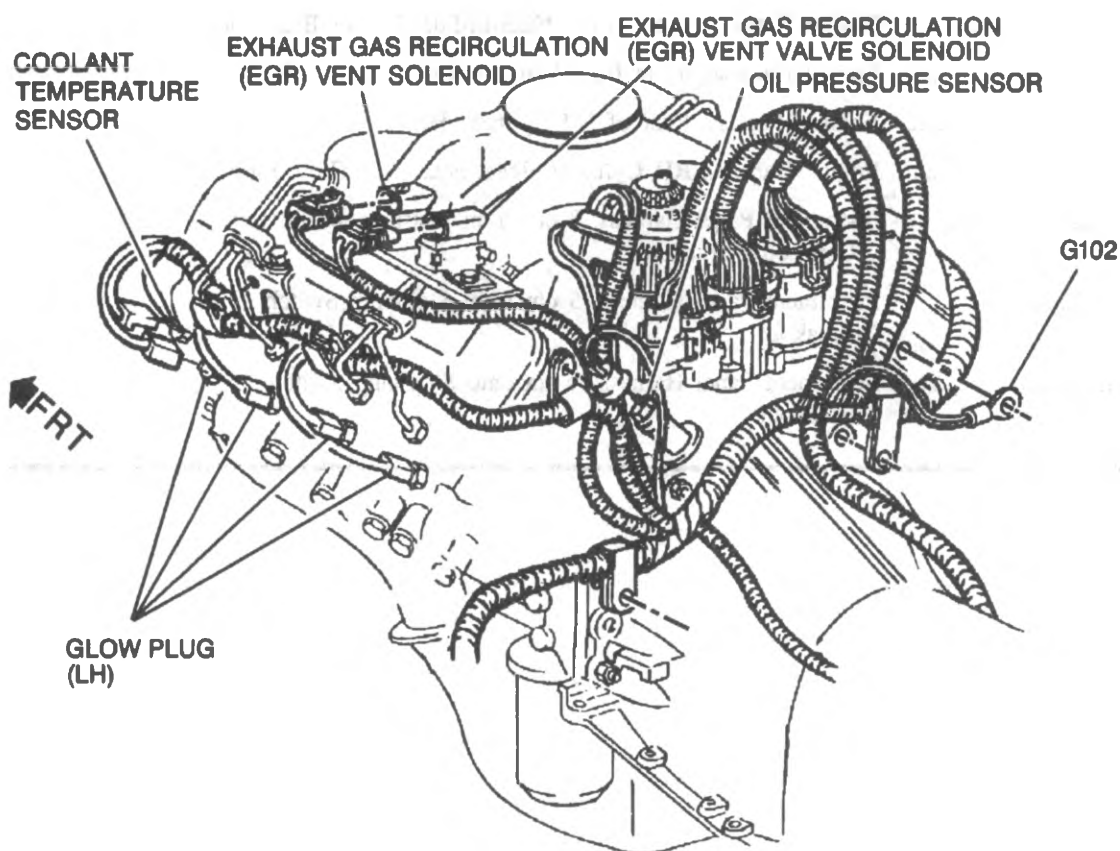
COMPONENT	LOCATION	201-PG	FIG.	CONN
Barometric Pressure Sensor.....	On Bulkhead.....	6.....	9	
Battery Junction Block .....	Rear of Engine Compartment, to Left of C100 .....	5.....	8	
Cold Advance Engine Coolant Temperature Switch.....	Bottom Rear of RH Cylinder Head.....	2.....	3	
Coolant Temperature Sensor.....	Front of LH Cylinder Head .....	1.....	2	
Data Link Connector (DLC) .....	Lower LH side of Instrument Panel			
Engine Speed Sensor .....	Top Rear of Engine, Behind Water-in-Fuel Sensor .....	1.....	2	
Fuel Heater .....	Top Rear of Engine, Below Water-in-Fuel Sensor .....	1.....	2	
Fuel Shut-off Solenoid.....	Top Front of Engine, at Intake Manifold			
Fuse Block.....	Lower LH side of Instrument Panel.....	8.....	14	
Generator.....	Top Front of Engine			
Glow Plug Control Module.....	Top Rear of RH Cylinder Head.....	5.....	7	
Glow Plug Indicator Lamp.....	Lower RH side of Instrument Panel.....	9.....	15	
Glow Plugs (LH & RH).....	On Respective Cylinder Head .....	1,2.....	2,3	
Oil Pressure Sensor.....	LH Rear of Engine .....	1.....	2	
Powertrain Control Module (PCM).....	Under Driver's Seat .....	11.....	19	
Starter Solenoid .....	Under RH Exhaust Manifold .....	3.....	4	
Stoplamp Switch .....	LH Side of Brake Pedal Support Bracket.....	9.....	16	
Throttle Position Sensor .....	Top of Engine, near Fuel Shutoff Solenoid			
Transmission .....	Behind Engine .....	7.....	11.....	202-7
Transmission Input Speed Sensor .....	LH Side of Transmission.....	7.....	11	
Vehicle Speed Sensor Buffer....	Near Park Brake Lever.....	10.....	17.....	202-8
Water-in-Fuel Indicator .....	Lower RH side of Instrument Panel.....	9.....	15	
Water-in-Fuel Sensor.....	Top Rear of Engine, Behind Intake Manifold .....	1,4,6..	2,6,10	
<b>CONNECTORS</b>				
C100.....	LH Rear of Engine Compartment, near Master Cylinder.....	6.....	9.....	202-0
<b>DIODES</b>				
D100.....	Behind Generator			
<b>GROMMETS</b>				
P100 .....	Behind LH side of Instrument Panel, near Fuse Block			
P300 .....	Under Driver's Seat, near PCM			
<b>GROUND</b>				
G132.....	Rear of RH Cylinder Head .....	1.....	2	
G133.....	LH Front of Engine, near Power Steering Pump			

**ENGINE CONTROLS - G VAN 6.5L DIESEL L57 VIN Y**

COMPONENT	LOCATION	201-PG	FIG.	CONN
<b>SPLICES</b>				
S101 .....	Engine Harness, 12 cm from Generator Breakout			
S110.....	Engine Harness, RH Cylinder Head, near Rear Glow Plug			
S116.....	Engine Harness, RH Front of Engine, near Fuel Pump, on Starter Solenoid Breakout			
S118.....	Engine Harness, 13 cm from C100 Breakout			
S119.....	Engine Harness, 8.5 cm from Generator Breakout			
S128 .....	Engine Harness, 7.5 cm from Barometric Pressure Sensor			
S151 .....	Engine Harness, 6 cm from Water-in-Fuel Sensor Breakout			
S152 .....	Engine Harness, 4 cm from Water-in-Fuel Sensor Breakout			
S176 .....	Engine Harness, Rear of LH Cylinder Head			
S177 .....	Engine Harness, RH Cylinder Head, near Rear Glow Plug			
S208 .....	Instrument Panel Harness, 8 cm from Instrument Cluster Connector Breakout			
S212 .....	Instrument Panel Harness, 5 cm from Stoplamp Switch Breakout			
S255 .....	Instrument Panel Harness, 4 cm onto Stoplamp Switch Breakout			

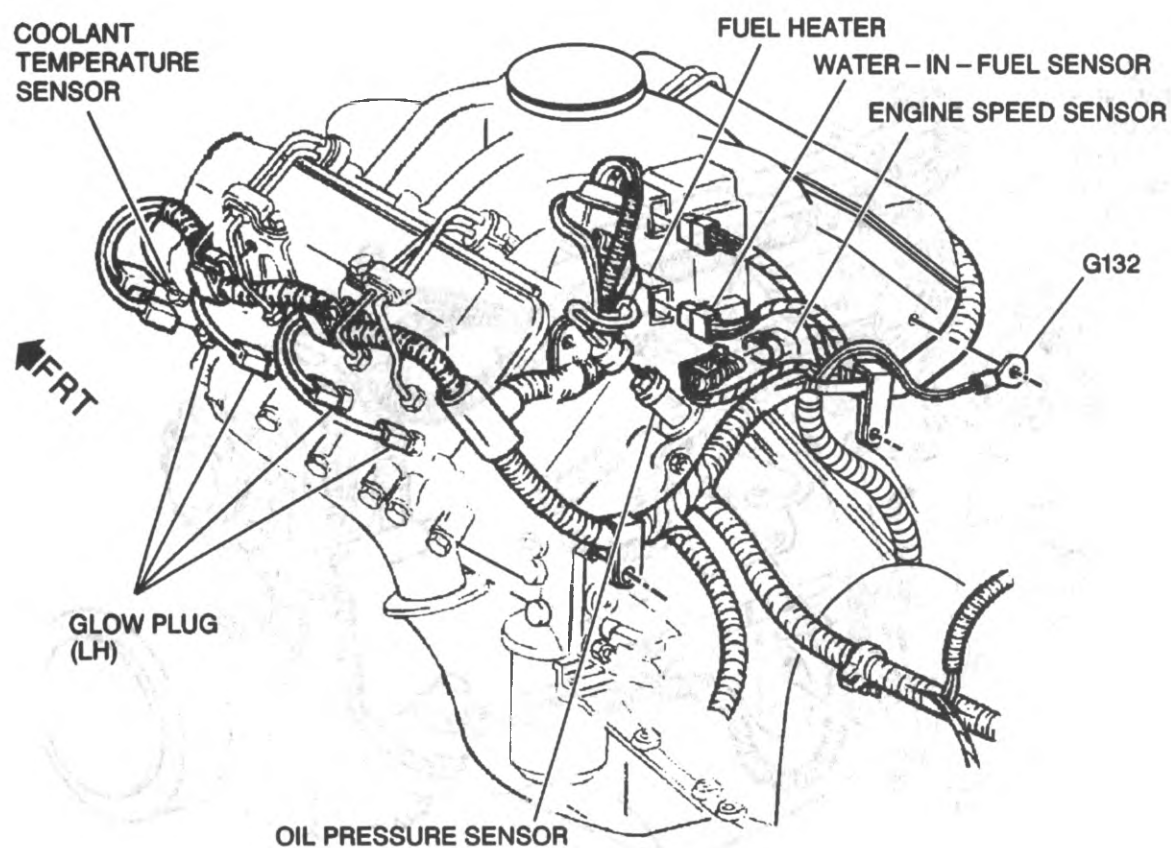
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COMPONENT LOCATION VIEWS - G-VAN



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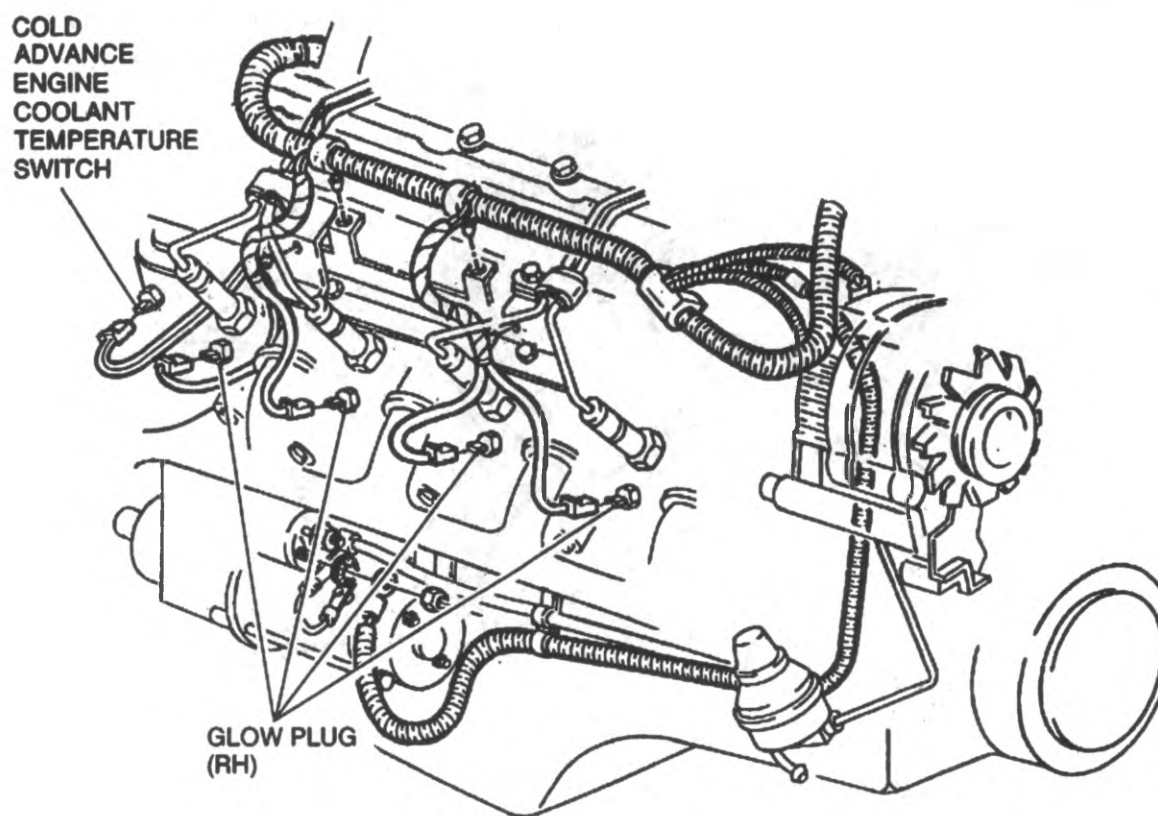
Figure 1—LH Side of Engine (L49)



01-11-95  
4508S5302

Figure 2—LH Side of Engine (L57)

COMPONENT LOCATION VIEWS - G-VAN



01-11-85  
450885304

Figure 3—RH Side of Engine (L57)

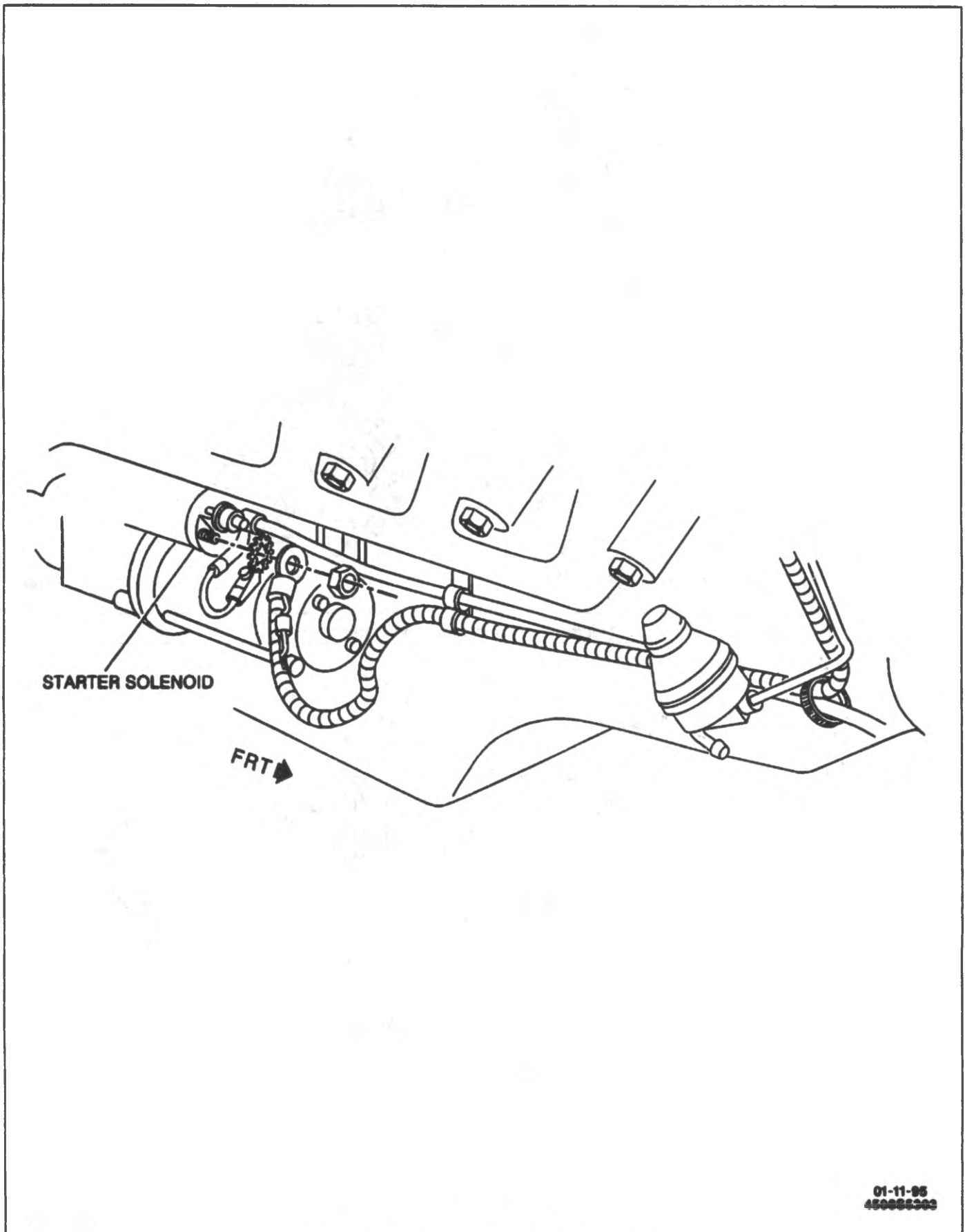


Figure 4—Lower RH Side of Engine (L57)

COMPONENT LOCATION VIEWS - G-VAN

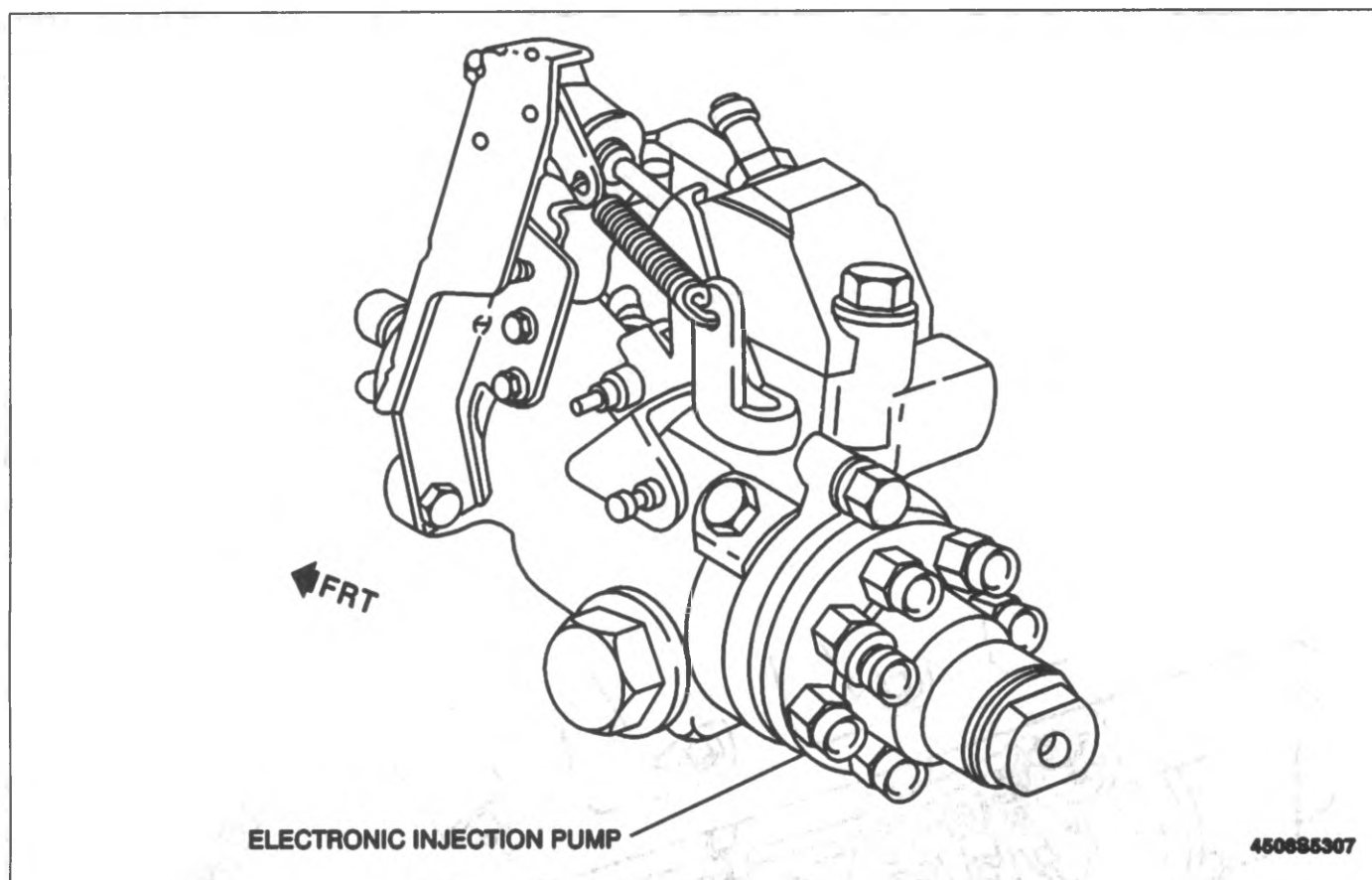


Figure 5—Electronic Injection Pump

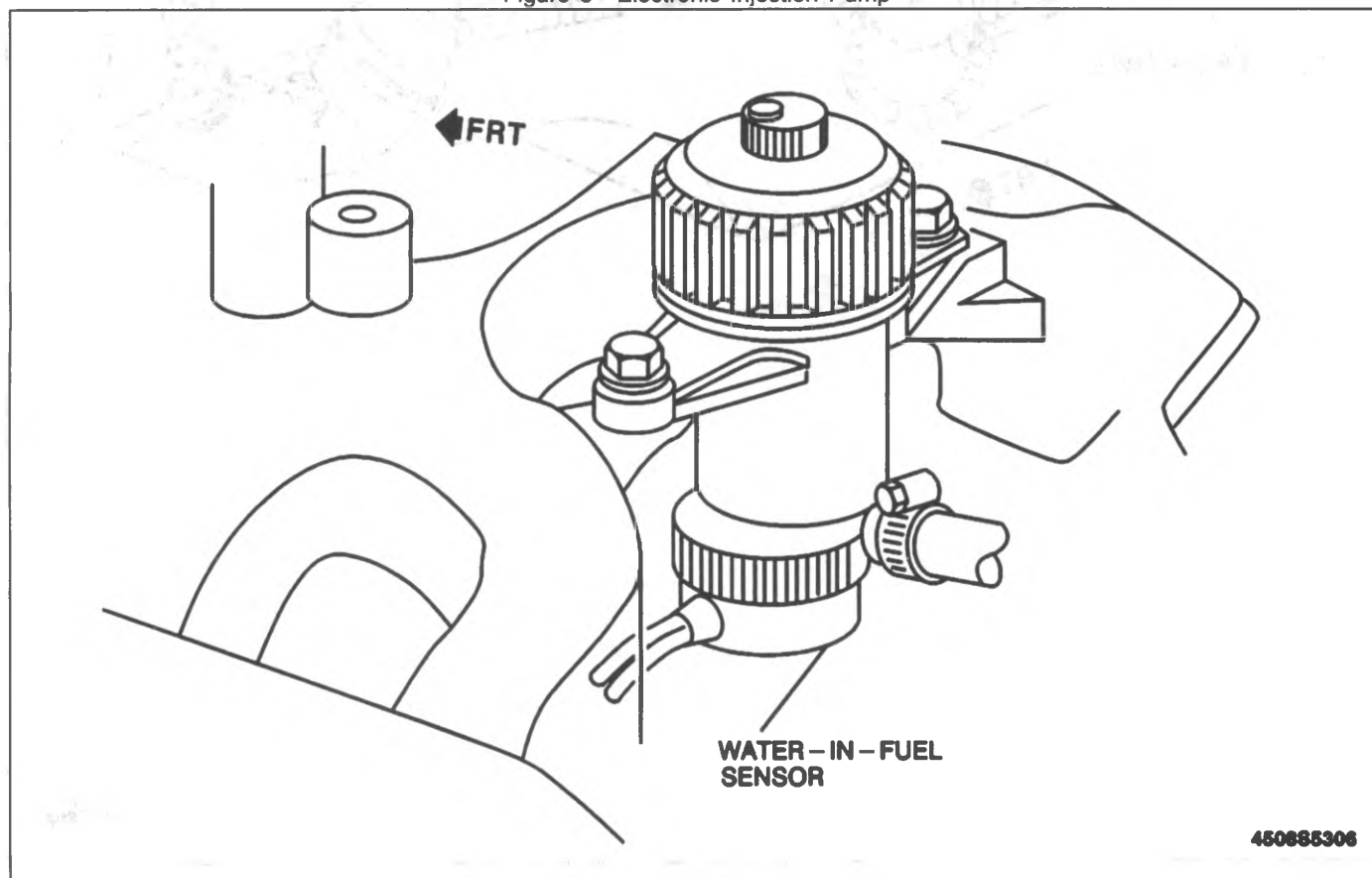


Figure 6—Water-in-Fuel Sensor

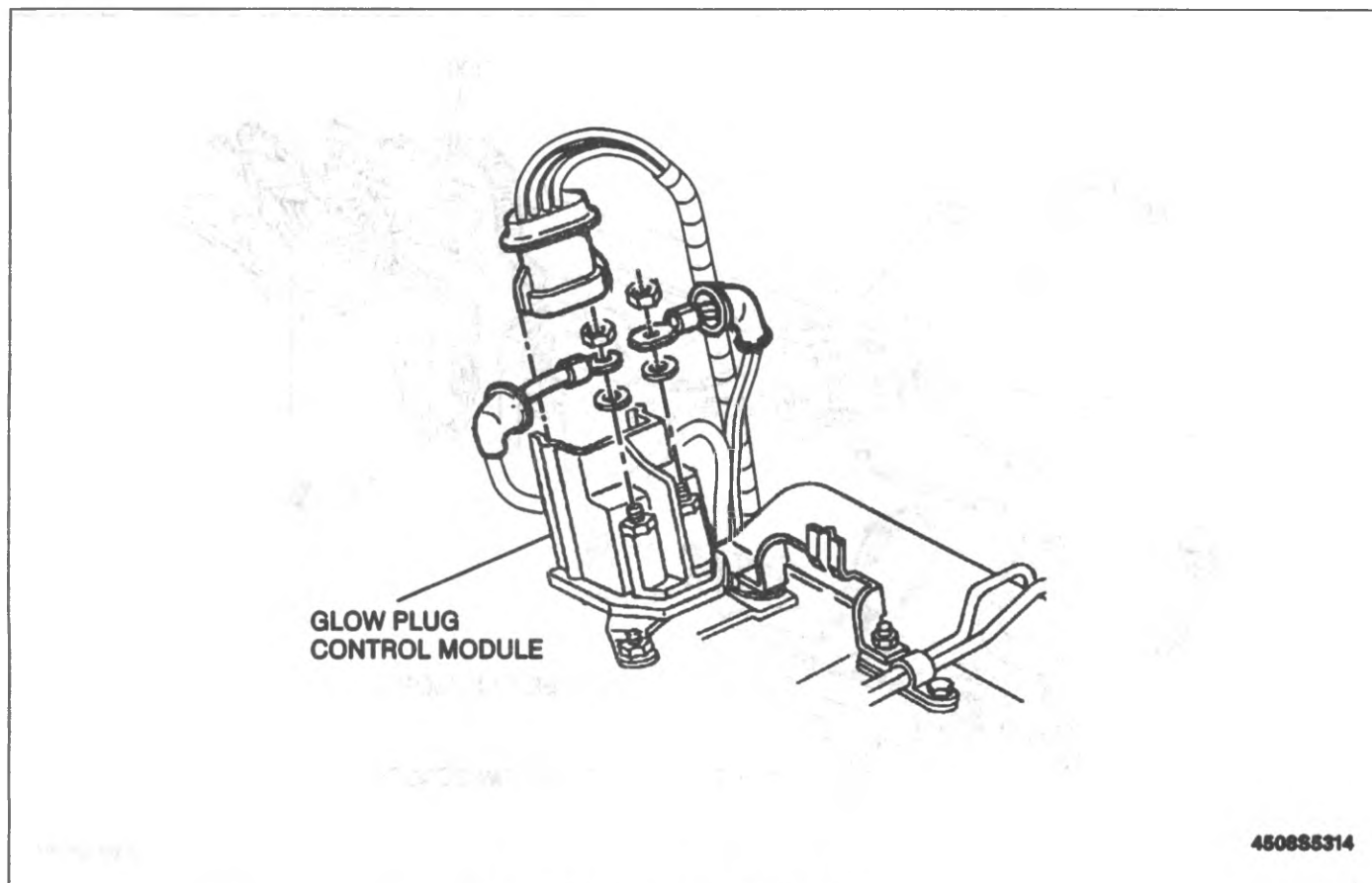


Figure 7—Glow Plug Control Module

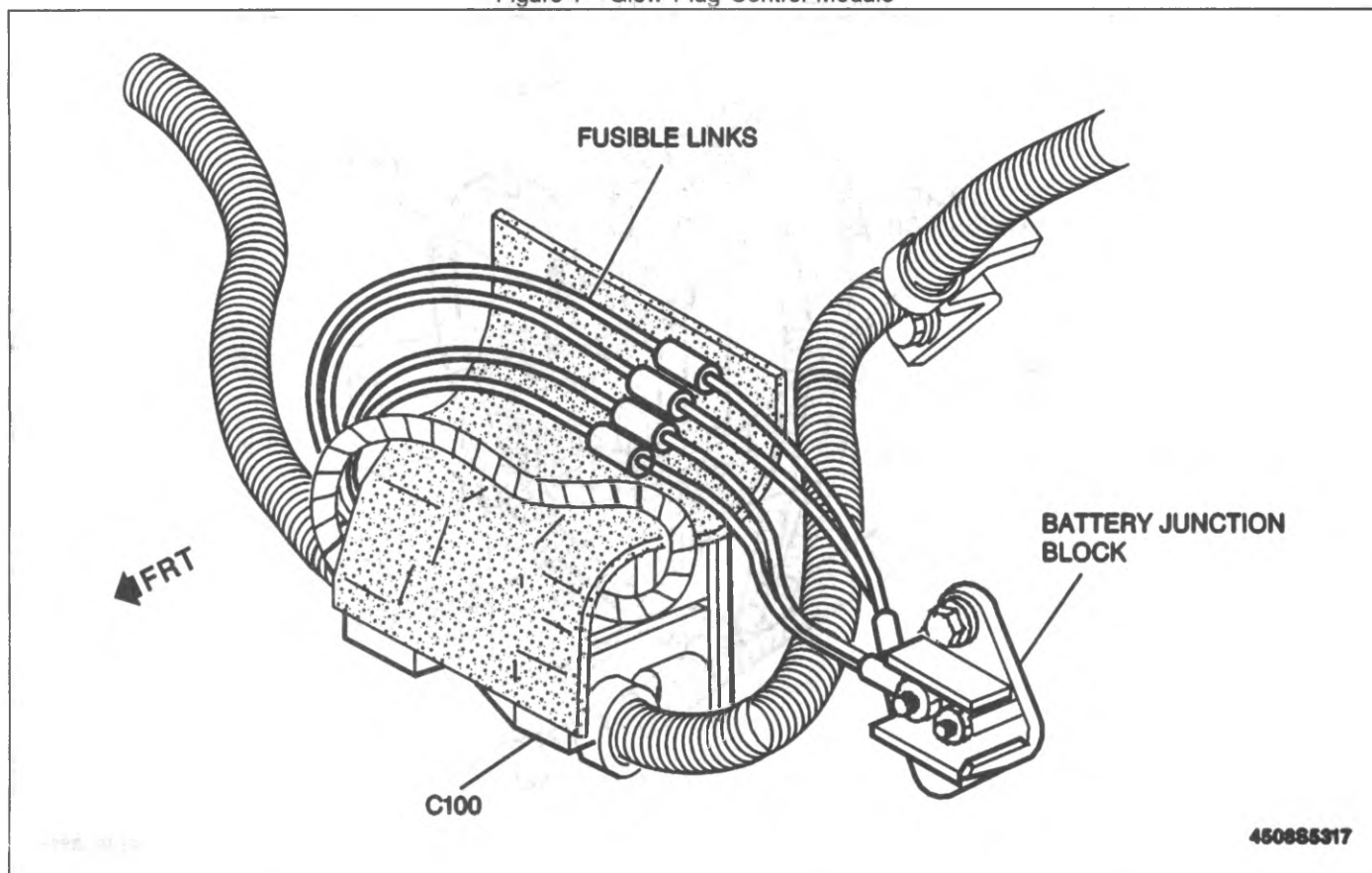


Figure 8—LH Side of Bulkhead



COMPONENT LOCATION VIEWS - G-VAN

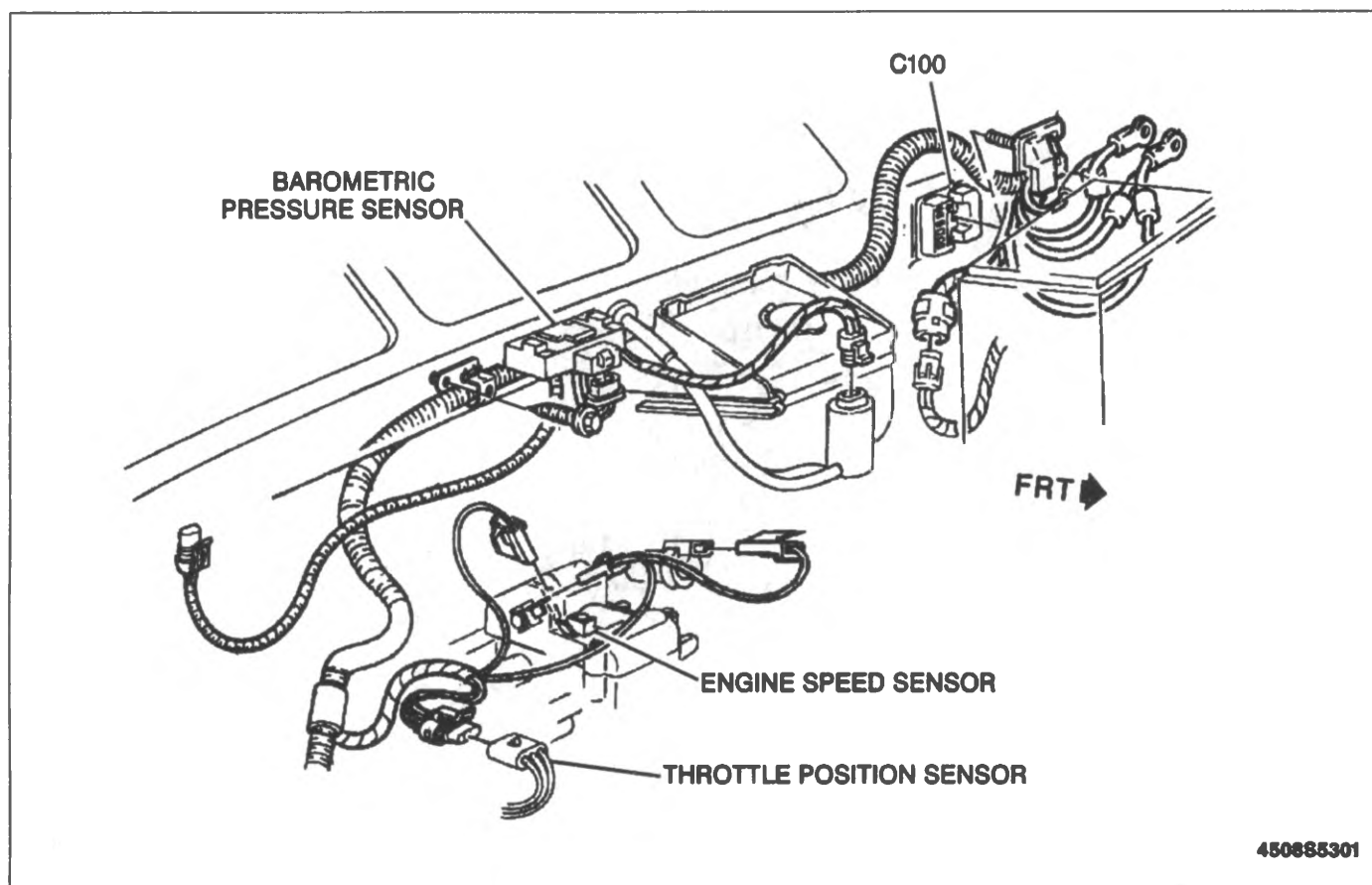


Figure 9—Rear of Engine Compartment

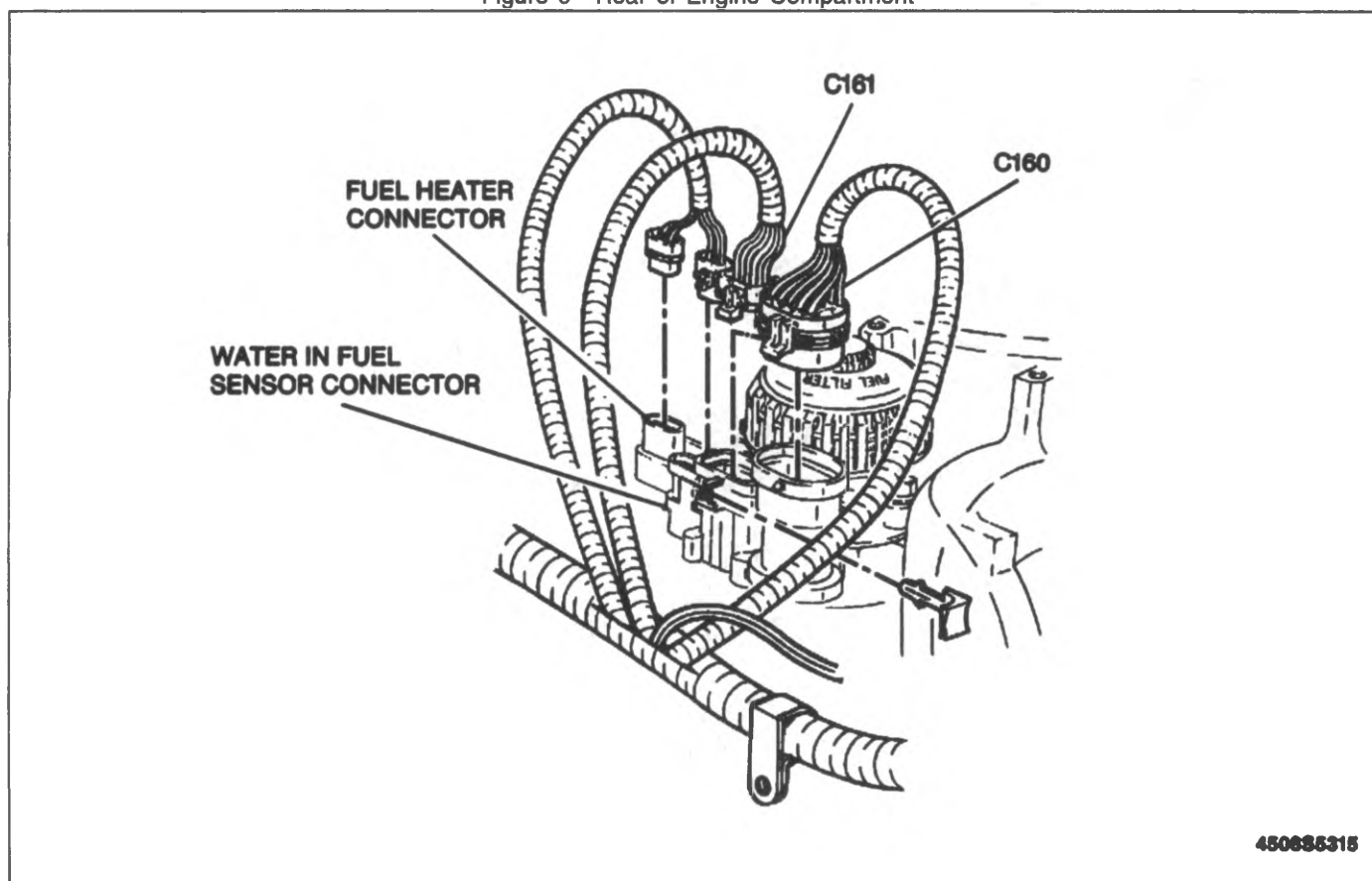


Figure 10—Rear of Engine (L49)

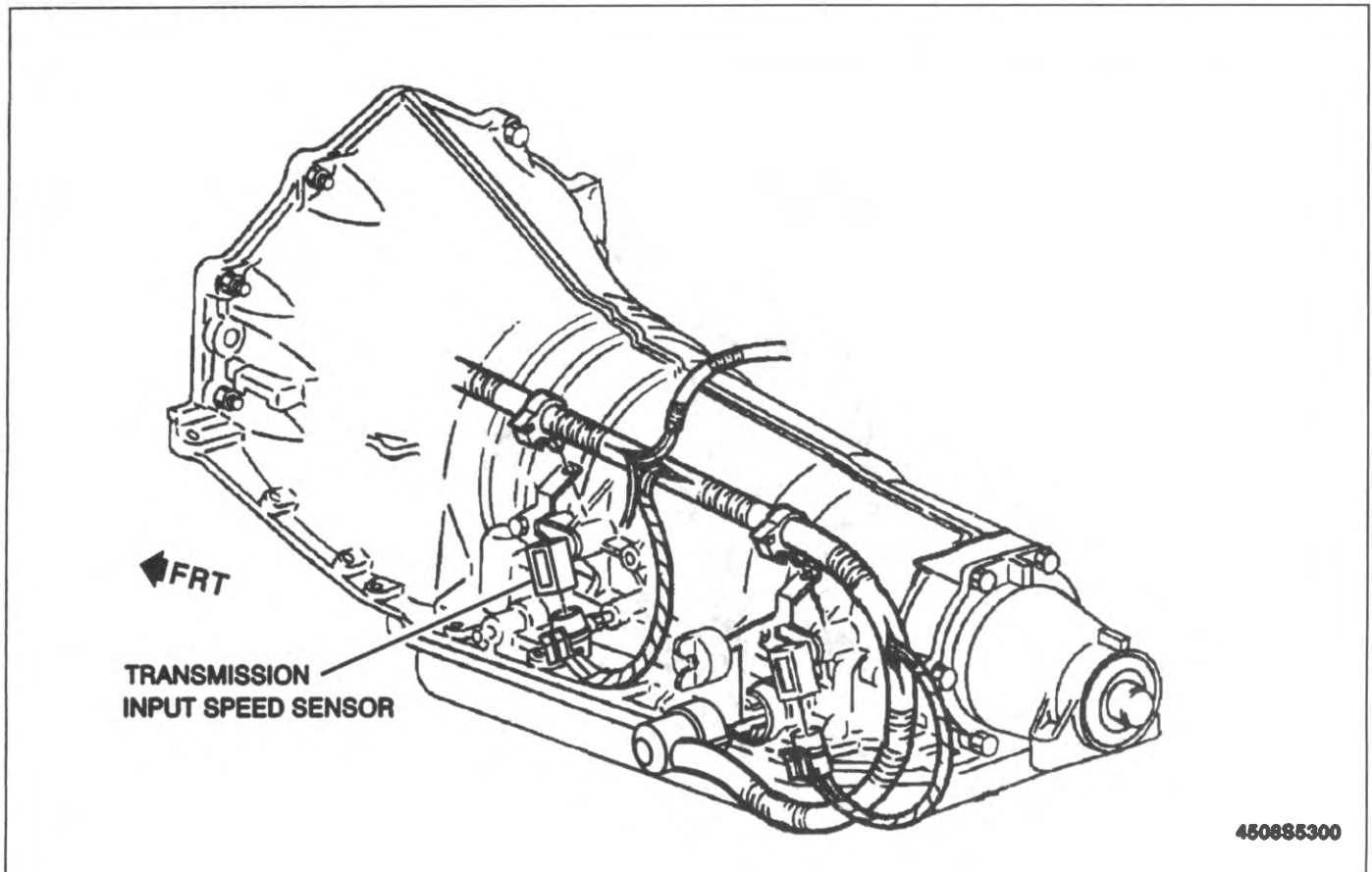


Figure 11—LH Side of Transmission

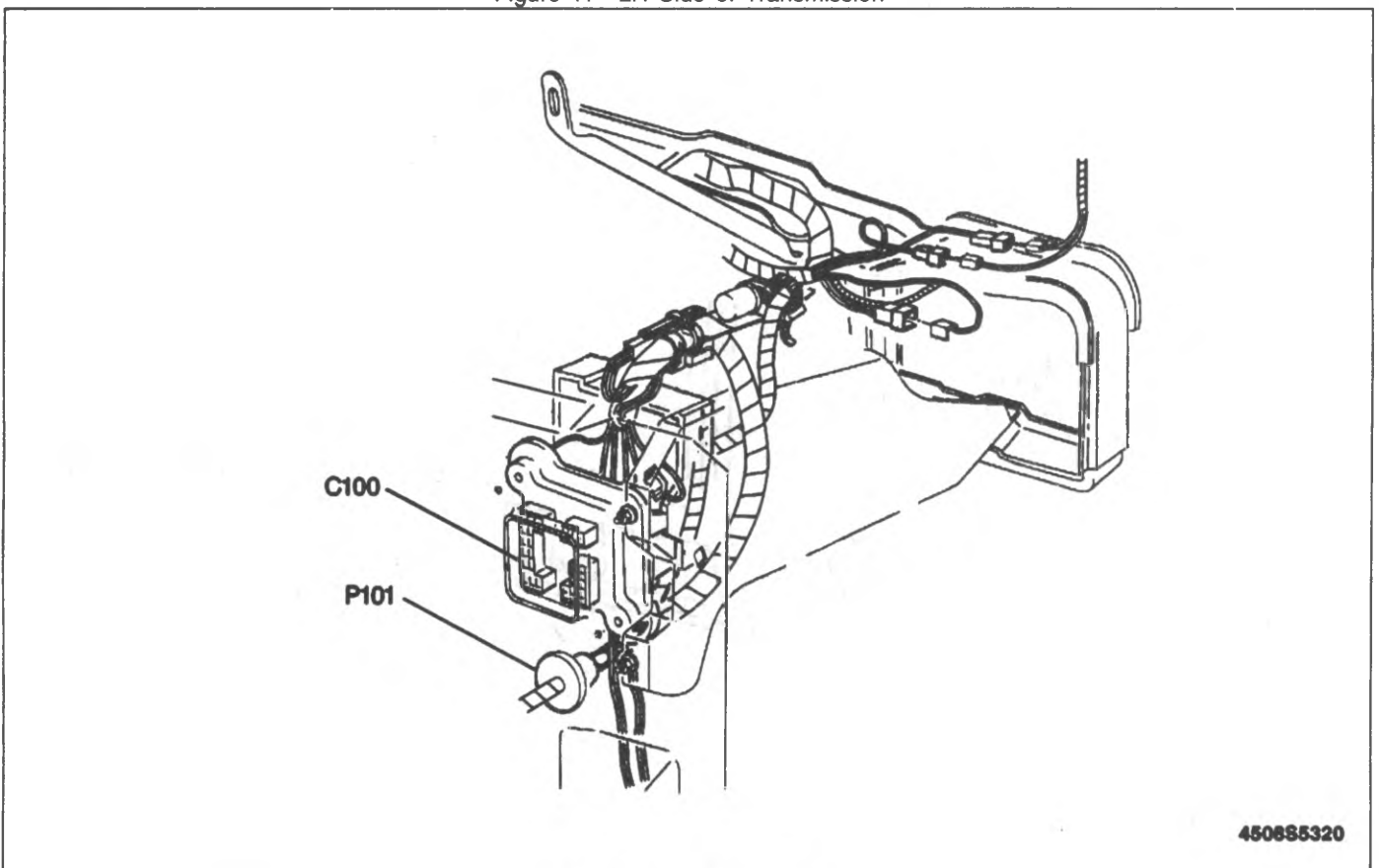


Figure 12—I/P Wiring

## COMPONENT LOCATION VIEWS - G-VAN

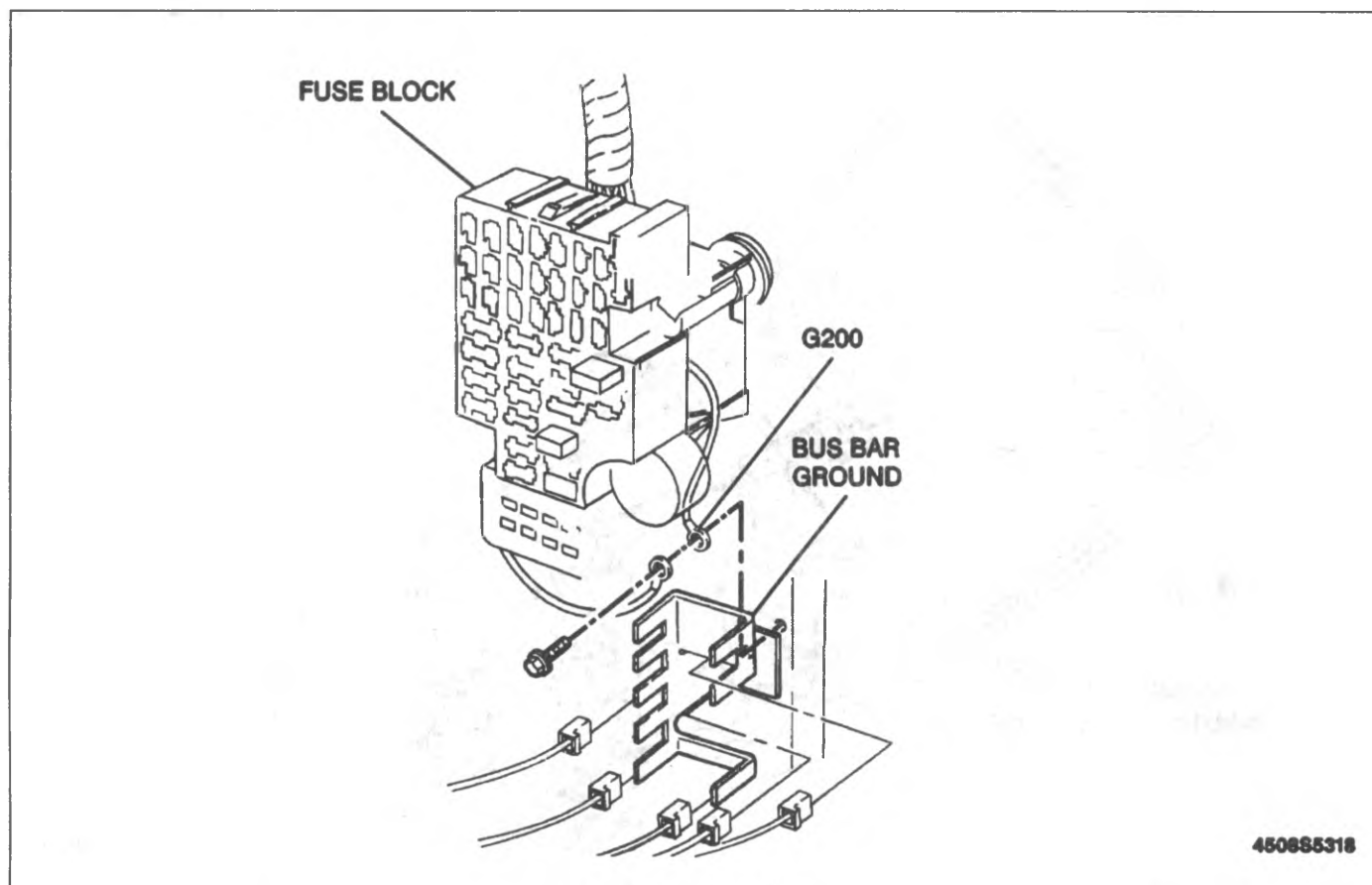


Figure 13—Fuse Block

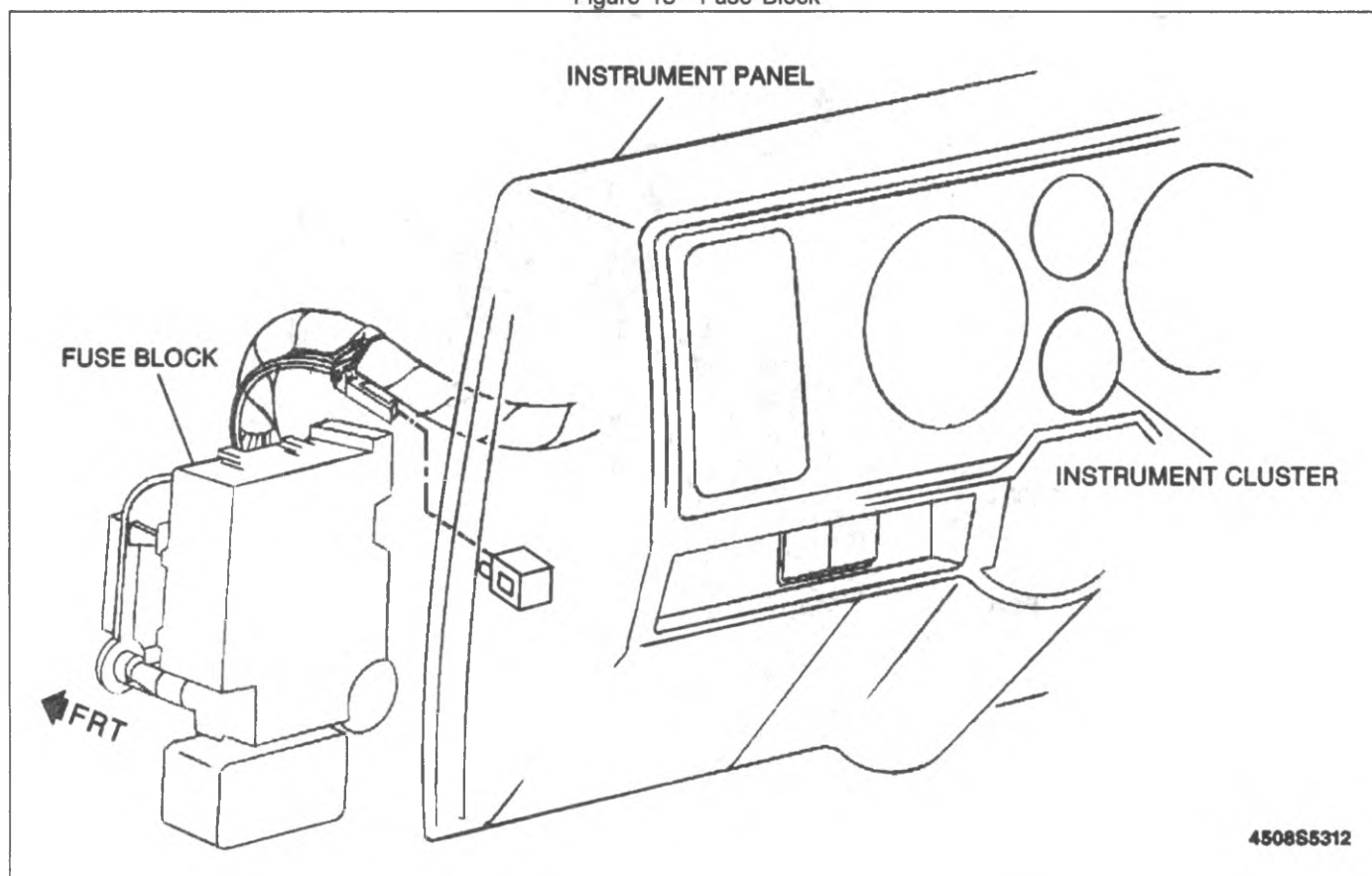


Figure 14—Instrument Panel

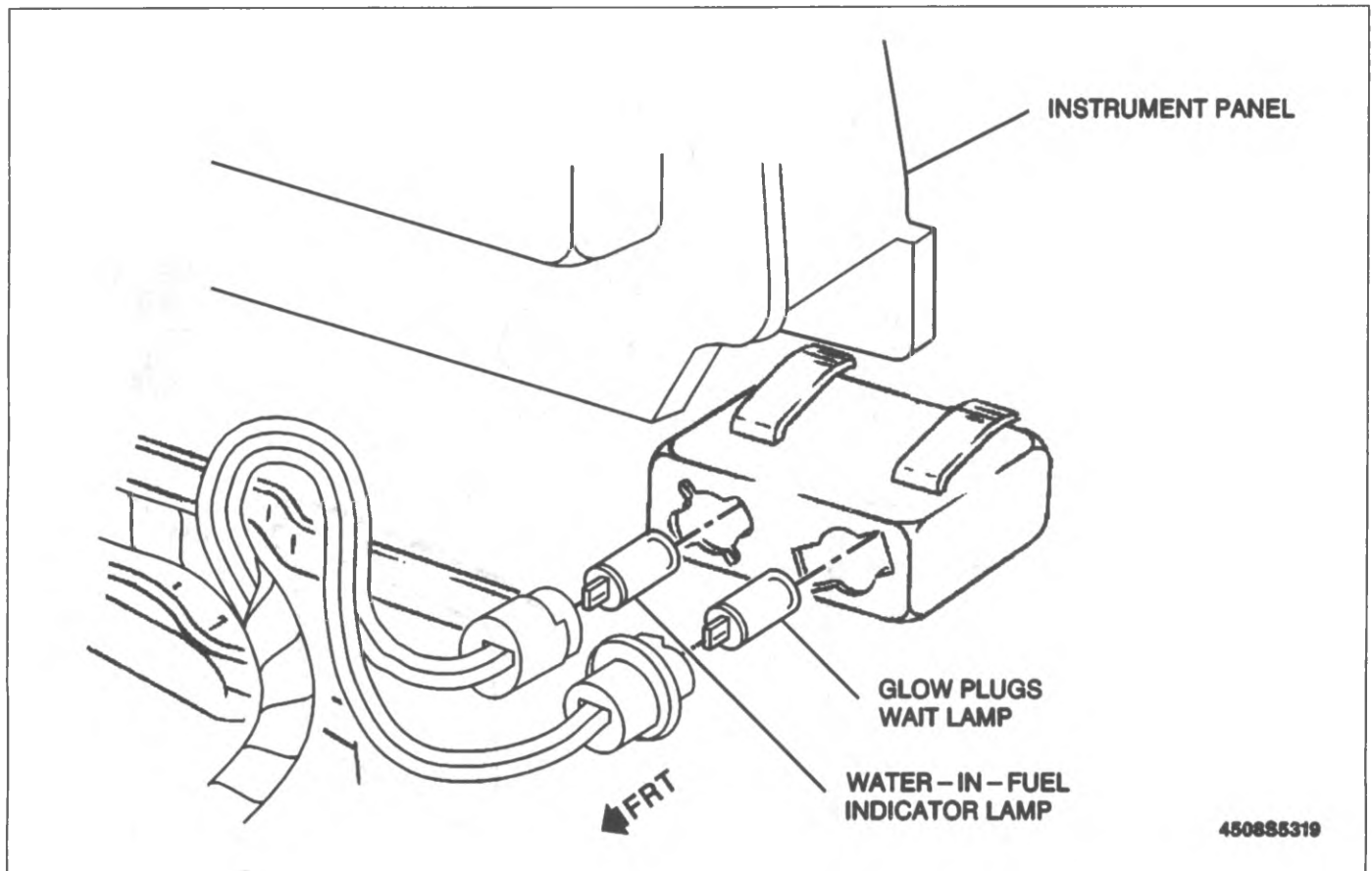


Figure 15—Instrument Panel

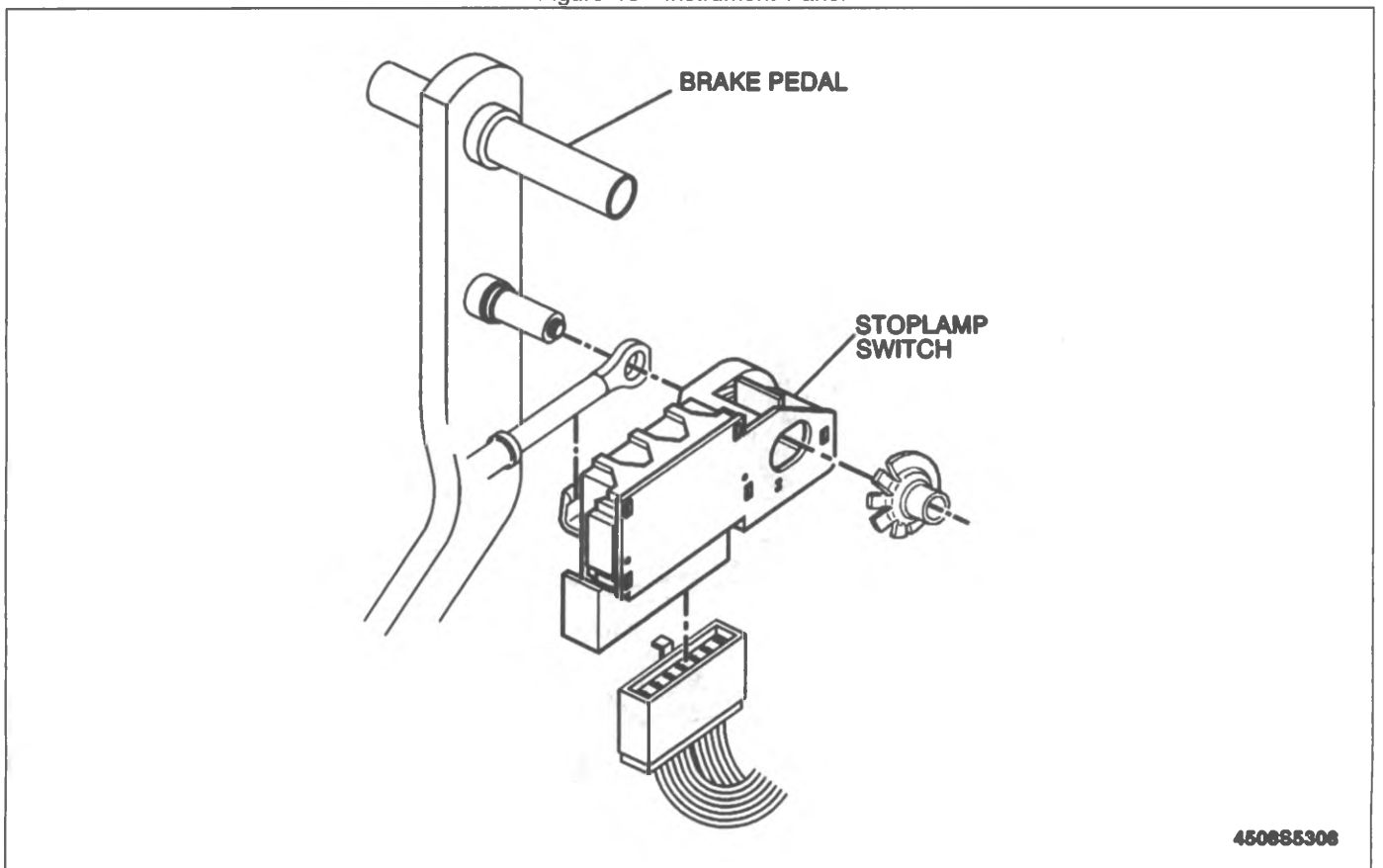


Figure 16—Stoplamp Switch

COMPONENT LOCATION VIEWS - G-VAN

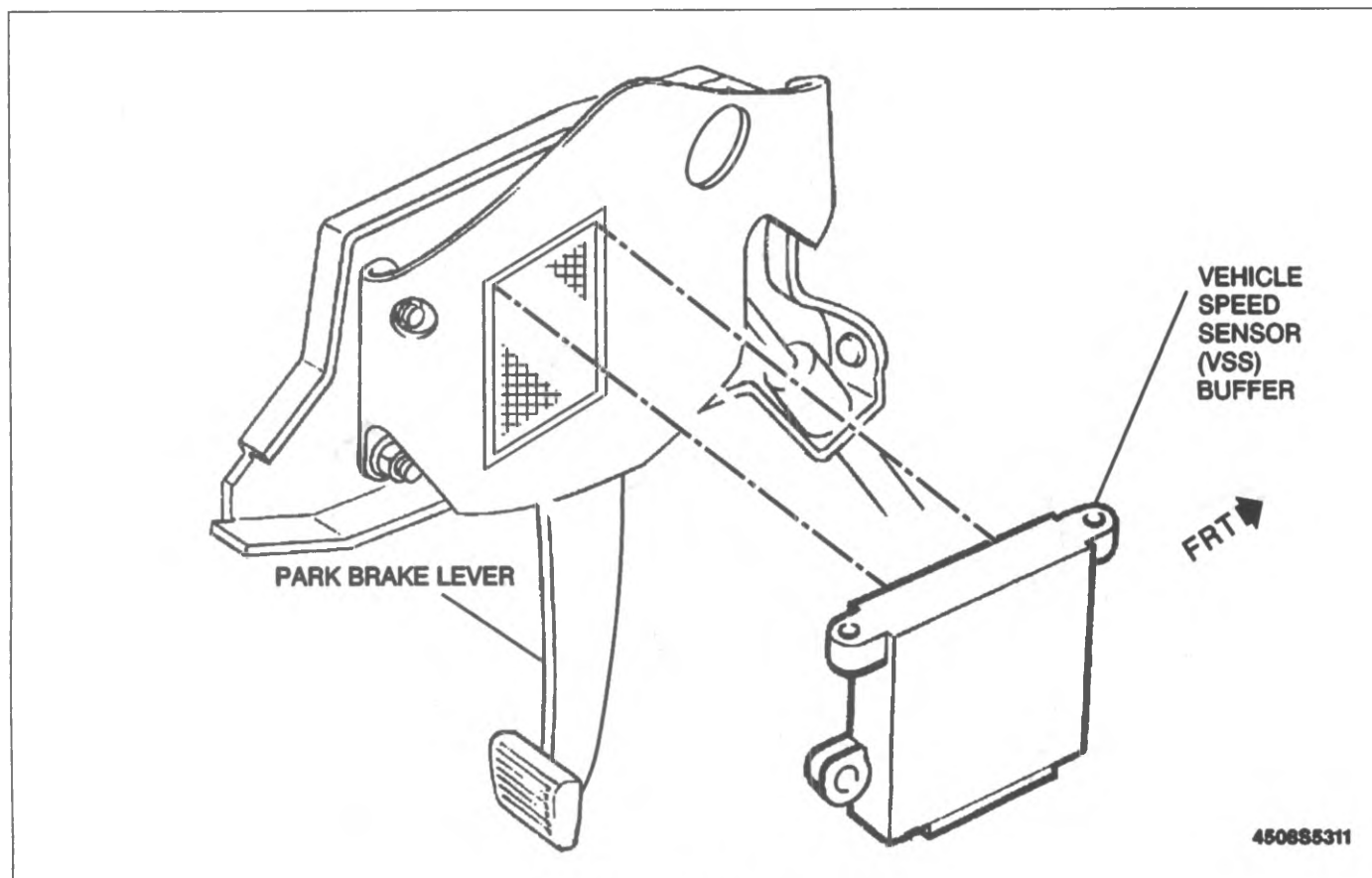


Figure 17—Park Brake Lever

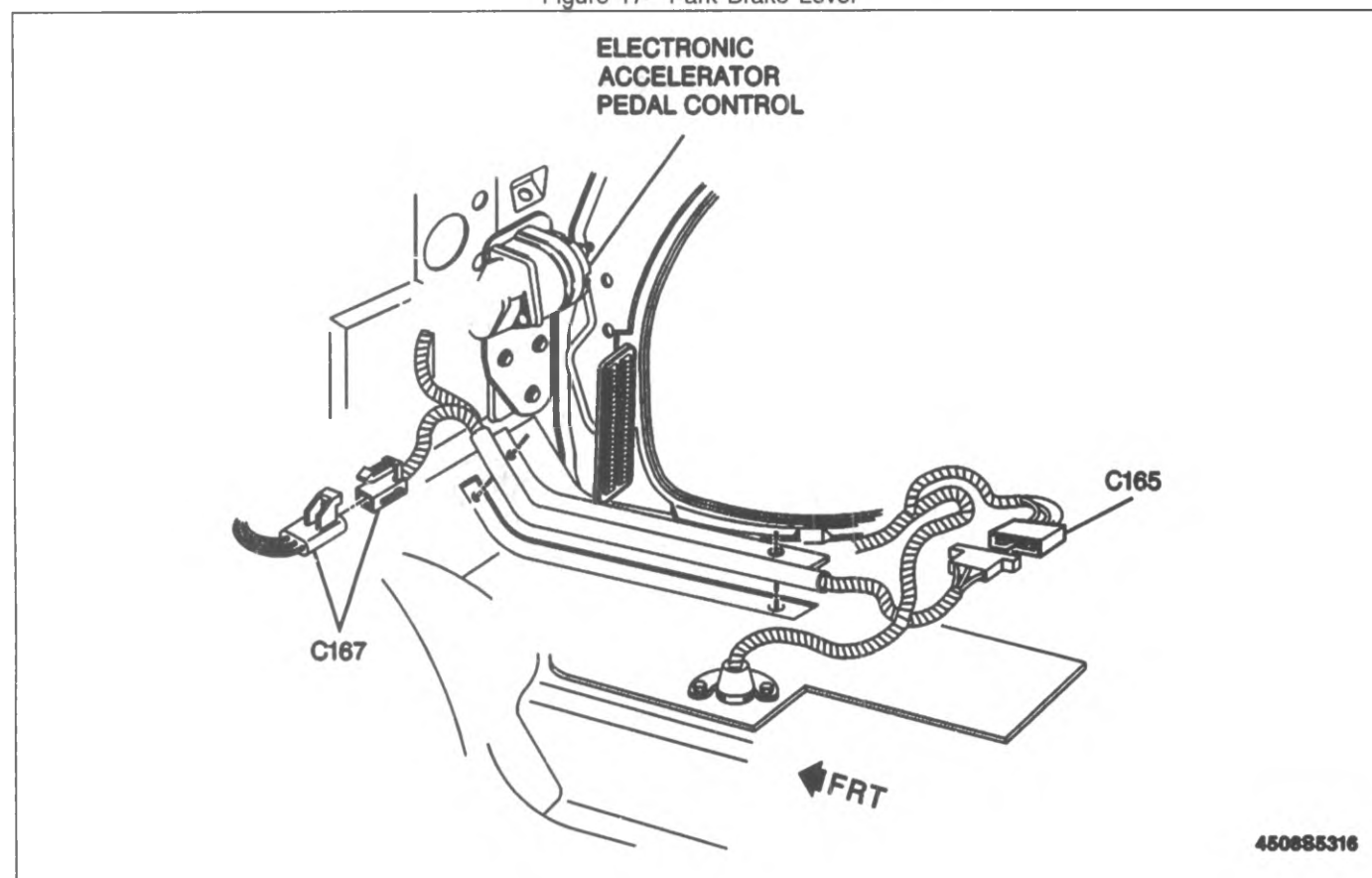
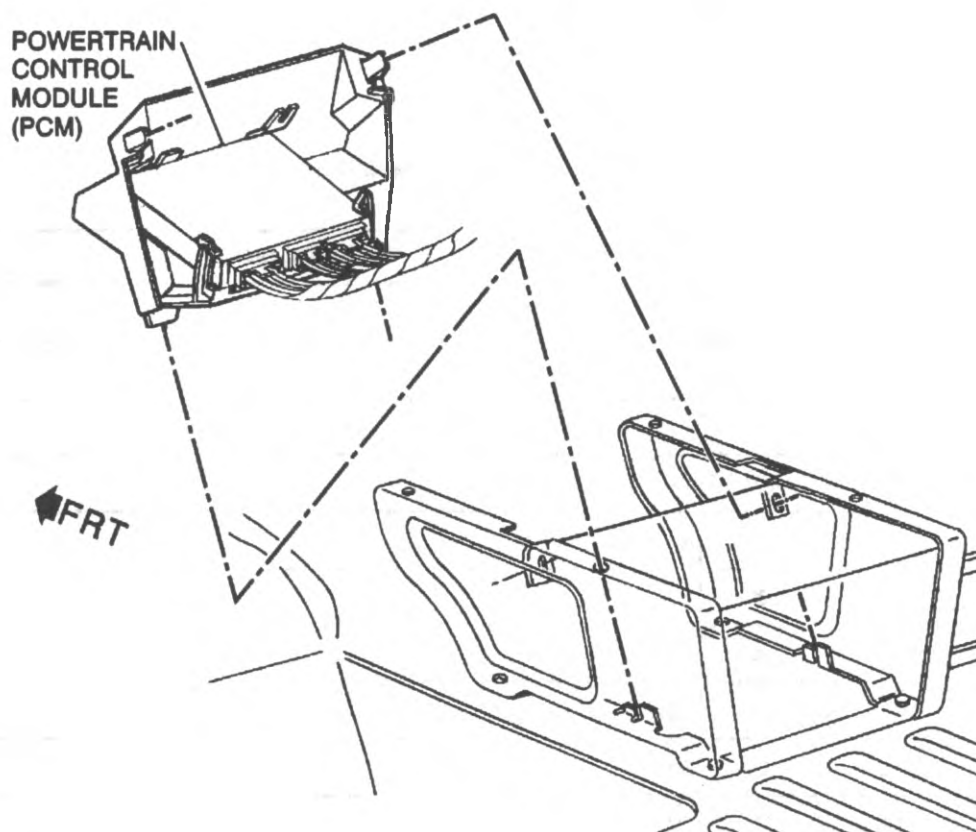


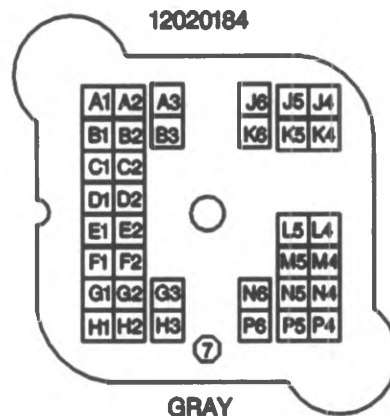
Figure 18—LH Front of Passenger Compartment



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450885309

Figure 19—Powertrain Control Module (PCM)

## HARNESS CONNECTOR FACES - G VAN



GRAY  
METRI - PACK 480  
C100

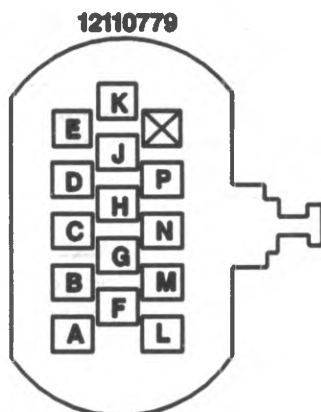
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CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A1	ORN	0.8	440	BATTERY FUSED FEED
A2	PNK	0.8	1149	IGNITION SWITCH OUTPUT
A3	PPL	0.5	30	FUEL GAUGE SENSOR
B1	BLK/WHT	0.8	450	GROUND
B2	PNK/BLK	0.8	39	IGNITION FUSED FEED
B3	ORN	1.0	503	GLOW PLUG FEED
C1	PNK	0.8	939	IGNITION FUSED FEED
C2	YEL/BLK	0.8	68	LOW COOLANT INDICATOR
D1	RED	5.0	2	BATTERY FEED
D2	TAN	0.5	31	OIL PRESSURE INDICATOR
E1	PNK/BLK	0.8	439	IGNITION FUSED FEED
E2	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
F1	RED	3.0	2	BATTERY FEED
F1	RED	3.0	2	BATTERY FEED
F2	BRN	1.0	437	VEHICLE SPEED SIGNAL
G1	PPL	0.8	420	STOPLAMP TO TCC SIGNAL
G2	PNK	1.0	94	WINDSHIELD WIPER SWITCH SIGNAL
G3	BRN/WHT	0.8	419	CHECK ENGINE INDICATOR
H1	PPL	5.0	6	STARTER SOLENOID FEED
H2	YEL/BLK	0.8	508	WATER-IN-FUEL INDICATOR
H3	ORN/BLK	0.5	1061	SERIAL DATA

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
J4	TAN/WHT	0.5	799	ABS BRAKE DIAGNOSTIC SIGNAL
J5	WHT	0.5	696	EBCM TO CLUSTER SIGNAL
J6	WHT/BLK	0.5	451	PCM GROUND
K4	WHT	0.5	852	ABS INDICATOR
K5	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
K5	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
K6	PNK/WHT	0.8	350	IGNITION FUSED FEED
L4	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
L5	LT GRN	1.0	11	HI BEAM HEADLAMP FEED
M4	LT GRN/BLK	0.8	822	VEHICLE SPEED SIGNAL RETURN
M5	TAN	0.8	12	LOW BEAM HEADLAMP FEED
N4	BRN	0.8	9	PARK LAMP FEED
N5				NOT USED
N6	DK BLU	0.8	15	RH FRONT TURN SIGNAL LAMP FEED
P4	PPL/WHT	0.8	821	VEHICLE SPEED SENSOR INPUT SIGNAL
P5	DK GRN	1.0	29	HORN FEED
P6	LT BLU	0.8	14	LH FRONT TURN SIGNAL LAMP FEED



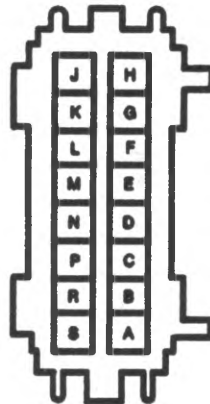
## HARNESS CONNECTOR FACES - G VAN



**BLACK**  
**METRI - PACK 280**  
**C160**

450685330

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	DK BLU/WHT	0.8	981	FUEL SHUT-OFF SOLENOID RETURN
B	TAN/BLK	0.8	564	PCM TO TIMING STEPPER MOTOR A1
C	RED/BLK	0.8	565	PCM TO TIMING STEPPER MOTOR A2
D	ORN/BLK	0.8	566	PCM TO TIMING STEPPER MOTOR B3
E	YEL/BLK	0.8	567	PCM TO TIMING STEPPER MOTOR B4
F	PNK	0.8	939	IGNITION FEED
G	PNK/WHT	0.8	982	CAM POSITION SENSOR
H	PPL	0.8	983	CAM POSITION SENSOR
J	LT GRN/WHT	0.8	987	FUEL TEMPERATURE SENSOR/ CAM POSITION SENSOR INPUT
K	YEL	0.8	1578	FUEL TEMPERATURE SENSOR OUTPUT
L	LT GRN	0.8	984	FUEL SOLENOID DRIVER
M	LT GRN	0.8	984	FUEL SOLENOID DRIVER
N	GRY	0.8	474	5 VOLT REFERENCE VOLTAGE
P	RED	0.8	985	CLOSURE SIGNAL
R				NOT USED

**12129431****16 - WAY METRI - PACK 280 SERIES****BLK  
C165****450685327**

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	ORN	0.8	960	SERVICE THROTTLE LAMP OUTPUT
B	RED	0.8	961	TPS #3 GROUND
C	DK BLU	0.8	992	TPS #1 SIGNAL
D	LT BLU	0.8	993	TPS #2 SIGNAL
E	DK GRN	0.8	994	TPS #3 SIGNAL
F	WHT/BLK	0.8	451	PCM GROUND
G	YEL	0.8	820	CHMSL FEED
H	ORN/BLK	0.5	1061	SERIAL DATA
J	DK GRN	0.8	83	CRUISE CONTROL OFF SIGNAL
K	DK BLU	0.8	84	CRUISE CONTROL SET/COAST SIGNAL
L	GRY	0.8	397	CRUISE CONTROL ON INPUT
M	YEL/BLK	0.8	995	TPS #3 REFERENCE VOLTAGE
N	PPL	0.8	996	TPS #2 REFERENCE VOLTAGE
P	LT BLU/BLK	0.8	997	TPS #1 REFERENCE VOLTAGE
R	BRN	0.8	998	TPS #1 GROUND
S	PPL	0.8	999	TPS #2 GROUND

## HARNESS CONNECTOR FACES - G VAN



**NATURAL  
BOW SERIES  
INSTRUMENT CLUSTER  
CONNECTOR**

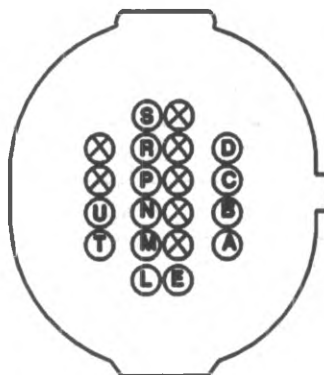
450685322

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
1	DK BLU	0.8	15	RH TURN SIGNAL LAMP FEED
2	LT BLU	0.8	14	LH TURN SIGNAL LAMP FEED
3	LT GRN	1.0	11	HI BEAM INDICATOR
4	PPL	0.5	30	FUEL GAUGE SENSOR
5	BLK	0.8	150	GROUND
6	NOT USED			
7	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
8	TAN	0.5	31	OIL PRESSURE INDICATOR
9	PNK/BLK	0.5	39	IGNITION FUSED FEED
10	GRY	0.8	69	LOW COOLANT MODULE CONTROLLED GROUND
11	BRN/WHT	0.8	419	CHECK ENGINE INDICATOR
12	NOT USED			

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
13	WHT	0.5	852	ABS INDICATOR LAMP
14	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
15	LT BLU/BLK	0.5	824	VEHICLE SPEED SIGNAL
16	YEL	0.8	237	FASTEN SEAT BELTS INDICATOR
17	BLK	0.8	150	GROUND
18	GRY	0.5	8	INSTRUMENT PANEL LAMP FEED

## HARNESS CONNECTOR FACES - G VAN

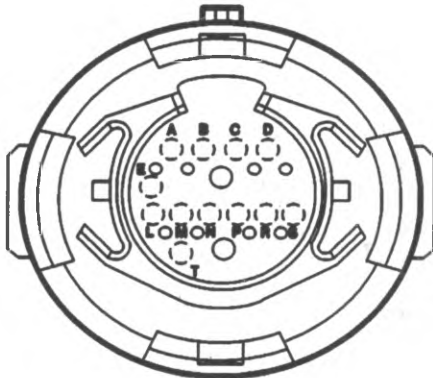
12160492



GRAY  
MICRO-PACK  
100

TRANSMISSION CONNECTOR 450685329

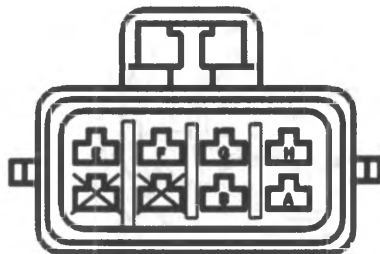
CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	LT GRN	0.8	1222	SHIFT SOLENOID A
B	YEL/BLK	0.8	1223	SHIFT SOLENOID B
C	RED/BLK	0.8	1228	PRESSURE CONTROL SOLENOID GROUND
D	LT BLU/WHT	0.8	1229	PRESSURE CONTROL SOLENOID FEED
E	PNK	0.8	1149	IGNITION FUSED FEED
L	BLK/YEL	0.8	1227	TRANSMISSION TEMPERATURE INPUT
M	BLK	0.8	452	TRANSMISSION TEMPERATURE GROUND
N	PNK	0.8	1224	RANGE MODE SELECTOR A
P	RED	0.8	1226	RANGE MODE SELECTOR B
R	DK BLU	0.8	1225	RANGE MODE SELECTOR C
S	WHT	0.8	897	SHIFT SOLENOID C
T	TAN/BLK	0.8	422	TCC OUTPUT
U	DK BLU	0.8	1350	TORQUE CONVERTER CLUTCH (TCC) ENABLE



12129829  
12 - WAY F MICRO - PACK 100 W  
GRY  
TRANSMISSION CONNECTOR 450825326

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	LT. GRN	0.8	1222	SHIFT SOLENOID A
B	YEL/BLK	0.8	1223	SHIFT SOLENOID B
C	RED/BLK	0.8	1228	PRESSURE CONTROL SOLENOID GROUND
D	LT BLU/WHT	0.8	1229	PRESSURE CONTROL SOLENOID FEED
E	PNK	0.8	1149	IGNITION FUSED FEED
L	BLK/YEL	0.8	1227	TRANSMISSION TEMPERATURE INPUT
M	BLK	0.8	452	TRANSMISSION TEMPERATURE GROUND
N	PNK	0.8	1224	RANGE MODE SELECTOR A
P	RED	0.8	1226	RANGE MODE SELECTOR B
R	DK BLU	0.8	1225	RANGE MODE SELECTOR C
S	WHT	0.8	1350	TORQUE CONVERTER CLUTCH (TCC) ENABLE
T				NOT USED

**HARNESS CONNECTOR FACES - G VAN**



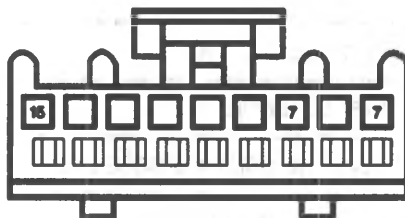
**12047937**

**8 - WAY F METRI - PACK 150 SERIES**

**BLK**

**C161**

**450685328**



**12066130**

**9 - WAY F MICRO - PACK 100 SERIES**

**NATURAL**

**VEHICLE SPEED**

**SENSOR (VSS) BUFFER**

**450685321**

**P-CHASSIS  
SECTION 8A  
ELECTRICAL DIAGRAMS  
AND  
DIAGNOSIS**



**BLANK**

**SECTION 8A**  
**ELECTRICAL DIAGNOSIS**  
**1994 AND 1995 P-CHASSIS**

**CAUTION:** This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to **CAUTIONS** in Section 9J under "ON-VEHICLE SERVICE" and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow **CAUTIONS** could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

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- 24 Engine Controls - 6.5L Turbo Diesel VIN F

**SECTION**

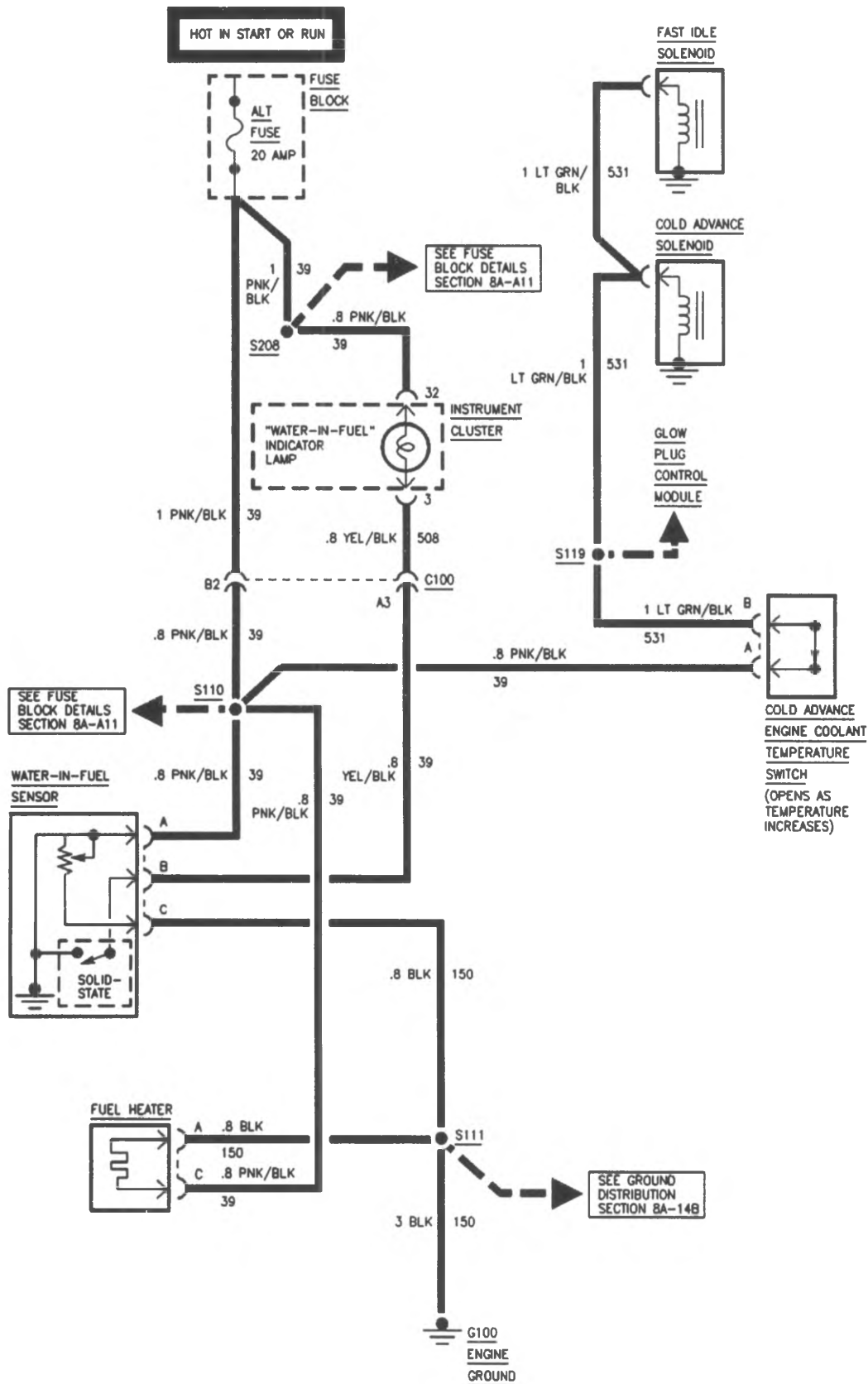
- 201 Component Location Views
- 202 Harness Connector Faces

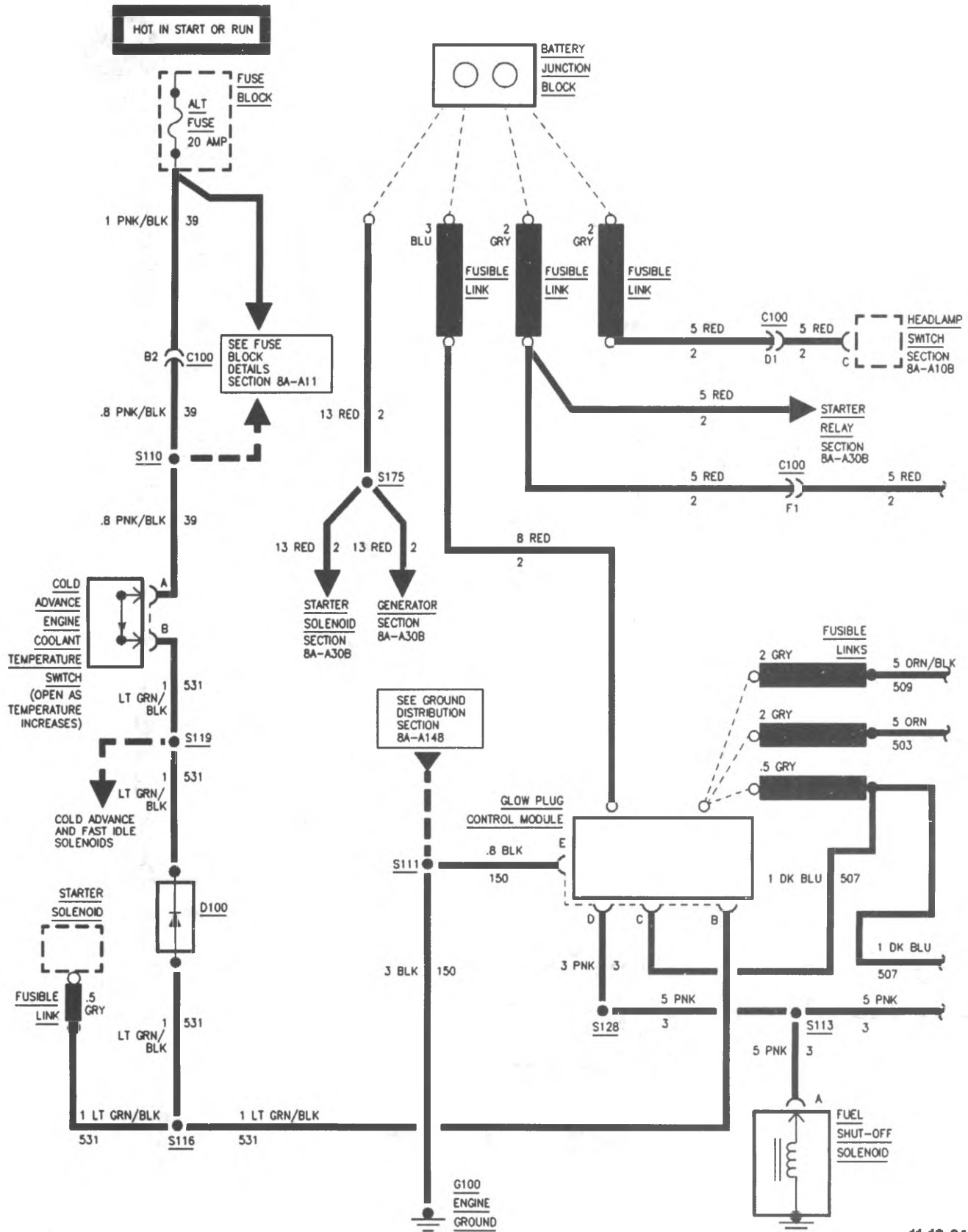
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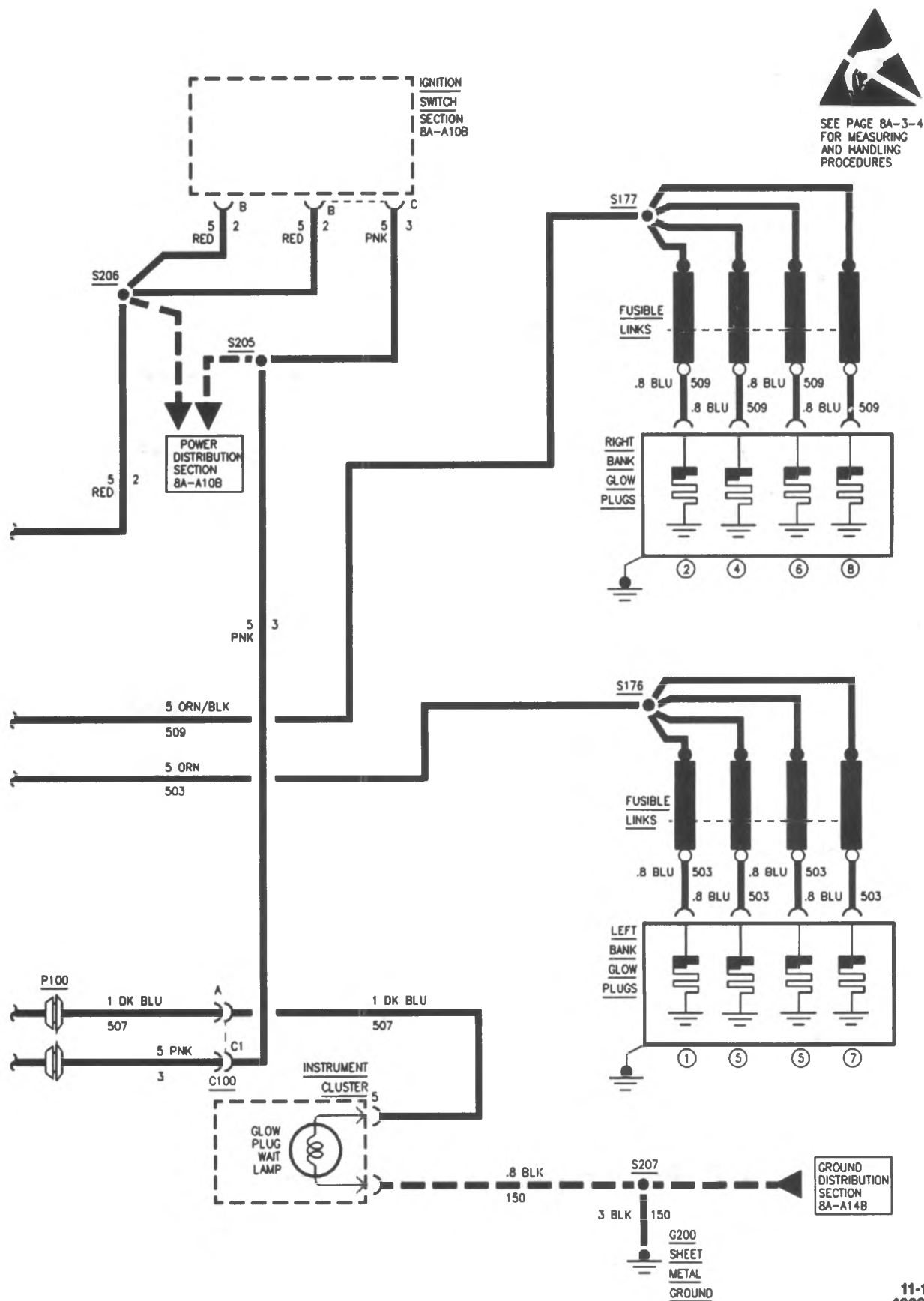
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## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L57 VIN Y





## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L57 VIN Y



COMPONENT	LOCATION	201-PG	FIG.	CONN
Battery Junction Block .....	LH front of Driver's Island .....	0 .....	1	
Cold Advance Engine Coolant Temperature Switch .....	Bottom rear of RH cylinder head .....	3 .....	4	
Cold Advance Solenoid .....	On Fuel Shut-Off Solenoid .....	3 .....	4	
Fast Idle Solenoid .....	On Fuel shut-off solenoid .....	3 .....	4	
Fuel Heater .....	Below Water-in-Fuel Sensor .....	9 .....	13	
Fuel Shut-Off Solenoid .....	Top center of engine, behind thermostat .....	3 .....	4	
Fuse Block .....	Under left side of instrument panel .....	5 .....	8	
Glow Plug Control Module .....	Top rear of LH cylinder head .....	9 .....	13 .....	202-12
Glow Plugs (LH & RH) .....	At respective cylinder head .....	3 .....	4	
Headlamp Switch .....	On LH side of Instrument Panel			
Ignition Switch .....	On Steering Column .....	6 .....	10	
Instrument Cluster .....	On LH side of instrument panel .....			202-06
Starter Solenoid .....	Above Starter Motor .....	3 .....	4	
Transmission .....	Behind Engine .....			202-10
Water-in-Fuel Sensor .....	Top rear of engine, near intake manifold .....	9 .....	13	
<b>CONNECTORS</b>				
C100 .....	LH side of Driver's Island, below fusible links .....	0 .....	1 .....	202-0
<b>DIODES</b>				
D100 .....	Engine Harness, behind generator			
<b>GROMMETS</b>				
P100 .....	On Driver's Island, Below Fusible Links			
<b>GROUND</b>				
G100 .....	Near Generator			
G200 .....	Near C100			
<b>SPLICES</b>				
S110 .....	Engine Harness, between RH Glow Plugs Breakouts			
S111 .....	Engine Harness, between RH Glow Plugs Breakouts			
S113 .....	Engine Harness, 6 cm from Starter Motor Breakout			
S116 .....	Engine Harness, 32 cm onto Starter Solenoid Breakout			
S119 .....	Engine Harness, 6.5 cm from Generator Breakout			
S128 .....	Engine Harness, 11 cm from Glow Plug Control Module			
S175 .....	Engine Harness, 12.5 cm from Starter Motor Breakout			
S176 .....	Engine Harness, at rear of LH cylinder head			
S177 .....	Engine Harness, at rear of RH cylinder head			
S205 .....	15 cm from Fuse Block Breakout			
S206 .....	12 cm from Fuse Block Breakout			



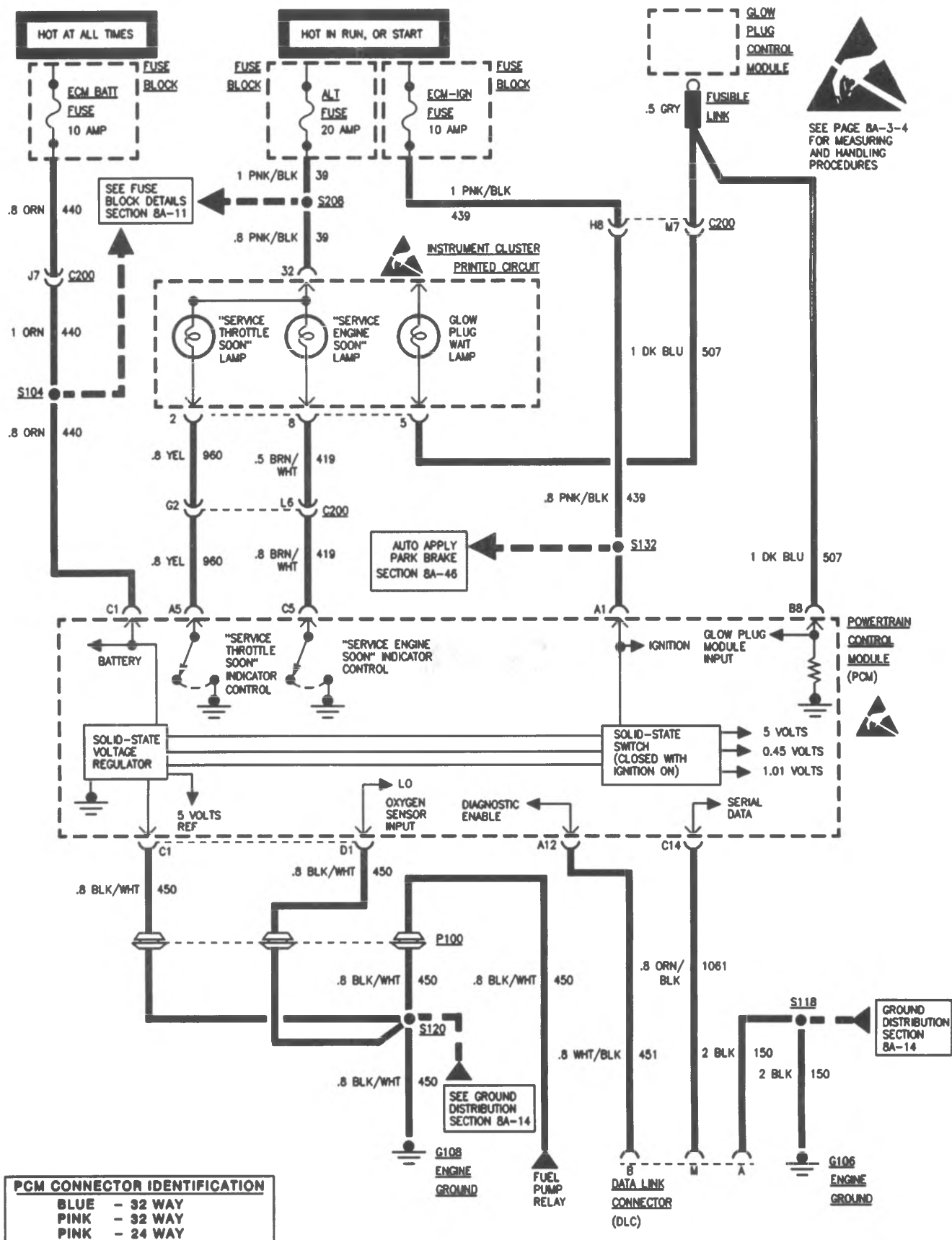
ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L57 VIN Y

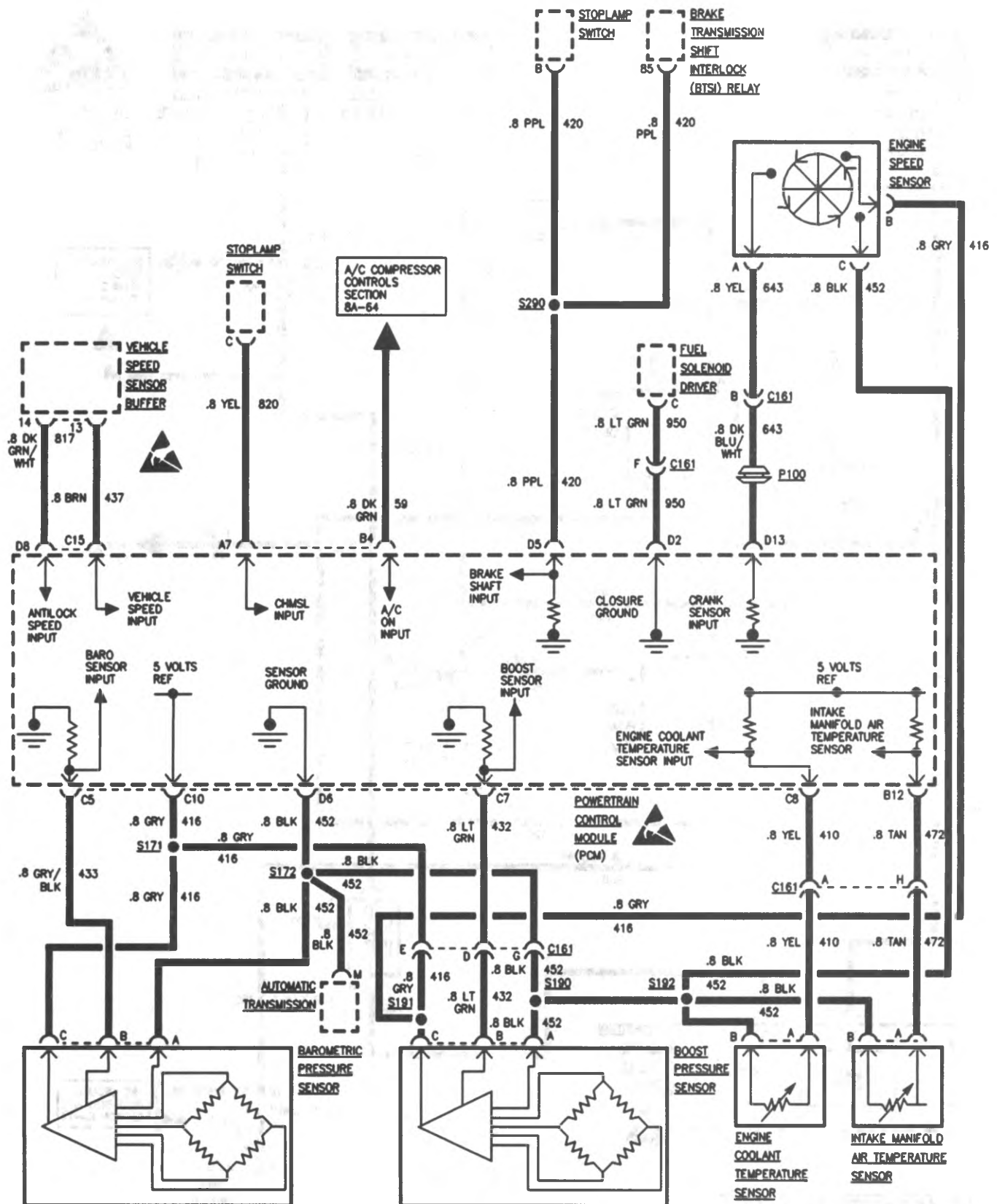
COMPONENT	LOCATION	201-PG	FIG.	CONN
S207 .....	4 cm from Fuse Block Breakout			
S208 .....	I/P Harness, 8 cm from Instrument Panel Connector Breakout			

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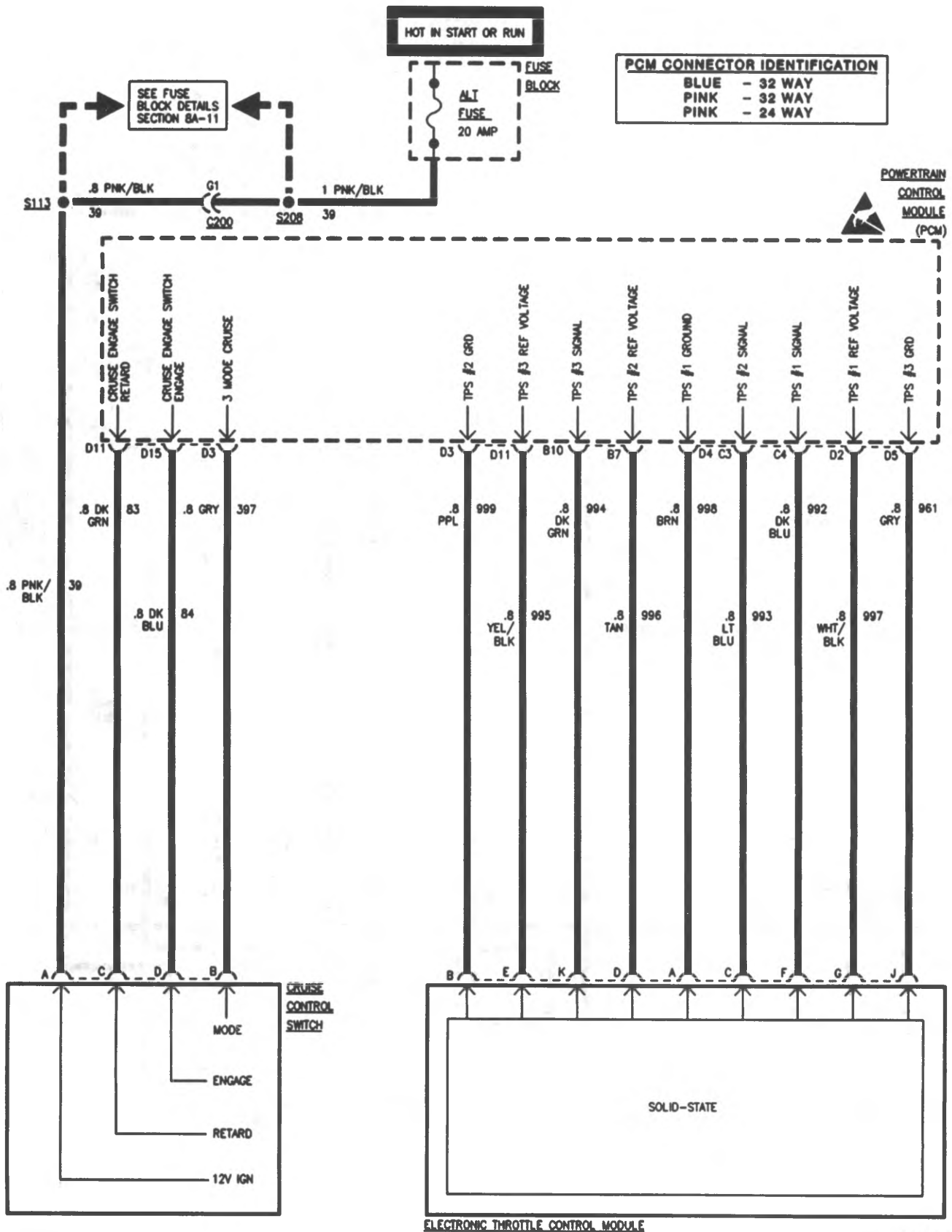
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## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L65 VIN F







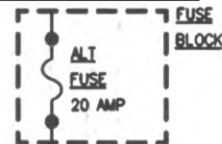


## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L65 VIN F

## PCM CONNECTOR IDENTIFICATION

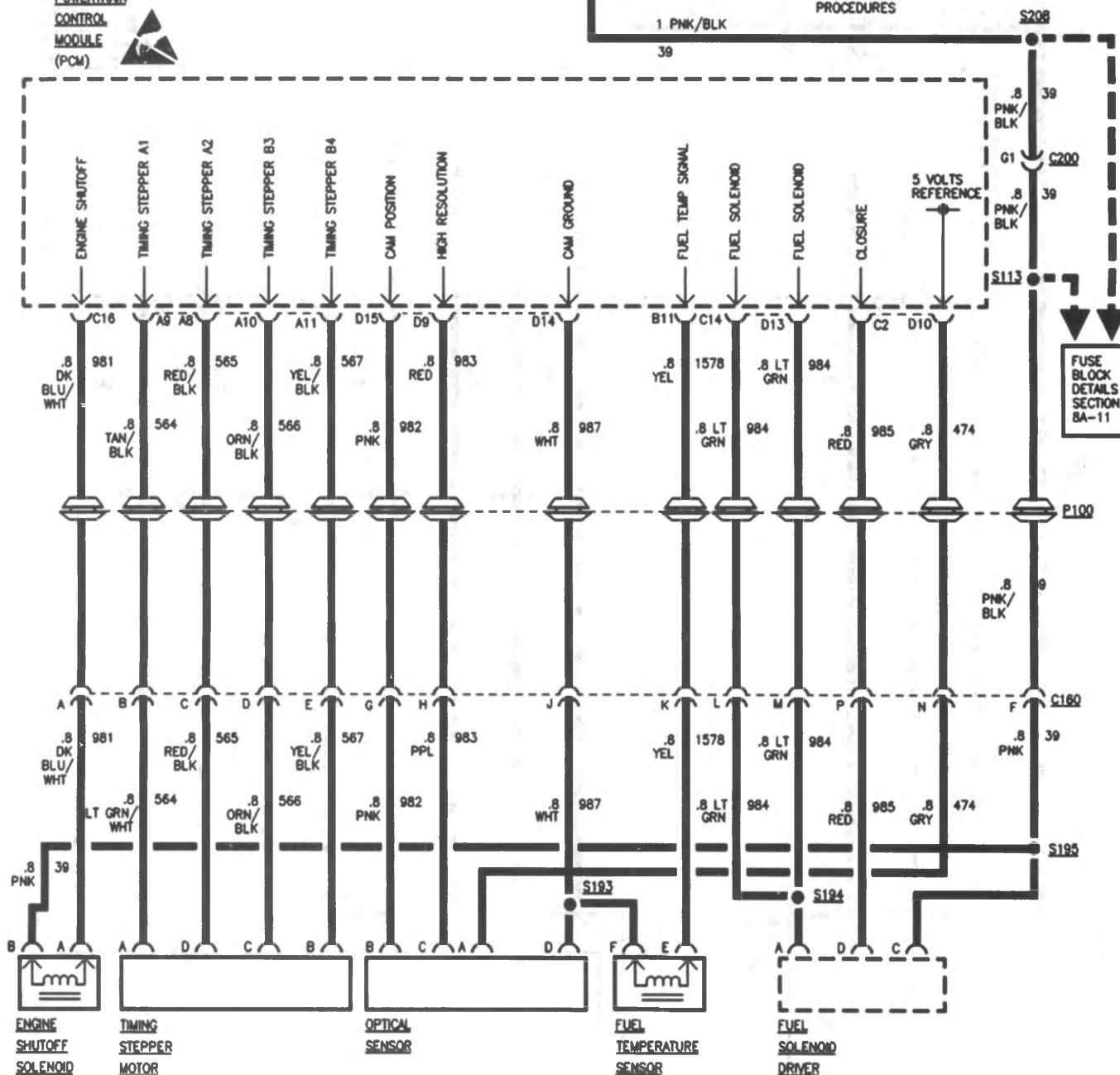
BLUE - 32 WAY  
 PINK - 32 WAY  
 PINK - 24 WAY

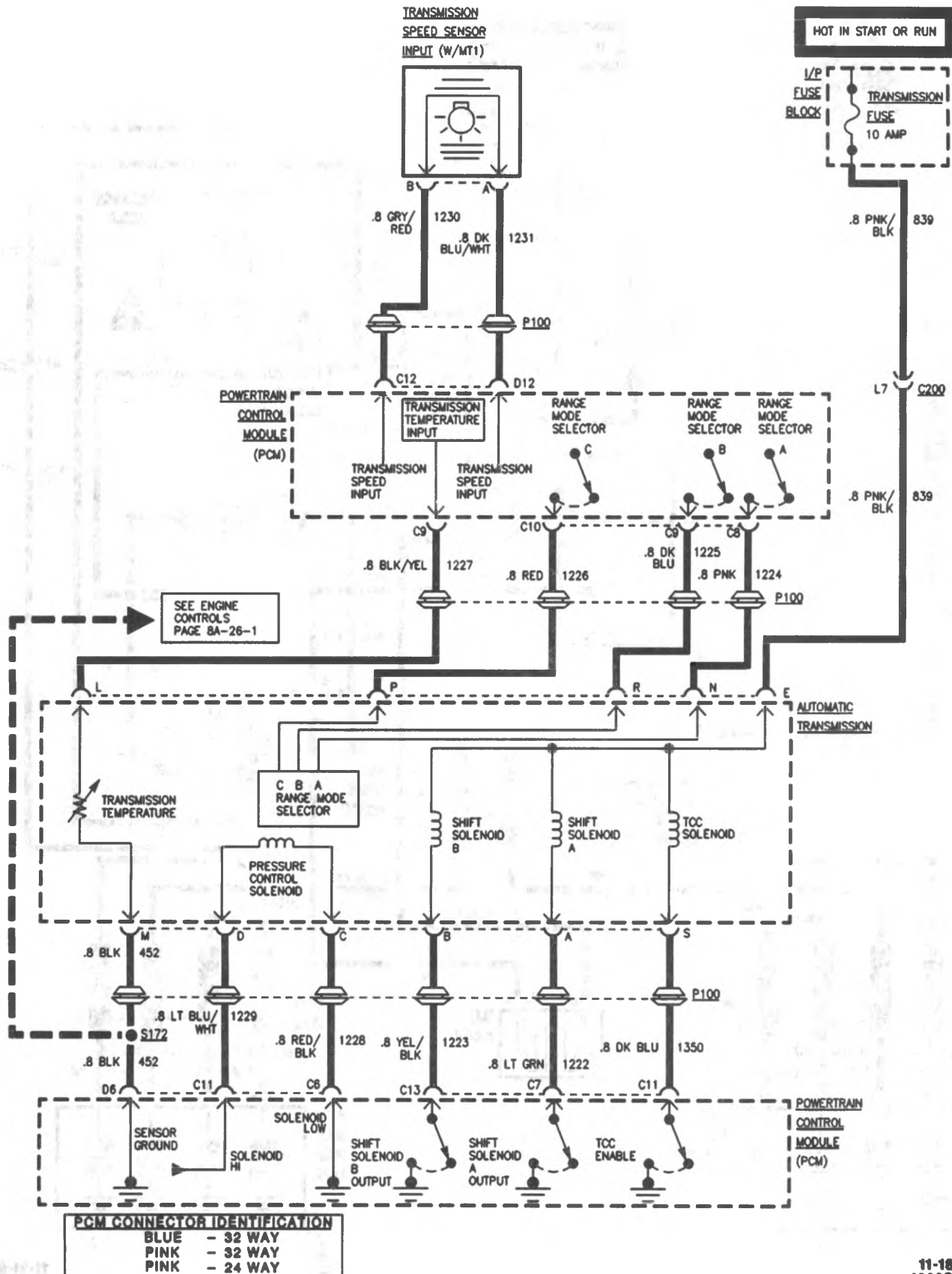
HOT IN START OR RUN



SEE PAGE 8A-3-4  
 FOR MEASURING  
 AND HANDLING  
 PROCEDURES

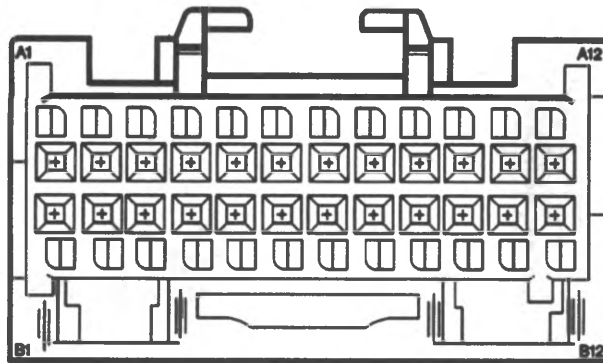
POWERTRAIN  
 CONTROL  
 MODULE  
 (PCM)











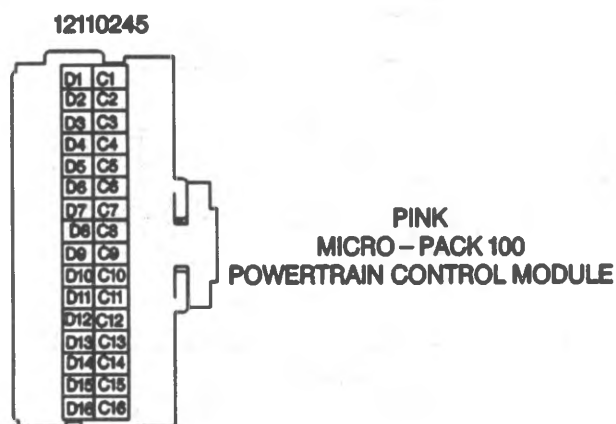
12110244  
 24 - WAY F MICRO - PACK 100 SERIES  
 PNK  
 POWERTRAIN CONTROL MODULE  
 400685331

#### POWERTRAIN CONTROL MODULE - 24-PIN PINK

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A1	PNK/BLK	0.8	439	12 IGNITION FUSED
A3	YEL	0.8	972	TCC SIGNAL RETURN
A5	YEL	0.8	1226	"SERVICE THROTTLE" LAMP OUTPUT
A7	YEL	0.8	820	CHMSL INPUT
A8	RED/BLK	0.8	565	TIMING STEPPER A2
A9	TAN/BLK	0.8	564	TIMING STEPPER A1
A10	ORN/BLK	0.8	566	TIMING STEPPER B3
A11	YEL/BLK	0.8	567	TIMING STEPPER B4
A12	WHT/BLK	0.8	451	DIAGNOSTIC ENABLE
B4	DK GRN	1.0	459	A/C "ON" INPUT
B7	TAN	0.8	996	REFERENCE VOLTAGE TPS 2
B8	DK BLU	1.0	507	GLOW PLUG "WAIT" LAMP OUTPUT
B10	DK GRN	0.8	994	TPS 3 SIGNAL INPUT
B11	YEL	0.8	1578	FUEL TEMPERATURE INPUT
B12	TAN	0.8	472	INTAKE MANIFOLD AIR TEMPERATURE

\*CAVITIES NOT LISTED ARE NOT USED

## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L65 VIN F



400685334

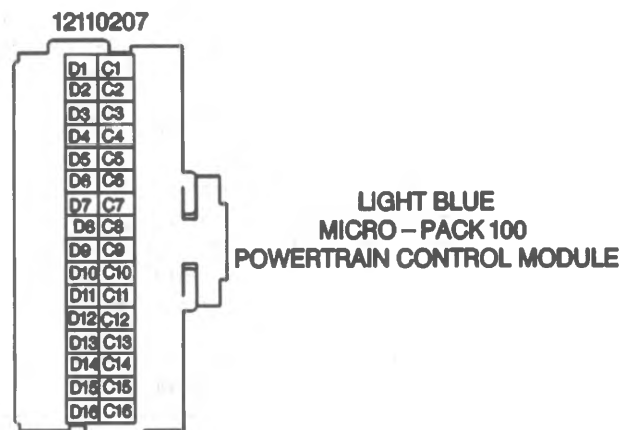
## POWERTRAIN CONTROL MODULE - 32-PIN PINK

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
C1	BLK/WHT	0.8	450	SYSTEM GROUND
C2	RED	0.8	985	CLOSURE SIGNAL
C3	LT BLU	0.5	993	TPS 2 SIGNAL
C4	DK BLU	0.5	992	TPS 1 SIGNAL
C5	GRY/BLK	0.8	433	BAROMETRIC PRESSURE SENSOR INPUT
C6	RED/BLK	0.8	1228	TRANS FORCE MOTOR HIGH
C7	LT GRN	0.8	432	MANIFOLD ABSOLUTE PRESSURE SENSOR INPUT
C8	YEL	0.8	410	COOLANT TEMPERATURE
C9	BLK/YEL	0.8	1227	TRANS TEMPERATURE INPUT
C10	GRY	0.8	416	+5 VOLT REFERENCE
C11	LT BLU/WHT	0.8	1229	TRANS FORCE MOTOR LOW
C12	GRY/RED	0.8	1230	TRANS SPEED SENSOR INPUT
C13	YEL	0.8	505	GLOW PLUG RELAY
C14	ORN/BLK	0.8	1061	SERIAL DATA
C15	BRN	0.8	437	VEHICLE SPEED SENSOR INPUT
D1	BLK/WHT	0.8	450	ENGINE GROUND
D2	LT GRN	0.8	950	CLOSURE GROUND
D3	PPL	0.8	999	TPS 2 GROUND
D4	BRN	0.8	998	TPS 1 GROUND
D5	GRY	0.8	961	TPS 3 GROUND

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
D6	BLK	0.8	452	TRANS TEMPERATURE/PRESSURE REFERENCE LOW
D9	RED	0.8	983	TPS 2 SIGNAL
D10	GRY	0.8	474	+5 VOLT REFERENCE
D11	YEL/BLK	0.8	995	REFERENCE VOLTAGE TPS 3
D12	DK BLU/WHT	0.8	1231	TRANS SPEED SENSOR INPUT
D13	DK BLU/WHT	0.8	643	CRANK SENSOR
D14	WHT	0.8	987	CAM POSITION SENSOR GROUND
D15	PNK	0.8	982	CAM POSITION SENSOR

\*CAVITIES NOT LISTED ARE NOT USED

## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L65 VIN F



400685333

## POWERTRAIN CONTROL MODULE - 32-PIN BLUE

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
C1	ORN	0.8	440	12V + BATTERY
C5	BRN/WHT	0.8	419	"SERVICE ENGINE SOON" LAMP OUTPUT
C7	LT GRN	0.8	1222	TRANS SHIFT SOLENOID A
C8	PNK	0.8	1224	TRANS RANGE MODE A
C9	DK BLU	0.8	1225	TRANS RANGE MODE B
C10	RED	0.8	1226	TRANS RANGE MODE C
C11	DK BLU	0.8	1350	3/1 SHIFT CONTROL
C13	YEL/BLK	0.8	1223	TRANS SHIFT SOLENOID B
C14	LT GRN	0.8	984	FUEL SOLENOID
C16	DK BLU/WHT	0.8	981	FUEL SHUTOFF
D2	WHT/BLK	0.8	997	REFERENCE VOLTAGE TPS 1
D3	GRY	0.8	397	3 MODE ELECTRONIC CRUISE CONTROL
D5	PPL	0.8	420	BRAKE SWITCH INPUT
D7	DK GRN/WHT	0.8	817	4000 PULSE VSS
D11	DK GRN	0.8	83	CRUISE CONTROL SWITCH - RETARD
D13	LT GRN	0.8	984	FUEL SOLENOID
D15	DK BLU	0.8	84	CRUISE CONTROL SWITCH - ENGAGE

\*CAVITIES NOT LISTED ARE NOT USED

COMPONENT	LOCATION	201-PG	FIG.	CONN
Air Temperature Sensor .....	On Intake-to-Turbo Manifold			
Barometric Pressure Sensor .....	Top Rear of LH Cylinder Head .....	1 .....	2	
Battery Junction Block .....	LH front of Driver's Island .....	4 .....	6	
Boost Pressure Sensor .....	On Turbo-to-Intake Manifold .....	1 .....	2	
Brake Transmission Shift Interlock (BTSI) Relay .....	RH Side of Driver's Next to Fuel Pump Relay .....	4 .....	6 .....	202-11
Cruise Control Switch .....	On LH Side of Steering Column			
Data Link Connector (DLC) .....	LH Side of Driver's Island .....	6 .....	9 .....	202-11
Electronic Injection Pump .....	Top Front of Engine, Below Intake Manifold			
Electronic Throttle Control Module .....	Above Accelerator Pedal Support Bracket .....	7 .....	11 .....	202-05
Engine Coolant Temperature Sensor .....	Top Front of Engine .....	2 .....	3	
Engine Speed Sensor .....	Lower LH Front of Engine, Behind Harmonic Balancer			
Fuel Heater .....	Next to Water-In-Fuel Sensor .....	8 .....	12	
Fuel Pump Prime .....	RH Frame Rail, near Fuel Tank .....	10 .....	15	
Fuel Pump Relay .....	RH Side of engine, behind thermostat .....	7 .....	11 .....	202-11
Fuel Pump/Oil Pressure Switch .....	Rear of LH Cylinder Head			
Fuel Shut-off Solenoid .....	Top Front of Engine, Top of Fuel Injector Pump, behind Thermostat			
Fuel Solenoid Driver .....	Top Front of Engine, LH Side of Fuel Injector Pump			
Fuel Temperature Sensor .....	Top Front of Engine, Top of Fuel Injector Pump			
Fuse Block .....	Under left side of instrument panel .....	5 .....	8	
Glow Plug Control Module .....	Top rear of LH cylinder head .....	4 .....	5 .....	202-12
Glow Plugs (LH & RH) .....	At respective cylinder head .....	1 .....	2	
Instrument Cluster .....	On LH side of instrument panel .....			202-08
Intake Manifold Air Temperature Sensor .....	On Turbo-to-Intake Manifold			
Optical Sensor .....	Top Front of Engine, Top of Fuel Injector Pump			
Powertrain Control Module (PCM) .....	LH Side of Driver's Island .....	6 .....	9	
Starter Motor .....	Lower RH Side of Engine			
Stoplamp Switch .....	Top of Brake Pedal Support Bracket .....	5 .....	7 .....	202-12
Timing Stepper Motor .....	Top Front of Engine, RH Side of Fuel Injector Pump			
Torque Converter Clutch (TCC) Solenoid .....	Top Rear of LH Cylinder Head, Next to Barometric Pressure Sensor			
Transmission .....	Behind Engine .....			202-10

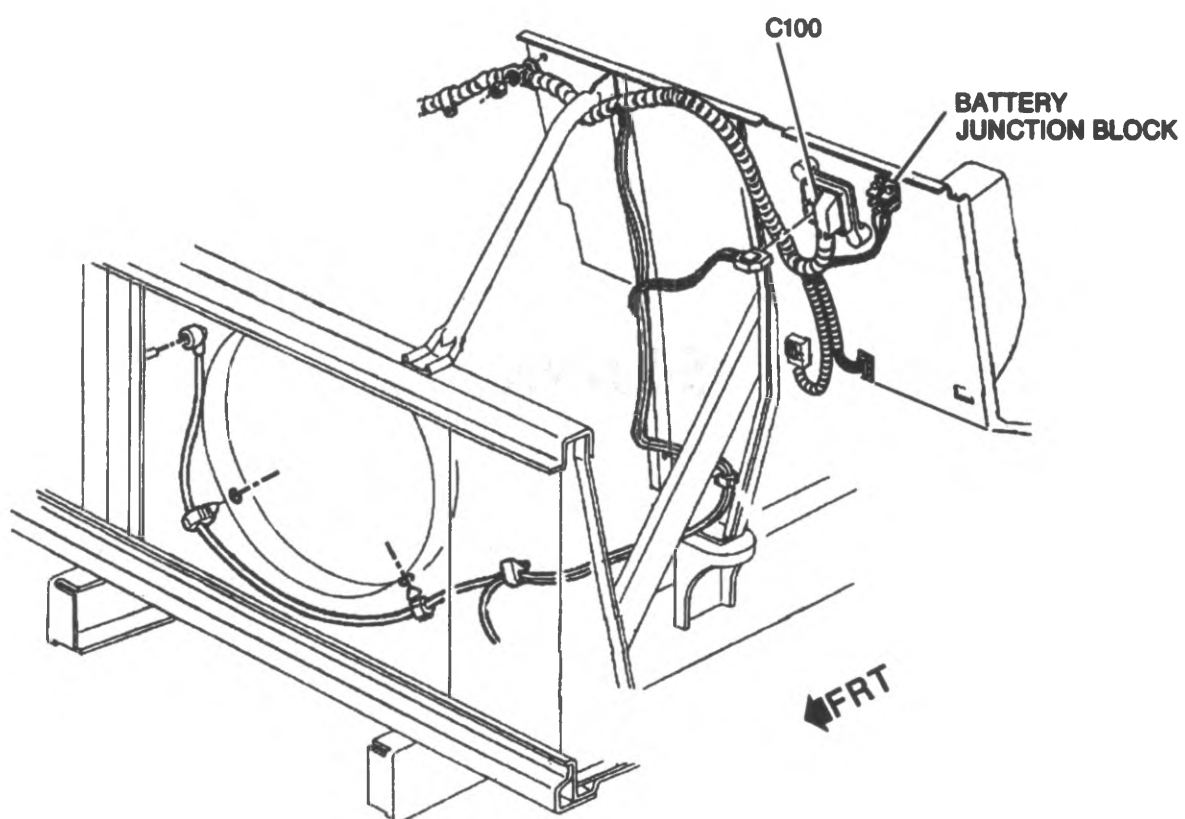
## ENGINE CONTROLS - P-CHASSIS 6.5L DIESEL L65 VIN F

COMPONENT	LOCATION	201-PG	FIG.	CONN
Transmission Input Speed Sensor.....	LH Front of Transmission.....	8.....	12	
Vehicle Speed Sensor (VSS) Buffer.....	RH Side of Driver's Island.....	5.....	7	
Water-in-Fuel Sensor.....	Top rear of engine, near intake manifold.....	8.....	12	
<b>CONNECTORS:</b>				
C160.....	Top Rear of Engine.....	8.....	12.....	202-04
C161.....	Top Rear of Engine.....	8.....	12.....	202-11
C200.....	Top of Driver's Island .....	4.....	6.....	202-02
<b>GROMMETS:</b>				
P100.....	LH Front of Driver's Island, Below Fusible Links.....	4.....	6	
<b>GROUND:</b>				
G106.....	Front Top of Engine, On Thermostat Manifold .....	2.....	3	
G108.....	Rear of LH Cylinder Head			
G202.....	Near C200			
<b>SPLICES:</b>				
S104.....	Engine Harness, 13.5 cm From C200			
S108.....	Engine Harness, 21 cm onto Generator Breakout			
S109.....	Engine Harness, 6.5 cm From Generator Breakout			
S113.....	Engine Harness, 4 cm From Barometric Pressure Breakout			
S118.....	Engine Harness, 4 cm From Barometric Pressure Breakout			
S120.....	Engine Harness, 10 cm From Generator Breakout			
S137.....	Engine Harness, 4 cm from Glow Plug Control Module Breakout			
S139.....	Engine Harness, 25 cm onto Fuel Pump Relay Breakout			
S171.....	Engine Harness, 19.5 cm from A/C Compressor connector Breakout			
S172.....	Engine Harness, 15 cm from Wiper motor connector Breakout			
S190.....	Engine Harness Jumper, Below Intake Manifold			
S191.....	Engine Harness Jumper, Below Intake Manifold			
S192.....	Engine Harness Jumper, Below Intake Manifold			
S193.....	Engine Harness Jumper, Below Intake Manifold			
S194.....	Engine Harness Jumper, Below Intake Manifold			
S207.....	I/P Harness, 16 cm from C200 Breakout			
S208.....	I/P Harness, 8 cm from Instrument Cluster Breakout			
S290.....	Engine Harness, 1.5 from PCM Breakout			

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COMPONENT LOCATION VIEWS - P-CHASSIS



01-10-95  
400855302

Figure 1—Engine Compartment (L57)

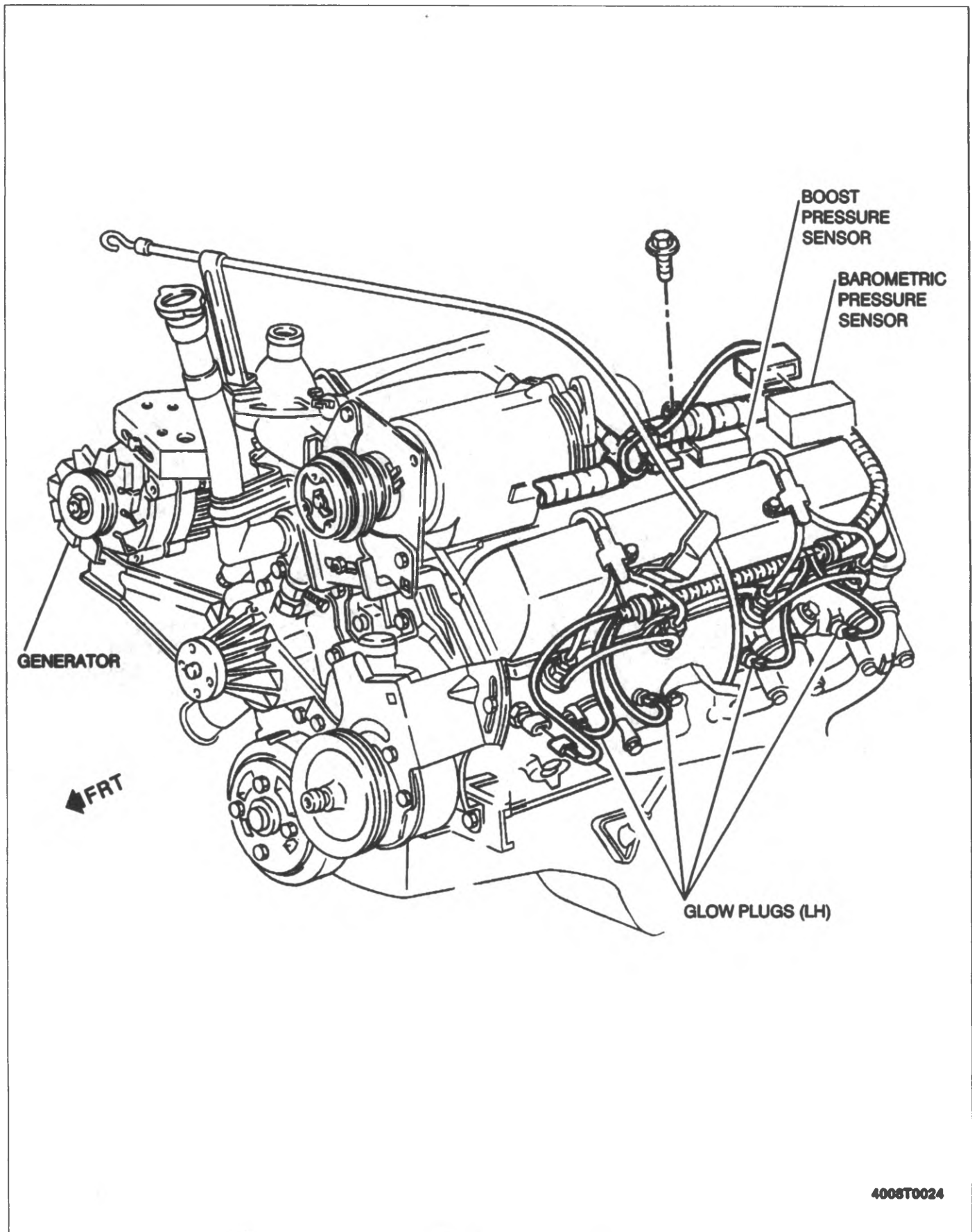
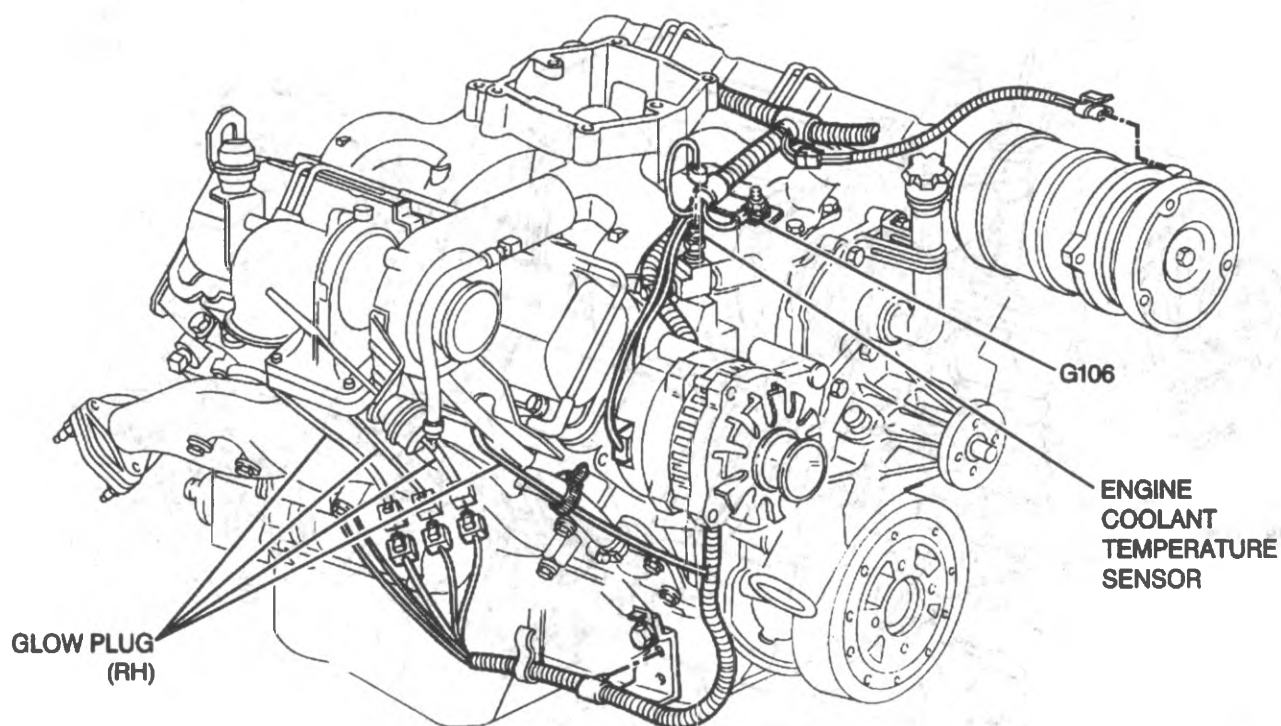


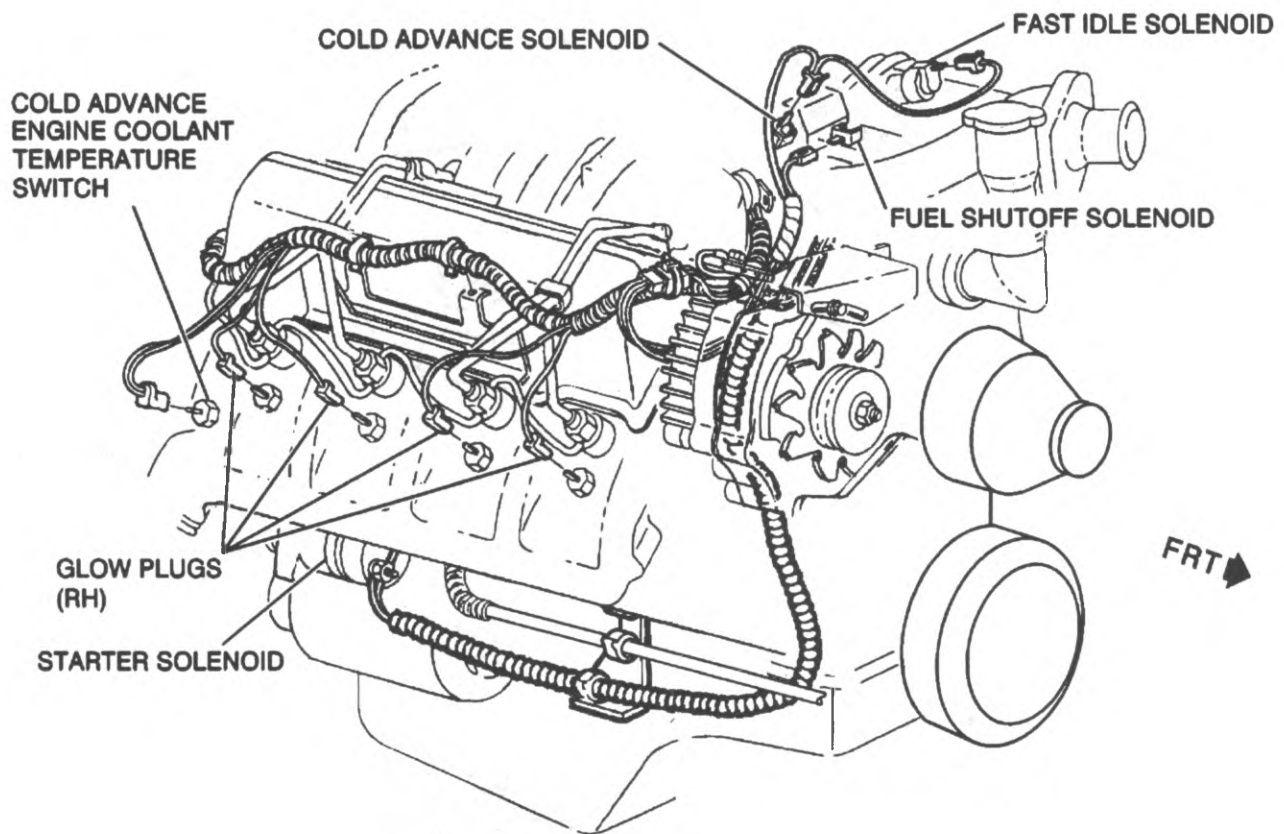
Figure 2—LH Side of Engine (L65)

COMPONENT LOCATION VIEWS - P-CHASSIS



4008T0023

Figure 3—RH Side of Engine (L65)



01-11-95  
400885300

Figure 4—RH Engine Wiring (L57)

## COMPONENT LOCATION VIEWS - P-CHASSIS

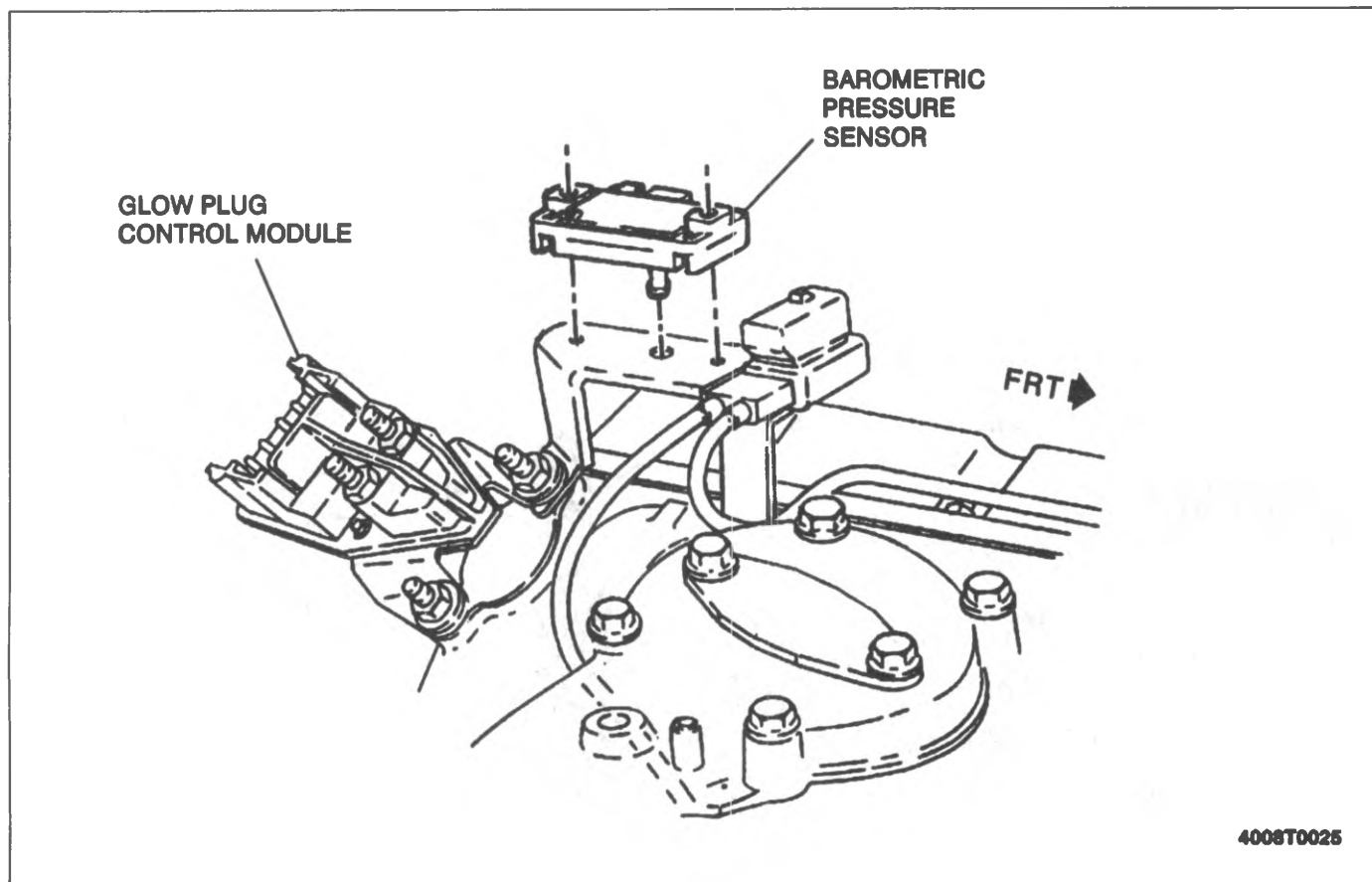


Figure 5—LH Rear of Engine (L65)

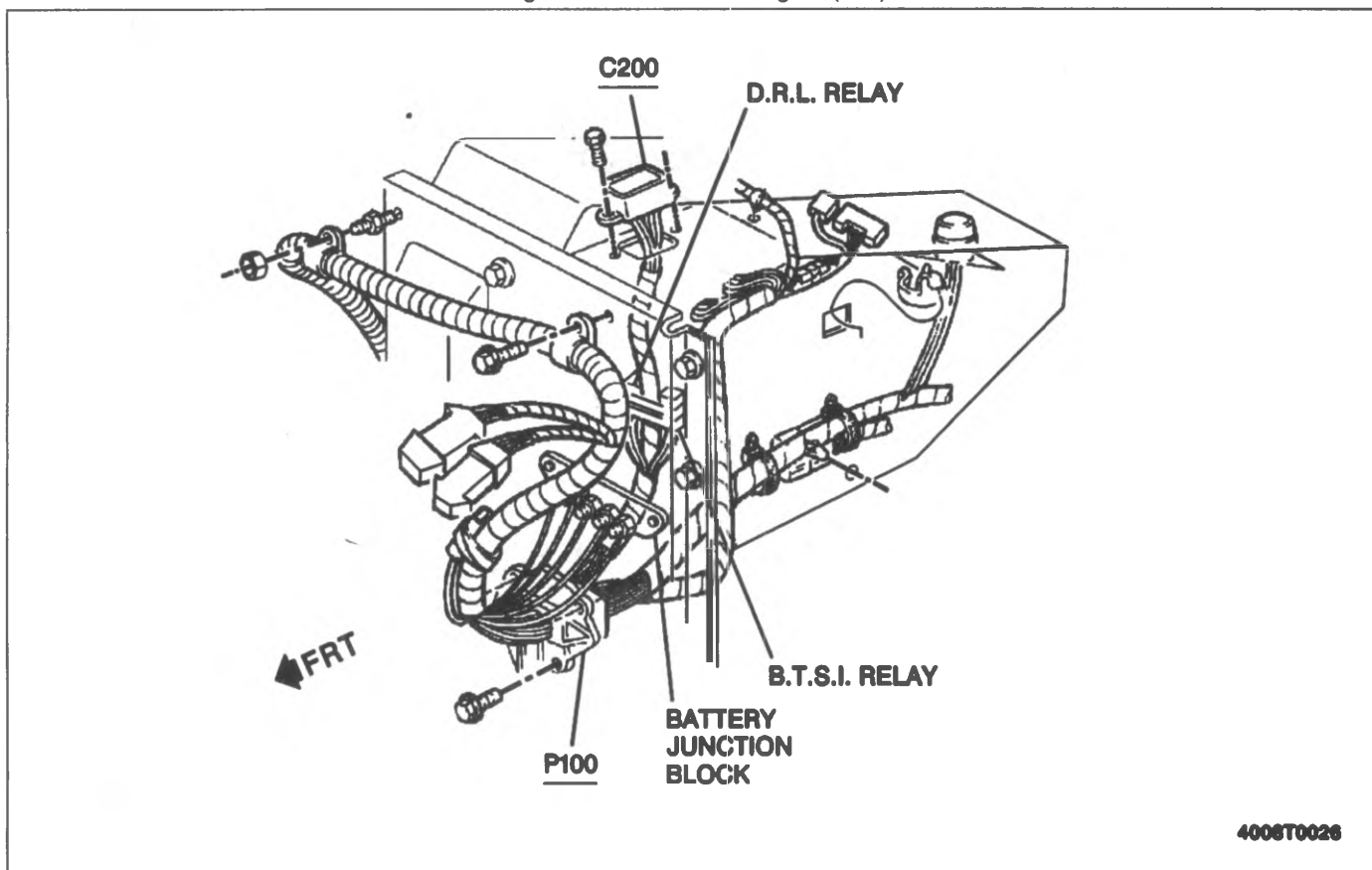


Figure 6—LH Rear Engine Compartment (L65)

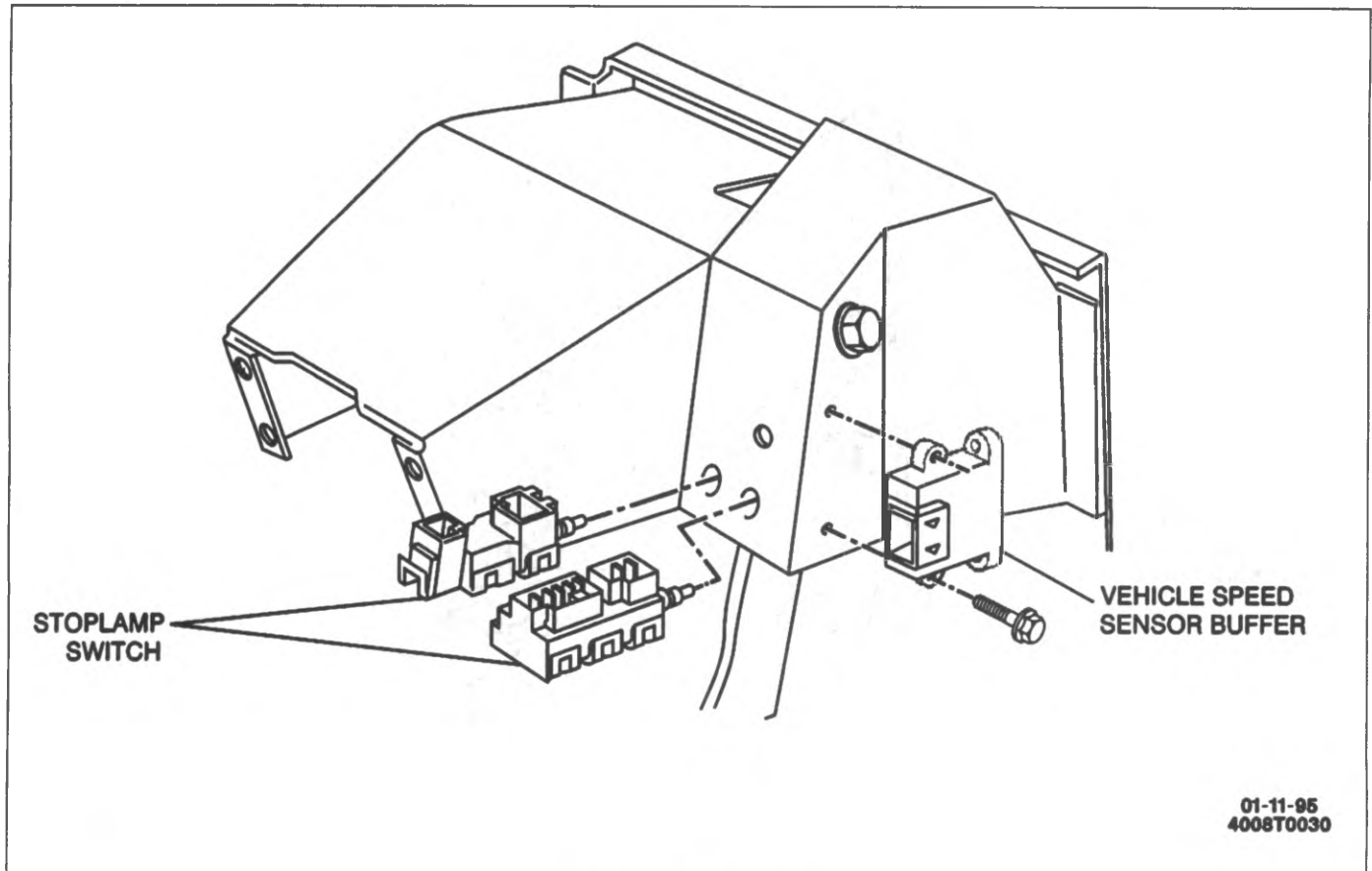


Figure 7—Driver's Island

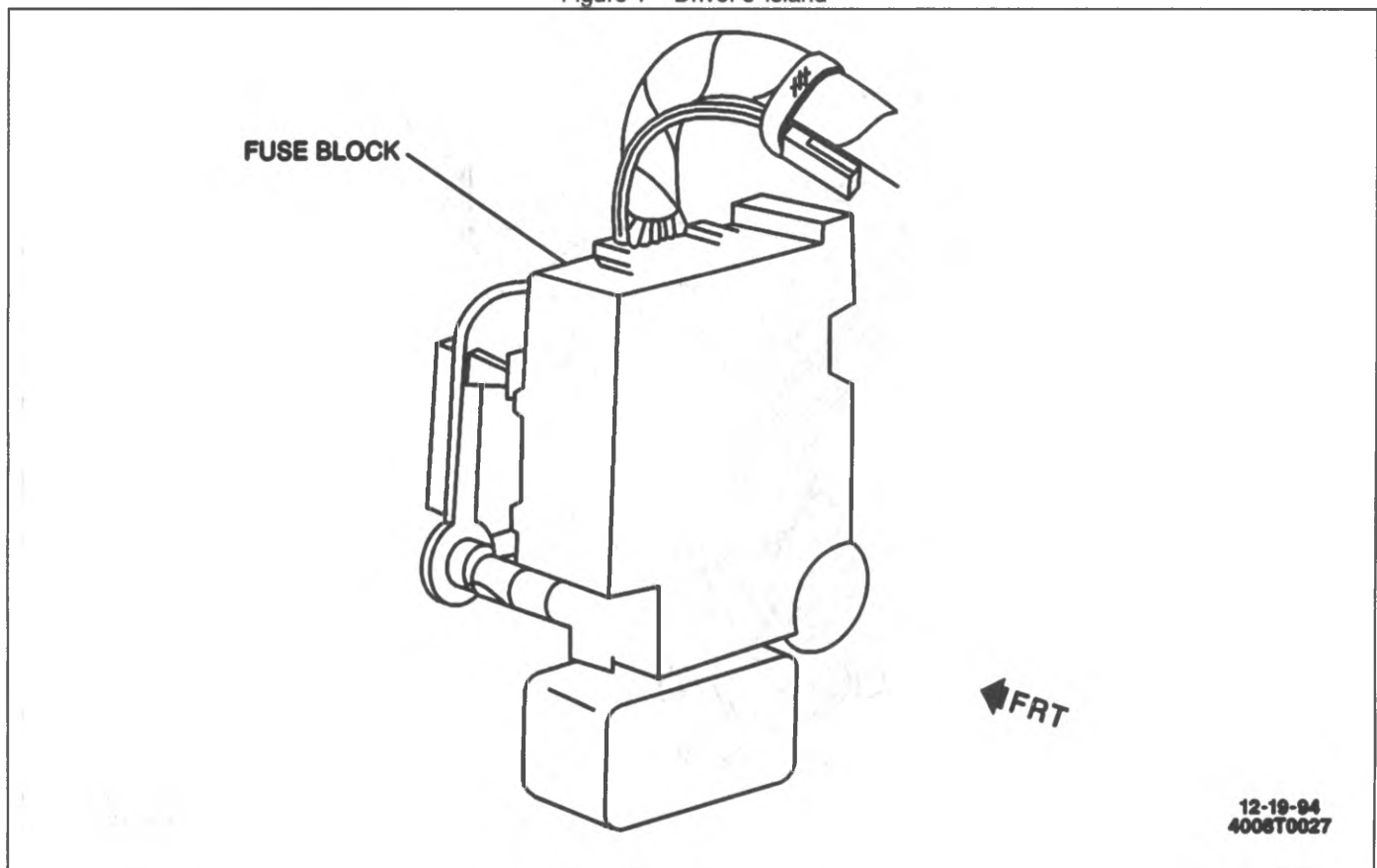


Figure 8—Fuse Block

COMPONENT LOCATION VIEWS - P-CHASSIS

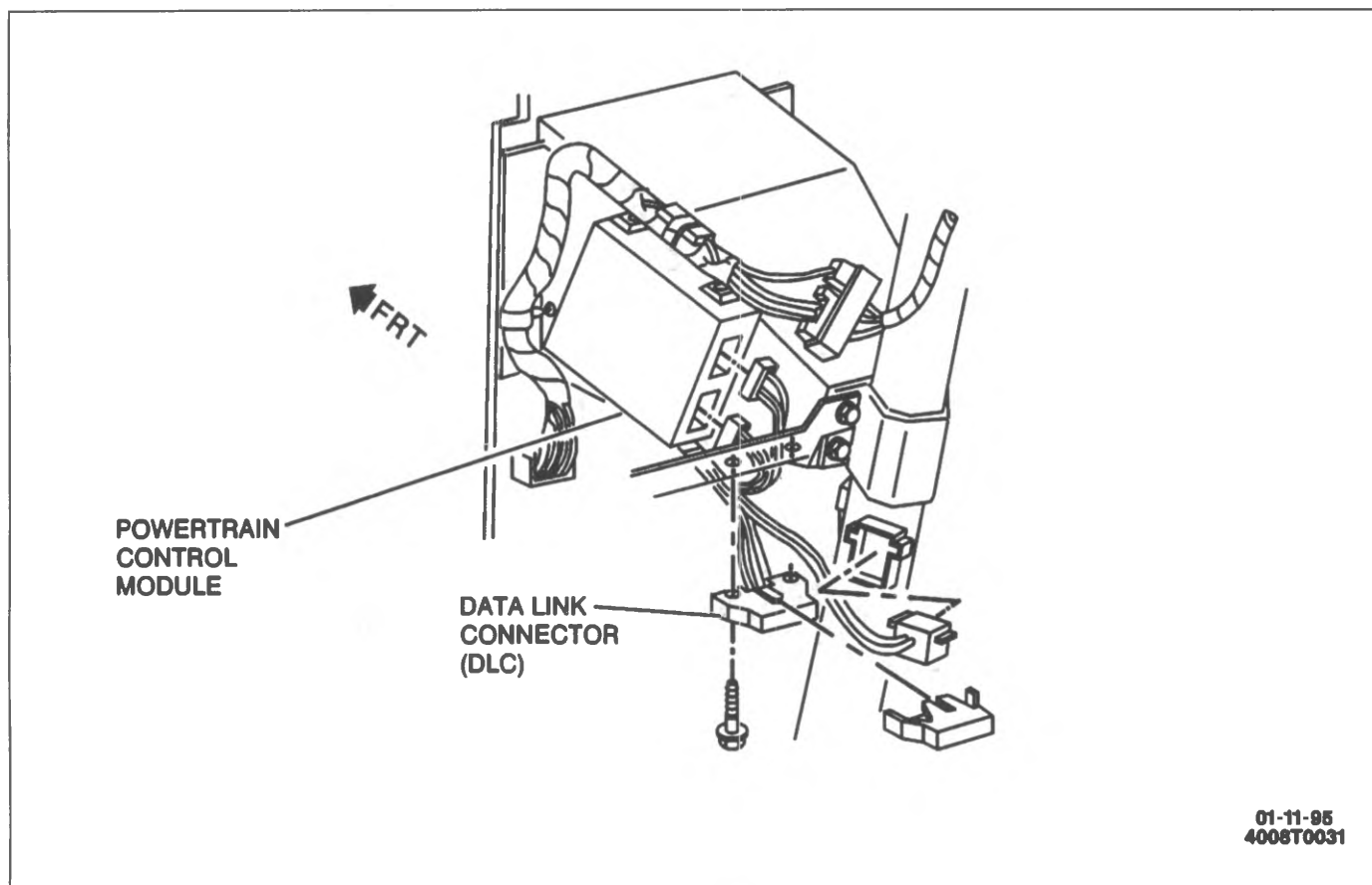


Figure 9—Driver's Island

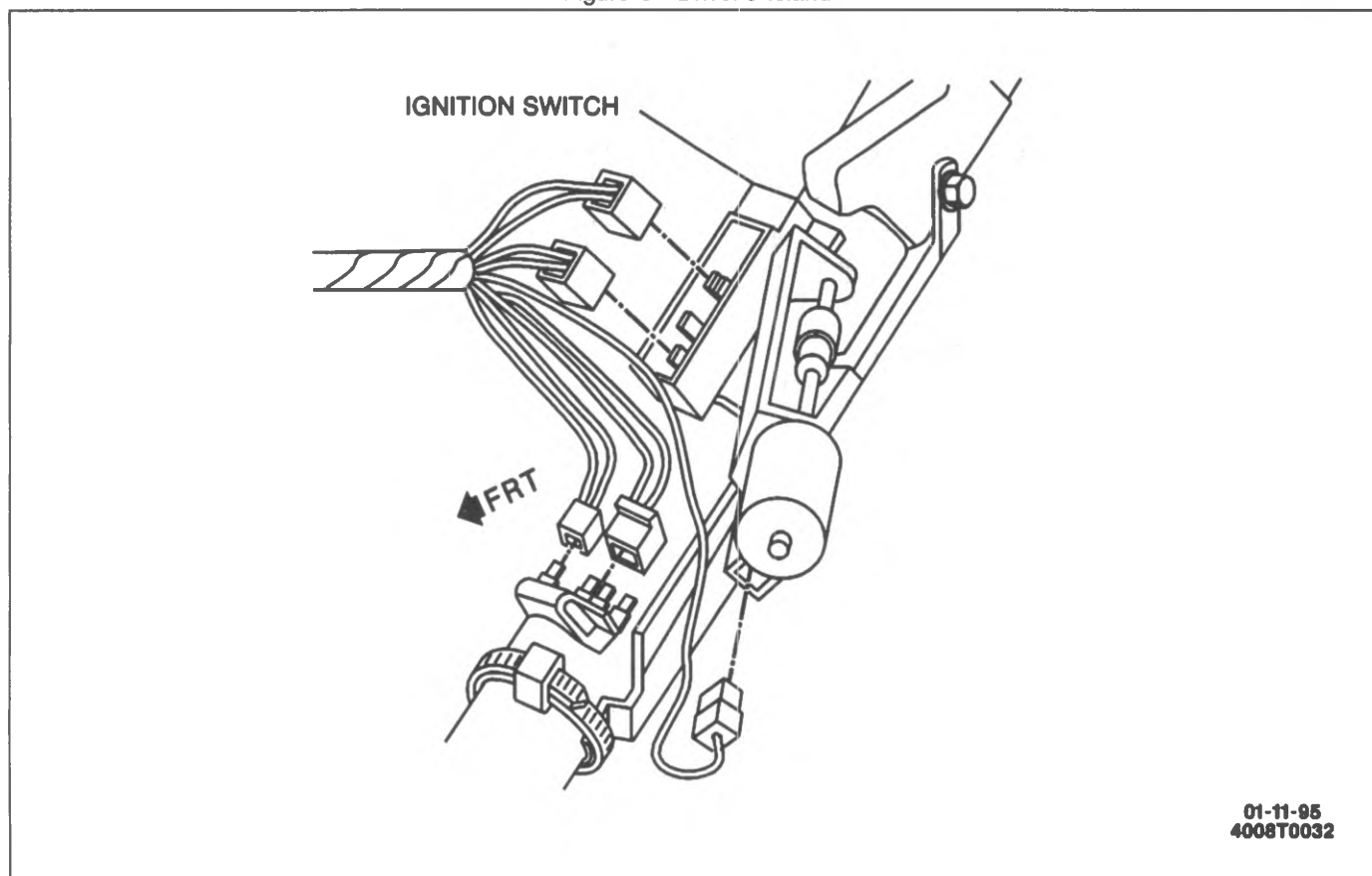
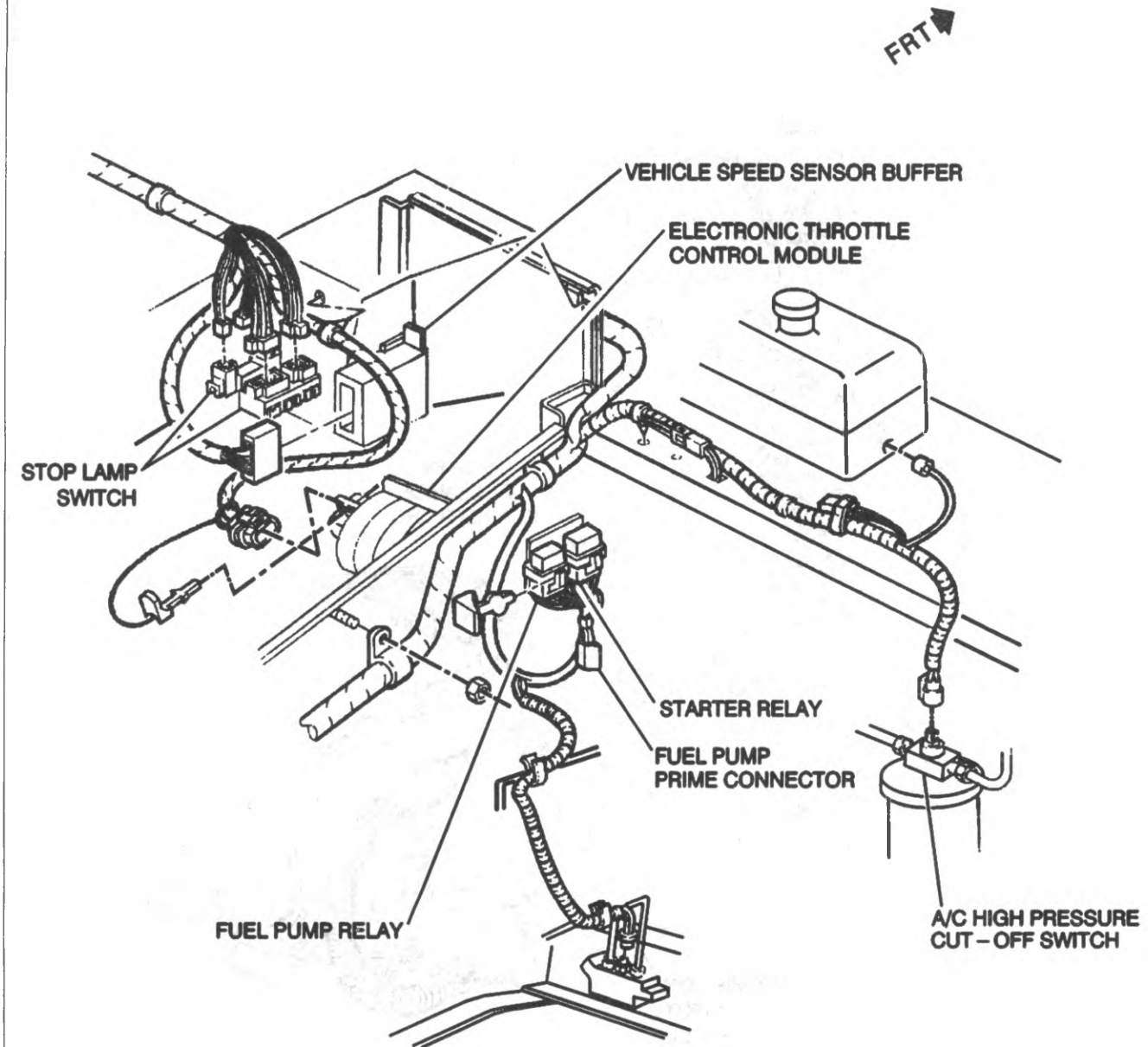


Figure 10—Steering Column

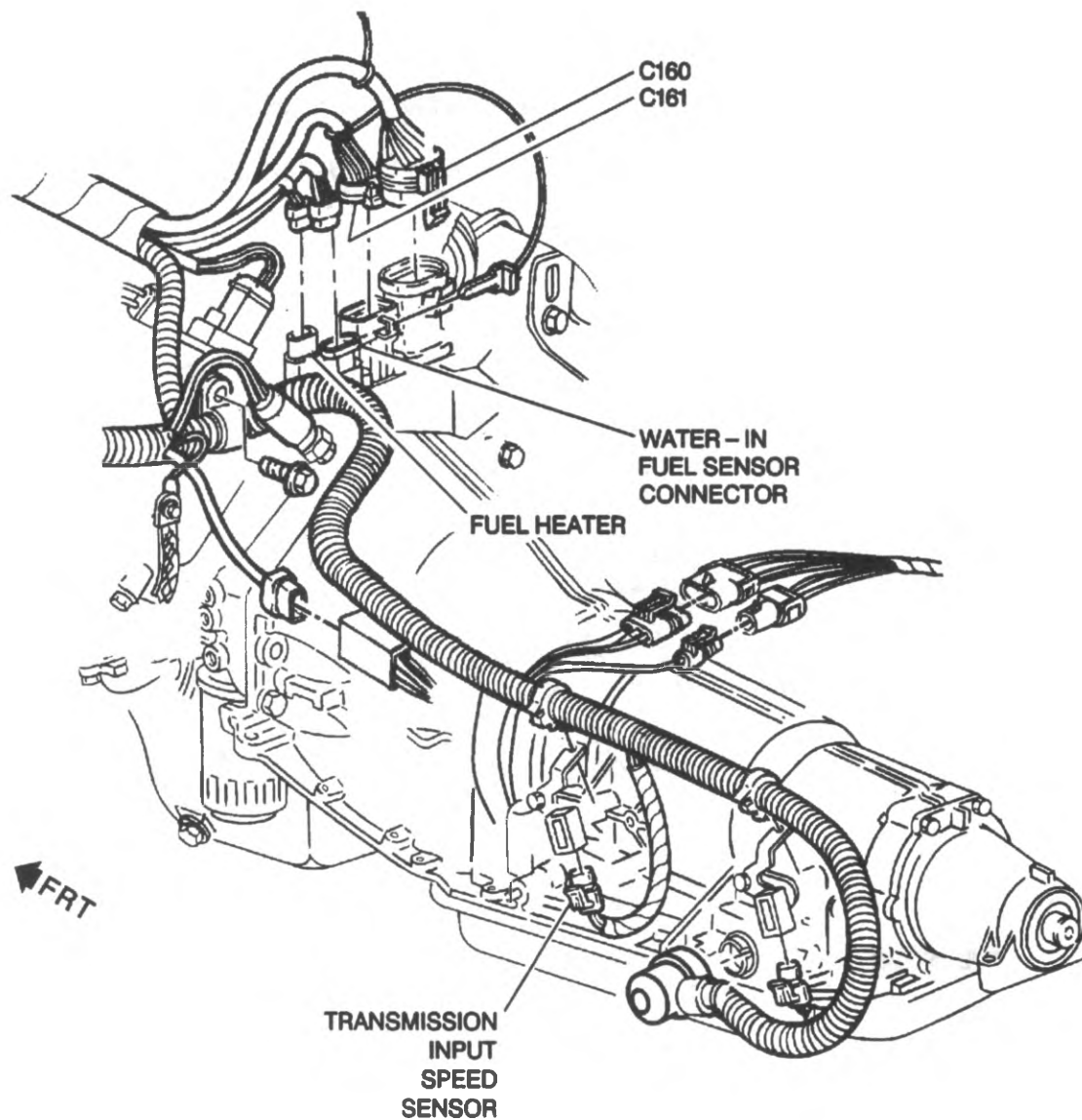


4008T0021

Figure 11—Driver's Island

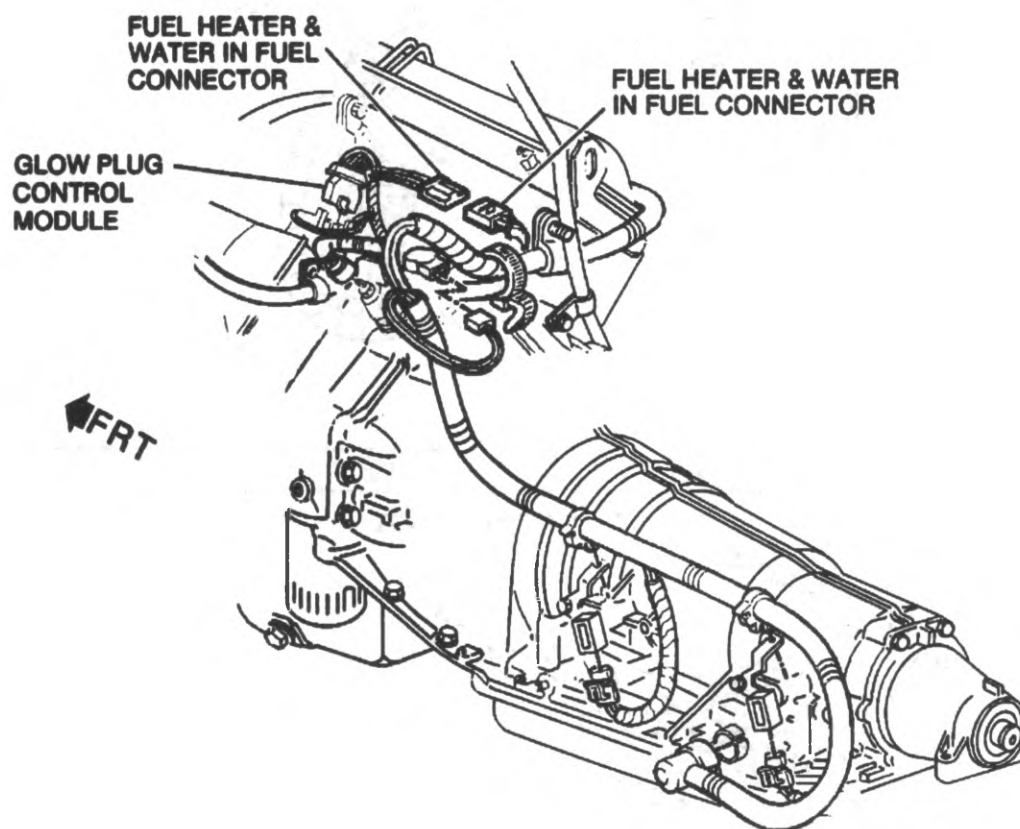


COMPONENT LOCATION VIEWS - P-CHASSIS



4008T0022

Figure 12—Rear of Engine/Transmission (L65)



01-11-95  
FF400855301

Figure 13—LH Side of Transmission (L57)

COMPONENT LOCATION VIEWS - P-CHASSIS

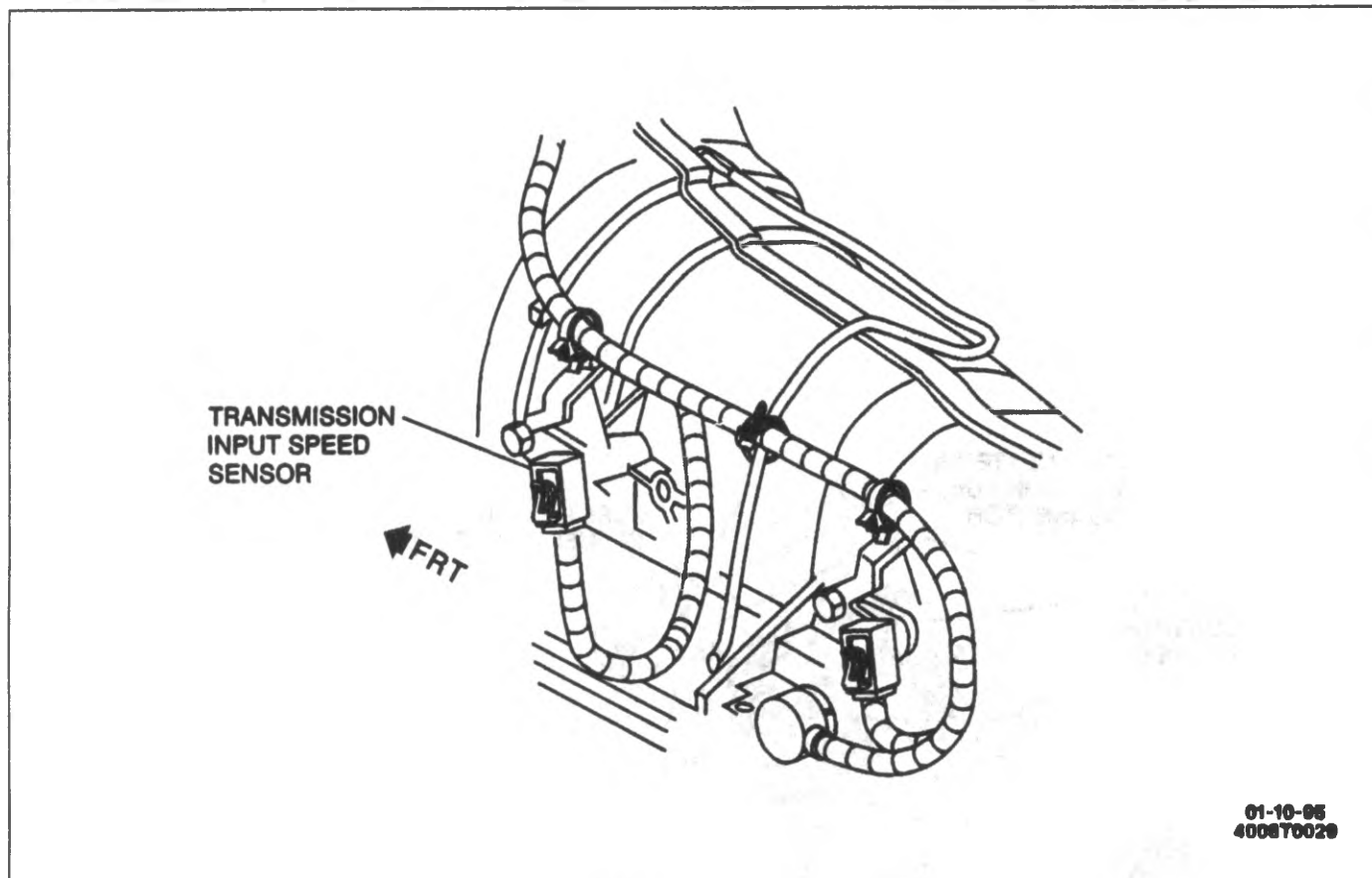


Figure 14—LH Side of Transmission

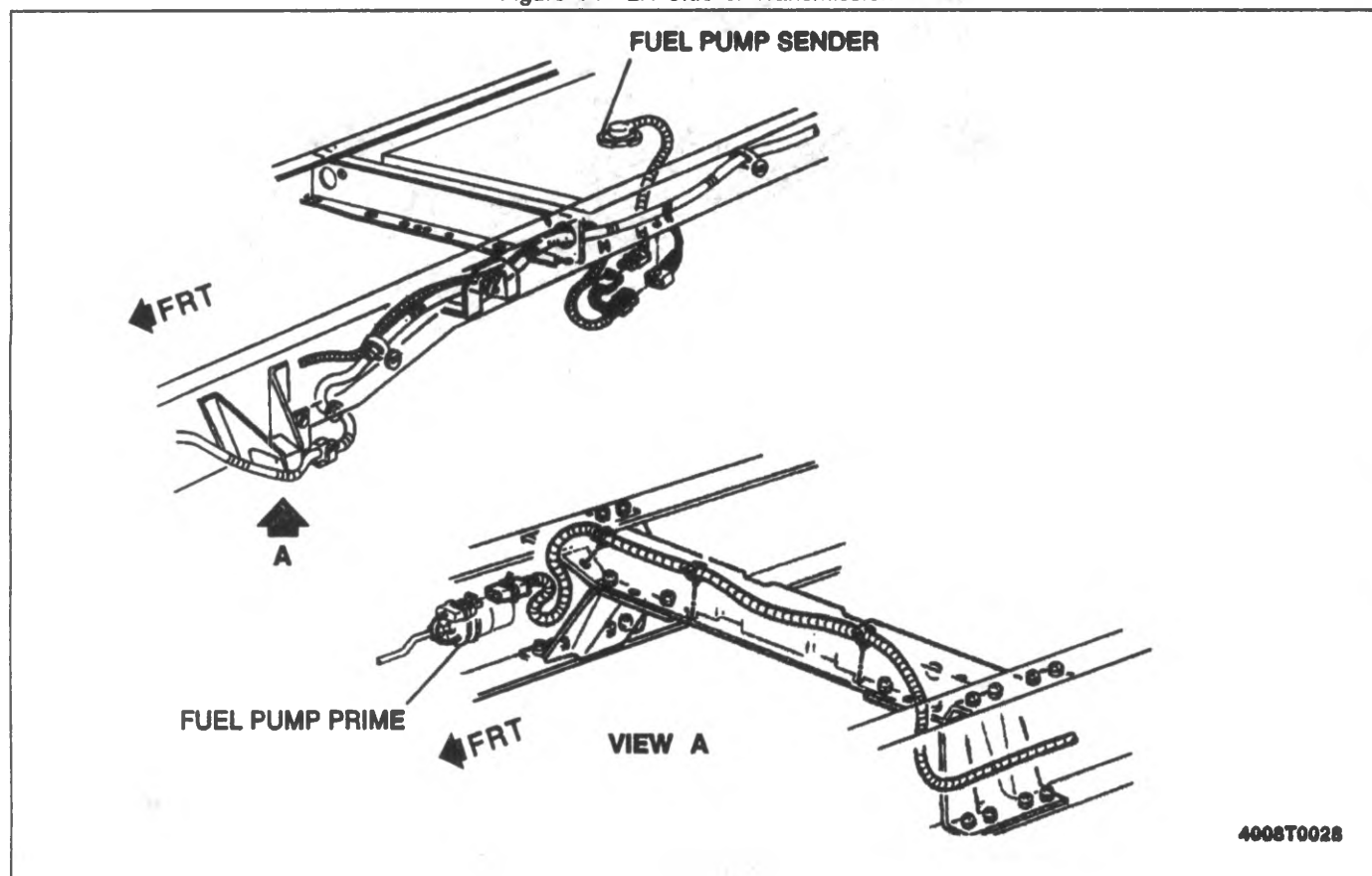
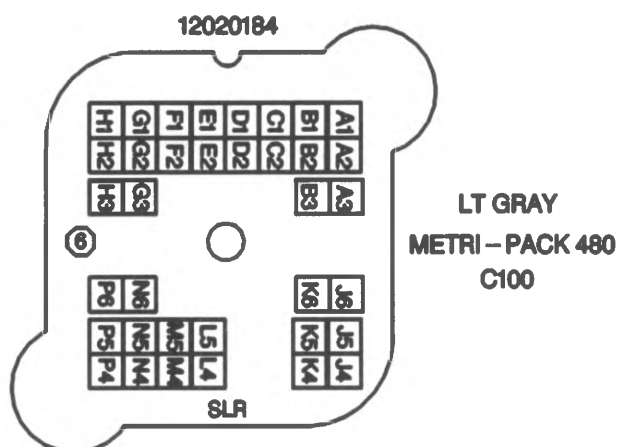


Figure 15—Fuel Pump Wiring

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## HARNESS CONNECTOR FACES - P-CHASSIS

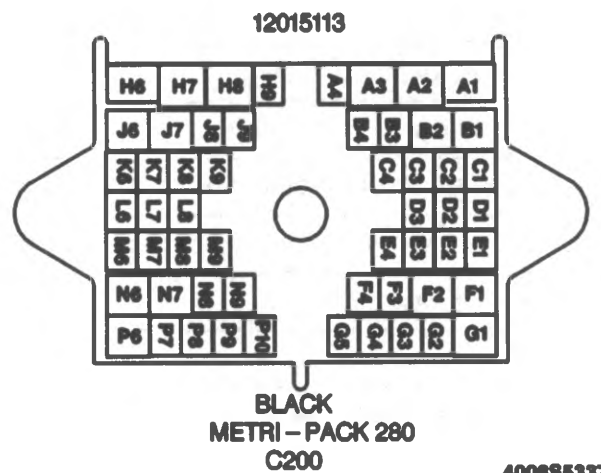


400695345

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A1	0.5	450	GROUND	
A2	DK GRN	0.5	389	VEHICLE SPEED SIGNAL - 4000 PULSES / MILE
A3	BRN	0.5	241	IGNITION FUSED FEED
B1	BLK	3.0	250	GROUND
B2	PNK	0.8	39	IGNITION FUSED FEED
B3	YEL/BLK	0.8	508	WATER-IN-FUEL INDICATOR
C1	GRY	0.5	1234	SHIFT INDICATOR
C2	BRN/WHT	0.5	419	CHECK ENGINE INDICATOR
D1	RED	3.0	2	BATTERY FEED
D2	TAN	0.5	31	OIL PRESSURE INDICATOR
E1	PNK	1.0	439	IGNITION FUSED FEED
E2	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
F1	DK BLU	1.0	507	GLOW PLUG INDICATOR
F2	BRN	1.0	141	IGNITION FUSED FEED
G1	ORN	3.0	440	BATTERY FEED
G2	YEL/BLK	0.5	68	LOW COOLANT INDICATOR
G3	ORN	0.8	540	BATTERY FEED
H1				NOT USED
H2	PNK	0.8	139	IGNITION FUSED FEED
H3	PNK	1.0	539	IGNITION FUSED FEED
J4				NOT USED

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
J5	PPL	0.5	30	FUEL GAUGE SENSOR
J6				NOT USED
K4	DK GRN	1.0	19	RH REAR TURN SIGNAL INDICATOR
K5	YEL	1.0	18	LH REAR TURN SIGNAL INDICATOR
K6	BRN	1.0	9	PARK LAMP FEED
L4				NOT USED
L5	LT GRN	1.0	11	HI BEAM HEADLAMP FEED
L6				NOT USED
M4	BLK	2.0	250	GROUND
M5	TAN	0.8	12	LOW BEAM HEADLAMP FEED
N4	BRN	1.0	9	PARK LAMP FEED
N5				NOT USED
N6	DK BLU	0.8	15	RH FRONT TURN SIGNAL LAMP FEED
P4				NOT USED
P5	DK GRN	1.0	29	HORN FEED
P6	LT BLU	1.0	14	LH FRONT TURN SIGNAL LAMP FEED

## HARNESS CONNECTOR FACES - P-CHASSIS



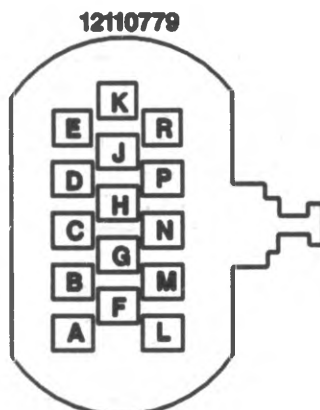
CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A1	RED	3.0	2	BATTERY FEED
A3	ORN	1.0	240	BATTERY FEED
A4	BLK	0.5	111	SYSTEM GROUND
B1	PNK	5.0	3	IGNITION SWITCH OUTPUT
B2	PPL	1.0	16	TURN SIGNAL FLASHER OUTPUT
B3	PNK/WHT	0.8	350	IGNITION SWITCH OUTPUT
C1	ORN	1.0	140	BATTERY FEED
C2	DK BLU	0.5	15	RH FRONT TURN SIGNAL LAMP FEED
D1	BRN	1.0	9	PARK LAMP FEED
D2	YEL/BLK	0.8	508	WATER-IN-FUEL INDICATOR
D3	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
E1	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
E2	GRY	0.5	8	INSTRUMENT PANEL LAMP FEED
E4	LT GRN	0.8	1844	AUTO APPLY PARK BRAKE INDICATOR
F2	ORN	5.0	300	IGNITION 'ON' OUTPUT
F3	PPL	0.5	30	FUEL GAUGE SENSOR
G1	PNK/BLK	1.0	39	IGNITION FUSED FEED
G2	YEL	0.8	960	SERVICE THROTTLE SOON INDICATOR

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
G3	TAN	0.5	31	OIL PRESSURE INDICATOR
G4	DK GRN	1.0	59	A/C COMPRESSOR CLUTCH FEED
G5	BRN	3.0	50	IGNITION 'ON' OUTPUT
H6	RED	5.0	2	BATTERY FEED
H7	PPL/WHT	5.0	806	IGNITION 'START' OUTPUT
H8	PNK/BLK	1.0	439	IGNITION FUSED FEED
H9	PPL/WHT	0.8	806	IGNITION 'START' OUTPUT
J6	LT GRN/BLK	0.8	592	DAYTIME RUNNING LAMP RELAY COIL OUTPUT
J7	ORN	0.8	440	BATTERY FUSED FEED
K6	LT GRN	1.0	11	HI BEAM HEADLAMP FEED
K7	DK BLU/WHT	0.8	593	DAYTIME RUNNING LAMP OUTPUT
L6	BRN/WHT	0.8	419	CHECK ENGINE INDICATOR
L7	PNK/BLK	0.8	839	IGNITION FUSED FEED
L8	YEL/BLK	0.8	68	LOW COOLANT INDICATOR
M6	RED	1.0	481	INJECTOR FUSED FEED
M7	DK BLU	1.0	507	GLOW PLUG INDICATOR
M8	YEL	1.0	10	HEADLAMP SWITCH OUTPUT
N6	DK BLU	2.0	75	FUSED FEED
N7	WHT	2.0	93	WINDSHIELD WIPER MOTOR FEED
P6	BRN	5.0	4	IGNITION SWITCH "ACC" OUTPUT
P7	LT BLU	1.0	14	LH FRONT TURN SIGNAL LAMP FEED
P8	LT BLU/BLK	1.0	824	VEHICLE SPEED SIGNAL

\*CAVITIES NOT LISTED ARE NOT USED



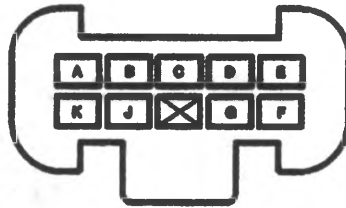
## HARNESS CONNECTOR FACES - P-CHASSIS



**BLACK**  
**METRI - PACK 280**  
**C160**

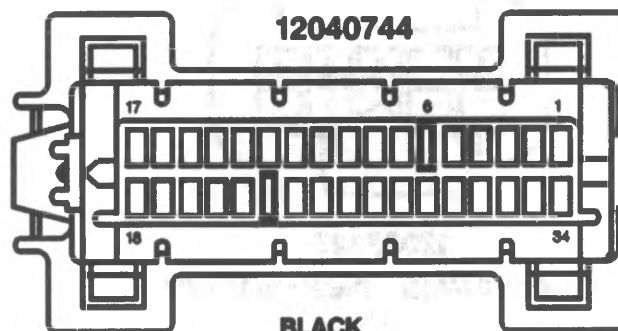
400685335

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	DK BLU/WHT	0.8	981	FUEL SHUT-OFF SOLENOID RETURN
B	TAN/BLK	0.8	564	PCM TO TIMING STEPPER MOTOR A1
C	RED/BLK	0.8	565	PCM TO TIMING STEPPER MOTOR A2
D	ORN/BLK	0.8	566	PCM TO TIMING STEPPER MOTOR B3
E	YEL/BLK	0.8	567	PCM TO TIMING STEPPER MOTOR B4
F	PNK/BLK	0.8	39	IGNITION FEED
G	PNK	0.8	982	CAM POSITION SENSOR
H	RED	0.8	983	CAM POSITION SENSOR
J	WHT	0.8	987	FUEL TEMPERATURE SENSOR/ CAM POSITION SENSOR INPUT
K	YEL	0.8	1578	FUEL TEMPERATURE SENSOR OUTPUT
L	LT GRN	0.8	984	FUEL SOLENOID DRIVER
M	LT GRN	0.8	984	FUEL SOLENOID DRIVER
N	GRY	0.8	474	5 VOLT REFERENCE VOLTAGE
P	RED	0.8	985	CLOSURE SIGNAL
R				NOT USED

**12065425****10 - WAY F METRI - PACK 150 SERIES****BLK****ELECTRONIC THROTTLE CONTROL MODULE****400685332**

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	BRN	0.8	998	TPS #1 GROUND
B	PPL	0.8	999	TPS #2 GROUND
C	LT BLU	0.8	993	TPS #2 SIGNAL
D	TAN	0.8	996	TPS #2 REFERENCE VOLTAGE
E	YEL/BLK	0.8	995	TPS #3 REFERENCE VOLTAGE
F	DK BLU	0.8	992	TPS #1 SIGNAL
G	WHT/BLK	0.8	997	TPS #1 REFERENCE VOLTAGE
H				NOT USED
J	GRY	0.8	961	TPS #3 GROUND
K	DK GRN	0.8	994	TPS #3 SIGNAL

## HARNESS CONNECTOR FACES - P-CHASSIS



**BLACK  
MICRO - PACK 100  
INSTRUMENT CLUSTER**

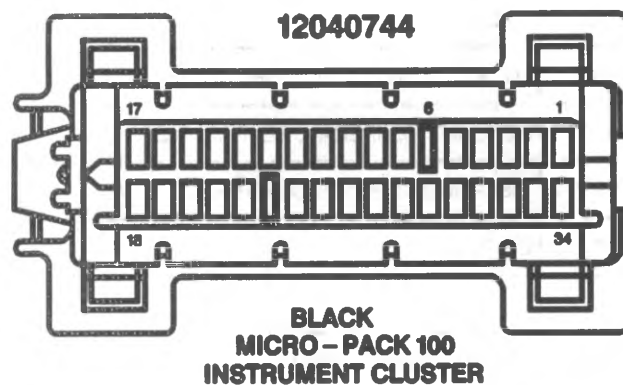
400885347

\*L57 ENGINE ONLY

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
1				NOT USED
2				NOT USED
3	YEL/BLK	0.8	508	WATER-IN-FUEL INDICATOR
4	YEL/BLK	0.5	68	LOW COOLANT INDICATOR
5	DK BLU	1.0	507	GLOW PLUG INDICATOR
7	BLK	0.5	250	GROUND
8	BRN/WHT	0.5	419	CHECK ENGINE INDICATOR
9	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
10	BLK/WHT	0.5	1651	SYSTEM GROUND
11				NOT USED
12	YEL	0.5	234	SEAT BELT INDICATOR
13				NOT USED
14				NOT USED
15	BLK	0.5	450	GROUND
16	DK BLU	0.5	15	RH FRONT TURN SIGNAL LAMP FEED
17	LT BLU	0.5	14	LH FRONT TURN SIGNAL LAMP FEED
18	LT GRN	1.0	11	HI BEAM INDICATOR
19	GRY	0.5	1234	SHIFT INDICATOR

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
20	BLK	0.5	250	GROUND
21	TAN	0.5	31	OIL PRESSURE INDICATOR
22	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
24	GRY	0.5	8	INSTRUMENT PANEL LAMP FEED
25	BLK	0.5	250	GROUND
26	NOT USED			
27	PNK	0.8	439	IGNITION FUSED FEED
28	DK GRN	0.5	389	VEHICLE SPEED SIGNAL - 4000 PULSES / MILE
29				NOT USED
30	PPL	0.5	30	FUEL GAUGE SENSOR
31				NOT USED
32	PNK	0.8	39	IGNITION FUSED FEED
33				NOT USED
34				NOT USED

## HARNESS CONNECTOR FACES - P-CHASSIS



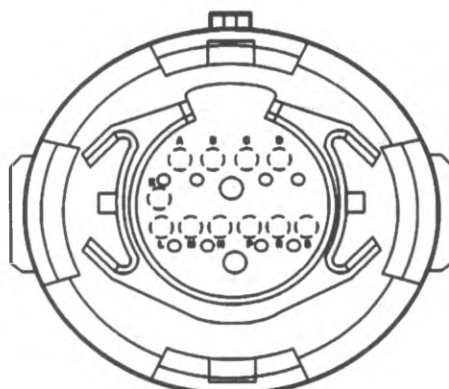
400685339

\*L65 ENGINE ONLY

CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
1				NOT USED
2	YEL	0.8	960	SERVICE THROTTLE SOON INDICATOR
3	YEL/BLK	0.8	508	WATER-IN-FUEL INDICATOR
4	YEL/BLK	0.8	68	LOW COOLANT INDICATOR
5	DK BLU	1.0	507	GLOW PLUG INDICATOR
7	BLK	0.8	150	GROUND
8	BRN/WHT	0.8	419	CHECK ENGINE INDICATOR
9	TAN/WHT	0.5	33	BRAKE WARNING INDICATOR
10	BLK	0.5	111	SYSTEM GROUND
11	DK BLU/WHT	0.8	593	DAYTIME RUNNING LAMP OUTPUT
12	YEL	0.8	237	FASTEN SEAT BELTS INDICATOR
13				NOT USED
14				NOT USED
15	BLK	0.8	150	GROUND
16	DK BLU	0.5	15	RH FRONT TURN SIGNAL LAMP FEED
17	LT BLU	0.5	14	LH FRONT TURN SIGNAL LAMP FEED
18	WHT	0.8	629	HI BEAM INDICATOR
19				NOT USED

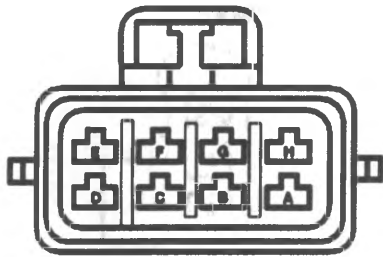
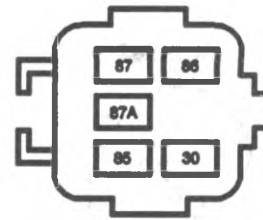
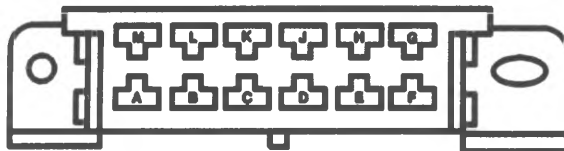
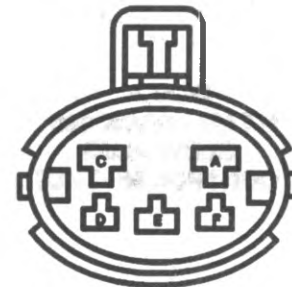
CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
20	BLK	0.8	150	GROUND
21	TAN	0.5	31	OIL PRESSURE INDICATOR
22	DK GRN	0.5	35	COOLANT TEMPERATURE INDICATOR
24	GRY	0.5	8	INSTRUMENT PANEL LAMP FEED
25	BLK	0.8	150	GROUND
26				NOT USED
27	PNK/BLK	0.8	39	IGNITION FUSED FEED
28	LT BLU/BLK	0.8	824	VEHICLE SPEED SIGNAL
29				NOT USED
30	PPL	0.5	30	FUEL GAUGE SENSOR
31				NOT USED
32	PNK/BLK	0.8	39	IGNITION FUSED FEED
33				NOT USED
34	LT GRN	0.8	1844	AUTO APPLY PARK BRAKE INDICATOR

## HARNESS CONNECTOR FACES - P-CHASSIS



**12129629**  
**12 - WAY F MICRO - PACK 100W**  
**GRY**  
**TRANSMISSION CONNECTOR 400685336**

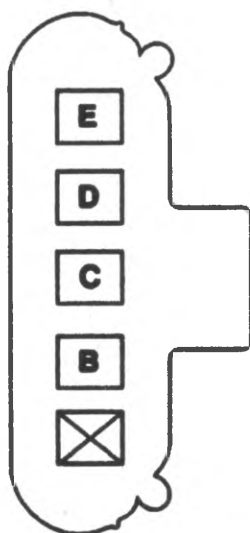
CAVITY	WIRE COLOR	WIRE SIZE	CKT	DESCRIPTION
A	LT GRN	0.8	1222	SHIFT SOLENOID A
B	YEL/BLK	0.8	1223	SHIFT SOLENOID B
C	RED/BLK	0.8	1228	PRESSURE CONTROL SOLENOID GROUND
D	LT BLU/WHT	0.8	1229	PRESSURE CONTROL SOLENOID FEED
E	PNK/BLK	0.8	839	IGNITION FUSED FEED
L	BLK/YEL	0.8	1227	TRANSMISSION TEMPERATURE INPUT
M	BLK	0.8	452	TRANSMISSION TEMPERATURE GROUND
N	PNK	0.8	1224	RANGE MODE SELECTOR A
P	RED	0.8	1226	RANGE MODE SELECTOR B
R	DK BLU	0.8	1225	RANGE MODE SELECTOR C
S	DK BLU	0.8	1350	TORQUE CONVERTER CLUTCH (TCC) ENABLE

**12047937****8 - WAY F METRI - PACK 150 SERIES****BLK****C161****400885341****12110539****5 - WAY F METRI - PACK 150 SERIES****BLK****BRAKE TRANSMISSION SHIFT INTERLOCK****(BTSI) RELAY****400885341****12020043****12 - WAY F METRI - PACK 280 SERIES****BLK****DATA LINK CONNECTOR****400885340****12052287****5 - WAY F METRI - PACK MIXED SERIES****BLK****FUEL PUMP RELAY****400885342**



HARNESS CONNECTOR FACES - P-CHASSIS

12015982



**BLACK  
METRI - PACK 280  
GLOW PLUG  
CONTROL MODULE**

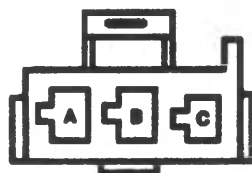
12045636



**GRAY  
METRI - PACK 280  
GLOW PLUG CONTROL MODULE**

40085338

40085346



**12033699  
3 - WAY F METRI - PACK  
MIXED SERIES  
BLK**



**12033706  
4 - WAY F METRI - PACK  
280 SERIES  
BLU**

**STOPLAMP SWITCH CONNECTORS**

40085344