SECTION 8A
ELECTRICAL DIAGNOSIS
FIREBIRD

INDEX

DIAGNOSTIC INFORMATION

This manual contains the following kinds of diagnostic information:

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

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

The **Electrical Schematic** should always be your starting point in using this Electrical Troubleshooting Manual. The 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 figure out why it doesn't.

The **Harness Connector Faces** show the cavity or terminal locations in all the multi-pin connectors shown in the schematic. Together with the wire colors and terminals given in the schematic, they help you locate test points. The drawings show the connector faces you see after the harness connector has been disconnected from a component. When more than one connector is connected to a component the connectors are all shown together.

The **Troubleshooting Hints** offer short-cuts or checks to help you 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 circuit should be operated and what should happen. This is especially important when you are working on a new system. The System Check will help you identify symptoms, lead you to diagnosis and confirm the system after repair.

The **System Diagnosis** provides a procedure to follow that will locate the condition in a circuit. 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 you in locating the condition as fast as possible.

The **Circuit Operation** will help you understand the circuit. It describes the components and how the circuit works.

The **Component Location List** helps you find where the parts of the circuit are in the vehicle. 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 cell 201.

Harness Routing Views are found in cell 203. These views show the routing of the major wiring harnesses and the in-line connectors between the major harnesses. These views will make troubleshooting easier when you are not sure about harness routing.

PAGE NUMBER

This section is organized into cells with most cells containing a circuit schematic and the text for that circuit. This makes the section easy to use, since the page number for a schematic will normally stay the same year after year, and it will also be the same in all the GM publications about that circuit. For example, the Cruise Control schematics will always be the first pages of cell 34. The other information for Cruise Control follows them on pages 34-2, 34-3, etc.

Some cells may have more than one circuit schematic, such as Power Distribution, Interior Lights, and Air Conditioning. The circuit you want can either be located by using the index, or by a quick look through the related cell.

All the engine circuits for a particular engine VIN type are in the same cell. This makes that cell easy to use, since schematics for other cars are not in your way. The instrument panel schematics are organized similarly. If you are working on a car with a Digital Cluster, only the schematics that apply to that car's Digital Cluster will be in the cell you use. Information on the Indicators and Gages Clusters will be in other cells.

SCHEMATICS

These schematics break the entire electrical system down into individual circuits. You are not distracted by wiring which is not part of the circuit you're working on.

It is important to realize that no attempt is made on the schematic to represent components and wiring as they physically appear on the car. 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.

The following example shows how to read a Horn schematic, see figure 1. Locate the Horn schematic using the Index. The circuit schematic will look somewhat like the one to the right. The schematic is read from top to bottom.

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.

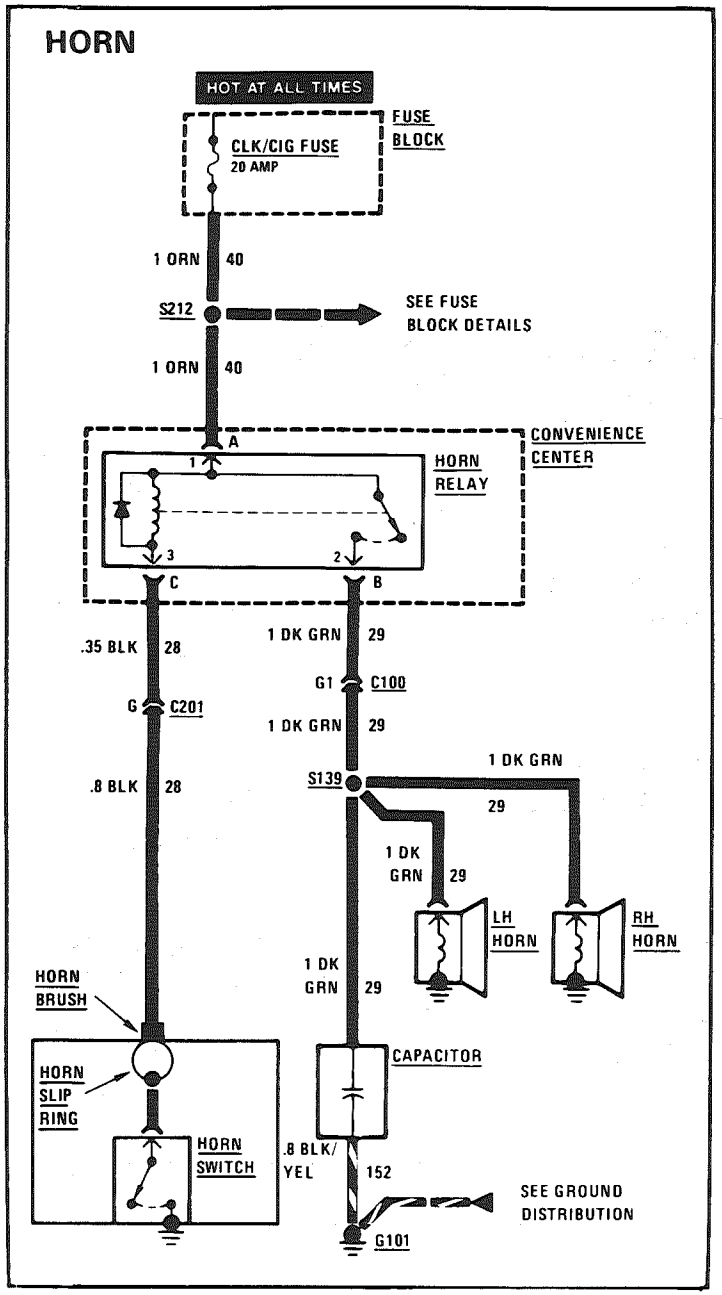


Figure 1 - Typical Horn Schematic

COMPONENT LOCATIONS

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

Listed in the left hand column are the components shown on the schematic. Next to the Convenience Center is the location, "Under LH side of I/P." Reference to LH and RH is made as though the troubleshooter was sitting in the driver's seat. On the same line, in the far right column, is a page-figure reference. In this case, you are directed to figure A on page 201-6.

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 you identify connectors on the car.

Grounds are listed next in the table. The location description for G101 reads, "LH front of engine compartment, behind headlights panel." You are directed to page 201-8, figure D.

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

COMPONENT LOCATION		Page-Figure
COMPONENTS		
Convenience Center	Under LH side of I/P	201-6-A
Fuse Block	Under LH side of I/P	201-6-A
Horn Brush/Slip Ring	Under steering wheel	201-5-E
Horn Switch	Under steering wheel	201-5-E
CONNECTORS		
C100 (46 cavities)	LH side of dash	201-5-B
C201 (11 cavities)	Under LH side of I/P, near C100	201-5-F
GROUNDS		
G101	LH front of engine compartment, behind headlights panel	201-8-D
SPLICES		
S139	Front lights harness, behind LH front light panel	201-8-C
S212	I/P harness, behind I/P, above steering column	201-6-B

Figure 2 - Typical Entries In The Component Location List

HARNESS CONNECTOR FACES

The connectors, see figure 3, are labeled with the component they are connected to, or the connector number from the schematic where they appear, and their color. The identifying number is for reference only; it is not the connector part number. For in-line connectors, the half shown is usually the Socket half. If both views are shown, the other half is the Pin Half.

Only connectors that have two or more terminals are shown.

If you need to backprobe a connector while it is on the component, 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.

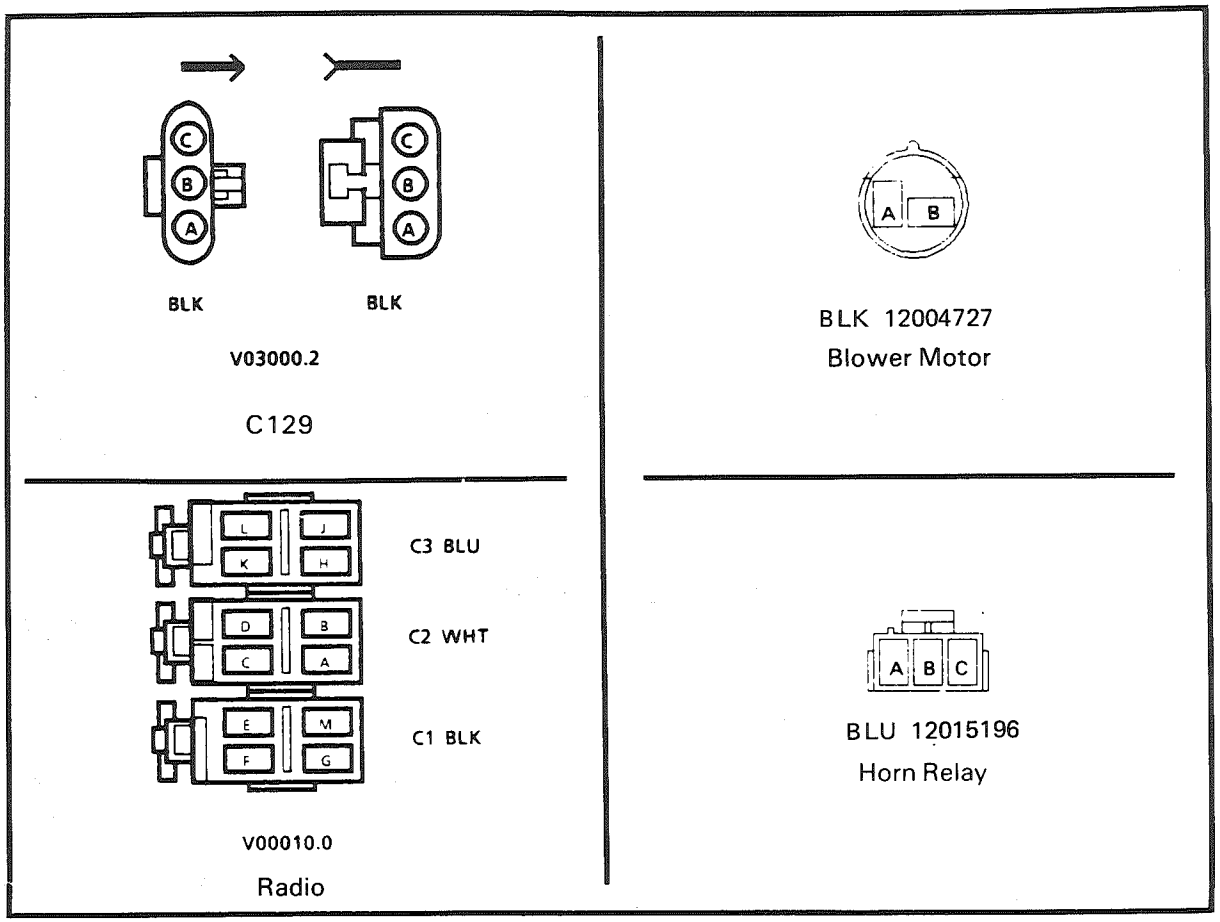


Figure 3 -Typical Harness Connector Faces

OTHER INFORMATION

Body Part Names

Refer to figure 4 for the correct body part names.

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 designations 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 car. See the General Information Section 0A of the Chassis Service Manual for the location of the label and the definition of the option codes.

Abbreviations

A/C — Air Conditioning
BCM — Body Computer Module
ECM — Electronic Control Module or Engine Control Module
I/P — Instrument Panel
RH — Right Hand, as seen from driver's seat
LH — Left Hand
Not Used — The connector cavity has no function.

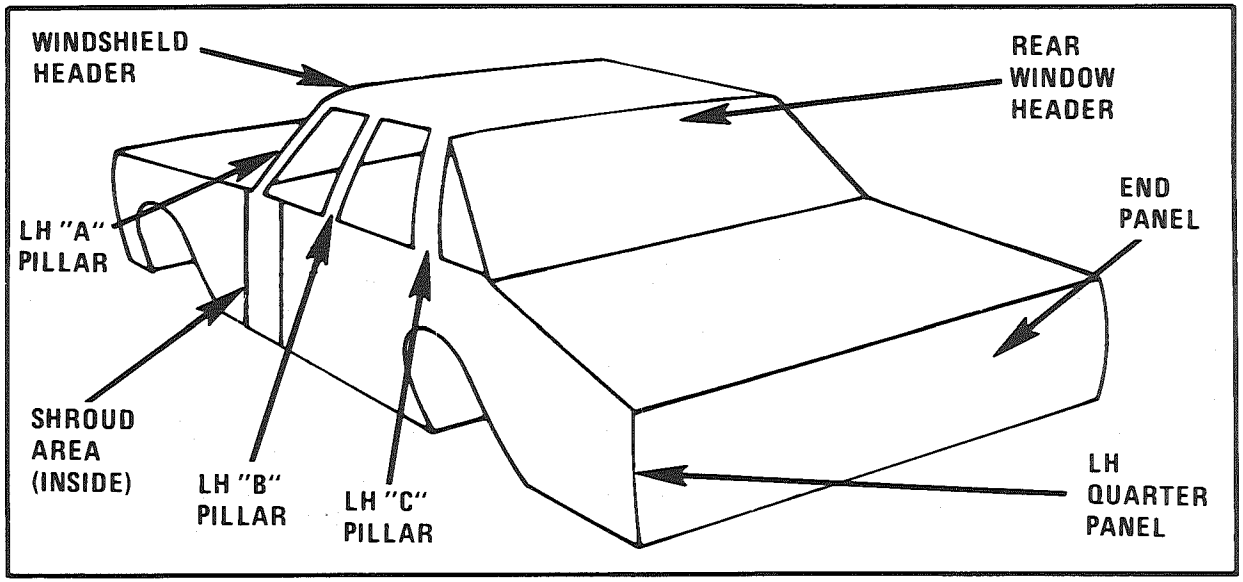


Figure 4 - Body Part Names

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 and Light Switch Details schematics. By using these three (3) schematics, power distribution wiring can be followed from the Battery and Generator to the first component after a Fusible Link, Fuse and 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 5 is a sample Power Distribution schematic. It shows how voltage is applied from the positive Battery terminal to the various circuits on the car. For example, Battery voltage is applied to the Starter Solenoid, Fusible Link D, the RED wire and connector C100 to Fuse 1 and Fuse 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 the RED wire to the Coolant Fan Relay.

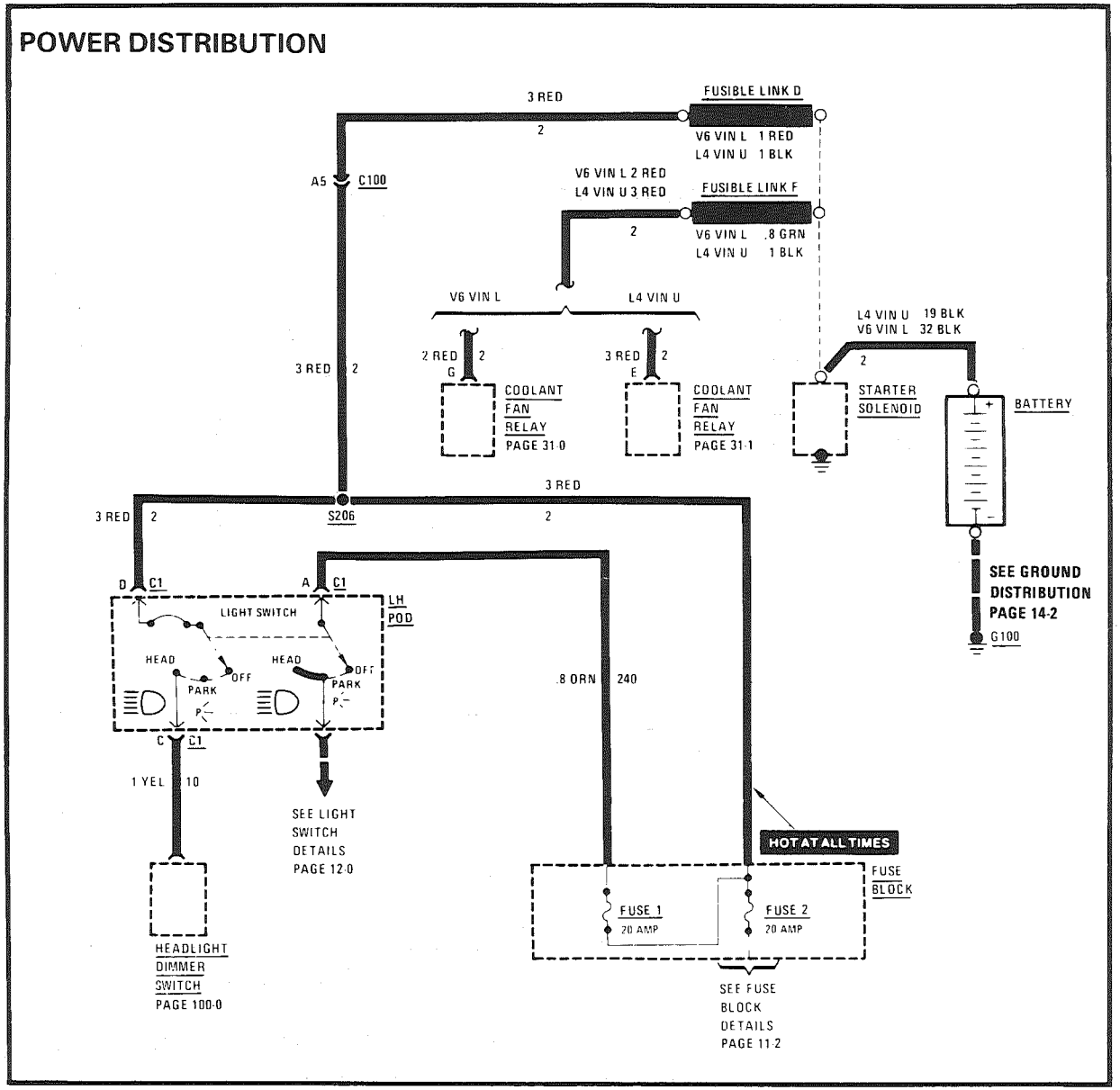


Figure 5 - Typical Power Distribution Schematic

Fuse Block Details

The Fuse Block Details schematic, see figure 6, shows all the wiring between a fuse and the components connected to the output of the fuse. In certain instances where space permits, this detail is shown on the Power Distribution schematic. The Fuse Block Details schematic is extremely helpful in locating a short circuit that causes a fuse to open.

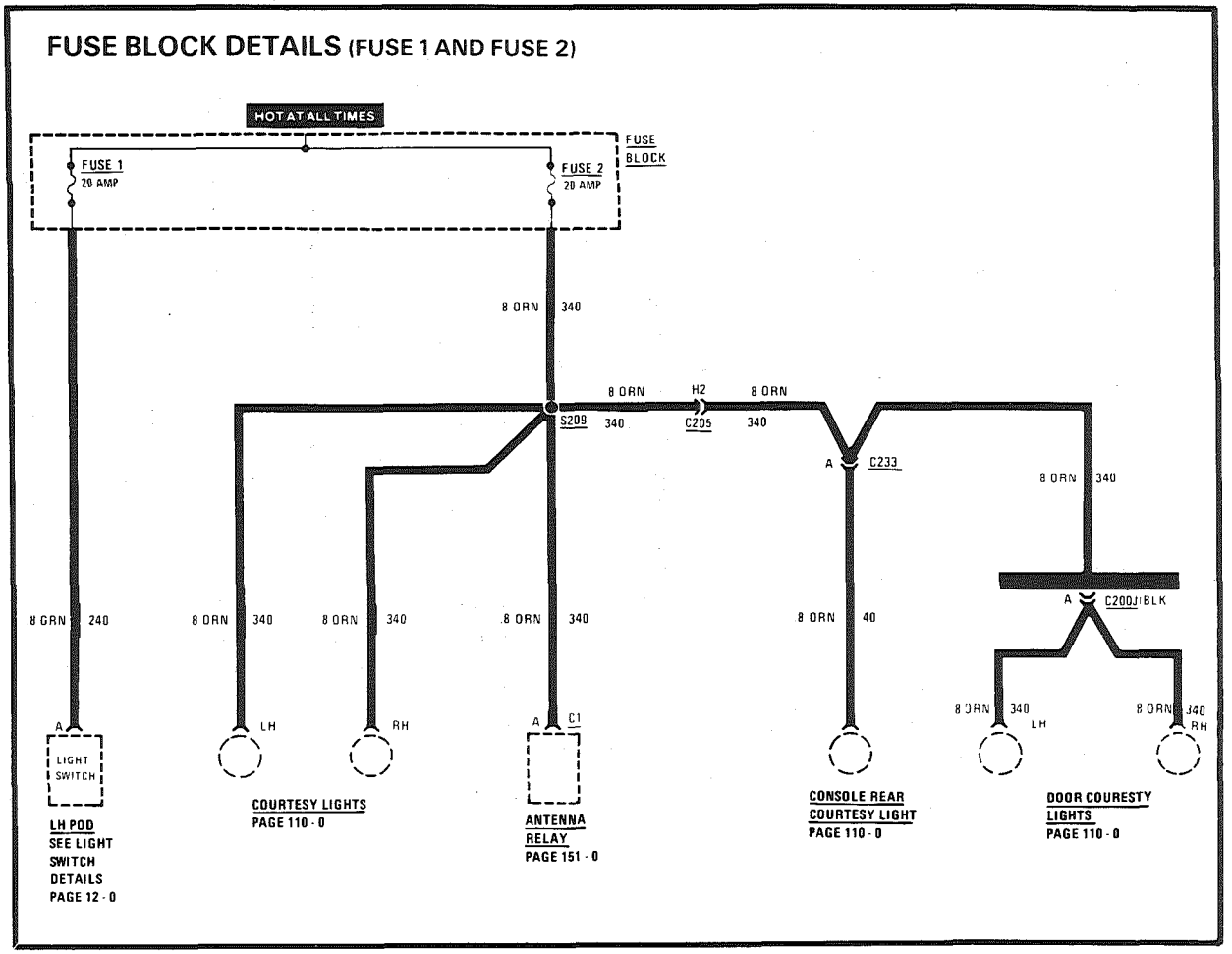


Figure 6 - Typical Fuse Block Details Schematic

Light Switch Details

The Light Switch Details schematic, see figure 7, shows the wiring between the Light Switch and the components connected to the output of the Light Switch. In certain instances where space permits, some of this detail may be shown on the Power Distribution schematic. The Light Switch Details schematic helps you understand the many wires that come from the Light Switch. This schematic is also helpful in locating a short circuit that causes the fuse ahead of the Light Switch to open.

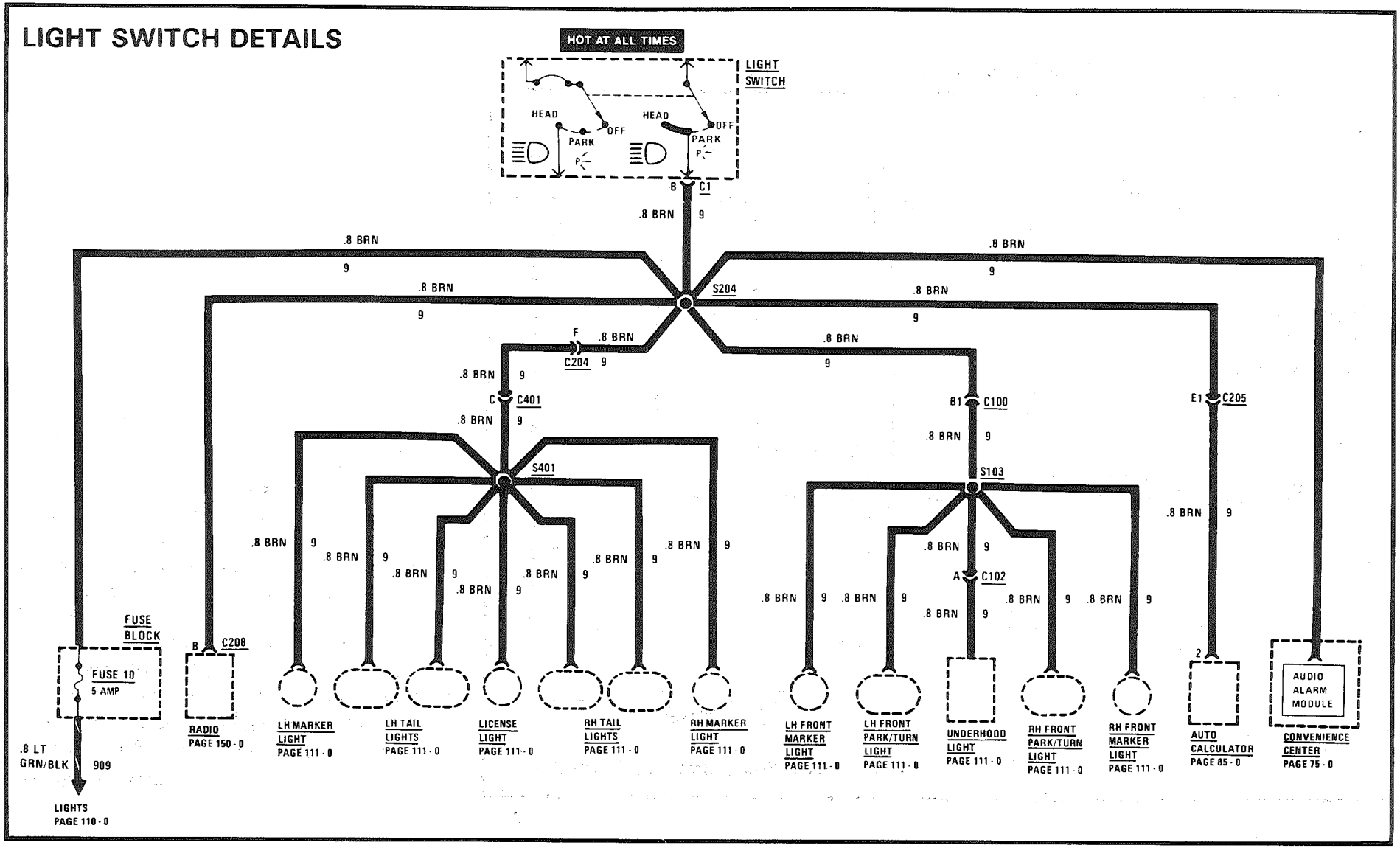


Figure 7 - Typical Light Switch Details Schematic

Ground Distribution

Figure 8 is a sample Ground Distribution schematic for the Headlights. It shows exactly which components share each ground. This information can often be a time-saver when troubleshooting ground circuits.

For example, if both Headlights and the Park/Turn Light on one side are all out, you could suspect an open in their common ground wire or the ground connection itself. On the other hand, if one of the lights works, you know that 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.

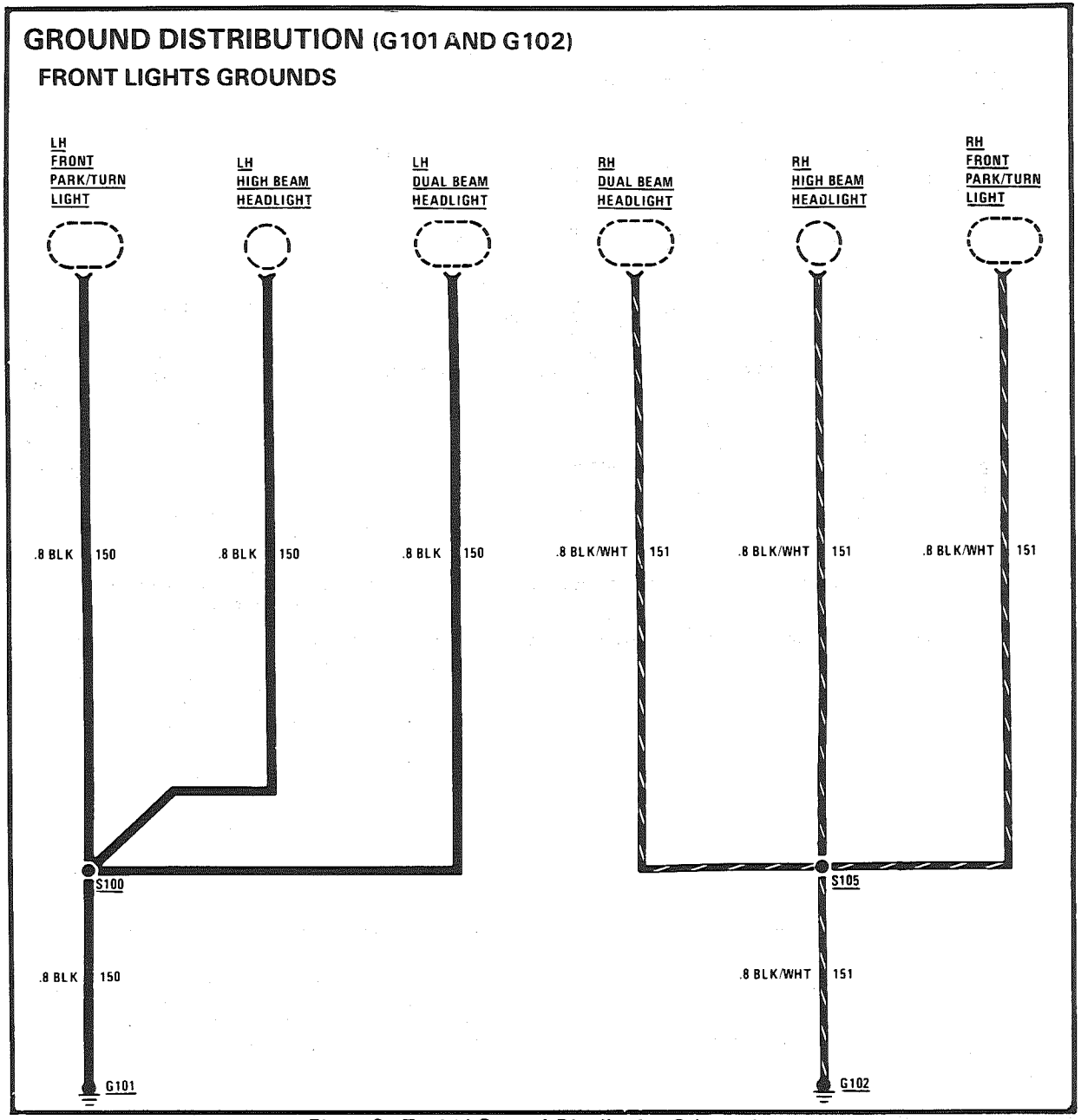
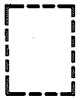


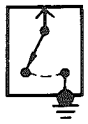
Figure 8 - Typical Ground Distribution Schematic

SYMBOLS

ENTIRE COMPONENT SHOWN

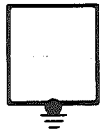


PART OF A COMPONENT SHOWN



NAME OF COMPONENT

DETAILS ABOUT COMPONENT OR ITS OPERATION



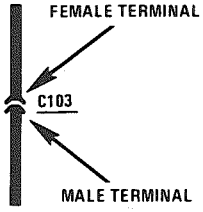
COMPONENT CASE IS DIRECTLY ATTACHED TO METAL PART OF CAR (GROUNDED)

WIRE IS ATTACHED TO METAL PART OF CAR (GROUNDED)

GROUND IS NUMBERED FOR REFERENCE ON COMPONENT LOCATION TABLE

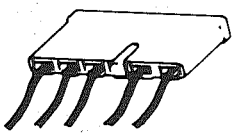
WIRE IS INDIRECTLY CONNECTED TO GROUND

WIRE MAY HAVE ONE OR MORE SPLICES BEFORE IT IS GROUNDED

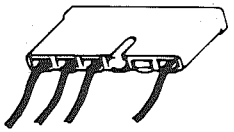


CONNECTOR REFERENCE NUMBER FOR COMPONENT LOCATION TABLE

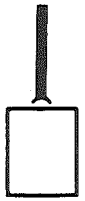
TABLE ALSO SHOWS TOTAL NUMBER OF TERMINALS POSSIBLE: C103 (6 CAVITIES)



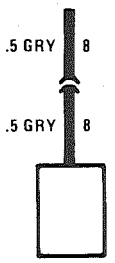
5 CAVITY CONNECTOR (5 OUT OF 5 CAVITIES ARE USED)



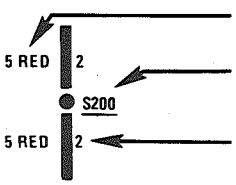
5 CAVITY CONNECTOR (4 OUT OF 5 CAVITIES ARE USED)



CONNECTOR ATTACHED TO COMPONENT



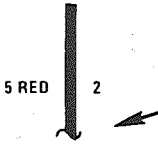
CONNECTOR ON COMPONENT LEAD (PIGTAIL)



INSULATION COLOR IS BOTH SHOWN AND LABELED

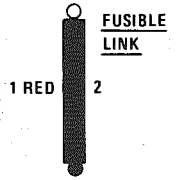
SPLICES ARE SHOWN AND NUMBERED

CIRCUIT NUMBER IS SHOWN TO HELP IN TRACING CIRCUITS

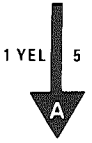


A WAVY LINE MEANS A WIRE IS TO BE CONTINUED

WIRE INSULATION IS ONE COLOR WITH ANOTHER COLOR STRIPE (RED WITH YELLOW)



WIRE SIZE AND INSULATION COLOR ARE LABELED



TO GENERATOR PAGE 30-0

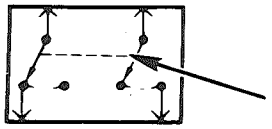
CURRENT PATH IS CONTINUED AS LABELED. THE ARROW SHOWS THE DIRECTION OF CURRENT FLOW AND IS REPEATED WHERE CURRENT PATH CONTINUES.

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

LIGHTS: TURN/HAZARD/STOP

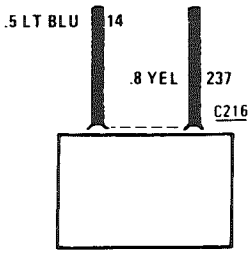
SYMBOLS

CIRCUIT BREAKER



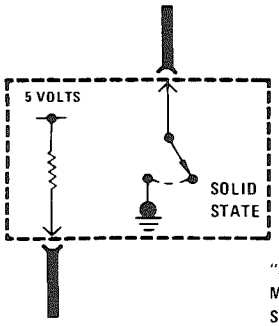
SWITCH CONTACTS THAT MOVE TOGETHER

DASHED LINE SHOWS A MECHANICAL CONNECTION BETWEEN SWITCH CONTACTS



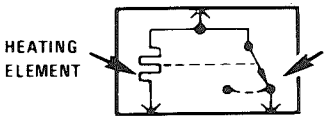
TWO TERMINALS IN THE SAME CONNECTOR

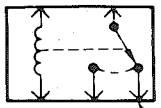
DASHED LINE SHOWS A PHYSICAL CONNECTION BETWEEN PARTS (SAME CONNECTOR)



ELECTRONIC CONTROL MODULE (ECM) SOLID STATE

"SOLID STATE" IDENTIFIES MODULE AS ELECTRONIC. SIMPLIFIED COMPONENTS WITHIN THE MODULE SHOW HOW EACH CIRCUIT IS COMPLETED. DO NOT MEASURE RESISTANCE OF CIRCUITS INSIDE SOLID STATE MODULES.





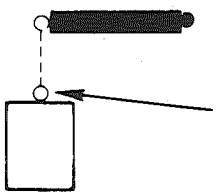
RELAY SHOWN WITH NO CURRENT FLOWING THROUGH COIL

NORMALLY CLOSED CONTACT

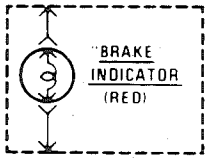
WHEN CURRENT FLOWS THROUGH COIL, CONTACT MOVES TO NORMALLY OPEN POSITION

NORMALLY OPEN CONTACT

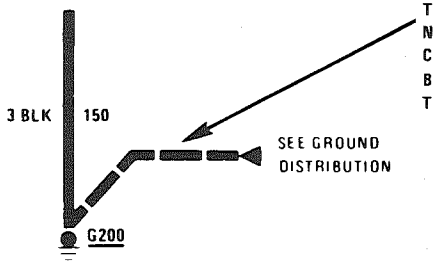
FUSIBLE LINK



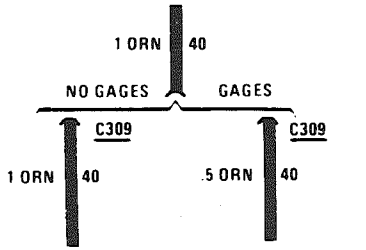
FUSIBLE LINK CONNECTS TO SCREW TERMINAL, SHOWN SEPARATED



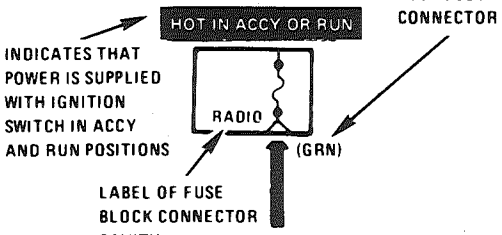
AN INDICATOR WHICH DISPLAYS THE LIGHTED WORD "BRAKE"



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



WIRE CHOICES FOR OPTIONS OR DIFFERENT MODELS ARE SHOWN AND LABELED

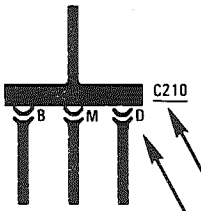


INDICATES THAT POWER IS SUPPLIED WITH IGNITION SWITCH IN ACCY AND RUN POSITIONS

COLOR OF FUSE BLOCK CONNECTOR

LABEL OF FUSE BLOCK CONNECTOR CAVITY

DIODE
CURRENT CAN FLOW ONLY IN THE DIRECTION OF THE ARROW

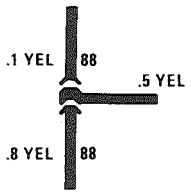


3 CONNECTORS ARE SHOWN CONNECTED TOGETHER AT A JUNCTION BLOCK. FOURTH WIRE IS SOLDERED TO COMMON CONNECTION ON BLOCK.

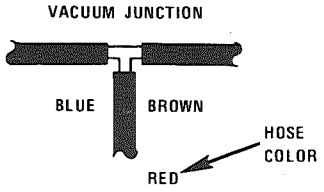
CONNECTOR NUMBER

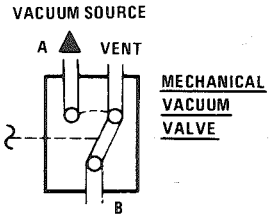
LETTERS FOR EACH CAVITY

SYMBOLS



3 WIRES ARE SHOWN CONNECTED TOGETHER WITH A PIGGYBACK CONNECTOR

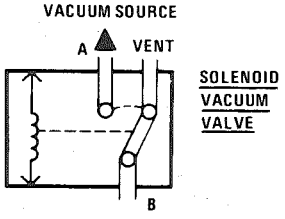




MECHANICAL VACUUM VALVE

WHEN THE VALVE IS IN THE " AT REST " POSITION, PORT B IS VENTED. THE VACUUM AT PORT A HAS NO EFFECT.

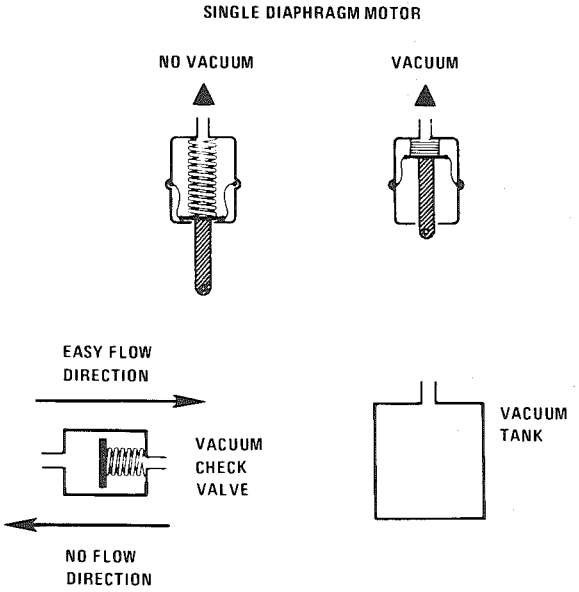
WHEN THE VALVE IS MOVED TO THE "OPERATED" POSITION VACUUM FROM PORT A IS CONNECTED TO PORT B

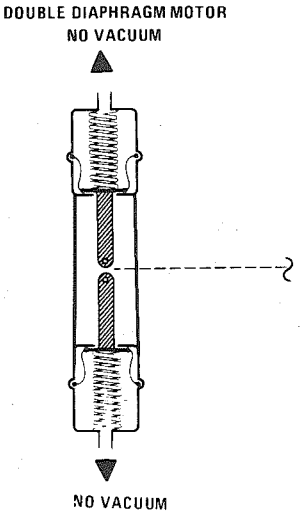


SOLENOID VACUUM VALVE

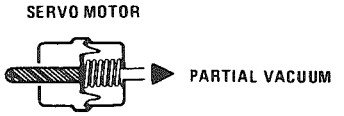
THE SOLENOID VACUUM VALVE USES THE SOLENOID TO MOVE THE VALVE

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.

The following four-step troubleshooting procedure is recommended:

Step 1: Check the problem.

Perform a System Check to be sure you understand what's wrong. Don't waste time fixing part of the problem! Do not begin disassembly or testing until you have narrowed down the possible causes.

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. The names of circuits that share the same fuse, ground, switch, etc., are included on each electrical schematic. (Shared circuits are also shown on Power Distribution, Ground Distribution, Fuse Block Details, and Light Switch 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 Cause and Repair.

- Narrow down the possible causes.
- Use the Troubleshooting Hints.
- Make the necessary measurements as given in the System Diagnosis.
- Before you replace a component, check power, signal, and ground wires at the component harness connector. If these are OK, the component must be bad.

Step 4: Test the Repair

Repeat the System Check to be sure you have fixed the whole problem.

Example

A customer brings in a car and says that the high beams do not work.

Step 1: Perform a System Check on the Headlights Circuit. You may discover that both low beams operate. In "Hi," you may notice that the High Beam Indicator comes on, but neither high beam operates.

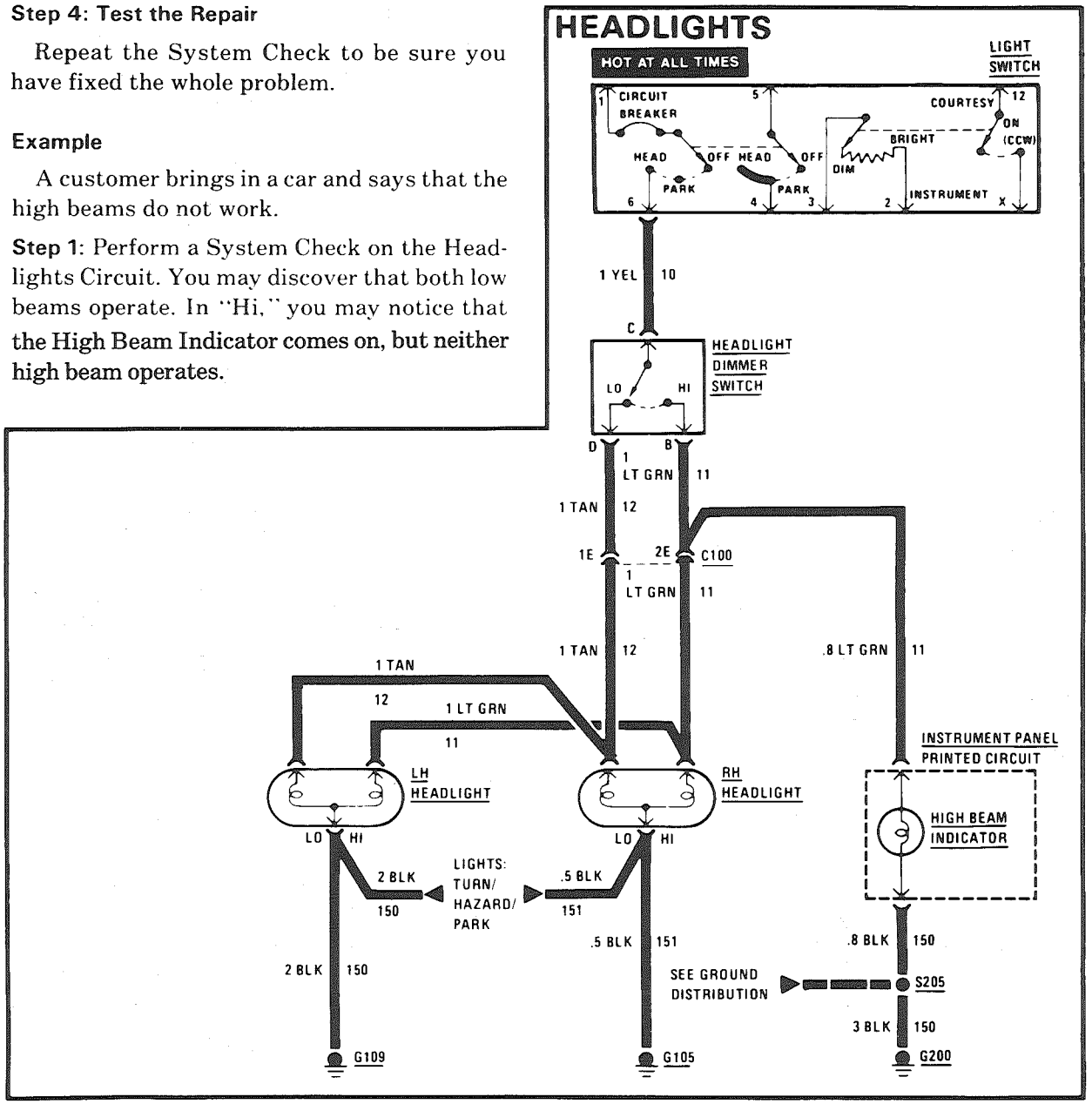


Figure 9 - Typical Headlights Schematic

Step 2: Read the Headlights electrical schematic, see figure 9. This is the step that will save you 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 low beams work, you know that the Light 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 High Beam Indicator came on when the Headlight Dimmer Switch was moved to Hi, you know that the Hi contacts of the dimmer switch and the LT GRN wire between the dimmer switch and C100 are good.

At this point, you could test for voltage at the RH Headlight with the dimmer switch in Hi. However, it is extremely unlikely that the high beam filaments have burned out in *both* headlights, or that *both* headlight 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 Headlight.

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

Step 3: Find the cause 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 high beams, both low beams, and the High Beam Indicator are all working.

Now suppose that the symptoms were different. You may have operated the Headlights and found that the low beams were working, but neither the high beams nor the High Beam Indicator were working. Looking at the schematic, you might conclude the following.

It is unlikely that both high beam filaments and the High Beam Indicator have all burned out at once. The cause is probably the dimmer switch or its connector.

TROUBLESHOOTING TOOLS

Electrical troubleshooting requires the use of common electrical test equipment.

TEST LIGHT/VOLTMETER

Use a test light to check for voltage. A Test Light (BT-7905 or equivalent) 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 voltmeter can be used instead of a test light. While a test light shows whether or not voltage is present, a voltmeter indicates how much voltage is present.

An increasing number of circuits include solid state control modules. One example is the Electronic Control Module (ECM) used with Computer Command Control and Electronic Fuel Injection. Voltages in these circuits should be tested only with a 10-megohm or higher impedance digital voltmeter or multimeter (J-29125 or equivalent). 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 a connection, you do not have to separate the two halves of the connector. Unless you are testing a "weather-pack" connector, you should 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.

CONNECTOR TEST ADAPTERS

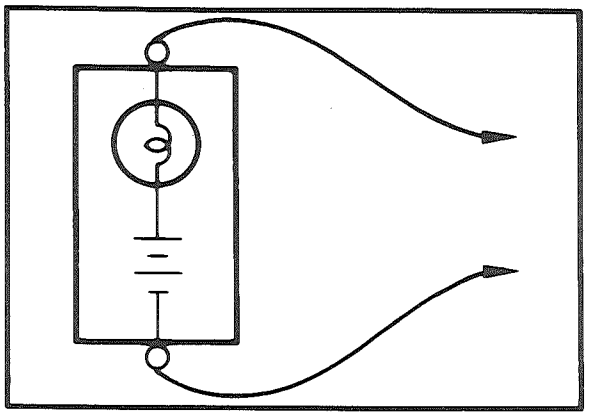
A connector Adapter Kit is available (J35616) for making tests and measurements at separated connectors. This kit contains an assortment of probes which mate with many of the types of connectors you will see. Avoid using paper clips and other substitutes since they can damage terminals and cause incorrect measurements.

SELF-POWERED TEST LIGHT

Use a self-powered test light (J-21008 or equivalent) 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 disconnect the car's Battery, or 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's 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.



Self-Powered Test Light

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 Electronic Control Module (ECM), should be tested only with a 10-megohm or higher impedance digital multimeter (J-29125 or equivalent).

When measuring resistance with a digital multimeter, the vehicle Battery should be disconnected. This will prevent incorrect readings. Digital meters 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 is available (J-36169 or equivalent) 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.

CAUTION: Do not use fused jumper wire in any instance to substitute for inputs or outputs at the ECM (Electronic Control Module), BCM (Body Control Module), or any microprocessor device.

SHORT FINDER

Short Finders are available (J-8681 or equivalent) 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.

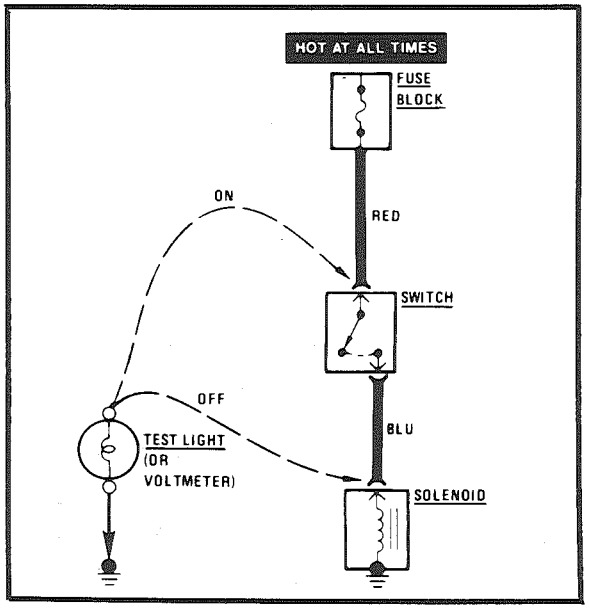
FUSE TESTER

A simple tester that indicates a blown fuse is available (J-34764 or equivalent). To check a fuse the tester is applied directly to the fuse in the fuse block. Two probes contact the fuse. The probes are either placed 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

TESTING FOR VOLTAGE

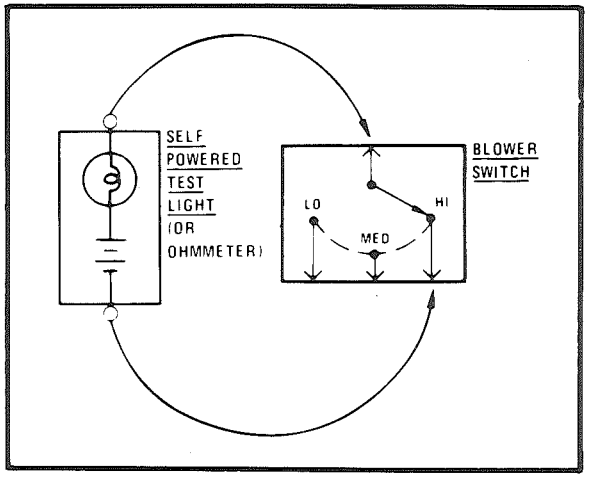
1. Connect one lead of a test light to a known good ground. If you are using a voltmeter, be sure it is the voltmeter's negative lead that you have connected to ground.
2. Connect the other lead of the test light or voltmeter to a selected test point (connector or terminal).
3. If the test light glows, there is voltage present. If you are using a voltmeter, note the voltage reading. It should be within one volt of measured Battery voltage. A loss of more than one volt indicates a problem.



Voltage Check

TESTING FOR CONTINUITY

1. Disconnect the car battery.
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. If you are using an ohmmeter, low or no resistance means good continuity.



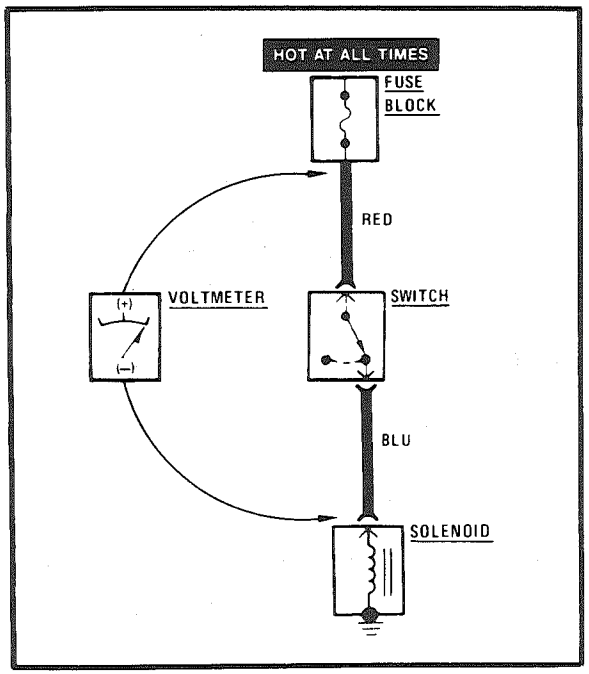
Continuity Check Through A Switch

TROUBLESHOOTING TESTS

TESTING FOR VOLTAGE DROP

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

1. Connect the positive lead of a voltmeter 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 voltmeter will show the difference in voltage between the two points. A difference (or drop) of more than one volt indicates a problem.

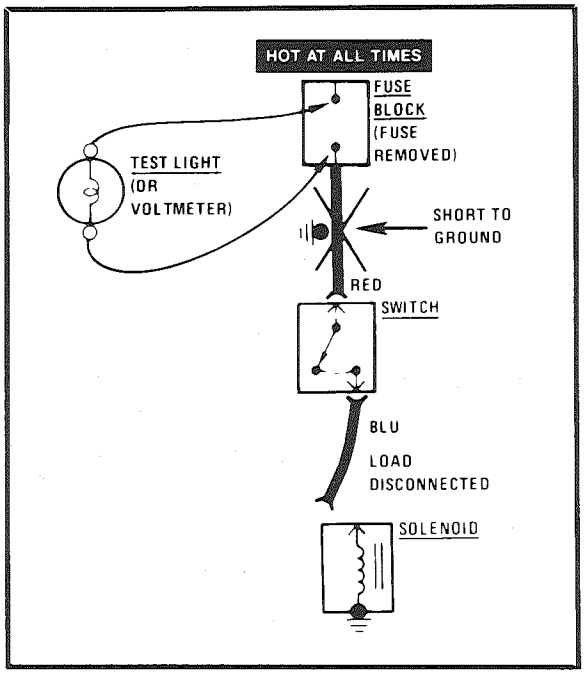


Voltage Drop Test

TESTING FOR SHORT TO GROUND

With a Test Light or Voltmeter

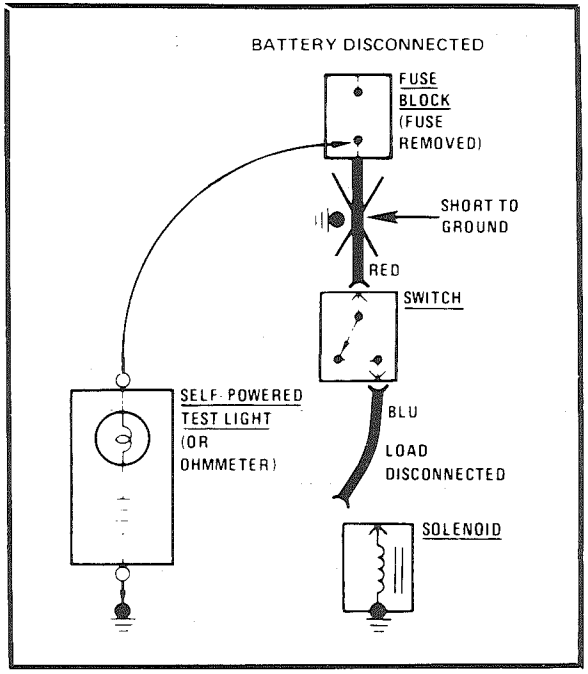
1. Remove the blown fuse and disconnect the load.
2. Connect a test light or voltmeter across the fuse terminals (be sure that the fuse is powered).
3. Beginning near the fuse block, wiggle the harness from side to side. Continue this at convenient points (about 6 inches apart) while watching the test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



Testing For Short With Test Light or Voltmeter

With a Self-Powered Test Light or Ohmmeter

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.



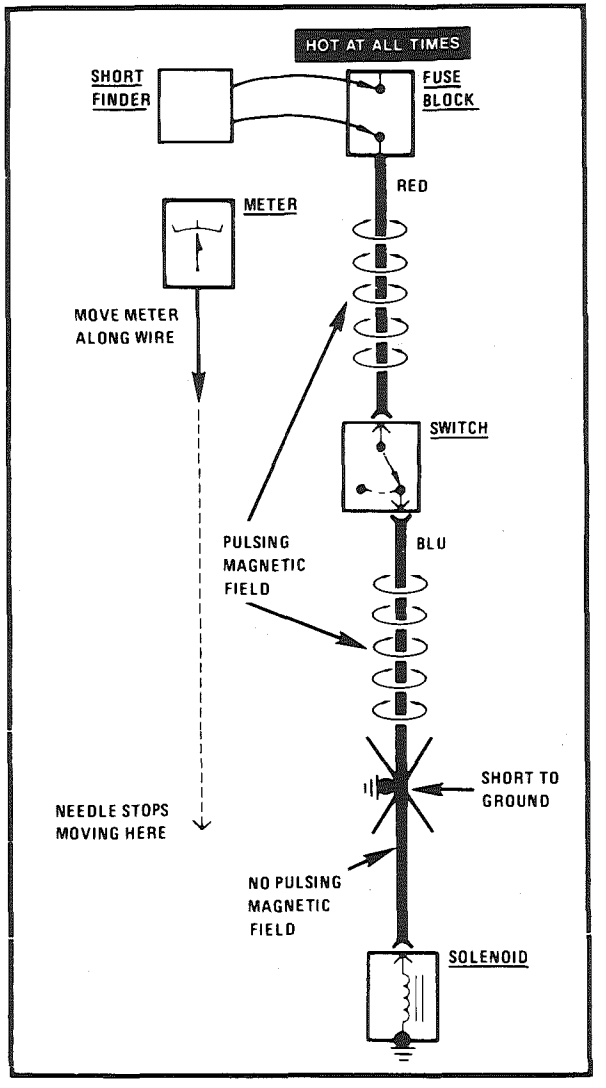
Testing For Short With Self-Powered Test Light or Ohmmeter

With a Short Finder

1. Remove the blown fuse, leaving the Battery connected.
2. Connect the Short Finder across the fuse terminals.
3. Close all switches in series with the circuit you are troubleshooting.
4. Operate the Short Finder. The Short Finder will pulse current to the short. This creates a pulsing magnetic field surrounding the circuit wiring between the fuse block and the short.
5. Beginning at the fuse block, slowly move the Short Finder meter along the circuit wiring. The meter will show current pulses through sheet metal and body trim. As long as the meter is between the fuse block and the short, the needle will move with each current pulse. When you have moved the meter past the point of the short, the needle will stop moving. Examine the wiring in that area for the short to ground.

Fuses Powering Several Loads

1. Find the schematic in Fuse Block Details (8A-11) 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, meter, or short finder as described above.
   - If fuse does not blow, go to next step.
4. Close each connector or switch until the fuse blows, to find which circuit the short is in. Connect test lamp, meter, or short finder at the connector to the suspect circuit (disconnected) rather than at the fuse terminals.



Finding Short With Short Finder

PROPER JUMP STARTING PROCEDURES

With the use of electronic components (such as solid-state radios, electronic control modules, and others) becoming more wide-spread each model year, the potential for damage caused by improper jump starts increases. The following guidelines are presented to reduce the likelihood of such damage.

JUMP START ONLY IF BUILT-IN HYDROMETER "EYE" ON BATTERY IS DARK. If the "eye" is clear or yellow, do not attempt to jump start. If the "eye" is green, the Battery is charged and does not require a jump start. Both the booster and the discharged Battery should be treated carefully when using jumper cables.

CAUTION: Do not expose the Battery to open flame or sparks. Serious personal injury, particularly to the eyes, may result from a Battery explosion, Battery acid, or electrical burns.

- The Ignition Switch must be in OFF when connecting or disconnecting the jumper cables.
- All accessories, including the Radio, should be turned off before jump starting.
- Cable polarity must be correct. Component damage can occur if the polarity is reversed, even if only briefly.
- Connect the positive jumper cable first, then connect the negative cable to the engine ground (not the negative terminal of the dead Battery).

ELECTRICAL REPAIRS

This section provides instruction in the following repairs:

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

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

CIRCUIT PROTECTION

All electrical circuits are protected against excessive loads which might occur because of shorts or overloads in the wiring system. Such protection is provided by a fuse, circuit breaker, or fusible link.

Fuses

The most common method of automotive wiring circuit protection is the fuse. Whenever there is an excessive amount of current flowing through a circuit the fusible element will melt and create an open or incomplete circuit (see Figure 1). Fuses are a "one time" protection device and must be replaced each time the circuit is overloaded.

Auto-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. The current rating of each fuse is molded into its head.

To determine whether or not an auto-fuse is blown, remove the suspect fuse and examine the element in the fuse for a break, (see Figure 1). If the element is broken, replace the fuse with one of equal current rating.

There are, however, additional specific circuits with in-line fuses. In-line fuses are located within the individual wiring harness. They are usually housed in spring-loaded, twist-type receptacles.

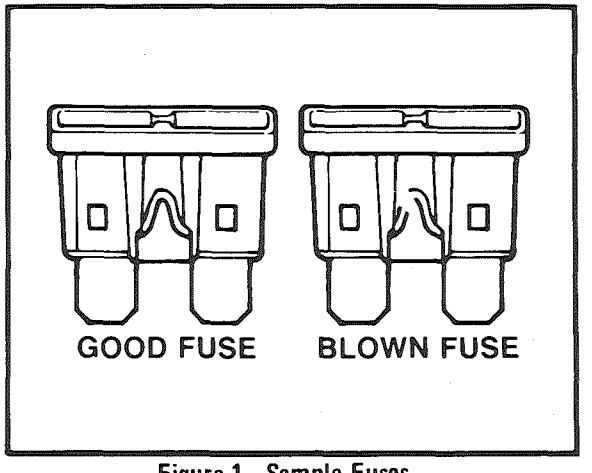


Figure 1 - Sample Fuses

CURRENT RATING (AMPERES)	COLOR
3	VIOLET
5	TAN
7.5	BROWN
10	RED
15	BLUE
20	YELLOW
25	WHITE
30	GREEN

Figure 2 - Fuse Rating And Color

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. The circuit breaker will remain open until the trouble is found and corrected. The circuit breaker will close automatically when the excessive current is removed. The condition of a circuit breaker may be verified by removing it from the circuit and checking the resistance. A good circuit breaker will have less than 1 ohm resistance between the two terminals.

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. Each fusible link is four wire-gauge sizes smaller than the cable it is designed to protect. Links are marked on the insulation with wire-gauge size because the heavy insulation makes the link appear to be a heavier gauge than it actually is. The same wire size fusible link must be used when replacing a blown fusible link.

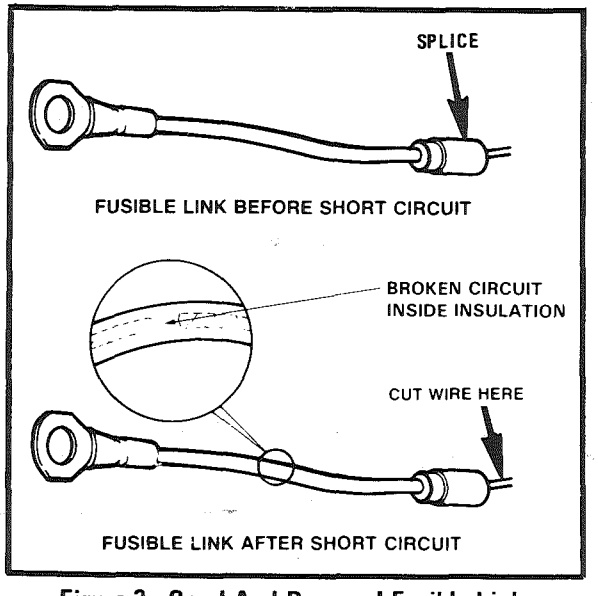


Figure 3 - Good And Damaged Fusible Links

Fusible links are available with two types of insulation: Hypalon® and Silicone/GXL (SIL/GXL). Service fusible links made with SIL/GXL may be used to replace either Hypalon® or SIL/GXL fusible links. Service fusible links made with Hypalon® may only be used to replace Hypalon® fusible links. To determine the fusible link type: nick the insulation of the blown fusible link with a knife. SIL/GXL will have a white inner core under the outer color. Hypalon® insulation is one color. 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, NEVER make a fusible link longer than 228 mm (9 in).

CAUTION: Fusible links cut longer than 228 mm (9 in) will not provide sufficient overload protection.

To replace a damaged fusible link, cut it off beyond the splice. Replace with a repair link. When connecting the repair link, strip wire and use staking-type pliers to crimp the splice securely in two places (see Figure 4). For more details on splicing procedures see Splicing Copper Wire.

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).

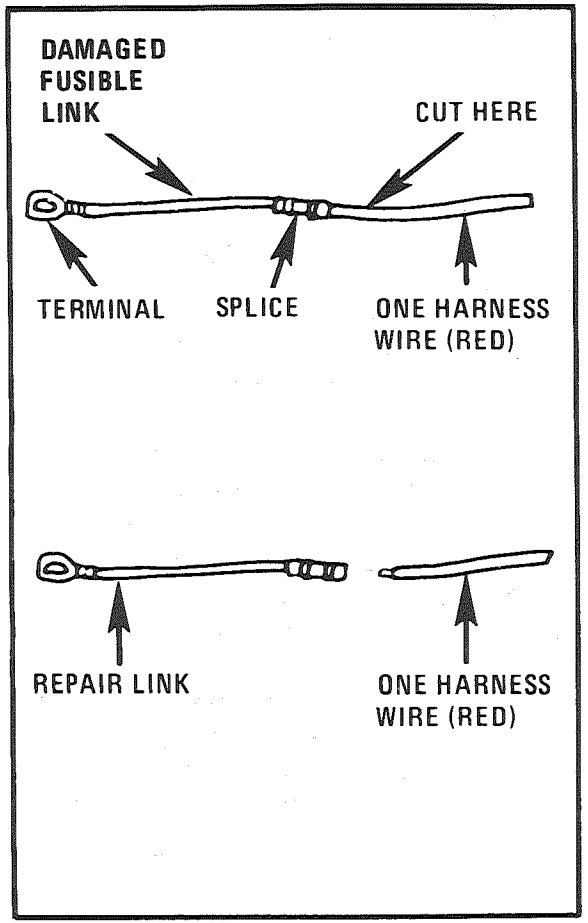


Figure 4 - Single Wire Feed Fusible Link

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.**

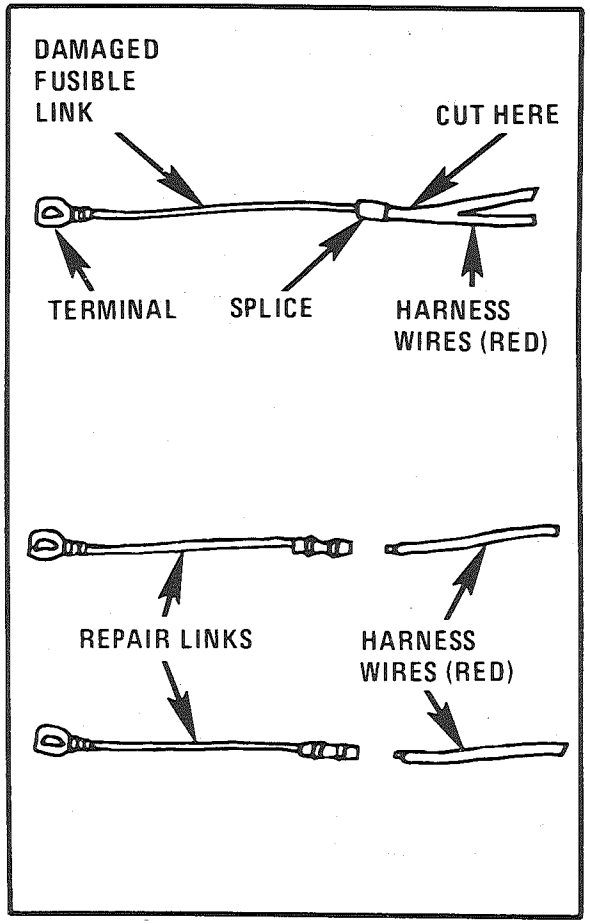


Figure 5 - Double Wire Feed Fusible Link

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, aluminum, or shielded cable for the correct splicing procedure.)

SPLICING COPPER WIRE

Step One: 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. Note that aluminum wire is enclosed in brown conduit. Refer to Splicing Aluminum Wire if necessary.

Step Two: 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 off to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40mm (1 1/2") away from other splices, harness branches, or connectors.

Step Three: 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 (see 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.

METRIC WIRE SIZES	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

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 your wire stripper and work down until you get a clean strip of the insulation. 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 the procedure on a new section of wire. The two stripped wire ends should be equal in length.

Step Four: 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 with your clips. Select the correct anvil on the crimper. (On most crimpers your choice is limited to either a small or large anvil.) Overlap the two 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.

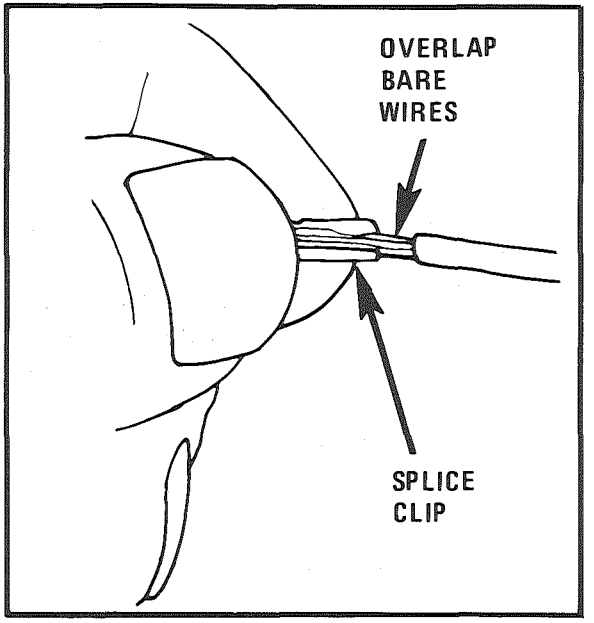


Figure 7 - Centering The Splice Clip

—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).

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, and
—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).

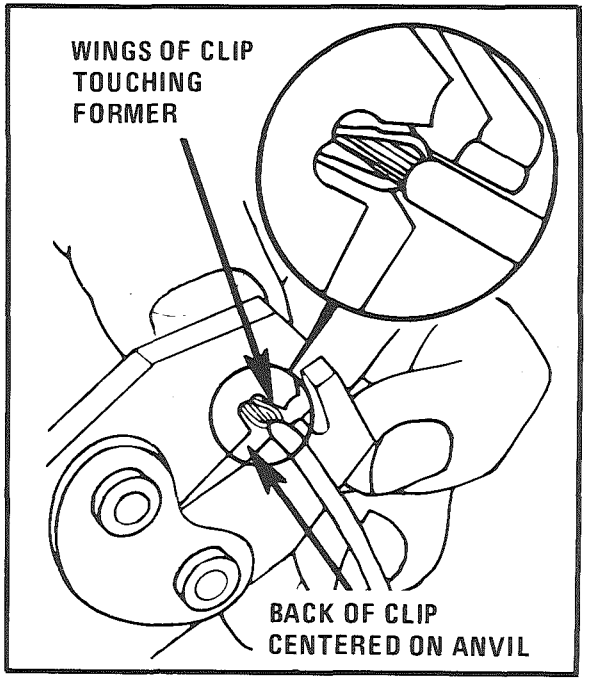


Figure 8 - Crimping The Splice Clip

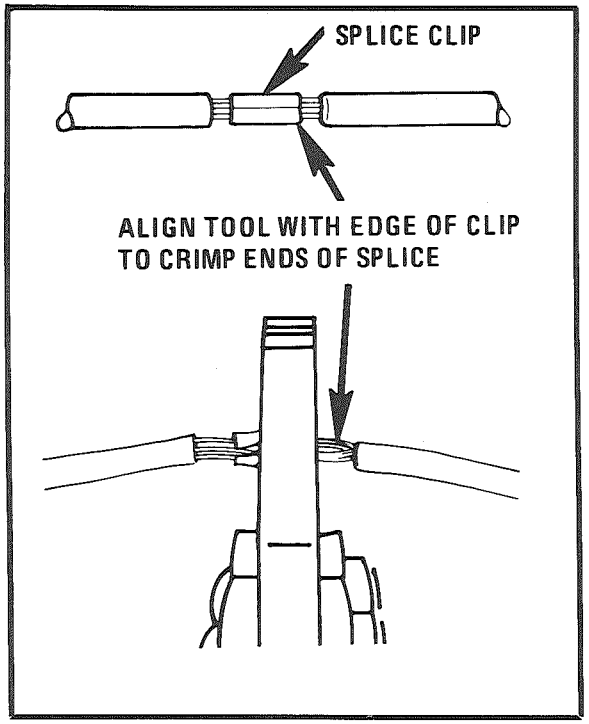


Figure 9 - Completing The Crimp

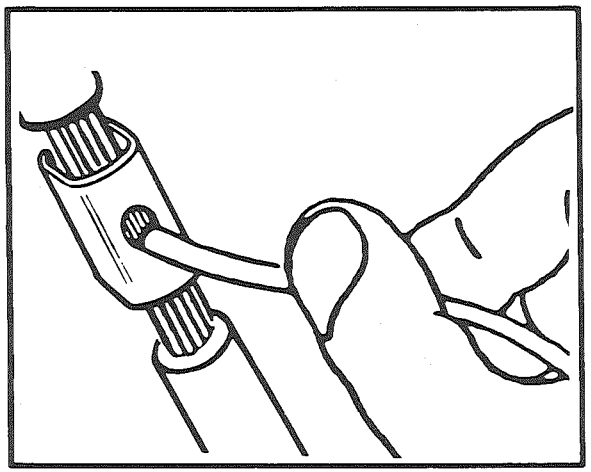


Figure 10 - Applying The Solder

Step Five: Solder

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

Step Six: 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 (see Figure 12).

SPLICING ALUMINUM WIRE

General Motors cars have a front body wiring harness made of 2.0 metric and 1.0 metric (14 and 16 gauge) insulated solid cable aluminum wires. These wires are enclosed in a brown solid plastic conduit from behind the instrument panel to the rear of the car..

A special repair kit (1684873-GR.2.530-KIT-ALUM-WIRE TERMINAL REPAIR) is available to help make repairs on aluminum wires. This kit contains materials and instructions that can be used either to splice wire or crimp on new terminals. The kit includes the following parts:

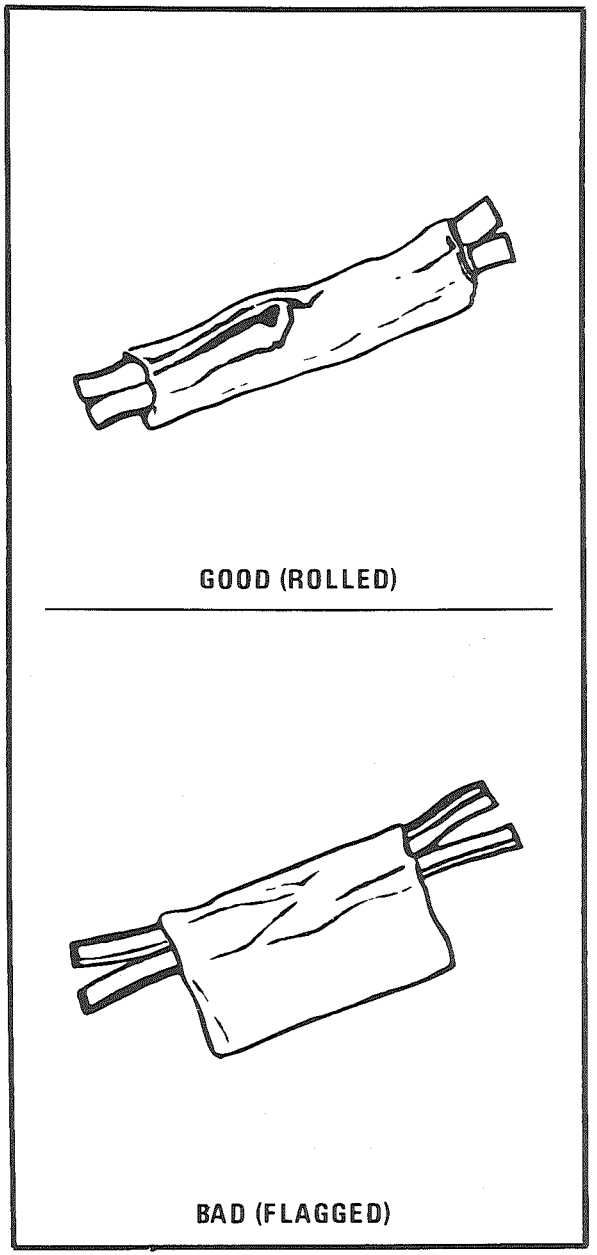


Figure 11 - Proper First Taping

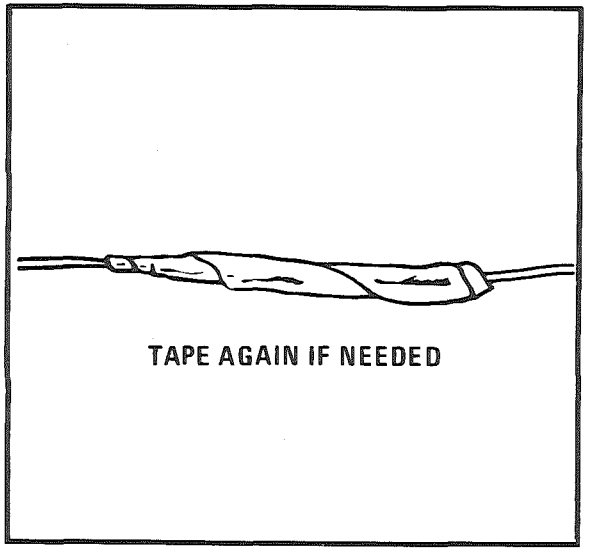


Figure 12 - Proper Second Taping

—Small cylindrical metal splice clips.
—A plastic tube of petroleum jelly.
—Ten 2.0 metric (14 gauge) DK GRN leads: 150mm (6") long with terminals.
—Ten 1.0 metric (16 gauge) BRN leads:150 mm (6") long with terminals.

Use of the special materials in this kit will help prevent galvanic corrosion. Galvanic corrosion causes increased resistance between the terminal and wire, or the splice clip and wire, or both. Increased resistance would affect the operation of the electrical components in the repaired circuit.

Step One: Open the Harness

Because the harness has a solid plastic conduit, simply cut the conduit open with diagonal cutters and pull out the desired wire. Be careful not to damage any of the wires when cutting open the conduit.

Step Two: 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 off to change the location of a splice. You may have to adjust splice locations to make certain that each splice is at least 40mm (1 1/2") away from the other splices, harness branches, or connectors.

Step Three: Strip the Insulation

When replacing a wire or lead, use a wire of the same size as the original wire, or larger. Look up the metric wire size on the schematic and select the proper-sized leads from the special repair kit. Remember that the wires in this harness can only be one of two sizes-2.0 metric or 1.0 metric (14 or 16 gauge).

Use wire strippers of the proper gauge to strip approximately 6mm (1/4") of insulation from each wire end.

When stripping the outer jacket from the aluminum wire core, be careful not to nick or damage the core. A damaged core will weaken the assembly at this point.

Step Four: Coating the Splice/Terminal

To prevent corrosion, apply a generous coating of petroleum jelly to the splice area. If you are replacing a lead, also thoroughly coat the terminal crimp area and aluminum core with petroleum jelly. Both areas are shown in Figure 13 and identified with the letter "A."

Step Five: Crimp the Wires

—Select the proper-sized splice clip (follow the instructions included in the special repair kit).
—Place one wire end in each end of the splice clip.
—Crimp the clip firmly to the wire using 10" slip joint pliers. Do NOT solder the splice (see Figure 14).
—Repeat this procedure for the second wire or lead in the splice clip.

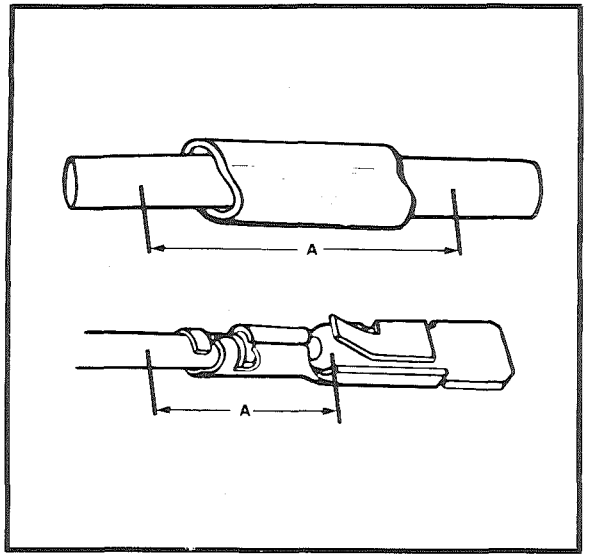


Figure 13 - Where To Apply Petroleum Jelly

Step Six: Tape Splice/Insert Terminal

Tape over both the splice clip and the petroleum jelly to seal out moisture and insulate the splice (see Figure 15). If you have replaced a lead, do not tape over the terminal crimp area but insert the lead into the connector body.

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 16 for a breakdown of twisted/shielded cable construction.

Step One: Remove Outer Jacket

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

Step Two: 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 Three: 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 (see Figure 17).

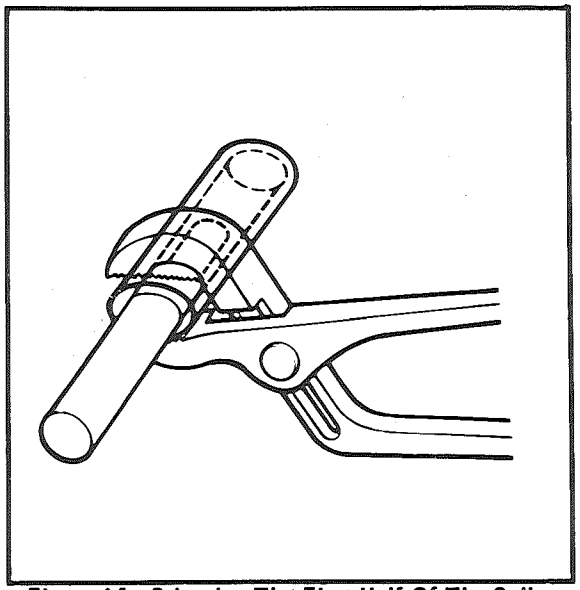


Figure 14 - Crimping The First Half Of The Splice Clip (Aluminum Wire)

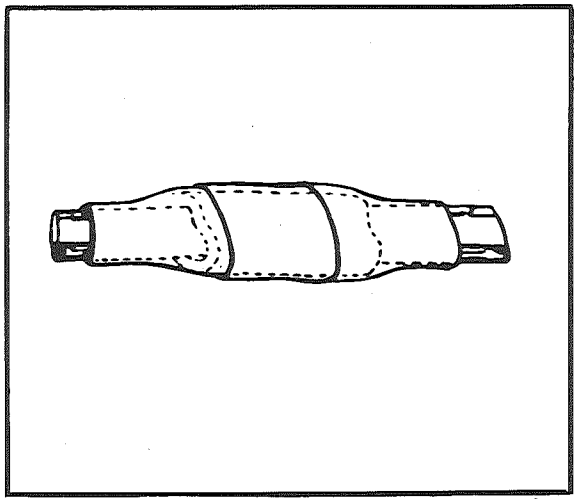


Figure 15 - The Tape Covers The Splice Clip And The Petroleum Jelly To Seal And Insulate

Step Four: Re-Assemble the Cable

After you have spliced and taped each wire, rewrap the 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 (see Figure 18).

Step Five: Tape the Cable

Tape over the entire cable using a winding motion (see Figure 19). This tape will replace the section of the jacket you removed to make the repair.

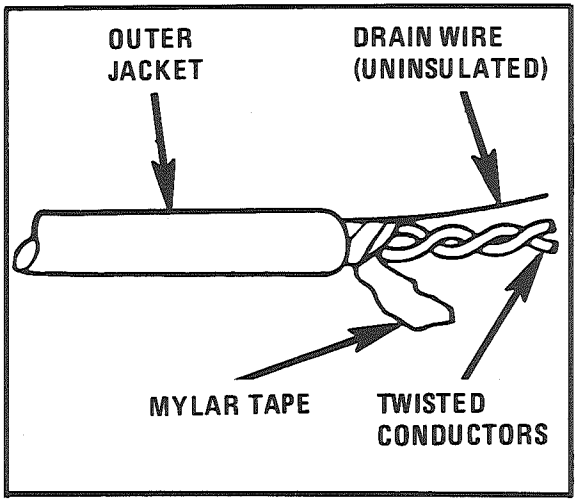


Figure 16 - Twisted/Shielded Cable

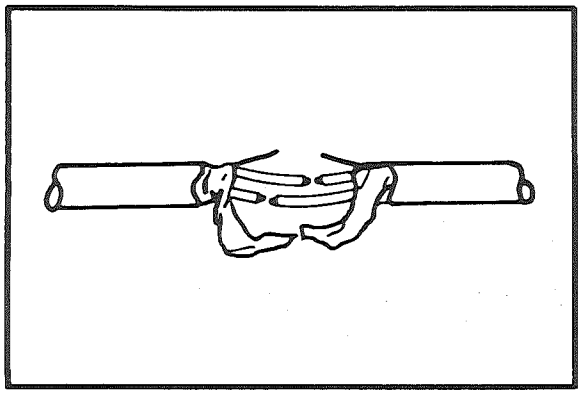


Figure 17 - The Untwisted Conductors

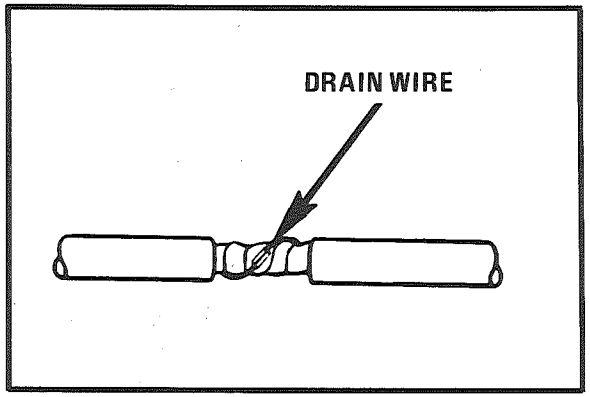


Figure 18 - The Re-Assembled Cable

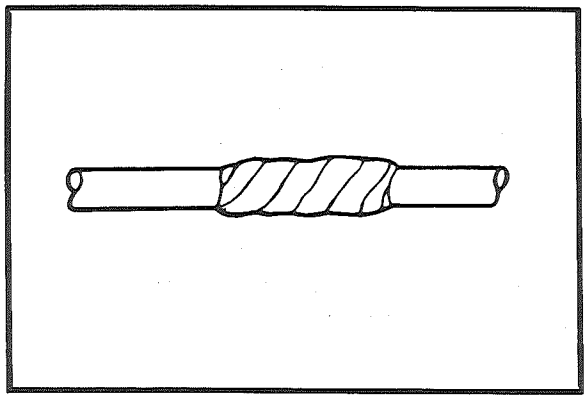


Figure 19 - Proper Taping

REPAIRING CONNECTORS

(Except Weather Pack® and Metri-Pack Series 150 Pull-to-Seat Type)

The following general repair procedures can be used for High Density, Printed Circuit and Bulkhead connectors. Prior to starting any repairs, separate connector halves and remove any terminal covers or retainers.

Instruction in the disassembly, repair, and assembly of connectors follows. Consult the figures for details on each specific type of connector. The instruction is divided into steps. Only perform those steps necessary to make the repair.

Step One: Remove the Lead

Depress the terminal locking tang using the proper size pick.

CAUTION: Do not place fingers or other parts of the body next to or around the back of the connector. If too much force is used, the pick and terminal both could be pushed out the back of the connector and cause injury.

—Place the pick between the locking tang of the terminal and the plastic of the connector body.
—Ease the lead back enough to release the locking tang.
—Pull the pick out.
—Gently pull the lead out of the back of the connector body.

Step Two: Re-Form the Locking Tang

If the lead and terminal are in good condition, reform the locking tang:

—Hold the lead firmly to prevent the splice between the terminal and the wire from flexing.
—Use the pick to bend the locking tang back into its original shape. Also check to see that the remainder of the terminal is still in its original shape.

Step Three: Make the Repair

When you make a repair, use the correct types of terminals and wires.

—Attach a new wire or a new terminal using the procedures in Splicing Copper Wire or Splicing Aluminum Wire.

Step Four: Insert the Lead

Before inserting the lead, make certain that the terminal is correctly shaped. Be careful to insert terminals in their proper locations.

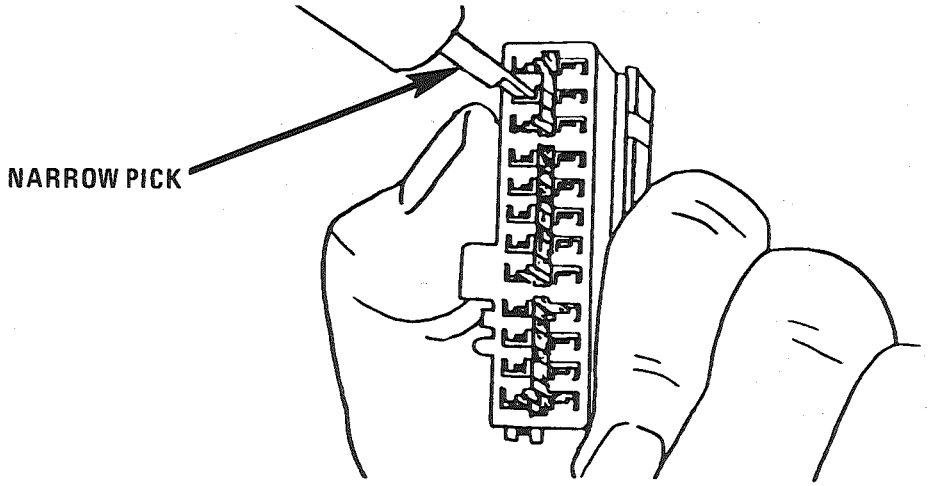
—Gently insert the lead from the back.

The terminal should stop or "catch" about halfway through the connector body.

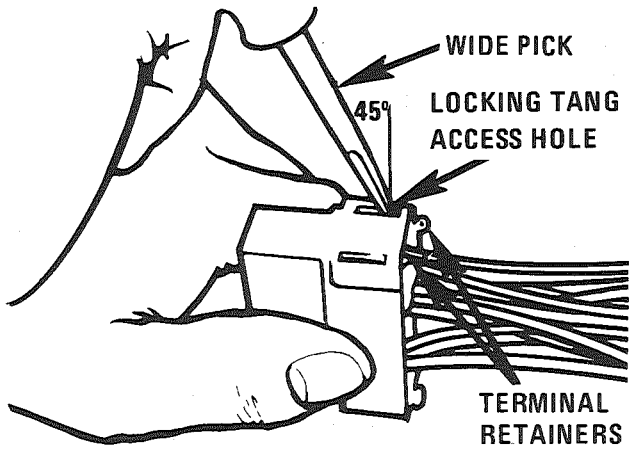
Note: With bulkhead connectors, in many cavities it is possible for the terminal to be inserted in two ways. Be sure it is inserted in the same direction as it was removed, or to mate correctly with the facing terminal.

—Push back and forth gently on the lead to be sure the terminal is held in place in both directions. If the terminal easily pushes or pulls out, review Step Two: "Re-Form the Locking Tang."

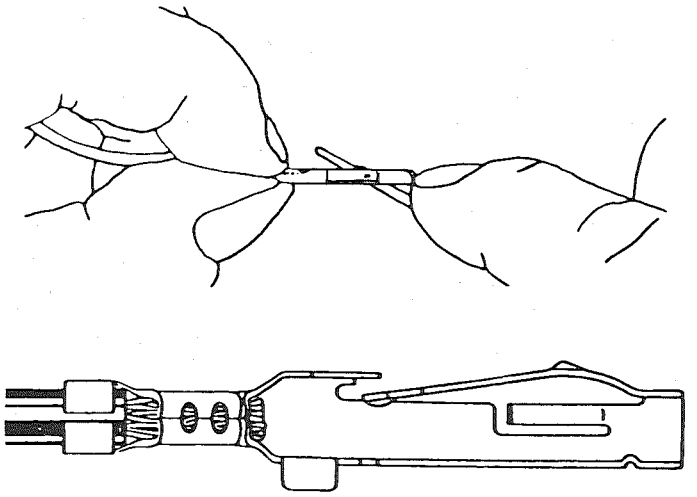
Before mating the connector halves replace any terminal covers or retainers that were removed, and apply grease to prevent corrosion.



DEPRESSING THE LOCKING TANG

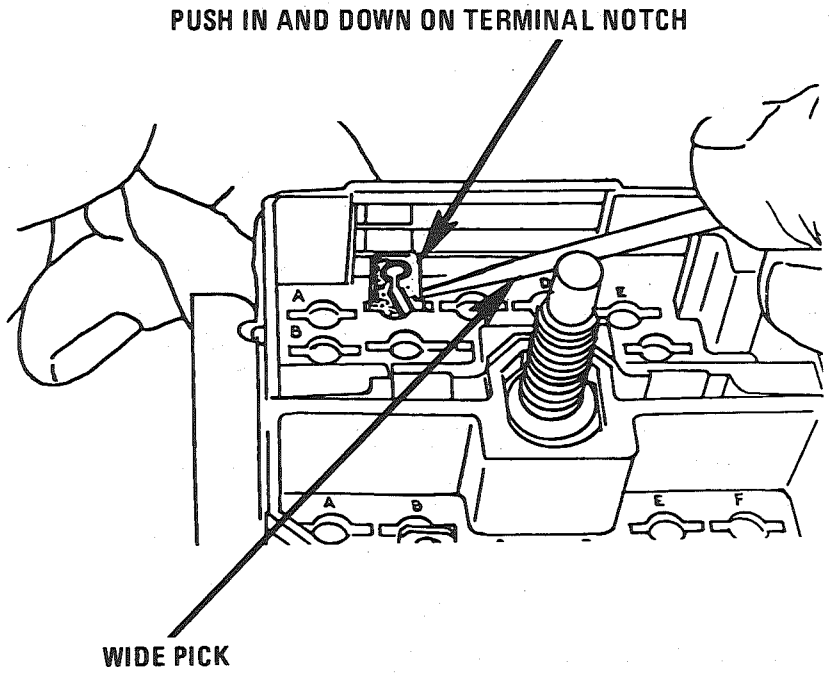


REMOVING TERMINAL RETAINERS

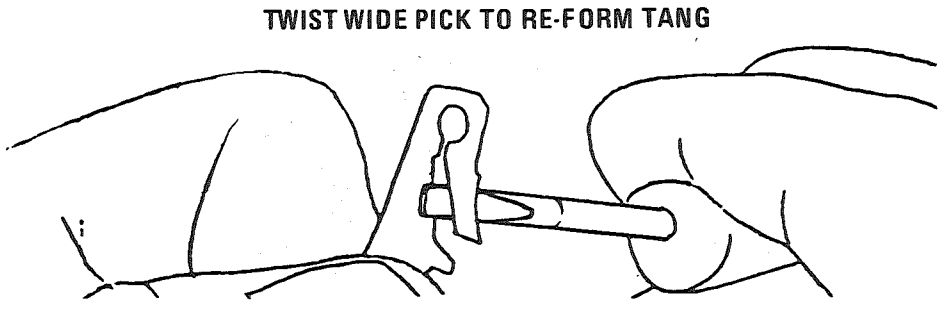


RE-FORMING THE LOCKING TANG

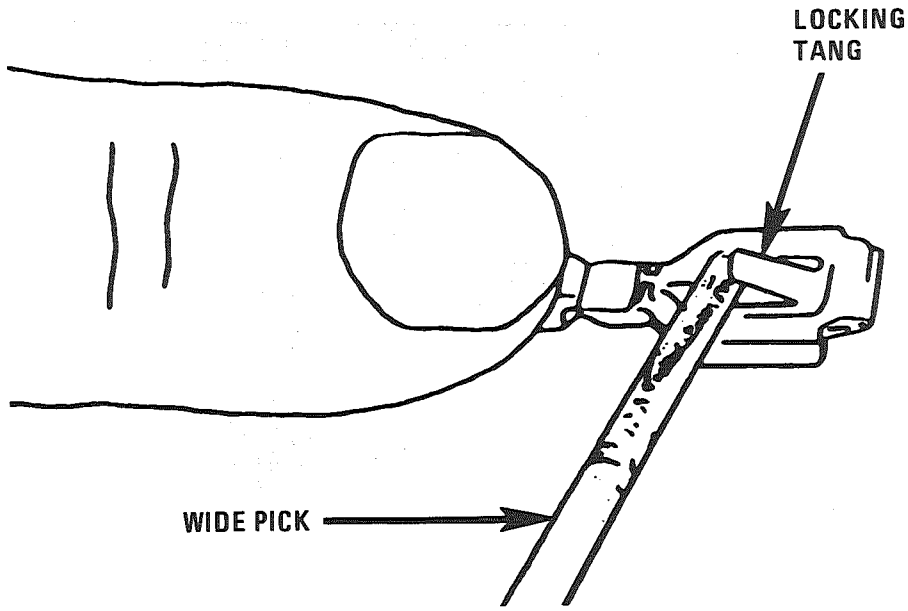
Figure 20 - High Density Connectors



DEPRESSING THE LOCKING TANG (MALE TERMINAL)



RE-FORMING THE LOCKING TANG (MALE TERMINAL)



RE-FORMING THE LOCKING TANG (FEMALE TERMINAL)

Figure 21 - Bulkhead Type Connectors

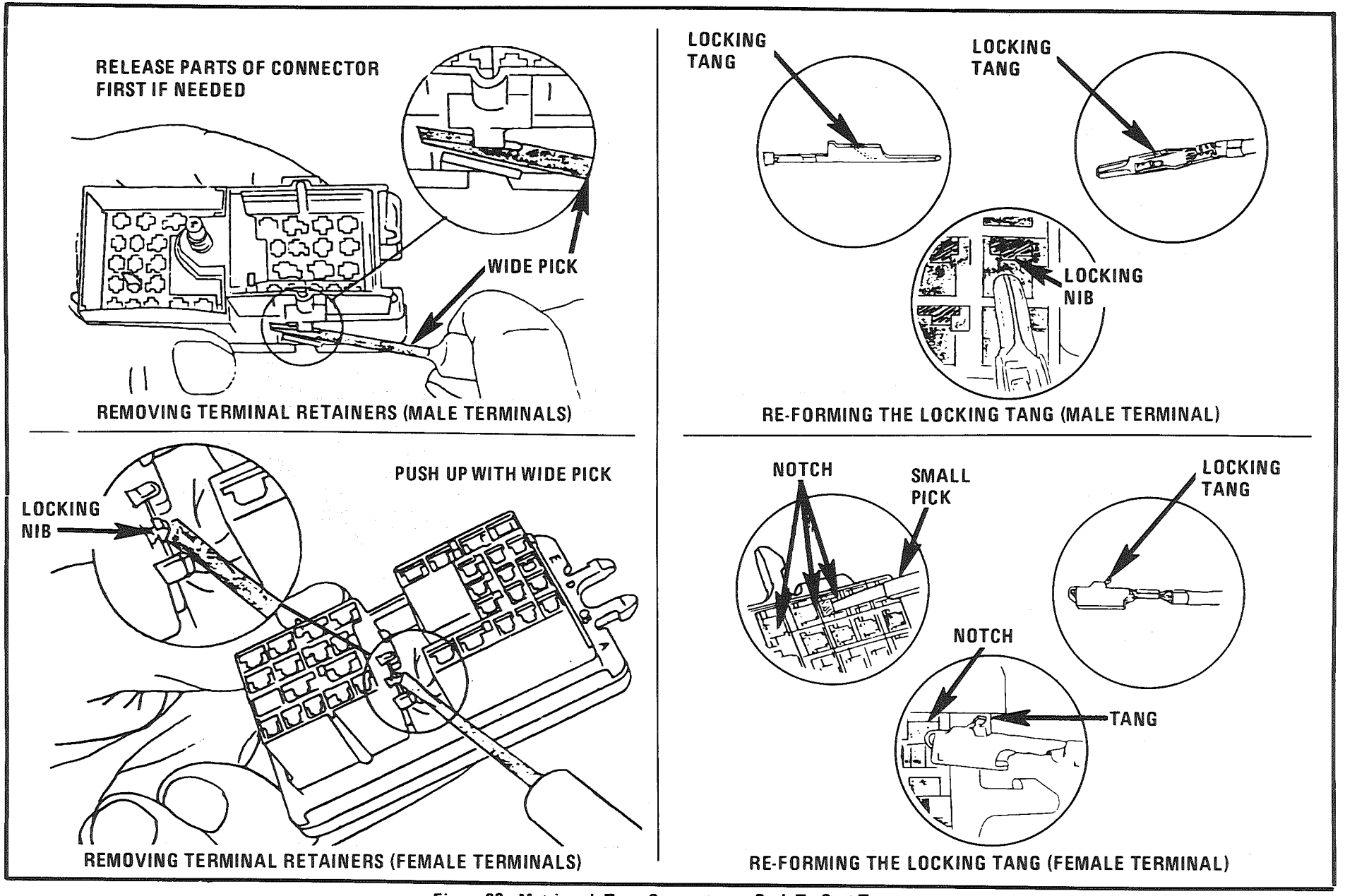


Figure 22 - Metri-pack Type Connectors – Push-To-Seat Type

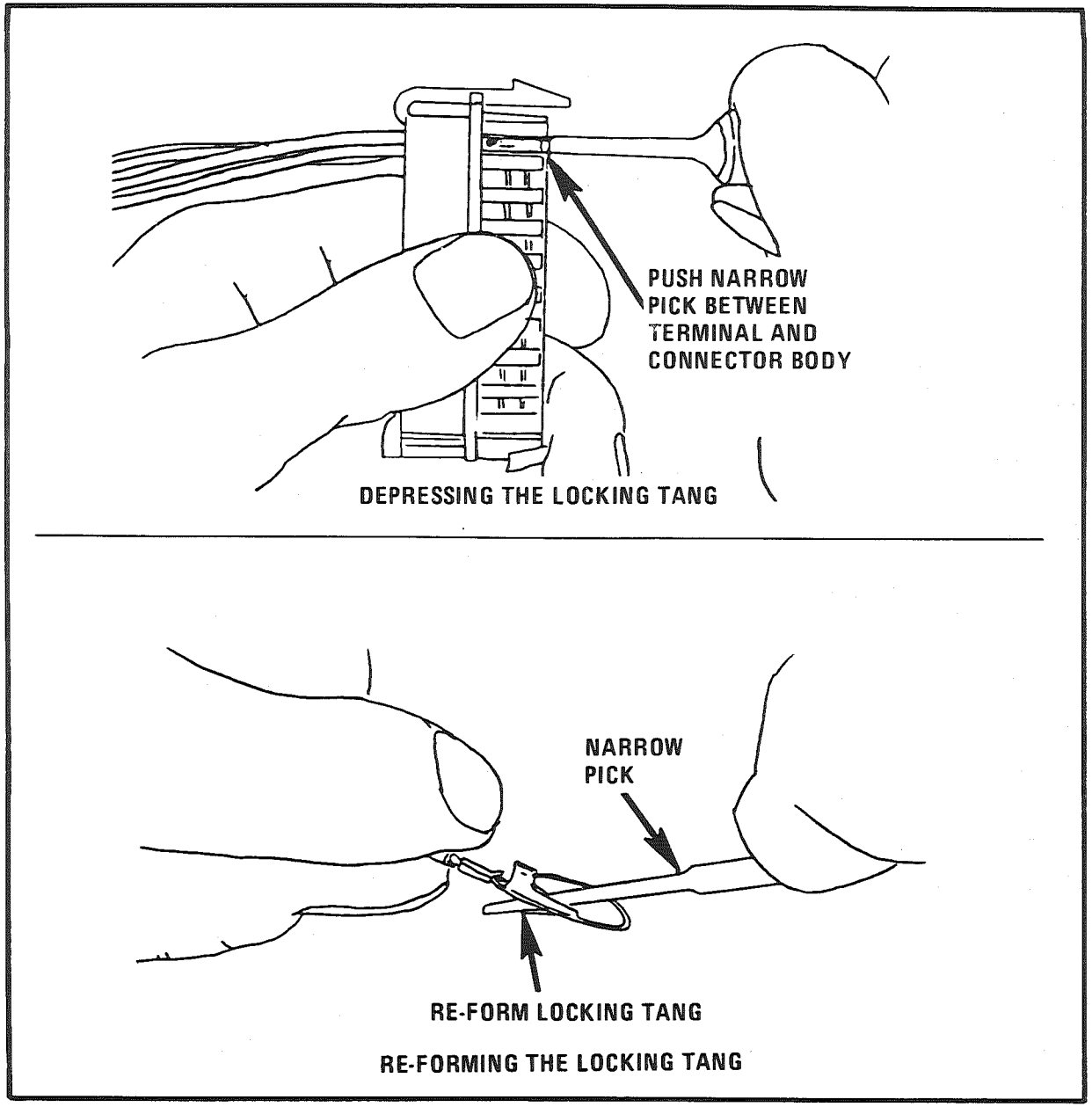


Figure 23 - Printed Circuit Type Connectors

REPAIRING WEATHER PACK® (Environmental) CONNECTORS

Weather Pack® or weatherproof connectors provide environmental protection on certain electrical circuits. This protection consists of a moisture-proof rubber flexible seal between the two connector halves and rubber cable seals attached to each terminal. The terminals and the cable seals are secured by a hinged secondary lock on small Weather Pack® connectors and by plastic terminal retainers on large Weather Pack® connectors.

If a Weather Pack® connector requires repair, do not replace the Weather Pack® parts with other types of connectors and temrinals. Also, do not omit either the large seal or the cable seals when making a repair.

Instruction in the disassemly, repair, and assembly of both small and large Weather Pack® connectors follows. The instruction is divided into steps. Only perform those steps necessary to make the repair.

Step One: Separate the Connector Halves

To separate a large connector, unscrew the bolt in the center of the connector body. Then pull the two halves apart. To separate a small connector, simply pull up on the primary lock and simultaneously pull the two halves apart.

Step Two: Remove the Terminal Retainer(s) (Large Connectors)/Open the Secondary Locks (Small Connectors)

To remove a terminal retainer, press a wide pick at a 45° angle against the locking nib (see Figure 24). Push the nib up as far as possible. Then, pull the retainer out.

To open the secondary locks on small connectors, flip down the lock hinges as shown in Figure 25.

Step Three: Remove the Lead

Depress the terminal locking tangs using a Weather Pack® pick(J28742-A or the equivalent):

- —Push the hollow cylinder of the pick into the terminal cavity from the front until it stops (see Figures 26 and 27).The pick should surround the terminal (see Figure 28 for drawings of locking tangs).
- —Pull the pick out.
- —Gently pull the lead out of the back of the connector body.

Note that the male connector body half contains female terminals and the female half houses male terminals.

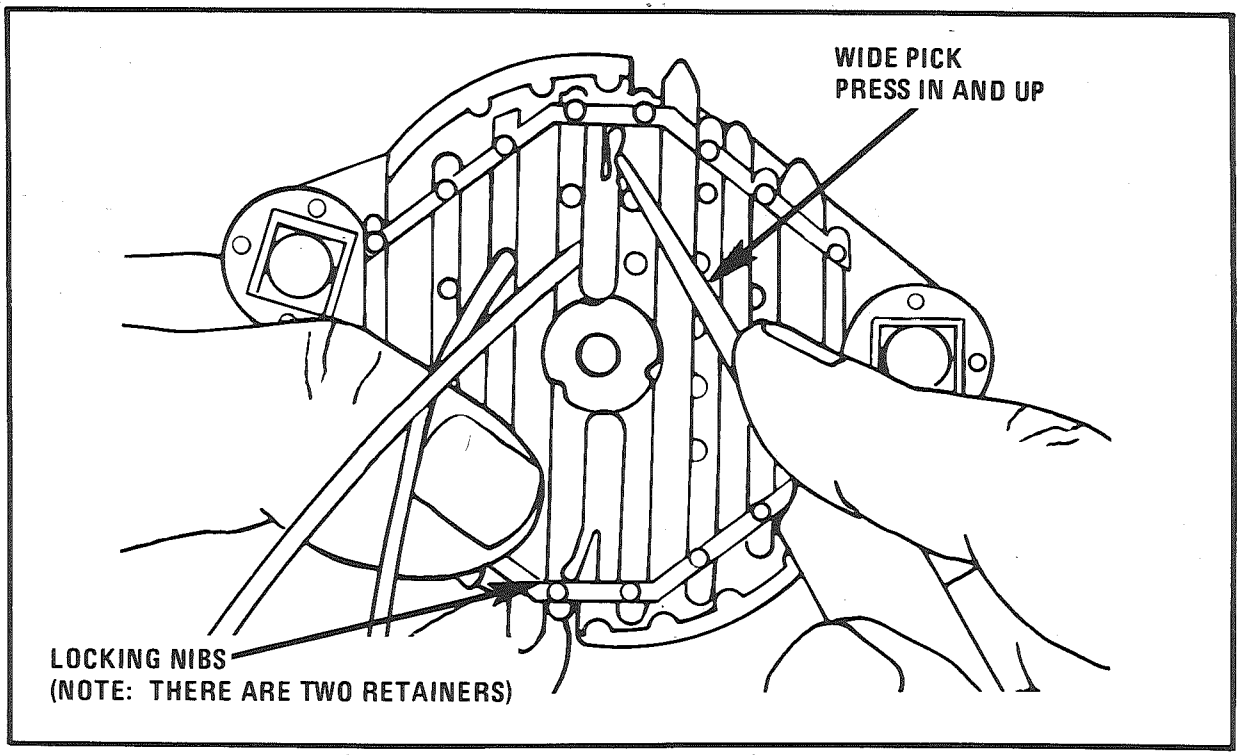


Figure 24 - Releasing the Terminal Retainers (Large Connectors)

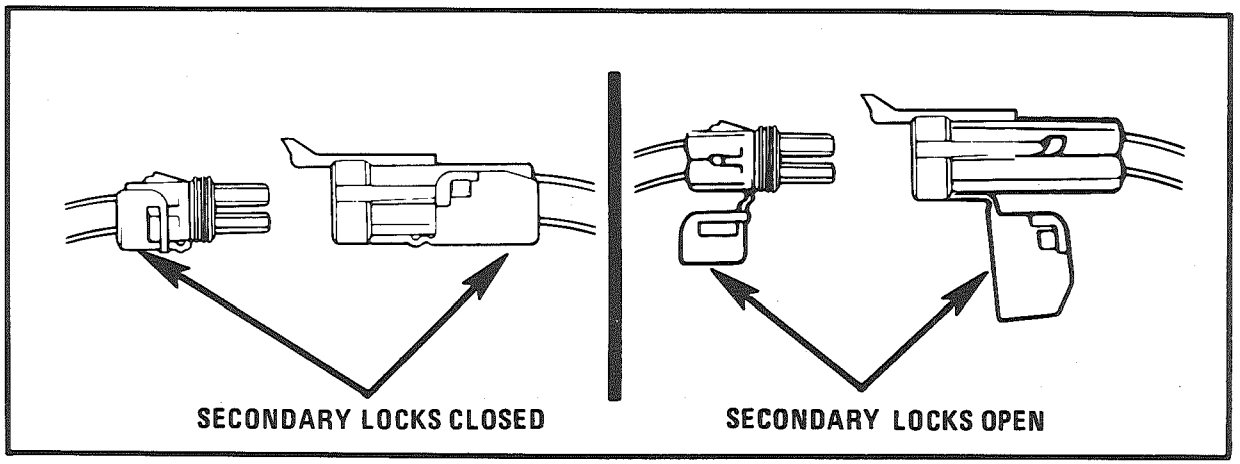


Figure 25 - Opening the Secondary Locks (Small Connectors)

Step Four: Re-Form the Locking Tang

If the lead and terminal are in good condition, re-form the locking tang.

—Hold the lead firmly to prevent the splice between the terminal and the wire from flexing.

—Use the pick (J28742-A or the equivalent) to bend the locking tang back into its original shape (see Figure 28). Also, check to see that the remainder of the terminal is still in its original shape. (See Step Six for instruction in inserting the lead.)

Step Five: Make the Repair

When you make a repair, use the correct types of terminals, wires, and seals.

To add a new lead, cut the wire and crimp and solder on the Weather Pack® lead assembly (see Figure 29) using rosin core solder. (Follow the instructions for splicing wire outlined earlier in this section for a review of splicing procedures.)

If Weather Pack® lead assemblies are not available, splice a new terminal and cable seal onto the existing wire.

—Cut the wire immediately behind the cable seal.

—Slip the new cable seal onto the wire and push it back out of the way.

—Strip 5.0mm (3/16") of insulation from the wire.

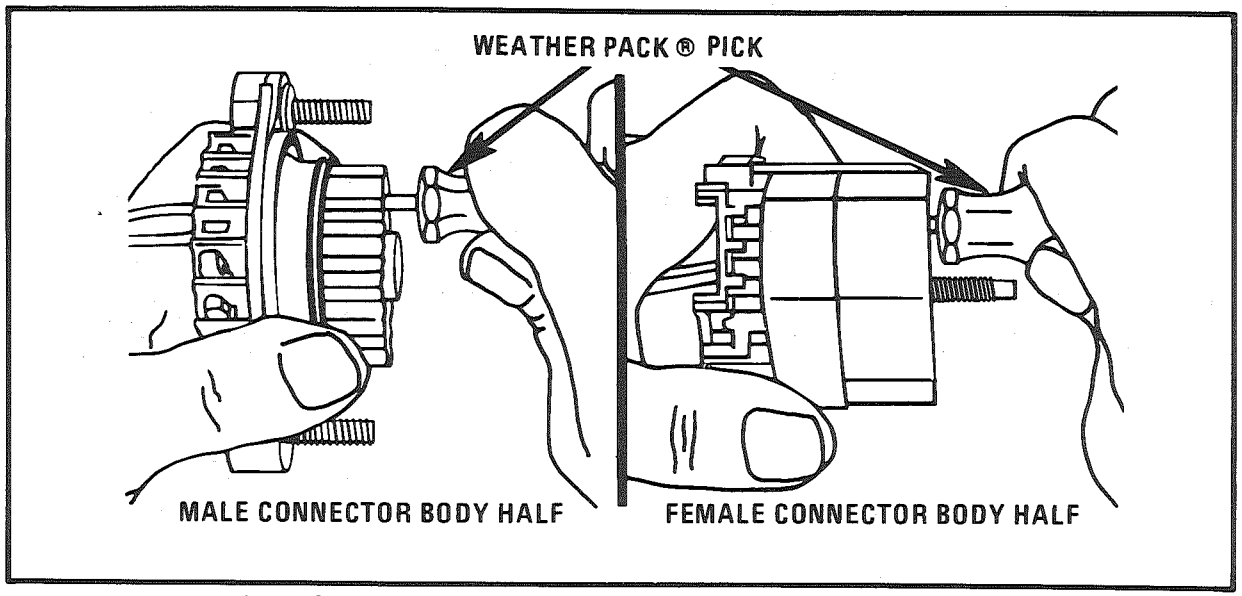


Figure 26 - Releasing The Terminal Locking Tangs (Large Connector)

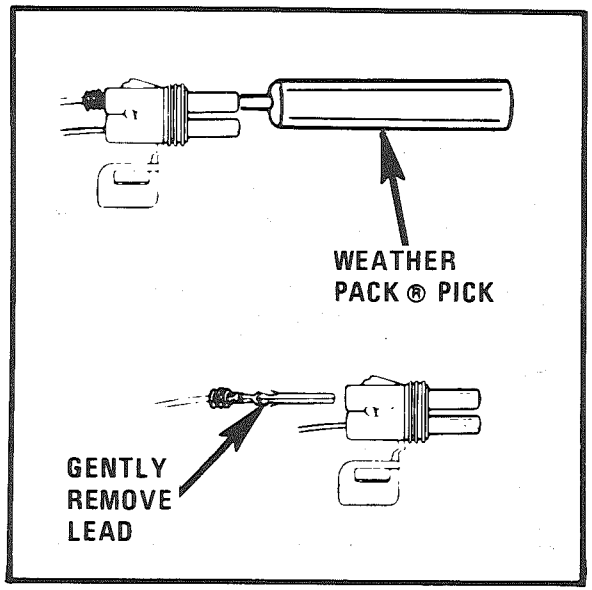


Figure 27 - Releasing The Terminal Locking Tangs (Small Connectors)

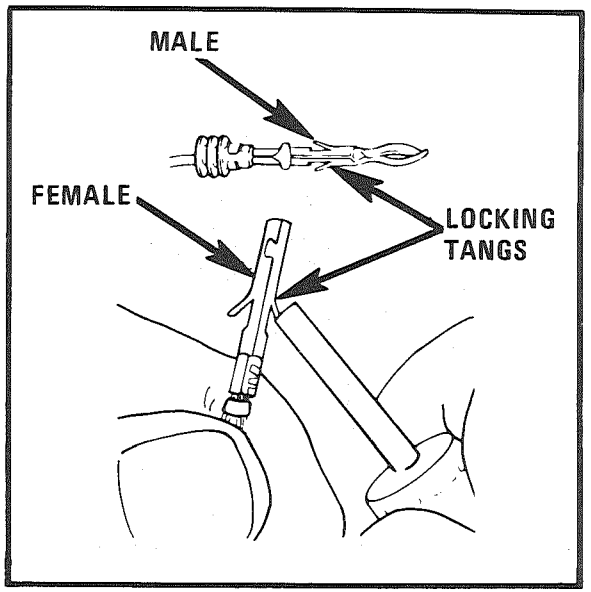


Figure 28 - Re-Forming The Locking Tang

—Crimp the new terminal over the copper strands (core crimp) as shown in Figure 30. (Use a standard crimping tool, number J25563 in the Kent-Moore catalog.)
—Solder with rosin core solder.
—Move the cable seal to edge of the insulation.
—Crimp the grips at the end of the terminal around the cable seal and insulated wire as shown in Figure 30 (insulation crimp). Apply light pressure for this crimp.

Remember to use the proper types of terminals and seals for this repair.

Step Six: Insert the Lead

Before inserting the lead, make certain that the terminal is correctly shaped (see Figure 28). Then, gently insert the lead from the back. The terminal should stop or "catch" about halfway through the connector body. Gently push back and forth on the lead to be sure the terminal is held in place in both directions. If the terminal easily pushes or pulls out, review Step Four; "Re-Form the Locking Tang."

Be careful to insert leads in their proper locations.

Step Seven: Replace the Terminal Retainer(s) (Large Connectors)/Secondary Locks (Small Connectors)

Replace the terminal retainers by slipping the retainer halves into the connector body (as shown in Figure 31).

To close the secondary locks on small connectors, flip the hinges back to their original positions (see Figure 32).

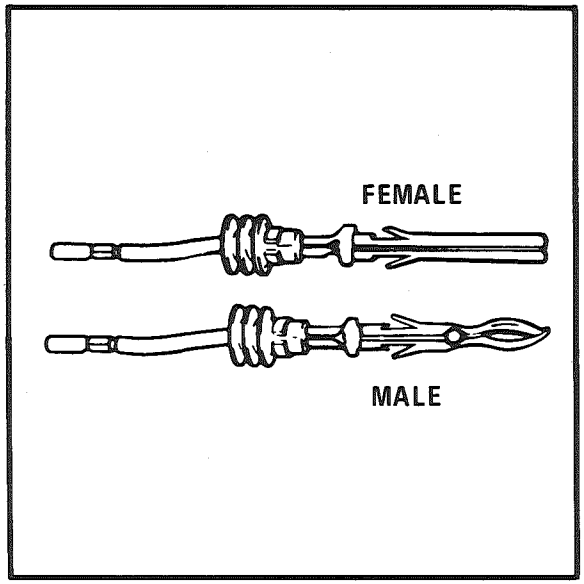


Figure 29 - Lead Assemblies

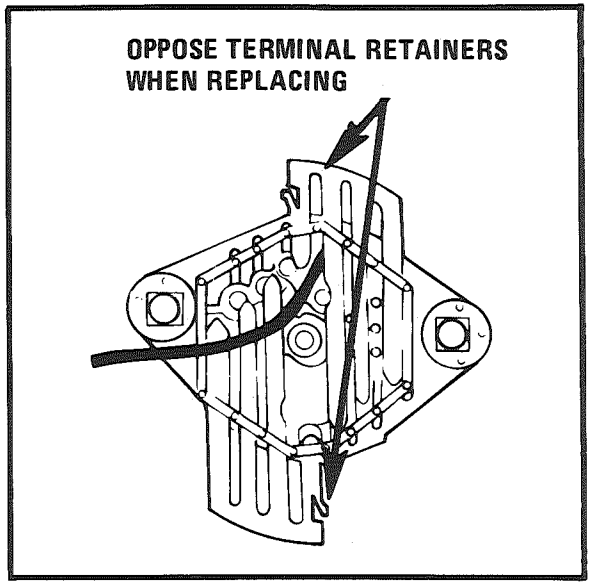


Figure 31 - Replacing The Terminal Retainers (Large Connectors)

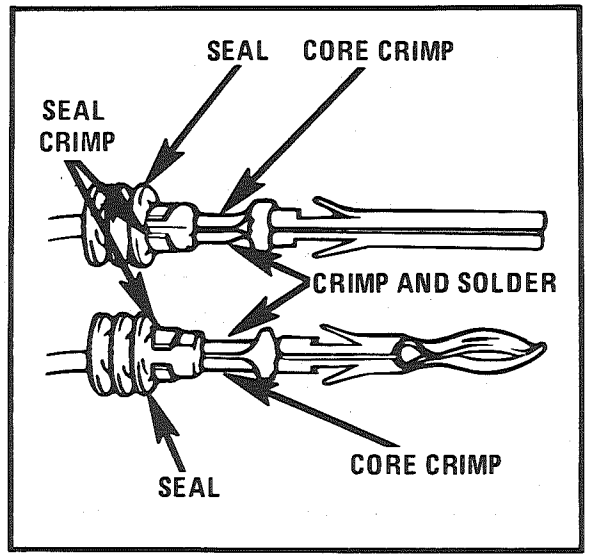


Figure 30 - Replacing The Terminal

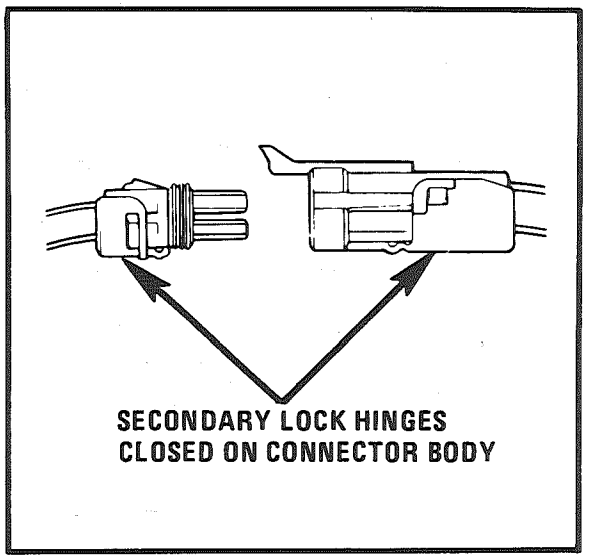


Figure 32 - Closing The Secondary Locks

REPAIRING METRI-PACK SERIES 150 CONNECTORS
(Pull-to-Seat Type)

Metri-Pack connectors are used to connect various sensors such as the cam, crankshaft and coolant sensors to primary harnesses in the engine compartment. The Metri-Pack connector consists of three parts (see Figure 35): a Pull to Seat type terminal, a connector body and a rubber seal which is inserted in the back of the connector body to provide environmental protection.

Do not replace the Metri-Pack parts with parts of other types of connectors and terminals or omit the environmental seals when repairing Metri-Pack connectors.

Repair instructions are divided into two steps, connector disassembly and terminal removal and connector assembly and terminal insertion. (Refer to figures 33 to 36)

Step One: Connector Disassembly and Terminal Removal

Insert tool BT-8446 or J35689 into the connector (Figure 33). Pull back on the wire slightly, pry up the locking tang and then push the wire through the front of the connector. If the terminal will be reused, reshape the locking tang.

Step 2: Connector Assembly and Terminal Insertion

Insert the wire through the seal and the connector body (Figure 35). Crimp the terminal to the stripped wire. Pull the wire and the terminal back through the connector body until it locks in place (Figure 36).

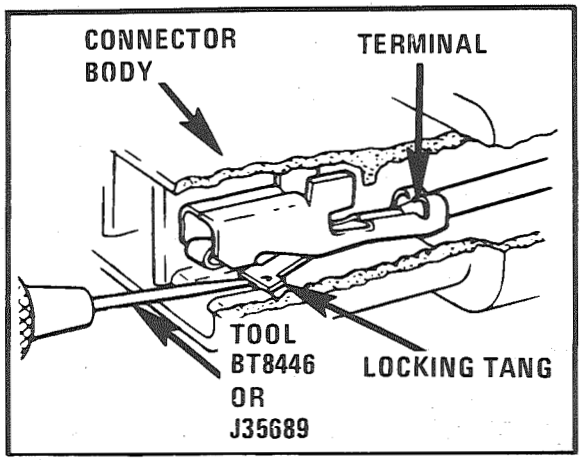


Figure 33 - Terminal Removal From Connector Body

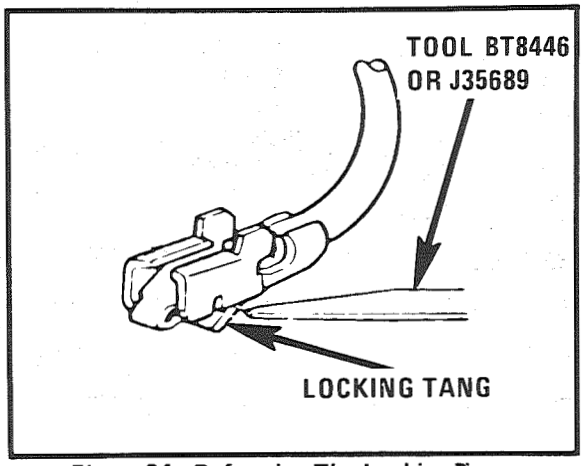


Figure 34 - Reforming The Locking Tang

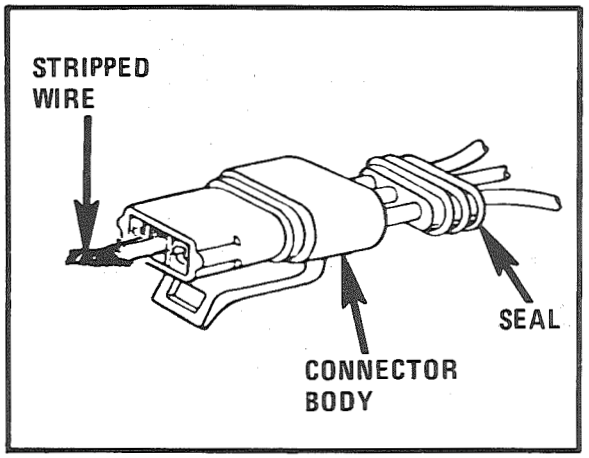


Figure 35 - Connector Reassembly

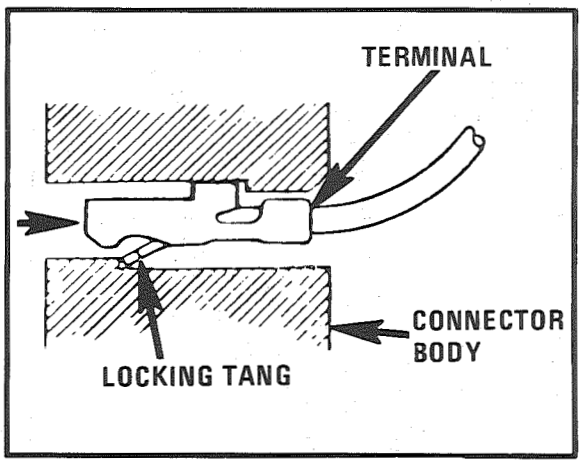
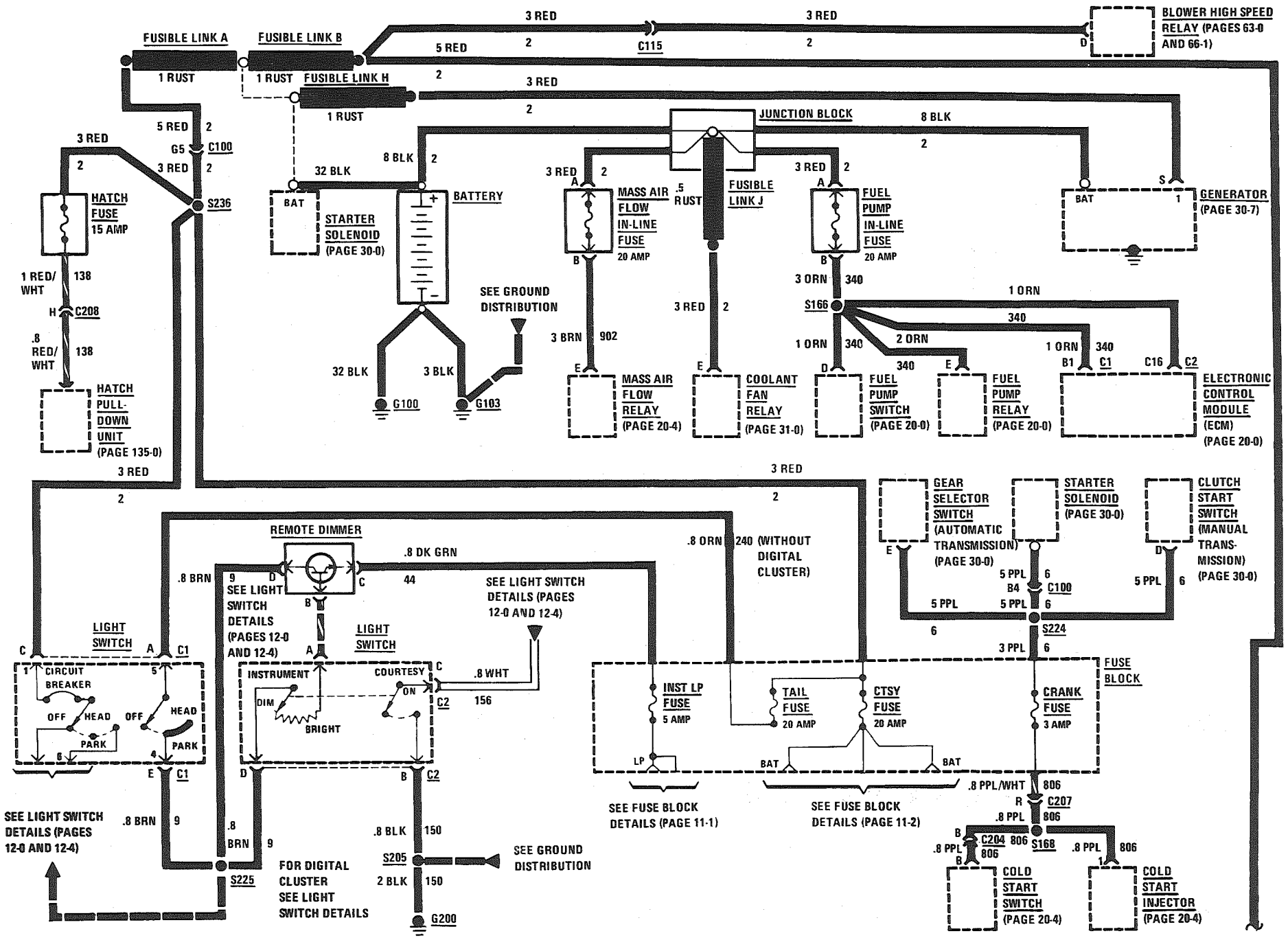
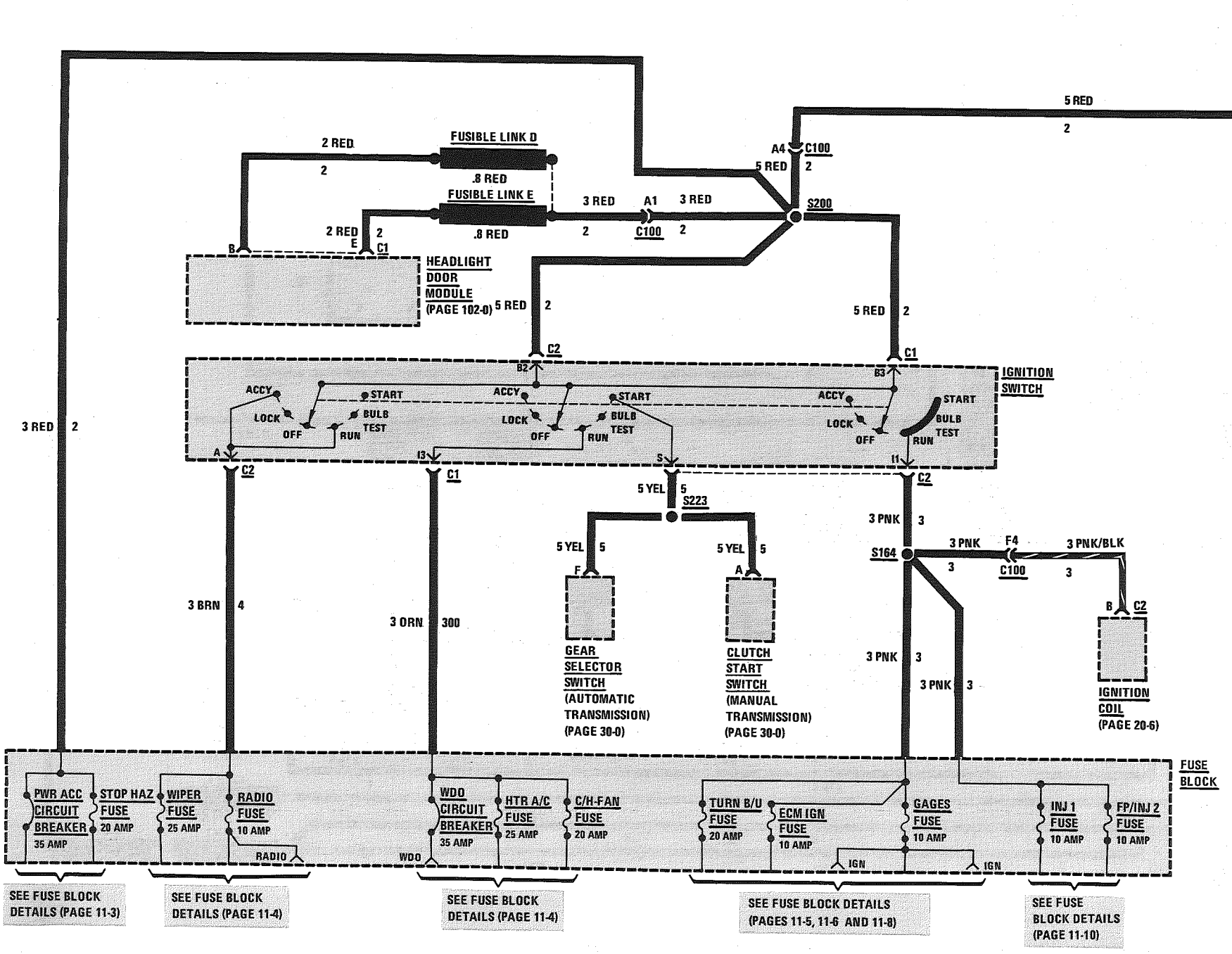


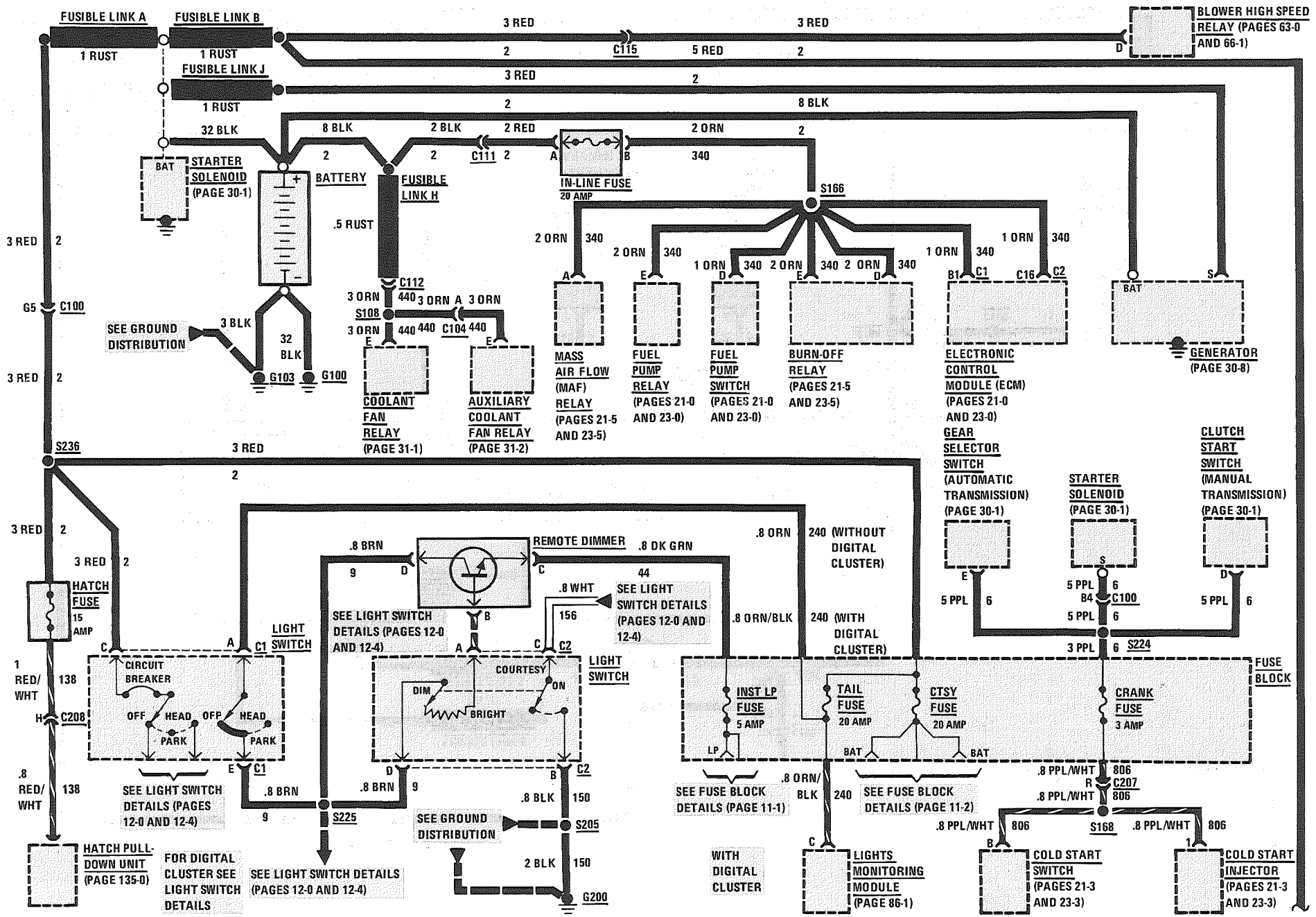
Figure 36 - Terminal Reinsertion

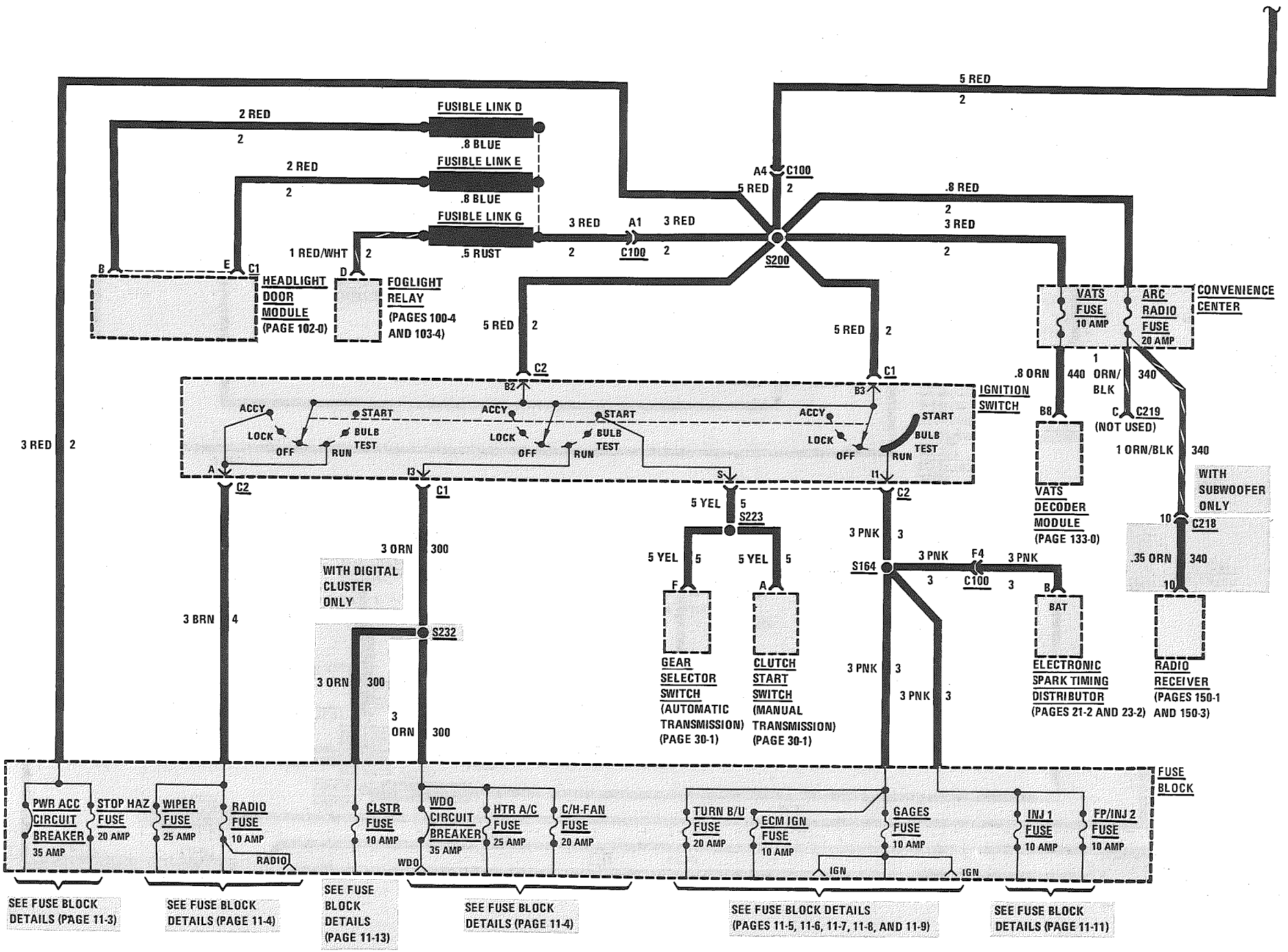
POWER DISTRIBUTION: V6 VIN S



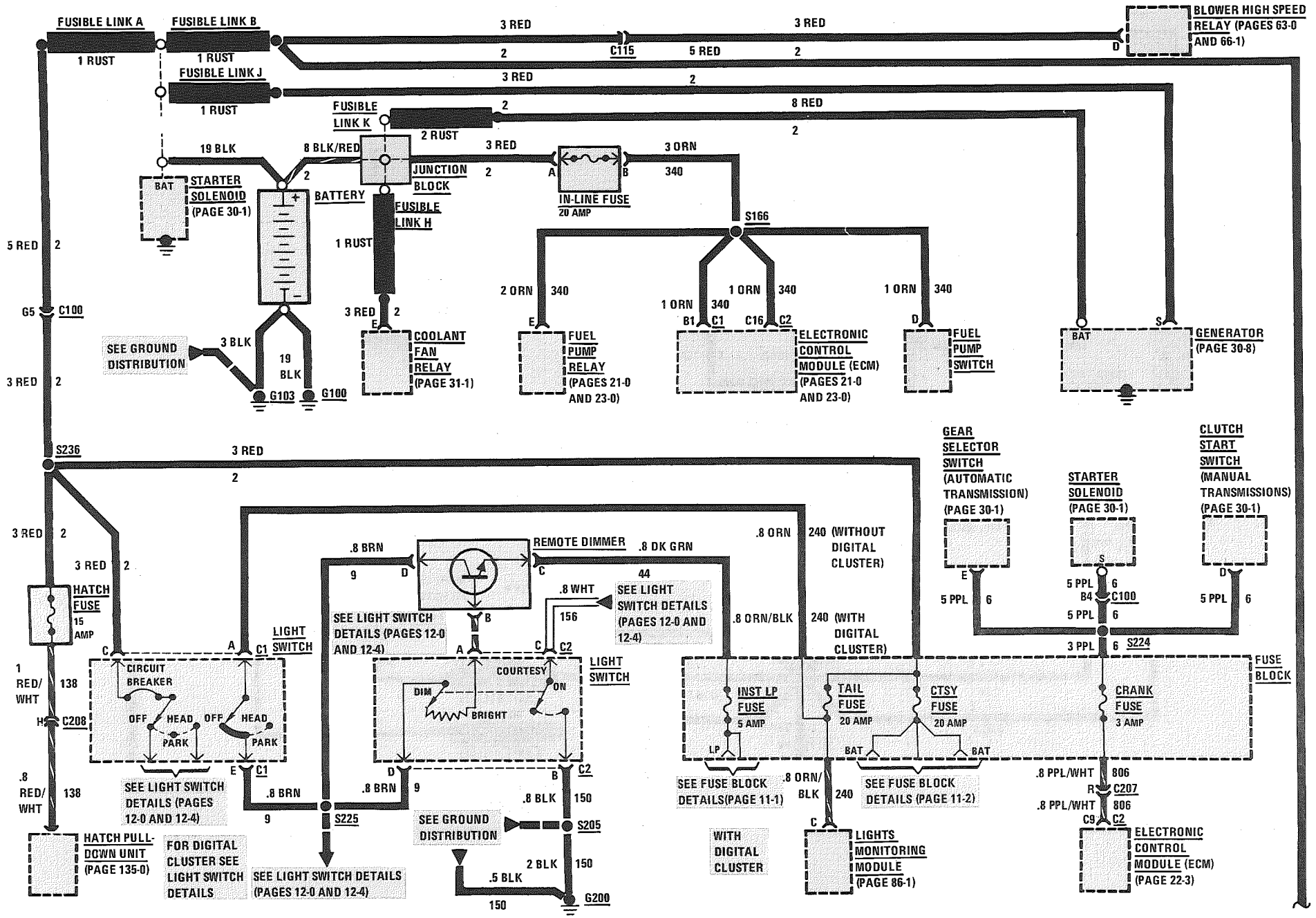

5 RED
2
2 RED
2
FUSIBLE LINK D
.8 RED
FUSIBLE LINK E
.8 RED
2 RED
2
E
C1
B
HEADLIGHT DOOR MODULE
(PAGE 102-0)
5 RED
2
A4
C100
5 RED
2
3 RED
A1
3 RED
2
C100
2
S200
5 RED
2
5 RED
2
C2
C1
B2
B3
IGNITION SWITCH
ACCY
START
LOCK
OFF
BULB TEST
RUN
3 RED
2
A
I3
S
I1
C2
C1
C2
5 YEL
5
S223
3 PNK
3
5 YEL
5
5 YEL
5
F
A
S164
3 PNK
F4
3 PNK/BLK
C100
3
3
B
C2
3 BRN
4
3 ORN
300
3 PNK
3
3 PNK
3
GEAR SELECTOR SWITCH
(AUTOMATIC TRANSMISSION)
(PAGE 30-0)
CLUTCH START SWITCH
(MANUAL TRANSMISSION)
(PAGE 30-0)
IGNITION COIL
(PAGE 20-6)
FUSE BLOCK
PWR ACC CIRCUIT BREAKER
35 AMP
STOP HAZ FUSE
20 AMP
WIPER FUSE
25 AMP
RADIO FUSE
10 AMP
RADIO
WDO CIRCUIT BREAKER
35 AMP
HTR A/C FUSE
25 AMP
C/H-FAN FUSE
20 AMP
WDO
TURN B/U FUSE
20 AMP
ECM IGN FUSE
10 AMP
GAGES FUSE
10 AMP
IGN
IGN
INJ 1 FUSE
10 AMP
FP/INJ 2 FUSE
10 AMP
SEE FUSE BLOCK DETAILS (PAGE 11-3)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGES 11-5, 11-6 AND 11-8)
SEE FUSE BLOCK DETAILS (PAGE 11-10)

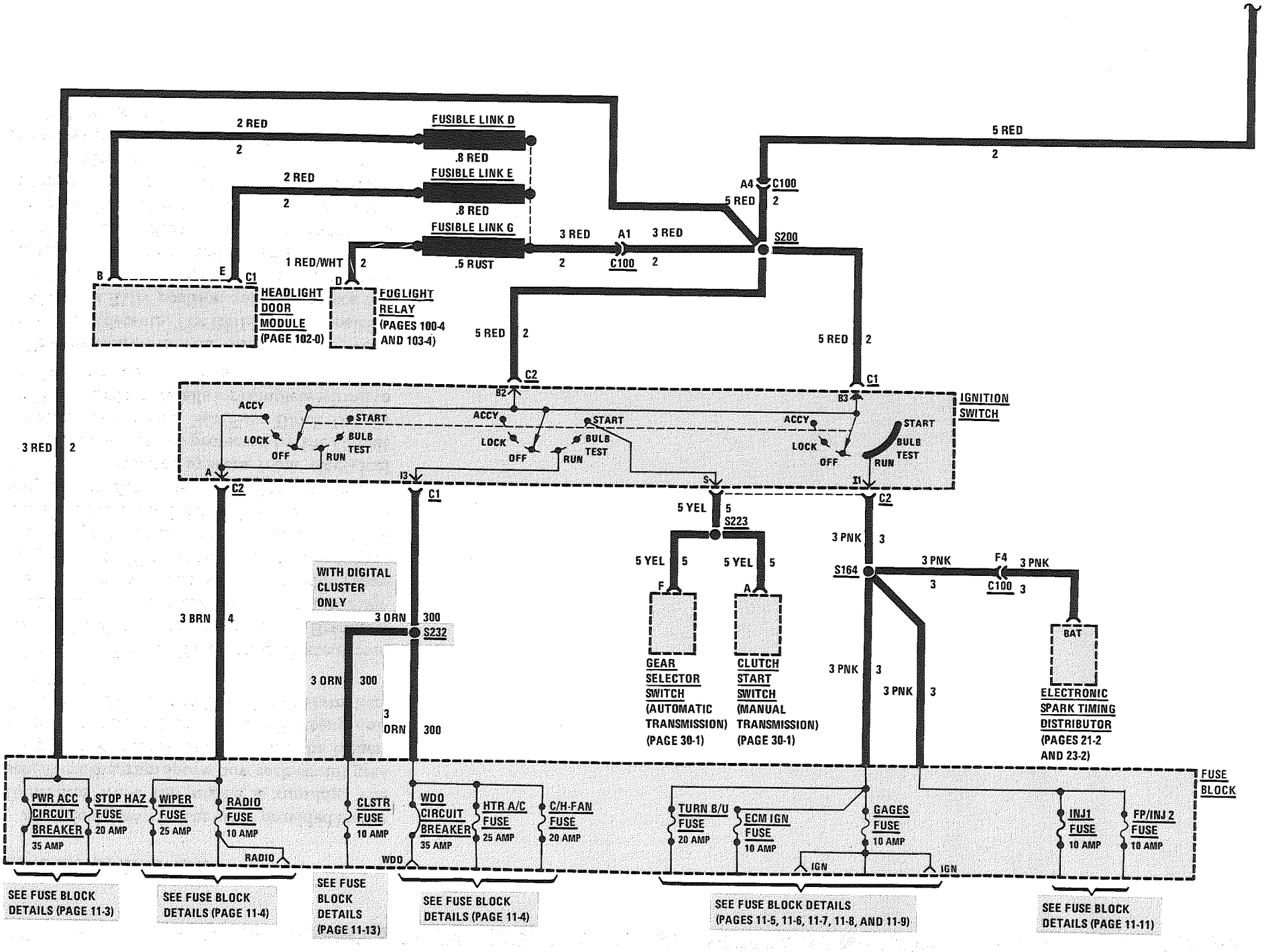
POWER DISTRIBUTION: V8 VIN F, V8 VIN 8




5 RED
2
2 RED
2
FUSIBLE LINK D
.8 BLUE
2 RED
2
FUSIBLE LINK E
.8 BLUE
FUSIBLE LINK G
.5 RUST
1 RED/WHT
2
3 RED
A1
C100
2
A4
C100
5 RED
2
.8 RED
2
3 RED
S200
B
E
C1
HEADLIGHT DOOR MODULE (PAGE 102-0)
D
FOGLIGHT RELAY (PAGES 100-4 AND 103-4)
5 RED
2
C2
5 RED
2
C1
VATS FUSE 10 AMP
ARC RADIO FUSE 20 AMP
CONVENIENCE CENTER
.8 ORN
440
1 ORN/BLK
340
B8
C
C219
(NOT USED)
1 ORN/BLK
340
WITH SUBWOOFER ONLY
10
C218
.35 ORN
340
10
B2
B3
ACCY
START
LOCK
OFF
BULB TEST
RUN
IGNITION SWITCH
3 RED
2
A
C2
I3
S
I1
C1
C2
VATS DECODER MODULE (PAGE 133-0)
3 ORN
300
WITH DIGITAL CLUSTER ONLY
5 YEL
5
S223
3 PNK
3
5 YEL
5
5 YEL
5
S164
3 PNK
F4
3 PNK
3
C100
3
B
BAT
3 BRN
4
S232
F
A
GEAR SELECTOR SWITCH (AUTOMATIC TRANSMISSION) (PAGE 30-1)
CLUTCH START SWITCH (MANUAL TRANSMISSION) (PAGE 30-1)
3 PNK
3
3 PNK
3
ELECTRONIC SPARK TIMING DISTRIBUTOR (PAGES 21-2 AND 23-2)
RADIO RECEIVER (PAGES 150-1 AND 150-3)
3 ORN
300
3
ORN
300
PWR ACC CIRCUIT BREAKER 35 AMP
STOP HAZ FUSE 20 AMP
WIPER FUSE 25 AMP
RADIO FUSE 10 AMP
RADIO
CLSTR FUSE 10 AMP
WDO CIRCUIT BREAKER 35 AMP
WDO
HTR A/C FUSE 25 AMP
C/H-FAN FUSE 20 AMP
TURN B/U FUSE 20 AMP
ECM IGN FUSE 10 AMP
GAGES FUSE 10 AMP
IGN
IGN
INJ 1 FUSE 10 AMP
FP/INJ 2 FUSE 10 AMP
FUSE BLOCK
SEE FUSE BLOCK DETAILS (PAGE 11-3)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGE 11-13)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGES 11-5, 11-6, 11-7, 11-8, AND 11-9)
SEE FUSE BLOCK DETAILS (PAGE 11-11)

POWER DISTRIBUTION: V8 VIN E




2 RED
FUSIBLE LINK D
.8 RED
2 RED
FUSIBLE LINK E
.8 RED
FUSIBLE LINK G
.5 RUST
1 RED/WHT
3 RED
A1
C100
5 RED
A4
C100
S200
B
E
C1
D
HEADLIGHT DOOR MODULE (PAGE 102-0)
FOGLIGHT RELAY (PAGES 100-4 AND 103-4)
C2
C1
B2
B3
IGNITION SWITCH
ACCY
START
LOCK
OFF
RUN
BULB TEST
A
I3
S
I1
C2
C1
5 YEL
S223
F
A
GEAR SELECTOR SWITCH (AUTOMATIC TRANSMISSION) (PAGE 30-1)
CLUTCH START SWITCH (MANUAL TRANSMISSION) (PAGE 30-1)
S164
F4
C100
BAT
ELECTRONIC SPARK TIMING DISTRIBUTOR (PAGES 21-2 AND 23-2)
WITH DIGITAL CLUSTER ONLY
3 BRN
3 ORN
300
S232
FUSE BLOCK
PWR ACC CIRCUIT BREAKER 35 AMP
STOP HAZ FUSE 20 AMP
WIPER FUSE 25 AMP
RADIO FUSE 10 AMP
CLSTR FUSE 10 AMP
WDO CIRCUIT BREAKER 35 AMP
HTR A/C FUSE 25 AMP
C/H-FAN FUSE 20 AMP
TURN B/U FUSE 20 AMP
ECM IGN FUSE 10 AMP
GAGES FUSE 10 AMP
INJ1 FUSE 10 AMP
FP/INJ 2 FUSE 10 AMP
RADIO
WDO
IGN
IGN
SEE FUSE BLOCK DETAILS (PAGE 11-3)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGE 11-13)
SEE FUSE BLOCK DETAILS (PAGE 11-4)
SEE FUSE BLOCK DETAILS (PAGES 11-5, 11-6, 11-7, 11-8, AND 11-9)
SEE FUSE BLOCK DETAILS (PAGE 11-11)

CIRCUIT OPERATION

Electrical power for the car is provided by the Generator when the engine is running. The schematic diagram shows how each circuit gets its power. For more details about the Generator, and connections to the Battery and Starter, see Starter and Charging System, Section 8A-30.

The car's Power Distribution System consists of Fusible Links, Fuses, Circuit Breakers, the Light Switch and the Ignition Switch. Fusible Links are short pieces of wire to which they supply power. They are covered with a special high-temperature insulation. When conducting a high current, the Fusible Link will melt and stop current flow. They are designed to protect the car's electrical system from electrical shorts where it is not protected by the Circuit Breakers and Fuses. See Fuse Block Details and Light Switch Details for complete wiring to the first component in each circuit.

The Ignition Switch has six positions, five of which have detents. The BULB TEST position is after the RUN position and just before the START position. BULB TEST does not have a detent. As shown in the schematic, circuits which are supplied from the Ignition Switch are On (Hot) for different switch positions. Individual schematics show their fuses supplied from headings such as "Hot In Run." The heading corresponds to the Ignition Switch position in which power is On.

COMPONENT LOCATION

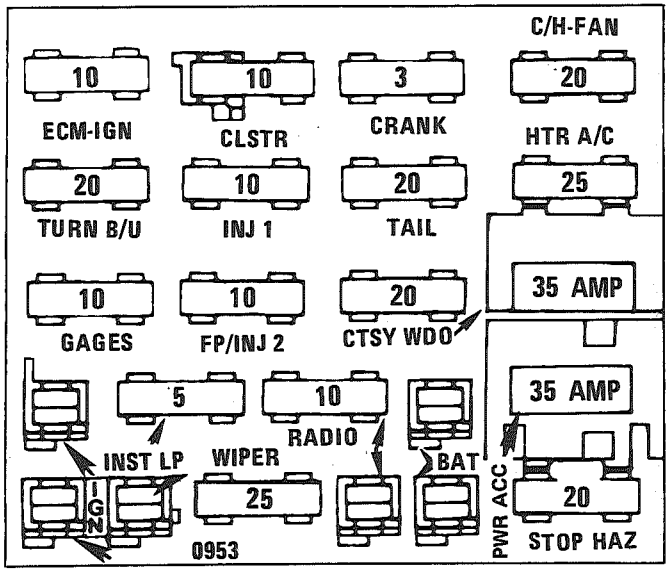
		Page-Figure
Auxiliary Coolant Fan Relay	RH front side of engine compartment	201- 5-A
Blower High Speed Relay	RH front of dash, near Blower Motor	201-14-A
Burn-Off Relay	LH rear corner of engine compartment, on relay bracket	201- 7-A
Clutch Start Switch	Above clutch pedal, on clutch pedal support	
Cold Start Injector (VIN F) (VIN 8)	Top LH side of engine	201- 7-A
Cold Start Injector (VIN S)	Top LH rear of engine	201- 0-C
Cold Start Switch (VIN F) (VIN 8)	Top center of engine	201- 8-C
Cold Start Switch (VIN S)	Top of engine	
Convenience Center	Behind I/P, to right of steering column	201-10-A
Coolant Fan Relay (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 3-A
Coolant Fan Relay (VIN F) (VIN 8)	Front of engine compartment, RH side of radiator support	201- 5-A
Coolant Fan Relay (VIN S)	LH rear corner of engine compartment, on relay bracket	201- 0-A
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Electronic Spark Timing (EST) Distributor (VIN E)	Top rear of engine	201- 3-A
Electronic Spark Timing (EST) Distributor (VIN F) (VIN 8)	Top rear of engine	201- 5-A
Fog Light Relay	LH front of engine compartment, on fender	201-16-A
Fuel Pump In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Fuel Pump Relay (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 3-A
Fuel Pump Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Fuel Pump Relay (VIN S)	LH rear corner of engine compartment, on relay bracket	201- 0-A
Fuel Pump Switch (VIN E)	Lower LH rear of engine	201- 3-A
Fuel Pump Switch (VIN F) (VIN 8)	Lower LH side of engine	201- 8-A
Fuel Pump Switch (VIN S)	Lower LH side of engine	201- 0-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Fusible Link A (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link A (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B

COMPONENT LOCATION

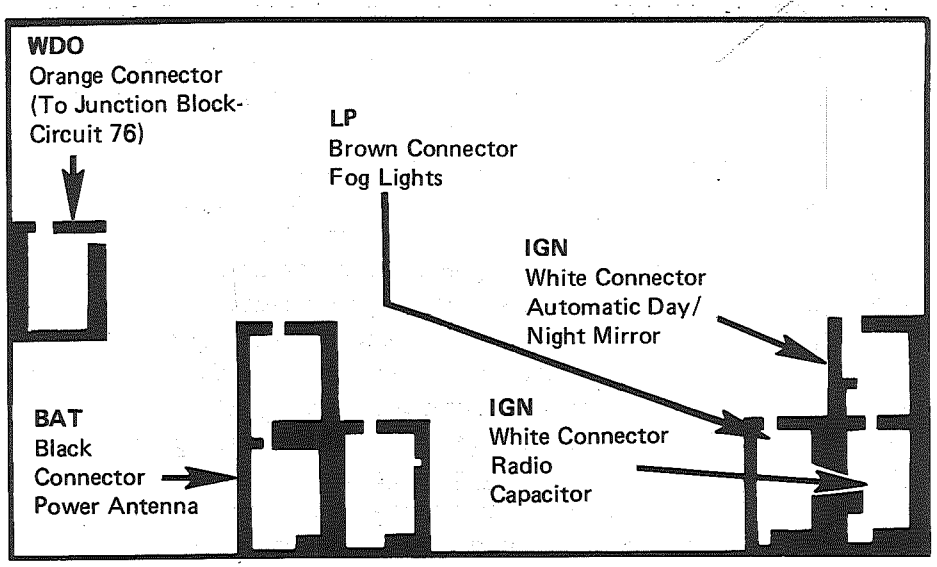
		Page-Figure
Fusible Link A (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link B (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link B (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link B (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link D	Front lights harness, near LH side of dash	201-16-A
Fusible Link E	Front lights harness, near LH side of dash	201-16-A
Fusible Link G	Front lights harness, near LH side of dash	201-16-A
Fusible Link H (VIN E)	RH front of engine compartment, at Junction Block	201- 3-B
Fusible Link H (VIN F) (VIN 8)	LH front of engine compartment, behind battery	201- 5-C
Fusible Link H (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link J (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link J (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link J (VIN S)	RH side of radiator support, at Junction Block	201- 1-A
Fusible Link K	RH front of engine compartment, at Junction Block	201- 3-B
Gear Selector Switch	In console, at base of gear selector	201-11-E
Hatch Fuse	Attached to side of Fuse Block	
Hatch Pull-Down Unit	Center of end panel, in cargo compartment	201-17-B
Headlight Door Module	LH front of dash	201-16-A
Ignition Coil (VIN S)	Rear RH side of engine	201- 1-A
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
In-Line Fuse (VIN F)(VIN 8)	On LH side of radiator support, forward of battery	201- 5-C
Junction Block	RH front of engine compartment, behind headlight	201- 1-A
Lights Monitoring Module	Behind I/P, at base of steering column	
Mass Air Flow (MAF) Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Mass Air Flow (MAF) Relay (VIN S)	Front of engine compartment, on RH side of radiator bracket	201- 1-A
Mass Air Flow In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Remote Dimmer	RH side of steering column, on I/P retainer	201-10-A
Starter Solenoid (VIN E)	Lower RH side of engine	201- 2-A
Starter Solenoid (VIN F) (VIN 8)	Lower RH side of engine	201- 6-B

COMPONENT LOCATION

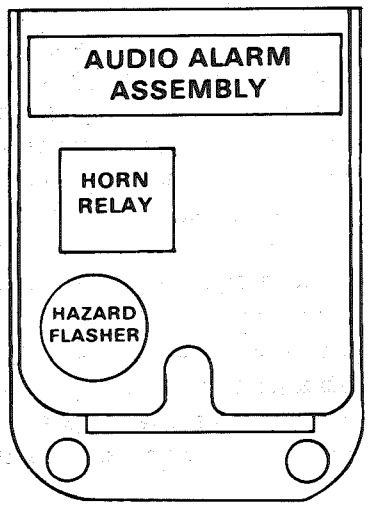
FUSE DATA DETAILS: FUSE DATA



FRONT VIEW OF FUSE BLOCK

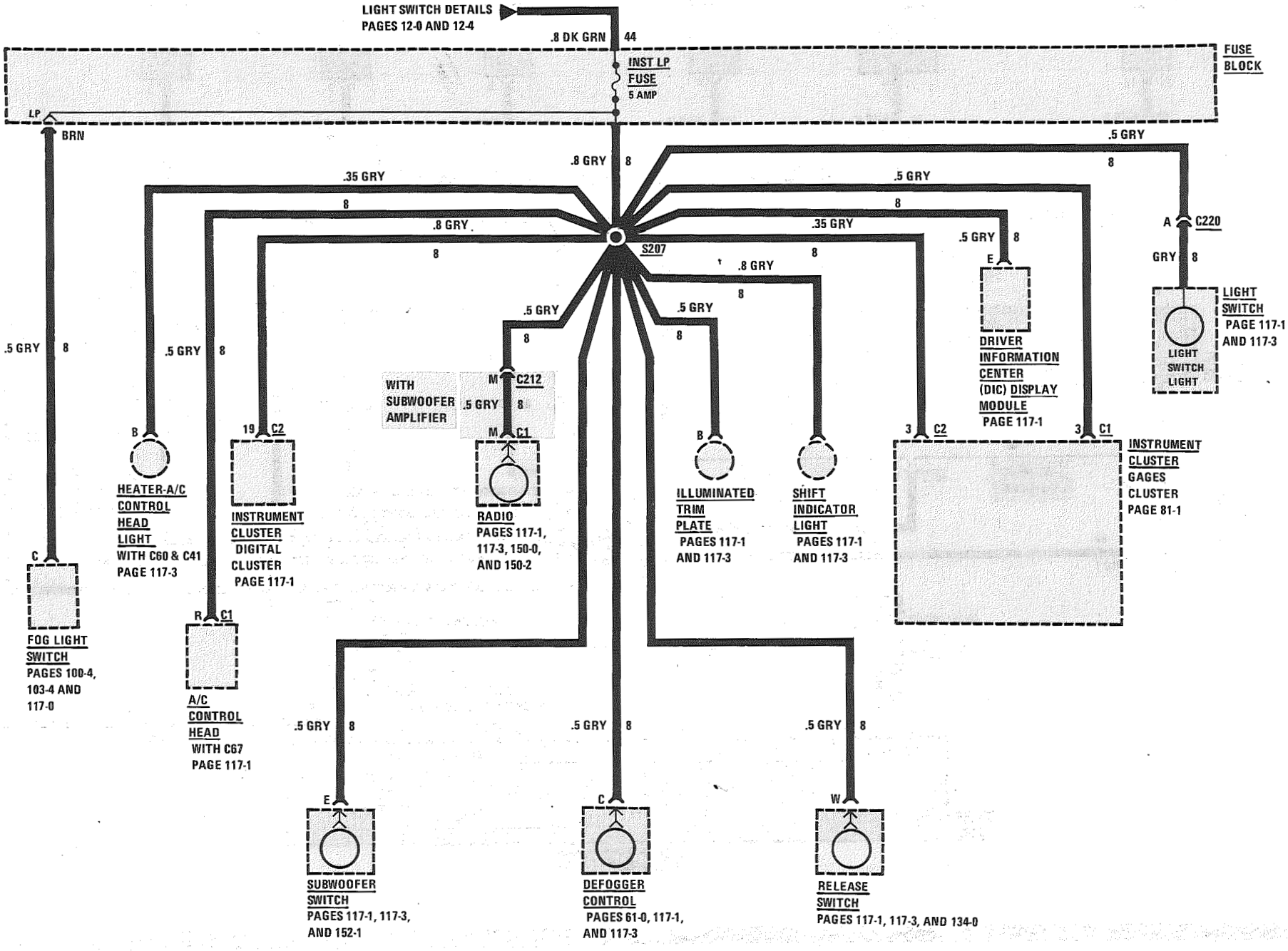


REAR VIEW OF FUSE BLOCK
Cavity and Connector Locations

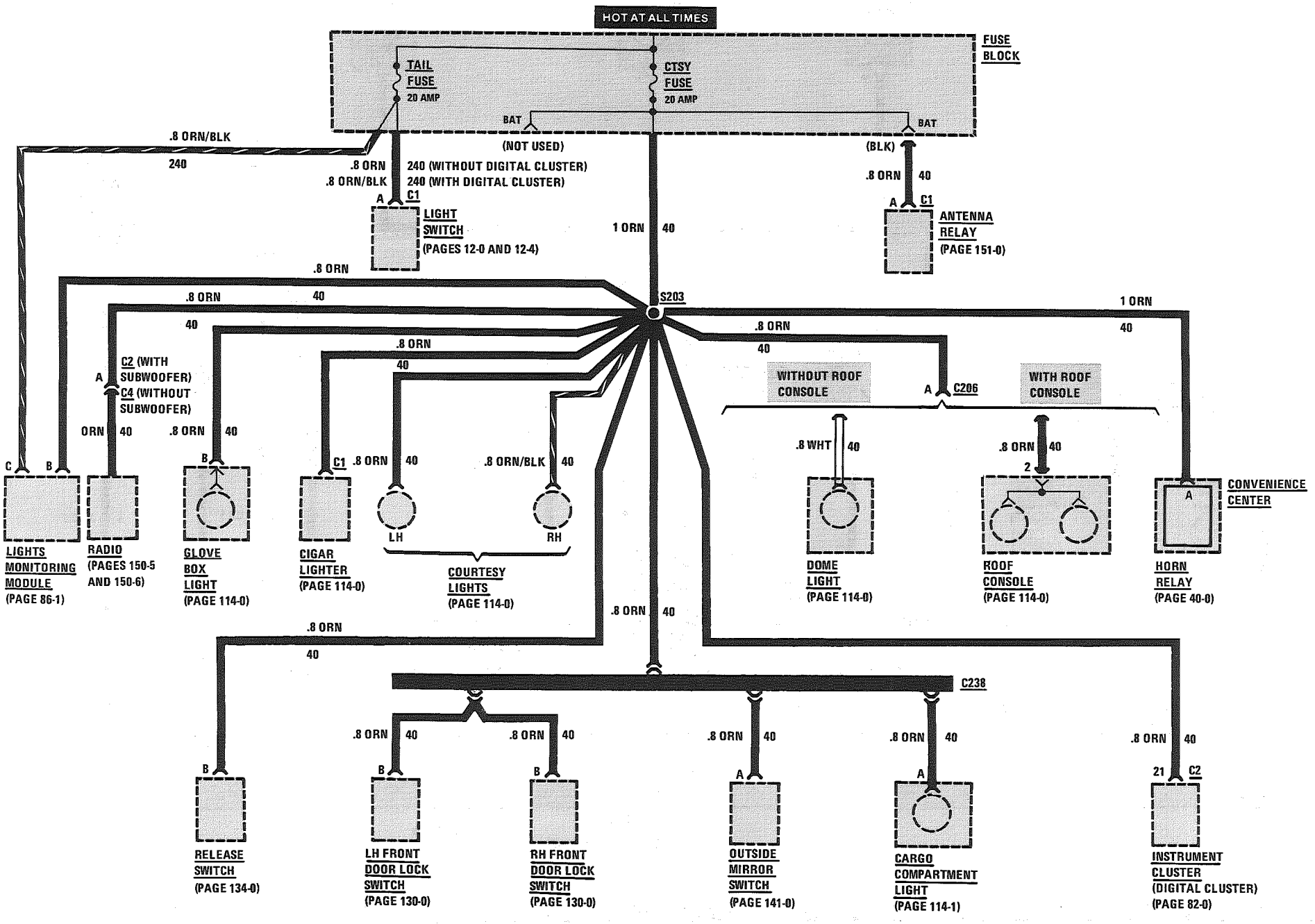


CONVENIENCE CENTER

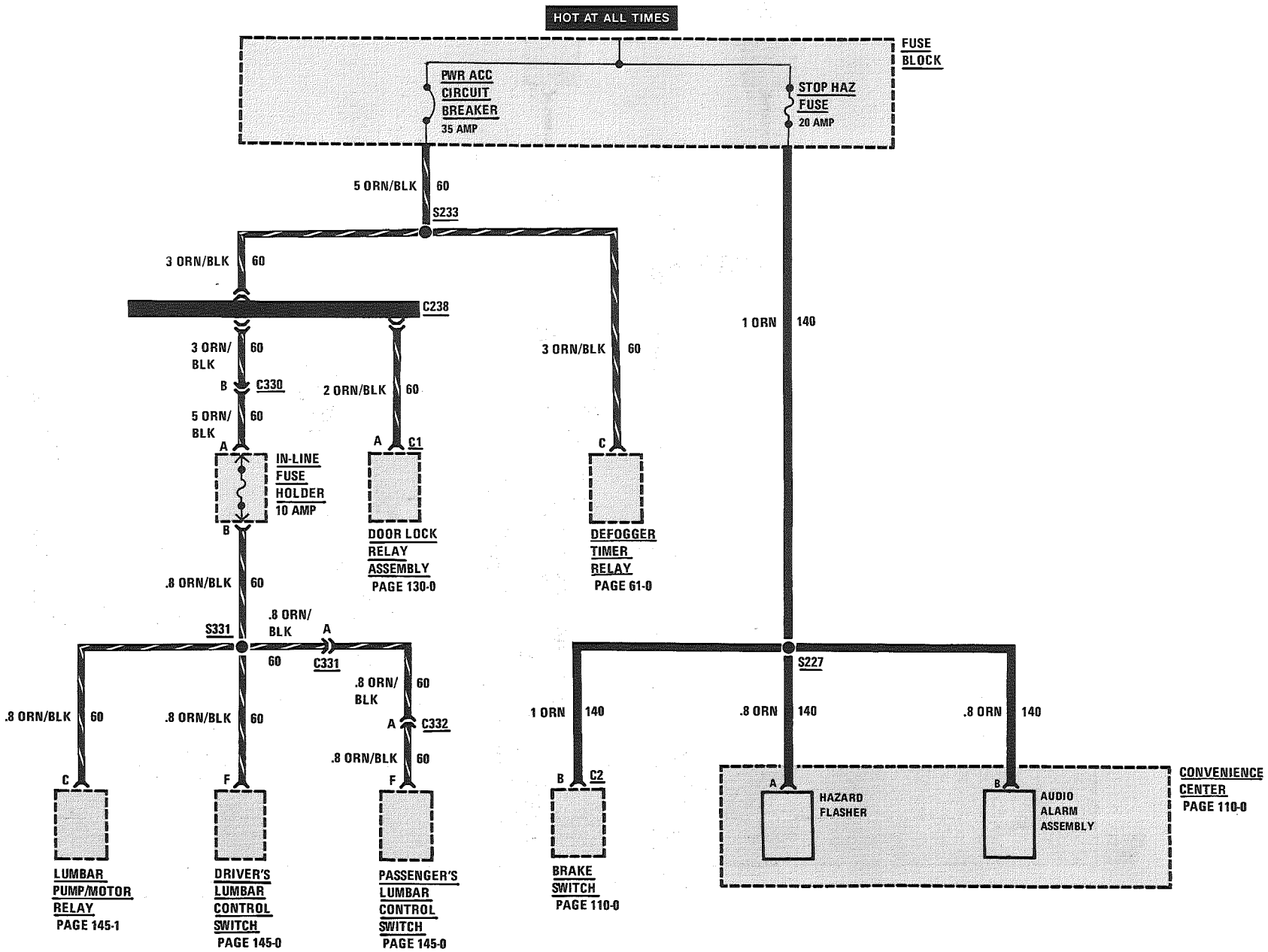
FUSE BLOCK DETAILS: INST LP FUSE



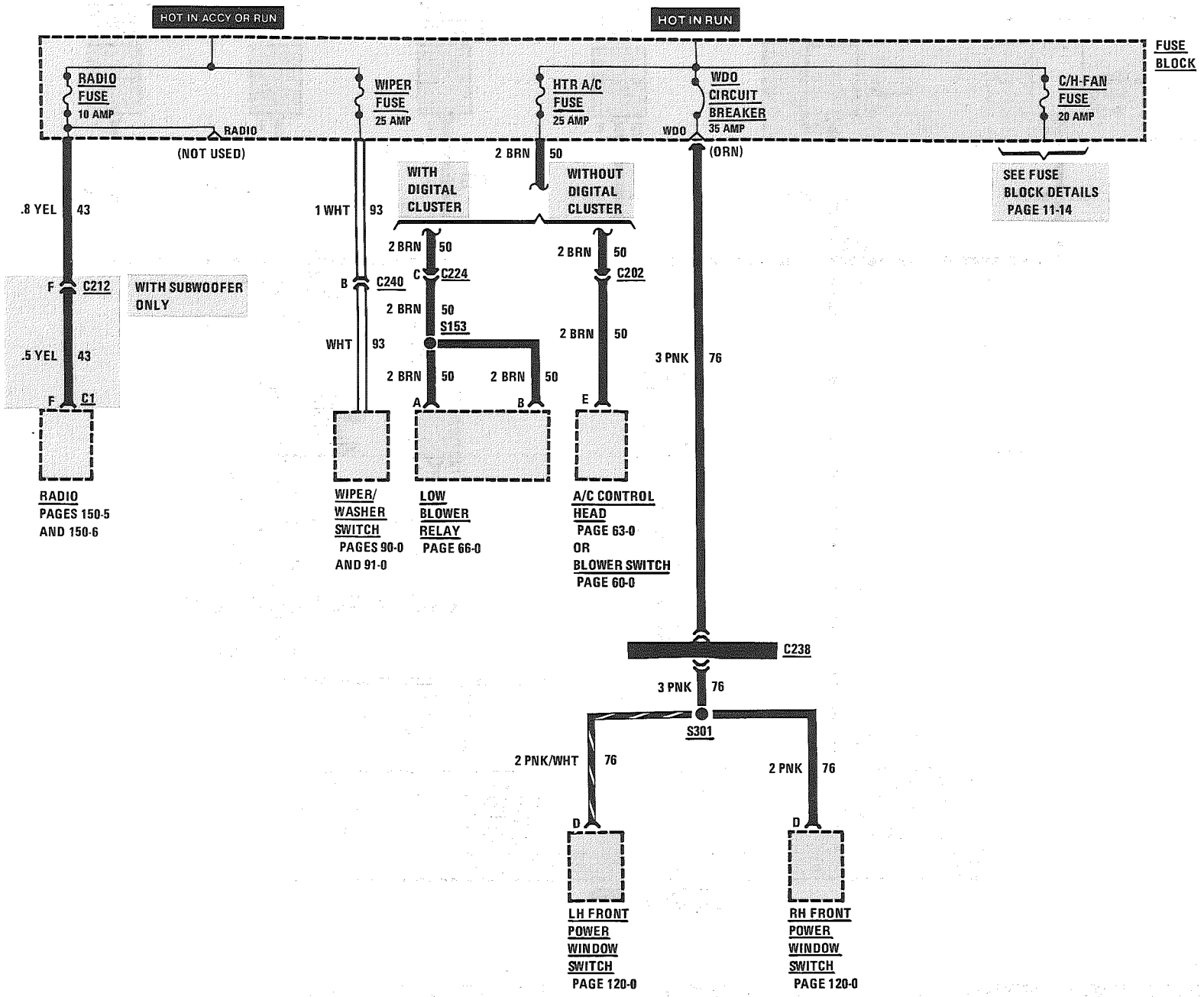
FUSE BLOCK DETAILS: CTSY FUSE AND TAIL FUSE



FUSE BLOCK DETAILS: PWR ACC CIRCUIT BREAKER AND STOP HAZ FUSE

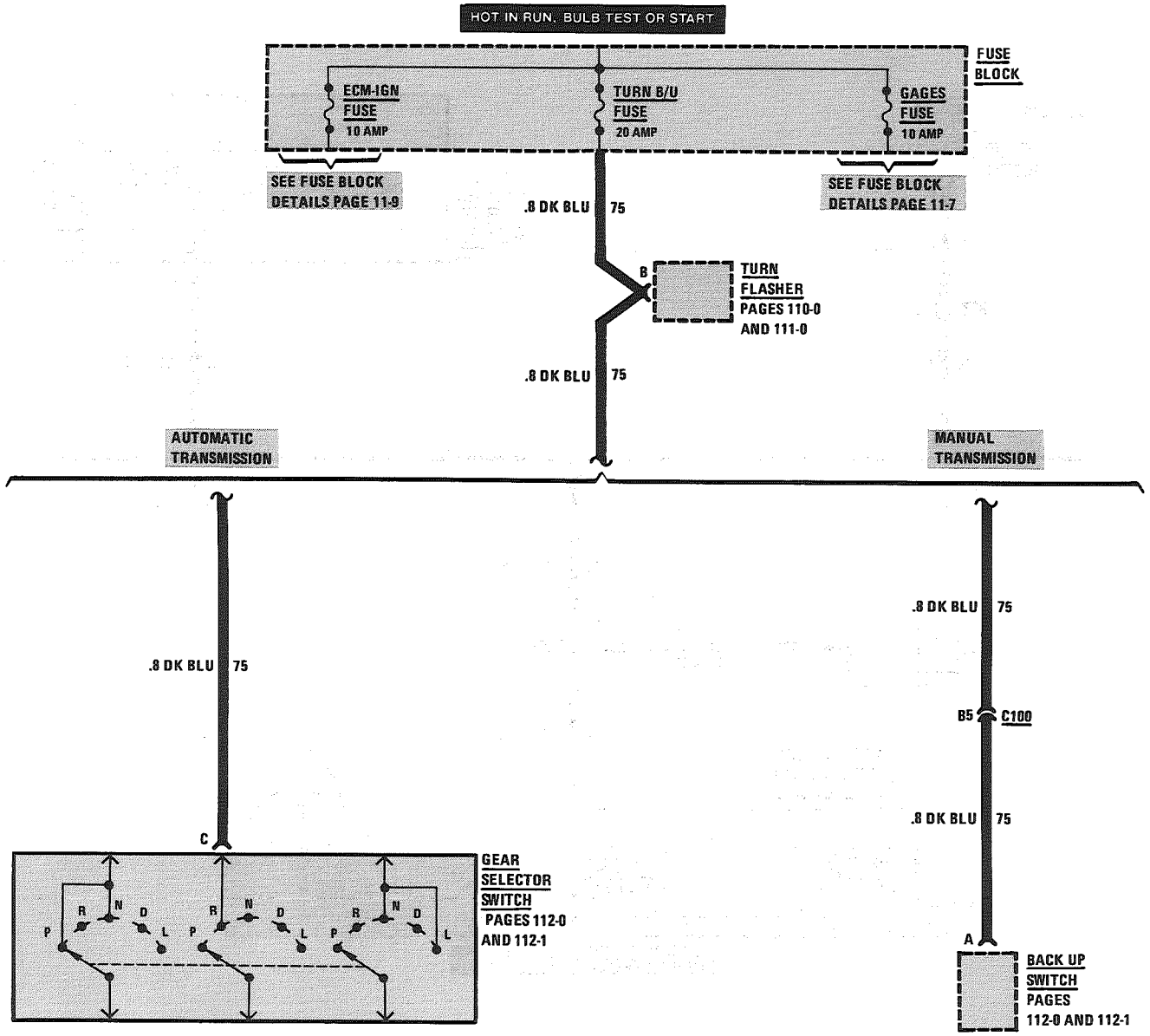


FUSE BLOCK DETAILS: WDO CIRCUIT BREAKER, HTR A/C FUSE, RADIO FUSE, AND WIPER FUSE



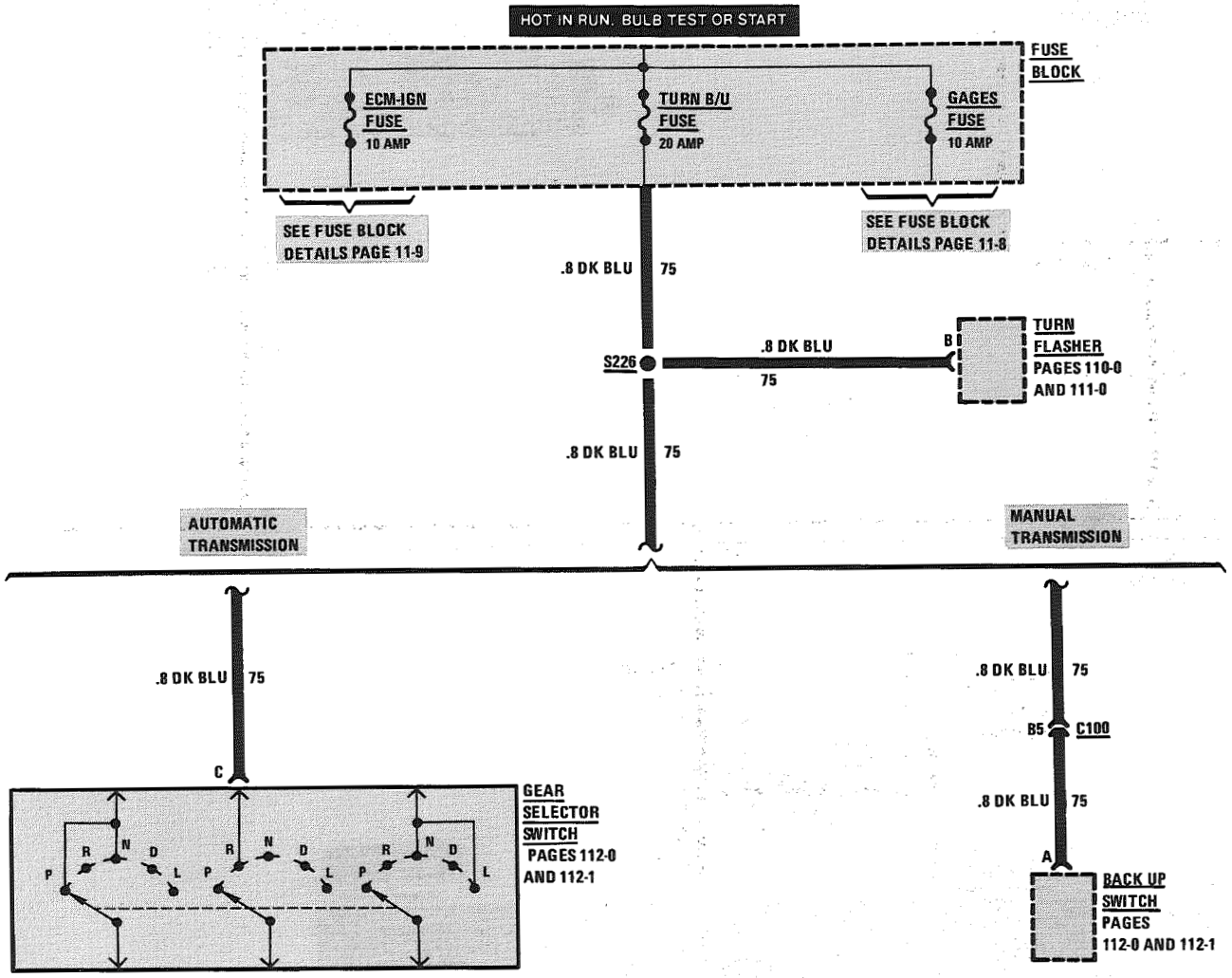
FUSE BLOCK DETAILS: TURN B/U FUSE

WITH DIGITAL CLUSTER

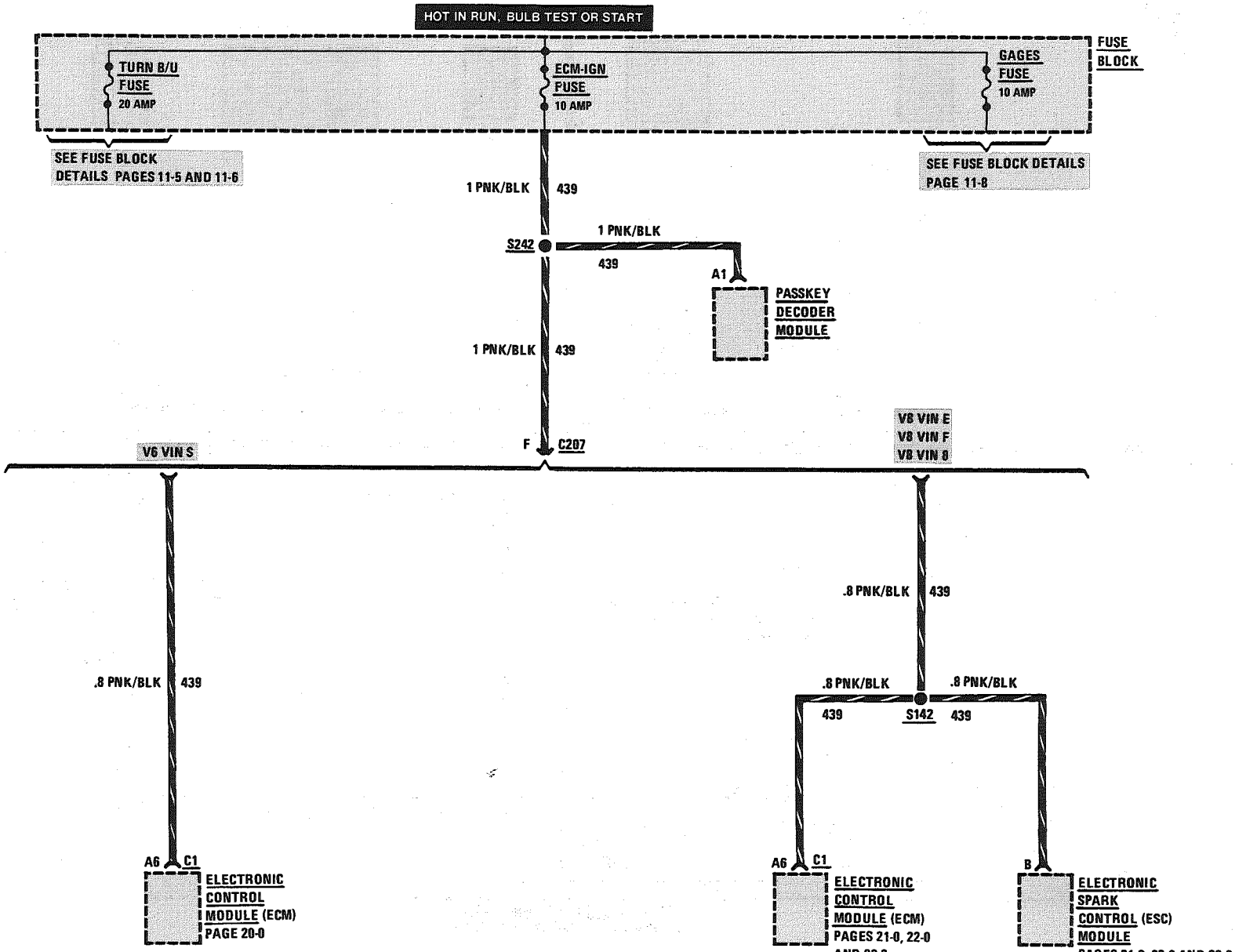


FUSE BLOCK DETAILS: TURN B/U FUSE

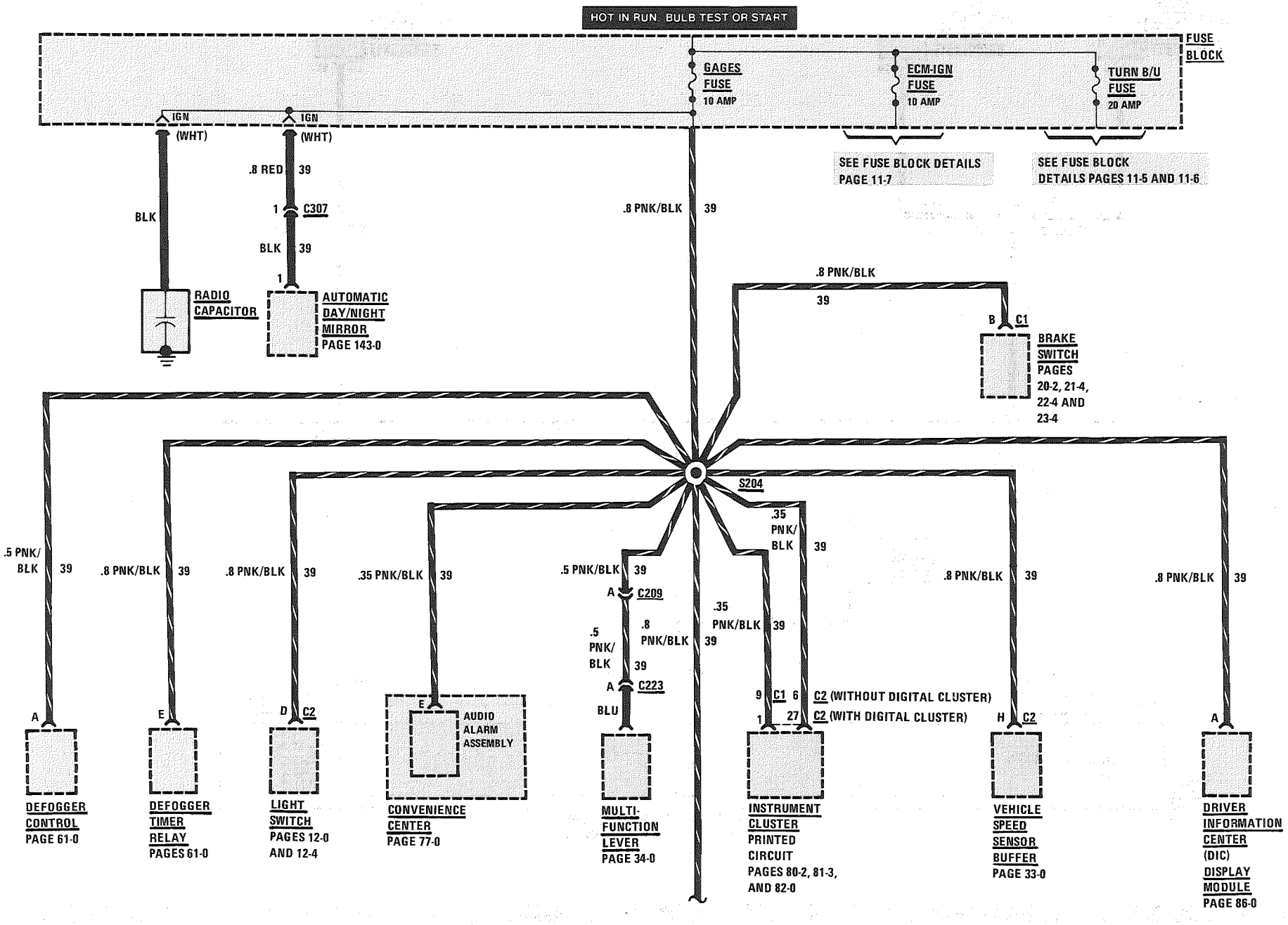
WITHOUT DIGITAL CLUSTER

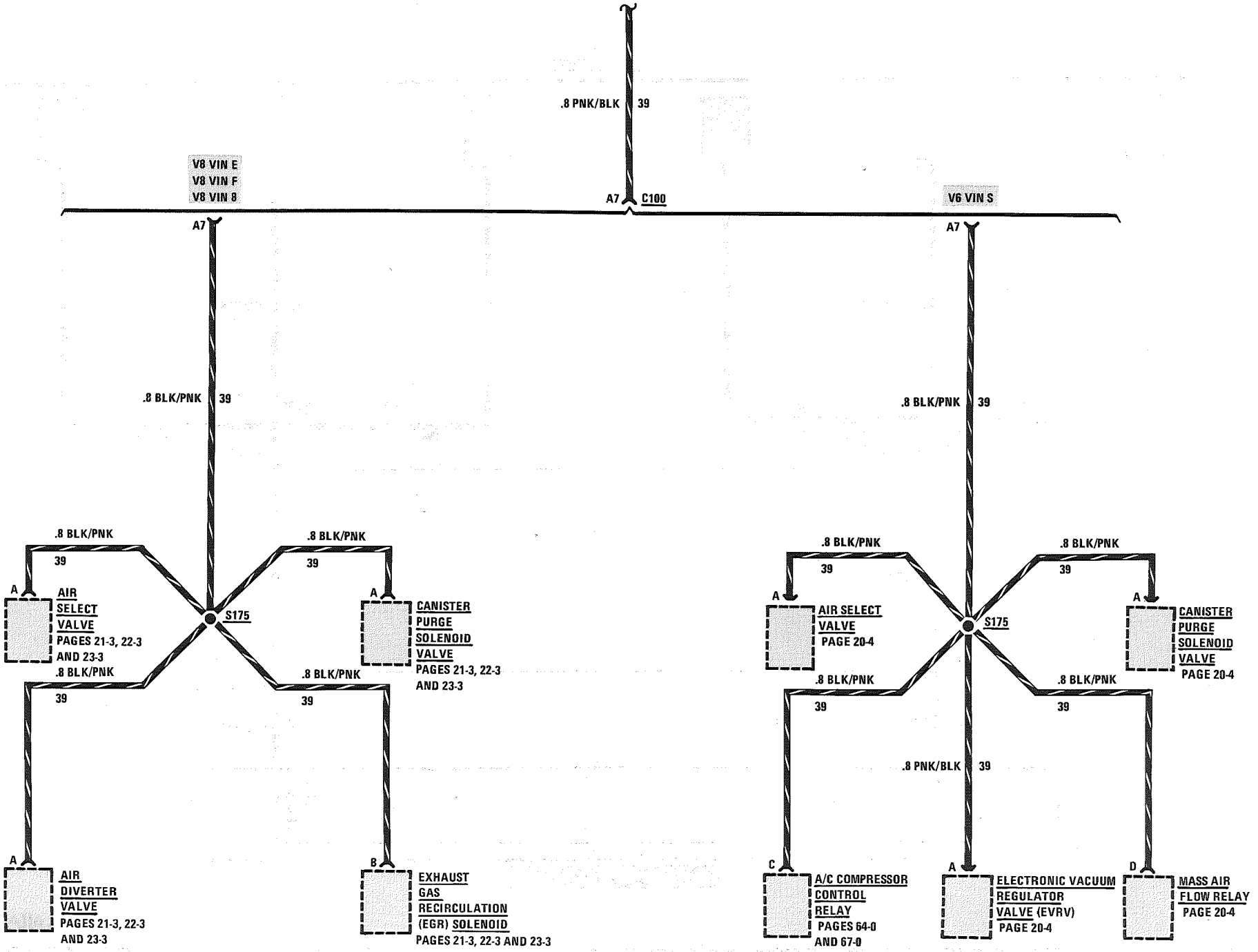


FUSE BLOCK DETAILS: ECM-IGN FUSE



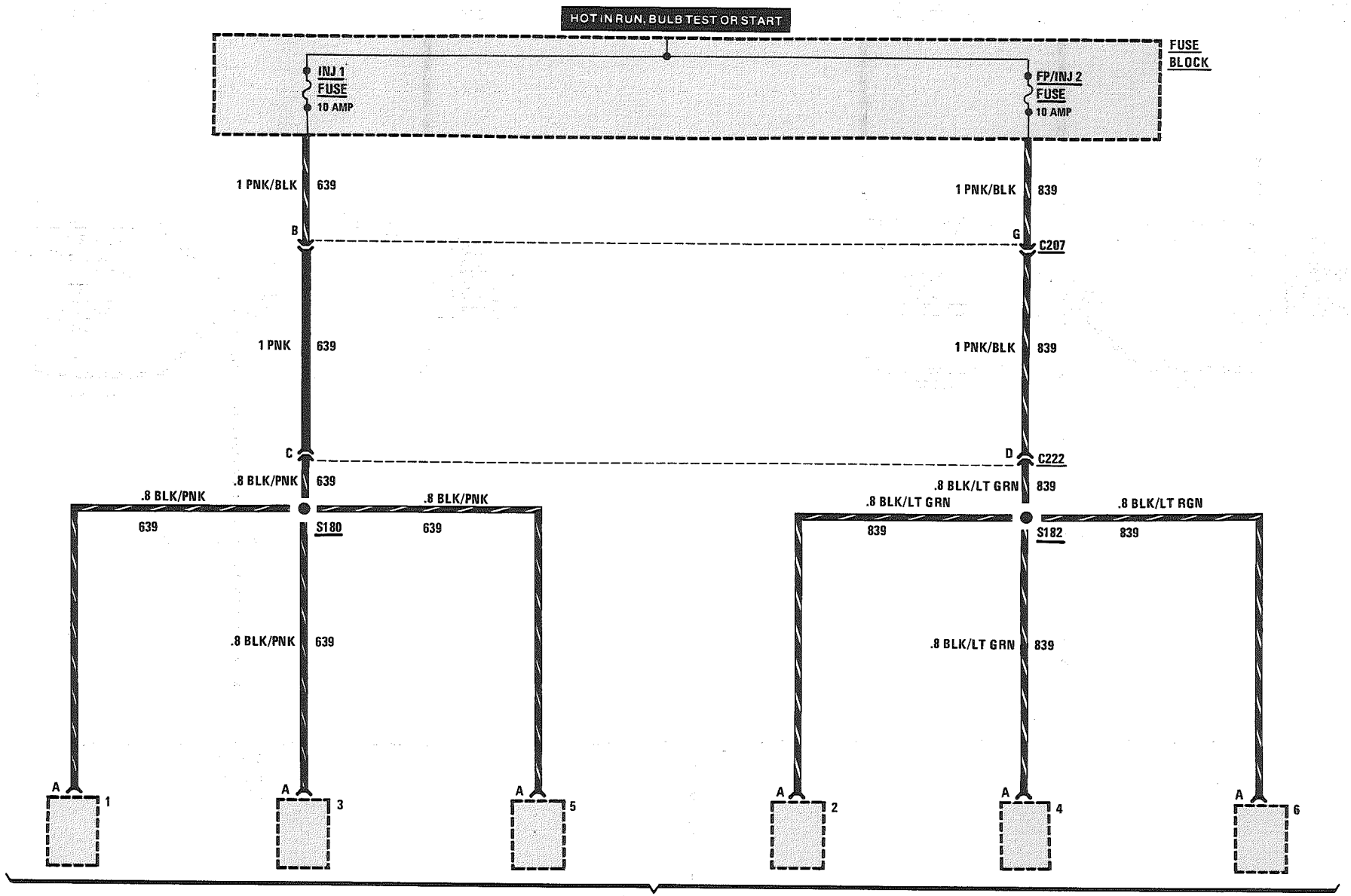
FUSE BLOCK DETAILS: GAGES FUSE




.8 PNK/BLK 39
V8 VIN E
V8 VIN F
V8 VIN 8
A7
C100
V6 VIN S
A7
.8 BLK/PNK 39
.8 BLK/PNK 39
A
AIR SELECT VALVE PAGES 21-3, 22-3 AND 23-3
S175
.8 BLK/PNK 39
A
CANISTER PURGE SOLENOID VALVE PAGES 21-3, 22-3 AND 23-3
.8 BLK/PNK 39
.8 BLK/PNK 39
A
AIR DIVERTER VALVE PAGES 21-3, 22-3 AND 23-3
B
EXHAUST GAS RECIRCULATION (EGR) SOLENOID PAGES 21-3, 22-3 AND 23-3
.8 BLK/PNK 39
.8 BLK/PNK 39
A
AIR SELECT VALVE PAGE 20-4
S175
.8 BLK/PNK 39
A
CANISTER PURGE SOLENOID VALVE PAGE 20-4
.8 BLK/PNK 39
.8 BLK/PNK 39
.8 PNK/BLK 39
C
A/C COMPRESSOR CONTROL RELAY PAGES 64-0 AND 67-0
A
ELECTRONIC VACUUM REGULATOR VALVE (EVRV) PAGE 20-4
D
MASS AIR FLOW RELAY PAGE 20-4

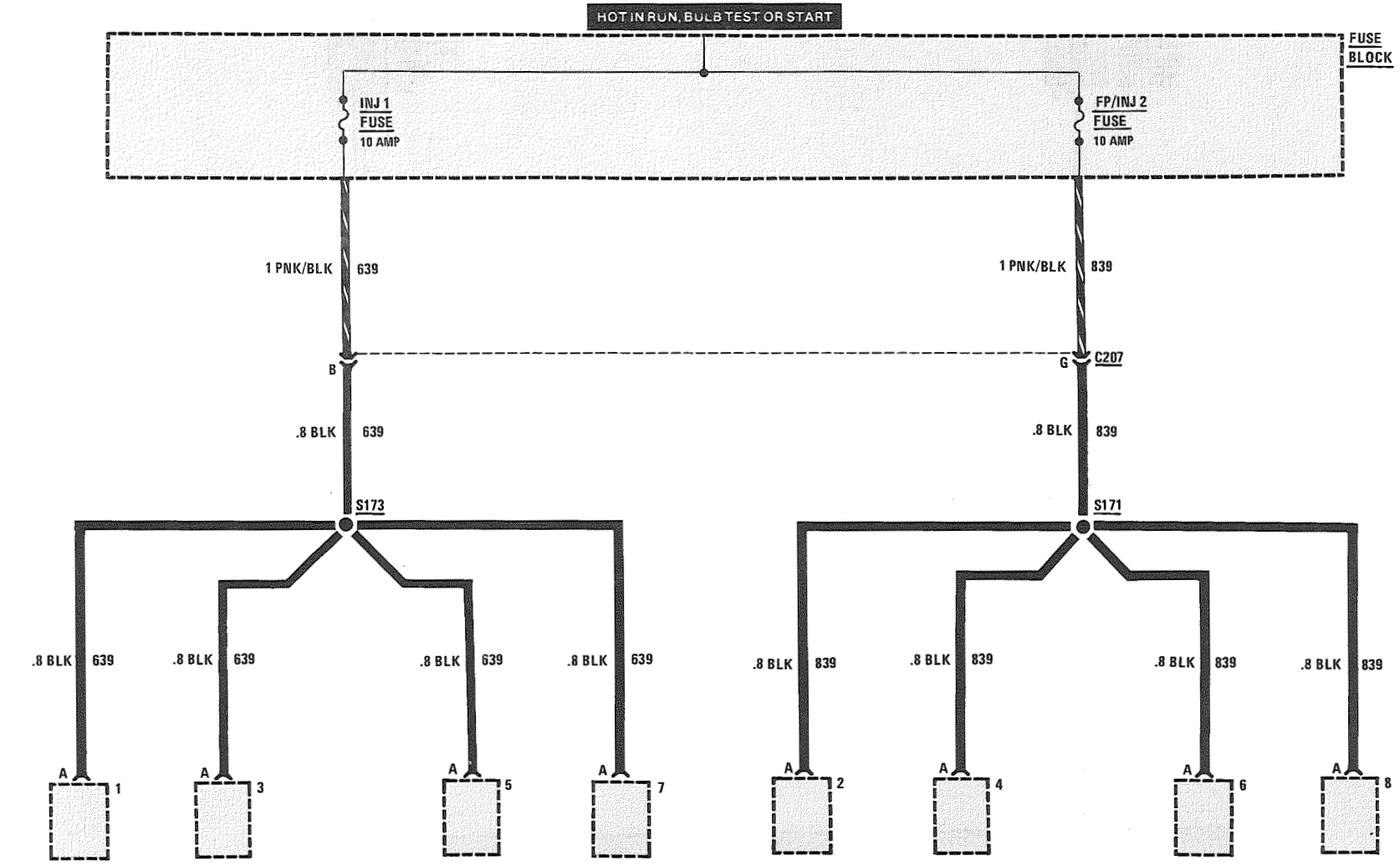
FUSE BLOCK DETAILS: INJ 1 FUSE AND FP/INJ 2 FUSE

V6 VIN S



FUSE BLOCK DETAILS: INJ 1 FUSE AND FP/INJ 2 FUSE

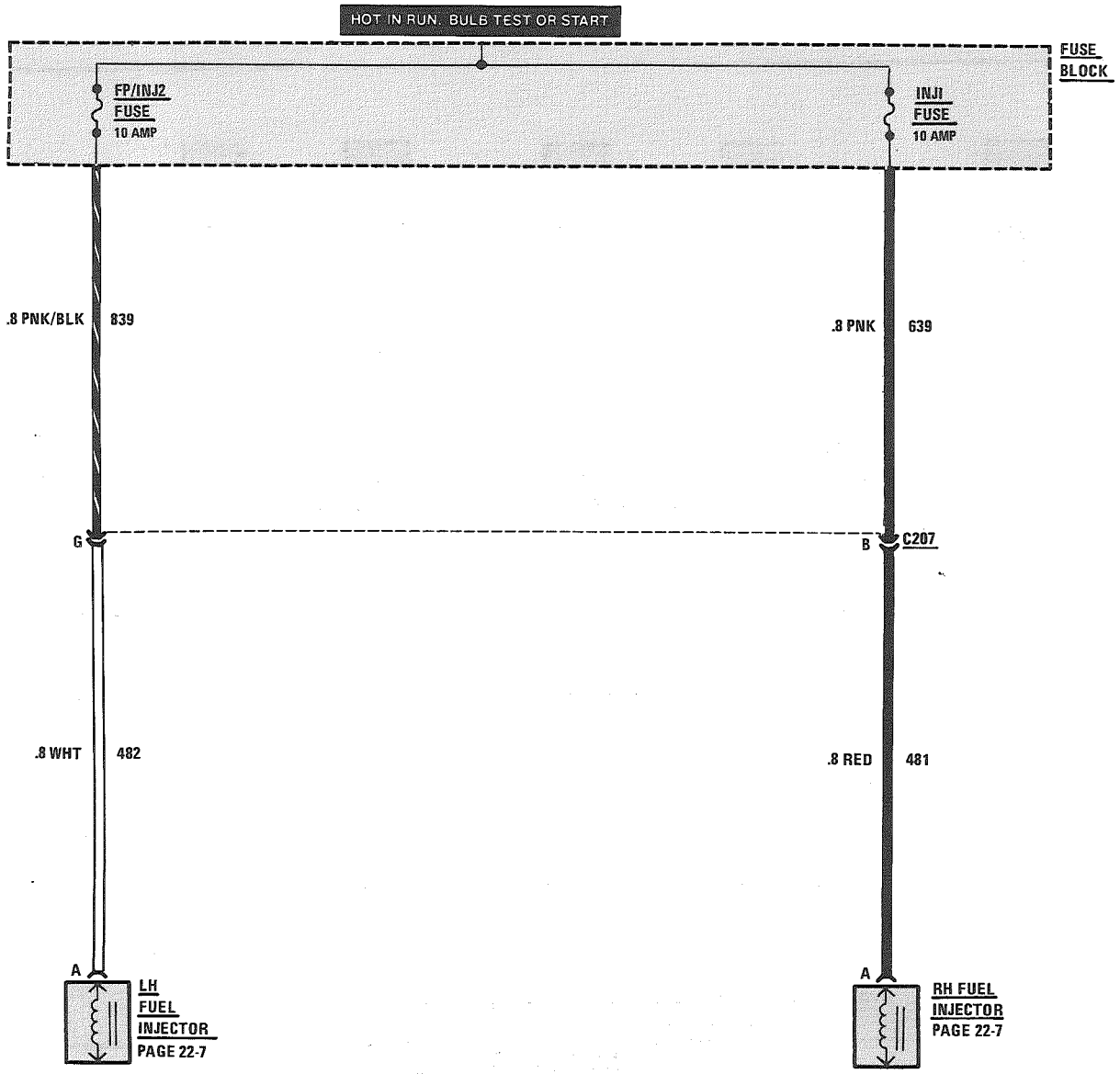
V8 VIN F AND V8 VIN 8



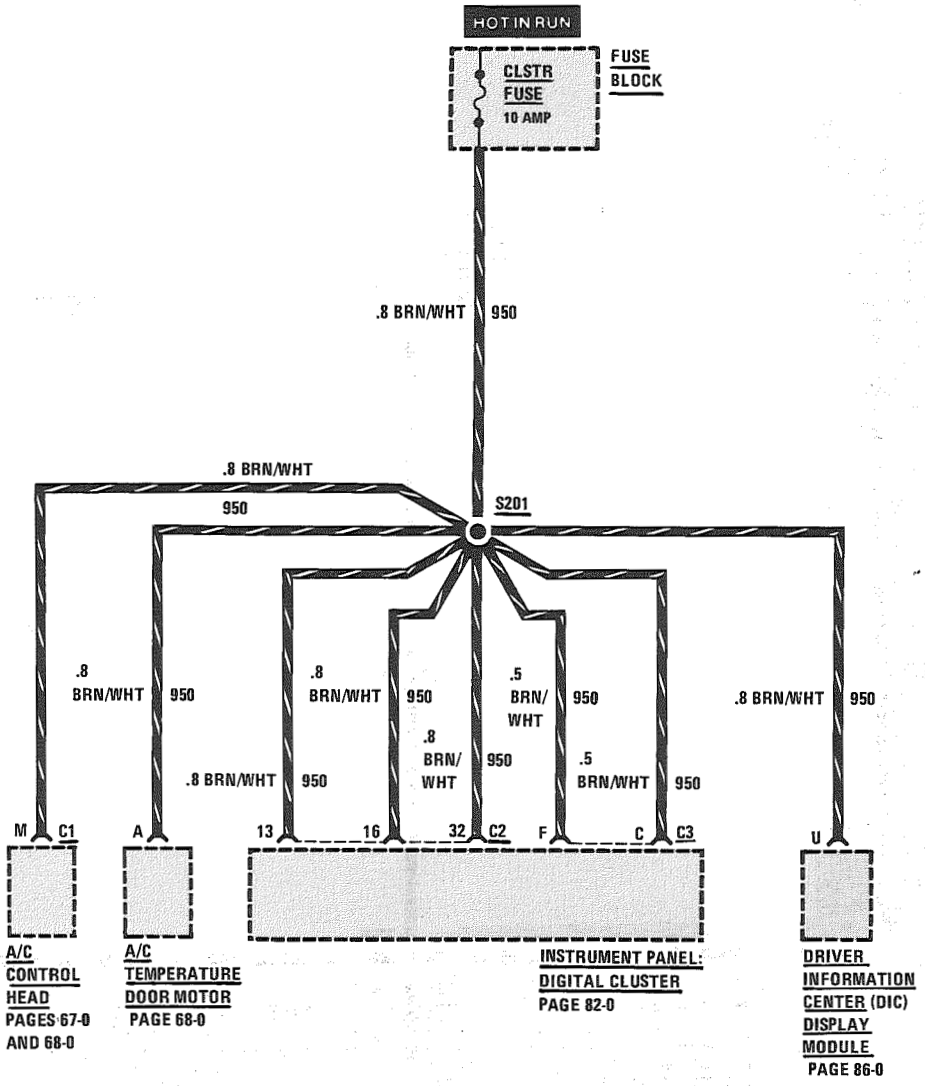
FUEL INJECTORS
PAGES 21-7 AND
23-7

FUSE BLOCK DETAILS: INJ 1 FUSE AND FP/INJ 2 FUSE

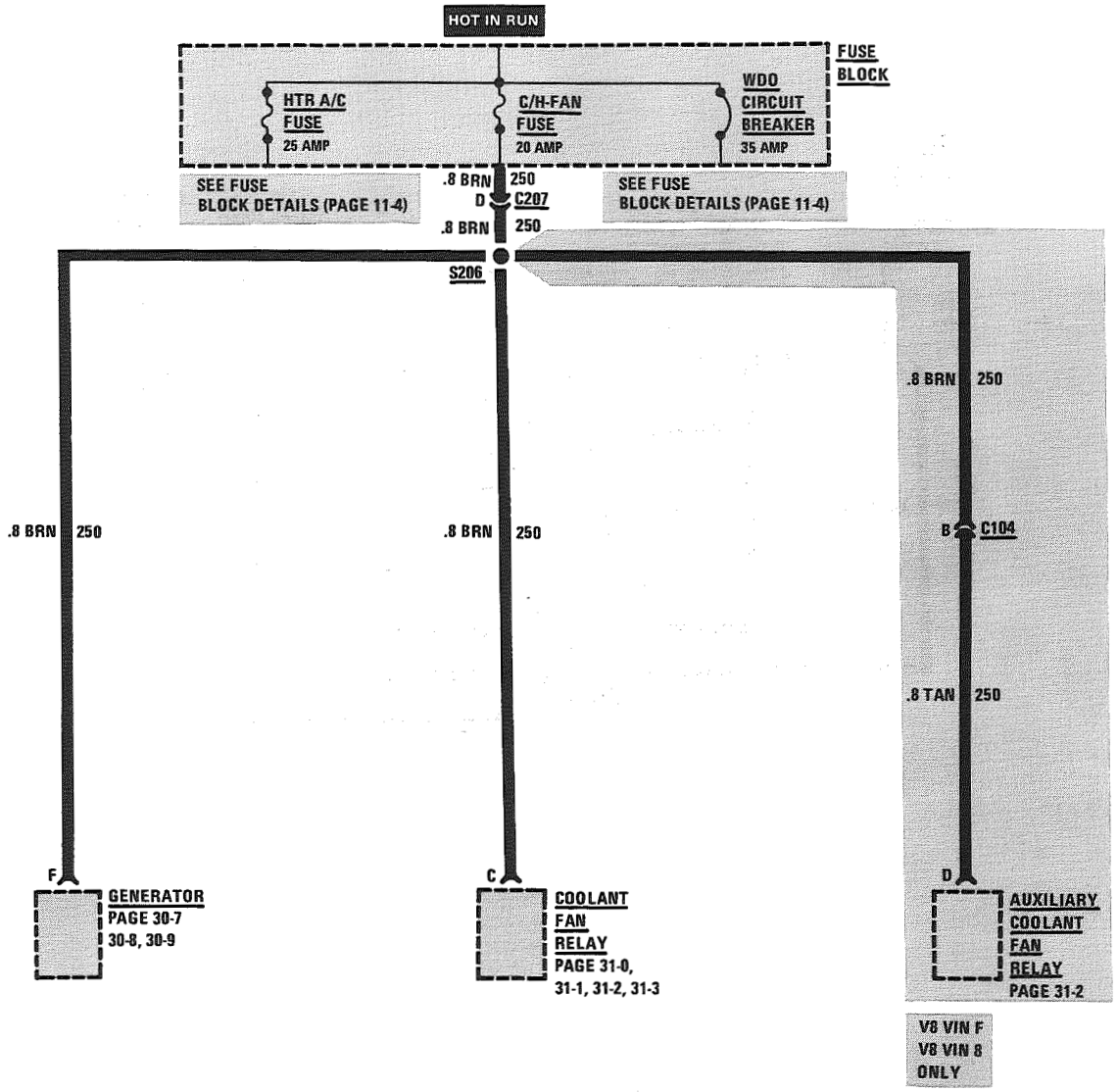
V8 VIN E



FUSE BLOCK DETAILS: CLSTR FUSE

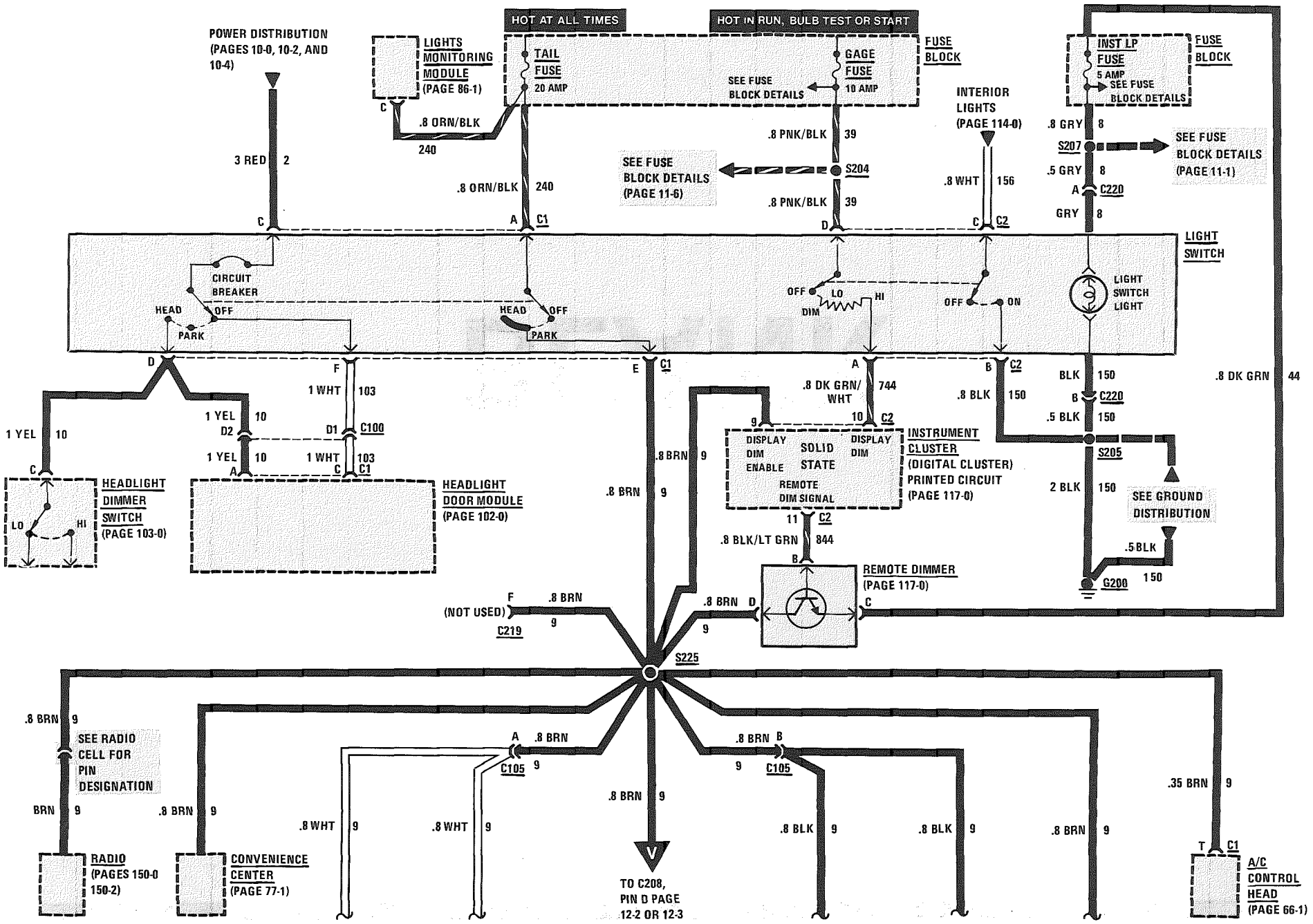


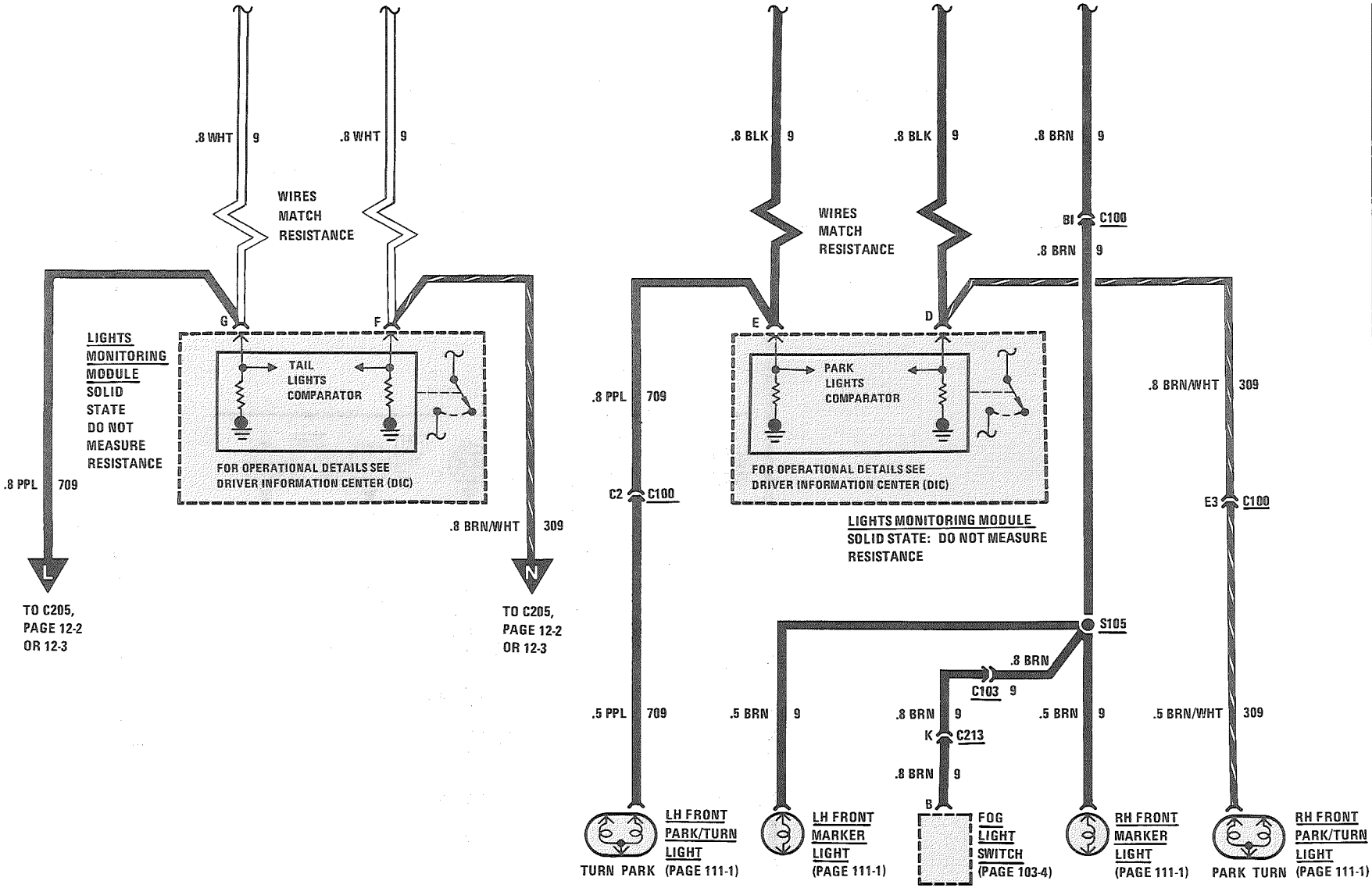
FUSE BLOCK DETAILS: C/H FAN FUSE



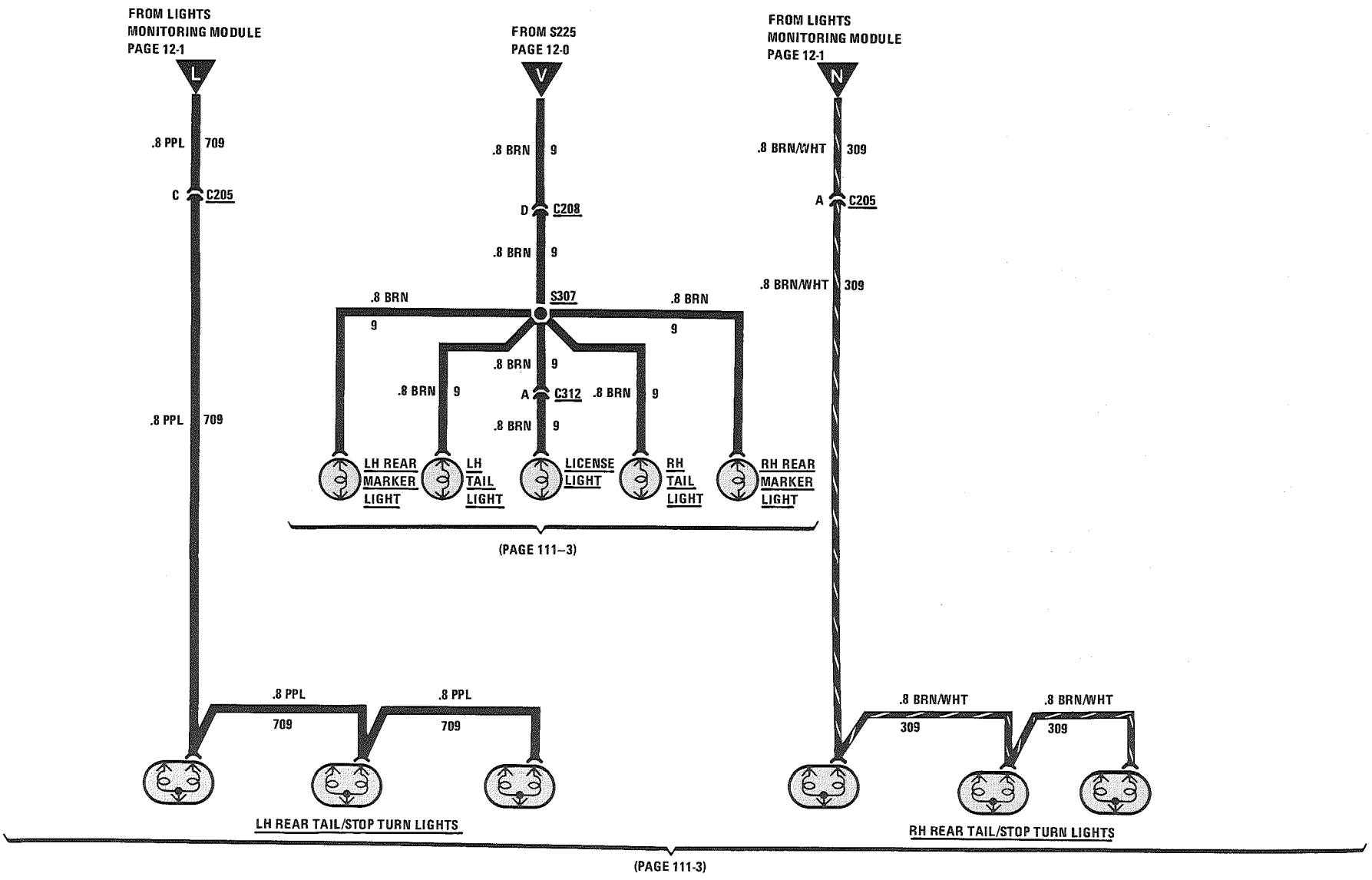
BLANK

LIGHT SWITCH DETAILS: WITH DIGITAL CLUSTER

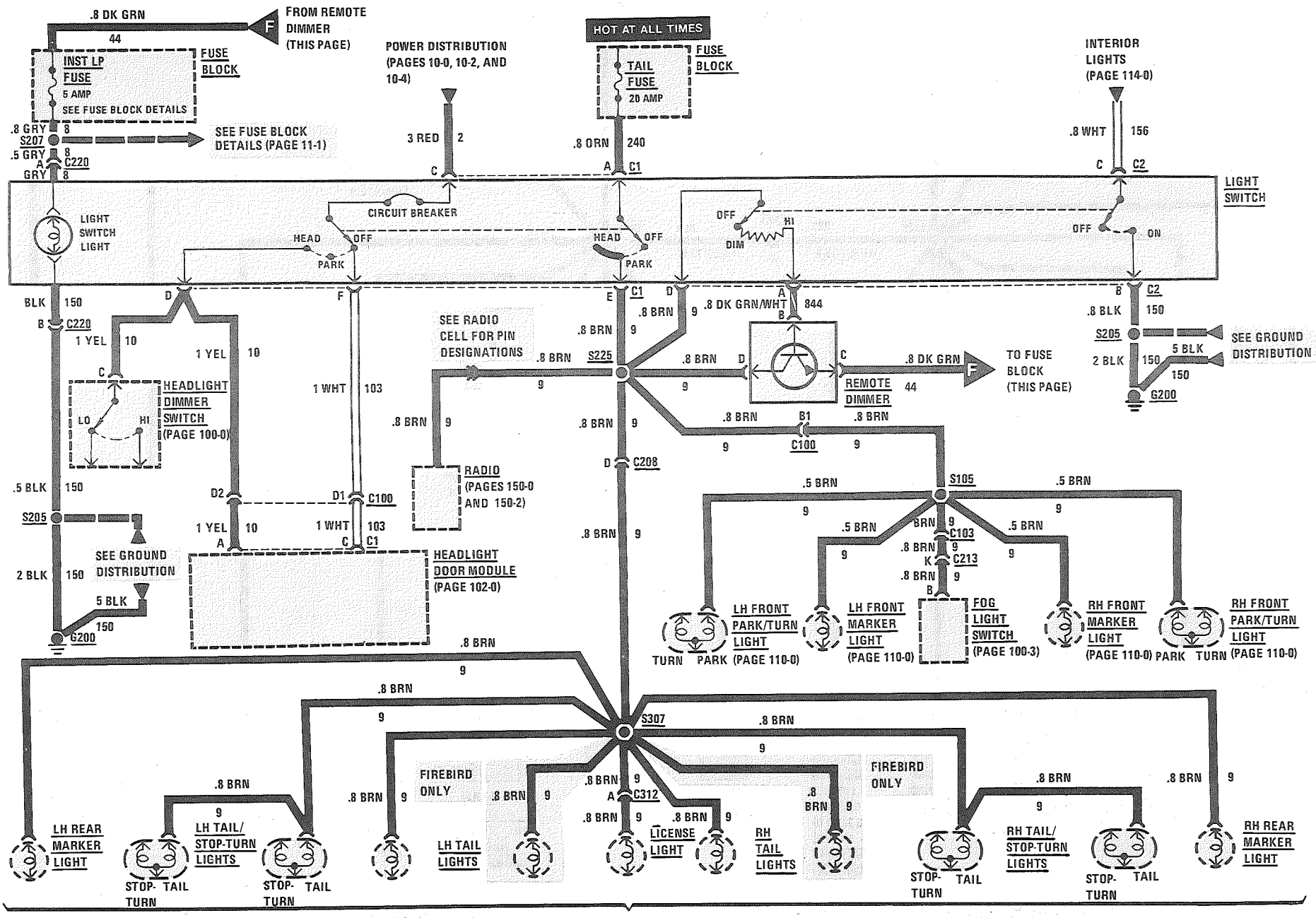



.8 WHT 9
.8 WHT 9
WIRES MATCH RESISTANCE
G
F
LIGHTS MONITORING MODULE SOLID STATE DO NOT MEASURE RESISTANCE
TAIL LIGHTS COMPARATOR
FOR OPERATIONAL DETAILS SEE DRIVER INFORMATION CENTER (DIC)
.8 PPL 709
.8 BRN/WHT 309
L
N
TO C205, PAGE 12-2 OR 12-3
TO C205, PAGE 12-2 OR 12-3
.8 BLK 9
.8 BLK 9
.8 BRN 9
WIRES MATCH RESISTANCE
E
D
B1 C100
.8 BRN 9
PARK LIGHTS COMPARATOR
FOR OPERATIONAL DETAILS SEE DRIVER INFORMATION CENTER (DIC)
LIGHTS MONITORING MODULE SOLID STATE: DO NOT MEASURE RESISTANCE
.8 PPL 709
C2 C100
.8 BRN/WHT 309
E3 C100
S105
.8 BRN
C103 9
.5 PPL 709
.5 BRN 9
.8 BRN 9
.5 BRN 9
.5 BRN/WHT 309
K C213
.8 BRN 9
B
LH FRONT PARK/TURN LIGHT (PAGE 111-1)
TURN PARK
LH FRONT MARKER LIGHT (PAGE 111-1)
FOG LIGHT SWITCH (PAGE 103-4)
RH FRONT MARKER LIGHT (PAGE 111-1)
RH FRONT PARK/TURN LIGHT (PAGE 111-1)
PARK TURN

LIGHT SWITCH DETAILS: WITH DIGITAL CLUSTER



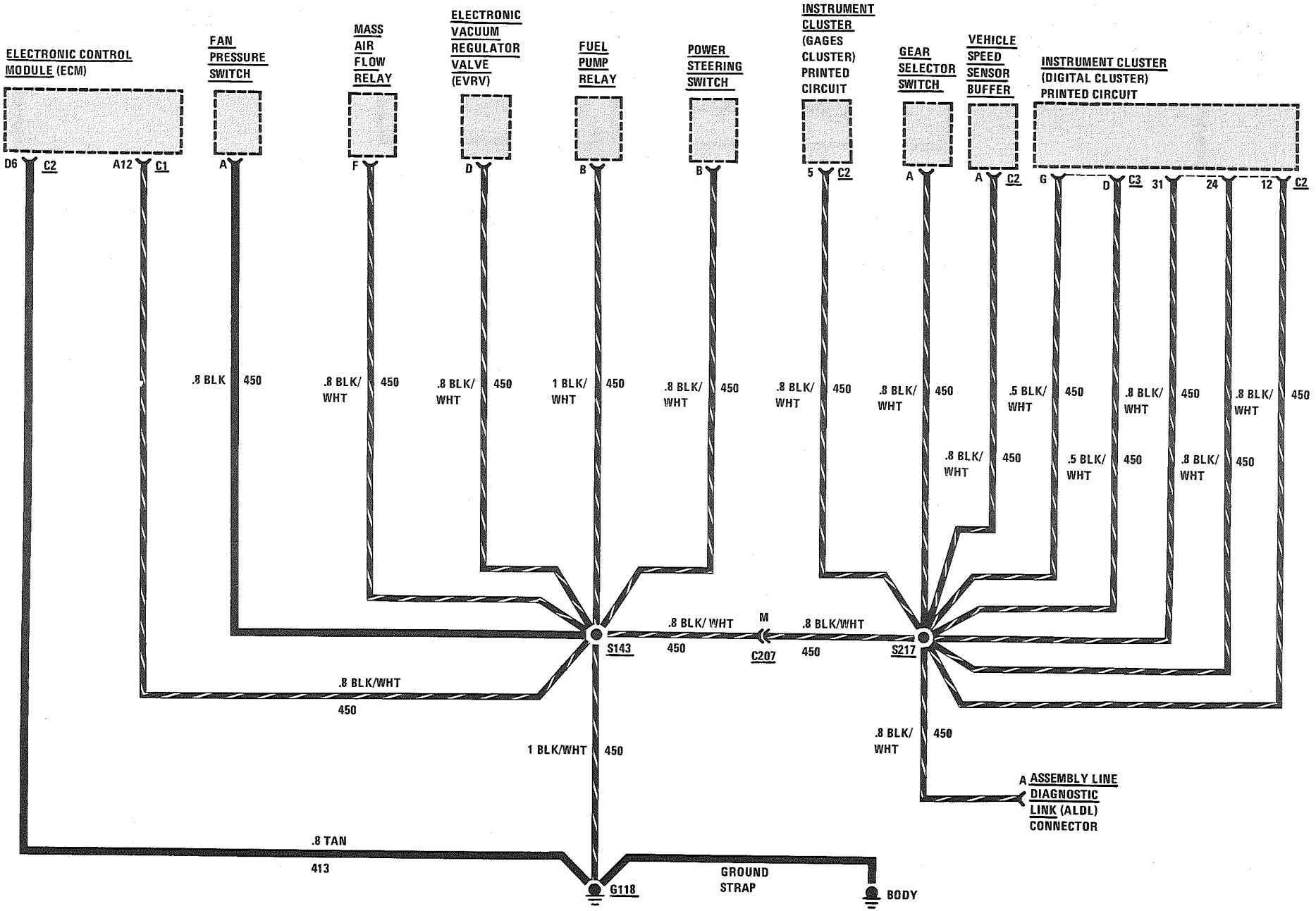
LIGHT SWITCH DETAILS: WITHOUT DIGITAL CLUSTER



(PAGE 110-3) TRANS AM;(PAGE 110-4) FIREBIRD

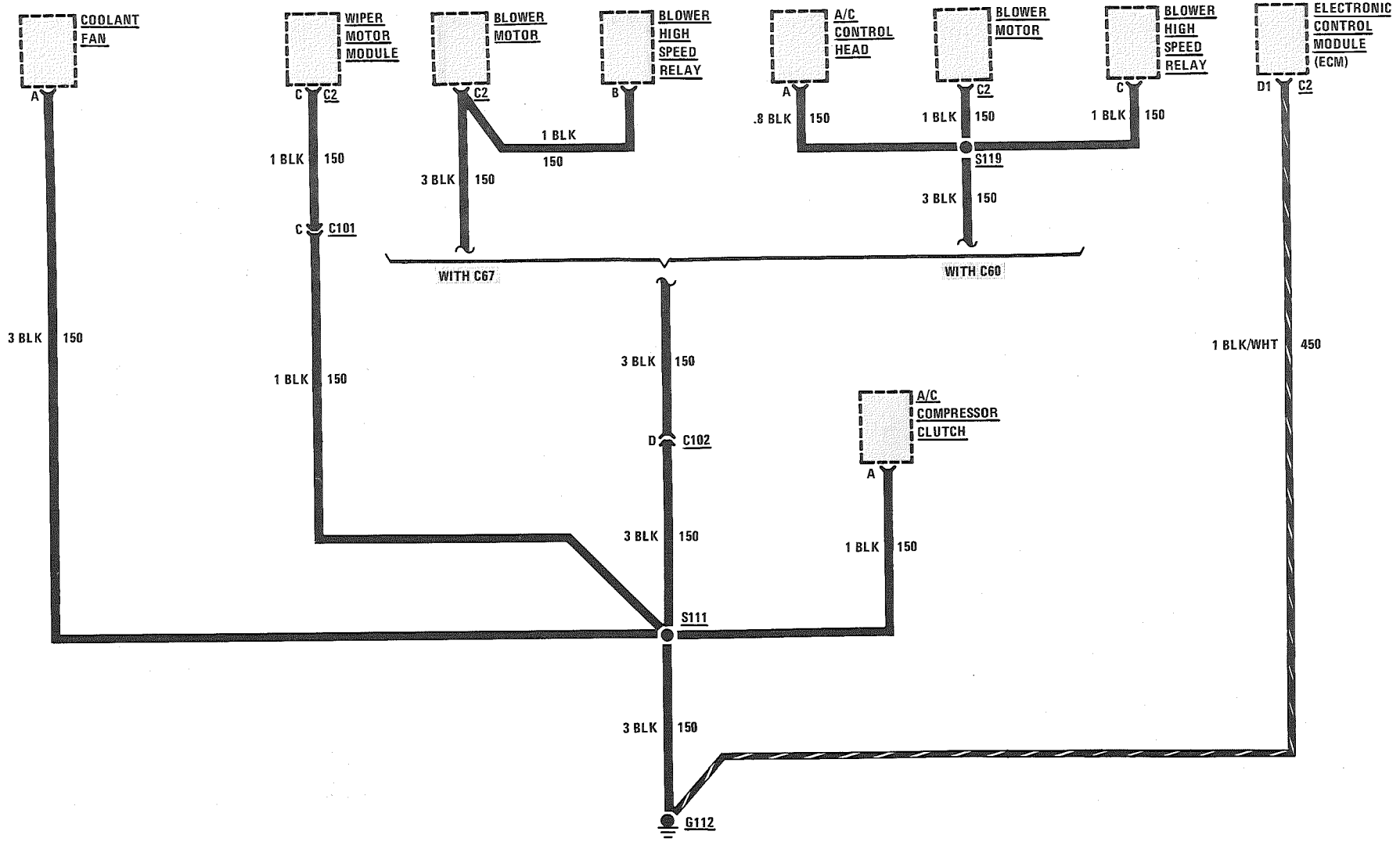
GROUND DISTRIBUTION: G118

ENGINE GROUND, V6 VIN S



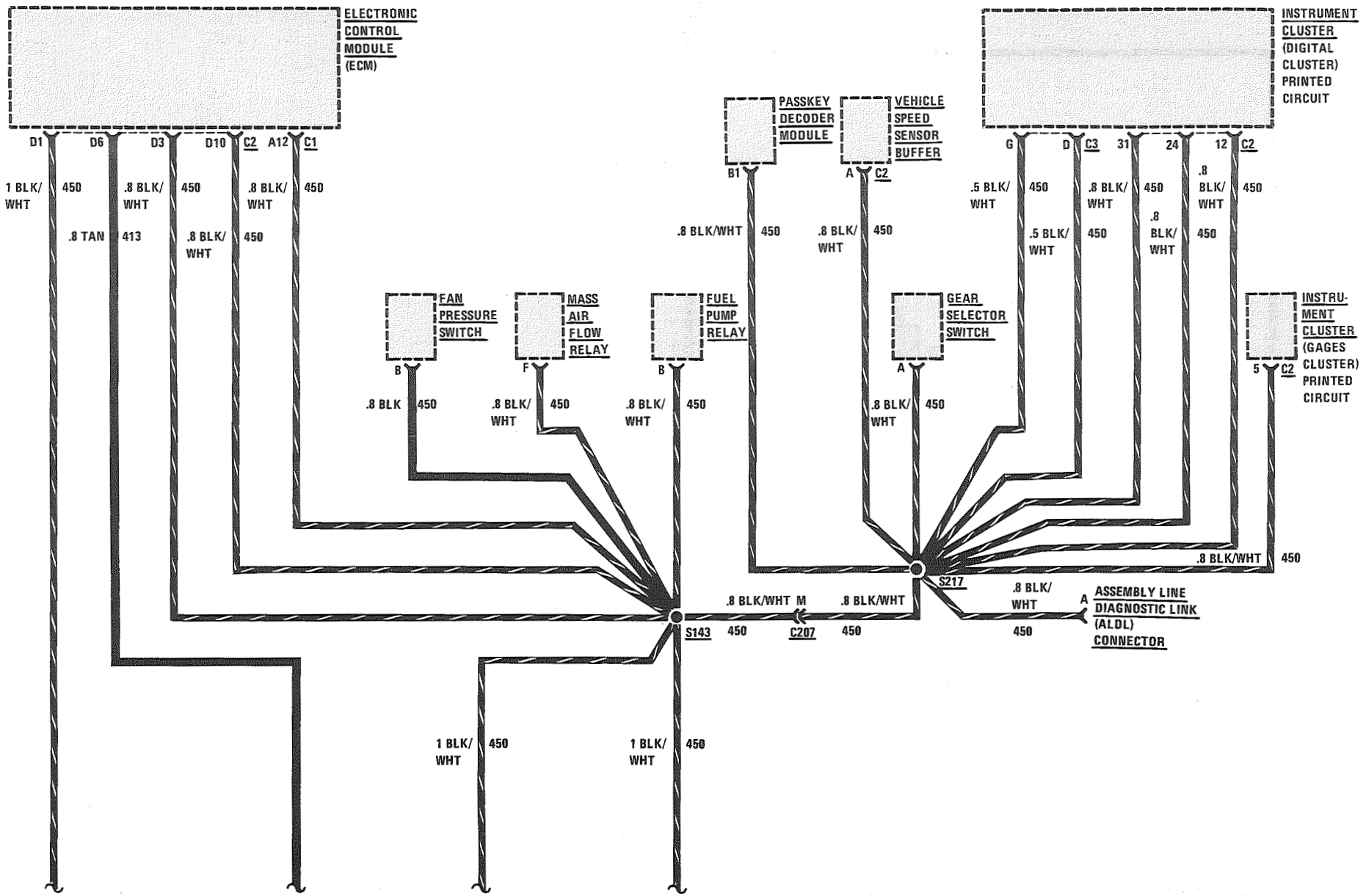
GROUND DISTRIBUTION: G112

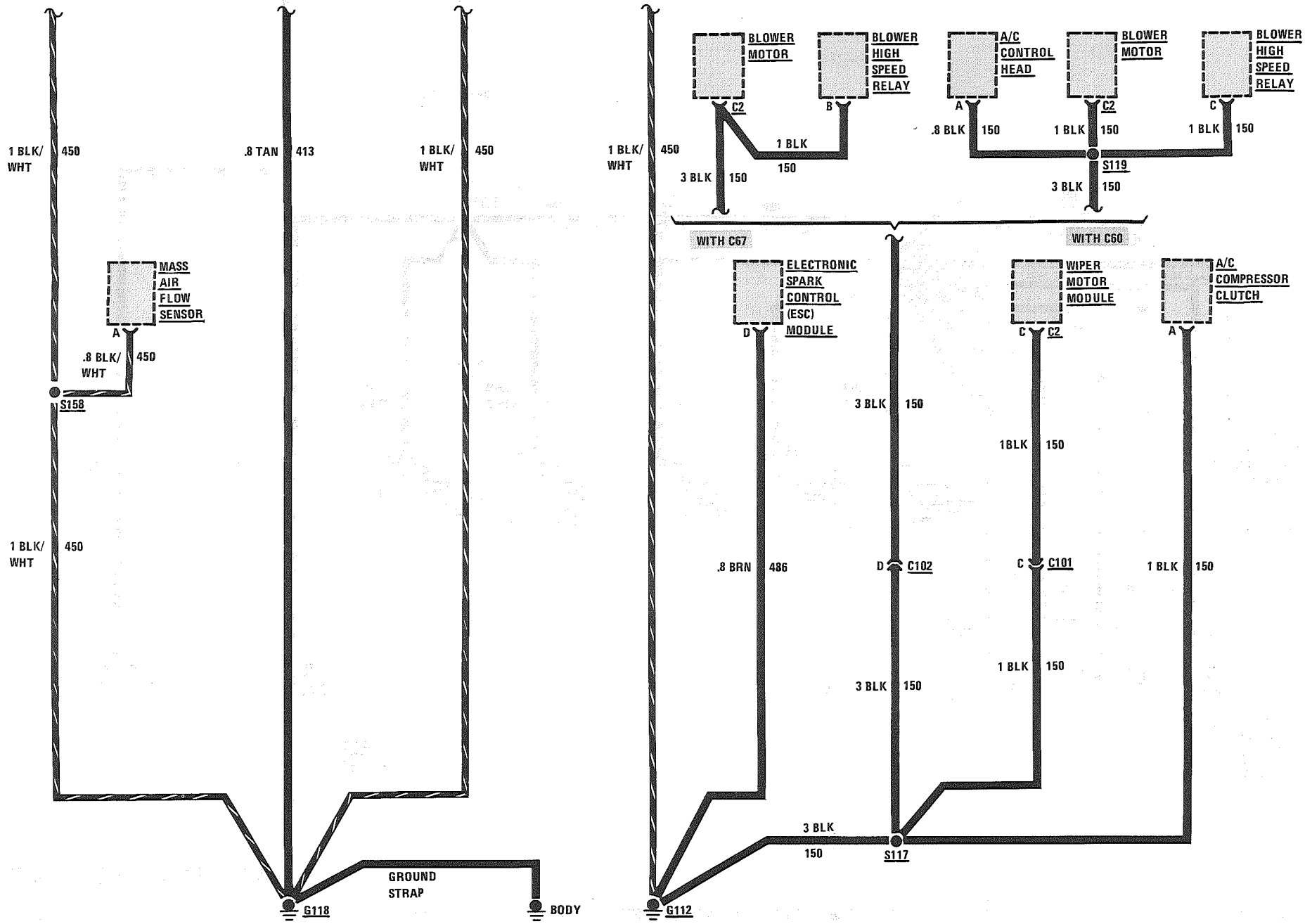
ENGINE GROUND, V6 VIN S



GROUND DISTRIBUTION: G112 AND G118

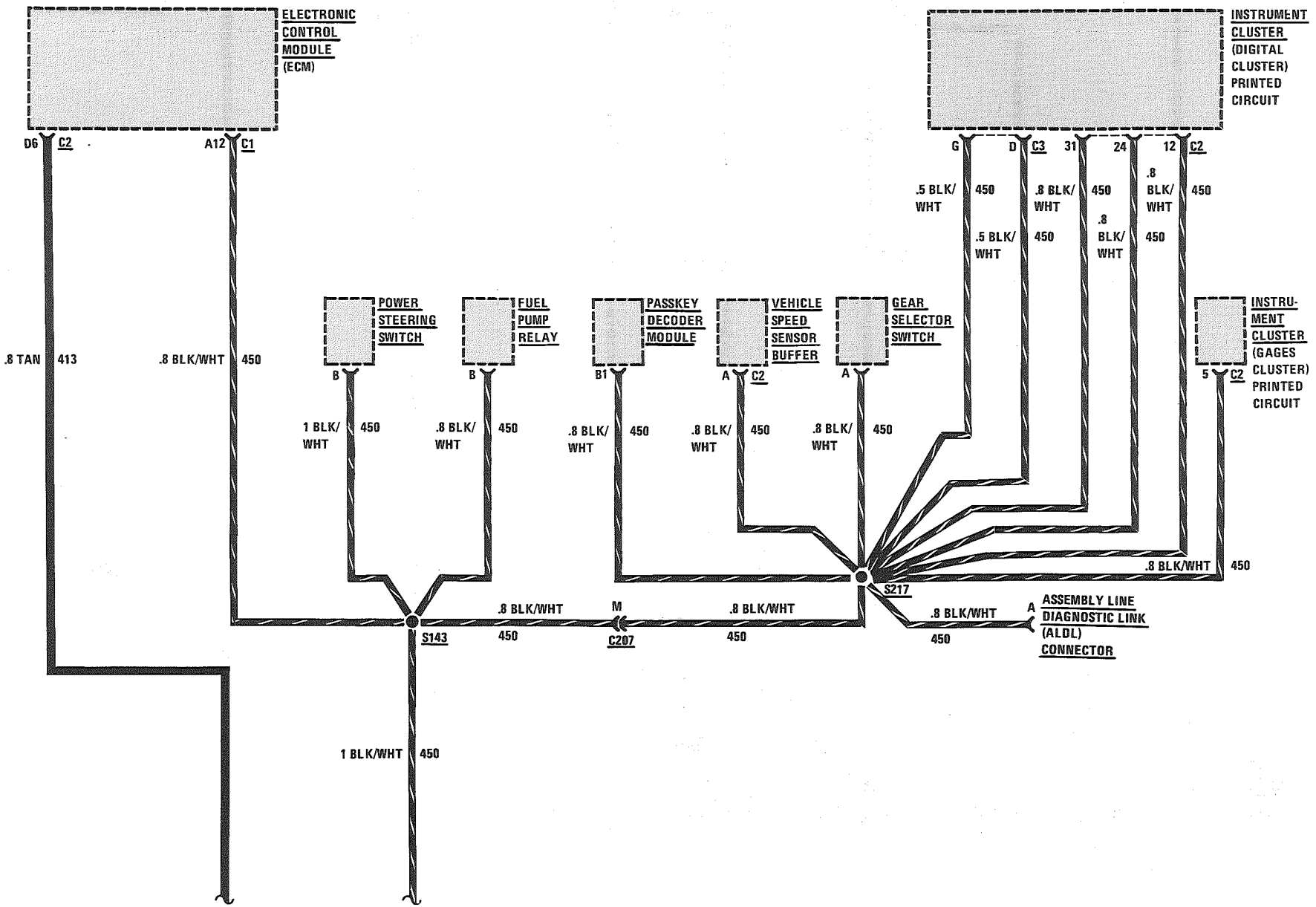
ENGINE GROUNDS, V8 VIN F AND V8 VIN 8

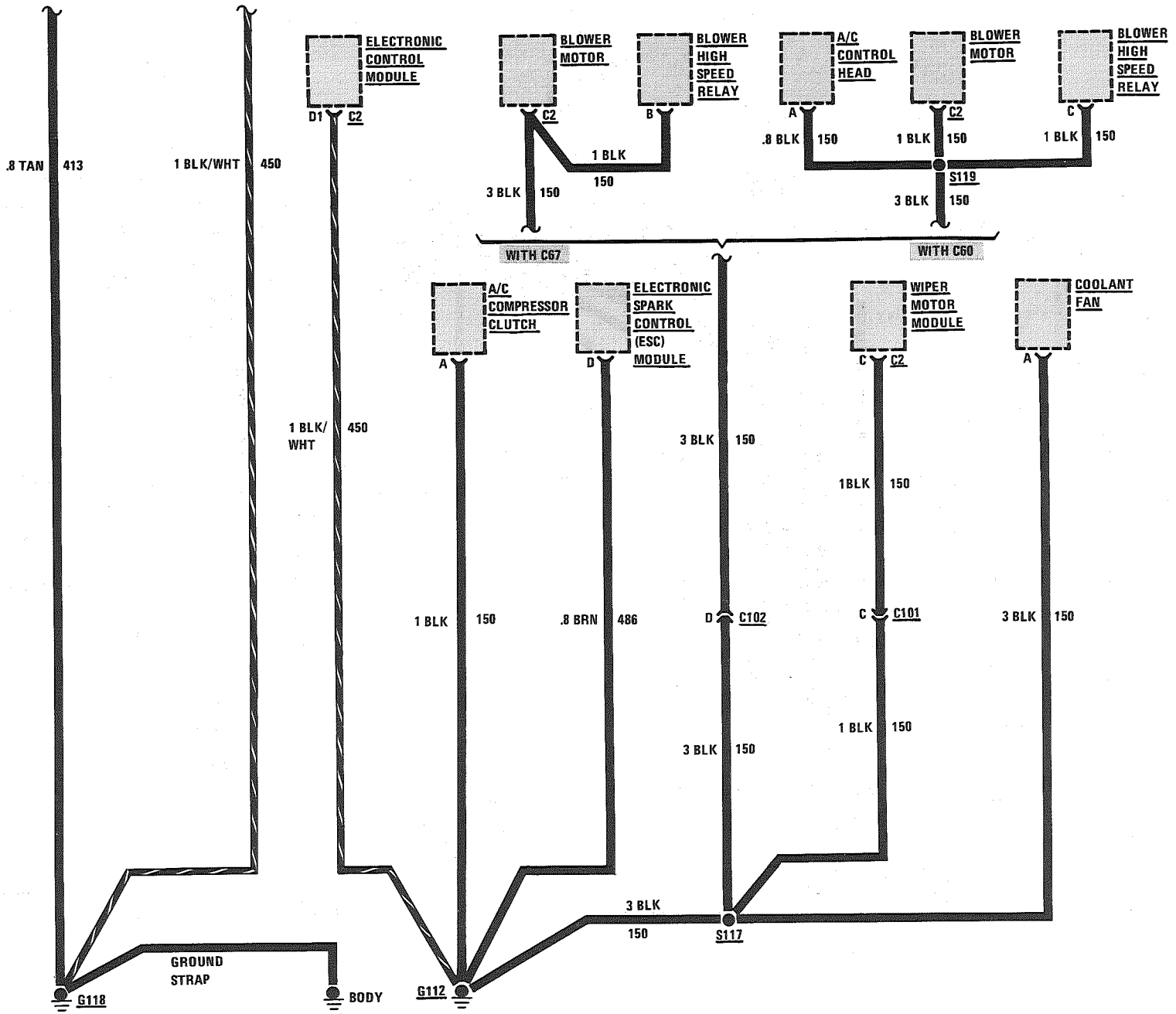



1 BLK/ WHT
450
.8 TAN
413
1 BLK/ WHT
450
MASS AIR FLOW SENSOR
A
.8 BLK/ WHT
450
S158
1 BLK/ WHT
450
GROUND STRAP
G118
BODY
1 BLK/ WHT
450
BLOWER MOTOR
C2
BLOWER HIGH SPEED RELAY
B
1 BLK
150
3 BLK
150
A/C CONTROL HEAD
A
.8 BLK
150
BLOWER MOTOR
C2
1 BLK
150
BLOWER HIGH SPEED RELAY
C
1 BLK
150
S119
3 BLK
150
WITH C67
WITH C60
ELECTRONIC SPARK CONTROL (ESC) MODULE
D
WIPER MOTOR MODULE
C
C2
A/C COMPRESSOR CLUTCH
A
3 BLK
150
18LK
150
.8 BRN
486
D
C102
C
C101
1 BLK
150
1 BLK
150
3 BLK
150
3 BLK
150
S117
G112

GROUND DISTRIBUTION: G112 AND G118

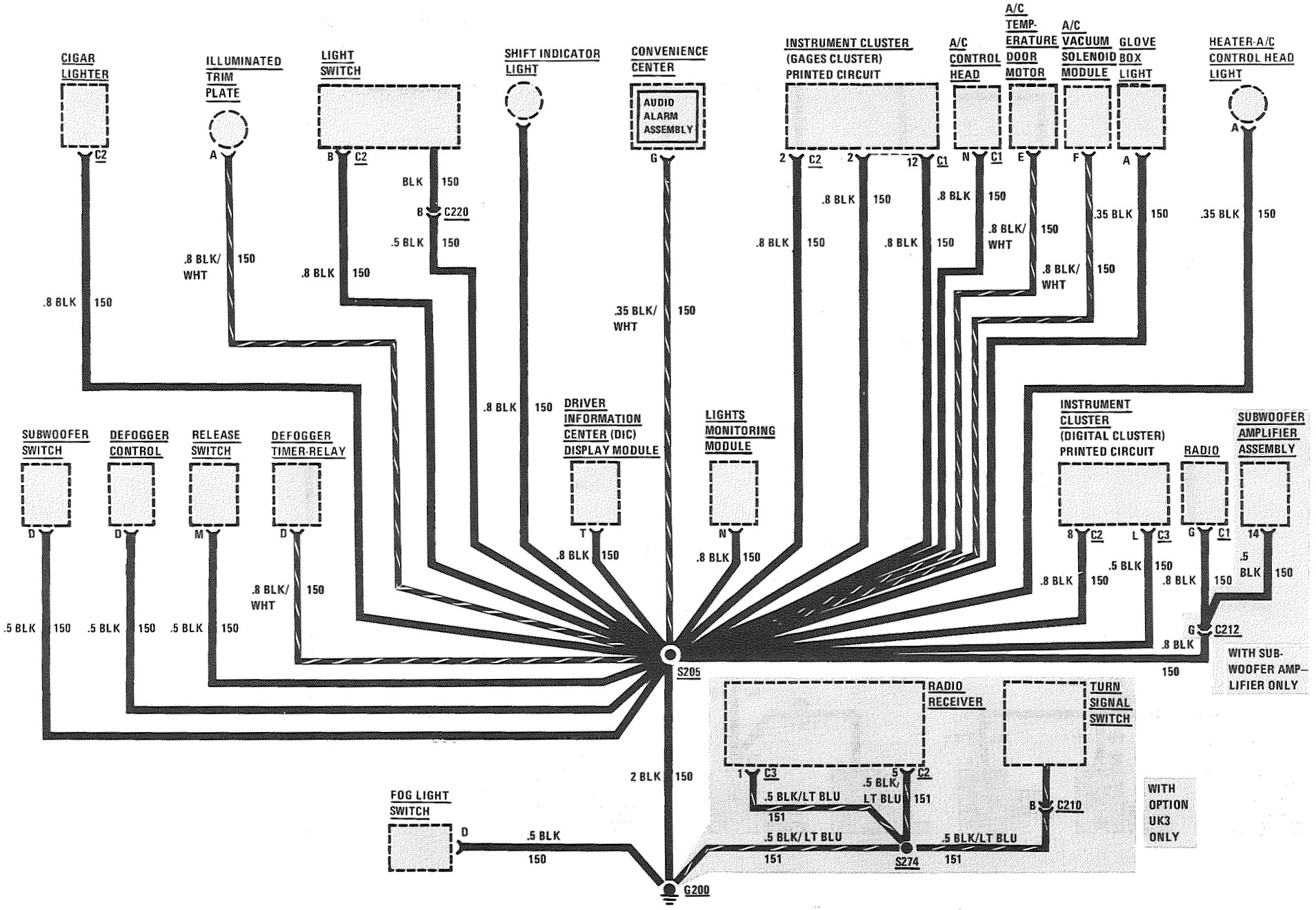
ENGINE GROUNDS, V8 VIN E



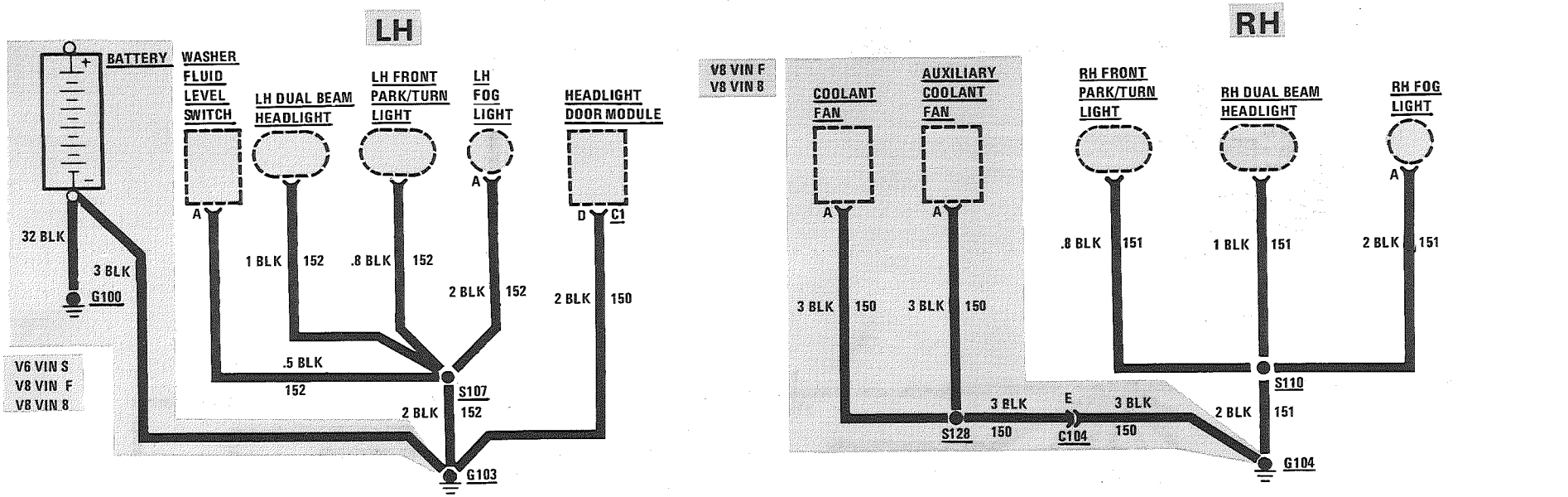

ELECTRONIC CONTROL MODULE
D1
C2
BLOWER MOTOR
C2
BLOWER HIGH SPEED RELAY
B
A/C CONTROL HEAD
A
BLOWER MOTOR
C2
BLOWER HIGH SPEED RELAY
C
.8 TAN 413
1 BLK/WHT 450
1 BLK 150
3 BLK 150
.8 BLK 150
1 BLK 150
1 BLK 150
S119
3 BLK 150
WITH C67
WITH C60
A/C COMPRESSOR CLUTCH
A
ELECTRONIC SPARK CONTROL (ESC) MODULE
D
WIPER MOTOR MODULE
C
C2
COOLANT FAN
A
1 BLK/ WHT 450
3 BLK 150
1BLK 150
1 BLK 150
.8 BRN 486
D
C102
C
C101
3 BLK 150
1 BLK 150
3 BLK 150
3 BLK 150
S117
GROUND STRAP
G118
BODY
G112

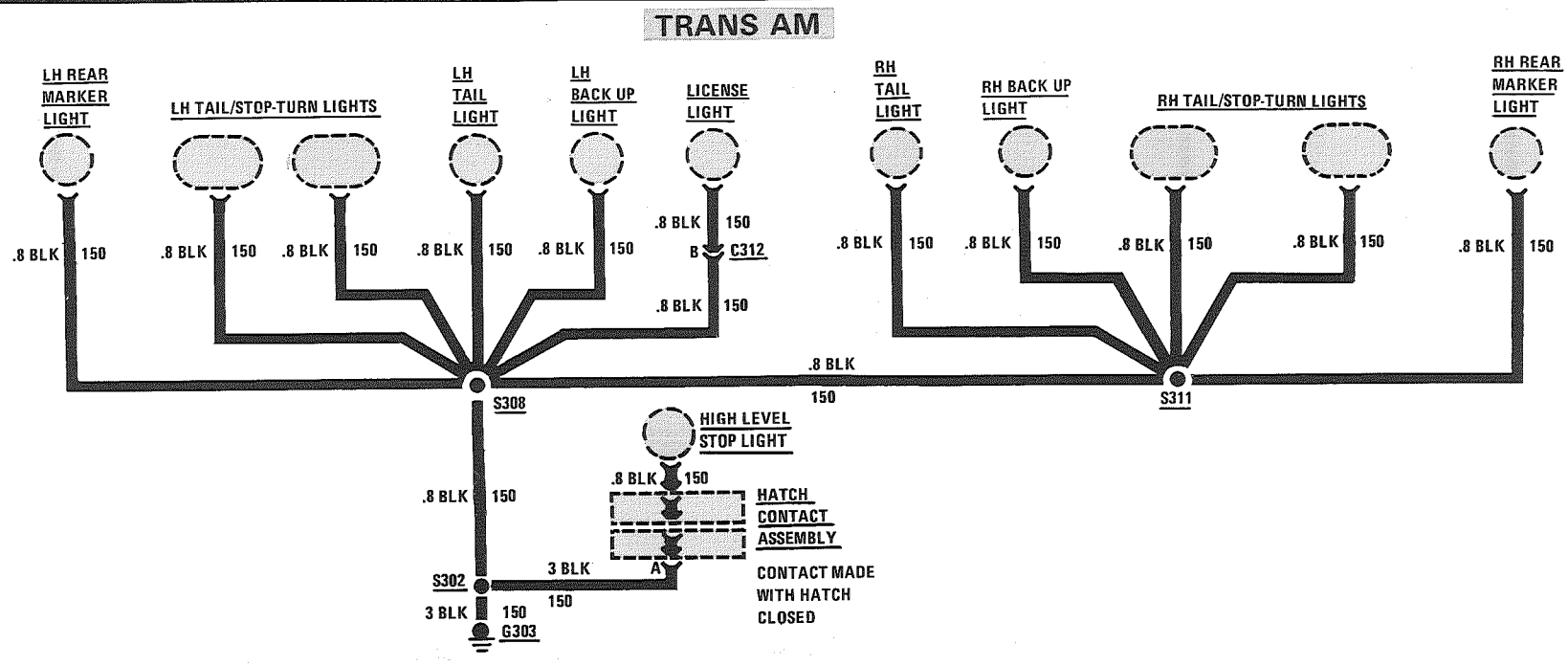
GROUND DISTRIBUTION: G200

INSTRUMENT CLUSTER



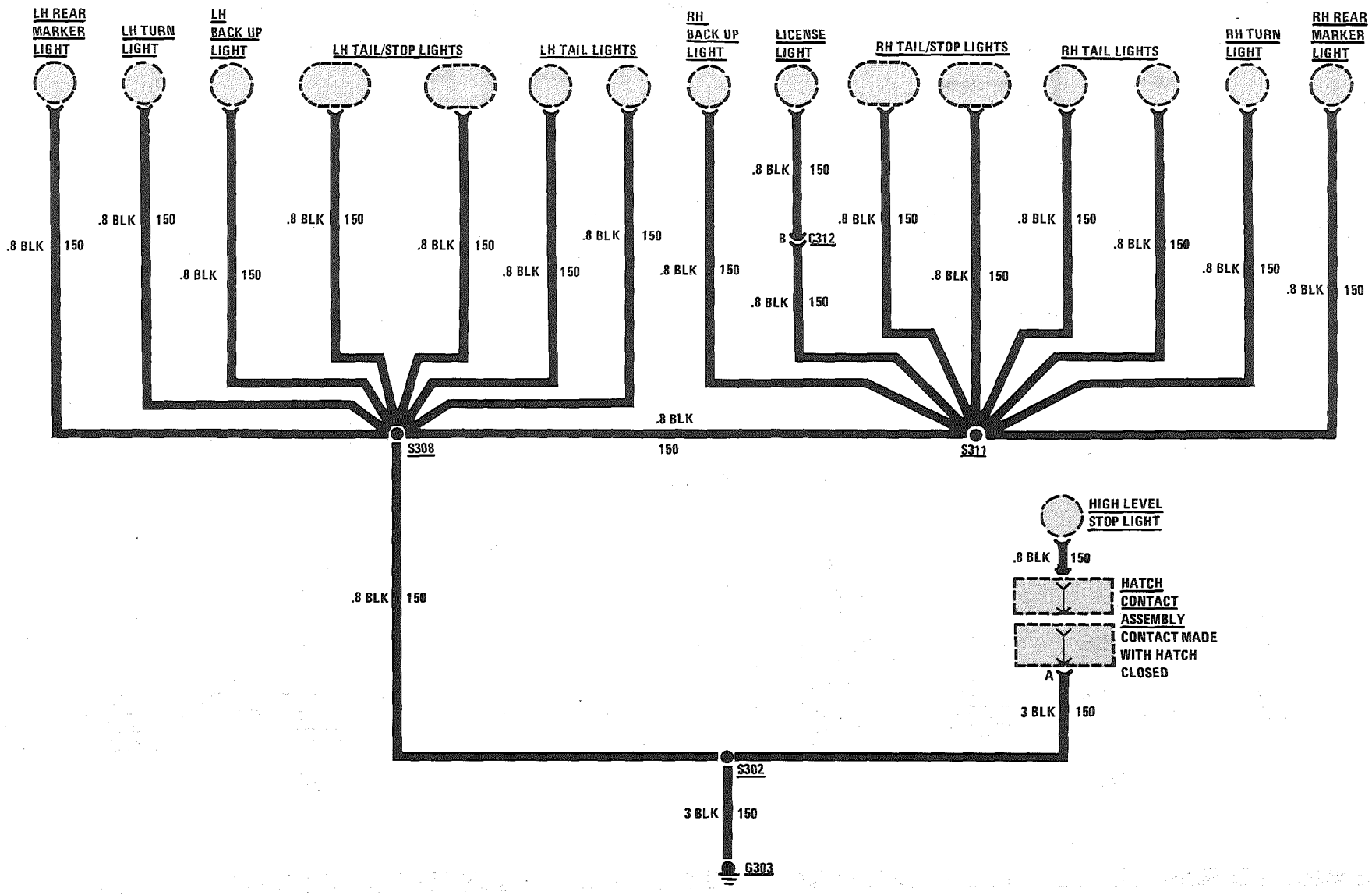
GROUND DISTRIBUTION: G103, G104, G303





GROUND DISTRIBUTION: G303

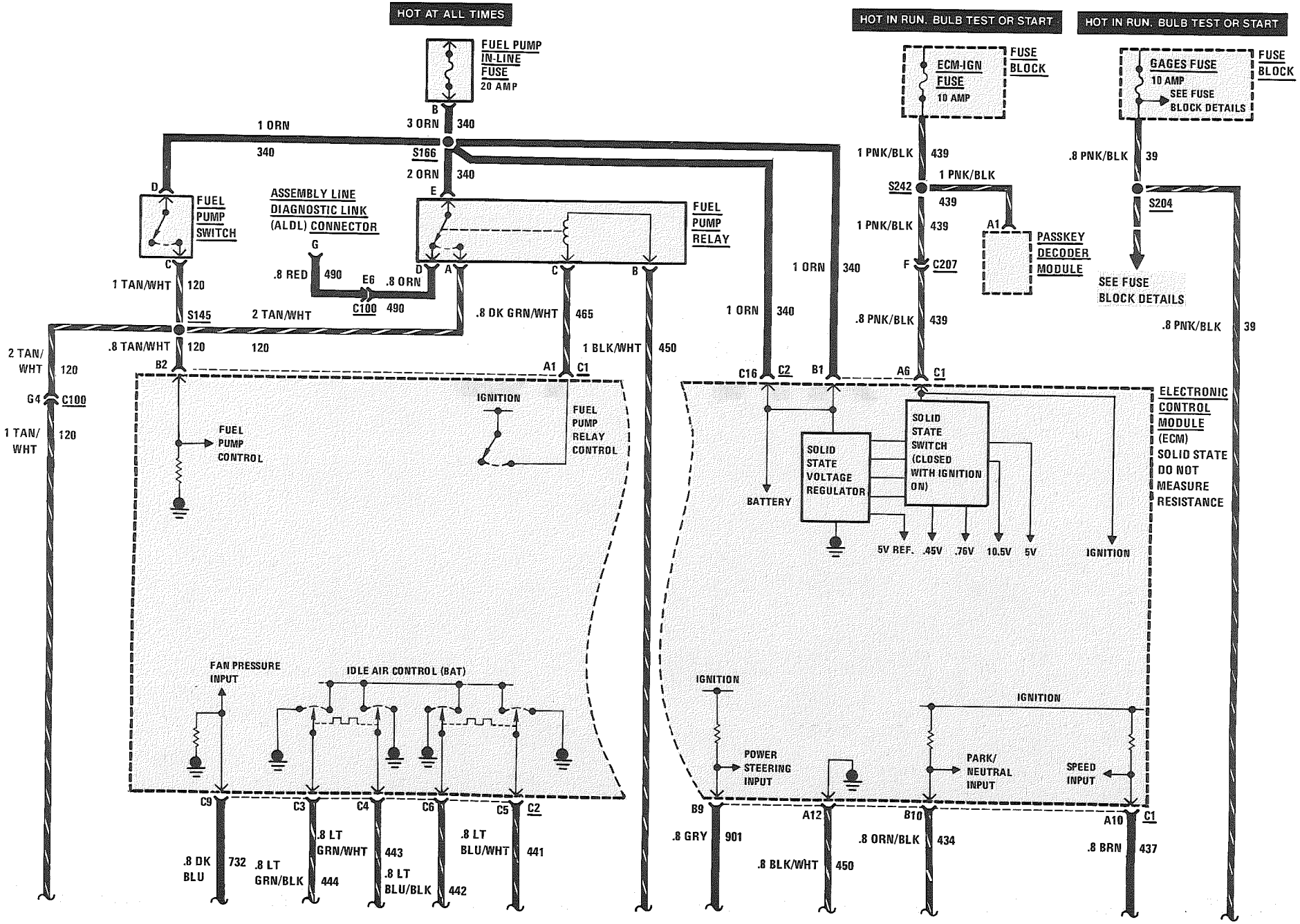
FIREBIRD

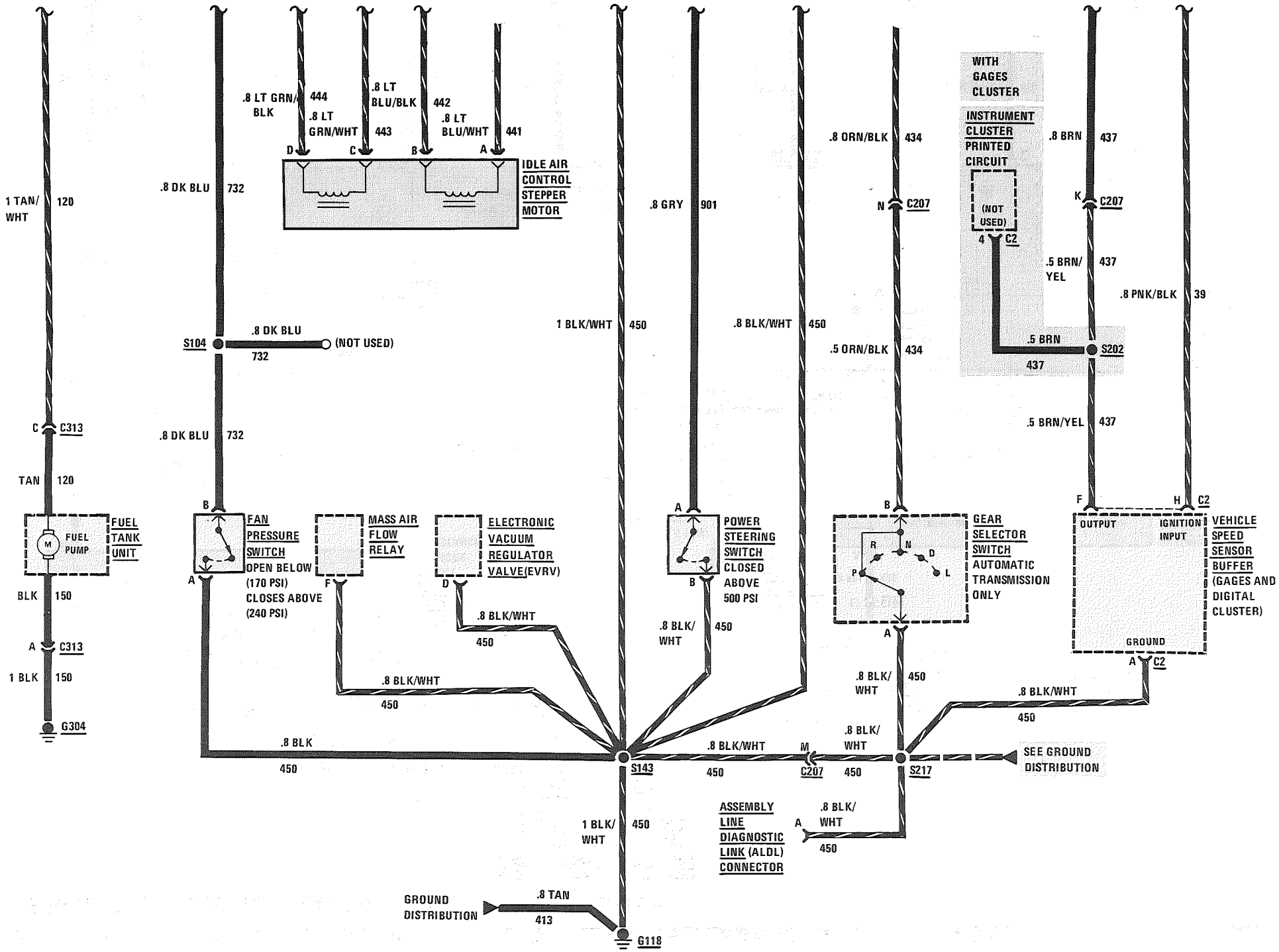


BLANK

MULTI-PORT FUEL INJECTION: V6 VIN S

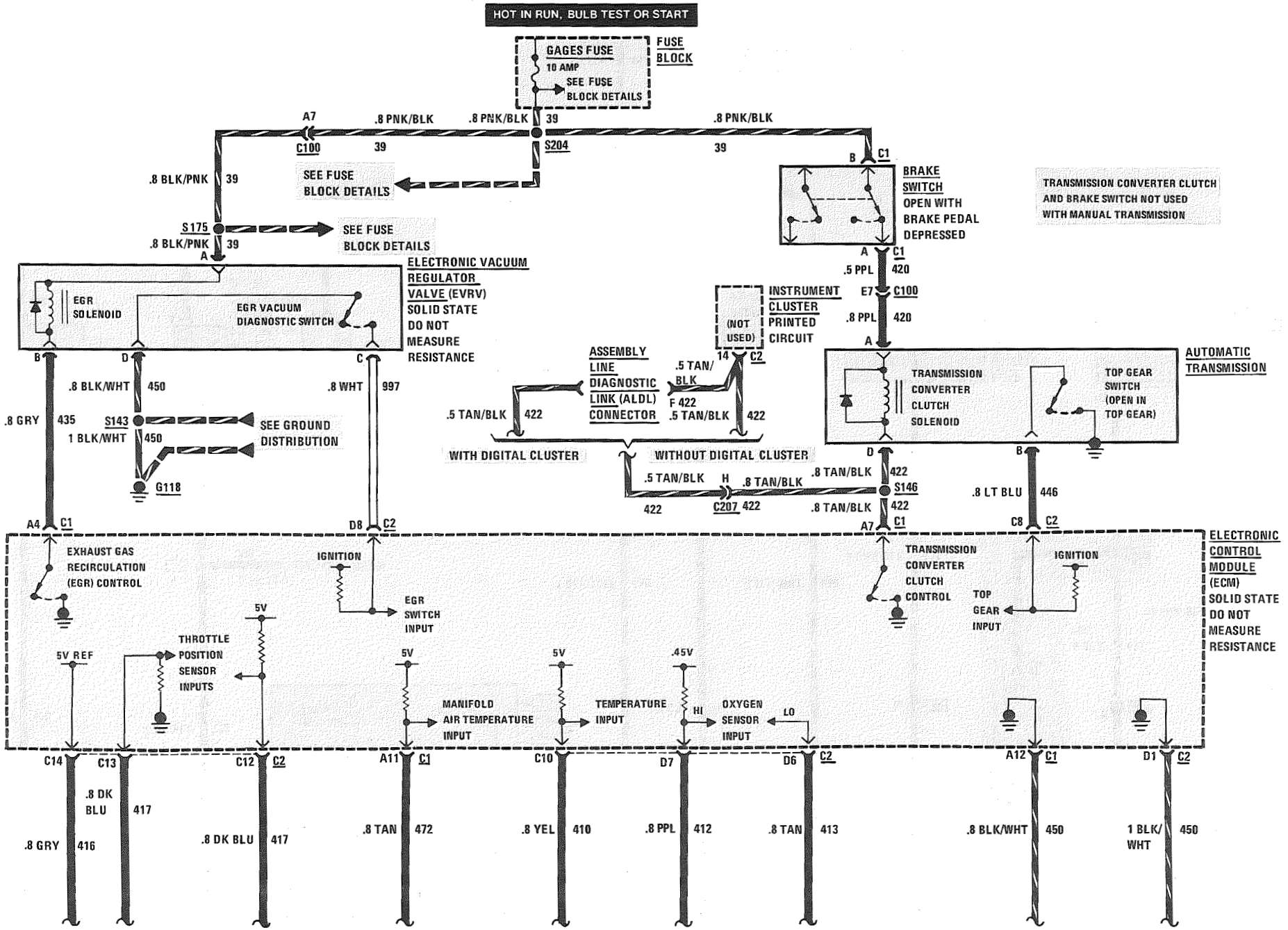
IDLE SPEED CONTROL, FUEL CONTROL, AND VEHICLE DATA SENSORS

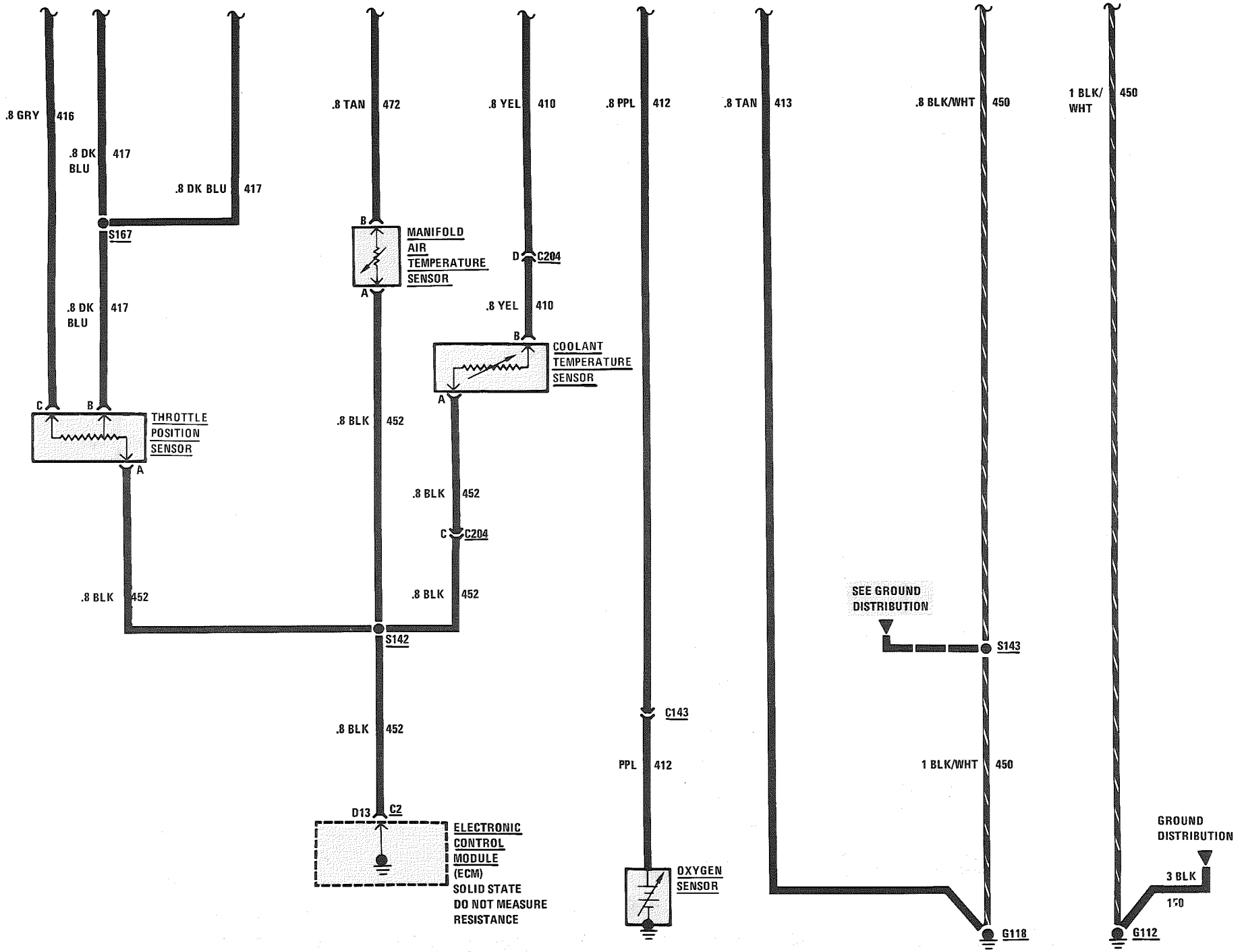



1 TAN/WHT 120
C C313
TAN 120
FUEL PUMP
FUEL TANK UNIT
BLK 150
A C313
1 BLK 150
G304
.8 DK BLU 732
S104
.8 DK BLU 732
(NOT USED)
.8 DK BLU 732
B
FAN PRESSURE SWITCH OPEN BELOW (170 PSI) CLOSES ABOVE (240 PSI)
A
MASS AIR FLOW RELAY
F
ELECTRONIC VACUUM REGULATOR VALVE(EVRV)
D
.8 BLK/WHT 450
.8 BLK/WHT 450
.8 BLK 450
.8 LT GRN/BLK 444
.8 LT GRN/WHT 443
.8 LT BLU/BLK 442
.8 LT BLU/WHT 441
D C B A
IDLE AIR CONTROL STEPPER MOTOR
1 BLK/WHT 450
.8 GRY 901
.8 BLK/WHT 450
A
POWER STEERING SWITCH CLOSED ABOVE 500 PSI
B
.8 BLK/WHT 450
.8 ORN/BLK 434
N C207
.5 ORN/BLK 434
B
GEAR SELECTOR SWITCH AUTOMATIC TRANSMISSION ONLY
R N D P L
A
.8 BLK/WHT 450
WITH GAGES CLUSTER
INSTRUMENT CLUSTER PRINTED CIRCUIT
(NOT USED)
4 C2
.8 BRN 437
K C207
.5 BRN/YEL 437
.5 BRN
S202
437
.5 BRN/YEL 437
.8 PNK/BLK 39
F H C2
OUTPUT
IGNITION INPUT
GROUND
A C2
VEHICLE SPEED SENSOR BUFFER (GAGES AND DIGITAL CLUSTER)
.8 BLK/WHT 450
S143
.8 BLK/WHT 450
M C207 450
S217
SEE GROUND DISTRIBUTION
1 BLK/WHT 450
ASSEMBLY LINE DIAGNOSTIC LINK (ALDL) CONNECTOR
A
.8 BLK/WHT 450
GROUND DISTRIBUTION
.8 TAN 413
G118

MULTI-PORT FUEL INJECTION: V6 VIN S

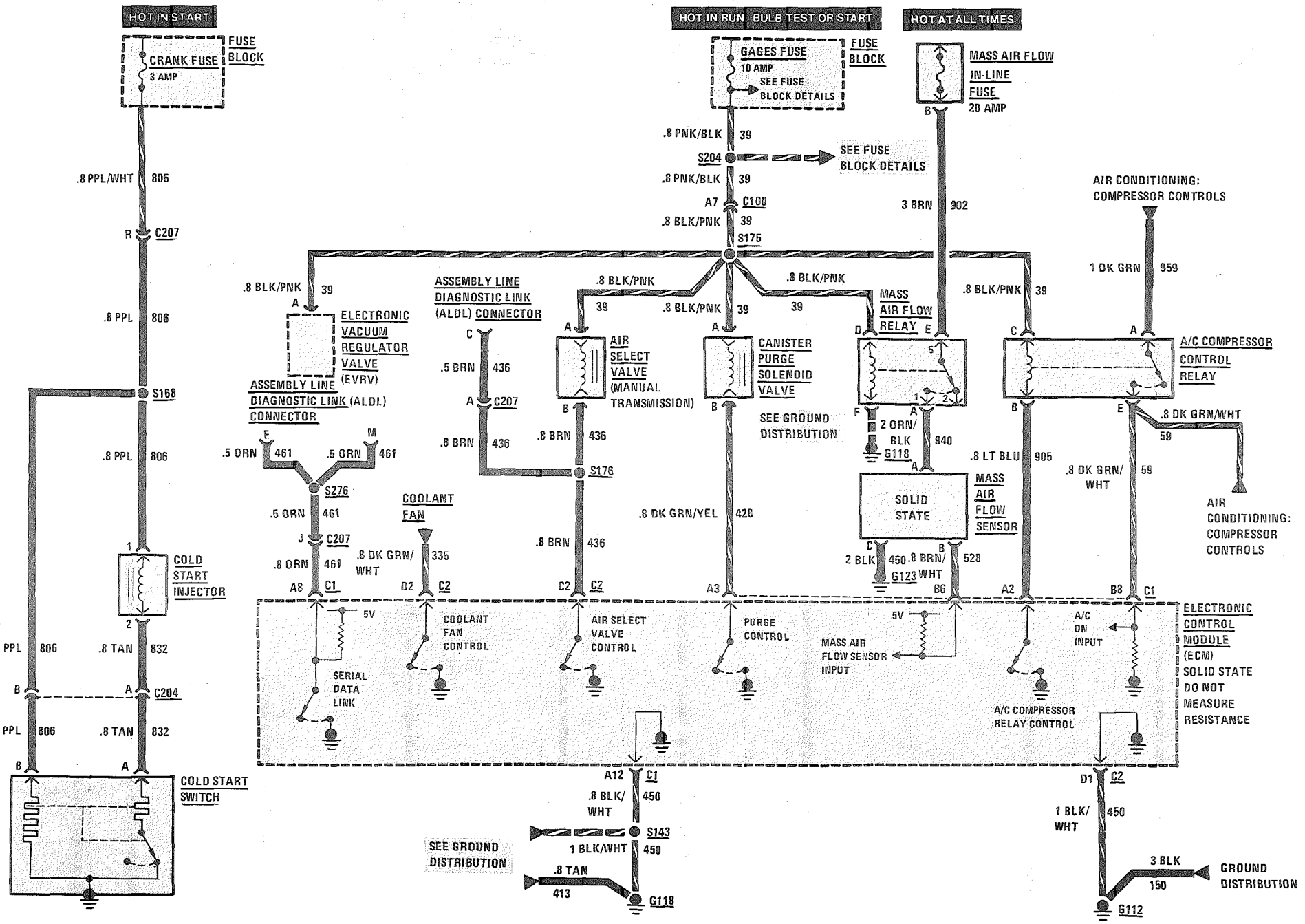
ENGINE DATA SENSORS, TRANSMISSION CONVERTER CLUTCH




.8 GRY 416
.8 DK BLU 417
.8 DK BLU 417
S167
.8 DK BLU 417
C
B
THROTTLE POSITION SENSOR
A
.8 BLK 452
.8 TAN 472
B
MANIFOLD AIR TEMPERATURE SENSOR
A
.8 YEL 410
D
C204
.8 YEL 410
B
COOLANT TEMPERATURE SENSOR
A
.8 BLK 452
C
C204
.8 BLK 452
.8 BLK 452
.8 BLK 452
S142
D13
C2
ELECTRONIC CONTROL MODULE (ECM)
SOLID STATE
DO NOT MEASURE RESISTANCE
.8 PPL 412
C143
PPL 412
OXYGEN SENSOR
.8 TAN 413
.8 BLK/WHT 450
SEE GROUND DISTRIBUTION
S143
1 BLK/WHT 450
G118
1 BLK/WHT 450
GROUND DISTRIBUTION
3 BLK
150
G112

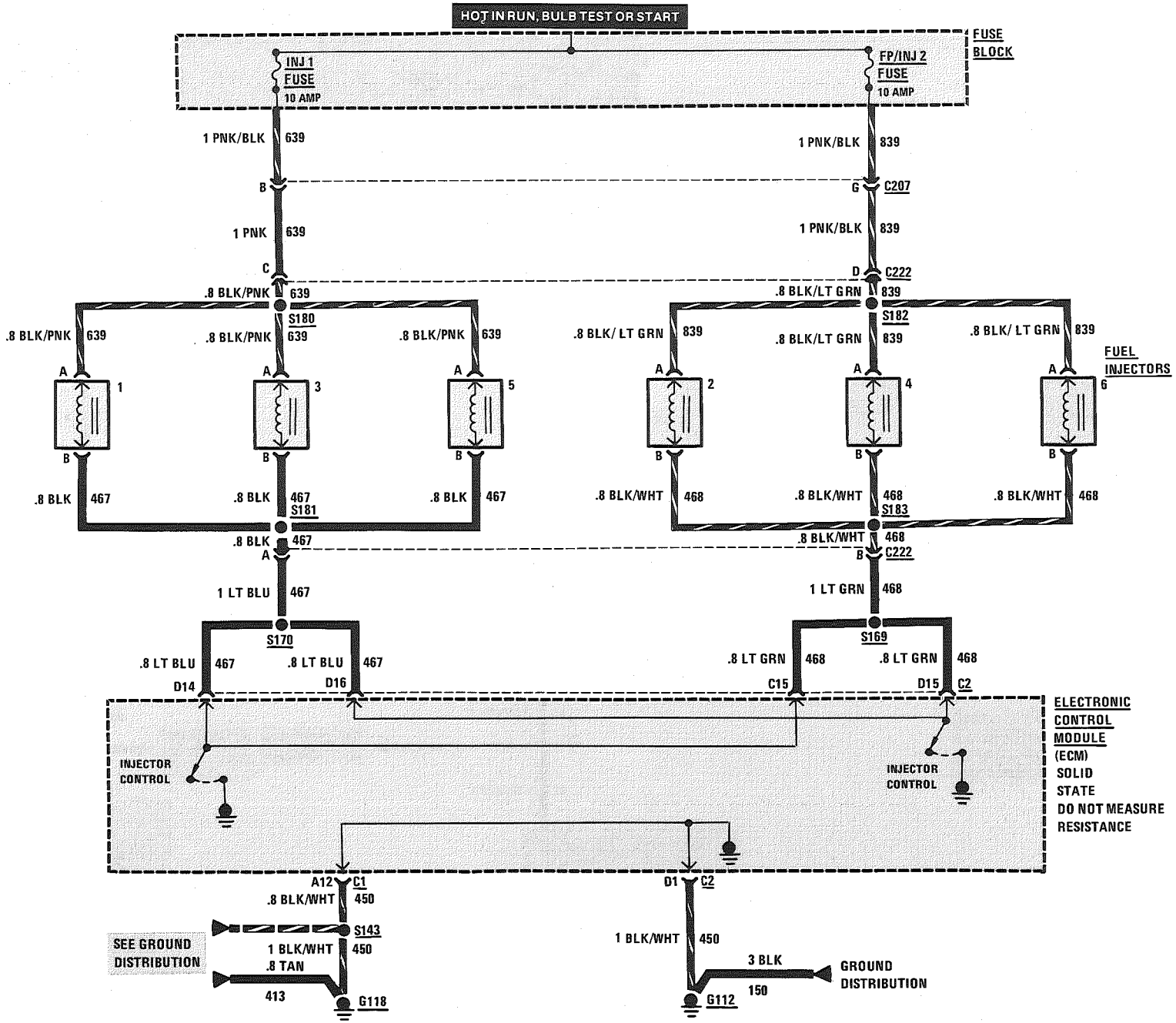
MULTI-PORT FUEL INJECTION: V6 VIN S

COLD START, EMISSION CONTROL, AND MASS AIR FLOW SENSOR



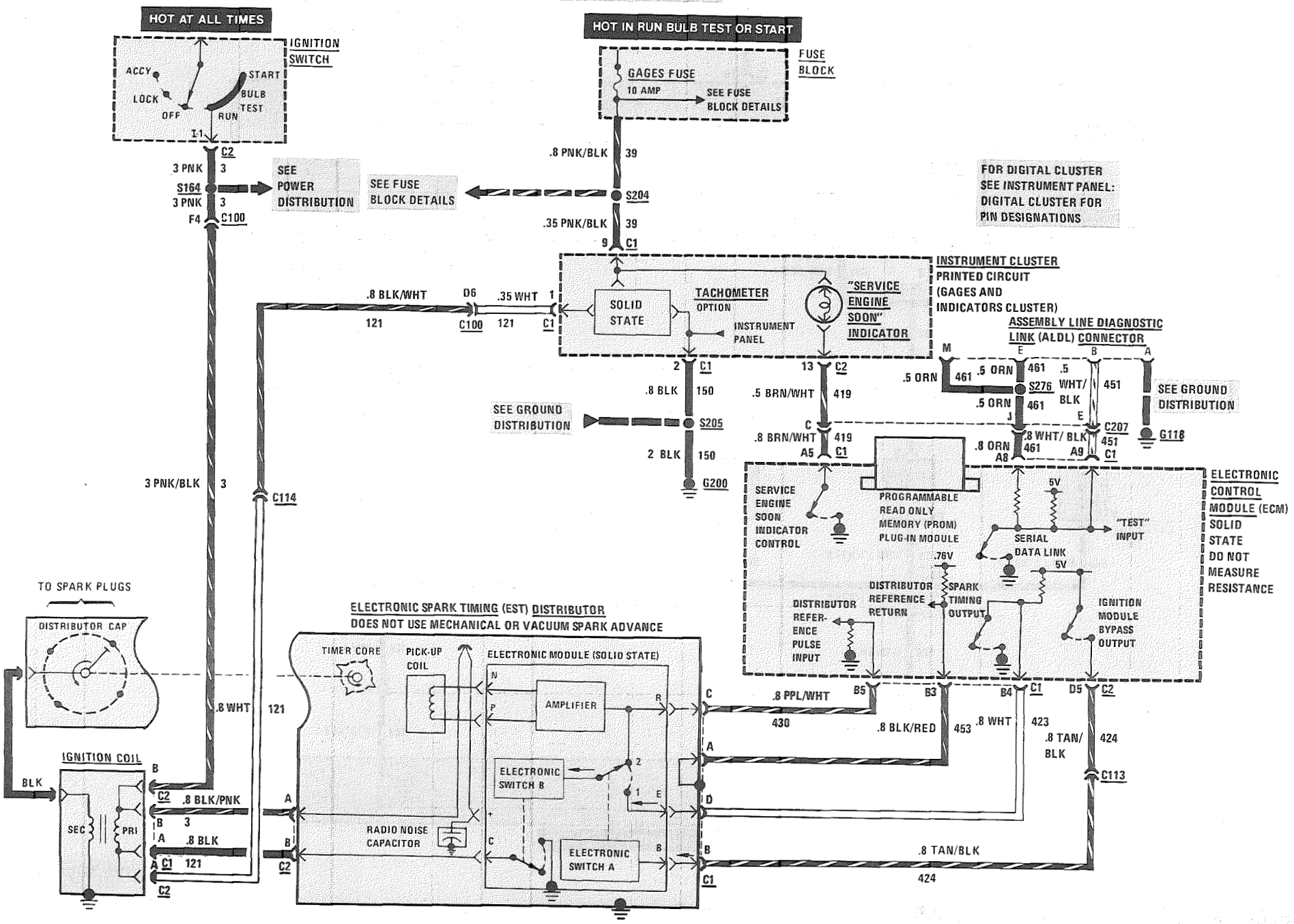
MULTI-PORT FUEL INJECTION: V6 VIN S

FUEL INJECTORS



MULTI-PORT FUEL INJECTION: V6 VIN S

IGNITION, SERVICE ENGINE SOON INDICATOR, AND TACHOMETER



COMPONENT LOCATION

		Page-Figure
A/C Compressor Control Relay	LH rear corner of engine compartment, on relay bracket	201- 0-A
AIR Select Valve (VIN S)	Lower RH side of engine, behind AIR pump	
Assembly Line Diagnostic Link (ALDL) Connector	On bottom of I/P hush panel, to right of steering column	
Brake Switch	Above brake pedal, on brake pedal support	201- 9-A
Canister Purge Solenoid Valve (VIN S)	Lower RH front corner of engine compartment	201- 1-A
Cold Start Injector (VIN S)	Top LH rear of engine	201- 0-C
Cold Start Switch (VIN S)	Top of engine	
Coolant Temperature Sensor (VIN S)	Top LH front of intake manifold	201- 0-A
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Electronic Spark Timing (EST) Distributor (VIN S)	Top rear of engine	201- 1-C
Electronic Vacuum Regulator Valve (EVRV)	Top RH rear of engine	201- 1-A
Fan Pressure Switch (VIN S)	Lower RH front of engine compartment, on A/C line	201- 1-A
Fuel Injectors	Top of engine, at each intake cylinder	
Fuel Pump In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Fuel Pump Relay (VIN S)	LH rear corner of engine compartment, on relay bracket	201- 0-A
Fuel Pump Switch (VIN S)	Lower LH side of engine	201- 0-A
Fuel Tank Unit	Top center of fuel tank	201- 9-C
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Gear Selector Switch	In console, at base of gear selector	201-11-E
Idle Air Control Stepper Motor (VIN S)	Top center of engine	201- 1-A
Ignition Coil (VIN S)	Rear RH side of engine	201- 1-A
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
Manifold Air Temperature (MAT) Sensor (VIN S)	RH front of engine compartment, on air cleaner assembly	201- 1-A

COMPONENT LOCATION

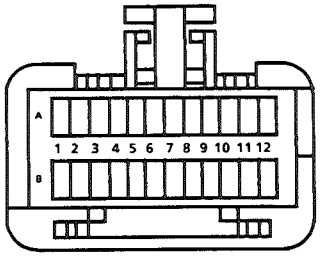
		Page-Figure
Mass Air Flow (MAF) Relay (VIN S)	Front of engine compartment, on RH side of radiator bracket	201- 1-A
Mass Air Flow (MAF) Sensor (VIN S)	Front of engine compartment, on rear of air cleaner	201- 1-A
Mass Air Flow In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Oxygen Sensor (VIN S)	Lower RH rear of engine, on exhaust manifold	201- 1-A
Power Steering Switch	Lower LH front corner of engine compartment, on steering unit	201- 0-A
Throttle Position Sensor (VIN S)	Top center of engine	201- 1-A
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C113 (1 cavity) (VIN S)	Taped to engine harness, RH front of dash	201- 1-A
C114 (1 cavity) (VIN S)	Taped to engine harness, above rear of engine	201- 1-A
C143 (1 cavity) (VIN S)	Lower rear RH side of engine	201- 1-A
C204 (4 cavities)	Above LH rear corner of engine	201- 0-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C222 (4 cavities)	Top front of engine	201- 0-A
C313 (3 cavities)	Below center of back seat	201- 9-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
G118 (VIN S)	Rear of RH cylinder head	201- 1-C
G123	RH front corner of engine compartment, on inner fender panel	201- 1-A
G200	Behind I/P, left of steering column	201-10-A
G304	Under rear seat, on support bracket	
S104 (VIN S)	Engine harness, lower RH side of engine	201- 1-A
S142 (VIN S)	Engine harness, lower RH side of engine	201- 1-A
S143 (VIN S)	Engine harness, center front of dash	201- 1-A
S145 (VIN S)	Engine harness, above rear of engine	201- 1-A
S146 (VIN S)	Engine harness, behind RH side of I/P	
S164	I/P harness, above Fuse Block	201-10-A
S166 (VIN S)	Engine harness, lower RH side of engine	201- 1-A
S167	Engine harness, behind RH side of I/P	
S168 (VIN S)	Engine harness, top rear of engine	201- 1-C
S169	Engine harness, behind RH side of I/P	
S170	Engine harness, behind RH side of I/P	

COMPONENT LOCATION

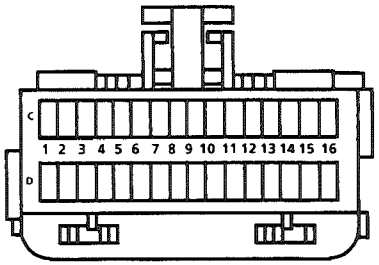
		Page-Figure
S175 (VIN S)	Engine harness, lower LH front of dash	201- 0-A
S176 (VIN S)	Engine harness, behind RH side of I/P	
S180 (VIN S)	Injector harness, top of engine	
S181	Injector harness, top of engine	
S182	Injector harness, top of engine	
S183	Injector harness, top of engine	
S202	I/P harness, behind RH side of I/P	201-13-A
S204	I/P harness, behind instrument cluster	201-10-A
S205	I/P harness, behind instrument cluster	201-10-A
S217	I/P harness, behind center of I/P	201-10-A
S242	I/P harness, behind RH side of I/P	201-13-A
S276	I/P harness, behind RH side of I/P	201-13-A
S346	Speaker harness, behind RH side of rear seat	201- 9-B

MULTI-PORT FUEL INJECTION: V6 VIN S

ELECTRONIC CONTROL MODULE CONNECTORS



C1 BLK



C2 BLK

ELECTRONIC CONTROL MODULE (ECM)

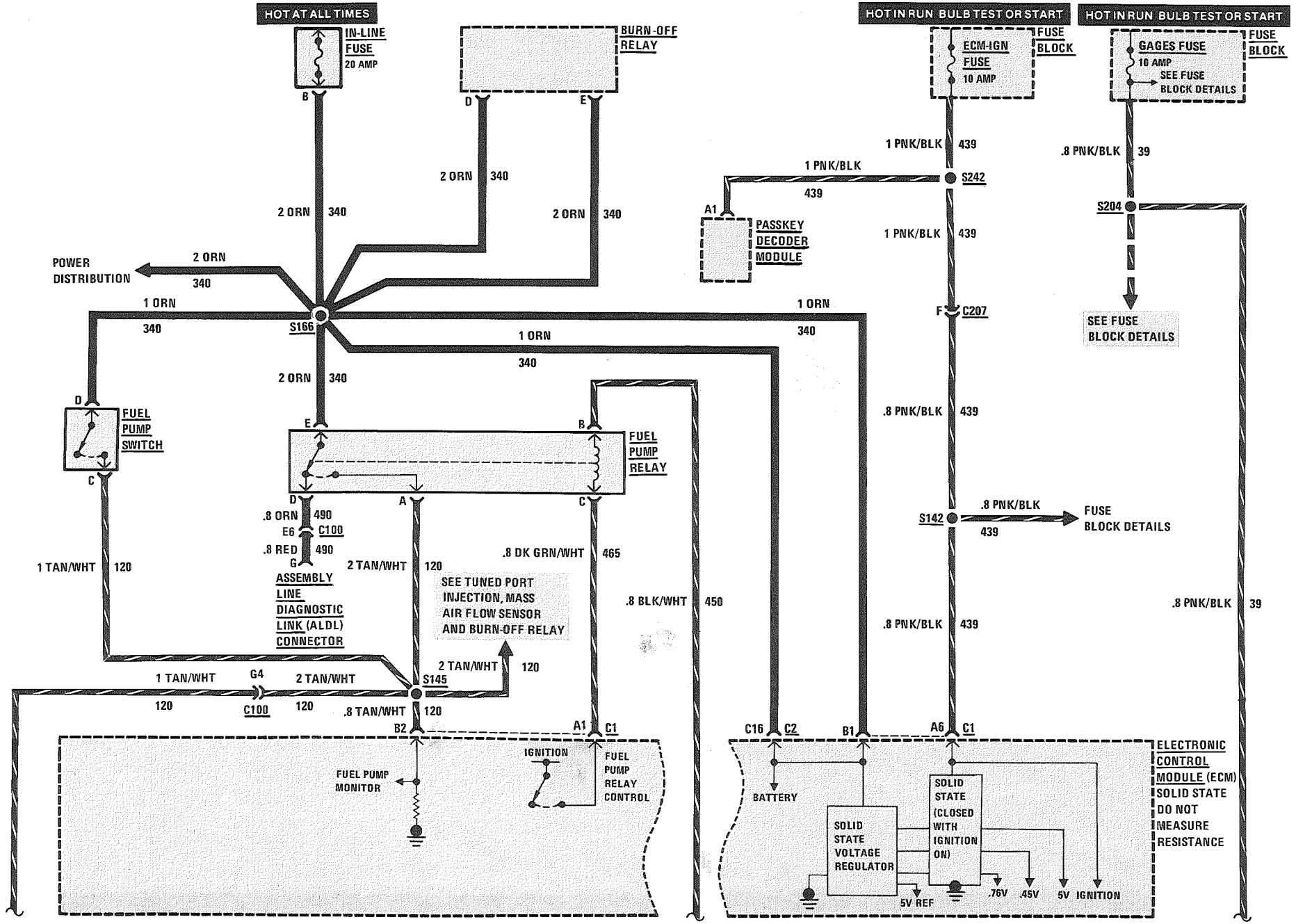
Cavity	Wire Color Socket Half	Circuit Number	Circuit Function
A1	DK GRN/WHT	465	Fuel Pump Relay Control
A2	LT BLU	905	A/C Compressor Relay Control
A3	DK GRN/YEL	428	Canister Purge Solenoid Valve Control
A4	GRY	435	Exhaust Gas Recirculation Solenoid Control
A5	BRN/WHT	419	"Service Engine Soon" Indicator Control
A6	PNK/BLK	439	Ignition
A7	TAN/BLK	422(Auto) 456(Man)	TCC Control (Auto) Shift Indicator Control (Man)
A8	ORN	461	Serial Data Link
A9	WHT/BLK	451	Diagnostic "Test" Input
A10	BRN	437	Speed Input
A11	TAN	472	Manifold Air Temperature Sensor Input
A12	BLK/WHT	450	Ground
B1	ORN	340	Battery
B2	TAN/WHT	120	Fuel Pump Control
B3	BLK/RED	453	Distributor Reference Pulse: LO
B4	WHT	423	Spark Timing Output
B5	PPL/WHT	430	Distributor Reference Pulse Input: HI
B6	BRN/WHT	528	Mass Air Flow Sensor Input
B7	—	—	Not Used
B8	DK GRN/WHT	59	A/C On Input
B9	GRY	901	Power Steering Input
B10	ORN/BLK	434	Park/Neutral Input
B11	—	—	Not Used
B12	—	—	Not Used
C1	—	—	Not Used
C2	BRN	436	Air Select Valve Control

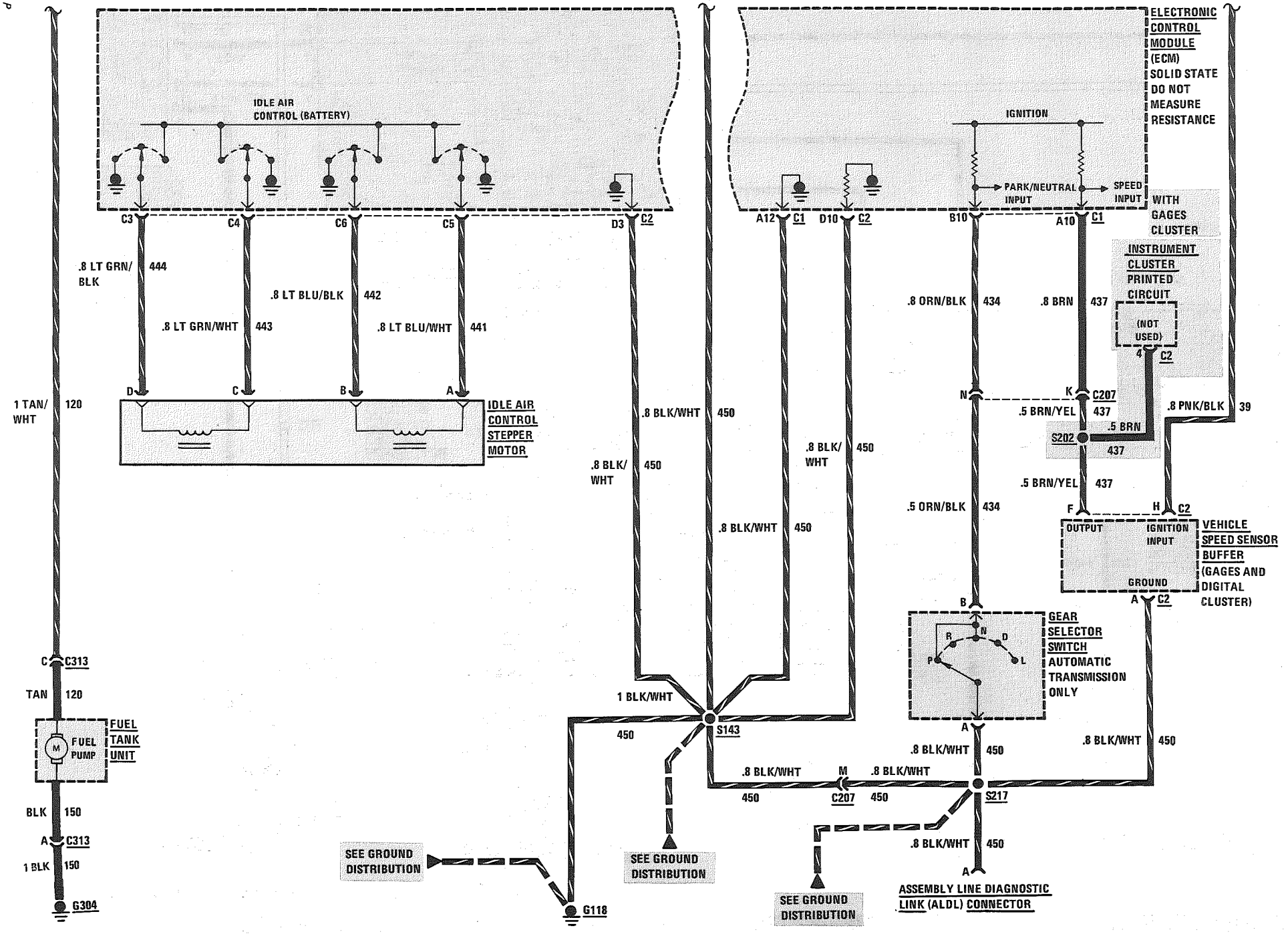
Cavity	Wire Color Socket Half	Circuit Number	Circuit Function
C5	LT BLU/WHT	441	Idle Air Control A HI
C6	LT BLU/BLK	442	Idle Air Control A LO
C7	—	—	Not Used
C8	LT BLU	446	Top Gear Input
C9	DK BLU	732	Fan Pressure Switch Input
C10	YEL	410	Coolant Temperature Sensor Input
C11	—	—	Not Used
C12	DK BLU	417	Throttle Position Sensor Input
C13	DK BLU	417	Throttle Position Sensor Input
C14	GRY	416	5 Volt Reference
C15	LT GRN	468	Connected to D14
C16	ORN	340	Battery
D1	BLK/WHT	450	Ground
D2	DK GRN/WHT	335	Fan Control Output
D3	—	—	Not Used
D4	—	—	Not Used
D5	TAN/BLK	424	Ignition Module Bypass Output
D6	TAN	413	Oxygen Sensor Input: LO
D7	PPL	412	Oxygen Sensor Input: HI
D8	WHT	397	Evrv Control
D9	—	—	Not Used
D10	—	—	Not Used
D11	—	—	Not Used
D12	—	—	Not Used
D13	BLK	452	Ground
D14	LT BLU	467	Fuel Injector Control
D15	LT GRN	468	Fuel Injector Control
D16	LT BLU	467	Connected to D15

BLANK

TUNED PORT INJECTION: V8 VIN F

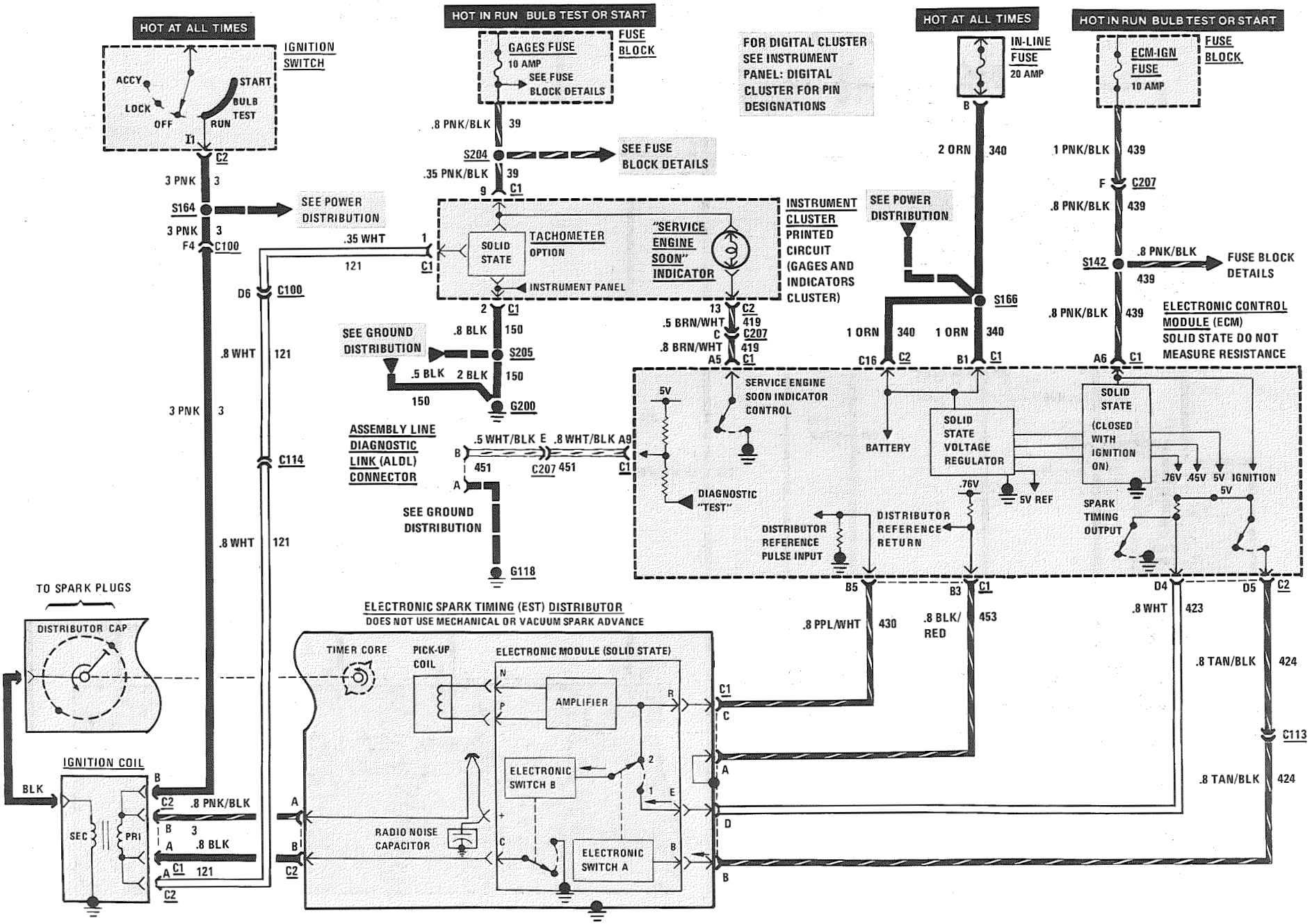
IDLE SPEED CONTROL, FUEL CONTROL, AND VEHICLE DATA SENSORS




IDLE AIR CONTROL (BATTERY)
C3
C4
C6
C5
D3
C2
.8 LT GRN/BLK
444
.8 LT GRN/WHT
443
.8 LT BLU/BLK
442
.8 LT BLU/WHT
441
D
C
B
A
IDLE AIR CONTROL STEPPER MOTOR
1 TAN/WHT
120
.8 BLK/WHT
450
.8 BLK/WHT
450
ELECTRONIC CONTROL MODULE (ECM) SOLID STATE DO NOT MEASURE RESISTANCE
IGNITION
PARK/NEUTRAL INPUT
SPEED INPUT
A12
C1
D10
C2
B10
A10
C1
WITH GAGES CLUSTER
INSTRUMENT CLUSTER PRINTED CIRCUIT
(NOT USED)
4
C2
.8 ORN/BLK
434
.8 BRN
437
N
K
C207
.5 BRN/YEL
437
.5 BRN
437
S202
.8 PNK/BLK
39
.5 BRN/YEL
437
.5 ORN/BLK
434
F
H
C2
OUTPUT
IGNITION INPUT
GROUND
A
C2
VEHICLE SPEED SENSOR BUFFER (GAGES AND DIGITAL CLUSTER)
B
R
N
D
P
L
GEAR SELECTOR SWITCH AUTOMATIC TRANSMISSION ONLY
A
.8 BLK/WHT
450
.8 BLK/WHT
450
.8 BLK/WHT
450
.8 BLK/WHT
M
.8 BLK/WHT
450
C207
450
S217
.8 BLK/WHT
450
A
ASSEMBLY LINE DIAGNOSTIC LINK (ALDL) CONNECTOR
C
C313
TAN
120
FUEL TANK UNIT
FUEL PUMP
BLK
150
A
C313
1 BLK
150
G304
1 BLK/WHT
450
S143
SEE GROUND DISTRIBUTION
SEE GROUND DISTRIBUTION
SEE GROUND DISTRIBUTION
G118

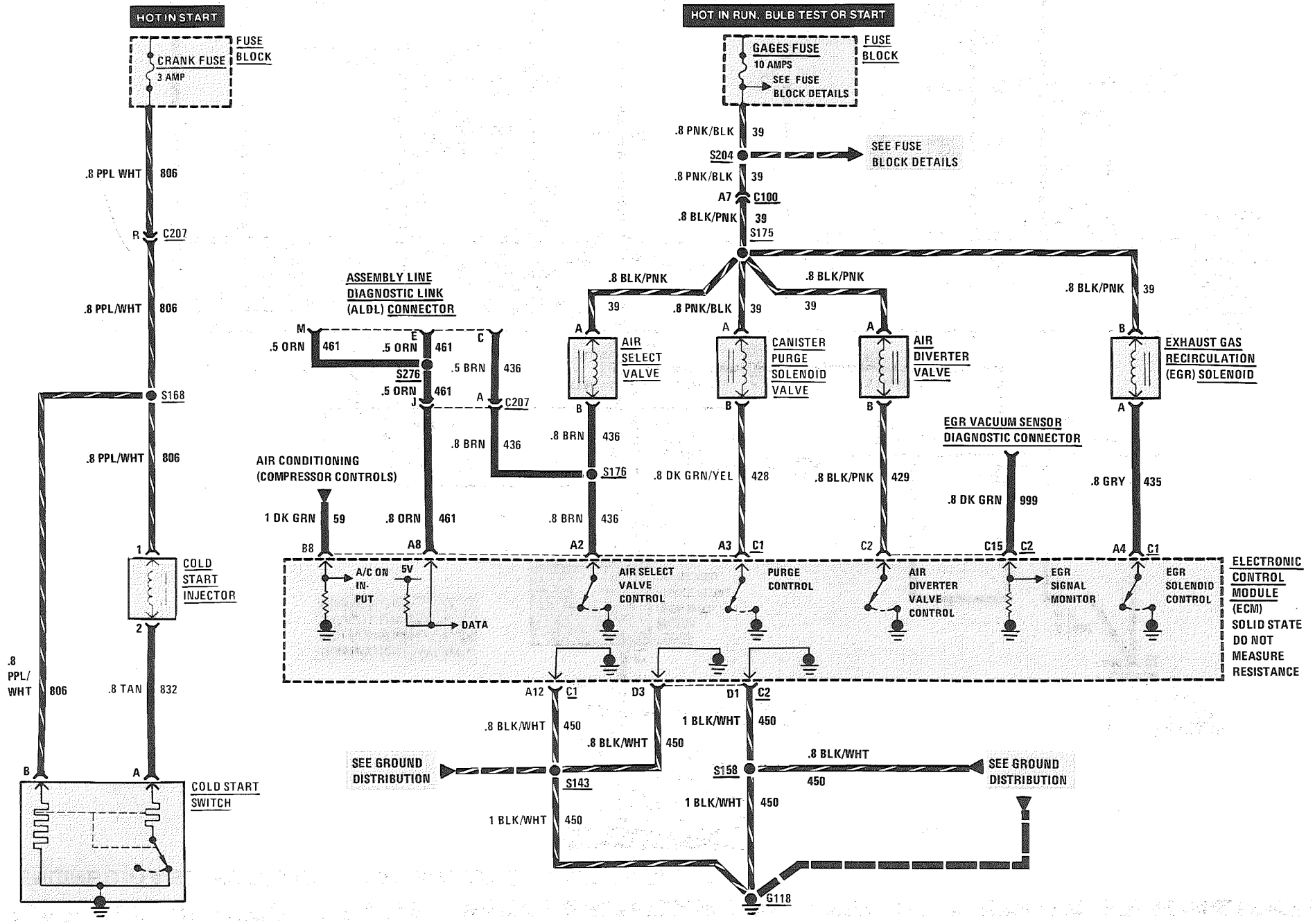
TUNED PORT INJECTION: V8 VIN F

IGNITION, SERVICE ENGINE SOON INDICATOR AND TACHOMETER



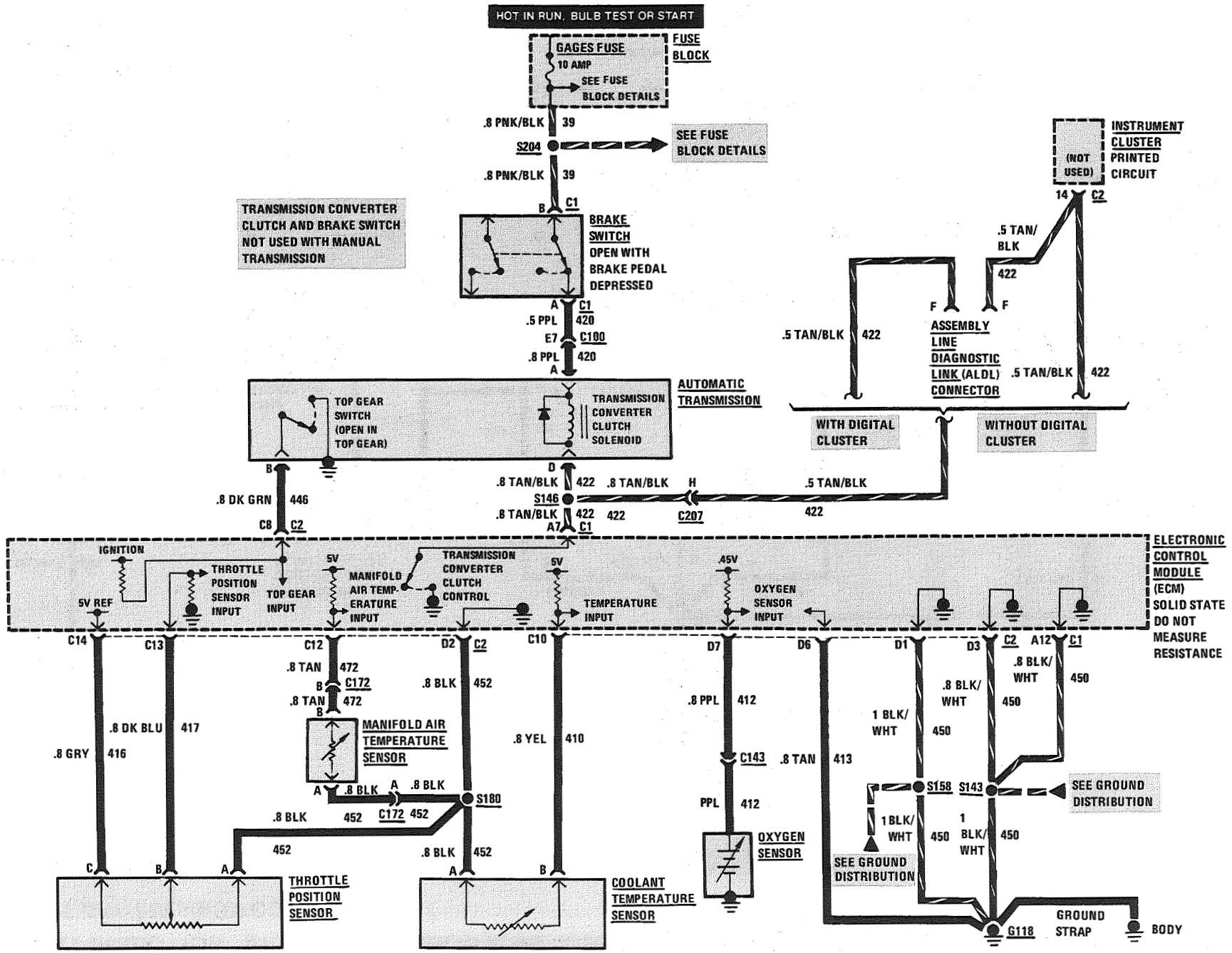
TUNED PORT INJECTION: V8 VIN F

COLD START AND EMISSION CONTROL



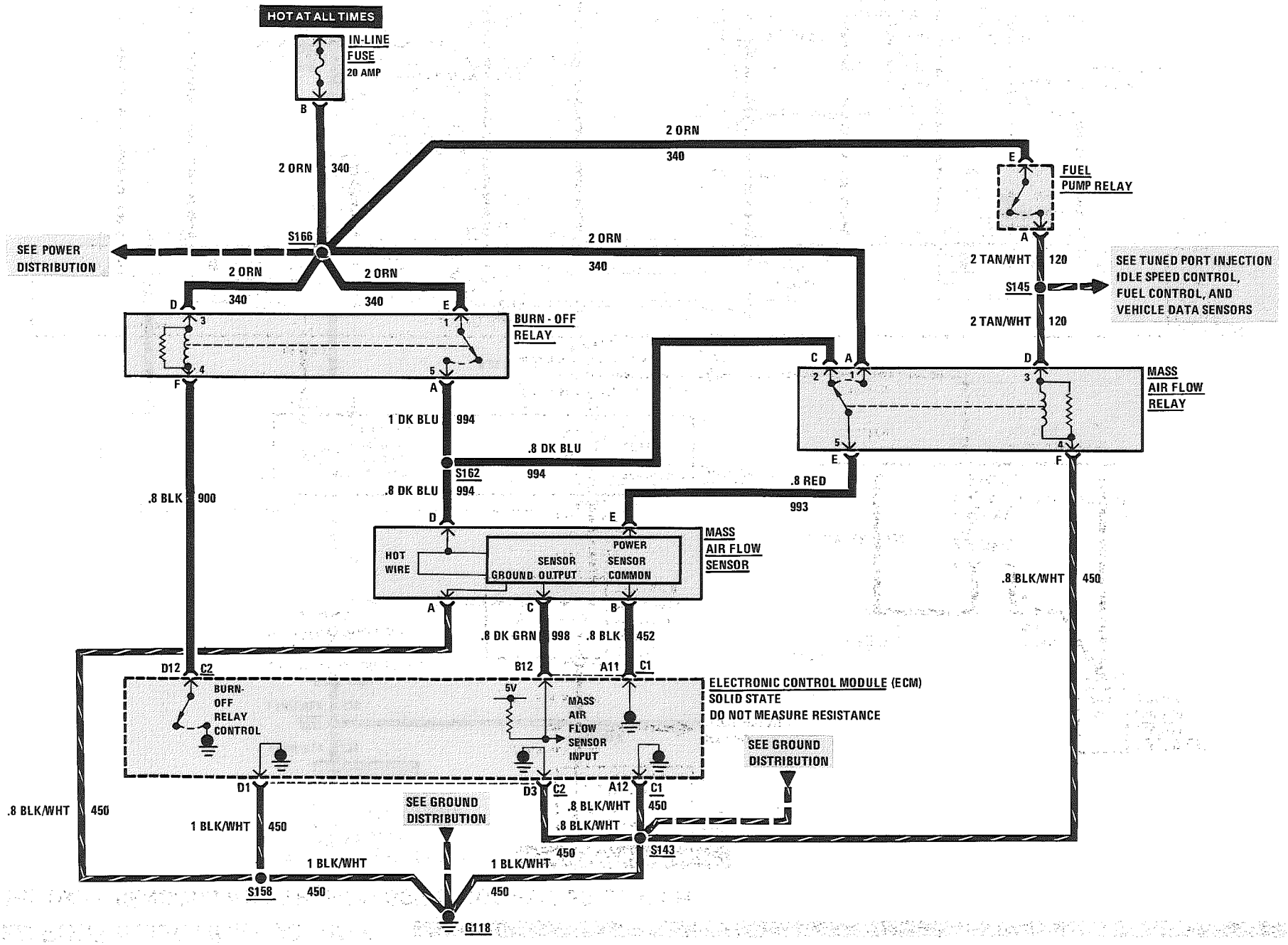
TUNED PORT INJECTION: V8 VIN F

ENGINE DATA SENSORS AND TRANSMISSION CONVERTER CLUTCH



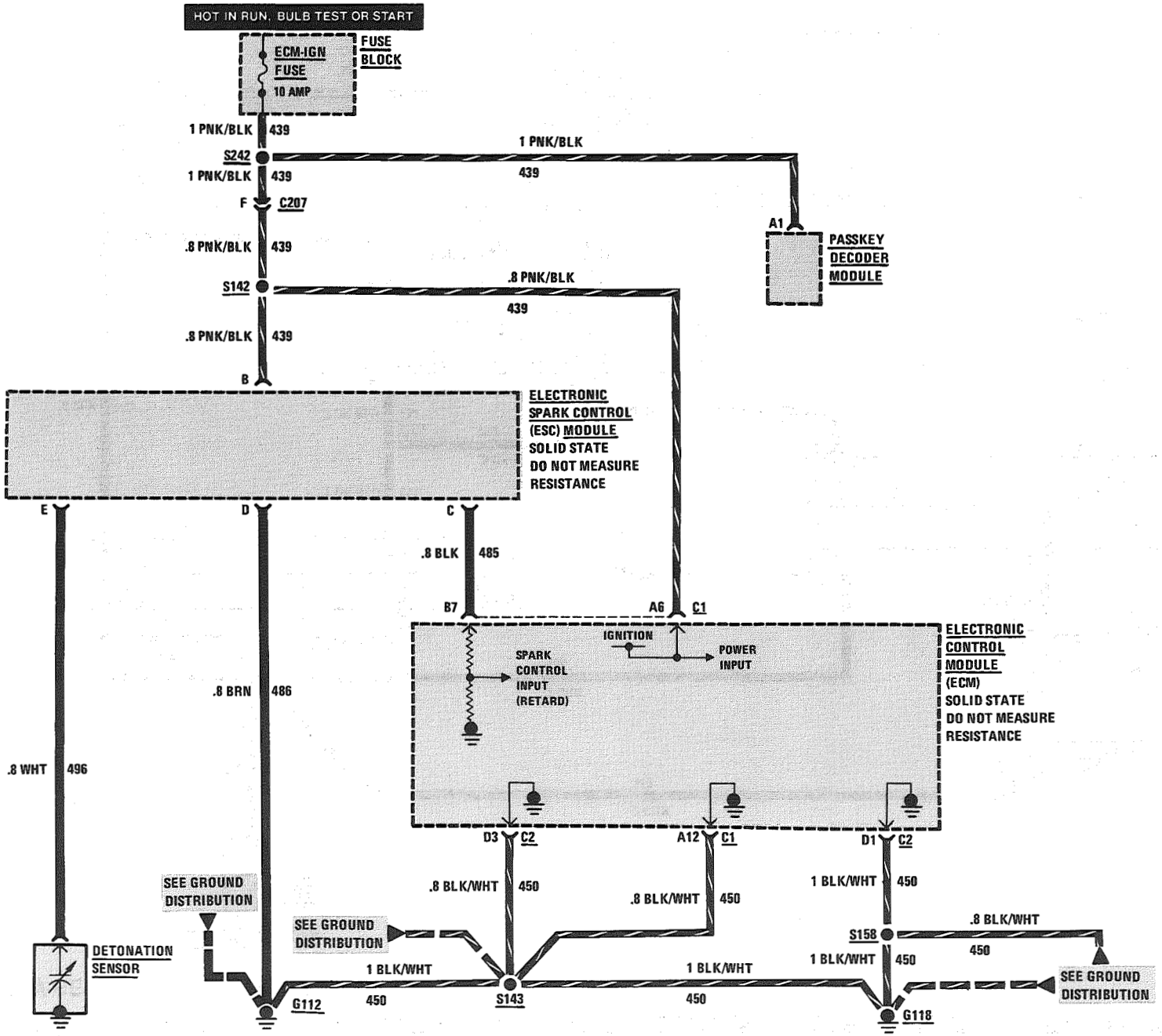
TUNED PORT INJECTION: V8 VIN F

MASS AIR FLOW SENSOR AND BURN-OFF RELAY



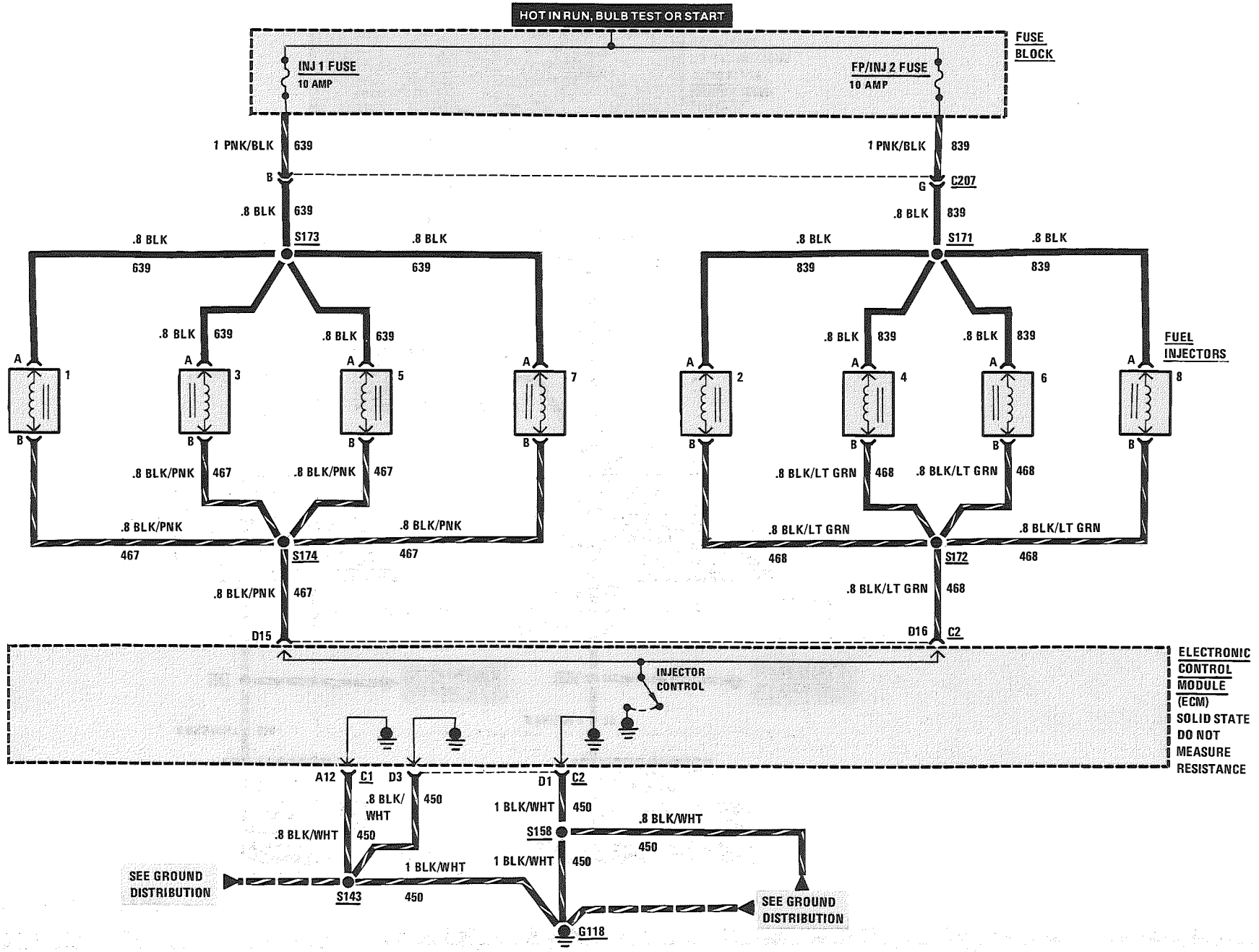
TUNED PORT INJECTION: V8 VIN F

SPARK CONTROL



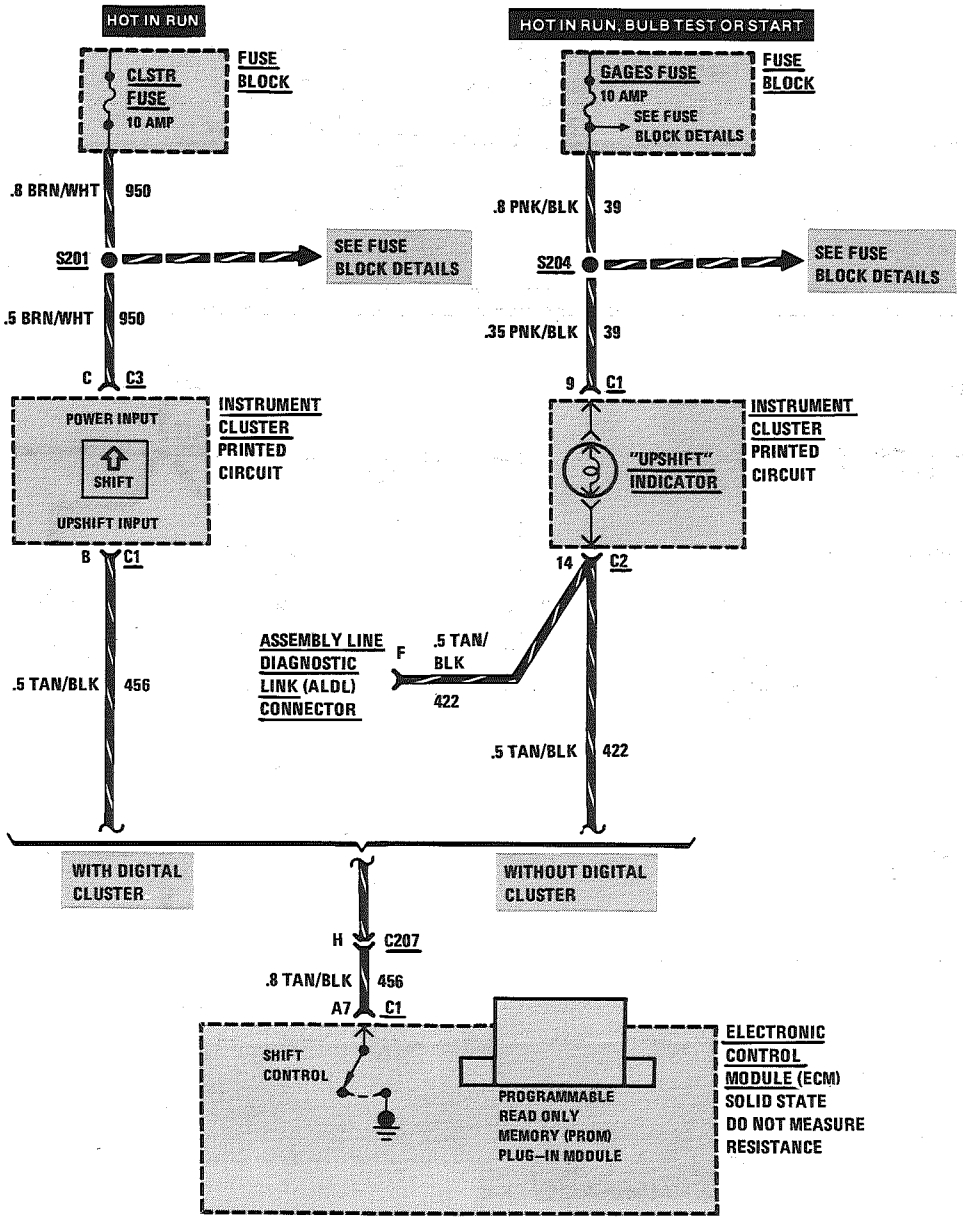
TUNED PORT INJECTION: V8 VIN F

FUEL INJECTORS



TUNED PORT INJECTION: V8 VIN F

UPSHIFT INDICATOR



COMPONENT LOCATION

		Page-Figure
AIR Diverter Valve (VIN F) (VIN 8)	RH front of engine, on valve cover	201- 6-A
AIR Select Valve (VIN F) (VIN 8)	RH front of engine, on valve cover	201- 6-A
Assembly Line Diagnostic Link (ALDL) Connector	On bottom of I/P hush panel, to right of steering column	
Brake Switch	Above brake pedal, on brake pedal support	201- 9-A
Burn-Off Relay	LH rear corner of engine compartment, on relay bracket	201- 7-A
Canister Purge Solenoid Valve (VIN F) (VIN 8)	Lower RH front corner of engine compartment	201- 5-A
Cold Start Injector (VIN F) (VIN 8)	Top LH side of engine	201- 7-A
Cold Start Switch (VIN F) (VIN 8)	Top center of engine	201- 8-C
Coolant Temperature Sensor (VIN F) (VIN 8)	Top LH front of engine	201- 8-C
Detonation Sensor (VIN F) (VIN 8)	Lower RH side of engine, above Starter Solenoid	201- 5-A
EGR Vacuum Sensor Diagnostic Connector	Top rear of engine	201- 4-E
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Electronic Spark Control (ESC) Module (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Electronic Spark Timing (EST) Distributor (VIN F) (VIN 8)	Top rear of engine	201- 5-A
Exhaust Gas Recirculation (EGR) Solenoid (VIN F) (VIN 8)	Top RH rear of intake manifold	201- 5-A
Fuel Injectors	Top of engine, at each intake cylinder	
Fuel Pump Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Fuel Pump Switch (VIN F) (VIN 8)	Lower LH side of engine	201- 8-A
Fuel Tank Unit	Top center of fuel tank	201- 9-C
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Gear Selector Switch	In console, at base of gear selector	201-11-E
Idle Air Control Stepper Motor (VIN F) (VIN 8)	Top LH front of engine	201- 8-C
Ignition Coil (VIN F)(VIN 8)	RH rear side of engine	201- 7-B
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A

COMPONENT LOCATION

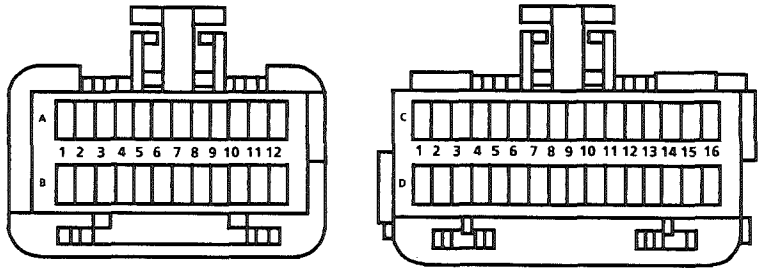
		Page-Figure
In-Line Fuse (VIN F)(VIN 8)	On LH side of radiator support, forward of battery	201- 5-C
Manifold Air Temperature (MAT) Sensor (VIN F) (VIN 8)	Top of intake manifold	
Mass Air Flow (MAF) Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Mass Air Flow (MAF) Sensor (VIN F) (VIN 8)	Front of engine compartment, on rear of air cleaner	201- 5-A
Oxygen Sensor (VIN F) (VIN 8)	Lower LH side of engine, on exhaust manifold	
Throttle Position Sensor (VIN F) (VIN 8)	Top center of engine	201- 8-C
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C113 (1 cavity) (VIN F) (VIN 8)	Taped to engine harness, RH front of dash	201- 5-A
C114 (1 cavity) (VIN F) (VIN 8)	Taped to engine harness, above rear of engine	201- 7-B
C143 (1 cavity) (VIN F) (VIN 8)	Lower LH side of engine, below exhaust manifold	201- 8-A
C172 (2 cavities)	Top rear of engine	201- 4-E
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C313 (3 cavities)	Below center of back seat	201- 9-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G118 (VIN F) (VIN 8)	Rear of RH cylinder head	201- 5-A
G200	Behind I/P, left of steering column	201-10-A
G304	Under rear seat, on support bracket	
S142 (VIN F) (VIN 8)	Engine harness, behind RH side of I/P	
S143 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S145 (VIN F) (VIN 8)	Engine harness, above LH rear of engine	201- 7-A
S146 (VIN F) (VIN 8)	Engine harness, behind RH side of I/P	
S158	Engine harness, behind RH side of I/P	
S162	Engine harness, LH rear corner of engine compartment	201- 7-A
S164	I/P harness, above Fuse Block	201-10-A
S166 (VIN F) (VIN 8)	Engine harness, above LH rear of engine	201- 7-A
S168 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S171	Engine harness, RH front of dash	201- 6-A

COMPONENT LOCATION

TUNED PORT INJECTION: V8 VIN F

ELECTRONIC CONTROL MODULE CONNECTORS

ELECTRONIC CONTROL MODULE (ECM)



C1 BLK C2 BLK V00005.1

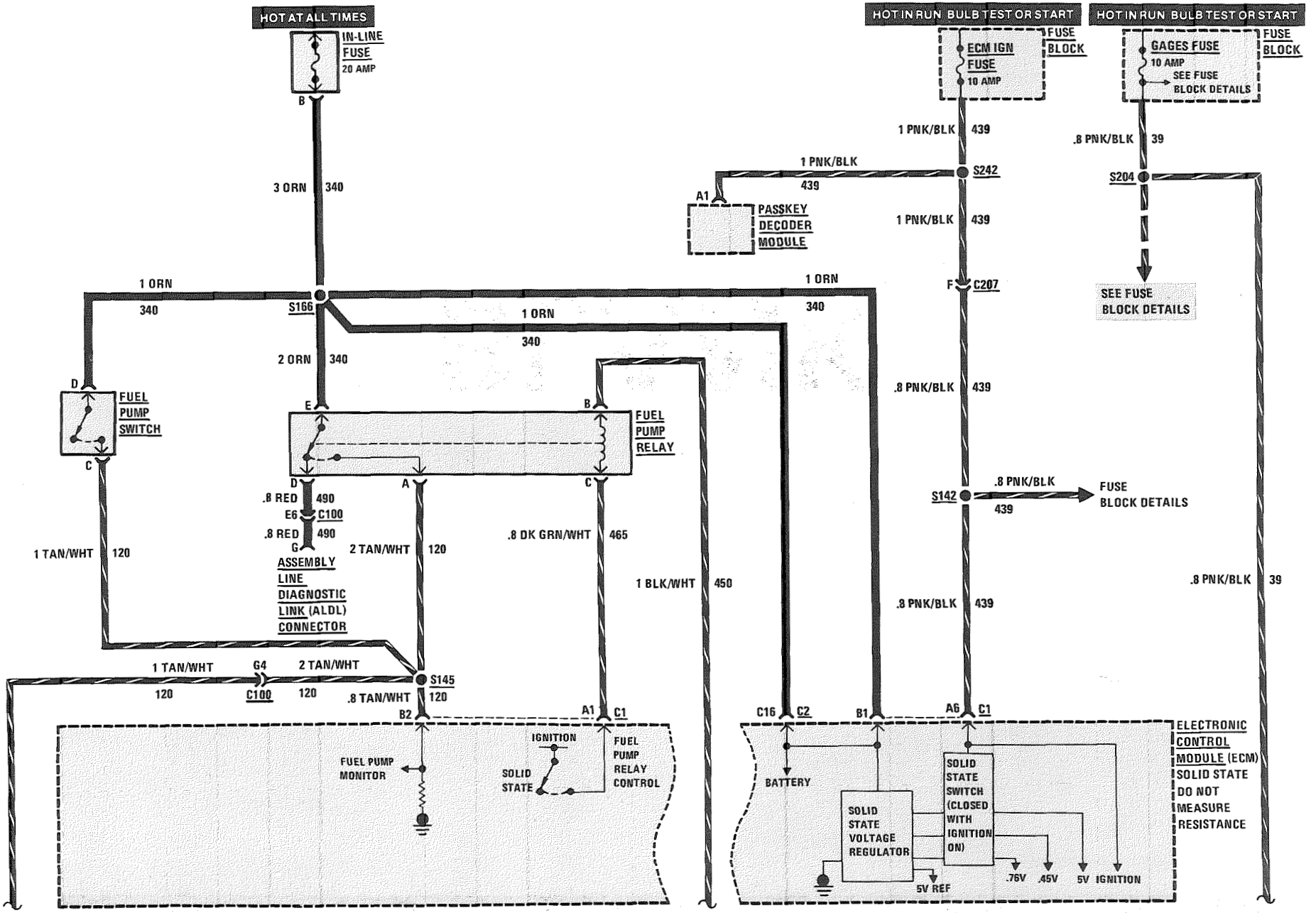
CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
A1	DK GRN/WHT	465	Fuel Pump Relay Control
A2	BRN	436	Air Select Valve Control
A3	DK GRN/YEL	428	Canister Purge Solenoid Valve Control
A4	GRY	435	Exhaust Gas Recirculation Solenoid Control
A5	BRN/WHT	419	"Service Engine Soon" Indicator Control
A6	PNK/BLK	439	Ignition
A7	TAN/BLK	422(Auto) 456 (Manual)	TCC Control (auto) Shift Indicator Control (manual)
A8	ORN	461	Data
A9	WHT/BLK	451	Diagnostic "Test" Input
A10	BRN	437	Speed Input
A11	BLK	452	Ground
A12	BLK/WHT	450	Ground
B1	ORN	340	Battery
B2	TAN/WHT	120	Fuel Pump Control
B3	BLK/RED	453	Distributor Reference Pulse Input:LO
B4	—	—	Not Used
B5	PPL/WHT	430	Distributor Reference Pulse Input:HI
B6	PPL	963	Theft Deterrent
B7	BLK	485	Electronic Spark Control Input (Retard)
B8	DK GRN	59	A/C On Input
B9			Not Used
B10	ORN/BLK	434	Park/Neutral Input
B11	—	—	Not Used
B12	DK GRN	998	Mass Air Flow Sensor Input
C1	DK GRN/WHT	335	Fan Control Output
C2	BLK/PNK	429	Air Diverter Valve Control
C3	LT GRN/BLK	444	Idle Air Control B LO
C4	LT GRN/WHT	443	Idle Air Control B HI

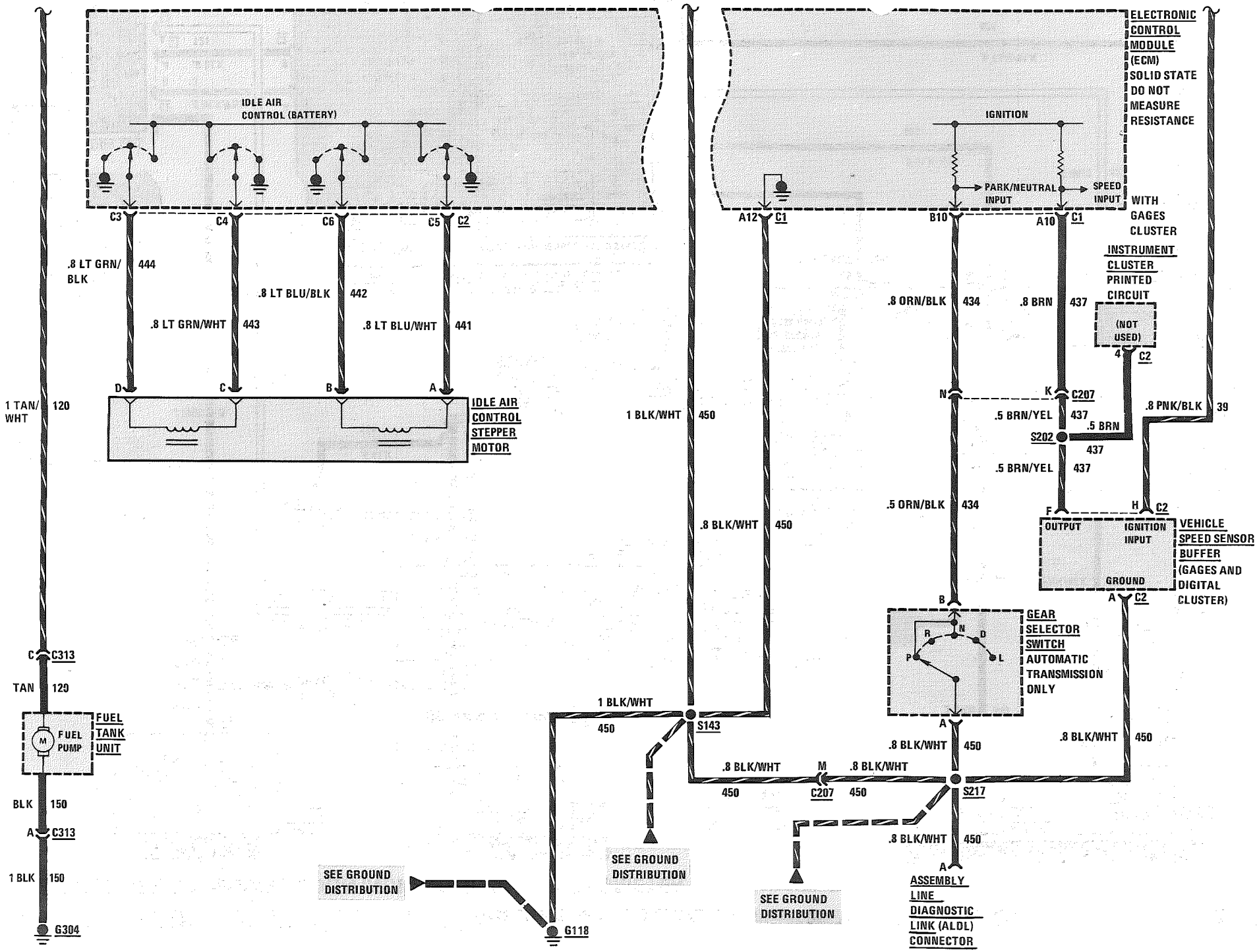
CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
C5	LT BLU/WHT	441	Idle Air Control A HI
C6	LT BLU/BLK	442	Idle Air Control A LO
C7	—	—	Not Used
C8	DK GRN	446	Top Gear Input
C9	—	—	Not Used
C10	YEL	410	Coolant Temperature Sensor Input
C11	—	—	Not Used
C12	TAN	472	Manifold Air Temperature Sensor Input
C13	DK BLU	417	Throttle Position Sensor Input
C14	GRY	416	5 Volt Reference
C15	DK GRN	999	EGR Vacuum Sensor Signal
C16	ORN	340	Battery
D1	BLK/WHT	450	Ground
D2	BLK	452	Ground
D3	BLK/WHT	450	Ground
D4	WHT	423	Spark Timing Output
D5	TAN/BLK	424	Ignition Module Bypass Output
D6	TAN	413	Oxygen Sensor Ground
D7	PPL	412	Oxygen Sensor Input
D8	—	—	Not Used
D9	—	—	Not Used
D10	BLK/WHT	450	Ground
D11	GRY	731	Fan Pressure Switch Input
D12	BLK	900	Burn-Off Relay Control
D13	—	—	Not Used
D14	—	—	Not Used
D15	BLK/PNK	467	Fuel Injector Control
D16	BLK/LT GRN	467	Fuel Injector Control

BLANK

THROTTLE BODY INJECTION: V8 VIN E

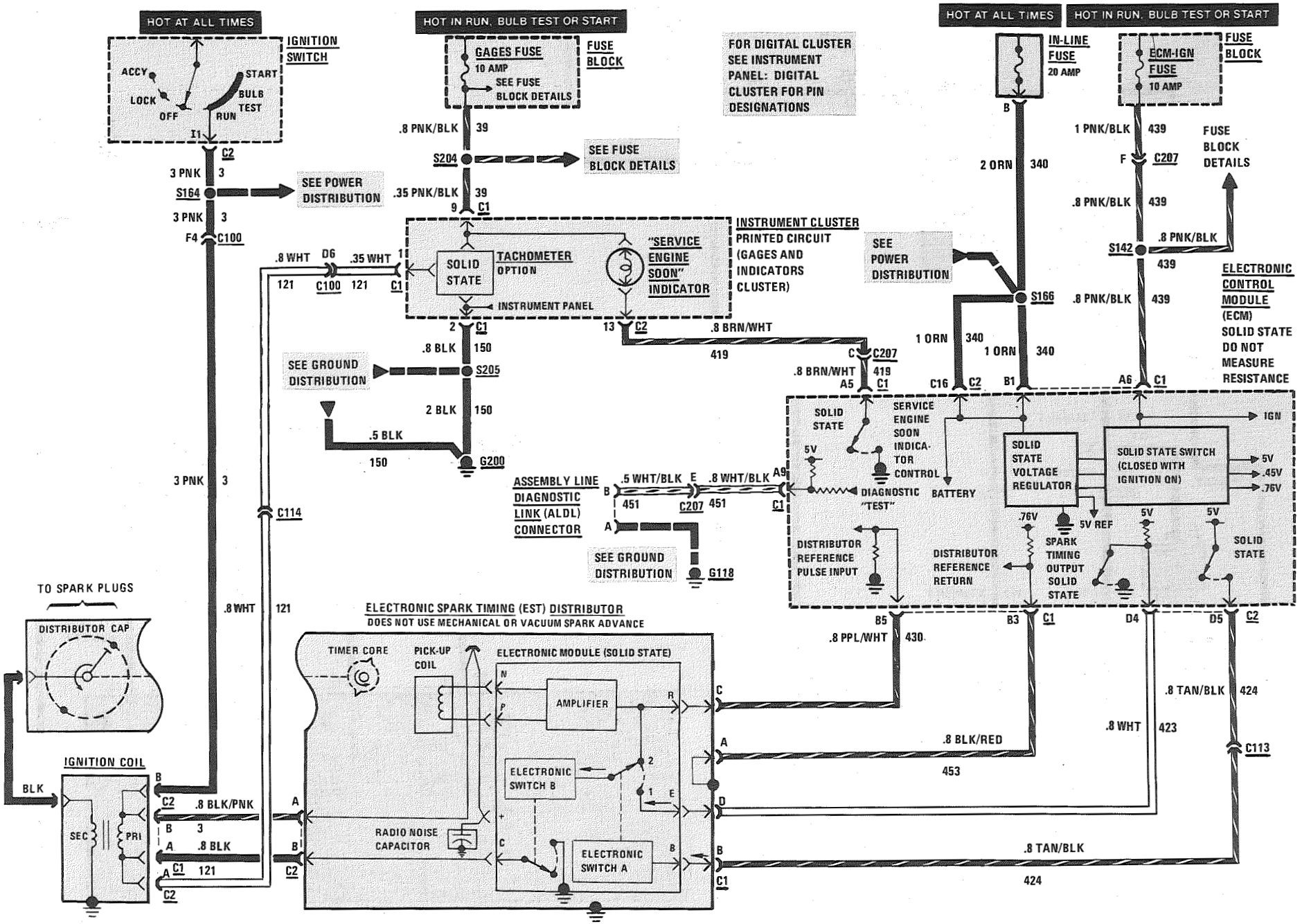
IDLE SPEED CONTROL, FUEL CONTROL, AND VEHICLE DATA SENSORS




IDLE AIR CONTROL (BATTERY)
C3
C4
C6
C5
C2
.8 LT GRN/ BLK
444
.8 LT GRN/WHT
443
.8 LT BLU/BLK
442
.8 LT BLU/WHT
441
D
C
B
A
IDLE AIR CONTROL STEPPER MOTOR
1 TAN/ WHT
120
C
C313
TAN
129
FUEL PUMP
FUEL TANK UNIT
BLK
150
A
C313
1 BLK
150
G304
SEE GROUND DISTRIBUTION
G118
1 BLK/WHT
450
S143
SEE GROUND DISTRIBUTION
.8 BLK/WHT
450
M
C207
450
S217
.8 BLK/WHT
450
SEE GROUND DISTRIBUTION
A
ASSEMBLY LINE DIAGNOSTIC LINK (ALDL) CONNECTOR
ELECTRONIC CONTROL MODULE (ECM) SOLID STATE DO NOT MEASURE RESISTANCE
IGNITION
PARK/NEUTRAL INPUT
SPEED INPUT
WITH GAGES CLUSTER
A12
C1
B10
A10
C1
INSTRUMENT CLUSTER PRINTED CIRCUIT
(NOT USED)
4
C2
.8 ORN/BLK
434
.8 BRN
437
N
K
C207
.5 BRN/YEL
437
.8 PNK/BLK
39
.5 BRN
S202
437
.5 BRN/YEL
437
.5 ORN/BLK
434
F
H
C2
OUTPUT
IGNITION INPUT
GROUND
VEHICLE SPEED SENSOR BUFFER (GAGES AND DIGITAL CLUSTER)
A
C2
B
R
N
D
P
L
GEAR SELECTOR SWITCH AUTOMATIC TRANSMISSION ONLY
A
.8 BLK/WHT
450
.8 BLK/WHT
450

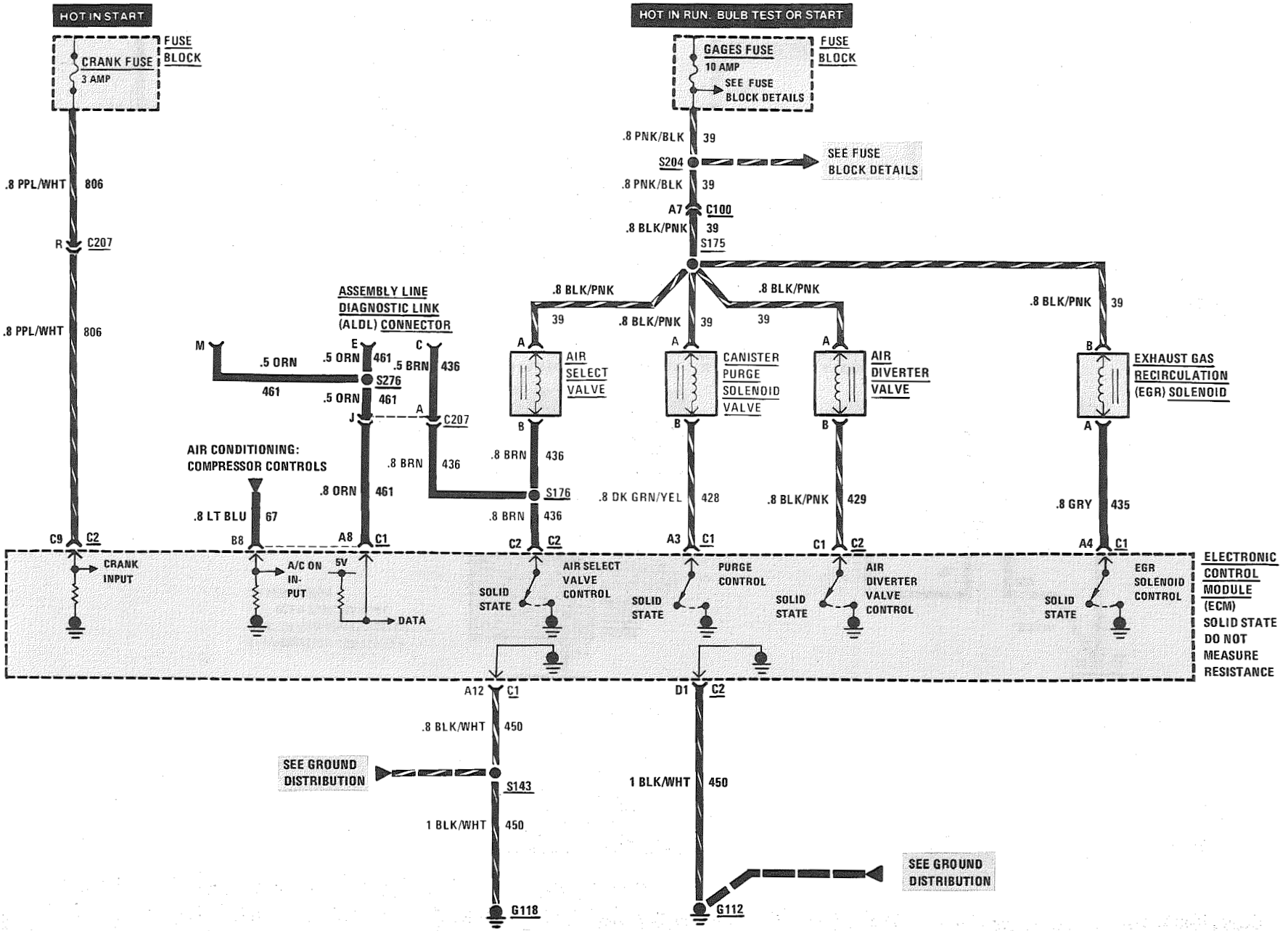
THROTTLE BODY INJECTION: V8 VIN E

IGNITION, SERVICE ENGINE SOON INDICATOR, AND TACHOMETER



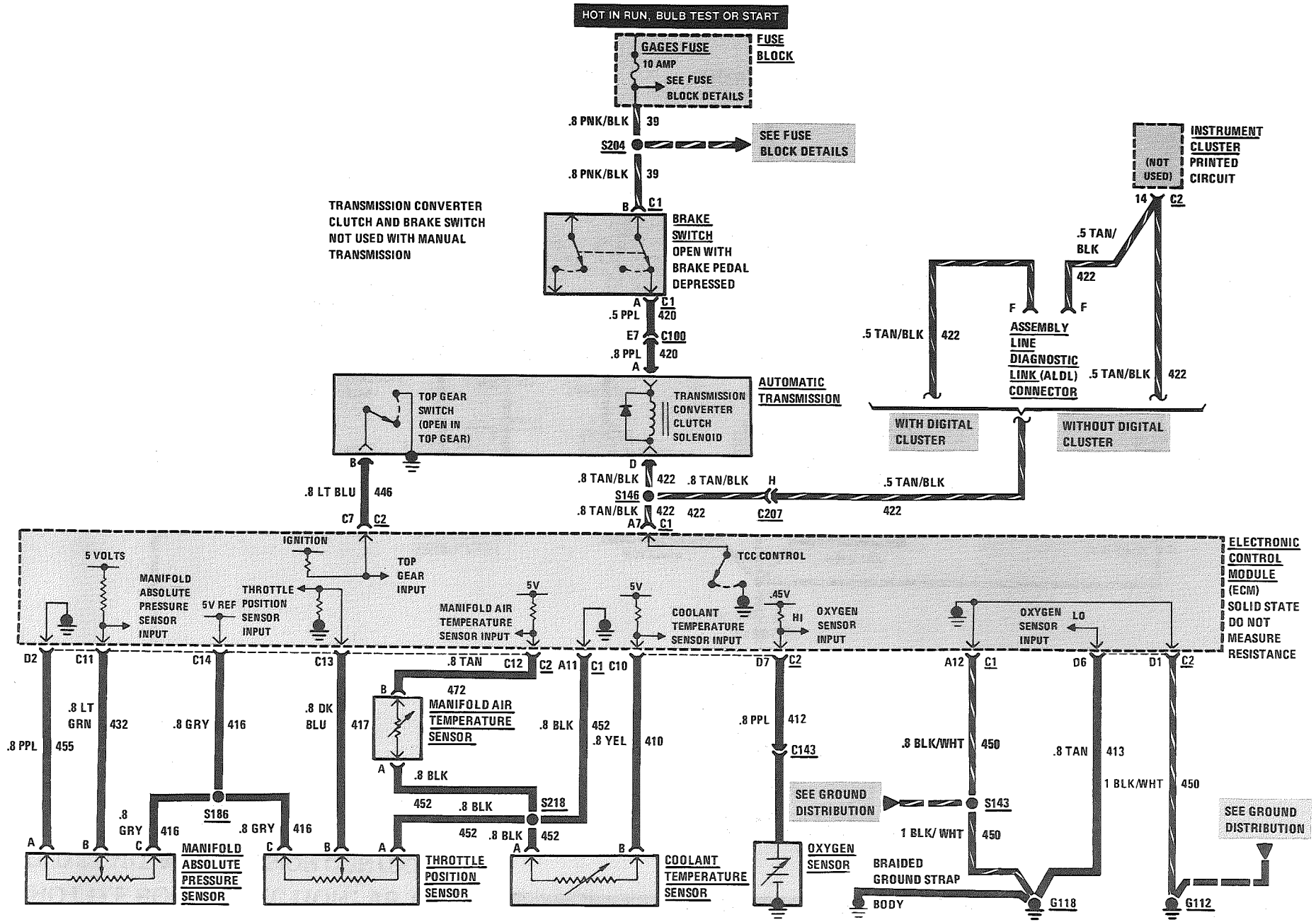
THROTTLE BODY INJECTION: V8 VIN E

COLD START AND EMISSION CONTROL



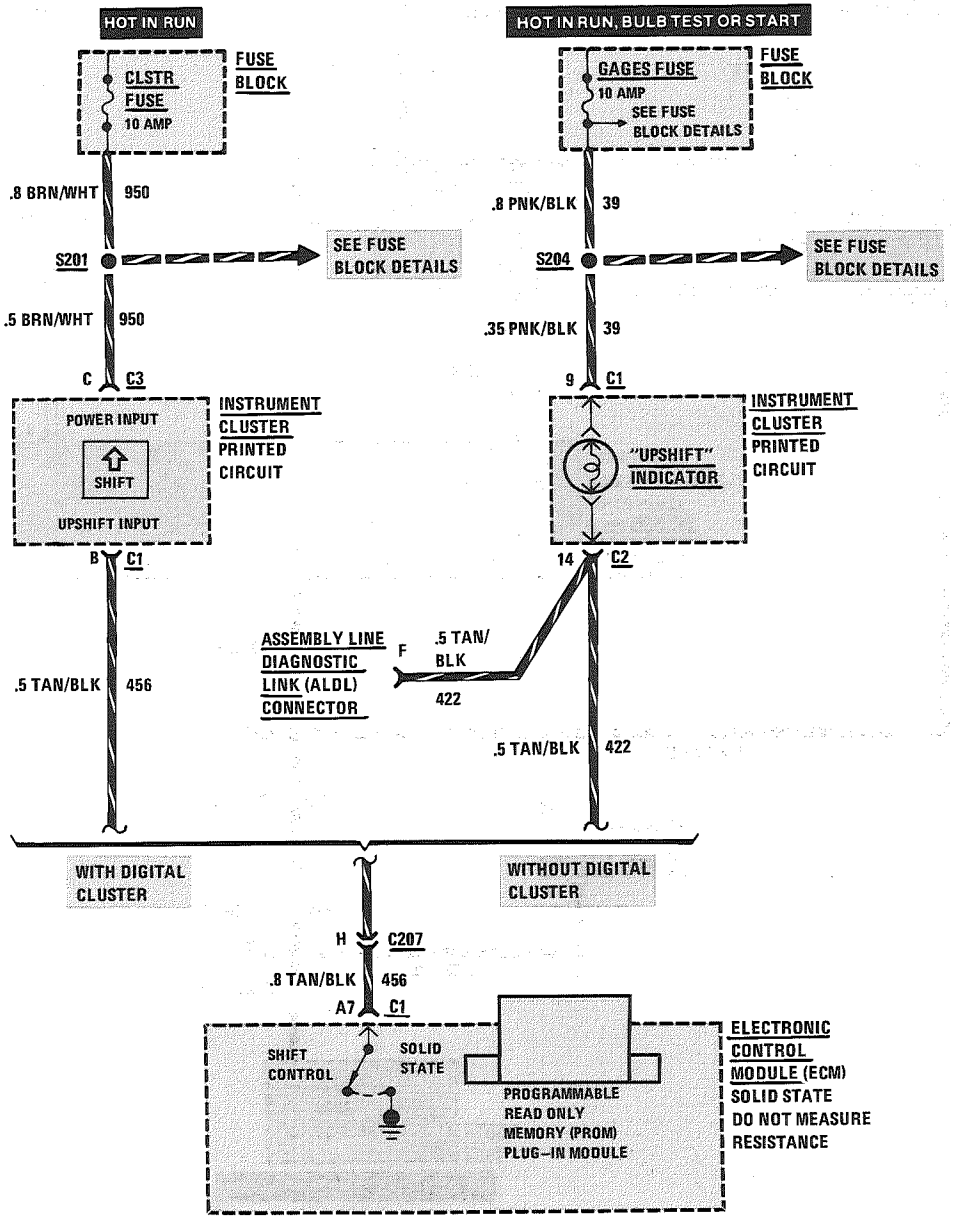
THROTTLE BODY INJECTION: V8 VIN E

ENGINE DATA SENSORS AND TRANSMISSION CONVERTER CLUTCH



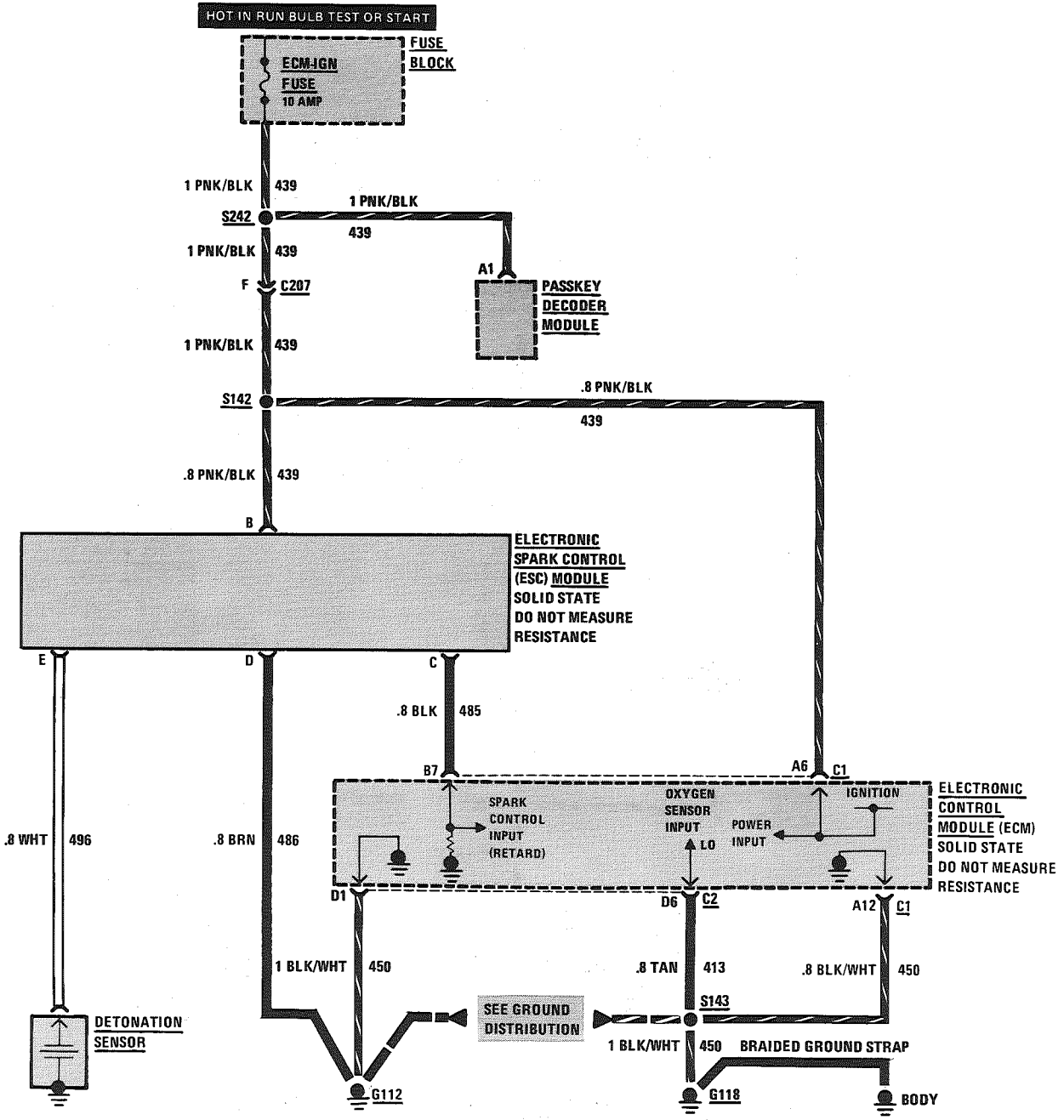
THROTTLE BODY INJECTION: V8 VIN E

UPSHIFT INDICATOR



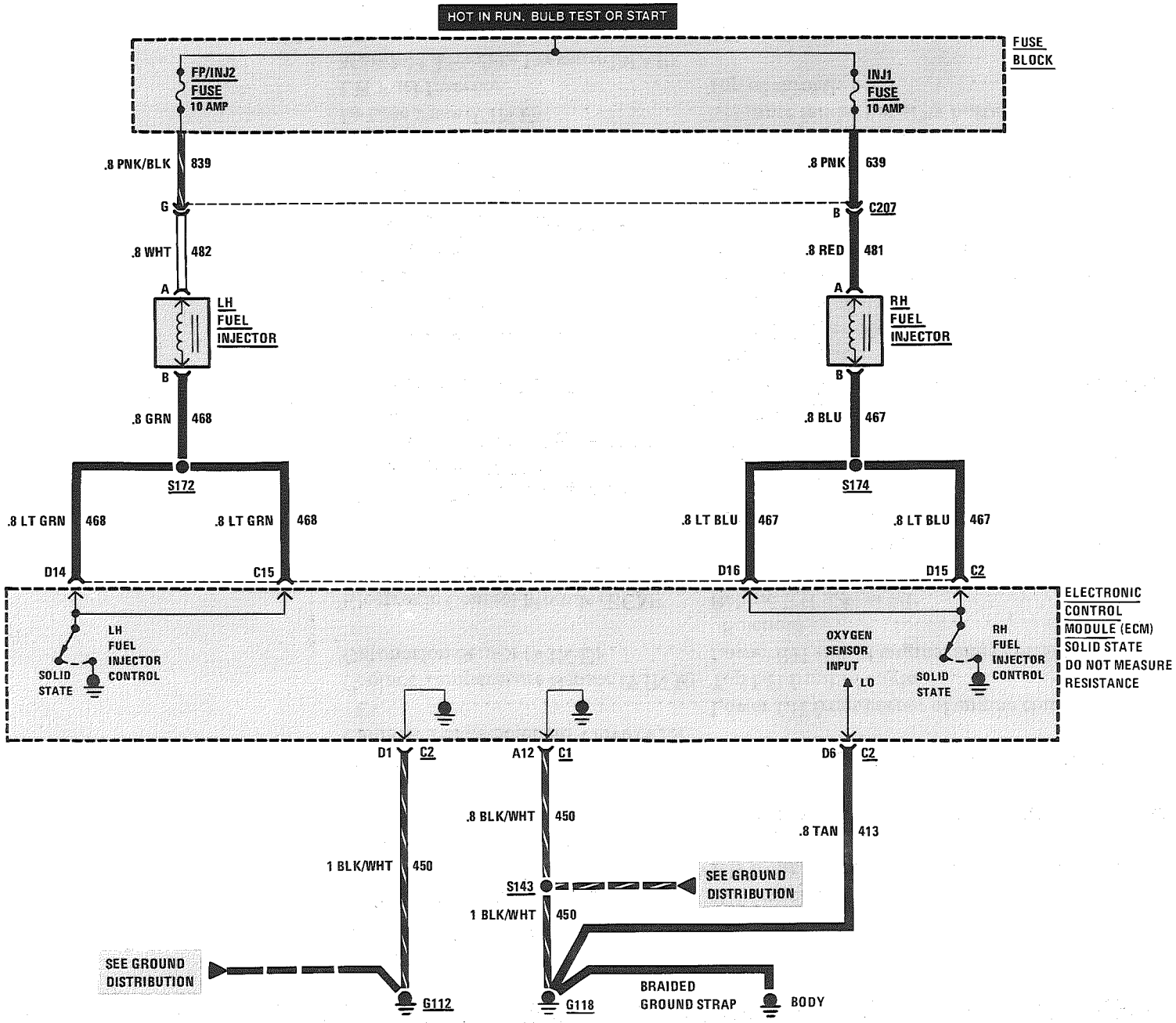
THROTTLE BODY INJECTION: V8 VIN E

SPARK CONTROL



THROTTLE BODY INJECTION: V8 VIN E

FUEL INJECTORS



COMPONENT LOCATION

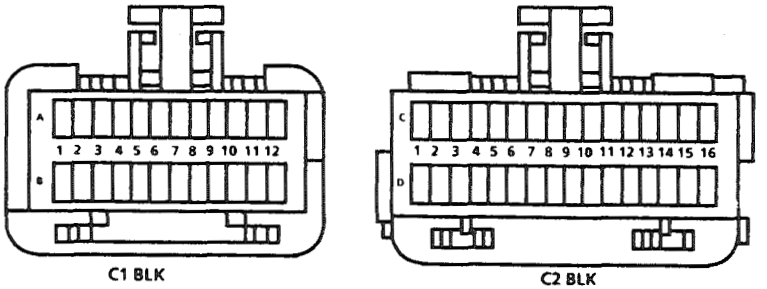
		Page-Figure
AIR Diverter Valve (VIN E)	RH front of engine	201- 2-A
AIR Select Valve (VIN E)	RH front of engine	201- 2-A
Assembly Line Diagnostic Link (ALDL) Connector	On bottom of I/P hush panel, to right of steering column	
Brake Switch	Above brake pedal, on brake pedal support	201- 9-A
Canister Purge Solenoid Valve (VIN E)	Lower LH front corner of engine compartment	201- 2-A
Coolant Temperature Sensor (VIN E)	Top LH front of engine	201- 4-D
Detonation Sensor (VIN E)	Lower RH side of engine, ahead of Starter Solenoid	201- 4-C
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Electronic Spark Control (ESC) Module (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 2-A
Electronic Spark Timing (EST) Distributor (VIN E)	Top rear of engine	201- 3-A
Exhaust Gas Recirculation (EGR) Solenoid (VIN E)	Top RH rear of intake manifold	201- 4-A
Fuel Pump Relay (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 3-A
Fuel Pump Switch (VIN E)	Lower LH rear of engine	201- 3-A
Fuel Tank Unit	Top center of fuel tank	201- 9-C
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Gear Selector Switch	In console, at base of gear selector	201-11-E
Idle Air Control Stepper Motor (VIN E)	Top center of engine	201- 2-A
Ignition Coil (VIN E)	Top center rear of engine	201- 4-A
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
In-Line Fuse (VIN E)	RH inner fender panel by battery	201- 3-B
LH Fuel Injector	Top of throttle body	201- 4-A
Manifold Absolute Pressure (MAP) Sensor	RH front of dash	201- 2-A
Manifold Air Temperature (MAT) Sensor (VIN E)	Top RH rear of engine	201- 4-A
Oxygen Sensor (VIN E)	Lower LH side of engine, on exhaust manifold	
RH Fuel Injector	Top of throttle body	201- 4-A

COMPONENT LOCATION

		Page-Figure
Throttle Position Sensor (VIN E)	Top center of engine	201- 4-A
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C113 (1 cavity) (VIN E)	Taped to engine harness, RH front of dash	201- 2-A
C114 (1 cavity) (VIN E)	Taped to engine harness, above rear of engine	
C143 (1 cavity) (VIN E)	Lower LH side of engine	201- 3-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C313 (3 cavities)	Below center of back seat	201- 9-C
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G118 (VIN E)	Rear of RH cylinder head	201- 5-B
G200	Behind I/P, left of steering column	201-10-A
G304	Under rear seat, on support bracket	
S142 (VIN E)	Engine harness, behind RH side of I/P	
S143 (VIN E)	Engine harness, RH front of dash	201- 2-A
S145 (VIN E)	Engine harness, above rear of engine	201- 3-C
S146 (VIN E)	Engine harness, behind RH side of I/P	
S164	I/P harness, above Fuse Block	201-10-A
S166 (VIN E)	Engine harness, above rear of engine	201- 3-C
S172 (VIN E)	Engine harness, RH front of dash	201- 2-A
S174 (VIN E)	Engine harness, RH front of dash	201- 2-A
S175 (VIN E)	Engine harness, above LH rear of engine	201- 3-A
S176 (VIN E)	Engine harness, behind RH side of I/P	
S186	Engine harness, RH front of dash	201- 2-A
S201	I/P harness, behind instrument cluster	201-10-A
S202	I/P harness, behind RH side of I/P	201-13-A
S204	I/P harness, behind instrument cluster	201-10-A
S205	I/P harness, behind instrument cluster	201-10-A
S217	I/P harness, behind center of I/P	201-10-A
S218	Engine harness, lower RH corner of engine compartment	201- 2-A
S242	I/P harness, behind RH side of I/P	201-13-A
S276	I/P harness, behind RH side of I/P	201-13-A

THROTTLE BODY INJECTION: V8 VIN E

ELECTRONIC CONTROL MODULE CONNECTORS



C1 BLK C2 BLK

ELECTRONIC CONTROL MODULE (ECM)

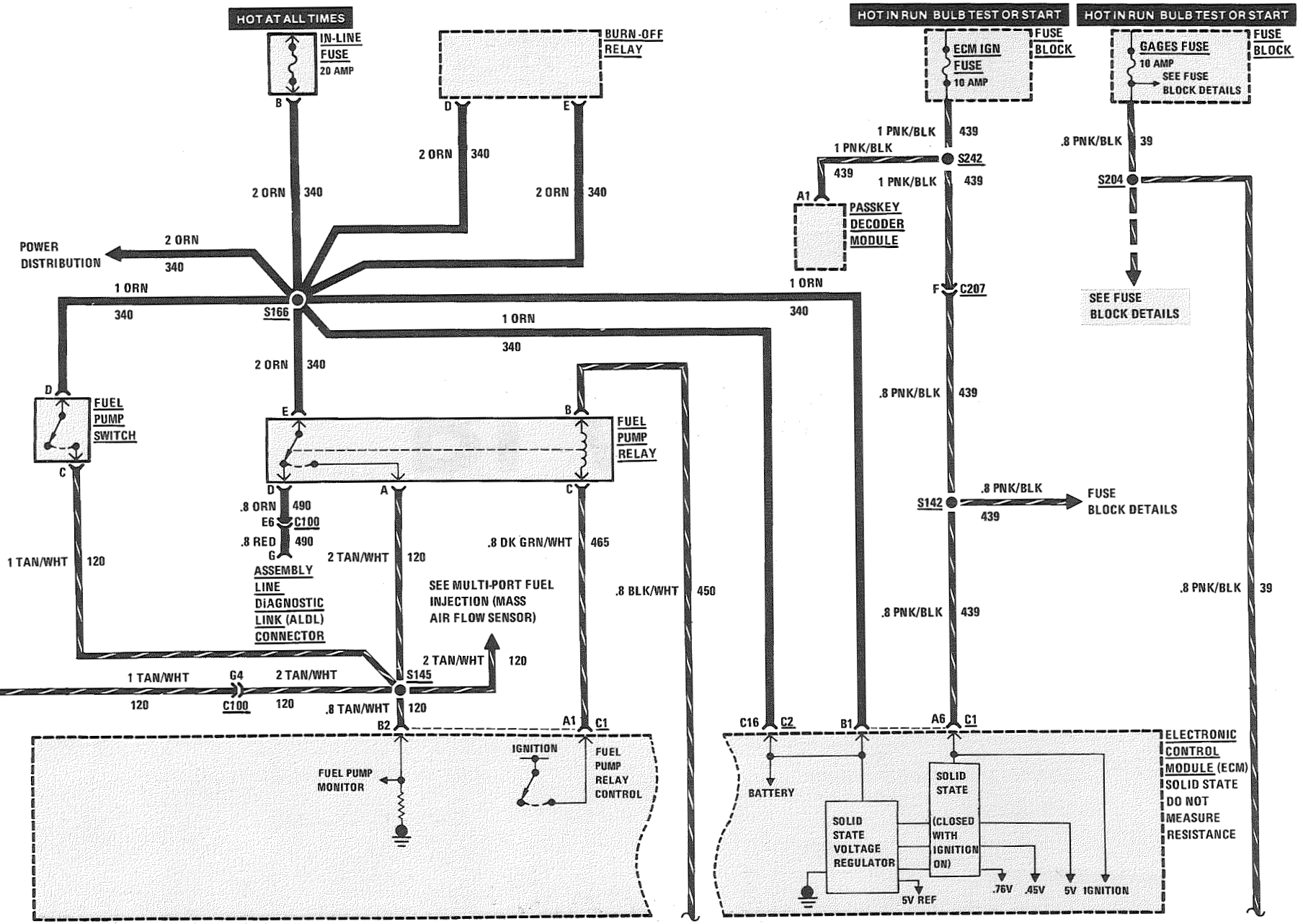
CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
A1	DK GRN/WHT	465	FUEL PUMP RELAY CONTROL
A2	—	—	NOT USED
A3	DK GRN/YEL	428	CANISTER PURGE SOLENOID VALVE CONTROL
A4	GRY	435	EXHAUST GAS RECIRCULATION SOLENOID CONTROL
A5	BRN/WHT	419	"SERVICE ENGINE SOON" INDICATOR CONTROL
A6	PNK/BLK	439	IGNITION
A7	TAN/BLK	422 (AUTO) 456 (MAN)	TCC CONTROL (AUTO) SHIFT INDICATOR CONTROL (MAN)
A8	ORN	461	SERIAL DATA LINK
A9	WHT/BLK	451	DIAGNOSTIC "TEST" INPUT
A10	BRN	437	SPEED INPUT
A11	BLK	452	GROUND
A12	BLK/WHT	450	GROUND
B1	ORN	340	BATTERY
B2	TAN/WHT	120	FUEL PUMP CONTROL
B3	BLK/RED	453	DISTRIBUTOR REFERENCE PULSE INPUT: LO
B4	—	—	NOT USED
B5	PPL/WHT	430	DISTRIBUTOR REFERENCE PULSE INPUT: HI
B6	—	—	NOT USED
B7	BLK	485	ELECTRONIC SPARK CONTROL INPUT (RETARD)
B8	LT BLU	67	A/C ON INPUT
B9	—	—	NOT USED
B10	ORN/BLK	434	PARK/NEUTRAL INPUT
B11	—	—	NOT USED
B12	—	—	NOT USED
C1	BLK/PNK	429	AIR DIVERTER VALVE CONTROL
C2	BRN	436	AIR SELECT VALVE CONTROL
C3	LT GRN/BLK	444	IDLE AIR CONTROL B LO
C4	LT GRN/WHT	443	IDLE AIR CONTROL B HI

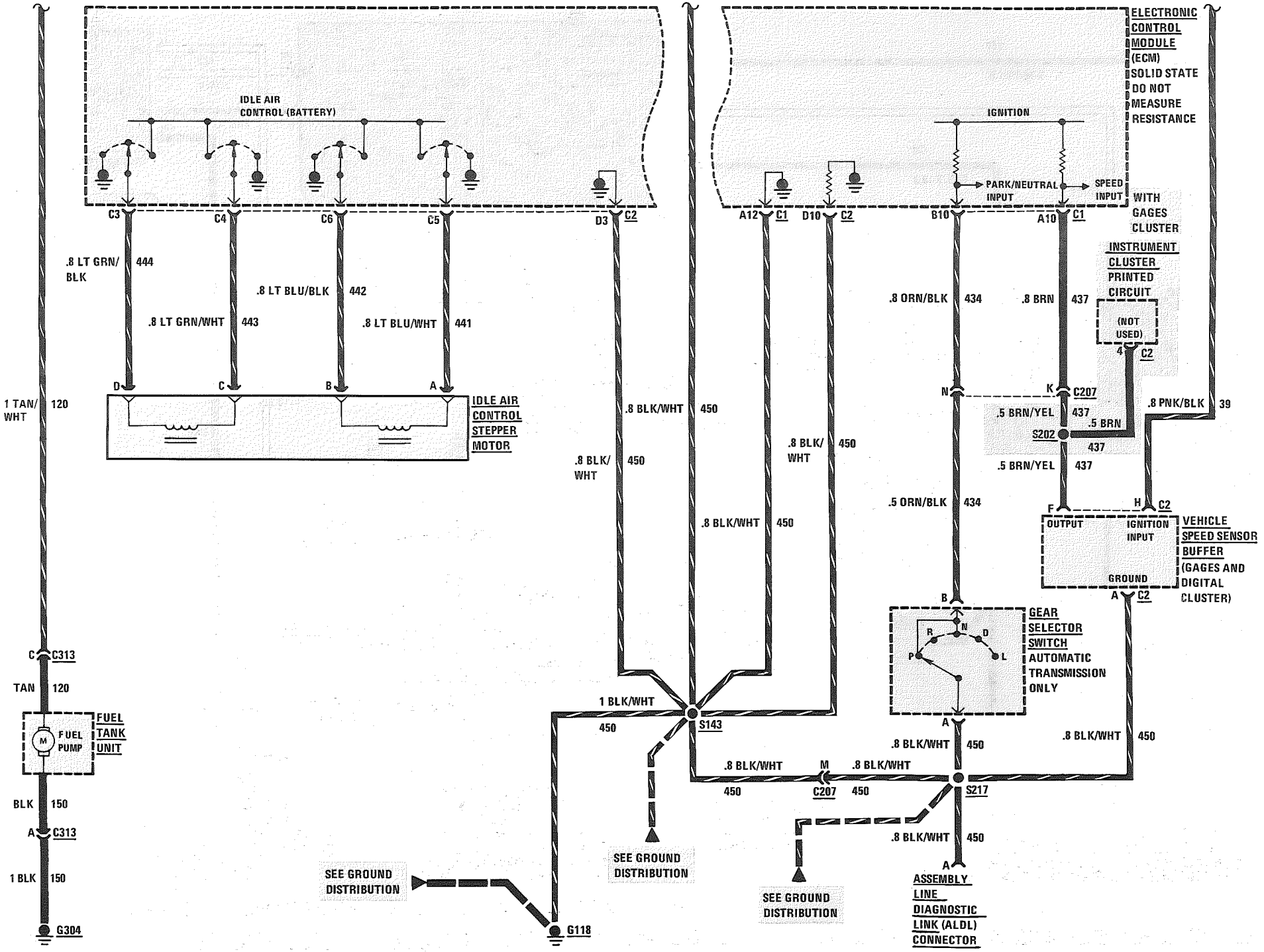
CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
C5	LT BLU/WHT	441	IDLE AIR CONTROL A HI
C6	LT BLU/BLK	442	IDLE AIR CONTROL A LO
C7	LT BLU	446	TOP GEAR INPUT
C8	LT BLU	901	POWER STEERING INPUT
C9	PPL/WHT	806	CRANK INPUT
C10	YEL	410	COOLANT TEMPERATURE SENSOR INPUT
C11	LT GRN	432	MANIFOLD ABSOLUTE PRESSURE SENSOR INPUT
C12	TAN	472	MANIFOLD AIR TEMPERATURE SENSOR INPUT
C13	DK BLU	417	THROTTLE POSITION SENSOR INPUT
C14	GRY	416	5 VOLT REFERENCE
C15	LT GRN	468	CONNECTED TO D14
C16	ORN	340	BATTERY
D1	BLK/WHT	450	GROUND
D2	PPL	455	GROUND
D3	—	—	NOT USED
D4	WHT	423	SPARK TIMING OUTPUT
D5	TAN/BLK	424	IGNITION MODULE BYPASS OUTPUT
D6	TAN	413	OXYGEN SENSOR INPUT: LO
D7	PPL	412	OXYGEN SENSOR INPUT
D8	—	—	NOT USED
D9	—	—	NOT USED
D10	—	—	NOT USED
D11	—	—	NOT USED
D12	—	—	NOT USED
D13	—	—	NOT USED
D14	LT GRN	468	LH FUEL INJECTOR CONTROL
D15	LT BLU	467	RH FUEL INJECTOR CONTROL
D16	LT BLU	467	CONNECTED TO D15

BLANK

MULTI-PORT FUEL INJECTION: V8 VIN 8

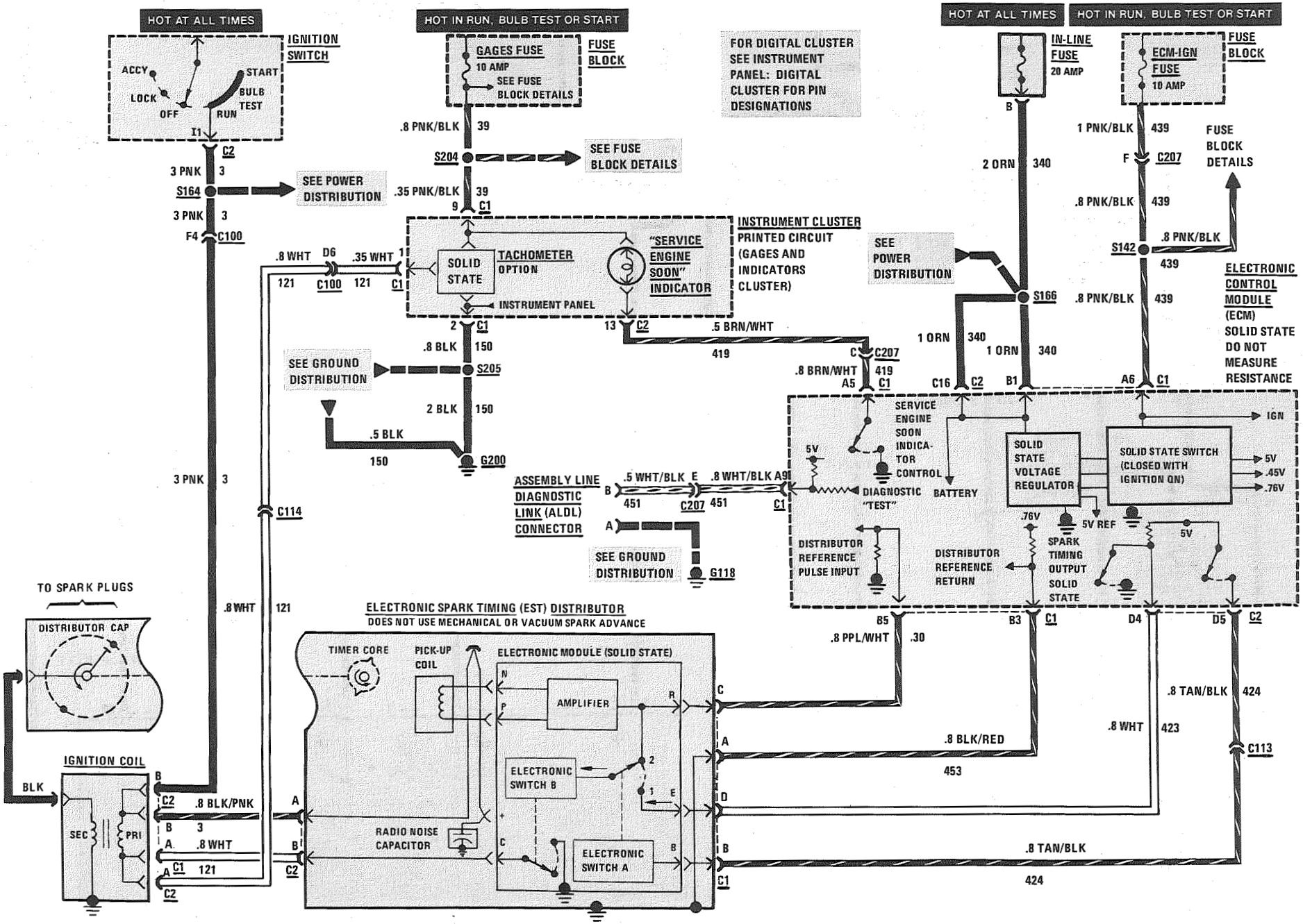
IDLE SPEED CONTROL, FUEL CONTROL, AND VEHICLE DATA SENSORS




IDLE AIR CONTROL (BATTERY)
ELECTRONIC CONTROL MODULE (ECM) SOLID STATE DO NOT MEASURE RESISTANCE
IGNITION
PARK/NEUTRAL INPUT
SPEED INPUT
WITH GAGES CLUSTER
INSTRUMENT CLUSTER PRINTED CIRCUIT
(NOT USED)
C3
C4
C6
C5
D3
C2
A12
C1
D10
B10
A10
.8 LT GRN/BLK 444
.8 LT GRN/WHT 443
.8 LT BLU/BLK 442
.8 LT BLU/WHT 441
.8 ORN/BLK 434
.8 BRN 437
D
C
B
A
1 TAN/WHT 120
IDLE AIR CONTROL STEPPER MOTOR
.8 BLK/WHT 450
.8 BLK/WHT 450
.8 BLK/WHT 450
.8 BLK/WHT 450
N
K
C207
.5 BRN/YEL 437
.5 BRN
S202
437
.5 BRN/YEL 437
.8 PNK/BLK 39
.5 ORN/BLK 434
F
H
C2
OUTPUT
IGNITION INPUT
GROUND
VEHICLE SPEED SENSOR BUFFER (GAGES AND DIGITAL CLUSTER)
A
C2
B
R
N
D
P
L
GEAR SELECTOR SWITCH AUTOMATIC TRANSMISSION ONLY
A
C C313
TAN 120
FUEL PUMP
FUEL TANK UNIT
1 BLK/WHT 450
S143
.8 BLK/WHT 450
.8 BLK/WHT 450
.8 BLK/WHT 450
M
C207
450
S217
BLK 150
A C313
1 BLK 150
G304
SEE GROUND DISTRIBUTION
G118
SEE GROUND DISTRIBUTION
SEE GROUND DISTRIBUTION
.8 BLK/WHT 450
A
ASSEMBLY LINE DIAGNOSTIC LINK (ALDL) CONNECTOR

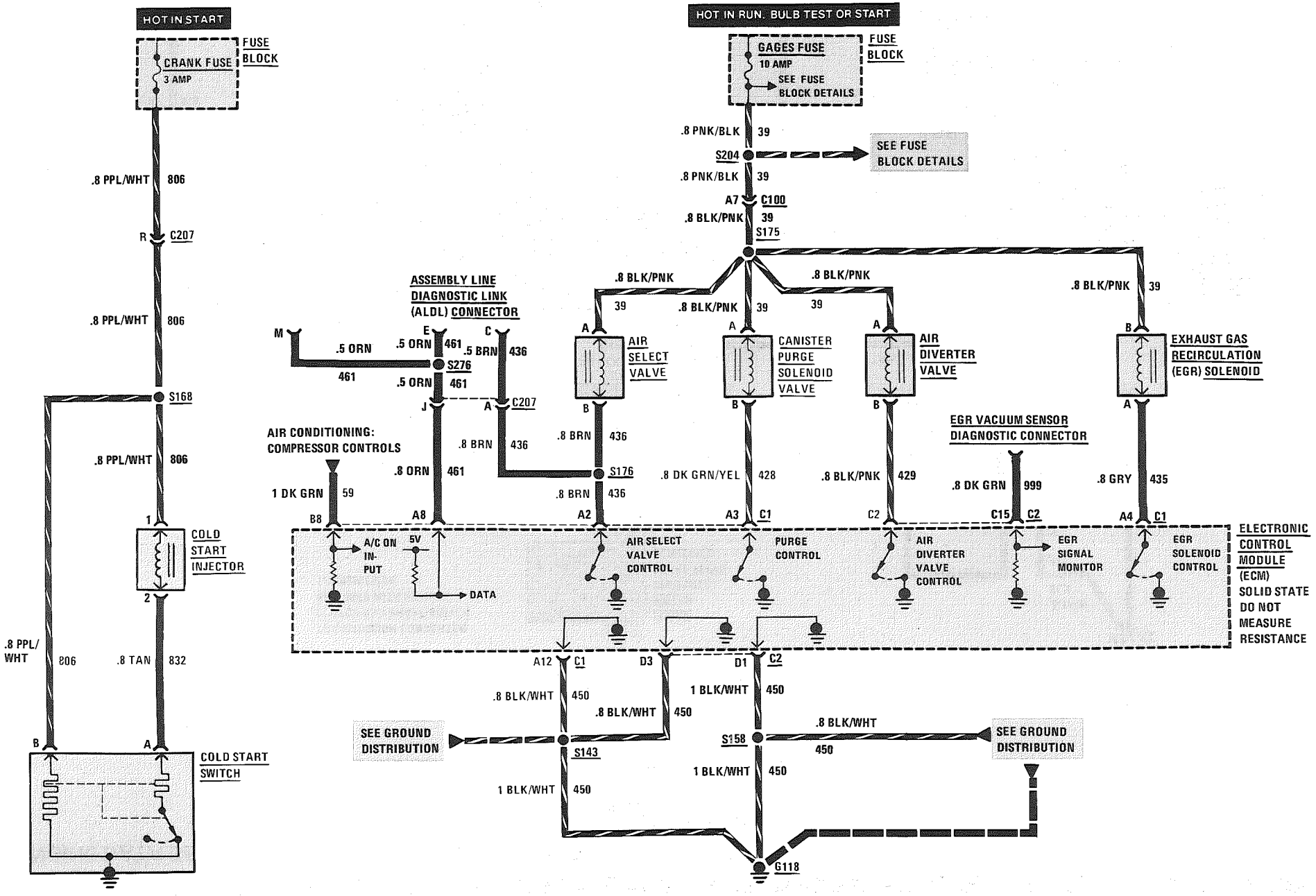
MULTI-PORT FUEL INJECTION: V8 VIN 8

IGNITION, SERVICE ENGINE SOON INDICATOR, AND TACHOMETER



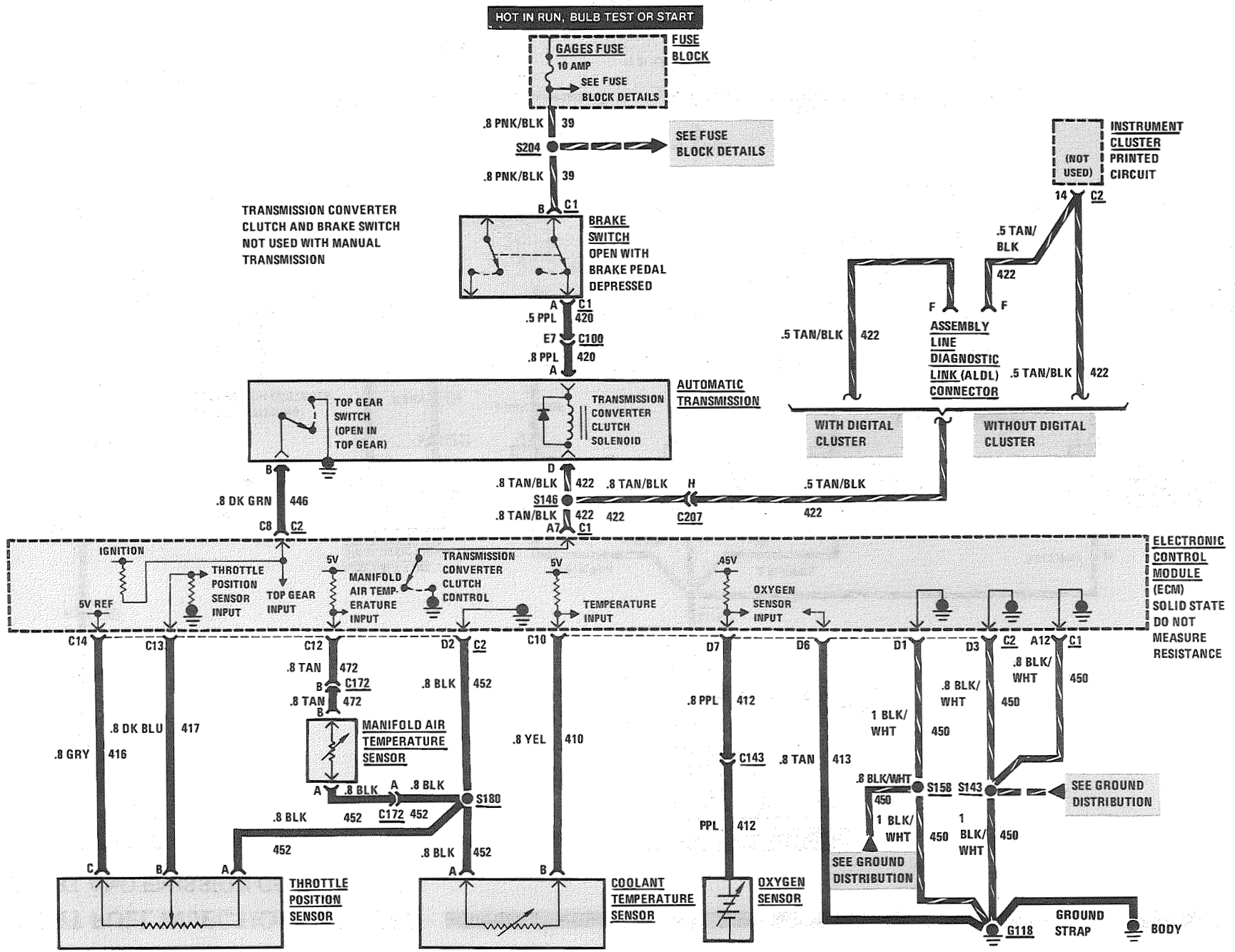
MULTI-PORT FUEL INJECTION: V8 VIN 8

COLD START AND EMISSION CONTROL



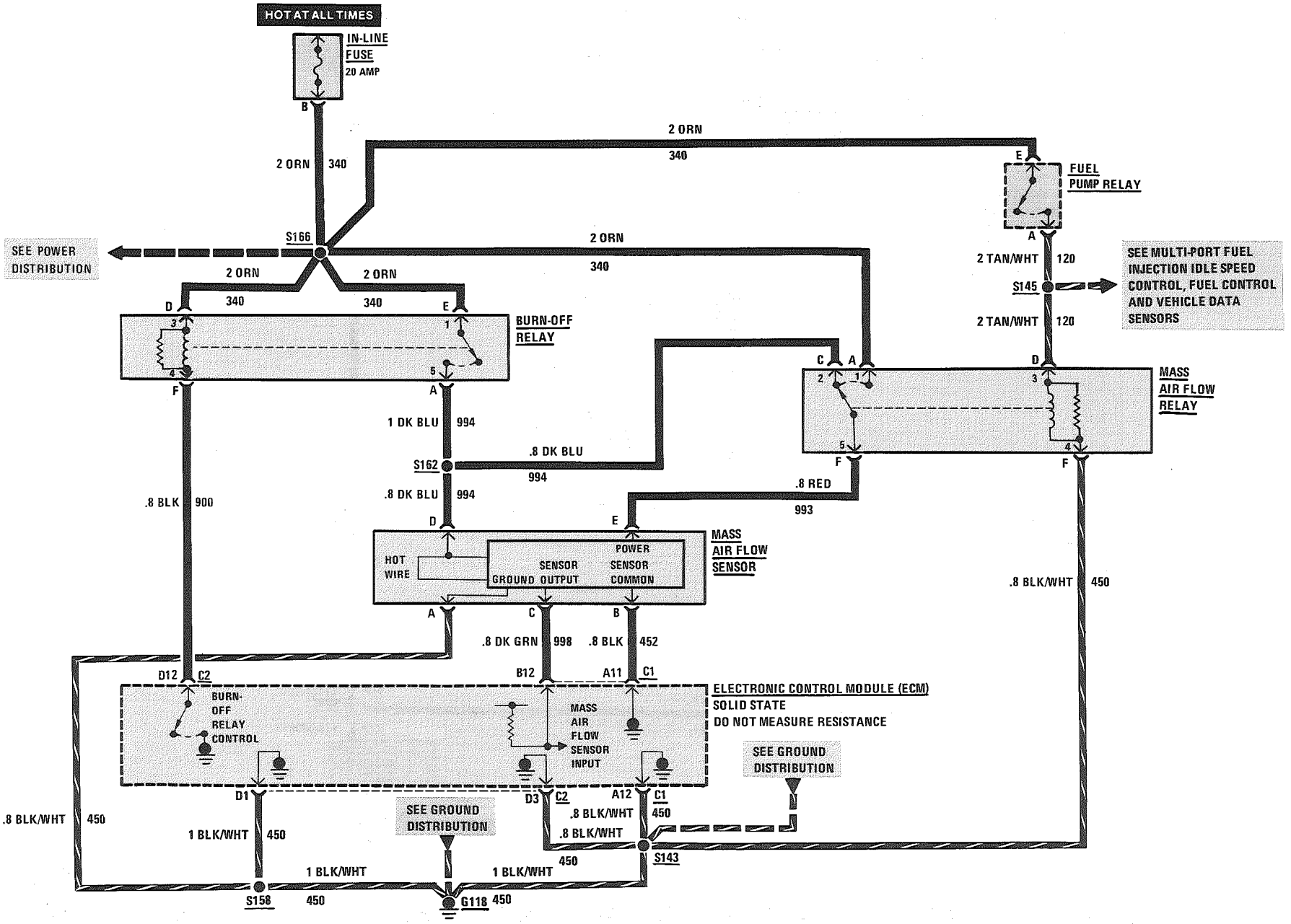
MULTI-PORT FUEL INJECTION: V8 VIN 8

ENGINE DATA SENSORS AND TRANSMISSION CONVERTER CLUTCH



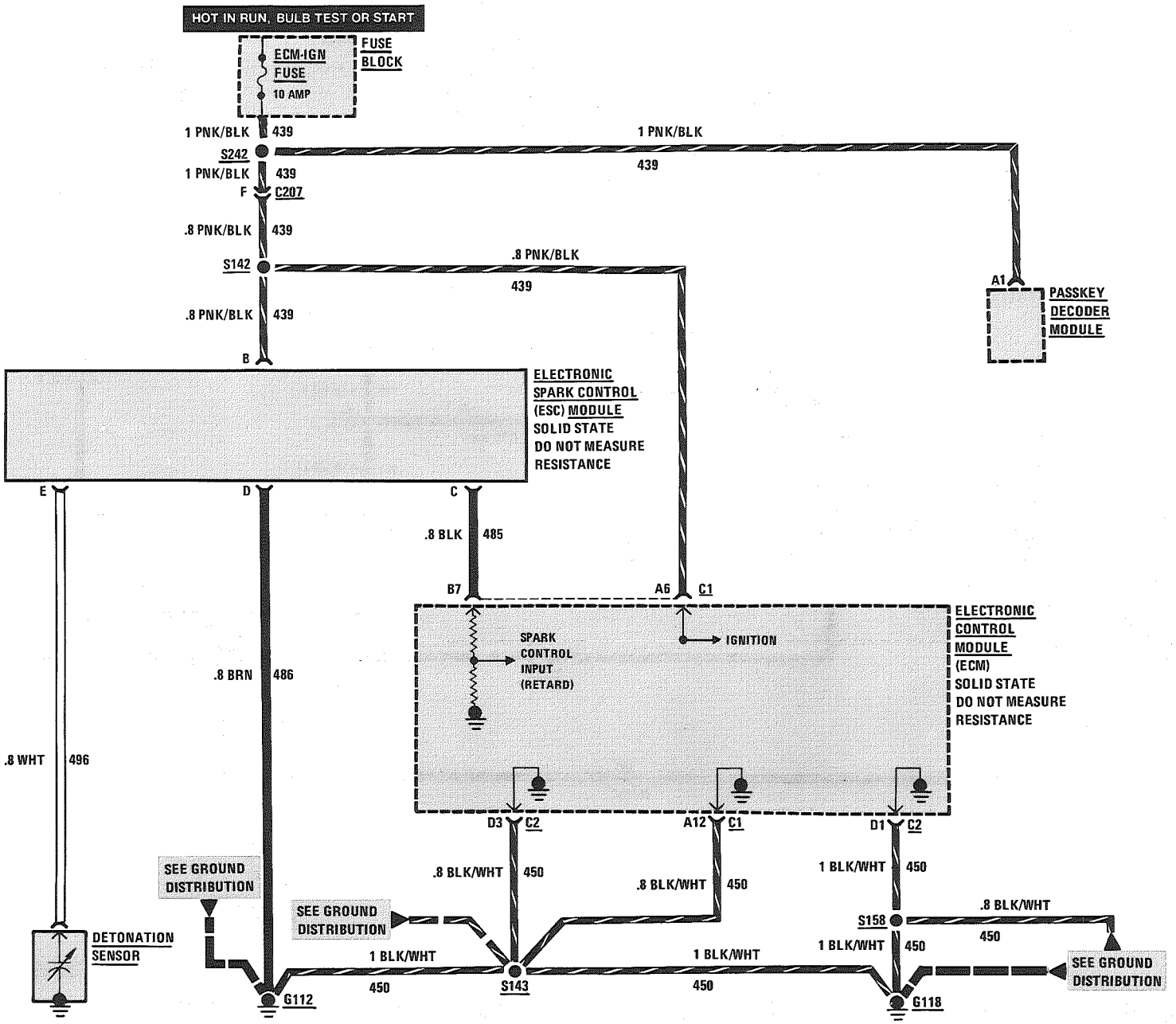
MULTI-PORT FUEL INJECTION: V8 VIN 8

MASS AIR FLOW SENSOR AND BURN-OFF RELAY



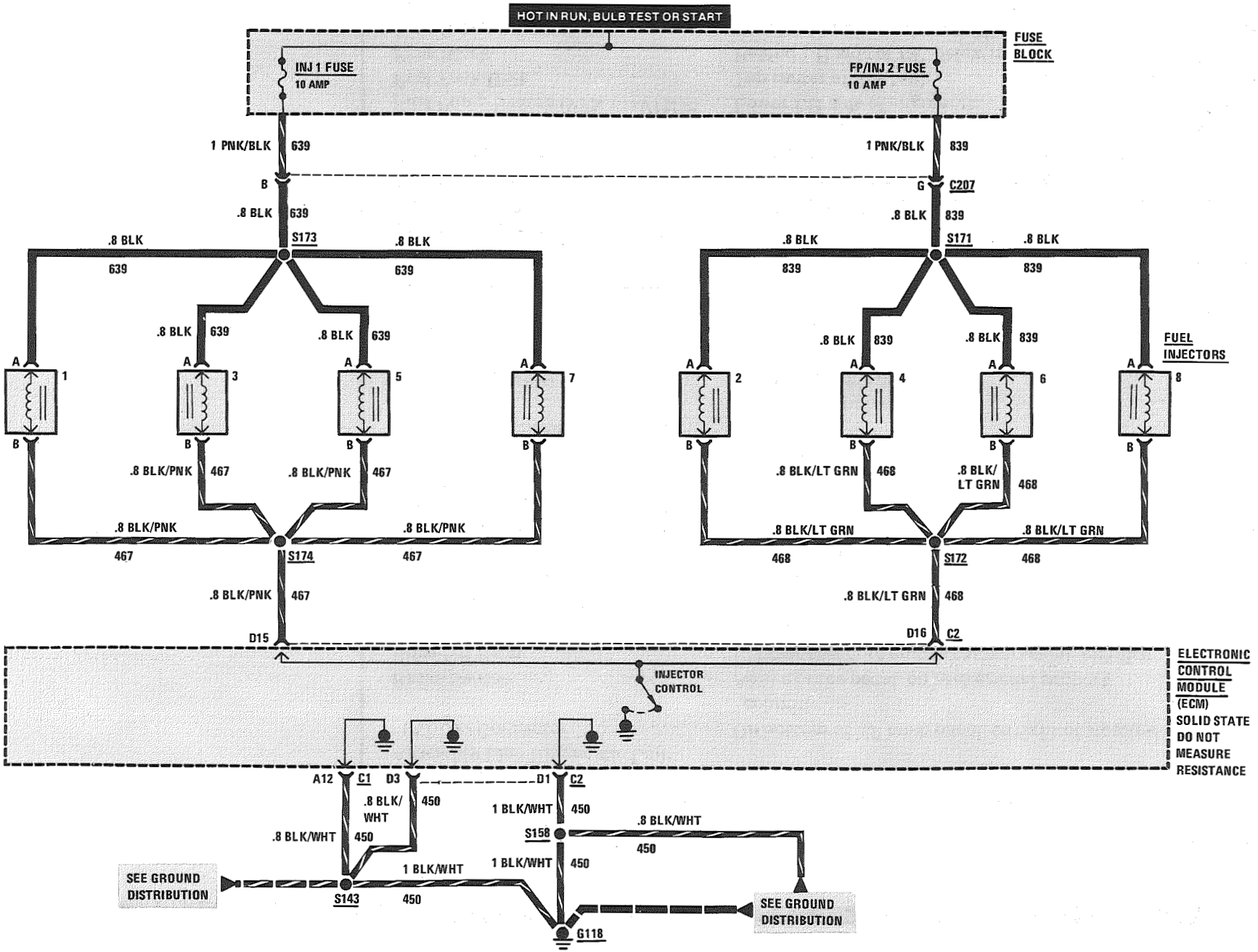
MULTI-PORT FUEL INJECTION: V8 VIN 8

SPARK CONTROL



MULTI-PORT FUEL INJECTION: V8 VIN 8

FUEL INJECTORS



COMPONENT LOCATION

		Page-Figure
AIR Diverter Valve (VIN F) (VIN 8)	RH front of engine, on valve cover	201- 6-A
AIR Select Valve (VIN F) (VIN 8)	RH front of engine, on valve cover	201- 6-A
Assembly Line Diagnostic Link (ALDL) Connector	On bottom of I/P hush panel, to right of steering column	
Brake Switch	Above brake pedal, on brake pedal support	201- 9-A
Burn-Off Relay	LH rear corner of engine compartment, on relay bracket	201- 7-A
Canister Purge Solenoid Valve (VIN F) (VIN 8)	Lower RH front corner of engine compartment	201- 5-A
Cold Start Injector (VIN F) (VIN 8)	Top LH side of engine	201- 7-A
Cold Start Switch (VIN F) (VIN 8)	Top center of engine	201- 8-C
Coolant Temperature Sensor (VIN F) (VIN 8)	Top LH front of engine	201- 8-C
Detonation Sensor (VIN F) (VIN 8)	Lower RH side of engine, above Starter Solenoid	201- 5-A
EGR Vacuum Sensor Diagnostic Connector	Top rear of engine	201- 4-E
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Electronic Spark Control (ESC) Module (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Electronic Spark Timing (EST) Distributor (VIN F) (VIN 8)	Top rear of engine	201- 5-A
Exhaust Gas Recirculation (EGR) Solenoid (VIN F) (VIN 8)	Top RH rear of intake manifold	201- 5-A
Fuel Injectors	Top of engine, at each intake cylinder	
Fuel Pump Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Fuel Pump Switch (VIN F) (VIN 8)	Lower LH side of engine	201- 8-A
Fuel Tank Unit	Top center of fuel tank	201- 9-C
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Gear Selector Switch	In console, at base of gear selector	201-11-E
Idle Air Control Stepper Motor (VIN F) (VIN 8)	Top LH front of engine	201- 8-C
Ignition Coil (VIN F)(VIN 8)	RH rear side of engine	201- 7-B
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
In-Line Fuse (VIN F)(VIN 8)	On LH side of radiator support, forward of battery	201- 5-C

COMPONENT LOCATION

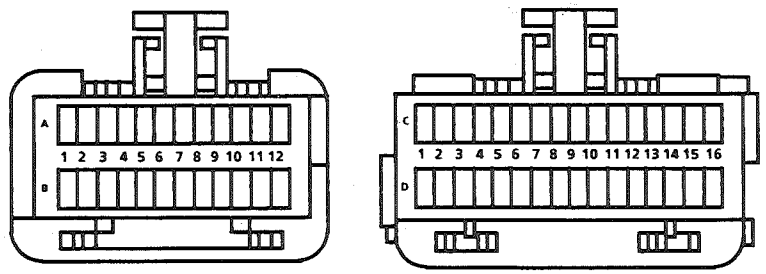
		Page-Figure
Manifold Air Temperature (MAT) Sensor (VIN F) (VIN 8)	Top of intake manifold	
Mass Air Flow (MAF) Relay (VIN F) (VIN 8)	LH rear corner of engine compartment, on relay bracket	201- 7-A
Mass Air Flow (MAF) Sensor (VIN F) (VIN 8)	Front of engine compartment, on rear of air cleaner	201- 5-A
Oxygen Sensor (VIN F) (VIN 8)	Lower LH side of engine, on exhaust manifold	
Throttle Position Sensor (VIN F) (VIN 8)	Top center of engine	201- 8-C
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C113 (1 cavity) (VIN F) (VIN 8)	Taped to engine harness, RH front of dash	201- 5-A
C114 (1 cavity) (VIN F) (VIN 8)	Taped to engine harness, above rear of engine	201- 7-B
C143 (1 cavity) (VIN F) (VIN 8)	Lower LH side of engine, below exhaust manifold	201- 8-A
C172 (2 cavities)	Top rear of engine	201- 4-E
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C313 (3 cavities)	Below center of back seat	201- 9-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G118 (VIN F) (VIN 8)	Rear of RH cylinder head	201- 5-A
G200	Behind I/P, left of steering column	201-10-A
G304	Under rear seat, on support bracket	
S142 (VIN F) (VIN 8)	Engine harness, behind RH side of I/P	
S143 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S145 (VIN F) (VIN 8)	Engine harness, above LH rear of engine	201- 7-A
S146 (VIN F) (VIN 8)	Engine harness, behind RH side of I/P	
S158	Engine harness, behind RH side of I/P	
S162	Engine harness, LH rear corner of engine compartment	201- 7-A
S164	I/P harness, above Fuse Block	201-10-A
S166 (VIN F) (VIN 8)	Engine harness, above LH rear of engine	201- 7-A
S168 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S171	Engine harness, RH front of dash	201- 6-A
S172 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A

COMPONENT LOCATION

		Page-Figure
S205	I/P harness, behind instrument cluster	201-10-A
S217	I/P harness, behind center of I/P	201-10-A
S242	I/P harness, behind RH side of I/P	201-13-A
S276	I/P harness, behind RH side of I/P	201-13-A
S173	Engine harness, top center rear of engine	201- 7-A
S174 (VIN F) (VIN 8)	Engine harness, top center rear of engine	201- 7-A
S175 (VIN F) (VIN 8)	Engine harness, above LH rear of engine	201- 7-A
S176 (VIN F) (VIN 8)	Engine harness, behind RH side of I/P	
S180 (VIN F) (VIN 8)	Engine harness, above RH rear of engine	201- 7-B
S202	I/P harness, behind RH side of I/P	201-13-A
S204	I/P harness, behind instrument cluster	201-10-A

MULTI-PORT FUEL INJECTION: V8 VIN 8

ELECTRONIC CONTROL MODULE CONNECTORS



C1 BLK ELECTRONIC CONTROL MODULE (ECM) C2 BLK

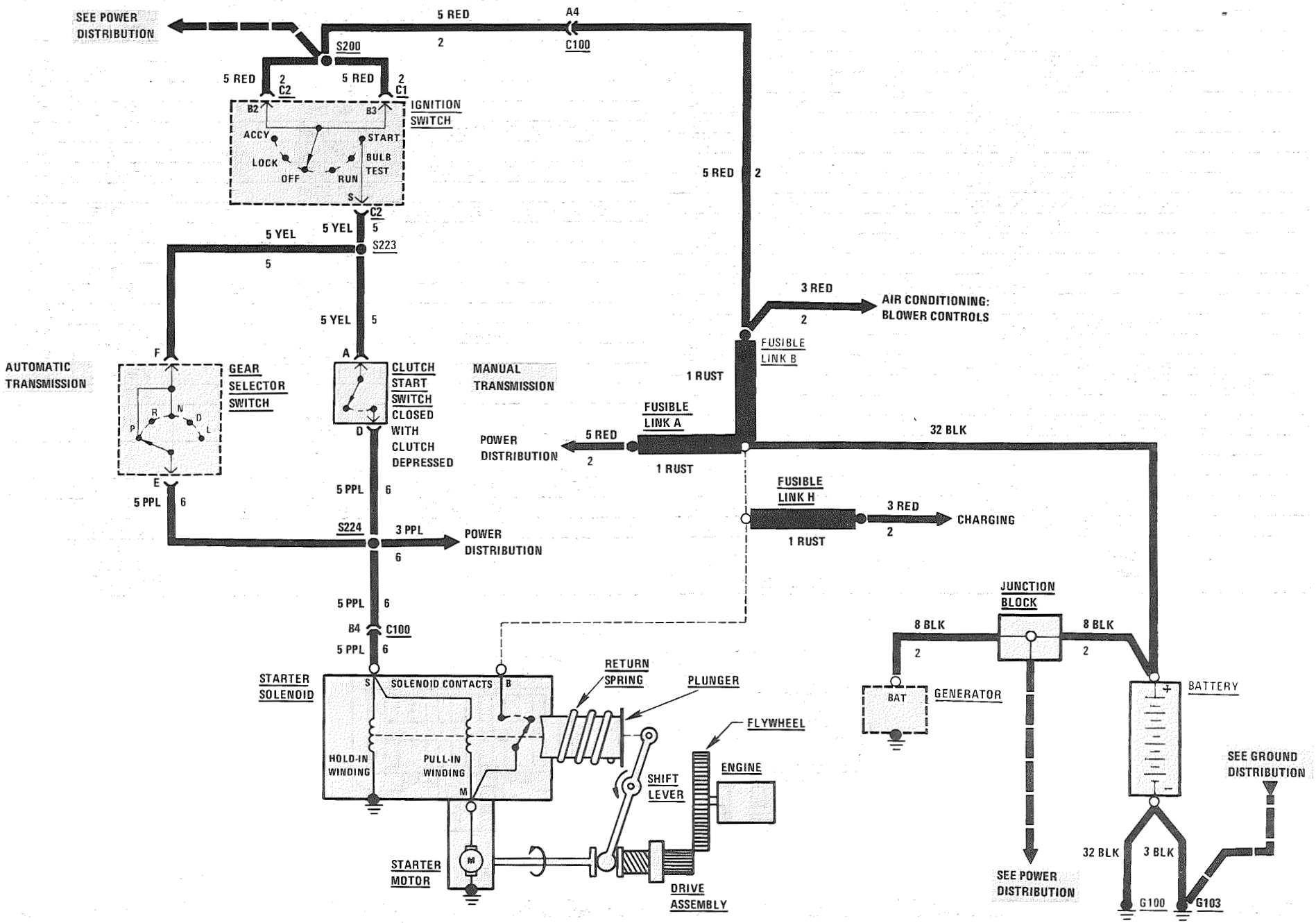
V00005.1

CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
A1	DK GRN/WHT	465	FUEL PUMP RELAY CONTROL
A2	BRN	436	AIR SELECT VALVE CONTROL
A3	DK GRN/YEL	428	CANISTER PURGE SOLENOID VALVE CONTROL
A4	GRY	435	EXHAUST GAS RECIRCULATION SOLENOID CONTROL
A5	BRN/WHT	419	"SERVICE ENGINE SOON" INDICATOR CONTROL
A6	PNK/BLK	439	IGNITION
A7	TAN/BLK	422	TCC CONTROL
A8	ORN	461	DATA
A9	WHT/BLK	451	DIAGNOSTIC "TEST" INPUT
A10	BRN	437	SPEED INPUT
A11	BLK	452	GROUND
A12	BLK/WHT	450	GROUND
B1	ORN	340	BATTERY
B2	TAN/WHT	120	FUEL PUMP CONTROL
B3	BLK/RED	453	DISTRIBUTOR REFERENCE PULSE INPUT: LO
B4	—	—	NOT USED
B5	PPL/WHT	430	DISTRIBUTOR REFERENCE PULSE INPUT: HI
B6	PPL	963	THEFT DETERRENT
B7	BLK	485	ELECTRONIC SPARK CONTROL INPUT (RETARD)
B8	DK GRN	59	A/C ON INPUT
B9	—	—	NOT USED
B10	ORN/BLK	434	PARK/NEUTRAL INPUT
B11	—	—	NOT USED
B12	DK GRN	998	MASS AIR FLOW SENSOR INPUT
C1	DK GRN/WHT	335	FAN CONTROL OUTPUT
C2	BLK/PNK	429	AIR DIVERTER VALVE CONTROL
C3	LT GRN/BLK	444	IDLE AIR CONTROL B LO
C4	LT GRN/WHT	443	IDLE AIR CONTROL B HI

CAVITY	WIRE COLOR SOCKET HALF	CIRCUIT NUMBER	CIRCUIT FUNCTION
C5	LT BLU/WHT	441	IDLE AIR CONTROL A HI
C6	LT BLU/BLK	442	IDLE AIR CONTROL A LO
C7	—	—	NOT USED
C8	DK GRN	446	TOP GEAR INPUT
C9	—	—	NOT USED
C10	YEL	410	COOLANT TEMPERATURE SENSOR INPUT
C11	—	—	NOT USED
C12	TAN	472	MANIFOLD AIR TEMPERATURE SENSOR INPUT
C13	DK BLU	417	THROTTLE POSITION SENSOR INPUT
C14	GRY	416	5 VOLT REFERENCE
C15	DK GRN	999	EGR VACUUM SENSOR SIGNAL
C16	ORN	340	BATTERY
D1	BLK/WHT	450	GROUND
D2	BLK	452	GROUND
D3	BLK/WHT	450	GROUND
D4	WHT	423	SPARK TIMING OUTPUT
D5	TAN/BLK	424	IGNITION MODULE BYPASS OUTPUT
D6	TAN	413	OXYGEN SENSOR GROUND
D7	PPL	412	OXYGEN SENSOR INPUT
D8	—	—	NOT USED
D9	—	—	NOT USED
D10	BLK/WHT	450	GROUND
D11	GRY	731	FAN PRESSURE SWITCH INPUT
D12	BLK	900	BURN-OFF RELAY CONTROL
D13	—	—	NOT USED
D14	—	—	NOT USED
D15	BLK/PNK	467	FUEL INJECTOR CONTROL
D16	BLK/LT GRN	468	FUEL INJECTOR CONTROL

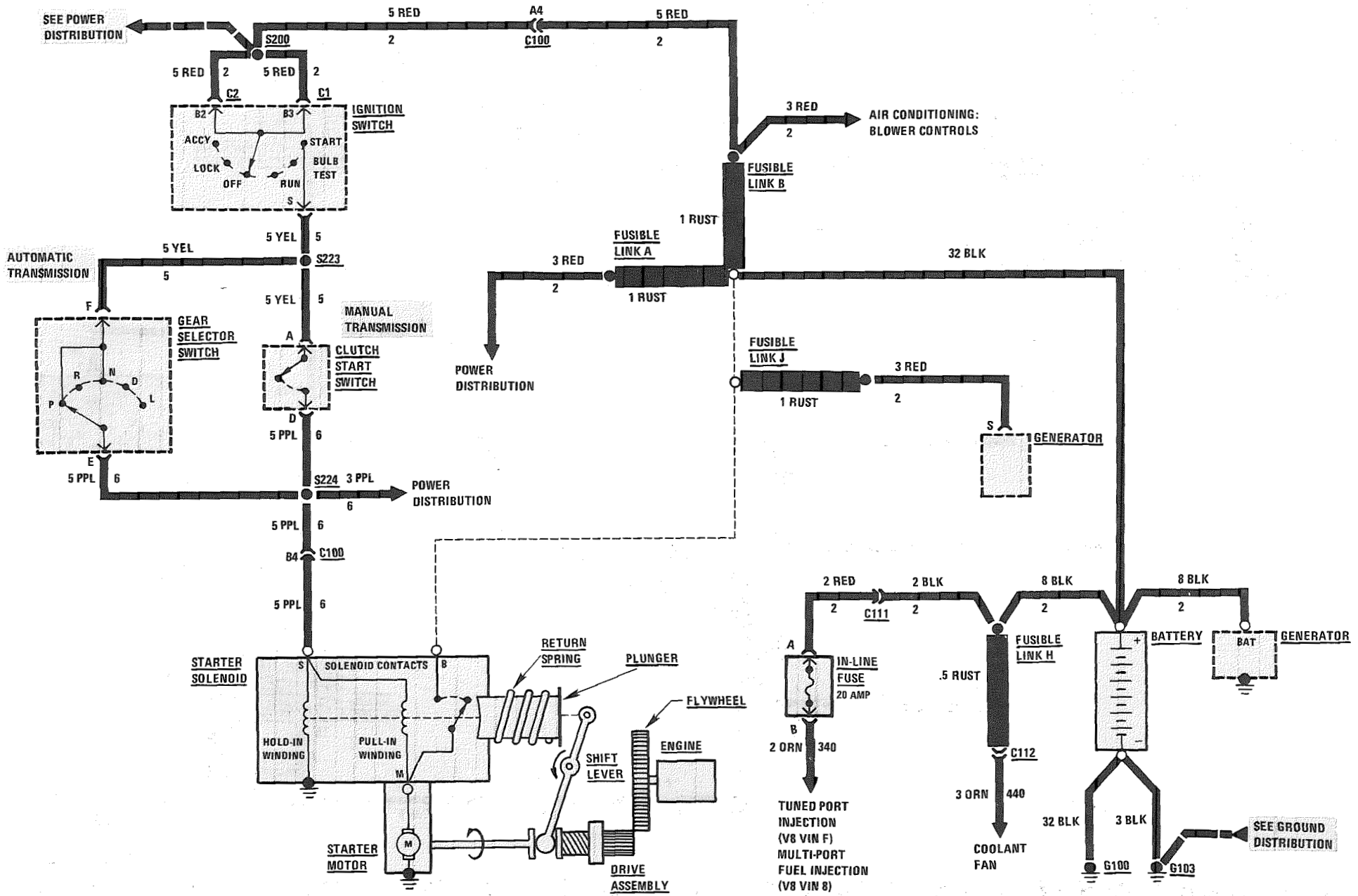
STARTER AND CHARGING SYSTEM: V6 VIN S

STARTER



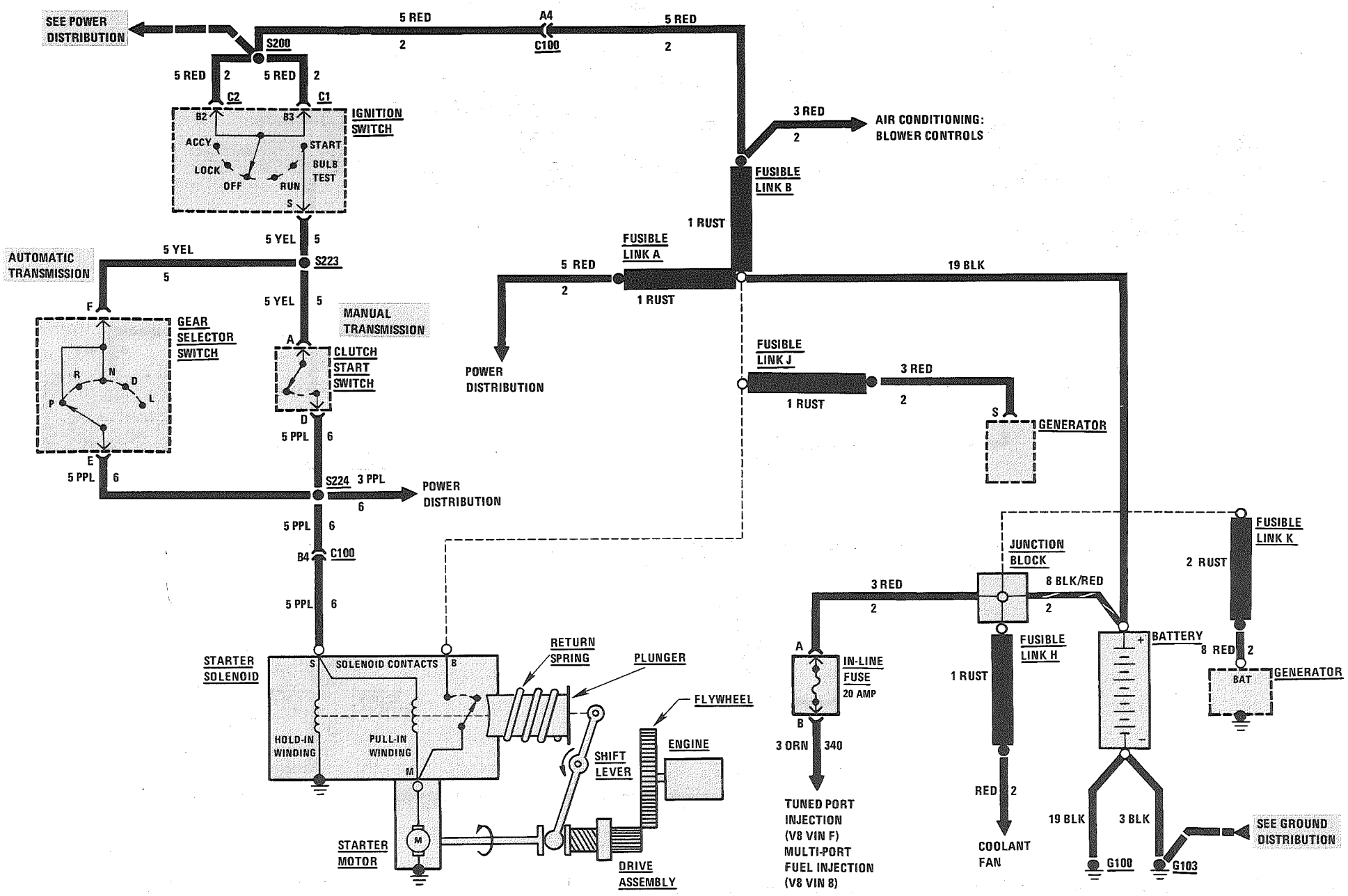
STARTER AND CHARGING SYSTEM: V8 VIN F, V8 VIN 8

STARTER



STARTER AND CHARGING SYSTEM: V8 VIN E

STARTER



STARTER AND CHARGING SYSTEM

TROUBLESHOOTING HINTS

STARTER

- **Try the following checks before doing the System Diagnosis.**

1. Check the hydrometer eye that is built into the vehicle Battery before troubleshooting the Starter System.

— Green eye - Battery is charged.

— Dark eye - Battery is discharged. Recharge Battery.

— Clear or yellow eye - Battery fluid is low. Replace Battery.

2. Check that the Starter Solenoid terminals S and B and battery connections are clean and tight.
3. Check that grounds G100 and G103 are clean and tight.

- **Go to System Diagnosis for diagnostic tests.**

SYSTEM DIAGNOSIS

STARTER

NOTE: The following tests are designed for engines and batteries at normal operating temperatures and assumes that there are no engine symptoms which could cause a no start condition. To use the tests under other conditions could result in misdiagnosis.

- **Diagnostic steps for the symptoms listed in the following table are listed after the table.**

COMPONENT LOCATION

		Page-Figure
Clutch Start Switch	Above clutch pedal, on clutch pedal support	
Fusible Link A (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link A (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link A (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link B (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link B (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link B (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link H (VIN E)	RH front of engine compartment, at Junction Block	201- 3-B
Fusible Link H (VIN F) (VIN 8)	LH front of engine compartment, behind battery	201- 5-C
Fusible Link H (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link J (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link J (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link K	RH front of engine compartment, at Junction Block	201- 3-B
Gear Selector Switch	In console, at base of gear selector	201-11-E
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
In-Line Fuse (VIN E)	RH inner fender panel by battery	201- 3-B
In-Line Fuse (VIN F)(VIN 8)	On LH side of radiator support, forward of battery	201- 5-C
Junction Block	RH front of engine compartment, behind headlight	201- 1-A
Starter Solenoid (VIN E)	Lower RH side of engine	201- 2-A
Starter Solenoid (VIN F) (VIN 8)	Lower RH side of engine	201- 6-B
Starter Solenoid (VIN S)	Lower RH side of engine	201- 1-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C111 (1 cavity)	Behind battery, near positive battery cable	201- 7-A
C112 (1 cavity)	Behind battery, near positive battery cable	201- 7-A
G100 (VIN E)	RH front of engine	201- 4-B
G100 (VIN F) (VIN 8)	Lower LH front of engine	201- 8-B
G100 (VIN S)	Lower LH front of engine	201- 1-B
G103 (Except VIN E)	On radiator support, behind LH headlights	201-16-A
G103 (VIN E)	RH inner fender panel, near battery	201- 3-B
S200	I/P harness, behind LH side of I/P	201-10-A

SYMPTOM TABLE

A: Engine does not crank and Starter Solenoid does not click

B: Starter Solenoid clicks, but engine does not crank or cranks slowly

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 1)

Measure: VOLTAGE
At: STARTER SOLENOID
Conditions:
- **Ignition Switch: START**
- **Gear Selector: PARK (Automatic Transmission)**
- **Clutch: DEPRESSED (Manual Transmission)**

Measure Between	Correct Voltage	For Diagnosis
S (PPL) & Ground	Battery	See 1
S (PPL) & Starter Motor mounting bolts	Battery	See 2

- If all the voltages are correct, replace the Starter Solenoid. Refer to Section 6D for replacement procedures.

1. Go to Table 2 (Automatic Transmission) or Table 3 (Manual Tranmission).
2. Clean the Starter Motor mounting bolts and Starter Motor. Scrape off any excess paint, rust or dirt.

COMPONENT LOCATION

		Page-Figure
S223	I/P harness, above Fuse Block	201- 9-A
S224	I/P harness, near LH shroud	

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 2—AUTOMATIC TRANSMISSION)

Measure: VOLTAGE
At: GEAR SELECTOR SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: START**

Measure Between	Correct Voltage	For Diagnosis
F (YEL) & Ground	Battery	See 1

- If voltage is correct, go to Table 4.

1. Go to Table 6.

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 3—MANUAL TRANSMISSION)

Measure: VOLTAGE
At: CLUTCH START SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: START**

Measure Between	Correct Result	For Diagnosis
A (YEL) & Ground	Battery	See 1

- If voltage is correct, go to Table 5.

1. Go to Table 6.

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 4—AUTOMATIC TRANSMISSION)

Connect: FUSED JUMPER
At: GEAR SELECTOR SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: START**

Jumper Between	Correct Result	For Diagnosis
F (YEL) & E (PPL)	Engine cranks	See 1

- If engine cranks, replace Gear Selector Switch. Check Gear Selector Switch adjustment before replacing with new switch.

1. Check/repair PPL (6) wire for an open.

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 5—MANUAL TRANSMISSION)

Connect: FUSED JUMPER
At: CLUTCH SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: START**

Jumper Between	Correct Result	For Diagnosis
A (YEL) & D (PPL) wires	Engine cranks	See 1

- If the engine cranks, check/replace the Clutch Start Switch.

1. Check/repair PPL (6) wire for an open.

A: ENGINE DOES NOT CRANK AND STARTER SOLENOID DOES NOT CLICK (TABLE 6)

Measure: VOLTAGE
At: IGNITION SWITCH CONNECTORS C1 & C2 (Connected)

Measure Between	Correct Result	For Diagnosis
B2 (RED) & Ground	Battery	See 1
B3 (RED) & Ground	Battery	See 1
• Turn the Ignition Switch to START		
S (YEL) & Ground	Battery	See 2

- If all the voltages are correct, check/repair YEL (5) wire for an open (see schematic).

1. Check RED (2) wire and Fusible Link B (see schematic).
2. Replace Ignition Switch.

B: STARTER SOLENOID CLICKS BUT ENGINE DOES NOT CRANK OR CRANKS SLOWLY (TABLE 1)

Measure: VOLTAGE
At: BATTERY TERMINALS
Conditions:
- **Battery fully charged**
- **Fuses INJ1 and FP/INJ 2: REMOVED**
- **Ignition Switch: START**
- **Engine being cranked**

Measure Between	Correct Voltage	For Diagnosis
Positive & Negative Battery Terminals	Greater than 9.5 volts	See 1

- If the voltage is correct, go to Table 2.

1. Refer to Section 6D for Battery Load Test. Remove Starter Assembly for repairs if the Battery is OK.

B: STARTER SOLENOID CLICKS BUT ENGINE DOES NOT CRANK OR CRANKS SLOWLY (TABLE 2)

Measure: VOLTAGE
At: BATTERY CABLES
Conditions:

- **Battery fully charged**
- **Fuses INJ1 and FP/INJ 2: REMOVED**
- **Ignition Switch: START**
- **Engine being cranked**

Measure Between	Correct Voltage	For Diagnosis
Negative Battery Terminal & Engine Block	Less than .5 volts	See 1
Positive Battery Terminal & Starter Solenoid Terminal B	Less than .5 volts	See 2

- If both voltages are correct, remove the Starter Assembly for repairs. Refer to Section 6D.

1. Replace negative battery cable.
2. Replace positive battery cable.

CIRCUIT OPERATION

STARTER

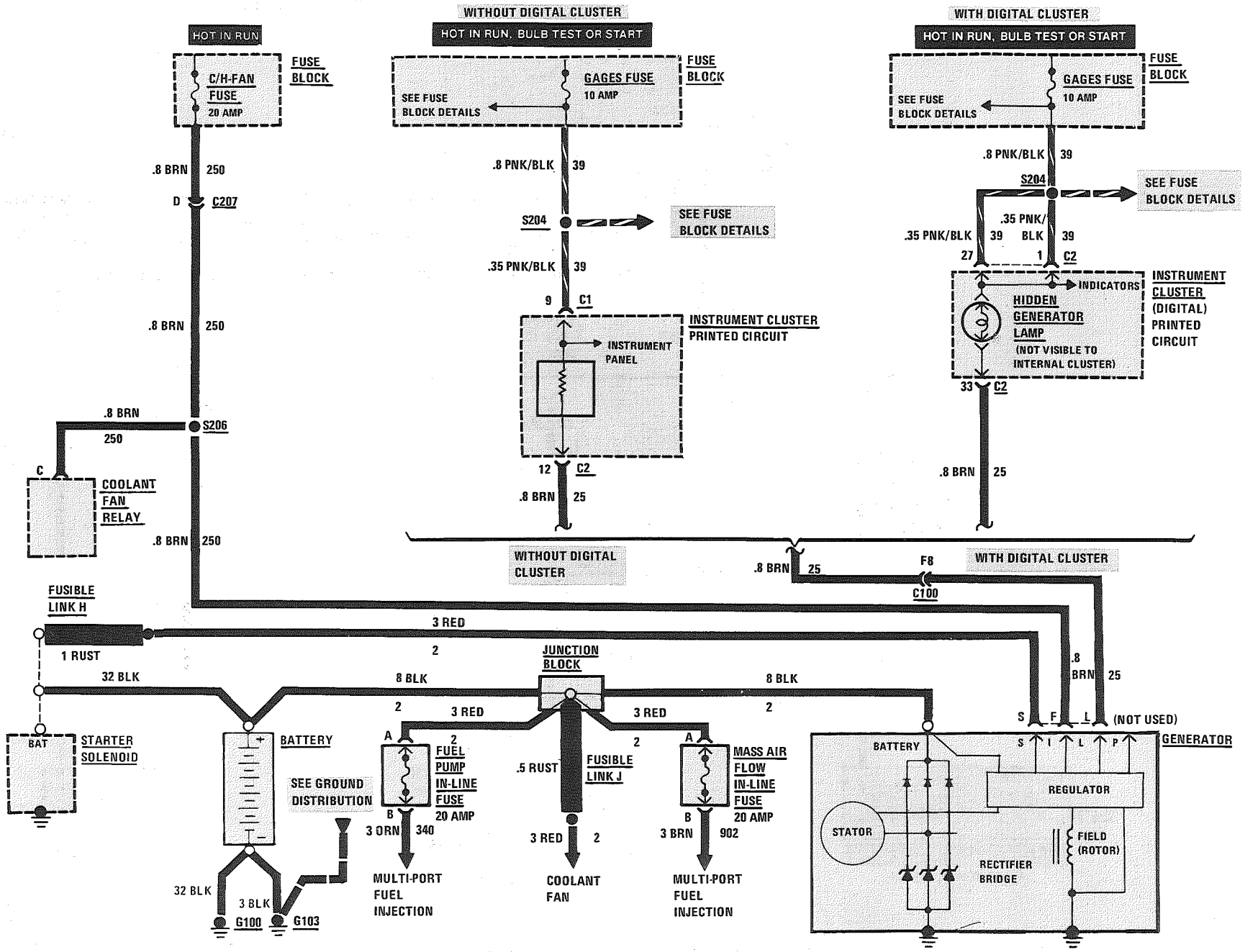
When the Ignition Switch is moved to the START position with the Gear Selector Switch in PARK or NEUTRAL (automatic transmission) or the Clutch Start Switch closed (manual transmission), battery voltage is applied to the Starter Solenoid. Both solenoid windings are energized. The circuit through the Pull-In Winding is completed to ground through the Starter Motor. The windings work together magnetically to pull in and hold in the Plunger. The Plunger moves the Shift Lever. This action causes the Drive Assembly to rotate as it engages the Flywheel Gear on the engine. At the same time, the Plunger also closes the Solenoid Switch contacts in the Starter Solenoid. Full battery voltage is applied directly to the Starter Motor and it cranks the engine.

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

When the Ignition Switch is released from the START position, battery voltage is removed from the PPL wire and the junction of the two windings. Current flows from the motor contacts, through both windings, to ground at the end of the Hold-In Winding. However, the direction of current flow through the Pull-In Winding is now opposite to the direction of current flow when the winding was first energized. The magnetic fields of the Pull-In and Hold-In Windings now oppose one another. This action of the windings, with the help of the Return Spring, causes the starter Drive Assembly to disengage and Solenoid Switch contacts open, the Starter Circuit is turned off.

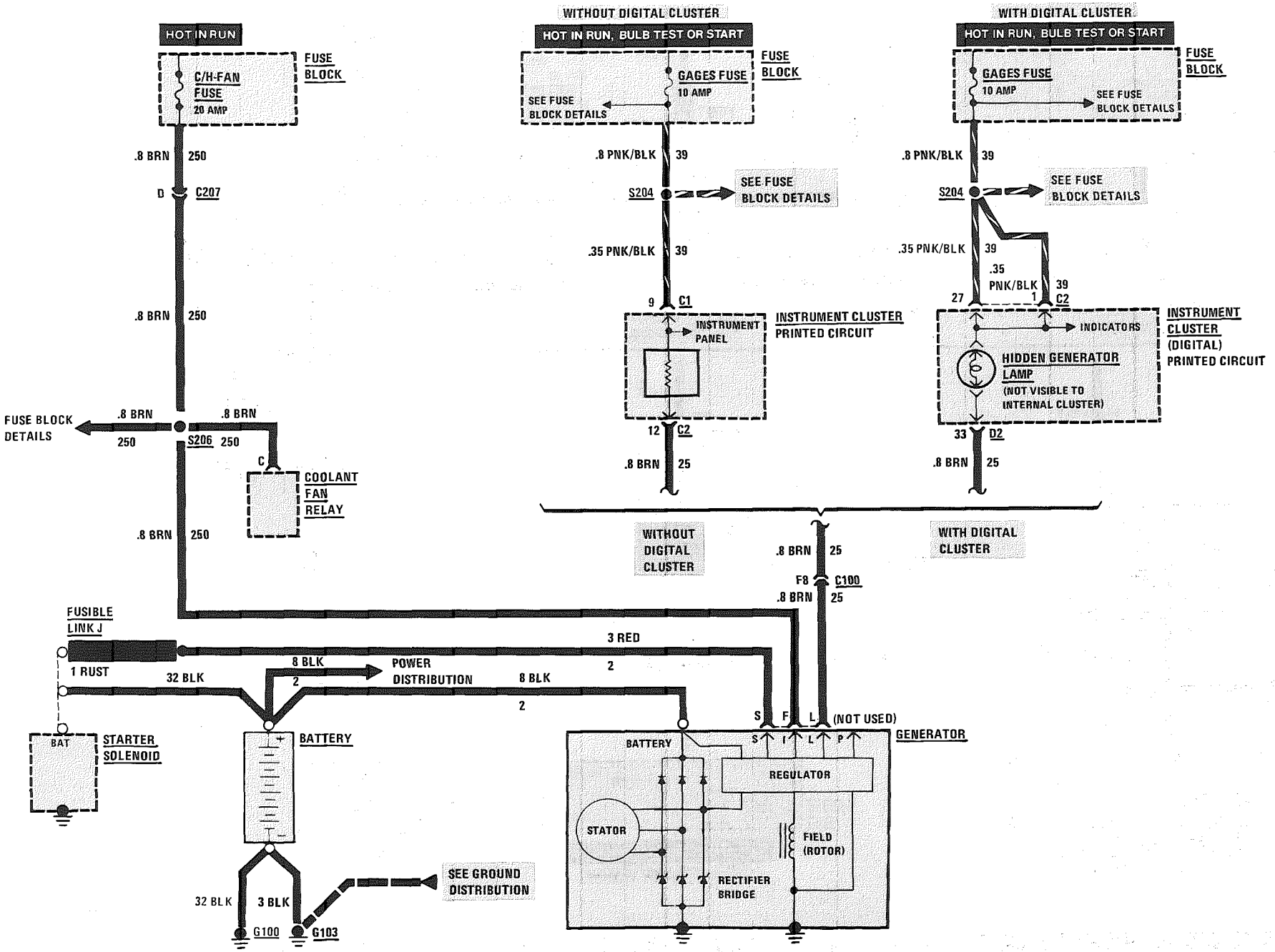
STARTER AND CHARGING SYSTEM: V6 VIN S

CHARGING



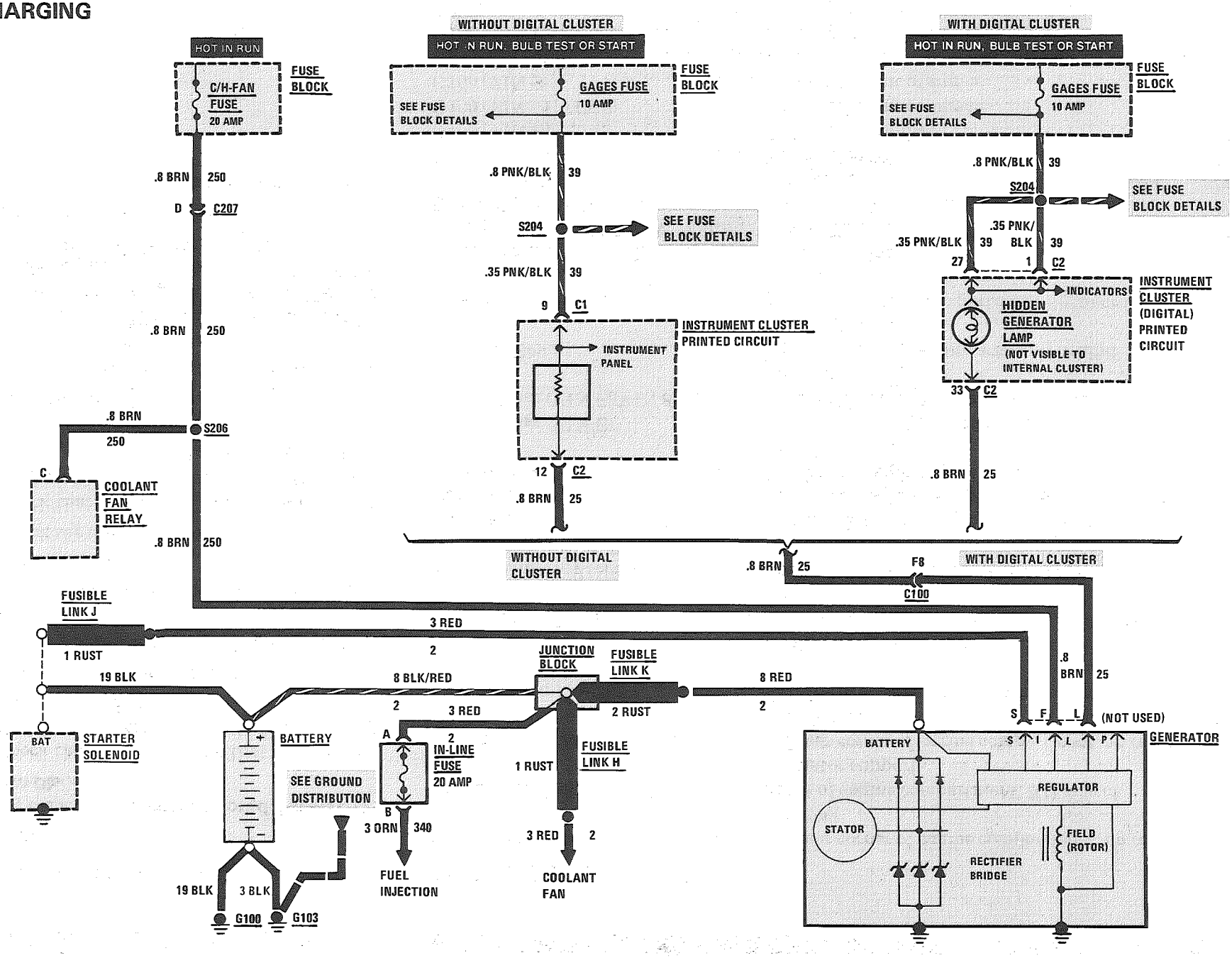
STARTER AND CHARGING SYSTEM: V8 VIN F, V8 VIN 8

CHARGING



STARTER AND CHARGING SYSTEM: V8 VIN E

CHARGING



TROUBLESHOOTING HINTS

CHARGING

- **Try the following checks before doing the System Diagnosis.**

1. Check the hydrometer eye that is built into the vehicle Battery before troubleshooting the Charging System.

— Green eye - Battery is charged.

— Dark eye - Battery is discharged. Recharge Battery.

— Clear or yellow eye - Battery fluid is low. Replace Battery.

2. Check the Generator Belt.
3. Check that the Starter Solenoid terminal B and battery connections are clean and tight.
4. Check that the Generator connector is tight and that the Generator battery terminal is clean and tight.
5. Check the vehicle voltmeter (if equipped) to assure accurate voltage readings.
6. Check the GAGES Fuse. This check can be done by observing the BRAKE Warning Indicator with the Ignition Switch in RUN and the Park Brake applied.
7. Check the C/H-FAN Fuse.

- **Go to System Diagnosis for diagnostic tests.**

COMPONENT LOCATION

		Page-Figure
Coolant Fan Relay (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 3-A
Coolant Fan Relay (VIN F) (VIN 8)	Front of engine compartment, RH side of radiator support	201- 5-A
Coolant Fan Relay (VIN S)	LH rear corner of engine compartment, on relay bracket	201- 0-A
Fuel Pump In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Fusible Link H (VIN E)	RH front of engine compartment, at Junction Block	201- 3-B
Fusible Link H (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Fusible Link J (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link J (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link J (VIN S)	RH side of radiator support, at Junction Block	201- 1-A
Fusible Link K	RH front of engine compartment, at Junction Block	201- 3-B
In-Line Fuse (VIN E)	RH inner fender panel by battery	201- 3-B
In-Line Fuse (VIN F)(VIN 8)	On LH side of radiator support, forward of battery	201- 5-C
Junction Block	RH front of engine compartment, behind headlight	201- 1-A
Mass Air Flow In-Line Fuse	RH side of engine compartment, on inner fender panel	201- 1-A
Starter Solenoid (VIN E)	Lower RH side of engine	201- 2-A
Starter Solenoid (VIN F) (VIN 8)	Lower RH side of engine	201- 6-B
Starter Solenoid (VIN S)	Lower RH side of engine	201- 1-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
G100 (VIN E)	RH front of engine	201- 4-B
G100 (VIN F) (VIN 8)	Lower LH front of engine	201- 8-B
G100 (VIN S)	Lower LH front of engine	201- 1-B
G103 (Except VIN E)	On radiator support, behind LH headlights	201-16-A
G103 (VIN E)	RH inner fender panel, near battery	201- 3-B
S204	I/P harness, behind instrument cluster	201-10-A
S206 (VIN E)	Engine harness, RH front of dash	201- 2-A

(Continued on facing page)

SYSTEM DIAGNOSIS

CHARGING

- **Do the tests below if the Battery is undercharged or overcharged or if the vehicle voltmeter shows less than 12 volts or more than 16 volts with the engine running at fast idle.**

GENERATOR TEST (TABLE 1)

Measure: VOLTAGE
At: GENERATOR BATTERY TERMINAL AND GENERATOR CONNECTOR (Disconnected)
Conditions
- **Ignition Switch: RUN**

Measure Between	Correct Result	For Diagnosis
L (BRN) & Ground	Battery	See 1
F (BRN) & Ground (see schematic)	Battery	See 2
S (RED) & Ground	Battery	See 3
Battery Terminal & Ground	Battery	See 4

(Continued in next column)

COMPONENT LOCATION

(Continued from previous column)

- If all voltages are correct, reconnect the connector and go to Table 2.

1. Check GAGES Fuse, BRN (25) wire, PNK/BLK (39) wire and the Instrument Cluster Printed Circuit for an open or short to ground.
2. Check C/H-FAN FUSE and the BRN (250) wire for an open or short to ground (see schematic).
3. Check RED (2) wire and Fusible Link (see schematic) for an open or short to ground.
4. Check wiring from the battery positive terminal of the Generator (see schematic).

GENERATOR TEST (TABLE 2)

Measure: VOLTAGE
At: GENERATOR
Conditions:
- **Generator Connector: CONNECTED**
- **All accessories: OFF**
- **Engine running at fast idle**

Measure Between	Correct Result	For Diagnosis
Battery terminal & Ground	Less than 16 volts	See 1

- If the voltage is correct, perform a Generator Load Test. Refer to Section 6D. Perform a Battery Load Test if the Generator is good. Refer to Section 6D.

1. Repair/replace Generator. Refer to Section 6D.

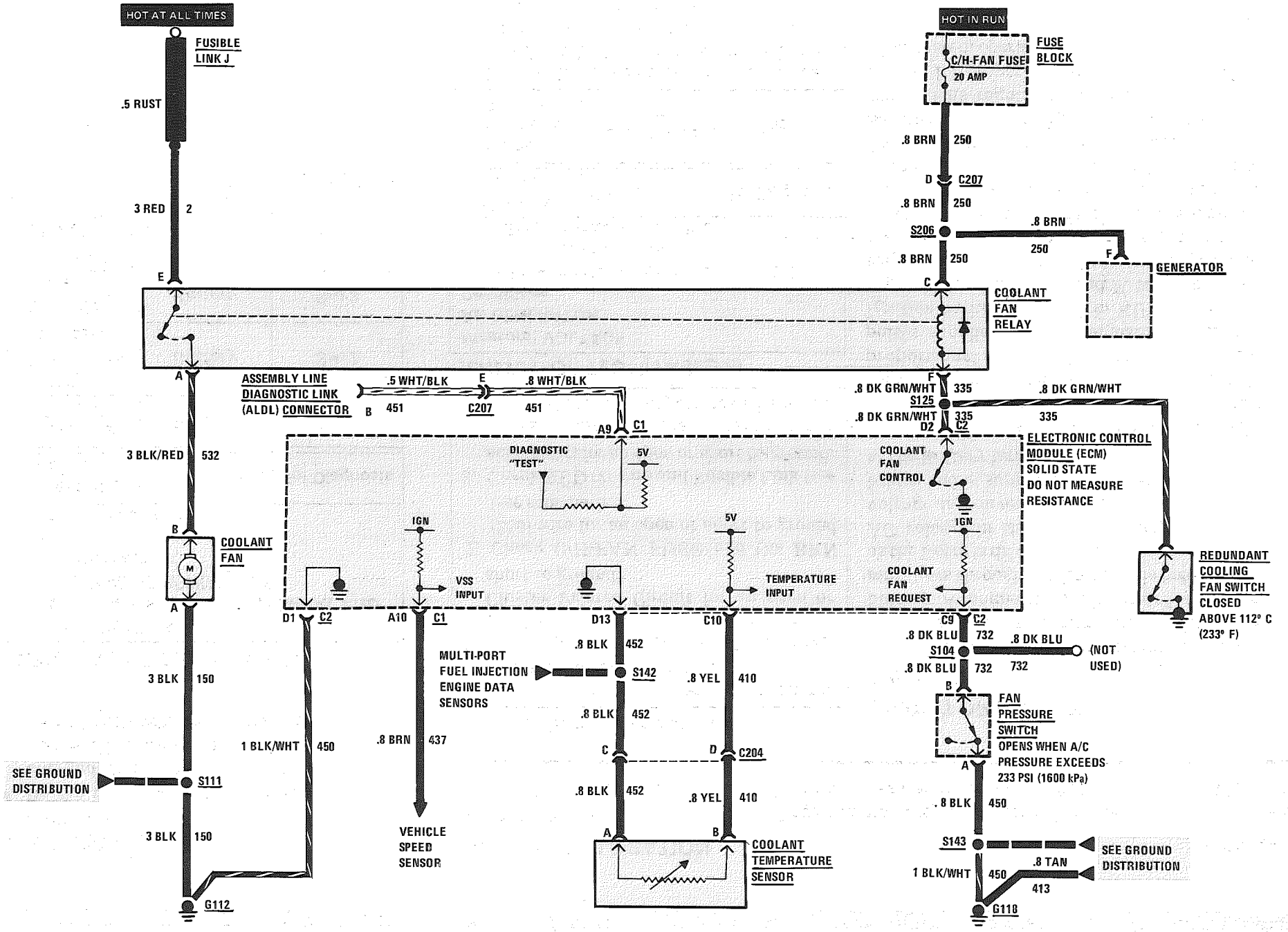
CIRCUIT OPERATION

CHARGING

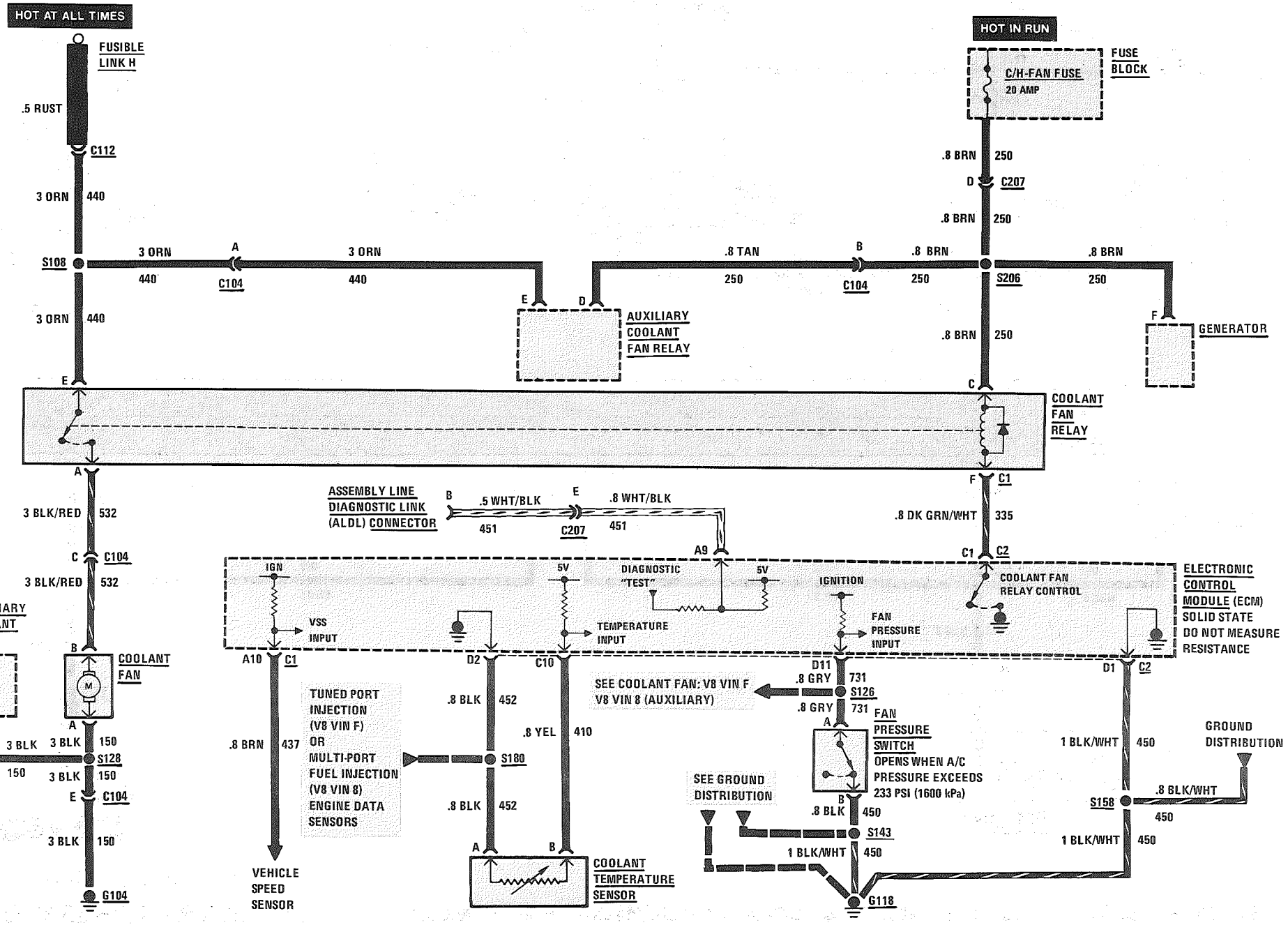
The Generator provides voltage to operate the car's electrical system and to charge its battery. A magnetic field is created when current flows through the Rotor. This field rotates as the Rotor is driven by the engine, creating an AC voltage in the Stator windings. The AC voltage is converted to DC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

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

COOLANT FAN: V6 VIN S

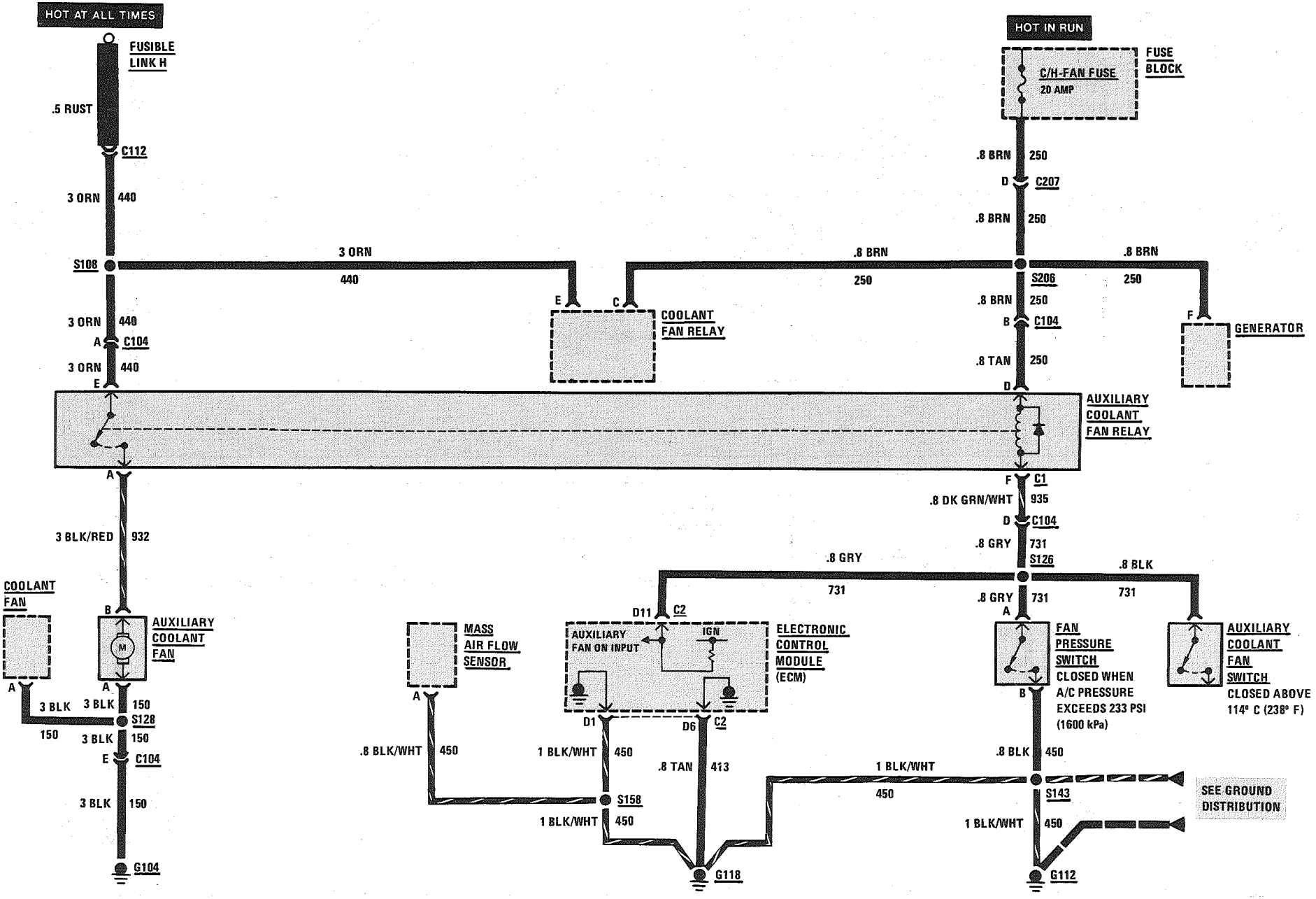


COOLANT FAN: V8 VIN F, V8 VIN 8

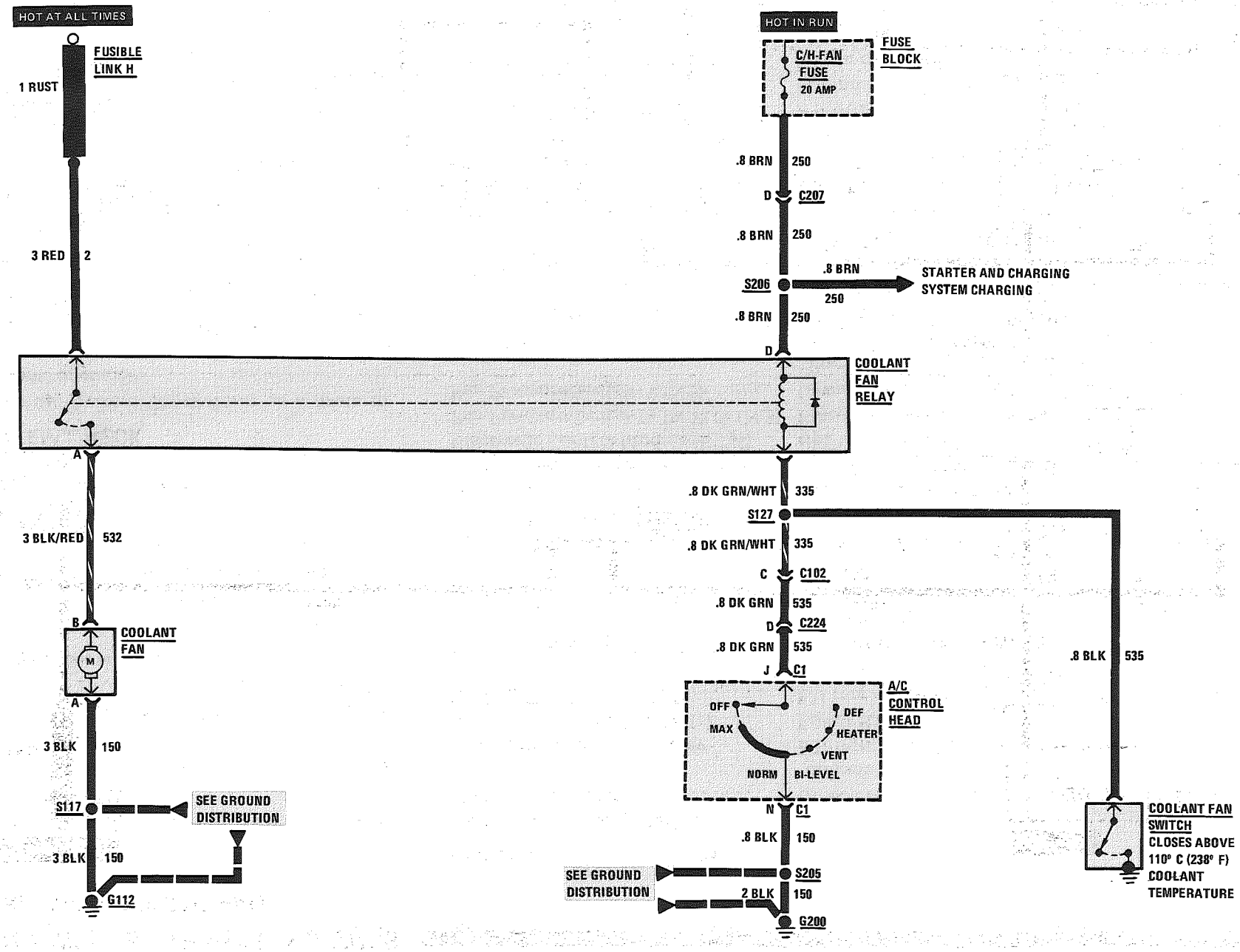


COOLANT FAN: V8 VIN F, V8 VIN 8

AUXILIARY COOLANT FAN



COOLANT FAN: V8 VIN E



TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check the C/H-FAN Fuse if the Coolant Fan does not run.
2. Check that ground G112 (V6 VIN S), G117 (V8 VIN E) or G104 (V8 VIN F and V8 VIN 8) is clean and tight.
3. Check the Fusible Link (see schematic).
4. If the Coolant Fan runs with the Ignition Switch OFF, replace the Coolant Fan Relay.

- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation.**

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT
With the engine cold and idling, turn the A/C Selector to NORM (if equipped with A/C)	VIN E: Coolant Fan turns on VIN S, VIN F & VIN 8: Coolant Fan (and Auxiliary Coolant Fan-if equipped) turns on when A/C Control Head Pressure exceeds 233 psi (1600 kPa)

(Continued on next page)

COMPONENT LOCATION

		Page-Figure
Assembly Line Diagnostic Link (ALDL) Connector	On bottom of I/P hush panel, to right of steering column	
Auxiliary Coolant Fan Relay	RH front side of engine compartment	201- 5-A
Auxiliary Coolant Fan Switch	Lower RH rear of engine	201- 6-A
Coolant Fan Relay (VIN E)	LH rear corner of engine compartment, on relay bracket	201- 3-A
Coolant Fan Relay (VIN F) (VIN 8)	Front of engine compartment, RH side of radiator support	201- 5-A
Coolant Fan Relay (VIN S)	LH rear corner of engine compartment, on relay bracket	201- 0-A
Coolant Fan Switch	Lower RH rear of engine, above starter solenoid	201- 4-A
Coolant Temperature Sensor (VIN F) (VIN 8)	Top LH front of engine	201- 8-C
Coolant Temperature Sensor (VIN S)	Top LH front of intake manifold	201- 0-A
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Fan Pressure Switch (VIN F) (VIN 8)	Lower RH side of engine, on A/C line	201- 5-A
Fan Pressure Switch (VIN S)	Lower RH front of engine compartment, on A/C line	201- 1-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Fusible Link H (VIN E)	RH front of engine compartment, at Junction Block	201- 3-B
Fusible Link H (VIN F) (VIN 8)	LH front of engine compartment, behind battery	201- 5-C
Fusible Link J (VIN S)	RH side of radiator support, at Junction Block	201- 1-A
Redundant Cooling Fan Switch	Top RH rear of engine	201- 1-C
C102 (4 cavities)	Center front of dash	201-14-A
C104 (6 cavities)	Front of engine compartment, RH side of radiator	201- 5-A
C204 (4 cavities)	Above LH rear corner of engine	201- 0-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C224 (6 cavities)	Center of I/P, behind A/C control	201-14-B
G104	On radiator support, behind RH headlights	201-16-A
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
G118 (VIN F) (VIN 8)	Rear of RH cylinder head	201- 5-A
G118 (VIN S)	Rear of RH cylinder head	201- 1-C

(Continued on next page)

(Continued from previous page)

With the engine coolant below operating temperature, move the A/C Selector to OFF	VIN E: Coolant Fan turns off VIN S, VIN F & VIN 8: Coolant Fan (and Auxiliary Coolant Fan-if equipped) turns off when A/C Control Head Pressure falls below 233 psi (1600 kPa)
With the engine warm, run the engine at a fast idle for several minutes	Coolant Fan (and Auxiliary Coolant Fan-if equipped) turns on before the Coolant Temperature Indicator in the Instrument Panel lights or before the Coolant Temperature Gage needle indicates hot
Turn the Ignition Switch to off	Coolant Fan (and Auxiliary Coolant Fan-if equipped) turns off

- **Refer to System Diagnosis when a result is not normal.**

SYSTEM DIAGNOSIS

V6 VIN S

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

COMPONENT LOCATION

		Page-Figure
G200	Behind I/P, left of steering column	201-10-A
S104 (VIN S)	Engine harness, lower RH side of engine	201- 1-A
S108	Engine harness, lower RH side of engine	201- 5-A
S111	Engine harness, RH rear of engine compartment	201- 1-A
S126	Engine harness, RH rear corner of engine compartment	201- 5-A
S127	Engine harness, RH front of dash	201- 2-A
S128	Cooling Fan harness, RH front corner of engine compartment	201- 6-A
S142 (VIN S)	Engine harness, lower RH side of engine	201- 1-A
S143 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S143 (VIN S)	Engine harness, center front of dash	201- 1-A
S158	Engine harness, behind RH side of I/P	
S205	I/P harness, behind instrument cluster	201-10-A
S206 (VIN E)	Engine harness, RH front of dash	201- 2-A
S206 (VIN F)(VIN 8)	Engine harness, top center rear of engine	201- 7-A
S206 (VIN S)	Engine harness, above rear of engine	201- 1-A

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Coolant Fan does not run at all	Do Test A
Coolant Fan does not run with engine hot but does run with the A/C on	Do Test B
Coolant Fan runs at all times with the engine cool and the A/C off	Do Test C

(Continued on next page)

COOLANT FAN

A: COOLANT FAN OPEN TEST (TABLE 1)

Connect: FUSED JUMPER
At: ALDL CONNECTOR
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
B & Ground	Coolant Fan runs	See 1

- If the result is correct, go to section 6E for ECM diagnosis.

1. Go to Table 2

A: COOLANT FAN OPEN TEST (TABLE 2)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Connected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
F (DK GRN/WHT) & Ground	Coolant Fan runs	See 1

- If the Coolant Fan runs, check the DK GRN/WHT (335) wire for an open. If the wire is OK, go to section 6E for ECM diagnosis.

1. Go to Table 3.

A: COOLANT FAN OPEN TEST (TABLE 3)

Connect: TEST LAMP
At: COOLANT FAN RELAY CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
C (BRN) & Ground	Test Lamp lights	See 1
E (RED) & Ground	Test Lamp lights	See 2

- If the results are correct, go to Table 4.

1. Check C/H-FAN Fuse and BRN (250) wire for open.
2. Check Fusible Link J and RED (2) wire for opens.

A: COOLANT FAN OPEN TEST (TABLE 4)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Disconnected)

Jumper Between	Correct Result	For Diagnosis
E (RED) & A (BLK/RED)	Coolant Fan runs	See 1

- If the Coolant Fan runs, replace the Coolant Fan Relay.

1. Leave fused jumper in place and go to Table 5.

A: COOLANT FAN OPEN TEST (TABLE 5)

Connect: TEST LAMP
At: COOLANT FAN CONNECTOR (Disconnected)
Condition:
- **Fused jumper from Table 4 connected**

Connect Between	Correct Result	For Diagnosis
B (BLK/RED) & Ground	Test Lamp lights	See 1
B (BLK/RED) & A (BLK)	Test Lamp lights	See 2

- If the results are correct, replace the Coolant Fan.

1. Check BLK/RED (532) wire for an open.
2. Check BLK (150) wire for an open.

B: COOLANT FAN SWITCH TEST

Connect: FUSED JUMPER
At; REDUNDANT COOLING FAN SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
DK GRN/WHT & Ground	Coolant Fan runs	See 1

- If the Coolant Fan runs, replace the Redundant Cooling Fan Switch, then refer to Section 6E for ECM diagnosis.

1. Check the DK GRN/WHT (335) wire for an open (see schematic).

C: COOLANT FAN SHORT TEST

1. With the Ignition Switch in RUN, remove the Redundant Cooling Fan Switch connector.
- If the Coolant Fan does not turn off, go to Step 2.
- If the Coolant Fan turns off, replace the Redundant Cooling Fan Switch.

2. Remove the C/H-FAN Fuse.
- If the Coolant Fan turns off, check the DK GRN/WHT (335) wires for a short to ground. Refer to Section 6E for ECM diagnosis if the wires are OK.
- If the Coolant Fan does not turn off, replace the Coolant Fan Relay.

SYSTEM DIAGNOSIS

V8 VIN F AND V8 VIN 8

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Coolant Fan does not run at all	Do Test A
Coolant Fan runs at all times with the A/C off and engine cool	Do Test B
Auxiliary Coolant Fan does not run at all	Do Test C

(Continued in next column)

(Continued from previous column)

Auxiliary Coolant Fan runs at all times with A/C off and the engine cool	Do Test D

A: COOLANT FAN OPEN TEST (TABLE 1)

Connect: FUSED JUMPER
At: ALDL CONNECTOR
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
B & Ground	Coolant Fan runs	See 1

- If the result is correct, go to Section 6E for ECM diagnosis.

1. Go to Table 2.

A: COOLANT FAN OPEN TEST (TABLE 2)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Connected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
F (DK GRN/WHT) & Ground	Coolant Fan runs	See 1

(Continued in next column)

(Continued from previous column)

- If the Coolant Fan runs, check the DK GRN/WHT (335) wire for an open. If wire is OK, go to Section 6E for ECM diagnosis.

1. Go to Table 3.

A: COOLANT FAN OPEN TEST (TABLE 3)

Connect: TEST LAMP
At: COOLANT FAN RELAY CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
C (BRN) & Ground	Test Lamp lights	See 1
E (ORN) & Ground	Test Lamp lights	See 2

- If the results are correct, go to Table 4.

1. Check C/H-FAN Fuse and BRN (250) wire for opens.
2. Check Fusible Link H and ORN (440) wire for opens.

(Continued on next page)

A: COOLANT FAN OPEN TEST (TABLE 4)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Disconnected)

Jumper Between	Correct Result	For Diagnosis
E (ORN) & A (BLK/RED)	Coolant Fan runs	See 1

- If the Coolant Fan runs, replace the Coolant Fan Relay.

1. Leave fused jumper in place and go to Table 5.

A: COOLANT FAN OPEN TEST (TABLE 5)

Connect: TEST LAMP
At: COOLANT FAN CONNECTOR (Disconnected)
Condition:
- **Fused jumper in place from Table 4**

Connect Between	Correct Result	For Diagnosis
B (BLK/RED) & Ground	Test Lamp lights	See 1
B (BLK/RED) & A (BLK)	Test Lamp lights	See 2

- If the results are correct, replace the Coolant Fan.

1. Check BLK/RED (532) wire for an open.
2. Check BLK (150) wire for an open.

B: COOLANT FAN SHORT TEST

With the Ignition Switch in RUN, remove the C/H-FAN Fuse.

- If the Coolant Fan turns off, check the DK GRN/WHT (335) wire for a short to ground. If the wire is OK, refer to Section 6E for ECM diagnosis.
- If the Coolant Fan does not turn off, replace the Coolant Fan Relay.

C: AUXILIARY COOLANT FAN OPEN TEST (TABLE 1)

Connect: FUSED JUMPER
At: AUXILIARY COOLANT FAN RELAY CONNECTOR (Connected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
F (DK GRN/WHT) & Ground	Auxiliary Coolant Fan runs	See 1

- If the Auxiliary Coolant Fan runs, check the DK GRN/WHT (935) and GRY (731) wires for opens. If wires are good, check switches.

1. Go to Table 2.

C: AUXILIARY COOLANT FAN OPEN TEST (TABLE 2)

Connect: TEST LAMP
At: AUXILIARY COOLANT FAN RELAY CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
D (ORN) & Ground	Test Lamp lights	See 1
E (ORN) & Ground	Test Lamp lights	See 2

- If the results are correct, go to Table 3.

1. Check ORN (440) and BRN (250) wires for opens.
2. Check ORN (440) wires for opens.

C: AUXILIARY COOLANT FAN OPEN TEST (TABLE 3)

Connect: FUSED JUMPER
At: AUXILIARY COOLANT FAN RELAY CONNECTOR (Disconnected)

Jumper Between	Correct Result	For Diagnosis
E (ORN) & A (BLK/RED)	Auxiliary Coolant Fan runs	See 1

- If the Auxiliary Coolant Fan runs, replace the Auxiliary Coolant Fan Relay.

1. Leave fused jumper in place and go to Table 5.

C: AUXILIARY COOLANT FAN OPEN TEST (TABLE 4)

Connect: TEST LAMP
At: AUXILIARY COOLANT FAN CONNECTOR (Disconnected)
Condition:
- **Fused jumper in place from Table 4**

Connect Between	Correct Result	For Diagnosis
B (BLK/RED) & Ground	Test Lamp lights	See 1
B (BLK/RED) & A (BLK)	Test Lamp lights	See 2

- If the results are correct, replace the Auxiliary Coolant Fan.

1. Check BLK/RED (932) wire for an open.
2. Check BLK (150) wire for an open.

D: AUXILIARY COOLANT FAN SHORT TEST

1. With the Ignition Switch in RUN, disconnect the Auxiliary Coolant Fan Switch.

- If the Auxiliary Coolant Fan does not turn off, go to Step 2.
- If the Auxiliary Coolant Fan turns off, replace the Auxiliary Coolant Fan Switch.

2. Disconnect the Fan Pressure Switch.

- If the Auxiliary Coolant Fan does not turn off, go to Step 3.
- If the Auxiliary Coolant Fan turns off, replace the Fan Pressure Switch.

3. Remove the C/H-FAN Fuse.

- If the Auxiliary Coolant Fan does not turn off, replace the Auxiliary Coolant Fan Relay.
- If the Auxiliary Coolant Fan turns off, check the DK GRN/WHT (935) and GRY (731) wires for a short to ground.

SYSTEM DIAGNOSIS

V8 VIN E

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Coolant Fan does not run with engine hot and the A/C on	Do Test A
Coolant Fan does not run with engine hot but does run with the A/C on	Do Test B
Coolant Fan does not run with the A/C on but does run with the engine hot	Do Test C
Coolant Fan runs at all times with A/C off and engine cool	Do Test D

A: COOLANT FAN OPEN TEST (TABLE 1)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Connected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
F (DK GRN) & Ground	Coolant Fan runs	See 1

- If the Coolant Fan runs, check the DK GRN (335) wire for an open.

1. Go to Table 2.

A: COOLANT FAN OPEN TEST (TABLE 2)

Connect: TEST LAMP
At: COOLANT FAN RELAY CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
D (BRN) & Ground	Test Lamp lights	See 1
E (RED) & Ground	Test Lamp lights	See 2

- If the results are correct, go to Table 3.

1. Check C/H-FAN Fuse and BRN (250) wire for opens.
2. Check Fusible Link H and RED (2) wire for opens.

(Continued on next page)

A: COOLANT FAN OPEN TEST (TABLE 3)

Connect: FUSED JUMPER
At: COOLANT FAN RELAY CONNECTOR (Disconnected)

Jumper Between	Correct Result	For Diagnosis
E (RED) & A (BLK/RED)	Coolant Fan runs	See 1

- If the Coolant Fan runs, replace the Coolant Fan Relay.

1. Leave fused jumper in place and go to Table 4.

A: COOLANT FAN OPEN TEST (TABLE 4)

Connect: TEST LAMP
At: COOLANT FAN CONNECTOR (Disconnected)
Condition:
- **Fused jumper in place from Table 3.**

Connect Between	Correct Result	For Diagnosis
B (BLK/RED) & Ground	Test Lamp lights	See 1
B (BLK/RED) & A (BLK)	Test Lamp lights	See 2

- If the results are correct, replace the Coolant Fan.

1. Check BLK/RED (532) wire for an open.
2. Check BLK (150) wire for an open.

B: COOLANT FAN SWITCH TEST

Connect: FUSED JUMPER
At: COOLANT FAN SWITCH CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
BLK & Ground	Coolant Fan runs	See 1

- If the Coolant Fan runs replace the Coolant Fan switch.

1. Check BLK (335) wire for an open (see schematic).

C: A/C CONTROL HEAD TEST

Connect: FUSED JUMPER
At: A/C CONTROL HEAD CONNECTOR C1 (Disconnected)
Condition:
- **Ignition Switch: RUN**

Jumper Between	Correct Result	For Diagnosis
J (DK GRN) & Ground	Coolant Fan runs	See 1
J (DK GRN) & N (BLK)	Coolant Fan runs	See 2

- If the results are correct, replace the A/C Control Head.

1. Check DK GRN/WHT (335) and DK GRN (535) wires for an open (see schematic).
2. Check BLK (150) wire for an open (see schematic).

D: COOLANT FAN SHORT TEST

1. With the Ignition Switch in RUN, remove the Coolant Fan Switch.

- If the fan continues to run, go to step 2.
- If the fan turns off, replace the Coolant Fan Switch.

2. Remove the C/H-FAN Fuse.

- If the fan turns off, go to step 3.
- If the fan continues to run, replace the Coolant Fan Relay.

3. Disconnect the A/C Control Head and reconnect C/H-FAN Fuse.

- If the fan continues to run, check the DK GRN/WHT (335) and BLK (335) wires for a short to ground.
- If the fan turns off, replace the A/C Control Head.

CIRCUIT OPERATION

V6 VIN S, V8 VIN F and V8 VIN 8

The Coolant Fan is controlled by the Electronic Control Module (ECM). In the V6 VIN S, the Coolant Fan is also controlled by the Redundant Cooling Fan Switch. When the ECM grounds the 335 circuit, the Coolant Fan Relay is energized and battery voltage is applied to the Coolant Fan. If the ECM fails (V6 VIN S), the Redundant Cooling Fan Switch will ground the 335 circuit and energize the Coolant Fan Relay. The ECM will ground the Coolant Fan Relay when the Coolant Temperature Sensor indicates the coolant temperature is greater than 106 °C (222 °F) or when the A/C Control Head pressure is greater than 233 psi (1600 kPa) and the vehicle speed is less than 40 mph.

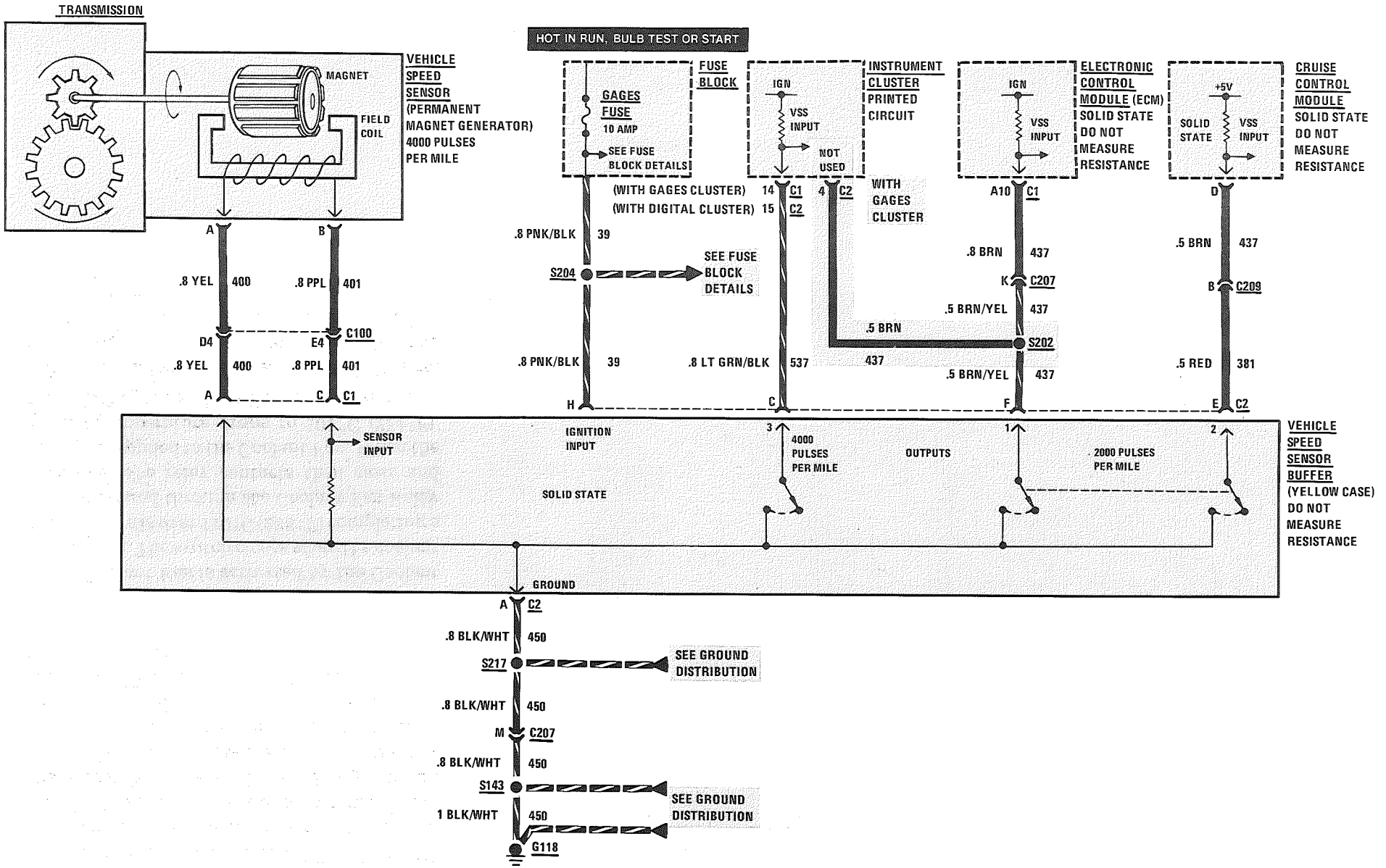
The Auxiliary Coolant Fan (V8 VIN F and V8 VIN 8) is controlled by the Fan Pressure Switch and the Auxiliary Coolant Fan Switch. If one of these switches closes, the Auxiliary Coolant Fan Relay is energized and the Auxiliary Coolant Fan is turned on. When a switch is closed, terminal D11 of ECM connector C2 is grounded. This tells the ECM that the Auxiliary Coolant Fan should be on.

V8 VIN E

The Coolant Fan is activated by the Coolant Fan Switch. The switch closes when the coolant temperature is over 110 °C (238 °F) completing a path to ground through the Coolant Fan Relay windings. The relay contacts then close and voltage is applied to the Coolant Fan. When the coolant temperature drops to 101 °C (214 °F), the switch opens and the Coolant Fan stops.

In A/C equipped vehicles, the A/C Control Head completes a path to ground for the Coolant Fan Relay. Voltage is then applied to the Coolant Fan.

VEHICLE SPEED SENSOR: PERMANENT MAGNET GENERATOR



VEHICLE SPEED SENSOR

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Diagnosis.**

1. Check the Gages Fuse by observing the Brake Indicator when applying the Parking Brake with the Ignition Switch in RUN (engine not running).
2. Check ground G118.
3. If only the Speedometer or only the Odometer does not work, replace the suspect item.

- **Go to System Diagnosis for diagnostic tests.**

SYSTEM DIAGNOSIS

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

COMPONENT LOCATION

		Page-Figure
Cruise Control Module	Behind RH side of I/P	201-11-A
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Vehicle Speed Sensor	Lower LH rear of transmission	201- 8-D
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C209 (2 cavities)	Behind RH side of I/P, left of Cruise Control Module	201-11-A
G118 (VIN E)	Rear of RH cylinder head	201- 5-B
G118 (VIN F) (VIN 8)	Rear of RH cylinder head	201- 5-A
G118 (VIN S)	Rear of RH cylinder head	201- 1-C
S143 (VIN E)	Engine harness, RH front of dash	201- 2-A
S143 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S143 (VIN S)	Engine harness, center front of dash	201- 1-A
S202	I/P harness, behind RH side of I/P	201-13-A
S204	I/P harness, behind instrument cluster	201-10-A
S217	I/P harness, behind center of I/P	201-10-A

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Speedometer does not operate properly, ECM Code 24 is not set	Do Test B
ECM Code 24 is set, Speedometer is good	Do Test C See Section 6E of Service Manual
Speedometer does not operate properly, and ECM Code 24 is set	Do Test A
Cruise Control does not operate properly, ECM Code 24 is not set	Do Test D

- **If your symptom is not listed in the Symptom Table, perform all the tests.**

VEHICLE SPEED SENSOR

A: VEHICLE SPEED SENSOR BUFFER TEST (TABLE 1)

Measure: VOLTAGE
At: VEHICLE SPEED SENSOR BUFFER CONNECTOR C2 (Disconnected)
Condition:
- **Ignition Switch: RUN**

Measure Between	Correct Voltage	For Diagnosis
H (PNK/BLK) & Ground	Battery	See 1
H (PNK/BLK) & A (BLK/WHT)	Battery	See 2

- If both voltages are correct, go to Table 2.

1. Check/repair PNK/BLK (39) wire for an open (see schematic).
2. Check/repair BLK/WHT (450) wire for an open (see schematic). Check that ground G118 is clean and tight.

A: VEHICLE SPEED SENSOR BUFFER TEST (TABLE 2)

Measure: AC VOLTAGE
At: VEHICLE SPEED SENSOR BUFFER CONNECTOR C1 (Connected)
Conditions:
- **Ignition Switch: RUN**
- **Gear Selector: NEUTRAL**
- **Turn drive wheels by hand while making measurement**

Measure Between	Correct AC Voltage	For Diagnosis
A (YEL) & C (PPL)	1 volt AC to 5 volts AC	See 1

- If the voltage is correct, replace the Vehicle Speed Sensor Buffer.

1. Check/repair the YEL (400) and PPL (401) wires (see schematic). Replace Vehicle Speed Sensor if both wires are OK, and connector C100 is correctly mated.

B: INSTRUMENT CLUSTER INPUT TEST

Measure: VOLTAGE
At: VEHICLE SPEED SENSOR BUFFER CONNECTOR C2 (Disconnected)
Condition:
- **Ignition Switch: RUN**

Measure Between	Correct Voltage	For Diagnosis
C (LT GRN/BLK) & Ground	Battery	See 1

- Vehicle Speed Sensor Buffer: CONNECTED
- Gear Selector: NEUTRAL
- Turn drive wheels by hand while making measurement

C (LT GRN/BLK) & Ground	Varying from less than 1 volt to more than 4 volts	See 2

- If voltages are correct, repair/replace Speedometer/Instrument Cluster.

1. Check LT GRN/BLK (537) wire for open or short to ground. If OK, repair/replace Instrument Cluster after verifying power inputs to Cluster (see Section 8A-81 or 82).
2. Replace Vehicle Speed Sensor Buffer.

C: ECM INPUT TEST

Measure: VOLTAGE
At: VEHICLE SPEED SENSOR BUFFER CONNECTOR C2 (Disconnected)
Condition:
- **Ignition Switch: RUN**

Measure Between	Correct Voltage	For Diagnosis
F (BRN/YEL) & Ground	Battery	See 1
• Vehicle Speed Sensor Buffer: CONNECTED • Gear Selector: NEUTRAL • Turn drive wheels by hand while making measurement		
F (BRN/YEL) & Ground	Varying from less than 1 volt to more than 4 volts	See 2

- If voltages are correct, refer to Section 6E for further diagnosis.

1. Check BRN and BRN/YEL (437) wires for an open or short to ground. Also check that connections are good. If OK, replace ECM.
2. Replace Vehicle Speed Sensor Buffer.

D: CRUISE CONTROL INPUT TEST

Measure: VOLTAGE
At: VEHICLE SPEED SENSOR BUFFER CONNECTOR C2 (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Cruise Switch: ON**

Measure Between	Correct Voltage	For Diagnosis
E (RED) & Ground	5 volts	See 1
• Vehicle Speed Sensor Buffer: CONNECTED • Gear Selector: NEUTRAL • Turn drive wheels by hand while making measurement		
E (RED) & Ground	Varying from less than 1 volt to more than 2.5 volts	See 2

- If voltages are correct, refer to Cruise Control, Section 8A-34 for further diagnosis. If Section 8A-34 refers you back to this section (Vehicle Speed Sensor, 8A-33), replace Cruise Control Module.

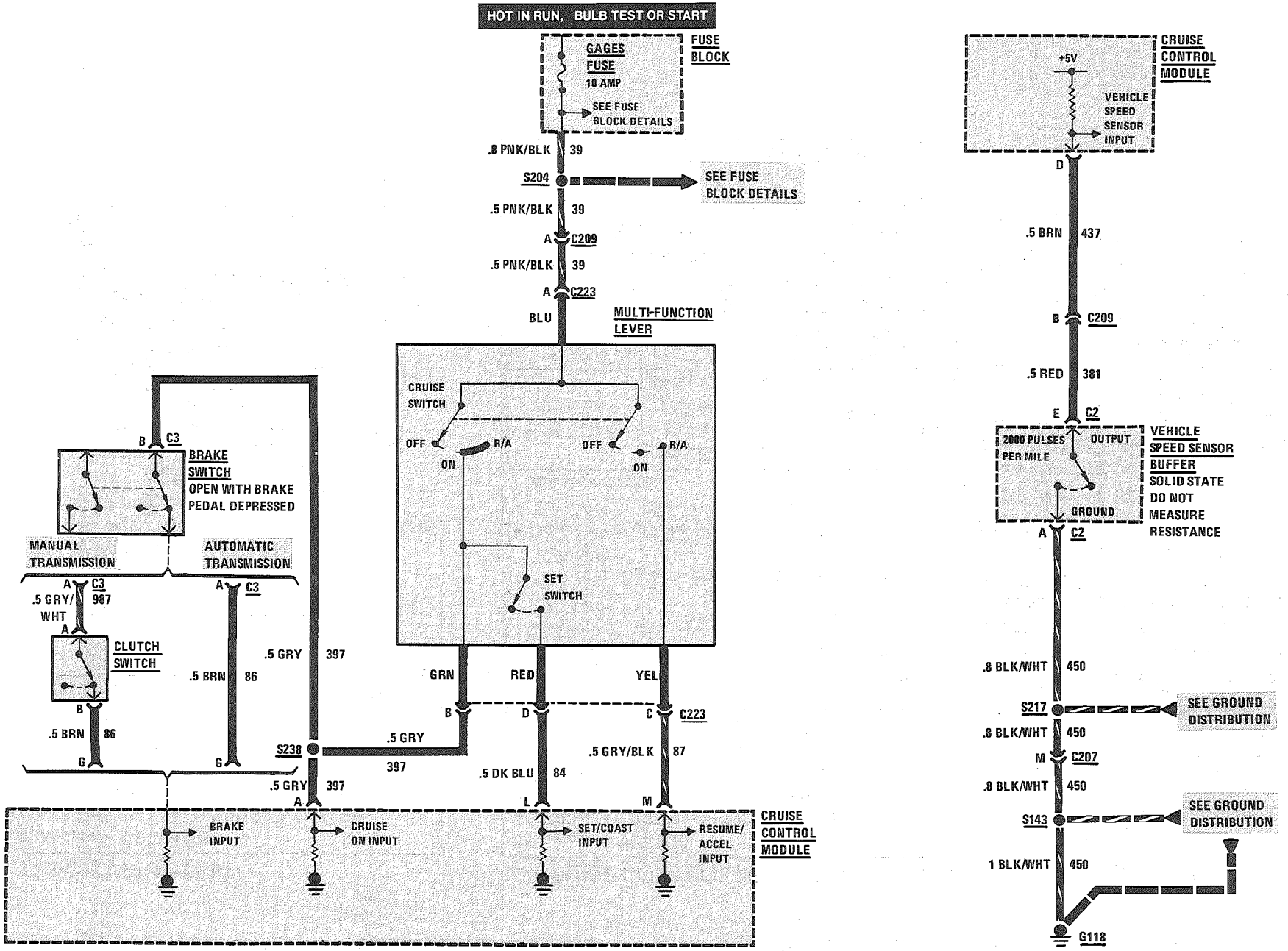
1. Check RED (381) wire for open or short to ground. If wire is good, replace Cruise Control Module.
2. Replace Vehicle Speed Sensor Buffer.

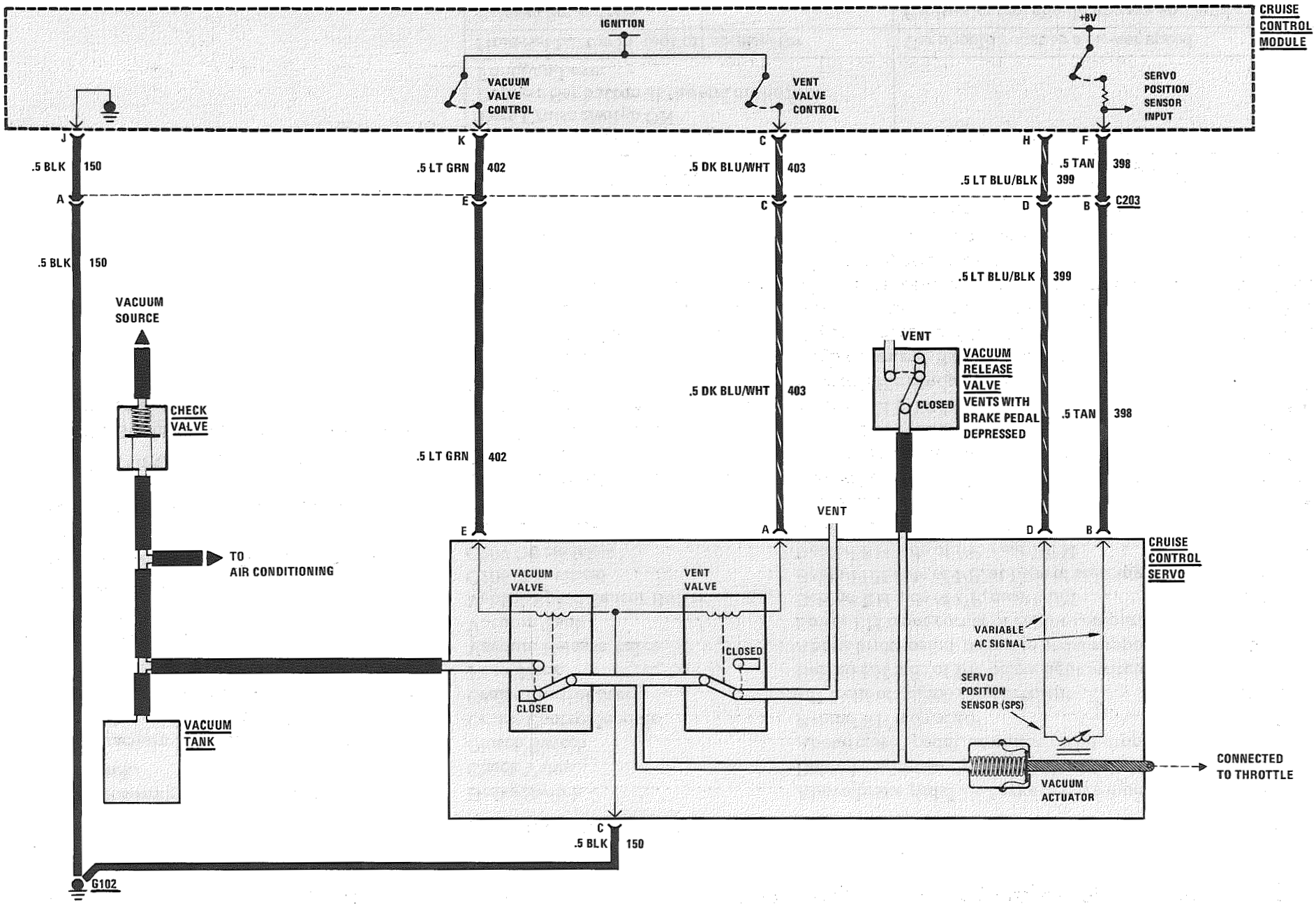
CIRCUIT OPERATION

The Vehicle Speed Sensor (VSS) generates a signal that indicates the speed of the vehicle. This signal is processed by the solid state Vehicle Speed Sensor Buffer to supply inputs to the Electronic Control Module (ECM), the Cruise Control Module and the Speedometer.

The Vehicle Speed Sensor is mounted in the Transmission. A magnet rotates near a coil, producing voltage pulses in the coil. The frequency of the AC voltage coming from this coil depends on the vehicle speed. As the speed increases, so does the number of voltage pulses per second.

The Vehicle Speed Sensor Buffer takes the sensor/voltage pulses from the sensor and uses them to close three solid state output switches. Each output terminal is switched to ground at a rate that is proportional to the speed of the car. The sensor generates 4000 pulses per mile (ppm). The Speedometer is switched at a frequency of 4000 ppm. The ECM and the Cruise Control use a lower frequency, 2000 pulses per mile. Their output pulses are operated by a circuit after it has divided the sensor frequency by two.


HOT IN RUN, BULB TEST OR START
GAGES FUSE
10 AMP
SEE FUSE BLOCK DETAILS
FUSE BLOCK
.8 PNK/BLK 39
S204
SEE FUSE BLOCK DETAILS
.5 PNK/BLK 39
A C209
.5 PNK/BLK 39
A C223
BLU
MULTI-FUNCTION LEVER
CRUISE SWITCH
OFF R/A
ON
OFF R/A
ON
SET SWITCH
B C3
BRAKE SWITCH
OPEN WITH BRAKE PEDAL DEPRESSED
MANUAL TRANSMISSION
AUTOMATIC TRANSMISSION
A C3
.5 GRY/WHT 987
A
CLUTCH SWITCH
B
.5 BRN 86
G
A C3
.5 BRN 86
G
.5 GRY 397
S238
.5 GRY 397
.5 GRY 397
A
GRN
RED
YEL
B
D
C C223
.5 GRY
397
.5 DK BLU 84
L
.5 GRY/BLK 87
M
BRAKE INPUT
CRUISE ON INPUT
SET/COAST INPUT
RESUME/ ACCEL INPUT
CRUISE CONTROL MODULE
+5V
VEHICLE SPEED SENSOR INPUT
CRUISE CONTROL MODULE
D
.5 BRN 437
B C209
.5 RED 381
E C2
2000 PULSES PER MILE
OUTPUT
GROUND
VEHICLE SPEED SENSOR BUFFER SOLID STATE DO NOT MEASURE RESISTANCE
A C2
.8 BLK/WHT 450
S217
SEE GROUND DISTRIBUTION
.8 BLK/WHT 450
M C207
.8 BLK/WHT 450
S143
SEE GROUND DISTRIBUTION
1 BLK/WHT 450
G118


CRUISE CONTROL MODULE
IGNITION
+8V
VACUUM VALVE CONTROL
VENT VALVE CONTROL
SERVO POSITION SENSOR INPUT
J
K
C
H
F
.5 BLK 150
.5 LT GRN 402
.5 DK BLU/WHT 403
.5 LT BLU/BLK 399
.5 TAN 398
A
E
C
D
B
C203
.5 BLK 150
.5 LT BLU/BLK 399
VACUUM SOURCE
VENT
VACUUM RELEASE VALVE VENTS WITH BRAKE PEDAL DEPRESSED
CLOSED
CHECK VALVE
.5 DK BLU/WHT 403
.5 TAN 398
.5 LT GRN 402
VENT
E
A
D
B
CRUISE CONTROL SERVO
TO AIR CONDITIONING
VACUUM VALVE
VENT VALVE
CLOSED
CLOSED
VARIABLE AC SIGNAL
SERVO POSITION SENSOR (SPS)
VACUUM TANK
CONNECTED TO THROTTLE
VACUUM ACTUATOR
C
.5 BLK 150
G102

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check vacuum hose for leaks, kinks, and/or restrictions. Also check Cruise Control Servo linkage. Refer to Section 9 for vacuum hose routing and servo linkage adjustments.
2. If the system works except for the Tap-Up and Tap-Down functions, replace the Cruise Control Module.

- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM CHECK (ROAD TEST)

- **Use the System Check Table as a guide to normal operation.**

COMPONENT LOCATION

		Page-Figure
Brake Switch	Above brake pedal, on brake pedal support	201- 9-A
Check Valve	Behind engine, to right of master brake cylinder	201-15-A
Clutch Switch	Above clutch pedal, on clutch pedal support	201-10-B
Cruise Control Module	Behind RH side of I/P	201-11-A
Cruise Control Servo	LH front of engine compartment	201-15-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Vacuum Release Valve	Above brake pedal, on brake pedal support	201-10-B
Vacuum Tank	Lower LH front corner of engine compartment	201-15-A
Vehicle Speed Sensor Buffer	Behind RH side of I/P, near ECM	201-13-A
C203 (6 cavities)	Behind LH side of I/P, at base of steering column	201-11-A
C207 (15 cavities)	Behind RH side of I/P, near ECM	201-13-A
C209 (2 cavities)	Behind RH side of I/P, left of Cruise Control Module	201-11-A
C223 (4 cavities)	Behind LH side of I/P, at base of steering column	201-11-A
G102	LH rear corner of engine compartment	201-15-A
G118 (VIN E)	Rear of RH cylinder head	201- 5-B
G118 (VIN F) (VIN 8)	Rear of RH cylinder head	201- 5-A
G118 (VIN S)	Rear of RH cylinder head	201- 1-C
S143 (VIN E)	Engine harness, RH front of dash	201- 2-A
S143 (VIN F) (VIN 8)	Engine harness, RH front of dash	201- 6-A
S143 (VIN S)	Engine harness, center front of dash	201- 1-A
S204	I/P harness, behind instrument cluster	201-10-A
S217	I/P harness, behind center of I/P	201-10-A
S238	Cruise control harness, near Brake Switch	201-11-A

SYSTEM CHECK TABLE

ACTION	CORRECT RESULT
Drive car faster that 25 mph Turn Cruise Switch ON Depress Set button at the end of the Multi-Function Lever	Car should maintain speed
Hold Set button in, foot off accelerator	Car should coast to a slower speed
Release Set button	Cruise Control should engage and hold a slower speed, if the new speed remains above 25 mph
Slide Cruise Switch to R/A and hold it there	Car should accelerate

(Continued on facing page)

(Continued from facing page)

Release Cruise Switch back to ON	Car should hold new faster speed
Tap brake pedal	Car should coast slower (Cruise disengages)
Slide Cruise Control Switch momentarily to R/A	Car should accelerate to former set speed
While cruising, accelerate, then remove foot from accelerator	Car should coast back to set speed
While cruising, tap Cruise Switch to R/A	Car should increase 1 mph for each tap, up to ten taps, then system must be reset to a new speed
While cruising, tap Set button	Car speed should decrease by 1 mph for each tap until 25 mph is reached when Cruise Control will not operate
Slide Cruise Switch to OFF	Cruise Control turns off

- **Refer to System Diagnosis when a result is not normal.**

SYSTEM DIAGNOSIS

- **Use the Isolation Test below to choose the proper diagnostic tests.**
- **Tests follow the Isolation Test.**
- **Note: Do not press both the SET and R/A Switches at the same time while the engine is running. If the Quick Checker displays a short light, release the switches immediately. Shorts can damage the Quick Checker.**

ISOLATION TEST

Connect: QUICK CHECKER (J-34185, SPECMO QC-3 OR EQUIVALENT) or VOLT-OHMMETER
At: CRUISE CONTROL MODULE CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Test with Quick Checker (J-34185 or equivalent) or Digital Meter**

Test	Condition	With Quick Checker, Correct Response	Without Quick Checker, Using a Digital Meter			For Different Response, Do Test:
			Meter Range	Connector Terminals	Correct Response	
1	Cruise Switch OFF	—	200 ohms	J & Ground	0 ohms	B
		All Lights Off	20 VDC	A & J	0 volts	A
			20 VDC	M & J	0 volts	

(ISOLATION TEST continued on next page)

(ISOLATION TEST continued from previous page)

Test	Condition	With Quick Checker, Correct Response	Without Quick Checker, Using a Digital Meter			For Different Response, Do Test
			Meter Range	Connector Terminals	Correct Response	
2	Cruise Switch ON	ON/OFF Light On	20 VDC	A & J	Battery voltage	B
		BRK Light On	20 VDC	G & J	Battery voltage	C
		VENT Light On	200 ohms	C & J	30 to 55 ohms	D
		VAC Light On	200 ohms	K & J	30 to 55 ohms	E
		SPS Light On	200 ohms	F & H	15 to 25 ohms	F
		RA Light Off	20 VDC	M & J	0 volts	A
		SC Light Off	20 VDC	L & J	0 volts	A
3	Cruise Switch ON, Set Switch pressed	SC Light On	20 VDC	L & J	Battery voltage	G
		VAC & SHORT Lights Off	200 ohms	K & J	30 to 55 ohms	H
4	Cruise Switch in R/A	ON/OFF Light On	20 VDC	A & J	Battery voltage	A
		RA Light On	20 VDC	M & J	Battery voltage	I
		VENT & SHORT Lights Off	200 ohms	C & J	30 to 55 ohms	J
5	Cruise Switch ON, drive wheels turned by hand	VSS Light flashes On and Off	20 VDC	A & D	Pulses between approximately battery voltage and less than 7 volts	K, L
6	Run engine for one minute, then turn it off. With Ignition Switch in RUN, and holding Cruise Switch in R/A, press Set Switch, wait for Servo to pull in and release Set Switch	Vacuum holds the servo all the way in	Connect fused jumper from C to M and from K to L before operating switches		Vacuum holds the servo all the way in	M
7	Quick Checker not connected	—	200 ohms	F & J	Over range	N

- If all the responses were correct, replace Cruise Control Module and check for proper operation.

TEST A: CRUISE SWITCH SHORT

Check for shorts to voltage in the wires to terminals G (BRN), A (GRY), M (GRY/BLK), L (DK BLU) of the Module (see schematic).

- If the wires are good, replace the Multi-Function Lever.

TEST B: POWER CIRCUIT OPEN

1. Check the GAGES Fuse.
2. Check that terminal J (BLK) is grounded.
3. Disconnect connector C235 and check for battery voltage at terminal A of the socket half with Ignition in RUN.
   - If battery voltage is missing, check/repair PNK/BLK (239) wire.
4. Check continuity between terminals A (BLU) and B (GRN) of the pin half of connector C223 with the Cruise Switch ON.
   - If the Switch is open, replace the Multi-Function Lever.
5. Check for an open in GRY (397) wire between terminal B of connector C223 and terminal A of the module connector.

TEST C: BRK CIRCUIT OPEN

1. Check for an open Brake Switch or Clutch Switch (see schematic)
2. Check for an open in the GRY (397) wire, BRN (86) wire or GRY/WHT (987) wire.

TEST D: VENT CIRCUIT OPEN

If you measured less than 30 ohms, perform Test J. Otherwise, remove the connector from the Cruise Control Servo. Measure the resistance between terminals A and C of the Servo.

- If it is greater than 55 ohms, replace the Servo.
- If it is less than 55 ohms, check for an open DK BLU/WHT (403) wire between terminal C of the Module and terminal A of the Servo. Check that terminal C (BLK) of the Servo connector is grounded (see schematic).

TEST E: VAC CIRCUIT OPEN

If you measured less than 30 ohms, perform Test H. Otherwise, remove the connector from the Cruise Control Servo. Measure the resistance between terminals E and C of the Servo.

- If it is more than 55 ohms, replace the Servo.
- If it is less than 55 ohms, check for an open in the LT GRN (402) wire between terminal K of the Module and terminal E of the Servo. Check that terminal C (BLK) of the Servo Connector is grounded (see schematic).

TEST F: SPS CIRCUIT OPEN

If you measured less than 15 ohms, perform Test N. Otherwise, remove the connector from the Cruise Control Servo. Measure the resistance between terminals B and D of the Servo.

- If it is more than 25 ohms, replace the Servo.
- If it is less than 25 ohms, check for an open in the LT BLU/BLK (399) wire between terminals H of the Module and terminal D of the Servo. Check for an open in the TAN (398) wire between terminal F of the Module and terminal B of the Servo.

TEST G: SC CIRCUIT OPEN

Disconnect C223 and check the switch continuity between terminals B (GRN) and D (RED) of the pin half with the Set Switch pressed.

- If the Switch is open, replace the Multi-Function Lever.
- If the switch is not open, check for an open in the DK BLU (84) wire between terminal D of connector C223 and terminal L of the Module.

TEST H: VAC CIRCUIT SHORT

Remove the connector from the Servo and measure resistance between terminals C and E of the Servo.

- If it is less than 30 ohms, replace the Servo.
- If it is 30 ohms or more, check for a short to ground in the LT GRN wire from terminal K of the Module to terminal E of the Servo.

(Continued on next page)

(Continued from previous page)

TEST I: R/A CIRCUIT OPEN

Disconnect C223 and check switch continuity between terminals A (BLU) and C (YEL) of the pin half of the Cruise Switch in R/A.

- If the switch is open, replace the Multi-Function Lever.
- If the switch is not open, check for an open in the GRY/BLK (87) wire between terminal C of connector C223 at terminal M of the Module.

TEST J: VENT CIRCUIT SHORT

Remove the connector from the Servo and measure resistance between terminals A and C of the Servo.

- If it is less than 30 ohms, replace the Servo.
- If it is 30 ohms or more, check for a short to ground in the DK BLU/WHT wire from terminal C of the Module to terminal A of the Servo.

TEST K: VSS CIRCUIT OPEN

If the VSS light does not come on, or the voltage between terminals A (GRY) and D (BRN) remains less than 7 volts, check for an open in the BRN (437) wire or the RED (381) wire from the Vehicle Speed Sensor Buffer. Refer to page 33-0 for diagnosis of Vehicle Speed Sensor.

TEST L: VSS CIRCUIT SHORT

If the VSS lights does not go off or Battery voltage remains between terminals A (GRY) and D (BRN), check for a short to ground on the BRN (437) wire or the RED (381) wire from the Vehicle Speed Sensor Buffer. Refer to page 33-0 for diagnosis of Vehicle Speed Sensor.

TEST M: VACUUM SYSTEM

1. Check for a blocked or leaking vacuum source.
2. If the vacuum source is good, plug the Vacuum Release Port and repeat Test 6 of the Isolation Test.
   - If the vacuum now holds the throttle open, replace or repair the Vacuum Release Valve or the hose to it.
   - If the test still fails, replace the Cruise Control Servo.

TEST N: SPS CIRCUIT SHORT

Disconnect the Cruise Control Servo connector and repeat Test 7 of the Isolation Test.

- If the resistance is now over range, replace the Cruise Control Servo.
- If the resistance is still low, find and repair the short in the TAN wire from terminal F of the Cruise Control Module to terminal B of the Cruise Control Servo.

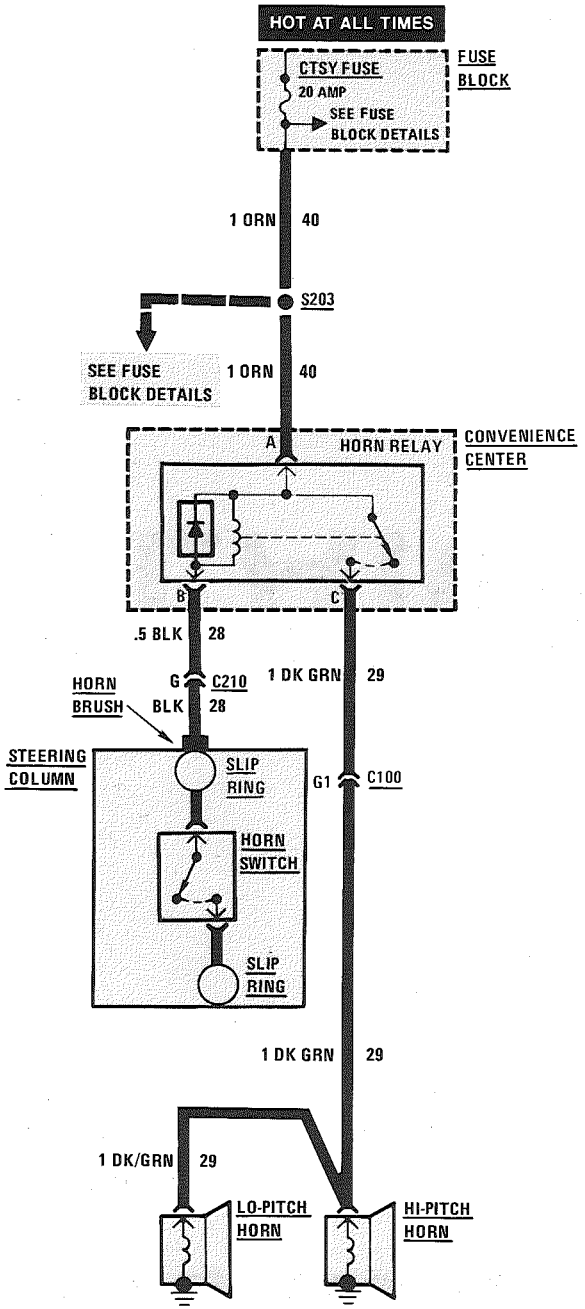
CIRCUIT OPERATION

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

One input to the Module is the vehicle speed. This input comes from the Vehicle Speed Sensor. If the actual speed signal is different from the speed that was set into and remembered by the Module, the Module generates pulses to change the vacuum and return the vehicle to the set speed. The Vehicle Speed Sensor is mounted on the Transmission. Other inputs to the Module are from the Cruise Switch and the Set Switch. A disengage input to the Module comes from a switch on the brake pedal. A seperate vacuum shut down of the Cruise Control comes from the Vacuum Release Valve on the brake pedal.

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

BLANK


HOT AT ALL TIMES
CTSY FUSE
20 AMP
SEE FUSE BLOCK DETAILS
FUSE BLOCK
1 ORN 40
S203
SEE FUSE BLOCK DETAILS
1 ORN 40
A
HORN RELAY
CONVENIENCE CENTER
B
C
.5 BLK 28
HORN BRUSH
G
C210
1 DK GRN 29
BLK 28
STEERING COLUMN
SLIP RING
G1
C100
HORN SWITCH
SLIP RING
1 DK GRN 29
1 DK/GRN 29
LO-PITCH HORN
HI-PITCH HORN

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Diagnosis.**

1. If the Horns do not sound at all, check the CTSY Fuse by operating the Cigar Lighter.
2. If only one Horn sounds, check the DK GRN (29) wire and the suspect Horn.

- **Go to System Diagnosis for diagnostic tests.**

SYSTEM DIAGNOSIS

- **Diagnostic steps for the symptoms listed in the following table are listed after the table.**

SYMPTOM TABLE

A: The Horns sound continuously
B: None of the Horns sound

A: THE HORNS SOUND CONTINUOUSLY

Connect: TEST LAMP
At: CONVENIENCE CENTER
Condition:
- **Horn Relay disconnected**

Connect Between	Correct Result	For Diagnosis
A (ORN) & B (BLK)	Test Lamp off	See 1

- If the result is correct, replace the Horn Relay.

1. Check the BLK (28) wire and the Horn Switch for shorts (see schematic).

COMPONENT LOCATION

		Page-Figure
Convenience Center	Behind I/P, to right of steering column	201-10-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Horn Switch	Below steering wheel hub	
Slip Ring	Below steering wheel hub	
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C210 (11 cavities)	Behind I/P, on RH lower side of steering column	201- 9-A
S203	I/P harness, behind instrument cluster	201-10-A

B: NONE OF THE HORNS SOUND (TABLE 1)

Connect: TEST LAMP
At: CONVENIENCE CENTER
Condition:
- **Horn Relay disconnected**

Connect Between	Correct Result	For Diagnosis
A (ORN) & Ground	Test Lamp lights	See 1
• Horn Switch: ON		
A (ORN) & B (BLK)	Test Lamp lights	See 2

- If all the results are correct, go to Table 2.

1. Check the ORN (40) wire for an open (see schematic).
2. Check the BLK (28) wire and the Horn Switch for an open (see schematic).

B: NONE OF THE HORNS SOUND (TABLE 2)

Connect: FUSED JUMPER
At: CONVENIENCE CENTER
Condition:
- **Horn Relay disconnected**

Jumper Between	Correct Result	For Diagnosis
A (ORN) & C (DK GRN)	Both Horns Sound	See 1

- If the result is correct, replace the Horn Relay.

1. Leave fused jumper connected and go to Table 3.

(Continued on next page)

(Continued from previous page)

B: NONE OF THE HORNS SOUND (TABLE 3)

Connect TEST LAMP
At: HORN CONNECTORS (Disconnected)
Condition:
- **Fused Jumper from Table 2 Connected**

Connect Between	Correct Result	For Diagnosis
Hi-Pitch Horn Connector & Ground	Test Lamp lights	See 1
Lo-Pitch Horn Connector & Ground	Test Lamp lights	See 1

- If all the results are correct, check/replace the suspect Horn(s).

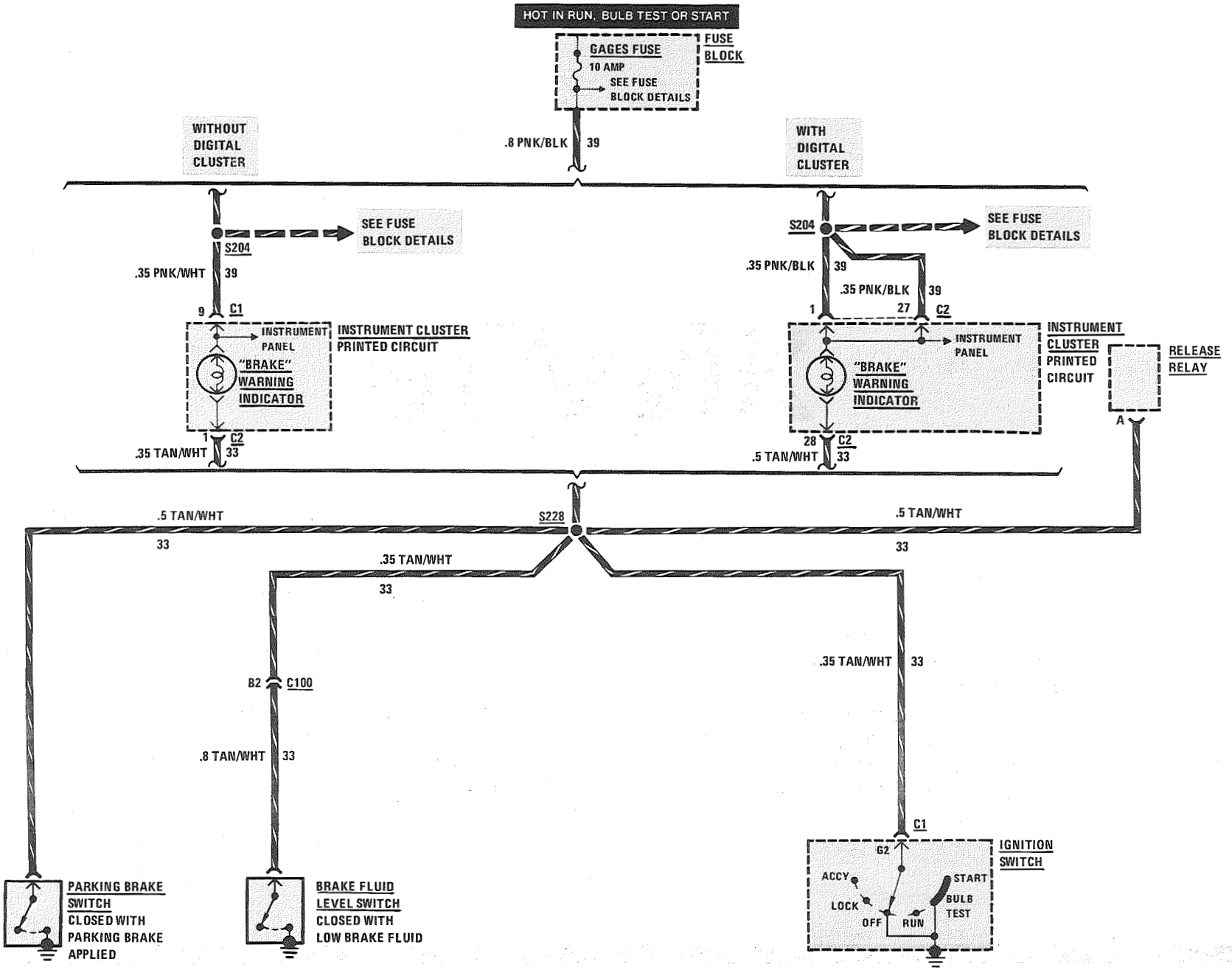
1. Check DK GRN (29) wire for an open (see schematic).

CIRCUIT OPERATION

Voltage is applied to the Horn Relay at all times. When the Horn Switch is depressed, the relay coil is grounded and the relay contacts close. Voltage is then applied to both Horns. The Horns sound.

BLANK

BRAKE WARNING SYSTEM



TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Diagnosis.**

  Check the GAGES Fuse and PNK/BLK (39) wire by observing the VOLTS or SERVICE ENGINE SOON Indicator with the Ignition Switch in RUN and the engine OFF.
- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation.**
- **Refer to System Diagnosis for a list of symptoms and diagnostic steps.**

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT
With the park brake released, turn the Ignition Switch slowly past the RUN position to BULB TEST	BRAKE Warning Indicator lights
Release the Ignition Switch to the RUN position	BRAKE Warning Indicator does not light
With the Ignition Switch in RUN, apply the park brake	Brake Warning Indicator lights
Release the park brake	Brake Indicator does not light

- **Refer to System Diagnosis when a result is not normal.**

COMPONENT LOCATION

		Page-Figure
Brake Fluid Level Switch	Below brake fluid reservoir	201-16-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Ignition Switch	Behind I/P, on top side of steering column	201- 9-A
Parking Brake Switch	In console, at base of parking brake	201-12-D
Release Relay	Taped to I/P harness, behind RH side of I/P	201-13-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
S204	I/P harness, behind instrument cluster	201-10-A
S228	I/P harness, above Fuse Block	201-10-A

SYSTEM DIAGNOSIS

- **Diagnostic steps for the symptoms listed in the following table are listed after the table.**

SYMPTOM TABLE

A	BRAKE Indicator remains on with the Ignition Switch in RUN and the park brake off
B	BRAKE Indicator lights with the park brake applied, but does not light when brake fluid level is low
C	BRAKE Indicator does not light at all
D	BRAKE Indicator lights with the Ignition Switch in BULB TEST, but does not light when the park brake is applied
E	BRAKE Indicator lights with the park brake applied, but does not light when the Ignition Switch is in BULB TEST

A: BRAKE INDICATOR REMAINS ON WITH THE IGNITION SWITCH IN RUN AND THE PARK BRAKE OFF (TABLE 1)

Disconnect: CONNECTOR
At: BRAKE FLUID LEVEL SWITCH
Conditions:
- **Ignition Switch: RUN**
- **Park Brake: OFF**

Disconnect	Correct Result	For Diagnosis
Brake Pressure Switch connector	Brake Warning Indicator does not light	See 1

- If the result is correct, refer to Section 5 to test the Brake Hydraulic System. Replace the Brake Fluid Level Switch if the Brake Hydraulic System is OK.

1. Go to Table 2.

A: BRAKE INDICATOR REMAINS ON WITH THE IGNITION SWITCH IN RUN AND THE PARK BRAKE OFF (TABLE 2)

Disconnect: CONNECTOR
At: PARKING BRAKE SWITCH
Conditions:
- **Ignition Switch: RUN**
- **Park Brake: OFF**

Disconnect	Correct Result	For Diagnosis
Parking Brake Switch connector	Brake Warning Indicator does not light	See 1

- If the result is correct, check/replace the Parking Brake Switch

1. Check the Ignition Switch for a short to ground in the RUN position. If Ignition Switch is good, check TAN/WHT (33) wires for a short to ground.

B: BRAKE INDICATOR LIGHTS WITH THE PARK BRAKE APPLIED, BUT DOES NOT LIGHT WHEN BRAKE FLUID LEVEL IS LOW

Connect: FUSED JUMPER
At: BRAKE FLUID LEVEL SWITCH CONNECTOR
Conditions:
- **Ignition Switch: RUN**
- **Park Brake: OFF**

Connect Between	Correct Result	For Diagnosis
Brake Fluid Level Switch Connector & Ground	Brake Warning Indicator lights	See 1

- If the result is correct, check/replace the Brake Fluid Level Switch.

1. Check TAN/WHT (33) wire for an open.

C: BRAKE INDICATOR DOES NOT LIGHT AT ALL

Connect: FUSED JUMPER
At: CONNECTOR C100 (Connected)
Condition:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
B2 (TAN/WHT) & Ground	Brake Warning Indicator lights	See 1

- If the result is correct, go to Tables C and D.

1. Check Indicator bulb, TAN/WHT (33) wire(s) and the Instrument Cluster Printed Circuit for an open.

D: BRAKE INDICATOR LIGHTS WITH THE IGNITION SWITCH IN BULB TEST, BUT DOES NOT LIGHT WHEN THE PARK BRAKE IS APPLIED

Connect: FUSED JUMPER
At: PARKING BRAKE SWITCH CONNECTOR
Conditions:
- **Ignition Switch: RUN**

Connect Between	Correct Result	For Diagnosis
Park Brake Switch connector & Ground	Brake Warning Indicator lights	See 1

- If the result is correct check/replace the Parking Brake Switch.

1. Check/repair TAN/WHT (33) wire for an open.

E: BRAKE INDICATOR LIGHTS WITH THE PARK BRAKE APPLIED, BUT DOES NOT LIGHT WHEN THE IGNITION SWITCH IS IN BULB TEST

Connect: FUSED JUMPER
At: IGNITION SWITCH CONNECTOR C1 (Connected)
Conditions:
- **Ignition Switch: RUN**
- **Park Brake: OFF**

Connect Between	Correct Result	For Diagnosis
G2 (TAN/WHT) & Ground	Brake Warning Indicator lights	See 1

- If the result is correct, check/replace the Ignition Switch.

1. Check/repair TAN/WHT (33) wire for an open.

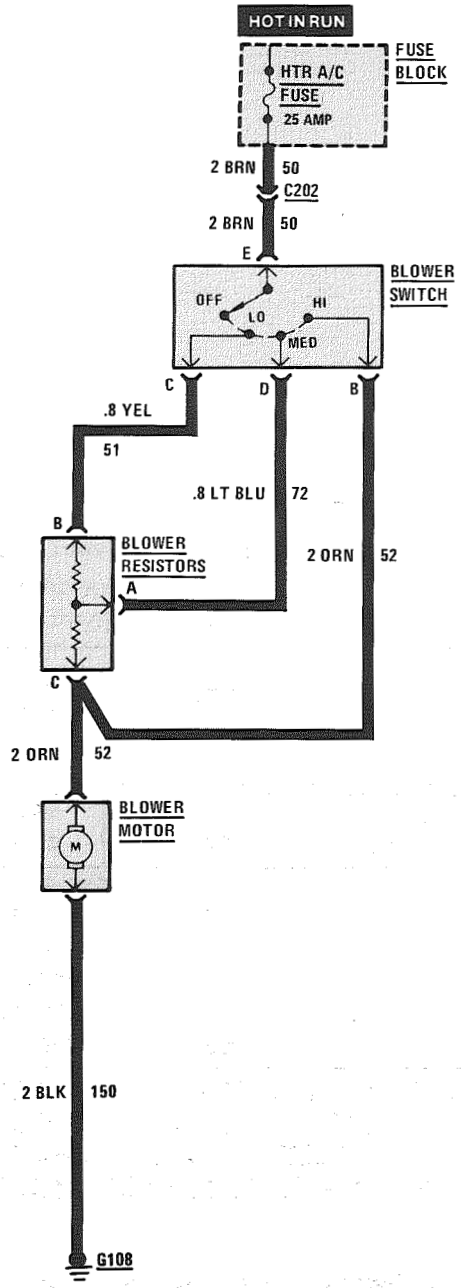
CIRCUIT OPERATION

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

The Ignition Switch provides a ground when it is in the BULB TEST and START positions. The BRAKE Warning Indicator lights.

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

The Brake Fluid Level Switch closes to light the BRAKE Warning Indicator when there is low brake fluid in one of the two hydraulic brake systems. This could be caused by a leak in one of the brake lines. The switch can be reset to an open condition by refilling the reservoir. This can only be accomplished after the faulty system has been repaired.


HOT IN RUN
FUSE BLOCK
HTR A/C FUSE 25 AMP
2 BRN 50
C202
2 BRN 50
E
BLOWER SWITCH
OFF
LO
HI
MED
C
D
B
.8 YEL
51
.8 LT BLU 72
2 ORN 52
B
BLOWER RESISTORS
A
C
2 ORN 52
BLOWER MOTOR
M
2 BLK 150
G108

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. If the Blower Motor does not operate at all, check the HTR A/C Fuse.
2. If the Blower Motor does not operate at all, check that G108 is clean and tight.
3. If the Blower Motor does not turn off, install a new Blower Switch.

- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation.**
- **Refer to System Diagnosis for a list of symptoms and diagnostic steps.**

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT
With the Ignition Switch in RUN, set the Blower Switch to OFF	Blower Motor does not operate
Set the Blower Switch to LO	Blower Motor operates at low speed
Set the Blower Switch to MED	Blower Motor operates at Medium speed
Set the Blower Switch to HI	Blower Motor operates at High speed

- **Refer to System Diagnosis when a result is not normal.**

COMPONENT LOCATION

		Page-Figure
Blower Motor (Without A/C)	RH front of dash, behind strut tower	201-14-D
Blower Resistors (Without A/C)	RH front side of heater housing	201-14-D
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
C202 (1 cavity)	Behind center of I/P, near control head	201-14-C
G108	RH front of dash, above center of Blower Motor	201-14-D

SYSTEM DIAGNOSIS

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Blower Motor operates with the Blower Switch in OFF	Replace Blower Switch
Blower Motor does not operate at all	Do Test C
Blower Motor does not operate in HI but operates in LO and/or MED	Do Test A Check ORN (52) wire for an open if Blower Switch is OK
Blower Motor does not operate in LO and/or MED but operates in HI	Do Test A Do Test B

- **If your symptom does not appear in the Sympton Table perform all of the Tests.**

A: BLOWER SWITCH TEST

Measure: VOLTAGE
At: BLOWER SWITCH CONNECTOR (Connected)
Condition:
• Ignition Switch: RUN

Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
• Blower Switch: LO		
C (YEL) & Ground	Battery	See 2
• Blower Switch: MED		
D (LT BLU) & Ground	Battery	See 2
• Blower Switch: HI		
B (ORN) & Ground	Battery	See 2

(A: BLOWER SWITCH TEST continued on next page)

(A: BLOWER SWITCH TEST continued from previous page)

- If all results are correct, go to the Symptom Table.
1. Check/repair BRN (50) wire for an open (see schematic).
2. Replace the Blower Switch.

B: BLOWER RESISTORS TEST

Measure: VOLTAGE
At: BLOWER RESISTORS CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Blower Switch: LO**

Measure Between	Correct Voltage	For Diagnosis
B (YEL) & Ground	Battery	See 1
• Blower Switch: MED		
A (LT BLU) & Ground	Battery	See 2

- If all results are correct, replace the Blower Resistors.
1. Check/repair YEL (51) wire for an open (see schematic).
2. Check/repair LT BLU (72) wire for an open (see schematic).

C: BLOWER MOTOR TEST

Measure: VOLTAGE
At: BLOWER MOTOR CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Blower Switch: HI**

Measure Between	Correct Voltage	For Diagnosis
ORN wire & Ground	Battery	See 1
ORN wire & BLK wire	Battery	See 2

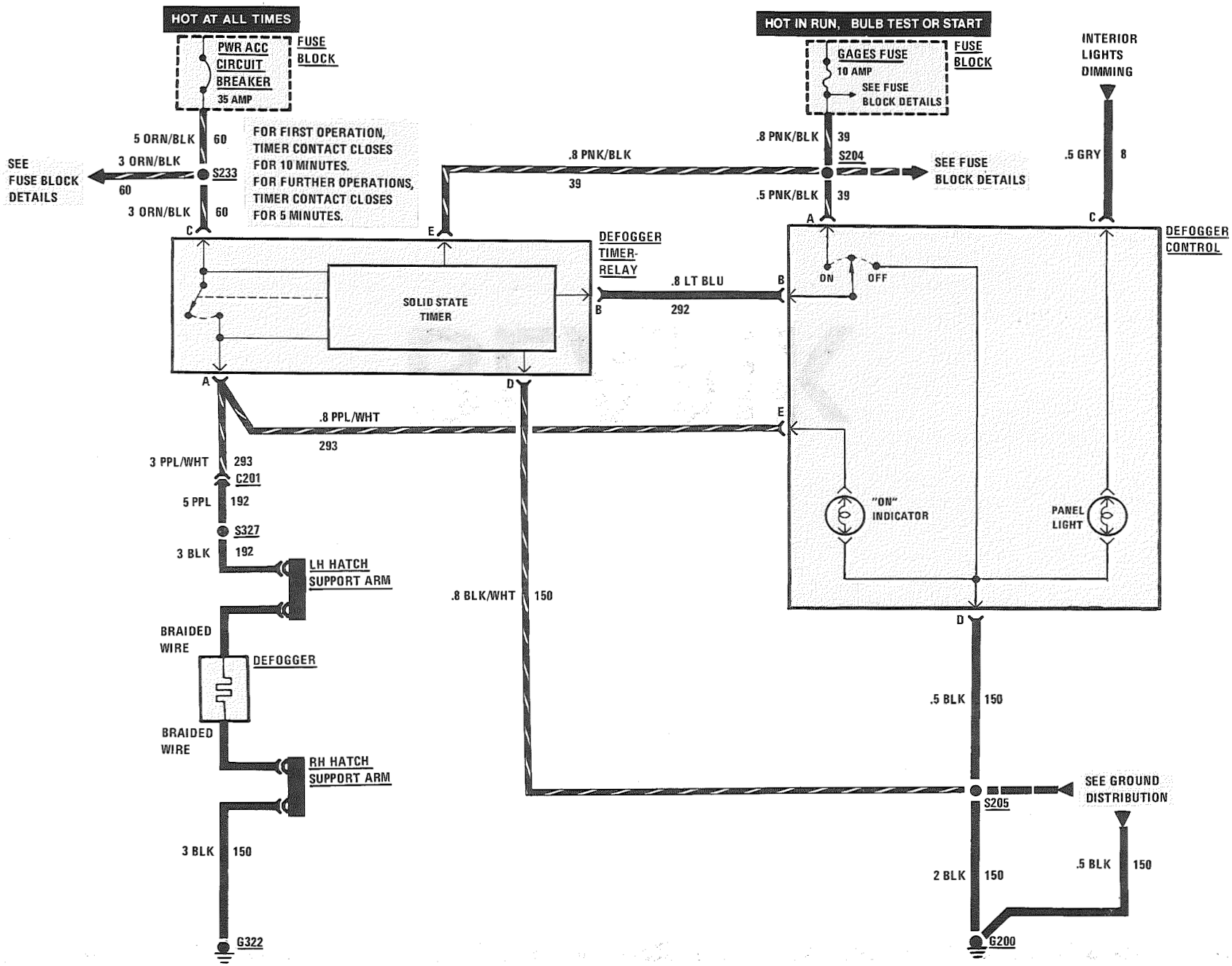
- If all results are correct, replace the Blower Motor.
1. Perform Blower Switch Test. If Blower Switch is OK, check/repair ORN (52) wire for an open (see schematic).
2. Check BLK (150) wire for an open (see schematic).

CIRCUIT OPERATION

The Blower Motor delivers air to the interior of the vehicle. Its speed is controlled by the Blower Switch and the Blower Resistors. When the Ignition Switch is in RUN, battery voltage is applied to the Blower Switch. With the Blower Switch in LO, voltage is applied across both Blower Resistors and the Blower Motor. The Blower Motor runs at its slowest speed. With the Blower Switch in MED, one of the Blower Resistors is bypassed and the Blower Motor runs faster. When the Blower Switch is set to HI, battery voltage is applied directly to the Blower Motor and the Blower Motor runs at its fastest speed.

BLANK

DEFOGGER


HOT AT ALL TIMES
PWR ACC CIRCUIT BREAKER
35 AMP
FUSE BLOCK
HOT IN RUN, BULB TEST OR START
GAGES FUSE
10 AMP
SEE FUSE BLOCK DETAILS
FUSE BLOCK
INTERIOR LIGHTS DIMMING
5 ORN/BLK 60
3 ORN/BLK
S233
60
3 ORN/BLK 60
SEE FUSE BLOCK DETAILS
FOR FIRST OPERATION, TIMER CONTACT CLOSES FOR 10 MINUTES. FOR FURTHER OPERATIONS, TIMER CONTACT CLOSES FOR 5 MINUTES.
.8 PNK/BLK 39
S204
39
.5 PNK/BLK 39
SEE FUSE BLOCK DETAILS
.5 GRY 8
C
E
A
C
DEFOGGER TIMER-RELAY
SOLID STATE TIMER
.8 LT BLU
B
292
B
ON
OFF
DEFOGGER CONTROL
A
D
E
.8 PPL/WHT
293
3 PPL/WHT 293
C201
5 PPL 192
S327
3 BLK 192
"ON" INDICATOR
PANEL LIGHT
LH HATCH SUPPORT ARM
.8 BLK/WHT 150
D
BRAIDED WIRE
DEFOGGER
.5 BLK 150
BRAIDED WIRE
RH HATCH SUPPORT ARM
SEE GROUND DISTRIBUTION
S205
3 BLK 150
2 BLK 150
.5 BLK 150
G322
G200

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check the PWR ACC Circuit Breaker by operating the Power Door Locks or Power Seats (if equipped).
2. Check the Gages Fuse by observing that the Instrument Cluster Lights.
3. Check ground G200 by observing that the Cigar Lighter operates normally.
4. Check that the connectors on the Defogger and the Defogger Timer-Relay are properly mated.
5. If one or more of the grid lines do not heat, refer to the Body Service Manual (Section 2) for repair procedures.

- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

COMPONENT LOCATION

		Page-Figure
Defogger Timer-Relay	Behind RH side of I/P, near ECM	201-11-D
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
C201 (1 cavity)	LH shroud, near center access hole	
G200	Behind I/P, left of steering column	201-10-A
G322	Rear of car, near RH hatch support bracket	201-15-D
S204	I/P harness, behind instrument cluster	201-10-A
S205	I/P harness, behind instrument cluster	201-10-A
S233	I/P harness, above Fuse Block	201-10-A
S327	Defogger harness, behind LH side of rear seat	

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation. Refer to the diagnosis given if other results occur. The actions must be performed in the order shown.**
- **Tests follow in System Diagnosis.**

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT	FOR DIAGNOSIS OF OTHER RESULTS
1. Turn the Ignition Switch to RUN, and depress the Defogger Control Switch.	A. The switch button returns to the rest position, and the ON Indicator in the center of the Defogger Control lights B. The Defogger grid removes fog from the rear window C. The ON Indicator and the Defogger turn off after approximately 10 minutes	Do Test A Do Test B Do Test D
2. Depress the Defogger Control Switch again	The ON Indicator and the Defogger turn on After approximately 5 minutes, they turn off again	Replace the Defogger Timer-Relay
3. With the Defogger ON, depress the Defogger Control OFF Switch	The ON Indicator and the Defogger turn OFF	Do Test B Do Test C

(Continued on next page)

SYSTEM DIAGNOSIS

- **Do the tests below when directed by the System Check.**

A. DEFOGGER TIMER-RELAY INPUT VOLTAGE TEST

Measure: VOLTAGE
At: DEFOGGER TIMER-RELAY CONNECTOR (Connected)
Conditions:
- **Ignition Switch: RUN**

Measure Between	Correct Voltage	For Diagnosis
C (ORN/BLK) & Ground	Battery	See 1
E (PNK/BLK) & Ground	Battery	See 2

- If all the voltages are correct, go to Test B.

1. Check the ORN/BLK (60) wire for an open (see schematic). If the wire is OK, check the PWR ACC Circuit Breaker.
2. Check the PNK/BLK (39) wire for an open (see schematic). If the wire is OK, check the Gages Fuse.

B: DEFOGGER TIMER-RELAY TEST

Connect: TEST LAMP
At: DEFOGGER TIMER-RELAY CONNECTOR (Connected)
Conditions:
- **Ignition Switch: RUN**
- **Defogger Switch: ON (HOLD)**

Connect Between	Correct Result	For Diagnosis
B (LT BLU) & Ground	Test Lamp lights	See 3
D (BLK/WHT) & B (LT BLU)	Test Lamp lights	See 2
A (PPL/WHT) & Ground	Test Lamp lights	See 1
• Defogger Switch: OFF (HOLD)		
B (LT BLU) & E (PNK/BLK)	Test Lamp lights	See 4
A (PPL/WHT) & Ground	Test Lamp does not light	See 1

- If all the results are correct, do Test D.

1. Replace the Defogger Timer-Relay.
2. Check the BLK/WHT (150) wire for an open (see schematic). Check that ground G200 is clean and tight.
3. Check the LT BLU (292) wire for an open (see schematic). If the wire is OK, do Test C.
4. Do Test C.

C: DEFOGGER CONTROL VOLTAGE TEST

Measure: VOLTAGE
At: DEFOGGER CONTROL CONNECTOR (Connected)
Conditions:
- **Ignition Switch: RUN**
- **Defogger Switch: ON (HOLD)**
- **Headlight Switch: PARK (Maximum Brightness)**

Connect Between	Correct Voltage	For Diagnosis
A (PNK/BLK) & Ground	Battery	See 1
B (LT BLU) & Ground	Battery	See 2
E (PPL/WHT) & Ground	Battery	See 3
C (GRY) & Ground	Battery	See 4
C (GRY) & D (BLK)	Battery	See 5

- If all the voltages are correct, and the Defogger still does not operate properly, do Test D.

1. Check the PNK/BLK (39) wire for an open (see schematic). If the wire is OK, check the Gages Fuse.
2. Replace the Defogger Control.
3. Check the PPL/WHT (293) wire for an open (see schematic). If the wire is OK, do Test B.
4. Check the INST LP Fuse. Check the GRY (8) wire for an open (see schematic).
5. Check the BLK (150) wire for an open (see schematic). Check that ground G200 is clean and tight. Replace Panel Light if wire and ground are OK.

D: DEFOGGER TEST

With the Ignition Switch in RUN, and the Defogger Switch pressed ON, connect one lead of a test lamp to ground. From inside the car, lightly touch the other lead to each grid line, and slowly move it along the length of the grid. The brilliance of the test lamp bulb should increase as the test lamp is moved from left (Passenger's side) to right (Driver's side).

- **If the test lamp does not light along any one of the grid lines, check PPL/WHT (293), PPL (192) and BLK (192) wires to the Defogger Control for an open (see schematic). If OK, do Test E.**
- **If the test lamp bulb shows full brilliance at both ends of the grid, check the BLK (150) wire for an open to ground (see schematic).**
- **If the test lamp suddenly lights as it is moved along the grid, a break in the continuity of the grid line exists. Refer to the GM Body Service Manual for grid line repair procedure.**

E: DEFOGGER LAMP TEST

Connect: TEST LAMP
At: LH & RH HATCH SUPPORT ARM (Connected)
Conditions:
- **Ignition Switch: RUN**
- **Defogger Switch: ON**

Connect Between	Correct Voltage	For Diagnosis
LH Hatch Support Arm (Braided Wire) & Ground (see schematic)	Test Lamp lights	See 1

(Continued in next column)

(Continued from previous column)

LH Hatch Support Arm (Braided Wire) & RH Hatch Support Arm (Braided Wire) (see schematic)	Test Lamp lights	See 2

- If all the results are correct, refer to the GM Body Service Manual Section 2 for grid line repair.

1. Do Test B.
2. Check the BLK (150) wire for an open (see schematic). Check that Ground G322 is clean and tight (see schematic).

CIRCUIT OPERATION

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

The contact in the Defogger Timer-Relay will stay closed until the Defogger OFF Switch is pushed, or the timer cycle is complete.

(Continued on next page)

(Continued from previous page)

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

The timer also shuts off at any time when the Defogger Control OFF Switch is depressed. In order to reset the Defogger Timer-Relay for the initial 10 minute time interval, the Ignition Switch must be turned OFF and then back to the RUN position before activating the Defogger.

BLANK

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation. All of the checks can be performed without the use of tools or disassembly of components.**
- **Even though one or more checks may not give a normal result, complete the entire System Check to reveal all symptoms which may exist.**

SYSTEM CHECK TABLE

Air Conditioning C60 Manual and C67 Electronic
Conditions:
- **Engine warm and running at idle**
- **Temperature outside car at 60 °F (16 °C) or higher**

SET A/C CONTROLS	EXPECTED RESULT	FOR DIAGNOSIS OF OTHER RESULTS
1. OFF Fan LO	• Blower is not running	8A-63, 66 Blower Controls
2. Move Temperature Selector rapidly back and forth (Manual)	• Temperature Valve hits stop in each direction	8A-65 Air Delivery
3. Move Temperature Selector from COLD to HOT (Electronic)	• Temperature Valve motor moves valve from one position to the other	8A-68 Air Delivery
4. HEATER Temperature Level at COLD	• Blower runs at low speed • Air at outside Temperature flows from floor outlets • Slight air flow at windshield outlets	8A-63, 66 Blower Controls 8A-65, 68 Air Delivery
5. Move Fan Switch through M1, M2 to HI	• Increased air flow at each step	8A-63, 66 Blower Controls
6. Move Temperature Selector to HOT	• Air flow becomes warm	8A-65, 68 Air Delivery
7. VENT	• Warm air flows from Instrument Panel outlets	8A-65, 68 Air Delivery
8. DEF	• Warm air flows from windshield outlets • Compressor turns on • Engine idle speed may increase	8A-65, 68 Air Delivery 8A-64, 67 Compressor Controls 6E Driveability and Emissions

(SYSTEM CHECK TABLE continued on facing page)

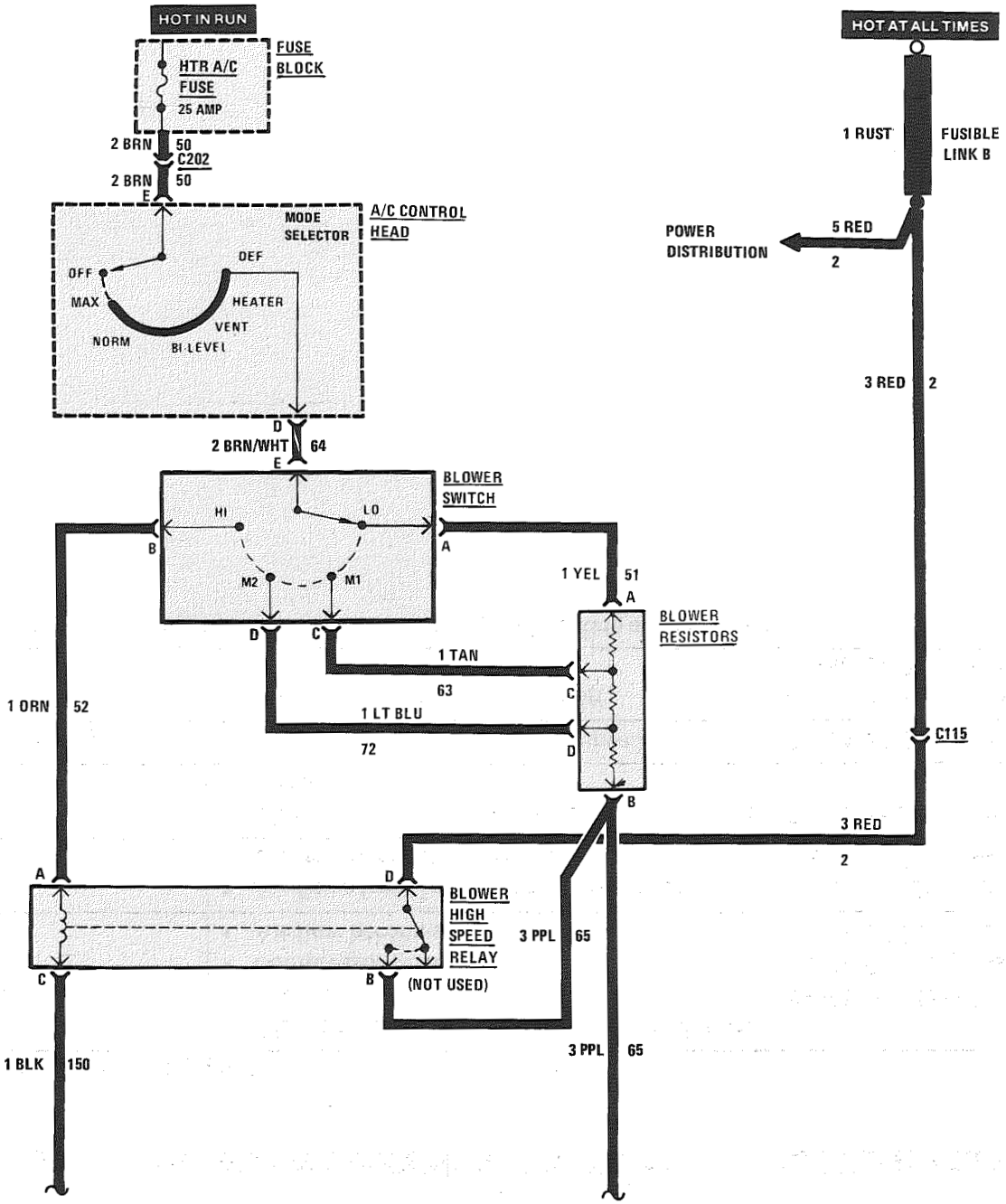
(SYSTEM CHECK TABLE continued from facing page)

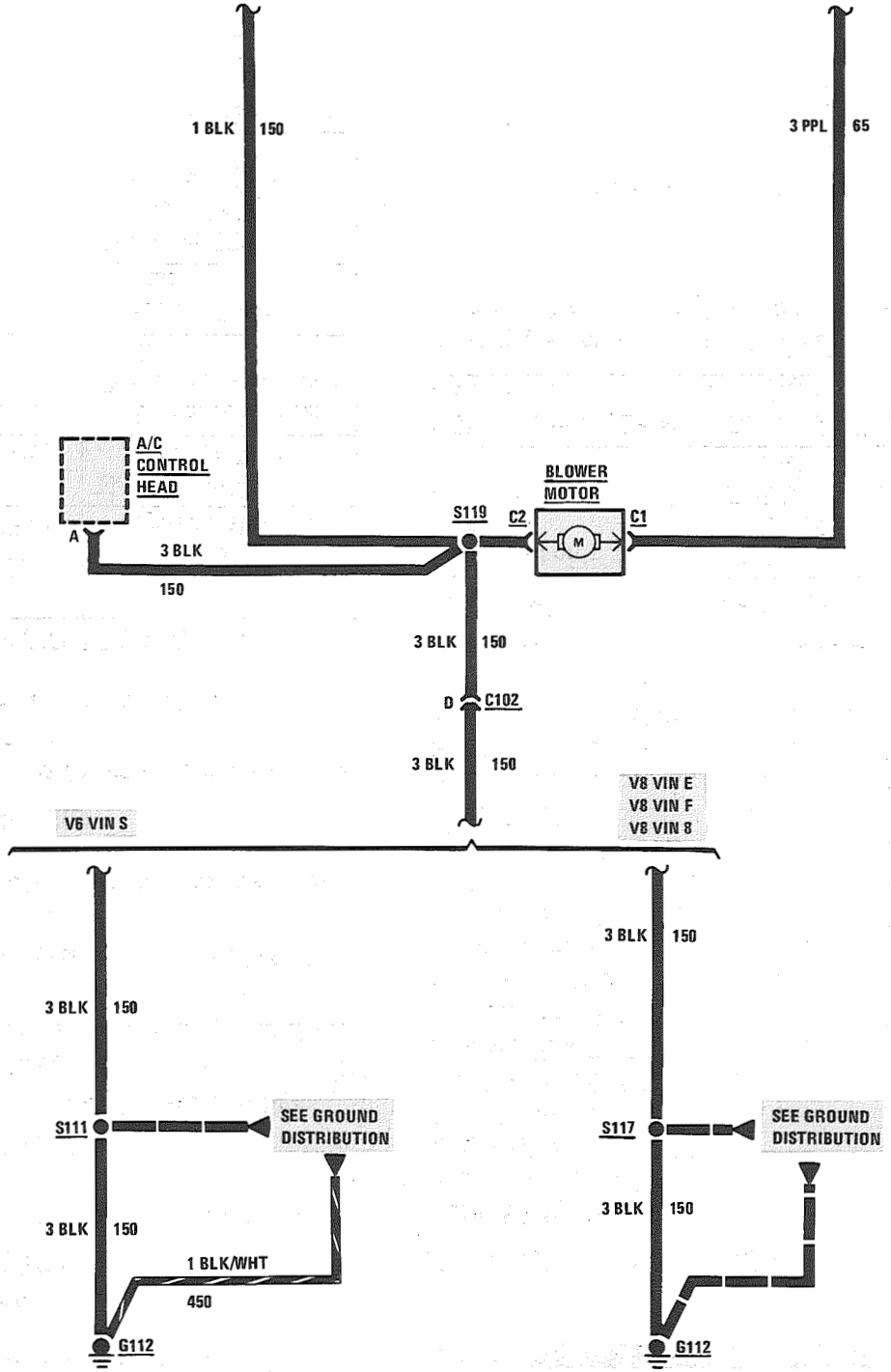
9. BI-LEVEL Set Temperature lever to COLD	• Air flows from Instrument Panel and floor outlets • Compressor turns on • Air flow becomes cold	8A-65, 68 Air Delivery 8A-64, 67 Compressor Controls 8A-64, 67 Compressor Controls
10. NORMAL	• Air flows from Instrument Panel outlets • Compressor continues to run	8A-65, 68 Air Delivery 8A-64, 67 Compressor Controls
11. MAX	• Blower noise increases as outside air door closes	8A-65, 68 Air Delivery
12. Quickly rotate steering wheel to stop	• Engine maintains normal idle speed	8A-64, 67 Compressor Controls
13. OFF	• Blower and Compressor turn off	8A-63, 64 Blower and Compressor Controls 8A-66, 67 Blower and Compressor Controls

- **If all of the above steps can be completed as described, the Air Conditioning and Heating system is operating normally.**

AIR CONDITIONING: BLOWER CONTROLS

C60, MANUAL




1 BLK 150
3 PPL 65
A/C CONTROL HEAD
A
3 BLK 150
S119
C2
BLOWER MOTOR
M
C1
3 BLK 150
D
C102
3 BLK 150
V6 VIN S
V8 VIN E
V8 VIN F
V8 VIN 8
3 BLK 150
S111
SEE GROUND DISTRIBUTION
3 BLK 150
1 BLK/WHT 450
G112
3 BLK 150
S117
SEE GROUND DISTRIBUTION
3 BLK 150
G112

AIR CONDITIONING: BLOWER CONTROLS

C60, MANUAL

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check the HTR A/C Fuse by visual inspection.
2. Check that ground G112 is clean and tight.
3. Check that Blower Motor connectors and Blower Relay are mated correctly and firmly seated.

- **Go to the A/C System Check in 8A-62 for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM DIAGNOSIS

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

SYMPTOM TABLE

SYMPTOM	DO TEST
Blower runs all the time (Ignition OFF)	B: Blower High Speed Relay Test
Blower run all the time (Ignition OFF)	E: A/C Mode Selector Test
Blower will not run in any mode	A: Blower Motor Test E: A/C Mode Selector Test
No Lo speed operation	C: Blower Resistors Test
No Hi speed operation	B: Blower High Speed Relay Test D: Blower Switch Test

(Continued in next column)

COMPONENT LOCATION

		Page-Figure
Blower High Speed Relay	RH front of dash, near Blower Motor	201-14-A
Blower Motor (With A/C)	RH front of dash	201-14-A
Blower Resistors (With A/C)	RH front of dash, behind strut tower	201-14-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Fusible Link B (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link B (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link B (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
C102 (4 cavities)	Center front of dash	201-14-A
C115 (1 cavity)	Center front of dash	201-14-A
C202 (1 cavity)	Behind center of I/P, near control head	201-14-C
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
S111	Engine harness, RH rear of engine compartment	201- 1-A
S117 (VIN E)	Engine harness, RH front of dash	201- 2-A
S117 (VIN F) (VIN 8)	Engine harness, top center rear of engine	201- 7-A
S119	A/C harness, RH rear of engine compartment	201-13-C

(Continued from previous column)

Hi speed only	B: Blower High Speed Relay Test D: Blower Switch Test
Blower runs in Lo at M1 or M2	D: Blower Switch Test

- **If your symptom does not appear in the Symptom Table, perform all of the tests.**

A: BLOWER MOTOR TEST

Measure: VOLTAGE
At: BLOWER MOTOR CONNECTORS (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: HI**

(A: BLOWER MOTOR TEST continued on facing page)

AIR CONDITIONING: BLOWER CONTROLS

C60, MANUAL

(A: BLOWER MOTOR TEST continued from facing page)

Measure Between	Correct Voltage	For Diagnosis
C1 (PPL) & Ground	Battery	See 1
C1 (PPL) & C2 (BLK)	Battery	See 2

- If the voltages are correct but the blower does not run, install a new Blower Motor.

1. Check the PPL (65) wire for an open. If the wire is good, go to Test B and Test D.
2. Check the BLK (150) wire for an open and that ground G112 is clean and tight (see schematic).

B: BLOWER HIGH SPEED RELAY TEST (TABLE 1)

Measure: VOLTAGE
At: BLOWER RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: HI**

Measure Between	Correct Voltage	For Diagnosis
D (RED) & Ground	Battery	See 1
A (ORN) & Ground	Battery	See 2
• Blower Switch: LO		
B (PPL) & Ground	Battery	See 3

(Continued in next column)

(Continued from previous column)

- If all voltages are correct, go to Table 2.

1. Check RED (2) wire for an open back to Fusible Link B.
2. Check ORN (52) wire for an open. If wire is good, go to Test D.
3. Check PPL (65) wire for an open between the Blower High Speed Relay Terminal B and the Blower Resistors Terminal B. If wire is good, go to Test C.

B: BLOWER HIGH SPEED RELAY TEST (TABLE 2)

Measure: RESISTANCE
At: BLOWER HIGH SPEED RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: OFF**
- **Negative Battery Terminal: DISCONNECTED**

Measure Between	Correct Resistance	For Diagnosis
C (BLK) & Ground	0 ohms	See 1
B (PPL) & Ground	Less than 3 ohms	See 2

- If all results in Table 1 and Table 2 are correct, but Blower Relay does not operate or Blower runs all the time, replace the Blower Relay.

1. Check the BLK (150) wire for an open.
2. Check the PPL (65) wire for an open. If wire is good, go to Test A.

C: BLOWER RESISTORS TEST

Measure: RESISTANCE
At: BLOWER RESISTORS (Disconnected)
Condition:
- **Ignition Switch: OFF**

Measure Between	Correct Result	For Diagnosis
A & C	1.5±1 ohm	See 1
C & D	0.2±1 ohm	See 1
D & B	0.7±5 ohm	See 1

- If the results are correct, Blower Resistors are operating normally. Return to Symptom Table.

1. Install new Blower Resistors.

D: BLOWER SWITCH TEST (TABLE 1)

Measure: VOLTAGE
At: BLOWER RESISTORS CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: LO**

Measure Between	Correct Voltage	For Diagnosis
A (YEL) & Ground	Battery	See 1 & 6
C (TAN) & Ground	0 Volts	See 2
• Blower Switch: M1		

(D: BLOWER SWITCH TEST (TABLE 1) continued on next page)

C60, MANUAL

(D: BLOWER SWITCH TEST (TABLE 1) continued on previous page)

C (TAN) & Ground	Battery	See 3 & 6
D (LT BLU) & Ground	0 Volts	See 4
• Blower Switch: M2		
D (LT BLU) & Ground	Battery	See 5 & 6

- If all voltages are correct, go to Table 2.

1. Check YEL (51) wire for an open.
2. If voltage is present, check TAN (63) wire for a wire to wire short to voltage. If wire is good, replace the Blower Switch.
3. Check the TAN (63) wire for an open.
4. If voltage is present, check LT BLU (72) wire for a wire to wire short to voltage. If wire is good, replace the Blower Switch.
5. Check Lt BLU (72) wire for an open.
6. If battery voltage is not present at terminals A, C or D, go to Test E. If voltage is present at one or more of the terminals, replace the Blower Switch.

D: BLOWER SWITCH TEST (TABLE 2)

Measure: VOLTAGE
At: BLOWER HIGH SPEED RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: M2**

Measure Between	Correct Voltage	For Diagnosis

(Continued in next column)

(Continued from previous column)

A (ORN) & Ground	0 Volts	See 1
• Blower Switch: HI		
A (ORN) & ground	Battery	See 2

- If voltages are correct, Blower Switch is operating normally. Return to Symptom Table.

1. If voltage is present, check ORN (52) wire for a wire to wire short to voltage. If wire is good, replace Blower Switch.
2. Check ORN (52) wire for an open. If wire is good, replace Blower Switch.

E: A/C MODE SELECTOR TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD CONNECTOR (Connected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: OFF**

Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
D (BRN/WHT) & Ground	0 Volts	See 2
• A/C Mode: All positions except OFF		
D (BRN/WHT) & Ground	Battery	See 3

(Continued in next column)

(Continued from previous column)

- If all voltages are correct, check the BRN/WHT (64) wire for an open. If wire is good replace the Blower Switch.

1. Check BRN (50) wire for an open back to HTR A/C Fuse.
2. If voltage is present, check BRN/WHT (64) wire for a wire to wire short to voltage. If wire is good, replace A/C Control Head.
3. If battery voltage is present at terminal E but is not present at terminal D, replace the A/C Control Head.

CIRCUIT OPERATION

The Blower Motor speed is controlled by the Blower Switch in the A/C Control Head. With the switch in the LO position, all of the Blower Resistors are in the circuit with the motor so that it runs slowly. In the M1 and M2 positions, the Blower Switch bypasses some of the Resistors, increasing the Motor speed.

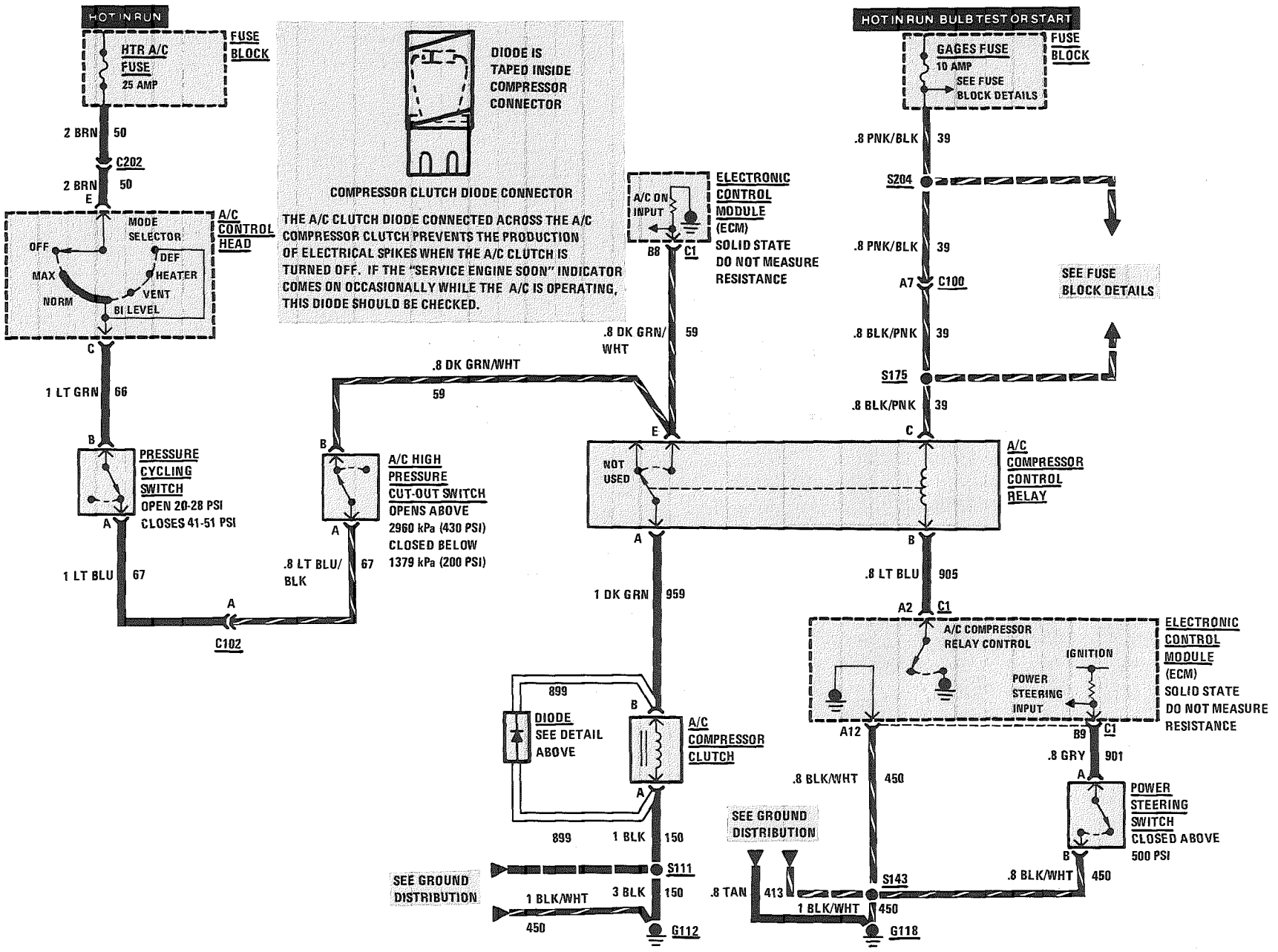
Voltage is applied to the Blower Motor through the contacts of the Blower High Speed Relay. When the Blower Switch is in the HI position, battery voltage is supplied through the ORN wire to the coil of the Blower High Speed Relay. The Relay is energized and its contacts supply battery voltage directly to the Blower Motor from Fusible Link B.

When the Mode Selector is in the OFF position, no voltage is applied to the Blower Switch and Motor so the Blower does not run. In all other positions, the Blower will operate as described.

BLANK

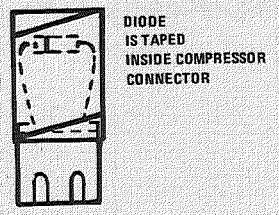
AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL, V6 VIN S



AIR CONDITIONING: COMPRESSOR CONTROLS

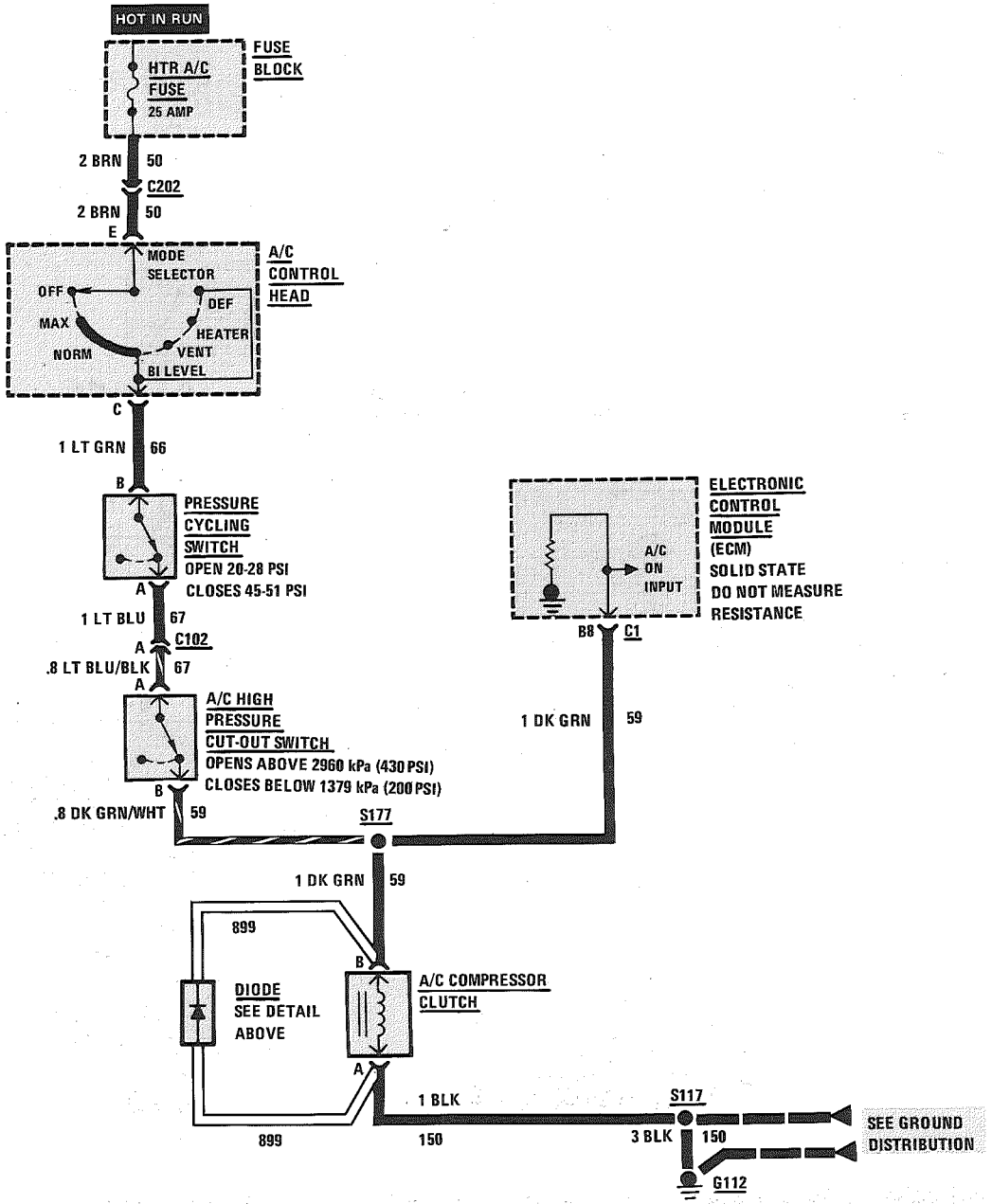
C60, MANUAL, V8 VIN F, V8 VIN 8



DIODE IS TAPED INSIDE COMPRESSOR CONNECTOR

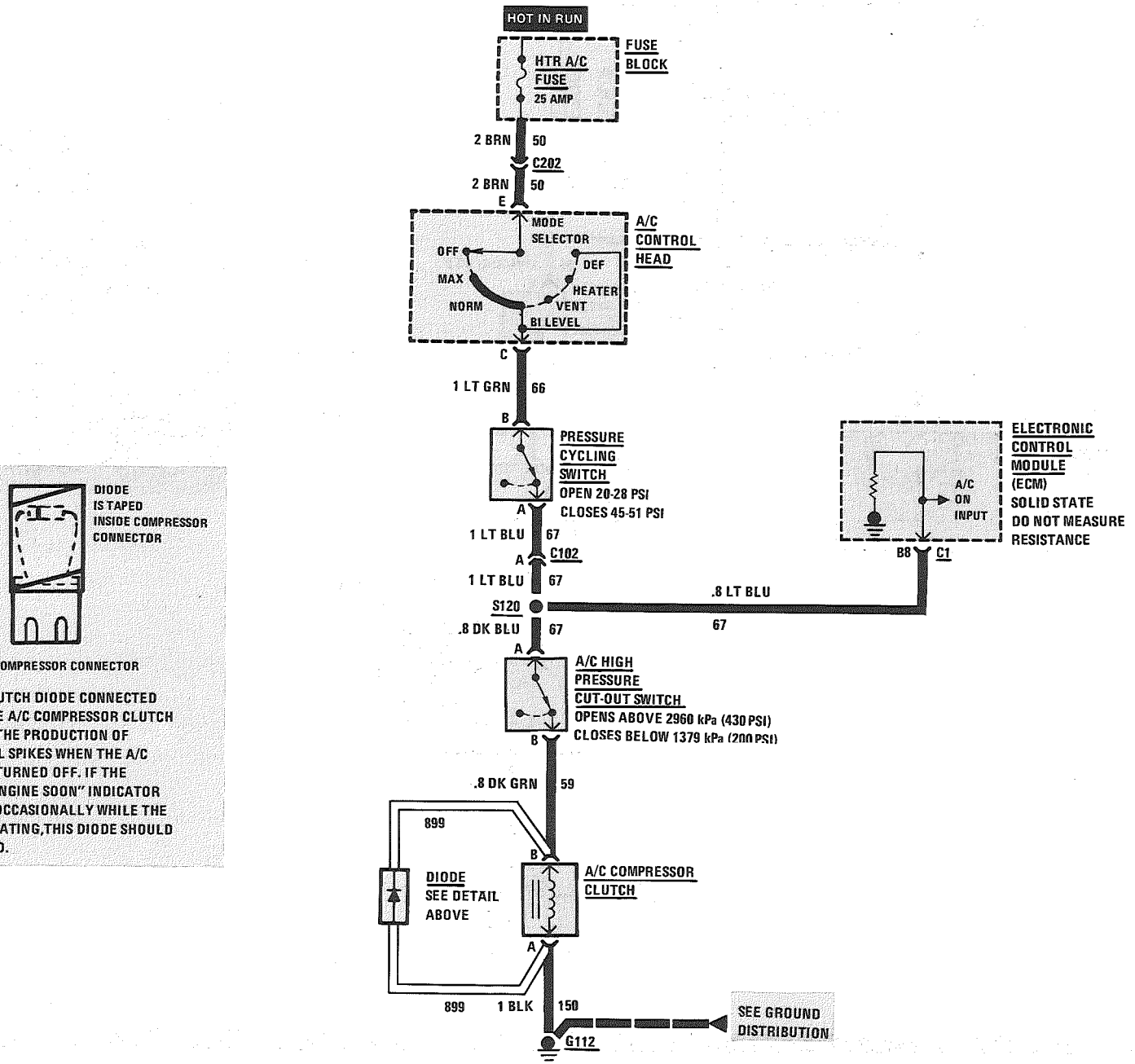
COMPRESSOR CONNECTOR

THE A/C CLUTCH DIODE CONNECTED ACROSS THE A/C COMPRESSOR CLUTCH PREVENTS THE PRODUCTION OF ELECTRICAL SPIKES WHEN THE A/C CLUTCH IS TURNED OFF. IF THE "SERVICE ENGINE SOON" INDICATOR COMES ON OCCASIONALLY WHILE THE A/C IS OPERATING, THIS DIODE SHOULD BE CHECKED.



AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL, V8 VIN E



COMPRESSOR CONNECTOR

THE A/C CLUTCH DIODE CONNECTED ACROSS THE A/C COMPRESSOR CLUTCH PREVENTS THE PRODUCTION OF ELECTRICAL SPIKES WHEN THE A/C CLUTCH IS TURNED OFF. IF THE "SERVICE ENGINE SOON" INDICATOR COMES ON OCCASIONALLY WHILE THE A/C IS OPERATING, THIS DIODE SHOULD BE CHECKED.

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check HTR-A/C Fuse by visual inspection.
2. Check that the A/C Compressor Clutch connector is firmly seated.
3. Check that ground G112 is clean and tight.

- **Go to System Check for a guide to normal Compressor Control operation.**
- **Go to System Diagnosis for Compressor Control diagnostic tests.**

SYSTEM CHECK

- **Complete the A/C System Check in Section 8A-62 as a guide to normal operation of the A/C System.**
- **Use the System Check Table as a guide to normal operation of the Compressor Controls.**

COMPONENT LOCATION

		Page-Figure
A/C Compressor Clutch (VIN E)	Top RH front of engine	201- 4-A
A/C Compressor Clutch (VIN F) (VIN 8)	Top RH front of engine	201- 6-A
A/C Compressor Clutch (VIN S)	Top LH front of engine.	201- 0-B
A/C Compressor Control Relay	LH rear corner of engine compartment, on relay bracket	201- 0-A
A/C High Pressure Cut-Out Switch (VIN E)	Top RH front of engine, on rear of A/C compressor	201- 4-D
A/C High Pressure Cut-Out Switch (VIN F) (VIN 8)	Top RH front of engine, on rear of A/C compressor	201- 6-C
A/C High Pressure Cut-Out Switch (VIN S)	Top LH front of engine, on rear of A/C compressor	201- 0-B
Diode	Inside A/C Compressor Clutch connector	201- 0-B
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Fuse Block	Behind LH side of I/P, below light switch.	201-10-A
Power Steering Switch	Lower LH front corner of engine compartment, on steering unit	201- 0-A
Pressure Cycling Switch.	On side of A/C accumulator	201-14-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C102 (4 cavities)	Center front of dash	201-14-A
C202 (1 cavity)	Behind center of I/P, near control head.	201-14-C
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
G118 (VIN S)	Rear of RH cylinder head	201- 1-C
S111	Engine harness, RH rear of engine compartment	201- 1-A
S117 (VIN F) (VIN 8)	Engine harness, top center rear of engine	201- 7-A
S120	Engine harness, RH front of dash	201- 2-A
S143 (VIN S)	Engine harness, center front of dash.	201- 1-A
S175 (VIN S)	Engine harness, lower LH front of dash	201- 0-A

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

(Continued from previous page)

COMPONENT LOCATION

		Page-Figure
S177	Engine harness, top RH front of engine	201- 5-A
S204	I/P harness, behind instrument cluster	201-10-A

SYSTEM CHECK TABLE

ACTION	EXPECTED RESULT
1. Turn the Ignition Switch to RUN and start the engine Move the A/C Mode Selector to OFF then to MAX	A click can be heard when the clutch engages
2. Move the Mode Selector between OFF and MAX several times	Verify that the clutch engages in the MAX position Clutch plate movement can be seen on the front of the compressor pulley If the clutch does not engage, proceed to step 4 If the clutch operates as expected, continue to step 3
3. Put the Mode Selector in MAX to engage clutch	Check that air from the coolant fan can move freely through condensor Feel the input (cool) and output (warm) pipes to the compressor If there is not a wide temperature difference after the compressor has run for several seconds, see Section 1B for refrigerant and compressor diagnostics
4. Turn off the ignition Check the refrigerant charge, according to the procedures in Section 1B	If the refrigerant charge is low, follow the procedures in Section 1B for refrigerant diagnosis If the refrigerant charge is normal, isolate the conditions using the procedures which follow in the System Diagnosis

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

SYSTEM DIAGNOSIS

V6 VIN S

- **Use the Isolation Test below to choose the proper diagnostic tests.**
- **Tests follow the Isolation Test.**

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: A/C COMPRESSOR CONTROL RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
C (PNK/BLK) & Ground	Battery	Check GAGES Fuse and PNK/BLK (39) wire for an open
E (DK GRN/WHT) & Ground	Battery	Check DK GRN/WHT (59) wire for an open. If wire is good, do Test C

- If voltages are correct, leave A/C Compressor Control Relay connector disconnected and go to Table 2.

ISOLATION TEST (TABLE 2)

Connect: FUSED JUMPER
At: A/C COMPRESSOR CONTROL RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Result	For Diagnosis
E (DK GRN/WHT) & A (DK GRN)	Clutch engages	Do Test B

- If action is correct, do Test A.

A: ECM COMPRESSOR CONTROL TEST (TABLE 1)

Measure: VOLTAGE
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **A/C Compressor Control Relay: CONNECTED**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B8 on Conn C1 (DK GRN/WHT) & Ground	Battery	See 1

(Continued in next column)

(Continued from previous column)

A2 on Conn C1 (LT BLU) & Ground	Battery	See 2

- If the voltages are correct, proceed to Table 2.

1. Check for an open in the DK GRN/WHT (59) wire.
2. Check for an open in the LT BLU (905) wire. If the wire is good, replace the A/C Compressor Control Relay.

A: ECM COMPRESSOR CONTROL TEST (TABLE 2)

Measure: RESISTANCE
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: OFF**
- **Negative Battery Terminal Disconnected**

Measure Between	Correct Resistance	For Diagnosis
B9 on Conn C1 (GRY) & Ground	0 Ohms	See 1

- If resistance is correct proceed to Table 3.

1. Check that Power Steering Switch is closed. If switch is open, replace it. Check for an open in the GRY (901) wire and BLK/WHT (450) wire.

(Continued on next page)

C60, MANUAL

(Continued from previous page)

A: ECM COMPRESSOR CONTROL TEST (TABLE 3)

Connect: FUSED JUMPER
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
A2 on Conn C1 (LT BLU) and Ground	A/C Compressor Control Relay operates & A/C Clutch engages	See 1

- If action is correct but A/C system does not operate under normal conditions, condition is due to ECM. Refer to Section 6E for ECM diagnostics.

1. Replace A/C Compressor Control Relay.

B: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: A/C COMPRESSOR CLUTCH (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

(Continued in next column)

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check for open in DK GRN (959) wire.
2. Check for open in BLK (150) wire.

C: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
C (LT GRN) & Ground	Battery	Replace A/C Control Head

- If voltages are correct, go to Step 2.

1. Check for open HTR-A/C Fuse or open BRN (50) wire.

C1. Remove the connectors from the Pressure Cycling Switch and the A/C High Pressure Switch. Connect a fused jumper between the terminals of the connectors. If switch is open, battery voltage will be present at terminal E of the A/C Compressor Control Relay, when the jumper is connected.

- If the Pressure Cycling Switch is open, refer to Section 1B to check for normal refrigerant charge. If refrigerant charge is low, follow procedures in Section 1B for refrigerant diagnostics. If refrigerant charge is normal, replace the Pressure Cycling Switch.
- If A/C High Pressure Cut-Out Switch is open, replace it.
- If both switches are good but battery voltage is not present at the A/C Compressor Control Relay, check the wiring between switches for an open (see schematic).

SYSTEM DIAGNOSIS

V8 VIN F, V8 VIN 8

- Use the Isolation Test below to choose the proper diagnostic tests.
- Tests follow the Isolation Test.

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60° F (16° C)**

Measure Between	Correct Voltage	For Diagnosis
B (LT GRN) & Ground	Battery	Do Test B

- If voltage is correct, leave Pressure Cycling Switch disconnected and go to Table 2.

ISOLATION TEST (TABLE 2)

Connect: JUMPER
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60° F (16° C)**

Jumper Between	Correct Action	For Diagnosis
B (LT GRN) & A (LT BLU)	Clutch engages	Do Test A

- If action is correct, refer to Section 1B for procedure to check refrigerant pressure.
- If refrigerant pressure is normal, replace the Pressure Cycling Switch.

A: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: A/C COMPRESSOR CLUTCH (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**
- **Pressure Cycling Switch: RECONNECTED**

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check that A/C High Pressure Cut-Out Switch is closed (see schematic). If it is open, replace it. Check for an open in the LT BLU (67) and DK GRN (59) wires.
2. Check for an open in the BLK (150) wire. Check that ground G112 is clean and tight.

B: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60° F (16° C)**

(Continued in next column)

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
C (LT GRN) & Ground	Battery	Replace A/C Control Head

- If voltages are correct, check for an open in the LT GRN (66) wire.

1. Check for open HTR-A/C Fuse or open BRN (50) wire.

SYSTEM DIAGNOSIS

V8 VIN H

- **Use the Isolation Test below to choose the proper diagnostic tests.**
- **Tests follow the Isolation Test.**

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (LT GRN) & Ground	Battery	Do Test B

- If voltage is correct, leave Pressure Cycling Switch disconnected and go to Table 2.

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

(Continued from previous page)

ISOLATION TEST (TABLE 2)

Connect: JUMPER
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
B (LT GRN) & A (LT BLU)	Clutch engages	Do Test A

- If action is correct but A/C Compressor Clutch does not engage under normal operating conditions, refer to Section 1B for procedure to check refrigerant pressure.
- If refrigerant pressure is normal, replace the Pressure Cycling Switch.

A: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: A/C COMPRESSOR CLUTCH (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Pressure Cycling Switch Connected**
- **Temperature Outside Car: Above 60°F (16°C)**

(Continued in next column)

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check that A/C High Pressure Cut-Out Switch is closed (see schematic). If it is open, replace it. Check for an open in the LT BLU (67) wire and the DK BLU (67) wire. Check for an open in the DK GRN (59) wire.
2. Check for an open in the BLK (150) wire.

B: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
C (LT GRN) & Ground	Battery	Replace A/C Control Head

- If voltages are correct, check for an open in the LT GRN (66) wire.

(Continued from previous column)

1. Check for open HTR-A/C Fuse or open BRN (50) wire.

CIRCUIT OPERATION

The compressor for the air conditioning system is belt driven by the engine through the Compressor Clutch. The clutch allows the compressor to be disengaged when air conditioning is not required or to remove the air conditioning load from the engine when necessary.

Operation of the compressor depends on the particular A/C mode selected by the driver. When the A/C Mode Selector Switch is in MAX, NORM, BI-LEVEL, or DEF, battery voltage is applied through the HTR-A/C Fuse and A/C Control Head Selector Switch to the remaining circuits.

V6 VIN S

For vehicles equipped with the V6 VIN S engine, the path to the A/C Compressor Control Relay is through the A/C Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch which are both normally closed. The A/C Pressure Cycling Switch opens when refrigerant pressure drops to a point near the level where the evaporator may begin to ice. It closes again when additional cooling is required. This action causes the compressor to cycle on and off. The A/C High Pressure Cut-Out Switch opens when refrigerant pressure is too high for normal operation.

AIR CONDITIONING: COMPRESSOR CONTROLS

C60, MANUAL

The A/C Compressor Control Relay is operated by the ECM. When the ECM receives the A/C ON signal at terminal B8, it grounds terminal A2 energizing the relay. When the relay is energized, voltage is applied to the A/C Compressor Clutch through the contacts of the relay.

If the ECM determines that engine load should be reduced, such as during full throttle, the A/C Compressor Control Relay is de-energized, which removes voltage from the A/C Compressor Clutch, thus removing the A/C load from the engine.

V8 VIN F, V8 VIN 8

From the A/C Control Head, voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing. The A/C High Pressure Cut-Out Switch opens if refrigerant pressure rises to a point that is too high for normal operation.

When voltage is applied to the Compressor Clutch, it is also applied to the ECM at terminal B8 on connector C1. The ECM will than increase the engine idle speed while the A/C Compressor Clutch is engaged.

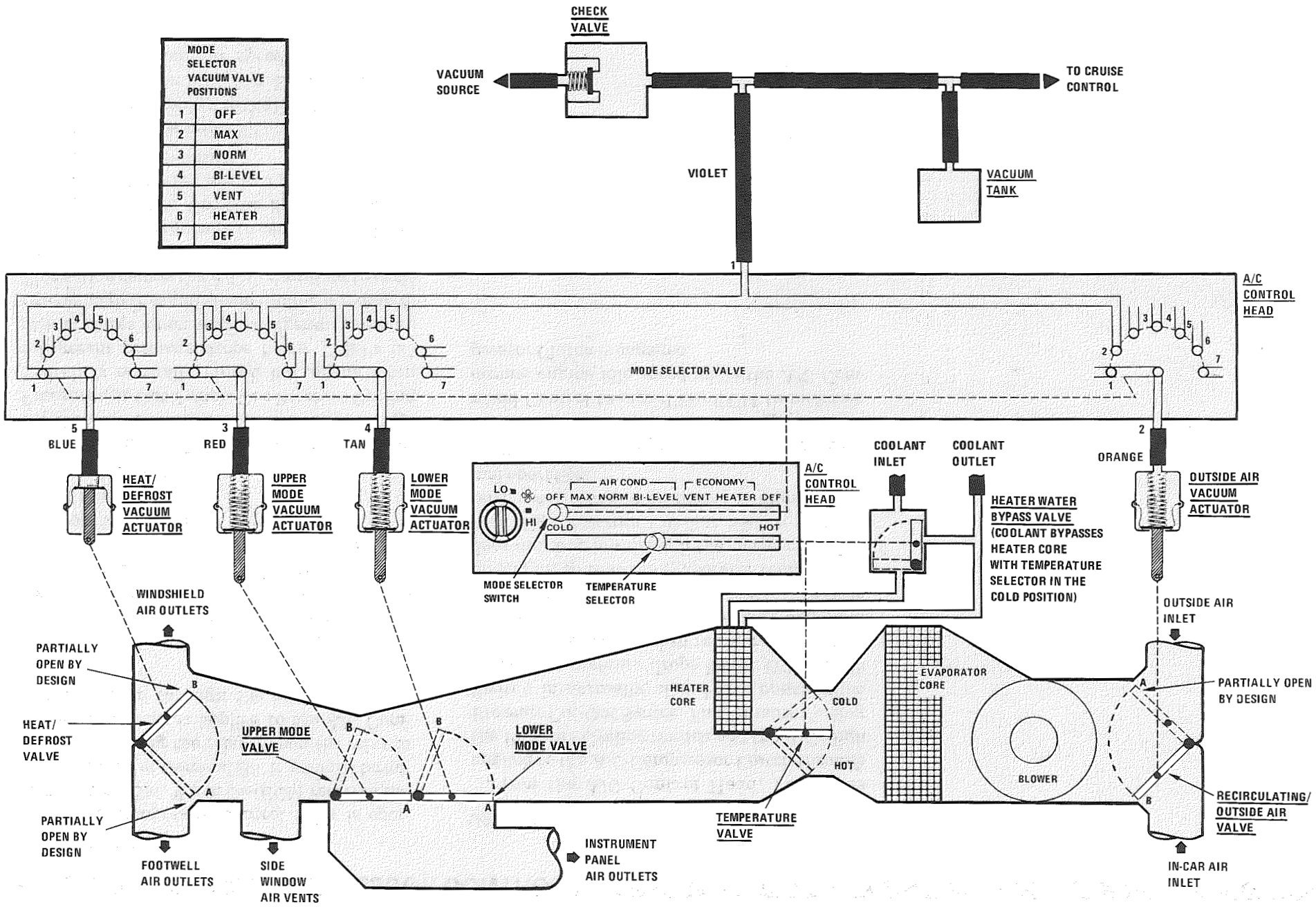
V8 VIN E

From the A/C Control Head, voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough the cause icing. The A/C High Pressure Cut-Out Switch opens if refrigerant pressure becomes too high for normal operation.

When voltage is applied to the Compressor Clutch, it is also applied to the Computer Command Control to signal the ECM to maintain normal engine idle speed while the A/C Compressor Clutch is engaged.

AIR CONDITIONING: AIR DELIVERY

C60, MANUAL



AIR CONDITIONING: AIR DELIVERY

C60, MANUAL

TROUBLESHOOTING HINTS

- **Try the following checks before doing System Diagnosis.**

1. Check for manifold vacuum to the vacuum tank at the BLACK hose from the engine and at the VIOLET hose to the A/C Control Head.
2. Check the operation of the Temperature Valve by moving the Temperature Selector rapidly back and forth several times. Listen for the valve to strike the stop at each end of its travel. If the sound indicates that the valve is not fully closing or opening, check the mechanical linkage between the valve and the Temperature Selector.
3. Check that Heater Water Bypass Valve operates when Temperature Selector is moved to maximum cold position.

- **Go to the A/C System Check in 8A-62 for a guide to normal operation and diagnostic references for the entire A/C System.**
- **Go to System Diagnosis to isolate air delivery conditions.**

SYSTEM DIAGNOSIS

- **Engine warm and running at idle.**
- If air flow does not come from the proper outlets under one or more operating modes, at least one of the air valves is not moving to the proper position.
- Check the operation of the air valves using the following chart. Put Blower Switch in HI to give a strong flow of air.

COMPONENT LOCATION

		Page-Figure
Check Valve	Behind engine, to right of master brake cylinder	201-15-A
Heat/Defrost Vacuum Actuator	Behind I/P, on LH side of plenum	201-14-C
Lower Mode Vacuum Actuator	Behind I/P, on LH lower side of plenum	201-14-C
Recirculating-Outside Air Vacuum Actuator (Manual)	Behind I/P, on RH side of plenum	201-14-C
Upper Mode Vacuum Actuator	Behind I/P, on LH side of plenum	201-14-C
Vacuum Tank	Lower LH front corner of engine compartment	201-15-A

AIR VALVE POSITION TABLE

Conditions:
- **Ignition Switch: RUN (Engine Running)**
- **Blower Switch: HI**

Mode Selector Switch	Heat/ Defrost Valve	Lower Mode Valve	Upper Mode Valve	Outside Air Valve
OFF	B	A	A	B
MAX	A	B	B	A
NORM	A	B	B	B
BI-LEVEL	B	B	A	B
VENT	A	B	B	B
HEAT-ER	B	A	A	B
DEF	A	A	A	B

- **Additional tests of the A/C Vacuum System are given in Section 1B.**

CIRCUIT OPERATION

The air valves in the air conditioning system are operated by mechanical and vacuum controls. There are no electrical circuits. The functions of the air valves and A/C Evaporator Core are described below.

Temperature Valve

The Temperature Valve is mechanically linked to the temperature selector in the A/C Control Head. With the selector in Cold, the valve is in the cold position. This prevents air from blowing across the Heater Core. With the selector in any other position, some or all of the air blows across the Heater Core providing continuous temperature control.

(Continued on next page)

(Continued from previous page)

A/C Evaporator Core

All air passing through the A/C Module moves across the A/C evaporator Core. When the A/C Compressor is on, the core is cooled and removes moisture from the air.

Heater Water Bypass Valve

In most operating modes, engine coolant circulates through the Heater Core to heat the air passing through the core. When the Temperature Selector is moved to the maximum cold position, the Heater Water Bypass Valve is operated by mechanical linkage so that the coolant does not flow through the Heater Core. This allows maximum cooling of the air.

Heat Defrost Valve

With the Mode Selector Switch in OFF, BI-LEVEL or HEATER vacuum is applied to the Heat Defrost Vacuum Actuator. The bellows contract and the Heat/Defrost Valve moves to B position. Most of the air flows out of the Footwell Air Outlets. In all other positions of the Mode Selector Switch no vacuum is applied to the Vacuum Actuator and the Heater/Defrost Valve remains in position A forcing most of the air out of the Windshield Air Outlets.

Upper and Lower Mode Valves

The two Mode Valves determine the amount of air flow to the Instrument Panel Air Outlets. When the Mode Selector Switch is in MAX, NORMAL or VENT, vacuum is applied to both the Upper and Lower Mode Vacuum Actuators. Both valves then move to position B and all air flows out the Instrument Panel Air Outlets. In the BI-LEVEL mode, vacuum is applied only to the Lower Mode Vacuum Actuator which moves the Lower Mode Valve to position B. The Upper Mode Valve moves to position A. In these positions some air flows out of the Instrument Panel Air Outlets and the rest flows out the Footwell Air Outlet. IN HEATER, DEF and OFF no vacuum is applied to either Vacuum Actuator and both Valves move to position A. All air then flows to either the Footwell Air Outlets or the Windshield Air Outlets depending on the position of the Heat/Defrost Valve.

Outside Air Valve

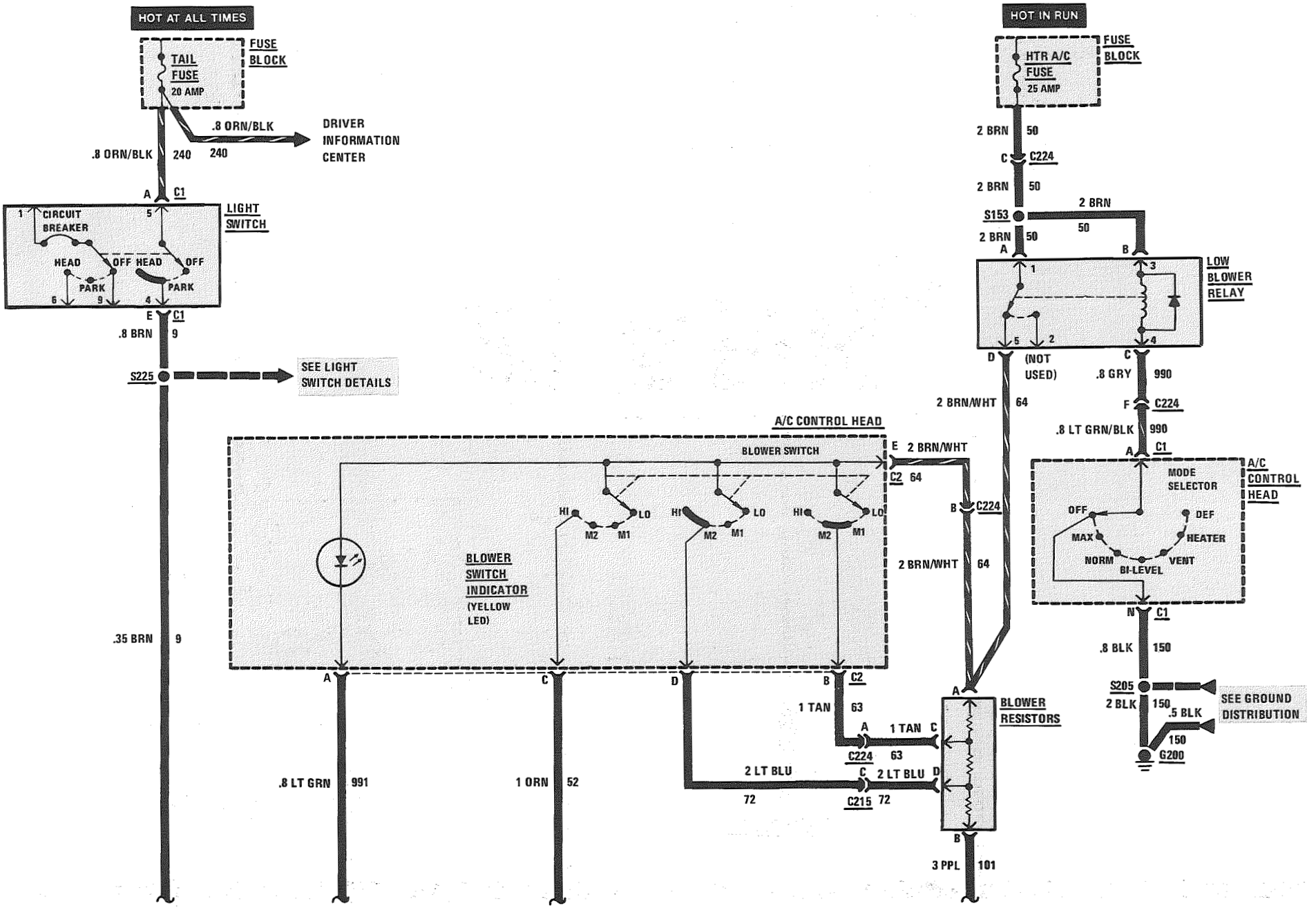
When the A/C Mode Selector is moved to MAX, vacuum is applied to the Outside Air Vacuum Actuator. The bellows are drawn in and the valve is moved to position A. Air from inside the car is pulled into the A/C Module.

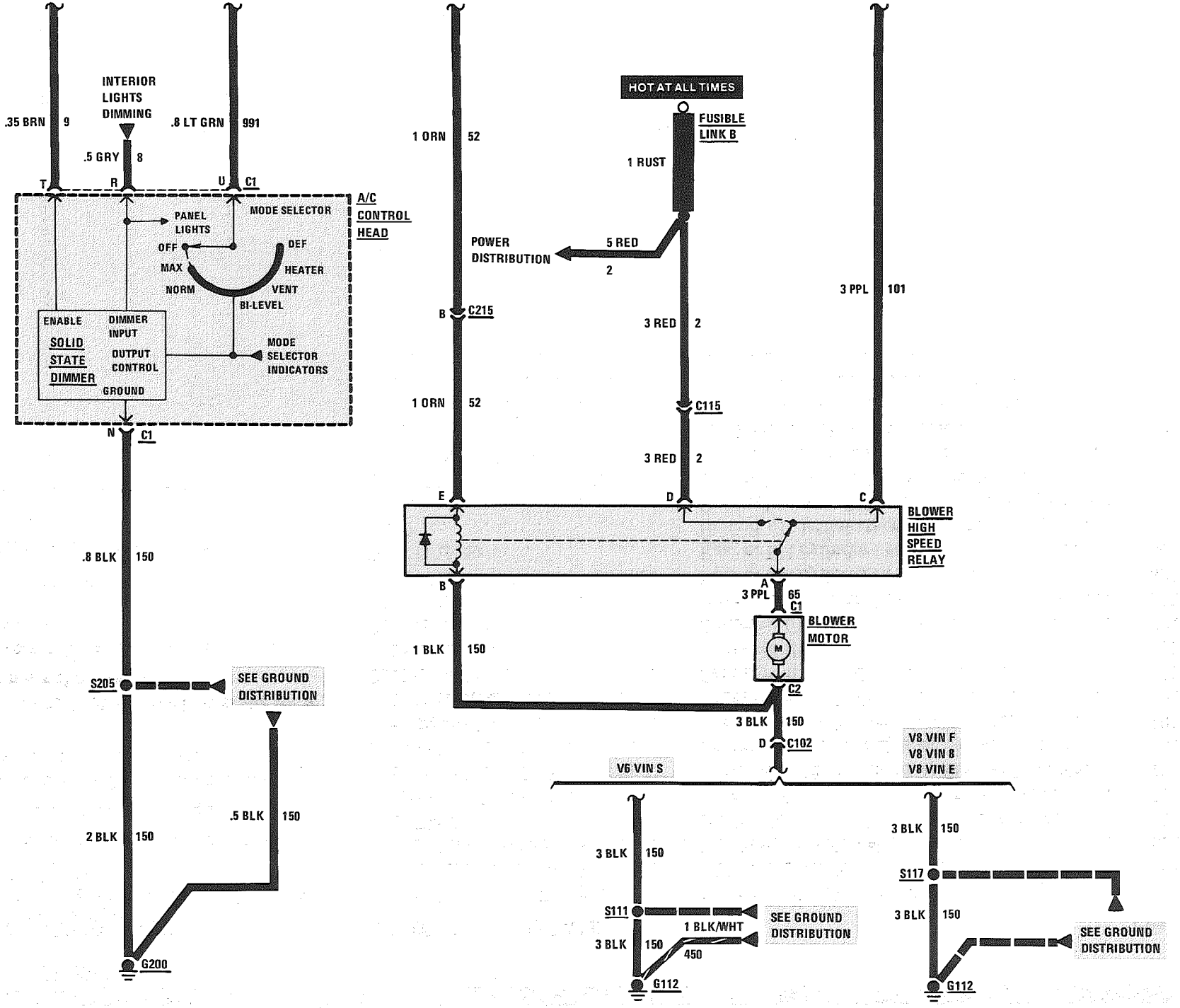
In any other Mode Selector Switch position, the Motor bellows are expanded and air is drawn in from the outside.

BLANK

AIR CONDITIONING: BLOWER CONTROLS

C67, ELECTRONIC




INTERIOR LIGHTS DIMMING
.35 BRN 9
.5 GRY 8
.8 LT GRN 991
T
R
U
C1
A/C CONTROL HEAD
PANEL LIGHTS
MODE SELECTOR
OFF
DEF
MAX
HEATER
NORM
VENT
BI-LEVEL
ENABLE
DIMMER INPUT
SOLID STATE DIMMER
OUTPUT CONTROL
GROUND
MODE SELECTOR INDICATORS
N
C1
.8 BLK 150
S205
SEE GROUND DISTRIBUTION
2 BLK 150
.5 BLK 150
G200
HOT AT ALL TIMES
FUSIBLE LINK B
1 RUST
1 ORN 52
POWER DISTRIBUTION
5 RED 2
3 PPL 101
B
C215
3 RED 2
1 ORN 52
C115
3 RED 2
E
D
C
BLOWER HIGH SPEED RELAY
B
A
3 PPL 65
C1
BLOWER MOTOR
M
1 BLK 150
C2
3 BLK 150
D
C102
V6 VIN S
V8 VIN F
V8 VIN 8
V8 VIN E
3 BLK 150
S111
SEE GROUND DISTRIBUTION
1 BLK/WHT
3 BLK 150
450
G112
3 BLK 150
S117
3 BLK 150
SEE GROUND DISTRIBUTION
G112

AIR CONDITIONING: BLOWER CONTROLS
C67, ELECTRONIC

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Diagnosis.**

1. Check the HTR A/C Fuse by visual inspection.
2. Check that G112 is clean and tight.
3. Check that Blower Motor connectors and Blower Relay are mated correctly and firmly seated.

- **Go the the A/C System Check in 8A-62 for a guide to normal operation.**
- **Go to System Diagnosis in this section for diagnostic tests.**

SYSTEM DIAGNOSIS

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

COMPONENT LOCATION

		Page-Figure
Blower High Speed Relay	RH front of dash, near Blower Motor	201-14-A
Blower Motor (With A/C)	RH front of dash	201-14-A
Blower Resistors (With A/C)	RH front of dash, behind strut tower	201-14-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Fusible Link B (VIN E)	Lower RH side of engine, at Starter Solenoid	201- 2-A
Fusible Link B (VIN F) (VIN 8)	Lower RH side of engine, at Starter Solenoid	201- 6-B
Fusible Link B (VIN S)	Lower RH side of engine, at Starter Solenoid	201- 1-A
Low Blower Relay	RH front of dash, near Blower Motor	201-14-A
C102 (4 cavities)	Center front of dash	201-14-A
C115 (1 cavity)	Center front of dash	201-14-A
C215 (3 cavities)	Center of I/P, behind A/C control	201-14-B
C224 (6 cavities)	Center of I/P, behind A/C control	201-14-B
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
G200	Behind I/P, left of steering column	201-10-A
S111	Engine harness, RH rear of engine compartment	201- 1-A
S117 (VIN E)	Engine harness, RH front of dash	201- 2-A
S117 (VIN F) (VIN 8)	Engine harness, top center rear of engine	201- 7-A
S153	A/C harness, RH front of dash	201-14-A
S205	I/P harness, behind instrument cluster	201-10-A
S225	I/P harness, behind instrument cluster	201-10-A

AIR CONDITIONING: BLOWER CONTROLS
C67, ELECTRONIC

SYMPTOM TABLE

SYMPTOM	DO TEST
Blower runs all the time (Ignition OFF)	B: Blower High Speed Relay Test
Blower runs all the time (Ignition ON)	E: Low Blower Relay Test
Blower will not run in any mode	A: Blower Motor Test D: Blower Switch Test F: A/C Mode Selector Blower Control Test
No Low or Medium Speed operation	C: Blower Resistors Test
No High Speed operation	B: Blower High Speed Relay Test D: Blower Switch Test
High Speed operation only	B: Blower High Speed Relay Test
None of the above	A, B, C, D, E and F
Panel lights or LED indicators do not light or dim	G: A/C Control Head LED and Panel Light Test

A: BLOWER MOTOR TEST

Measure: VOLTAGE
At: BLOWER MOTOR CONNECTORS (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: HI**

Measure Between	Correct Voltage	For Diagnosis
C1(PPL) & Ground	Battery	See 1
C1(PPL) & C2(BLK)	Battery	See 2

- If the voltages are correct, but the Blower does not run, install a new Blower Motor.

1. Check PPL (65) wire for an open. If wire is good, do Tests B and D.
2. Check BLK (150) wire for an open and ground G112 is clean and tight.

B: BLOWER HIGH SPEED RELAY TEST (TABLE 1)

Measure: VOLTAGE
AT: BLOWER HIGH SPEED RELAY CONNECTOR (Disconnect)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: HI**

Measure Between	Correct Voltage	For Diagnosis
D(RED) & Ground	Battery	See 1
C (PPL) & Ground	Battery	See 2
E (ORN) & Ground	Battery	See 3

- If voltages are correct, proceed to Table 2.

1. Check RED (2) wire for an open back to Fusible Link B.
2. Check PPL (101) wire for an open. If wire is good, do Test C.
3. Check ORN (52) wire for an open. If wire is good, do Test D.

(Continued on next page)

AIR CONDITIONING: BLOWER CONTROLS
C67, ELECTRONIC

(Continued from previous page)

B: BLOWER HIGH SPEED RELAY TEST (TABLE 2)

Measure: RESISTANCE
AT: BLOWER HIGH SPEED RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: OFF**
- **Negative Battery Terminal: DISCONNECTED**

Measure Between	Correct Resistance	For Diagnosis
B (BLK) & Ground	0 ohms	See 1
A (PPL) & Ground	Aproximately 3 ohms	See 2

- If voltages in Table 1 and resistances in Table 2 are correct, but Blower Relay does not operate or runs all the time, replace the Blower Relay.

1. Check BLK (150) wire for an open.
2. Check PPL (65) wire for an open. If wire is good, recheck measurements made in Test A.

C: BLOWER RESISTORS TEST

Measure: RESISTANCE
At: BLOWER RESISTORS CONNECTOR (Disconnected)
Condition:
- **Ignition Switch: OFF**

Measure Between	Correct Resistance	For Diagnosis
A & C	1.5 ± 1 ohm	See 1
C & D	0.7 ± .5 ohm	See 1
D & B	0.2 ± .1 ohm	See 1

- If resistances are correct, Blower Resistors are operating normally. Return to Symptom Table.

1. Install new Blower Resistors.

D: BLOWER SWITCH TEST (TABLE 1)

Measure: VOLTAGE
At: BLOWER RESISTOR CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: LO**

Measure Between	Correct Voltage	For Diagnosis
A (BRN/WHT) & Ground	Battery	See 1
C (TAN) & Ground	0 volts	See 2
• Blower Switch: M1		
C (TAN) & Ground	Battery	See 3 and 5
D (LT BLU) & Ground	0 volts	See 2
• Blower Switch: M2		
D (LT BLU) & Ground	Battery	See 4 and 5

- If all voltages are correct, go to Table 2.

1. Check BRN/WHT (64) wire for an open. If wire is good, do Test E. (see schematic).
2. If battery voltage is present, check for a wire to wire short to voltage. If wire is good, replace the Blower Switch.
3. Check TAN (63) wire for an open.
4. Check LT BLU (72) wire for an open.
5. If voltage is present at terminal A but is not present at either terminals C or D, check the BRN/WHT (64) wire for an open between the Blower Resistor terminal A and the A/C Control Head terminal E.

AIR CONDITIONING: BLOWER CONTROLS
C67, ELECTRONIC

D: BLOWER SWITCH TEST (TABLE 2)

Measure: VOLTAGE
At: BLOWER HIGH SPEED RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Blower Switch: M2**

Measure Between	Correct Voltage	For Diagnosis
E (ORN) & Ground	0 volts	See 1
• Blower Switch: HI		
E (ORN) & Ground	Battery	See 2

- If all voltages are correct, Blower Switch is operating normally. Return to Symptom Table.

1. If voltage is present, check ORN (52) wire for a wire to wire short to voltage. If wire is good, replace Blower Switch.
2. Check ORN (52) wire for an open. If wire is good, replace Blower Switch.

E: LOW BLOWER RELAY TEST

Measure: VOLTAGE
At: LOW BLOWER RELAY (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: OFF**

Measure Between	Correct Voltage	For Diagnosis
A (BRN) & Ground	Battery	See 1 and 2
B (BRN) & Ground	Battery	See 1 and 2
A (BRN) & D (BRN/WHT)	Battery	See 3
B (BRN) & C (GRY)	Battery	See 4
• A/C Mode: All modes except OFF		
B (BRN) & C (GRY)	0 volts	See 5

- If all voltages are correct, but blower runs in A/C OFF Mode, or no voltages are present in other tests, replace the Low Blower Relay.

1. Check for an open in BRN (50) wire.
2. If voltages are incorrect at both terminals A and B, check Blower Fuse and BRN (50) wire.
3. Check for open in BRN/WHT (64) wire.
4. Check for open in GRY or LT GRN/BLK (990) wires. If wires are good, do Test F.
5. Check for short to ground in GRY or LT GRN/BLK (990) wires. If wires are good, replace the A/C Control Head.

F: A/C MODE SELECTOR BLOWER CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD CONNECTOR C1 and C2 (Connected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: OFF**

Measure Between	Correct Voltage	For Diagnosis
N (BLK) C1 & Ground	0 volts	See 1
A (LT GRN/BLK) C1 & Ground	0 volts	See 2
E (BRN/WHT)C2 & Ground	0 volts	See 3
• A/C Mode: All positions except OFF.		
A (LT GRN/BLK) C1 & Ground	Battery	See 4
E (BRN/WHT) C2 & Ground	Battery	See 5

- If all voltages are correct, A/C Mode Selector and Low Blower Relay are operating normally. Return to Symptom Table.

1. If voltage is present, check BLK (150) wire for an open. Check that G200 is clean and tight.
2. If voltage is present, replace A/C Control Head.
3. If voltage is present, replace Low Blower Relay.

(Continued on next page)

(Continued from previous page)

4. Check for open or short to ground in LT GRN/BLK (990) wire. If wire is good, do Test E.
5. Check for open in BRN/WHT (64) wire. If wire is good, do Test E.

G: A/C CONTROL HEAD LED AND PANEL LIGHT TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD CONNECTORS (Connected)
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: VENT**
- **Light Switch: PARK**
- **Light Dimmer Setting: Full Brightness**

Measure Between	Correct Voltage	For Diagnosis
T (BRN) C1 & Ground	Battery	See 1
R (GRY) & Ground	Battery	See 2
• Light Dimmer Setting: Minimum Brightness		
R (GRY) & Ground	Minimum Panel Light Voltage	See 3

- If voltages are correct, but Panel Lights or LED Indicators do not light or dim, replace the A/C Control Head.

1. Check BRN (9) wire for an open.
2. Check GRY (8) wire for an open.
3. Go to 8A-12, Light Switch Details for diagnosis.

G1. If Blower Switch Indicator does not light, check LT GRN (991) wire for an open. If wire is good, replace A/C Control Head.

- If any individual LED Mode Indicator does not light, replace A/C Control Head.

CIRCUIT OPERATION

The Blower Motor is a variable speed motor which runs at a speed proportional to the applied voltage. The higher the voltage applied to the motor, the faster the speed.

When the Ignition Switch is in RUN, battery voltage is applied to the Low Blower Relay through the HTR-A/C Fuse.

With the Mode Selector in OFF, the Low Blower Relay coil is grounded through the GRY wire and the A/C Control Head. The relay operates, its contacts open, and the voltage to the Blower Switch is removed. No voltage is supplied to the Blower circuits. When any other mode except OFF is selected, the Low Blower Relay is deenergized and voltage is applied to the Blower Switch and Blower Resistors.

With the Blower Switch in LO, voltage is applied through all Blower Resistors to the contacts of the Blower High Speed Relay, and the Blower Motor. The blower runs at low speed.

As the Blower Switch is moved through positions M1 and M2, the switch bypasses some of the Blower Resistors allowing more voltage to be applied to the Blower Motor which will increase its speed.

When the Blower Switch is in HI, voltage is applied through the ORN (52) wire to the coil of the Blower High Speed Relay. The Blower High Speed Relay operates, removing the Blower Resistors from the circuit.

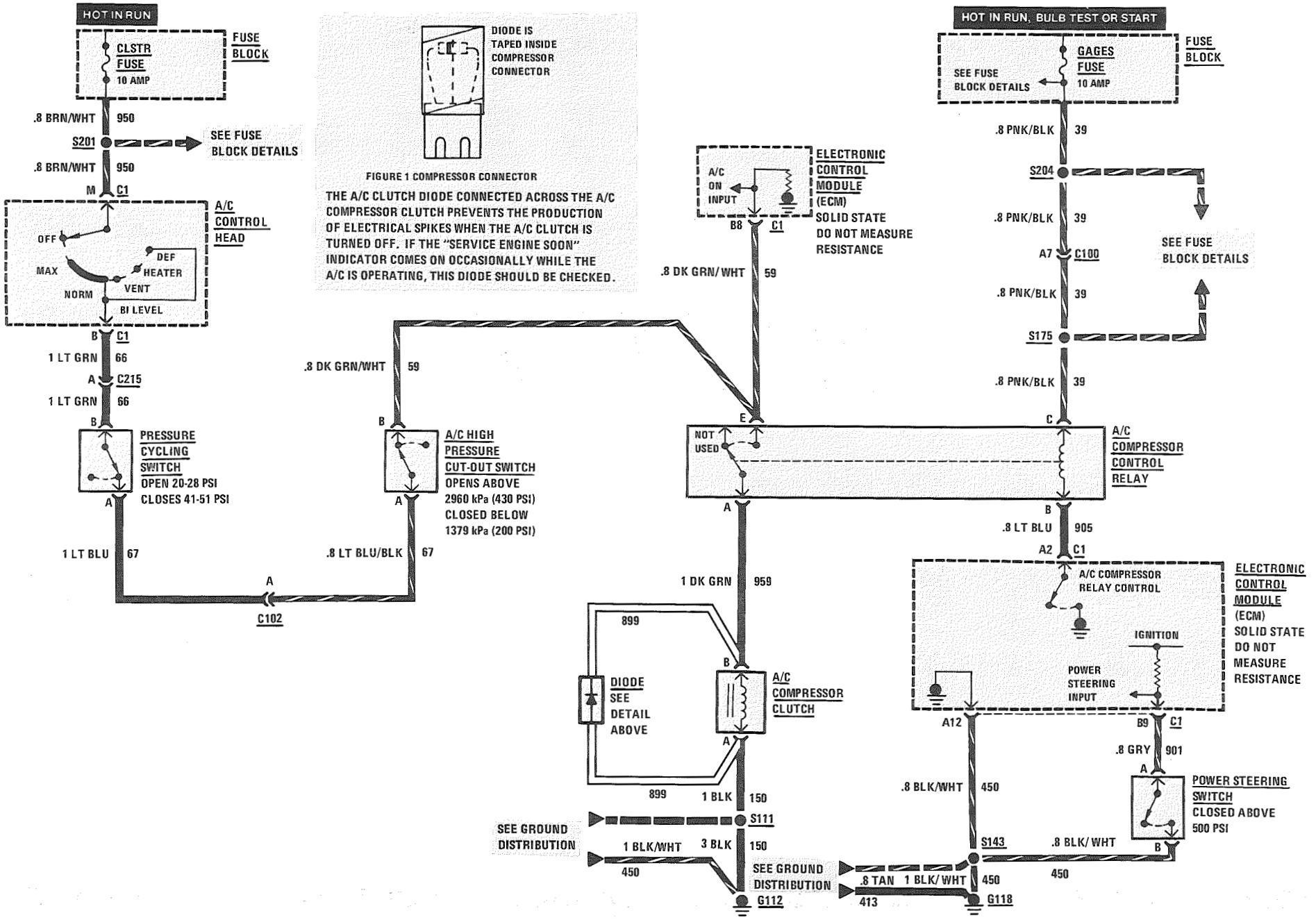
Battery voltage is then applied directly to the Blower Motor through the relay contacts and the motor runs at maximum speed.

The battery voltage at terminal E of the A/C Control Head is also applied to the Blower Switch Indicator and the Mode Selector Indicators through the LT GRN (991) wire and Mode Selector Switch. When the light switch is turned to the PARK or HEAD position, battery voltage is applied to terminal T of the A/C Control Head which enables the Solid State dimmer. The brightness of the LED Indicator will then be determined by the volage level at terminal R. The voltage at terminal R is controlled by the panel lights dimmer control and sets the brightness level of the panel lights and LED Indicators in the A/C Control Head.

BLANK

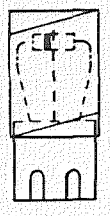
AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC, V6 VIN S



AIR CONDITIONING: COMPRESSOR CON' .OLS

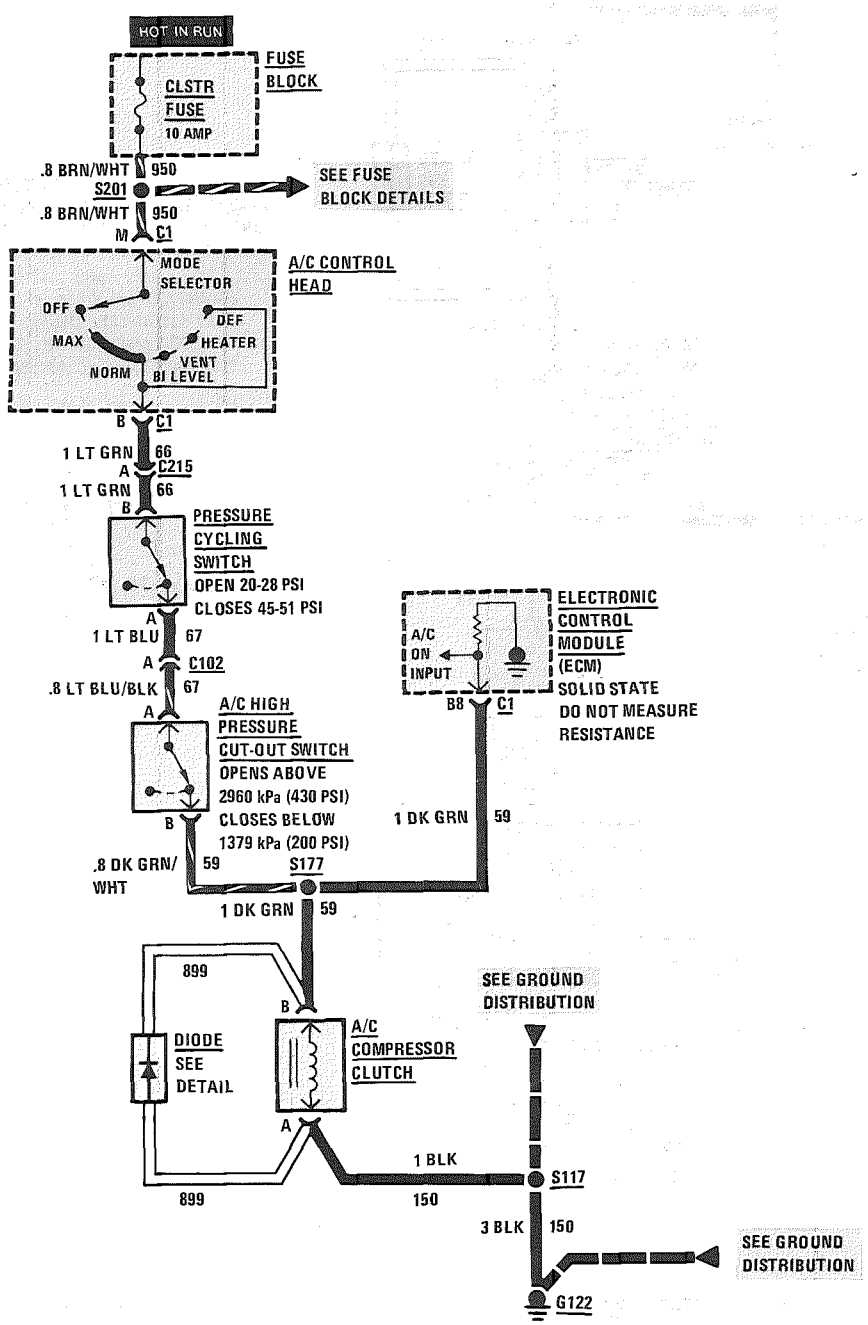
C67, ELECTRONIC, V8 VIN F, V8 VIN 8



DIODE IS TAPED INSIDE COMPRESSOR CONNECTOR

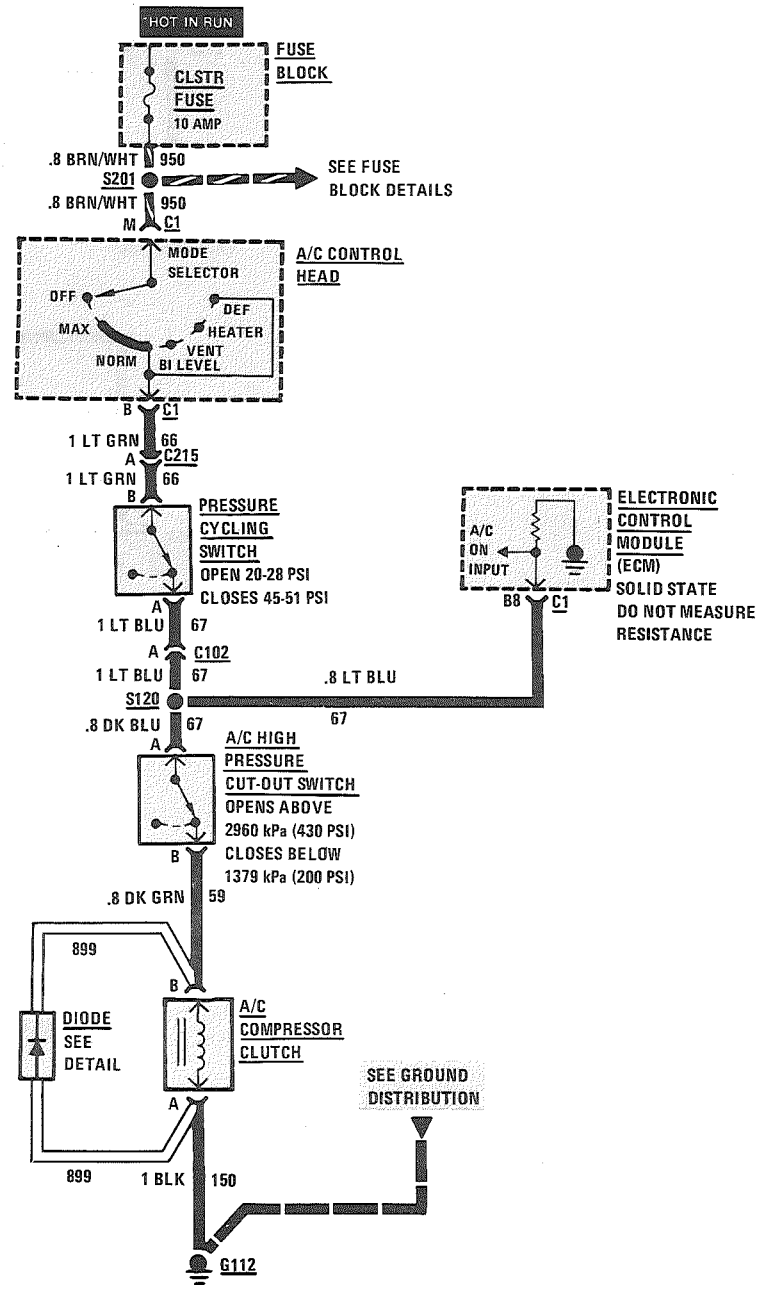
FIGURE 1 COMPRESSOR CONNECTOR

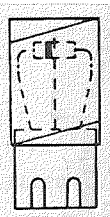
THE A/C CLUTCH DIODE CONNECTED ACROSS THE A/C COMPRESSOR CLUTCH PREVENTS THE PRODUCTION OF ELECTRICAL SPIKES WHEN THE A/C CLUTCH IS TURNED OFF. IF THE "SERVICE ENGINE SOON" INDICATOR COMES ON OCCASIONALLY WHILE THE A/C IS OPERATING, THIS DIODE SHOULD BE CHECKED.



AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC, V8 VIN E





DIODE IS TAPED INSIDE COMPRESSOR CONNECTOR

FIGURE 1 COMPRESSOR CONNECTOR

THE A/C CLUTCH DIODE CONNECTED ACROSS THE A/C COMPRESSOR CLUTCH PREVENTS THE PRODUCTION OF ELECTRICAL SPIKES WHEN THE A/C CLUTCH IS TURNED OFF. IF THE "SERVICE ENGINE SOON" INDICATOR COMES ON OCCASIONALLY WHILE THE A/C IS OPERATING, THIS DIODE SHOULD BE CHECKED.

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check CLSTR Fuse by visual inspection.
2. Check that the A/C Compressor Clutch connector is firmly seated.
3. Check that ground G112 is clean and tight.

- **Go to System Check for a guide to normal Compressor Control operation.**
- **Go to System Diagnosis for Compressor Control diagnostic tests.**

SYSTEM CHECK

- **Complete the A/C System Check in Section 8A-62 as a guide to normal operation of the A/C System.**
- **Use the System Check Table as a guide to normal operation of the Compressor Control.**

COMPONENT LOCATION

		Page-Figure
A/C Compressor Clutch (VIN E)	Top RH front of engine	201- 4-A
A/C Compressor Clutch (VIN F) (VIN 8)	Top RH front of engine	201- 6-A
A/C Compressor Clutch (VIN S)	Top LH front of engine	201- 0-B
A/C Compressor Control Relay	LH rear corner of engine compartment, on relay bracket	201- 0-A
A/C High Pressure Cut-Out Switch (VIN E)	Top RH front of engine, on rear of A/C compressor	201- 4-D
A/C High Pressure Cut-Out Switch (VIN F) (VIN 8)	Top RH front of engine, on rear of A/C compressor	201- 6-C
A/C High Pressure Cut-Out Switch (VIN S)	Top LH front of engine, on rear of A/C compressor	201- 0-B
Diode	Inside A/C Compressor Clutch connector	201- 0-B
Electronic Control Module (ECM)	Behind RH side of I/P	201-12-B
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Power Steering Switch	Lower LH front corner of engine compartment, on steering unit	201- 0-A
Pressure Cycling Switch	On side of A/C accumulator	201-14-A
C100 (42 cavities)	LH front of dash, left of brake master cylinder	201- 0-A
C102 (4 cavities)	Center front of dash	201-14-A
C215 (3 cavities)	Center of I/P, behind A/C control	201-14-B
G112 (VIN E)	Rear of LH cylinder head	201- 3-C
G112 (VIN F) (VIN 8)	Rear of LH cylinder head	201- 7-C
G112 (VIN S)	Rear of LH cylinder head	201- 0-C
G118 (VIN S)	Rear of RH cylinder head	201- 1-C
S111	Engine harness, RH rear of engine compartment	201- 1-A
S117 (VIN F) (VIN 8)	Engine harness, top center rear of engine	201- 7-A
S120	Engine harness, RH front of dash	201- 2-A
S143 (VIN S)	Engine harness, center front of dash	201- 1-A
S175 (VIN S)	Engine harness, lower LH front of dash	201- 0-A
S177	Engine harness, top RH front of engine	201- 5-A
S201	I/P harness, behind instrument cluster	201-10-A
S204	I/P harness, behind instrument cluster	201-10-A

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

(Continued from previous page)

SYSTEM CHECK TABLE

ACTION	EXPECTED RESULT
1. Turn the Ignition Switch to RUN and start the engine Set the A/C Mode to OFF then to MAX	A click can be heard when the clutch engages
2. Alternately select OFF and MAX several times	Verify that the clutch engages in MAX Clutch plate movement can be seen on the front of the compressor pulley If the clutch does not engage, proceed to step 4 If the clutch operates as expected, continue to Step 3
3. Select MAX mode to engage clutch	Check that air from the coolant fan can move freely through condensor Feel the input (cool) and output (warm) pipes to the compressor If there is not a wide temperature difference after the compressor has run for several seconds, see Section 1B for refrigerant and compressor diagnostics
4. Turn off the ignition Check the refrigerant charge, according to the procedures in Section 1B	If the refrigerant charge is low, follow the procedures in Section 1B for refrigerant diagnosis If the refrigerant charge is normal, isolate the conditions using the procedures which follow in the System Diagnosis

- **Refer to System Diagnosis when a result is not normal.**

SYSTEM DIAGNOSIS

V6 VIN S

- **Use the Isolation Test below to choose the proper diagnostic tests.**
- **Tests follow the Isolation Test.**

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: A/C COMPRESSOR CONTROL RELAY CONNECTOR (Disconnected)
Conditions:

- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
C (PNK/BLK) & Ground	Battery	Check GAGES Fuse and PNK/BLK (39) wire for an open

(ISOLATION TEST (TABLE 1) continued on facing page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

(ISOLATION TEST (TABLE 1) continued from facing page)

E (DK GRN/WHT) & Ground	Battery	Check DK GRN/WHT (59) wire for an open. If wire is good, do Test C

- If voltages are correct leave A/C Compressor Control Relay Connector disconnected and go to Table 2.

ISOLATION TEST (TABLE 2)

Connect: FUSED JUMPER
At: A/C COMPRESSOR CONTROL RELAY CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
E (DK GRN/WHT) & A (DK GRN)	Clutch Engages	Do Test B

- If action is correct, do Test A.

A: ECM COMPRESSOR CONTROL TEST (TABLE 1)

Measure: VOLTAGE
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine not running)**
- **A/C Mode: NORM**
- **A/C Compressor Control Relay Connected**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B8 on Conn C1 (DK GRN/WHT) & Ground	Battery	See 1
A2 on Conn C1 (LT BLU) & Ground	Battery	See 2

- If voltages are correct proceed to Table 2.

1. Check for open in DK GRN/WHT (59) wire.
2. Check for open in LT BLU (905) wire. If wire is good, replace A/C Compressor Control Relay.

A: ECM COMPRESSOR CONTROL TEST (TABLE 2)

Measure: RESISTANCE
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: OFF**
- **Negative Battery Terminal Disconnected**

Measure Between	Correct Resistance	For Diagnosis
B9 on Conn C1 (GRY) & Ground	0 ohms	See 1

- If resistance is correct proceed to Table 3.

1. Check that Power Steering Switch is closed. If switch is open, replace it. Check for an open in the GRY (901) wire and BLK/WHT (450) wire.

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

(Continued from previous page)

A: ECM COMPRESSOR CONTROL TEST (TABLE 3)

Connect: FUSED JUMPER
At: ECM CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine not running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
A2 on Conn C1 (LT BLU) & Ground	A/C Compressor Control Relay operates and A/C Clutch engages	See 1

- If action is correct but A/C system does not operate under normal conditions, condition is due to ECM. Refer to Section 6E for ECM diagnostics.

1. Replace A/C Compressor Control Relay.

B: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: COMPRESSOR CLUTCH CONNECTOR (Disconnected)
- **Ignition Switch: RUN (Engine not running)**
- **A/C Mode: NORM**
- **A/C Compressor Control Relay disconnected**
- **A/C Compressor Control Relay terminals A and E jumpered**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check for open in DK GRN (959) wire.
2. Check for open in BLK (150) wire.

C: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
M (BRN/WHT) & Ground	Battery	See 1
B (LT GRN) & Ground	Battery	Replace A/C Control Head

- If voltages are correct, go to C1.

1. Check for open CLSTR Fuse or open BRN/WHT (950) wire.

C1. Remove the connectors from the A/C Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch and connect a fused jumper between the terminals of the connectors.

- If either switch is open, battery voltage will be present at Terminal E of the A/C Compressor Control Relay when the jumper is connected.
- If the A/C Pressure Cycling Switch is open, refer to Section 1B to check for normal refrigerant charge. If refrigerant charge is normal replace the switch. If refrigerant charge is low, follow procedures in Section 1B for refrigerant diagnostics.
- If the A/C High Pressure Cut-Out Switch is open replace it.

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

- If both switches are good but battery voltage is not present at the A/C Compressor Control Relay, check the wiring between switches for an open (see schematic).

SYSTEM DIAGNOSIS

V8 VINF, V8 VIN 8

- **Use the Isolation Test below to choose the proper diagnostic tests.**
- **Tests follow the Isolation Test.**

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: A/C PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (LT GRN) & Ground	Battery	Do Test B

- If voltage is correct, leave Pressure Cycling Switch disconnected and go to Table 2.

ISOLATION TEST (TABLE 2)

Connect: FUSED JUMPER
At: A/C PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
B (LT GRN) & A (LT BLU)	Clutch Engages	Do Test A

- If action is correct, refer to Section 1B for procedure to check refrigerant pressure. If refrigerant pressure is normal, replace the Pressure Cycling Switch.

A: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: A/C COMPRESSOR CLUTCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine not running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check that A/C High Pressure Cut-Out Switch is closed (see schematic). If it is open, replace it. Check for an open in the LT BLU (67) and DK GRN (59) wires.
2. Check for an open in the BLK (150) wire. Check that ground G112 is clean and tight.

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

(Continued from previous page)

B: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: NORM**
- **Temperature outside car: above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
M (BRN/WHT) & Ground	Battery	See 1
B (LT GRN) & Ground	Battery	Replace A/C Control Head Assembly

- If voltages are correct, check for an open in the LT GRN (66) wire.

1. Check for an open CLSTR Fuse or open BRN/WHT (950) wire.

SYSTEM DIAGNOSIS

V8 VIN E

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (LT GRN) & Ground	Battery	Do Test B

- If voltage is correct, leave Pressure Cycling Switch disconnected and go to Table 2.

ISOLATION TEST (TABLE 2)

Connect: JUMPER
At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine need not be running)**
- **A/C Mode: NORM**
- **Temperature Outside Car: Above 60°F (16°C)**

Jumper Between	Correct Action	For Diagnosis
B (LT GRN) & A (LT BLU)	Clutch Engages	Do Test A

- If action is correct but A/C Compressor Clutch does not engage under normal operating conditions, refer to Section 1B for procedure to check refrigerant pressure. If refrigerant pressure is normal, replace the Pressure Cycling Switch.

A: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE
At: A/C COMPRESSOR CLUTCH CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN (Engine not running)**
- **A/C Mode: NORM**
- **Pressure Cycling Switch Connected**
- **Temperature Outside Car: Above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
B (DK GRN) & Ground	Battery	See 1
B (DK GRN) & A (BLK)	Battery	See 2

- If voltages are correct but clutch does not engage, replace the Compressor Clutch.

1. Check that A/C High Pressure Cut-Out Switch is closed (see schematic). If it is open, replace it. Check for an open in the LT BLU (67) wire, the DK BLU (67) wire and the DK GRN (59) wire.
2. Check for an open in the BLK (150) wire. Check that ground G112 is clean and tight.

AIR CONDITIONING: COMPRESSOR CONTROLS

C67, ELECTRONIC

B: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD
Conditions:
- **Ignition Switch: RUN**
- **A/C Mode: NORM**
- **Temperature outside car: above 60°F (16°C)**

Measure Between	Correct Voltage	For Diagnosis
M (BRN/WHT) & Ground	Battery	See 1
B (LT GRN) & Ground	Battery	Replace A/C Control Head

- *If voltages are correct, check for an open in the LT GRN (66) wire.*

1. Check for an open CLSTR Fuse or open BRN (950) wire.

CIRCUIT OPERATION

The compressor for the air conditioning system is belt driven by the engine through the Compressor Clutch. The clutch allows the compressor to be disengaged when air conditioning is not required or to remove the air conditioning load from the engine when necessary.

Operation of the compressor depends on the particular A/C mode selected by the driver. When the A/C Mode is in MAX, NORM, BI-LEVEL or DEF battery voltage is applied through the CLSTR Fuse and A/C Control Head Mode Selector Switch to the remaining circuits.

V6 VIN S

For vehicles equipped with the V6 VIN S engine the path to the A/C Compressor Control Relay is through the A/C Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch which are both normally closed. The A/C Pressure Cycling Switch opens when refrigerant pressure drops to a point where the evaporator may begin to ice. It closes again when the pressure rises to the point where additional cooling is required. This action causes the compressor to cycle on and off. The A/C High Pressure Cut-Out Switch opens when refrigerant pressure is too high for normal operation.

The A/C Compressor Control Relay is operated by the ECM. When the ECM receives the A/C ON signal at Terminal B8, it grounds Terminal A2, energizing the relay. When the relay is energized, voltage is applied to the A/C Compressor Clutch through the contacts of the relay. If the ECM determines that engine load should be reduced, such as during full throttle, the A/C Compressor Control Relay is de-energized which removes voltage from the A/C Compressor Clutch thus removing the A/C load from the engine.

V8 VIN F, V8 VIN 8

From the A/C Control Head voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch and the A/C High Pressire Cut-Out Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing. The A/C High Pressure Cut-Out Switch opens if refrigerant pressure rises to a point which is too high for normal operation.

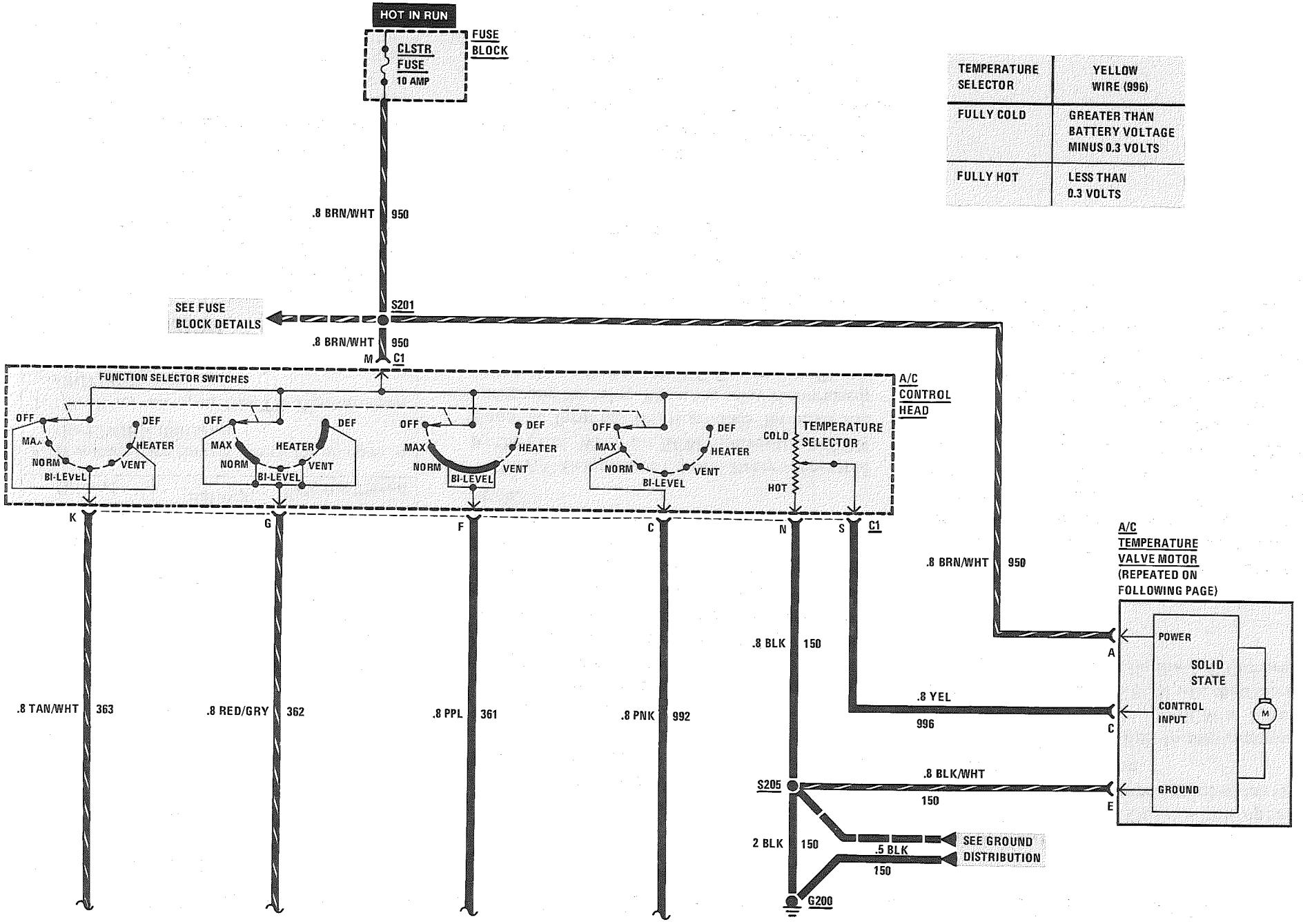
When voltage is applied to the compressor clutch it is also applied to the ECM at Terminal B8 on Connector C1. The ECM will then increase the engine idle speed while the A/C Compressor Clutch is engaged.

V8 VIN E

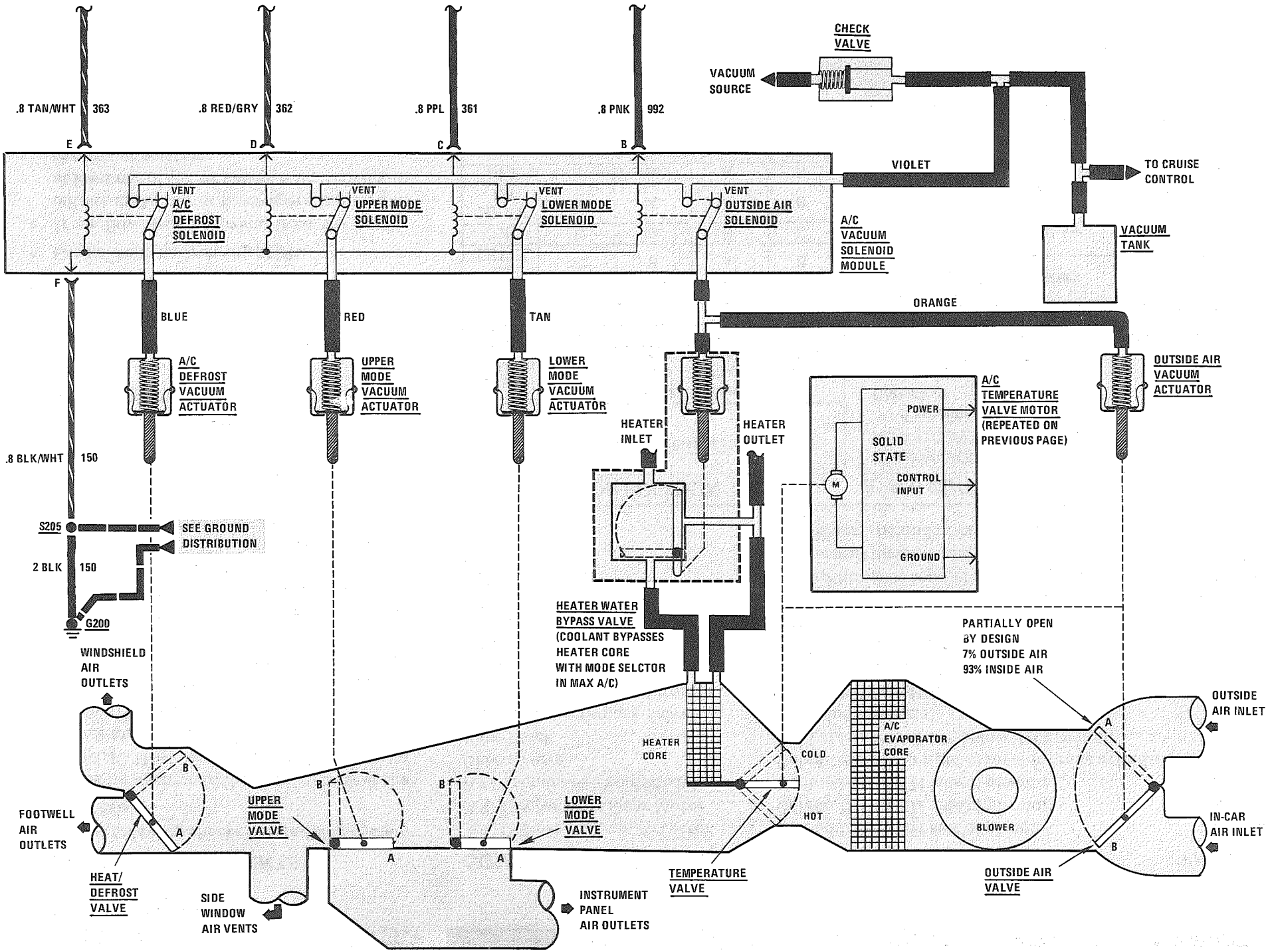
From the A/C Control Head voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch and the A/C High Pressure Cut-Out Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing. The A/C High Pressure Cut-Out Switch opens if refrigerant pressure becomes too high for normal operation.

AIR CONDITIONING: AIR DELIVERY

C67, ELECTRONIC



TEMPERATURE SELECTOR	YELLOW WIRE (996)
FULLY COLD	GREATER THAN BATTERY VOLTAGE MINUS 0.3 VOLTS
FULLY HOT	LESS THAN 0.3 VOLTS


.8 TAN/WHT 363
.8 RED/GRY 362
.8 PPL 361
.8 PNK 992
E
D
C
B
CHECK VALVE
VACUUM SOURCE
VIOLET
TO CRUISE CONTROL
VENT A/C DEFROST SOLENOID
VENT UPPER MODE SOLENOID
VENT LOWER MODE SOLENOID
VENT OUTSIDE AIR SOLENOID
A/C VACUUM SOLENOID MODULE
VACUUM TANK
F
BLUE
RED
TAN
ORANGE
A/C DEFROST VACUUM ACTUATOR
UPPER MODE VACUUM ACTUATOR
LOWER MODE VACUUM ACTUATOR
OUTSIDE AIR VACUUM ACTUATOR
HEATER INLET
HEATER OUTLET
A/C TEMPERATURE VALVE MOTOR (REPEATED ON PREVIOUS PAGE)
POWER
SOLID STATE
CONTROL INPUT
GROUND
M
.8 BLK/WHT 150
S205
SEE GROUND DISTRIBUTION
2 BLK 150
G200
HEATER WATER BYPASS VALVE (COOLANT BYPASSES HEATER CORE WITH MODE SELCTOR IN MAX A/C)
PARTIALLY OPEN BY DESIGN 7% OUTSIDE AIR 93% INSIDE AIR
WINDSHIELD AIR OUTLETS
OUTSIDE AIR INLET
HEATER CORE
COLD
HOT
A/C EVAPORATOR CORE
BLOWER
IN-CAR AIR INLET
FOOTWELL AIR OUTLETS
UPPER MODE VALVE
LOWER MODE VALVE
HEAT/ DEFROST VALVE
SIDE WINDOW AIR VENTS
INSTRUMENT PANEL AIR OUTLETS
TEMPERATURE VALVE
OUTSIDE AIR VALVE
A
B

AIR CONDITIONING: AIR DELIVERY

C67, ELECTRONIC

TROUBLESHOOTING HINTS

- **Try the following checks before doing System Diagnosis.**

1. Check for vacuum to the vacuum tank at the BLACK Hose from the engine vacuum source and at the VIOLET Hose to the A/C Vacuum Solenoid Module.
2. Check the operation of the Temperature Valve by setting the Temperature Selector to COLD and then moving it to HOT. Observe that the valve moves through its full range each time the Temperature Selector is changed from one end of the range to the other. If the valve is not fully closing or opening, check that the valve is free to move and that none of the linkage is binding.
3. Check that Heater Water Bypass Valve operates in MAX A/C Mode.

- **Go to the A/C System Check in 8A-62 for a guide to normal operation of the Air Delvery System.**
- **Go to System Diagnosis in this section for diagnostic tests.**

SYSTEM DIAGNOSIS

- **Engine warm and running at idle.**
- If air flow does not come from the proper outlets under one or more operating modes, at least one of the air valves is not moving to the proper position.
- Check the operation of the air valves using the following chart. Put Blower switch in HI to give a strong flow of air.

COMPONENT LOCATION

		Page-Figure
A/C Defrost Vacuum Actuator	Behind I/P, on LH side of plenum	201-14-B
A/C Temperature Door Motor	Behind I/P, on RH side of plenum	201-13-A
A/C Vacuum Solenoid Module	Behind I/P, on RH side of plenum	201-13-A
Check Valve	Behind engine, to right of master brake cylinder	201-15-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Heater Water Bypass Valve	RH front of engine	
Lower Mode Vacuum Actuator	Behind I/P, on LH side of plenum	201-14-B
Outside Air Vacuum Actuator	Behind I/P, on RH side of plenum	201-14-B
Upper Mode Vacuum Actuator	Behind I/P, on LH side of plenum	201-14-B
Vacuum Tank	Lower LH front corner of engine compartment	201-15-A
G200	Behind I/P, left of steering column	201-10-A
S125	Engine harness, top LH rear of engine	201- 0-C
S201	I/P harness, behind instrument cluster	201-10-A
S205	I/P harness, behind instrument cluster	201-10-A

AIR DOOR POSITION TABLE

Conditions:
- **Ignition Switch: RUN (Engine Running)**
- **Blower Switch: HI**

Operating Mode	Heat/ Defrost Valve	Lower Mode Valve	Upper Mode Valve	Outside Air Valve
OFF	B	A	A	B
MAX	B	B	B	A
NORM	B	B	B	B
BI-LEVEL	B	B	A	B
VENT	B	B	B	B
HEATER	B	A	A	B
DEF	A	A	A	B

- **Additional tests of the A/C Vacuum System are given in Section 1B.**

A: A/C CONTROL HEAD VOLTAGE TEST

Measure: VOLTAGE
At: A/C CONTROL HEAD CONNECTOR C1 (Disconnected)
Condition:
- **Ignition Switch: ON**

Measure Between	Correct Voltage	For Diagnosis
M (BRN/WHT) & Ground	Battery	See 1
M (BRN/WHT) & N (BLK)	Battery	See 2

- If voltages are correct, go to tests B and C.

1. Check for open CLSTR Fuse or BRN/WHT (950) wire.
2. Check for open in BLK (150) wire to ground.

(Continued on facing page)

AIR CONDITIONING: AIR DELIVERY

C67, ELECTRONIC

B: TEMPERATURE VALVE MOTOR VOLTAGE TEST

Measure: VOLTAGE
At: A/C TEMPERATURE VALVE MOTOR CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Mode: VENT**
- **Temperature Selector: COLD**

Measure Between	Correct Voltage	For Diagnosis
A (BRN/WHT) & Ground	Battery	See 1
A (BRN/WHT) & E (BLK/WHT)	Battery	See 2
C (YEL) & E (BLK/WHT)	Battery	See 3
• Temperature Selector: HOT		
C (YEL) & E (BLK/WHT)	Less than 0.5 volts (See Note)	See 3

- If voltages are correct, check that Temperature Valve is free to move and linkage is not binding. If valve is free to move, but does not operate correctly, replace the A/C Temperature Valve Motor.

1. Check for open in BRN/WHT (950) wire.
2. Check for open in BLK/WHT (150) wire.
3. Check for open in YEL (996) wire. If wire is good, replace A/C Control Head.

Note: Voltage at terminal C (YEL) varies continuously between Battery and approximately 0.5 volts as the Temperature Selector is moved from COLD to HOT. If voltage change is not uniform, replace the A/C Control Head.

C: VACUUM SOLENOID MODULE VOLTAGE TEST

Measure: VOLTAGE
At: A/C VACUUM SOLENOID MODULE CONNECTOR (Disconnected)
Conditions:
- **Ignition Switch: RUN**
- **Mode: OFF**

Measure Between	Correct Voltage	For Diagnosis
E (TAN/WHT) & Ground	Battery	See 1
E (TAN/WHT) & F (BLK/WHT)	Battery	See 2
• Mode: BI-LEVEL and HEATER		
E (TAN/WHT) & Ground	Battery	See 1
• Mode: MAX, NORM and VENT		
D (RED/GRY) & Ground	Battery	See 3
• Mode: MAX, NORM, BI-LEVEL and VENT		
C (PPL) & Ground	Battery	See 4
• Mode: MAX		
B (PNK) & Ground	Battery	See 5
• If all voltages are correct, but one or more air valves do not receive vacuum, replace the A/C Vacuum Solenoid Module.		

(Continued in next column)

(Continued from previous column)

1. Check TAN/WHT (363) wire for an open or short to ground. If wire is good, replace the A/C Control Head.
2. Check BLK/WHT (150) wire for an open.
3. Check RED/GRY (362) wire for an open or short to ground. If wire is good, replace the A/C Control Head.
4. Check PPL (361) wire for an open or short to ground. If wire is good, replace the A/C Control Head.
5. Check PNK (992) wire for an open or short to ground. If wire is good, replace the A/C Control Head.

CIRCUIT OPERATION

The air valves that control the heating and air conditioning air flow are operated by vacuum actuators. The valves that apply or vent vacuum to these actuators are solenoid operated and are located in the A/C Control Head. Circuits controlled by pushbutton switches power the solenoids.

The functions of the vacuum valves and air valves are described below.

(Continued on next page)

AIR CONDITIONING: AIR DELIVERY

C67, ELECTRONIC

(Continued from previous page)

Temperature Valve

The Temperature Valve is positioned by the A/C Temperature Valve Motor which is controlled by the Temperature Selector. When the Temperature Selector is moved to the COLD position, battery voltage is applied to the Control Input of the A/C Temperature Valve Motor on the YEL (996) wire. The circuits in the A/C Temperature Valve Motor cause the motor to move the Temperature Valve to the COLD position which blocks all air from passing through the Heater Core.

As the Temperature Selector is moved from the COLD to HOT position, the voltage at the control input of the A/C Temperature Valve Motor drops to about 0.3 volts at the HOT position. The changing voltage level causes the motor to move the valve to the position corresponding to the setting of the Temperature Selector.

Outside Air Valve

The Outside Air Valve determines whether air will be drawn from the outside air inlet or from inside the car. The valve is in position B (see schematic) in all modes except MAX, permitting outside air to enter. In the MAX Mode, the Outside Air Solenoid is energized applying vacuum to the Outside Air Vacuum Actuator which moves the valve to position A. Air from inside the car is then recirculated to get maximum cooling from the air conditioning system.

Heater Water Bypass Valve

In all operating modes except MAX, engine coolant circulates through the heater core to heat the air from the Blower. When the MAX Mode is selected, the Heater Water Bypass valve is operated by the Outside Air Vacuum Actuator.

Heat/Defrost Valve

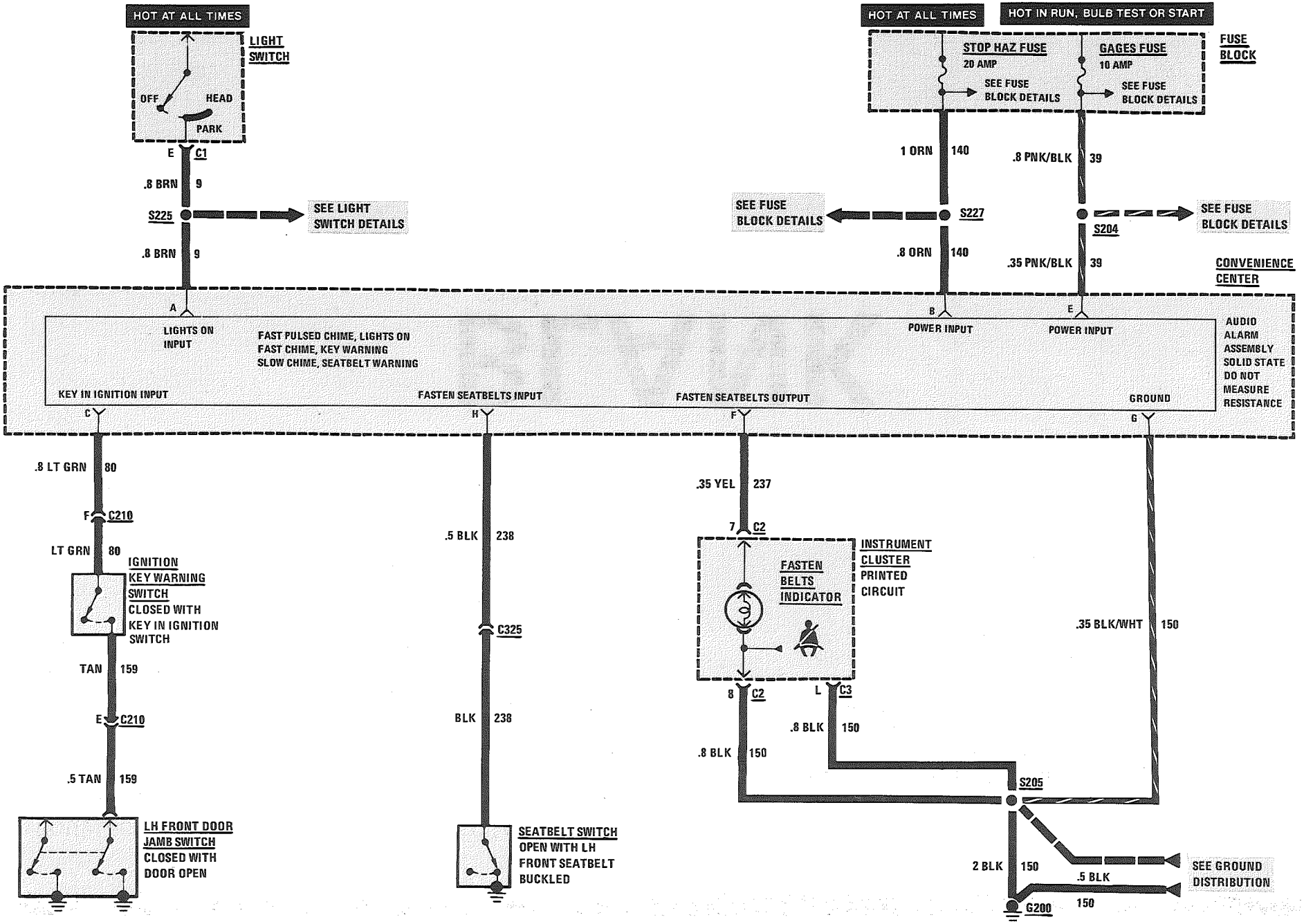
With the system OFF, or with the BI-LEVEL or HEATER Modes selected, vacuum is applied to the A/C Defrost Vacuum Actuator. The bellows contract and the Heat/Defrost Valve moves to B position. Most of the air flows out of the Footwell Air Outlets. In all other Modes no vacuum is applied to the Vacuum Actuator and the Heat/Defrost Valve remains in position A forcing most of the air out of the Windshield Air Outlets.

Upper and Lower Mode Valves

The two Mode Valves determine the amount of air flow to the Instrument Panel Air Outlets. When the Mode selected is MAX, NORMAL or VENT, vacuum is applied to both the Upper and Lower Mode Vacuum Actuators. Both valves then move to position B and all air flows out the Instrument Panel Air Outlets. In the BI-LEVEL mode, vacuum is applied only to the Lower Mode Vacuum Actuator which moves the Lower Mode Valve to position B. The Upper Mode Valve moves to position A. In these positions some air flows out of the Instrument Panel Air Outlets and the rest flows out the Footwell Air Outlet. In HEATER, DEF and OFF no vacuum is applied to either Vacuum Actuator and both valves move to position A. All air then flows to either the Footwell Air Outlets or the Windshield Air Outlets depending on the position of the Heat/Defrost Valve.

BLANK

WARNINGS AND ALARMS: CHIME



TROUBLESHOOTING HINTS

- **Try the following checks before doing the System Check.**

1. Check the STOP HAZ Fuse by observing the Hazard Lights Operation.
2. Check the GAGES Fuse by observing the BRAKE Warning Indicator with the Park Brake applied and the Ignition Switch in RUN.
3. Check G200 by operating the Cigar Lighter.
4. If the FASTEN BELT chime reminder and indicator operate continuously, replace Audio Alarm Assembly.
5. If the Park Lights are operating normally and only the Lights-On reminder operates incorrectly, replace the Audio Alarm Assembly.

- **Go to System Check for a guide to normal operation.**
- **Go to System Diagnosis for diagnostic tests.**

SYSTEM CHECK

- **Use the System Check Table as a guide to normal operation.**

COMPONENT LOCATION

		Page-Figure
Convenience Center	Behind I/P, to right of steering column	201-10-A
Fuse Block	Behind LH side of I/P, below light switch	201-10-A
Ignition Key Warning Switch	Upper part of steering column	
Seatbelt Switch	In driver's seatbelt buckle	
C210 (11 cavities)	Behind I/P, on RH lower side of steering column	201- 9-A
C325 (1 cavity)	At LH door sill, base of center pillar	
G200	Behind I/P, left of steering column	201-10-A
S204	I/P harness, behind instrument cluster	201-10-A
S205	I/P harness, behind instrument cluster	201-10-A
S225	I/P harness, behind instrument cluster	201-10-A
S227	I/P harness, behind instrument cluster	201-10-A

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT
Sit in the driver's seat and close the driver's door Turn the Ignition Switch to RUN Do not buckle the seatbelt	A slow chime alarm sounds The FASTEN BELTS Indicator lights in the Instrument Cluster The chime stops and the indicator shuts off after 4 to 8 seconds

(Continued in next column)

(Continued from previous column)

Repeat above, but buckle seatbelt	No chime, FASTEN BELTS Indicator lights for 4-8 Seconds
With the Ignition Switch in ACCY, LOCK, or OFF, and the key still in the ignition, open the LH front door	The fast chime alarm sounds (faster than the seatbelt chime)

(Continued on facing page)

(Continued from facing page)

Remove the key from the Ignition	The alarm stops
With the key removed from the ignition, turn the Light Switch to PARK	The fast pulsed chime alarm sounds (faster than the key chime)
Turn the Light Switch OFF	The alarm stops

- **Refer to System Diagnosis when a result is not normal.**

SYSTEM DIAGNOSIS

- **Do the tests listed for your symptom in the Symptom Table below.**
- **Tests follow the Symptom Table.**

SYMPTOM TABLE

SYMPTOM	DO TEST
None of the Alarms operate	A: Audio Alarm Assembly Test
Only the Key In Ignition Warning does not operate	B: Key In Ignition Input Test
The Key In Ignition Warning operates when it should not	B: Key In Ignition Input Test
THE FASTEN BELTS chime reminder does not operate	C: Fasten Belts Input Test

(Continued in next column)

(Continued from previous column)

The FASTEN BELTS chime reminder operates when the Seatbelt is buckled	C: Fasten Belts Input Test
The FASTEN BELTS Indicator does not operate, but the FASTEN BELTS chime operates	D: FASTEN BELTS Indicator Test
The FASTEN BELTS Indicator is always on, but chime operates properly	D: FASTEN BELTS Indicator Test
Only the Lights-On Reminder does not operate	E: Lights-On Input Test

A: AUDIO ALARM ASSEMBLY TEST

Connect: TEST LAMP
At: CONVENIENCE CENTER
Condition:
- **Audio Alarm Module Removed**

Connect Between	Correct Result	For Diagnosis
B (ORN) & Ground	Test Lamp lights	See 1
B (ORN) & G (BLK/WHT)	Test Lamp lights	See 2

- If all results are correct and all the chime functions were not working, replace the Audio Alarm Assembly.

1. Check the ORN (140) wire.
2. Check the BLK/WHT (150) wire for an open to ground.

B: KEY IN IGNITION INPUT TEST

Connect: SELF-POWERED TEST LAMP
At: CONVENIENCE CENTER
Conditions:
- **Ignition Switch (Key In): ACCY, LOCK, or OFF**
- **Audio Alarm Assembly removed**
- **LH Front Door: OPEN**

Connect Between	Correct Result	For Diagnosis
C (LT GRN) & Ground	Test Lamp lights	See 1
• Ignition Switch: KEY OUT • LH Front Door: OPEN		
C (LT GRN) & Ground	Test Lamp does not light	See 2
• Ignition Switch (KEY IN): ACCY, LOCK or OFF • LH Front Door: CLOSED		
C (LT GRN) & Ground	Test Lamp does not light	See 3

- If all the test lamp results are correct, replace the Audio Alarm Module.

1. Check/repair the Ignition Key Warning Switch, the LH Front Door Jamb Switch, LT GRN (80) and TAN (159) wires for an open (see schematic).
2. Check Ignition Key Warning Switch and LT GRN (80) wire for a short to ground (see schematic).
3. Check LH Front Door Jamb Switch and TAN (159) wire for a short to ground.

C: FASTEN BELTS INPUT TEST

Connect: TEST LAMP
At: CONVENIENCE CENTER
Conditions:
- **Ignition Switch: RUN**
- **Audio Alarm Assembly: Removed**
- **LH Front Seatbelt Unbuckled**

Connect Between	Correct Result	For Diagnosis
E (PNK/BLK) & Ground	Test Lamp lights	See 1
E (PNK/BLK) & H (BLK)	Test Lamp lights	See 2
• Buckle LH Front Seatbelt		
E (PNK/BLK) & H (BLK)	Test Lamp off	See 3

- If the above results are correct, replace the Audio Alarm Assembly.

1. Check PNK/BLK (39) wire for an open.
2. Check the Seatbelt Switch, and BLK (238) wire for an open (see schematic).
3. Check BLK (238) wire for a short to ground. If wire is OK, replace the Seatbelt Switch.

D: FASTEN BELTS INDICATOR TEST

Connect: FUSED JUMPER
At: CONVENIENCE CENTER
Condition:
- **Audio Alarm Assembly Removed**

Connect Between	Correct Result	For Diagnosis
B (ORN) & F (YEL)	FASTEN BELTS Indicator lights	See 1
Remove Jumper	FASTEN BELTS Indicator does not light	See 2

- If the indicator response was correct, replace the Audio Alarm Module.

1. Check/repair the bulb, the YEL (237) wire, the BLK (150) wires, and the Instrument Cluster printed circuit for opens.
2. Check the Instrument Cluster Printed Circuit for a short to Battery.

E: LIGHTS-ON INPUT TEST

Measure: VOLTAGE
At: CONVENIENCE CENTER
Conditions:
- **Audio Alarm Module Removed**
- **Light Switch: HEAD or PARK**

Measure Between	Correct Voltage	For Diagnosis
A (BRN) & Ground	Battery	See 1

- If the voltage is correct, replace the Audio Alarm Module.

1. Check/repair the BRN wire to splice S225 (see schematic).

CIRCUIT OPERATION

The Warnings and Alarms System sounds a chime to bring attention to one or more of several conditions. These conditions are: 1) the lights are on and the Ignition Switch is not in RUN, BULB TEST, or START; 2) the Ignition key is in the Ignition Switch when the driver's door is open; and 3) the seatbelt is unbuckled when the Ignition Switch is in RUN, BULB TEST, or START.

Voltage is applied at all times through the STOP HAZ Fuse to terminal B, to power the solid state Audio Alarm Assembly.

IGNITION KEY WARNING

Voltage is applied to the Audio Alarm Assembly by the STOP HAZ Fuse. Whenever the key is in the Ignition Switch and the Ignition Switch is in LOCK, OFF, or ACCY with the driver's door open, terminal C of the module is grounded. This sounds the alarm.

SEATBELT WARNING

With the Ignition Switch in RUN, BULB TEST, or START, voltage is applied through the Gages Fuse to the Audio Alarm Assembly. With the driver's seatbelt unbuckled, terminal H of the module is grounded through the Seatbelt Switch. The FASTEN BELTS Indicator always goes on for about 5 seconds when the Ignition Switch is set to RUN, BULB TEST, or START. The Fasten Belts Chime, however, only sounds if the seatbelt is unbuckled and the Ignition Switch is in RUN, BULB TEST or START.

LIGHTS-ON WARNING

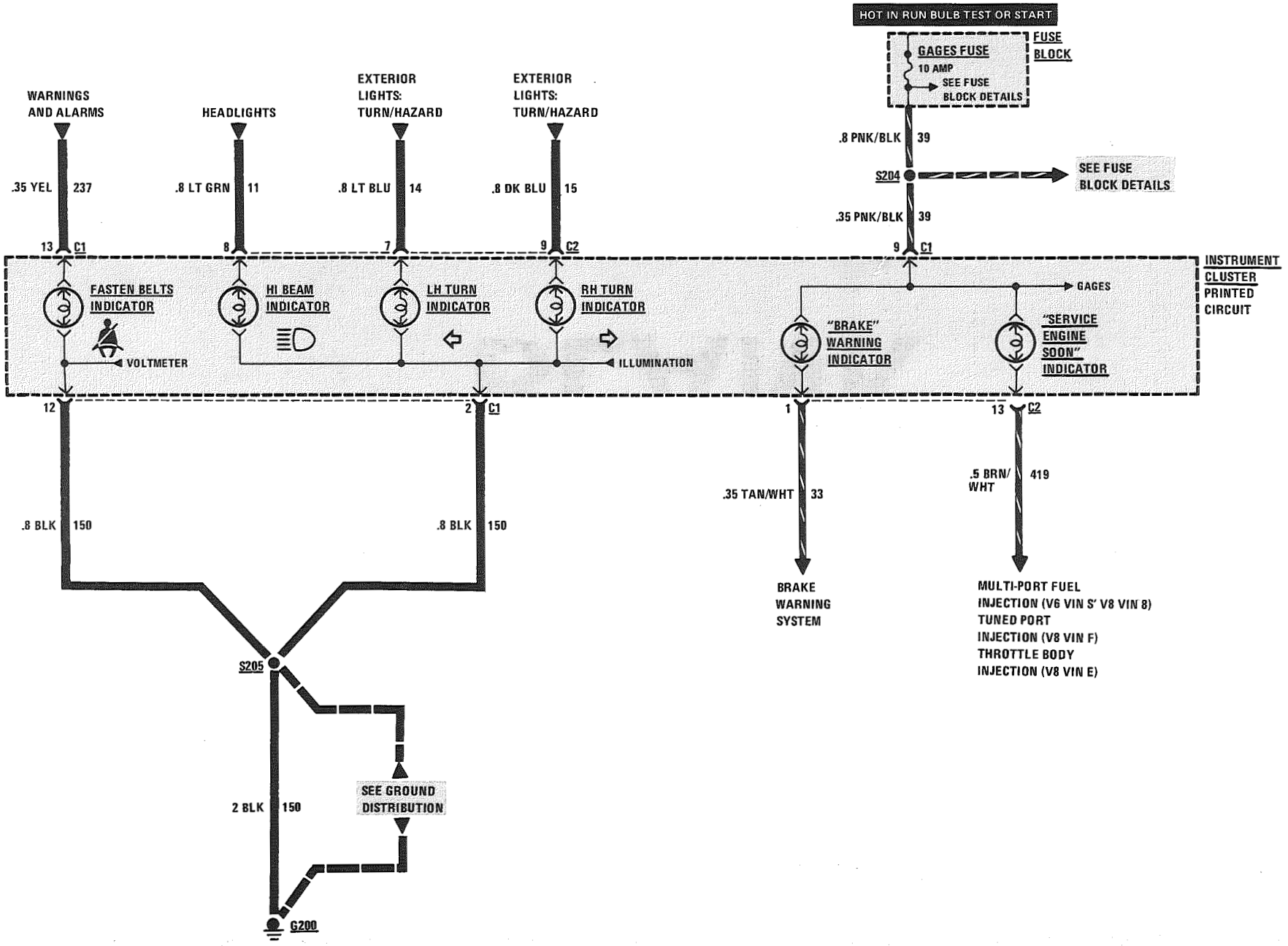
When the Light Switch is in HEAD or PARK, voltage is applied to the Audio Alarm Assembly. When the Ignition Switch is in RUN, BULB TEST, or START, voltage is applied through the Gages Fuse to the module. These two voltages are sensed and the alarm is not sounded.

When the Ignition Switch is not in RUN, BULB TEST, or START, the Gages Fuse loses voltage. The Audio Alarm Assembly senses the change. If voltage is still available from the Light Switch, the Lights-On Warning alarm will sound. The alarm can be turned off by turning the Light Switch to the OFF setting. The module no longer senses voltage from the Light Switch, so the alarm does not sound.

BLANK

INSTRUMENT PANEL: GAGES CLUSTER

INDICATORS



INSTRUMENT PANEL: GAGES CLUSTER

INDICATORS, ILLUMINATION