1996
F150-450

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ELECTRICAL AND VACUUM TROUBLESHOOTING MANUAL

EVTM

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1996 F150-F450/F-Super Duty Electrical & Vacuum Trouble-Shooting Manual (EVTM)

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ELECTRICAL AND VACUUM TROUBLESHOOTING MANUAL
FCS-12254-96

FORD CUSTOMER SERVICE DIVISION

Quality is Job 1

Ford Customer Service Division has continued with the existing format for the 1996 F-SERIES EVTM. Our goal is to provide accurate and timely electrical and vacuum service information.

1996 EVTM FEATURES

- Schematic pages contain **Component Location** references to full-view illustrations.
- **"COMPONENT TESTING"** procedures (CELL 149) tell the user how to perform diagnostic tests on various circuits.
- **Connector Views** are located at the end of individual cells along with a circuit function chart, and are shown for connectors with five or more cavities.
- **NOTES, CAUTIONS and WARNINGS** contain important safety information.
- Full view **"COMPONENT LOCATION VIEWS"** (CELL 151) help locate on-vehicle components.
- Circuit voltages appear on schematic pages to help simplify troubleshooting. Nonessential troubleshooting hints have been deleted.
- **Cellular Pagination:** Each section (or cell) in the EVTM is identified by a unique number and starts with page 1. For example: **"HOW TO USE THIS MANUAL"** is CELL 2 and begins with page 2–1.
- **"IN-LINE CONNECTOR FACES"** (CELL 150) shows in-line connectors with six or more terminals, to aid in servicing electrical wiring.
- "C" numbers are assigned for all electrical connectors. "C" numbers are listed in the **"LOCATION INDEX"** (CELL 152).
- **"HARNESS CAUSAL PART NUMBERS"** (CELL 153) aids in identifying warranty concerns.
- **In-line connector numbers** contain a suffix to denote connector "gender" type (F–socket, M–prior blade).

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 07150
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 they compromises neither their personal safety nor the vehicle integrity by their 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** contain important information.

- **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 contain references to full-view illustrations and description notes for various components. The references are reverse-text blocks located next to each component and connector and refer the user to the appropriate illustration page and zone. The description notes describe the operation of the component.

Schematic pages 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.

Component connector face information specific to a certain cell is 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 and are accompanied by a pinout chart that lists the function of all circuitry associated with that component.

"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.

"IN-LINE CONNECTOR FACES" (Cell 150) contains illustrations of all the in-line connectors that have 6 or more terminals. The terminals have pin numbers assigned to them.

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

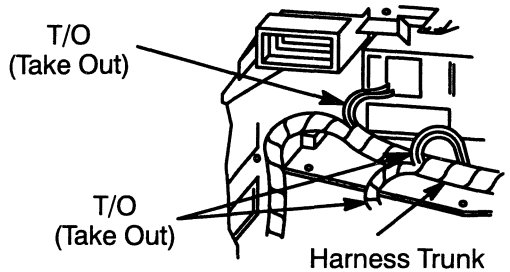
The **"LOCATION INDEX"** (Cell 152) provides the base part numbers, locations, connector face references and illustration references for all components, connectors, splices and grounds.

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



2. If a connector serves the same purpose in two separate versions (e.g., Automatic/ Manual), but is physically different, *two* connector numbers are used. However, if a connector serves the same purpose in two separate versions (e.g., Automatic/ Manual) 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 as follows (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 Customer 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 parking 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 when working on a vehicle.*
- *To avoid injury, always remove rings, watches, loose hanging jewelry and avoid wearing 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 notes at the components 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 in the box at the top of the page.

Step 3. Test the suspected 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.

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

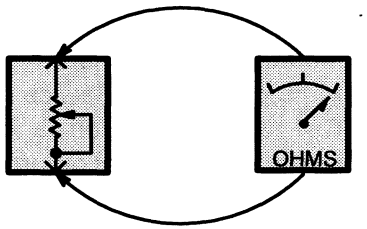


Figure 1–Resistance Check

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

TEST LAMP

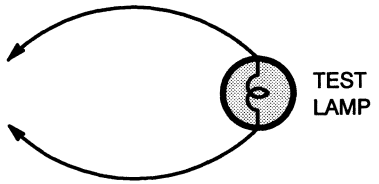


Figure 2–Test Lamp

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

Uses: Voltage Check, Short Check.

SELF-POWERED TEST LAMP

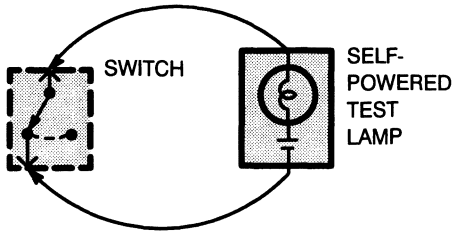


Figure 3–Continuity Check

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.

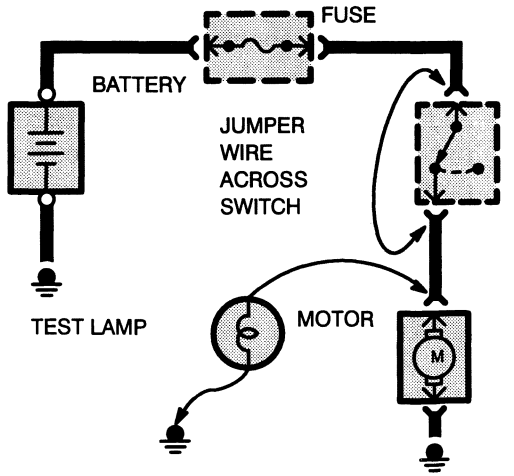


Figure 4—Switch Circuit Check and Voltage Check

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).

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).

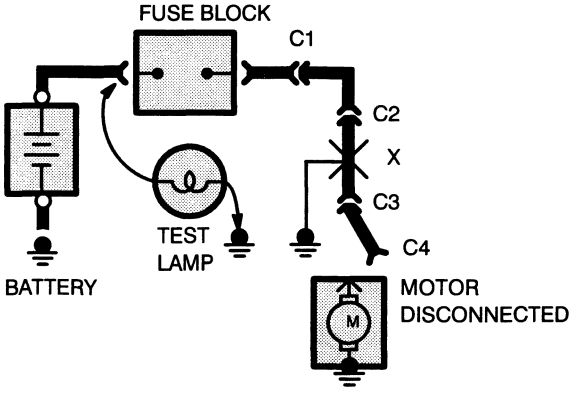


Figure 5—Short Check

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.

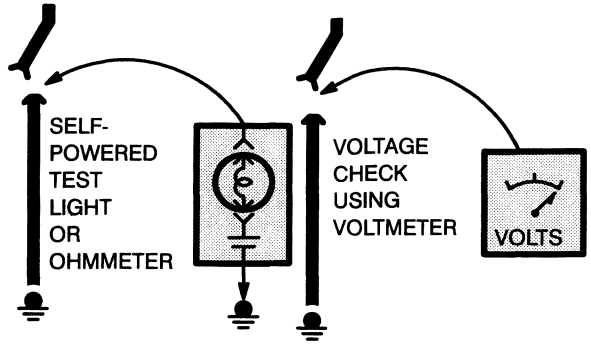


Figure 6—Ground Check

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).

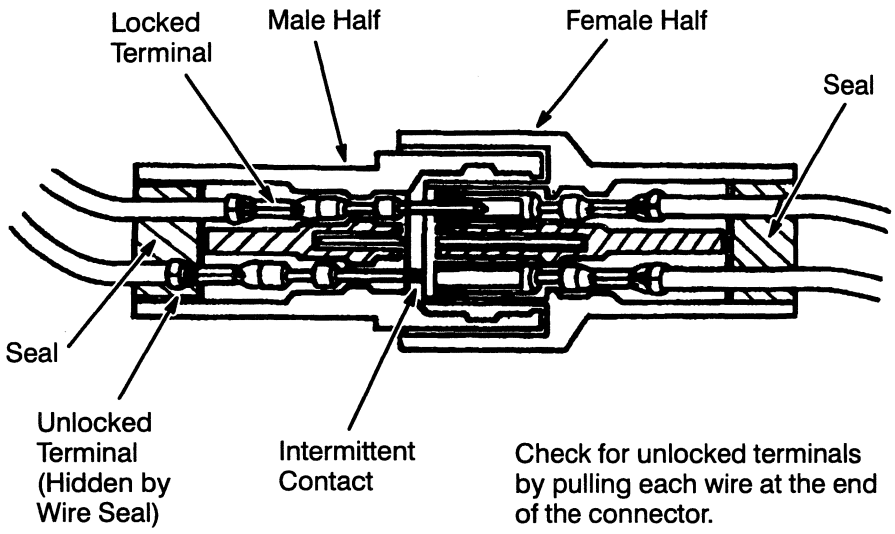
The circuit schematics in this manual make it easy to identify common points in circuits. This knowledge can help narrow the concern to a specific area. For example, if several circuits fail at the same time, check for a common power or ground connection (see *Power Distribution* or *Grounds*). If part 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

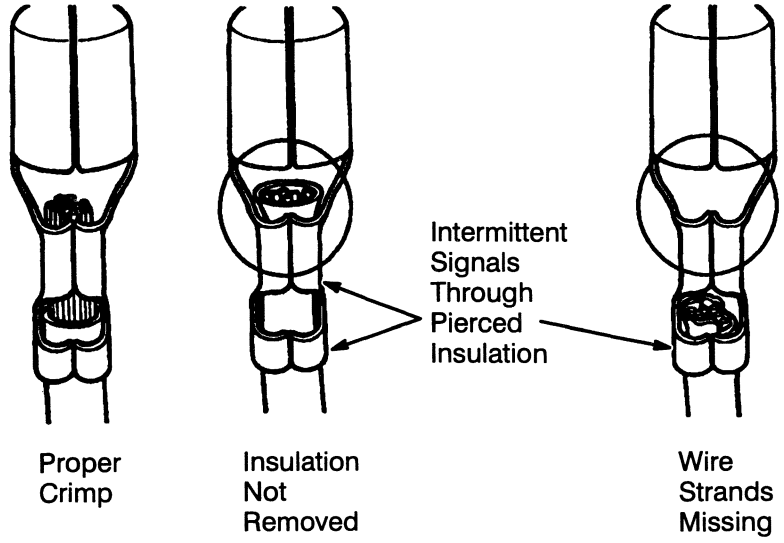
The following illustrations are known examples of wiring harness, splices and connectors that will create intermittent electrical concerns. The concerns are hidden and can only be discovered by a physical evaluation as shown in each illustration.

NOTE: When servicing gold plated terminals in a connector, only replace with the gold plated terminals designed for that connector.

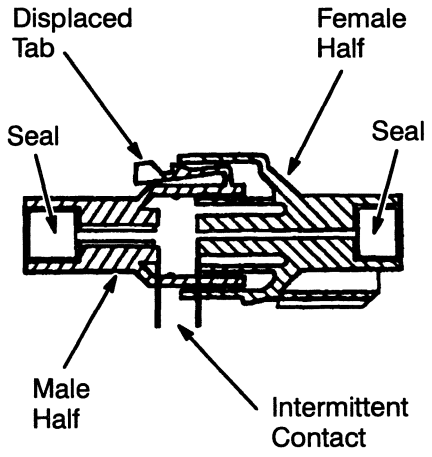


Check for unlocked terminals by pulling each wire at the end of the connector.

TERMINAL NOT PROPERLY SEATED

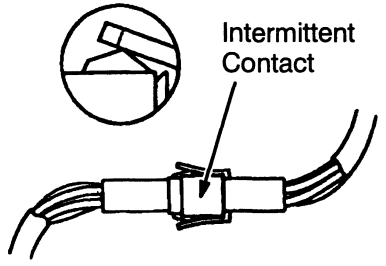


DEFECTIVE INSULATION STRIPPING



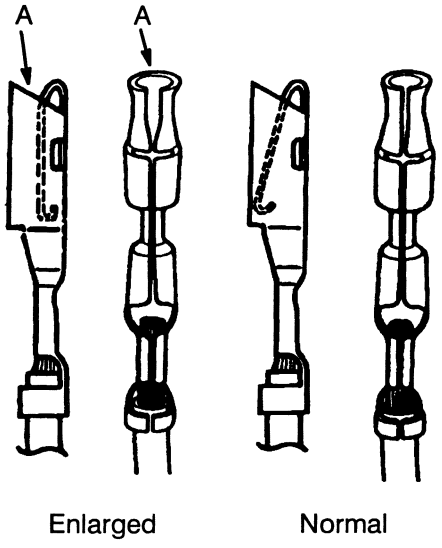
Type A

Lock may be displaced into an unlocked position; pull on the connector to verify the lock.



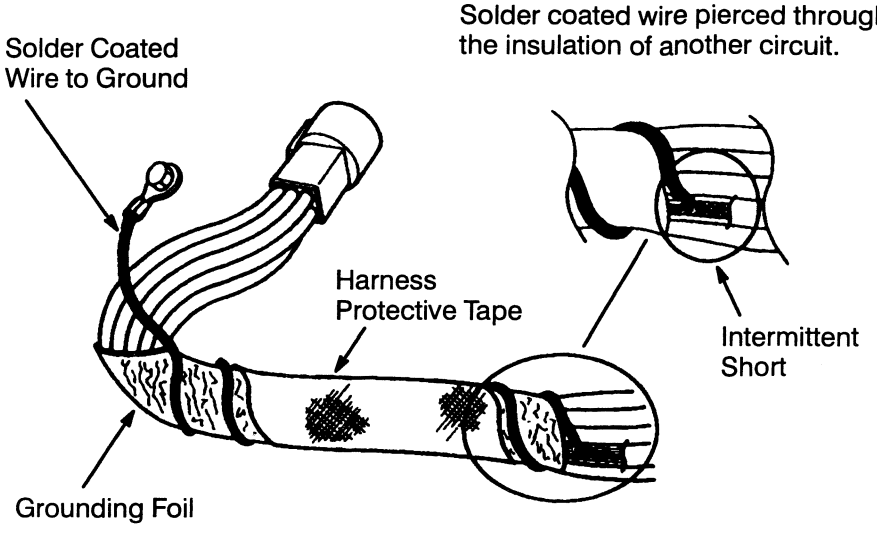
Type B

PARTIALLY MATED CONNECTORS

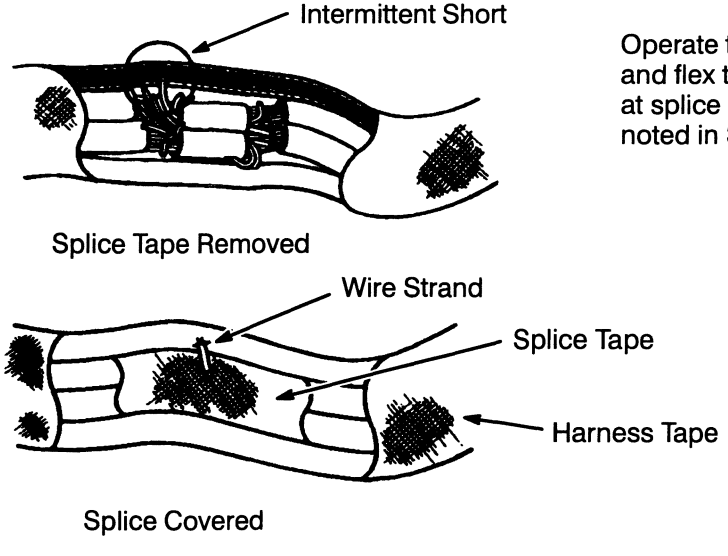


Any probe entering the terminal may enlarge the contact spring opening creating an intermittent signal. Insert the correct mating terminal (Location A) from the service kit and feel for a loose fit.

DEFORMED (ENLARGED) FEMALE TERMINALS

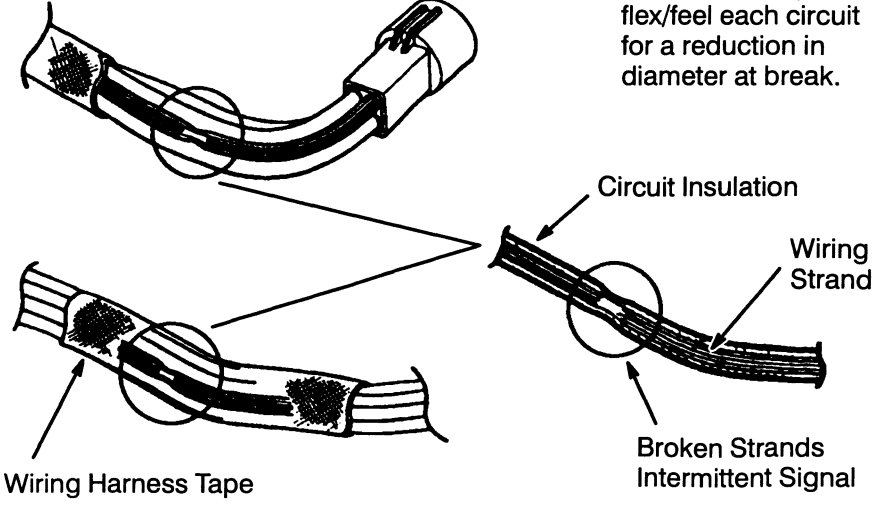


ELECTRICAL SHORT INSIDE THE HARNESS



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 suspected 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.

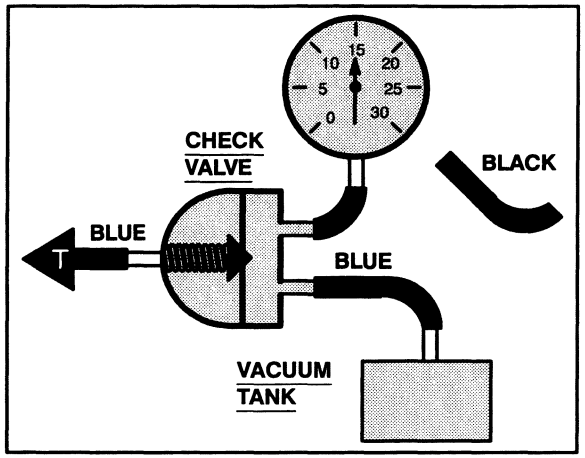


Figure 1 – System Supply Test

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.

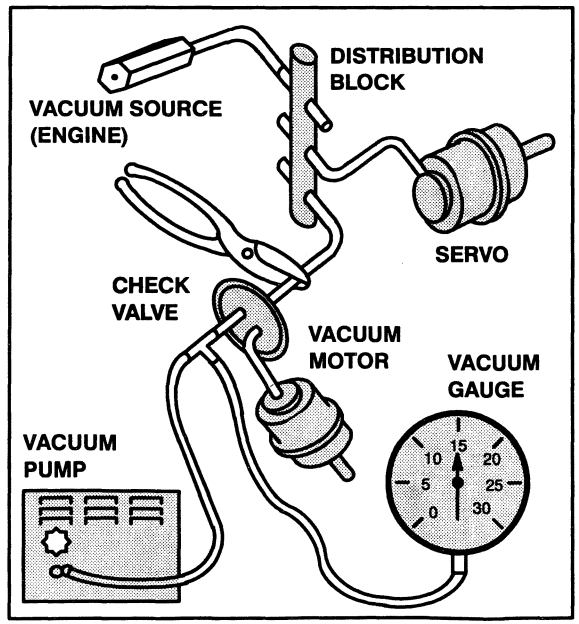
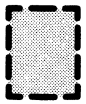
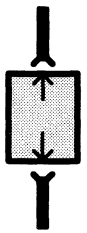


Figure 2 – Testing For Leaks In Typical Vacuum System

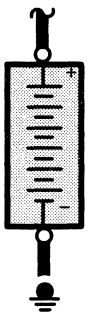
ELECTRICAL SYMBOLS



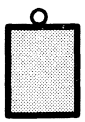
DASHED COMPONENT BOX
ONLY PART OF THE COMPONENT IS SHOWN ON THE PAGE; THE COMPONENT IS SHOWN COMPLETE IN ANOTHER LOCATION



COMPONENT WITH CONNECTORS



BATTERY



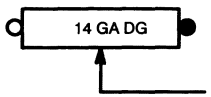
SCREW TERMINAL ON COMPONENT

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

GROUND CONNECTION

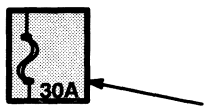
FUSE

CURRENT RATING



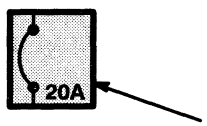
FUSIBLE LINK

WIRE SIZE AND COLOR



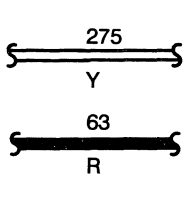
MAXI-FUSE
or
FUSIBLE LINK CARTRIDGE

CURRENT RATING

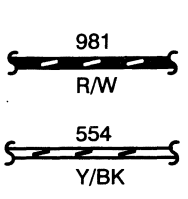


CIRCUIT BREAKER

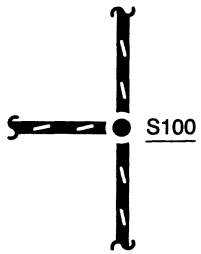
CURRENT RATING



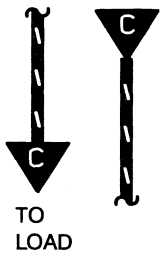
SOLID WIRES



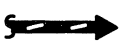
STRIPED WIRES



SPLICE OR CRIMP TERMINAL

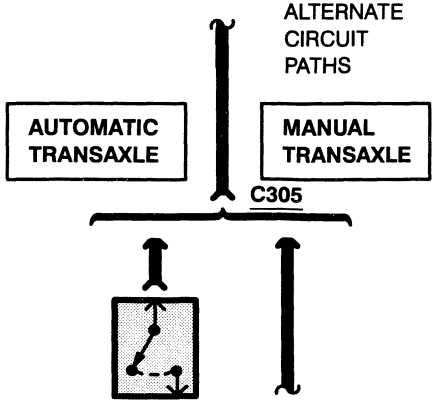


"CUT" WIRES REFERENCED BETWEEN PAGES
ARROWS SHOW CURRENT FLOW FROM POWER TO GROUND



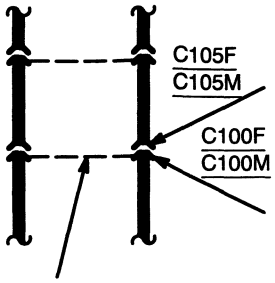
BACKUP LIGHTS

"REFERENCE" WIRES
COMPLETE WIRING SHOWN ON ANOTHER PAGE

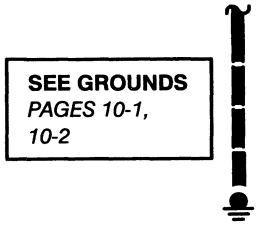


ALTERNATE CIRCUIT PATHS

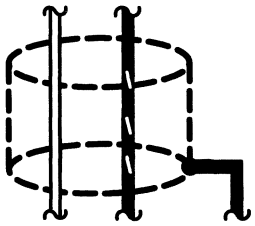
ELECTRICAL SYMBOLS



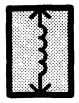
SINGLE DASHED LINE INDICATES THAT WIRE ON LEFT ALSO PASSES THROUGH THE SAME CONNECTOR



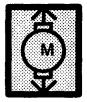
DASHED WIRE
CIRCUITRY IS NOT SHOWN IN COMPLETE DETAIL, BUT IS COMPLETE ON ANOTHER PAGE



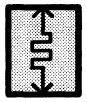
SHIELD
WIRES ARE COVERED BY A SHIELD



FIELD COIL

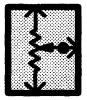


MOTOR

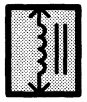


HEATING ELEMENT

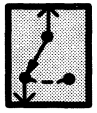
THERMISTOR



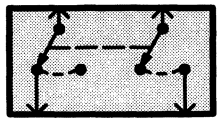
RHEOSTAT OR POTENTIOMETER



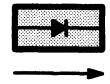
SOLENOID



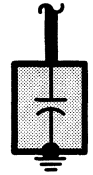
SWITCH



GANGED SWITCHES
CONTACTS MOVE AT THE SAME TIME

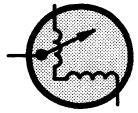


DIODES
CURRENT FLOWS IN DIRECTION OF ARROW ONLY



CAPACITOR

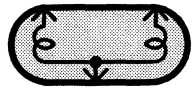
TRANSISTOR



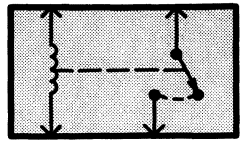
GAUGE

LIGHT EMITTING DIODE (LED)

LIGHT BULB

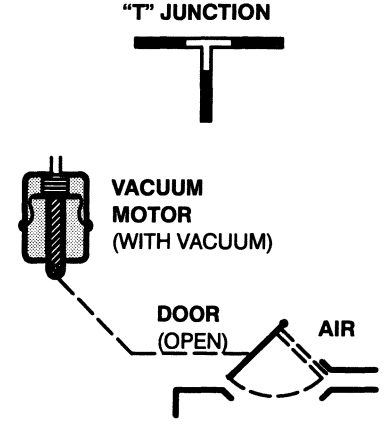


DUAL FILAMENT LIGHT BULB



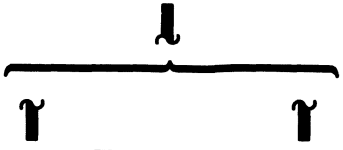
RELAY
CONTACTS CHANGE POSITION WITH CURRENT THROUGH COIL

VACUUM SYMBOLS



VACUUM ON VACUUM MOTOR PULLS DOOR OPEN TO LET AIR PASS THROUGH

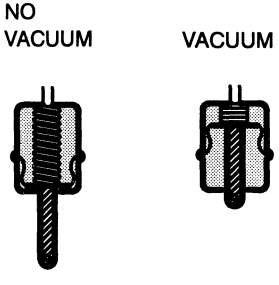
"CUT" HOSES REFERENCED BETWEEN PAGES
ARROW SHOWS FROM MANIFOLD FITTING TO COMPONENT



NOTE
OTHER VACUUM SYMBOLS USED ON VACUUM SYSTEM DIAGRAMS ARE FULLY EXPLAINED ON THE PAGES WHERE THEY APPEAR.

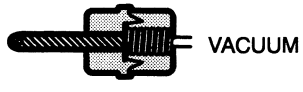
VACUUM MOTOR OPERATION

SINGLE DIAPHRAGM MOTOR



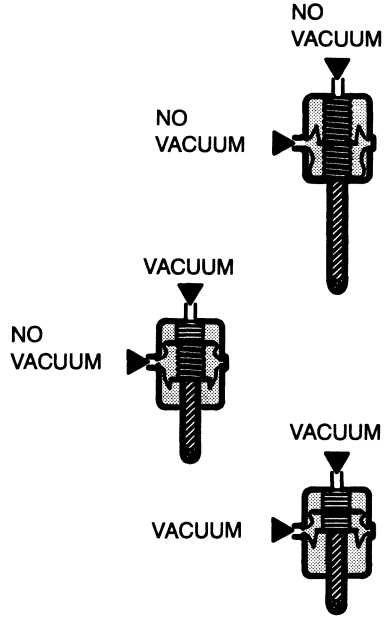
Vacuum motors operate like electrical solenoids, mechanically pushing or pulling a shaft between two fixed positions. When vacuum is not applied, the shaft is pushed all the way out by a spring.

SERVO MOTOR

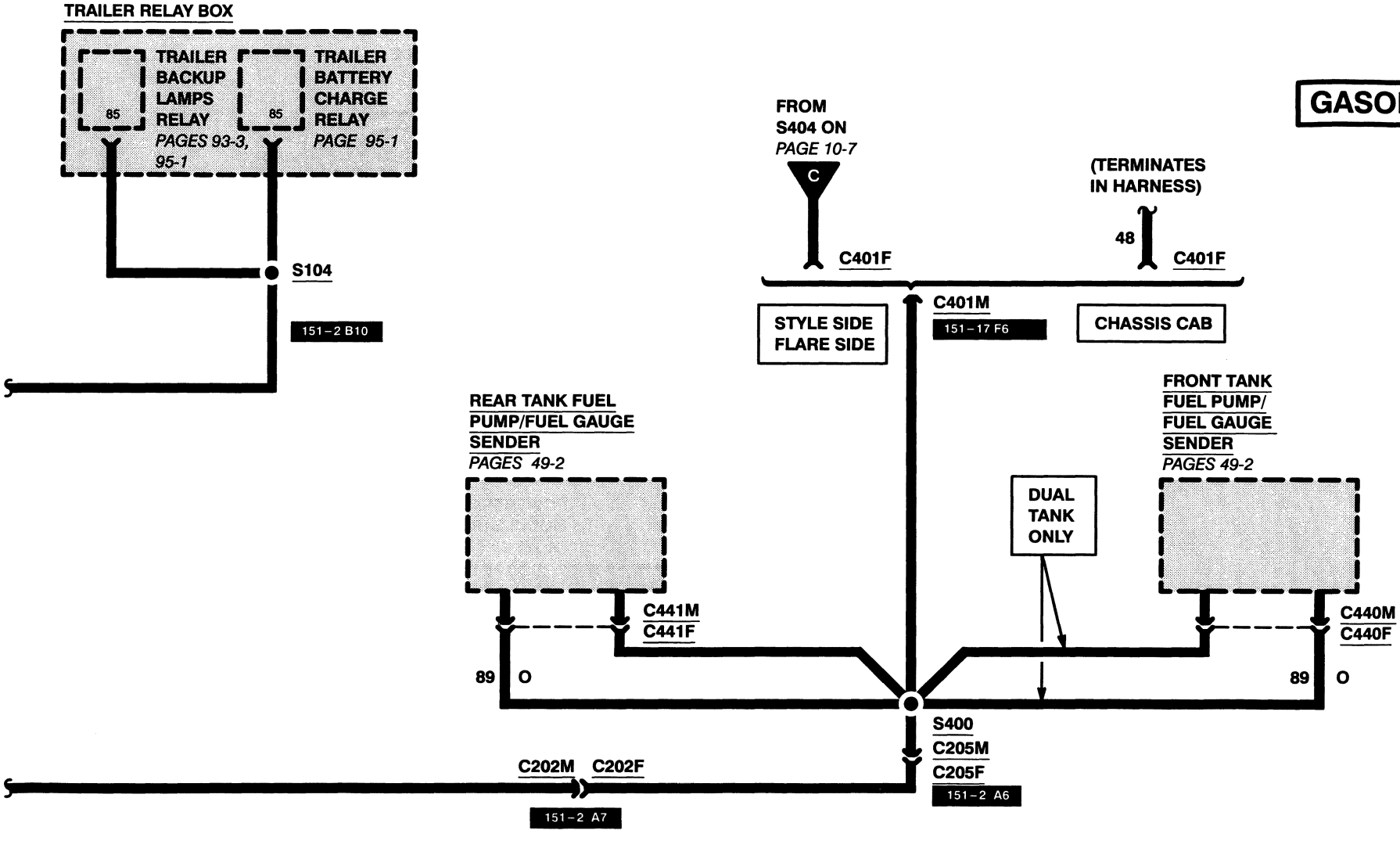


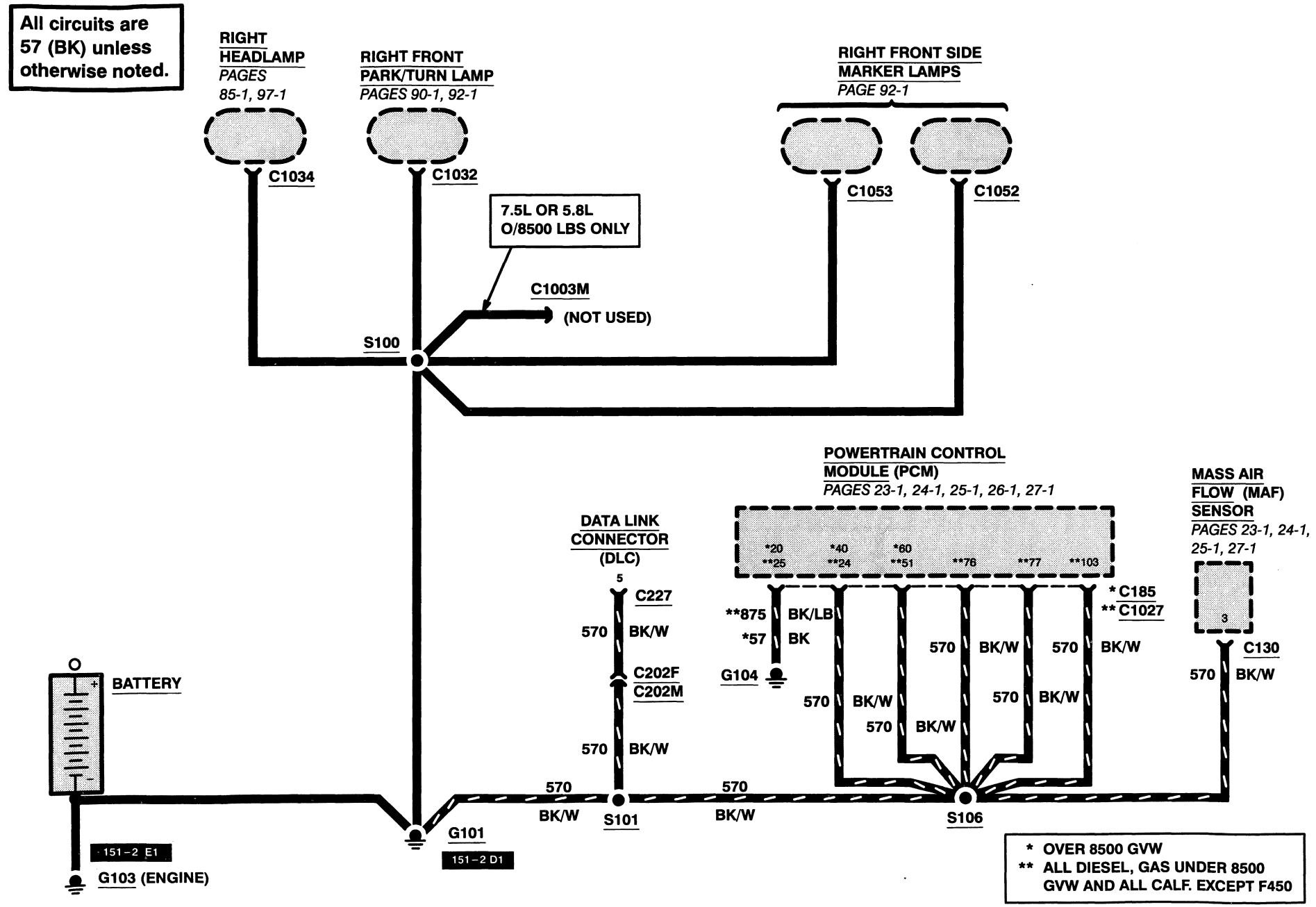
Some vacuum motors can position the actuating arm at any position between fully extended and fully retracted. The Servo is operated by a control valve that applies varying amounts of vacuum to the motor. The higher the vacuum level, the greater the retraction of the motor arm. Servo Motors work nearly 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

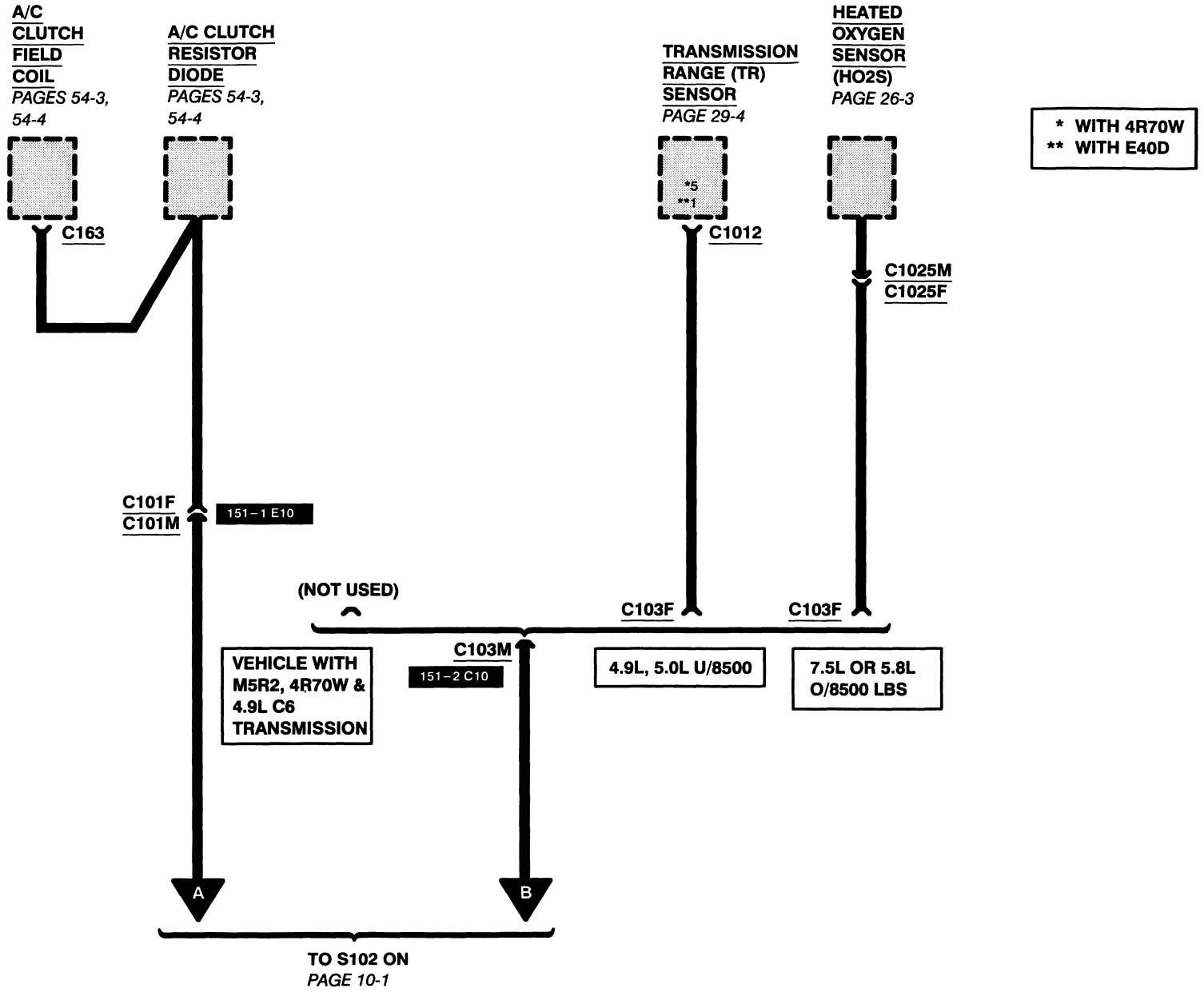


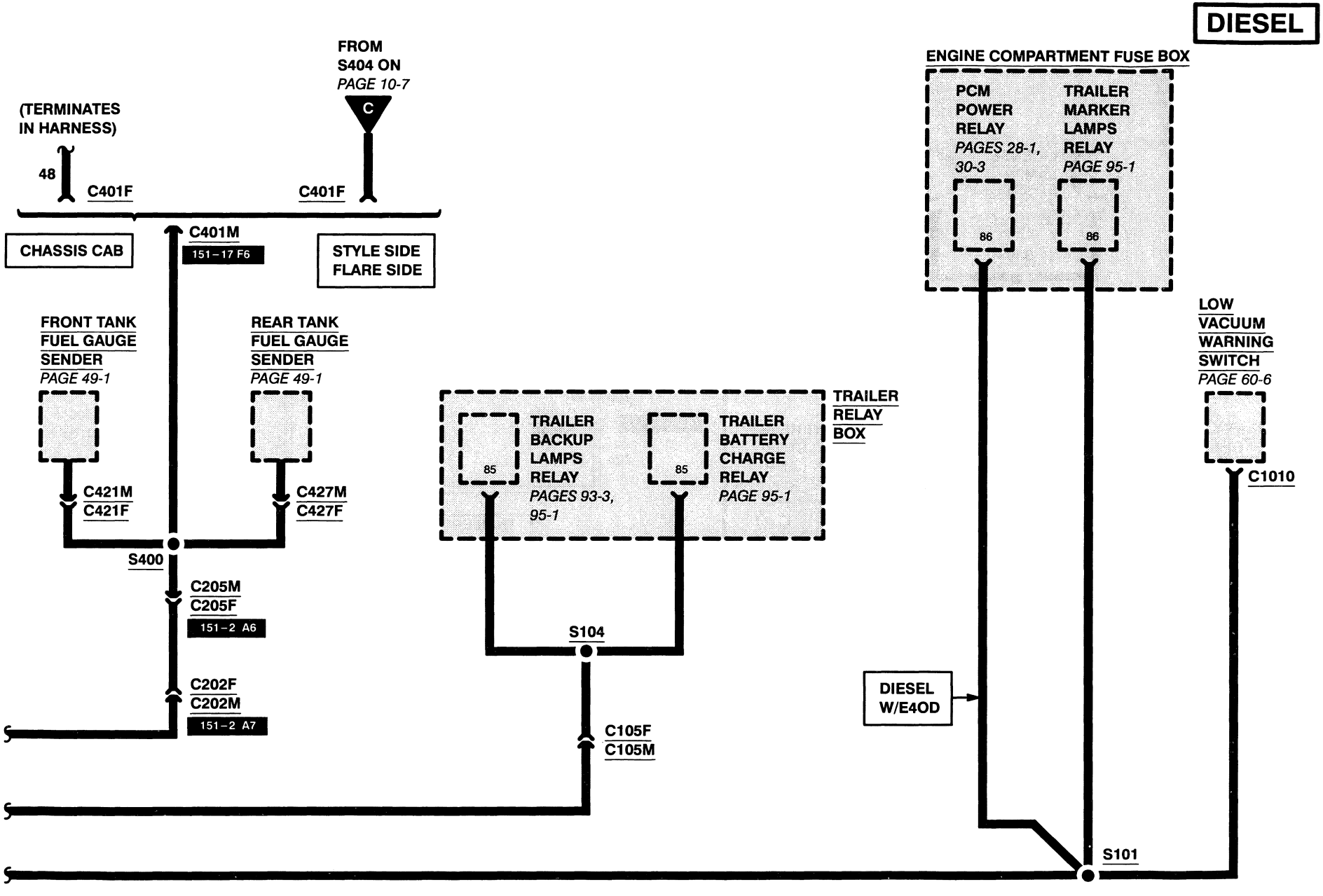
A double diaphragm motor has three positions (it is actually two motors in one housing). When the top port gets vacuum, the shaft pulls halfway in. When both ports get vacuum, the shaft pulls all the way in.


TRAILER RELAY BOX
TRAILER BACKUP LAMPS RELAY
PAGES 93-3, 95-1
85
TRAILER BATTERY CHARGE RELAY
PAGE 95-1
85
S104
151-2 B10
GASOLINE
FROM S404 ON
PAGE 10-7
C
C401F
(TERMINATES IN HARNESS)
48
C401F
C401M
151-17 F6
STYLE SIDE FLARE SIDE
CHASSIS CAB
REAR TANK FUEL PUMP/FUEL GAUGE SENDER
PAGES 49-2
FRONT TANK FUEL PUMP/ FUEL GAUGE SENDER
PAGES 49-2
DUAL TANK ONLY
C441M
C441F
C440M
C440F
89
O
89
O
S400
C205M
C205F
151-2 A6
C202M
C202F
151-2 A7


All circuits are 57 (BK) unless otherwise noted.
RIGHT HEADLAMP
PAGES 85-1, 97-1
RIGHT FRONT PARK/TURN LAMP
PAGES 90-1, 92-1
RIGHT FRONT SIDE MARKER LAMPS
PAGE 92-1
C1034
C1032
C1053
C1052
7.5L OR 5.8L O/8500 LBS ONLY
C1003M
(NOT USED)
S100
POWERTRAIN CONTROL MODULE (PCM)
PAGES 23-1, 24-1, 25-1, 26-1, 27-1
DATA LINK CONNECTOR (DLC)
MASS AIR FLOW (MAF) SENSOR
PAGES 23-1, 24-1, 25-1, 27-1
*20 **25
*40 **24
*60 **51
**76
**77
**103
5
C227
570 BK/W
C202F
C202M
570 BK/W
**875 BK/LB
*57 BK
G104
570 BK/W
570 BK/W
570 BK/W
570 BK/W
570 BK/W
*C185
**C1027
3
C130
570 BK/W
BATTERY
570 BK/W
S101
570 BK/W
S106
G101
151-2 D1
151-2 E1
G103 (ENGINE)
* OVER 8500 GVW
** ALL DIESEL, GAS UNDER 8500 GVW AND ALL CALF. EXCEPT F450

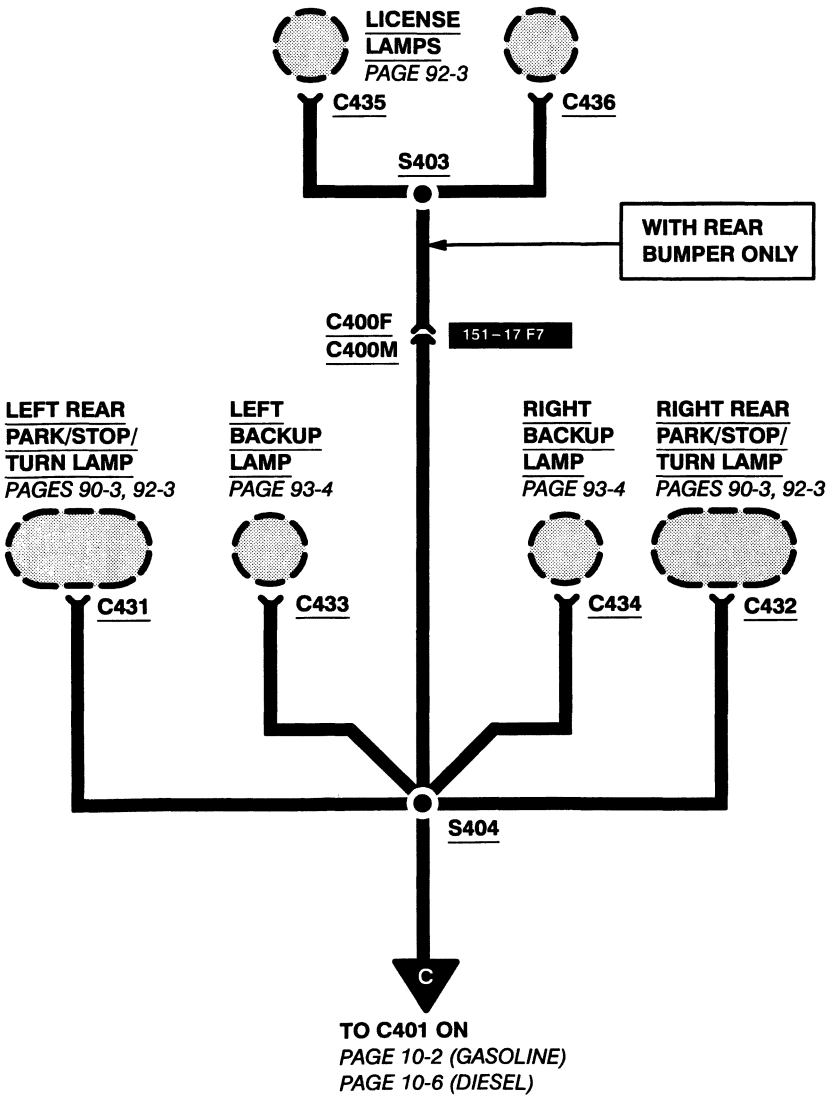
GASOLINE


A/C CLUTCH FIELD COIL
PAGES 54-3, 54-4
A/C CLUTCH RESISTOR DIODE
PAGES 54-3, 54-4
TRANSMISSION RANGE (TR) SENSOR
PAGE 29-4
HEATED OXYGEN SENSOR (HO2S)
PAGE 26-3
* WITH 4R70W
** WITH E40D
C163
*5
**1
C1012
C1025M
C1025F
C101F
C101M
151-1 E10
(NOT USED)
C103F
C103F
C103M
151-2 C10
VEHICLE WITH M5R2, 4R70W & 4.9L C6 TRANSMISSION
4.9L, 5.0L U/8500
7.5L OR 5.8L O/8500 LBS
A
B
TO S102 ON
PAGE 10-1

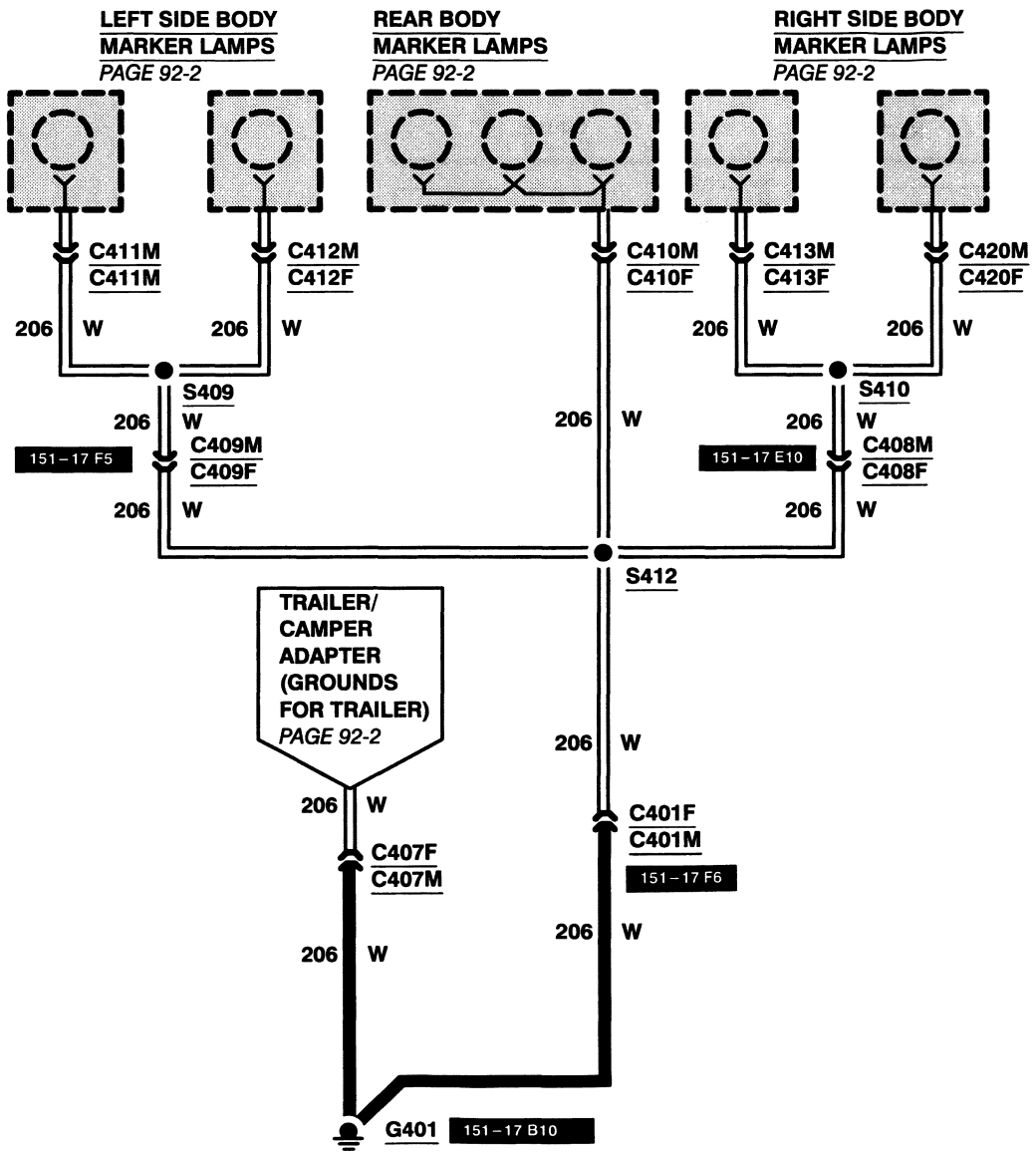

DIESEL
FROM
S404 ON
PAGE 10-7
C
(TERMINATES
IN HARNESS)
48
C401F
C401F
CHASSIS CAB
C401M
151-17 F6
STYLE SIDE
FLARE SIDE
ENGINE COMPARTMENT FUSE BOX
PCM
POWER
RELAY
PAGES 28-1,
30-3
86
TRAILER
MARKER
LAMPS
RELAY
PAGE 95-1
86
FRONT TANK
FUEL GAUGE
SENDER
PAGE 49-1
REAR TANK
FUEL GAUGE
SENDER
PAGE 49-1
LOW
VACUUM
WARNING
SWITCH
PAGE 60-6
C1010
TRAILER
RELAY
BOX
TRAILER
BACKUP
LAMPS
RELAY
PAGES 93-3,
95-1
85
TRAILER
BATTERY
CHARGE
RELAY
PAGE 95-1
85
C421M
C421F
C427M
C427F
S400
C205M
C205F
151-2 A6
S104
C202F
C202M
151-2 A7
C105F
C105M
DIESEL
W/E4OD
S101

All circuits are 57 (BK) unless otherwise noted.

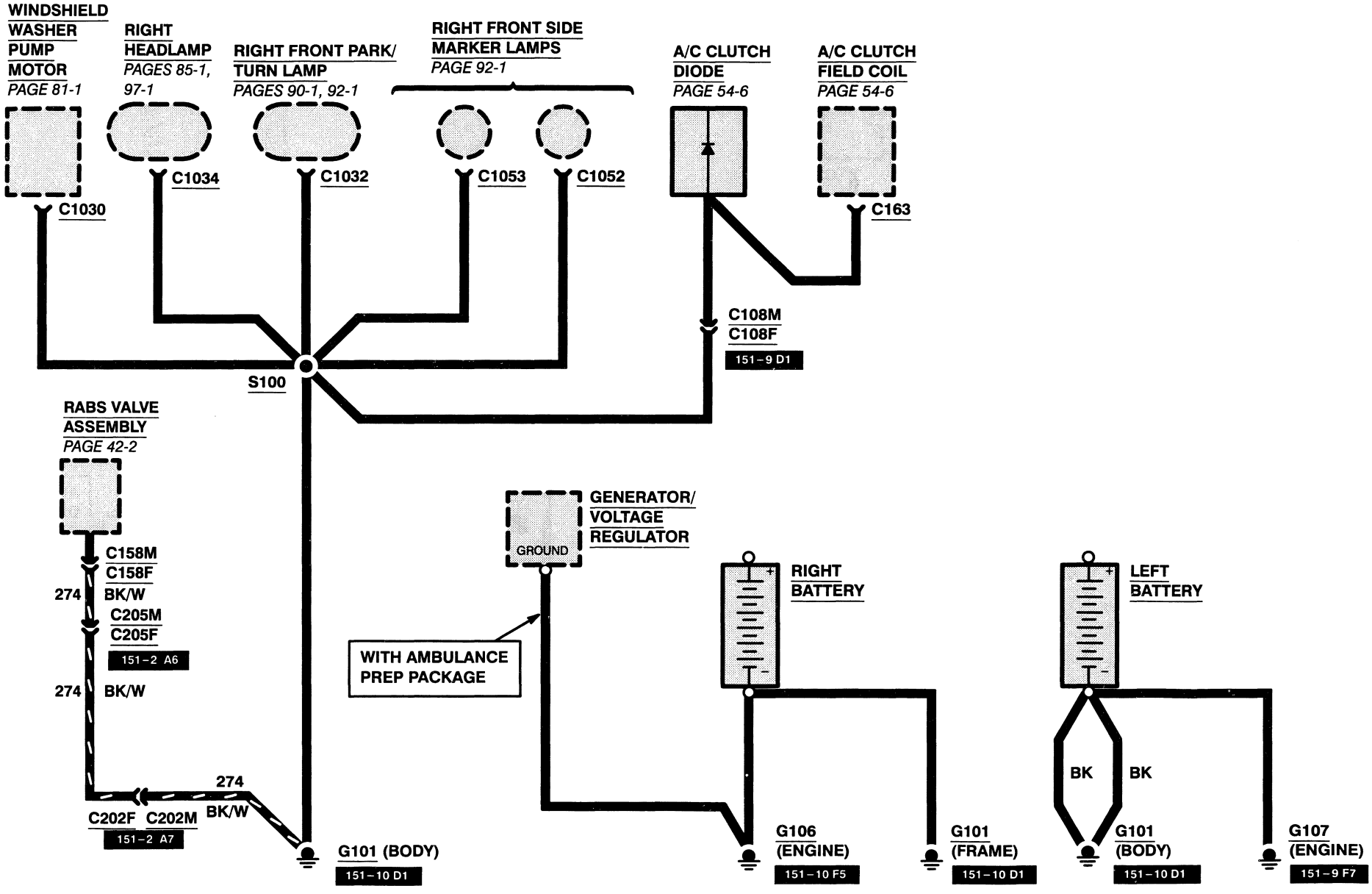
STYLE SIDE FLARE SIDE

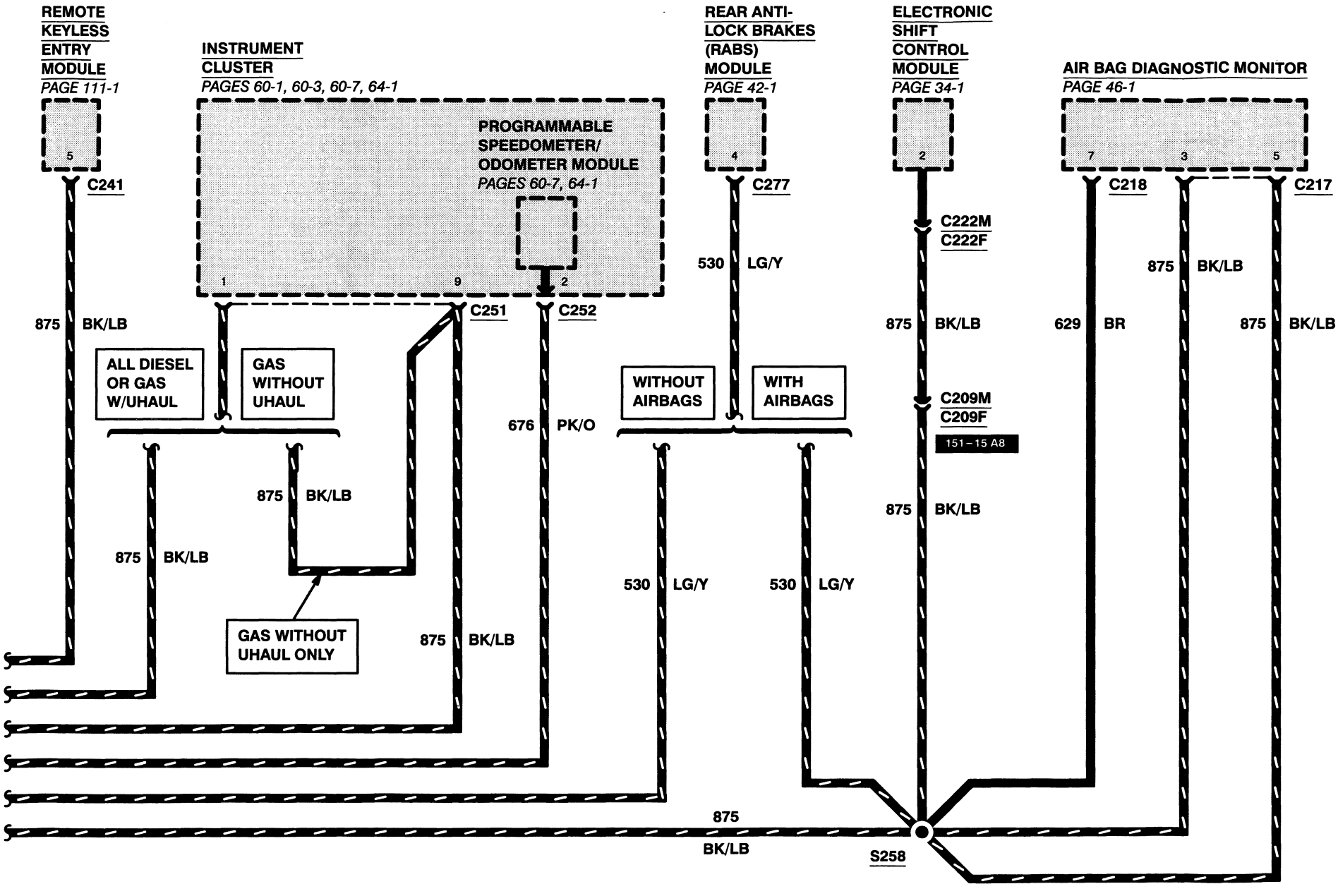


F350 DUAL REAR WHEEL

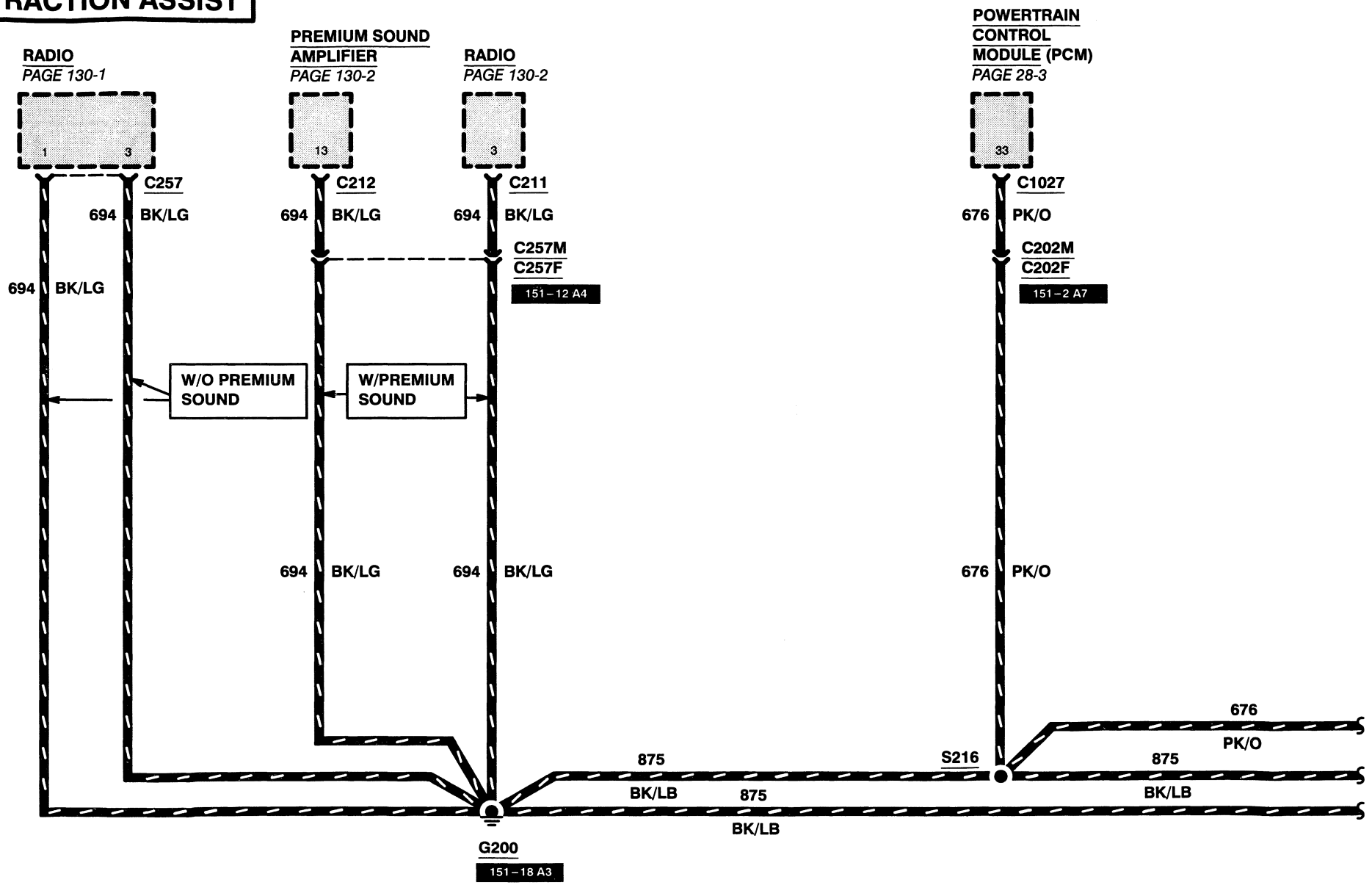


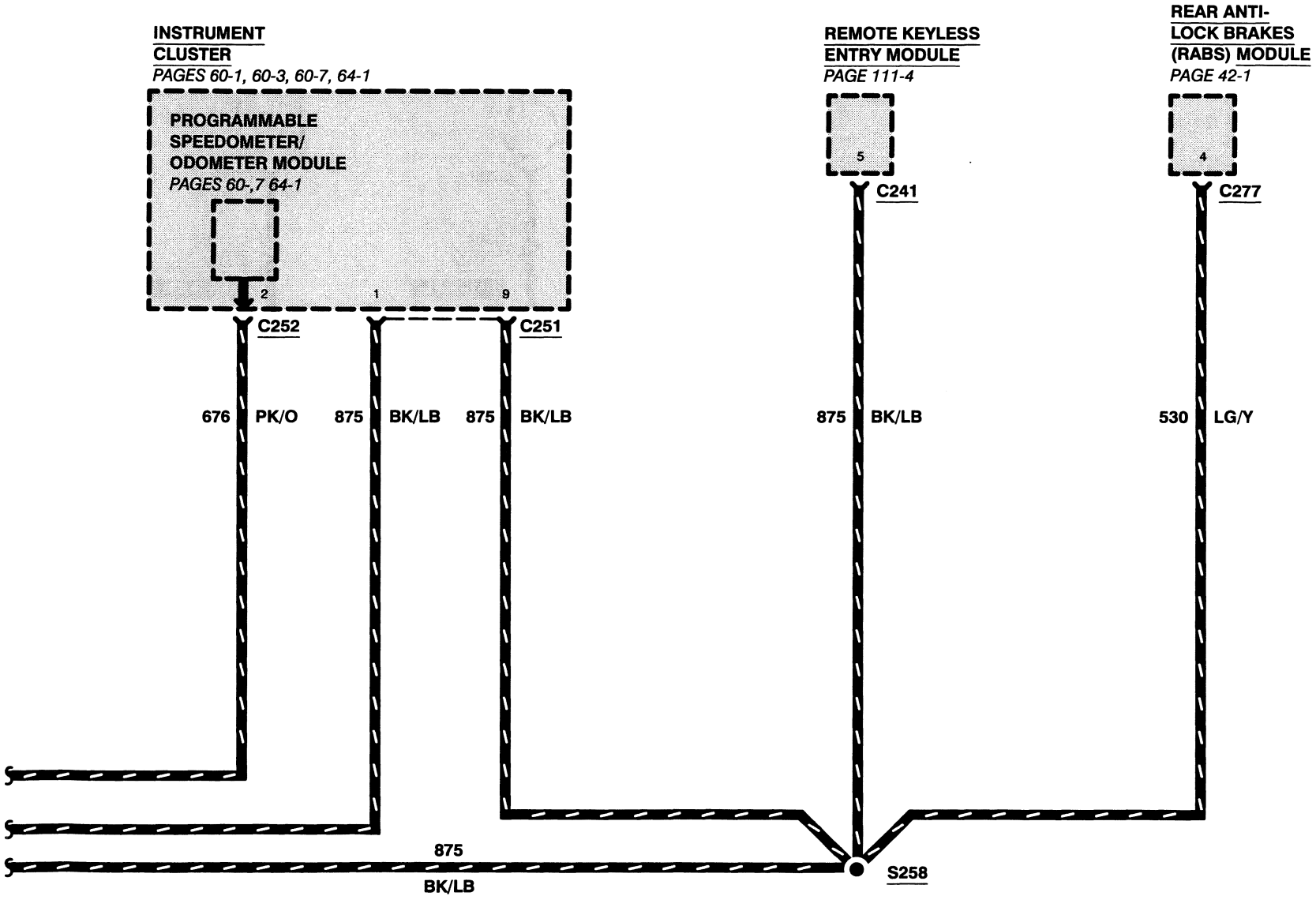
DIESEL

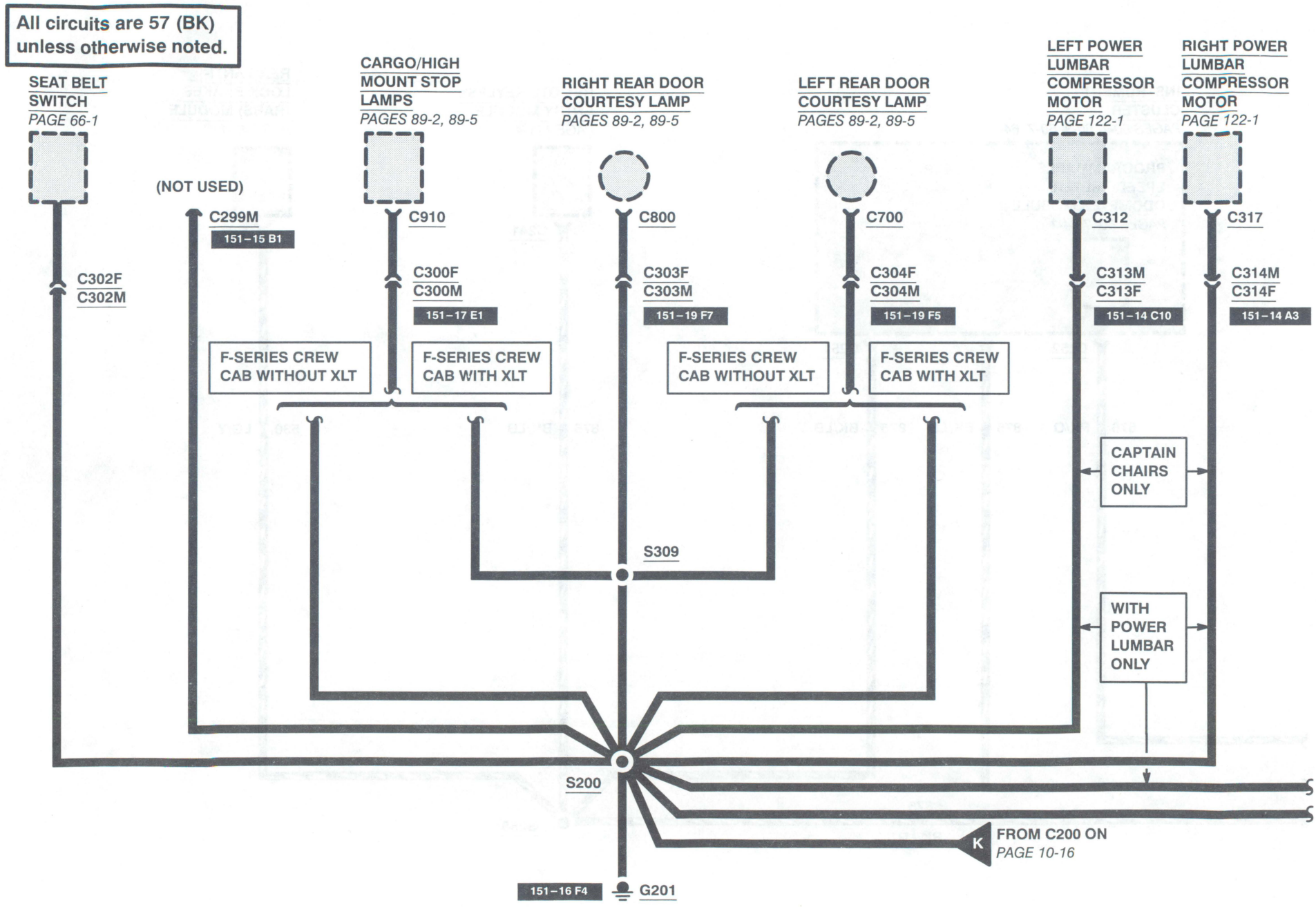

WINDSHIELD WASHER PUMP MOTOR
PAGE 81-1
RIGHT HEADLAMP
PAGES 85-1, 97-1
RIGHT FRONT PARK/ TURN LAMP
PAGES 90-1, 92-1
RIGHT FRONT SIDE MARKER LAMPS
PAGE 92-1
A/C CLUTCH DIODE
PAGE 54-6
A/C CLUTCH FIELD COIL
PAGE 54-6
C1030
C1034
C1032
C1053
C1052
C163
C108M
C108F
151-9 D1
S100
RABS VALVE ASSEMBLY
PAGE 42-2
C158M
C158F
274 BK/W
C205M
C205F
151-2 A6
274 BK/W
274 BK/W
C202F C202M
151-2 A7
G101 (BODY)
151-10 D1
GENERATOR/ VOLTAGE REGULATOR
GROUND
WITH AMBULANCE PREP PACKAGE
RIGHT BATTERY
LEFT BATTERY
BK
BK
G106 (ENGINE)
151-10 F5
G101 (FRAME)
151-10 D1
G101 (BODY)
151-10 D1
G107 (ENGINE)
151-9 F7

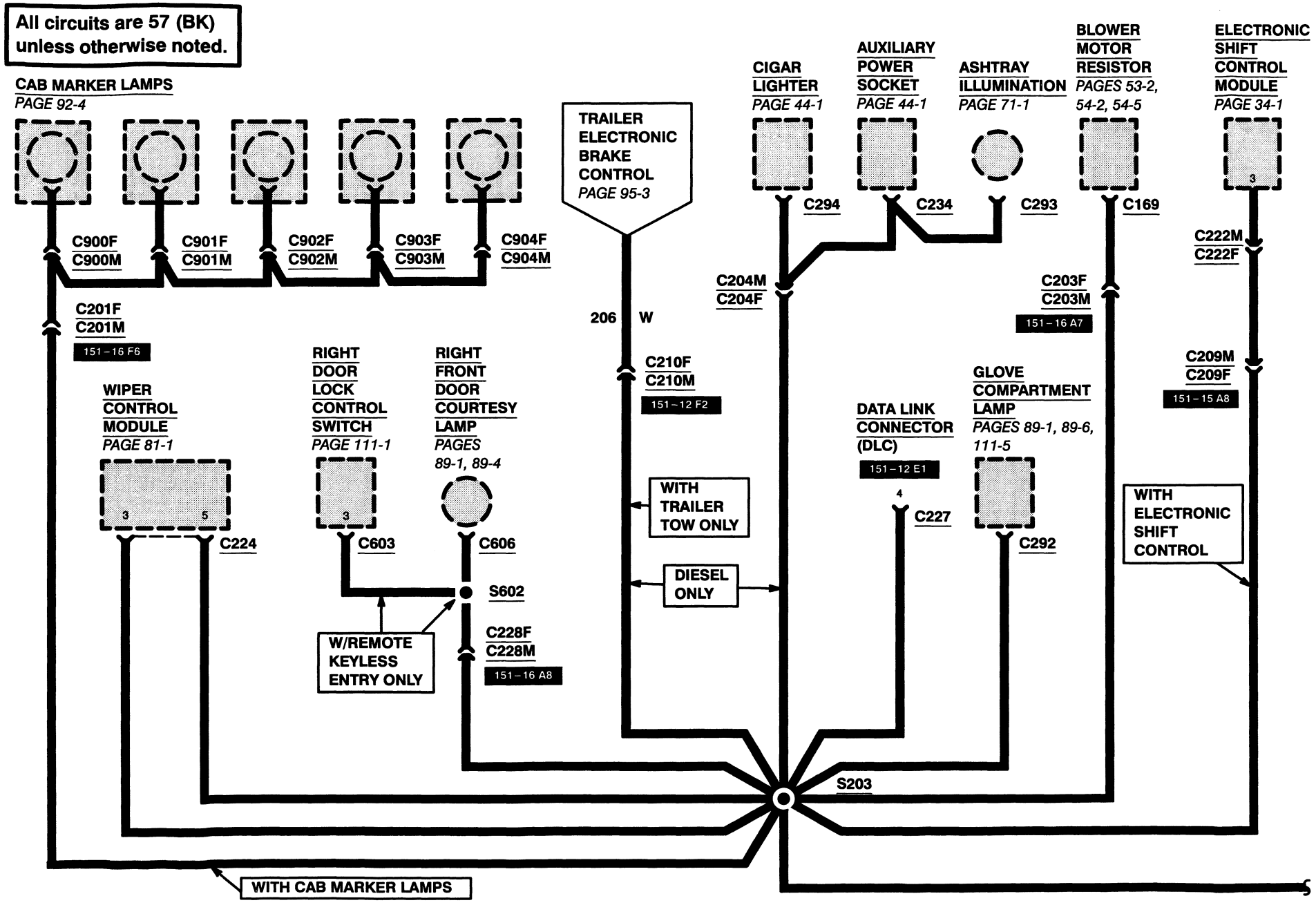

REMOTE KEYLESS ENTRY MODULE
PAGE 111-1
5
C241
INSTRUMENT CLUSTER
PAGES 60-1, 60-3, 60-7, 64-1
PROGRAMMABLE SPEEDOMETER/ ODOMETER MODULE
PAGES 60-7, 64-1
1
9
2
C251
C252
REAR ANTI-LOCK BRAKES (RABS) MODULE
PAGE 42-1
4
C277
ELECTRONIC SHIFT CONTROL MODULE
PAGE 34-1
2
C222M
C222F
C209M
C209F
151-15 A8
AIR BAG DIAGNOSTIC MONITOR
PAGE 46-1
7
3
5
C218
C217
875 BK/LB
530 LG/Y
875 BK/LB
629 BR
875 BK/LB
875 BK/LB
ALL DIESEL OR GAS W/UHAUL
GAS WITHOUT UHAUL
676 PK/O
WITHOUT AIRBAGS
WITH AIRBAGS
875 BK/LB
875 BK/LB
875 BK/LB
530 LG/Y
530 LG/Y
GAS WITHOUT UHAUL ONLY
875 BK/LB
875 BK/LB
S258

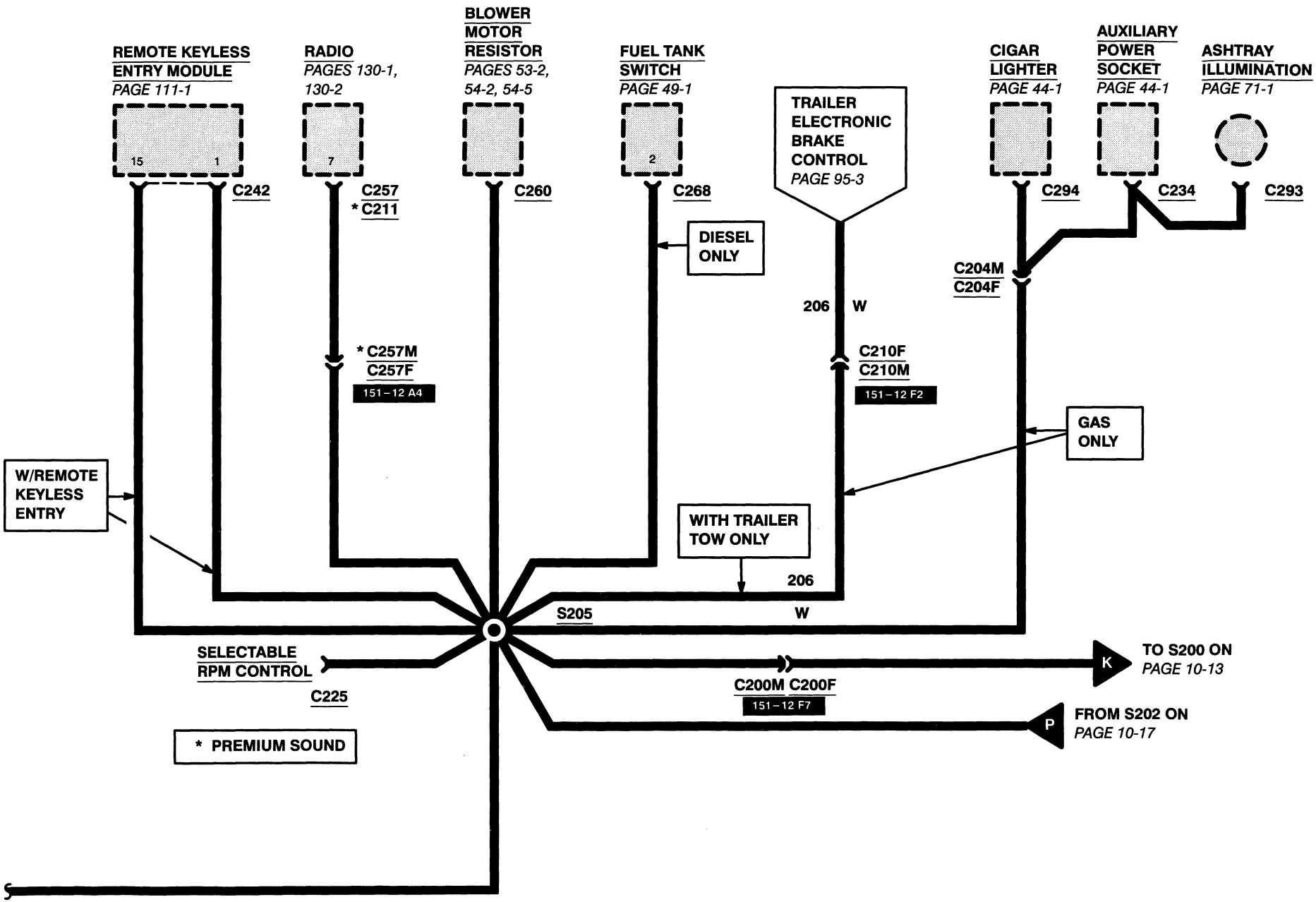
ALL DIESEL WITH TRACTION ASSIST



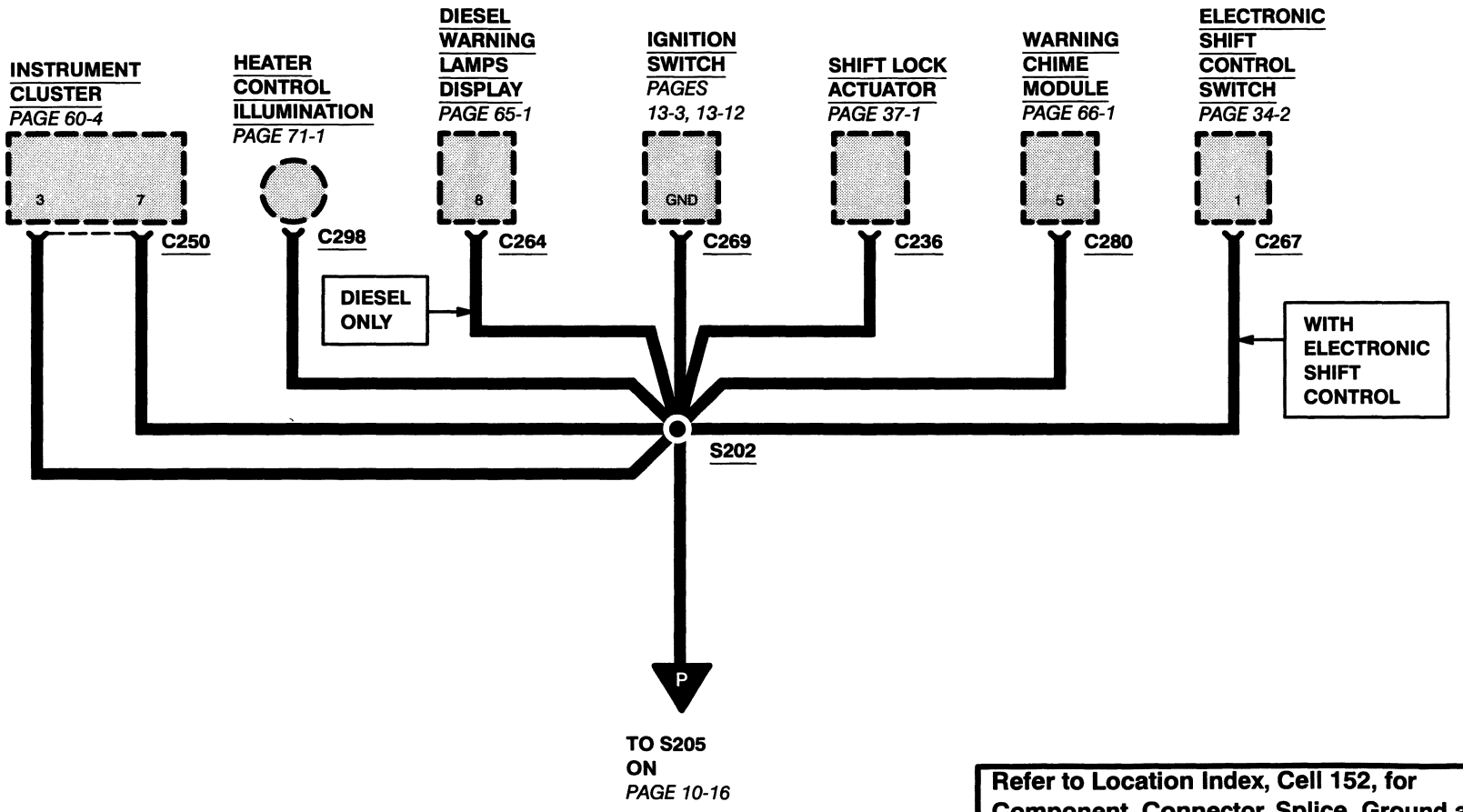

INSTRUMENT CLUSTER
PAGES 60-1, 60-3, 60-7, 64-1
PROGRAMMABLE SPEEDOMETER/ ODOMETER MODULE
PAGES 60-,7 64-1
2
1
9
C252
C251
676 PK/O
875 BK/LB
875 BK/LB
REMOTE KEYLESS ENTRY MODULE
PAGE 111-4
5
C241
875 BK/LB
REAR ANTI-LOCK BRAKES (RABS) MODULE
PAGE 42-1
4
C277
530 LG/Y
875
BK/LB
S258


All circuits are 57 (BK) unless otherwise noted.
SEAT BELT SWITCH
PAGE 66-1
C302F
C302M
(NOT USED)
C299M
151–15 B1
CARGO/HIGH MOUNT STOP LAMPS
PAGES 89-2, 89-5
C910
C300F
C300M
151–17 E1
F-SERIES CREW CAB WITHOUT XLT
F-SERIES CREW CAB WITH XLT
RIGHT REAR DOOR COURTESY LAMP
PAGES 89-2, 89-5
C800
C303F
C303M
151–19 F7
LEFT REAR DOOR COURTESY LAMP
PAGES 89-2, 89-5
C700
C304F
C304M
151–19 F5
F-SERIES CREW CAB WITHOUT XLT
F-SERIES CREW CAB WITH XLT
LEFT POWER LUMBAR COMPRESSOR MOTOR
PAGE 122-1
C312
C313M
C313F
151–14 C10
RIGHT POWER LUMBAR COMPRESSOR MOTOR
PAGE 122-1
C317
C314M
C314F
151–14 A3
CAPTAIN CHAIRS ONLY
WITH POWER LUMBAR ONLY
S309
S200
K
FROM C200 ON
PAGE 10-16
151–16 F4
G201


All circuits are 57 (BK) unless otherwise noted.
CAB MARKER LAMPS
PAGE 92-4
C900F
C900M
C901F
C901M
C902F
C902M
C903F
C903M
C904F
C904M
C201F
C201M
151-16 F6
WIPER CONTROL MODULE
PAGE 81-1
3
5
C224
RIGHT DOOR LOCK CONTROL SWITCH
PAGE 111-1
3
C603
RIGHT FRONT DOOR COURTESY LAMP
PAGES 89-1, 89-4
C606
S602
W/REMOTE KEYLESS ENTRY ONLY
C228F
C228M
151-16 A8
TRAILER ELECTRONIC BRAKE CONTROL
PAGE 95-3
206 W
C210F
C210M
151-12 F2
WITH TRAILER TOW ONLY
DIESEL ONLY
CIGAR LIGHTER
PAGE 44-1
C294
AUXILIARY POWER SOCKET
PAGE 44-1
C234
ASHTRAY ILLUMINATION
PAGE 71-1
C293
C204M
C204F
DATA LINK CONNECTOR (DLC)
151-12 E1
4
C227
GLOVE COMPARTMENT LAMP
PAGES 89-1, 89-6, 111-5
C292
BLOWER MOTOR RESISTOR
PAGES 53-2, 54-2, 54-5
C169
C203F
C203M
151-16 A7
ELECTRONIC SHIFT CONTROL MODULE
PAGE 34-1
3
C222M
C222F
C209M
C209F
151-15 A8
WITH ELECTRONIC SHIFT CONTROL
S203
WITH CAB MARKER LAMPS


REMOTE KEYLESS ENTRY MODULE
PAGE 111-1
15
1
C242
RADIO
PAGES 130-1, 130-2
7
C257
*C211
*C257M
C257F
151-12 A4
BLOWER MOTOR RESISTOR
PAGES 53-2, 54-2, 54-5
C260
FUEL TANK SWITCH
PAGE 49-1
2
C268
DIESEL ONLY
TRAILER ELECTRONIC BRAKE CONTROL
PAGE 95-3
206 W
C210F
C210M
151-12 F2
CIGAR LIGHTER
PAGE 44-1
C294
AUXILIARY POWER SOCKET
PAGE 44-1
C234
ASHTRAY ILLUMINATION
PAGE 71-1
C293
C204M
C204F
GAS ONLY
W/REMOTE KEYLESS ENTRY
WITH TRAILER TOW ONLY
206
S205
W
SELECTABLE RPM CONTROL
C225
* PREMIUM SOUND
C200M C200F
151-12 F7
K
TO S200 ON
PAGE 10-13
P
FROM S202 ON
PAGE 10-17

All circuits are 57 (BK) unless otherwise noted.



Refer to Location Index, Cell 152, for Component, Connector, Splice, Ground and Base Part Number descriptions and locations.

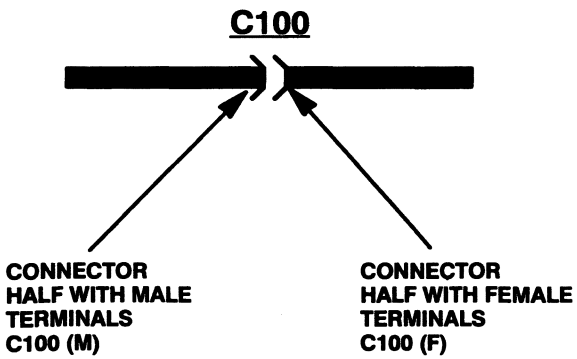
Splice	Location
S404 (With Flare Side)	Rear lamp connector harness, near T/O to C401
S404 (Without Flare Side)	Rear lamp connector harness, near T/O to C400
S405	Left lamp connector harness, near T/O to left backup lamp
S406	Right rear lamp connector harness, near T/O to right backup lamp
S409	Left marker lamp harness, near T/O to C412
S410	Right marker lamp harness, near T/O to C420
S412	Rear lamp connector harness, near T/O to C410
S417 (With Chassis Cab)	Rear lamp connector harness, near T/O to C448
S417 (With Flare Side)	Rear lamp connector harness, near T/O to C401
S417 (Without Flare Side)	Rear lamp connector harness, near T/O to C400
S418	Rear license lamp harness, near T/O to C400
S419	Rear lamps harness, near T/O to C401
S420	Rear lamp connector harness, near T/O to C410
S421	Left marker harness, in T/O to C412
S422	Right marker lamp harness, in T/O to C420
S423	Rear window regulator control harness, near T/O to tailgate window switch
S424	Rear lamps harness, near T/O to license lamps
S426	Rear lamp connector harness, near T/O to C401
S428	Rear lamps harness, near T/O to output shaft speed sensor
S429	Rear lamps harness, near T/O to output shaft speed sensor
S500	Window regulator left front door harness, near T/O to master window control switch
S501	Window regulator left front door harness, near T/O to C214
S502	Window regulator left front door harness, near T/O to C500
S503	Door window regulator control harness, near T/O to power mirror motor
S600	Window regulator right front door harness, near T/O to right window control switch
S601	Window regulator right front door harness, near T/O to C600
S602	Window regulator right front door harness, near T/O to right window control switch
S900	Rear view inside mirror harness, in windshield header
S901	Rear view inside mirror harness, in windshield header
S902	Rear view inside mirror harness, in windshield header

* Not Available

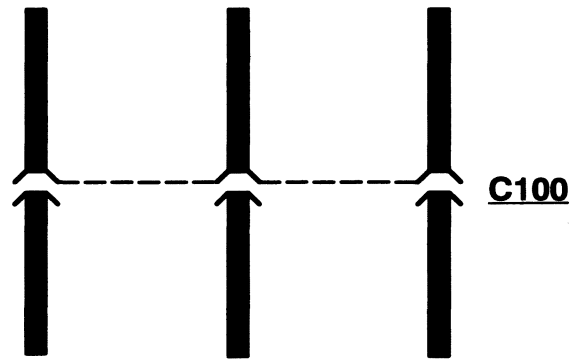
HOW TO IDENTIFY A BASIC HARNESS NUMBER BY USING A "C" NUMBER

Understand these symbols before using the following listing:

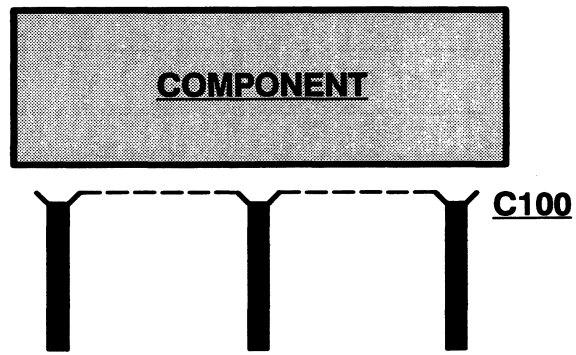
HARNESS TO HARNESS CONNECTION



DASHED LINES INDICATE TERMINALS OF SAME CONNECTOR



COMPONENT CONNECTION



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 harness base part number.

2) If the problem is not in a connector (such as a short or a broken wire), then choose a connector located on the same harness that has the problem. Identify the "C" number in the following listing and read the base part number of the harness that has the problem.

Connector Number	Wire Assembly
C101 (F)	9D930
C101 (M)	12A581
C101 (F) 4.9L	14289
C102	12A581
C103 (F)	15525
C103 (M)	12A581
C104	12A581
C105 (F)	14A346
C105 (M)	12A581
C106 (F)	12A581
C106 (M)	18A586
C107	12A581
C108 (F)	12A581
C108 (M)	14305
C110 (F)	15525
C110 (M)	12A581
C111	12A581
C115 (F)	12A581
C115 (M)	14305
C116	*
C117 (F)	14K067
C117 (M)	15525
C118	14305
C125 (F)	14289
C125 (M)	9D930
C126 4.9L	14289
C126	9D930
C127	15525
C128	12A581
C130	12A581
C131	12A581
C135 4.9L	14289
C135	9D930
C138 (F)	PIA
C138 (M)	12A581
C139 (F)	14305
C139 (M)	12A581
C143 DIESEL	14401
C143 GAS	12A581
C144	PIA
C145	PIA
C146	PIA
C149 (F)	14A346
C149 (M)	14405
C150	9D930
C151	12A581
C153	14305
C154	14305
C155	PIA
C156	PIA
C158	14405
C159 (F)	14401
C159 (M)	14401
C161	14K067
C162	18A586
C163	9D930
C163 4.9L	14289
C163 DIESEL	14305
C164	9D930
C165	14305
C166	15525
C168	18A586
C169	18A586
C170	12A581
C171	9D930
C172	14305
C173 (F)	15A702
C173 (M)	12A581
C174	PIA
C175	PIA
C176	12A581
C177	12A581
C178 4.9L	14289
C178	9D930
C180 4.9L	14289
C180	9D930
C181	9D930
C182	9D930
C182 4.9L	14289
C183	9D930
C184	14305
C185	12A581
C186	PIA
C187	14305
C188	PIA
C190	9D930
C191	9D930
C192	9D930
C193	9D930
C194	9D930
C195	9D930
C196	9D930
C197	9D930
C198	12A581
C199	12A581
C200 (F)	14A504
C200 (M)	14401
C201 (F)	15460
C201 (M)	14401
C203 (F)	18A586
C203 (M)	14401
C204 (F)	14401
C204 (M)	13A726
C205 (F)	14401
C205 (M)	14405
C207	14401
C208	14401
C209 (F)	14B095
C209 (M)	14401
C210 (F)	14A348
C210 (M)	14401
C211	19B113
C212	19B113
C213 (F)	14A265
C213 (M)	14A509
C214 (F)	14A509
C214 (F) **	19A123
C214 (M)	14A504
C215 (F)	14A509
C215 (M)	14A504
C216	12A581
C217	14401
C218	14401
C219 (F)	14401
C219 (M)	9C899
C220 (F)	14B095
C220 (M)	PIA
C221	14B095
C222 (F)	14B095
C222 (M)	PIA
C223	14B095
C224	14401
C225	14401
C226	14401
C227	14401
C228 (F)	14A265
C228 (M)	14401
C229 (F)	14A504
C229 (M)	14401
C230	14401
C231	14401
C232	14401

* No Figure Available
** W/O Power Windows

153-3 HARNESS CAUSAL PART NUMBER

Connector Number	Wire Assembly
C234	13A726
C235 (F)	14A504
C235 (M)	14401
C240	14401
C241	14401
C242	14401
C243	14401
C244	14401
C250	14401
C251	14401
C252	14401
C257	14401
C258	14401
C260	14401
C261	14401
C262	14401
C263	14A504
C264	14401
C267	14401
C268	14401
C269	14401
C271	14401
C273	14401
C274	14401
C275	14401
C276	14401
C277	14401
C278	14401
C279	14401
C280	14401
C282	AUDIO CABLE
C283	AUDIO CABLE
C292	14401
C293	13A726
C294	13A726
C295	13A726
C296	14401
C298	14401
C299 (F)	17K745
C299 (M)	14A504
C300 (F)	14334
C300 (M)	14A504
C302	14A504
C303 (F)	14632
C303 (M)	14A504
C304 (F)	14632
C304 (M)	14A504
C305	14B084
C306	14B084
C307 (F)	14632
C307 (M)	14A504
C308 (F)	14632
C308 (M)	14A504
C310	14086
C311	14086
C312	14B084
C313 (F)	14A504
C313 (M)	14B084
C314 (F)	14A504
C314 (M)	14B084
C315 (F)	14335
C315 (M)	14A504
C317	14B084
C321	14334
C322	14334
C326	14A504
C327	14A504
C328	14B095
C329	14401
C330	12A581
C400 (F)	13412
C400 (M)	13A409
C401 (F)	13A409
C401 (M)	14405
C404	14405
C406 (F) *	14405
C406 (M) *	13A409
C407 (F)	13A576
C407 (M)	14405
C408 (F)	13A409
C408 (M)	15A411
C409 (F)	13A409
C409 (M)	15A411
C410 (F)	13A409
C410 (M)	15425
C411	15A411
C412	15A411
C413	15A411
C417 (F)	12964
C417 (M)	13A576
C418 (F)	14405
C418 (M)	14086
C420	15A411
C421	14405
C423	14405
C424 (F)	13A576
C424 (M)	14405
C427	14405
C428	14086
C429	14086
C431 **	13A409
C431 ***	13A409
C432	13A409
C433	13A409
C434	13A409
C435 ****	13412
C435 *	13A409
C436 ****	13412
C436 *	13A409
C440	14405
C441 *****	14406
C441	14405
C446 ******	13412
C447 *******	13A409
C448 *******	13A409
C500	14A509
C502	14A509
C503	14A509
C504	14A509
C505	14A509
C507	14A509
C507 ********	19A123
C508	14A509
C509 (F)	14A265
C509 (M)	14A509
C510	14A509
C550	14A509

* W/Flareside
**W/Flareside
*** W/O Flareside Chassis Cab
**** W/O Flareside W Rear Bumper
***** Chassis Cab & 185 Wheelbase
****** W/O Flareside W/O Rear Bumper
******* Chassis Cab
******** Custom & XL Trim

Connector Number	Wire Assembly
C600	14A256
C602	14A256
C603	14A256
C606	14A256
C607	14A256
C608	14A256
C609	14A256
C700	14632
C701	14632
C702	14632
C703	14632
C704 (F)	14632
C704 (M)	14632
C800	14632
C801	14632
C802	14632
C803	14632
C804 (F)	14632
C804 (M)	14632
C900	15460
C901	15460
C902	15460
C903	15460
C904	15460
C905	14334
C906	14334
C907	14334
C908	14334
C910	14334
C911	17K745
C912	17K745
C913	17K745
C1000	PIA
C1001	PIA
C1002	PIA
C1003 (F)	12A690
C1003 (M)	12A581
C1004	PIA
C1005	12A581
C1006	12A581
C1007	9D930
C1007 4.9L	14289
C1008	9D930
C1008 4.9L	14289
C1009	9D930
C1009 4.9L	14289
C1010	12A581
C1011	12A581
C1012	15525
C1013	PIA
C1014	PIA
C1015	PIA
C1017	9D930
C1017 4.9L	14289
C1018	PIA
C1019	12A581
C1020	15525
C1021	12A581
C1022	9D930
C1022 4.9L	14289
C1023	9D930
C1023 4.9L	14289
C1024	9D930
C1025	9D930
C1025	12A690
C1025 *	15525
C1026	9D930
C1026 4.9L	14289
C1027	12A581
C1029	14305
C1030	12A581
C1031	12A581
C1032	12A581
C1033	12A581
C1034	12A581
C1035	15A702
C1036	9D930
C1037	9D930
C1038	9D930
C1047	PIA
C1048	7C078
C1049	15525
C1052	12A581
C1053	12A581
C1054	12A581
C1055	12A581
C1056	PIA
C1057 (F)	PIA
C1057 (M)	PIA
C1058 (F)	PIA
C1058 (M)	PIA
C1059 (F)	PIA
C1059 (M)	PIA
C1060 (F)	PIA
C1060 (M)	PIA
C1061 (M)	15525
C1061 (F)	7C078
C2000	14401
C2001	14401

* All 7.5L Except F450 & 5.8L over 8500 LBS

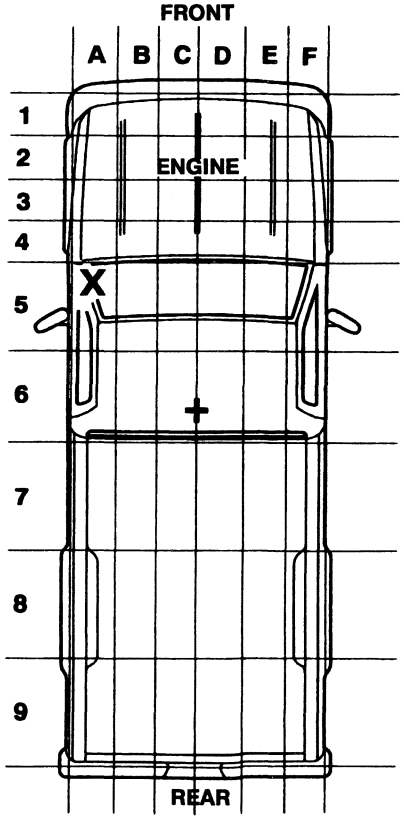
VEHICLE REPAIR LOCATION CODES

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

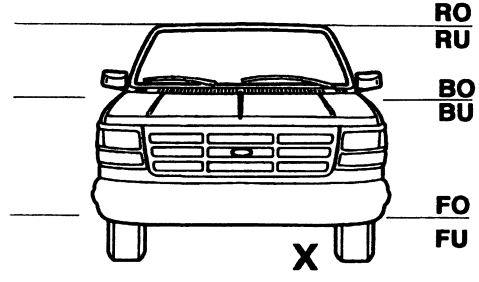
FOR EXAMPLE, AN "X" HAS BEEN PLACED IN THE QUADRANT OF THE VEHICLE DIAGRAMS INDICATING THE LOCATION OF THE REPAIR. SEE DIAGRAMS.

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

FRONT/REAR DIRECTION



OVER/UNDER DIRECTION

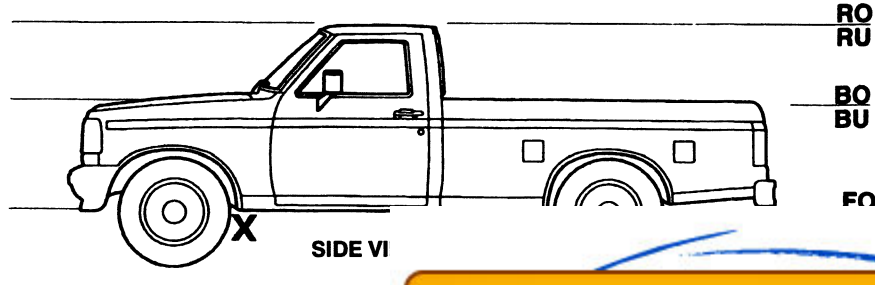


R = ROOF LINE
- RO = ROOF OVER
- RU = ROOF UNDER

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

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

+ CENTER OF VEHICLE



SIDE VI