INSTRUMENTATION AND WARNING SYSTEMS

GROUP 13

(10000 & 19000)

SECTION 13-01 Instrument Cluster—Conventional

VEHICLE APPLICATION

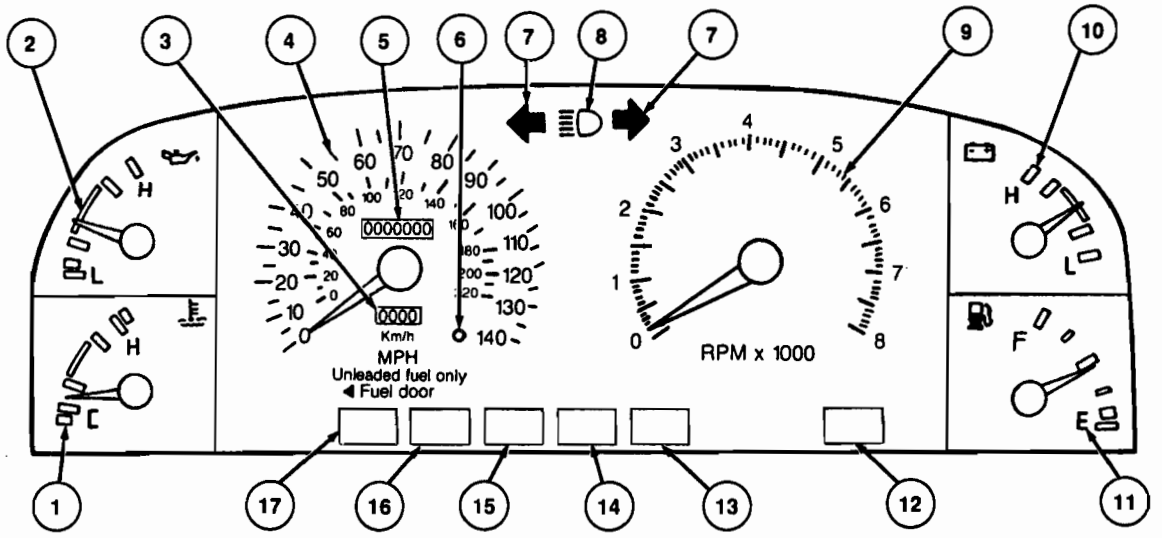
Capri.

DESCRIPTION

The instrument cluster contains a speedometer, tachometer, fuel gauge, voltmeter, oil pressure gauge and engine coolant temperature gauge. It also contains warning indicator lamps. A boost gauge is included on turbocharged vehicles. All panel/cluster bulbs are controlled by the panel dimmer switch located on the instrument panel.

DESCRIPTION (Continued)

Non-Turbo Cluster

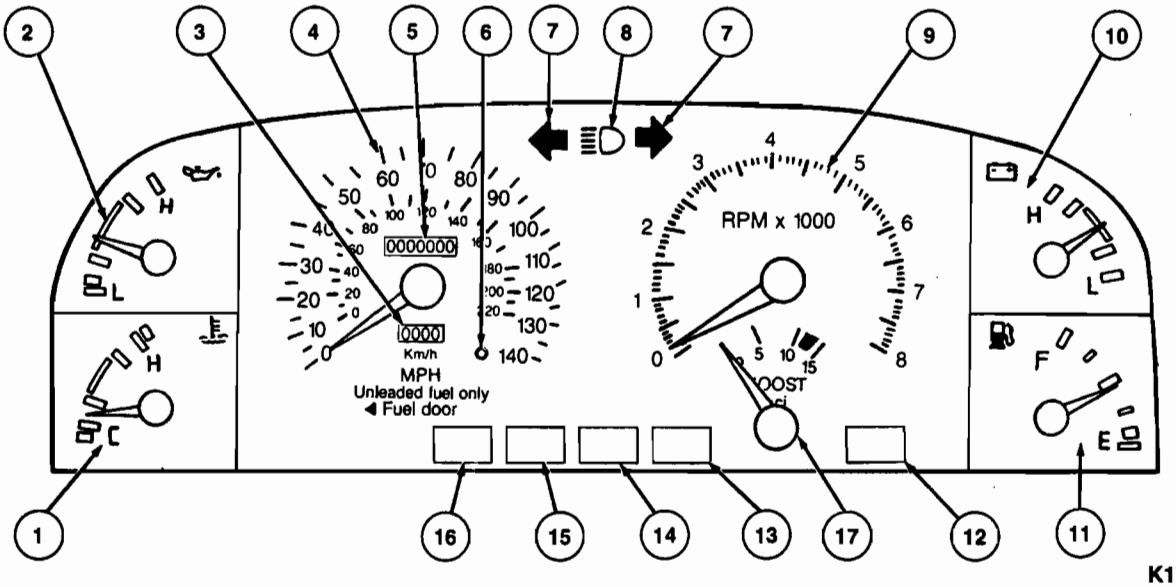


K17162-A

Item	Part Number	Description	Item	Part Number	Description
1	—	Engine Coolant Temperature Gauge	10	—	Battery Voltage Gauge
2	—	Engine Oil Pressure Gauge	11	—	Fuel Gauge
3	—	Trip Odometer	12	—	Charge System Warning Indicator
4	—	Speedometer	13	—	Brake System Warning Indicator
5	—	Odometer	14	—	Check Engine Warning Indicator
6	—	Trip Odometer Reset Button	15	—	Safety Belt Warning Indicator
7	—	Turn Signal/Hazard Indicator	16	—	Air Bag Warning Indicator
8	—	High Beam Headlamps Indicator	17	—	Manual Shift Indicator (Automatic Transaxle)
9	—	Tachometer			

DESCRIPTION (Continued)

Turbo Cluster

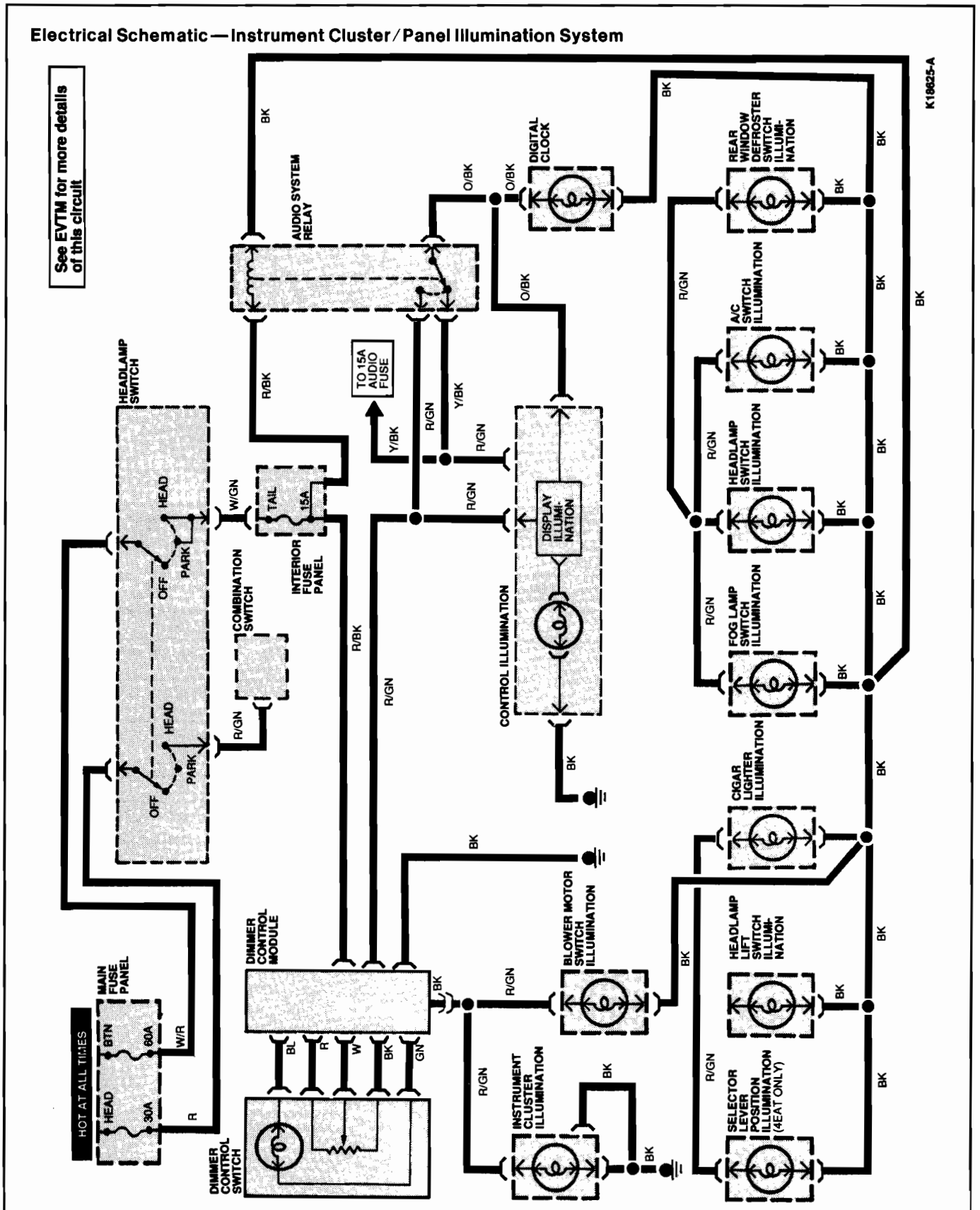


K17163-A

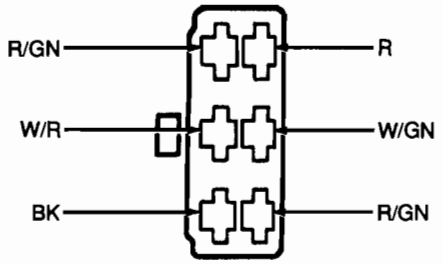
Item	Part Number	Description	Item	Part Number	Description
1	—	Engine Coolant Temperature Gauge	10	—	Battery Voltage Gauge
2	—	Engine Oil Pressure Gauge	11	—	Fuel Gauge
3	—	Trip Odometer	12	—	Charge System Warning Indicator
4	—	Speedometer	13	—	Brake System Warning Indicator
5	—	Odometer	14	—	Check Engine Warning Indicator
6	—	Trip Odometer Reset Button	15	—	Safety Belt Warning Indicator
7	—	Turn Signal/Hazard Indicator	16	—	Air Bag Warning Indicator
8	—	High Beam Headlamps Indicator	17	—	Turbo Boost Gauge
9	—	Tachometer			

DIAGNOSIS AND TESTING

Electrical Schematic—Instrument Cluster/Panel Illumination System

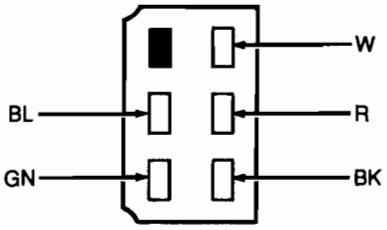


DIAGNOSIS AND TESTING (Continued)



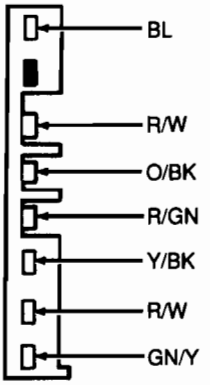
HEADLAMP SWITCH

K18626-A



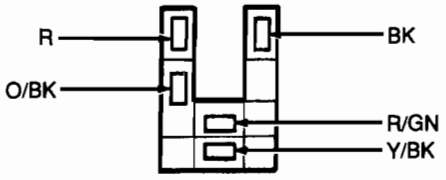
DIMMER CONTROL SWITCH

K18627-A



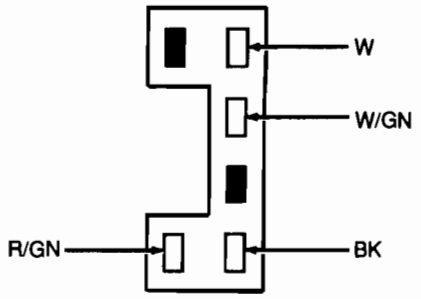
ELECTRONIC RADIO

K18628-A



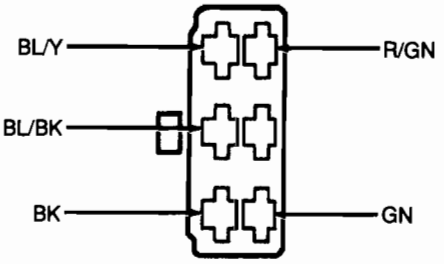
AUDIO SYSTEM RELAY

K18629-A



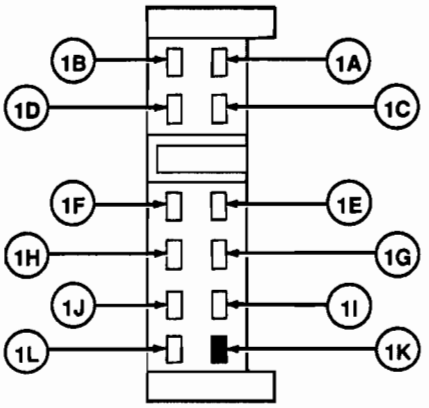
HEADLAMP LIFT SWITCH

K18630-A



A/C SWITCH

K18631-A



INSTRUMENT CLUSTER

K18632-A

Pin Number	Wire Color	Circuit Function
1A	BK	Ground
1B	GN/W	RH Turn Indicator
1C	BR/Y	Transaxle Control Module (Auto Only)
1D	R/W	High Beam Indicator
1E	BK/Y	Warning Indicator Lamp Power
1F	GN/BK	LH Turn Indicator
1G	Y/R	Oil Pressure Sender
1H	R/GN	Dimmer Control Module

(Continued)

DIAGNOSIS AND TESTING (Continued)

Pin Number	Wire Color	Circuit Function
1I	BK	Ground

(Continued)

Pin Number	Wire Color	Circuit Function
1J	BK	Ground
1K	—	Not Used
1L	Y/W	Temperature Gauge Sending Unit

System Inspection—Instrument Cluster/Panel Illumination System

1. Visually inspect the components. Check for:

VISUAL INSPECTION CHART

Mechanical	Electrical

• Damaged Components	• Blown Fuses:
	  • 60 amp BTN
	  • 30 amp HEAD
	  • 15 amp TAIL
	• Damage to Wiring Harness
	• Loose or Corroded Connections

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. If the fault is not visually evident, determine condition and refer to the following condition chart.

CONDITION CHART—INSTRUMENT CLUSTER/PANEL ILLUMINATION SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• All Lamps Not Operating Correctly	• Fuse(s). • Damaged circuit. • Headlamp switch. • Dimmer control switch. • Audio system relay. • Illumination lamps.	• Go to **A1.**
• Illumination Lamps Not Working Using the Headlamp Switch	• Fuses(s) • Headlamp switch. • Power to the headlamp switch.	• Go to **A1.**
• Some Illumination Lamps Not Operating Correctly	• Damaged circuit. • Dimmer control module. • Audio system relay. • Wires to the illumination lamps. • Blown bulb(s).	• Go to **A12.**
• Audio Illumination and Clock Not Operating Correctly	• Damaged circuit. • Blown bulb(s). • Audio system relay.	• Go to **A16.**
• Some Lamp(s) Not Operating Correctly	• Damaged circuit. • Blown bulb(s).	• Go to **A22.**

PINPOINT TEST A—INSTRUMENT CLUSTER/PANEL ILLUMINATION SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK FUSES		
	• Locate main fuse panel. • Check 30 amp HEAD fuse and the 60 amp BTN fuse. • **Are fuse(s) OK?**	Yes ▶ No ▶	GO to **A5.** GO to **A2.**
A2	CHECK SYSTEM		
	• Replace fuse(s). • **Does fuse(s) fail again?**	Yes ▶ 30 amp HEAD 60 amp BTN ▶ No ▶	GO to **A3.** GO to **A4.** GO to **A5.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—INSTRUMENT CLUSTER/PANEL ILLUMINATION SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
A3	CHECK FOR SHORTS TO GROUND		
	• Disconnect positive battery cable. • Locate and disconnect main fuse panel connector and headlamp switch. • Measure resistance between the R wire at the main fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE R wire from main fuse panel to headlamp switch. GO to **A5.**
A4	CHECK FOR SHORTS TO GROUND		
	• Disconnect the positive battery cable. • Locate and disconnect the main fuse panel connector and headlamp switch. • Measure resistance between the W/R wire at the main fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE W/R wire from main fuse panel to headlamp switch. GO to **A5.**
A5	CHECK POWER SUPPLY TO HEADLAMP SWITCH		
	• Disconnect headlamp switch. • Measure the voltage on the R and the W/R wires at the headlamp switch? • **Is voltage(s) greater than 10 volts?**	Yes ▶ No ▶	GO to **A6.** SERVICE wire in question.
A6	CHECK HEADLAMP SWITCH GROUND		
	• Key OFF. • Measure the resistance between the BK wire at the headlamp switch and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A7.** SERVICE BK wire.
A7	CHECK HEADLAMP SWITCH OPERATION		
	• Disconnect headlamp switch. • Measure the resistance between the terminals listed in the following switch positions.	Yes ▶ No ▶	GO to **A8.** REPLACE headlamp switch.

Switch Position	Wire Colors	Resistance
OFF	R, R/GN	Greater than 10,000 ohms
	W/R, W/GN	Greater than 10,000 ohms
Parking Lamps	R, R/GN	Greater than 10,000 ohms
	W/R, W/GN	Less than 5 ohms
Headlamps	R, R/GN	Less than 5 ohms
	W/R, W/GN	Less than 5 ohms

	• **Are resistance(s) OK?**		
A8	CHECK WIRE TO INTERIOR FUSE PANEL		
	• Locate interior fuse panel. • Measure the resistance of the W/GN wire from headlamp switch to the interior fuse panel (15 amp tail fuse). • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A9.** SERVICE W/GN wire.
A9	CHECK FUSE		
	• Check the 15 amp TAIL fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **A12.** GO to **A10.**
A10	CHECK SYSTEM		
	• Replace 15 amp TAIL fuse. • Headlamp switch in the ON position. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **A11.** GO to **A12.**
A11	CHECK FOR SHORTS TO GROUND		
	• Disconnect the dimmer control module, audio system relay and interior fuse panel connector. • Measure the resistance between the R/BK wire(s) at the interior fuse panel and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE R/BK wire. GO to **A12.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—INSTRUMENT CLUSTER/PANEL ILLUMINATION SYSTEM (Continued)

	TEST STEP	RESULT ▶	ACTION TO TAKE
A12	CHECK POWER SUPPLY TO DIMMER CONTROL MODULE		
	• Locate the dimmer control module. • Headlamp switch in the ON position. • Measure the voltage on the R/BK wire at the dimmer control module. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A13.** SERVICE R/BK wire.
A13	CHECK DIMMER CONTROL MODULE GROUND		
	• Key OFF. • Measure the resistance between the BK wire at the dimmer control module and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A14.** SERVICE BK wire.
A14	CHECK OPERATION OF DIMMER CONTROL MODULE		
	• Headlamp switch in the ON position. • Measure the voltage on the R/GN wire at the dimmer control module while operating the dimmer control switch from low to high illumination. The voltage range should be between 0 volts and 12 volts. • **Are voltages in the correct range(s)?**	Yes ▶ No ▶	GO to **A15.** REPLACE dimmer control switch.
A15	CHECK VOLTAGE TO ELECTRONIC RADIO		
	• Locate and disconnect the electronic radio connector. • Headlamp switch in the ON position. • Measure the voltage on the R/GN wire at the electronic radio connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A16.** SERVICE R/GN wire.
A16	CHECK POWER SUPPLY TO AUDIO SYSTEM RELAY		
	• Locate the audio system relay. • Disconnect the audio system relay connector. • Headlamp switch in the ON position. • Measure the voltage on the R/BK wire at the audio system relay connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A17.** SERVICE the R/BK wire.
A17	CHECK AUDIO SYSTEM RELAY GROUND		
	• Measure resistance between the BK wire at the audio system relay and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A18.** SERVICE BK wire.
A18	CHECK OPERATION OF AUDIO SYSTEM RELAY		
	• Disconnect audio system relay. • Measure the resistance between the following wire colors (terminals) at the relay:	Yes ▶ No ▶	GO to **A19.** REPLACE audio system relay.

Wire Colors	Resistance
Y/BK, O/BK	Less than 5 ohms
O/BK, R/GN	Greater than 10,000 ohms

- Apply 12 volts to the R/BK terminal of the relay.
- Ground the BK terminal of the relay.
- Measure the resistance between the following wire colors at the relay:

Wire Colors	Resistance
O/BK, R/GN	Less than 5 ohms
O/BK, Y/BK	Greater than 10,000 ohms

- **Are resistances correct?**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—INSTRUMENT CLUSTER/PANEL ILLUMINATION SYSTEM (Continued)

	TEST STEP	RESULT ▶	ACTION TO TAKE
A19	CHECK WIRE TO ELECTRONIC RADIO		
	• Disconnect the audio system relay and the electronic radio. • Measure the resistance of the Y/BK wire between the audio system relay and the electronic radio. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A20.** SERVICE Y/BK wire.
A20	CHECK CONTINUITY OF AUDIO WIRES		
	• Disconnect the electronic radio connector. • Check for continuity on the O/BK wires between the audio system relay, electronic radio, and the digital clock. • **Is there continuity?**	Yes ▶ No ▶	GO to **A21.** SERVICE O/BK wire(s).
A21	TEST DIGITAL CLOCK LAMP		
	• Key OFF. • Locate and disconnect the digital clock connector. • Apply 12 volts to the O/BK wire terminal at the digital clock. • Ground the BK wire terminal. • **Does digital clock lamp illuminate?**	Yes ▶ No ▶	GO to **A22.** REPLACE lamp.
A22	CHECK WIRES TO LAMPS		
	• Key OFF. • Locate dimmer control module. • Locate each illumination lamp connector. • Measure the resistance of the R/GN wires from the dimmer control module to the following lamp connectors: — Headlamp lift switch — Instrument cluster illumination — Headlamp switch — Fog lamp switch — Cigar lighter — Air conditioner switch — Rear window defroster switch — Blower motor switch • **Are all resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A23.** SERVICE R/GN wire(s) in question.
A23	TEST ILLUMINATION BULBS		
	• Apply 12 volts to the R/GN wire and ground the BK wire at the following lamp connectors: — Headlamp lift switch — Instrument cluster illumination — Headlamp switch — Fog lamp switch — Cigar lighter — Air conditioner switch — Rear window defroster switch — Blower motor switch — Selector lever position (4EAT only) • **Do all lamps operate correctly?**	Yes ▶ No ▶	GO to **A24.** REPLACE the bulb(s) in question.
A24	CHECK GROUND OF LAMPS		
	• Measure resistance between the BK wire and ground at the following lamp connectors: — Headlamp lift switch — Instrument cluster illumination — Headlamp switch — Fog lamp switch — Cigar lighter — Air conditioner switch — Rear window defroster switch — Blower motor switch — Selector lever position (4EAT only) • **Are all resistances less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. SERVICE BK wire(s) in questions.

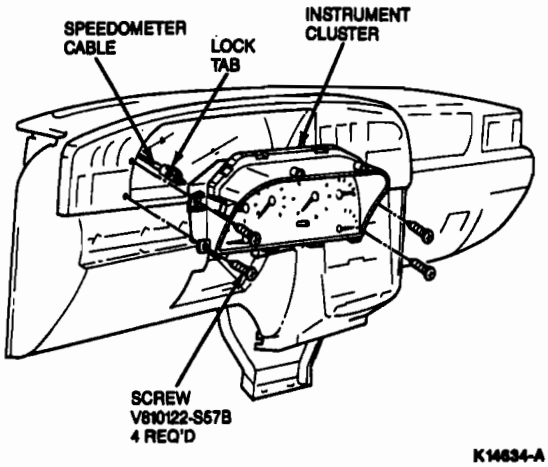
REMOVAL AND INSTALLATION

Instrument Cluster

Removal

NOTE: Federal law requires that a label stating the odometer has been serviced or replaced be affixed to any vehicle that has had its odometer serviced, replaced or reset to zero.

1. Disconnect negative battery cable.
2. Remove radio / heater control bezel, covers from both sides of steering column, and instrument panel bezel. Refer to Section 01-12.
3. Disconnect speedometer cable at transaxle.
4. Remove screws and slide instrument cluster outward.
5. Press lock tab and release speedometer cable from instrument cluster.
6. Remove connectors from rear of cluster.
7. Remove instrument cluster.



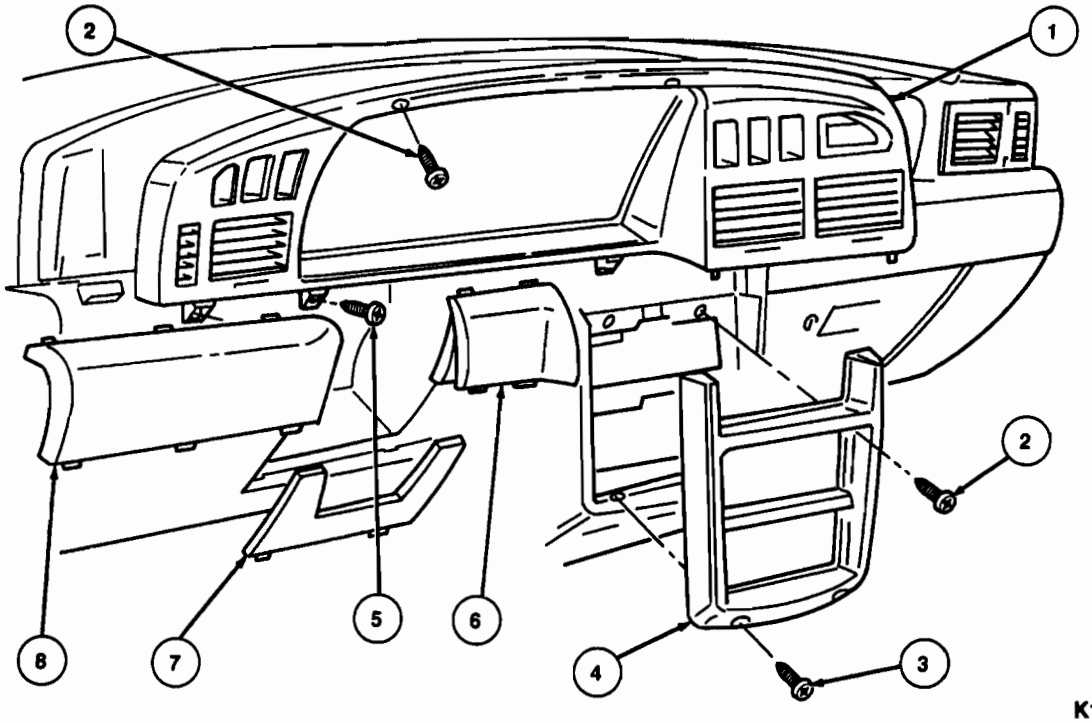
Installation

NOTE: Prior to connecting speedometer cable to instrument cluster, apply a 4.6mm (3 / 16 inch) ball of Silicone Damping Grease D7AZ-19A331-A (ESE-M1C171-A) or equivalent in the drive hole of the speedometer head.

1. Apply grease and connect speedometer cable to wiring connectors to instrument cluster. Make sure speedometer lock tab is fully engaged.
2. Slide cluster into place and install screws retaining cluster to instrument panel. Tighten screws to 3-4 N·m (27-35 lb-in).
3. Connect speedometer cable at transaxle.
4. Install instrument panel bezel, covers on each side of steering column, and radio / heater control bezel.

REMOVAL AND INSTALLATION (Continued)

5. Connect negative battery cable.



K14523-B

Item	Part Number	Description
1	044D70	Instrument Cluster Bezel
2	—	Upper Screw (2 Req'd)
3	V810122-S57B	Lower Screw (2 Req'd)
4	044D70	Heater/Radio Bezel
5	—	Lower Screw (3 Req'd)
6	04338	Right Trim Cover
7	04459	Center Trim Cover
6	04338	Left Trim Cover

TK14523B

Speed Sensor

Removal and Installation

NOTE: On vehicles equipped with speed control, a speed sensor is mounted in the speedometer assembly. If replacement is required, the speedometer assembly must be replaced.

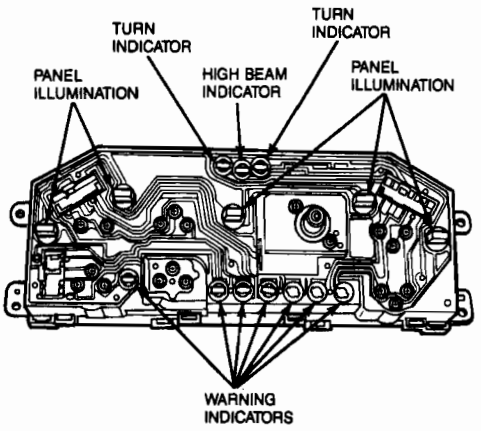
Instrument Cluster Bulbs

Removal and Installation

1. Remove instrument cluster as outlined.
2. Replace bulb(s).

REMOVAL AND INSTALLATION (Continued)

3. Install instrument cluster as outlined.



Heater Control Panel Bulb

Removal and Installation

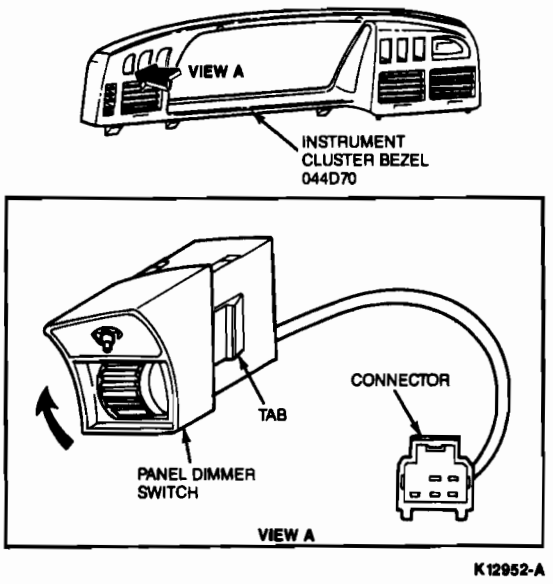
1. Remove heater or A/C control panel assembly. Refer to Section 12-02 or 12-03.
2. Replace bulb.
3. Install heater or A/C control panel assembly. Refer to Section 12-02 or 12-03.

Panel Dimmer Switch

The panel dimmer switch is located on the LH side of the instrument cluster bezel.

Removal

1. Disconnect negative battery cable.
2. Remove instrument cluster bezel. Refer to Section 01-12.
3. Disconnect electrical connector from switch.
4. Depress tabs on both sides of switch and remove from bezel.



Installation

1. Insert switch into bezel.
2. Connect electrical connector to switch.
3. Install instrument cluster bezel.
4. Connect negative battery cable.
5. Check switch for proper operation.

DISASSEMBLY AND ASSEMBLY

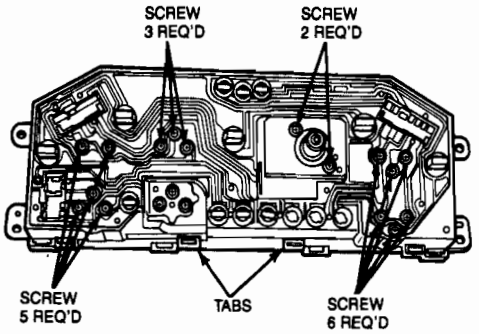
Instrument Cluster

Disassembly

1. Remove instrument cluster as outlined.
2. Release tabs and separate upper housing from lower housing.

DISASSEMBLY AND ASSEMBLY (Continued)

3. Remove screws from back of instrument cluster as shown.

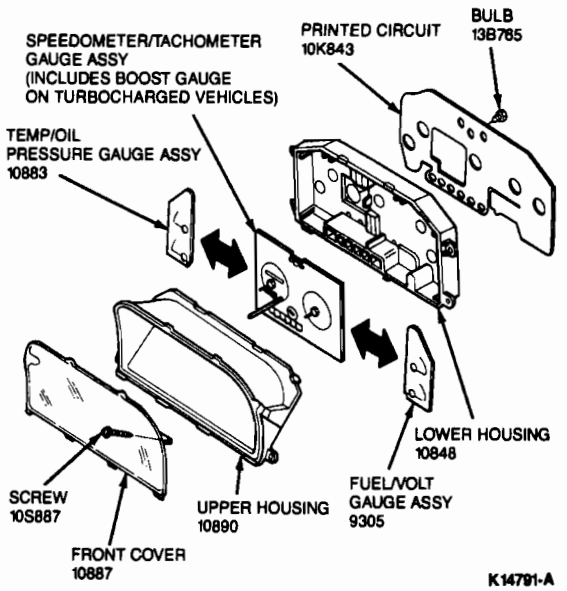


NATURALLY ASPIRATED VEHICLE CLUSTER SHOWN
TURBOCHARGED VEHICLE CLUSTER SIMILAR

K14524-A

NOTE: The gauges are serviced as three subassemblies. Individual gauge mechanisms are not available.

4. Carefully remove the gauge assembly. If necessary, separate the main assembly into one of the three subassemblies for service:
   a. Fuel / volt gauge assembly.
   b. Temperature / oil pressure gauge assembly.
   c. Speedometer / tachometer gauge assembly (includes boost gauge on turbocharged vehicles).
5. If necessary, the clear front cover can be removed from the upper housing after removing the two retaining screws.



K14791-A

Assembly

1. Install clear front cover onto upper housing with two retaining screws, if removed.

   NOTE: Two short screws are used for the speedometer, three medium screws are used for the boost gauge, and long screws are used in the remaining gauges.
2. Assemble the gauge panel and align it on the lower housing.
3. Attach the upper housing to the lower housing. Make sure tabs are fully engaged.
4. Install instrument cluster into vehicle as outlined.
5. Check operation of all gauges and indicator lamps.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-in
Cluster Screws	3-4	27-35

SECTION 13-02 Speedometer/Odometer

VEHICLE APPLICATION

Capri.

DESCRIPTION

The speedometer is connected to the differential of the transaxle by a flexible speedometer cable, and a drive gear located inside the transaxle. On vehicles equipped with speed control, a speed sensor is mounted in the speedometer assembly.

The cable drives the speedometer which registers speed in miles per hour and kilometers per hour. The cable also drives an odometer which records distance traveled in miles and tenths of a mile.

The speedometer is not serviced separately. It is part of the speedometer, tachometer and boost gauge assembly. The boost gauge is used only on turbocharged vehicles.

DIAGNOSIS AND TESTING

System Inspection—Speedometer System

1. Visually inspect the components of the speedometer system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Malfunctioning speedometer • Binding or broken cable • Cable connections • Condition of drive gear in transaxle	• Refer to Section 13-01 for speedometer illumination

2. Check the speedometer cable for signs of wear or breakage.
3. Check the speedometer cable for kinks or misrouting.
4. If the fault is not visually evident, determine the condition and proceed to the following condition chart.

SPEEDOMETER SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Speedometer Not Working	• Broken cable. • Cable connections. • Damaged speedometer.	• Go to **A1.**
• Speedometer Reading Inaccurate	• Binding cable. • Damaged speedometer.	• Go to **A3.**
• Odometer Not Working But Speedometer OK	• Damaged speedometer.	• Replace speedometer.
• Speedometer Readings Fluctuate	• Binding cable. • Damaged speedometer.	• Replace cable. • Go to **A3.**
• Speedometer Noisy	• Lack of lubrication on cable. • Binding cable. • Damaged speedometer.	• Lube cable. • Replace cable. • Replace speedometer.

DIAGNOSIS AND TESTING (Continued)

SPEEDOMETER DIAGNOSIS

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK SPEEDOMETER CABLE		
	• Check the following speedometer cable connections: — Connection to transaxle — Connection to speedometer • **Are connections in satisfactory condition?**	Yes ▶ No ▶	GO to **A2.** SERVICE as required.
A2	CHECK SPEEDOMETER CABLE		
	• Disconnect speedometer cable from the transaxle. • Remove speedometer drive gear from transaxle. • Spin the speedometer cable and inspect the speedometer drive gear. • **Are there any concerns present, such as binding cable or broken drive gear teeth?**	Yes ▶ No ▶	SERVICE cable or gear as required. REPLACE speedometer.
A3	CHECK SPEEDOMETER CALIBRATION		
	• Verify the chart below:	Yes ▶ No ▶	Speedometer system OK. REPLACE speedometer.

Standard Indication (km/h)	Allowable Range (km/h)
40	40-44
80	80-88
120	120-130

Standard Indication (MPH)	Allowable Range (MPH)
30	27.0-34.5
60	54.0-69.0
90	81.0-103.5

• **Do readings fall in the allowable range?**

NOTE: Tire wear and pressure can cause incorrect readings.

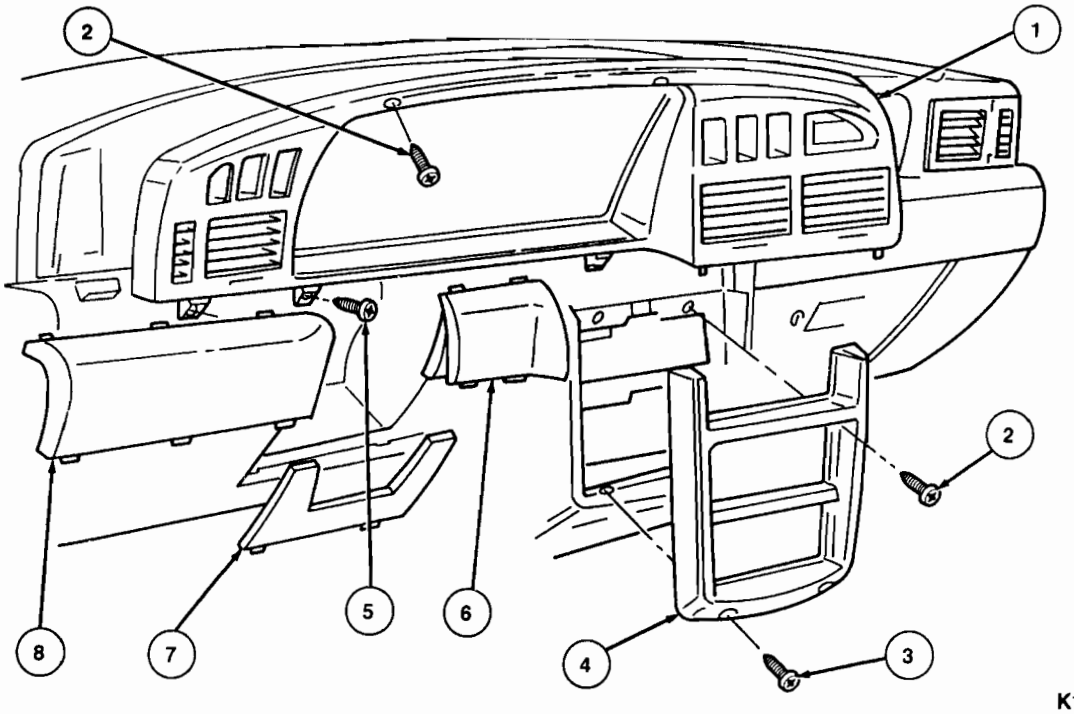
REMOVAL AND INSTALLATION

Speedometer Cable

Removal

1. Disconnect speedometer cable at transaxle.
2. Remove battery.
3. Remove radio/heater control bezel, covers from both sides of steering column and instrument panel bezel. Refer to Section 01-12.

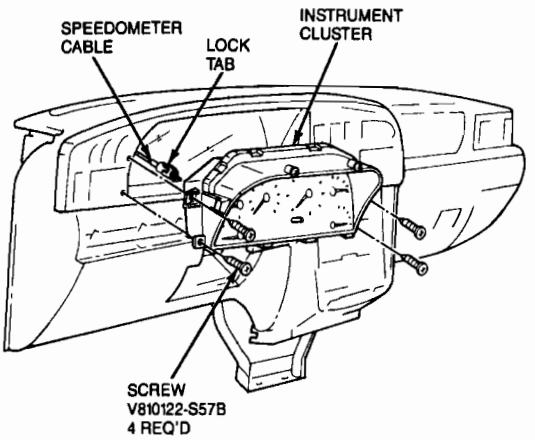
REMOVAL AND INSTALLATION (Continued)



K14523-B

Item	Part Number	Description
1	044D70	Instrument Cluster Bezel
2	—	Upper Screw (2 Req'd)
3	V810122-S57B	Lower Screw (2 Req'd)
4	044D70	Heater/Radio Bezel
5	—	Lower Screw (3 Req'd)
6	04338	Right Trim Cover
7	04459	Center Trim Cover
8	04338	Left Trim Cover

4. Remove instrument cluster. Refer to Section 13-01.
5. Slide speedometer cable back, and using a thin, flat-bladed screwdriver, release plastic retainer tabs in dash panel.
6. Remove speedometer cable.



K14634-A

REMOVAL AND INSTALLATION (Continued)

Installation

NOTE: Prior to connecting speedometer cable to instrument cluster, apply a 4.6mm (3/16 inch) ball of Silicone Damping Grease D7AZ-19A331-A (ESE-M1C171-A) or equivalent in the drive hole of the speedometer head.

1. Insert cable into dash panel. Snap plastic retainer into place and attach cable boot to retainer.
2. Route cable through instrument panel.
3. Apply grease to speedometer cable connection on cluster. Position cluster in instrument panel and connect speedometer cable. Make sure speedometer lock tab is fully engaged.
4. Install instrument cluster. Refer to Section 13-01.
5. Install instrument panel bezel, covers on each side of steering column, and radio/heater control bezel. Refer to Section 01-12.
6. Connect speedometer cable at transaxle.
7. Install battery.
8. Check speedometer for proper operation.

Speedometer Cable Core

Removal and Installation

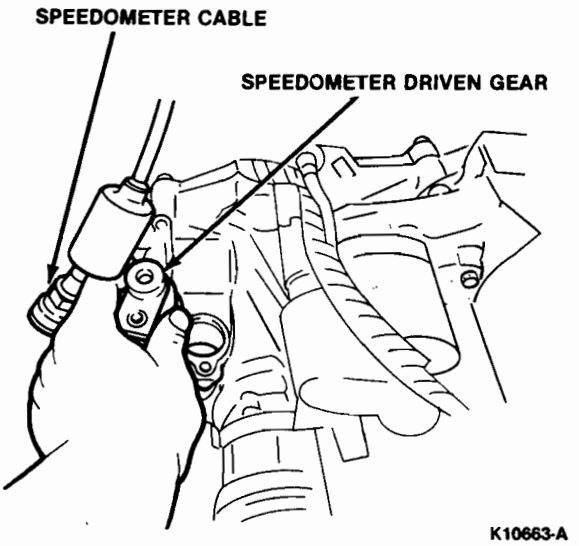
1. Remove speedometer cable assembly as outlined.
2. Pull core from cable.
3. Install core into speedometer cable.
4. Install speedometer cable as outlined.

Speedometer Driven Gear

Removal

1. Disconnect cable from speedometer driven gear at transaxle.
2. Remove bolt from driven gear.

   NOTE: The speedometer driven gear may stick in transaxle bore. To assist in removing it from transaxle bore, insert a flat-tipped screwdriver or equivalent between transaxle case and speedometer driven gear. Gently pry up until speedometer driven gear is removed from transaxle case.
3. Remove speedometer driven gear and O-ring.



Installation

1. Inspect O-ring for nicks or cuts; replace if damaged.
2. Install O-ring onto speedometer driven gear and insert into transaxle bore.
3. Install retaining bolt.
4. Connect cable into speedometer driven gear.

Speedometer Assembly

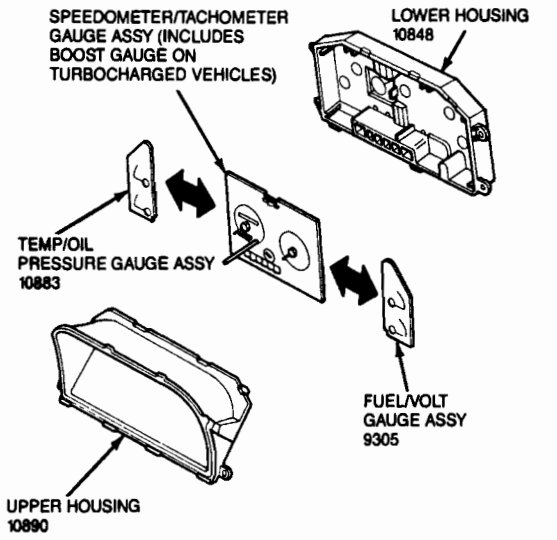
Removal

NOTE: Federal law requires that a label stating the odometer has been serviced or replaced be affixed to any vehicle that has had its odometer serviced, replaced or reset to zero.

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.

REMOVAL AND INSTALLATION (Continued)

3. Separate speedometer / tachometer / boost gauge assembly from other gauge assemblies.



Installation

CAUTION: The speedometer is calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position speedometer / tachometer / boost gauge assembly to other gauge assemblies.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check speedometer and all other gauges / indicators for proper operation.
5. Attach odometer notice label to vehicle.

SECTION 13-03 Fuel Gauge

VEHICLE APPLICATION

Capri.

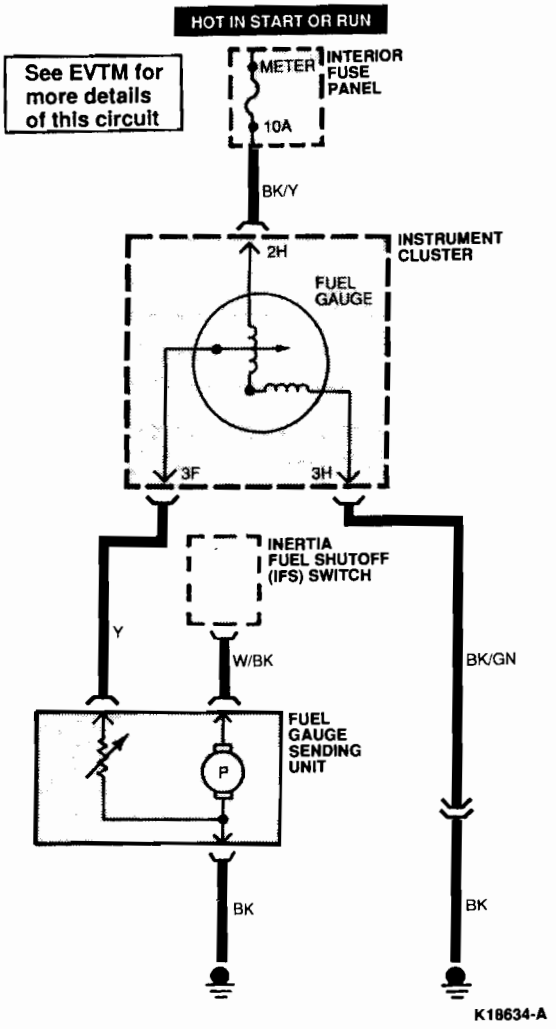
DESCRIPTION

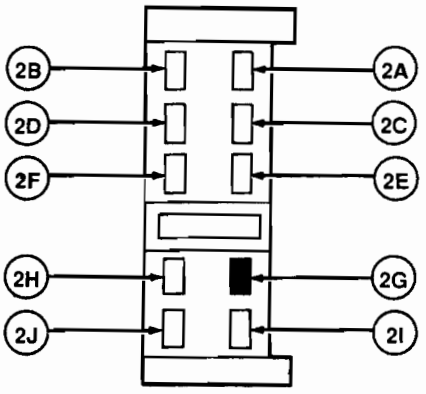
The fuel level indicator gauge pointer is attached to a wire-wound bimetal strip, which, when heated by a signal from the fuel sender unit, produces the appropriate level indication. When the current is low, there is little heating effect and the pointer moves a short distance. As the current increases, it produces a greater heating effect, causing the pointer to move a greater distance.

The fuel gauge is not serviced separately. It is part of the fuel / volt gauge assembly.

DIAGNOSIS AND TESTING

Electrical Schematic—Fuel Level Indicating System

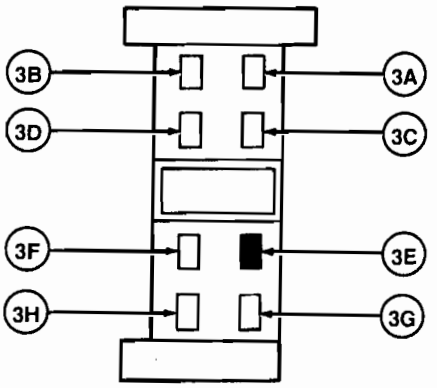




INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A



K18633-A

Pin Number	Wire Color	Circuit Function
3A	BR/W	Parking Brake Switch
3B	W/BL	Boost Sensor
3C	LG/R	Powertrain Control Module (PCM)
3D	BK	Boost Sensor
3E	—	Not Used
3F	Y	Fuel Gauge Sending Unit
3G	W/BK	Generator
3H	BK/GN	Ground

System Inspection—Fuel Level Indicating System

1. Visually inspect the components of the fuel level indicating system.

DIAGNOSIS AND TESTING (Continued)

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged fuel gauge	• Blown fuse: • 10 amp METER
• Damaged fuel gauge sending unit	• Damage to wire harness • Loose or corroded connections

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. Inspect the fuel gauge and the fuel gauge sending unit for obvious opens or shorts causing partial operation.
4. If the fault is not visually evident, determine condition and refer to the following condition chart.

CONDITION CHART—FUEL LEVEL INDICATING SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Fuel Gauge Always Reads Empty	• Fuse. • Circuit. • Damaged fuel gauge. • Damaged fuel gauge sending unit.	• Go to **A1.**
• Fuel Gauge Always Reads Full	• Yellow wire shorted to ground. • Damaged fuel gauge. • Damaged fuel gauge sending unit.	• Go to **A6.**
• Fuel Gauge Reads Inaccurately	• Damaged fuel gauge.	• Go to **A6.**

PINPOINT TEST A—FUEL LEVEL INDICATING SYSTEM

	TEST STEP	RESULT ▶	ACTION TO TAKE
A1	CHECK FUSE		
	• Locate the interior fuse panel. • Check the 10 amp METER fuse. • **Is the fuse OK?**	Yes ▶ No ▶	GO to **A4.** GO to **A2.**
A2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON. • **Does the fuse fail again?**	Yes ▶ No ▶	GO to **A3.** GO to **A4.**
A3	CHECK FOR SHORTS TO GROUND		
	• Replace the 10 amp METER fuse. • Disconnect the interior fuse panel connector and instrument cluster connector. • Measure resistance between the BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire. GO to **A4.**
A4	CHECK FOR POWER SUPPLY TO FUEL GAUGE		
	• Key ON. • Locate instrument cluster connector. • Measure voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A5.** SERVICE BK/Y wire.
A5	CHECK FUEL GAUGE GROUND		
	• Locate and disconnect the instrument cluster connector. • Measure the resistance between the BK/GN wire at the instrument cluster connector and ground. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A6.** SERVICE the BK/GN wire.
A6	CHECK FUEL GAUGE		
	• Key ON. • Ground Y wire at the instrument cluster connector. • **Does fuel gauge read full?**	Yes ▶ No ▶	GO to **A7.** REPLACE fuel gauge.
A7	CHECK WIRE FOR SHORT TO GROUND		
	• Locate and disconnect the instrument cluster connector and fuel gauge sending unit connector. • Measure the resistance between the Y wire at the instrument cluster connector and ground. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE Y wire. GO to **A8.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—FUEL LEVEL INDICATING SYSTEM (Continued)

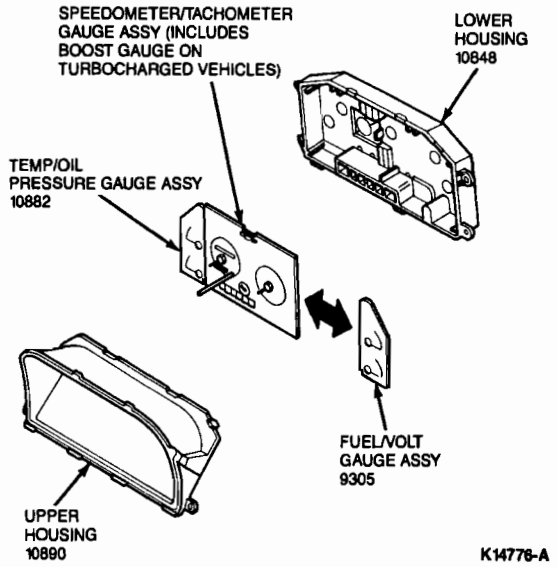
TEST STEP		RESULT ▶	ACTION TO TAKE
A8	CHECK FUEL GAUGE WIRE CONTINUITY		
	• Remove the rear seat cushion. • Key On. • Ground Y wire at the fuel gauge sending unit. • **Does fuel gauge read full?**	Yes ▶ No ▶	GO to **A9.** SERVICE Y wire between instrument cluster and fuel gauge sending unit.
A9	CHECK FUEL GAUGE SENDING UNIT GROUND		
	• Measure resistance between the BK wire at the fuel gauge sending unit and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A10.** SERVICE the BK wire.
A10	CHECK FUEL GAUGE SYSTEM		
	• Key ON. • **Does fuel gauge system operate correctly?**	Yes ▶ No ▶	RETURN to condition chart. REPLACE fuel gauge sending unit.

REMOVAL AND INSTALLATION

Fuel Gauge

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.
3. Separate the fuel / volt gauge from the speedometer / tachometer / boost gauge assembly. (The boost gauge is used only on turbocharged vehicles.)



Installation

CAUTION: The gauges are calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position fuel / volt gauge to speedometer / tachometer / boost gauge assembly.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check all gauges and indicators for proper operation.

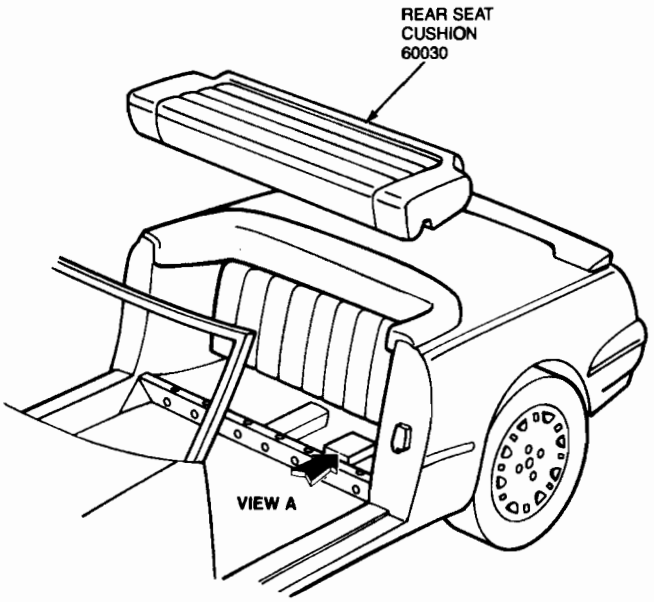
Fuel Tank Sending Unit

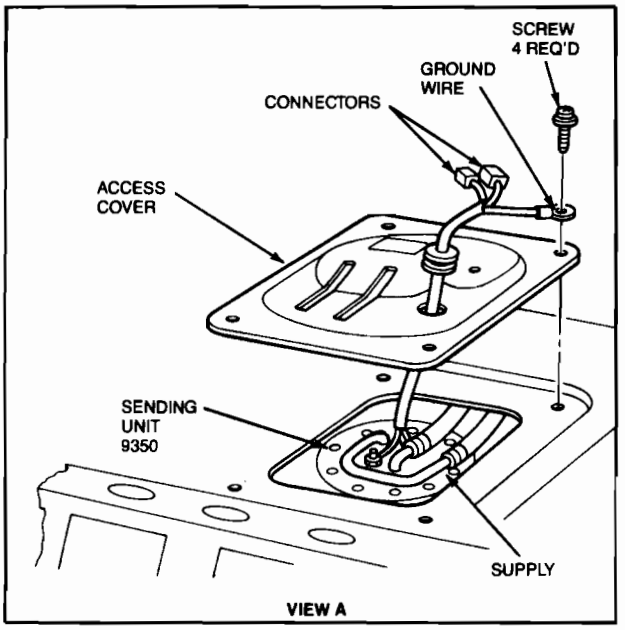
Removal

1. Remove rear seat cushion. Refer to Section 01-10.
2. Relieve fuel pressure as follows:
   a. Run engine while disconnecting fuel pump electrical connector.

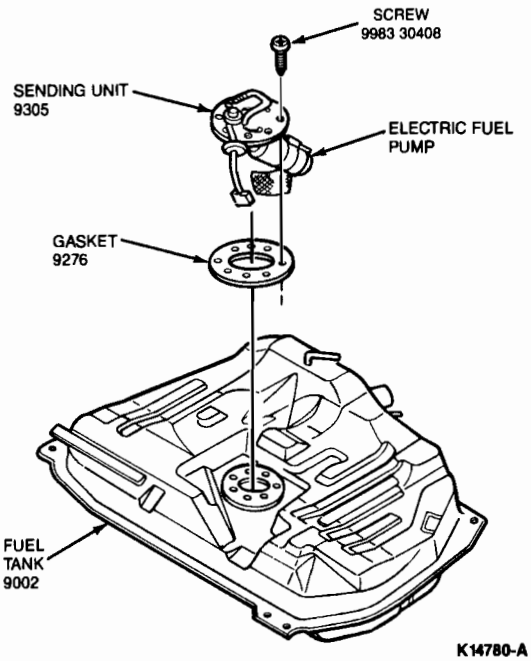
REMOVAL AND INSTALLATION (Continued)

b. Allow engine to run until it stalls. Fuel pressure is now relieved.





3. Disconnect fuel pump ground wire from access cover.
4. Remove access cover.
5. Remove and plug supply and return lines.
6. Remove sending unit retaining bolts.
7. Remove sending unit and gasket from fuel tank. Cover opening of fuel tank to prevent contaminants from entering tank.
8. Remove fuel pump. Refer to Section 10-01.



REMOVAL AND INSTALLATION (Continued)

Installation

1. Install fuel pump onto sending unit. Refer to Section 10-01.
2. Position a new gasket onto fuel tank and install sending unit with retaining bolts.
3. Unplug and connect supply and return lines and secure with clamps.
4. Install access cover.
5. Install fuel pump connector and ground wire.
6. Start engine and check for leaks. Check the operation of the fuel gauge.
7. Install rear seat cushion. Refer to Section 01-10.

SECTION 13-04 Charging System Gauge

VEHICLE APPLICATION

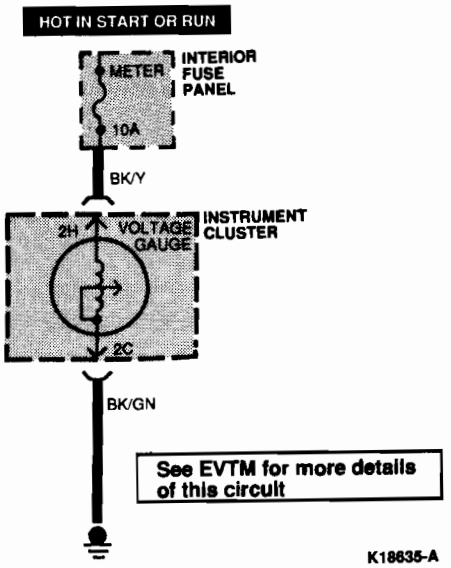
Capri.

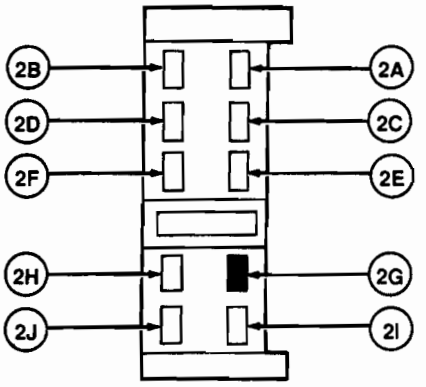
DESCRIPTION

The voltmeter indicates the voltage potential at the battery. It is not serviceable and must be replaced as part of the fuel/volt gauge assembly.

DIAGNOSIS AND TESTING

Electrical Schematic—Voltage Gauge System





INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used

(Continued)

DIAGNOSIS AND TESTING (Continued)

Pin Number	Wire Color	Circuit Function
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A

System Inspection—Voltage Gauge System

1. Visually inspect the components of the voltage gauge system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged voltage gauge	• Blown fuse: • 10 amp METER • Damage to wiring harness • Loose or corroded connections

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. Inspect the voltage gauge for obvious opens or shorts causing partial operation.
4. If the fault is not visually evident, determine condition and refer to the following condition chart.

CONDITION CHART—VOLTAGE GAUGE SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Voltage Gauge Not Working	• Fuse • Circuit • Voltage Gauge	• Go to **A1.**
• Voltage Gauge Always Reads Low	• Circuit. • Damaged voltage gauge. • Charging system.	• Go to **A4.** • Refer to Section 14-00.
• Voltage Gauge Always Reads High	• Damaged voltage gauge. • Charging system.	• Go to **A1.** • Refer to Section 14-00.
• Voltage Gauge Is Inaccurate	• Damaged voltage gauge.	• Go to **A1.**

PINPOINT TEST A—VOLTAGE GAUGE SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK FUSE		
	• Locate interior fuse panel. • Check 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **A4.** GO to **A2.**
A2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON. • Inspect the fuse. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **A3.** GO to **A4.**
A3	CHECK FOR SHORTS TO GROUND		
	• Replace the 10 amp METER fuse. • Locate and disconnect the interior fuse panel connector and instrument cluster connector. • Measure resistance between the BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire. GO to **A4.**
A4	CHECK POWER SUPPLY TO VOLTAGE GAUGE		
	• Key ON. • Locate the instrument cluster connector. • Measure the voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A5.** SERVICE BK/Y wire between instrument cluster and interior fuse panel.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—VOLTAGE GAUGE SYSTEM (Continued)

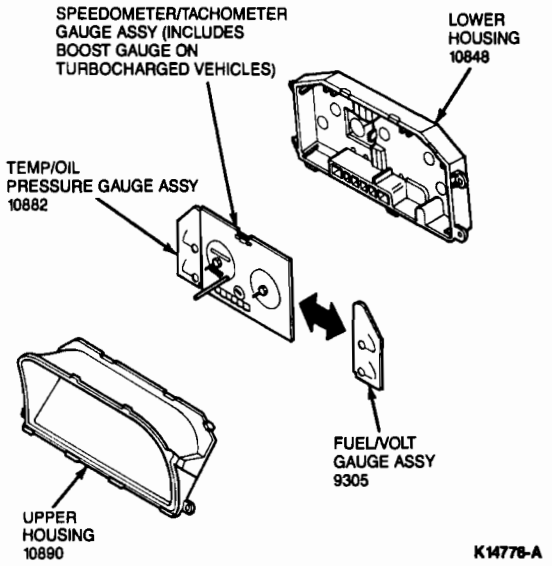
TEST STEP		RESULT ▶	ACTION TO TAKE
A5	CHECK VOLTAGE GAUGE GROUND		
	• Measure resistance between the BK/GN wire at instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REPLACE voltage gauge. SERVICE BK/GN wire.

REMOVAL AND INSTALLATION

Voltmeter

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.
3. Separate the fuel/volt gauge from the speedometer/tachometer/boost gauge assembly. (The boost gauge is used only on turbocharged vehicles.)



Installation

CAUTION: The gauges are calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position fuel/volt gauge to speedometer/tachometer/boost gauge assembly.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check all gauges and indicators for proper operation.

SECTION 13-05 Tachometer, Oil Pressure Gauge, Coolant Temperature Gauge and Turbo Boost Gauge

VEHICLE APPLICATION

Capri.

DESCRIPTION

Tachometer

The tachometer is an electrically-operated instrument which indicates engine speed in revolutions per minute (rpm). The tachometer range is 0 to 6,500 rpm.

The tachometer is mounted in the instrument cluster assembly. The electrical schematic is shown in the illustration.

The tachometer is not serviced separately. It is part of the speedometer / tachometer / boost gauge assembly. (The boost gauge is used only on turbocharged vehicles).

Oil Pressure Gauge

The oil pressure indicating system consists of a sender unit mounted on the RH side of the engine block and a gauge mounted in the instrument cluster.

When the engine oil pressure is low, the sender resistance is high, resulting in low current flow through the gauge and little pointer movement.

The oil pressure gauge is not serviceable and must be replaced as part of the temperature / oil pressure gauge assembly.

Engine Coolant Temperature Gauge

The engine coolant temperature indicating system consists of a sender unit mounted on the front of the cylinder head and a temperature gauge mounted in the instrument cluster. The sending unit located in the thermostat housing operates the electric fan.

When the engine coolant temperature is low, the sender resistance is high, resulting in low current flow through the gauge and little pointer movement.

NOTE: The temperature gauge is not serviceable and must be replaced as part of the temperature / oil pressure gauge assembly.

DESCRIPTION (Continued)

The gauge pointer may indicate at the top of the normal band with the coolant temperature within specification under certain driving conditions, such as heavy traffic or stop and go driving in hot weather.

Turbo Boost Gauge

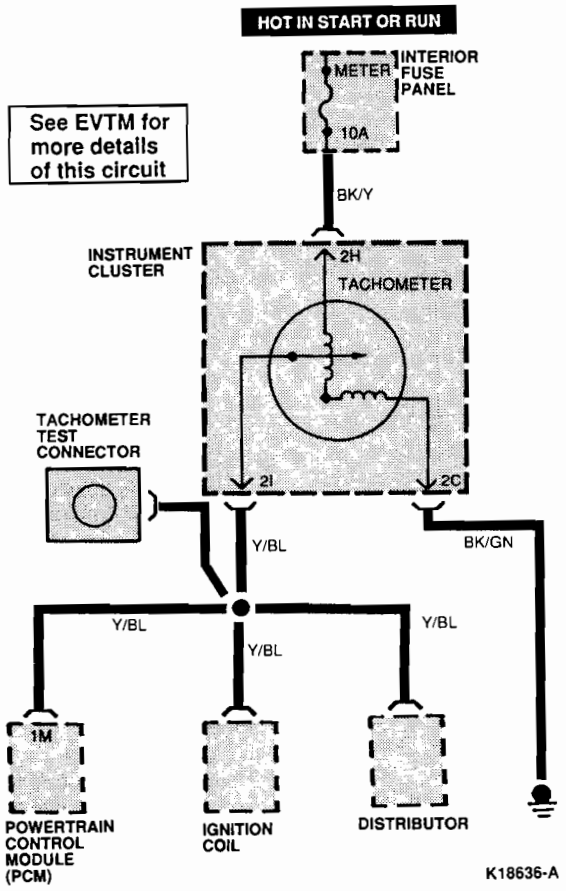
The turbo boost indicating system consists of an electrically operated gauge mounted in the instrument cluster and a sensor mounted in the engine compartment. The sensor converts a vacuum signal to electrical input for the gauge.

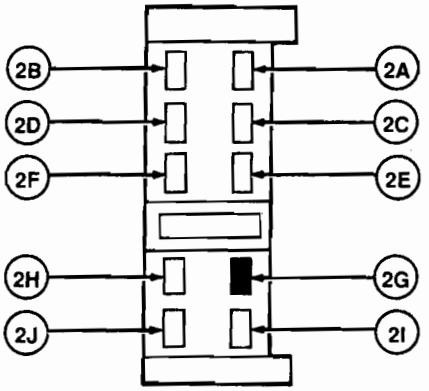
The boost gauge is not serviced separately. It is part of the speedometer, tachometer and boost gauge assembly.

DIAGNOSIS AND TESTING

Tachometer

Electrical Schematic—Tachometer System





INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A

System Inspection—Tachometer System

1. Visually inspect the components of the tachometer system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged tachometer	• Blown fuse: — 10 amp METER • Damage to wiring harness • Loose or corroded connections

2. Inspect the tachometer for obvious opens or shorts causing partial operation.
3. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
4. If fault is not visually evident, determine condition and refer to the following condition chart.

DIAGNOSIS AND TESTING (Continued)

CONDITION CHART—TACHOMETER SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Tachometer Not Working	• Fuse. • Tachometer damage. • Damaged signal wire.	• Go to **A1.**
• Tachometer Does Not Function But All Cluster Components Do Function Properly	• Tachometer damage. • Damage to signal wire. • Open ground wire.	• Go to **A4.**
• Tachometer Reading Abnormally	• Tachometer damage.	• Go to **A7.**

PINPOINT TEST A: TACHOMETER SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK FUSE		
	• Locate the interior fuse panel. • Check 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **A4.** GO to **A2.**
A2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **A3.** GO to **A4.**
A3	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect the interior fuse panel connector and instrument cluster connector. • Measure resistance between BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire. GO to **A4.**
A4	CHECK POWER SUPPLY TO TACHOMETER		
	• Key ON. • Locate the instrument cluster connector. • Measure voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A5.** SERVICE BK/Y wire.
A5	PERFORM TACHOMETER PULSE CHECK NO. 1		
	• Key OFF. • Locate the ignition coil. • Disconnect the ignition coil connector. • Using a test lead apply 12 volts to the Y/BL wire at the ignition coil connector. • **Does the tachometer needle jump?**	Yes ▶ No ▶	GO to **A8.** GO to **A6.**
A6	PERFORM TACHOMETER PULSE CHECK NO. 2		
	• Locate the instrument cluster connector. • Key ON. • Using a test lead, apply 12 volts to the Y/BL wire at the instrument cluster connector. • **Does the tachometer needle jump?**	Yes ▶ No ▶	SERVICE the Y/BL wire between the instrument cluster and ignition coil. REPLACE the tachometer.
A7	CHECK TACHOMETER		
	• Disconnect Y/BL wire from the ignition coil and place a signal generator and a tachometer tester between the Y/BL wire and ground • Compare the tester and tachometer indications. • **Are the readings within allowable range?**	Yes ▶ No ▶	REFER to Section 03-07. REPLACE the tachometer (See Caution). **CAUTION: When removing or installing a tachometer, do not drop or subject it to sharp impact.**

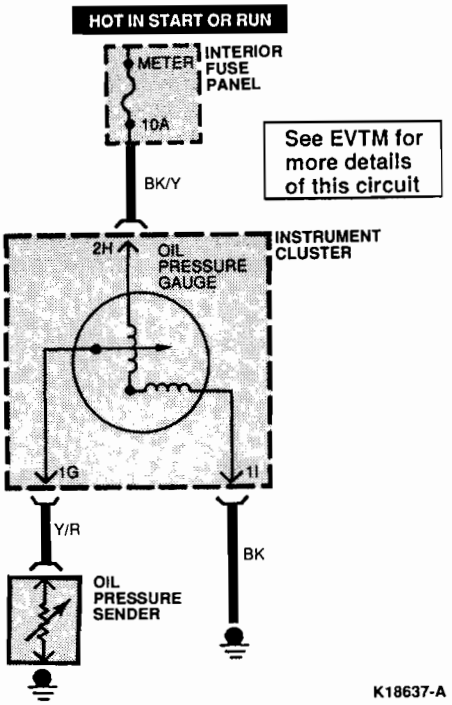
Standard Indication (RPM)	Allowable Range (RPM)
1000	100-1050
2000	2000-2050
3000	3000-3050
4000	4000-4050
5000	5000-5050
6000	6000-6050

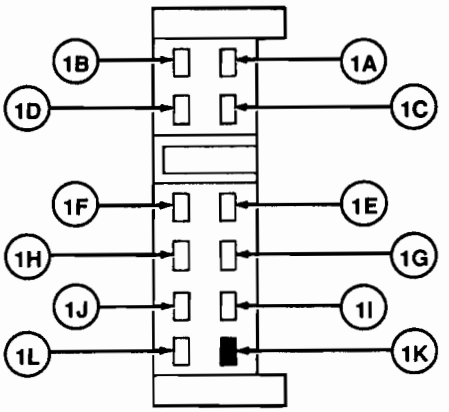
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A: TACHOMETER SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
A8	CHECK TACHOMETER GROUND		
	• Locate and disconnect the instrument cluster connector. • Measure the resistance between the BK wire at the instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A9.** SERVICE BK wire.
A9	CHECK WIRE BETWEEN TACHOMETER AND IGNITION COIL		
	• Key OFF. • Measure resistance of the Y/BL wire between the instrument cluster (tachometer) and ignition coil. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. SERVICE Y/BL wire.

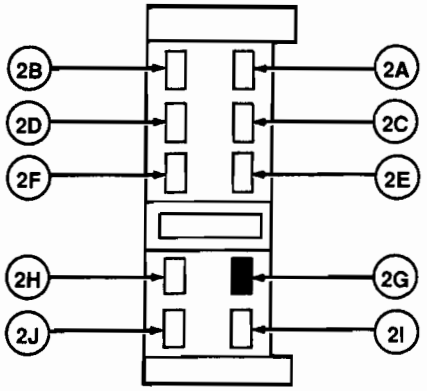
Electrical Schematic—Oil Pressure Gauge System





Pin Number	Wire Color	Circuit Function
1A	BK	Ground
1B	GN/W	RH Turn Indicator
1C	BR/Y	Transaxle Control Module (TCM) (ATX Only)
1D	R/W	High Beam Indicator
1E	BK/Y	Warning Indicator Lamp Power
1F	GN/BK	LH Turn Indicator
1G	Y/R	Oil Pressure Sender
1H	R/GN	Dimmer Control Module
1I	BK	Ground
1J	BK	Ground
1K	—	Not Used
1L	Y/W	Temperature Gauge Sending Unit

DIAGNOSIS AND TESTING (Continued)



INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A

System Inspection— Oil Pressure Gauge System

1. Visually inspect the components of the oil pressure gauge system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged oil pressure gauge	• Blown fuse: — 10 amp METER • Damage to wiring harness • Loose or corroded connections

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. Inspect the oil pressure gauge and the oil pressure sender for obvious opens or shorts causing partial operation.
4. If fault is not visually evident, determine condition and refer to the following condition chart.

CONDITION CHART—OIL PRESSURE GAUGE SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Oil Pressure Gauge Always Reads Low	• Fuse. • Circuit. • Damaged oil pressure sender. • Damaged oil pressure gauge.	• Go to **B1.**
• Oil Pressure Gauge Always Reads High	• Oil pressure gauge wire shorted to ground. • Damaged oil pressure sender. • Damaged oil pressure gauge.	• Go to **B7.**
• Oil Pressure Gauge Reads Inaccurately	• Damaged oil pressure gauge. • Damaged oil pressure sender.	• Go to **B10.**

PINPOINT TEST B: OIL PRESSURE GAUGE SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
B1	CHECK FUSE		
	• Locate the interior fuse panel. • Check the 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **B4.** GO to **B2.**
B2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON, engine running. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **B3.** GO to **B4.**

DIAGNOSIS AND TESTING (Continued)

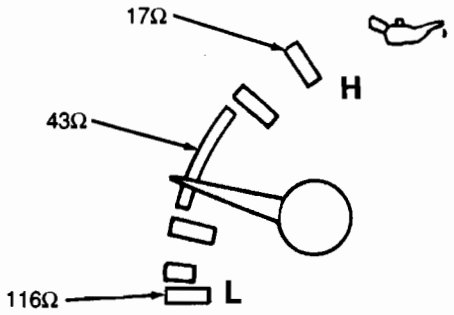
PINPOINT TEST B: OIL PRESSURE GAUGE SYSTEM (Continued)

	TEST STEP	RESULT ▶	ACTION TO TAKE
B3	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect the interior fuse panel connector and instrument cluster connector. • Measure the resistance between the BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire. GO to **B4.**
B4	CHECK POWER SUPPLY TO THE OIL PRESSURE GAUGE		
	• Locate the instrument cluster connector. • Key ON. • Measure voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **B5.** SERVICE BK/Y wire.
B5	CHECK OIL PRESSURE GAUGE		
	• Key ON. • Place a jumper wire from the Y/R wire at instrument cluster connector to ground. • **Does the oil pressure gauge read high?**	Yes ▶ No ▶	GO to **B6.** REPLACE oil pressure gauge.
B6	CHECK OIL PRESSURE GAUGE WIRE CONTINUITY		
	• Disconnect oil pressure sender connector. • Key ON. • Place a jumper wire from Y/R wire at the oil pressure sender connector to ground. • **Does the oil pressure gauge read high?**	Yes ▶ No ▶	GO to **B7.** SERVICE Y/R wire between oil pressure sender and instrument cluster.
B7	CHECK OIL PRESSURE SENDER		
	• Disconnect the oil pressure sender. • Key ON. • **Does oil pressure gauge read low?**	Yes ▶ No ▶	GO to **B8.** REPLACE oil pressure sender.
B8	CHECK OIL PRESSURE SENDER		
	• Locate and disconnect the instrument cluster connector. • Key ON. • **Does oil pressure gauge still read low?**	Yes ▶ No ▶	REPLACE oil pressure sender. GO to **B9.**
B9	CHECK OIL PRESSURE GAUGE GROUND		
	• Disconnect instrument cluster connector. • Measure resistance between the BK wire at the instrument cluster connector and ground. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **B10** SERVICE BK wire.

DIAGNOSIS AND TESTING (Continued)

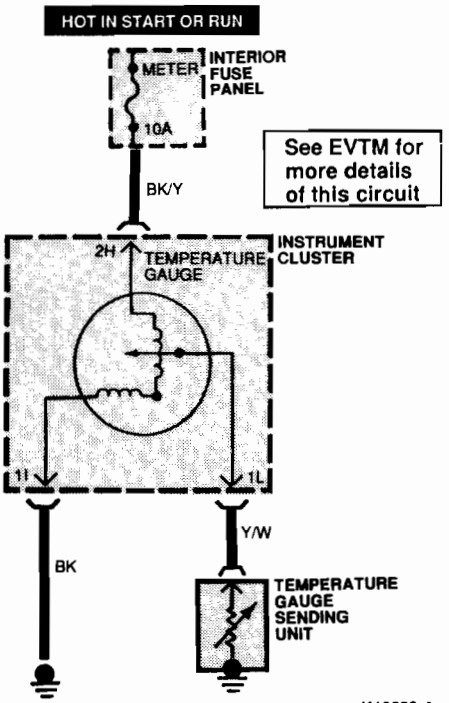
PINPOINT TEST B: OIL PRESSURE GAUGE SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
B10	CHECK OIL PRESSURE GAUGE		
	• Disconnect oil pressure sender connector. • Connect one lead of Rotunda Gauge System Tester 021-00038 or equivalent to the Y/R wire at the oil pressure connector and the other lead to ground. • Set the tester to resistance values shown. • Place the ignition switch to the ON position and check to see that the needle indicator displays the correct values. • Continue each inspection for two minutes to correctly judge the condition (allowable readings are twice the width of the needle). • **Are readings within the allowable range?**	Yes ▶ No ▶	REPLACE oil pressure sender. REPLACE oil pressure gauge.

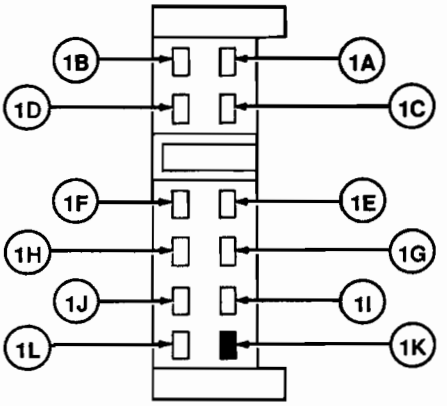


K19338-A

Electrical Schematic—Temperature Gauge System



K18638-A



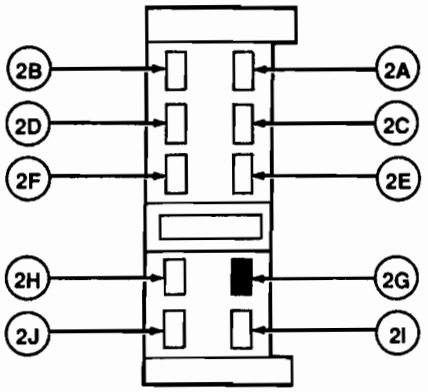
INSTRUMENT CLUSTER K18632-A

Pin Number	Wire Color	Circuit Function
1A	BK	Ground
1B	GN/W	RH Turn Indicator
1C	BR/Y	Transaxle Control Module (TCM) (ATX Only)
1D	R/W	High Beam Indicator
1E	BK/Y	Warning Indicator Lamp Power
1F	GN/BK	LH Turn Indicator

(Continued)

DIAGNOSIS AND TESTING (Continued)

Pin Number	Wire Color	Circuit Function
1G	Y/R	Oil Pressure Sender
1H	R/GN	Dimmer Control Module
1I	BK	Ground
1J	BK	Ground
1K	—	Not Used
1L	Y/W	Temperature Gauge Sending Unit



INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A

System Inspection—Temperature Gauge System

1. Visually inspect the components of the temperature gauge system.
2. Inspect the temperature gauge for obvious opens or shorts causing partial operation.
3. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
4. If fault is not visually evident, determine condition and refer to the following condition chart.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged temperature gauge	• Blown fuse: — 10 amp METER • Damage to wiring harness • Loose or corroded connections

CONDITION CHART—TEMPERATURE GAUGE SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Temperature Gauge Always Reads Cold	• Fuse. • Circuit. • Temperature gauge sending unit. • Temperature gauge.	• Go to **C1.**
• Temperature Gauge Always Reads Hot	• Short to ground. • Temperature gauge sending unit. • Temperature gauge.	• Go to **C7.**
• Temperature Gauge Inaccurate	• Open wires. • Temperature gauge sending unit.	• Go to **C10.**

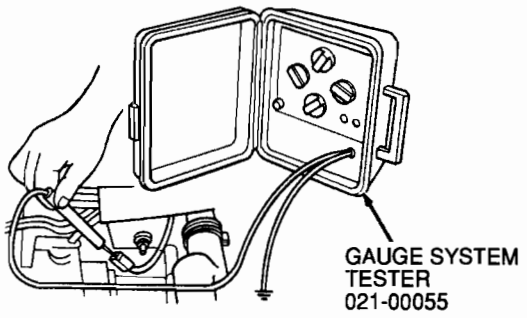
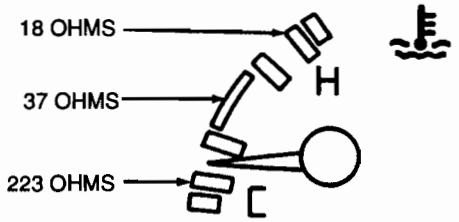
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: TEMPERATURE GAUGE SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
C1	CHECK FUSE		
	• Locate the interior fuse panel. • Check 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **C4.** GO to **C2.**
C2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **C3.** GO to **C4.**
C3	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect the interior fuse panel connector and instrument cluster connector. • Measure resistance between BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire. GO to **C4.**
C4	CHECK POWER SUPPLY TO TEMPERATURE GAUGE		
	• Key ON. • Locate instrument cluster connector. • Measure voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **C5.** SERVICE BK/Y wire.
C5	CHECK TEMPERATURE GAUGE		
	• Locate instrument cluster connector. • Key ON. • Place a jumper wire from the Y/W wire at instrument cluster to ground. • **Does temperature gauge read hot?**	Yes ▶ No ▶	GO to **C6.** REPLACE temperature gauge.
C6	CHECK TEMPERATURE GAUGE WIRE CONTINUITY		
	• Key ON. • Place a jumper wire from Y/W wire at the temperature gauge sending unit to ground. • **Does the temperature gauge read hot?**	Yes ▶ No ▶	GO to **C7.** SERVICE Y/W wire between the temperature gauge sending unit and instrument cluster.
C7	CHECK TEMPERATURE GAUGE		
	• Disconnect the temperature gauge sending unit. • **Does temperature gauge read cold?**	Yes ▶ No ▶	GO to **C8.** REPLACE temperature gauge.
C8	CHECK TEMPERATURE GAUGE		
	• Locate and disconnect the instrument cluster connector. • **Does the temperature gauge still read cold?**	Yes ▶ No ▶	REPLACE temperature gauge. GO to **C9.**
C9	CHECK TEMPERATURE GAUGE GROUND		
	• Locate and disconnect instrument cluster connector. • Measure resistance between the BK wire at the instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **C10.** SERVICE BK wire.

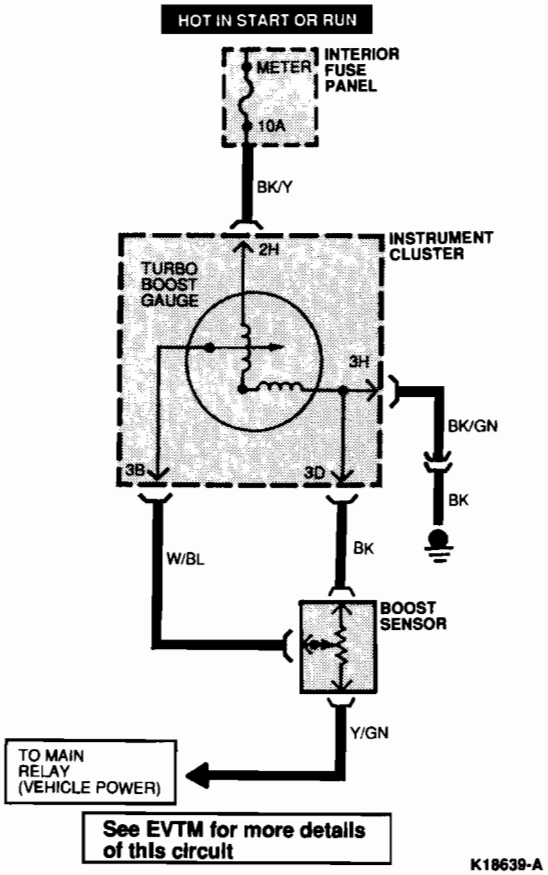
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: TEMPERATURE GAUGE SYSTEM (Continued)

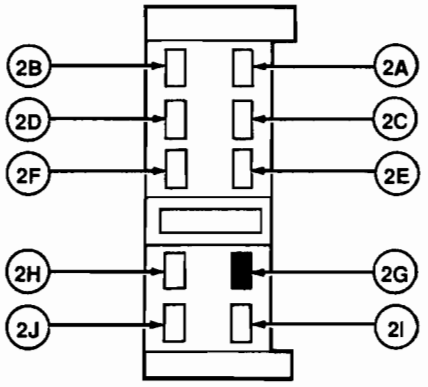
TEST STEP		RESULT ▶	ACTION TO TAKE
C10	CHECK TEMPERATURE GAUGE SENDING UNIT		
	• Remove connector from temperature gauge sending unit. • Connect one lead of the Rotunda Gauge System Tester 021-00055 or equivalent to the connector and the other lead to ground. • Set gauge tester to the resistance values shown. • Place ignition switch to the ON position and check to see that the needle indictor displays the correct reading. • Continue each inspection for two minutes to correctly judge the condition (allowable readings are twice the width of the needle). • **Are readings within the allowable range?**  **K17161-A**  **K17160-B**	Yes ▶ No ▶	GO to **C11.** REPLACE temperature gauge sending unit.
C11	CHECK TEMPERATURE GAUGE SENDING UNIT		
	• Remove temperature gauge sending unit. • Place temperature gauge sending unit in a container of water and heat to 80°C (176°F). • Measure resistance between the case and the terminal of the sending unit. • **Does resistance measure between 49.3 ohms and 57.7 ohms?**	Yes ▶ No ▶	GO to **C12.** REPLACE temperature gauge sending unit.
C12	CHECK TEMPERATURE GAUGE SENDING UNIT		
	• Key OFF. • Measure resistance between temperature gauge sending unit casing and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. REPLACE temperature gauge sending unit.

DIAGNOSIS AND TESTING (Continued)

Electrical Schematic—Turbo Boost Gauge System



K18639-A



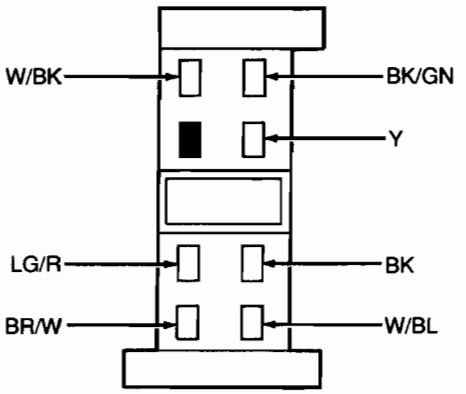
INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator
2C	BK	Ground (Vehicle Speed Sensor)

(Continued)

Pin Number	Wire Color	Circuit Function
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil (Tachometer Pulse)
2J	BK/GN	Ground (Voltage Gauge, Tachometer)

TL8225A



K18640-A

Pin Number	Wire Color	Circuit Function
3A	BR/W	Parking Brake Switch
3B	W/BL	Boost Sensor
3C	LG/R	Powertrain Control Module (PCM)
3D	BK	Boost Sensor
3E	—	Not Used
3F	Y	Fuel Gauge Sending Unit
3G	W/BK	Generator
3H	BK/GN	Ground

System Inspection—Turbo Boost Gauge System

1. Visually inspect the components of the turbo boost gauge system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged turbo boost gauge	• Blown fuse: — 10 amp METER • Damage to wiring harness • Loose or corroded connections

DIAGNOSIS AND TESTING (Continued)

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. Inspect the turbo boost gauge and the boost sensor for obvious opens or shorts causing partial operation.
4. If fault is not visually evident, determine condition and refer to the following condition chart.

CONDITION CHART—TURBO BOOST GAUGE SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Turbo Boost Gauge Always Reads Low	• Fuse. • Circuit. • Damaged boost sensor. • Damaged turbo boost gauge.	• Go to **D1.**
• Turbo Boost Gauge Always Reads High	• Circuit. • Damaged boost sensor. • Damaged turbo boost gauge.	• Go to **D4.**
• Turbo Boost Gauge Is Erratic	• Damaged boost sensor. • Damaged turbo boost gauge.	• Go to **D4.**

PINPOINT TEST D: TURBO BOOST GAUGE SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
D1	CHECK FUSE		
	• Locate the interior fuse panel. • Check the 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **D4.** GO to **D2.**
D2	CHECK SYSTEM		
	• Replace the 10 amp METER fuse. • Key ON. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **D3.** GO to **D4.**
D3	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect the interior fuse panel connector and instrument cluster connector. • Measure resistance between BK/Y at the interior fuse panel and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE the BK/Y wire. GO to **D4.**
D4	CHECK POWER SUPPLY TO TURBO BOOST GAUGE		
	• Locate and disconnect the instrument cluster connector. • Key ON. • Measure voltage on the BK/Y wire at the instrument cluster connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **D5.** SERVICE BK/Y wire.
D5	CHECK GROUND WIRES		
	• Locate and disconnect the instrument cluster 8 pin connector and the boost sensor connector. • Measure the resistance between the BK wire between the instrument cluster connector and boost sensor connector. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **D6.** SERVICE BK wire.
D6	CHECK VOLTAGE AT BOOST SENSOR		
	• Locate and disconnect boost sensor connector. • Key ON. • Measure voltage on the Y/GN wire at the boost sensor connector. • **Is the voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **D7.** SERVICE Y/GN wire.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: TURBO BOOST GAUGE SYSTEM (Continued)

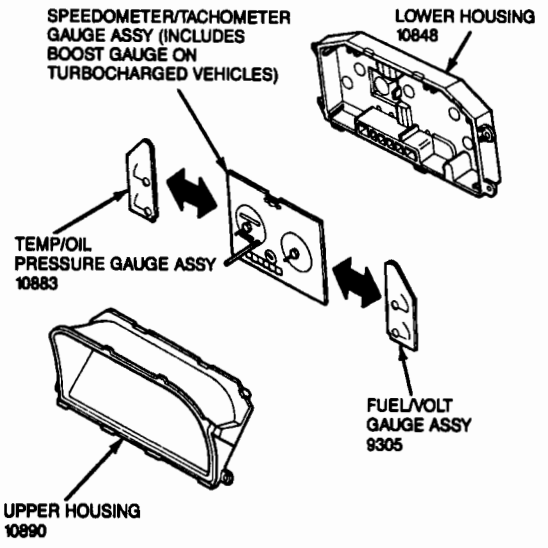
TEST STEP		RESULT ▶	ACTION TO TAKE
D7	CHECK BOOST GAUGE SIGNAL WIRE		
	• Locate and disconnect instrument cluster 8-pin connector. • Disconnect boost sensor. • Measure resistance of the W/BL wire between the instrument cluster connector and boost sensor connector. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **D8.** SERVICE W/BL wire.
D8	CHECK TURBO BOOST GAUGE		
	• Locate the instrument cluster 8 pin connector. • Key ON. • Ground W/BL wire at the turbo boost gauge (instrument cluster connector). • **Does the turbo boost gauge read low?** • Apply 12 volts to W/BL wire at the turbo boost gauge (instrument cluster connector). • **Does turbo boost gauge read high?**	Yes ▶ No ▶	GO to **D9.** REPLACE turbo boost gauge.
D9	CHECK BOOST SENSOR		
	• Disconnect boost sensor connector. • Place a jumper wire between Y/GN and W/BL wires on boost sensor connector. • Key ON. • **Does turbo boost gauge read high?**	Yes ▶ No ▶	REPLACE boost sensor. RETURN to condition chart.

REMOVAL AND INSTALLATION

Tachometer

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.
3. Separate speedometer/tachometer/boost gauge assembly from other gauge assemblies.



Installation

CAUTION: Tachometer is calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position speedometer/tachometer/boost gauge assembly to other gauge assemblies.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check tachometer and all other gauges/indicators for proper operation.

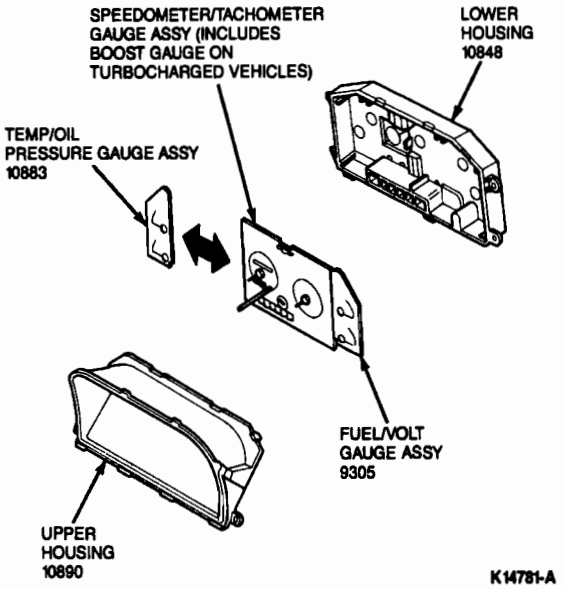
Temperature Gauge

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.

REMOVAL AND INSTALLATION (Continued)

3. Separate the temperature / oil pressure gauge from the speedometer / tachometer / boost gauge assembly. (The boost gauge is used only on turbocharged vehicles.)



Installation

CAUTION: The gauges are calibrated at the factory. Excessive rough handling could disturb calibration.

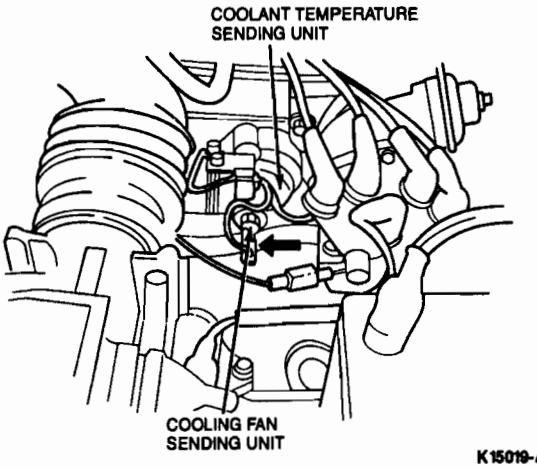
1. Position temperature / oil pressure gauge to speedometer / tachometer / boost gauge assembly.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check all gauges and indicators for proper operation.

Temperature Sending Unit

Removal

1. Relieve cooling system pressure.

   WARNING: NEVER REMOVE THE RADIATOR CAP UNDER ANY CIRCUMSTANCES WHILE THE ENGINE IS OPERATING. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY FROM HOT COOLANT OR STEAM BLOW OUT (AND / OR DAMAGE TO THE COOLING SYSTEM OR ENGINE). SWITCH OFF THE ENGINE AND WAIT UNTIL IT HAS COOLED. EVEN THEN, USE EXTREME CARE WHEN REMOVING THE CAP FROM A HOT RADIATOR. WRAP A THICK CLOTH AROUND THE CAP AND TURN IT SLOWLY TO THE FIRST STOP. STEP BACK WHILE THE PRESSURE IS RELEASED FROM THE COOLING SYSTEM. WHEN CERTAIN ALL THE PRESSURE HAS BEEN RELEASED, PRESS DOWN ON THE CAP WITH A CLOTH, TURN AND REMOVE IT.
2. Partially drain engine coolant. Refer to Section 03-03.
3. Disconnect electrical connector from sending unit.
4. Using a suitable tool, unscrew sending unit.



Installation

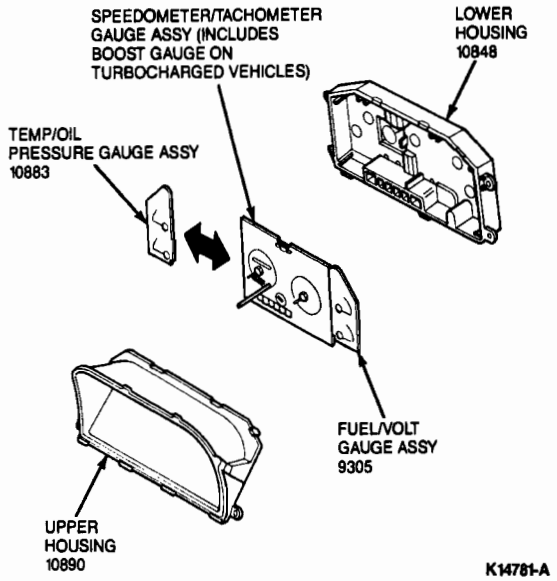
1. Apply Pipe Sealant with Teflon® D8AZ-19554-A (ESG-M4G194-A or ESR-M18P7-A), or equivalent to threads of sending unit.
2. Install sending unit into cylinder head. Tighten securely.
3. Connect electrical connector onto sending unit terminal.
4. Fill cooling system to proper level. Refer to Section 03-03.
5. Check gauge for proper operation.

REMOVAL AND INSTALLATION (Continued)

Oil Pressure Gauge

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.
3. Separate the temperature / oil pressure gauge from the speedometer / tachometer / boost gauge assembly. (The boost gauge is used only on turbocharged vehicles.)



Installation

CAUTION: The gauges are calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position temperature / oil pressure gauge to speedometer / tachometer / boost gauge assembly.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check all gauges and indicators for proper operation.

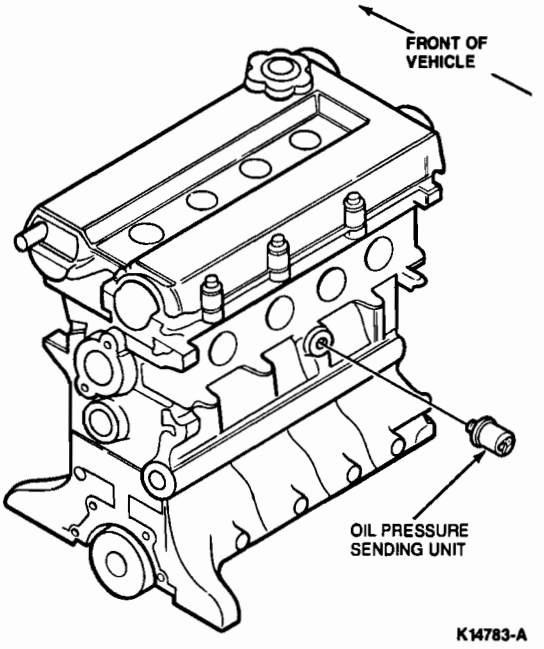
Oil Pressure Sending Unit

Removal

1. Disconnect electrical lead wire from oil sending unit.

   CAUTION: Do not use locking-type pliers to remove or install oil sending unit. The diaphragm in the sending unit could be damaged with the use of locking-type pliers.

2. Unscrew oil sending unit with a suitable tool.



Installation

1. Apply pipe sealant with Teflon® D8AZ-19554-A (ESG-M4G194-A or ESR-M18P7-A) or equivalent to threads of sending unit.
2. Install sending unit into cylinder head. Tighten to 16-23 N·m (12-16 lb-ft).
3. Connect electrical lead onto sending unit terminal.

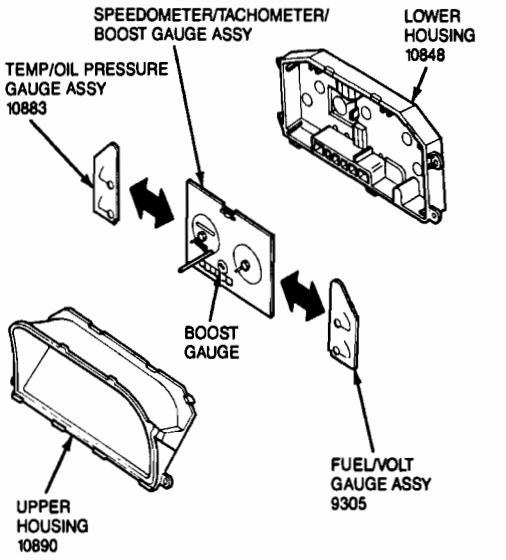
Turbo Boost Gauge

Removal

1. Disconnect negative battery cable.
2. Remove and disassemble instrument cluster assembly. Refer to Section 13-01.

REMOVAL AND INSTALLATION (Continued)

3. Separate speedometer / tachometer / boost gauge assembly from other gauge assemblies.



Installation

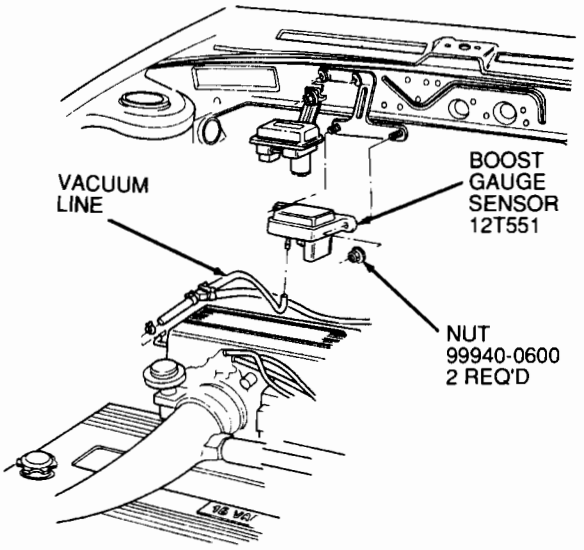
CAUTION: Gauges are calibrated at the factory. Excessive rough handling could disturb calibration.

1. Position speedometer, tachometer, and boost gauge assembly to other gauge assemblies.
2. Install gauge assembly into instrument cluster and install cluster. Refer to Section 13-01.
3. Connect negative battery cable.
4. Check all gauges and indicators for proper operation.

Turbo Boost Gauge Sensor

Removal

1. Disconnect vacuum line and electrical connector from sensor.
2. Remove two nuts and washers.
3. Remove sensor.



Installation

1. Install sensor with two washers and nuts. Tighten to 6-10 N·m (5-7 lb-ft).
2. Inspect vacuum lines and replace as required.
3. Connect vacuum line and electrical connector to sensor.
4. Check all gauges for proper operation.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Oil Pressure Sending Unit	16-23	12-16
Turbo Boost Gauge Sensor	6-10	5-7

SECTION 13-06 Horn

VEHICLE APPLICATION

Capri.

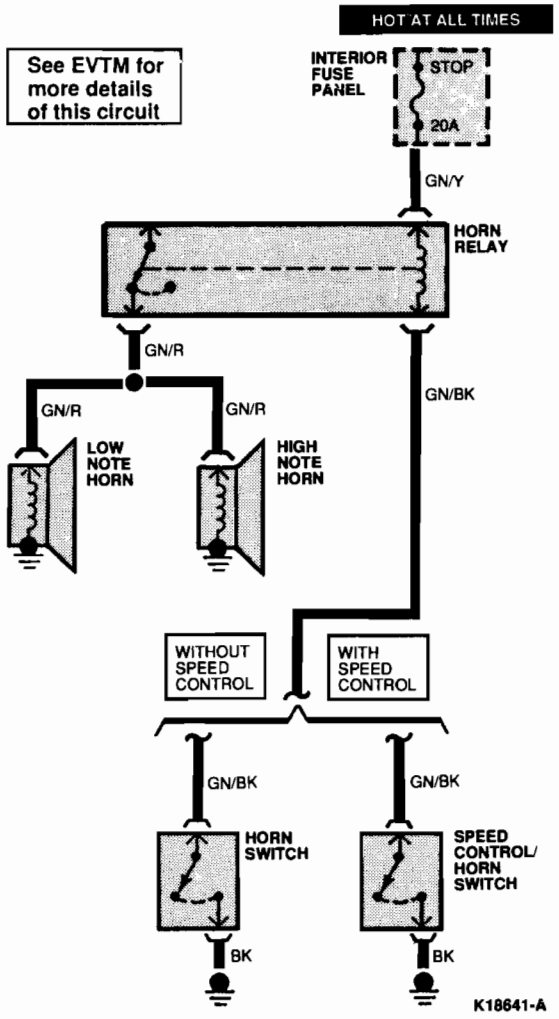
DESCRIPTION

The horns are mounted above the left fog lamp, behind the front bumper. The horn switches are located in the upper steering wheel spokes and are actuated by pushing on either horn symbol switches.

The horn relay is mounted on the left inner headlamp support.

DIAGNOSIS AND TESTING

Electrical Schematic—Horn System



System Inspection—Horn System

1. Visually inspect components of the horn system.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Damaged Horn Switch • Damaged Horn Unit • Damaged Relay	• Blown Fuse: • 20 amp STOP fuse • Damaged Wire Harnesses • Loose or Corroded Connections

2. Operate horn switch and observe high and low horn operation.
3. Briefly inspect the exposed wiring harnesses and connectors for apparent damage.
4. If the fault is not visually evident, determine the condition and refer to the following chart.

DIAGNOSIS AND TESTING (Continued)

CONDITION CHART—HORN SYSTEM

CONDITION	POSSIBLE SOURCE	ACTION
• Horn Does Not Work	• Fuse. • Horn relay. • Horn switch. • Horns. • Circuit.	• Go to **H1.** • Go to **H5.** • Go to **H9.** • Go to **H8.** • Go to **H4.**
• Horn Works Continuously	• Short to ground. • Horn relay. • Horn switch. • Horns. • Circuit.	• Go to **H3.** • Go to **H5.** • Go to **H9.** • Go to **H8.** • Go to **H4.**
• Horns Work Abnormally	• Short to ground. • Horn relay. • Horn switch. • Horns. • Circuit.	• Go to **H3.** • Go to **H5.** • Go to **H9.** • Go to **H8.** • Go to **H4.**

PINPOINT TEST H—HORN SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
H1	CHECK FUSE		
	• Locate interior fuse panel. • Check the 20 amp STOP fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **H4.** GO to **H2.**
H2	CHECK SYSTEM		
	• Replace the 20 amp STOP fuse. • **Did fuse fail again?**	Yes ▶ No ▶	GO to **H3.** GO to **H4.**
H3	CHECK FOR SHORTS TO GROUND		
	• Disconnect horn relay connector. • Locate and disconnect the interior fuse panel connector. • Measure resistance between the GN/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE GN/Y wire. GO to **H4.**
H4	CHECK POWER SUPPLY TO HORN RELAY		
	• Disconnect the horn relay connector. • Measure voltage on the GN/Y wire at horn relay connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **H5.** SERVICE GN/Y wire.
H5	CHECK HORN RELAY		
	• Disconnect horn relay connector. • Measure resistance between the GN/Y terminal and the GN/R terminal on horn relay. • **Is resistance greater than 10,000 ohms?** • Apply 12 volts to the GN/Y terminal on horn relay. • Ground the GN/BK terminal on horn relay. • Measure resistance between the GN/Y terminal and the GN/R terminal. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **H6.** REPLACE horn relay.
H6	CHECK WIRE BETWEEN HORN RELAY AND HORNS		
	• Measure resistance of the GN/R wire between the horn relay and the horns. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **H7.** SERVICE GN/R wire(s).
H7	CHECK HORNS		
	• Disconnect horn connectors. • Apply 12 volts to the GN/R terminals on the horns. • **Did horns sound?**	Yes ▶ No ▶	GO to **H8.** SERVICE/REPLACE horns.

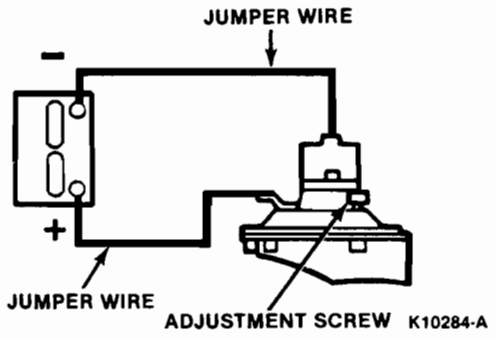
DIAGNOSIS AND TESTING (Continued)

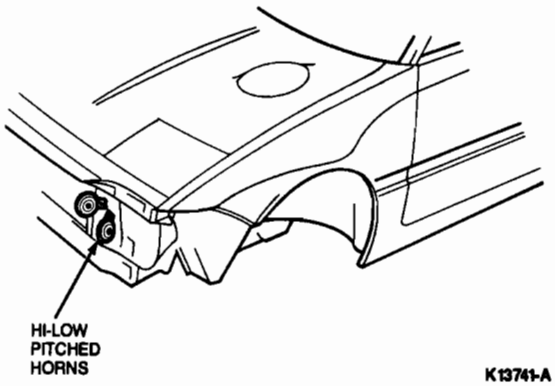
PINPOINT TEST H—HORN SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
H8	CHECK WIRE BETWEEN HORN RELAY AND HORN SWITCH		
	• Locate horn switch. • Measure resistance of the GN/BK wire between the horn relay and the horn switch. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **H9.** SERVICE GN/BK wire.
H9	CHECK HORN SWITCH		
	• Disconnect horn switch connector. • Measure resistance between the GN/BK terminal and the BK terminal on the horn switch. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	RETURN to condition chart. REPLACE horn switch.

ADJUSTMENTS

1. Verify that ground is good by checking the connections for corrosion and that the mounting screw is tight.
2. Attach a wire to the positive (+) battery terminal and to the horn contact. If the horn sounds normally, check the wiring to the horn. If it does not sound, proceed to Step 3.
3. Connect a wire between the negative (-) terminal of the battery and the mounting bracket. Connect another wire from the positive (+) terminal of the battery to the horn contact. If the horn does not sound and there is no evidence of a spark at the battery terminal, turn the adjusting screw one-quarter to three-eighths of a turn. Then secure adjusting screw by clinching housing extrusion with diagonals or pliers. If horn does not function, refer to Diagnosis and Testing.





Installation

1. Position horn assembly.
2. Install bolts through brackets and into radiator support. Tighten to 7-10 N·m(5-7 lb-ft).
3. Attach wiring connector to horn contact.
4. Verify proper operation of horns.

REMOVAL AND INSTALLATION

Horns and Brackets

Removal

1. Disconnect wiring connectors from horn.
2. Remove retaining bolts from brackets.
3. Remove horn from below bumper.

Horn Switch

Removal

1. Disconnect negative battery cable.
2. Remove horn switch by carefully prying around switch bezel with small, flat-bladed screwdriver.
3. Disconnect two wires from switch.

Installation

1. Connect two wires to switch.
2. Install switch in steering wheel.
3. Connect negative battery cable and verify proper operation.

REMOVAL AND INSTALLATION (Continued)

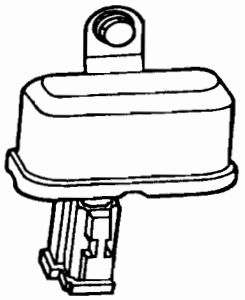
Horn Relay

Removal

1. Locate horn relay on the left inner headlamp support.
2. Disconnect plug at horn relay.
3. Remove screw securing relay to inner headlamp support.

Installation

1. Install screw through relay bracket and into inner fender.
2. Connect plug at horn relay.



K10282-B

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Horn Retaining Bolts	7-10	5-7

SECTION 13-07 Clock

VEHICLE APPLICATION

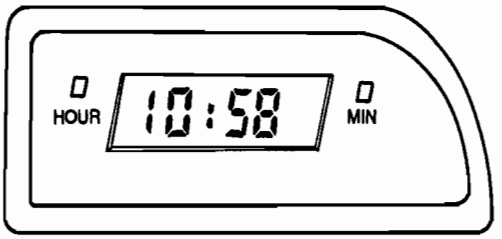
Capri.

DESCRIPTION

The quartz movement, electronic clock is mounted on the RH side of the instrument panel bezel. The illumination for the clock is set so that when the headlamps or parking lamps are turned on, the intensity of the clock lamp is lowered and controlled by the instrument panel lighting control. When all the lamps are turned off the intensity is increased for easier viewing in bright sunlight. The clock displays time in a 12 hour format and is always on. Changing the time can be done as follows:

To change the hour digits, press the HOUR button. Pressing the button once and then releasing it advances and sets the digits one at a time. Holding the button in, advances the digits rapidly.

To change the minute digits, press the MIN button. Pressing the button once and releasing it advances and sets the digits one at a time. Holding the button in, advances the digits rapidly.



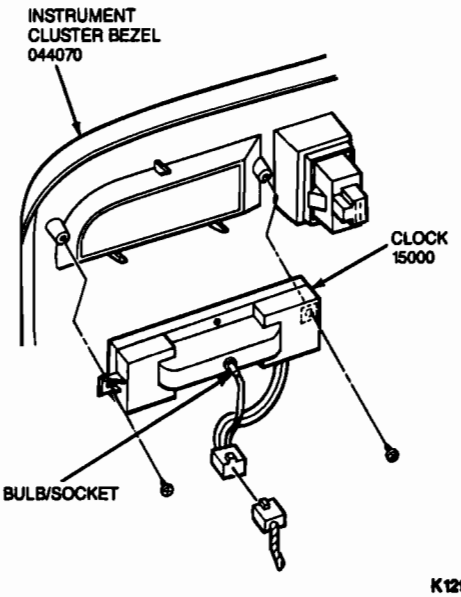
K12927-A

REMOVAL AND INSTALLATION

Clock

Removal

1. Remove instrument cluster bezel. Refer to Section 01-12.
2. Rotate bulb socket and remove.
3. Remove screws and clock assembly.



K12928-A

REMOVAL AND INSTALLATION (Continued)

Installation

1. Install clock with screws to instrument cluster bezel.
2. Install bulb socket to clock.
3. Install instrument cluster bezel. Refer to Section 01-12.

SECTION 13-09 Gauges, Warning Devices, Miscellaneous—Analog

VEHICLE APPLICATION

Capri.

DESCRIPTION

Instrument Panel Lamps

All instrument panel lamps should illuminate when the ignition switch is turned to the "ON" position except the brake warning indicator lamp. The brake warning indicator lamp should illuminate for a few seconds when the ignition is turned to the "START" position. The illumination of these lamps proves that the bulbs are operating correctly.

Some switches include indicator lamps as part of the switch. These are not serviced separately. The fog lamp switch, headlamp switch, and defogger switch all include indicator lamps.

Safety Belt Indicator

The system incorporates a buzzer and lamp as warning devices. The safety belt warning lamp illuminates for several seconds after the ignition switch is turned to the RUN position, regardless of safety belt usage. The safety belt warning buzzer is grounded by a switch in the left inboard buckle. The safety belt warning buzzer will sound unless the driver's belt is connected.

Check Engine Warning Lamp

The check engine warning lamp illuminates when there is a problem in the engine control or emission system. Refer to the Powertrain Control/Emissions Diagnosis Manual [1] for further information.

1 Can be purchased as a separate item.

DESCRIPTION (Continued)

Brake Indicator

The brake indicator illuminates when the parking brake lever is lifted up, a leak in the brake hydraulic system occurs, the brake fluid in the reservoir is low, or too much air is contained in the hydraulic system causing the two separate hydraulic systems to become unbalanced. The ignition switch must be in the RUN position.

The lamp will illuminate when the ignition is turned to the START position and should go out when the engine is started.

The brake indicator circuit consists of the parking brake switch and a pressure differential warning switch.

Charge Warning Indicator Lamp

This indicator lamp illuminates if there is a concern in either the generator or wiring systems. Refer to Section 13-01 for additional information.

Air Bag Indicator Lamp

Refer to Section 01-20B for information on the air bag warning indicator lamp.

Turn Signal Indicators

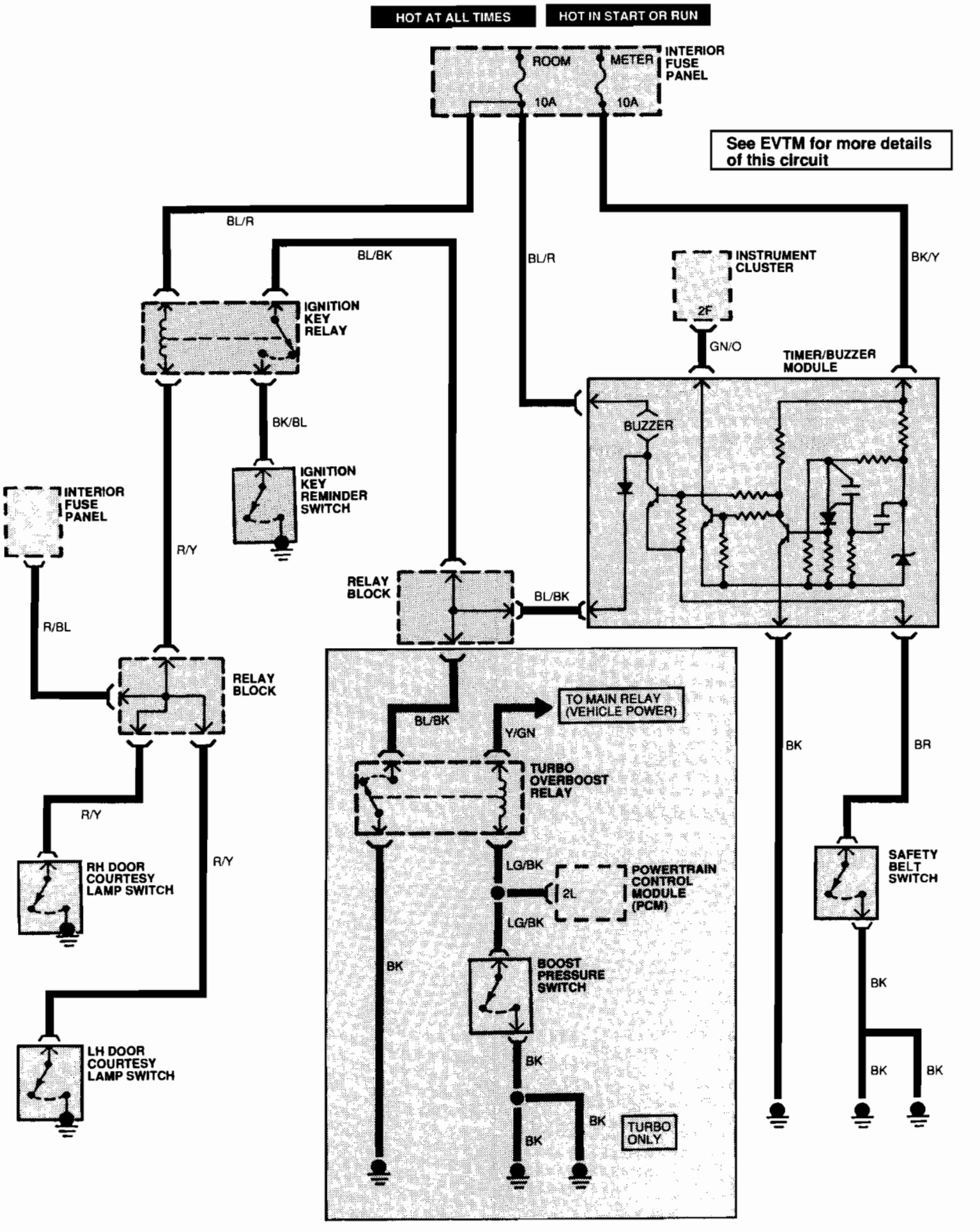
The turn signal system consists of the multi-function switch, turn signal / hazard flasher, indicating lamps and necessary wiring. Refer to Section 11-05 for additional information.

High Beam Indicator

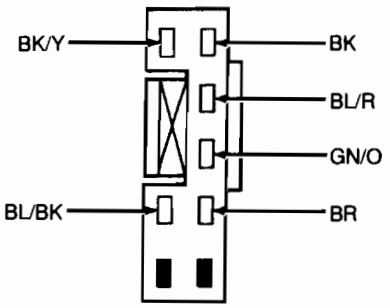
This indicator lamp illuminates when the headlamps are on and in high beam position or when the flash-to-pass switch is activated.

DIAGNOSIS AND TESTING

Electrical Schematic — Timer / Buzzer Warning System

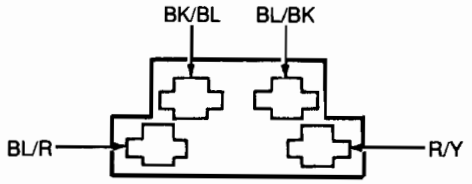


DIAGNOSIS AND TESTING (Continued)



TIMER/BUZZER MODULE

K18643-A

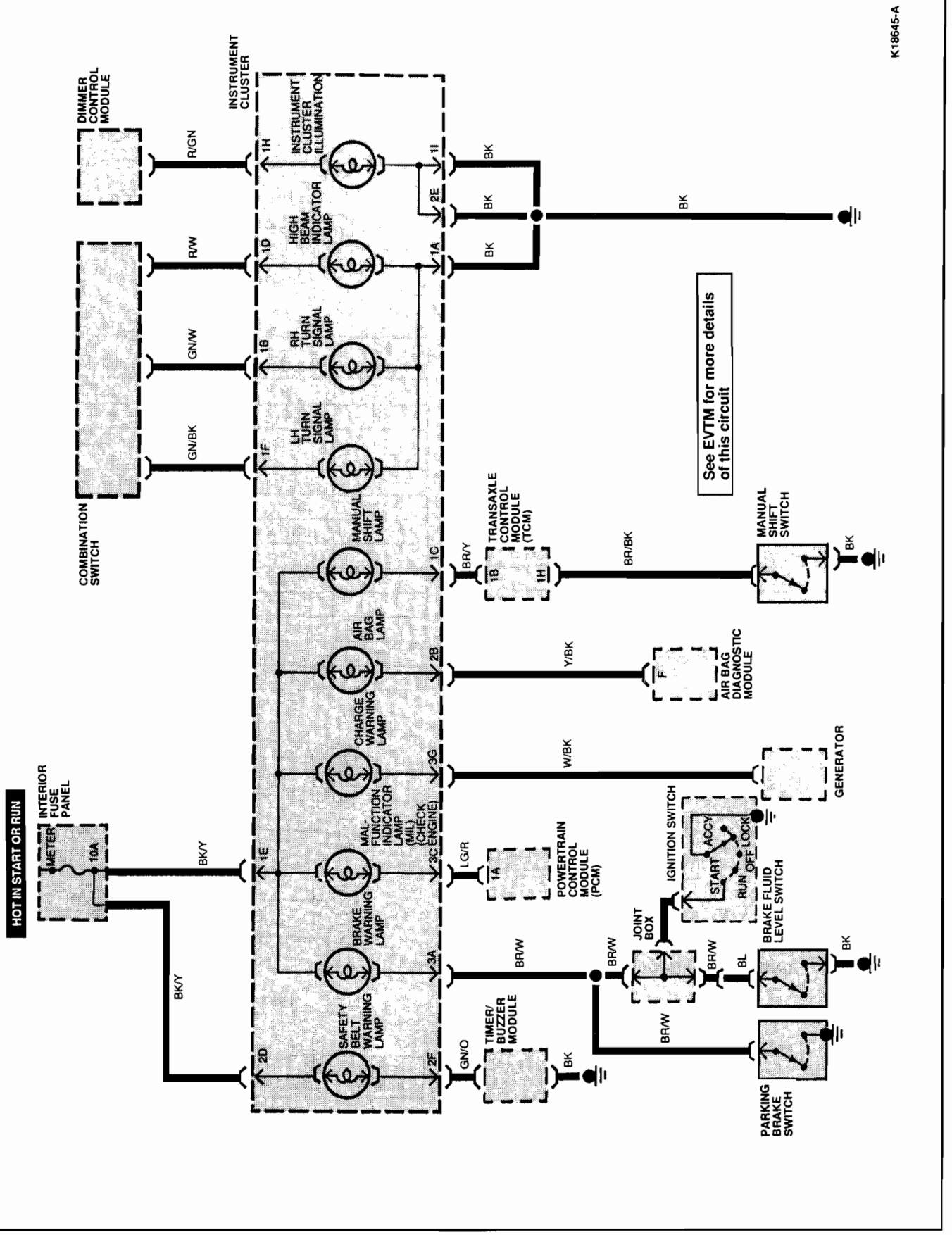


IGNITION KEY RELAY

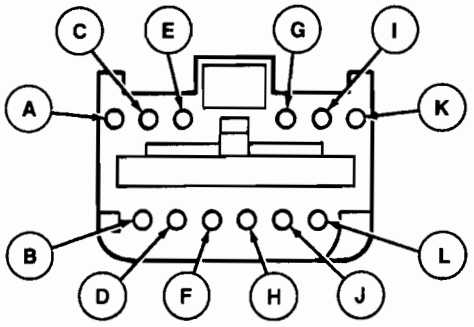
K18644-A

DIAGNOSIS AND TESTING (Continued)

Electrical Schematic —Warning Indicator Lamps System

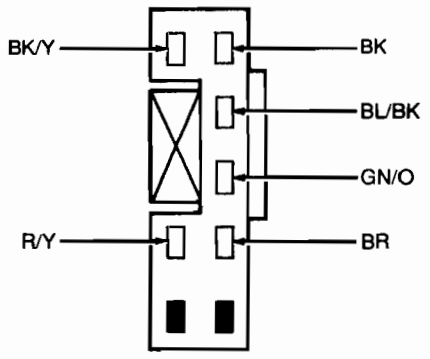


DIAGNOSIS AND TESTING (Continued)

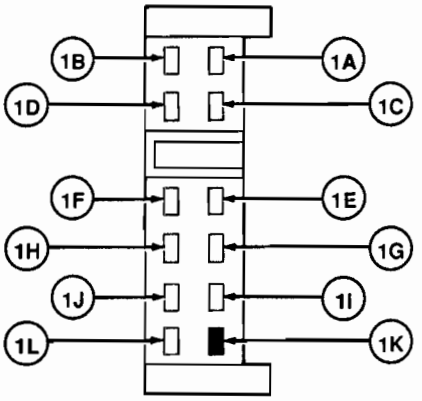


AIR BAG DIAGNOSTIC MODULE K18646-A

Pin Number	Wire Color	Circuit Function
A	PK/W	Center Crash Sensor
B	P/O	Air Bag Diagnostic Module Power Supply
C	PK/O	RH Crash Sensor
D	BK	Ground
E	BL/W	Safing Sensor Ground
F	Y/BK	Air Bag Indicator Lamp
G	W/O	Safing Sensor
H	BK	Ground
I	BL/O	Air Bag Backup Power Supply
J	BK	Ground
K	BL	Battery Power Supply
L	P/O	Air Bag Diagnostic Module Power Supply

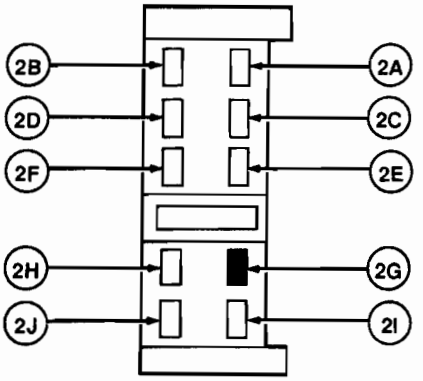


TIMER/BUZZER MODULE K18647-A



INSTRUMENT CLUSTER K18632-A

Pin Number	Wire Color	Circuit Function
1A	BK	Ground
1B	GN/W	RH Turn Indicator
1C	BR/Y	Transaxle Control Module (TCM) (Auto Only)
1D	R/W	High Beam Indicator
1E	BK/Y	Warning Indicator Lamp Power
1F	GN/BK	LH Turn Indicator
1G	Y/R	Oil Pressure Sender
1H	R/GN	Dimmer Control Module
1I	BK	Ground
1J	BK	Ground
1K	—	Not Used
1L	Y/W	Temperature Gauge Sending Unit



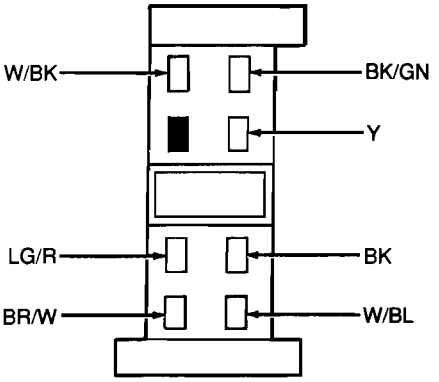
INSTRUMENT CLUSTER L8225-A

Pin Number	Wire Color	Circuit Function
2A	GN/R	Vehicle Speed Sensor (VSS)
2B	Y/BK	Air Bag Diagnostic Module Indicator

(Continued)

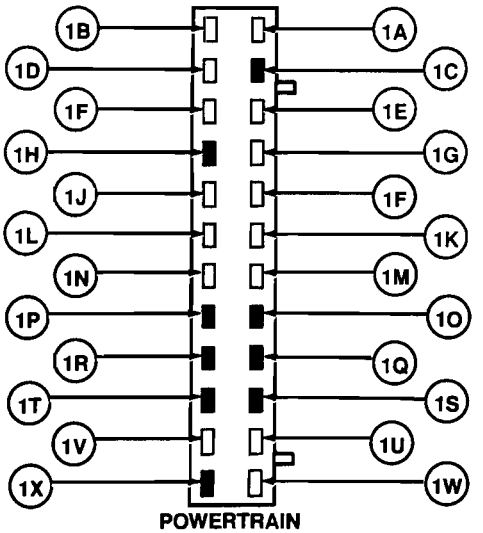
DIAGNOSIS AND TESTING (Continued)

Pin Number	Wire Color	Circuit Function
2C	BK	Ground for VSS
2D	BK/Y	Safety Belt Warning Indicator Lamp Power
2E	BK	Ground
2F	GN/O	Safety Belt Warning Indicator Lamp Ground
2G	—	Not Used
2H	BK/Y	Gauge Power
2I	Y/BL	Ignition Coil
2J	BK/GN	Ground for Voltmeter, Tach and Boost



K18640-A

Pin Number	Wire Color	Circuit Function
3A	BR/W	Parking Brake Switch
3B	W/BL	Boost Sensor
3C	LG/R	Powertrain Control Module (PCM)
3D	BK	Boost Sensor
3E	—	Not Used
3F	Y	Fuel Gauge Sending Unit
3G	W/BK	Generator
3H	BK/GN	Ground



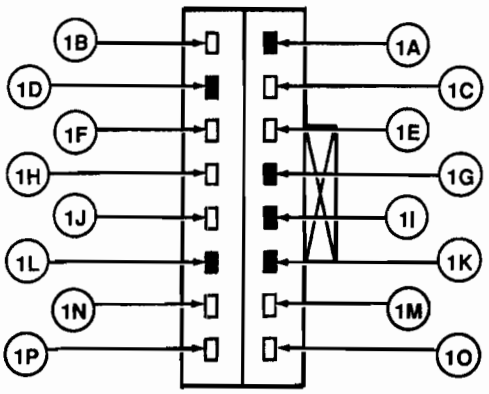
POWERTRAIN CONTROL MODULE

Q3240-A

Pin Number	Wire Color	Circuit Function
1A	LG/R	MIL Lamp
1B	GN/BK	Self Test Output
1C	—	Not Used
1D	BK/BL	Switch Monitor Lamp
1E	GN/O	Idle Switch
1F	W	WAC Relay
1G	R/BL	Park/Neutral Position Switch, Clutch Pedal Position Switch
1H	—	Not Used
1I	BL	Electrical Load Control Module
1J	W/GN	Brake On/Off (BOO) Switch
1K	GN/R	Power Steering Pressure Switch
1L	R	A/C Control Switch
1M	Y/BL	Ignition Diagnostic Monitor
1N	Y	Cylinder Identification Sensor
1O	—	Not Used
1P	—	Not Used
1Q	—	Not Used
1R	—	Not Used
1S	—	Not Used
1T	—	Not Used
1U	LG/Y	Ignition Control Module (Non-Turbo) Knock Control Unit 1 (Turbo)
1V	BK	Ground (Non-Turbo Only)
1W	Y	Self Test Input
1X	—	Not Used

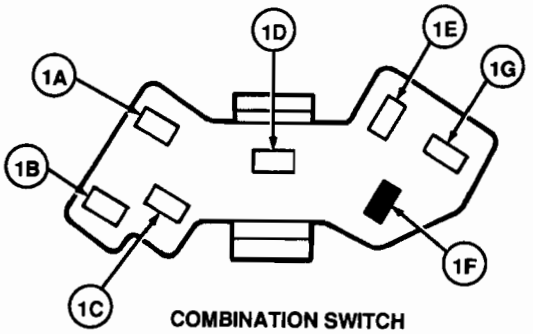
TQ3240A

DIAGNOSIS AND TESTING (Continued)



TRANSAXLE CONTROL MODULE (TCM) K18648-A

Pin Number	Wire Color	Circuit Function
1A	—	Not Used
1B	BR/Y	Manual Shift Lamp
1C	R	STO Test Connector
1D	—	Not Used
1E	R/BK	STI Test Connector
1F	W/GN	Brake On/Off (BOO) Switch
1G	—	Not Used
1H	BR/BK	Manual Shift Switch
1I	—	Not Used
1J	BK	Ground
1K	—	Not Used
1L	—	Not Used
1M	BK/BL	Transaxle Oil Temperature Switch
1N	BL/GN	Powertrain Control Module (PCM)
1O	GN/O	Powertrain Control Module (PCM)
1P	GN/R	Vehicle Speed Sensor (VSS)

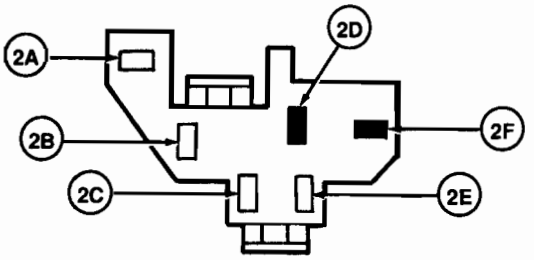


COMBINATION SWITCH K19278-A

Pin Number	Wire Color	Circuit Function
1A	R/GN	Headlamp Switch
1B	R/BK	Low Beam Power Supply

(Continued)

Pin Number	Wire Color	Circuit Function
1C	R/W	High Beam Power Supply
1D	R	Power Supply
1E	GN/BK	Left Turn Signal
1F	—	Not Used
1G	GN/BK	Left Turn Signal



COMBINATION SWITCH K19279-A

Pin Number	Wire Color	Circuit Function
2A	GN/W	Right Turn Signal
2B	GN/W	Right Turn Signal
2C	GN/Y	Flasher Module
2D	—	Not Used
2E	GN/R	Hazard Flasher
2F	—	Not Used

System Inspection—Warning Indicator System

1. Visually inspect the components of the warning system.

VISUAL INSPECTION CHART

Mechanical	Electrical

• Damaged components	• Blown Fuses:
	  • 10 amp ROOM
	  • 10 amp METER
	• Damage to wiring harness
	• Loose or corroded connections

2. Check the wiring harness for obvious signs of shorts, opens, bad connections or damage.
3. If the fault is not visually evident, determine condition and refer to the following condition chart.

DIAGNOSIS AND TESTING (Continued)

CONDITION CHART—WARNING INDICATORS

CONDITION	POSSIBLE SOURCE	ACTION
• Timer/Buzzer Not Operating Correctly	• Fuse(s). • Switches. • Circuit. • Timer/buzzer module	• Go to **A1.**
• Buzzer Not Operating With Key in the Ignition	• Timer/buzzer module. • Circuit. • Ignition key relay.	• Go to **A10.**
• Buzzer Not Operating With the Doors Open	• Door courtesy lamp switches. • Circuit • Ignition key relay.	• Go to **A21.**
• Buzzer Not Operating With the Safety Belts Not Connected	• Safety belt switch. • Circuit. • Timer/buzzer module.	• Go to **A33.**
• No Buzzer With Safety Belt Illumination Indicator On	• Circuit. • Timer/buzzer module.	• Go to **A19.**
• Buzzer Constantly Operating With the Key in the Ignition	• Door courtesy lamp switches. • Circuit. • Timer/buzzer module.	• Go to **A25.**
• All Warning Indicators Not Operating Correctly	• Fuse. • Bulbs. • Circuit. • Instrument cluster circuit board.	• Go to **B1.**
• Some Warning Indicators Not On	• Bulb(s). • Circuit. • Instrument cluster circuit board.	• Go to **B1.**
• Combination Switch in the LH Turn Position, Indicator Not On	• Circuit. • Instrument cluster circuit board. • Bulb.	• Go to **B24.**
• Combination Switch in the RH Turn Position, Indicator Not On	• Circuit. • Instrument cluster circuit board. • Bulb.	• Go to **B33.**
• Combination Switch in the High Beam Position, Indicator Not On	• Circuit. • Instrument cluster circuit board. • Bulb.	• Go to **B37.**

PINPOINT TEST A—TIMER/BUZZER WARNING SYSTEM

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK FUSE		
	• Locate the interior fuse panel. • Check 10 amp ROOM fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **A4.** GO to **A2.**
A2	CHECK SYSTEM		
	• Replace 10 amp ROOM fuse. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **A3.** GO to **A4.**
A3	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect interior fuse panel connector. • Disconnect the ignition key relay and timer/buzzer module. • Measure resistance between the BL/R wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE the BL/R wire(s). GO to **A4.**
A4	CHECK POWER SUPPLY TO IGNITION KEY RELAY		
	• Locate the ignition key relay. • Measure voltage on the BL/R wire at the ignition key relay. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A5.** SERVICE BL/R wire.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A — TIMER/BUZZER WARNING SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
A5	CHECK IGNITION KEY RELAY		
	• Disconnect ignition key connector. • Measure resistance between the BL/BK and BK/BL terminals on the relay. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to **A6.** REPLACE ignition key relay.
A6	CHECK OPERATION OF IGNITION KEY RELAY		
	• Disconnect the ignition key relay. • Apply 12 volts to the BL/R terminal on the ignition key relay. • Ground R/Y terminal on the ignition key relay. • Measure resistance between the BL/BK and BK/BL terminals on the ignition key relay. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A7.** REPLACE ignition key relay.
A7	CHECK IGNITION KEY REMINDER SWITCH OPERATION		
	• Disconnect ignition key relay. • Measure resistance from the BK/BL wire at the ignition key relay connector to ground. • Key in ignition—Less then 5 ohms Key removed from ignition—Greater than 10,000 ohms • **Are resistance(s) correct?**	Yes ▶ No ▶	GO to **A9.** GO to **A8.**
A8	CHECK WIRE TO IGNITION KEY REMINDER SWITCH		
	• Disconnect ignition key relay and ignition key reminder switch. • Measure resistance of the BK/BL wire between the ignition key relay and the ignition key reminder switch. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REPLACE ignition key reminder switch. SERVICE BK/BL wire.
A9	CHECK FUSE		
	• Locate the interior fuse panel. • Check 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **A12.** GO to **A10.**
A10	CHECK SYSTEM		
	• Replace 10 amp METER fuse. • Key ON • **Does fuse fail again?**	Yes ▶ No ▶	GO to **A11.** GO to **A12.**
A11	CHECK FOR SHORTS TO GROUND		
	• Locate and disconnect interior fuse panel connector. • Disconnect timer/buzzer module connector. • Measure resistance between the BK/Y wire at the interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire from the interior fuse panel to timer/buzzer module. GO to **A12.**
A12	CHECK WIRE FROM INSTRUMENT CLUSTER TO TIMER/BUZZER MODULE		
	• Locate instrument cluster 10-pin connector. • Measure resistance of the GN/O wire between the instrument cluster and timer/buzzer module. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A13.** SERVICE GN/O wire.
A13	CHECK POWER SUPPLY TO TIMER/BUZZER MODULE		
	• Locate timer/buzzer module. • Measure voltage on the BL/R wire at the timer/buzzer module connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **A14.** SERVICE BL/R wire between the interior fuse panel and timer/buzzer module.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—TIMER/BUZZER WARNING SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
A14	CHECK WIRES TO DOOR COURTESY LAMP SWITCHES		
	• Disconnect ignition key relay connector. • Locate door courtesy lamp switches. • Measure resistance(s) of the R/Y wire between the ignition key relay and door courtesy lamp switches: • **Are resistance(s) less than 5 ohms?**	Yes ▶ No ▶	GO to **A15.** SERVICE R/Y wire(s).
A15	CHECK OPERATION OF DOOR COURTESY SWITCHES		
	• Disconnect door courtesy switches. • Measure resistance from the R/Y terminal on each switch to the switch case. **Switch Position** / **Resistance** Depressed / Greater than 10,000 ohms Released / Less than 5 ohms • **Are resistance(s) OK?**	Yes ▶ No ▶	GO to **A16.** REPLACE door courtesy lamp switch in question.
A16	CHECK FOR SHORT TO GROUND		
	• Disconnect ignition key relay. • Leave door courtesy lamp switches disconnected. • Measure resistance between the R/Y wire at the ignition key relay connector and ground. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to **A17.** SERVICE R/Y wire.
A17	CHECK WIRE FROM IGNITION KEY RELAY TO TIMER/BUZZER MODULE		
	• Locate ignition key relay and timer/buzzer module. • Measure resistance of the BL/BK wire between the ignition key relay and the timer/buzzer module. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A18.** SERVICE BL/BK wire.
A18	CHECK FOR SHORT TO GROUND		
	• Locate and disconnect ignition key relay, timer/buzzer module, and turbo overboost relay. • Measure resistance between BL/BK wire at the timer/buzzer module connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No (Non-Turbo) ▶ No (Turbo) ▶	SERVICE BL/BK from the timer/buzzer module to the ignition key relay and/or turbo overboost relay. GO to **A25.** GO to **A19.**
A19	CHECK WIRE FROM TIMER/BUZZER MODULE TO TURBO OVERBOOST RELAY (TURBO ONLY)		
	• Locate timer/buzzer module and turbo overboost relay. • Measure resistance of the BL/BK wire between the turbo overboost relay and the timer/buzzer module. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A20.** SERVICE BL/BK wire.
A20	CHECK TURBO OVERBOOST RELAY GROUND (TURBO ONLY)		
	• Locate turbo overboost relay. • Measure resistance between BK wire at the turbo overboost relay connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A21.** SERVICE BK wire.
A21	CHECK TURBO OVERBOOST RELAY (TURBO ONLY)		
	• Locate and remove turbo overboost relay. • Measure resistance across BL/BK terminal and BK terminal on the relay. • **Is resistance greater than 10,000 ohms?** • Apply 12 volts to the LG/BK terminal on the relay. • Ground Y/GN terminal on the relay. • Measure resistance across the BL/BK terminal and BK terminal on the relay. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A22.** REPLACE turbo overboost relay.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A—TIMER/BUZZER WARNING SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
A22	CHECK WIRE TO THE BOOST PRESSURE SWITCH (TURBO ONLY)		
	• Disconnect boost pressure switch. • Disconnect turbo overboost relay. • Measure resistance of LG/BK wire between the turbo overboost relay and the boost pressure switch. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A23.** SERVICE LG/BK wire from turbo overboost relay to boost pressure switch.
A23	CHECK OPERATION OF BOOST PRESSURE SWITCH (TURBO ONLY)		
	• Disconnect boost pressure switch connector. • Connect a pressure tester to the boost pressure switch. • Measure resistance across the terminals of the boost pressure switch. • Compare readings with the following chart. **Pressure** / **Resistance** 0 kPa (0 psi) / Over 10,000 ohms 72-80 kPa (10-12 psi) / Under 5 ohms • **Are measurements OK?**	Yes ▶ No ▶	GO to **A24.** REPLACE boost pressure switch.
A24	CHECK BOOST PRESSURE SWITCH GROUND (TURBO ONLY)		
	• Locate and disconnect boost pressure switch. • Measure resistance between the BK wire at the boost pressure switch and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A25.** SERVICE BK wire.
A25	CHECK TIMER/BUZZER MODULE GROUND		
	• Disconnect timer/buzzer module. • Measure resistance between the BK wire at timer/buzzer module connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A26.** SERVICE BK wire.
A26	CHECK WIRE FROM TIMER/BUZZER MODULE TO SAFETY BELT SWITCH		
	• Locate and disconnect safety belt switch connector. • Measure resistance of the BR wire between the timer/buzzer module to the safety belt switch. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A27.** SERVICE BR wire.
A27	CHECK SAFETY BELT SWITCH GROUND		
	• Locate and disconnect safety belt switch. • Measure resistance between the BK wire at the safety belt switch and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **A28.** SERVICE BK wire.
A28	CHECK SAFETY BELT SWITCH OPERATION		
	• Place a jumper wire from the BR wire at the safety belt switch to ground. • **Does timer/buzzer operate correctly?**	Yes ▶ No ▶	REPLACE safety belt switch. REPLACE timer/buzzer module.

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
B1	CHECK FUSE		
	• Locate fuse panel. • Check 10 amp METER fuse. • **Is fuse OK?**	Yes ▶ No ▶	GO to **B4.** GO to **B2.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
B2	CHECK SYSTEM		
	• Replace 10 amp METER fuse. • Key ON. • **Does fuse fail again?**	Yes ▶ No ▶	GO to **B3.** GO to **B4.**
B3	CHECK FOR SHORTS TO GROUND		
	• Replace fuse. • Locate and disconnect interior fuse panel connector. • Locate and disconnect instrument cluster connector. • Measure resistance between the BK/Y wire at interior fuse panel connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	SERVICE BK/Y wire from interior fuse panel to instrument cluster. GO to **B4.**
B4	CHECK POWER SUPPLY TO INSTRUMENT CLUSTER		
	• Locate instrument cluster 12-pin connector. • Key ON. • Measure voltage on the BK/Y wire at the instrument cluster 12-pin connector. • **Is the voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **B5.** SERVICE BK/Y wire.
B5	FAULT SYMPTOM CHART		
	• Inspect which indicator lamp(s) are not operating correctly.	Brake Warning ▶ MIL (Check Engine) ▶ Charge Warning ▶ Manual Shift (ATX) ▶ Air Bag ▶ Safety Belt Warning ▶	GO to **B6.** GO to **B11.** GO to **B14.** GO to **B17.** GO to **B23.** GO to **B26.**
B6	CHECK BRAKE WARNING INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BR/W wire (brake warning indicator lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B8.** GO to **B7.**
B7	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BR/W wire (brake warning indicator lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B8.** SERVICE instrument cluster circuit board.
B8	CHECK WIRE(S) TO BRAKE SWITCH		
	• Key OFF. • Locate instrument cluster 8-pin connector. • Measure resistance from the instrument cluster BR/W wire to both the brake fluid level switch and the parking brake switch. • **Are the resistance(s) less than 5 ohms?**	Yes ▶ No ▶	GO to **B9.** SERVICE BR/W wire.
B9	CHECK BRAKE SWITCH(ES) GROUND		
	• Key OFF. • Measure resistance of the brake fluid level switch (BK wire) and the parking brake switch casing to ground. • **Are resistance(s) less than 5 ohms?**	Yes ▶ No ▶	GO to **B10.** SERVICE grounds as needed.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
B10	CHECK BRAKE SWITCH(ES) OPERATION		
	• Locate parking brake and brake fluid level switches. • Key ON. • Using a jumper wire, connect the BR/W wire of the parking brake switch to ground. • **Does brake warning indicator lamp operate correctly?** • Using a jumper wire, connect BR/W wire of the brake fluid level switch to ground. • **Does brake warning indicator lamp operate correctly?**	Yes ▶ No ▶	RETURN to condition chart. REPLACE switch in question.
B11	CHECK MALFUNCTION INDICATOR LAMP (MIL) (CHECK ENGINE)		
	• Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the LG/R wire (check engine lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B13.** GO to **B12.**
B12	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the LG/R wire (check engine lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B13.** SERVICE instrument cluster circuit board.
B13	CHECK WIRE TO PCM		
	• Key OFF. • Disconnect the 8-pin instrument cluster connector. • Locate PCM. • Measure resistance of LG/R wire between the instrument cluster and the PCM. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to Powertrain Control/Emissions Diagnosis Manual.[2] SERVICE LG/R wire.
B14	CHECK CHARGE WARNING INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the W/BK wire (charge warning indicator lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B16.** GO to **B15.**
B15	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the W/BK wire (charge warning indicator lamp) at the instrument cluster 8-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B16.** SERVICE instrument cluster circuit board.
B16	CHECK WIRE TO GENERATOR		
	• Key OFF. • Disconnect 8-pin instrument cluster connector. • Disconnect the generator connector. • Measure resistance of W/BK wire between the instrument cluster connector and the generator. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to Section 14-00. SERVICE W/BK wire.

2 Can be purchased as a separate item.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
B17	CHECK MANUAL SHIFT INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BR/Y wire (manual shift indicator lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B19.** GO to **B18.**
B18	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BR/Y wire (manual shift indicator lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B19.** SERVICE instrument cluster circuit board.
B19	CHECK WIRE TO TRANSAXLE CONTROL MODULE (TCM)		
	• Key OFF. • Disconnect 12-pin instrument cluster connector. • Locate transaxle control module (TCM). • Measure resistance of BR/Y wire between the instrument cluster and the TCM. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to Section 07-01. SERVICE BR/Y wire.
B20	CHECK WIRE TO MANUAL SHIFT SWITCH		
	• Locate and disconnect the TCM and manual shift switch connectors. • Measure the resistance of the BR/BK wire between the TCM and manual shift switch connectors. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	GO to **B21.** SERVICE the BR/BK wire.
B21	CHECK MANUAL SHIFT SWITCH		
	• Disconnect the manual shift switch connector. • Measure the resistance between the BR/BK and and BK terminals on the manual shift switch. • **Is the resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to **B22.** REPLACE the manual shift switch.
B22	CHECK MANUAL SHIFT SWITCH GROUND		
	• Disconnect the manual shift switch connector. • Measure the resistance between the BK wire at the manual shift switch connector and ground. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to the Powertrain Control/Emission Diagnosis Manual. [3] SERVICE the BK wire.
B23	CHECK AIR BAG INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the Y/BK wire (air bag indicator lamp) at the instrument cluster 10-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B25.** GO to **B24.**
B24	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the Y/BK wire (air bag indicator lamp) at the instrument cluster 10-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B25.** SERVICE instrument cluster circuit board.

3 Can be purchased as a separate item.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
B25	CHECK WIRE TO AIR BAG DIAGNOSTIC MODULE		
	• Key OFF. • Disconnect 10-pin instrument cluster connector. • Locate air bag diagnostic module. • Measure resistance of Y/BK wire between the instrument cluster and the air bag diagnostic module. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to Section 01-20B. SERVICE Y/BK wire.
B26	CHECK SAFETY BELT WARNING INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 10-pin connector. • Apply 12 volts to the BK/Y wire at the instrument cluster 10-pin connector. • Using a jumper wire, ground the GN/O wire (safety belt warning indicator lamp) at the instrument cluster 10-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B28.** GO to **B27.**
B27	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the BK/Y wire at the instrument cluster 10-pin connector. • Using a jumper wire, ground the GN/O wire (safety belt warning indicator lamp) at the instrument cluster 10-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B28.** SERVICE instrument cluster circuit board.
B28	CHECK WIRE TO TIMER/BUZZER MODULE		
	• Key OFF. • Disconnect 10-pin instrument cluster connector. • Locate timer/buzzer module. • Measure resistance of GN/O wire between the instrument cluster and the timer/buzzer module. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	REFER to Pinpoint Test A—Timer/Buzzer Warning System in this section. SERVICE GN/O wire.
B29	CHECK POWER SUPPLY TO INSTRUMENT CLUSTER		
	• Key ON. • Locate instrument cluster. • Place combination switch in the LH turn position. • Disconnect 12-pin instrument cluster connector. • Measure voltage on the GN/BK wire at the instrument cluster 12-pin connector. • **Does voltage flash between 0 and 12 volts?**	Yes ▶ No ▶	Go to **B30.** SERVICE GN/BK wire.
B30	CHECK LH TURN SIGNAL LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the GN/BK wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (LH turn signal lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B32.** GO to **B31.**
B31	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the GN/BK wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (LH turn signal lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B32.** SERVICE instrument cluster circuit board.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
B32	CHECK GROUND		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Disconnect 12-pin instrument cluster connector. • Measure resistance between BK wire at the instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. SERVICE BK wire.
B33	CHECK POWER SUPPLY TO INSTRUMENT CLUSTER		
	• Key ON. • Locate instrument cluster 12-pin connector. • Place combination switch in RH turn position. • Disconnect the 12-pin instrument cluster connector. • Measure voltage on the GN/W wire at the instrument cluster. • **Does voltage flash between 0 and 12 volts?**	Yes ▶ No ▶	GO to **B34.** SERVICE GN/W wire.
B34	CHECK RH TURN SIGNAL LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the GN/W wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (RH turn signal lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B36.** GO to **B35.**
B35	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the GN/W wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (RH turn signal lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B36.** SERVICE instrument cluster circuit board.
B36	CHECK GROUND		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Disconnect 12-pin instrument cluster connector. • Measure resistance between BK wire at the instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. SERVICE BK wire.
B37	CHECK POWER SUPPLY TO INSTRUMENT CLUSTER		
	• Key ON. • Locate instrument cluster 12-pin connector. • Place combination switch in the HIGH beam position. • Disconnect the 12-pin instrument cluster connector. • Measure voltage on the R/W wire at the instrument cluster 12-pin connector. • **Is voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **B38.** SERVICE R/W wire.
B38	CHECK HIGH BEAM INDICATOR LAMP		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Apply 12 volts to the R/W wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (high beam indicator lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B40.** GO to **B39.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B—WARNING INDICATOR LAMPS SYSTEM (Continued)

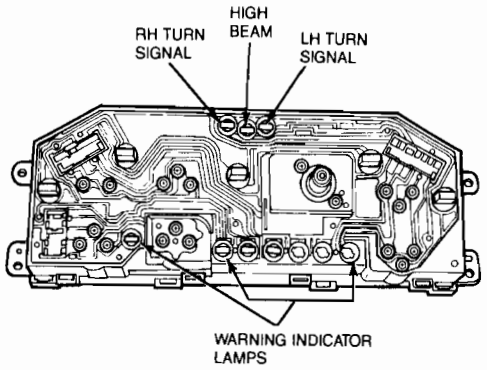
	TEST STEP	RESULT ▶	ACTION TO TAKE
B39	CHECK INSTRUMENT CLUSTER		
	• Replace bulb. • Key OFF. • Apply 12 volts to the R / W wire at the instrument cluster 12-pin connector. • Using a jumper wire, ground the BK wire (high beam indicator lamp) at the instrument cluster 12-pin connector. • **Does lamp operate correctly?**	Yes ▶ No ▶	GO to **B40.** SERVICE instrument cluster circuit board.
B40	CHECK GROUND		
	• Key OFF. • Locate instrument cluster 12-pin connector. • Disconnect 12-pin instrument cluster connector. • Measure resistance between BK wire at the instrument cluster connector and ground. • **Is resistance less than 5 ohms?**	Yes ▶ No ▶	RETURN to condition chart. SERVICE BK wire.

REMOVAL AND INSTALLATION

Warning / Indicator Lamp Bulbs

Removal and Installation

1. Remove instrument cluster. Refer to Section 13-01.
2. Replace bulb(s).
3. Install instrument cluster.



High Beam Switch

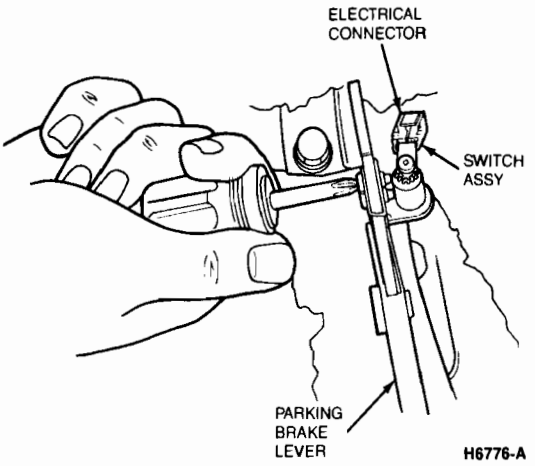
Removal and Installation

The high beam and flash-to-pass switches are part of the turn signal switch assembly. Refer to Section 11-05 for service.

Parking Brake Switch

Removal

1. Remove rear console. Refer to Section 01-12.
2. Remove retaining screws and parking brake warning indicator lamp switch from parking brake lever.



Installation

1. Install parking brake warning indicator lamp switch onto parking brake lever.
2. Adjust switch as required to operate warning lamp in instrument cluster when brake handle is lifted more than two notches.
3. Install console. Refer to Section 01-12.

REMOVAL AND INSTALLATION (Continued)

Brake Fluid Level Switch

Removal and Installation

The low brake fluid level switch is located in the base of the master cylinder reservoir. Refer to Section 06-00 for service.

Safety Belt Switch

Removal and Installation

1. Remove front safety belt retractor. Refer to Section 01-20A.
2. Disconnect electrical wiring from switch.
3. Remove switch.
4. To install, reverse Removal procedure.