1993

Mustang

Electrical & Vacuum Troubleshooting Manual

ELECTRICAL AND VACUUM TROUBLESHOOTING MANUAL
FPS-12121-93

FORD PARTS and SERVICE DIVISION

Quality is Job 1

Ford Parts and Service Division has developed a new format for the1993 Mustang EVTM. Our goal is to provide accurate and timely electrical and vacuum service information.

1993 EVTM FEATURES

- **"CIRCUIT OPERATION"** descriptions (CELL 7) that explain how each circuit works. These descriptions are designed to be used in conjunction with the Electrical Schematic.
- **Schematic pages** now contain **COMPONENT LOCATION** references to full-view illustrations.
- **"COMPONENT TESTING"** procedures (CELL 149) that tell the user how to perform diagnostic tests on various circuits.
- **Connector End Views** are now located at the end of individual cells and are shown for connectors with five or more cavities; for connectors with ten or more cavities, a circuit function chart is provided.
- **NOTES, CAUTIONS and WARNINGS** that contain important safety information.
- Full view **"COMPONENT LOCATION VIEWS"** (CELL 151) to help locate on-vehicle components.
- Circuit voltages have been added to schematic pages to help simplify troubleshooting. Starting with this edition of the EVTM nonessential troubleshooting hints have been deleted.
- **Cellular Pagination:** A specific section (or cell) in all EVTMs is numbered by cell and starts with page 1. For example: **"HOW TO USE THIS MANUAL"** is CELL 2 and begins with page 2-1.
- **"C"** numbers have been assigned for all electrical connectors. **"C"** numbers are listed in numerical order in the **"LOCATION INDEX"** (CELL 152).

ORDERING INFORMATION

Information about how to order additional copies of this publication or other Ford publications may be obtained by writing to Helm Incorporated at the address shown below or by calling 1-800-782-4356. Other publications available include:

- Service Manuals
- Service Specification Books
- Car/Truck Wiring Diagrams
- Powertrain Control/Emissions Diagnosis Manuals

Helm Incorporated
P.O. Box 87150
Detroit, Michigan 48207

1-1 TABLE OF CONTENTS/INDEX

Table of Contents

Index

IMPORTANT SAFETY NOTICE

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all motor vehicles, as well as the personal safety of the individual doing the work. This Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this Manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

2-1 HOW TO USE THIS MANUAL

The purpose of this manual is to show electrical and vacuum circuits in a clear and simple fashion to make troubleshooting easier. **NOTES, CAUTIONS** and **WARNINGS** containing important information appear in boxes on text pages.

- **NOTES** describe how switches and other components operate to help complete a particular procedure.
- **CAUTIONS** provide information that could prevent making an error that may damage the vehicle.
- **WARNINGS** provide information to prevent personal injury.

The **WARNINGS** list on page 2-2 contains general warnings to follow when servicing a vehicle.

Components that work together are shown together. All electrical components used in a specific system are shown on one diagram. The circuit breaker or fuse is shown at the top of the page. All wires, connectors, components and splices are shown in the flow of current to ground at the bottom of the page. If a component is used in several different systems, it is shown in several places. For example, the Main Light Switch is electrically a part of many systems and is repeated on many pages.

In some cases, a component may seem (by its name) to belong to a system where it has no electrical connection. For example, Radio Illumination is electrically part of Instrument Illumination, but because it has no electrical connection to the Radio system, it is not shown on the Radio diagram.

Schematic pages now contain references to full-view illustrations. These references are reverse-text blocks located next to each component and connector and refer the user to the appropriate illustration page and zone.

Schematic pages now contain circuit voltages to help simplify troubleshooting hints. 12V is used to imply battery voltage on a component connector terminal, and 0V is used to show that there should be continuity to ground on that particular terminal. Conditional voltages such as "12V with the ignition switch in RUN" will also be provided. Troubleshooting hints that can't be simplified with circuit voltages will be shown at the end of each cell.

Connector face information specific to a certain cell is now found at the end of that cell. A Connector Face Reference List is provided to locate connector faces that are shown in different cells. Component connectors with five or more terminals are illustrated. Component Connectors with 10 or more terminals are accompanied by a pinout chart that lists the function of all circuitry associated with that component.

"CIRCUIT OPERATION" (Cell 7) contains descriptions of **HOW THE CIRCUIT WORKS** for each system as well as references to the appropriate diagnostic section of the Service Manual. The beginning of each section has a reverse-text block identifying the page on which the corresponding schematic appears.

"GROUNDS" (Cell 10) contains ground circuitry shown in complete detail. This information is useful for checking interconnections of the ground circuits of different systems.

"POWER DISTRIBUTION" (Cell 13) contains power distribution circuitry shown in complete detail. This section displays how the various fuses are powered and, in turn, how each system is powered.

"COMPONENT TESTING" (Cell 149) contains testing procedures for various switches. This Information includes schematics, component terminal locations and step-by-step procedures.

"COMPONENT LOCATION VIEWS" (Cell 151) contains full-view illustrations which show the location of all components and connectors in the vehicle.

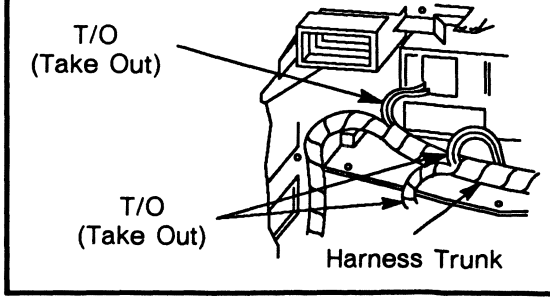
The **"LOCATION INDEX"** (Cell 152) provides the base part numbers, locations, connector face references and illustration references for all components, connectors, splices and grounds.

HELPFUL REMINDERS

Before using the EVTM for troubleshooting, refer to these HELPFUL REMINDERS:

1. The abbreviation T/O, for take out, used in the Location Index (Cell 152), refers to the point at which a group of wires branch off the harness trunk. Refer to the wiring harness illustration.

Wiring harness at back of Instrument Panel, showing typical T/O (Take Out) locations



HELPFUL REMINDERS (CONTINUED)

2. If a connector serves the same purpose in two separate versions (e.g., EFI/Carb), but is physically different, *two* connector numbers are used. However, if a connector serves the same purpose in two separate versions (e.g., EFI/Carb) and is physically the same, but the wire colors are different, only *one* connector number is used. If the same physical connector is used more than once, then more than *one* connector number is used.
3. Wiring schematics provide a picture of how and under what conditions the circuit is powered, of the current path to circuit components, and of how a circuit is grounded. Each circuit component is named (underlined titles). Wire and connector colors are listed (standard Ford color abbreviations are used):

COLOR ABBREVIATIONS

BL	**Blue**	**N**	**Natural**
BK	**Black**	**O**	**Orange**
BR	**Brown**	**PK**	**Pink**
DB	**Dark Blue**	**P**	**Purple**
DG	**Dark Green**	**R**	**Red**
GN	**Green**	**T**	**Tan**
GY	**Gray**	**W**	**White**
LB	**Light Blue**	**Y**	**Yellow**
LG	**Light Green**		

Note: Whenever a wire is labeled with two colors, the first color listed is the basic color of the wire, and the second color listed is the stripe marking of the wire.

4. When reporting Vehicle Repair Location Codes to Ford Parts and Service Division, refer to Cell 160 (beginning on page 160-1). Note: Do *not* use the illustrations in Cell 151 (beginning on page 151-1) for reporting Vehicle Repair Location Codes.
5. **WARNINGS**

- *Always wear safety glasses for eye protection.*
- *Use safety stands whenever a procedure requires being under a vehicle.*
- *Be sure that the* **Ignition Switch** *is always in the OFF position, unless otherwise required by the procedure.*
- *Set the park brake when working on any vehicle. An automatic transmission should be in PARK. A manual transmission should be in NEUTRAL.*
- *Operate the engine only in a well-ventilated area to avoid danger of carbon monoxide.*
- *Keep away from moving parts, especially the fan and belts, when the engine is running.*
- *To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.*
- *Do not allow flame or sparks near the battery. Gases are always present in and around the battery cell. An explosion could occur.*
- *Do not smoke.*
- *To avoid injury, always remove rings, watches, loose hanging jewelry and loose clothing.*

HOW TO FIND ELECTRICAL CONCERNS

TROUBLESHOOTING STEPS

These six steps present an orderly method of troubleshooting.

Step 1. Verify the concern.
- Operate the complete system to check the accuracy and completeness of the customer's complaint.

Step 2. Narrow the concern.
- Using the EVTM, narrow down the possible causes and locations of the concern to pinpoint the exact cause.
- Read the description of *How the Circuit Works* and study the wiring schematic. You should then know enough about the circuit operation to determine where to check for the trouble. Further information can be found by referring to the Service Manual pages listed after *How the Circuit Works.*

Step 3. Test the cause.
- Use electrical test procedures to find the specific cause of the symptoms.
- The component location reference bars and the pictures will help you find components. The Location Index (at the end of the manual) gives component location information for connectors, diodes, resistors, splices and grounds.

Step 4. Verify the cause.
- Confirm that you have found the correct cause by connecting jumper wires and/or temporarily installing a known good component and operating the circuit.

HOW TO FIND ELECTRICAL CONCERNS

Step 5. Make the repair.

- Repair or replace the inoperative component.

Step 6. Verify the repair.

- Operate the system as in Step 1 and check that your repair has removed all symptoms without creating any new symptoms.

Some engine circuits may need special test equipment and special procedures. See the *Service Manual* and other service books for details. You will find the circuits in this manual to be helpful with those special test procedures.

TROUBLESHOOTING TOOLS

JUMPER WIRE

This is a test lead used to connect two points of a circuit. A Jumper Wire can bypass an open to complete a circuit.

WARNING

Never use a jumper wire across loads (motors, etc.) connected between hot and ground. This direct battery short may cause injury or fire.

VOLTMETER

A DC Voltmeter measures circuit voltage. Connect negative (- or black) lead to ground, and positive (+ or red) lead to voltage measuring point.

OHMMETER

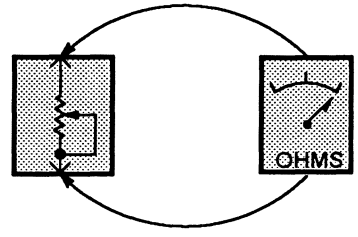


Figure 1–Resistance Check

An Ohmmeter shows the resistance between two connected points (Figure 1).

TEST LAMP

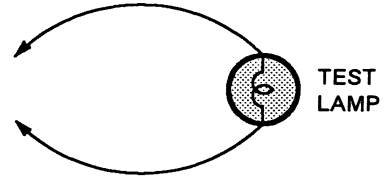


Figure 2–Test Lamp

A Test Light is a 12-volt bulb with two test leads (Figure 2).

Uses: Voltage Check, Short Check.

SELF-POWERED TEST LAMP

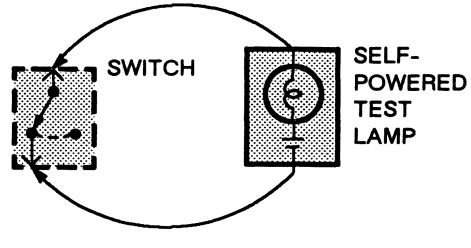


Figure 3–Continuity Check

The Self-Powered Test Lamp is a bulb, battery and set of test leads wired in series (Figure 3). When connected to two points of a continuous circuit, the bulb glows.

Uses: Continuity Check, Ground Check.

CAUTION

When using a self-powered test lamp or ohmmeter, be sure power is off in circuit during testing. Hot circuits can cause equipment damage and false readings.

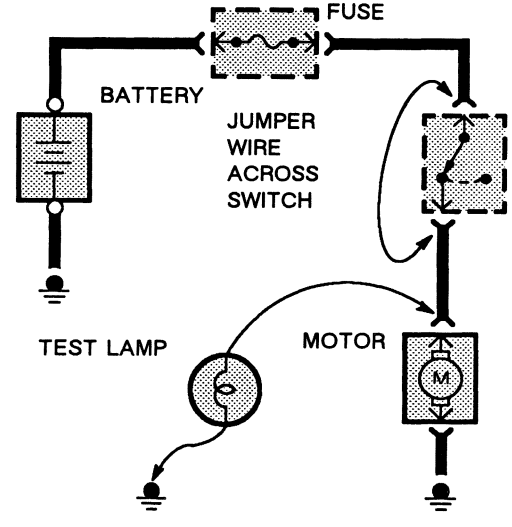


Figure 4—Switch Circuit Check and Voltage Check

In an inoperative circuit with a switch in series with the load, jumper the terminals of the switch to power the load. If jumpering the terminals powers the circuit, the switch is inoperative (Figure 4).

HOW TO FIND ELECTRICAL CONCERNS (CONTINUED)

CONTINUITY CHECK (Locating open circuits)

Connect one lead of Self-Powered Test Lamp or Ohmmeter to each end of circuit (Figure 3). Lamp will glow if circuit is closed. Switches and fuses can be checked in the same way.

VOLTAGE CHECK

Connect one lead of test lamp to a known good ground or the negative (-) battery terminal. Test for voltage by touching the other lead to the test point. Bulb goes on when the test point has voltage (Figure 4).

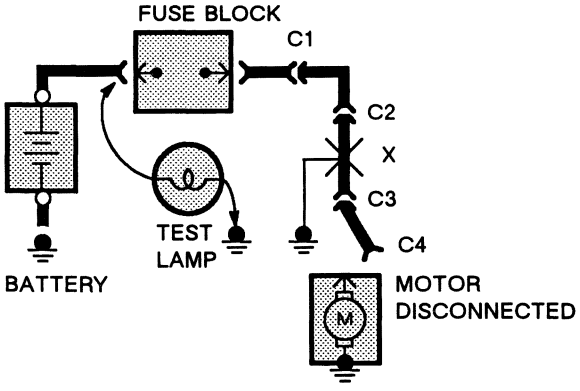


Figure 5—Short Check

A fuse that repeatedly blows is usually caused by a short to ground. It's important to be able to locate such a short quickly (Figure 5).

1. Turn off everything powered through the fuse.
2. Disconnect other loads powered through the fuse:
   - Motors: disconnect motor connector (Connector C4 in Figure 5).
   - Lights: remove bulbs.
3. Turn Ignition Switch to RUN (if necessary) to power fuse.
4. Connect one Test Lamp lead to hot end of blown fuse. Connect other lead to ground. Bulb should glow, showing power to fuse. *(This step is just a check to be sure you have power to the circuit.)*
5. Disconnect the test lamp lead that is connected to ground, and reconnect it to the load side of the fuse at the connector of the disconnected component. (In Figure 5, connect the test lamp lead to connector C4.)
   - If the Test Lamp is off, the short is in the disconnected component.
   - If the Test Lamp goes on, the short is in the wiring. You must find the short by disconnecting the circuit connectors, one at a time, until the Test Lamp goes out. For example, in Figure 5 with a ground at X, the bulb goes out when C1 or C2 is disconnected, but not after disconnecting C3. This means the short is between C2 and C3.

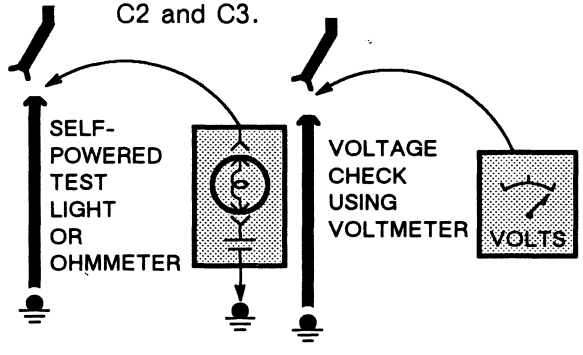


Figure 6—Ground Check

Turn on power to the circuit. Perform a Voltage Check between the suspected inoperative ground and the frame. Any indicated voltage means that the ground is inoperative (Figure 6).

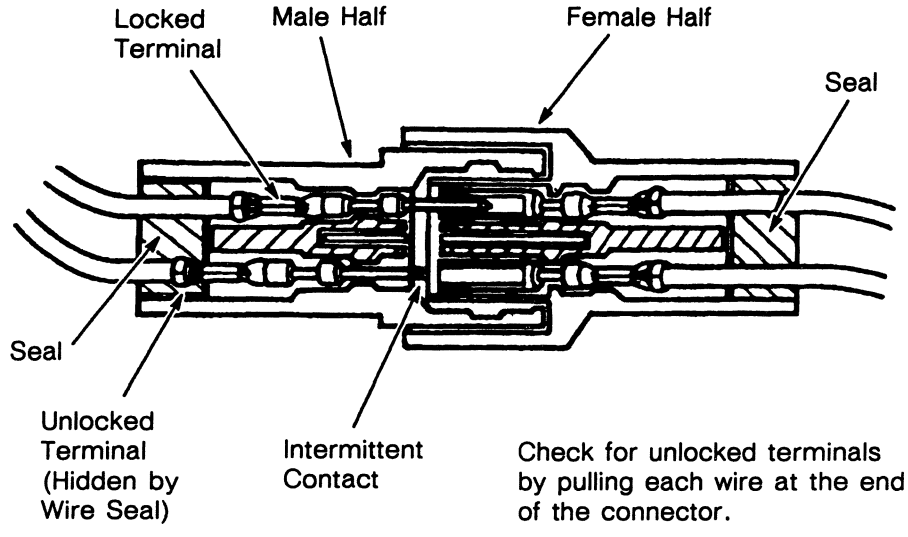
Turn off power to the circuit. Connect one lead of a Self-Powered Test Lamp or Ohmmeter to the wire in question and the other lead to a known ground. If the bulb glows, the circuit ground is OK (Figure 6).

The circuit schematics in this manual make it easy to identify common points in circuits. This knowledge can help narrow the concern to a specific area. For example, if several circuits fail at the same time, check for a common power or ground connection (see *Power Distribution* or *Grounds*). If part of a circuit fails, check the connections between the part that works and the part that doesn't work.

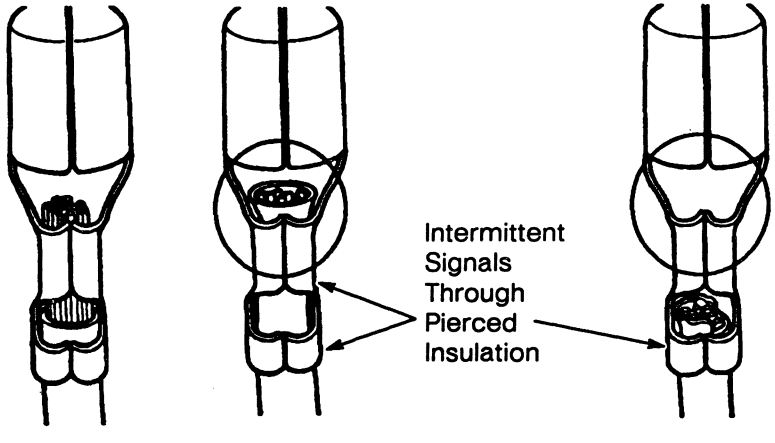
For example, if the lo beam headlamps work, but the high beams and the indicator lamp don't work, then power and ground paths must be good. Since the dimmer switch is the component that switches this power to the high beam lights and indicator, it is most likely the cause of failure.

TROUBLESHOOTING WIRING HARNESS AND CONNECTOR HIDDEN CONCERNS

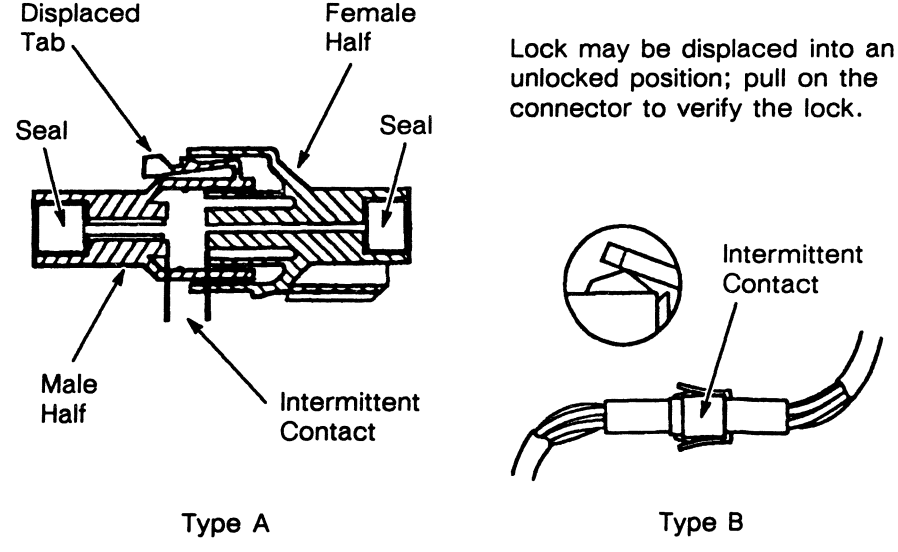
The following illustrations are known examples of wiring harnesses, splices and connectors that will create intermittent electrical concerns. The concerns are hidden and can only be discovered by a physical evaluation as shown in each illustration.



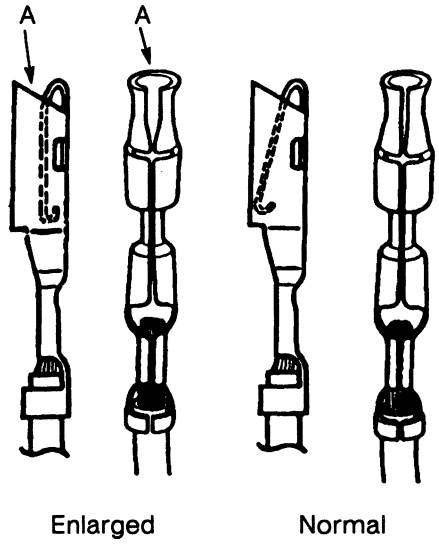
TERMINAL NOT PROPERLY SEATED



DEFECTIVE INSULATION STRIPPING

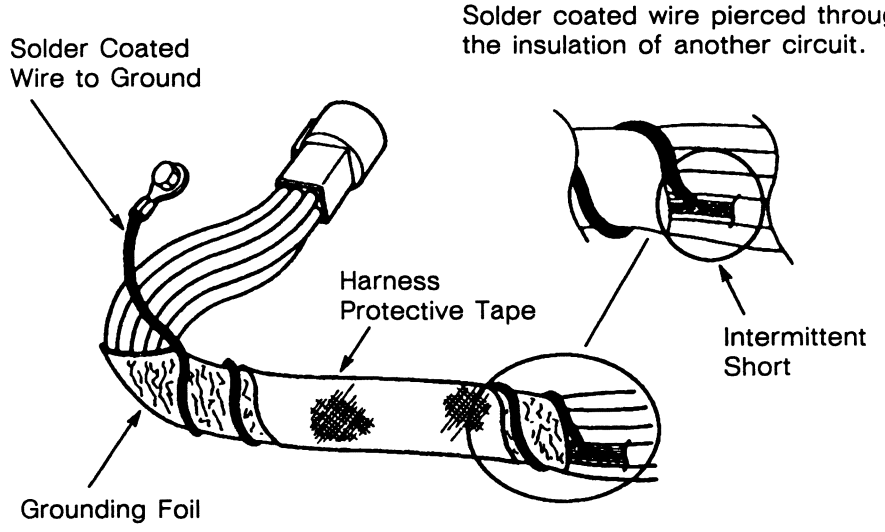


PARTIALLY MATED CONNECTORS

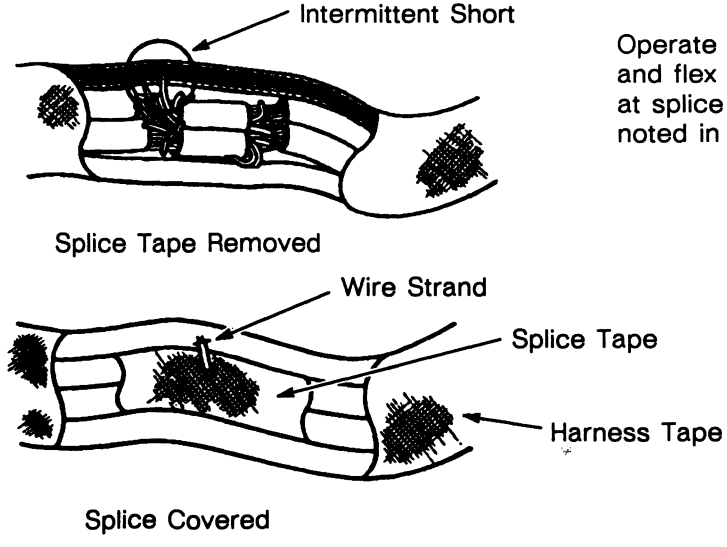


Any probe entering the terminal may enlarge the contact spring opening creating an intermittent signal. Insert the correct mating terminal (Location A) from the service kit and feel for a loose fit.

DEFORMED (ENLARGED) FEMALE TERMINALS

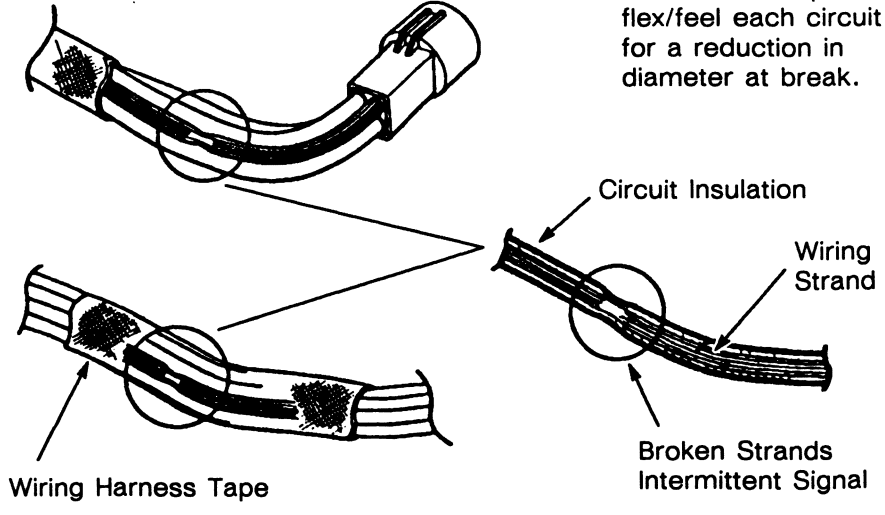


ELECTRICAL SHORT INSIDE THE HARNESS



Operate the system and flex the harness at splice location noted in Section 152.

ELECTRICAL SHORT WITHIN THE HARNESS



Remove the tape and flex/feel each circuit for a reduction in diameter at break.

BROKEN WIRE STRANDS IN HARNESS

HOW TO FIND THE VACUUM CONCERNS

These six steps present an orderly method of troubleshooting.

Step 1. Verify the concern.

- Operate the system and observe all symptoms to check the accuracy and completeness of the customer's complaint.

Step 2. Narrow the concern.

- Narrow down the possible causes and locations of the concern to pinpoint the exact cause.

Step 3. Test the cause.

- Use test procedures to find the specific cause of the symptoms.

Step 4. Verify the cause.

- Confirm that you have found the right cause by operating the parts of the circuit you think are good.

Step 5. Make the repair.

- Repair or replace the inoperative component.

Step 6. Verify the repair.

- Operate the system as in Step 1. Check that your repair has removed all symptoms without creating any new symptoms.

NOTE: Vacuum system problems fall into three groups.

1. Leaks in hoses, connectors or motor diaphragms.
2. Pinched lines or clogged valves.
3. Inoperative parts driven by vacuum motors.

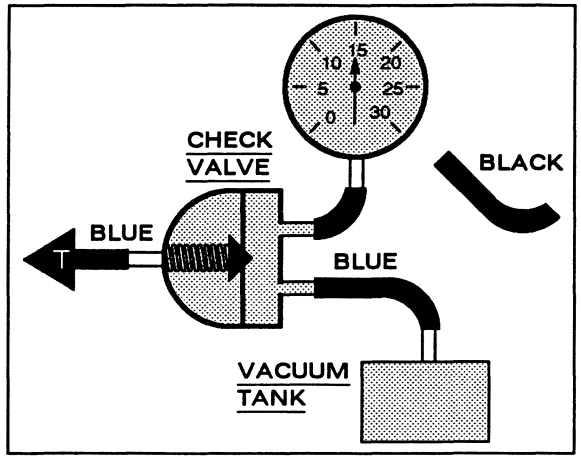


Figure 1 - System Supply Test

Vacuum Supply Test

1. Connect Vacuum Tester to system side of Check Valve (Figure 1).
2. Start engine. Gauge should show approximately 15 inches of vacuum.
3. Turn off engine, and observe gauge:
   - If vacuum holds, supply OK.
   - If vacuum fails, replace Check Valve or Tank.

Leak Test

1. Connect Vacuum Gauge and Vacuum Pump (Figure 2) to system hose in place of tank.
2. Open valve and start pump. Operate control in all modes.
3. Listen for hiss and observe gauge.

NOTE: Hissing is normal at Function Control when changing modes.

If system hisses or loses vacuum, find system leak as follows:

1. Turn on Vacuum Pump and check vacuum build-up.
2. Stop pump; vacuum should drop.
3. Clamp supply hoses with needlenose pliers, one at a time, until vacuum stops dropping (Figure 2).
4. Check vacuum schematic to find components in that line.
5. Clamp hoses through circuit to find leak.

Component Test

1. Connect Vacuum Tester to component.
2. Pump Vacuum Tester. Check that all components operate correctly and vacuum holds.
3. Replace component if vacuum does not hold.

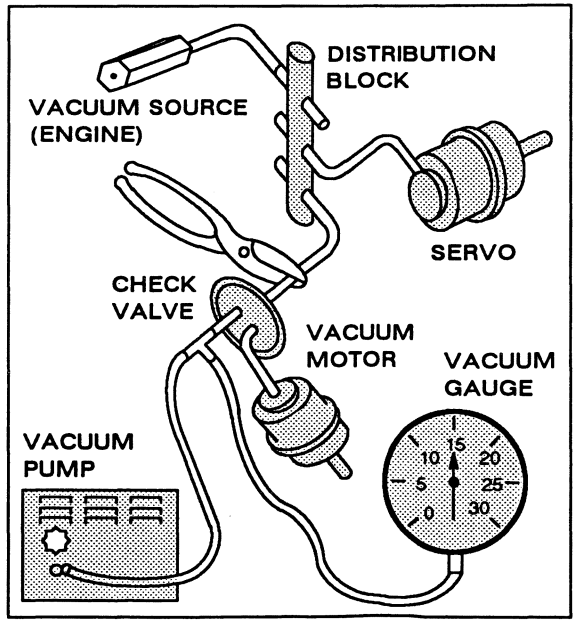


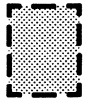
Figure 2 - Testing For Leaks In Typical Vacuum System

SAE J1930 NOMENCLATURE STANDARDS

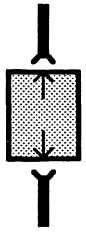
Certain Ford component names have been changed in this EVTM to conform to Society of Automotive Engineers (SAE) directive J1930. SAE J1930 standardizes automotive component names for all vehicle manufacturers. A table lists new 1993 SAE J1930 component names and the obsolete 1992 component names.

1993 MUSTANG COMPONENT NAMES	1992 MUSTANG COMPONENT NAMES
Barometric Pressure (BARO) Sensor	Barometric Absolute Pressure (BAP) Sensor
Brake On/Off (BOO) Switch	Stop Lamp Switch
Canister Purge (CANP) Solenoid	Canister Purge Solenoid
Clutch Pedal Position (CPP) Switch #1	(2.5L) Clutch Pedal Switch (5.0L) Clutch Engage Switch (CES)
Clutch Pedal Position (CCP) Switch #2	Clutch Switch
Constant Control Relay Module	Integrated Relay Control Module
Crankshaft Position (CKP) Sensor	Crankshaft Position Sensor
Data Link Connector (DLC) C198	VIP Test Connector C198
Data Link Connector (DLC) C199	VIP Test Connector C199
Heated Oxygen Sensor (HO2S)	Heated Exhaust Gas Oxygen (HEGO) Sensor
Idle Air Control (IAC) Valve	Idle Air Bypass Valve
Ignition Control Module (ICM)	Distributorless Ignition System (DIS) Module
Ignition Control Module (ICM)	TFI Ignition Module
Inertia Fuel Shut-off Switch	Inertia Switch
Intake Air Temperature (IAT) Sensor	Air Charge Temperature (ACT) Sensor
Left Heated Oxygen Sensor (HO2S)	Left Heated Exhaust Gas Oxygen (HEGO) Sensor
Park/Neutral Position Switch	Neutral Gear Switch (NGS)
Park/Neutral Position Switch	Backup/Neutral Safety Switch
PCM Power Relay	EEC Power Relay
Power Steering Pressure (PSP) Switch	Power Steering Pressure Switch
Powertrain Control Module (PCM)	Electronic Engine Control (EEC) Module
Right Heated Oxygen Sensor (HO2S)	Right Heated Exhaust Gas Oxygen (HEGO) Sensor
Secondary Air Injection Bypass (AIRB) Solenoid	Thermactor Air Bypass (TAB) Solenoid
Secondary Air Injection Diverter (AIRD) Solenoid	Thermactor Air Diverter (TAD) Solenoid
Starter Clutch Pedal Position (SCPP) Switch	Clutch Interrupt Switch
Throttle Position (TP) Sensor	Throttle Position Sensor

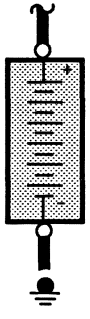
ELECTRICAL SYMBOLS



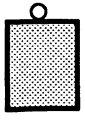
DASHED COMPONENT BOX
ONLY PART OF THE COMPONENT IS SHOWN ON THE PAGE; THE COMPONENT IS SHOWN COMPLETE IN ANOTHER LOCATION



COMPONENT WITH CONNECTORS



BATTERY



SCREW TERMINAL ON COMPONENT

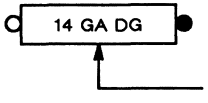
SOLID STATE

SEALED ELECTRONIC COMPONENT
ANY CIRCUITRY SHOWN INSIDE THE BOX IS A FUNCTIONAL EQUIVALENT ONLY AND IS NOT EXACT

GROUND CONNECTION

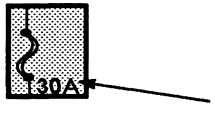
FUSE

CURRENT RATING



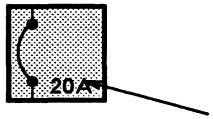
FUSIBLE LINK

WIRE SIZE AND COLOR



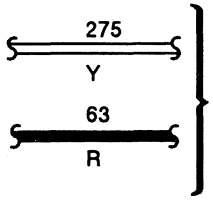
MAXI-FUSE or FUSIBLE LINK CARTRIDGE

CURRENT RATING

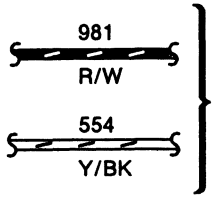


CIRCUIT BREAKER

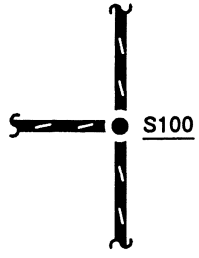
CURRENT RATING



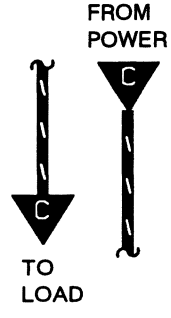
SOLID WIRES



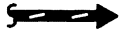
STRIPED WIRES



SPLICE OR CRIMP TERMINAL

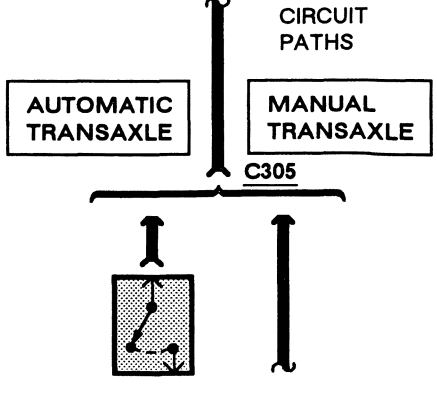


"CUT" WIRES REFERENCED BETWEEN PAGES
ARROWS SHOW CURRENT FLOW FROM POWER TO GROUND



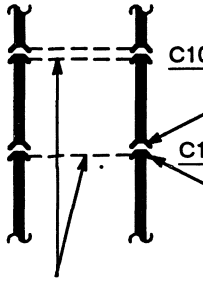
BACKUP LIGHTS

"REFERENCE" WIRES
COMPLETE WIRING SHOWN ON ANOTHER PAGE



ALTERNATE CIRCUIT PATHS

ELECTRICAL SYMBOLS



SOCKET

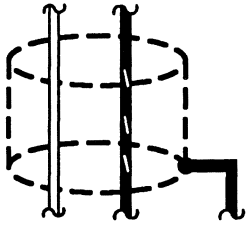
IN-LINE CONNECTOR

PIN OR BLADE

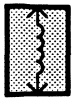
SINGLE OR DOUBLE DASHED LINE INDICATES THAT WIRE ON LEFT ALSO PASSES THROUGH THE SAME CONNECTOR

SEE GROUNDS *PAGES 10-1, 10-2*

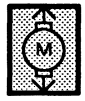
DASHED WIRE
CIRCUITRY IS NOT SHOWN IN COMPLETE DETAIL, BUT IS COMPLETE ON ANOTHER PAGE



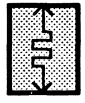
SHIELD
WIRES ARE COVERED BY A SHIELD



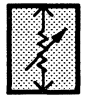
FIELD COIL OR CHOKE



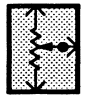
MOTOR



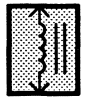
HEATING ELEMENT



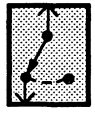
THERMISTOR



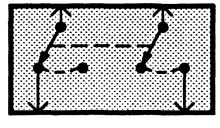
RHEOSTAT OR POTENTIOMETER



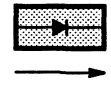
SOLENOID



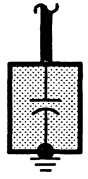
SWITCH



GANGED SWITCHES
CONTACTS MOVE AT THE SAME TIME

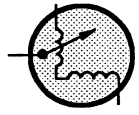


DIODES
CURRENT FLOWS IN DIRECTION OF ARROW ONLY



CAPACITOR

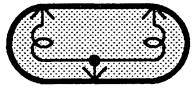
TRANSISTOR



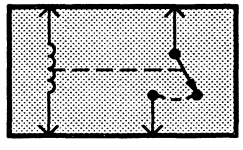
GAUGE

LIGHT EMITTING DIODE (LED)

LIGHT BULB

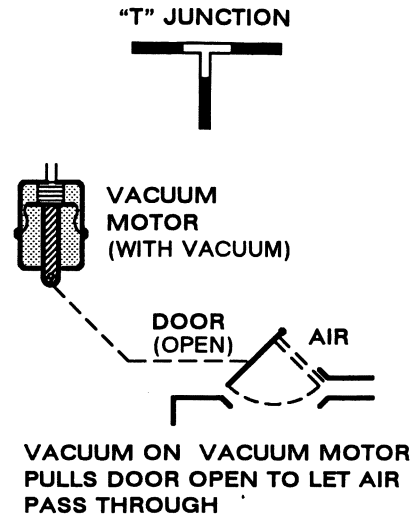


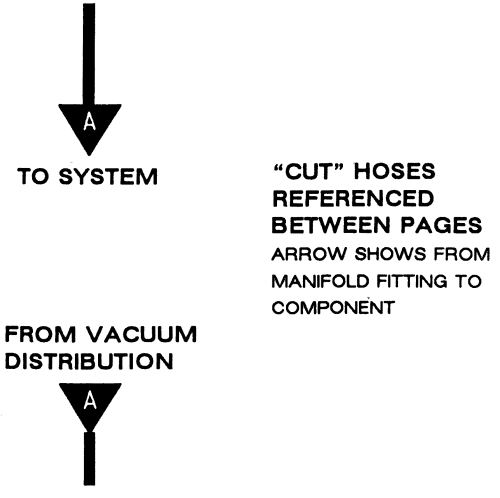
DUAL FILAMENT LIGHT BULB

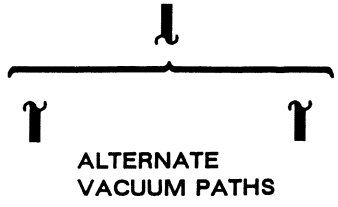


RELAY
CONTACTS CHANGE POSITION WITH CURRENT THROUGH COIL

VACUUM SYMBOLS



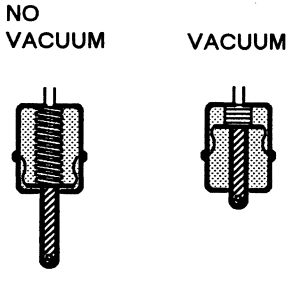




NOTE
Other vacuum symbols used on vacuum system diagrams are fully explained on those pages.

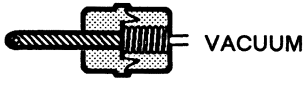
VACUUM MOTOR OPERATION

SINGLE DIAPHRAGM MOTOR



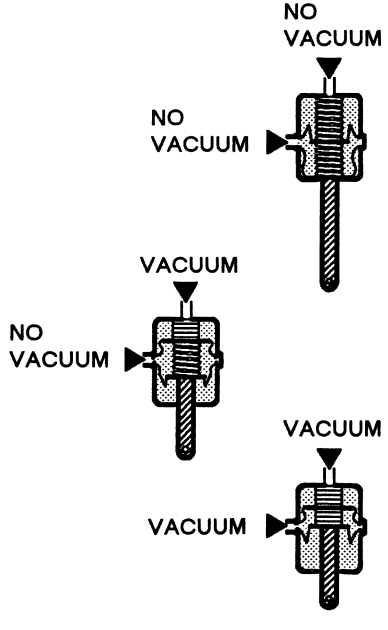
Vacuum motors operate like electrical solenoids, mechanically pushing or pulling a shaft between two fixed positions. When vacuum is not applied, the shaft is pushed all the way out by a spring.

SERVO MOTOR



Some vacuum motors, such as the Servo Motor in the Speed 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 nearly the same way as two-position motors, except for the way the vacuum is applied. Servo Motors are generally larger and provide a calibrated control.

DOUBLE DIAPHRAGM MOTOR



A double diaphragm motor has three positions (it is actually two motors in one housing). When the top port gets vacuum, the shaft pulls halfway in. When both ports get vacuum, the shaft pulls all the way in.

SECTION 10

GROUNDS

HOW THE CIRCUIT WORKS

The ground circuits show how many different systems may share a common ground point.

While all of the ground circuits shown are shown complete, additional ground circuits may exist in the vehicle. Any ground circuit not shown in Cell 10 is shown complete in the appropriate system schematic.

All wires are 57 (BK) unless otherwise noted.

SECTION 12

CHARGING SYSTEM

HOW THE CIRCUIT WORKS

The Alternator is belt-driven by the engine. Field current is supplied from the Integral Alternator Regulator (IAR), mounted on the rear of the Alternator, to the rotating field of the Alternator, through two brushes and two slip rings.

The Alternator produces power in the form of alternating current. The alternating current is rectified to direct current by six diodes. The Alternator Regulator automatically adjusts the Alternator field current to maintain the Alternator output voltage within prescribed limits to correctly charge the Battery. The Alternator is self-current limiting.

The regulator voltage control circuit is turned on when the Ignition Switch is in START or RUN and voltage is applied to Regulator terminal I through a resistor in parallel with the Charge Indicator. When the Ignition Switch is OFF, the control circuit is turned OFF and no field current flows to the Alternator.

The Charge Indicator is connected across the terminals of a 500-ohm resistor in the Instrument Cluster. Current passes through the Indicator when the Ignition Switch is in START or RUN and there is no voltage at terminal S. When voltage at terminal S rises to a preset value, the regulator switching circuits stop the flow of current into terminal I and the indicator turns OFF.

System voltage is "sensed" at Regulator terminal A. The regulator switching circuits turn the warning indicator ON to indicate a system fault if terminal A voltage is excessively high or low or if the voltage at terminal S is below a preset value.

A Fuse Link is included in the charging system wiring on all models. The Fuse Link prevents damage to the wiring harness and Alternator if the wiring harness should become grounded or if a booster battery is improperly connected to the charging system.

For further diagnostic information, refer to Section 14-00 of the Service Manual.

SECTION 13

POWER DISTRIBUTION

HOW THE CIRCUIT WORKS

The Power Distribution circuits show how several systems may receive power through the same fuse, circuit breaker or fuse link.

The circuits shown also indicate whether a particular fuse, circuit breaker or fuse link receives power directly from the Battery or through the Ignition Switch contacts.

SECTION 13 (cont'd)

For further diagnostic information, refer to Section 18-01 of the Service Manual.

SECTION 20

STARTING SYSTEM

HOW THE CIRCUIT WORKS

The Battery, Starter Motor, Starter Relay and Ignition Switch make up the Starting System. On vehicles with automatic transmissions, the Park/Neutral Position Switch must be closed (PARK or NEUTRAL) to operate the Starter Motor. On vehicles with manual transmissions, the Starter Clutch Pedal Position (SCPP) Switch must be closed (clutch fully depressed) to operate the Starter Motor.

Turning the Ignition Switch to START sends current through the Starter Relay coil and the relay operates. Current from the Battery then flows directly through the Starter Relay to the Starter Motor to start the engine.

For further diagnostic information, refer to Section 03-06 of the Service Manual.

SECTION 21

IGNITION SYSTEM

HOW THE CIRCUIT WORKS

DISTRIBUTION IGNITION (DI) SYSTEM (5.0L)

The Distributor Ignition (DI) System contains an Ignition Control Module (ICM), which is mounted on the side of the Distributor.

When the engine is cranking or running:

- The pickup in the Distributor provides the signal input through the Ignition Control Module (ICM) to the Powertrain Control Module (PCM), which returns a signal to the Ignition Control Module (ICM). The Ignition Control Module switches current on and off in the primary circuit of the ignition coil, according to the signal from the Powertrain Control Module (PCM).
- Each interruption of primary current makes the Ignition Coil secondary circuit produce an open circuit high-voltage pulse of up to 40,000 volts.

High-voltage pulses are transmitted to the Distributor, which sends them to fire the spark plugs.

Two signal circuits, 395 (GY/O) and 929 (PK), are connected between the Ignition Control Module (ICM) and the Powertrain Control Module (PCM).

For further diagnostic information, refer to the Powertrain Control/Emissions Diagnosis Manual.

ELECTRONIC ENGINE CONTROL (2.3 EFI)

HOW THE CIRCUIT WORKS

The Electronic Engine Control System uses a Powertrain Control Module (PCM) to control fuel flow, exhaust gas recirculation (EGR), ignition system functions, evaporative emission, idle speed, A/C cutout, and engine cooling.

Fuel Flow

The 2.3L Multiport Fuel Injection System (MFI) is classified as a multi-point, pulse time, fuel injection system. A metered amount of fuel is injected into each cylinder in accordance with engine demand. The PCM Module determines the required fuel flow rate from various engine sensors.

The Fuel Pump supplies fuel under pressure to the Fuel Injectors. When the Ignition Switch is turned to RUN or START, voltage is applied to the Fuel Pump from the Constant Control Relay Module through the Inertia Fuel Shut-off Switch. The Inertia Fuel Shut-off Switch is a safety device which cuts off voltage to the Fuel Pump in the event of a collision. Once the Inertia Fuel Shut-off Switch opens, it must be reset manually.

NOTE: If the engine does not operate after a collision, it may be that the Inertia Fuel Shut-off Switch has opened. To reset the switch, put your finger through the hole in front of the trunk trim line and push down on the plunger.

WARNING

If you see or smell gasoline, do not reset the Inertia Fuel Shut-off Switch.

Exhaust Gas Recirculation (EGR)

The EGR Vacuum Regulator controls the EGR valve movement. The PCM Module receives data from various sensors and also checks the existing valve position through the EGR Valve Position Sensor. The PCM Module calculates if the present EGR flow should be increased, maintained or decreased, and determines how to operate the EGR Valve to control emissions.

Canister Purge

The carbon canister collects fuel vapors from the fuel tank to be burned later in the engine. The Canister Purge (CANP) Solenoid is controlled by the PCM Module. When the PCM Module grounds the Canister Purge (CANP) Solenoid, the vapors are released to the engine for burning.

Ignition

The PCM System has a special Electronic Ignition (EI) System that has no centrifugal or vacuum advance mechanisms. Instead, all ignition timing is controlled by the PCM Module.

Powertrain Control Module (PCM) Inputs

The Powertrain Control Module (PCM) uses information from various sensors to determine engine operating conditions.

Mass Air Flow (MAF) Sensor

The Mass Air Flow (MAF) Sensor directly measures the mass of the air flowing into the engine. The sensor output is used by the PCM Module to calculate the injector pulse width for proper air/fuel ratio.

SECTION 23 (cont'd)

A4LD Transmission

The A4LD Transmission is an electronically controlled four speed automatic transmission. The Powertrain Control Module (PCM) uses inputs from various sensors to control the operation of the A4LD Transmission.

The A4LD Transmission has self-test capabilities much like those in other electronic control systems.

The Constant Control Relay Module (CCRM) supplies power to the PCM and PCM system related components. When the Ignition Switch is turned to RUN or START, voltage is applied to the 3-4 Shift Solenoid and the Torque Converter Clutch (TCC) Solenoid.

The Throttle Position (TP) Sensor is a potentiometer. The sensor output is a DC voltage that varies with throttle angle. By monitoring the TP Sensor output and other sensors, the PCM calculates the proper transmission line pressure, shift scheduling, and Torque Converter Clutch.

The Profile Ignition Pickup (PIP) signal is produced by Electronic Ignition (EI). It sends RPM and Crankshaft position information to the PCM to determine shift scheduling and torque converter operation.

The 3-4 Shift Solenoid provides gear selection of third and fourth gears by controlling the pressure to the shift valves.

The Torque Converter Clutch (TCC) Solenoid provides the torque converter clutch control by shifting the converter clutch control valve to apply or release the torque converter clutch.

The Vehicle Speed Sensor generates an AC signal that is proportional to vehicle speed.

The PCM uses this speed signal and other inputs to determine the shift scheduling and converter clutch control.

The Brake On/Off (BOO) Switch is used to prevent converter clutch operation when the brake has been depressed.

This input is ignored if the Throttle Position Sensor indicates more than one third throttle position.

The Engine Coolant Temperature Sensor is a thermistor in which resistance decreases as engine coolant temperature increases. The PCM measures the voltage drop across the Engine Coolant Temperature Sensor and uses this information to help calculate fuel delivery, spark timing and EGR control and clutch converter operation.

Idle Air Control (IAC) Valve

The Idle Air Control (IAC) Valve controls engine idle speed by regulating the amount of air allowed to pass around the throttle plates. This permits the PCM Module to make idle speed corrections to prevent engine stall during cold engine warm-ups as engine load changes.

Barometric Pressure (BARO)

The Barometric Pressure (BARO) Sensor measures the barometric pressure and provides this information as a variable frequency signal to the PCM Module.

Throttle Position (TP) Sensor

The Throttle Position (TP) Sensor is a potentiometer. The sensor output is a DC voltage that varies with throttle plate angle. By monitoring the Throttle Position (TP) Sensor output, the PCM Module calculates fuel delivery requirements based on driver demand and assists automatic transmission operation.

Heated Oxygen Sensor (HO2S)

The Heated Oxygen Sensor (HO2S) provides a voltage for regulating the air/fuel ratio to the PCM Module by sensing the oxygen content of the exhaust gases. Too much oxygen indicates a lean mixture, while too little oxygen indicates a rich mixture.

Power Steering Pressure (PSP) Switch

The Power Steering Pressure (PSP) Switch is used to indicate increased engine load to the PCM Module. The switch will signal increased engine load to the PCM Module when power steering fluid pressure increases (when the steering is turned from lock to lock). The PCM Module will then increase engine idle speed to prevent engine stall.

SECTION 23 (cont'd)

Engine Coolant Temperature (ECT) Sensor

The Engine Coolant Temperature (ECT) Sensor is a thermistor whose resistance decreases as engine coolant temperature increases and increases as engine coolant temperature decreases (Negative Temperature Coefficient). The PCM Module measures the voltage drop across the Engine Coolant Temperature (ECT) Sensor and uses this information to calculate fuel delivery, spark timing, EGR and automatic transmission operation.

Intake Air Temperature (IAT) Sensor

The Intake Air Temperature (IAT) Sensor is a thermistor whose resistance decreases as manifold air temperature increases and increases as manifold air temperature decreases (Negative Temperature Coefficient). The PCM Module measures the voltage drop across the Intake Air Temperature (IAT) Sensor and uses this information to calculate fuel delivery, spark timing and EGR control.

Vehicle Speed Sensor (VSS)

The Vehicle Speed Sensor (VSS) generates an AC signal that is proportional to vehicle speed. The AC signal is sent to the PCM Module and is used for engine management and automatic transmission operation.

Constant Control Relay Module (CCRM)

The Constant Control Relay Module (CCRM) supplies power to the A/C Clutch, Electric Cooling Fan, Fuel Pump and PCM Module. Their functions are integrated into the module.

For further diagnostic information, refer to the Powertrain Control/Emissions Diagnosis Manual.

SECTION 24

ELECTRONIC ENGINE CONTROL (5.0L)

HOW THE CIRCUIT WORKS

The Electronic Engine Control System uses a Powertrain Control Module (PCM) to control fuel flow, exhaust gas recirculation (EGR), ignition system functions, evaporative emission, idle speed, A/C cutout, and air management.

Fuel Flow

Fuel injectors, mounted in the intake manifold at the intake port, meter the flow of fuel into the engine. The PCM Module fires the injectors.

Fuel is supplied to the engine by an in-tank Electric Fuel Pump. When the Ignition Switch is turned to the RUN position, voltage is applied to the Fuel Pump Relay Coil. The Coil is grounded by the PCM Module and the relay contacts close. Voltage is now applied to the Fuel Pump.

When the Fuel Pump Relay is grounded by the PCM Module and the Inertia Fuel Shut-off Switch is closed, power is supplied to the Fuel Pump. Fuel flow is produced by the Fuel Pump, and fuel pressure is built up in the fuel delivery system. Fuel pressure is controlled by a fuel pressure regulator.

NOTE: If the engine does not operate after a collision, it may be that the Inertia Fuel Shut-off Switch has opened. To reset the switch, put your finger through the hole in front of the trunk trim line and push down on the plunger.

WARNING

If you see or smell gasoline, do not reset the Inertia Fuel Shut-off Switch.

SECTION 33

COOLING FANS

HOW THE CIRCUIT WORKS

The Cooling Fan System consists of a one-speed fan and an electric motor. The Electric Cooling Fan operates only when the Ignition Switch is in RUN.

The Constant Control Relay Module and the Powertrain Control Module (PCM) control the Electric Cooling Fan.

The Electric Cooling Fan turns on when the engine temperature is higher than normal (on at 102°C, off at 99°C), or A/C is on and vehicle speed does not provide enough airflow (on at 52 mph or below, off at 45 mph).

For further diagnostic information, refer to Section 03-03 of the Service Manual.

SECTION 37

SHIFT LOCK

HOW THE CIRCUIT WORKS

With the Ignition Switch in RUN, the Shift Lock Actuator prevents the driver from shifting the automatic transmission out of PARK unless the brake pedal is depressed.

NOTE: If the gear selector cannot be shifted out of Park with the Ignition Switch in RUN and the brake pedal depressed, follow these steps:

- **Turn Ignition Switch to OFF**
- **Move shift lever to NEUTRAL**
- **Start the engine**
- **Shift into DRIVE**

For further diagnostic information, refer to Section 17-05 of the Service Manual.

SECTION 44

HORN/CIGAR LIGHTER

HOW THE CIRCUIT WORKS

Horn

A Horn Switch is mounted in each of the upper steering wheel spokes. With a Horn Switch depressed, the Horn Relay is energized and current flows from Fuse 16 through the Horn Relay contacts to the Low and High Pitch Horns. The horns sound.

Cigar Lighter

Voltage is applied, at all times, through Fuse 16 to the Cigar Lighter. When the Cigar Lighter is depressed, the contacts close and current flows through the heating element to ground.

For further diagnostic information, refer to Sections 11-04 and 13-06 of the Service Manual.

SECTION 46

AIR BAG RESTRAINT SYSTEM

HOW THE CIRCUIT WORKS

The Air Bag Restraint System consists of a driver air bag, an Air Bag Diagnostic Module and Crash Sensors.

Air Bag Diagnostic Module

The Air Bag Diagnostic Module contains a microcomputer that monitors electrical system components and connections. The assembly performs a self-check of the microcomputer's internal circuits and energizes the Air Bag Indicator lamp during prove out and whenever a fault occurs. Eleven different faults can be detected and translated into a coded lamp display. If certain faults occur, the system will be disarmed by a firing disarm device built into the Diagnostic Module. If a system fault exists and the lamp is malfunctioning, an audible tone will be heard, indicating the need for service.

Sensors

The Sensor assembly is an electrical switch that reacts to impacts according to direction and force. It discriminates between impacts that require air bag inflation and impacts that do not require air bag inflation. When an impact occurs that requires air bag inflation, the sensor contacts close, completing the electrical circuit, and the system then operates.

Four crash sensors are mounted in the vehicle. At least two sensors, one safing, one forward, must be activated to inflate the air bag.

Warning
Do not attempt to diagnose or troubleshoot air bag circuitry without consulting the shop manual. Improper troubleshooting could cause the air bag to fire inadvertently, causing injury.

For further diagnostic information, refer to Section 01-20 of the Service Manual.

SECTION 60 (cont'd)

If the oil level is adequate, the Indicator will turn off when the Ignition Switch is released to the RUN position. If the oil level is low (approximately 1.4 liters [1.5 quarts] or less), the Relay will ground circuit 208 (GY) to turn on the lamp. The lamp remains on until the Ignition Switch is turned to the OFF position.

Check Low Coolant Indicator (5.0L)

The Low Coolant Switch, mounted on the recovery bottle, is used to illuminate the Low Coolant Indicator. Located in the instrument cluster, the Indicator informs the driver of a low coolant condition. When the ignition is turned to the START or RUN position, the CHECK COOLANT light illuminates for a couple of seconds and then turns OFF after the engine is started, which indicates adequate coolant fill. The Low Coolant Indicator illuminates when the coolant level drops 2 inches below the FULL COLD mark, located on the side of the recovery bottle. When indicating a low coolant condition, the Low Coolant Indicator stays illuminated. The CHECK COOLANT light stays illuminated until the coolant is filled to the FULL HOT mark and the vehicle ignition is turned to the OFF position and then cycled back to START or RUN.

After the Ignition Switch is turned off, five minutes will pass before the Relay will take a new reading. This delay allows time for oil drainback to prevent false readings. If the engine is restarted during this 5 minute period, the last reading will be indicated.

Low Coolant Level

When the Ignition Switch is turned to the RUN position, the CHECK COOLANT light will illuminate for a couple of seconds and then turn off when the engine is started, indicating adequate coolant fill. If the coolant level in the recovery bottle is low (below the FULL COLD line when the engine is cold), the CHECK COOLANT light will illuminate, delay for about five seconds, then turn back on, indicating a low coolant condition. When indicating a low coolant condition, the CHECK COOLANT light will latch to the ON position. The CHECK COOLANT light will remain on until the coolant is filled to the FULL HOT line and the vehicle ignition is turned to the off position and then cycled back on.

For further diagnostic information, refer to Section 13-01 of the Service Manual.

SECTION 64

VEHICLE SPEED SENSOR (VSS)

HOW THE CIRCUIT WORKS

The Vehicle Speed Sensor (VSS) is a small signal generator that is turned by a gear inside the transmission assembly. The Vehicle Speed Sensor (VSS) produces a signal that is proportional to vehicle road speed.

The Vehicle Speed Sensor (VSS) supplies this signal to the components that require vehicle speed information including the Speed Control Amplifier (on Speed Control equipped vehicles) and Powertrain Control Module (PCM).

For further diagnostic information, refer to Section 17 (Test DP) in the Powertrain Control/Emissions Diagnosis Manual.

SECTION 66

WARNING CHIME

HOW THE CIRCUIT WORKS

Key Warning

The Warning Chime sounds when the driver's door is open and the key is in the Ignition Switch, and keeps sounding until the door is closed or the key is removed. When the driver's door is open, power is supplied to the Warning Chime Module through circuit 159 (R/PK). When the key is in the ignition, ground is supplied to the Warning Chime Module through circuit 158 (BK/PK).

Fasten Belts

When the Ignition Switch is turned to the START or RUN position, power is supplied through circuit 640 (R/Y) to the Warning Chime Module, which supplies power through circuit 450 (DG/LG) to illuminate the Fasten Belts indicator for approximately six seconds.

If the driver's safety belt is not fastened, ground is supplied from the Seat Belt Switch through circuit 85 (BR/LB) to the Warning Chime Module and it sounds during the six seconds that the Fasten Belts Indicator is illuminated.

Lights On

The Warning Chime will sound when opening the driver's door with the Main Light Switch in PARK or HEAD, until the door is closed or the Headlamps are turned OFF. When the driver's door is open, power is supplied through circuit 159 (R/PK) to the Warning Chime Module. When the Main Light Switch is in PARK or HEAD, power is supplied through circuit 14 (BR) to the Warning Chime Module.

For further diagnostic information, refer to Section 13-09 of the Service Manual.

SECTION 71

INSTRUMENT ILLUMINATION

HOW THE CIRCUIT WORKS

Voltage is applied, at all times, to the Main Light Switch through Fuse 4. When the Main Light Switch is set to PARK or HEAD, voltage is applied through Fuse 13 to the Instrument Illumination Lamps. The Instrument Panel Dimming Rheostat adjusts the voltage applied to the Instrument Illumination Lamps.

For further diagnostic information, refer to Section 13-01 of the Service Manual.

SECTION 81

INTERVAL WIPER/WASHER

HOW THE CIRCUIT WORKS

The Interval Wiper/Washer allows the driver to select LO speed, HI speed or Interval wipe. With the wipers in the interval position, wipes are spaced two to ten seconds apart.

The Interval Wiper/Washer Switch has a momentary Washer Switch, a four-position Wiper Switch and a Variable Resistor which sets interval time.

SECTION 81 (cont'd)

Washer Operation

Pushing the wiper/washer control knob sends current from Fuse 2 through the Washer Switch to the Washer Pump.

LO/HI Speed Wiper Operation

When the Wiper Switch is in the LO or HI position, section A of the Wiper Switch powers the interval override input so that the Electronic Switch and the Governor Relay are pulled in continuously. Wiper Motor current then flows through Fuse 2 and the energized Governor Relay contacts to the L terminal of the Wiper Motor. Power is applied to the H terminal of the Wiper Motor through section B of the Wiper Switch for HI speed operation.

Interval Wiper Operation

During interval operation, the wipers make single wipes at lo speed separated by a variable length pause.

When first switched to INT position, section B of the Wiper Switch activates the Interval Timer. The Interval Timer momentarily closes the Electronic Switch, energizing the Governor Relay. Current flows to the Wiper Motor L terminal through the contacts of the energized Governor Relay. Ground is connected to terminal C of the Wiper Motor.

As the Wiper Motor turns, the Wiper Motor Switch changes from the grounded PARK position contact, which is not powered, and the Wiper Motor stops. After a pause (controlled by the variable resistor), the Interval Timer pulls in the Governor Relay to start another wipe.

When parking is complete, the Wiper Motor is braked to a stop by shunting the L and C terminals through the Wiper Motor Switch. Braking takes place when the Wiper Motor Switch moves to the PARK position. The Wiper Motor L terminal is connected to terminal C through the PARK contact of the Wiper Motor Switch and the deenergized contact of the Governor Relay.

For further diagnostic information, refer to Section 01-16 of the Service Manual.

SECTION 85

HEADLAMPS

HOW THE CIRCUIT WORKS

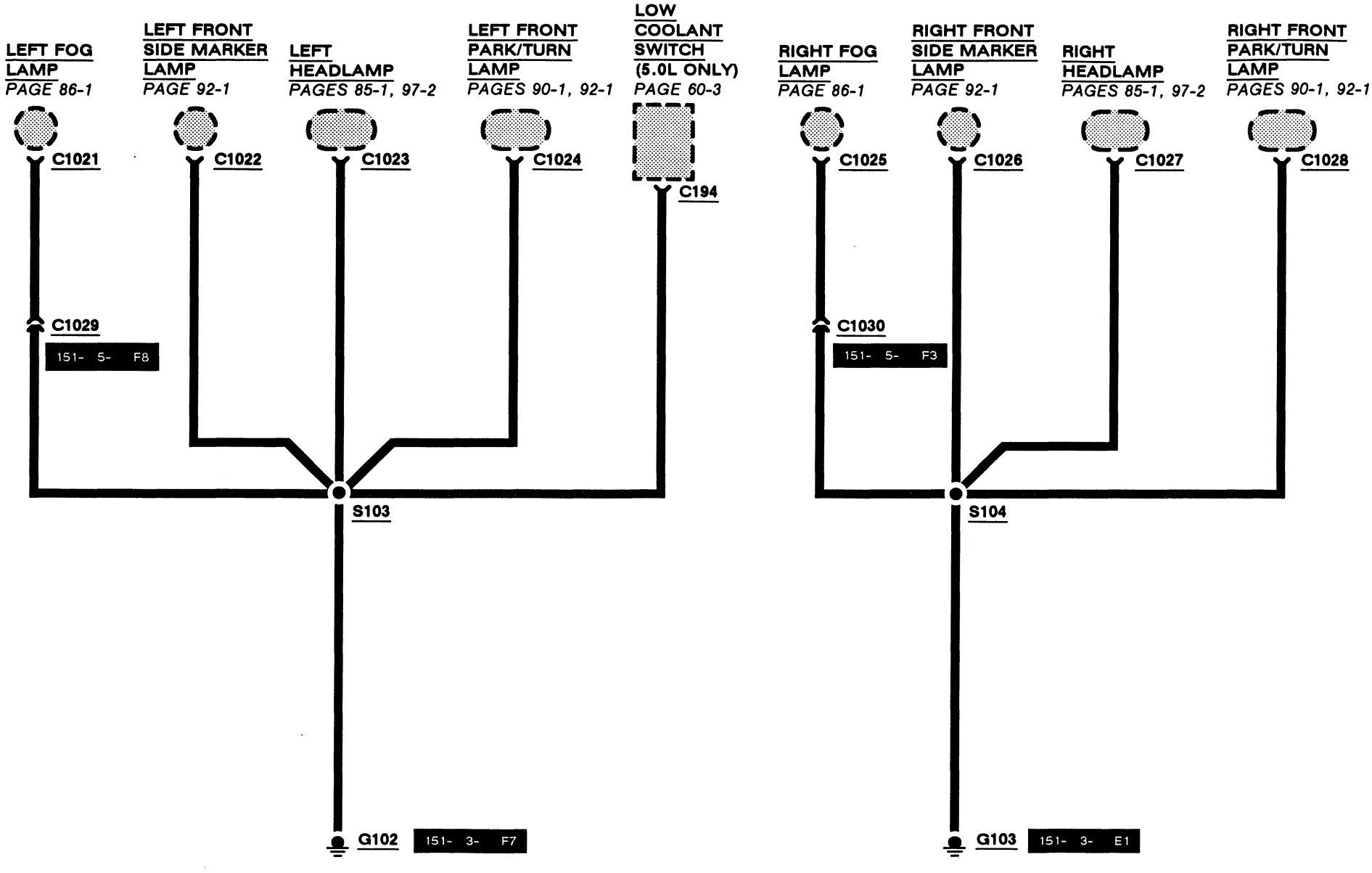
Power to operate the Headlamps flows through the Main Light Switch and the Dimmer Switch. When the Dimmer Switch lever is pulled partway toward the driver, the Flash-to-pass Switch closes, providing power to the Hi Beam Headlamps from Fuse 10.

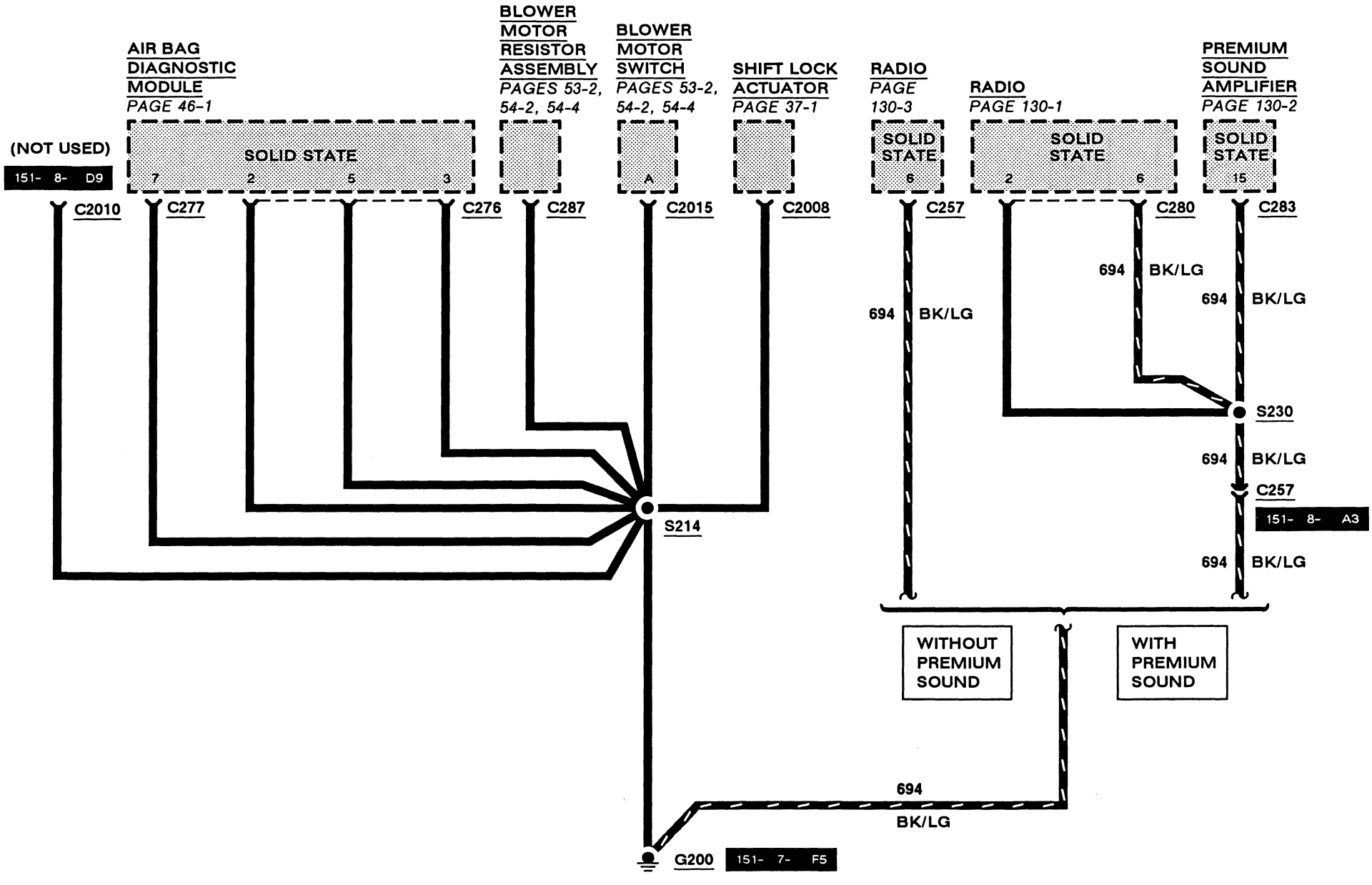
For further diagnostic information, refer to Section 17-01 of the Service Manual.

10-1 GROUNDS

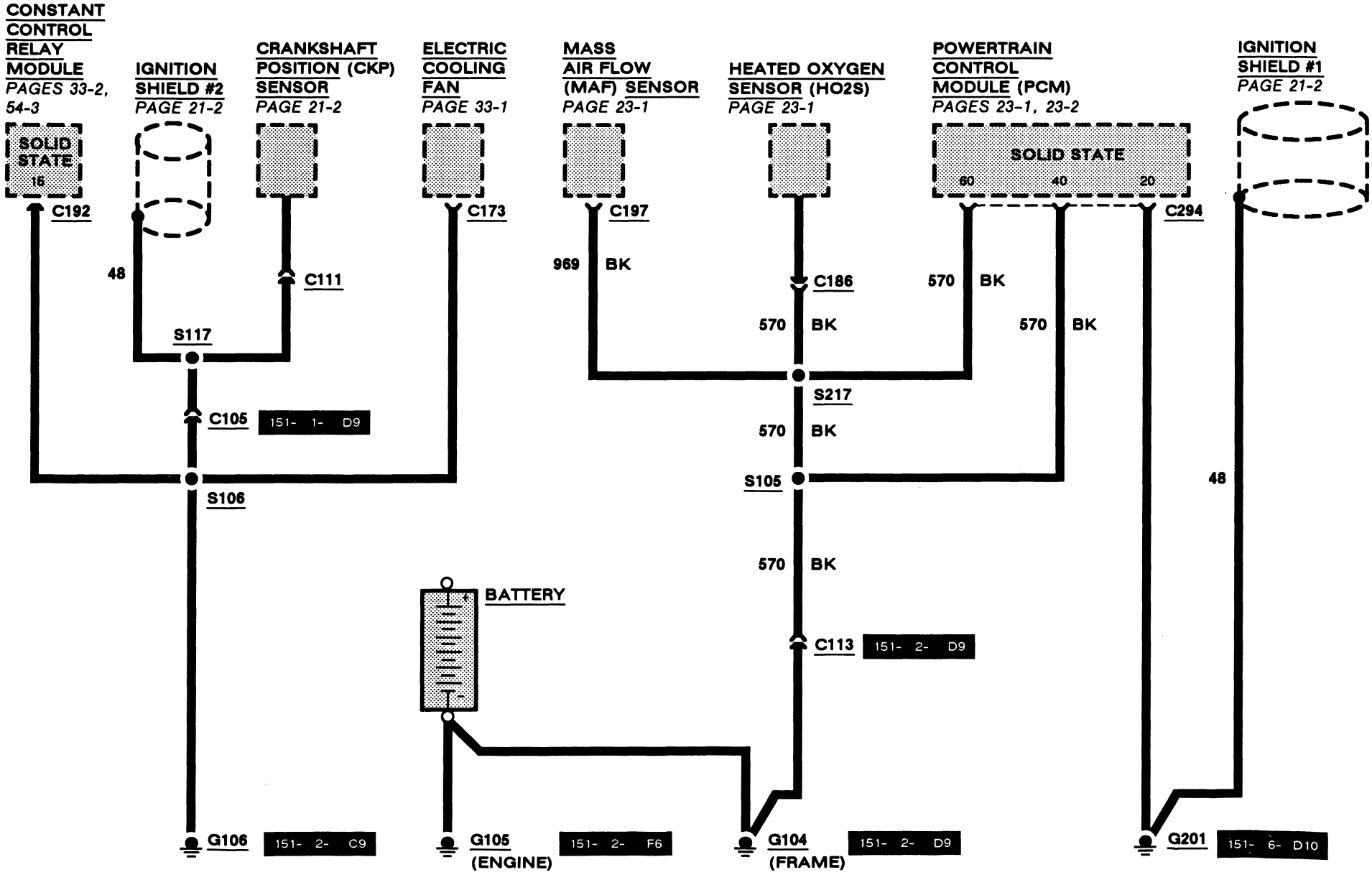
1993 MUSTANG

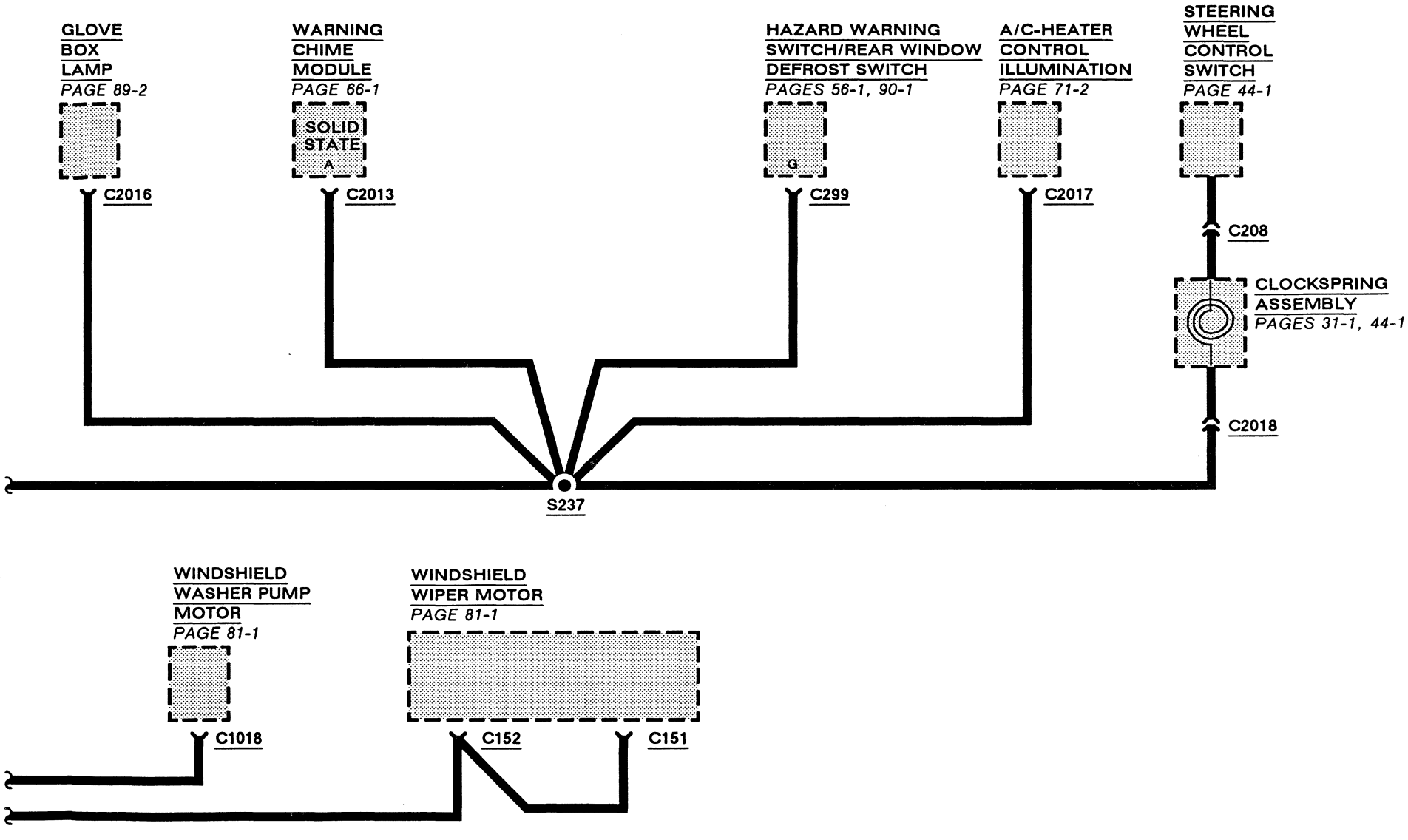
For Circuit Operation, refer to page 7-1.




AIR BAG DIAGNOSTIC MODULE
PAGE 46-1
BLOWER MOTOR RESISTOR ASSEMBLY
PAGES 53-2, 54-2, 54-4
BLOWER MOTOR SWITCH
PAGES 53-2, 54-2, 54-4
SHIFT LOCK ACTUATOR
PAGE 37-1
RADIO
PAGE 130-3
RADIO
PAGE 130-1
PREMIUM SOUND AMPLIFIER
PAGE 130-2
(NOT USED)
151- 8- D9
SOLID STATE
7 2 5 3
SOLID STATE
6
SOLID STATE
2 6
SOLID STATE
15
C2010
C277
C276
C287
C2015
C2008
C257
C280
C283
694 BK/LG
694 BK/LG
694 BK/LG
S230
694 BK/LG
C257
151- 8- A3
694 BK/LG
S214
WITHOUT PREMIUM SOUND
WITH PREMIUM SOUND
694 BK/LG
G200
151- 7- F5

2.3L

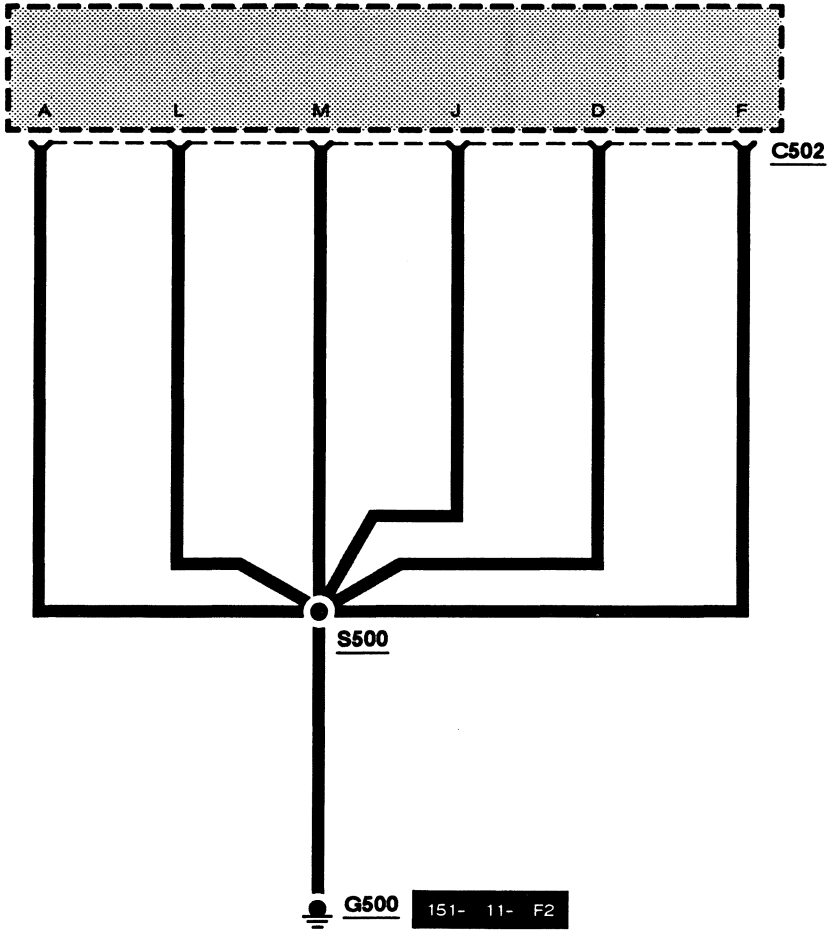

CONSTANT CONTROL RELAY MODULE
PAGES 33-2, 54-3
IGNITION SHIELD #2
PAGE 21-2
CRANKSHAFT POSITION (CKP) SENSOR
PAGE 21-2
ELECTRIC COOLING FAN
PAGE 33-1
MASS AIR FLOW (MAF) SENSOR
PAGE 23-1
HEATED OXYGEN SENSOR (HO2S)
PAGE 23-1
POWERTRAIN CONTROL MODULE (PCM)
PAGES 23-1, 23-2
IGNITION SHIELD #1
PAGE 21-2
SOLID STATE
16
SOLID STATE
60
40
20
C192
C111
C173
C197
C186
C294
48
969 BK
570 BK
570 BK
570 BK
S117
S217
C105
151- 1- D9
570 BK
S106
S105
48
570 BK
BATTERY
C113
151- 2- D9
G106
151- 2- C9
G105
(ENGINE)
151- 2- F6
G104
(FRAME)
151- 2- D9
G201
151- 6- D10


GLOVE BOX LAMP
PAGE 89-2
C2016
WARNING CHIME MODULE
PAGE 66-1
SOLID STATE
A
C2013
HAZARD WARNING SWITCH/REAR WINDOW DEFROST SWITCH
PAGES 56-1, 90-1
G
C299
A/C-HEATER CONTROL ILLUMINATION
PAGE 71-2
C2017
STEERING WHEEL CONTROL SWITCH
PAGE 44-1
C208
CLOCKSPRING ASSEMBLY
PAGES 31-1, 44-1
C2018
S237
WINDSHIELD WASHER PUMP MOTOR
PAGE 81-1
C1018
WINDSHIELD WIPER MOTOR
PAGE 81-1
C152
C151

2 AND 3 DOOR

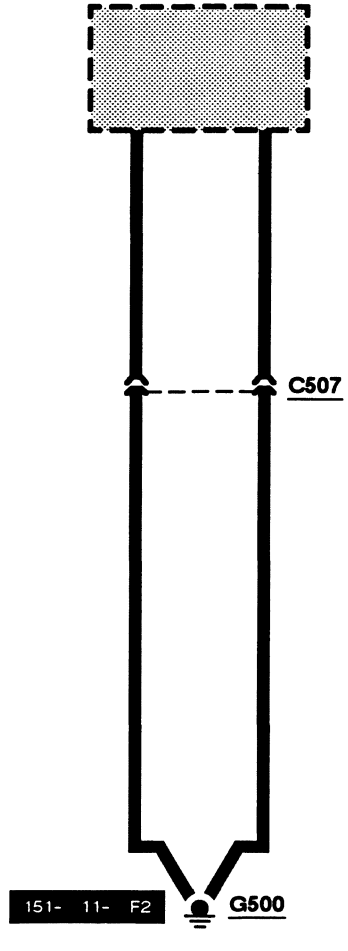
WITH POWER WINDOWS

MASTER WINDOW/ DOOR LOCK CONTROL SWITCH
PAGES 100-3, 110-1



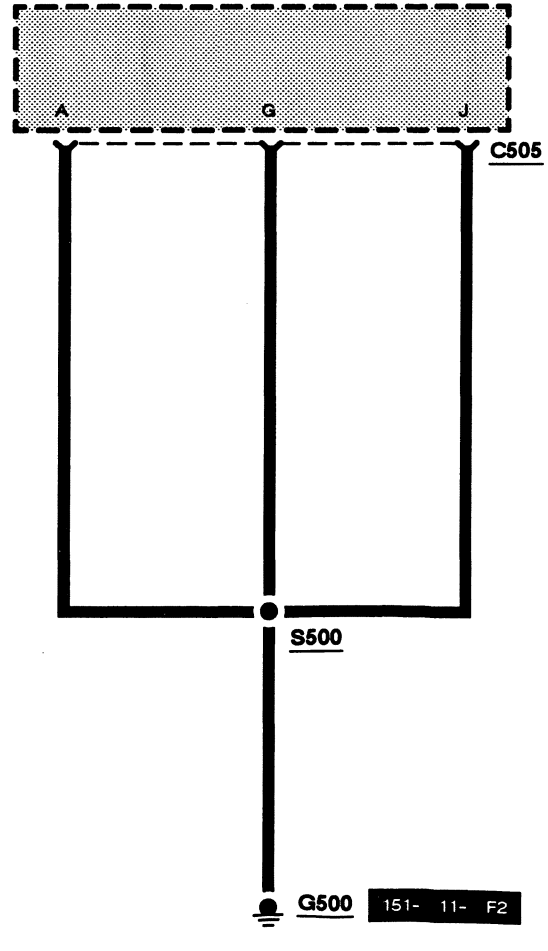
WITHOUT POWER WINDOWS

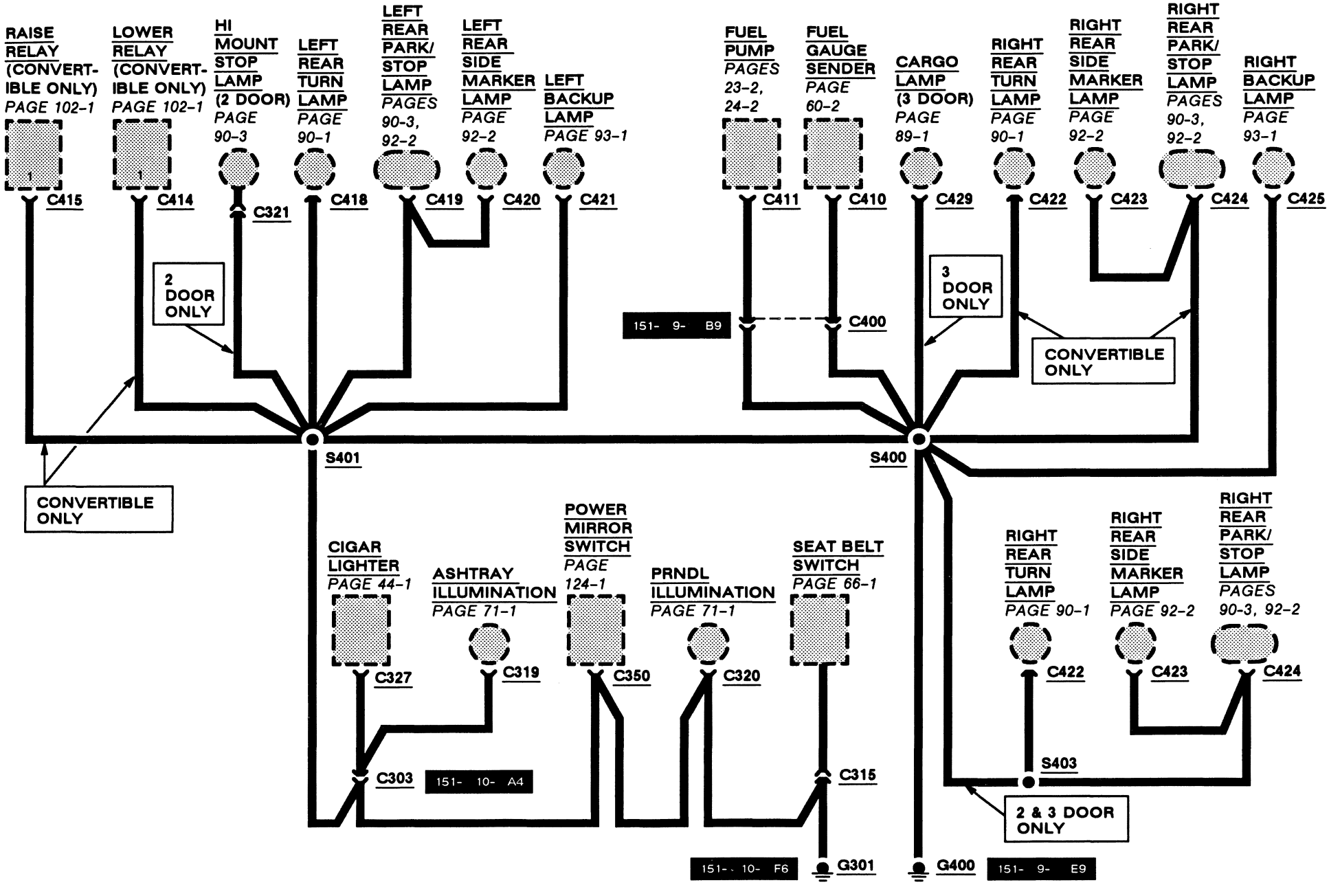
LEFT DOOR LOCK SWITCH
PAGE 110-2

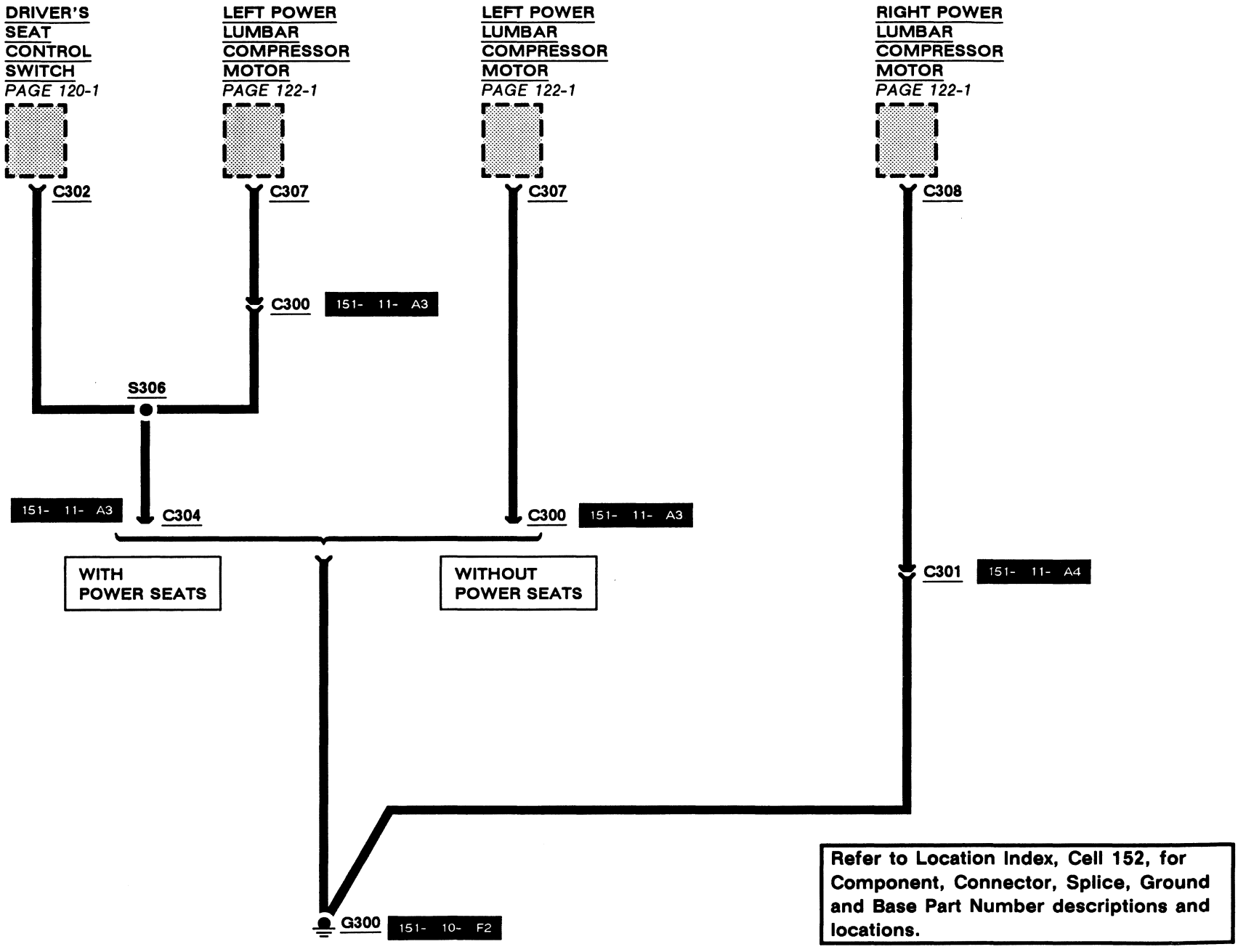


CONVERTIBLE

MASTER WINDOW/ DOOR LOCK CONTROL SWITCH
PAGES 100-1, 110-3




RAISE RELAY (CONVERTIBLE ONLY) PAGE 102-1
LOWER RELAY (CONVERTIBLE ONLY) PAGE 102-1
HI MOUNT STOP LAMP (2 DOOR) PAGE 90-3
LEFT REAR TURN LAMP PAGE 90-1
LEFT REAR PARK/STOP LAMP PAGES 90-3, 92-2
LEFT REAR SIDE MARKER LAMP PAGE 92-2
LEFT BACKUP LAMP PAGE 93-1
FUEL PUMP PAGES 23-2, 24-2
FUEL GAUGE SENDER PAGE 60-2
CARGO LAMP (3 DOOR) PAGE 89-1
RIGHT REAR TURN LAMP PAGE 90-1
RIGHT REAR SIDE MARKER LAMP PAGE 92-2
RIGHT REAR PARK/STOP LAMP PAGES 90-3, 92-2
RIGHT BACKUP LAMP PAGE 93-1
C415
C414
C321
C418
C419
C420
C421
C411
C410
C429
C422
C423
C424
C425
2 DOOR ONLY
3 DOOR ONLY
151- 9- B9
C400
CONVERTIBLE ONLY
CONVERTIBLE ONLY
S401
S400
CIGAR LIGHTER PAGE 44-1
ASHTRAY ILLUMINATION PAGE 71-1
POWER MIRROR SWITCH PAGE 124-1
PRNDL ILLUMINATION PAGE 71-1
SEAT BELT SWITCH PAGE 66-1
RIGHT REAR TURN LAMP PAGE 90-1
RIGHT REAR SIDE MARKER LAMP PAGE 92-2
RIGHT REAR PARK/STOP LAMP PAGES 90-3, 92-2
C327
C319
C350
C320
C422
C423
C424
C303
151- 10- A4
C315
S403
2 & 3 DOOR ONLY
151- 10- F6
G301
G400
151- 9- E9

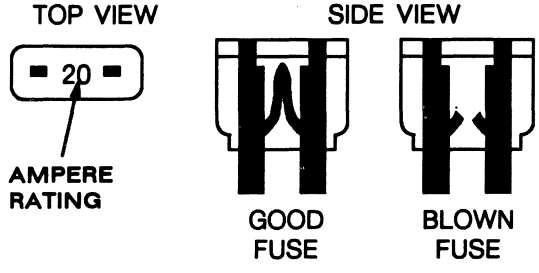

DRIVER'S SEAT CONTROL SWITCH
PAGE 120-1
LEFT POWER LUMBAR COMPRESSOR MOTOR
PAGE 122-1
LEFT POWER LUMBAR COMPRESSOR MOTOR
PAGE 122-1
RIGHT POWER LUMBAR COMPRESSOR MOTOR
PAGE 122-1
C302
C307
C307
C308
C300
151- 11- A3
S306
151- 11- A3
C304
C300
151- 11- A3
C301
151- 11- A4
WITH POWER SEATS
WITHOUT POWER SEATS
G300
151- 10- F2
Refer to Location Index, Cell 152, for Component, Connector, Splice, Ground and Base Part Number descriptions and locations.

11-1 CIRCUIT PROTECTION/FUSE PANEL

CIRCUIT PROTECTION DEVICES

Electrical circuits on this vehicle may be protected by fuses, fusible links, maxi-fuse cartridges, circuit breakers, or a combination of these devices.

BLADE TYPE FUSE

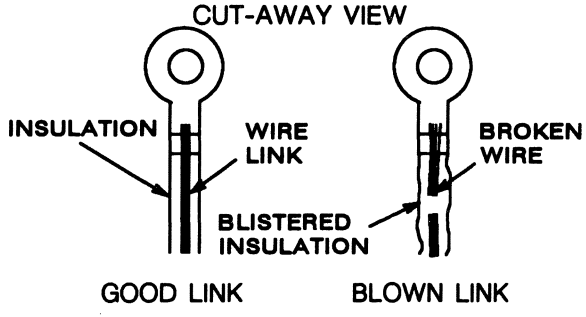


Blade type fuses have a transparent plastic housing. To check a fuse, pull it from the fuse panel and look at the fuse element through the housing. Always replace a blown fuse with a new fuse that has the same ampere rating.

The ampere rating of a blade type fuse can also be determined by following the color code shown here:

BLADE FUSE COLOR CODING	
AMPERE RATING	HOUSING COLOR
4	Pink
5	Tan
10	Red
15	Light Blue
20	Yellow
25	Natural
30	Light Green

FUSIBLE LINK



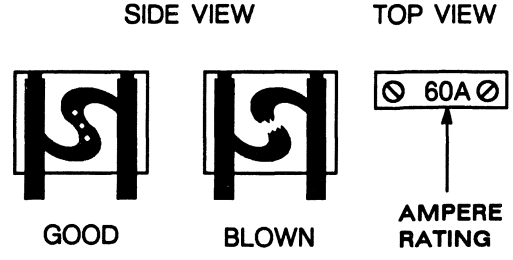
Fusible links are short lengths of wire that are smaller in diameter than the wires they are protecting. Fusible link wire is covered with a special thick, non-flammable insulation. An overload condition causes the insulation to blister. If the overload condition continues, the wire link will melt. To check a fusible link, look for blistered insulation. If the insulation is okay, pull lightly on the wire; If the fusible link stretches, the wire has melted.

When replacing fusible links, first cut the protected wire where it is connected to the fusible link. Then, tightly crimp or solder the new link to the protected wire.

Fusible links are often identified by color coding of the insulation, as shown here:

FUSIBLE LINK COLOR CODING	
WIRE LINK SIZE	INSULATION COLOR
20 GA	Blue
18 GA	Brown or Red
16 GA	Black or Orange
14 GA	Green
12 GA	Gray

MAXI-FUSE CARTRIDGE



Maxi-fuse cartridges have a transparent colored plastic housing. To check a maxi-fuse cartridge, look at the fuse element through the side of the housing.

To replace a maxi-fuse cartridge, pull it from the fuse box or panel. Always replace a blown maxi-fuse cartridge with a new one having the same ampere rating.

The ampere rating of a maxi-fuse cartridge can also be determined by following the color code shown here:

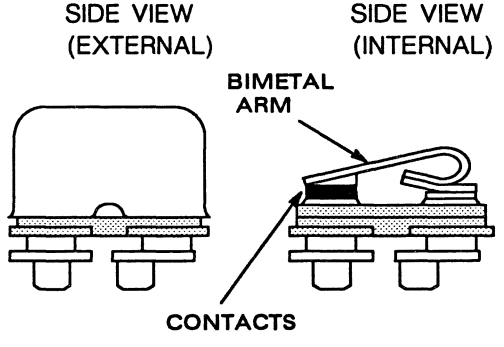
FUSIBLE LINK CARTRIDGE COLOR CODING	
AMPERE RATING	HOUSING COLOR
30	Light Green
40	Amber
50	Red
60	Blue

CIRCUIT BREAKER

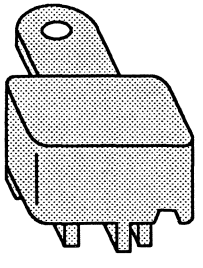
Some circuits are protected by circuit breakers (abbreviated "c. b." in fuse chart). They can be Fuse Panel mounted or in-line. Like fuses, they are rated in amperes.

Each circuit breaker conducts current through an arm made of two types of metal bonded together (bimetal arm). If the arm starts to carry too much current, it heats up. As one metal expands faster than the other the arm bends, opening the contacts. Current flow is broken. A circuit breaker can be the cycling or non-cycling type.

FUSE PANEL MOUNTED CYCLING TYPE

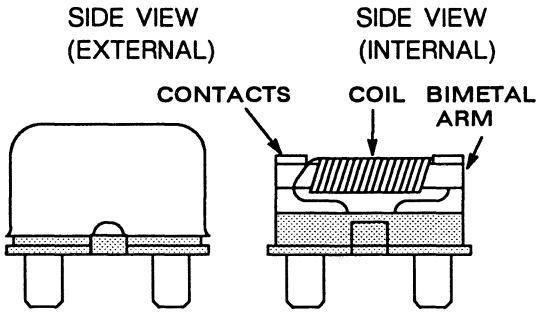


IN-LINE MOUNTED CYCLING TYPE

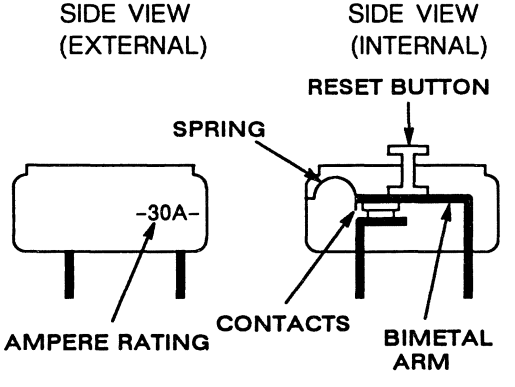


In the cycling type, the bimetal arm cools and straightens out. This cycle repeats as long as the overcurrent exists and power is applied.

FUSE PANEL MOUNTED NON-CYCLING TYPE



FUSE PANEL MOUNTED MANUAL RESET TYPE

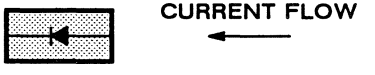


Two types of non-cycling circuit breakers are used; one is reset by removing power from the circuit, and the other is reset by depressing a reset button.

In the first type, there is a coil wrapped around the bimetal arm. When an overcurrent exists and the contacts open, a small current passes through the coil. This current through the coil is not enough to operate a load, but it does heat up both the coil and the bimetal arm. This keeps the arm in the open position until power is removed.

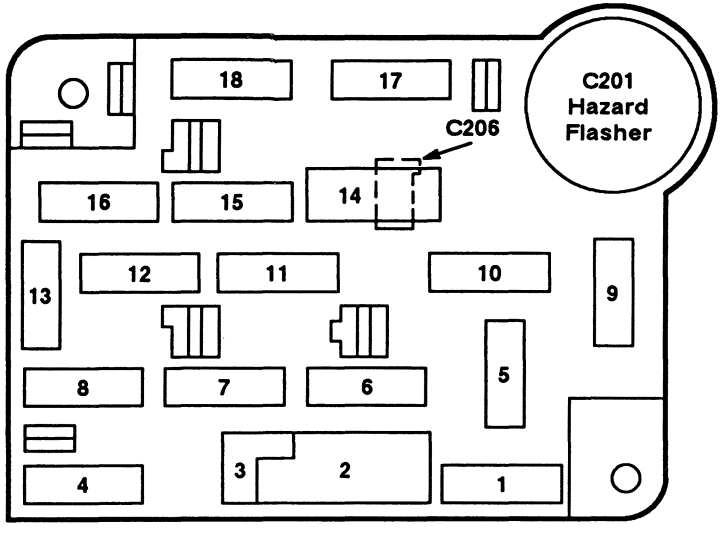
In the second type, a spring pushes the bimetal arm down and holds the contacts together. When an overcurrent condition exists and the bimetal arm heats up, the bimetal arm bends enough to overcome the spring and the contacts snap open. The contacts stay open until the reset button is pushed and the contacts snap together again.

DIODE



Diodes are electrical devices that permit current to flow in one direction only. The current flows in the direction indicated by the arrow.

11-3 CIRCUIT PROTECTION/FUSE PANEL



Fuse Value Amps	Color Code
4	Pink
5	Tan
10	Red
15	Light Blue
20	Yellow
25	Natural
30	Light Green

Fuse Position	Amps	Circuits Protected
1	15	Turn/Stop/Hazard Lamps, Speed Control, Shift Lock
2	15	Interval Wiper/Washer
3	—	(Not Used)
4	15	Exterior Lamps, Instrument Illumination, Warning Chime
5	15	Turn Signals, Backup Lamps, Rear Window Defrost, Convertible Top, Daytime Running Lamps (DRL), Shift Lock
6	20	Instrument Illumination, A/C-Heater, Trunk Lid Release, Speed Control
7	15	Air Bag Restraint System
8	15	Courtesy Lamps, Radio, Warning Chime, Power Mirror
9	30	A/C-Heater
10	20	Flash-to-Pass, Daytime Running Lamps (DRL)
11	15	Radio
12	15	Convertible Top
13	5	Instrument Illumination
14	20 c.b.	Power Windows
15	15	Fog Lamps
16	20	Cigar Lighter, Horn
17	20	Premium Sound Amplifier
18	15	Instrument Cluster, Air Bag Restraint System, Warning Chime, Low Oil Level Warning Relay

Power Distribution

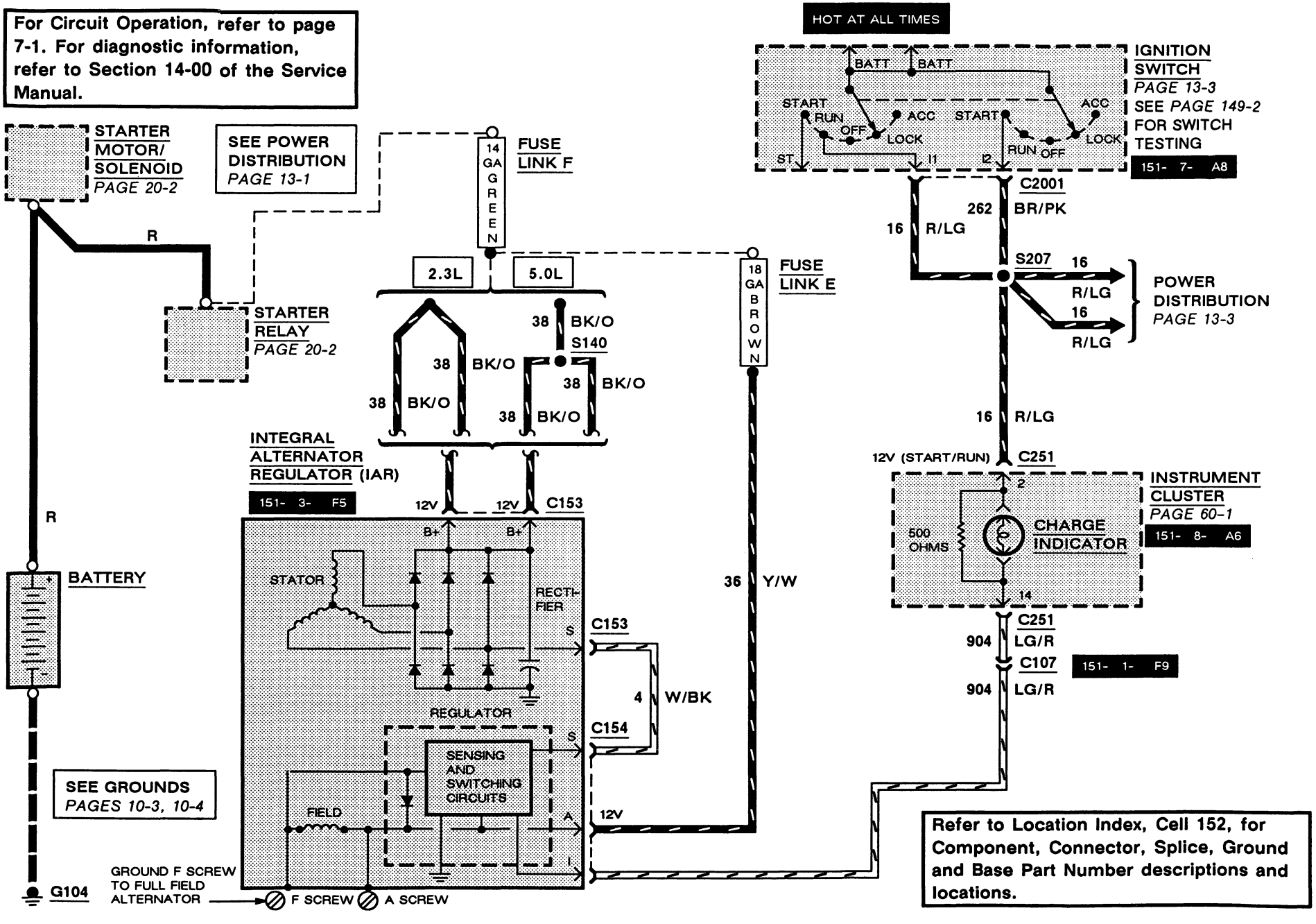
The Alternator and Battery are connected together at the Starter Relay hot terminal. Other circuits originate at the Starter Relay hot terminal and are protected by fuse links. Low power circuits are also protected by fuses.

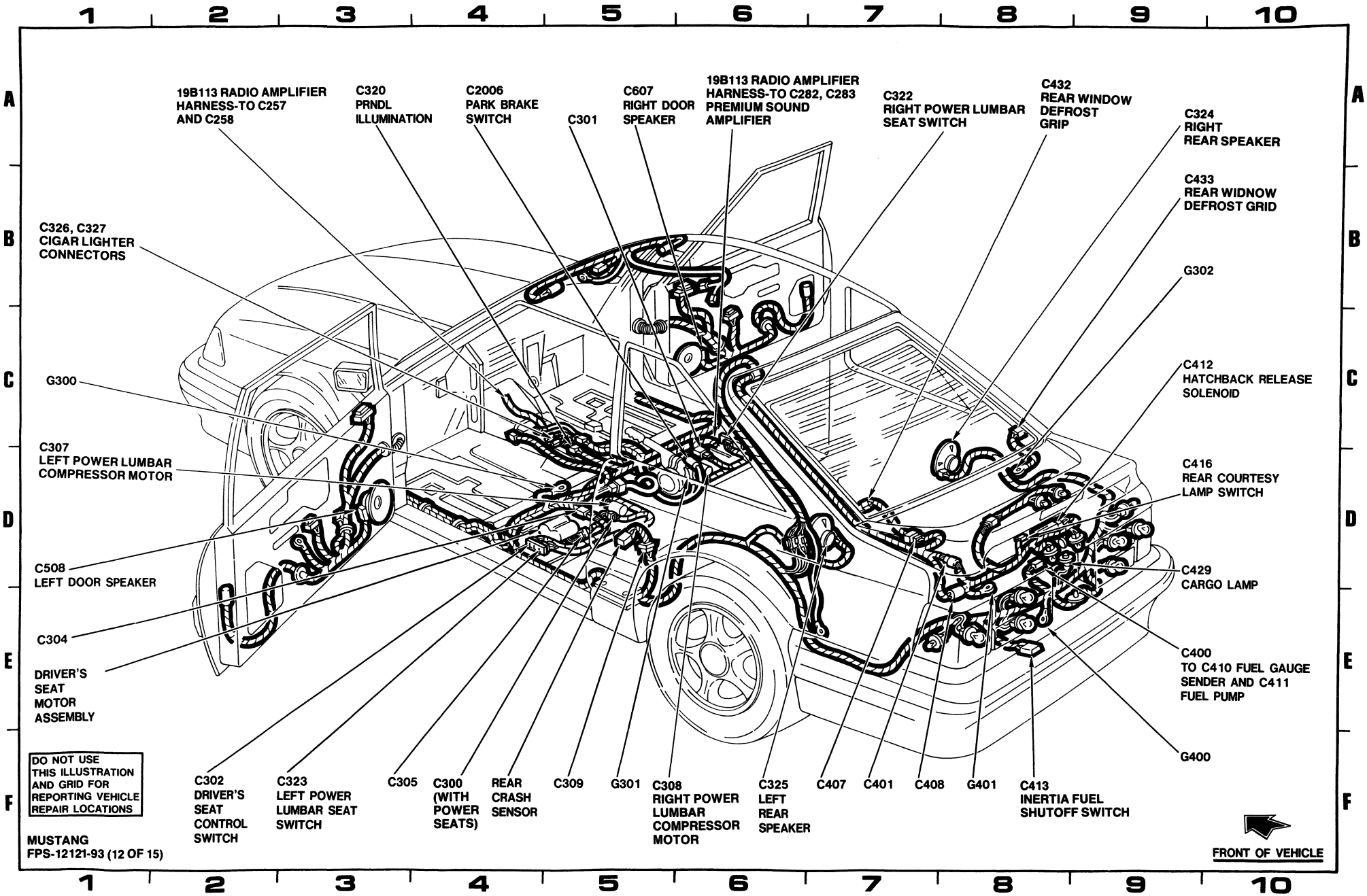
The Ignition Switch and Headlamp Switch are powered at all times, as are fuses 1, 4, 7, 8, 10, 12 and 16. The other fuses are powered through the Ignition Switch or the Main Light Switch.

Position 3 is not used.

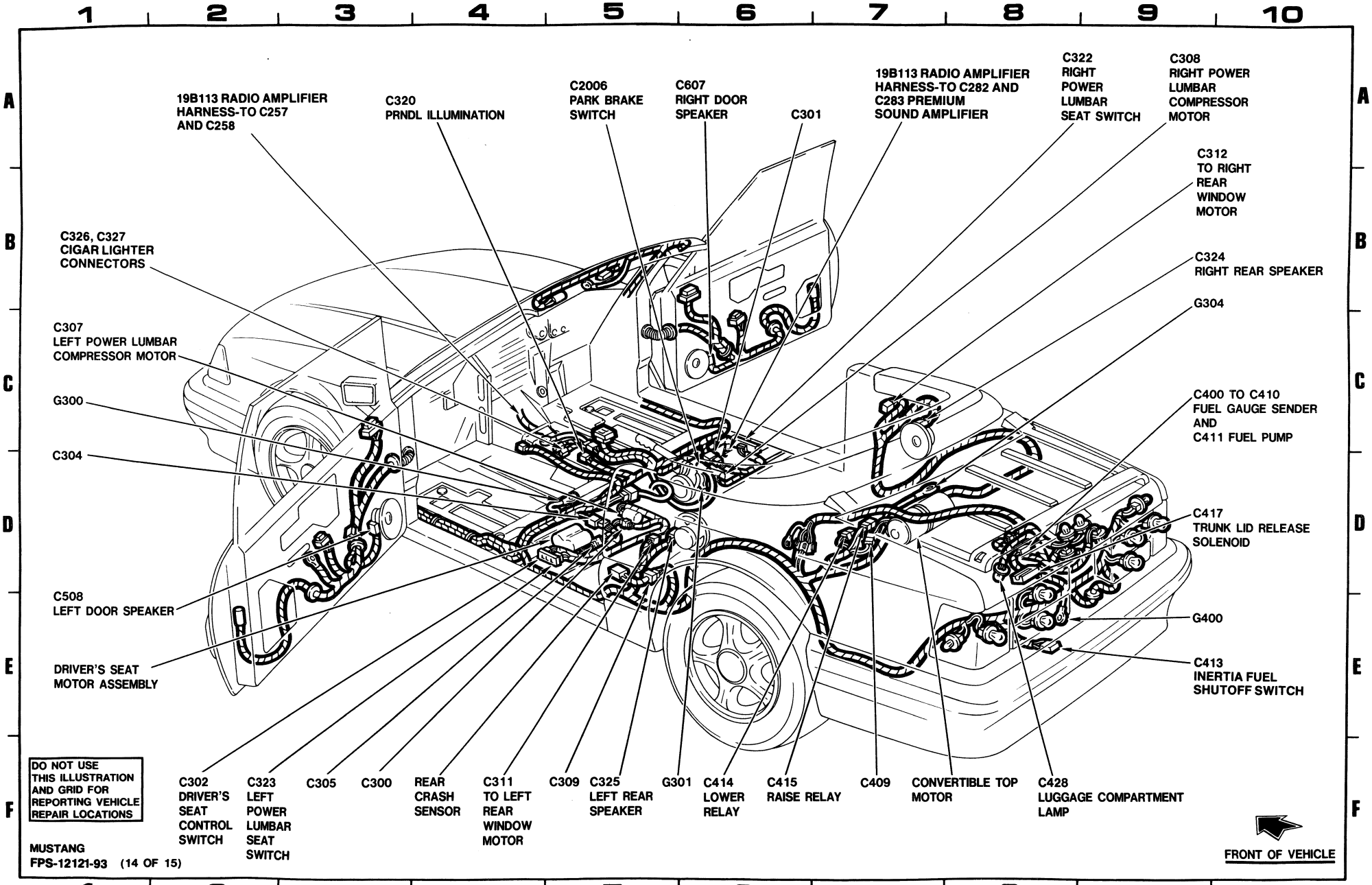
12-1 CHARGING SYSTEM

1993 MUSTANG





FULL BODY VIEW (3 DOOR) (1 of 2)



FULL BODY VIEW (CONVERTIBLE) (1 of 2)

152-1 LOCATION INDEX

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
A4LD Transmission	7005	Under center of car, on transmission	C157	151- 2- A5	
A/C Clutch Diode (2.3L)	14A604	RH side of engine compartment, taped to engine harness		151- 3- C1	
A/C Clutch Diode (5.0L)	14A604	LH side of engine compartment, taped to air conditioner jumper harness		151- 4- F6	
A/C Clutch Field Coil (2.3L)	19703	Lower RH front of engine, part of A/C compressor assembly	C159	151- 3- D1	
A/C Clutch Field Coil (5.0L)	19703	Top LH front of engine, part of A/C compressor assembly	C159	151- 4- F5	
A/C-Heater Control Assembly	19980	Center of I/P	C285	151- 7- F2	
A/C-Heater Control Illumination	18549/19980	Center of I/P, on A/C-heater control assembly	C2017	151- 7- A3	
Air Bag Diagnostic Module	14B056	Behind lower center of I/P	C276, 277	151- 8- E1	46-3
Ashtray Illumination	15055	Center console, in ashtray	C319	151-10- C1	
Backup Lamp Switch	15520	LH side of manual transmission	C161	★	
Backup Lamps	13465	Rear of car, on respective sides	C421, C425	151-11- F8	
Barometric Pressure (BARO) Sensor (2.3L)	12B583	Top center of safety wall	C163	151- 1- A6	
Barometric Pressure (BARO) Sensor (5.0L)	12B583	Top center of safety wall	C163	151- 4- A5	
Blower Motor	19805	Behind RH side of I/P, in A/C-heater plenum	C286	151- 7- B1	
Blower Motor Resistor Assembly	19A706	Behind RH side of I/P, in A/C-heater plenum	C287	151- 7- C1	
Blower Motor Switch	19A642	Center of I/P	C2015	151- 7- A4	
Brake Fluid Level Switch (2.3L)	2L414	LH rear of engine compartment, on brake fluid reservoir	C164	151- 3- B9	
Brake Fluid Level Switch (5.0L)	2L414	LH rear of engine compartment, on brake fluid reservoir	C164	151- 5- A8	
Brake On/Off (BOO) Switch	13480	Behind LH side of I/P, on brake pedal support	C2011	151- 7- F4	

★ No Figure Available

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Canister Purge (CANP) Solenoid (2.3L)	9C915	RH side of engine compartment, forward of shock tower	C1032	151- 1- C1	
Canister Purge (CANP) Solenoid (5.0L)	9C915	Lower RH front of engine compartment	C1032	151- 5- E1	
Cargo Lamp	13776	Center rear of cargo area	C429	151-12- D9	
Center Line Crash Sensor (2.3L)	14B006	Top center of upper radiator support	C166	151- 2- F5	
Center Line Crash Sensor (5.0L)	14B006	Top center of upper radiator support	C166	151- 5- F5	
Cigar Lighter	15052	Center console, in ashtray	C326, C327	151-10- C1	
Clockspring Assembly	14A664	In top of steering column, below steering wheel	C2010, C2018	151- 8- D9	
Clutch Cycling Pressure Switch (2.3L)	19E561	RH rear corner of engine compartment, on A/C accumulator	C167	151- 3- A2	
Clutch Cycling Pressure Switch (5.0L)	19E561	RH rear corner of engine compartment, on A/C accumulator	C167	151- 4- A2	
Clutch Pedal Position (CPP) Switch #1	11A152	Behind LH side of I/P, on clutch pedal support	C290	151- 7- A6	
Clutch Pedal Position (CPP) Switch #2	9A837	Behind LH side of I/P, on clutch pedal support	C291	151- 7- F6	
Clutch Pedal Position (CPP) Switch #2 Jumper	9D821	Behind center of I/P, on I/P support brace	C291	151- 7- F6	
Constant Control Relay Module	12B581	Mounted on side of RH front strut tower	C192	151- 3- A1	33-3
Convertible Top Motor	533A00	Behind top center of rear seat	C409	151-14- F7	
Convertible Top Switch	13A350	Top LH side of I/P, right of instrument cluster	C2023	151- 7- A7	
Coolant Temperature Sender (2.3L)	10884	LH rear of engine, below oil pressure switch	C168	151- 3- A6	
Coolant Temperature Sender (5.0L)	10884	Top LH front of engine, LH side of distributor	C168	151- 4- A5	
Crankshaft Position (CKP) Sensor	6C315	Center front of engine, near timing chain cover	C111, C112	151- 1- F5	21-5

152-3 LOCATION INDEX

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Data Link Connector (DLC) C198 (2.3L)	14489	LH rear of engine compartment, mounted on rear of strut tower	C198	151- 2- A9	23-6
Data Link Connector (DLC) C198 (5.0L)	14489	LH rear of engine compartment, mounted on rear of strut tower	C198	151- 5-B10	24-7
Data Link Connector (DLC) C199 (2.3L)	14489	LH rear of engine compartment, mounted on rear of strut tower	C199	151- 2- A9	23-6
Data Link Connector (DLC) C199 (5.0L)	14489	LH rear of engine compartment, mounted on rear of strut tower	C199	151- 5-B10	24-7
Daytime Running Lamps (DRL) Module (2.3L)	15A272	In front of LH front fender, below horns	C170	151- 3- E9	97-3
Daytime Running Lamps (DRL) Module (5.0L)	15A272	In front of LH front fender, below horns	C170	151- 4- E9	97-3
Distributor	12127	Top front of engine		151- 4- F3	
Dome Lamp (With Moonroof)	13776	Center of windshield header	C927	151- 9- A1	
Dome Lamp (Without Moonroof)	13776	Center of roof	C926	151- 9- A5	
Driver's Seat Control Switch		LH side of LH front seat	C302	151-11- F4	120- 2
Driver's Seat Motor Assembly		Under LH front seat	C305	151-11- F5	120- 2
DRL Shorting Connector (2.3L)	14A624	In front of LH front fender, below horns	C170	151- 3- E9	
DRL Shorting Connector (5.0L)	14A624	In front of LH front fender, below horns	C170	151- 4- E9	
EGR Vacuum Regulator Solenoid (2.3L)	9J472	RH rear of engine compartment, on rear of strut tower	C171	151- 1- B1	
EGR Vacuum Regulator Solenoid (5.0L)	9J459	RH rear of engine compartment, on rear of strut tower	C171	151- 5- A2	
EGR Valve Position Sensor (2.3L)	9G428	Top LH rear of engine, on rear of intake manifold	C172	151- 1- A8	
EGR Valve Position Sensor (5.0L)	9G428	Top RH rear of engine, on rear of intake manifold	C172	151- 4- A3	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Electric Cooling Fan	8K621	Center front of engine compartment, behind radiator	C173	151- 3- F4	
Engine Compartment Lamp	15702	Underside of engine compartment hood	C158	151- 3- A9	
Engine Coolant Temperature (ECT) Sensor (2.3L)	12A648	RH rear of engine, below throttle body	C174	151- 1- A3	
Engine Coolant Temperature (ECT) Sensor (5.0L)	12A648	Top RH front of engine, RH side of fuel injector No. 1	C174	151- 4- E1	
Engine Indicator Diode	14A604	Behind LH side of I/P, taped in main harness, near speed control amplifier		151- 8- F8	
Fog Lamp Switch	11654	Top LH side of I/P, left of instrument cluster	C298	151- 7- B9	
Fog Lamps	15200	Lower front of car, on respective sides	C1021, C1025	151- 5- F7	
Front Park/Turn Lamps	13200	Front of car, on respective sides	C1024, C1028	151- 3- F8	
Front Side Marker Lamps	15A424	Front of respective front fenders	C1022, C1026	151- 3- F9	
Fuel Gauge Sender	9H307	Below rear of car, top LH side of fuel tank	C410	151- 9- B9	
Fuel Injectors (2.3L)	9F593	Top of each cylinder	C178, C179 C180, C181	151- 1- F4	
Fuel Injectors (5.0L)	9F593	Top of each cylinder	C178, C179 C181, C182 C183, C184 C185	151- 4- B9	
Fuel Pump	9350	Below rear of car, top RH side of fuel tank	C411	151- 9- B9	
Fuel Pump Relay	14N089	RH side of engine compartment, on lower front of wheel well	C103	151- 5- D1	24-7
Fuse Link A (2.3L)	14526	Front of LH fender apron, at starter relay		151- 3- D9	
Fuse Link A (5.0L)	14526	Front of LH fender apron, at starter relay		151- 4- D9	
Fuse Link B (2.3L)	14526	Front of LH fender apron, at starter relay		151- 3- D9	
Fuse Link B (5.0L)	14526	Front of LH fender apron, at starter relay		151- 4- D9	
Fuse Link C (2.3L)	14526	Front of LH fender apron, at starter relay		151- 3- D9	
Fuse Link C (5.0L)	14526	Front of LH fender apron, at starter relay		151- 4- D9	
Fuse Link D	14526	Front of LH fender apron, at starter relay		151- 4- D9	

152-5 LOCATION INDEX

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Fuse Link E (2.3L)	14526	LH side of engine compartment, taped to dash panel to headlamp junction harness, behind battery		151- 3- F6	
Fuse Link E (5.0L)	14526	LH side of engine compartment, behind battery		151- 4- F9	
Fuse Link F (2.3L)	14526	Front of LH fender apron, at starter relay		151- 3- D9	
Fuse Link F (5.0L)	14526	Front of LH fender apron, at starte relay		151- 4- D9	
Fuse Link G (2.3L)	14526	Front of LH fender apron, at starter relay		151- 3- C9	
Fuse Link G (5.0L)	14526	Front of LH fender apron, at starter relay		151- 4- D9	
Fuse Link H	14526	Front of LH fender apron, at starter relay		151- 3- C9	
Fuse Link J	14526	Front of LH fender apron, at starter relay		151- 3- C9	
Fuse Link K (2.3L)	14526	RH rear corner of engine compartment, taped to engine harness		151- 2- B1	
Fuse Link K (5.0L)	14526	RH rear corner of engine compartment, taped to engine harness		151- 4- A1	
Fuse Link N (2.3L)	14526	LH rear corner of engine compartment, taped to main harness		151- 2- A9	
Fuse Link N (5.0L)	14526	LH rear corner of engine compartment, taped in main harness		151- 4- B9	
Fuse Panel	14A067	Behind LH side of I/P, left of steering column	C206	151- 7- E9	
Glove Box Lamp	14413	RH side of I/P, in glove box	C2016	151- 8- B1	
Hatchback Release Solenoid	14030	Center rear of hatchback, near latch assembly	C412	151-12- C9	
Hazard Flasher	13350	Behind LH side of I/P, on fuse panel	C201	151- 7- F8	
Hazard Warning Switch	13A350	Top LH side of I/P, RH side of instrument cluster	C299	151- 7- A6	90–4
Headlamps	13005	Front of car, on respective sides	C1023, C1027	151- 3- F9	
Heated Oxygen Sensor (HO2S)	9F472	Lower RH rear of engine, in exhaust manifold	C186	151- 1- C1	
Heater Control Assembly	18549	Center of I/P	C285	151- 7- F2	
Hi Mount Stop Lamps (2 Door)	13A613	Center of rear package tray	C321	151-10- E9	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Hi Mount Stop Lamps (3 Door)	13A613	In center of rear spoiler	C430	151-13- C9	
Hi Mount Stop Lamps (Convertible)	13A613	Center rear of trunk lid	C431	151-15- A9	
Horn Relay	13853	Behind RH center of I/P, above warning chime module	C187	151- 7- A3	44–2
Horns (2.3L)	13A803	In front of LH front fender, near windshield washer fluid reservoir	C188, C189	151- 2- E9	
Horns (5.0L)	13A803	In front of LH front fender, near windshield washer fluid reservoir	C188, C189	151- 5-E10	
Idle Air Control (IAC) Valve (2.3L)	9F715	Top rear of engine, above valve cover	C190	151- 1- A5	
Idle Air Control (IAC) Valve (5.0L)	9F715	Top RH side of engine, forward of throttle body	C190	151- 4- C1	
Ignition Coil	12029	LH side of engine compartment, on front of strut tower	C191	151- 5-C10	
Ignition Control Module (ICM) (2.3L)	12A199	Top LH front of engine, forward of intake manifold	C155, C156	151- 2- A2	21–5
Ignition Control Module (ICM) (5.0L)	12A297	Center front of engine, on LH side of distributor	C155, C156	151- 4- F4	21–5
Ignition Key Warning Switch	11A127	Top RH side of steering column, part of ignition lock cylinder	C2026	151- 7- A9	
Ignition Suppression Resistor	14A601	LH rear corner of engine compartment, taped to engine harness		151- 4- A8	
Ignition Switch	11572	Top RH side of steering column	C2001	151- 7- A8	13–12
In-line Circuit Breaker (2.3L)	14A065	Front of LH fender apron, on starter relay		151- 3- B9	
In-line Circuit Breaker (5.0L)	14A065	Front of LH fender apron, on starter relay		151- 4- C9	
Inertia Fuel Shut-off Switch	9341	Lower LH center rear of trunk	C413	151- 9- E9	
Instrument Cluster	10849	Top LH side of I/P	C250, C251	151- 8- A6	60–4
Instrument Panel Dimming Rheostat	11691	LH side of I/P, left of steering column	C2022	151- 8- C9	
Intake Air Temperature (IAT) Sensor (2.3L)	12A697	RH side of engine compartment, on air cleaner assembly	C160	151- 1- E1	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Intake Air Temperature (IAT) Sensor (5.0L)	12A697	Top LH front of engine, behind coolant temperature sender	C160	151- 4- F8	
Integral Alternator Regulator (IAR) (2.3L)	10300/10346	Top LH front of engine	C153, C154	151- 3- F5	12-2
Integral Alternator Regulator (IAR) (5.0L)	10300/10346	RH front of engine	C153, C154	151- 4- F2	12-2
Interval Governor	6C625	Behind LH side of I/P, LH side of steering column brace	C2002	151- 8- F9	81-2
Left Dash Speaker	18808	Behind top LH corner of I/P	C2025	151- 8- B9	
Left Door Lock Motor	218A42	In rear of LH front door	C503	151-11- E1	
Left Door Lock Switch	14A509	Center of LH front door, on armrest	C507	151-11- E1	110- 5
Left Door Speaker	18808	In lower front of LH front door	C508	151-10- D1	
Left Forward Crash Sensor (2.3L)	14B005	LH side of upper radiator support, behind headlamp	C177	151- 2- F8	
Left Forward Crash Sensor (5.0L)	14B005	LH side of upper radiator support, behind headlamp	C177	151- 5- F8	
Left Front Courtesy Lamp Switch	13713	In front of LH front door jamb	C297	151- 6- F5	
Left Front Window Motor	23394	In lower front of LH front door	C504	151-11- F3	
Left Heated Oxygen Sensor (HO2S)	9F472	Lower LH rear of engine, in exhaust manifold	C193	151- 5- A6	
Left Power Lumbar Compressor Motor	65530	Under RH side of LH front seat	C307	151-10- F4	
Left Power Lumbar Seat Switch	14C715	On LH side of LH front seat	C323	151-10- F3	
Left Power Mirror	17682	Top front of LH front door	C509	151-11- C1	
Left Rear Speaker (2 Door)	18971	LH side of rear package tray	C325	151-10- F8	
Left Rear Speaker (3 Door)	18932	LH front of cargo area	C325	151-12- F6	
Left Rear Speaker (Convertible)	18971	Front of LH rear quarter panel, in trim panel	C325	151-14- F5	
Left Rear Window Motor	23394	In front of LH rear quarter panel	C311	151-14- F4	
Left Vanity Mirror Lamp	17A679	At LH vanity mirror	C917	151- 9- C1	
License Lamps (2 Door And Convertible)	13550	Center rear of trunk lid	C426, C427	151-11- E9	
License Lamps (3 Door)	13550	Center rear of hatchback	C426, C427	151-13- E9	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Low Coolant Switch	10D968	LH front of engine compartment, in coolant reservoir	C194	151- 4- F9	
Low Oil Level Sensor	6C624	Lower LH rear of engine, on side of oil pan	C195	151- 5- A6	
Low Oil Warning Relay	6C625	Behind LH side of I/P, LH side of steering column brace	C200	151- 8- D9	60–5
Lower Relay	9345	Behind top center of rear seat, LH side of convertible top motor	C414	151-14- F6	102– 2
Luggage Compartment Lamp (2 Door)	19B516	Center rear of trunk lid	C428	151- 9- D9	
Luggage Compartment Lamp (Convertible)	19B516	LH rear of trunk lid	C428	151-14- F8	
Main Light Switch	11654	Top LH side of I/P, LH side of instrument cluster	C2005	151- 7- B9	13–12
Map Lamp (2 And 3 Door)	13776	Center of roof	C918	151- 9- A7	
Map Lamp (Convertible)	13776	Center of windshield header	C900	151-15- A4	
Mass Air Flow (MAF) Sensor (2.3L)	12B579	RH side of engine compartment, on rear of air cleaner assembly	C197	151- 1- D1	
Mass Air Flow (MAF) Sensor (5.0L)	12B579	RH side of engine compartment, on air intake assembly	C197	151- 4- D1	
Master Window/Door Lock Control Switch (2 And 3 Door)	14A509	Center of LH front door, on armrest	C502	151-11- D1	100– 4
Master Window/Door Lock Control Switch (Convertible)	14A509	Center of front LH door, on armrest	C505	151-15- C1	100– 4
Multi-function Switch	13K359	Inside top of steering column	C268, C269 C270	151- 8- A8	90–4
Octane Adjust Shorting Bar	14A464	RH rear of engine compartment	C1000	151- 2- A4	
Oil Pressure Sender	9D290	Lower LH front of engine, above oil filter	C1001	151- 5- F6	
Oil Pressure Switch	9278	LH rear of engine, below valve cover	C1002	151- 3- A5	
Park Brake Switch	15852	Below rear of center console, on RH rear of park brake lever assembly	C2006	151-10- F6	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Park/Neutral Position Switch (Automatic)	7A247	LH side of automatic transmission	C162	★	
Park/Neutral Position Switch (Manual)	7A247	Top front of manual transmission	C117	151-11- B1	
PCM Power Relay	12A646	Behind RH cowl panel, on bracket, above powertrain control module (PCM)	C293	151- 6- A6	24-8
Power Mirror Switch	17B676	On center console	C350	151- 9- D1	124- 2
Power Steering Pressure (PSP) Switch	3N824	Lower LH side of engine, near power steering pump	C1003	151- 1- F7	
Powertrain Control Module (PCM) (2.3L)	12A650	Behind RH cowl panel	C294	151- 6- F7	23-5
Powertrain Control Module (PCM) (5.0L)	12A650	Behind RH cowl panel	C294	151- 6- F7	24-6
Premium Sound Amplifier	18B849	Below RH front seat	C282, C283	151-10- A7	130- 5
Primary Coil (RH)	12029	Top RH side of engine, right of valve cover	C1004	151- 2- C1	
PRNDL Illumination	15A808	Center console, near gearshift lever	C320	151-10- E1	
Radio (With Premium Sound)	18806	Center of I/P	C280, C281	151- 8- F4	130- 4
Radio (Without Premium Sound)	18806	Center of I/P	C257, C258	151- 8- F4	130- 4
Radio Noise Capacitor	18801	Top RH front of engine, near secondary coil (LH)	C1006	151- 2- F4	
Raise Relay	9345	Behind top center of rear seat, LH side of convertible top motor	C415	151-14- F6	102- 2
Rear Courtesy Lamp Switch	13713	Center rear of hatchback	C416	151-12- D9	
Rear Crash Sensor	14B007	In lower front of LH rear quarter panel	C309	151- 9- F3	46-3
Rear Park/Stop Lamps	13465	Rear of car, on respective sides	C419, C424	151-11- C9	
Rear Side Marker Lamps	13465	Rear of car, on respective sides	C420, C423	151-11- C9	
Rear Turn Lamps	13465	Rear of car, on respective sides	C418, C422	151-11- F9	
Rear Window Defrost Control Relay	18C641	Behind LH side of I/P, on RH side of fuse panel	C2007	151- 7- E9	56-2
Rear Window Defrost Grid	42006	Inside rear window	C432, C433	151- 9- A8	
Rear Window Defrost Switch	13A350	Top LH side of I/P, right of instrument cluster	C2020	151- 7- A7	

★ No Figure Available

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Right Dash Speaker	18808	Behind top RH corner of I/P	C2024	151- 8- A2	
Right Door Lock Motor	218A42	In rear of RH front door	C603	151-11- B9	
Right Door Lock Switch	14A265	Center of RH front door, on armrest	C606	151-11- A8	110- 5
Right Door Speaker	18808	Lower front of RH front door	C607	151-10- A5	
Right Forward Crash Sensor (2.3L)	14B004	RH side of upper radiator support, behind headlamp	C176	151- 2- F3	
Right Forward Crash Sensor (5.0L)	14B004	RH side of upper radiator support, behind headlamp	C176	151- 5- F2	
Right Front Courtesy Lamp Switch	13713	In front of RH front door jamb	C296	151- 6-C10	
Right Front Window Motor	23394	In lower front of RH front door	C604	151-11- B9	
Right Heated Oxygen Sensor (HO2S)	9F472	Lower RH rear of engine, in exhaust manifold	C1005	151- 5- A4	
Right Power Lumbar Compressor Motor	65530	Under LH side of RH front seat	C308	151-10- B9	
Right Power Lumbar Seat Switch	14C715	On RH side of RH front seat	C322	151-10- B9	
Right Power Mirror	17682	Top front of RH front door	C608	151-11- A5	
Right Rear Speaker (2 Door)	18971	RH side of rear package tray	C324	151-10- D9	
Right Rear Speaker (3 Door)	18932	RH front of cargo area	C324	151-12- A9	
Right Rear Speaker (Convertible)	18971	Front of RH rear quarter panel, in trim panel	C324	151-14- B9	
Right Rear Window Motor	23394	In front of RH rear quarter panel	C312	151-14- A9	
Right Vanity Mirror Lamp	17A679	At RH vanity mirror	C916	151- 9- A3	
Right Window/Door Lock Control Switch	14A265	Center of RH front door, on armrest	C602	151-11- A6	100- 5
Seat Belt Switch	10B924	Inside LH front seat belt buckle assembly	C315	151-10- A4	
Secondary Air Injection Bypass (AIRB) Solenoid	95448	RH rear of engine compartment, on rear of strut tower	C1013	151- 5- B1	
Secondary Air Injection Diverter (AIRD) Solenoid	95448	RH rear of engine compartment, on rear of strut tower	C1014	151- 5- A1	

Component	Base Part No.	Location	Connector	Page Zone	Connector Page
Secondary Coil (LH)	12029	Top RH front of engine, right of valve cover	C1007	151- 2- E1	
Shift Lock Actuator	3F719	Top RH side of steering column, near ignition switch	C2008	151- 8- A7	
Speed Control Amplifier	9D843	Behind LH side of I/P, near top of cowl panel	C214, C215	151- 7- F7	31-3
Speed Control Servo (2.3L)	9C735	In rear of LH front fender		151- 3- A9	31-3
Speed Control Servo (5.0L)	9C735	In rear of LH front fender		151- 4- A9	31-3
SPOUT Check Connector C1009 (2.3L)	14A464	Top LH front of engine, near ignition control module (ICM)	C1009	151- 2- E9	
SPOUT Check Connector C1009 (5.0L)	14A464	LH front of engine, taped to engine harness, near distributor	C1009	151- 4- F5	
Starter Clutch Pedal Position (SCPP) Switch	11A152	Behind LH side of I/P, on clutch pedal support	C288	151- 7- A5	
Starter Motor/Solenoid (2.3L)	11001	Lower RH rear of engine		151- 3- A4	
Starter Motor/Solenoid (5.0L)	11001	Lower RH rear of engine		151- 4- C1	
Starter Relay (2.3L)	11450	Front of LH fender apron		151- 3- C9	
Starter Relay (5.0L)	11450	Front of LH fender apron		151- 4- C9	
Steering Column Air Bag	043B13	In center of steering wheel	C2009	151- 6- F6	
Steering Wheel Control Switch	9C888	Center of steering wheel	C208	151- 6- A5	
Tachometer Service Connector C1001	14A624	LH front of engine, near ignition control module (ICM)	C1001	151- 2- A6	
Throttle Position (TP) Sensor (2.3L)	9B989	Top rear of engine, on throttle body	C1031	151- 1- A5	
Throttle Position (TP) Sensor (5.0L)	9B989	Top RH side of engine, on rear of throttle body	C1015	151- 5- A3	
Trunk Lid Release Solenoid (2 Door)	14030	Center rear of trunk lid, near latch assembly	C417	151- 9- C9	
Trunk Lid Release Solenoid (Convertible)	14030	Center rear of trunk lid, near latch assembly	C417	151-14- D9	
Trunk Lid/Hatchback Release Switch	19B514	RH side of I/P, in glove box	C2019	151- 7- A1	

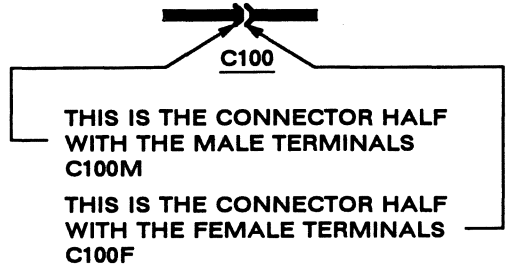
Splice	Location
S600 (With Power Windows)	Window regulator right front door harness, near T/O to right window/door lock control switch
S600 (Without Power Windows)	Right front door lock harness, near T/O to C606
S601 (With Power Windows)	Window regulator right front door harness, near T/O to right window/door lock control switch
S601 (Without Power Windows)	Right front door lock harness, near T/O to C606

153-1 HARNESS CAUSAL PART NUMBER

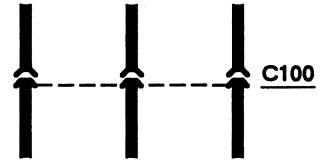
HOW TO IDENTIFY A BASIC HARNESS NUMBER BY USING A "C" NUMBER

Understand these symbols before you use the following listing:

THIS MEANS A HARNESS CONNECTION

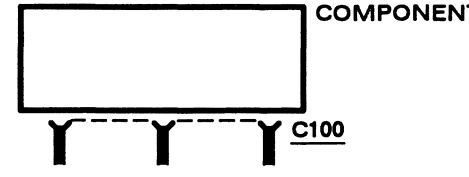


THE DASHED LINE MEANS THAT ALL OF THESE TERMINALS ARE IN THE SAME CONNECTION



THE UPPER FEMALE TERMINALS ARE IN C100F; THE LOWER MALE TERMINALS ARE IN C100M

THIS MEANS A COMPONENT CONNECTION



THE F AND M IS NOT USED WITH THE "C" NUMBER

Identify the basic harness part number by:

1. If the problem is in a connector, find the connector "C" number in the EVTM schematics. Then locate the "C" number in the following listing and read the basic harness part number.
2. If the problem is **not** in a connector (such as a short or broken wire), then choose a connector **located on the same harness** that has the problem. Identify the "C" number of that connector. Locate the "C" number in the following listing and read the basic part number of the harness that has the problem.

Connector Number	Wire Assembly
C100 (F)	12A581
C100 (M)	14A666
C100 (M)	19D887
C101 (F)	12A690
C101 (M)	12A581
C102 (F)	15A702
C102 (M)	14401
C103	12A581
C104 (F)	9D930
C104 (M)	12A581
C105 (F)	12A690
C105 (M)	12A581
C106 (F) (Automatic)	7C078
C106 (F) (Manual)	15525
C106 (M)	7E443
C107 (F)	14290
C107 (M)	14401
C108 (F)	14290
C108 (M)	14401
C110 (F) (2.3L)	12A690
C110 (F) (5.0L)	12A581
C110 (M)	14401
C111	12A690
C112	12A690
C113	12A581
C117	7E443
C118 (F)	9D930
C118 (M)	12A581
C119 (F)	9D930
C119 (M)	12A581
C151	14401
C152	14401
C153	14290
C154	14290
C155	12A690
C156	12A690
C157	12A690
C158	15A702
C159	19D887
C160 (2.3L)	12A581
C160 (5.0L)	9D930
C161	15525
C162	7C078
C163	12A581
C164	14401
C165	9D930
C166 (F)	P.I.A.
C166 (M)	12A581
C167	12A581
C168 (2.3L)	12A690
C168 (5.0L)	9D930
C170	14401
C171	12A581
C172	9D930
C173	12A581
C174 (2.3L)	12A581
C174 (5.0L)	9D930
C176 (F)	P.I.A.
C176 (M)	12A581
C177 (F)	P.I.A.
C177 (M)	14401
C178	9D930
C179	9D930
C180	9D930
C181	9D930
C182	9D930
C183	9D930
C184	9D930
C185	9D930
C186	12A581
C187	14401
C188	14290
C189	14290
C190 (2.3L)	12A690
C190 (5.0L)	9D930
C191	12A581
C192	12A581
C193	12A690
C194	14290
C195	12A690
C197	12A581
C198	12A581
C199	12A581
C1000	12A581
C1001	9D930
C1002	12A690
C1003	12A581
C1004	12A690
C1005	12A690
C1006	12A690
C1007	12A690
C1008	P.I.A.
C1009 (2.3L)	12A690
C1009 (5.0L)	12A581
C1011	12A690
C1012	12A581
C1013	12A581
C1014	12A581
C1015	9D930
C1016	7E443
C1018	14401
C1019	14401
C1020	12A581
C1021	P.I.A.
C1022	14290
C1023	14290
C1024	14290
C1025	P.I.A.
C1026	14290
C1027	14290
C1028	14290
C1029	14290
C1030	14290
C1031	12A581
C1032	12A581
C200	14401
C201	14401
C203 (F)	14405
C203 (M)	14401
C204 (F)	14A200
C204 (M)	14401
C205 (F)	14401
C205 (M)	14334
C206	14401
C207 (F)	14405
C207 (M)	14401
C208	P.I.A.
C212 (F)	7E443
C212 (M)	14401
C213 (F)	14401
C213 (M)	12A581
C214	P.I.A.

153-3 HARNESS CAUSAL PART NUMBER

Connector Number	Wire Assembly
C215	14401
C216 (F)	14401
C216 (M)	12A581
C217 (F)	14401
C217 (M)	14405
C221 (F) (Without Power Windows)	14025
C221 (F) (With Power Windows)	14631
C221 (M)	14A200
C222 (F) (Without Power Windows)	14024
C222 (F) (With Power Windows)	14630
C222 (M)	14A200
C224 (F)	14631
C224 (M)	14A200
C225 (F)	14A200
C225 (M)	14631
C227 (F) (Without Power Windows)	14025
C227 (F) (With Power Windows)	14631
C227 (F) (Without Power Windows And Door Locks)	19A044
C227 (M)	14401
C228 (F) (Without Power Windows)	14024
C228 (F) (With Power Windows)	14630
C228 (F) (Without Power Windows And Door Locks)	19A044
C228 (M)	14401
C229 (F)	14631
C229 (M)	14405
C230 (F) (Without Power Windows)	14025
C230 (F) (With Power Windows)	14631
C230 (F) (Without Power Windows And Door Locks)	19A044
C230 (M)	14405
C231 (F) (Without Power Windows)	14024
C231 (F) (With Power Windows)	14630
C231 (M)	14405
C250	14401
C251	14401
C257 (F)	14401
C257 (M)	19B113
C258 (F)	14401
C258 (M)	19B113
C268	14401
C269	14401
C270	14401
C276	14401
C277	14401
C280	19B113
C281	19B113
C282	19B113
C283	19B113
C285	14401
C286	14401
C287	14401
C288	14401
C289	14401
C290	14401
C291	14401
C293	12A581
C294	12A581
C296	14334
C297	14405
C298	14401
C299	14401
C2001	14401
C2002	14401
C2005	14401
C2006	14405
C2007	14401
C2008	14401
C2009	P.I.A.
C2010	14401
C2011	14401
C2012	14401
C2013	14401
C2014	14A200
C2015	14401
C2016	14401
C2017	14401
C2018	14401
C2019	14401
C2020	14401
C2022	14401
C2023	14401
C2024	14401
C2025	14401
C2026	14401
C300 (F) (Without Power Seats)	14B084
C300 (F) (With Power Seats)	14B723
C300 (M)	14405
C301 (F)	14B084
C301 (M)	14405
C302	14B723
C303 (F)	14A318
C303 (M)	14405
C304 (F)	14B723
C304 (M)	14405
C305	14B723
C307	14B084
C308	14B084

Connector Number	Wire Assembly
C309 (F)	P.I.A.
C309 (M)	14405
C311	14405
C312	14405
C315	14405
C319	14A318
C320	14405
C321 (F)	14405
C321 (M)	P.I.A.
C322	14B084
C323	14B084
C324	14405
C325	14405
C326	14A318
C327	14A318
C350	14405
C400 (F)	14405
C400 (M)	9A340
C401 (F)	13B440
C401 (M)	13412
C403 (F)	13B440
C403 (F)	19B516
C403 (M)	14405
C405 (F)	13B440
C405 (F)	19B516
C405 (M)	14405
C406 (F)	18C618
C406 (M)	14405
C407 (F)	13B440
C407 (M)	18C619
C408 (F)	13B440
C408 (M)	13412
C409	14405
C410	9A340
C411	9A340
C412	13412
C413	14405
C414	14405
C415	14405
C416	13412
C417	19B516
C418	14405
C419	14405
C420	14405
C421	14405
C422	14405
C423	14405
C424	14405
C425	14405
C426	13412
C426	19B516
C427	13412
C427	19B516
C428	19B516
C429	14405
C430	13412
C431	19B516
C432	18C618
C433	18C619
C502	14631
C503 (Without Power Windows)	14025
C503 (Without Power Windows)	14631
C504	14631
C505	14631
C507	14025
C508 (Without Power Windows)	14025
C508 (With Power Windows)	14631
C509 (Without Power Windows)	14025
C509 (With Power Windows)	14631
C602	14630
C603 (Without Power Windows)	14024
C603 (With Power Windows)	14630
C604	14630
C606	14024
C607 (Without Power Windows)	14024
C607 (With Power Windows)	14630
C608 (Without Power Windows)	14024
C608 (With Power Windows)	14630
C900	14334
C916	14334
C916	14335
C917	14334
C917	14335
C918	14335
C926	14335
C927	14334

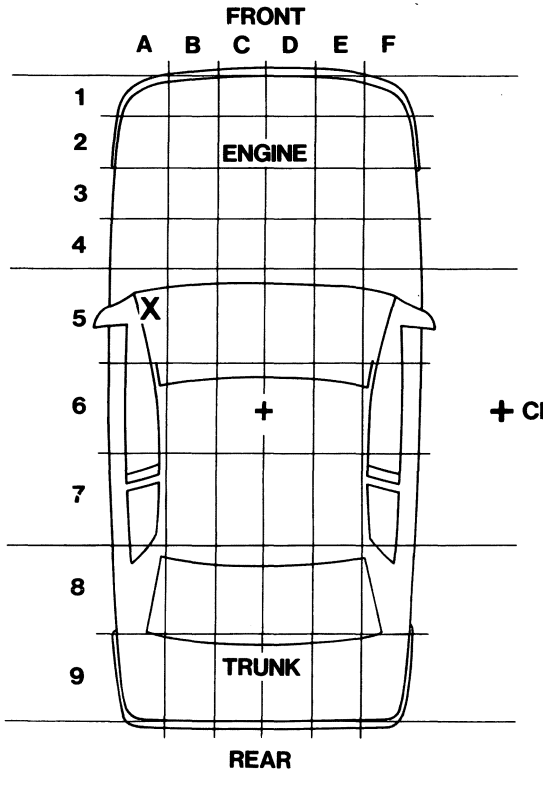
VEHICLE REPAIR LOCATION CODES

TO PINPOINT THE ACTUAL VEHICLE LOCATION OF A REPAIR, THE VEHICLE REPAIR LOCATION CODE IS REQUIRED.

FOR EXAMPLE, AN "X" HAS BEEN PLACED IN THE QUADRANT OF THE VEHICLE DIAGRAMS INDICATING THE LOCATION OF THE REPAIR. SEE DIAGRAMS.

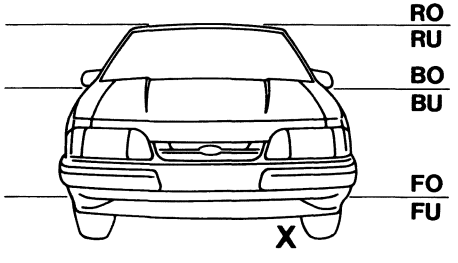
LOCATION CODE, FOR THE EXAMPLE IS: A5/FU — (UNDER THE FLOOR OF DRIVER'S LEFT FOOT.)

FRONT/REAR DIRECTION



+ CENTER OF VEHICLE

OVER/UNDER DIRECTION



R = ROOF LINE
RO = ROOF OVER
RU = ROOF UNDER

B = BELT LINE
BO = BELT OVER
BU = BELT UNDER

F = FLOOR PAN
FO = FLOOR OVER
FU = FLOOR UNDER