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2002 Wiring Diagrams Features

- Pages are now presented in **landscape format**, 11 x 8 1/2.
- **Cell numbering** system is utilized.
- A **system overview** page now appears at the beginning of the cell of each major system. This page contains a high level overview of the connectivity of all components that make up a complete system.
- **Component operational information** now appears for components on each page of the system overview. This provides a brief description of how the component works.
- **Simplified component internal information** now appears on the system overview and schematic pages for solid state devices, as it is available from engineering.
- **Diagnostic test information** such as voltage and resistances values now appear on the system overview and schematic pages for solid state devices and sensors, as it is available from engineering.
- **Service base part numbers** now appear with all components.
- **Component location referencing** now appears where a component is shown complete on the schematic pages to provide a reference to the component location view.
- **Schematic page referencing** has been enhanced to provide a reference to where a splice or ground is shown complete. Additionally, in-cell referencing has been enhanced with letters to indicate that a circuit continues from one page to another within the same cell.
- All **connector views** are shown complete and located in Cell 150.
- **Component location views** are located in Cell 151 and are more specific, concentrating on select wiring and components for the area of the vehicle shown.

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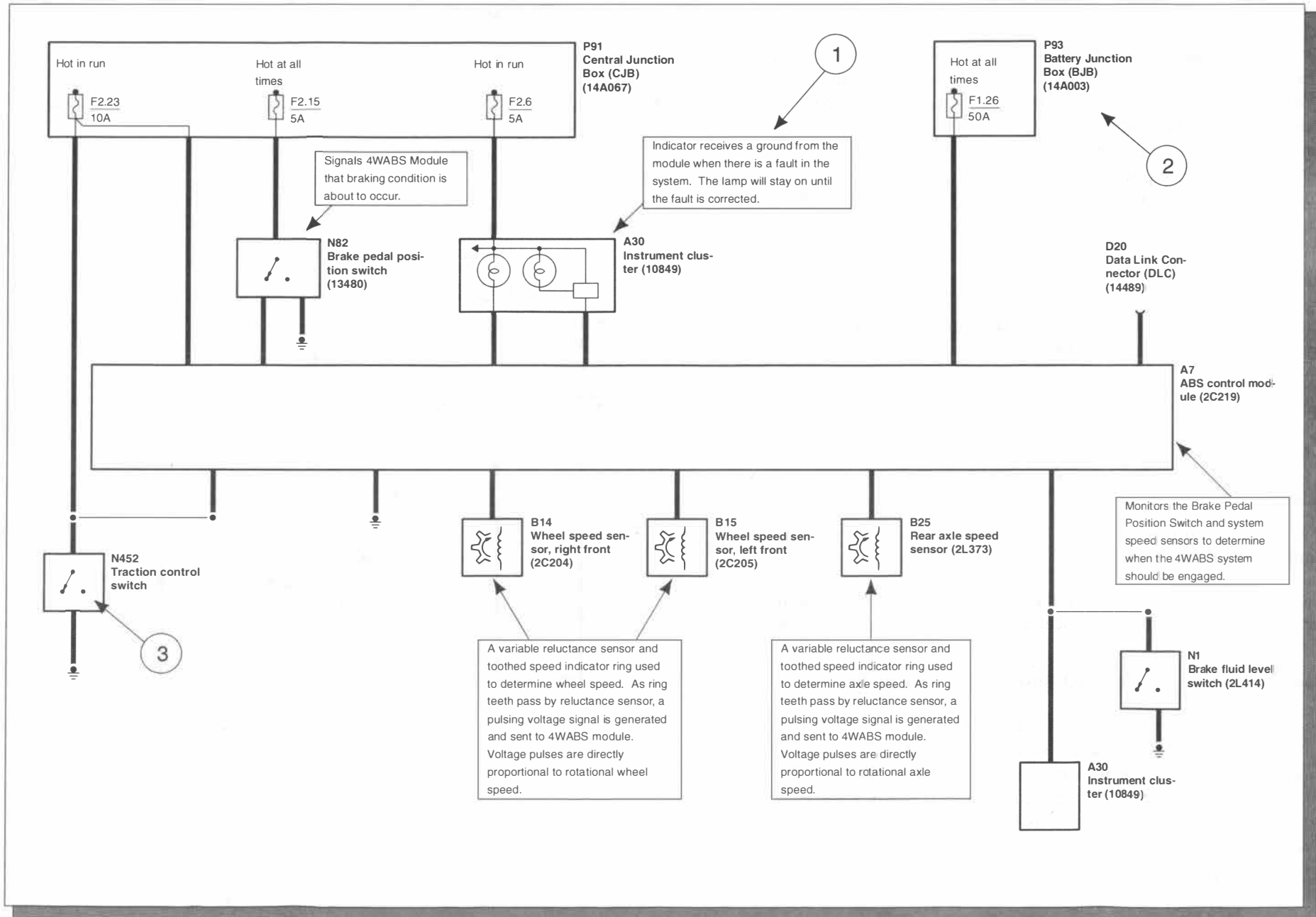
All wiring connections between components are shown exactly as they exist in the vehicles. It is important to realize, however, that no attempt has been made on the schematic to represent components and wiring as they physically appear on the vehicle. For example, a 4-foot length of wire is treated no differently in a schematic from one which is only a few inches long. Furthermore, to aid in understanding electrical (electronic) operation, wiring inside complicated components has been simplified.

Complete Circuit Operation

Each circuit is shown completely and independently in one cell. Other components which are connected to the circuit may not be shown unless they influence the circuit operation.

System Overview

Each major vehicle system includes a complete system overview prior to each set of schematic pages. It is important to realize that this is only a high level overview of the complete system connectivity. It includes component operational information (1), component name and base part number (2), and basic component internals (3). It does not include specific circuit information, connector or pin numbers, splices or grounds. That information is found on the schematic pages.



Current Flow (1)

Each cell normally starts with the component that powers the circuit such as a fuse or the ignition switch. Current flow is shown from the power source at the top of the page to ground at the bottom of the page. In order to concentrate on the essential parts, power supply and ground connections are sometimes simplified by a dashed line in the schematics. A full representation of the power supply of a fuse or the power distribution from a fuse to various components is given in cell 13 "Power Distribution". Full representation of the ground connections are shown in cell 10 "Grounds".

Switch Positions (2)

Within the schematic, all switches, sensors and relays are shown "at rest" (as if the Ignition Switch were OFF).

Splices (3)

A dashed line indicates that the splice is not shown completely. A reference is given to the page where the splice appears in full. It is also listed in the Index.

Component Referencing (4)

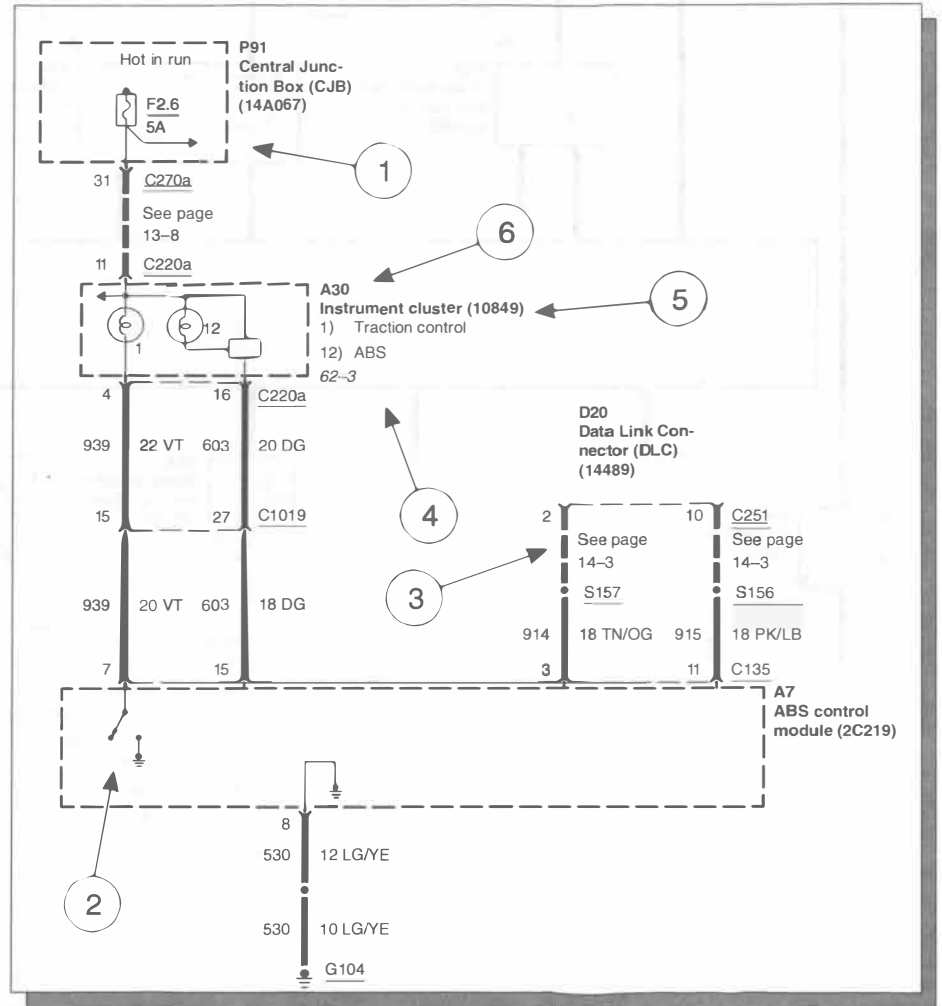
Each component on a schematic has a reference to the component location view for that component. It is located to the right of each component.

Component Names, Notes and Base Part Numbers (5)

Component names are placed on the right hand side of each component. Any notes that describe switch positions or operating conditions follow the name. Descriptions of the internals of the component are also included here. The page where the component appears in full is listed in the Index. The base part number for a component is listed in parentheses next to or under a component. These part numbers will appear any place the component name appears in the publication.

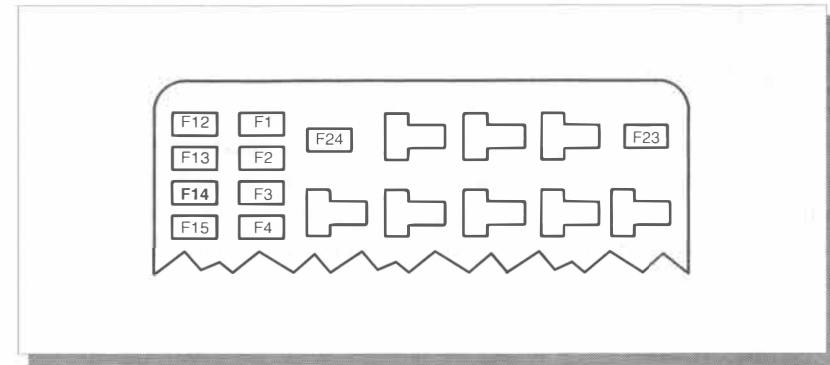
Component Identification Numbers (6)

Each component on each schematic has a component identification number located to the upper right hand side of the component. By finding this number in the Component Location Chart, the Component Location View for that component can easily be found.



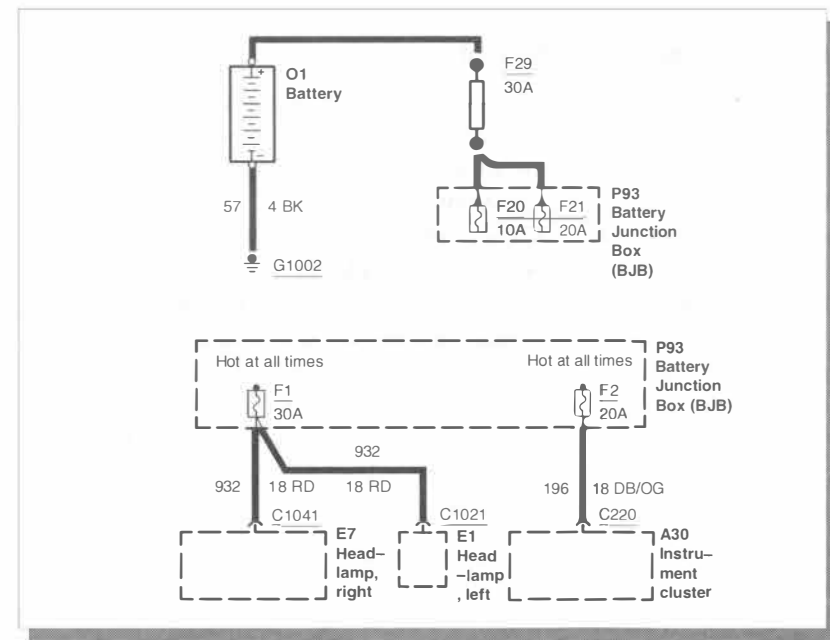
Fuse and Relay Information

Cell 11 “Fuse and Relay Information” contains a view of the fuse-/relay box in which all fuses and relays are identified.



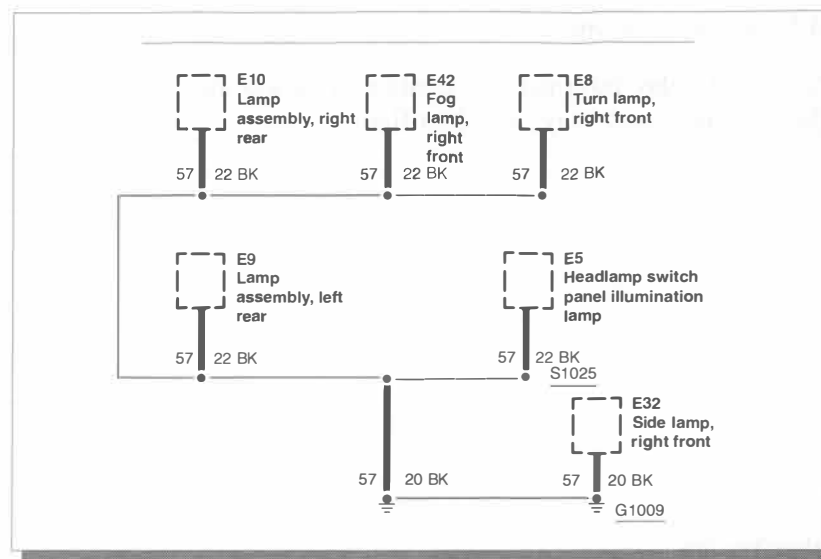
Power Distribution

Cell 13 “Power Distribution” shows the current feed circuit. The current path is shown from the battery to the ignition switch and to all fuses. It also shows the circuits protected by each fuse. The circuit is traced from the fuse to the component. All details (wires, splices, connectors) between the fuse and the first component are shown.



Ground Distribution

Cell 10 “Grounds” contains the schematics that show the complete details for each ground connection or main ground splice. This is useful in diagnosing a problem affecting several components at once (poor ground connection or ground splice). All details (wires, splices, connectors) between the ground point and the components are shown. These ground connection details are shown here in order to keep the individual cell schematics as uncluttered as possible.



Component and Connector Information

Cell 152 “Component Location Charts” helps the user find where the various items depicted on the schematic can physically be found on the vehicle. A brief written description of the location is given, along with a reference to the component location views.

Cell 151 “Component Location Views” show the components and their connecting wires as they can be found on the vehicle.

Cell 150 “Connector Views” show the views of the pins and/or cavities of all connectors. The pin and cavity sides are shown separately as if the connector were disconnected. The color of the connector housing is indicated next to the connector number when available. The harness causal number is located above the connector view and below the connector number. The circuit function charts are located below each connector. The wiring harness designations are listed in cell 152 “Component Location Charts”.

C150

12A581

B15
Wheel speed sensor, left front (2C205)



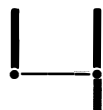
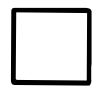
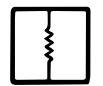
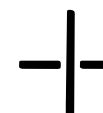

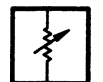

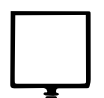
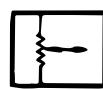



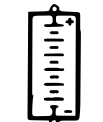

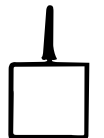
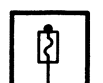


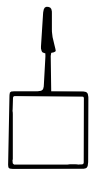

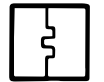
F02085

Pin	Circuit	Circuit Function
1	522 (TN/BK)	Wheel speed sensor, left front (2C205) –
2	521 (TN/OG)	Wheel speed sensor, left front (2C205) +

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.*

4-1 Symbols

	Distributed splice		Entire component		Resistor or heating element
	Crossed wiring without connection		Part of a component		Potentiometer (pressure or temperature)
	Splice		Component case directly attached to metal part of vehicle (ground)		Potentiometer (outside influence)
	Removable connection				
	Ground		Component with screw terminals		Battery
	Connector		Connector attached to component		Fuse
	Female connector				
	Male connector		Connector attached to component lead (pigtail)		Circuit breaker
					Heating element, Conductor loop



Ignition coil assembly



Buzzer



Antenna



Solenoid controlled valve or clutch solenoid



Air bag sliding contact (14A664)



Permanent magnet, one-speed-motor



Light emitting diode (LED)



Diode, current flows in direction of arrow



Permanent magnet, two-speed-motor



Capacitor



Transistor



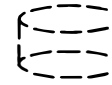
Rotational sensor



Variable capacitor



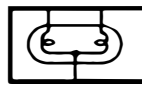
Lamp



Shield



Piezoelectric sensor



Bifilament lamp



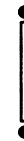
Horn or speaker



Coil



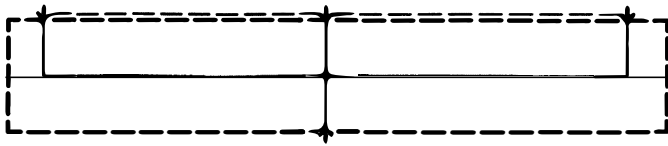
Gauges



Fusible link

4-3 Symbols

Joint connector



Wire colors	
BK	Black
BN	Brown
BU	Blue
DB	Dark blue
DG	Dark green
GN	Green
GY	Gray
LB	Light blue
LG	Light green
NA	Natural
OG	Orange
PK	Pink
RD	Red
SR	Silver
TN	Tan
VT	Violet
WH	White
YE	Yellow



Power ground



signal



Signal return



Switched ground



Reference voltage



Left-hand-drive vehicles

VBATT

Battery voltage

VPWR

Switched or module voltage

SCP +

Standard Corporate Protocol (SCP) data +

SCP -

Standard Corporate Protocol (SCP) data -

ISO

Data bus ISO 9141 (K-line)

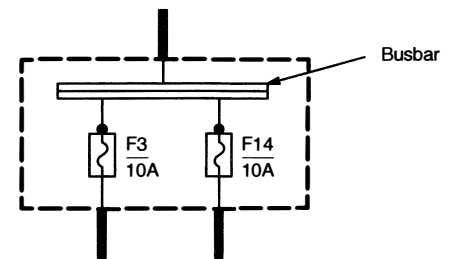
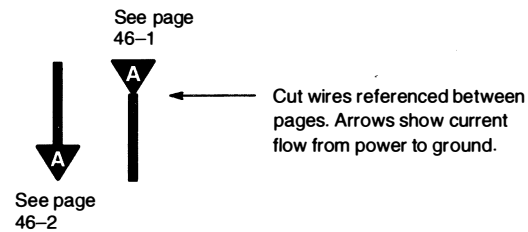
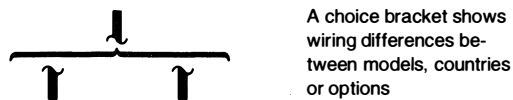
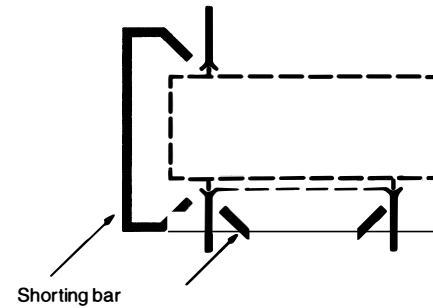
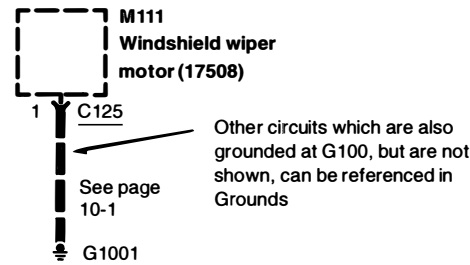
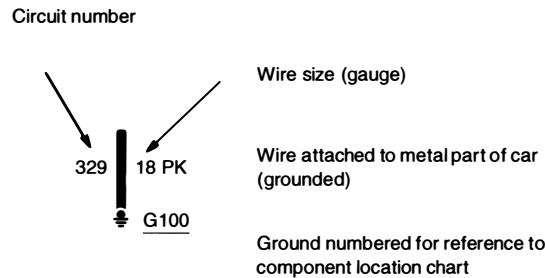
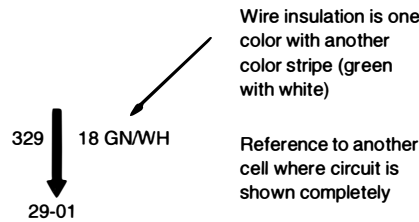
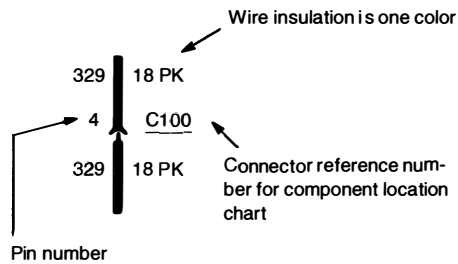
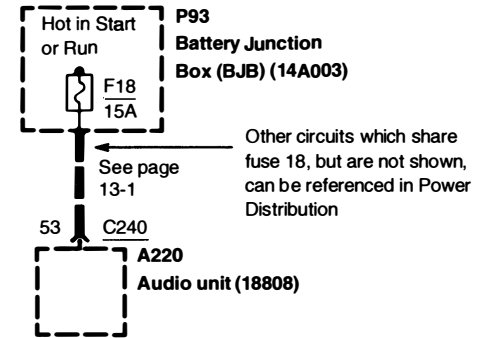
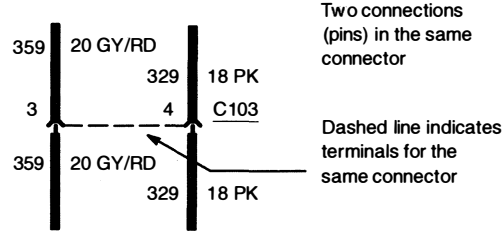
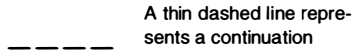
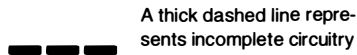
PWR

Switched power

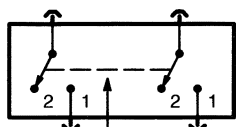
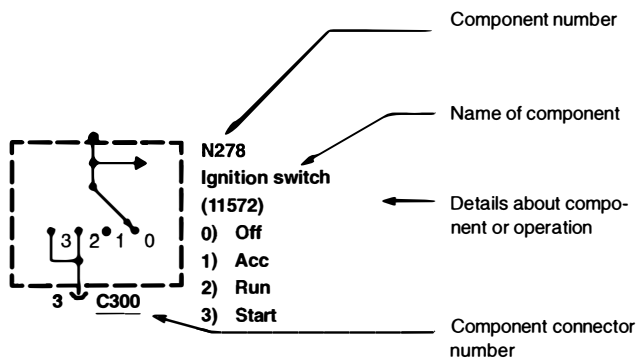
Country code



Canada

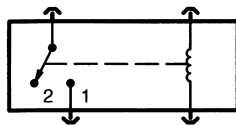


4-5 Symbols

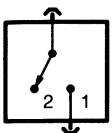


Switches that move together

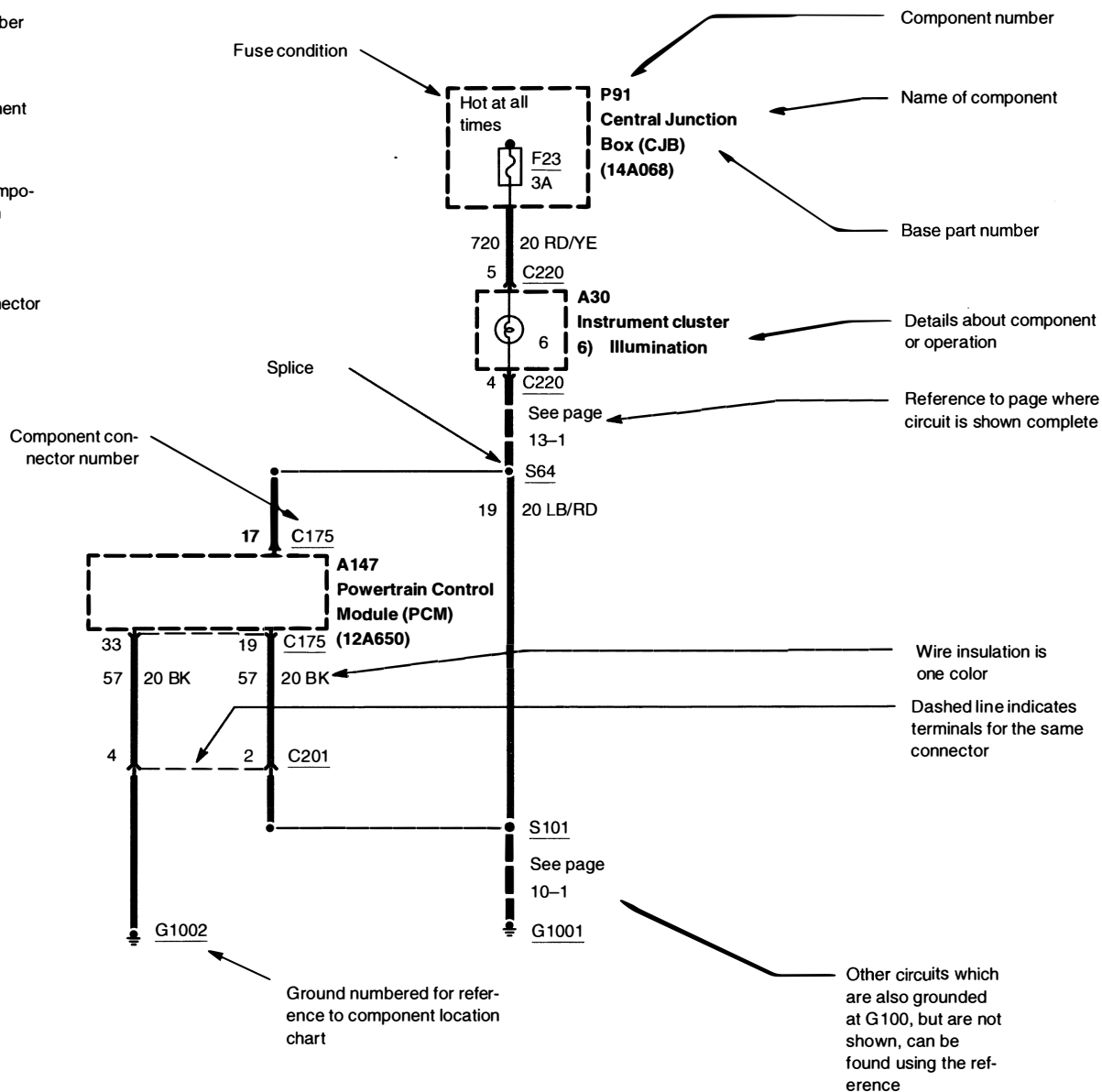
Dashed line shows a mechanical connection between switches



Normally open contact
 When coil is energized, switch is activated



One pole, two position switch

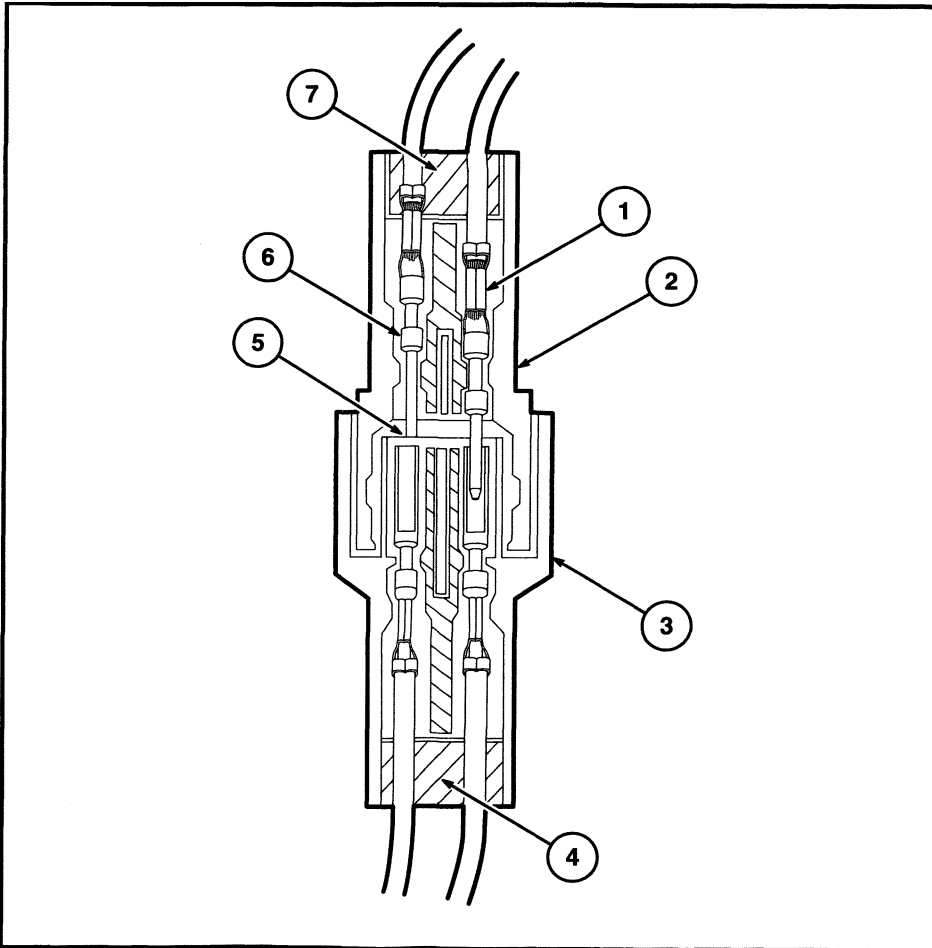


5-1 Connector Repair Procedures

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.

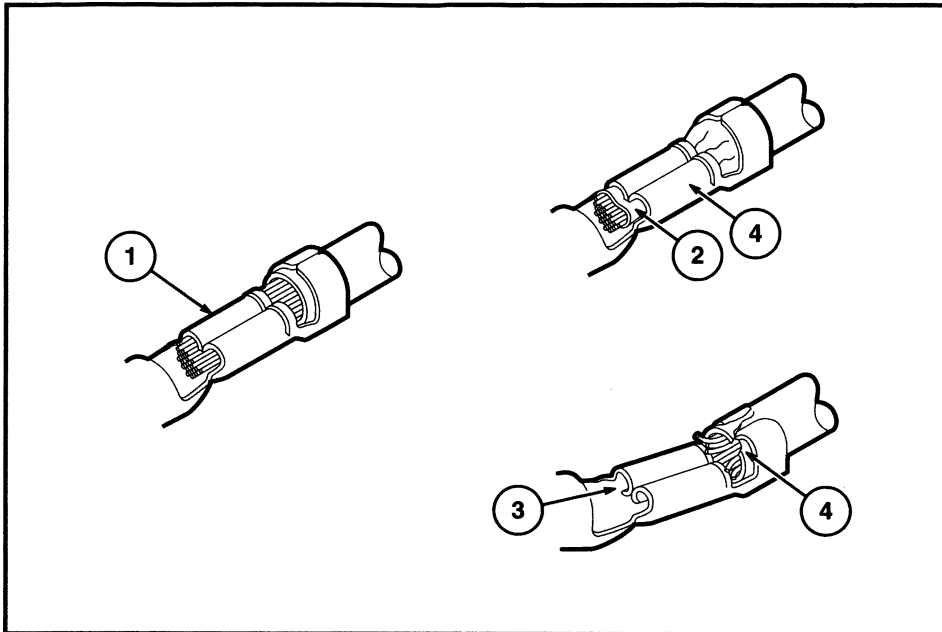
NOTE: Several components, such as the PCM, utilize gold plated terminals in their connections to the wiring harness. If those terminals need to be replaced, they must be replaced with a gold plated terminal.



Terminal not properly seated

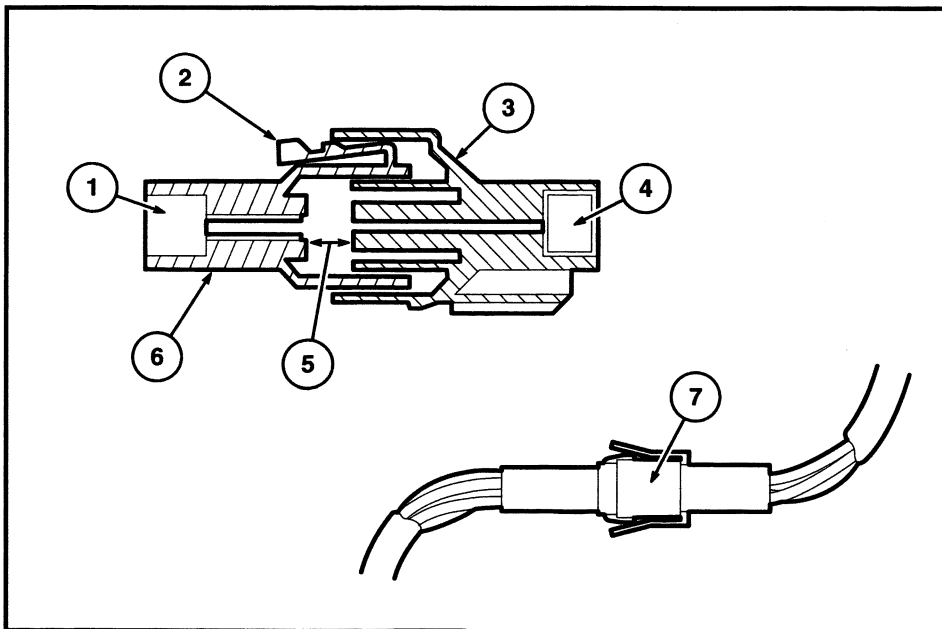
- 1 = Locked terminal
- 2 = Male half
- 3 = Female half
- 4 = Seal
- 5 = Intermittent contact
- 6 = Unlocked terminal (Hidden by wire seal)
- 7 = Seal

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



Defective insulation stripping

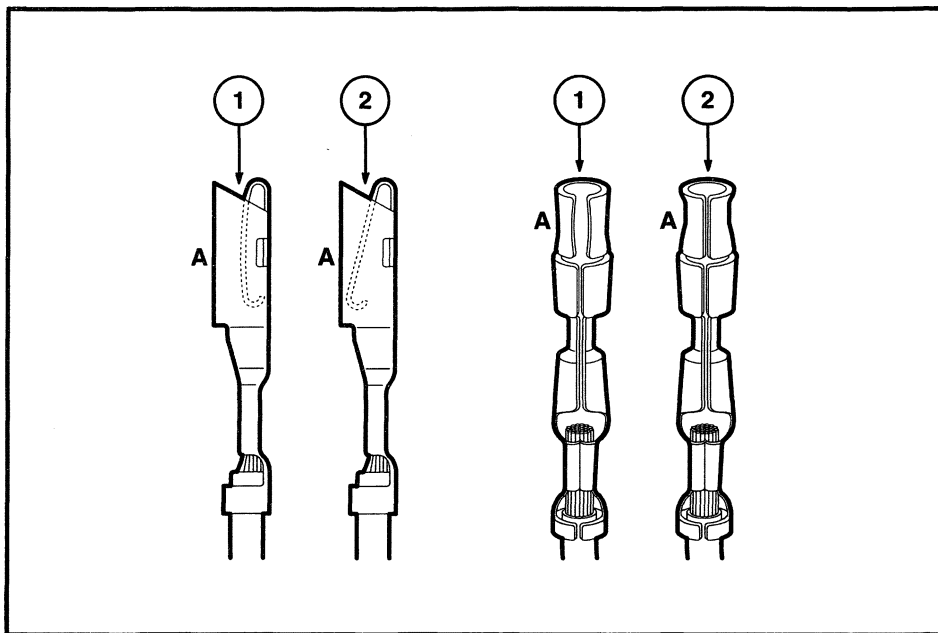
- 1 = Proper crimp
- 2 = Insulation not removed
- 3 = Wire strands missing
- 4 = Intermittent signals through pierced insulation



Partially mated connectors

- 1 = Seal
- 2 = Displaced tab
- 3 = Female half
- 4 = Seal
- 5 = Intermittent contact
- 6 = Male half
- 7 = Intermittent contact

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

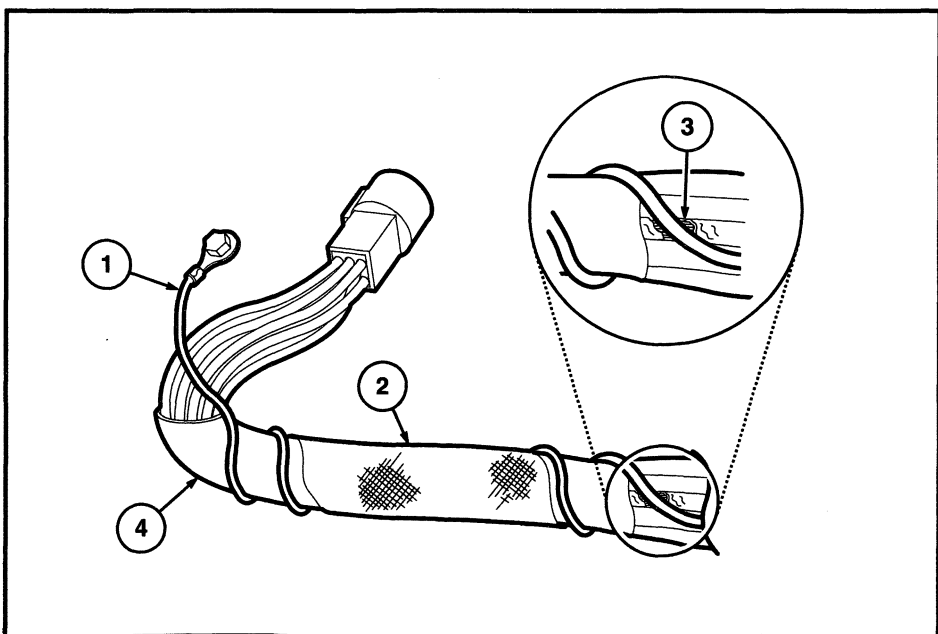


Deformed (enlarged) female terminals

1 = Enlarged

2 = Normal

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.



Electrical short inside the harness

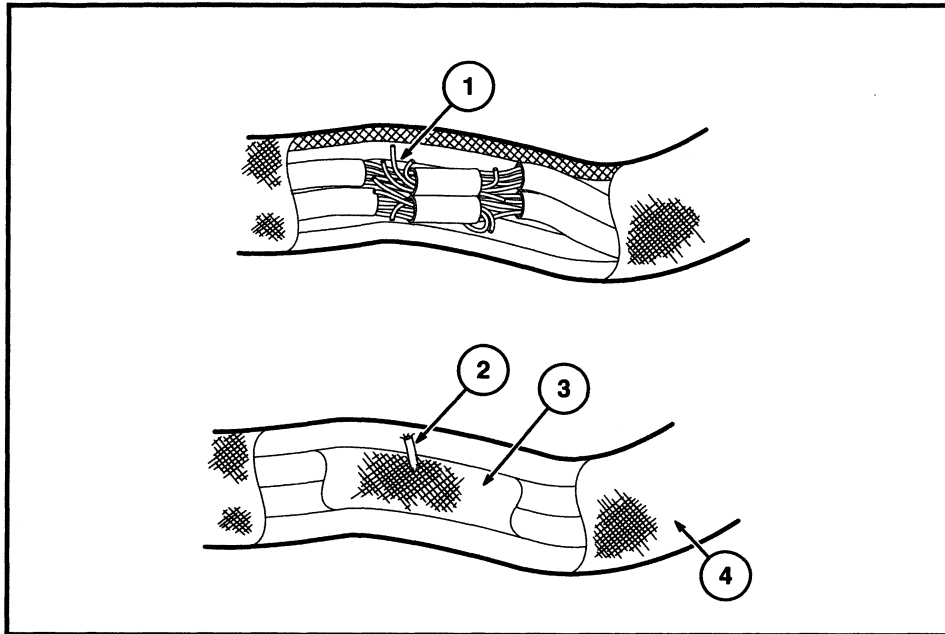
1 = Solder coated wire to ground

2 = Harness protective tape

3 = Intermittent short

Solder coated wire pierced through the insulation of another circuit

4 = Grounding foil



Electrical short within the harness

Splice tape removed

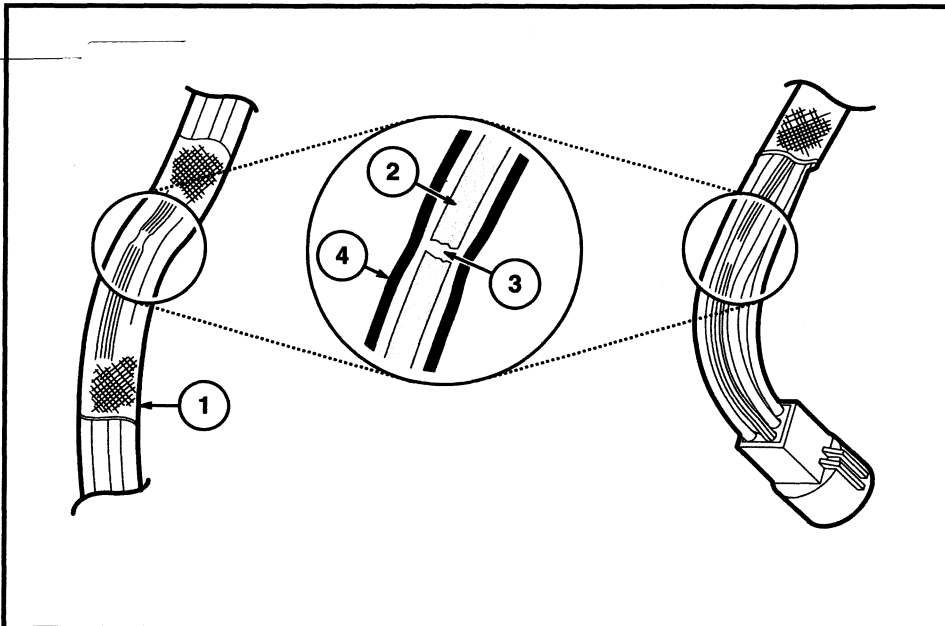
1 = Intermittent short

Splice covered

2 = Wire strand

3 = Splice tape

4 = Harness tape



Broken wire strands in harness

1 = Wiring harness tape

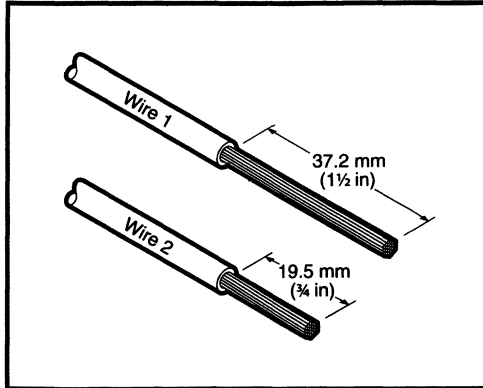
2 = Wiring strand

3 = Broken strands intermittent signal

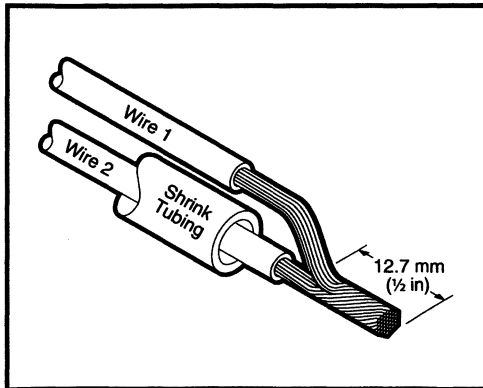
4 = Circuit insulation

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

Recommended splicing method

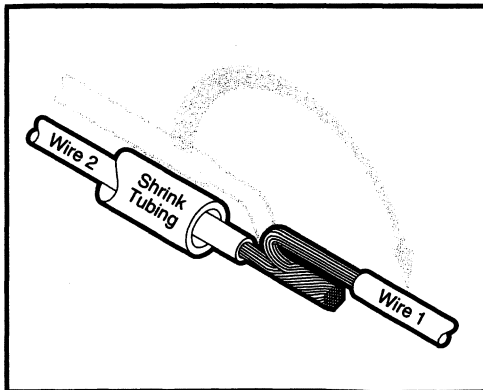


1. Disconnect battery ground cable.
2. Strip wires to appropriate length.



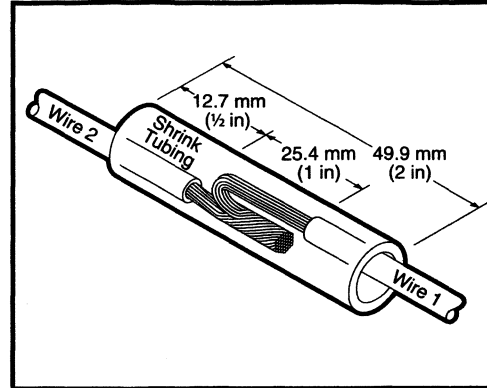
3. Install heat shrink tubing.
4. Twist wires together.
5. Solder wires together.

NOTE: Use rosin core mildly-activated (RMA) solder. Do not use acid core solder.



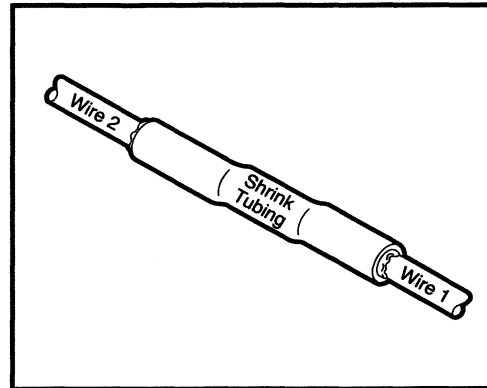
6. Bend Wire 1 back in a straight line.

NOTE: Wait for solder to cool before moving wires.



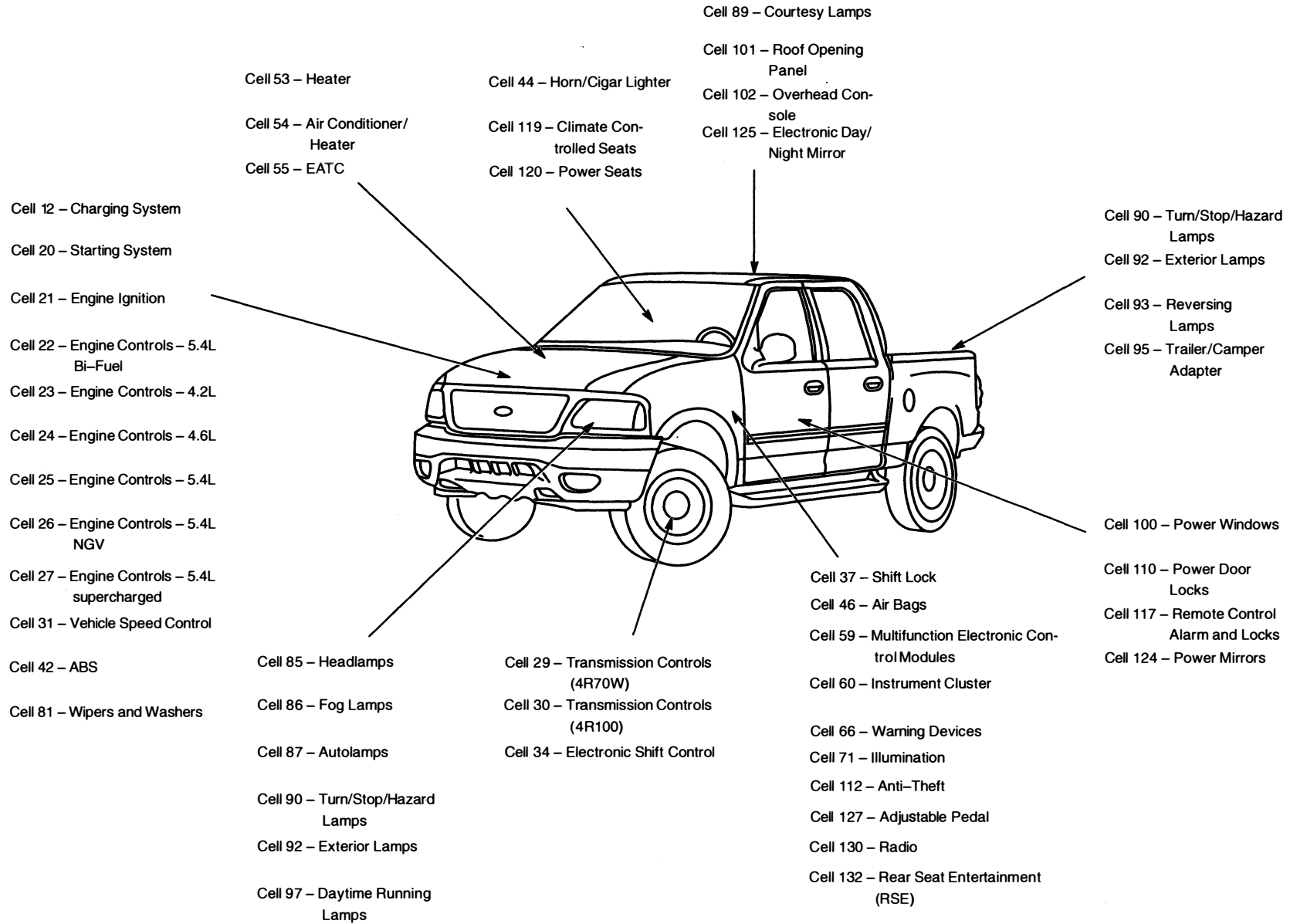
7. Evenly position heat shrink tubing over wire repair.

NOTE: Overlap tubing on both wires.

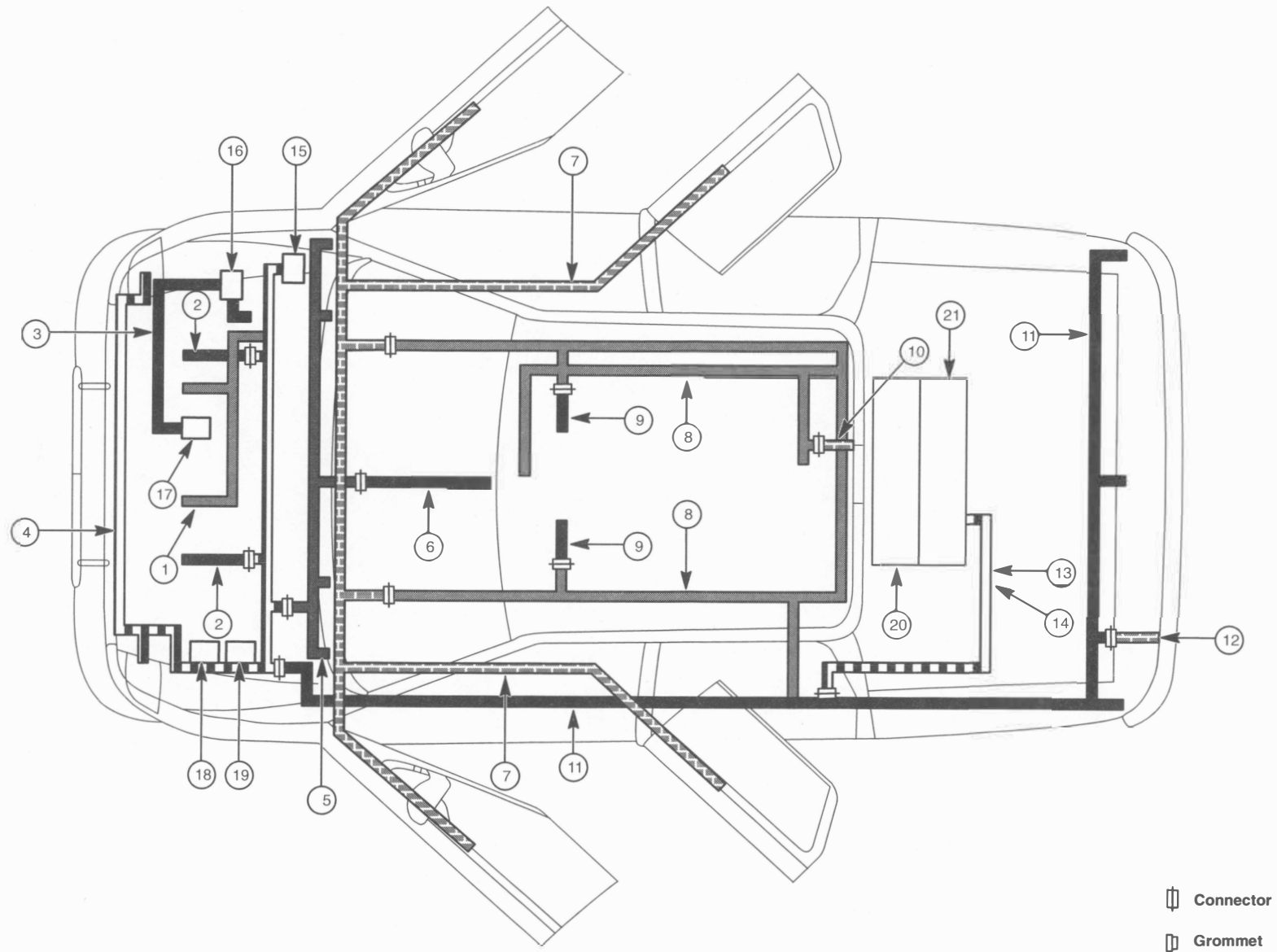


8. Use heat gun to heat the repaired area until adhesive flows out of both ends of heat shrink tubing.
9. Reconnect battery ground cable.

8-1 Systems Overview

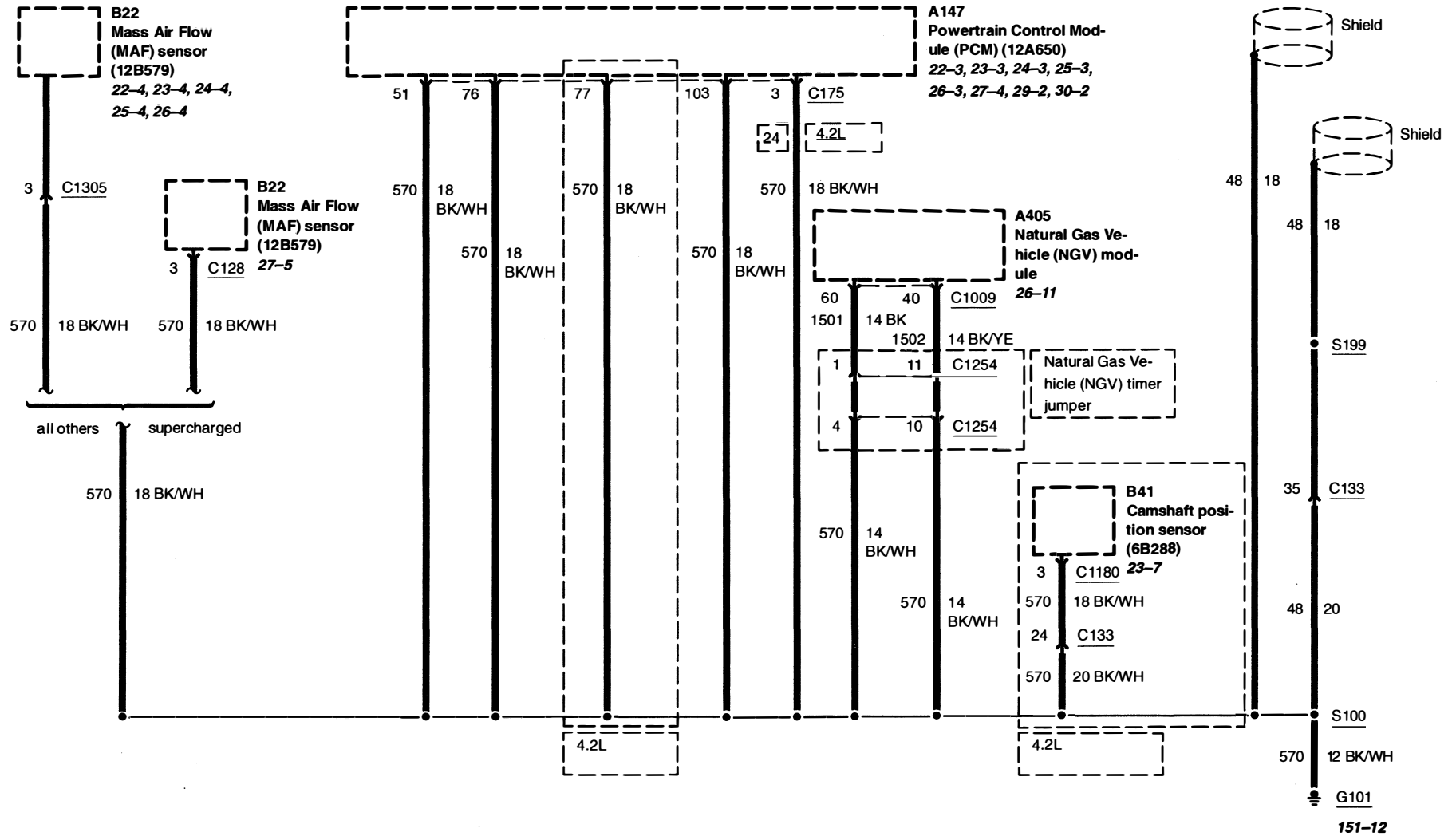


9-1 Wiring Harness Overview

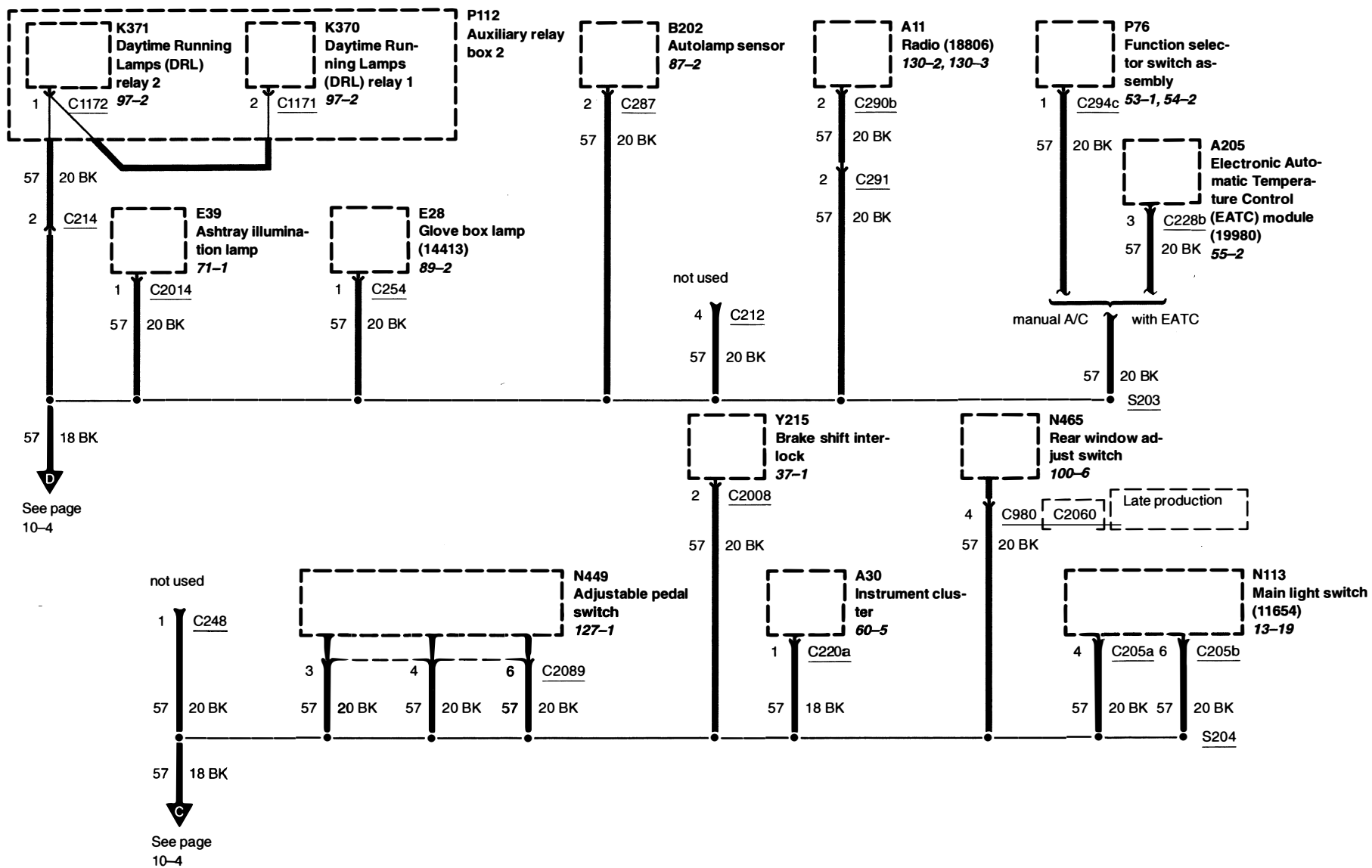


Item	Part Number	Description
1	12B637	Wiring harness – Engine control sensor and fuel charge
2	12A581	Wiring harness – Engine control sensor
3	14B060	Wiring harness – Starter motor relay and battery ground
4	14A320	Wiring harness – Multifunction switch
5	14401	Wiring harness – Main
6	19B113	Wiring harness – CD changer (18D806)
7	14A005	Wiring harness – Body main
8	14A504	Wiring harness – Body main
9	14B084	Wiring harness – Passenger, driver seat jumper
10	13A625	Wiring harness – High mounted stoplamp
11	14405	Wiring harness – Tail lamps
12	13A576	Wiring harness – Trailer lamp feed
13	A2-765	Wiring harness – Bi-fuel tank 1
14	A2-766	Wiring harness – Bi-fuel tank 2
15	A147	Powertrain Control Module (PCM) (12A650)
16	O1	Battery (10655)
17	O5	Generator
18	A7	ABS control module (2C219)
19	P93	Battery Junction Box (BJB) (14A003)
20	–	Natural Gas Vehicle (NGV) tank
21	–	Natural Gas Vehicle (NGV) tank

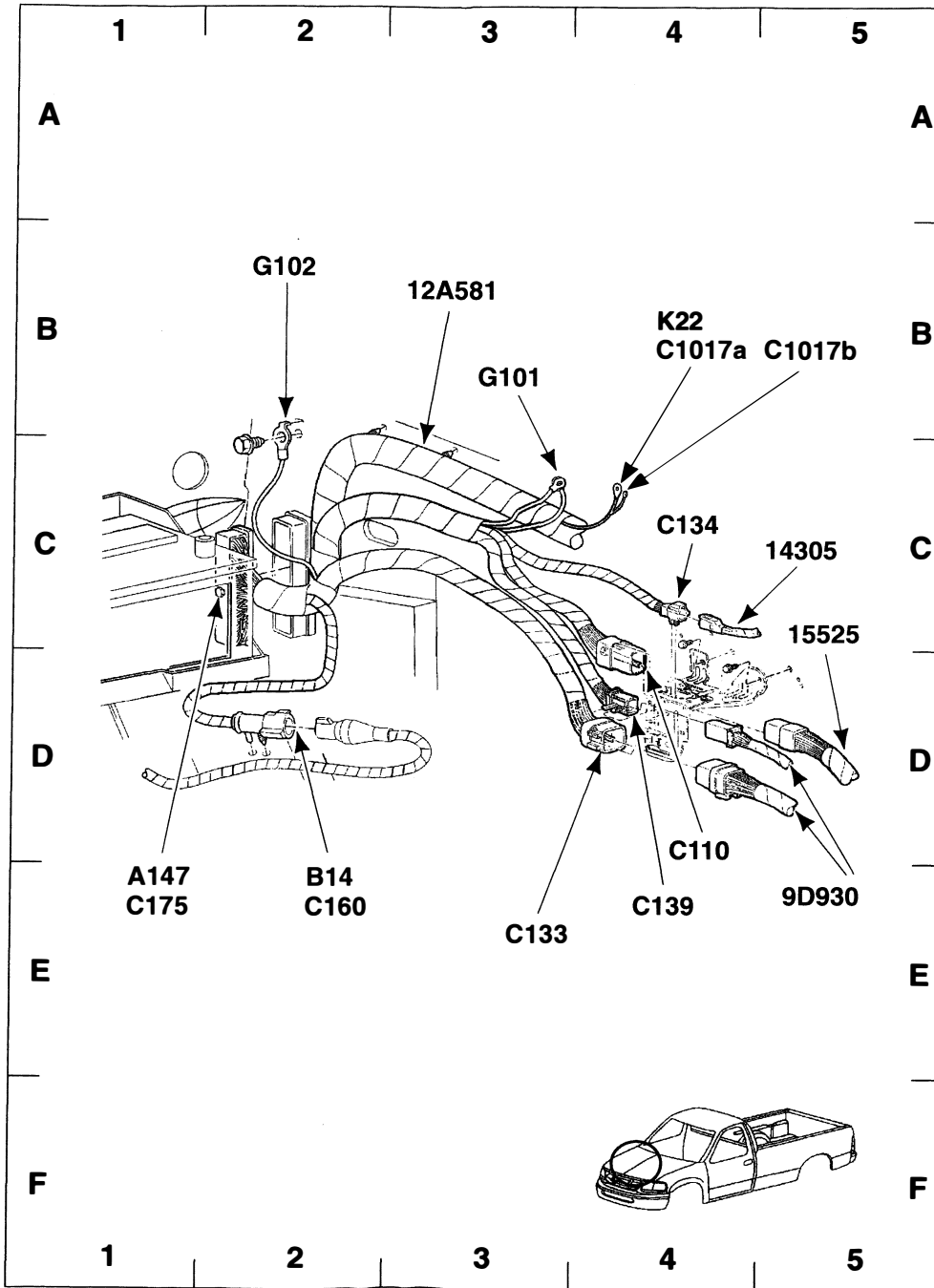
G101



10-5 Grounds

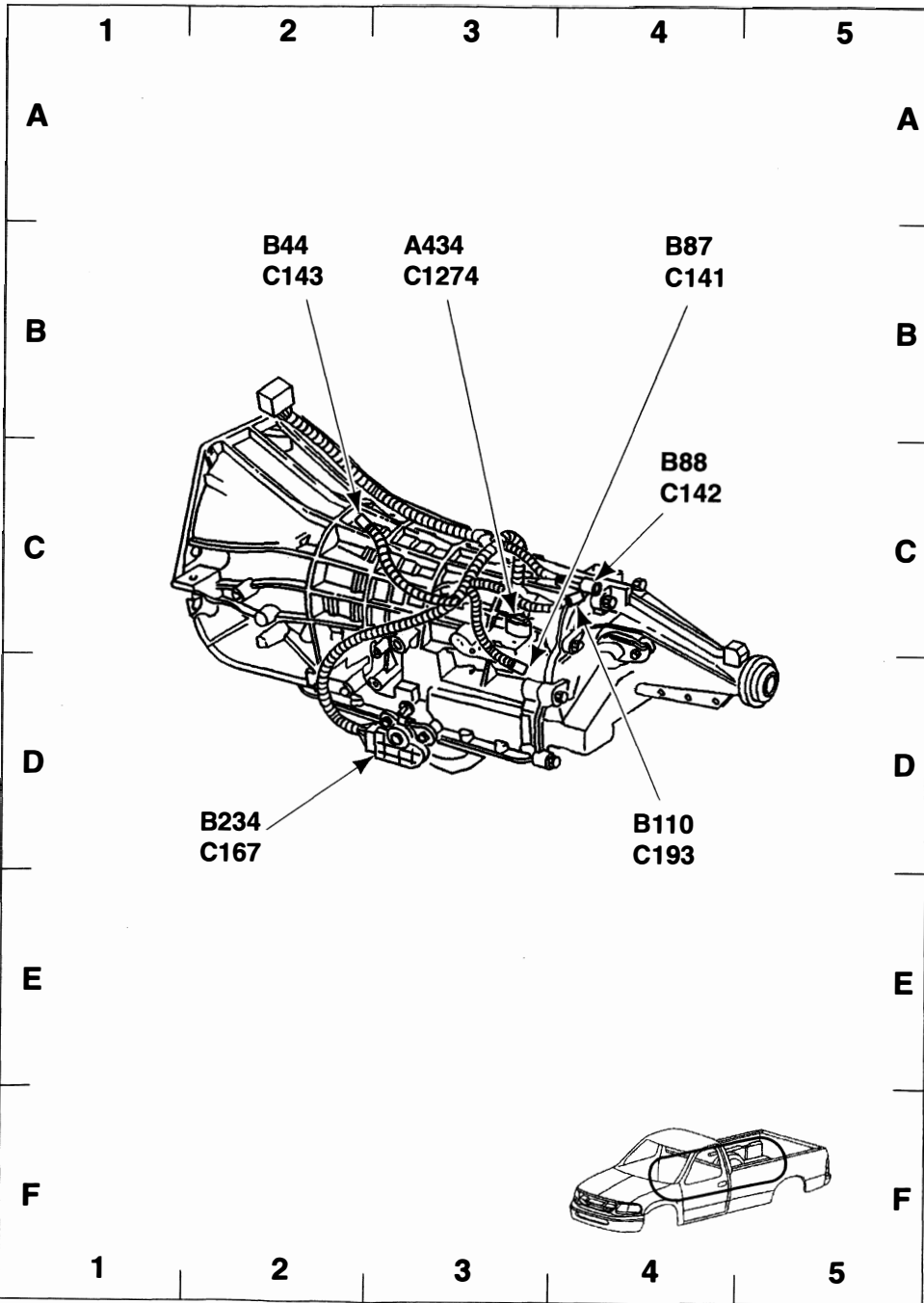


engine compartment, rear, RH side



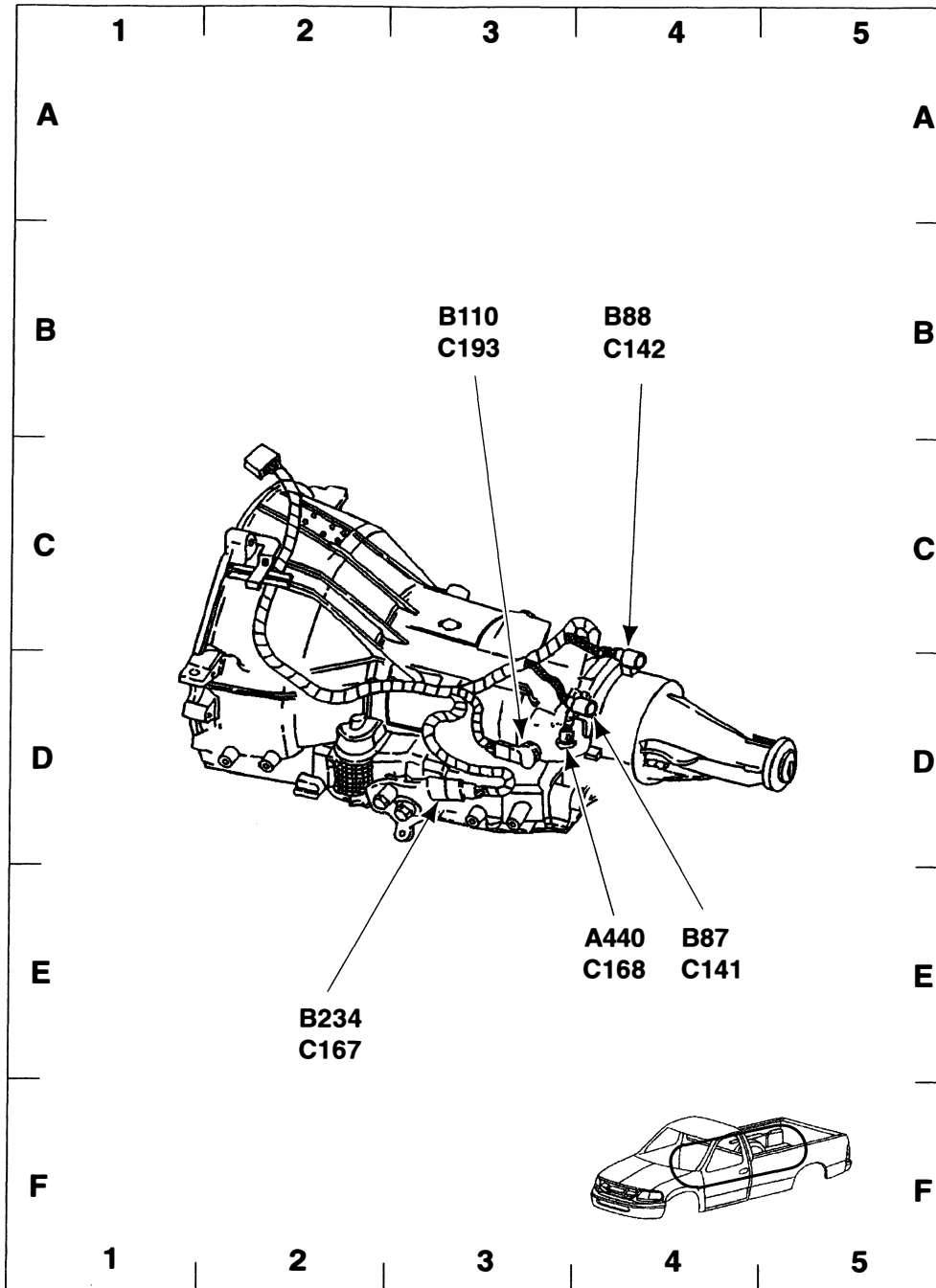
12A581	B 3
14305	C 5
15525	C 5
9D930	E 5
A147 Powertrain Control Module (PCM) (12A650)	E 1
B14 .. Wheel speed sensor, right front (2C204)	E 2
C110	D 4
C133	E 3
C134	C 4
C139	E 4
C160	E 2
C175	E 1
C1017b	B 5
C1017a	B 4
G101	B 3
G102	B 2
K22 .. Starter relay (11450)	B 4

4R100 transmission 4X2



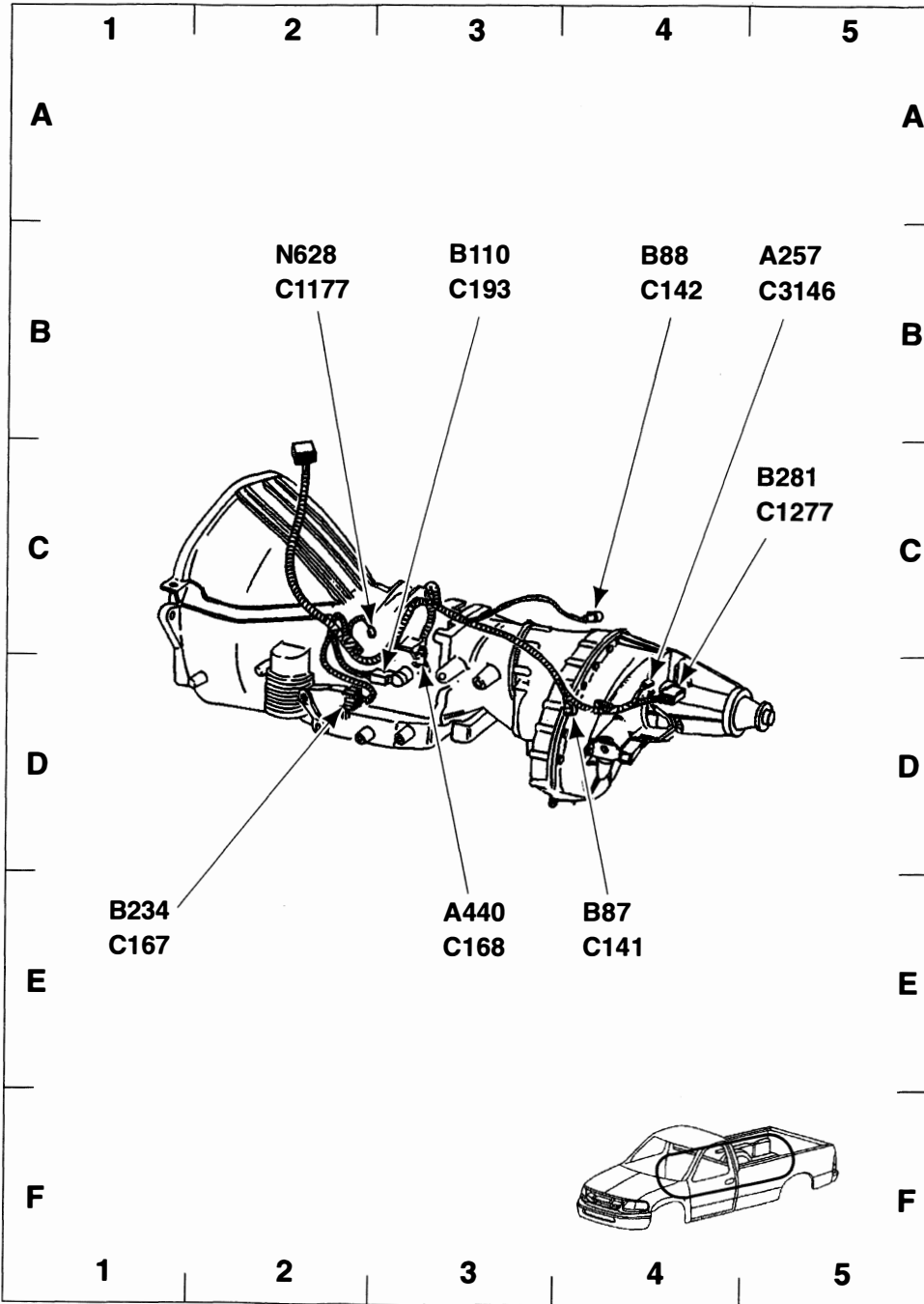
A434	4R100 transmission	.....	B 3
B44	.. Turbine shaft speed sensor (7M101)	.....	B 2
B87	.. Heated Oxygen Sensor (HO2S) #22 (9G444)	.....	B 4
B88	.. Heated Oxygen Sensor (HO2S) #12 (9G444)	.....	C 4
B110	.. Output Shaft Speed (OSS) sensor (7M101)	.....	D 4
B234	.. Digital Transmission Range (DTR) sensor (7F293)	....	D 2
C141	.....		B 4
C142	.....		C 4
C143	.....		B 2
C167	.....		D 2
C193	.....		D 4
C1274	.....		B 3

4R70W transmission 4X2



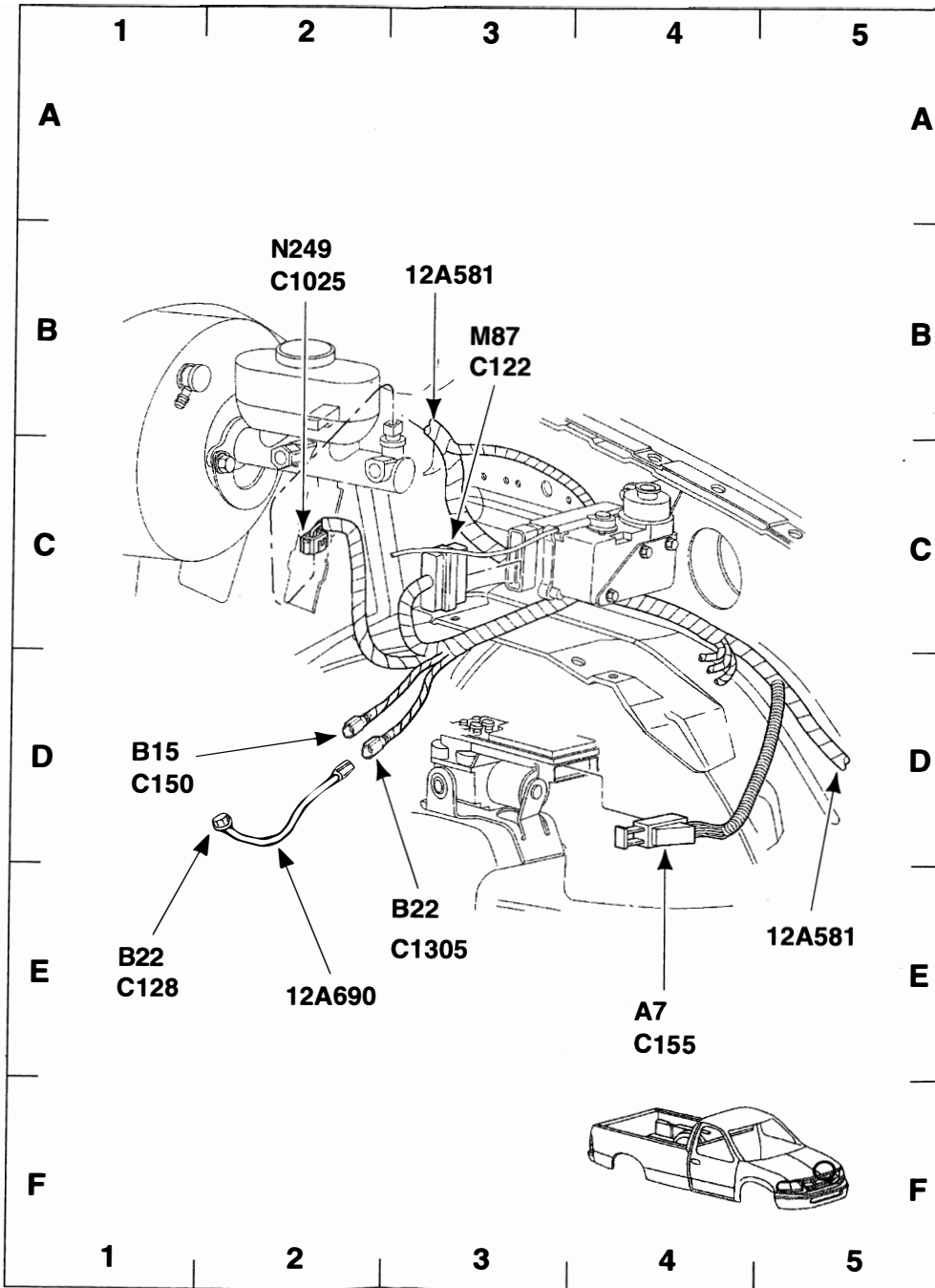
A440	4R70W transmission	E 4
B87	.. Heated Oxygen Sensor (HO2S) #22 (9G444)	E 4
B88	.. Heated Oxygen Sensor (HO2S) #12 (9G444)	B 4
B110	.. Output Shaft Speed (OSS) sensor (7M101)	B 3
B234	.. Digital Transmission Range (DTR) sensor (7F293)	E 2
C141	.....	E 4
C142	.....	B 4
C167	.....	E 2
C168	.....	E 4
C193	.....	B 3

4R70W transmission 4X4

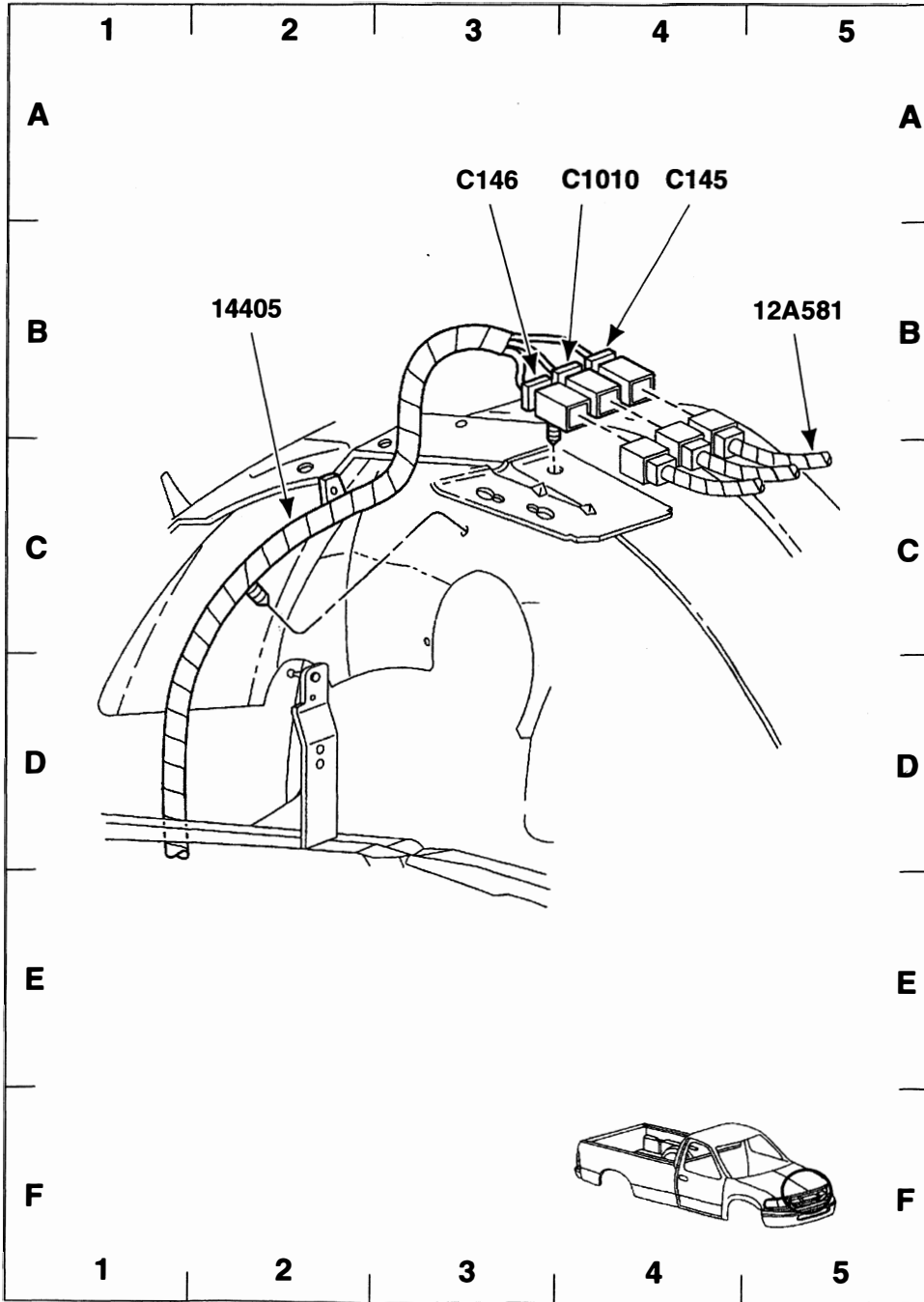


A257	Transfer case assembly	B 5
A440	4R70W transmission	E 3
B87	.. Heated Oxygen Sensor (HO2S) #22 (9G444)	E 4
B88	.. Heated Oxygen Sensor (HO2S) #12 (9G444)	B 4
B110	.. Output Shaft Speed (OSS) sensor (7M101)	B 3
B234	.. Digital Transmission Range (DTR) sensor (7F293)	E 1
B281	.. Transfer case speed sensor	C 5
C141	.....	E 4
C142	.....	B 4
C167	.....	E 1
C168	.....	E 3
C193	.....	B 3
C1177	.....	B 2
C1277	.....	C 5
C3146	.....	B 5
N628	4x4 High/Low indicator switch	B 2

engine compartment, LH side



12A581	B 3
12A690	E 2
12A581	E 5
A7 .. ABS control module (2C219)	E 4
B15 .. Wheel speed sensor, left front (2C205)	D 1
B22 .. Mass Air Flow (MAF) sensor (12B579)	E 1
B22 .. Mass Air Flow (MAF) sensor (12B579)	E 3
C122	B 3
C128	E 1
C150	D 1
C155	E 4
C1025	B 2
C1305	E 3
M87 .. Speed control servo (9C735)	B 3
N249 .. Brake pressure switch (2B264)	B 2



engine compartment, LH side

12A581	B 5
14405	B 2
C145	A 4
C146	A 3
C1010	A 4

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